

SUZUKI

GSX-S1000S

SERVICE MANUAL

99500-07L00-03E

IMPORTANT

All street-legal Suzuki motorcycles with engine displacement of 50 cc or greater are subject to Environmental Protection agency emission regulations. These regulations set specific standards for exhaust emission output levels as well as particular servicing requirements. This manual includes specific information required to properly inspect and service this street-legal motorcycle in accordance with all EPA regulations. It is strongly recommended that the chapter on Emission Control, Periodic Servicing and FI System and Fuel System be thoroughly reviewed before any type of service work is performed. Further information concerning the EPA emission regulations and U.S. Suzuki's emission control program can be found in the U.S. SUZUKI EMISSION CONTROL PROGRAM MANUAL/SERVICE BULLETIN.

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 GSX-S1000S and procedures for its inspection/service and overhaul of its main components.

Other information considered as generally known is not included.

Read the GENERAL INFORMATION section to familiarize yourself with the motorcycle and its maintenance.

Use this section as well as other sections to use as a guide for proper inspection and service.

This manual will help you know the motorcycle better so that you can assure your customers of fast and reliable service.

** This manual has been prepared on the basis of the latest specifications at the time of publication. If modifications have been made since then, differences may exist between the content of this manual and the actual motorcycle.*

** Illustrations in this manual are used to show the basic principles of operation and work procedures. They may not represent the actual motorcycle exactly in detail.*

** This manual is written for persons who have enough knowledge, skills and tools, including special tools, for servicing SUZUKI motorcycles. If you do not have the proper knowledge and tools, ask your authorized SUZUKI motorcycle dealer to help you.*

▲ WARNING

Inexperienced mechanics or mechanics without the proper tools and equipment may not be able to properly perform the services described in this manual.

Improper repair may result in injury to the mechanic and may render the motorcycle unsafe for the rider and passenger.

SUZUKI MOTOR CORPORATION

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Section 00

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Precautions

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Precautions

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, radiator and exhaust system until they have cooled.

NOTICE

- Never use gasoline as a cleaning solvent.
- After servicing the fuel, oil, water, 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 reconnecting the battery, connect the positive (+) cable first and then the negative (-) cable, and replace the terminal cover on the positive (+) terminal.

- When performing service to electrical parts, if the service procedures do not require use of battery power, disconnect the negative (-) cable 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, engine coolant and other fluids: batteries, and tires.
- To protect Earth's natural resources, properly dispose of used motorcycle and parts.

Precautions for Catalytic Converter

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As this vehicle is equipped with a catalytic converter, use only unleaded fuel and be careful not to let a large amount of unburned fuel 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 (e.g. starting the engine when the fuel tank is nearly empty.)

Precautions for Electrical Circuit Service

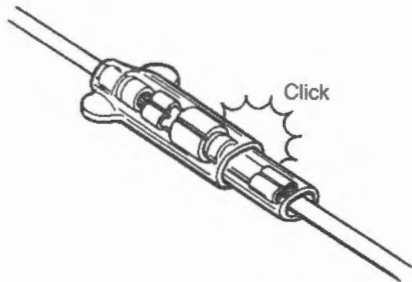
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When handling the electrical parts or servicing the electric system, observe the following points for the safety of the system.

Electrical Parts

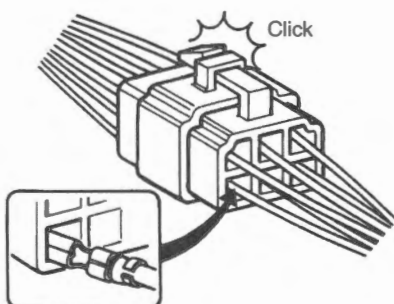
Connector / Coupler

- 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.



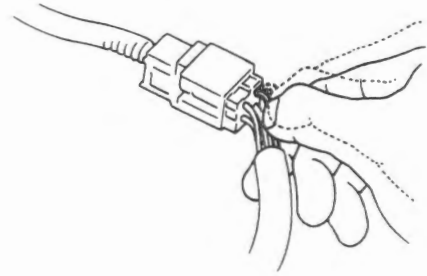
I310G1000001-01

- 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.



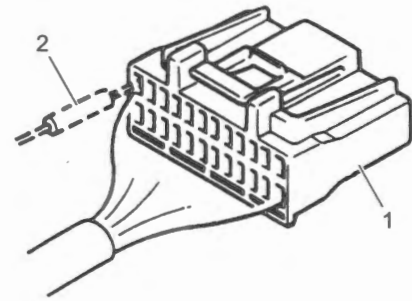
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- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



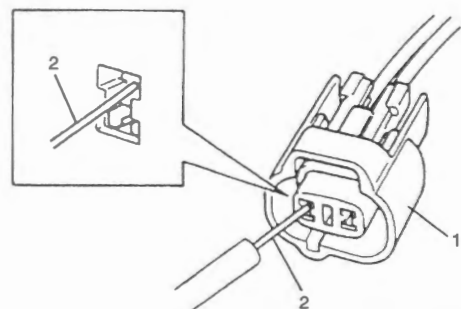
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- When taking measurements at electrical coupler (1) using a tester probe (2), be sure to insert the probe from the wire harness side (rear) of the coupler.



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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 or 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.

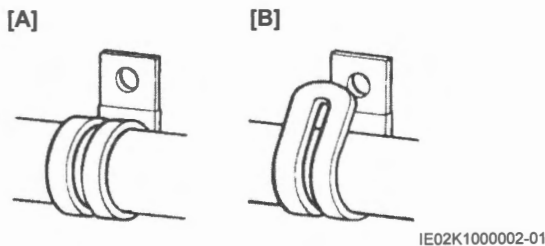


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- Avoid applying grease or other similar material to connector/coupler terminals to prevent electric trouble.

Clamp

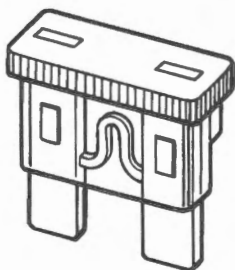
- Clamp the wire harness at such positions as indicated in "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).
- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute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



[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.



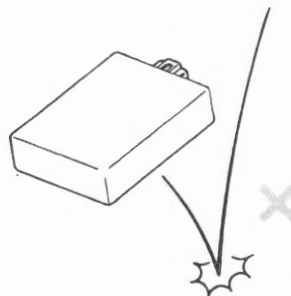
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Switch

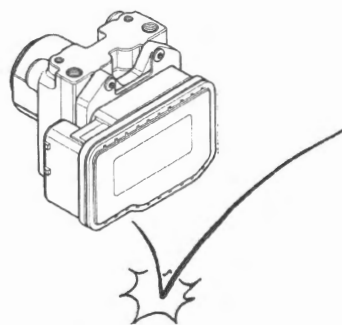
Never apply grease material to switch contact points to prevent damage.

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.

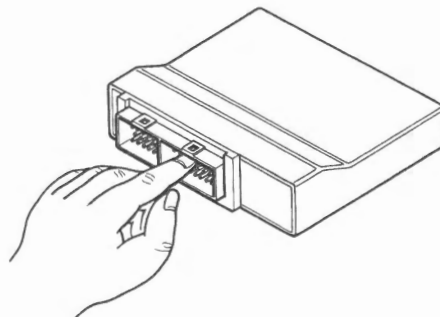


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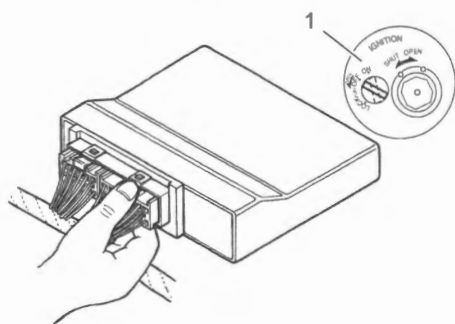
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- Be careful not to touch the electrical terminals of the electrical parts (ECM / CDI UNIT, etc.). The static electricity from your body may damage them.



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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.



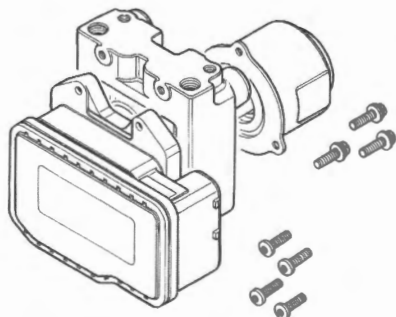
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- Never allow dust or water to contact the ABS control unit/HU.



I649G1000004-02

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

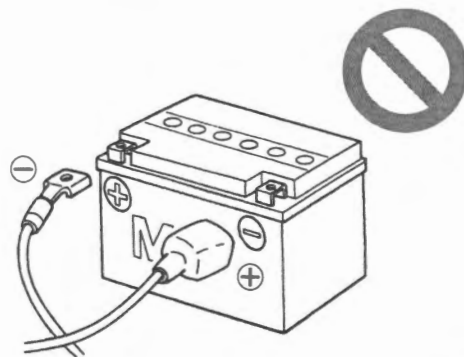


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- Never connect any tester (voltmeter, ohmmeter, or whatever) to the electronic unit when its coupler is disconnected. Otherwise, damage to electronic unit may result.
- Never connect an ohmmeter to the electronic unit with its coupler connected. If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

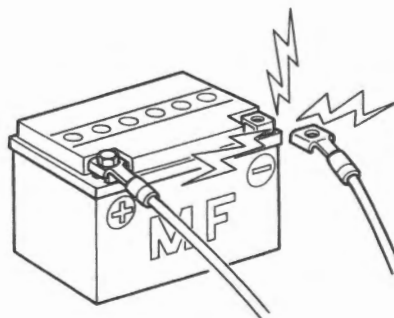
Battery

- 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.



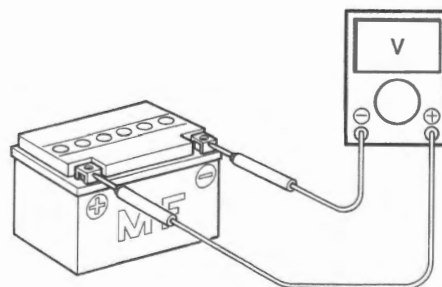
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- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the electronic unit which may result in serious damage.



I310G1000011-01

- 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.



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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.

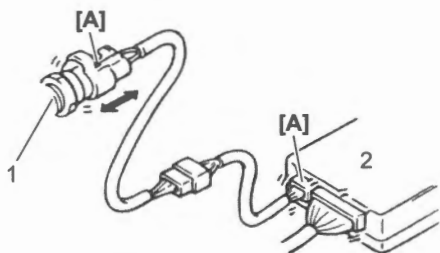
Open circuit check

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.



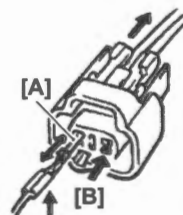
IE02K1000004-01

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

- 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.

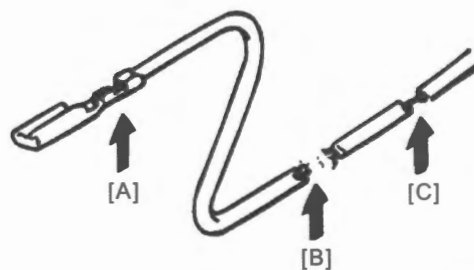
If contact tension is not enough, rectify the contact to increase tension or replace. The terminals must be clean and free of any foreign material which could impede proper terminal contact.



IE02K1000005-01

[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.



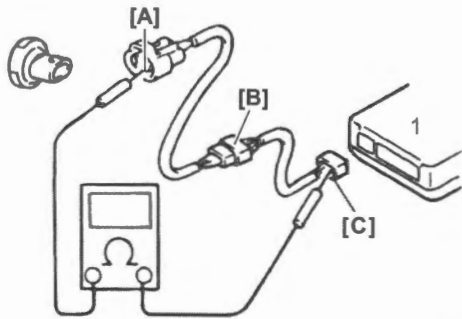
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[A]: Looseness of crimping	[C]: Thin wire (A few strands left)
[B]: Open	

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].

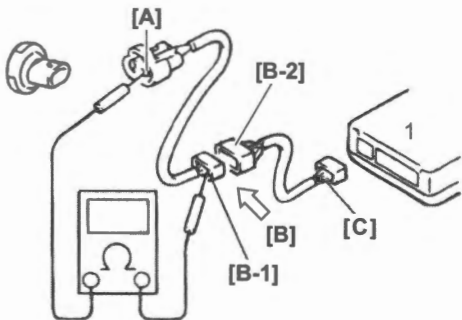


IE02K100007-01

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].



IE02K100008-01

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].

Voltage between

[A] and body ground: 0 V

[B] and body ground: Approx. 5 V

[C] and body ground: Approx. 5 V

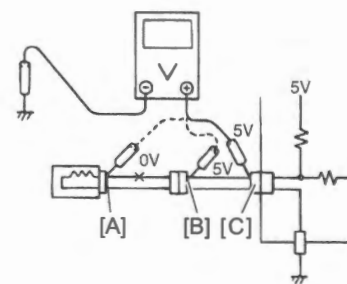
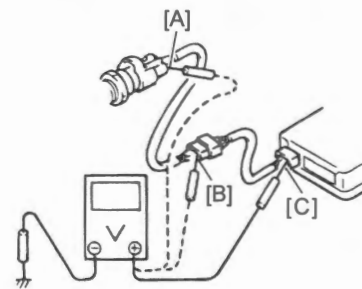
- 3) Also, if measured values are as listed following, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals [A] and [B].

Voltage between

[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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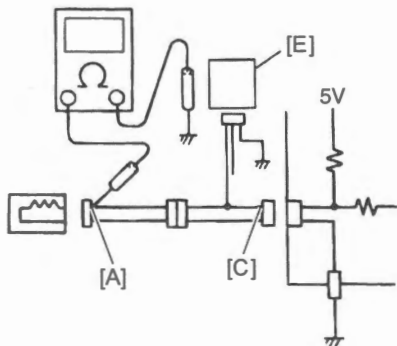
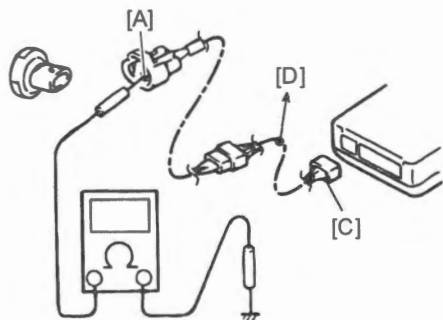
Short circuit check (Wire harness to ground)

- 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].

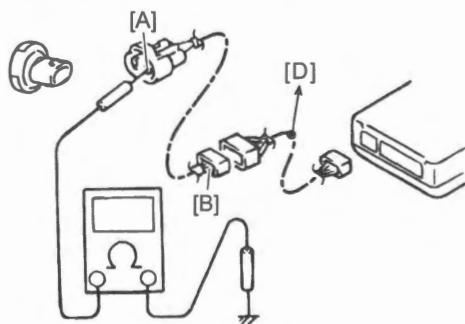


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[D]: To other parts

[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].



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[D]: To other parts

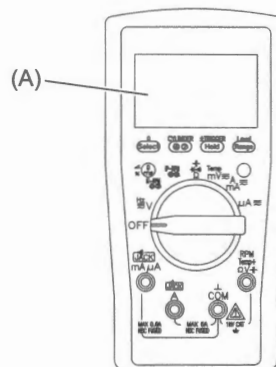
Precautions for Circuit Tester

BENK07L2000004

- Recommend the use of circuit tester set.

Special tool

(A): 09900-25011



IJ37K1000001-01

- 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 Probe

NOTICE

- When using the 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 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

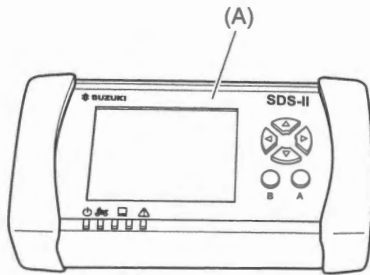
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- In some models of the SUZUKI motorcycles, the DTC can be confirmed by using SDS-II.
- Read the instruction manual when using SDS-II and operate it properly.

Special tool

(A): 09904-41031

09904-41040

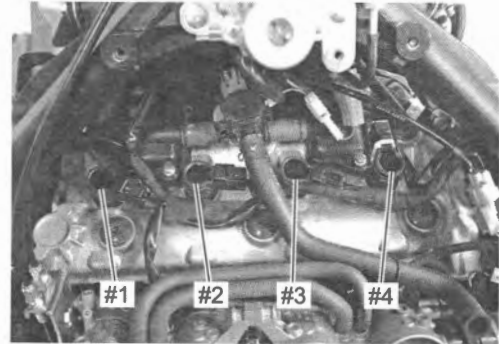


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Precautions for Identification

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When viewed from the state in sitting on the seat, this motorcycle distinguishes the No.1 cylinder and its related parts are as #1, the No.2 cylinder and its related parts are as #2, the No.3 cylinder and its related parts are as #3, and the No.4 cylinder and its related parts are as #4, as counted from left to right.



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Section 0

General Information

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General Information

General Description

Abbreviations

BENK07L20101001

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:

CAN: Controller Area Network
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
ETV: Electric Throttle Valve
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
GP: Gear Position

H:

HC: Hydrocarbons
HI: High
HO2: Heated Oxygen
HU: Hydraulic Unit

I:

IAP: Intake Air Pressure
IAT: Intake Air Temperature
I.D.: Inside Diameter
IG: Ignition
IMU: Inertial Measurement Unit
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

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
TO: Tip-over

TP: Throttle Position

TPS: Throttle Position Sensor

V:

VVT: Variable Valve Timing

SAE-to-Former SUZUKI Term

BENK07L20101008

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

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.
	Apply oil. Use engine oil unless otherwise specified.
	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1 : 1).
	Apply SUZUKI SUPER GREASE A. 99000-25011
	Apply SUZUKI SUPER GREASE C. 99000-25030
	Apply SUZUKI MOLYBDENUM GREASE L. 99000-25280
	Apply SUZUKI MOLY PASTE. 99000-25140
	Apply SUZUKI SILICONE GREASE. 99000-25100
	Apply SUZUKI WATER RESISTANT GREASE EP2 or GREASE. 99000-25350 or 99000-25380
	Apply SUZUKI BOND 1207B. 99000-31140
	Apply SUZUKI BOND 1215. 99000-31110
	Apply SUZUKI BOND 1216B. 99000-31230
	Apply THREAD LOCK CEMENT 1303B. 99000-32030
	Apply THREAD LOCK CEMENT 1322D. 99000-32150
	Apply THREAD LOCK CEMENT 1342H. 99000-32160
	Apply THREAD LOCK CEMENT 1360. 99000-32130
	Use SUZUKI SUPER LONG LIFE COOLANT (BLUE). 99000-99032-20X Use SUZUKI LONG LIFE COOLANT (GREEN). 99000-99032-12X
	Apply or use fork oil.
	Apply or use brake fluid.
	Use special tool.
	Do not reuse.
	Note on reassembly.

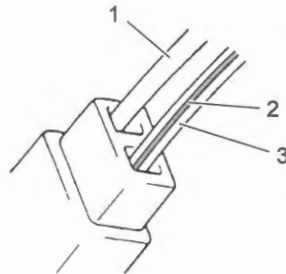
Wire Color Symbols

BENK07L20101003

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.



ID26J1010224-02

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

Applicable Model / VIN

BENK07L20101004

Applicable Model

GSX-S1000S

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
GSX-S1000SM0	JS1GT7DB#L7100001 -	California State

Vehicle Side View

SUZUKI GSX-S1000S

BENK07L20101005

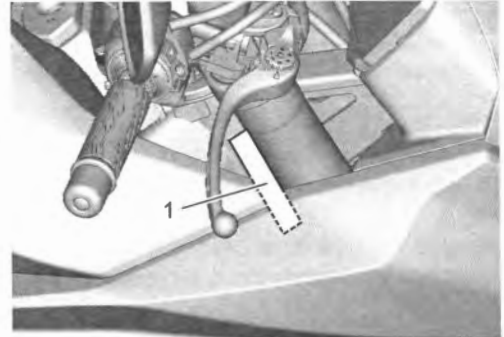


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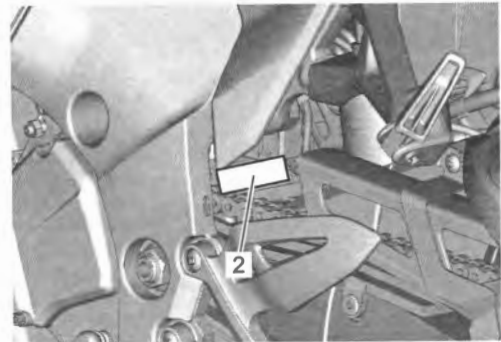
Vehicle Identification Number

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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.



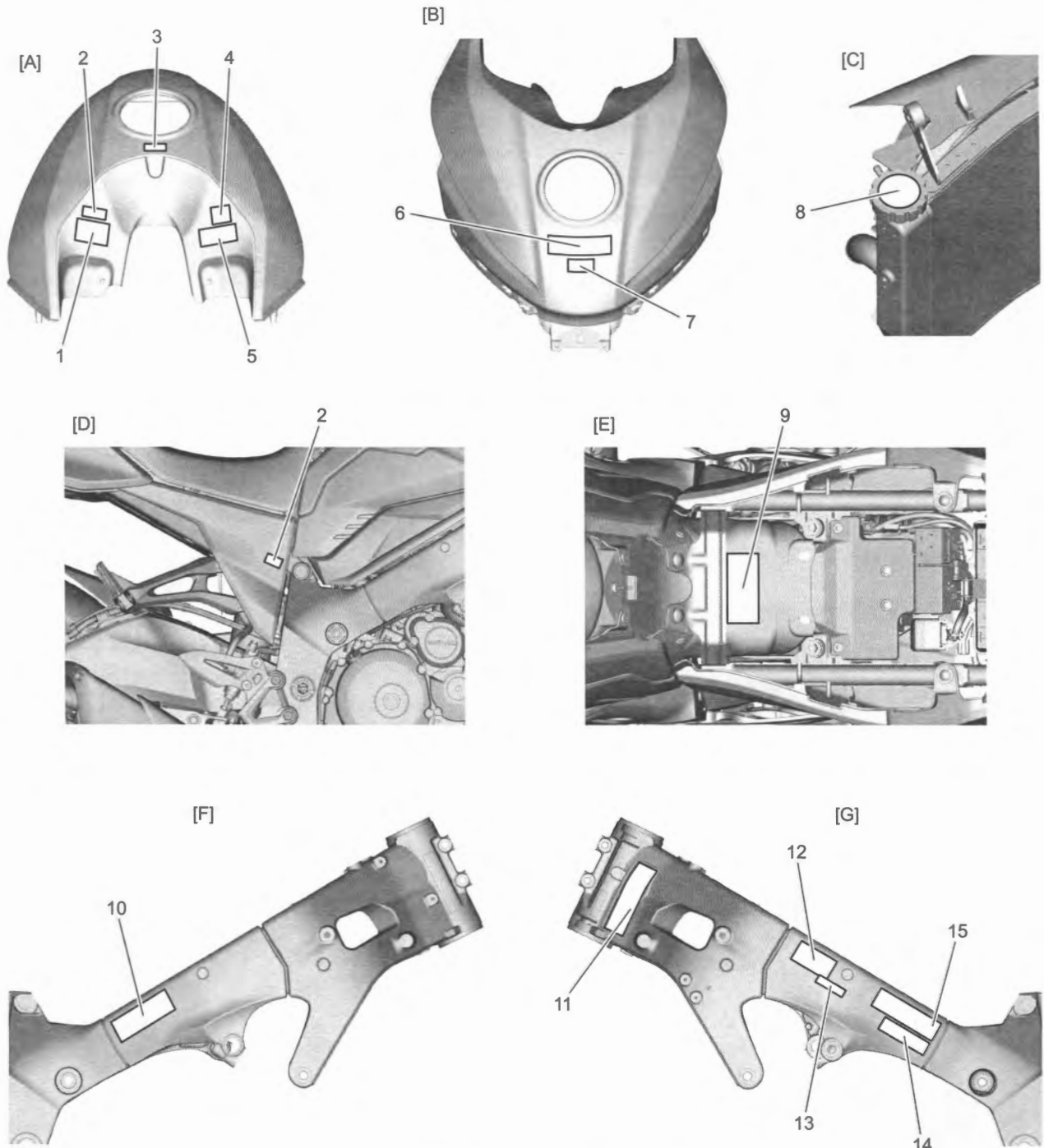
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IK07L1010003-01

Warning, Caution and Information Labels Location

BENK07L20101007



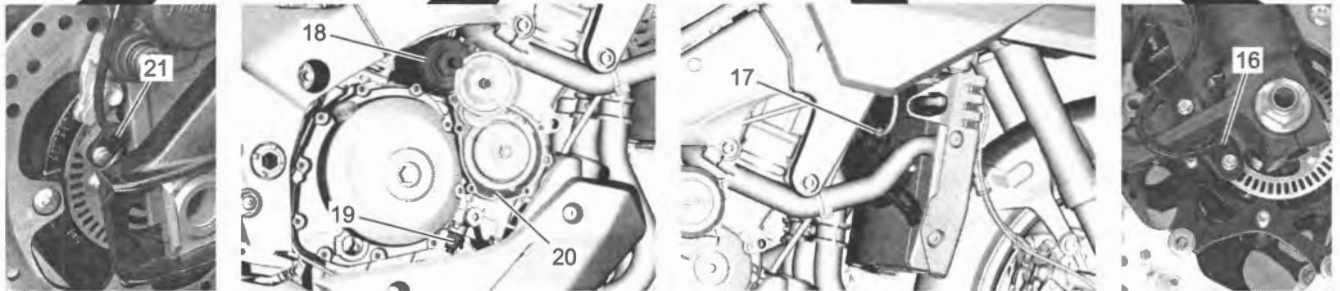
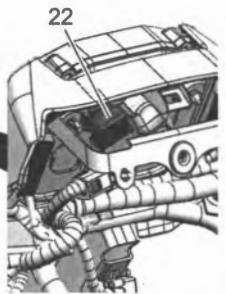
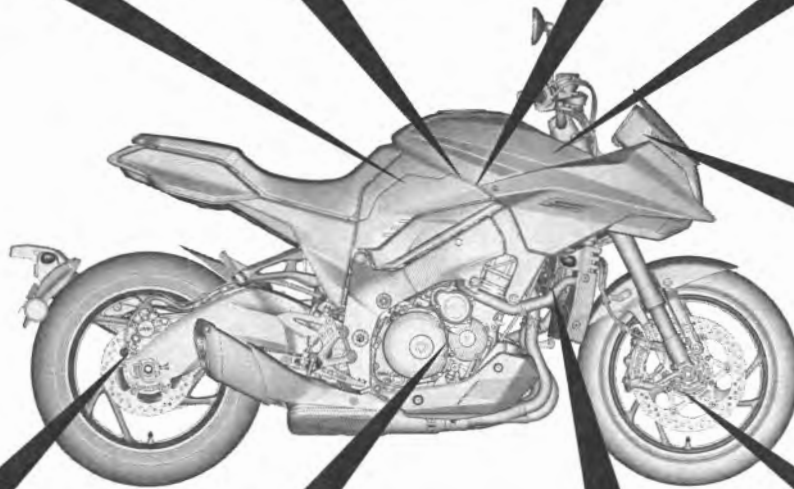
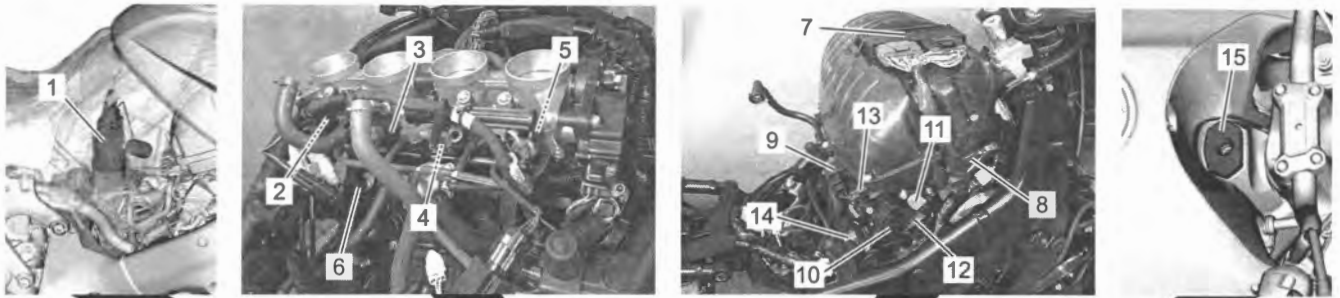
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[A]: Fuel tank front cover	2. Brake fluid information label (If equipped)	10. Vacuum hose routing label (If equipped)
[B]: Fuel tank upper cover	3. Gasoline label (If equipped)	11. Safety plate, ID plate or Manufacturer label
[C]: Radiator cap	4. Fuel information label (If equipped)	12. Manual notice label (If equipped)
[D]: Frame cover (RH)	5. Fuel information label or Helmet label (If equipped)	13. ICES label (If equipped)
[E]: Fuel tank	6. General warning label (If equipped)	14. EPA noise label (If equipped)
[F]: Frame (RH)	7. Fuel information label (If equipped)	15. Information label or UN noise label (If equipped)
[G]: Frame (LH)	8. Radiator cap label (If equipped)	
1. General warning label (If equipped)	9. Tire information label	

Component Location

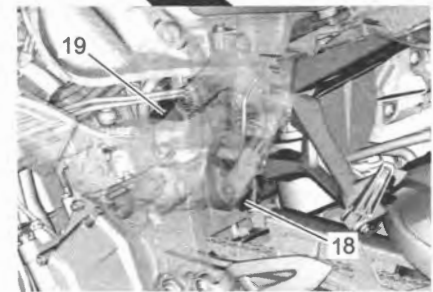
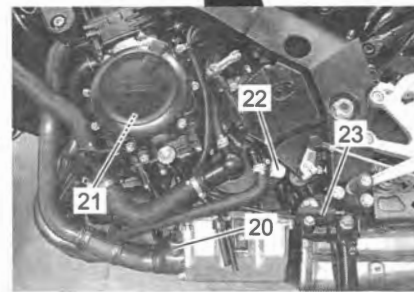
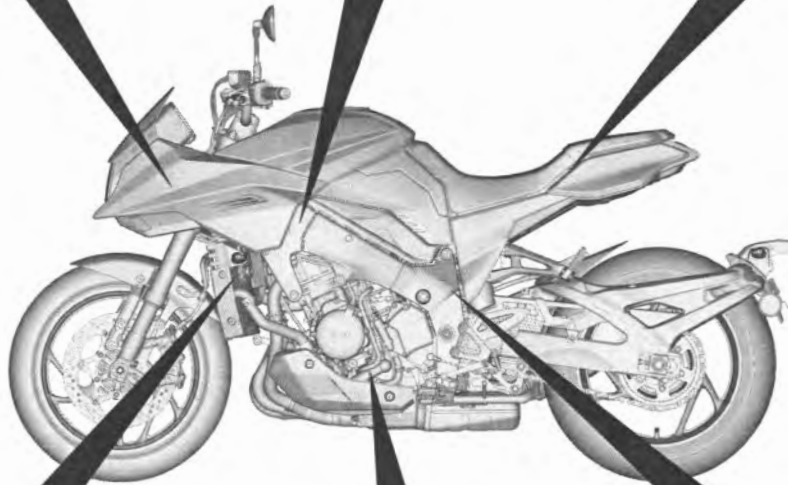
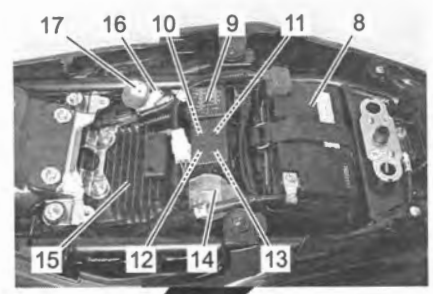
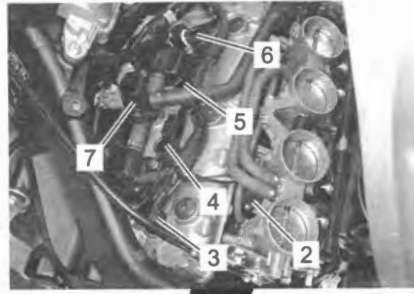
Electrical Components Location

BENK07L20103001



IK07L1010005-03

1. Fuel pump/Fuel level gauge	9. IAP sensor	17. Cooling fan
2. Fuel injector #1	10. STV actuator	18. Starter motor
3. Fuel injector #2	11. STP sensor	19. Oil pressure switch
4. Fuel injector #3	12. TP sensor	20. CKP sensor
5. Fuel injector #4	13. IAT sensor	21. Rear wheel speed sensor
6. ECT sensor	14. EVAP system purge control solenoid valve (If equipped)	22. Turn signal relay (If equipped)
7. ECM	15. Immobilizer antenna (If equipped)	
8. AP sensor	16. Front wheel speed sensor	



IK07L1010006-05

1. TO sensor	9. Fuse box	17. Mode select coupler (6P)
2. ISC valve	10. Cooling fan relay	18. EXCV actuator
3. Ignition coil #1	11. Side-stand relay	19. ABS control unit/HU
4. Ignition coil #2	12. Fuel pump relay	20. HO2 sensor
5. Ignition coil #3	13. High beam relay	21. Generator
6. Ignition coil #4	14. Starter relay/Main fuse	22. GP switch
7. PAIR control solenoid valve	15. Regulator/rectifier	23. Side-stand switch
8. Battery	16. Mode select coupler (2P)	24. Horn

Maintenance and Lubrication

Precautions

Precautions for Maintenance

BENK07L20200001

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

BENK07L20205001

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	3750	7500	11250	15000
Air cleaner element (I: ☞(Page 0B-3), R: ☞(Page 0B-3))	—	I	I	R	I	
Exhaust pipe bolts and muffler bolts (T: ☞(Page 0B-3))	T	—	T	—	T	
Exhaust control valve (I: ☞(Page 0B-3))	I	—	I	—	I	
Valve clearance (I: ☞(Page 0B-3))	—	—	—	—	I	
Spark plugs (I: ☞(Page 0B-3), R: ☞(Page 0B-3))	—	I	R	I	R	
Fuel hose (I: ☞(Page 0B-3), R: ☞(Page 0B-3))	—	I	I	I	I	
	Replace every 4 years					
Evaporative emission control system (If equipped) (I: ☞(Page 0B-3))	—	—	I	—	I	
Engine oil (R: ☞(Page 0B-3))	R	R	R	R	R	
Engine oil filter (R: ☞(Page 0B-3))	R	—	—	R	—	
Throttle cable play (I: ☞(Page 0B-3))	I	I	I	I	I	
PAIR (air supply) system (I: ☞(Page 0B-3))	—	—	I	—	I	
Throttle valve synchronization (I: ☞(Page 0B-3))	I (CA. only)	—	I	—	I	
Engine coolant (R: ☞(Page 0B-3))	—	—	R	—	R	
	“SUZUKI SUPER LONG LIFE COOLANT” (Blue)	Replace every 4 years or 48000 km (30000 miles)				
	“SUZUKI LONG LIFE COOLANT” (Green) or an engine coolant other than “SUZUKI SUPER LONG LIFE COOLANT” (Blue)	—	—	R	—	R
Radiator hose (I: ☞(Page 0B-3))	—	I	I	I	I	
Clutch cable play (I: ☞(Page 0B-3))	—	I	I	I	I	
Drive chain (I: ☞(Page 0B-3), I: ☞(Page 0B-3))	I	I	I	I	I	
	Clean and lubricate every 1000 km (600 miles)					
Brakes (I: ☞(Page 0B-3))	I	I	I	I	I	
Brake fluid (I: ☞(Page 0B-4), R: ☞(Page 0B-4))	—	I	I	I	I	
	Replace every 2 years					
Brake hose (I: ☞(Page 0B-4), R: ☞(Page 0B-4))	—	I	I	I	I	
	Replace every 4 years					
Tires (I: ☞(Page 0B-4))	—	I	I	I	I	
Steering (I: ☞(Page 0B-4))	I	—	I	—	I	
Front forks (I: ☞(Page 0B-4))	—	—	I	—	I	
Rear suspension (I: ☞(Page 0B-4))	—	—	I	—	I	
Chassis bolts and nuts (T: ☞(Page 0B-5))	T	T	T	T	T	
Lubrication (I: ☞(Page 0B-7))	Lubricate every 1000 km (600 miles)					

Repair Instructions

Air Cleaner Element Inspection

BENK07L20206001

Refer to "Air Cleaner Element Inspection" in Section 1D (Page 1D-8).

Air Cleaner Element Replacement

BENK07L20206002

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

Exhaust Pipe Bolt and Muffler Bolt Inspection

BENK07L20206003

Refer to "Exhaust System Inspection" in Section 1K (Page 1K-19).

Exhaust Control Valve Inspection

BENK07L20206004

Refer to "Exhaust Control Valve Inspection" in Section 1K (Page 1K-8).

Valve Clearance Inspection and Adjustment

BENK07L20206005

Refer to "Valve Clearance Inspection and Adjustment" in Section 1D (Page 1D-26).

Spark Plug Inspection

BENK07L20206006

Refer to "Spark Plug Inspection" in Section 1H (Page 1H-6).

Spark Plug Replacement

BENK07L20206007

Refer to "Spark Plug Removal and Installation" in Section 1H (Page 1H-5).

Fuel Hose Inspection

BENK07L20206008

Refer to "Fuel Hose Inspection" in Section 1G (Page 1G-6).

Fuel Hose Replacement

BENK07L20206009

Refer to "Fuel Feed Hose Removal and Installation" in Section 1G (Page 1G-7).

Evaporative Emission Control System Inspection (If Equipped)

BENK07L20206010

Refer to "EVAP Control System Inspection (If Equipped)" in Section 1B (Page 1B-13).

Engine Oil Replacement

BENK07L20206011

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

Engine Oil Filter Replacement

BENK07L20206012

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

Throttle Cable Play Inspection and Adjustment

BENK07L20206013

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

PAIR System Inspection

BENK07L20206014

Refer to "PAIR System Inspection" in Section 1B (Page 1B-10).

Throttle Valve Synchronization

BENK07L20206015

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

Engine Coolant Replacement

BENK07L20206016

Refer to "Engine Coolant Replacement" in Section 1F (Page 1F-6).

Radiator Hose Inspection

BENK07L20206017

Refer to "Radiator Hose Inspection" in Section 1F (Page 1F-9).

Clutch Cable Play Inspection and Adjustment

BENK07L20206018

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

Drive Chain Inspection and Adjustment

BENK07L20206019

Refer to "Drive Chain Inspection and Adjustment" in Section 3A (Page 3A-2).

Drive Chain Cleaning and Lubricating

BENK07L20206020

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

Brake System Inspection

BENK07L20206021

Brake Pad

- Front: ⌘ (Page 4B-2)
- Rear: ⌘ (Page 4C-2)

Brake Disc

- Front: ⌘ (Page 4B-6)
- Rear: ⌘ (Page 4C-7)

Brake Light Switch

Refer to "Rear Brake Light Switch Inspection" in Section 4A (Page 4A-7).

Brake Pedal Height

Refer to "Brake Pedal Height Inspection and Adjustment" in Section 4A (Page 4A-10).

Brake Fluid Inspection

BENK07L20206022

Refer to "Brake Fluid Level Check" in Section 4A (Page 4A-9).

Brake Fluid Replacement

BENK07L20206023

Refer to "Brake Fluid Replacement" in Section 4A (Page 4A-14).


Brake Hose Inspection

BENK07L20206024

Refer to "Brake Hose Inspection" in Section 4A (Page 4A-10).

Brake Hose Replacement

BENK07L20206025

- Front:  (Page 4A-15)
- Rear:  (Page 4A-15)

Tire Inspection

BENK07L20206026

Refer to "Tire Inspection and Cleaning" in Section 2D (Page 2D-15).

Steering System Inspection

BENK07L20206027

Refer to "Steering On-Vehicle Inspection" in Section 6B (Page 6B-8).

Front Fork Inspection

BENK07L20206028

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

Rear Suspension Inspection

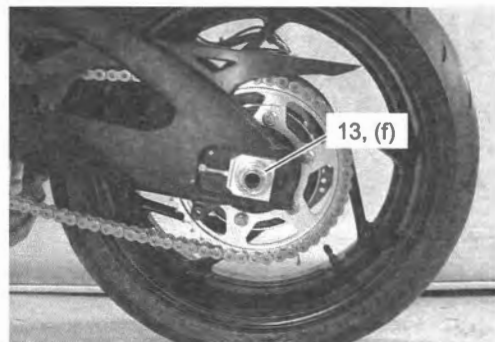
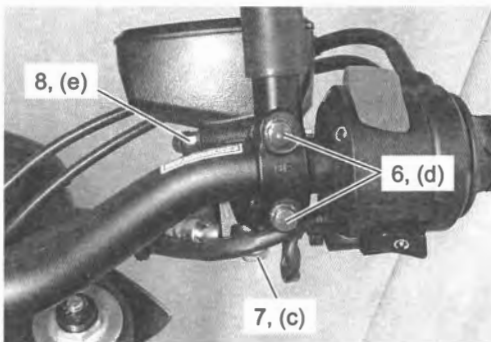
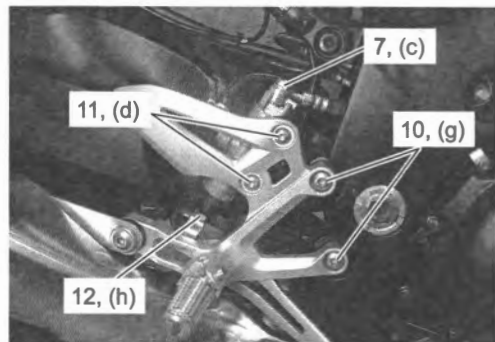
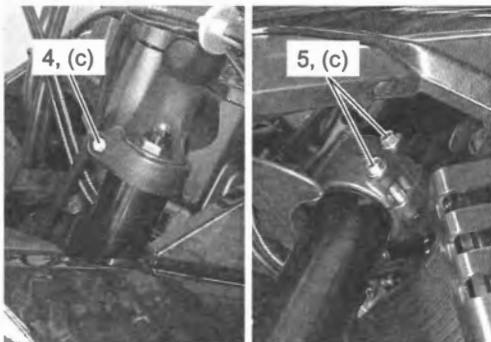
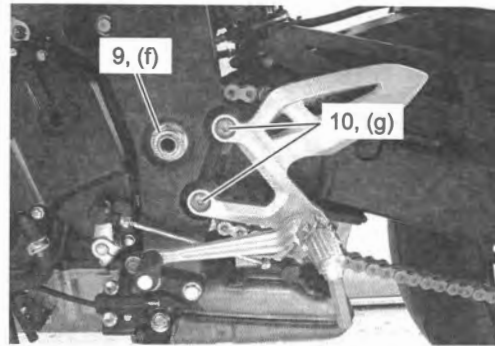
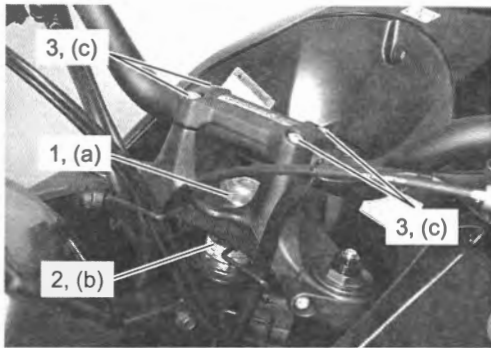
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Refer to "Rear Suspension On-Vehicle Inspection" in Section 2C (Page 2C-3).

Chassis Bolt and Nut Inspection

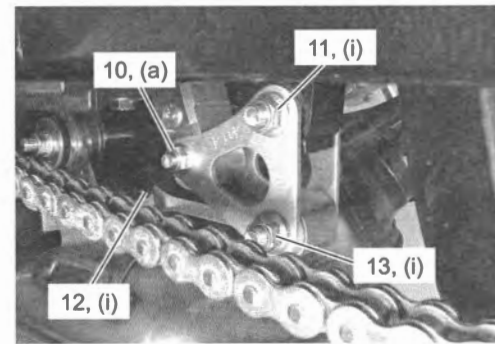
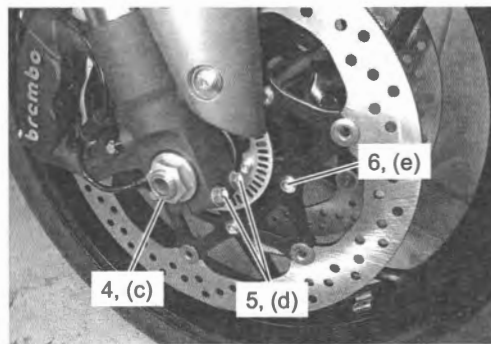
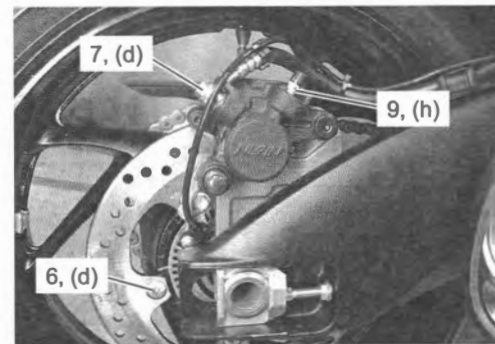
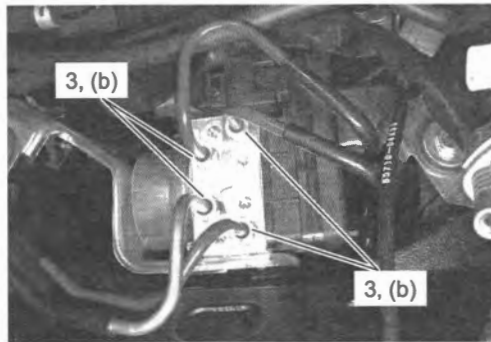
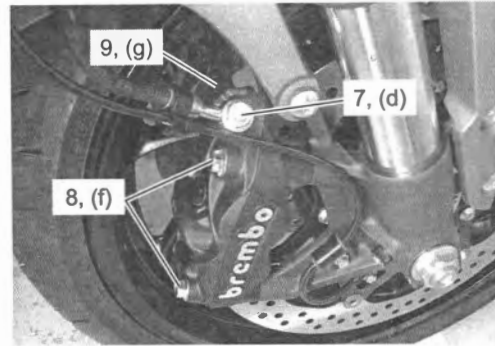
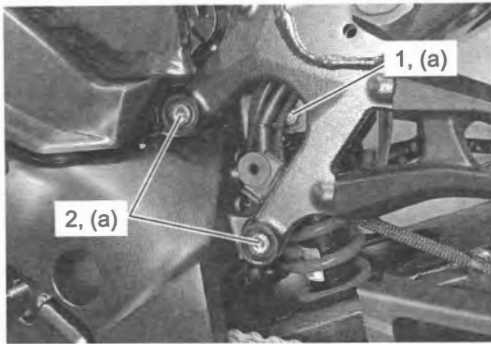
BENK07L20206030

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



IK07L1020001-01

1. Steering stem head nut	8. Air bleeder valve	(b): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)
2. Steering stem lock-nut	9. Swingarm pivot nut	(c): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
3. Handlebar clamp bolt	10. Front footrest bracket bolt	(d): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
4. Front fork upper clamp bolt	11. Rear brake master cylinder mounting bolt	(e): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)
5. Front fork lower clamp bolt	12. Rear brake master cylinder rod lock-nut	(f): 100 N·m (10.2 kgf-m, 74.0 lbf-ft)
6. Front brake master cylinder holder bolt	13. Rear axle nut	(g): 26 N·m (2.7 kgf-m, 19.5 lbf-ft)
7. Brake hose union bolt	(a): 90 N·m (9.2 kgf-m, 66.5 lbf-ft)	(h): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)



IK07L1020002-02

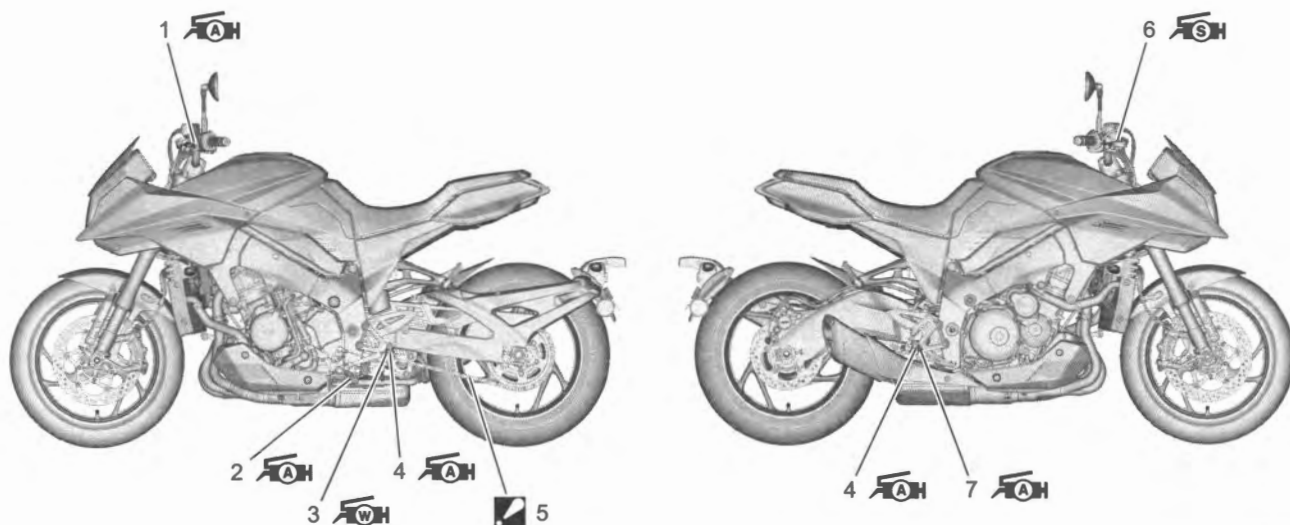
1. Rear shock absorber upper mounting nut	9. Air bleeder valve	(d): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2. Seat rail bolt	10. Rear shock absorber lower mounting nut	(e): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)
3. Brake pipe flare nut	11. Cushion lever mounting nut	(f): 39 N·m (4.0 kgf-m, 29.0 lbf-ft)
4. Front axle nut	12. Cushion rod front mounting nut	(g): 7.5 N·m (0.76 kgf-m, 5.55 lbf-ft)
5. Front axle pinch bolt	13. Cushion rod rear mounting nut	(h): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)
6. Brake disc bolt	(a): 50 N·m (5.1 kgf-m, 37.0 lbf-ft)	(i): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)
7. Brake hose union bolt	(b): 16 N·m (1.6 kgf-m, 12.0 lbf-ft)	
8. Front brake caliper mounting bolt	(c): 100 N·m (10.2 kgf-m, 74.0 lbf-ft)	

Lubrication Points

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.



IK07L1020003-05

1. Clutch lever pivot	5. Drive chain : Lubricate with a motorcycle sealed drive chain lubricant or high viscosity oil.	: Apply silicone grease.
2. Side-stand pivot and spring hook	6. Brake lever pivot	: Apply grease.
3. Gearshift lever pivot	7. Brake pedal pivot	
4. Front footrest pivot	: Apply grease.	

Special Tools and Equipment

Recommended Service Material

BENK07L20208001

NOTE

Required service material(s) is also described in:
"Lubrication Points" (Page 0B-7)

Service Data

Precautions

Precautions for Service Data

BENK07L20300001

NOTE

Specifications and service data are subject to change without notice.

Specifications

Specifications

BENK07L20307001

Dimensions and curb mass

Item	Specification	Remark
Overall length	2130 mm (83.86 in)	—
Overall width	835 mm (32.9 in)	—
Overall height	1110 mm (43.70 in)	—
Wheelbase	1460 mm (57.48 in)	—
Ground clearance	140 mm (5.51 in)	—
Seat height	825 mm (32.5 in)	—
Curb mass	215 kg (474 lbs)	—

Engine

Item	Specification	Remark
Type	Four-stroke, liquid-cooled, DOHC	—
Number of cylinders	4	—
Bore	73.4 mm (2.89 in)	—
Stroke	59.0 mm (2.32 in)	—
Displacement	999 cm ³ (60.963 cu. in)	—
Compression ratio	12.2 : 1	—
Fuel system	Fuel injection	—
Air cleaner	Paper element	—
Starter system	Electric	—
Lubrication system	Wet sump	—
Idle speed	1150 ± 100 r/min	—

Drive train

Item	Specification	Remark
Clutch	Wet multi-plate type	—
Transmission	6-speed constant mesh	—
Gearshift pattern	1-down, 5-up	—
Primary reduction ratio	1.553 (73/47)	—
Gear ratios	Low	2.562 (41/16)
	2nd	2.052 (39/19)
	3rd	1.714 (36/21)
	4th	1.500 (36/24)
	5th	1.360 (34/25)
	Top	1.269 (33/26)
Final reduction ratio	2.588 (44/17)	—
Drive chain	RK525GSH, 116 links	—

Chassis

Item	Specification	Remark
Front suspension	Inverted telescopic, coil spring, oil damped	—
Rear suspension	Link type, coil spring, oil damped	—
Front fork stroke	120 mm (4.72 in)	—
Rear wheel travel	130 mm (5.12 in)	—
Steering angle	29° (right and left)	—
Caster	25°	—
Trail	100 mm (3.94 in)	—
Turning radius	3.4 m (11.2 ft)	—
Front brake	Disc brake, twin	—
Rear brake	Disc brake	—
Front tire size	120/70ZR17M/C (58W), tubeless	—
Rear tire size	190/50ZR17M/C (73W), tubeless	—

Electrical

Item	Specification	Remark
Ignition type	Electronic ignition (Transistorized)	—
Spark plug	NGK CR9EIA-9 or DENSO IU27D	—
Battery	12 V 31.0 kC (8.6 Ah)/10 HR	—
Generator	Three-phase A.C. generator	—
Main fuse	30 A	—
Fuse	10/10/10/10/10/10/15 A	—
ABS fuse	10/25 A	—
Headlight	LED	—
Position light	LED	—
Brake light/Taillight	LED	—
Turn signal light	LED	—
License plate light	LED	—
Instrument panel light	LED	—
Neutral indicator light	LED	—
High beam indicator light	LED	—
Turn signal indicator light	LED	—
Engine coolant temperature indicator light/Oil pressure indicator light	LED	—
MIL	LED	—
Traction control indicator light	LED	—
Engine RPM indicator light	LED	Main/Sub
ABS indicator light	LED	—
Immobilizer indicator light	LED	If equipped

Capacities

Item	Specification	Remark
Fuel tank	12.0 L (3.17 US gal, 2.64 Imp gal)	—
Engine oil	Oil change	2800 ml (2.96 US qt, 2.43 Imp qt)
	With filter change	3200 ml (3.38 US qt, 2.82 Imp qt)
Engine coolant	2750 ml (2.91 US qt, 2.42 Imp qt)	—

Service Data

BENK07L20307002

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		Battery voltage	—
PAIR control solenoid valve resistance	20 – 30 °C (68 – 86 °F)	20 – 24 Ω	—

Engine Electrical Devices

Item	Specification	Standard	Limit
AP sensor power supply voltage		4.5 – 5.5 V	—
AP sensor output voltage	Idle speed at 1 atm.	Approx. 2.8 V	—
IAP sensor power supply voltage		4.5 – 5.5 V	—
IAP sensor output voltage	Idle speed at 1 atm.	Approx. 2.7 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	Approx. 4.5 V	
STP sensor power supply voltage		4.5 – 5.5 V	—
STP sensor output voltage	Closed	0.57 – 0.67 V	—
	Opened	Approx. 4.5 V	
ISC valve resistance	20 °C (68 °F)	Approx. 20 Ω	—
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	0.5 V or more	—
CKP sensor resistance	20 °C (68 °F)	Approx. 168 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.	With EVAP control system	04K3	—
	Without EVAP control system	04K2	—
Throttle body bore size		44 mm (1.7 in)	—
Throttle cable play		2.0 – 4.0 mm (0.079 – 0.16 in)	—
Engine idle speed	When engine warmed	1150 ± 100 r/min	—
Fast idle speed		1150 – 2000 r/min	—
STVA resistance		Approx. 7.8 Ω	—
Compression pressure		1300 – 1700 kPa (13.3 – 17.3 kgf/cm ² , 189 – 246 psi)	1000 kPa (10.2 kgf/cm ² , 145 psi)
Compression pressure difference		—	200 kPa (2 kgf/cm ² , 29 psi)
Cam height	Intake	36.78 – 36.83 mm (1.448 – 1.450 in)	36.48 mm (1.437 in)
	Exhaust	36.63 – 36.68 mm (1.443 – 1.444 in)	36.33 mm (1.431 in)
Camshaft journal oil clearance	Intake	0.032 – 0.066 mm (0.0013 – 0.0025 in)	0.150 mm (0.0059 in)
	Exhaust	0.032 – 0.066 mm (0.0013 – 0.0025 in)	0.150 mm (0.0059 in)
Camshaft journal holder I.D.	Intake	24.012 – 24.025 mm (0.9454 – 0.9458 in)	—
	Exhaust	24.012 – 24.025 mm (0.9454 – 0.9458 in)	
Camshaft journal O.D.	Intake	23.959 – 23.980 mm (0.9433 – 0.9440 in)	—
	Exhaust	23.959 – 23.980 mm (0.9433 – 0.9440 in)	
Camshaft runout	Intake & Exhaust	—	0.10 mm (0.004 in)
Cam chain pin	At arrow "3"	14th pin	—
Valve clearance	When engine cold	Intake	0.10 – 0.20 mm (0.0040 – 0.0078 in)
		Exhaust	0.20 – 0.30 mm (0.0079 – 0.0118 in)
Valve diameter	Intake	30 mm (1.2 in)	—
	Exhaust	24 mm (0.94 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)
Valve stem O.D.	Intake	4.475 – 4.490 mm (0.1762 – 0.1767 in)	—
	Exhaust	4.455 – 4.470 mm (0.1754 – 0.1759 in)	—
Valve seat width	Intake	0.9 – 1.1 mm (0.036 – 0.043 in)	—
	Exhaust	0.9 – 1.1 mm (0.036 – 0.043 in)	—

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		—	37.3 mm (1.47 in)
	Exhaust		—	37.3 mm (1.47 in)
Valve spring pre-load	When compressed to 33.55 mm (1.321 in)	Intake	141 – 163 N (14.4 – 16.6 kgf, 31.7 – 36.6 lbf)	—
		Exhaust	141 – 163 N (14.4 – 16.6 kgf, 31.7 – 36.6 lbf)	—
Cylinder head distortion			—	0.20 mm (0.0078 in)
Cylinder distortion			—	0.20 mm (0.0078 in)
Cylinder bore			73.400 – 73.415 mm (2.8898 – 2.8903 in)	No nicks or Scratches
Piston diameter	Measure at 8 mm (0.3 in) from the skirt end.		73.370 – 73.385 mm (2.8886 – 2.8891 in)	73.280 mm (2.8851 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		0.81 – 0.83 mm (0.0319 – 0.0326 in)	—
	2nd		0.81 – 0.83 mm (0.0319 – 0.0326 in)	—
	Oil		1.51 – 1.53 mm (0.0595 – 0.0602 in)	—
Piston ring thickness	1st		0.77 – 0.79 mm (0.0304 – 0.0311 in)	—
	2nd		0.77 – 0.79 mm (0.0304 – 0.0311 in)	—
Piston ring free end gap	1st		Approx. 9 mm (0.4 in)	7.2 mm (0.29 in)
	2nd		Approx. 8 mm (0.3 in)	6.4 mm (0.26 in)
Piston ring end gap	1st		0.06 – 0.18 mm (0.0024 – 0.0070 in)	0.50 mm (0.019 in)
	2nd		0.06 – 0.18 mm (0.0024 – 0.0070 in)	0.50 mm (0.019 in)
Piston pin bore I.D.			16.002 – 16.008 mm (0.6300 – 0.6302 in)	16.030 mm (0.6311 in)
Piston pin O.D.			15.995 – 16.000 mm (0.6298 – 0.6299 in)	15.980 mm (0.6292 in)
Conrod small end I.D.			16.010 – 16.018 mm (0.6304 – 0.6306 in)	16.040 mm (0.6314 in)
Conrod big end side clearance			0.10 – 0.20 mm (0.0040 – 0.0078 in)	0.3 mm (0.011 in)
Conrod big end width			19.95 – 20.00 mm (0.7855 – 0.7874 in)	—

Item	Specification	Standard	Limit
Conrod big end I.D.		38.000 – 38.016 mm (1.4961 – 1.4966 in)	—
Conrod big end oil clearance		0.040 – 0.064 mm (0.0016 – 0.0025 in)	0.080 mm (0.0031 in)
Crank pin width		20.10 – 20.15 mm (0.7914 – 0.7933 in)	—
Crank pin O.D.		34.976 – 35.000 mm (1.3770 – 1.3779 in)	—
Crank pin bearing thickness		1.476 – 1.492 mm (0.0582 – 0.0587 in)	—
Crankshaft journal O.D.		34.982 – 35.000 mm (1.3773 – 1.3779 in)	—
Crankshaft journal oil clearance		0.010 – 0.028 mm (0.0004 – 0.0011 in)	0.080 mm (0.0031 in)
Crankcase journal I.D.		38.000 – 38.018 mm (1.4961 – 1.4967 in)	—
Crankcase journal bearing thickness		1.492 – 1.507 mm (0.0588 – 0.0593 in)	—
Crankshaft thrust bearing thickness	Right side	2.42 – 2.44 mm (0.0953 – 0.0960 in)	—
	Left side	2.36 – 2.50 mm (0.0930 – 0.0984 in)	—
Crankshaft thrust clearance		0.060 – 0.110 mm (0.0024 – 0.0043 in)	—
Crankshaft runout		—	0.05 mm (0.0019 in)
Balancer journal oil clearance		0.028 – 0.052 mm (0.0011 – 0.0020 in)	0.080 mm (0.0031 in)
Balancer journal O.D.		22.976 – 22.992 mm (0.9046 – 0.9051 in)	—

Engine Lubrication System

Item	Specification	Standard	Limit
Oil pressure	At 60 °C (140 °F), 3000 r/min	100 – 400 kPa (1.1 – 4.0 kgf/cm ² , 14.5 – 58.0 psi)	—
Necessary amount of engine oil	Oil change	2800 ml (2.96 US qt, 2.46 Imp qt)	—
	Oil and filter change	3200 ml (3.38 US qt, 2.82 Imp qt)	
	Engine overhaul	3400 ml (3.59 US qt, 2.99 Imp qt)	

Cooling System

Item	Specification	Standard	Limit
Engine coolant	Engine side	Approx. 2500 ml (2.64 US qt, 2.20 Imp qt)	—
	Reservoir 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/cm ² , 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. 100 °C (212 °F)	
Thermostat valve opening temperature		Approx. 82 °C (179.6 °F)	—
Thermostat valve lift	At 95 °C (203 °F)	8 mm (0.3 in) or more	—

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	223 ml (7.54 US oz, 7.85 Imp oz) or more	—
Fuel pressure		289 – 299 kPa (2.95 – 3.04 kgf/cm ² , 42.0 – 43.3 psi)	—

Ignition System

Item	Specification	Standard	Limit
Firing order		1-2-4-3	—
Spark plug	Type	NGK: CR9EIA-9 / DENSO: IU27D	—
	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		80 V or more	—
Ignition coil resistance	10 – 30 °C (50 – 86 °F)	Primary	1.1 – 1.9 Ω
		Secondary	6400 – 9600 Ω
Immobilizer antenna power supply voltage (If equipped)		Battery voltage	—
Immobilizer indicator light (If equipped)		LED	—

Starting System

Item	Specification	Standard	Limit
Starter motor brush length		12 mm (0.47 in)	8.5 mm (0.34 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)	Tester's battery voltage 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	20 °C (68 °F)		0.12 – 0.18 Ω
Generator no-load voltage	When engine cold	At 5000 r/min	65 V (AC) or more
Recharging time	Standard charging		0.9 A for 5 to 10 hours
	Fast charging		4.5 A for 1 hour
Generator Max. output	At 5000 r/min		Approx. 385 W
Battery	Type designation		YTZ10S
	Capacity		12 V 31.0 kC (8.6 Ah)/10 HR

Exhaust System

Item	Specification	Standard	Limit
EXCVA position sensor power supply voltage		4.5 – 5.5 V	—
EXCVA position sensor output voltage	Closed	0.45 – 1.40 V	—
	Opened	3.60 – 4.55 V	
EXCVA position sensor resistance	At adjustment position		Approx. 3100 Ω

Front Suspension

Item	Specification	Standard	Limit
Front fork inner tube O.D.		43 mm (1.7 in)	—
Front fork oil level	Without spring, outer tube fully compressed	93 mm (3.7 in)	—
Front fork spring free length		271 mm (10.7 in)	265 mm (10.5 in)
Front fork oil capacity	Each leg	520 ml (17.58 US oz, 18.30 Imp oz)	—
Front fork spring adjuster		10 mm (0.39 in)	—
Front fork damping force adjuster	Rebound side	8 clicks counterclockwise from stiffest position	—
	Compression side	2 turns counterclockwise from stiffest position	

Rear Suspension

Item	Specification	Standard	Limit
Rear shock absorber spring adjuster		3rd position from softest end	—
Rear shock absorber damping force adjuster	Rebound side	1 turn counterclockwise from stiffest position	—
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		190/50ZR17M/C (73W)	
Tire type	Front		DUNLOP: Roadsport2 M	—
	Rear		DUNLOP: Roadsport2 M	
Tire tread depth	Recommended depth	Front	—	1.6 mm (0.062 in)
		Rear	—	2.0 mm (0.078 in)
Cold inflation tire pressure	Solo riding	Front	250 kPa (2.50 kgf/cm ² , 36 psi)	—
		Rear	290 kPa (2.90 kgf/cm ² , 42 psi)	
	Dual riding	Front	250 kPa (2.50 kgf/cm ² , 36 psi)	—
		Rear	290 kPa (2.90 kgf/cm ² , 42 psi)	
Wheel rim size	Front		17 M/C x MT 3.50	—
	Rear		17 M/C x MT 6.00	

Drive Chain / Drive Train / Drive Shaft

Item	Specification	Standard	Limit
Drive chain	Type	RK525GSH	—
	Links	116 links	—
Drive chain 20-pitch length		—	319.4 mm (12.57 in)
Drive chain slack	On side-stand	20 – 30 mm (0.79 – 1.18 in)	—

Brake Control System and Diagnosis

Item	Specification	Standard	Limit
Rear brake pedal height		50 – 60 mm (2.0 – 2.3 in)	—
Master cylinder bore / piston diameter	Front	Approx. 19.1 mm (0.752 in)	—
	Rear	Approx. 14.0 mm (0.551 in)	

Front Brakes

Item	Specification	Standard	Limit
Front brake disc thickness		5.0 mm (0.20 in)	4.5 mm (0.18 in)
Front brake disc runout		—	0.30 mm (0.012 in)
Front brake caliper cylinder bore / piston diameter		Approx. 32 mm (1.3 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	0.38 – 1.05 mm (0.0150 – 0.0413 in)	—
	Rear	0.42 – 1.08 mm (0.0166 – 0.0425 in)	—
Wheel speed sensor power supply voltage	Front	Battery voltage	—
	Rear	Battery voltage	—

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.3	0.1 – 0.3 mm (0.004 – 0.011 in)	0.5 mm (0.019 in)
Gearshift fork groove width	No.1	5.0 – 5.1 mm (0.197 – 0.200 in)	—
	No.3	5.0 – 5.1 mm (0.197 – 0.200 in)	
Gearshift fork thickness	No.1	4.8 – 4.9 mm (0.189 – 0.192 in)	—
	No.3	4.8 – 4.9 mm (0.189 – 0.192 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	1st	Approx. 1.80 V	—
	2nd	Approx. 2.26 V	
	3rd	Approx. 3.00 V	
	4th	Approx. 3.66 V	
	5th	Approx. 4.36 V	
	6th	Approx. 4.69 V	

Clutch

Item	Specification	Standard	Limit
Clutch lever play		10 – 15 mm (0.4 – 0.6 in)	—
Clutch release screw		1/2 turn counterclockwise	—
Drive plate thickness		2.72 – 2.88 mm (0.107 – 0.113 in)	2.42 mm (0.0953 in)
Drive plate claw width		13.85 – 13.96 mm (0.5453 – 0.5496 in)	13.35 mm (0.5256 in)
Driven plate distortion		—	0.10 mm (0.004 in)
Clutch spring free length		57.01 mm (2.244 in)	54.2 mm (2.14 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	10 A	—	
	Signal	10 A	—	
	Parking	10 A	—	
	Fuel	10 A	—	
	Fan	15 A	—	
	Main	30 A	—	
	ABS motor	25 A	—	
ABS valve	10 A	—		

Lighting Systems

Item	Specification	Standard	Limit
Headlight	HI	LED	—
	LO	LED	—
Position light		LED	—
Brake light/Taillight		LED	—
Turn signal light		LED	—
License plate light		LED	—

Combination Meter / Fuel Meter / Horn

Item	Specification	Standard	Limit
Instrument panel light		LED	—
Neutral indicator light		LED	—
High beam indicator light		LED	—
Turn signal indicator light		LED	—
Engine coolant temperature indicator light/Oil pressure indicator light		LED	—
MIL		LED	—
Traction control indicator light		LED	—
Engine RPM indicator light	Main & Sub	LED	—
ABS indicator light		LED	—

Fasteners Information

BENK07L20307003

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

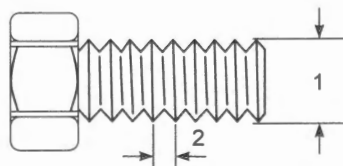
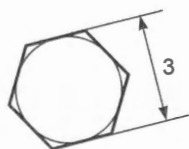
Combining male and female fasteners with different thread pitches will damage both fasteners.

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



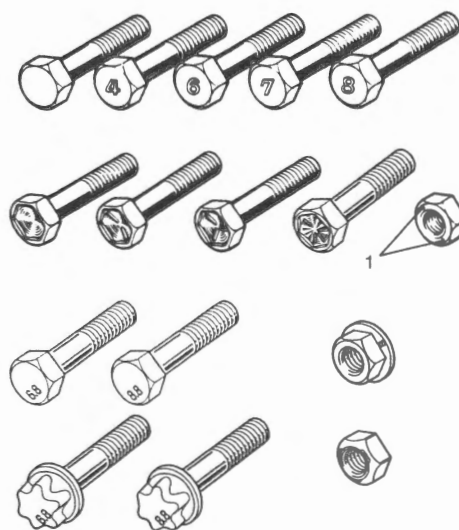
IE31J1030001-02

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

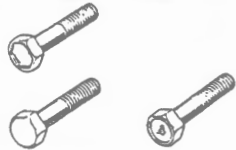





Standard Tightening Torques

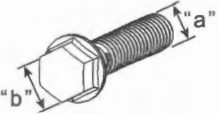
Each fastener should be tightened to the torque specified in each section. If no torque description or specification is provided in the relevant section, refer to the following tightening torque chart for the applicable torque for each fastener. When a fastener of greater strength than the original one 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  IE31J1030003-01	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
	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  IE31J1030004-01	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
	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 *: Self-locking nut (6 strength)  IE31J1030005-01	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
	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  IE31J1030006-01	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
	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)  IE31J1030007-01	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
	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)  IE31J1030008-01	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  ID26J1030004-01	Width across flats "b" [mm]	Thread diameter "a" [mm]	Unit		
			N-m	kgf-m	lbf-ft
	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

BENK07L20308001

Fuel

NOTICE

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

Use unleaded gasoline with an octane rating of 95 RON (90 AKI) or higher.

Unleaded gasoline containing up to 5% or 10% ethanol by volume may be used. Use the recommended gasoline according to a gasoline label (if equipped).

Engine Oil

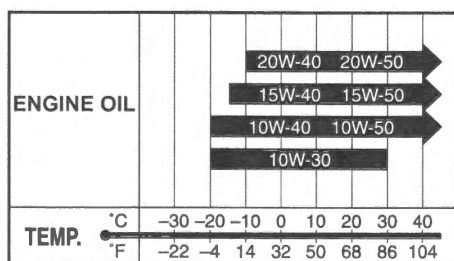
Use Suzuki genuine engine oil or equivalent. If Suzuki genuine engine oil is not available, select a proper engine oil according to the following guideline.

	Engine oil
API service classification	SG, SH, SJ, SL, SM or SN
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.

NOTICE

When 10W-30 engine oil is used, use only SG, SH, SJ, SL API classification. If there are not used API classification engine oils, the engine will be damaged.



IF04K1030001-01

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



ID26J1030005-02

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.

Coolant 99000-99032-12X (SUZUKI LONG LIFE COOLANT (GREEN))

Coolant 99000-99032-20X (SUZUKI SUPER LONG LIFE COOLANT (BLUE))

If SUZUKI COOLANT is not available, use an anti-freeze/engine coolant compatible with an aluminum radiator, mixed with distilled water only.

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

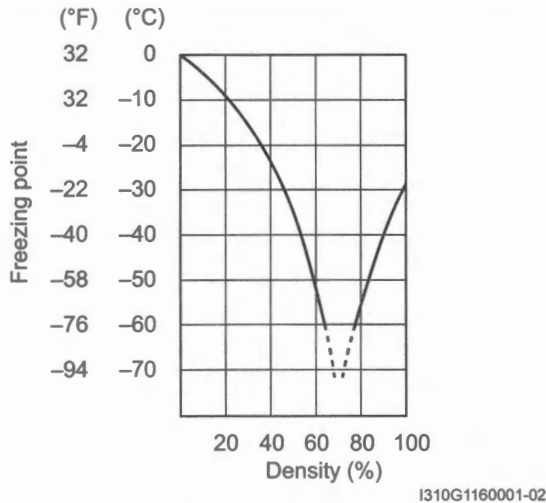
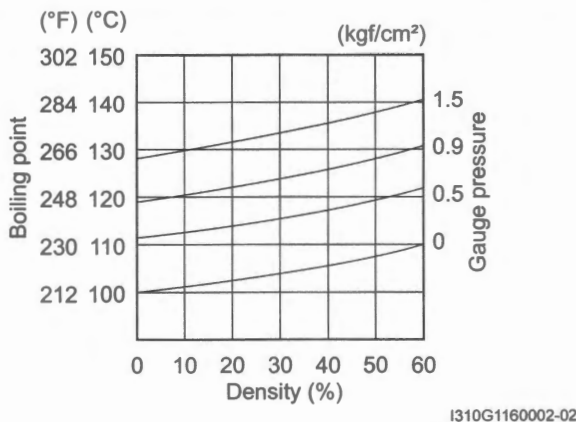


Fig.2: Engine coolant density-boiling point curve



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 L-01.

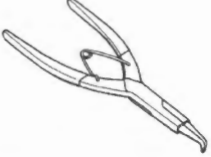
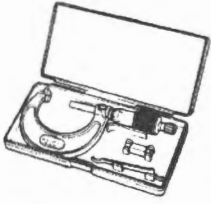
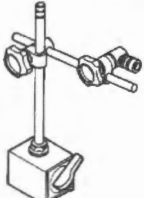
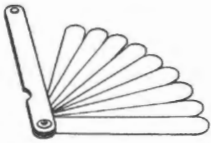
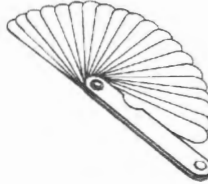
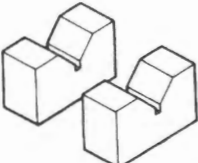



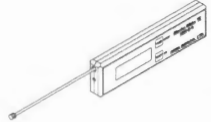
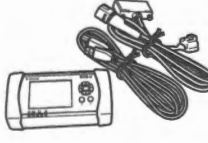
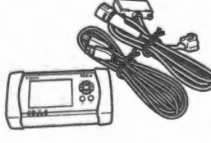
Fork oil 99000-99044-L01 (SUZUKI FORK OIL L-01)

Special Tool




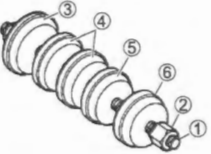












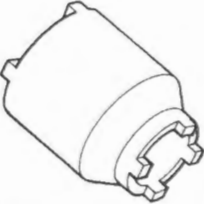

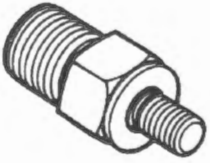
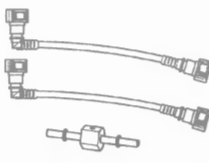


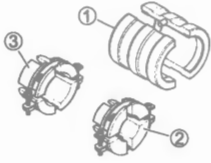
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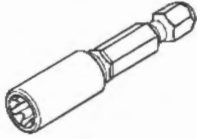


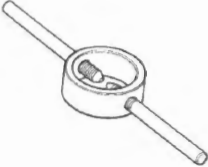

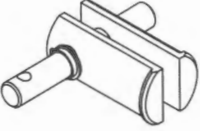
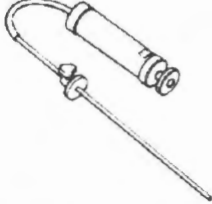
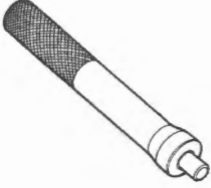

NOTE

Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A.

				
09900-06104 Snap ring pliers (External: Bent nose)	09900-06107 Snap ring pliers (External)	09900-06108 Snap ring pliers (Internal)	09900-20202 Micrometer (25 - 50 mm)	09900-20203 Micrometer (50 - 75 mm)
				
09900-20530 Cylinder gauge set	09900-20602 Dial gauge (1 x 0.001 mm)	09900-20605 Dial calipers (10 - 34 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	09900-22303 Plastigage (0.025 - 0.076 mm)
				
09900-22304 Plastigage (0.051 - 0.152 mm)	09900-22401 Small bore gauge (10 - 18 mm)	09900-22403 Small bore gauge (18 - 35 mm)	09900-25009 Needle point probe set	09900-25011 Circuit tester set
				
09900-26010 Digital tachometer	09900-28631 TP Sensor test lead	09904-41030 SDS-II set	09904-41031 SDS-II set	09904-41040 SDS-II (oscilloscope) set

 <p>09904-41051 Conversion cable</p>	 <p>09910-60620 Adjustable wrench</p>	 <p>09912-66310 Micrometer (0 - 25 mm)</p>	 <p>09913-50121 Oil seal remover</p>	 <p>09913-70210 Bearing installer set</p>
 <p>09915-40620 Oil filter wrench</p>	 <p>09915-63311 Compression gauge adapter</p>	 <p>09915-64512 Compression gauge set (2500 kPa)</p>	 <p>09915-74511 Oil pressure gauge set (600 kPa)</p>	 <p>09915-74540 Oil pressure gauge attachment</p>
 <p>09916-10912 Valve lapper</p>	 <p>09916-14510 Valve lifter</p>	 <p>09916-14522 Valve lifter attachment</p>	 <p>09916-33210 Valve guide reamer (ø4.5)</p>	 <p>09916-33320 Valve guide outer reamer (ø9.8)</p>
 <p>09916-34542 Reamer handle</p>	 <p>09916-51710 Valve guide installer / remover set</p>	 <p>09916-77310 Piston ring compressor</p>	 <p>09916-84511 Tweezers</p>	 <p>09917-47011 Vacuum pump gauge set</p>
 <p>09918-78211 Radiator cap tester kit</p>	 <p>09919-28620 Sleeve protector</p>	 <p>09920-31020 Extension handle</p>	 <p>09920-34830 Starter clutch rotor holder</p>	 <p>09920-53740 Clutch sleeve hub holder</p>

 <p>09921-20210 Bearing remover (ø12)</p>	 <p>09921-20240 Bearing remover set</p>	 <p>09922-22712 Drive chain cut / rivet tool set</p>	 <p>09923-74511 Bearing remover (ø20-35)</p>	 <p>09924-84510 Bearing installer set</p>
 <p>09924-84521 Bearing installer set</p>	 <p>09925-18011 Bearing installer</p>	 <p>09930-10121 Spark plug socket set</p>	 <p>09930-11940 Torx® bit holder (3/8 sq.)</p>	 <p>09930-11950 Torx® wrench (T25H)</p>
 <p>09930-30104 Rotor remover sliding shaft</p>	 <p>09930-34980 Rotor remover</p>	 <p>09930-44521 Rotor holder</p>	 <p>09930-82720 Mode selection switch</p>	 <p>09930-82760 Mode selection switch</p>
 <p>09940-14911 Steering stem nut socket</p>	 <p>09940-14940 Swingarm pivot adjuster wrench</p>	 <p>09940-14960 Steering stem nut socket wrench</p>	 <p>09940-14990 Engine mounting adjuster wrench</p>	 <p>09940-30221 Front fork cylinder holder</p>
 <p>09940-40211 Fuel pressure gauge adapter</p>	 <p>09940-40220 Fuel pressure gauge attachment</p>	 <p>09940-51711 Bearing installer</p>	 <p>09940-52841 Front fork inner rod holder</p>	 <p>09940-52861 Front fork oil seal installer set</p>

 <p>09940-63110 Torx® bit (E8)</p>	 <p>09940-93110 Fork spring compressor</p>	 <p>09940-94922 Front fork spring stopper plate</p>	 <p>09940-94930 Front fork spacer holder</p>	 <p>09941-34513 Bearing installer set</p>
 <p>09941-54913 Bearing outer race remover</p>	 <p>09943-74111 Front fork oil level gauge</p>	 <p>09943-88211 Pinion bearing installer</p>	 <p>09944-28321 Hexagon bit socket (19 mm : 1/2 sq.)</p>	

Section 1

Engine

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Precautions

Precautions

Precautions for Engine

BENK07L21000001

Refer to "General Precautions" in Section 00 (Page 00-1), "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2), "Precautions for Circuit Tester" in Section 00 (Page 00-7) and "Precautions for SDS-II" in Section 00 (Page 00-8).

Engine General Information and Diagnosis

Precautions

Precautions for DTC Trouble Shooting

BENK07L21100001

Refer to "General Precautions" in Section 00 (Page 00-1), "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2), "Precautions for Circuit Tester" in Section 00 (Page 00-7) and "Precautions for SDS-II" in Section 00 (Page 00-8).

NOTE

After repairing the trouble, clear the DTC using the special tool. (Page 1A-17)

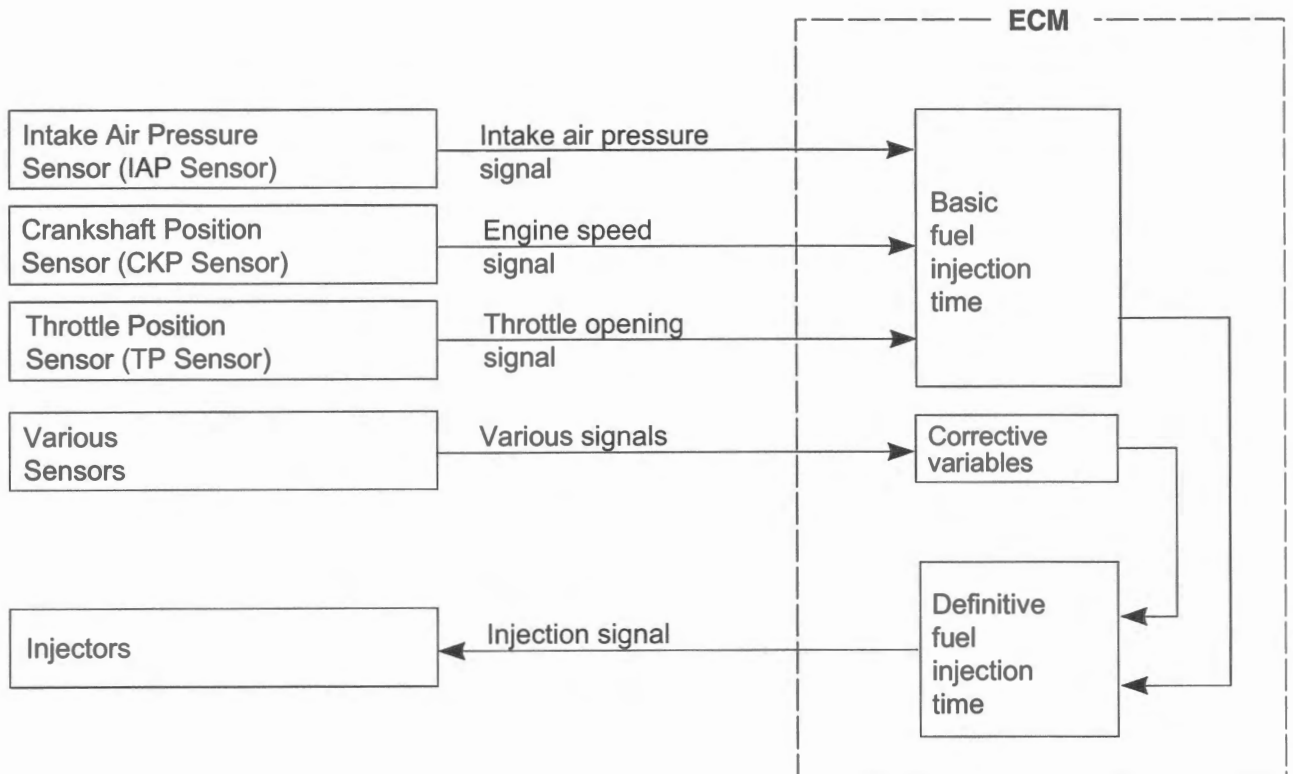
General Description

Injection Timing Description

BENK07L21101001

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.



I718H1110268-05

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.

Traction Control System Description

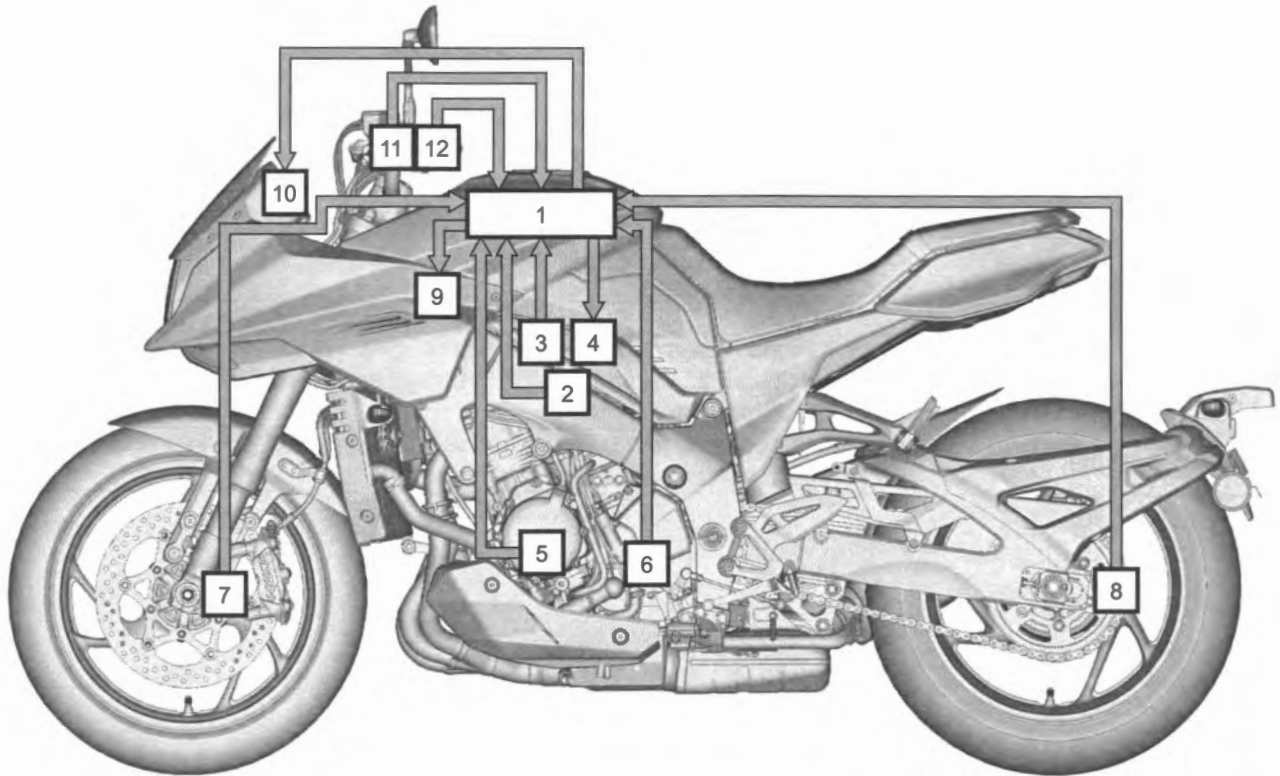
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Summary

Traction control system controls engine power output to prevent rear wheel spin and secures stability of the motorcycle.

The system senses the condition of rear wheel rotation by the signals sent from front and rear wheel speed sensors, TP sensor, CKP sensor and GP switch.





When the rear wheel spin has been detected, ECM reduces engine power output to prevent its spin by controlling ignition timing and STV actuator.



IK07L1110001-01

1. ECM	5. CKP sensor	9. Ignition coils
2. TP sensor	6. GP switch	10. Combination meter
3. STP sensor	7. Front wheel speed sensor	11. Select switch
4. STV actuator	8. Rear wheel speed sensor	12. Mode switch

Traction Control System Mode Description

	Display	Controlled Content
OFF	 IK07L1110002-01	In "OFF mode", the traction control system does not make the engine control.
Mode 1	 IK07L1110003-01	In "Mode 1", the system controls engine power output and allows a certain degree of wheel spin.
Mode 2	 IK07L1110004-01	In "Mode 2", the system controls engine power output and allows a lesser degree of wheel spin than when set in Mode 1. The content is in the middle between the Mode 1 and the Mode 3.
Mode 3	 IK07L1110005-01	In "Mode 3", the system controls engine power output and allows a minimum wheel spin.

NOTE

Set in the "OFF mode" when either only front or rear wheel is rotated such as on a chassis dynamometer, etc.

Traction Control Indicator Light Description

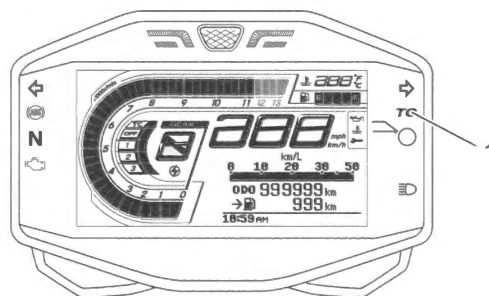
The traction control indicator light comes on when the ignition switch is turned "ON" and goes off after the motorcycle speed exceeds 5 km/h (3 mile/h).

After that the indicator light does not come on after the motorcycle speed decreases to less than 5 km/h (3 mile/h).

The indicator light blinks when the traction control system is controlling the engine power output while riding.

The indicator light comes on and remains on when the traction control system is not working due to a system malfunction.

Traction control indicator light (Riding with more than 5 km/h (3 mile/h))	Operating condition of traction control system
OFF	Traction control system works normally.
Blinking	Traction control system controls engine power output.
ON	Traction control system does not work properly. Refer to "DTC Check" (Page 1A-16).



IK07L1110006-01

1. Traction control indicator light

Easy Start System Description

BENK07L21101003

This model has adopted easy start system which operates cranking continuously for specified time without continuous pushing of the starter switch.

- ECM monitors various signals and one-push of the starter switch makes the starter relay to ON to operate the starter motor until the engine is started. However, if the engine cannot be started within the specified time, the ECM sets the starter relay to OFF.
- When the ignition switch is ON, engine stop switch is "RUN" position and, judging conditions of all of the following factors, ECM controls the starter relay to set ON. However, responding to either of the following conditions, ECM sets the starter relay to OFF.
 - Status of GP switch or clutch lever position switch
 - Status of starter switch
 - Status of engine start

Self-Diagnosis Function

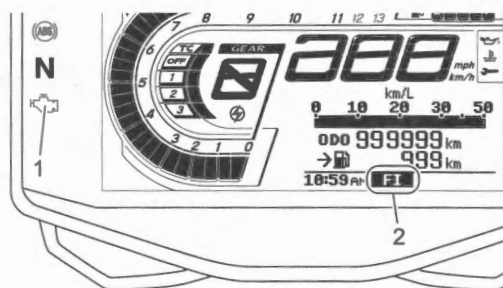
BENK07L21101004

The self-diagnosis function is incorporated in the ECM. The function has two modes, "User mode" and "Dealer mode".

User Mode

The ECM warns riders to turn the MIL (1) on or blink it depending on the failure place or its content. At the same time, "FI" (2) is indicated in the LCD.

And the ECM turns the MIL off when detecting 3 D/C-correct continuously after detecting the first abnormality.



IK07L1110007-01

Supplementation

- When engine control system is normal condition, ECM turns the MIL on about 3 seconds after turning the ignition switch ON.
- When lowering of the battery is detected, the MIL repeats a quick three time blinking.
- 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 ECM erases the registered failure data when not detecting the same one during 40 times of warm up cycle after turning MIL on. And the warm up cycle means the cycle of engine warm up operation that the engine coolant temperature reaches more than approximately 70 °C (158 °F) and also rises more than approximately 20 °C (68 °F) from the one at engine starting.

Dealer Mode

To check the function of the individual engine control system devices, the dealer mode is provided. In this check, the special tool is necessary to read the code of the malfunction items.

- The defective function is memorized in the ECM. Use the special tool's coupler to connect to the mode select coupler (6P).

Special tool**09930-82720**

- The memorized malfunction code is indicated by the display of the LCD.
- Malfunction means that the ECM does not receive normal signal from the devices. These affected devices are indicated in the code form.

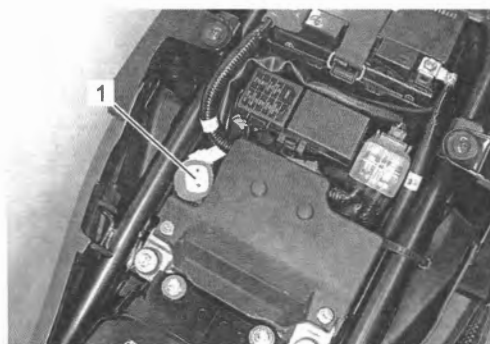
NOTE

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

Diagnostic coupler location

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

Special tool
09904-41051



IK07L1110008-01

Comparison Table of DTC Name

BENK07L21101005

Refer to "Electrical Components Location" in Section 0A (Page 0A-7).

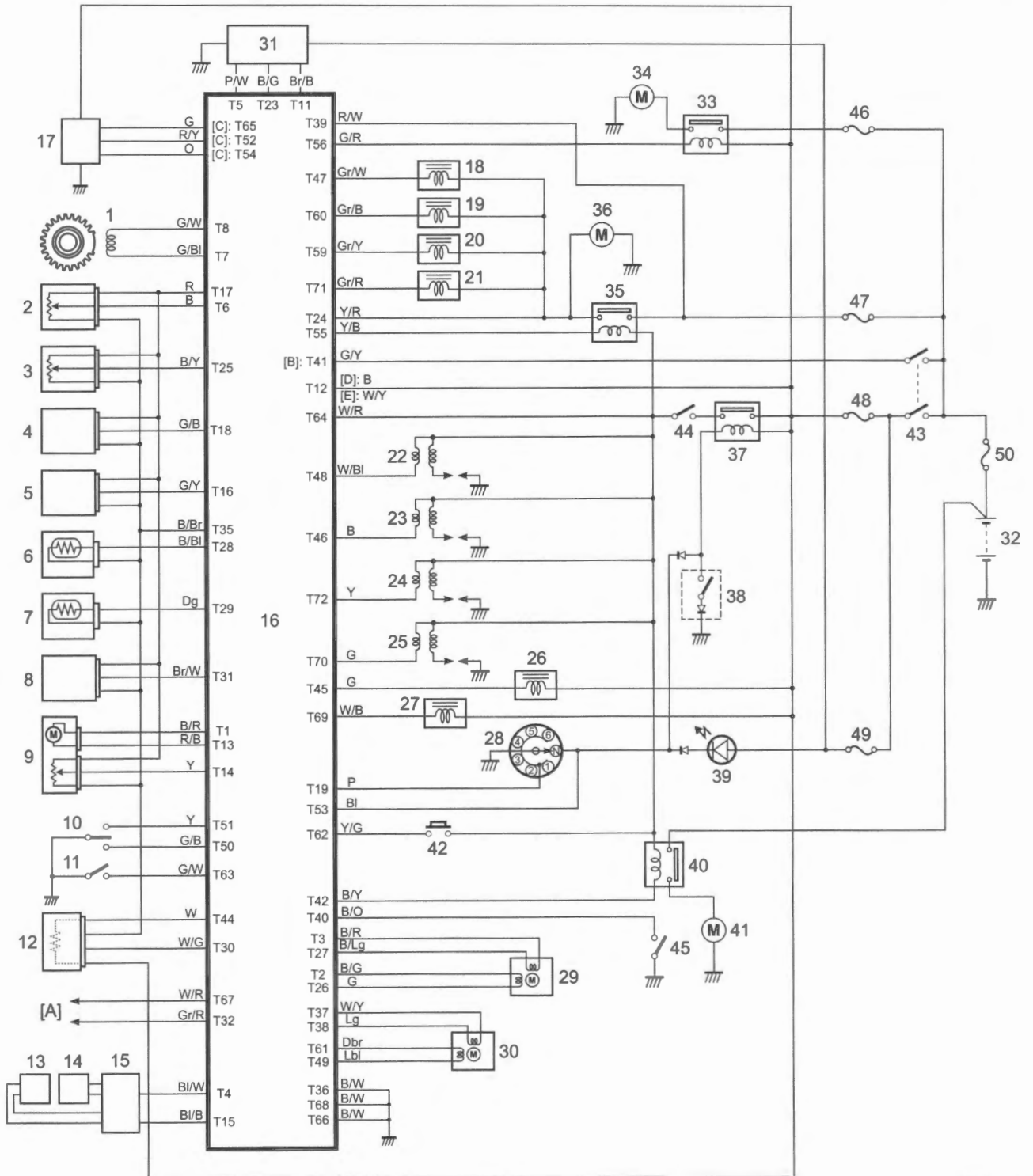
The comparison with the terms used in DTC name and this service manual are shown in the table below.

Terms in DTC	Term in the service manual
CKP Sensor "A"	CKP Sensor
EVAP System Purge Control Valve	EVAP System Purge Control Solenoid Valve
EXCVA	EXCVA Motor
Fan 1	Cooling Fan
HO2 Sensor Heater Bank 1 Sensor 1	HO2 Sensor Heater
IAP Sensor 2	AP Sensor
IAT Sensor 1	IAT Sensor
Ignition Coil "A"	Ignition Coil #1
Ignition Coil "B"	Ignition Coil #2
Ignition Coil "C"	Ignition Coil #3
Ignition Coil "D"	Ignition Coil #4
Injector Cylinder 1	Fuel Injector #1
Injector Cylinder 2	Fuel Injector #2
Injector Cylinder 3	Fuel Injector #3
Injector Cylinder 4	Fuel Injector #4
ISC System	ISC Valve
O2 Sensor Bank 1 Sensor 1	HO2 Sensor
PAIR System Control "A"	PAIR Control Solenoid Valve
Throttle Actuator "A"	STV Actuator
TP Sensor / Switch "A"	TP Sensor
TP Sensor / Switch "B"	STP Sensor
Vehicle Speed Sensor "A"	Front Wheel Speed Sensor
Vehicle Speed Sensor "B"	Rear Wheel Speed Sensor

Schematic and Routing Diagram

FI System Wiring Diagram

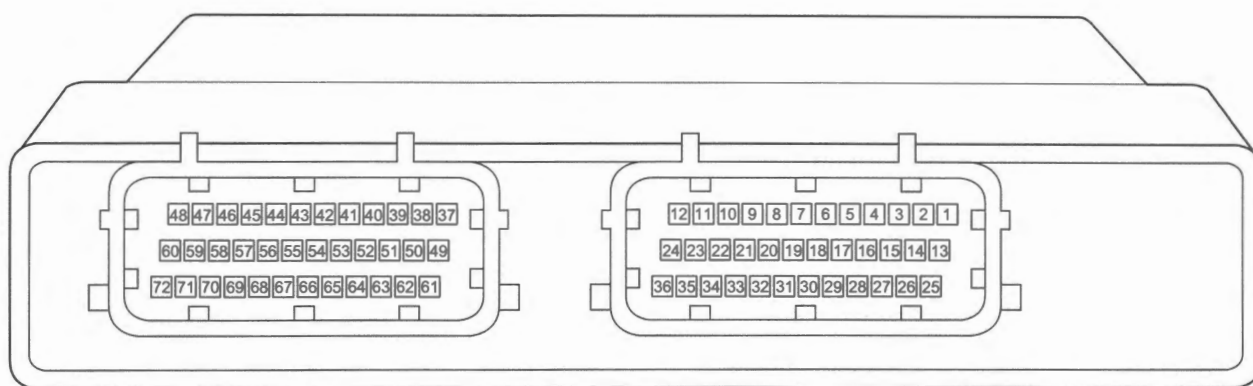
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IK07L1110009-01

[A]: To mode select coupler (6P)	15. ABS control unit	34. Cooling fan motor
[B]: Without immobilizer system	16. ECM	35. Fuel pump relay
[C]: With immobilizer system	17. Immobilizer antenna	36. Fuel pump
[D]: For E.U., Australia, Taiwan, Israel, Thailand and Middle East	18. Fuel injector #1	37. Side-stand relay
[E]: Except for E.U., Australia, Taiwan, Israel, Thailand and Middle East	19. Fuel injector #2	38. Side-stand switch
1. CKP sensor	20. Fuel injector #3	39. Neutral indicator light
2. TP sensor	21. Fuel injector #4	40. Starter relay
3. STP sensor	22. Ignition coil #1	41. Starter motor
4. IAP sensor	23. Ignition coil #2	42. Starter switch
5. AP sensor	24. Ignition coil #3	43. Ignition switch
6. ECT sensor	25. Ignition coil #4	44. Engine stop switch
7. IAT sensor	26. EVAP system purge control solenoid valve (If equipped)	45. Clutch lever position switch
8. TO sensor	27. PAIR control solenoid valve	46. Fan fuse (15 A)
9. EXCVA / EXCVA position sensor	28. GP switch	47. Fuel fuse (10 A)
10. Select switch	29. STV actuator	48. Ignition fuse (10 A)
11. Mode switch	30. ISC valve	49. Signal fuse (10 A)
12. HO2 sensor	31. Combination meter	50. Main fuse (30 A)
13. Front wheel speed sensor	32. Battery	
14. Rear wheel speed sensor	33. Cooling fan relay	

Terminal Arrangement of ECM Connector "T"



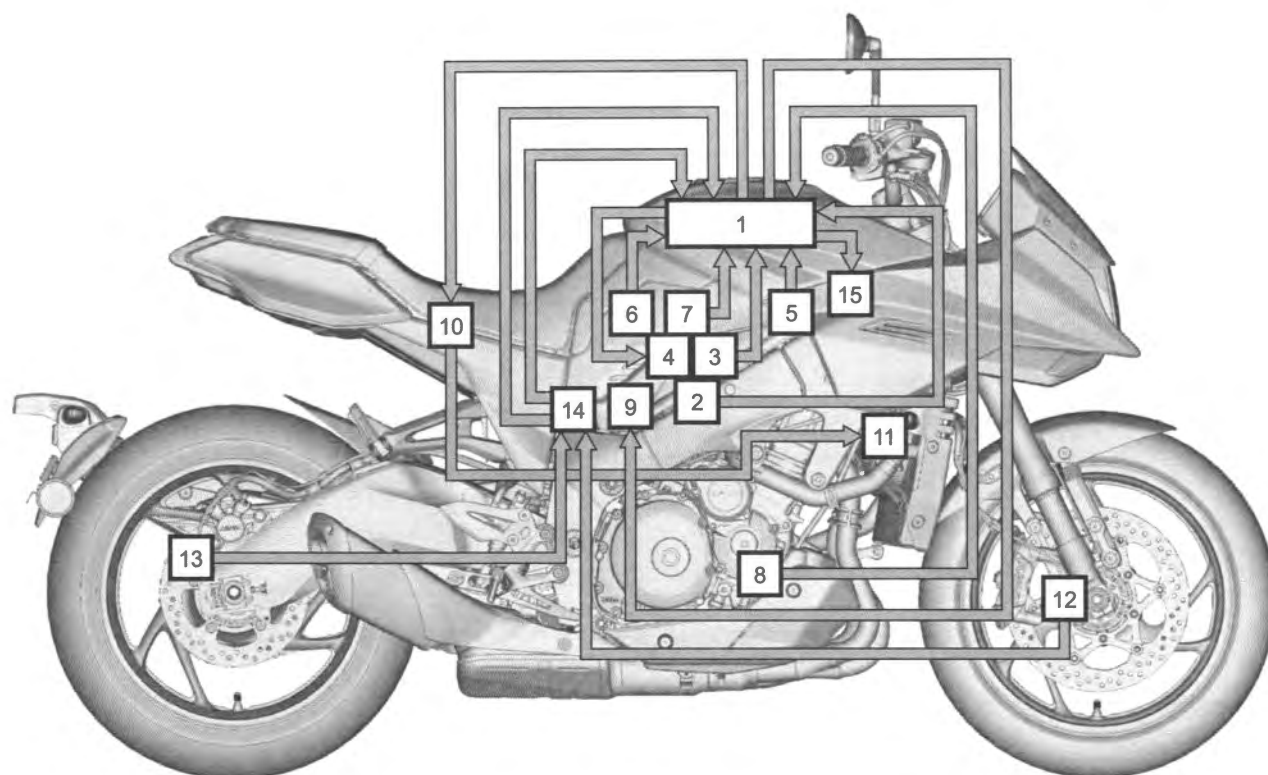
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TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
T1	EXCVA power (+)	T37	ISC valve signal (ISC, 1A)
T2	STVA signal (STVA, 2A)	T38	ISC valve signal (ISC, 1B)
T3	STVA signal (STVA, 1A)	T39	Power source for back-up
T4	Rear wheel speed sensor signal	T40	Clutch lever position switch
T5	Speed sensor output signal	T41	Ignition switch signal (If equipped)
T6	TP sensor signal	T42	Starter motor relay
T7	CKP sensor signal (CKP-)	T43	—
T8	CKP sensor signal (CKP+)	T44	HO2 sensor heater
T9	—	T45	EVAP system purge control solenoid valve (If equipped)
T10	—	T46	Ignition coil #2
T11	Tachometer	T47	Fuel injector #1
T12	Power source	T48	Ignition coil #1
T13	EXCVA power (-)	T49	ISC valve signal (ISC, 2B)
T14	EXCVA position sensor	T50	Select switch 2
T15	Front wheel speed sensor signal	T51	Select switch 1
T16	AP sensor signal	T52	Immobilizer communication (If equipped)
T17	Power source for sensors	T53	Neutral signal
T18	IAP sensor signal	T54	Immobilizer indicator (If equipped)
T19	GP switch signal	T55	Fuel pump relay
T20	—	T56	Cooling fan relay
T21	—	T57	—
T22	—	T58	—
T23	Serial data for combination meter	T59	Fuel injector #3
T24	Power source for fuel injectors	T60	Fuel injector #2
T25	STP sensor	T61	ISC valve signal (ISC, 2A)
T26	STVA signal (STVA, 2B)	T62	Starter switch
T27	STVA signal (STVA, 1B)	T63	Mode switch
T28	ECT sensor signal	T64	Engine stop switch
T29	IAT sensor signal	T65	Immobilizer communication (If equipped)
T30	HO2 sensor signal	T66	General power ground (E01)
T31	TO sensor signal	T67	Mode switch
T32	Serial data for self-diagnosis	T68	Ignition system ground (E03)
T33	—	T69	PAIR control solenoid valve
T34	—	T70	Ignition coil #4
T35	Sensor ground (E2)	T71	Fuel injector #4
T36	ECM ground (E1)	T72	Ignition coil #3

Component Location

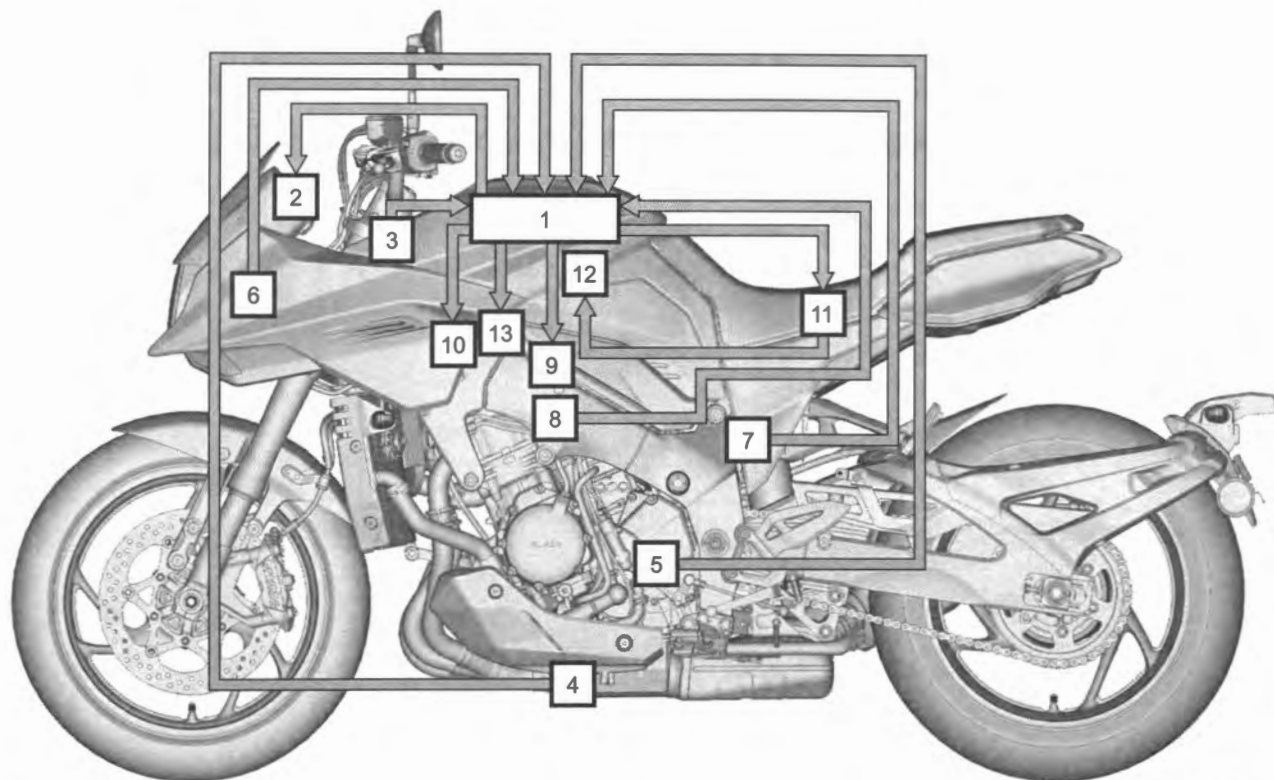
FI System Component Location

BENK07L21103001



IK07L1110010-01

1. ECM	6. IAP sensor	11. Cooling fan
2. TP sensor	7. IAT sensor	12. Front wheel speed sensor
3. STP sensor	8. CKP sensor	13. Rear wheel speed sensor
4. STV actuator	9. EVAP system purge control solenoid valve (if equipped)	14. ABS control unit
5. AP sensor	10. Cooling fan relay	15. PAIR control solenoid valve



IK07L1110011-01

1. ECM	6. TO sensor	11. FP relay
2. Combination meter	7. EXCVA / EXCVA position sensor	12. Fuel pump
3. Ignition switch/Immobilizer (If equipped)	8. ECT sensor	13. ISC valve
4. HO2 sensor	9. Fuel injectors	
5. GP switch	10. Ignition coils	

Diagnostic Information and Procedures

Engine Symptom Diagnosis

BENK07L21104001

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-26)
	Worn valve guides or poor seating of valves.	Repair or replace. ☞(Page 1D-46)
	Mistimed valves.	Adjust. ☞(Page 1D-26)
	Excessively worn piston rings.	Replace. ☞(Page 1D-60)
	Worn down cylinder bores.	Replace. ☞(Page 1D-47) ☞(Page 1D-51)
	Too slow starter motor cranking.	Repair or replace. ☞(Page 1I-6)
	Poor seating of spark plugs.	Retighten. ☞(Page 1H-5)
Engine will not start or is hard to start (Plug not sparking)	Defective spark plugs.	Replace. ☞(Page 1H-5)
	Too wide spark plug gap.	Replace. ☞(Page 1H-5)
	Fouled spark plugs.	Replace. ☞(Page 1H-5)
	Wet spark plugs.	Dry or replace. ☞(Page 1H-6)
	Defective ignition coils.	Replace. ☞(Page 1H-5)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective ECM.	Replace. ☞(Page 1C-4)
Open-circuited wiring connections.	Repair or replace. ☞(Page 9A-5)	
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-18) • Fuel hose: ☞(Page 1G-7)
	Defective fuel pump.	Replace. ☞(Page 1G-15)
	Defective fuel pump relay.	Replace. ☞(Page 1G-18)
	Defective fuel pressure regulator.	Replace. ☞(Page 1G-16)
	Defective fuel injectors.	Replace. ☞(Page 1G-19)
	Defective ECM.	Replace. ☞(Page 1C-4)
	Open-circuited wiring connections.	Repair and replace. ☞(Page 9A-5)
Engine will not start or is hard to start (Incorrect fuel/air mixture)	TP sensor out of adjustment.	Adjust. ☞(Page 1C-9)
	Defective fuel pump.	Replace. ☞(Page 1G-15)
	Defective fuel pressure regulator.	Replace. ☞(Page 1G-16)
	Defective TP sensor.	Replace. ☞(Page 1C-10)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective IAP sensor.	Replace. ☞(Page 1C-6)
	Defective ECM.	Replace. ☞(Page 1C-4)
	Defective ECT sensor.	Replace. ☞(Page 1C-8)
	Defective IAT sensor.	Replace. ☞(Page 1C-7)
	Defective AP sensor.	Replace. ☞(Page 1C-5)
Clogged ISC valve air passage way.	Repair or replace. ☞(Page 1D-11)	
Engine idles poorly	Valve clearance out of adjustment.	Adjust. ☞(Page 1D-26)
	Poor seating of valves.	Repair. ☞(Page 1D-44)
	Defective valve guides.	Replace. ☞(Page 1D-46)
	Worn down camshafts and/or camshafts surface.	Replace. ☞(Page 1D-19) ☞(Page 1D-20)
	Too wide spark plug gap.	Replace. ☞(Page 1H-5)
	Defective ignition coils.	Replace. ☞(Page 1H-5)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective ECM.	Replace. ☞(Page 1C-4)
	Defective TP sensor.	Replace. ☞(Page 1C-10)
	Defective fuel pump.	Replace. ☞(Page 1G-15)
	Imbalanced throttle valves.	Adjust. ☞(Page 1D-15)
	Damaged or cracked vacuum hose.	Replace.
	Damaged or clogged ISC valve.	Clean or replace. ☞(Page 1C-2)
	Dirty throttle body.	Clean. ☞(Page 1D-15)
	ISC incorrect leaning.	Reset learned value. ☞(Page 1C-3)

1A-13 Engine General Information and Diagnosis:

Condition	Possible cause	Correction / Reference Item
Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.	Repair or replace. ☞(Page 1C-6)
	Clogged fuel filter.	Clean or replace. ☞(Page 1G-18)
	Defective fuel pump.	Replace. ☞(Page 1G-15)
	Defective fuel pressure regulator.	Replace. ☞(Page 1G-16)
	Defective ECT sensor.	Replace. ☞(Page 1C-8)
	Defective thermostat.	Replace. ☞(Page 1F-14)
	Defective IAT sensor.	Replace. ☞(Page 1C-7)
	Damaged or cracked vacuum hose.	Replace.
	Damaged or clogged ISC valve.	Clean or replace. ☞(Page 1C-2)
	Engine stalls often (Fuel injector improperly operating)	Defective fuel injectors.
No injection signal from ECM.		Repair or replace. ☞(Page 1A-37)
Open or short circuited wiring connections.		Repair or replace. ☞(Page 9A-5)
Defective battery or low battery voltage.		Replace or recharge. ☞(Page 1J-8)
Engine stalls often (Control circuit or sensor improperly operating)	Defective ECM.	Replace. ☞(Page 1C-4)
	Defective fuel pressure regulator.	Replace. ☞(Page 1G-16)
	Defective TP sensor.	Replace. ☞(Page 1C-10)
	Defective IAT sensor.	Replace. ☞(Page 1C-7)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective ECT sensor.	Replace. ☞(Page 1C-8)
	Defective fuel pump relay.	Replace. ☞(Page 1G-18)
	Defective ISC valve.	Replace. ☞(Page 1C-2)
	ISC incorrect learning.	Reset learned value. ☞(Page 1C-3)
Engine stalls often (Engine internal parts improperly operating)	Fouled spark plugs.	Replace. ☞(Page 1H-5)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective ECM.	Replace. ☞(Page 1C-4)
	Clogged fuel hose.	Clean or replace. ☞(Page 1G-7)
	Valve clearance out of adjustment.	Adjust. ☞(Page 1D-26)
	Dirty throttle body.	Clean. ☞(Page 1D-15)
Noisy engine (Excessive valve chatter)	Too large valve clearance.	Adjust. ☞(Page 1D-26)
	Weakened or broken valve springs.	Replace. ☞(Page 1D-40)
	Worn tappet or camshafts surface.	Replace. ☞(Page 1D-19) ☞(Page 1D-20)
	Worn or burnt camshaft journals.	Replace. ☞(Page 1D-19) ☞(Page 1D-20)
	Noisy engine (Noise seems to come from piston)	Worn down pistons.
Worn down cylinders.		Replace. ☞(Page 1D-47) ☞(Page 1D-51)
Combustion chamber fouled with carbon.		Clean. ☞(Page 1D-46)
Worn piston pins or piston pins bore.		Replace. ☞(Page 1D-47) ☞(Page 1D-51)
Worn piston rings or ring grooves.		Replace. ☞(Page 1D-60)
Noisy engine (Noise seems to come from cam chain)		Stretched cam chain.
	Worn sprockets.	Replace. ☞(Page 1D-47) ☞(Page 1D-51)
	Cam chain tension adjuster not working.	Repair or replace. ☞(Page 1D-19) ☞(Page 1D-20)
Noisy engine (Noise seems to come from crankshaft)	Rattling bearing due to wear.	Replace. ☞(Page 1D-63)
	Worn or burnt conrod crank pin bearings.	Replace. ☞(Page 1D-71)
	Worn or burnt journal bearings.	Replace. ☞(Page 1D-63)
	Too large thrust clearance.	Replace thrust bearings. ☞(Page 1D-47) ☞(Page 1D-51)
Noisy engine (Noise seems to come from balancer)	Worn or burnt journal bearings.	Replace. ☞(Page 1D-68)

Condition	Possible cause	Correction / Reference Item
Noisy engine (Noise seems to come from water pump)	Worn or damaged impeller shaft.	Replace. ☞(Page 1F-17)
	Worn or damaged mechanical seal.	Replace. ☞(Page 1F-17)
	Contact between pump case and impeller.	Replace. ☞(Page 1F-17)
Engine runs poorly in high speed range (Defective engine internal/electrical parts)	Weakened valve springs.	Replace. ☞(Page 1D-40)
	Worn camshafts.	Replace. ☞(Page 1D-19) ☞(Page 1D-20)
	Valve clearance out of adjustment.	Adjust. ☞(Page 1D-26)
	Too narrow spark plug gap.	Replace. ☞(Page 1H-5)
	Defective ignition coils.	Replace. ☞(Page 1H-5)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective ECM.	Replace. ☞(Page 1C-4)
	Clogged air cleaner element.	Replace. ☞(Page 1D-8)
	Clogged fuel hose, resulting in inadequate fuel supply to injector.	Clean and prime.
	Defective fuel pump.	Replace. ☞(Page 1G-15)
	Defective TP sensor.	Replace. ☞(Page 1C-10)
	Defective STP sensor.	Replace. ☞(Page 1C-17)
	Defective STVA.	Replace. ☞(Page 1D-11)
Engine runs poorly in high speed range (Defective air flow system)	Clogged air cleaner element.	Replace. ☞(Page 1D-8)
	Defective throttle valve.	Adjust or replace. ☞(Page 1D-11)
	Defective secondary throttle valve.	Adjust or replace. ☞(Page 1D-11)
	Sucking air from throttle body joint or intake pipe joint.	Retighten or replace.
	Defective ECM.	Replace. ☞(Page 1C-4)
	Defective STP sensor.	Replace. ☞(Page 1C-17)
	Defective STVA.	Replace. ☞(Page 1D-11)
Engine runs poorly in high speed range (Defective control circuit or sensor)	Low fuel pressure.	Repair or replace.
	Defective TP sensor.	Replace. ☞(Page 1C-10)
	Defective IAT sensor.	Replace. ☞(Page 1C-7)
	Defective IAP sensor.	Replace. ☞(Page 1C-6)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective ECM.	Replace. ☞(Page 1C-4)
	TP sensor out of adjustment.	Adjust. ☞(Page 1C-9)
	Defective STP sensor.	Replace. ☞(Page 1C-17)
	Defective STVA.	Replace. ☞(Page 1D-11)
	Defective EXCVA.	Replace. ☞(Page 1K-8)
Engine lacks power (Defective engine internal/electrical parts)	Weakened valve springs.	Replace. ☞(Page 1D-40)
	Valve clearance out of adjustment.	Adjust. ☞(Page 1D-26)
	Worn piston rings or cylinders.	Replace. ☞(Page 1D-60)
	Poor seating of valves.	Repair. ☞(Page 1D-44)
	Fouled spark plugs.	Replace. ☞(Page 1H-5)
	Incorrect spark plugs.	Replace. ☞(Page 1H-5)
	Clogged fuel injectors.	Clean or replace. ☞(Page 1G-20)
	Clogged air cleaner element.	Replace. ☞(Page 1D-8)
	Sucking air from throttle body joint or intake pipe joint.	Retighten or replace.
	Too much engine oil.	Drain out excess oil.
	Defective fuel pump.	Replace. ☞(Page 1G-15)
	Defective ECM.	Replace. ☞(Page 1C-4)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective ignition coils.	Replace. ☞(Page 1H-5)
	Defective STP sensor.	Replace. ☞(Page 1C-17)
	Defective STVA.	Replace. ☞(Page 1D-11)

1A-15 Engine General Information and Diagnosis:

Condition	Possible cause	Correction / Reference Item
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	Repair or replace.
	Defective TP sensor.	Replace. ☞(Page 1C-10)
	Defective IAT sensor.	Replace. ☞(Page 1C-7)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective IAP sensor.	Replace. ☞(Page 1C-6)
	Defective AP sensor.	Replace. ☞(Page 1C-5)
	Defective ECM.	Replace. ☞(Page 1C-4)
	TP sensor out of adjustment.	Adjust. ☞(Page 1C-9)
	Defective STP sensor.	Replace. ☞(Page 1C-17)
	Defective STVA.	Replace. ☞(Page 1D-11)
	Defective EXCVA.	Replace. ☞(Page 1K-8)
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-13)
	Use of incorrect engine oil.	Replace. ☞(Page 1E-5)
	Sucking air from throttle body joint or intake pipe joint.	Retighten or replace.
Defective cooling system.	Refer to "Engine Cooling Symptom Diagnosis" in Section 1F (Page 1F-5).	
Engine overheats (Lean fuel/air mixture)	Short-circuited IAP sensor/lead wire.	Repair or replace. ☞(Page 1C-6)
	Short-circuited IAT sensor/lead wire.	Repair or replace. ☞(Page 1C-7)
	Sucking air from throttle body joint or intake pipe joint.	Retighten or replace.
	Defective fuel injectors.	Replace. ☞(Page 1G-19)
	Defective ECT sensor.	Replace. ☞(Page 1C-8)
Dirty or heavy exhaust smoke	Too much engine oil.	Drain out excess oil.
	Worn piston rings or cylinders.	Replace. ☞(Page 1D-60)
	Worn valve guides.	Replace. ☞(Page 1D-46)
	Scored or scuffed cylinder walls.	Replace. ☞(Page 1D-47) ☞(Page 1D-51)
	Worn valve stems.	Replace. ☞(Page 1D-40)
	Defective valve stem oil seal.	Replace. ☞(Page 1D-40)
	Worn oil ring side rails.	Replace. ☞(Page 1D-60)

DTC Check

BENK07L21104002

NOTE

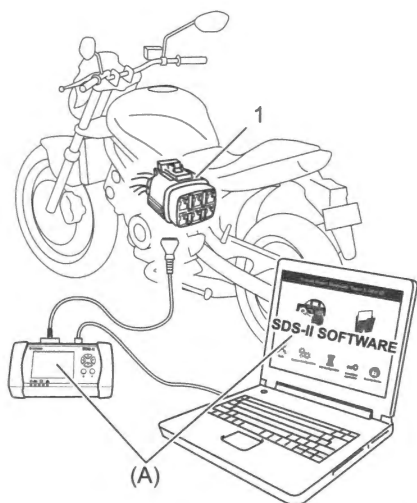
- Do not disconnect the coupler from ECM, battery cable from battery, ECM ground wire from engine or main fuse before confirming DTC stored in memory. Such disconnection will erase memorized information in ECM memory.
- Before checking DTC, read "User mode and Dealer mode" under "Self-Diagnosis Function" (Page 1A-5) carefully to have good understanding as to what functions are available and how to use it.

Use of SDS-II

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Connect the SDS-II to mode select coupler (6P) (1).

Special tool

(A): 09904-41031
09904-41040



IJ31J1452047-02

- 4) Turn the ignition switch ON.
- 5) Read DTC according to instructions displayed on SDS-II and print it or write it down. Refer to SDS-II operation manual for further details.

NOTE

Not only SDS-II used for DTCs but also for reproducing and checking on screen the failure condition as described by customers using the trigger.

How to use trigger referring to the SDS-II operation manual for further details.

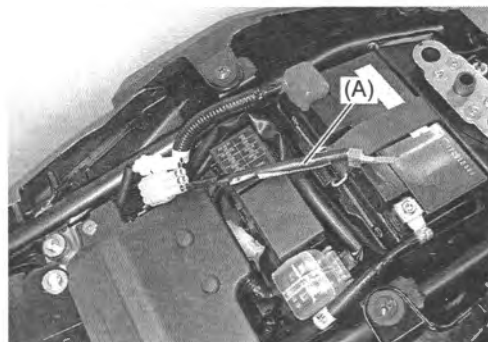
- 6) Close the SDS-II.
- 7) Turn the ignition switch OFF.
- 8) Disconnect the SDS-II from the mode select coupler (6P).
- 9) Install the removed parts.

Use of Mode Select Switch

- 1) Remove the seat. (Page 9D-19)
- 2) Connect the special tool to the mode select coupler (6P) at the wiring harness.

Special tool

(A): 09930-82720



IK07L1110012-01

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



ID26J1110213-02

- 5) Check the DTC to determine the malfunction part. (Page 1A-17)



IK07L1110013-01

DTC Clearance

BENK07L21104003

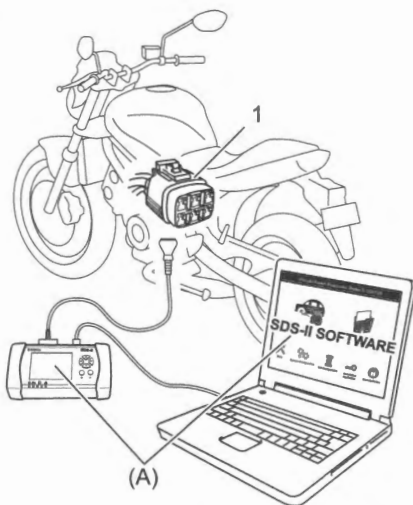
NOTE

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.

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Connect the SDS-II to the mode select coupler (6P) (1).

Special tool

(A): 09904-41031
09904-41040



IJ31J1452047-02

- 4) Turn the ignition switch ON.
- 5) Clear DTC according to instructions displayed on SDS-II. Refer to SDS-II operation manual for further details.
- 6) Close the SDS-II.
- 7) Turn the ignition switch OFF.
- 8) Disconnect the SDS-II from the mode select coupler (6P).
- 9) Install the removed parts.

DTC Table

BENK07L21104004

DTC		DTC name	DTC detecting condition
—	C00	None	—
P0030	C44	HO2 Sensor Heater Control Circuit Bank 1 Sensor 1 (Page 1A-23)	HO2 sensor heater drive circuit is shorted to ground or open.
P0105	C17	IAP Sensor Circuit (Page 1A-25)	The sensor output voltage is higher than 4.85 V.
P0106		IAP Sensor Circuit Range / Performance (Page 1A-25)	The IAP sensor vacuum hose has come off.
P0107		IAP Sensor Circuit Low (Page 1A-25)	The sensor output voltage is lower than 0.5 V.
P0110	C21	IAT Sensor 1 Circuit (Page 1A-27)	The sensor output voltage is higher than 4.85 V.
P0112		IAT Sensor 1 Circuit Low (Page 1A-27)	The sensor output voltage is lower than 0.15 V.
P0115	C15	ECT Sensor Circuit (Page 1A-29)	The sensor output voltage is higher than 4.85 V.
P0117		ECT Sensor Circuit Low (Page 1A-29)	The sensor output voltage is lower than 0.15 V.

DTC		DTC name	DTC detecting condition
P0120	C14	TP Sensor / Switch "A" Circuit ☞(Page 1A-31)	The sensor output voltage is lower than 0.2 V.
P0123		TP Sensor / Switch "A" Circuit High ☞(Page 1A-31)	The sensor output voltage is higher than 4.8 V.
P0130	C44	O2 Sensor Circuit Bank 1 Sensor 1 ☞(Page 1A-33)	HO2 sensor output voltage is not input to ECM during engine operation and running condition.
P0170	C45	Fuel Trim Bank 1 ☞(Page 1A-35)	The fuel trim correction is out of its threshold value.
P0201	C32	Injector Circuit / Open – Cylinder 1 ☞(Page 1A-37)	Fuel injector #1 signal is interrupted by 4 times or more continuity although CKP signal is detected.
P0202	C33	Injector Circuit / Open – Cylinder 2 ☞(Page 1A-37)	Fuel injector #2 signal is interrupted by 4 times or more continuity although CKP signal is detected.
P0203	C34	Injector Circuit / Open – Cylinder 3 ☞(Page 1A-37)	Fuel injector #3 signal is interrupted by 4 times or more continuity although CKP signal is detected.
P0204	C35	Injector Circuit / Open – Cylinder 4 ☞(Page 1A-37)	Fuel injector #4 signal is interrupted by 4 times or more continuity although CKP signal is detected.
P0220	C29	TP Sensor / Switch "B" Circuit ☞(Page 1A-39)	The sensor output voltage is lower than 0.15 V.
P0223		TP Sensor / Switch "B" Circuit High ☞(Page 1A-39)	The sensor output voltage is higher than 4.85 V.
P0231	C41	FP Secondary Circuit Low ☞(Page 1A-41)	No voltage is applied to fuel pump although FP relay is ON.
P0232		FP Secondary Circuit High ☞(Page 1A-41)	Voltage is applied to fuel pump although the FP relay is OFF.
P0335	C12	CKP Sensor "A" Circuit ☞(Page 1A-43)	The signal does not reach ECM for 2 seconds or more, after receiving the starter signal.
P0351	C24	Ignition Coil "A" Primary / Secondary Circuit ☞(Page 1A-45)	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-45)	Ignition coil #2 signal is interrupted by 8 times or more continuity although CKP signal is detected.
P0353	C26	Ignition Coil "C" Primary / Secondary Circuit ☞(Page 1A-45)	Ignition coil #3 signal is interrupted by 8 times or more continuity although CKP signal is detected.
P0354	C27	Ignition Coil "D" Primary / Secondary Circuit ☞(Page 1A-45)	Ignition coil #4 signal is interrupted by 8 times or more continuity although CKP signal is detected.
P0418	C49	PAIR System Control "A" Circuit ☞(Page 1A-45)	PAIR control solenoid valve voltage is not input to ECM.
P0443 *1	C62 *1	EVAP System Purge Control Valve Circuit ☞(Page 1A-47)	EVAP system purge control solenoid valve voltage is not input to ECM.
P0480	C60	Fan 1 Control Circuit ☞(Page 1A-49)	Cooling fan relay signal is not input to ECM.
P0500	C16	Vehicle Speed Sensor "A" ☞(Page 1A-51)	The front wheel speed sensor signal is not input for more than 3 seconds.
P0505	C40	ISC System Circuit ☞(Page 1A-53)	The circuit voltage of motor drive is unusual.

1A-19 Engine General Information and Diagnosis:

DTC		DTC name	DTC detecting condition
P0506	C65	ISC System RPM Lower Than Expected ☞(Page 1A-55)	Idle speed dropped lower than desired idle speed by more than specified range.
P0507		ISC System RPM Higher Than Expected ☞(Page 1A-55)	Idle speed rose higher than desired idle speed by more than specified range.
P0914	C31	GP Sensor Circuit ☞(Page 1A-57)	Gear position signal voltage is lower than specified value.
P1100	C13	IAP Sensor 2 Circuit ☞(Page 1A-59)	The sensor output voltage is higher than 4.85 V.
P1101		IAP Sensor 2 Circuit Range / Performance ☞(Page 1A-59)	The AP sensor vacuum hose has come off.
P1102		IAP Sensor 2 Circuit Low ☞(Page 1A-59)	The sensor output voltage is lower than 0.5 V.
P1400	C46	EXCVA Position Sensor Circuit ☞(Page 1A-61)	The sensor output voltage is higher than 4.9 V.
P1401		EXCVA Position Sensor Circuit Low ☞(Page 1A-61)	The sensor output voltage is lower than 0.14 V.
P1403	C46	EXCVA Circuit Low Voltage ☞(Page 1A-65)	EXCVA control signal is not supplied from the ECM. ECM does not receive communication signal from the EXCVA or operation voltage does not reach EXCVA motor.
P1610	C42	Ignition Switch Signal Circuit ☞(Page 1A-67)	Ignition switch signal is not input to the ECM. When the ID agreement is not verified. (With immobilizer system) ECM does not receive communication signal from the immobilizer antenna. (With immobilizer system)
P1700	C23	TO Sensor Circuit ☞(Page 1A-67)	The sensor output voltage is lower than 0.2 V.
P1702		TO Sensor Circuit High ☞(Page 1A-67)	The sensor output voltage is higher than 4.8 V.
P2100	C28	Throttle Actuator "A" Control Motor Circuit ☞(Page 1A-69)	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 is fixed.
P2158	C91	Vehicle Speed Sensor "B" ☞(Page 1A-51)	The rear wheel speed sensor signal is not input for more than 3 seconds.
P2505	C41	ECM Power Input Signal ☞(Page 1A-71)	No voltage is applied to the ECM although the ignition switch is turned ON.

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

*1

If equipped.

Fail-Safe Function Table

BENK07L21104005

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	Intake air pressure value is fixed to approx. 100 kPa (760 mmHg).	"YES"	"YES"
TP sensor	The throttle opening is fixed to full open position. Ignition timing is also fixed.	"YES"	"YES"
ECT sensor	Engine coolant temperature value is fixed to 80 °C (176 °F). Cooling fan is fixed on position.	"YES"	"YES"
IAT sensor	Intake air temperature value is fixed to 25 °C (77 °F).	"YES"	"YES"
AP sensor	Atmospheric pressure is fixed to approx. 100 kPa (760 mmHg).	"YES"	"YES"
Ignition signal	#1 fuel-cut	"YES"	"YES"
		#2, #3 & #4 cylinders can run.	
	#2 fuel-cut	"YES"	"YES"
		#1, #3 & #4 cylinders can run.	
	#3 fuel-cut	"YES"	"YES"
	#1, #2 & #4 cylinders can run.		
	#4 fuel-cut	"YES"	"YES"
		#1, #2 & #3 cylinders 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 open position.	"YES"	"YES"
GP signal	Gear position signal is fixed to 6th gear.	"YES"	"YES"
HO2 sensor	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	"YES"	"YES"
PAIR control solenoid valve	ECM stops controlling PAIR control solenoid valve.	"YES"	"YES"
EXCVA	EXCVA is fixed to full open position. When motor disconnection or lock occurs, power from ECM is shut off.	"YES"	"YES"
ISC valve	When motor disconnection or lock occurs, power from ECM is shut off.	"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

BENK07L21104006

Customer Complaint Analysis

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

NOTE

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

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

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

MIL condition (LED)	<input type="checkbox"/> Always ON / <input type="checkbox"/> Sometimes ON / <input type="checkbox"/> Always OFF / <input type="checkbox"/> Good condition
Malfunction display/code (LCD)	User mode: <input type="checkbox"/> No display / <input type="checkbox"/> Malfunction display ()
	Dealer mode: <input type="checkbox"/> No code / <input type="checkbox"/> Malfunction code ()

PROBLEM SYMPTOMS

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

MOTORCYCLE/ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS

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

Visual Inspection

Prior to diagnosis using the SDS-II or mode select switch, 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 SDS-II or mode select switch.

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-6)
Air cleaner element	Dirt	☞ (Page 1D-8)
	Clogging	
Battery	Corrosion of terminal	☞ (Page 1J-9)
Throttle cable	Play	☞ (Page 1D-10)
Vacuum hoses of air intake system	Disconnection	—
	Looseness	—
	Bend	—
Fuses	Burning	—
MIL	Operation	☞ (Page 1A-5)
Each indicator light	Operation	☞ (Page 9C-7)
Combination meter	Operation	☞ (Page 9C-7)
Exhaust system	Leakage of exhaust gas	☞ (Page 1K-19)
	Noise	
Harness coupler	Disconnection	☞ (Page 00-2)
	Poor contact	

DTC P0030 (C44)

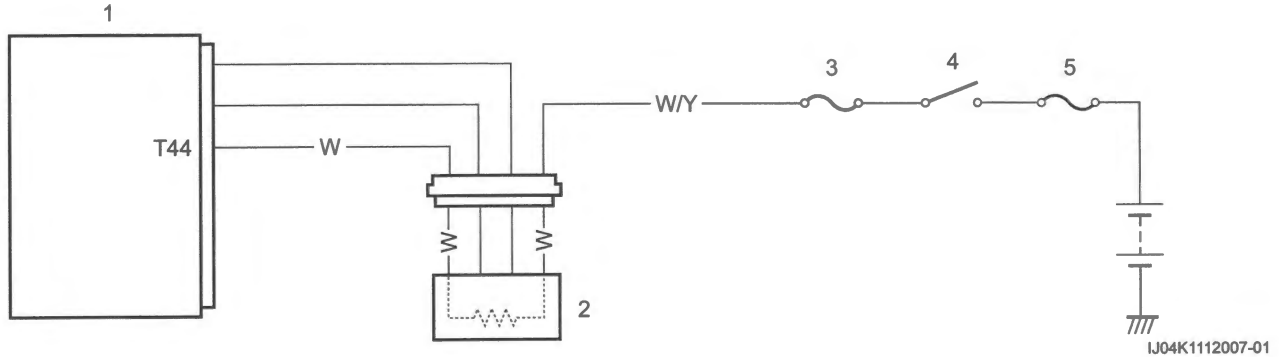
BENK07L21104007

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P0030 (C44): HO2 Sensor Heater Control Circuit Bank 1 Sensor 1 HO2 sensor heater drive circuit is shorted to ground or open.</p>	<ul style="list-style-type: none"> • HO2 sensor heater • HO2 sensor heater circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



1. ECM	3. Ignition fuse	5. Main fuse
2. HO2 sensor	4. Ignition switch	

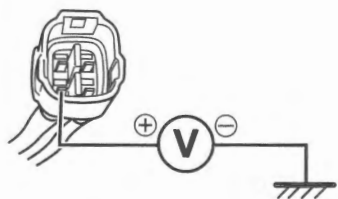
Troubleshooting

Step 1

HO2 sensor heater power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor coupler. (Page 1C-12)
- 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/Y wire and ground.

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



IE31J1110202-01

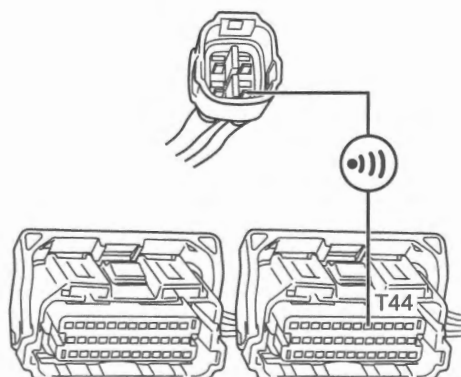
Is check result OK?

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

Step 2

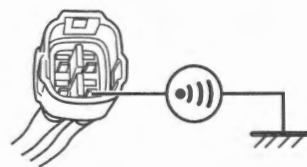
HO2 sensor heater drive circuit check

- 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 wire: less than 1 Ω



IJ04K1112008-01

- Between W wire and ground: infinity



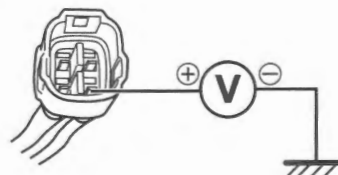
ID26J1110062-03

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



ID26J1110055-05

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



ID26J1110064-03

Is check result OK?

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

Step 3

HO2 sensor heater resistance check

- 1) Turn the ignition switch OFF.
- 2) Measure the HO2 sensor heater resistance. Refer to "HO2 Sensor Heater Resistance" under "HO2 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 HO2 sensor with a new one. (Page 1C-12)

DTC P0105 / P0106 / P0107 (C17)

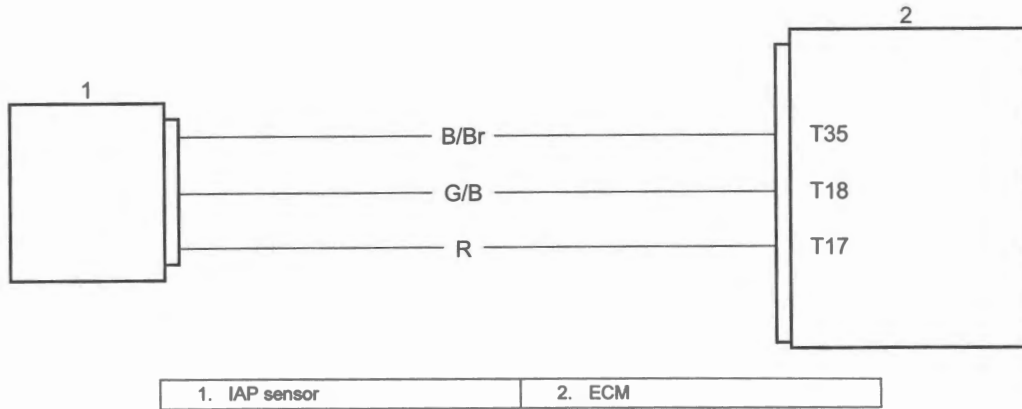
BENK07L21104008

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0105 (C17): IAP Sensor Circuit The sensor output voltage is higher than 4.85 V.	<ul style="list-style-type: none"> • Vacuum passage between throttle body and IAP sensor • IAP sensor • IAP sensor circuit • ECM
P0106 (C17): IAP Sensor Circuit Range / Performance The IAP sensor vacuum hose has come off.	
P0107 (C17): IAP Sensor Circuit Low The sensor output voltage is lower than 0.5 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K112009-01

Troubleshooting

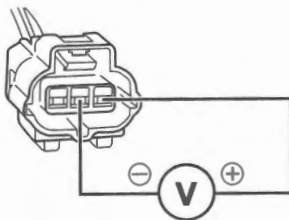
Step 1

IAP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the IAP sensor coupler. (Page 1C-6)
- 3) Check for proper terminal connection to the IAP sensor 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 power supply voltage

[Standard]: 4.5 – 5.5 V



IJ04K112010-01

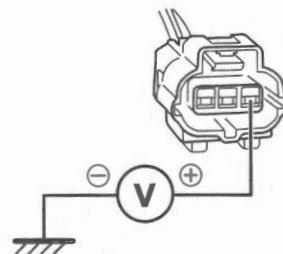
Is check result OK?

- 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.



IJ04K112011-01

Is voltage specified range in Step 1?

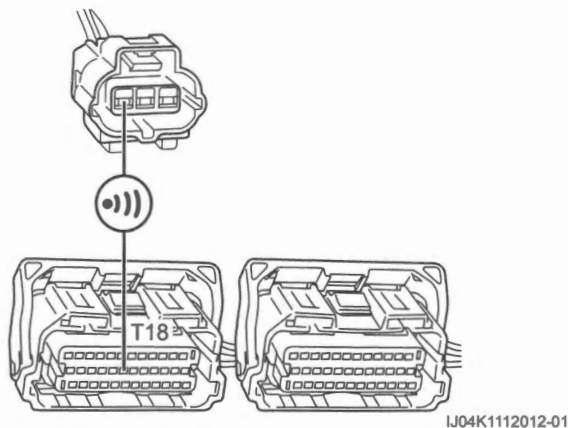
- Yes Repair or replace the B/Br wire.
- No Repair or replace the R wire.

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/B wire: less than 1 Ω



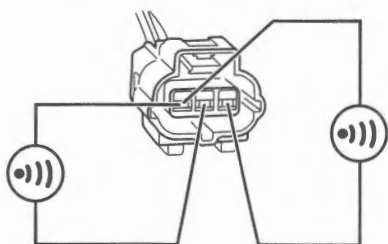
IJ04K1112012-01

– Between G/B wire and ground: infinity



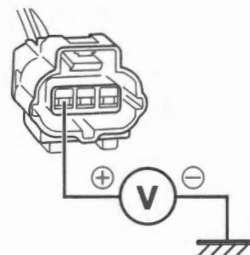
IJ04K1112013-01

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



IJ04K1112014-01

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



IJ04K1112015-01

Is check result OK?

- Yes Go to Step 4.
- No Repair or replace the G/B wire.

Step 4

IAP sensor output voltage at idle speed check

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM couplers and IAP sensor coupler.
- 3) Measure the IAP sensor output voltage at idle speed. Refer to "IAP Sensor Output Voltage at Idle Speed" under "IAP Sensor Inspection" in Section 1C (Page 1C-6).

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 with a new one. (Page 1C-6)

Step 5

IAP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the IAP sensor. (Page 1C-6)
- 3) Measure the IAP sensor output voltage. Refer to "IAP Sensor Output Voltage" under "IAP Sensor Inspection" in Section 1C (Page 1C-6).

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 with a new one. (Page 1C-6)

DTC P0110 / P0112 (C21)

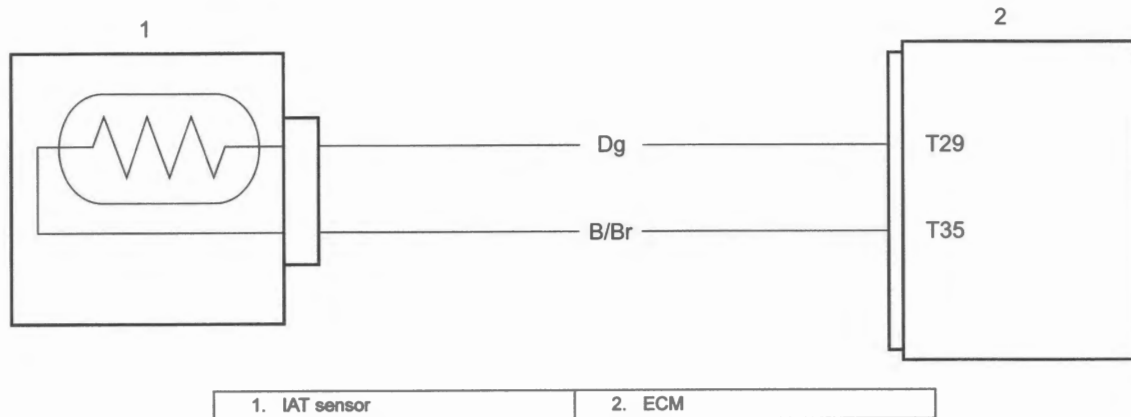
BENK07L21104009

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0110 (C21): IAT Sensor 1 Circuit The sensor output voltage is higher than 4.85 V.	<ul style="list-style-type: none"> • IAT sensor • IAT sensor circuit • ECM
P0112 (C21): IAT Sensor 1 Circuit Low The sensor output voltage is lower than 0.15 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



Troubleshooting

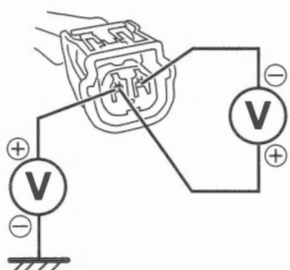
Step 1

IAT sensor input voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the IAT sensor coupler. (Page 1C-7)
- 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

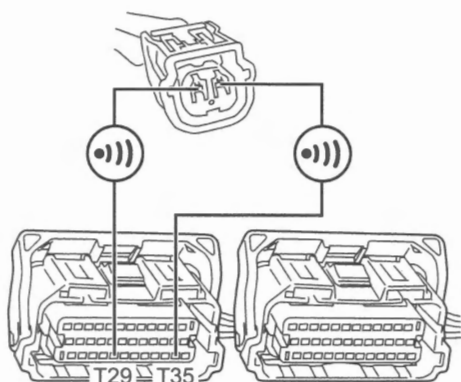
Is check result OK?

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

Step 2

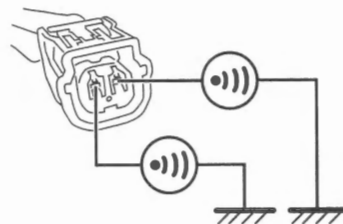
IAT sensor circuit check

- 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



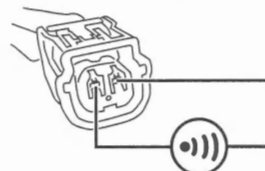
IJ04K1112017-01

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



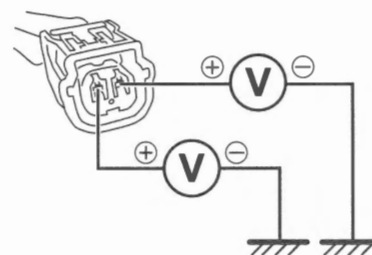
IH18K1110012-01

- 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-6)

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. (Page 1C-7)

DTC P0115 / P0117 (C15)

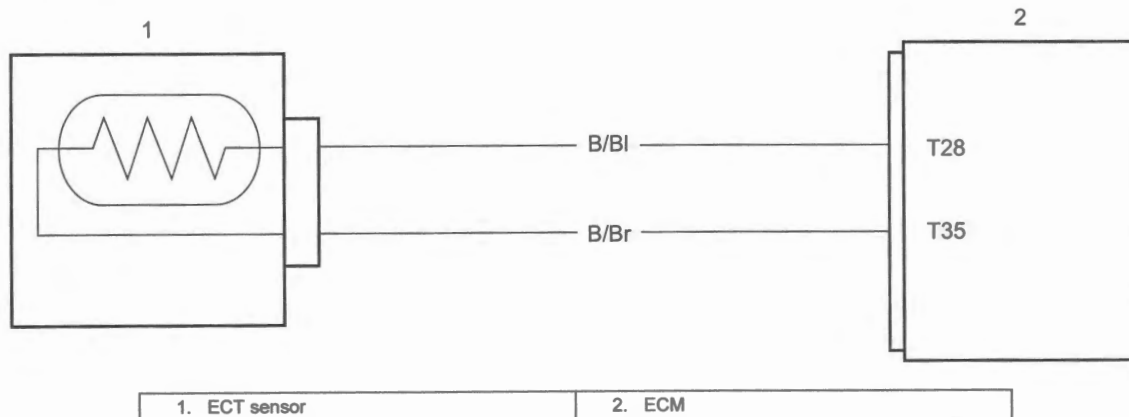
BENK07L21104010

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.	<ul style="list-style-type: none"> • ECT sensor • ECT sensor circuit • ECM
P0117 (C15): ECT Sensor Circuit Low The sensor output voltage is lower than 0.15 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



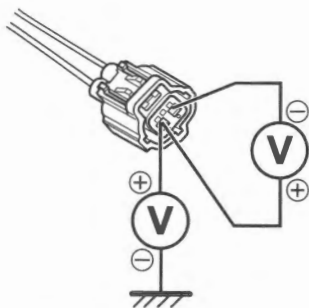
Troubleshooting

Step 1

ECT sensor power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECT sensor coupler. (Page 1C-8)
- 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/BI wire and ground.
- 6) If OK, measure the voltage between the B/BI wire and B/Br wire.

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



ID26J1110038-05

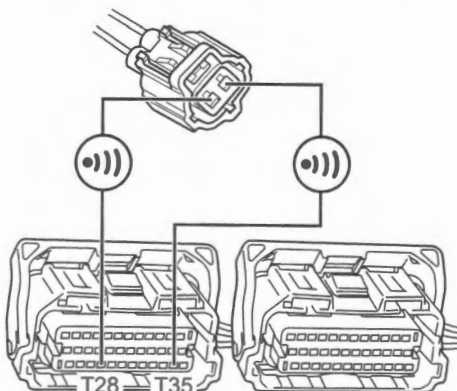
Is check result OK?

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

Step 2

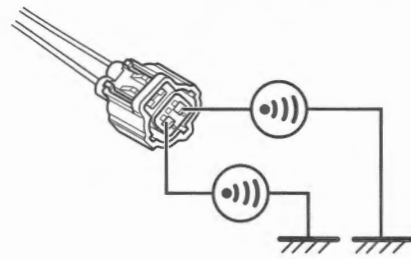
ECT sensor circuit check

- 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/BI wire and B/Br wire: less than 1 Ω



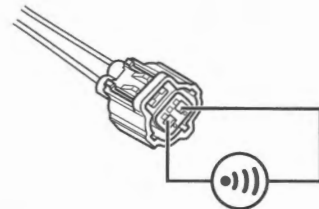
IJ04K1112019-01

- Between B/BI wire and ground: infinity
- Between B/Br wire and ground: infinity



ID26J1110038-04

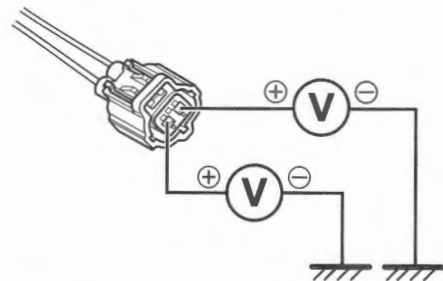
- Between B/BI wire terminal and B/Br wire terminal at ECT sensor coupler: infinity



ID26J1110039-04

• Voltage

- Turn the ignition switch ON.
- B/BI 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-7)

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-4)
- No Replace the ECT sensor with a new one. (Page 1C-8)

DTC P0120 / P0123 (C14)

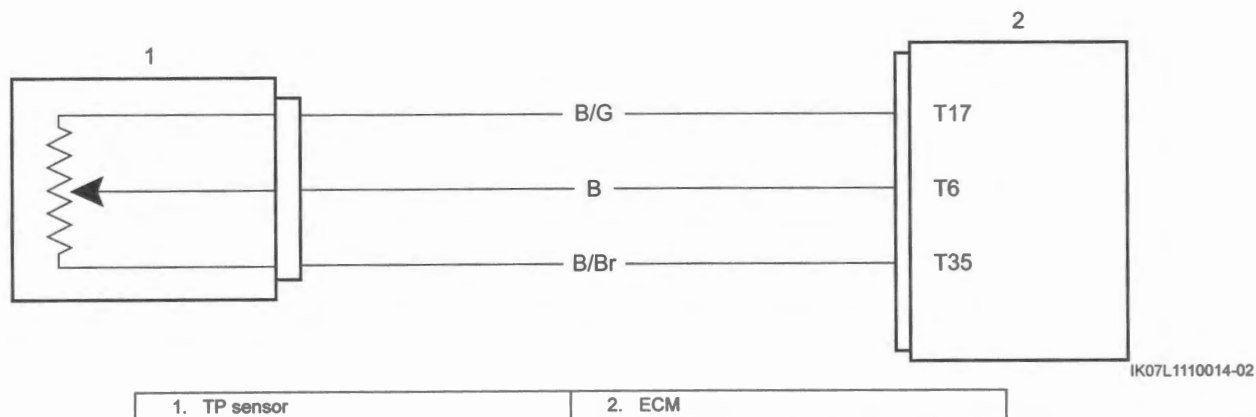
BENK07L21104011

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 0.2 V.	<ul style="list-style-type: none"> • TP sensor • TP sensor circuit • ECM
P0123 (C14): TP Sensor / Switch "A" Circuit High The sensor output voltage is higher than 4.8 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



Troubleshooting

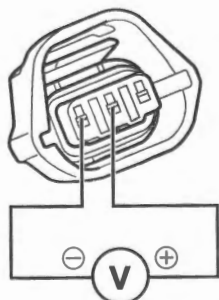
Step 1

TP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the TP sensor coupler. (Page 1C-10)
- 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 B/G wire and B/Br wire.

TP sensor power supply voltage

[Standard]: 4.5 – 5.5 V



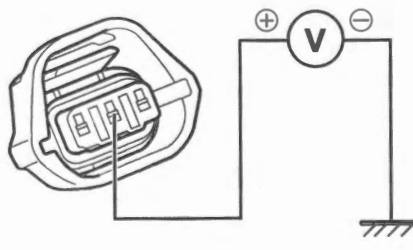
Is check result OK?

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

Step 2

TP sensor ground circuit check

- 1) Measure the voltage between the B/G wire and ground.



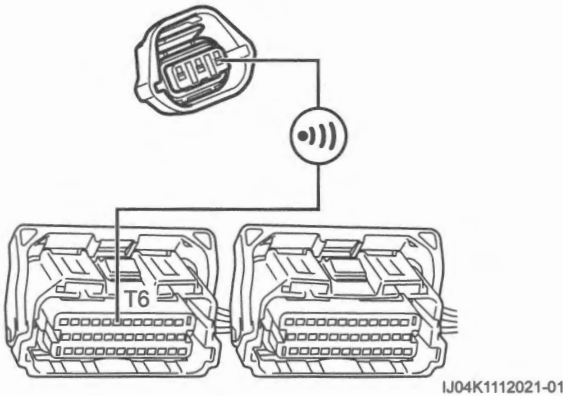
Is voltage specified range in Step 1?

- Yes Repair or replace the B/Br wire.
- No Repair or replace the B/G wire.

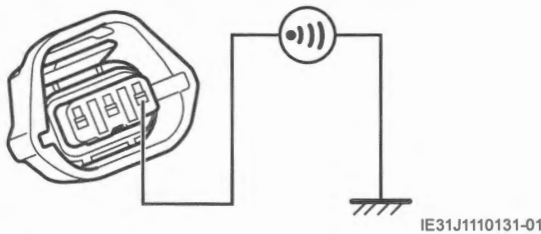
Step 3

TP sensor signal circuit check

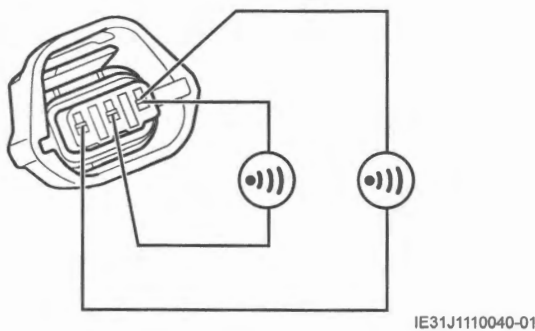
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-4)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - B wire: less than 1 Ω



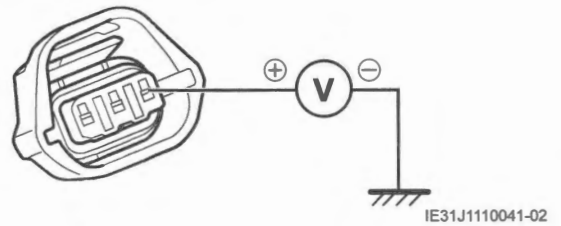
– Between B wire and ground: infinity



– Between B wire terminal and other terminal at TP sensor coupler: infinity



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



Is check result OK?

- Yes Go to Step 4.
- No Repair or replace the B 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-8)

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-10)

DTC P0130 (C44)

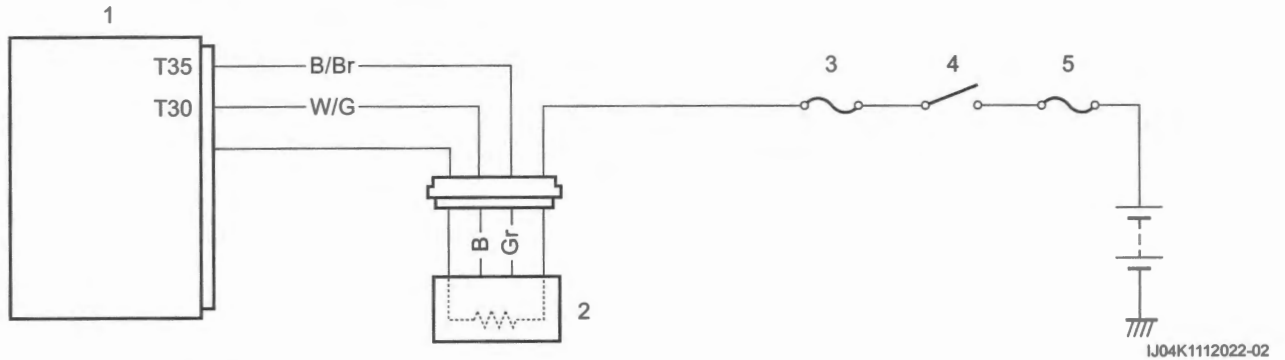
BENK07L21104012

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble Area
<p>P0130 (C44): O2 Sensor Circuit Bank 1 Sensor 1 HO2 sensor output voltage is not input to ECM during engine operation and running condition.</p>	<ul style="list-style-type: none"> • HO2 sensor • HO2 sensor circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



1. ECM	3. Ignition fuse	5. Main fuse
2. HO2 sensor	4. Ignition switch	

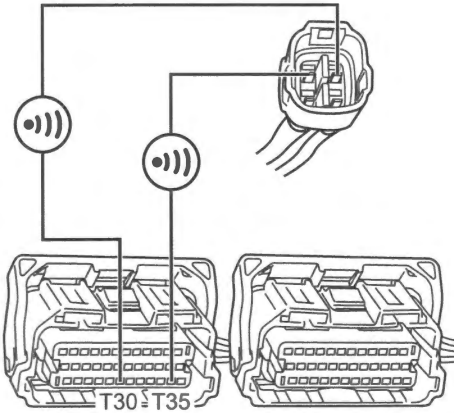
IJ04K1112022-02

Troubleshooting

Step 1

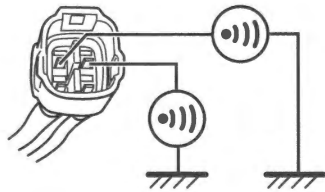
HO2 sensor circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor coupler and ECM couplers.
 - HO2 sensor: (Page 1C-12)
 - 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



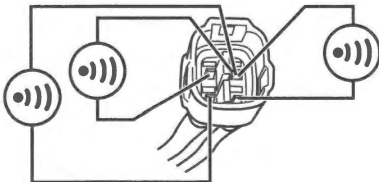
IJ04K1112023-01

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



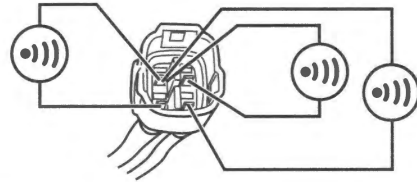
ID26J1110054-03

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



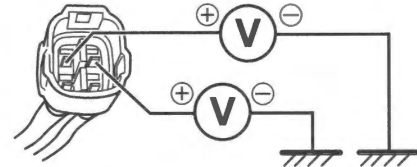
ID26J1110208-01

- 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 Removal and Installation" in Section 1C (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 HO2 sensor with a new one. (Page 1C-12)

DTC P0170 (C45)

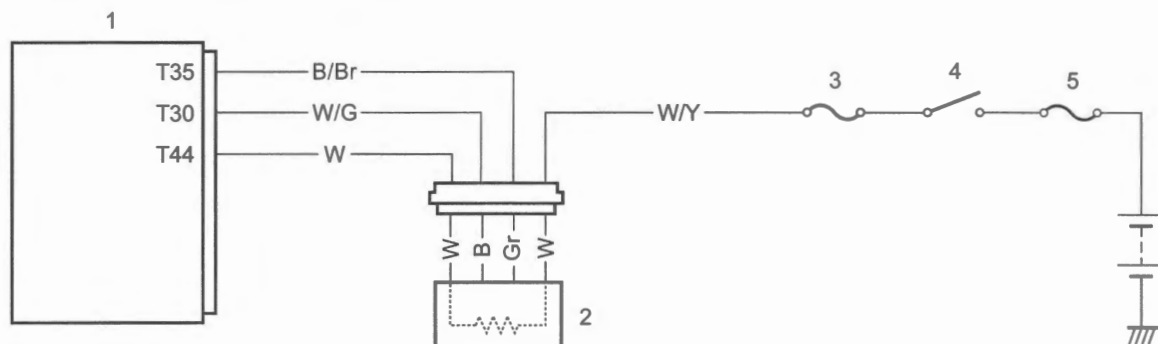
BENK07L21104013

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble Area
<p>P0170 (C45): Fuel Trim Bank 1 The fuel trim correction is out of its threshold value.</p>	<ul style="list-style-type: none"> • 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-7).



IJ04K1112024-01

1. ECM	3. Ignition fuse	5. Main fuse
2. HO2 sensor	4. 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-5)
 - Fuel injector circuit: Refer to "Wiring Diagram" under "DTC P0201 (C32) / P0202 (C33) / P0203 (C34) / P0204 (C35)" (Page 1A-37).
 - Fuel injector: ☞(Page 1G-20)
 - IAP sensor: ☞(Page 1C-6)
 - AP sensor: ☞(Page 1C-5)
 - PAIR system: ☞(Page 1B-10)
 - EVAP control system (If equipped): ☞(Page 1B-13)
 - PCV hose: ☞(Page 1B-11)

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-19)
 - Air intake system: Refer to "Step 3" under "DTC P0506 / P0507 (C65)" (Page 1A-55).

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 (C44)" (Page 1A-33).

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-12)
- 2) Perform "DTC Check" (Page 1A-16) and recheck 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) / P0202 (C33) / P0203 (C34) / P0204 (C35)

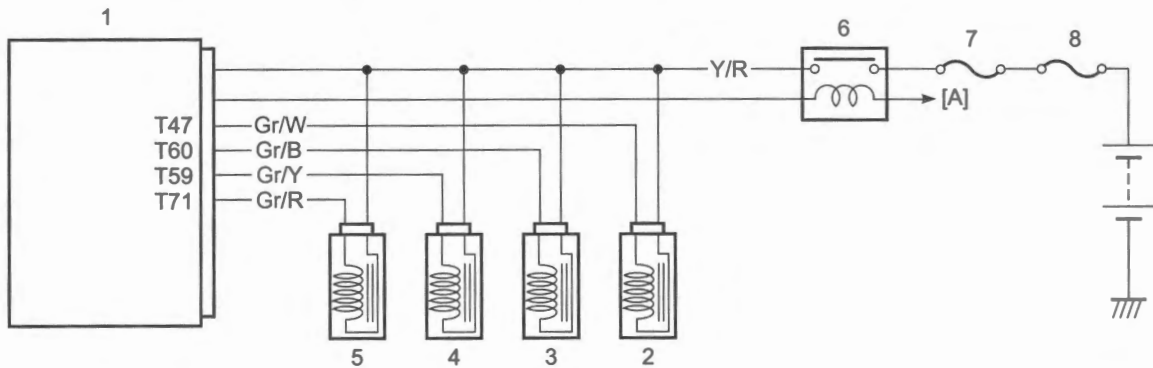
BENK07L21104014

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 4 times or more continuity although CKP signal is detected.	<ul style="list-style-type: none"> Fuel injector #1 Fuel injector #1 circuit ECM
P0202 (C33): Injector Circuit / Open – Cylinder 2 Fuel injector #2 signal is interrupted by 4 times or more continuity although CKP signal is detected.	<ul style="list-style-type: none"> Fuel injector #2 Fuel injector #2 circuit ECM
P0203 (C34): Injector Circuit / Open – Cylinder 3 Fuel injector #3 signal is interrupted by 4 times or more continuity although CKP signal is detected.	<ul style="list-style-type: none"> Fuel injector #3 Fuel injector #3 circuit ECM
P0204 (C35): Injector Circuit / Open – Cylinder 4 Fuel injector #4 signal is interrupted by 4 times or more continuity although CKP signal is detected.	<ul style="list-style-type: none"> Fuel injector #4 Fuel injector #4 circuit ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K1112025-01

[A]: To engine stop switch	3. Fuel injector #2	6. FP relay
1. ECM	4. Fuel injector #3	7. Fuel fuse
2. Fuel injector #1	5. Fuel injector #4	8. Main fuse

Troubleshooting

Step 1

Fuel injector power supply voltage check

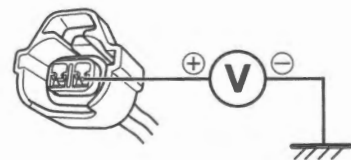
- Turn the ignition switch OFF.
- Disconnect the fuel injector coupler. Refer to "Fuel Injector On-Vehicle Inspection" in Section 1G (Page 1G-19).
- Connect the immobilizer antenna coupler and install the fuel tank lower cover. (If equipped) Refer to "Fuel Pressure Inspection" in Section 1G (Page 1G-5).
- Check for proper terminal connection to the fuel injector coupler.
- If connections are OK, turn the ignition switch ON.

- 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 power supply voltage
[Standard]: Battery voltage



IF04K1110023-01

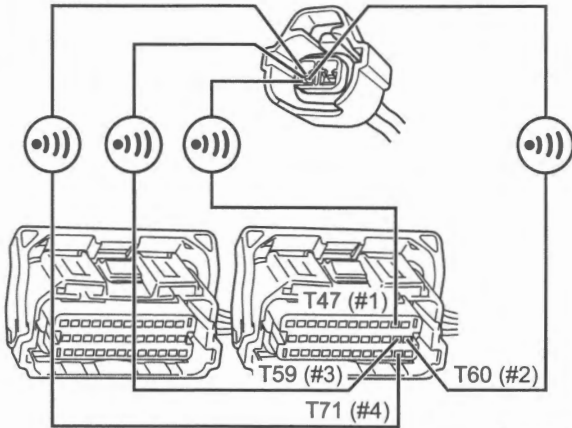
Is check result OK?

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

Step 2

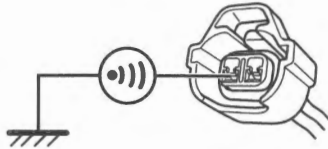
Fuel injector drive circuit check

- 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 (#1), Gr/B (#2), Gr/Y (#3) or Gr/R (#4) wire: less than 1 Ω



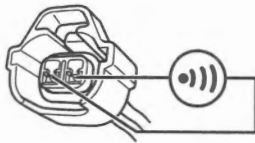
IJ04K1112026-01

- Between Gr/W (#1), Gr/B (#2), Gr/Y (#3) or Gr/R (#4) wire and ground: infinity



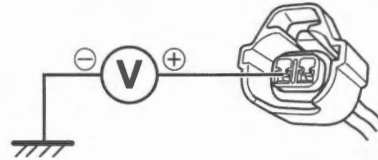
IF04K1110025-01

- Between Gr/W (#1), Gr/B (#2), Gr/Y (#3) or Gr/R (#4) wire terminal and Y/R wire terminal at fuel injector coupler: infinity



IF04K1110026-01

- Voltage
 - Turn the ignition switch ON.
 - Gr/W (#1), Gr/B (#2), Gr/Y (#3) or Gr/R (#4) wire: approx. 0 V



IF04K1110027-01

Is check result OK?

- Yes Go to Step 3.
- No Repair or replace the defective wire harness.

Step 3

Fuel injector resistance check

- 1) Turn the ignition switch OFF.
- 2) Measure the fuel injector resistance. (Page 1G-19)

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 with a new one. (Page 1G-19)

DTC P0220 / P0223 (C29)

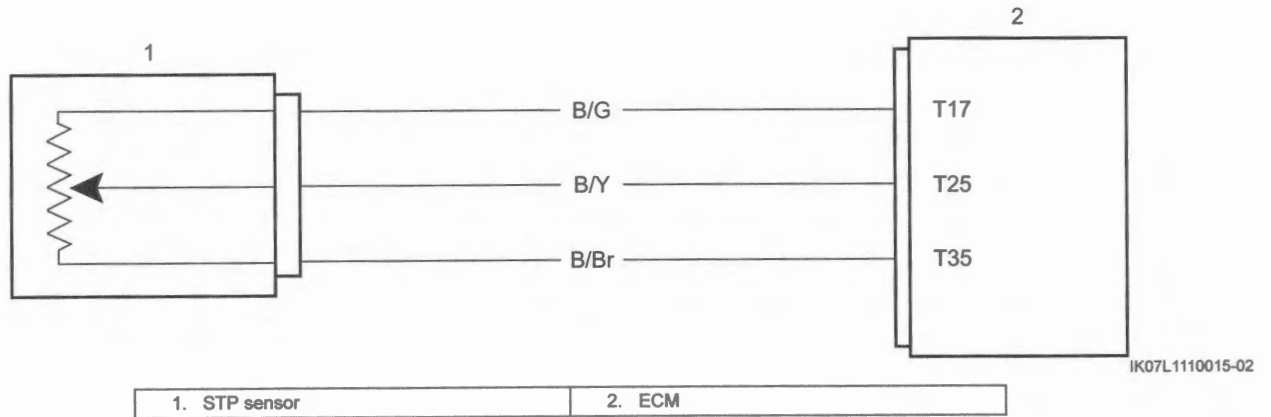
BENK07L21104015

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0220 (C29): TP Sensor / Switch "B" Circuit The sensor output voltage is lower than 0.15 V.	<ul style="list-style-type: none"> • STP sensor • STP sensor circuit
P0223 (C29): TP Sensor / Switch "B" Circuit High The sensor output voltage is higher than 4.85 V.	<ul style="list-style-type: none"> • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



Troubleshooting

Step 1

STP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the STP sensor coupler. (Page 1C-17)
- 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 B/G wire and B/Br wire.

STP sensor power supply voltage

[Standard]: 4.5 – 5.5 V



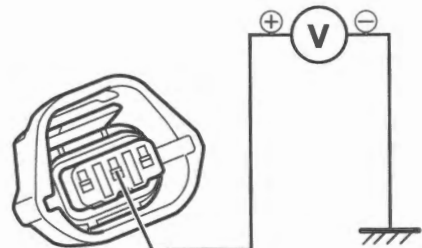
Is check result OK?

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

Step 2

STP sensor ground circuit check

- 1) Measure the voltage between the B/G wire and ground.



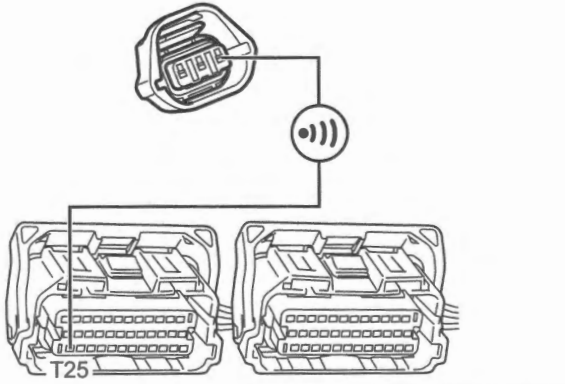
Is voltage specified range in Step 1?

- Yes Repair or replace the B/Br wire.
- No Repair or replace the B/G wire.

Step 3

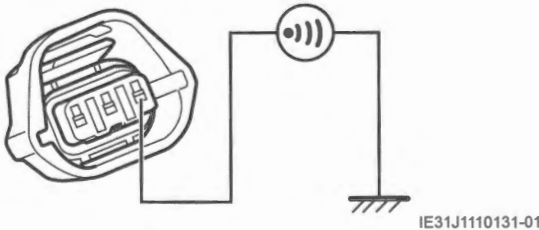
STP sensor signal circuit check

- 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
 - B/Y wire: less than 1 Ω



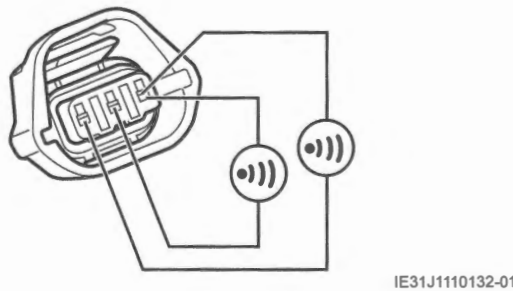
IJ04K1112072-01

– Between B/Y wire and ground: infinity



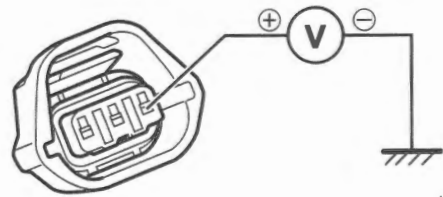
IE31J1110131-01

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



IE31J1110132-01

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



IE31J1110133-01

Is check result OK?

- Yes Go to Step 4.
- No Repair or replace the B/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-16)

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-17)

DTC P0231 / P0232 (C41)

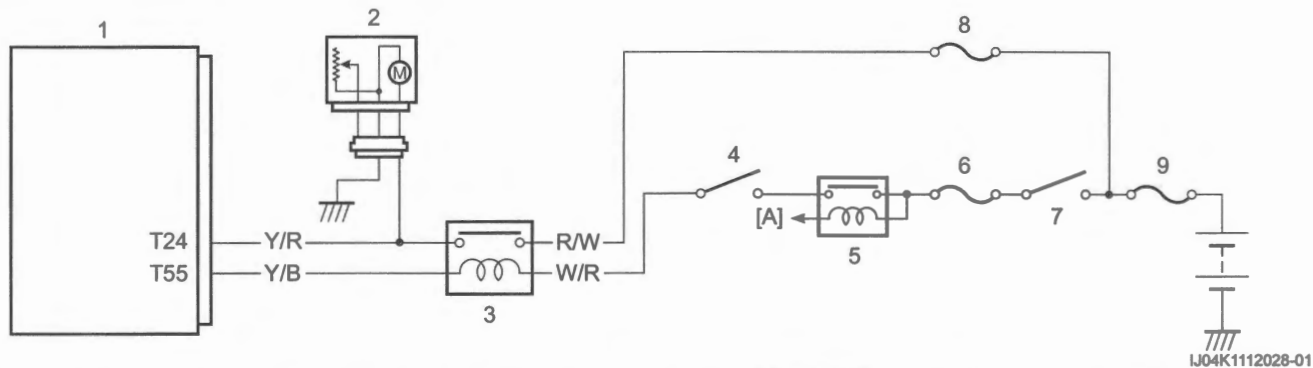
BENK07L21104016

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0231 (C41): FP Secondary Circuit Low No voltage is applied to fuel pump although the FP relay is ON.	<ul style="list-style-type: none"> Fuel pump relay Fuel pump relay circuit ECM
P0232 (C41): FP Secondary Circuit High Voltage is applied to fuel pump although the FP relay is OFF.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



[A]: To side-stand switch	4. Engine stop switch	8. Fuel fuse
1. ECM	5. Side-stand relay	9. Main fuse
2. Fuel pump	6. Ignition fuse	
3. FP relay	7. Ignition switch	

Troubleshooting

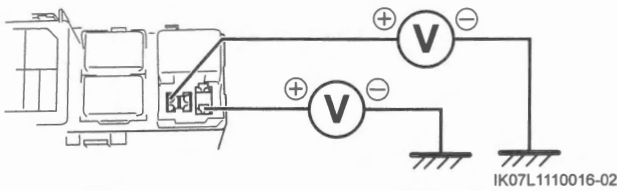
Step 1

FP relay power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the FP relay. (Page 1G-18)
- 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.

FP relay power supply voltage

[Standard]: Battery voltage



Is check result OK?

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

Step 2

FP relay check

- 1) Check the FP relay. (Page 1G-18)

Is check result OK?

- Yes Go to Step 3.
- No Replace the FP relay with a new one. (Page 1G-18)

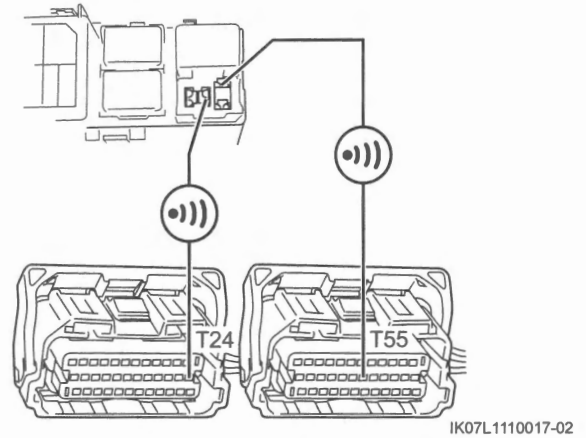
Step 3

FP relay drive circuit check

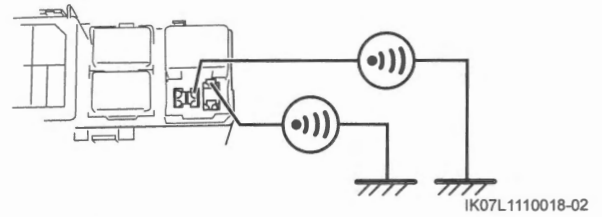
- 1) Turn the ignition switch OFF.
- 2) Disconnect the fuel pump coupler and ECM couplers.
 - Fuel pump: (Page 1G-11)
 - ECM: (Page 1C-4)
- 3) Check for proper terminal connection to the ECM couplers.

- 4) If connections are OK, check the following points.

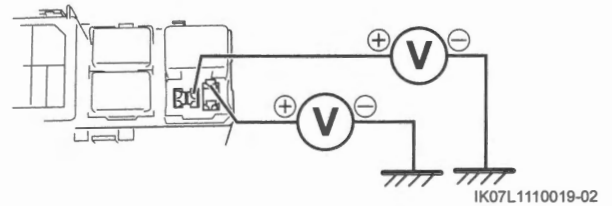
- Resistance
 - Y/R wire and Y/B wire: less than 1 Ω



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



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



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.

DTC P0335 (C12)

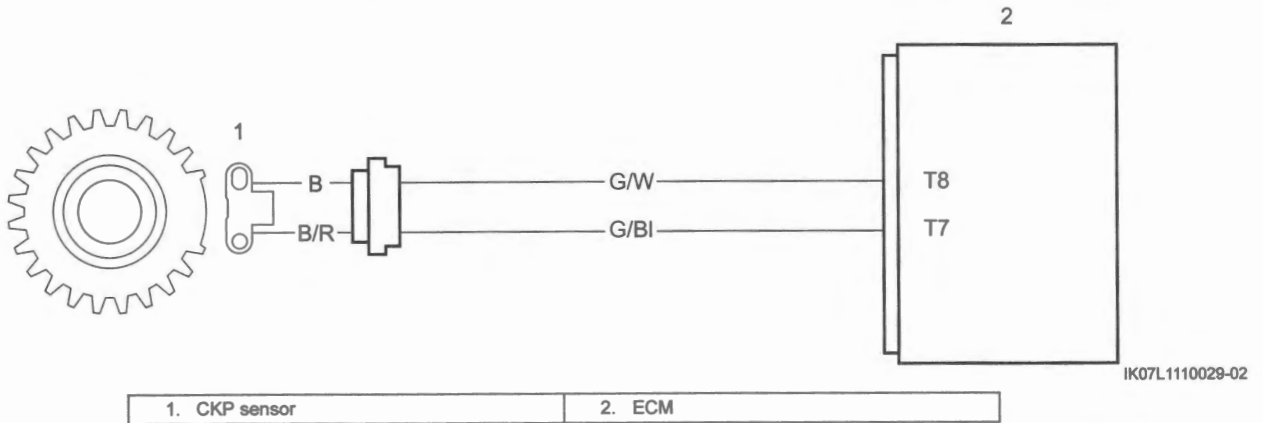
BENK07L21104017

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P0335 (C12): CKP Sensor "A" Circuit The signal does not reach ECM for 2 seconds or more, after receiving the starter signal.</p>	<ul style="list-style-type: none"> • 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-7).



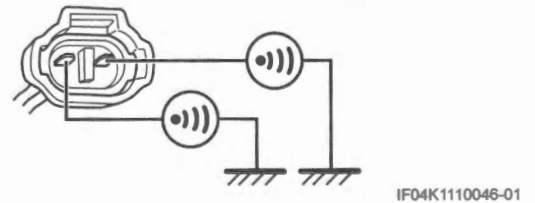
Troubleshooting

Step 1

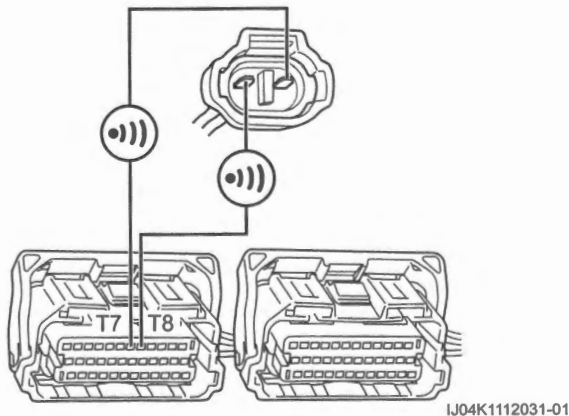
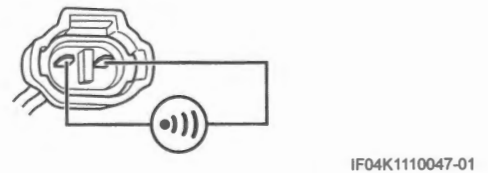
CKP sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the CKP sensor coupler and ECM couplers.
 - CKP sensor: (Page 1C-14)
 - 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
 - G/W wire and G/BI wire: less than 1 Ω

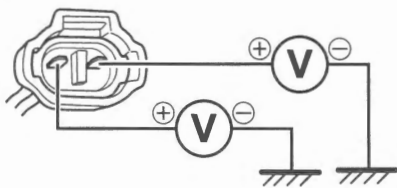
- Between G/W wire and ground: infinity
- Between G/BI wire and ground: infinity



- Between the G/W wire terminal and G/BI wire terminal at CKP sensor coupler: infinity



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



IF04K1110048-01

Is check result OK?

- Yes Go to Step 2.
- 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-13).

Is check result OK?

- Yes Go to Step 3.
- No Replace the CKP sensor with a new one. (Page 1C-14)

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-13).

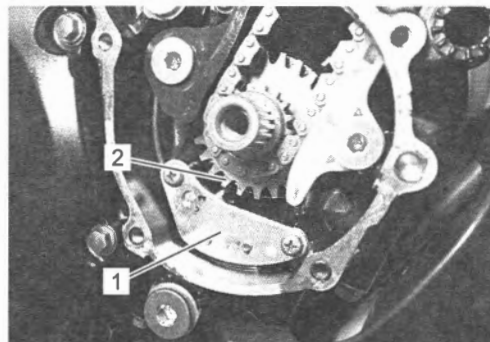
Is check result OK?

- 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 signal generator rotor check

- 1) Turn the ignition switch OFF.
- 2) Remove the starter clutch. (Page 1I-9)
- 3) Check that end face of the CKP sensor (1) and signal generator rotor teeth (2) are free from any metal particles and damage.



IF04K1110049-01

Is check result OK?

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

DTC P0351 (C24) / P0352 (C25) / P0353 (C26) / P0354 (C27)

BENK07L21104018

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-4).
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.	
P0353 (C26): Ignition Coil "C" Primary / Secondary Circuit Ignition coil #3 signal is interrupted by 8 times or more continuity although CKP signal is detected.	
P0354 (C27): Ignition Coil "D" Primary / Secondary Circuit Ignition coil #4 signal is interrupted by 8 times or more continuity although CKP signal is detected.	

DTC P0418 (C49)

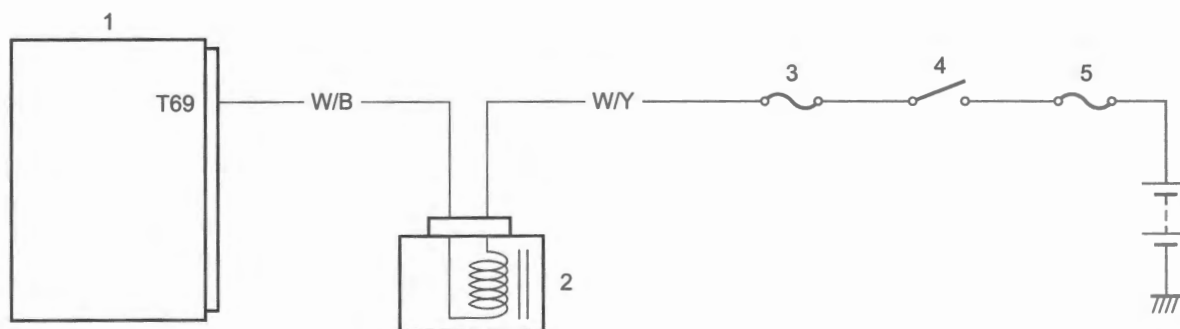
BENK07L21104019

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0418 (C49): PAIR System Control "A" Circuit PAIR control solenoid valve voltage is not input to ECM.	<ul style="list-style-type: none"> • PAIR control solenoid valve • PAIR control solenoid valve circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K1112032-01

1. ECM	3. Ignition fuse	5. Main fuse
2. PAIR control solenoid valve	4. Ignition switch	

Troubleshooting

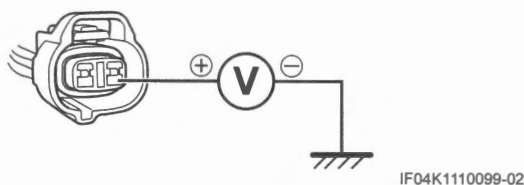
Step 1

PAIR control solenoid valve power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the PAIR control solenoid valve coupler. (Page 1B-9)
- 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/Y wire and ground.

PAIR control solenoid valve power supply voltage

[Standard]: Battery voltage



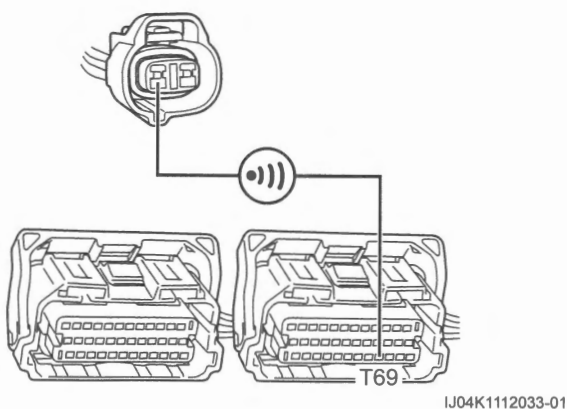
Is check result OK?

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

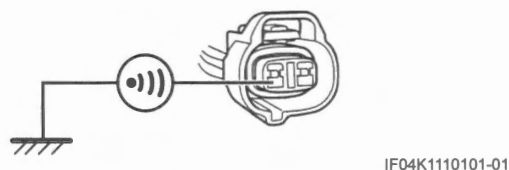
Step 2

PAIR control solenoid valve driver circuit check

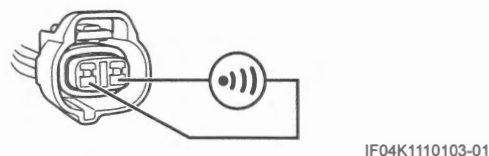
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-4)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - W/B wire: less than 1 Ω



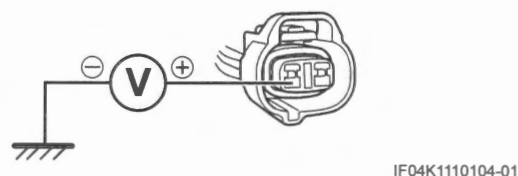
- Between W/B wire and ground: infinity



- Between W/B wire terminal and W/Y wire terminal at PAIR control solenoid valve coupler: infinity



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



Is check result OK?

- Yes Go to Step 3.
- No Repair or replace the W/B 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” in Section 1B (Page 1B-10).

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-9)

DTC P0443 (C62) [If Equipped]

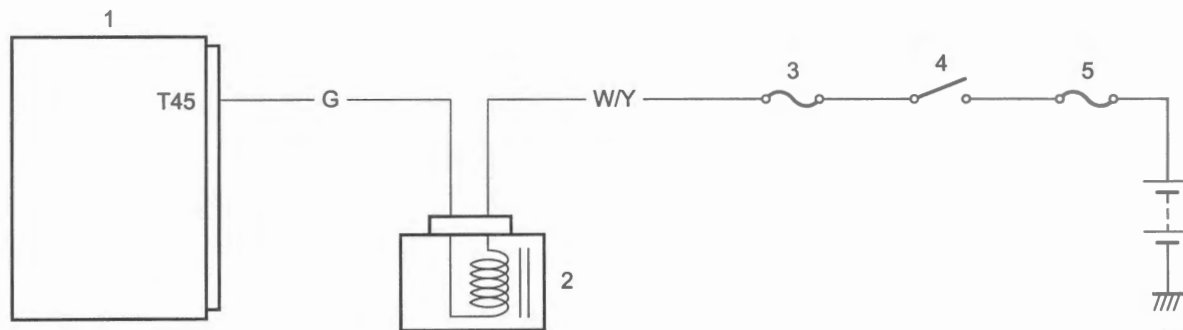
BENK07L21104020

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P0443 (C62): EVAP System Purge Control Valve Circuit EVAP system purge control solenoid valve voltage is not input to ECM.</p>	<ul style="list-style-type: none"> • EVAP system purge control solenoid valve • EVAP system purge control solenoid valve circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K1112034-01

1. ECM	3. Ignition fuse	5. Main fuse
2. EVAP system purge control solenoid valve	4. Ignition switch	

Troubleshooting

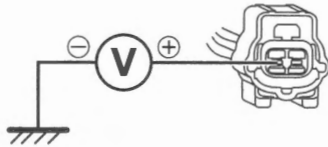
Step 1

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-12)
- 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/Y wire and ground.

EVAP system purge control solenoid valve power supply voltage (If equipped)

[Standard]: Battery voltage



ID26J1110239-01

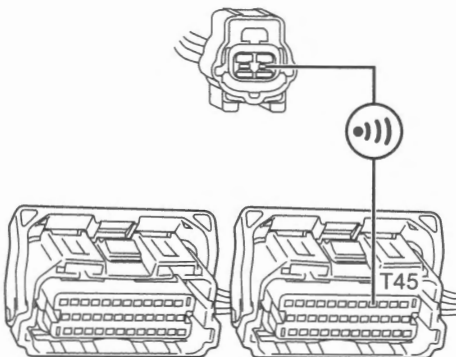
Is check result OK?

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

Step 2

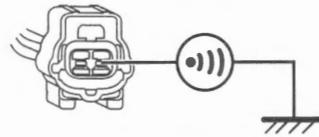
EVAP system purge control solenoid valve driver circuit check

- 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
 - G wire: less than 1 Ω



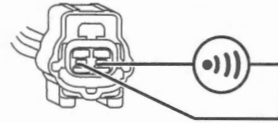
IJ04K1112035-01

- Between G wire and ground: infinity



ID26J1110241-01

- Between G wire terminal and W/Y wire terminal at EVAP system purge control solenoid valve coupler: infinity



ID26J1110242-01

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



ID26J1110243-01

Is check result OK?

- Yes Go to Step 3.
- No Repair or replace the G 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-13).

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-12)

DTC P0480 (C60)

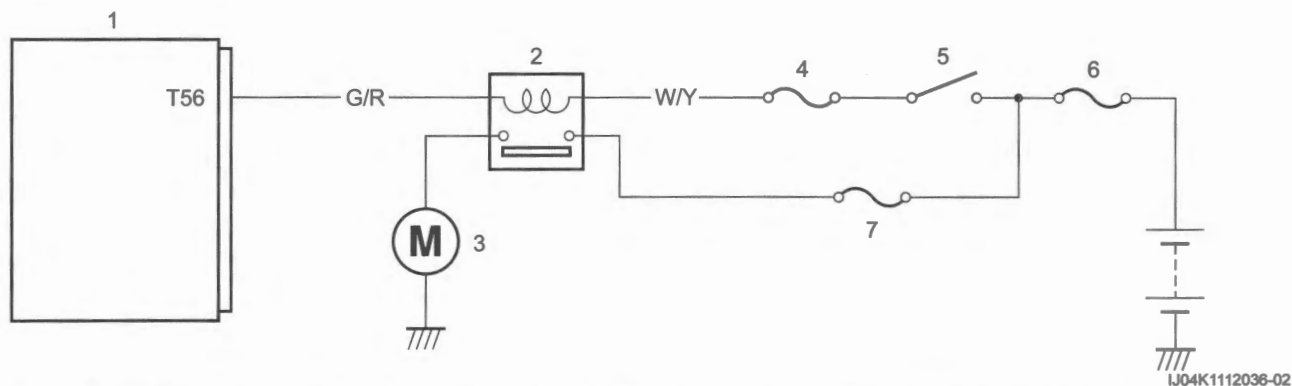
BENK07L21104021

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.	<ul style="list-style-type: none"> • Cooling fan relay • Cooling fan relay circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K1112036-02

1. ECM	4. Ignition fuse	7. Fan fuse
2. Cooling fan relay	5. Ignition switch	
3. Cooling fan motor	6. Main fuse	

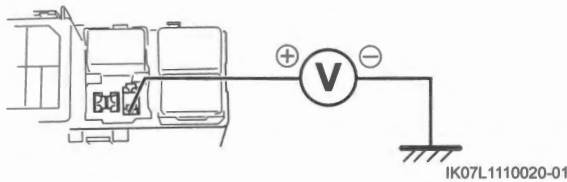
Troubleshooting

Step 1

Cooling fan relay power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the cooling fan relay. (Page 1F-13)
- 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/Y wire and ground.

Cooling fan relay power supply voltage
[Standard]: Battery voltage



Is check result OK?

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

Step 2

Cooling fan relay check

- 1) Check the cooling fan relay. (Page 1F-13)

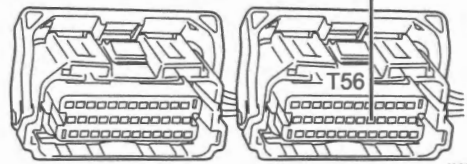
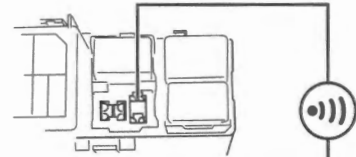
Is check result OK?

- Yes Go to Step 3.
- No Replace the cooling fan relay with a new one. (Page 1F-13)

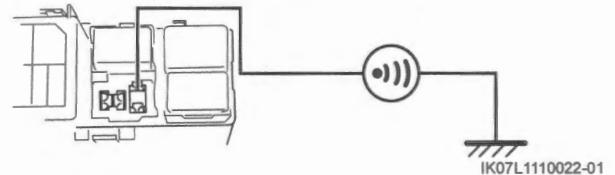
Step 3

Cooling fan relay drive circuit check

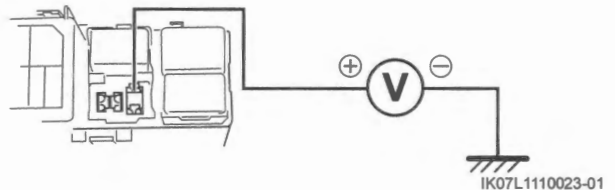
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-4)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - G/R wire: less than 1 Ω



- Between G/R wire and ground: infinity



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



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) / P2158 (C91)

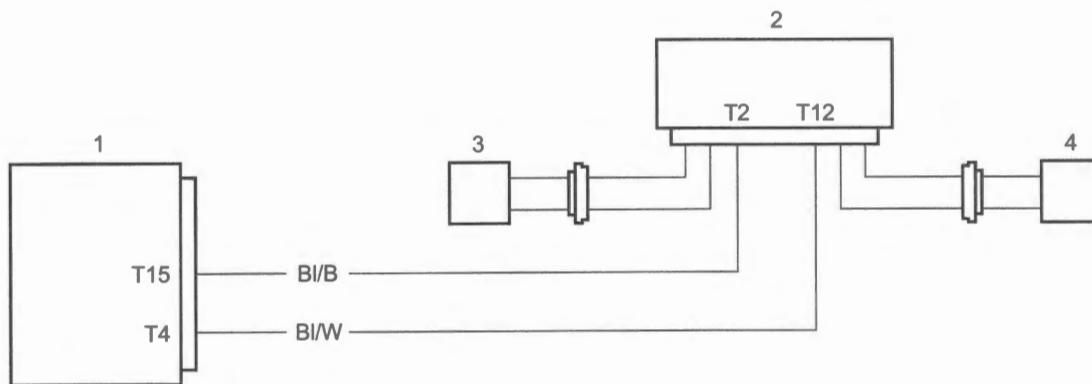
BENK07L21104022

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P0500 (C16): Vehicle Speed Sensor "A" The front wheel speed sensor signal is not input for more than 3 seconds.</p>	<ul style="list-style-type: none"> • Front wheel speed sensor circuit • ABS control unit • ECM
<p>P2158 (C91): Vehicle Speed Sensor "B" The rear wheel speed sensor signal is not input for more than 3 seconds.</p>	<ul style="list-style-type: none"> • Rear wheel speed sensor circuit • ABS control unit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K1112041-01

1. ECM	3. Front wheel speed sensor
2. ABS control unit	4. Rear wheel speed sensor

Troubleshooting

Step 1

ABS DTC check

- 1) Check that DTC is detected in ABS. (Page 4E-12)

Is the DTC detected?

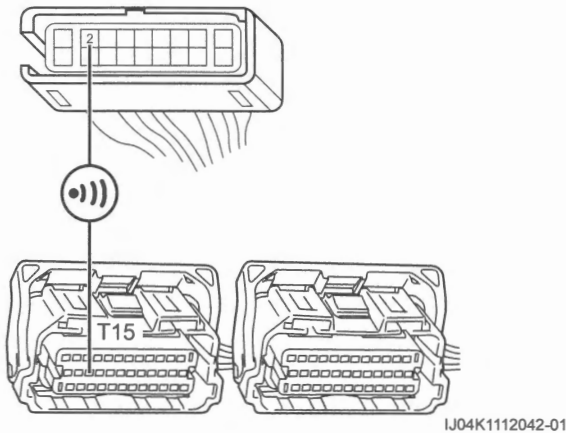
- Yes Go to troubleshooting for DTCs. Refer to "DTC Table" in Section 4E (Page 4E-16).
- No Go to Step 2.

Step 2

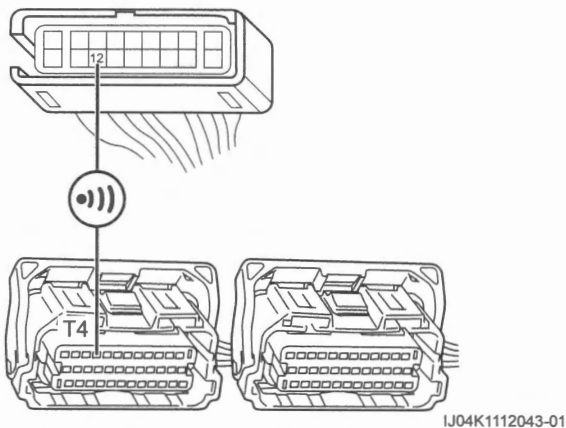
Speed sensor signal circuit check (From ABS control unit to ECM)

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ABS control unit coupler and ECM couplers.
 - ABS control unit: (Page 4E-31)
 - 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
 - BI/B (Front), BI/W (Rear) wire: less than 1 Ω

Front

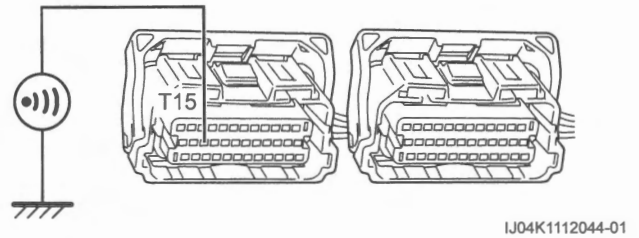


Rear

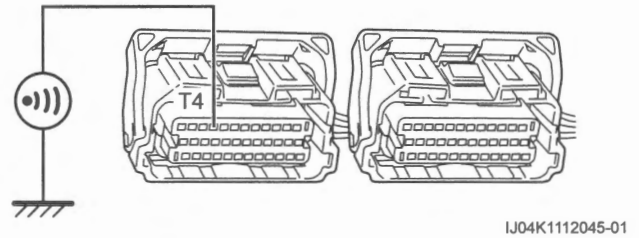


- BI/B (Front), BI/W (Rear) wire and ground: infinity

Front



Rear



Is check result OK?

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

DTC P0505 (C40)

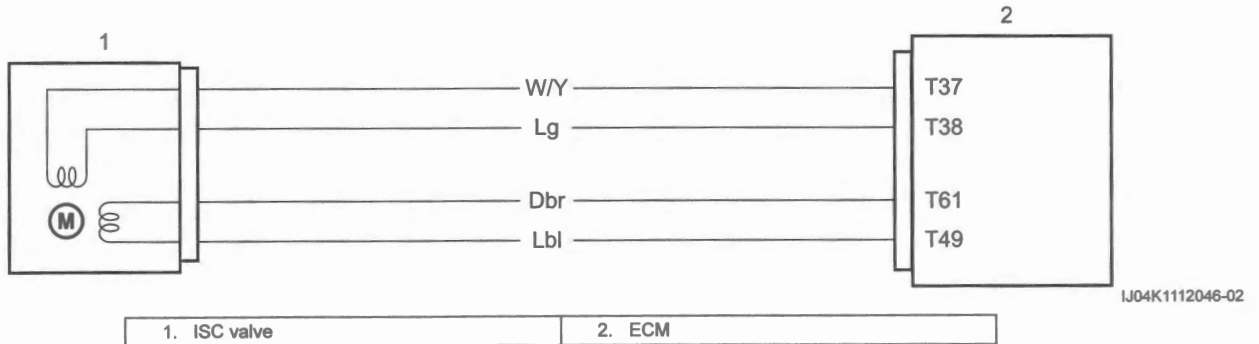
BENK07L21104023

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0505 (C40): ISC System Circuit The circuit voltage of motor drive is unusual.	<ul style="list-style-type: none"> • ISC valve • ISC valve circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



Troubleshooting

NOTICE

Be careful not to disconnect the battery cables, ECM couplers or ISC valve coupler at least 5 seconds after ignition switch is turned to OFF.

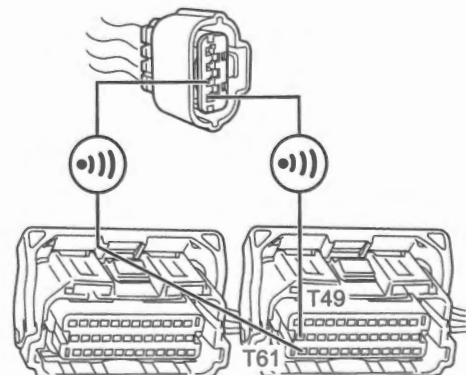
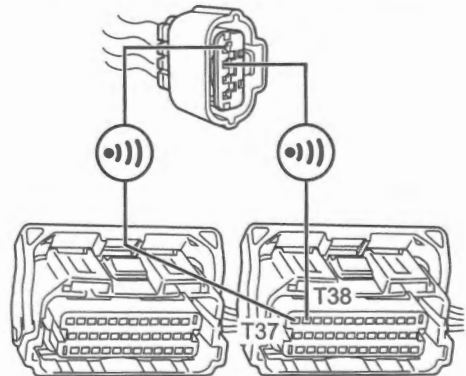
If they are disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual value being written in the ECM and causing an error of ISC valve operation.

Step 1**ISC valve drive circuit check**

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ISC valve coupler and ECM couplers.
 - ISC valve: (Page 1C-2)
 - ECM: (Page 1C-4)
- 3) Check for proper terminal connection to the ISC valve coupler and ECM couplers.

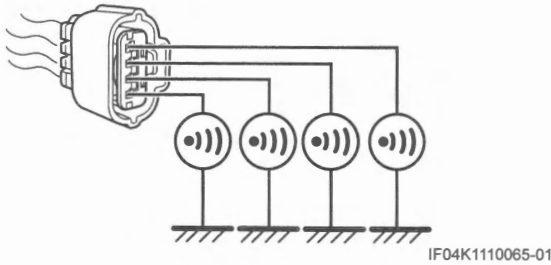
- 4) If connections are OK, check the following points.

- Resistance
 - W/Y, Lg, Dbr and Lbl wires: less than 1 Ω

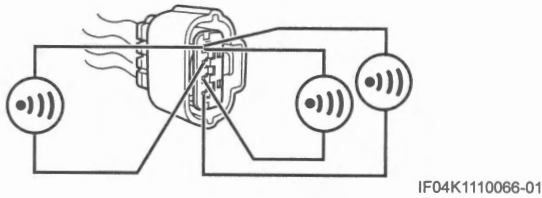


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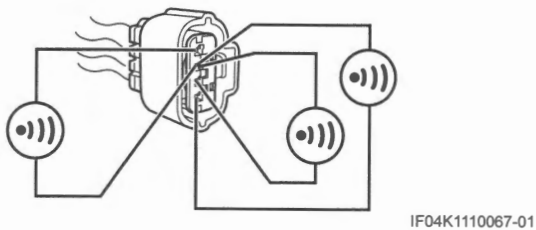
- Between W/Y wire and ground: infinity
- Between Lg wire and ground: infinity
- Between Dbr wire and ground: infinity
- Between Lbl wire and ground: infinity



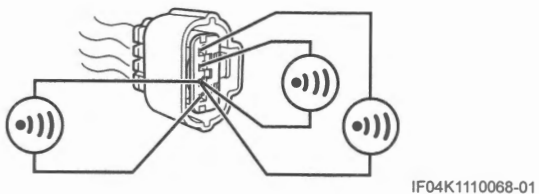
- Between W/Y wire terminal and other terminal at ISC valve coupler: infinity



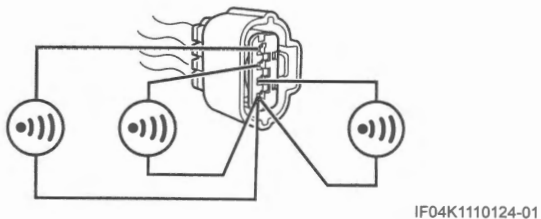
- Between Lg wire terminal and other terminal at ISC valve coupler: infinity



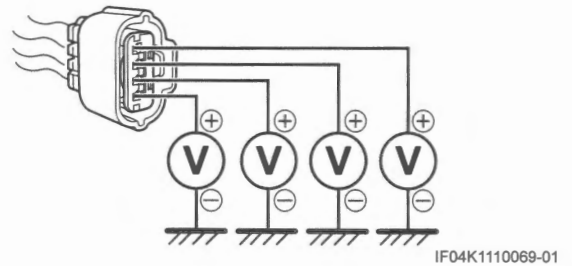
- Between Dbr wire terminal and other terminal at ISC valve coupler: infinity



- Between Lbl wire terminal and other terminal at ISC valve coupler: infinity



- Voltage
 - Turn the ignition switch ON.
 - W/Y, Lg, Dbr and Lbl wires: approx. 0 V



Is check result OK?

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

Step 2

ISC valve resistance check

- 1) Turn the ignition switch OFF.
- 2) Measure the ISC valve resistance. ⚡ (Page 1C-2)

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. ⚡ (Page 1C-4)
- No Replace the ISC valve with a new one. ⚡ (Page 1C-2)

DTC P0506 / P0507 (C65)

BENK07L21104024

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.	<ul style="list-style-type: none"> • Air passage • STV actuator • Engine mechanism
P0507 (C65): ISC System RPM Higher Than Expected Idle speed rose higher than desired idle speed by more than specified range.	

Troubleshooting

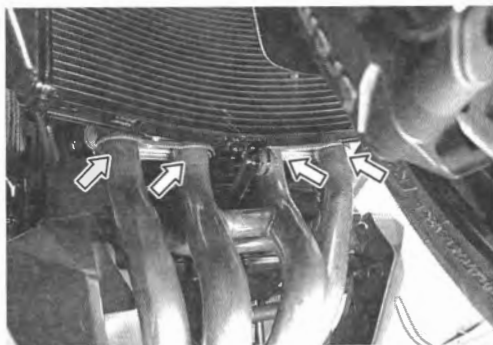
NOTICE

Be careful not to disconnect the battery cables, ECM couplers or ISC valve coupler at least 5 seconds after ignition switch is turned to OFF.

If they are 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 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.



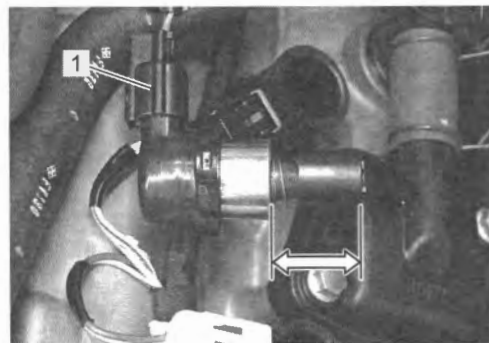
IK07L1110024-02

Is check result OK?

- Yes Go to Step 2.
- No Repair or replace defective parts.

Step 2**ISC valve operation check**

- 1) Turn the ignition switch OFF.
- 2) Remove the ISC valve. (Page 1C-2)
- 3) Connect the ISC valve coupler (1).
- 4) Turn the ignition switch ON and then OFF again.
- 5) While performing above step 4), check that the ISC valve moves from fully open position to fully closed position.



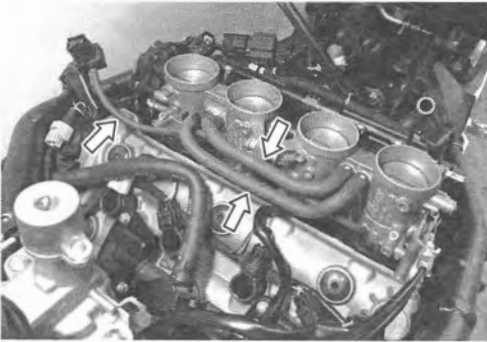
IJ04K1112048-01

Is check result OK?

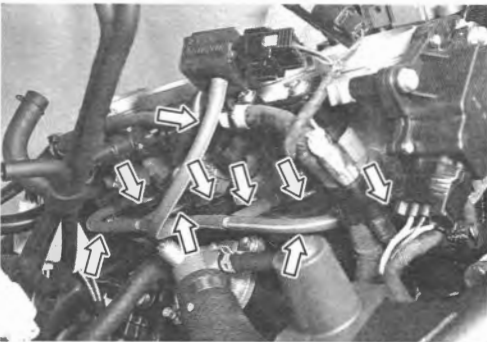
- Yes Install the ISC valve and go to Step 3.
(Page 1C-2)
- No Replace the ISC valve with a new one.
(Page 1C-2)

Step 3**Air intake system check**

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



IF04K1110072-02



IF04K1110073-02

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-3)
 - Fuel pressure: ☞(Page 1G-5)

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)

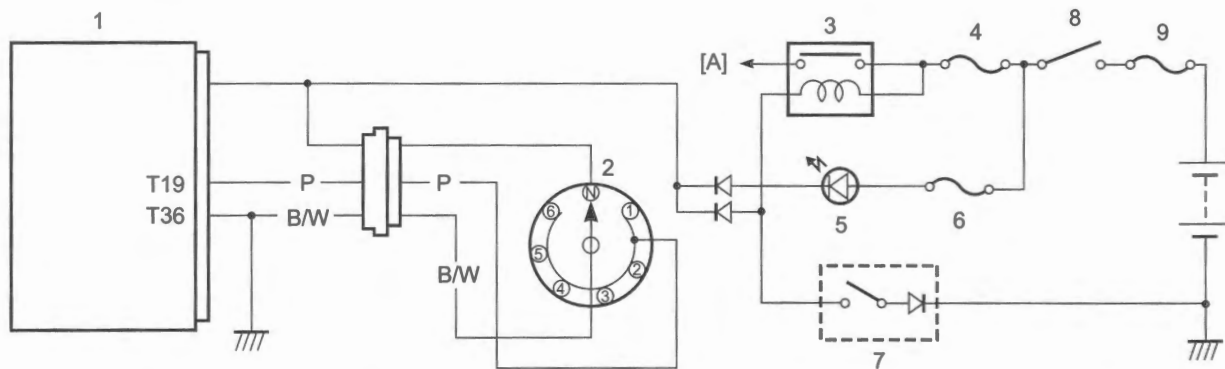
BENK07L21104025

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0914 (C31): GP Sensor Circuit Gear position signal voltage is lower than specified value.	<ul style="list-style-type: none"> • GP switch • GP switch circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K1112049-01

[A]: To engine stop switch	4. Ignition fuse	8. Ignition switch
1. ECM	5. Neutral indicator light	9. Main fuse
2. GP switch	6. Signal fuse	
3. Side-stand relay	7. Side-stand switch	

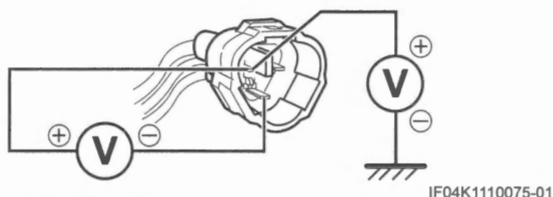
Troubleshooting

Step 1

GP switch power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the GP switch coupler. (Page 5B-13)
- 3) Check for proper terminal connection to the GP switch coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the P wire and ground.
- 6) If OK, measure the voltage between the P wire and B/W wire.

GP switch power supply voltage
[Standard]: 4.5 – 5.5 V



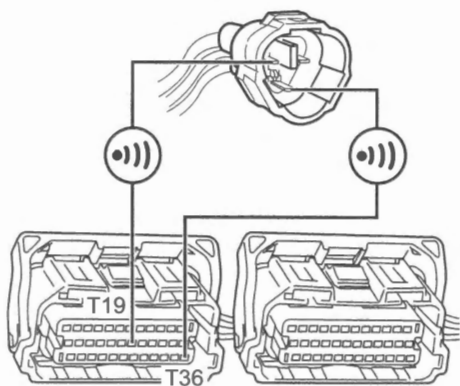
Is check result OK?

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

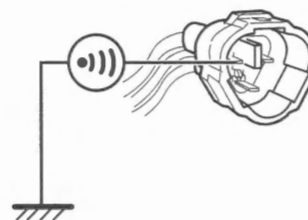
Step 2

GP switch circuit check

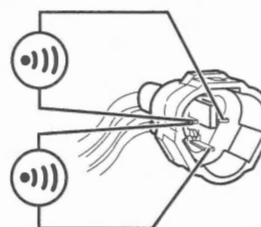
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-4)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - P wire and B/W wire: less than 1 Ω



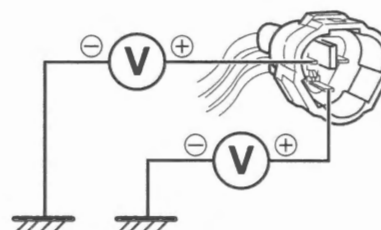
- Between P wire and ground: infinity



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



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



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-12)

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-4)
- No Replace the GP switch with a new one. (Page 5B-13)

DTC P1100 / P1101 / P1102 (C13)

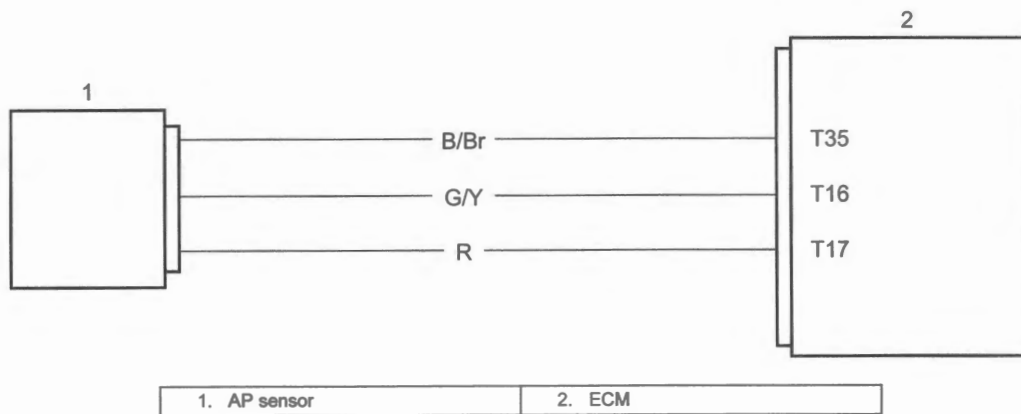
BENK07L21104026

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1100 (C13): IAP Sensor 2 Circuit The sensor output voltage is higher than 4.85 V.	<ul style="list-style-type: none"> • Vacuum passage between throttle body and AP sensor • AP sensor • AP sensor circuit • ECM
P1101 (C13): IAP Sensor 2 Circuit Range / Performance The AP sensor vacuum hose has come off.	
P1102 (C13): IAP Sensor 2 Circuit Low The sensor output voltage is lower than 0.5 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K1112052-01

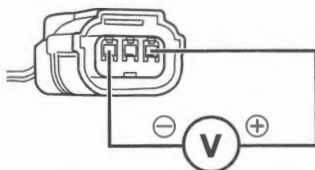
Troubleshooting

Step 1

AP sensor power supply circuit check

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

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



IJ04K1112053-01

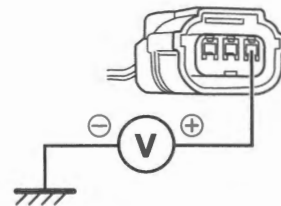
Is check result OK?

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

Step 2

AP sensor ground circuit check

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



IJ04K1112054-01

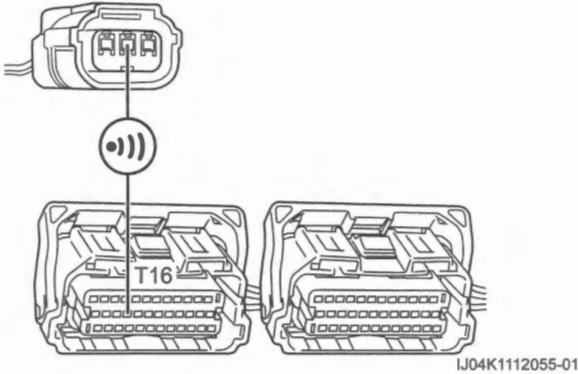
Is voltage specified range in Step 1?

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

Step 3

AP 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



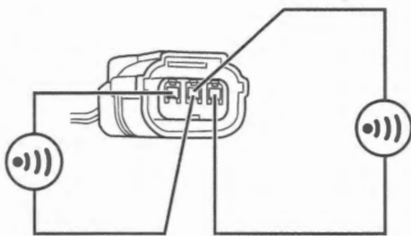
IJ04K1112055-01

– Between G/Y wire and ground: infinity



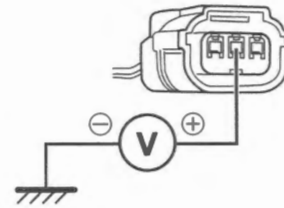
IJ04K1112056-01

– G/Y wire terminal and other terminal at AP sensor coupler: infinity



IJ04K1112057-01

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



IJ04K1112058-01

Is check result OK?

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

Step 4

AP sensor output voltage at idle speed check

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM couplers and AP sensor coupler.
- 3) Measure the AP sensor output voltage at idle speed. Refer to "AP Sensor Output Voltage at Idle Speed" under "AP Sensor Inspection" in Section 1C (Page 1C-5).

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 AP sensor with a new one. (Page 1C-5)

Step 5

AP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the AP sensor. (Page 1C-5)
- 3) Measure the AP sensor output voltage. Refer to "AP Sensor Output Voltage" under "AP Sensor Inspection" 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 AP sensor with a new one. (Page 1C-5)

DTC P1400 / P1401 (C46)

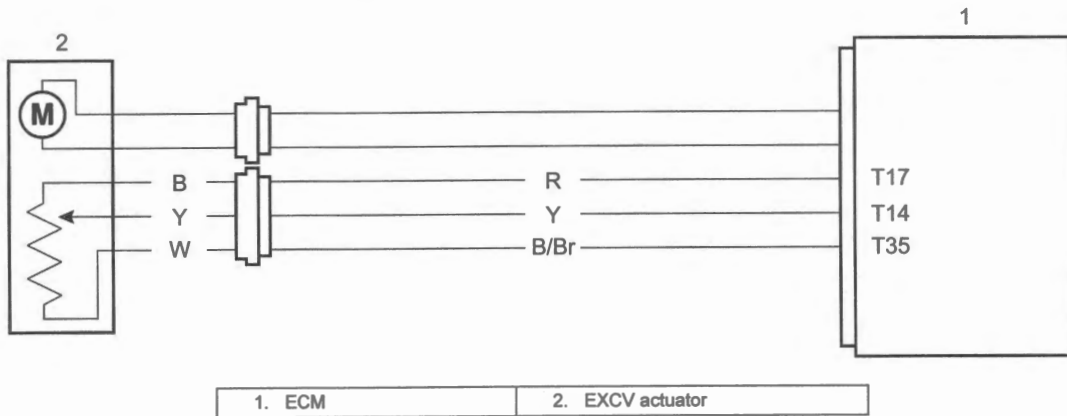
BENK07L21104027

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1400 (C46): EXCVA Position Sensor Circuit The sensor output voltage is higher than 4.9 V.	<ul style="list-style-type: none"> • EXCV actuator • EXCVA maladjustment • EXCVA position sensor circuit • ECM
P1401 (C46): EXCVA Position Sensor Circuit Low The sensor output voltage is lower than 0.14 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K1112059-01

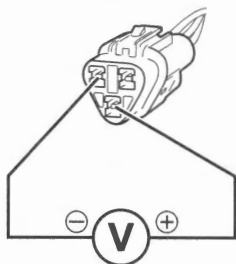
Troubleshooting

Step 1

EXCVA position sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the EXCVA position sensor coupler. (Page 1K-8)
- 3) Check for proper terminal connection to the EXCVA position sensor coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the R wire and B/Br wire.

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



IF04K1110105-03

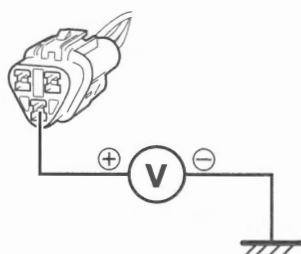
Is check result OK?

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

Step 2

EXCVA position sensor ground circuit check

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



IF04K1110106-02

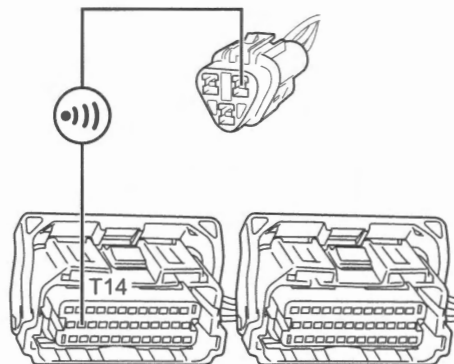
Is voltage specified range in Step 1?

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

Step 3

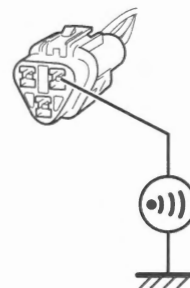
EXCVA position sensor signal circuit check

- 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



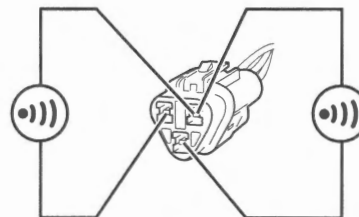
IJ04K1112060-01

– Between Y wire and ground: infinity



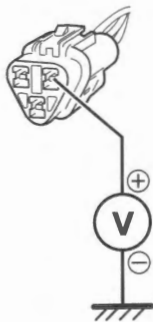
IF04K1110108-02

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



IF04K1110109-02

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



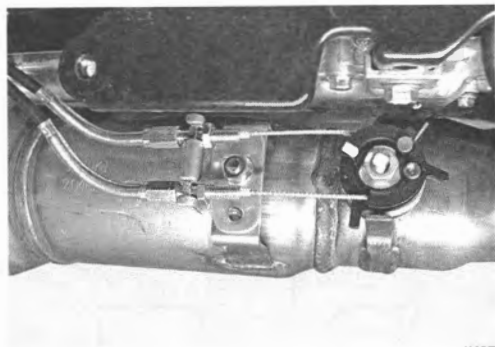
IF04K1110110-02

Is check result OK?

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

Step 4**EXCV cable check**

- 1) Turn the ignition switch OFF.
- 2) Remove the right under cowling. (Page 9D-42)
- 3) Check the installation of EXCV cables. Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-8).



IK07L1110025-01

Is check result OK?

- Yes Go to Step 5.
- No Replace or adjust the EXCV cables.
- Replace: (Page 1K-8)
 - Adjust: (Page 1K-13)

Step 5**EXCVA position sensor resistance check**

- 1) Connect the ECM couplers and EXCVA position sensor coupler.
- 2) Set the EXCVA to adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-8).
- 3) Turn the ignition switch OFF and disconnect the EXCVA position sensor coupler.
- 4) Measure the EXCVA position sensor resistance. Refer to "EXCVA Position Sensor Resistance" under "EXCVA Inspection" in Section 1K (Page 1K-12).

Is check result OK?

- Yes Go to Step 6.
- No Replace the EXCVA with a new one.
(Page 1K-8)

Step 6**EXCVA position sensor output voltage check**

- 1) Connect the EXCVA position sensor coupler.
- 2) Measure the EXCVA position sensor output voltage. Refer to "EXCVA Position Sensor Output Voltage" under "EXCVA Inspection" in Section 1K (Page 1K-12).

Is check result OK?

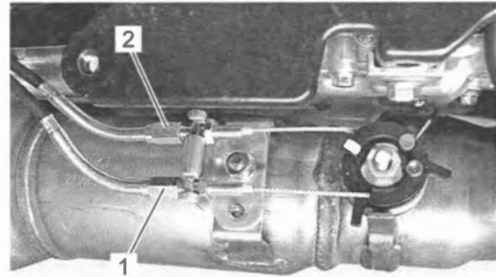
- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-4)
- No Go to Step 7.

Step 7**EXCV cable adjusting check****NOTICE**

- Adjusting the cable with the EXCV fully opened or fully closed can damage the EXCVA.
Be sure to adjust the cable with the EXCV set in the adjustment position. ⚠(Page 1K-8)
- Do not turn the EXCVA pulley using the wrench.

- 1) If the EXCVA position sensor output voltage is 0.45 V or less at EXCV fully closed position, adjust the output voltage to the specified value by turning the No.1 cable adjuster (1). ⚠(Page 1K-8)
- 2) Repeat the procedure in Step 6 until the output voltage is set within the specified value. (If P1400 / P1401 (C46) code is indicated after adjusting the voltage, increase the voltage to 0.9 V).

- 3) If the EXCVA position sensor output voltage is 4.55 V or more at EXCV fully opened position, adjust the output voltage to the specified value by turning the No.2 cable adjuster (2). Refer to "EXCVA Adjustment" in Section 1K (Page 1K-13). Repeat the procedure in Step 6 until the output voltage is set within the specified value.



IK07L1110026-01

Is the voltage OK?

- | | |
|-----|---|
| Yes | Replace the ECM with a known good one, and inspect it again. ⚠(Page 1C-4) |
| No | Replace the EXCVA with a new one. ⚠(Page 1K-8) |

DTC P1403 (C46)

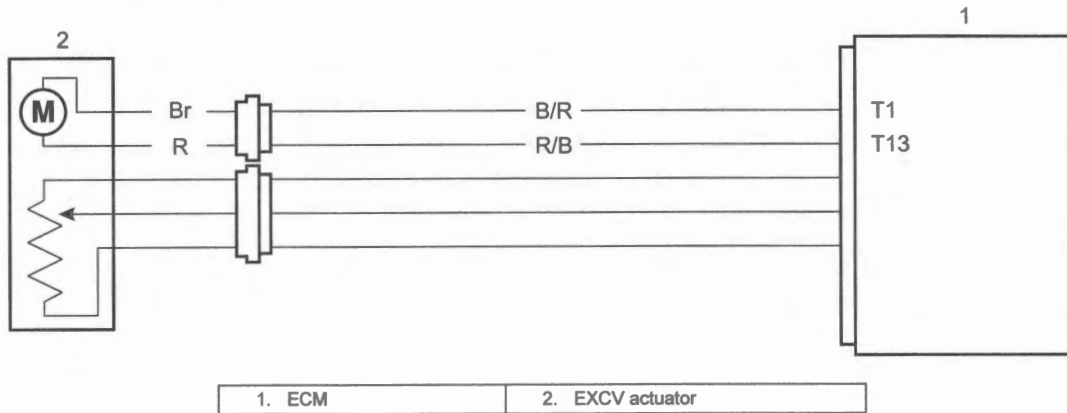
BENK07L21104028

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P1403 (C46): EXCVA Circuit Low Voltage EXCVA control signal is not supplied from the ECM. ECM does not receive communication signal from the EXCVA or operation voltage does not reach EXCVA motor.</p>	<ul style="list-style-type: none"> • EXCVA • EXCVA motor circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



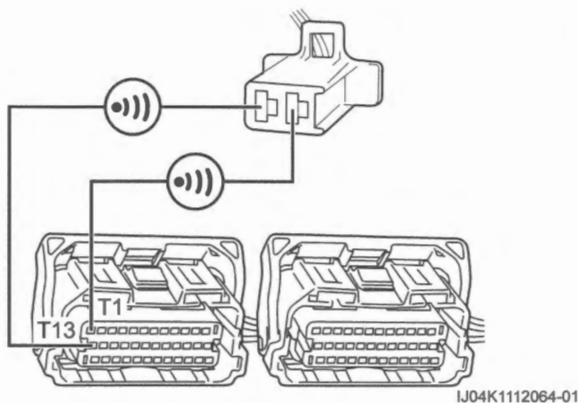
IJ04K1112063-01

Troubleshooting

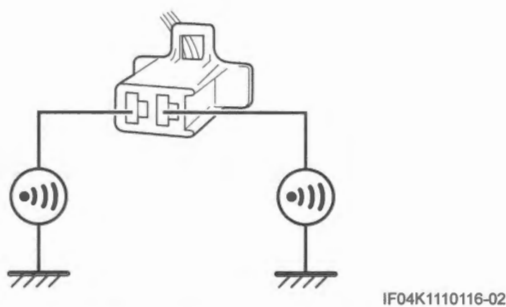
Step 1

EXCVA motor circuit check

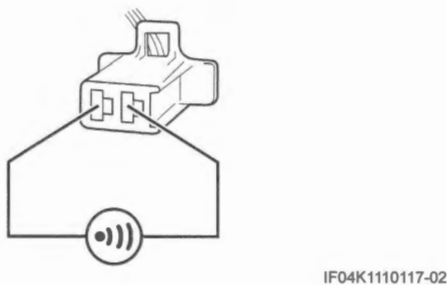
- 1) Turn the ignition switch OFF.
- 2) Disconnect the EXCVA motor coupler and ECM couplers.
 - EXCV actuator: ☞(Page 1K-8)
 - ECM: ☞(Page 1C-4)
- 3) Check for proper terminal connection to the EXCVA motor coupler and ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - B/R wire and R/B wire: less than 1 Ω



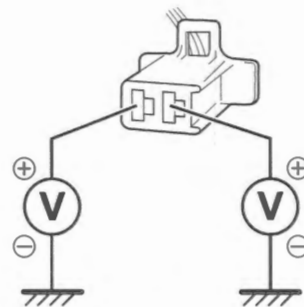
- Between B/R wire and ground: infinity
- Between R/B wire and ground: infinity



- Between B/R wire terminal and R/B wire terminal at EXCVA motor coupler: infinity



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



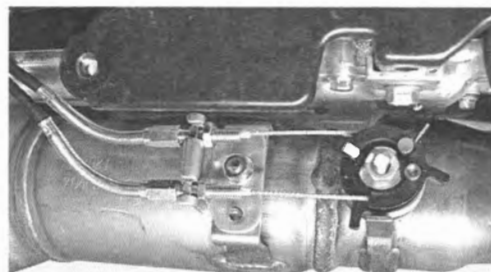
Is check result OK?

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

Step 2

EXCV cable check

- 1) Turn the ignition switch OFF.
- 2) Remove the right under cowling. ☞(Page 9D-42)
- 3) Check the installation of EXCV cables. Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-8).



IK07L1110025-01

Is check result OK?

- Yes Go to Step 3.
- No Replace or adjust the EXCV cables.
 - Replace: ☞(Page 1K-8)
 - Adjust: ☞(Page 1K-13)

Step 3

EXCVA motor check

- 1) Check the operation of EXCVA motor. Refer to "EXCVA Motor" under "EXCVA Inspection" in Section 1K (Page 1K-12).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-4)
- No Replace the EXCVA with a new one. ☞(Page 1K-8)

DTC P1610 (C42)

BENK07L21104029

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. When the ID agreement is not verified. (With immobilizer system) ECM does not receive communication signal from the immobilizer antenna. (With immobilizer system)	<ul style="list-style-type: none"> • Ignition switch • Ignition switch circuit • ECM • Immobilizer system (If equipped) • Immobilizer system circuit (If equipped)

Troubleshooting

Refer to "Ignition Switch Inspection" in Section 1H (Page 1H-8) for details.

DTC P1700 / P1702 (C23)

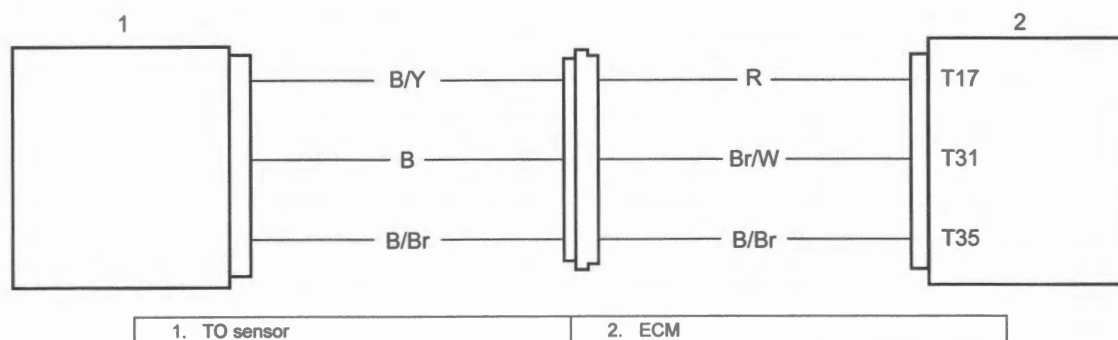
BENK07L21104030

DTC Detecting Condition and Trouble Area

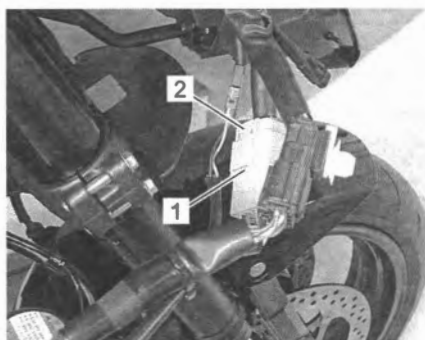
DTC detecting condition	Trouble area
P1700 (C23): TO Sensor Circuit The sensor output voltage is lower than 0.2 V.	<ul style="list-style-type: none"> • TO sensor • TO sensor circuit • ECM
P1702 (C23): TO Sensor Circuit High The sensor output voltage is higher than 4.8 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).

**Troubleshooting****Step 1****TO sensor power supply circuit check**

- 1) Turn the ignition switch OFF.
- 2) Remove the right side cover assembly. (Page 9D-22)
- 3) Disconnect the wiring harness No.1 coupler (10P) (1) and wiring harness No.2 coupler (10P) (2).

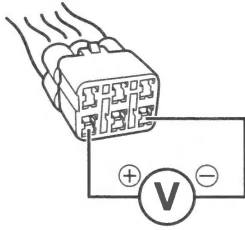


IK07L1110030-01

- 4) Check for proper terminal connection to the wiring harness No.1 coupler (10P) and wiring harness No.2 coupler (10P).
- 5) If connections are OK, connect the wiring harness No.1 coupler (10P) and wiring harness No.2 coupler (10P).
- 6) Disconnect the TO sensor coupler. (Page 1C-16)
- 7) Check for proper terminal connection to the TO sensor coupler.
- 8) If connections are OK, install the battery and turn the ignition switch ON.
- 9) Measure the voltage between the B/Y wire and B/Br wire.

TO sensor power supply voltage

[Standard]: 4.5 – 5.5 V



ID26J1110153-02

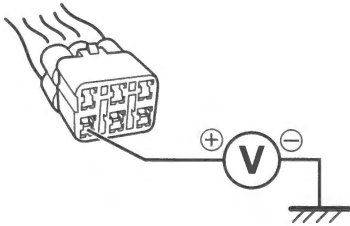
Is check result OK?

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

Step 2

TO sensor ground circuit check

- 1) Measure the voltage between the B/Y wire and ground.



ID26J1110154-02

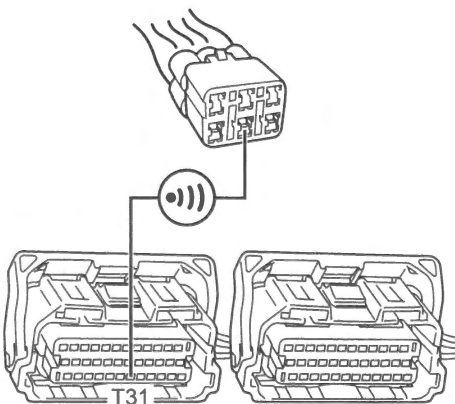
Is voltage specified range in Step 1?

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

Step 3

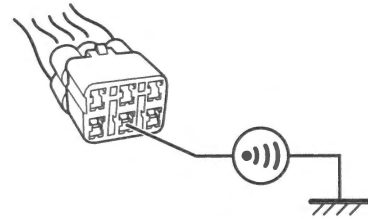
TO sensor signal circuit check

- 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
 - B wire: less than 1 Ω



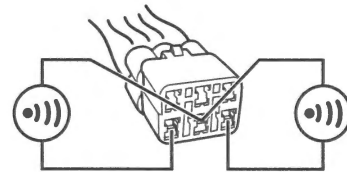
IJ04K1112067-01

- Between B wire and ground: infinity



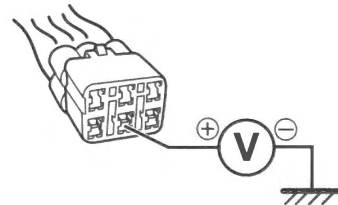
ID26J1110156-03

- Between B wire terminal and other terminal at TO sensor coupler: infinity



ID26J1110157-03

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



ID26J1110158-02

Is check result OK?

- Yes Go to Step 4.
- No Repair or replace the B wire or 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-15).

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-16)

DTC P2100 (C28)

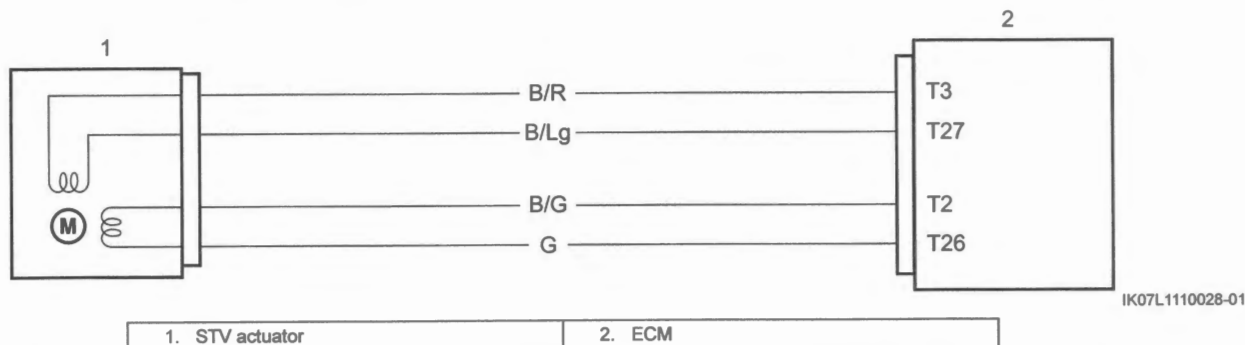
BENK07L21104031

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>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 is fixed.</p>	<ul style="list-style-type: none"> • STV actuator • STVA circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



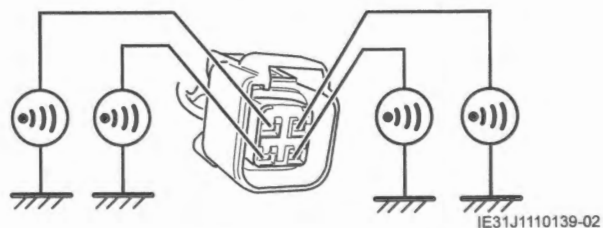
Troubleshooting

Step 1

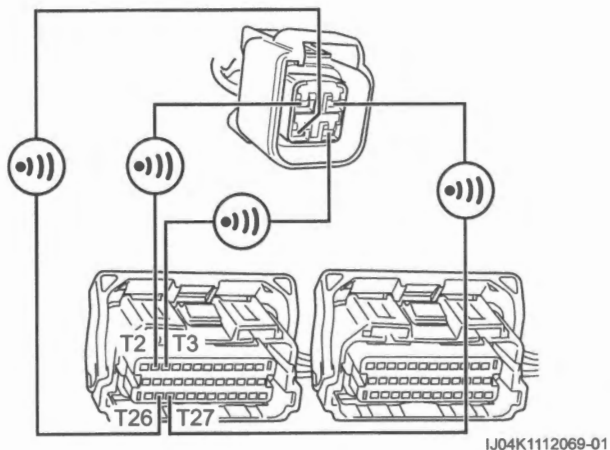
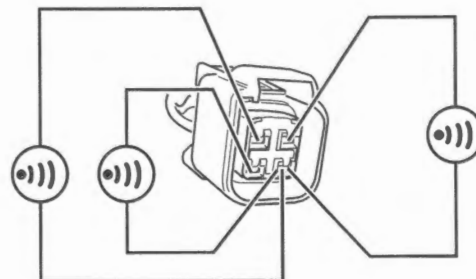
STVA circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the STVA coupler and ECM couplers.
 - STV actuator: (Page 1C-18)
 - 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
 - B/R, B/Lg, B/G and G wires: less than 1 Ω

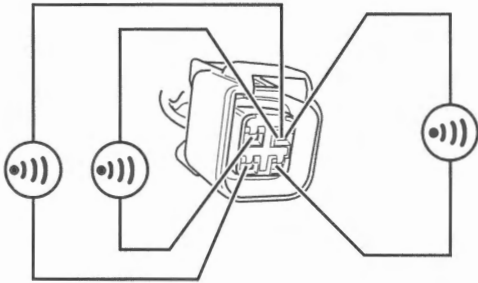
- Between B/R wire and ground: infinity
- Between B/Lg wire and ground: infinity
- Between B/G wire and ground: infinity
- Between G wire and ground: infinity



- Between B/R wire terminal and other terminal at STVA coupler: infinity

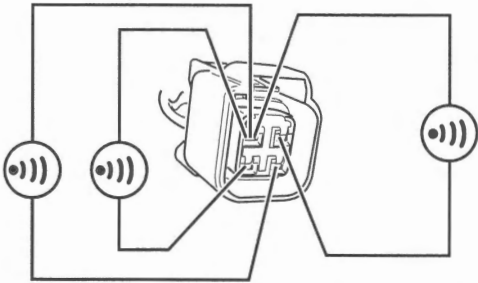


- Between B/Lg wire terminal and other terminal at STVA coupler: infinity



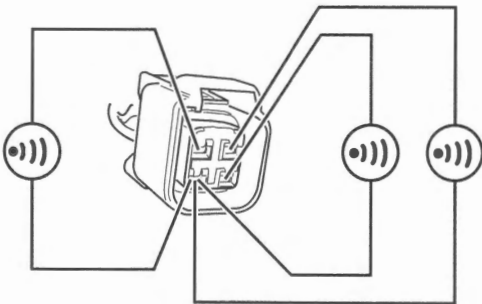
IE31J1110142-01

- Between B/G wire terminal and other terminal at STVA coupler: infinity



IE31J1110143-01

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



IE31J1110141-01

• Voltage

- Turn the ignition switch ON.
- B/R, B/Lg, B/G 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-18)

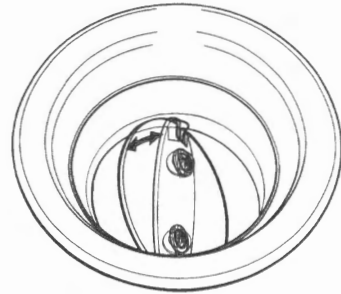
Is check result OK?

- Yes Go to Step 3.
- No Replace the throttle body assembly with a new one. (Page 1D-11)

Step 3

STV operation check

- 1) Remove the air cleaner cover. (Page 1D-6)
- 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)
- No Replace the throttle body assembly with a new one. (Page 1D-11)

DTC P2505 (C41)

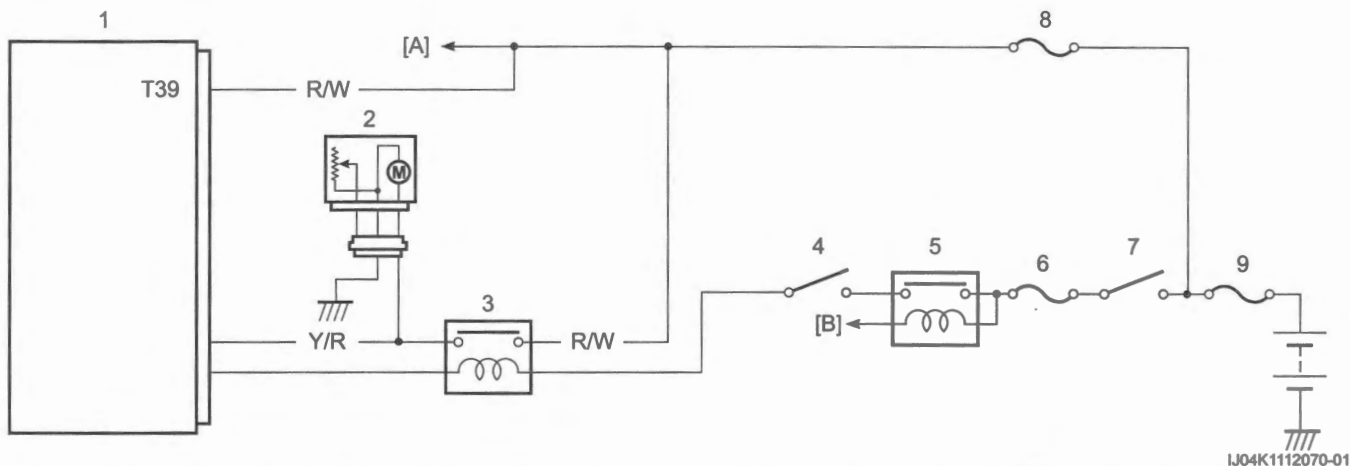
BENK07L21104032

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P2505 (C41): ECM Power Input Signal No voltage is applied to the ECM although the ignition switch is turned ON.	<ul style="list-style-type: none"> Fuel fuse ECM power supply circuit ECM

Wiring Diagram

Refer to "FI System Wiring Diagram" (Page 1A-7).



IJ04K1112070-01

[A]: To combination meter	3. FP relay	7. Ignition switch
[B]: To side-stand switch	4. Engine stop switch	8. Fuel fuse
1. ECM	5. Side-stand relay	9. Main fuse
2. Fuel pump	6. Ignition fuse	

Troubleshooting

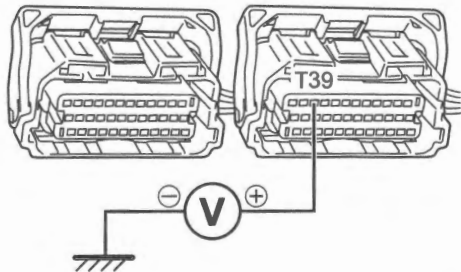
Step 1

ECM power supply voltage check

- Turn the ignition switch OFF.
- Disconnect the ECM couplers. (Page 1C-4)
- Check for proper terminal connection to the ECM couplers.
- If connections are OK, Measure the voltage between the R/W wire and ground.

ECM power supply voltage

[Standard]: Battery voltage



IJ04K1112071-01

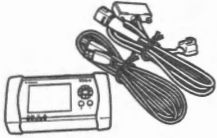
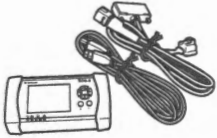
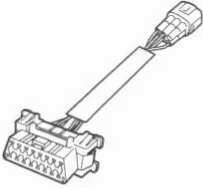

Is check result OK?

- | | |
|-----|--|
| Yes | Replace the ECM with a known good one, and inspect it again. (Page 1C-4) |
| No | Check fuel fuse for blowout. If fuse is not blown, repair or replace the R/W wire. |

Special Tools and Equipment

Special Tool

BENK07L21108001

<p>09904-41031 SDS-II set ☞ (Page 1A-16) / ☞ (Page 1A-17)</p> 	<p>09904-41040 SDS-II (oscilloscope) set ☞ (Page 1A-16) / ☞ (Page 1A-17)</p> 
<p>09904-41051 Conversion cable ☞ (Page 1A-6)</p> 	<p>09930-82720 Mode selection switch ☞ (Page 1A-5) / ☞ (Page 1A-16)</p> 

Emission Control Devices

Precautions

Precautions for Emission Control Devices

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

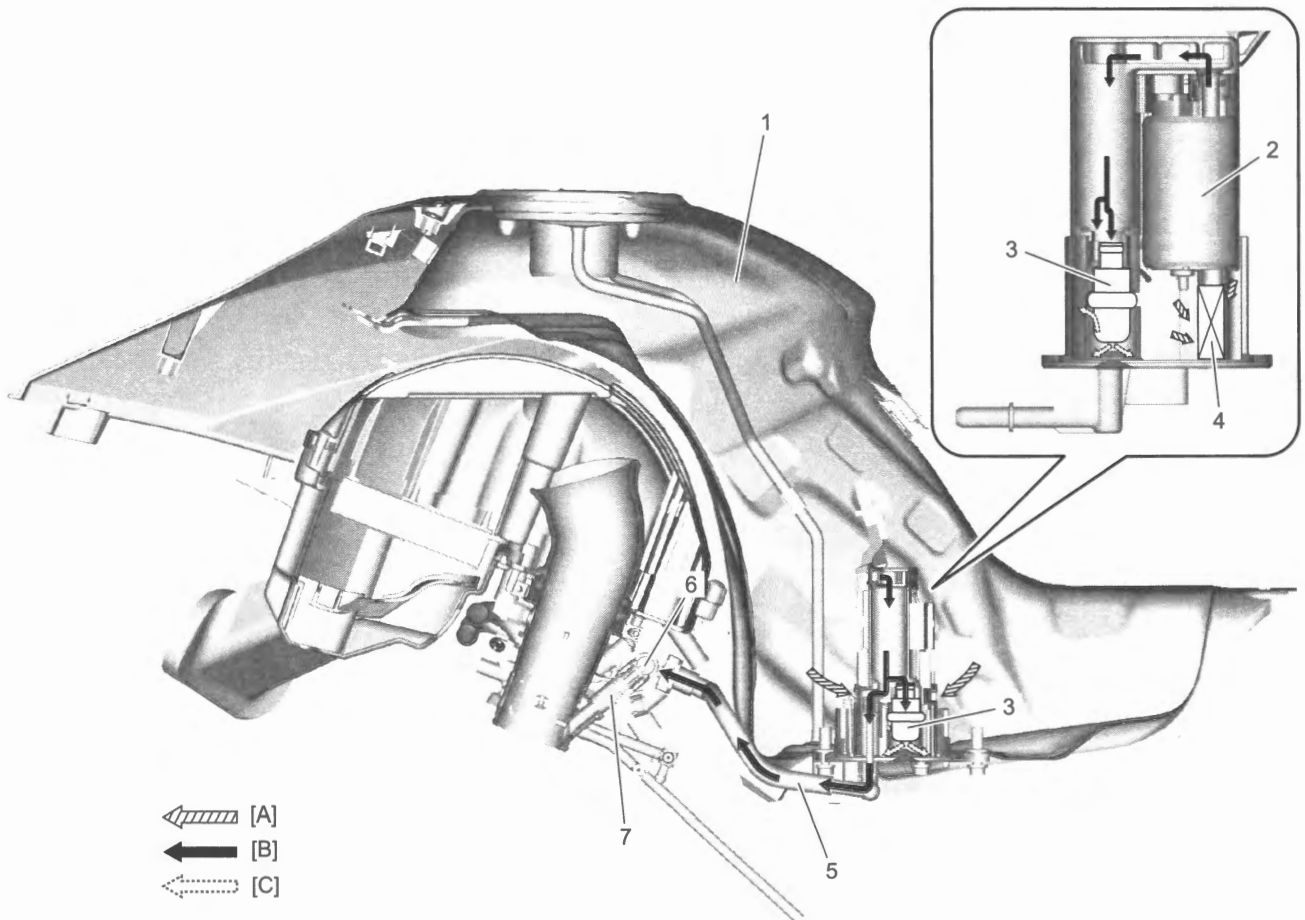
BENK07L21200001

General Description

Fuel Injection System Description

This motorcycle is 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.

BENK07L21201001



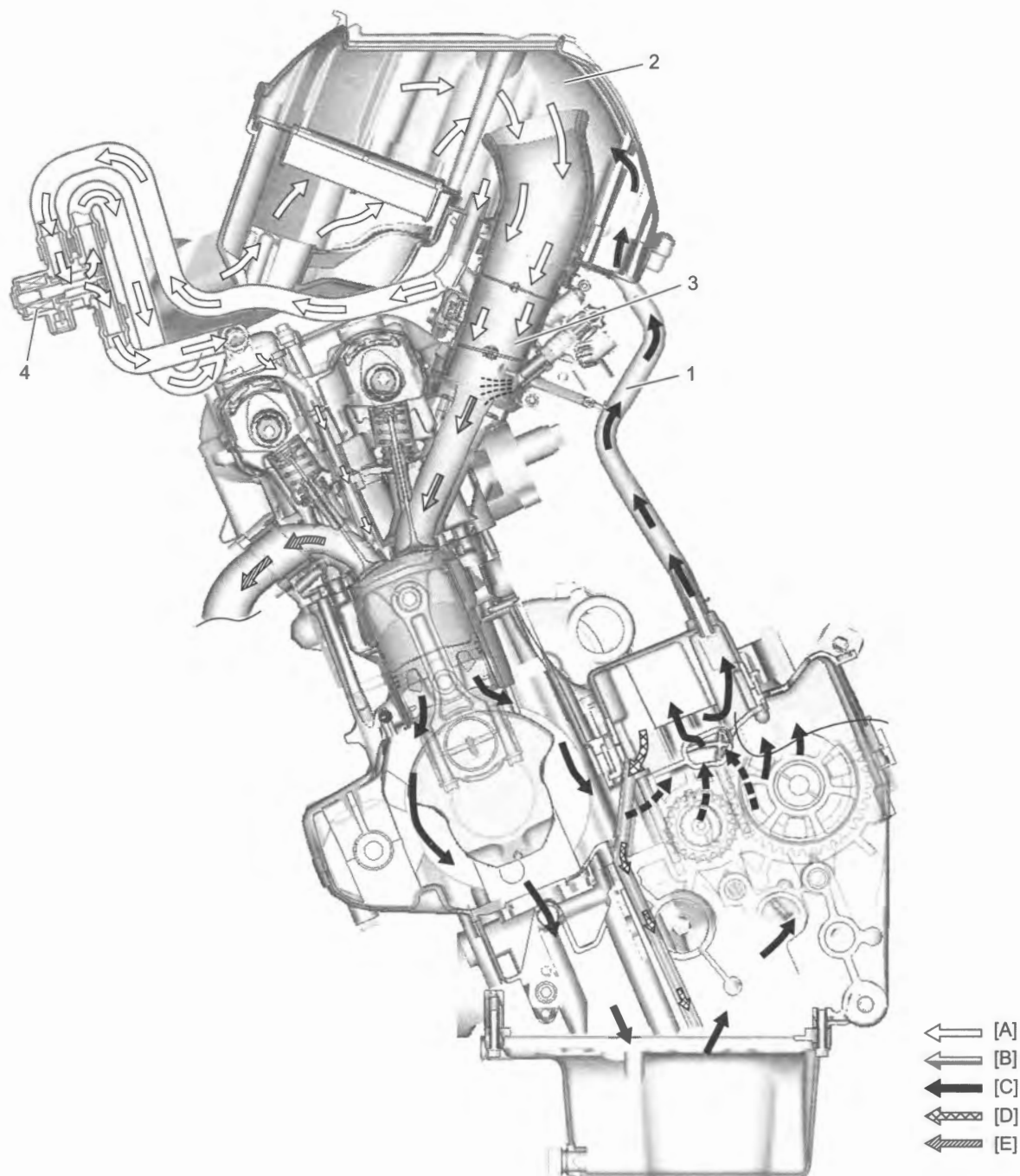
IK07L1120001-01

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

Crankcase Emission Control System Description

BENK07L21201002

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 hose (1), air cleaner (2) and throttle body (3).



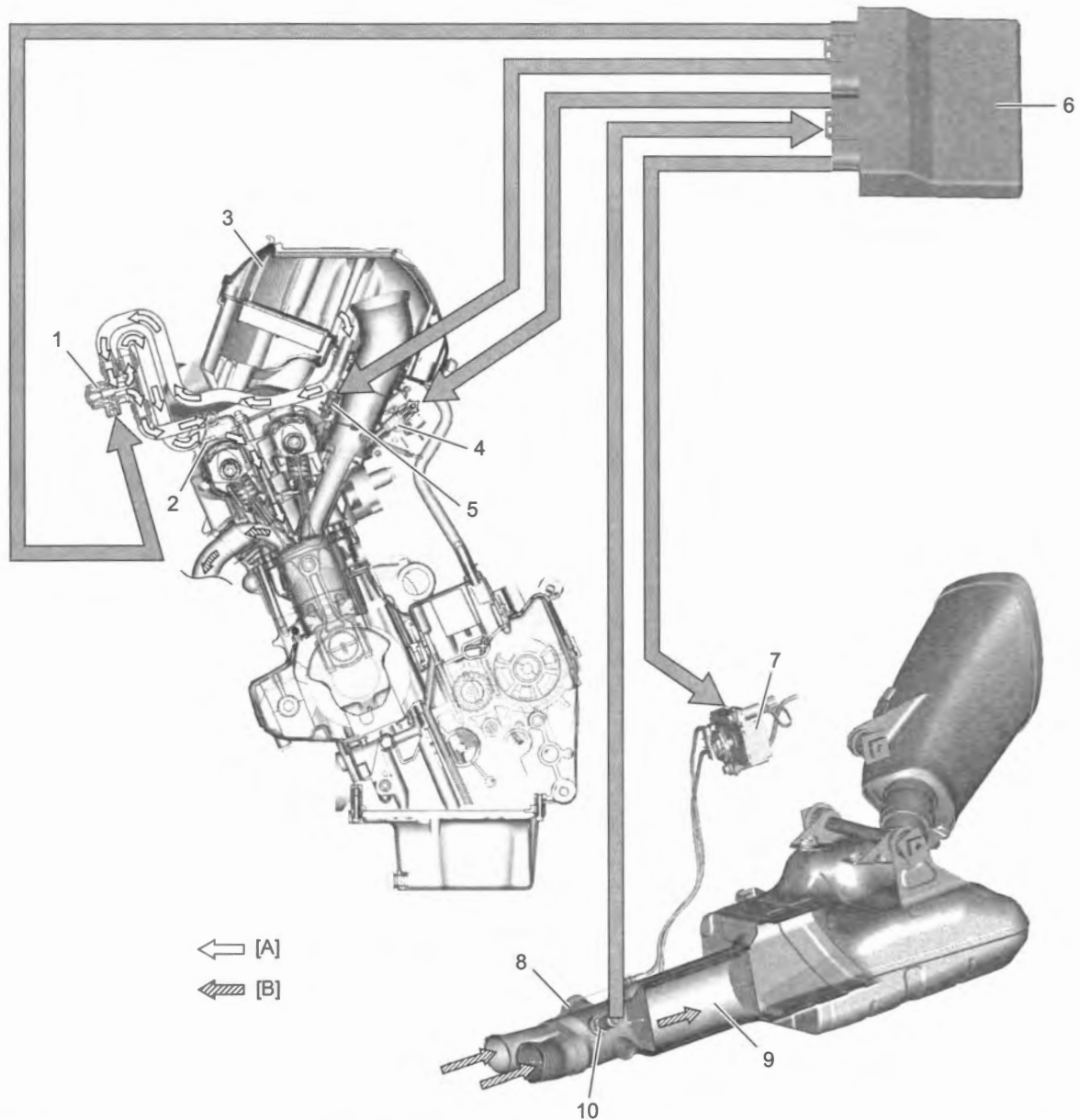
IF04K1120033-06

[A]: Fresh air	[C]: Blow-by gas	[E]: Exhaust gas
[B]: Fuel/Air mixture	[D]: Return oil	4. PAIR control solenoid valve

Exhaust Emission Control System Description

BENK07L21201003

The exhaust emission control system is composed of the PAIR system, 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. The PAIR control solenoid valve is operated by the ECM, which is controlled according to the signals from TP sensor, ECT sensor, IAP sensor and CKP sensor. The exhaust gas flow is performed by the exhaust control valve actuator which is controlled by the ECM by changing the exhaust control valve angle. ISC valve adjusts the bypass air volume of the throttle body to control engine idling speed with various sensor signals by varying engine running conditions.



IF04K1120037-01

[A]: Fresh air	2. PAIR reed valve	5. ISC valve	8. Exhaust control valve
[B]: Exhaust gas	3. Air cleaner box	6. ECM	9. Three-way catalyst
1. PAIR control solenoid valve	4. Fuel injector	7. Exhaust control valve actuator	10. HO2 sensor

Noise Emission Control System Description

BENK07L21201004

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.

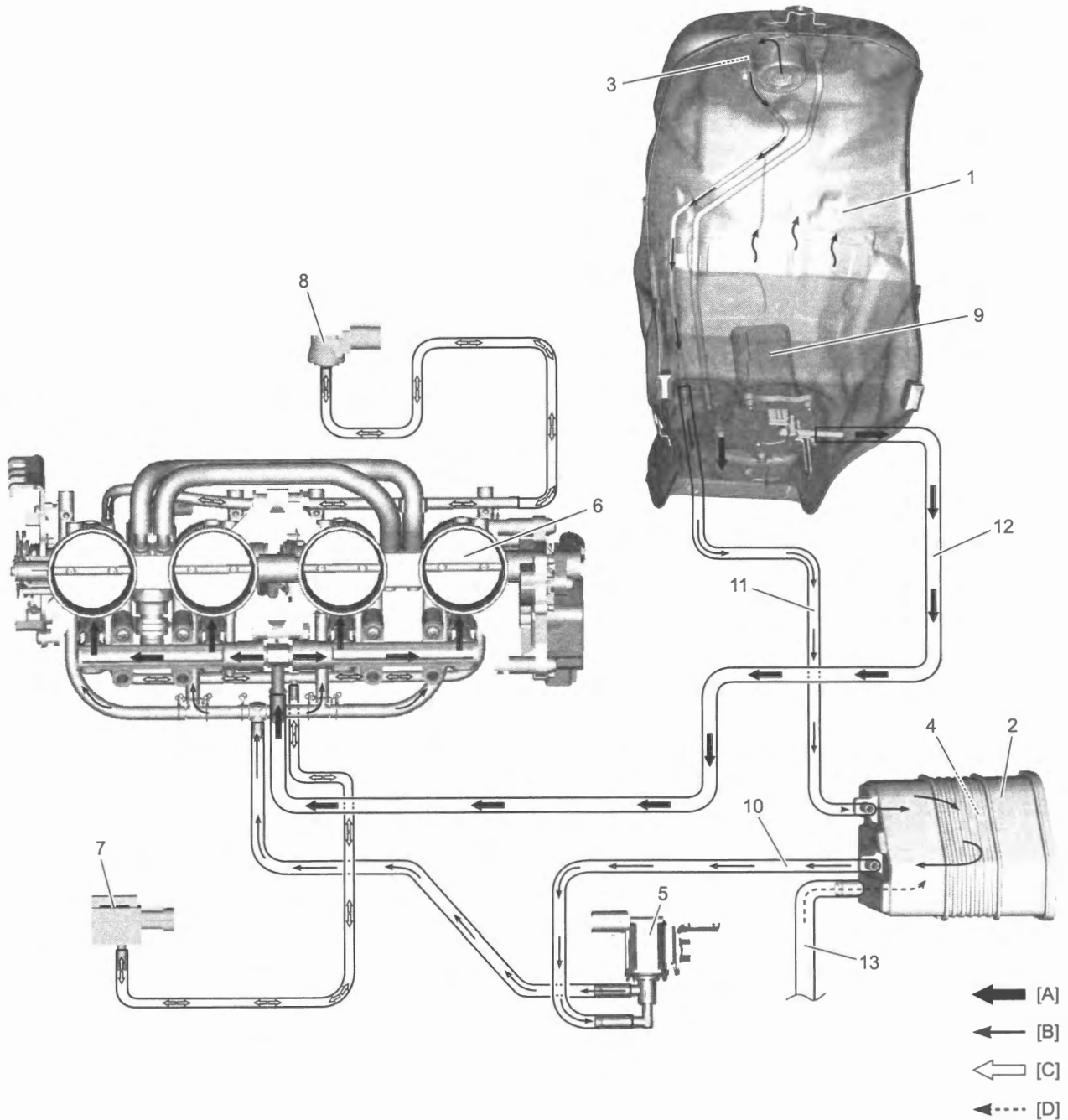
Evaporative Emission Control System Description (If Equipped)

BENK07L21201005

The evaporative emission control system is composed of the EVAP system.

The EVAP system restrains hydrocarbons namely HC vapors from emitting into the atmosphere. The HC vapors' pressure in the fuel tank (1) may rise affected by change of ambient temperature, barometric pressure or refueling, and the pressurized vapors are conducted into the EVAP canister (2) through the fuel shut-off valve (3) so as to maintain the tank pressure normal. Active carbon (4) in the EVAP canister (2) absorbs the hydrocarbons and storing them.

The active carbon (4) stores the hydrocarbons until the engine is able to consume them. When the EVAP system purge control solenoid valve (5) is turned ON by the ECM, fresh air flow into the EVAP canister (2) due to negative intake pressure, then the HC vapors are pulled apart from the active carbon (4) and sucked into the throttle body (6).



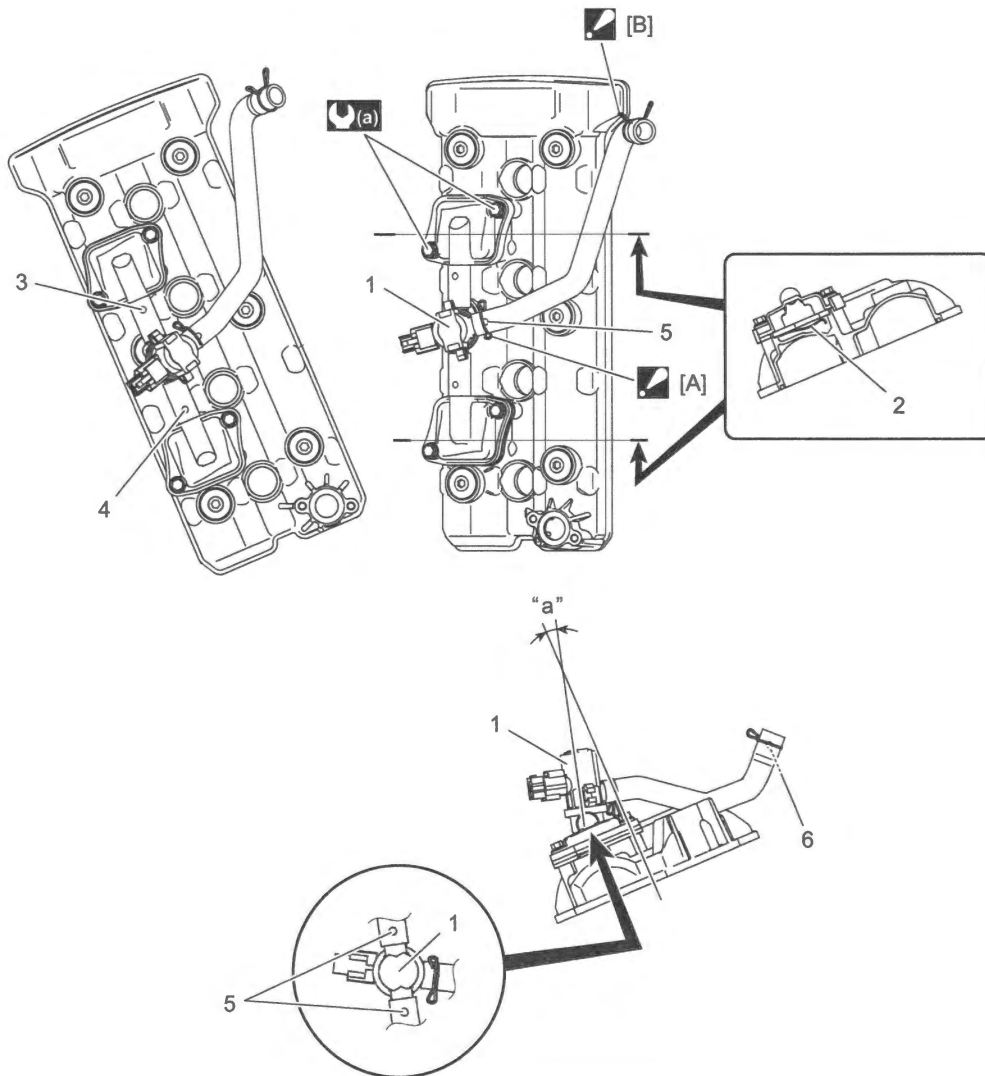
IK07L1120002-05

[A]: Fuel	7. IAP sensor	11. Surge hose
[B]: HC vapor	8. AP sensor	12. Fuel feed hose
[C]: Vacuum	9. Fuel pump	13. Canister drain hose
[D]: Fresh air	10. Purge hose	

Schematic and Routing Diagram

PAIR System Hose Routing Diagram

BENK07L21202001

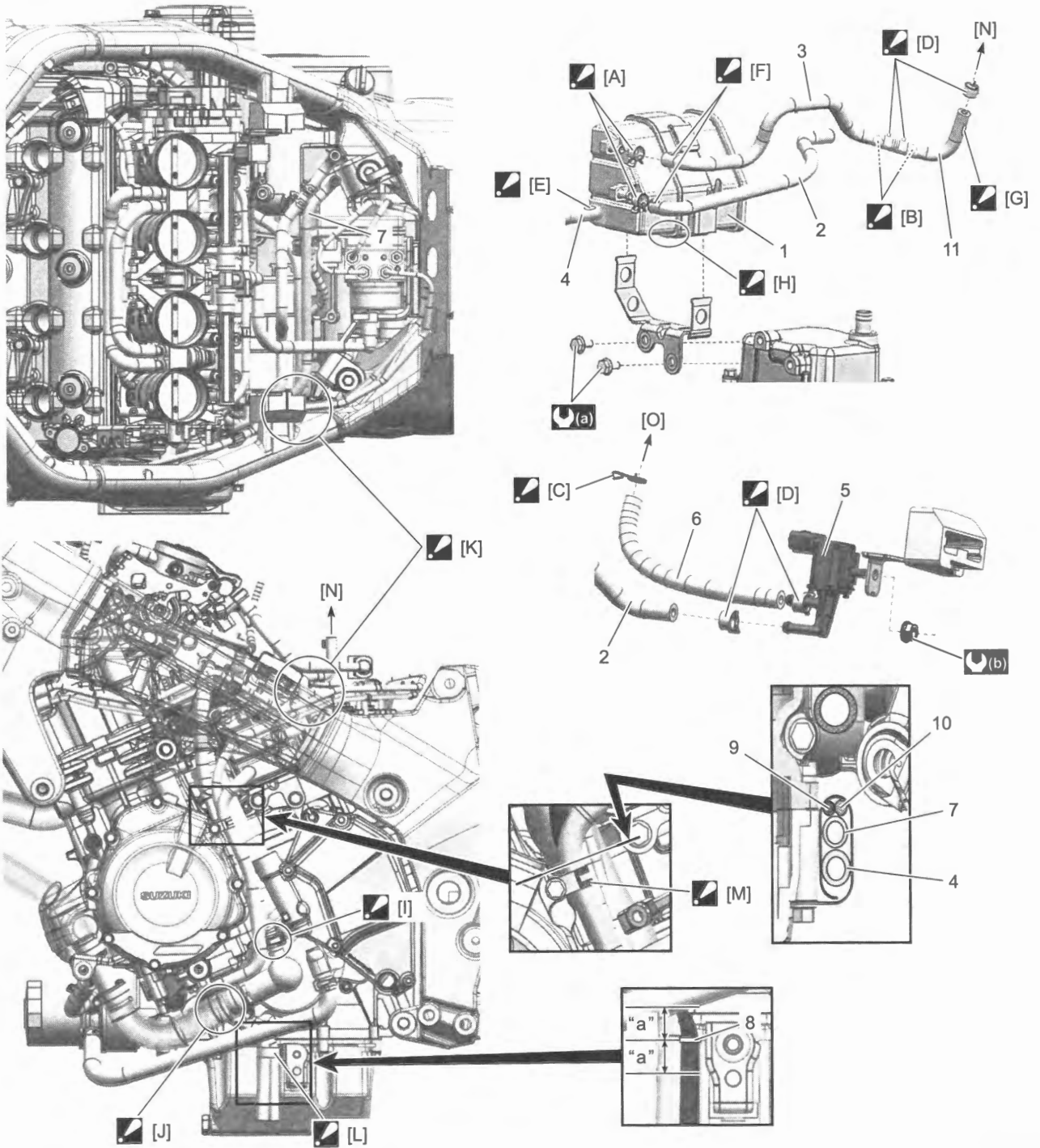


IK07L1120014-02

[A]: Clamp end should face downward.	4. Pink marking
[B]: Clamp end should face right side forward. (Approx. 45°) Do not contact the frame and air cleaner box.	5. Yellow marking
1. PAIR control solenoid valve	6. White marking
2. PAIR reed valve	"a": 15°
3. Blue marking	(a) : 10 N-m (1.0 kgf-m, 7.5 lbf-ft)

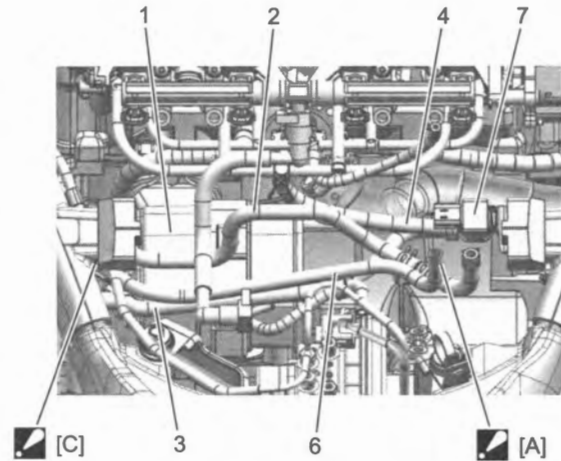
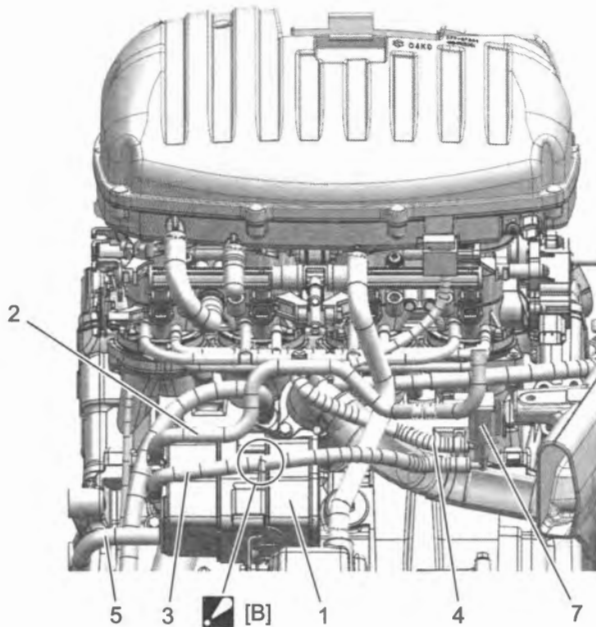
EVAP Canister Hose Routing Diagram (If Equipped)

BENK07L21202002



IK07L1120003-03

☑ [A]: Face the clamp end downward.	1. EVAP canister
☑ [B]: Face the green mark forward.	2. Purge hose No.1
☑ [C]: Face the clamp end backward.	3. Surge hose No.2
☑ [D]: Face the clamp end forward.	4. Canister drain hose
☑ [E]: Face the yellow mark upward.	5. EVAP system purge control solenoid valve
☑ [F]: Face the white mark upward.	6. Purge hose No.2
☑ [G]: Face the yellow mark to right side.	7. Water drain hose
☑ [H]: Fit the boss of cushion to the slit of the EVAP canister.	8. White mark
☑ [I]: Do not contact the hose clamp and canister drain hose.	9. HO2 sensor lead wire
☑ [J]: Pass the HO2 sensor lead wire and canister drain hose inside of the radiator hose.	10. Side-stand switch lead wire
☑ [K]: Pass the water drain hose inside of the brake pipes.	11. Surge hose No.1
☑ [L]: Clamp the hose at the white mark portion.	"a": Within 10 mm (0.39 in)
☑ [M]: Clamp the hose at the mark portion.	ⓐ : 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
[N]: To fuel tank	ⓑ : 6.7 N·m (0.68 kgf·m, 4.95 lbf·ft)
[O]: To throttle body	



IK07L1120013-02

☑ [A]: Face the white mark to right side.	3. Purge hose No.1
☑ [B]: Set the purge hose No.1 on the boss of cushion.	4. Purge hose No.2
☑ [C]: Pass the water drain hose between the surge hose No.2 and purge hose No.1.	5. Canister drain hose
1. EVAP canister	6. Water drain hose
2. Surge hose No.2	7. EVAP system purge control solenoid valve

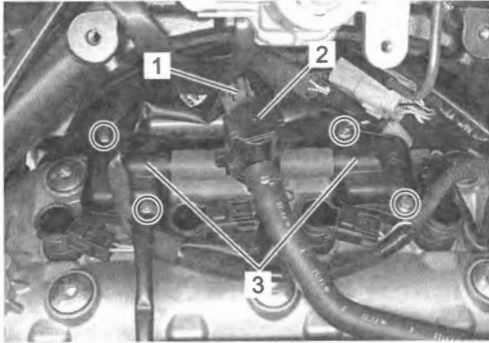
Repair Instructions

PAIR Reed Valve Removal and Installation

BENK07L21206001

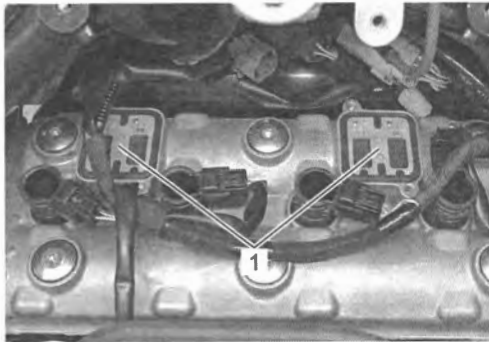
Removal

- 1) Remove the air cleaner box. (Page 1D-7)
- 2) Disconnect the PAIR control solenoid valve coupler (1).
- 3) Remove the PAIR control solenoid valve (2) with PAIR reed valve covers (3).



IK07L1120016-01

- 4) Remove the PAIR reed valves (1).



IK07L1120017-01

Installation

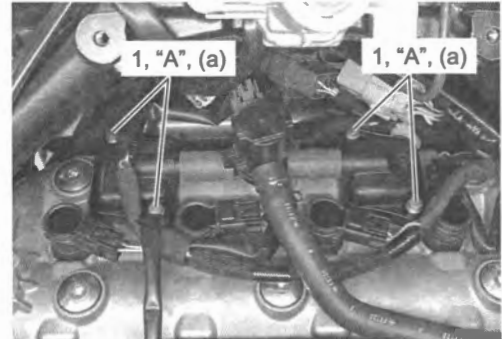
Install the PAIR reed valve in the reverse order of removal. Pay attention to the following point:

- Apply thread lock to the PAIR reed valve cover bolts (1) and tighten them to the specified torque.

“A”: Thread lock cement 99000–32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

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



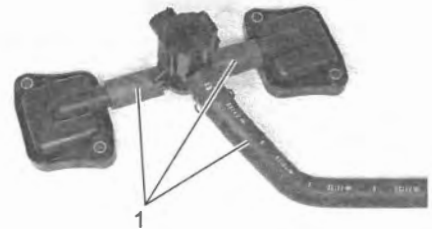
IK07L1120018-01

PAIR Control Solenoid Valve Removal and Installation

BENK07L21206002

Removal

- 1) Remove the PAIR control solenoid valve with the PAIR reed valve covers. (Page 1B-9)
- 2) Disconnect the PAIR hoses (1).



IK07L1120019-01

Installation

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

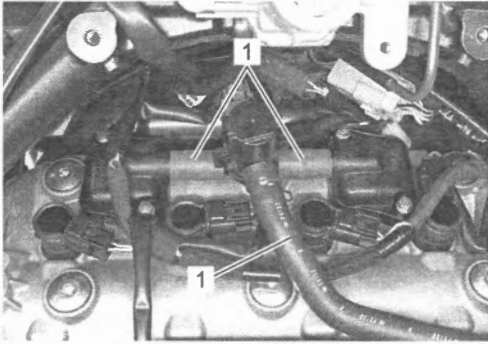
- Connect the PAIR hoses properly. Refer to “PAIR System Hose Routing Diagram” (Page 1B-6).

PAIR System Inspection

BENK07L21206003

PAIR Hose

- 1) Remove the air cleaner box. (Page 1D-7)
- 2) Inspect the PAIR hoses (1) for wear or damage. If it is worn or damaged, replace the PAIR hose with a new one. Refer to "PAIR System Hose Routing Diagram" (Page 1B-6).



IK07L1120015-01

- 3) Install the removed parts.

PAIR Reed Valve

- 1) Remove the PAIR reed valves. Refer to "PAIR Reed Valve Removal and Installation" (Page 1B-9).
- 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.

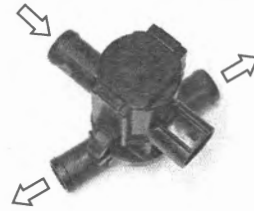


I947H1120018-01

- 3) Install the PAIR reed valves. Refer to "PAIR Reed Valve Removal and Installation" (Page 1B-9).

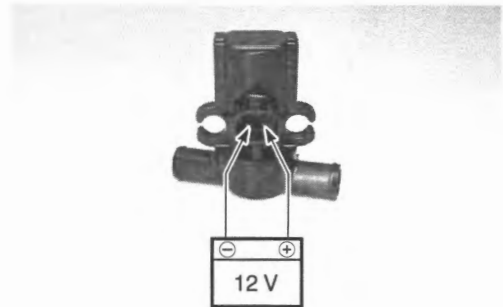
PAIR Control Solenoid Valve

- 1) Remove the PAIR control solenoid valve. Refer to "PAIR Control Solenoid Valve Removal and Installation" (Page 1B-9).
- 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.



IF04K1120008-01

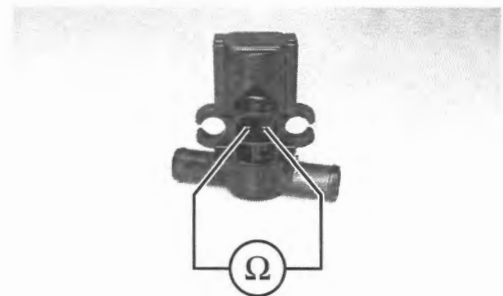
- 3) Connect the 12 V battery to the PAIR control solenoid valve terminals and check the air flow. If air does not flow out, the solenoid valve is in normal condition.



IF04K1120009-01

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

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



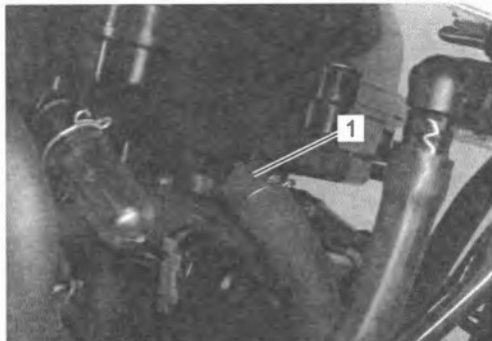
IF04K1120010-01

- 5) Reinstall the PAIR control solenoid valve. Refer to "PAIR Control Solenoid Valve Removal and Installation" (Page 1B-9).

PCV Hose Inspection

BENK07L21206004

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Inspect the PCV hose (1) for wear and damage.
If it is worn or damaged, replace the PCV hose with a new one.
- 3) Check that the PCV hose (1) is securely connected.



IF04K1120011-03

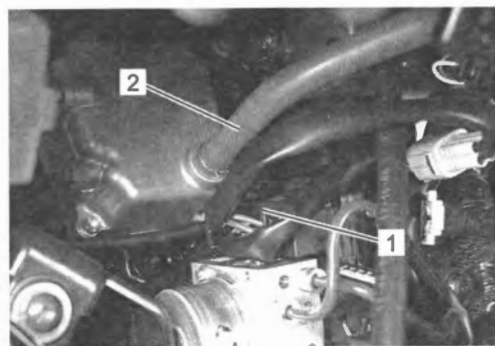
- 4) Install the removed parts.

PCV Hose / PCV Cover Removal and Installation

BENK07L21206005

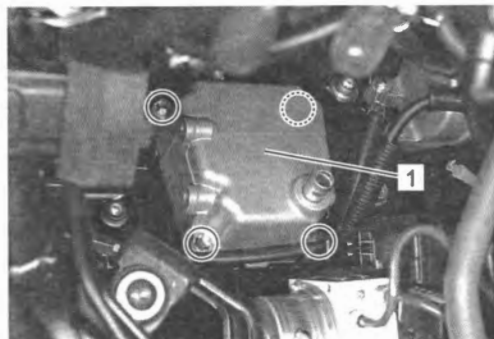
Removal

- 1) Remove the fuel tank. (Page 1G-11)
- 2) Remove the EVAP canister. (If equipped) Refer to "EVAP Control System Removal and Installation (If Equipped)" (Page 1B-12).
- 3) Disconnect the ABS control unit coupler (1) and PCV hose (2). (Page 4E-31)



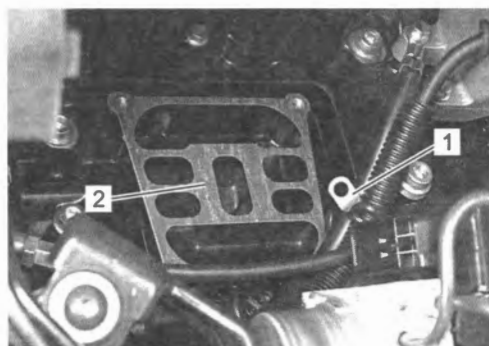
IK07L1120004-01

- 4) Remove the PCV cover (1).



IK07L1120005-01

- 5) Remove the clamp (1) and gasket (2).

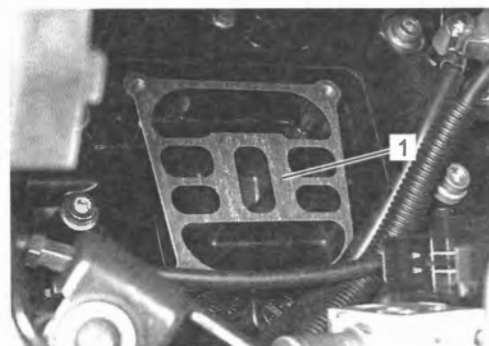


IK07L1120006-01

Installation

Install the PCV hose / PCV cover in the reverse order of removal. Pay attention to the following points:

- Install the new gasket (1).

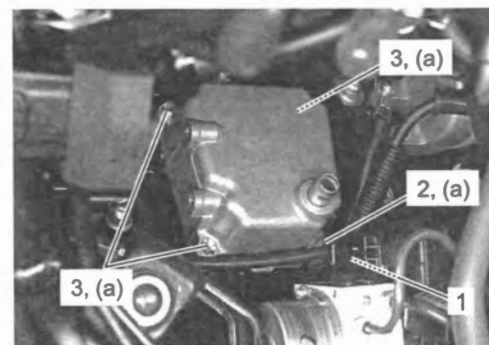


IK07L1120007-01

- Fit the clamp (1) to the PCV cover bolt (2), and tighten the PCV cover bolts (2) and (3) to the specified torque.

Tightening torque

PCV cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



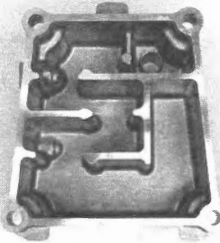
IK07L1120008-01

- Connect the PCV hose securely. Refer to "Intake System Construction" in Section 1D (Page 1D-5).

PCV Cover Inspection

BENK07L21206006

- 1) Remove the PCV cover. Refer to "PCV Hose / PCV Cover Removal and Installation" (Page 1B-11).
- 2) Inspect the PCV cover for carbon deposit. If carbon deposit is found in the PCV cover, remove the carbon.



IF04K1120017-01

- 3) Install the removed parts.

EVAP Control System Removal and Installation (If Equipped)

BENK07L21206007

Refer to "EVAP Canister Hose Routing Diagram (If Equipped)" (Page 1B-7).

Hose Removal

- 1) Remove the fuel tank. (Page 1G-11)
- 2) Remove the EVAP hoses.

Installation

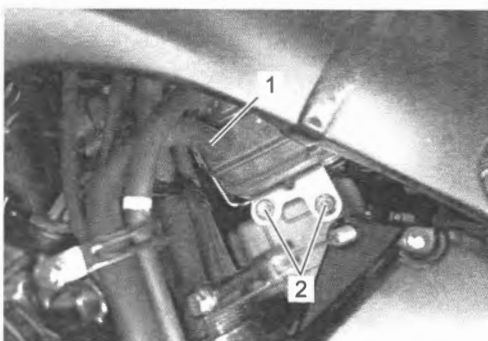
- 1) Install the EVAP hoses.
- 2) Install the removed parts.

EVAP Canister

Refer to "EVAP Canister Hose Routing Diagram (If Equipped)" (Page 1B-7).

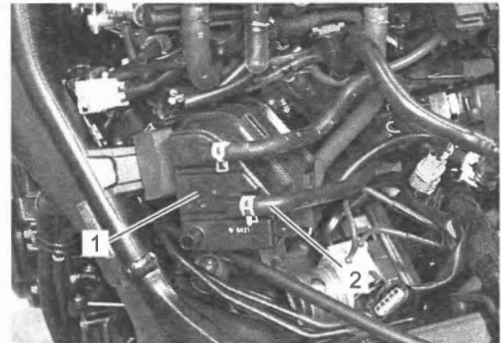
Removal

- 1) Remove the fuel tank. (Page 1G-11)
- 2) Disconnect the canister drain hose (1).
- 3) Remove the canister bracket bolts (2).



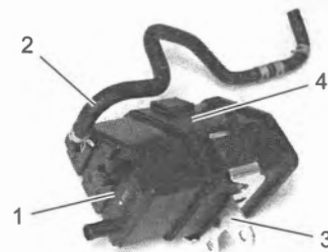
IJ04K1120004-01

- 4) Lift the EVAP canister (1) and disconnect the purge hose No.1 (2).
- 5) Remove the EVAP canister assembly (1).



IK07L1120009-01

- 6) Remove the following parts from the EVAP canister (1).
 - Surge hose No.2 (2)
 - Canister bracket (3)
 - Canister cushion (4)



IK07L1120010-02

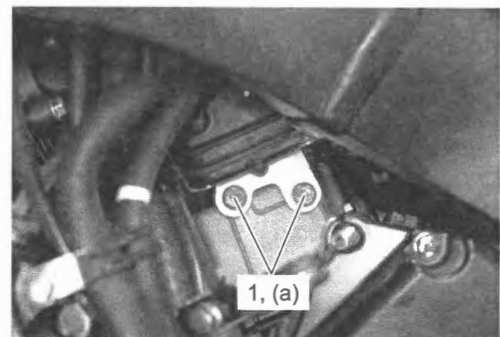
Installation

Install the EVAP canister in the reverse order of removal. Pay attention to the following point:

- Tighten the canister bracket bolts (1) to the specified torque.

Tightening torque

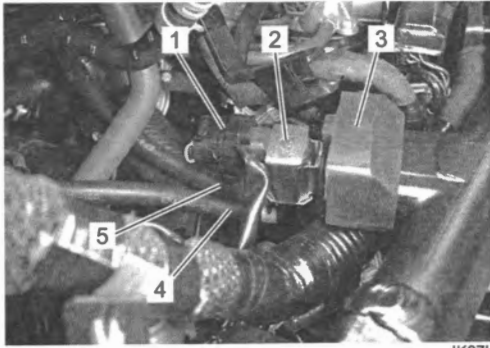
Canister bracket bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IJ04K1120006-01

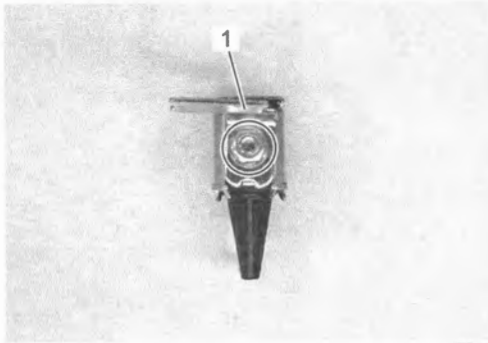
EVAP System Purge Control Solenoid Valve Removal

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Disconnect the coupler (1).
- 3) Remove the EVAP system purge control solenoid valve (2) from the cushion (3).
- 4) Disconnect the purge hose No.1 (4) and purge hose No.2 (5).



IK07L1120011-01

- 5) Remove the bracket (1).



IF04K1120024-01

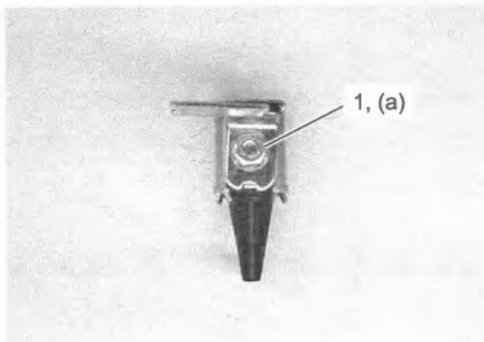
Installation

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): 6.7 N·m (0.68 kgf-m, 4.95 lbf-ft)



IF04K1120023-01

EVAP Control System Inspection (If Equipped)

BENK07L21206008

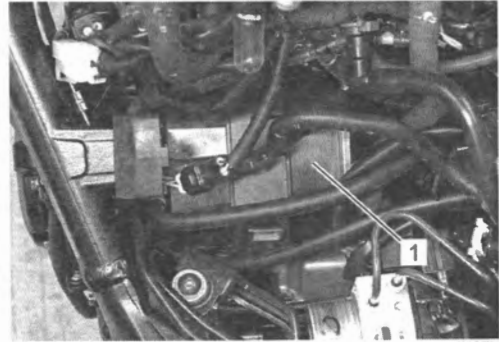
Refer to "EVAP Control System Removal and Installation (If Equipped)" (Page 1B-12).

Hose

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

EVAP Canister

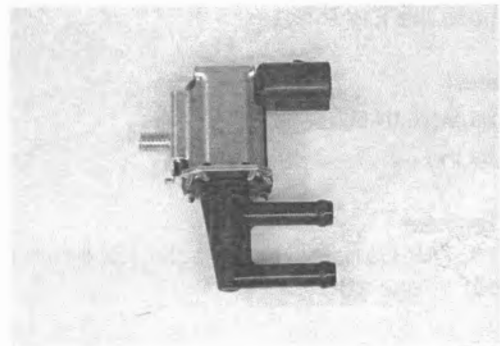
Inspect the EVAP canister body for damage to the body. If any defect is found, replace the EVAP canister (1) with a new one.



IK07L1120012-01

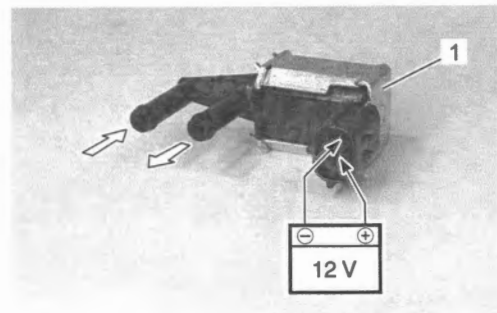
EVAP System Purge Control Solenoid Valve

- 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.



IF04K1120026-01

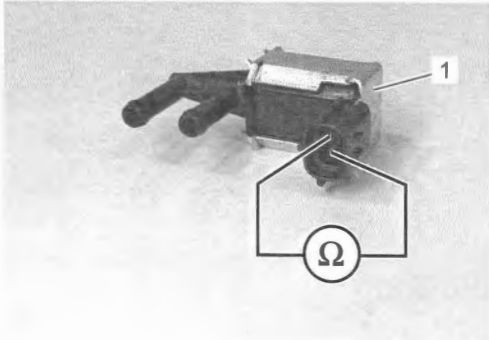
- 2) Connect the 12 V battery to the terminals of the EVAP system purge control solenoid valve (1) and check the air flow. If air flows out, the solenoid valve is in normal condition.



IF04K1120027-02

- 3) Check the resistance between the terminals of the 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

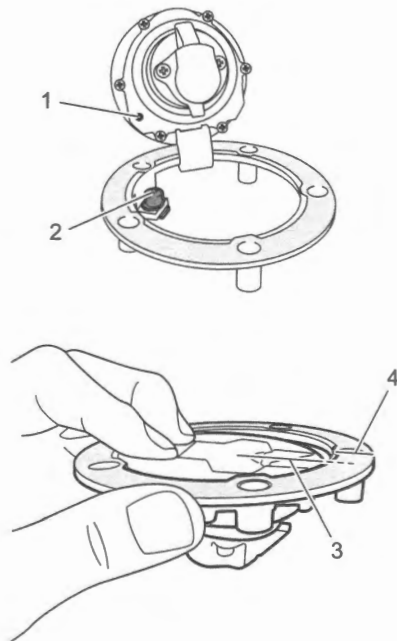


IF04K1120028-02

Fuel Shut-off Valve

Refer to "Fuel Tank Cap Removal and Installation" in Section 1G (Page 1G-11).

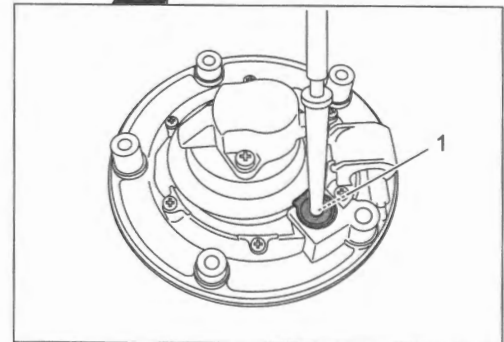
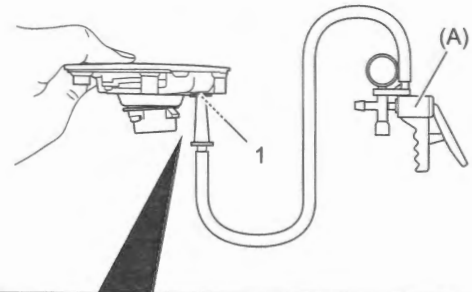
- 1) Hold the fuel tank cap so that the fuel tank cap breather hole (1) is aligned with and closely contacts the packing breather port (2) and the fuel tank cap upper surface (3) is located lower than the fuel tank cap ring upper surface (4).



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.

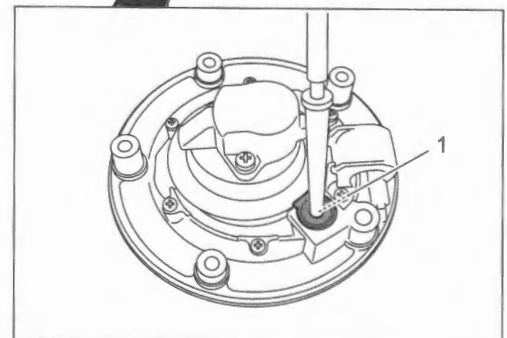
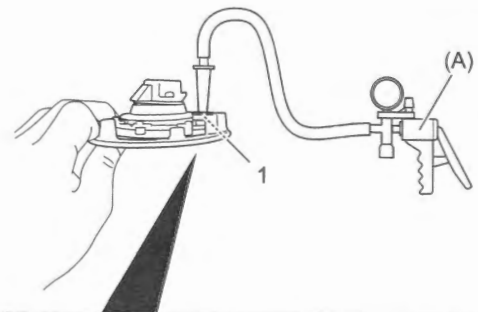
Special tool
 (A): 09917-47011



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



IH13K1120034-03

Specifications

Tightening Torque Specifications

BENK07L21207001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
PAIR reed valve cover bolt	10	1.0	7.5	☞ (Page 1B-9)
PCV cover bolt	10	1.0	7.5	☞ (Page 1B-11)
Canister bracket bolt	10	1.0	7.5	☞ (Page 1B-12)
EVAP system purge control solenoid valve nut	6.7	0.68	4.95	☞ (Page 1B-13)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“PAIR System Hose Routing Diagram” (Page 1B-6)

“EVAP Canister Hose Routing Diagram (If Equipped)” (Page 1B-7)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

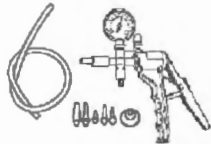
Recommended Service Material

BENK07L21208001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞ (Page 1B-9)

Special Tool

BENK07L21208002

09917-47011 Vacuum pump gauge set ☞ (Page 1B-14) / ☞ (Page 1B-14)	
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Engine Electrical Devices

Precautions

Precautions for Engine Electrical Device

BENK07L21300001

Refer to "General Precautions" in Section 00 (Page 00-1), "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2), "Precautions for Circuit Tester" in Section 00 (Page 00-7) and "Precautions for SDS-II" in Section 00 (Page 00-8).

Component Location

Engine Electrical Components Location

BENK07L21303001

Refer to "Electrical Components Location" in Section 0A (Page 0A-7).

Diagnostic Information and Procedures

Engine Symptom Diagnosis

BENK07L21304001

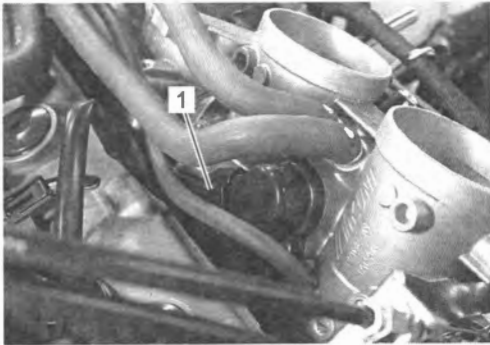
Refer to "Engine Symptom Diagnosis" in Section 1A (Page 1A-12).

Repair Instructions

ISC Valve Inspection

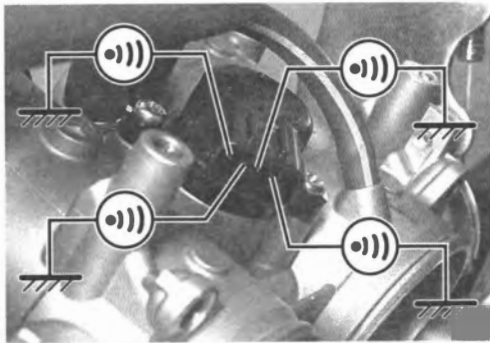
BENK07L21306001

- 1) Remove the air cleaner box. (Page 1D-7)
- 2) Disconnect the ISC valve coupler (1).



IF04K1130001-01

- 3) Loosen the intake pipe clamp screws and move the throttle body. Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-11).
- 4) Check that the resistance between each terminal of ISC valve and ground is infinity.

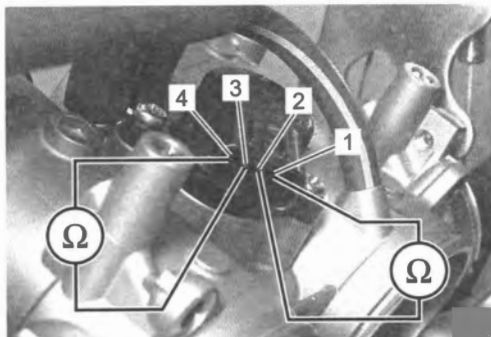


IF04K1130002-02

- 5) Measure the resistance between the W/Y wire terminal (1) and Lg wire terminal (2), and between the Dbr wire terminal (3) and Lbl wire terminal (4). If the resistance is out of the specified value, replace the ISC valve. (Page 1C-2)

ISC valve resistance

20 °C (68 °F) [Standard]: Approx. 20 Ω



IF04K1130003-01

- 6) After finishing the ISC valve inspection, install the removed parts.

ISC Valve Removal and Installation

BENK07L21306002

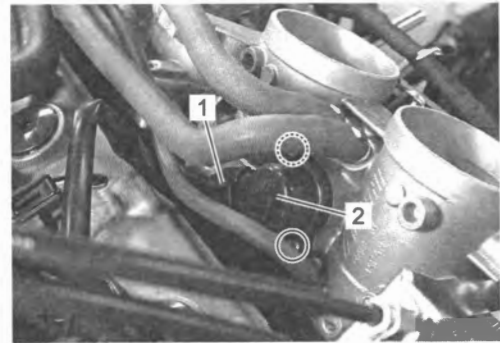
Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).

Removal

NOTICE

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

- 1) Disconnect the ISC valve coupler (1).
- 2) Remove the ISC valve (2).



IF04K1130004-01

Installation

- 1) Apply a thin coat of engine oil to the new O-ring (1) and install it.

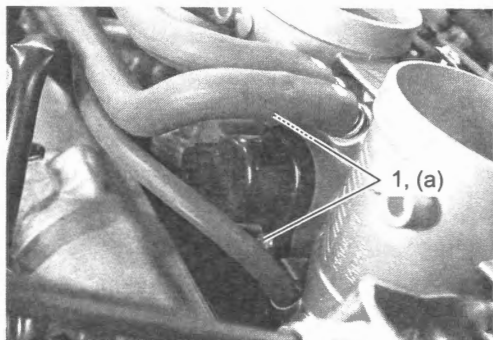


IF04K1130005-01

- 2) Install the ISC valve to the throttle body and tighten the ISC valve mounting screws (1) to the specified torque.

Tightening torque

ISC valve mounting screw (a): 2.0 N·m (0.20 kgf·m, 1.50 lbf·ft)



IF04K1130006-02

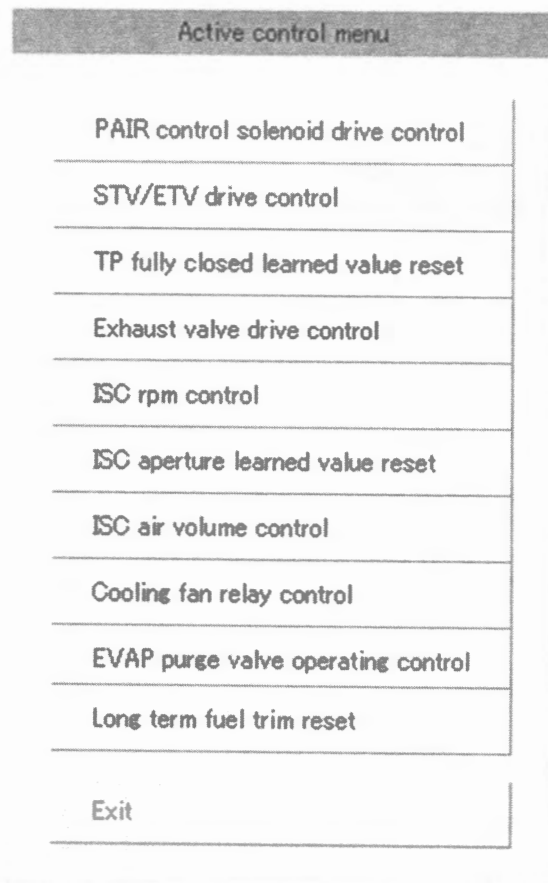
- 3) Connect the ISC valve coupler.
- 4) After installing the removed parts, reset the ISC aperture learned value. (Page 1C-3)

ISC Aperture Learned Value Reset

BENK07L21306003

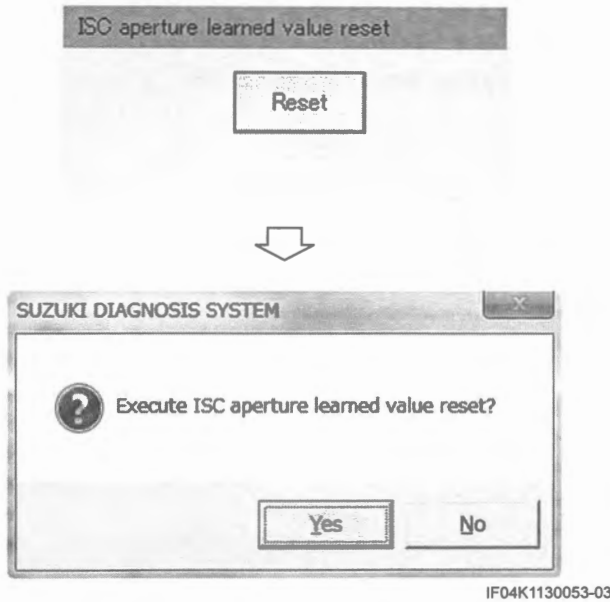
When replacing the throttle body assembly or ISC valve with a new one or reinstalling the ISC valve, reset the ISC aperture learned value in the following procedure:

- 1) Remove the seat. (Page 9D-19)
- 2) Set up the SDS-II referring to the SDS-II operation manual for further details.
- 3) Turn the ignition switch ON.
- 4) Click the "Active control".
- 5) Click the "ISC aperture learned value reset".



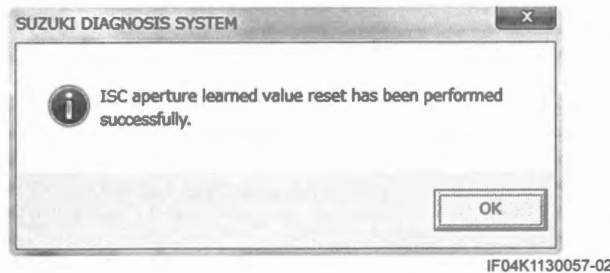
IJ04K1130018-01

- 6) Click the "Reset" button to clear the ISC aperture learned value.



NOTE

The learned value of the ISC valve is set at preset position.



- 7) Close the SDS-II and turn the ignition switch OFF.

NOTE

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

ECM Removal and Installation

BENK07L21306004

Removal

NOTICE

Be careful not to disconnect the battery cables, ECM couplers or ISC valve coupler at least 5 seconds after ignition switch is turned to OFF.

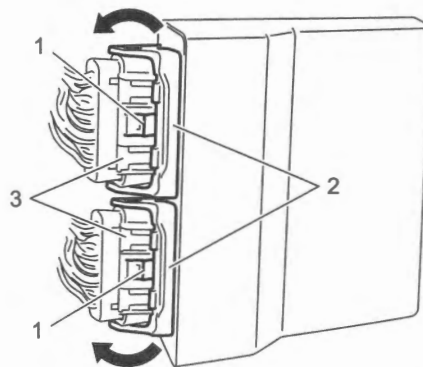
If they are disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual value being written in the ECM and causing an error of ISC valve operation.

- 1) Disconnect the battery (-) lead wire. (Page 1J-9)

- 2) Lift and support the fuel tank. (Page 1G-11)
 3) Remove the band (1).



- 4) Disconnect the ECM couplers as follows:
 a) Push the lock (1) to release locking of the lock levers (2).
 b) Turn the lock levers (2) in direction of arrow until they stops and disconnect the ECM couplers (3).

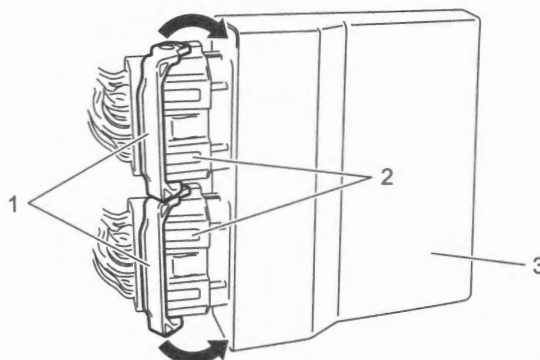


- 5) Remove the ECM.

Installation

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

- Connect the ECM couplers as follows:
 - a. Make sure that lock levers (1) are in unlock position.
 - b. Insert the couplers (2) to ECM (3) until they stops with lock levers (1) in unlocked position.
 - c. Turn the lock levers (1) in direction of arrow to lock the couplers (2) securely.



IJ04K1130008-02

AP Sensor Inspection

BENK07L21306005

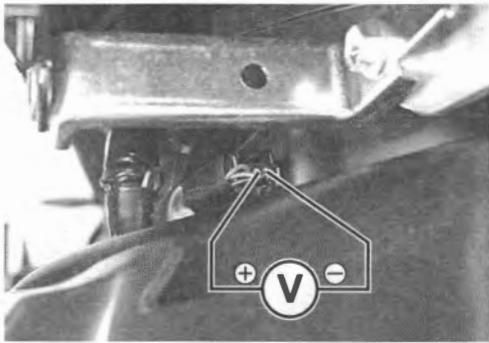
AP Sensor Output Voltage at Idle Speed

- 1) Check the AP sensor power supply voltage and circuit. (Page 1A-59)
- 2) Turn the ignition switch OFF.
- 3) Connect the AP sensor coupler and ECM couplers.
- 4) Run the engine at idle speed, measure the AP sensor output voltage between the G/Y wire and B/Br wire. If the voltage is not within the specified value, replace the AP sensor. (Page 1C-5)

AP sensor output voltage

Idle speed at 1 atm.

[Standard]: Approx. 2.8 V



IK07L1130002-01

- 5) After finishing the AP sensor inspection, install the removed parts.

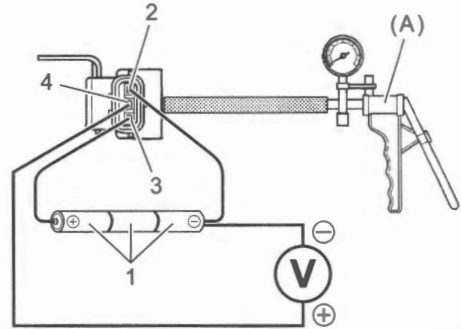
AP Sensor Output Voltage

- 1) Turn the ignition switch OFF.
- 2) Remove the AP sensor. (Page 1C-5)
- 3) Connect the vacuum pump gauge to the vacuum port of the AP 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 AP sensor. (Page 1C-5)

Special tool

(A): 09917-47011



IF04K1130052-01

ALTITUDE (Reference)		ATMOSPHERIC 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	5004 – 7998	85 – 76	637 – 570	2.6 – 3.4
2439 – 3048	8002 – 10000	76 – 70	570 – 525	2.4 – 3.1

IK07L1130021-01

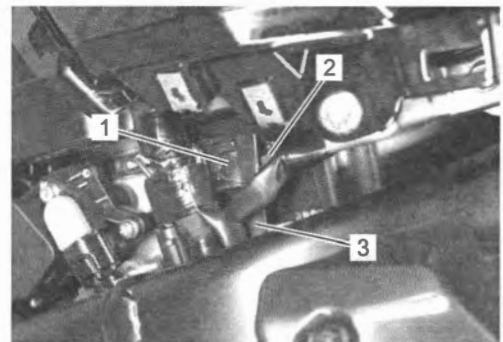
- 6) After finishing the AP sensor inspection, install the removed parts.

AP Sensor Removal and Installation

BENK07L21306006

Removal

- 1) Remove the right frame front cover assembly. (Page 9D-34)
- 2) Remove the AP sensor (1) from the air cleaner box.
- 3) Disconnect the AP sensor coupler (2) and vacuum hose (3) from the AP sensor (1).



IK07L1130003-02

Installation

Install the AP sensor in the reverse order of removal.

IAP Sensor Inspection

BENK07L21306007

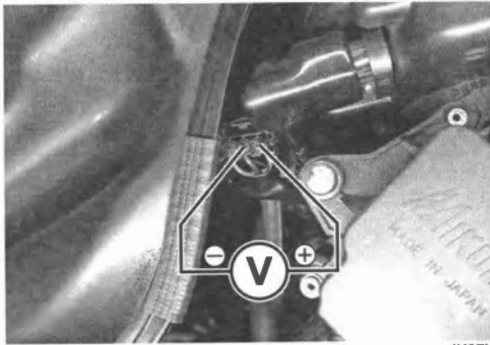
IAP Sensor Output Voltage at Idle Speed

- 1) Check the IAP sensor power supply voltage and circuit. (Page 1A-25)
- 2) Turn the ignition switch OFF.
- 3) Connect the IAP sensor coupler and ECM couplers.
- 4) Run the engine at idle speed, measure the IAP sensor output voltage between the G/B wire and B/Br wire. If the voltage is not within the specified value, replace the IAP sensor. (Page 1C-6)

IAP sensor output voltage

Idle speed at 1 atm.

[Standard]: Approx. 2.7 V



IK07L1130004-01

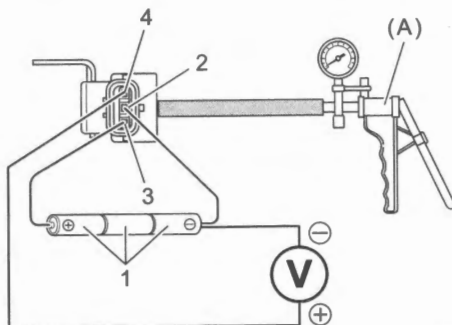
- 5) After finishing the IAP sensor inspection, install the removed parts.

IAP Sensor Output Voltage

- 1) Turn the ignition switch OFF.
- 2) Remove the IAP sensor. (Page 1C-6)
- 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-6)

Special tool

(A): 09917-47011



ID26J1110034-04

ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
m	ft	kPa	mmHg	V
0 – 610	0 – 2001	100 – 94	760 – 705	3.1 – 3.6
611 – 1524	2005 – 5000	94 – 85	705 – 638	2.8 – 3.4
1525 – 2438	5004 – 7998	85 – 76	637 – 570	2.6 – 3.1
2439 – 3048	8002 – 10000	76 – 70	570 – 525	2.4 – 2.9

IK07L1130022-01

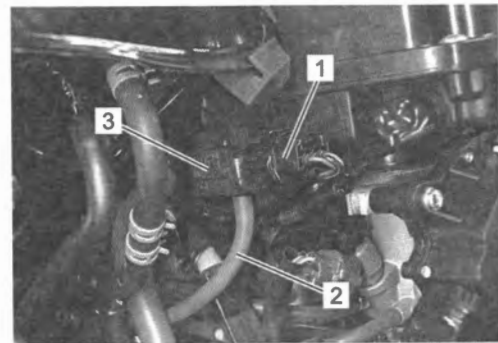
- 6) After finishing the IAP sensor inspection, install the removed parts.

IAP Sensor Removal and Installation

BENK07L21306008

Removal

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Disconnect the IAP sensor coupler (1) and vacuum hose (2).
- 3) Remove the IAP sensor (3).



IK07L1130005-01

Installation

Install the IAP sensor in the reverse order of removal.

IAT Sensor Inspection

BENK07L21306009

Refer to "IAT Sensor Removal and Installation" (Page 1C-7).

Measure the IAT sensor resistance. 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-7)

IAT sensor resistance

0 °C (32 °F) [Standard]: 5400 – 6600 Ω

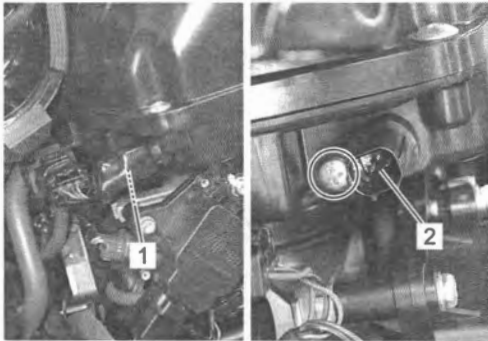
80 °C (176 °F) [Standard]: 290 – 390 Ω

IAT Sensor Removal and Installation

BENK07L21306010

Removal

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Disconnect the IAT sensor coupler (1) and remove the IAT sensor (2).



IK07L1130006-01

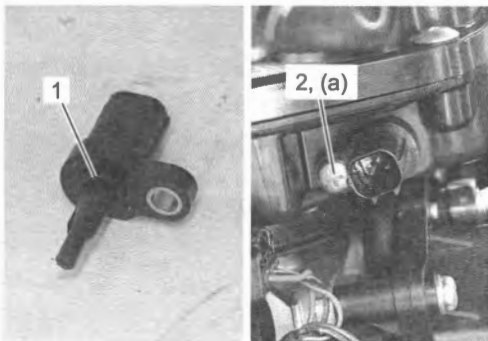
Installation

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)



IF04K1130013-02

ECT Sensor Inspection

BENK07L21306011

Refer to "ECT Sensor Removal and Installation" (Page 1C-8).

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.

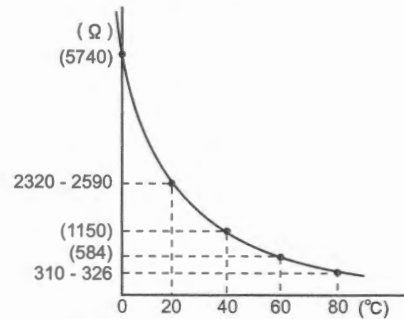
NOTICE

- 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.

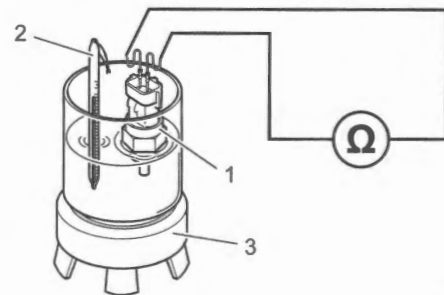
ECT sensor resistance

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

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



ID26J1130061-02



3. Heater

ID26J1130060-01

ECT Sensor Removal and Installation

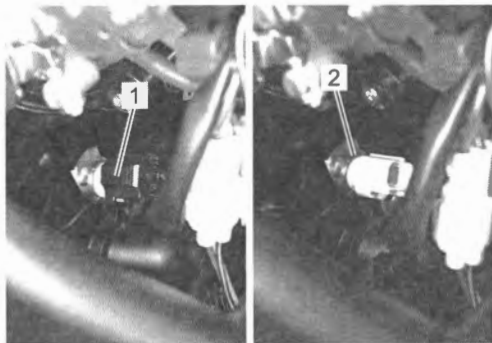
BENK07L21306012

Removal

- 1) Drain engine coolant. (Page 1F-6)
- 2) Lift and support the fuel tank. (Page 1G-11)
- 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.



IF04K1130014-01

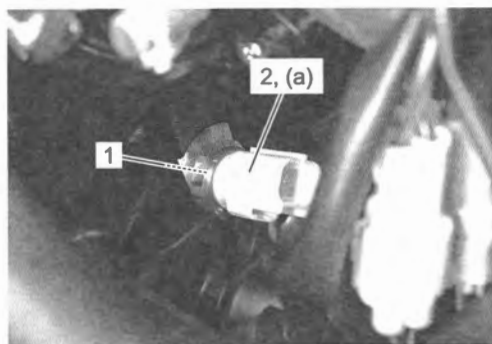
Installation

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

- Install the new gasket (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)



IF04K1130015-01

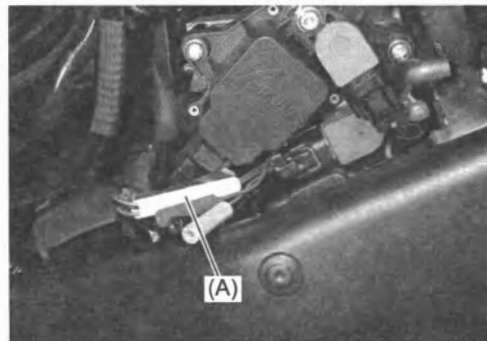
TP Sensor Inspection

BENK07L21306013

- 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-31)
- 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



IK07L1130007-01

- 5) Turn the ignition switch ON.
- 6) Measure the voltage between the B 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-9) or "TP Sensor Removal and Installation" (Page 1C-10).

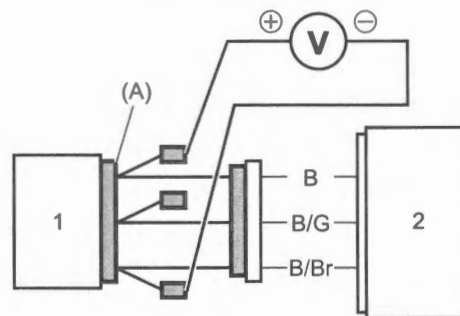
TP sensor output voltage

Closed [Standard]: 1.10 – 1.14 V

Opened [Standard]: Approx. 4.5 V

Special tool

(A): 09900-28631



IK07L1130008-01

1. TP sensor	2. ECM
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- 7) After finishing the TP sensor inspection, remove the special tool and install the removed parts.

TP Sensor Adjustment

BENK07L21306014

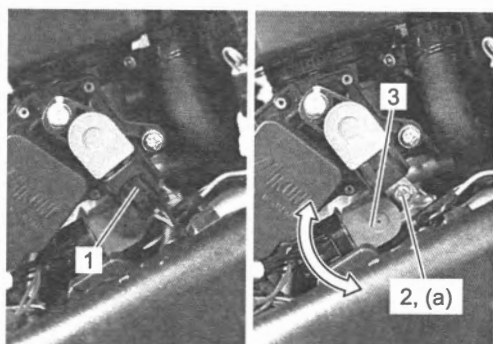
- 1) Check the TP sensor output voltage. (Page 1C-8)
- 2) If voltage is not within the specified value, disconnect the STP sensor coupler (1) and loosen the TP sensor mounting screw (2) with the special tool.

Special tool 09930-11950

- 3) Adjust the TP sensor (3) until the output voltage comes within the specified value. (Page 1C-8)
- 4) Tighten the TP sensor mounting screw (2) to the specified torque.

Tightening torque

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



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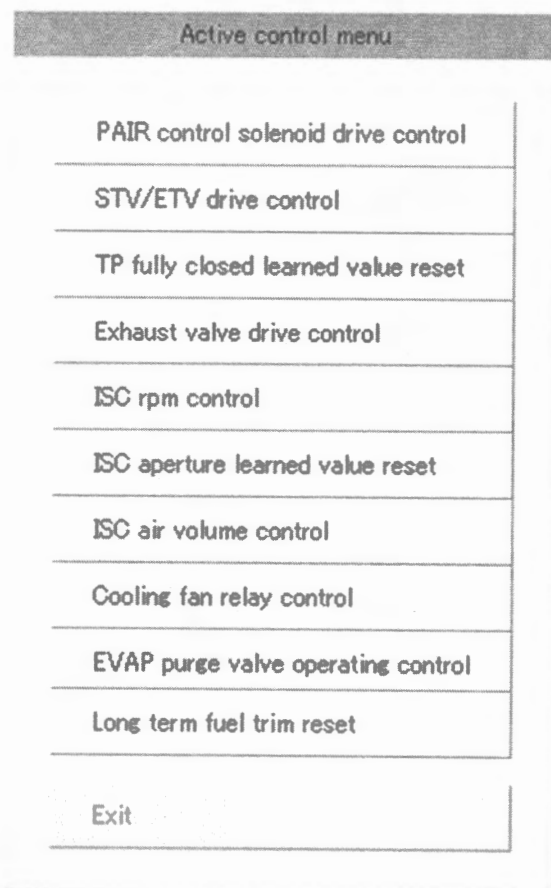
- 5) Remove the special tool and connect the sensor couplers.
- 6) Reset the TP fully closed learned value. (Page 1C-9)
- 7) After finishing the TP sensor adjustment, install the removed parts.

TP Fully Closed Learned Value Reset

BENK07L21306015

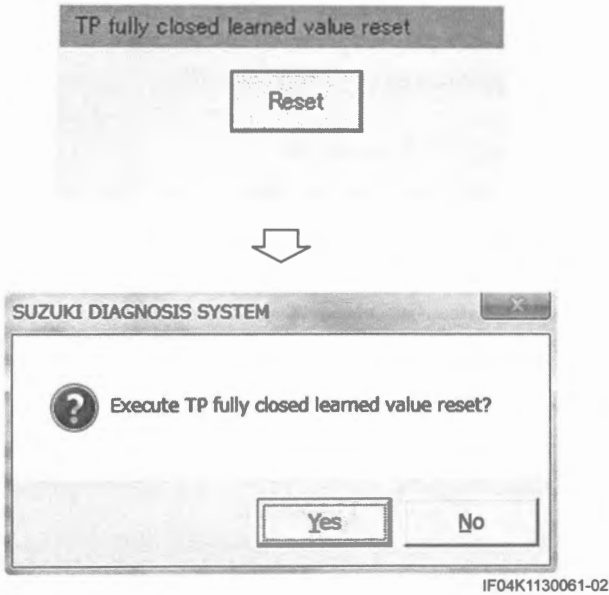
When replacing the throttle body assembly or TP sensor with a new one or reinstalling the TP sensor, reset the TP fully closed learned value in the following procedure:

- 1) Remove the seat. (Page 9D-19)
- 2) Set up the SDS-II referring to the SDS-II operation manual for further details.
- 3) Turn the ignition switch ON.
- 4) Click the "Active control".
- 5) Click the "TP fully closed learned value reset".



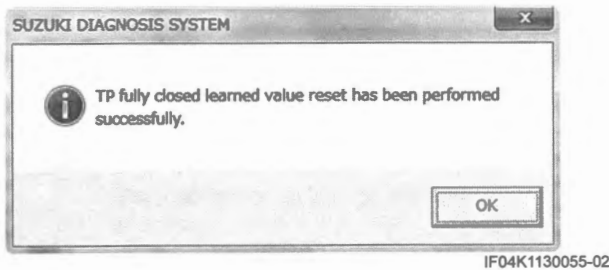
IJ04K1130018-01

- 6) Click the "Reset" button to clear the TP fully closed learned value.



NOTE

The learned value of the TP sensor is set at preset position.



- 7) Close the SDS-II and turn the ignition switch OFF.

NOTE

The TP sensor opening initialization is automatically started after the ignition switch is turned OFF position.

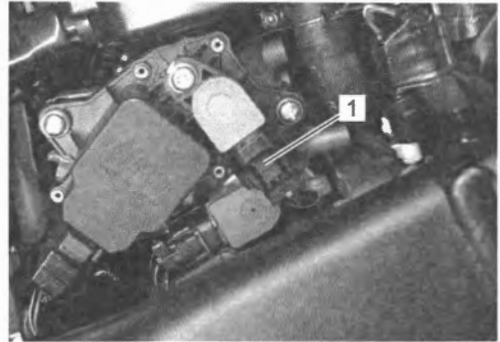
- 8) Install the removed parts.

TP Sensor Removal and Installation

BENK07L21306016

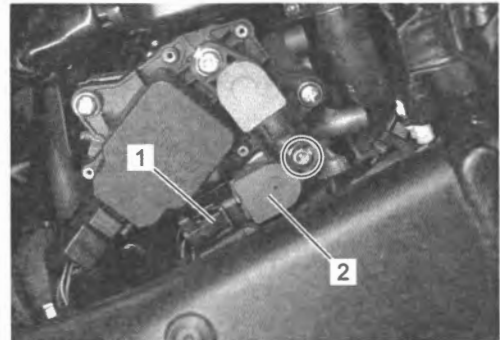
Removal

- 1) Remove the right frame front cover assembly.
☞ (Page 9D-34)
- 2) Disconnect the STP sensor coupler (1).



- 3) Prior to disassembly, mark the sensor's original position with a paint or scribe for accurate reinstallation.
- 4) Disconnect the TP sensor coupler (1).
- 5) Remove the TP sensor (2) with the special tool.

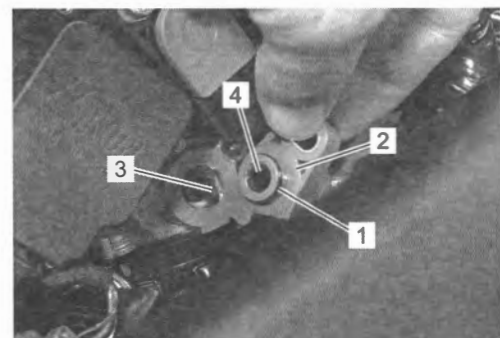
Special tool
09930-11950



Installation

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

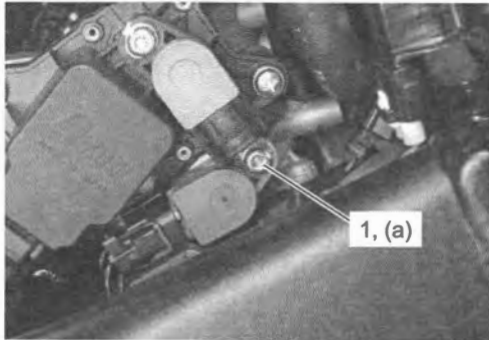
- Apply a thin coat of engine oil to the new O-ring (1).
- With the throttle valve fully closed, install the TP sensor (2) aligning the throttle shaft end (3) with the groove (4) of the TP sensor.



- 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)



IK07L1130011-01

- Check the throttle valve operating smoothly.
- Adjust the position of TP sensor. (Page 1C-9)
- Reset the TP fully closed learned value. (Page 1C-9)

HO2 Sensor Inspection

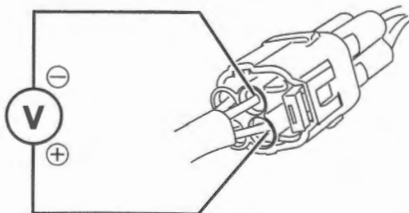
BENK07L21306017

HO2 Sensor Output Voltage

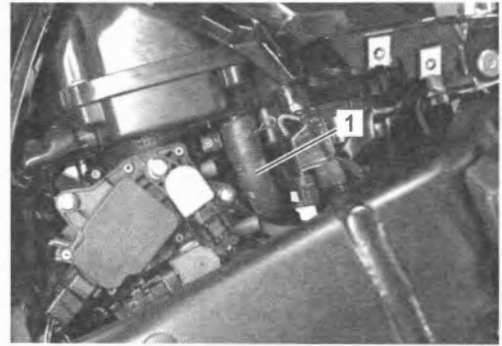
- 1) Remove the frame front cover assemblies. (Page 9D-34)
- 2) Start the engine and warm up the engine enough.
- 3) Measure the HO2 sensor output voltage between the B wire and Gr wire, in idling condition.
- 4) If OK, then pinch the PAIR hose (1) with a proper hose clamp.
- 5) Measure the HO2 sensor 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

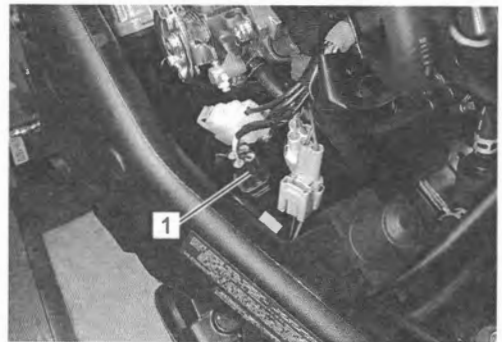


IK07L1130012-01

- 6) If the HO2 sensor output voltage is not within the standard range, replace the HO2 sensor. (Page 1C-12)
- 7) After finishing the HO2 sensor inspection, remove a proper hose clamp and install the removed parts.

HO2 Sensor Heater Resistance

- 1) Remove the left frame front cover assembly. (Page 9D-34)
- 2) Disconnect the HO2 sensor coupler (1).

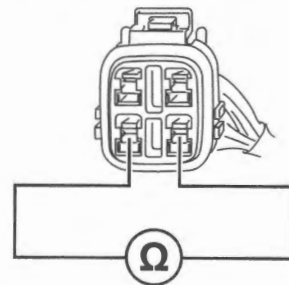


IF04K1130024-03

- 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-12)

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

BENK07L21306018

Removal

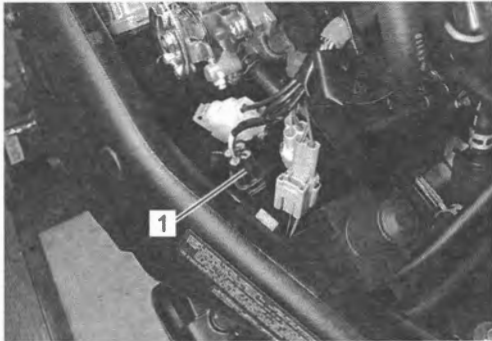
⚠ WARNING

Do not remove the HO2 sensor while it is hot.

NOTICE

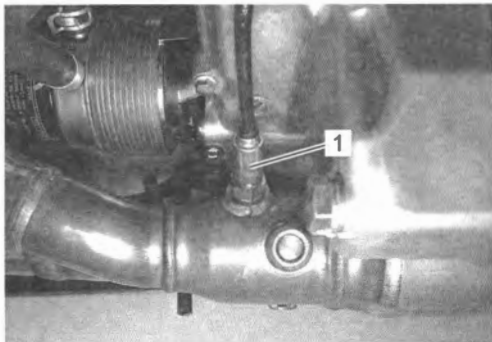
- Be careful not to expose the HO2 sensor to excessive shock.
- Do not use an impact wrench when removing or installing the HO2 sensor.
- Be careful not to twist or damage the sensor lead wire.

- 1) Remove the left frame front cover assembly. ☞(Page 9D-34)
- 2) Remove the left under cowling. ☞(Page 9D-42)
- 3) Disconnect the HO2 sensor coupler (1).



IF04K1130025-04

- 4) Remove the HO2 sensor (1).



IF04K1130026-02

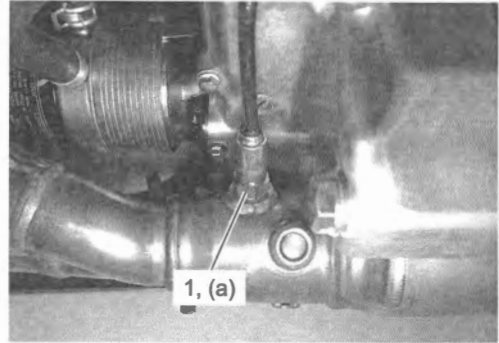
Installation

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)



IF04K1130027-02

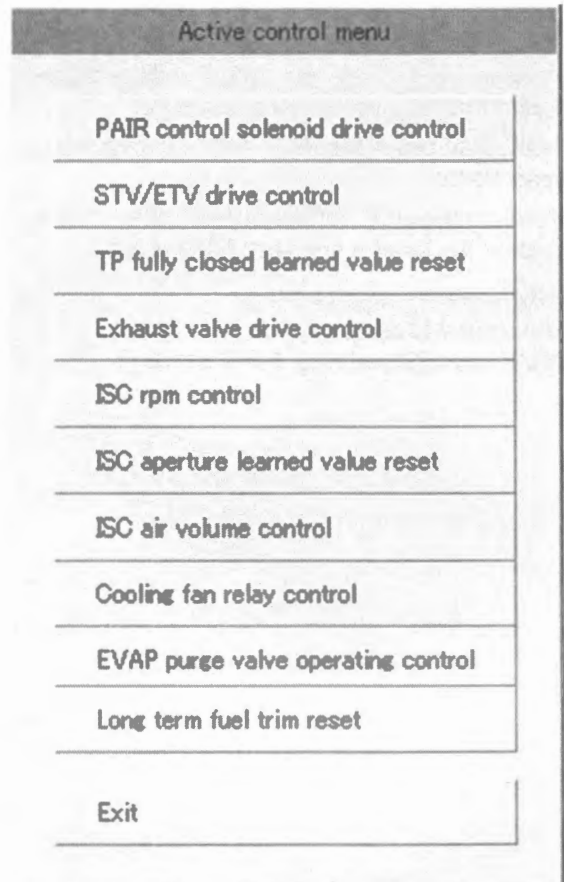
- Route the HO2 sensor lead wire. Refer to "Fuel Tank Water Drain Hose and Fuel Tank Breather Hose Routing Diagram" in Section 1G (Page 1G-3).
- Reset the long term fuel trim when replacing the HO2 sensor. ☞(Page 1C-12)

Long Term Fuel Trim Reset

BENK07L21306019

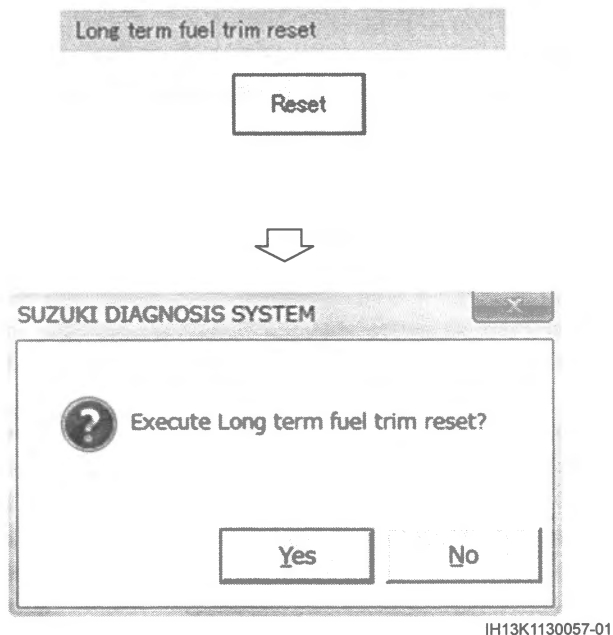
When replacing the HO2 sensor with a new one, reset the long term fuel trim in the following procedure:

- 1) Remove the seat. ☞(Page 9D-19)
- 2) Set up the SDS-II referring to the SDS-II operation manual for further details.
- 3) Turn the ignition switch ON.
- 4) Click the "Active control".
- 5) Click the "Long term fuel trim reset".



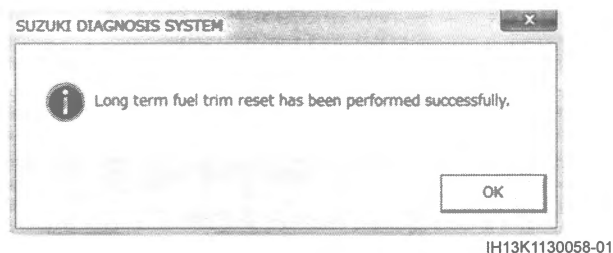
IJ04K1130018-01

- Click the "Reset" button to clear the long term fuel trim (HO2 sensor feedback learned value).



NOTE

The learned value of the long term fuel trim (HO2 sensor feedback learned value) is set at preset position.



- Close the SDS-II and turn the ignition switch OFF.

NOTE

The long term fuel trim (HO2 sensor feedback learned value) initialization is automatically started after the ignition switch is turned OFF position.

- Install the removed parts.

CKP Sensor Inspection

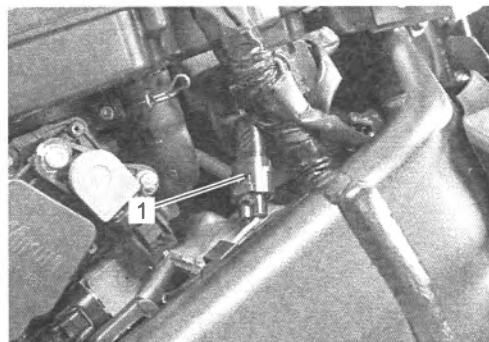
BENK07L21306020

CKP Sensor Peak Voltage

NOTE

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

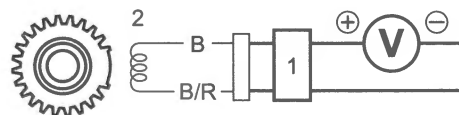
- Disconnect the fuel injector couplers. Refer to "Fuel Injector On-Vehicle Inspection" in Section 1G (Page 1G-19).
- Disconnect the CKP sensor coupler (1).



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

CKP sensor – circuit tester connection

	(+) Probe	(-) Probe
CKP sensor (2)	B lead wire	B/R lead wire



IK07L1130023-01

- Measure the CKP sensor peak voltage in the following procedure:
 - Shift the transmission into neutral, turn the ignition switch ON.
 - Press the starter switch and allow the engine to crank for a few seconds, and then measure the CKP sensor peak voltage.
- 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.

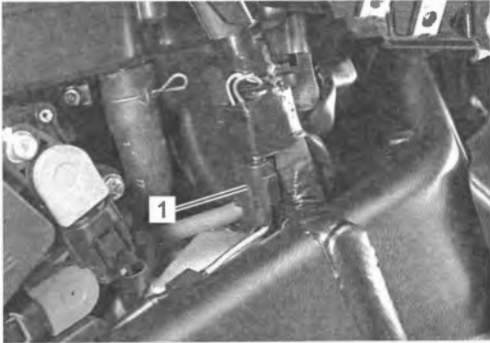
CKP sensor peak voltage

When cranking [Standard]: 0.5 V or more

- After measuring the CKP sensor peak voltage, install the removed parts.

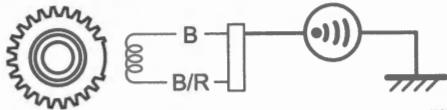
CKP Sensor Resistance

- 1) Remove the right frame front cover assembly. (Page 9D-34)
- 2) Disconnect the CKP sensor coupler (1).



IK07L1130026-01

- 3) Check that the resistance between B lead wire of CKP sensor and ground is infinity.

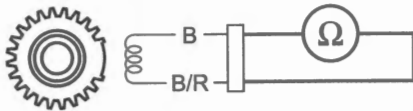


IK07L1130024-01

- 4) Measure the resistance between the B lead wire and B/R lead wire. If the resistance is not within the standard range, replace the CKP sensor. (Page 1C-14)

CKP sensor resistance

20 °C (68 °F) [Standard]: Approx. 168 Ω



IK07L1130025-01

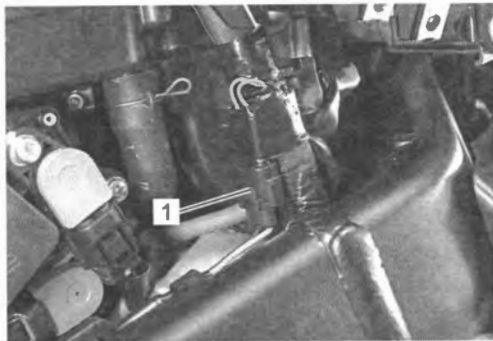
- 5) After measuring the CKP sensor resistance, install the removed parts.

CKP Sensor Removal and Installation

BENK07L21306021

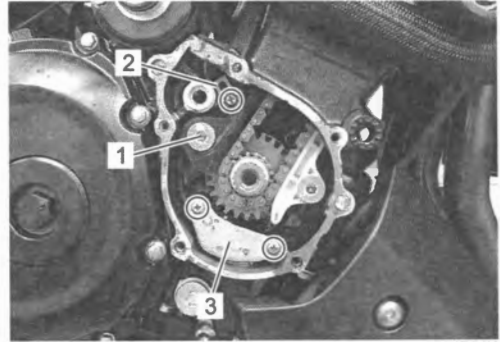
Removal

- 1) Remove the right frame front cover assembly. (Page 9D-34)
- 2) Disconnect the CKP sensor coupler (1).



IK07L1130026-01

- 3) Remove the starter clutch. (Page 11-9)
- 4) Remove the cam chain tension adjuster. Refer to "Cam Chain Tension Adjuster / Camshaft Removal" in Section 1D (Page 1D-19).
- 5) Remove the cam chain tensioner bolt (1).
- 6) Remove the clamp (2) and CKP sensor (3).



IF04K1130034-01

Installation

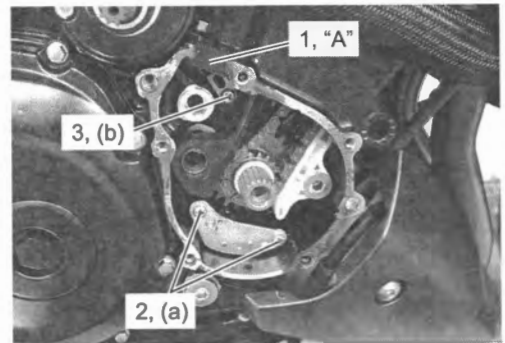
Install the CKP sensor in the reverse order of removal. Pay attention to the following points:

- Apply sealant to the grommet (1).
"A": Sealant 99000-31140 (SUZUKI BOND 1207B)
- Tighten the CKP sensor screws (2) and clamp screw (3) to the specified torque.

Tightening torque

CKP sensor screw (a): 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)

CKP sensor lead wire clamp screw (b): 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)



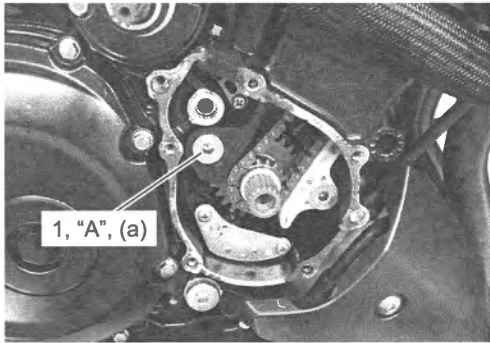
IF04K1130035-02

- Apply thread lock to the cam chain tensioner bolt (1) and tighten it to the specified torque.

“A”: Thread lock cement 99000–32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

Cam chain tensioner bolt (a): 23 N·m (2.3 kgf·m, 17.0 lbf·ft)

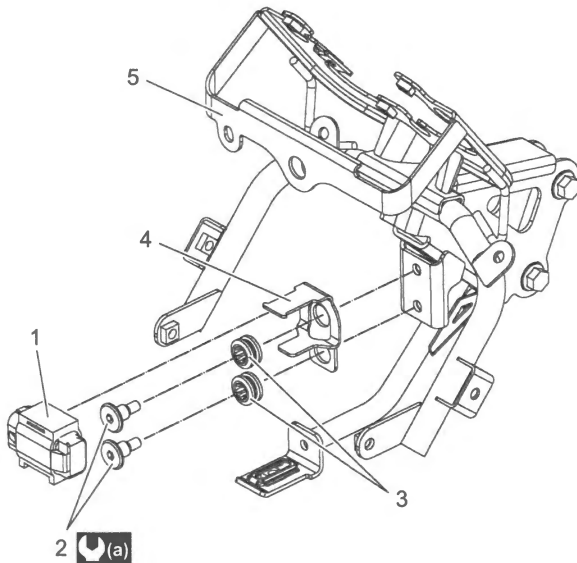


IF04K1130036-01

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

TO Sensor Construction

BENK07L21306022



IK07L1130013-02

1. TO sensor	4. TO sensor bracket
2. TO sensor bracket bolt	5. Cowling brace
3. Cushion	(a) : 7.0 N·m (0.71 kgf·m, 5.20 lbf·ft)

TO Sensor Inspection

BENK07L21306023

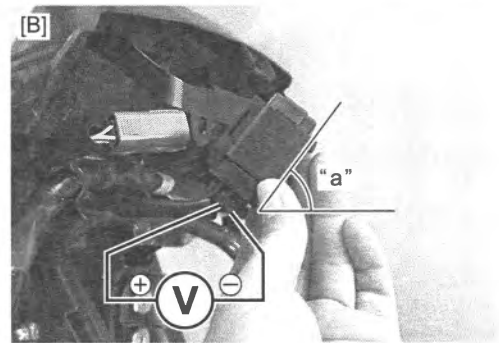
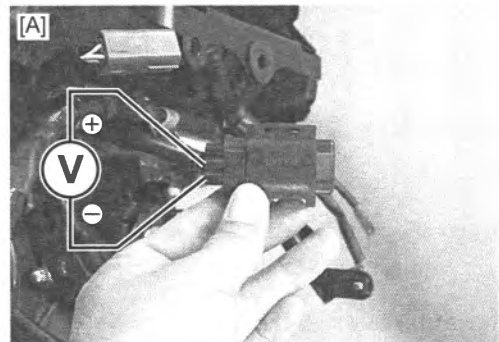
TO Sensor Output Voltage

- 1) Check the TO sensor power supply voltage and circuit. (Page 1A-67)
- 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) Turn the ignition switch ON, measure the TO sensor output voltage between the B wire and B/Br wire. If the voltage is not within the specified value, replace the TO sensor. (Page 1C-16)

TO sensor output voltage

Normal [Standard]: 0.4 – 1.4 V

Leaning 65° [Standard]: 3.7 – 4.4 V



IK07L1130014-01

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

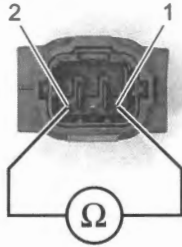
- 5) After finishing the TO sensor inspection, install the removed parts.

TO Sensor Resistance

- 1) Remove the TO sensor. ⚡(Page 1C-16)
- 2) Measure the resistance between B/Y wire terminal (1) and B/Br wire terminal (2). If the resistance is out of the specified value, replace the TO sensor. ⚡(Page 1C-16)

TO sensor resistance

[Standard]: 16500 – 22300 Ω



IF04K1130039-02

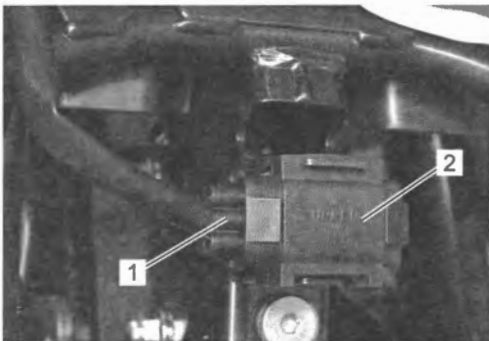
- 3) After finishing the TO sensor inspection, install the removed parts.

TO Sensor Removal and Installation

BENK07L21306024

Removal

- 1) Remove the headlight. ⚡(Page 9B-6)
- 2) Disconnect the coupler (1) and remove the TO sensor (2).

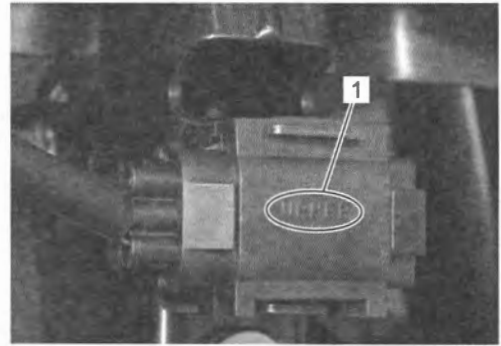


IK07L1130015-01

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.



IK07L1130016-01

STP Sensor Inspection and Adjustment

BENK07L21306025

- 1) Check the STP sensor power supply voltage and circuit. ⚡(Page 1A-39)
- 2) Turn the ignition switch OFF.
- 3) Remove the air cleaner box. ⚡(Page 1D-7)
- 4) Connect the ECM couplers.
- 5) Disconnect the STVA coupler (1).
- 6) Connect the special tool between the STP sensor and its coupler.

Special tool

(A): 09900-28631



IF04K1130042-01

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

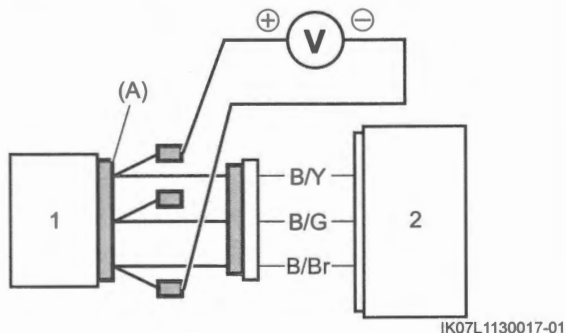
STP sensor output voltage

Closed [Standard]: 0.57 – 0.67 V

Opened [Standard]: Approx. 4.5 V

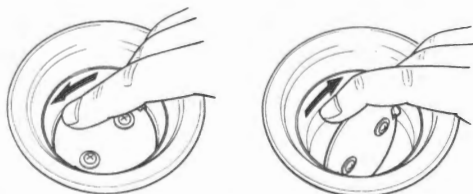
Special tool

(A): 09900-28631



IK07L1130017-01

1. STP sensor	2. ECM
---------------	--------



I705H1110071-01

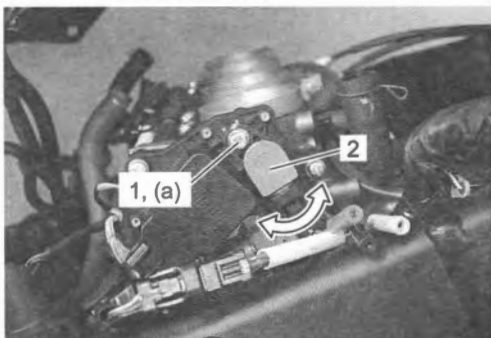
- 9) If voltage is not within the specified value, loosen the STP sensor mounting screw (1) with the special tool.

Special tool
09930-11950

- 10) Adjust the STP sensor (2) until the output voltage comes within the specified value.
- 11) 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)



IF04K1130044-02

- 12) Remove the special tool and install the removed parts.

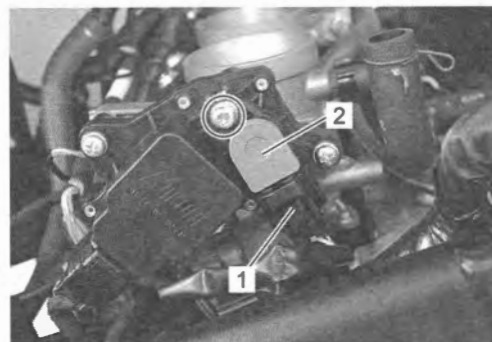
STP Sensor Removal and Installation

BENK07L21306026

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the ECM and air cleaner box. (Page 1D-7)
- 3) Disconnect the STP sensor coupler (1).
- 4) Prior to disassembly, mark the sensor's original position with a paint or scribe for accurate reinstallation.
- 5) Remove the STP sensor (2) with the special tool.

Special tool
09930-11950



IF04K1130045-01

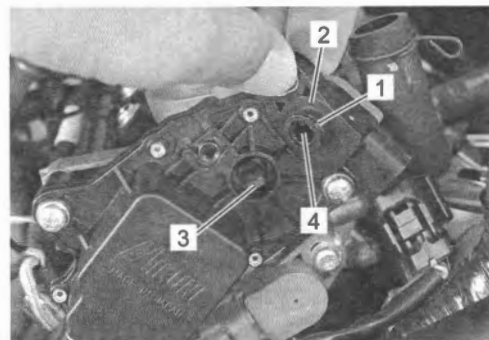
Installation

- 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.

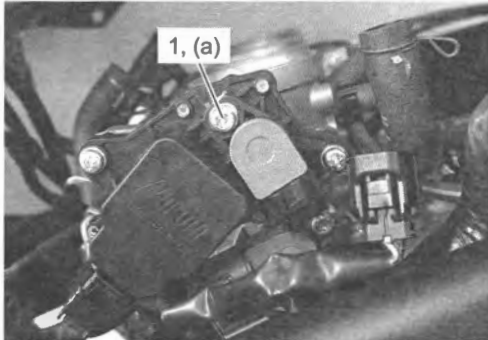


IF04K1130046-02

- 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)



IF04K1130047-01

- 5) Check the STV operating smoothly.
- 6) Adjust the position of STP sensor. (Page 1C-16)
- 7) Install the removed parts.

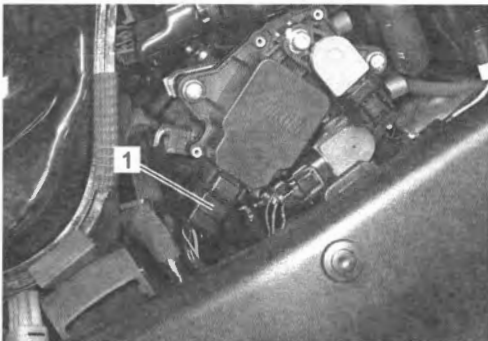
STV Actuator Inspection

BENK07L21306027

NOTICE

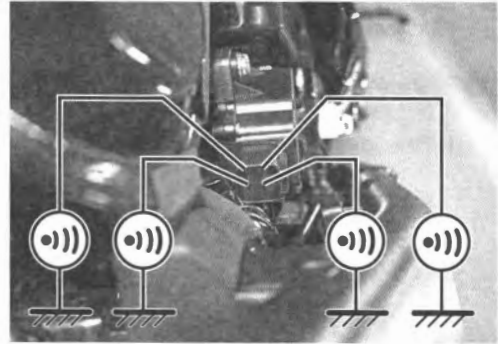
Never remove the STVA from the throttle body. It is available only as a throttle body assembly.

- 1) Remove the right frame front cover assembly. (Page 9D-34)
- 2) Disconnect the STVA coupler (1).



IK07L1130018-02

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

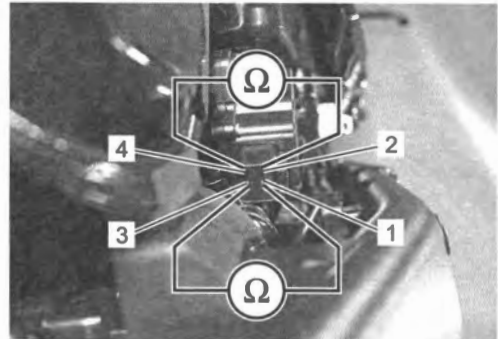


IK07L1130019-02

- 4) Measure the resistance between the B/G wire terminal (1) and G wire terminal (3), and between the B/Lg wire terminal (2) and B/R wire terminal (4). If the resistance is out of the specified value, replace the throttle body assembly. (Page 1D-11)

STVA resistance

[Standard]: Approx. 7.8 Ω



IK07L1130020-02

- 5) After finishing the STVA inspection, install the removed parts.

Specifications

Tightening Torque Specifications

BENK07L21307001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
ISC valve mounting screw	2.0	0.20	1.50	☞ (Page 1C-3)
IAT sensor screw	1.3	0.13	0.95	☞ (Page 1C-7)
ECT sensor	18	1.8	13.5	☞ (Page 1C-8)
TP sensor mounting screw	3.5	0.36	2.60	☞ (Page 1C-9) / ☞ (Page 1C-11)
HO2 sensor	25	2.5	18.5	☞ (Page 1C-12)
CKP sensor screw	4.5	0.46	3.35	☞ (Page 1C-14)
CKP sensor lead wire clamp screw	4.5	0.46	3.35	☞ (Page 1C-14)
Cam chain tensioner bolt	23	2.3	17.0	☞ (Page 1C-15)
STP sensor mounting screw	3.5	0.36	2.60	☞ (Page 1C-17) / ☞ (Page 1C-18)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“TO Sensor Construction” (Page 1C-15)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

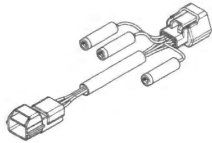
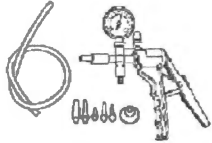
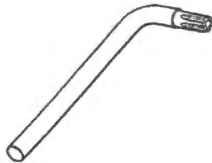
Recommended Service Material

BENK07L21308001

Material	SUZUKI recommended product or Specification		Note
Sealant	SUZUKI BOND 1207B	P/No.: 99000-31140	☞ (Page 1C-14)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞ (Page 1C-15)

Special Tool

BENK07L21308002

09900-28631 TP Sensor test lead ☞ (Page 1C-8) / ☞ (Page 1C-8) / ☞ (Page 1C-16) / ☞ (Page 1C-17)		09917-47011 Vacuum pump gauge set ☞ (Page 1C-5) / ☞ (Page 1C-6)	
09930-11950 Torx® wrench (T25H) Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A. ☞ (Page 1C-9) / ☞ (Page 1C-10) / ☞ (Page 1C-11) / ☞ (Page 1C-17) / ☞ (Page 1C-17) / ☞ (Page 1C-18)			

Engine Mechanical

Precautions

Precautions for Engine Mechanical

BENK07L21400001

Refer to "General Precautions" in Section 00 (Page 00-1), "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2) and "Precautions for SDS-II" in Section 00 (Page 00-8).

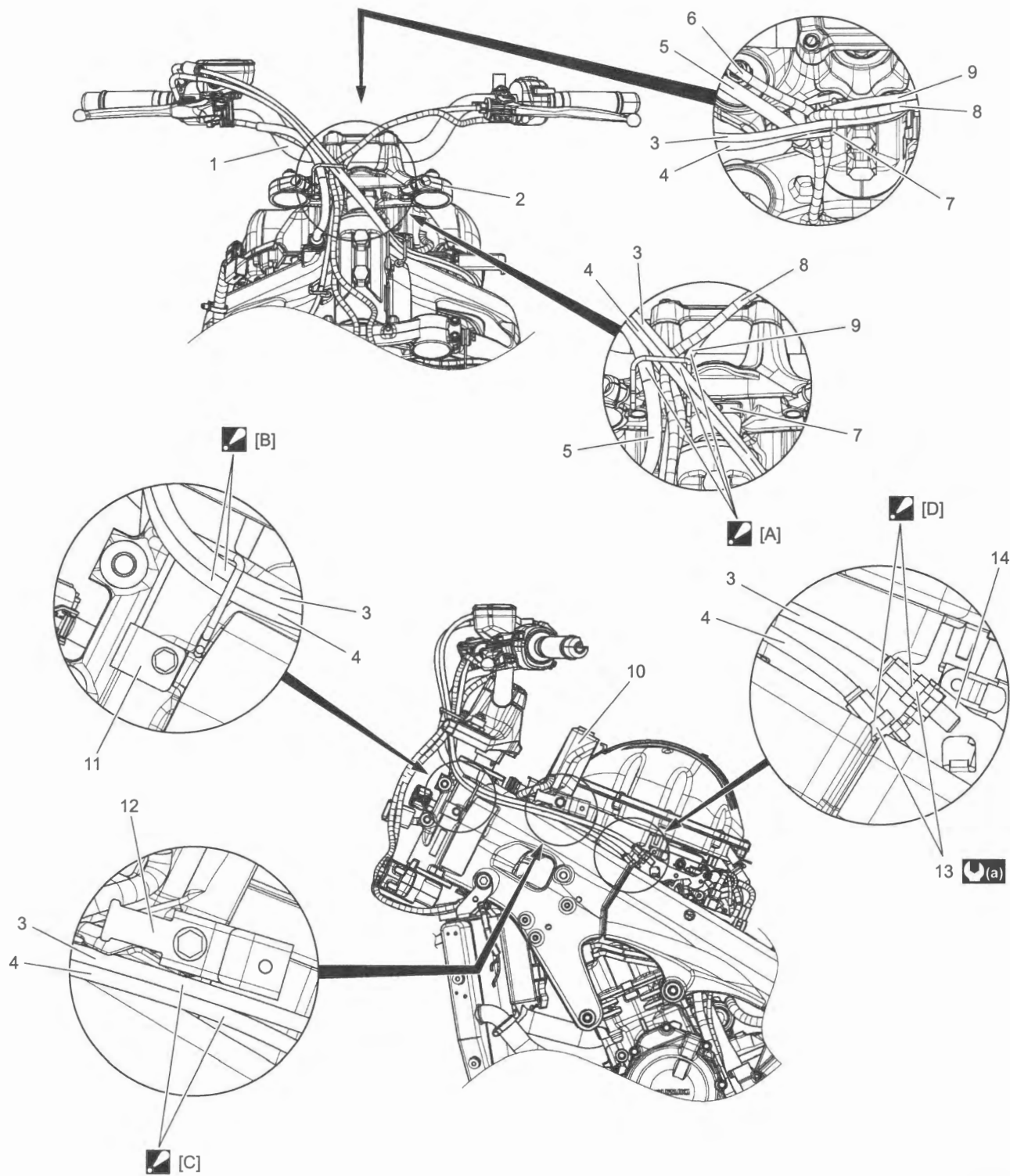
NOTE

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

BENK07L21402001



IK07L1140020-02

<p>☑ [A]: Pass the clutch cable and throttle cables into the guide. Pass the throttle cables in front of the clutch cable. Pass the clutch cable inside of the front brake hose.</p>	7. Cable guide No.1
<p>☑ [B]: Pass the throttle cables as shown.</p>	8. Left handle switch lead wire
<p>☑ [C]: Pass the throttle cables under the fuel tank cover bracket.</p>	9. Clutch cable
<p>☑ [D]: The clearance between the throttle cable adjuster and lock-nut is one turn or less.</p>	10. Fuel tank front bracket
1. Handlebars	11. Cable guide No.2
2. Steering stem upper bracket	12. Fuel tank cover bracket
3. Throttle cable No.1	13. Throttle cable lock-nut
4. Throttle cable No.2	14. Throttle body
5. Front brake hose	🔧(a) : 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)
6. Right handle switch lead wire	

Diagnostic Information and Procedures

Engine Mechanical Symptom Diagnosis

BENK07L21404001

Refer to "Engine Symptom Diagnosis" in Section 1A (Page 1A-12).

Compression Pressure Check

BENK07L21404002

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) Remove the air cleaner box. (Page 1D-7)
- 3) Remove the spark plugs. (Page 1H-5)
- 4) Disconnect the fuel injector couplers. Refer to "Fuel Injector On-Vehicle Inspection" in Section 1G (Page 1G-19).

- 5) Connect the immobilizer antenna coupler (1) and install the fuel tank lower cover (2). (If equipped)
- 6) Connect the ECM couplers (3).

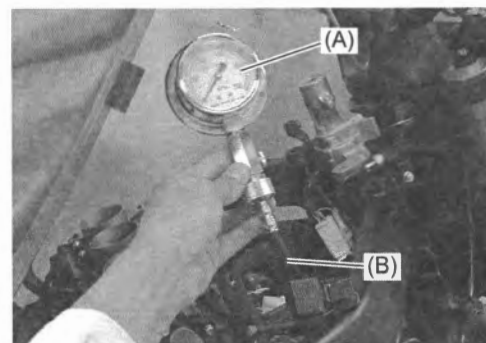


IK07L1140010-01

- 7) 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



IF04K1140003-02

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



IF04K1140004-01

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

Compression pressure

[Standard]: 1300 – 1700 kPa (13.3 – 17.3 kgf/cm², 189 – 246 psi)

[Limit]: 1000 kPa (10.2 kgf/cm², 145 psi)

Compression pressure difference

[Limit]: 200 kPa (2 kgf/cm², 29 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:

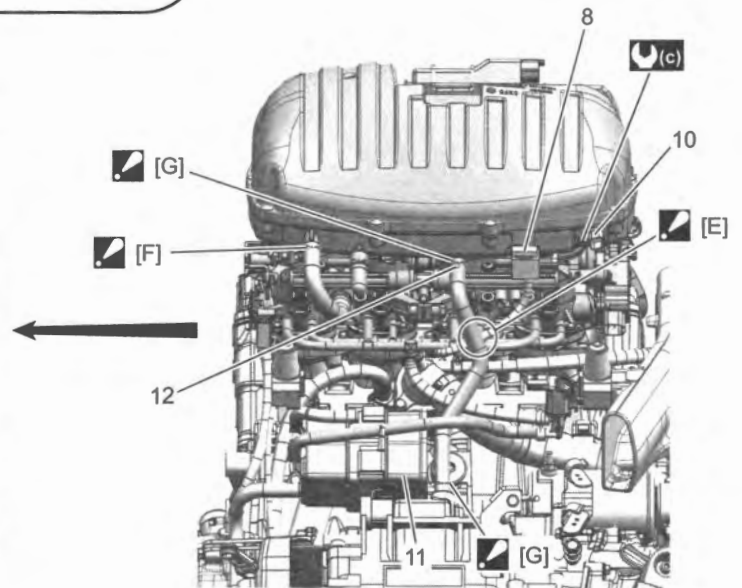
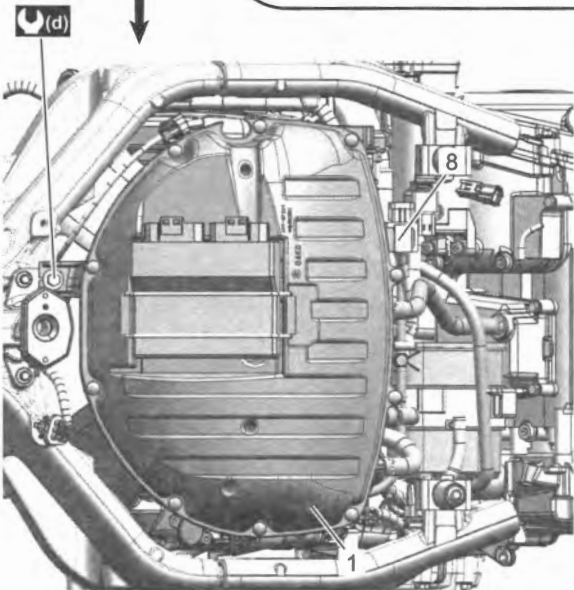
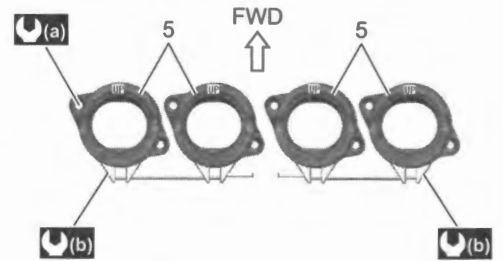
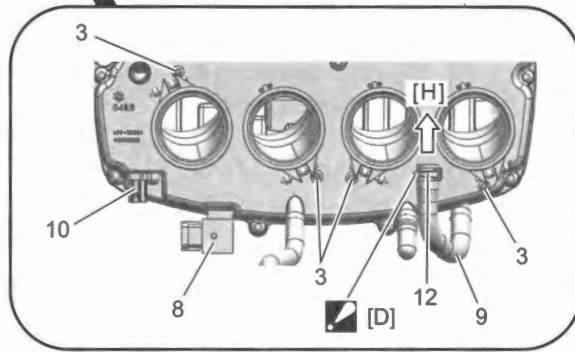
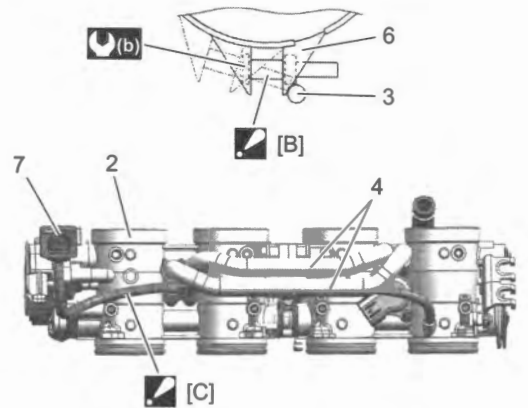
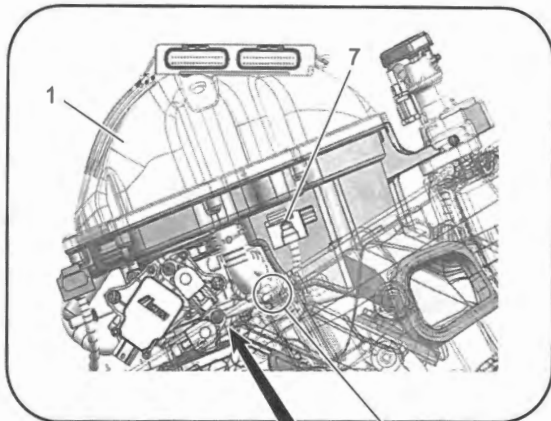
- Compression pressure in one of the cylinders is 1000 kPa (10.2 kgf/cm², 145 psi) and less.
- The difference in compression pressure between any two cylinders is 200 kPa (2 kgf/cm², 29 psi) and more.
- All compression pressure readings are below 1300 kPa (13.3 kgf/cm², 189 psi) even when they measure 1000 kPa (10.2 kgf/cm², 145 psi) and more.

- 11) After checking the compression pressure, install the removed parts.

Repair Instructions

Intake System Construction

BENK07L21406001



IK07L1140001-01

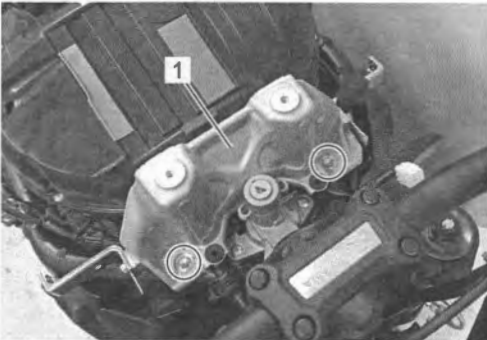
<p>☑ [A]: Pass the vacuum hose under the PAIR hose.</p>	1. Air cleaner box	9. ISC valve hose
<p>☑ [B]: Do not contact the screw to the stopper.</p>	2. Throttle body assembly	10. IAT sensor
<p>☑ [C]: Pass the vacuum hose between the throttle body and ISC delivery hose.</p>	3. Stopper	11. EVAP canister (if equipped)
<p>☑ [D]: Face the clamp end downward.</p>	4. ISC delivery hose	12. White mark
<p>☑ [E]: Pass the vacuum hose between the PCV hose and throttle body.</p>	5. Intake pipe	⤵(a) : 8.4 N-m (0.86 kgf-m, 6.20 lbf-ft)
<p>☑ [F]: Face the clamp end backward.</p>	6. Air cleaner outlet tube clamp	⤵(b) : 1.5 N-m (0.15 kgf-m, 1.10 lbf-ft)
<p>☑ [G]: Face the clamp end backward. Position the clamp at 4 – 8 mm (0.2 – 0.3 in) from hose end.</p>	7. AP sensor	⤵(c) : 1.3 N-m (0.13 kgf-m, 0.95 lbf-ft)
<p>[H]: To throttle body</p>	8. IAP sensor	⤵(d) : 5.5 N-m (0.56 kgf-m, 4.05 lbf-ft)

Air Cleaner Element Removal and Installation

BENK07L21406002

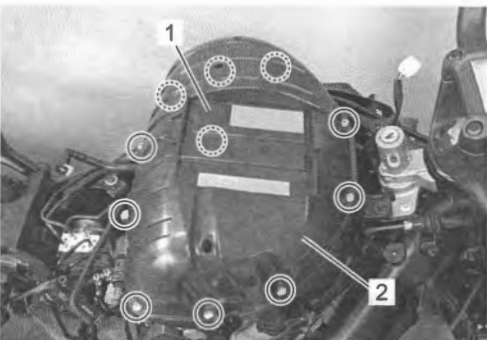
Removal

- 1) Remove the fuel tank. (Page 1G-11)
- 2) Remove the fuel tank lower cover. (Page 9D-32)
- 3) Remove the ECM. (Page 1C-4)
- 4) Remove the fuel tank front bracket (1).



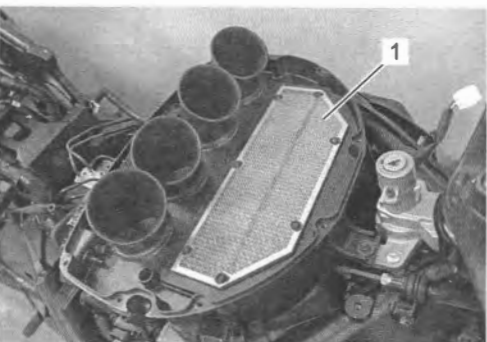
IK07L1140002-01

- 5) Remove the plug (1).
- 6) Remove the air cleaner cover (2).



IK07L1140003-01

- 7) Remove the air cleaner element (1).

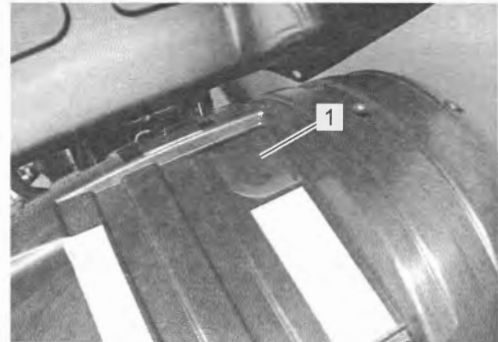


IK07L1140004-01

Installation

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

- Install the plug (1) to the air cleaner cover correctly.

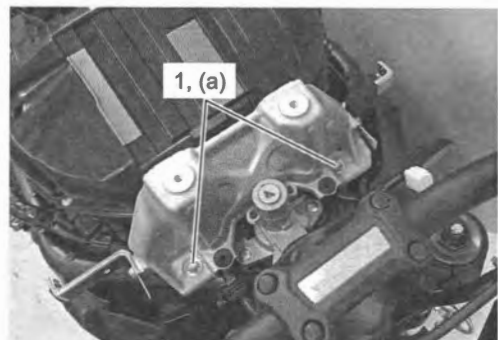


IF04K1140338-01

- Tighten the fuel tank front bracket bolt (1) to the specified torque.

Tightening torque

Fuel tank front bracket bolt (a): 10 N·m (1.0 kgf·m, 7.5 lbf·ft)



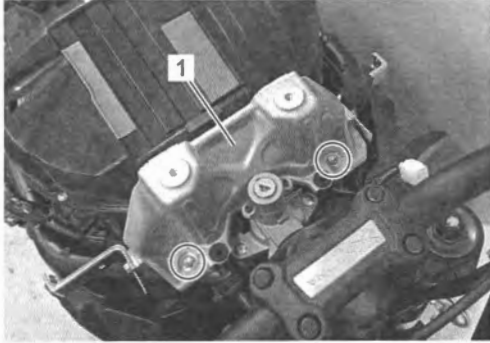
IK07L1140005-01

Air Cleaner Box Removal and Installation

BENK07L21406003

Removal

- 1) Remove the fuel tank. (Page 1G-11)
- 2) Remove the fuel tank lower cover. (Page 9D-32)
- 3) Remove the ECM. (Page 1C-4)
- 4) Remove the fuel tank front bracket (1).



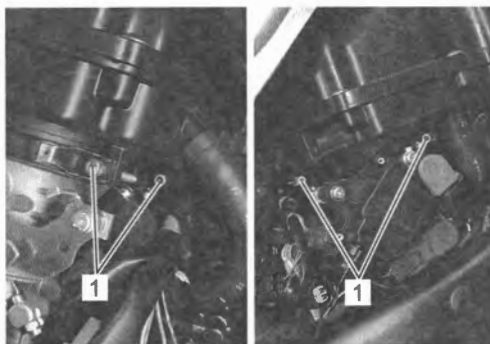
IK07L1140002-01

- 5) Remove the air cleaner bolt (1).



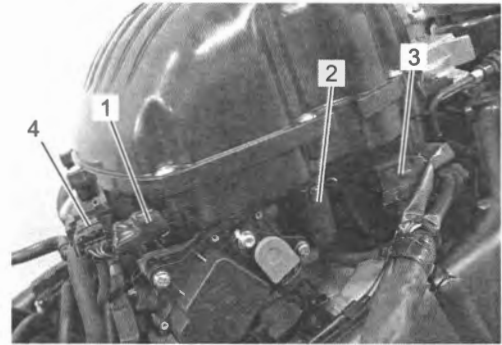
IF04K1140007-01

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



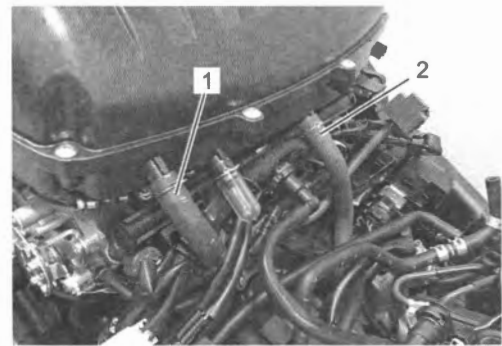
IF04K1140008-01

- 7) Disconnect the IAT sensor coupler (1) and PAIR hose (2).
- 8) Remove the AP sensor (3) and IAP sensor (4).



IK07L1140006-01

- 9) Disconnect ISC valve hose (1) and PCV hose (2).
- 10) Remove the air cleaner box.



IK07L1140007-01

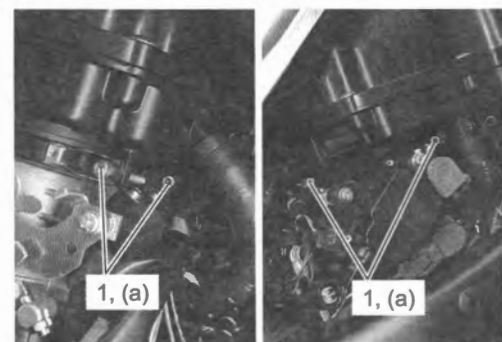
Installation

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

- Pass the front wheel speed sensor lead wire properly. (Page 4E-7)
- Route the hoses properly. Refer to "Intake System Construction" (Page 1D-5).
- Tighten the air cleaner outlet tube clamp screws (1) to the specified torque.

Tightening torque

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

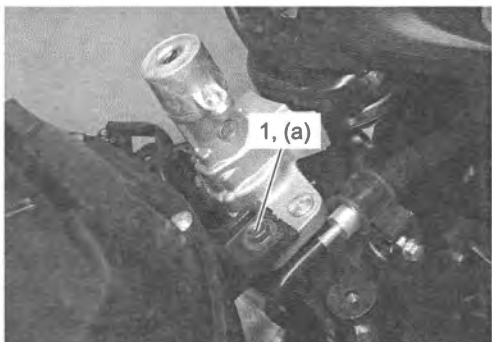


IF04K1140335-01

- Tighten the air cleaner bolt (1) to the specified torque.

Tightening torque

Air cleaner bolt (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

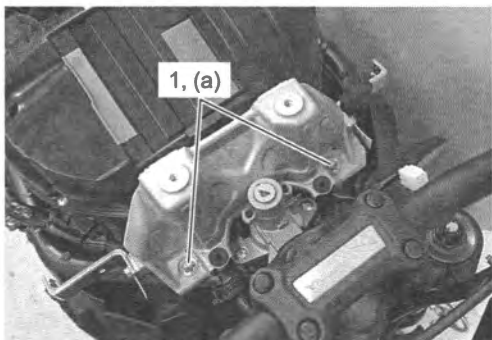


IF04K1140011-01

- Tighten the fuel tank front bracket bolt (1) to the specified torque.

Tightening torque

Fuel tank front bracket bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IK07L1140005-01

Air Cleaner Element Inspection

BENK07L21406004

Refer to "Air Cleaner Element Removal and Installation" (Page 1D-6).

- 1) Inspect the air cleaner element for clogging. If it is clogged with dirt, replace it with a new one.

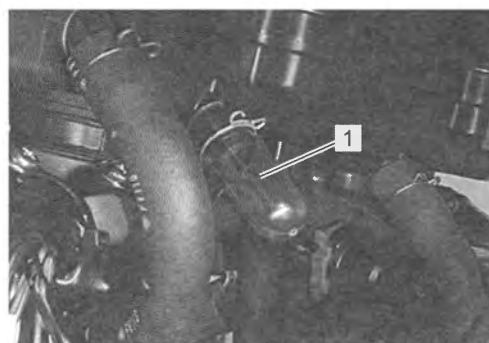
NOTICE

- Do not blow the air cleaner element with compressed air.
- If driving under dusty conditions, replace 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.



IF04K1140012-01

- 2) Remove the drain plug (1) and drain water from the air cleaner box.

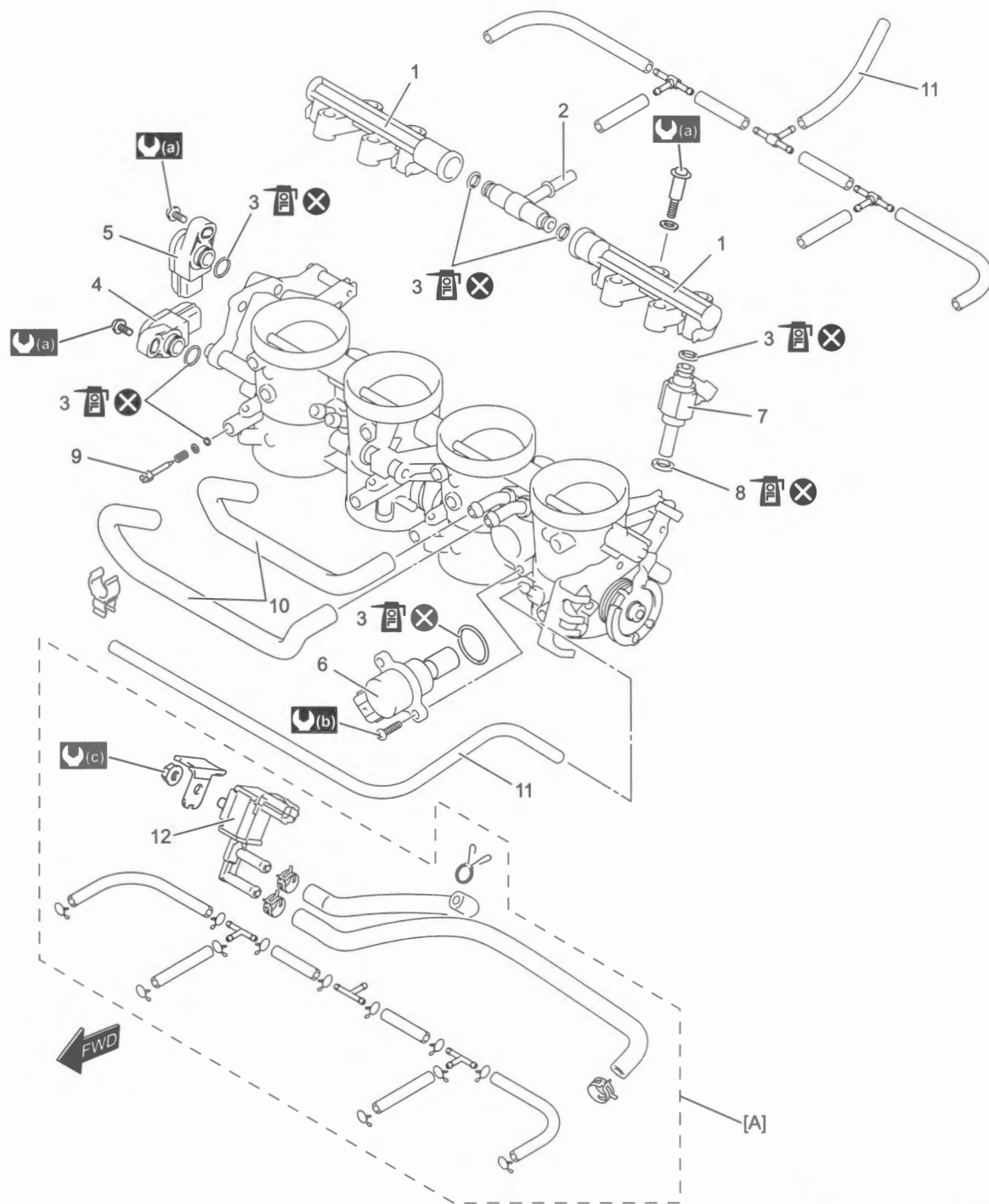


IF04K1140013-03

- 3) Install the drain plug.

Throttle Body Components

BENK07L21406005



IF04K1140340-01

[A]: If equipped	5. STP sensor	10. ISC delivery hose	(c) : 10 N-m (1.0 kgf-m, 7.5 lbf-ft)
1. Fuel delivery pipe	6. ISC valve	11. Vacuum hose	Apply engine oil.
2. Nipple joint	7. Fuel injector	12. EVAP system purge control solenoid valve	Do not reuse.
3. O-ring	8. Cushion seal	(a) : 3.5 N-m (0.36 kgf-m, 2.60 lbf-ft)	
4. TP sensor	9. Air screw	(b) : 2.0 N-m (0.20 kgf-m, 1.50 lbf-ft)	

Throttle Cable Play On-Vehicle Inspection and Adjustment

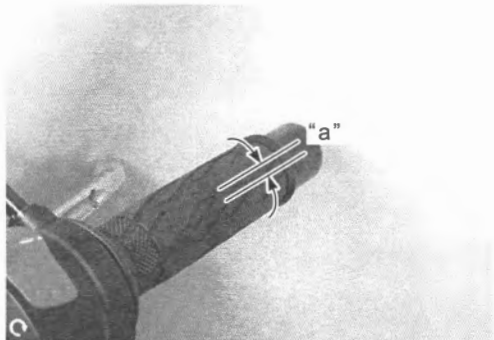
BENK07L21406006

Inspection

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

Throttle cable play

[Standard]: 2.0 – 4.0 mm (0.079 – 0.16 in)



IF04K1140015-01

Adjustment

- 1) Remove the rubber boot (1).
- 2) Loosen the lock-nut (2) of the throttle cable No.1.
- 3) Turn the adjuster (3) in or out until the throttle cable play (at the throttle grip) is within the specification.

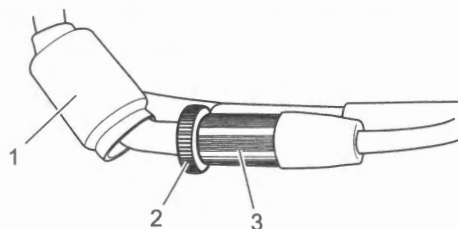
Throttle cable play

[Standard]: 2.0 – 4.0 mm (0.079 – 0.16 in)

- 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.



IE31J1130081-01

- 5) Reinstall the rubber boot.

Engine Idle Speed Inspection

BENK07L21406007

- 1) Remove the left frame front cover assembly. ☞ (Page 9D-34)
- 2) Warm up the engine.
- 3) Contact the antenna end of the special tool with the ignition coil #1 and check the engine idle speed. If the engine idle speed is out of the specified range, check the air suction, ISC valve, etc. Refer to "ISC Valve Inspection" in Section 1C (Page 1C-2).

NOTE

The engine idle speed is automatically adjusted by the ISC valve. Therefore, no adjuster is provided.

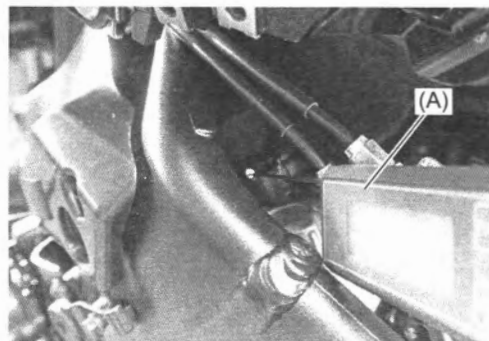
Engine idle speed

When engine warmed

[Standard]: 1150 ± 100 r/min

Special tool

(A): 09900-26010



IK07L1140021-02

- 4) Turn the ignition switch OFF and install the removed parts.

Throttle Cable Removal and Installation

BENK07L21406008

Removal

- 1) Remove the left frame front cover assembly. ☞ (Page 9D-34)
- 2) Remove the right handle switch. Refer to "Handlebar Removal and Installation" in Section 6B (Page 6B-4).
- 3) Remove the throttle cables as shown in the cable routing diagram. Refer to "Throttle Cable Routing Diagram" (Page 1D-2).

Installation

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

- Install the throttle cables as shown in the cable routing diagram. Refer to "Throttle Cable Routing Diagram" (Page 1D-2).
- Check the throttle cable play and proper operation. ☞ (Page 1D-10)

Throttle Body Removal and Installation

BENK07L21406009

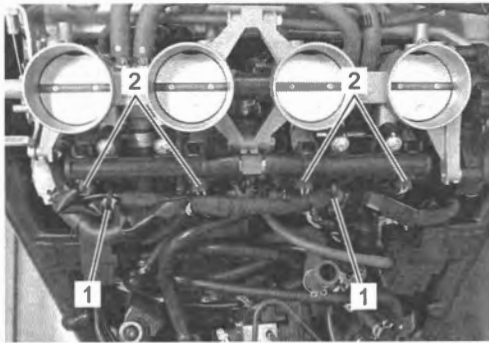
Removal

- 1) Remove the air cleaner box. (Page 1D-7)
- 2) Disconnect the vacuum hoses (1).



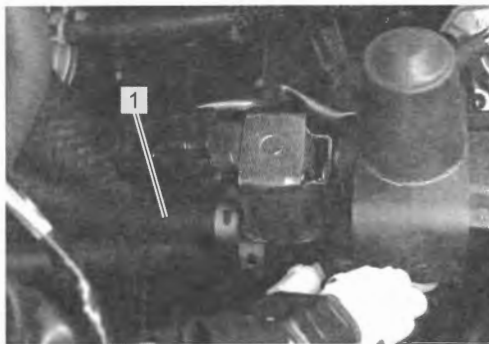
IF04K1140018-01

- 3) Remove the clamps (1) and disconnect the fuel injector couplers (2).



IK07L1140008-01

- 4) Disconnect the purge hose No.2 (1) (If equipped).



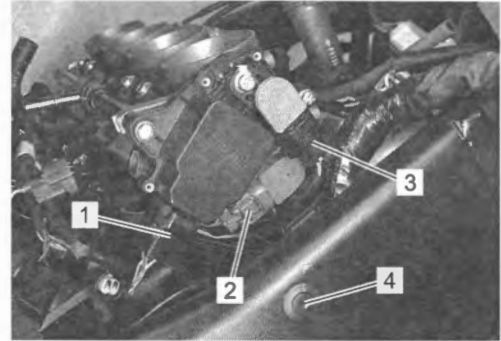
IF04K1140020-01

- 5) Disconnect the ISC valve coupler (1).



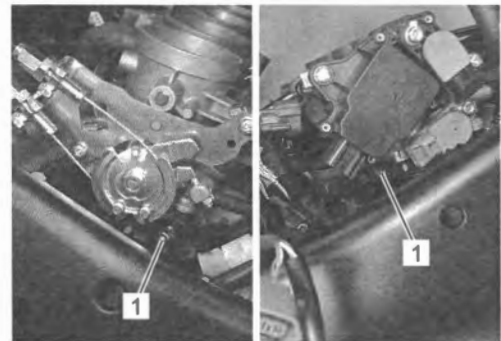
IF04K1140022-03

- 6) Disconnect the STVA coupler (1), TP sensor coupler (2), STP sensor coupler (3) and remove the fasteners (4).



IF04K1140021-04

- 7) Loosen the intake pipe clamp screws (1) and move the throttle body.

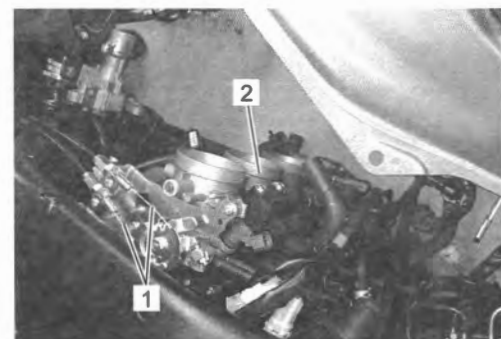


IF04K1140023-02

- 8) Disconnect the throttle cables (1).
- 9) Remove the throttle body (2).

NOTICE

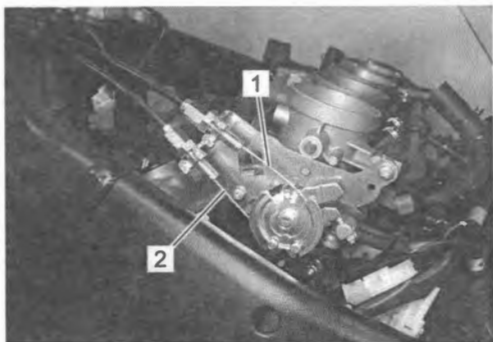
- After disconnecting the throttle cables, do not snap the throttle valve from the open to full close. It may cause damage to the throttle valve and throttle body.
- If foreign materials like mud and sand are adhered to the intake pipe or the throttle body, they are likely to get into the intake port.
When foreign materials like mud or sand are adhered, remove them before starting the work.



IF04K1140024-01

Installation

- 1) Connect the throttle cable No.1 (1) and throttle cable No.2 (2) to the throttle body.

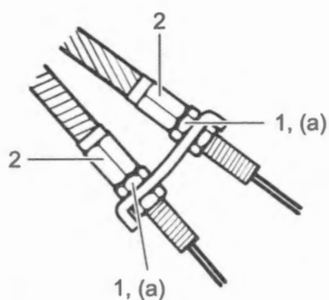


IF04K1140025-01

- 2) Loosen each throttle cable lock-nut (1).
- 3) Turn the each throttle cable adjuster (2) fully.
- 4) Tighten each lock-nut (1) to the specified torque.

Tightening torque

Throttle cable lock-nut (a): 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)

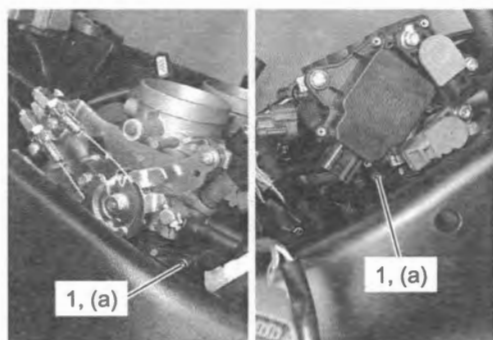


IF04K1140336-01

- 5) Install the throttle body to the intake pipes.
- 6) Tighten the intake pipe clamp screws (1) to the specified torque.

Tightening torque

Intake pipe clamp screw (a): 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)



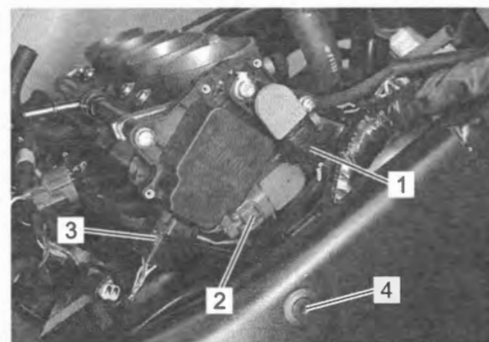
IF04K1140026-03

- 7) Connect the ISC valve coupler (1).



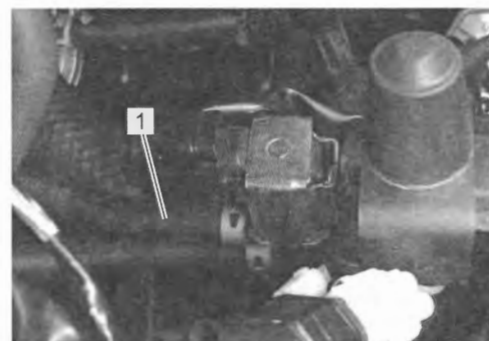
IF04K1140027-03

- 8) Connect the STP sensor coupler (1), TP sensor coupler (2) and STVA coupler (3) and install the fasteners (4).



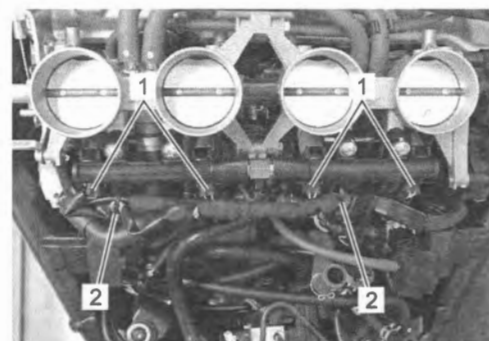
IF04K1140028-04

- 9) Connect the purge hose No.2 (1) (if equipped).



IF04K1140031-01

- 10) Connect the fuel injector couplers (1) and install the clamps (2).



IK07L1140009-01

11) Connect the vacuum hoses (1).



IF04K1140030-01

12) Connect the fuel feed hose. (Page 1G-6)

13) Install the air cleaner box. (Page 1D-7)

14) Adjust the throttle cable play. (Page 1D-10)

15) Reset the ISC aperture learned value. (Page 1C-3)

16) Install the removed parts.

Throttle Body Disassembly and Reassembly

BENK07L21406010

Refer to "Throttle Body Removal and Installation" (Page 1D-11).

Disassembly

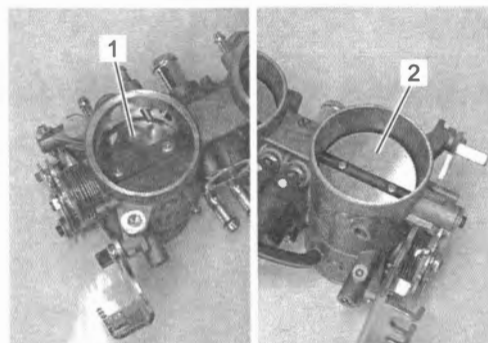
NOTICE

- 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).



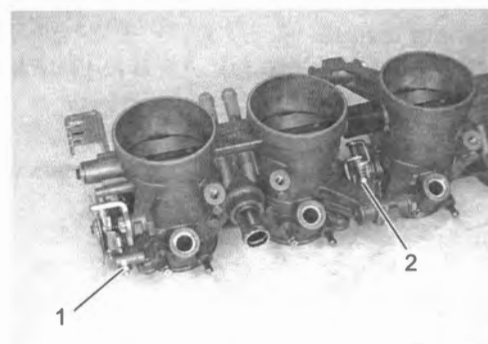
IF04K1140032-01

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



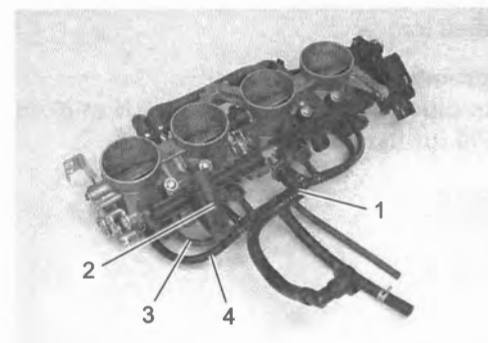
IF04K1140033-01

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



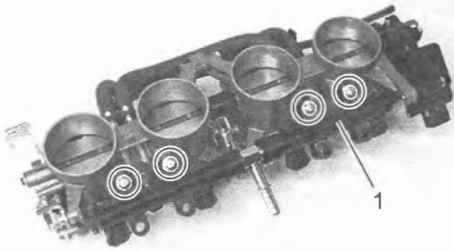
IF04K1140034-01

- 1) Disconnect the fuel feed hose (1), ISC valve hose (2) and vacuum hoses (3).
- 2) Disconnect the purge hoses (4). (If equipped)



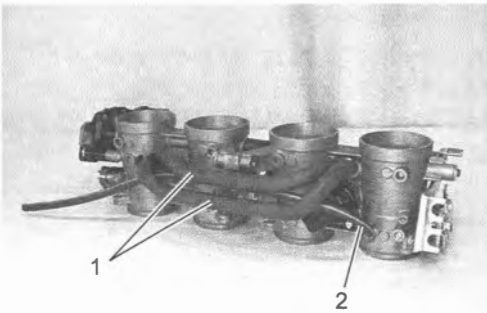
IF04K1140035-01

- 3) Remove the fuel delivery pipe assembly (1). Refer to "Fuel Injector / Fuel Delivery Pipe Removal and Installation" in Section 1G (Page 1G-19).



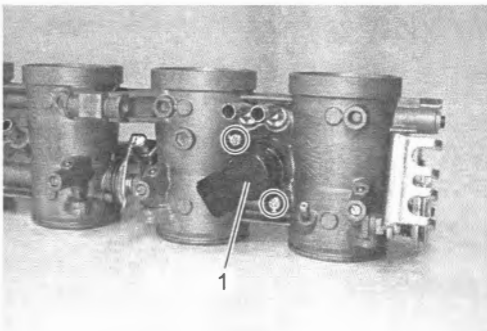
IF04K1140036-01

- 4) Disconnect the ISC delivery hoses (1) and vacuum hose (2).



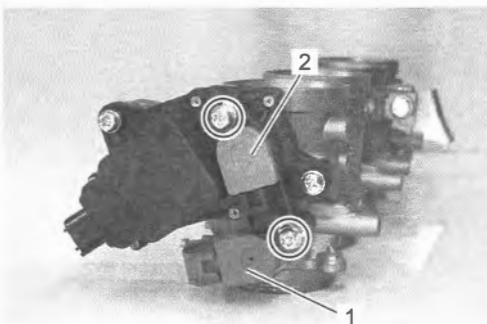
IF04K1140037-01

- 5) Remove the ISC valve (1). (Page 1C-2)



IF04K1140038-01

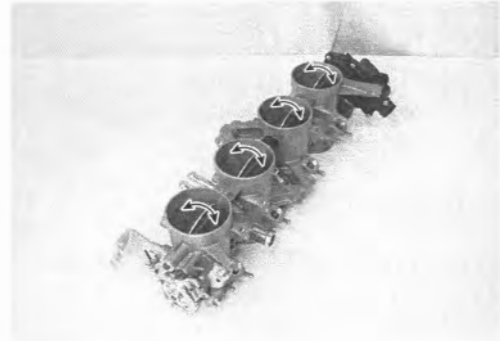
- 6) Remove the TP sensor (1). (Page 1C-10)
- 7) Remove the STP sensor (2). (Page 1C-17)



IF04K1140039-01

Reassembly

- 1) Install the STP sensor. (Page 1C-17)
- 2) Check the STV operating smoothly.
- 3) Adjust the position of STP sensor, if necessary. (Page 1C-16)



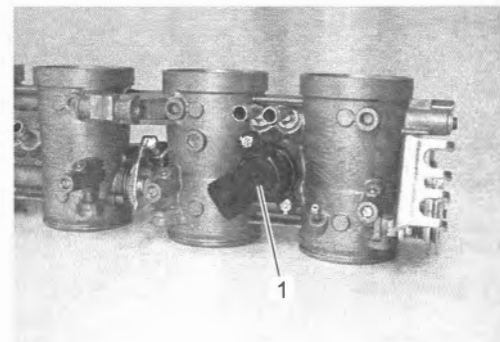
IF04K1140040-01

- 4) Install the TP sensor. (Page 1C-10)
- 5) Check the throttle valve operating smoothly.
- 6) Adjust the position of TP sensor, if necessary. (Page 1C-9)



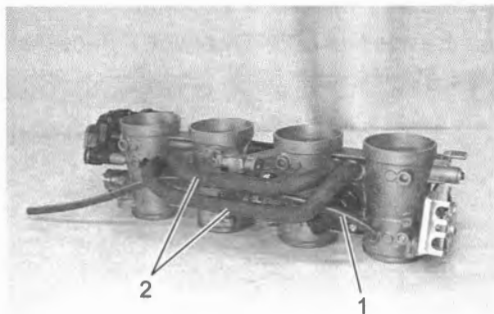
IF04K1140041-01

- 7) Install the ISC valve (1). (Page 1C-2)



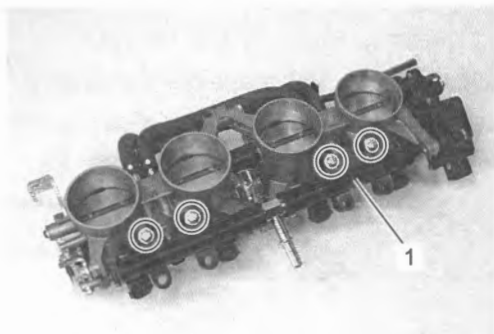
IF04K1140042-01

- 8) Connect the vacuum hose (1) and ISC delivery hoses (2).



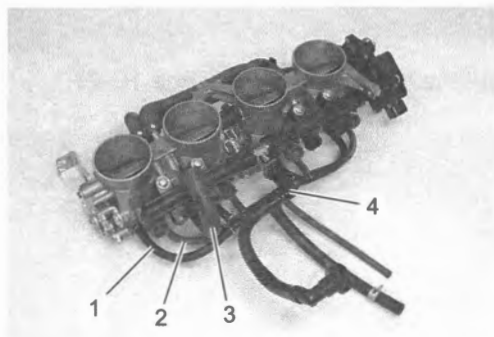
IF04K1140043-01

- 9) Install the fuel delivery pipe assembly (1). (Page 1G-19)



IF04K1140044-01

- 10) Connect the purge hoses (1) (If equipped).
 11) Connect the vacuum hoses (2), ISC valve hose (3) and fuel feed hose (4).



IF04K1140045-01

Throttle Body Inspection and Cleaning

BENK07L21406011

Refer to "Throttle Body Disassembly and Reassembly" (Page 1D-13).

Inspection

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

- O-rings
- Throttle valves
- Secondary throttle valves

- Vacuum hoses
- ISC valve hoses
- Fuel delivery pipes
- Cushion seals
- Fuel injectors

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 cleaning chemical or do not splay the cleaning chemical directly to the throttle valve. Cleaning chemical will penetrate into electronic parts resulting in cause of malfunction.**
- **Do not use wire to clean passages. Wire may damage them.**
- **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

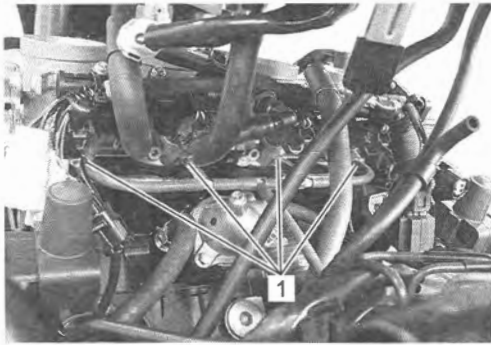
BENK07L21406012

- 1) Remove the air cleaner box. (Page 1D-7)
- 2) Connect the immobilizer antenna coupler (1) and install the fuel tank lower cover (2). (If equipped)
- 3) Connect the ECM couplers (3).



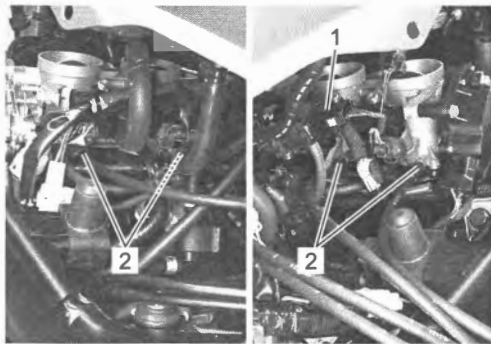
IK07L1140010-01

- 4) Connect the fuel feed hose and fuel pump coupler. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-11).
- 5) Disconnect the respective vacuum hoses (1) from vacuum nipples on the throttle body.



IF04K1140046-04

- 6) Disconnect the IAP sensor coupler (1).
- 7) Connect the respective vacuum tester hoses (2) to the vacuum nipples.

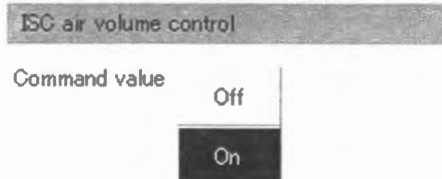


IF04K1140317-01

- 8) Set up the SDS-II referring to the SDS-II operation manual for further details.
- 9) Start the engine.
- 10) Click "Data monitor".
- 11) Warm up the engine (Engine coolant temp. more than 80 °C (176 °F)).
- 12) Click "Active control".
- 13) Click "ISC air volume control".
- 14) Click "ON" to fix the ISC air volume of four cylinders.

NOTE

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



IF04K1140337-02

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

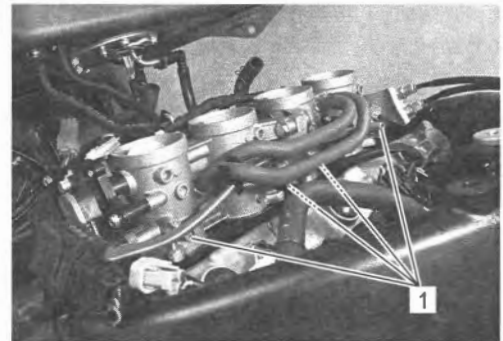


IK07L1140022-01

- 16) Equalize the vacuum of the cylinders by turning each synchronizing screws (1) and keep it running at idling speed.

NOTE

Always set the engine rpm at idle speed.



IF04K1140048-02

- 17) If the adjustment is not yet correct, remove each synchronizing screw and clean them using a swab moistened with a carburetor cleaner (petroleum solvent) and blow dry with a compressed air. Also, clean the synchronizing screw passageways.

NOTE

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

- 18) Repeat the procedures from 8) to 16).
- 19) Close the SDS-II and turn the ignition switch OFF.
- 20) Disconnect the vacuum tester and install the removed parts.
- 21) After completing the throttle valve synchronization, clear the DTC and reset the ISC aperture learned value. (Page 1C-3)

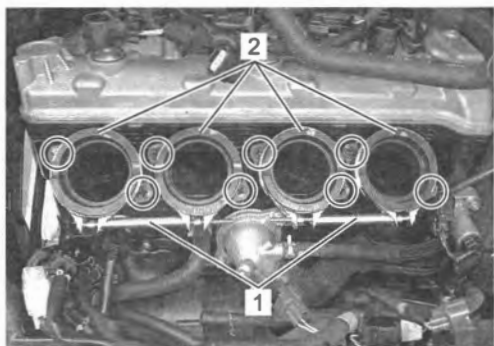
Intake Pipe Removal and Installation

BENK07L21406013

Refer to "Throttle Body Removal and Installation" (Page 1D-11).

Removal

- 1) Remove the intake pipe clamps (1).
- 2) Remove the intake pipes (2).



IK07L1140023-01

Installation

Install the intake pipe in the reverse order of removal. Pay attention to the following points:

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

NOTE

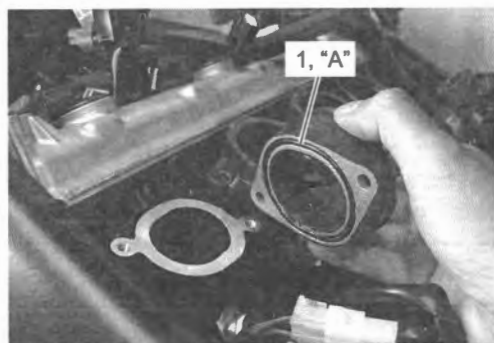
Face the "UP" mark (2) on the intake pipe to upper.

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

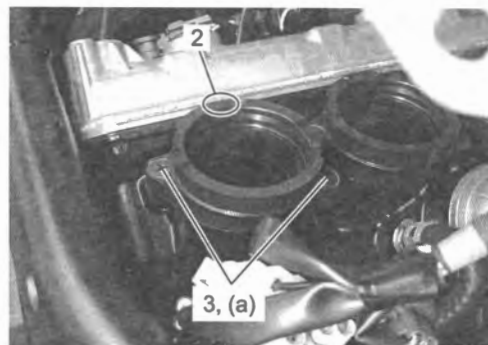
- Tighten the intake pipe screws (3) to the specified torque.

Tightening torque

Intake pipe screw (a): 8.4 N·m (0.86 kgf-m, 6.20 lbf-ft)



IF04K1140051-01



IK07L1140024-01

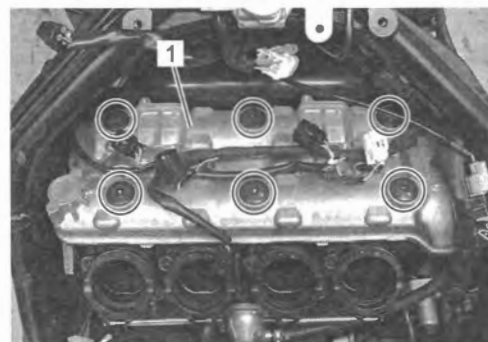
Cylinder Head Cover Removal and Installation

BENK07L21406014

Refer to "Throttle Body Removal and Installation" (Page 1D-11).

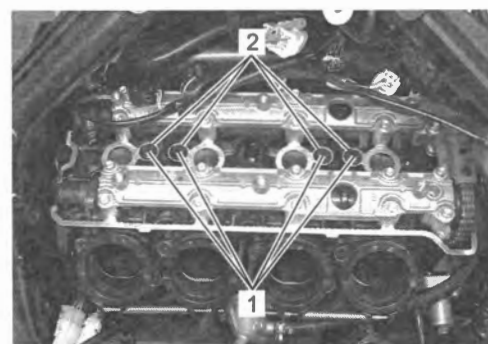
Removal

- 1) Remove the ignition coils. ⚡ (Page 1H-5)
- 2) Disconnect the PAIR control solenoid valve coupler and remove the PAIR reed valves. ⚡ (Page 1B-9)
- 3) Remove the cylinder head cover (1).



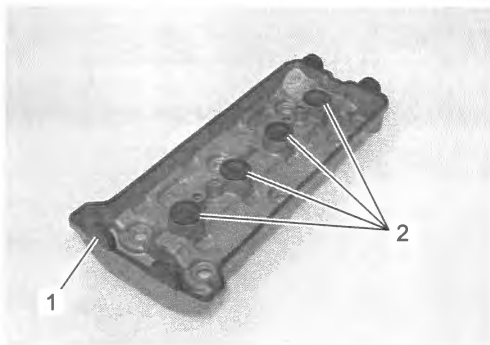
IF04K1140053-01

- 4) Remove the dowel pins (1) and O-rings (2).



IF04K1140054-01

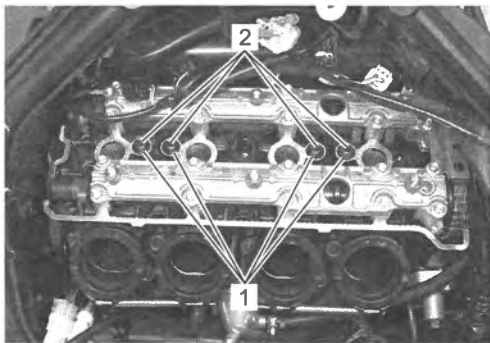
5) Remove the gaskets (1) and (2).



IF04K1140059-01

Installation

1) Install the dowel pins (1) and new O-rings (2).

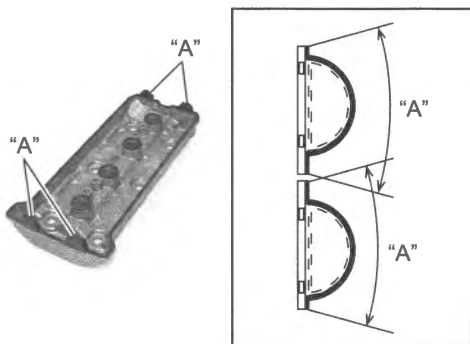


IF04K1140055-01

2) Install new gaskets to the cylinder head cover.

3) Apply sealant to the cam end cap points of the gasket as shown.

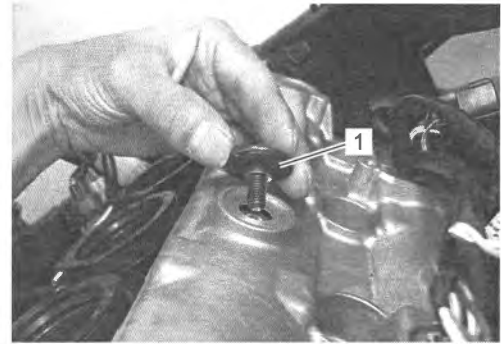
“A”: Sealant 99000-31140 (SUZUKI BOND 1207B)



IF04K1140056-02

4) Place the cylinder head cover on the cylinder head.

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

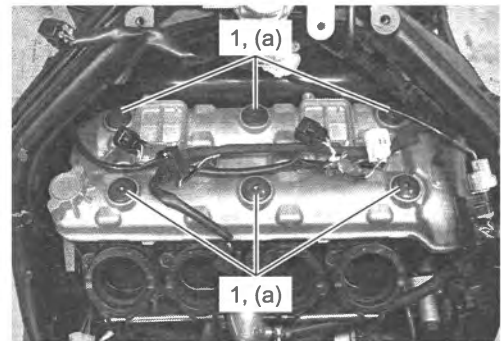


IF04K1140057-01

6) 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)



IF04K1140058-01

7) Install the following parts.

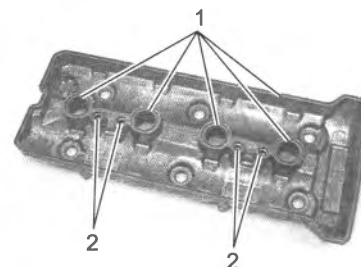
- PAIR reed valves. ⚙️ (Page 1B-9)
- PAIR control solenoid valve. ⚙️ (Page 1B-9)
- Ignition coils. ⚙️ (Page 1H-5)

Cylinder Head Cover Inspection

BENK07L21406015

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

Clean and check the gasket grooves (1) and PAIR reed valve mating surfaces (2) of the cylinder head cover. If there is anything unusual, replace the cylinder head cover with a new one.



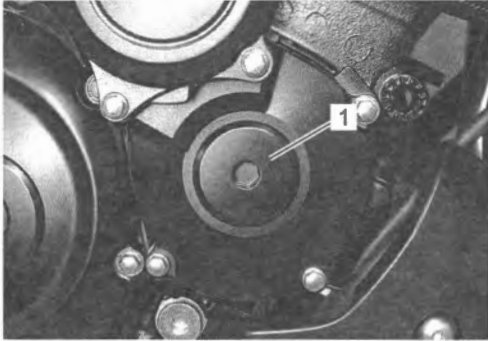
IF04K1140061-03

Cam Chain Tension Adjuster / Camshaft Removal

BENK07L21406016

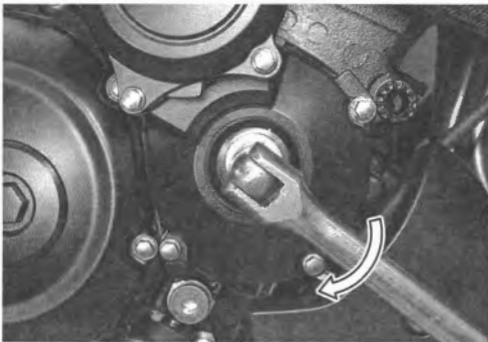
Refer to "Cylinder Head Cover Removal and Installation" (Page 1D-17).

- 1) Remove the spark plugs. (Page 1H-5)
- 2) Remove the crankshaft hole plug (1).

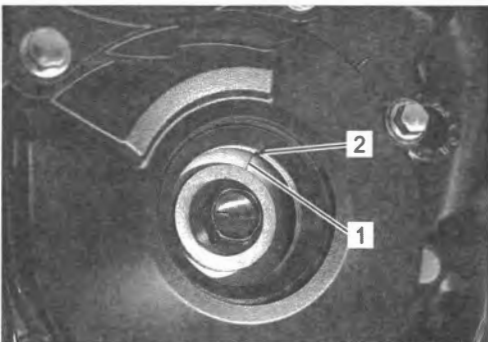


IF04K1140062-01

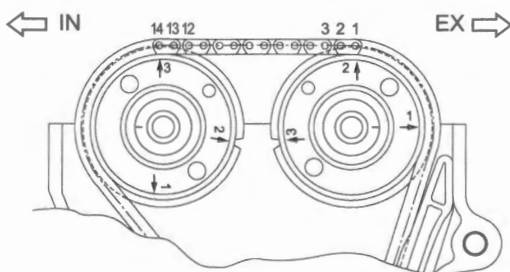
- 3) Turn the crankshaft to bring the line (1) on the starter clutch to the slit (2) of cap hole thread and also to bring the camshafts to the position as shown.



IF04K1140063-01



IF04K1140064-01

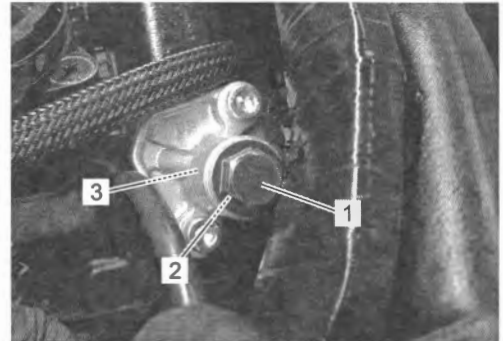


IF04K1140065-02

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

▲ CAUTION

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



IF04K1140066-01

- 5) Remove the cam chain tension adjuster (1).



IF04K1140067-01

- 6) Remove the gasket (1).

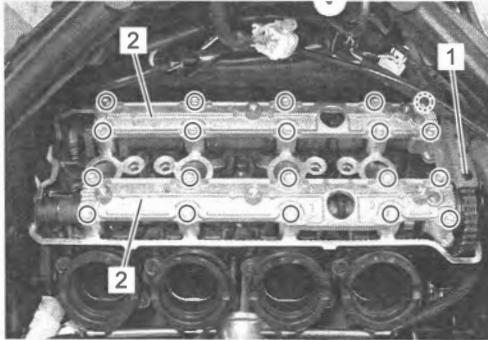


IF04K1140068-01

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

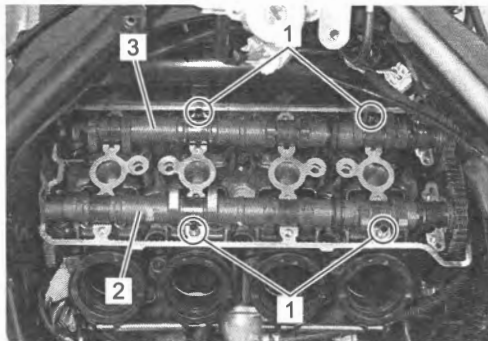
NOTICE

Be sure to loosen the camshaft journal holder bolts evenly by shifting the wrench in the descending order of numbers.



IF04K1140069-01

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



IF04K1140070-01

Cam Chain Tension Adjuster / Camshaft Installation

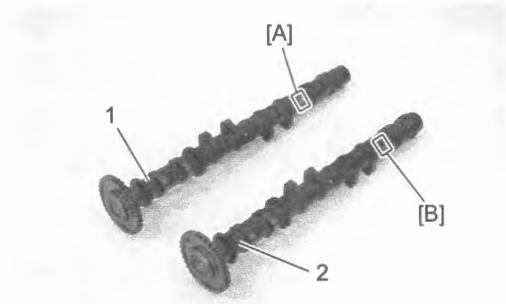
BENK07L21406017

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

NOTE

Identify the camshafts according to the following embossed letters.

- Intake camshaft (1): [A]
 Exhaust camshaft (2): [B]



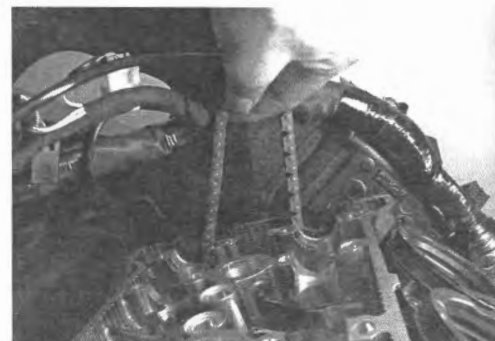
IF04K1140071-03

[A]: IN	[B]: EX
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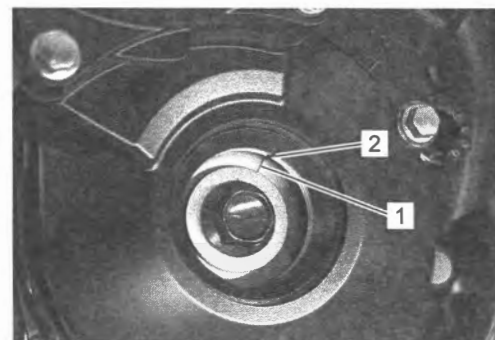
- 2) Turn the crankshaft clockwise and align the line (1) on the starter clutch to the slit (2) of cap hole thread while keeping the cam chain pulled upward.

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 the line (1) with slit (2) and hold this position when installing the camshafts.



IF04K1140072-01



IF04K1140073-01

- 3) Pull the cam chain lightly.
- 4) Turn the exhaust camshaft so that the arrow is aligned with the gasket surface of the cylinder head. (The exhaust camshaft sprocket has an arrow marked "1" (1).)
- 5) Engage the cam chain with the exhaust camshaft sprocket.

NOTE

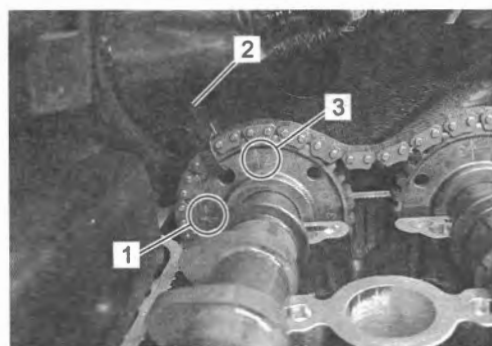
Before installing the camshaft, check that the tappets are installed correctly.

- 6) Bind the cam chain and the sprocket with a proper clamp (2) to prevent the cam chain disengagement while installing the camshaft journal holders.
- 7) The other arrow marked "2" (3) should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked "2" (3), count out 14 roller pins (from the exhaust camshaft side going towards the intake camshaft side).
- 8) Engage the 14th roller pin on the cam chain with the arrow marked "3" (4) on the intake camshaft sprocket.

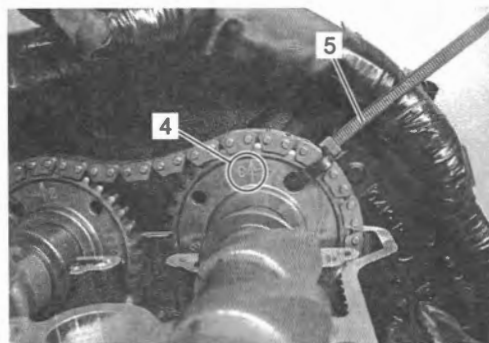
- 9) Bind the cam chain and the sprocket with a proper clamp (5) to prevent the cam chain disengagement while installing the camshaft journal holders.

NOTE

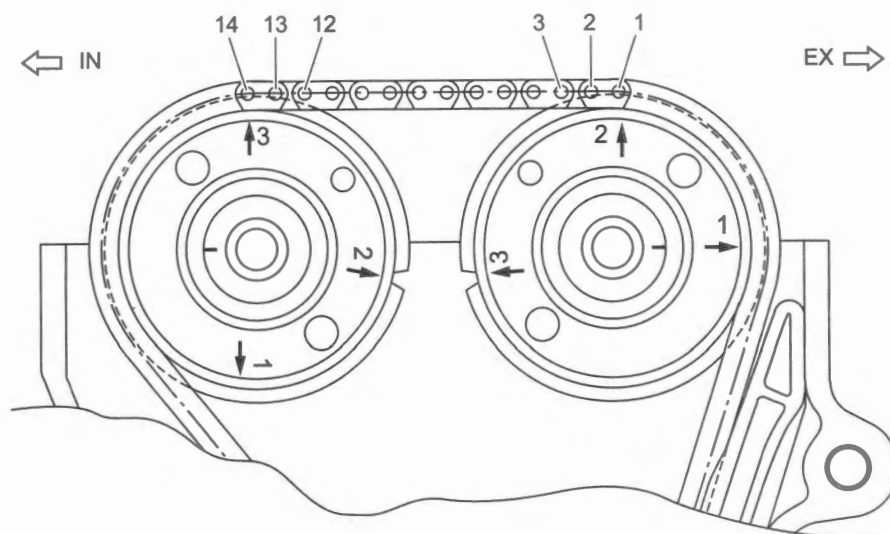
The cam chain should now be on all three sprockets. Be careful not to move the crankshaft until the camshaft journal holders and cam chain tension adjuster are secured.



IF04K1140074-01

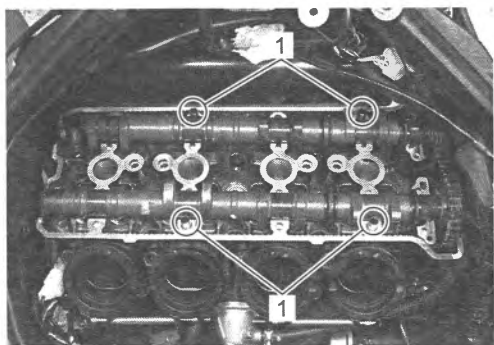


IF04K1140075-01



IF04K1140076-01

10) Install the dowel pins (1).



IF04K1140077-02

11) Install the camshaft journal holders (1) and cam chain guide No.2 (2).

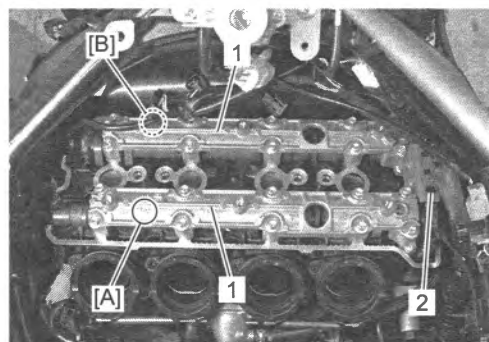
12) Have the camshaft journal holders seated evenly by tightening the camshaft journal holder bolts lightly, in the ascending order of numbers.

NOTICE

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

NOTE

- Each camshaft journal holder (1) is identified with a cast-on letters.
- The ascending order of numbers are indicated on the camshaft journal holders (1).



IF04K1140078-01

[A]: IN	[B]: EX
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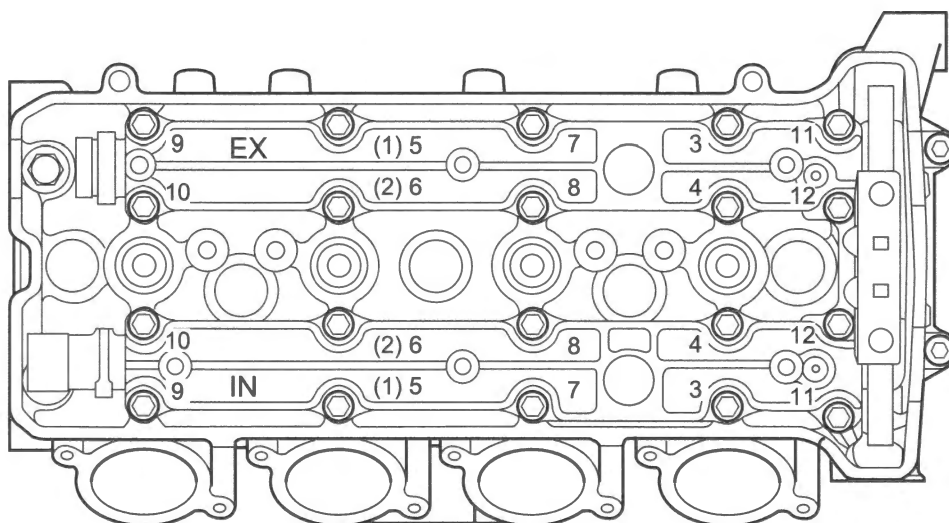
13) Tighten the camshaft journal holder bolts in ascending order of numbers to the specified torque.

Tightening torque

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

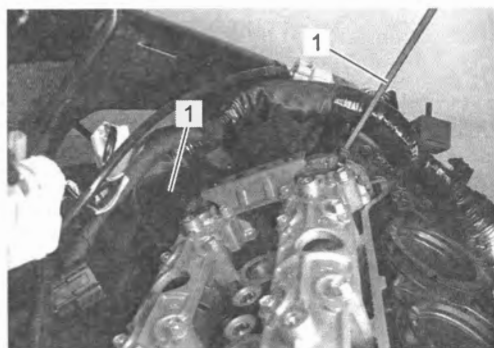
NOTICE

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.



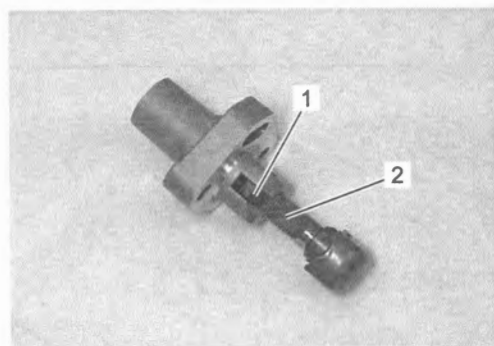
IB08J1140088-01

14) Remove the clamps (1).



IF04K1140079-01

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



IF04K1140080-01

16) Fit a new gasket (1).

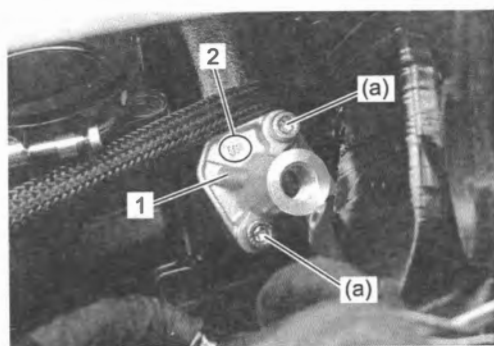


IF04K1140081-01

17) Install the cam chain tension adjuster (1) with "UP" mark (2) faced to the top of cylinder head.

Tightening torque

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



IF04K1140082-01

18) Install the spring (1).

19) Install the new gasket (2) and cam chain tension adjuster plug (3).

NOTE

Click sound is heard when extending the push rod.

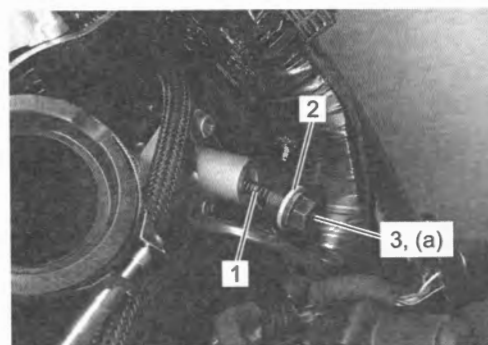
20) Tighten the cam chain tension adjuster plug (3) to the specified torque.

Tightening torque

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

NOTICE

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

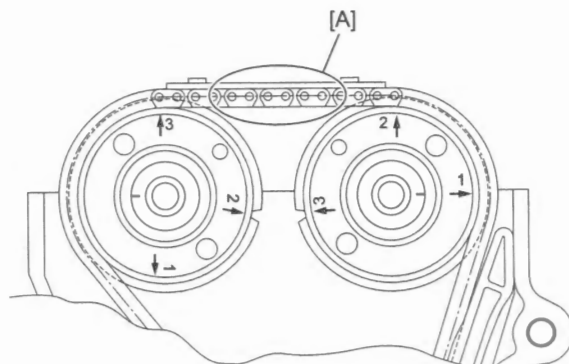


IF04K1140318-01

21) Rotate the crankshaft (some turns) and recheck the valve timing.

NOTICE

Make sure that the adjuster works properly by checking no slack at point [A].



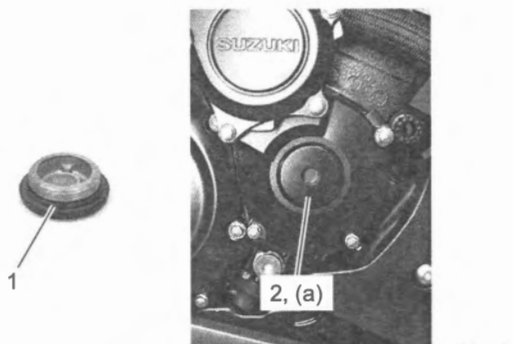
IF04K1140083-01

22) Check and adjust the valve clearance. (Page 1D-26)

23) Install the new O-ring (1) and tighten the crankshaft hole plug (2) to the specified torque.

Tightening torque

Crankshaft hole plug (a): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)



IF04K1140084-01

24) Install the removed parts.

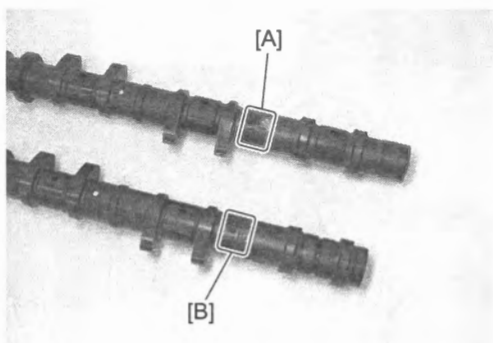
Camshaft Inspection

BENK07L21406018

Refer to "Cam Chain Tension Adjuster / Camshaft Removal" (Page 1D-19) and "Cam Chain Tension Adjuster / Camshaft Installation" (Page 1D-20).

Camshaft Identification

The camshafts can be identified by the embossed letter.



IF04K1140085-02

[A]: IN (Intake camshaft)	[B]: EX (Exhaust camshaft)
---------------------------	----------------------------

Cam Wear

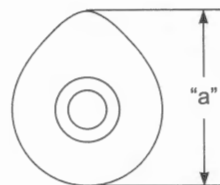
Check the camshaft for wear or damage. Measure the cam height "a" with a micrometer. Replace a camshaft if the cams are worn to the service limit.

Cam height

Intake [Limit]: 36.48 mm (1.437 in)

Exhaust [Limit]: 36.33 mm (1.431 in)

Special tool
09900-20202



I649G1140199-03

Camshaft Runout

Measure the runout using the dial gauge. Replace the camshaft if the runout exceeds the limit.

Camshaft runout

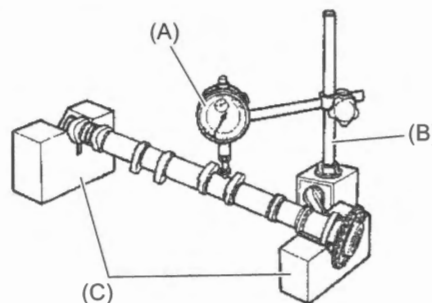
Intake & Exhaust [Limit]: 0.10 mm (0.004 in)

Special tool

(A): 09900-20607

(B): 09900-20701

(C): 09900-21304



IF04K1140086-01

Camshaft Journal Wear

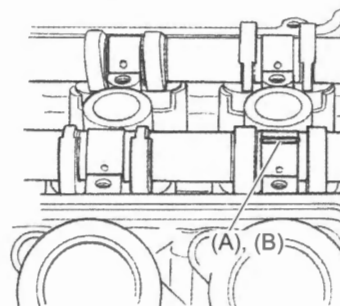
Inspect the camshaft journal wear in the following procedures:

- 1) Determine whether or not each journal is worn down to the limit by measuring the oil clearance with the camshaft installed in place.
- 2) Use the plastigage to read the clearance at the widest portion, which is specified as follows.

Special tool

(A): 09900-22303

(B): 09900-22304



IF04K1140087-01

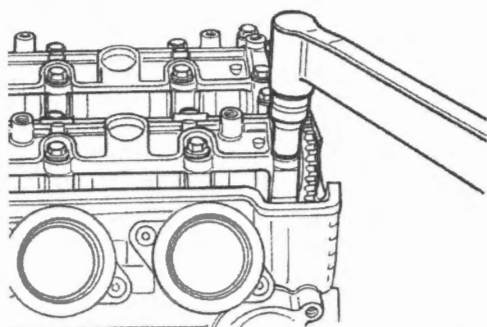
- 3) Install each camshaft journal holder to its original position. Refer to "Cam Chain Tension Adjuster / Camshaft Installation" (Page 1D-20).
- 4) Tighten the camshaft journal holder bolts in ascending order of numbers to the specified torque. Refer to "Cam Chain Tension Adjuster / Camshaft Installation" (Page 1D-20).

NOTE

Do not rotate the camshafts with the plastigage in place.

Tightening torque

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



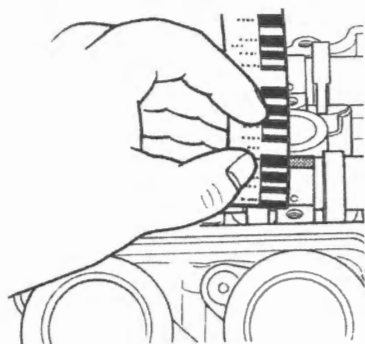
I947H1140066-01

- 5) Remove the camshaft journal holders and measure the width of the compressed plastigage using the envelope scale.
- 6) This measurement should be taken at the widest part of the compressed plastigage.

Camshaft journal oil clearance

Intake [Limit]: 0.150 mm (0.0059 in)

Exhaust [Limit]: 0.150 mm (0.0059 in)



I947H1140067-01

- 7) If the camshaft journal oil clearance exceeds the limit, measure the inside diameter of the camshaft journal holder and the outside diameter of the camshaft journal. Replace the camshaft or the cylinder head depending upon which one exceeds the specification.

Camshaft journal holder I.D.

Intake [Standard]: 24.012 – 24.025 mm (0.9454 – 0.9458 in)

Exhaust [Standard]: 24.012 – 24.025 mm (0.9454 – 0.9458 in)

Camshaft journal O.D.

Intake [Standard]: 23.959 – 23.980 mm (0.9433 – 0.9440 in)

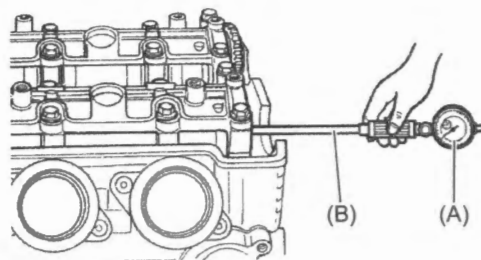
Exhaust [Standard]: 23.959 – 23.980 mm (0.9433 – 0.9440 in)

Special tool

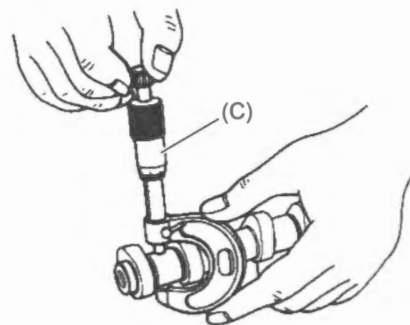
(A): 09900-20602

(B): 09900-22403

(C): 09912-66310



IF04K1140088-01

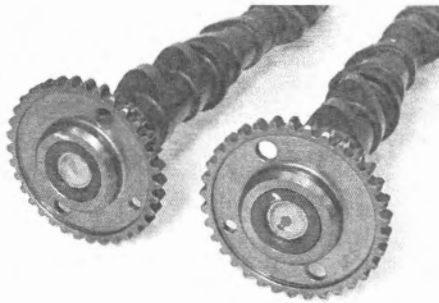


IF04K1140089-01

Camshaft Sprocket

Inspect the teeth of each camshaft sprocket for wear or damage.

If they are worn or damaged, replace the sprocket/camshaft assembly and cam chain as a set.



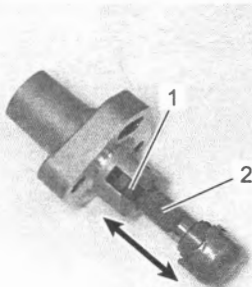
IF04K1140090-01

Cam Chain Tension Adjuster Inspection

BENK07L21406019

Refer to "Cam Chain Tension Adjuster / Camshaft Removal" (Page 1D-19) and "Cam Chain Tension Adjuster / Camshaft Installation" (Page 1D-20).

Unlock the ratchet (1), and move the push rod (2) in place to see if it slides smoothly. If any stickiness is noted or ratchet mechanism is faulty, replace the cam chain tension adjuster assembly with a new one.



IF04K1140091-01

Valve Clearance Inspection and Adjustment

BENK07L21406020

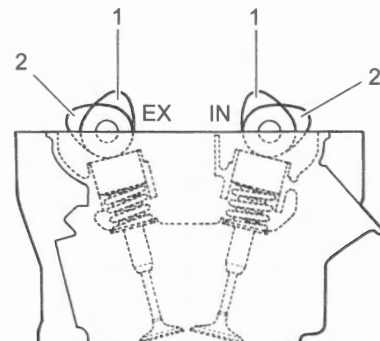
Refer to "Cylinder Head Cover Removal and Installation" (Page 1D-17) and "Spark Plug Removal and Installation" in Section 1H (Page 1H-5).

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.

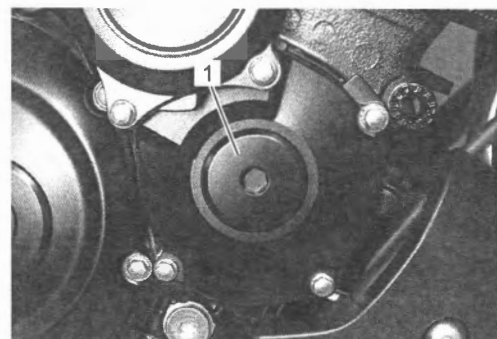
NOTE

- 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.



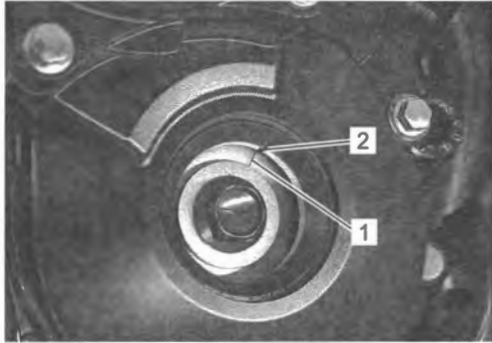
IF04K1140093-01

1) Remove the crankshaft hole plug (1).

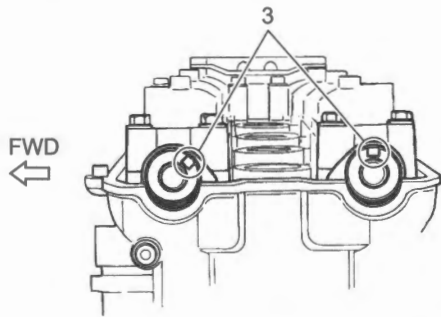


IF04K1140092-01

- 2) Turn the crankshaft to bring the line (1) on the starter clutch to the slit (2) of cap hole thread and also to bring the notches (3) on the left ends of both camshafts (EX and IN) to the positions as shown.



IF04K1140064-01



IF04K1140095-01

- 3) In this condition, read the valve clearance at the valves (1) (IN and EX of #4 cylinder, EX of #3 and IN of #2). If the clearance is out of specification, adjust the clearance.

Valve clearance

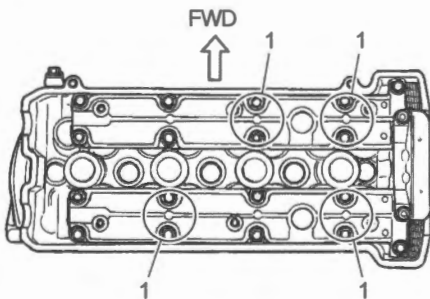
When engine cold

Intake [Standard]: 0.10 – 0.20 mm (0.0040 – 0.0078 in)

Exhaust [Standard]: 0.20 – 0.30 mm (0.0079 – 0.0118 in)

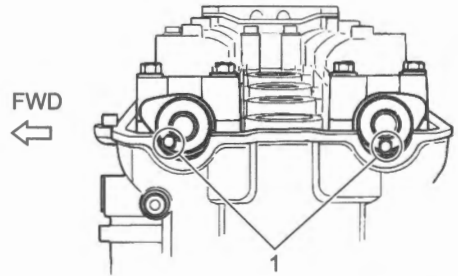
Special tool

09900-20803



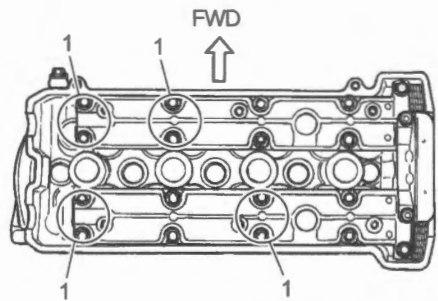
IF04K1140096-03

- 4) Turn the crankshaft 360° degrees (one rotation) to bring the line on the starter clutch to the slit of cap hole thread and also to bring the notches (1) to the position as shown.



IF04K1140098-02

- 5) Read the clearance at the rest of the valves (1) and adjust the clearance if necessary.



IF04K1140099-02

Cam position	Notch position	
	Exhaust camshaft	Intake camshaft
(1)	← FWD	← FWD

IF04K1140100-03

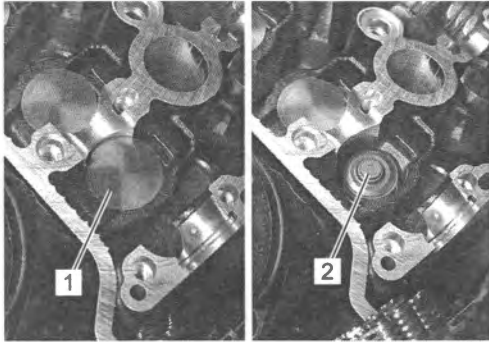
Cam position	Notch position	
	Exhaust camshaft	Intake camshaft
(1)	← FWD	← FWD

IF04K1140097-04

Adjustment

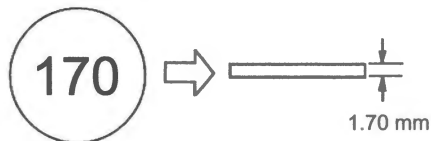
The clearance is adjusted by replacing the existing tappet shim with a thicker or thinner shim.

- 1) Remove the intake or exhaust camshaft. (Page 1D-19)
- 2) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



IF04K1140101-01

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

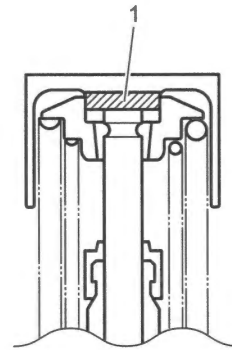


I837H1020014-01

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

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



IF04K1140319-02

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

TAPPET SHIM SET (12800-05830)

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

HOW TO USE THIS CHART:

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

EXAMPLE

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

(INTAKE SIDE)

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

TAPPET SHIM SET (12800-05830)

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


HOW TO USE THIS CHART:

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

EXAMPLE

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


(EXHAUST SIDE)

- 6) Install the camshafts and cam chain tension adjuster.  (Page 1D-20)
- 7) Rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement, then check the clearance again to confirm that it is within the specified range.
- 8) After finishing the tappet clearance adjustment, check the engine for smooth starting and free from any abnormal noise.

Engine Assembly Removal





BENK07L21406021

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

- 1) Remove the seat.  (Page 9D-19)
- 2) Disconnect the battery (-) lead wire (1).




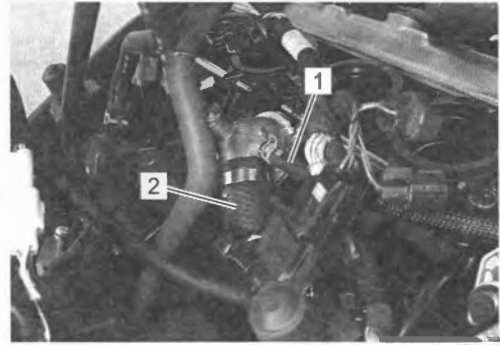
IK07L1140011-01

- 3) Jack up the motorcycle and fix it for safety.
- 4) Drain engine oil.  (Page 1E-5)
- 5) Drain engine coolant.  (Page 1F-6)
- 6) Remove the air cleaner box.  (Page 1D-7)
- 7) Remove the throttle body assembly.  (Page 1D-11)
- 8) Remove the oil cooler water outlet hose (1).



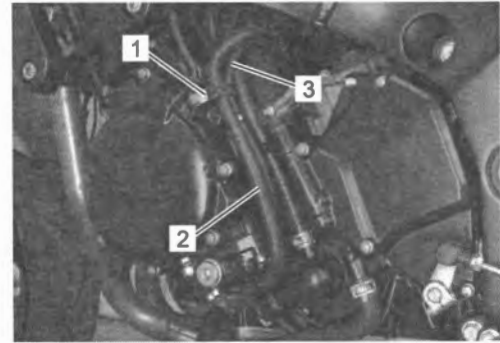
IF04K1140330-02

- 9) Remove the radiator assembly.  (Page 1F-9)
- 10) Disconnect the air bleed hose (1) and radiator inlet hose (2).



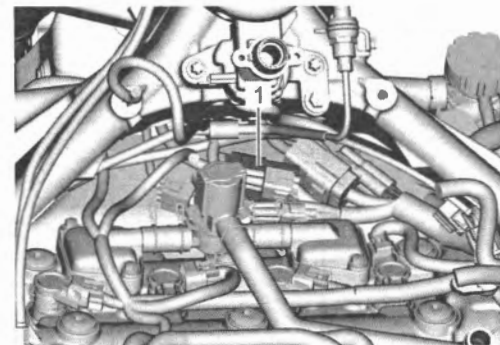
IF04K1140103-02

- 11) Remove the EVAP canister (If equipped). Refer to "EVAP Control System Removal and Installation (If Equipped)" in Section 1B (Page 1B-12).
- 12) Release the clamp (1) and remove the fuel tank breather hose (EVAP canister drain hose (If equipped)) (2) and water drain hose (3) from engine.



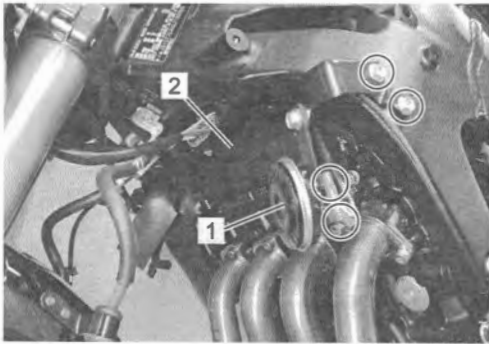
IF04K1140107-04

- 13) Remove the fixed clamp of left handle switch coupler (1) from the radiator heat shield.



IK07L1140018-01

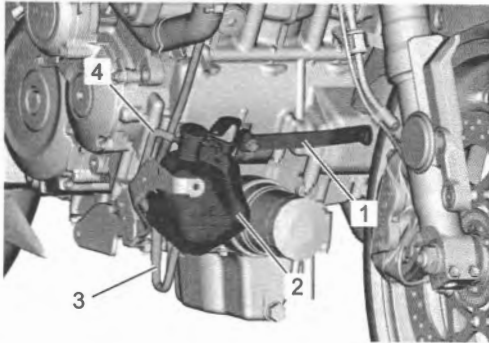
14) Remove the horn (1) and radiator heat shield (2).



IF04K1140104-02

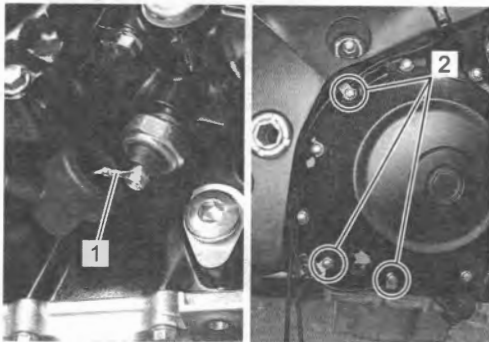
15) Remove the exhaust system components. Refer to "Exhaust Pipe / Muffler Removal" in Section 1K (Page 1K-15) and "Exhaust Pipe / Muffler Installation" in Section 1K (Page 1K-17).

16) Remove the radiator lower bracket (1) with reservoir tank (2), reservoir tank inlet hose (3) and reservoir tank over flow hose (4).



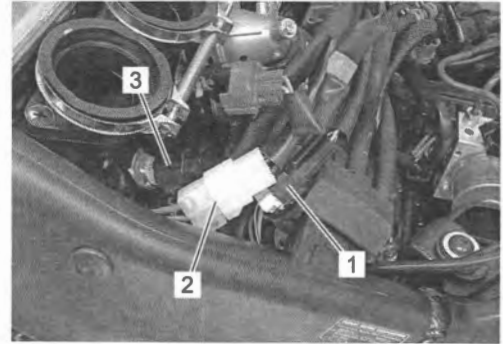
IK07L1140012-01

17) Disconnect the oil pressure switch lead wire (1) and release the clamps (2). (Page 1E-10)



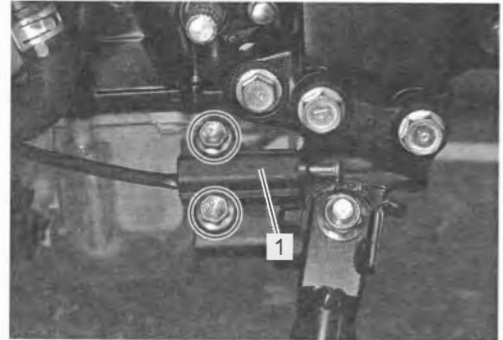
IF04K1140106-03

18) Disconnect the GP switch coupler (1), generator coupler (2) and ECT sensor coupler (3).



IK07L1140013-01

19) Remove the side-stand switch (1).



IF04K1140109-01

20) Disconnect the starter motor lead wire (1) and engine ground lead wire (2).



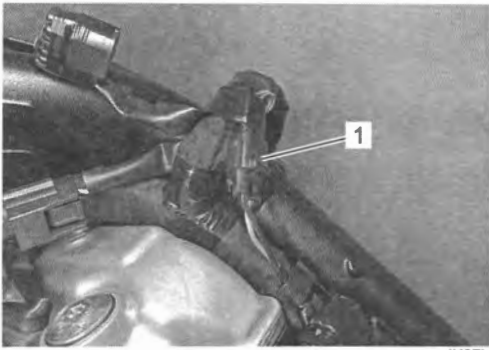
IF04K1140110-04

21) Remove the PCV hose (1).



IF04K1140111-02

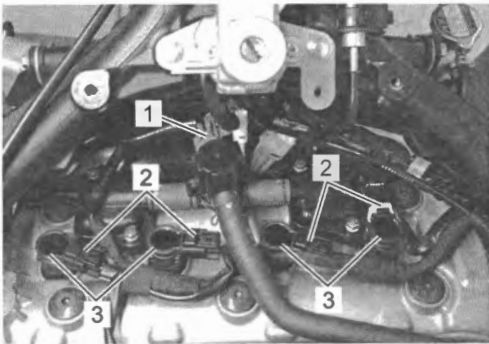
22) Disconnect the CKP sensor coupler (1).



IK07L1140014-02

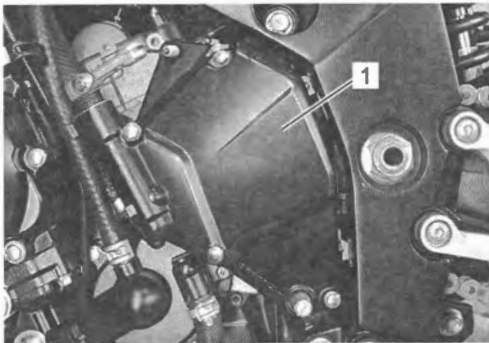
23) Disconnect the PAIR control solenoid valve coupler (1) and ignition coil couplers (2).

24) Remove the ignition coils (3). (Page 1H-5)



IF04K1140113-02

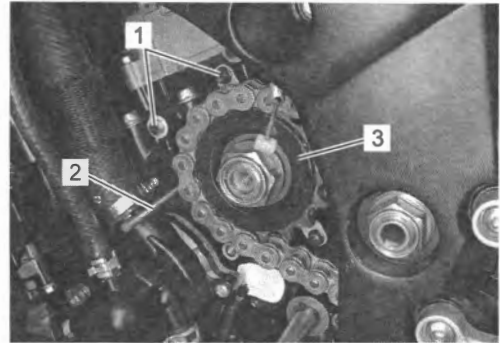
25) Remove the engine sprocket cover (1). Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-10).



IF04K1140114-02

26) Remove the dowel pins (1) and clutch push rod (2).

27) Remove the engine sprocket (3). Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-4).

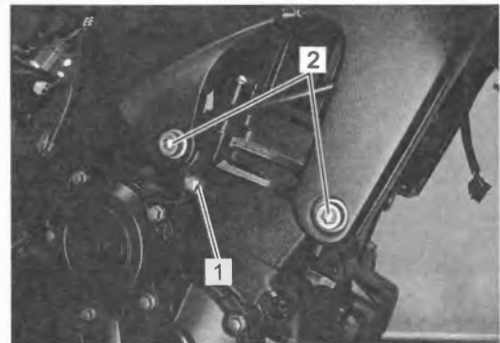


IF04K1140115-01

28) Support the engine with a proper jack.

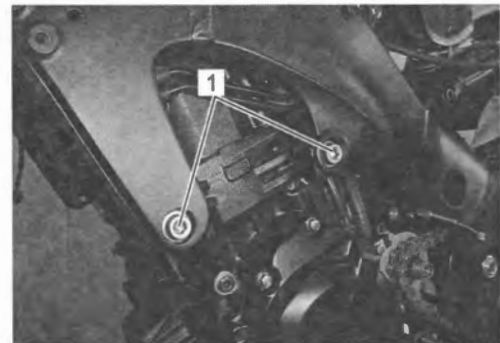
29) Loosen the engine mounting pinch bolt (1) (RH).

30) Remove the engine mounting bolts (2) (RH).



IF04K1140320-01

31) Remove the engine mounting bolts (1) (LH).



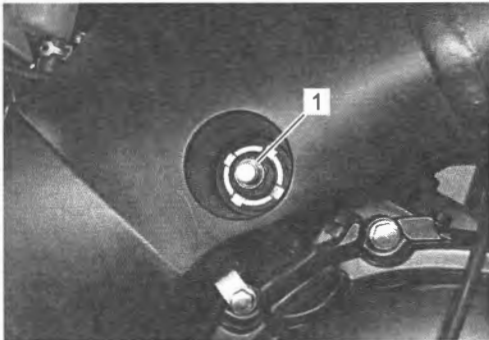
IF04K1140116-01

- 32) Remove the engine mounting nut (1).
- 33) Remove the engine mounting thrust adjuster lock-nut (2) with the special tool.
- 34) Loosen the engine mounting thrust adjuster (3) fully.

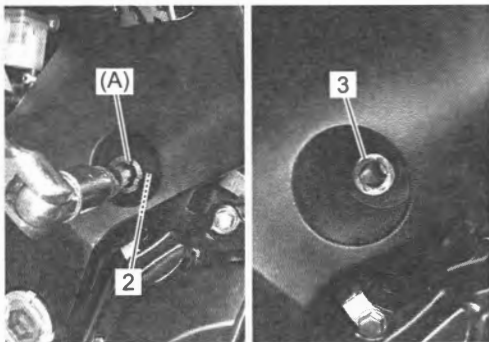
Special tool
(A): 09940-14990

NOTE

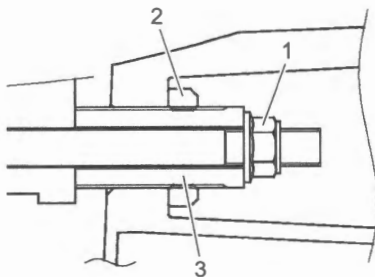
Do not remove the engine mounting bolt at this stage.



IF04K1140117-01



IF04K1140118-01



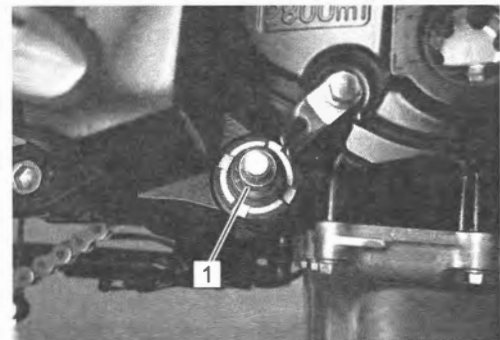
IF04K1140119-01

- 35) Remove the engine mounting nut (1).
- 36) Loosen the engine mounting thrust adjuster lock-nut (2) with the special tool.
- 37) Loosen the engine mounting thrust adjuster (3) fully.

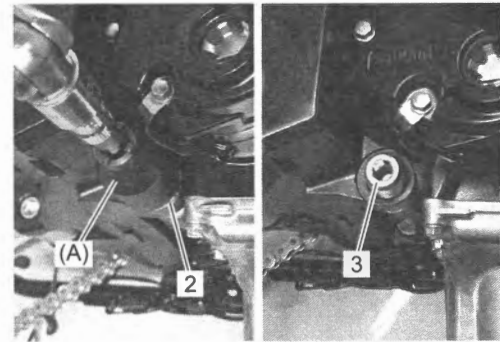
Special tool
(A): 09940-14990

NOTE

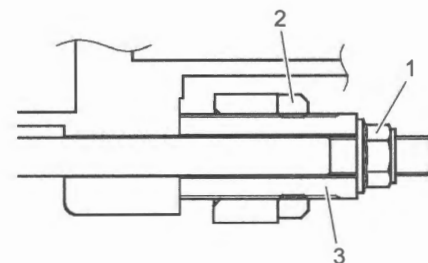
Do not remove the engine mounting bolt at this stage.



IF04K1140120-01



IF04K1140121-01



IF04K1140122-01

- 38) Remove the engine mounting bolts and gradually lower the front side of the engine. Then, take off the drive chain from the driveshaft.
- 39) Remove the engine assembly.

Engine Assembly Installation

BENK07L21406022

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

- Gradually raise the rear side of the engine assembly, and then put the drive chain on the driveshaft.

NOTICE

Be careful not to catch the wiring harness between the frame and the engine.

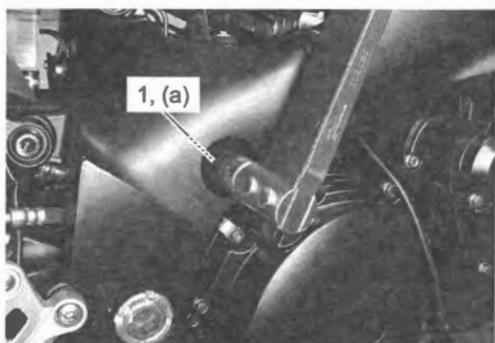


IF04K1140123-01

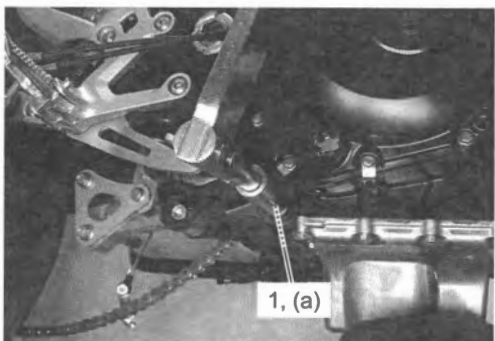
- Install all engine mounting bolts and tighten them temporarily.
- Tighten the engine mounting thrust adjusters (1) to the specified torque.

Tightening torque

Engine mounting thrust adjuster (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IF04K1140124-01



IF04K1140125-01

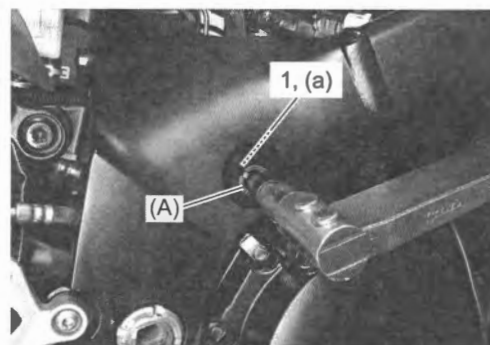
- Tighten the engine mounting thrust adjuster lock-nuts (1) to the specified torque with the special tool.

Special tool

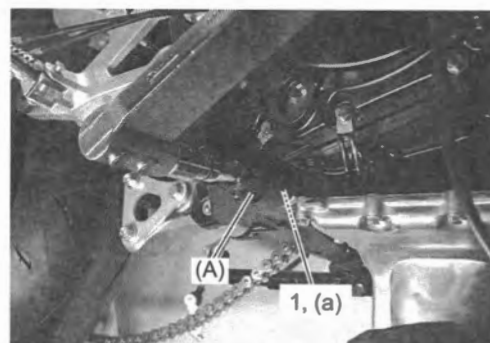
(A): 09940-14990

Tightening torque

Engine mounting thrust adjuster lock-nut (a): 45 N·m (4.6 kgf-m, 33.5 lbf-ft)



IF04K1140126-01



IF04K1140127-01

- Tighten all engine mounting bolts and nuts to the specified torque in order of "1" → "2" as shown.

NOTE

The engine mounting nuts are self-locking. Once the nuts have been removed, they are no longer of any use.

Tightening torque

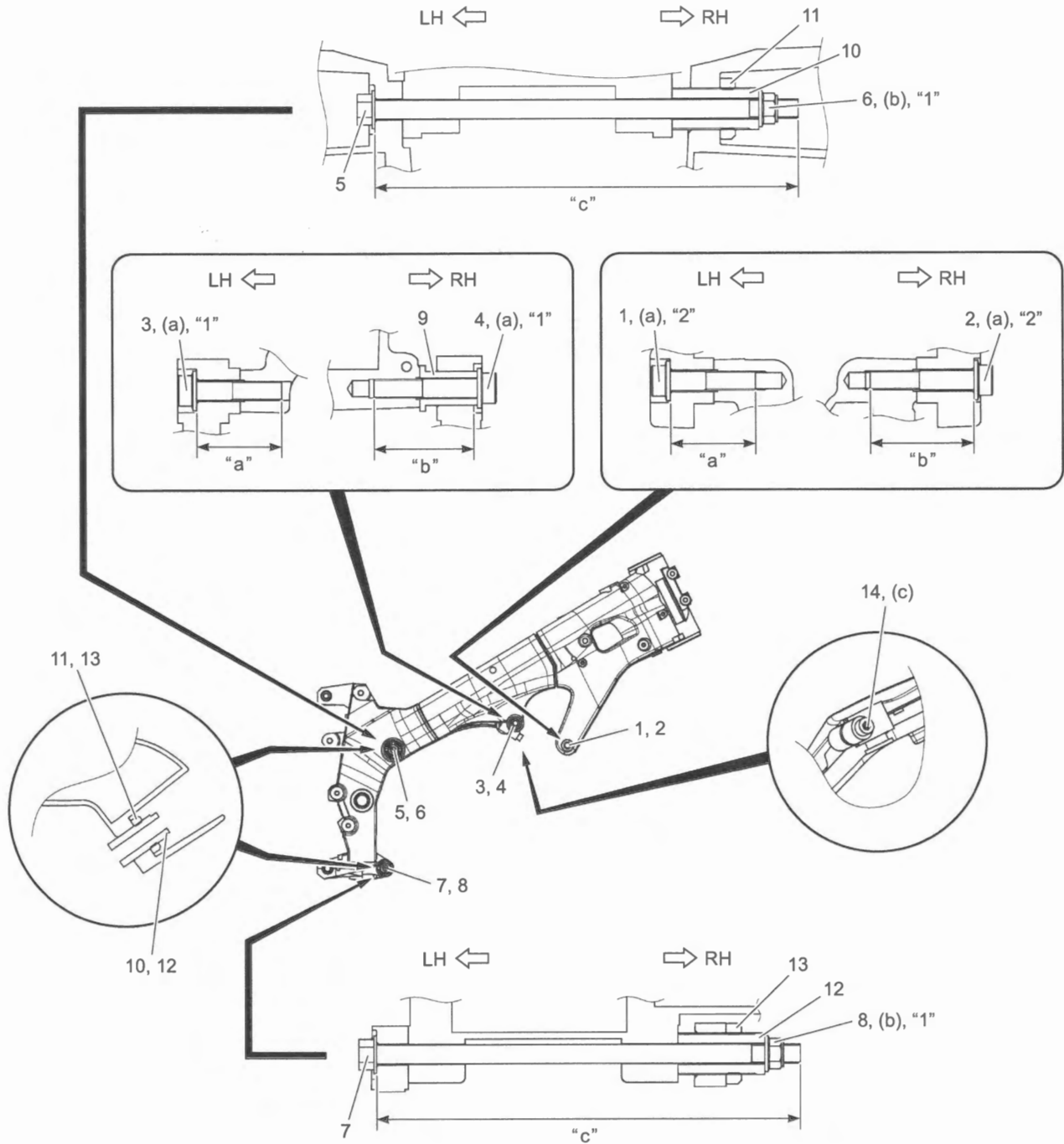
Engine mounting bolt (a): 55 N·m (5.6 kgf-m, 40.5 lbf-ft)

Engine mounting nut (b): 75 N·m (7.6 kgf-m, 55.5 lbf-ft)

- Tighten the engine mounting pinch bolt to the specified torque as shown.

Tightening torque

Engine mounting pinch bolt (c): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



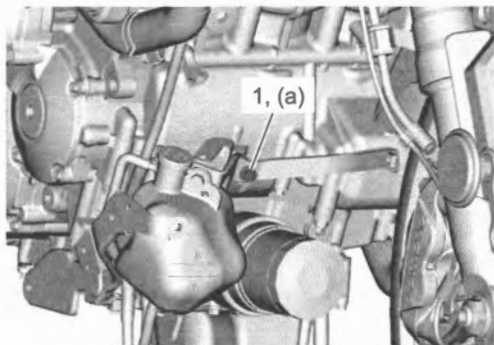
IK07L1140025-03

1. Engine mounting bolt (Front upper, Left)	7. Engine mounting bolt (Rear lower)	13. Engine mounting thrust adjuster lock-nut (Rear lower)
2. Engine mounting bolt (Front upper, Right)	8. Engine mounting nut (Rear lower)	14. Engine mounting pinch bolt
3. Engine mounting bolt (Rear upper, Left)	9. Engine mounting spacer	"a": 45 mm (1.8 in)
4. Engine mounting bolt (Rear upper, Right)	10. Engine mounting thrust adjuster (Rear upper)	"b": 55 mm (2.1 in)
5. Engine mounting bolt (Rear upper)	11. Engine mounting thrust adjuster lock-nut (Rear upper)	"c": 225 mm (8.86 in)
6. Engine mounting nut (Rear upper)	12. Engine mounting thrust adjuster (Rear lower)	

- Install the engine sprocket. Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-4).
- Tighten the radiator bracket bolt (1) to the specified torque.

Tightening torque

Radiator bracket bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IK07L1140019-01

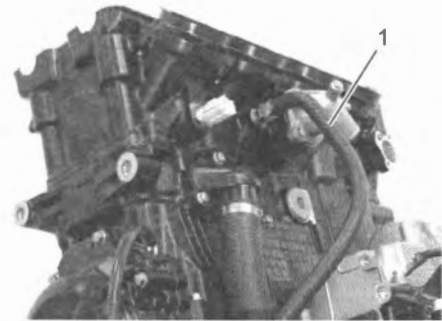
- Install the exhaust pipe assembly and muffler. Refer to "Exhaust Pipe / Muffler Installation" in Section 1K (Page 1K-17).
- Install the radiator. Refer to "Radiator / Cooling Fan Motor Removal and Installation" in Section 1F (Page 1F-9).
- Install the throttle body. Refer to "Throttle Body Removal and Installation" (Page 1D-11).
- Install the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" (Page 1D-7).
- Check the radiator hose and water hose routing. ☞(Page 1F-2)
- Check the wiring harness routing. ☞(Page 9A-9)
- After finishing the engine installation, check the following items.
 - Throttle cable play: ☞(Page 1D-10)
 - Throttle valve synchronization: ☞(Page 1D-15)
 - Clutch cable play: ☞(Page 5C-5)
 - Engine oil leakage: ☞(Page 1E-5)
 - Engine coolant leakage: ☞(Page 1F-7)

Cylinder Head Removal

BENK07L21406023

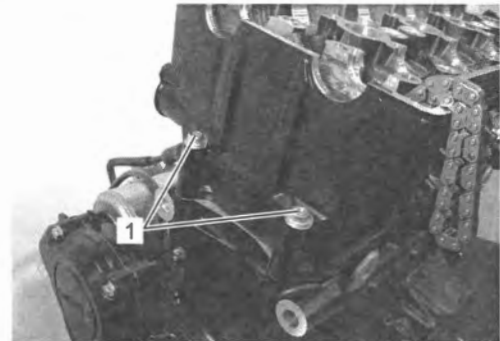
Refer to "Engine Assembly Removal" (Page 1D-31) and "Cam Chain Tension Adjuster / Camshaft Removal" (Page 1D-19).

- 1) Disconnect the water bypass hose (1).



IF04K1140129-02

- 2) Remove the cylinder head bolts (L50) (1).



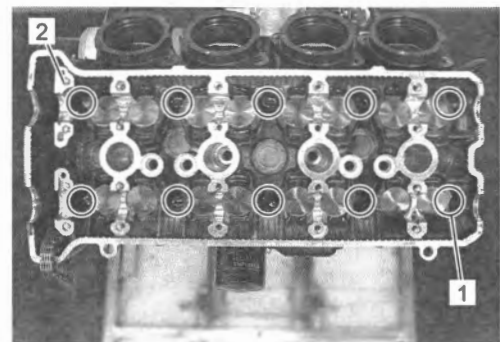
IF04K1140132-01

- 3) Remove the cylinder head bolts (L105) (1).

NOTE

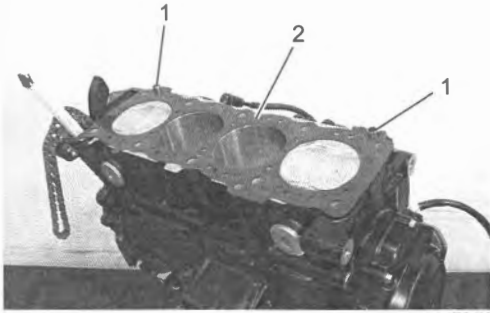
When loosening the cylinder head bolts, loosen each bolt little by little diagonally.

- 4) Remove the cylinder head (2).



IF04K1140130-03

- Remove the dowel pins (1) and cylinder head gasket (2).

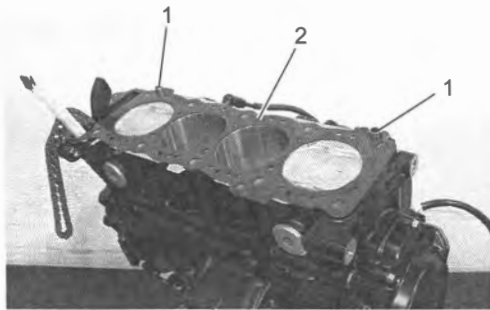


IF04K1140131-01

Cylinder Head Installation

BENK07L21406024

- Install the dowel pins (1) and a new cylinder head gasket (2) to the cylinder.



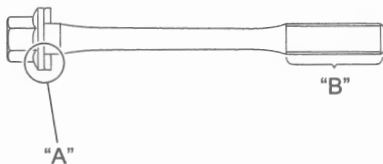
IF04K1140133-01

- Place the cylinder head on the gasket.

NOTE

When installing the cylinder head, keep the cam chain taut.

- Apply engine oil to the both side of the washers "A" and thread portion "B" of the bolts before installing the cylinder head bolts (L105).

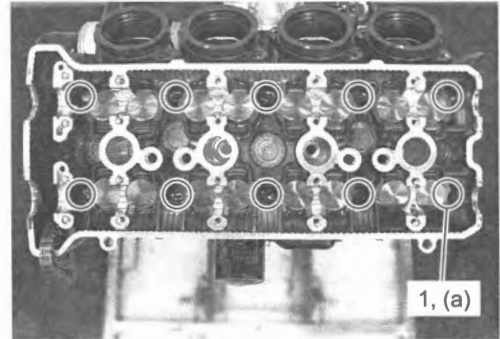


IF04K1140331-03

- Tighten the cylinder head bolts (L105) to the specified torque with a torque wrench sequentially and diagonally.
- Additionally tighten the cylinder head bolts (1) with the specified angles diagonally using an angular torque gauge.

Tightening torque

Cylinder head bolt (L105) (a): 31 N·m (3.2 kgf-m, 23.0 lbf-ft) → turn clockwise 60°

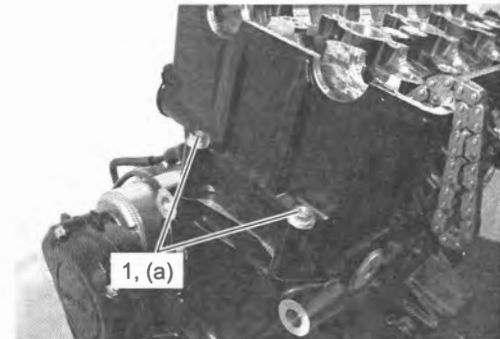


IF04K1140334-01

- Tighten the cylinder head bolts (L50) (1) to the specified torque.

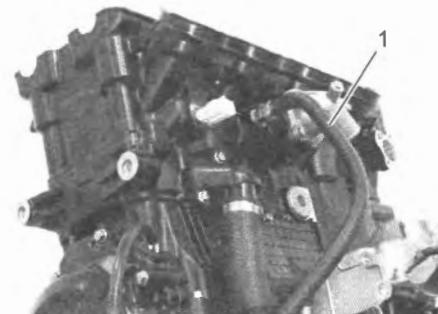
Tightening torque

Cylinder head bolt (L50) (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1140136-01

- Connect the water bypass hose (1).



IF04K1140129-02

- Install the camshafts. (Page 1D-20)

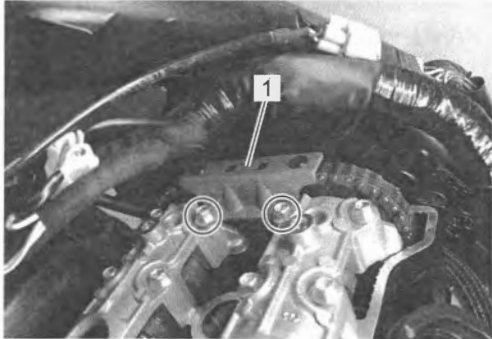
Cam Chain Guide / Cam Chain Tensioner Removal and Installation

BENK07L21406025

Removal

Cam chain guide No.2

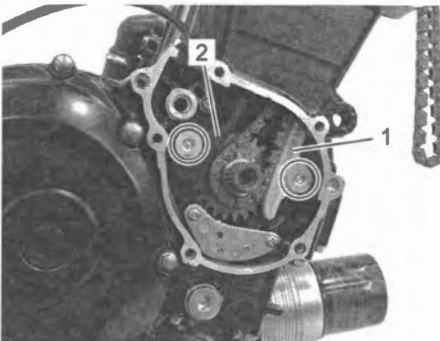
- 1) Remove the cylinder head cover. (Page 1D-17)
- 2) Remove the cam chain guide No.2 (1).



IF04K1140138-01

Cam chain guide No.1 / cam chain tensioner

- 1) Remove the cylinder head. (Page 1D-37)
- 2) Remove the starter clutch. (Page 11-9)
- 3) Remove the cam chain guide No.1 (1) and cam chain tensioner (2).



IF04K1140139-01

Installation

Cam chain guide No.1 / cam chain tensioner

- 1) Insert the cam chain tensioner (1).
- 2) Apply a small quantity of thread lock to the cam chain tensioner bolt (2) and tighten it to the specified torque.

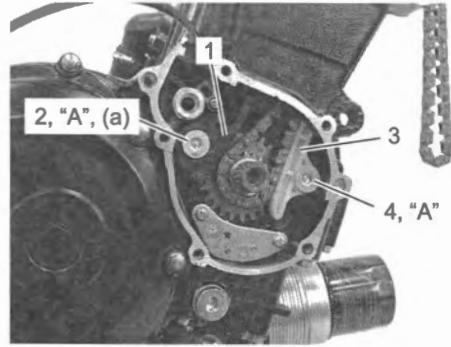
"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

Cam chain tensioner bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

- 3) Insert the cam chain guide No.1 (3).
- 4) Apply a small quantity of thread lock to the cam chain guide No.1 bolt (4) and tighten it.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)



IF04K1140140-03

- 5) Install the starter clutch. (Page 11-9)

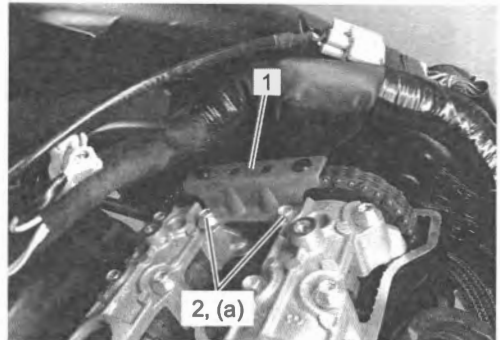
- 6) Install the cylinder head. (Page 1D-38)

Cam chain guide No.2

- 1) Install the cam chain guide No.2 (1).
- 2) Tighten the camshaft journal holder bolts (2) to the specified torque.

Tightening torque

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



IF04K1140141-01

- 3) Install the cylinder head cover. (Page 1D-17)

Cam Chain Guide Inspection

BENK07L21406026

Refer to "Cam Chain Guide / Cam Chain Tensioner Removal and Installation" (Page 1D-39).

Check the contacting surface of the cam chain guides. If it is worn or damaged, replace it with a new one.



IF04K1140142-01

Cam Chain Tensioner Inspection

BENK07L21406027

Refer to "Cam Chain Guide / Cam Chain Tensioner Removal and Installation" (Page 1D-39).
Check the contacting surface of the cam chain tensioner. If it is worn or damaged, replace it with a new one.



IF04K1140143-01

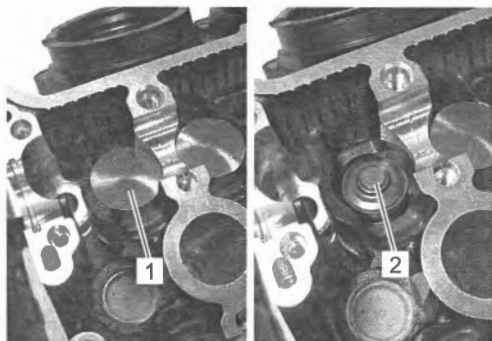
Valve / Valve Spring Removal and Installation

BENK07L21406028

Refer to "Cylinder Head Removal" (Page 1D-37) and "Cylinder Head Installation" (Page 1D-38).

Removal

- 1) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



IF04K1140144-01

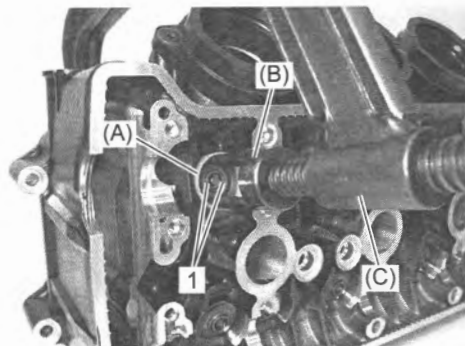
- 2) Insert the special tool between the valve springs and cylinder head.
- 3) Using the special tools, compress the valve springs and remove the two cotter halves (1) from the valve stem.

NOTICE

Be careful not to damage the tappet sliding surface with the special tool.

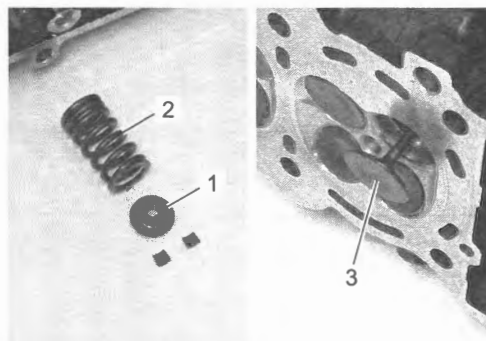
Special tool

- (A): 09919-28620
- (B): 09916-14522
- (C): 09916-14510
- 09916-84511



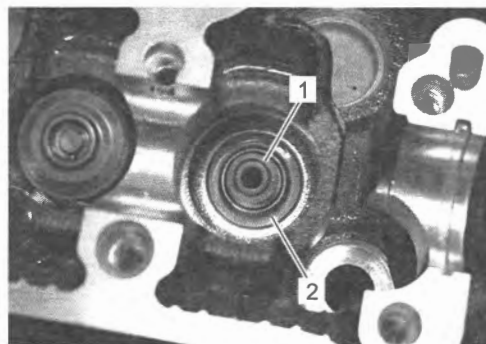
IF04K1140145-01

- 4) Remove the valve spring retainer (1) and valve spring (2).
- 5) Pull out the valve (3) from the combustion chamber side.



IF04K1140146-01

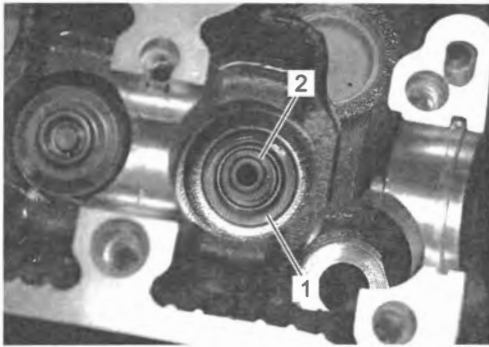
- 6) Remove the oil seal (1) and spring seat (2).
- 7) Remove the other valves in the same manner as described previously.



IF04K1140147-01

Installation

- 1) Install the valve spring seat (1).
- 2) Apply engine oil to the new oil seal (2), and press-fit it into the position.



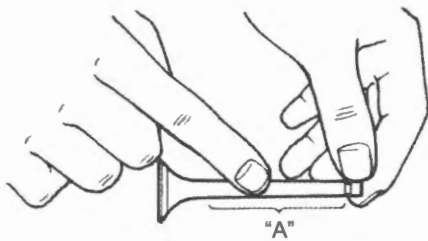
IF04K1140148-02

- 3) Insert the valve, with its stem coated with molybdenum oil solution all around and along the full stem length without any break.

NOTICE

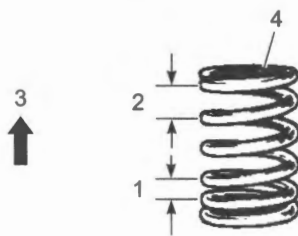
When inserting the valve, take care not to damage the lip of the oil seal.

“A”: Assembly lubrication (Molybdenum oil solution)



IF04K1140149-01

- 4) Install each valve spring with the small-pitch portion (1) facing cylinder head.



IF04K1140150-01

2. Large-pitch portion	4. Paint
3. Upward	

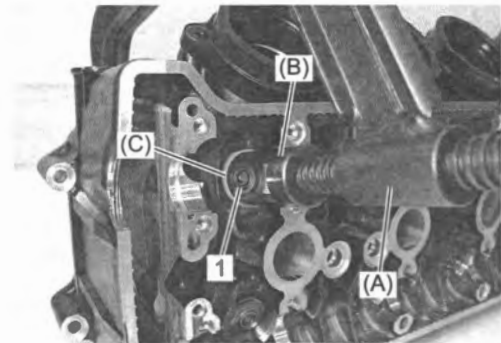
- 5) Put on the valve spring retainer (1), and using the special tools, press down the springs, fit the cotter halves to the stem end, and release the lifter to allow the cotter halves to wedge in between retainer and stem.

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.

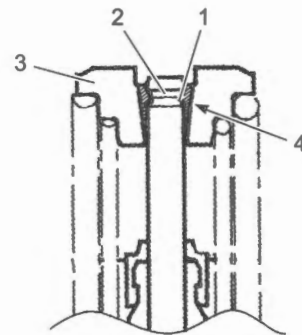
Special tool

- (A): 09916-14510
 (B): 09916-14522
 (C): 09919-28620
 09916-84511



IF04K1140151-01

- 6) Be sure that the rounded lip (1) of the cotter fits snugly into the groove (2) in the stem end.



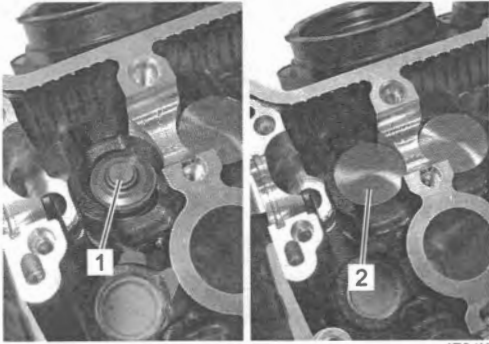
IF04K1140152-01

3. Valve spring retainer	4. Cotter
--------------------------	-----------

- 7) Apply engine oil to the stem ends and tappet shims (1).
- 8) Apply engine oil to the tappets (2).
- 9) 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.



IF04K1140153-02

Valve Inspection

BENK07L21406029

Refer to "Valve / Valve Spring Removal and Installation" (Page 1D-40).

Valve Stem Runout

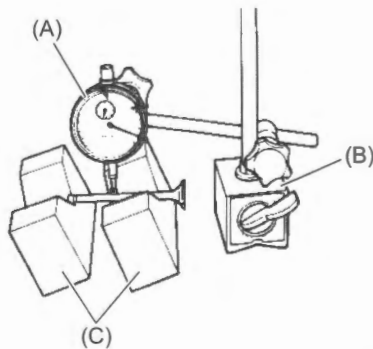
Support the valve using V blocks, as shown in the figure, and check its runout using the dial gauge. If the runout exceeds the service limit, replace the valve.

Valve stem runout

Intake & Exhaust [Limit]: 0.05 mm (0.0019 in)

Special tool

- (A): 09900-20607
- (B): 09900-20701
- (C): 09900-21304



IF04K1140154-01

Valve Head Radial Runout

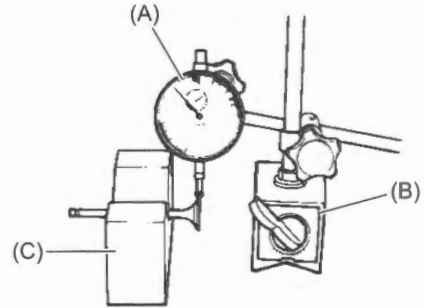
Place the dial gauge at a right angle to the valve head face and measure the valve head radial runout. If it measures more than the service limit, replace the valve.

Valve head radial runout

Intake & Exhaust [Limit]: 0.03 mm (0.0011 in)

Special tool

- (A): 09900-20607
- (B): 09900-20701
- (C): 09900-21304



IF04K1140155-01

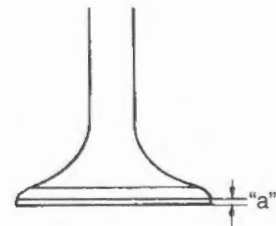
Valve Face Wear

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)



I649G1140233-02

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 valve guide should be replaced with a new one.

Valve stem deflection

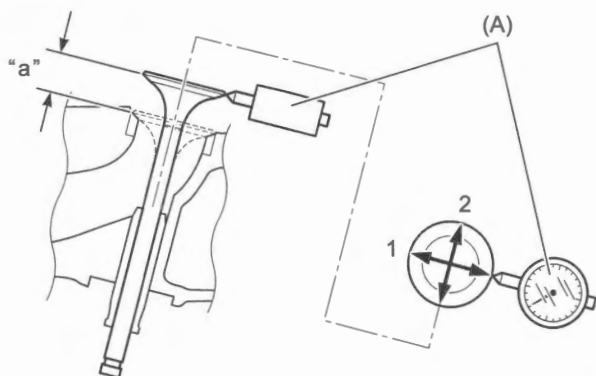
Intake & Exhaust

0.35 mm (0.013 in)

Special tool

(A): 09900-20607

09900-20701



IH18K1140324-02

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 deflection.

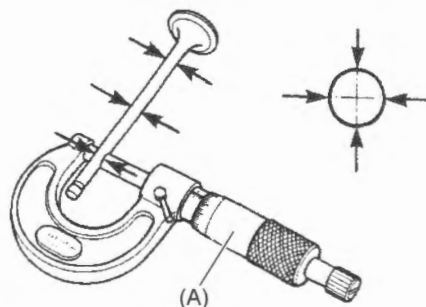
Valve stem O.D.

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



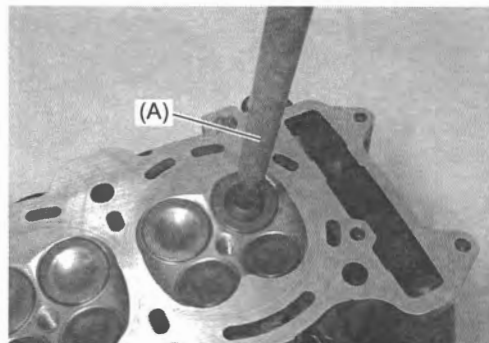
IF04K1140158-01

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): 09916-10912



IF04K1140159-01

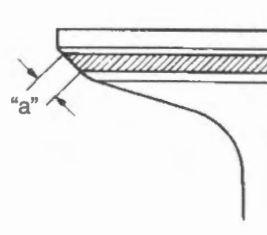
- 4) Check that the transferred red lead (blue) on the valve face is uniform all around and in center of the valve face.

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-44)

Valve seat width

Intake [Standard]: 0.9 – 1.1 mm (0.036 – 0.043 in)

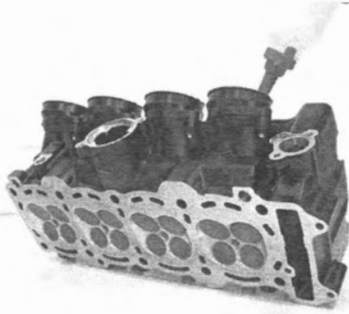
Exhaust [Standard]: 0.9 – 1.1 mm (0.036 – 0.043 in)



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-44)



IF04K1140160-01

Valve Seat Repair

BENK07L21406030

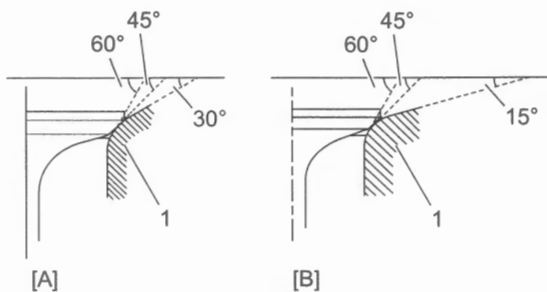
The valve seats (1) for both the intake and exhaust valves are machined to three different angles. The seat contact surface is cut at 45°.

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 reinstalled. (Page 1D-26)



IF04K1140326-02

[A]: Intake valve	[B]: Exhaust valve
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	Intake	Exhaust
Seat angle	30°/45°/60°	15°/45°/60°
Seat width	0.9 – 1.1 mm (0.036 – 0.043 in)	←
Valve diameter	30 mm (1.2 in)	24 mm (0.94 in)
Valve guide I.D.	4.500 – 4.512 mm (0.1772 – 0.1776 in)	←

Valve Spring Inspection

BENK07L21406031

Refer to “Valve / Valve Spring Removal and Installation” (Page 1D-40).

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]: 37.3 mm (1.47 in)

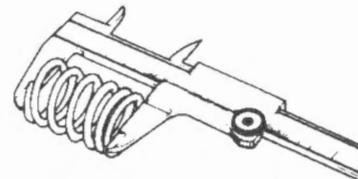
Exhaust [Limit]: 37.3 mm (1.47 in)

Valve spring pre-load

When compressed to 33.55 mm (1.321 in)

Intake [Standard]: 141 – 163 N (14.4 – 16.6 kgf, 31.7 – 36.6 lbf)

Exhaust [Standard]: 141 – 163 N (14.4 – 16.6 kgf, 31.7 – 36.6 lbf)



IK34K2140017-01



ID26J1140263-01

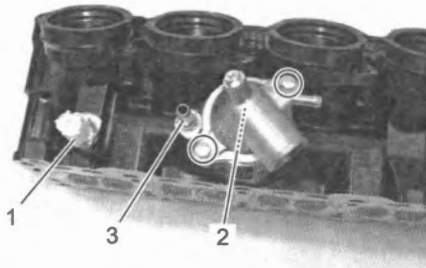
Cylinder Head Disassembly and Reassembly

BENK07L21406032

Refer to "Cylinder Head Removal" (Page 1D-37) and "Cylinder Head Installation" (Page 1D-38).

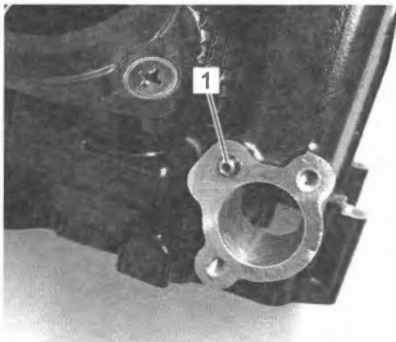
Disassembly

- 1) Remove the ECT sensor (1). (Page 1C-8)
- 2) Remove the thermostat (2). (Page 1F-14)
- 3) Remove the bypass hose union (3).



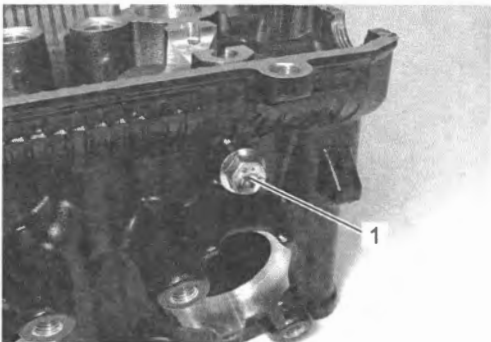
IF04K1140163-01

- 4) Remove the oil jet (for cam chain tension adjuster) (1). (Page 1E-12)



IF04K1140164-01

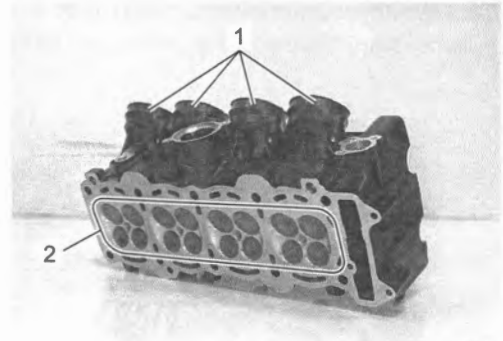
- 5) Remove the oil gallery bolt (1).



IF04K1140321-01

- 6) Remove the following parts.

- Intake pipes (1): (Page 1D-17)
- Valves (2) and valve springs: (Page 1D-40)
- Valve guides: (Page 1D-46)



IF04K1140165-01

Reassembly

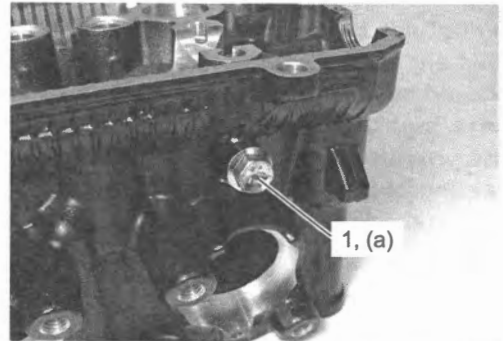
- 1) Install the following parts:

- Intake pipes: (Page 1D-17)
- Valves and valve springs: (Page 1D-40)
- Valve guides: (Page 1D-46)

- 2) Install the oil gallery bolt (1) with new gasket and tighten it to the specified torque.

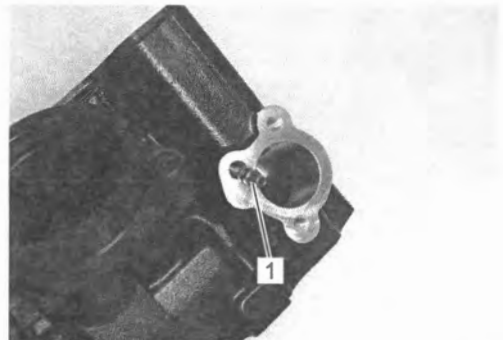
Tightening torque

Oil gallery bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1140166-01

- 3) Install the oil jet (1) (for cam chain tension adjuster). (Page 1E-12)



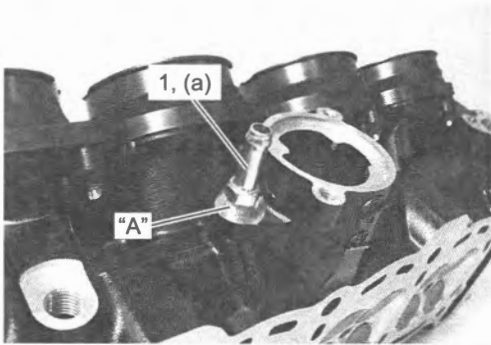
IF04K1140167-01

- 4) Apply sealant to the thread part of bypass hose union (1) and tighten it to the specified torque.

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

Tightening torque

Bypass hose union (a): 12 N·m (1.2 kgf-m, 9.0 lbf-ft)



IF04K1140168-02

- 5) Install the thermostat. (Page 1F-14)
- 6) Install the ECT sensor. (Page 1C-8)

Cylinder Head Inspection

BENK07L21406033

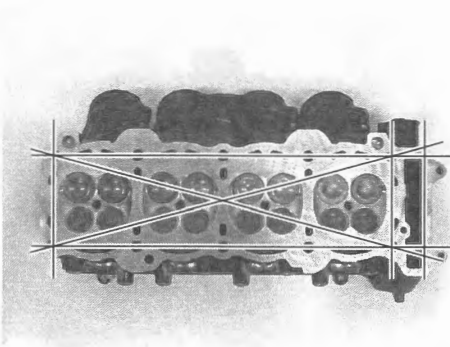
Refer to "Cylinder Head Removal" (Page 1D-37) and "Cylinder Head Installation" (Page 1D-38).

- 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]: 0.20 mm (0.0078 in)

**Special tool
09900-20803**



IF04K1140169-02

Valve Guide Replacement

BENK07L21406034

Refer to "Valve / Valve Spring Removal and Installation" (Page 1D-40).

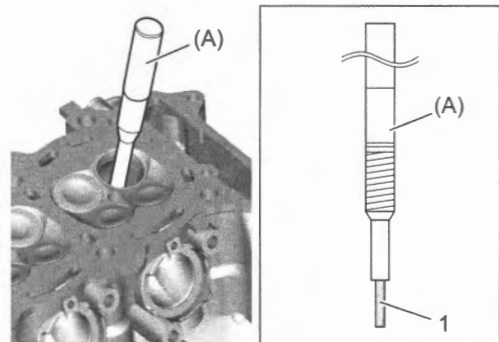
- 1) Using the special tool fitted with an appropriate attachment (1), drive the valve guide out toward the intake or exhaust camshaft side.

NOTE

- Discard the removed valve guide sub-assemblies.
- Only oversized valve guides are available as replacement parts. (Part No.11115-29G70)

Special tool

(A): 09916-51710



IK07L1140015-01

- 2) Refinish the valve guide holes in the cylinder head using the reamer and handle.
- 3) Remove the special tools by turning clockwise and raising them at the same time.

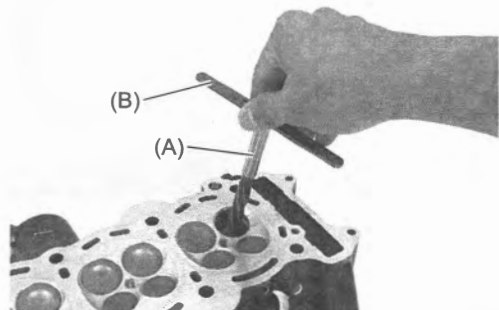
NOTICE

Never turn the special tools counterclockwise, as this will dull the blades.

Special tool

(A): 09916-33320

(B): 09916-34542



IF04K1140171-01

- 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) with a hot plate.

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.

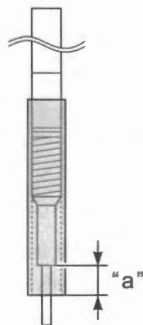
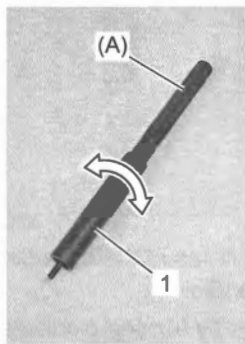
NOTICE

Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.

- 6) Screw the sleeve (1) onto the special tool used in Step 1) and adjust the measurements “a” by turning the sleeve.

Special tool

(A): 09916-51710



IH17K1140178-04

“a”: 13.7 – 13.9 mm (0.540 – 0.547 in) [IN and EX]

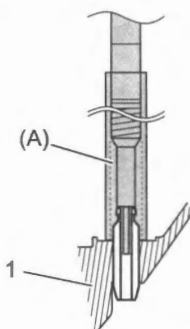
- 7) Drive the guide into the guide hole using the special tool.

NOTE

Install the valve guide until the special tool contacts the cylinder head.

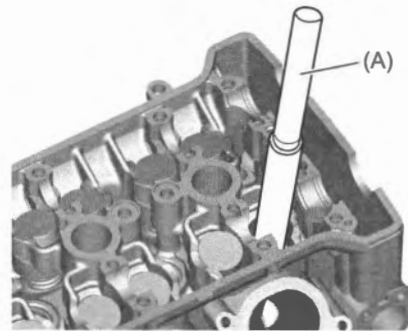
Special tool

(A): 09916-51710



IH17K1140179-02

1. Cylinder head



IK07L1140016-02

- 8) After installing the valve guides, refinish their guiding bores using the reamer. Be sure to clean and oil the guides after reaming.

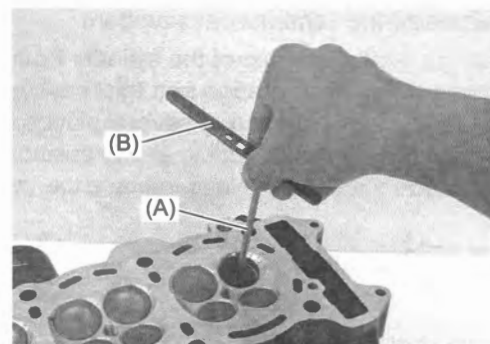
NOTE

- Be sure to cool down the cylinder head to ambient air temperature.
- Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.

Special tool

(A): 09916-33210

(B): 09916-34542



IF04K1140174-01

Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal

BENK07L21406035

Refer to “Engine Assembly Removal” (Page 1D-31) and “Cylinder Head Removal” (Page 1D-37).

PCV Cover

Remove the PCV cover. ⚙️ (Page 1B-11)

Starter Motor

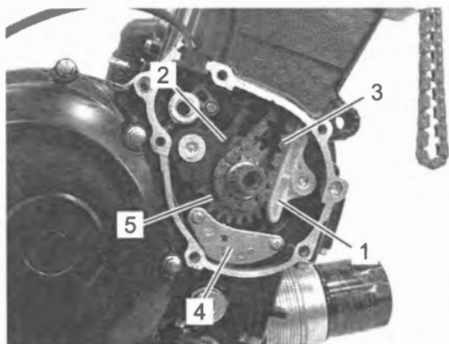
Remove the starter motor. ⚙️ (Page 11-5)

Starter Idle Gear / Starter Clutch

Remove the starter idle gear No.1, No.2 and starter clutch. ⚙️ (Page 11-9)

Cam Chain Guide No.1 / Cam Chain Tensioner / Cam Chain / CKP Sensor / Cam Chain Drive Sprocket

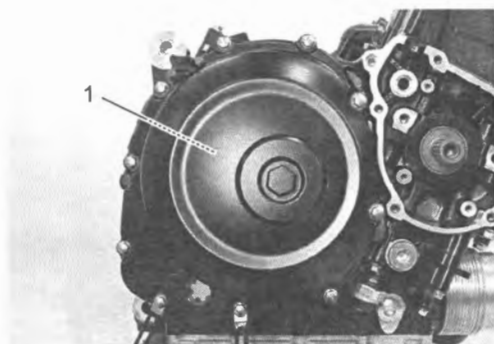
- 1) Remove the cam chain guide No.1 (1). (Page 1D-39)
- 2) Remove the cam chain tensioner (2). (Page 1D-39)
- 3) Remove the cam chain (3).
- 4) Remove the CKP sensor (4). (Page 1C-14)
- 5) Remove the cam chain drive sprocket (5).



IF04K1140175-01

Clutch

Remove the clutch component parts (1). (Page 5C-14)



IF04K1140176-02

Generator

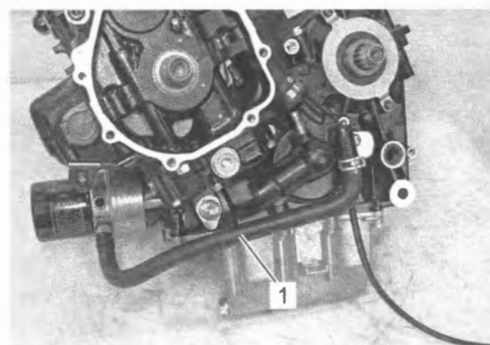
Remove the generator cover (1) and rotor. Refer to "Generator Removal" in Section 1J (Page 1J-4).



IF04K1140177-01

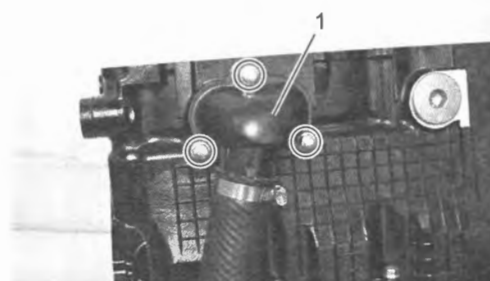
Water Hose / Water Pump

- 1) Remove the oil cooler water inlet hose (1).



IF04K1140178-01

- 2) Remove the water inlet connector (1).



IF04K1140179-01

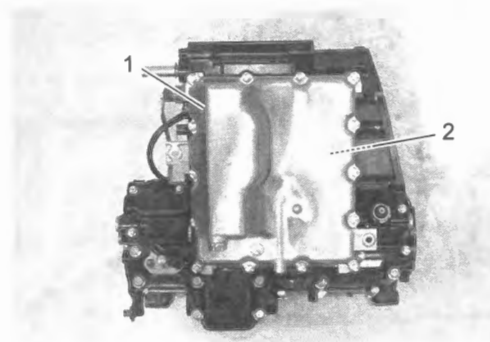
- 3) Remove the water pump. (Page 1F-16)

Oil Filter / Oil Cooler

- 1) Remove the oil filter. (Page 1E-6)
- 2) Remove the oil cooler. (Page 1E-10)

Oil Pan

Remove the oil pan (1) and gasket (2). (Page 1E-6)



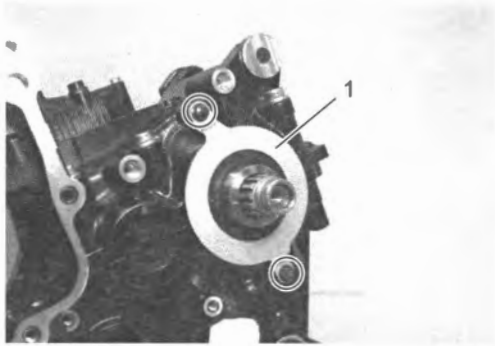
IF04K1140180-01

Oil Strainer

Remove the oil strainer and oil gallery pipe. (Page 1E-6)

Lower Crankcase

- 1) Remove the driveshaft oil seal retainer (1).

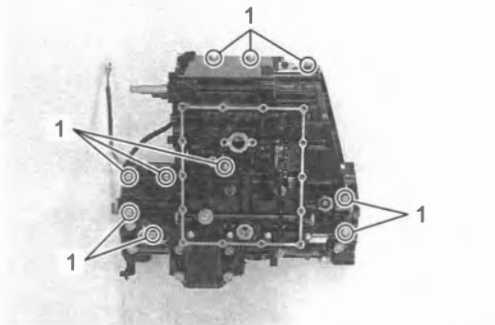


IF04K1140181-01

- 2) Remove the crankcase lower bolts (M6) (1).

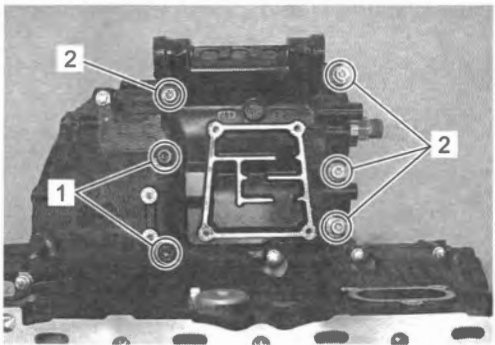
NOTE

Loosen the crankcase bolts diagonally and smaller size ones first.



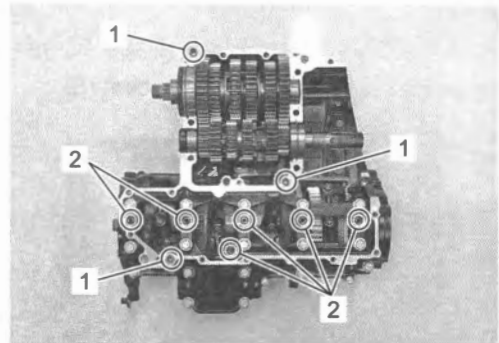
IF04K1140182-02

- 3) Remove the crankcase upper bolts (M8) (1) and crankcase middle bolts (M8) (2).



IF04K1140183-02

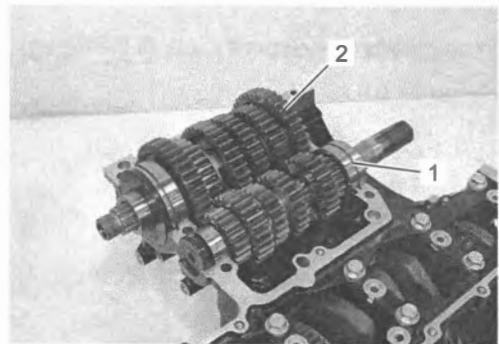
- 4) Make sure that all of the bolts are removed. Then, tap the sides of the lower crankcase using a plastic hammer to separate the middle and lower crankcase halves and then lift the lower crankcase off the middle crankcase.
- 5) Remove the dowel pins (1) and O-rings (2).



IF04K1140184-01

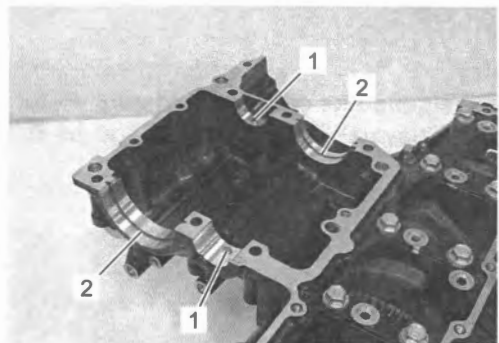
Transmission

- 1) Remove the driveshaft assembly (1) and countershaft assembly (2). (Page 5B-3)



IF04K1140185-01

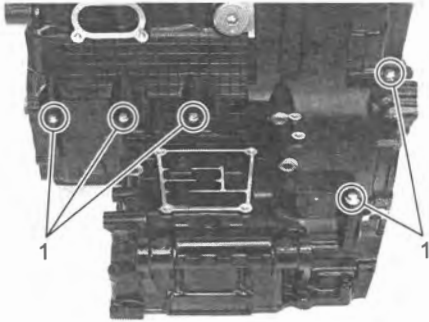
- 2) Remove the pins (1) and C-rings (2).



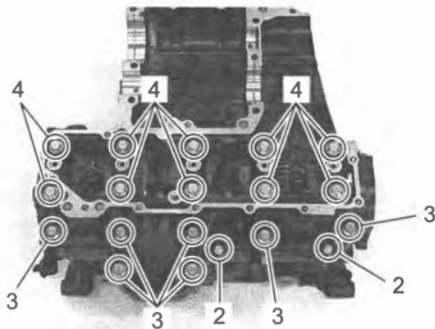
IF04K1140186-01

Middle Crankcase

- 1) Remove the crankcase upper bolts (M6) (1).
- 2) Remove the crankcase middle bolts (M6) (2), crankcase middle bolts (M8) (3) and crankcase middle bolts (M9) (4).

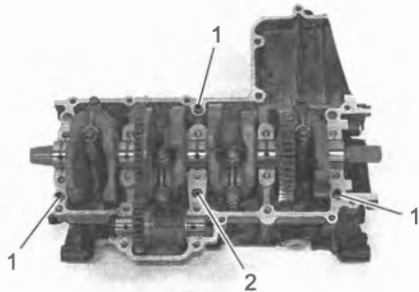


IF04K1140187-01



IF04K1140188-02

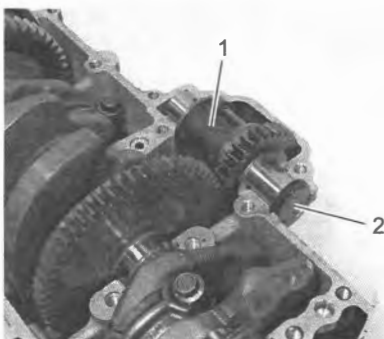
- 3) Remove the dowel pins (1) and O-ring (2).



IF04K1140189-01

Balancer Shaft

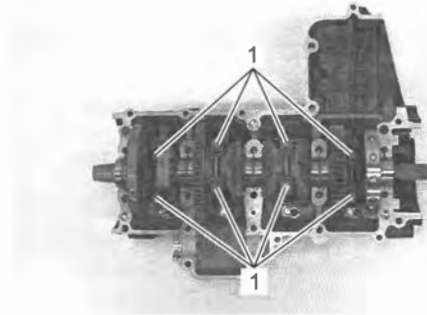
Remove the balancer shaft assembly (1) and plug (2).



IF04K1140322-01

Crankshaft

- 1) Loosen the conrod cap bolts (1).



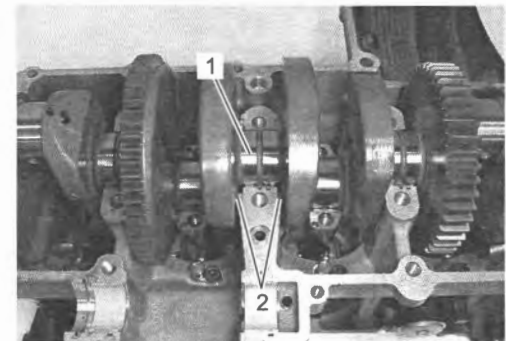
IF04K1140190-01

- 2) Remove the conrod caps (1) by tapping the bolts (2) lightly with a plastic hammer.



IF04K1140191-01

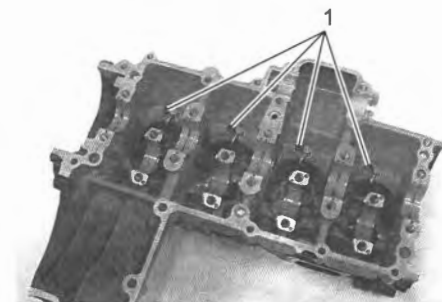
- 3) Remove the crankshaft (1) and thrust bearings (2).



IF04K1140192-01

Piston Cooling Jet

Remove the piston cooling jets (1). (Page 1E-12)



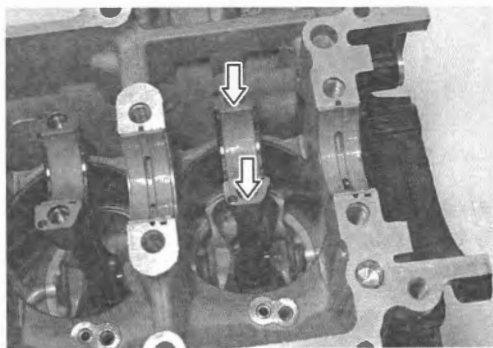
IF04K1140193-01

Piston / Conrod

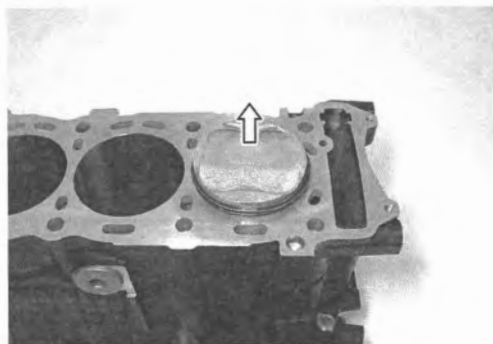
- 1) Push the conrod to cylinder head side and remove the piston and conrod from the upper crankcase.

NOTICE

Be careful not to damage the cylinder wall by the conrod.

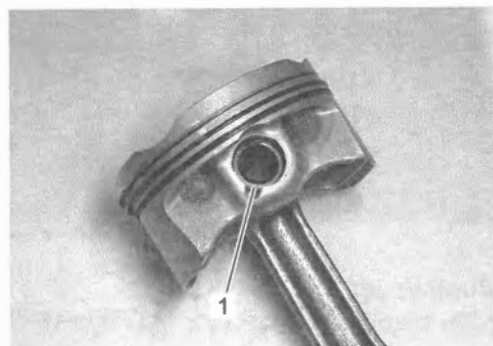


IF04K1140194-01



IF04K1140195-01

- 2) Remove the piston pin circlip (1).

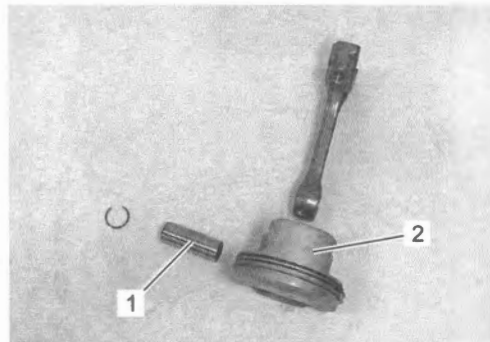


IF04K1140196-01

- 3) Draw out the piston pin (1) and piston (2).

NOTE

Scribe the cylinder number on the piston head.



IF04K1140197-01

Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation

BENK07L21406036

Piston / Conrod

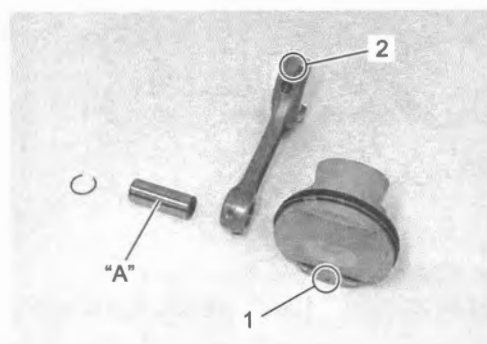
- 1) Apply a small quantity of molybdenum oil solution onto each piston pin.

"A": Assembly lubrication (Molybdenum oil solution)

- 2) Assemble the piston and conrod.

NOTE

When installing the pistons, the indent (1) on the piston head must be brought to the other side of I.D. code (2) on the conrod big end.

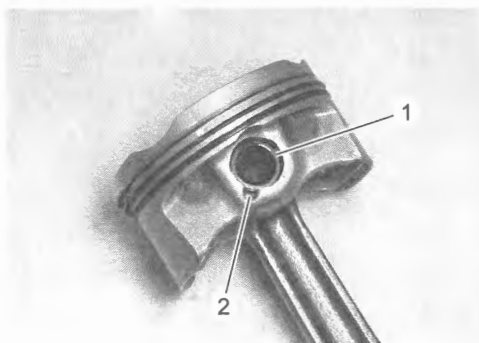


IF04K1140198-01

3) Install the new piston pin circlips (1).

NOTE

End gap of the circlip (1) should not be aligned with the cutaway (2) in the piston pin bore.



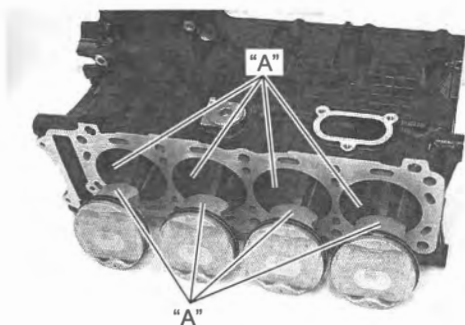
IF04K1140199-01

4) Apply a small quantity of molybdenum oil solution to the sliding surface of the pistons and cylinder walls.

NOTE

Be sure to install the pistons in the cylinders from which they were removed in disassembly, referring to the cylinder numbers, #1 through #4, scribed on the piston.

“A”: Assembly lubrication (Molybdenum oil solution)



IF04K1140200-01

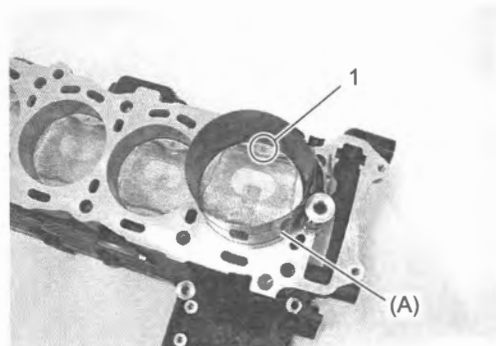
5) Install the pistons with conrods into the cylinders from topside using the special tool.

NOTE

When installing the pistons, the indent (1) of each piston head must be brought to the exhaust side.

Special tool

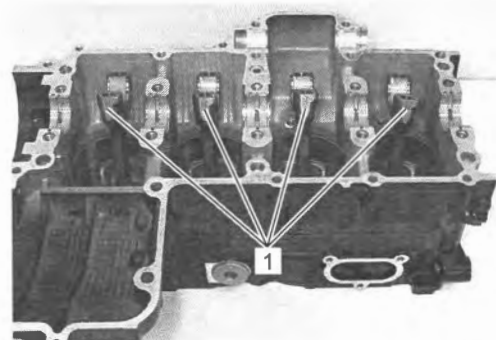
(A): 09916-77310



IF04K1140201-01

6) Clean each conrod big end.

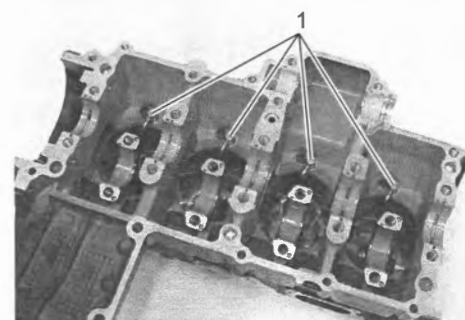
7) Check that I.D. code (1) on each conrod faces intake side.



IF04K1140202-01

Piston Cooling Jet

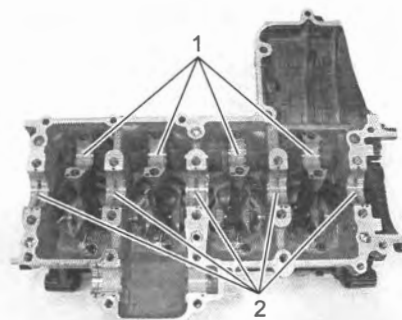
Install each position cooling jets (1). (Page 1E-12)



IF04K1140203-01

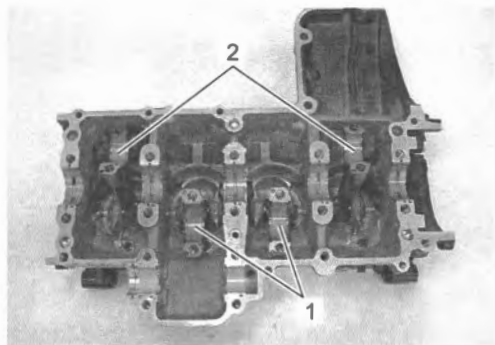
Crankshaft

1) Apply engine oil to each crank pin bearing surface (1) and crankshaft journal bearing surface (2).



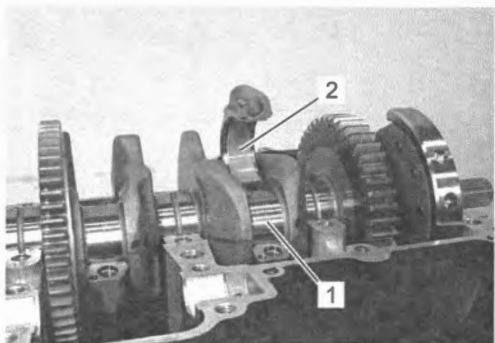
IF04K1140204-01

- 2) Position the #2 and #3 conrod big ends (1) on the same side, and the #1 and #4 conrod big ends (2) on the opposite side of #2 and #3.



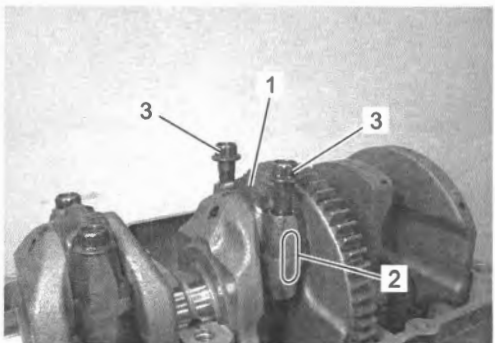
IF04K1140205-01

- 3) Set the crankshaft onto the conrods and upper crankcase.
- 4) Clean each conrod big end.
- 5) Apply engine oil to each crank pin (1) and bearing surface (2).



IF04K1140207-01

- 6) When fitting the conrod cap (1), make sure that I.D. code (2) on each conrod faces intake side.
- 7) Apply engine oil to the flange and thread portion of the conrod cap bolts (3).

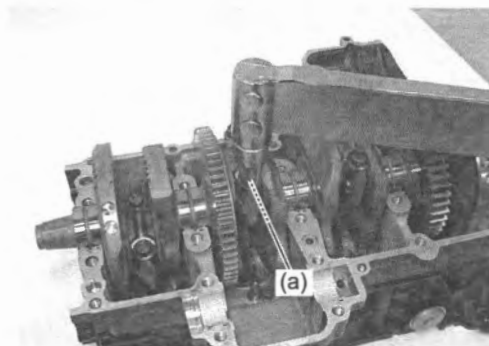


IF04K1140208-01

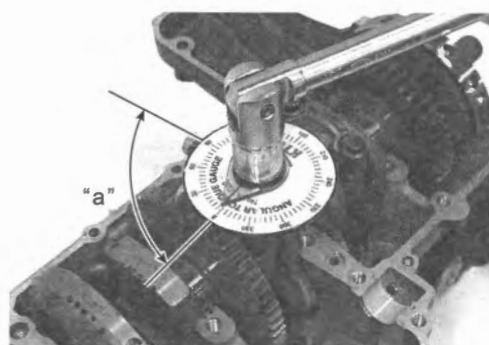
- 8) Tighten the conrod cap bolt by using a 10 mm, 12 point socket wrench in the following two steps.

Tightening torque

Conrod cap bolt (a): 21 N·m (2.1 kgf-m, 15.5 lbf-ft) → turn clockwise 90°



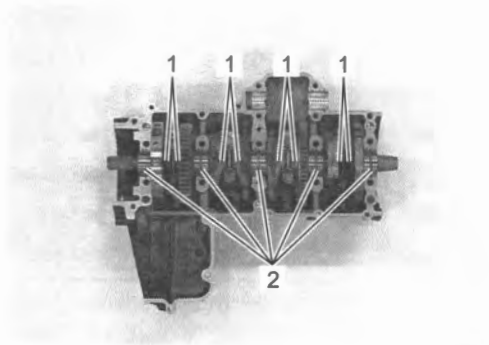
IF04K1140209-01



IF04K1140210-01

"a": 90°

- 9) Apply engine oil to the conrod big end side surfaces (1).
- 10) Apply engine oil to each crankshaft journal (2) and bearing lightly.
- 11) Check the conrod movement for smooth turning.

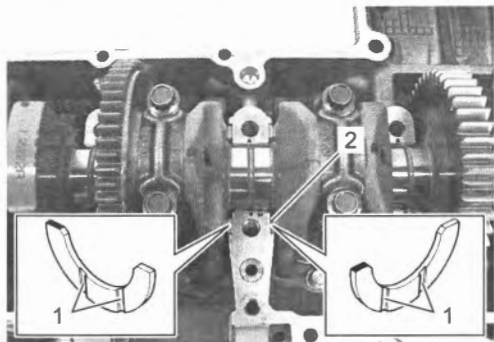


IF04K1140211-01

- 12) Insert the right and left thrust bearings with the oil grooves (1) facing towards the crankshaft web.

NOTE

- Right-thrust bearing (2) has green painting.
- Inspect and select the crankshaft thrust clearance if necessary. ⚙️ (Page 1D-77)



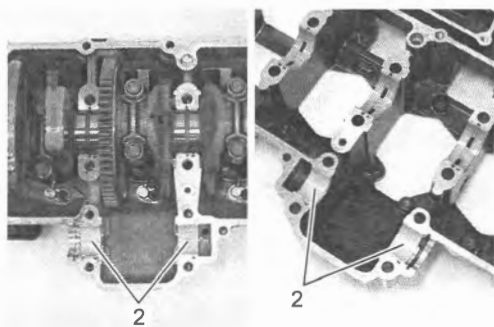
IF04K1140212-02

Balancer Shaft

- 1) Apply a engine oil to each balancer shaft journal (1) and bearing (2) lightly.

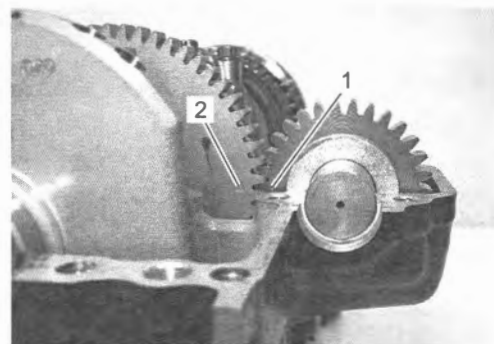


IF04K1140332-01



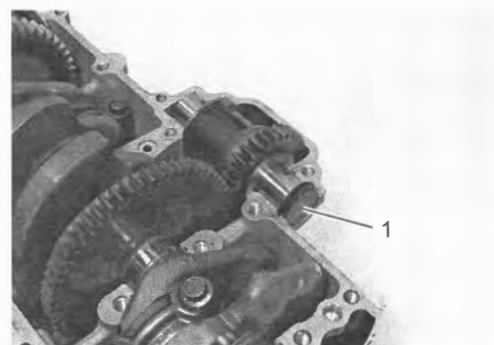
IF04K1140214-02

- 2) Set the balancer shaft so that its punch mark (1) is aligned with the index (2) on the crankshaft.



IF04K1140215-01

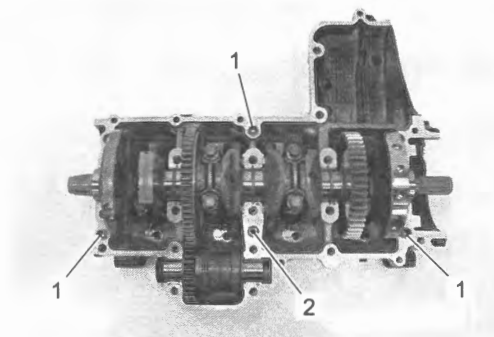
- 3) Install the new plug (1).



IF04K1140216-01

Middle Crankcase

- 1) Install the dowel pins (1) and new O-ring (2).



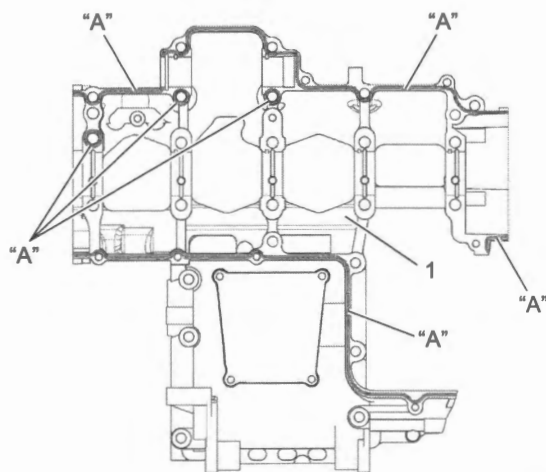
IF04K1140217-01

- 2) Clean the mating surfaces of the upper and middle crankcase halves. Apply sealant to the mating surface of the middle crankcase (1).

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 a few minutes.
- Take extreme care not to apply sealant to any oil hole, oil groove and bearing.
- Apply sealant to distorted surfaces as it forms a comparatively thick film.

“A”: Sealant 99000-31140 (SUZUKI BOND 1207B)



IF04K1140218-01

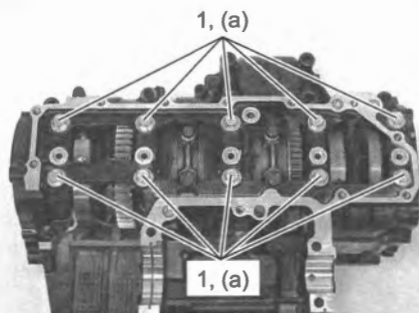
- 3) Match the upper and middle crankcases.
- 4) Tighten the crankcase middle bolts (M9) (1). Tighten each bolt a little at a time to equalize the pressure in following steps.

NOTE

The ascending order of numbers are indicated on the middle crankcase.

Tightening torque

Crankcase middle bolt (M9) (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft) → turn clockwise 50°



IF04K1140219-02

- 5) Install the crankcase middle bolt (M8) (1) with left under cowling front bracket (2).
- 6) Tighten the crankcase middle bolts (M8) (1) and (3) to the specified torque in the following two steps.

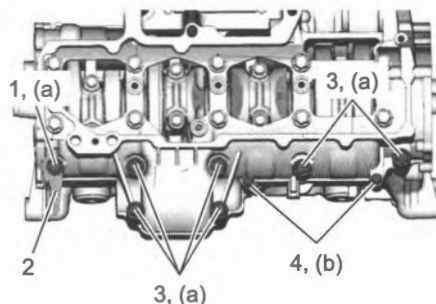
Tightening torque

Crankcase middle bolt (M8) (a): 15 → 26 N·m (1.5 → 2.7 kgf-m, 11.0 → 19.5 lbf-ft)

- 7) Tighten the crankcase middle bolts (M6) (4) to the specified torque.

Tightening torque

Crankcase middle bolt (M6) (b): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)

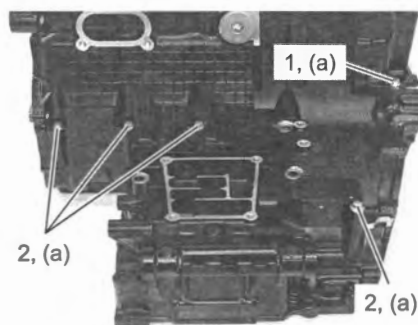


IK07L1140028-01

- 8) Install the new gasket washer to the crankcase upper bolt (M6) (1).
- 9) Tighten the crankcase upper bolts (M6) (1) and (2) to the specified torque.

Tightening torque

Crankcase upper bolt (M6) (a): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)



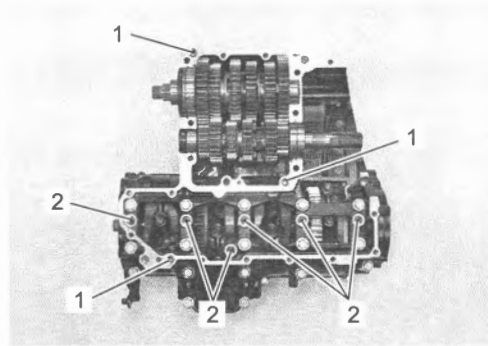
IF04K1140221-01

Transmission

Install the transmission. ☞ (Page 5B-3)

Lower Crankcase

- 1) Install the dowel pins (1) and new O-rings (2).



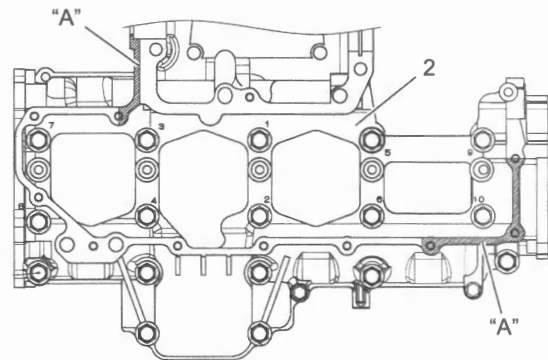
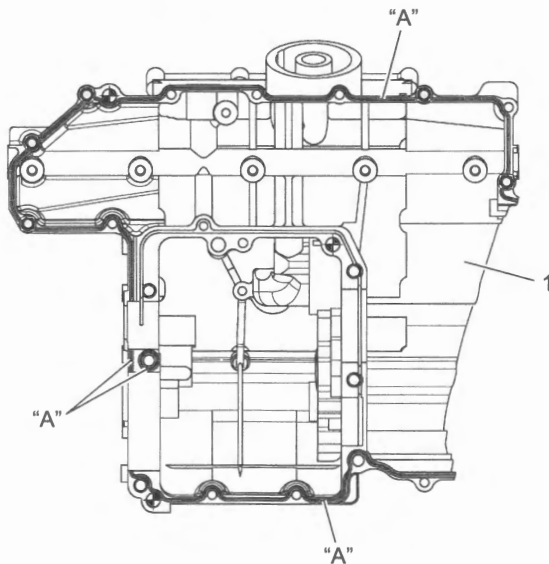
IF04K1140222-01

- 2) Clean the mating surfaces of lower and middle crankcase halves. Apply sealant to the mating surface of the lower crankcase (1) and middle crankcase (2).

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 99000-31140 (SUZUKI BOND 1207B)

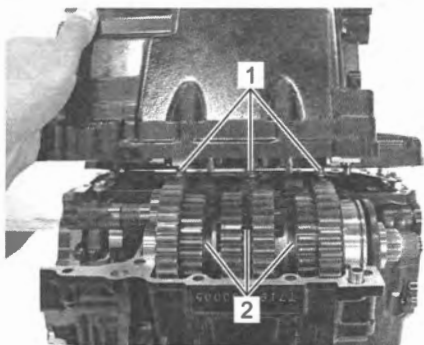


IF04K1140223-03

3) Match the middle and lower crankcase.

NOTE

Align each gearshift fork (1) with its groove (2).



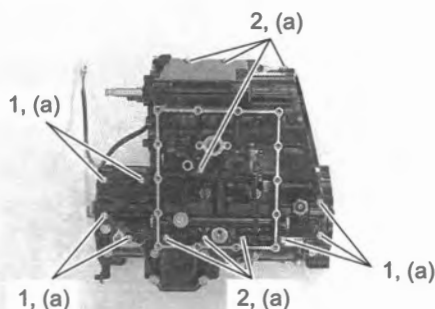
IF04K1140224-01

4) Install the new gaskets to the crankcase lower bolts (M6) (1).

5) Tighten the crankcase lower bolts (M6) (1) and (2) to the specified torque.

Tightening torque

Crankcase lower bolt (M6) (a): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)



IF04K1140225-01

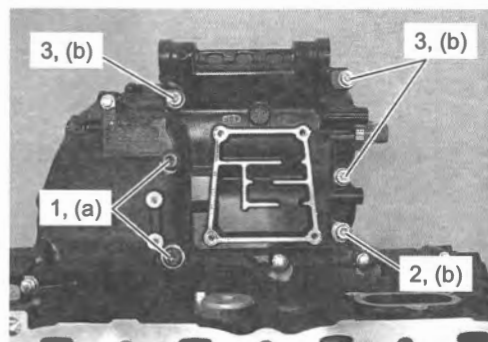
6) Install the new gaskets to the crankcase upper bolts (M8) (1) and crankcase middle bolt (M8) (2).

7) Tighten the bolts (1), (2) and (3) to the specified torque in the following two steps.

Tightening torque

Crankcase upper bolt (M8) (a): 15 → 26 N·m (1.5 → 2.7 kgf-m, 11.0 → 19.5 lbf-ft)

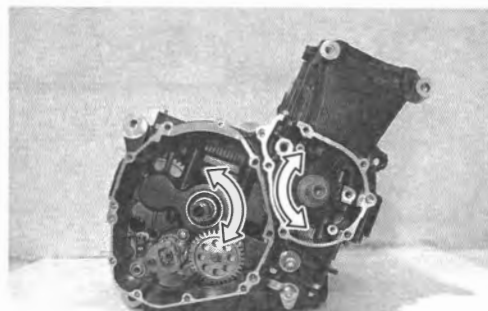
Crankcase middle bolt (M8) (b): 15 → 26 N·m (1.5 → 2.7 kgf-m, 11.0 → 19.5 lbf-ft)



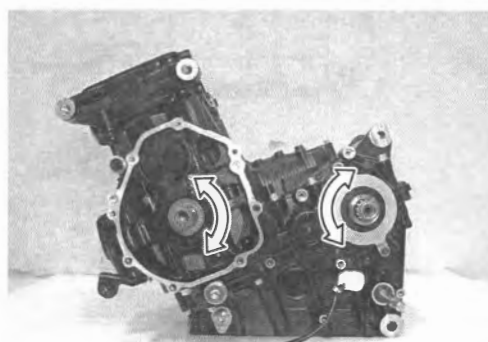
IF04K1140226-01

8) After crankcase bolts have been tightened, check that the crankshaft rotates smoothly.

9) Also check that the driveshaft and countershaft rotate smoothly.



IF04K1140227-02



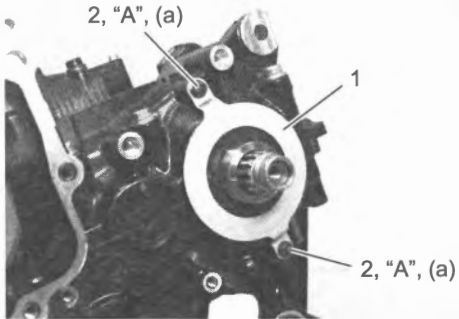
IF04K1140228-02

- 10) Install the driveshaft oil seal retainer (1).
- 11) Apply thread lock to the bolts (2) and tighten them to the specified torque.

“A”: Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

Driveshaft oil seal retainer bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1140229-01

Oil Strainer

Install the oil strainer and oil gallery pipe. (Page 1E-6)

Oil Pan

Install the new gasket and oil pan. (Page 1E-6)

Oil Cooler / Oil Filter

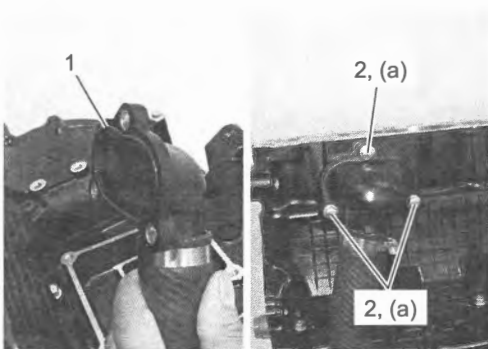
Install the oil cooler and oil filter. Refer to “Oil Cooler Removal and Installation” in Section 1E (Page 1E-10) and “Oil Filter Replacement” in Section 1E (Page 1E-6).

Water Pump / Water Hose

- 1) Install the water pump assembly. (Page 1F-16)
- 2) Apply engine coolant to the new O-ring (1).
- 3) Tighten the water inlet connector mounting bolts (2) to the specified torque.

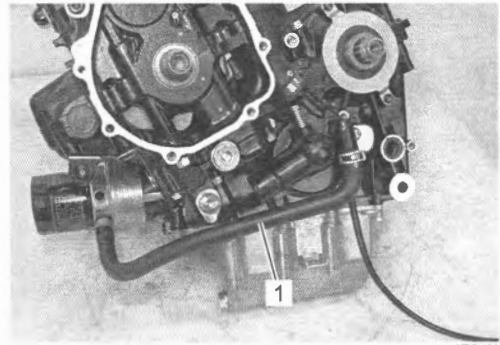
Tightening torque

Water inlet connector mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1140231-01

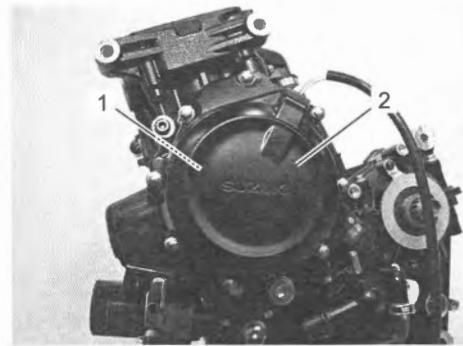
- 4) Install the oil cooler water inlet hose (1). (Page 1F-2)



IF04K1140230-01

Generator

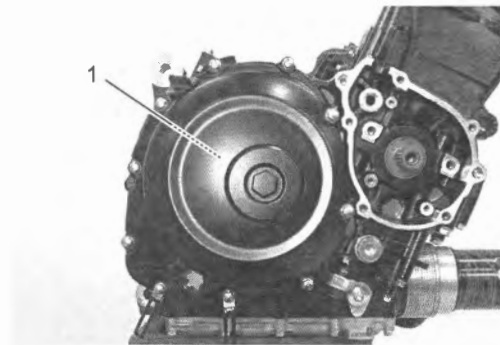
Install the generator rotor (1) and cover (2). Refer to “Generator Installation” in Section 1J (Page 1J-5).



IF04K1140232-01

Clutch

Install the clutch component parts (1). (Page 5C-17)



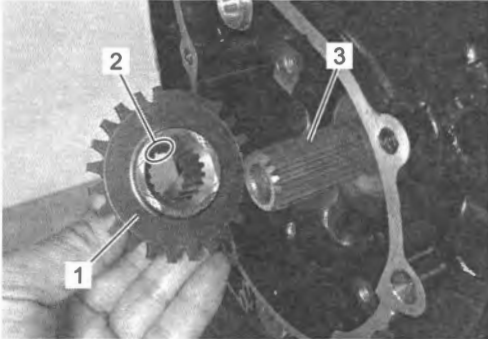
IF04K1140233-02

Cam Chain Drive Sprocket / CKP Sensor / Cam Chain / Cam Chain Tensioner / Cam Chain Guide No.1

1) Install the cam chain drive sprocket (1).

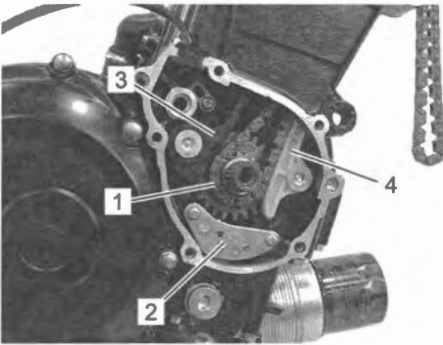
NOTE

When installing the cam chain drive sprocket, align the wide spline tooth (2) and (3).



IF04K1140234-02

- 2) Install the cam chain (1).
- 3) Install the CKP sensor (2). (Page 1C-14)
- 4) Install the cam chain tensioner (3) and cam chain guide No.1 (4). (Page 1D-39)



IF04K1140235-01

Starter Clutch / Starter Idle Gear

Install the starter clutch and starter idle gear No.1, No.2. (Page 1I-9)

Starter Motor

Install the starter motor. (Page 1I-5)

PCV Cover

Install the PCV cover. (Page 1B-11)

Cylinder Head

Install the cylinder head assembly. (Page 1D-38)

Cylinder Inspection

BENK07L21406037

Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47) and "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51).

Cylinder Distortion

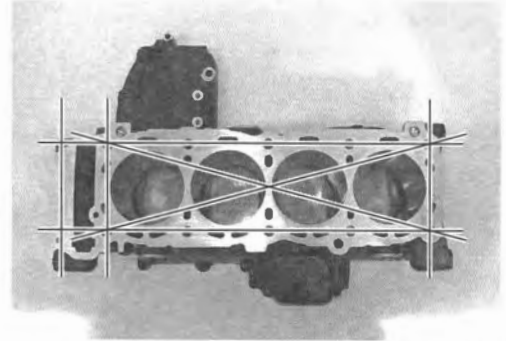
Check the gasket surface of the cylinder for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If any reading exceeds the service limit, replace the crankcase set.

Cylinder distortion

[Limit]: 0.20 mm (0.0078 in)

Special tool

09900-20803



IF04K1140236-01

Cylinder Bore

Measure the cylinder bore diameter at six places. If any one of the measurements exceed the limit, overhaul the cylinder and replace the piston with an oversize piston. The remaining cylinders must also be rebored accordingly; otherwise, the imbalance might cause excessive vibration.

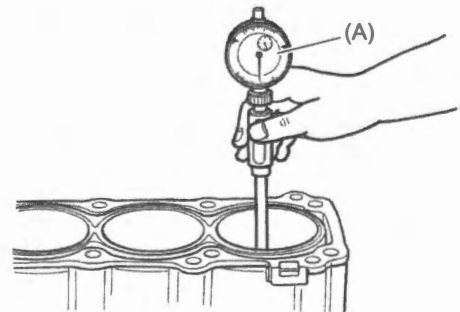
Cylinder bore

[Standard]: 73.400 – 73.415 mm (2.8898 – 2.8903 in)

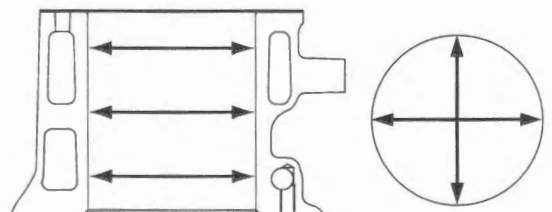
[Limit]: No nicks or Scratches

Special tool

(A): 09900-20530



IF04K1140327-02



I837H1140180-01

Piston to Cylinder Clearance

Refer to "Piston / Piston Ring Inspection" (Page 1D-61).

Piston Ring Removal and Installation

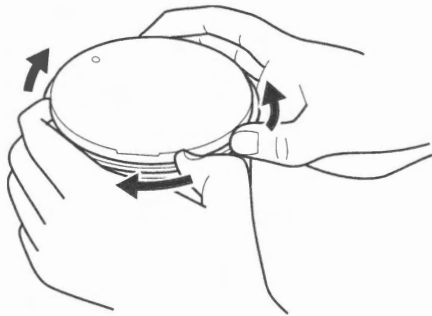
BENK07L21406038

Removal

- 1) Remove the piston. Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47).
- 2) Carefully spread the ring opening with your thumbs and then push up the opposite side of the 1st ring to remove it.

NOTE

Do not expand the piston ring excessively since it is apt to be broken down.



I837H1140181-01

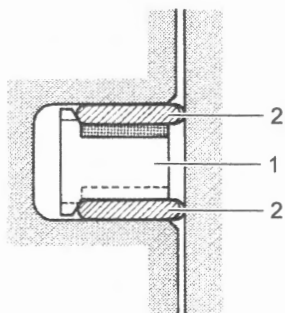
- 3) Remove the 2nd ring and oil ring in the same manner.

Installation

NOTE

- When installing the piston ring, be careful not to damage the piston.
- Do not expand the piston ring excessively since it is apt to be broken down.

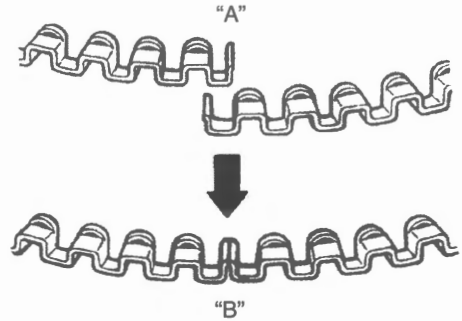
- 1) Install the piston rings in the order of the oil ring, 2nd ring and 1st ring.
 - a) The first member to go into the oil ring groove is the spacer (1). After placing the spacer, fit the two side rails (2).



IF04K1140328-02

NOTICE

When installing the spacer, be careful not to allow its two ends to overlap in the groove.



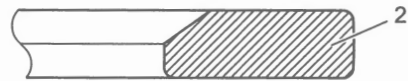
I705H1140170-02

"A": INCORRECT "B": CORRECT

- b) Install the 2nd ring (1) and 1st ring (2) to piston.

NOTE

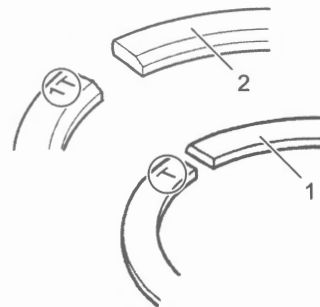
1st ring (2) and 2nd ring (1) differ in shape.



IF04K1140237-01

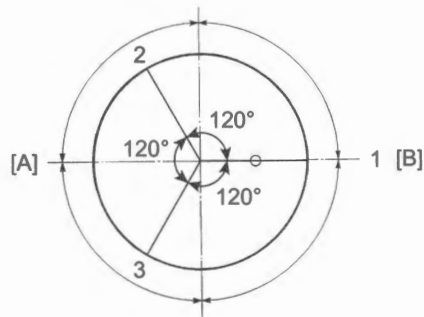
NOTE

Face the side with the stamped mark upward when assembling.



IF04K1140238-01

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.



IF04K1140239-02

[A]:	EX
[B]:	IN
1.	1st ring and spacer
2.	Upper side rail
3.	2nd ring and lower side rail

3) Install each piston and piston pin. (Page 1D-51)

Piston / Piston Ring Inspection

BENK07L21406039

Refer to "Piston Ring Removal and Installation" (Page 1D-60).

Piston Diameter

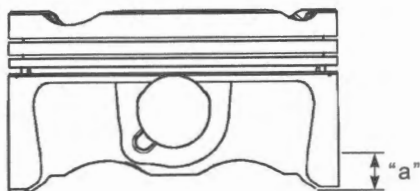
Measure the piston diameter using the micrometer at 8 mm (0.3 in) "a" from the skirt end. If the piston diameter is less than the service limit, replace the piston.

Piston diameter

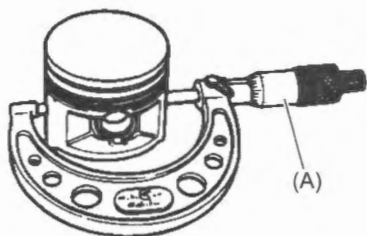
Measure at 8 mm (0.3 in) from the skirt end.
 [Limit]: 73.280 mm (2.8851 in)

Special tool

(A): 09900-20203



IF04K1140240-01



IF04K1140241-01

Piston to Cylinder Clearance

Subtract the piston diameter from the cylinder bore diameter. If the piston to cylinder clearance exceeds the service limit, replace both the cylinder and the piston.

Piston to cylinder clearance

[Limit]: 0.120 mm (0.0047 in)

Piston Ring to Groove Clearance

Measure the side clearances of the 1st and 2nd piston rings using the thickness gauge. If any of the clearances exceed the limit, replace both the piston and piston rings.

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]: 0.81 – 0.83 mm (0.0319 – 0.0326 in)

2nd [Standard]: 0.81 – 0.83 mm (0.0319 – 0.0326 in)

Oil [Standard]: 1.51 – 1.53 mm (0.0595 – 0.0602 in)

Piston ring thickness

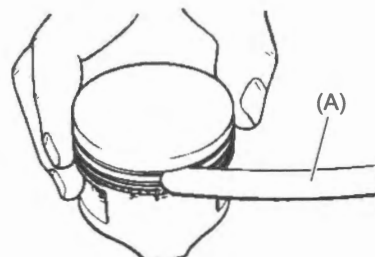
1st [Standard]: 0.77 – 0.79 mm (0.0304 – 0.0311 in)

2nd [Standard]: 0.77 – 0.79 mm (0.0304 – 0.0311 in)

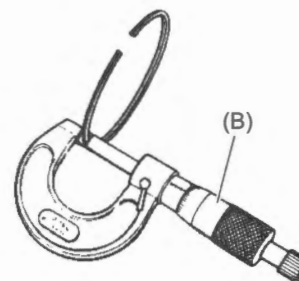
Special tool

(A): 09900-20803

(B): 09912-66310



IF04K1140242-01



IF04K1140243-01

Piston Ring Free End Gap and Piston Ring End Gap

Measure the piston ring free end gap using vernier calipers. Next, fit the piston ring squarely into the cylinder and measure the piston ring end gap using the thickness gauge. If any of the measurements exceed the service limit, replace the piston ring with a new one.

Piston ring free end gap

1st [Limit]: 7.2 mm (0.29 in)

2nd [Limit]: 6.4 mm (0.26 in)

Piston ring end gap

1st [Limit]: 0.50 mm (0.019 in)

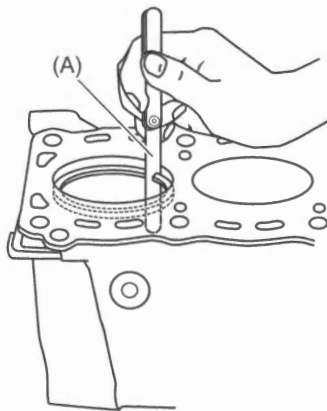
2nd [Limit]: 0.50 mm (0.019 in)

Special tool

(A): 09900-20803



IK46K1140139-01



IK07L1140017-01

Piston Pin and Pin Bore

Measure the piston pin bore inside diameter using the small bore gauge. If either is out of specification or the difference between these measurements surpasses limits, replace the piston.

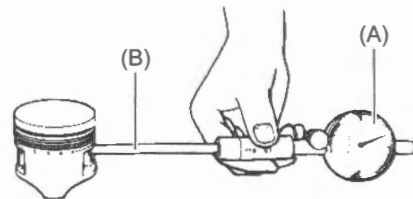
Piston pin bore I.D.

[Limit]: 16.030 mm (0.6311 in)

Special tool

(A): 09900-20602

(B): 09900-22401



IF04K1140246-01

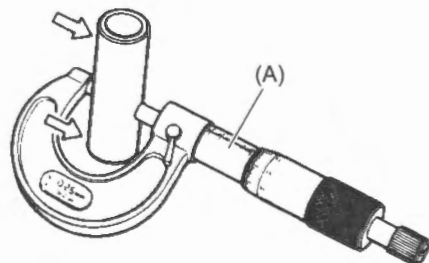
Measure the piston pin outside diameter at three positions using the micrometer. If any of the measurements are out of specification, replace the piston pin.

Piston pin O.D.

[Limit]: 15.980 mm (0.6292 in)

Special tool

(A): 09912-66310



IF04K1140323-02

Upper Crankcase / Middle Crankcase / Lower Crankcase Disassembly and Reassembly

BENK07L21406040

Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47) and "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51).

Disassembly

Crankshaft journal bearing

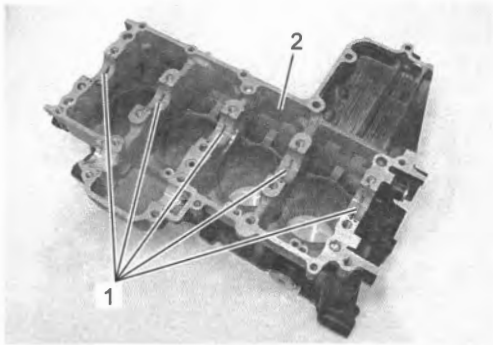
Remove the crankshaft journal bearings (1).

NOTICE

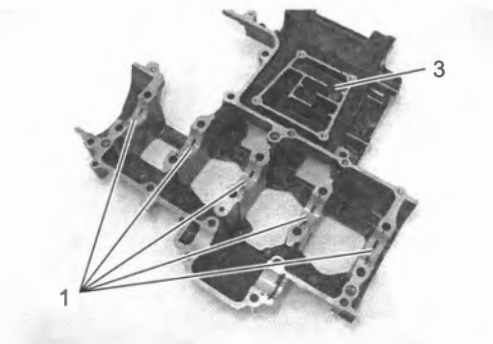
- When removing the crankshaft journal bearings, be careful not to scratch the crankcase and the crankshaft journal bearings.
- Do not touch the bearing surfaces with your hands. Grasp the bearings by their edges.

NOTE

- Do not remove the crankshaft journal bearings unless absolutely necessary.
- Make a note of where the crankshaft journal bearings are removed from so that they can be reinstalled in their original positions.



IF04K1140247-02



IF04K1140248-01

2. Upper crankcase

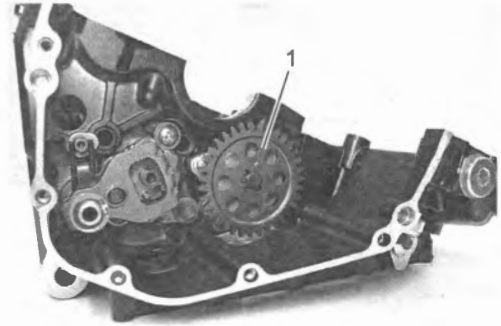
3. Middle crankcase

Balancer shaft bearing

Remove the balancer shaft bearings. ⚙️ (Page 1D-68)

Oil pump

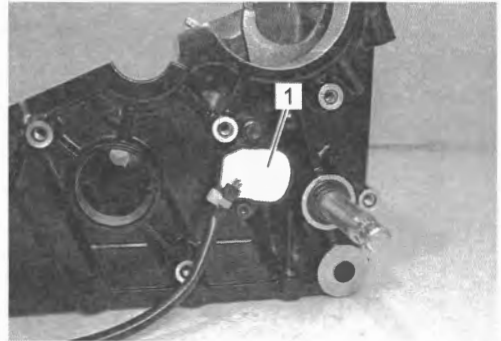
Remove the oil pump (1). ⚙️ (Page 1E-13)



IF04K1140249-01

GP switch

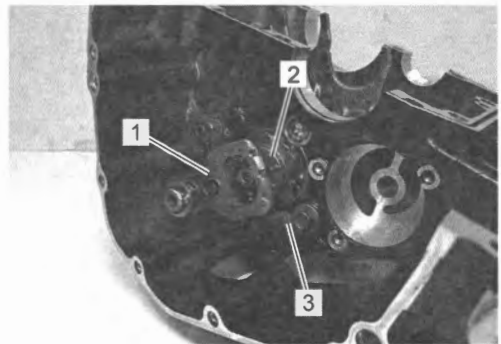
Remove the GP switch (1). ⚙️ (Page 5B-13)



IF04K1140250-01

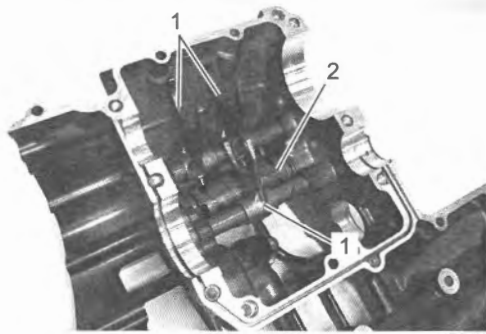
Gearshift system

1) Remove the gearshift shaft (1), gearshift cam plate (2) and gearshift cam stopper (3). ⚙️ (Page 5B-18)



IF04K1140251-01

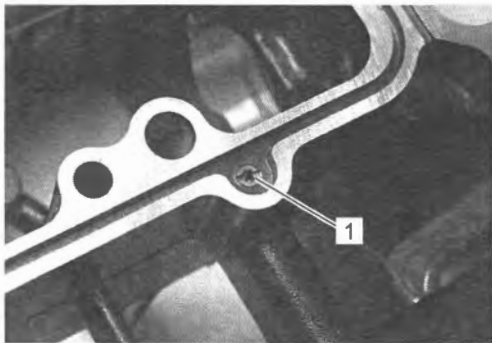
- 2) Remove the gearshift forks (1) and gearshift cam (2).
 ⌚ (Page 5B-3)



IF04K1140252-01

Oil jet

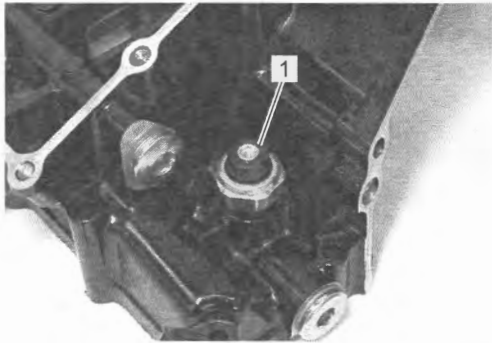
- Remove the oil jet (1) (for transmission). ⌚ (Page 1E-12)



IF04K1140253-01

Oil pressure switch

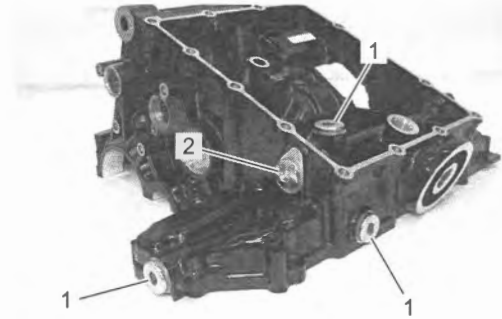
- Remove the oil pressure switch (1). ⌚ (Page 1E-10)



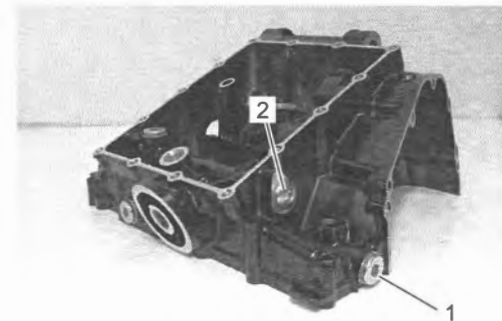
IF04K1140254-01

Oil gallery plug

- 1) Remove the oil gallery plugs (1).
 2) Remove the oil gallery lower plugs (2).

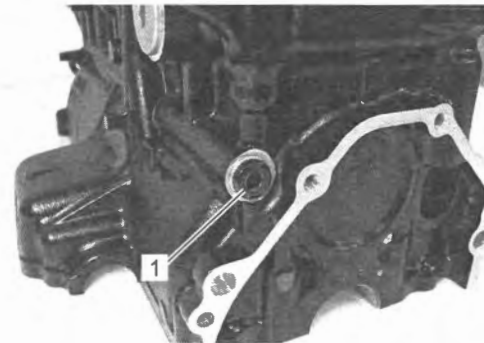


IF04K1140255-01



IF04K1140256-01

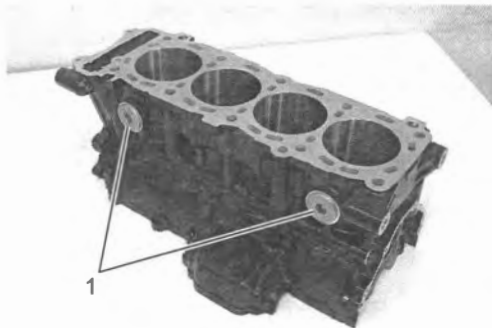
- 3) Remove the oil gallery upper plug (M10) (1).



IF04K1140257-01

Water jacket plug

Remove the water jacket plugs (1).



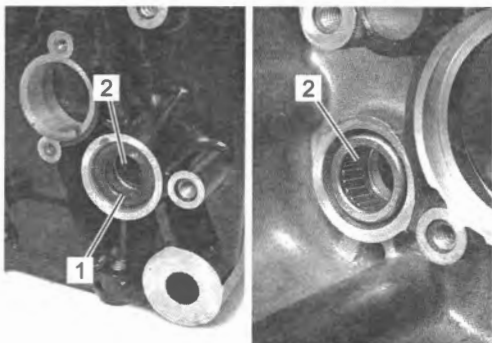
IF04K1140258-01



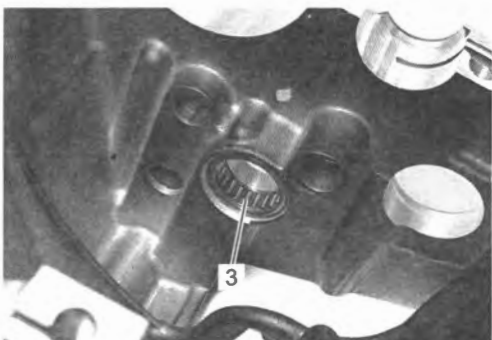
IF04K1140259-01

Oil seal / bearing

Remove the gearshift shaft oil seal (1), gearshift shaft bearings (2) and gearshift cam bearing (3). (Page 5B-5)



IF04K1140260-01



IF04K1140261-01

Reassembly

Oil seal / bearing

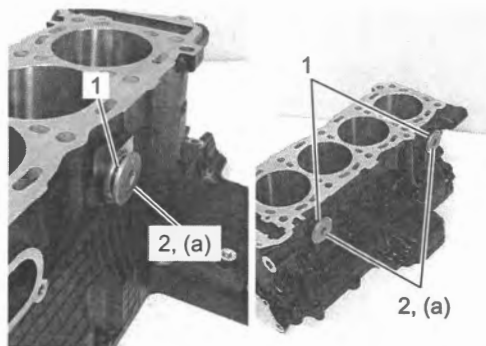
Install the new gearshift cam bearing, new gearshift shaft bearings and new gearshift shaft oil seal. (Page 5B-5)

Water jacket plug

- Apply engine coolant to the new O-rings (1) of the water jacket plugs.
- Tighten each plug (2) to the specified torque.

Tightening torque

Water jacket plug (a): 9.5 N·m (0.97 kgf-m, 7.00 lbf-ft)



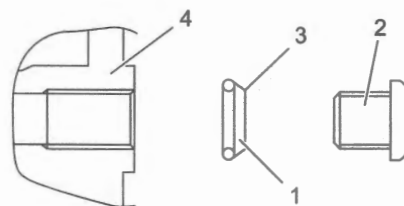
IF04K1140262-01

Oil gallery plug

- 1) Install the new gasket (1) to the oil gallery upper plug (M10) (2).

NOTE

The edge (3) of gasket (1) faces the oil gallery upper plug (M10) (2) side.



IK07L1140026-01

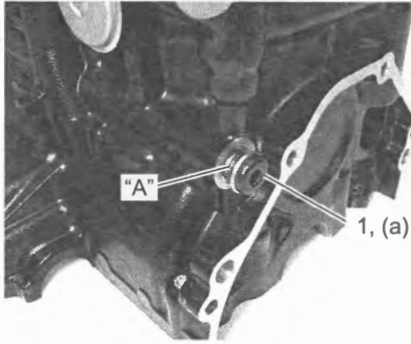
4. Upper crankcase

- 2) Apply thread lock to the oil gallery upper plug (M10) (1) and tighten it to the specified torque.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

Oil gallery upper plug (M10) (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)

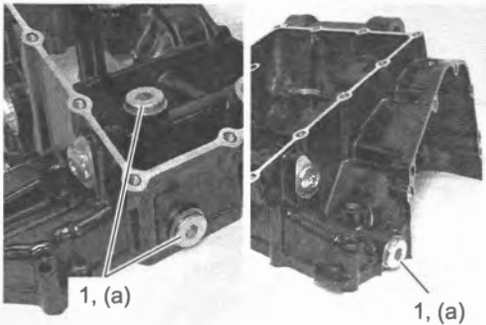


IF04K1140264-01

- 3) Install the new gaskets to the oil gallery plugs.
- 4) Tighten the oil gallery plugs (1) to the specified torque.

Tightening torque

Oil gallery plug (M16) (a): 35 N·m (3.6 kgf-m, 26.0 lbf-ft)

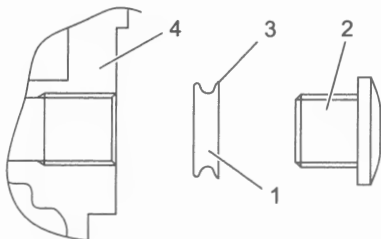


IF04K1140265-02

- 5) Install the new gaskets (1) to the oil gallery lower plugs (2).

NOTE

The edge (3) of gasket (1) faces the oil gallery lower plug (2) side.



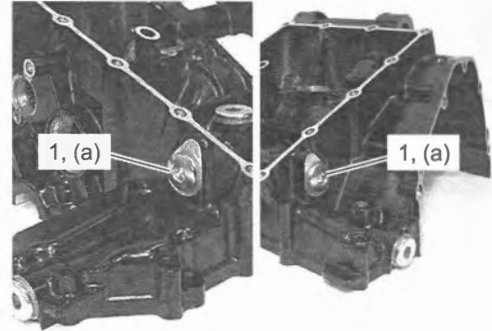
4. Lower crankcase

IK07L1140027-01

- 6) Tighten the oil gallery lower plugs (1) to the specified torque.

Tightening torque

Oil gallery lower plug (M14) (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



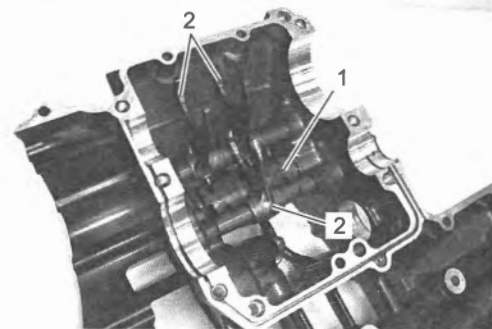
IF04K1140267-02

Oil jet

Install the oil jet (for transmission). (Page 1E-12)

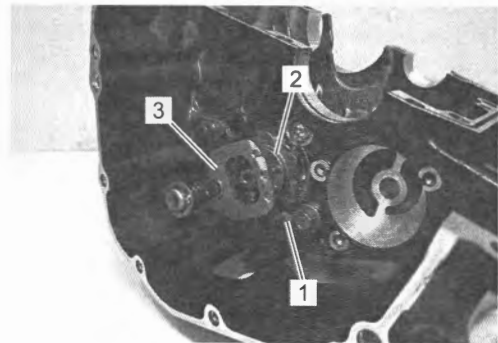
Gearshift system

- 1) Install the gearshift cam (1) and gearshift forks (2). (Page 5B-3)



IF04K1140268-01

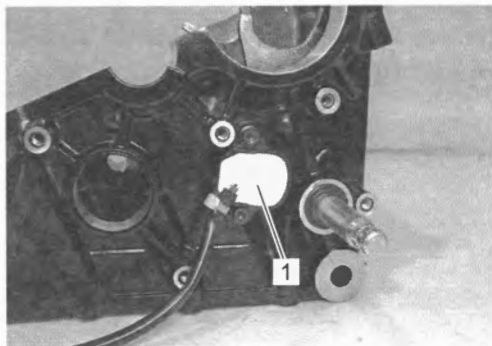
- 2) Install the gearshift cam stopper (1), gearshift cam plate (2) and gearshift shaft (3). (Page 5B-18)



IF04K1140269-01

GP switch

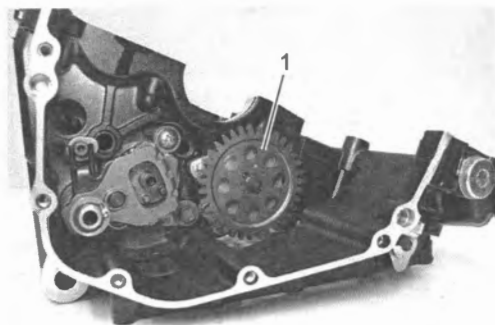
Install the GP switch (1). (Page 5B-13)



IF04K1140270-01

Oil pump

Install the oil pump (1). (Page 1E-13)



IF04K1140271-01

Balancer shaft bearing

Install the balancer shaft bearings. (Page 1D-68)

Crankshaft journal bearing

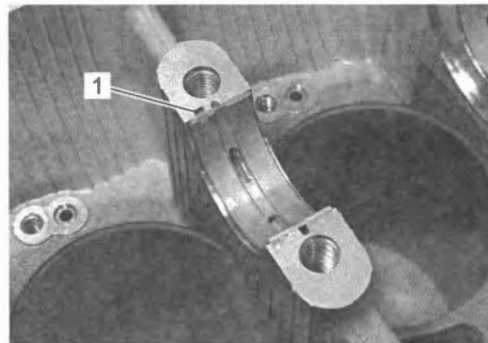
Install the crankshaft journal bearings to the upper and lower crankcases, be sure to fix the stopper part (1) first and press the other end.

NOTICE

- When removing the crankshaft journal bearings, be careful not to scratch the crankcase and the crankshaft journal bearings.
- Do not touch the bearing surfaces with your hands. Grasp the bearings by their edges.

NOTE

- Do not touch the bearing surfaces with your hands. Grasp by the edge of the bearing shell.
- Inspect and select the crankshaft journal bearing if necessary. Refer to "Crankshaft Journal Bearing Inspection and Selection" (Page 1D-75).



IF04K1140272-01

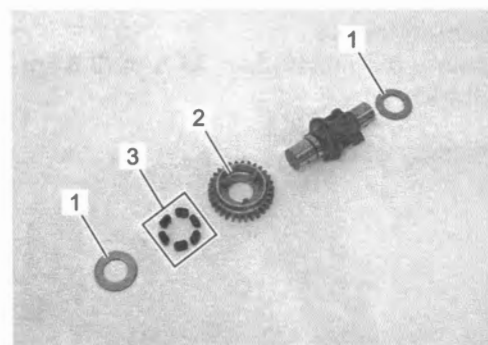
Balancer Shaft Disassembly and Reassembly

BENK07L21406041

Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47).
Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51).

Disassembly

Remove the washers (1), balancer gear (2) and dampers (3).

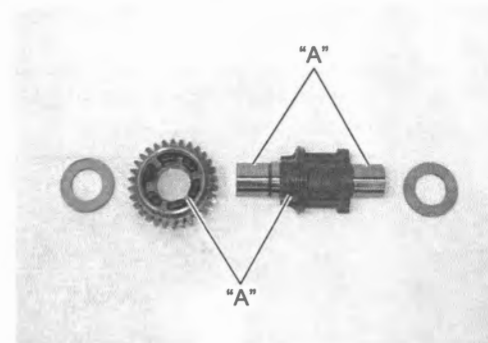


IF04K1140273-01

Reassembly

Reassembly is in the reverse order of disassembly. Pay attention to the following points:

- Apply engine oil to each part "A".

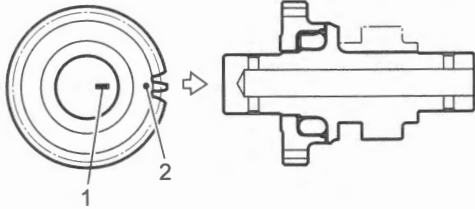


IF04K1140274-01

- Set the dampers and install the balancer shaft to balancer gear.

NOTE

- **Fit the stopper of the balancer shaft between the dampers.**
- **Align the line (1) on the balancer shaft with the punch (2) on the balancer gear.**



IF04K1140275-03

Balancer Shaft Inspection

BENK07L21406042

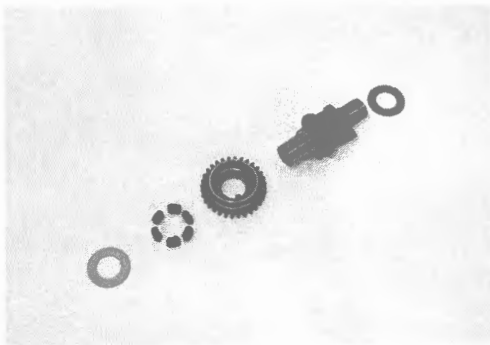
Refer to “Balancer Shaft Disassembly and Reassembly” (Page 1D-67).

Balancer Shaft

Inspect the balancer shaft for wear or damage. Replace the balancer shaft if there is anything unusual.

Damper

Inspect the dampers for wear and damage, replace them if any defects are found.



IF04K1140276-01

Balancer Shaft Journal Bearing Removal and Installation

BENK07L21406043

Refer to “Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal” (Page 1D-47) and “Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation” (Page 1D-51).

Removal

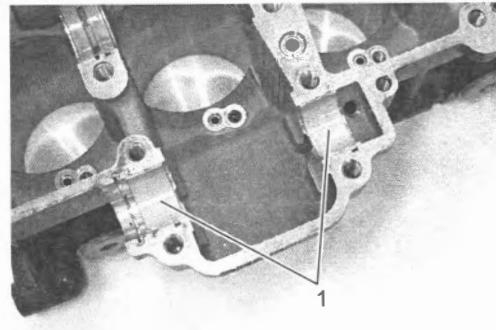
Remove the balancer shaft journal bearings (1).

NOTICE

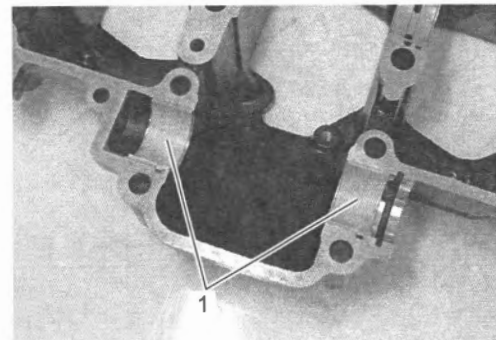
- **When removing the balancer shaft journal bearings, be careful not to scratch the crankcase and the balancer shaft journal bearings.**
- **Do not touch the bearing surfaces with your hands. Grasp the bearings by their edges.**

NOTE

- **Do not remove the bearings (1) unless absolutely necessary.**
- **Make a note of where the bearings are removed from so that they can be reinstalled in their original positions.**



IF04K1140277-01



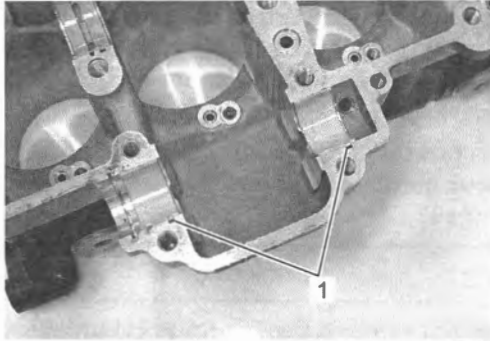
IF04K1140278-01

Installation

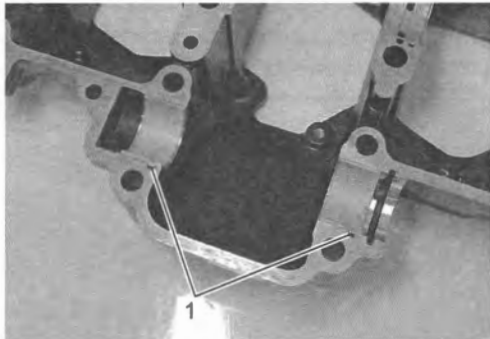
When installing the bearings to the crankcases, be sure to install the tab (1) first, and then press in the other opposite side of the bearing.

NOTE

Inspect and select the balancer shaft journal bearing if necessary. Refer to "Balancer Shaft Journal Bearing Inspection and Selection" (Page 1D-69).



IF04K1140279-02



IF04K1140280-01

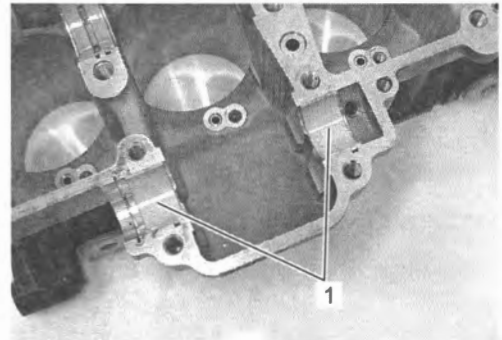
Balancer Shaft Journal Bearing Inspection and Selection

BENK07L21406044

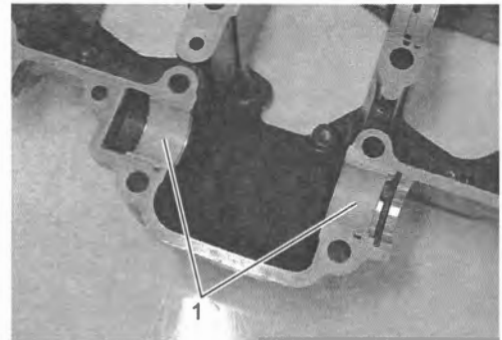
Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47) and "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51).

Inspection

Inspect the bearing surfaces (1) for any signs of fusion, pitting, burn or flaws. If any, replace them with a specified set of bearings.



IF04K1140281-01



IF04K1140282-01

Selection

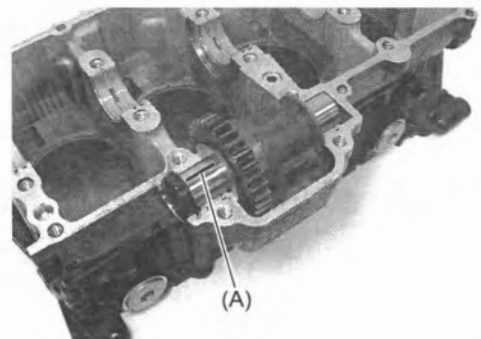
- 1) Place the plastigage axially along the balancer shaft journal as shown.

NOTICE

Never rotate the balancer shaft when a piece of plastigage is installed.

Special tool

(A): 09900-22303



IF04K1140283-01

- 2) Mate the middle crankcase with the upper crankcase, and tighten each crankcase bolt to the specified torque.

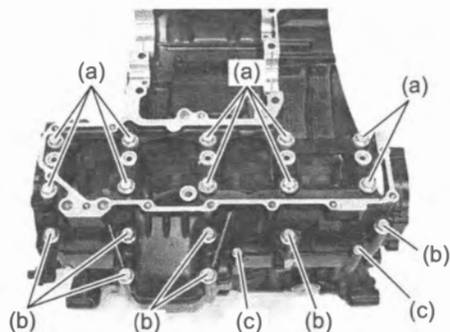
Tightening torque

Crankcase middle bolt (M9) (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft) → turn clockwise 50°

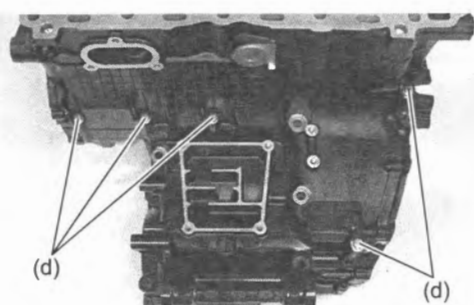
Crankcase middle bolt (M8) (b): 15 → 26 N·m (1.5 → 2.7 kgf-m, 11.0 → 19.5 lbf-ft)

Crankcase middle bolt (M6) (c): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)

Crankcase upper bolt (M6) (d): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)



IF04K1140284-02



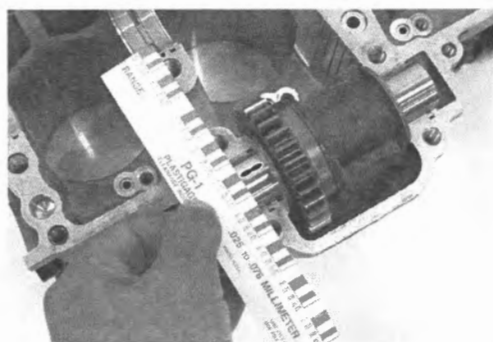
IF04K1140285-02

- 3) Remove the middle crankcase 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.

Balancer journal oil clearance

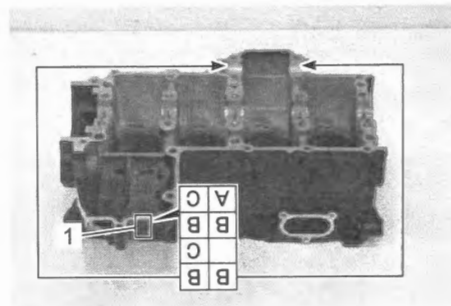
[Standard]: 0.028 – 0.052 mm (0.0011 – 0.0020 in)

[Limit]: 0.080 mm (0.0031 in)



IF04K1140286-01

- 4) Check the corresponding crankcase journal I.D. codes (1), [A] or [B] which is stamped on the rear of upper crankcase.

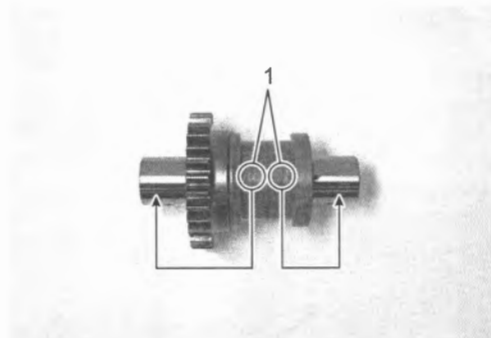


IF04K1140287-01

- 5) Check the corresponding balancer shaft journal O.D. codes (1), [A] or [B] which is stamped on the balancer shaft.

Balancer journal O.D.

[Standard]: 22.976 – 22.992 mm (0.9046 – 0.9051 in)



IF04K1140324-01

Bearing selection table

		Balancer shaft journal O.D.	
		Code	
Crankcase I.D.	A	Green	Black
	B	Black	Brown

IF04K1140325-02

Crankcase I.D. specification

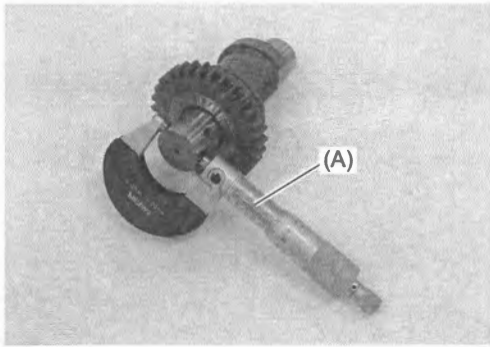
Code	I.D. specification
A	26.000 – 26.008 mm (1.0237 – 1.0239 in)
B	26.008 – 26.016 mm (1.0240 – 1.0242 in)

Balancer shaft journal O.D. specification

Code	O.D. specification
A	22.984 – 22.992 mm (0.9049 – 0.9051 in)
B	22.976 – 22.984 mm (0.9046 – 0.9048 in)

Special tool

(A): 09912-66310



IF04K1140288-01

Bearing thickness specification

Color (Part No.)	Thickness
Green (12229-40F5-0A0)	1.486 – 1.490 mm (0.0585 – 0.0586 in)
Black (12229-40F5-0B0)	1.490 – 1.494 mm (0.0587 – 0.0588 in)
Brown (12229-40F5-0C0)	1.494 – 1.498 mm (0.05882 – 0.05897 in)

NOTE

The balancer shaft journal bearings on upper and middle crankcases are the same.



IF04K1140289-01

Conrod Crank Pin Bearing Removal and Installation

BENK07L21406045

Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47) and "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51).

Removal

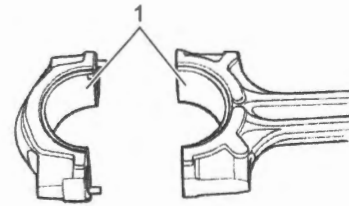
Remove the conrod crank pin bearings (1).

NOTICE

- When removing the bearings, be careful not to scratch the conrods and the bearings.
- Do not touch the bearing surfaces with your hands. Grasp the bearings by their edges.

NOTE

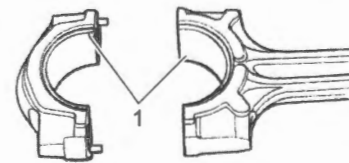
- Do not remove the bearings (1) unless absolutely necessary.
- Make a note of where the bearings are removed from so that they can be reinstalled in their original positions.



IF04K1140329-02

Installation

When installing the bearings into the conrod cap and conrod, be sure to fix the stopper part (1) first, and then press in the other opposite side of the bearing.



IF04K1140290-01

Conrod / Crankshaft Inspection

BENK07L21406046

Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47) and "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51).

Conrod Small End I.D.

Measure the conrod small end inside diameter using the small bore gauge.

If the conrod small end inside diameter exceeds the service limit, replace the conrod.

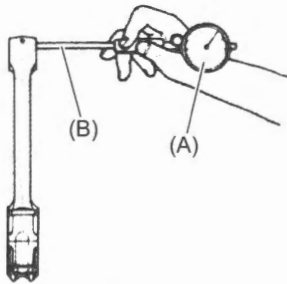
Conrod small end I.D.

[Limit]: 16.040 mm (0.6314 in)

Special tool

(A): 09900-20602

(B): 09900-22401



IF04K1140291-01

Conrod Big End Side Clearance

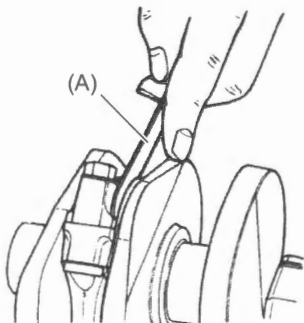
- 1) Check the conrod big end side clearance using the thickness gauge.

Conrod big end side clearance

[Limit]: 0.3 mm (0.011 in)

Special tool

(A): 09900-20803



IF04K1140292-01

- 2) If the clearance exceeds the limit, remove the conrod and measure the conrod big end width and crank pin width. Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51). If any of the measurements are out of specification, replace the conrod or crankshaft.

Conrod big end width

[Standard]: 19.95 – 20.00 mm (0.7855 – 0.7874 in)

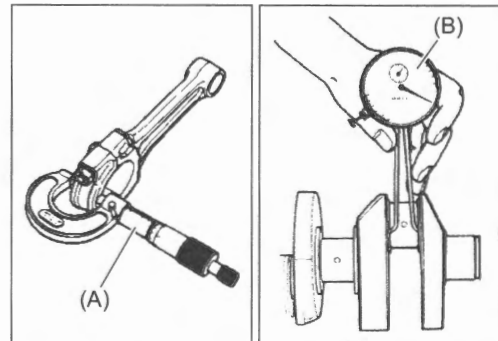
Crank pin width

[Standard]: 20.10 – 20.15 mm (0.7914 – 0.7933 in)

Special tool

(A): 09912-66310

(B): 09900-20605



IF04K1140293-01

Crankshaft Runout

Support the crankshaft using V blocks as shown, with the two end journals resting on the blocks. Set up the dial gauge as shown, and rotate the crankshaft slowly to read the runout. Replace the crankshaft if the runout exceeds the service limit.

Crankshaft runout

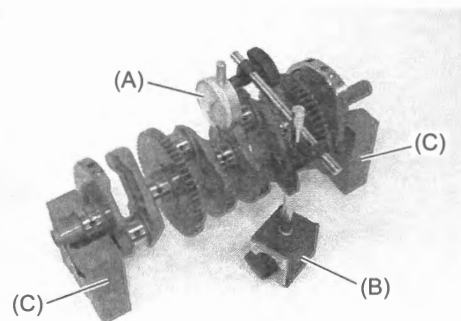
[Limit]: 0.05 mm (0.0019 in)

Special tool

(A): 09900-20607

(B): 09900-20701

(C): 09900-21304



IF04K1140294-01

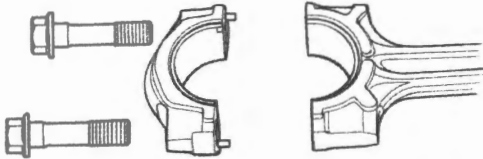
Conrod Crank Pin Bearing Inspection and Selection

BENK07L21406047

Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47) and "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51).

Inspection

- 1) Inspect the bearing surfaces for any signs of fusion, pitting, burn or flaws. If any, replace them with a specified set of bearings.

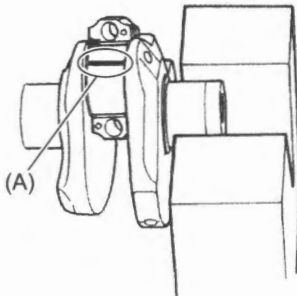


I718H1140285-01

- 2) Place the plastigage axially along the crank pin, avoiding the oil hole, as shown in the figure.

Special tool

(A): 09900-22303



IF04K1140295-01

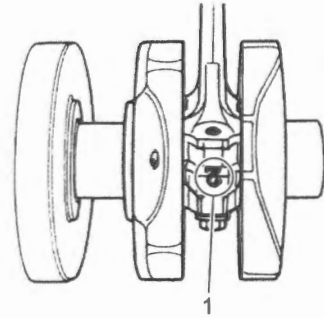
- 3) Tighten the conrod cap bolts to the specified torque, in two stages.

NOTE

- When installing the conrod cap bolts 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: 21 N·m (2.1 kgf-m, 15.5 lbf-ft) → turn clockwise 90°



IF04K1140296-01

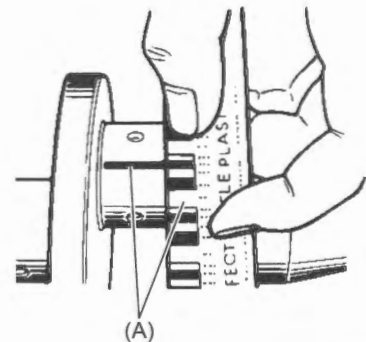
- 4) Remove the conrod cap bolts and measure the width of the compressed plastigage using the envelope scale. This measurement should be taken at the widest part of the compressed plastigage. If the oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.

Conrod big end oil clearance

[Standard]: 0.040 – 0.064 mm (0.0016 – 0.0025 in)
[Limit]: 0.080 mm (0.0031 in)

Special tool

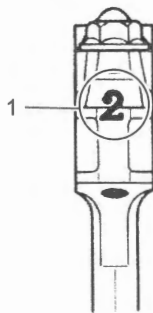
(A): 09900-22303



IF04K1140297-01

Selection

- 1) Check the corresponding conrod I.D. code numbers ([1] or [2]) (1).



IF04K1140298-01

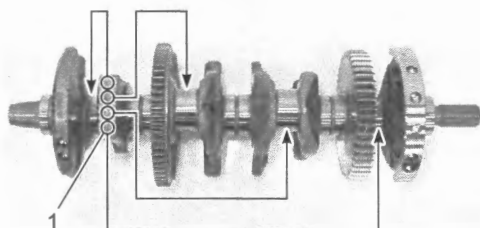
Conrod big end I.D.

[Standard]: 38.000 – 38.016 mm (1.4961 – 1.4966 in)

Conrod I.D. specification

Code (1)	I.D. specification
1	38.000 – 38.008 mm (1.4961 – 1.4963 in)
2	38.008 – 38.016 mm (1.4964 – 1.4966 in)

- 2) Check the corresponding crank pin O.D. code numbers ([1], [2] or [3]) (1).



IF04K1140299-01

- 3) Measure the conrod crank pin O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

Crank pin O.D.

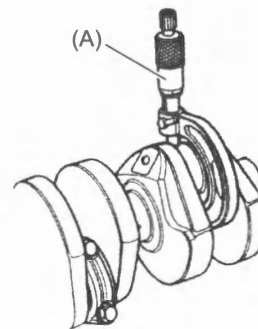
[Standard]: 34.976 – 35.000 mm (1.3770 – 1.3779 in)

Crank pin O.D. specification

Code	O.D. specification
1	34.992 – 35.000 mm (1.3777 – 1.3779 in)
2	34.984 – 34.992 mm (1.3774 – 1.3776 in)
3	34.976 – 34.984 mm (1.3770 – 1.3773 in)

Special tool

(A): 09900–20202



IF04K1140300-01

- 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
Conrod I.D.	1	Green	Black	Brown
	2	Black	Brown	Yellow

IF04K1140333-03

Crank pin bearing thickness

[Standard]: 1.476 – 1.492 mm (0.0582 – 0.0587 in)

Bearing thickness specification

Color (Part No.)	Thickness
Yellow (12164-47H10-0D0)	1.488 – 1.492 mm (0.0586 – 0.0587 in)
Brown (12164-47H10-0C0)	1.484 – 1.488 mm (0.05843 – 0.05858 in)
Black (12164-47H10-0B0)	1.480 – 1.484 mm (0.0583 – 0.0584 in)
Green (12164-47H10-0A0)	1.476 – 1.480 mm (0.05811 – 0.05826 in)



1. Color code

IF04K1140301-01

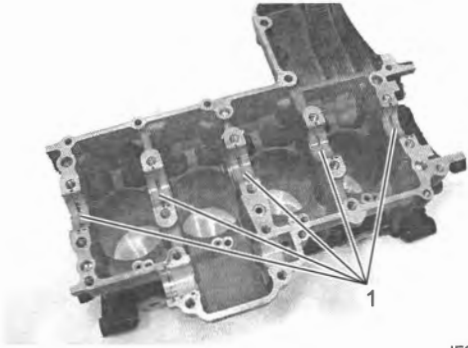
Crankshaft Journal Bearing Inspection and Selection

BENK07L21406048

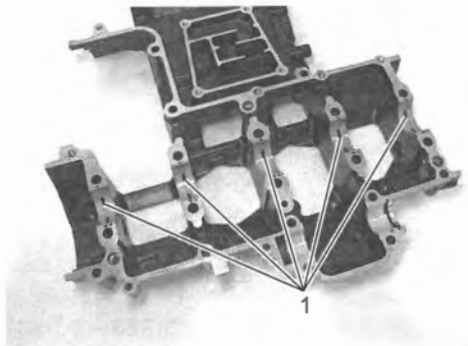
Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47) and "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51).

Inspection

- 1) Inspect each upper and lower crankcase bearing (1) for any damage.



IF04K1140302-02

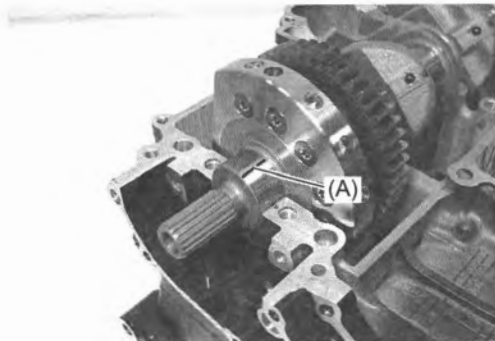


IF04K1140303-01

- 2) Set the crankshaft onto the upper crankcase.
- 3) Install the plastigage onto each crankshaft journal.

Special tool

(A): 09900-22303



IF04K1140304-01

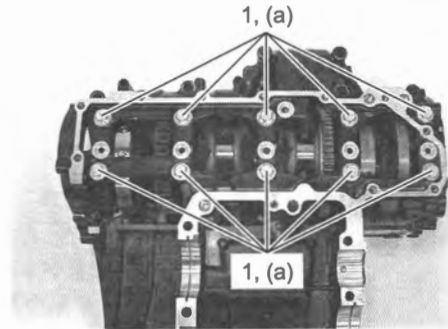
- 4) Mate the lower crankcase with the upper crankcase.
- 5) Tighten the crankcase middle bolts (M9) (1) in order of number. Tighten each bolt a little at a time to equalize the pressure in the following two steps.

NOTE

Do not rotate the crankshaft when a piece of plastigage is installed.

Tightening torque

Crankcase middle bolt (M9) (a): 18 N·m (1.8 kgf·m, 13.5 lbf·ft) → turn clockwise 50°

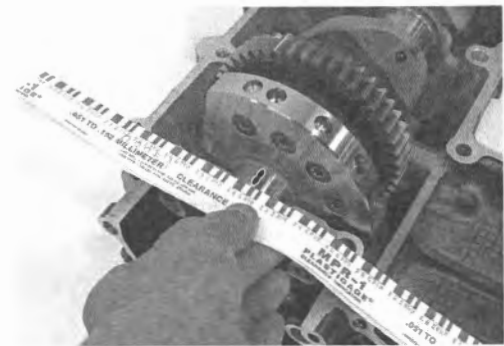


IF04K1140305-02

- 6) Remove the middle crankcase and measure the width of 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.

Crankshaft journal oil clearance

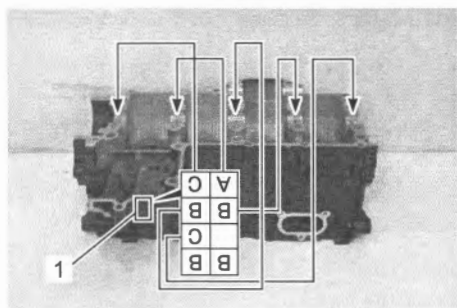
[Standard]: 0.010 – 0.028 mm (0.0004 – 0.0011 in)
[Limit]: 0.080 mm (0.0031 in)



IF04K1140306-01

Selection

- 1) Check the corresponding crankcase journal I.D. codes ([A], [B] or [C]) (1), which are stamped on the upper crankcase.



IF04K1140307-01

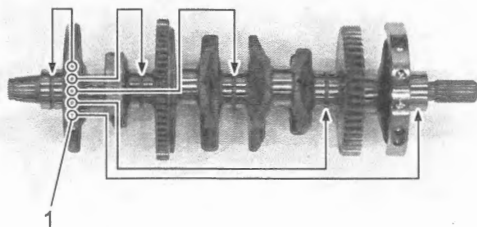
Crankcase journal I.D.

[Standard]: 38.000 – 38.018 mm (1.4961 – 1.4967 in)

Crankcase journal I.D. specification

Code (1)	I.D. specification
A	38.000 – 38.006 mm (1.4961 – 1.4962 in)
B	38.006 – 38.012 mm (1.4963 – 1.4965 in)
C	38.012 – 38.018 mm (1.4966 – 1.4967 in)

- 2) Check the corresponding crankshaft journal O.D. codes ([A], [B] or [C]) (1), which are stamped on the crankshaft.



IF04K1140308-01

- 3) Measure the crankshaft O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

Crankshaft journal O.D.

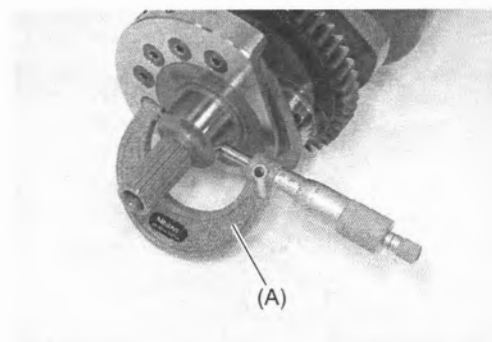
[Standard]: 34.982 – 35.000 mm (1.3773 – 1.3779 in)

Crankshaft journal O.D. specification

Code (1)	O.D. specification
A	34.994 – 35.000 mm (1.3778 – 1.3779 in)
B	34.988 – 34.994 mm (1.3775 – 1.3777 in)
C	34.982 – 34.988 mm (1.3773 – 1.3774 in)

Special tool

(A): 09900–20202



IF04K1140309-01

- 4) Select the specified bearings from the bearing selection table.

Bearing selection table

	Code	Crankshaft O.D.		
		A	B	C
Crankcase I.D.	A	Green	Black	Brown
	B	Black	Brown	Yellow
	C	Brown	Yellow	Blue

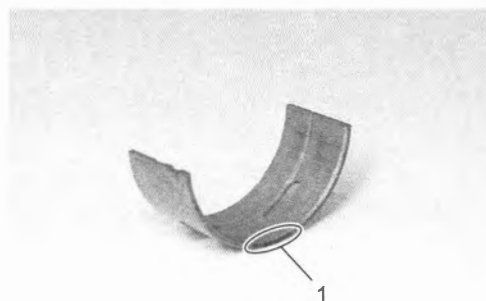
IF04K1140310-01

Crankcase journal bearing thickness

[Standard]: 1.492 – 1.507 mm (0.0588 – 0.0593 in)

Bearing thickness specification

Color (Part No.)	Thickness
Blue (12229-04K00-0E0)	1.504 – 1.507 mm (0.05922 – 0.05933 in)
Yellow (12229-04K00-0D0)	1.501 – 1.504 mm (0.0591 – 0.0592 in)
Brown (12229-04K00-0C0)	1.498 – 1.501 mm (0.05898 – 0.05909 in)
Black (12229-04K00-0B0)	1.495 – 1.498 mm (0.05886 – 0.05897 in)
Green (12229-04K00-0A0)	1.492 – 1.495 mm (0.05874 – 0.05885 in)



IF04K1140311-01

1. Color code

Crankshaft Thrust Clearance Inspection and Selection

BENK07L21406049

Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" (Page 1D-47) and "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Installation" (Page 1D-51).

Inspection

- 1) With the crankshaft's right-side and left-side thrust bearings inserted into the upper crankcase.
- 2) Measure the thrust clearance "a" between the left-side thrust bearing and crankshaft using the thickness gauge. If the thrust clearance exceeds the standard range, adjust the thrust clearance.

NOTE

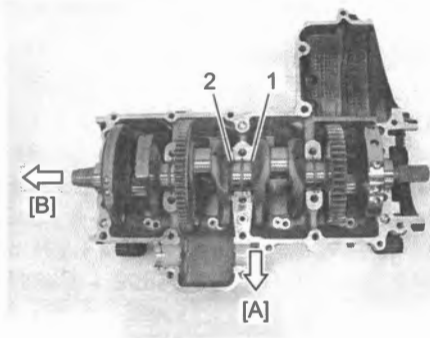
Pull the crankshaft to the left (generator side) so that there is no clearance on the right-side thrust bearing.

Crankshaft thrust clearance

[Standard]: 0.060 – 0.110 mm (0.0024 – 0.0043 in)

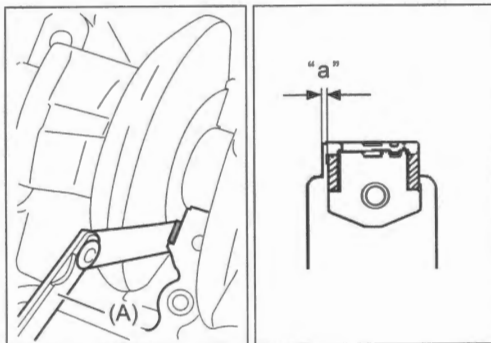
Special tool

(A): 09900-20803



IF04K1140312-01

[A]: Front side	1. Right-side thrust bearing
[B]: Left side	2. Left-side thrust bearing



IF04K1140313-01

"a": Clearance

Selection

- 1) Remove the right-side thrust bearing and measure its thickness using the micrometer. If the thickness of the right-side thrust bearing is below standard, replace it with a new bearing and measure the thrust clearance again, as described in Inspection 1) and 2).

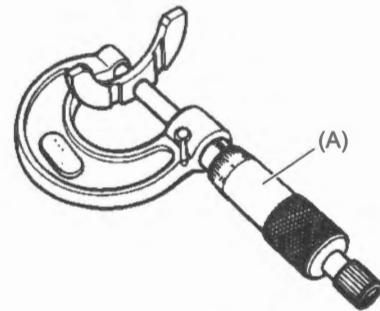
Camshaft thrust bearing thickness

Right side [Standard]: 2.42 – 2.44 mm (0.0953 – 0.0960 in)

Left side [Standard]: 2.36 – 2.50 mm (0.0930 – 0.0984 in)

Special tool

(A): 09912-66310

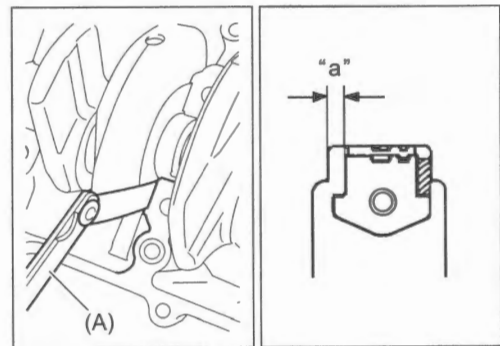


IF04K1140314-01

- 2) If the right-side thrust bearing is within the standard range, reinsert the right-side thrust bearing and remove the left-side thrust bearing.
- 3) With the left-side thrust bearing removed, measure the clearance "a" using the thickness gauge as shown.

Special tool

(A): 09900-20803



IF04K1140315-01

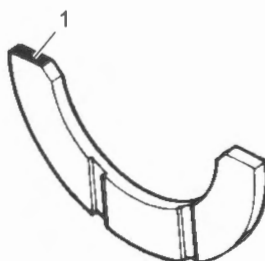
4) Select a left-side thrust bearing from the selection table.

NOTE

Right-side thrust bearing has the same specification as the GREEN (12228-48B00-0E0) of left-side thrust bearing.

Thrust bearing selection table

Clearance before inserting left-side thrust bearing	Color (Part No.)	Thrust bearing thickness	Thrust clearance
2.570 – 2.590 mm (0.1012 – 0.1019 in)	Brown (12228-48B00-0B0)	2.480 – 2.500 mm (0.0977 – 0.0984 in)	0.070 – 0.110 mm (0.0028 – 0.0043 in)
2.550 – 2.570 mm (0.1004 – 0.1011 in)	Red (12228-48B00-0C0)	2.460 – 2.480 mm (0.0969 – 0.0976 in)	
2.530 – 2.550 mm (0.0996 – 0.1003 in)	Yellow (12228-48B00-0D0)	2.440 – 2.460 mm (0.0961 – 0.0968 in)	
2.510 – 2.530 mm (0.0989 – 0.0996 in)	Green (12228-48B00-0E0)	2.420 – 2.440 mm (0.0953 – 0.0960 in)	
2.490 – 2.510 mm (0.0981 – 0.0988 in)	Blue (12228-48B00-0F0)	2.400 – 2.420 mm (0.0945 – 0.0952 in)	
2.470 – 2.490 mm (0.0973 – 0.0980 in)	Orange (12228-48B00-0G0)	2.380 – 2.400 mm (0.0937 – 0.0944 in)	
2.440 – 2.470 mm (0.0961 – 0.0972 in)	Black (12228-48B00-0H0)	2.360 – 2.380 mm (0.0930 – 0.0937 in)	0.060 – 0.110 mm (0.0024 – 0.0043 in)



IF04K1140316-01

1. Color code

5) After selecting a left-side thrust bearing, install it and then measure the thrust clearance again.

Specifications

Tightening Torque Specifications

BENK07L21407001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Fuel tank front bracket bolt	10	1.0	7.5	☞(Page 1D-6) / ☞(Page 1D-8)
Air cleaner outlet tube clamp screw	1.5	0.15	1.10	☞(Page 1D-7)
Air cleaner bolt	5.5	0.56	4.05	☞(Page 1D-8)
Throttle cable lock-nut	4.5	0.46	3.35	☞(Page 1D-12)
Intake pipe clamp screw	1.5	0.15	1.10	☞(Page 1D-12)
Intake pipe screw	8.4	0.86	6.20	☞(Page 1D-17)
Cylinder head cover bolt	14	1.4	10.5	☞(Page 1D-18)
Camshaft journal holder bolt	10	1.0	7.5	☞(Page 1D-22) / ☞(Page 1D-25) / ☞(Page 1D-39)
Cam chain tension adjuster bolt	10	1.0	7.5	☞(Page 1D-23)
Cam chain tension adjuster plug	23	2.3	17.0	☞(Page 1D-23)
Crankshaft hole plug	11	1.1	8.5	☞(Page 1D-24)
Engine mounting thrust adjuster	23	2.3	17.0	☞(Page 1D-35)
Engine mounting thrust adjuster lock-nut	45	4.6	33.5	☞(Page 1D-35)
Engine mounting bolt	55	5.6	40.5	☞(Page 1D-35)
Engine mounting nut	75	7.6	55.5	☞(Page 1D-35)
Engine mounting pinch bolt	23	2.3	17.0	☞(Page 1D-35)
Radiator bracket bolt	10	1.0	7.5	☞(Page 1D-37)
Cylinder head bolt (L105)	31 N·m (3.2 kgf·m, 23.0 lbf·ft) → turn clockwise 60°			☞(Page 1D-38)
Cylinder head bolt (L50)	10	1.0	7.5	☞(Page 1D-38)
Cam chain tensioner bolt	23	2.3	17.0	☞(Page 1D-39)
Oil gallery bolt	10	1.0	7.5	☞(Page 1D-45)
Bypass hose union	12	1.2	9.0	☞(Page 1D-46)
Conrod cap bolt	21 N·m (2.1 kgf·m, 15.5 lbf·ft) → turn clockwise 90°			☞(Page 1D-53) / ☞(Page 1D-73)
Crankcase middle bolt (M9)	18 N·m (1.8 kgf·m, 13.5 lbf·ft) → turn clockwise 50°			☞(Page 1D-55) / ☞(Page 1D-70) / ☞(Page 1D-75)
Crankcase middle bolt (M8)	15 → 26 N·m (1.5 → 2.7 kgf·m, 11.0 → 19.5 lbf·ft)			☞(Page 1D-55) / ☞(Page 1D-57) / ☞(Page 1D-70)
Crankcase middle bolt (M6)	11	1.1	8.5	☞(Page 1D-55) / ☞(Page 1D-70)
Crankcase upper bolt (M6)	11	1.1	8.5	☞(Page 1D-55) / ☞(Page 1D-70)
Crankcase lower bolt (M6)	11	1.1	8.5	☞(Page 1D-57)
Crankcase upper bolt (M8)	15 → 26 N·m (1.5 → 2.7 kgf·m, 11.0 → 19.5 lbf·ft)			☞(Page 1D-57)
Driveshaft oil seal retainer bolt	10	1.0	7.5	☞(Page 1D-58)
Water inlet connector mounting bolt	10	1.0	7.5	☞(Page 1D-58)
Water jacket plug	9.5	0.97	7.00	☞(Page 1D-65)
Oil gallery upper plug (M10)	18	1.8	13.5	☞(Page 1D-66)
Oil gallery plug (M16)	35	3.6	26.0	☞(Page 1D-66)
Oil gallery lower plug (M14)	23	2.3	17.0	☞(Page 1D-66)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Throttle Cable Routing Diagram” (Page 1D-2)

“Intake System Construction” (Page 1D-5)

“Throttle Body Components” (Page 1D-9)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L21408001

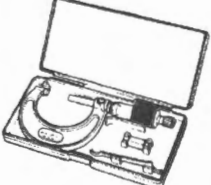
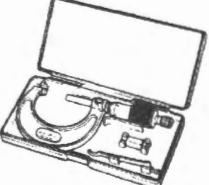
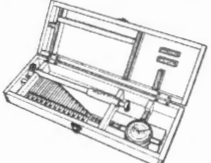



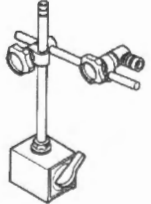
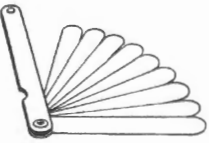
Material	SUZUKI recommended product or Specification		Note
Assembly lubrication	Molybdenum oil solution	—	☞(Page 1D-41) / ☞(Page 1D-51) / ☞(Page 1D-52)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞(Page 1D-17)
Sealant	SUZUKI BOND 1207B	P/No.: 99000-31140	☞(Page 1D-18) / ☞(Page 1D-46) / ☞(Page 1D-55) / ☞(Page 1D-56)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞(Page 1D-39) / ☞(Page 1D-39) / ☞(Page 1D-58) / ☞(Page 1D-66)

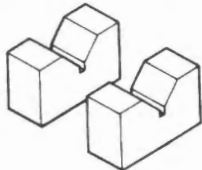


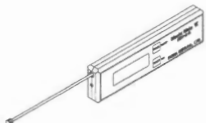





NOTE


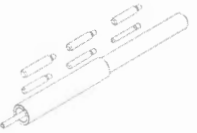


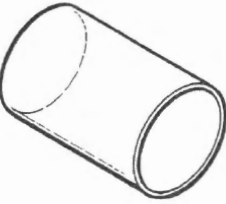
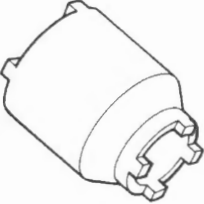
Required service material(s) is also described in:
“Throttle Body Components” (Page 1D-9)

Special Tool

BENK07L21408002

09900-20202 Micrometer (25 - 50 mm) ☞(Page 1D-24) / ☞(Page 1D-74) / ☞(Page 1D-76)		09900-20203 Micrometer (50 - 75 mm) ☞(Page 1D-61)	
09900-20530 Cylinder gauge set ☞(Page 1D-59)		09900-20602 Dial gauge (1 x 0.001 mm) ☞(Page 1D-25) / ☞(Page 1D-62) / ☞(Page 1D-72)	
09900-20605 Dial calipers (10 - 34 mm) ☞(Page 1D-72)		09900-20607 Dial gauge (10 x 0.01 mm) ☞(Page 1D-24) / ☞(Page 1D-42) / ☞(Page 1D-42) / ☞(Page 1D-43) / ☞(Page 1D-72)	
09900-20701 Dial gauge chuck ☞(Page 1D-24) / ☞(Page 1D-42) / ☞(Page 1D-42) / ☞(Page 1D-43) / ☞(Page 1D-72)		09900-20803 Thickness gauge ☞(Page 1D-27) / ☞(Page 1D-46) / ☞(Page 1D-59) / ☞(Page 1D-61) / ☞(Page 1D-62) / ☞(Page 1D-72) / ☞(Page 1D-77) / ☞(Page 1D-77)	

<p>09900-21304 V blocks</p> <p>☞(Page 1D-24) / ☞(Page 1D-42) / ☞(Page 1D-42) / ☞(Page 1D-72)</p>	 <p>09900-22303 Plastigage (0.025 - 0.076 mm)</p> <p>☞(Page 1D-24) / ☞(Page 1D-69) / ☞(Page 1D-73) / ☞(Page 1D-73) / ☞(Page 1D-75)</p> 
<p>09900-22304 Plastigage (0.051 - 0.152 mm)</p> <p>☞(Page 1D-24)</p>	<p>09900-22401 Small bore gauge (10 - 18 mm)</p> <p>☞(Page 1D-62) / ☞(Page 1D-72)</p> 
<p>09900-22403 Small bore gauge (18 - 35 mm)</p> <p>☞(Page 1D-25)</p>	<p>09900-26010 Digital tachometer</p> <p>☞(Page 1D-10)</p> 
<p>09912-66310 Micrometer (0 - 25 mm)</p> <p>☞(Page 1D-25) / ☞(Page 1D-43) / ☞(Page 1D-61) / ☞(Page 1D-62) / ☞(Page 1D-71) / ☞(Page 1D-72) / ☞(Page 1D-77)</p>	<p>09915-63311 Compression gauge adapter</p> <p>☞(Page 1D-3)</p> 
<p>09915-64512 Compression gauge set (2500 kPa)</p> <p>1. Gauge 2. Hose (Adapter)</p> <p>☞(Page 1D-3)</p>	<p>09916-10912 Valve lapper</p> <p>☞(Page 1D-43)</p> 
<p>09916-14510 Valve lifter</p> <p>1. Main unit 2. Attachment</p> <p>☞(Page 1D-40) / ☞(Page 1D-41)</p>	<p>09916-14522 Valve lifter attachment</p> <p>☞(Page 1D-40) / ☞(Page 1D-41)</p> 
<p>09916-33210 Valve guide reamer (ø4.5)</p> <p>☞(Page 1D-47)</p>	<p>09916-33320 Valve guide outer reamer (ø9.8)</p> <p>☞(Page 1D-46)</p>  

<p>09916-34542 Reamer handle</p> <p>☞ (Page 1D-46) / ☞ (Page 1D-47)</p>		<p>09916-51710 Valve guide installer / remover set</p> <p>☞ (Page 1D-46) / ☞ (Page 1D-47) / ☞ (Page 1D-47)</p>	
<p>09916-77310 Piston ring compressor</p> <p>☞ (Page 1D-52)</p>		<p>09916-84511 Tweezers</p> <p>☞ (Page 1D-40) / ☞ (Page 1D-41)</p>	
<p>09919-28620 Sleeve protector</p> <p>☞ (Page 1D-40) / ☞ (Page 1D-41)</p>		<p>09940-14990 Engine mounting adjuster wrench</p> <p>☞ (Page 1D-34) / ☞ (Page 1D-34) / ☞ (Page 1D-35)</p>	

Engine Lubrication System

Precautions

Precautions for Engine Oil

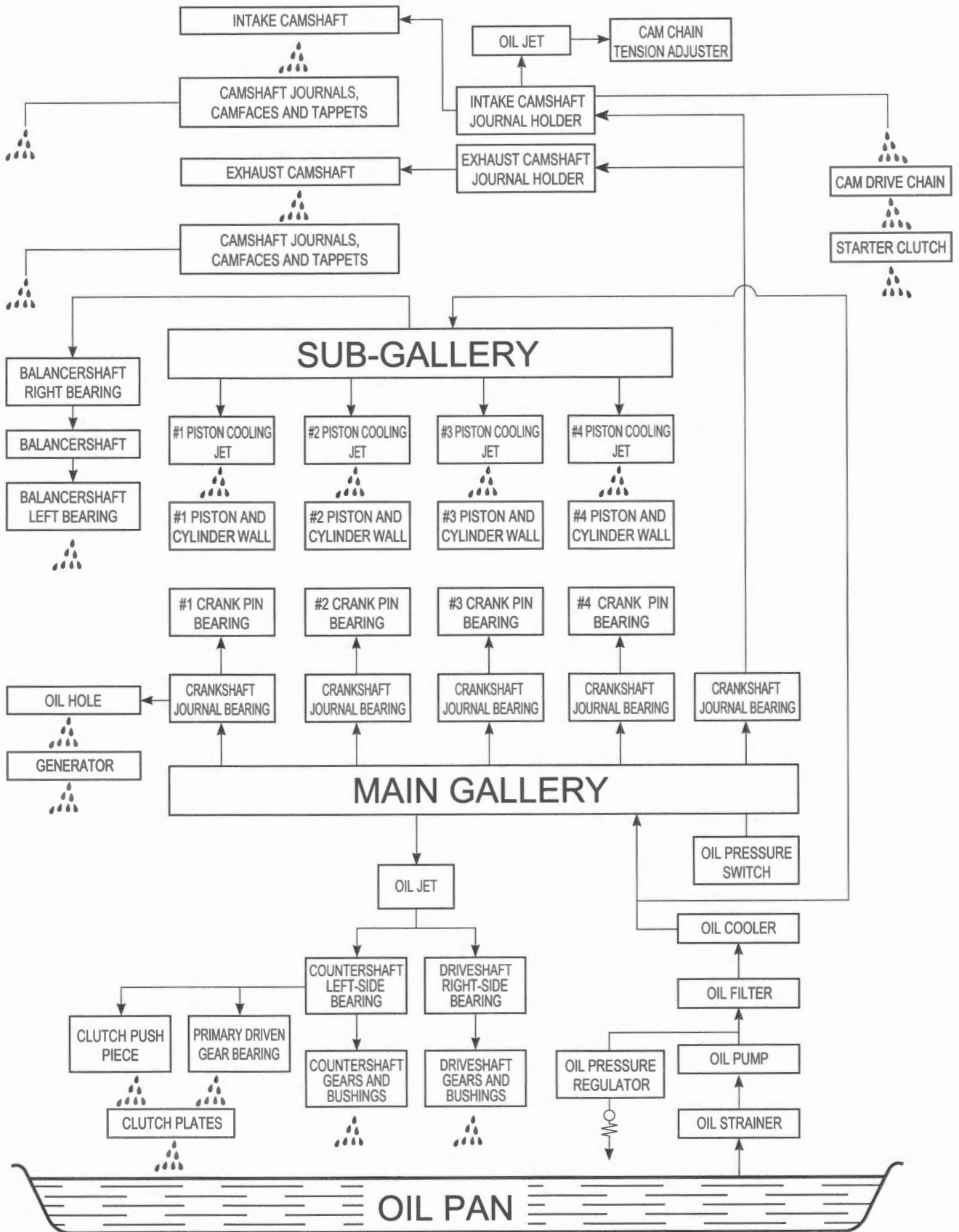
Refer to "Fuel / Oil / Fluid / Coolant Recommendation" in Section 0C (Page 0C-13).

BENK07L21500001

Schematic and Routing Diagram

Engine Lubrication System Chart Diagram

BENK07L21502001



Diagnostic Information and Procedures

Engine Lubrication Symptom Diagnosis

BENK07L21504001

Condition	Possible cause	Correction / Reference Item
Engine overheats	Insufficient amount of engine oil.	Add engine oil. ⌚(Page 1E-5)
	Defective oil pump.	Replace. ⌚(Page 1E-13)
	Clogged oil circuit.	Clean.
	Incorrect engine oil.	Change. ⌚(Page 1E-5)
	Clogged oil cooler.	Replace. ⌚(Page 1E-10)
Exhaust smoke is dirty or thick	Excessive amount of engine oil.	Drain out excess engine oil. ⌚(Page 1E-5)
Engine lacks power	Excessive amount of engine oil.	Drain out excess engine oil. ⌚(Page 1E-5)

Oil Pressure Check

BENK07L21504002

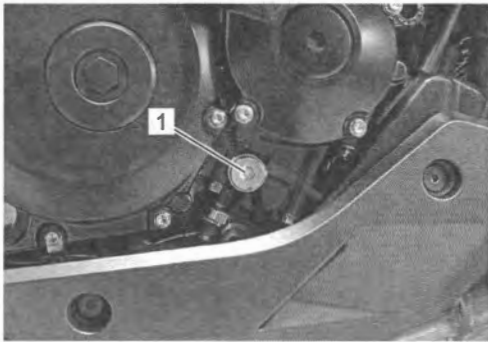
Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

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 (M16) (1).

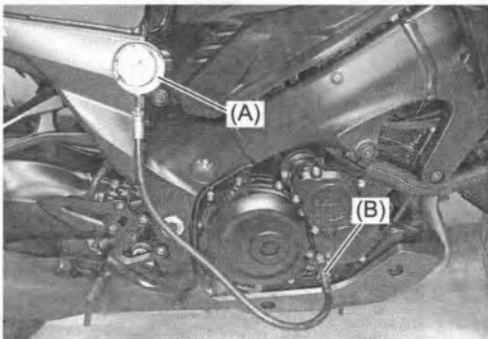


IK07L1150001-01

- 3) Install the oil pressure gauge and attachment into the oil gallery.

Special tool

- (A): 09915-74511
 (B): 09915-74540



IK07L1150007-01

- 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]: 100 – 400 kPa (1.1 – 4.0 kgf/cm², 14.5 – 58.0 psi)

High oil pressure	Low oil pressure
<ul style="list-style-type: none"> • Engine oil viscosity is too high • Clogged oil passage • Combination of the above items 	<ul style="list-style-type: none"> • 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.

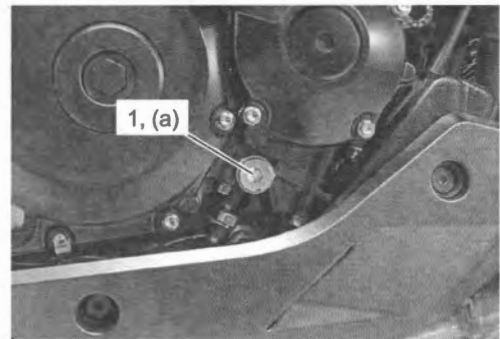
▲ WARNING

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 (M16) (1).
- 8) Install the oil gallery plug (M16) (1) and tighten it to the specified torque.

Tightening torque

Oil gallery plug (M16) (a): 35 N·m (3.6 kgf-m, 26.0 lbf-ft)



IK07L1150002-01

- 9) Check the engine oil level. ⚙️ (Page 1E-5)

Repair Instructions

Engine Oil Inspection

BENK07L21506001

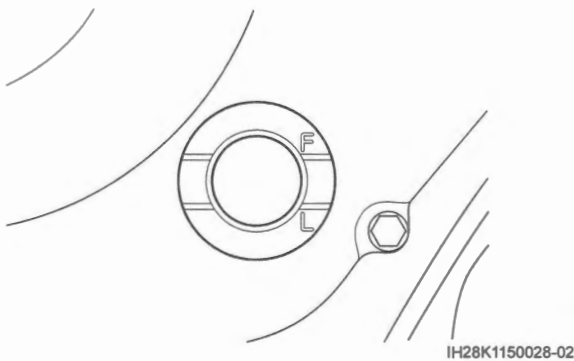
Engine Oil Leakage Inspection

Visually check the cylinder, crankcase, etc. for oil leakage.

Engine Oil Level Inspection

- 1) Keep the motorcycle upright on a level surface.
- 2) Start the engine at idle speed for a few minutes. Turn off the engine and wait for about three minutes.
- 3) Check the oil level and deterioration through the inspection window.

If the oil level is below mark "L", add new oil up to "F" level. However, if the oil is deteriorated or discoloration, replace it.



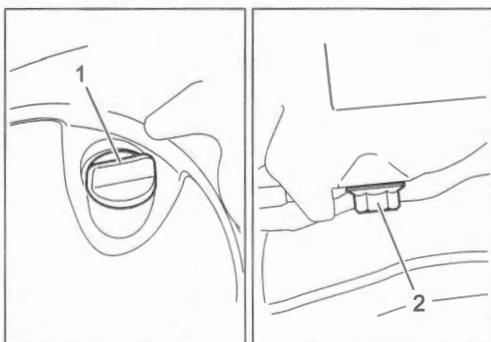
Engine Oil Replacement

BENK07L21506002

- 1) Keep the motorcycle upright on a level surface.
- 2) Start the engine at idle speed for a few minutes and then turn off the engine.
- 3) Place an oil pan under the engine and remove the oil filler cap (1).
- 4) Drain engine oil by removing the oil drain plug (2).

▲ CAUTION

To avoid getting burned, do not touch the engine, engine oil and exhaust system.



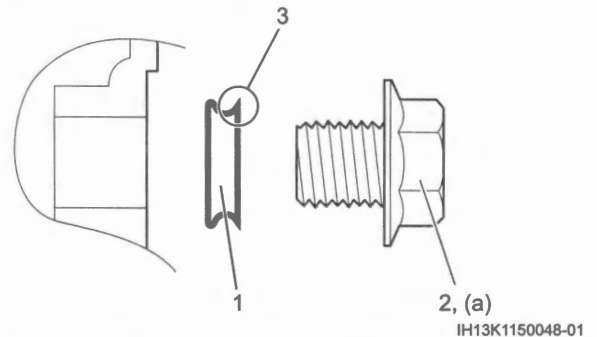
- 5) Install the new gasket washer (1) to the oil drain plug (2) and tighten the oil drain plug to the specified torque.

NOTE

The sharp edge (3) of gasket must face the oil drain plug side.

Tightening torque

Oil drain plug (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



- 6) Pour new oil through the oil filler hole.

Necessary amount of engine oil

Oil change [Standard]: 2800 ml (2.96 US qt, 2.46 Imp qt)

Oil and filter change [Standard]: 3200 ml (3.38 US qt, 2.82 Imp qt)

Engine overhaul [Standard]: 3400 ml (3.59 US qt, 2.99 Imp qt)



- 7) Install the oil filler cap.
- 8) Start the engine and check for oil leakage.
- 9) Stop the engine and check the engine oil level again. Refer to "Engine Oil Inspection" (Page 1E-5).

Oil Filter Replacement

BENK07L21506003

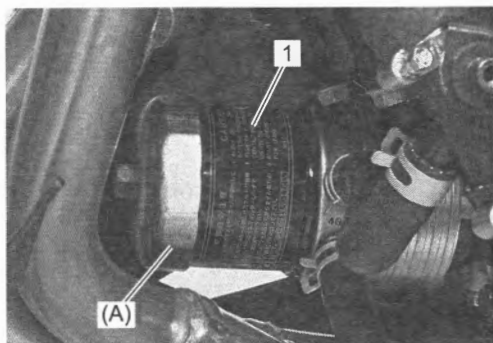
- 1) Drain engine oil. (Page 1E-5)
- 2) Remove the left under cowling. (Page 9D-42)
- 3) Remove the oil filter (1) using the special tool.

NOTE

Detach the special tool once the oil filter has come loose, and then remove the filter by hand.

Special tool

(A): 09915-40620



IF04K1150009-02

- 4) 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.

- 5) 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

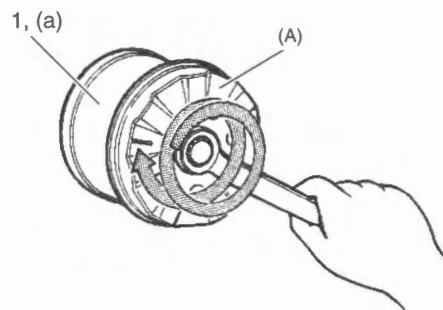
To properly tighten the oil filter, use the special tool. Never tighten the oil filter by hand only.

Special tool

(A): 09915-40620

Tightening torque

Oil filter (a): 20 N·m (2.0 kgf-m, 15.0 lbf-ft)



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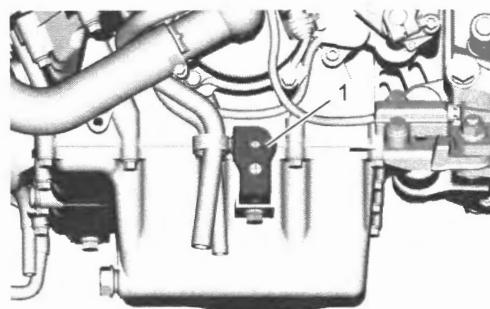
- 6) Add new engine oil. (Page 1E-5)
- 7) Check the engine oil level. (Page 1E-5)

Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation

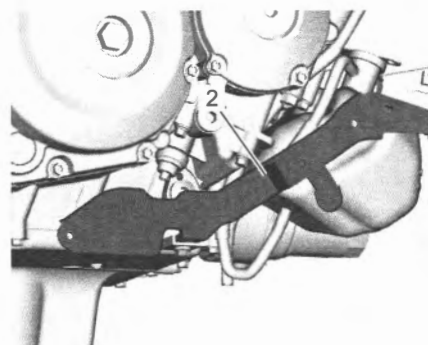
BENK07L21506004

Removal

- 1) Drain engine oil. (Page 1E-5)
- 2) Remove the under cowlings and under cowling cover. (Page 9D-42)
- 3) Remove the exhaust pipe. (Page 1K-15)
- 4) Remove the left under cowling rear bracket (1) and right under cowling bracket (2).



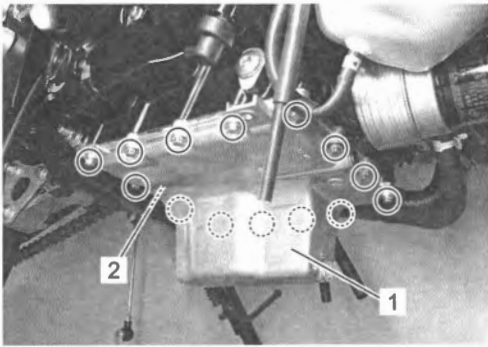
IK07L1150003-01



IK07L1150004-01

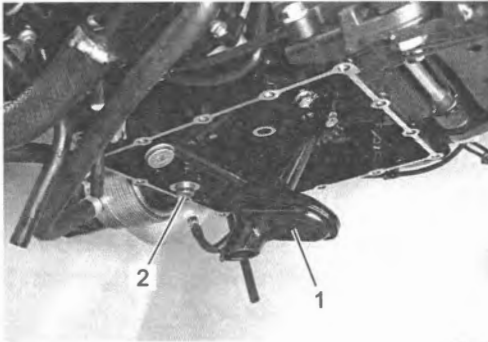
1E-7 Engine Lubrication System:

5) Remove the oil pan (1) and gasket (2).



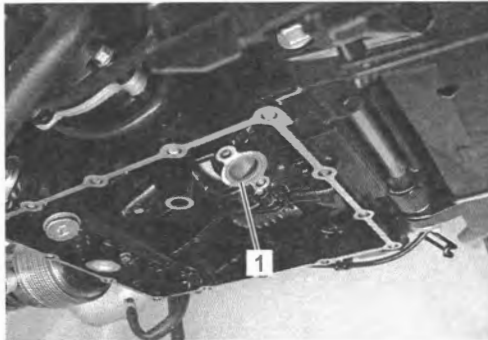
IF04K1150012-01

6) Remove the oil strainer (1) and oil gallery pipe (2).



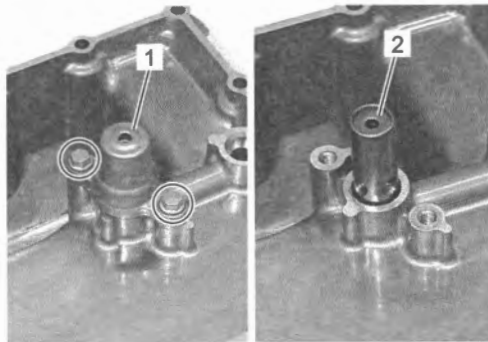
IF04K1150013-01

7) Remove the O-ring (1).



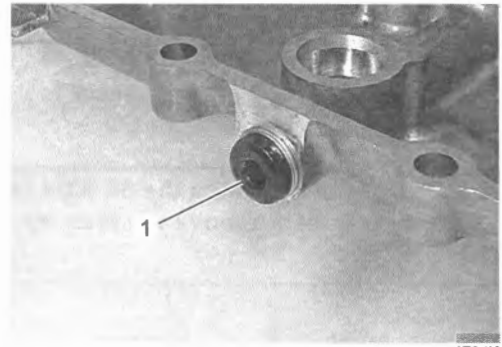
IF04K1150014-01

8) Remove the oil pressure regulator case (1) and oil pressure regulator (2).



IF04K1150015-01

9) Remove the oil gallery plug (M10) (1).



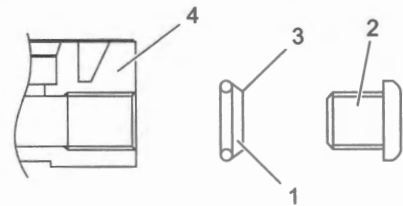
IF04K1150016-02

Installation

1) Install the new gasket (1) to the oil gallery plug (M10) (2).

NOTE

The edge (3) of gasket (1) faces the oil gallery plug (M10) (2) side.



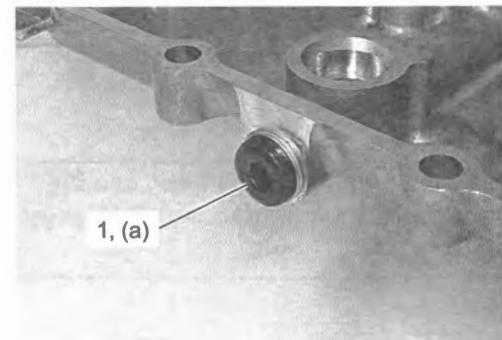
IK07L1150011-01

4. Oil pan

2) Tighten the oil gallery plug (M10) (1) to the specified torque.

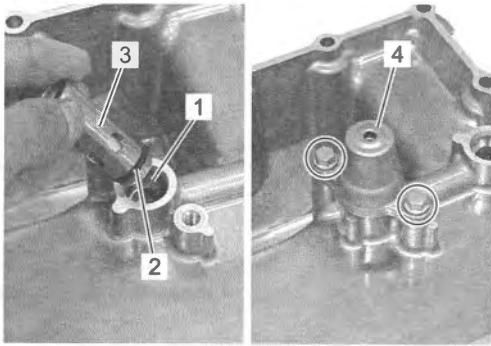
Tightening torque

Oil gallery plug (M10) (a): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)



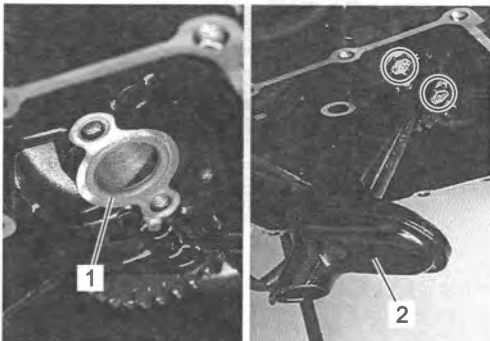
IF04K1150018-02

- 3) Apply engine oil to the oil pressure regulator hole (1) of the oil pan.
- 4) Apply engine oil to the new O-ring (2).
- 5) Install the oil pressure regulator (3) and oil pressure regulator case (4).



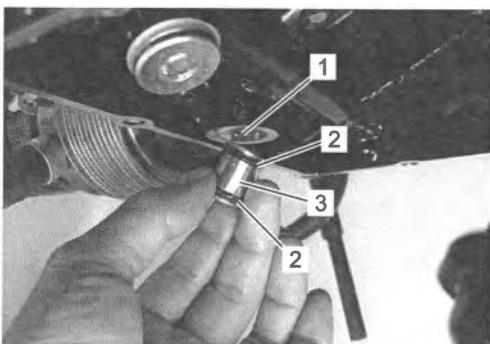
IK07L1150013-01

- 6) Apply engine oil to the new O-ring (1).
- 7) Install the oil strainer (2).



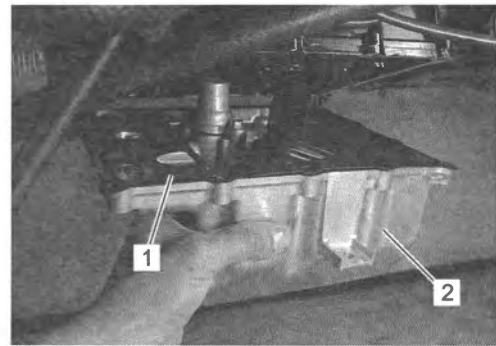
IF04K1150020-04

- 8) Apply engine oil to the oil gallery pipe hole (1) of the lower crankcase.
- 9) Apply engine oil to the new O-rings (2).
- 10) Install the oil gallery pipe (3).



IK07L1150014-01

- 11) Fit the new gasket (1) and oil pan (2).

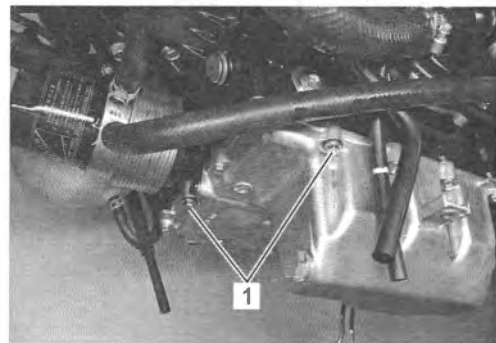


IF04K1150022-01

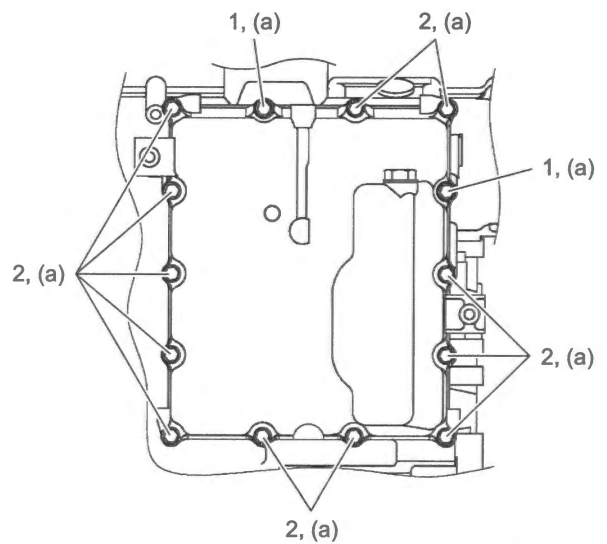
- 12) Install the new gasket washer to the bolts (1) and tighten the bolts (1) and (2) to the specified torque.

Tightening torque

Oil pan bolt (a): 10 N·m (1.0 kgf·m, 7.5 lbf·ft)



IF04K1150023-01



IF04K1150024-01

1E-9 Engine Lubrication System:

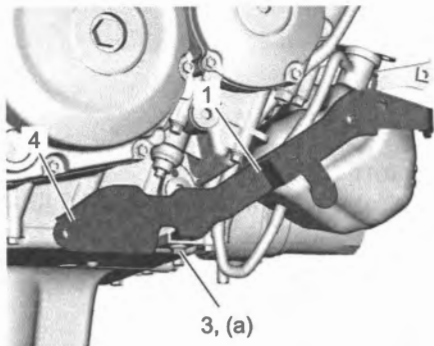
13) Install the right under cowling bracket (1) and left under cowling rear bracket (2).

14) Tighten the under cowling bracket bolts (3) to the specified torque.

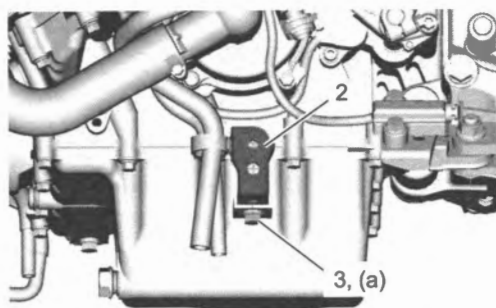
Tightening torque

Under cowling bracket bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

15) Push the right under cowling bracket end (4) to inside until it stops.



IK07L1150008-02



IK07L1150006-02

16) Install the exhaust pipe. ☞(Page 1K-17)

17) Install the under cowling cover and under cowlings.
☞(Page 9D-42)

18) Pour engine oil. ☞(Page 1E-5)

Oil Pressure Regulator / Oil Strainer Inspection

BENK07L21506005

Refer to "Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation" (Page 1E-6).

Oil Pressure Regulator

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.



IF04K1150030-01

Oil Strainer

Clean the oil strainer if necessary. Inspect the oil strainer body for damage. If necessary, replace it with a new one.



IF04K1150029-01

Oil Cooler / Oil Cooler Hose Inspection

BENK07L21506006

Refer to "Under Cowling / Under Cowling Cover Removal and Installation" in Section 9D (Page 9D-42).

Oil Cooler Hose

Refer to "Water Hose Inspection" in Section 1F (Page 1F-12).

Oil Cooler

Inspect the oil cooler (1) for engine oil leakage. If any defects are found, replace the oil cooler (1) with a new one. Refer to "Oil Cooler Removal and Installation" (Page 1E-10).



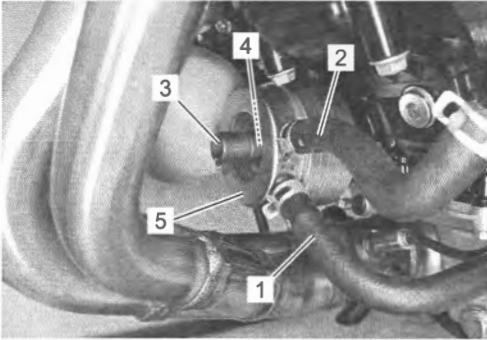
IF04K1150025-02

Oil Cooler Removal and Installation

BENK07L21506007

Removal

- 1) Drain engine coolant. (Page 1F-6)
- 2) Remove the oil filter. (Page 1E-6)
- 3) Disconnect the oil cooler water inlet hose (1) and oil cooler water outlet hose (2).
- 4) Remove the oil cooler union bolt (3) and washer (4).
- 5) Remove the oil cooler (5).

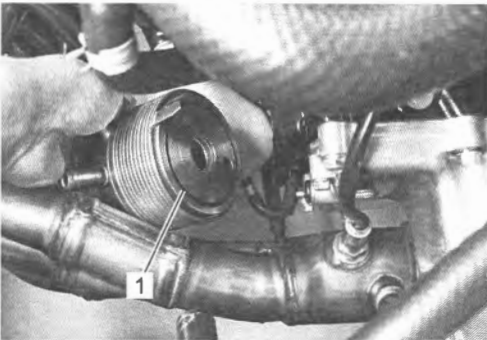


IF04K1150026-03

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).



IF04K1150027-02

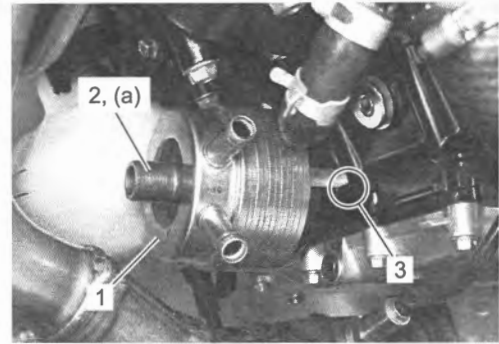
- Install the oil cooler (1) and tighten the oil cooler union bolt (2) to the specified torque.

Tightening torque

Oil cooler union bolt (a): 70 N·m (7.1 kgf-m, 52.0 lbf-ft)

NOTE

Contact the stopper (3) of oil cooler and crankcase.



IF04K1150028-01

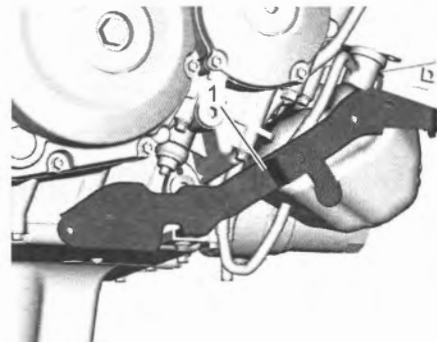
- Connect the oil cooler inlet hose and oil cooler outlet hose. (Page 1F-2)
- Pour engine coolant. (Page 1F-6)
- Install the new oil filter and pour engine oil. (Page 1E-6)

Oil Pressure Switch Removal and Installation

BENK07L21506008

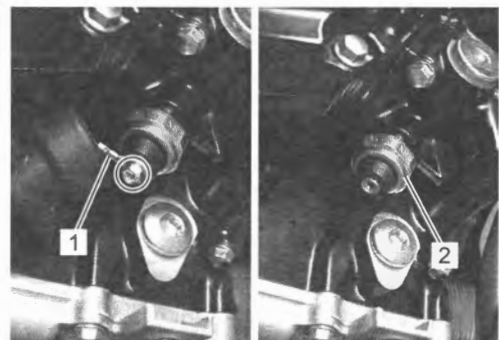
Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the right under cowling and under cowling cover. (Page 9D-42)
- 3) Remove the right under cowling bracket (1).



IK07L1150005-01

- 4) Drain engine oil. (Page 1E-5)
- 5) Disconnect the oil pressure switch lead wire (1).
- 6) Remove the oil pressure switch (2).



IK07L1150012-01

Installation

- 1) Install the oil pressure switch (1), apply the sealant to its thread part and tighten it to the specified torque.

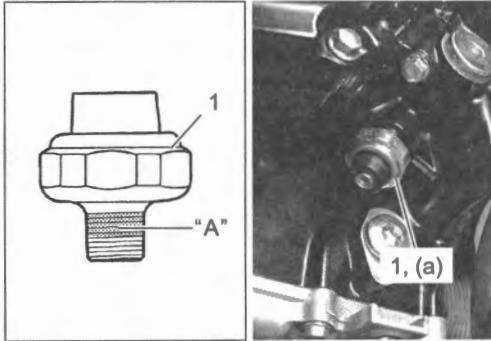
NOTE

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)



IF04K1150032-01

- 2) Connect the oil pressure switch lead wire (1). Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).

Tightening torque

Oil pressure switch lead wire connecting screw (a): 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)



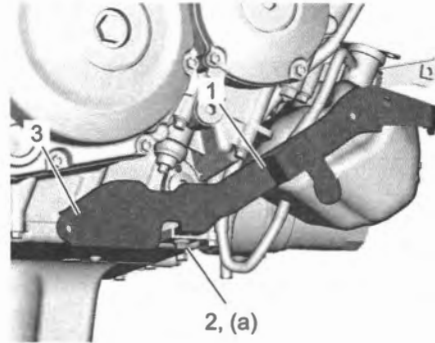
IF04K1150033-01

- 3) Install the right under cowling bracket (1) and tighten its bolt (2) to the specified torque.

Tightening torque

Under cowling bracket bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- 4) Push the right under cowling bracket end (3) to inside until it stops.



IK07L1150009-02

- 5) Pour engine oil. (Page 1E-5)

- 6) Install the removed parts.

Oil Pressure Switch Inspection

BENK07L21506009

Refer to "Oil Pressure Switch Removal and Installation" (Page 1E-10).

NOTE

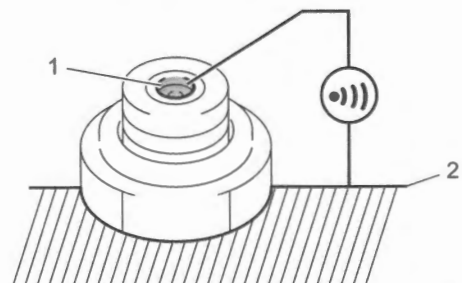
Before inspecting the oil pressure switch, check if the engine oil level is correct.

(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		

IJ04K1150002-01



IK07L1150010-01

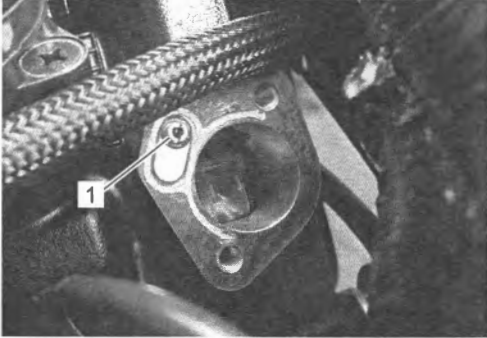
- 3) After finishing the oil pressure switch inspection, install the removed parts.

Oil Jet / Piston Cooling Jet Removal and Installation

BENK07L21506010

Oil Jet (For Cam Chain Tension Adjuster) Removal

- 1) Remove the cam chain tension adjuster. (Page 1D-19)
- 2) Remove the oil jet (1).

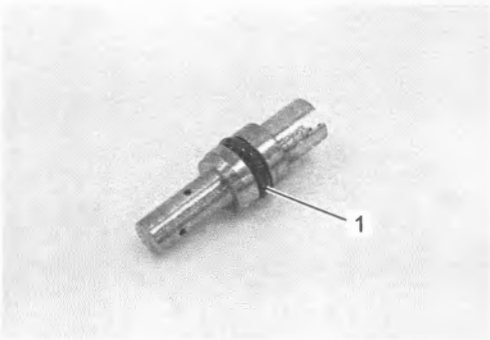


IF04K1150034-02

Installation

Install the oil jet (for cam chain tension adjuster) in the reverse order of removal. Pay attention to the following points:

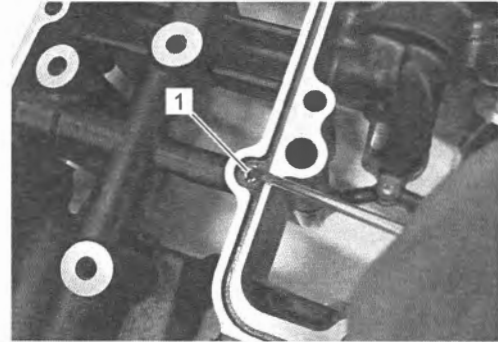
- Apply engine oil to the oil jet hole of the upper crankcase before installing the oil jet (for cam chain tension adjuster).
- Apply engine oil to the new O-ring (1).



IF04K1150035-02

Oil Jet (For Transmission) Removal

- 1) Separate the crankcases, middle and lower. Refer to "Balancer Shaft Assembly / Crankshaft / Piston / Cylinder Removal" in Section 1D (Page 1D-47).
- 2) Remove the oil jet (for transmission) (1).



IF04K1150036-01

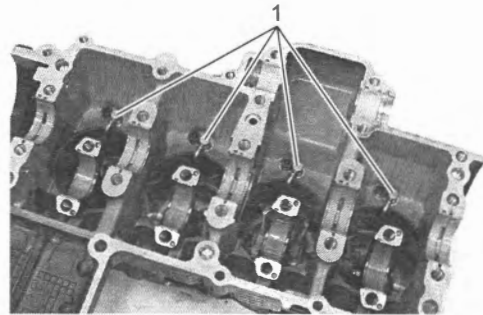
Installation

Install the oil jet (for transmission) in the reverse order of removal.

Piston Cooling Jet

Removal

- 1) Remove the crankshaft assembly. (Page 1D-47)
- 2) Remove the piston cooling jets (1).



IF04K1150037-01

Installation

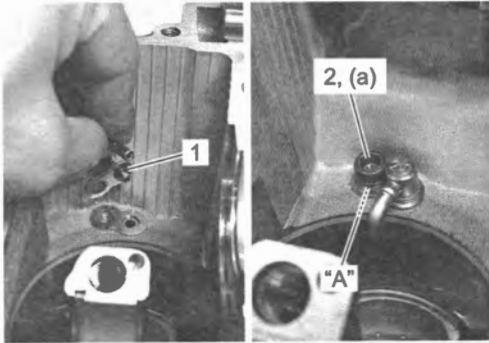
Install the piston cooling jets in the reverse order of removal. Pay attention to the following points:

- Apply engine oil to the new O-rings (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)



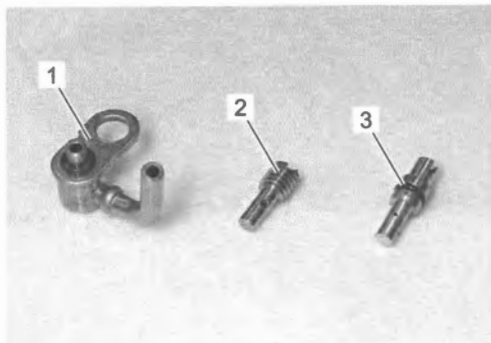
IF04K1150038-02

Oil Jet / Piston Cooling Jet Inspection

BENK07L21506011

Refer to “Oil Jet / Piston Cooling Jet Removal and Installation” (Page 1E-12).

Make sure that the oil jets and piston cooling jet are not clogged. If they are clogged, clean their oil passage using a wire of the proper size and compressed air.



IF04K1150039-01

1. Piston cooling jet
2. Oil jet (for transmission)
3. Oil jet (for cam chain tension adjuster)

Oil Pump Removal and Installation

BENK07L21506012

Refer to “Clutch Removal” in Section 5C (Page 5C-14) and “Clutch Installation” in Section 5C (Page 5C-17).

NOTE

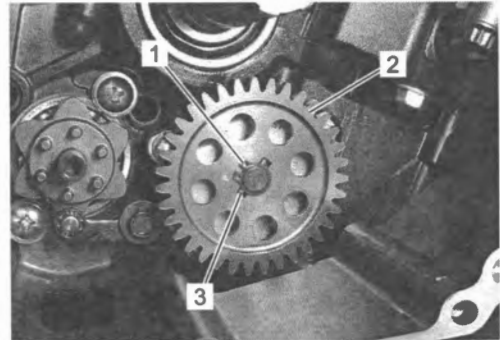
Be careful not to drop any parts into the crankcase.

Removal

- 1) Remove the circlip (1).

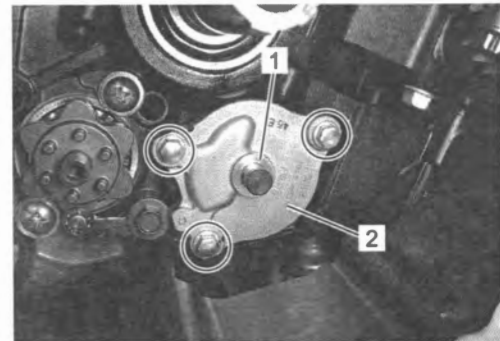
Special tool
09900–06107

- 2) Remove the oil pump driven gear (2) and pin (3).



IF04K1150040-01

- 3) Remove the washer (1) and oil pump assembly (2).

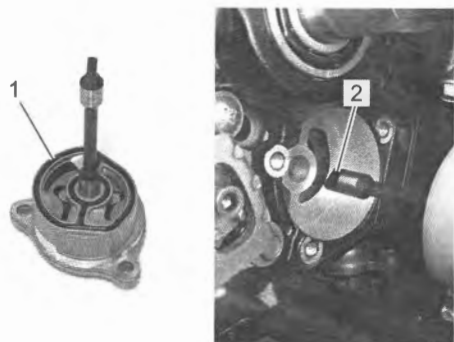


IF04K1150041-01

Installation

Install the oil pump in the reverse order of removal. Pay attention to the following points:

- Apply engine oil to the new O-ring (1).
- Install the oil pump with the slot on the shaft end (2) securely engaged with the groove on the water pump shaft.

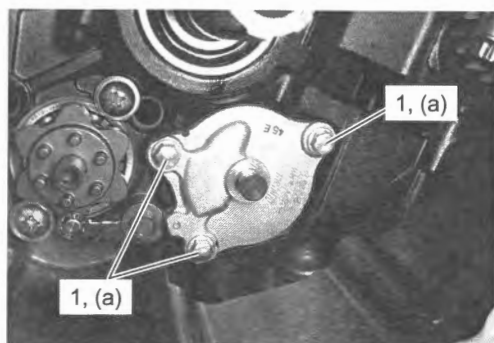


IF04K1150042-02

- Tighten the bolts (1) to the specified torque.

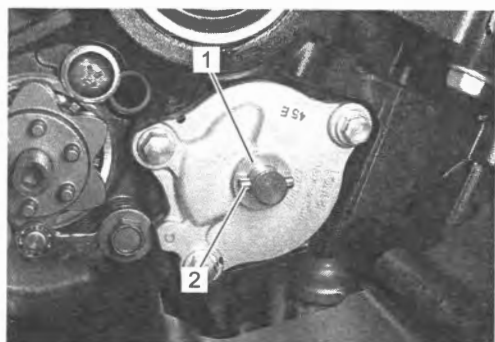
Tightening torque

Oil pump bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1150043-01

- Install the washer (1) and pin (2).

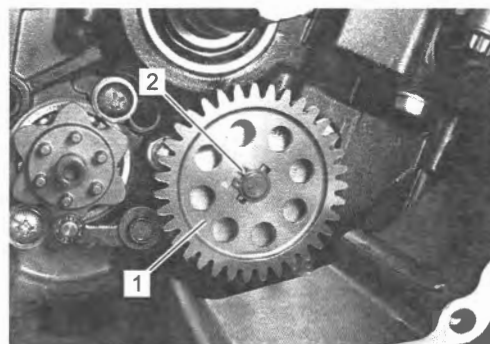


IF04K1150044-02

- Install the oil pump driven gear (1) and new circlip (2).

Special tool

09900-06107



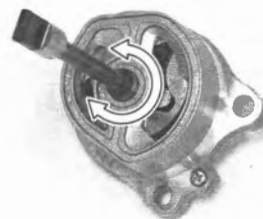
IF04K1150045-02

Oil Pump Inspection

BENK07L21506013

Refer to "Oil Pump Removal and Installation" (Page 1E-13).

Rotate the oil pump shaft by hand and check that it moves smoothly. If it does not move smoothly, replace the oil pump assembly.



IF04K1150046-01

Specifications

Tightening Torque Specifications

BENK07L21507001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Oil gallery plug (M16)	35	3.6	26.0	☞ (Page 1E-4)
Oil drain plug	23	2.3	17.0	☞ (Page 1E-5)
Oil filter	20	2.0	15.0	☞ (Page 1E-6)
Oil gallery plug (M10)	11	1.1	8.5	☞ (Page 1E-7)
Oil pan bolt	10	1.0	7.5	☞ (Page 1E-8)
Under cowling bracket bolt	10	1.0	7.5	☞ (Page 1E-9) / ☞ (Page 1E-11)
Oil cooler union bolt	70	7.1	52.0	☞ (Page 1E-10)
Oil pressure switch	13	1.3	9.5	☞ (Page 1E-11)
Oil pressure switch lead wire connecting screw	1.5	0.15	1.10	☞ (Page 1E-11)
Piston cooling jet bolt	10	1.0	7.5	☞ (Page 1E-13)
Oil pump bolt	10	1.0	7.5	☞ (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

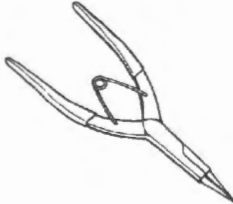

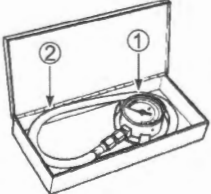

Recommended Service Material

BENK07L21508001

Material	SUZUKI recommended product or Specification		Note
Sealant	SUZUKI BOND 1207B	P/No.: 99000-31140	☞ (Page 1E-11)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞ (Page 1E-13)

Special Tool

BENK07L21508002

09900-06107 Snap ring pliers (External) ☞ (Page 1E-13) / ☞ (Page 1E-14)		09915-40620 Oil filter wrench ☞ (Page 1E-6) / ☞ (Page 1E-6)	
09915-74511 Oil pressure gauge set (600 kPa) 1. Gauge 2. Hose ☞ (Page 1E-4)		09915-74540 Oil pressure gauge attachment ☞ (Page 1E-4)	

Engine Cooling System

Precautions

Precautions for Engine Cooling System

BENK07L2160001

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).

▲ 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

BENK07L2160002

Refer to "Fuel / Oil / Fluid / Coolant Recommendation" in Section 0C (Page 0C-13).

General Description

Engine Coolant Description

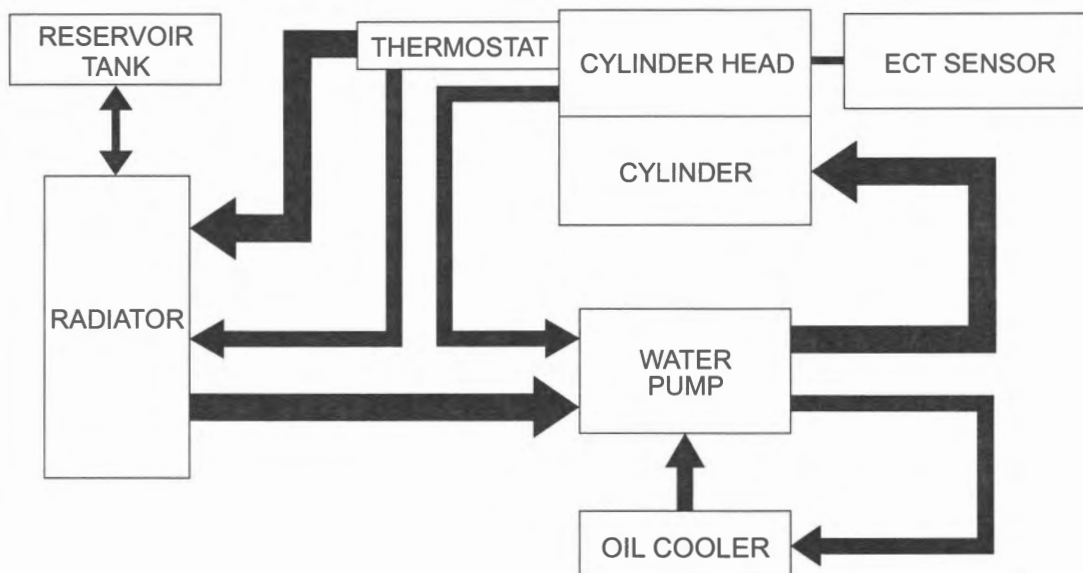
BENK07L21601001

Refer to "Fuel / Oil / Fluid / Coolant Recommendation" in Section 0C (Page 0C-13).

Schematic and Routing Diagram

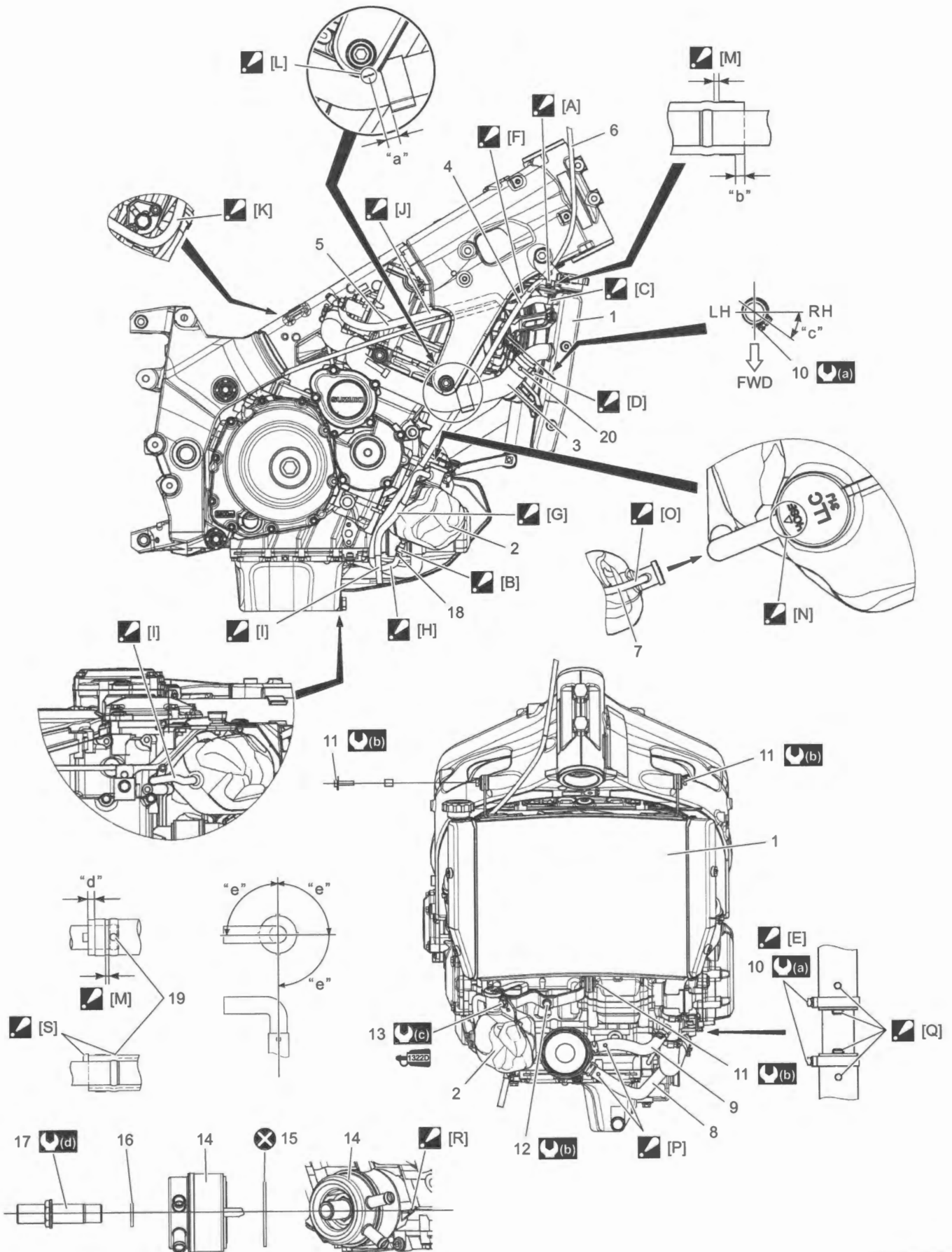
Cooling Circuit Diagram

BENK07L21602001



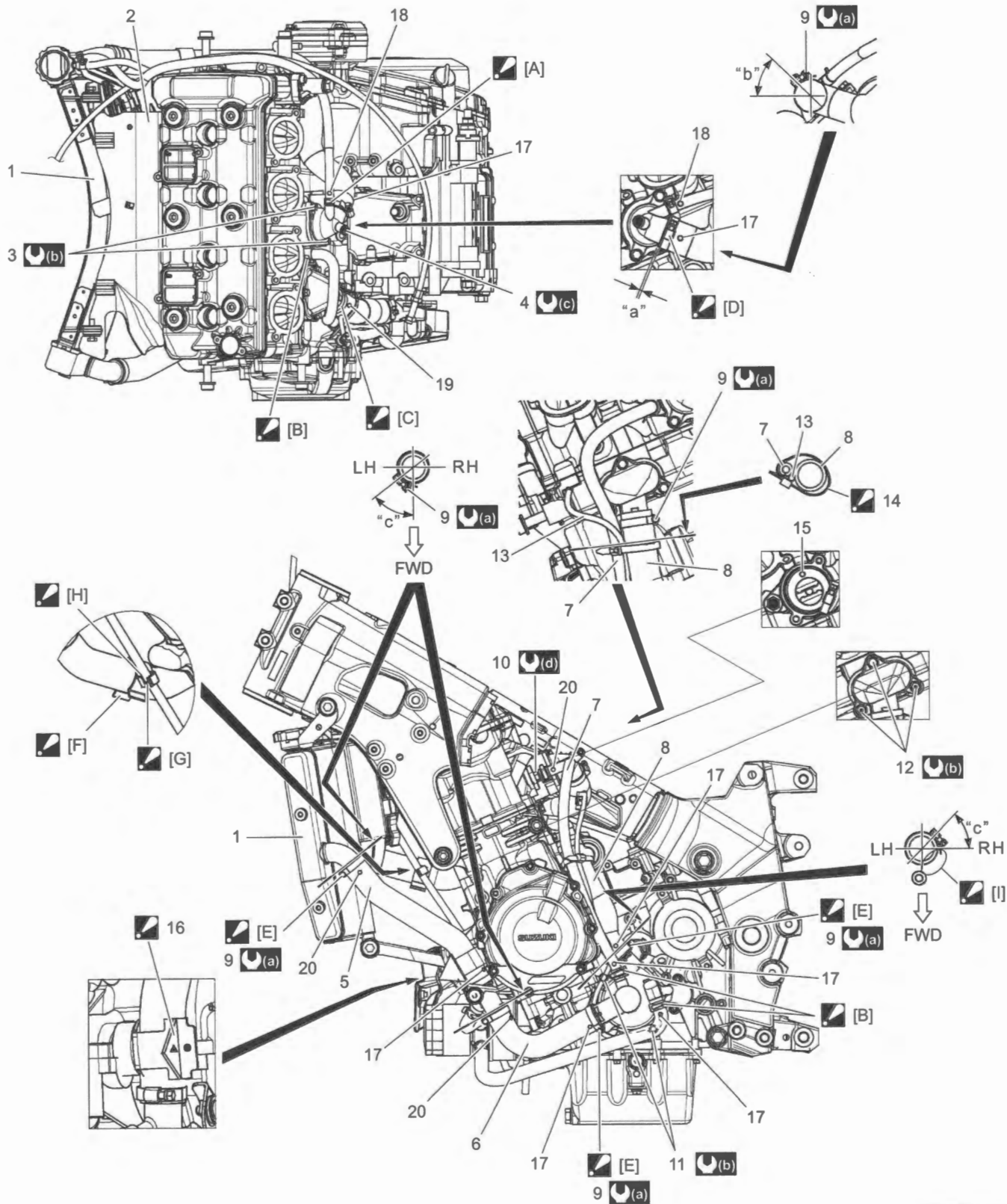
IF04K1160001-02

Water Hose Routing Diagram



[A]: Face the clamp end downward.	7. Reservoir tank overflow hose
[B]: Face the clamp end to left side.	8. Oil cooler water inlet hose
[C]: Face the clamp end upward.	9. Oil cooler water outlet hose
[D]: Face the screw head to right side.	10. Water hose clamp screw
[E]: Face the screw head to left side.	11. Radiator mounting bolt
[F]: Pass the clutch cable under the air bleed hose.	12. Radiator bracket bolt
[G]: Pass the reservoir tank overflow hose behind the reservoir tank.	13. Reservoir tank mounting bolt
[H]: Do not bend the reservoir tank overflow hose.	14. Oil cooler
[I]: Pass the reservoir tank overflow hose outside of the reservoir tank inlet hose.	15. O-ring
[J]: Align the air bleed hose and clutch cable.	16. Washer
[K]: Pass the air bleed hose under the cam chain tension adjuster.	17. Oil cooler union bolt
[L]: Datum point (Contact position of the hose and frame)	18. White mark
[M]: Keep clearance.	19. Match mark
[N]: Align the triangle mark of the reservoir tank cap with the reservoir tank overflow hose.	20. Yellow mark
[O]: Pass the reservoir tank overflow hose downward.	"a": 0 – 10 mm (0 – 0.39 in)
[P]: Face the yellow mark forward.	"b": 2 – 8 mm (0.08 – 0.31 in)
[Q]: Align the hose stopper with the match mark.	"c": 15 – 45°
[R]: Contact the stopper to the crankcase.	"d": 1 – 3 mm (0.04 – 0.11 in)
[S]: Insert the water hose until the stopper or align the match mark with the bulge.	"e": 90°
1. Radiator	(a) : 1.5 N·m (0.15 kgf·m, 1.10 lbf·ft)
2. Reservoir tank	(b) : 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
3. Radiator inlet hose	(c) : 6.0 N·m (0.61 kgf·m, 4.45 lbf·ft)
4. Reservoir tank inlet hose	(d) : 70 N·m (7.1 kgf·m, 52.0 lbf·ft)
5. Air bleed hose	(18221) : Apply thread lock to the thread part.
6. Clutch cable	: Do not reuse.

1F-4 Engine Cooling System:



[A]: Face the clamp end upward.	10. Bypass union
[B]: Face the clamp end to left side.	11. Water pump bolt
[C]: Face the screw head backward.	12. Water inlet connector mounting bolt
[D]: Face the screw head to right side.	13. GP switch lead wire
[E]: Face the screw head to left side.	14. Clamp : Clamp the water bypass hose, cylinder inlet hose and GP switch lead wire at upper than the protector of the cylinder inlet hose. Align the clamp and match mark on water bypass hose.
[F]: Face the open end of clamp downward.	15. Jiggle valve
[G]: Face the open end of clamp forward.	16. Water hose band : For installation, refer to "Water Hose Removal and Installation" (Page 1F-13).
[H]: Align the clamp with the match mark.	17. White mark
[I]: Do not contact the tip of clamp and water bypass hose.	18. Green mark
1. Radiator	19. Red mark
2. Radiator heat shield	20. Yellow mark
3. Thermostat connector cover bolt	"a": 2 – 6 mm (0.08 – 0.23 in)
4. Thermostat cover air bolt	"b": 30 – 60°
5. Radiator outlet hose	"c": 15 – 45°
6. Radiator outlet hose No.2	(a) : 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)
7. Water bypass hose	(b) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
8. Cylinder inlet hose	(c) : 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)
9. Water hose clamp screw	(d) : 12 N·m (1.2 kgf-m, 9.0 lbf-ft)

Diagnostic Information and Procedures

Engine Cooling Symptom Diagnosis

BENK07L21604001

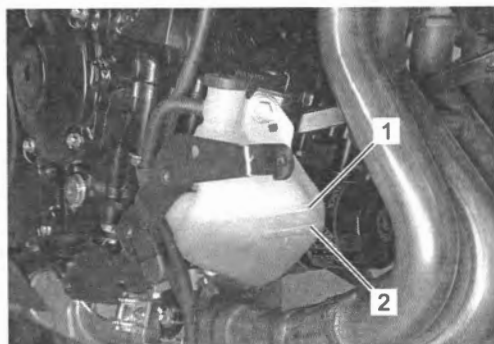
Condition	Possible cause	Correction / Reference Item
Engine overheats	Not enough engine coolant.	Add engine coolant. (Page 1F-6)
	Radiator core clogged with dirt or scale.	Clean. (Page 1F-11)
	Faulty cooling fan.	Repair or replace. (Page 1F-9)
	Defective cooling fan relay, or open-or-short circuited.	Repair or replace. (Page 1F-13)
	Clogged water passage.	Clean.
	Air trapped in the cooling circuit.	Bleed air. (Page 1F-6)
	Defective water pump.	Replace. (Page 1F-17)
	Use of incorrect engine coolant.	Replace. (Page 1F-6)
	Defective thermostat.	Replace. (Page 1F-14)
	Defective ECT sensor.	Replace. (Page 1C-8)
	Defective ECM.	Replace. (Page 1C-4)
	Damaged ISC valve.	Replace. (Page 1C-2)
	Incorrect ISC learning.	Reset learned value. (Page 1C-3)
Engine over cools	Defective cooling fan relay, or open-or-short circuited.	Repair or replace. (Page 1F-13)
	Extremely cold weather.	Put on radiator cover.
	Defective thermostat.	Replace. (Page 1F-14)
	Defective ECT sensor.	Replace. (Page 1C-8)
	Defective ECM.	Replace. (Page 1C-4)

Repair Instructions

Engine Coolant Level Inspection

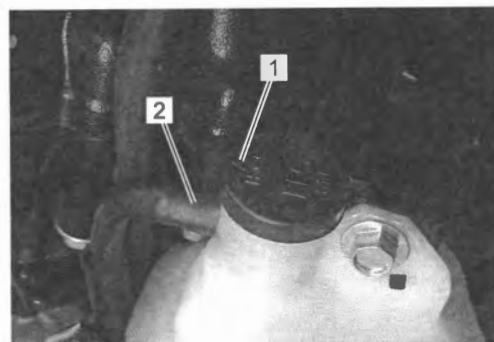
BENK07L21606001

- 1) Keep the motorcycle upright.
- 2) Remove the right under cowling and under cowling cover. (Page 9D-42)
- 3) 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, add engine coolant to the bottom of full line from the engine coolant reservoir tank filler.



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- 4) Install the reservoir tank cap by aligning the match mark (1) and reservoir tank overflow hose (2).



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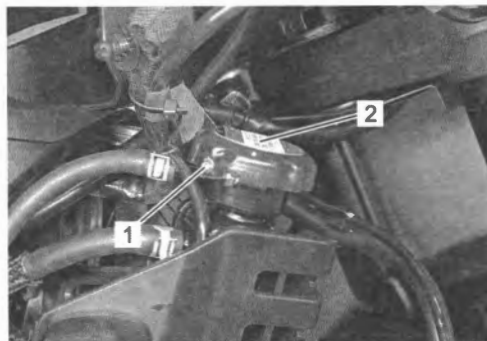
- 5) Install the removed parts.

Engine Coolant Replacement

BENK07L21606002

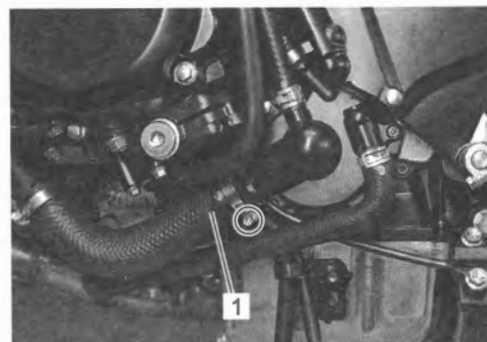
Refer to "Engine Coolant Description" (Page 1F-1).

- 1) Support the motorcycle upright.
- 2) Remove the under cowlings and under cowling cover. (Page 9D-42)
- 3) Lift and support the fuel tank. (Page 1G-11)
- 4) Remove the radiator cap screw (1) and radiator cap (2).



IK07L1160004-01

- 5) Disconnect the radiator outlet hose No.2 (1) and drain engine coolant.



IF04K1160006-01

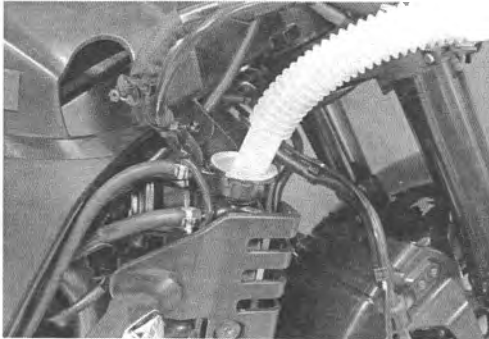
- 6) Flush the radiator with fresh water if necessary.
- 7) Connect the radiator outlet hose No.2. (Page 1F-2)

- 8) Pour the specified engine coolant up to the radiator inlet.

Engine coolant

Engine side [Standard]: Approx. 2500 ml (2.64 US qt, 2.20 Imp qt)

Reservoir tank side [Standard]: Approx. 250 ml (0.26 US qt, 0.22 Imp qt)



IK07L1160005-01

- 9) Slowly swing the motorcycle, right and left, to bleed the air trapped in the cooling circuit.
- 10) Add engine coolant up to the radiator inlet.
- 11) Close the radiator cap securely.
- 12) Start up the engine at idle speed for few minutes.
- 13) Stop the engine and wait until the engine cools down fully.
- 14) Open the radiator cap and add engine coolant up to the radiator inlet.
- 15) Repeat the 11) – 14) procedures until no air bleeds from the radiator inlet.
- 16) Loosen the thermostat cover air bolt (1) and check the engine coolant flows out.



IF04K1160063-01

- 17) Tighten the thermostat cover air bolt to the specified torque.

Tightening torque

Thermostat cover air bolt: 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)

- 18) Install the radiator cap and tighten the radiator cap screw.
- 19) After warming up and cooling down the engine several times, add the engine coolant up to the full level of the reservoir. (Page 1F-6)
- 20) Install the removed parts.

Engine Cooling System Inspection

BENK07L21606003

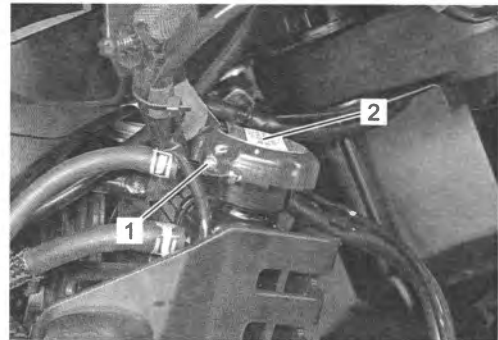
- 1) Remove the right side cover assembly. (Page 9D-22)
- 2) Remove the radiator cap screw (1) and radiator cap (2).
- 3) Connect the special tool to the filler.
- 4) Pressurize the cooling system with approx. 137.4 kPa (1.4 kgf/cm², 19.9 psi) of pressure, and then check if it holds the pressure for 10 seconds.

NOTICE

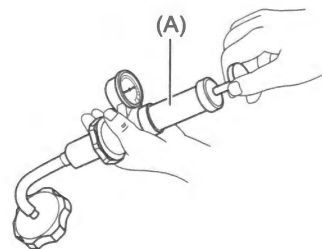
Do not exceed the radiator cap release pressure, or the radiator cap and subsequently the radiator, can be damaged.

Special tool

(A): 09918-78211



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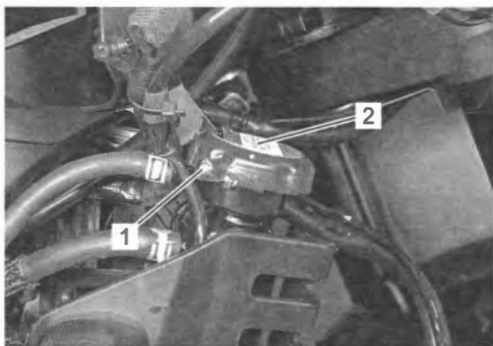
- 5) Install the removed parts.

Radiator Cap Inspection

BENK07L21606004

Refer to "Engine Cooling System Inspection" (Page 1F-7).

- 1) Remove the right side cover assembly. ⚙️ (Page 9D-22)
- 2) Remove the radiator cap screw (1) and radiator cap (2).



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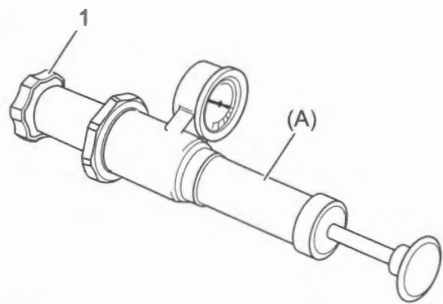
- 3) Attach the radiator cap (1) to the special tool as shown in the figure.
- 4) Slowly apply pressure to the radiator cap. If the radiator cap does not hold the pressure for at least 10 seconds, replace it with a new one.

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



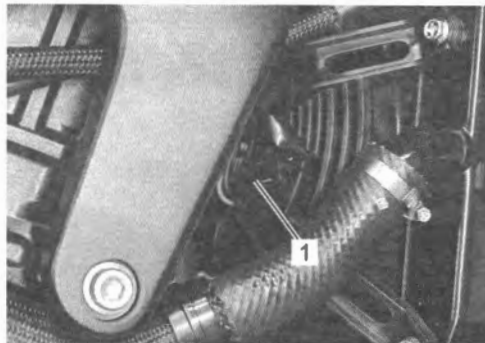
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- 5) Install the removed parts.

Cooling Fan On-Vehicle Inspection

BENK07L21606005

- 1) Disconnect the cooling fan motor coupler (1).



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- 2) Test the cooling fan motor (3) for load current with an ammeter (2) connected as shown in the figure. If the fan motor does not turn, replace the cooling fan assembly with a new one. ⚙️ (Page 1F-9)

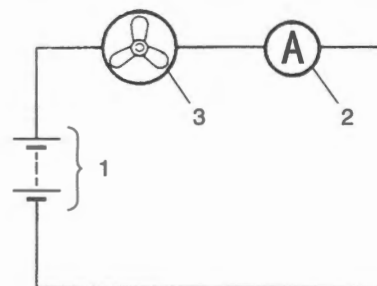
NOTE

- 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 5.4 A.

Cooling fan operating temperature

OFF→ON [Standard]: Approx. 105 °C (221 °F)

ON→OFF [Standard]: Approx. 100 °C (212 °F)



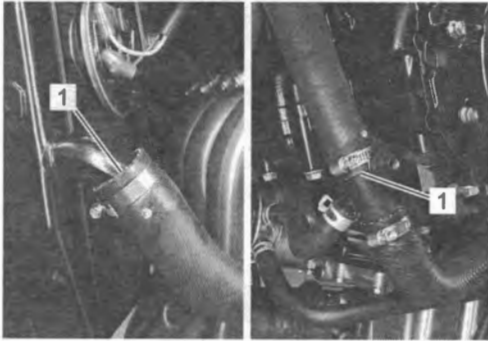
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- 3) After finishing the cooling fan inspection, install the removed parts.

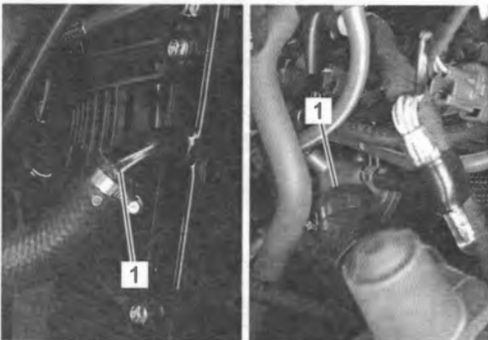
Radiator Hose Inspection

BENK07L21606006

- 1) Remove the left under cowling. (Page 9D-42)
- 2) Lift and support the fuel tank. (Page 1G-11)
- 3) Check the radiator hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.
- 4) Any leakage from the connecting section (1) should be corrected by proper tightening. (Page 1F-2)



IF04K1160012-02



IF04K1160013-01

- 5) After finishing the radiator hose inspection, install the removed parts.

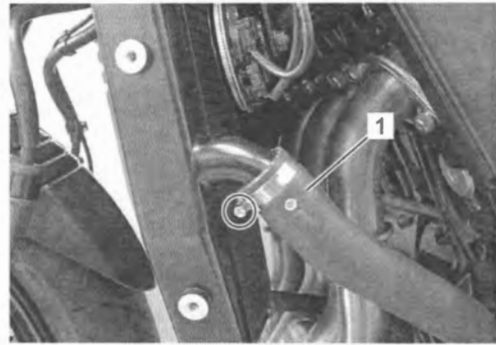
Radiator / Cooling Fan Motor Removal and Installation

BENK07L21606007

Removal

- 1) Remove the following parts.
 - Side cover assemblies: (Page 9D-22)
 - Frame body cover assemblies: (Page 9D-26)
 - Frame body upper covers: (Page 9D-26)
- 2) Drain engine coolant. (Page 1F-6)

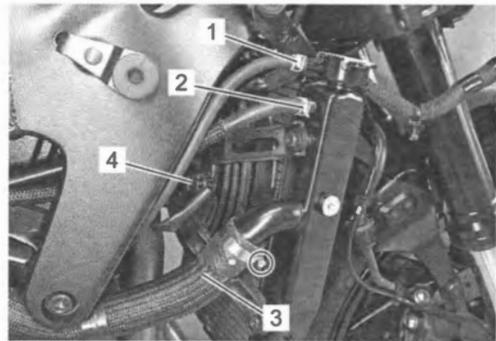
- 3) Disconnect the radiator outlet hose (1).



IK07L1160007-01

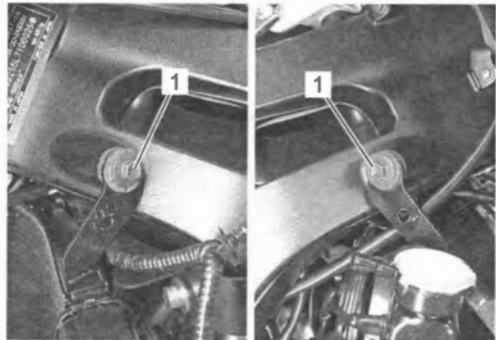
- 4) Disconnect the reservoir tank inlet hose (1), air bleed hose (2) and radiator inlet hose (3).

- 5) Disconnect the cooling fan motor coupler (4).

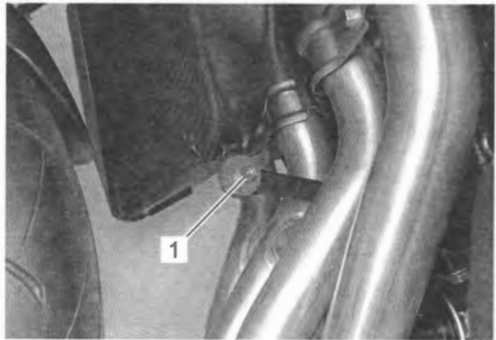


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- 6) Remove the radiator mounting bolts (1).

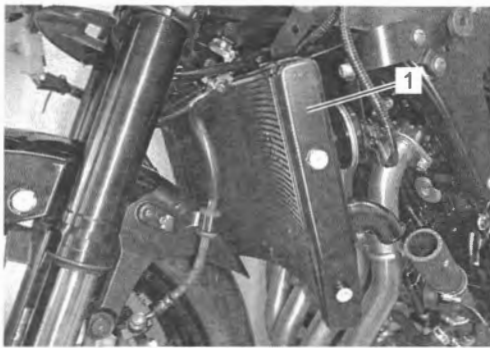


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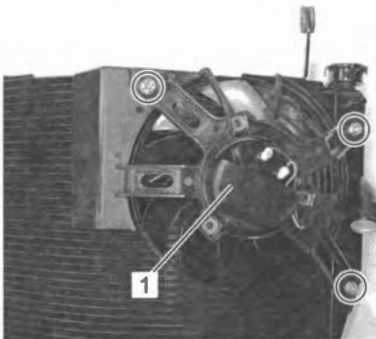
IK07L1160024-01

7) Remove the radiator (1).



IK07L1160006-01

8) Remove the cooling fan motor (1).



IF04K1160018-02

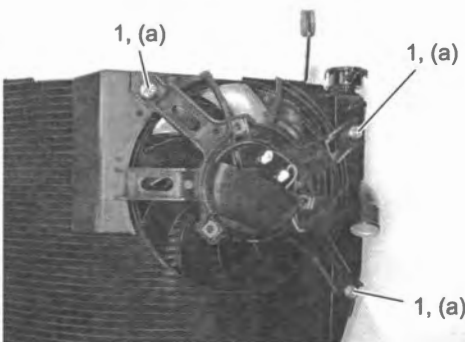
Installation

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

- Tighten the cooling fan assembly mounting bolts (1) to the specified torque.

Tightening torque

Cooling fan assembly mounting bolt (a): 8.4 N·m (0.86 kgf-m, 6.20 lbf-ft)

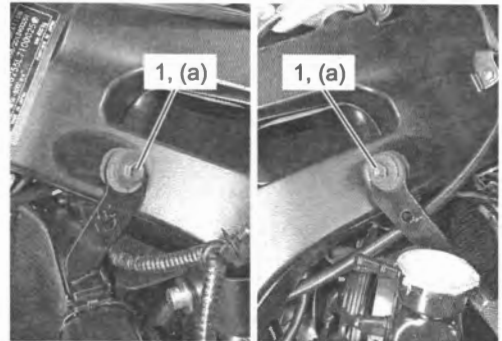


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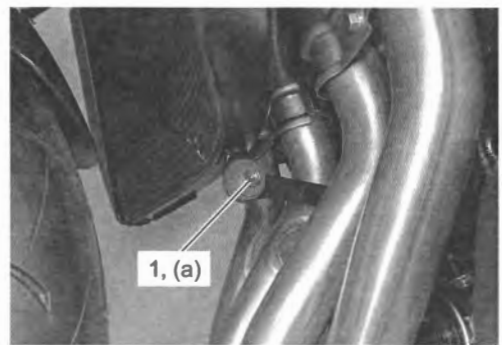
- Tighten the radiator mounting bolts (1) to the specified torque.

Tightening torque

Radiator mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IK07L1160010-01

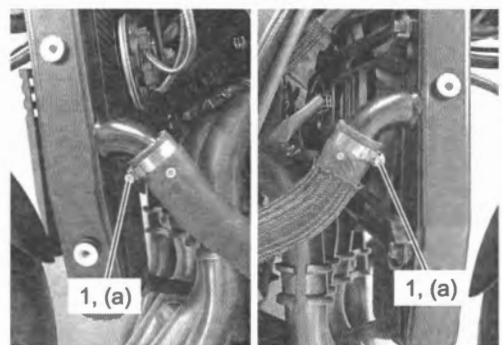


IK07L1160011-01

- Tighten the water hose clamp screws (1) to the specified torque.

Tightening torque

Water hose clamp screw (a): 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)



IK07L1160012-01

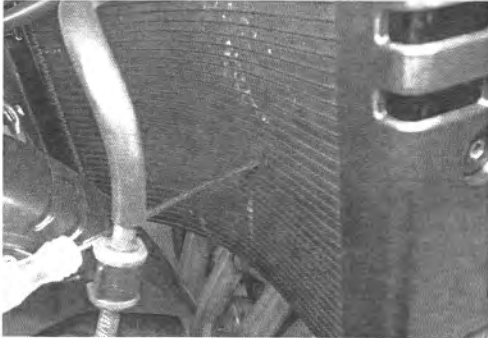
- Connect the radiator hoses securely. ↻(Page 1F-2)
- Pour engine coolant. ↻(Page 1F-6)

Radiator Inspection and Cleaning

BENK07L21606008

Inspection

- 1) Inspect the radiator for coolant leaks. If any defects are found, replace the radiator with a new one.
- 2) If the fins are bent or dented, repair them by carefully straightening them with the blade of a small screwdriver.



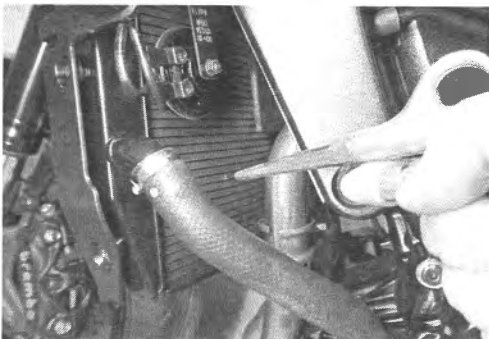
IK07L1160013-01

Cleaning

Blow out any foreign matter that is stuck in the radiator fins using compressed air.

NOTICE

- Do not bend the fins when using compressed air.
- Apply compressed air from the engine side. If compressed air is applied from the other side, dirt will be forced into the pores of radiator.

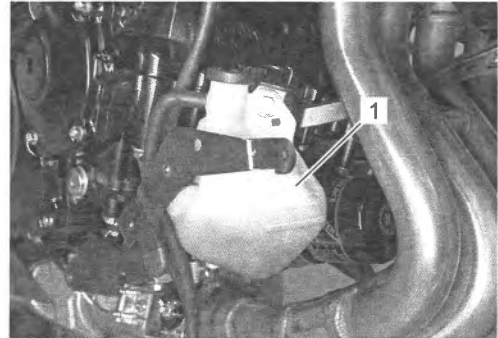


IK07L1160014-01

Radiator Reservoir Tank Inspection

BENK07L21606009

- 1) Remove the right under cowling and under cowling cover. (Page 9D-42)
- 2) Inspect the radiator reservoir tank (1) coolant leaks. If any defects are found, replace the radiator reservoir tank with a new one.



IK07L1160015-01

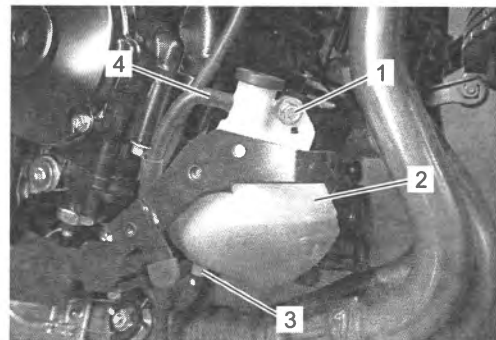
- 3) Install the removed parts.

Radiator Reservoir Tank Removal and Installation

BENK07L21606010

Removal

- 1) Remove the right under cowling and under cowling cover. (Page 9D-42)
- 2) Remove the reservoir tank bolt (1) and reservoir tank (2).
- 3) Disconnect the reservoir tank inlet hose (3) and drain engine coolant.
- 4) Disconnect the reservoir tank overflow hose (4).



IK07L1160016-01

1F-12 Engine Cooling System:

Installation

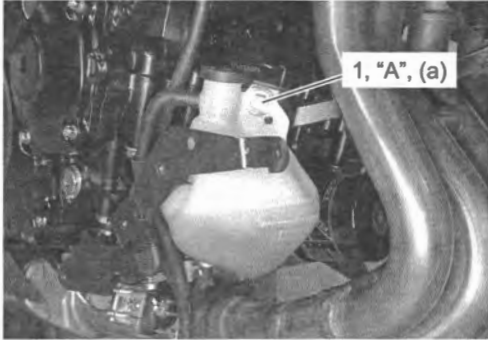
Install the radiator reservoir tank in the reverse order of removal. Pay attention to the following points:

- Apply thread lock to the reservoir tank mounting bolt (1) and then tighten the bolt (1) to the specified torque.

“A”: Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

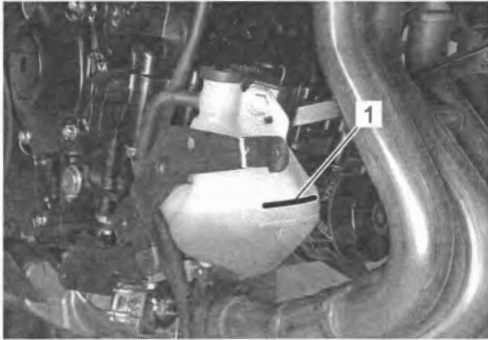
Tightening torque

Reservoir tank mounting bolt (a): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)



IK07L1160017-01

- Fill the reservoir tank to the upper level (1). (Page 1F-6)



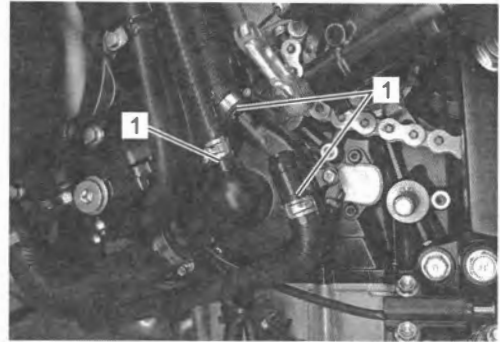
IK07L1160018-01

Water Hose Inspection

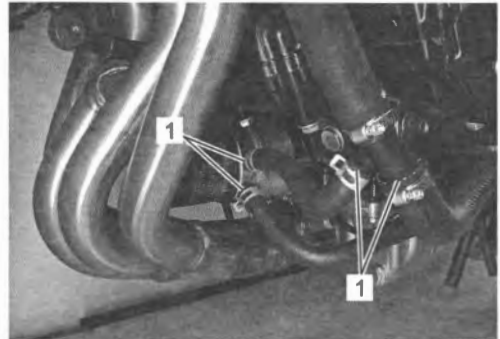
BENK07L21606011

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Remove the left under cowling. (Page 9D-42)
- 3) Remove the engine sprocket cover. Refer to “Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation” in Section 5C (Page 5C-10).
- 4) Check the water hoses for crack, damage or engine coolant leakage. If any defect is found, replace the water hose with a new one.

- 5) Any leakage from the connecting section (1) should be corrected by proper tightening. (Page 1F-2)



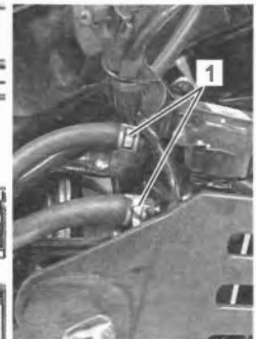
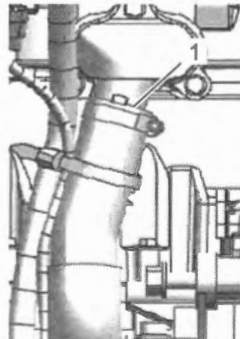
IF04K1160028-02



IF04K1160029-01



IF04K1160030-01



IK07L1160019-01

- 6) After finishing the water hose inspection, install the removed parts.

Water Hose Removal and Installation

BENK07L21606012

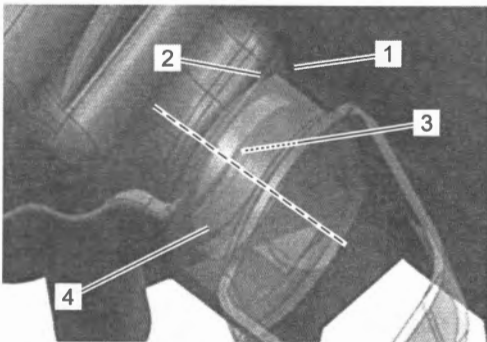
Removal

- 1) Drain engine coolant. (Page 1F-6)
- 2) Lift and support the fuel tank. (Page 1G-11)
- 3) Remove the left under cowling. (Page 9D-42)
- 4) Remove the engine sprocket cover. Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-10).
- 5) Remove the water hoses and water hose band. (Page 1F-2)

Installation

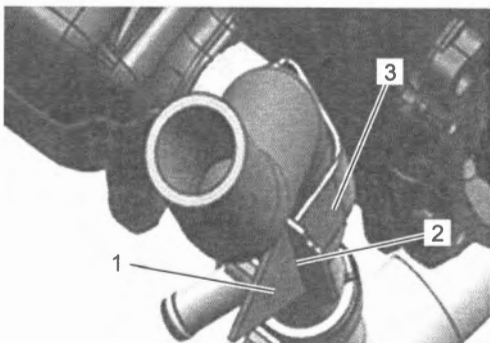
Install the water hose in the reverse order of removal. Pay attention to the following point:

- Install the water hose band to the radiator outlet hose as follows:
 - a. Fit the corner (1) of band cushion to the corner (2) of crankcase.
 - b. Align the center of balancer plug (3) with the center of band cushion (4).



IK07L1160020-02

- c. Insert the triangle part (1) into the slit (2) of water hose band (3).



IK07L1160021-01

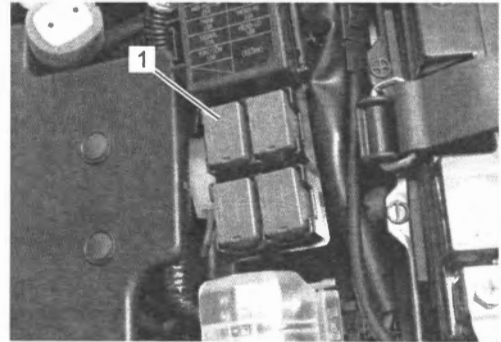
Cooling Fan Relay Inspection

BENK07L21606013

NOTE

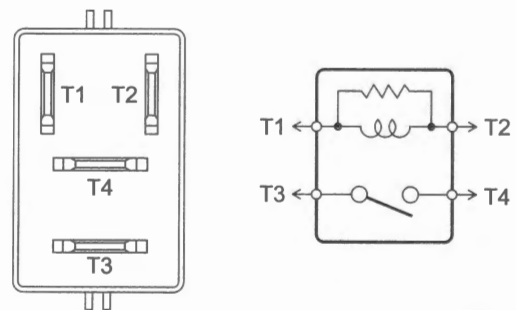
Cooling fan relay, fuel pump relay, side-stand relay and high beam relay are same parts.

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Remove the cap and cooling fan relay (1).



IK07L1160028-01

- 4) Check that there is no continuity between terminals "T3" and "T4".
If there is faulty condition, replace the cooling fan relay.
- 5) Check that there is continuity between terminals "T1" and "T2".
If there is faulty condition, replace the cooling fan relay.
- 6) Connect the battery positive (+) terminal and negative (-) terminal between terminals "T1" and "T2", and check for continuity between terminals "T3" and "T4".
If there is no continuity when the relay is connected to the battery, replace the cooling relay.



IK07L1160025-01

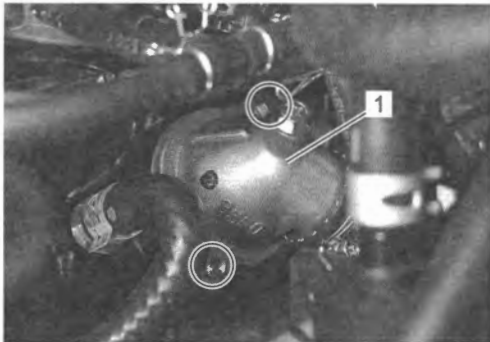
- 7) After finishing the cooling fan relay inspection, install the removed parts.

Thermostat Removal and Installation

BENK07L21606014

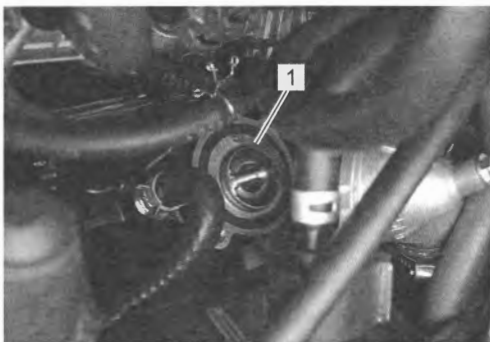
Removal

- 1) Drain engine coolant. (Page 1F-6)
- 2) Lift and support the fuel tank. (Page 1G-11)
- 3) Place a rag under the thermostat connector cover (1) and then remove the thermostat connector cover (1).



IF04K1160033-01

- 4) Remove the thermostat (1).



IF04K1160034-01

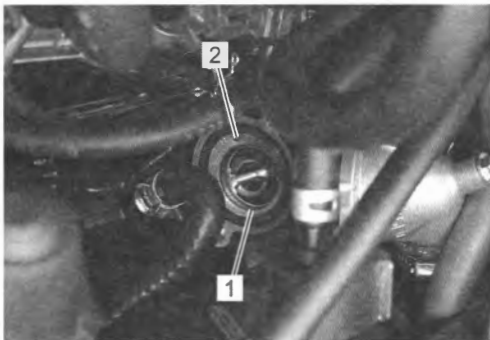
Installation

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

- Install the thermostat (1).

NOTE

The jiggle valve (2) of the thermostat faces upside.

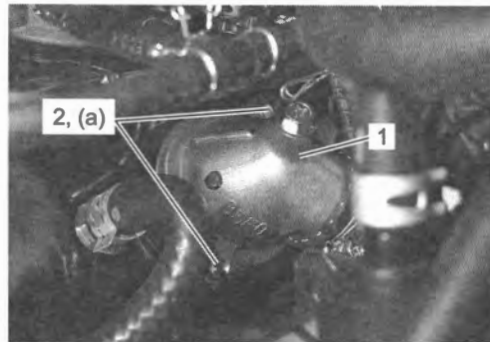


IF04K1160035-01

- Install the thermostat connector cover (1) and tighten the bolts (2) to the specified torque.

Tightening torque

Thermostat connector cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1160036-01

- Pour engine coolant and bleed air from the cooling system. (Page 1F-6)

Thermostat Inspection

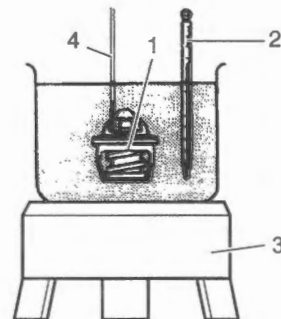
BENK07L21606015

- 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).



4. String

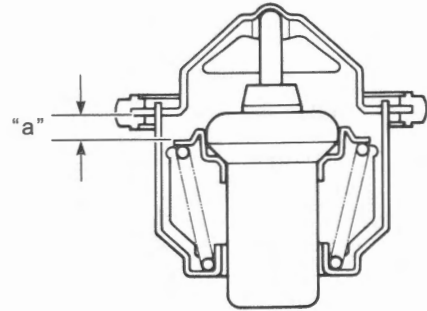
ID26J1160035-04

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]: Approx. 82 °C (179.6 °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.

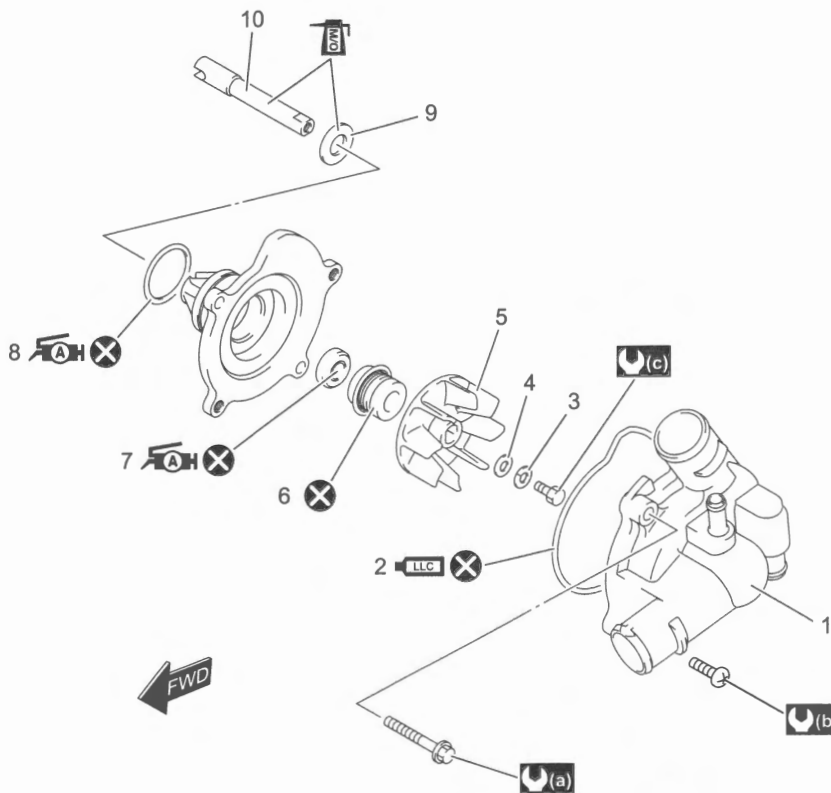
Thermostat valve lift
At 95 °C (203 °F) [Standard]: 8 mm (0.3 in) or more



1944H1160022-01

Water Pump Assembly Components

BENK07L21606016



IF04K1160069-02

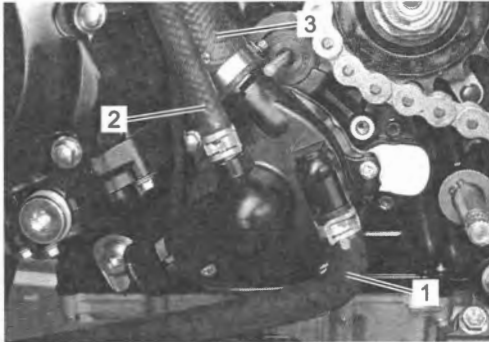
1. Water pump case	7. Oil seal	(c) : 8.0 N-m (0.82 kgf-m, 5.90 lbf-ft)
2. O-ring	8. O-ring	AH : Apply grease.
3. Washer	9. Washer	DML : Apply molybdenum oil solution.
4. Seal washer	10. Impeller shaft	LLC : Apply engine coolant.
5. Impeller	(a) : 10 N-m (1.0 kgf-m, 7.5 lbf-ft)	X : Do not reuse.
6. Mechanical seal	(b) : 5.5 N-m (0.56 kgf-m, 4.05 lbf-ft)	

Water Pump Removal and Installation

BENK07L21606017

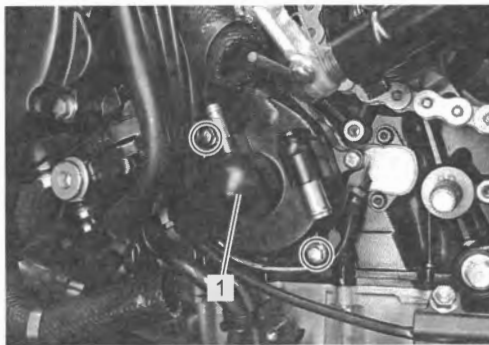
Removal

- 1) Drain engine oil. ☞(Page 1E-5)
- 2) Drain engine coolant. ☞(Page 1F-6)
- 3) Remove the engine sprocket cover. Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-10).
- 4) Disconnect the oil cooler water inlet hose (1), water bypass hose (2) and cylinder inlet hose (3).



IF04K1160037-03

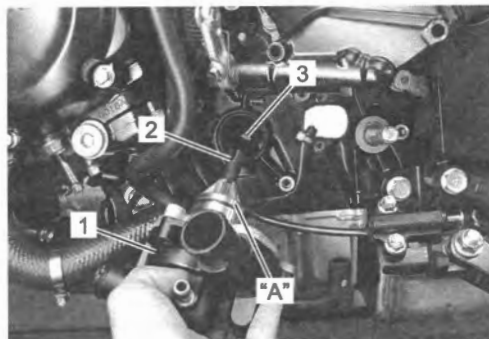
- 5) Remove the water pump (1).



IF04K1160038-01

Installation

- 1) Apply grease to the new O-ring.
"A": Grease 99000-25011 (SUZUKI SUPER GREASE A)
- 2) Install the water pump assembly (1) with the slot of the pump shaft end (2) securely engaged with the flat (3) of the oil pump shaft.

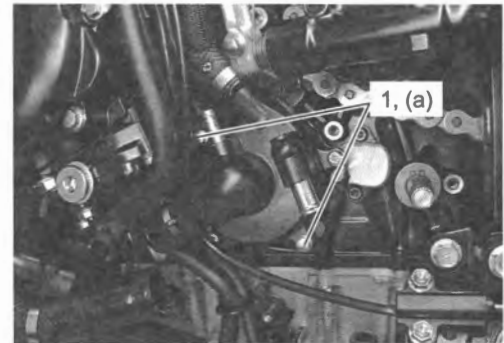


IF04K1160039-01

- 3) Tighten the water pump bolts (1) to the specified torque.

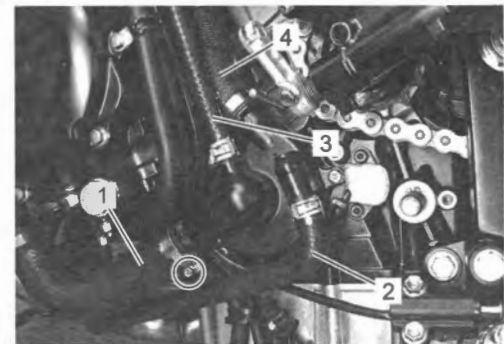
Tightening torque

Water pump bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1160040-01

- 4) Connect the radiator outlet hose No.2 (1), oil cooler water inlet hose (2), water bypass hose (3) and cylinder inlet hose (4). ☞(Page 1F-2)



IF04K1160041-03

- 5) Install the engine sprocket cover. Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-10).
- 6) Pour engine oil. ☞(Page 1E-5)
- 7) Pour engine coolant and bleed air from the cooling system. ☞(Page 1F-6)

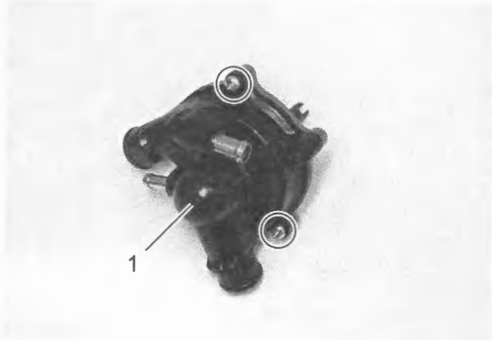
Water Pump Disassembly and Reassembly

BENK07L21606018

Refer to "Water Pump Removal and Installation" (Page 1F-16).

Disassembly

1) Remove the water pump case (1).



IF04K1160042-01

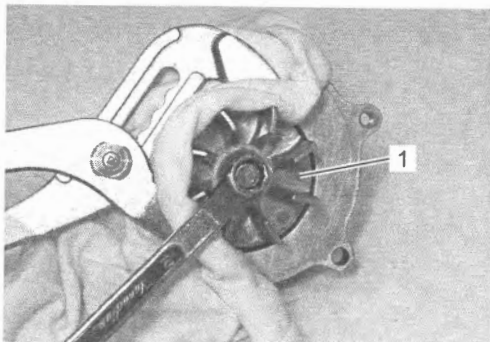
2) Remove the O-ring (1).



IF04K1160043-01

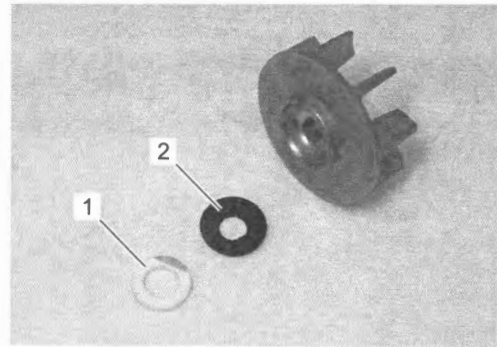
3) Remove the impeller securing bolt by holding the impeller (1) with a water pump pliers.

4) Remove the impeller (1).



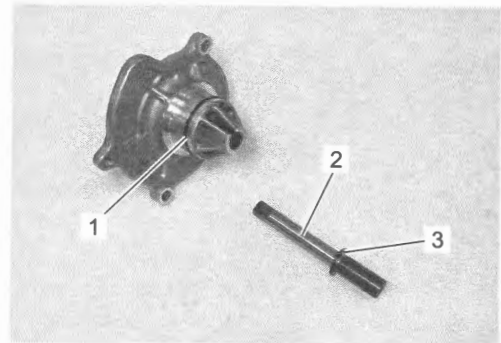
IF04K1160044-01

5) Remove the mechanical seal ring (1) and rubber seal (2).



IF04K1160045-01

6) Remove the O-ring (1), impeller shaft (2) and washer (3).

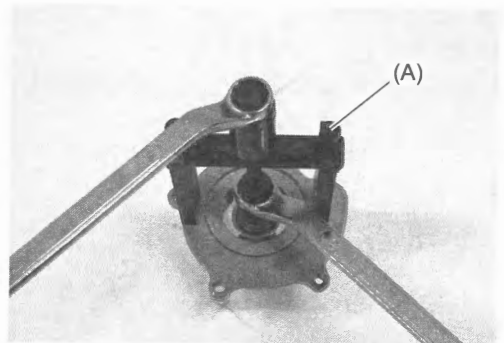


IF04K1160062-01

7) Remove the mechanical seal using the special tool.

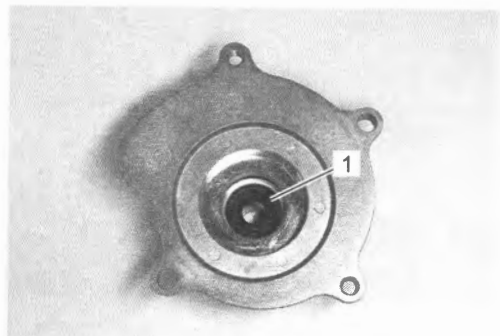
Special tool

(A): 09921-20240



IF04K1160046-01

8) Remove the oil seal (1).



IF04K1160047-01

Reassembly

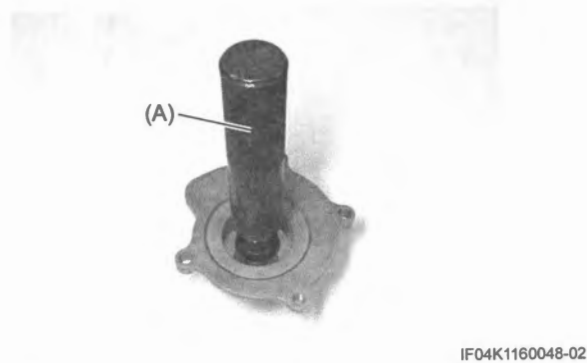
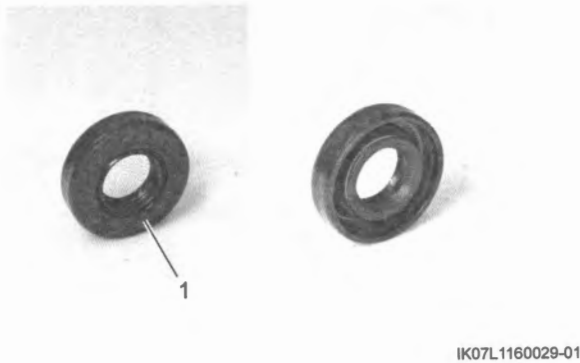
- 1) Install the new oil seal with the special tool.

NOTE

Face the flat side (1) of the oil seal to the mechanical seal side.

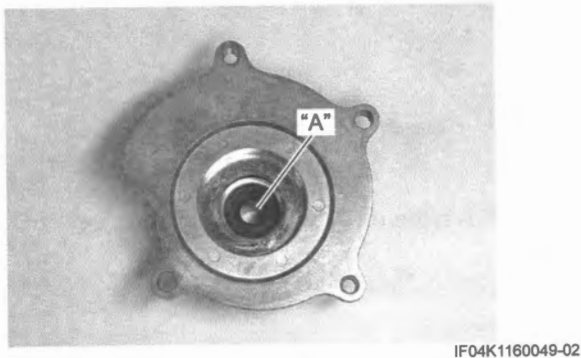
Special tool

(A): 09913-70210



- 2) Apply grease to the oil seal lip.

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



- 3) Install the new mechanical seal using a suitable size socket wrench.

NOTE

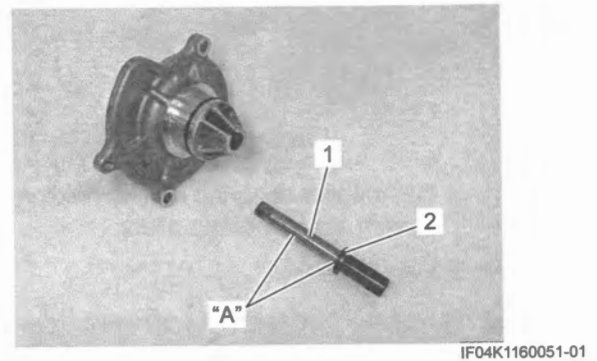
On the new mechanical seal, the sealer has been applied.



- 4) Apply molybdenum oil solution to the impeller shaft (1) and washer (2).

"A": Assembly lubrication (Molybdenum oil solution)

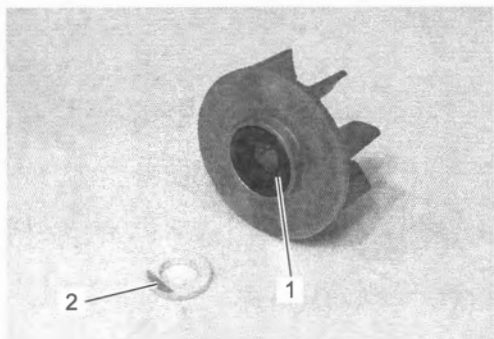
- 5) Install the impeller shaft (1) and washer (2) to the water pump holder.



- 6) Install the rubber seal (1) into the impeller.
- 7) After wiping off the oily or greasy matter from the mechanical seal ring, install it into the impeller.

NOTE

- The paint marked side (2) of the mechanical seal ring faces the rubber seal (1).
- Make sure the mechanical seal ring is fit into the impeller.

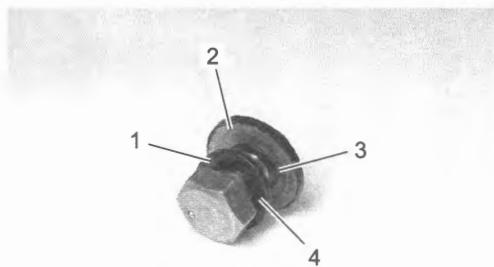


IF04K1160052-01

- 8) Install the washer (1) and seal washer (2) onto the impeller securing bolt.

NOTE

The metal side (3) of seal washer and the curved side (4) of washer face the impeller securing bolt head.

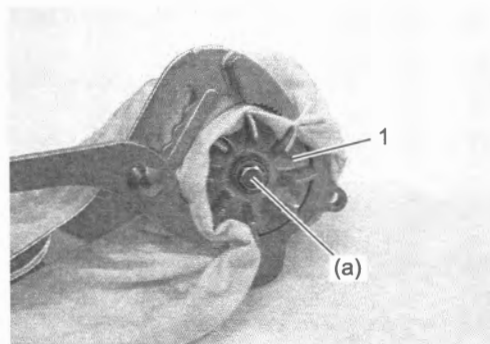


IF04K1160053-01

- 9) Install the impeller (1).
- 10) Hold the impeller with water pump pliers and tighten the impeller securing bolt to the specified torque.

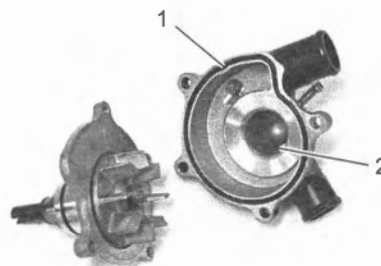
Tightening torque

Impeller securing bolt (a): 8.0 N·m (0.82 kgf-m, 5.90 lbf-ft)



IF04K1160054-02

- 11) Install the new O-ring (1) to the water pump case (2) and apply engine coolant to it.

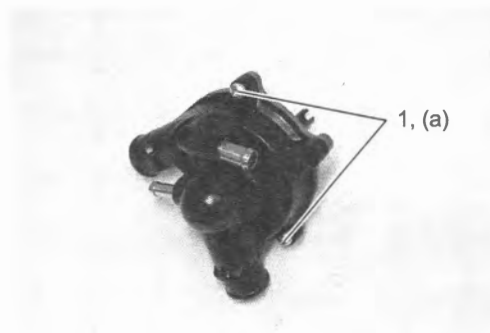


IF04K1160055-01

- 12) Tighten the screws (1) to the specified torque.

Tightening torque

Water pump case screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IF04K1160056-01

Water Pump Related Parts Inspection

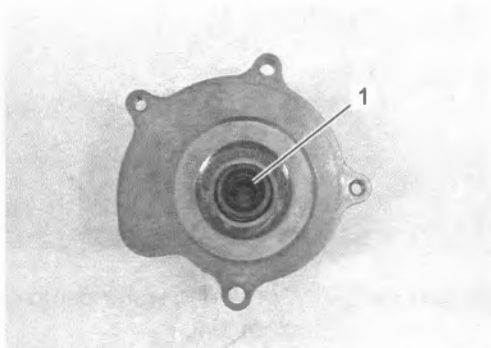
BENK07L21606019

Refer to "Water Pump Disassembly and Reassembly" (Page 1F-17).

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.

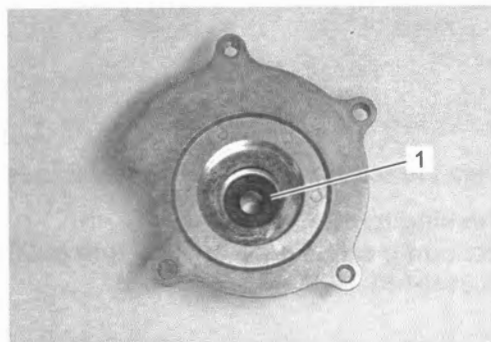


IF04K1160057-01

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.

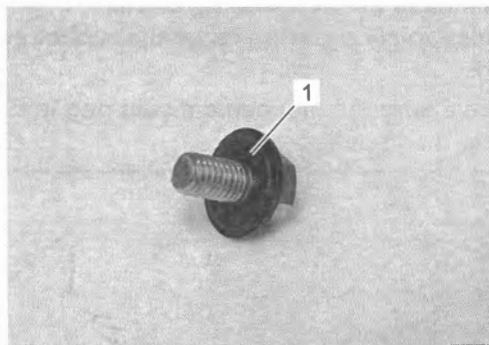


IF04K1160058-01

Seal Washer

Visually inspect the seal washer (1) for damage, with particular attention given to the sealing face.

Replace the seal washer (1) that shows indications of leakage.

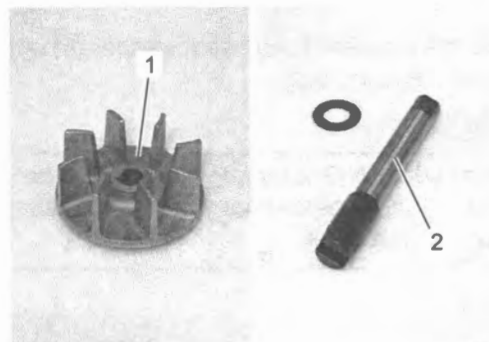


IF04K1160059-01

Impeller / Shaft

Visually inspect the impeller (1) and its shaft (2) for damage.

Replace the impeller (1) or shaft (2) if necessary.

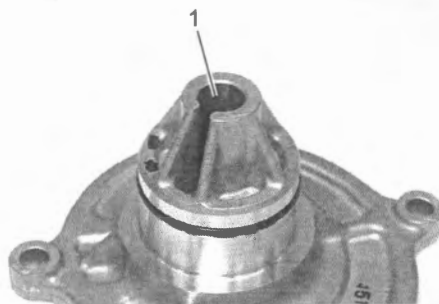


IF04K1160060-01

Impeller Shaft Journal

Visually inspect the journal (1) for damage or scratch.

Replace the holder if necessary.



IF04K1160061-01

Specifications

Tightening Torque Specifications

BENK07L21607001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Thermostat cover air bolt	6.0	0.61	4.45	☞ (Page 1F-7)
Cooling fan assembly mounting bolt	8.4	0.86	6.20	☞ (Page 1F-10)
Radiator mounting bolt	10	1.0	7.5	☞ (Page 1F-10)
Water hose clamp screw	1.5	0.15	1.10	☞ (Page 1F-10)
Reservoir tank mounting bolt	6.0	0.61	4.45	☞ (Page 1F-12)
Thermostat connector cover bolt	10	1.0	7.5	☞ (Page 1F-14)
Water pump bolt	10	1.0	7.5	☞ (Page 1F-16)
Impeller securing bolt	8.0	0.82	5.90	☞ (Page 1F-19)
Water pump case screw	5.5	0.56	4.05	☞ (Page 1F-19)

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-15)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L21608001

Material	SUZUKI recommended product or Specification		Note
Assembly lubrication	Molybdenum oil solution	—	☞ (Page 1F-18)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞ (Page 1F-16) / ☞ (Page 1F-18)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞ (Page 1F-12)

NOTE

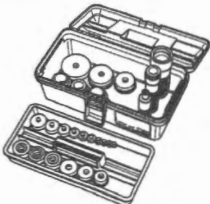

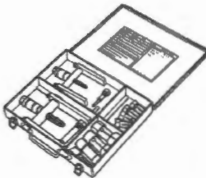
Required service material(s) is also described in:

“Water Hose Routing Diagram” (Page 1F-2)

“Water Pump Assembly Components” (Page 1F-15)

Special Tool

BENK07L21608002

09913-70210 Bearing installer set ☞ (Page 1F-18) 	09918-78211 Radiator cap tester kit ☞ (Page 1F-7) / ☞ (Page 1F-8) 
09921-20240 Bearing remover set ☞ (Page 1F-17) 	

Fuel System

Precautions

Precautions for Fuel System

BENK07L21700001

▲ WARNING

- Keep away from fire or spark.
 - During disassembling, use care to minimize spillage of gasoline.
 - Spilled gasoline should be wiped off immediately.
 - Work in a well-ventilated area.
-

▲ CAUTION

- To prevent the fuel system (fuel tank, fuel hose, etc.) from contamination with foreign particles, blind all openings.
 - After removing the throttle body, tape the cylinder intake section to prevent foreign particles from entering.
-

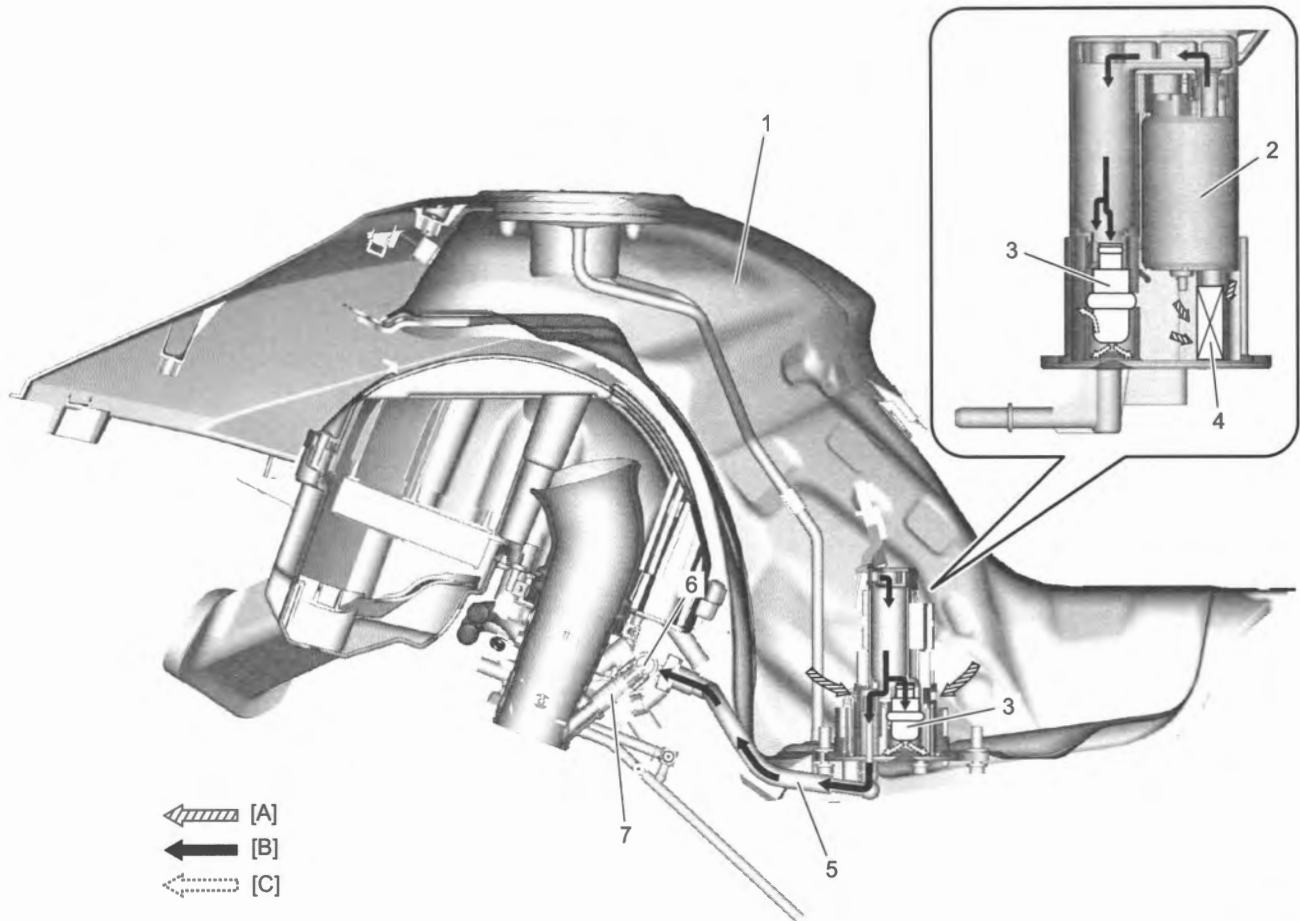
General Description

Fuel System Description

BENK07L21701001

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 the fuel is injected into the throttle body in conic dispersion when each injector opens according to the injection signal from the ECM. The fuel relieved by the fuel pressure regulator flows back to the fuel tank.



- ← [A]
- ← [B]
- ← [C]

[A]: Before-pressurized fuel	[B]: Pressurized fuel	[C]: Relieved fuel
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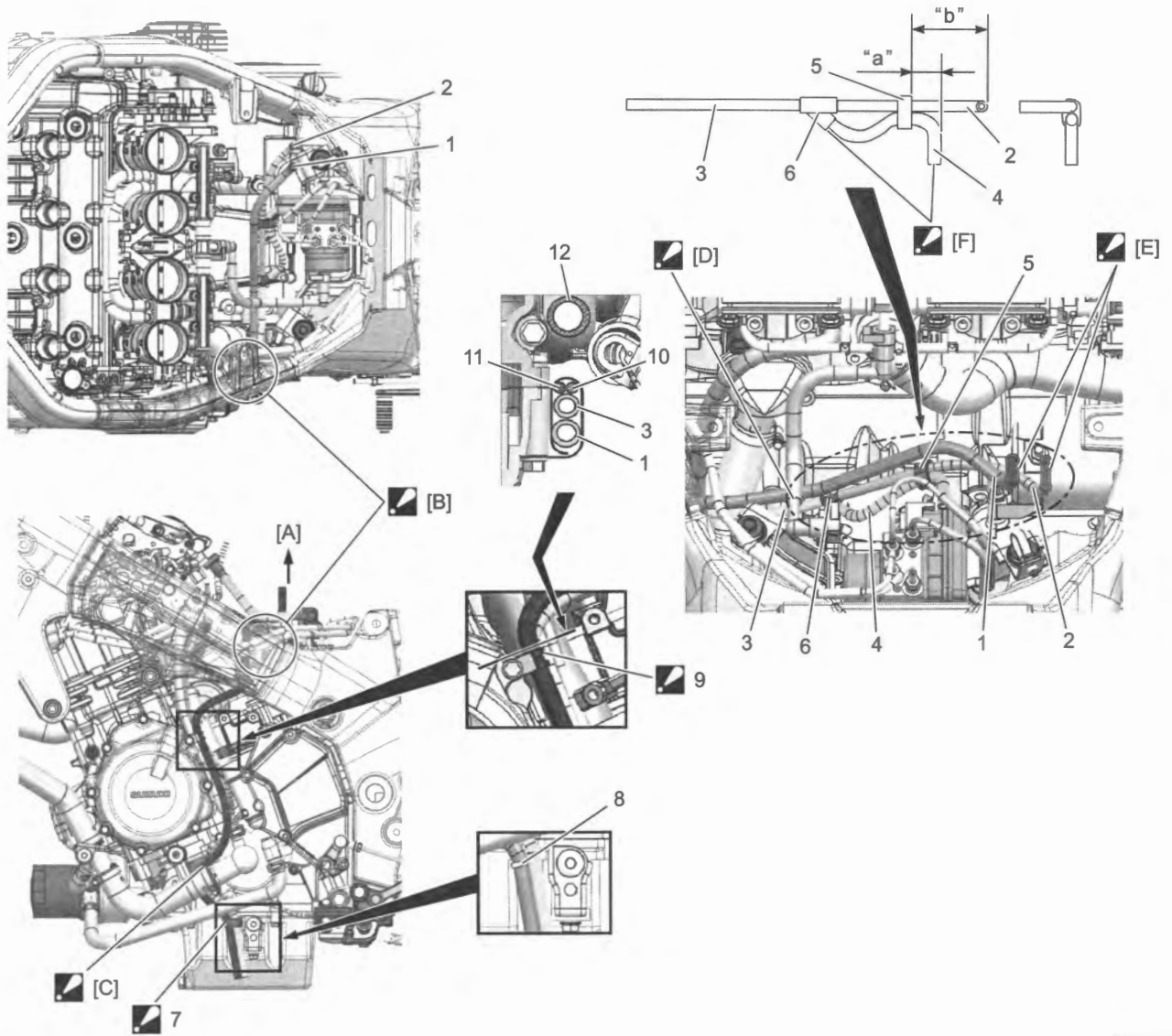
IK07L1120001-01

Schematic and Routing Diagram

Fuel Tank Water Drain Hose and Fuel Tank Breather Hose Routing Diagram

BENK07L21702001

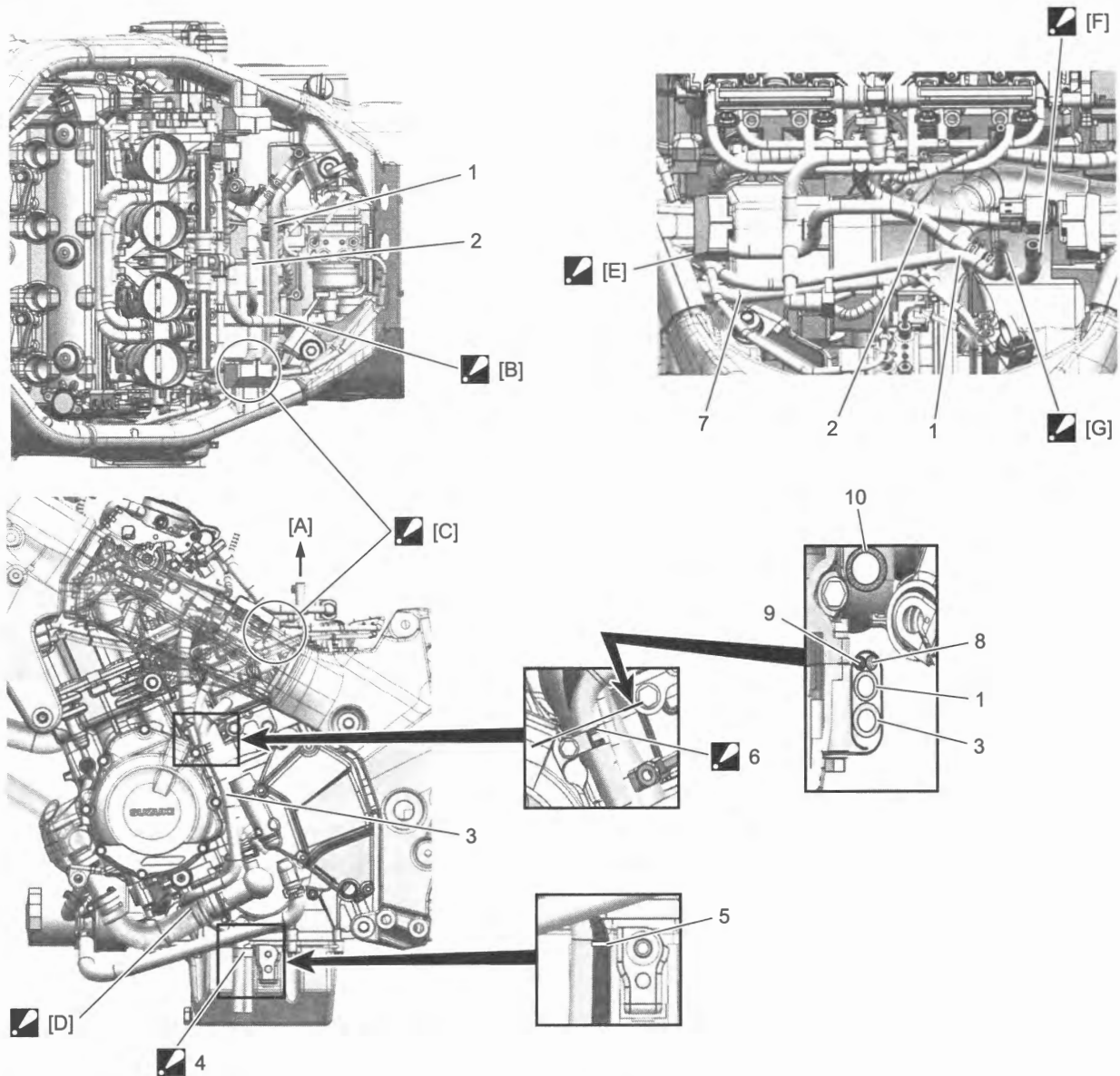
Without EVAP Control System



IK07L1170001-01

[A]: To fuel tank	5. Breather hose clamp
[B]: Pass the hoses inside of the brake pipes.	6. 3-way joint
[C]: Pass the fuel tank water drain hose and fuel tank breather hose No.2 inside of the radiator hose.	[7]: Clamp : Clamp the white marking of the hose within 10 mm (0.39 in).
[D]: Pass the hoses under the fuel feed hose.	8. White mark
[E]: Face the white marking of the hose to right side.	[9]: Clamp : Clamp the marking of the hose.
[F]: Match the direction of 3-way joint and fuel tank breather hose No.3.	10. Side-stand switch lead wire
1. Fuel tank water drain hose	11. HO2 sensor lead wire
2. Fuel tank breather hose No.1	12. Water bypass hose
3. Fuel tank breather hose No.2	"a": 10 – 30 mm (0.40 – 1.18 in)
4. Fuel tank breather hose No.3	"b": 90 – 110 mm (3.55 – 4.33 in)

With EVAP Control System



IK07L1170042-01

[A]: To fuel tank	3. Canister drain hose
☑ [B]: Pass the fuel tank water drain hose under the fuel feed hose.	☑ 4. Clamp : Clamp the white marking of the hose within 10 mm (0.39 in).
☑ [C]: Pass the fuel tank water drain hose inside of the brake pipes.	5. White mark
☑ [D]: Pass the drain hoses inside of the radiator hose.	☑ 6. Clamp : Clamp the marking of the hose.
☑ [E]: Pass the fuel tank water drain hose between the surge hose No.2 and purge hose No.1.	7. Purge hose No.1
☑ [F]: Face the clamp end forward. Face the yellow marking of the hose to right side.	8. Side-stand switch lead wire
☑ [G]: Face the white marking of the hose to right side.	9. HO2 sensor lead wire
1. Fuel tank water drain hose	10. Water bypass hose
2. Surge hose No.2	

Diagnostic Information and Procedures

Fuel System Symptom Diagnosis

BENK07L21704001

Refer to "Engine Symptom Diagnosis" in Section 1A (Page 1A-12).

Repair Instructions

Fuel Pressure Inspection

BENK07L21706001

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Place a clean rag under the fuel feed hose (1) and remove the fuel feed hose (1). (Page 1G-6)

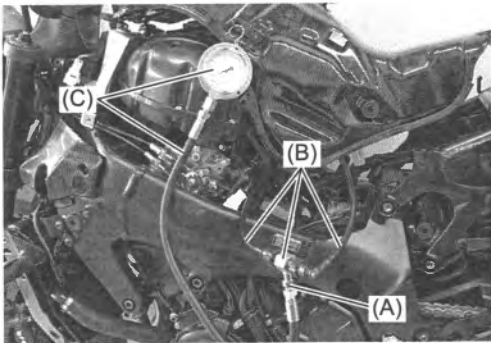


IK07L1170002-01

- 3) Install the special tools between the fuel pump and fuel delivery pipe.

Special tool

- (A): 09940-40211
 (B): 09940-40220
 (C): 09915-74511



IK07L1170003-01

- 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

Fuel pressure

[Standard]: 289 – 299 kPa (2.95 – 3.04 kgf/cm², 42.0 – 43.3 psi)

- 5) Remove the special tools.

▲ WARNING

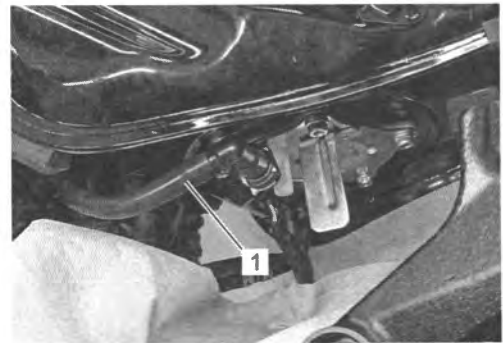
Before removing the special tools, turn the ignition switch OFF and release the fuel pressure slowly.

- 6) After finishing the fuel pressure inspection, install the removed parts.

Fuel Discharge Amount Inspection

BENK07L21706002

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Place a clean rag under the fuel feed hose (1) and disconnect the fuel feed hose (1). (Page 1G-6)

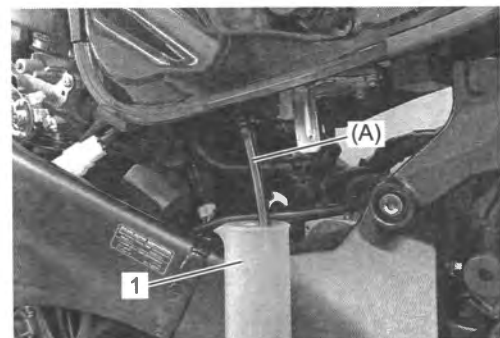


IK07L1170002-01

- 3) Connect a special tool to the fuel pump.
- 4) Place the measuring cylinder (1) and insert the special tool into the measuring cylinder (1).

Special tool

- (A): 09940-40220



IK07L1170004-01

- 5) Remove the fuel pump relay. (Page 1G-18)
- 6) Connect the fuel pump relay lead wire terminal (between R/W wire terminal (1) and Y/R 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

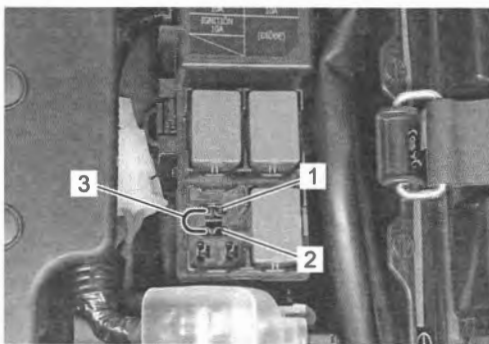
NOTE

The battery must be in fully charged condition.

FP discharge amount

Per 10 seconds

[Standard]: 223 ml (7.54 US oz, 7.85 Imp oz) or more



IK07L1170005-01

- 7) After finishing the fuel discharge inspection, install the removed parts.

Fuel Pressure Relief Procedure

BENK07L21706003

NOTICE

Performing this procedure when the engine is still hot can damage the catalyst. Wait until the engine has cooled down before performing this procedure.

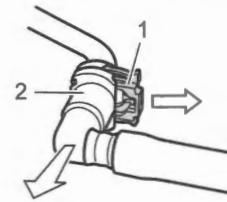
- 1) Check that the engine is cold.
- 2) Disconnect the fuel pump coupler. (Page 1G-11)
- 3) Start the engine and run it until the engine stops for lack of the fuel. Repeat cranking the engine 2 – 3 times for about 3 seconds each time to dissipate the fuel pressure in line. Fuel connections are now safe for servicing.
- 4) After servicing, install the removed parts.

Fuel Feed Hose Disconnection and Reconnection

BENK07L21706004

Disconnection

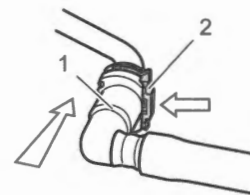
- 1) Relieve fuel pressure. (Page 1G-6)
- 2) Pull the retainer (1).
- 3) Disconnect the fuel feed hose joint (2) from fuel pipe.



IE31J1170034-01

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 Hose Inspection

BENK07L21706005

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Inspect the fuel feed hose (1) for damage and fuel leakage. If any defects are found, the fuel feed hose (1) must be replaced.



IK07L1170006-01

- 3) After finishing the fuel feed hose inspection, install the removed parts.

Fuel Feed Hose Removal and Installation

BENK07L21706006

Removal

- 1) Lift and support the fuel tank. ⚠(Page 1G-11)
- 2) Place a clean rag under the fuel feed hose (1).
- 3) Disconnect the fuel feed hose joints (2) and remove the fuel feed hose (1). ⚠(Page 1G-6)



IK07L1170007-01

Installation

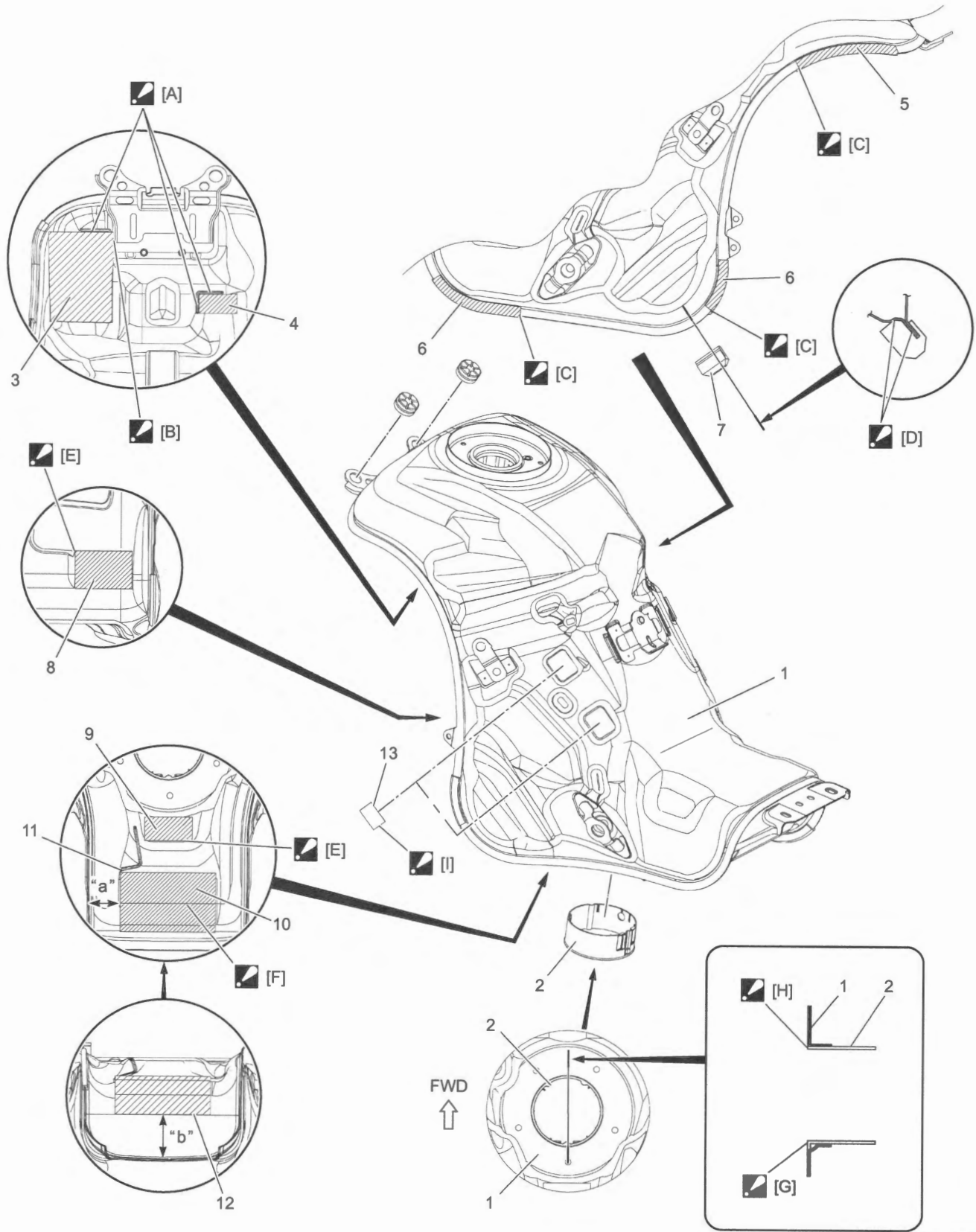
Install the fuel feed hose in the reverse order of removal.

Fuel Tank Construction










Fuel Tank Cover

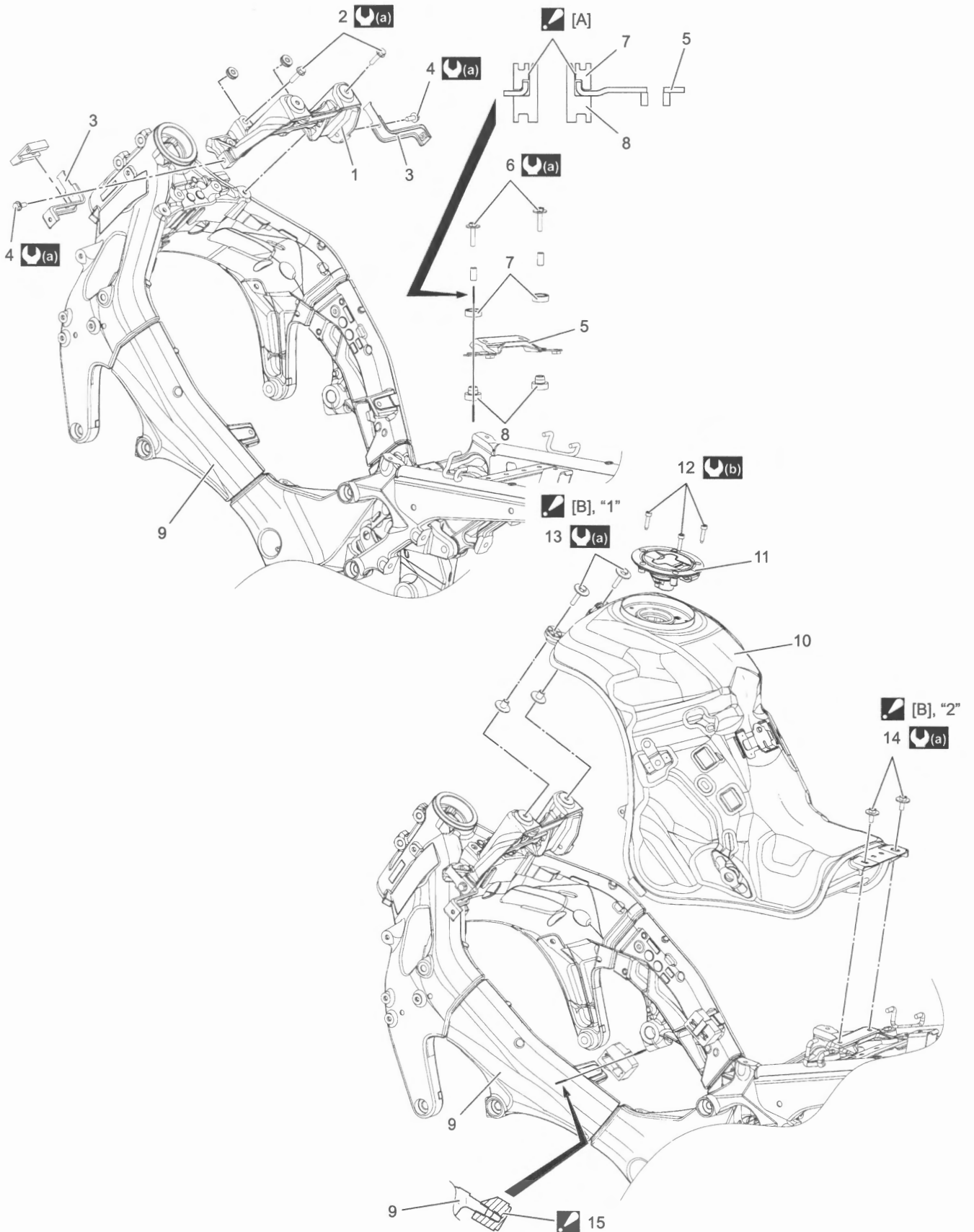
Refer to "Fuel Tank Cover Construction" in Section 9D (Page 9D-17).

Fuel Tank



1G-9 Fuel System:

 [A]: Clean the adhesive surface before sticking the cushion. Stick the cushion aligning with the fuel tank bead. Press the cushion after sticking.	4. Fuel tank inner cushion
 [B]: Stick the cushion aligning with the fuel tank front bracket.	5. Fuel tank molding (RH only)
 [C]: Insert the molding to the fuel tank flange after matching the molding end with the convex part of the flange.	6. Fuel tank molding (Both sides)
 [D]: Adhere the cushion to the flange inside and fuel tank inner with an adhesive.	7. Fuel tank side cushion (Both sides)
 [E]: Clean the adhesive surface before sticking the cushion. Stick the cushion in parallel with the end of curved surface after matching the corner of the cushion with the end of curved surface. Press the cushion after sticking.	8. Fuel tank inner No.1 cushion
 [F]: Clean the adhesive surface before sticking the cushion. Press the cushion after sticking.	9. Fuel tank center cushion
 [G]: Align the groove of the fuel tank inner vessel with the protrusion of the fuel tank.	10. Fuel tank inner No.3 cushion
 [H]: The fuel tank inner vessel must not protrude from the fuel pump fitting surface of the fuel tank.	11. End of bead
 [I]: Clean the adhesive surface before sticking the fastener. Stick the fastener aligning with the concave part of the fuel tank. Press the fastener after sticking.	12. End of curved surface
1. Fuel tank	13. Frame cover front fastener (Both sides)
2. Fuel tank inner vessel	"a": Approx. 33 mm (1.3 in)
3. Fuel tank inner No.2 cushion	"b": Approx. 45 mm (1.8 in)



1G-11 Fuel System:

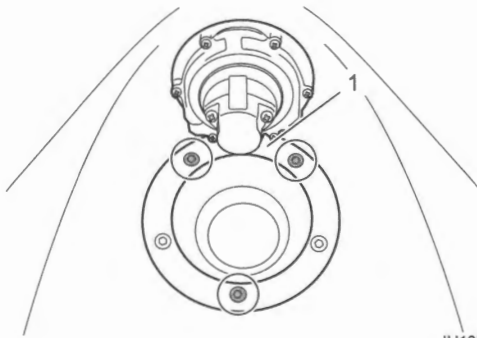
<ul style="list-style-type: none"> ☑ [A]: Adhere the cushions with an adhesive. ☑ [B]: Tighten the fuel tank rear bolts temporarily, and then tighten the bolts to the specified torque in order of "1" → "2". 	<ul style="list-style-type: none"> 9. Frame 10. Fuel tank
1. Fuel tank front bracket	11. Fuel tank cap
2. Fuel tank front bracket bolt	12. Fuel tank cap bolt
3. Fuel tank cover bracket	13. Fuel tank front bolt
4. Fuel tank cover bracket bolt	14. Fuel tank rear bolt
5. Fuel tank rear bracket	<ul style="list-style-type: none"> ☑ 15. Fuel tank side No.2 cushion : Insert the cushion to the frame until it contacts the frame edge.
6. Fuel tank rear bracket bolt	<ul style="list-style-type: none"> ⓐ : 10 N·m (1.0 kgf-m, 7.5 lbf-ft) ⓑ : 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)
7. Fuel tank rear upper cushion	
8. Fuel tank rear lower cushion	

Fuel Tank Cap Removal and Installation

BENK07L21706008

Removal

- 1) Open the fuel tank cap with the ignition key.
- 2) Remove the fuel tank cap (1).



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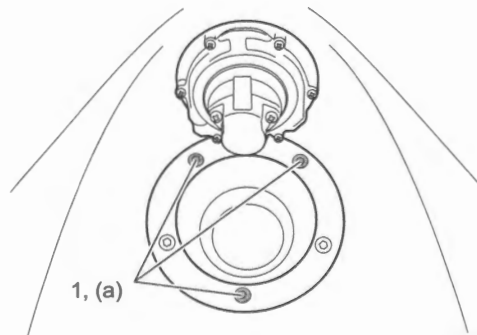
Installation

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)



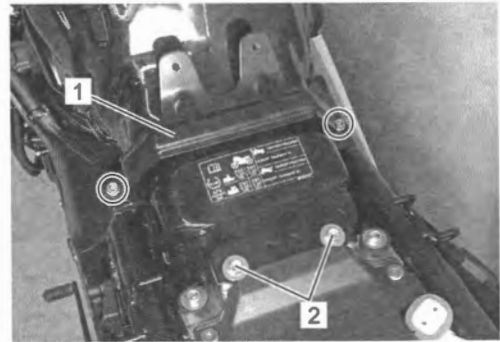
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Fuel Tank Removal and Installation

BENK07L21706009

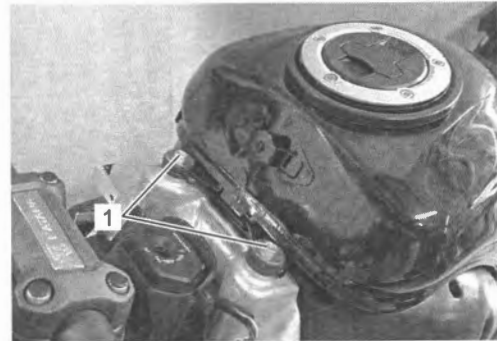
Removal

- 1) Remove the fuel tank cover. (Page 9D-32)
- 2) Remove the seat bracket (1).
- 3) Remove the fuel tank rear bolts (2).



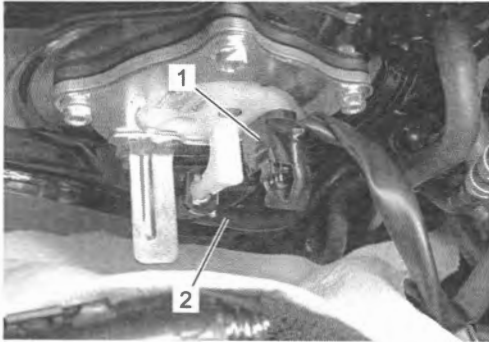
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- 4) Remove the fuel tank front bolts (1).



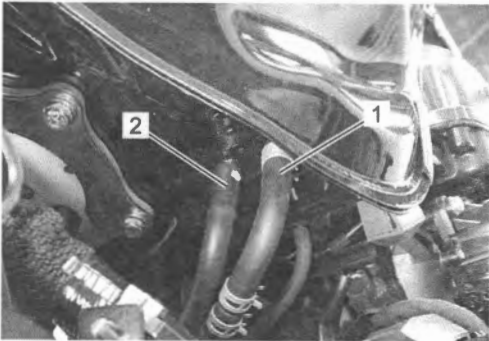
IK07L1170011-03

- 5) Lift and support the fuel tank.
- 6) Disconnect the fuel pump coupler (1).
- 7) Place a clean rag under the fuel feed hose (2) and disconnect the fuel feed hose (2). ⚠(Page 1G-6)



IK07L1170012-02

- 8) Disconnect the surge hose or fuel tank breather hose (1) and fuel tank water drain hose (2).



IK07L1170013-01

- 9) Remove the fuel tank.
- 10) Remove the following parts from the fuel tank:
 - Fuel tank filler cap (1): ⚠(Page 1G-11)
 - Fuel pump assembly (2): ⚠(Page 1G-15)



IK07L1170014-01

Installation

Install the fuel tank in the reverse order of removal. Pay attention to the following points:

NOTICE

Be sure not to bend or twist the hoses when installing.

- Connect the fuel tank water drain hose and surge hose or fuel tank breather hose. ⚠(Page 1G-3)
- Tighten the fuel tank rear bolts and fuel tank front bolts in the following procedures:
 - a. Temporarily tighten the fuel tank rear bolts (1).
 - b. Tighten the fuel tank front bolts (2) to the specified torque.

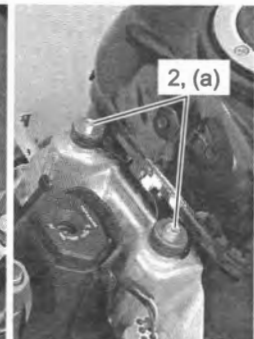
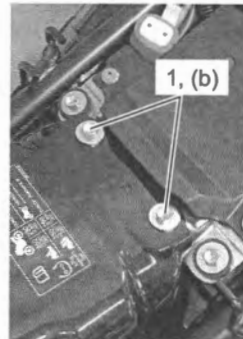
Tightening torque

Fuel tank front bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- c. Tighten the fuel tank rear bolt (1) to the specified torque.

Tightening torque

Fuel tank rear bolt (b): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

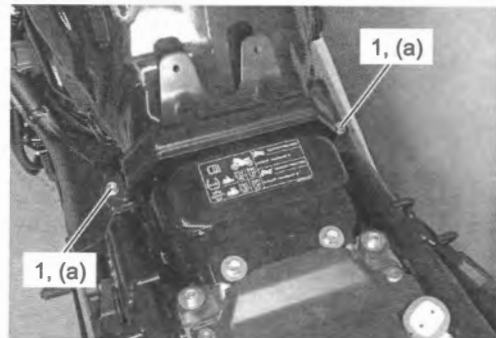


IK07L1170015-02

- Tighten the seat bracket bolts (1) to the specified torque.

Tightening torque

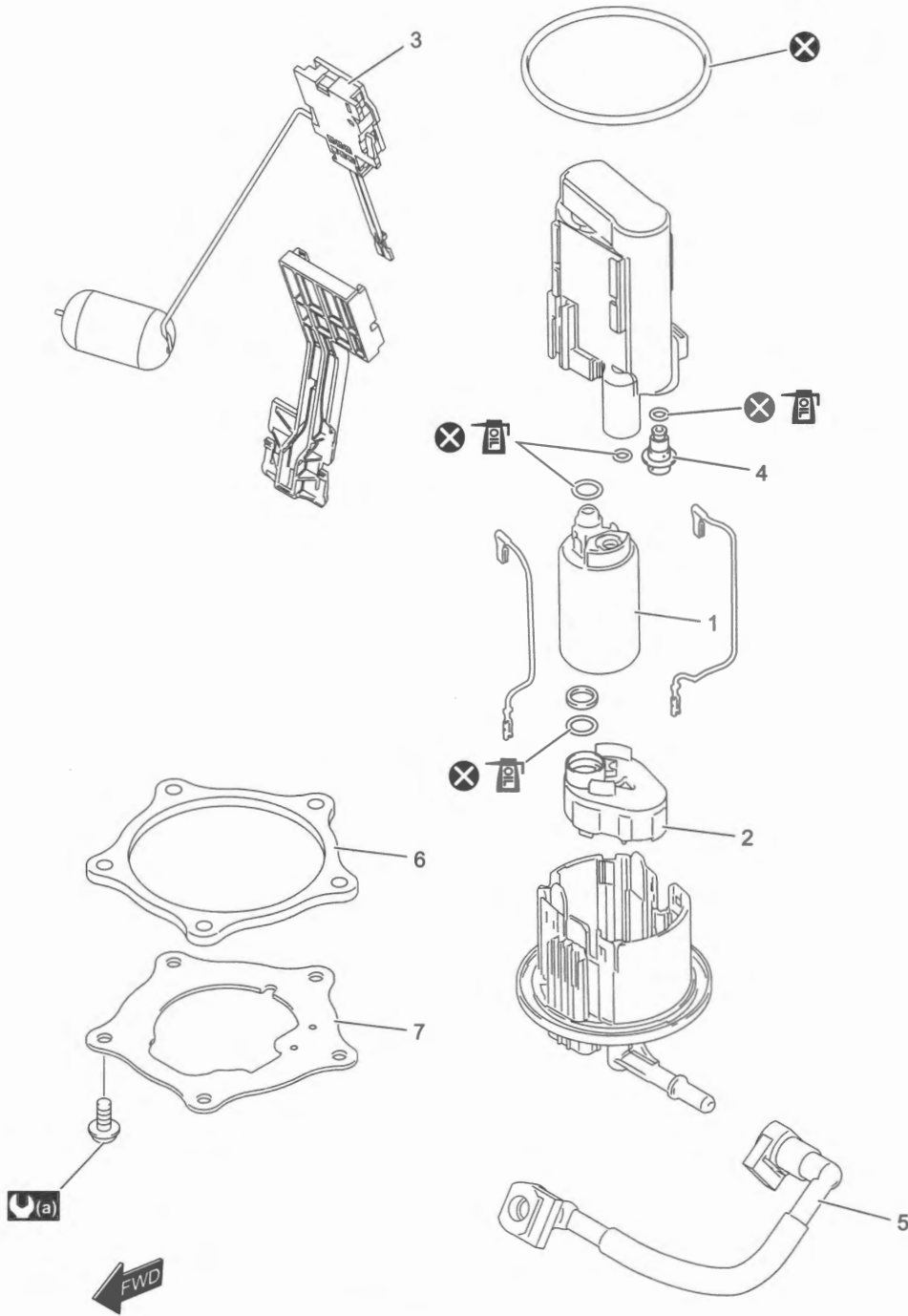
Seat bracket bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IK07L1170041-01

Fuel Pump Components

BENK07L21706010

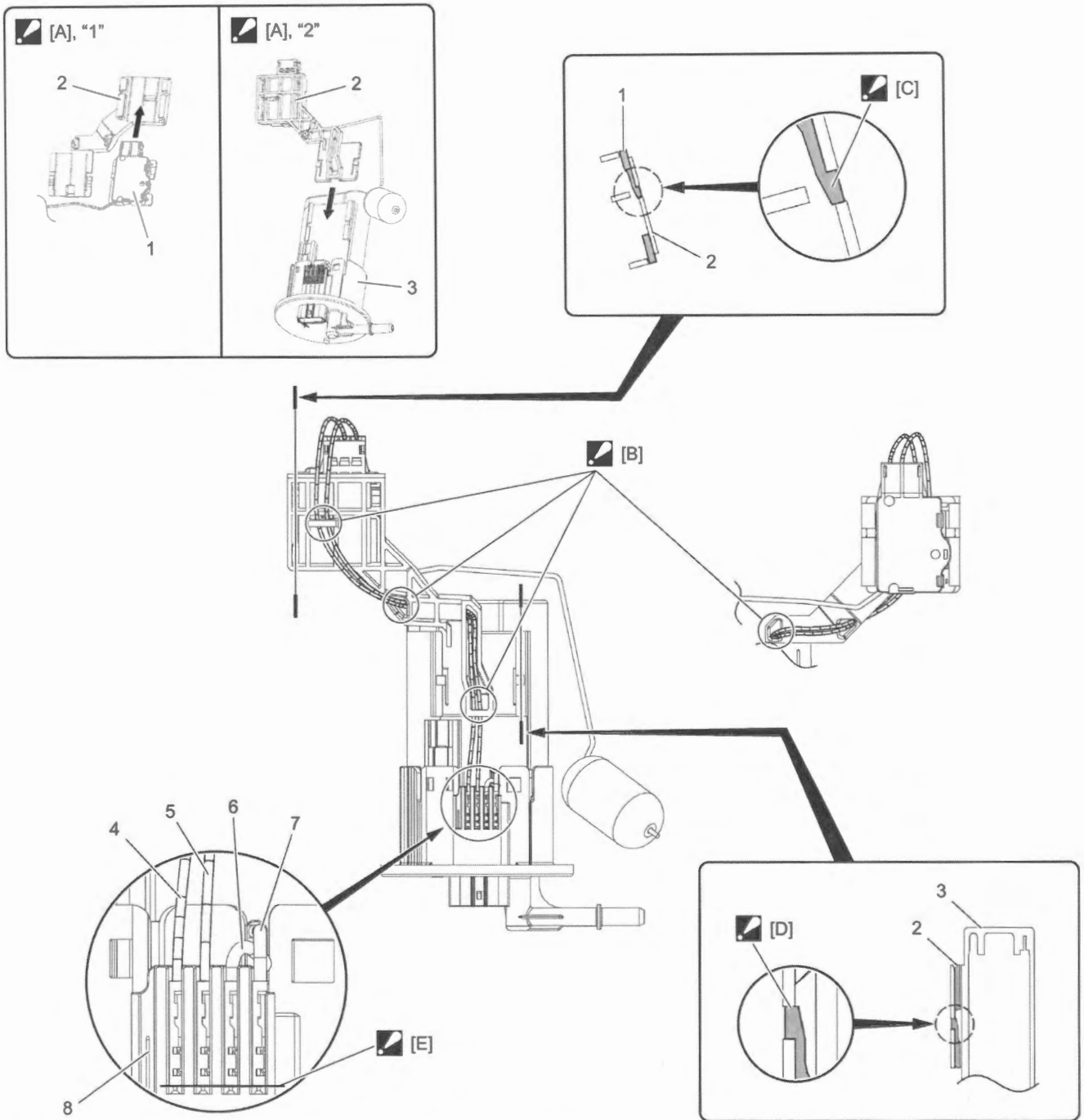


IK07L1170043-01

1. Fuel pump	5. Fuel feed hose	: Apply engine oil.
2. Fuel filter	6. Fuel pump inner plate	: Do not reuse.
3. Fuel level gauge	7. Fuel pump outer plate	
4. Fuel pressure regulator	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	

Fuel Level Gauge Construction

BENK07L21706011



IK07L1170040-02

<p>☑ [A]: Install the fuel level gauge and fuel level gauge attachment to the fuel pump assembly in order of "1" → "2".</p>	3. Fuel pump assembly
<p>☑ [B]: Pass the lead wires into the hole of fuel level gauge attachment. Route the lead wires as shown in the figure.</p>	4. Fuel level gauge (+) lead wire (R)
<p>☑ [C]: Set the fuel level gauge to the fuel level gauge attachment until the hook is locked firmly.</p>	5. Fuel level gauge (-) lead wire (B)
<p>☑ [D]: Set the fuel level gauge attachment to the fuel pump assembly until the hook is locked firmly.</p>	6. Fuel pump (-) lead wire (B)
<p>☑ [E]: Put in the fuel level gauge terminals until the height of tips becomes the same as that of fuel pump terminals.</p>	7. Fuel pump (+) lead wire (Bl)
1. Fuel level gauge	8. Empty terminal
2. Fuel level gauge attachment	

Fuel Pump On-Vehicle Inspection

BENK07L21706012

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-18)
- TO sensor: ☞ (Page 1A-67)

If the fuel pump relay, TO sensor and fuel pump circuit connections are OK, the fuel pump may be faulty, replace the fuel pump with a new one. ☞ (Page 1G-15)

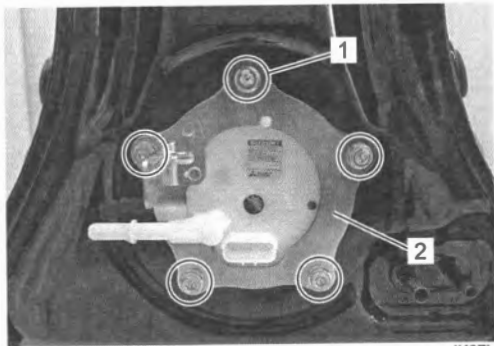
Fuel Pump Assembly Removal and Installation

BENK07L21706013

Refer to "Fuel Tank Removal and Installation" (Page 1G-11).

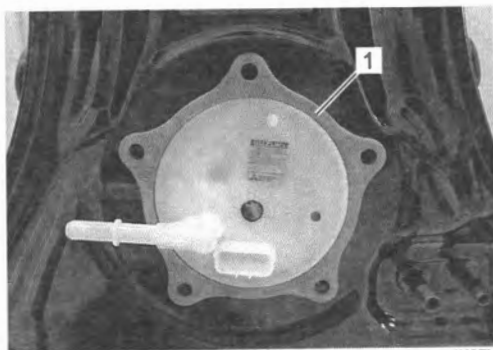
Removal

- 1) Remove the fuel pump mounting bolts (1) diagonally.
- 2) Remove the fuel pump outer plate (2).



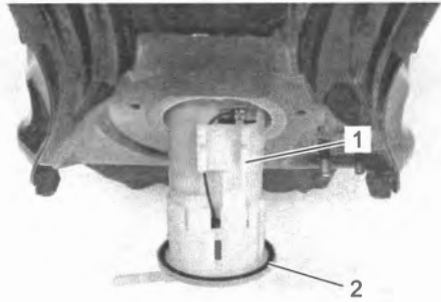
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- 3) Remove the fuel pump inner plate (1).



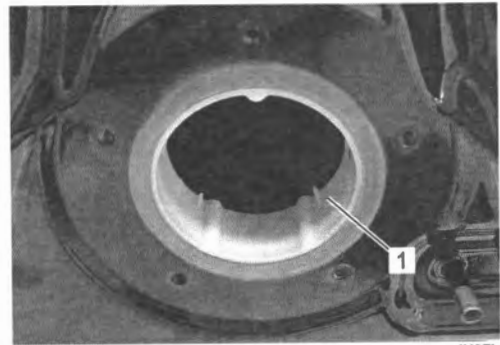
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- 4) Remove the fuel pump assembly (1) with the O-ring (2).



IK07L1170018-01

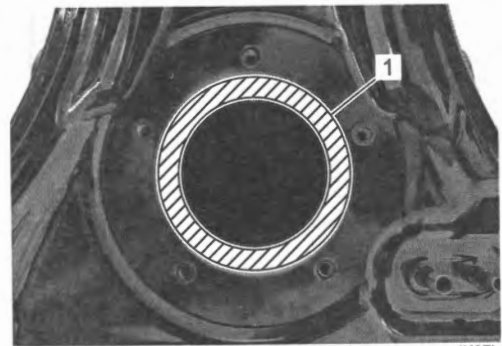
- 5) Remove the fuel tank inner vessel (1).



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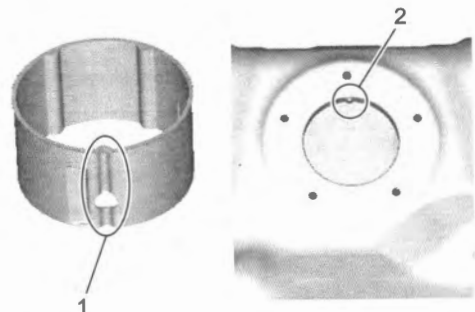
Installation

- 1) Check that the fuel pump fitting surface (1) on the fuel tank is free from any deformation and damage.



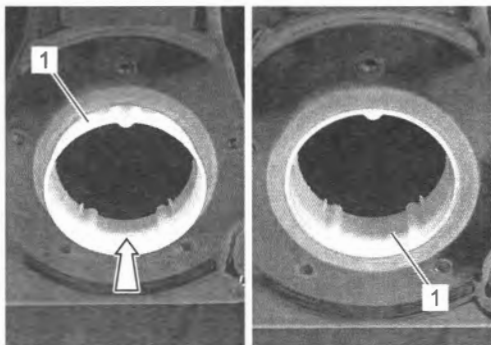
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- 2) Align the groove (1) of the fuel tank inner vessel with the protrusion (2) of the fuel tank.



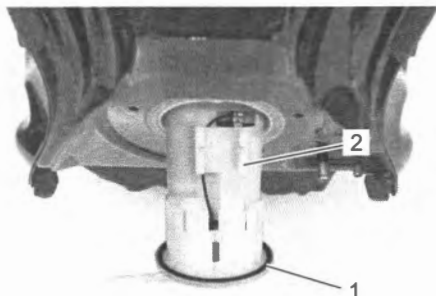
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- 3) Insert the fuel tank inner vessel (1) into the fuel tank until the end face becomes flush with the fuel pump fitting surface on the fuel tank.



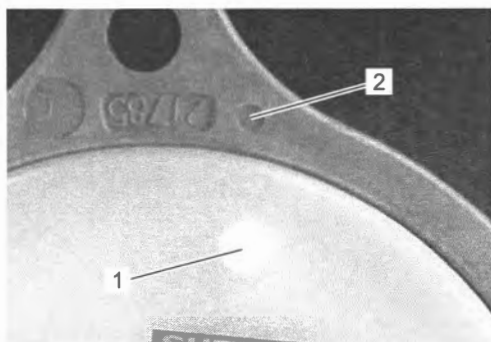
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- 4) Install the new O-ring (1) to the fuel pump groove securely and set the fuel pump assembly (2) into the fuel tank.



IK07L1170022-01

- 5) Align the protrusion (1) of the fuel pump assembly with the punch mark (2) of the fuel pump inner plate.

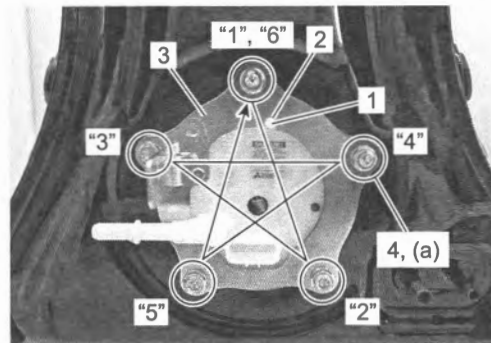


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- 6) Align the protrusion (1) of the fuel pump assembly with the cutout (2) of the fuel pump outer plate (3) and tighten all the fuel pump mounting bolts (4) lightly in the numerical order ("1" – "6") and then tighten them to the specified torque.

Tightening torque

Fuel pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IK07L1170024-01

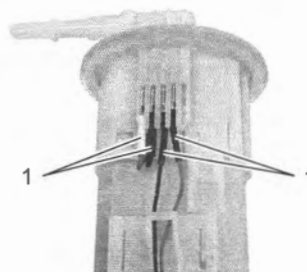
Fuel Pump Disassembly and Reassembly

BENK07L21706014

Refer to "Fuel Pump Assembly Removal and Installation" (Page 1G-15).

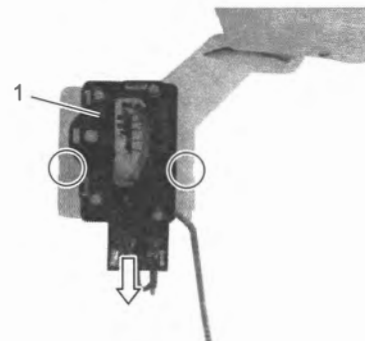
Disassembly

- 1) Disconnect the lead wires (1).



IK07L1170025-02

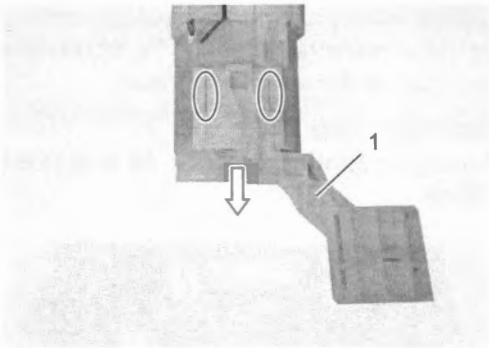
- 2) Remove the fuel level gauge (1).



IK07L1170026-01

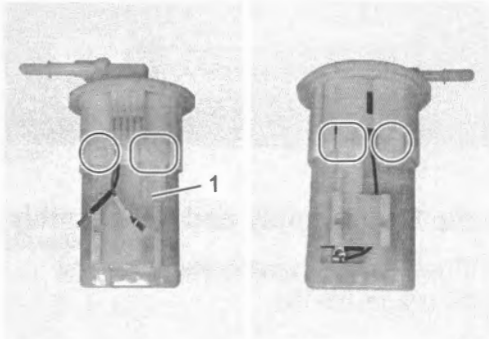
1G-17 Fuel System:

3) Remove the fuel level gauge attachment (1).



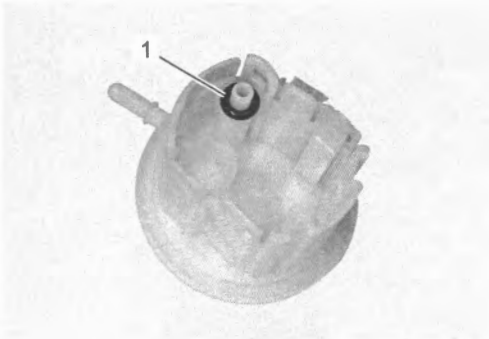
IK07L1170027-01

4) Remove the fuel pump case (1).



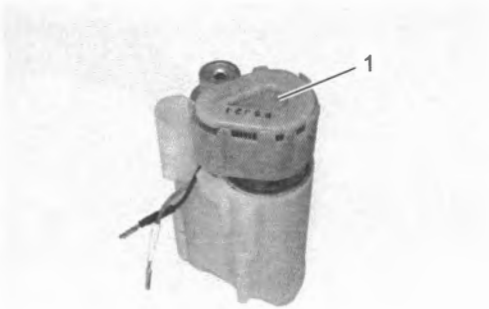
IK07L1170028-01

5) Remove the O-ring (1) from the flange.



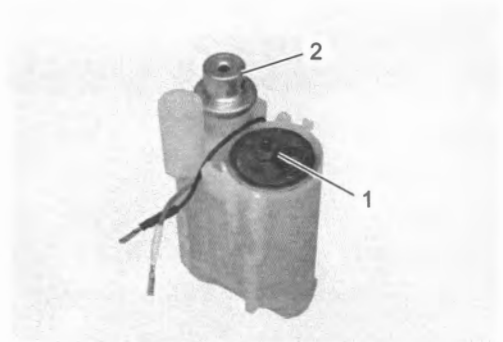
IK07L1170029-01

6) Remove the fuel filter (1).



IK07L1170030-01

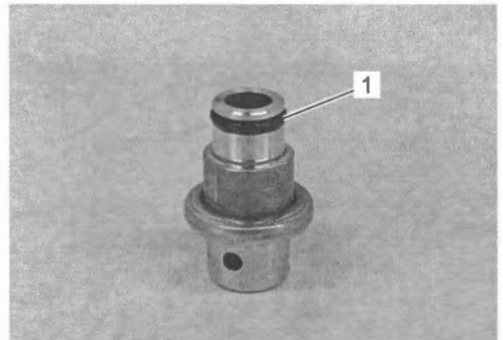
7) Remove the fuel pump (1) and fuel pressure regulator (2).



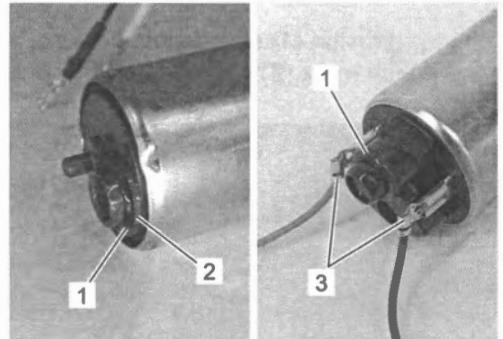
IK07L1170031-01

8) Remove the O-rings (1) and spacer (2).

9) Disconnect the lead wires (3).



IK07L1170032-01

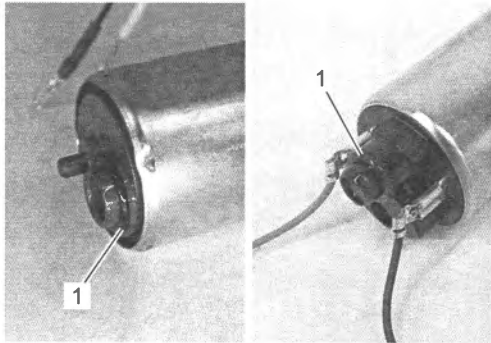


IK07L1170033-01

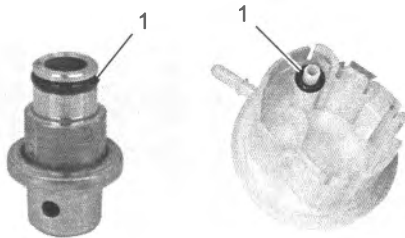
Reassembly

Reassemble the fuel tank pump in the reverse order of the disassembly. Pay attention to the following points:

- Apply engine oil lightly to the new O-rings (1) and install them.



IK07L1170034-01



IK07L1170035-01

- Install the fuel level gauge and connect all lead wires properly. Refer to "Fuel Level Gauge Construction" (Page 1G-14).

Fuel Filter Inspection

BENK07L21706015

Refer to "Fuel Pump Disassembly and Reassembly" (Page 1G-16).

Inspect the fuel filter for dirt. If the fuel filter is dirtied excessively, replace the fuel filter with a new one.



IK07L1170036-01

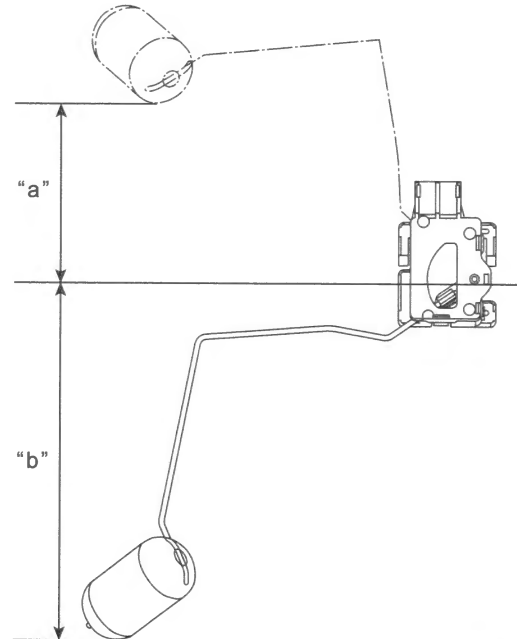
Fuel Level Gauge Inspection

BENK07L21706016

Refer to "Fuel Pump Assembly Removal and Installation" (Page 1G-15).

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"	68.1 – 77.1 mm (2.69 – 3.03 in)	8 – 12 Ω
"b"	137.4 – 146.4 mm (5.410 – 5.763 in)	267 – 273 Ω

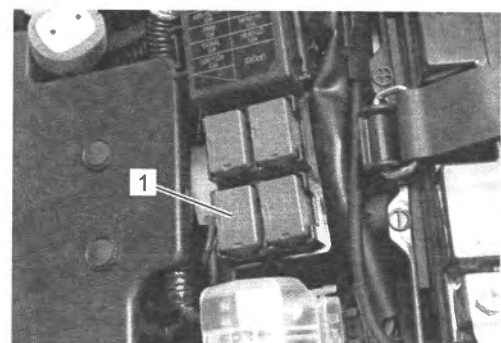


IK07L1170037-01

Fuel Pump Relay Inspection

BENK07L21706017

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Remove the cap and fuel pump relay (1).



IK07L1170038-02

- 4) Check the fuel pump relay referring to "Cooling Fan Relay Inspection" in Section 1F (Page 1F-13).
- 5) Install the removed parts.

Fuel Injector On-Vehicle Inspection

BENK07L21706018

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Turn the ignition switch OFF.
- 3) Disconnect the fuel injector coupler (1).

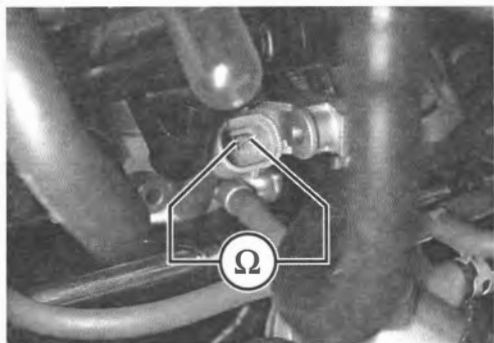


IF04K1170033-01

- 4) Measure the fuel injector resistance between terminals using the circuit tester. If resistance is out of specification, replace the fuel injector with a new one. (Page 1G-19)

Fuel injector resistance

20 °C (68 °F) [Standard]: 11.5 – 12.5 Ω



IF04K1170034-01

- 5) After finishing the fuel injector inspection, install the removed parts.

Fuel Injector / Fuel Delivery Pipe Removal and Installation

BENK07L21706019

NOTE

The fuel injector can be removed without removing the throttle body.

Removal

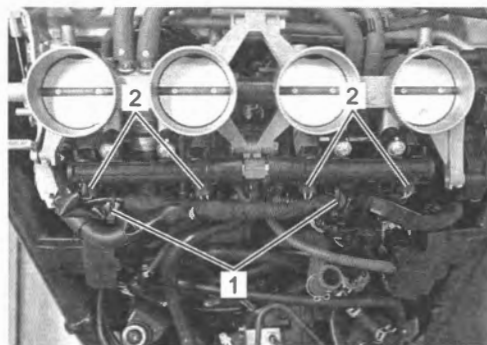
- 1) Remove the air cleaner box. (Page 1D-7)

- 2) Place a clean rag under the fuel feed hose (1) and disconnect the fuel feed hose (1). (Page 1G-6)



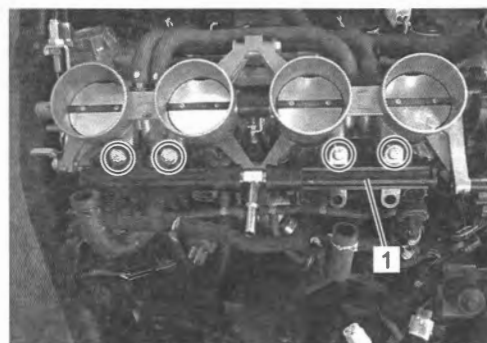
IF04K1170035-02

- 3) Remove the clamps (1) and disconnect the fuel injector couplers (2).



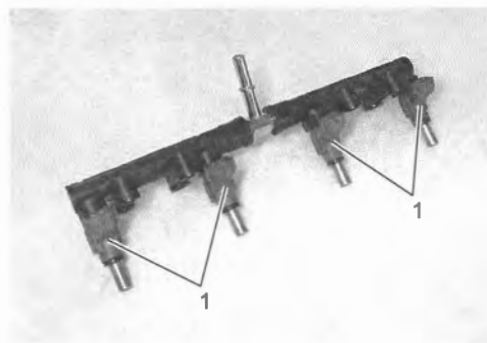
IK07L1170039-01

- 4) Remove the fuel delivery pipe assembly (1).



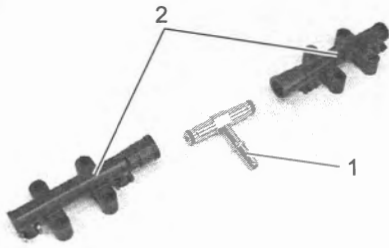
IF04K1170037-01

- 5) Remove the fuel injectors (1) from the fuel delivery pipes.



IF04K1170038-01

6) Remove the nipple joint (1) from the fuel delivery pipes (2).

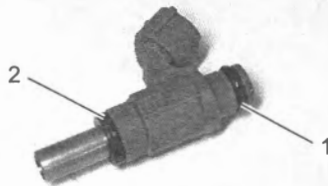


IF04K1170049-01

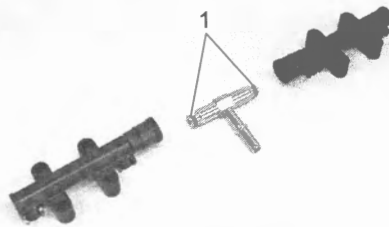
Installation

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-rings (1) and new cushion seals (2).



IF04K1170039-01

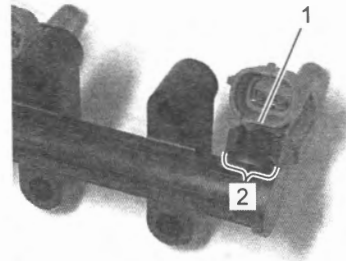


IF04K1170040-01

- Align the coupler (1) of injector with boss (2) of the delivery pipe, install each fuel injector by pushing it straight to the delivery pipe.

NOTICE

Never turn the fuel injector while pushing it.



IF04K1170041-01

- Install the fuel delivery pipe assembly (1) to the throttle body.

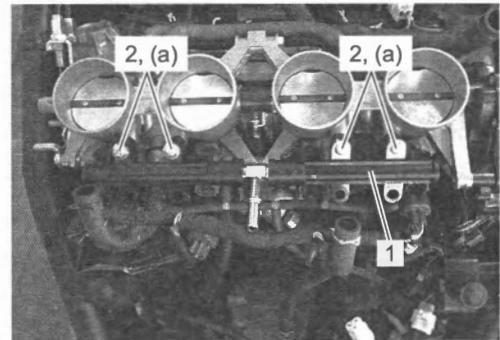
NOTICE

Never turn the fuel injectors while installing them.

- Tighten the fuel delivery pipe mounting screws (2) to the specified torque.

Tightening torque

Fuel delivery pipe mounting screw (a): 3.5 N·m (0.36 kgf-m, 2.60 lbf-ft)



IF04K1170042-01

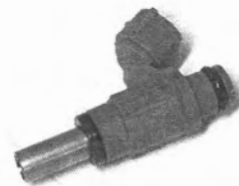
- Clamp the wiring harness. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).

Fuel Injector Inspection and Cleaning

BENK07L21706020

Refer to "Fuel Injector / Fuel Delivery Pipe Removal and Installation" (Page 1G-19).

Check the fuel injector filter for evidence of dirt and contamination. If present, clean and check for presence of dirt in the fuel line and fuel tank.



IF04K1170050-01

Specifications

Tightening Torque Specifications

BENK07L21707001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Fuel tank cap bolt	3.0	0.31	2.25	☞ (Page 1G-11)
Fuel tank front bolt	10	1.0	7.5	☞ (Page 1G-12)
Fuel tank rear bolt	10	1.0	7.5	☞ (Page 1G-12)
Seat bracket bolt	10	1.0	7.5	☞ (Page 1G-12)
Fuel pump mounting bolt	10	1.0	7.5	☞ (Page 1G-16)
Fuel delivery pipe mounting screw	3.5	0.36	2.60	☞ (Page 1G-20)

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-13)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L21708001

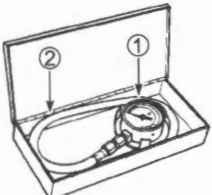
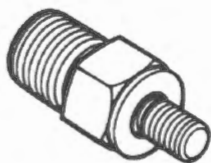
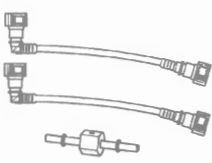
NOTE

Required service material(s) is also described in:

“Fuel Pump Components” (Page 1G-13)

Special Tool

BENK07L21708002

<p>09915-74511 Oil pressure gauge set (600 kPa) 1. Gauge 2. Hose ☞ (Page 1G-5)</p> 	<p>09940-40211 Fuel pressure gauge adapter Discontinued ☞ (Page 1G-5)</p> 
<p>09940-40220 Fuel pressure gauge attachment ☞ (Page 1G-5) / ☞ (Page 1G-5)</p> 	

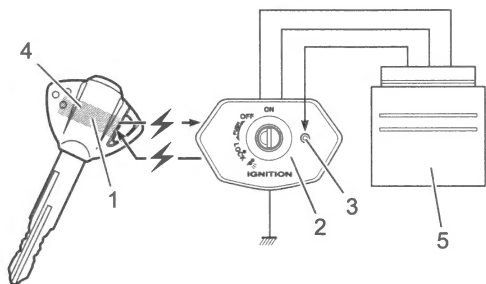
Ignition System

General Description

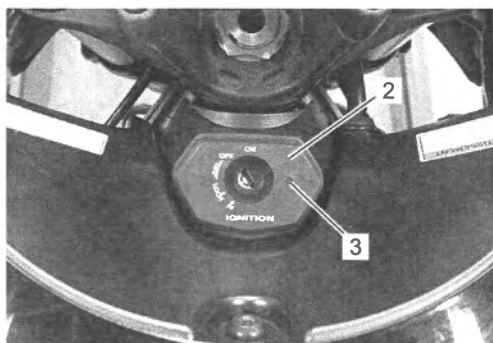
Immobilizer Description (If Equipped)

BENK07L21801001

The immobilizer verifies that the key ID (1) agrees with ECM ID by means of radio communication through the immobilizer antenna (2). When the ID agreement is verified, the system makes the engine ready to start.



IH13K1180012-01

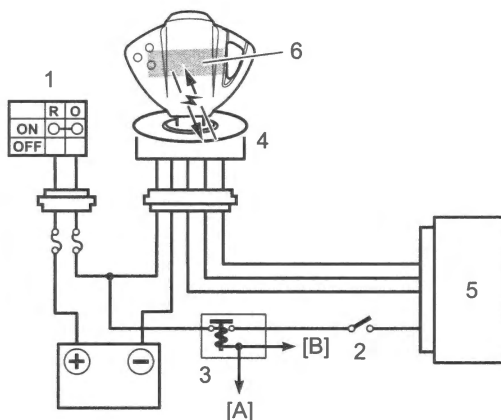


IK07L1180001-02

3. Indicator light	5. ECM
4. Transponder	

Operation

When the ignition switch (1) is turned ON with the engine stop switch (2) and side-stand relay (3) in ON, the immobilizer antenna (4) and ECM (5) are powered ON. The ECM transmits a signal to the transponder (6) through the immobilizer antenna (4) in order to make comparison between the key ID and ECM ID. With the signal received, the transponder transmits the key ID signal to ECM (5) so that ECM (5) can make comparison with its own ID, and if it matches, the engine is made ready to start.



IH13K1180013-02

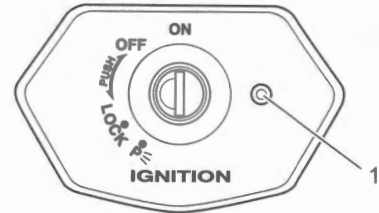
[A]: To side-stand switch	[B]: To GP switch
---------------------------	-------------------

1H-2 Ignition System:

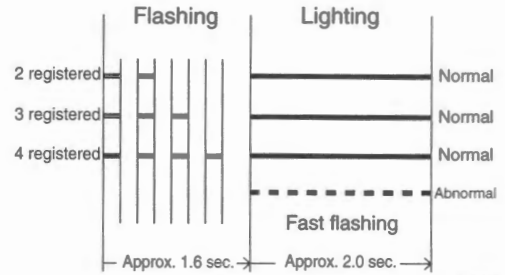
Also, when the ignition switch is turned ON, the indicator light (1) flashes as many as the number of IDs registered in ECM. Thereafter, if the IDs are in agreement, the indicator light turns on for two seconds to notify of completion in successful communication. If the indicator light (LED) (1) flashes fast, it notifies of communication error or disagreement of ID.

NOTE

- If the indicator light (1) flashes fast, turn the ignition switch OFF then ON to make judgment again as there is possible misjudgment due to environmental radio interference.
- When the battery performance is lowered in winter (low temperature), the system may at times makes a re-judgment at the time of beginning the starter motor operation. In this case, the indicator light (1) operation starts immediately after the starter operation.



IE31J1180004-01

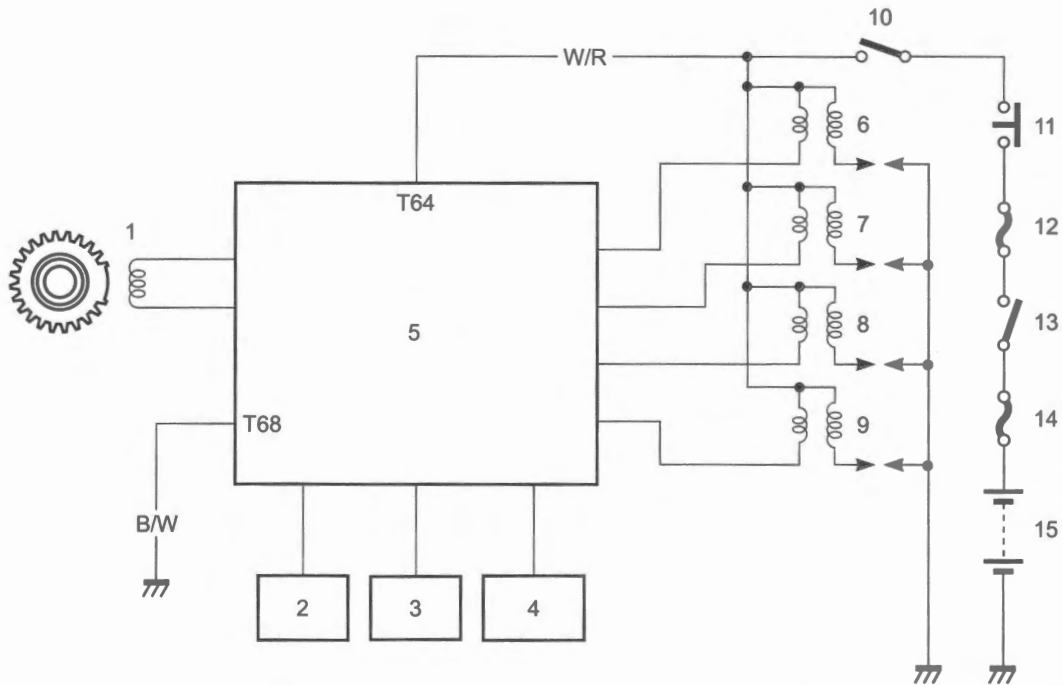


I705H1180006-01

Schematic and Routing Diagram

Ignition System Diagram

BENK07L21802001



IK07L1180008-02

1. CKP sensor	6. Ignition coil #1	11. Side-stand relay
2. TP sensor	7. Ignition coil #2	12. Ignition fuse
3. ECT sensor	8. Ignition coil #3	13. Ignition switch
4. GP switch	9. Ignition coil #4	14. Main fuse
5. ECM	10. Engine stop switch	15. Battery

Component Location

Ignition System Components Location

BENK07L21803001

Refer to "Electrical Components Location" in Section 0A (Page 0A-7).

Diagnostic Information and Procedures

Ignition System Symptom Diagnosis

BENK07L21804001

Condition	Possible cause	Correction / Reference Item
Spark plug not sparking	Damaged spark plugs.	Replace. ☞(Page 1H-5)
	Fouled spark plugs.	Replace. ☞(Page 1H-5)
	Wet spark plugs.	Dry or replace. ☞(Page 1H-6)
	Defective ignition coils.	Replace. ☞(Page 1H-5)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	Defective ECM.	Replace. ☞(Page 1C-4)
	Open-circuited wiring connections.	Repair or replace. ☞(Page 9A-5)
Engine stalls easily (No spark)	Fouled spark plugs.	Replace. ☞(Page 1H-5)
	Defective CKP sensor.	Replace. ☞(Page 1C-14)
	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 high idling speed.	Inspect FI system.
	Incorrect gasoline.	Change.
	Dirty air cleaner element.	Replace. ☞(Page 1D-8)
	Incorrect spark plugs (Cold type).	Change to standard spark plug. ☞(Page 1H-5)
Spark plug quickly becomes fouled with oil or carbon	Worn piston rings.	Replace. ☞(Page 1D-60)
	Worn pistons.	Replace. ☞(Page 1D-47) ☞(Page 1D-51)
	Worn cylinders.	Replace. ☞(Page 1D-47) ☞(Page 1D-51)
	Excessive valve-stem to valve-guide clearance.	Replace. ☞(Page 1D-40)
	Worn valve stem oil seals.	Replace. ☞(Page 1D-40)
Spark plug electrodes overheat or burn	Incorrect spark plugs (Hot type).	Change to standard spark plug. ☞(Page 1H-5)
	Overheated engine.	Inspect cooling system.
	Loose spark plugs.	Tighten. ☞(Page 1H-5)
	Excessively lean air/fuel mixture.	Inspect FI system.

No Spark or Poor Spark

BENK07L21804002

Troubleshooting**NOTE**

Check that the transmission is in neutral and the engine stop switch is in the "RUN" position. Check that the fuse is not blown and the battery is fully-charged before diagnosing.

Step 1

- 1) Check the ignition system couplers for poor connections.

Is there connection in the ignition system couplers?

- Yes Go to Step 2.
No Poor connection of couplers.

Step 2

- 1) Turn the ignition switch ON.
- 2) Measure the battery voltage between W/R wire (+) and B/W wire (-) of ECM. Refer to "Ignition System Diagram" (Page 1H-2).

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-7).

Is the peak voltage OK?

- Yes Go to Step 4.
No Go to Step 5.

Step 4

Inspect the spark plug(-s). ⚡(Page 1H-6)

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-7)

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-13).

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 Removal and Installation

BENK07L21806001

Removal

▲ WARNING

**The hot engine can burn you.
Wait until the engine is cool enough to touch.**

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Disconnect the ignition coil couplers (1).

NOTICE

Disconnect the ignition coil coupler before removing the ignition coil to avoid coupler damage.

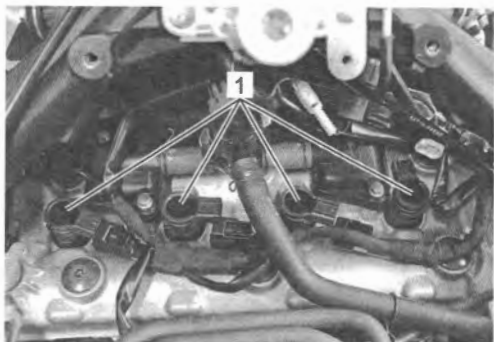


IF04K1180006-02

- 4) Remove the ignition coils (1).

NOTICE

- Do not pry up the ignition coil with a screw driver or a bar to avoid its damage.
- Be careful not to drop the ignition coil to prevent short/open circuit.



IF04K1180007-02

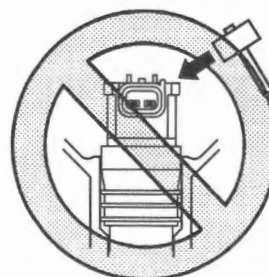
Installation

Install the ignition coil in the reverse order of removal. Pay attention to the following point:

- Position the ignition coils and install them. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).

NOTICE

Do not hit the ignition coil with a plastic hammer when installing it.



ID26J1180025-02

Spark Plug Removal and Installation

BENK07L21806002

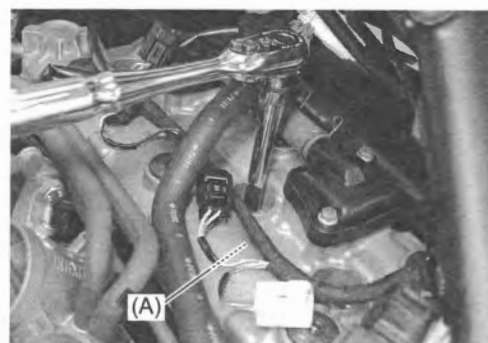
Refer to "Ignition Coil Removal and Installation" (Page 1H-5).

Removal

Remove the spark plugs with a spark plug wrench.

Special tool

(A): 09930-10121



IF04K1180008-01

1H-6 Ignition System:

Installation

Screw the spark plugs into the cylinder head with fingers, and then tighten them to the specified torque.

NOTICE

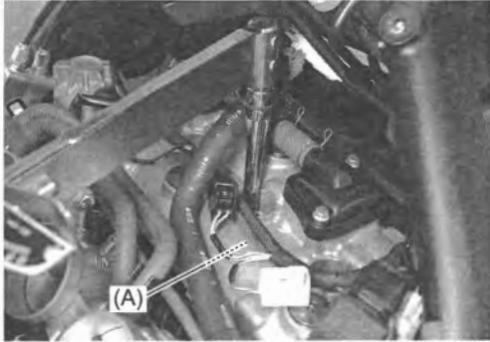
Do not cross thread or over tighten the spark plug, or such an operation will damage the aluminum threads of the cylinder head.

Special tool

(A): 09930-10121

Tightening torque

Spark plug: 11 N·m (1.1 kgf-m, 8.5 lbf-ft)



IF04K1180021-01

Spark Plug Inspection

BENK07L21806003

Refer to "Spark Plug Removal and Installation" (Page 1H-5).

Spark Plug Inspection

Check spark plug for:

- Electrode wear
- Carbon deposits
- Insulator damage
- Spark plug gap "a"

If any abnormality is found, replace the spark plug with a new one.

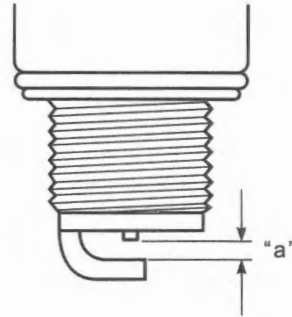
Spark plug

Type [Standard]: NGK: CR9EIA-9 / DENSO: IU27D

Gap [Standard]: 0.8 – 0.9 mm (0.032 – 0.035 in)



I823H1020005-01



ID26J1180010-03

NOTICE

Confirm the thread size and reach when replacing the plug. If the reach is too short, carbon will be deposited on the screw portion of the plug hole and engine damage may result.

Heat Range

Check spark plug heat range by observing electrode color. If the electrode of the spark plug is wet appearing or dark color, replace the spark plug with hotter type one. If it is white or glazed appearing, replace the spark plug with colder type one.

Heat range

	Hot type (Option)	Standard	Cold type (Option)
NGK	CR8EIA-9	CR9EIA-9	CR10EIA-9
DENSO	IU24D	IU27D	IU31D

Ignition Coil Inspection

BENK07L21806004

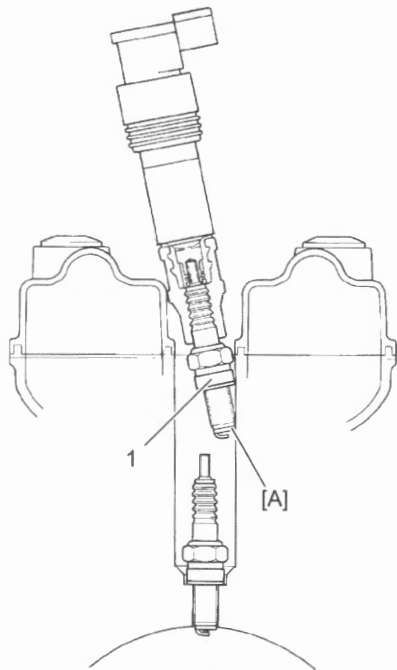
Refer to "Ignition Coil Removal and Installation" (Page 1H-5).

Ignition Coil Primary Peak Voltage

- 1) Disconnect the fuel injector couplers. Refer to "Fuel Injector On-Vehicle Inspection" in Section 1G (Page 1G-19).
- 2) Connect new spark plug (1) to each ignition coil.
- 3) Connect all the ignition coil couplers to the ignition coils respectively, and ground them on the cylinder head.

NOTE

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



IH13K1180014-03

[A]: Contact the spark plug to the cylinder head.

- 4) Connect the immobilizer antenna coupler (1) and install the fuel tank lower cover (2). (If equipped)
- 5) Connect the ECM couplers (3).

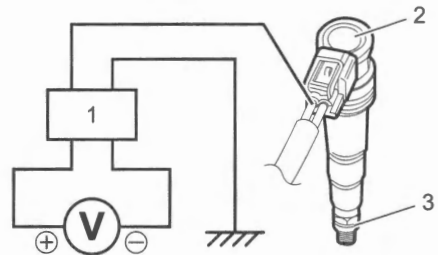


IK07L1180009-01

- 6) Connect the circuit tester with the peak volt adapter (1) as follows.

Ignition coil – circuit tester connection

	(+) Probe	(-) Probe
Ignition coil #1 (2)	W/Bl wire terminal	Ground
Ignition coil #2 (2)	B wire terminal	Ground
Ignition coil #3 (2)	Y wire terminal	Ground
Ignition coil #4 (2)	G wire terminal	Ground



IK07L1180002-02

3. New spark plug

- 7) Measure the ignition coil primary peak voltage in the following procedures:

⚠ WARNING

Do not touch the tester probes and spark plugs to prevent an electric shock while testing.

- a) Shift the transmission into neutral and turn the ignition switch ON.
 - b) Press the starter switch and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- 8) Repeat the b) procedure several times and measure the highest peak voltage.
If the voltage is lower than standard range, replace the ignition coil. (Page 1H-5)

Ignition coil primary peak voltage

[Standard]: 80 V or more

- 9) After measuring the ignition coil primary peak voltage, install the removed parts.

1H-8 Ignition System:

Ignition Coil Resistance

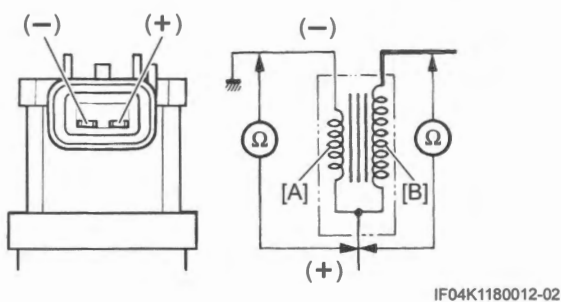
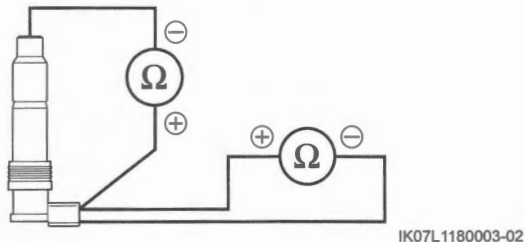
Measure the ignition coil for resistance in both primary and secondary coils. If the resistance is not within the standard range, replace the ignition coil with a new one.

Ignition coil resistance

10 – 30 °C (50 – 86 °F)

Primary [Standard]: 1.1 – 1.9 Ω

Secondary [Standard]: 6400 – 9600 Ω



[A]: Primary coil

[B]: Secondary coil

Engine Stop Switch Inspection

BENK07L21806005

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Disconnect the right handle switch coupler (1).



- 4) Inspect the engine stop switch for continuity with a circuit tester. If any abnormality is found, replace the right handle switch with a new one. Refer to "Handlebar Removal and Installation" in Section 6B (Page 6B-4).

Color	O/B	O/W
Position		
OFF (X)		
RUN (Q)	○—○	○—○

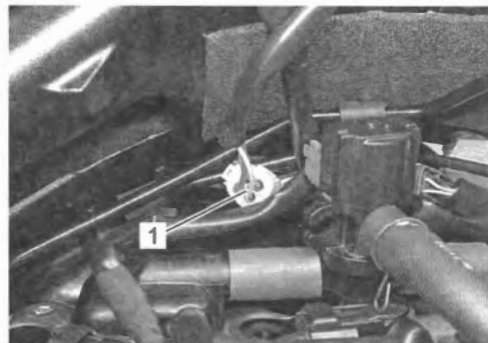
I822H1180023-01

- 5) After finishing the engine stop switch inspection, install the removed parts.

Ignition Switch Inspection

BENK07L21806006

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Disconnect the ignition switch coupler(-s) (1).



- 4) Inspect the ignition switch for continuity with a circuit tester. If any abnormality is found, replace the ignition switch with a new one.

With immobilizer system

Color	R	O	Gr	Br
Position				
ON	○—○	○—○	○—○	○—○
OFF				
LOCK				
P	○—○			○—○

IF04K1180015-01

Without immobilizer system

Color	O/Y	R	O	Gr	Br
Position					
ON		○—○	○—○	○—○	○—○
OFF					
LOCK					
P		○—○			○—○

IK07L1180011-01

- 5) After finishing the ignition switch inspection, reinstall the removed parts.

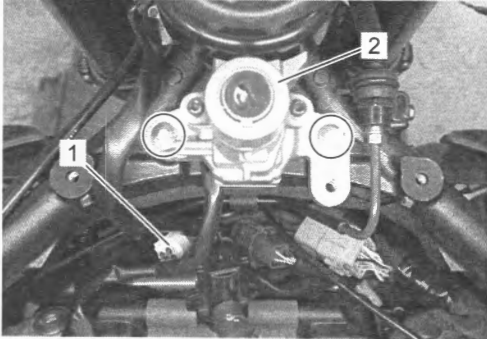
Ignition Switch Removal and Installation

BENK07L21806007

Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).

Removal

- 1) Disconnect the ignition switch coupler(-s) (1).
- 2) Remove the ignition switch (2).



IK07L1180006-01

Installation

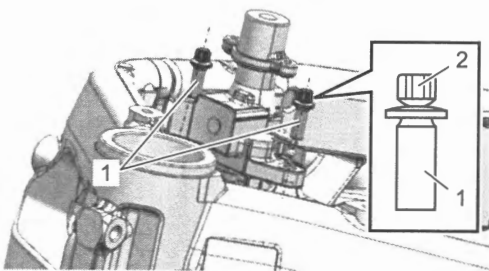
Install the ignition switch in the reverse order of removal. Pay attention to the following point:

- Tighten new ignition switch mounting bolts (1) with the special tool until head (2) of each bolt (1) is broken off.

Special tool

09930-11940

09940-63110



IF04K1180022-02

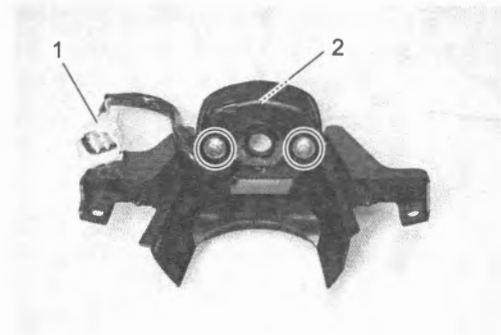
Immobilizer Antenna Removal and Installation (With Immobilizer System)

BENK07L21806008

Refer to "Fuel Tank Upper Cover / Fuel Tank Front Cover / Fuel Tank Lower Cover Removal and Installation" in Section 9D (Page 9D-32).

Removal

Remove the coupler (1) and immobilizer antenna (2).

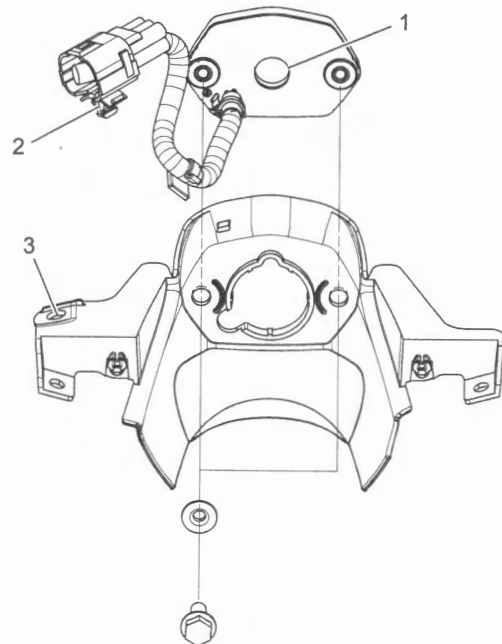


IF04K1180019-01

Installation

Install the immobilizer antenna in the reverse order of removal. Pay attention to the following points:

- Align the key hole (1) of immobilizer antenna so as not to contact the immobilizer antenna with the ignition key.
- Insert the protrusion (2) of immobilizer coupler into the hole (3) of fuel tank lower cover.



IK07L1180007-03

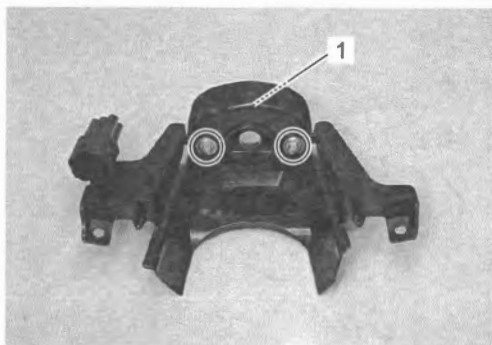
**Ignition Switch Cover Removal and Installation
(Without Immobilizer System)**

BENK07L21806009

Refer to "Fuel Tank Upper Cover / Fuel Tank Front Cover / Fuel Tank Lower Cover Removal and Installation" in Section 9D (Page 9D-32).

Removal

Remove the ignition switch cover (1).



IF04K1180020-01

Installation

Install the ignition switch cover in the reverse order of removal.

Specifications

Tightening Torque Specifications

BENK07L21807001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Spark plug	11	1.1	8.5	☞(Page 1H-6)



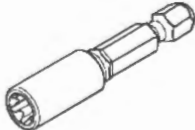
Reference:

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

BENK07L21808001

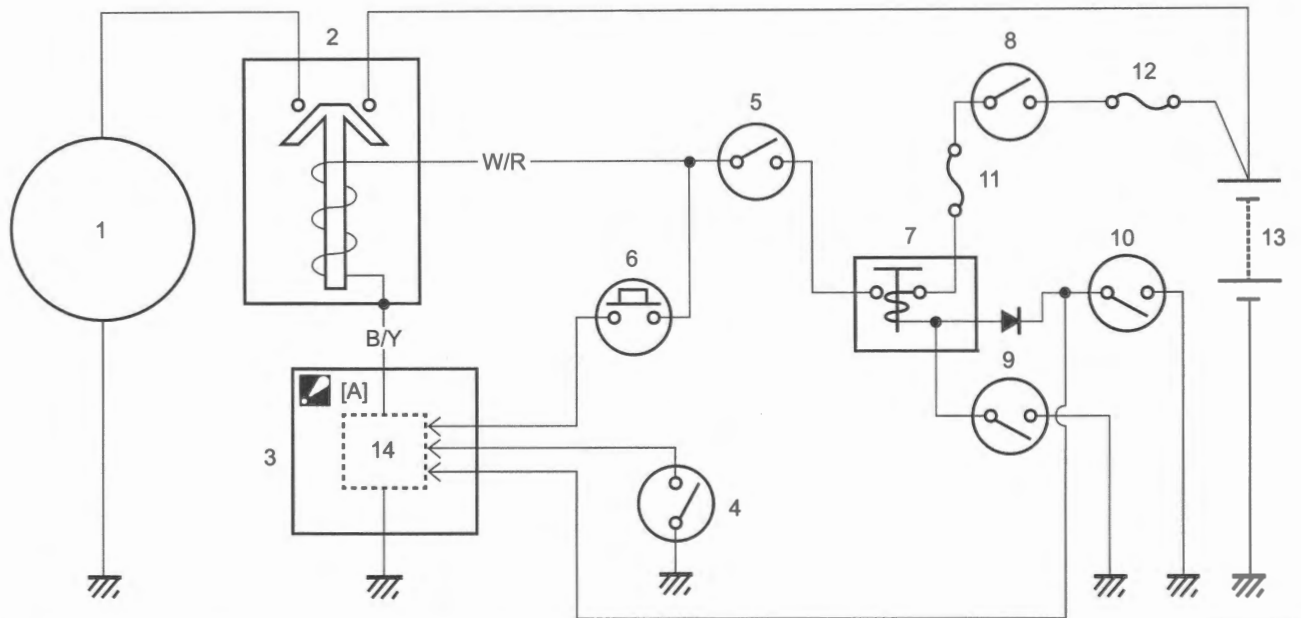
<p>09930-10121 Spark plug socket set ☞(Page 1H-5) / ☞(Page 1H-6)</p> 	<p>09930-11940 Torx® bit holder (3/8 sq.) Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A. ☞(Page 1H-9)</p> 
<p>09940-63110 Torx® bit (E8) Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A. ☞(Page 1H-9)</p> 	

Starting System

Schematic and Routing Diagram

Starting System Diagram

BENK07L21902001



IK07L1190001-01

<input checked="" type="checkbox"/> [A]: CPU determines to turn on the starter relay by the conditions of starter switch, clutch lever position switch and GP switch signals.	5. Engine stop switch	10. GP switch
1. Starter motor	6. Starter switch	11. Ignition fuse
2. Starter relay	7. Side-stand relay	12. Main fuse
3. ECM	8. Ignition switch	13. Battery
4. Clutch lever position switch	9. Side-stand switch	14. CPU

Component Location

Starting System Components Location

BENK07L21903001

Refer to "Electrical Components Location" in Section 0A (Page 0A-7).

Diagnostic Information and Procedures

Starting System Symptom Diagnosis

BENK07L21904001

Condition	Possible cause	Correction / Reference Item
Engine does not turn though the starter motor runs	Faulty starter clutch.	Replace. ☞(Page 1I-9)
Starter switch is not effective	Run down battery.	Repair or replace. ☞(Page 1J-8)
	Defective switch contacts.	Replace. <ul style="list-style-type: none"> • Starter switch and engine stop switch: ☞(Page 6B-4) • Clutch lever position switch: ☞(Page 5C-8) • Ignition switch: ☞(Page 1H-9) • Side-stand switch • GP switch: ☞(Page 5B-13)
	Brushes not seating properly on starter motor commutator.	Repair or replace. ☞(Page 1I-6)
	Defective starter relay or side-stand relay.	Replace. <ul style="list-style-type: none"> • Starter relay: ☞(Page 1I-7) • Side-stand relay: ☞(Page 1I-8)
	Defective diode.	Replace. ☞(Page 1I-8)
	Defective fuse.	Replace.

Starter Motor Will Not Run

BENK07L21904002

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 | <ul style="list-style-type: none"> • 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 11-1).

Is the voltage OK?

Yes Go to Step 4.

- | | |
|----|--|
| No | <ul style="list-style-type: none"> • Faulty ignition switch. • Faulty engine stop switch. • Faulty clutch lever position switch. • Faulty ECM. • Faulty GP switch. • Faulty side-stand relay. • Faulty diode. • Faulty starter switch. • Faulty side-stand switch. • Poor contact of coupler. • Open circuit in wire harness. |
|----|--|

Step 4

Check the starter relay. (Page 11-7)

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

BENK07L21904003

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.

Troubleshooting**Step 1**

Check the side-stand switch. (Page 11-8)

Is the side-stand switch OK?

Yes Go to Step 2.

- | | |
|----|--|
| No | <ul style="list-style-type: none"> • Faulty side-stand switch. • Faulty diode. |
|----|--|

Step 2

Check the starter clutch. (Page 11-12)

Is the starter clutch OK?

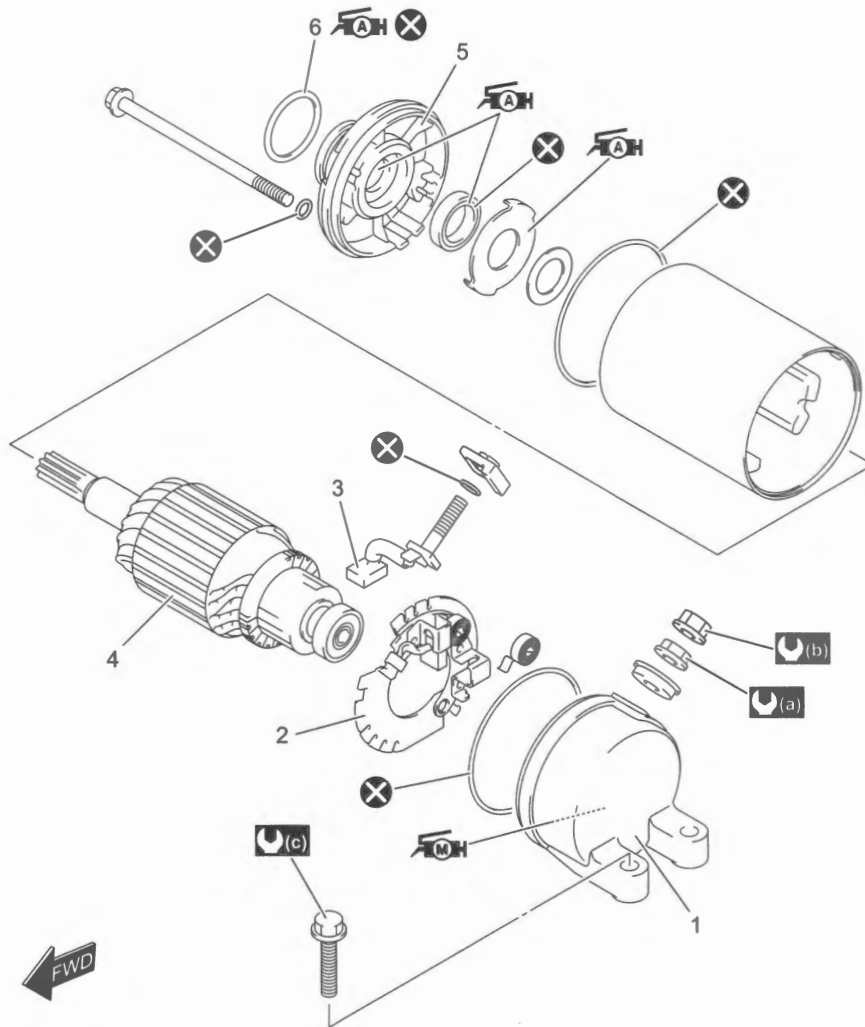
- | | |
|-----|---|
| Yes | <ul style="list-style-type: none"> • Open circuit in wire harness. • Poor contact of coupler. |
|-----|---|

No	Faulty starter clutch.
----	------------------------

Repair Instructions

Starter Motor Components

BENK07L21906001



IF04K1190047-01

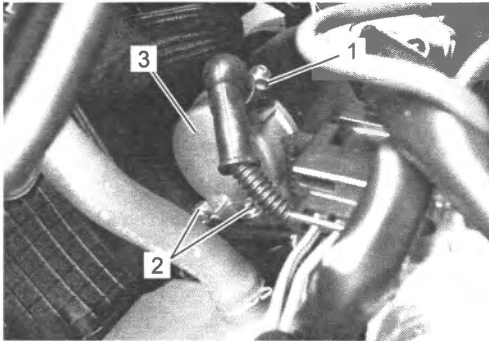
1. Frame	4. Armature	(a) : 4.9 N-m (0.50 kgf-m, 3.65 lbf-ft)	AH : Apply grease.
2. Brush holder	5. Starter housing	(b) : 6.0 N-m (0.61 kgf-m, 4.45 lbf-ft)	MH : Apply moly paste.
3. Brush	6. O-ring	(c) : 10 N-m (1.0 kgf-m, 7.5 lbf-ft)	X : Do not reuse.

Starter Motor Assembly Removal and Installation

BENK07L21906002

Removal

- 1) Turn the ignition switch OFF and disconnect the battery (-) lead wire. (Page 1J-9)
- 2) Remove the fuel tank. (Page 1G-11)
- 3) Disconnect the starter motor lead wire (1) and remove the starter motor bolts (2).
- 4) Remove the starter motor (3).



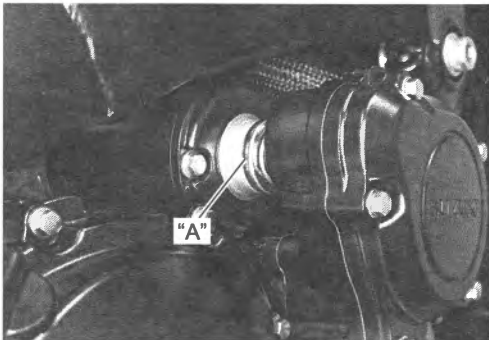
IF04K1190002-03

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)



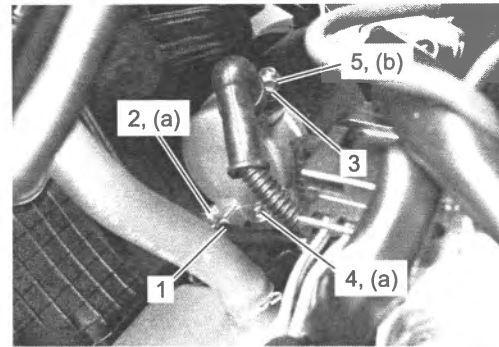
IF04K1190003-01

- Fit the engine ground lead wire (1) to the starter motor bolt (2) and connect the starter motor lead wire (3). Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-9).
- Tighten the starter motor bolts (2), (4) and starter motor terminal nut (5) to the specified torque.

Tightening torque

Starter motor bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Starter motor terminal nut (b): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)



IK07L1190012-01

Starter Motor Disassembly and Reassembly

BENK07L21906003

Refer to “Starter Motor Assembly Removal and Installation” (Page 11-5).

Disassembly

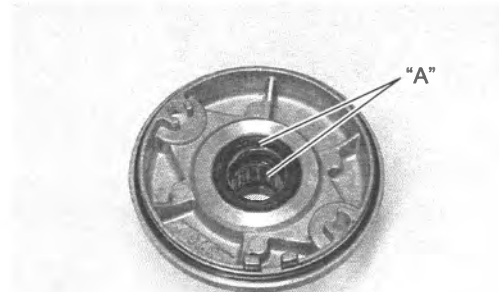
Disassemble the starter motor. (Page 11-4)

Reassembly

Reassemble the starter motor in the reverse order of removal. Pay attention to the following points:

- Replace the O-rings with new ones.
- Apply grease to the lip of the oil seal and bearing.

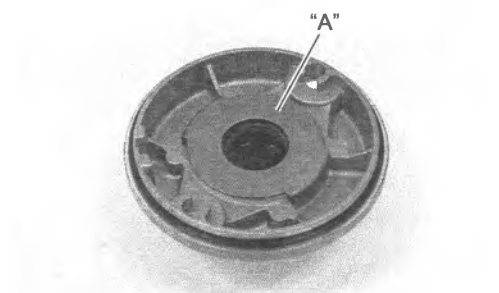
“A”: Grease 99000-25011 (SUZUKI SUPER GREASE A)



IF04K1190005-02

- Apply grease to the lock plate.

“A”: Grease 99000-25011 (SUZUKI SUPER GREASE A)

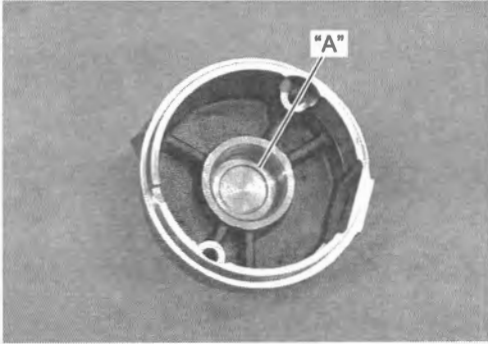


IF04K1190044-01

11-6 Starting System:

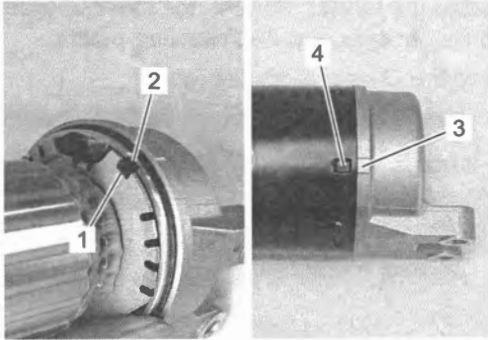
- Apply a small quantity of moly paste to the bearing position of the frame.

"A": Assembly lubrication 99000-25140 (SUZUKI MOLY PASTE)



IF04K1190045-01

- Align the groove (1) on the brush holder with the groove (2) on the frame.
- Align the projection (3) on the frame with the projection (4) on the starter motor case.



IF04K1190006-01

Starter Motor Inspection

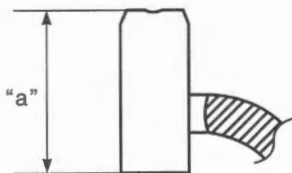
BENK07L21906004

Refer to "Starter Motor Disassembly and Reassembly" (Page 11-5).

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 or brush terminal 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 with a new one.

Starter motor brush length [Limit]: 8.5 mm (0.34 in)



I718H1190013-01

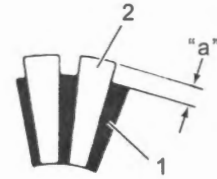
Commutator

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.



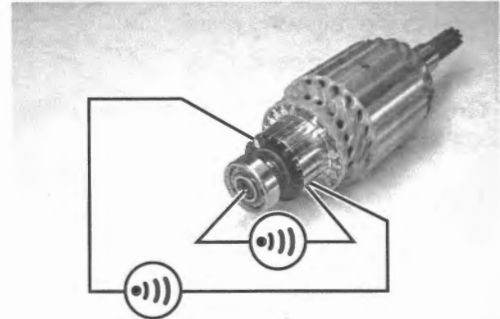
IE31J1190009-01

2. Segment

Armature Coil

Measure for continuity between each segment. Measure for continuity between each segment and the armature shaft.

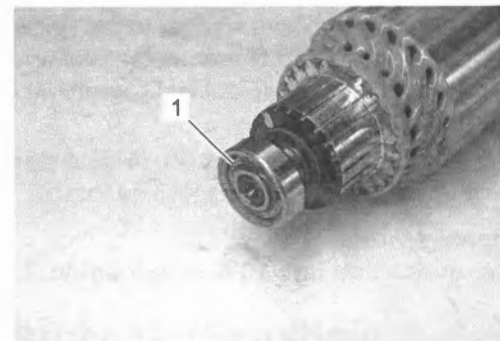
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the starter motor assembly with a new one.



IF04K1190007-01

Bearing (Armature Shaft)

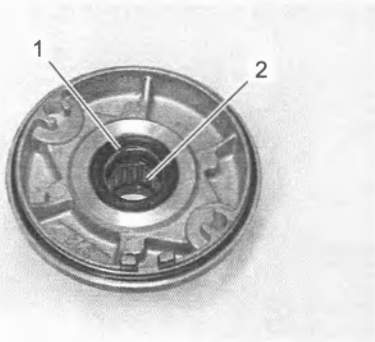
Check the armature shaft bearing (1) for abnormal noise and smooth movement. If any defects are found, replace the starter motor assembly with a new one.



IF04K1190008-01

Oil Seal / Bearing (Starter Housing Assembly)

- 1) Check the seal lip (1) for damage. If any damage is found, replace the oil seal with a new one.
- 2) Check the bearing (2) for abnormal noise and smooth movement. If any defects are found, replace the starter housing assembly with a new one.



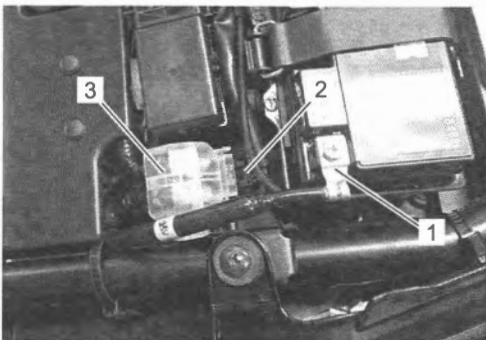
IF04K1190009-02

Starter Relay Removal and Installation

BENK07L21906005

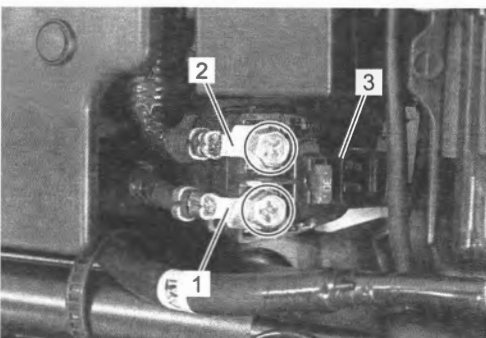
Removal

- 1) Remove the seat. (Page 9D-19)
- 2) Disconnect the battery (-) lead wire (1) from the battery. (Page 1J-9)
- 3) Disconnect the starter relay coupler (2) and remove the starter relay cover (3).



IK07L1190002-01

- 4) Disconnect the starter motor lead wire (1) and battery (+) lead wire (2).
- 5) Remove the starter relay (3).



IK07L1190003-01

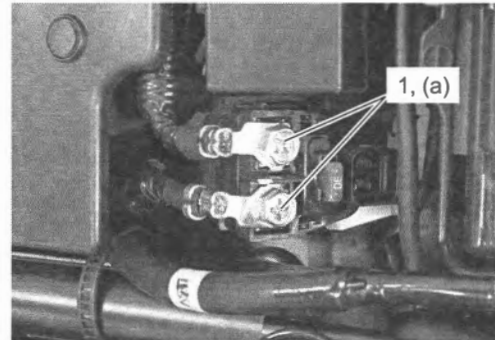
Installation

Install the starter relay in the reverse order of removal. Pay attention to the following point:

- Tighten the starter relay terminal bolts (1) to the specified torque.

Tightening torque

Starter relay terminal bolt (a): 4.9 N·m (0.50 kgf·m, 3.65 lbf·ft)



IK07L1190004-01

Starter Relay Inspection

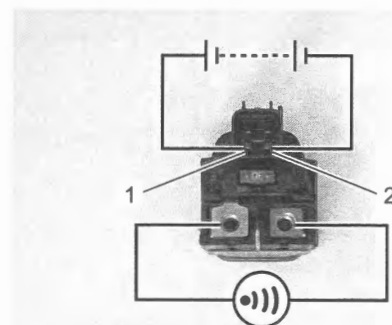
BENK07L21906006

Refer to "Starter Relay Removal and Installation" (Page 11-7).

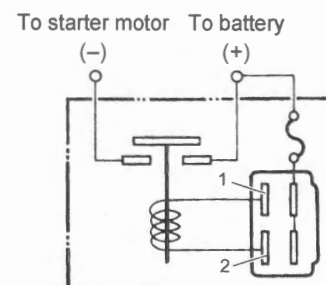
- 1) Apply 12 V to (1) and (2) terminals and check for continuity between the positive and negative terminals using the circuit tester. If the starter relay clicks and continuity is found, the relay is OK.

NOTICE

Do not apply battery voltage to the starter relay for five seconds or more, otherwise the relay coil may overheat and get damaged.



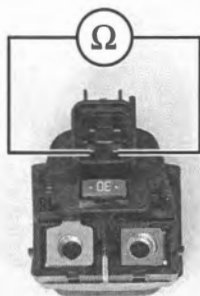
IF04K1190012-01



IE31J1190016-02

- 2) Measure the relay coil resistance between the terminals using the 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



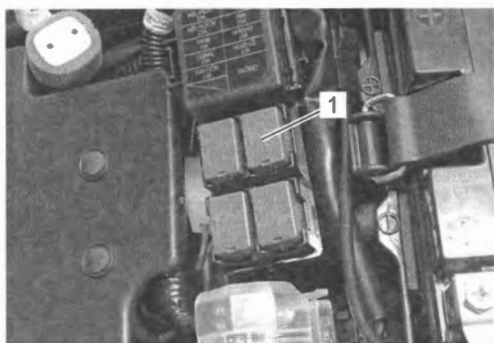
IF04K1190013-02

Side-stand Relay Removal and Installation

BENK07L21906007

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Remove the cap and side-stand relay (1).



IK07L1190005-01

Installation

Install the side-stand relay in the reverse order of removal.

Starter Interlock System Parts Inspection

BENK07L21906008

Check the interlock system for proper operation. If the interlock system does not operate properly, check each component for damage or abnormalities. If any abnormality is found, replace the component with a new one.

Side-stand Switch

- 1) Turn the ignition switch OFF.
- 2) Remove the left frame front cover assembly. (Page 9D-34)
- 3) Disconnect the side-stand switch coupler (1).



IK07L1190006-01

- 4) Using diode range of circuit tester, check the between each terminal of side-stand switch (1) according to the following table. If any defect is found, replace the side-stand switch with a new one.

NOTE

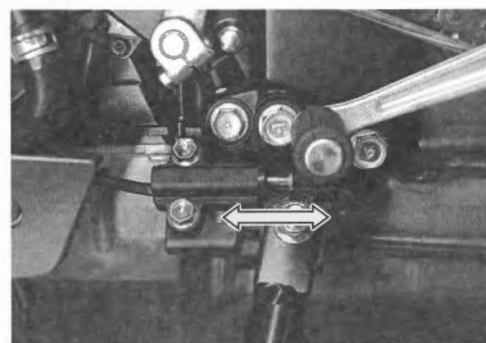
For diode test, refer to the instruction manual of circuit tester.



IK07L1190010-01

Side-stand switch voltage

	(-) probe of tester	(+) probe of tester
	T1	T2
ON (Side-stand retracted)	0.4 – 0.6 V	
OFF (Side-stand on the ground)	Tester's battery voltage or more	



IF04K1190016-01

- 5) Install the removed parts.

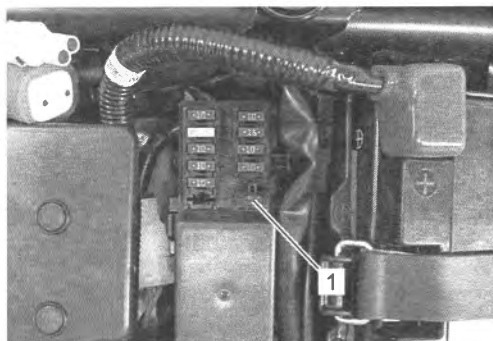
Side-stand Relay

Refer to "Side-stand Relay Removal and Installation" (Page 11-8).

Check the side-stand relay referring to "Cooling Fan Relay Inspection" in Section 1F (Page 1F-13).

Diode

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Open the fuse box and remove the diode (1).

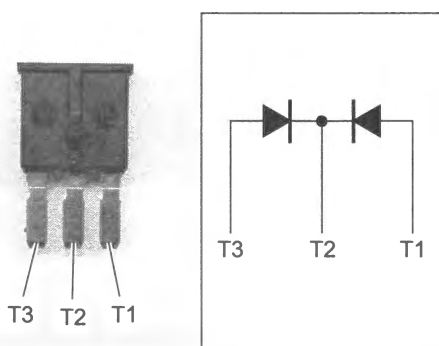


IK07L1190007-01

- 4) Using diode range of circuit tester, check the between each terminal of diode according to the following table.
If any defect is found, replace the diode with a new one.

NOTE

For diode test, refer to the instruction manual of circuit tester.



IK07L1190008-01

(-) probe of tester to:	(+) probe of tester to:			
		T1	T2	T3
	T1	—	[B]	—
	T2	[A]	—	[A]
T3	—	[B]	—	

- [A]: Forward connection
- [B]: Reverse connection

- 5) Install the removed parts.

GP Switch

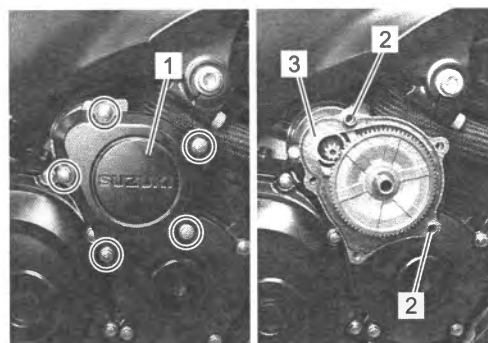
Refer to "GP Switch Inspection" in Section 5B (Page 5B-12).

Starter Idle Gear / Starter Clutch Removal and Installation

BENK07L21906009

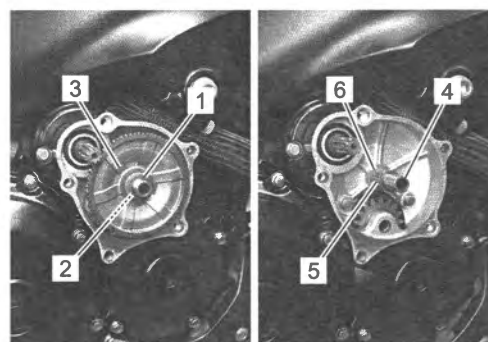
Removal

- 1) Remove the starter idle gear cap (1).
- 2) Remove the dowel pins (2) and gasket (3).



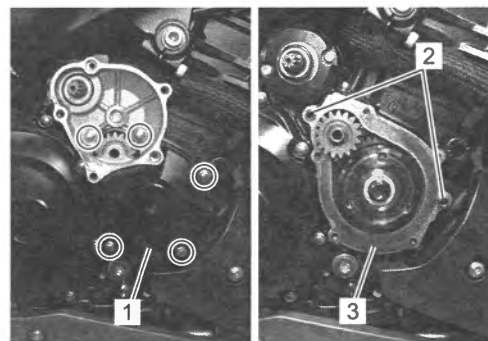
IF04K1190020-02

- 3) Remove the wave washer (1), washer (2) and starter idle gear No.1 (3).
- 4) Remove the starter idle pin (4), bearing (5) and washer (6).



IF04K1190021-01

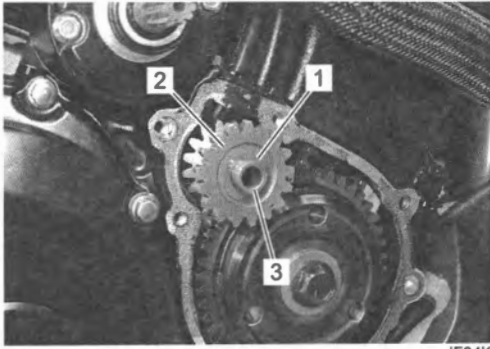
- 5) Remove the starter clutch cover (1).
- 6) Remove the dowel pins (2) and gasket (3).



IF04K1190022-02

11-10 Starting System:

- 7) Remove the wave washer (1), starter idle gear No.2 (2) and starter idle pin (3).



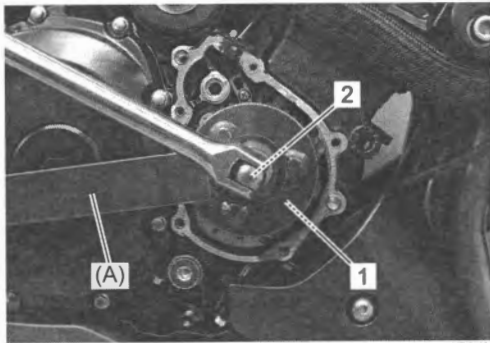
IF04K1190023-01

- 8) Hold the starter clutch (1) with the special tool.

Special tool

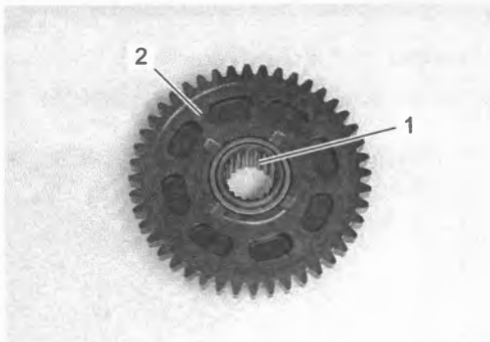
(A): 09920-34830

- 9) Remove the bolt (2) and starter clutch (1).



IF04K1190024-01

- 10) Remove the bearing (1) and starter driven gear (2).

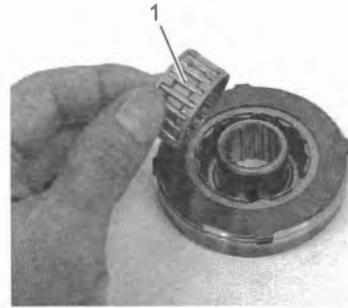


IF04K1190025-01

Installation

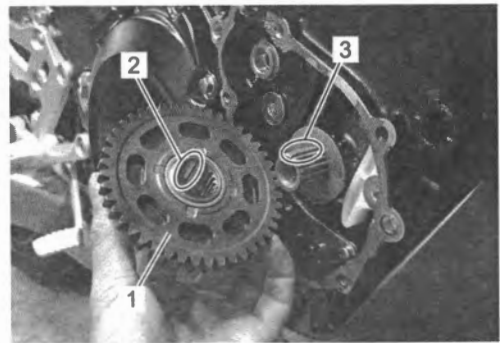
Install the starter clutch and starter idle gear in the reverse order of removal. Pay attention to the following points:

- Apply engine oil to the bearing (1).



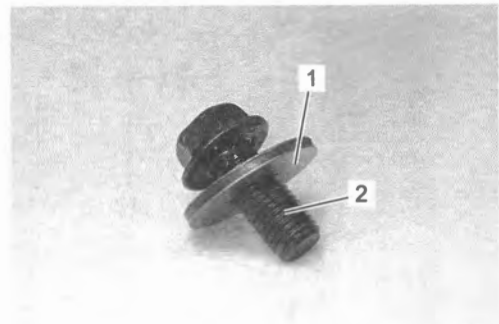
IF04K1190026-01

- Install the starter clutch (1) aligning the wide spline tooth (2) with that of crankshaft (3).



IF04K1190027-01

- Apply engine oil to the washer (1) and thread part of the starter clutch bolt (2).



IF04K1190028-01

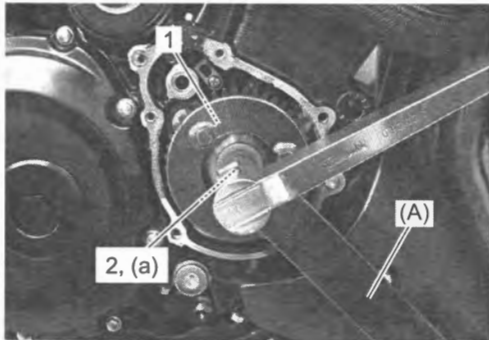
- Hold the starter clutch (1) with the special tool and tighten the starter clutch bolt (2) to the specified torque.

Special tool

(A): 09920-34830

Tightening torque

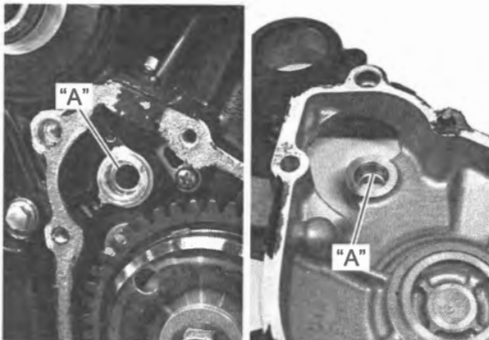
Starter clutch bolt (a): 54 N·m (5.5 kgf-m, 40.0 lbf-ft)



IF04K1190029-01

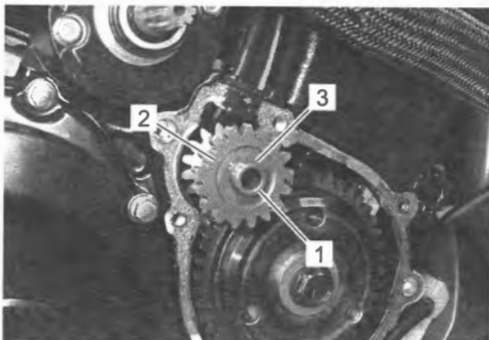
- Apply molybdenum oil solution to the boss of crankcase and starter clutch cover.

“A”: Assembly lubrication (Molybdenum oil solution)



IF04K1190030-01

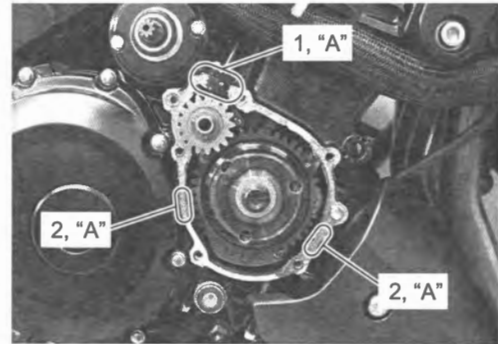
- Install the starter idle pin (1), starter idle gear No.2 (2) and wave washer (3).



IF04K1190031-01

- Apply sealant to the grommet position (1) and mating surfaces parting lines (2) between the upper and middle crankcases.

“A”: Sealant 99000-31140 (SUZUKI BOND 1207B)

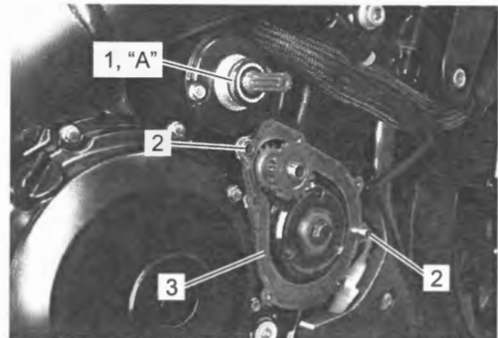


IF04K1190032-01

- Apply grease to the new O-ring (1).

“A”: Grease 99000-25011 (SUZUKI SUPER GREASE A)

- Install the dowel pins (2) and new gasket (3).

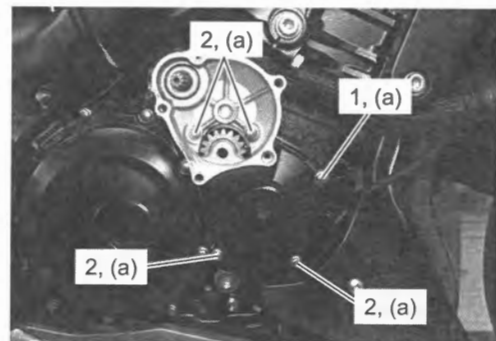


IF04K1190033-01

- Fit the new gasket to the starter clutch cover bolt (1) and tighten bolts (1) and (2) to the specified torque.

Tightening torque

Starter clutch cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

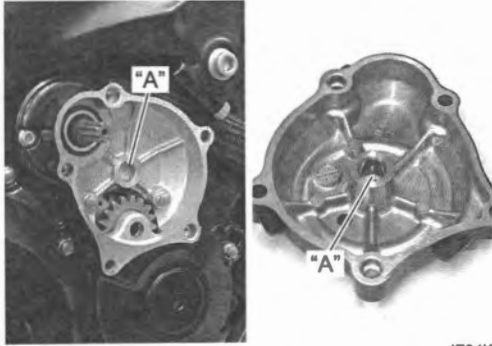


IF04K1190034-01

11-12 Starting System:

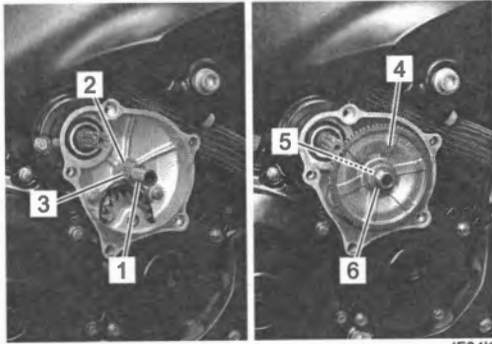
- Apply molybdenum oil solution to the boss of starter clutch cover and starter idle gear cap.

"A": Assembly lubrication (Molybdenum oil solution)



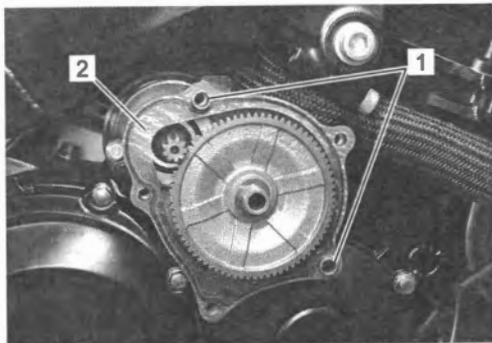
IF04K1190035-01

- Install the starter idle pin (1), washer (2) and bearing (3).
- Install the starter idle gear No.1 (4), washer (5) and wave washer (6).



IF04K1190036-01

- Install the dowel pins (1) and new gasket (2).

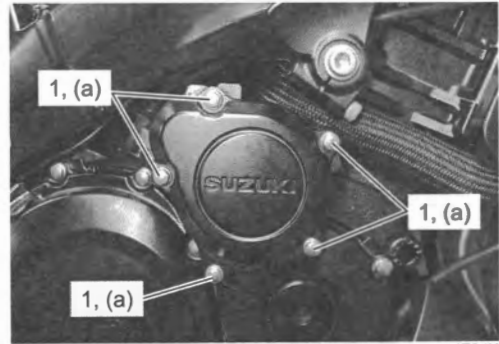


IF04K1190037-01

- Tighten the starter idle gear cap bolts (1) to the specified torque.

Tightening torque

Starter idle gear cap bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



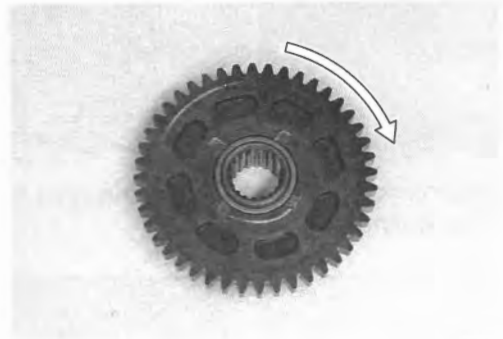
IF04K1190038-01

Starter Clutch Inspection

BENK07L21906010

Starter Clutch

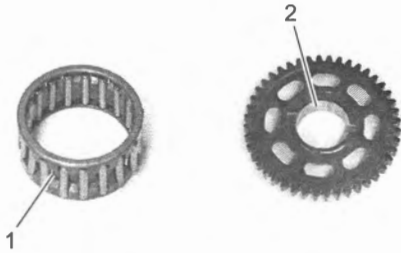
- 1) Install the starter driven gear onto the starter clutch.
- 2) Turn the starter driven gear by hand to inspect the starter clutch for a smooth movement. The gear turns in one direction only. If a large resistance is felt for rotation, inspect the starter clutch or the starter clutch contacting surface on the starter driven gear for wear or damage. If they are found to be damaged, replace them with new ones.



IF04K1190039-01

Starter Clutch Bearing / Starter Driven Gear

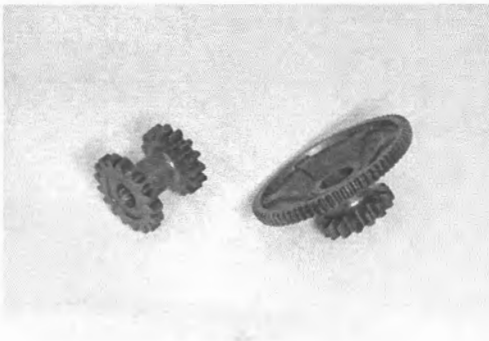
Inspect the starter clutch bearing (1) and starter clutch contacting surface on the starter driven gear (2) for wear and damage. If they are found to be damaged, replace them with new ones.



IF04K1190040-01

Starter Idle Gear No.1 / Starter Idle Gear No.2

Inspect the starter idle gear No.1 and No.2 for wear or damage. If any defects are found, replace it with a new one.



IF04K1190041-01

Starter Switch Inspection

BENK07L21906011

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Disconnect the right handle switch coupler (1).



IK07L1190009-01

- 4) Inspect the starter switch for continuity with a circuit tester. If any abnormality is found, replace the right handle switch with a new one. Refer to "Handlebar Removal and Installation" in Section 6B (Page 6B-4).

Color	O/W	Y/G
Position		
PUSH	○	○

IK07L1190011-01

- 5) After finishing the starter switch inspection, install the removed parts.

Specifications

Tightening Torque Specifications

BENK07L21907001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Starter motor bolt	10	1.0	7.5	☞ (Page 11-5)
Starter motor terminal nut	6.0	0.61	4.45	☞ (Page 11-5)
Starter relay terminal bolt	4.9	0.50	3.65	☞ (Page 11-7)
Starter clutch bolt	54	5.5	40.0	☞ (Page 11-11)
Starter clutch cover bolt	10	1.0	7.5	☞ (Page 11-11)
Starter idle gear cap bolt	10	1.0	7.5	☞ (Page 11-12)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Starter Motor Components” (Page 11-4)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L21908001


Material	SUZUKI recommended product or Specification		Note
Assembly lubrication	Molybdenum oil solution	—	☞ (Page 11-11) / ☞ (Page 11-12)
	SUZUKI MOLY PASTE	P/No.: 99000-25140	☞ (Page 11-6)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞ (Page 11-5) / ☞ (Page 11-5) / ☞ (Page 11-5) / ☞ (Page 11-11)
Sealant	SUZUKI BOND 1207B	P/No.: 99000-31140	☞ (Page 11-11)

NOTE

Required service material(s) is also described in:
“Starter Motor Components” (Page 11-4)

Special Tool

BENK07L21908002

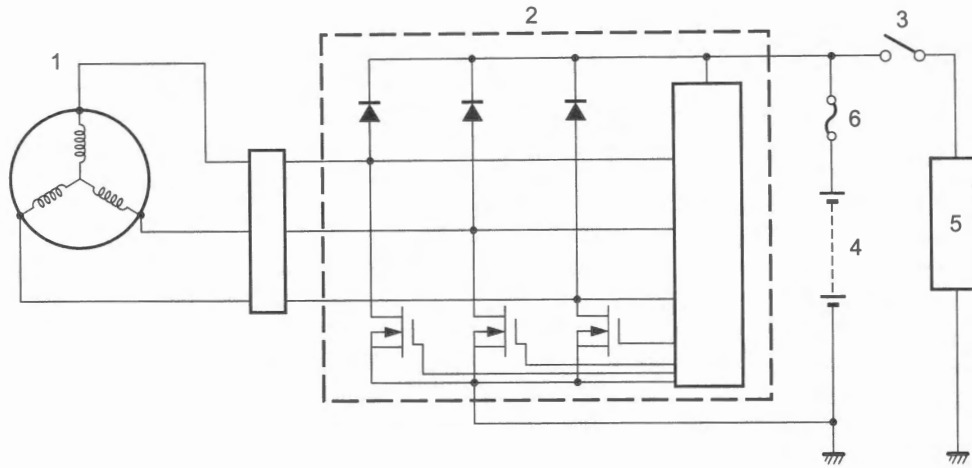
09920-34830 Starter clutch rotor holder ☞ (Page 11-10) / ☞ (Page 11-11)	
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Charging System

Schematic and Routing Diagram

Charging System Diagram

BENK07L21A02001



IF04K11A0001-01

1. Generator	3. Ignition switch	5. Load
2. Regulator/rectifier	4. Battery	6. Main fuse

Component Location

Charging System Components Location

BENK07L21A03001

Refer to "Electrical Components Location" in Section 0A (Page 0A-7).

Diagnostic Information and Procedures

Charging System Symptom Diagnosis

BENK07L21A04001

Condition	Possible cause	Correction / Reference Item
Generator does not charge	Open- or short-circuited lead wires, or loose lead connections.	<i>Repair, replace or connect properly.</i>
	Short-circuited, grounded or open generator coil.	<i>Replace. ☞(Page 1J-4) ☞(Page 1J-5)</i>
	Short-circuited or punctured regulator/rectifier.	<i>Replace. ☞(Page 1J-7)</i>
Generator does charge, but charging rate is below the specification	Lead wires tend to get short- or open-circuited or loosely connected at terminals.	<i>Repair or retighten.</i>
	Grounded or open-circuited generator coil.	<i>Replace. ☞(Page 1J-4) ☞(Page 1J-5)</i>
	Defective regulator/rectifier.	<i>Replace. ☞(Page 1J-7)</i>
	Defective cell plates in the battery.	<i>Replace the battery. ☞(Page 1J-9)</i>
Generator overcharges	Internal short-circuit in the battery.	<i>Replace the battery. ☞(Page 1J-9)</i>
	Damaged or defective regulator/rectifier.	<i>Replace. ☞(Page 1J-7)</i>
	Poorly grounded regulator/rectifier.	<i>Clean and tighten ground connection.</i>

1J-2 Charging System:

Condition	Possible cause	Correction / Reference Item
Unstable charging	Lead wire insulation frayed due to vibration, resulting in intermittent short-circuiting.	Repair or replace.
	Internally short-circuited generator.	Replace. ⌚(Page 1J-4) ⌚(Page 1J-5)
	Defective regulator/rectifier.	Replace. ⌚(Page 1J-7)
Battery overcharges	Faulty regulator/rectifier.	Replace. ⌚(Page 1J-7)
	Faulty battery.	Replace. ⌚(Page 1J-9)
	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-3)
	Cell plates have lost much of their active materials a result of overcharging.	Replace the battery and correct the charging system. ⌚(Page 1J-9)
	Internal short-circuit in the battery.	Replace the battery. ⌚(Page 1J-9)
	Too low battery voltage.	Recharge the battery fully. ⌚(Page 1J-8)
	Too old battery.	Replace the battery. ⌚(Page 1J-9)
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-9)
	The battery was left unused in a cold climate for too long.	Replace the battery if badly sulfated. ⌚(Page 1J-9)
"Sulfation", acidic white powdery substance or spots on surface of cell plates	Cracked battery case.	Replace the battery. ⌚(Page 1J-9)
	Battery has been left in a run-down condition for a long time.	Replace the battery. ⌚(Page 1J-9)

Battery Runs Down Quickly

BENK07L21A04002

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 following points of battery.

- Tightening state of the battery lead wire mounting bolts. ⌚(Page 1J-9)
- Visual of the battery. ⌚(Page 1J-9)

Is check result OK?

Yes Go to Step 3.

- No
- Loose battery lead wire mounting bolts.
 - Faulty battery.

Step 3

Check the battery for current leakage. ⌚(Page 1J-3)

Is the battery for current leakage OK?

Yes Go to Step 4.

- No
- Short circuit of wire harness.
 - Faulty electrical equipment.

Step 4

Measure the regulated voltage between the battery terminals. ⌚(Page 1J-3)

Is the regulated voltage OK?

Yes

- Faulty battery.
- Abnormal driving condition.

No Go to Step 5.

Step 5

Measure the resistance of the generator coil. ⌚(Page 1J-4)

Is the resistance of generator coil OK?

Yes Go to Step 6.

- No
- Faulty generator coil.
 - Poor contact of couplers.

Step 6

Measure the generator no-load performance. (Page 1J-4)

Is the generator no-load performance OK?

- Yes Go to Step 7.
No Faulty generator.

Step 7

- 1) Replace the regulator/rectifier with a new one. (Page 1J-7)
- 2) Measure the regulated voltage between the battery terminals. (Page 1J-3)

Is the regulated voltage OK?

- Yes End.
No
- Faulty wire harness.
 - Poor contact of couplers.

Repair Instructions**Battery Current Leakage Inspection**

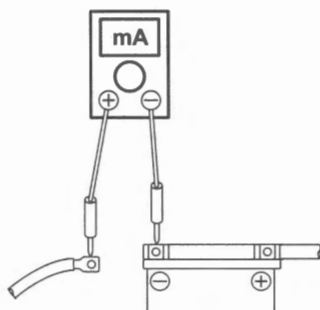
BENK07L21A06001

- 1) Turn the ignition switch OFF.
- 2) Remove the seat and disconnect the battery (-) lead wire. (Page 1J-9)
- 3) Measure the current between battery (-) terminal and the battery (-) lead wire using the 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 and install the seat. (Page 1J-9)

Regulated Voltage Inspection

BENK07L21A06002

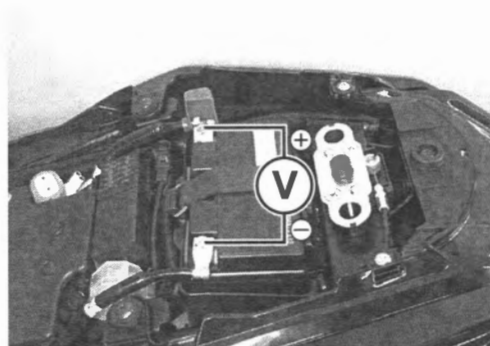
- 1) Remove the seat. (Page 9D-19)
- 2) Start the engine and keep it running at 5000 r/min with the dimmer switch turned HI position.
- 3) Measure the DC voltage between the battery (+) and (-) terminals using the circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier referring to step 5) – 7) in “Troubleshooting” under “Battery Runs Down Quickly” (Page 1J-2).

NOTE

When making this test, be sure that the battery is in fully charged condition.

Regulated voltage**Charging output**

At 5000 r/min [Standard]: 14.0 – 15.5 V



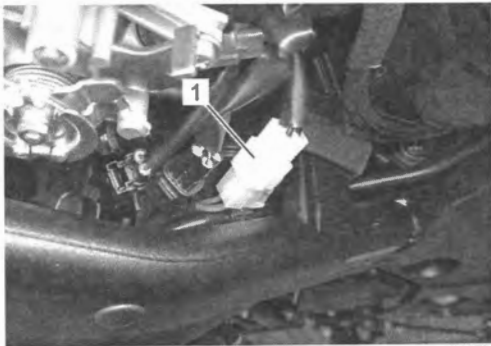
IK07L11A0001-01

Generator Inspection

BENK07L21A06003

Generator Coil Resistance

- 1) Remove the left frame front cover assembly. (Page 9D-34)
- 2) Disconnect the generator coupler (1).



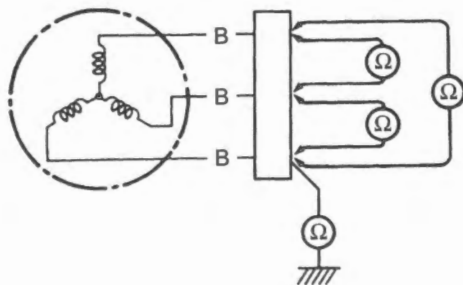
IK07L11A0002-01

- 3) Check that the resistance between each lead wire and ground is infinity.
- 4) 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

20 °C (68 °F)

[Standard]: 0.1 – 0.2 Ω

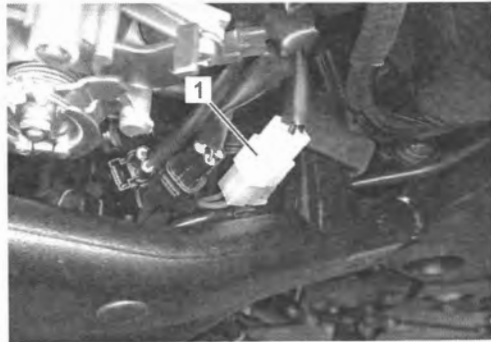


IF04K11A0021-01

- 5) Connect the generator coupler and install the removed parts.

No-load Performance

- 1) Remove the left frame front cover assembly. (Page 9D-34)
- 2) Disconnect the generator coupler (1).



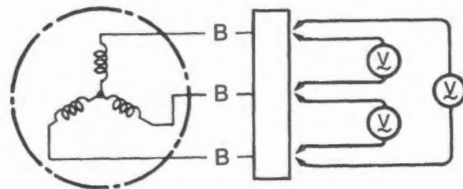
IK07L11A0002-01

- 3) Start the engine and keep it running at 5000 r/min.
- 4) Using the 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.

Generator no-load voltage

When engine cold

At 5000 r/min [Standard]: 65 V (AC) or more



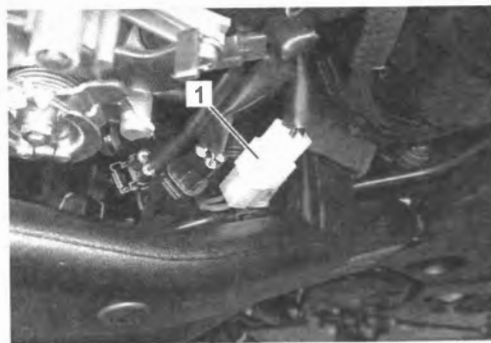
IF04K11A0022-01

- 5) Connect the generator coupler and install the removed parts.

Generator Removal

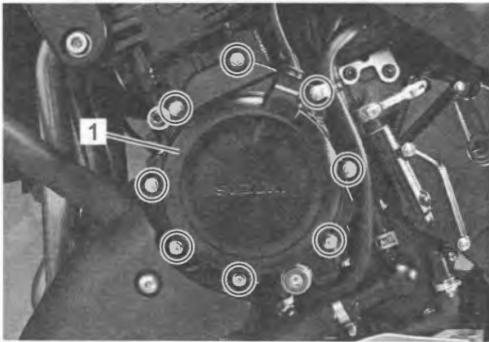
BENK07L21A06004

- 1) Disconnect the battery (-) lead wire. (Page 1J-9)
- 2) Drain engine oil. (Page 1E-5)
- 3) Remove the left frame front cover assembly. (Page 9D-34)
- 4) Remove the generator coupler (1).



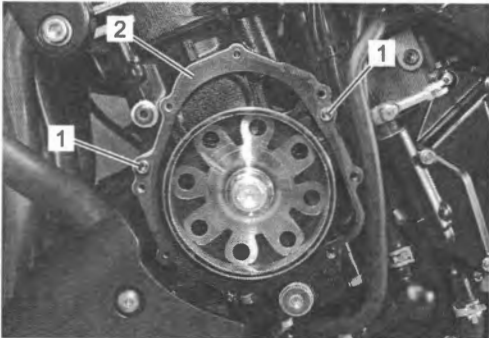
IK07L11A0002-01

5) Remove the generator cover (1).



IF04K11A0006-01

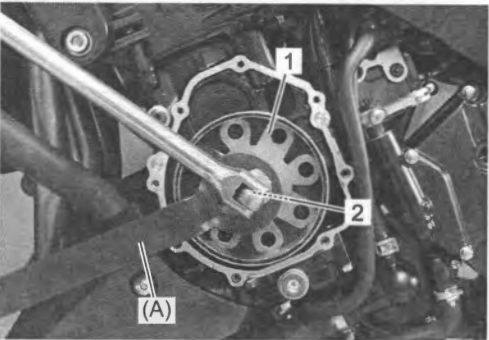
6) Remove the dowel pins (1) and gasket (2).



IF04K11A0007-01

7) Hold the generator rotor (1) using the special tool and remove the generator rotor bolt (2).

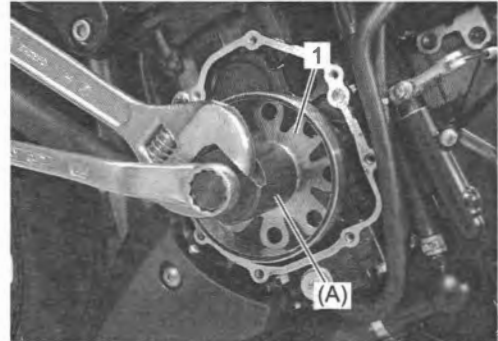
Special tool
(A): 09930-44521



IF04K11A0008-02

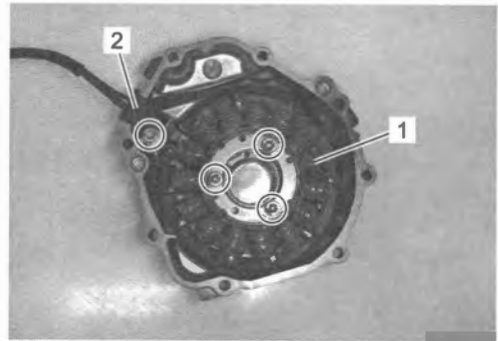
8) Remove the generator rotor (1) using the special tool.

Special tool
(A): 09930-34980



IF04K11A0009-01

9) Remove the generator stator (1) and grommet (2).



IF04K11A0010-02

Generator Installation

BENK07L21A06005

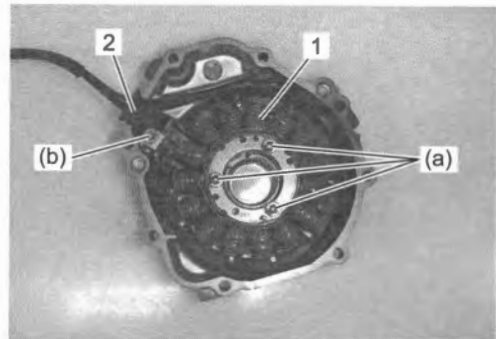
1) Install the generator stator (1) and tighten the bolts to the specified torque.

Tightening torque

Generator stator bolt (a): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)

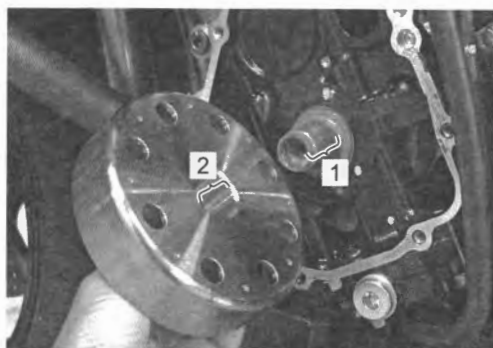
Generator lead wire clamp bolt (b): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)

2) Install the grommet (2) to the generator cover.



IF04K11A0011-02

- 3) 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.



IF04K11A0012-01

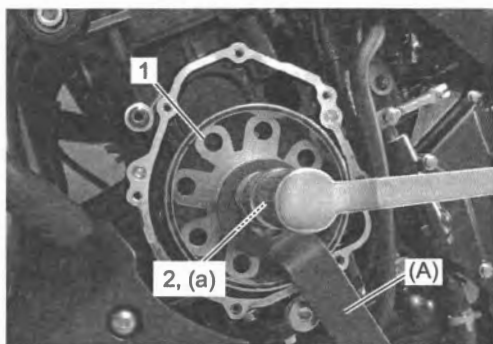
- 4) Install the generator rotor (1) on the crankshaft.
 5) Hold the generator rotor using the special tool and tighten its bolt (2) to the specified torque.

Special tool

(A): 09930-44521

Tightening torque

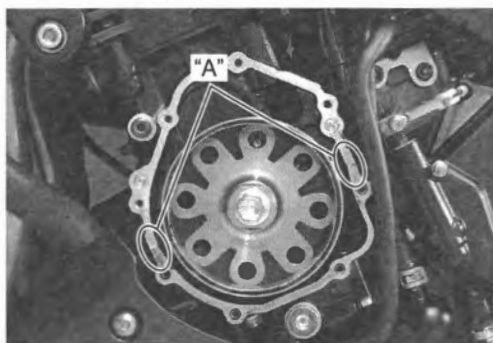
Generator rotor bolt (a): 160 N·m (16.3 kgf-m, 118.0 lbf-ft)



IF04K11A0013-01

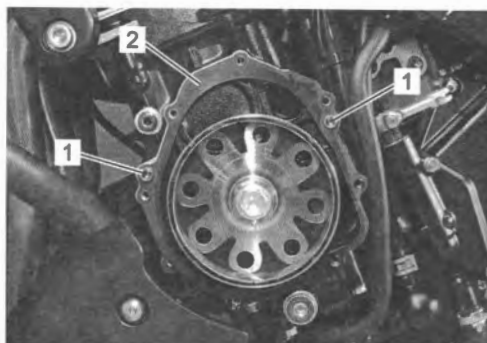
- 6) Apply a sealant lightly to the mating surfaces at the parting line between the upper and middle crankcases as shown.

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



IF04K11A0020-01

- 7) Install the dowel pins (1) and new gasket (2).



IF04K11A0014-01

- 8) Install the generator cover (1) and tighten the generator cover bolts (2), (3) and (4) to the specified torque.

▲ CAUTION

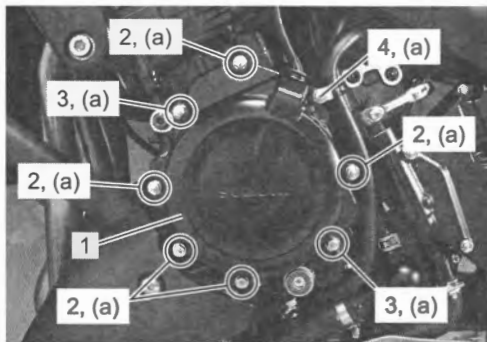
Be careful not to pinch the finger between the generator cover and the crankcase.

NOTE

- Fit the new gasket to the bolts (3).
- Fit the clamp to the bolt (4).

Tightening torque

Generator cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K11A0015-03

- 9) Connect the generator coupler (1).

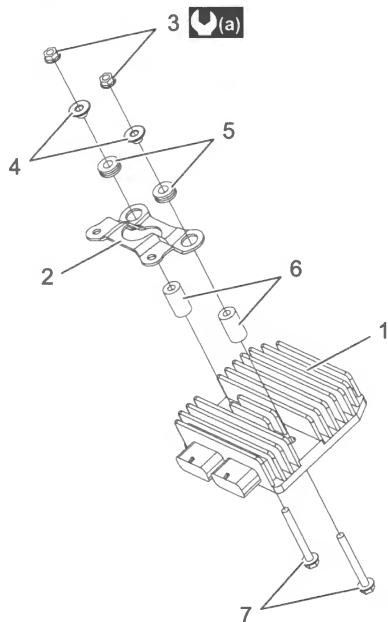


IK07L11A0002-01

- 10) Connect the battery (-) lead wire. (Page 1J-9)
 11) Remove the left frame front cover assembly. (Page 9D-34)
 12) Pour engine oil. (Page 1E-5)

Regulator / Rectifier Construction

BENK07L21A06006



IK07L11A0012-02

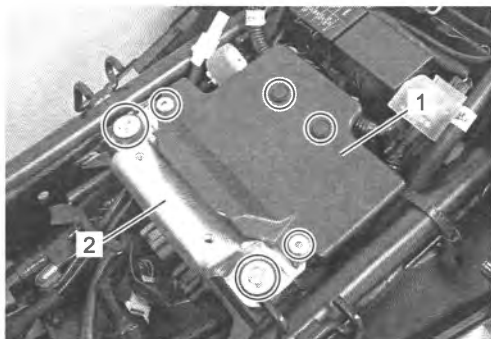
1. Regulator/rectifier	5. Regulator/rectifier bracket cushion
2. Regulator/rectifier bracket	6. Regulator/rectifier spacer
3. Regulator/rectifier nut	7. Regulator/rectifier bolt
4. Regulator/rectifier bracket spacer	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Regulator / Rectifier Removal and Installation

BENK07L21A06007

Removal

- 1) Remove the fuel tank. (Page 1G-11)
- 2) Disconnect the battery (-) lead wire. (Page 1J-9)
- 3) Remove the rectifier cover (1) and fuel tank rear bracket (2).



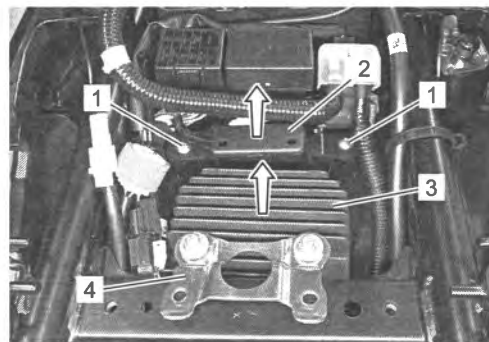
IK07L11A0003-01

- 4) Disconnect the regulator/rectifier couplers (1) and remove the regulator/rectifier bracket bolts (2).



IK07L11A0004-01

- 5) Remove the electric parts holder screws (1) and move the electric parts holder (2).
- 6) Remove the regulator/rectifier (3) with regulator/rectifier bracket (4).



IK07L11A0005-01

- 7) Remove the regulator/rectifier bracket (1).



IK07L11A0006-01

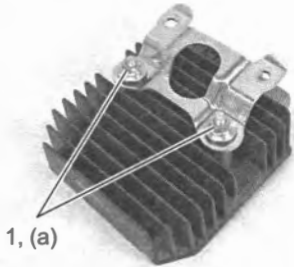
Installation

Install the regulator/rectifier in the reverse order of removal. Pay attention to the following points:

- Tighten the regulator/rectifier nuts (1) to the specified torque.

Tightening torque

Regulator/rectifier nut (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

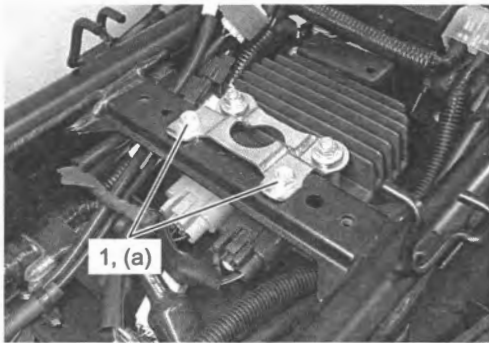


IK07L11A0007-01

- Install the electric parts holder. Refer to “Rectifier Cover / Electric Parts Holder Removal and Installation” in Section 9D (Page 9D-27).
- Tighten the regulator/rectifier bracket bolts (1) to the specified torque.

Tightening torque

Regulator/rectifier bracket bolt (a): 8.5 N·m (0.87 kgf-m, 6.30 lbf-ft)



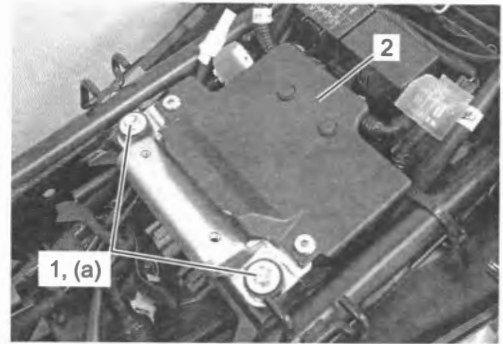
IK07L11A0008-01

- Tighten the fuel tank rear bracket bolts (1) to the specified torque.

Tightening torque

Fuel tank rear bracket bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- Install the rectifier cover (2). Refer to “Rectifier Cover / Electric Parts Holder Removal and Installation” in Section 9D (Page 9D-27).



IK07L11A0009-01

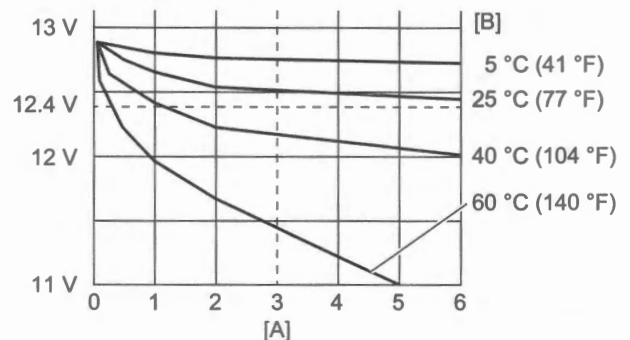
Battery Charging

BENK07L21A06008

NOTICE

- For charging the battery, read the instruction manuals of the battery and battery charger and follow the instructions properly.
- For charging the battery, follow the specified charging current and time. Otherwise, the battery may be overcharged and resulted in shortened service life of the battery.
- If the battery is left discharged to 11.5 V or less, the battery voltage may not recover fully after recharging and the battery may be discharged quickly during use.
- It is recommended to recharge the battery periodically with reference to the battery self-discharge rate by ambient temperature, so as not to drop the battery voltage below 12.4 V during the motorcycle storage to avoid shortening of the battery service life.

Self discharge rate by environment



IH13K11A0031-01

[A]: Time (Month)

[B]: Ambient temperature

NOTE

For charging MF battery, use a charger applicable to MF battery.

- 1) Remove the battery from the motorcycle. (Page 1J-9)
- 2) Measure the battery voltage.
If the voltage reading is 12.4 V or less, recharge the battery.

Recharging time

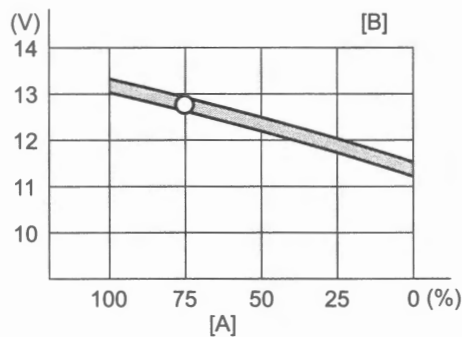
Standard charging [Standard]: 0.9 A for 5 to 10 hours

Fast charging [Standard]: 4.5 A for 1 hour

- 3) After recharging, wait at least 30 minutes and then measure the battery voltage using the circuit tester. If the battery voltage is 12.4 V or less, recharge the battery again.

If the battery voltage is still 12.4 V or less after recharging, replace the battery with a new one.

- 4) Install the battery to the motorcycle. (Page 1J-9)



IH13K11A0032-02

[A]: Battery charged condition

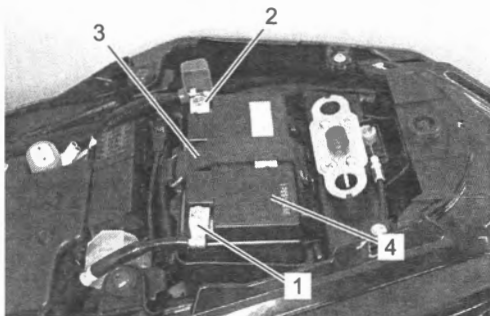
[B]: Ambient temperature 0 – 40 °C (32 – 104 °F)

Battery Removal and Installation

BENK07L21A06009

Removal

- 1) Remove the seat. (Page 9D-19)
- 2) Disconnect the battery (–) lead wire (1) first, then disconnect the battery (+) lead wire (2).
- 3) Remove the battery band (3) and battery (4) from the motorcycle.



IK07L11A0010-01

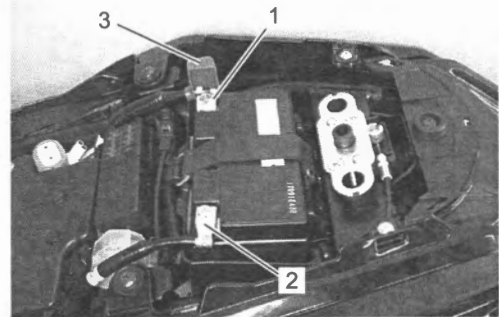
Installation

Install the tool holder and 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.
- Cover the battery (+) terminal with the terminal cover (3) securely.



IK07L11A0011-02

Battery Visual Inspection

BENK07L21A06010

- 1) Remove the seat. (Page 9D-19)
- 2) Visually inspect the surface of the battery container.
If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one.
If the battery terminals are found to be coated with rust or an acidic white powdery substance, clean the battery terminals with sandpaper.
- 3) Install the seat.

Specifications

Tightening Torque Specifications

BENK07L21A07001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Generator stator bolt	11	1.1	8.5	☞(Page 1J-5)
Generator lead wire clamp bolt	11	1.1	8.5	☞(Page 1J-5)
Generator rotor bolt	160	16.3	118.0	☞(Page 1J-6)
Generator cover bolt	10	1.0	7.5	☞(Page 1J-6)
Regulator/rectifier nut	10	1.0	7.5	☞(Page 1J-8)
Regulator/rectifier bracket bolt	8.5	0.87	6.30	☞(Page 1J-8)
Fuel tank rear bracket bolt	10	1.0	7.5	☞(Page 1J-8)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Regulator / Rectifier Construction” (Page 1J-7)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment



Recommended Service Material

BENK07L21A08001

Material	SUZUKI recommended product or Specification		Note
Sealant	SUZUKI BOND 1207B	P/No.: 99000-31140	☞(Page 1J-6)

Special Tool

BENK07L21A08002

09930-34980 Rotor remover ☞(Page 1J-5)		09930-44521 Rotor holder ☞(Page 1J-5) / ☞(Page 1J-6)	
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Exhaust System

Precautions

Precautions for Exhaust System

BENK07L21B00001

▲ 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.

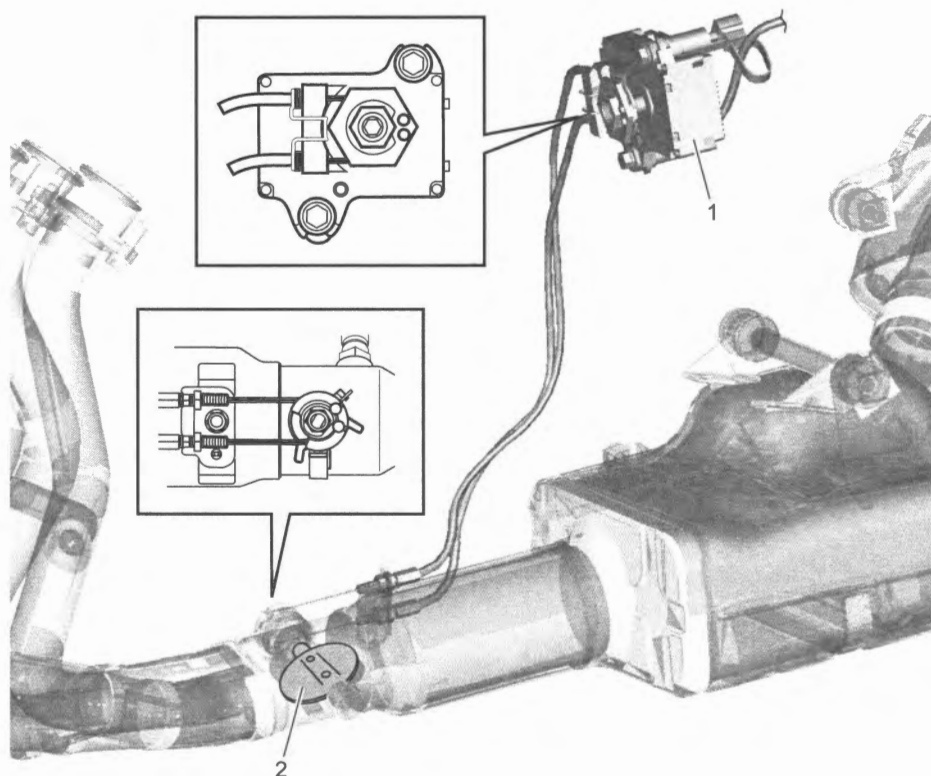
General Description

Exhaust Control System Description

BENK07L21B01001

The EXCS consists of the EXCV, EXCVA and EXCV cables.

EXCV is installed in the exhaust pipe. EXCVA is mounted backward of the frame. The EXCV is operated by the EXCVA via the cables. This system is designed to improve the engine torque at low engine speed.



1. Exhaust control valve actuator (EXCVA)

2. Exhaust control valve (EXCV)

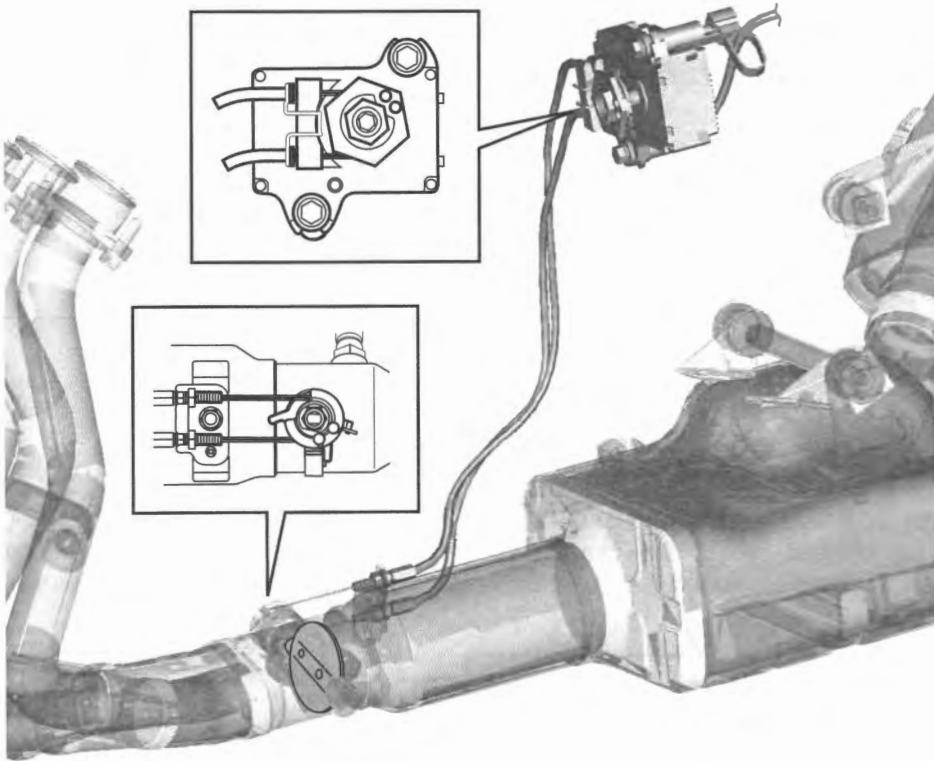
IF04K11B0061-02

Exhaust Control System Operation Description

BENK07L21B01002

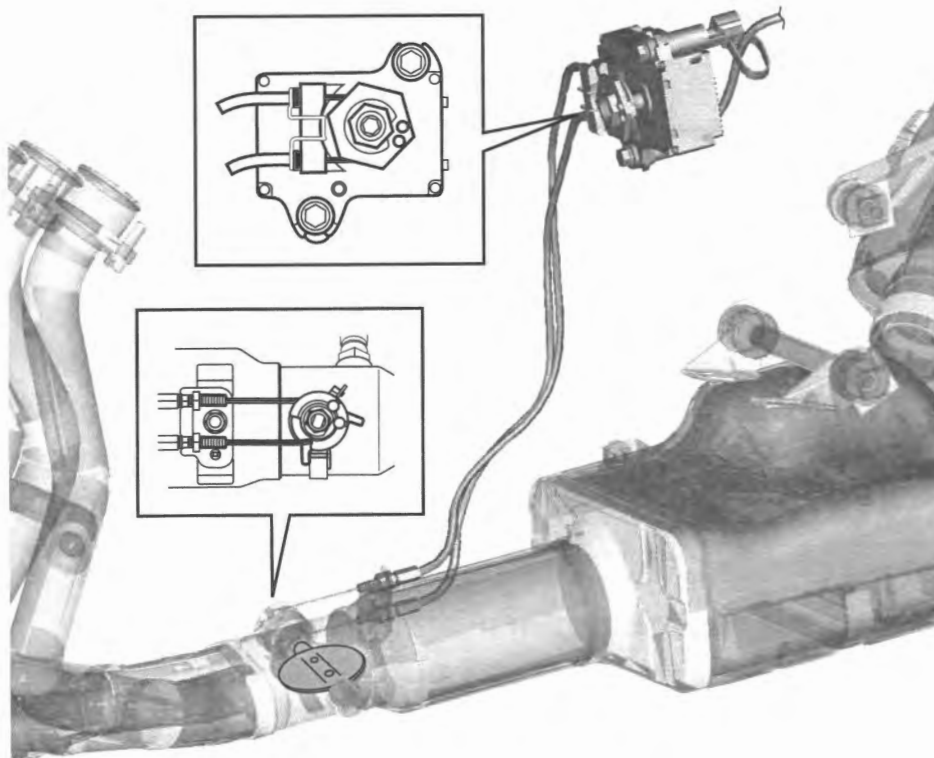
The EXCS is operated by the signal supplied from the ECM. The open/close operation of the EXCV is performed by the EXCVA which is controlled by the ECM by changing the current direction of the actuator motor. The position sensor (incorporated in the EXCVA) detects the EXCVA movement by measuring the voltage and then the ECM determines the EXCV opening angle based on the engine speed and gear positions. Every time the ignition switch is turned ON, the EXCVA automatically drives the EXCV and detects full close/open position voltages and sets the EXCV to middle position.

FULL CLOSE



IF04K11B0062-02

FULL OPEN

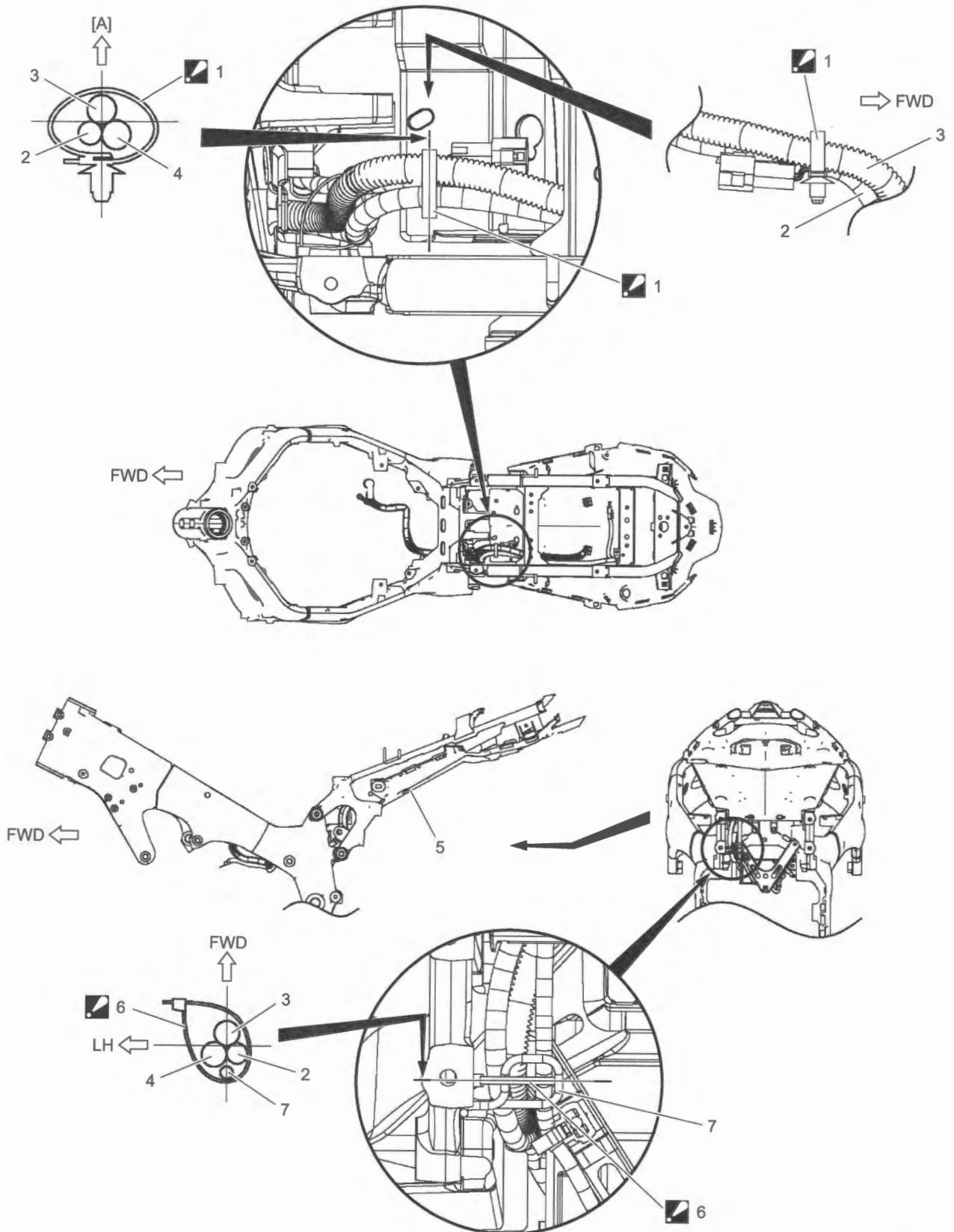


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Schematic and Routing Diagram

EXCVA Lead Wire Routing Diagram

BENK07L21B02001



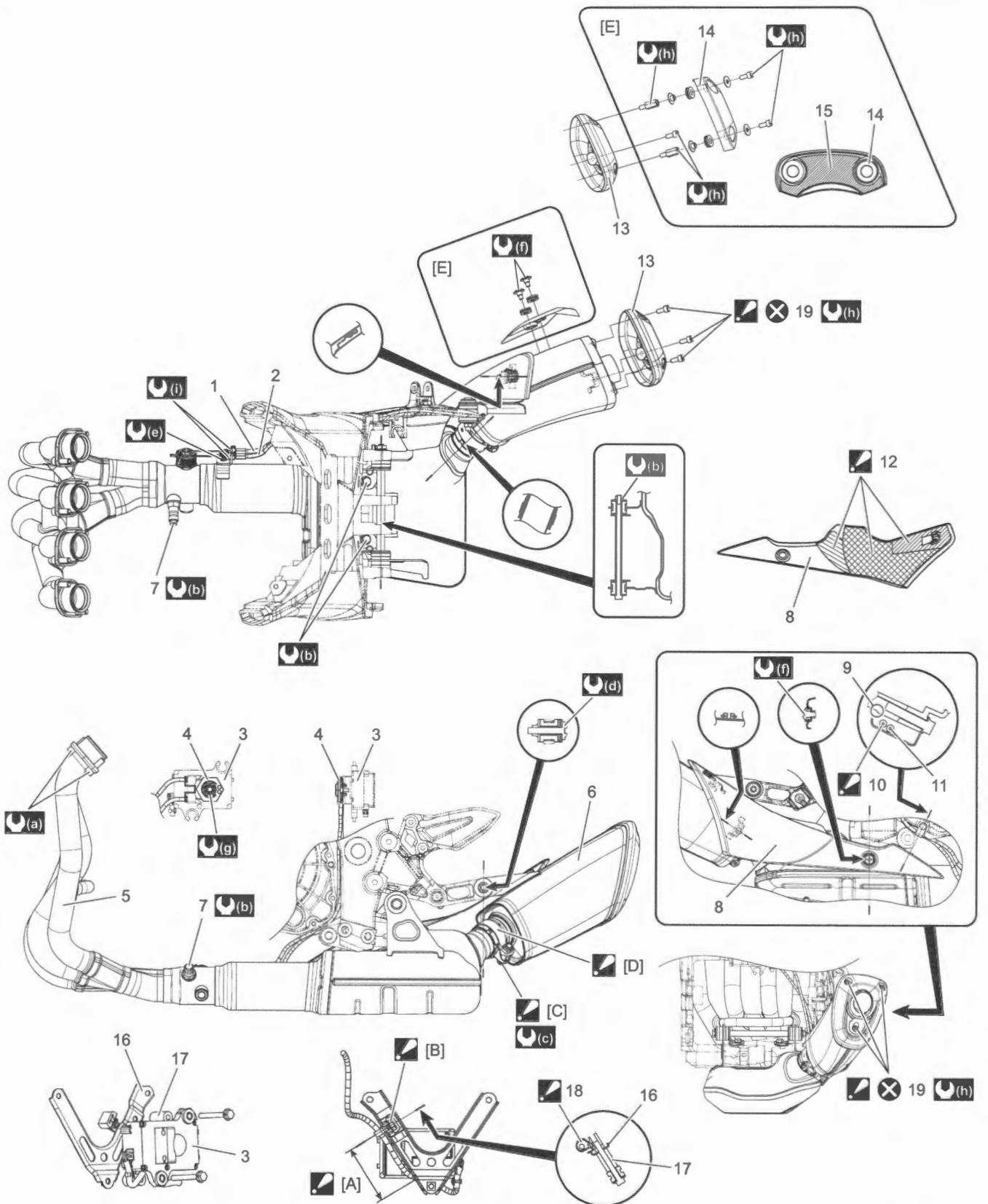
1K-4 Exhaust System:

[A]: Upper side	4. Battery (-) lead wire
 1. Fixed clamp : Clamp the protection tube of the EXCVA lead wire, battery (-) lead wire and starter motor lead wire. Do not clamp the EXCVA bare wire.	5. Rear fender front
2. EXCVA lead wire	 6. Clamp : Clamp the EXCVA lead wire, battery (-) lead wire, starter motor lead wire and harness guide. Fix the lead wires with the clamp firmly. Face the clamp lock outside. Cut off the excess tip of the clamp.
3. Starter motor lead wire	7. Harness guide

Repair Instructions

Exhaust Control System Construction

BENK07L21B06001

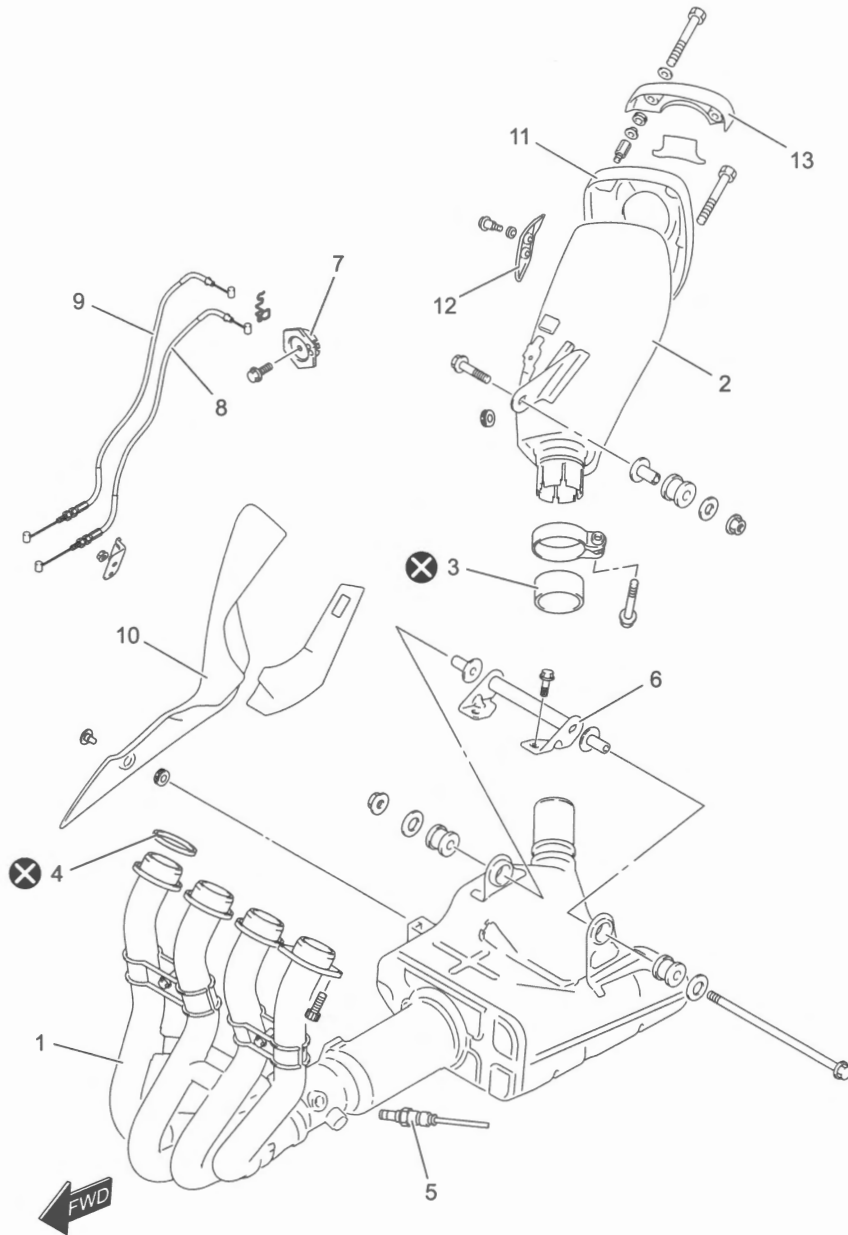


1K-6 Exhaust System:

[A]: Do not slacken the lead wire in this area.	13. Muffler rear cover
[B]: Set the clamp to the EXCVA mounting bolt.	14. Muffler cover No.2
[C]: Apply nickel based anti seize to the thread part.	15. Muffler cover heat shield
[D]: Fit the muffler connector clamp hole to the convex part of muffler.	16. EXCVA bracket
[E]: If equipped	17. Spacer
1. EXCV cable No.1	18. Clamp : Cut off the excess tip of the clamp.
2. EXCV cable No.2	19. Muffler rear cover bolt : For tightening order, refer to "Exhaust Pipe / Muffler Installation" (Page 1K-17).
3. EXCVA	(a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
4. EXCVA pulley	(b) : 25 N·m (2.5 kgf-m, 18.5 lbf-ft)
5. Exhaust pipe	(c) : 18 N·m (1.8 kgf-m, 13.5 lbf-ft)
6. Muffler	(d) : 30 N·m (3.1 kgf-m, 22.5 lbf-ft)
7. HO2 sensor	(e) : 11 N·m (1.1 kgf-m, 8.5 lbf-ft)
8. Muffler front cover	(f) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
9. Step	(g) : 5.0 N·m (0.51 kgf-m, 3.70 lbf-ft)
10. EXCV cable No.1 : Do not drop the EXCV cable No.1 into the step.	(h) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
11. EXCV cable No.2	(i) : 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)
12. Muffler cover heat shield : Do not stick out the heat shield from the muffler front cover.	: Do not reuse.

Exhaust System Components

BENK07L21B06002



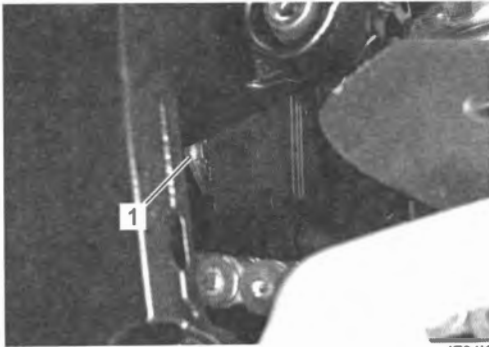
IK07L11B0016-01

1. Exhaust pipe	6. Exhaust support bracket	11. Muffler rear cover
2. Muffler	7. EXCVA pulley	12. Muffler cover No.1 (If equipped)
3. Muffler connector	8. EXCV cable No.1	13. Muffler cover No.2 (If equipped)
4. Exhaust pipe gasket	9. EXCV cable No.2	⊗ : Do not reuse.
5. HO2 sensor	10. Muffler front cover	

Exhaust Control Valve Inspection

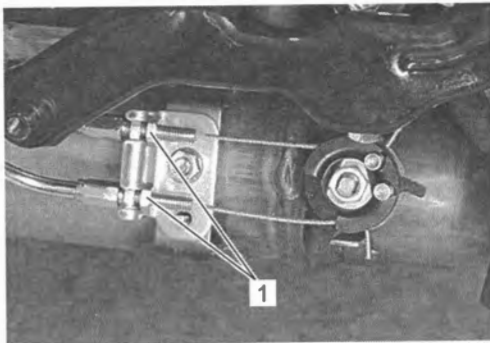
BENK07L21B06003

- 1) Remove the right under cowling. (Page 9D-42)
- 2) Check the EXCVA (1) for its smooth movement when the ignition switch is turned on. If the EXCVA does not move smoothly, check EXCVA electrical circuit. Refer to "EXCVA Inspection" (Page 1K-12).



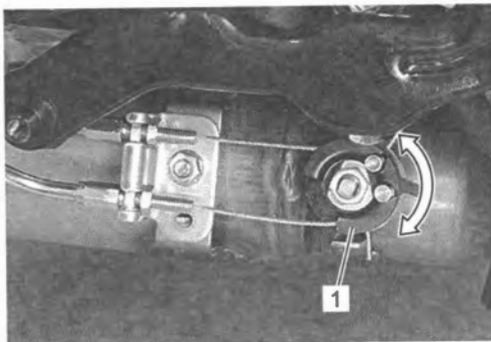
IF04K11B0002-01

- 3) Turn the ignition switch OFF.
- 4) Check the lock-nuts (1) for tightness. If the lock-nuts (1) are loose, tighten them after adjusting the cable length. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).



IF04K11B0003-02

- 5) Check that the EXCV pulley (1) rotates to full open/close stopper positions, when turning the ignition switch ON.
- 6) Check that the voltage of EXCVA position sensor is within specification. If not, perform EXCVA adjustment. Refer to "EXCVA Adjustment" (Page 1K-13).



IF04K11B0004-02

- 7) Turn the ignition switch OFF.

EXCVA / EXCV Cable Removal and Installation

BENK07L21B06004

Removal

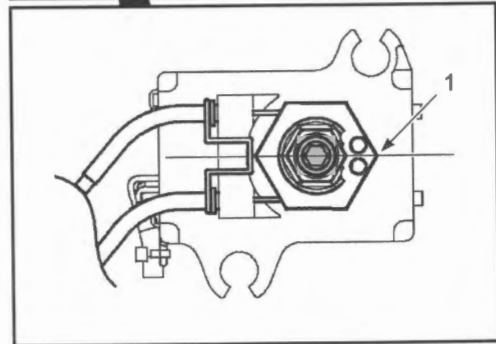
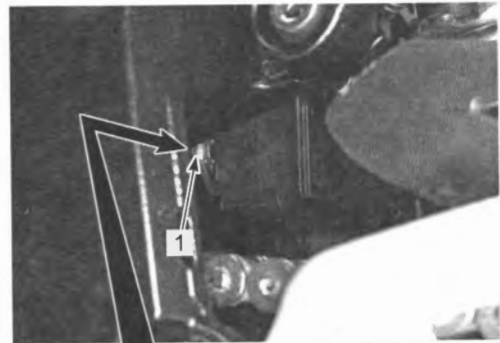
NOTICE

When the EXCV cables are removed from the EXCV pulley and turn the ignition switch ON, the EXCV cables will be coiled up. In this case, EXCVA must be removed. Do not turn the ignition switch ON after the EXCV cables are removed from the EXCV pulley.

NOTE

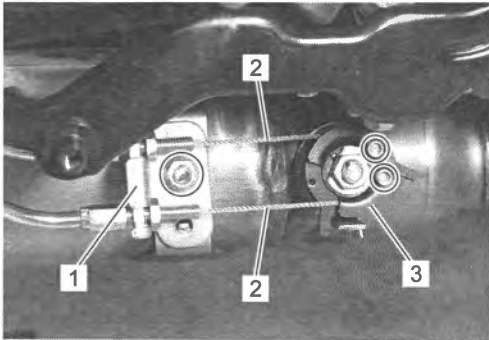
Before removing the EXCV cables, be sure to set the EXCVA pulley to the adjustment position.

- 1) Turn the ignition switch OFF.
- 2) Connect the special tool to the mode select coupler. Refer to "DTC Check" in Section 1A (Page 1A-16).
- 3) After turning the mode select switch ON, turn the ignition switch ON.
- 4) Check that the cable slots of the EXCVA pulley comes to the middle (Adjustment position) (1).
- 5) Turn the ignition switch OFF.



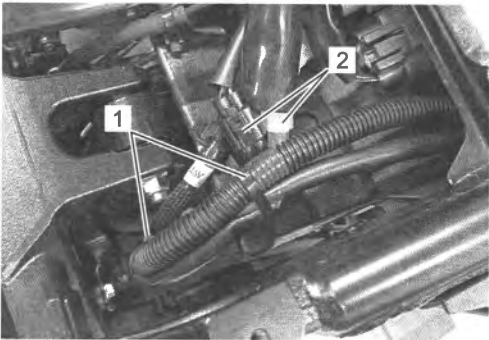
IF04K11B0006-03

- 6) Remove the right under cowling. (Page 9D-42)
- 7) Remove the EXCV cable bracket (1).
- 8) Remove the EXCV cables (2) from the EXCV pulley (3).



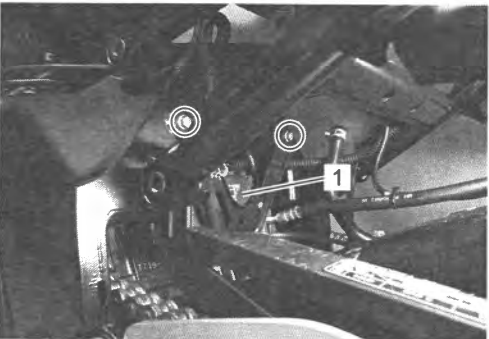
IF04K11B0008-01

- 9) Remove the fuel tank. (Page 1G-11)
- 10) Remove the clamps (1) and disconnect the EXCVA couplers (2).



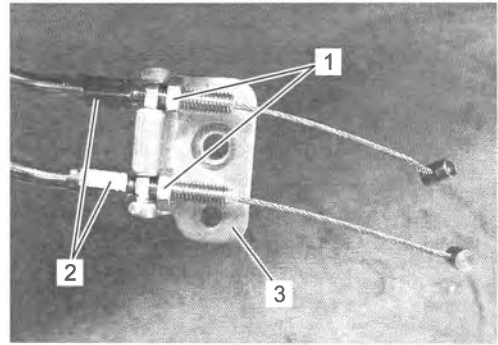
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- 11) Remove the rear shock absorber. (Page 2C-4)
- 12) Remove the EXCVA (1) and rear reservoir tank.



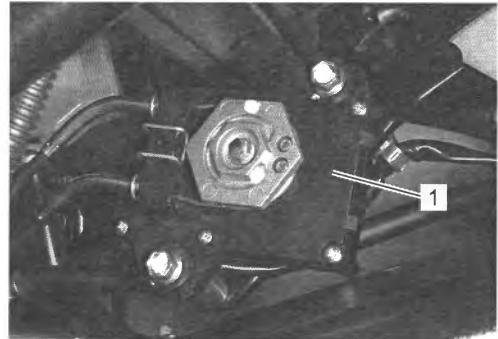
IF04K11B0005-03

- 13) Loosen the lock-nuts (1).
- 14) Remove the EXCV cables (2) from its bracket (3).



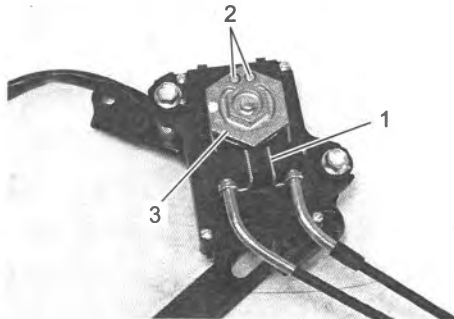
IF04K11B0009-01

- 15) Remove the EXCVA (1) with the EXCV cables.



IF04K11B0010-01

- 16) Remove the guide (1).
- 17) Disconnect the EXCV cables (2) from the EXCVA pulley (3).



IF04K11B0011-01

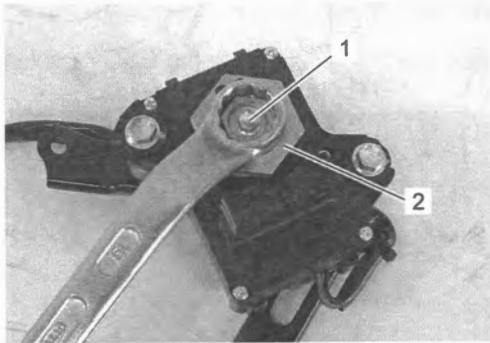
1K-10 Exhaust System:

- 18) Hold the pulley with a box end wrench, and remove the pulley mounting bolt (1).

NOTICE

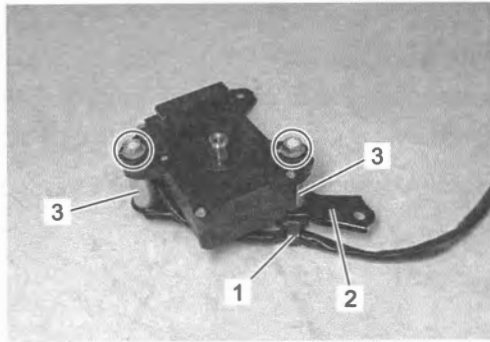
- When loosening or tightening the pulley bolt, be sure to fix the pulley with a box end wrench, or EXCVA may get damaged.
- Do not use the box end wrench to turn EXCVA pulley so as not to cause damage to the internal gear of EXCVA.

- 19) Remove the pulley (2) from the EXCVA body.



IF04K11B0012-02

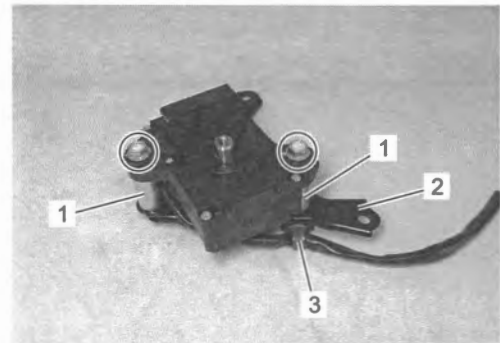
- 20) Remove the clamp (1), bracket (2) and spacers (3).



IF04K11B0013-02

Installation

- 1) Install the spacers (1), bracket (2) and clamp (3).

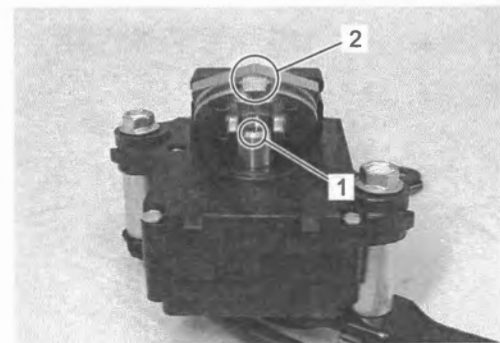


IF04K11B0014-02

- 2) Install the EXCVA pulley to the shaft.

NOTE

Align the shaft's line (1) and cable slots (2).



IF04K11B0015-02

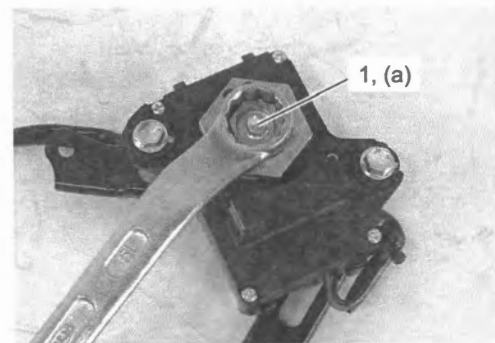
- 3) Hold the pulley with a box end wrench, and then tighten the pulley bolt (1) to the specified torque.

NOTICE

When loosening or tightening the pulley bolt, be sure to fix pulley with a box end wrench, or EXCVA may get damaged.

Tightening torque

EXCVA pulley bolt (a): 5.0 N·m (0.51 kgf·m, 3.70 lbf·ft)



IF04K11B0016-02

- Temporarily install the EXCV cable No.1 (04K0CL) (1) and No.2 (04K0OP) (2) to the EXCV cable bracket (3) and install them to the center exhaust pipe.

NOTE

The EXCV cables are identified by the letters.

No.1 cable (1): 04K0CL

No.2 cable (2): 04K0OP

- Install the EXCV cable No.1 (1) and No.2 (2) to the EXCV pulley.
- Adjust the inner cable length "a" of No.1 cable (1) in 44.5 – 45.5 mm (1.76 – 1.79 in) by turning the adjuster (4), then tighten the lock-nut (5) to the specified torque.

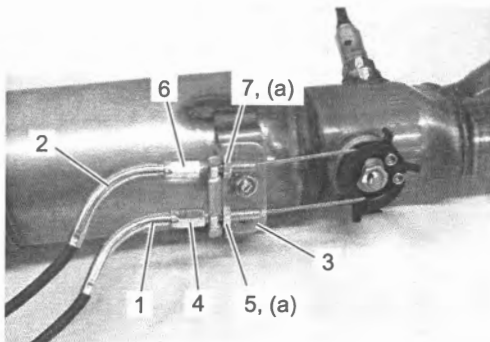
Tightening torque

EXCV cable lock-nut (a): 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)

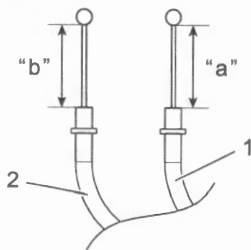
- Adjust the inner cable length "b" of No.2 cable (2) in 50 – 51 mm (1.97 – 2.00 in) by turning the adjuster (6), then tighten the lock-nut (7) to the specified torque.

Tightening torque

EXCV cable lock-nut (a): 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)

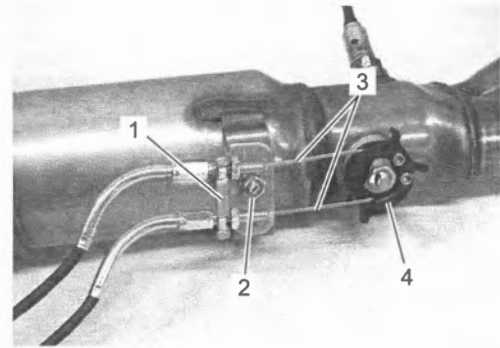


IF04K11B0017-02



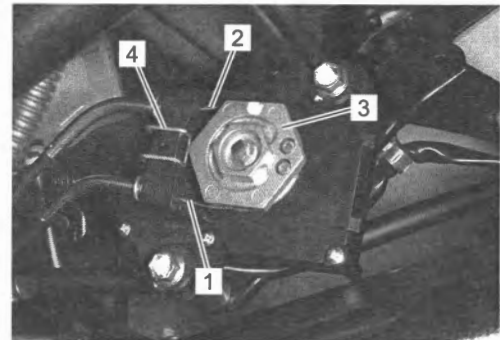
IF04K11B0018-01

- Remove the EXCV cable bracket (1) by removing the nut (2).
- Remove the EXCV cables (3) from the EXCV pulley (4).



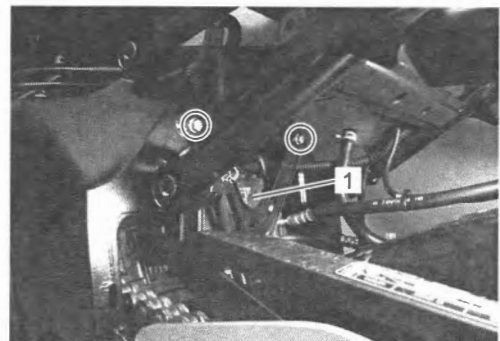
IF04K11B0019-02

- Install the EXCV cable No.1 (1) and No.2 (2) to the EXCV pulley (3).
- Install the guide (4).



IF04K11B0020-01

- Install the EXCV (1) and rear reservoir tank. Refer to "Rear Brake Hose Routing Diagram" in Section 4A (Page 4A-4).



IF04K11B0021-03

- 13) Install the rear shock absorber. (Page 2C-4)
- 14) Pass the EXCVA lead wire and install the clamps. Refer to "EXCVA Lead Wire Routing Diagram" (Page 1K-3).
- 15) Connect the EXCVA couplers (1).

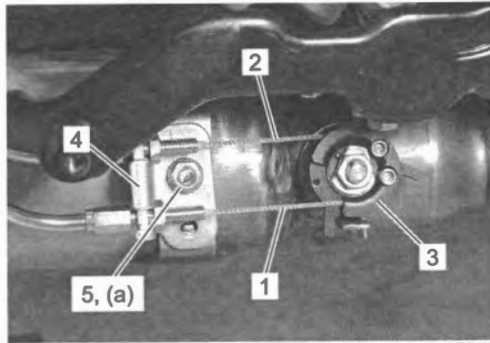


IK07L11B0002-02

- 16) Install the fuel tank. (Page 1G-11)
- 17) Install the EXCV cable No.1 (1) and No.2 (2) to the EXCV pulley (3).
- 18) Install the EXCV cable bracket (4) and tighten the nut (5) to the specified torque.

Tightening torque

EXCV cable bracket mounting nut (a): 11 N·m (1.1 kgf-m, 8.5 lbf-ft)



IF04K11B0022-02

- 19) Inspect the EXCVA position sensor voltage. Refer to "EXCVA Adjustment" (Page 1K-13).
- 20) Install the removed parts.

EXCVA Inspection

BENK07L21B06005

EXCVA Position Sensor Resistance

- 1) Set the EXCVA to adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).
- 2) Turn the ignition switch OFF and disconnect the EXCVA position sensor coupler (1). Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).

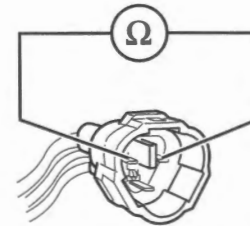


IK07L11B0003-02

- 3) Measure the resistance between the Y wire and W wire.

EXCVA position sensor resistance

At adjustment position [Standard]: Approx. 3100 Ω



IF04K1110112-01

EXCVA Position Sensor Output Voltage

Refer to "EXCVA Adjustment" (Page 1K-13).

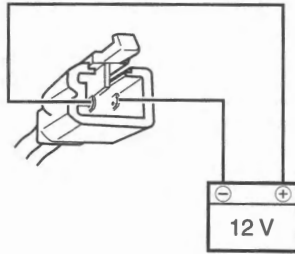
EXCVA Motor

- 1) Turn the ignition switch OFF.
- 2) Disconnect the EXCVA motor coupler (1). Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).



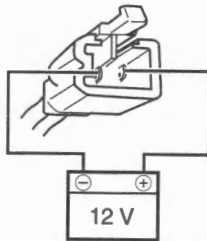
IK07L11B0004-02

- 3) Apply 12 V to the terminals and check the operation of EXCVA.



IK07L11B0011-01

- 4) Then, switch the wires supplied 12 V and check the operation of EXCVA. (Check the operation of EXCVA in both way.)



IK07L11B0012-01

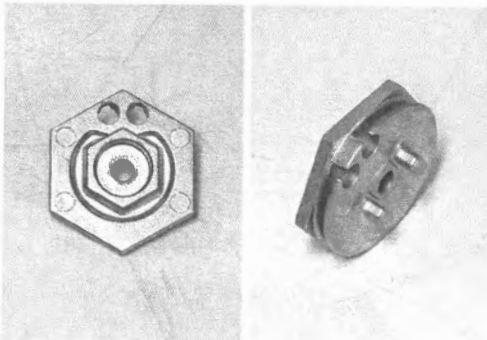
- 5) If the EXCVA pulley is not rotate, replace the EXCVA with a new one.

EXCVA Pulley Inspection

BENK07L21B06006

Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).

- Visually inspect the EXCVA pulley for wear and damage. If there is anything unusual, replace the pulley with a new one.



IF04K11B0026-01

EXCVA Adjustment

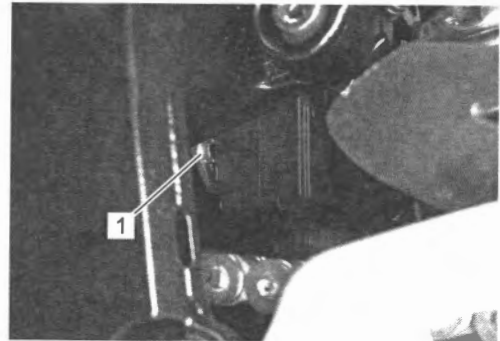
BENK07L21B06007

Step 1

- 1) Set the EXCVA to the adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).

Step 2

- 1) Turn the ignition switch OFF.
- 2) Connect the special tool to the mode select coupler. Refer to "DTC Check" in Section 1A (Page 1A-16).
- 3) Turn the ignition switch ON and check the operation of EXCVA (1).
(EXCVA operation order: Full open → Full close → Full open)



IF04K11B0027-01

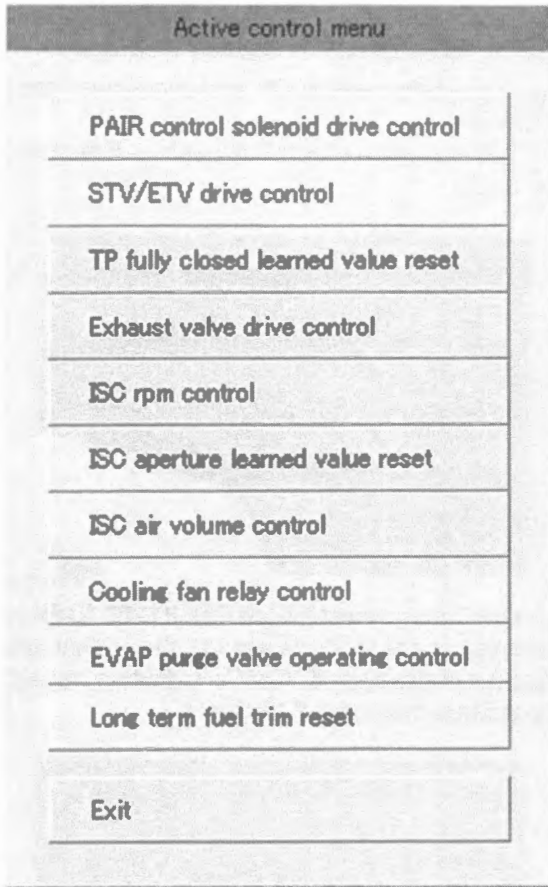
- 4) Turn the mode select switch ON. If DTC "C46" is not indicated on the LCD display (1), the adjustment is correctly completed. If "C46" is indicated, repeat the procedures from Step 3 to Step 4.



IK07L11B0013-01

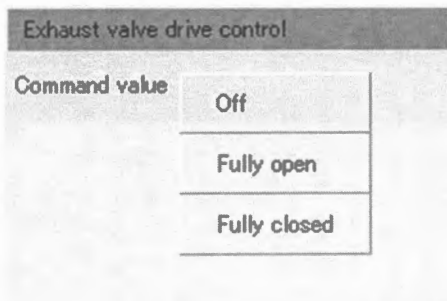
Step 3

- 1) Turn the ignition switch OFF.
- 2) Remove the fuel tank. (Page 1G-11)
- 3) Set up the SDS-II referring to the SDS-II operation manual for further details.
- 4) Turn the ignition switch ON.
- 5) Click "Exhaust valve drive control".



IJ04K1130018-01

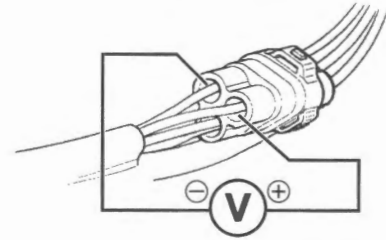
- 6) Click "Fully closed".



IF04K11B0065-03

- 7) Measure the EXCVA position sensor output voltage between the Y wire and W wire at EXCV fully closed position.

EXCVA position sensor output voltage
Closed [Standard]: 0.45 – 1.40 V



IF04K11B0060-03

- 8) If the measured voltage is less than specification, adjust the No.1 cable adjuster (1) as follows:
 - a) Set the EXCVA to the adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).

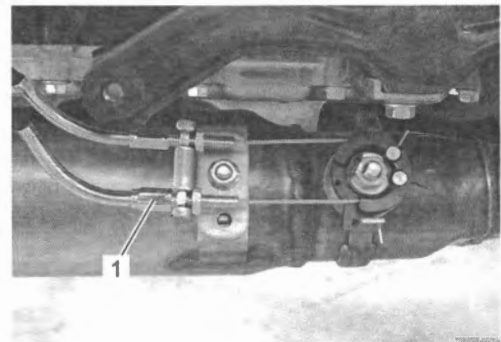
NOTICE

Adjusting the No.1 cable with the EXCV fully closed can damage the EXCVA.
 Be sure to adjust the No.1 cable with the EXCV set in the adjustment position.

- b) Turn the No.1 cable adjuster (1) in or out to set the voltage within the specified value.

NOTE

If C46 code is indicated after adjusting the voltage, increase the voltage to 0.9 V.



IF04K11B0030-02

Step 4

- 1) Click "Fully open".

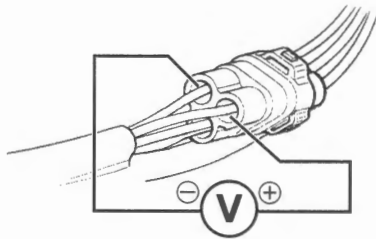
Exhaust valve drive control

Command value	Off
	Fully open
	Fully closed

IF04K11B0066-03

- 2) Measure the EXCVA position sensor output voltage between the Y wire and W wire at EXCV fully opened position.

EXCVA position sensor output voltage
Opened [Standard]: 3.60 – 4.55 V



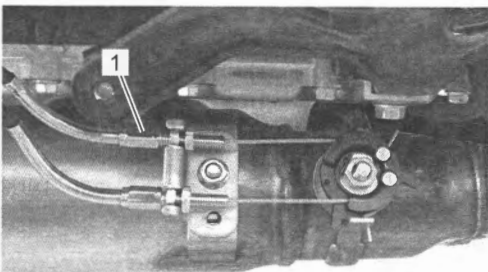
IF04K11B0060-03

- 3) If the measured voltage is more than specification, adjust the No.2 cable adjuster (1) as follows:
 - a) Set the EXCVA to the adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).

NOTICE

Adjusting the No.2 cable with the EXCV fully opened can damage the EXCVA.
Be sure to adjust the No.2 cable with the EXCV set in adjustment position.

- b) Turn the No.2 cable adjuster (1) in or out to set the output voltage within the specified value.

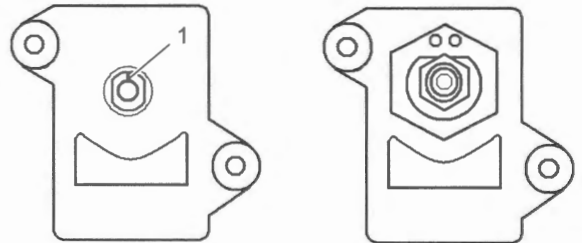


IF04K11B0032-03

- 4) After adjusting the EXCV cables, perform Step 2 to confirm DTC "C46" is not indicated.
- 5) Install the removed parts.

Repair (EXCV pulley does not rotate when turning the ignition switch ON, during EXCVA adjustment)

- 1) Turn the ignition switch OFF.
- 2) Disconnect the EXCVA coupler and EXCV cables from the EXCVA pulley. (Page 1K-8)
- 3) Apply 12 V to the EXCVA lead wire between the Br wire and R wire to rotate the motor so that the line (1) or pulley comes to the adjacent position as shown.



IF04K11B0055-01

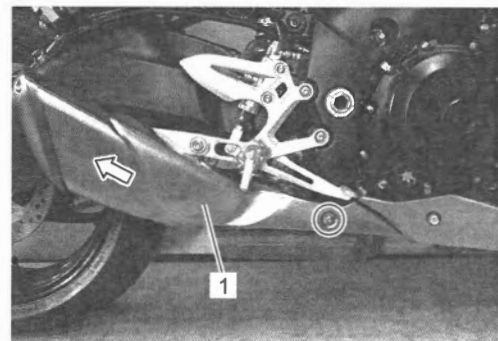
- 4) Connect the EXCVA coupler.
- 5) Check the EXCVA to the adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).
- 6) Turn the ignition switch OFF.
- 7) Connect the EXCV cables and install the EXCVA. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).
- 8) Inspect the EXCVA position sensor voltage. Refer to "EXCVA Adjustment" (Page 1K-13).

Exhaust Pipe / Muffler Removal

BENK07L21B06008

Muffler

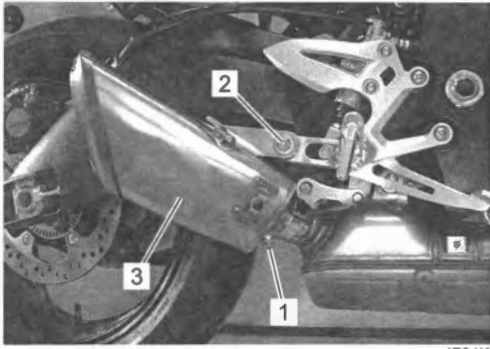
- 1) Remove the muffler front cover (1).



IF04K11B0033-02

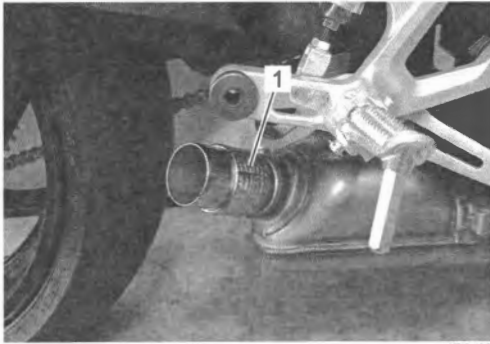
1K-16 Exhaust System:

- 2) Loosen the muffler connector bolt (1).
- 3) Remove the support bolt and nut (2) and muffler (3).



IF04K11B0034-01

- 4) Remove the muffler connector (1).



IF04K11B0035-01

- 5) Remove the muffler cover No.1 and muffler cover No.2. (If equipped) Refer to "Exhaust Control System Construction" (Page 1K-5).
- 6) Remove the muffler rear cover (1).



IF04K11B0036-01

Exhaust Pipe

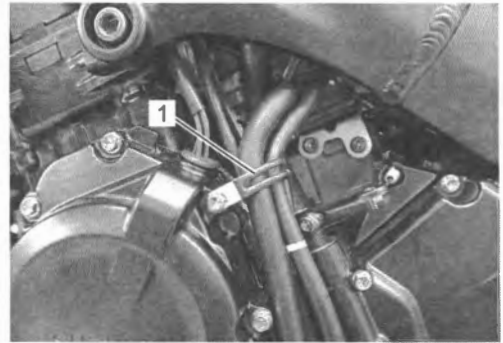
- 1) Remove the right under cowling. (Page 9D-42)
- 2) Remove the left frame front cover assembly. (Page 9D-34)
- 3) Move the radiator. (Page 1F-9)

- 4) Disconnect the HO2 sensor coupler (1).



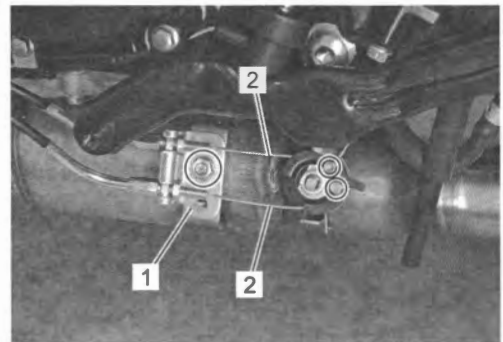
IK07L11B0005-01

- 5) Remove the HO2 sensor lead wire from the clamp (1).



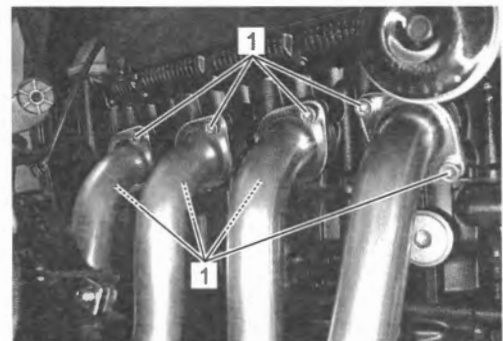
IK07L11B0006-01

- 6) Remove the EXCV cable bracket (1) with EXCV cables (2). Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).



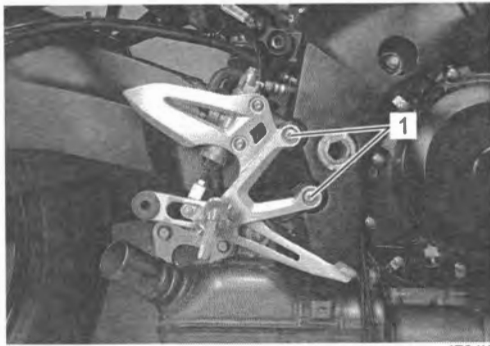
IF04K11B0038-01

- 7) Remove the exhaust pipe bolts (1).



IF04K11B0039-01

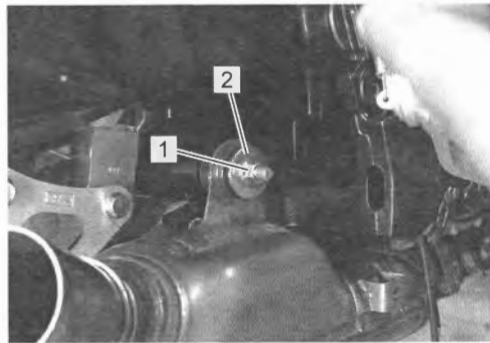
8) Remove the front footrest bracket bolts (1).



IF04K11B0040-01

9) Remove the gearshift link arm. (Page 5B-18)

10) Remove the exhaust support nut (1) and washer (2).



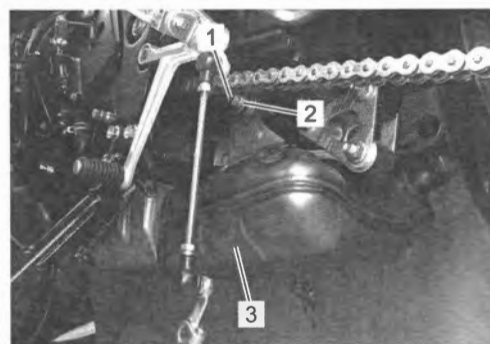
IF04K11B0041-01

11) Remove the exhaust support bolt (1) and washer (2).

12) Remove the exhaust pipe (3).

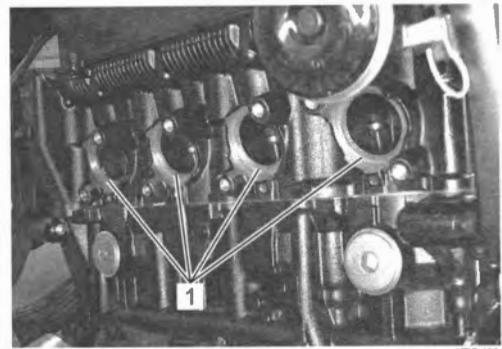
NOTE

Support the exhaust pipe assembly to prevent it from falling.



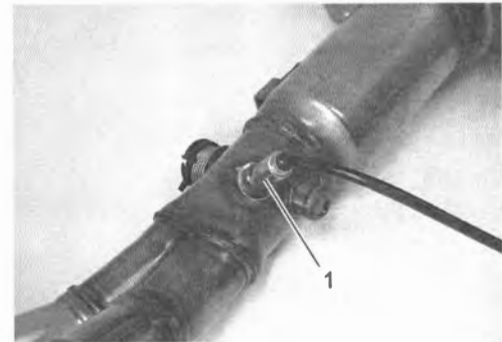
IF04K11B0042-01

13) Remove the exhaust pipe gaskets (1).



IF04K11B0043-01

14) Remove the HO2 sensor (1). (Page 1C-12)



IF04K11B0044-01

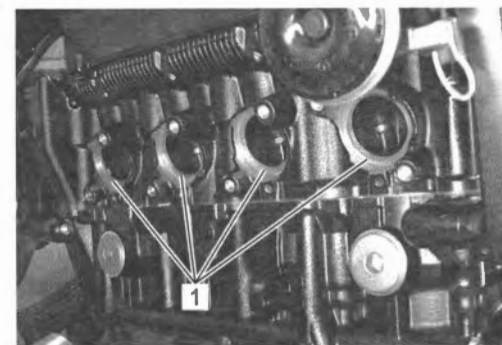
Exhaust Pipe / Muffler Installation

BENK07L21B06009

Exhaust Pipe

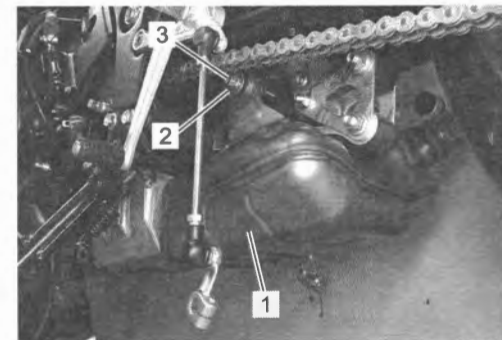
1) Install the HO2 sensor. (Page 1C-12)

2) Install the new exhaust pipe gaskets (1).



IF04K11B0045-01

3) Temporarily the exhaust pipe (1), washer (2) and exhaust support bolt (3).



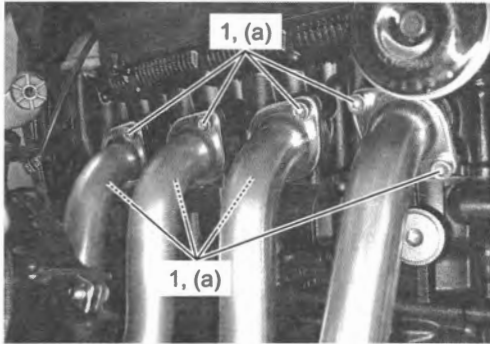
IF04K11B0046-01

1K-18 Exhaust System:

- 4) Tighten the 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)

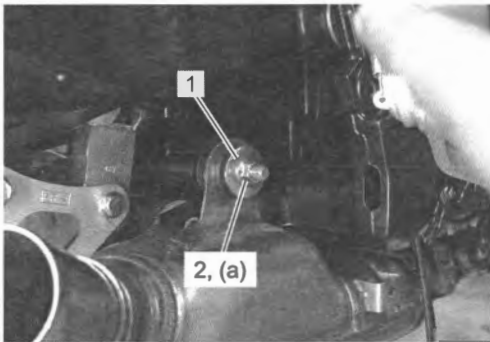


IF04K11B0047-01

- 5) Install the washer (1) and tighten the exhaust support nut (2) to the specified torque.

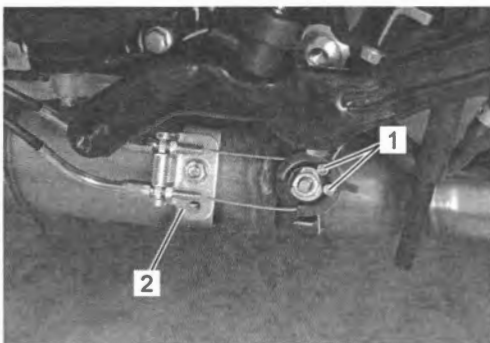
Tightening torque

Exhaust support nut (a): 25 N·m (2.5 kgf-m, 18.5 lbf-ft)



IF04K11B0048-01

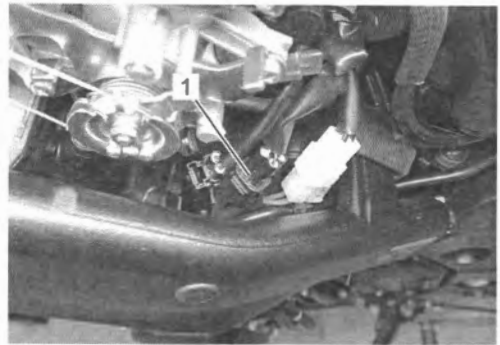
- 6) Install the front footrest. (Page 9E-2)
7) Install the gearshift link arm. (Page 5B-18)
8) Install the EXCV cables (1) and bracket (2). Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).



IF04K11B0049-02

- 9) Install the radiator. (Page 1F-9)
10) Route the HO2 sensor lead wire and clamp it. Refer to "Fuel Tank Water Drain Hose and Fuel Tank Breather Hose Routing Diagram" in Section 1G (Page 1G-3).

- 11) Connect the HO2 sensor coupler (1).



IK07L11B0005-01

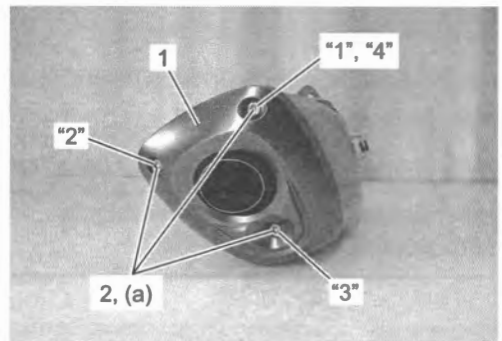
- 12) Install the left frame front cover assembly. (Page 9D-34)
13) Install the right under cowling. (Page 9D-42)

Muffler

- 1) Install the muffler rear cover (1) and tighten the new muffler rear cover bolts (2) to the specified torque in order of "1" → "2" → "3" → "4".

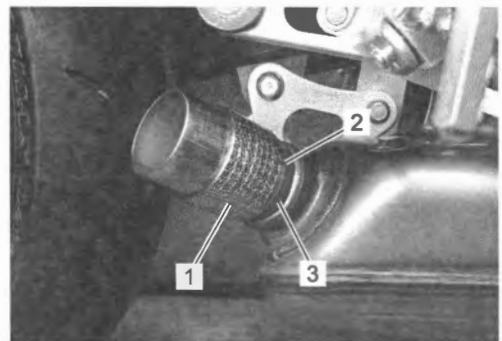
Tightening torque

Muffler rear cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IK07L11B0015-01

- 2) Install the muffler cover No.1 and muffler cover No.2. (If equipped) Refer to "Exhaust Control System Construction" (Page 1K-5).
3) Put the edge (2) of a new muffler connector (1) to the exhaust pipe stopper (3).



IF04K11B0051-01

- 4) Install the muffler (1) and tighten the muffler support bolt (2) to the specified torque.

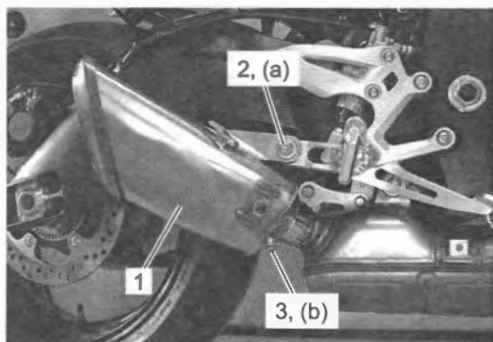
Tightening torque

Muffler support bolt (a): 30 N·m (3.1 kgf-m, 22.5 lbf-ft)

- 5) Apply nickel based anti seize to the thread part of muffler connector bolt (3) and tighten it to the specified torque.

Tightening torque

Muffler connector bolt (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)

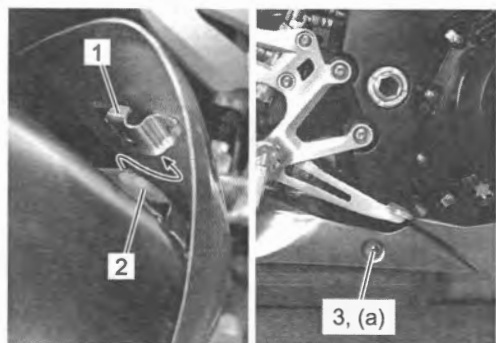


IF04K11B0052-02

- 6) Slide the muffler cover retainer (1) to the hook (2) on the muffler and tighten the muffler front cover bolt (3) to the specified torque.

Tightening torque

Muffler front cover bolt (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IF04K11B0053-02

Exhaust System Inspection

BENK07L21B06010

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 support nut and muffler support bolt are tightened to their specified torque.

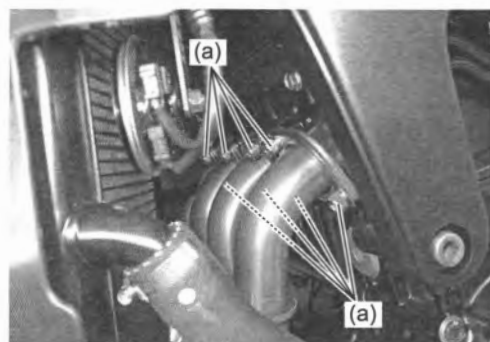
Tightening torque

Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

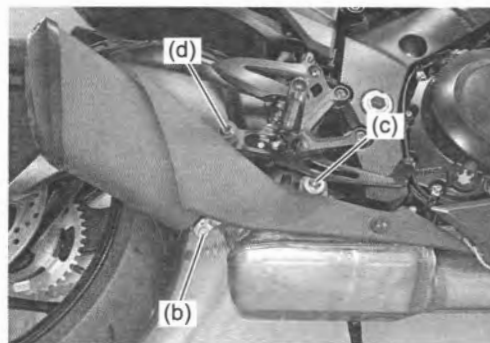
Muffler connector bolt (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)

Exhaust support nut (c): 25 N·m (2.5 kgf-m, 18.5 lbf-ft)

Muffler support bolt (d): 30 N·m (3.1 kgf-m, 22.5 lbf-ft)



IK07L11B0007-01



IK07L11B0008-01

Specifications

Tightening Torque Specifications

BENK07L21B07001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
EXCVA pulley bolt	5.0	0.51	3.70	☞(Page 1K-10)
EXCV cable lock-nut	4.5	0.46	3.35	☞(Page 1K-11) / ☞(Page 1K-11)
EXCV cable bracket mounting nut	11	1.1	8.5	☞(Page 1K-12)
Exhaust pipe bolt	23	2.3	17.0	☞(Page 1K-18) / ☞(Page 1K-19)
Exhaust support nut	25	2.5	18.5	☞(Page 1K-18) / ☞(Page 1K-19)
Muffler rear cover bolt	10	1.0	7.5	☞(Page 1K-18)
Muffler support bolt	30	3.1	22.5	☞(Page 1K-19) / ☞(Page 1K-19)
Muffler connector bolt	18	1.8	13.5	☞(Page 1K-19) / ☞(Page 1K-19)
Muffler front cover bolt	5.5	0.56	4.05	☞(Page 1K-19)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Exhaust Control System Construction” (Page 1K-5)

“Fasteners Information” in Section 0C (Page 0C-11)

Section 2

Suspension

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Rear Shock Absorber Inspection	2C-5	Air Valve Removal and Installation	2D-17
Rear Shock Absorber Bearing Removal and Installation	2C-6	Wheel Balance Check and Adjustment	2D-17
Rear Shock Absorber Disposal	2C-6	Specifications	2D-18
Cushion Lever Removal and Installation	2C-7	Tightening Torque Specifications	2D-18
Cushion Lever Inspection	2C-8	Special Tools and Equipment	2D-18
Cushion Rod Removal and Installation	2C-8	Recommended Service Material	2D-18
Cushion Rod Inspection	2C-9	Special Tool	2D-18
Cushion Rod Bearing Removal and Installation	2C-9		

Precautions

Precautions

Precautions for Suspension

BENK07L22000001

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 and muffler.**
-

Suspension General Diagnosis

Diagnostic Information and Procedures

Suspension and Wheel Symptom Diagnosis

BENK07L22104001

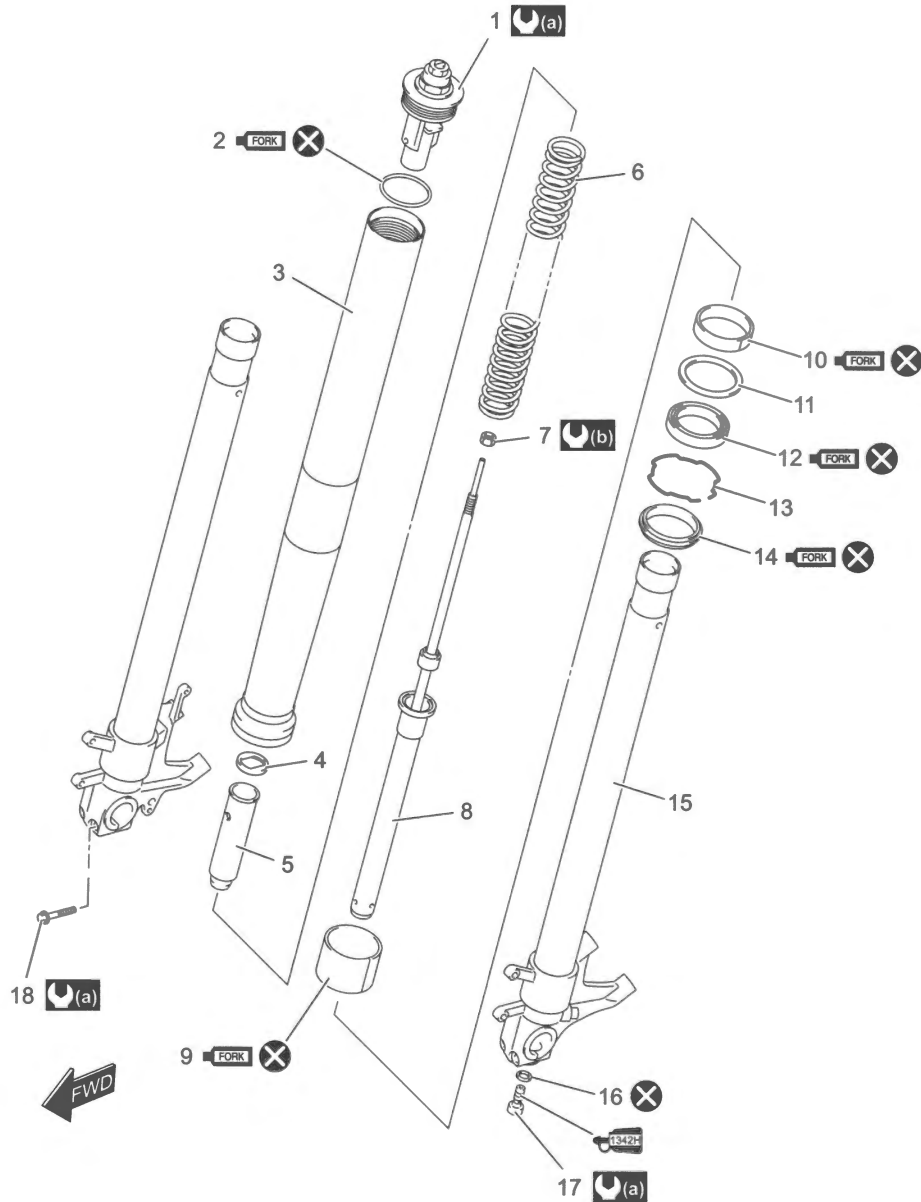
Condition	Possible cause	Correction / Reference Item
Wobbly front wheel	Distorted wheel rim.	Replace. ☞(Page 2D-15)
	Worn front wheel bearings.	Replace. ☞(Page 2D-5)
	Defective or incorrect tire.	Replace. ☞(Page 2D-15)
	Loose front axle nut.	Tighten. ☞(Page 0B-5)
	Loose front axle pinch bolts.	Tighten. ☞(Page 0B-5)
	Incorrect fork oil level.	Adjust. ☞(Page 2B-4)
	Incorrect front wheel weight balance.	Adjust. ☞(Page 2D-17)
Front suspension too soft	Insufficiently viscous fork oil.	Replace. ☞(Page 2B-4)
	Insufficient fork oil.	Check level and add. ☞(Page 2B-4)
	Weak spring.	Replace. ☞(Page 2B-4)
	Improperly set front fork spring adjuster.	Adjust. ☞(Page 2B-2)
	Improperly set front fork damping force adjuster.	Adjust. ☞(Page 2B-2)
Front suspension too stiff	Excessively viscous fork oil.	Replace. ☞(Page 2B-4)
	Excessive fork oil.	Check level and drain. ☞(Page 2B-4)
	Bent front axle.	Replace. ☞(Page 2D-4)
	Improperly set front fork spring adjuster.	Adjust. ☞(Page 2B-2)
	Improperly set front fork damping force adjuster.	Adjust. ☞(Page 2B-2)
Front suspension too noisy	Insufficient fork oil.	Check level and add. ☞(Page 2B-4)
	Loose front fork clamp bolt.	Tighten. ☞(Page 0B-5)
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-14)
	Loose rear suspension related bolt and nut.	Tighten. ☞(Page 0B-5)
	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-4)
	Rear shock absorber leaks oil.	Replace. ☞(Page 2C-4)
	Improperly set rear shock absorber spring adjuster.	Adjust. ☞(Page 2C-3)
	Improperly set rear shock absorber damping force adjuster.	Adjust. ☞(Page 2C-3)
Rear suspension too stiff	Bent rear shock absorber shaft.	Replace. ☞(Page 2C-4)
	Worn swingarm bearings.	Replace. ☞(Page 2C-14)
	Worn rear suspension bearings.	Replace. ☞(Page 2C-6)
	Bent swingarm pivot shaft.	Replace. ☞(Page 2C-10)
	Improperly set rear shock absorber spring adjuster.	Adjust. ☞(Page 2C-3)
	Improperly set rear shock absorber damping force adjuster.	Adjust. ☞(Page 2C-3)
Rear suspension too noisy	Loose rear suspension related bolt and nut.	Tighten. ☞(Page 0B-5)
	Worn swingarm bearings.	Replace. ☞(Page 2C-14)
	Worn rear suspension bearings.	Replace. ☞(Page 2C-6)

Front Suspension

Repair Instructions

Front Fork Components

BENK07L22206001



IF04K1220044-01

1. Front fork cap bolt	9. Inner tube slide metal	17. Damper rod bolt
2. O-ring	10. Outer tube slide metal	18. Front axle pinch bolt
3. Outer tube	11. Oil seal retainer	(a) : 23 N·m (2.3 kgf·m, 17.0 lbf·ft)
4. Spring retainer	12. Oil seal	(b) : 15 N·m (1.5 kgf·m, 11.0 lbf·ft)
5. Spacer	13. Oil seal stopper ring	1342H : Apply thread lock to the thread part.
6. Spring	14. Dust seal	FORK : Apply fork oil.
7. Lock-nut	15. Inner tube	X : Do not reuse.
8. Inner rod/damper rod	16. Gasket	

Front Fork On-Vehicle Inspection

BENK07L22206002

Inspect the front forks (1) for oil leakage and damage. If any defect is found, replace any defective parts. (Page 2B-4)



IK07L1220005-01

Front Suspension Adjustment

BENK07L22206003

NOTICE

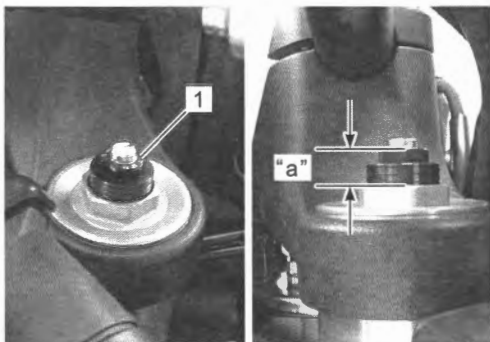
Adjust the left and right front forks to the same setting.

Spring Adjustment

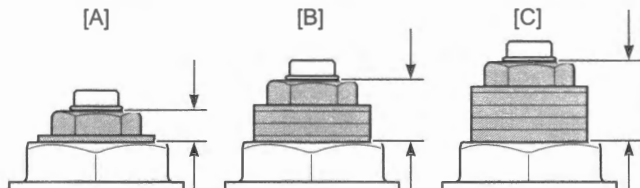
Turn the spring adjuster (1) counterclockwise fully. From that position (softest), turn it clockwise to the specified position "a".

Front fork spring adjuster

[Standard]: 10 mm (0.39 in)



IF04K1220002-01



IF04K1220043-02

[A]: 4 mm (0.16 in) (maximum)	[C]: 14 mm (0.55 in) (minimum)
[B]: 10 mm (0.39 in) (standard)	

Damping Force Adjustment

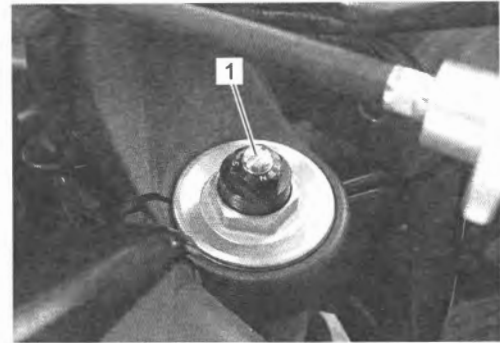
Rebound damping force

Fully turn the damping force adjuster (1) clockwise. From that position (stiffest), turn it counterclockwise to standard setting position.

Front fork damping force adjuster

Rebound side

[Standard]: 8 clicks counterclockwise from stiffest position



IF04K1220003-01

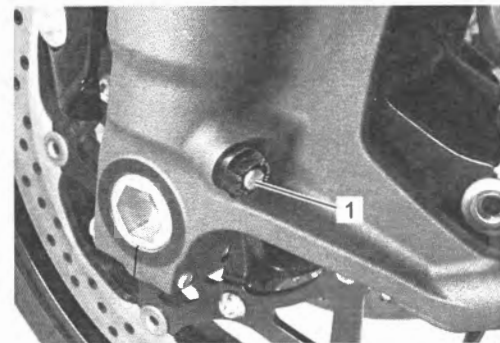
Compression damping force

Fully turn the damping force adjuster (1) clockwise. From that position (stiffest), turn it counterclockwise to the standard setting position.

Front fork damping force adjuster

Compression side

[Standard]: 2 turns counterclockwise from stiffest position



IF04K1220004-01

Front Fork Assembly Removal and Installation

BENK07L22206004

NOTE

The right and left front forks are installed symmetrically (except front wheel speed sensor) and therefore the removal procedure for one side is the same as that for the other side.

Removal

- 1) Remove the front wheel assembly. (Page 2D-4)
- 2) Remove the reflex reflectors (if equipped). Refer to "Reflex Reflector Removal and Installation" in Section 9B (Page 9B-13).
- 3) Remove the front wheel speed sensor lead wire clamp bolt (1) (RH only).
- 4) Disconnect the brake hoses from the clamps (2) on the front fender.
- 5) Remove the front fender (3) and front fender brackets (4). (Page 9D-29)

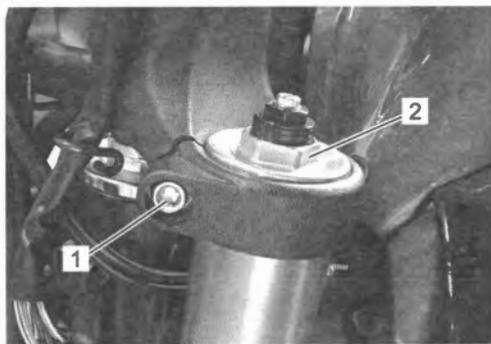


IK07L1220001-02

- 6) Loosen the front fork upper clamp bolt (1).

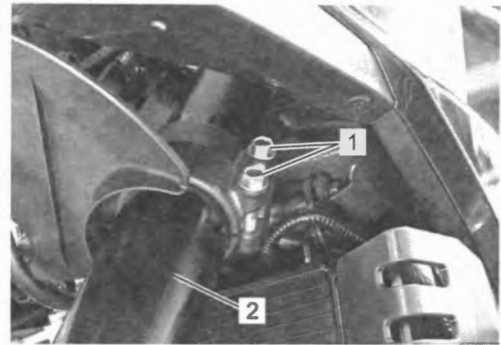
NOTE

Slightly loosen the front fork cap bolt (2) to facilitate later disassembly.



IF04K1220007-01

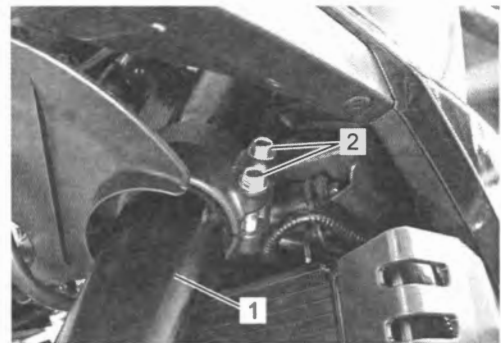
- 7) Loosen the front fork lower clamp bolts (1), and then remove the front fork (2) by supporting it.



IK07L1220002-01

Installation

- 1) Set the front fork (1) to the steering stem lower bracket temporarily by tightening the front fork lower clamp bolts (2).



IK07L1220003-01

- 2) Tighten the front fork cap bolt (1) to the specified torque.

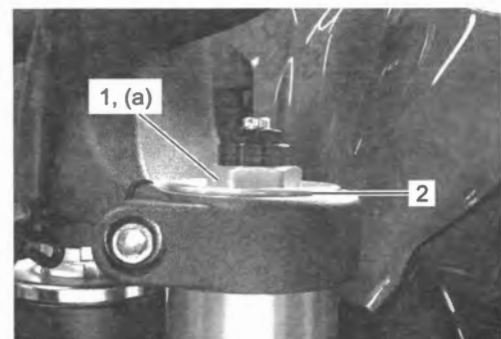
NOTE

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 top end of outer tube to the upper surface (2) of the steering stem upper bracket.

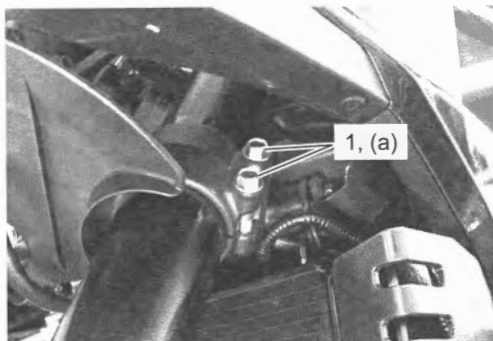


IF04K1220010-02

- 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)

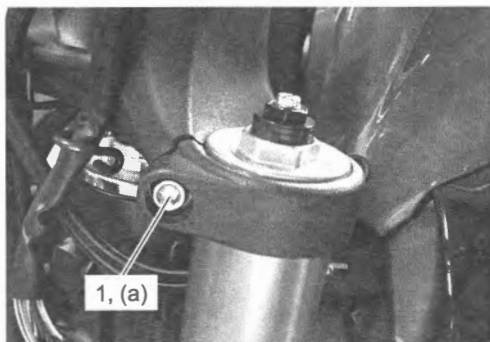


IF04K1220004-01

- 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)



IF04K1220012-01

- 7) Install the front fender. ☞ (Page 9D-8)
8) Install the front wheel assembly. ☞ (Page 2D-4)

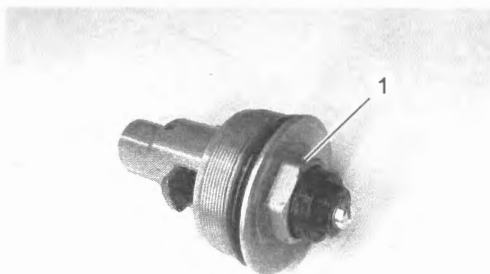
Front Fork Disassembly and Reassembly

BENK07L22206005

Refer to "Front Fork Assembly Removal and Installation" (Page 2B-3).

NOTICE

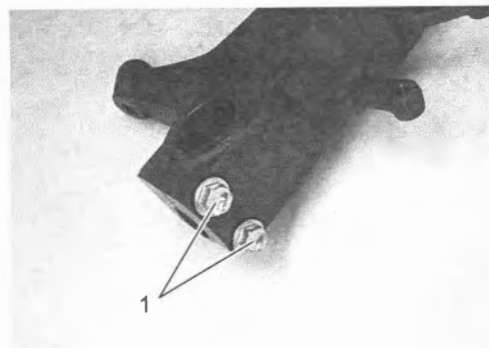
Do not disassemble the front fork cap bolt (1).



IF04K1220015-01

Disassembly

- 1) Remove the front axle pinch bolts (1).

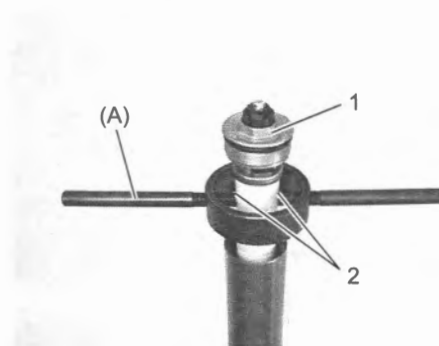


IF04K1220016-01

- 2) Loosen the front fork cap bolt (1).
3) Install the special tool to the holes (2) on the spacer.

Special tool

(A): 09940-94930



IF04K1220017-01

- 4) Set the special tool (A) referring to the manual.
5) Compress the fork spring using the special tool (A) and insert the special tool (B) between the lock-nut (1) and spring retainer (2). Then, expand the special tool (A) and pinch the special tool (B) between the lock-nut and the spring retainer.

NOTE

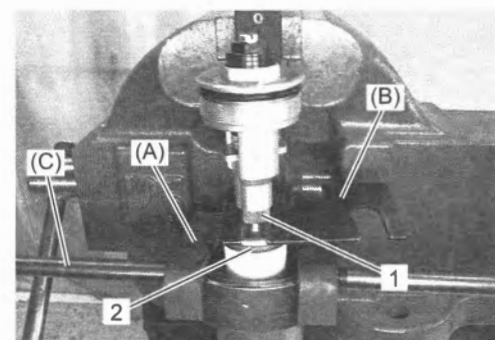
If the lock-nut does not come out, pull up the front fork cap bolt by hand.

Special tool

(A): 09940-93110

(B): 09940-94922

(C): 09940-94930



IF04K1220018-01

2B-5 Front Suspension:

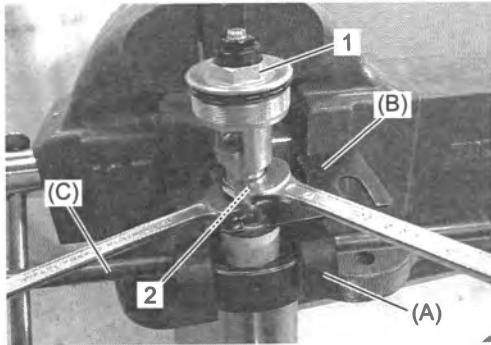
- 6) Remove the front fork cap bolt (1) from the inner rod by loosening the lock-nut (2).
- 7) Compress the special tool (A) and remove the special tool (B).

Special tool

(A): 09940-93110

(B): 09940-94922

(C): 09940-94930



IF04K1220019-01

- 8) Expand slowly the special tool (A) and remove the special tool (A). Then, remove the spring retainer (1) and the spacer (2).

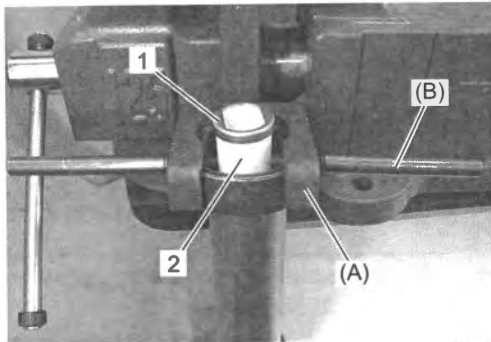
NOTE

Hold front fork by hand to prevent it sliding.

Special tool

(A): 09940-93110

(B): 09940-94930

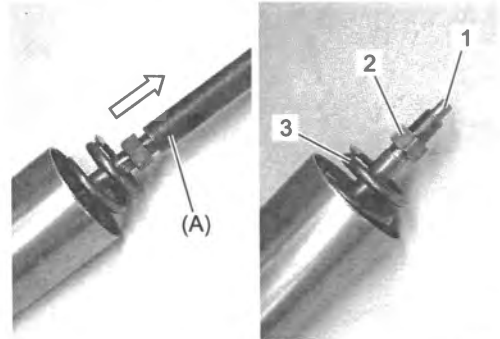


IF04K1220020-01

- 9) Pull up the inner rod using the special tool and remove the adjuster rod (1), lock-nut (2) and spring (3).

Special tool

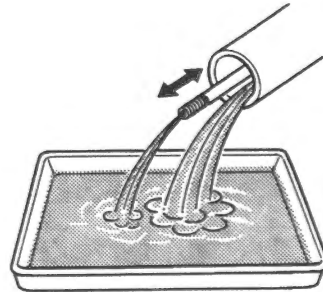
(A): 09940-52841



IF04K1220021-02

- 10) Invert the fork and stroke the inner rod several times to drain out fork oil.

- 11) Hold the fork inverted for a few minutes to drain oil.



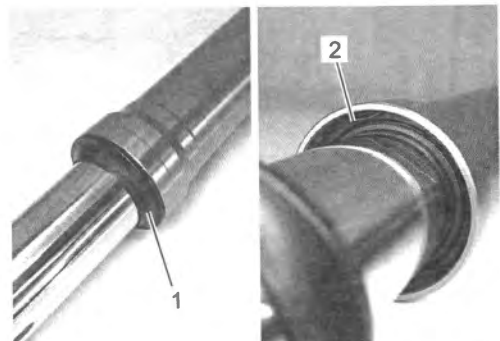
IE31J1220023-01

- 12) Remove the dust seal (1).

- 13) Remove the oil seal stopper ring (2).

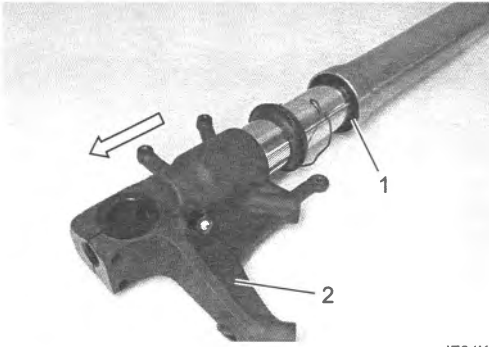
NOTICE

- Scratches on the inner tube could cause oil leaks.
- Avoid scratching when removing.



IF04K1220022-01

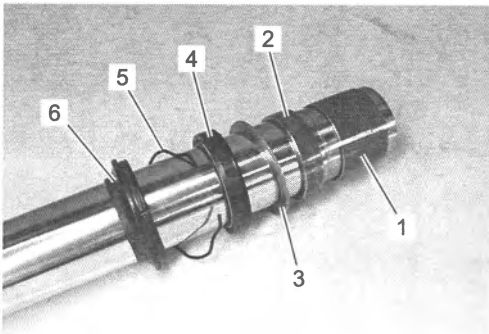
- 14) Remove the oil seal (1) by pulling out the inner tube (2).



IF04K1220023-01

- 15) Remove the following parts from the inner tube.

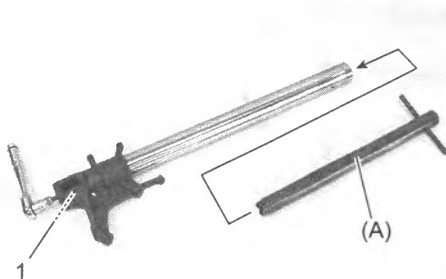
- a) Inner tube slide metal (1)
- b) Outer tube slide metal (2)
- c) Oil seal retainer (3)
- d) Oil seal (4)
- e) Oil seal stopper ring (5)
- f) Dust seal (6)



IF04K1220024-01

- 16) Remove the damper rod bolt (1) using the special tool.

Special tool
(A): 09940-30221

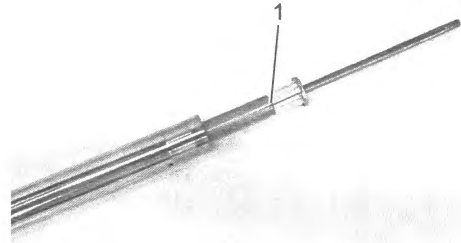


IF04K1220025-02

- 17) Remove the inner rod/damper rod (1).

NOTE

Do not disassemble the inner rod/damper rod.



IF04K1220026-01

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) Cover the inner tube with a plastic film.

NOTICE

Scratches on the oil seal lip may cause oil leakage. When installing the seals, place a plastic film over the slide bushing groove and edges of the inner tube to avoid damaging the seals' lip.

- 2) Install the following parts to the inner tube.

- a) New dust seal (1)
- b) Stopper ring (2)
- c) New oil seal (3)

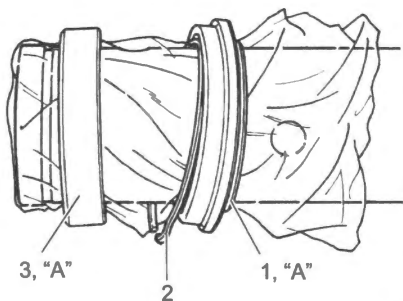
NOTE

Face the stamp mark side of the oil seal to the dust seal side.

2B-7 Front Suspension:

3) Apply fork oil to the dust seal lip and oil seal lip.

"A": Fork oil 99000-99044-L01 (SUZUKI FORK OIL L-01)

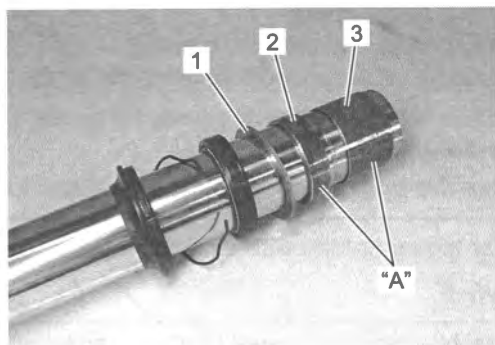


IE31J1220030-01

4) Remove the plastic film and install the oil seal retainer (1), new outer tube slide metal (2) and new inner tube slide metal (3) keep them free from dust.

5) Apply fork oil to the outer tube slide metal (2) and inner tube slide metal (3).

"A": Fork oil 99000-99044-L01 (SUZUKI FORK OIL L-01)



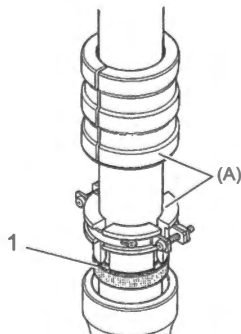
IF04K1220027-01

6) Insert the inner tube into the outer tube.

7) Press fit the oil seal (1) using the special tool until the stopper ring groove on the outer tube can be seen.

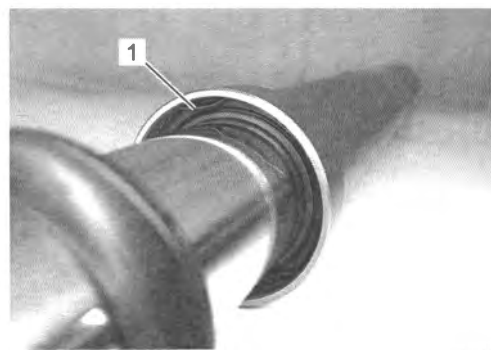
Special tool

(A): 09940-52861



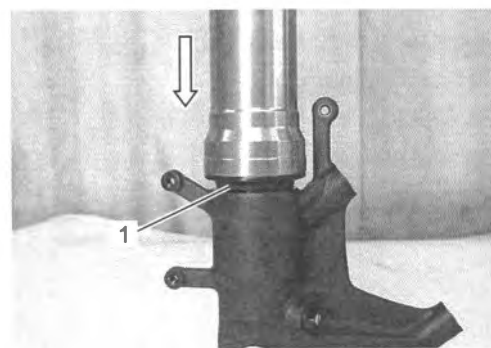
ID26J1220024-02

8) When installing the stopper ring (1), make sure that the stopper ring is fitted securely into the groove.



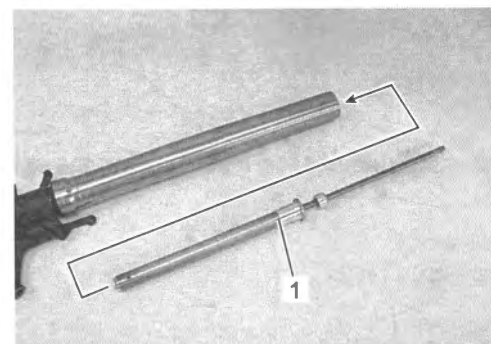
IF04K1220028-01

9) Press fit the dust seal (1).



IF04K1220029-01

10) Install the inner rod/damper rod (1) and into the inner tube.



IF04K1220030-01

- 11) Install the new gasket (1) to the damper rod bolt (2).
- 12) Apply thread lock to the damper rod bolt and tighten it to the specified torque with the special tool.

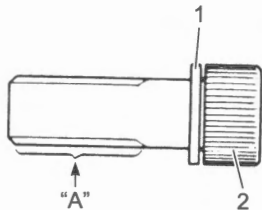
"A": Thread lock cement 99000-32160 (THREAD LOCK CEMENT 1342H)

Special tool

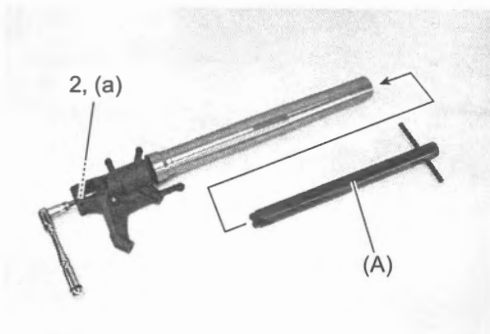
(A): 09940-30221

Tightening torque

Damper rod bolt (a): 23 N·m (2.3 kgf·m, 17.0 lbf·ft)



IE12J1220019-01



IF04K1220031-01

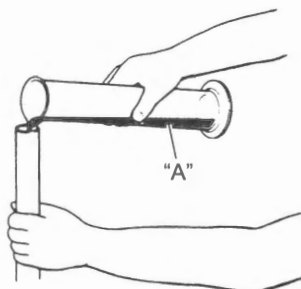
- 13) Place the front fork vertically without spring.
- 14) Compress it fully.
- 15) Pour specified front fork oil up to the top level of the inner tube.

Front fork oil capacity

Each leg

[Standard]: 520 ml (17.58 US oz, 18.30 Imp oz)

"A": Fork oil 99000-99044-L01 (SUZUKI FORK OIL L-01)



ID26J1220030-01

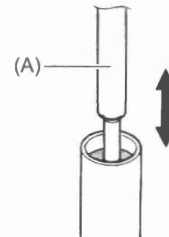
- 16) Move the inner rod slowly using the special tool (A) more than ten times until bubbles do not come out from the oil.

NOTE

Refill front fork oil up to the top of the inner tube to find bubbles while bleeding air.

Special tool

(A): 09940-52841

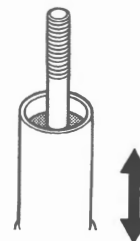


IF04K1220032-01

- 17) Refill specified front fork oil up to the top level of the inner tube again. Move the outer tube up and down several strokes until bubbles do not come out from the oil.
- 18) Keep the front fork vertically and wait 5 – 6 minutes.

NOTE

- **Always keep oil level over the inner rod top end, or air may enter the inner rod during this procedure.**
- **Take extreme attention to pump out air completely.**



IE31J1220039-01

2B-9 Front Suspension:

- 19) Hold the front fork vertically and adjust fork oil level "a" with the special tool.

NOTE

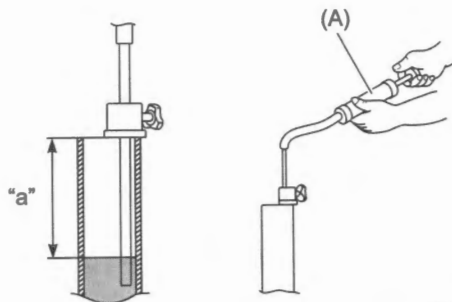
When adjusting the fork oil level, remove the fork spring and compress the outer tube fully.

Front fork oil level

Without spring, outer tube fully compressed
[Standard]: 93 mm (3.7 in)

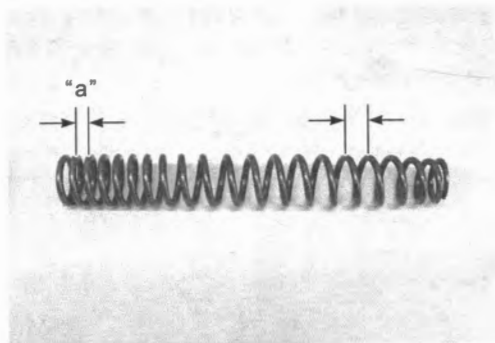
Special tool

(A): 09943-74111



ID26J1220031-02

- 20) Install the fork spring into the inner tube with its smaller pitch "a" facing the bottom side.



IF04K1220033-01

- 21) Pull up the inner rod using the special tool and install the adjuster rod (1).

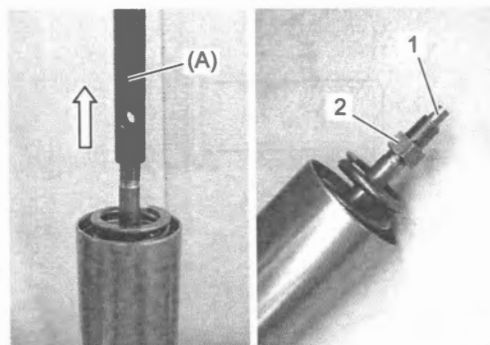
Special tool

(A): 09940-52841

- 22) Turn the lock-nut (2) until stops on the inner rod threads.

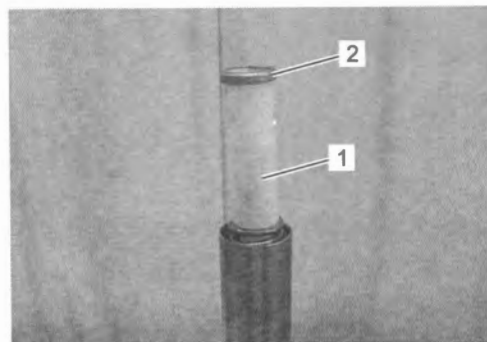
NOTE

Face the chamfer side of the lock-nut (2) downward.



IF04K1220034-02

- 23) Install the spacer (1) and spring retainer (2).

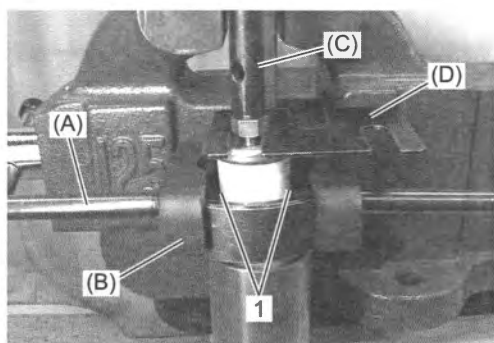


IF04K1220035-01

- 24) Install the special tool (A) to the holes (1) on the spacer.
- 25) Set the special tool (B) referring to the manual.
- 26) Pull up the inner rod using the special tool (C).
- 27) Compress the spring using the special tool (B) and then insert the special tool (D) between the lock-nut and spring retainer. Then, expand the special tool (B) and pinch the special tool (D) between the lock-nut and the spring retainer.

Special tool

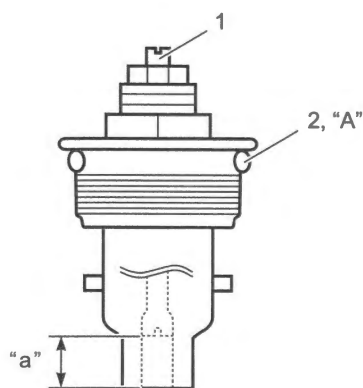
- (A): 09940-94930
- (B): 09940-93110
- (C): 09940-52841
- (D): 09940-94922



IF04K1220036-01

- 28) Turn the rebound damping force adjuster (1) clockwise until the first click is heard after distance "a" is obtained (stiffest position).
- 29) Apply fork oil to the new O-ring (2).

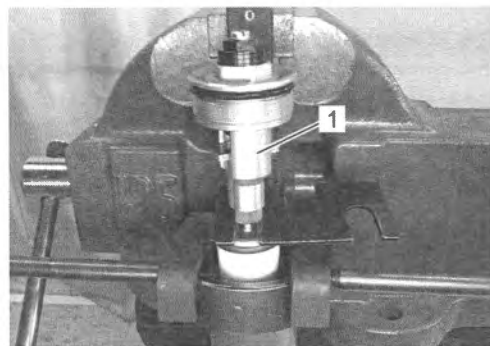
"A": Fork oil 99000-99044-L01 (SUZUKI FORK OIL L-01)



IF04K1220037-01

"a": 13 mm (0.51 in)

- 30) Slowly turn the front fork cap bolt (1) completely by hand until the end of the front fork cap bolt (1) seats on the inner rod end.

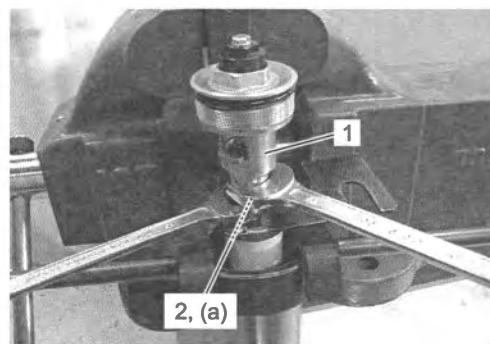


IF04K1220038-01

- 31) Hold the front fork cap bolt (1) and tighten the lock-nut (2) to the specified torque.

Tightening torque

Front fork inner rod lock-nut (a): 15 N·m (1.5 kgf-m, 11.0 lbf-ft)



IF04K1220039-01

- 32) Remove the special tools.

NOTE

Hold front fork by hand to prevent it sliding.

- 33) Tighten the front fork cap bolt to the outer tube temporarily.
- 34) Install the front axle pinch bolts.
- 35) After installing the front fork, adjust the spring and two kinds of damping force.

Front Fork Inspection

BENK07L22206006

Refer to "Front Fork Disassembly and Reassembly" (Page 2B-4).

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.



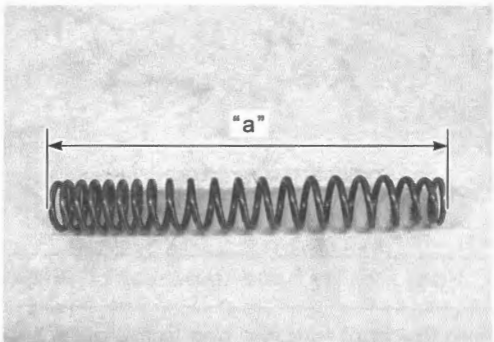
IF04K1220040-01

Fork Spring

Measure the fork spring free length "a". If it is shorter than the service limit, replace it with a new one.

Front fork spring free length

[Limit]: 265 mm (10.5 in)

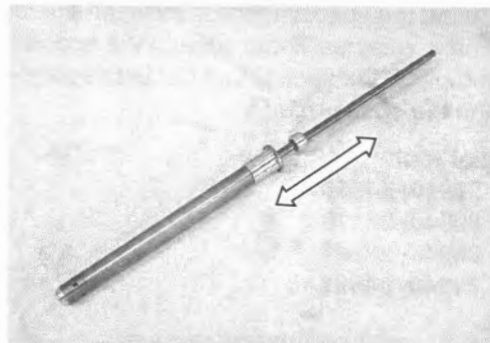


IF04K1220041-01

Inner Rod / Damper Rod

Move the inner rod by hand to examine it for smoothness.

If any defects are found, replace inner rod/damper rod with a new one.



IF04K1220042-01

Specifications

Tightening Torque Specifications

BENK07L22207001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Front fork cap bolt	23	2.3	17.0	☞ (Page 2B-3)
Front fork lower clamp bolt	23	2.3	17.0	☞ (Page 2B-4)
Front fork upper clamp bolt	23	2.3	17.0	☞ (Page 2B-4)
Damper rod bolt	23	2.3	17.0	☞ (Page 2B-8)
Front fork inner rod lock-nut	15	1.5	11.0	☞ (Page 2B-10)

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

BENK07L22208001



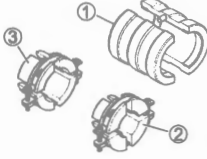


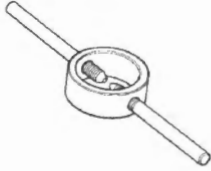
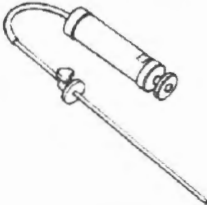
Material	SUZUKI recommended product or Specification		Note
Fork oil	SUZUKI FORK OIL L-01	P/No.: 99000-99044-L01	☞(Page 2B-7) / ☞(Page 2B-7) / ☞(Page 2B-8) / ☞(Page 2B-10)
Thread lock cement	THREAD LOCK CEMENT 1342H	P/No.: 99000-32160	☞(Page 2B-8)

NOTE

Required service material(s) is also described in:
 "Front Fork Components" (Page 2B-1)

Special Tool

BENK07L22208002

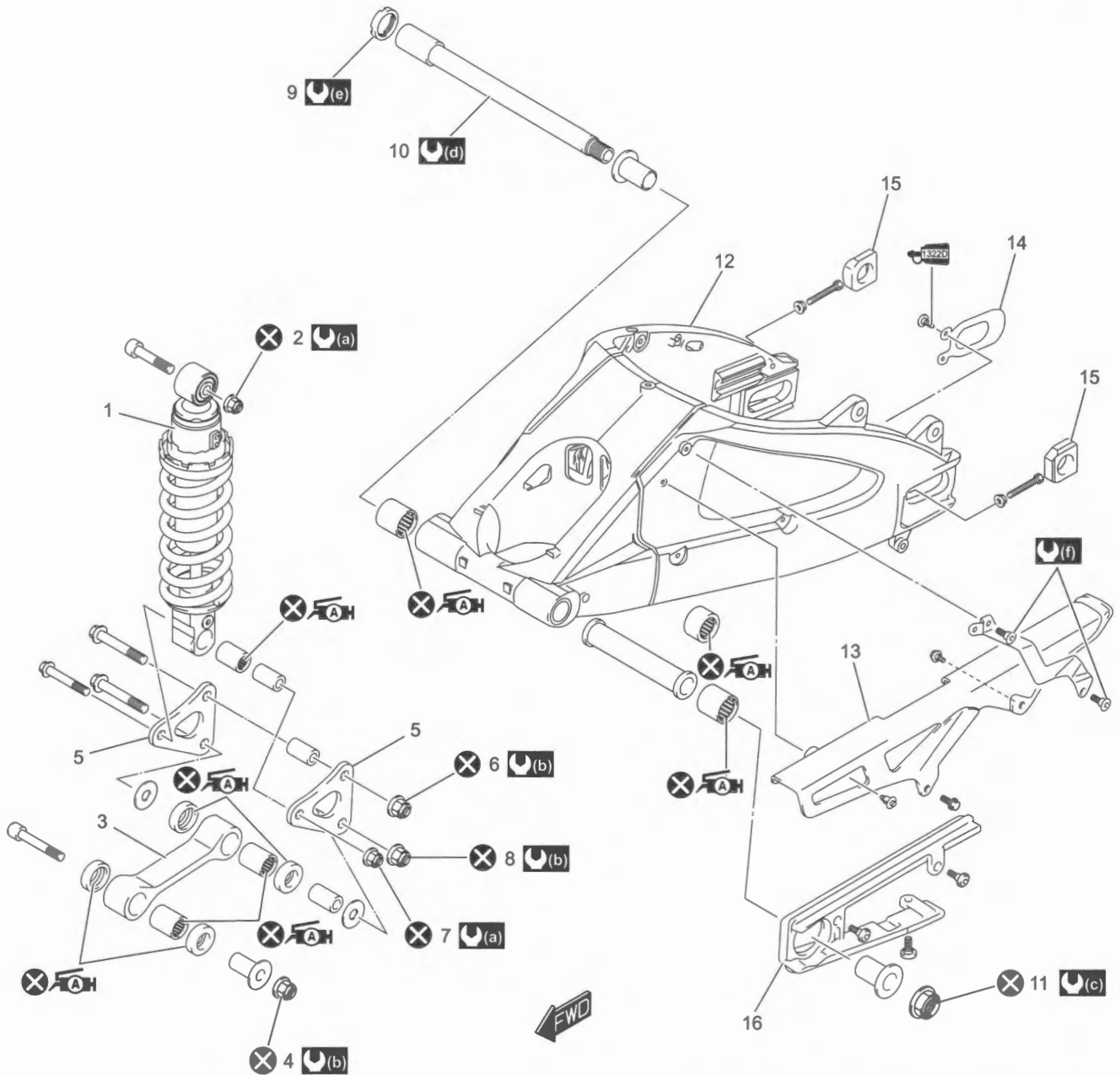
09940-30221 Front fork cylinder holder ☞(Page 2B-6) / ☞(Page 2B-8) 	09940-52841 Front fork inner rod holder ☞(Page 2B-5) / ☞(Page 2B-8) / ☞(Page 2B-9) / ☞(Page 2B-10) 
09940-52861 Front fork oil seal installer set 1. Hammer (09941-53610) 2. Attachment (09940-52870) 3. Attachment (09940-52880) ☞(Page 2B-7) 	09940-93110 Fork spring compressor ☞(Page 2B-4) / ☞(Page 2B-5) / ☞(Page 2B-5) / ☞(Page 2B-10) 
09940-94922 Front fork spring stopper plate This tool is included in Front fork spacer holder set (09940-94922). ☞(Page 2B-4) / ☞(Page 2B-5) / ☞(Page 2B-10) 	09940-94930 Front fork spacer holder ☞(Page 2B-4) / ☞(Page 2B-4) / ☞(Page 2B-5) / ☞(Page 2B-5) / ☞(Page 2B-10) 
09943-74111 Front fork oil level gauge ☞(Page 2B-9) 	

Rear Suspension

Repair Instructions

Rear Suspension Components

BENK07L22306001

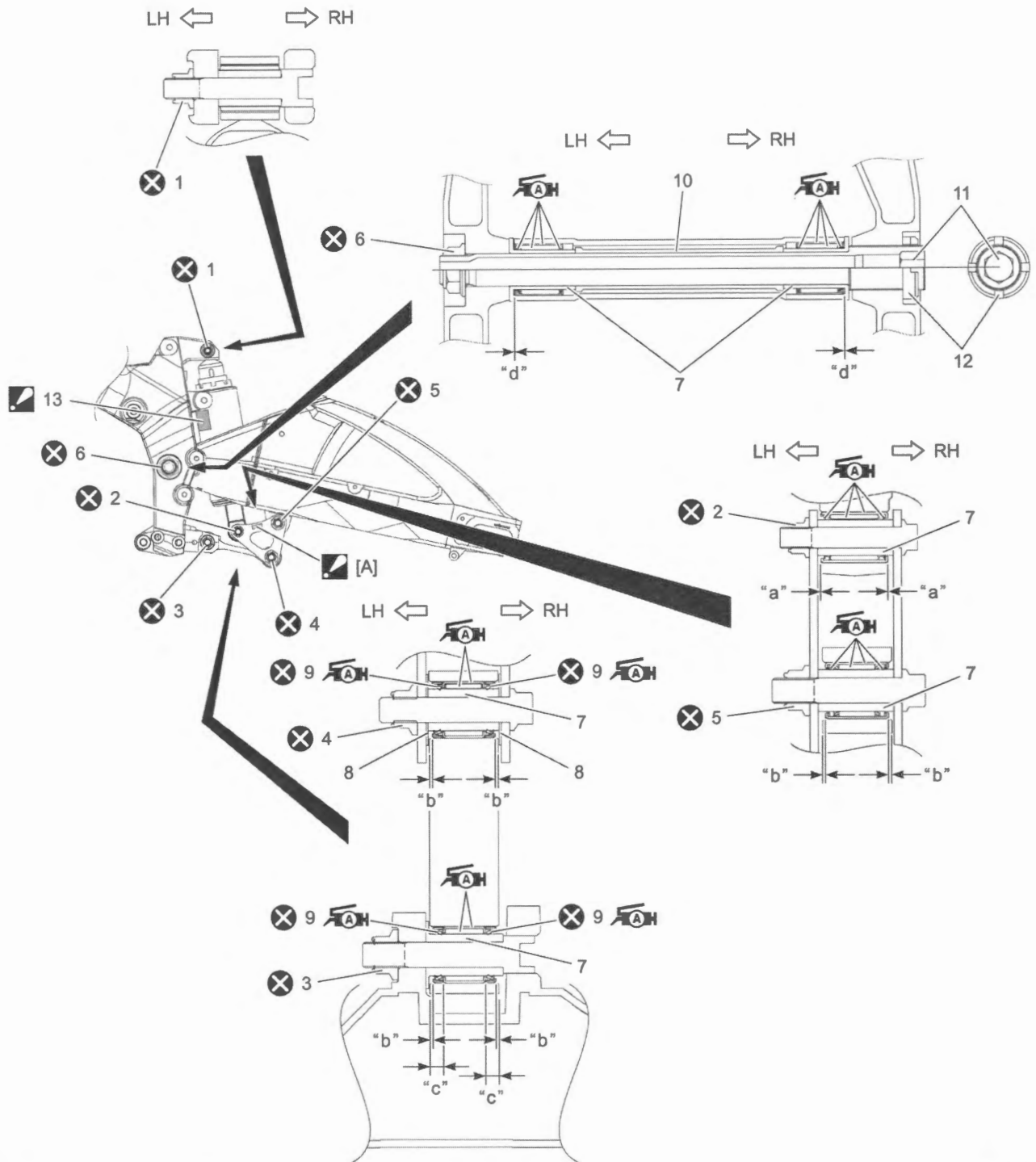


IK07L1230033-03

1. Rear shock absorber	10. Swingarm pivot shaft	⌚(c) : 100 N·m (10.2 kgf·m, 74.0 lbf·ft)
2. Rear shock absorber upper mounting nut	11. Swingarm pivot nut	⌚(d) : 15 N·m (1.5 kgf·m, 11.0 lbf·ft)
3. Cushion rod	12. Swingarm	⌚(e) : 90 N·m (9.2 kgf·m, 66.5 lbf·ft)
4. Cushion rod front mounting nut	13. Chain case	⌚(f) : 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
5. Cushion lever	14. Plate	⌘ : Apply grease.
6. Cushion lever mounting nut	15. Chain adjuster	⌚(g) : Apply thread lock to the thread part.
7. Rear shock absorber lower mounting nut	16. Chain buffer	⊗ : Do not reuse.
8. Cushion rod rear mounting nut		
9. Swingarm pivot lock-nut		

Rear Suspension Assembly Construction

BENK07L22306002



IK07L1230029-02

<p>▲ [A]: Set the cushion lever so that the arrow mark points forward.</p>	7. Spacer	"a": 0.5 mm (0.02 in)
1. Rear shock absorber upper mounting nut	8. Washer	"b": 1.5 mm (0.059 in)
2. Rear shock absorber lower mounting nut	9. Dust seal	"c": 6.5 mm (0.26 in)
3. Cushion rod front mounting nut	10. Center spacer	"d": 0 - 0.5 mm (0 - 0.01 in)
4. Cushion rod rear mounting nut	11. Swingarm pivot shaft	▲ AH : Apply grease.
5. Cushion lever mounting nut	12. Swingarm pivot lock-nut	⊗ : Do not reuse.
6. Swingarm pivot nut	<p>▲ 13. Warning label : Face the warning label forward.</p>	

Rear Suspension On-Vehicle Inspection

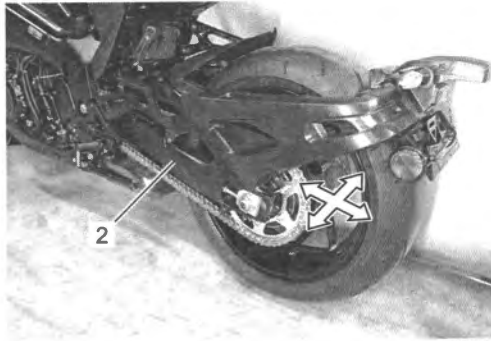
BENK07L22306003

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 replacement: ⚙️ (Page 2C-4)
- Swingarm pivot shaft and bearing inspection: ⚙️ (Page 2C-13)
- Cushion lever inspection: ⚙️ (Page 2C-8)
- Cushion rod inspection: ⚙️ (Page 2C-9)
- Swingarm inspection: ⚙️ (Page 2C-13)



IK07L1230001-01



IK07L1230002-01

Rear Shock Absorber Adjustment

BENK07L22306004

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



IK07L1230003-01

Damping Force Adjustment

NOTE

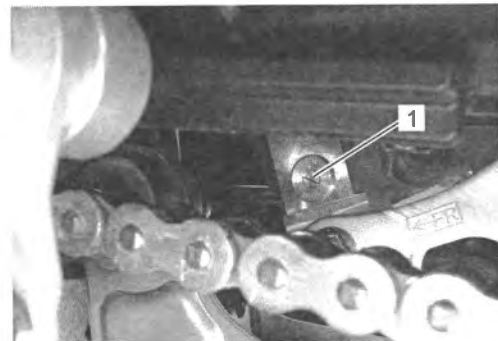
- Turn the adjuster clockwise to stiffen the damping force and turn it counterclockwise to soften the damping force.
- Fine-tune the adjuster by turning it slightly until punch marks align.

Fully turn the damping force adjuster (1) clockwise. From full hard position, turn it out to standard setting position.

Rear shock absorber damping force adjuster

Rebound side

[Standard]: 1 turn counterclockwise from stiffest position



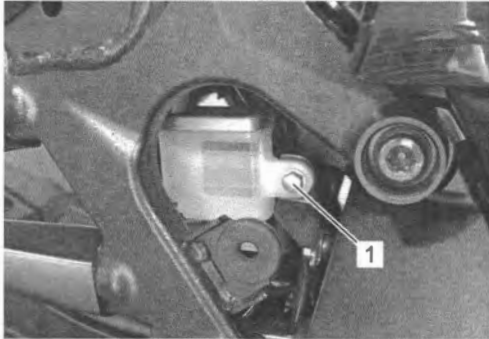
IF04K1230005-01

Rear Shock Absorber Removal and Installation

BENK07L22306005

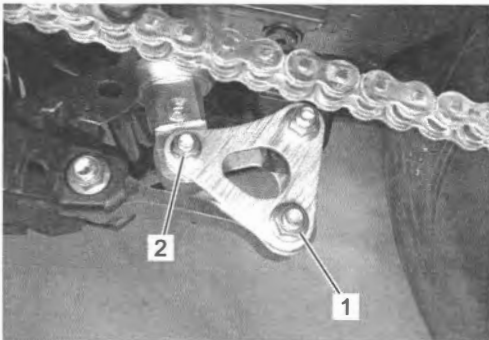
Removal

- 1) Remove the exhaust pipe and muffler. (Page 1K-15)
- 2) Support the motorcycle with a jack to relieve load on the rear shock absorber.
- 3) Remove the frame covers. (Page 9D-36)
- 4) Remove the rear brake reservoir tank mounting bolt (1).



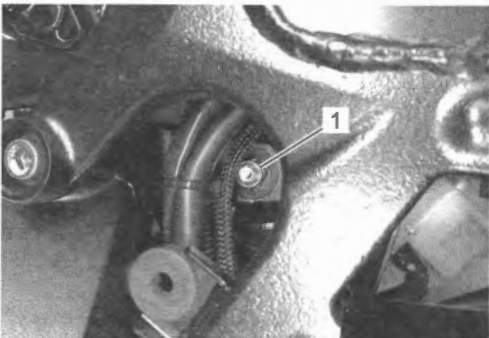
IK07L1230004-01

- 5) Remove the cushion rod rear mounting bolt and nut (1) and washers.
- 6) Remove the rear shock absorber lower mounting bolt and nut (2).



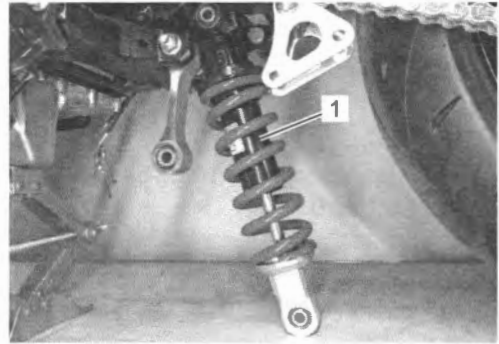
IK07L1230005-01

- 7) Remove the rear shock absorber upper mounting bolt and nut (1).



IK07L1230006-01

- 8) Remove the rear shock absorber (1) to the lower side.



IK07L1230007-01

- 9) Remove the spacer (1) from the rear shock absorber.

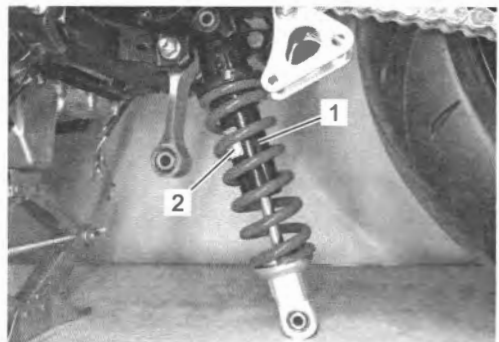


IF04K1230010-01

Installation

Install the rear shock absorber in the reverse order of removal. Pay attention to the following points:

- Install the rear shock absorber (1) so that the warning label (2) faces forward.



IK07L1230008-01

2C-5 Rear Suspension:

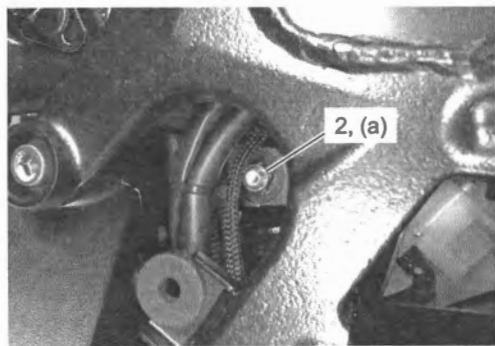
- Install the washers (1) between the cushion rod and cushion levers.
- Tighten the new rear shock absorber upper and lower mounting nuts (2) to the specified torque.
- Tighten the new cushion rod rear mounting nut (3) to the specified torque.

Tightening torque

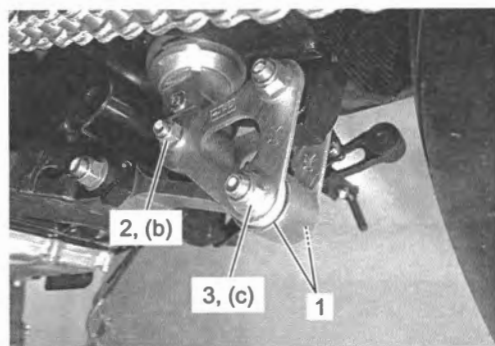
Rear shock absorber upper mounting nut (a): 50 N·m (5.1 kgf-m, 37.0 lbf-ft)

Rear shock absorber lower mounting nut (b): 50 N·m (5.1 kgf-m, 37.0 lbf-ft)

Cushion rod rear mounting nut (c): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)



IK07L1230009-01



IK07L1230010-03

- Tighten the rear brake reservoir tank mounting bolt. Refer to "Rear Brake Hose Routing Diagram" in Section 4A (Page 4A-4).
- Install the exhaust pipe and muffler. ☞ (Page 1K-17)
- Install the frame covers. ☞ (Page 9D-36)

Rear Shock Absorber Inspection

BENK07L22306006

Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-4).

Rear Shock Absorber

Inspect the rear shock absorber for damage and oil leakage, and absorber bushing for wear and damage. If any defect is found, replace the rear shock absorber with a new one.

NOTICE

Do not attempt to disassemble the rear shock absorber. It is unserviceable.



IF04K1230015-01

Spacer

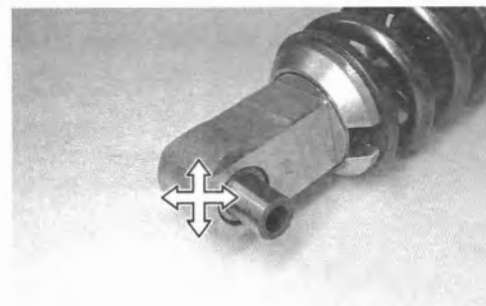
Inspect the spacer for any flaws or other damage. If any defect is found, replace the spacer with a new one.



IE31J1230012-01

Rear Shock Absorber Bearing

- 1) Insert the spacer into bearing.
- 2) Check the play by moving the spacer up and down. If excessive play is noted, replace the bearing with a new one. ☞ (Page 2C-6)



IF04K1230016-01

Rear Shock Absorber Bearing Removal and Installation

BENK07L22306007

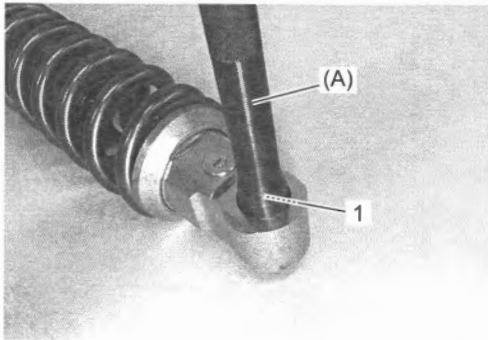
Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-4).

Removal

- 1) Remove the rear shock absorber bearing (1) using the special tool.

Special tool

(A): 09943-88211



IF04K1230017-01

Installation

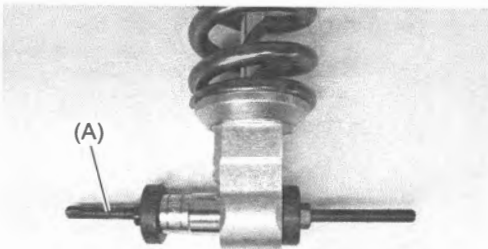
- 1) Apply a small quantity of the grease to housing when installing the bearing.

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

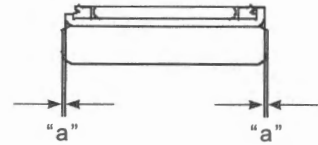
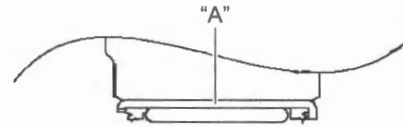
- 2) Press the new bearing into the rear shock absorber to the depth "a" of 0.5 mm (0.02 in) from the edge using the special tool and suitable size socket wrench.

Special tool

(A): 09924-84521



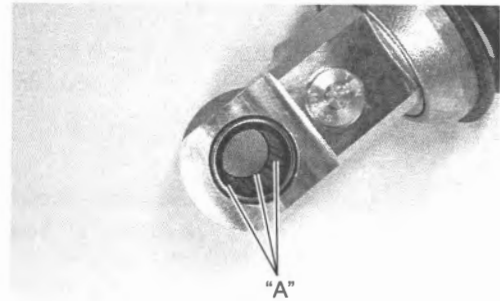
IF04K1230018-01



IF04K1230019-02

- 3) Apply grease to the bearing and dust seals.

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



IF04K1230020-01

Rear Shock Absorber Disposal

BENK07L22306008

Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-4).

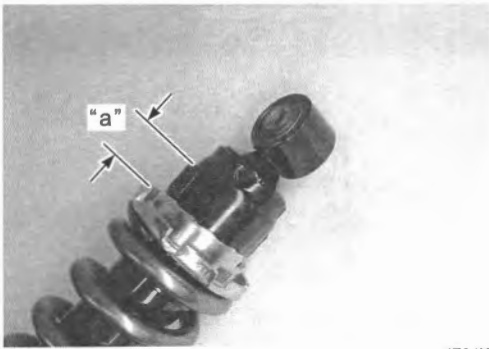
The rear shock absorber unit contains high-pressure nitrogen gas.

⚠ 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 "a" using a center punch.



IF04K1230021-02

- 2) Wrap rear shock absorber (1) with a plastic bag (2) and fix it on a vise.
- 3) Drill a 2 – 3 mm (0.08 – 0.12 in) hole at the marked drill center using a drilling machine and let out gas while taking care not to get the plastic bag entangled with the drill bit.

▲ WARNING

- Be sure to wear protective glasses since drilling chips and oil may fly off with blowing gas when the drill bit has penetrated through the body.
- Make sure to drill at the specified position. Otherwise, pressurized oil may spout out forcefully.



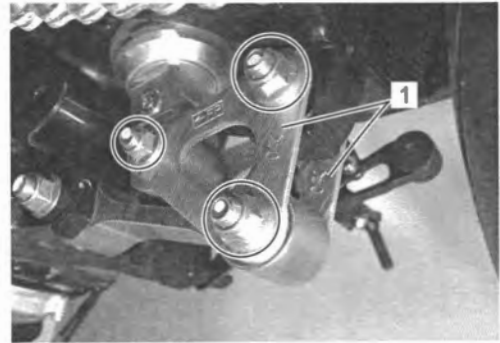
IF04K1230022-03

Cushion Lever Removal and Installation

BENK07L22306009

Removal

- 1) Remove the exhaust pipe and muffler. (Page 1K-15)
- 2) Support the motorcycle to relieve load on the cushion levers.
- 3) Remove the cushion levers (1) and washers.



IK07L1230012-01

Installation

Install the cushion lever in the reverse order of removal. Pay attention to the following points:

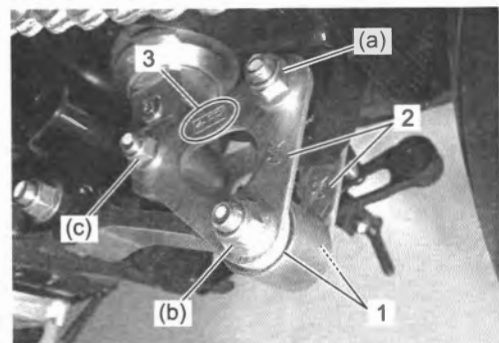
- Install the washers (1) between the cushion rod and cushion levers.
- Set the cushion levers (2) so that the arrow mark (3) points forward.
- Tighten each new nuts to the specified torque.

Tightening torque

Cushion lever mounting nut (a): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)

Cushion rod rear mounting nut (b): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)

Rear shock absorber lower mounting nut (c): 50 N·m (5.1 kgf-m, 37.0 lbf-ft)



IK07L1230011-01

- Install the exhaust pipe and muffler. (Page 1K-17)

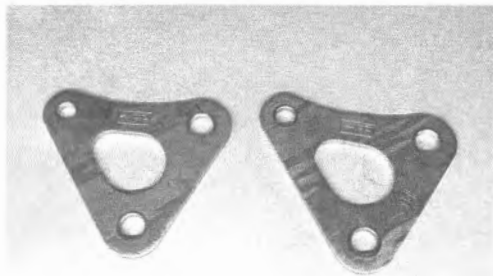
Cushion Lever Inspection

BENK07L22306010

Refer to "Cushion Lever Removal and Installation" (Page 2C-7).

Cushion Lever

Inspect the cushion levers for damage and bend. If any defects are found, replace the cushion levers with new ones.



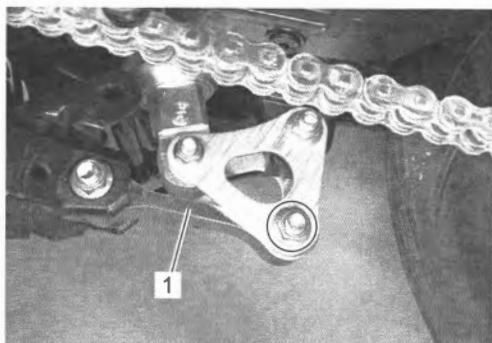
IF04K1230025-01

Cushion Rod Removal and Installation

BENK07L22306011

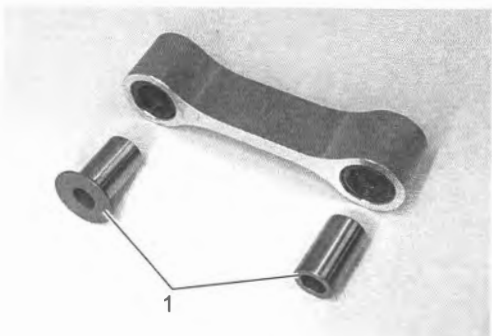
Removal

- 1) Remove the exhaust pipe and muffler. (Page 1K-15)
- 2) Support the motorcycle to relieve load on the cushion rod.
- 3) Remove the cushion rod (1) and washers.



IK07L1230013-01

- 4) Remove the spacers (1).

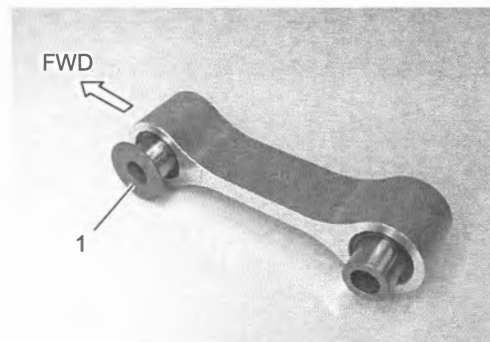


IK07L1230014-01

Installation

Install the cushion rod in the reverse order of removal. Pay attention to the following points:

- Insert the spacer (1) into the bearing from the left side.



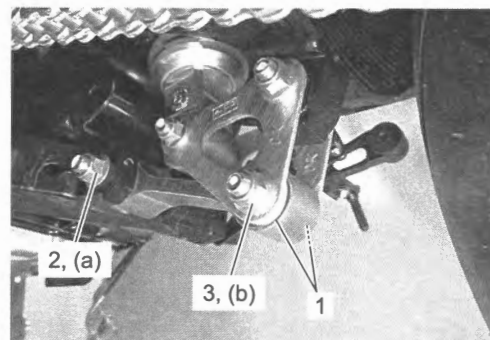
IK07L1230015-01

- Install the washers (1) between cushion rod and cushion levers.
- Tighten the new nuts (2) and (3) to the specified torque.

Tightening torque

Cushion rod front mounting nut (a): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)

Cushion rod rear mounting nut (b): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)



IK07L1230016-02

- Install the exhaust pipe and muffler. (Page 1K-17)

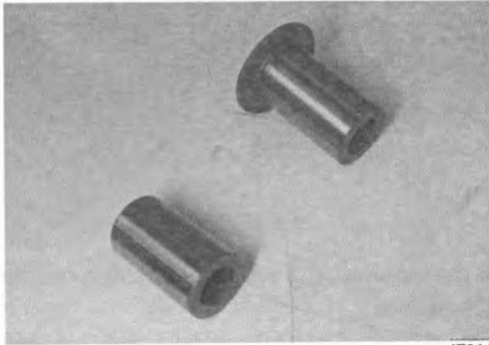
Cushion Rod Inspection

BENK07L22306012

Refer to "Cushion Rod Removal and Installation" (Page 2C-8).

Spacer

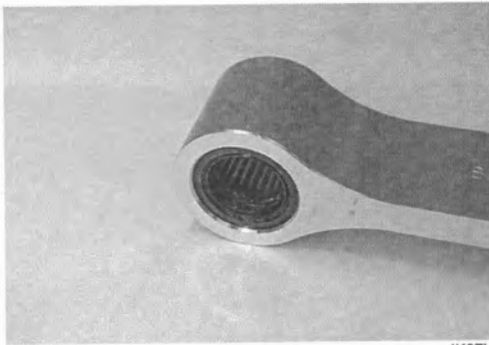
Inspect the spacers for any flaws or other damage. If any defects are found, replace it with a new one.



IE31J1230029-01

Dust Seal

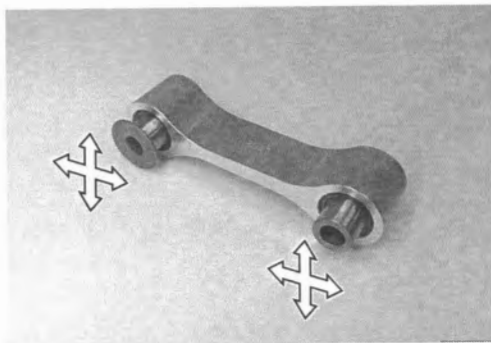
Inspect the lip of dust seals for wear or damage. If any defects are found, replace the dust seals with new ones.



IK07L1230017-01

Cushion Rod Bearing

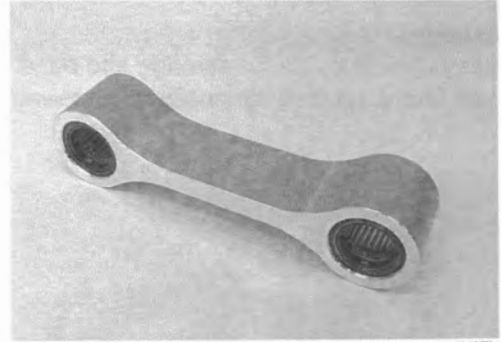
- 1) Insert the spacers into bearings.
- 2) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one. (Page 2C-9)



IK07L1230018-01

Cushion Rod

Inspect the cushion rod for damage. If any defect is found, replace the cushion rod with a new one.



IK07L1230019-01

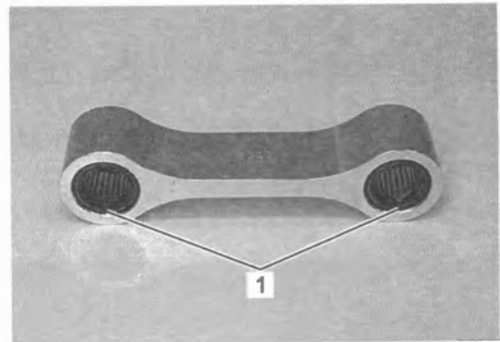
Cushion Rod Bearing Removal and Installation

BENK07L22306013

Refer to "Cushion Rod Removal and Installation" (Page 2C-8).

Removal

- 1) Remove the dust seals (1).

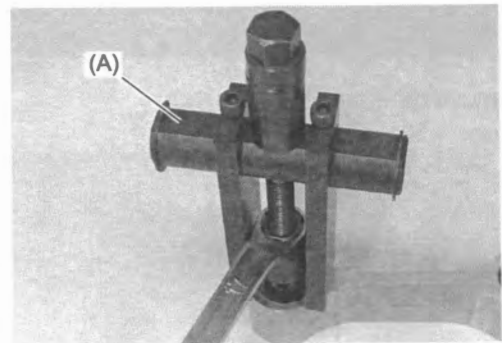


IK07L1230020-01

- 2) Remove the cushion rod bearings using the special tool.

Special tool

(A): 09921-20240



IK07L1230021-01

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 rod to the depth "a" of 6.5 mm (0.26 in) from both edge using the special tool and suitable size socket wrench.

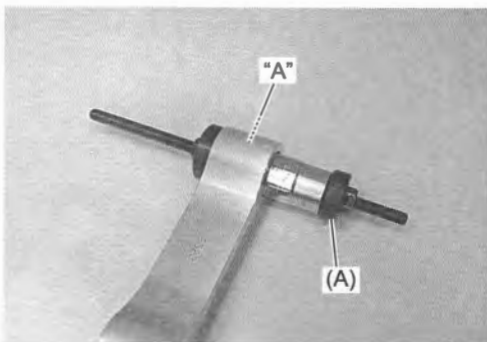
Special tool

(A): 09924-84521

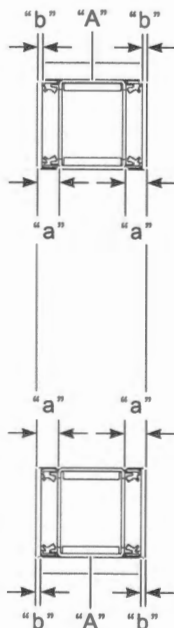
- 3) Press the new dust seals into the cushion rod to the depth "b" of 1.5 mm (0.059 in) from both edge using the special tool and suitable size socket wrench.

Special tool

(A): 09924-84521



IK07L1230022-02



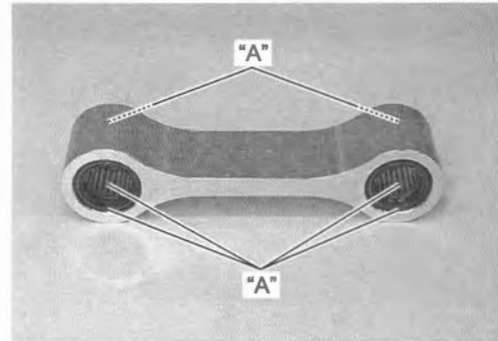
IK07L1230023-03

"a": 6.5 mm (0.26 in)

"b": 1.5 mm (0.059 in)

- 4) Apply grease to the bearings and dust seals.

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



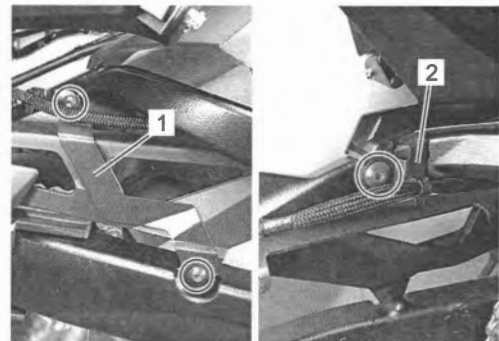
IK07L1230024-01

Swingarm Removal and Installation

BENK07L22306014

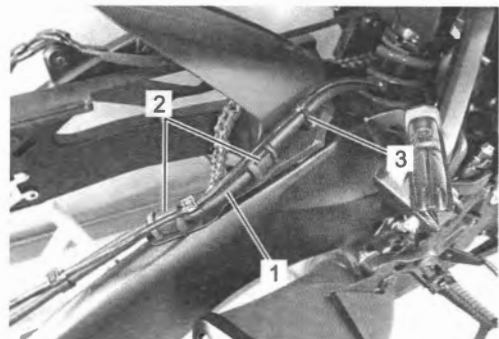
Removal

- 1) Cut the drive chain. Refer to "Drive Chain Replacement" in Section 3A (Page 3A-8).
- 2) Remove the exhaust pipe and muffler. (Page 1K-15)
- 3) Remove the rear wheel assembly. (Page 2D-10)
- 4) Remove the chain case reinforcement (1) and harness guide (2).



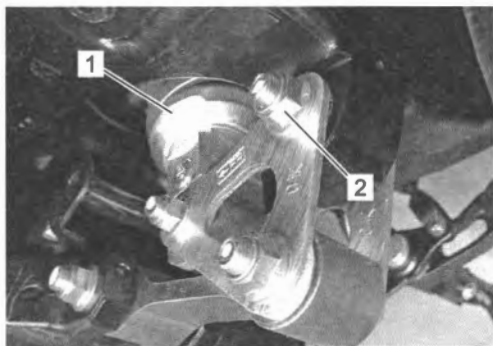
IK07L1230030-01

- 5) Remove the rear brake hose (1) from the brake hose guides (2) and clamp (3).



IK07L1230031-01

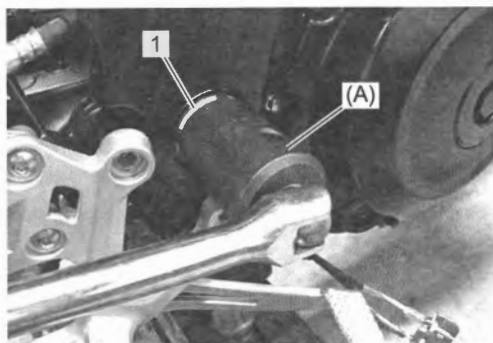
- 6) Remove the rear shock absorber (1). (Page 2C-4)
- 7) Remove the cushion lever mounting bolt and nut (2).



IK07L1230026-01

- 8) Remove the swingarm pivot shaft lock-nut (1) with the special tool.

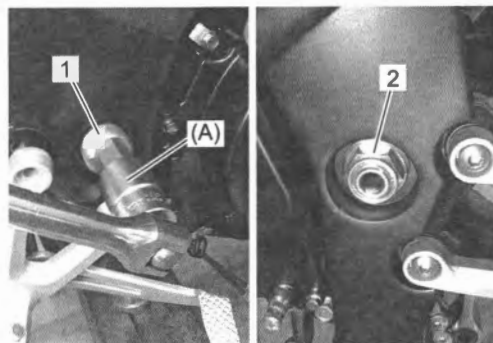
Special tool
(A): 09940-14940



IF04K1230034-01

- 9) Hold the swingarm pivot shaft (1) using the special tool and remove the swingarm pivot nut (2).

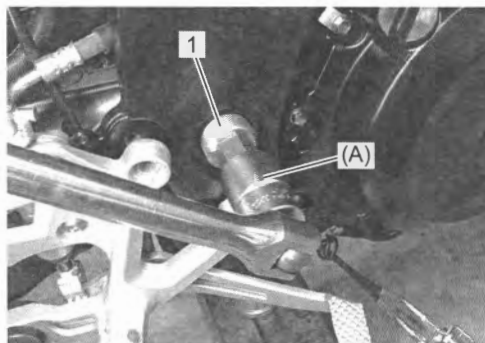
Special tool
(A): 09944-28321



IF04K1230035-01

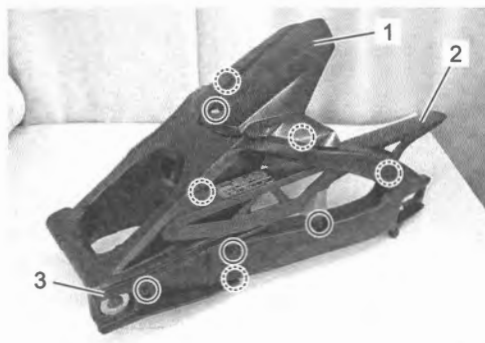
- 10) Remove the swingarm assembly by removing the swingarm pivot shaft (1) using the special tool.

Special tool
(A): 09944-28321



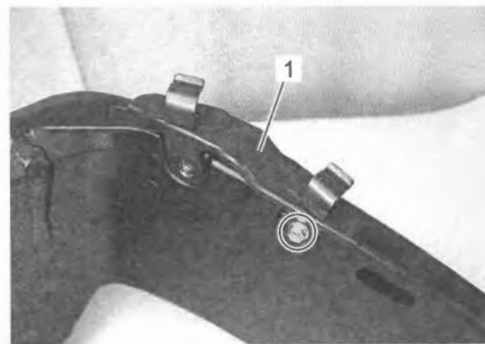
IF04K1230036-01

- 11) Remove the rear fender lower (1), chain case (2) and chain buffer (3) from the swingarm.



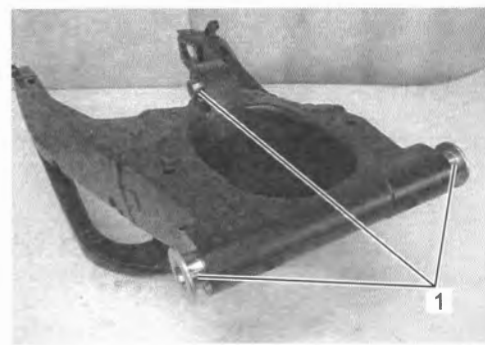
IF04K1230037-03

- 12) Remove the brake hose guide (1).



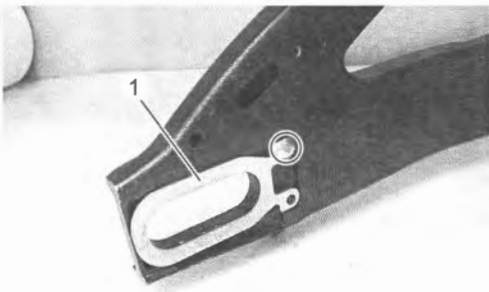
IF04K1230038-01

- 13) Remove the spacers (1) from the swingarm.



IF04K1230039-01

- 14) Remove the plate (1).



IF04K1230040-01

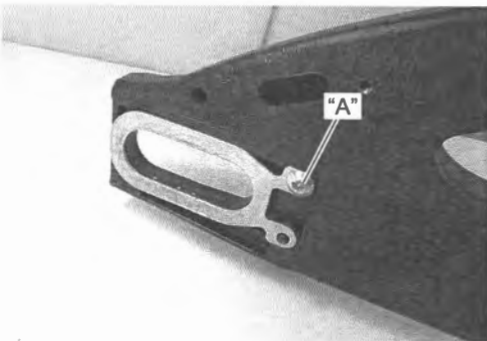
- 15) Remove the left and right drive chain adjuster bolts and nuts.

Installation

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

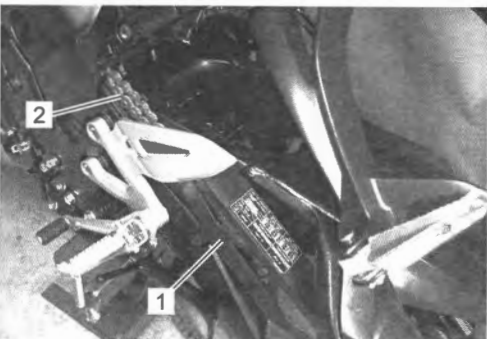
- Apply thread lock to the screw.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)



IF04K1230041-01

- Install the rear fender lower. (Page 9D-31)
- Install the chain case. (Page 3A-2)
- When installing the swingarm assembly (1), pass the chain (2) to the swingarm.



IF04K1230043-01

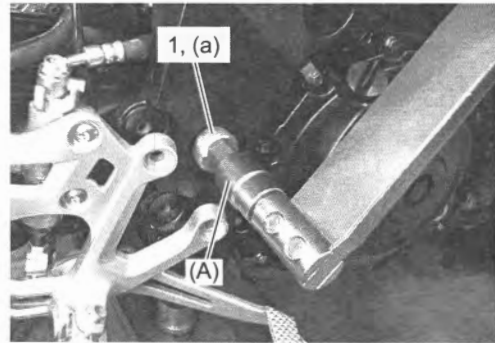
- Insert the swingarm pivot shaft (1) and tighten it to the specified torque.

Special tool

(A): 09944-28321

Tightening torque

Swingarm pivot shaft (a): 15 N·m (1.5 kgf-m, 11.0 lbf-ft)



IF04K1230044-01

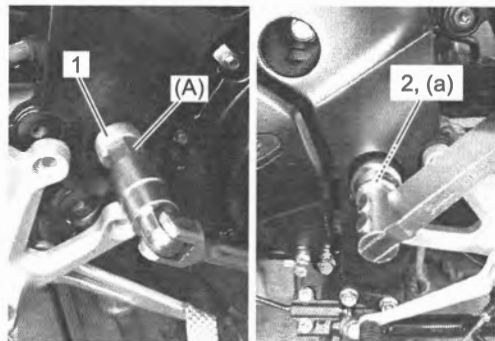
- Hold the swingarm pivot shaft (1) using the special tool and tighten the new swingarm pivot nut (2) to the specified torque.

Special tool

(A): 09944-28321

Tightening torque

Swingarm pivot nut (a): 100 N·m (10.2 kgf-m, 74.0 lbf-ft)



IF04K1230045-01

2C-13 Rear Suspension:

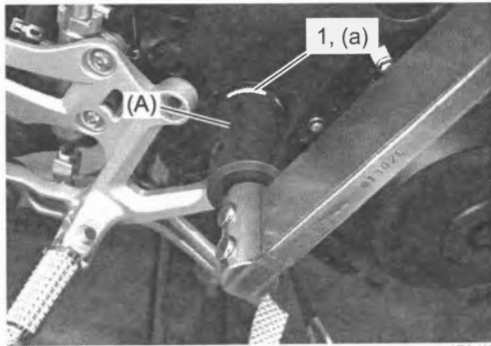
- Tighten the swingarm pivot lock-nut (1) to the specified torque using the special tool.

Special tool

(A): 09940-14940

Tightening torque

Swingarm pivot lock-nut (a): 90 N·m (9.2 kgf-m, 66.5 lbf-ft)



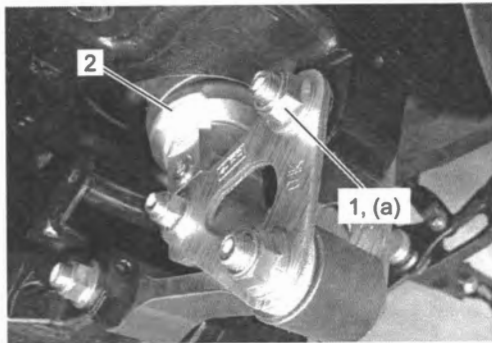
IF04K1230046-01

- Tighten the new cushion lever mounting nut (1) to the specified torque.

Tightening torque

Cushion lever mounting nut (a): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)

- Install the rear shock absorber (2). ☞ (Page 2C-4)



IK07L1230028-01

- Connect the rear brake hose into the brake hose guide. Refer to "Rear Brake Hose Routing Diagram" in Section 4A (Page 4A-4).
- Install the rear wheel assembly. ☞ (Page 2D-10)
- Install the rear fender brace and left rear fender rear cover. ☞ (Page 9D-11)
- Install the exhaust pipe and muffler. ☞ (Page 1K-17)
- Connect the drive chain. Refer to "Drive Chain Replacement" in Section 3A (Page 3A-8).
- Adjust the drive chain slack, after connecting it. Refer to "Drive Chain Inspection and Adjustment" in Section 3A (Page 3A-2).

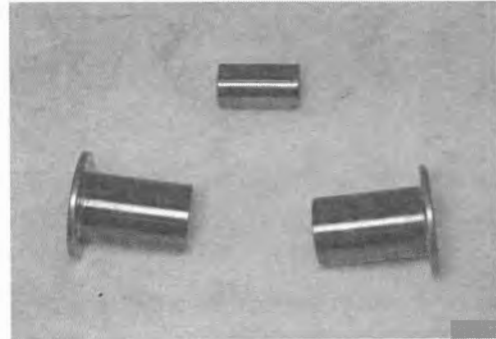
Swingarm Inspection

BENK07L22306015

Refer to "Swingarm Removal and Installation" (Page 2C-10).

Spacers

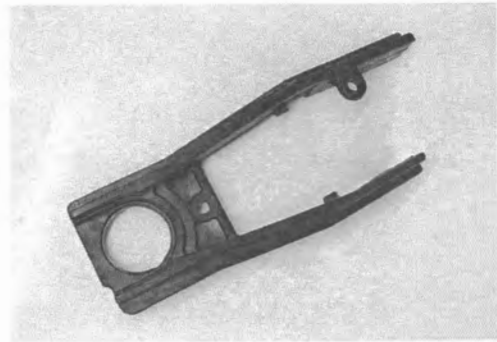
Inspect the spacers for wear and damage. If any defects are found, replace the spacers with new ones.



IE31J1230055-01

Chain Buffer

Inspect the chain buffer for wear and damage. If any defect is found, replace the chain buffer with a new one.



IF04K1230047-01

Plate

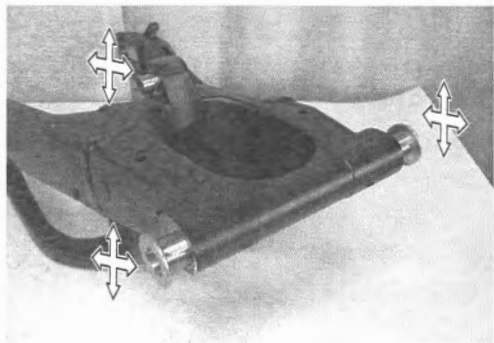
Inspect the plate for damage and excessive bend. If any defect is found, replace the plate with a new one.



IK07L1230032-01

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-14)



IF04K1230049-01

Swingarm

Inspect the swingarm for damage. If any defect is found, replace the swingarm with a new one.



IF04K1230050-01

Swingarm Pivot Shaft

Using a dial gauge, check the swingarm pivot shaft for runout. If the runout exceeds the service limit, replace the pivot shaft.

Actual runout is 1/2 of the total indicator reading.

Swingarm pivot shaft runout

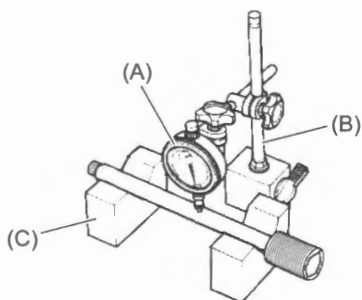
[Limit]: 0.3 mm (0.011 in)

Special tool

(A): 09900-20607

(B): 09900-20701

(C): 09900-21304



IE31J1230060-01

Swingarm Bearing Removal and Installation

BENK07L22306016

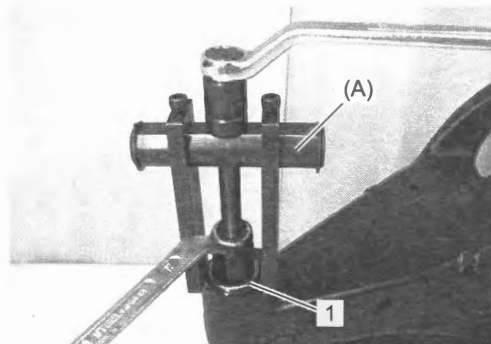
Refer to "Swingarm Removal and Installation" (Page 2C-10).

Removal

- 1) Remove the swingarm pivot bearings (1) on both sides using the special tool.

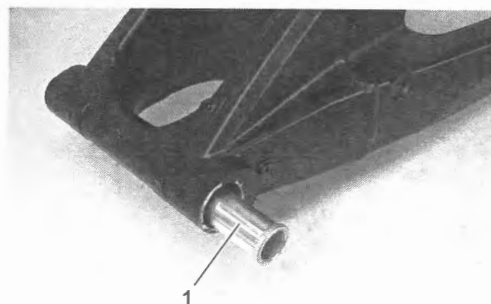
Special tool

(A): 09921-20240



IF04K1230051-01

- 2) Remove the center spacer (1).

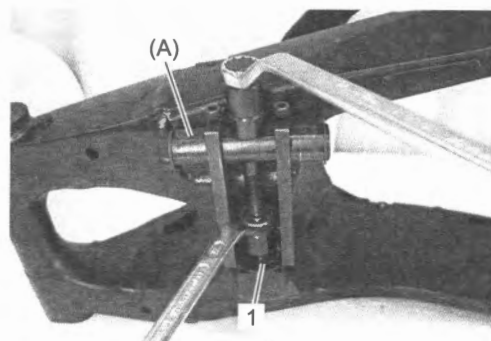


IF04K1230052-01

- 3) Remove the cushion lever bearing (1) using the special tool.

Special tool

(A): 09921-20240



IF04K1230053-01

Installation

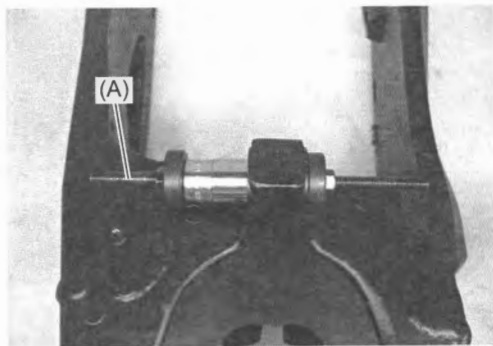
- 1) Apply a small quantity of the grease to housing when installing the bearing.

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

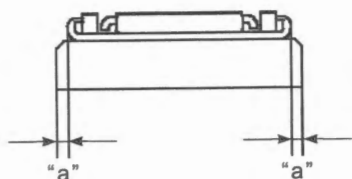
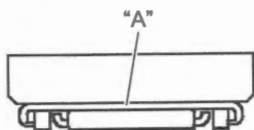
- 2) Press the new cushion lever bearing into the swingarm to the depth "a" of 1.5 mm (0.059 in) from the edge using the special tool and suitable size socket wrench.

Special tool

(A): 09924-84521



IF04K1230054-01



IF04K1230055-01

- 3) Install the center spacer.
- 4) Apply a small quantity of the grease to housing, when installing the bearings.

NOTE

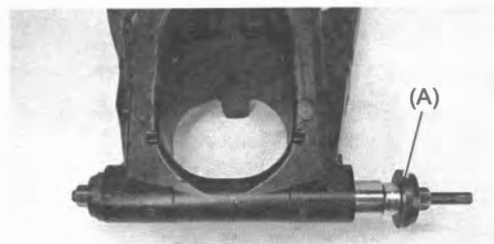
The stamped mark side of the pivot bearing faces outside.

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

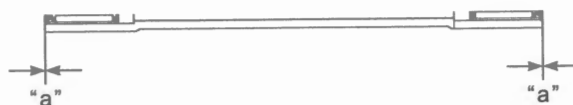
- 5) Press the new pivot bearings into the swingarm to the depth "a" of 0 – 0.5 mm (0 – 0.019 in) from the edge using the special tool and suitable size socket.

Special tool

(A): 09941-34513



IF04K1230056-01



IF04K1230057-01

- 6) Apply grease to the bearings and dust seals.

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



IF04K1230058-01

Specifications

Tightening Torque Specifications

BENK07L22307001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Rear shock absorber upper mounting nut	50	5.1	37.0	☞ (Page 2C-5)
Rear shock absorber lower mounting nut	50	5.1	37.0	☞ (Page 2C-5) / ☞ (Page 2C-7)
Cushion rod rear mounting nut	80	8.2	59.0	☞ (Page 2C-5) / ☞ (Page 2C-7) / ☞ (Page 2C-8)
Cushion lever mounting nut	80	8.2	59.0	☞ (Page 2C-7) / ☞ (Page 2C-13)
Cushion rod front mounting nut	80	8.2	59.0	☞ (Page 2C-8)
Swingarm pivot shaft	15	1.5	11.0	☞ (Page 2C-12)
Swingarm pivot nut	100	10.2	74.0	☞ (Page 2C-12)
Swingarm pivot lock-nut	90	9.2	66.5	☞ (Page 2C-13)

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

BENK07L22308001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞ (Page 2C-6) / ☞ (Page 2C-6) / ☞ (Page 2C-10) / ☞ (Page 2C-10) / ☞ (Page 2C-15) / ☞ (Page 2C-15) / ☞ (Page 2C-15)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞ (Page 2C-12)

NOTE

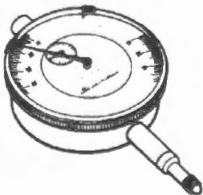

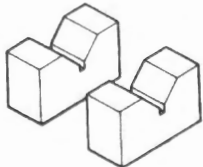
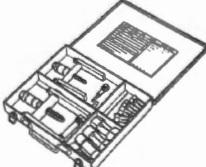
Required service material(s) is also described in:

“Rear Suspension Components” (Page 2C-1)


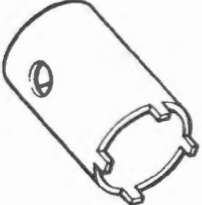

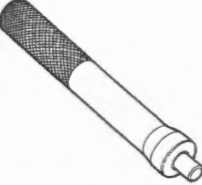
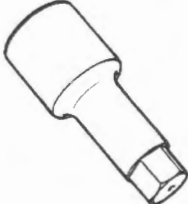
“Rear Suspension Assembly Construction” (Page 2C-2)

Special Tool

BENK07L22308002

09900-20607 Dial gauge (10 x 0.01 mm) ☞ (Page 2C-14)		09900-20701 Dial gauge chuck ☞ (Page 2C-14)	
09900-21304 V blocks ☞ (Page 2C-14)		09921-20240 Bearing remover set ☞ (Page 2C-9) / ☞ (Page 2C-14) / ☞ (Page 2C-14)	

2C-17 Rear Suspension:

<p>09924-84521 Bearing installer set</p> <p>☞(Page 2C-6) / ☞(Page 2C-10) / ☞(Page 2C-10) / ☞(Page 2C-15)</p>	 <p>09940-14940 Swingarm pivot adjuster wrench</p> <p>☞(Page 2C-11) / ☞(Page 2C-13)</p> 
<p>09941-34513 Bearing installer set</p> <p>☞(Page 2C-15)</p>	 <p>09943-88211 Pinion bearing installer</p> <p>☞(Page 2C-6)</p> 
<p>09944-28321 Hexagon bit socket (19 mm : 1/2 sq.)</p> <p>☞(Page 2C-11) / ☞(Page 2C-11) / ☞(Page 2C-12) / ☞(Page 2C-12)</p>	

Wheels and Tires

Precautions

Precautions for Wheel and Tire

BENK07L22400001

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

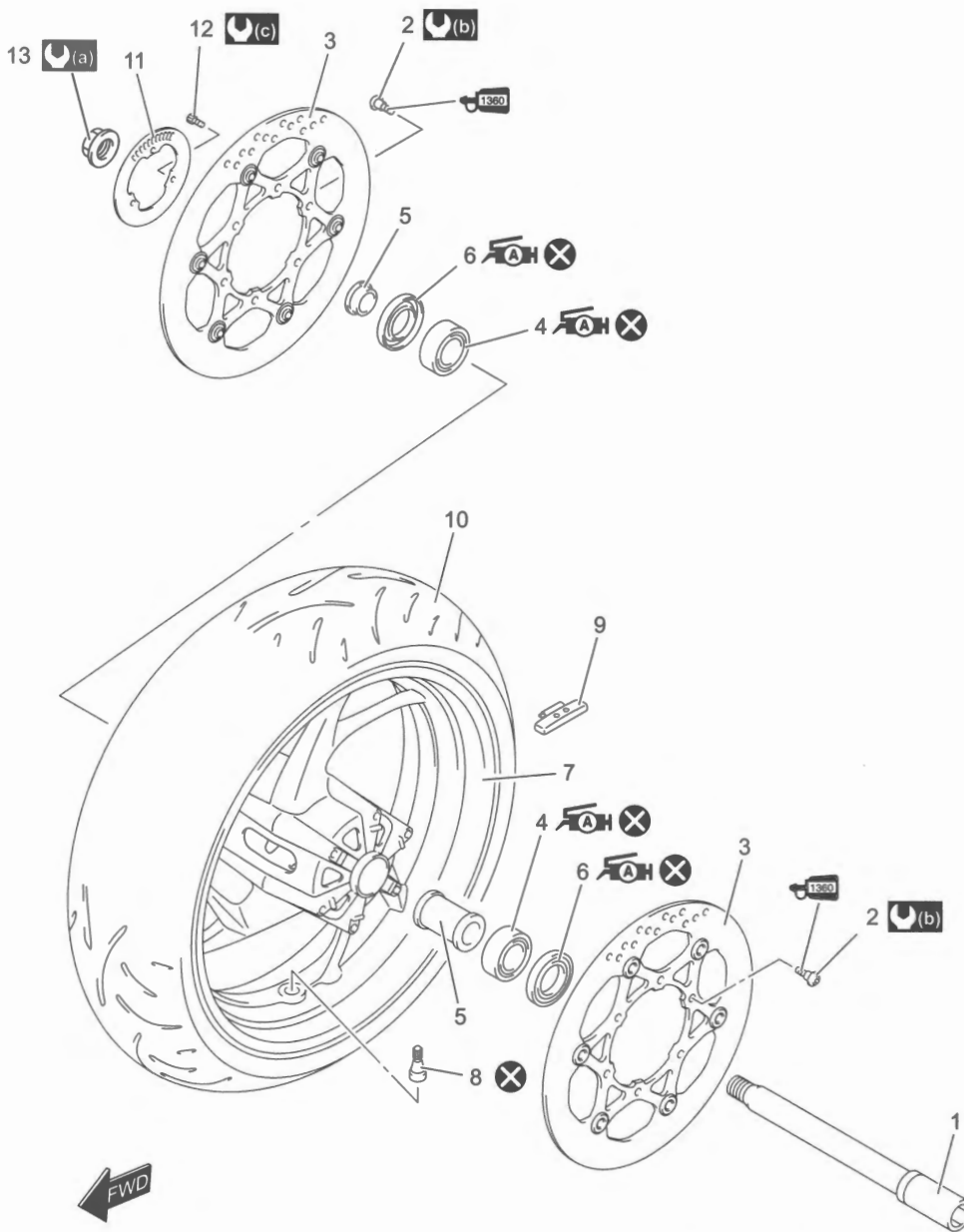
▲ WARNING

- 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

BENK07L22406001

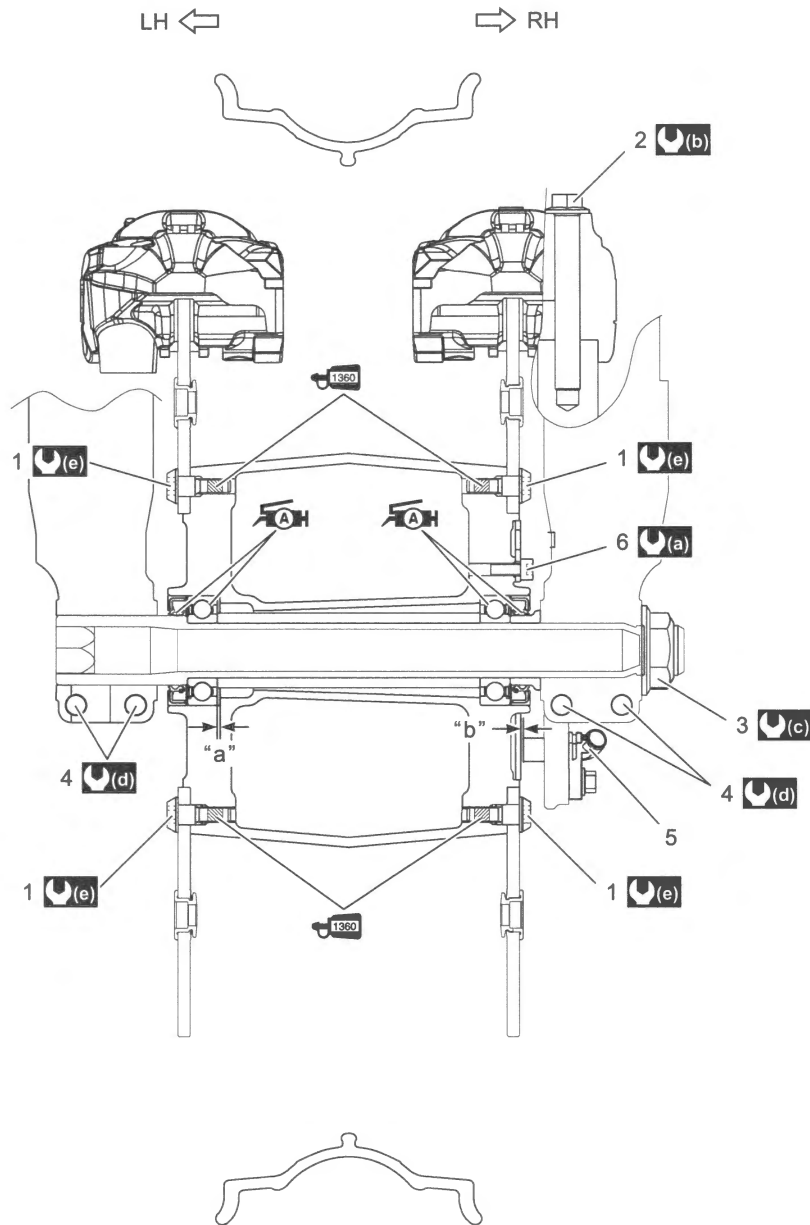


IF04K1240039-02

1. Front axle	6. Dust seal	11. Front wheel speed sensor rotor	: 6.5 N·m (0.66 kgf·m, 4.80 lbf·ft)
2. Brake disc bolt	7. Front wheel	12. Wheel speed sensor rotor bolt	: Apply grease.
3. Brake disc	8. Air valve	13. Front axle nut	: Apply thread lock to the thread part.
4. Bearing	9. Wheel balancer	: 100 N·m (10.2 kgf·m, 74.0 lbf·ft)	: Do not reuse.
5. Spacer	10. Front tire	: 18 N·m (1.8 kgf·m, 13.5 lbf·ft)	

Front Wheel Assembly Construction

BENK07L22406002



IF04K1240001-04

1. Brake disc bolt	6. Front wheel speed sensor rotor bolt	(c) : 100 N·m (10.2 kgf·m, 74.0 lbf·ft)
2. Brake caliper mounting bolt	"a": Clearance	(d) : 23 N·m (2.3 kgf·m, 17.0 lbf·ft)
3. Front axle nut	"b": 0.38 – 1.05 mm (0.015 – 0.0413 in)	(e) : 18 N·m (1.8 kgf·m, 13.5 lbf·ft)
4. Front axle pinch bolt	(a) : 6.5 N·m (0.66 kgf·m, 4.80 lbf·ft)	AH : Apply grease.
5. Front wheel speed sensor	(b) : 39 N·m (4.0 kgf·m, 29.0 lbf·ft)	1360 : Apply thread lock to the thread part.

Front Wheel Assembly Removal and Installation

BENK07L22406003

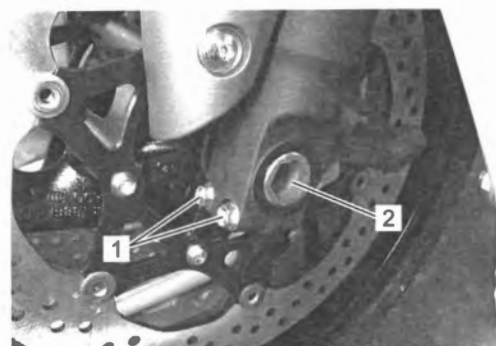
Removal

- 1) Remove the front wheel speed sensor mounting bolt. (Page 4E-31)
- 2) Remove the front brake calipers. (Page 4B-3)
- 3) Remove the front axle nut (1).
- 4) Loosen the two axle pinch bolts (2) on the right front fork leg.



IF04K1240002-01

- 5) Raise the front wheel off the ground and support the motorcycle.
- 6) Loosen two axle pinch bolts (1) on the left front fork leg.
- 7) Draw out the front axle (2) and remove the front wheel.



IF04K1240003-01

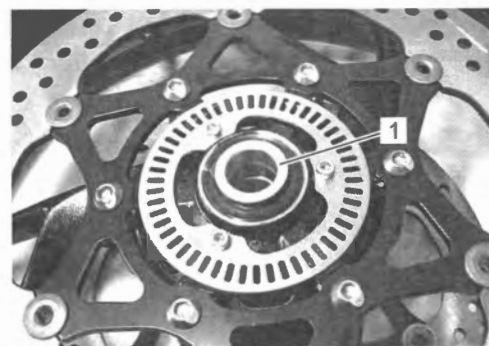
- 8) Remove the spacer (1).



IF04K1240004-01

Installation

- 1) Install the spacer (1) into the right side of the wheel.



IF04K1240005-01

- 2) Install the front wheel with the front axle and tighten the front axle nut temporarily.

⚠ WARNING

The directional arrow on the tire should point to the wheel rotation, when installing the wheel.



IK07L1240001-01

- 3) Remove a jack or a wooden block.
- 4) Install the front brake calipers. (Page 4B-3)
- 5) Hold the front axle with the special tool and tighten the front axle nut (1) to the specified torque.

Special tool

(A): 09944-28321

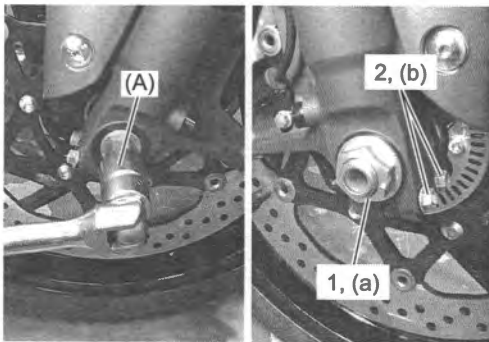
Tightening torque

Front axle nut (a): 100 N·m (10.2 kgf-m, 74.0 lbf-ft)

- 6) Tighten the two axle pinch bolts (2) on the right front fork leg to the specified torque.

Tightening torque

Front axle pinch bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IF04K1240007-02

- 7) Move the front fork up and down 4 or 5 times to stabilize the front axle.

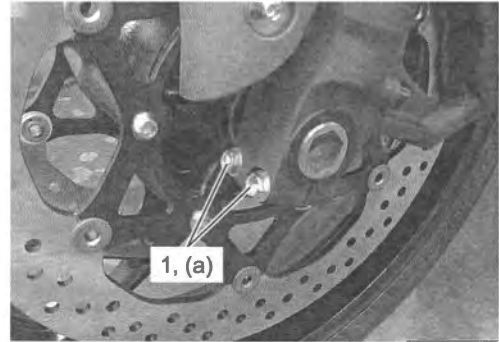


IK07L1240002-01

- 8) Tighten the two axle pinch bolts (1) on the left 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)



IF04K1240009-02

- 9) Install the front wheel speed sensor. (Page 4E-31)

Front Wheel Dust Seal / Front Wheel Bearing Removal and Installation

BENK07L22406004

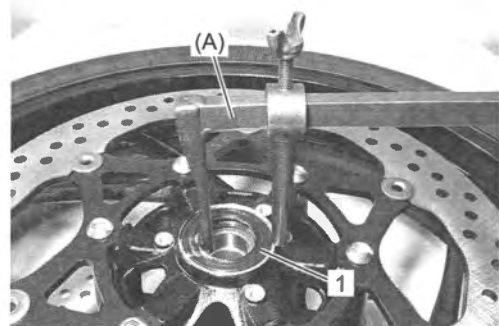
Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4).

Removal

- 1) Remove the front wheel speed sensor rotor. (Page 4E-31)
- 2) Remove the dust seals (1) on both sides with the special tool.

Special tool

(A): 09913-50121



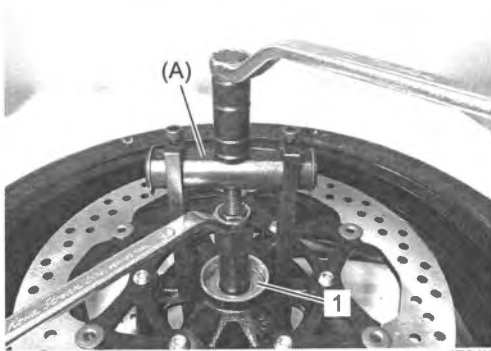
IF04K1240010-01

2D-6 Wheels and Tires:

- 3) Remove the bearings (1) on both sides with the special tool.

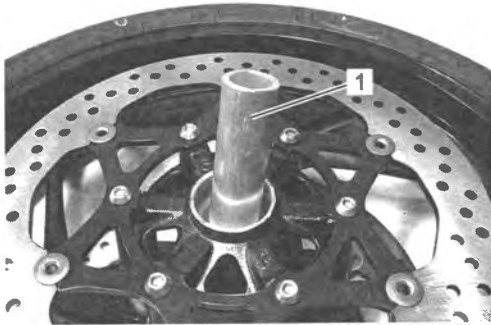
Special tool

(A): 09921-20240



IF04K1240011-01

- 4) Remove the spacer (1).



IF04K1240012-01

Installation

- 1) Apply grease to the new wheel bearings.

Grease 99000-25011 (SUZUKI SUPER GREASE

A)



I649G1240019-02

- 2) First install the right wheel bearing, then install the spacer (1) and left wheel bearing with the special tools.

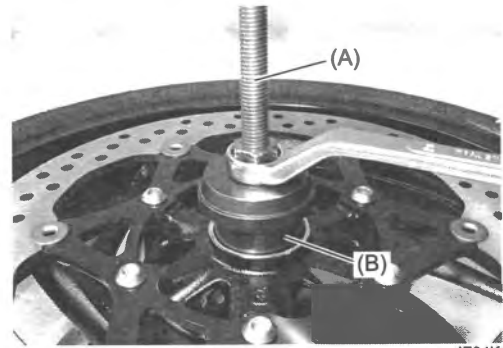
NOTICE

The sealed cover of the bearing must face outside.

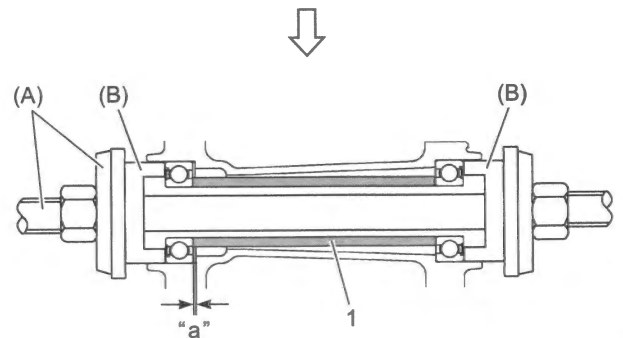
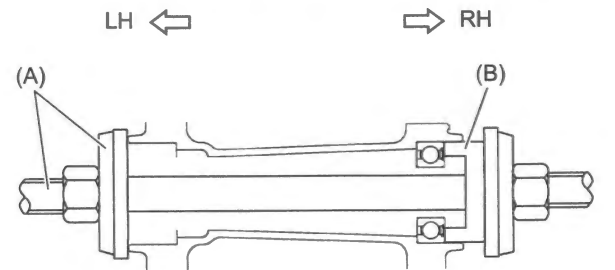
Special tool

(A): 09941-34513

(B): 09913-70210



IF04K1240013-01



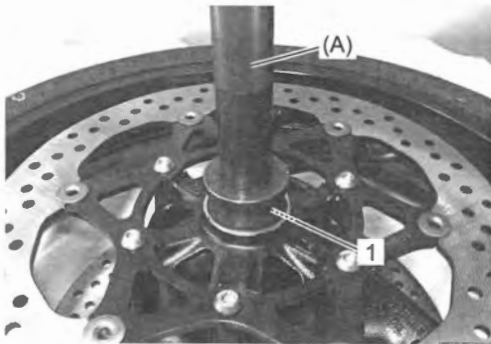
IF04K1240014-02

"a": Clearance

- 3) Install the new dust seals (1) on both sides with the special tool.

Special tool

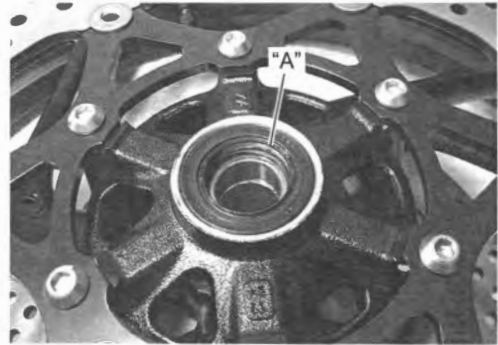
(A): 09913-70210



IF04K1240015-01

- 4) Apply grease to the lip of the dust seals.

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

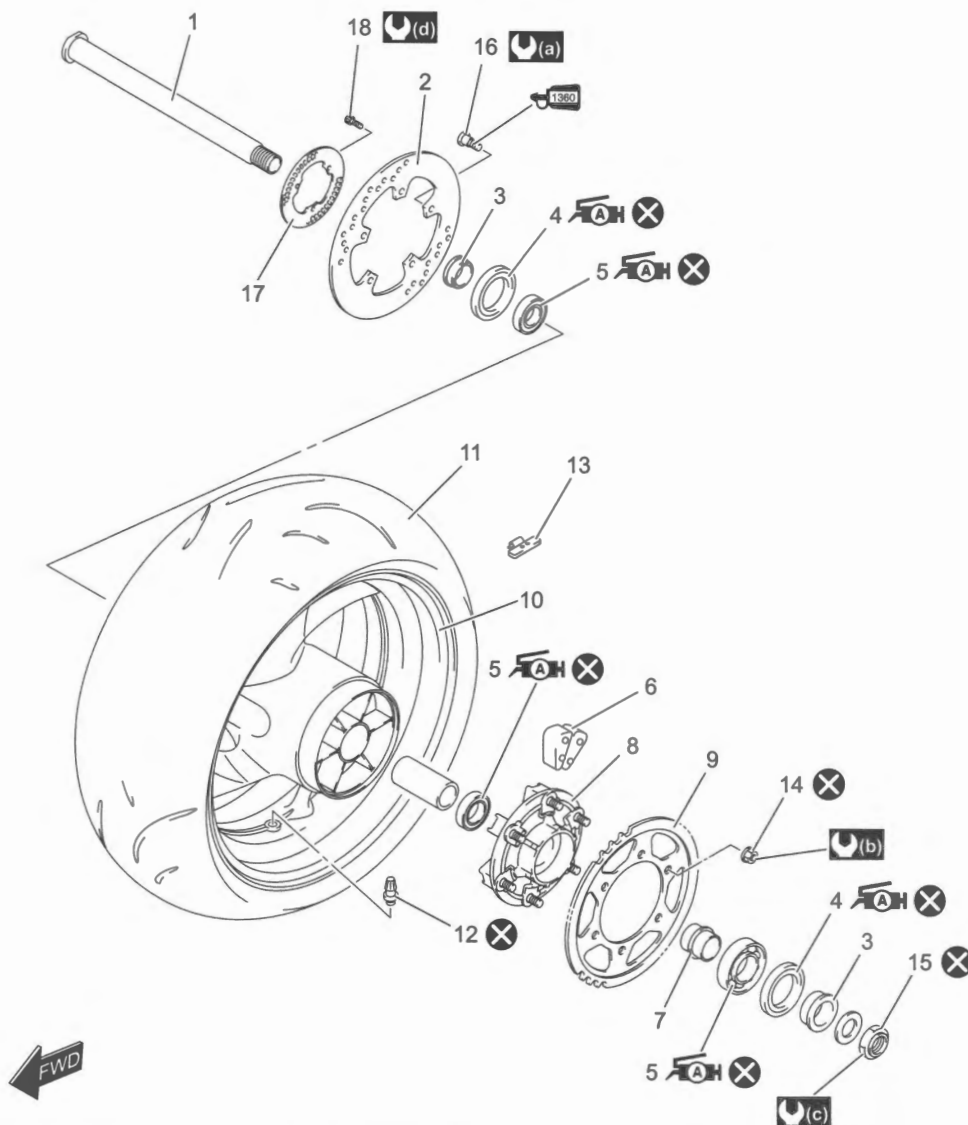


IF04K1240016-01

- 5) Install the front wheel speed sensor rotor. (Page 4E-33)

Rear Wheel Components

BENK07L22406005

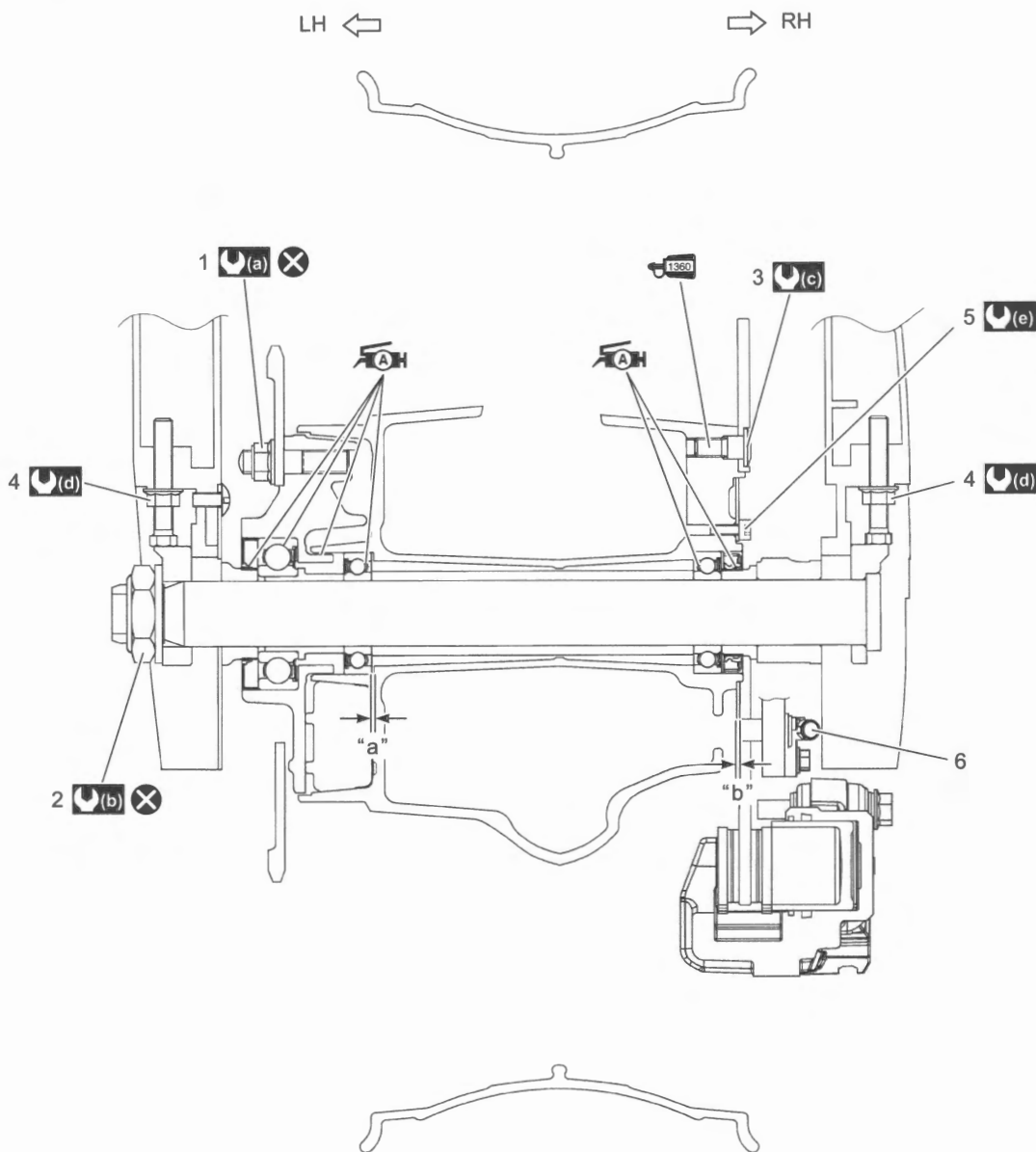


IF04K1240040-02

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)
3. Spacer	12. Air valve	⌚(c) : 100 N·m (10.2 kgf-m, 74.0 lbf-ft)
4. Dust seal	13. Wheel balancer	⌚(d) : 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)
5. Bearing	14. Rear sprocket nut	⌚AH ⊗ : Apply grease.
6. Rear wheel damper	15. Rear axle nut	⌚1850 : Apply thread lock to the thread part.
7. Retainer	16. Brake disc bolt	⊗ : Do not reuse.
8. Rear sprocket mounting drum	17. Wheel speed sensor rotor	
9. Rear sprocket	18. Wheel speed sensor rotor bolt	

Rear Wheel Assembly Construction

BENK07L22406006



IF04K1240017-04

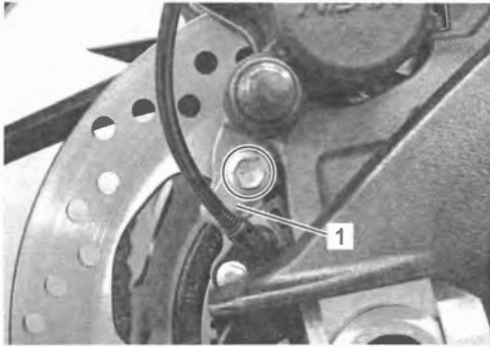
1. Rear sprocket nut	"a": Clearance	(e) : 6.5 N-m (0.66 kgf-m, 4.80 lbf-ft)
2. Rear axle nut	"b": 0.42 – 1.08 mm (0.017 – 0.0425 in)	AH : Apply grease.
3. Brake disc bolt	(a) : 60 N-m (6.1 kgf-m, 44.5 lbf-ft)	1350 : Apply thread lock to the thread part.
4. Chain adjuster lock-nut	(b) : 100 N-m (10.2 kgf-m, 74.0 lbf-ft)	X : Do not reuse.
5. Rear wheel speed sensor rotor bolt	(c) : 23 N-m (2.3 kgf-m, 17.0 lbf-ft)	
6. Rear wheel speed sensor	(d) : 21 N-m (2.1 kgf-m, 15.5 lbf-ft)	

Rear Wheel Assembly Removal and Installation

BENK07L22406007

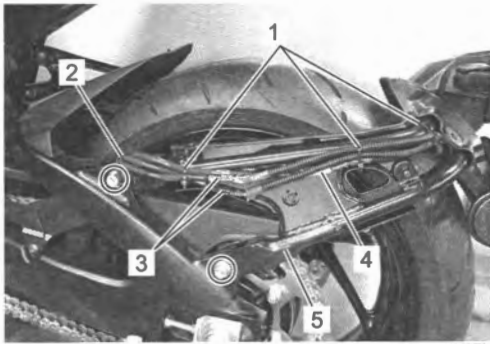
Removal

- 1) Remove the rear wheel speed sensor bracket (1).



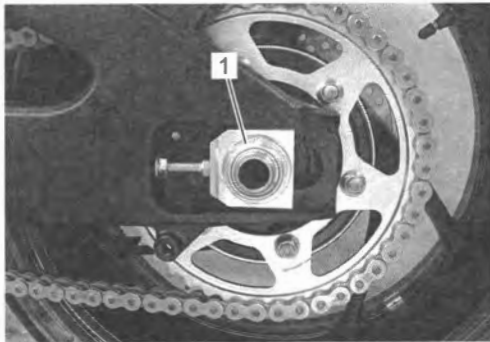
IK07L1240003-01

- 2) Remove the left rear fender rear cover. (Page 9D-11)
- 3) Remove the clamps (1) and (2). Disconnect the rear turn signal light couplers (3) and license plate light coupler (4).
- 4) Remove the rear fender brace (5).



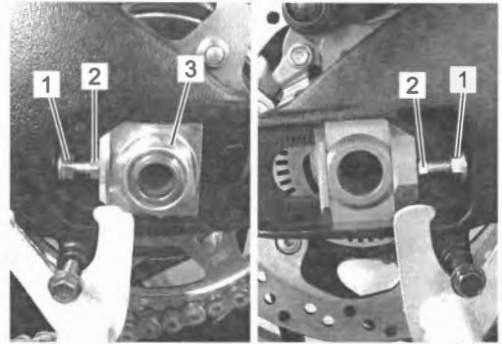
IK07L1240004-02

- 5) Loosen the rear axle nut (1).



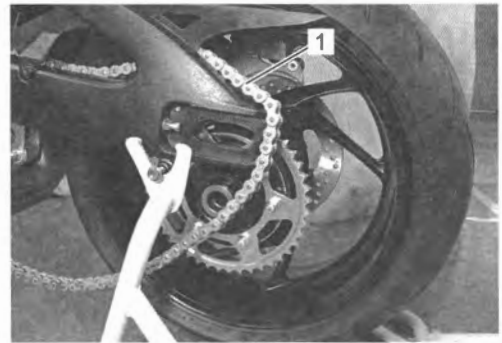
IF04K1240018-01

- 6) Raise the rear wheel off the ground and support the motorcycle.
- 7) Loosen the left and right lock-nuts (1) and turn in the adjuster bolts (2).
- 8) Remove the rear axle nut (3).



IF04K1240019-01

- 9) Draw out the rear axle.
- 10) Remove the drive chain (1) from the rear sprocket.



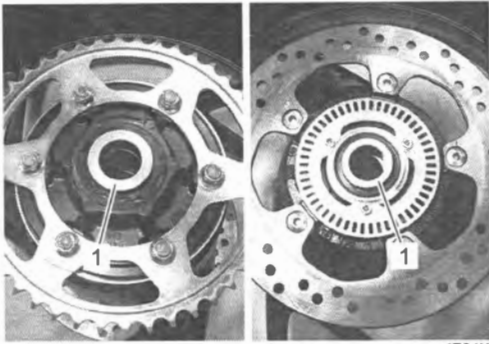
IF04K1240020-01

- 11) Remove the rear brake caliper assembly (1).
- 12) Remove the rear wheel assembly.



IF04K1240021-01

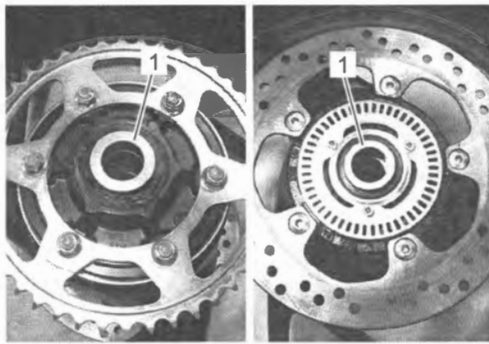
13) Remove the left and right spacers (1).



IF04K1240022-02

Installation

1) Install the left and right spacers (1).

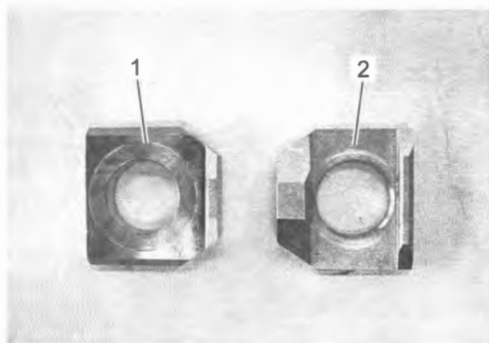


IF04K1240023-02

- 2) Install the rear wheel.
- 3) Install the rear brake caliper to the swingarm.
- 4) Install the drive chain to the rear sprocket.
- 5) Install the left chain adjuster (1) and right chain adjuster (2) to the swingarm.

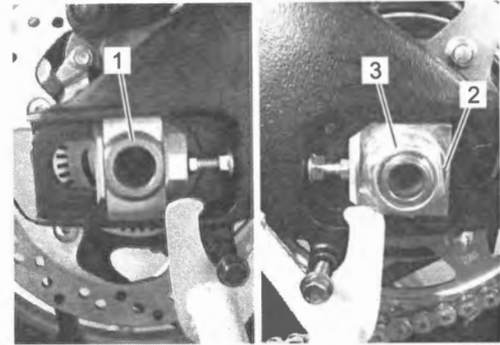
NOTE

Right and left shape is different.



IF04K1240024-01

- 6) Install the rear axle (1) and washer (2).
- 7) Tighten the new rear axle nut (3) temporarily.



IF04K1240025-01

- 8) Remove the jack or a wooden block.
- 9) Adjust the chain slack. Refer to "Drive Chain Inspection and Adjustment" in Section 3A (Page 3A-2).
- 10) Install the rear fender brace and left rear fender rear cover. (Page 9D-38)
- 11) Install the rear wheel speed sensor bracket. (Page 4E-32)

Rear Wheel Dust Seal / Rear Wheel Bearing Removal and Installation

BENK07L22406008

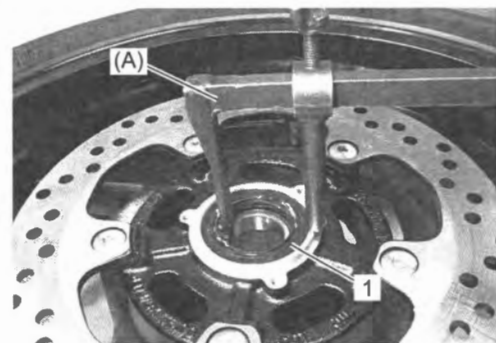
Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" in Section 3A (Page 3A-6).

Removal

- 1) Remove the rear wheel dampers. (Page 2D-14)
- 2) Remove the rear wheel speed sensor rotor. (Page 4E-33)
- 3) Remove the dust seal (1) with the special tool.

Special tool

(A): 09913-50121

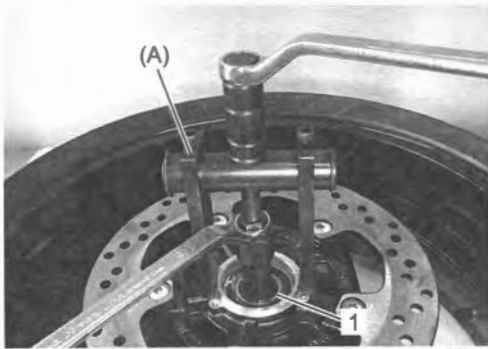


IF04K1240026-01

- 4) Remove the bearings (1) on both sides with the special tool.

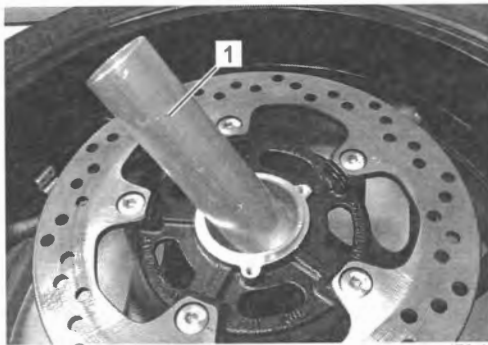
Special tool

(A): 09921-20240



IF04K1240027-01

- 5) Remove the spacer (1).



IF04K1240028-01

Installation

- 1) Apply grease to the new wheel bearings.

Grease 99000-25011 (SUZUKI SUPER GREASE

A)



I649G1240019-02

- 2) First install the right wheel bearing, then install the spacer (1) and left wheel bearing with the special tools.

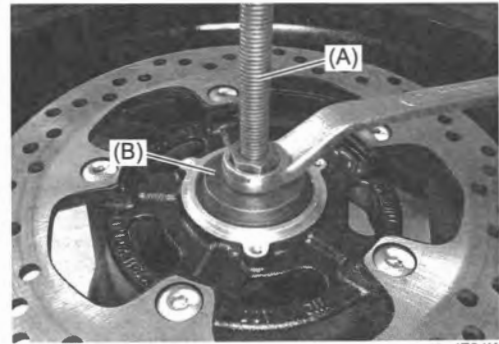
NOTICE

The sealed cover of the bearing must face outside.

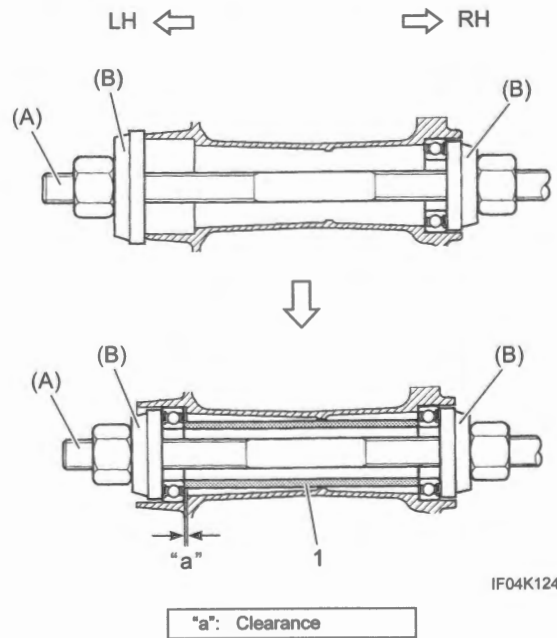
Special tool

(A): 09941-34513

(B): 09924-84510



IF04K1240029-01

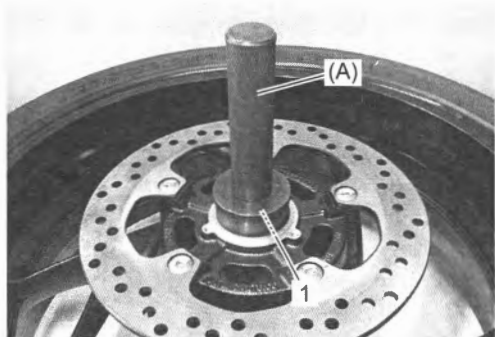


IF04K1240030-01

3) Install a new dust seal (1) with the special tool.

Special tool

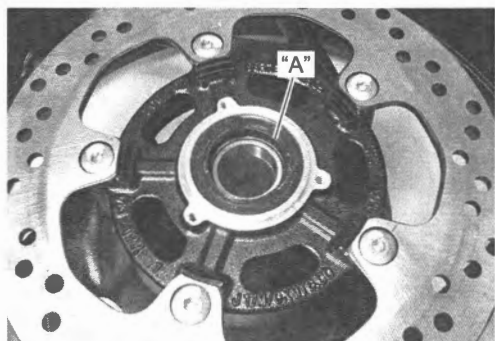
(A): 09913-70210



IF04K1240031-01

4) Apply grease to the dust seal lip.

“A”: Grease 99000-25011 (SUZUKI SUPER GREASE A)



IF04K1240037-01

5) Install the rear wheel speed sensor rotor. (Page 4E-33)

6) Install the rear wheel dampers. (Page 2D-14)

Wheel / Wheel Axle Inspection

BENK07L22406009

Refer to “Front Wheel Assembly Removal and Installation” (Page 2D-4).

Refer to “Rear Wheel Assembly Removal and Installation” (Page 2D-10).

Wheel

Make sure that the wheel runout checked as shown does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings.

- Front: (Page 2D-5)
- Rear: (Page 2D-11)

If bearing replacement fails to reduce the runout, replace the wheel.

Wheel rim runout

Front

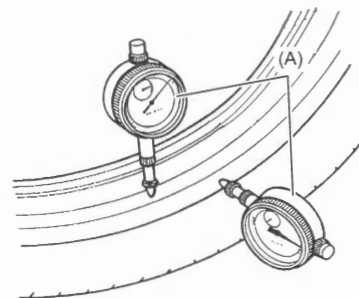
Axial & Radial [Limit]: 2.0 mm (0.08 in)

Rear

Axial & Radial [Limit]: 2.0 mm (0.08 in)

Special tool

(A): 09900-20607



ID26J1240033-01

Wheel Axle

Using a dial gauge, check the wheel axle for runout, If the runout exceeds the limit, replace the wheel axle. Actual runout is 1/2 of the total indicator reading.

Wheel axle runout

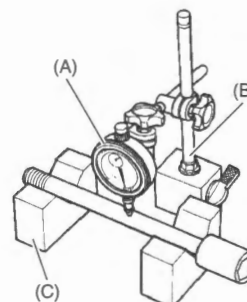
Front & Rear [Limit]: 0.25 mm (0.010 in)

Special tool

(A): 09900-20607

(B): 09900-20701

(C): 09900-21304



ID26J1240034-03

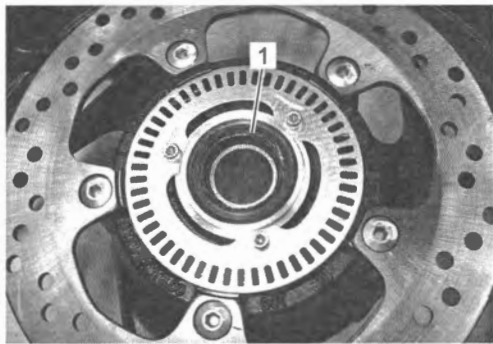
Dust Seal

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-5)
- Rear: ☞(Page 2D-11)



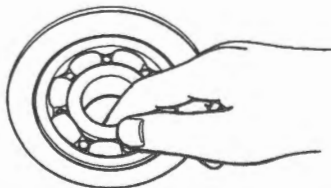
IF04K1240032-01



IF04K1240033-01

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-5)
 - 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-6).
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-34).

Rear Sprocket

Refer to "Rear Sprocket Mounting Drum / Sprocket Inspection" in Section 3A (Page 3A-6).

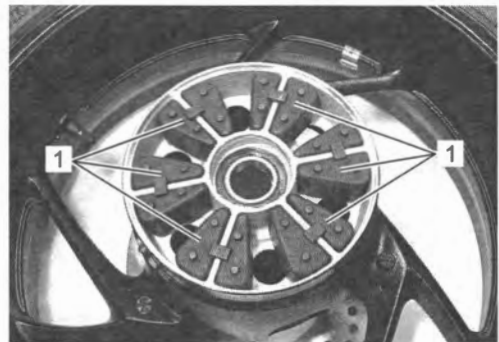
Rear Wheel Damper Removal and Installation

BENK07L22406010

Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" in Section 3A (Page 3A-6).

Removal

Remove the rear wheel dampers (1).



IF04K1240034-01

Installation

Install the rear wheel dampers in the reverse order of removal.

Rear Wheel Damper Inspection

BENK07L22406011

Inspect the rear wheel dampers for wear and damage. Replace the damper if there is anything unusual.



IF04K1240035-01

Tire Inspection and Cleaning

BENK07L22406012

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

Tire size

Front [Standard]: 120/70ZR17M/C (58W)

Rear [Standard]: 190/50ZR17M/C (73W)

Tire type

Front [Standard]: DUNLOP: Roadsport2 M

Rear [Standard]: DUNLOP: Roadsport2 M



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.

Tire tread depth

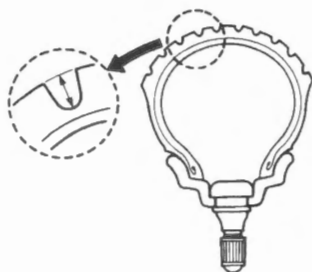
Recommended depth

Front [Limit]: 1.6 mm (0.062 in)

Rear [Limit]: 2.0 mm (0.078 in)

Special tool

09900-20805



I310G1020068-02

Tire pressure

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

Cold inflation tire pressure

Solo riding

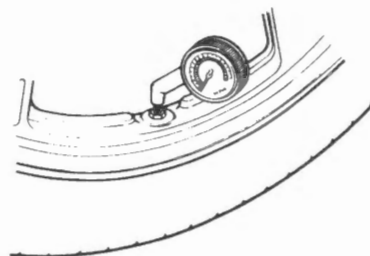
Front [Standard]: 250 kPa (2.50 kgf/cm², 36 psi)

Rear [Standard]: 290 kPa (2.90 kgf/cm², 42 psi)

Dual riding

Front [Standard]: 250 kPa (2.50 kgf/cm², 36 psi)

Rear [Standard]: 290 kPa (2.90 kgf/cm², 42 psi)



I310G1020069-02

Tire Removal and Installation

BENK07L22406013

Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4).

Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" in Section 3A (Page 3A-6).

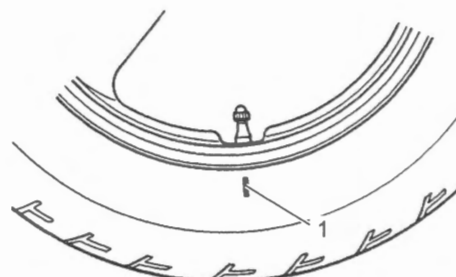
Removal

▲ 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.



1. Chalk mark

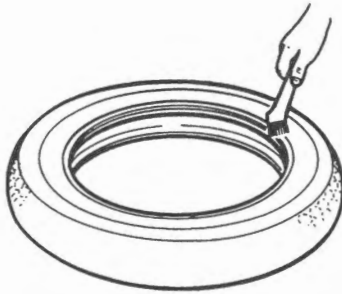
IE31J1240036-01

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.

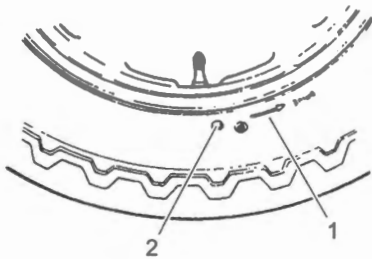


I649G1240038-02

- 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.



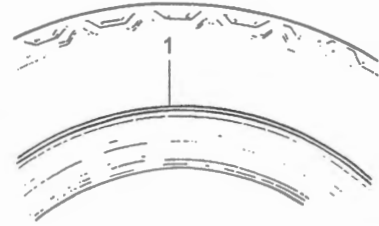
IF04K1240038-01

- 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 rim's safety hump and cause serious personal injury.
- Do not inflate tires exceeding 400 kPa (4.0 kgf/cm², 57 psi). Over-inflation may cause the bead to break, which may cause serious personal injury.

- 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-15)
- 7) As necessary, adjust the tire balance. ↪ (Page 2D-17)

Wheel Rim / Air Valve Inspection and Cleaning

BENK07L22406014

Refer to "Tire Removal and Installation" (Page 2D-15).
Refer to "Air Valve Removal and Installation" (Page 2D-17).

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-13)

Wheel rim size

Front [Standard]: 17 M/C x MT 3.50

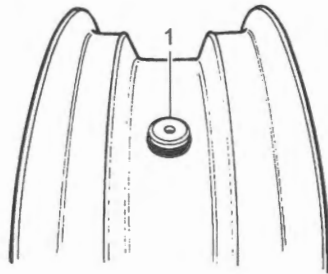
Rear [Standard]: 17 M/C x MT 6.00



I649G1240041-02

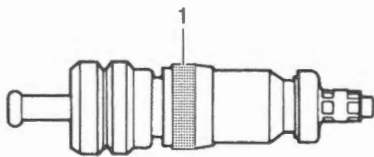
Air Valve

Inspect the air valve (1) for peeling and damage. If any defect is found, replace the air valve with a new one.



IE31J1240038-01

Inspect the valve core seal (1) for wear and damage. If any defect is found, replace the valve core with a new one.



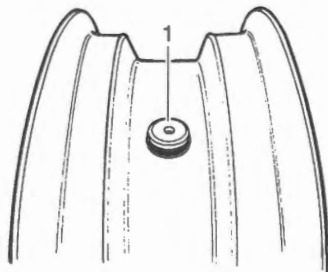
IE31J1240039-01

Air Valve Removal and Installation

Refer to "Tire Removal and Installation" (Page 2D-15). BENK07L22406015

Removal

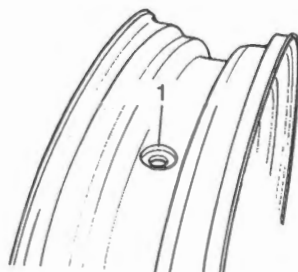
Remove the air valve (1) from the wheel.



IE31J1240040-01

Installation

1) Clean off the dirt around the valve hole (1).

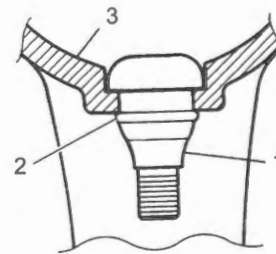


IE31J1240041-01

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

BENK07L22406016

Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4).

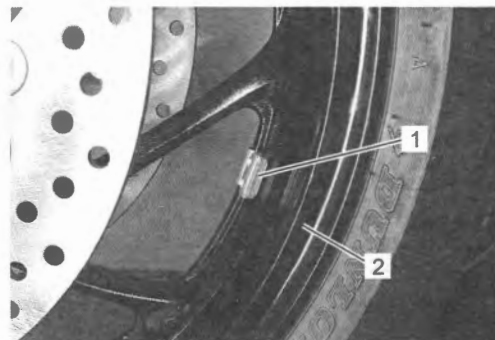
Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" in Section 3A (Page 3A-6).

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.



IF04K1240036-01

3) Recheck the wheel balance.

Specifications

Tightening Torque Specifications

BENK07L22407001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Front axle nut	100	10.2	74.0	☞ (Page 2D-5)
Front axle pinch bolt	23	2.3	17.0	☞ (Page 2D-5) / ☞ (Page 2D-5)

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

BENK07L22408001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000–25011	☞ (Page 2D-6) / ☞ (Page 2D-7) / ☞ (Page 2D-12) / ☞ (Page 2D-13)

NOTE

Required service material(s) is also described in:

“Front Wheel Components” (Page 2D-2)

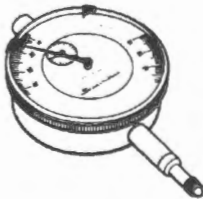


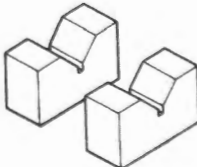

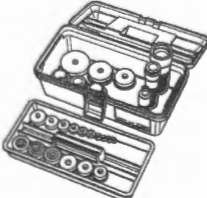
“Front Wheel Assembly Construction” (Page 2D-3)

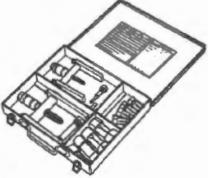
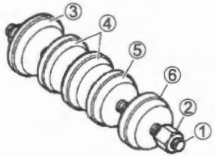


“Rear Wheel Components” (Page 2D-8)

“Rear Wheel Assembly Construction” (Page 2D-9)

Special Tool

BENK07L22408002

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-15)		09900–21304 V blocks ☞ (Page 2D-13)	
09913–50121 Oil seal remover ☞ (Page 2D-5) / ☞ (Page 2D-11)		09913–70210 Bearing installer set ☞ (Page 2D-6) / ☞ (Page 2D-7) / ☞ (Page 2D-13)	

<p>09921-20240 Bearing remover set ☞ (Page 2D-6) / ☞ (Page 2D-12)</p> 	<p>09924-84510 Bearing installer set ☞ (Page 2D-12)</p> 
<p>09941-34513 Bearing installer set ☞ (Page 2D-6) / ☞ (Page 2D-12)</p> 	<p>09944-28321 Hexagon bit socket (19 mm : 1/2 sq.) ☞ (Page 2D-5)</p> 

Section 3

Driveline / Axle

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Precautions	3-1	Rear Sprocket Mounting Drum Assembly	
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Drive Chain and Sprocket Symptom		Rear Sprocket Mounting Drum Dust Seal /	
Diagnosis	3A-1	Bearing Removal and Installation	3A-7
Repair Instructions	3A-1	Drive Chain Replacement	3A-8
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Precautions

Precautions

Precautions for Driveline / Axle

BENK07L23000001

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 seal rings of the drive chain.
 - Clean the drive chain with a spray-type chain cleaner and blow dry with compressed air. 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 seal rings.
 - When drive chain replacement is necessary, the original equipment type drive chain should be used.
-

Drive Chain / Drive Train / Drive Shaft

Diagnostic Information and Procedures

Drive Chain and Sprocket Symptom Diagnosis

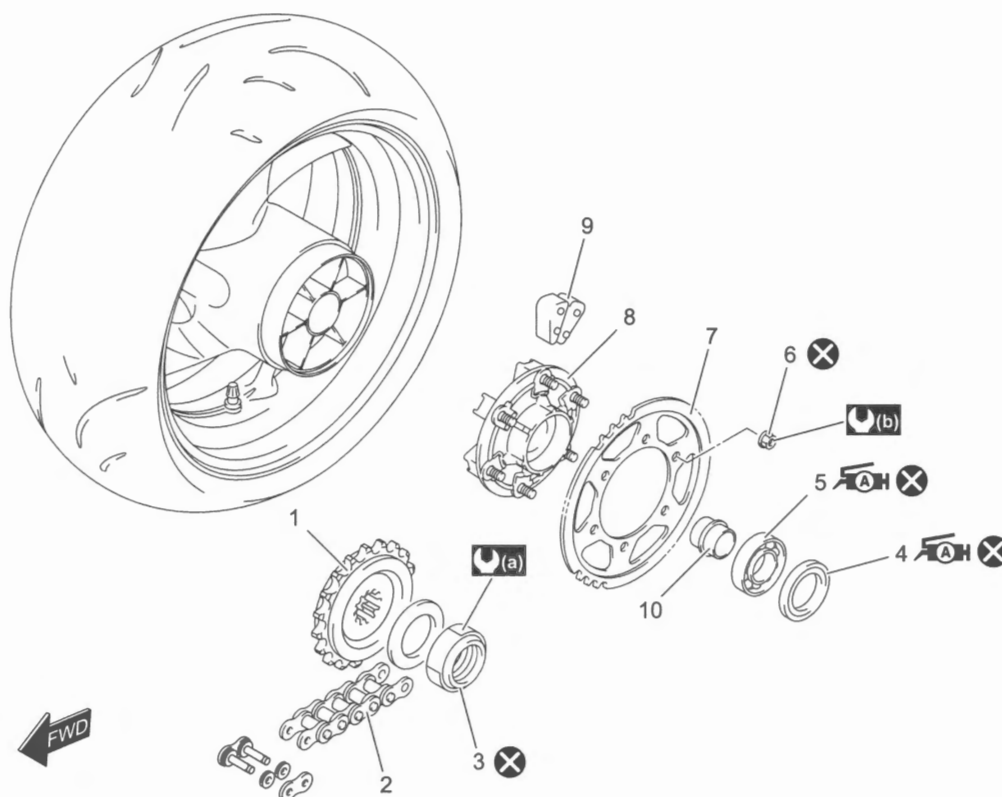
BENK07L23104001

Condition	Possible cause	Correction / Reference Item
Noisy Drive Chain	Worn sprocket.	Replace. ☞(Page 3A-4) ☞(Page 3A-5)
	Worn drive chain.	Replace. ☞(Page 3A-8)
	Stretched drive chain.	Replace. ☞(Page 3A-8)
	Too large drive chain slack.	Adjust. ☞(Page 3A-2)
	Drive chain out of adjustment.	Adjust. ☞(Page 3A-2)

Repair Instructions

Drive Chain Related Components

BENK07L23106001

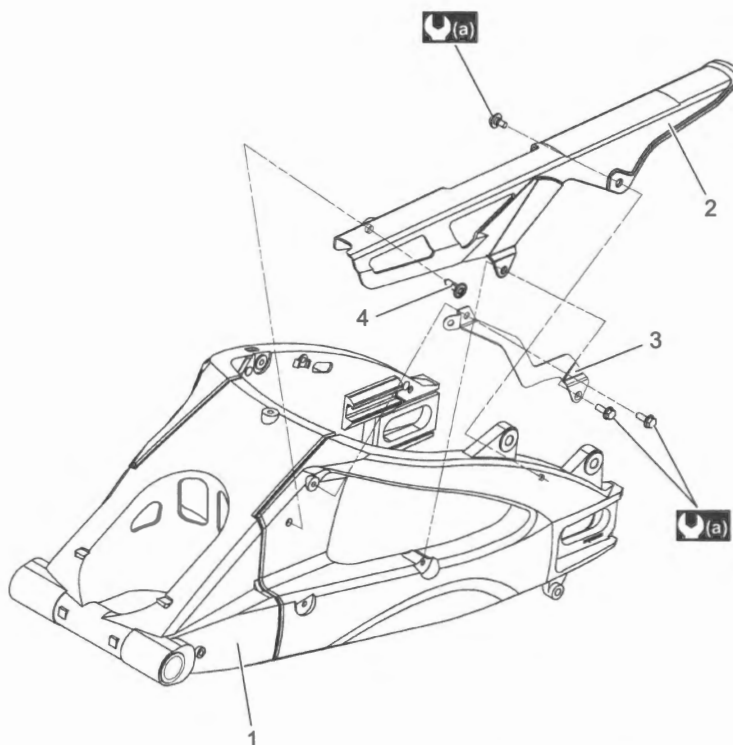


IF04K1310036-02

1. Engine sprocket	6. Rear sprocket nut	☞(a) : 115 N·m (11.7 kgf·m, 85.0 lbf·ft)
2. Drive chain	7. Rear sprocket	☞(b) : 60 N·m (6.1 kgf·m, 44.5 lbf·ft)
3. Engine sprocket nut	8. Rear sprocket mounting drum	AH : Apply grease.
4. Dust seal	9. Wheel damper	X : Do not reuse.
5. Bearing	10. Retainer	

Chain Case Construction

BENK07L23106002



1. Swingarm	4. Fastener
2. Chain case	: 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
3. Chain case reinforcement	

IK07L1310001-02

Drive Chain Inspection and Adjustment

BENK07L23106003

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)

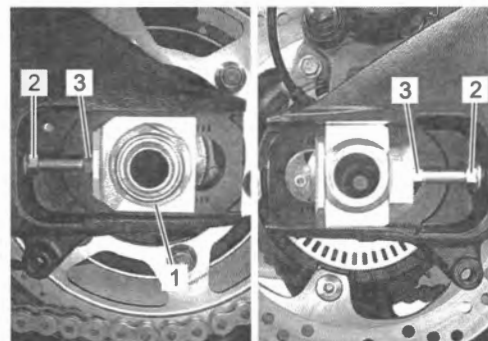
NOTE

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 seal rings

Drive Chain Length Inspection

- 1) Place the motorcycle on the side-stand.
- 2) Loosen the rear axle nut (1).
- 3) Loosen the left and right chain adjuster lock-nuts (2).
- 4) Give tension to the drive chain fully by turning both chain adjuster bolts (3).

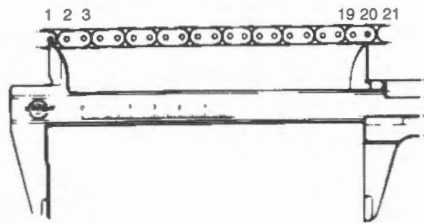


IF04K1310001-03

- 5) 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)



I649G1020034-02

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

Drive Chain Slack Adjustment

- 1) Place the motorcycle on the side-stand.
- 2) Loosen the rear axle nut (1).
- 3) Loosen the left and right chain adjuster lock-nuts (2).
- 4) Loosen or tighten both chain adjuster bolts (3) until there is 20 – 30 mm (0.79 – 1.18 in) "a" of slack at the middle of the chain between the engine and rear sprockets.

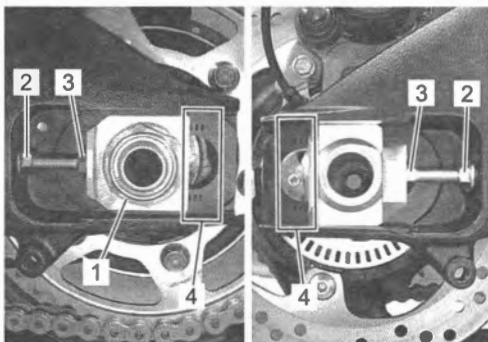
NOTICE

The reference marks (4) on both sides of the swingarm and the edge of each chain adjuster must be aligned to ensure that the front and rear wheels are correctly aligned.

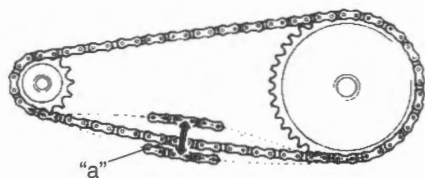
Drive chain slack

On side-stand

[Standard]: 20 – 30 mm (0.79 – 1.18 in)



IF04K1310002-03



I649G1020036-02

- 5) 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)

- 6) Recheck the drive chain slack after tightening the axle nut.
- 7) Tighten both chain adjuster lock-nuts to the specified torque.

Tightening torque

Chain adjuster lock-nut: 21 N·m (2.1 kgf-m, 15.5 lbf-ft)

Drive Chain Cleaning and Lubricating

BENK07L23106004

- 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.

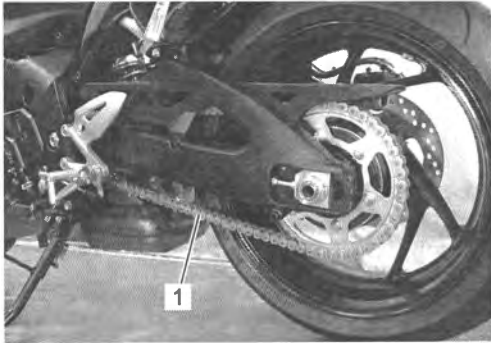
- 4) Use a soft brush to clean the drive chain (1). Be careful not to damage the seal ring even through using a soft brush.
- 5) Wipe off water and neutral detergent.
- 6) Lubricate with a motorcycle sealed drive chain lubricant or high viscosity oil.

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).



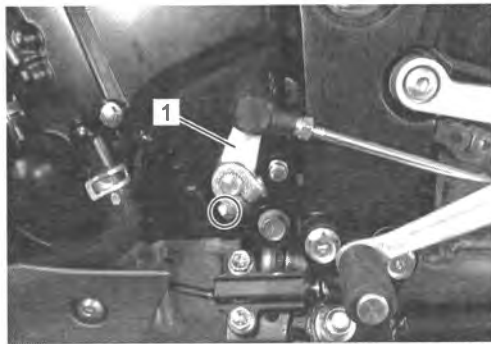
IF04K1310003-01

Engine Sprocket Removal and Installation

BENK07L23106005

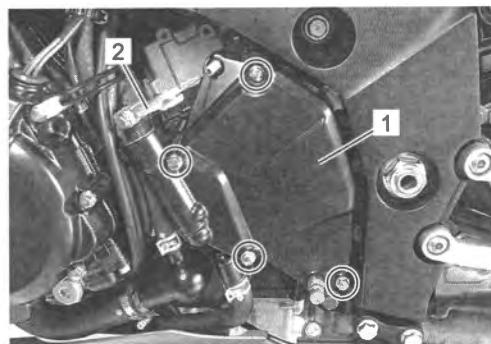
Removal

- 1) Remove the gearshift link arm (1).



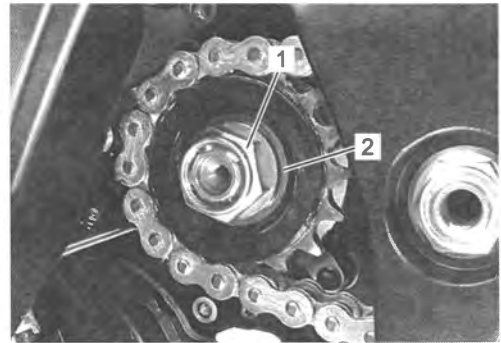
IF04K1310004-01

- 2) Move the engine sprocket cover (1) with the clutch release arm (2).



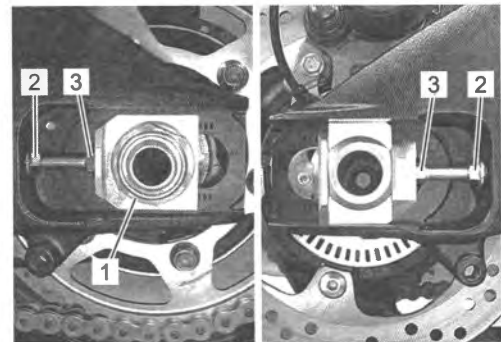
IF04K1310005-02

- 3) Remove the engine sprocket nut (1) while depressing the rear brake pedal.
- 4) Remove the washer (2).



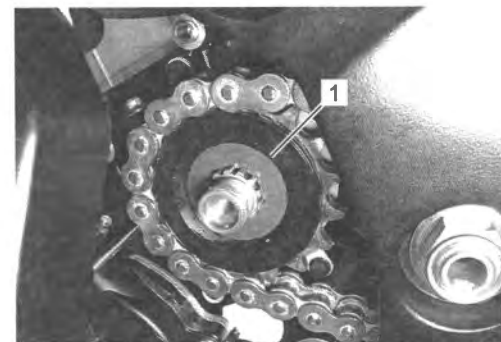
IF04K1310006-02

- 5) Loosen the rear axle nut (1).
- 6) Support the motorcycle with a jack or wooden block.
- 7) Loosen the left and right lock-nuts (2) and turn in the adjuster bolts (3) to provide additional chain slack.



IF04K1310007-02

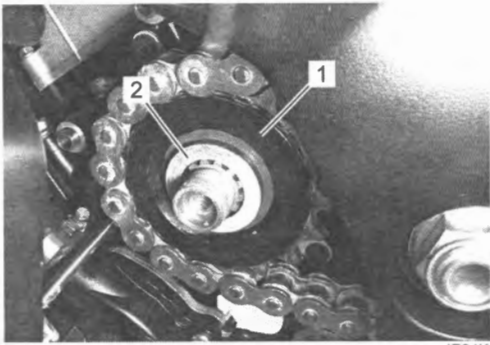
- 8) Remove the engine sprocket (1).



IF04K1310008-01

Installation

- 1) Install the engine sprocket (1) and washer (2).

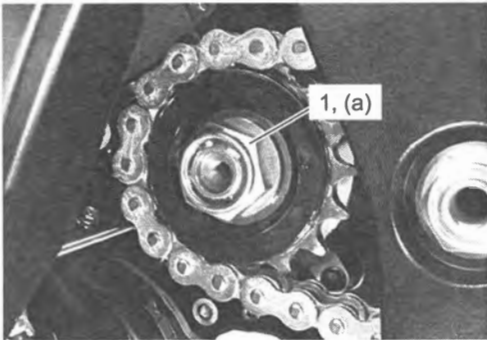


IF04K1310009-02

- 2) Tighten the new engine sprocket nut (1) to the specified torque.

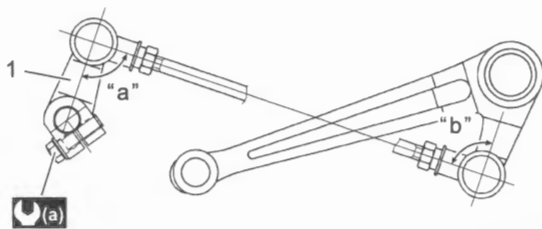
Tightening torque

Engine sprocket nut (a): 115 N·m (11.7 kgf-m, 85.0 lbf-ft)



IF04K1310010-02

- 3) Install the engine sprocket cover.
- 4) Install the gearshift link arm (1) to the gearshift shaft.



IF04K1310011-02

"a": 90°	Ⓜ(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
"b": 87.5°	

- 5) Check the gearshift lever height. (Page 5B-15)
- 6) Adjust the drive chain slack. Refer to "Drive Chain Inspection and Adjustment" (Page 3A-2).

Rear Sprocket Removal and Installation

BENK07L23106006

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-10).

Removal

- 1) Remove the rear sprocket (1).



IF04K1310012-02

Installation

Install the rear sprocket in the reverse order of removal. Pay attention to the following point:

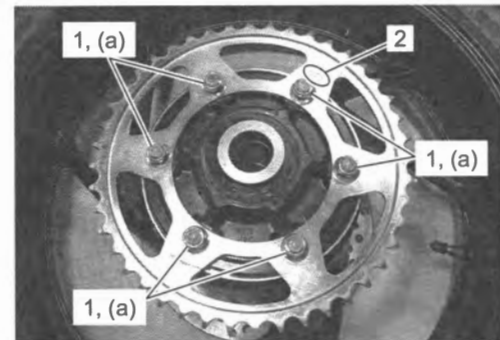
- Tighten the new rear sprocket nuts (1) to the specified torque.

NOTE

The stamped mark (2) on the sprocket should face outside.

Tightening torque

Rear sprocket nut (a): 60 N·m (6.1 kgf-m, 44.5 lbf-ft)



IF04K1310013-01

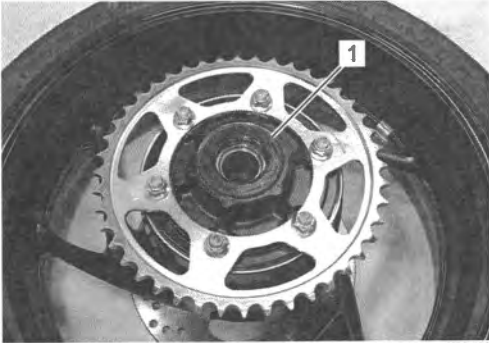
Rear Sprocket Mounting Drum Assembly Removal and Installation

BENK07L23106007

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-10).

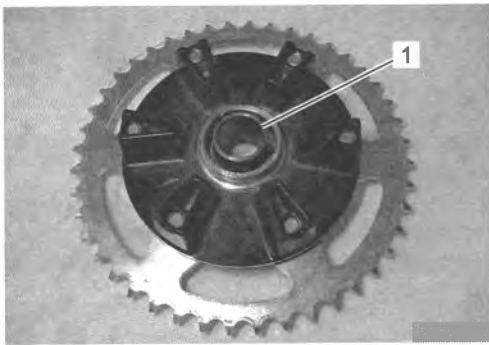
Removal

- 1) Remove the rear sprocket mounting drum assembly (1).



IF04K1310014-01

- 2) Remove the retainer (1).



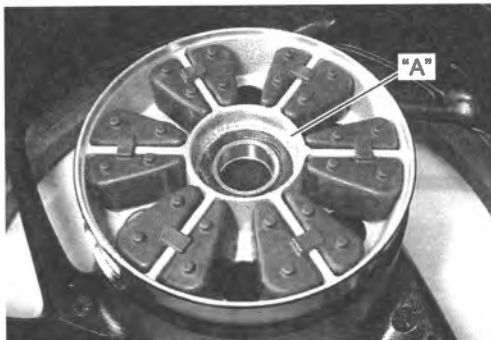
IF04K1310015-01

Installation

Install the rear sprocket mounting drum assembly in the reverse order of removal. Pay attention to the following point:

- Apply grease to the contacting surface between the rear wheel hub and rear sprocket mounting drum.

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



IF04K1310016-02

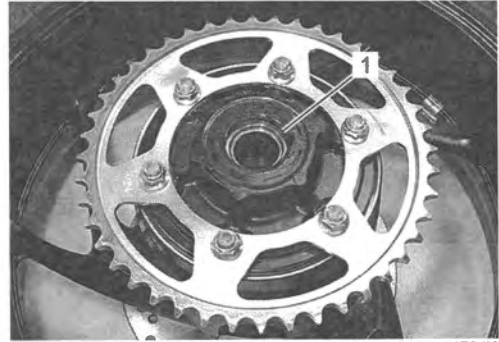
Rear Sprocket Mounting Drum / Sprocket Inspection

BENK07L23106008

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-10).

Dust Seal

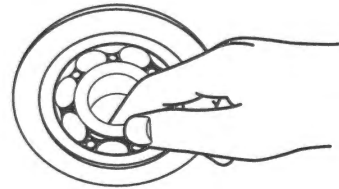
Inspect the sprocket mounting drum dust seal lip (1) for wear or damage. If any damage is found, replace the dust seal with a new one. (Page 3A-7)



IF04K1310017-03

Bearing

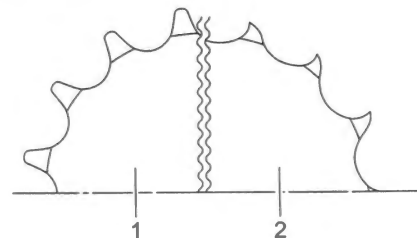
Inspect the play of the sprocket mounting drum bearing by hand while they are in the drum. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. (Page 3A-7)



I649G1310015-03

Sprocket

- 1) Remove the engine sprocket cover. (Engine sprocket only) (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-5)
 - Drive chain: (Page 3A-8)



IE31J1310022-02

1. Normal wear	2. Excessive wear
----------------	-------------------

- 3) Install the engine sprocket cover. (Engine sprocket only) (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-2).

Rear Sprocket Mounting Drum Dust Seal / Bearing Removal and Installation

BENK07L23106009

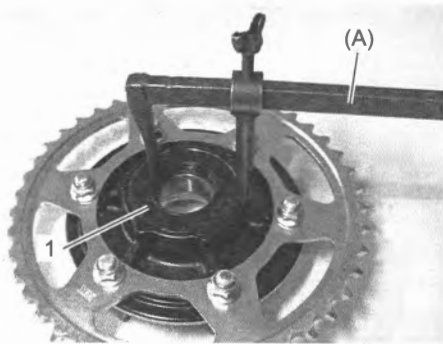
Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" (Page 3A-6).

Removal

- 1) Remove the dust seal (1) using the special tool.

Special tool

(A): 09913-50121

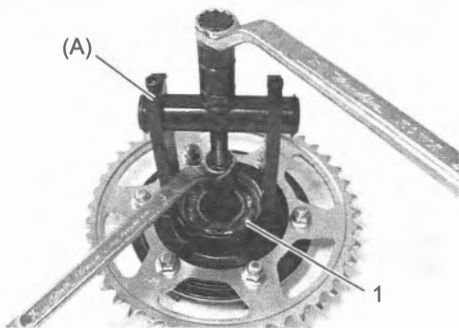


IF04K1310018-01

- 2) Remove the bearing (1) with the special tool.

Special tool

(A): 09921-20240



IF04K1310019-01

Installation

- 1) Apply grease to the new bearing.

Grease 99000-25011 (SUZUKI SUPER GREASE A)



I649G1310020-02

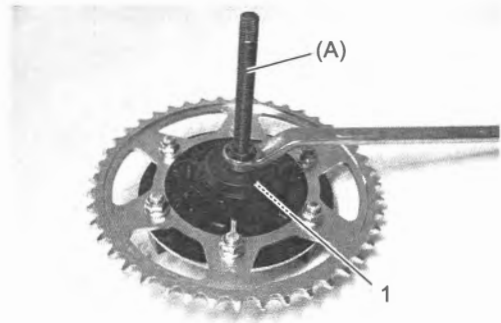
- 2) Install the bearing (1) with the special tool.

NOTICE

The sealed cover of the bearing must face inside.

Special tool

(A): 09924-84510

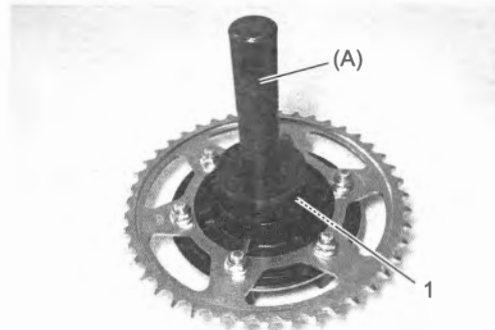


IF04K1310020-01

- 3) Install a new dust seal (1) with the special tool.

Special tool

(A): 09913-70210



IF04K1310021-01

4) Apply grease to the dust seal lip.

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



IF04K1310022-01

Drive Chain Replacement

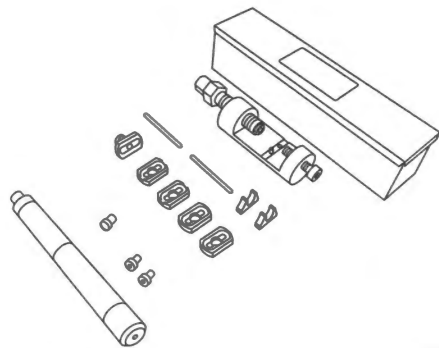
BENK07L23106010

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.

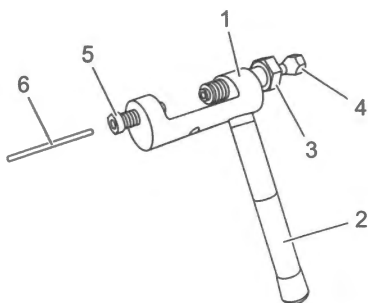
**Special tool
09922-22712**



IF04K1310024-02

Drive Chain Cutting

1) Set up the special tool.

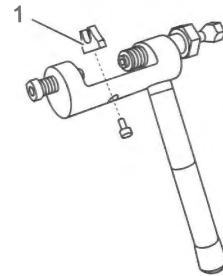


IF04K1310025-03

1. Tool body	4. Pressure bolt B
2. Grip handle	5. Adjuster bolt
3. Pressure bolt A	6. Cutting pin

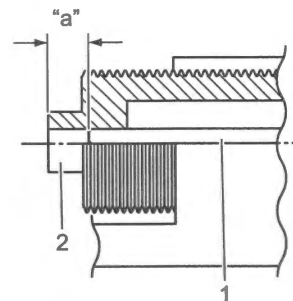
2) Select the correct guide plate (1) from table below, and mount it to the tool body.

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).

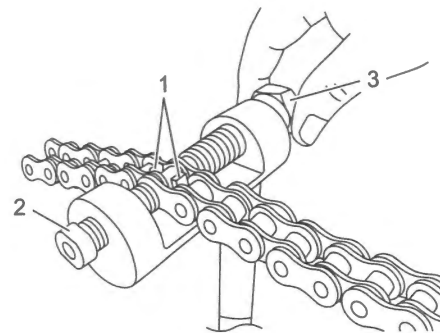


IE31J1310029-02

4) Place the drive chain link being disjoined 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 joint pin properly.

6) Tighten the pressure bolt A (3).



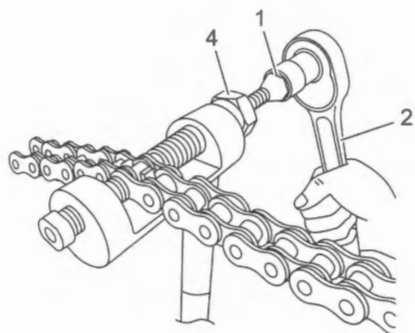
IF04K1310026-04

- Turn in the pressure bolt B (1) with the wrench (2) and force out the joint pin (3).

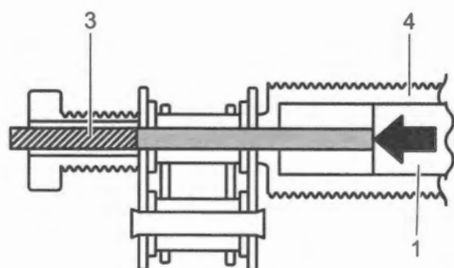
NOTE

Continue turning in the pressure bolt B (1) until the joint pin should be completely pushed out of the drive chain.

- After the joint pin (3) is removed, loosen the pressure bolt B (1) and then pressure bolt A (4).



IF04K1310027-06



IE31J1310032-02

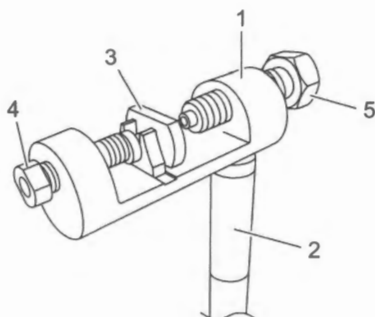
Drive Chain Connecting

⚠ 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

- Set up the special tool.



IF04K1310028-05

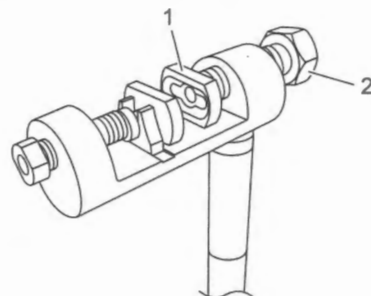
1. Tool body	4. Adjuster bolt
2. Grip handle	5. Pressure bolt A
3. Wedge holder	

- 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

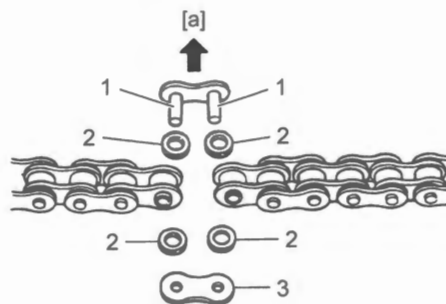
NOTE

In case joint plate is too large to fit on "520 pressure holder". Please select "50 pressure holder".



IF04K1310034-02

- Connect both ends of the drive chain with the joint pins (1) inserted from the wheel side [a] as installed on the motorcycle.



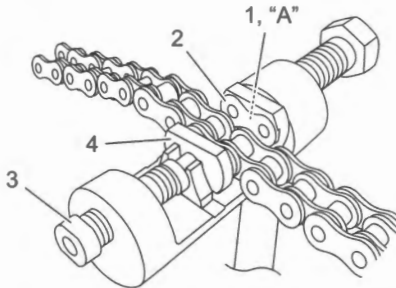
IF04K1310035-01

2. Seal 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.

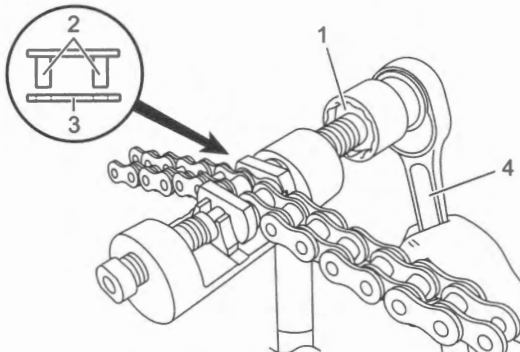
"A": Grease 99000-25011 (SUZUKI SUPER GREASE A)

- 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.



IF04K1310030-04

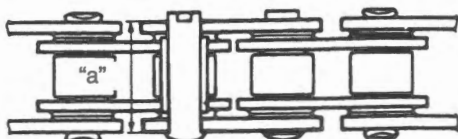
- 8) Continue pressing the joint plate until the distance "a" between the two joint plates come to the specification.

Joint plate distance specification

[Standard]: 19.45 – 19.75 mm (0.7657 – 0.7775 in)

NOTICE

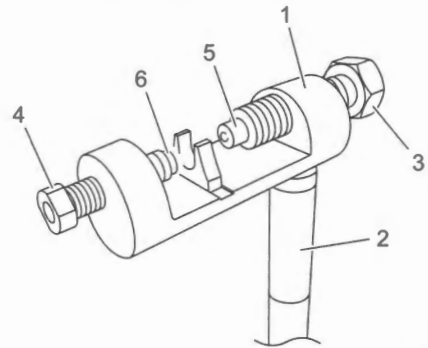
If pressing of the joint plate makes the dimension out of specification excessively, the work must be carried out again by using new joint parts.



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

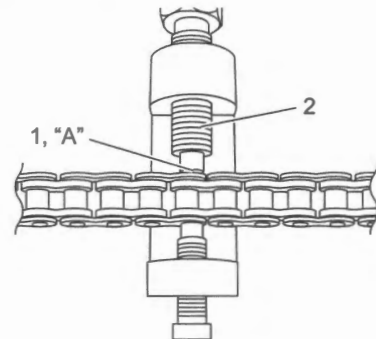
- 2) Apply grease to the flare pin (1).

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

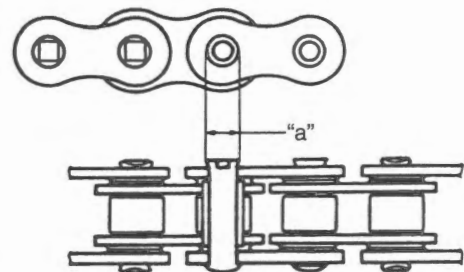
- 3) Stake the joint pin by turning (approximately 7/8 turn) the pressure bolt A (2) until the pin end diameter "a" becomes the specified dimension.
- 4) After joining of the drive chain has been completed, check to make sure that the link is smooth and no abnormal condition (no cracked joint pin, etc) is found.

Pin end diameter specification

[Standard]: 5.45 – 5.55 mm (0.215 – 0.218 in)



IF04K1310032-03



I649G1310036-03

- 5) Adjust the drive chain slack, after connecting it. Refer to "Drive Chain Inspection and Adjustment" (Page 3A-2).

Specifications

Tightening Torque Specifications

BENK07L23107001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Rear axle nut	100	10.2	74.0	☞(Page 3A-3)
Chain adjuster lock-nut	21	2.1	15.5	☞(Page 3A-3)
Engine sprocket nut	115	11.7	85.0	☞(Page 3A-5)
Rear sprocket nut	60	6.1	44.5	☞(Page 3A-5)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Drive Chain Related Components” (Page 3A-1)

“Chain Case Construction” (Page 3A-2)

“Engine Sprocket Removal and Installation” (Page 3A-4)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L23108001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞(Page 3A-6) / ☞(Page 3A-7) / ☞(Page 3A-8) / ☞(Page 3A-10) / ☞(Page 3A-10)



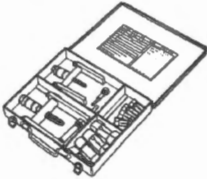

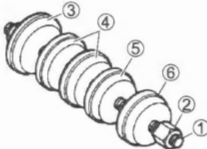
NOTE

Required service material(s) is also described in:

“Drive Chain Related Components” (Page 3A-1)

Special Tool

BENK07L23108002

09913-50121 Oil seal remover ☞(Page 3A-7)		09913-70210 Bearing installer set ☞(Page 3A-7)	
09921-20240 Bearing remover set ☞(Page 3A-7)		09922-22712 Drive chain cut / rivet tool set ☞(Page 3A-8)	
09924-84510 Bearing installer set ☞(Page 3A-7)			

Section 4

Brakes

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Precautions

Precautions

Precautions for Brake System

BENK07L2400001

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

BENK07L2400002

▲ 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, 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.

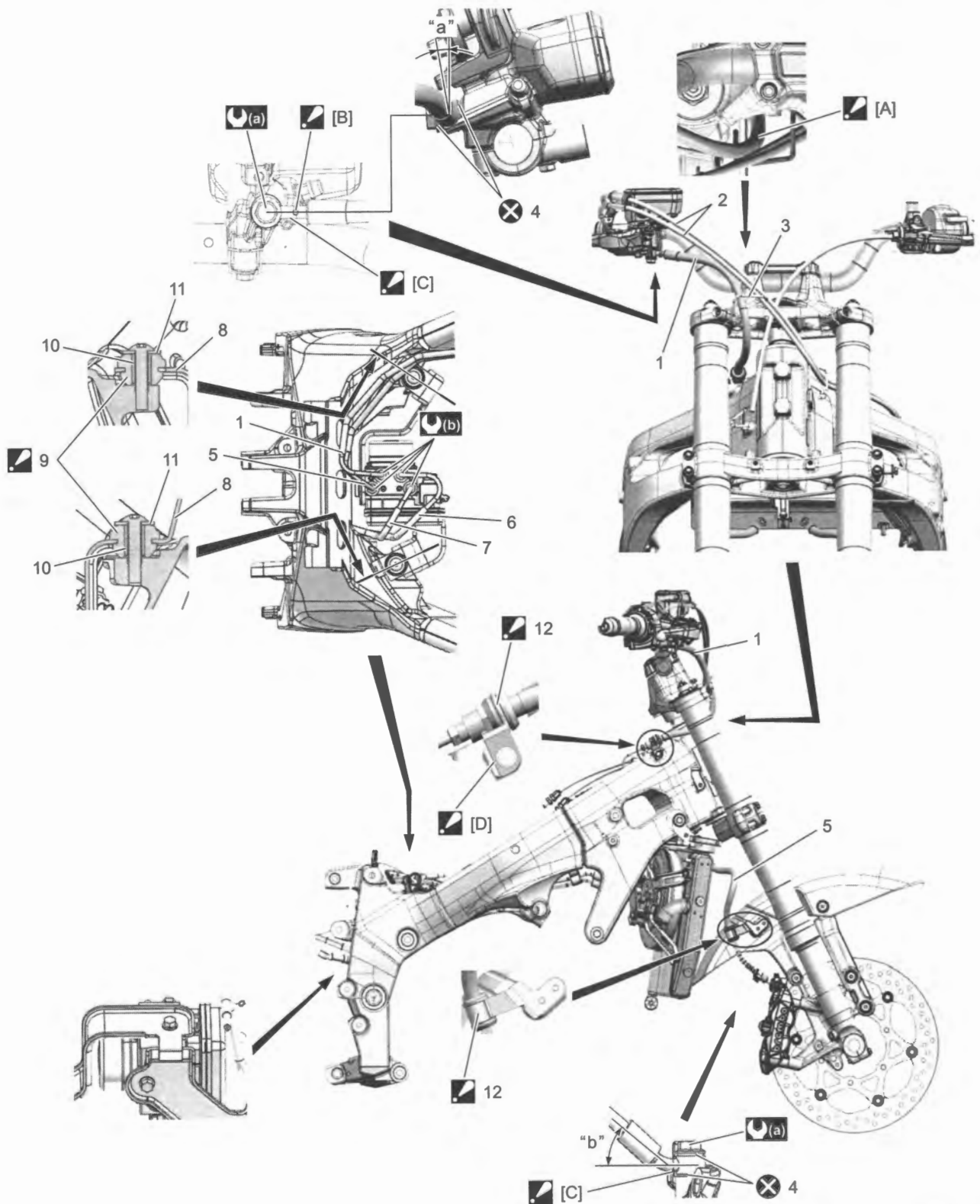
If the fluid is spilled, flush it with water immediately.

Brake Control System and Diagnosis

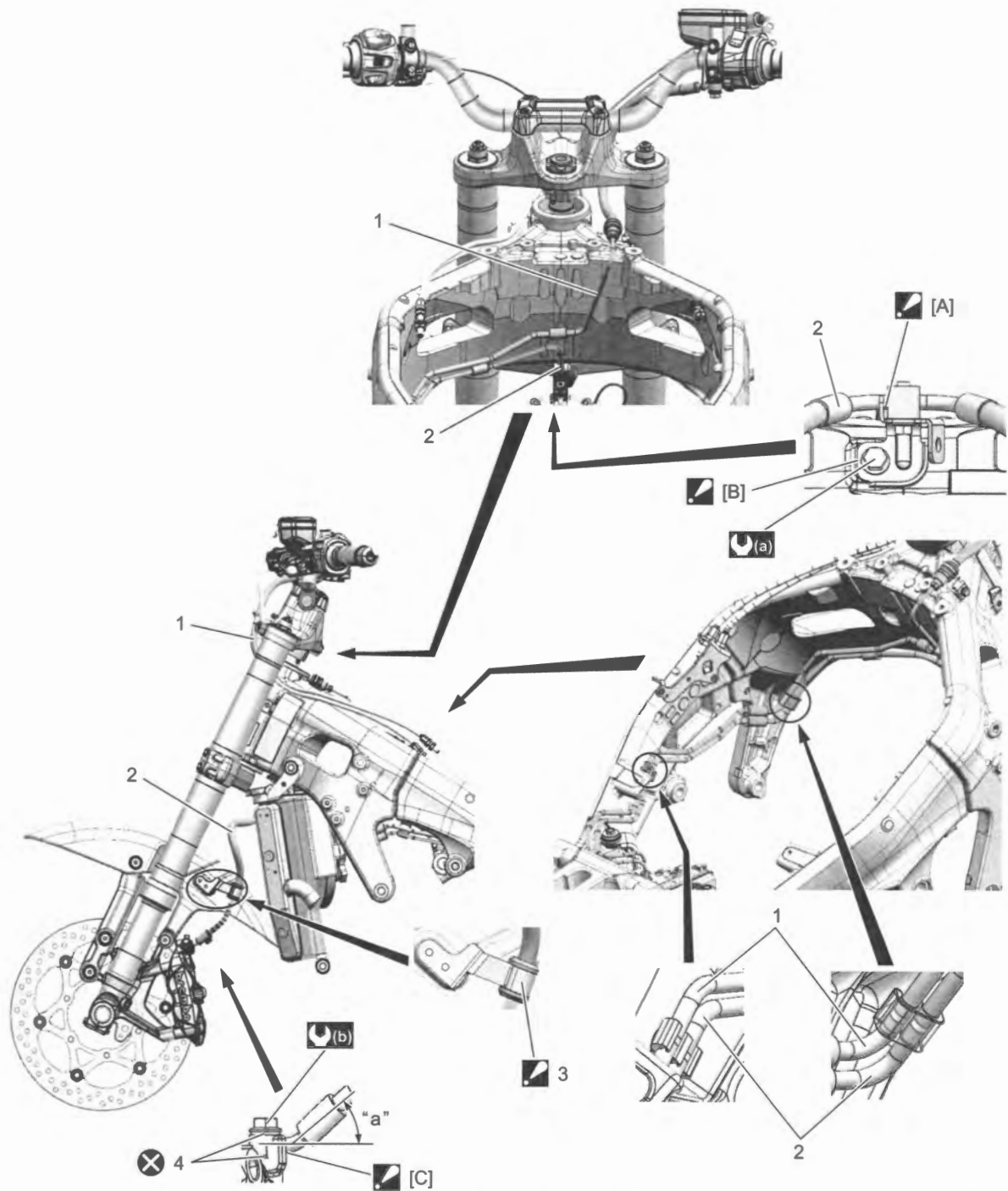
Schematic and Routing Diagram

Front Brake Hose Routing Diagram

BENK07L24102001



<input checked="" type="checkbox"/> [A]: Pass the brake hose behind the cable guide and throttle cables.	8. ABS control unit/HU holder
<input checked="" type="checkbox"/> [B]: Face the green paint making downward.	<input checked="" type="checkbox"/> 9. Rubber : Install the rubber in the proper direction.
<input checked="" type="checkbox"/> [C]: After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	10. Spacer
<input checked="" type="checkbox"/> [D]: After the clamp has contacted the stopper, tighten the bolt.	11. Washer
1. Front brake hose (master cylinder to ABS control unit/HU)	<input checked="" type="checkbox"/> 12. Clamp : Install the brake hose sleeve to the clamp firmly.
2. Throttle cable	"a": 10°
3. Cable guide	"b": 40°
4. Seal washer	<input checked="" type="checkbox"/> (a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
5. Front brake hose (ABS control unit/HU to brake caliper)	<input checked="" type="checkbox"/> (b) : 16 N·m (1.6 kgf-m, 12.0 lbf-ft)
6. Rear brake hose (master cylinder to ABS control unit/HU)	<input checked="" type="checkbox"/> : Do not reuse.
7. Rear brake hose (ABS control unit/HU to brake caliper)	

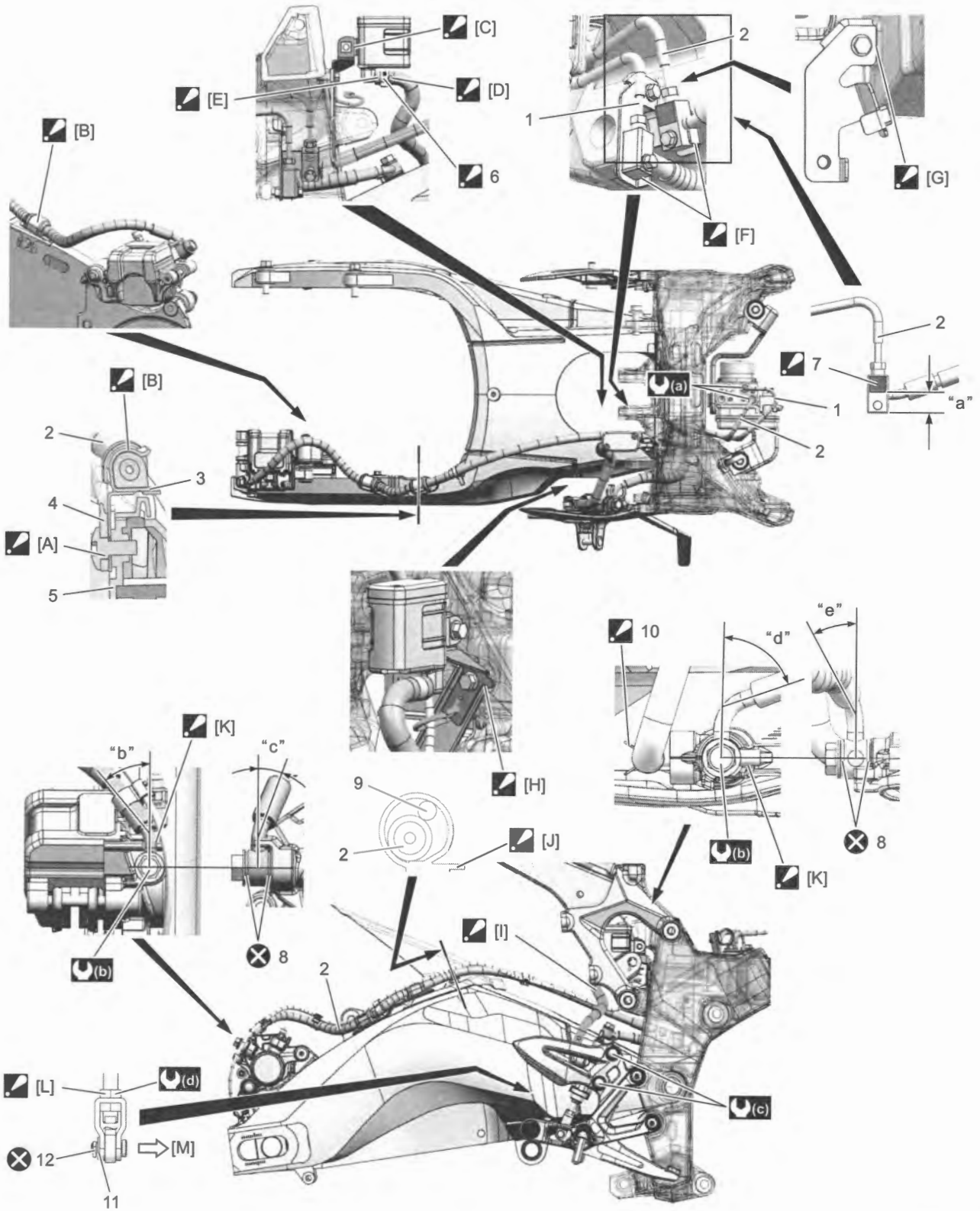


IK07L1410025-01

<p>☑ [A]: After the brake hose joint has contacted the stopper, tighten the bolt.</p>	<p>4. Seal washer</p>
<p>☑ [B]: After the clamp has contacted the stopper, tighten the bolt to the specified torque.</p>	<p>"a": 40°</p>
<p>☑ [C]: After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.</p>	<p>⚙️ (a) : 11 Nm (1.1 kgf-m, 8.5 lbf-ft)</p>
<p>1. Front brake hose (master cylinder to ABS control unit/HU)</p>	<p>⚙️ (b) : 23 N-m (2.3 kgf-m, 17.0 lbf-ft)</p>
<p>2. Front brake hose (ABS control unit/HU to brake caliper)</p>	<p>⊗ : Do not reuse.</p>
<p>☑ 3. Clamp : Install the brake hose sleeve to the clamp firmly.</p>	

Rear Brake Hose Routing Diagram

BENK07L24102002



IK07L1410026-02

4A-5 Brake Control System and Diagnosis:

<p>☑ [A]: Fit the step part of bolt to the hole of rear fender lower.</p>	<p>☑ 6. Clamp : Face the clamp end to inside.</p>
<p>☑ [B]: Install the brake hose sleeve to the clamp firmly.</p>	<p>☑ 7. Brake hose protector : Stick the protector aligning with the end of curved surface. Press the protector after sticking.</p>
<p>☑ [C]: After the stopper of rear brake reservoir tank has contacted the bracket, tighten the bolt.</p>	<p>8. Seal washer</p>
<p>☑ [D]: Face the white paint making to inside.</p>	<p>9. Rear wheel speed sensor lead wire</p>
<p>☑ [E]: Insert the reservoir hose firmly.</p>	<p>☑ 10. Clamp : Face the clamp end backward.</p>
<p>☑ [F]: After the brake hose joint has contacted the stopper, tighten the bolt.</p>	<p>11. Washer</p>
<p>☑ [G]: After the clamp has contacted the stopper of frame, tighten the bolt.</p>	<p>12. Cotter pin</p>
<p>☑ [H]: After the stopper of reservoir tank bracket has contacted the EXCVA bracket, tighten the bolt.</p>	<p>"a": 13 mm (0.52 in) or more</p>
<p>☑ [I]: Pass the reservoir hose inside of the seat rail.</p>	<p>"b": 40°</p>
<p>☑ [J]: Cut off the excess tip of the fixed clamp within 5 mm (0.1 in). Insert the fixed clamp firmly.</p>	<p>"c": 20°</p>
<p>☑ [K]: After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.</p>	<p>"d": 70°</p>
<p>☑ [L]: Hold the yoke and tighten the lock-nut to the specified torque.</p>	<p>"e": 14°</p>
<p>[M]: Outside</p>	<p>🔧(a) : 16 N·m (1.6 kgf-m, 12.0 lbf-ft)</p>
<p>1. Rear brake hose (master cylinder to ABS control unit/HU)</p>	<p>🔧(b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)</p>
<p>2. Rear brake hose (ABS control unit/HU to brake caliper)</p>	<p>🔧(c) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)</p>
<p>3. Brake hose guide</p>	<p>🔧(d) : 18 N·m (1.8 kgf-m, 13.5 lbf-ft)</p>
<p>4. Rear fender lower</p>	<p>⊗ : Do not reuse.</p>
<p>5. Swingarm</p>	

Diagnostic Information and Procedures

Brake Symptom Diagnosis

BENK07L24104001

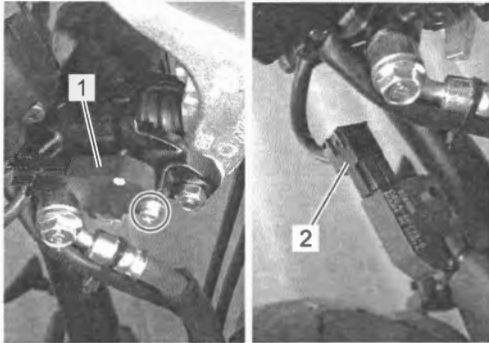
Condition	Possible cause	Correction / Reference Item
Insufficient brake power	Leakage of brake fluid from hydraulic system.	Repair or replace.
	Worn pads and/or disc.	Replace. ☞(Page 4B-2) ☞(Page 4C-2) ☞(Page 4B-6) ☞(Page 4C-7)
	Oil adhesion on friction surface of pads.	Clean disc and pads.
	Air in hydraulic system.	Bleed air. ☞(Page 4A-11)
	Not enough brake fluid in the reservoir.	Replenish. ☞(Page 4A-9)
	Brake squeaking	Carbon adhesion on pad surface.
	Tilted pad.	Correct pad fitting or replace. ☞(Page 4B-2) ☞(Page 4C-2)
	Damaged wheel bearing.	Replace. ☞(Page 2D-5) ☞(Page 2D-11)
	Loose front wheel axle or rear wheel axle.	Tighten to specified torque. ☞(Page 0B-5)
	Worn pads and/or disc.	Replace. ☞(Page 4B-2) ☞(Page 4C-2) ☞(Page 4B-6) ☞(Page 4C-7)
	Foreign material in brake fluid.	Replace brake fluid. ☞(Page 4A-14)
	Clogged return port of master cylinder.	Disassemble and clean master cylinder.
Excessive brake lever stroke	Air in hydraulic system.	Bleed air. ☞(Page 4A-11)
	Insufficient brake fluid.	Replenish fluid to specified level. ☞(Page 4A-9)
	Improper quality of brake fluid.	Replace with correct fluid. ☞(Page 4A-14)
Leakage of brake fluid	Insufficient tightening of connection joints.	Tighten to specified torque. ☞(Page 0B-5)
	Cracked hose.	Replace. ☞(Page 4A-15) ☞(Page 4A-15)
	Worn master cylinder piston and/or cup.	Replace master cylinder piston and/or cup. ☞(Page 4A-18) ☞(Page 4A-23)
	Worn brake caliper piston seal and dust seal.	Replace brake caliper piston seal and dust seal. ☞(Page 4B-3) ☞(Page 4C-4)
	Brake drags	Rusty part.
	Insufficient front brake lever or rear brake pedal pivot lubrication.	Lubricate. ☞(Page 0B-7)

Repair Instructions

Front Brake Light Switch Inspection

BENK07L24106001

- 1) Grasping the front brake lever, remove the front brake light switch (1).
- 2) Disconnect the front brake light switch coupler (2).



IF04K1410005-01

- 3) Inspect the front brake light switch for continuity with a circuit tester. If any abnormality is found, replace the switch with a new one.

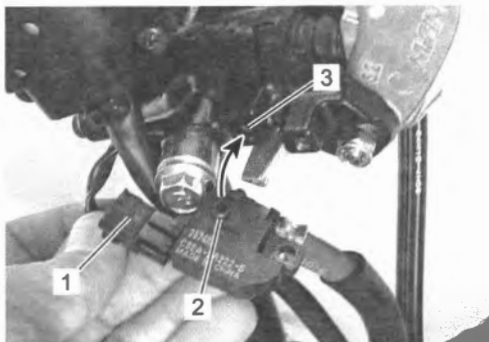
Color Position	Terminal (B/R)	Terminal (B/Bl)
OFF		
ON	○	○

ID26J1410033-02

- 4) Connect the front brake light switch coupler (1).
- 5) When installing the front brake light switch, align the projection (2) on the switch with the hole (3) in the master cylinder.
- 6) Tighten the front brake light switch screw to the specified torque.

Tightening torque

Front brake light switch screw: **1.2 N·m (0.12 kgf-m, 0.90 lbf-ft)**



IF04K1410006-02

Rear Brake Light Switch Inspection

BENK07L24106002

- 1) Remove the rectifier cover. (Page 1J-7)
- 2) Disconnect the rear brake light switch coupler (1).



IK07L1410001-01

- 3) Inspect the rear brake light switch for continuity with a tester. If any abnormality is found, replace the switch with a new one.

Color Position	Terminal (O)	Terminal (W/B)
OFF		
ON	○	○

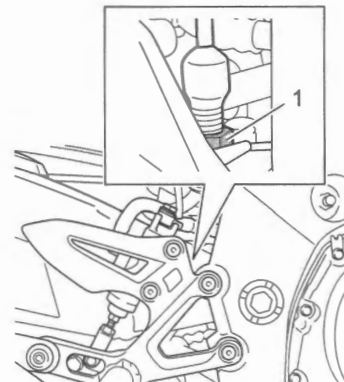
IF04K1410008-01

- 4) Connect the rear brake light switch coupler.
- 5) Install the removed parts.

Rear Brake Light Switch Inspection and Adjustment

BENK07L24106003

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.



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Front Brake Light Switch Removal and Installation

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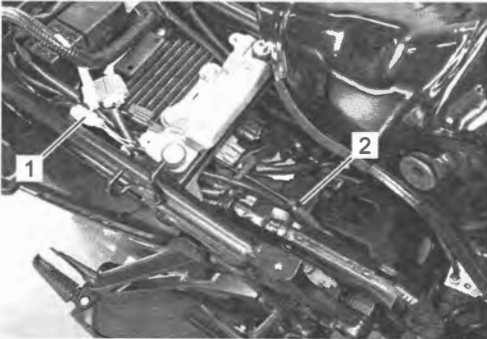
Refer to "Front Brake Light Switch Inspection" (Page 4A-7).

Rear Brake Light Switch Removal and Installation

BENK07L24106005

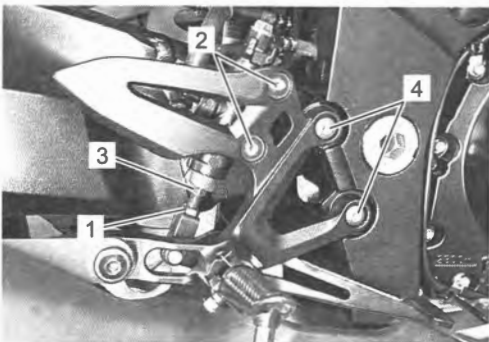
Removal

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Remove the rectifier cover. (Page 1J-7)
- 3) Disconnect the rear brake light switch coupler (1).
- 4) Remove the clamp (2).



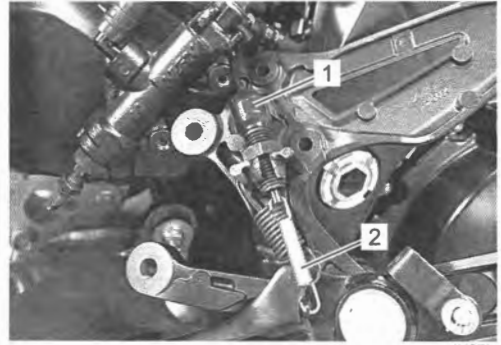
IK07L1410027-01

- 5) Loosen the rear brake master cylinder rod lock-nut (1).
- 6) Remove the rear brake master cylinder bolts (2).
- 7) Remove the rear brake master cylinder from the brake pedal by turning the push rod (3).
- 8) Remove the front footrest bolts (4).



IK07L1410028-01

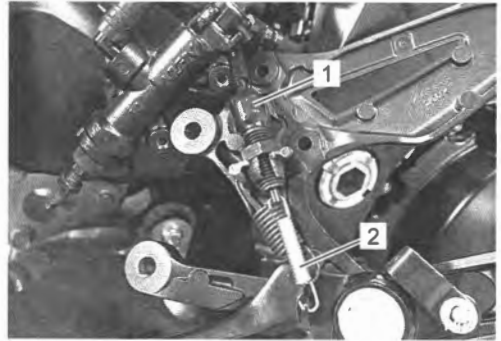
- 9) Remove the rear brake light switch (1) and spring (2) from the front footrest bracket.



IK07L1410029-01

Installation

- 1) Install the rear brake light switch (1) to the front footrest bracket and hook the spring (2) in the correct direction. Refer to "Front Footrest Bracket Construction" in Section 9E (Page 9E-2).



IK07L1410029-01

- 2) Route the rear brake light switch lead wire properly and bind the rear brake light switch and rear wheel speed sensor lead wires with the clamp (1). (Page 9A-9)
- 3) Connect the rear brake light switch coupler (2).



IK07L1410031-01

- 4) Tighten the rear brake master cylinder rod lock-nut (1) to the specified torque.
- 5) Tighten the rear brake master cylinder bolts (2) to the specified torque.

Tightening torque

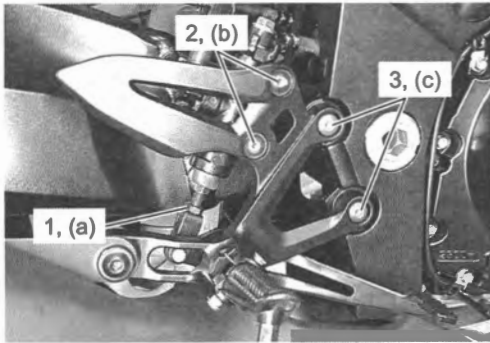
Rear brake master cylinder rod lock-nut (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)

Rear brake master cylinder bolt (b): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- 6) Tighten the front footrest bolts (3) to the specified torque.

Tightening torque

Front footrest bolt (c): 26 N·m (2.7 kgf-m, 19.5 lbf-ft)



IK07L1410032-01

- 7) Inspect the rear brake light switch. ⚙️ (Page 4A-7)
- 8) Install the fuel tank. ⚙️ (Page 1G-11)

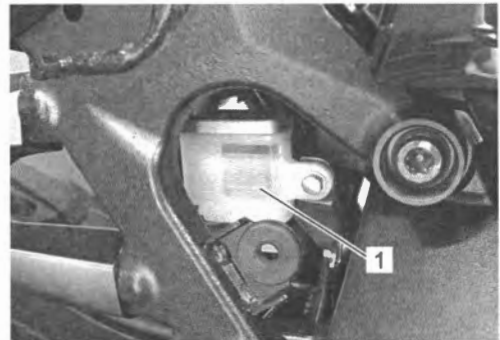
Brake Fluid Level Check

BENK07L24106006

- 1) Keep the motorcycle upright and place the handlebars straight.
- 2) Remove the right frame cover. ⚙️ (Page 9D-36)
- 3) 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)

IF04K1410010-02



IK07L1410002-01

- 4) Install the right frame cover. ⚙️ (Page 9D-36)

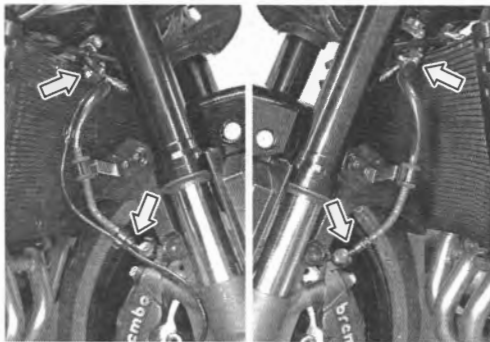
Brake Hose Inspection

BENK07L24106007

- 1) Remove the fuel tank. ☞ (Page 1G-11)
- 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-15)
 - Rear: ☞ (Page 4A-15)



IK07L1410003-01



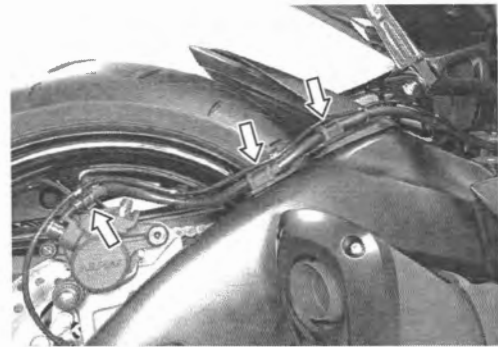
IK07L1410004-01



IK07L1410005-01



IK07L1410006-01



IK07L1410007-01

- 3) Install the removed parts.

Rear Brake Pedal Construction

BENK07L24106008

Refer to "Front Footrest Bracket Construction" in Section 9E (Page 9E-2).

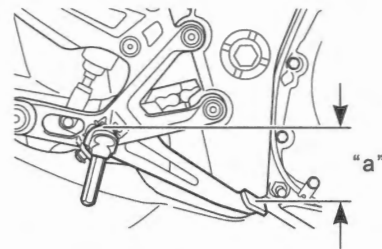
Brake Pedal Height Inspection and Adjustment

BENK07L24106009

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

Brake pedal height

[Standard]: 50 – 60 mm (2.0 – 2.3 in)

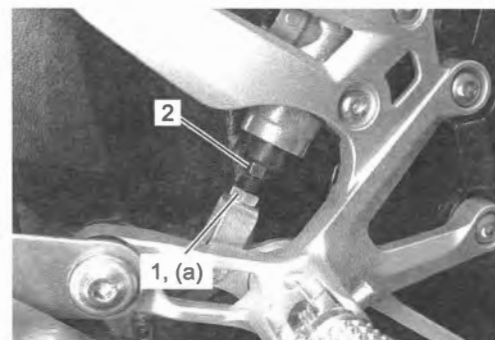


IF04K1410017-01

- 2) Loosen the lock-nut (1).
- 3) Turn the push rod (2) in or out until the brake pedal height is within the specification.
- 4) Tighten the lock-nut (1) to the specified torque.

Tightening torque

Rear brake master cylinder rod lock-nut (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)



IF04K1410018-01

- 5) After finishing the brake pedal height inspection and adjustment, check the rear brake light switch. ☞ (Page 4A-7)

Air Bleeding from Brake Line

BENK07L24106010

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.

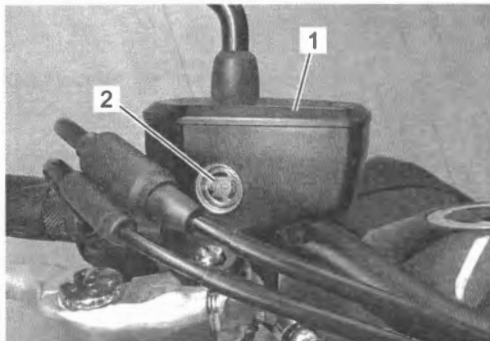
NOTE

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

- 1) Place the motorcycle on a level surface and keep the handlebars straight.
- 2) Remove the reservoir cap (1) and diaphragm.
- 3) Fill the 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)

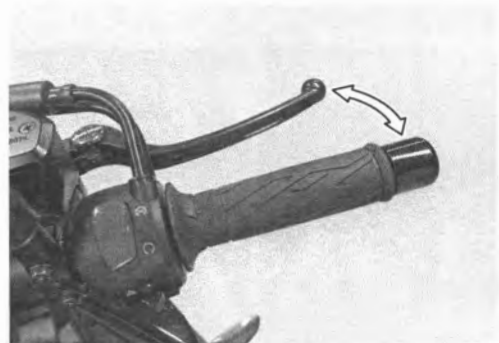


IF04K1410019-01

- 4) Attach a clear hose to the front brake master cylinder 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 front brake master cylinder air bleeder valve (1) and drain the brake fluid into the receptacle.



IF04K1410020-03



IK07L1410008-02

- 6) Tighten the front brake master cylinder 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 brake fluid as necessary to keep the fluid above the lower level.

- 8) Tighten the front brake master cylinder air bleeder valve to the specified torque.

Tightening torque

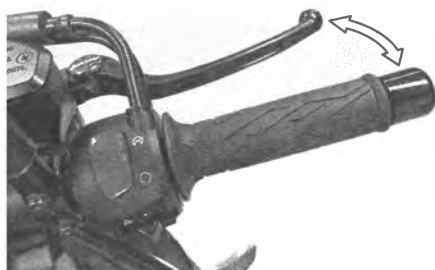
**Front brake master cylinder air bleeder valve:
6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)**

- 9) Remove the clear hose from the front brake master cylinder air bleeder valve.

- 10) Attach the clear hose to the left side front brake caliper air bleeder valve (1), and insert the free end of the hose into a receptacle.
- 11) Operate the brake lever several times and, while holding the lever gripped, loosen the left brake caliper air bleeder valve (1) and drain brake fluid into a receptacle.



IK07L1410030-02



IK07L1410008-02

- 12) Tighten the left brake caliper air bleeder valve and release the brake lever slowly.
- 13) Repeat the steps 11) and 12) until the fluid is flowing out without bubbles.

NOTE

While bleeding the brake system, replenish the reservoir with brake fluid as necessary to keep the fluid above the lower level.

- 14) Tighten the left brake caliper air bleeder valve to the specified torque.

Tightening torque

Front brake caliper air bleeder valve: 7.5 N·m (0.76 kgf-m, 5.55 lbf-ft)

- 15) Bleed air from the right brake caliper side in the same manner as the left brake caliper side.

- 16) Fill the reservoir with brake fluid to the depth "a" of 7 mm (0.3 in) from the reservoir tank edge.

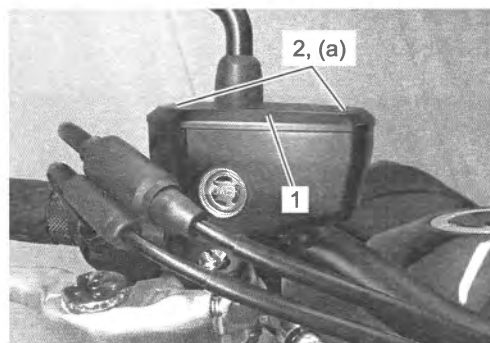


IF04K1410024-02

- 17) Install the diaphragm and reservoir cap (1).
- 18) Tighten the reservoir cap screws (2) to the specified torque.

Tightening torque

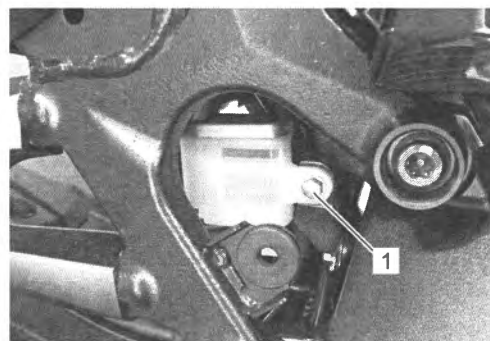
Front reservoir cap screw (a): 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)



IF04K1410025-01

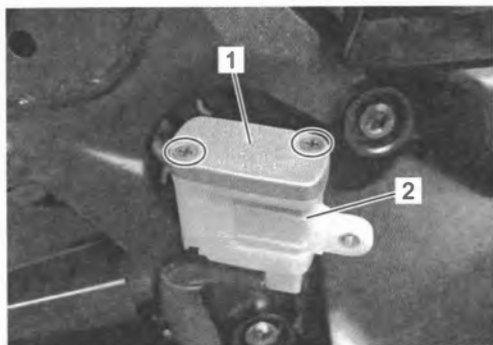
Rear Brake

- 1) Place the motorcycle on a level surface.
- 2) Remove the right frame cover. (Page 9D-36)
- 3) Remove the reservoir tank mounting bolt (1) and move the reservoir tank outside of the seat rail.



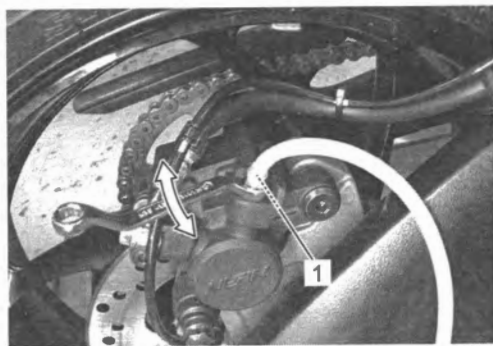
IK07L1410023-01

- 4) Remove the reservoir cap (1) and diaphragm.
- 5) Fill the reservoir with brake fluid up to the upper level (2) of the reservoir. Place the reservoir cap to prevent dirt from entering.



IK07L1410009-01

- 6) Attach a clear hose to the rear brake caliper air bleeder valve (1), and insert the free end of the hose into a receptacle.
- 7) Operate the brake pedal several times and, while depressing the pedal, loosen the rear brake caliper air bleeder valve (1) and drain the brake fluid into the receptacle.



IF04K1410028-01



IF04K1410029-01

- 8) Tighten the rear brake caliper air bleeder valve and release the brake pedal slowly.
- 9) Repeat the steps 7) and 8) until the fluid is flowing out without bubbles.

NOTE

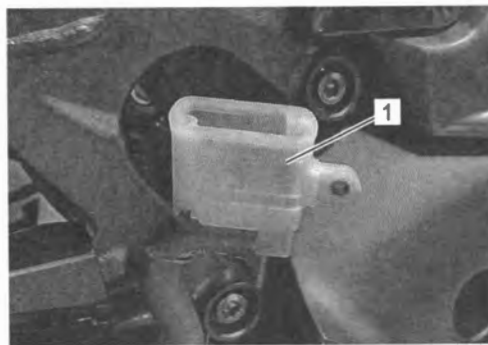
While bleeding the brake system, replenish the reservoir with the brake fluid as necessary to keep the fluid above the lower level.

- 10) Tighten the rear brake caliper air bleeder valve to the specified torque.

Tightening torque

Rear brake caliper air bleeder valve: 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)

- 11) Fill the reservoir with brake fluid to the upper level (1) of the reservoir.

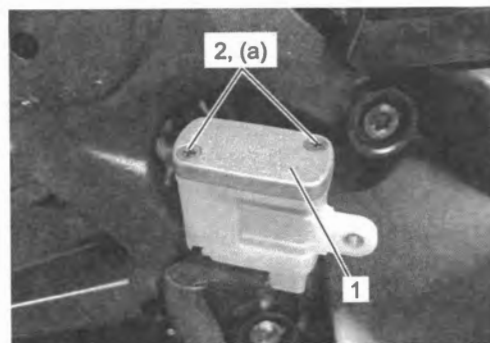


IK07L1410010-01

- 12) Install the diaphragm and reservoir cap (1).
- 13) 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)



IK07L1410011-01

- 14) Install the reservoir tank. Refer to "Rear Brake Hose Routing Diagram" (Page 4A-4).
- 15) Install the right frame cover. (Page 9D-36)

Brake Fluid Replacement

BENK07L24106011

Front Brake

- 1) Place the motorcycle on a level surface and keep the handlebars straight.
- 2) Remove the reservoir cap and diaphragm.
- 3) Suck up the old brake fluid as much as possible.



IF04K1410032-01

- 4) Fill the reservoir with new brake fluid.

Brake fluid (DOT 4)

- 5) Attach a clear hose to the front brake caliper air bleeder valve (1) and insert the free end of the hose into a receptacle.
- 6) Loosen the front brake caliper air bleeder valve, squeeze and release the brake lever and drain the old brake fluid out of the brake system.

NOTE

While replacing the brake system, replenish the reservoir with the brake fluid as necessary to keep the fluid above the lower level.



IK07L1410012-01

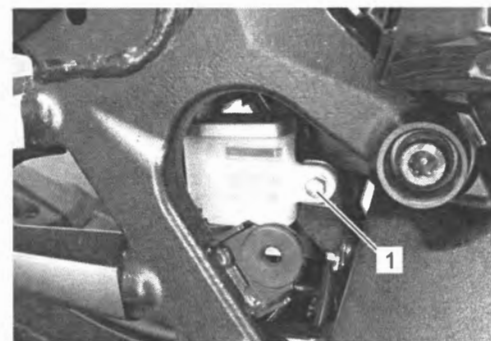


IK07L1410008-02

- 7) Bleed the air from the front brake system. (Page 4A-11)

Rear Brake

- 1) Place the motorcycle on a level surface.
- 2) Remove the right frame cover. (Page 9D-36)
- 3) Remove the reservoir tank mounting bolt (1) and move the reservoir tank outside of the seat rail.



IK07L1410023-01

- 4) Remove the reservoir cap and diaphragm.
- 5) Suck up the old brake fluid as much as possible.



IK07L1410013-01

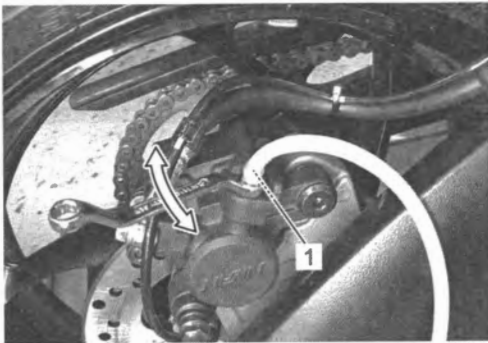
6) Fill the reservoir with new brake fluid.

Brake fluid (DOT 4)

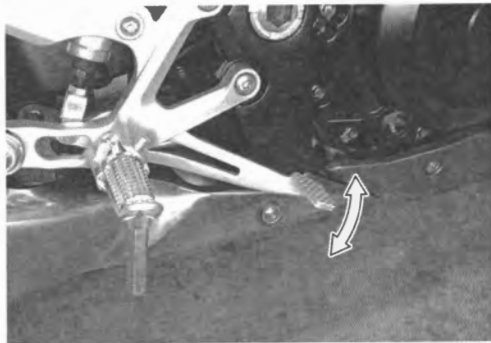
- 7) Attach a clear hose to the rear brake caliper air bleeder valve (1) and insert the free end of the hose into a receptacle.
- 8) Loosen the rear brake caliper air bleeder valve (1) and pump the brake pedal until the old brake fluid flows out of the brake system.

NOTE

While replacing the brake system, replenish the reservoir with the brake fluid as necessary to keep the fluid above the lower level.



IK07L1410014-01



IF04K1410038-01

9) Bleed the air from the rear brake system. (Page 4A-11)

Front Brake Hose Removal and Installation

BENK07L24106012

Refer to "Front Brake Hose Routing Diagram" (Page 4A-1).

Removal

- 1) Drain brake fluid. (Page 4A-14)
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Remove the front brake hoses.

Installation

- 1) Install the front brake hoses.
- 2) Install the air cleaner box. (Page 1D-7)
- 3) Bleed air from the front brake system. (Page 4A-11)

Rear Brake Hose Removal and Installation

BENK07L24106013

Refer to "Rear Brake Hose Routing Diagram" (Page 4A-4).

Removal

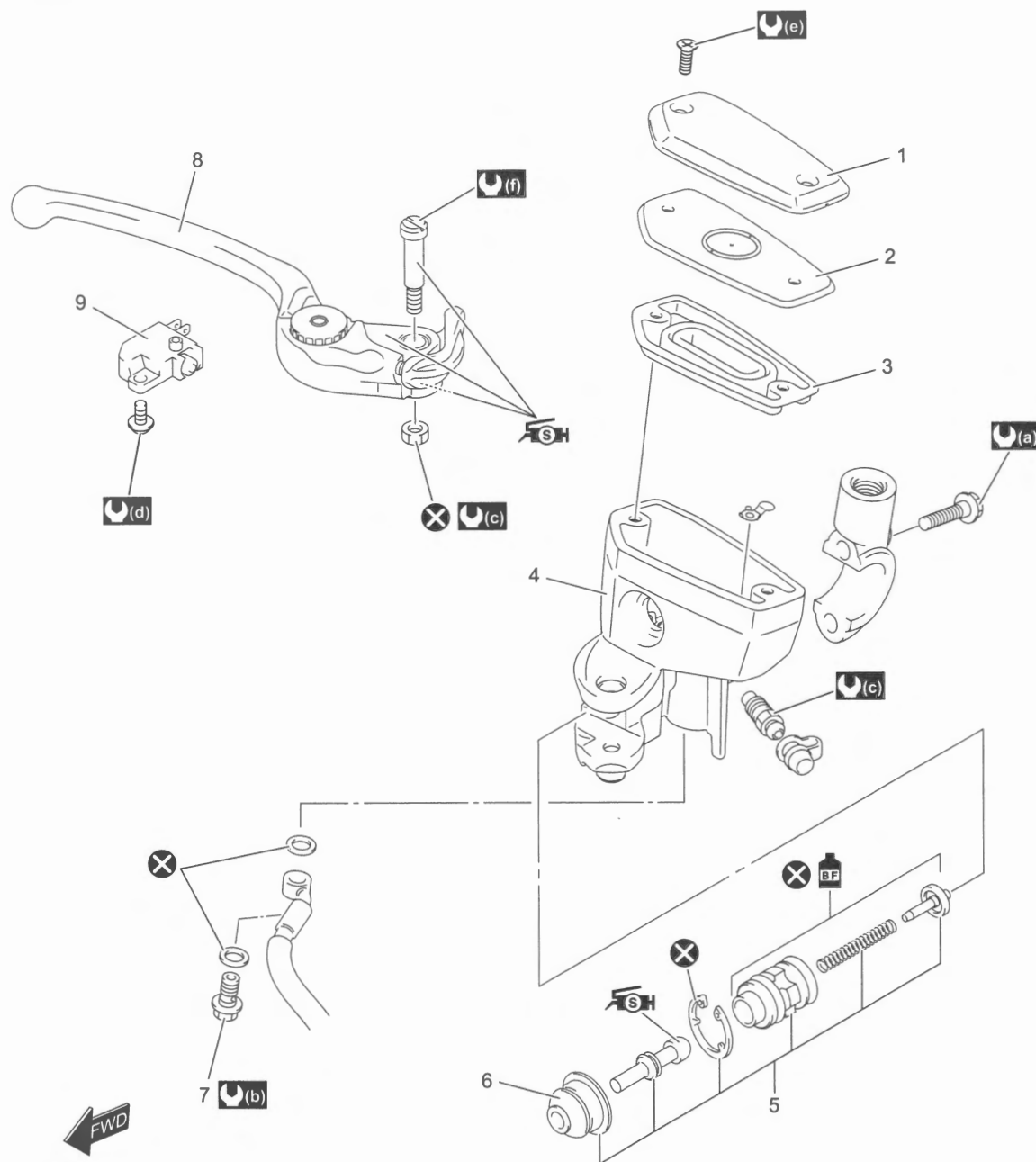
- 1) Remove the fuel tank. (Page 1G-11)
- 2) Drain brake fluid. (Page 4A-14)
- 3) Remove the rear brake hoses.

Installation

- 1) Install the rear brake hoses.
- 2) Bleed air from the rear brake system. (Page 4A-11)
- 3) Install the removed parts.

Front Brake Master Cylinder Assembly / Brake Lever Components

BENK07L24106014



IK07L1410016-03

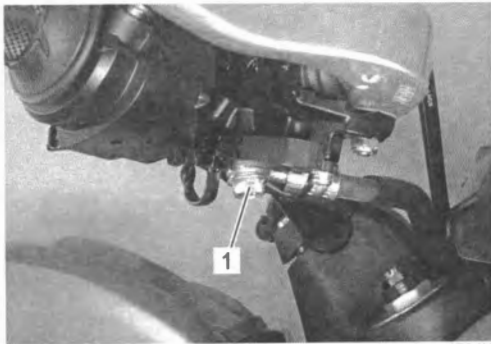
1. Reservoir cap	7. Brake hose union bolt	(d) : 1.2 N-m (0.12 kgf-m, 0.90 lbf-ft)
2. Plate	8. Brake lever	(e) : 1.5 N-m (0.15 kgf-m, 1.10 lbf-ft)
3. Diaphragm	9. Brake light switch	(f) : 1.0 N-m (0.10 kgf-m, 0.75 lbf-ft)
4. Master cylinder	(a) : 10 N-m (1.0 kgf-m, 7.5 lbf-ft)	SH : Apply silicone grease.
5. Piston/Cup set	(b) : 23 N-m (2.3 kgf-m, 17.0 lbf-ft)	BF : Apply brake fluid.
6. Dust boot	(c) : 6.0 N-m (0.61 kgf-m, 4.45 lbf-ft)	X : Do not reuse.

Front Brake Master Cylinder Assembly Removal and Installation

BENK07L24106015

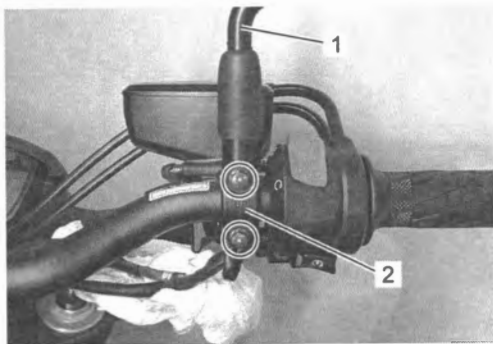
Removal

- 1) Drain brake fluid. (Page 4A-14)
- 2) Place a 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.



IF04K1410039-01

- 4) Remove the right rear view mirror (1).
- 5) Remove the master cylinder holder (2).



IF04K1410040-01

- 6) Disconnect the front brake light switch lead wire coupler (1) and master cylinder assembly (2).



IF04K1410041-01

Installation

Install the front brake master cylinder in the reverse order of removal. Pay attention to the following points:

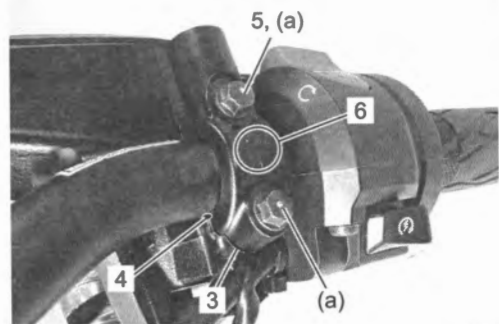
- When installing the master cylinder assembly (1) onto the handlebars (2), align the edge (3) of master cylinder with the punch mark (4) on the handlebars (2) and tighten the upper bolt (5) first.

NOTE

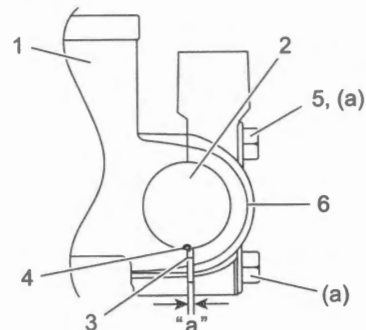
Face the up mark (6) upward.

Tightening torque

Front brake master cylinder holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1410042-02



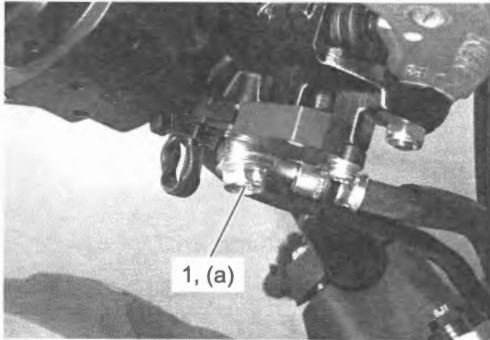
IK07L1410033-01

"a": Clearance

- Install the brake hose union bolt and new seal washers to the 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)



IF04K1410044-01

- Bleed air from the brake system. (Page 4A-11)

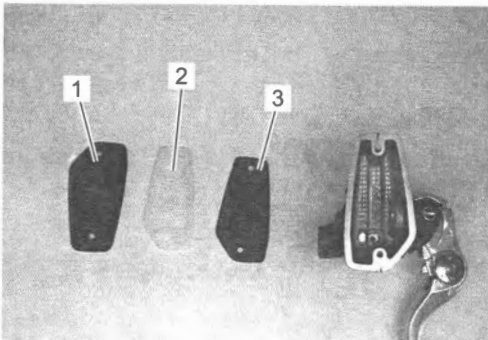
Front Brake Master Cylinder Assembly / Brake Lever Disassembly and Reassembly

BENK07L24106016

Refer to "Front Brake Master Cylinder Assembly Removal and Installation" (Page 4A-17).

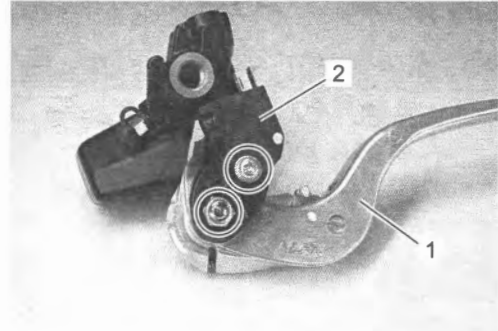
Disassembly

- 1) Remove the reservoir cap (1), plate (2) and diaphragm (3).



IF04K1410045-01

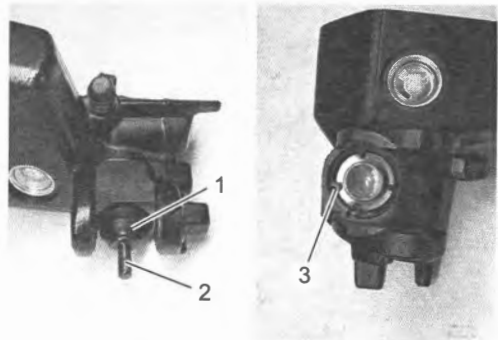
- 2) Remove the brake lever (1) and front brake light switch (2).



IF04K1410046-01

- 3) Remove the dust boot (1) and push rod (2).
- 4) Remove the snap ring (3) using the special tool.

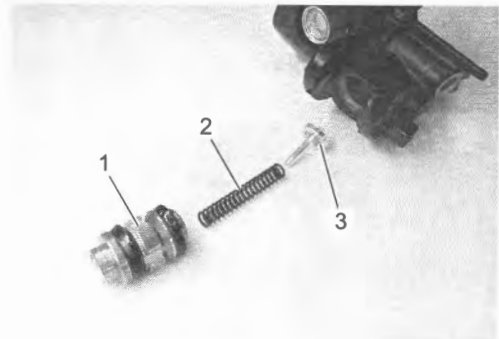
Special tool
09900-06108



IF04K1410047-01

- 5) Remove the following parts from the master cylinder.

- Piston/cup set (1)
- Return spring (2)
- Return spring guide (3)



IF04K1410048-01

Reassembly

Reassemble the front brake master cylinder and brake lever in the reverse order of disassembly. Pay attention to the following points:

NOTICE

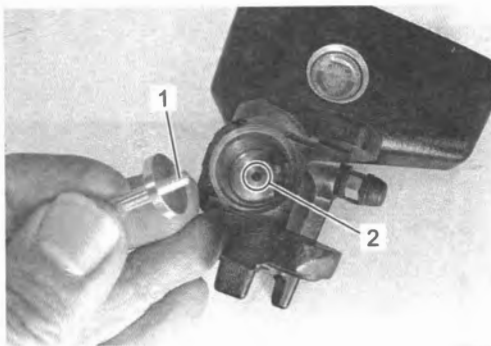
- Wash the master cylinder components with new brake fluid before reassembly.
- Do not wipe the brake fluid off after washing the components.
- When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.

Brake fluid (DOT 4)



IK07L1410017-01

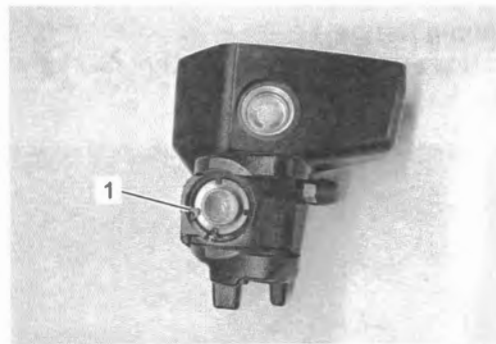
- When installing the return spring guide, fit the spring guide end (1) into the hole (2) of the master cylinder.



IF04K1410049-01

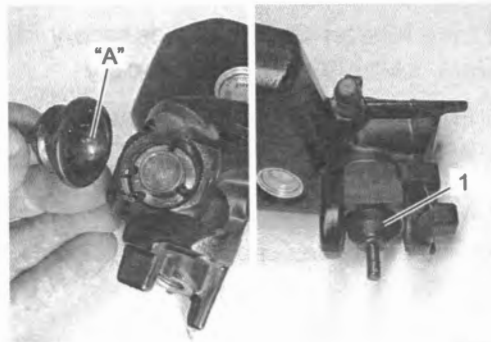
- Install the new snap ring (1) using the special tool.

Special tool
09900-06108



IF04K1410050-01

- Apply grease to the push rod end.
"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)
- Set the dust boot (1) to the master cylinder securely.

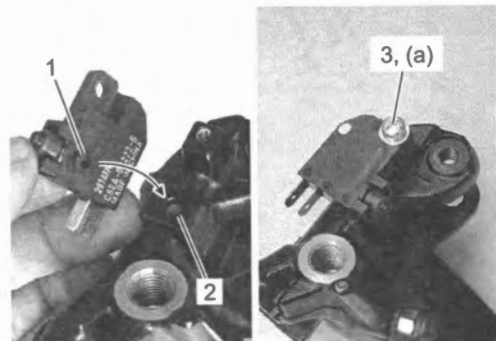


IF04K1410051-01

- When installing the front brake light switch, align the projection (1) on the switch with the hole (2) in the master cylinder.
- Tighten the front brake light switch screw (3) to the specified torque.

Tightening torque

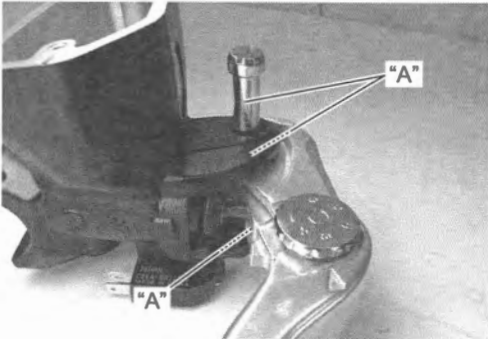
Front brake light switch screw (a): 1.2 N·m (0.12 kgf-m, 0.90 lbf-ft)



IF04K1410052-01

- 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)



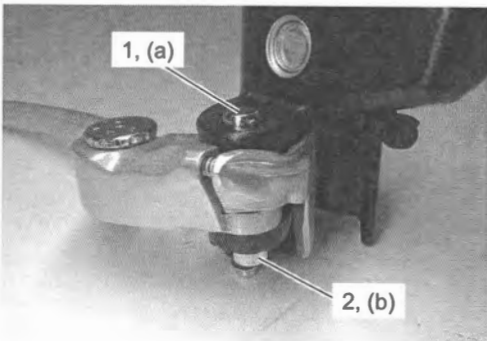
IF04K1410053-04

- Tighten the pivot bolt (1) and new lock-nut (2) to the specified torque.

Tightening torque

Brake lever pivot bolt (a): 1.0 N·m (0.10 kgf-m, 0.75 lbf-ft)

Brake lever pivot bolt lock-nut (b): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)



IF04K1410054-01

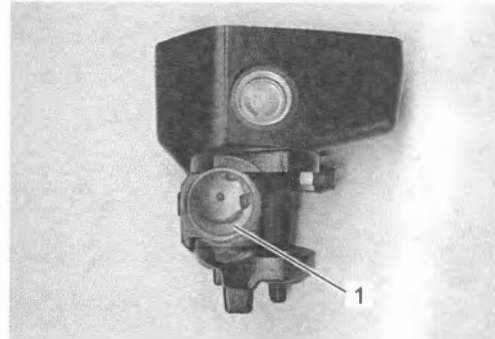
Front Brake Master Cylinder Parts Inspection

BENK07L24106017

Refer to "Front Brake Master Cylinder Assembly / Brake Lever Disassembly and Reassembly" (Page 4A-18).

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.



IF04K1410055-01

Dust Boot

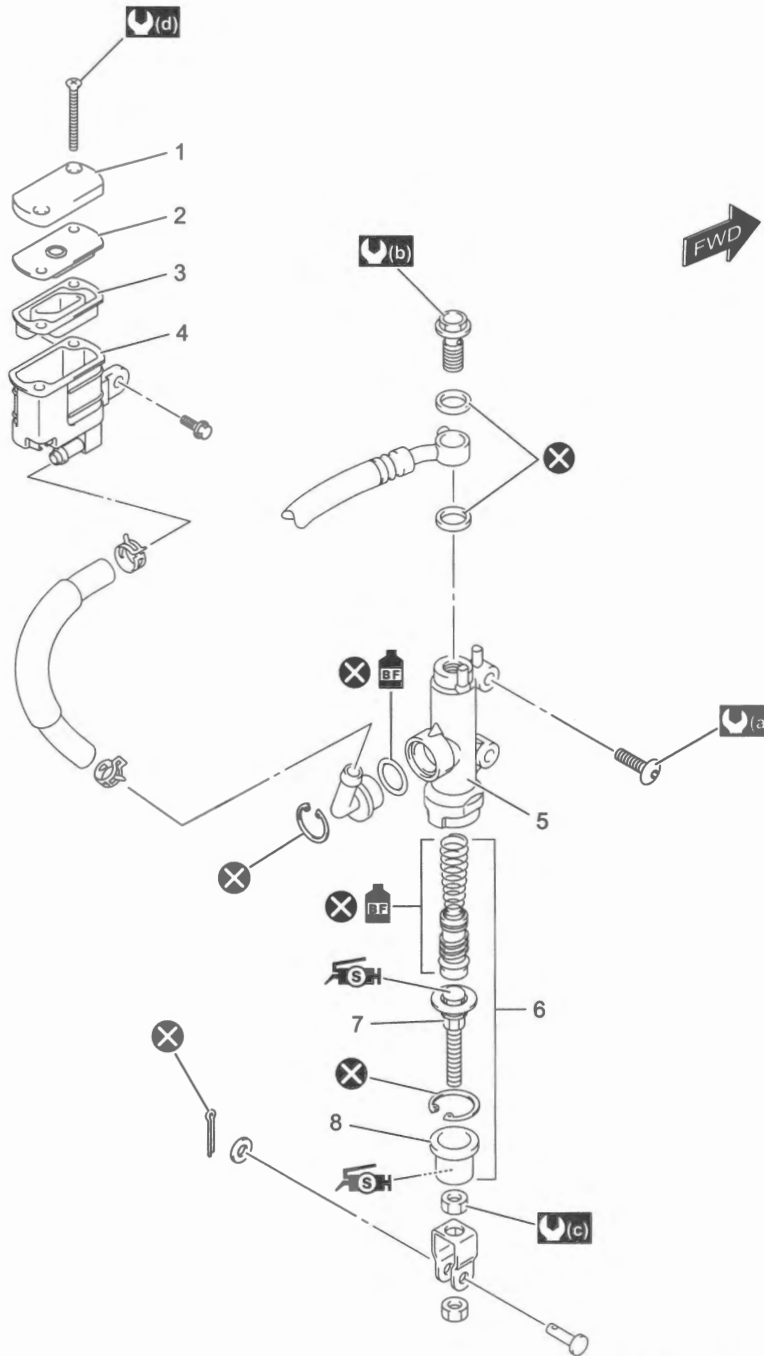
Inspect the dust boot for wear or damage. If any defects are found, replace it with a new one.



IK07L1410018-02

Rear Brake Master Cylinder Assembly Components

BENK07L24106018



IK07L1410019-02

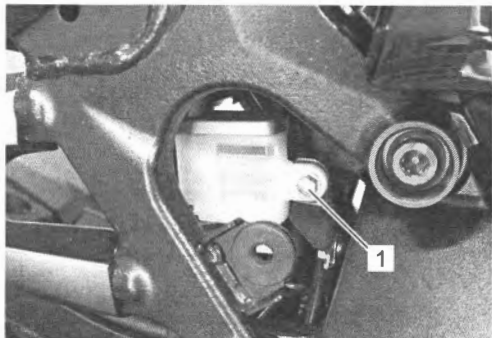
1. Reservoir cap	6. Piston/Cup set	: 18 N·m (1.8 kgf-m, 13.5 lbf-ft)
2. Plate	7. Push rod	: 1.2 N·m (0.12 kgf-m, 0.90 lbf-ft)
3. Diaphragm	8. Dust boot	: Apply silicone grease.
4. Reservoir tank	: 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	: Apply brake fluid.
5. Master cylinder	: 23 N·m (2.3 kgf-m, 17.0 lbf-ft)	: Do not reuse.

Rear Brake Master Cylinder Assembly Removal and Installation

BENK07L24106019

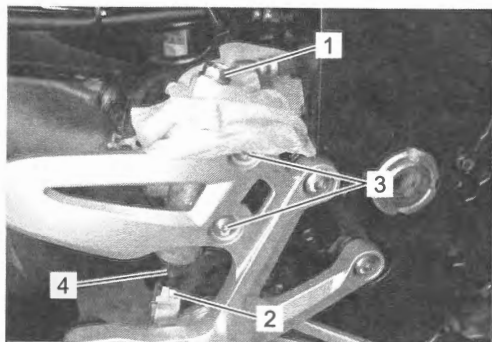
Removal

- 1) Remove the right frame cover. (Page 9D-36)
- 2) Drain brake fluid. (Page 4A-14)
- 3) Remove the reservoir tank mounting bolt (1).



IK07L1410023-01

- 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 seal washers.
- 6) Loosen the rear brake master cylinder rod lock-nut (2).
- 7) Remove the master cylinder mounting bolts (3).
- 8) Remove the master cylinder with the reservoir tank by turning the push rod (4).



IF04K1410057-01

Installation

Install the rear brake master cylinder in the reverse order of removal. Pay attention to the following points:

- Tighten the rear brake 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 rear brake master cylinder rod lock-nut (2) to the specified torque.

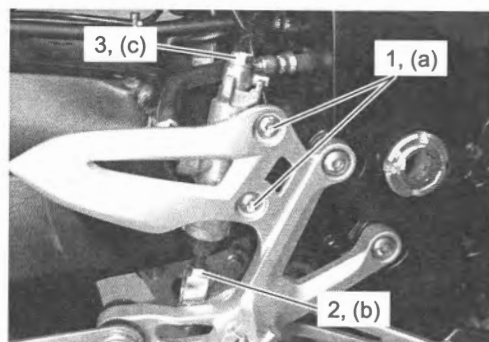
Tightening torque

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 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)



IF04K1410058-01

- Install the reservoir tank. Refer to "Rear Brake Hose Routing Diagram" (Page 4A-4).
- Bleed air from the system after installing the master cylinder. (Page 4A-11)
- Adjust the brake pedal height. (Page 4A-10)

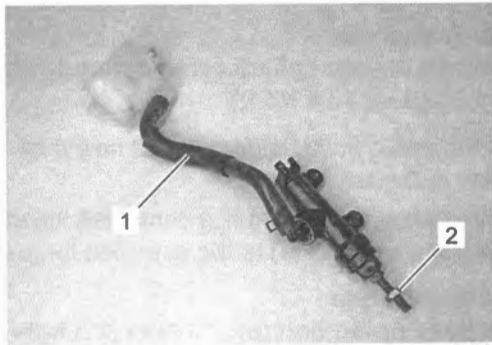
Rear Brake Master Cylinder Disassembly and Reassembly

BENK07L24106020

Refer to "Rear Brake Master Cylinder Assembly Removal and Installation" (Page 4A-22).

Disassembly

- 1) Disconnect the reservoir tank hose (1).
- 2) Remove the rear brake master cylinder rod lock-nut (2).

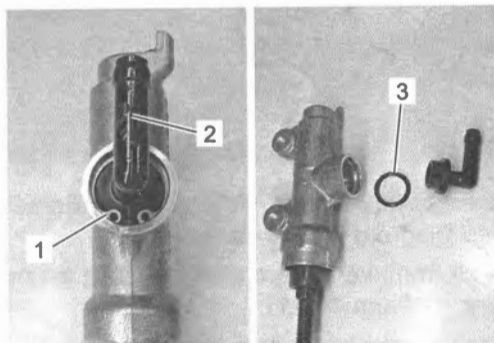


IK07L1410020-01

- 3) Remove the snap ring (1) using the special tool.

Special tool
09900-06108

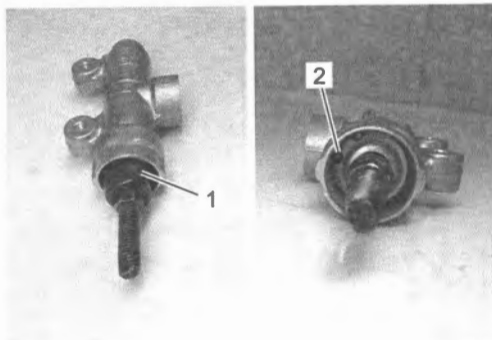
- 4) Remove the brake hose connector (2) and O-ring (3).



IF04K1410060-01

- 5) Pull out the dust boot (1) and remove the snap ring (2) using the special tool.

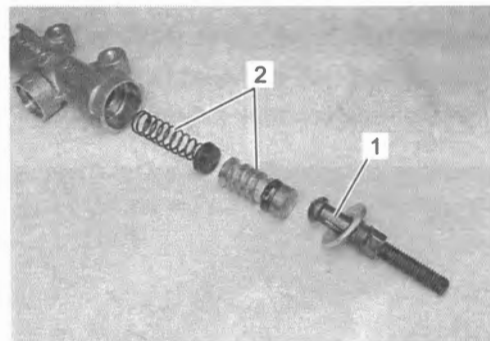
Special tool
09900-06108



IF04K1410061-01

- 6) Remove the following parts from the master cylinder.

- Push rod (1)
- Piston/cup set (2)



IF04K1410062-01

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, kerosene, etc.
- Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.

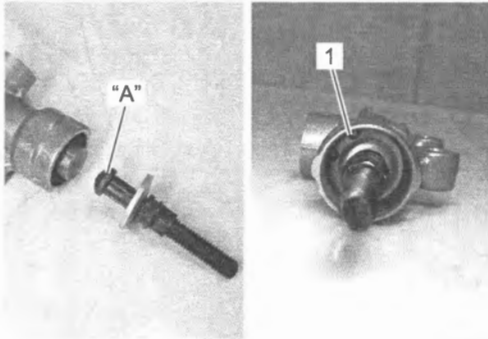
Brake fluid (DOT 4)



IB14J1410051-02

- Apply grease to the push rod end.
"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)
- Install the new snap ring (1) using the special tool.

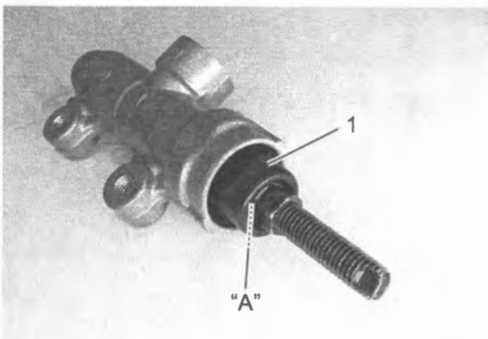
Special tool
09900-06108



IF04K1410064-03

- Apply grease to the lip of the dust boot (1).
- Set the dust boot (1) to the master cylinder securely.

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)



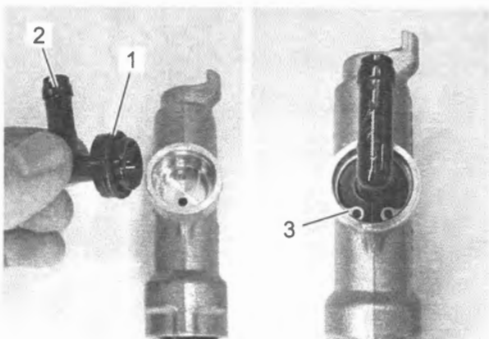
IF04K1410065-02

- Apply brake fluid to the new O-ring (1) and install it to the brake hose connector (2).

Brake fluid (DOT 4)

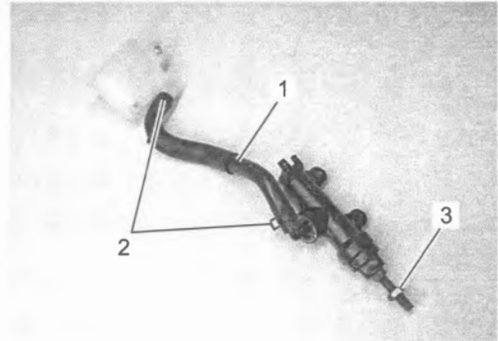
- Install the new snap ring (3) using the special tool.

Special tool
09900-06108



IF04K1410066-02

- Connect the reservoir tank hose (1) and set the clips (2). Refer to "Rear Brake Hose Routing Diagram" (Page 4A-4).
- Install the rear brake master cylinder rod lock-nut (3).



IK07L1410021-01

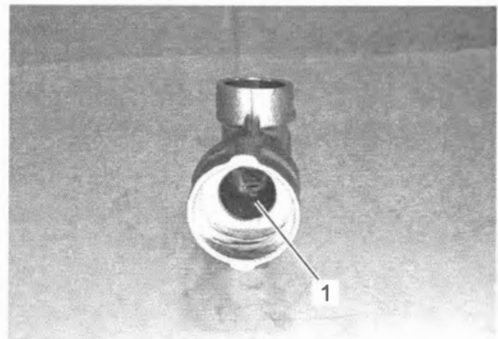
Rear Brake Master Cylinder Parts Inspection

BENK07L24106021

Refer to "Rear Brake Master Cylinder Disassembly and Reassembly" (Page 4A-23).

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.



IF04K1410068-01

Dust Boot

Inspect the dust boot for wear or damage. If any defects are found, replace it with a new one.



IK07L1410022-02

Specifications

Tightening Torque Specifications

BENK07L24107001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Front brake light switch screw	1.2	0.12	0.90	☞(Page 4A-7) / ☞(Page 4A-19)
Rear brake master cylinder rod lock-nut	18	1.8	13.5	☞(Page 4A-9) / ☞(Page 4A-10) / ☞(Page 4A-22)
Rear brake master cylinder bolt	10	1.0	7.5	☞(Page 4A-9)
Front footrest bolt	26	2.7	19.5	☞(Page 4A-9)
Front brake master cylinder air bleeder valve	6.0	0.61	4.45	☞(Page 4A-11)
Front brake caliper air bleeder valve	7.5	0.76	5.55	☞(Page 4A-12)
Front reservoir cap screw	1.5	0.15	1.10	☞(Page 4A-12)
Rear brake caliper air bleeder valve	6.0	0.61	4.45	☞(Page 4A-13)
Rear reservoir cap screw	1.2	0.12	0.90	☞(Page 4A-13)
Front brake master cylinder holder bolt	10	1.0	7.5	☞(Page 4A-17)
Brake hose union bolt	23	2.3	17.0	☞(Page 4A-18) / ☞(Page 4A-22)
Brake lever pivot bolt	1.0	0.10	0.75	☞(Page 4A-20)
Brake lever pivot bolt lock-nut	6.0	0.61	4.45	☞(Page 4A-20)
Rear brake master cylinder mounting bolt	10	1.0	7.5	☞(Page 4A-22)

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-4)

“Front Brake Master Cylinder Assembly / Brake Lever Components” (Page 4A-16)

“Rear Brake Master Cylinder Assembly Components” (Page 4A-21)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L24108001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4A-9) / ☞(Page 4A-11) / ☞(Page 4A-14) / ☞(Page 4A-15) / ☞(Page 4A-19) / ☞(Page 4A-23) / ☞(Page 4A-24)
Grease	SUZUKI SILICONE GREASE	P/No.: 99000-25100	☞(Page 4A-19) / ☞(Page 4A-20) / ☞(Page 4A-24) / ☞(Page 4A-24)

NOTE

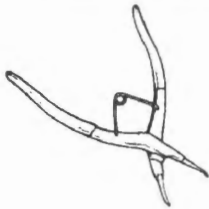
Required service material(s) is also described in:

“Front Brake Master Cylinder Assembly / Brake Lever Components” (Page 4A-16)

“Rear Brake Master Cylinder Assembly Components” (Page 4A-21)

Special Tool

BENK07L24108002

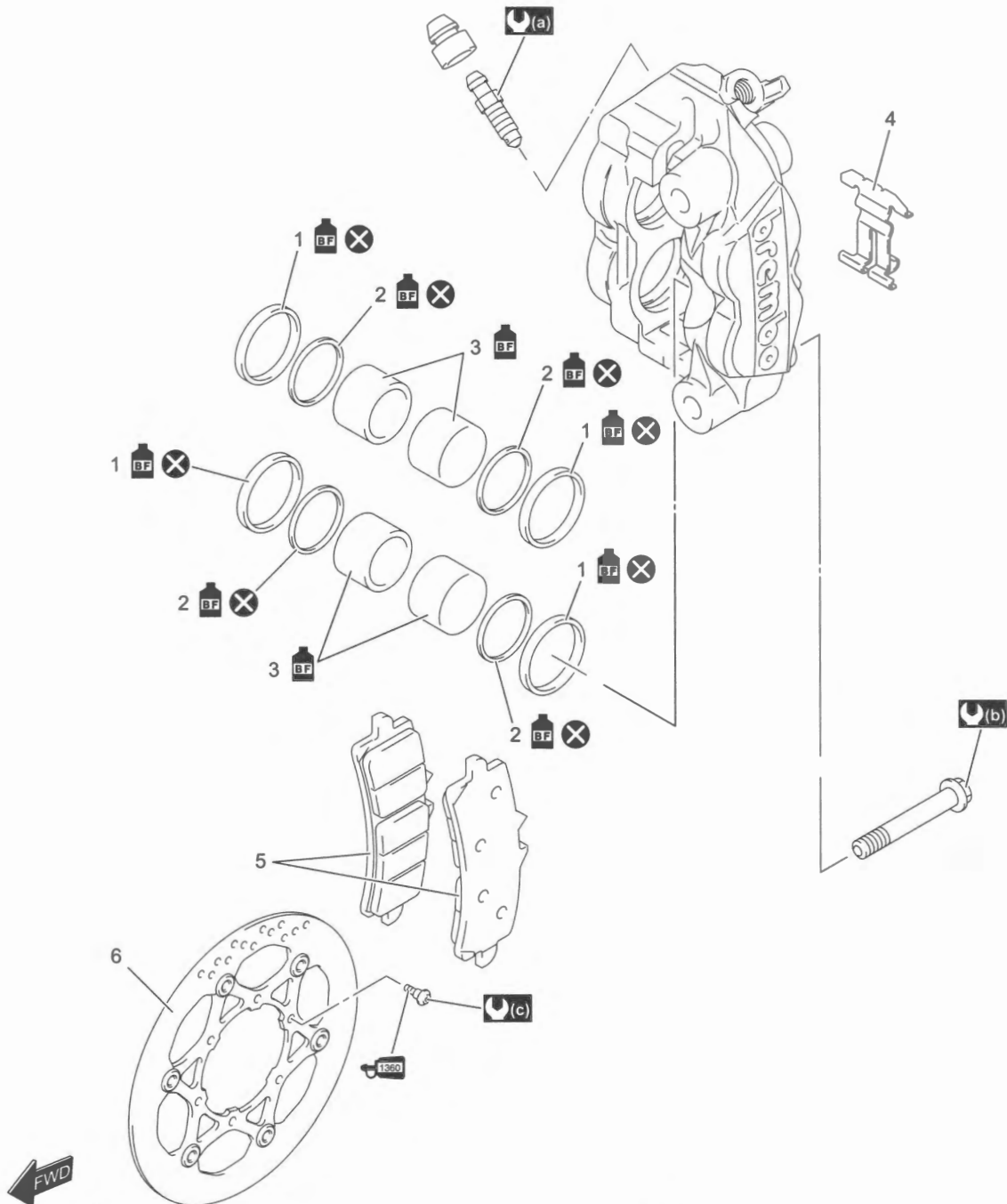
09900-06108 Snap ring pliers (Internal) ☞(Page 4A-18) / ☞(Page 4A-19) / ☞(Page 4A-23) / ☞(Page 4A-23) / ☞(Page 4A-24) / ☞(Page 4A-24)	
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Front Brakes

Repair Instructions

Front Brake Components

BENK07L24206001



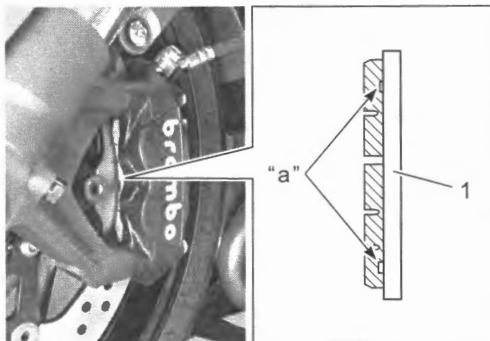
IF04K1420019-01

1. Piston seal	5. Brake pad	: 18 N-m (1.8 kgf-m, 13.5 lbf-ft)
2. Dust seal	6. Front brake disc	: Apply thread lock to the thread part.
3. Piston	: 7.5 N-m (0.76 kgf-m, 5.55 lbf-ft)	: Apply brake fluid.
4. Brake pad spring	: 39 N-m (4.0 kgf-m, 29.0 lbf-ft)	: Do not reuse.

Front Brake Pad Inspection

BENK07L24206002

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-2)



IF04K1420001-03

Front Brake Pad Replacement

BENK07L24206003

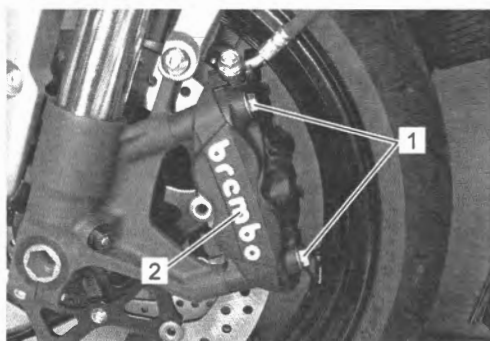
NOTICE

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.

- 1) Remove the brake caliper mounting bolts (1) and brake caliper (2).

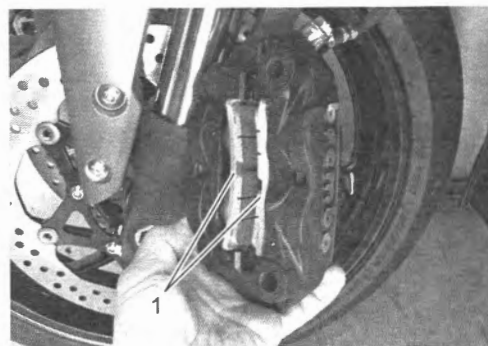


IF04K1420002-01

- 2) Remove the brake pads (1).

NOTE

Do not operate the brake lever while removing the brake pads.



IF04K1420003-01

- 3) Clean up the caliper especially around the caliper pistons.
- 4) Install the new brake pads.

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.

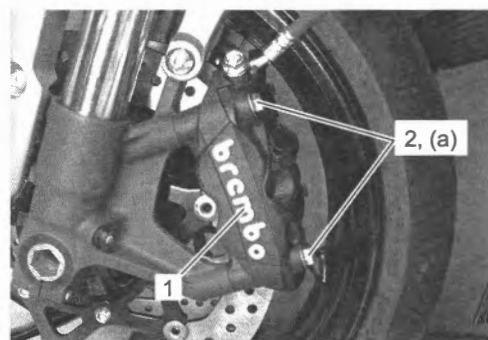


IF04K1420004-01

- 5) Install the brake caliper (1).
- 6) 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)



IF04K1420005-01

Front Brake Caliper Removal and Installation

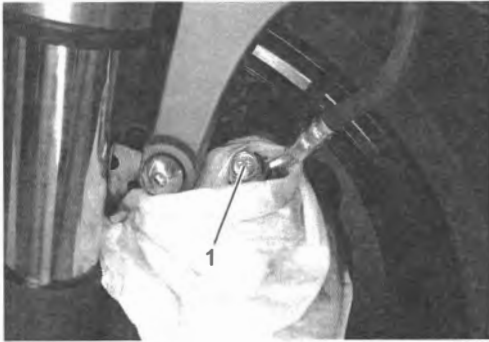
BENK07L24206004

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-14)
- 2) Place a rag underneath the union bolt 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.



IF04K1420006-01

- 4) Remove the brake caliper (1).



IF04K1420007-01

Installation

- 1) Install the brake caliper (1).
- 2) Tighten caliper mounting bolts (2) to the specified torque.

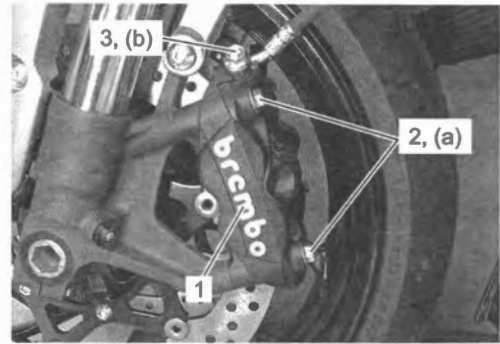
Tightening torque

Front brake caliper mounting bolt (a): 39 N·m (4.0 kgf-m, 29.0 lbf-ft)

- 3) Install the brake hose union bolt (3) and new seal washers to brake hose.
- 4) After setting the brake hose union to 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)



IF04K1420008-01

- 5) Bleed air from the brake system after installing the caliper. (Page 4A-11)
- 6) Check the brake fluid leakage referring to "Brake Hose Inspection" in Section 4A (Page 4A-10) and brake operation.

Front Brake Caliper Disassembly and Reassembly

BENK07L24206005

Refer to "Front Brake Caliper Removal and Installation" (Page 4B-3).

CAUTION

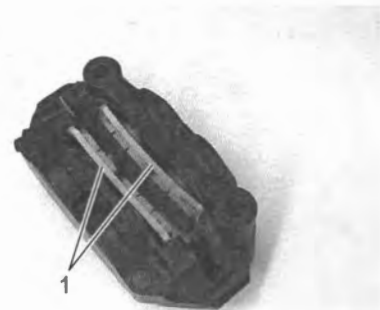
Take care not to damage piston and caliper cylinder of front brake caliper.

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.

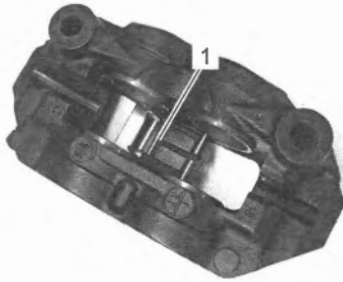
Disassembly

- 1) Remove the brake pads (1).



IF04K1420009-01

2) Remove the pad spring (1).

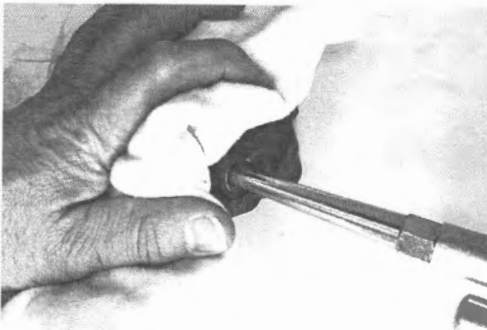


IF04K1420010-01

3) Remove the caliper pistons applying compressed air gradually from the hole for the brake hose.

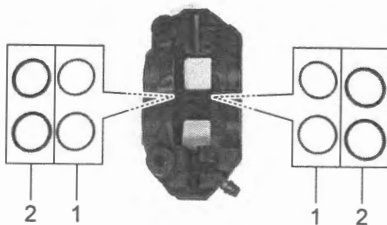
▲ WARNING

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.



IF04K1420011-01

4) Remove the dust seals (1) and piston seals (2).



IF04K1420012-01

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)

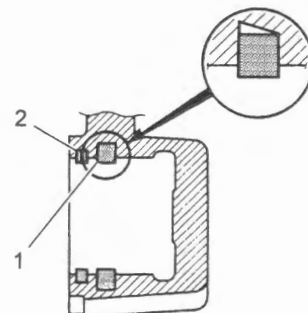


I649G1420012-02

- 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).



IH28K1430022-01

4B-5 Front Brakes:

- When installing the brake pad spring, fit the brake pad spring claws to the grooves of the brake caliper.



IF04K1420013-01

Front Brake Caliper Parts Inspection

BENK07L24206006

Refer to "Front Brake Caliper Disassembly and Reassembly" (Page 4B-3).

Brake Caliper Cylinder

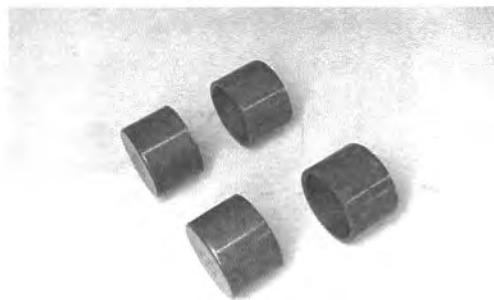
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damage is found, replace the caliper with a new one.



IF04K1420014-01

Brake Caliper Piston

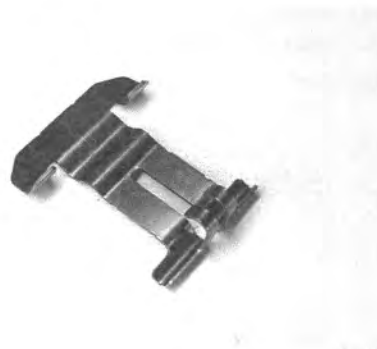
Inspect the brake caliper pistons surface for any scratches or other damage. If any damage is found, replace them with new ones.



IF04K1420015-01

Brake Pad Spring

Inspect the brake pad spring for damage and excessive bend. If any defects are found, replace it with a new one.



IF04K1420016-01

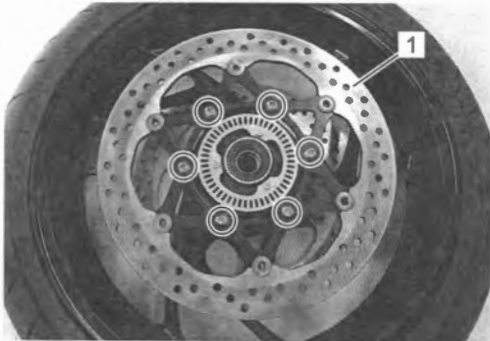
Front Brake Disc Removal and Installation

BENK07L24206007

Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-4).

Removal

- 1) Remove the front brake disc (1).



IG04K1420001-01

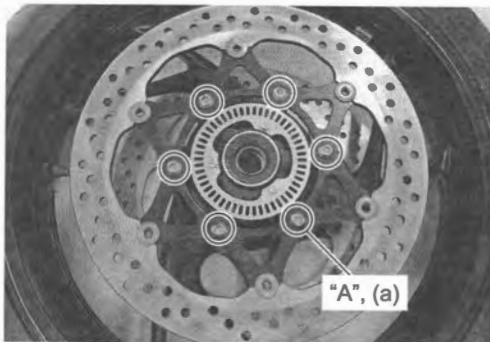
Installation

- 1) Make sure that the brake disc is clean and free of any grease.
- 2) Install the front brake disc.
- 3) Apply thread lock to the brake disc bolts and tighten them to the specified torque.

"A": Thread lock cement 99000-32130 (THREAD LOCK CEMENT 1360)

Tightening torque

Brake disc bolt (a): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)



IG04K1420002-01

Front Brake Disc Inspection

BENK07L24206008

Brake Disc Thickness

Check the brake disc for damage or cracks and measure the thickness using the micrometer.

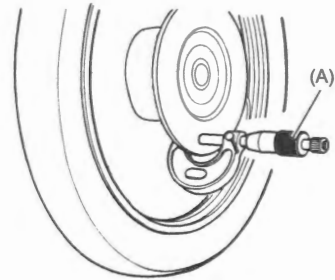
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Front brake disc thickness

[Limit]: 4.5 mm (0.18 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-2).
- 2) Measure the runout using the dial gauge.
Replace the disc if the runout exceeds the service limit.

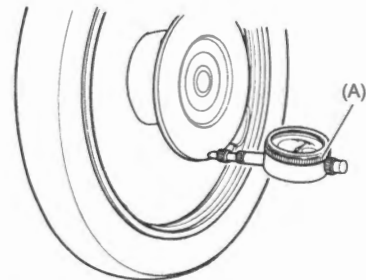
Front brake disc runout

[Limit]: 0.30 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-2).

Specifications

Tightening Torque Specifications

BENK07L24207001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Front brake caliper mounting bolt	39	4.0	29.0	☞(Page 4B-2) / ☞(Page 4B-3)
Brake hose union bolt	23	2.3	17.0	☞(Page 4B-3)
Brake disc bolt	18	1.8	13.5	☞(Page 4B-6)

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

BENK07L24208001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4B-4) / ☞(Page 4B-4)
Thread lock cement	THREAD LOCK CEMENT 1360	P/No.: 99000-32130	☞(Page 4B-6)

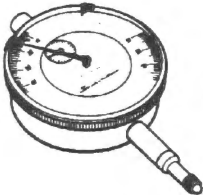

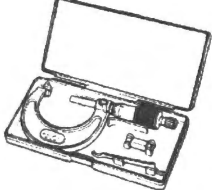
NOTE

Required service material(s) is also described in:

“Front Brake Components” (Page 4B-1)

Special Tool

BENK07L24208002

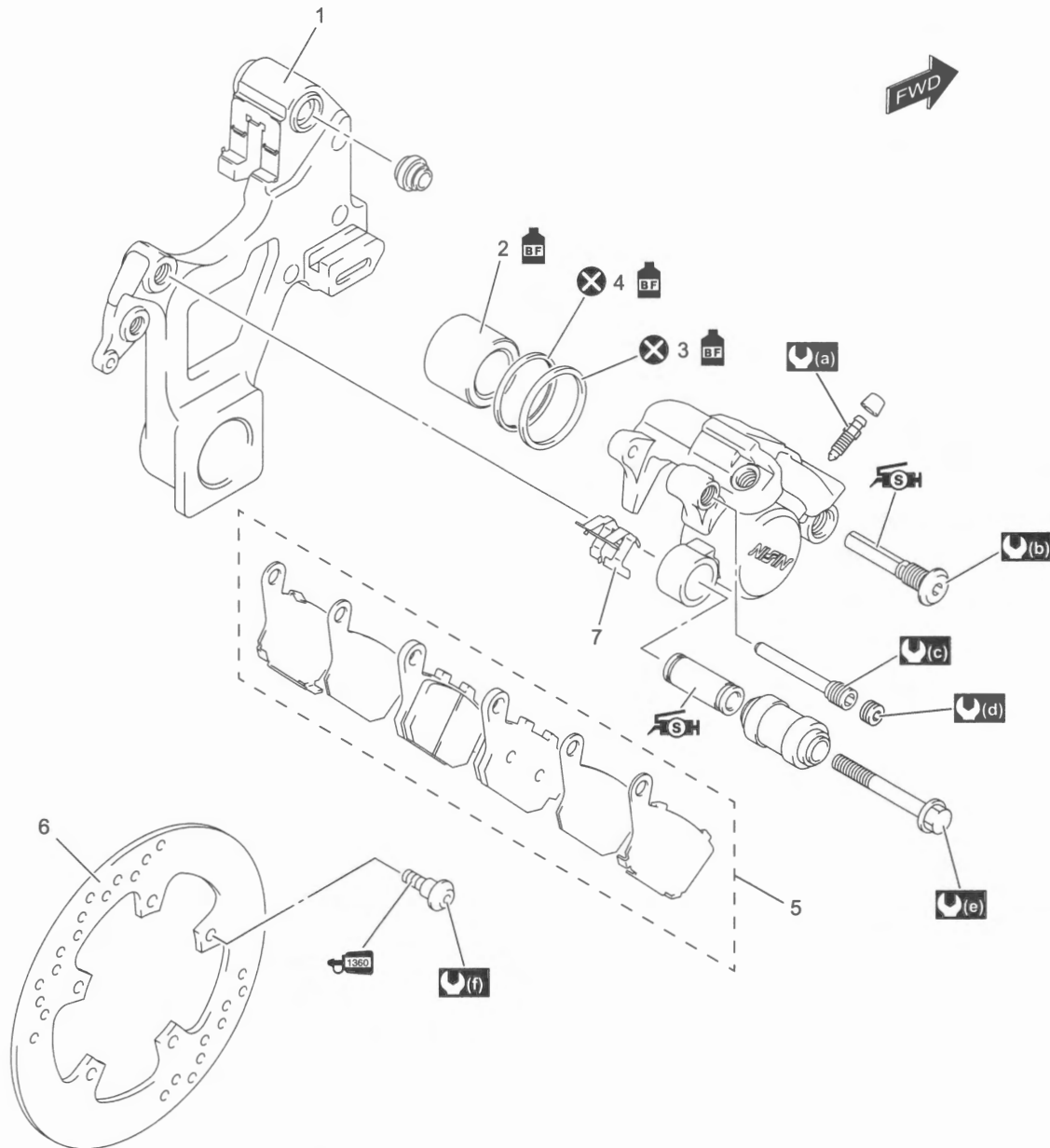
09900-20607 Dial gauge (10 x 0.01 mm) ☞(Page 4B-6) 	09900-20701 Dial gauge chuck ☞(Page 4B-6) 
09912-66310 Micrometer (0 - 25 mm) ☞(Page 4B-6) 	

Rear Brakes

Repair Instructions

Rear Brake Components

BENK07L24306001



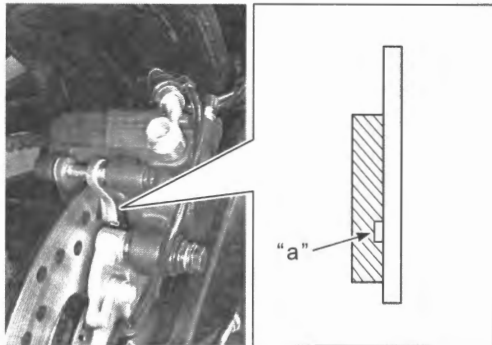
IK07L1430001-02

1. Rear caliper bracket	7. Brake pad spring	(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) : 18 N·m (1.8 kgf·m, 13.5 lbf·ft)	BF : Apply brake fluid.
5. Rear brake pad/Shim set	(d) : 2.5 N·m (0.25 kgf·m, 1.85 lbf·ft)	X : Do not reuse.
6. Rear brake disc	(e) : 22 N·m (2.2 kgf·m, 16.5 lbf·ft)	

Rear Brake Pad Inspection

BENK07L24306002

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)



IF04K1430001-01

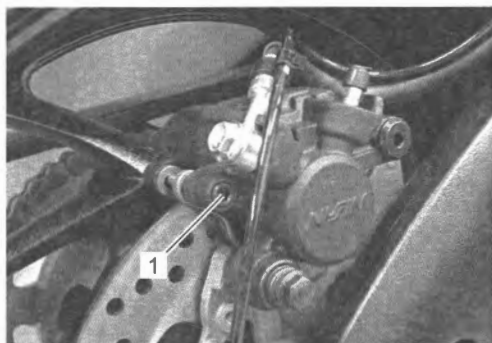
Rear Brake Pad Replacement

BENK07L24306003

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 rear wheel speed sensor bracket. (Page 4E-32)
- 2) Remove the pin plug (1).

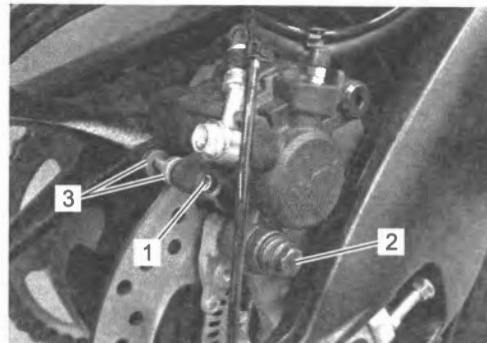


IF04K1430002-02

- 3) Remove the pad mounting pin (1).
- 4) Remove the caliper mounting bolt (2).
- 5) Remove the brake pads (3) with the rear caliper pivoted up.

NOTE

Do not operate the brake pedal while removing the brake pads.

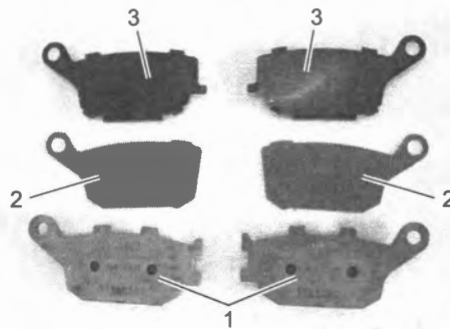


IF04K1430003-02

- 6) Clean up the caliper especially around the caliper piston.
- 7) Assemble the new brake pads (1), insulators (2) and shims (3).

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.

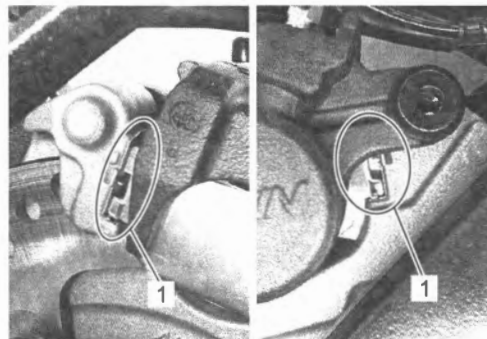


IF04K1430004-03

- 8) Install the new brake pads.

NOTE

Check the pad end (1) for proper fit to the brake pad retainer.



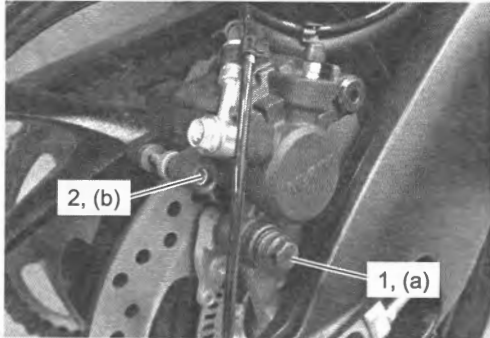
IF04K1430005-01

- 9) 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)

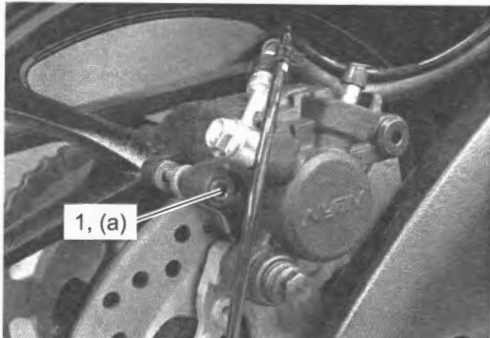


IF04K1430006-02

- 10) 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)



IF04K1430007-02

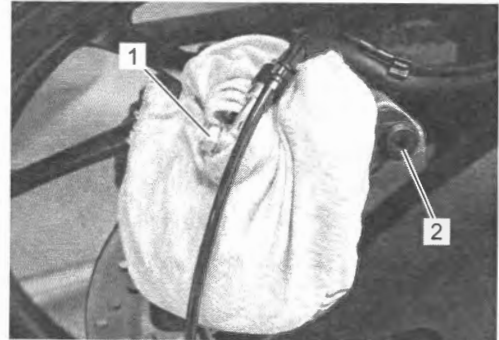
- 11) Install the rear wheel speed sensor bracket. (Page 4E-32)

Rear Brake Caliper Removal and Installation

BENK07L24306004

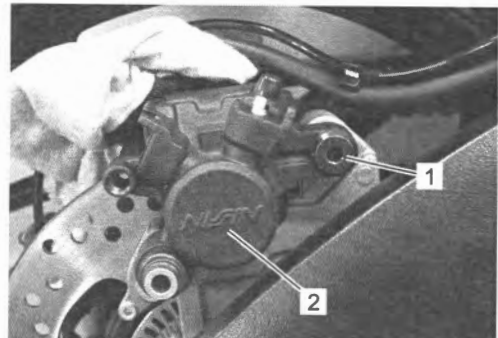
Removal

- 1) Drain brake fluid. (Page 4A-14)
- 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.
- 5) Loosen the sliding pin (2).



IF04K1430008-02

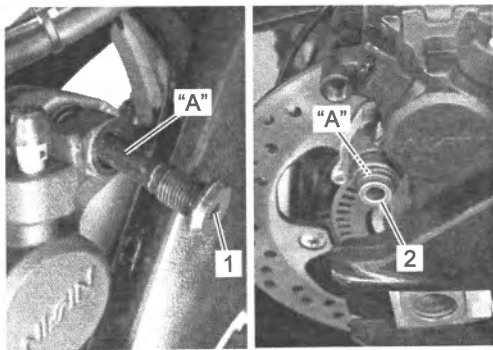
- 6) Remove the sliding pin (1) and remove the caliper (2) from the caliper bracket.



IF04K1430009-02

Installation

- 1) Install the caliper to the caliper bracket.
- 2) Apply grease to the sliding pin (1) and sleeve (2).
“A”: Grease 99000–25100 (SUZUKI SILICONE GREASE)
- 3) Temporarily tighten the sliding pin (1).



IF04K1430010-06

- 4) Install the brake pads. (Page 4C-2)
- 5) Tighten the sliding pin (1) to the specified torque.

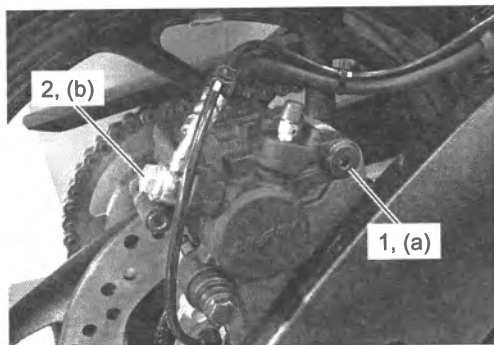
Tightening torque

Rear brake caliper sliding pin (a): 27 N·m (2.8 kgf-m, 20.0 lbf-ft)

- 6) Install the brake hose union bolt (2) and new seal washers to brake hose.
- 7) After the brake hose union has contacted the stopper, 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)



IF04K1430011-02

- 8) Bleed air from the brake system after installing the caliper. (Page 4A-11)
- 9) Check the brake fluid leakage referring to “Brake Hose Inspection” in Section 4A (Page 4A-10) and brake operation.

Rear Brake Caliper Disassembly and Reassembly

BENK07L24306005

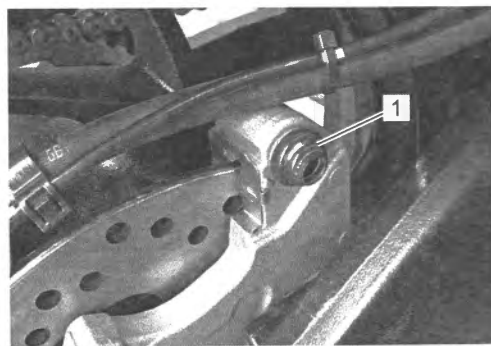
Refer to “Rear Brake Caliper Removal and Installation” (Page 4C-3).

▲ CAUTION

Take care not to damage piston and caliper cylinder of rear brake caliper.

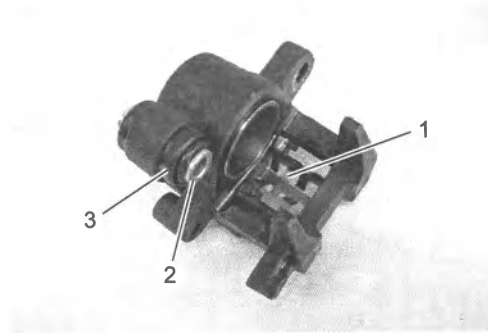
Disassembly

- 1) Remove the rubber boot (1).



IK07L1430002-01

- 2) Remove the pad spring (1).
- 3) Remove the sleeve (2) and rubber boot (3).



IF04K1430013-01

- 4) Remove the caliper piston applying compressed air gradually from the hole for the brake hose.

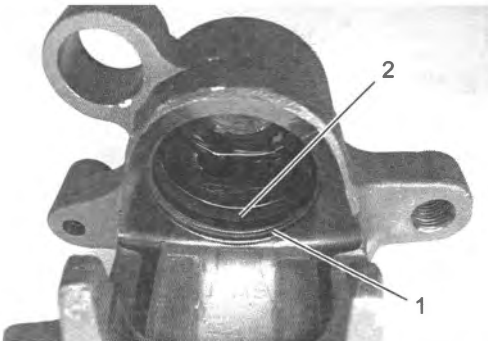
⚠ WARNING

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.



IF04K1430014-01

- 5) Remove the dust seal (1) and piston seal (2).



IF04K1430015-01

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)

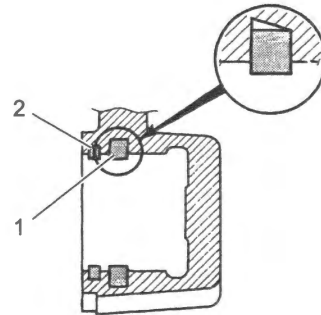


I649G1430018-02

- 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).

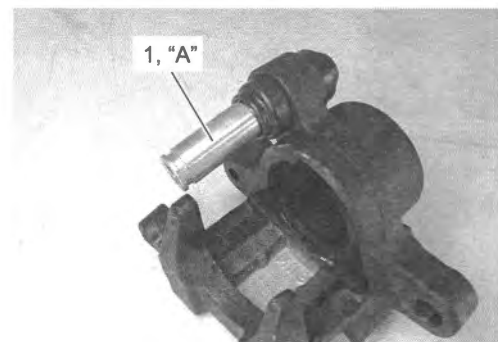


IH13K1430017-02

- Apply grease to the sleeve (1).

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)

- Install the sleeve (1) into the rubber boot.
- Set the rubber boot to the sleeve securely.



IF04K1430016-01

Rear Brake Caliper Parts Inspection

BENK07L24306006

Refer to "Rear Brake Caliper Disassembly and Reassembly" (Page 4C-4).

Brake Caliper Cylinder

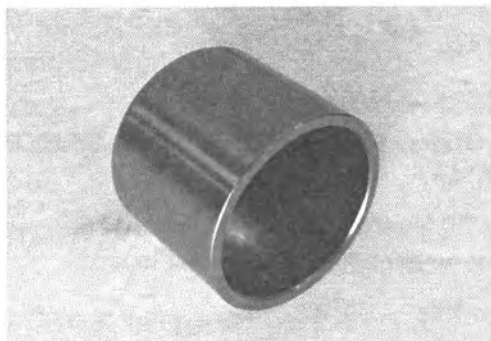
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damage is found, replace the caliper with a new one.



IF04K1430017-01

Brake Caliper Piston

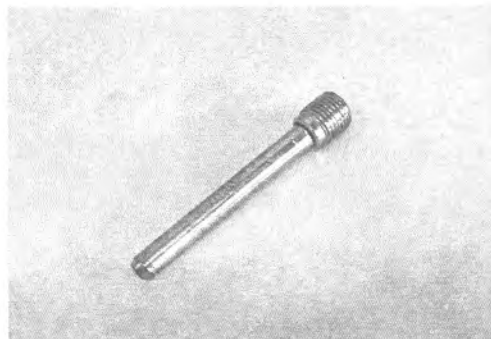
Inspect the brake caliper piston surface for any scratches or other damage. If any defects are found, replace the piston with a new one.



IE31J1430023-01

Brake Pad Mounting Pin

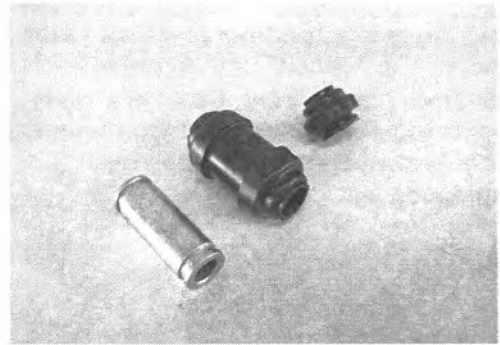
Inspect the brake pad mounting pin for wear and other damage. If any damage is found, replace the brake pad mounting pin with a new one.



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 spring for damage and excessive bend. If any defects are found, replace it with a new one.



IK07L1430003-01

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

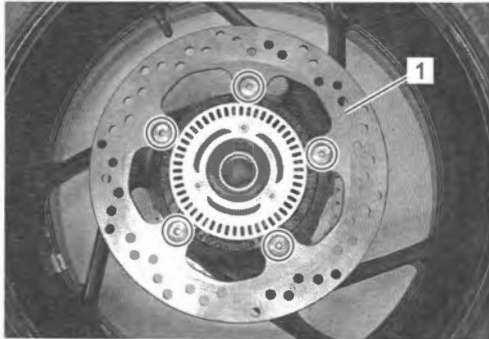
Rear Brake Disc Removal and Installation

BENK07L24306007

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-10).

Removal

Remove the rear brake disc (1).



IF04K1430022-01

Installation

- 1) Make sure that the brake disc (1) is clean and free of any grease.
- 2) Install the rear brake disc (1).

NOTE

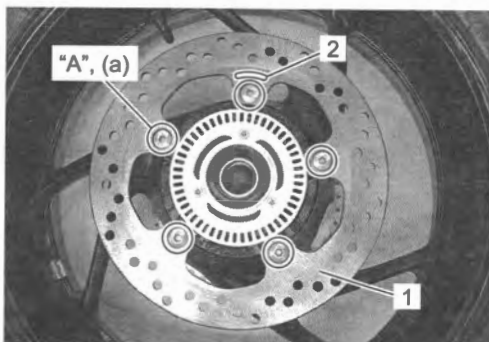
The stamped mark (2) on the brake disc should face to the outside.

- 3) Apply thread lock to the brake disc bolts and tighten them to the specified torque.

"A": Thread lock cement 99000-32130 (THREAD LOCK CEMENT 1360)

Tightening torque

Brake disc bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IF04K1430023-02

Rear Brake Disc Inspection

BENK07L24306008

Brake Disc Thickness

Check the brake disc for damage or cracks and measure the thickness using the micrometer.

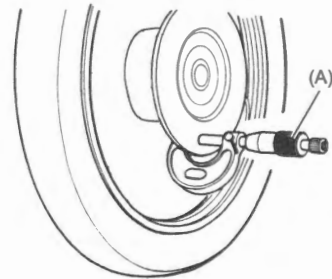
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Rear brake disc thickness

[Limit]: 4.5 mm (0.18 in)

Special tool

(A): 09912-66310



ID26J1430036-01

Brake Disc Runout

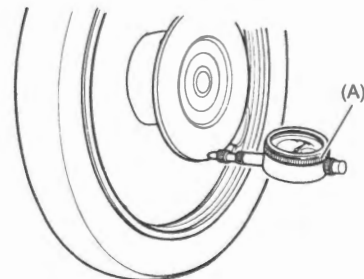
- 1) Dismount the rear brake pads.
Refer to "Rear Brake Pad Replacement" (Page 4C-2).
- 2) Measure the runout using the dial gauge.
Replace the disc if the runout exceeds the service limit.

Rear brake disc runout

[Limit]: 0.30 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

BENK07L24307001

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)
Rear brake caliper sliding pin	27	2.8	20.0	☞(Page 4C-4)
Brake hose union bolt	23	2.3	17.0	☞(Page 4C-4)
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

BENK07L24308001

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-4) / ☞(Page 4C-5)
Thread lock cement	THREAD LOCK CEMENT 1360	P/No.: 99000-32130	☞(Page 4C-7)

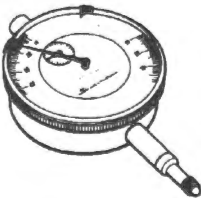

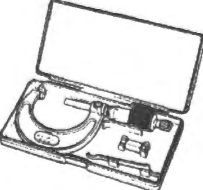
NOTE

Required service material(s) is also described in:

“Rear Brake Components” (Page 4C-1)

Special Tool

BENK07L24308002

09900-20607 Dial gauge (10 x 0.01 mm) ☞(Page 4C-7)		09900-20701 Dial gauge chuck ☞(Page 4C-7)	
09912-66310 Micrometer (0 - 25 mm) ☞(Page 4C-7)			

ABS

Precautions

Precautions for ABS Service

BENK07L24500001

- 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.
- The wheel speed sensor cannot be disassembled.

Precautions for Diagnosing Troubles

BENK07L24500002

To ensure that the trouble diagnosis is done accurately and smoothly, observe the following and follow "ABS Check" (Page 4E-10).

- The information on the DTCs detected by the ABS control unit can be checked and cleared using the special tool.

NOTE

After repairing the trouble, clear the DTC using special tool. ⚡(Page 4E-14)

- 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-10). 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

BENK07L24500003

Refer to "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2) and "Precautions for ABS Service" (Page 4E-1).

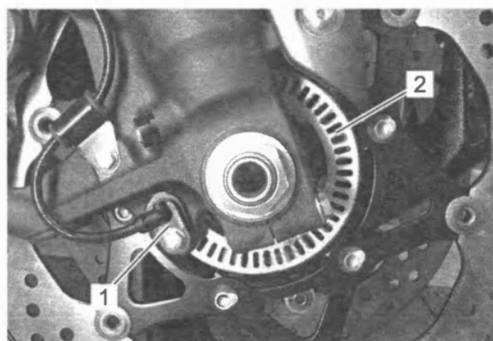
General Description

Wheel Speed Sensor Description

BENK07L24501001

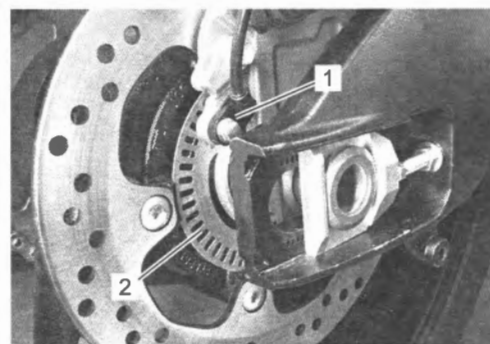
Wheel speed sensor consists of wheel speed sensor (1) and sensor rotor (2).

Front



IF04K1450001-01

Rear

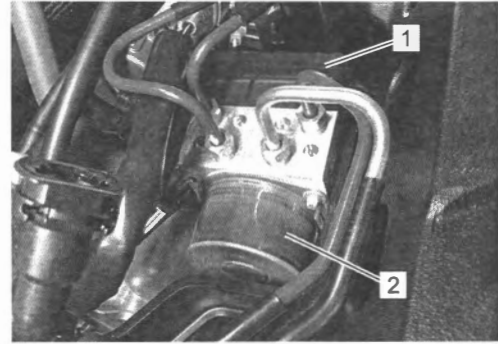


IF04K1450002-01

ABS Control Unit Description

BENK07L24501002

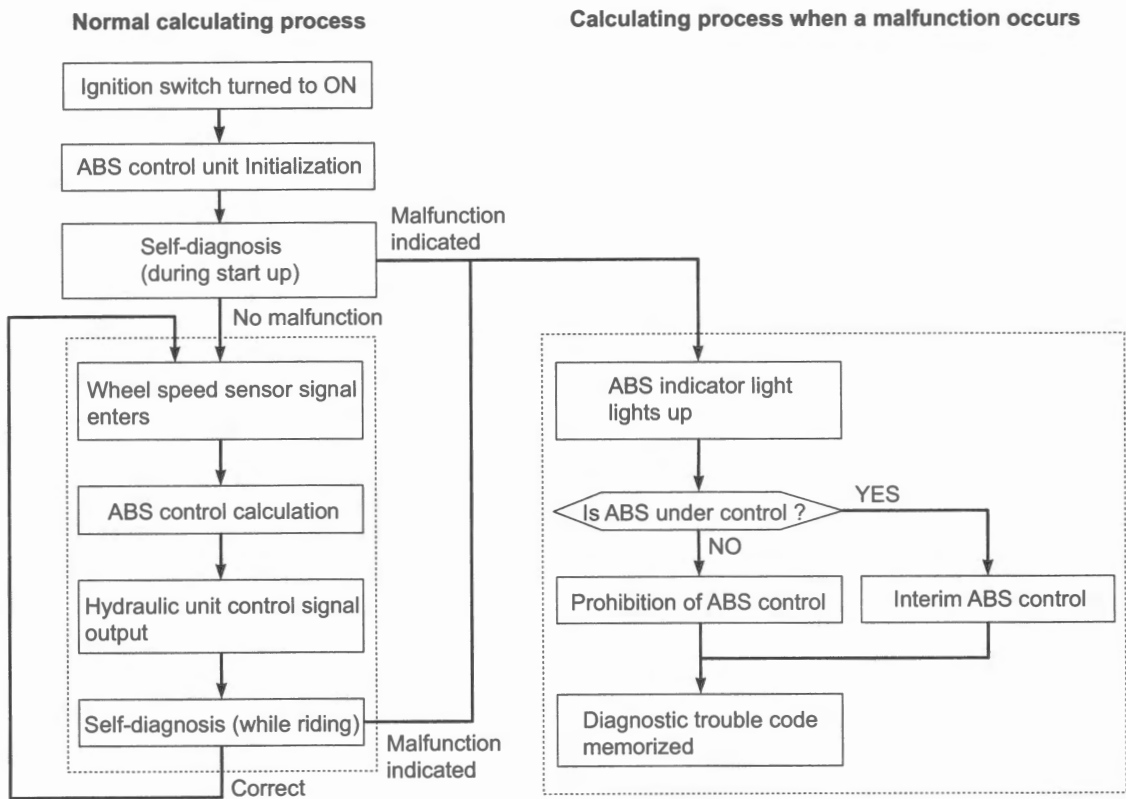
ABS control unit (1) calculates signals input from each one of front and rear wheel speed sensors, monitors the slipping conditions of the wheels and, at the same time, sends control signal to Hydraulic Unit (HU) (2). This ABS control unit/HU can not be disassembled.



IF04K1450003-02

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. 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.

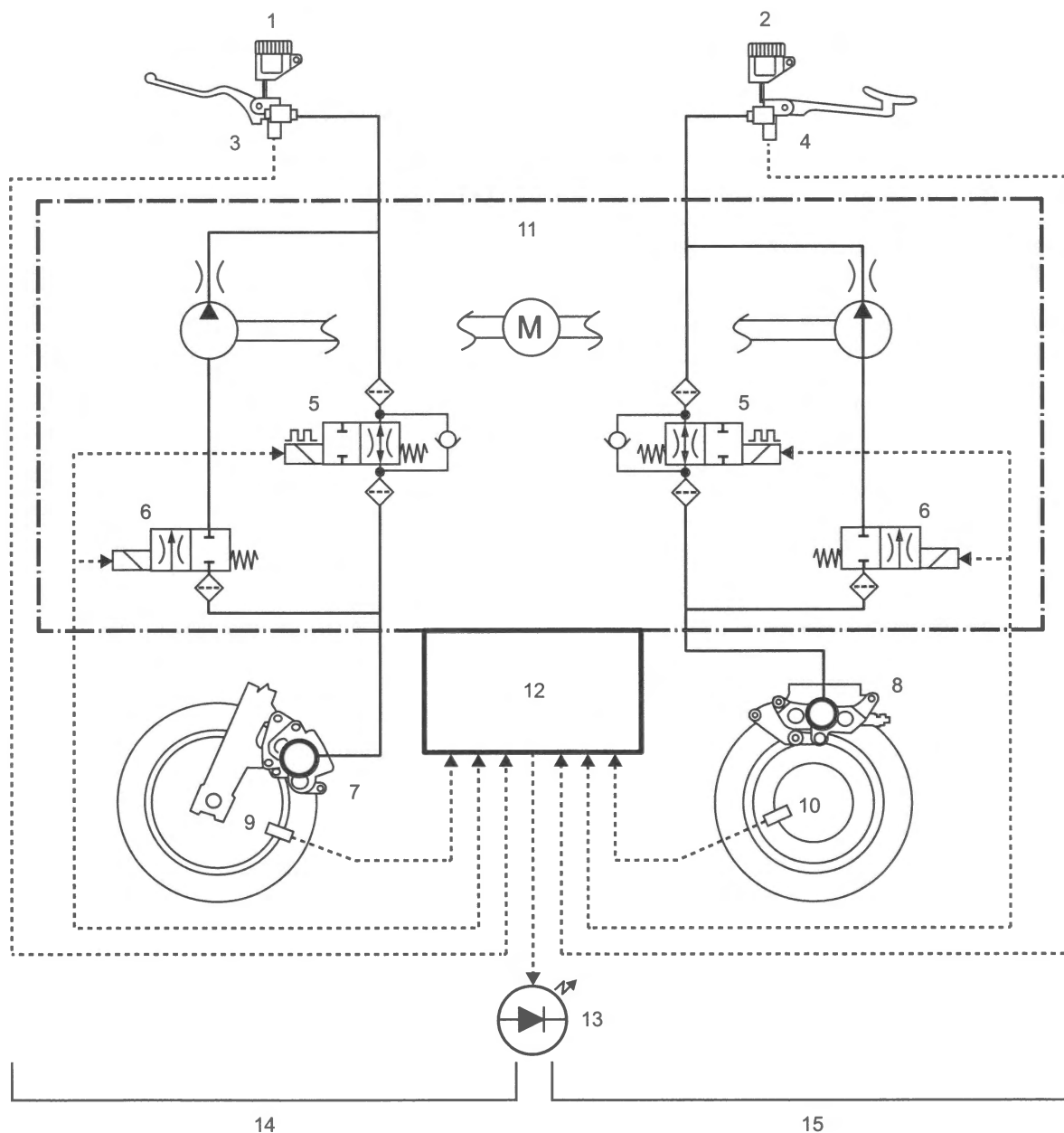


1823H3450006-01

Hydraulic Unit (HU) Description

BENK07L24501003

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.



1. Front brake lever/master cylinder	9. Front wheel speed sensor
2. Rear brake pedal/master cylinder	10. Rear wheel speed sensor
3. Front brake switch	11. HU
4. Rear brake switch	12. ABS control unit
5. Inlet valve	13. ABS indicator light
6. Outlet valve	14. Front system
7. Front brake caliper	15. Rear system
8. Rear brake caliper	

IF04K1450069-07

Self-diagnosis Function and ABS Indicator Light Description

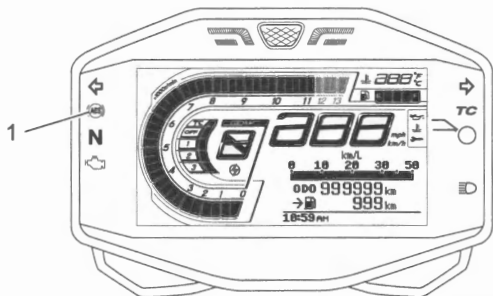
BENK07L24501004

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 5 km/h (3 mile/h).
- If an ABS malfunction has occurred, the ABS indicator light keeps lighting up.



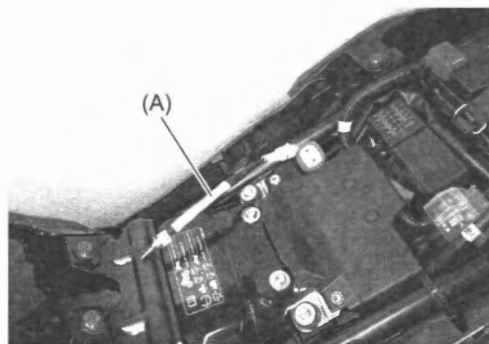
IK07L1450001-01

NOTE

When a malfunction has occurred in the ABS, connect the special tool to the mode select coupler (2P) to display the diagnostic trouble code on the ABS indicator light. (Page 4E-12)

Special tool

(A): 09930-82760

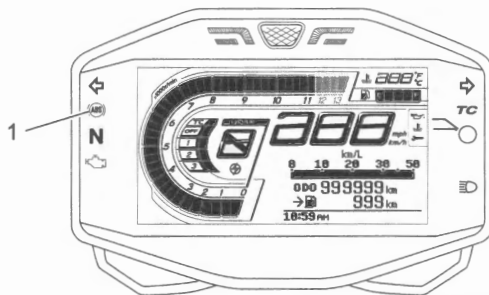


IK07L1450002-01

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 5 km/h (3 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 5 km/h (3 mile/h).	The ABS is normally activated.
The ABS indicator light keeps lighting up even though the motorcycle is ridden at more than 5 km/h (3 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-18)



IK07L1450001-01

Stored DTCs (Diagnostic Trouble Codes)

The maximum of six DTCs can be recorded. In these records, duplication of the same DTC will not occur. If the system detects the 7th DTC, it overwrites the record of the oldest DTC.

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

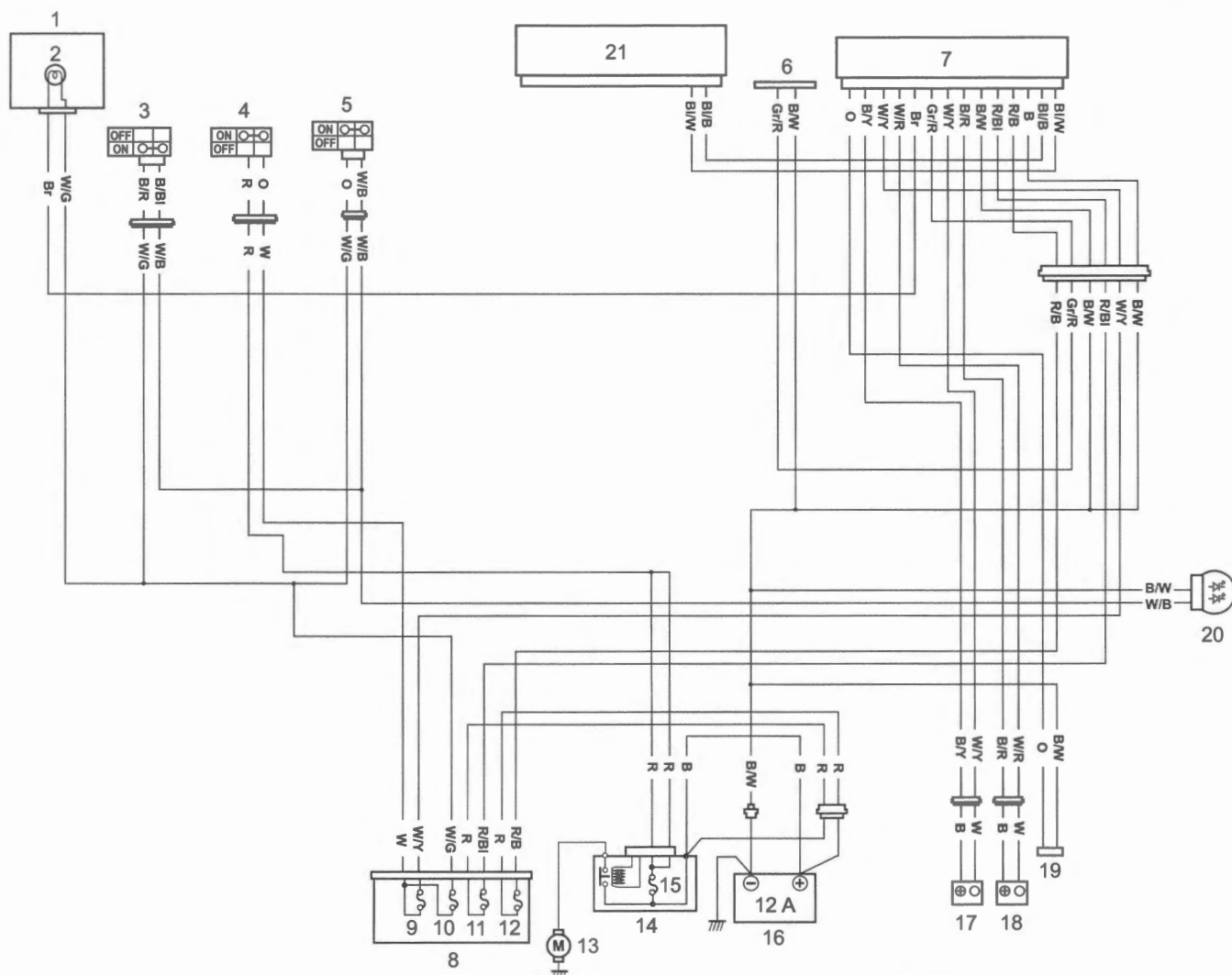
BENK07L24501005

If malfunction occurs in the ABS electric system, this sets ABS inactivated and ABS indicator light turns ON. In this case, it functions as the normal brake. However, if malfunction occurs while ABS is being activated, when ABS control unit diagnoses that the operation can continue, it will effectuate ABS provisional control (turning the ABS indicator light ON). Upon the moment when the provisional control is over, ABS will be set inactivated.

Schematic and Routing Diagram

ABS Wiring Diagram

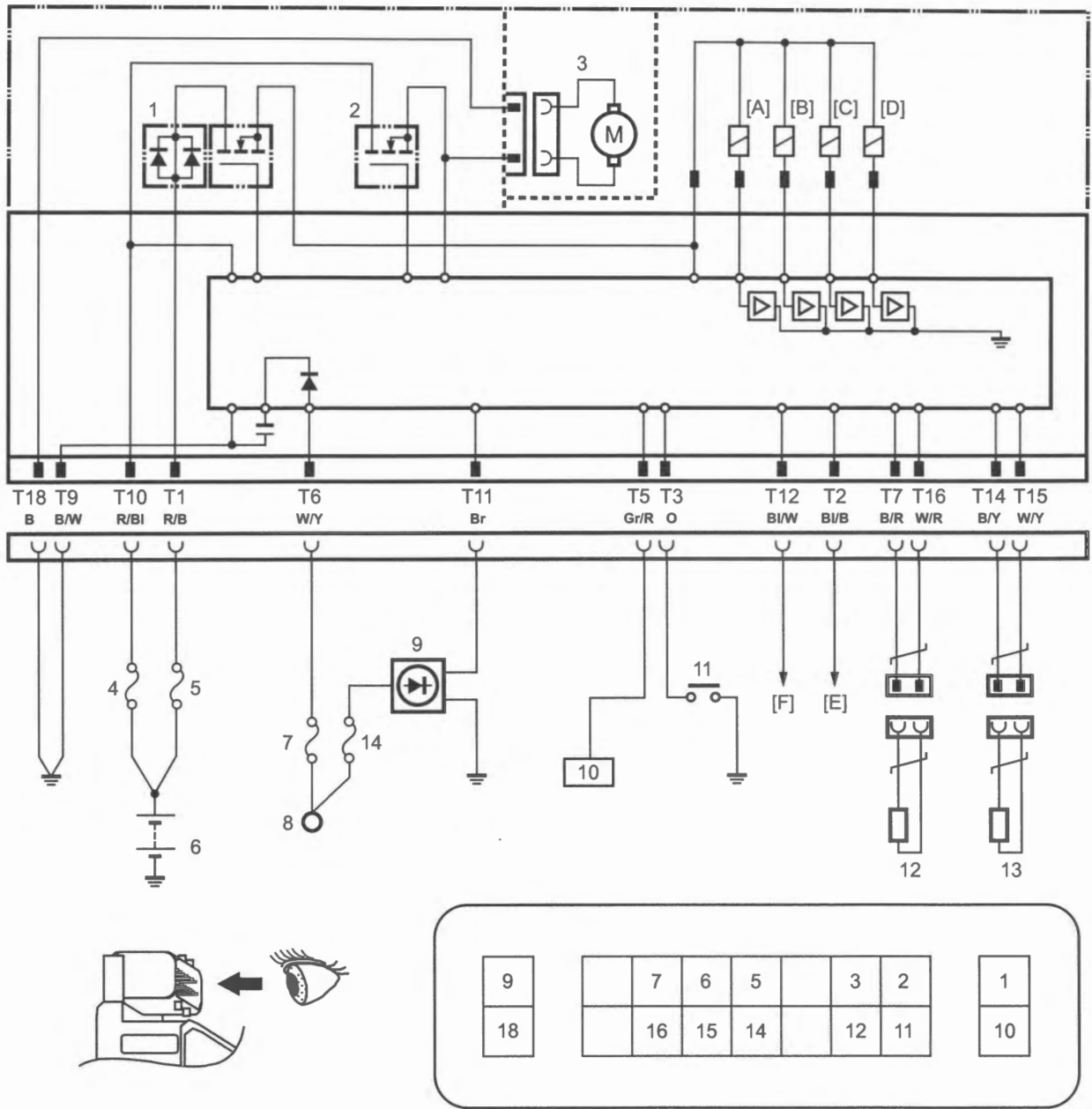
BENK07L24502001



IK07L1450004-03

1. Combination meter	8. Fuse box	15. Main fuse (30 A)
2. ABS indicator light	9. Ignition fuse (10 A)	16. Battery
3. Front brake switch	10. Signal fuse (10 A)	17. Rear wheel speed sensor
4. Ignition switch	11. ABS motor fuse (25 A)	18. Front wheel speed sensor
5. Rear brake switch	12. ABS valve fuse (10 A)	19. Mode select coupler (2P)
6. Mode select coupler (6P)	13. Starter motor	20. Rear combination light
7. ABS control unit	14. Starter relay	21. ECM

ABS Control Unit / HU Diagram

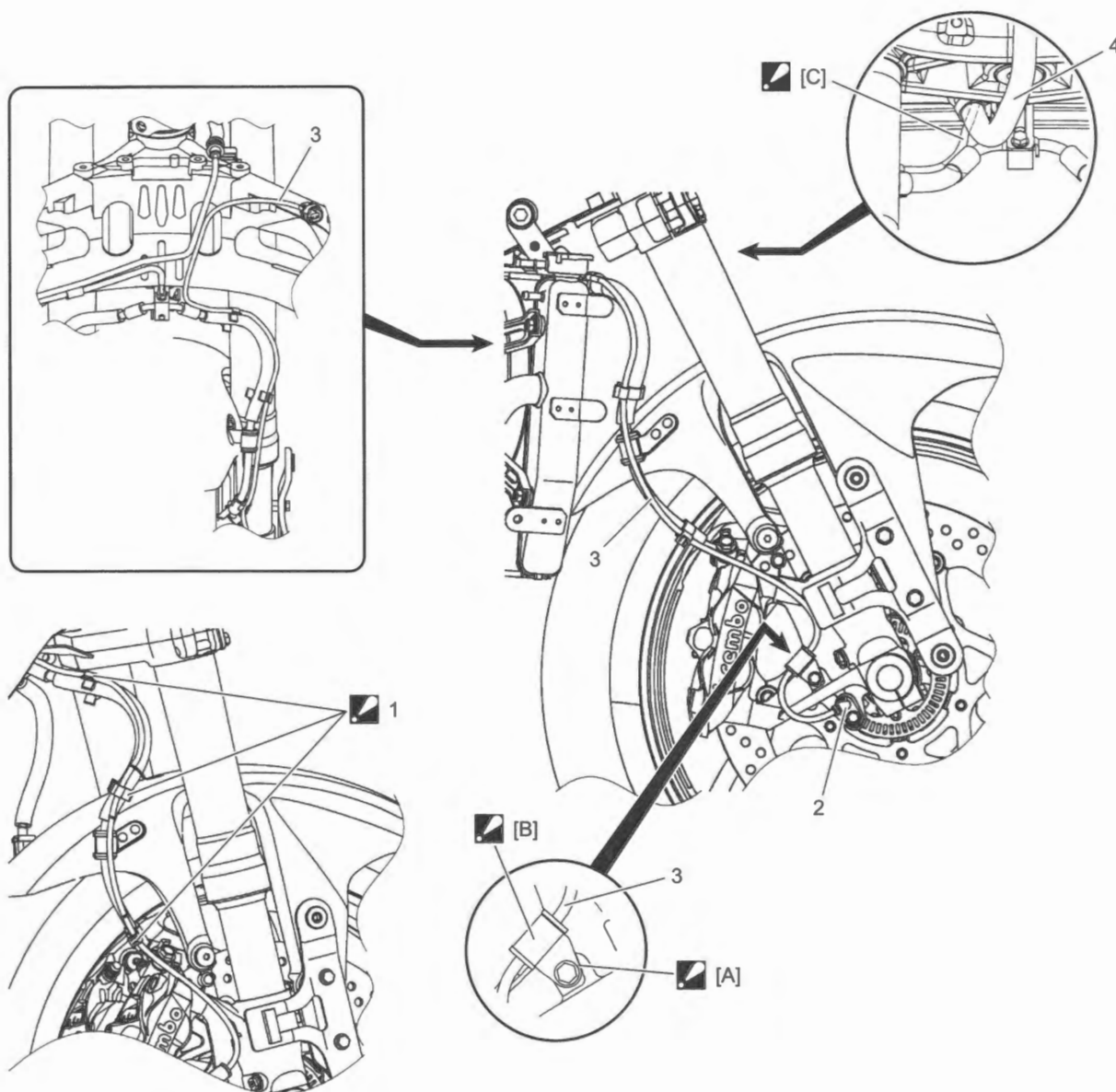


IK07L1450005-03

[A]: Front brake solenoid inlet valve	2. ABS motor relay	9. ABS indicator light
[B]: Front brake solenoid outlet valve	3. ABS motor	10. Mode select coupler (6P)
[C]: Rear brake solenoid inlet valve	4. ABS valve fuse (25 A)	11. Mode select coupler (2P)
[D]: Rear brake solenoid outlet valve	5. ABS valve fuse (10 A)	12. Front wheel speed sensor
[E]: To ECM (Front wheel speed sensor signal)	6. Battery	13. Rear wheel speed sensor
[F]: To ECM (Rear wheel speed sensor signal)	7. Ignition fuse (10 A)	14. Signal fuse (10 A)
1. ABS valve relay	8. Ignition switch	

Front Wheel Speed Sensor Routing Diagram

BENK07L24502003

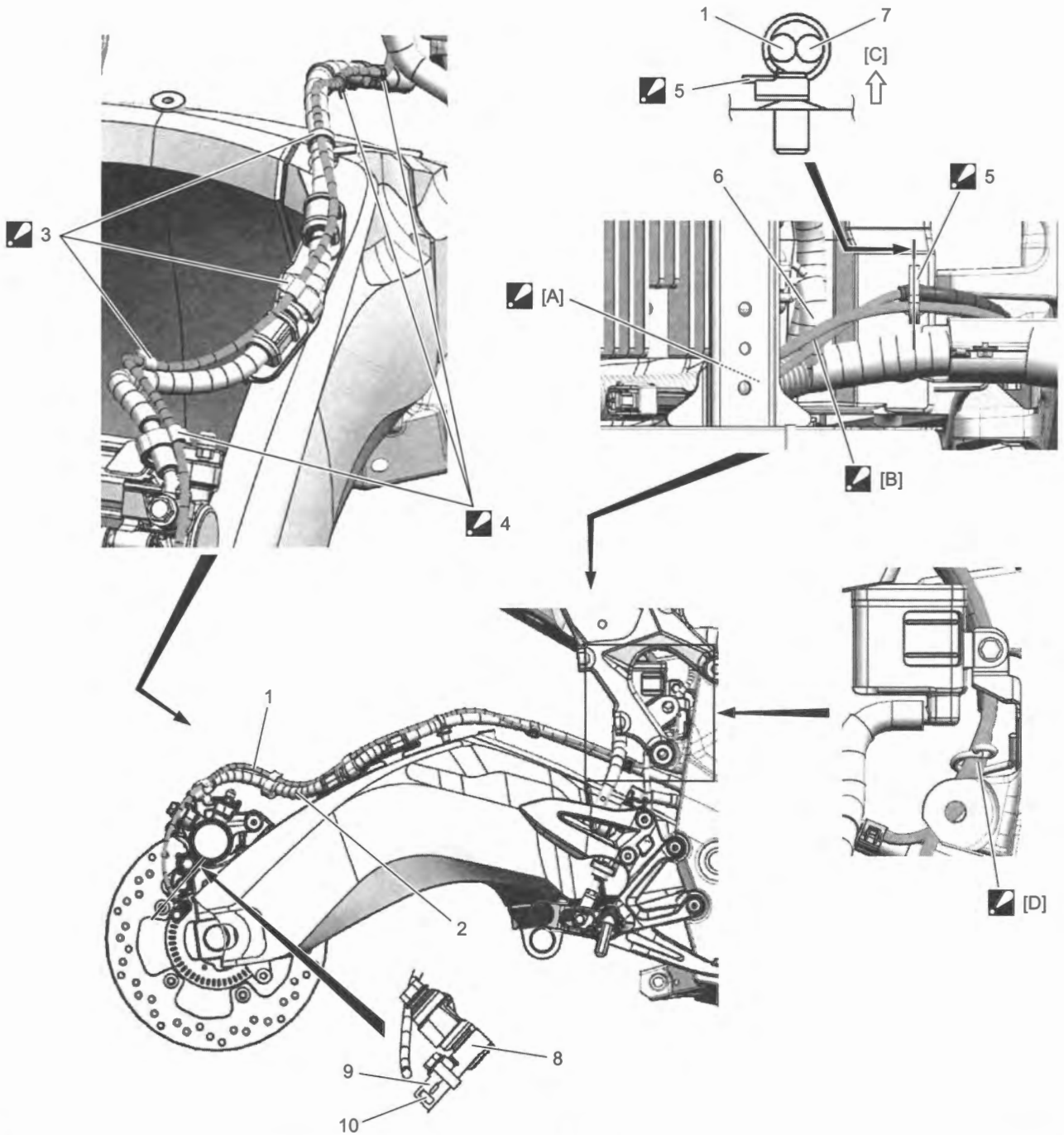


IF04K1450009-04

<p>☑ [A]: After the stopper of clamp has contacted the bracket of front fork inner tube, tighten the bolt.</p>	2. Front wheel speed sensor
<p>☑ [B]: Fix the front wheel speed sensor lead wire sleeve to the clamp firmly.</p>	3. Front wheel speed sensor lead wire
<p>☑ [C]: Pass the front wheel speed sensor lead wire to the under and left side of the wiring harness.</p>	4. Wiring harness
<p>☑ 1. Clamp : Clamp the marking of the front wheel speed sensor lead wire.</p>	

Rear Wheel Speed Sensor Routing Diagram

BENK07L24502004



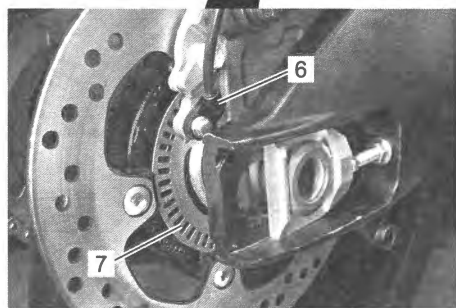
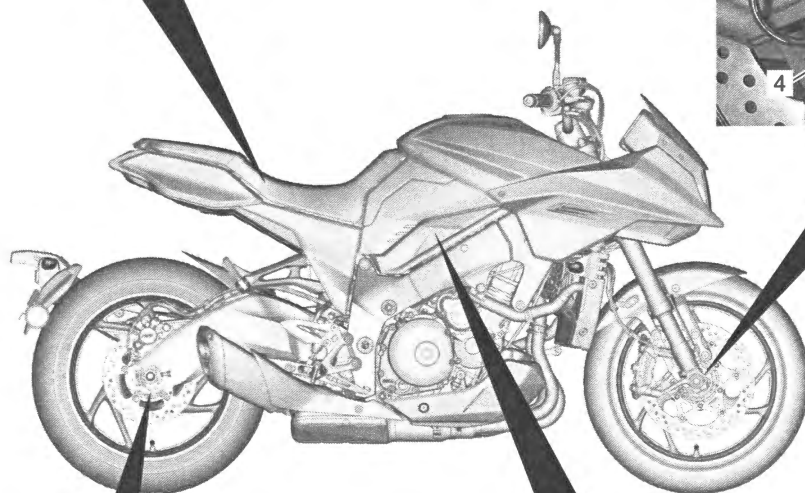
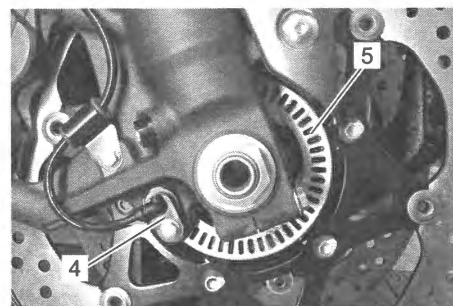
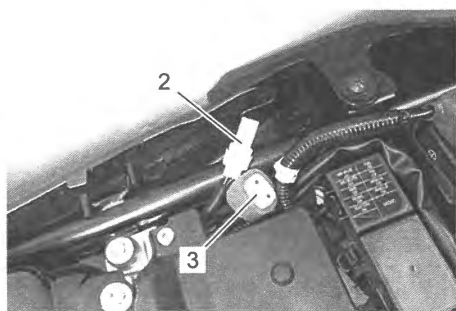
IK07L1450006-01

<p>☑ [A]: Pass the rear wheel speed sensor lead wire under the frame.</p>	<p>☑ 4. Clamp : Pass the rear wheel speed sensor lead wire outside of the rear brake hose and clamp it at the marking portion.</p>
<p>☑ [B]: Pass the rear wheel speed sensor lead wire and rear brake light switch lead wire over the regulator/rectifier branch wire.</p>	<p>☑ 5. Clamp : Clamp the rear wheel speed sensor lead wire and rear brake light switch lead wire from the protector edge of rear wheel speed sensor lead wire within 10 mm (0.39 in). Face the tip of clamp to inside. Cut off the excess tip of the clamp.</p>
<p>[C]: Upward</p>	<p>6. Regulator/rectifier branch wire</p>
<p>☑ [D]: Pass the rear wheel speed sensor lead wire and rear brake light switch lead wire into the guide.</p>	<p>7. Rear brake light switch lead wire</p>
<p>1. Rear wheel speed sensor lead wire</p>	<p>8. Rear brake caliper</p>
<p>2. Rear brake hose (ABS control unit/HU to brake caliper)</p>	<p>9. Rear wheel speed sensor bracket</p>
<p>☑ 3. Clamp : Pass the rear wheel speed sensor lead wire over the rear brake hose and clamp it at the marking portion.</p>	<p>10. Pin</p>

Component Location

ABS Components Location

BENK07L24503001



IK07L1450007-02

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	

Diagnostic Information and Procedures

ABS Check

BENK07L24504001

Refer to the following items for the details of each step.

Step 1

Customer complaint analysis

- 1) Perform customer complaint analysis. (Page 4E-11)

Was customer complaint analysis performed?

Yes Go to Step 2.

No Perform customer complaint analysis.

Step 2

DTC check

- 1) Check for DTCs (including pending DTC). (Page 4E-12)

Is there any DTC(s)?

Yes Print DTCs write down and check and repair according to applicable DTC troubleshooting, and go to Step 5.

No Go to Step 3.

Step 3

Visual inspection

- 1) Perform visual inspection. (Page 4E-12)

Is there any faulty condition?

Yes Repair or replace defective part, and then go to Step 5.

No Go to Step 4.

Step 4

Trouble symptom confirmation

- 1) Check trouble symptom. (Page 4E-12)

Is trouble symptom identified?

Yes Repair or replace defective part, and then go to Step 5.

No Go to Step 5.

Step 5

ABS control unit/HU operation check

- 1) Check ABS control unit/HU operation. (Page 4E-12)

Is there any abnormal condition?

Yes Repair or replace the malfunction part, and then go to Step 6.

No Go to Step 6.

Step 6

Final confirmation test

- 1) Perform final confirmation test. (Page 4E-12)

Does the trouble recur?

Yes Go to Step 2.

No End.

Step 1: Customer Complaint Analysis

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

NOTE

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

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

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

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	Over 5 km/h (3 mile/h)
Goes off after running over 5 km/h (3 mile/h): Yes / No	When turning
Flashes	Others
Tires	Brake operating conditions
Abnormal air pressure	Usual braking
Less thread depth	Quick/hard braking
No specified tires installed	
	Interface
Road surface	Too big pulsations at brake lever and pedal
Paved road:	Too large brake lever and pedal strokes
Dry / Wet / Others	Others
Unpaved road:	
Gravel / Muddy / Uneven / Others	Others
	Abnormal noise from the ABS control unit/HU
	Skid noise from the calipers
	Vibration at the brake lever and pedal

NOTE:

Step 2: DTC Check

First, check DTC (including pending DTC). (Page 4E-12)

Step 3: Visual Inspection

As a preliminary step, perform visual check of the items that support proper function of the engine. (Page 4E-17)

Step 4: Trouble Symptom Confirmation

Based on information obtained in "Step 1: Customer Complaint Analysis" (Page 4E-11), check trouble symptoms.

Step 5: ABS Control Unit / HU Operation Check

Check that the ABS control unit/HU operation is normal. (Page 4E-15)

Step 6: Final Confirmation 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. Confirm that the problem symptom is not observed anymore 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 Clearance" (Page 4E-14) and perform test riding and confirm that the DTC is not indicated.

DTC Check

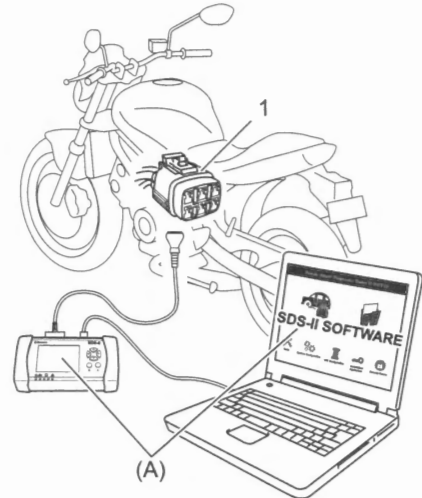
BENK07L24504002

NOTE

- Do not disconnect coupler from ABS control unit, the battery cable from the battery, ABS control unit ground wire harness from the main fuse before confirming the DTC stored in memory. Such disconnection will erase the memorized information in ABS control unit memory.
- Before proceeding DTC check, read "Self-diagnosis Function and ABS Indicator Light Description" (Page 4E-4) and correctly understand the function and usage.

Use of SDS-II

- 1) Turn the ignition switch "OFF".
- 2) Remove the seat. (Page 9D-19)
- 3) Connect the SDS-II to mode select coupler (6P) (1). (Page 4E-9)

Special tool**(A): 09904-41030****09904-41040**

IJ31J1452047-02

- 4) Turn the ignition switch "ON".
- 5) Read DTC according to instructions displayed on SDS-II and print it or write it down. Refer to SDS-II operation manual for further details.

NOTE

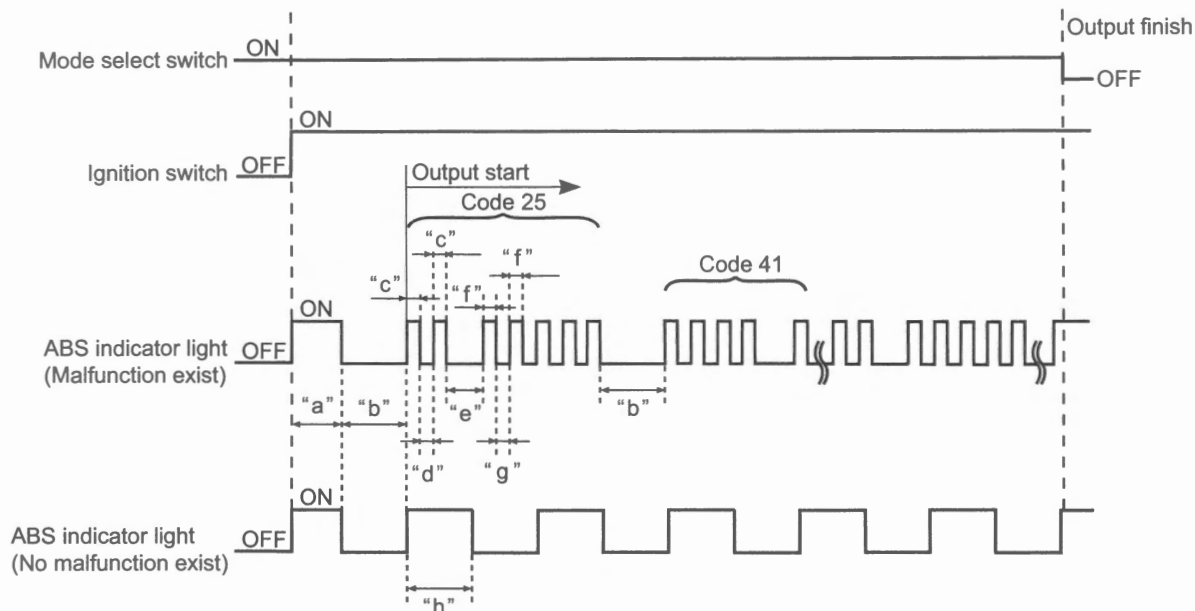
- Not only SDS-II used for detecting DTCs but also for reproducing and checking on screen the failure condition as described by customers using the trigger.
 - How to use trigger referring to the SDS-II operation manual for further details.
- 6) Close the SDS-II and turn the ignition switch OFF and then disconnecting the SDS-II.
 - 7) Install the removed parts.

Use of Mode Select Switch

How to read the DTC

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 DTC is recorded, the light repeats flashing for 3.6 seconds in a cyclic manner.



"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)	"h": About 3.6 seconds

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DTC check

NOTE

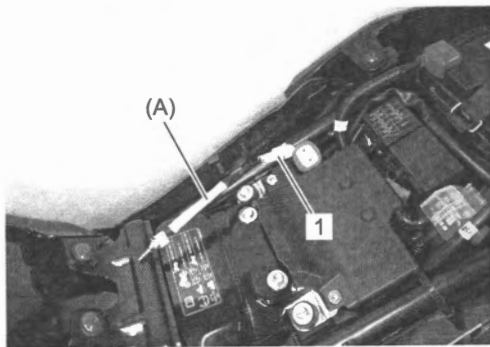
Both past DTC and current DTC are detected by using mode select coupler.

Connect the special tool to the mode select coupler to output the memorized DTCs on the ABS indicator light.

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Connect the special tool to the mode select coupler (2P) (1).

Special tool

(A): 09930-82760



IK07L1450008-01

- 4) Switch the special tool to ON.



I718H1450040-03

- 5) Turn the ignition switch ON.
The ABS indicator light starts flashing to indicate the DTC. (Page 4E-16)
- 6) Turn the ignition switch OFF and disconnect the special tool.
- 7) Install the removed parts.

DTC Clearance

BENK07L24504003

NOTE

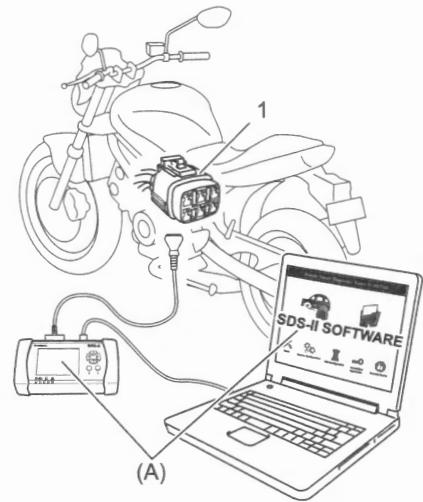
- The previous past DTC still remains stored in the ABS control unit. Therefore, erase the past DTC memorized in the ABS control unit using SDS-II.
- The DTC is memorized in the ABS control unit also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction past DTC.

Use of SDS-II

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Connect the SDS-II to mode select coupler (6P) (1). (Page 4E-9)

Special tool

**(A): 09904-41030
09904-41040**

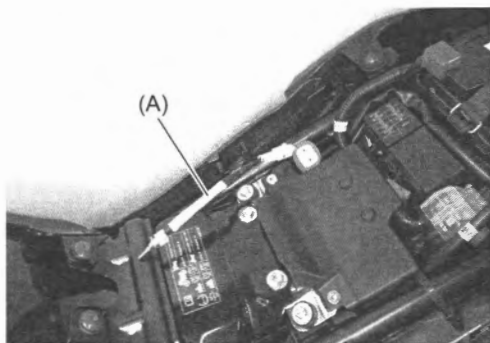


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- 4) Turn the ignition switch "ON".
- 5) Clear DTC according to instructions displayed on SDS-II. Refer to SDS-II operation manual for further details.
- 6) After completing the clearance, close the SDS-II and turn the ignition switch "OFF".
- 7) Disconnect the SDS-II and install the removed parts.
- 8) Ride the motorcycle at more than 30 km/h (19 mile/h) and quickly apply the brakes to check that the ABS activates correctly.

Use of Mode Select Switch**Current DTC**

- 1) After repairing the trouble, turn off the ignition switch.
- 2) Clear current DTC according to the clearance method of past DTC. (Page 4E-15)
- 3) Connect the special tool, and then switch the special tool to ON.

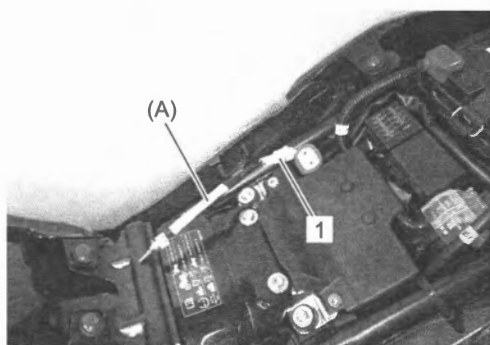
Special tool**(A): 09930-82760**

IK07L1450002-01

- 4) Turn the ignition switch ON.
- 5) When the ABS indicator light turns on and off repeatedly at 3.6 sec intervals, the current DTC has been erased.

Past DTC

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Connect the special tool to the mode select coupler (1).

Special tool**(A): 09930-82760**

IK07L1450009-01

- 4) Switch the special tool to ON.



I718H1450040-03

- 5) Turn the ignition switch ON.
- 6) Turn the special tool's switch OFF then ON again for more than 1 second. Repeat this operation 3 or more times. When the ABS indicator light turns on and off repeatedly at 3.6 sec intervals, the past DTC is cleared.
- 7) Disconnect the special tool from the mode select coupler and install the removed parts.

ABS Control Unit / HU Operation Check

BENK07L24504004

NOTE

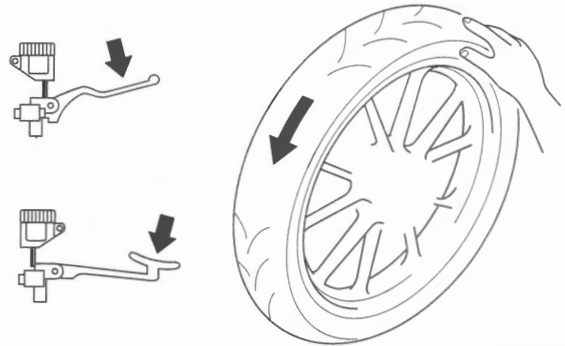
- **A false diagnosis may result if operation check of the ABS control unit/HU is performed without satisfying all of the specified condition below. Check that all the following conditions are met before performing operation check of the ABS control unit/HU.**
 - Battery voltage is 12 V or more.
 - No air is trapped in the brake system.
 - Brakes do not drag.
 - No DTC is stored in ABS control unit/HU.
- **Operation check must be performed by 2 persons.**

- 1) Remove the seat. (Page 9D-19)
- 2) Raise the front and rear wheels off the ground and support the motorcycle.
- 3) Shift the transmission into neutral.
- 4) Set up the SDS-II referring to the SDS-II operation manual for further details.
- 5) Turn the ignition switch ON.
- 6) Click the "Active control".
- 7) Click the "ABS HU operating".

- 8) Perform the following procedure.
- Apply the front brake.
 - Select front wheel by SDS-II.
 - Check whether the front wheel rotates freely by hand due to brake depressurization.
 - Check the rear wheel in the same manner as described previously.

NOTE

Depressurization by SDS-II is available for 5 seconds.



IH17K1450092-01

- 9) If any faulty condition is found, replace ABS control unit/HU. ☞(Page 4E-35)
- 10) Close the SDS-II and turn the ignition switch OFF.

DTC Table

BENK07L24504005

DTC	Malfunction cause	Indicator status	Reference
None	Normal	ON *1	—
C1625 (25)	Wheel speed sensor related malfunction	ON	☞(Page 4E-20)
C1635 (35)	ABS motor malfunction	ON	☞(Page 4E-21)
C1641 (41)	Wheel speed sensor signal malfunction (F) *2	ON	☞(Page 4E-22)
C1642 (42)	Wheel speed sensor circuit open (F) *2	ON	☞(Page 4E-23)
C1644 (44)	Wheel speed sensor signal malfunction (R) *2	ON	☞(Page 4E-25)
C1645 (45)	Wheel speed sensor circuit open (R) *2	ON	☞(Page 4E-26)
C1647 (47)	Supply voltage (Increased)	ON *3	☞(Page 4E-28)
C1648 (48)	Supply voltage (Decreased)	ON *3	☞(Page 4E-28)
C1655 (55)	ABS control unit malfunction	ON *4	☞(Page 4E-29)
C1661 (61)	ABS solenoid malfunction	ON	☞(Page 4E-30)

*1: It goes off after running at more than 5 km/h (3 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.

*3: When the voltage resumes the normal level, the ABS indicator light will go off.

*4: These are times that the ABS indicator light does not light up.

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.

Visual Inspection

BENK07L24504006

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-2) and "Rear Brake Pad Inspection" in Section 4C (Page 4C-2)
Brake fluid	Level, leakage	"Brake Fluid Level Check" in Section 4A (Page 4A-9)
ABS indicator light	Operation	"ABS Indicator Light Inspection" (Page 4E-18)
Tire	Pressure	"Tire Inspection and Cleaning" in Section 2D (Page 2D-15)
	Type, size	"Tire Inspection and Cleaning" in Section 2D (Page 2D-15)
	Damage, wear	"Tire Inspection and Cleaning" in Section 2D (Page 2D-15)
Wheel	Runout, play	"Wheel / Wheel Axle Inspection" in Section 2D (Page 2D-13)
Other parts that can be checked visually		—

NOTICE

- The standard tires fitted on this motorcycle are 120/70ZR17M/C (58W) for front and 190/50ZR17M/C (73W) for rear. The use of tires other than those specified may cause instability. It is highly recommended to use SUZUKI Genuine Tires.
- Replace the tires as a set, otherwise the DTC C1625 (25) may be stored.

ABS Symptom Diagnosis

BENK07L24504007

Condition	Possible cause	Correction / Reference Item
The ABS indicator light keeps lighting up even though the motorcycle is ridden at more than 5 km/h (3 mile/h).	Malfunctioning the ABS function.	Perform the ABS check. (Page 4E-10)
	Malfunctioning the ABS indicator light circuit.	Check the ABS indicator light circuit. (Page 4E-18)
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-10)
	Malfunctioning the ABS indicator light circuit.	Check the ABS indicator light circuit. (Page 4E-18)
	Malfunctioning the combination meter.	Check the combination meter. (Page 9C-7)

ABS Indicator Light Inspection

BENK07L24504008

Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-6).

Troubleshooting

Step 1

- 1) Check if the ABS indicator light (1) lights up when turning the ignition switch ON.



Does the ABS indicator light 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 5 km/h (3 mile/h).

Does the ABS indicator light go off?

Yes Normal (No DTC exists)

- No
- DTC output. (Page 4E-12)
 - If DTC can not be output (the ABS indicator light does not flash), go to Step 6.

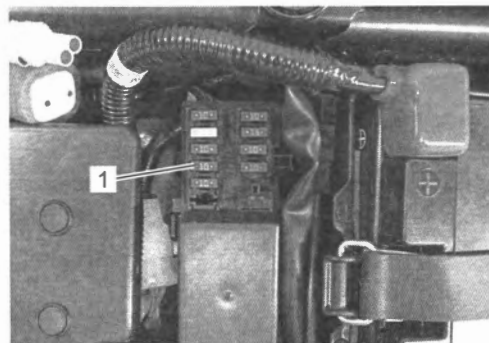
Step 3

(The ABS indicator light does not light up)

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Open the fuse box and inspect the signal fuse (10 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



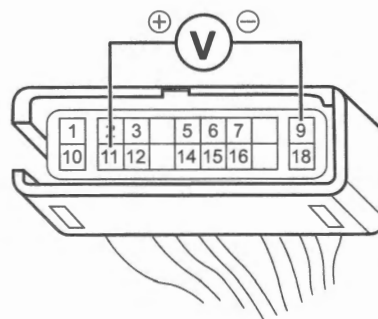
Is the signal fuse OK?

Yes Go to Step 4.

No Replace the signal fuse.

Step 4

- 1) Disconnect the ABS control unit coupler. (Page 4E-31)
- 2) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between "T11" (Br) and "T9" (B/W) at the coupler.



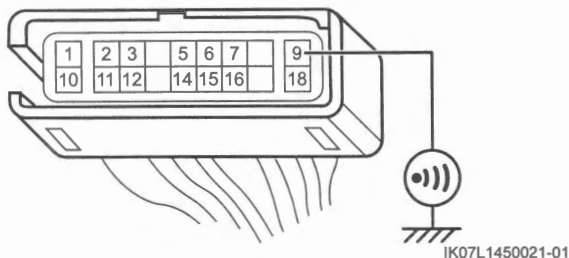
Is voltage 7.5 – 9.5 V?

Yes Go to Step 5.

- No
- Inspect the wire harness. (Faulty indicator light wire or ground wire)
 - Faulty combination meter.

Step 5

- 1) Turn the ignition switch OFF.
- 2) Check for continuity between "T9" (B/W) at the coupler and body ground.



IK07L1450021-01

Is continuity indicated?

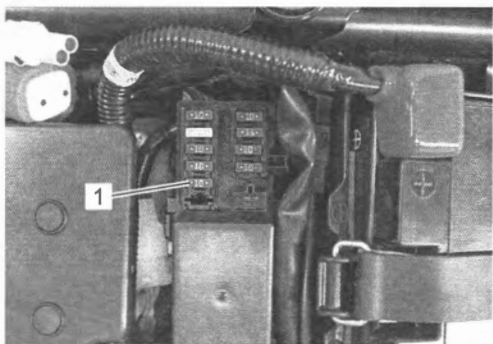
- Yes Replace the ABS control unit/HU. (Page 4E-35)
- No Inspect the wire harness. (Faulty ground wire)

Step 6**(The ABS indicator light does not go off)**

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Open the fuse box and inspect the ignition fuse (10 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



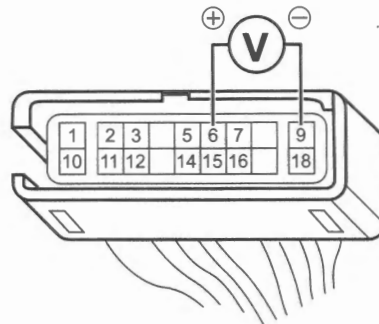
IK07L1450018-01

Is the ignition fuse OK?

- Yes Go to Step 7.
- No Replace the ignition fuse.

Step 7

- 1) Disconnect the ABS control unit coupler. (Page 4E-31)
- 2) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between "T6" (W/Y) terminal and "T9" (B/W) terminal at the coupler.



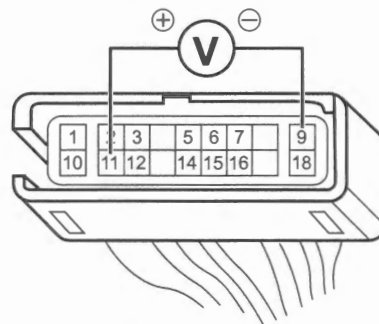
IK07L1450022-01

Is the voltage 12.0 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 "T11" (Br) terminal and "T9" (B/W) terminal at the coupler.



IK07L1450023-01

Is voltage 7.5 – 9.5 V?

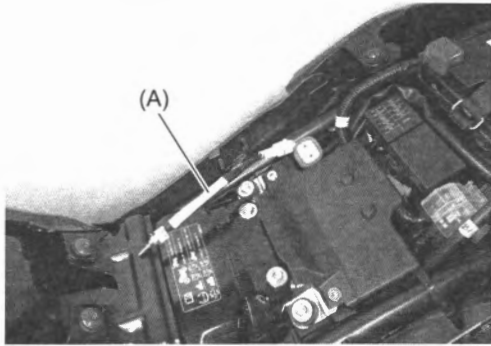
- Yes Go to Step 9.
- No Inspect the wire harness. (Faulty indicator light wire or ground wire)

Step 9

- 1) Turn the ignition switch OFF.
- 2) Short the mode select coupler (2P) terminals using the special tool.

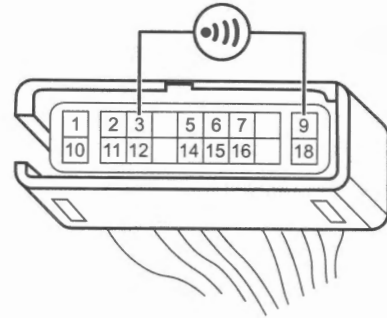
Special tool

(A): 09930-82760



IK07L1450002-01

- 3) Check for continuity between "T3" (O) and "T9" (B/W) at the coupler.



IK07L1450024-01

Is continuity indicated?

- Yes Replace the ABS control unit/HU. (Page 4E-35)
- No Inspect the wire harness. (Faulty mode select coupler wire)

DTC C1625 (25)

BENK07L24504009

Possible Cause

Wheel Speed Sensor Related Malfunction

Incorrect tire size, poor tire pressure, deformed wheel, wheel spinning, incorrect tooth count, interference at one or more wheels, permanent bad signal, etc.

Troubleshooting

Step 1

- 1) Check that the specified tires are installed. (Page 2D-15)

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-15)

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-34)

Are the rotors OK?

- Yes Go to Step 4.
- No Clean or replace the rotor.
 - Front wheel speed sensor rotor: (Page 4E-33)
 - Rear wheel speed sensor rotor: (Page 4E-33)

Step 4

- 1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge. (Page 4E-34)

Are the clearances OK?

- Yes Replace the ABS control unit/HU. (Page 4E-35)
- No Adjust the clearance.

DTC C1635 (35)

BENK07L24504010

Possible Cause

ABS Motor Malfunction

ABS motor relay circuit open or short, broken fuse for motor relay, ABS motor circuit open or short, faulty ABS motor relay, faulty ABS motor, faulty ABS control unit, etc.

Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-6).

Troubleshooting**Step 1**

- 1) Turn the ignition switch ON and check that the operation sound is heard from the ABS control unit. (Page 4E-9)

Does the ABS motor make any turning noise?

- Yes
- Faulty HU motor.
 - Replace the ABS control unit/HU. (Page 4E-35)

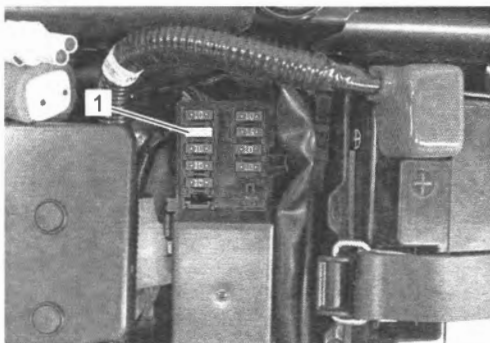
No Go to Step 2.

Step 2

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Open the fuse box inspect the ABS motor fuse (25 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



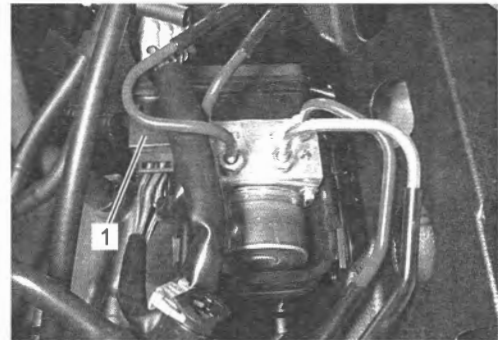
IK07L1450010-01

Is the ABS motor fuse OK?

- Yes Go to Step 3.
- No Replace the ABS motor fuse.

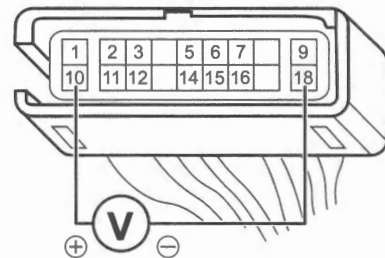
Step 3

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (Page 4E-31)



IF04K1450024-02

- 3) Measure the voltage between "T10" (R/BI) and "T18" (B) at the coupler.



IK07L1450025-01

Is voltage 12.0 V or more?

- Yes Replace the ABS control unit/HU. (Page 4E-35)
- No Inspect the wire harness. (Faulty motor power supply or ground wire)

DTC C1641 (41)

BENK07L24504011

Possible Cause

Wheel Speed Sensor Signal Malfunction (F)

Too great air gap, worn or missing teeth, noise, interference between lines, loose contact in wheel speed sensor connector, wheel speed sensor not securely fastened, input amplifier in wheel speed sensor connector, wheel speed sensor not securely fastened, input amplifier in ABS control unit failure, etc.

Troubleshooting

Step 1

- 1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge. (Page 4E-34)

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-34)

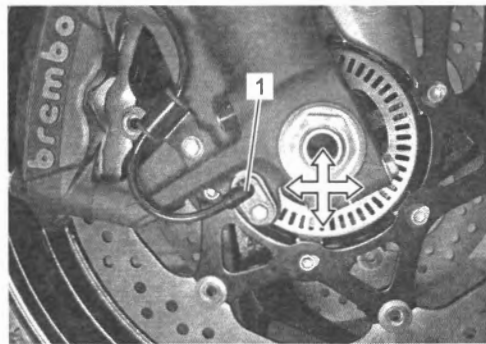
Is the sensor rotor OK?

Yes Go to Step 3.

No Clean or replace the sensor rotor. (Page 4E-33)

Step 3

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



IF04K1450026-01

Is the sensor mounted securely?

Yes Go to DTC C1642 (42). (Page 4E-23)

No Tighten the mounting bolt.

DTC C1642 (42)

BENK07L24504012

Possible Cause

Wheel Speed Sensor Circuit Open (F)

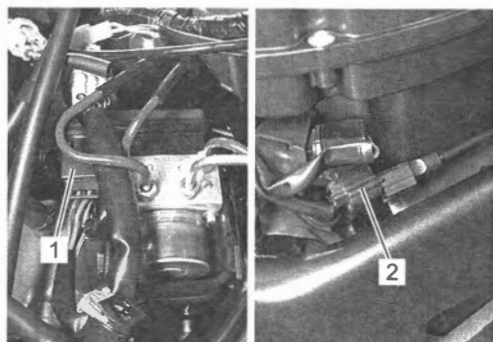
Wheel speed sensor circuit open or short, loosen contact in wheel speed sensor connector, input amplifier in ABS control unit failure, etc.

Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-6).

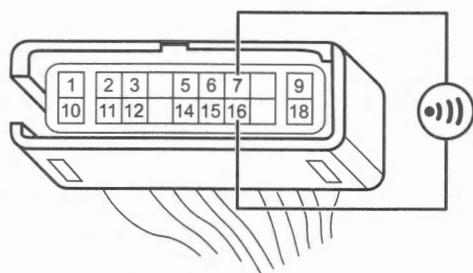
Troubleshooting**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank. (Page 1G-11)
- 3) 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-31)



IJ04K1450001-02

- 4) Check for continuity between "T16" (W/R) and "T7" (B/R) at the ABS control unit coupler.



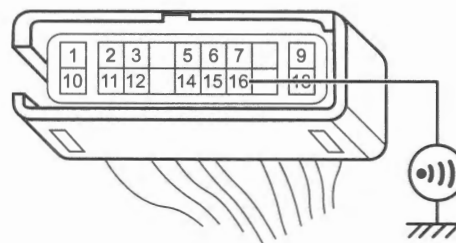
IK07L1450026-01

Is no continuity indicated?

- Yes Go to Step 2.
- No
- Inspect the wire harness. (Faulty sensor wire)
 - Faulty front wheel speed sensor. (Page 4E-31)

Step 2

- 1) Check for continuity between "T16" (W/R) and ground at the ABS control unit coupler.



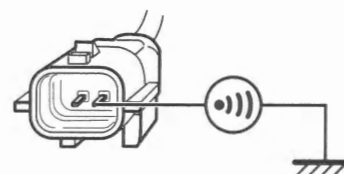
IK07L1450027-01

Is no continuity indicated?

- Yes Go to Step 4.
- No Go to Step 3.

Step 3

- 1) Disconnect the front wheel speed sensor coupler.
- 2) Check for continuity between "T1" and ground at the front wheel speed sensor coupler.



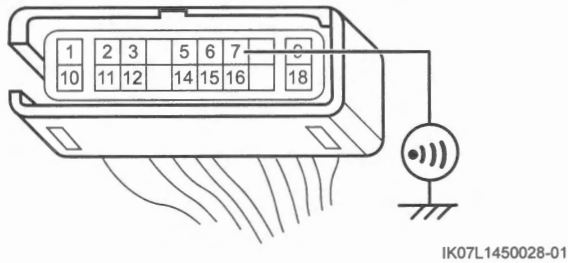
IJ04K1450002-01

Is no continuity indicated?

- Yes Inspect the wire harness. (Faulty W/R wire)
- No Faulty front wheel speed sensor. (Page 4E-31)

Step 4

- 1) Check for continuity between "T7" (B/R) and ground at the ABS control unit coupler.

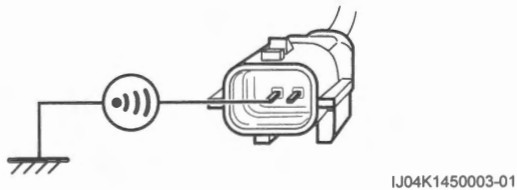


Is no continuity indicated?

- Yes Go to Step 6.
- No Go to Step 5.

Step 5

- 1) Disconnect the front wheel speed sensor coupler.
- 2) Check for continuity between "T2" and ground at the front wheel speed sensor coupler.

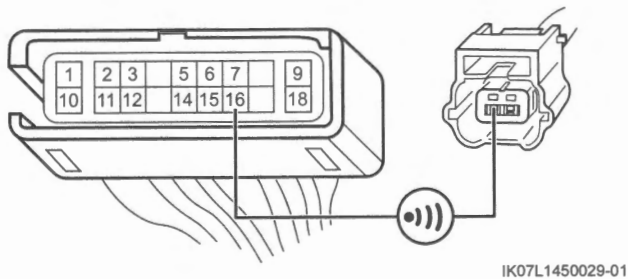


Is no continuity indicated?

- Yes Inspect the wire harness. (Faulty B/R wire)
- No Faulty front wheel speed sensor. (Page 4E-31)

Step 6

- 1) Disconnect the front wheel speed sensor coupler.
- 2) Check for continuity between "T16" (W/R) on the ABS control unit coupler and "T1" on the front wheel speed sensor coupler.

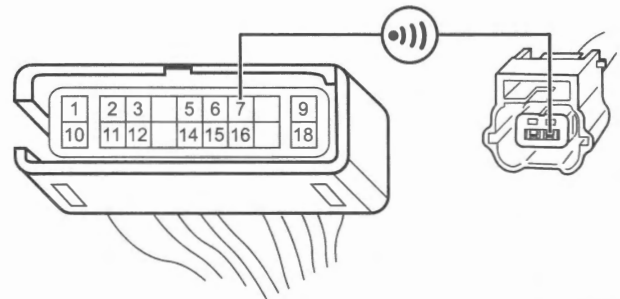


Is continuity indicated?

- Yes Go to Step 7.
- No Inspect the wire harness. (Faulty W/R wire)

Step 7

- 1) Check for continuity between "T7" (B/R) on the ABS control unit coupler and "T2" on the front wheel speed sensor coupler.



Is continuity indicated?

- Yes Go to Step 8.
- No Inspect the wire harness. (Faulty B/R wire)

Step 8

- 1) Measure the front wheel speed sensor current. Refer to "Wheel Speed Sensor Circuit" under "Wheel Speed Sensor and Sensor Rotor Inspection" (Page 4E-34).

Is check result OK?

- Yes Replace the ABS control unit/HU. (Page 4E-35)
- No Faulty front wheel speed sensor. (Page 4E-31)

DTC C1644 (44)

BENK07L24504013

Possible Cause

Wheel Speed Sensor Signal Malfunction (R)

Too great air gap, worn or missing teeth, noise, interference between lines, loose contact in wheel speed sensor connector, wheel speed sensor not securely fastened, input amplifier in ABS control unit failure, etc.

Troubleshooting

Step 1

- 1) Inspect the clearance between the rear wheel speed sensor and sensor rotor using the thickness gauge. (Page 4E-34)

Is the clearance OK?

- Yes Go to Step 2.
No Adjust the clearance.

Step 2

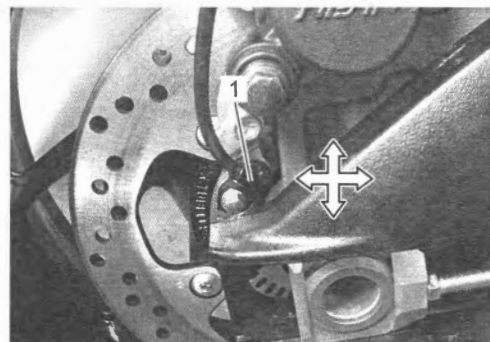
- 1) Inspect the rear wheel speed sensor rotor for damage and check that no foreign objects are caught in the rotor openings. (Page 4E-34)

Is the sensor rotor OK?

- Yes Go to Step 3.
No Clean or replace the sensor rotor. (Page 4E-33)

Step 3

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



IF04K1450034-01

Is the sensor mounted securely?

- Yes Go to DTC C1645 (45). (Page 4E-26)
No Tighten the mounting bolt.

DTC C1645 (45)

BENK07L24504014

Possible Cause

Wheel Speed Sensor Circuit Open (R)

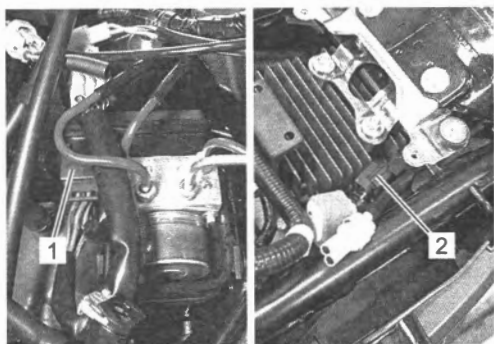
Wheel speed sensor circuit open or short, loosen contact in wheel speed sensor connector, input amplifier in ABS control unit failure, etc.

Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-6).

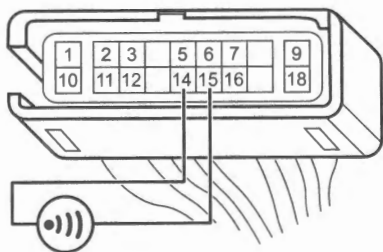
Troubleshooting**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank. (Page 1G-11)
- 3) Remove the rectifier cover. (Page 1J-7)
- 4) 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-31)



IK07L1450011-01

- 5) Check for continuity between "T15" (W/Y) and "T14" (B/Y) at the ABS control unit coupler.



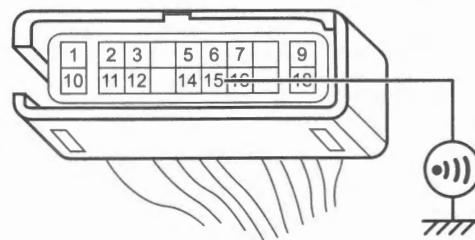
IK07L1450031-01

Is no continuity indicated?

- Yes Go to Step 2.
- No
- Inspect the wire harness. (Faulty sensor wire)
 - Faulty rear wheel speed sensor. (Page 4E-32)

Step 2

- 1) Check for continuity between "T15" (W/Y) and ground at the ABS control unit coupler.



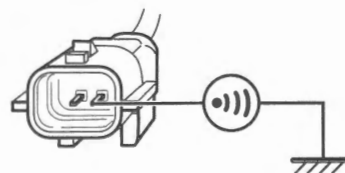
IK07L1450032-01

Is no continuity indicated?

- Yes Go to Step 4.
- No Go to Step 3.

Step 3

- 1) Disconnect the rear wheel speed sensor coupler.
- 2) Check for continuity between "T1" and ground at the rear wheel speed sensor coupler.



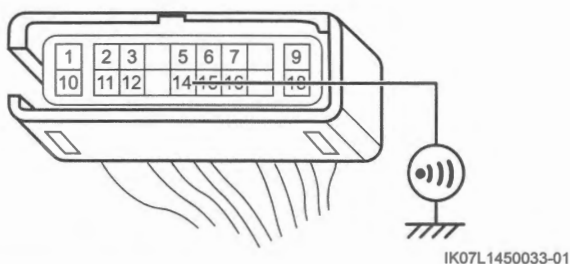
IJ04K1450007-01

Is no continuity indicated?

- Yes Inspect the wire harness. (Faulty W/Y wire)
- No Replace the rear wheel speed sensor. (Page 4E-32)

Step 4

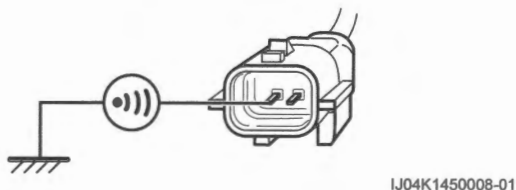
- 1) Check for continuity between "T14" (B/Y) and ground at the ABS control unit coupler.

**Is no continuity indicated?**

- Yes Go to Step 6.
No Go to Step 5.

Step 5

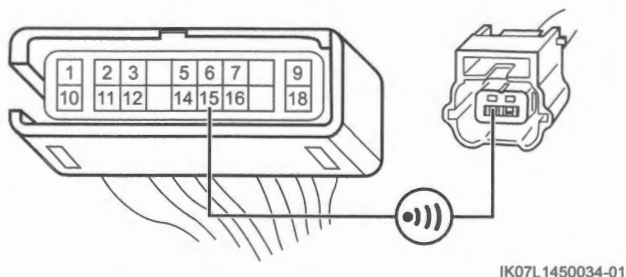
- 1) Disconnect the rear wheel speed sensor coupler.
- 2) Check for continuity between "T2" and ground at the rear wheel speed sensor coupler.

**Is no continuity indicated?**

- Yes Inspect the wire harness. (Faulty B/Y wire)
No Replace the rear wheel speed sensor.
☞ (Page 4E-32)

Step 6

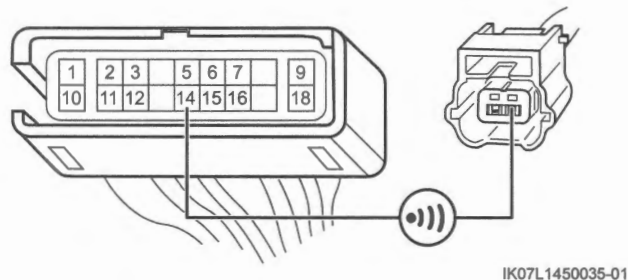
- 1) Disconnect the rear wheel speed sensor coupler.
- 2) Check for continuity between "T15" (W/Y) on the ABS control unit coupler and "T1" on the rear wheel speed sensor coupler.

**Is continuity indicated?**

- Yes Go to Step 7.
No Inspect the wire harness. (Faulty W/Y wire)

Step 7

- 1) Check for continuity between "T14" (B/Y) on the ABS control unit coupler and "T2" on the rear wheel speed sensor coupler.

**Is continuity indicated?**

- Yes Go to Step 8.
No Inspect the wire harness. (Faulty B/Y wire)

Step 8

- 1) Measure the rear wheel speed sensor current. Refer to "Wheel Speed Sensor Current" under "Wheel Speed Sensor and Sensor Rotor Inspection" (Page 4E-34).

Is check result OK?

- Yes Replace the ABS control unit/HU. ☞ (Page 4E-35)
No Replace the rear wheel speed sensor.
☞ (Page 4E-32)

DTC C1647 (47) / C1648 (48)

BENK07L24504015

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.

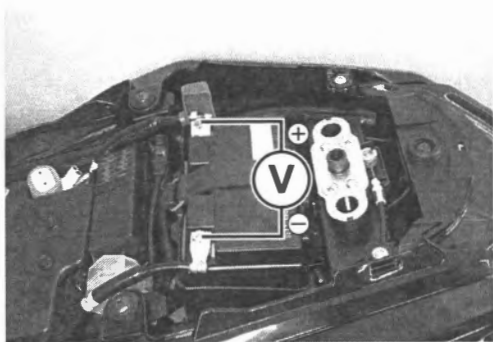
Wiring Diagram

Refer to "ABS Control Unit / HU Diagram" (Page 4E-6).

Troubleshooting

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Measure the voltage between the (+) and (-) battery terminals.



IK07L1450012-01

Is voltage 12 V or more?

Yes Go to Step 2.

No Charge or replace the battery. (Page 1J-9)

Step 2

- 1) Measure the regulated voltage between the battery terminals. (Page 1J-3)

Is the regulated voltage OK?

Yes Go to Step 3.

No Inspect the generator and regulator/rectifier.

- Generator: (Page 1J-4)
- Regulator/rectifier: (Page 1J-2)

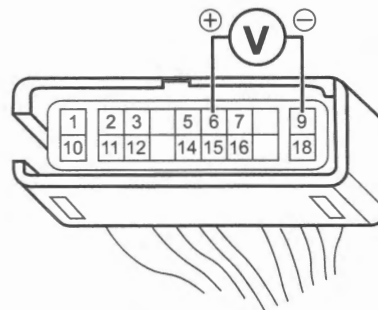
Step 3

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank. (Page 1G-11)
- 3) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (Page 4E-31)



IF04K1450044-02

- 4) Start the engine at 5000 r/min with the dimmer switch set to HI.
- 5) Measure the voltage between "T6" (W/Y) and "T9" (B/W) at the coupler.



IK07L1450036-01

Is voltage same as Step 2?

Yes Replace the ABS control unit/HU. (Page 4E-35)

No Inspect the wire harness. (Faulty ignition or ground wire)

DTC C1655 (55)

BENK07L24504016

Possible Cause

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-34)

Are the clearances OK?

- Yes Go to Step 2.
 No Adjust the clearance.

Step 2

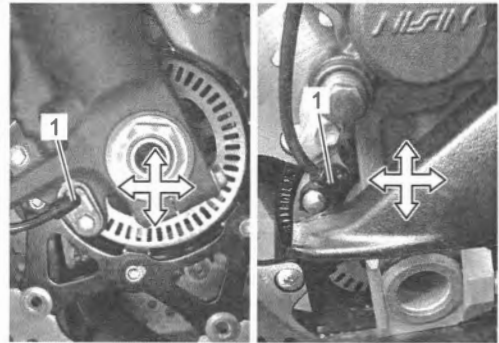
- 1) Inspect both of the wheel speed sensor rotors for damage and check that no foreign objects are caught in the rotor openings. (Page 4E-34)

Are the rotors OK?

- Yes Go to Step 3.
 No Clean or replace the rotor.
- Front wheel speed sensor rotor: (Page 4E-33)
 - Rear wheel speed sensor rotor: (Page 4E-33)

Step 3

- 1) Check that the front and rear wheel speed sensors (1) are mounted securely.



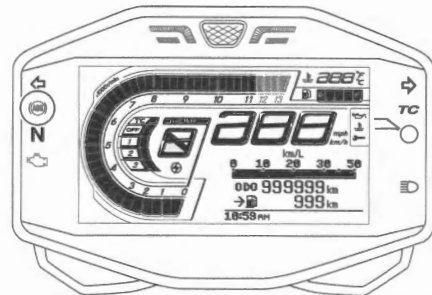
IF04K1450046-01

Are the sensors mounted securely?

- Yes Go to Step 4.
 No Tighten the mounting bolts.

Step 4

- 1) Delete DTCs (Page 4E-14) and repeat the code output procedure. (Page 4E-12)



IK07L1450013-01

Is the DTC C1655 (55) output again?

- Yes Replace the ABS control unit/HU. (Page 4E-35)
 No Intermittent trouble.

DTC C1661 (61)

BENK07L24504017

Possible Cause

ABS Solenoid Malfunction

ABS valve relay circuit open or short, broken fuse for valve relay, faulty ABS valve relay, interruption of valve, failure output from ABS control unit, etc.

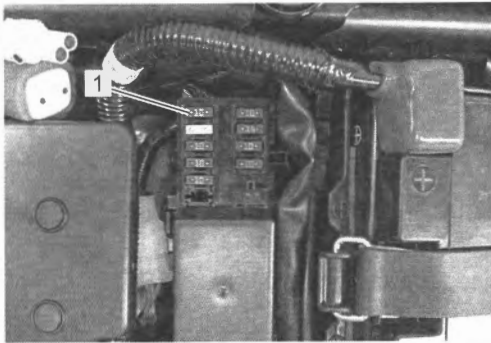
Troubleshooting

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Open the fuse box and inspect the ABS valve fuse (10 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



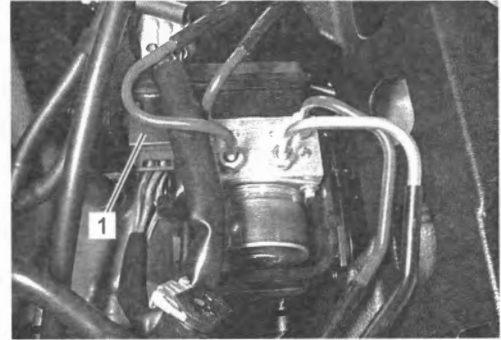
IK07L1450014-02

Is the ABS valve fuse OK?

- Yes Go to Step 2.
- No Replace the ABS valve fuse.

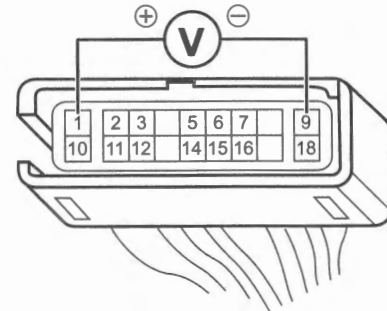
Step 2

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (Page 4E-31)



IF04K1450048-02

- 3) Measure the voltage between "T1" (R/B) and "T9" (B/W) at the coupler.



IK07L1450037-01

Is voltage 12.0 V or more?

- Yes Replace the ABS control unit/HU. (Page 4E-35)
- No Inspect the wire harness. (Faulty solenoid or ground wire)

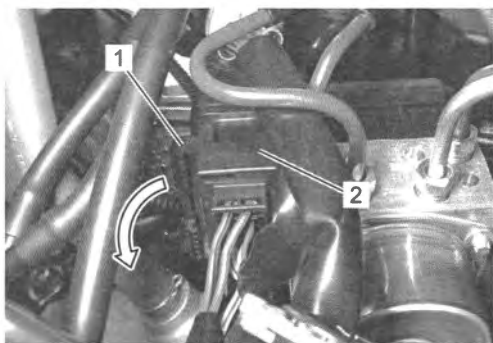
Repair Instructions

ABS Control Unit Coupler Disconnection and Reconnection

BENK07L24506001

Disconnection

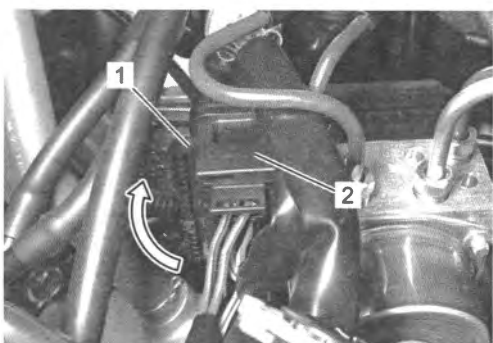
- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank. (Page 1G-11)
- 3) Turn the lock lever (1) in direction of arrow until and disconnect the ABS control unit coupler (2).



IF04K1450050-02

Reconnection

- 1) Make sure that lock lever (1) is in unlock position.
- 2) Insert the coupler (2) to ABS control unit it stop with lock lever in unlocked position.
- 3) Turn the lock lever in direction of arrow to lock the coupler securely.



IF04K1450051-02

- 4) Install the fuel tank. (Page 1G-11)

Front Wheel Speed Sensor Removal and Installation

BENK07L24506002

Refer to "Front Wheel Speed Sensor Routing Diagram" (Page 4E-7).

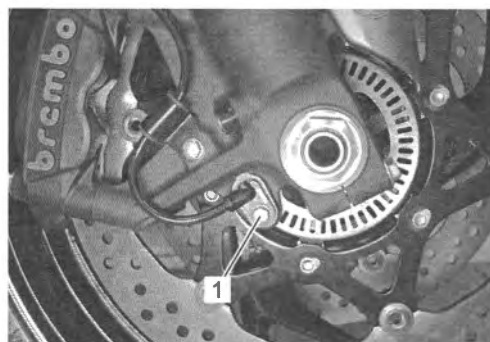
Removal

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank. (Page 1G-11)
- 3) Disconnect the front wheel speed sensor coupler (1).



IF04K1450052-02

- 4) Remove the front wheel speed sensor mounting bolt (1).



IF04K1450053-01

- 5) Remove the front wheel speed sensor.

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-34).

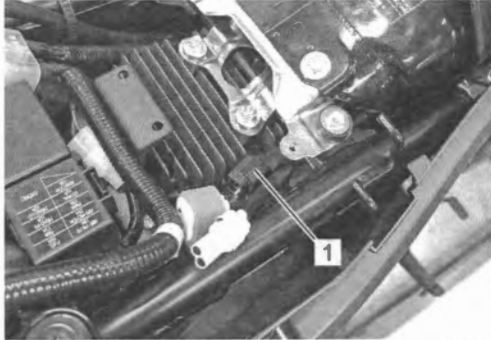
Rear Wheel Speed Sensor Removal and Installation

BENK07L24506003

Refer to "Rear Wheel Speed Sensor Routing Diagram" (Page 4E-8).

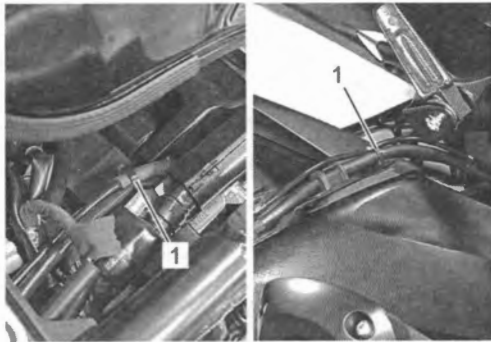
Removal

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank. (Page 1G-11)
- 3) Remove the rectifier cover. (Page 1J-7)
- 4) Disconnect the rear wheel speed sensor coupler (1).



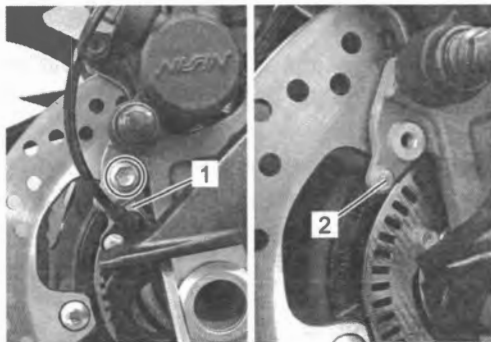
IK07L1450015-01

- 5) Remove the clamps (1).



IK07L1450016-01

- 6) Remove the rear wheel speed sensor bracket (1).
- 7) Remove the pin (2).



IF04K1450073-01

- 8) Remove the rear wheel speed sensor (1).



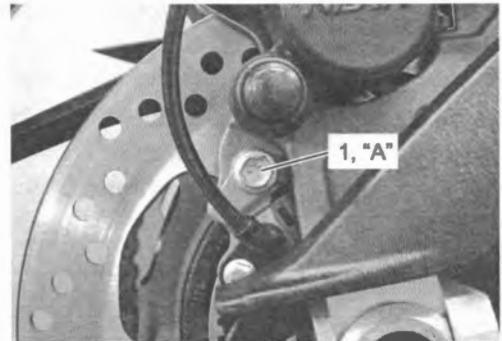
IF04K1450055-02

Installation

Install the rear wheel speed sensor in the reverse order of removal. Pay attention to the following points:

- Apply thread lock to the rear wheel speed sensor bracket bolt (1) and tighten it.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)



IF04K1450074-02

- After installing the rear wheel speed sensor, check the clearance between the rear wheel speed sensor and sensor rotor. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection" (Page 4E-34).

Front Wheel Speed Sensor Rotor Removal and Installation

BENK07L24506004

Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-4).

NOTICE

- Do not hit the front wheel speed sensor rotor when dismantling the front wheel.
- When replacing the tire, make sure not to damage the sensor rotor.

Removal

- 1) Remove the front wheel speed sensor rotor (1).



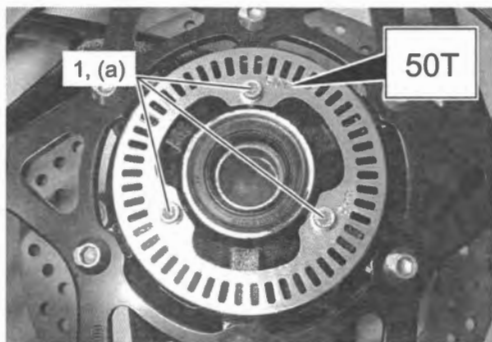
IF04K1450056-01

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

Wheel speed sensor rotor bolt (a): 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)



IF04K1450057-01

- 3) After installing the front wheel, check the clearance between the front wheel speed sensor and sensor rotor. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection" (Page 4E-34).

Rear Wheel Speed Sensor Rotor Removal and Installation

BENK07L24506005

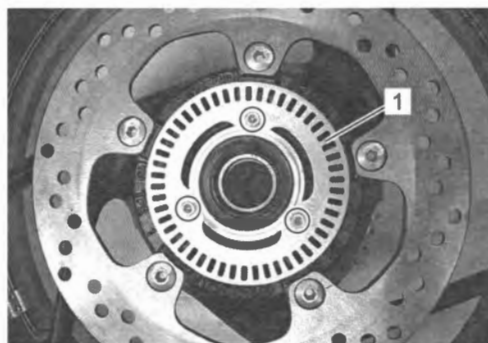
Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-10).

NOTICE

- Do not hit the rear wheel speed sensor rotor when dismantling the rear wheel.
- When replacing the tire, make sure not to damage the sensor rotor.

Removal

- 1) Remove the rear wheel speed sensor rotor (1) by removing the bolts.



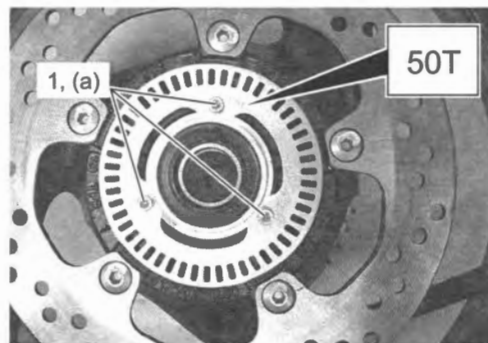
IF04K1450058-01

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

Wheel speed sensor rotor bolt (a): 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)



IF04K1450059-01

- 3) After installing the rear wheel, check the clearance between the rear wheel speed sensor and sensor rotor. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection" (Page 4E-34).

Wheel Speed Sensor and Sensor Rotor Inspection

BENK07L24506006

Wheel Speed Sensor – Sensor Rotor Clearance

Check the clearance between the wheel speed sensor (1) and sensor rotor (2) using the thickness gauge (A, B).

Special tool

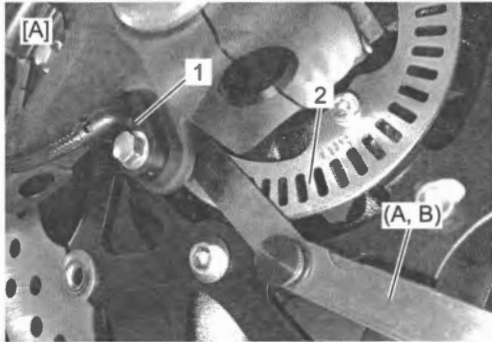
(A): 09900-20803

(B): 09900-20806

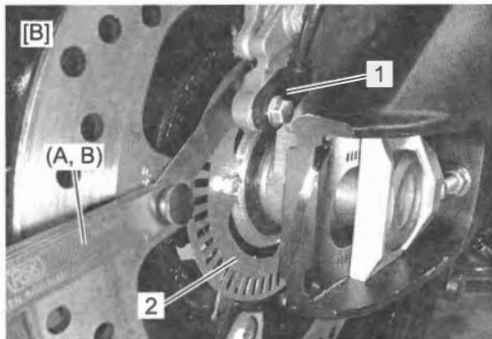
Wheel speed sensor – Sensor rotor clearance

Front [Standard]: 0.38 – 1.05 mm (0.0150 – 0.0413 in)

Rear [Standard]: 0.42 – 1.08 mm (0.0166 – 0.0425 in)



IF04K1450060-01



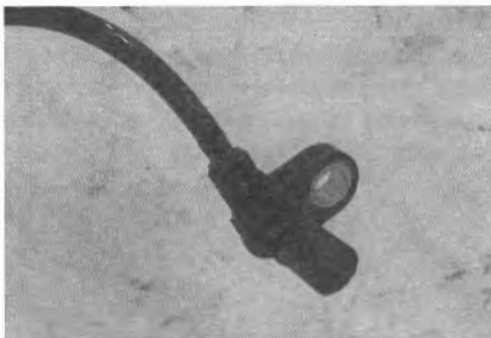
IF04K1450061-01

[A]: Front

[B]: Rear

Wheel Speed Sensor

- Remove the wheel speed sensor.
 - Front: (Page 4E-31)
 - Rear: (Page 4E-32)
- Inspect the wheel speed sensor for damage. Clean the sensor if any metal particle or foreign material stuck on it.



IE31J1450068-01

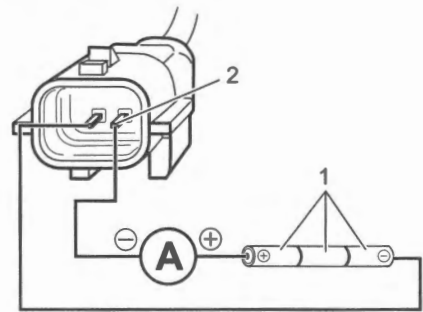
- After finishing the speed sensor inspection, install the wheel speed sensor.
 - Front: (Page 4E-31)
 - Rear: (Page 4E-32)

Wheel Speed Sensor Current

- Disconnect the wheel speed sensor coupler.
 - Front: (Page 4E-31)
 - Rear: (Page 4E-32)
- 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 "T1" (2) on the wheel speed sensor coupler.

Normal value

5.9 – 16.8 mA

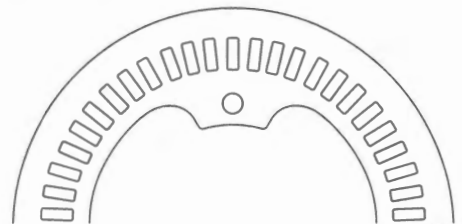


IH20K1930020-03

- Install the removed parts.

Wheel Speed Sensor Rotor

- Raise the wheel off the ground and support the motorcycle.
- 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-33)
 - Rear: (Page 4E-33)



I718H1450064-02

ABS Control Unit / HU Removal and Installation

BENK07L24506007

Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-11).

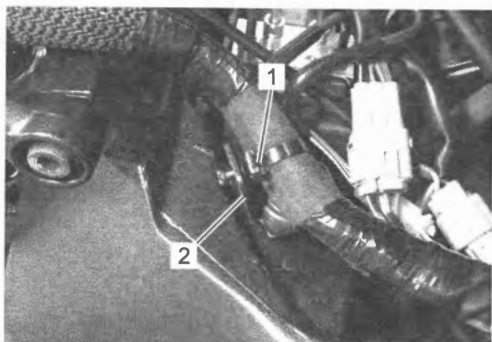
Removal**▲ WARNING**

When storing the brake fluid, seal the container completely and keep away from children.

NOTICE

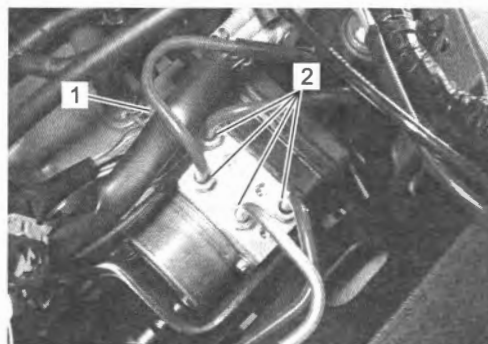
- This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not mix different types of fluid such as silicone-based or petroleum-based.
- Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for long periods.
- Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials etc. and will damage them severely.
- The ABS control unit/HU cannot be disassembled.

- 1) Turn the ignition switch OFF.
- 2) Drain the brake fluid. (Page 4A-14)
- 3) Disconnect the clamp (1) from the plate (2).



IF04K1450063-02

- 4) Disconnect the ABS control unit coupler (1). (Page 4E-31)
- 5) Loosen the flare nuts (2) and disconnect the brake pipes.



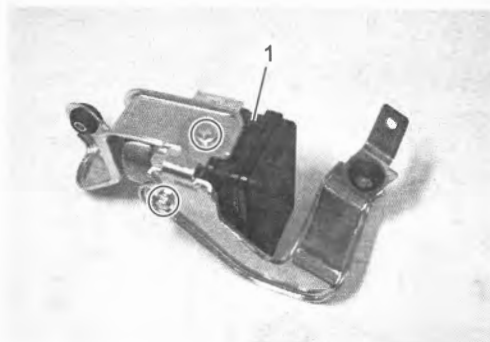
IF04K1450064-02

- 6) Remove the ABS control unit/HU assembly (1).



IF04K1450065-01

- 7) Remove the ABS control unit/HU (1) from the holder.



IF04K1450066-01

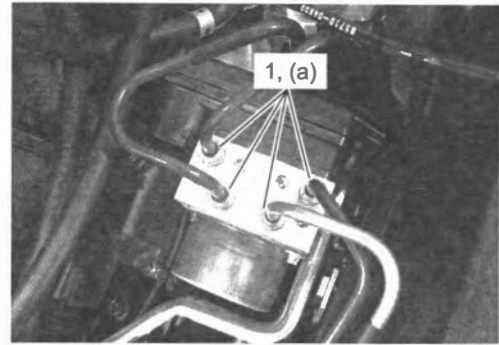
Installation

Install the ABS control unit/HU in the reverse order of removal. Pay attention to the following points:

- Make sure to hold the brake pipe when tightening the flare nut, or it may be misaligned.
- 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)



IF04K1450067-02

- Bleed air from the brake fluid circuit. (Page 4A-11)
- Check ABS control unit/HU operation. (Page 4E-15)

Specifications

Tightening Torque Specifications

BENK07L24507001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Wheel speed sensor rotor bolt	6.5	0.66	4.80	(Page 4E-33) / (Page 4E-33)
Brake pipe flare nut	16	1.6	12.0	(Page 4E-36)

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

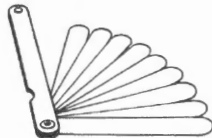
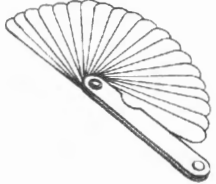
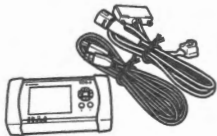
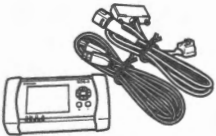
Recommended Service Material

BENK07L24508001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	(Page 4E-32)

Special Tool

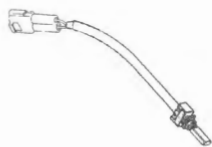
BENK07L24508002

09900-20803 Thickness gauge (Page 4E-34) 	09900-20806 Thickness gauge (Page 4E-34) 
09904-41030 SDS-II set (Page 4E-12) / (Page 4E-14) 	09904-41040 SDS-II (oscilloscope) set (Page 4E-12) / (Page 4E-14) 

09930-82760

Mode selection switch

- ☞(Page 4E-4) /
- ☞(Page 4E-14) /
- ☞(Page 4E-15) /
- ☞(Page 4E-15) /
- ☞(Page 4E-20)



Section 5

Transmission / Transaxle

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Precautions

Precautions

Precautions for Transmission / Transaxle

BENK07L25000001

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).

Manual Transmission

Diagnostic Information and Procedures

Manual Transmission Symptom Diagnosis

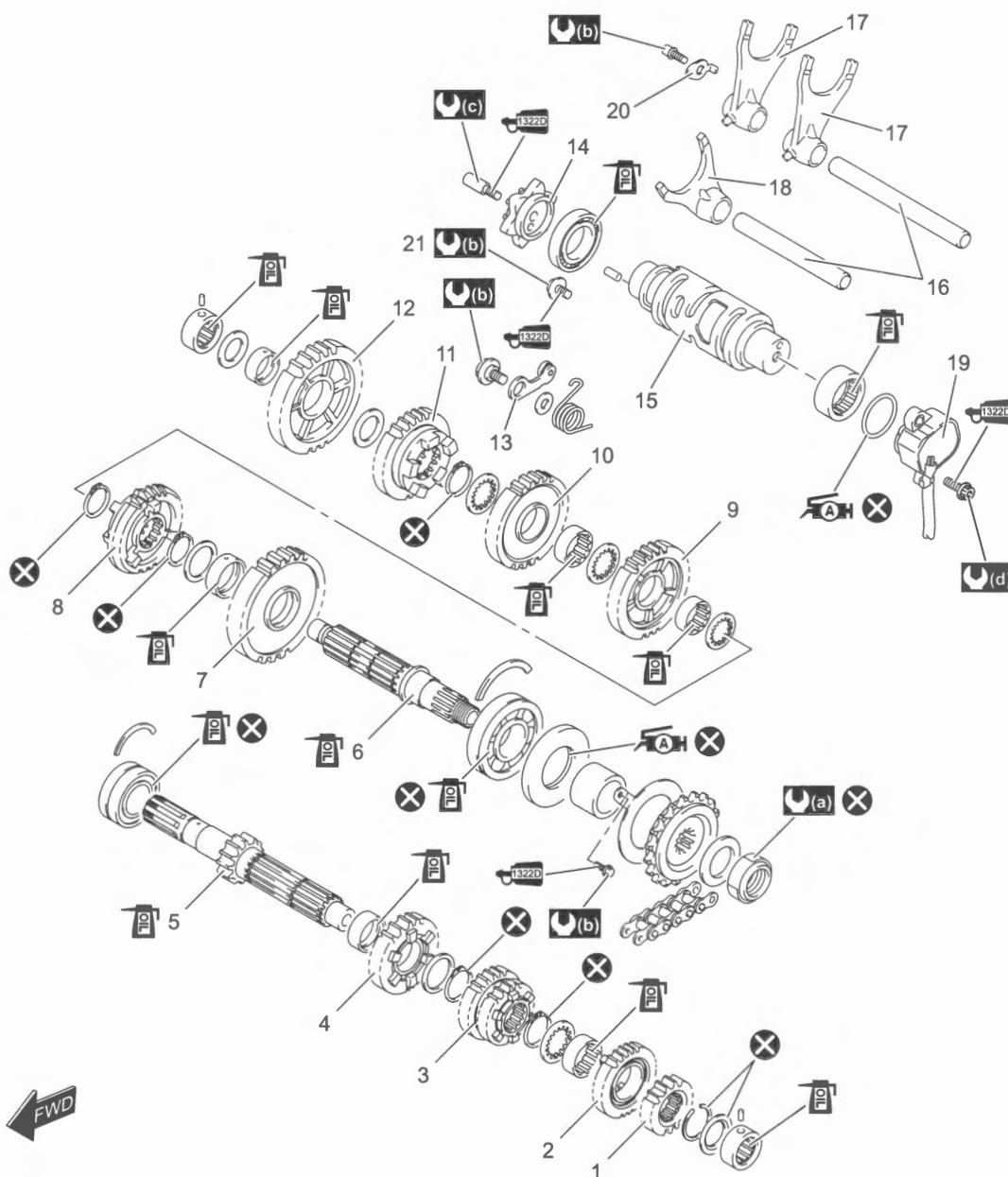
BENK07L25204001

Condition	Possible cause	Correction / Reference Item
Engine is noisy (Noise seems to come from the transmission)	Worn or rubbing gear.	Replace. ☞(Page 5B-7)
	Worn countershaft spline.	Replace countershaft. ☞(Page 5B-7)
	Worn driveshaft spline.	Replace driveshaft. ☞(Page 5B-7)
	Worn bearing.	Replace. ☞(Page 5B-7)
Transmission will not shift	Broken gearshift cam.	Replace. ☞(Page 5B-3)
	Distorted gearshift fork.	Replace. ☞(Page 5B-3)
	Worn gearshift pawl.	Replace. ☞(Page 5B-18)
Transmission will not shift back	Broken return spring on shift shaft.	Replace. ☞(Page 5B-18)
	Rubbing or stuck gearshift shaft.	Repair or replace. ☞(Page 5B-18)
	Worn or distorted gearshift fork.	Replace. ☞(Page 5B-3)
Transmission jumps out of gear	Worn shifting gears on driveshaft or countershaft.	Replace. ☞(Page 5B-7)
	Worn or distorted gearshift fork.	Replace. ☞(Page 5B-3)
	Weakened gearshift stopper spring.	Replace. ☞(Page 5B-18)
	Worn gearshift cam plate.	Replace. ☞(Page 5B-18)

Repair Instructions

Transmission Components

BENK07L25206001



IF04K1520077-04

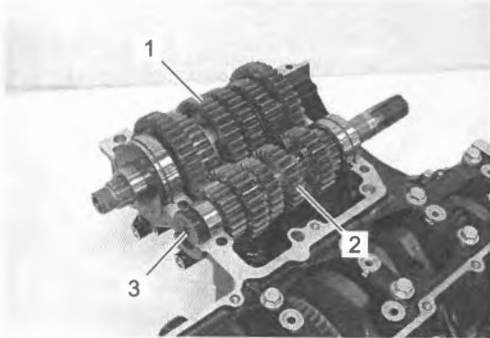
1. 2nd drive gear	11. 5th driven gear	21. Gearshift cam bearing retainer screw
2. 6th drive gear	12. 1st driven gear	(a) : 115 N·m (11.7 kgf-m, 85.0 lbf-ft)
3. 3rd/4th drive gear	13. Gearshift cam stopper	(b) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
4. 5th drive gear	14. Gearshift cam plate	(c) : 13 N·m (1.3 kgf-m, 9.5 lbf-ft)
5. Countershaft/1st drive gear	15. Gearshift cam	(d) : 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)
6. Driveshaft	16. Gearshift fork shaft	(A) : Apply grease.
7. 2nd driven gear	17. Gearshift fork No.1	1322D : Apply thread lock to the thread part.
8. 6th driven gear	18. Gearshift fork No.3	T : Apply engine oil.
9. 3rd driven gear	19. GP switch	X : Do not reuse.
10. 4th driven gear	20. Gearshift fork shaft retainer	

Transmission Removal and Installation

BENK07L25206002

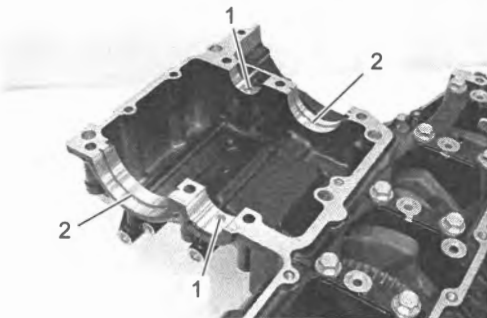
Removal

- 1) Remove the engine assembly. (Page 1D-31)
- 2) Separate the middle and lower crankcases. (Page 1D-47)
- 3) Remove the driveshaft assembly (1), countershaft assembly (2) and clutch push rod oil seal (3).



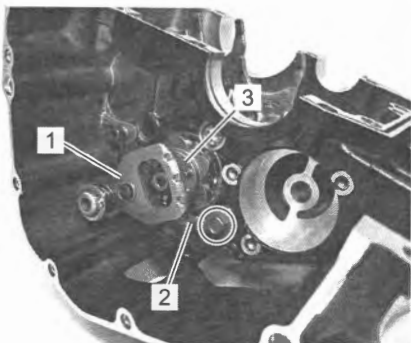
IF04K1520001-01

- 4) Remove the bearing pins (1) and C-rings (2).



IF04K1520002-01

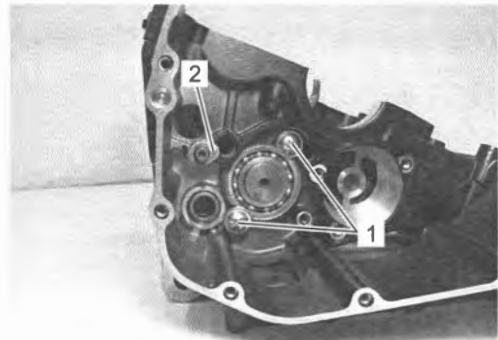
- 5) Remove the gearshift shaft assembly (1), gearshift cam stopper (2) and gearshift cam plate (3). (Page 5B-18)



IF04K1520074-01

- 6) Remove the gearshift cam bearing retainer screws (1).

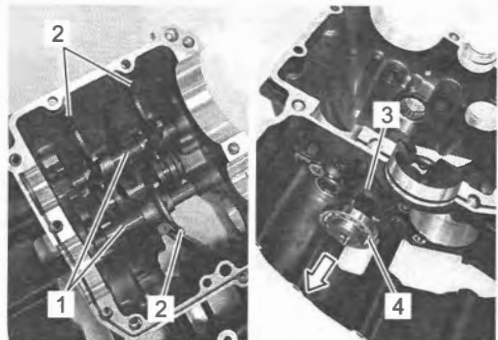
- 7) Remove the gearshift fork shaft retainer (2).



IF04K1520003-01

- 8) Remove the gearshift fork shafts (1) and gearshift forks (2).

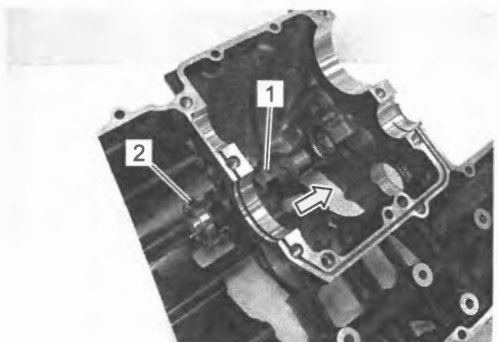
- 9) Remove the gearshift cam (3) and bearing (4).



IF04K1520004-03

Installation

- 1) Install the gearshift cam (1) with the bearing (2) fitted.



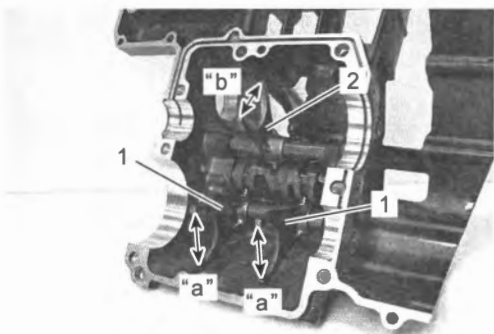
IF04K1520005-01

- 2) Install the gearshift forks No.1 (1) and No.3 (2).

NOTE

The gearshift forks No.1 (1) are same parts.

- 3) With engaging each fork end to the cam groove, insert the fork shaft.



IF04K1520006-01

"a": 40 mm (1.6 in)	"b": 36 mm (1.4 in)
---------------------	---------------------

- 4) Apply thread lock to the gearshift cam bearing retainer screws (1) and tighten them to the specified torque.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

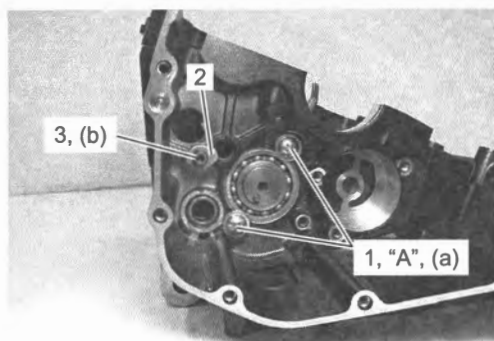
Tightening torque

Gearshift cam bearing retainer screw (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- 5) Install the gearshift fork shaft retainer (2) and tighten the gearshift arm stopper (3) to the specified torque.

Tightening torque

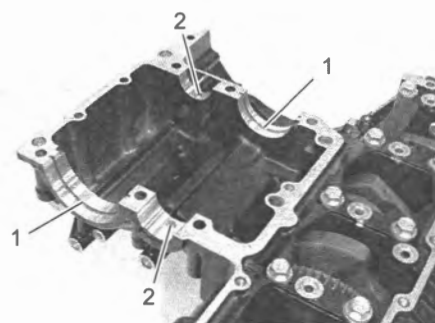
Gearshift arm stopper (b): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1520007-01

- 6) Install the gearshift cam plate, gearshift cam stopper and gearshift shaft assembly. (Page 5B-18)

- 7) Install the C-rings (1) and bearing pins (2).

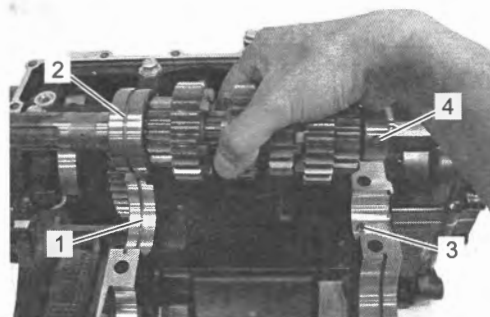


IF04K1520008-01

- 8) Install the countershaft assembly.

NOTE

Align the C-ring (1) with the groove (2) of bearing and the bearing pin (3) with the indent (4) on the bearing.

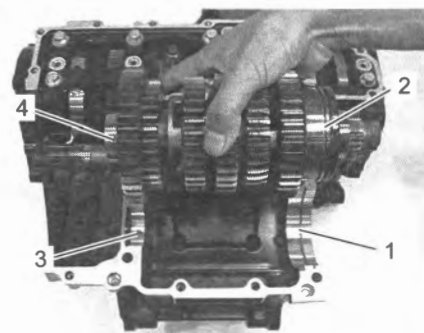


IF04K1520009-01

- 9) Install the driveshaft assembly.

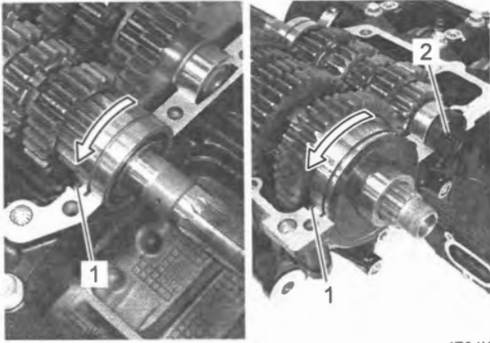
NOTE

Align the C-ring (1) with the groove (2) of bearing and the bearing pin (3) with the indent (4) on the bearing.



IF04K1520010-01

- 10) Turn the bearings and set the bearing dowel pins (1) in each position.
- 11) Install the new clutch push rod oil seal (2).



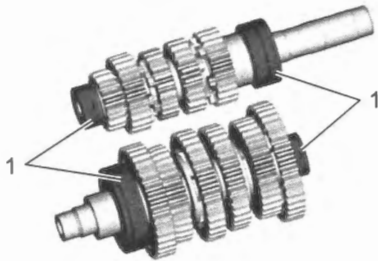
IF04K1520011-01

- 12) Reassemble the middle and lower crankcases. (Page 1D-51)

Transmission Bearing Inspection

BENK07L25206003

- 1) Remove the driveshaft assembly and countershaft assembly. (Page 5B-3)
- 2) Inspect the driveshaft and countershaft bearings (1) for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. (Page 5B-7)



IK07L1520007-01

- 3) Install the driveshaft assembly and countershaft assembly. (Page 5B-3)

Gearshift Cam Bearing (Left) / Gearshift Bearing / Oil Seal Removal and Installation

BENK07L25206004

Refer to "Transmission Removal and Installation" (Page 5B-3).

Removal

NOTE

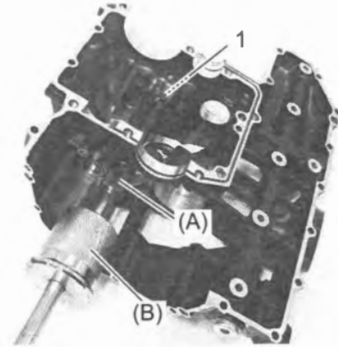
If there is no abnormal condition, the oil seal and bearing removal is not necessary.

- 1) Remove the gearshift cam bearing (left) (1) with the special tools.

Special tool

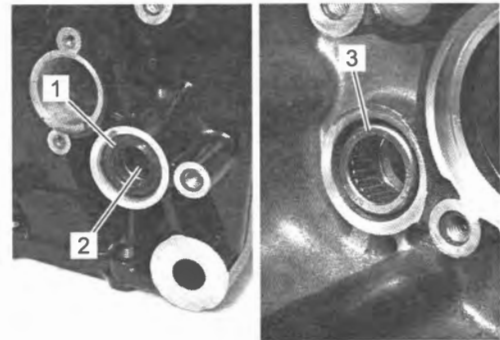
(A): 09923-74511

(B): 09930-30104



IF04K1520012-01

- 2) Remove the gearshift shaft oil seal (1) and gearshift shaft bearings (2) and (3). (Page 5B-21)



IF04K1520013-01

Installation

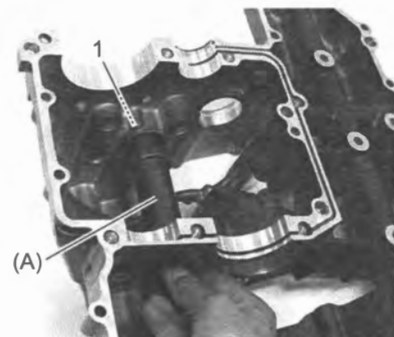
- 1) Install the new gearshift shaft bearings and new gearshift shaft oil seal. (Page 5B-21)
- 2) Install the new gearshift cam bearing (1) with the special tool.

NOTE

The stamped mark side of the gearshift cam bearing faces gearshift cam side.

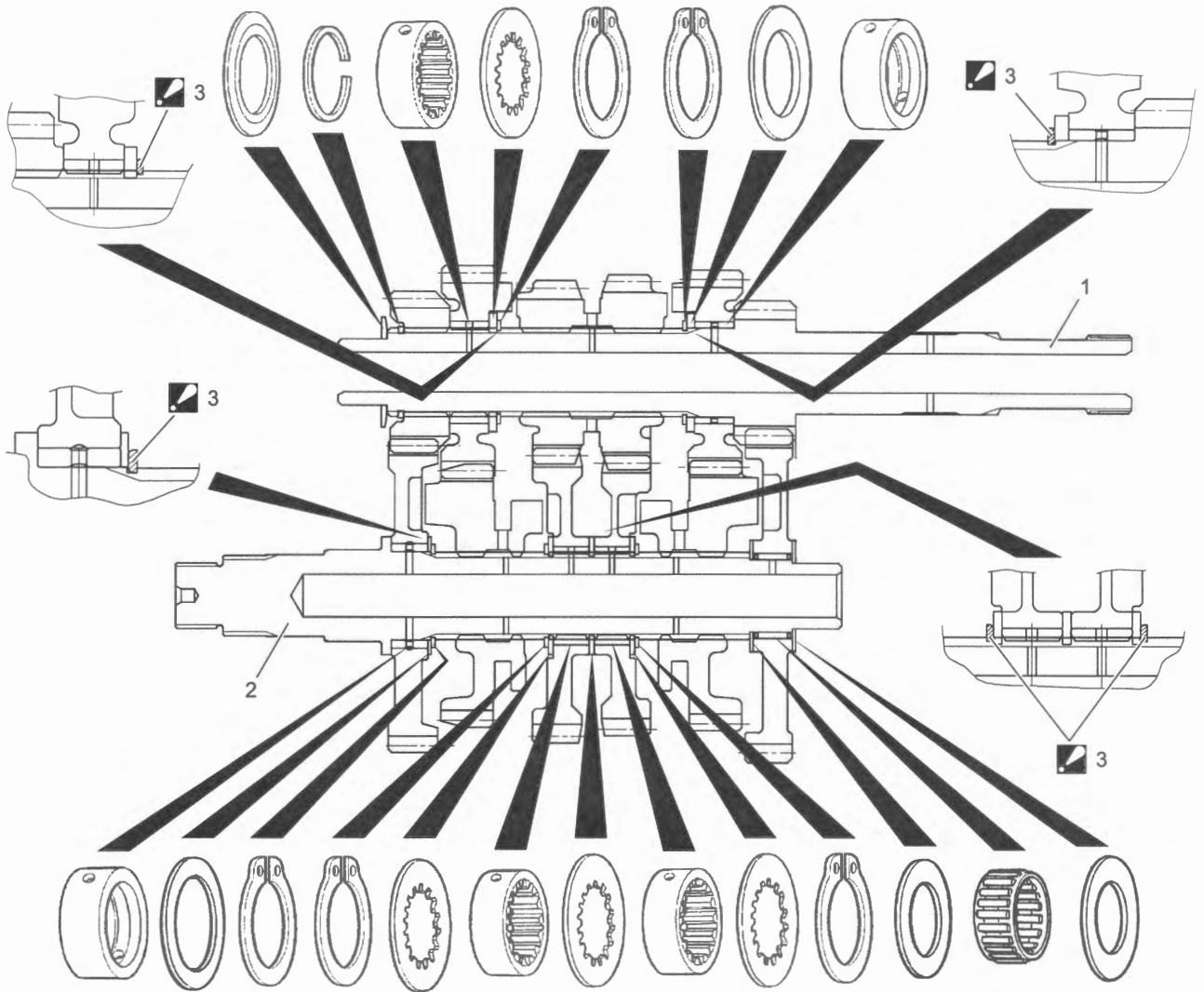
Special tool

(A): 09913-70210



IF04K1520014-02

Transmission Construction



IF04K1520072-02

<p>1. Countershaft</p>	<p>2. Driveshaft</p>	<p>3. Snap ring : Face the sharp edge outside.</p>
------------------------	----------------------	--

Countershaft Gear / Driveshaft Gear Disassembly and Reassembly

BENK07L25206006

Refer to "Transmission Removal and Installation" (Page 5B-3).

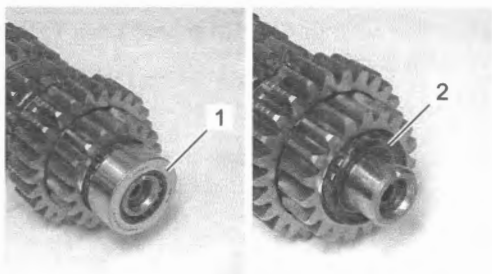
Disassembly

▲ CAUTION

Identify the position of each removed part.
Organize the parts in their respective groups
(i.e., drive or driven) so that they can be
reinstalled in their original positions.

Countershaft

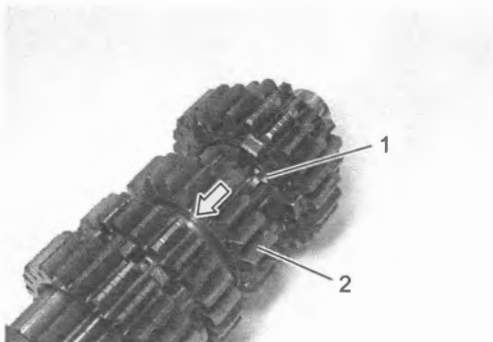
- 1) Remove the bearing (1) and oil seal (2).



IF04K1520015-01

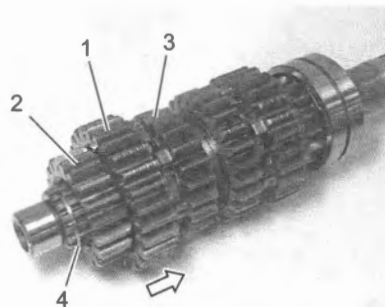
- 2) Remove the 6th drive gear snap ring (1) from its groove and slide it towards the 3rd/4th drive gears (2).

Special tool
09900-06104



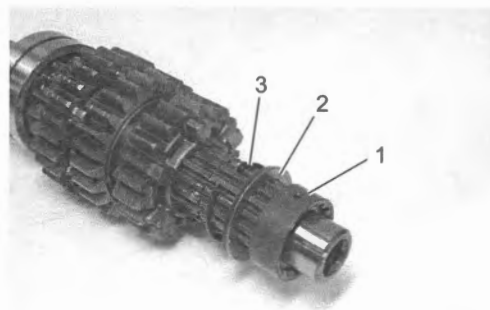
IF04K1520016-02

- 3) Slide the 6th (1) and 2nd (2) drive gears toward the 3rd/4th drive gear (3), then remove the 2nd drive gear circlip (4).
- 4) Remove the 2nd drive gear (2) and 6th drive gear (1).



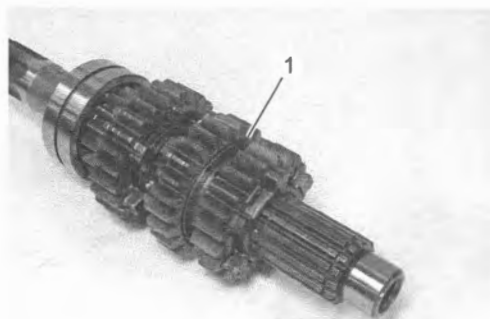
IF04K1520017-01

- 5) Remove the 6th drive gear bushing (1), washer (2) and snap ring (3).



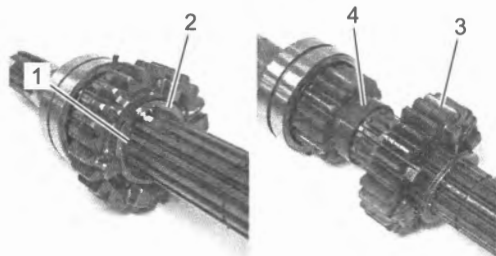
IF04K1520018-01

- 6) Remove the 3rd/4th drive gear (1).



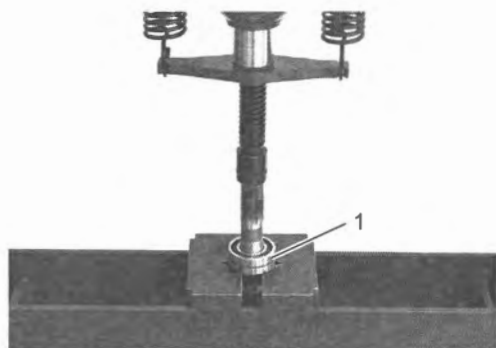
IF04K1520019-01

- 7) Remove the snap ring (1) and washer (2).
- 8) Remove the 5th drive gear (3) and 5th drive gear bushing (4).



IF04K1520020-01

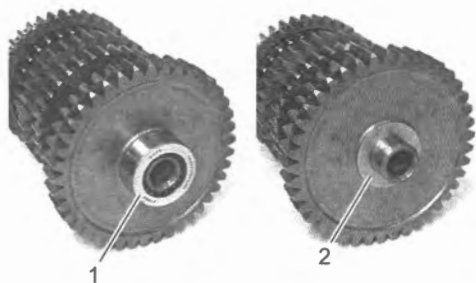
- 9) Remove the countershaft bearing (1) using hydraulic press.



IF04K1520021-01

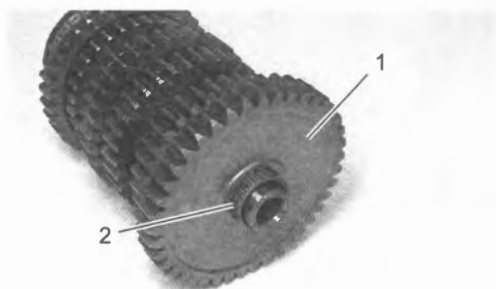
Driveshaft

- 1) Remove the bearing (1) and washer (2).



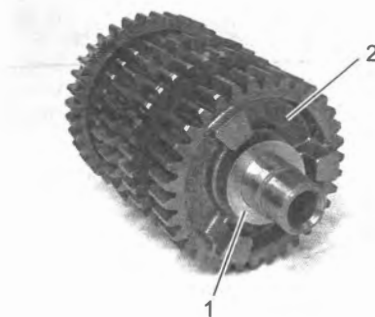
IF04K1520022-01

- 2) Remove the 1st driven gear (1) and bearing (2).



IF04K1520023-01

- 3) Remove the washer (1) and 5th driven gear (2).

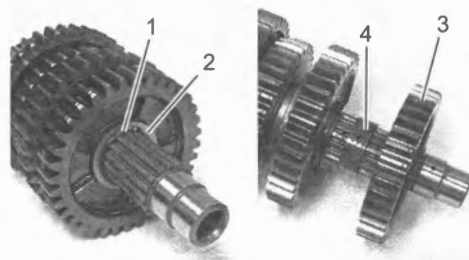


IF04K1520024-01

- 4) Remove the snap ring (1) with the special tool.

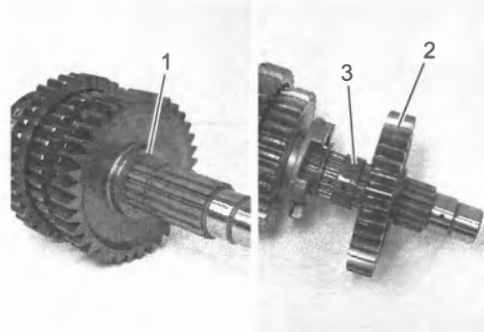
Special tool
09900-06107

- 5) Remove the washer (2), 4th driven gear (3) and 4th driven gear bushing (4).



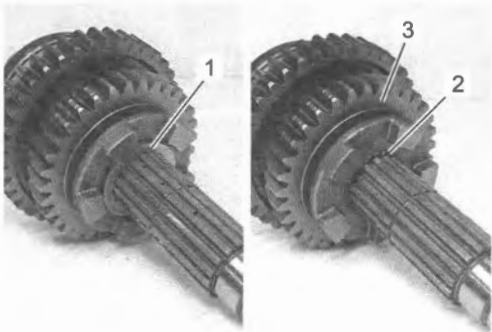
IF04K1520025-01

- 6) Remove the washer (1), 3rd driven gear (2) and 3rd driven gear bushing (3).



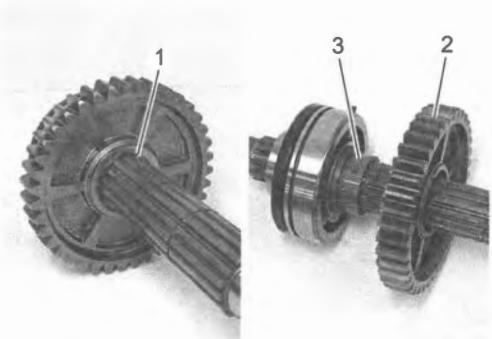
IF04K1520026-01

- 7) Remove the washer (1), snap ring (2) and 6th driven gear (3).



IF04K1520027-01

- 8) Remove the snap ring (1), 2nd driven gear (2) and 2nd driven gear bushing (3).



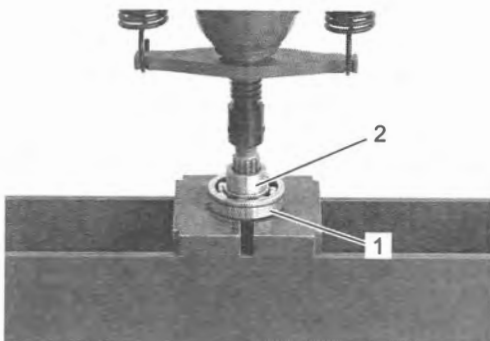
IF04K1520028-01

- 9) Remove the oil seal (1).



IF04K1520029-01

- 10) Remove the driveshaft bearing (1), engine sprocket spacer (2) using hydraulic press.

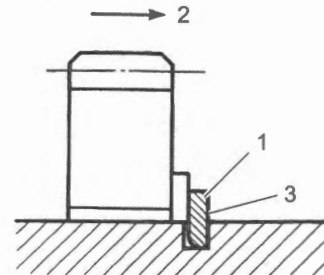


IF04K1520030-01

Reassembly

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-6).
 - When installing a new snap ring, do not expand the end gap larger than required to slip the snap ring over the shaft.
 - After installing a snap ring, make sure that it is completely seated in the groove and securely fitted.
 - Rotate the bearing by hand to inspect if there is any abnormal noise and for smooth rotation. Replace the bearing if there is anything unusual.
 - Before installing the gears, apply engine oil to the driveshaft and countershaft.
-
- 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.



IF04K1520031-01

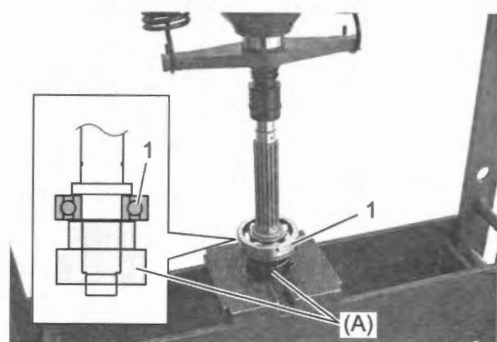
3. Sharp edge

Driveshaft

- Install the driveshaft bearing (1) using a hydraulic press and special tool.

Special tool

(A): 09913-70210

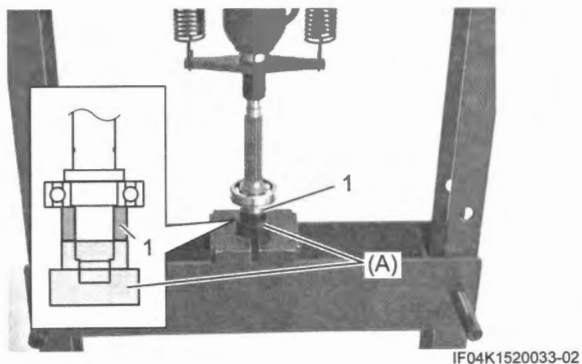


IF04K1520032-02

- Install the engine sprocket spacer (1) using a hydraulic press and special tool.

Special tool

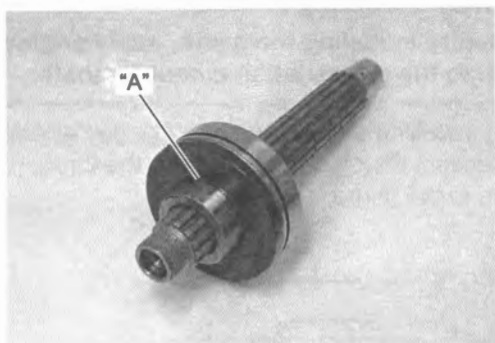
(A): 09913-70210



IF04K1520033-02

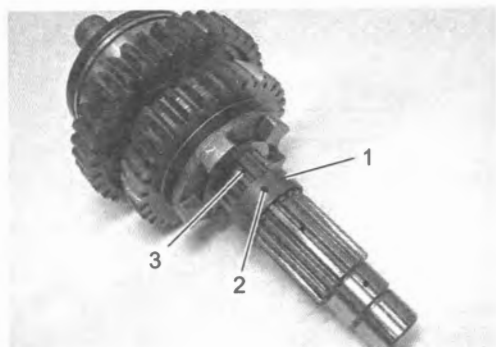
- Apply grease to the new oil seal lip.

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



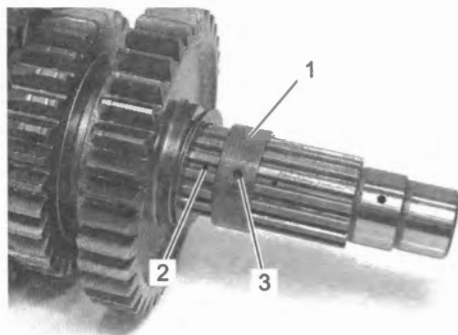
IF04K1520075-01

- When installing the 3rd driven gear bushing (1) onto the driveshaft, align the shaft oil hole (2) with the bushing oil hole (3).



IF04K1520034-01

- When installing the 4th driven gear bushing (1) onto the driveshaft, align the shaft oil hole (2) with the bushing oil hole (3).



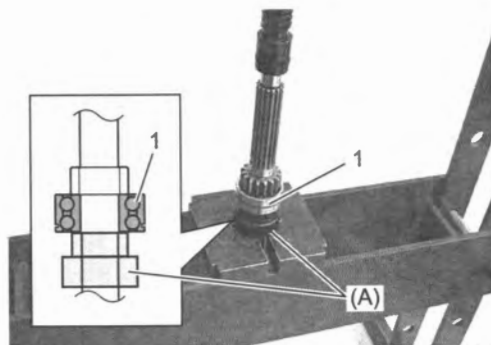
IF04K1520035-01

Countershaft

- Install the countershaft bearing (1) using a hydraulic press and special tool.

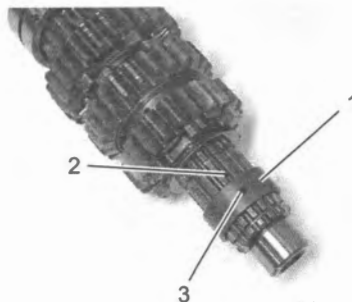
Special tool

(A): 09913-70210



IF04K1520036-04

- When installing the 6th drive gear bushing (1) onto the countershaft, align the shaft oil hole (2) with the bushing oil hole (3).



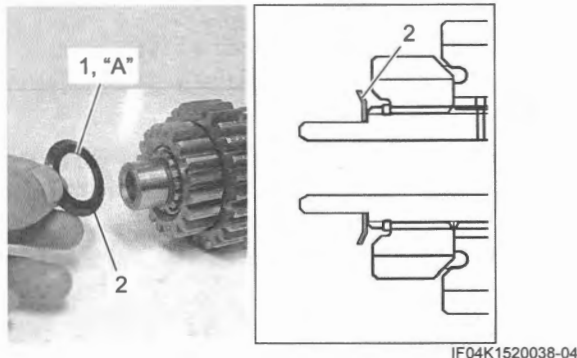
IF04K1520037-01

- Apply grease to the new oil seal lip (1).

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

NOTE

The oil seal (2) is directional. Install the oil seal (2) as shown in the illustration.



Gearshift Fork / Gearshift Cam Inspection

BENK07L25206007

Refer to "Transmission Removal and Installation" (Page 5B-3) and "Countershaft Gear / Driveshaft Gear Disassembly and Reassembly" (Page 5B-7).

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 the 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)

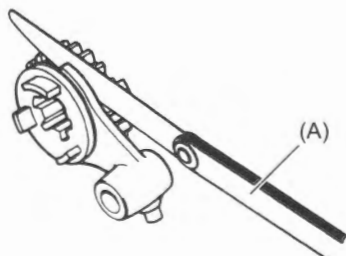
[Limit]: 0.5 mm (0.019 in)

No.3 [Standard]: 0.1 – 0.3 mm (0.004 – 0.011 in)

[Limit]: 0.5 mm (0.019 in)

Special tool

(A): 09900-20803



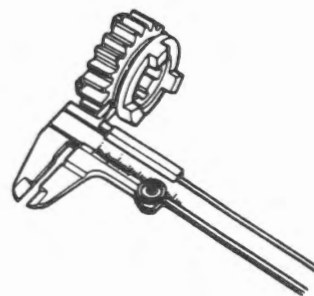
Gearshift Fork Groove Width

Measure the gearshift fork groove width using the vernier calipers.

Gearshift fork groove width

No.1 [Standard]: 5.0 – 5.1 mm (0.197 – 0.200 in)

No.3 [Standard]: 5.0 – 5.1 mm (0.197 – 0.200 in)



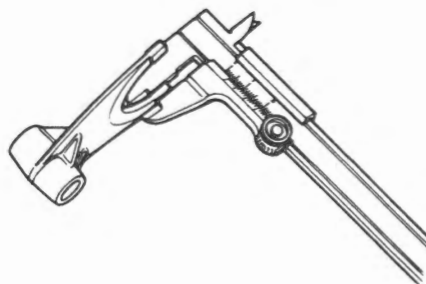
Gearshift Fork Thickness

Measure the gearshift fork thickness using the vernier calipers.

Gearshift fork thickness

No.1 [Standard]: 4.8 – 4.9 mm (0.189 – 0.192 in)

No.3 [Standard]: 4.8 – 4.9 mm (0.189 – 0.192 in)



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.



Gearshift Cam Bearing

Inspect the gearshift cam bearings, left and right for abnormal noise and smooth rotation.

Replace the bearing if there is anything unusual. Refer to "Gearshift Cam Bearing (Left) / Gearshift Bearing / Oil Seal Removal and Installation" (Page 5B-5).



IF04K1520073-01

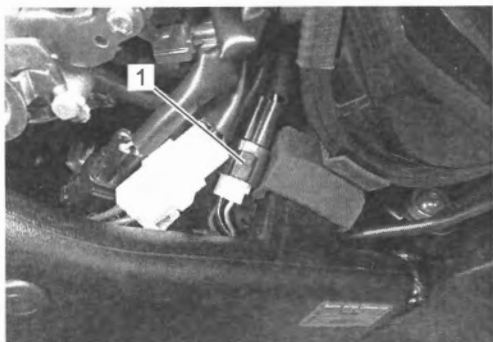
GP Switch Inspection

BENK07L25206008

- 1) Turn the ignition switch OFF.
- 2) Remove the left frame front cover assembly. (Page 9D-34)
- 3) Disconnect the GP switch coupler (1).

NOTICE

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



IK07L1520001-01

- 4) Check the continuity between BI and B/W lead wires with the transmission in "NEUTRAL".

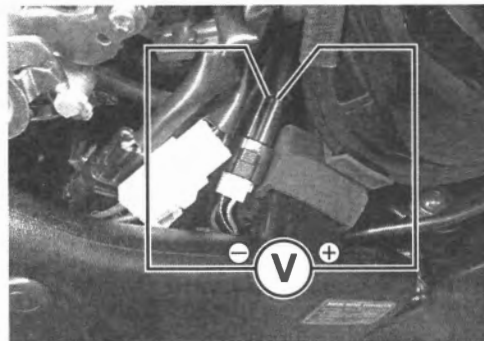
	BI	B/W
ON (Neutral)	○ ————— ○	
OFF (Except neutral)		

I649G1190045-03

- 5) Connect the GP switch coupler to the wiring harness.
- 6) Support the motorcycle with a jack.
- 7) Turn the ignition switch ON and side-stand to upright position.
- 8) Measure the voltage between P and B/W lead wires when shifting the gearshift lever from low to top.

GP switch voltage

- 1st [Standard]: Approx. 1.80 V
- 2nd [Standard]: Approx. 2.26 V
- 3rd [Standard]: Approx. 3.00 V
- 4th [Standard]: Approx. 3.66 V
- 5th [Standard]: Approx. 4.36 V
- 6th [Standard]: Approx. 4.69 V



IK07L1520002-01

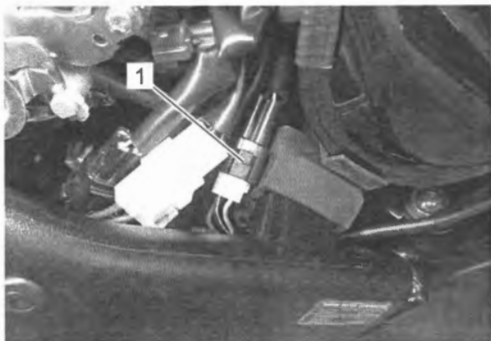
- 9) Turn the ignition switch OFF.
- 10) After finishing the GP switch inspection, install the removed parts.

GP Switch Removal and Installation

BENK07L25206009

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the left frame front cover assembly. (Page 9D-34)
- 3) Disconnect the GP switch coupler (1).



IK07L1520001-01

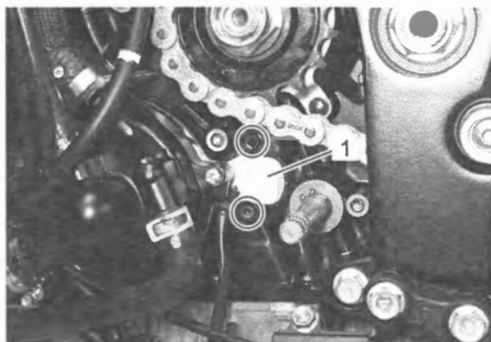
- 4) Remove the clamp (1).



IK07L1520003-01

- 5) Remove the engine sprocket cover. Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-10).

- 6) Remove the GP switch (1).



IF04K1520046-01

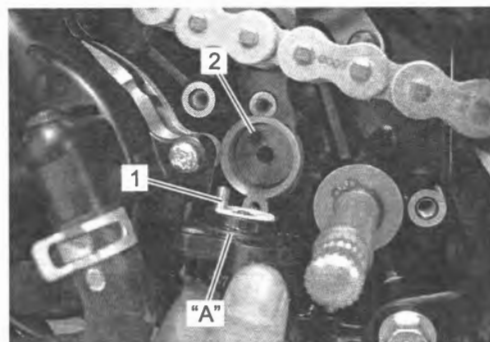
Installation

Install the GP switch in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new O-ring.

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

- Align the GP switch pin (1) with the gearshift cam hole (2).



IF04K1520047-01

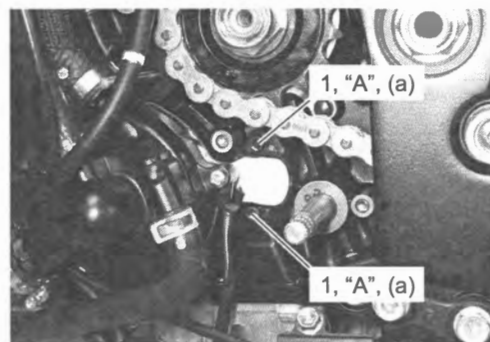
- Apply thread lock to the GP switch bolts (1).

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

- Tighten the GP switch bolts (1) to the specified torque.

Tightening torque

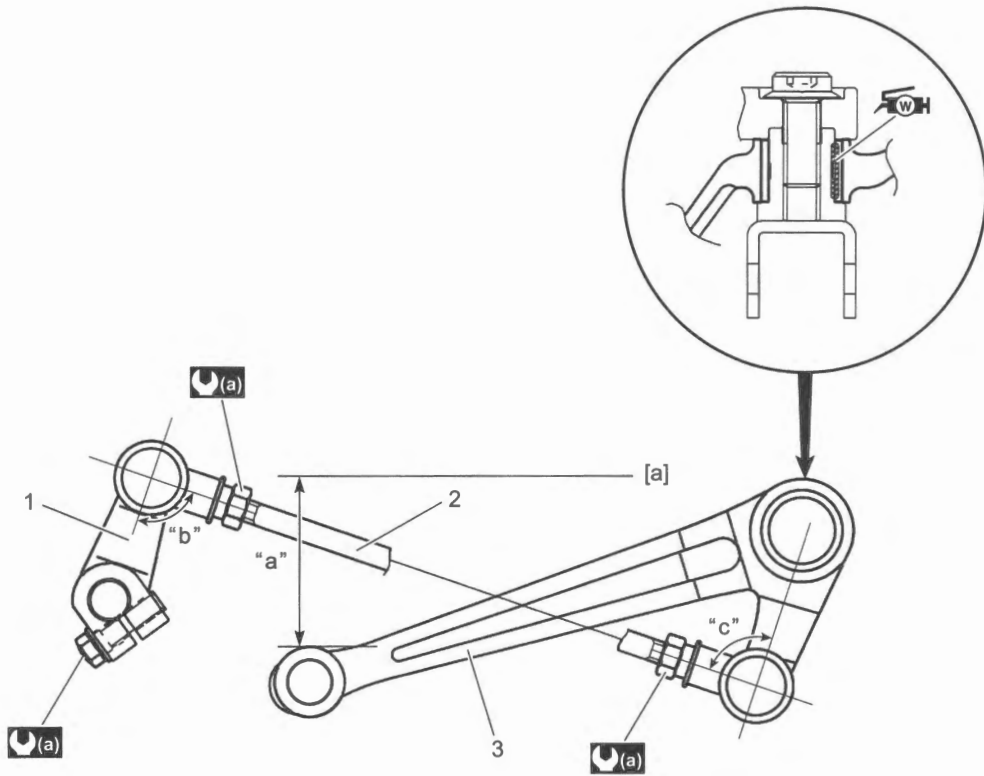
GP switch bolt (a): 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)



IK07L1520004-02

- Route the GP switch lead wire. Refer to "Water Hose Routing Diagram" in Section 1F (Page 1F-2).

Gearshift Lever Construction



IF04K1520049-04

[a]: Footrest top surface	3. Gearshift lever	"c": 87.5°
1. Gearshift link arm	"a": 45 – 55 mm (1.8 – 2.1 in)	(a) : 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
2. Gearshift link rod	"b": 90°	WH : Apply grease.

Gearshift Lever Removal and Installation

BENK07L25206011

Refer to "Gearshift Lever Construction" (Page 5B-14).

Removal

Remove the gearshift lever.

Installation

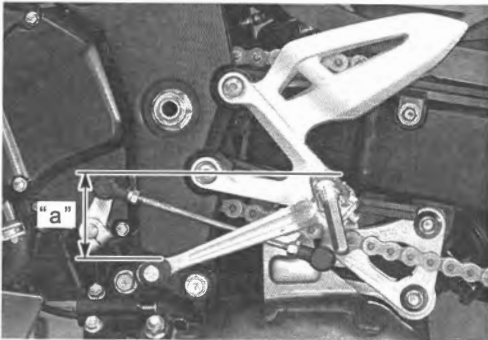
- 1) Install the gearshift lever.
- 2) After installing the gearshift lever, check the gearshift lever height. ↗ (Page 5B-15)

Gearshift Lever Height Inspection and Adjustment

BENK07L25206012

Inspection

Inspect the gearshift lever height "a" between the pedal top face and footrest.

Gearshift lever height**[Standard]: 45 – 55 mm (1.8 – 2.1 in)**

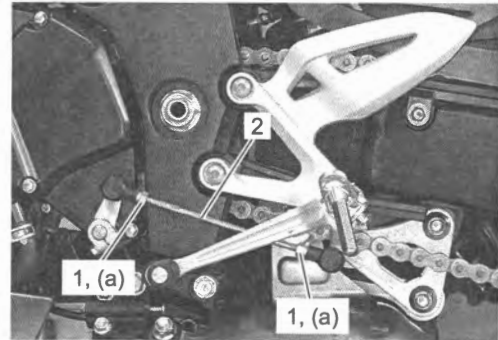
IF04K1520050-02

Adjustment

- 1) Loosen the lock-nuts (1).
- 2) Turn the gearshift link rod (2) until the gearshift lever height is within the specification.

Gearshift lever height**[Standard]: 45 – 55 mm (1.8 – 2.1 in)**

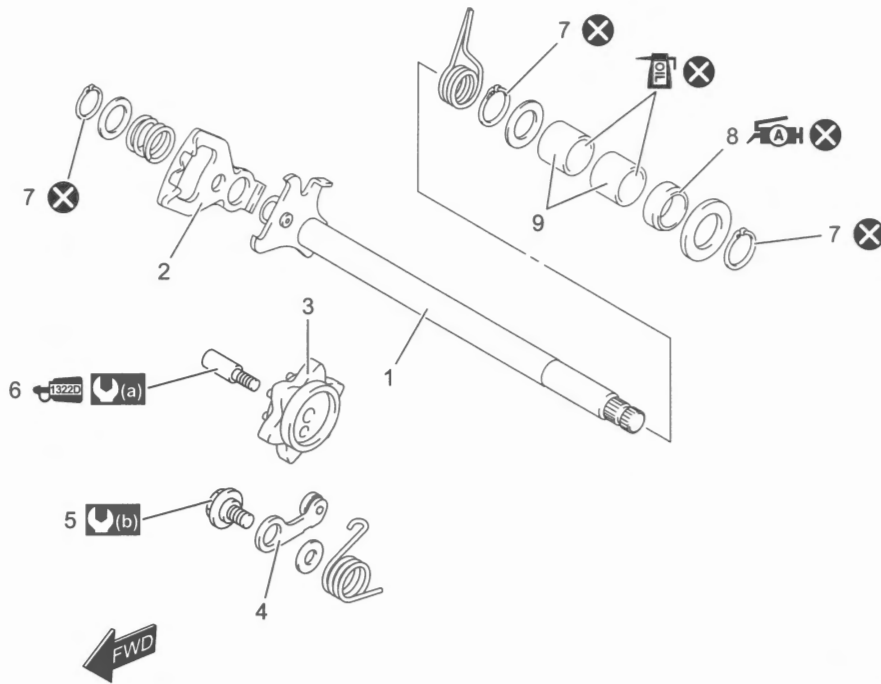
- 3) Tighten the lock-nuts (1) to the specified torque.

Tightening torque**Gearshift link rod nut (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)**

IF04K1520051-02

Gearshift Shaft / Gearshift Cam Plate Components

BENK07L25206013

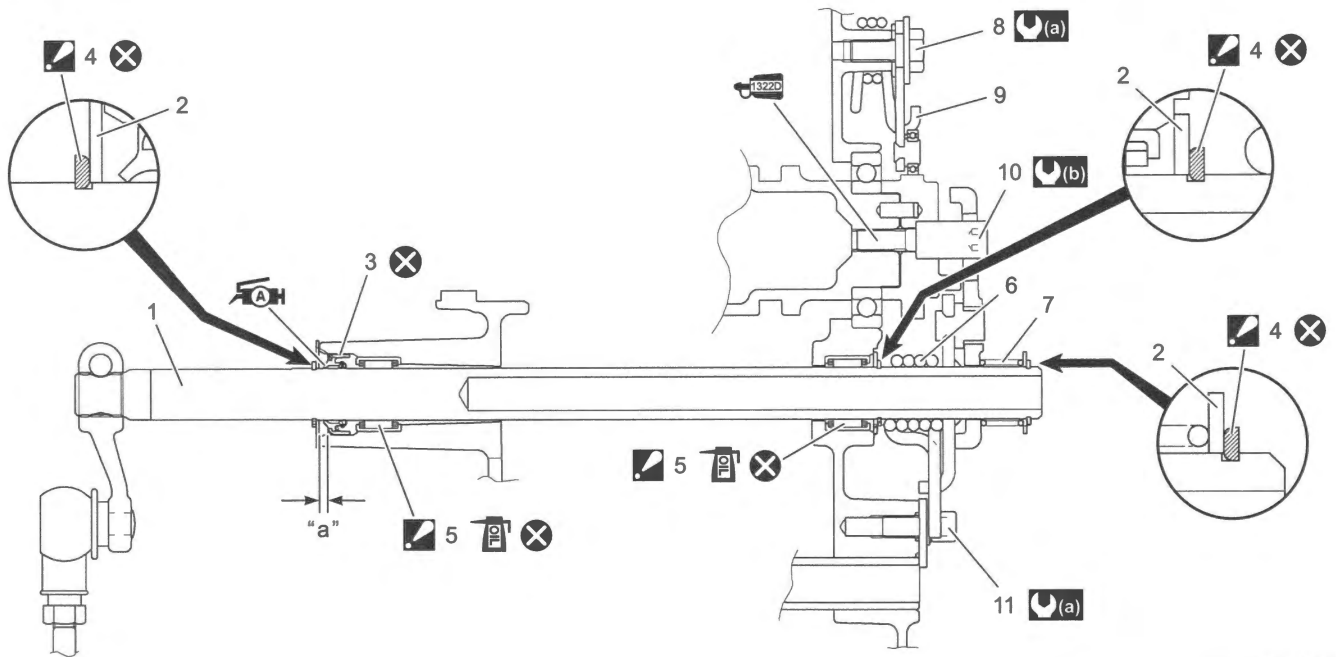


IF04K1520078-03

1. Gearshift shaft	5. Gearshift cam stopper bolt	9. Gearshift shaft bearing	: Apply thread lock to the thread part.
2. Gearshift cam drive plate	6. Gearshift cam plate bolt	: 13 N·m (1.3 kgf·m, 9.5 lbf·ft)	: Apply engine oil.
3. Gearshift cam plate	7. Snap ring	: 10 N·m (1.0 kgf·m, 7.5 lbf·ft)	: Do not reuse.
4. Gearshift cam stopper	8. Gearshift shaft oil seal	: Apply grease.	

Gearshift Shaft Construction

BENK07L25206014



IF04K1520052-06

1. Gearshift shaft	10. Gearshift cam plate bolt
2. Washer	11. Gearshift arm stopper
3. Gearshift shaft oil seal	"a": 1.5 – 2.5 mm (0.059 – 0.098 in)
4. Snap ring : Face the sharp edge outside.	(a) : 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
5. Gearshift shaft bearing : Face the stamped mark side faces outside.	(b) : 13 N·m (1.3 kgf·m, 9.5 lbf·ft)
6. Gearshift shaft return spring	AH : Apply grease.
7. Gearshift plate return spring	1322D : Apply thread lock to the thread part.
8. Gearshift cam stopper bolt	DO NOT REUSE : Apply engine oil.
9. Gearshift cam stopper arm spring	X : Do not reuse.

Gearshift Shaft / Gearshift Cam Plate Removal and Installation

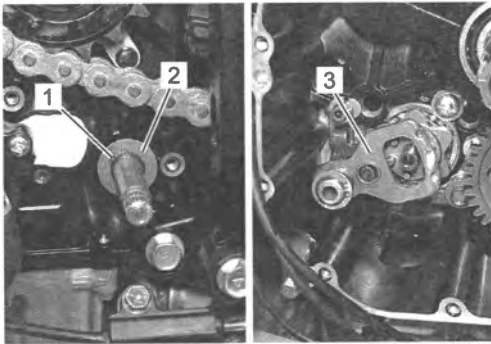
BENK07L25206015

Removal

- 1) Remove the engine sprocket cover. Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-10).
- 2) Remove the clutch components. (Page 5C-14)
- 3) Remove the snap ring (1) and washer (2) from the gearshift shaft.

Special tool
09900-06107

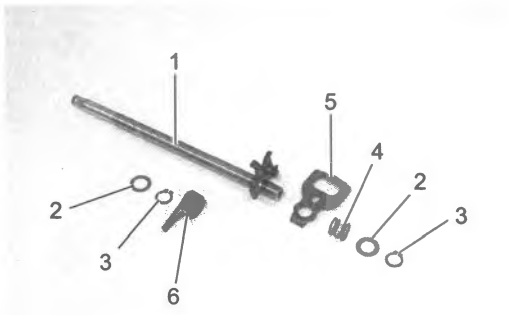
- 4) Remove the gearshift shaft assembly (3).



IF04K1520053-01

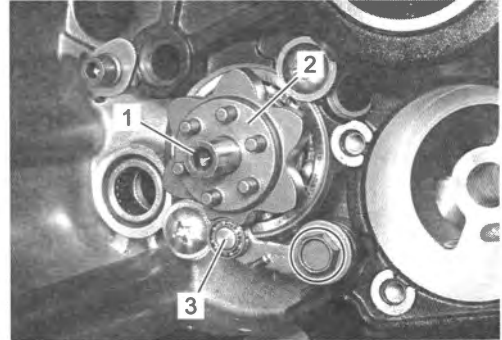
- 5) Remove the following parts from the gearshift shaft (1).
 - Washer (2)
 - Snap ring (3)
 - Gearshift plate return spring (4)
 - Gearshift cam drive plate (5)
 - Gearshift shaft return spring (6)

Special tool
09900-06107



IF04K1520054-01

- 6) Remove the oil pump. (Page 1E-13)
- 7) Remove the gearshift cam plate bolt (1) and gearshift cam plate (2).
- 8) Remove the gearshift cam stopper (3).



IF04K1520055-01

Installation

Refer to "Gearshift Shaft Construction" (Page 5B-17).

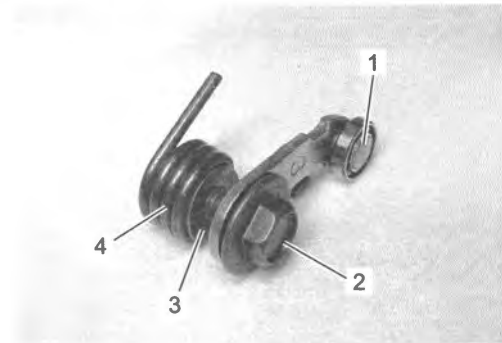
- 1) Assemble the gearshift cam stopper (1), bolt (2), washer (3) and gearshift cam stopper arm spring (4).
- 2) Tighten the gearshift cam stopper bolt (2) to the specified torque.

NOTE

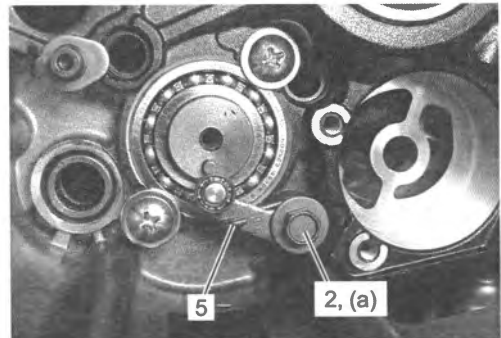
Hook the gearshift cam stopper arm spring end (5) to the gearshift cam stopper.

Tightening torque

Gearshift cam stopper bolt (a): 10 N·m (1.0 kgf·m, 7.5 lbf·ft)



IF04K1520056-02

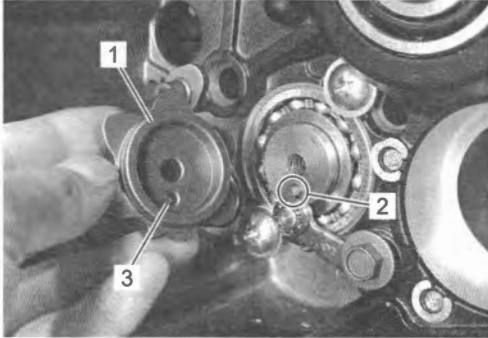


IF04K1520057-01

- 3) Check the gearshift cam stopper moves smoothly.
- 4) Locate the gearshift cam in the neutral position.
- 5) Install the gearshift cam plate (1).

NOTE

Align the gearshift cam pin (2) with the gearshift cam plate hole (3).



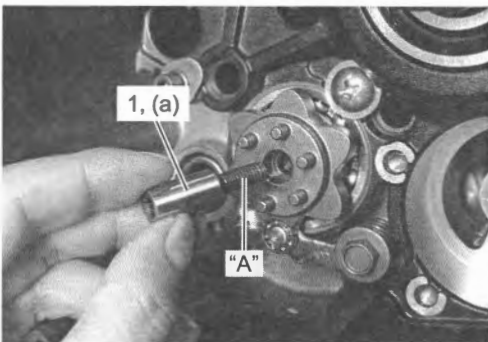
IF04K1520058-02

- 6) 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)

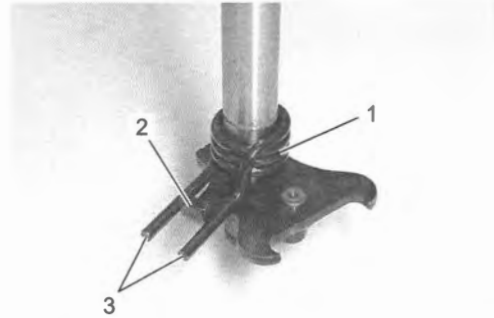


IF04K1520059-01

- 7) Install the oil pump. (Page 1E-13)
- 8) Install the gearshift shaft return spring (1).

NOTE

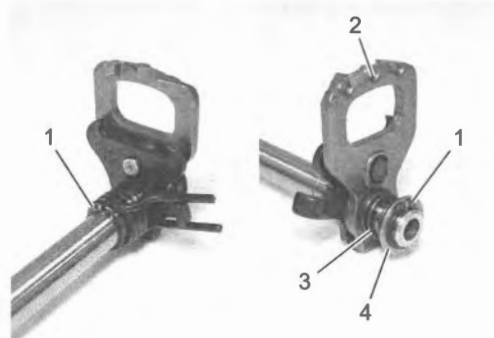
Position the stopper (2) of gearshift arm between the shaft return spring ends (3).



IF04K1520060-02

- 9) Install the following parts.

- New snap ring (1)
- Gearshift cam drive plate (2)
- Gearshift plate return spring (3)
- Washer (4)

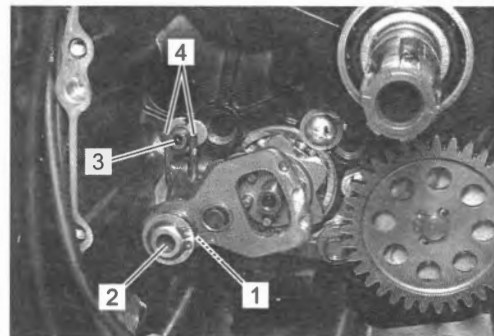


IF04K1520061-01

- 10) Install the washer (1) and gearshift shaft assembly (2).

NOTE

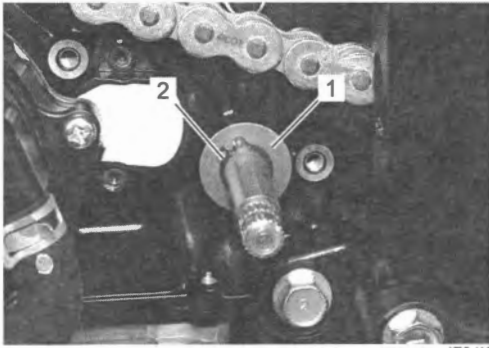
Pinch the gearshift arm stopper (3) with return spring ends (4).



IF04K1520062-01

11) Install the washer (1) and new snap ring (2).

Special tool
09900-06107



IF04K1520063-01

12) Install the clutch components. ⌚ (Page 5C-17)

13) Install the engine sprocket cover. Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-10).

14) After installing the gearshift lever, check the gearshift lever height. ⌚ (Page 5B-15)

Gearshift Linkage Inspection

BENK07L25206016

Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" (Page 5B-18).

Gearshift Shaft

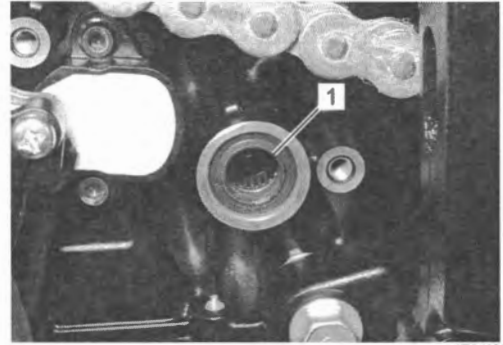
Check the gearshift shaft (1) for bend or wear. Check the return spring (2) for damage or fatigue. If any defects are found, replace the defective part(-s).



IF04K1520064-01

Gearshift Shaft Oil Seal

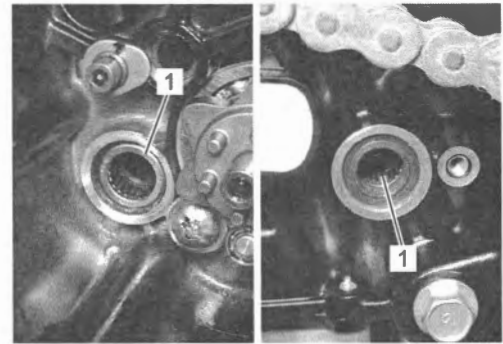
Inspect the gearshift shaft oil seal lip (1) for damage or wear. If any defect is found, replace the oil seal with a new one.



IF04K1520066-01

Gearshift Shaft Bearing

Inspect the gearshift shaft bearings (1) for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.



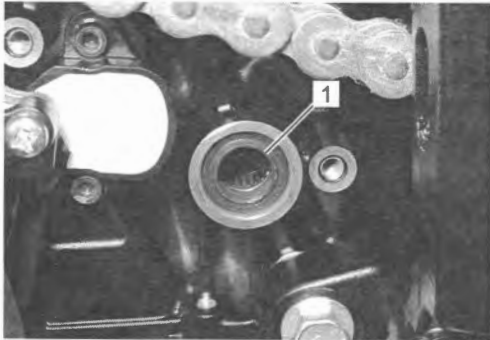
IF04K1520065-01

Gearshift Shaft Oil Seal / Bearing Removal and Installation

BENK07L25206017

Removal

- 1) Remove the gearshift shaft. Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" (Page 5B-18).
- 2) Remove the gearshift shaft oil seal (1).



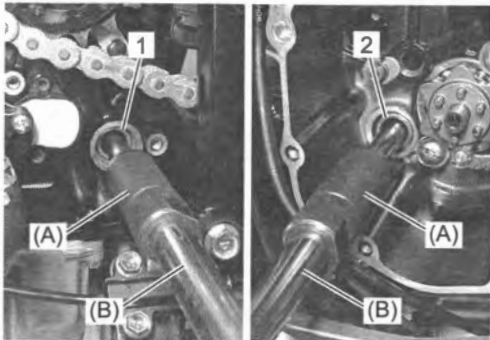
IF04K1520067-01

- 3) Remove the bearings (1) and (2) with the special tools.

Special tool

(A): 09921-20210

(B): 09930-30104



IF04K1520068-01

Installation

Install the oil seal and bearing in the reverse order of removal. Pay attention to the following points:

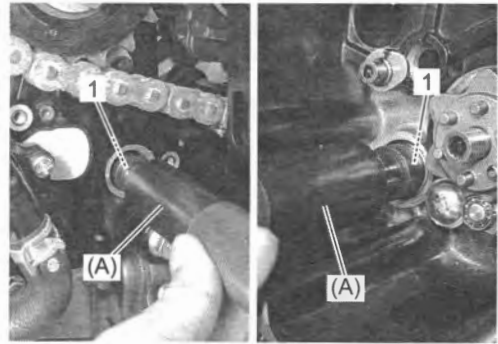
- Install the new bearings (1) with the special tool.

NOTE

The stamped mark side of gearshift shaft bearing faces outside.

Special tool

(A): 09913-70210

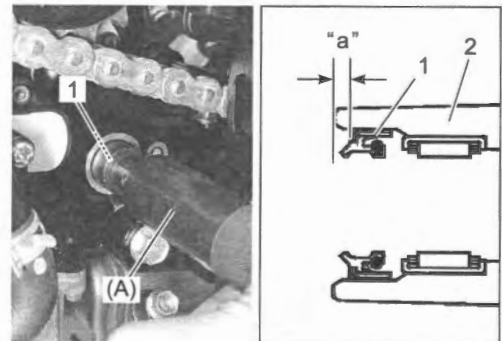


IF04K1520069-01

- Install the new oil seal (1) with the special tool.

Special tool

(A): 09913-70210



IF04K1520070-03

2. Crankcase

"a": 1.5 - 2.5 mm (0.059 - 0.098 in)

- Apply grease to the oil seal lip.

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



IF04K1520071-01

Specifications

Tightening Torque Specifications

BENK07L25207001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Gearshift cam bearing retainer screw	10	1.0	7.5	☞ (Page 5B-4)
Gearshift arm stopper	10	1.0	7.5	☞ (Page 5B-4)
GP switch bolt	6.0	0.61	4.45	☞ (Page 5B-13)
Gearshift link rod nut	10	1.0	7.5	☞ (Page 5B-15)
Gearshift cam stopper bolt	10	1.0	7.5	☞ (Page 5B-18)
Gearshift cam plate bolt	13	1.3	9.5	☞ (Page 5B-19)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Transmission Components” (Page 5B-2)

“Gearshift Lever Construction” (Page 5B-14)

“Gearshift Shaft / Gearshift Cam Plate Components” (Page 5B-16)

“Gearshift Shaft Construction” (Page 5B-17)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L25208001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞ (Page 5B-10) / ☞ (Page 5B-11) / ☞ (Page 5B-13) / ☞ (Page 5B-21)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞ (Page 5B-4) / ☞ (Page 5B-13) / ☞ (Page 5B-19)

NOTE

Required service material(s) is also described in:

“Transmission Components” (Page 5B-2)

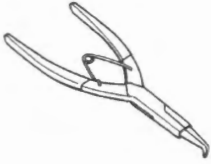
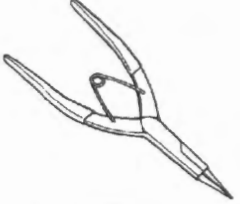
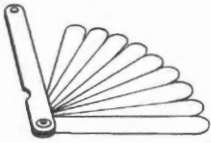

“Gearshift Lever Construction” (Page 5B-14)



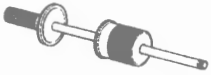
“Gearshift Shaft / Gearshift Cam Plate Components” (Page 5B-16)

“Gearshift Shaft Construction” (Page 5B-17)

Special Tool

BENK07L25208002

09900-06104 Snap ring pliers (External: Bent nose) ☞ (Page 5B-7)		09900-06107 Snap ring pliers (External) ☞ (Page 5B-8) / ☞ (Page 5B-18) / ☞ (Page 5B-18) / ☞ (Page 5B-20)	
09900-20803 Thickness gauge ☞ (Page 5B-11)		09913-70210 Bearing installer set ☞ (Page 5B-5) / ☞ (Page 5B-9) / ☞ (Page 5B-10) / ☞ (Page 5B-10) / ☞ (Page 5B-21) / ☞ (Page 5B-21)	

<p>09921-20210 Bearing remover (ø12) ☞ (Page 5B-21)</p> 	<p>09923-74511 Bearing remover (ø20 - 35) ☞ (Page 5B-5)</p> 
<p>09930-30104 Rotor remover sliding shaft This tool is included in Rotor remover set (09930-30135). ☞ (Page 5B-5) / ☞ (Page 5B-21)</p> 	

Clutch

Precautions

Precautions for Clutch System

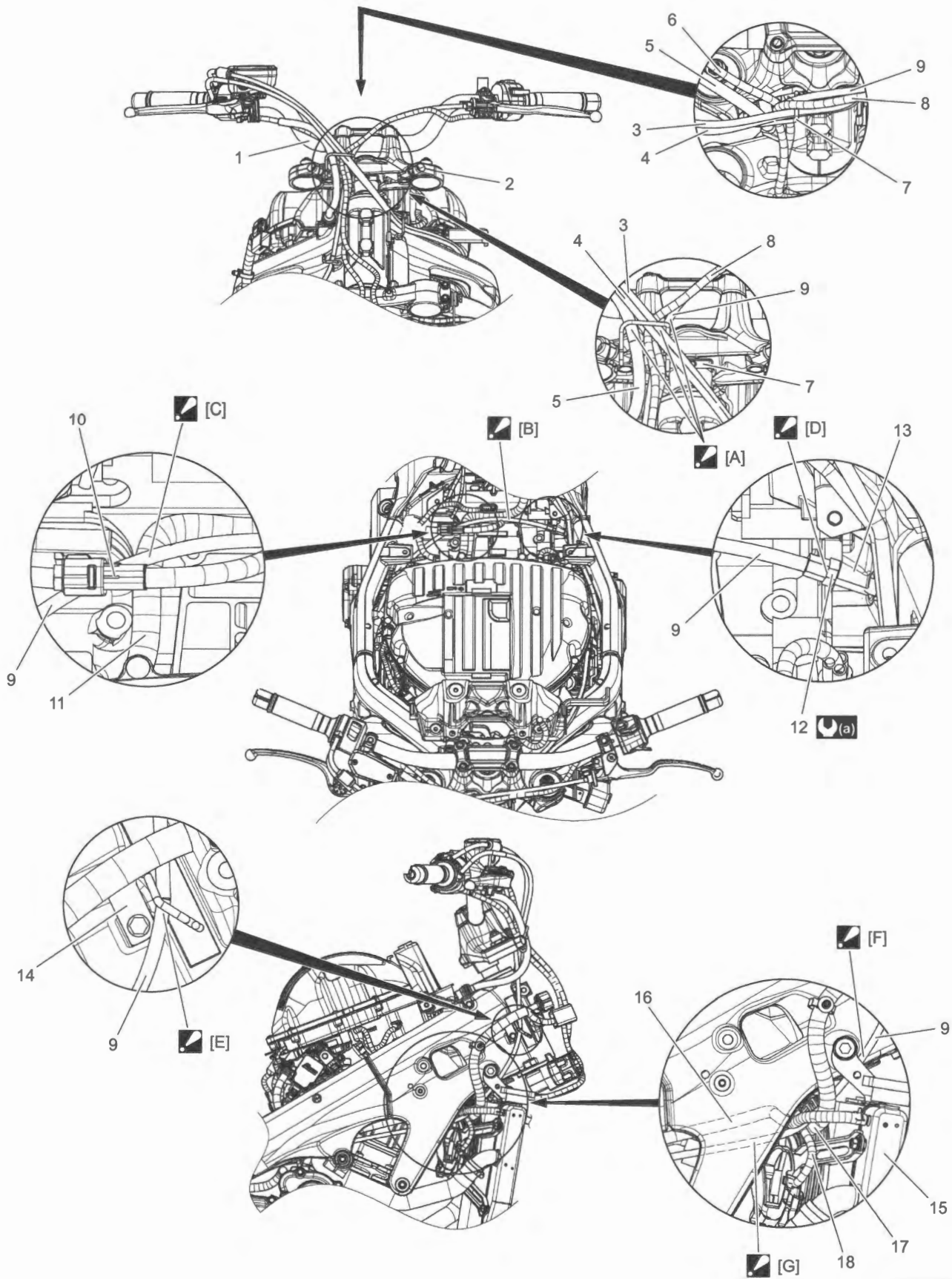
BENK07L25300001

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).

Schematic and Routing Diagram

Clutch Cable Routing Diagram

BENK07L25302001



5C-3 Clutch:

<input checked="" type="checkbox"/> [A]: Pass the clutch cable and throttle cables into the guide. Pass the throttle cables in front of the clutch cable. Pass the clutch cable inside of the front brake hose.	7. Cable guide No.1
<input checked="" type="checkbox"/> [B]: Pass the clutch cable to bend gently. Do not bend the clutch cable forcibly.	8. Left handle switch lead wire
<input checked="" type="checkbox"/> [C]: Pass the clutch cable over the battery (-) lead wire and starter motor lead wire. Pass the clutch cable under the wiring harness and coupler.	9. Clutch cable
<input checked="" type="checkbox"/> [D]: The clearance between the clutch cable adjuster and lock-nut is one turn or less.	10. Wiring harness and coupler
<input checked="" type="checkbox"/> [E]: Pass the clutch cable inside of the guide.	11. Starter motor lead wire
<input checked="" type="checkbox"/> [F]: Pass the clutch cable between the radiator bracket and frame.	12. Clutch cable lock-nut
<input checked="" type="checkbox"/> [G]: Pass the clutch cable under the air bleed hose. Pass the clutch cable over the wiring harness and cooling fan motor lead wire.	13. Engine sprocket cover
1. Handlebars	14. Clutch cable guide
2. Steering stem upper bracket	15. Radiator
3. Throttle cable No.1	16. Air bleed hose
4. Throttle cable No.2	17. Wiring harness
5. Front brake hose	18. Cooling fan motor lead wire
6. Right handle switch lead wire	<input checked="" type="checkbox"/> (a) : 4.5 N-m (0.46 kgf-m, 3.35 lbf-ft)

Diagnostic Information and Procedures

Clutch System Symptom Diagnosis

BENK07L25304001

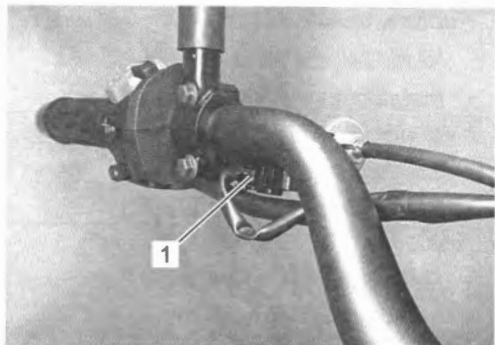
Condition	Possible cause	Correction / Reference Item
Noisy engine (Noise seems to come from the clutch)	Worn countershaft spline.	Replace countershaft. ⌚(Page 5B-7)
	Worn clutch sleeve hub spline.	Replace clutch sleeve hub. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
	Worn clutch plate teeth.	Replace clutch plate. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
	Distorted clutch plates, driven and drive.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
	Worn clutch release bearing.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
	Weakened clutch damper spring.	Replace primary driven gear. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
Clutch slips	Clutch cable play out of adjustment.	Adjust. ⌚(Page 5C-5)
	Weakened clutch springs.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
	Worn or distorted clutch pressure plate.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
	Distorted clutch plates.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
Clutch drags	Clutch cable play out of adjustment.	Adjust. ⌚(Page 5C-5)
	Some clutch springs are weak, while others are not.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
	Worn or distorted clutch pressure plate.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
	Distorted clutch plates.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
Slipper clutch improperly operating	Clutch lifter pin height out of adjustment.	Adjust. ⌚(Page 5C-23)
	Weakened wave spring washers.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)
	Worn clutch lifter drive cam or clutch lifter driven cam.	Replace. • Removal: ⌚(Page 5C-14) • Installation: ⌚(Page 5C-17)

Repair Instructions

Clutch Lever Position Switch Inspection

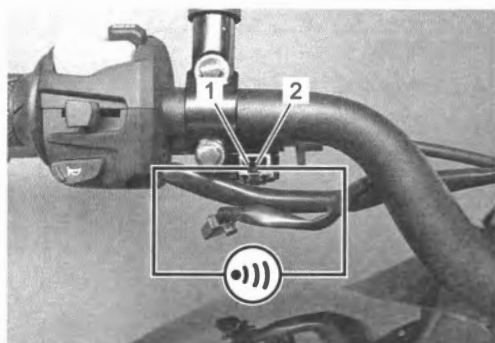
BENK07L25306001

- 1) Disconnect the clutch lever position switch coupler (1).



IK07L1530001-02

- 2) Inspect the clutch lever position switch for continuity between "T1" (1) and "T2" (2) using a circuit tester. If any defect is found, replace the clutch lever position switch with a new one. Refer to "Clutch Lever Removal and Installation" (Page 5C-8).



IK07L1530012-01

Terminal Position	T1	T2
OFF		
ON	○	○

IJ27K1410003-03

- 3) Connect the clutch lever position switch coupler.

Clutch Cable Play On-Vehicle Inspection and Adjustment

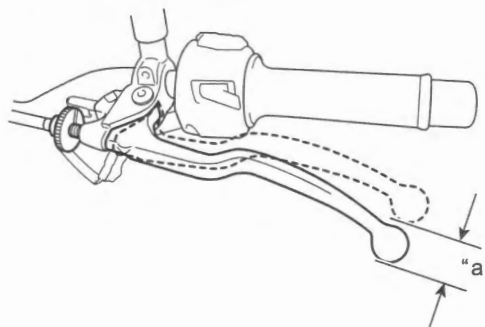
BENK07L25306002

Inspection

Inspect the clutch cable play "a". Adjust the clutch cable if necessary.

Clutch lever play

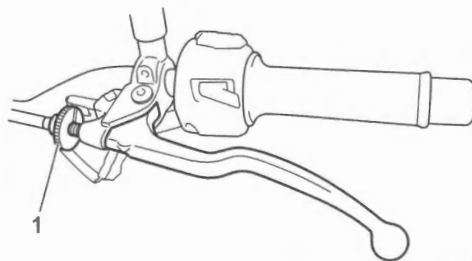
[Standard]: 10 – 15 mm (0.4 – 0.6 in)



IF04K1530002-01

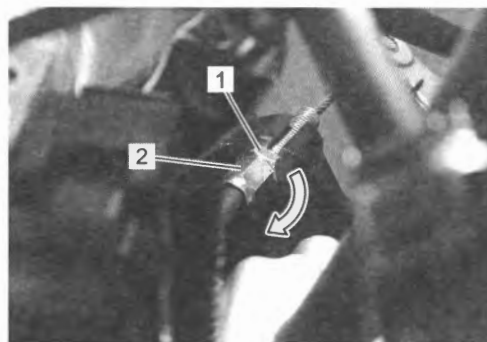
Adjustment

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Remove the EVAP canister (if equipped). Refer to "EVAP Control System Removal and Installation (If Equipped)" in Section 1B (Page 1B-12).
- 3) Turn in the adjuster (1) all the way into the clutch lever assembly.



IF04K1530003-01

- 4) Loosen the lock-nut (1) and turn the clutch cable adjuster (2) clockwise fully.

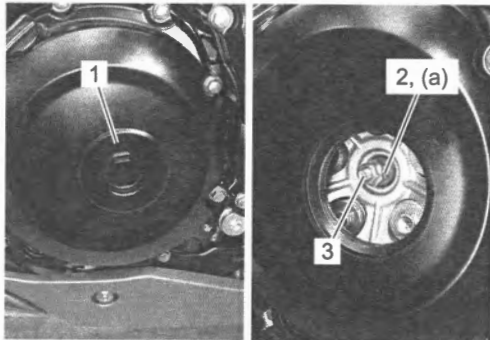


IK07L1530017-02

- 5) Remove the clutch release adjuster cap (1).
- 6) Loosen the lock-nut (2) and turn out the clutch release screw (3) two or three rotations.
- 7) From that position, slowly turn in the clutch release screw (3) until resistance is felt.
- 8) From this position, turn out the clutch release screw (3) 1/2 rotations, and tighten the lock-nut (2) while holding the screw (3).

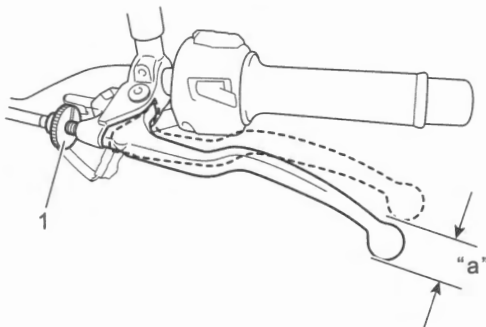
Tightening torque

Clutch release adjuster nut (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

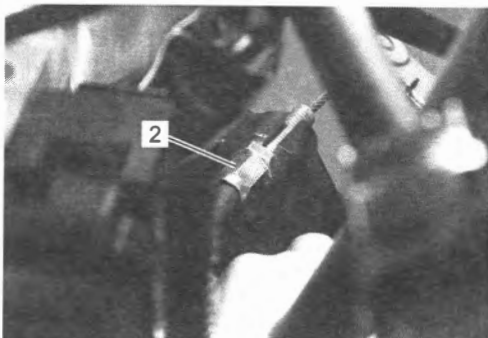


IF04K1530005-02

- 9) Turn out the adjuster (1) three or four rotations.
- 10) Turn the clutch cable adjuster (2) to obtain 10 – 15 mm (0.4 – 0.6 in) of free play "a" at clutch lever end.



IF04K1530073-01

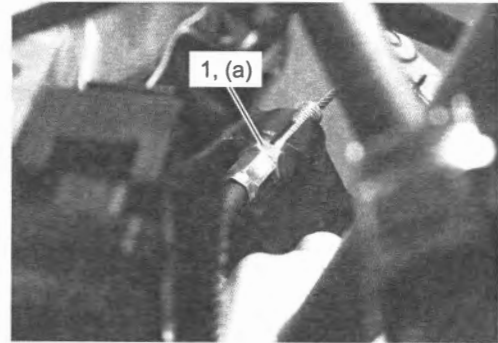


IK07L1530018-01

- 11) Tighten the lock-nut (1) to the specified torque.

Tightening torque

Clutch cable lock-nut (a): 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)



IK07L1530014-01

- 12) Install the clutch release adjuster cap.

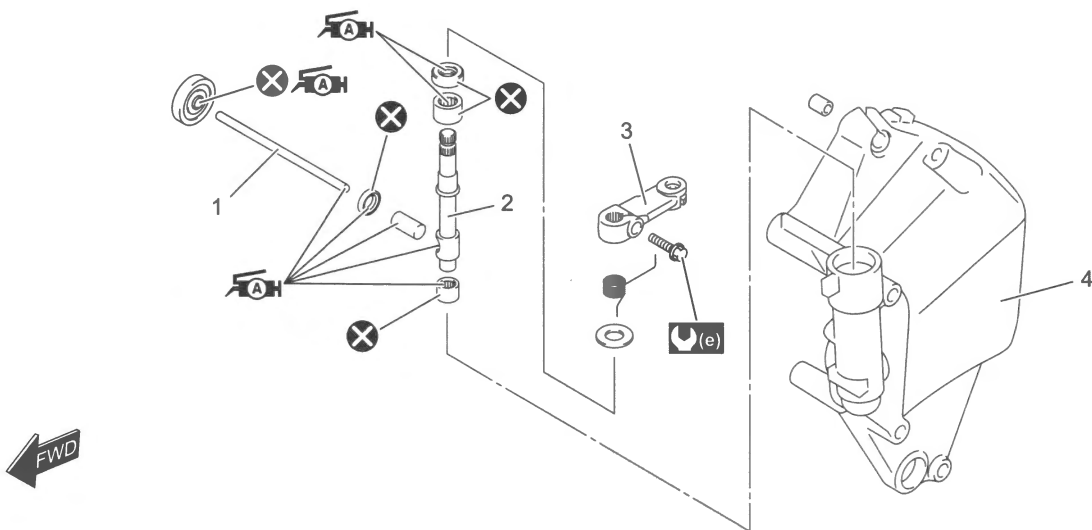
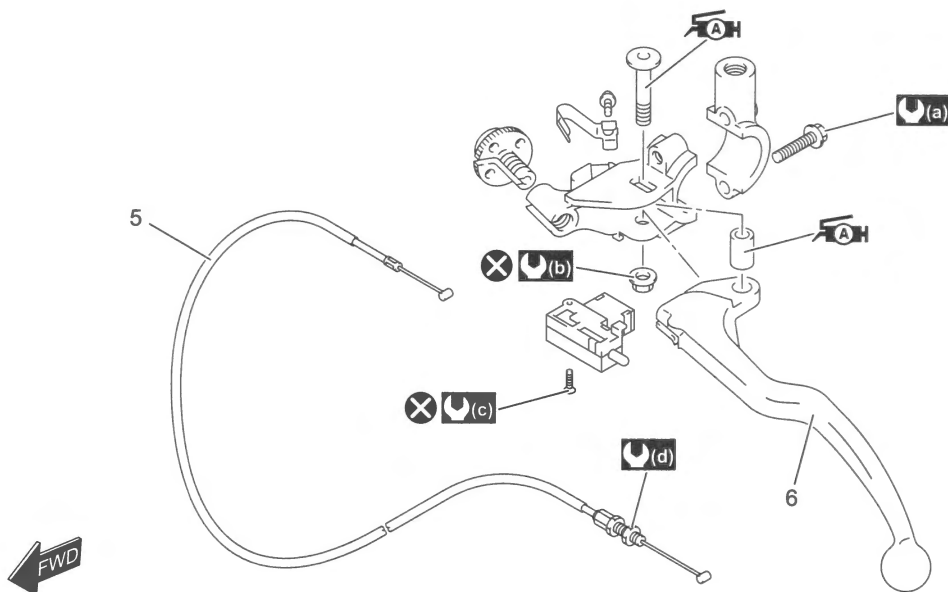
Tightening torque

Clutch release adjuster cap: 11 N·m (1.1 kgf-m, 8.5 lbf-ft)

- 13) Install the removed parts.

Clutch Control System Components

BENK07L25306003



IK07L1530019-01

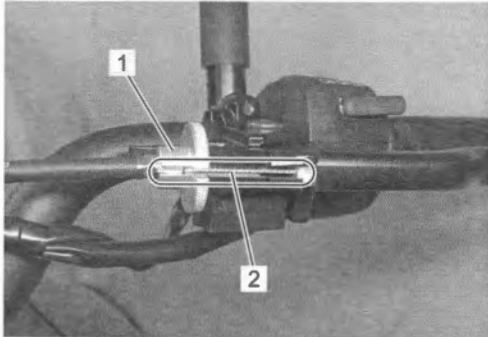
1. Clutch push rod (Left)	6. Clutch lever	(e) : 8.8 N-m (0.90 kgf-m, 6.50 lbf-ft)
2. Clutch release camshaft	(a) : 10 N-m (1.0 kgf-m, 7.5 lbf-ft)	(AH) : Apply grease.
3. Clutch release arm	(b) : 6.5 N-m (0.66 kgf-m, 4.80 lbf-ft)	(X) : Do not reuse.
4. Engine sprocket cover	(c) : 0.6 N-m (0.06 kgf-m, 0.45 lbf-ft)	
5. Clutch cable	(d) : 4.5 N-m (0.46 kgf-m, 3.35 lbf-ft)	

Clutch Cable Removal and Installation

BENK07L25306004

Removal

- 1) Turn the adjuster (1) all the way into the clutch lever assembly.
- 2) Align the clutch lever and adjuster (1) with the cutaway.
- 3) Disconnect the clutch cable (2) from the clutch lever side.



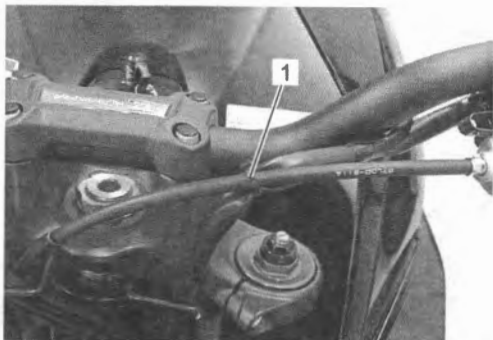
IK07L1530002-01

- 4) Disconnect the clutch cable (1).



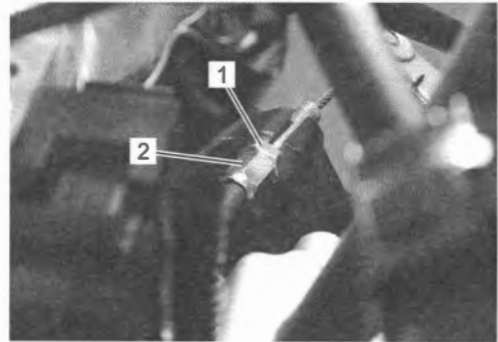
IF04K1530008-01

- 5) Remove the clamp (1).



IK07L1530003-01

- 6) Lift and support the fuel tank. ☞ (Page 1G-11)
- 7) Remove the EVAP canister (if equipped). Refer to "EVAP Control System Removal and Installation (If Equipped)" in Section 1B (Page 1B-12).
- 8) Loosen the clutch cable lock-nut (1).
- 9) Remove the clutch cable adjuster (2) from the engine sprocket cover.



IF04K1530010-01

Installation

Install the clutch cable in the reverse order of removal. Pay attention to the following points:

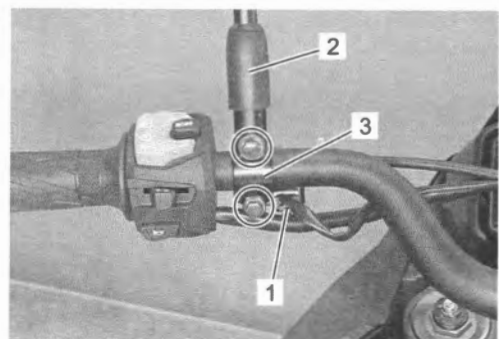
- Route the clutch cable and clamp it. Refer to "Clutch Cable Routing Diagram" (Page 5C-2).
- After installing the removed parts, adjust the clutch cable play. ☞ (Page 5C-5)

Clutch Lever Removal and Installation

BENK07L25306005

Removal

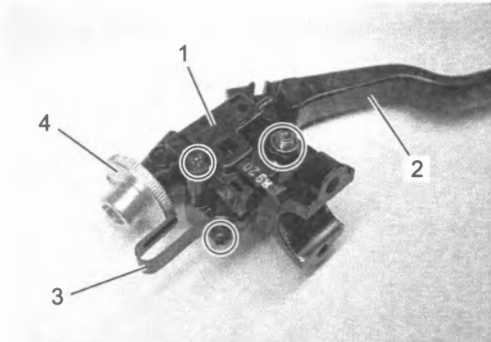
- 1) Disconnect the clutch lever position switch coupler (1).
- 2) Disconnect the clutch cable from the clutch lever side. ☞ (Page 5C-8)
- 3) Remove the left rear view mirror (2) and clutch lever holder (3).
- 4) Remove the clutch lever assembly.



IK07L1530004-02

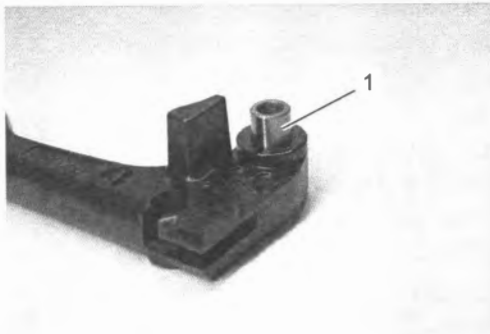
5C-9 Clutch:

- 5) Remove the clutch lever position switch (1) and clutch lever (2).
- 6) Remove the spring (3) and cable adjuster nut (4).



IK07L1530005-01

- 7) Remove the collar (1).

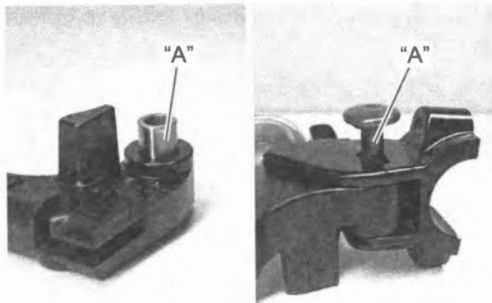


IK07L1530006-01

Installation

Install the clutch lever in the reverse order of removal. Pay attention to the following points:

- Apply grease to the collar and clutch lever pivot bolt.
"A": Grease 99000-25011 (SUZUKI SUPER GREASE A)

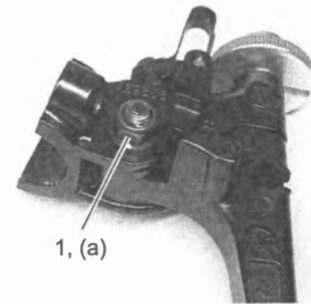


IK07L1530007-01

- Tighten the new clutch lever pivot nut (1) to the specified torque.

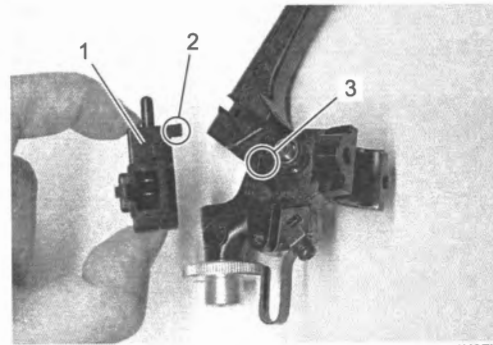
Tightening torque

Clutch lever pivot nut (a): 6.5 N·m (0.66 kgf-m, 4.80 lbf-ft)



IK07L1530008-01

- 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.

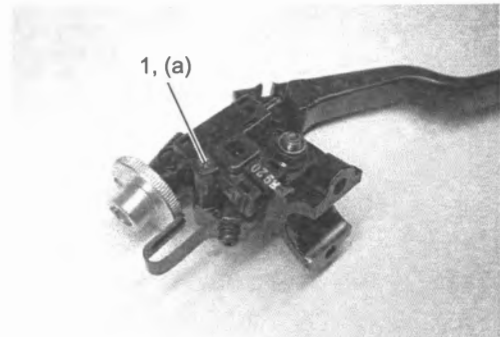


IK07L1530009-01

- Tighten the new clutch lever position switch screw (1) to the specified torque.

Tightening torque

Clutch lever position switch screw (a): 0.6 N·m (0.06 kgf-m, 0.45 lbf-ft)

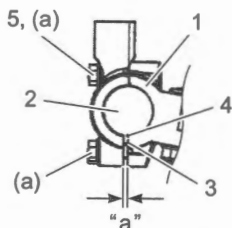


IK07L1530010-01

- When installing the clutch lever assembly (1) onto the handlebars (2), align the edge (3) of clutch lever assembly with the punch mark (4) on the handlebars (2) and tighten the upper bolt (5) first.

Tightening torque

Clutch lever holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IF04K1530072-01

"a": Clearance

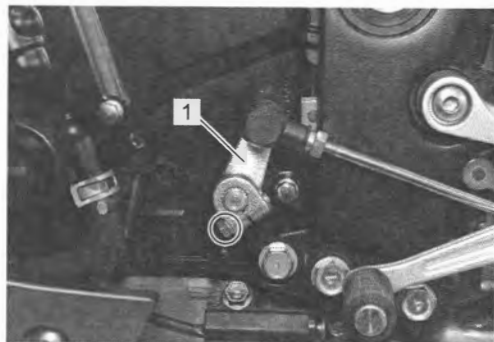
- After installing the removed parts, adjust the clutch cable play. (Page 5C-5)

Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation

BENK07L25306006

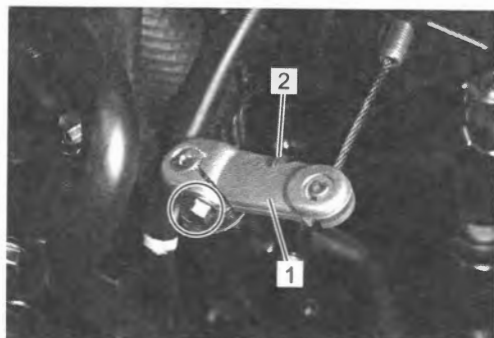
Removal

- Lift and support the fuel tank. (Page 1G-11)
- Remove the EVAP canister (if equipped). (Page 1B-12)
- Remove the gearshift link arm (1).



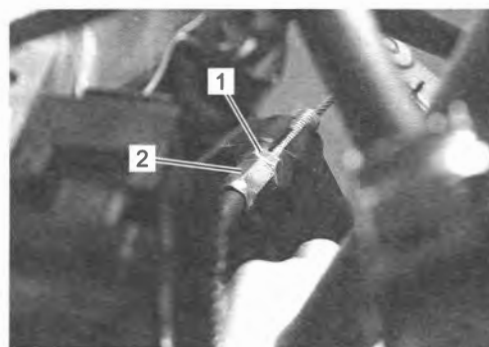
IF04K1530017-01

- Remove the clutch release arm (1) and spring (2).



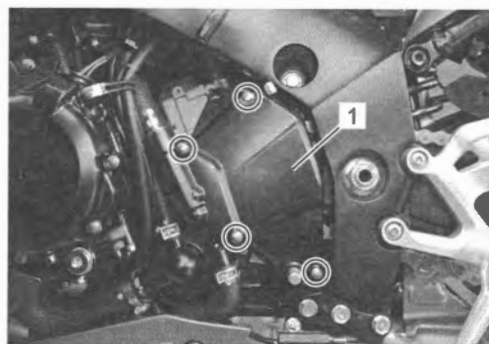
IF04K1530018-02

- Loosen the clutch cable lock-nut (1).
- Remove the clutch cable adjuster (2).



IF04K1530019-01

- Remove the engine sprocket cover (1).



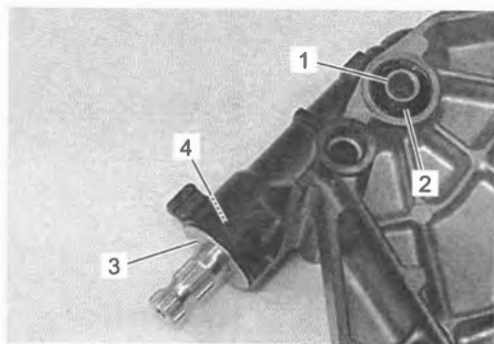
IF04K1530020-02

- Remove the clutch push rod (left) (1) and dowel pins (2).



IF04K1530021-03

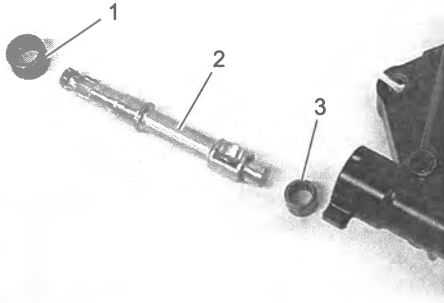
- Remove the clutch push rod cap (1) and oil seal (2).
- Remove the washer (3) and oil seal (4).



IF04K1530022-02

5C-11 Clutch:

- 11) Remove the clutch release camshaft upper bearing (1) with clutch release camshaft (2).
- 12) Remove the clutch release camshaft lower bearing (3).



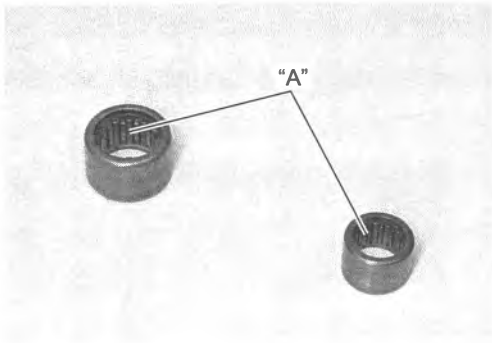
IF04K1530023-02

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)

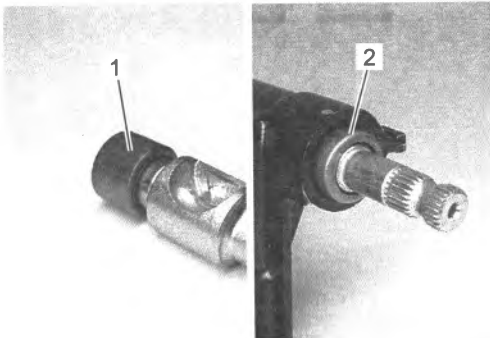


IF04K1530024-02

- Install the clutch release camshaft lower bearing (1) and upper bearing (2).

NOTE

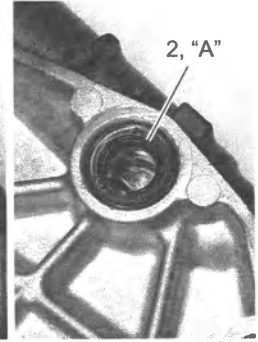
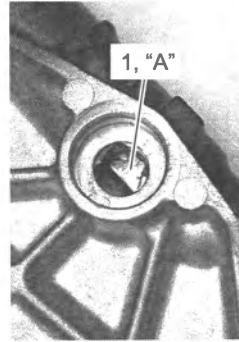
The stamped mark side of bearings faces outside.



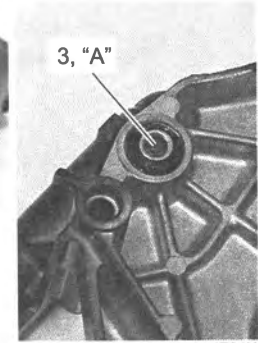
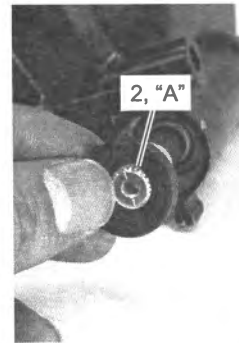
IF04K1530025-01

- Apply grease to the contact position of clutch release camshaft (1), new oil seal lips (2) and clutch push rod cap (3).

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



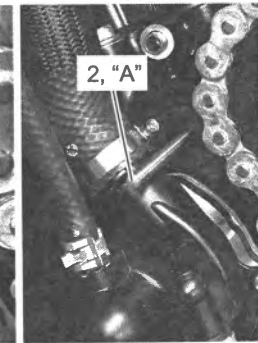
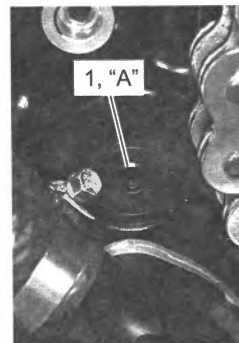
IF04K1530026-01



IF04K1530027-04

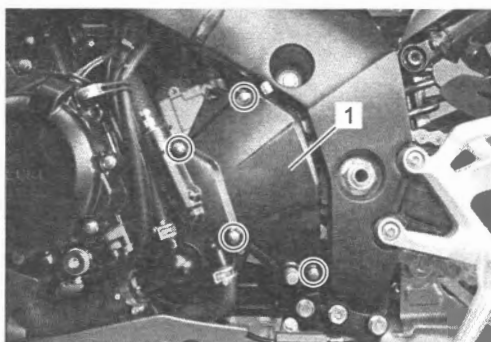
- Apply a small quantity of grease to oil seal lip (1) and the clutch push rod end (2).

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



IF04K1530028-03

- Install the engine sprocket cover (1).

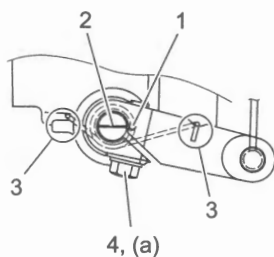


IF04K1530029-02

- When installing the clutch release arm, align the punch mark (1) of clutch release arm with slit (2) of clutch release camshaft.
- Hook the spring end (3) to the clutch release arm and engine sprocket cover.
- Tighten the clutch release arm bolt (4) to the specified torque.

Tightening torque

Clutch release arm bolt (a): 8.8 N·m (0.90 kgf-m, 6.50 lbf-ft)



IF04K1530030-02

- After installing, adjust the clutch cable play and check the gearshift lever height. Refer to "Clutch Cable Play On-Vehicle Inspection and Adjustment" (Page 5C-5) and "Gearshift Lever Height Inspection and Adjustment" in Section 5B (Page 5B-15).

Clutch Push Rod (Left) Inspection

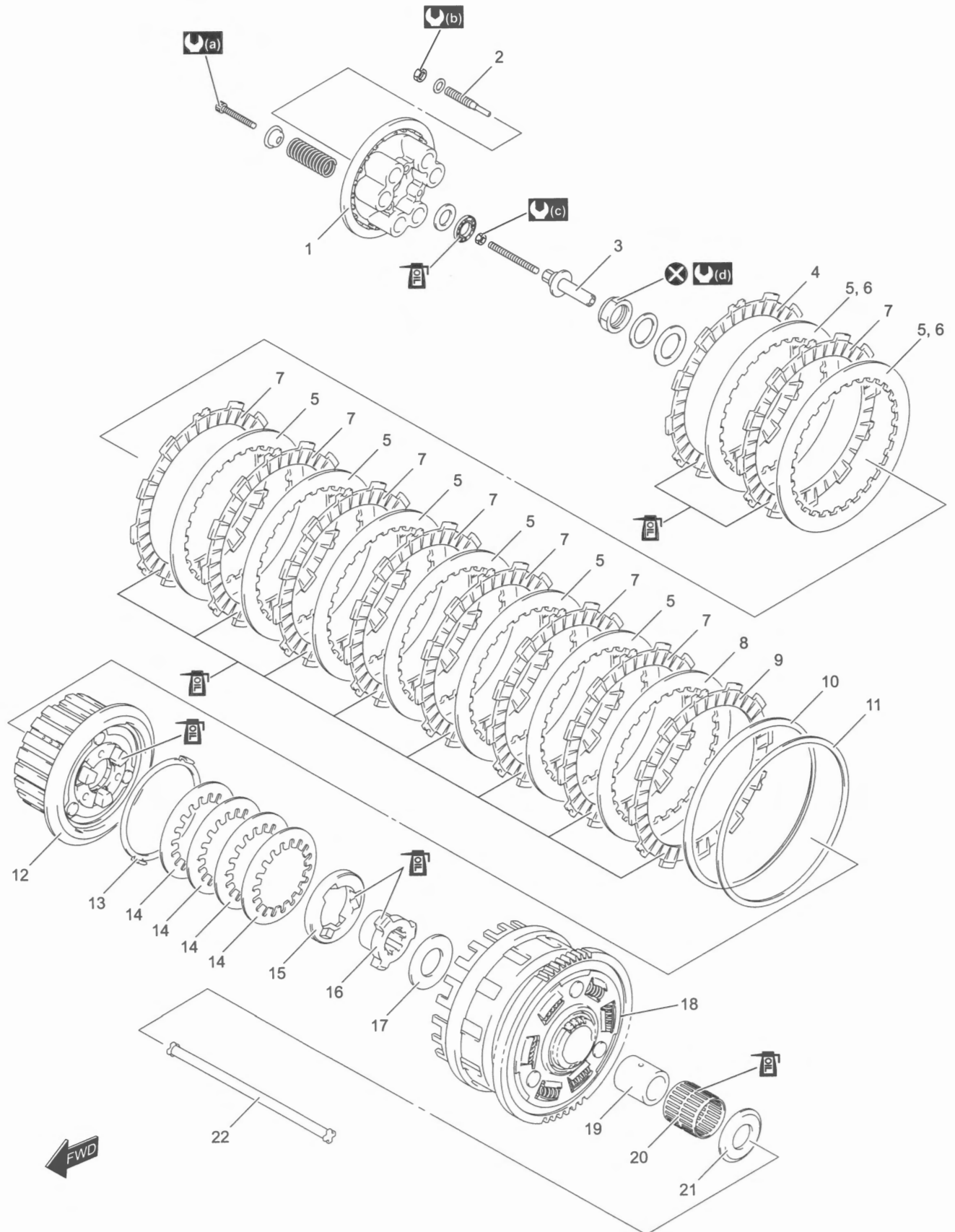
BENK07L25306007

Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" (Page 5C-10). Inspect the push rod for wear or bend. If any defects are found, replace it with a new one.



IF04K1530031-01

Clutch Components

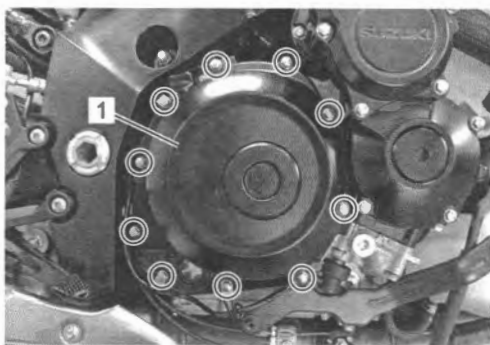


1. Clutch pressure plate	11. Wave washer seat	21. Thrust washer
2. Clutch lifter pin	12. Clutch sleeve hub	22. Clutch push rod (right)
3. Clutch push piece	13. Seat washer	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
4. Drive plate No.2 (1 pc.)	14. Wave spring washer (4 pcs.)	(b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
5. Driven plate No.1 (6 – 8 pcs.)	15. Clutch lifter driven cam	(c) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
6. Driven plate No.3 (0 – 2 pc(-s).)	16. Clutch lifter drive cam	(d) : 95 N·m (9.7 kgf-m, 70.0 lbf-ft)
7. Drive plate No.1 (8 pcs.)	17. Thrust washer	: Apply engine oil.
8. Driven plate No.2 (1 pc.)	18. Primary driven gear assembly	: Do not reuse.
9. Drive plate No.3 (1 pc.)	19. Spacer	
10. Wave washer	20. Bearing	

Clutch Removal

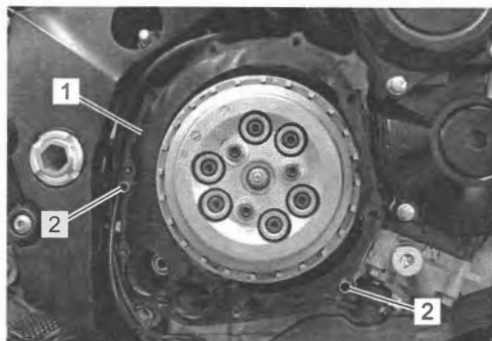
BENK07L25306009

- 1) Drain engine oil. (Page 1E-5)
- 2) Remove the right under cowling. (Page 9D-42)
- 3) Remove the clutch cover (1).



IJ04K1532001-01

- 4) Remove the gasket (1) and dowel pins (2).

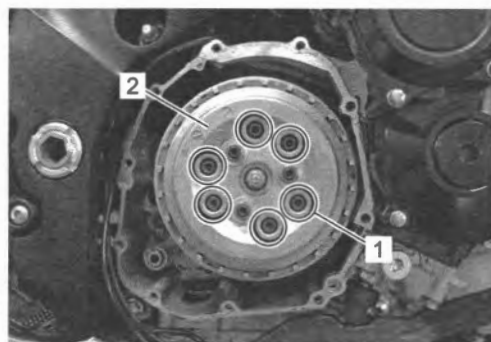


IJ04K1532002-02

- 5) Remove the clutch spring set bolts (1), clutch springs and clutch pressure plate (2).

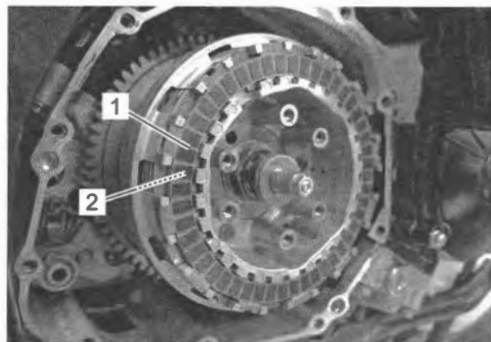
NOTE

Loosen the clutch spring set bolts (1) little by little and diagonally.



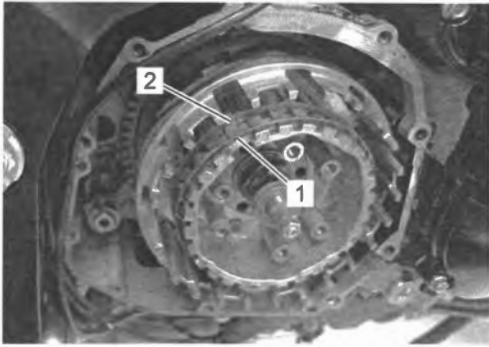
IJ04K1532003-01

- 6) Remove the clutch drive plates (1) and driven plates (2).



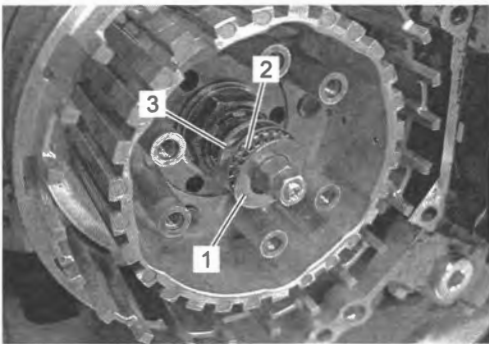
IJ04K1532004-01

- 7) Remove the wave washer (1) and wave washer seat (2).



IJ04K1532005-01

- 8) Remove the thrust washer (1), clutch release bearing (2) and clutch push piece (3).

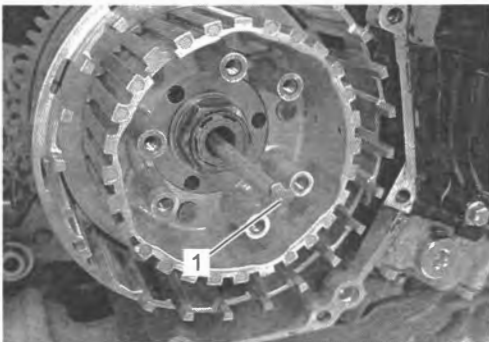


IJ04K1532006-01

- 9) Remove the clutch push rod (right) (1).

NOTE

If it is difficult to pull out the push rod (right) (1), use a magnetic hand or wire.



IJ04K1532007-01

- 10) Unlock the clutch sleeve hub nut.



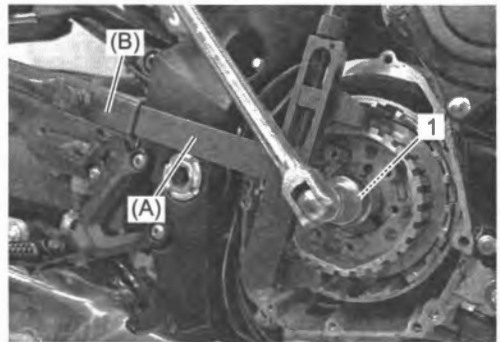
IJ04K1532008-01

- 11) Hold the clutch sleeve hub with the special tools and remove the clutch sleeve hub nut (1).

Special tool

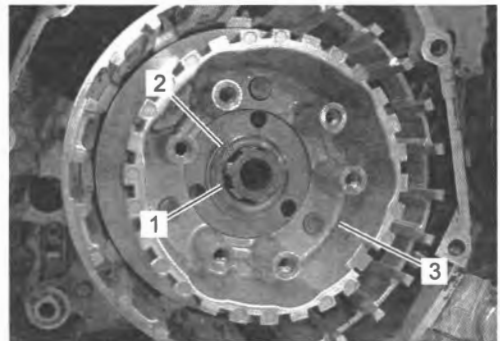
(A): 09920-53740

(B): 09920-31020



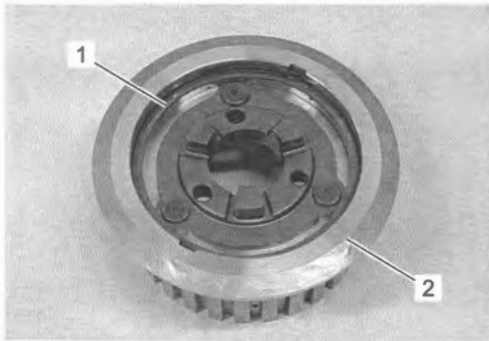
IJ04K1532009-01

- 12) Remove the spring washer (1), washer (2) and clutch sleeve hub assembly (3).



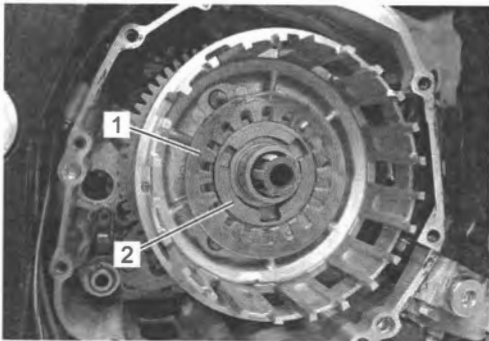
IJ04K1532010-01

- 13) Remove the seat washer (1) from the clutch sleeve hub (2).



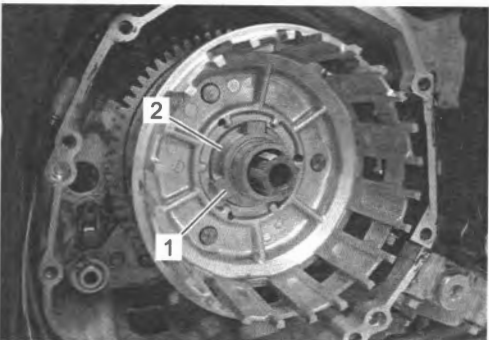
IJ04K1532011-01

- 14) Remove the wave spring washers (4 pcs.) (1) and clutch lifter driven cam (2).



IJ04K1532012-01

- 15) Remove the clutch lifter drive cam (1) and thrust washer (2).

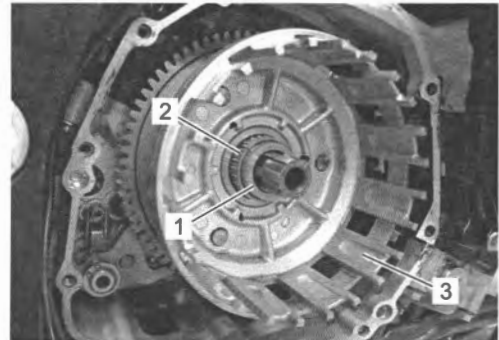


IJ04K1532013-01

- 16) Remove the spacer (1) and bearing (2).
17) Remove the primary driven gear assembly (3).

NOTE

If it is difficult to remove the primary driven gear, rotate the crankshaft.



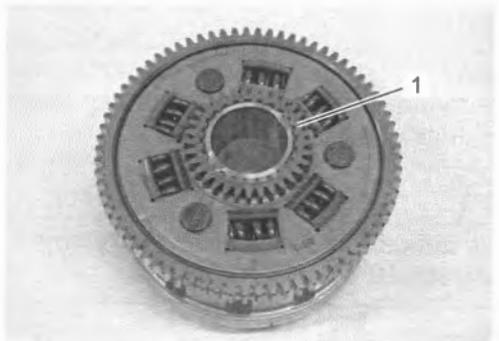
IJ04K1532014-01

- 18) Remove the thrust washer (1).



IJ04K1532015-01

- 19) Remove the oil pump drive gear (1).

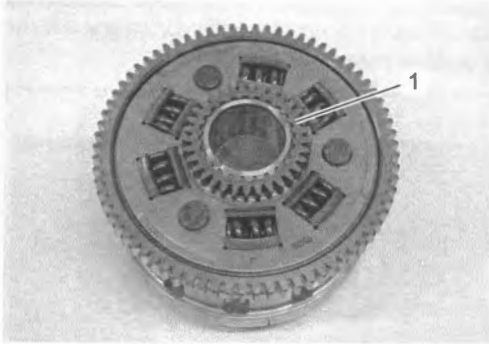


IJ04K1532016-01

Clutch Installation

BENK07L25306010

- 1) Install the oil pump drive gear (1).

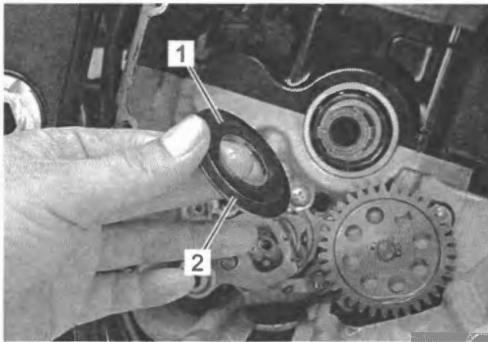


IJ04K1532017-01

- 2) Install the thrust washer (1).

NOTE

The tapered portion (2) of thrust washer (1) faces the crankcase side.



IJ04K1532018-02

- 3) Install the primary driven gear assembly (1).

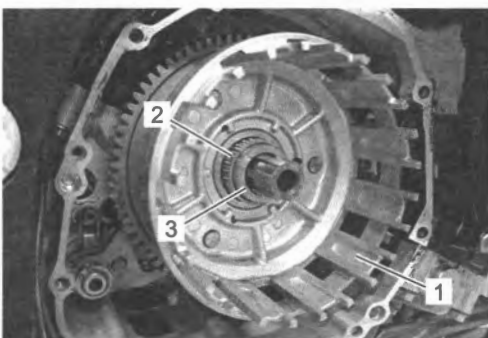
NOTICE

Be sure to engage the oil pump drive gear with driven gear, and primary driven gear with drive gear.

NOTE

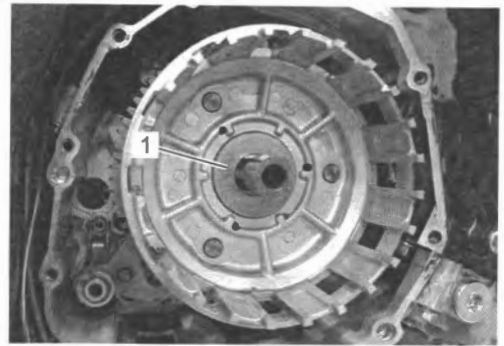
If it is difficult to install the primary driven gear, rotate the crankshaft.

- 4) Apply engine oil to the bearing (2) and install it.
- 5) Install the spacer (3).



IJ04K1532019-01

- 6) Install the thrust washer (1).

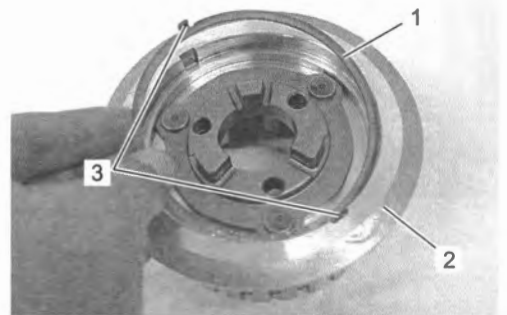


IJ04K1532020-01

- 7) Install the seat washer (1) to the clutch sleeve hub (2).

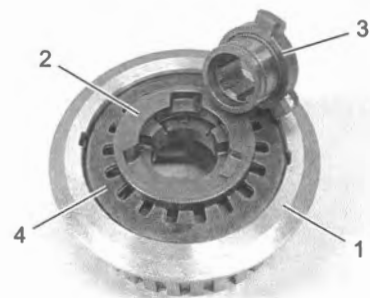
NOTE

The tabs (3) on the seat washer (1) faces outside.



IJ04K1532021-02

- 8) Apply engine oil to the contacting surfaces of the clutch sleeve hub (1), clutch lifter driven cam (2) and clutch lifter drive cam (3).
- 9) Install the wave spring washers (4 pcs.) (4), clutch lifter driven cam (2) and clutch lifter drive cam (3).

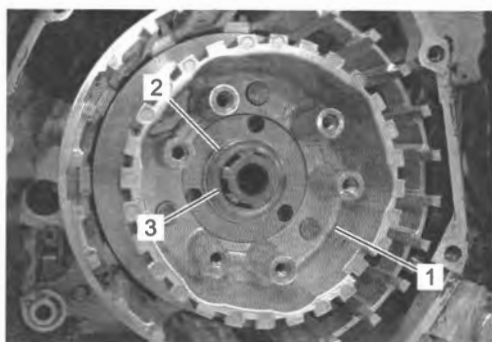


IJ04K1532022-01

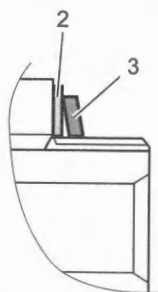
- 10) Install the clutch sleeve hub assembly (1), washer (2) and spring washer (3).

NOTE

The conical curve side of spring washer (3) faces outside.



IJ04K1532023-01



IJ04K1532024-01

- 11) Hold the clutch sleeve hub with the special tools and tighten the new clutch sleeve hub nut (1) to the specified torque.

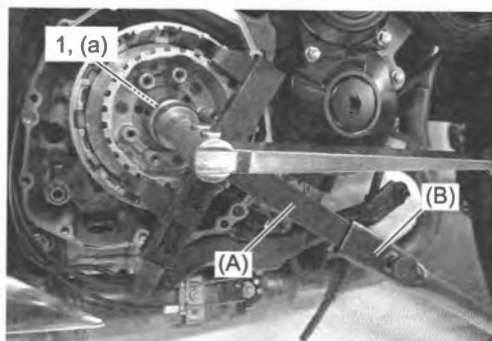
Special tool

(A): 09920-53740

(B): 09920-31020

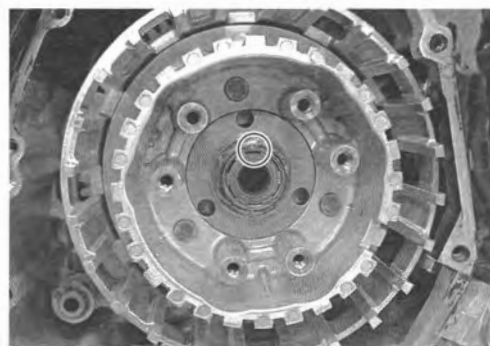
Tightening torque

Clutch sleeve hub nut (a): 95 N·m (9.7 kgf·m, 70.0 lbf·ft)



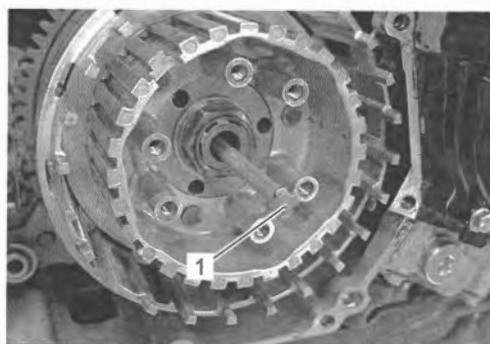
IJ04K1532025-01

- 12) Lock the clutch sleeve hub nut with a center punch.



IJ04K1532026-01

- 13) Install the clutch push rod (right) (1) into the countershaft.



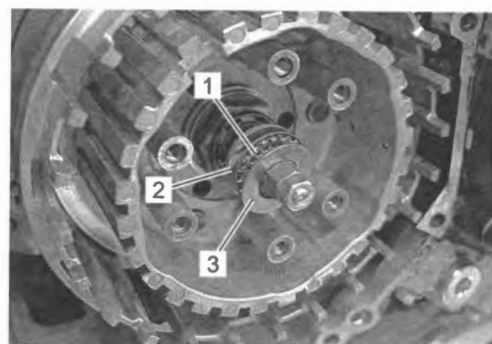
IJ04K1532027-01

- 14) Apply engine oil to clutch release bearing (1).

- 15) Install the clutch push piece (2), clutch release bearing (1) and thrust washer (3).

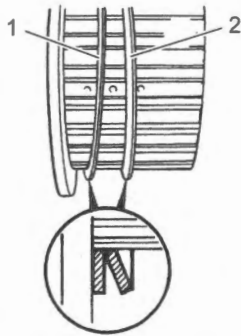
NOTE

Thrust washer (3) is located between the clutch pressure plate and clutch release bearing (1).



IJ04K1532028-01

- 16) Install the wave washer seat (1) and wave washer (2) onto the clutch sleeve hub.

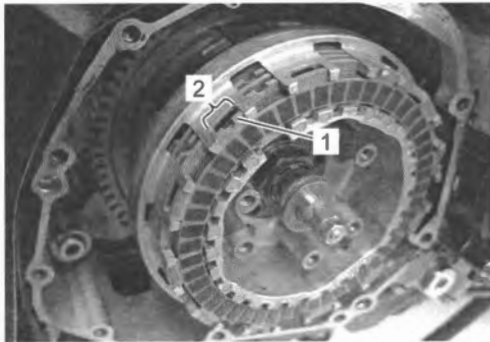


IF04K1530056-01

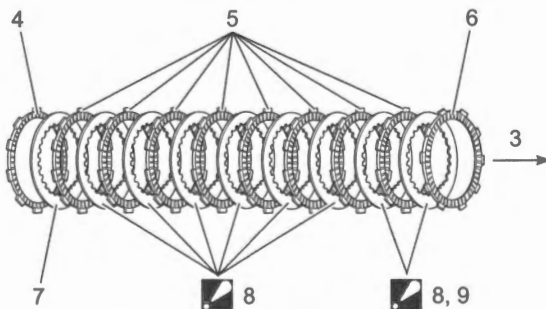
- 17) Apply engine oil to the clutch drive plates.
 18) Insert the clutch drive plates and driven plate one by one into the clutch sleeve hub in the prescribed order.

NOTE

Insert the outermost drive plate No.2 claws (1) to the other slits (2) of clutch housing as shown.



IJ04K1532029-01



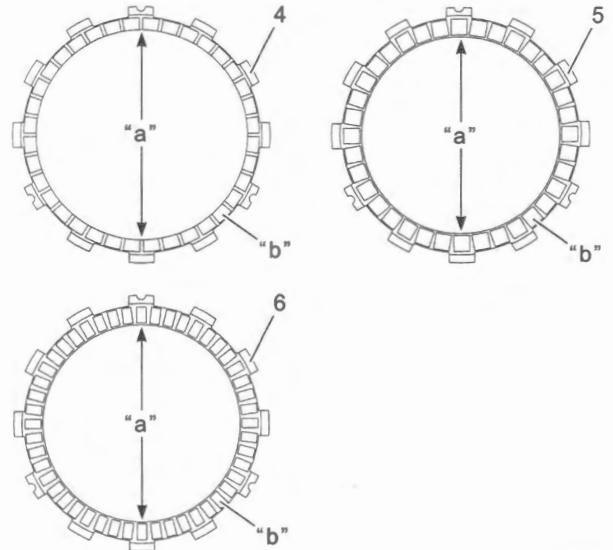
IK07L1530015-01

3.	Direction of outside (Clutch pressure plate side)
4.	Drive plate No.3 (1 pc.)
5.	Drive plate No.1 (8 pcs.)
6.	Drive plate No.2 (1 pc.)
7.	Driven plate No.2 (1 pc.)
8.	Driven plate No.1 (6 – 8 pcs.) : The No.1 and No.3 driven plates are 8 pcs. in total.
9.	Driven plate No.3 (0 – 2 pc(-s).) : The No.1 and No.3 driven plates are 8 pcs. in total.

NOTE

For drive plate

Three kinds of the drive plate (No.1, No.2 and No.3) are equipped in the clutch system, they can be distinguished by the inside diameter "a" and clutch facing "b".



IJ04K1532048-01

Drive plate	I.D. "a"	Clutch facing "b"
(4) No.3	118 mm (4.65 in)	36 pcs.
(5) No.1	111 mm (4.37 in)	36 pcs.
(6) No.2	111 mm (4.37 in)	48 pcs.

NOTE

For driven plate

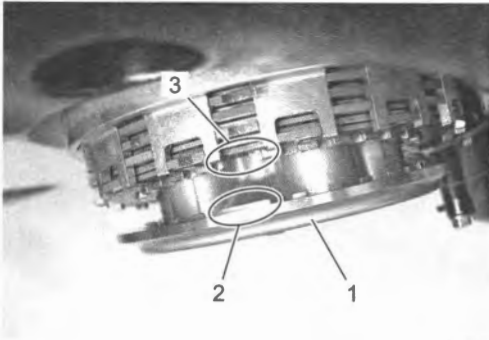
Basically in this motorcycle, 8 pcs. of the driven plate No.1 and 1 pc. of the driven plate No.2 are installed. Instead of 1 or 2 pc(-s). of the No.1, however, sometimes same pcs. of the driven plate No.3 may have been installed at the factory for the purpose of fine adjusting the overall thickness of clutch plates. The driven plate No.3 should be installed in the clutch pressure plate side. When replacing the driven plate, always use 8 pcs. of the driven plate No.1 and 1 pc. of the driven plate No.2.

Driven plate	Thickness	Color
No.1	2.3 mm (0.091 in)	Silver
No.2	2.3 mm (0.091 in)	Gray
No.3	2.6 mm (0.10 in)	Silver

- 19) Install the clutch pressure plate (1).

NOTE

When install the clutch pressure plate (1), fit the convex part (2) of the clutch pressure plate (1) onto the concave part (3) of the clutch sleeve hub.



IJ04K1532032-01

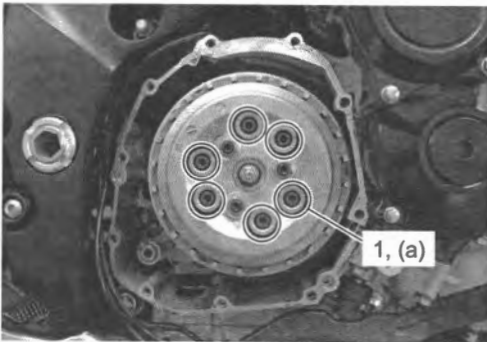
- 20) Install the clutch springs and set bolts (1).
21) Tighten the clutch spring set bolts (1) to the specified torque.

NOTE

Tighten the clutch spring set bolt little by little and diagonally.

Tightening torque

Clutch spring set bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

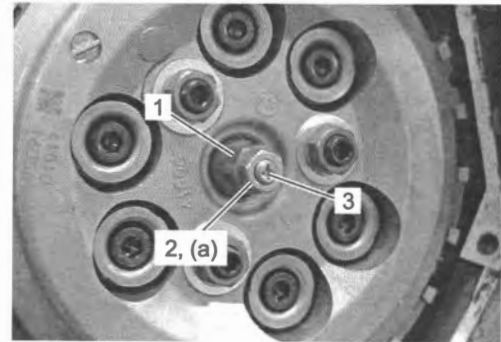


IJ04K1532033-01

- 22) Hold the clutch push piece (1).
23) Loosen the clutch release adjuster nut (2) and turn the clutch release screw (3) clockwise until resistance is felt.
24) From the position of 23), turn the clutch release screw (3) counterclockwise 1/2 rotation, and tighten the clutch release adjuster nut (2) while holding the clutch release screw (3).

Tightening torque

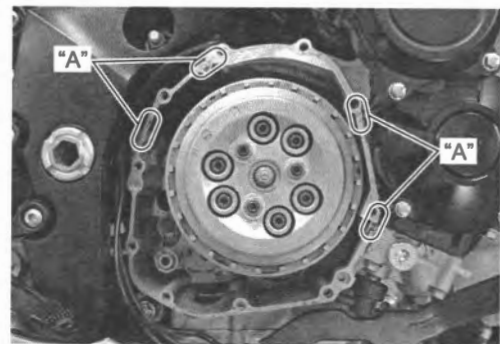
Clutch release adjuster nut (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IJ04K1532034-01

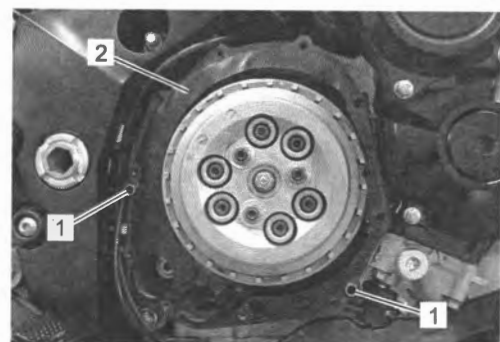
- 25) Apply sealant lightly to the mating surfaces at the parting line between the upper and middle, middle and lower crankcases as shown.

“A”: Sealant 99000-31140 (SUZUKI BOND 1207B)



IJ04K1532035-02

- 26) Install the dowel pins (1) and new gasket (2).



IJ04K1532036-01

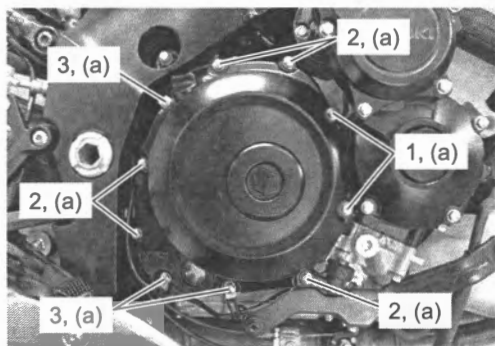
- 27) Install the clutch cover.
- 28) Fit the new gasket to the clutch cover bolts (1).
- 29) Tighten the clutch cover bolts (1), (2) and (3) to the specified torque.

NOTE

Fit the clamps to the bolts (3).

Tightening torque

Clutch cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IJ04K1532037-01

- 30) Install the right under cowling. (Page 9D-42)
- 31) Pour engine oil. (Page 1E-5)

Clutch Parts Inspection

BENK07L25306011

Refer to "Clutch Removal" (Page 5C-14) and "Clutch Installation" (Page 5C-17).

Clutch Drive and Driven Plate

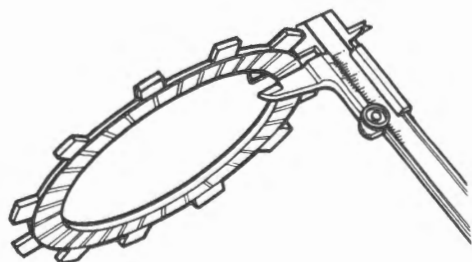
NOTE

Wipe off the engine oil from the drive and driven plates with a clean rag.

Measure the thickness of drive plates with a vernier calipers. If the drive plate thickness is found to have reached the limit, replace it with a new one.

Drive plate thickness

[Limit]: 2.42 mm (0.0953 in)

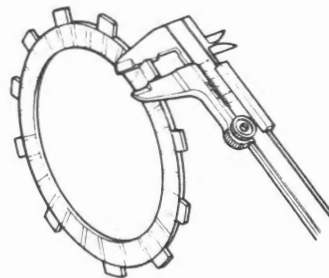


IK46K1530041-01

Measure the claw width of drive plates using a vernier calipers. Replace the drive plates found to have worn down to the limit.

Drive plate claw width

[Limit]: 13.35 mm (0.5256 in)



IK46K1530042-01

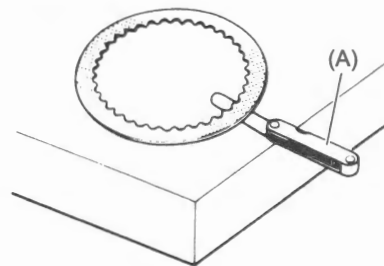
Measure each driven plate for distortion with a thickness gauge and surface plate. Replace driven plates which exceed the limit.

Driven plate distortion

[Limit]: 0.10 mm (0.004 in)

Special tool

(A): 09900-20803



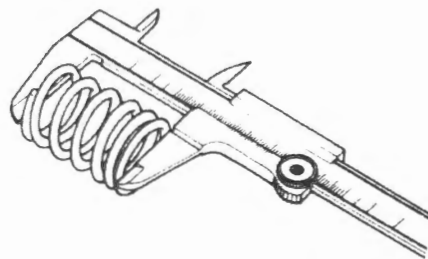
IF04K1530066-01

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]: 54.2 mm (2.14 in)

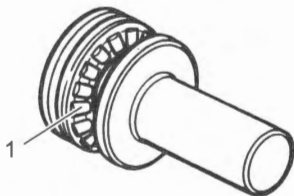


IK46K1530043-01

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.



IF04K1530068-01

Push Rod (Right)

Inspect the push rod for wear and damage.

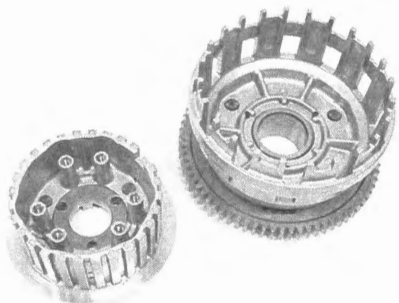
If any defects are found, replace the push rod with a new one.



IJ04K1532038-01

Clutch Sleeve Hub and Primary Driven Gear Assembly

Inspect the slot of the clutch sleeve hub and primary driven gear assembly for damage or wear caused by the clutch plates. If necessary, replace it with a new one.



IJ04K1532039-01

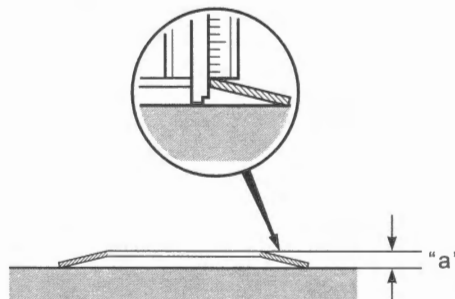
Wave Spring Washer

Measure the free height "a" of each wave spring washer with a vernier calipers.

If each wave spring washer height is not within the specified limit, replace it with a new one.

Wave spring washer height

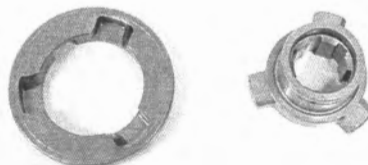
[Limit]: 4.30 mm (0.170 in)



IK07L1530011-01

Clutch Lifter Drive Cam and Clutch Lifter Driven Cam

Inspect the clutch lifter drive cam and clutch lifter driven cam for wear and damage. If any defects are found, replace the clutch lifter drive cam or clutch lifter driven cam.



IJ04K1532041-01

Clutch Lifter Pin Inspection and Adjustment

BENK07L25306012

Refer to "Clutch Removal" (Page 5C-14) and "Clutch Installation" (Page 5C-17).

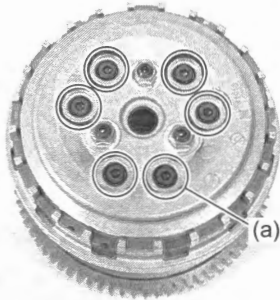
- 1) Assemble the following parts into the primary driven gear assembly.
 - Clutch sleeve hub
 - Wave washer seat and wave washer
 - Clutch drive plates and clutch driven plates
 - Clutch pressure plate
 - Clutch springs and clutch springs set bolts

NOTE

Tighten the clutch spring set bolt little by little and diagonally.

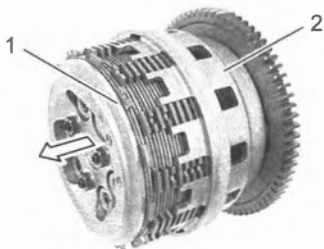
Tightening torque

Clutch spring set bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IJ04K1532042-01

- 2) Remove the clutch assembly (1) from the primary driven gear assembly (2).



IJ04K1532043-01

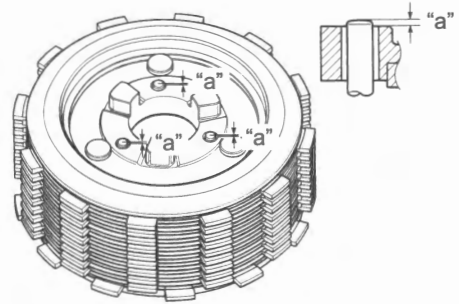
- 3) Inspect the clutch lifter pin height "a" at three positions using the thickness gauge. If the measurement is out of the specification, adjust the clutch lifter pin height "a" as shown.

Clutch lifter pin height

[Standard]: 0.2 – 0.4 mm (0.008 – 0.015 in)

Special tool

09900-20803

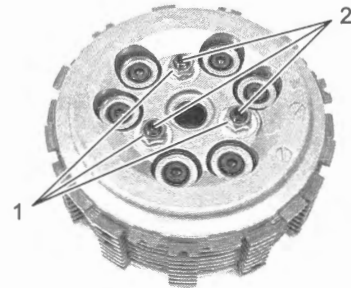


I947H1530045-01

- 4) Loosen the clutch lifter pin lock-nuts (1) and turn the clutch lifter pins (2) counterclockwise.

NOTE

Each clutch lifter pin height should be as closely as possible.



IJ04K1532044-01

5) Set the thickness gauge to 0.3 mm (0.01 in).

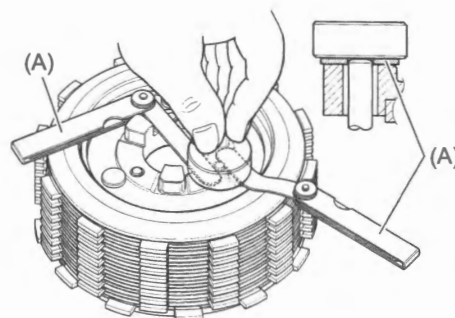
Special tool

(A): 09900-20803

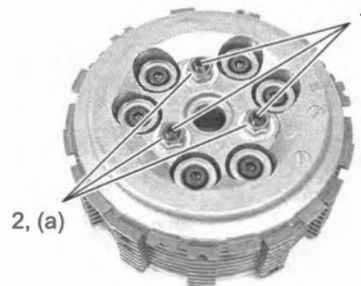
- 6) Place a proper flat plate on the thickness gauges and hold them by hand.
- 7) Slowly turn each clutch lifter pin (1) clockwise until resistance is felt.
- 8) Hold the clutch lifter pins (1) and tighten the clutch lifter pin lock-nuts (2).

Tightening torque

Clutch lifter pin lock-nut (a): 23 N·m (2.3 kgf·m, 17.0 lbf·ft)



IJ04K1532045-02



IJ04K1532046-01

Specifications

Tightening Torque Specifications

BENK07L25307001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Clutch release adjuster nut	5.5	0.56	4.05	☞ (Page 5C-6) / ☞ (Page 5C-20)
Clutch cable lock-nut	4.5	0.46	3.35	☞ (Page 5C-6)
Clutch release adjuster cap	11	1.1	8.5	☞ (Page 5C-6)
Clutch lever pivot nut	6.5	0.66	4.80	☞ (Page 5C-9)
Clutch lever position switch screw	0.6	0.06	0.45	☞ (Page 5C-9)
Clutch lever holder bolt	10	1.0	7.5	☞ (Page 5C-10)
Clutch release arm bolt	8.8	0.90	6.50	☞ (Page 5C-12)
Clutch sleeve hub nut	95	9.7	70.0	☞ (Page 5C-18)
Clutch spring set bolt	10	1.0	7.5	☞ (Page 5C-20) / ☞ (Page 5C-23)
Clutch cover bolt	10	1.0	7.5	☞ (Page 5C-21)
Clutch lifter pin lock-nut	23	2.3	17.0	☞ (Page 5C-24)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

- “Clutch Cable Routing Diagram” (Page 5C-2)
- “Clutch Control System Components” (Page 5C-7)
- “Clutch Components” (Page 5C-13)
- “Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L25308001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞ (Page 5C-9) / ☞ (Page 5C-11) / ☞ (Page 5C-11) / ☞ (Page 5C-11)
Sealant	SUZUKI BOND 1207B	P/No.: 99000-31140	☞ (Page 5C-20)

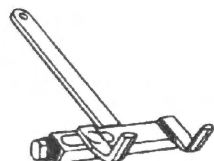
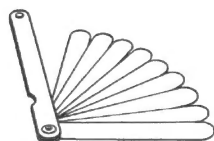
NOTE

Required service material(s) is also described in:
 “Clutch Control System Components” (Page 5C-7)
 “Clutch Components” (Page 5C-13)

Special Tool

BENK07L25308002

09900-20803 Thickness gauge ☞ (Page 5C-21) / ☞ (Page 5C-23) / ☞ (Page 5C-24)	09920-31020 Extension handle ☞ (Page 5C-15) / ☞ (Page 5C-18)
09920-53740 Clutch sleeve hub holder ☞ (Page 5C-15) / ☞ (Page 5C-18)	



Section 6

Steering

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Precautions

Precautions

Precautions for Steering

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

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Steering General Diagnosis

Diagnostic Information and Procedures

Steering Symptom Diagnosis

BENK07L26104001

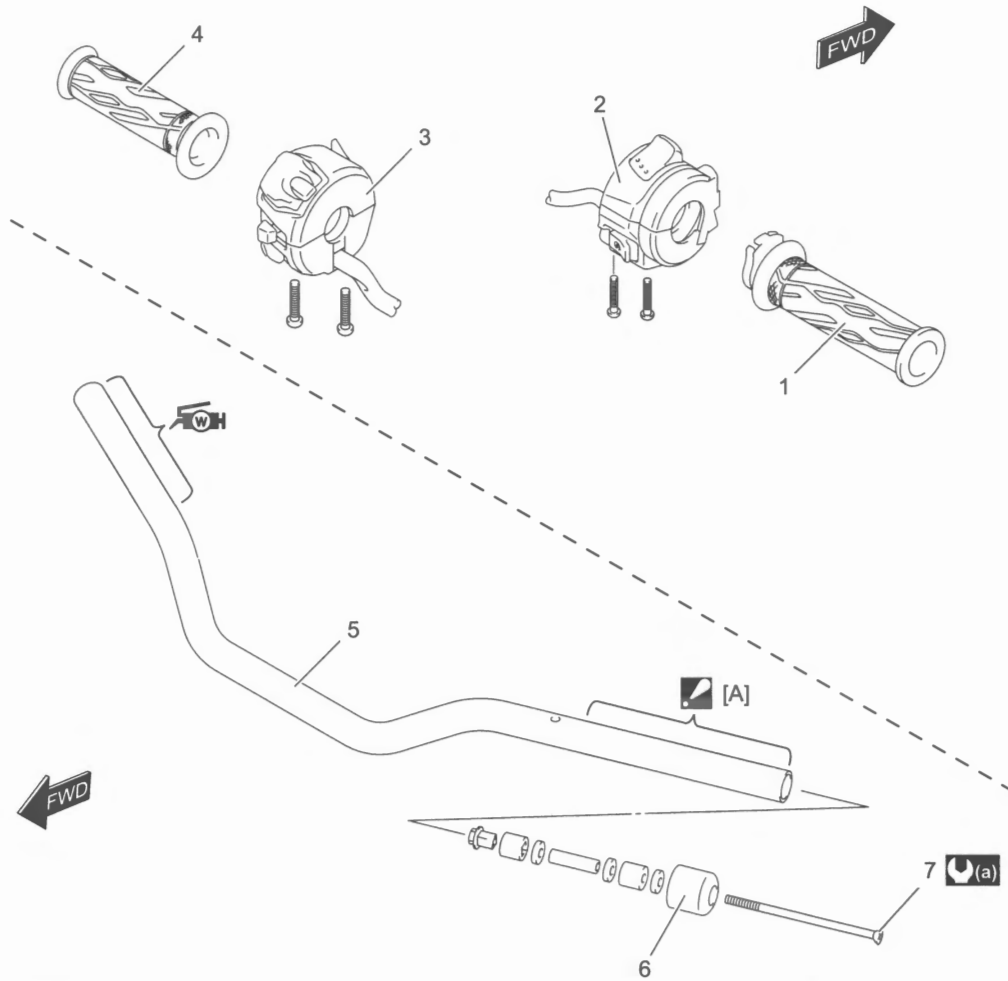
Condition	Possible cause	Correction / Reference Item
Heavy steering	Over tightened steering stem adjust-nut.	Adjust. ⌚(Page 6B-8)
	Broken bearing in steering stem.	Replace. ⌚(Page 6B-13)
	Distorted steering stem.	Replace. ⌚(Page 6B-10)
	Not enough pressure in tires.	Adjust. ⌚(Page 2D-15)
Wobbly handlebar	Loss of balance between right and left front forks.	Replace fork, adjust fork oil level or replace fork spring. ⌚(Page 2B-3) ⌚(Page 2B-4)
	Distorted front fork.	Repair or replace. ⌚(Page 2B-3)
	Distorted front axle or crooked tire.	Replace. ⌚(Page 2D-4) ⌚(Page 2D-15)
	Loose steering stem adjust-nut.	Adjust. ⌚(Page 6B-8)
	Worn or incorrect tire.	Replace. ⌚(Page 2D-15)
	Incorrect tire pressure.	Adjust. ⌚(Page 2D-15)
	Worn bearing/race in steering stem.	Replace. ⌚(Page 6B-13)

Steering / Handlebar

Repair Instructions

Handlebar Components

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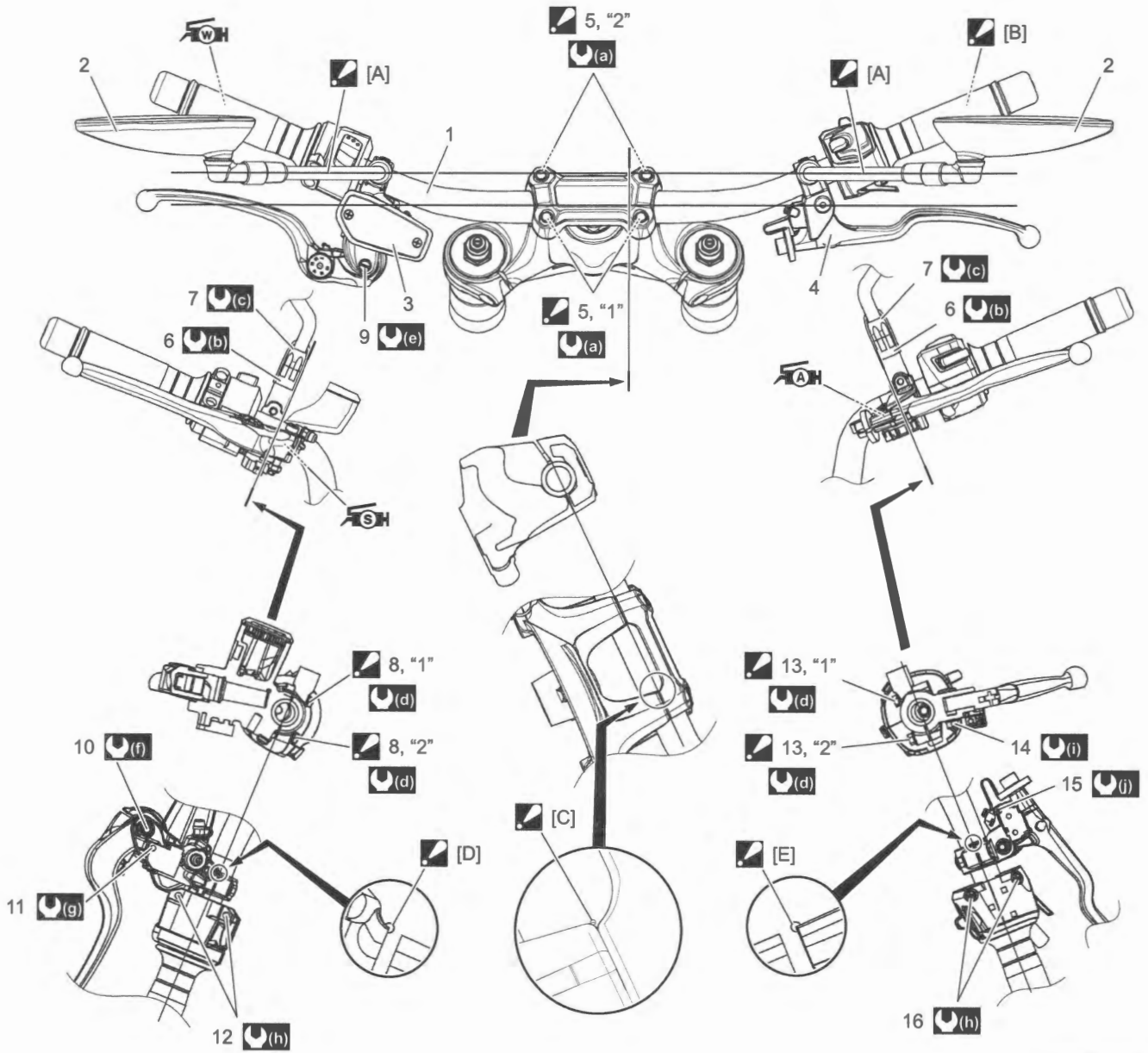


IK07L1620019-02

[A]: Apply handle grip glue.	4. Left handle grip	: 5.5 N·m (0.56 kgf·m, 4.05 lbf·ft)
1. Throttle grip	5. Handlebars	: Apply grease.
2. Right handle switch	6. Handle balancer	
3. Left handle switch	7. Handle balancer screw	






















Handlebar Construction

BENK07L26206002



IK07L1620014-02

6B-3 Steering / Handlebar:

 [A]: Set the stay of rear view mirror in parallel with the straight line of handlebar.	 13. Clutch lever holder bolt : Tighten the bolts to the specified torque in order of "1" → "2".
 [B]: Apply handle grip glue.	14. Clutch lever pivot nut
 [C]: Align the matching surface of handle holder with punch mark of handlebars.	15. Clutch lever position switch screw
 [D]: Align the punch mark of handlebars with the edge of master cylinder.	16. Left handle switch screw
 [E]: Align the punch mark of handlebars with the edge of clutch lever holder.	 (a) : 23 N·m (2.3 kgf·m, 17.0 lbf·ft)
1. Handlebars	 (b) : 28 N·m (2.9 kgf·m, 21.0 lbf·ft)
2. Rear view mirror	 (c) : 18 N·m (1.8 kgf·m, 13.5 lbf·ft)
3. Front brake master cylinder	 (d) : 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
4. Clutch lever	 (e) : 1.0 N·m (0.10 kgf·m, 0.75 lbf·ft)
 5. Handlebar clamp bolt : Tighten the bolts to the specified torque in order of "1" → "2".	 (f) : 6.0 N·m (0.61 kgf·m, 4.45 lbf·ft)
6. Rear view mirror adapter	 (g) : 1.2 N·m (0.12 kgf·m, 0.90 lbf·ft)
7. Rear view mirror nut	 (h) : 3.0 N·m (0.31 kgf·m, 2.25 lbf·ft)
 8. Front brake master cylinder holder bolt : Tighten the bolts to the specified torque in order of "1" → "2".	 (i) : 6.5 N·m (0.66 kgf·m, 4.80 lbf·ft)
9. Brake lever pivot bolt	 (l) : 0.6 N·m (0.06 kgf·m, 0.45 lbf·ft)
10. Brake lever pivot bolt lock-nut	 AH : Apply grease.
11. Front brake light switch screw	 SH : Apply silicone grease.
12. Right handle switch screw	 WH : Apply grease.

Handlebar Removal and Installation

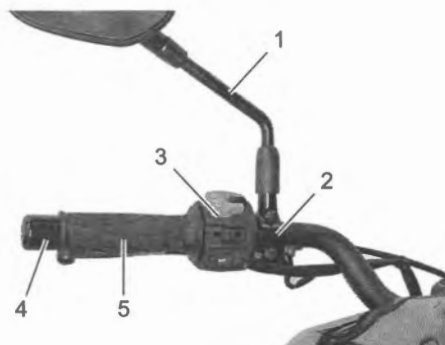
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Removal

NOTE

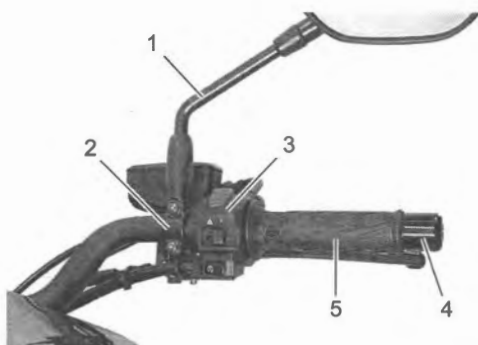
Do not turn the master cylinder upside down.

- 1) Remove the following parts from the left side of the handlebar.
 - a) Left rear view mirror (1)
 - b) Clutch lever assembly (2)
 - c) Left handle switch (3)
 - d) Handle balancer (4)
 - e) Left handle grip (5)



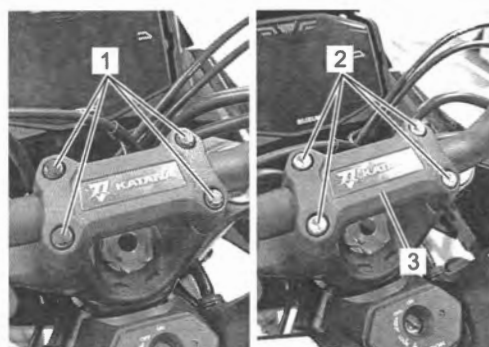
IK07L1620001-01

- 2) Remove the following parts from the right side of the handlebar.
 - a) Right rear view mirror (1)
 - b) Front brake master cylinder assembly (2)
 - c) Right handle switch (3)
 - d) Handle balancer (4)
 - e) Throttle grip (5)



IK07L1620002-01

- 3) Remove the caps (1), bolts (2) and handle holder (3).



IK07L1620003-01

- 4) Remove the handlebars.

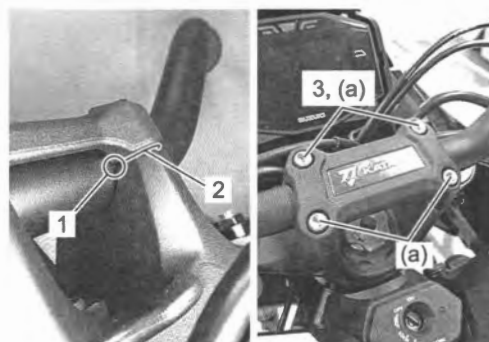
Installation

- 1) Place the handlebars and handle holder on the bracket.
- 2) Set the handlebars so that its punch mark (1) aligns with the mating surface (2) of handle holder left part and tighten the handlebar clamp bolts from the front ones (3) first.

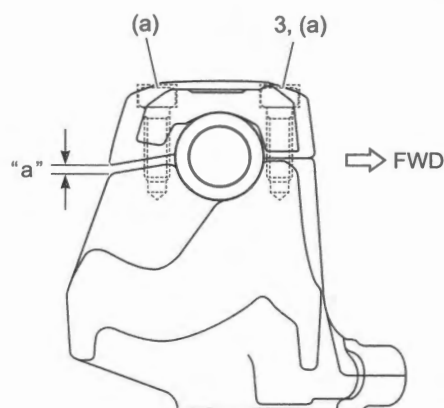
Tightening torque

Handlebar clamp bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

- 3) Install the caps onto the bolt heads.



IK07L1620004-01



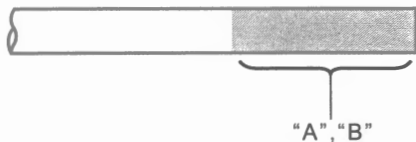
IK07L1620005-01

"a": Clearance

- 4) Install the front brake master cylinder assembly.
☞ (Page 4A-17)
- 5) Apply grease onto the handlebars before installing the throttle grip.

"A": Grease 99000-25350 (SUZUKI WATER RESISTANT GREASE EP2)

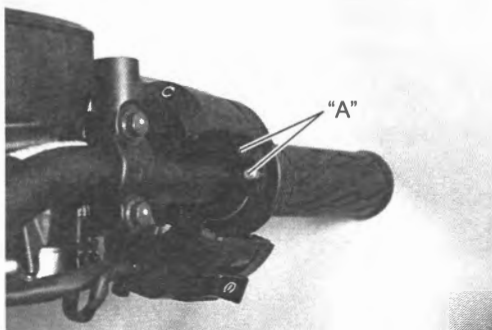
"B": Grease 99000-25380 (GREASE)



IK07L1620015-01

- 6) Apply grease to the end of the throttle cables and cable pulley.

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

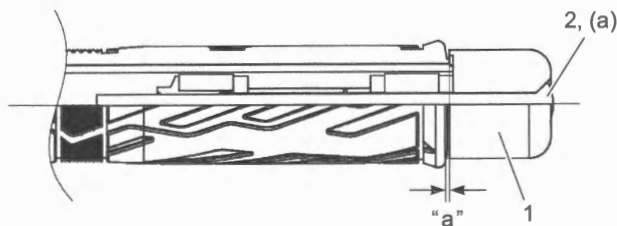


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- 7) Install the handle balancer (1) to the handlebar right end and tighten the handle balancer screw (2) to the specified torque.

Tightening torque

Handle balancer screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



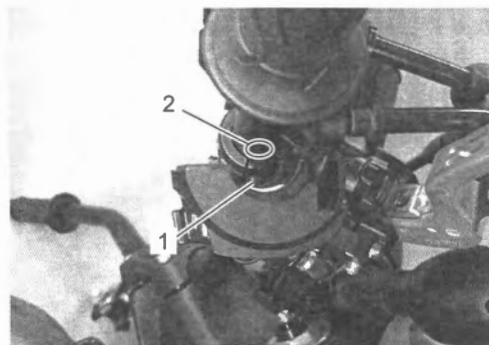
IK07L1620006-03

"a": 0.5 – 1.5 mm (0.019 – 0.059 in)

- 8) Insert the projection (1) of the right handle switch into the hole (2) of the handlebars and tighten the right handle switch screws to the specified torque.

Tightening torque

Right handle switch screw: 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)



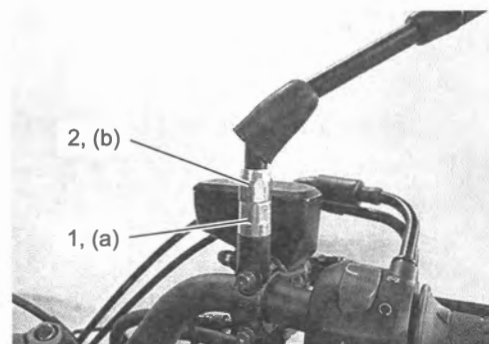
IF04K1620008-03

- 9) Install the right rear view mirror. Tighten the rear view mirror adapter (1) and rear view mirror nut (2) to the specified torque.

Tightening torque

Rear view mirror adapter (a): 28 N·m (2.9 kgf-m, 21.0 lbf-ft)

Rear view mirror nut (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)

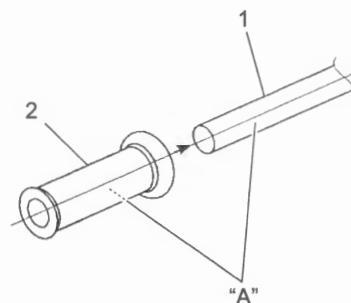


IK07L1620016-02

- 10) Clean, degrease and dry both the left handlebar outer surface (1) on which the grip is being fitted and internal surface of the left handle grip (2).

- 11) 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 handle grip (2) evenly.

"A": Adhesive (Handle grip glue)

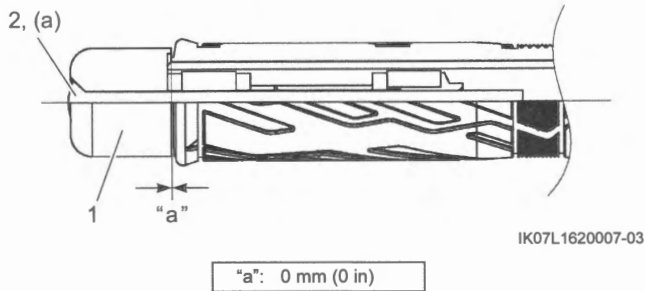


IE31J1620012-01

- 12) Install the handle balancer (1) to the handlebar left end and tighten the handle balancer screw (2) to the specified torque.

Tightening torque

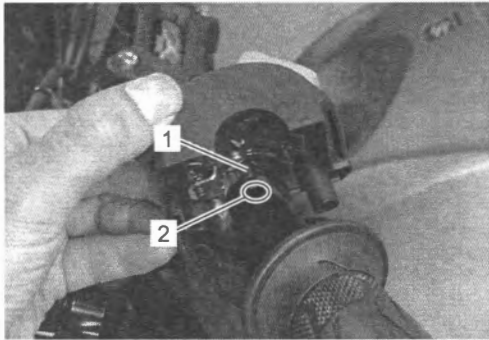
Handle balancer screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



- 13) Insert the projection (1) of the left handle switch into the hole (2) of the handlebars and tighten the left handle switch screws to the specified torque.

Tightening torque

Left handle switch screw: 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)



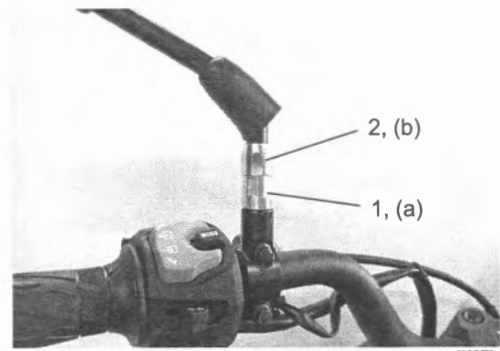
- 14) Install the clutch lever. (Page 5C-8)

- 15) Install the left rear view mirror. Tighten the rear view mirror adapter (1) and rear view mirror nut (2) to the specified torque.

Tightening torque

Rear view mirror adapter (a): 28 N·m (2.9 kgf-m, 21.0 lbf-ft)

Rear view mirror nut (b): 18 N·m (1.8 kgf-m, 13.5 lbf-ft)



- 16) Check to make sure that the wire harnesses, cables and hoses are properly routed.

- Wire harness: (Page 9A-9)
- Cable: (Page 1D-2)
- Hose: (Page 4A-1)

- 17) Check the throttle cable for the play and smooth operation. (Page 1D-10)

- 18) Check the clutch cable for the play and smooth operation. (Page 5C-5)

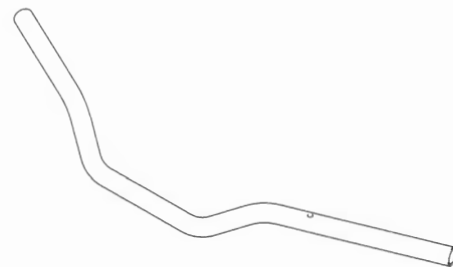
Handlebar Inspection

BENK07L26206004

Refer to "Handlebar Removal and Installation" (Page 6B-4).

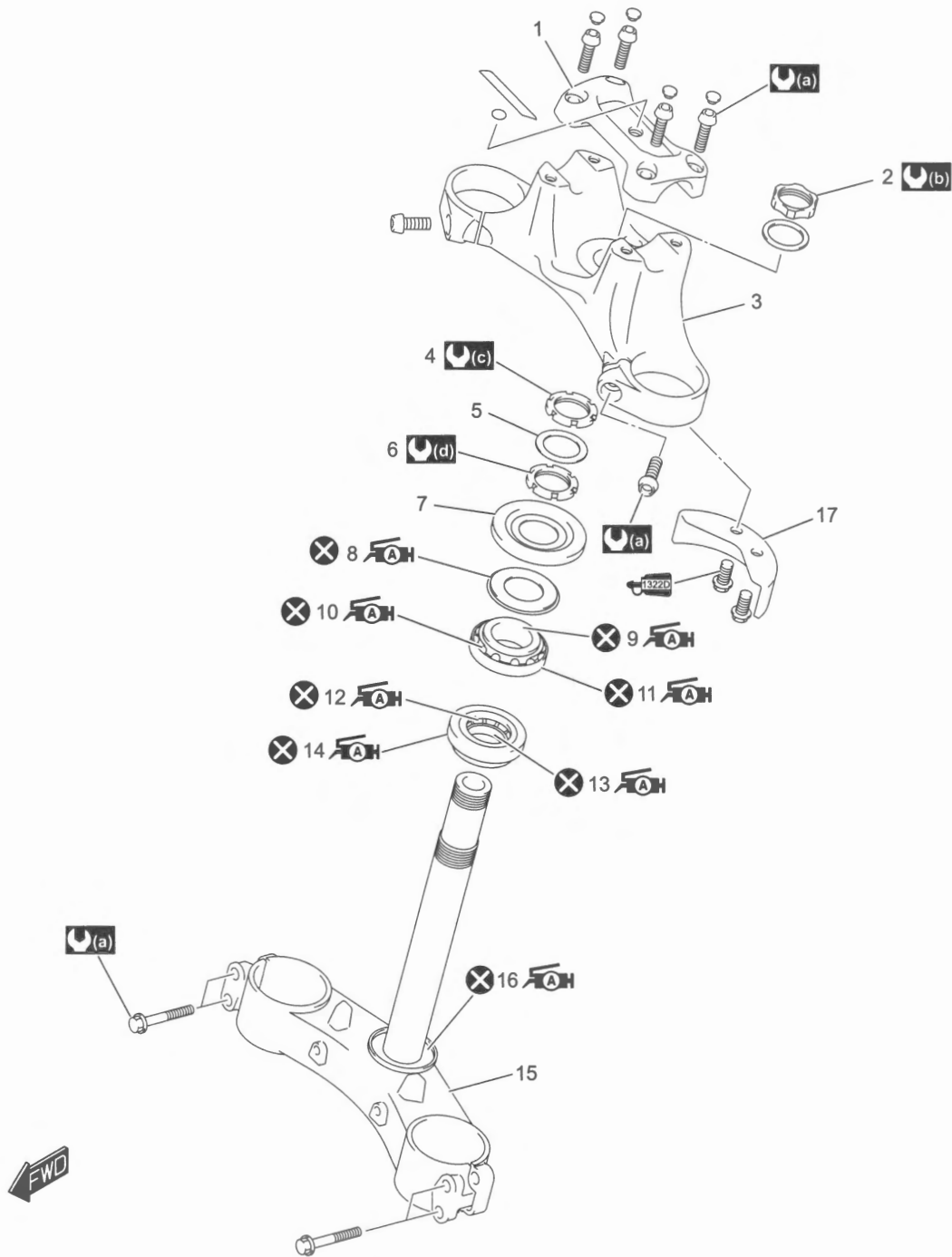
Inspect the handlebars for distortion and damage.

If any defect is found, replace the handlebars with a new one.



Steering Stem Components

BENK07L26206005



IK07L1620021-01

1. Handle holder	9. Steering stem upper bearing outer race	17. Steering lock plate
2. Steering stem head nut	10. Steering stem upper bearing	(a) : 23 N·m (2.3 kgf·m, 17.0 lbf·ft)
3. Steering stem upper bracket	11. Steering stem upper bearing inner race	(b) : 90 N·m (9.2 kgf·m, 66.5 lbf·ft)
4. Steering stem lock-nut	12. Steering stem lower bearing	(c) : 80 N·m (8.2 kgf·m, 59.0 lbf·ft)
5. Washer	13. Steering stem lower bearing outer race	(d) : 20 N·m (2.0 kgf·m, 15.0 lbf·ft) → turn counterclockwise 0 – 1/4
6. Steering stem adjust-nut	14. Steering stem lower bearing inner race	AH : Apply grease.
7. Dust cover	15. Steering stem lower bracket	1322D : Apply thread lock to the thread part.
8. Dust seal	16. Lower seal	X : Do not reuse.

Steering On-Vehicle Inspection

BENK07L26206006

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.



IK07L1620008-01

- 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.



IK07L1620018-01

- 2) If play is found, readjust the steering. (Page 6B-8)

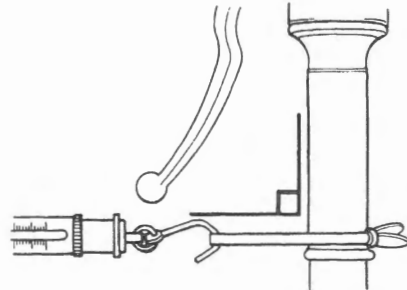
Steering Tension Adjustment

BENK07L26206007

- 1) By supporting the motorcycle, lift the front wheel until it is off the floor 20 – 30 mm (0.8 – 1.2 in).
- 2) Check to make sure that the cables and wire harnesses are properly routed.
- 3) With the front wheel in the straight ahead state, hitch the spring scale on one handlebar grip end as shown in the figure and read the graduation when the handlebars start moving.

Steering tension initial force

[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 cowling brace. (Page 9D-20)
 - b) Remove the handlebars. (Page 6B-4)
 - c) Remove the cable guide (1).



IK07L1620009-02

- d) First, loosen the front fork upper clamp bolts, steering stem head nut and steering stem lock-nut, and then adjust the steering stem adjust-nut by loosening or tightening it.

Special tool

(A): 09910-60620



IK07L1620010-01

- e) Tighten the steering stem lock-nut, 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 lock-nut: 80 N·m (8.2 kgf-m, 59.0 lbf-ft)

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)

- f) Make sure that the initial force is within the specified range and the steering is not loose.



IK07L1620008-01

- g) Install the removed parts.

Steering Stem Upper Bracket Removal and Installation

BENK07L26206008

Removal

- 1) Support the motorcycle.
- 2) Remove the cowling brace. (Page 9D-20)
- 3) Remove the handlebars. (Page 6B-4)
- 4) Remove the cable guide (1).



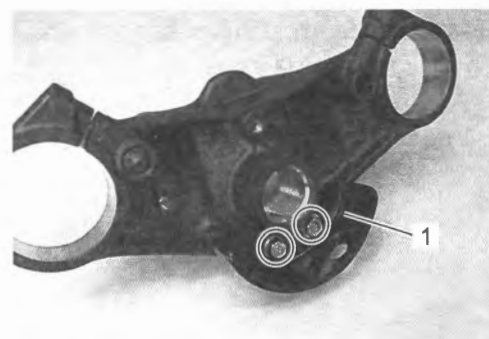
IK07L1620009-02

- 5) Loosen the front fork upper clamp bolts (1).
- 6) Remove the steering stem head nut (2), washer (3) and steering stem upper bracket assembly (4).



IF04K1620016-01

- 7) Remove the steering lock plate (1).

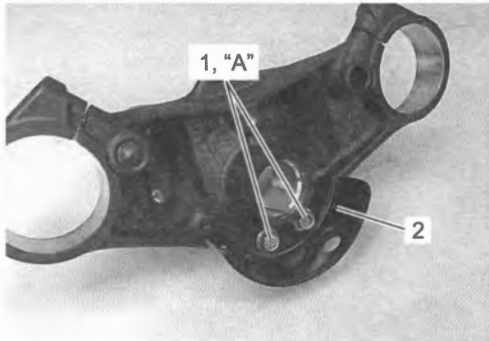


IK07L1620011-01

Installation

- 1) Apply thread lock to the bolts (1) and install the steering lock plate (2).

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)



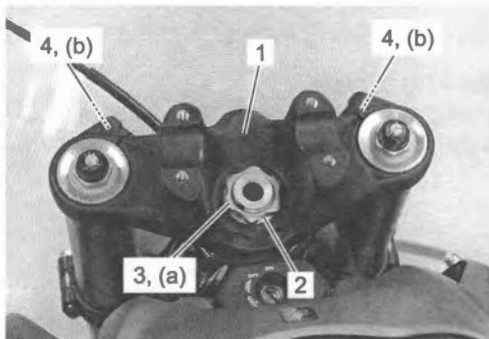
IK07L1620012-01

- 2) Install the steering stem upper bracket (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)



IF04K1620019-02

- 4) Install the guide (1). Refer to "Throttle Cable Routing Diagram" in Section 1D (Page 1D-2) and "Front Brake Hose Routing Diagram" in Section 4A (Page 4A-1).



IK07L1620009-02

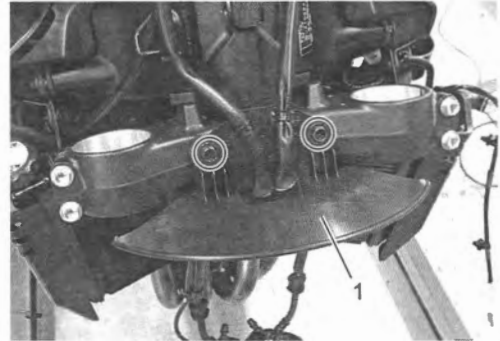
- 5) Install the handlebars. (Page 6B-4)
- 6) Install the cowling brace. (Page 9D-20)

Steering Stem Removal and Installation

BENK07L26206009

Removal

- 1) Remove the steering stem upper bracket. (Page 6B-9)
- 2) Remove the front forks. (Page 2B-3)
- 3) Remove the lower bracket cover (1).



IK07L1620013-01

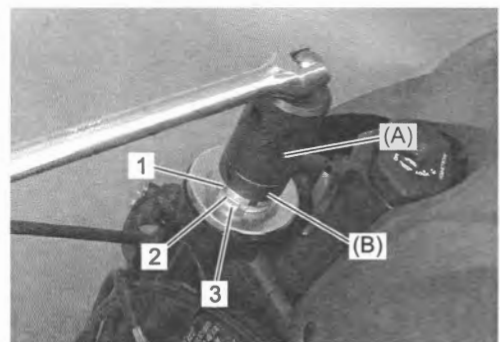
- 4) While holding the steering stem lower bracket, remove the steering stem lock-nut (1), washer (2) and steering stem adjust-nut (3) with the special tools.

Special tool

(A): 09940-14911

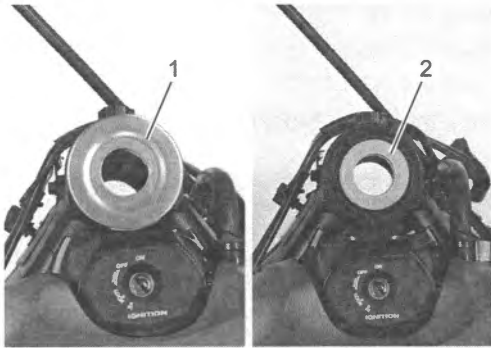
(B): 09940-14960

- 5) Remove the steering stem lower bracket.

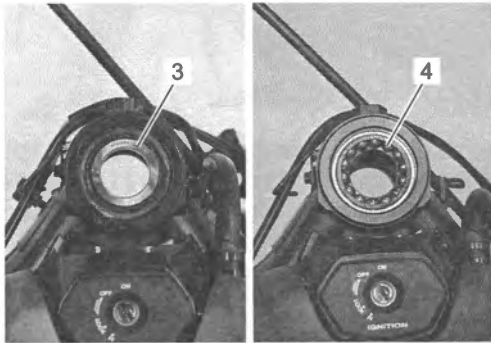


IF04K1620021-02

- 6) Remove the dust cover (1), dust seal (2), steering stem upper bearing outer race (3) and steering stem upper bearing (4).

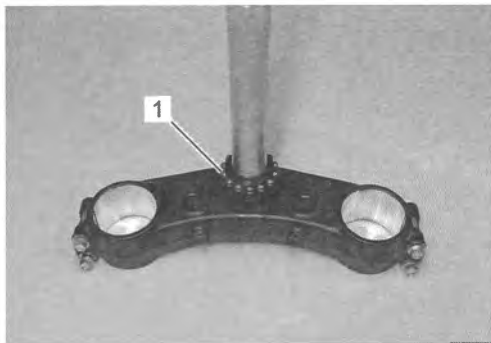


IF04K1620022-01



IF04K1620023-01

- 7) Remove the steering stem lower bearing (1).

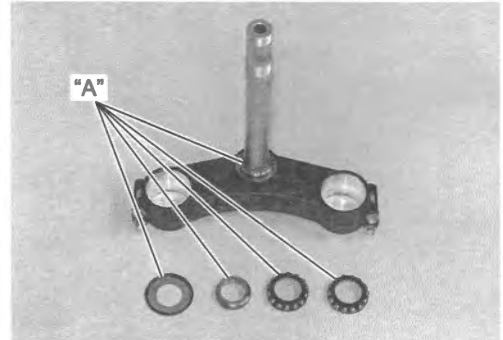


IF04K1620034-01

Installation

- 1) Apply grease to the bearings, races, lower seal and new dust seal lip, and install the steering stem lower bracket to the frame.

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



IF04K1620024-01

- 2) Install the steering stem adjust-nut (1) and temporarily tighten it to the specified torque (20 N·m (2.0 kgf-m, 15.0 lbf-ft)) with the special tools.

Special tool

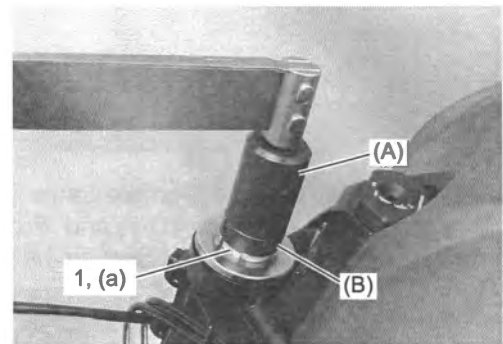
(A): 09940-14911

(B): 09940-14960

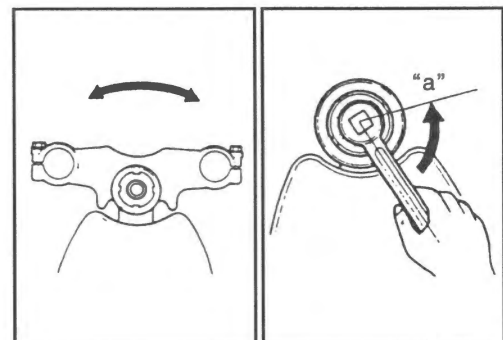
- 3) Turn the steering stem lower bracket to the left and right about five or six times so that the taper roller bearings seat properly.
- 4) Loosen the steering stem adjust-nut 0 – 1/4 turn "a".

Tightening torque

Steering stem adjust-nut (a): 20 N·m (2.0 kgf-m, 15.0 lbf-ft) → turn counterclockwise 0 – 1/4

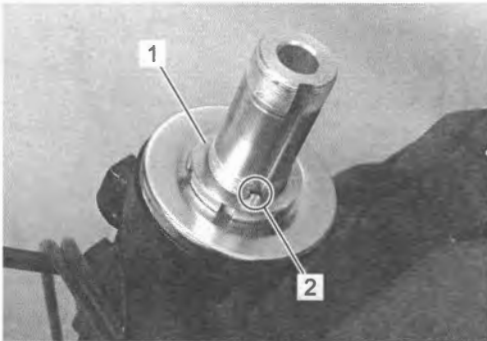


IF04K1620025-01



I649G1620026-02

- 5) 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 stem adjust-nut.
- 6) When installing the washer (1), align the lug (2) of the washer to the groove of the steering stem.



IF04K1620026-01

- 7) Tighten the steering stem lock-nut (1) to the specified torque with the special tools.

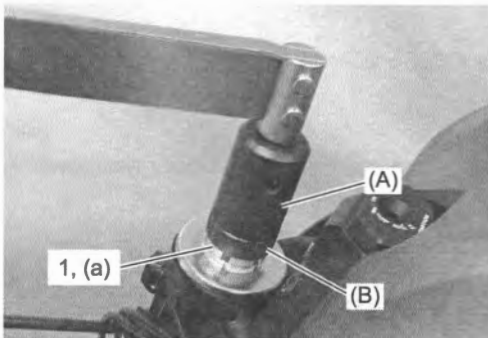
Special tool

(A): 09940-14911

(B): 09940-14960

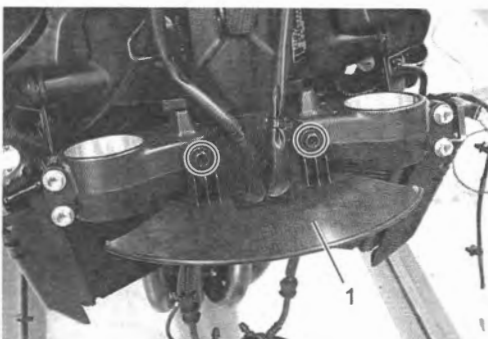
Tightening torque

Steering stem lock-nut (a): 80 N·m (8.2 kgf-m, 59.0 lbf-ft)



IF04K1620027-01

- 8) Install the lower bracket cover (1).

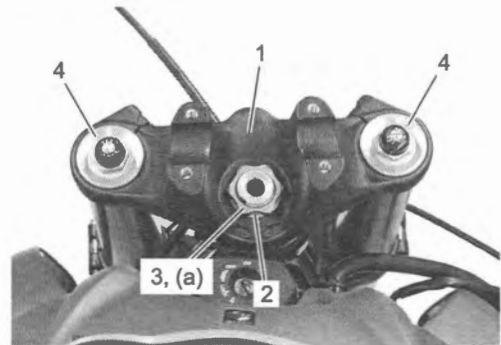


IK07L1620013-01

- 9) Install the steering stem upper bracket (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)



IF04K1620028-03

- 12) Install the front forks. ☞(Page 2B-3)
- 13) Install the guide (1). Refer to "Throttle Cable Routing Diagram" in Section 1D (Page 1D-2) and "Front Brake Hose Routing Diagram" in Section 4A (Page 4A-1).



IK07L1620009-02

- 14) Install the handlebars. ☞(Page 6B-4)
- 15) Check the steering tension. ☞(Page 6B-8)

Steering Stem Inspection

BENK07L26206010

Refer to "Steering Stem Removal and Installation" (Page 6B-10).

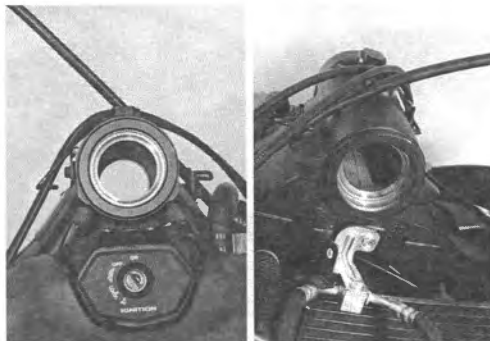
Inspect the removed parts for the following abnormalities:

- 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.



IF04K1620030-01



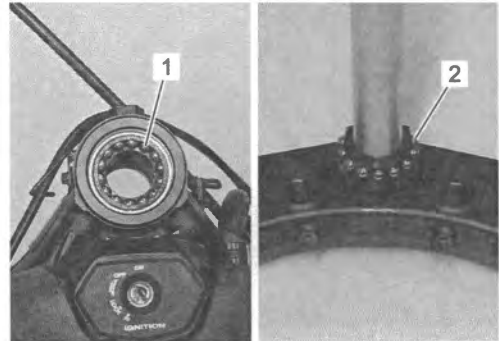
IF04K1620031-01

Steering Stem Bearing Removal and Installation

BENK07L26206011

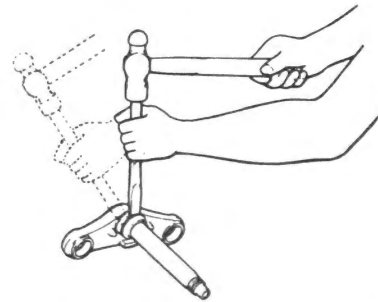
Removal

- 1) Remove the steering stem upper bearing (1) and steering stem lower bearing (2). Refer to "Steering Stem Removal and Installation" (Page 6B-10).



IF04K1620032-01

- 2) Remove the steering stem lower bearing outer race and lower seal with a chisel.



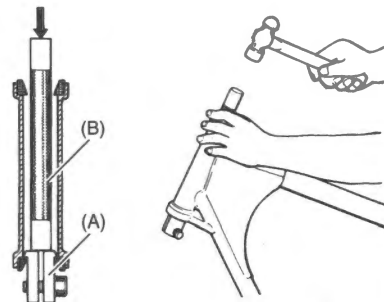
1649G1620033-02

- 3) Remove the steering stem upper and lower bearing inner races using the special tools.

Special tool

(A): 09941-54913

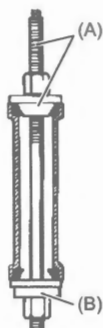
(B): 09940-51711



ID26J1620040-01

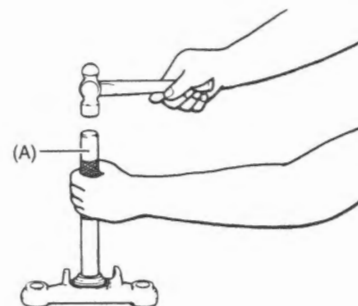
Installation

- 1) Press in the new upper and lower inner races using the special tools.

Special tool**(A): 09941-34513****(B): 09913-70210**

IE31J1620050-01

- 2) Press in the new lower outer race with bearing roller using the special tool.

Special tool**(A): 09925-18011**

ID26J1620042-01

- 3) Install the steering stem lower bracket to the frame.
☞ (Page 6B-10)

Specifications**Tightening Torque Specifications**

BENK07L26207001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Handlebar clamp bolt	23	2.3	17.0	☞ (Page 6B-4)
Handle balancer screw	5.5	0.56	4.05	☞ (Page 6B-5) / ☞ (Page 6B-6)
Right handle switch screw	3.0	0.31	2.25	☞ (Page 6B-5)
Rear view mirror adapter	28	2.9	21.0	☞ (Page 6B-5) / ☞ (Page 6B-6)
Rear view mirror nut	18	1.8	13.5	☞ (Page 6B-5) / ☞ (Page 6B-6)
Left handle switch screw	3.0	0.31	2.25	☞ (Page 6B-6)
Steering stem lock-nut	80	8.2	59.0	☞ (Page 6B-9) / ☞ (Page 6B-12)
Steering stem head nut	90	9.2	66.5	☞ (Page 6B-9) / ☞ (Page 6B-10) / ☞ (Page 6B-12)
Front fork upper clamp bolt	23	2.3	17.0	☞ (Page 6B-9) / ☞ (Page 6B-10)
Steering stem adjust-nut	20 N·m (2.0 kgf·m, 15.0 lbf·ft) → turn counterclockwise 0 – 1/4			☞ (Page 6B-11)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Handlebar Components” (Page 6B-1)

“Handlebar Construction” (Page 6B-2)

“Steering Stem Components” (Page 6B-7)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L26208001

Material	SUZUKI recommended product or Specification		Note
Adhesive	Handle grip glue	—	☞ (Page 6B-5)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞ (Page 6B-5) / ☞ (Page 6B-11)
	SUZUKI WATER RESISTANT GREASE EP2	P/No.: 99000-25350	☞ (Page 6B-5)
	GREASE	P/No.: 99000-25380	☞ (Page 6B-5)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞ (Page 6B-10)

NOTE

Required service material(s) is also described in:

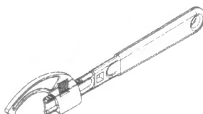
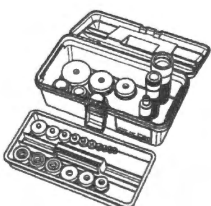

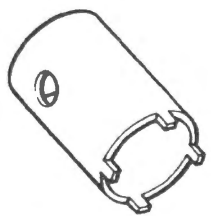
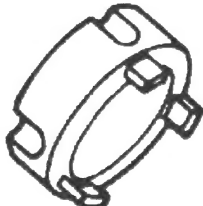
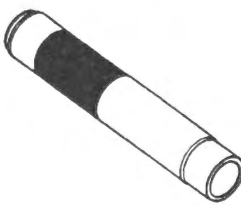

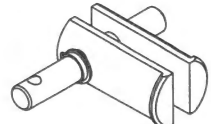
“Handlebar Components” (Page 6B-1)

“Handlebar Construction” (Page 6B-2)

“Steering Stem Components” (Page 6B-7)

Special Tool

BENK07L26208002

09910-60620 Adjustable wrench ☞ (Page 6B-9)		09913-70210 Bearing installer set ☞ (Page 6B-14)	
09925-18011 Bearing installer ☞ (Page 6B-14)		09940-14911 Steering stem nut socket ☞ (Page 6B-10) / ☞ (Page 6B-11) / ☞ (Page 6B-12)	
09940-14960 Steering stem nut socket wrench ☞ (Page 6B-10) / ☞ (Page 6B-11) / ☞ (Page 6B-12)		09940-51711 Bearing installer ☞ (Page 6B-13)	
09941-34513 Bearing installer set ☞ (Page 6B-14)		09941-54913 Bearing outer race remover ☞ (Page 6B-13)	

Section 9

Body and Accessories

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Precautions

Precautions

Precautions for Electrical System

BENK07L29000001

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

BENK07L29003001

Refer to "Electrical Components Location" in Section 0A (Page 0A-7).

Wiring Systems

General Description

Abbreviations

Refer to the "Abbreviations" in Section 0A (Page 0A-1) for the general abbreviations.

BENK07L29101001

Wire / Connector Color Symbols

Refer to "Wire Color Symbols" in Section 0A (Page 0A-4).

BENK07L29101002

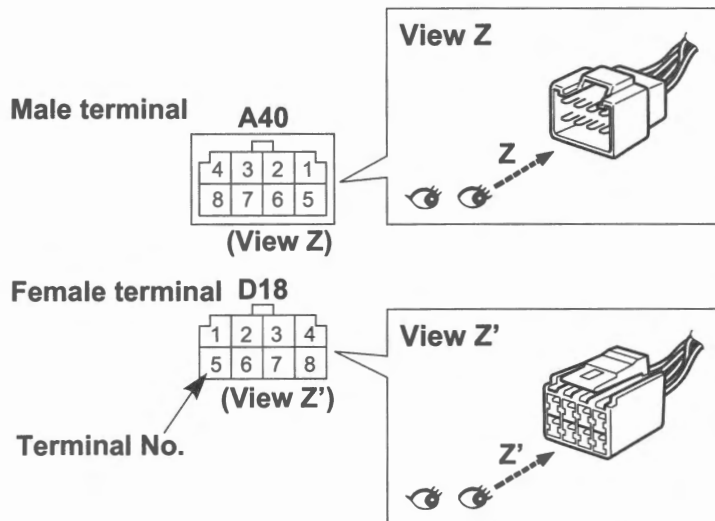
How to Read Terminal Nos.

The connector shape and terminal layout shown in this manual are those when viewed from "Z" in the illustration.

BENK07L29101003

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.



IE31J1910901-02

Glossary

BENK07L29101004

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	
FRONT WHEEL SPEED SENSOR	
FUEL	
FUEL INJECTOR	
FUEL LEVEL GAUGE	
FUEL METER	
FUEL PUMP	
FUEL PUMP RELAY	
FUSE BOX	

9A-3 Wiring Systems:

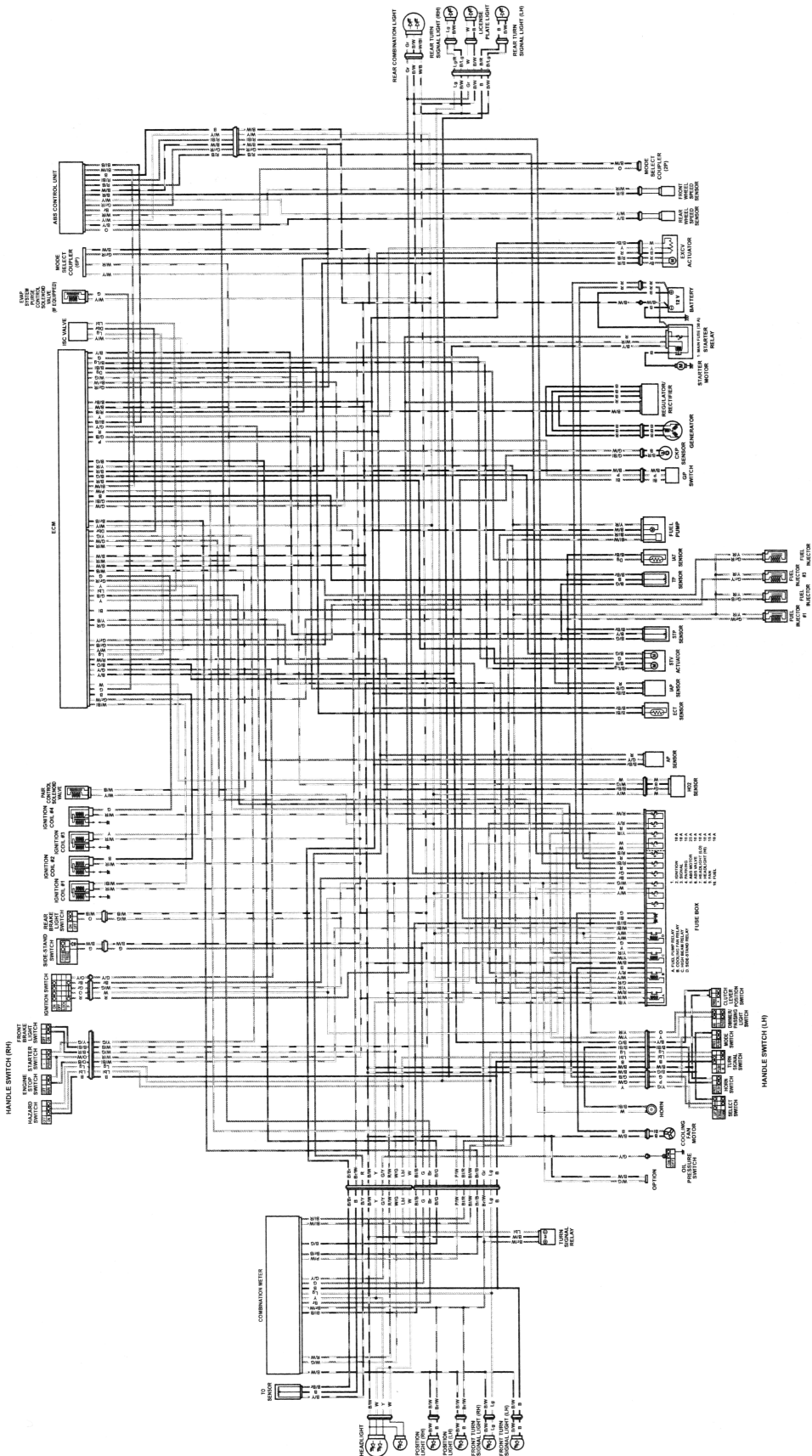
English	
GEARSHIFT SENSOR	
GENERATOR	
GP SENSOR	
GP SWITCH	
HANDLE SWITCH	
HANDLEBAR SWITCH	
HAZARD SWITCH	
HEADLIGHT	
HEADLIGHT HI	
HEADLIGHT LO	
HI BEAM INDICATOR LIGHT	
HIGH BEAM INDICATOR LIGHT	
HIGH BEAM RELAY	
HIGH POSITION DIODE	
HO2 SENSOR	
HORN	
HORN BUTTON	
HORN SWITCH	
IAP SENSOR	
IAP/TP SENSOR	
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	
PASSING RELAY	
PAIR CONTROL SOLENOID VALVE	
PARK	
PARKING	
PARKING BRAKE RELAY	
PARKING BRAKE SWITCH	
PARKING/REAR BRAKE LIGHT SWITCH	
POSITION LIGHT	
POWER SOURCE	

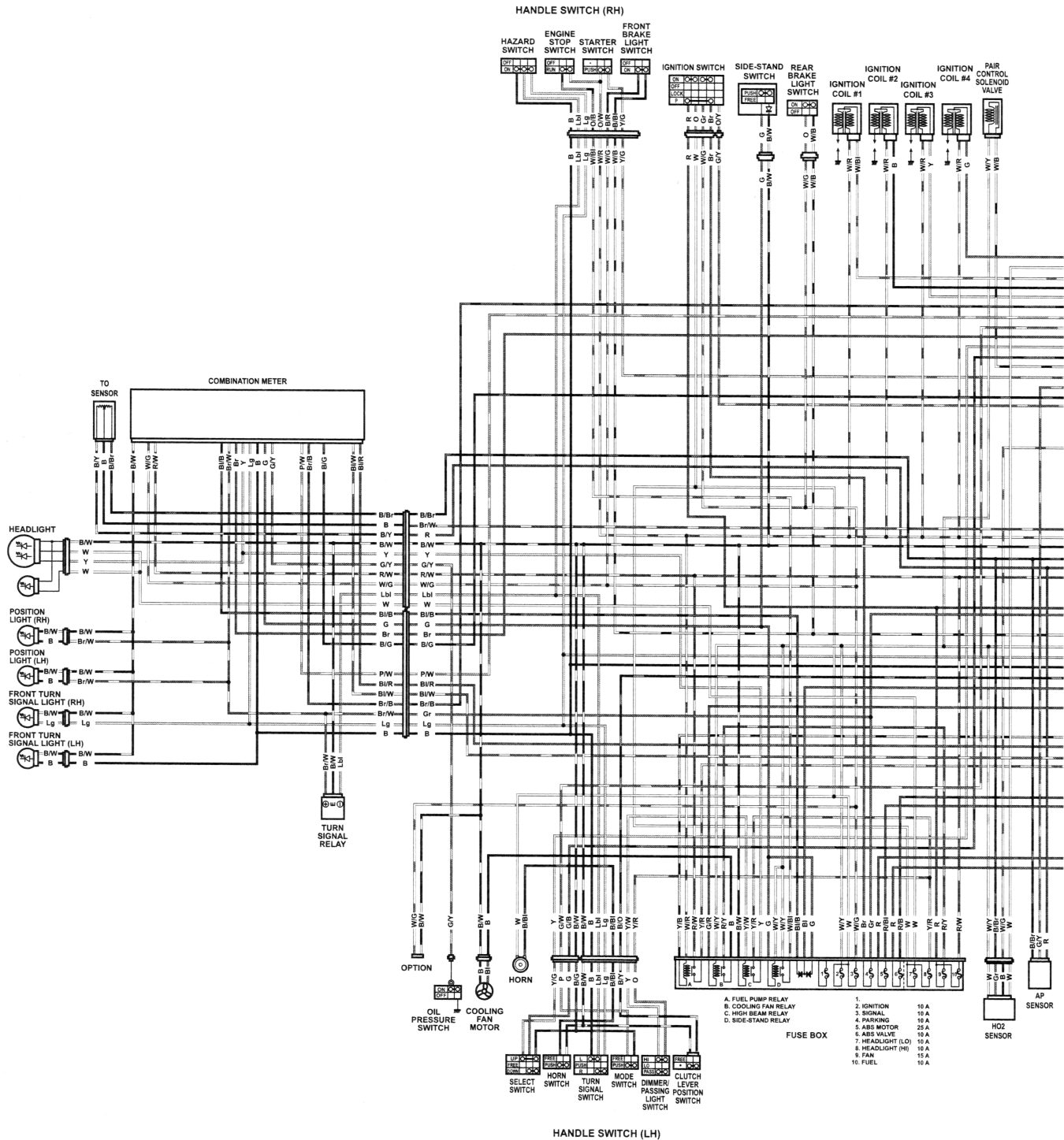
English	
POWER SOURCE FUSE	
PRIMARY FUEL INJECTOR	
REAR BRAKE LIGHT SWITCH	
REAR COMBINATION LIGHT	
REAR TURN SIGNAL LIGHT	
REAR WHEEL SPEED SENSOR	
REGULATOR/RECTIFIER	
RESISTOR	
SECONDARY FUEL INJECTOR	
SELECT SWITCH	
S-HAC	
SIDE-STAND DIODE	
SIDE-STAND RELAY	
SIDE-STAND SWITCH	
SIGNAL	
SPEED SENSOR	
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	

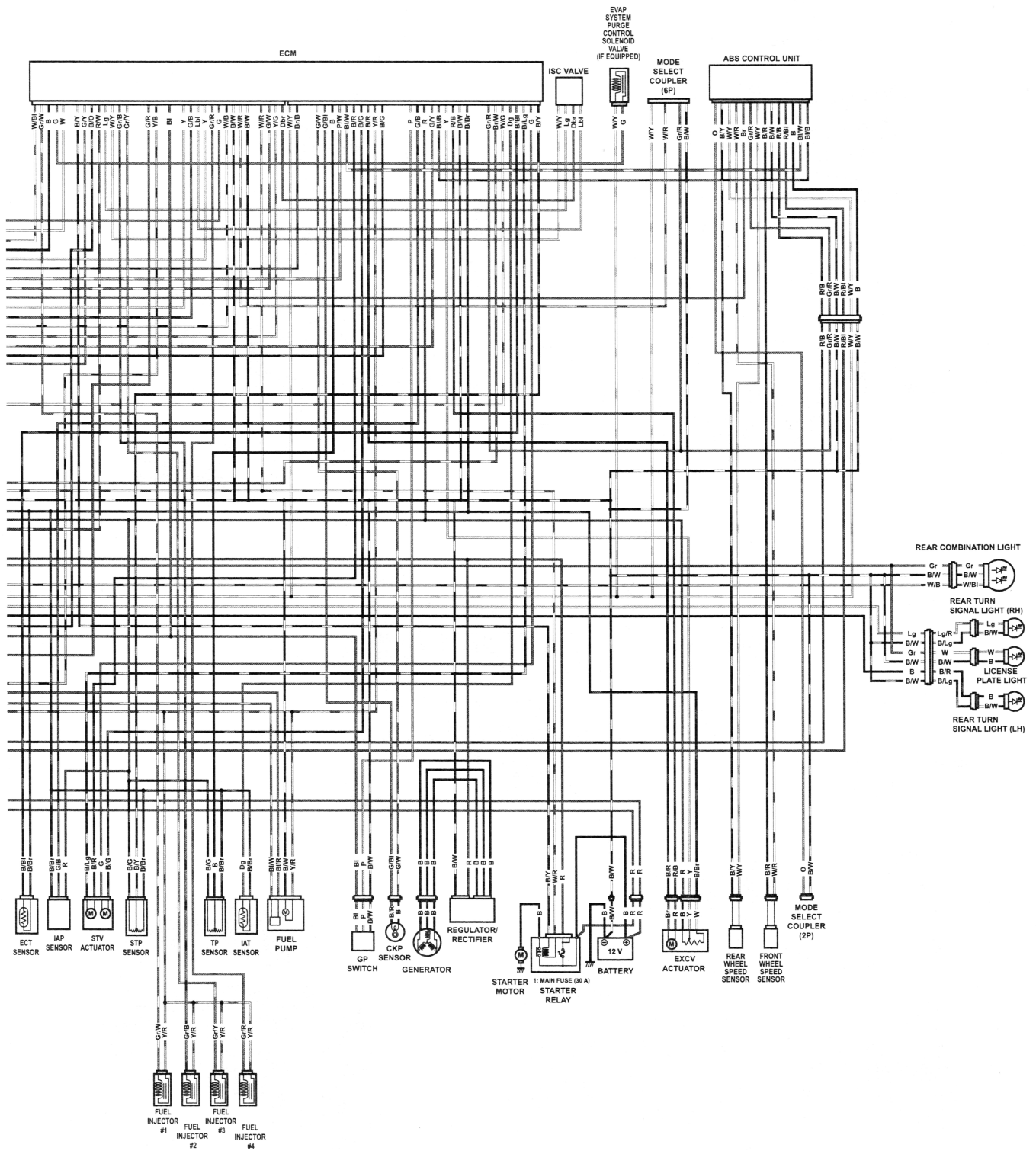
Schematic and Routing Diagram

Wiring Diagram

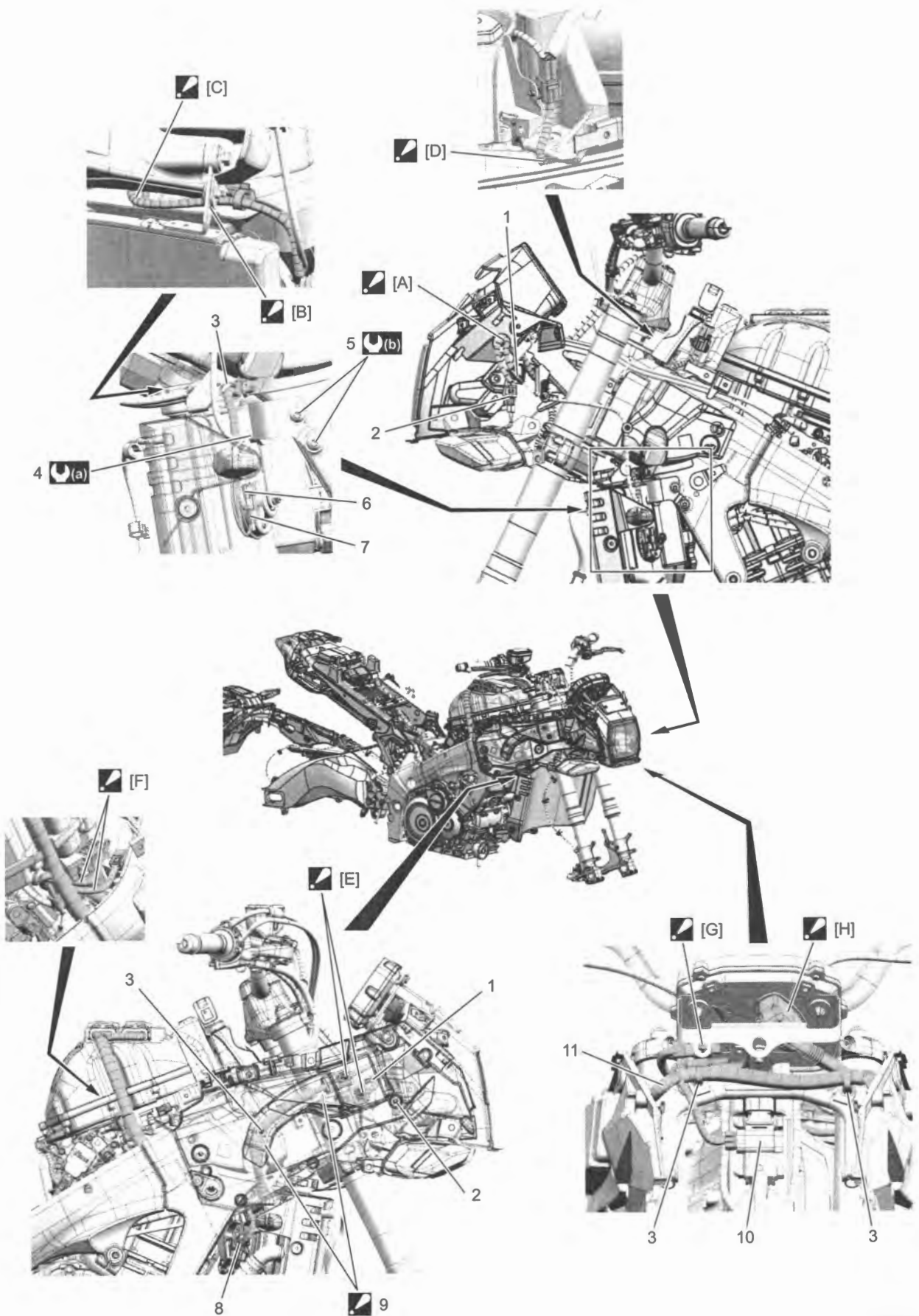
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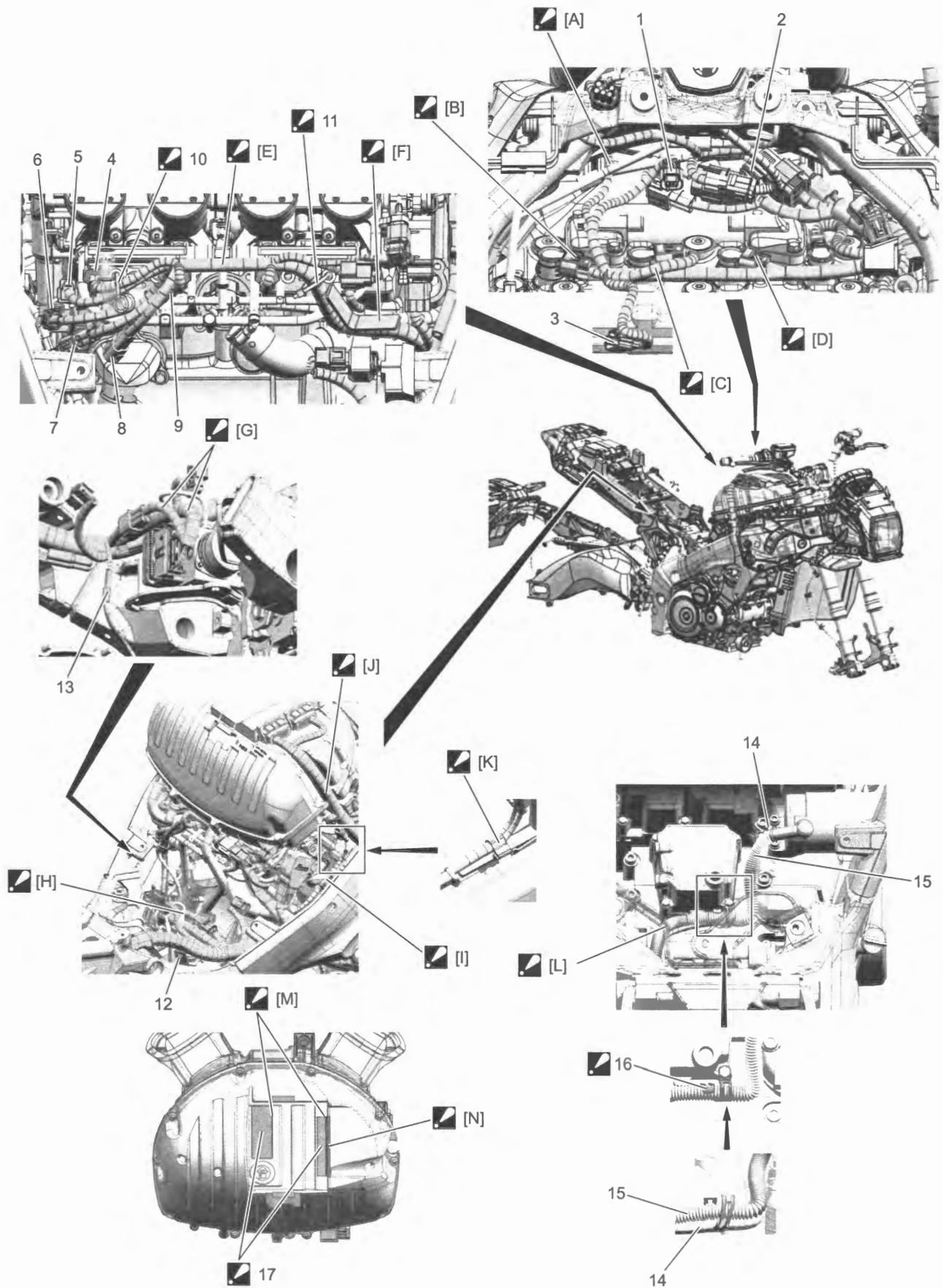




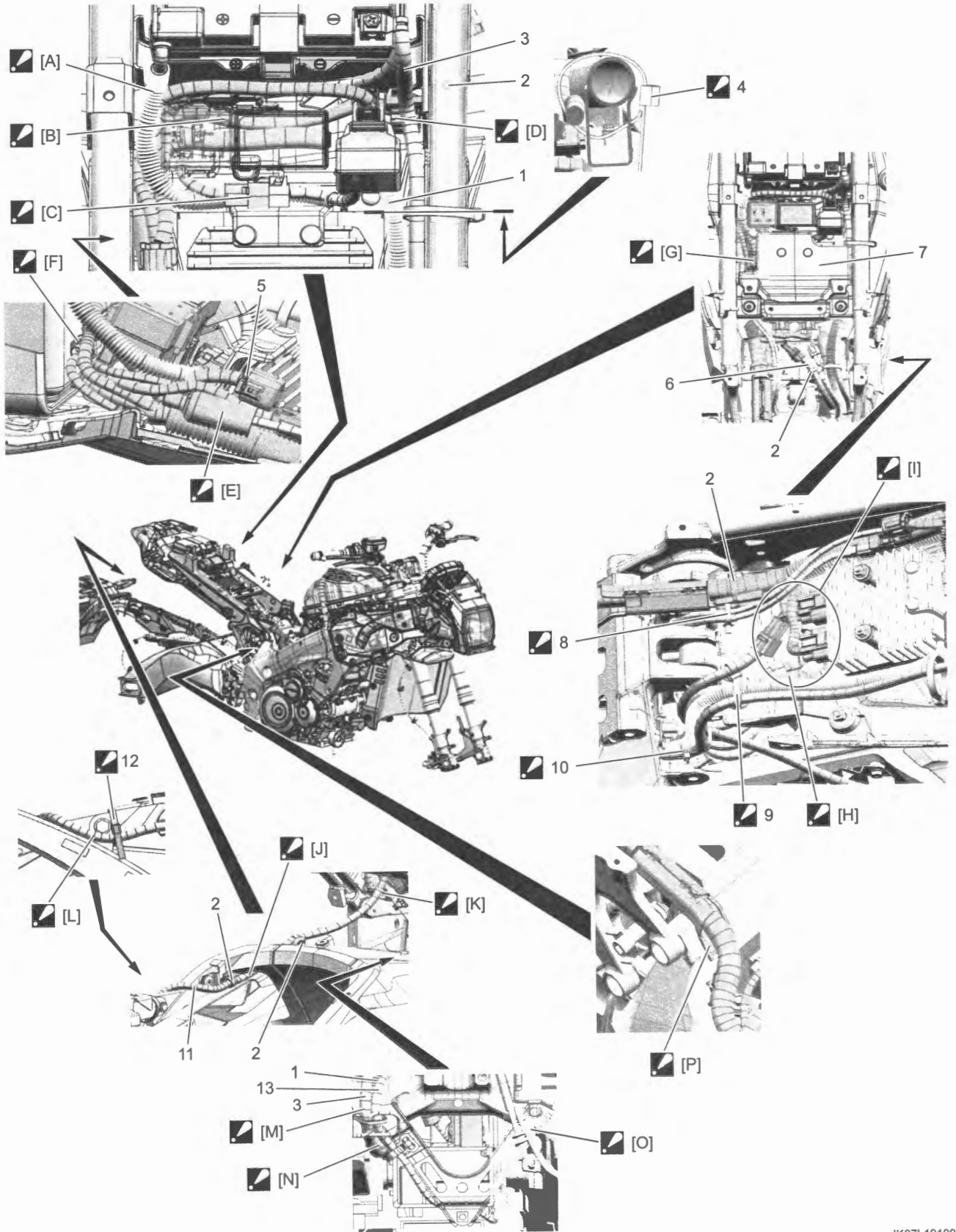
Wiring Harness Routing Diagram



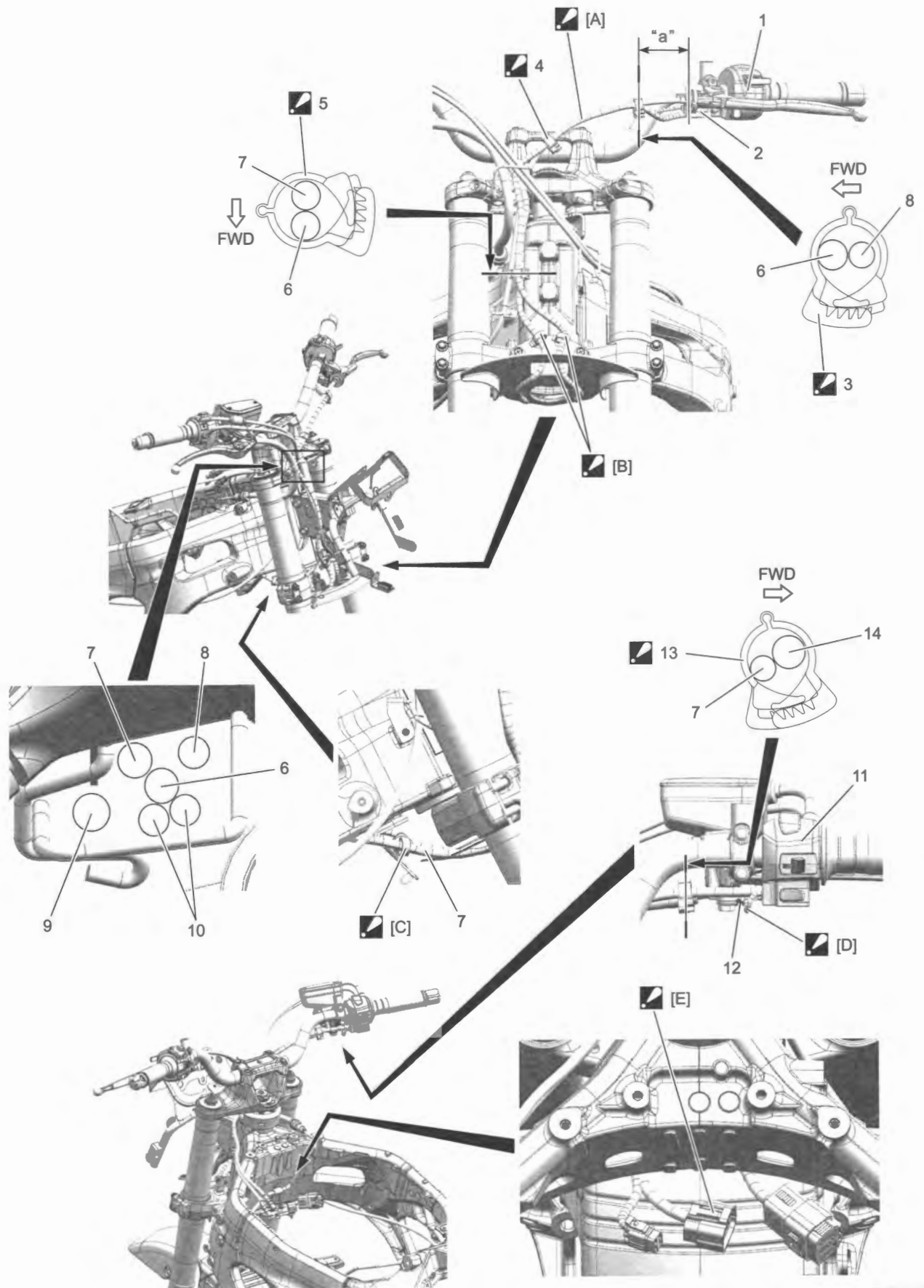
<p> [A]: Pass the left front turn signal light branch wire and left position light branch wire into the hole of the cowling body.</p>	<p>4. Horn bolt</p>
<p> [B]: Pass the horn branch wire behind the radiator mounting part.</p>	<p>5. Horn plate bolt</p>
<p> [C]: Pass the horn branch wire inside of the wall of the radiator heat shield.</p>	<p>6. Horn lead wire (B/BI)</p>
<p> [D]: Pass the immobilizer antenna branch wire (if equipped) outside of the fuel tank front bracket mounting part.</p>	<p>7. Horn lead wire (W)</p>
<p> [E]: Insert the fixed clamp of the wiring harness coupler into the hole of the right side inner cover.</p>	<p>8. Cooling fan motor coupler</p>
<p> [F]: Pass the front wheel speed sensor branch wire and AP sensor branch wire inside of the ECM branch wire. Pass the front wheel speed sensor branch wire and AP sensor branch wire outside of the vacuum hose of the AP sensor.</p>	<p> 9. Clamp : Pass the right front turn signal light lead wire outside of the wiring harness. First, clamp the lower side of the wiring harness and coupler side of the right front turn signal light lead wire at the blue tape portion. Next, pass the right front turn signal light lead wire along the wiring harness and clamp them at the blue tape portion. Cut off the excess tip of the clamp.</p>
<p> [G]: Insert the fixed clamp of the headlight coupler into the hole of the cowling brace.</p>	<p>10. TO sensor</p>
<p> [H]: Fit the coupler boot until it contacts bottom of the lower case.</p>	<p>11. Wiring harness No.2</p>
<p>1. Front turn signal light coupler</p>	<p> (a) : 21 N·m (2.1 kgf-m, 15.5 lbf-ft)</p>
<p>2. Position light coupler</p>	<p> (b) : 14 N·m (1.4 kgf-m, 10.5 lbf-ft)</p>
<p>3. Fixed clamp</p>	



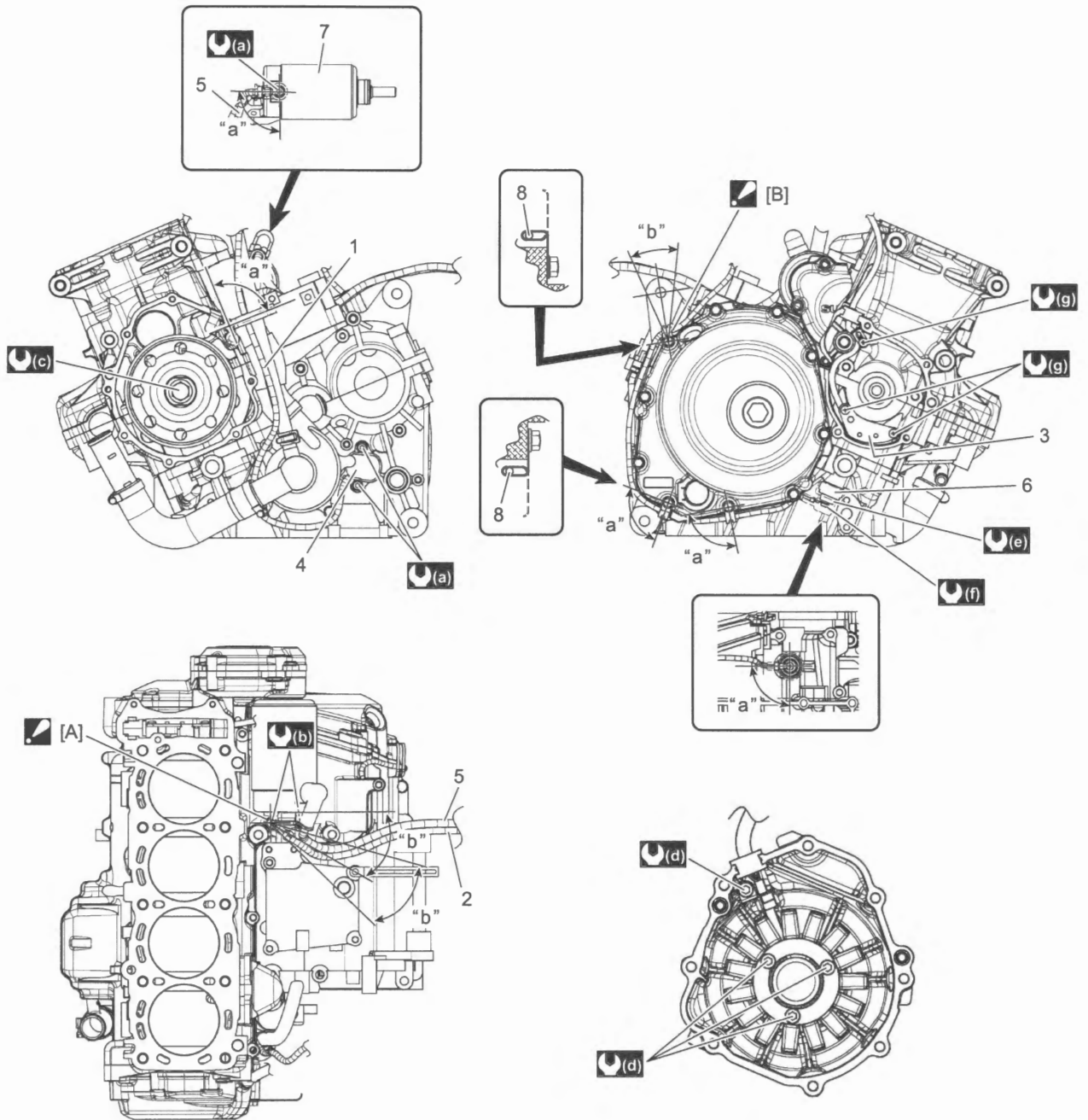
<input checked="" type="checkbox"/> [A]: Pass the horn branch wire under the brake pipe and set it in front of the vertical board of the radiator heat shield.	3. ISC valve coupler
<input checked="" type="checkbox"/> [B]: Contact the ignition coil #1 to the PAIR reed valve cover. The clearance between the PAIR reed valve cover and ignition coil #1 coupler is within 10 mm (0.39 in).	4. Fuel injector #1 coupler
<input checked="" type="checkbox"/> [C]: Pass the ignition coil #2 lead wire over the main harness.	5. Generator coupler
<input checked="" type="checkbox"/> [D]: Contact the ignition coil #3 to the PAIR reed valve cover. The clearance between the PAIR reed valve cover and ignition coil #3 coupler is within 10 mm (0.39 in). Before connecting the ignition coil #1 coupler, connect the ignition coil #3 coupler.	6. Side-stand switch coupler
<input checked="" type="checkbox"/> [E]: Pass the wiring harness over the nipple joint.	7. HO2 sensor coupler
<input checked="" type="checkbox"/> [F]: Do not set the guide part over the fuel tank side No.2 cushion and EVAP system purge control solenoid valve.	8. GP switch coupler
<input checked="" type="checkbox"/> [G]: Pass the ABS control unit branch wire and mode select coupler (2P) branch wire upside of the ABS control unit.	9. ECT sensor branch wire
<input checked="" type="checkbox"/> [H]: Pass the ABS control unit lead wire under the brake pipe.	<input checked="" type="checkbox"/> 10. Clamp : Clamp the hole of the fuel delivery pipe, green tape portion of the fuel injector #1 branch wire and generator branch wire. Cut off the excess tip of the clamp.
<input checked="" type="checkbox"/> [I]: Insert the harness guide to the center of the frame rib.	<input checked="" type="checkbox"/> 11. Clamp : Clamp the hole of the fuel delivery pipe and green tape portion of the wiring harness. Cut off the excess tip of the clamp.
<input checked="" type="checkbox"/> [J]: Pass the ECM lead wire into the groove of air cleaner box.	12. Fixed clamp
<input checked="" type="checkbox"/> [K]: Pass the CKP sensor lead wire into the hook of the clamp.	13. Oil pressure switch coupler
<input checked="" type="checkbox"/> [L]: Pass the starter motor lead wire and battery (-) lead wire under the ABS control unit/HU holder.	14. Battery (-) lead wire
<input checked="" type="checkbox"/> [M]: Stick the cushion aligning with the emboss line.	15. Starter motor lead wire
<input checked="" type="checkbox"/> [N]: Contact the cushion to the corner of air cleaner cover.	<input checked="" type="checkbox"/> 16. Clamp : Clamp the starter motor lead wire and battery (-) lead wire. Do not overlap the clamp.
1. PAIR control solenoid valve coupler	<input checked="" type="checkbox"/> 17. ECM cushion : Stick the cushion along the curved surface end of air cleaner.
2. Option coupler	



<p>☑ [A]: Pass the battery (+) lead wire over the battery (-) branch wire.</p>	<p>☑ [P]: Insert the harness guide into the hole of the frame.</p>
<p>☑ [B]: Pass the rear combination light branch wire under the fuse box.</p>	<p>1. Starter motor lead wire</p>
<p>☑ [C]: Set the battery (+) coupler over the battery (+) lead wire.</p>	<p>2. Fixed clamp</p>
<p>☑ [D]: Set the alarm coupler (if equipped) behind the starter relay.</p>	<p>3. Battery (-) lead wire</p>
<p>☑ [E]: After connecting the rear brake light switch coupler, cover it with boot.</p>	<p>☑ 4. Clamp : Pass the clamp into the holes of the seat rail. Clamp the battery (-) lead wire and seat rail. Face the clamp lock outside.</p>
<p>☑ [F]: Set the mode select coupler (2P) under the battery (-) branch wire.</p>	<p>5. Mode select coupler (6P)</p>
<p>☑ [G]: Set the mode select coupler (6P) under the rectifier cover.</p>	<p>6. License plate light lead wire</p>
<p>☑ [H]: After connecting the EXCVA coupler, cover it with the boot.</p>	<p>7. Rectifier cover</p>
<p>☑ [I]: Connect the couplers in order of EXCVA (2 pcs.) → license plate light, regulator/rectifier (gray) → regulator/rectifier (black).</p>	<p>☑ 8. Fixed clamp : Clamp the rear wheel speed sensor lead wire and white tape portion of the rear brake light switch lead wire. Face the clamp lock inside. Cut off the excess tip of the clamp.</p>
<p>☑ [J]: Pass the license plate light lead wire between the swingarm and chain case.</p>	<p>☑ 9. Fixed clamp : Clamp the EXCVA lead wire, blue tape portion of the starter motor lead wire and battery (-) lead wire. Cut off the excess tip of the clamp.</p>
<p>☑ [K]: Pass the license plate light lead wire into the seat rail guide.</p>	<p>☑ 10. Clamp : Clamp the harness guide, EXCVA lead wire, battery (-) lead wire and blue tape position of the starter motor lead wire. Cut off the excess tip of the clamp.</p>
<p>☑ [L]: Pass the license plate light lead wire outside of the rear fender brace mounting part.</p>	<p>11. License plate light lead wire</p>
<p>☑ [M]: Pass the battery (-) lead wire under the starter motor lead wire and set it outside of the vehicle.</p>	<p>☑ 12. Clamp : Clamp the rear fender brace and license plate light lead wire. Face the clamp lock outside.</p>
<p>☑ [N]: Pass the battery (-) lead wire and starter motor lead wire between the frame and EXCVA bracket.</p>	<p>13. EXCVA lead wire</p>
<p>☑ [O]: Pass the rear brake light switch lead wire and rear wheel speed sensor lead wire into the guide.</p>	



<input checked="" type="checkbox"/> [A]: Pass the left handle switch lead wire in front of the clutch cable.	6. Left handle switch lead wire
<input checked="" type="checkbox"/> [B]: Insert the fixed clamp into the hole of the lower bracket cover.	7. Right handle switch lead wire
<input checked="" type="checkbox"/> [C]: Insert the fixed clamp into the hole of the front brake hose lower clamp.	8. Clutch cable
<input checked="" type="checkbox"/> [D]: Pass the front brake light switch lead wire under the right handle switch lead wire. Pass the front brake light switch lead wire to right side of the union bolt of the front brake master cylinder.	9. Front brake hose
<input checked="" type="checkbox"/> [E]: Insert the left handle switch coupler (8P) into the hole of the radiator heat shield.	10. Throttle cable
1. Left handle switch	11. Right handle switch
2. Clutch lever position switch	12. Front brake light switch
<input checked="" type="checkbox"/> 3. Clamp : Face the clamp lock downward. Engage the clamp lock at least 3 notches.	<input checked="" type="checkbox"/> 13. Clamp : Face the clamp lock downward. Clamp the left handle switch lead wire and front brake hose union. Engage the clamp lock at least 2 notches.
<input checked="" type="checkbox"/> 4. Clamp : Face the clamp lock downward. Contact the clamp to the clutch cable protector. Engage the clamp lock at least 3 notches.	14. Front brake hose union
<input checked="" type="checkbox"/> 5. Clamp : Face the clamp lock to the vehicle center side. Clamp the left and right handle switch lead wires. Engage the clamp lock at least 3 notches.	"a": 40 – 60 mm (1.6 – 2.3 in)



IK07L1910904-02

<p> [A]: Install the battery (-) lead wire within 15 – 45° from the rear bracket surface of starter motor as shown.</p>	"a": 75 – 105°
<p> [B]: Install the clamp within 15° from the hole of upper crankcase as shown.</p>	"b": 30°
1. Gear position switch lead wire	(a) : 6.0 N·m (0.61 kgf-m, 4.45 lbf-ft)
2. Battery (-) lead wire	(b) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
3. CKP sensor	(c) : 160 N·m (16.3 kgf-m, 118.0 lbf-ft)
4. Gear position switch	(d) : 11 N·m (1.1 kgf-m, 8.5 lbf-ft)
5. Starter motor lead wire	(e) : 13 N·m (1.3 kgf-m, 9.5 lbf-ft)
6. Oil pressure switch	(f) : 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)
7. Starter motor	(g) : 4.5 N·m (0.46 kgf-m, 3.35 lbf-ft)
8. Oil pressure switch lead wire	

Component Location

Electrical Components Location

BENK07L29103001

Refer to "Electrical Components Location" in Section 0A (Page 0A-7).

Specifications

Tightening Torque Specifications

BENK07L2910S001

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

"Wiring Harness Routing Diagram" (Page 9A-9)

"Fasteners Information" in Section 0C (Page 0C-11)

Lighting Systems

Diagnostic Information and Procedures

Headlight Symptom Diagnosis

BENK07L29204001

Condition	Possible cause	Correction / Reference Item
Low beam does not light up	Circuit fuse blown.	Replace fuse and check short circuit.
	Faulty LED.	Replace headlight. ⌚(Page 9B-6)
	Faulty wiring or grounding.	Repair wiring. ⌚(Page 9A-5)
High beam does not light up	Circuit fuse blown.	Replace fuse and check short circuit.
	Faulty LED.	Replace headlight. ⌚(Page 9B-6)
	Faulty wiring or grounding.	Repair wiring. ⌚(Page 9A-5)
	Faulty high beam relay.	Check high beam relay. ⌚(Page 9B-7)
	Faulty dimmer/passing light switch.	Check dimmer/passing light switch. ⌚(Page 9B-14)

Turn Signal Light and Hazard Light Symptom Diagnosis

BENK07L29204002

Condition	Possible cause	Correction / Reference Item
Flash rate high or one side only flashes	Faulty combination meter (without turn signal relay).	Replace combination meter. ⌚(Page 9C-8)
	Faulty turn signal relay (if equipped).	Check turn signal relay. ⌚(Page 9B-13)
	Faulty LED.	Replace turn signal light. • Front: ⌚(Page 9B-12) • Rear: ⌚(Page 9B-12)
	Faulty wiring or grounding.	Repair wiring. ⌚(Page 9A-5)
	Faulty hazard switch.	Check hazard switch. ⌚(Page 9B-14)
Flash rate low	Supply voltage low or high resistance.	Check charging system. ⌚(Page 1J-3) Repair wiring. ⌚(Page 9A-5)
	Faulty combination meter.	Replace combination meter. ⌚(Page 9C-8)

Rear Combination Light Symptom Diagnosis

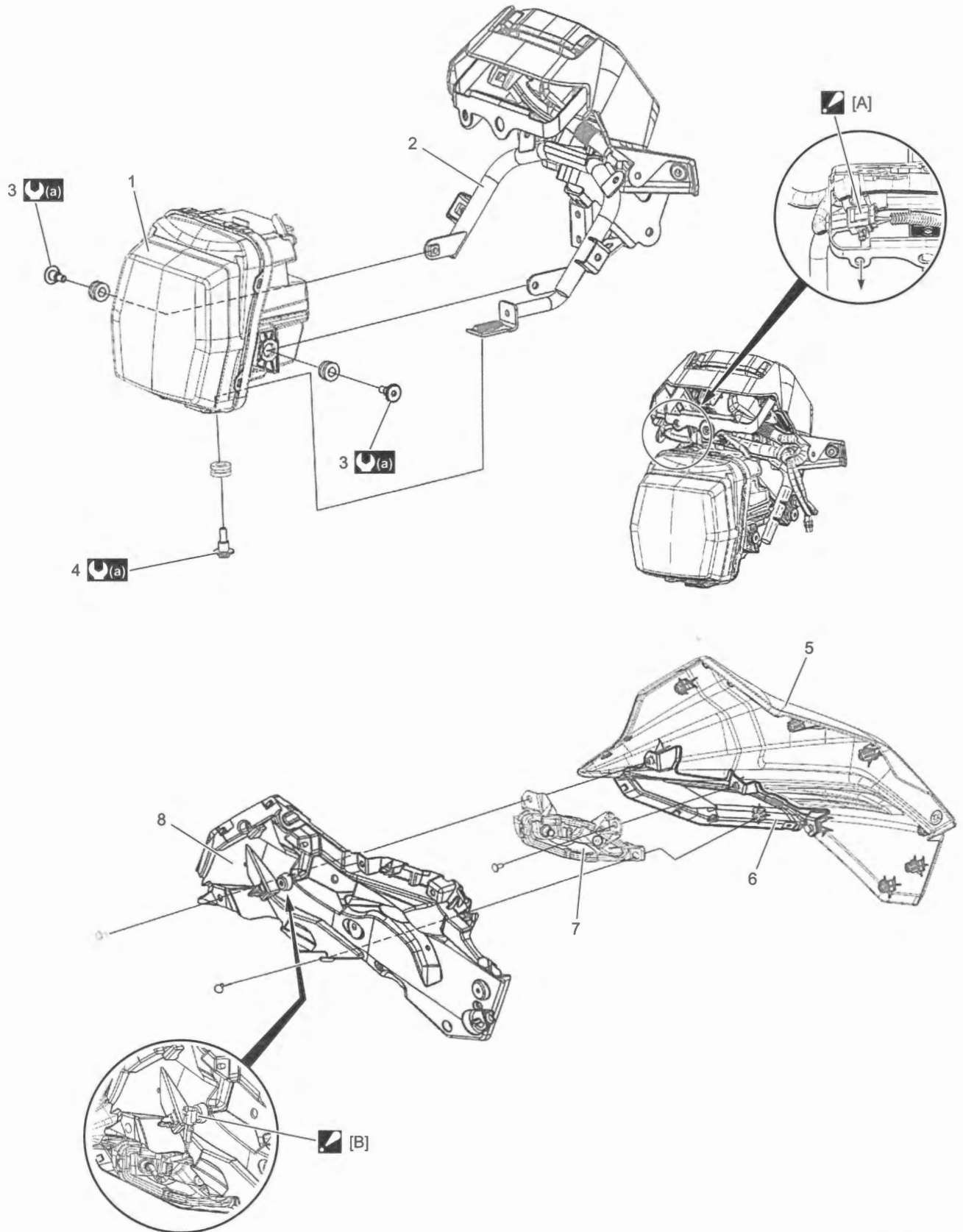
BENK07L29204003

Condition	Possible cause	Correction / Reference Item
Taillight does not light up	Circuit fuse blown.	Replace fuse and check short circuit.
	Faulty LED.	Replace rear combination light. ⌚(Page 9B-11)
	Faulty wiring or grounding.	Repair wiring. ⌚(Page 9A-5)
Some lights do not light up	Faulty LED.	Replace rear combination light. ⌚(Page 9B-11)
Brake light does not light up	Faulty LED.	Replace rear combination light. ⌚(Page 9B-11)
	Faulty front brake light switch.	Check front brake light switch. ⌚(Page 4A-7)
	Faulty rear brake light switch.	Check rear brake light switch. ⌚(Page 4A-7)
	Faulty wiring or grounding.	Repair wiring. ⌚(Page 9A-5)
Brake light stays on	Faulty front brake light switch.	Check front brake light switch. ⌚(Page 4A-7)
	Faulty rear brake light switch.	Check rear brake light switch. ⌚(Page 4A-7)
	Faulty wiring or grounding.	Repair wiring. ⌚(Page 9A-5)




Repair Instructions

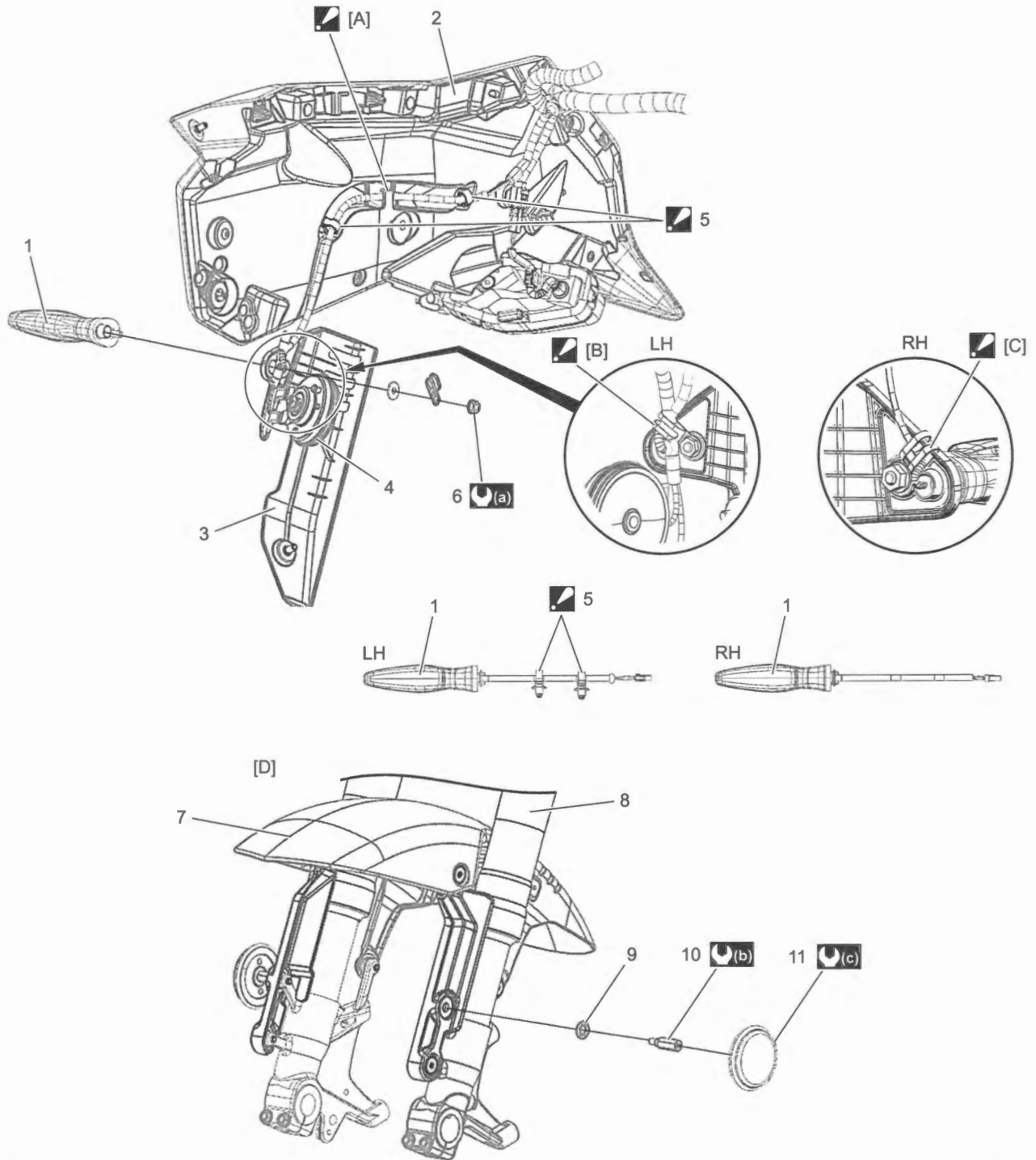
Front Lighting System Construction

BENK07L29206001



9B-3 Lighting Systems:

 [A]: After connecting the headlight coupler, insert the fixed clamp into the hole of the cowling brace.	5. Side cover
 [B]: After installing the side inner cover to the side cover, insert the fixed clamp into the hole of the side inner cover.	6. Side lower cover
1. Headlight	7. Front position light
2. Cowling brace	8. Side inner cover
3. Headlight bolt	 (a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
4. Headlight beam adjuster bolt	

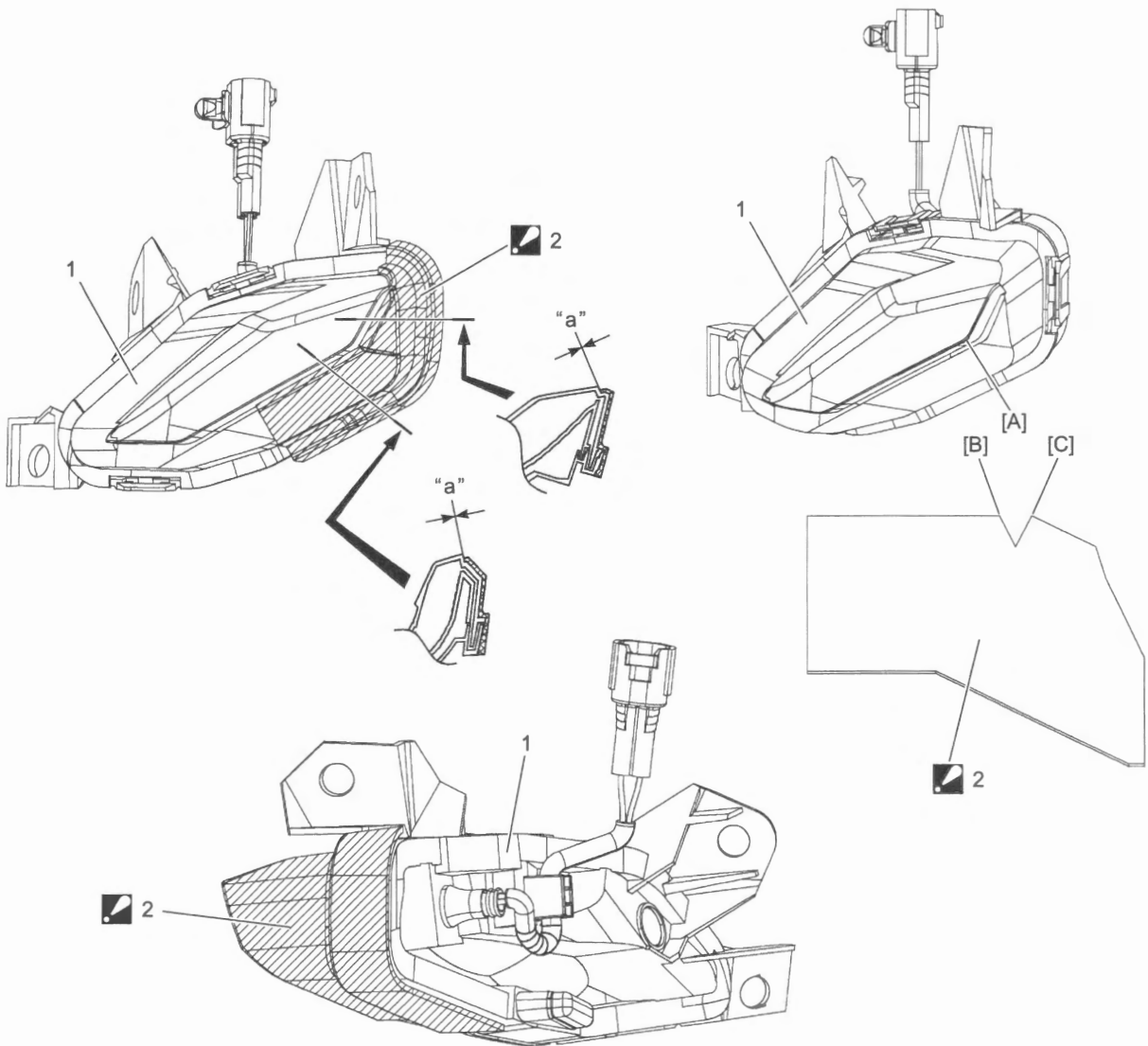


IK07L1920002-03

<p>☑ [A]: Pass the front turn signal lead wire inside of the hook. (LH only)</p>	6. Front turn signal light mounting nut
<p>☑ [B]: Clamp the front turn signal lead wire and horn lead wire. Contact the clamp to the collar of the front turn signal light.</p>	7. Front fender
<p>☑ [C]: Clamp the front turn signal lead wire. Contact the clamp to the collar of the front turn signal light.</p>	8. Front fork
[D]: For Canada and California State	9. Washer
1. Front turn signal light	10. Front side reflex reflector bolt
2. Side inner cover	11. Front side reflex reflector
3. Frame body cover	☑(a) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
4. Horn	☑(b) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
☑ 5. Fixed clamp (LH only) : Clamp the lead wire at the blue tape portion. Cut off the excess tip of the clamp. Insert the fixed clamp into the hole of the side inner cover.	☑(c) : 1.8 N·m (0.18 kgf-m, 1.35 lbf-ft)

Front Position Light Cushion Construction

BENK07L29206002



IK07L1920027-02

<p>1. Front position light</p>	<p>"a": 0 – 2 mm (0 – 0.07 in)</p>
<p>2. Position light cushion : Clean the adhesive surface before sticking the cushion. First, fit the point [B] to [A] and stick the cushion aligning with the lens edge. Next, fit the point [C] to [A] and stick the cushion aligning with the lens edge. Press the cushion after sticking.</p>	

Headlight Removal and Installation

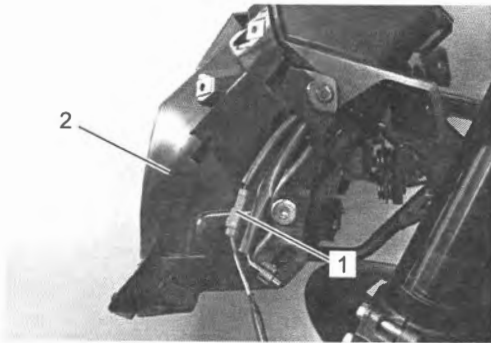
BENK07L29206003

NOTE

Headlight is LED.
Replace the headlight as an assembly if headlight is defective.

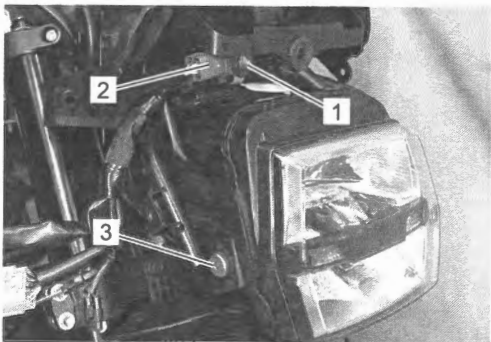
Removal

- 1) Remove the following parts.
 - Side cover assemblies: (Page 9D-22)
 - Meter front panel: (Page 9D-20)
- 2) Disconnect the left front turn signal light coupler (1) and remove the body cowling assembly (2). (Page 9D-20)

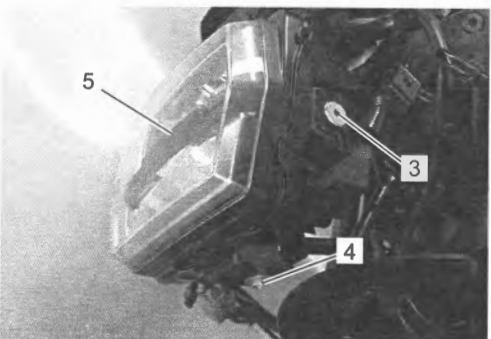


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- 3) Remove the fixed clamp (1) and disconnect the headlight coupler (2).
- 4) Remove the headlight bolts (3) and headlight beam adjuster bolt (4).
- 5) Remove the headlight (5).



IK07L1920003-01



IK07L1920004-01

Installation

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

- Tighten the headlight bolts to the specified torque. Refer to "Front Lighting System Construction" (Page 9B-2).

Tightening torque

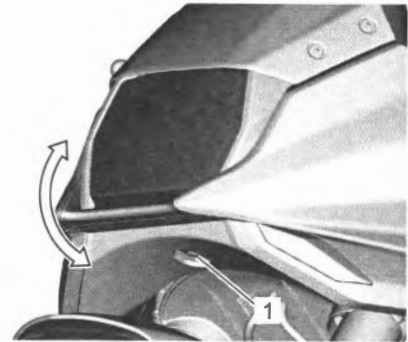
Headlight bolt: 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- After installing the removed parts, be sure to adjust the headlight beam. (Page 9B-6)

Headlight Beam Adjustment

BENK07L29206004

- 1) Loosen the headlight beam adjuster bolt (1).
- 2) Moving the headlight forward or backward, adjust the headlight beam vertically.

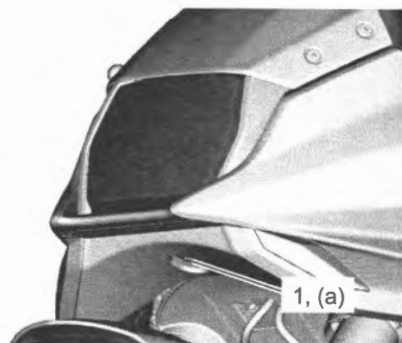


IK07L1920005-01

- 3) Tighten the headlight beam adjuster bolt (1) to the specified torque.

Tightening torque

Headlight beam adjuster bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

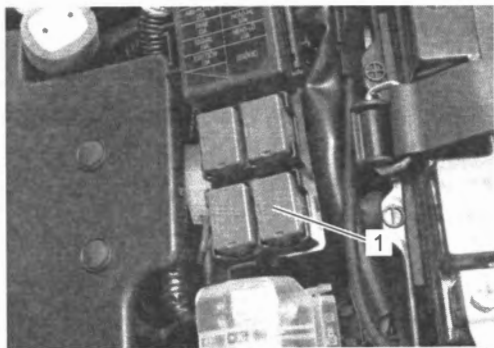


IK07L1920006-01

High Beam Relay Inspection

BENK07L29206005

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-19)
- 3) Remove the cap and high beam relay (1).



IK07L1920007-01

- 4) Check the high beam relay referring to "Cooling Fan Relay Inspection" in Section 1F (Page 1F-13).
- 5) Install the removed parts.

Front Position Light Removal and Installation

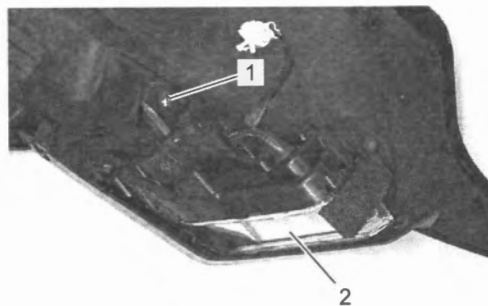
BENK07L29206006

NOTE

- Front position light is LED.
Replace the front position light as an assembly if front position light is defective.
- The same procedures are applicable to both the right and left lights.

Removal

- 1) Remove the side inner cover. (Page 9D-22)
- 2) Remove the screw (1) and front position light (2).



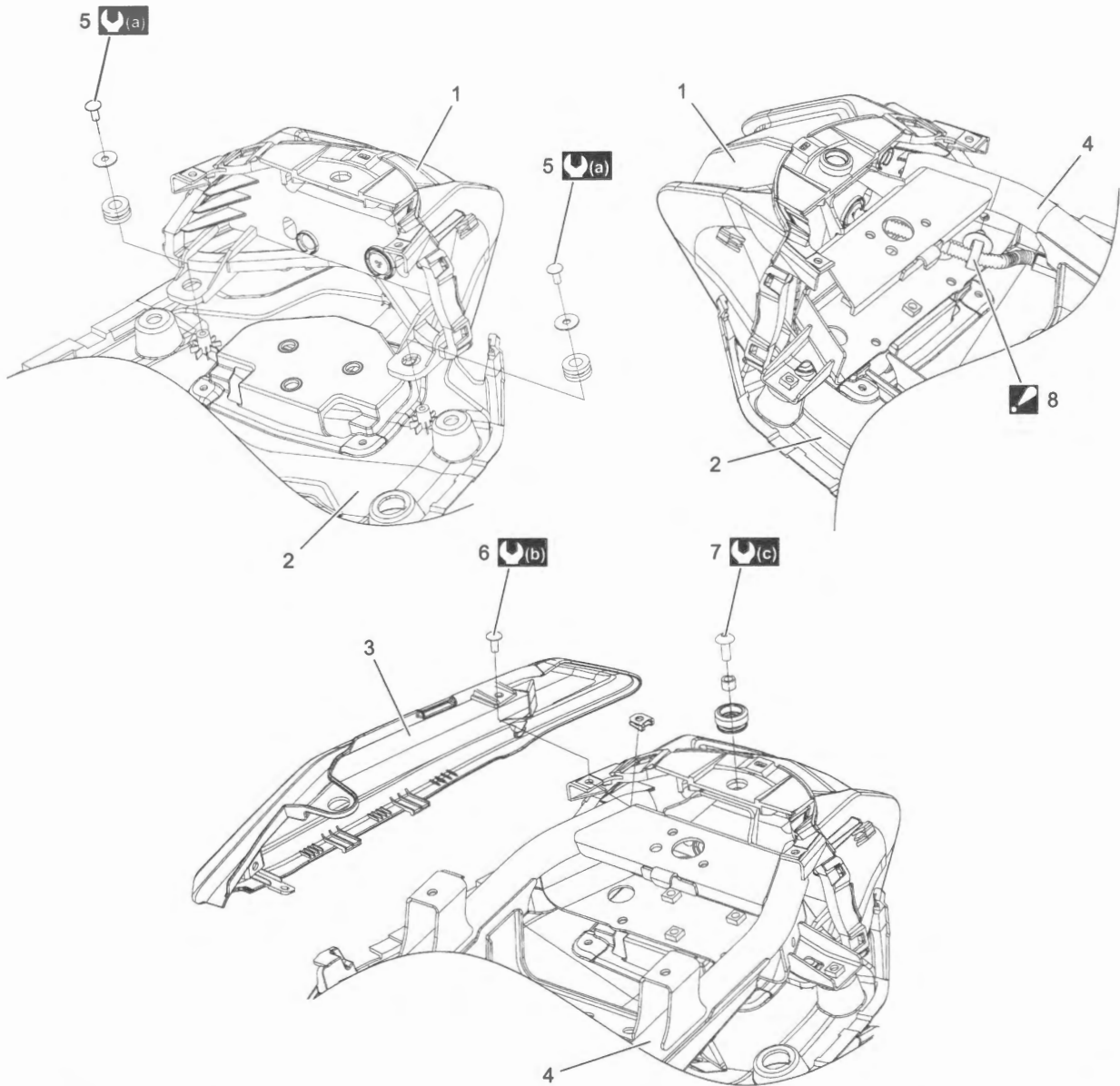
IK07L1920008-01

Installation

Install the front position light in the reverse order of removal.

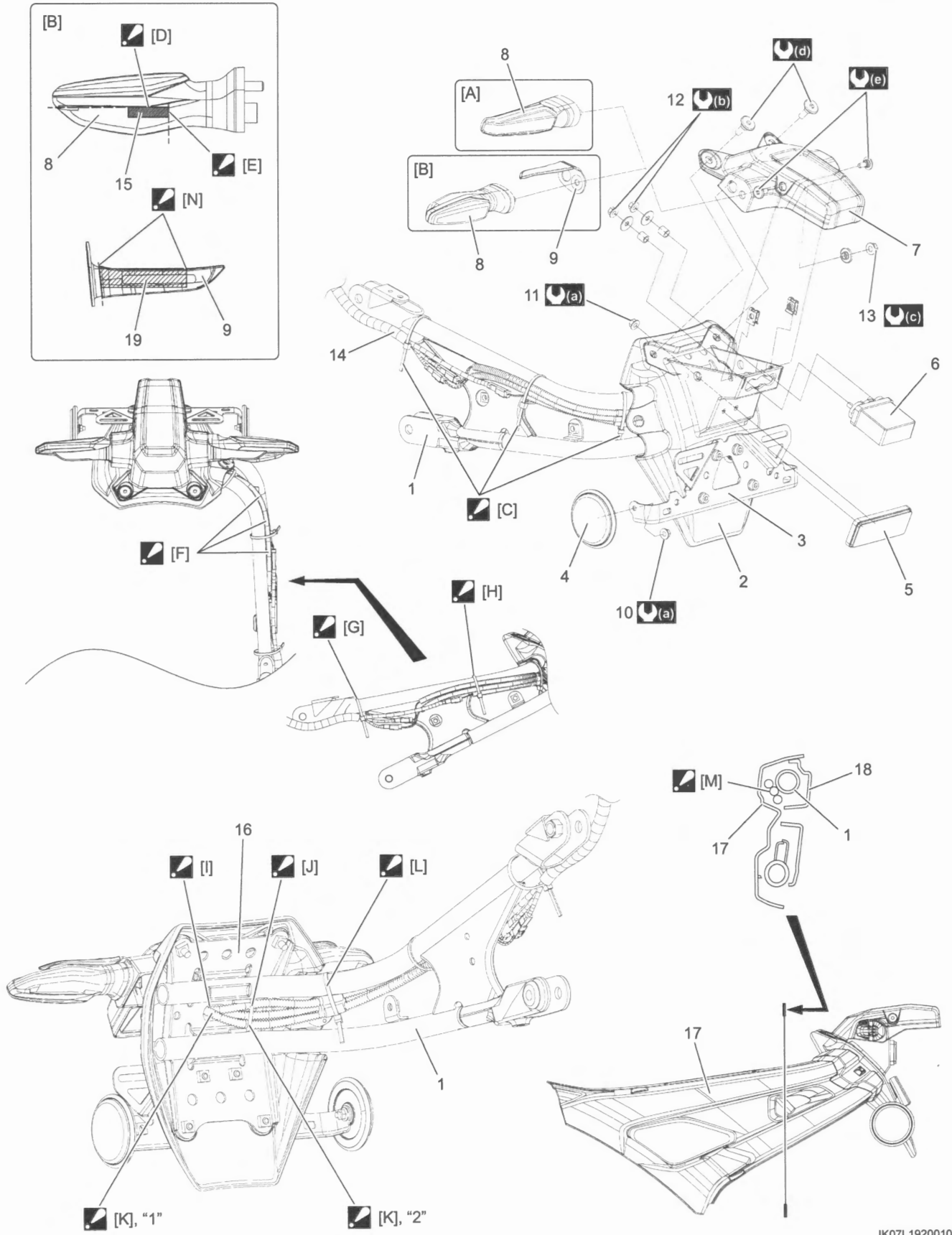
Rear Lighting System Construction






BENK07L29206007



IK07L1920009-04

1. Rear combination light	7. Rear combination light screw (M6)
2. Rear fender front	8. Fixed clamp : Insert the fixed clamp into the hole of seat rail.
3. Frame rear cover	(a) : 1.8 N·m (0.18 kgf-m, 1.35 lbf-ft)
4. Seat rail	(b) : 2.0 N·m (0.20 kgf-m, 1.50 lbf-ft)
5. Rear combination light screw (M5)	(c) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
6. Frame cover screw	



[A]: For Canada and California State	6. License plate light
[B]: Except for Canada and California State	7. Rear fender rear cover
<input checked="" type="checkbox"/> [C]: Face the clamp lock downward. Cut off the excess tip of the clamp.	8. Rear turn signal light
<input checked="" type="checkbox"/> [D]: Stick the tape along the edge of the housing.	9. Rear turn signal bracket
<input checked="" type="checkbox"/> [E]: Stick the tape along the edge of the housing rib.	10. Rear side reflex reflector nut
<input checked="" type="checkbox"/> [F]: Pass the license plate light lead wire and rear turn signal light lead wires outside of the rear fender brace.	11. Rear reflex reflector nut
<input checked="" type="checkbox"/> [G]: Contact the clamp to the welding part of the rear fender brace bracket.	12. License plate light nut
<input checked="" type="checkbox"/> [H]: Clamp the blue tape portion of the license plate light lead wire at the protection tube side. Be careful not to clamp the bare wire side of the blue tape portion.	13. Rear turn signal light mounting nut
<input checked="" type="checkbox"/> [I]: Pass the lead wires into the hole of the rear fender brace plate.	14. License plate light lead wire
<input checked="" type="checkbox"/> [J]: Pass the lead wires between the guide and rear fender brace plate.	15. Rear turn signal tape
<input checked="" type="checkbox"/> [K]: Pass the lead wires in order of "1" → "2".	16. Rear fender brace plate
<input checked="" type="checkbox"/> [L]: Clamp the license plate light lead wire and rear turn signal light lead wires at the blue tape portion.	17. Left rear fender rear cover
<input checked="" type="checkbox"/> [M]: Do not pinch the lead wires between the left rear fender rear cover and rear fender inner.	18. Rear fender inner
<input checked="" type="checkbox"/> [N]: Stick the cushion along the outer shape of the rubber.	19. Rear turn signal bracket cushion
1. Rear fender brace	 (a) : 1.8 N·m (0.18 kgf-m, 1.35 lbf-ft)
2. Rear fender rear	 (b) : 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)
3. License plate holder	 (c) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
4. Rear side reflex reflector	 (d) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
5. Rear reflex reflector	 (e) : 4.7 N·m (0.48 kgf-m, 3.50 lbf-ft)

Rear Combination Light Removal and Installation

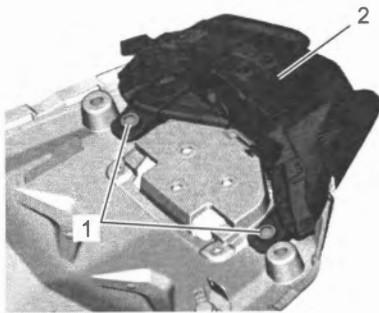
BENK07L29206008

NOTE

Taillight and brake light are LED.
Replace the rear combination light as an assembly if taillight or brake light is defective.

Removal

- 1) Remove the rear fender front assembly. (Page 9D-30)
- 2) Remove the screws (1) and rear combination light (2).

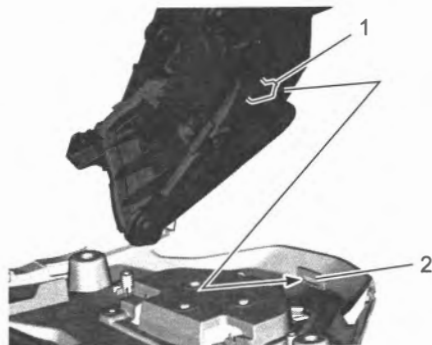


IK07L1920011-01

Installation

Install the rear combination light in the reverse order of removal. Pay attention to the following points:

- When installing the rear combination light, insert the projection (1) into the hole (2) of the rear fender front.

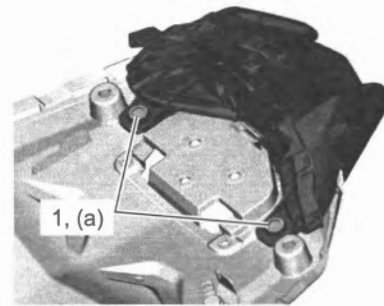


IK07L1920012-02

- Tighten the rear combination light screws (M5) (1) to the specified torque.

Tightening torque

Rear combination light screw (M5) (a): 1.8 N·m (0.18 kgf-m, 1.35 lbf-ft)



IK07L1920013-01

License Plate Light Removal and Installation

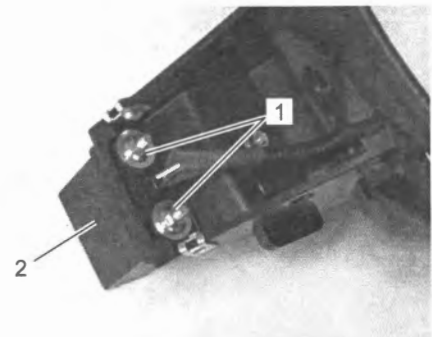
BENK07L29206009

NOTE

License plate light is LED.
Replace the license plate light as an assembly if license plate light is defective.

Removal

- 1) Remove the rear fender rear cover assembly from the rear fender rear assembly. (Page 9D-38)
- 2) Remove the nuts (1) and license plate light (2).



IK07L1920014-01

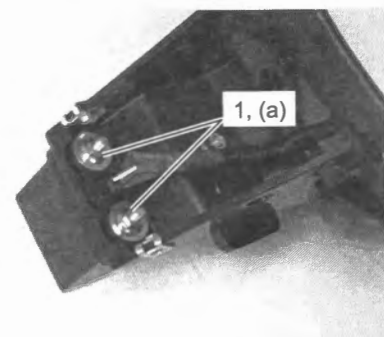
Installation

Install the license plate light in the reverse order of removal. Pay attention to the following point:

- Tighten the license plate light nuts (1) to the specified torque.

Tightening torque

License plate light nut (a): 3.0 N·m (0.31 kgf-m, 2.25 lbf-ft)



IK07L1920015-01

Front Turn Signal Light Removal and Installation

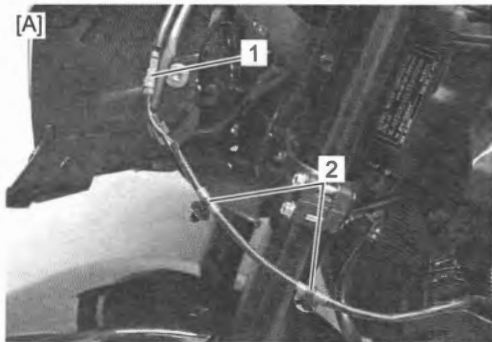
BENK07L29206010

NOTE

- Front turn signal light is LED. Replace the front turn signal light as an assembly if front turn signal light is defective.
- The same procedures are almost applicable to both the right and left lights.

Removal

- 1) Remove the side cover assembly. (Page 9D-22)
- 2) Disconnect the front turn signal light coupler (1).
- 3) Remove the fixed clamps (2) or clamps (3).



IK07L1920016-02

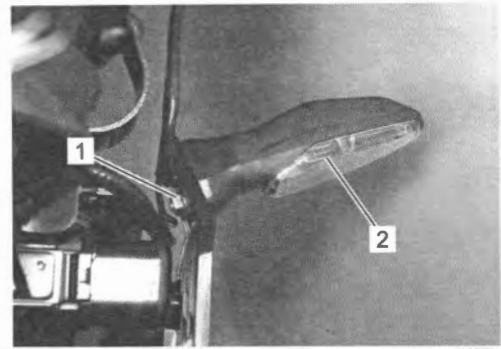


IK07L1920026-01

[A]: Left side

[B]: Right side

- 4) Remove the nut (1) and front turn signal light (2).



IK07L1920017-02

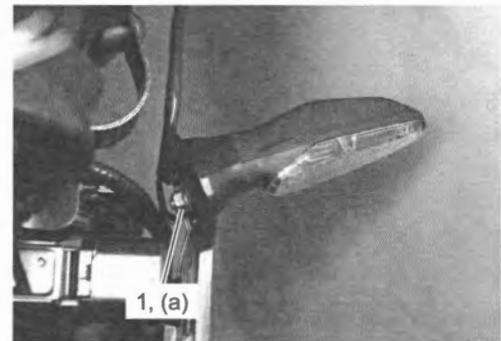
Installation

Install the front turn signal light in the reverse order of removal. Pay attention to the following points:

- Install the clamps correctly. Refer to "Front Lighting System Construction" (Page 9B-2).
- Tighten the front turn signal light mounting nut (1) to the specified torque.

Tightening torque

Front turn signal light mounting nut (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IK07L1920019-01

- Route the front turn signal lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).

Rear Turn Signal Light Removal and Installation

BENK07L29206011

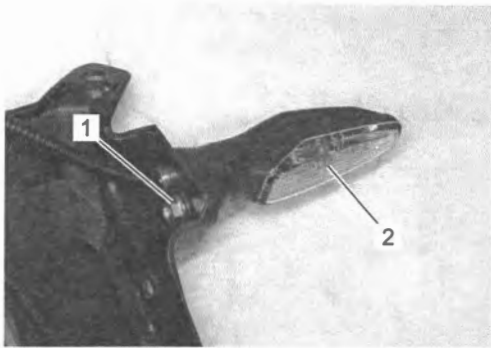
NOTE

- Rear turn signal light is LED. Replace the rear turn signal light as an assembly if rear turn signal light is defective.
- The same procedures are applicable to both the right and left lights.

Removal

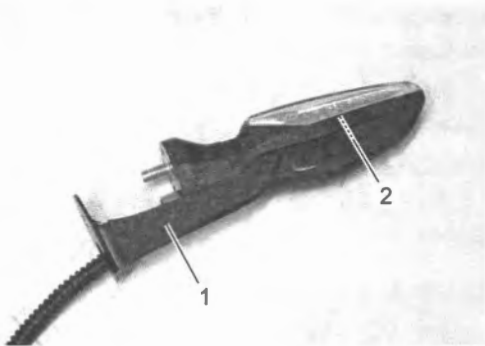
- 1) Remove the rear fender rear cover assembly from the rear fender rear. (Page 9D-38)

2) Remove the nut (1) and rear turn signal light (2).



IK07L1920020-01

3) Except for Canada and California State, remove the rear turn signal bracket (1) from the rear turn signal light (2).



IK07L1920021-01

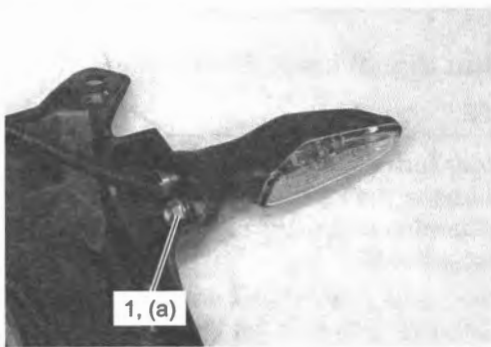
Installation

Install the rear turn signal light in the reverse order of removal. Pay attention to the following points:

- Tighten the rear turn signal light mounting nut (1) to the specified torque.

Tightening torque

Rear turn signal light mounting nut (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



IK07L1920022-01

- Route the rear turn signal lead wire. Refer to "Rear Lighting System Construction" (Page 9B-8).

Reflex Reflector Removal and Installation

BENK07L29206012

Front Side Reflex Reflector (If Equipped)

Refer to "Front Lighting System Construction" (Page 9B-2).

Rear Side Reflex Reflector

Refer to "Rear Lighting System Construction" (Page 9B-8).

Rear Reflex Reflector Removal

- 1) Remove the rear fender rear assembly. (Page 9D-38)
- 2) Remove the rear reflex reflector. (Page 9B-8)

Installation

Install the rear reflex reflector in the reverse order of removal.

Turn Signal Relay Inspection (If Equipped)

BENK07L29206013

Refer to "Electrical Components Location" in Section 0A (Page 0A-7).

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 LED, turn signal switch and circuit connection.

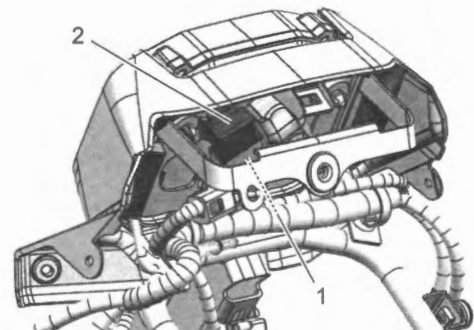
If the LED, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal relay with a new one. (Page 9B-13)

Turn Signal Relay Removal and Installation (If Equipped)

BENK07L29206014

Removal

- 1) Remove the headlight. (Page 9B-6)
- 2) Disconnect the coupler (1) and remove the turn signal relay (2).



IK07L1920028-01

Installation

Install the turn signal relay in the reverse order of removal.

Turn Signal Switch Inspection

BENK07L29206015

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Disconnect the left handle switch coupler (8P) (1).



IK07L1920023-01

- 4) Inspect the turn signal switch for continuity with a circuit tester. If any abnormality is found, replace the left handle switch with a new one. Refer to "Handlebar Removal and Installation" in Section 6B (Page 6B-4).

Color Position	Lg	Lbl	B
L		○ — ○	○ — ○
PUSH			
R	○ — ○	○ — ○	

1944H1920039-01

- 5) After finishing the turn signal switch inspection, install the removed parts.

Hazard Switch Inspection

BENK07L29206016

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Disconnect the right handle switch coupler (1).



IK07L1920024-01

- 4) Inspect the hazard switch for continuity with a circuit tester.

If any abnormality is found, replace the right handle switch with a new one. Refer to "Handlebar Removal and Installation" in Section 6B (Page 6B-4).

Color Position	B	Lbl	Lg
OFF			
ON	○ — ○	○ — ○	○ — ○

1822H1920024-01

- 5) After finishing the hazard switch inspection, install the removed parts.

Dimmer / Passing Light Switch Inspection

BENK07L29206017

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Disconnect the left handle switch coupler (8P) (1).



IK07L1920023-01

- 4) Inspect the dimmer/passing light switch for continuity with a circuit tester.

If any abnormality is found, replace the left handle switch with a new one. Refer to "Handlebar Removal and Installation" in Section 6B (Page 6B-4).

Color Position	Y	O
HI	○ — ○	○ — ○
LO		
PASS	○ — ○	○ — ○

IK07L1920025-01

- 5) After finishing the dimmer/passing light switch inspection, install the removed parts.

Specifications

Tightening Torque Specifications

BENK07L29207001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Headlight bolt	10	1.0	7.5	☞ (Page 9B-6)
Headlight beam adjuster bolt	10	1.0	7.5	☞ (Page 9B-6)
Rear combination light screw (M5)	1.8	0.18	1.35	☞ (Page 9B-11)
License plate light nut	3.0	0.31	2.25	☞ (Page 9B-11)
Front turn signal light mounting nut	5.5	0.56	4.05	☞ (Page 9B-12)
Rear turn signal light mounting nut	5.5	0.56	4.05	☞ (Page 9B-13)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Front Lighting System Construction” (Page 9B-2)

“Rear Lighting System Construction” (Page 9B-8)

“Fasteners Information” in Section 0C (Page 0C-11)

Combination Meter / Fuel Meter / Horn

General Description

Combination Meter System Description

BENK07L29301001

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 display (4), Engine coolant temperature indicator / Oil pressure indicator (5), Tachometer (6), Speedometer (7), TC system indicator (8), Gear position indicator (9), Service reminder indicator (10), Engine rpm indicator (11) and Multifunction display (12) respectively.

LED (Light Emitting Diode)

LED is used for the illumination light and each indicator light.

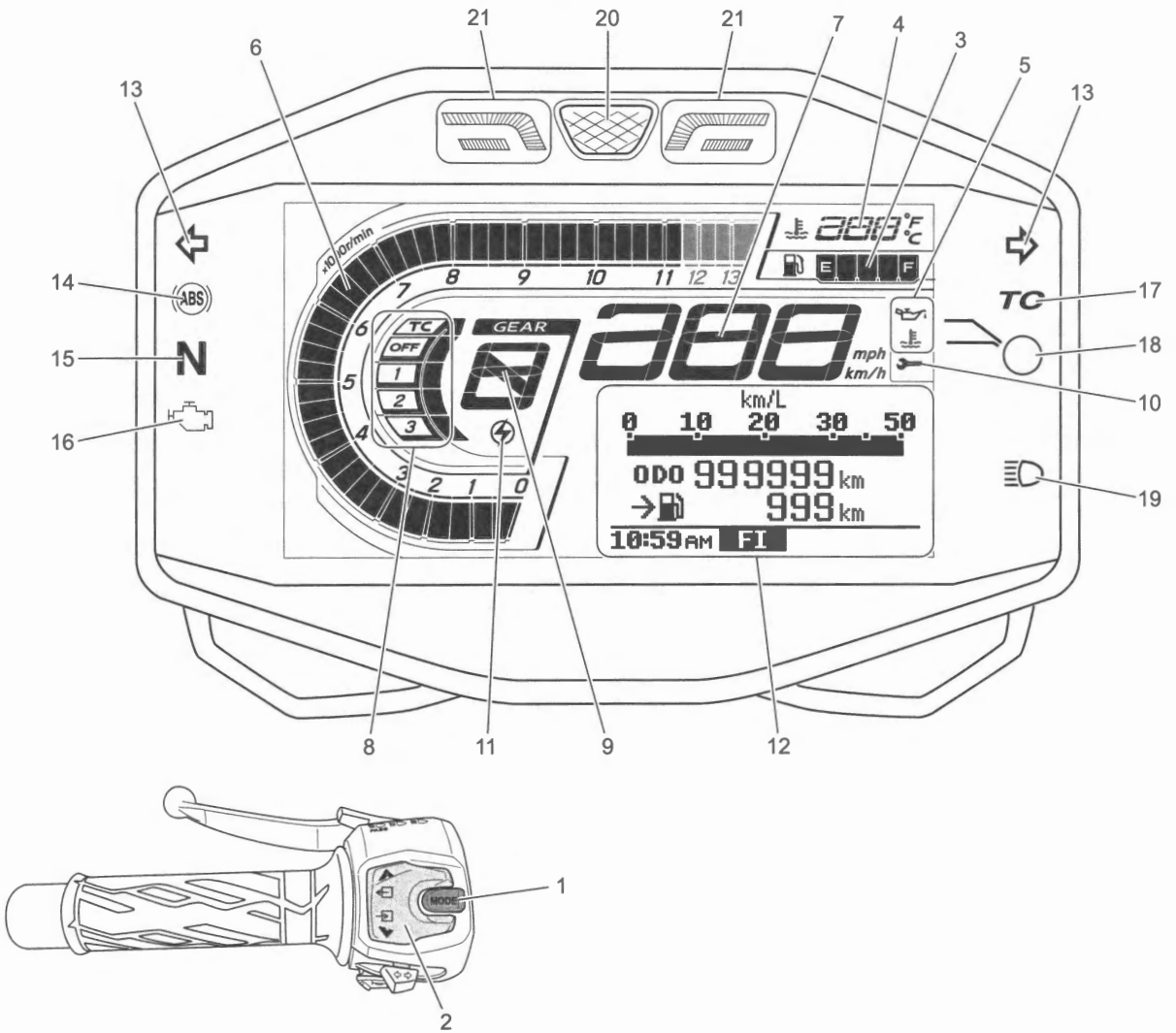
LED is maintenance free. LED is less power consuming and more resistant to vibration compared to the bulb.

Multifunction Display

The Multifunction display indicates the Instantaneous fuel consumption meter, Odometer, Driving range meter, Trip meter A/B, Average fuel consumption A/B, Voltmeter, Instrument panel light brightness, FI (DTC) and Clock respectively.

The Multifunction display can be selected and set in the following "MENU" by the select switch (2).

- DISPLAY
- DATE & TIME
- TACHO SET
- RPM SET
- UNIT
- SERVICE



IK07L1930001-03

1. Mode switch	17. LED (TC indicator light)
13. LED (Turn signal indicator light)	18. LED (Engine coolant temperature indicator light/Oil pressure indicator light)
14. LED (ABS indicator light)	19. LED (High beam indicator light)
15. LED (Neutral indicator light)	20. LED (Engine rpm indicator light (Main))
16. LED (MIL)	21. LED (Engine rpm indicator light (Sub))

Service Reminder Indicator Description

BENK07L29301002

The service reminder indicator comes on to notify the rider of the preset date and distance for the service maintenance.

The service reminder is set using the mode select switch (special tool), monitoring the multifunction display and pushing the select switch in the left handle switch (UP or DOWN) for the setting.

Special tool
09930-82720

Diagnostic Information and Procedures**Combination Meter Symptom Diagnosis**

BENK07L29304001

- 1) Check combination meter power and ground circuit.
- 2) Check DTC. (Page 1A-16)
 - If some DTC appears during inspection in Step 2), go to applicable DTC diagnostic 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.	Check front wheel speed sensor. (Page 4E-34)
	Defective speedometer.	Check speedometer. (Page 9C-11)
	Defective ECM.	Check ECM. (Page 1A-51)
	Faulty speedometer circuit.	Repair circuit. (Page 9A-5)
	Faulty front wheel speed sensor circuit.	Repair circuit. (Page 9A-5)
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 fuel level gauge circuit.	Repair wiring. (Page 9A-5)
Oil pressure indicator does not operate	Oil pressure switch	Check oil pressure switch. (Page 1E-11)
	Oil pressure indicator	Check oil pressure indicator. (Page 9C-11)
	Oil pressure switch circuit	Repair circuit. (Page 9A-5)
Engine coolant temperature indicator does not operate	Faulty ECT sensor	Check ECT sensor. (Page 1C-7)
	Faulty ECT indicator	Check ECT indicator. (Page 9C-8)
	Faulty ECT sensor circuit	Repair circuit. (Page 9A-5)
GP indicator does not operate	Faulty GP switch.	Check GP switch. Refer to "GP Switch Inspection" in Section 5B (Page 5B-12).
	Faulty GP indicator.	Check GP indicator.
	Faulty GP switch circuit.	Repair circuit. (Page 9A-5)
Indicator light does not operate	Faulty combination meter (LED).	Replace combination meter. (Page 9C-8)
	Faulty switch or sensor.	Check switch or sensor. <ul style="list-style-type: none"> • Turn signal switch: (Page 9B-14) • GP switch: (Page 5B-12) • Dimmer/passing light switch: (Page 9B-14) • Oil pressure switch: (Page 1E-11) • ECT sensor: (Page 1C-7)
	Faulty wiring or grounding.	Repair wiring. (Page 9A-5)

Horn Symptom Diagnosis

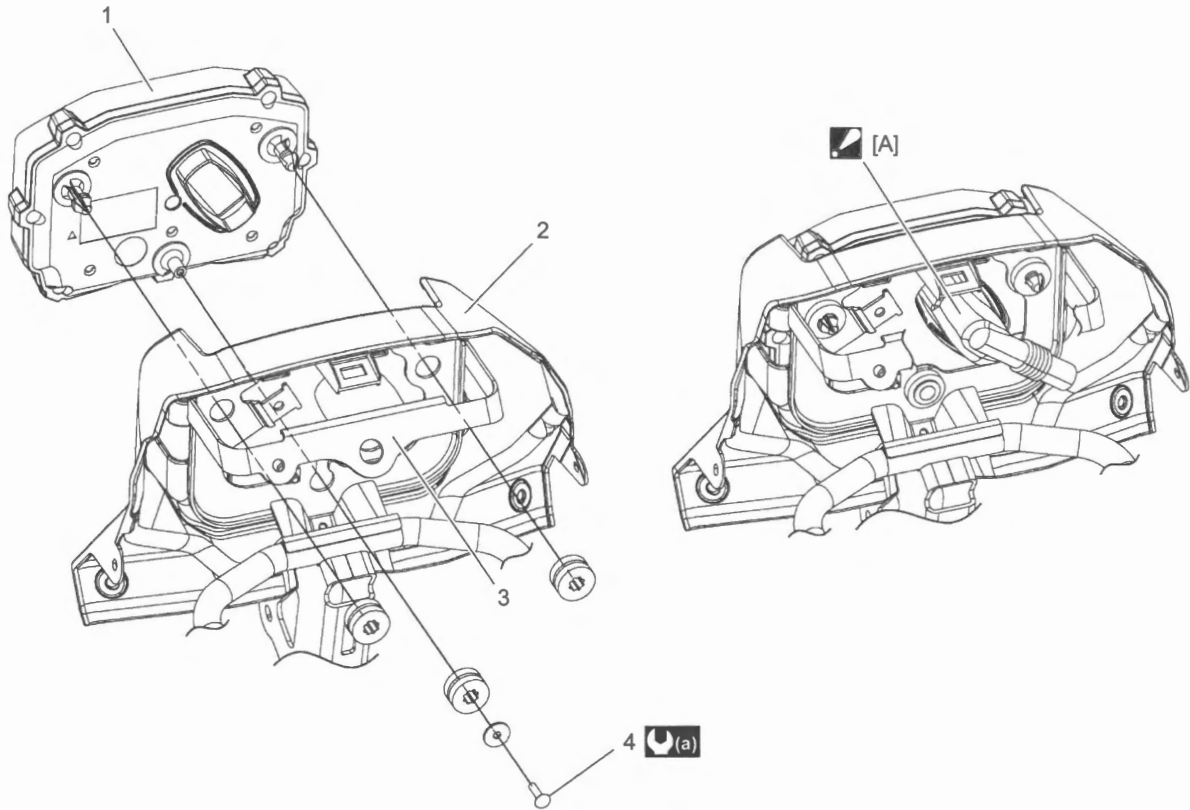
BENK07L29304002

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. (Page 9A-5)
	Faulty horn.	Check horn. (Page 9C-11)

Repair Instructions

Combination Meter Construction

BENK07L29306001

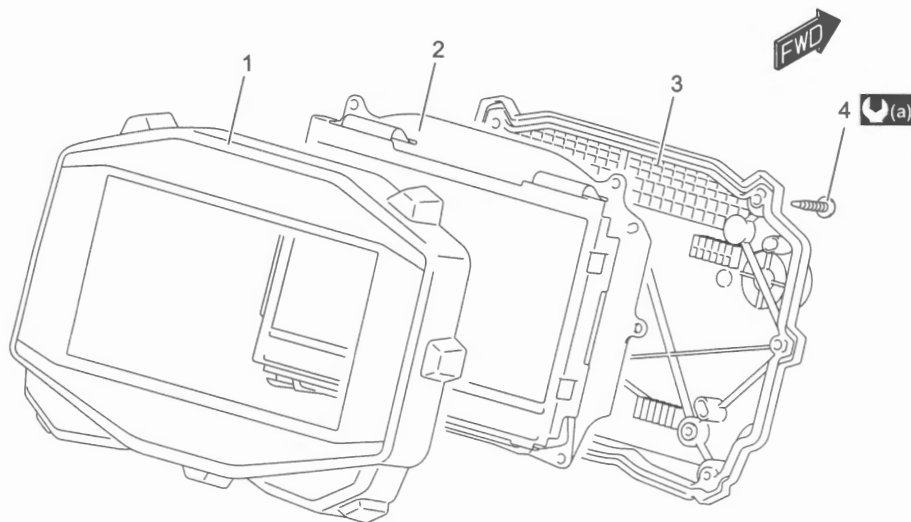


IK07L1930002-03

<p>▣ [A]: Fit the coupler boot until it contacts bottom of the lower case.</p> <p>1. Combination meter assembly</p> <p>2. Meter rear panel</p>	<p>3. Cowling brace</p> <p>4. Combination meter mounting screw</p> <p>⤵(a) : 1.5 N·m (0.15 kgf·m, 1.10 lbf·ft)</p>
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Combination Meter Components

BENK07L29306002



IK07L1930003-02

1. Upper case	4. Combination meter screw
2. Combination meter unit	⤵(a) : 2.0 N·m (0.20 kgf·m, 1.50 lbf·ft)
3. Lower case	

Service Reminder Reset

BENK07L29306003

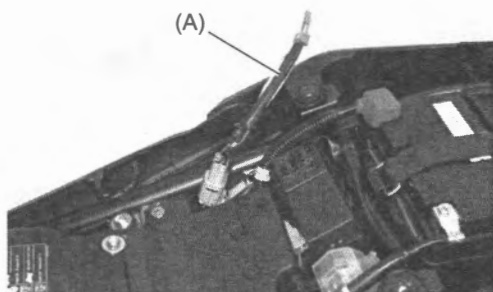
NOTE

- Before set up the service reminder, check that the multifunction display indicates the current calendar.
- The date and distance inputted in the service reminder will not be reset even if the battery cable is disconnected.

- 1) Remove the seat. (Page 9D-19)
- 2) Connect the special tool to the mode select coupler (6P) at the wiring harness.

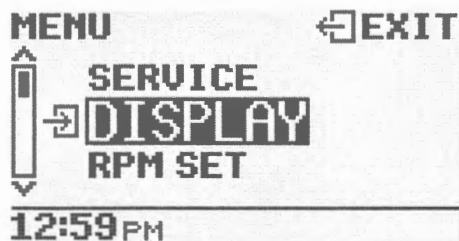
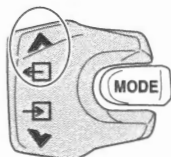
Special tool

(A): 09930-82720



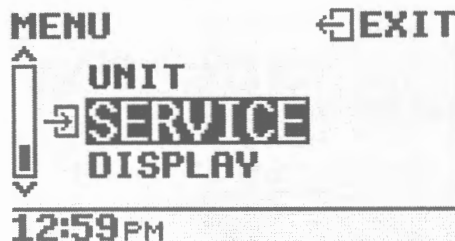
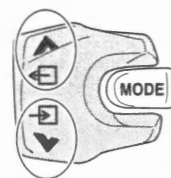
IK07L1930004-01

- 3) Turn the ignition switch ON.
- 4) Press the select switch (UP) for about 2 seconds to switch the screen to "MENU".



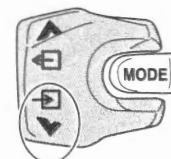
IK07L1930016-01

- 5) Press the select switch (UP or DOWN) to select "SERVICE".



IK07L1930017-02

- 6) Press the select switch (DOWN) for about 2 seconds. "SERVICE" starts blinking and changes the screen for setting.

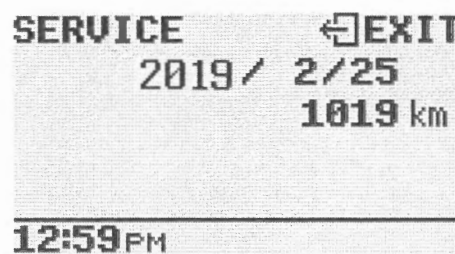


IH17K1930026-01

- Before the service reminder indicator comes on:

NOTE

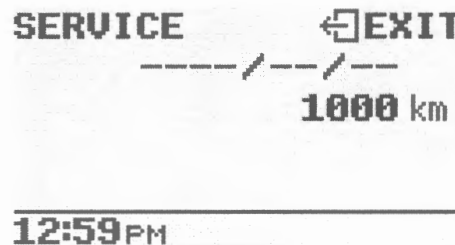
In this initial screen, 1000 km (600 mile) is shown but the date is not shown.



IK07L1930018-02

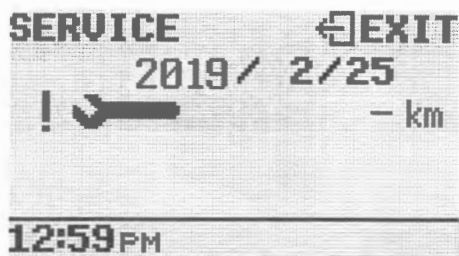
NOTE

When the service reminder is not set:



IK07L1930026-01

- When the service reminder indicator comes on:

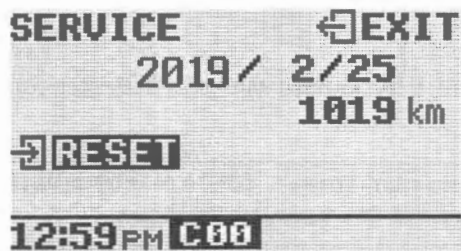


IK07L1930023-03

- 7) Turn the special tool's switch ON and "RESET" appears on the screen.



ID26J1110213-02

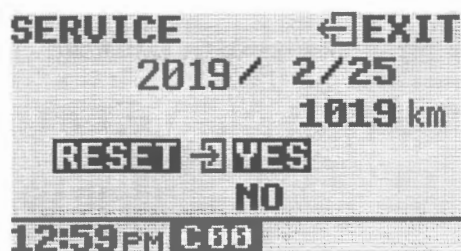


IK07L1930019-02

- 8) By pressing the select switch (DOWN) for about 2 seconds, "YES" and "NO" appear on the screen.



IH17K1930026-01



IK07L1930020-02

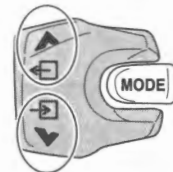
- 9) Press the select switch (UP or DOWN) to select "YES".

- 10) Press the select switch (DOWN) for about 2 seconds to select month, day and distance to setting screen.

NOTE

If "NO" is selected and press the select switch (DOWN) for about 2 seconds or press the select switch (UP) for about 2 seconds, the screen returns to Step 7).

- 11) Press the select switch (UP or DOWN) to select month, day, distance and "SET" indication. The selected item is highlighted.



IH17K1930031-01

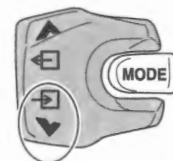


IK07L1930021-02

- 12) Press the select switch (DOWN) for about 2 seconds to make arrow marks appear above and below the indication.

NOTE

Even if the special tool's switch is set OFF, the setting mode continues.



IH17K1930026-01



IK07L1930022-02

- 13) Press the select switch (UP or DOWN) to set month, day and distance indications.

NOTE

- **Month can be selected from present month plus within one year in 12 steps.**
Example (if this month is 2019/5): Possible setting is 2020/5 – 2019/6.
- **Day can be selected within the range of 1 – 31.**
- **Distance can be selected within 1000 – 12000 km in every 1000 km or 600 mile and within 1000 – 7500 mile in every 500 mile.**

- 14) Press the select switch (DOWN) for about 2 seconds. The arrow marks above and below the indication disappear and the setting is confirmed.

NOTE

If the following conditions appear, the setting data is canceled.

- **Ignition switch is OFF.**
- **The setting operation is suspended for one minute.**
- **Speed sensor signal is input and the display is changed automatically.**

- 15) Press the select switch (UP or DOWN) to select "SET".
- 16) Press the select switch (DOWN) for about 2 seconds and the service reminder setting is confirmed before returning to setting screen in Step 7).
- 17) Turn the ignition switch OFF and disconnect the special tool.
- 18) Install the removed parts.

Combination Meter On-Vehicle Inspection

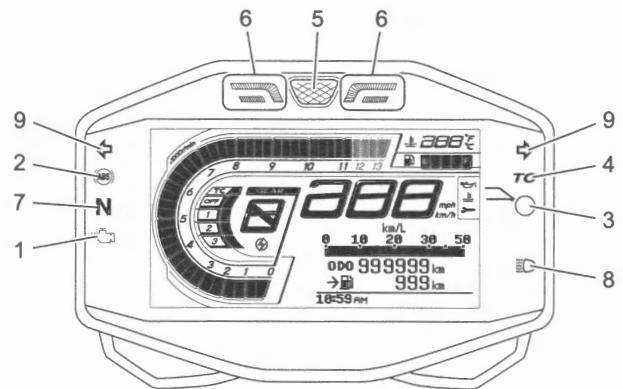
BENK07L29306004

LED Inspection

Check that the LEDs (MIL (1), ABS indicator light (2), Engine coolant temperature indicator light/Oil pressure indicator light (3), TC indicator light (4), Engine rpm indicator light (Main) (5) and (Sub) (6)) immediately light up when the ignition switch is turned to ON.

Check that other LEDs (Neutral indicator light (7), High beam indicator light (8) and Turn signal indicator lights (9)) light up/go off by operating the gearshift lever, dimmer/passing light and turn signal switches.

If abnormal condition is found, replace the combination meter with a new one after checking its wire harness/coupler. (Page 9C-8)



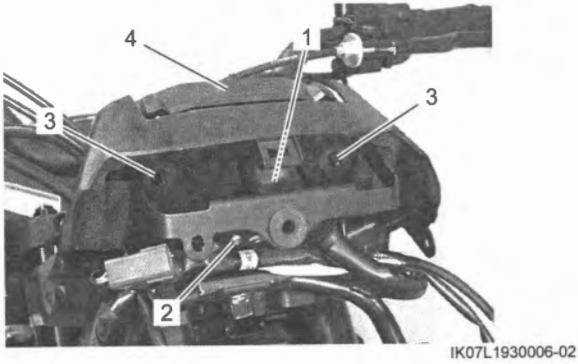
IK07L1930005-01

Combination Meter Assembly Removal and Installation

BENK07L29306005

Removal

- 1) Remove the headlight. (Page 9B-6)
- 2) Disconnect the coupler (1) and remove the combination meter mounting screw (2).
- 3) Unhook the hooks (3) and remove the combination meter assembly (4).



Installation

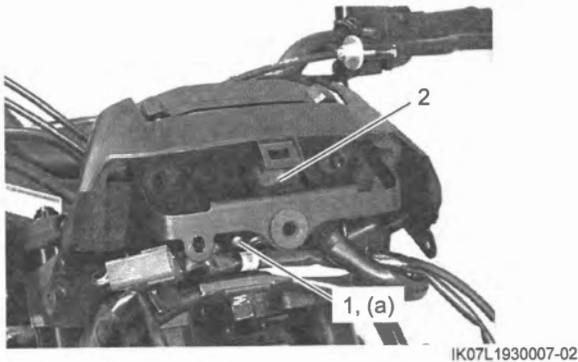
Install the combination meter assembly in the reverse order of removal. Pay attention to the following points:

- Tighten the combination meter mounting screw (1) to the specified torque.

Tightening torque

Combination meter mounting screw (a): 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)

- Fit the coupler boot (2) until it contacts bottom of the lower case.



Combination Meter Disassembly and Reassembly

BENK07L29306006

Refer to "Combination Meter Assembly Removal and Installation" (Page 9C-8).

Disassembly

Disassemble the combination meter as shown in the combination meter components. (Page 9C-4)

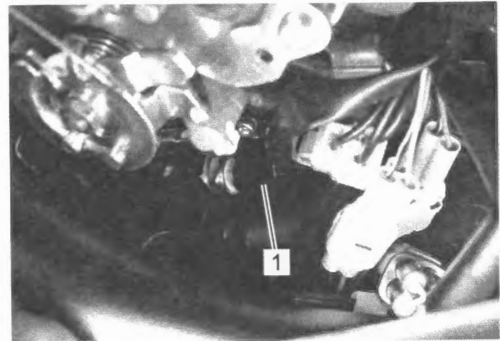
Reassembly

Assemble the combination meter as shown in the combination meter components. (Page 9C-4)

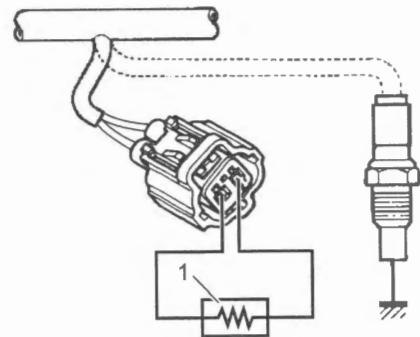
ECT Indicator / ECT Indicator Light Inspection

BENK07L29306007

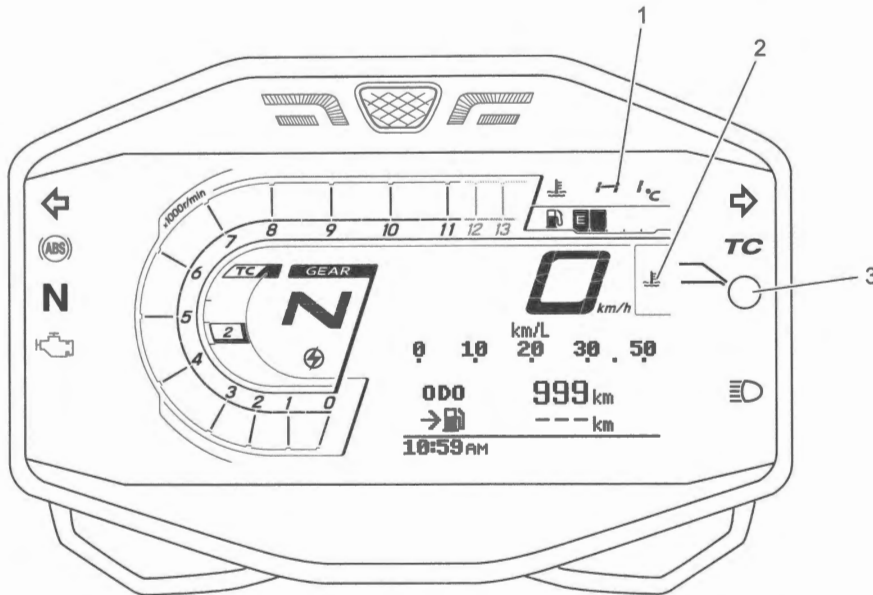
- 1) Disconnect the oil pressure switch lead wire. Refer to "Oil Pressure Indicator / Oil Pressure Indicator Light Inspection" (Page 9C-11).
- 2) Remove the left frame front cover assembly. (Page 9D-34)
- 3) Disconnect the ECT sensor coupler (1).



- 4) Connect a variable resistor (1) between the terminals.



- 5) Turn the ignition switch ON.
- 6) Check the LCD (1), (2) and LED (3) 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-8)



IK07L1930008-02

Resistance	LCD (1)		LED (3)	LCD (2)	Engine coolant temperature
	°C	°F			
More than 2450 Ω	"- - -"	"- - -"	OFF	—	Less than 20 °C (68 °F)
From more than 98.5 Ω to 2450 Ω or less	"20" – "125"	"68" – "257"	OFF	—	From 20 °C (68 °F) or more to less than 125 °C (257 °F)
98.5 Ω or less	"HI"	"HI"	ON	Flicker	125 °C (257 °F) or more

- 7) Connect the ECT sensor coupler and oil pressure switch lead wire.
- 8) Install the removed parts.

ECT Sensor Removal and Installation

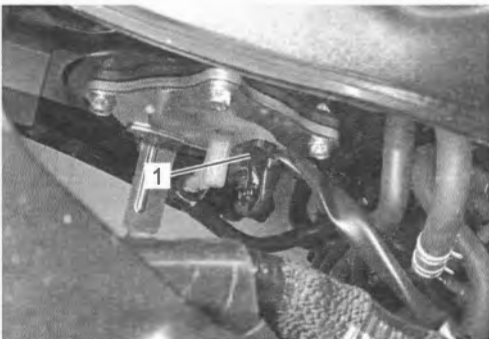
BENK07L29306008

Refer to "ECT Sensor Removal and Installation" in Section 1C (Page 1C-8).

Fuel Level Indicator Inspection

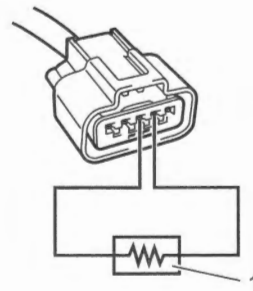
BENK07L29306009

- 1) Lift and support the fuel tank. (Page 1G-11)
- 2) Disconnect the fuel pump coupler (1).



IK07L1930030-02

- 3) Connect a variable resistor (1) between the BI/W and BI/R wire terminals.



IH17K1930009-01

- 4) Turn the ignition switch ON.
- 5) Check the display of fuel level indicator (LCD) as shown in the figure.
If any abnormality is found, replace the combination meter with a new one. (Page 9C-8)

NOTE

It takes approx. 38 seconds that the fuel level indicator indicates the detected fuel level.

Resistance	Fuel level indicator
185.2 – 200.4 Ω	
157.4 – 170.4 Ω	
131.7 – 142.5 Ω	
94.3 – 102.3 Ω	
12.9 – 15.9 Ω	

IK07L1930010-01

- 6) Connect the fuel pump coupler and reinstall the fuel tank. (Page 1G-11)

Fuel Level Gauge Inspection

BENK07L29306010

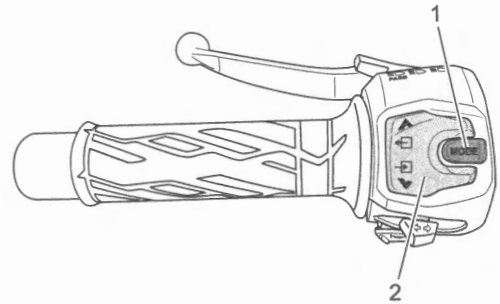
Refer to “Fuel Level Gauge Inspection” in Section 1G (Page 1G-18).

TC System Indicator Inspection

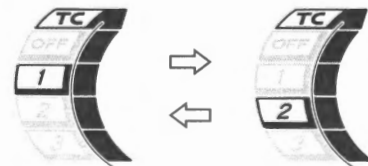
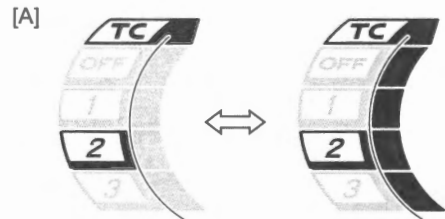
BENK07L29306011

- 1) Make sure that the TC indicator light comes on when the ignition switch is turned “ON”.
- 2) Make sure that the TC indicator light goes off after the motorcycle speed exceeds 5 km/h (3 mile/h).
- 3) Make sure that the TC system indicator changes when the mode switch (1) or the select switch (2) is operated.

If any defect is found, replace the ECM with a known good one after inspecting the switches and the harness, and make sure that the TC system indicator changes by operating these switches again. Replace the combination meter or the ECM with a new one after confirmation of the defect. Refer to “Combination Meter Assembly Removal and Installation” (Page 9C-8) or “ECM Removal and Installation” in Section 1C (Page 1C-4).



IK07L1930011-01



IK07L1930012-01

[A]: When mode switch (1) is pushed.

[B]: When select switch (UP, DOWN) (2) is pushed.

Speedometer On-Vehicle Inspection

BENK07L29306012

If the speedometer, odometer or tripmeter does not function properly, inspect the front wheel speed sensor and the coupler connections. If the front wheel speed sensor and coupler connections are OK, replace the combination meter with a new one. (Page 9C-8)

Speed Sensor Removal and Installation

BENK07L29306013

Refer to "Front Wheel Speed Sensor Removal and Installation" in Section 4E (Page 4E-31).

Speed Sensor Inspection

BENK07L29306014

Refer to "Wheel Speed Sensor and Sensor Rotor Inspection" in Section 4E (Page 4E-34).

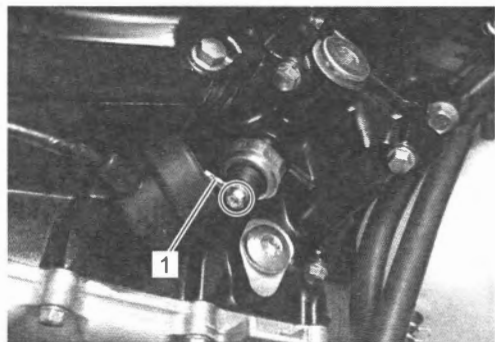
Oil Pressure Indicator / Oil Pressure Indicator Light Inspection

BENK07L29306015

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) Remove the right under cowling bracket. Refer to "Under Cowling / Under Cowling Cover Construction" in Section 9D (Page 9D-16).
- 2) Disconnect the oil pressure switch lead wire (1). Refer to "Oil Pressure Switch Removal and Installation" in Section 1E (Page 1E-10).

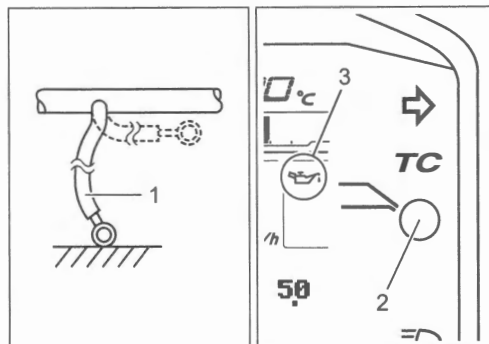


IF04K1930013-02

3) Turn the ignition switch ON.

4) 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.



IK07L1930013-01

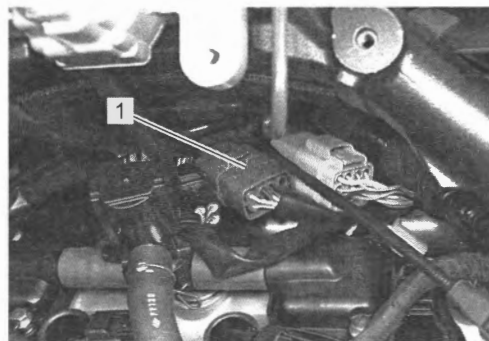
5) Install the removed parts.

Horn Inspection

BENK07L29306016

Horn Switch Inspection

- 1) Remove the air cleaner box. (Page 1D-7)
- 2) Disconnect the left handle switch coupler (8P) (1).



IK07L1930014-01

3) Inspect the horn switch for continuity with a circuit tester.

If any abnormality is found, replace the left handle switch with a new one. Refer to "Handlebar Removal and Installation" in Section 6B (Page 6B-4).

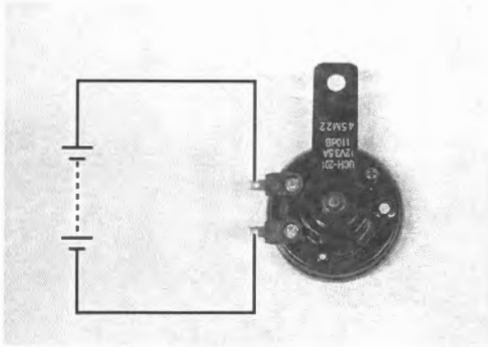
Color Position	B/BI	B/W
•		
PUSH	○	○

I718H1930028-03

4) After finishing the horn switch inspection, install the removed parts.

Horn Inspection

- 1) Remove the horn. (Page 9C-12)
- 2) Connect a 12 V battery to the horn terminals. If the sound is not heard from the horn, replace the horn with a new one.



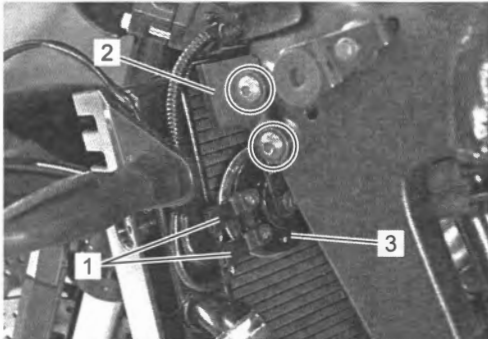
IF04K1930016-03

Horn Removal and Installation

BENK07L29306017

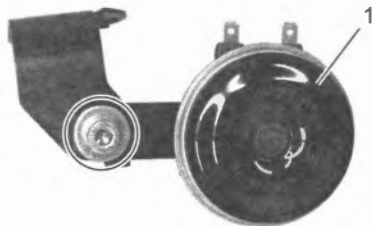
Removal

- 1) Remove the left side cover assembly. (Page 9D-22)
- 2) Disconnect the horn connectors (1).
- 3) Remove the horn plate (2) with horn (3).



IK07L1930024-03

- 4) Remove the horn (1).



IK07L1930027-01

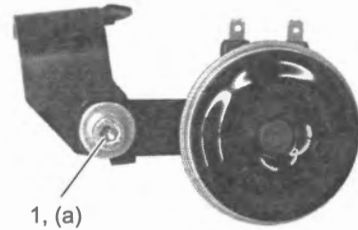
Installation

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

- Tighten the horn bolt (1) to the specified torque.

Tightening torque

Horn bolt (a): 21 N·m (2.1 kgf-m, 15.5 lbf-ft)



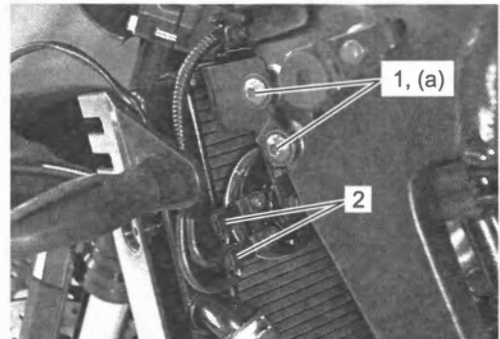
IK07L1930028-01

- Tighten the horn plate bolts (1) to the specified torque.

Tightening torque

Horn plate bolt (a): 14 N·m (1.4 kgf-m, 10.5 lbf-ft)

- Connect the horn connectors (2) in correct position. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).



IK07L1930029-01

Mode Switch Inspection

BENK07L29306018

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Disconnect the left handle switch coupler (4P) (1).



IK07L1930015-01

- 4) Inspect the mode switch for continuity with a circuit tester.
If any abnormality is found, replace the left handle switch with a new one. Refer to "Handlebar Removal and Installation" in Section 6B (Page 6B-4).

Color Position	P	B/G
•		
PUSH	○ ————— ○	○ ————— ○

IJ04K1130016-01

- 5) After finishing the mode switch inspection, install the removed parts.

Select Switch Inspection

BENK07L29306019

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Disconnect the left handle switch coupler (4P) (1).



IK07L1930015-01

- 4) Inspect the select switch for continuity with a circuit tester.
If any abnormality is found, replace the left handle switch with a new one. Refer to "Handlebar Removal and Installation" in Section 6B (Page 6B-4).

Color Position	Y/G	G	B/G
UP	○ ————— ○		○ ————— ○
•			
DOWN		○ ————— ○	○ ————— ○

IJ04K1130017-01

- 5) After finishing the select switch inspection, install the removed parts.

Specifications

Tightening Torque Specifications

BENK07L29307001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Combination meter mounting screw	1.5	0.15	1.10	☞ (Page 9C-8)
Horn bolt	21	2.1	15.5	☞ (Page 9C-12)
Horn plate bolt	14	1.4	10.5	☞ (Page 9C-12)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Combination Meter Construction” (Page 9C-4)


“Combination Meter Components” (Page 9C-4)

“Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Special Tool

BENK07L29308001

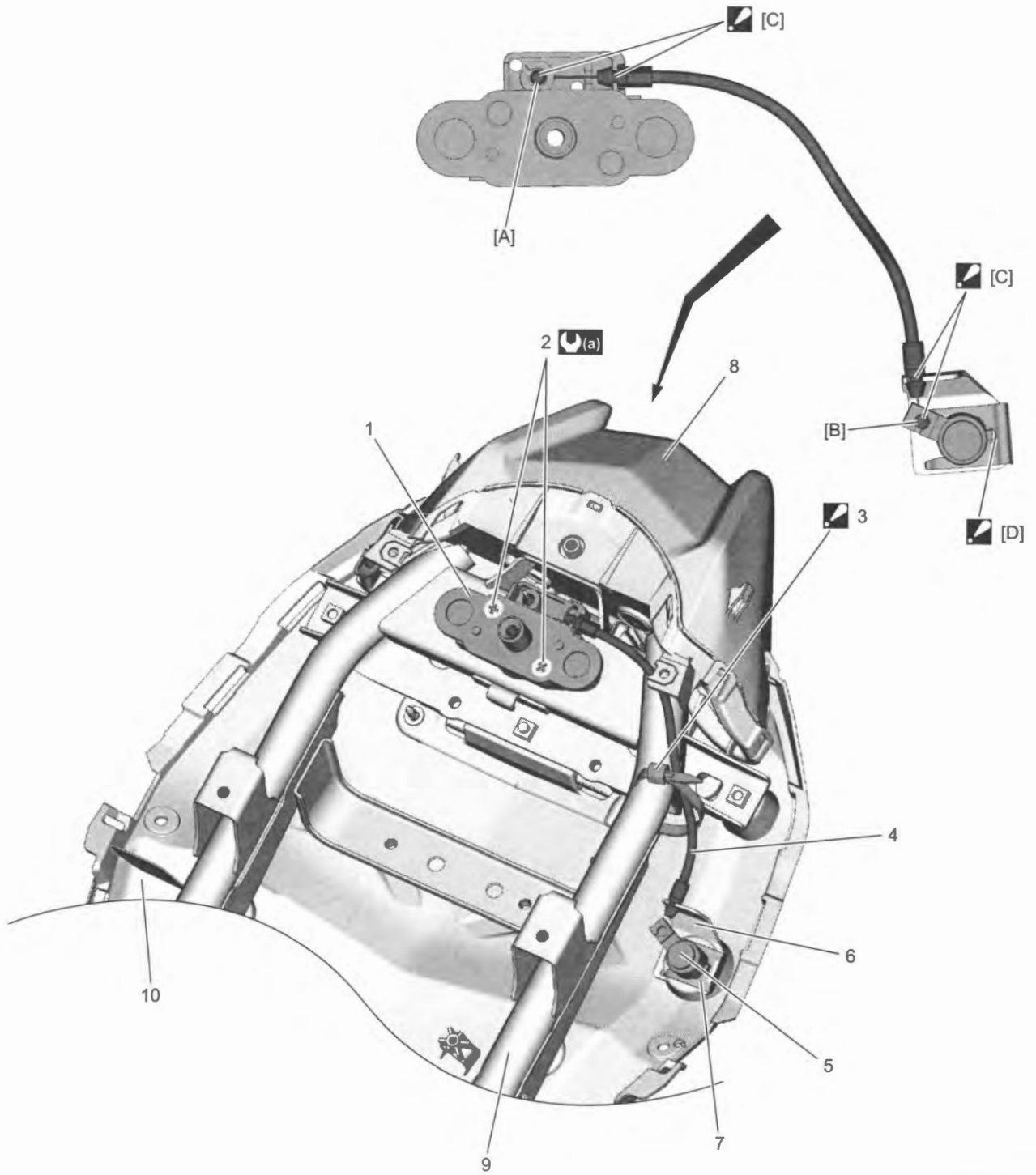
09930-82720 Mode selection switch ☞ (Page 9C-3) / ☞ (Page 9C-5)	
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Exterior Parts

Schematic and Routing Diagram





Seat Lock Cable Routing Diagram

BENK07L29402001



IK07L1940001-01

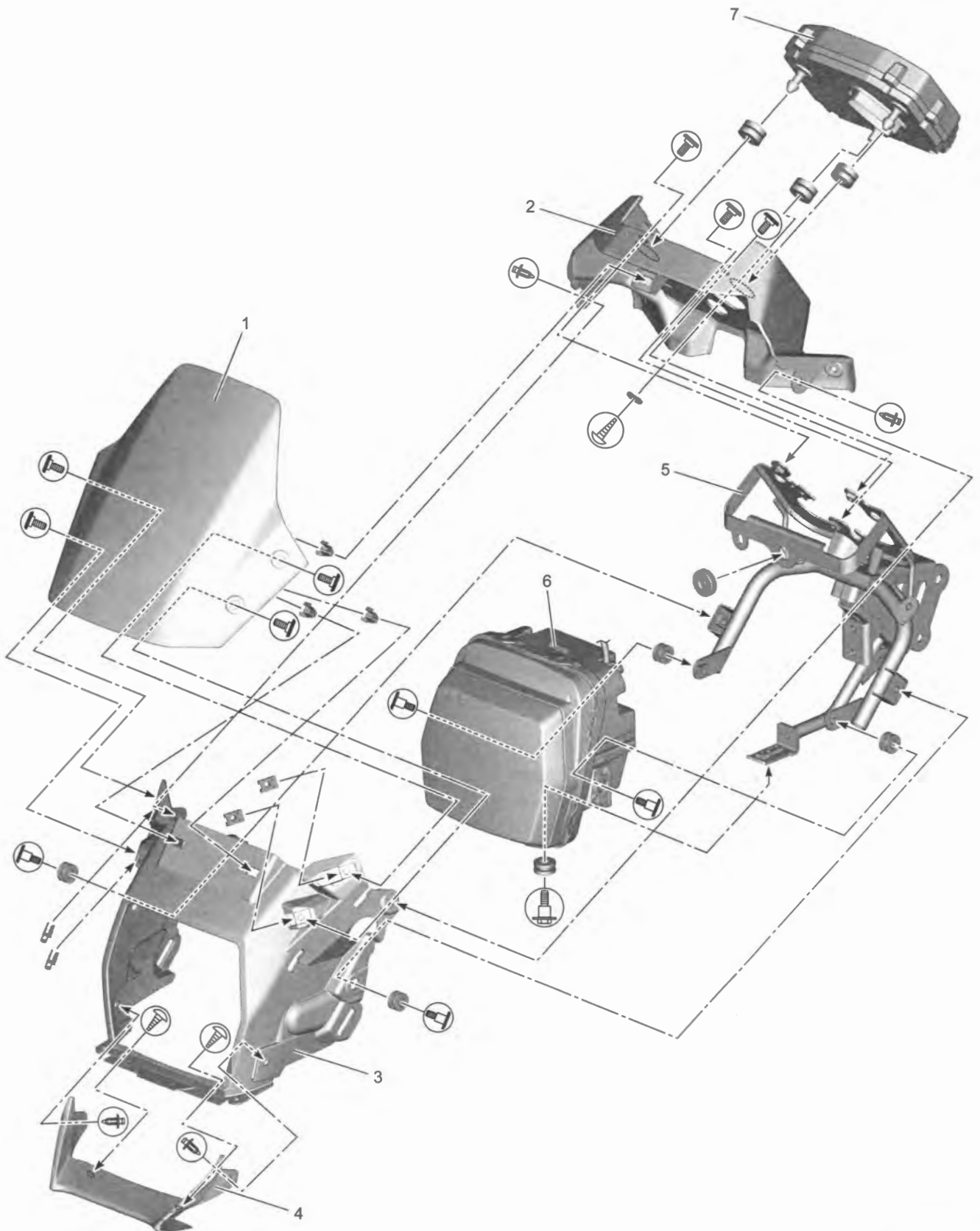
9D-2 Exterior Parts:

[A]: Spherical shape	5. Seat lock assembly
[B]: Cylindrical shape	6. Seat lock cable guide
 [C]: Set the seat lock cable firmly.	7. Seat lock plate
 [D]: Align the rib of seat lock assembly and groove of each part.	8. Rear combination light
1. Striker support bracket	9. Seat rail
2. Striker support bracket screw	10. Rear fender front
 3. Clamp : Face the tip of clamp to left side and locked part of clamp upward. Set the clamp firmly.	 (a) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
4. Seat lock cable	

Repair Instructions

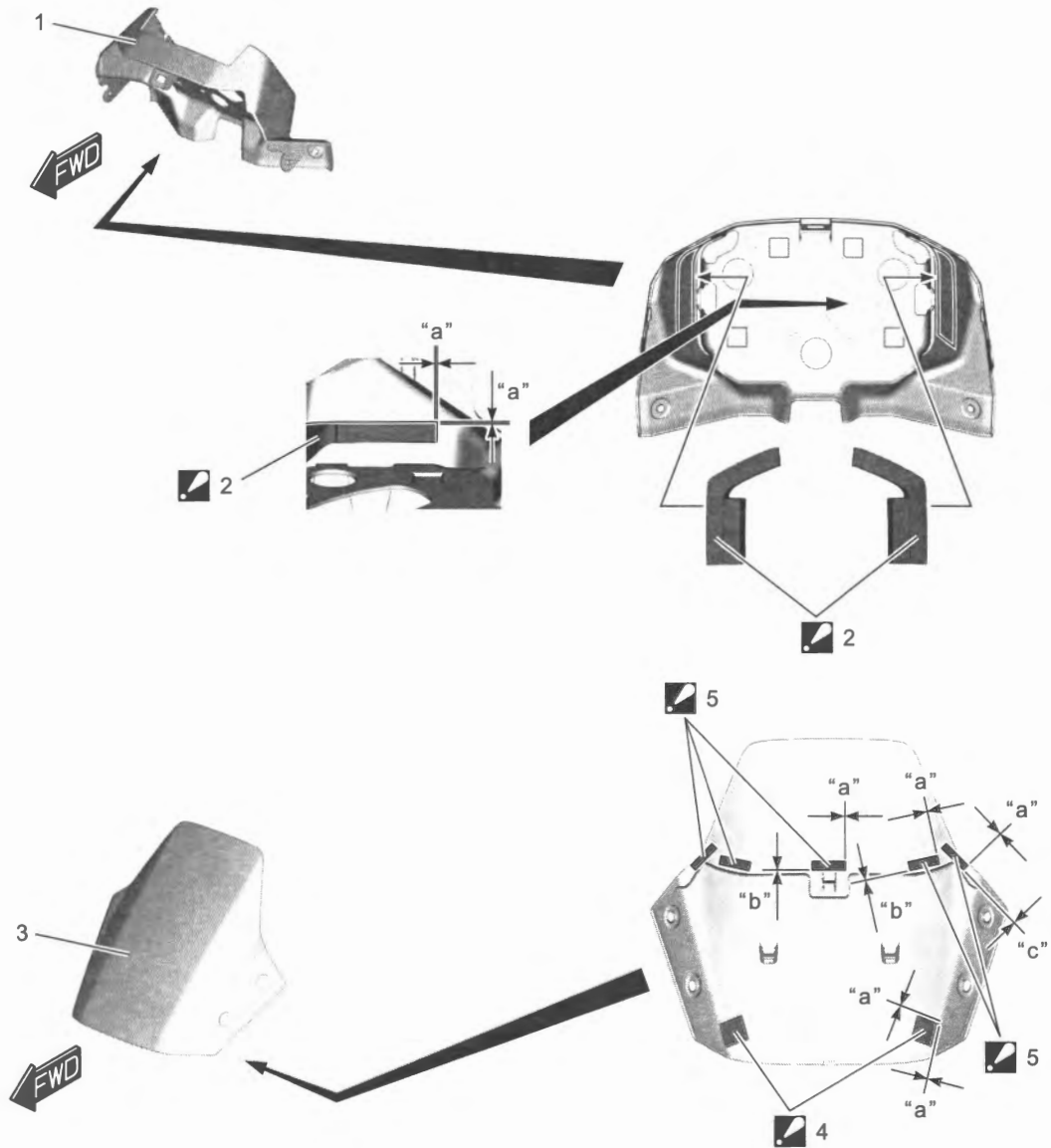
Meter Panel / Body Cowling Construction

BENK07L29406001



9D-4 Exterior Parts:

1. Meter front panel	4. Body front cowling	7. Combination meter
2. Meter rear panel	5. Cowling brace	
3. Body cowling	6. Headlight	

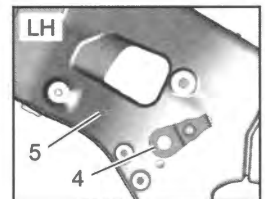
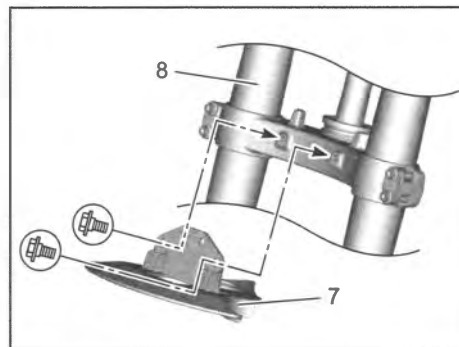
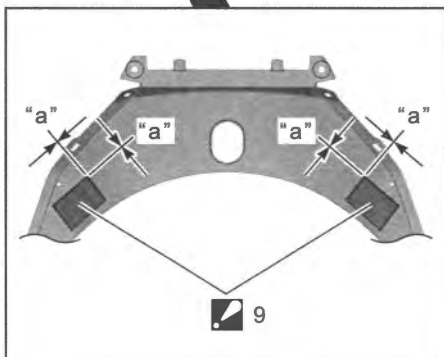
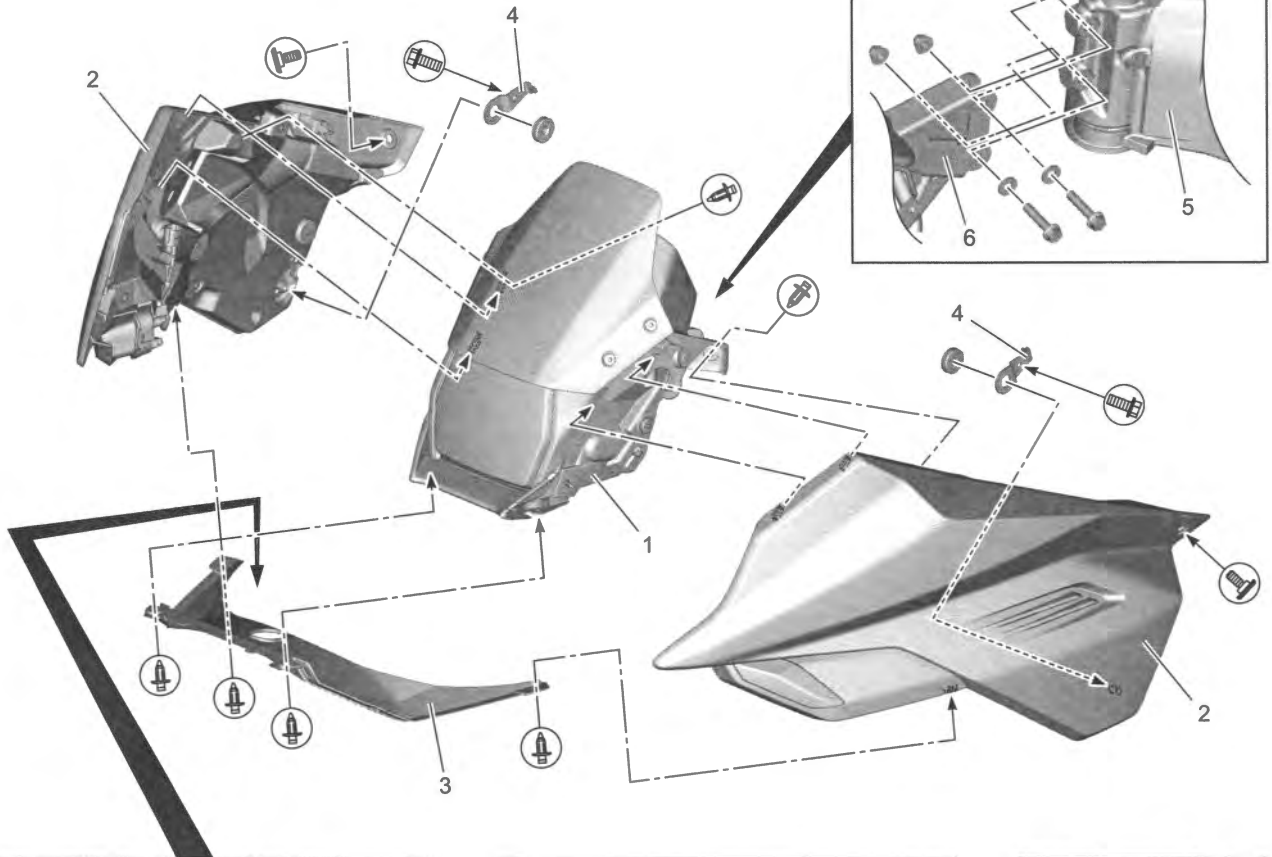
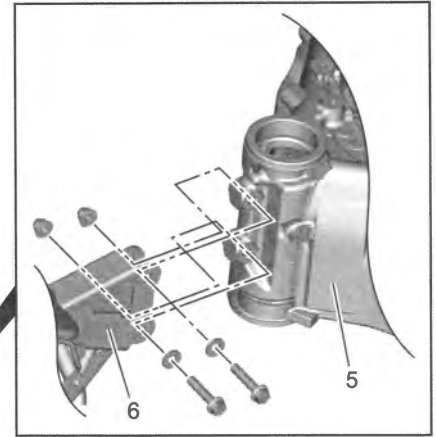


IK07L1940003-03

1. Meter rear panel	<p>5. Meter front panel tape : Clean the adhesive surface before sticking the tape. Stick the tape aligning with the emboss line. Press the tape after sticking.</p> <p>"a": 0 – 2 mm (0 – 0.07 in)</p>
<p>2. Cowling No.2 cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion aligning with the emboss line. Press the cushion after sticking.</p>	<p>"b": 0 – 1 mm (0 – 0.03 in)</p>
3. Meter front panel	<p>"c": –0.5 – 0.5 mm (–0.01 – 0.01 in)</p>
<p>4. Meter front panel cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion matching with the bearing surface. Press the cushion after sticking.</p>	

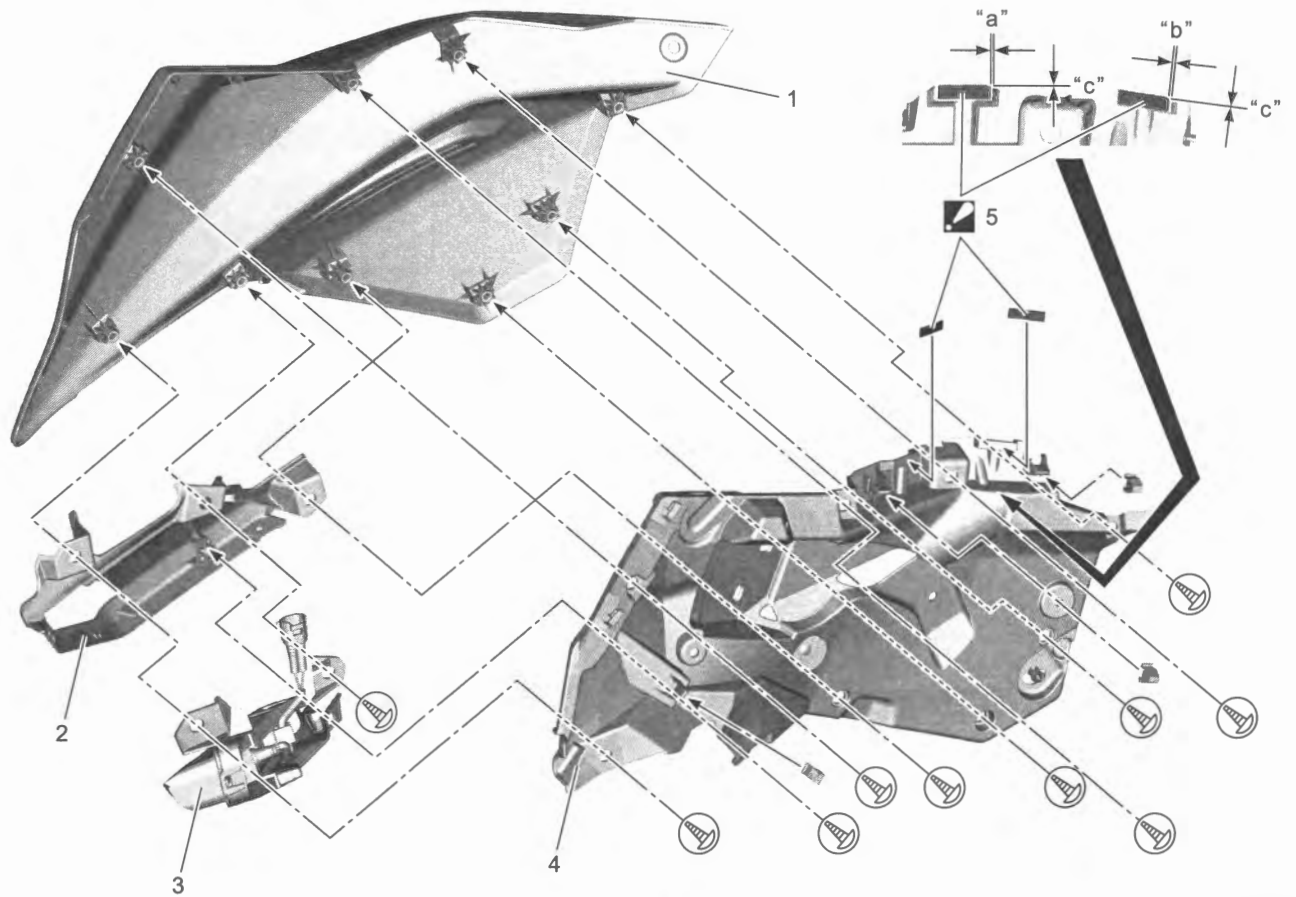
Side Cover / Body Cowling Cover Construction

BENK07L29406002



IK07L1940004-02

1. Body cowling assembly	6. Cowling brace
2. Side cover assembly	7. Lower bracket cover
3. Body cowling cover	8. Front fork
4. Cowling side bracket	9. Cowling No.4 cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion aligning with the emboss line. Press the cushion after sticking.
5. Frame	"a": 0 – 2 mm (0 – 0.07 in)

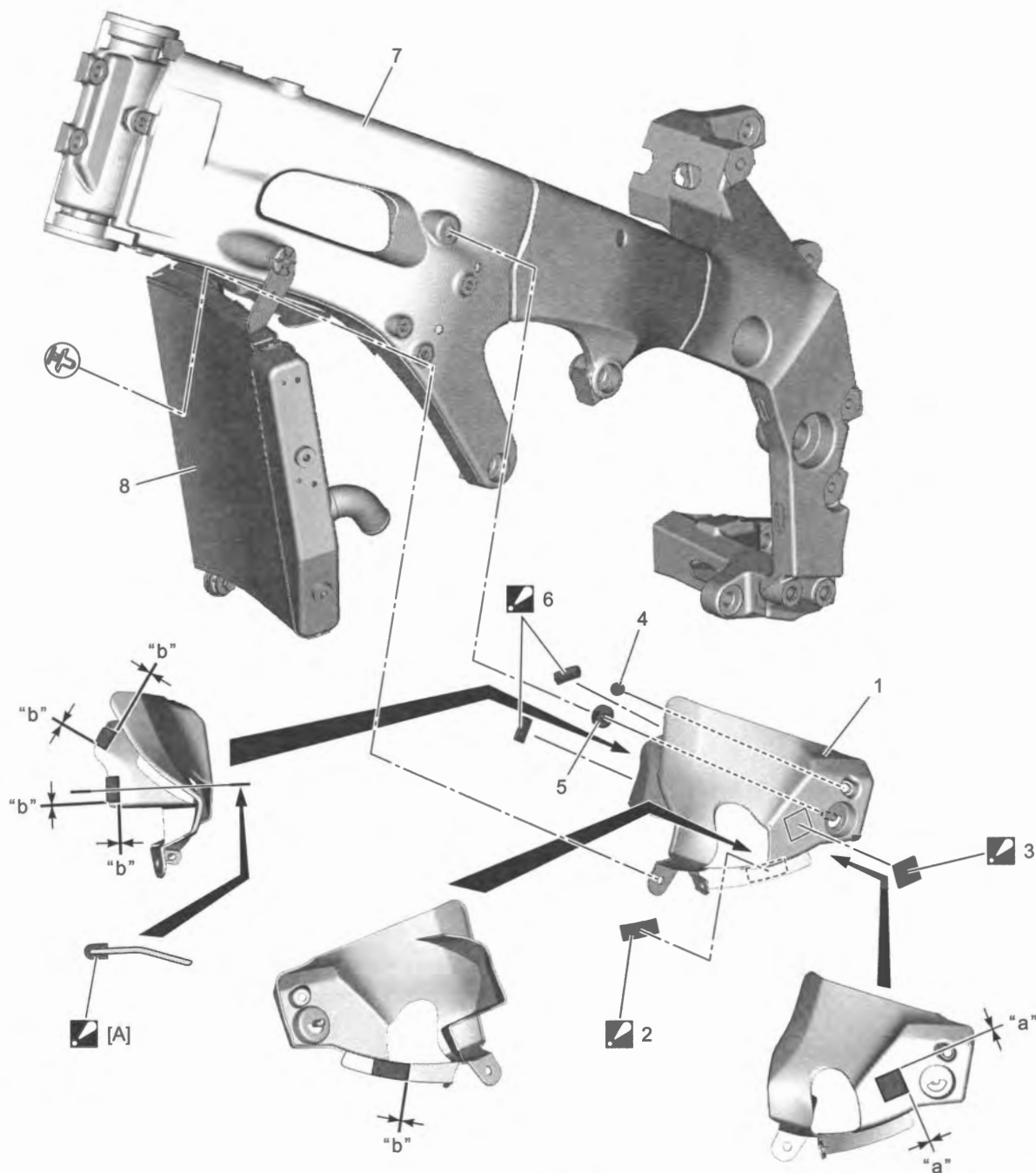


IK07L1940005-02

1. Side cover	5. Side cowling cushion : Stick the cushion matching with the bearing surface.
2. Side lower cover	"a": 1.2 – 2.4 mm (0.048 – 0.094 in)
3. Front position light	"b": 0.8 – 2.0 mm (0.032 – 0.078 in)
4. Side inner cover	"c": 0 – 0.7 mm (0 – 0.02 in)

Frame Body Upper Cover Construction

BENK07L29406003

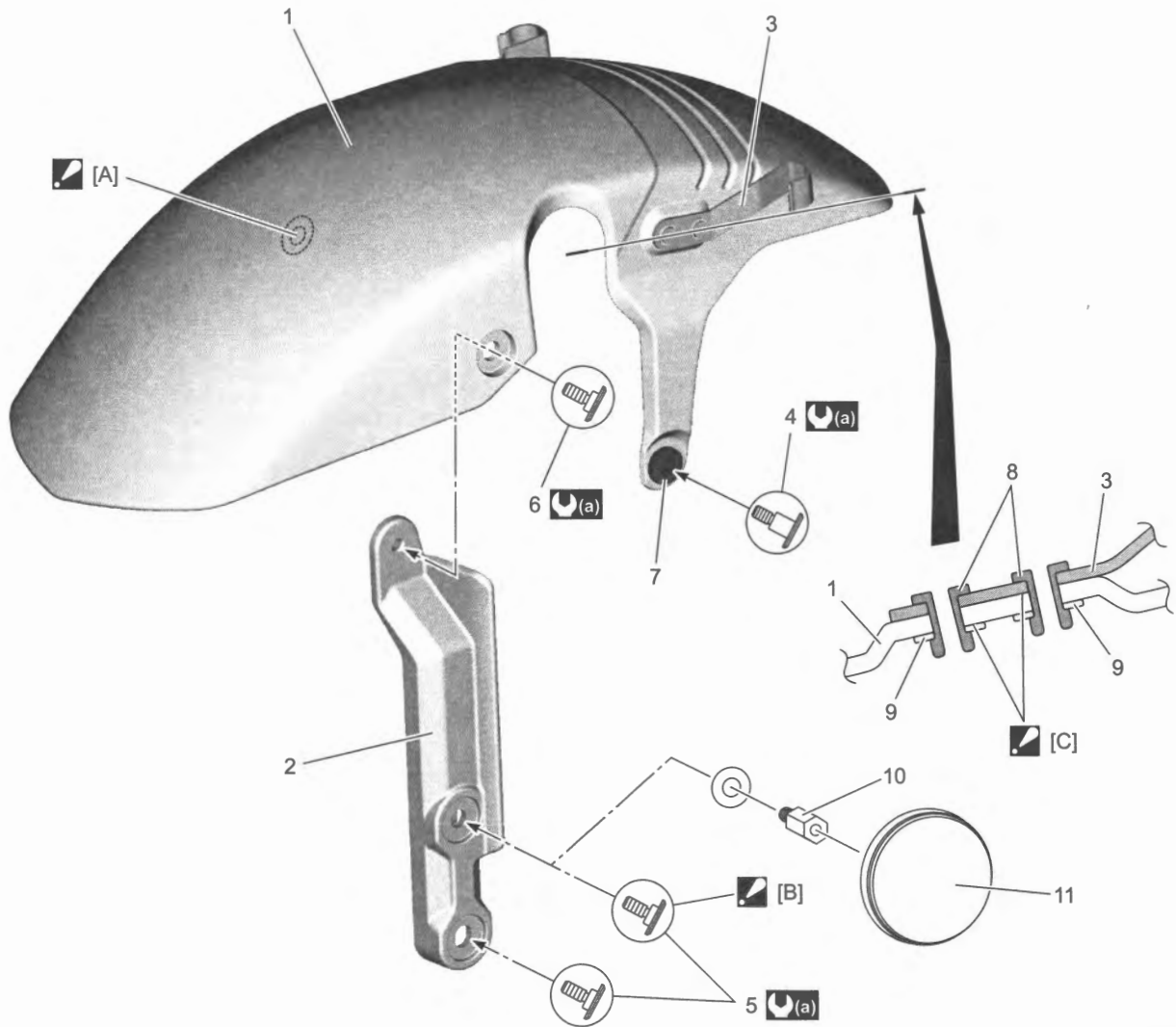


IK07L1940006-02

<p>☑ [A]: Stick the cushion wrapping with the edge of the frame body upper cover.</p>	<p>☑ 6. Frame body cover No.4 cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion matching with the area of no graining. Press the cushion after sticking.</p>
<p>1. Frame body upper cover</p>	<p>7. Frame</p>
<p>☑ 2. Frame body cover No.1 cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion aligning with the emboss line. Press the cushion after sticking.</p>	<p>8. Radiator</p>
<p>☑ 3. Frame body cover No.2 cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion matching with the area of no graining. Press the cushion after sticking.</p>	<p>"a": 0 – 1.0 mm (0 – 0.39 in)</p>
<p>4. Frame body cover No.3 cushion</p>	<p>"b": 0 – 2 mm (0 – 0.07 in)</p>
<p>5. Cowling inner cushion</p>	

Front Fender Construction

BENK07L29406004

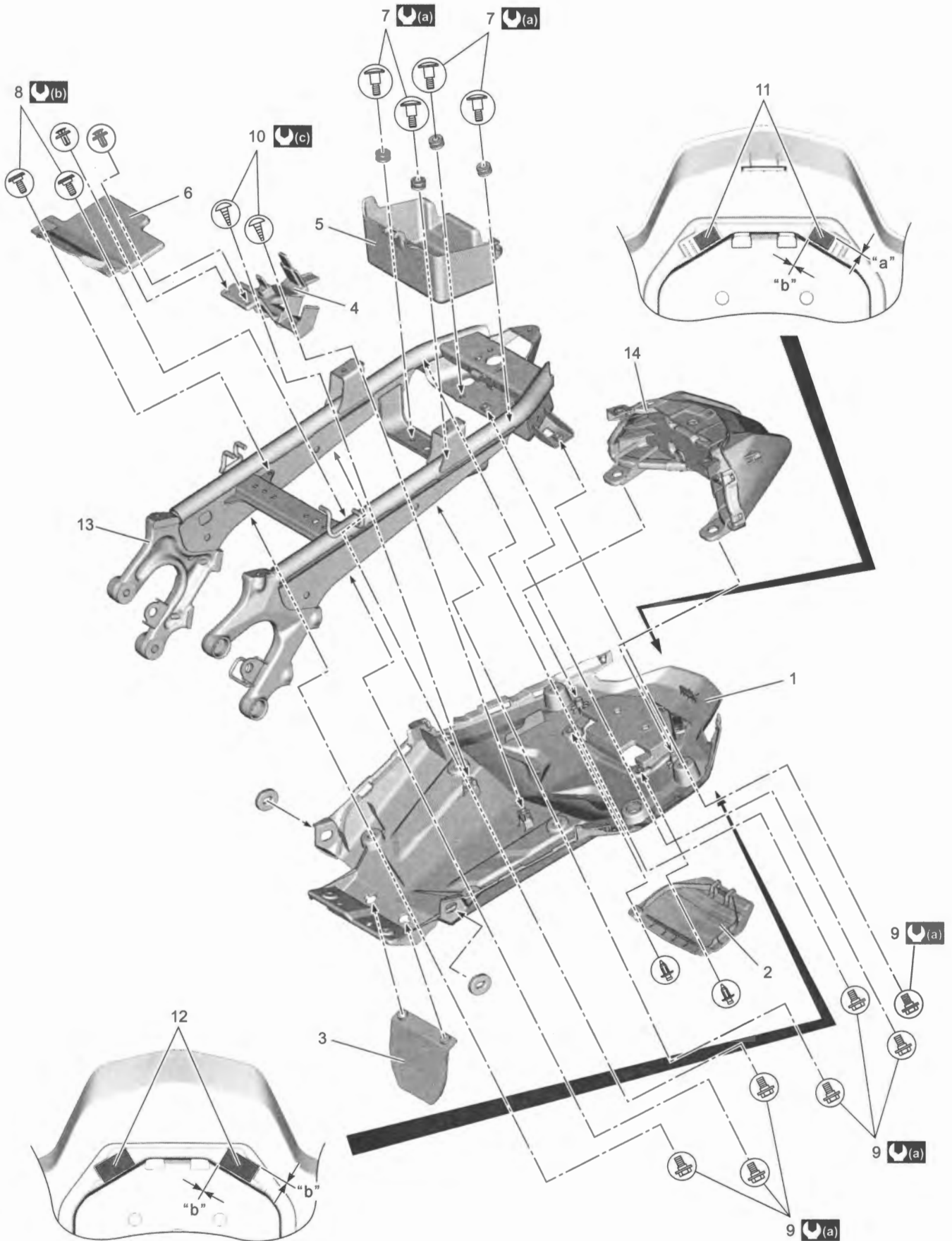


IK07L1940007-05

<p>☑ [A]: When installing the front fender, tighten the right side of front fender upper screw first.</p>	6. Front fender upper screw
<p>☑ [B]: When installing the front fender bracket, tighten the upper side of front fender front screw first. (both sides)</p>	7. Cushion
<p>☑ [C]: Install the rivet firmly, there must not be clearance between the front fender, brake hose clamp and washer.</p>	8. Rivet
1. Front fender	9. Washer
2. Front fender bracket	10. Front side reflex reflector bolt (If equipped)
3. Brake hose clamp	11. Front side reflex reflector (If equipped)
4. Front fender rear screw	Ⓜ(a) : 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
5. Front fender front screw	

Rear Fender Front Construction

BENK07L29406005

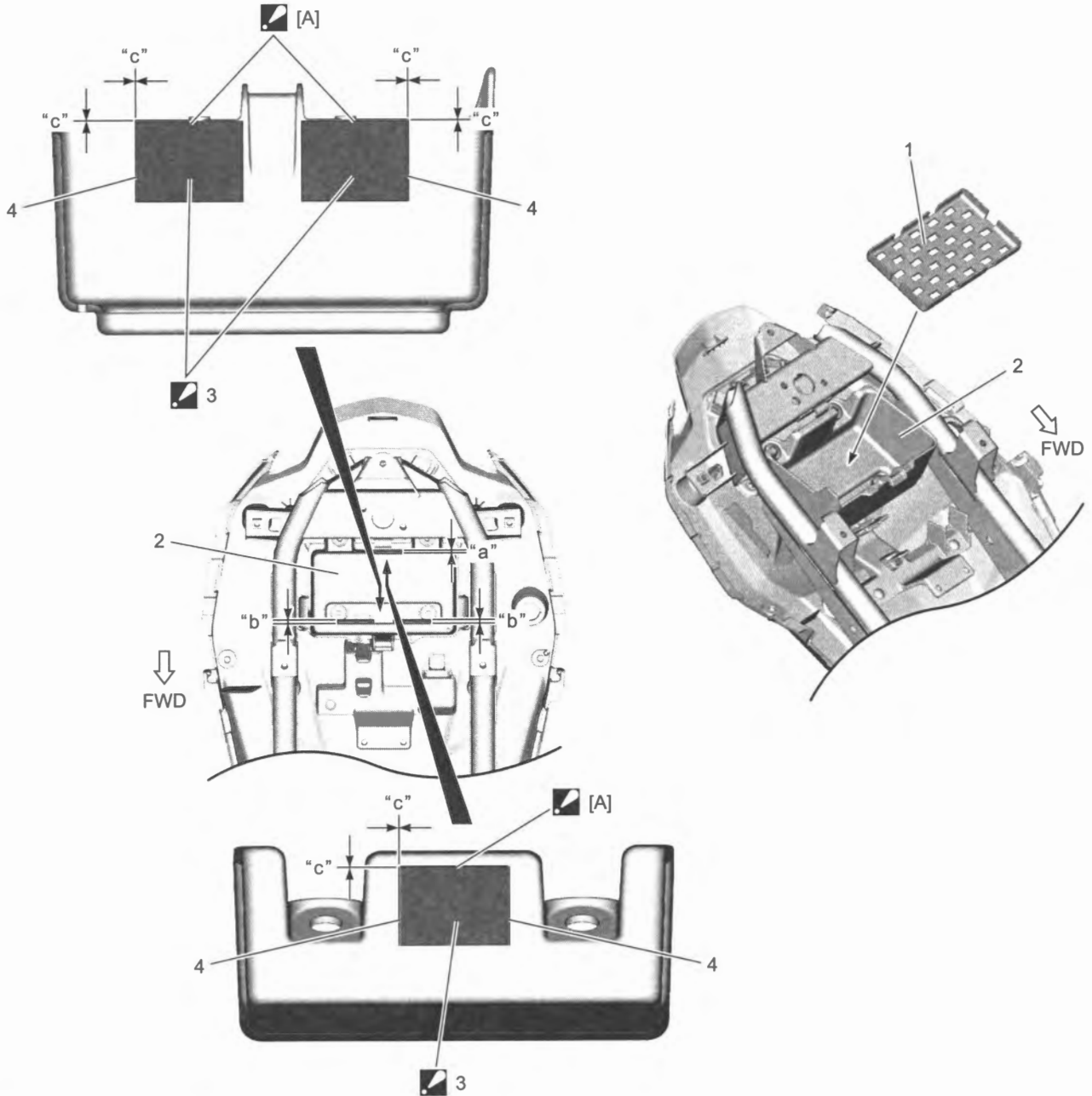


9D-10 Exterior Parts:

1. Rear fender front	8. Rectifier cover screw	"a": -1 – 1 mm (-0.03 – 0.03 in)
2. Rear fender front cover	9. Rear fender front bolt	"b": 0 – 2 mm (0 – 0.07 in)
3. Rear fender mudguard	10. Electric parts holder screw	ⓐ : 8.4 N·m (0.86 kgf-m, 6.20 lbf-ft)
4. Electric parts holder	11. Rear fender front No.1 cushion	ⓑ : 4.7 N·m (0.48 kgf-m, 3.50 lbf-ft)
5. Battery holder	12. Rear fender front No.2 cushion	ⓒ : 1.5 N·m (0.15 kgf-m, 1.10 lbf-ft)
6. Rectifier cover	13. Seat rail	
7. Battery holder screw	14. Rear combination light	

Battery Protector Construction

BENK07L29406006

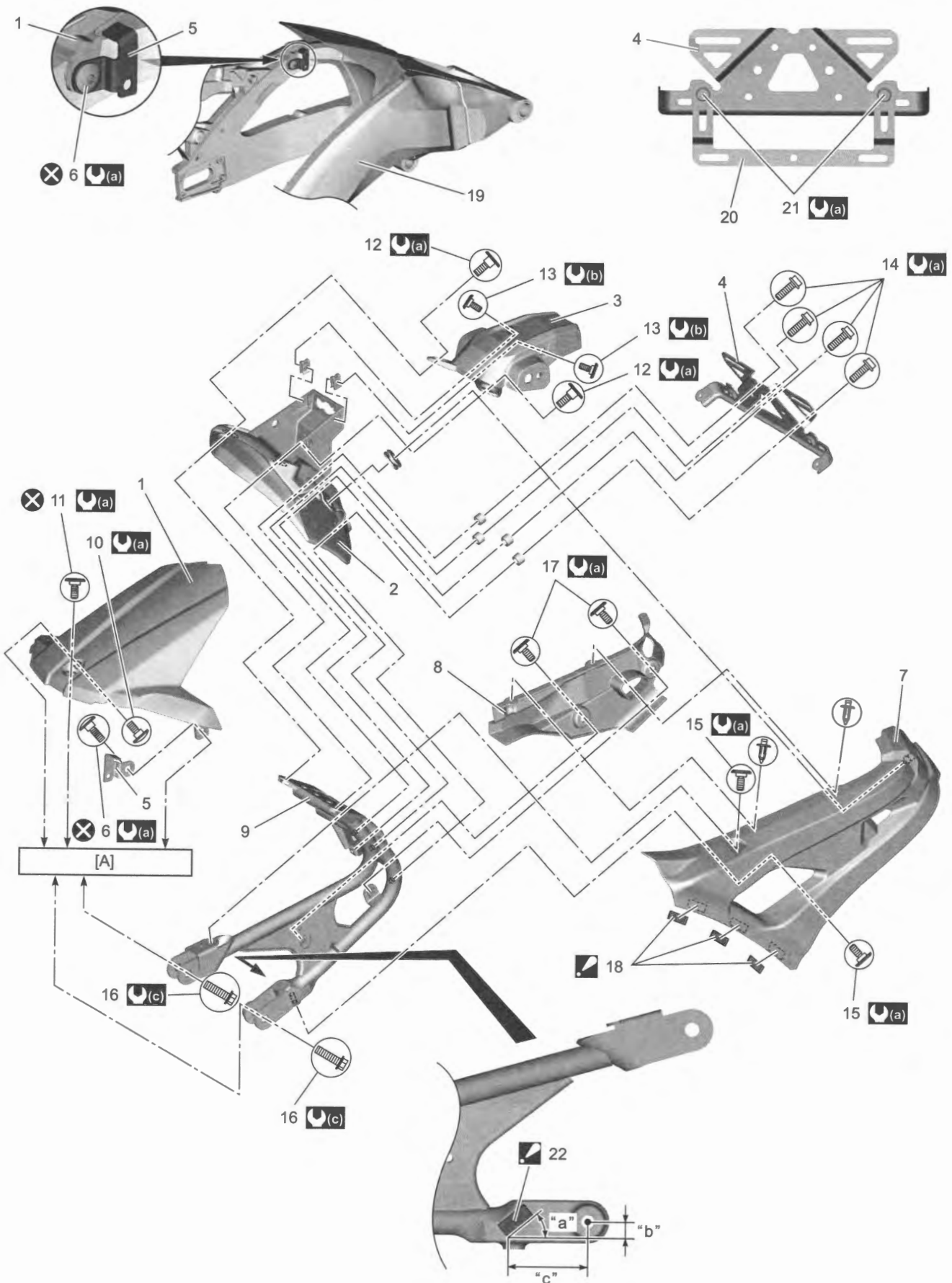


IK07L1940009-01







<p>ⓐ [A]: Stick the protector aligning with the end of curved surface.</p> <p>1. Battery protector</p> <p>2. Battery holder</p>	<p>4. Emboss line</p> <p>"a": 2 mm (0.08 in)</p> <p>"b": 4 mm (0.2 in)</p> <p>"c": 0 – 1 mm (0 – 0.03 in)</p>
<p>ⓑ : Battery protector</p> <p>: Clean the adhesive surface before sticking the protector.</p> <p>Press the protector after sticking.</p>	

Rear Fender Rear / Rear Fender Lower / License Plate Holder Construction

BENK07L29406007

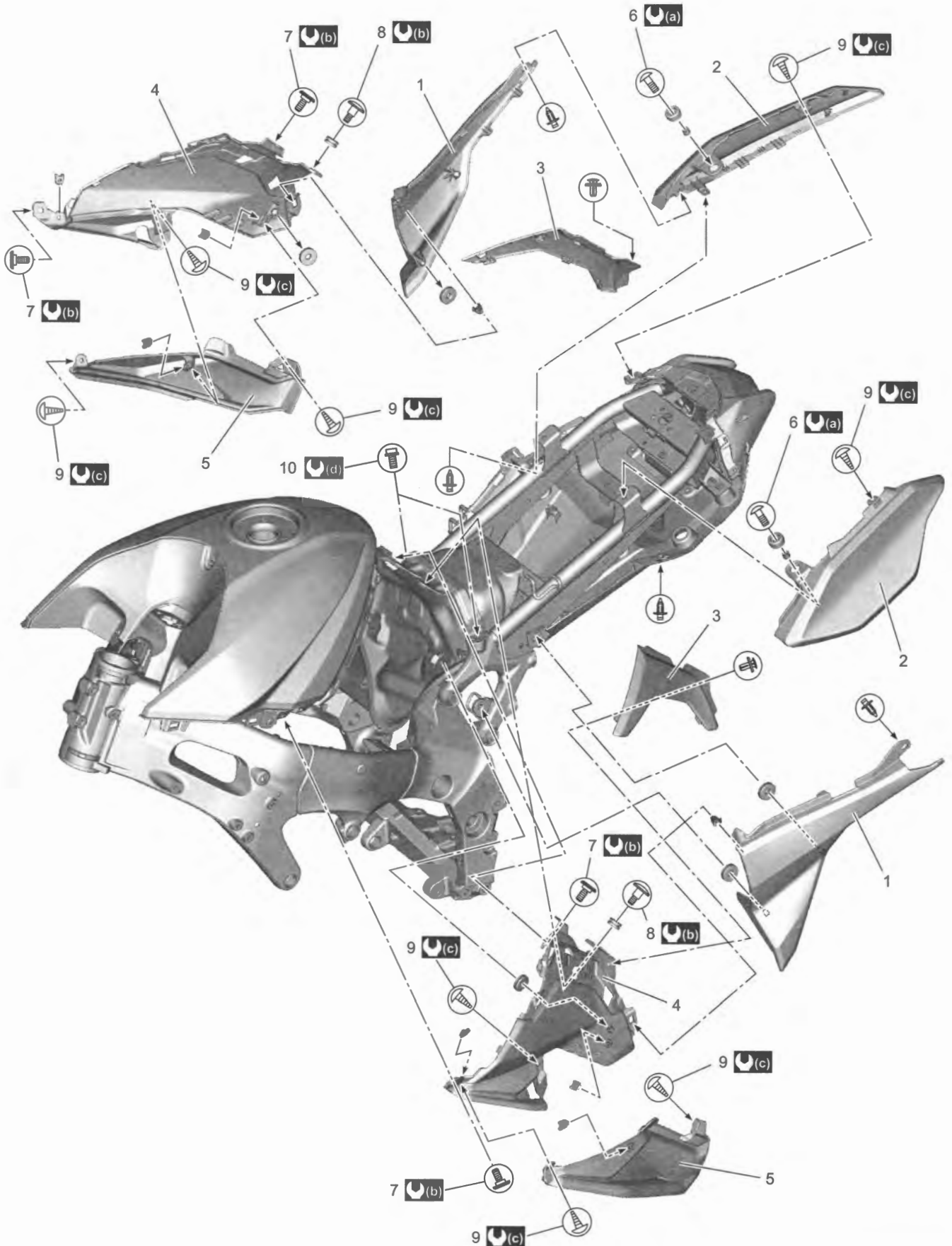


9D-12 Exterior Parts:

[A]: To swingarm	15. Left rear fender cover bolt
1. Rear fender lower	16. Rear fender brace mounting bolt
2. Rear fender rear	17. Left rear fender inner bolt
3. Rear fender rear cover	 18. Left rear fender cover cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion matching with the frame shape. Press the cushion after sticking.
4. License plate holder	19. Swingarm
5. Rear fender lower bracket	20. License plate holder plate
6. Left rear fender lower bolt	21. License holder screw
7. Left rear fender rear cover	 22. Rear fender brace cushion : Clean the adhesive surface before sticking the cushion. Press the cushion after sticking.
8. Rear fender inner	"a": 40°
9. Rear fender brace	"b": 11 mm (0.43 in)
10. Right rear fender lower bolt	"c": 57 mm (2.2 in)
11. Rear fender lower bolt	 (a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
12. Rear fender cover upper screw	 (b) : 4.7 N·m (0.48 kgf-m, 3.50 lbf-ft)
13. Rear fender cover screw	 (c) : 55 N·m (5.6 kgf-m, 40.5 lbf-ft)
14. License plate holder bolt	 : Do not reuse.

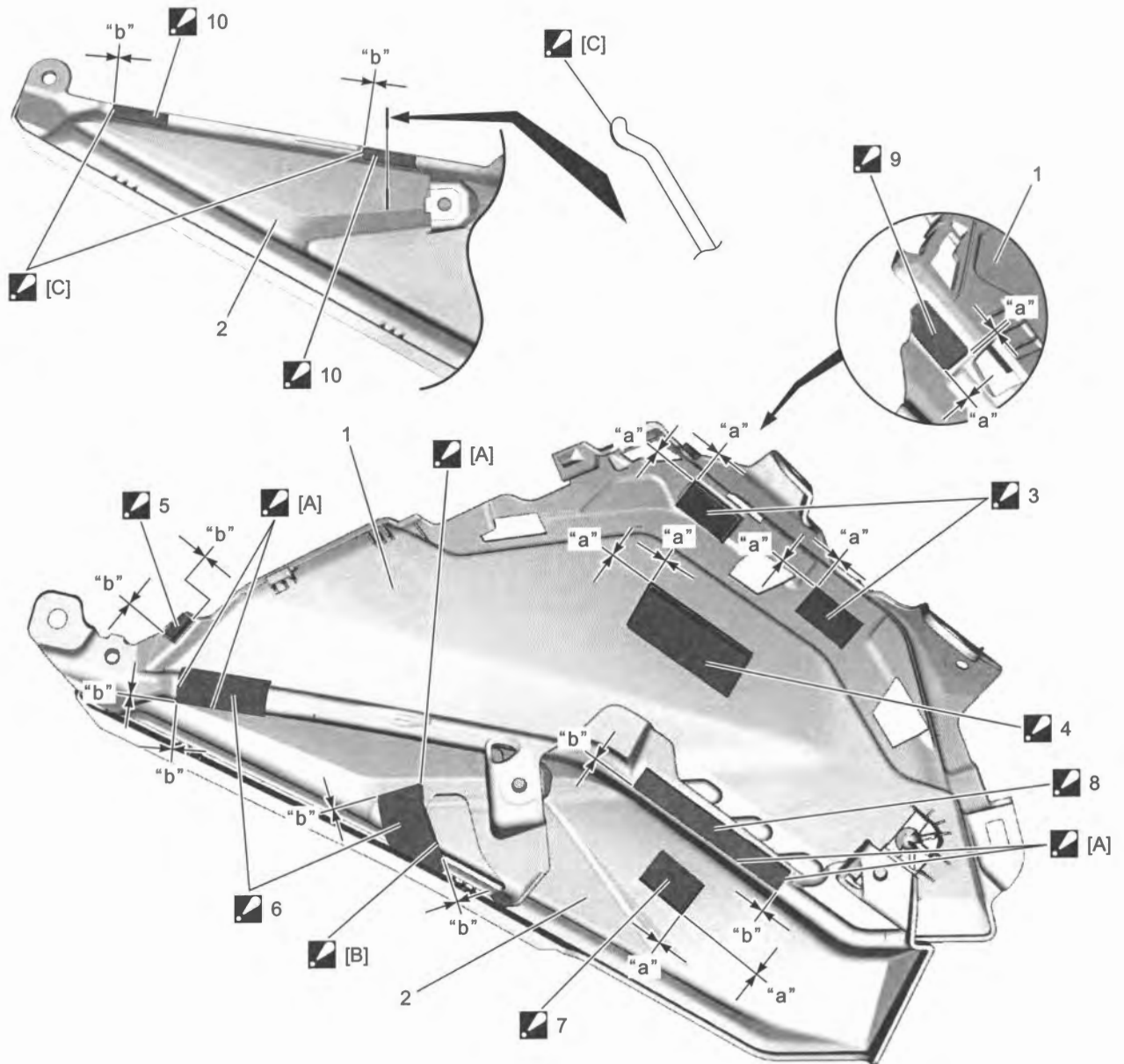
Frame Cover Construction

BENK07L29406008

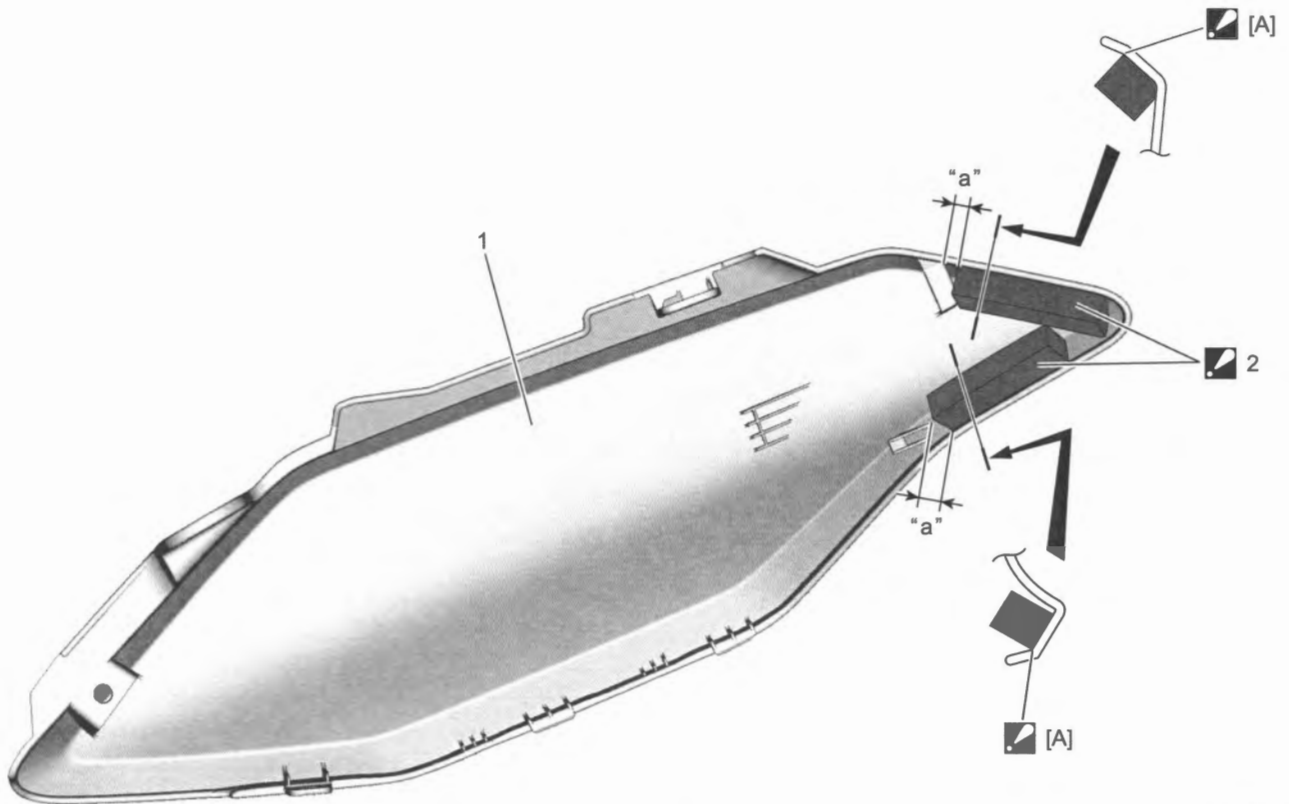


9D-14 Exterior Parts:

1. Frame cover	6. Frame rear cover screw	(a) : 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)
2. Frame rear cover	7. Frame front center cover No.1 screw	(b) : 4.7 N·m (0.48 kgf-m, 3.50 lbf-ft)
3. Frame front upper cover	8. Frame front center cover No.2 screw	(c) : 2.0 N·m (0.20 kgf-m, 1.50 lbf-ft)
4. Frame front center cover	9. Frame cover screw	(d) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
5. Frame front lower cover	10. Seat bracket bolt	



<p>☑ [A]: Stick the cushion aligning with the end of curved surface.</p>	<p>☑ 6. Frame cover center cushion (RH only) : Clean the adhesive surface before sticking the cushion. Press the cushion after sticking.</p>
<p>☑ [B]: Stick the cushion aligning with the hole edge.</p>	<p>☑ 7. Frame cover lower No.2 cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion aligning with the emboss line. Press the cushion after sticking.</p>
<p>☑ [C]: Stick the tape aligning with the end of curved surface.</p>	<p>☑ 8. Frame cover lower cushion : Clean the adhesive surface before sticking the cushion. Press the cushion after sticking.</p>
<p>1. Frame front center cover</p>	<p>☑ 9. Frame cover center cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion matching with the concave portion. Press the cushion after sticking.</p>
<p>2. Frame front lower cover</p>	<p>☑ 10. Frame cover front tape : Clean the adhesive surface before sticking the tape. Press the tape after sticking.</p>
<p>☑ 3. Frame cover fastener : Clean the adhesive surface before sticking the fastener. Stick the fastener aligning with the emboss line. Press the fastener after sticking.</p>	<p>"a": 0 – 2 mm (0 – 0.07 in)</p>
<p>☑ 4. Frame cover cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion aligning with the emboss line. Press the cushion after sticking.</p>	<p>"b": -1 – 1 mm (-0.03 – 0.03 in)</p>
<p>☑ 5. Frame cover upper cushion : Clean the adhesive surface before sticking the cushion. Stick the cushion matching with the concave portion. Press the cushion after sticking.</p>	

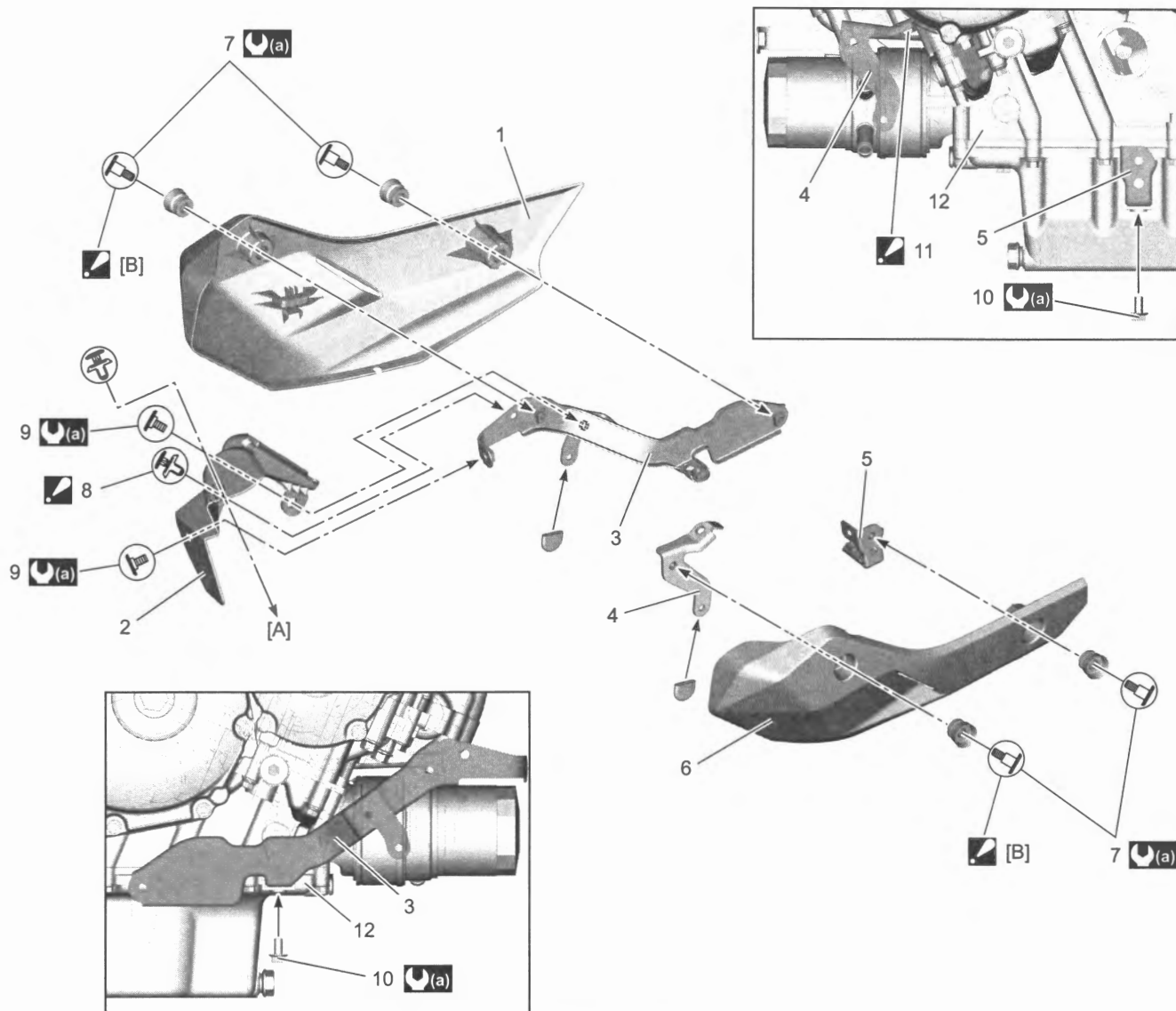


IK07L1940013-02

<p>☑ [A]: Stick the cushion aligning with the end of curved surface.</p>	<p>☑ 2. Frame rear cover cushion : Clean the adhesive surface before sticking the cushion. Press the cushion after sticking.</p>
<p>1. Frame rear cover</p>	<p>"a": 3 – 7 mm (0.12 – 0.27 in)</p>

Under Cowling / Under Cowling Cover Construction

BENK07L29406009

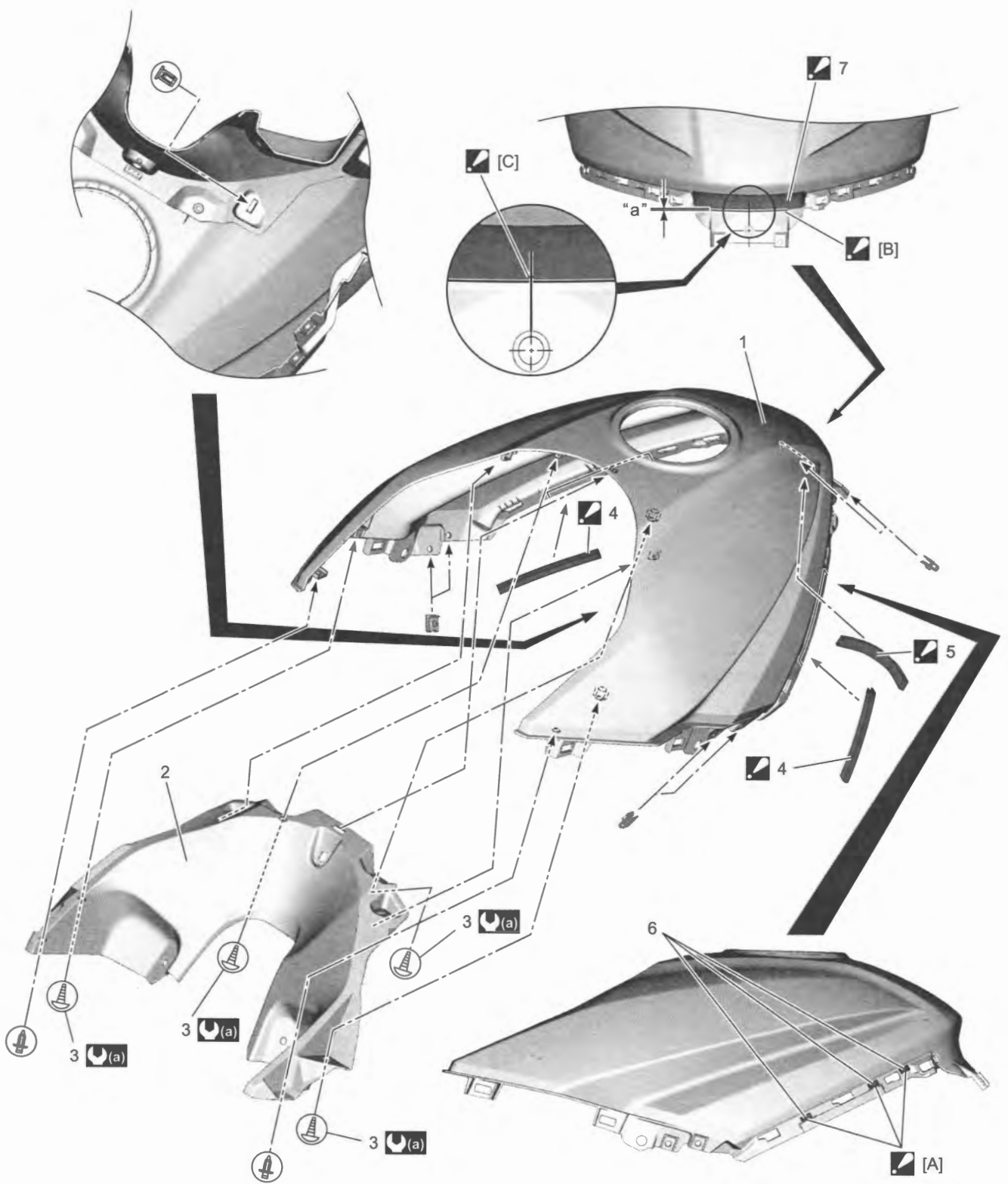


IK07L1940014-02

<p>[A]: To radiator lower bracket</p>	<p>7. Under cowling bolt</p>
<p>☑ [B]: When installing the under cowling, tighten the front side of under cowling bolt first.</p>	<p>☑ 8. Under cowling fastener : When installing the under cowling cover, install the under cowling fastener first. When installing the under cowling fastener, do not rotate the right under cowling bracket.</p>
<p>1. Right under cowling</p>	<p>9. Under cowling cover bolt</p>
<p>2. Under cowling cover</p>	<p>10. Under cowling bracket bolt</p>
<p>3. Right under cowling bracket</p>	<p>☑ 11. Crankcase middle bolt (M8) : Install the crankcase middle bolt (M8) with left under cowling front bracket.</p>
<p>4. Left under cowling front bracket</p>	<p>12. Engine assembly</p>
<p>5. Left under cowling rear bracket</p>	<p>🔩(a) : 10 N·m (1.0 kgf·m, 7.5 lbf·ft)</p>
<p>6. Left under cowling</p>	

Fuel Tank Cover Construction

BENK07L29406010



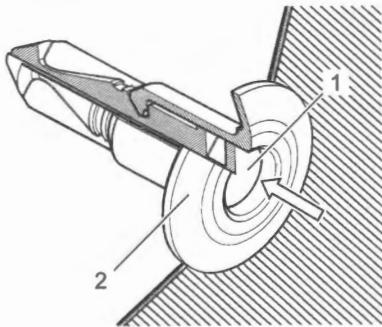
<p>☑ [A]: Stick the cushion aligning with the emboss line.</p>	<p>☑ 4. Fuel tank cover molding : Insert the molding aligning with the emboss line.</p>
<p>☑ [B]: Stick the protector aligning with the emboss line.</p>	<p>☑ 5. Fuel tank upper cover cushion : Stick the cushion aligning with the emboss line.</p>
<p>☑ [C]: Align the notch of the protector with the emboss line.</p>	<p>6. Fuel tank cover cushion</p>
<p>1. Fuel tank upper cover</p>	<p>☑ 7. Fuel tank cover protector : Clean the adhesive surface before sticking the protector. Stick the protector without defects (crease, wrinkle, sag, etc.). Press the protector after sticking.</p>
<p>2. Fuel tank front cover</p>	<p>"a": 0 – 3 mm (0 – 0.1 in)</p>
<p>3. Fuel tank front cover screw</p>	<p>ⓐ : 2.0 N·m (0.20 kgf·m, 1.50 lbf·ft)</p>

Fastener Removal and Installation

BENK07L29406011

**Type 1
Removal**

- 1) Depress the head of fastener center piece (1).
- 2) Pull out the fastener (2).



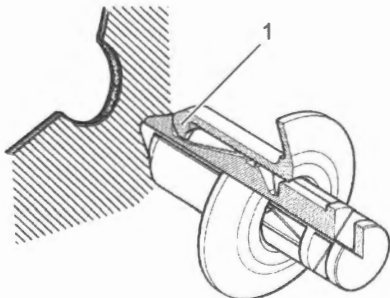
ID26J1940192-01

Installation

- 1) Let the center piece stick out toward the head so that the claws (1) closes.
- 2) Insert the fastener into the installation hole.

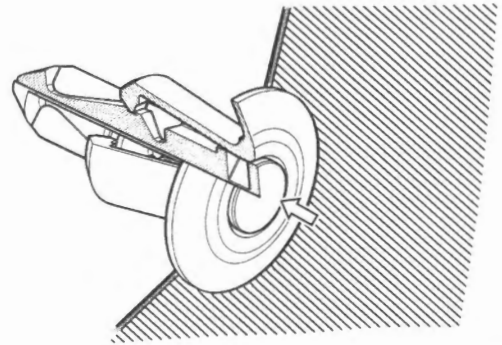
NOTE

To prevent the claws (1) from damage, insert the fastener all the way into the installation hole.



ID26J1940160-01

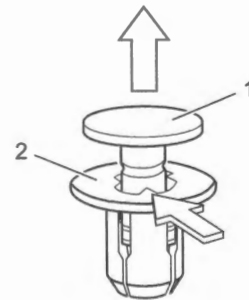
- 3) Push in the head of center piece until it becomes flush with the fastener outside face.



I649G1940007-02

**Type 2
Removal**

- 1) Pry up the head of fastener center piece (1).
- 2) Pull out the fastener (2).



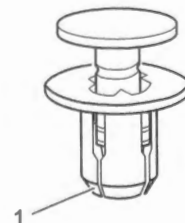
IH17K1940016-01

Installation

- 1) Insert the fastener into the installation hole.

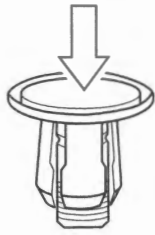
NOTE

To prevent the claws (1) from damage, insert the fastener all the way into the installation hole.



IH17K1940017-01

2) Push in the head of center piece.



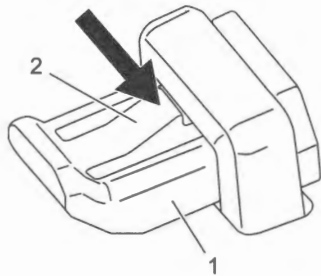
IH17K1940018-01

Clip Removal and Installation

BENK07L29406012

Removal

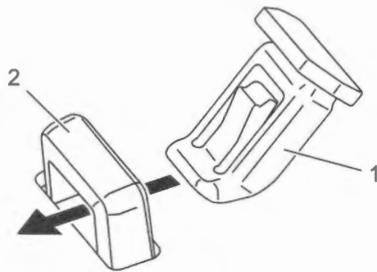
Pull out the clip (1) while depressing the claw (2).



IK07L1940016-01

Installation

Insert the clip (1) into the gate (2) as shown in the figure.



IK07L1940017-01

Seat Removal and Installation

BENK07L29406013

Removal

1) Unlock the seat lock (1) with the ignition key.

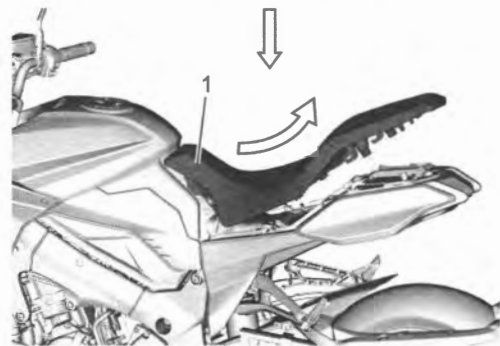
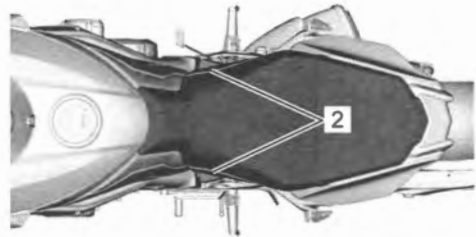


IK07L1940018-01

2) Remove the seat (1).

NOTE

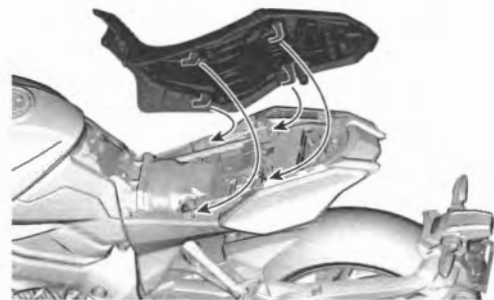
Do not insert the seat into the inside of the frame covers (2) when removing or installing the seat.



IK07L1940019-03

Installation

Slide the seat hooks into the seat hook retainers and push down firmly until the seat snaps into the locked position.



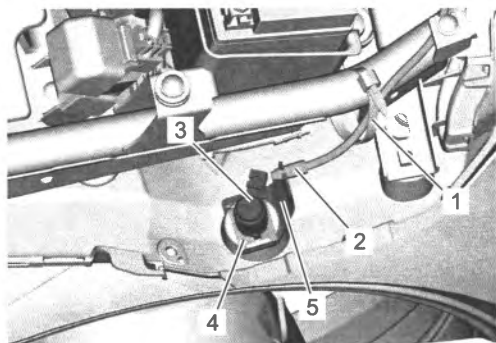
IK07L1940021-01

Seat Lock Cable / Seat Lock Assembly / Striker Support Bracket Removal and Installation

BENK07L29406014

Seat Lock Cable / Seat Lock Assembly Removal

- 1) Remove the left frame rear cover. (Page 9D-36)
- 2) Remove the clamp (1).
- 3) Disconnect the seat lock cable (2) from the seat lock assembly (3).
- 4) Remove the seat lock plate (4), seat lock cable guide (5) and seat lock assembly (3).



IK07L1940022-02

Installation

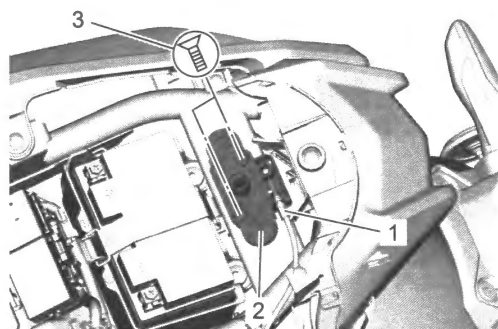
Install the seat lock cable and seat lock assembly in the reverse order of removal. Pay attention to the following point.

- Install the seat lock assembly and seat lock cable. Refer to "Seat Lock Cable Routing Diagram" (Page 9D-1).

Striker Support Bracket

Removal

- 1) Remove the seat. (Page 9D-19)
- 2) Disconnect the seat lock cable (1) from the striker support bracket (2).
- 3) Remove the striker support bracket screws (3) and striker support bracket (2).



IK07L1940023-04

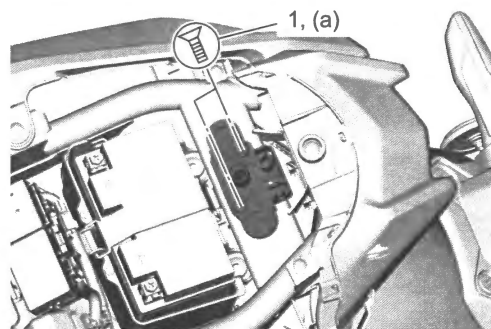
Installation

Install the striker support bracket in the reverse order of removal. Pay attention to the following point:

- Tighten the striker support bracket screws (1) to the specified torque.

Tightening torque

Striker support bracket screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)



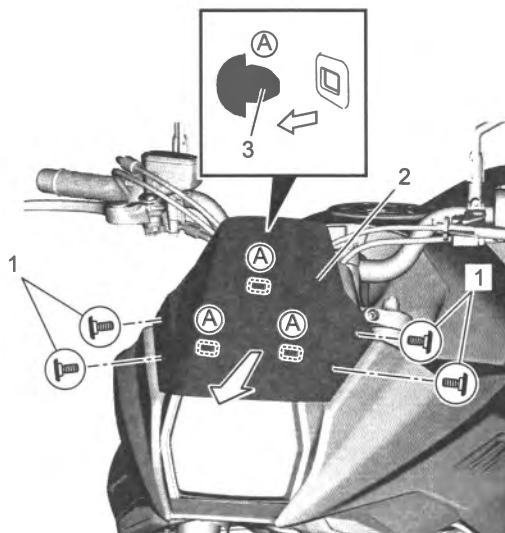
IK07L1940024-02

Meter Panel / Body Cowling / Cowling Brace Removal and Installation

BENK07L29406015

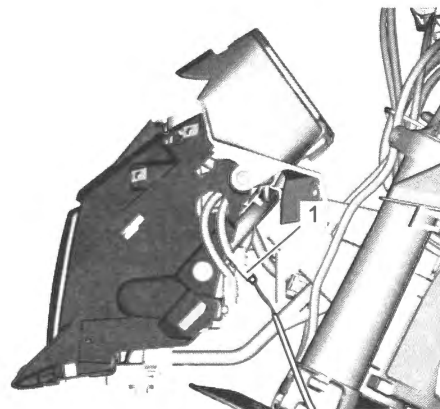
Removal

- 1) Remove the meter front panel bolts (1).
- 2) Pull the meter front panel (2) forward to unhook the hooks (3) and remove it.



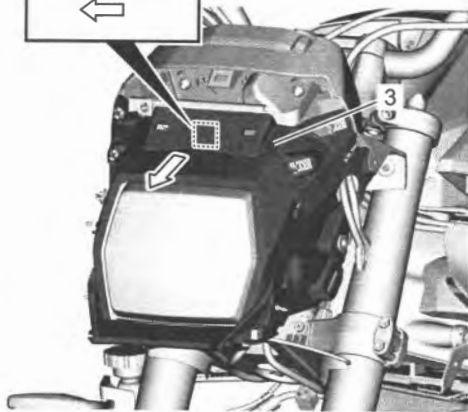
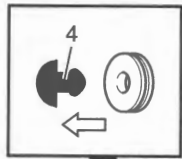
IK07L1940025-03

- 3) Remove the side cover assemblies. (Page 9D-22)
- 4) Disconnect the left front turn signal coupler (1).



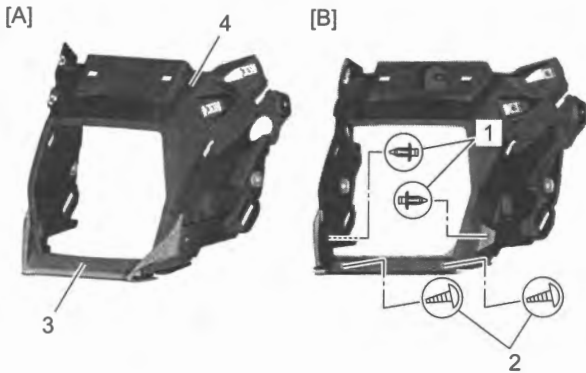
IK07L1940026-02

- 5) Remove the fasteners (1). (Page 9D-18)
- 6) Remove the body cowling bolts (2).
- 7) Pull the body cowling assembly (3) forward to unhook the hook (4) and remove it.



IK07L1940027-02

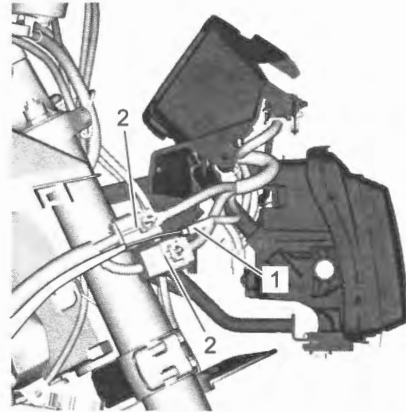
- 8) Remove the fasteners (1). (Page 9D-18)
- 9) Remove the body front cowling screws (2).
- 10) Remove the body front cowling (3) from the body cowling (4).



IK07L1940028-03

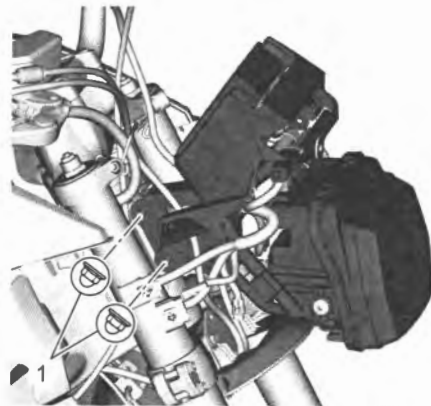
[A]: Front side	[B]: Rear side
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- 11) Disconnect the right front turn signal coupler (1) and wiring harness couplers (2).



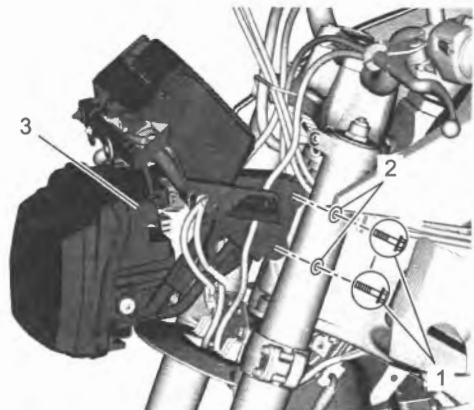
IK07L1940029-03

- 12) Remove the cowling brace nuts (1).



IK07L1940030-02

- 13) Remove the cowling brace bolts (1) and washers (2), then remove the cowling brace assembly (3).

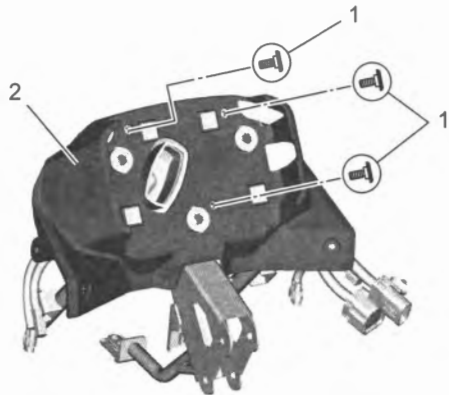


IK07L1940031-02

14) Remove the following parts.

- Headlight: (Page 9B-6)
- Combination meter assembly: (Page 9C-8)

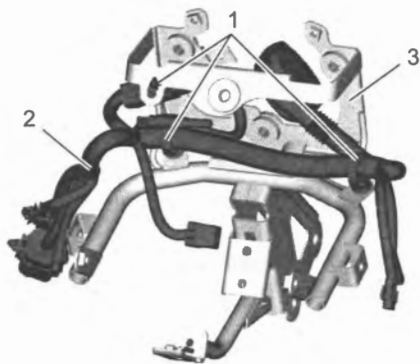
15) Remove the meter rear panel bolts (1) and meter rear panel (2).



IK07L1940032-03

16) Remove the TO sensor. (Page 1C-16)

17) Remove the fixed clamps (1) and wiring harness No.2 (2) from the cowling brace (3).



IK07L1940033-03

Installation

Install the meter panel, body cowling and cowling brace in the reverse order of removal. Pay attention to the following point:

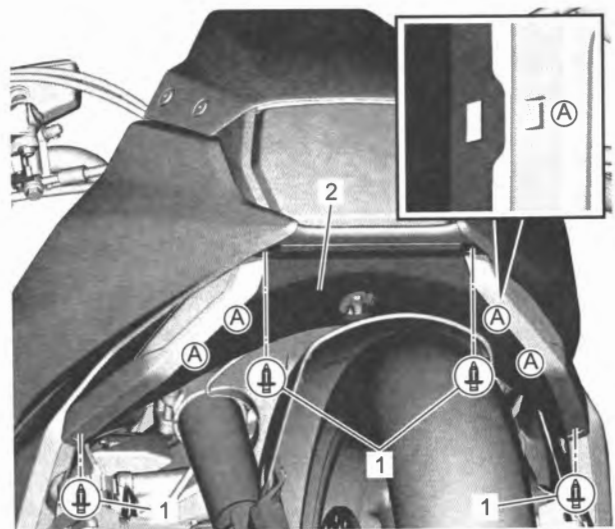
- Route the wiring harness No.2, left front turn signal lead wire and position light lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).

Body Cowling Cover / Side Cover / Side Inner Cover / Side Lower Cover Removal and Installation

BENK07L29406016

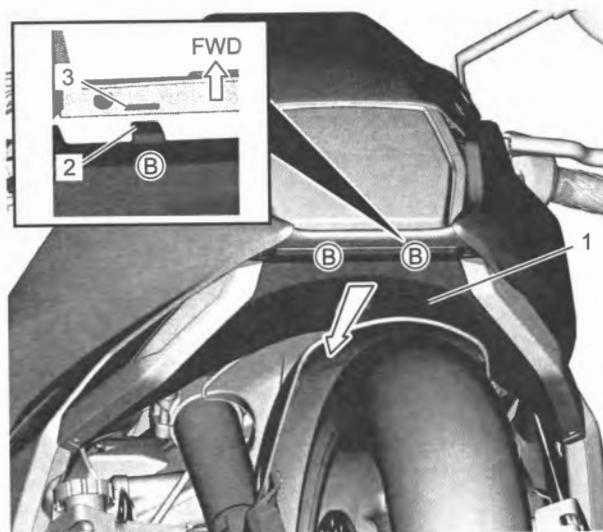
Removal

- 1) Remove the fasteners (1). (Page 9D-18)
- 2) Unhook the hooks pushing the body cowling cover (2).



IK07L1940085-04

- 3) Pull the body cowling cover (1) backward to remove the protrusions (2) of body cowling cover from the holes (3) of body cowling, then body cowling cover.

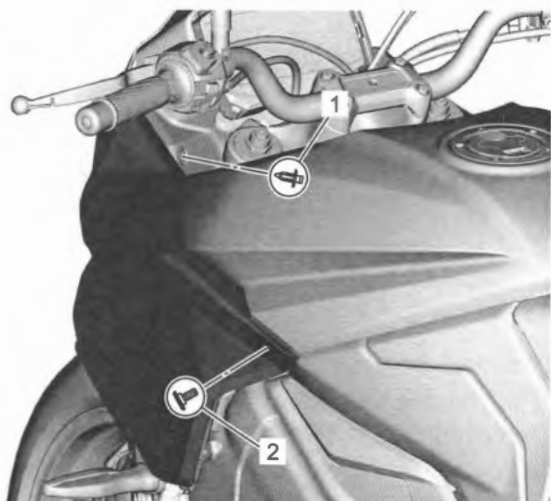


IK07L1940086-03

- 4) Remove the fastener (1). (Page 9D-18)
- 5) Remove the side cowl bolt (2).

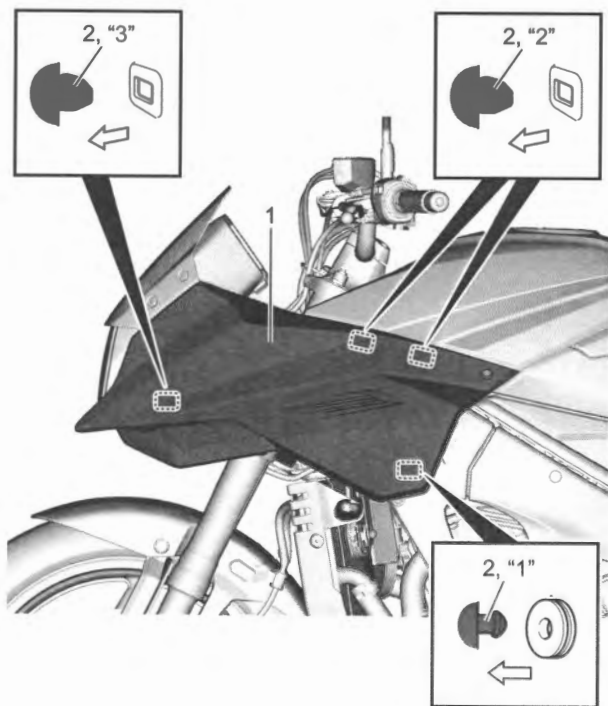
NOTE

For removal and installation of the side cover assemblies, the same procedures are applicable to both the right and left sides except the fixed clamps.



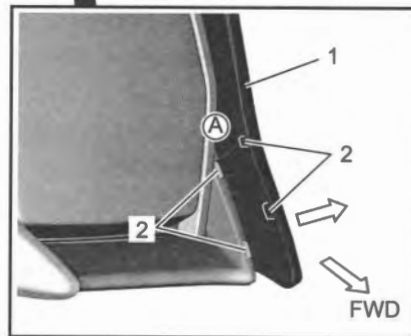
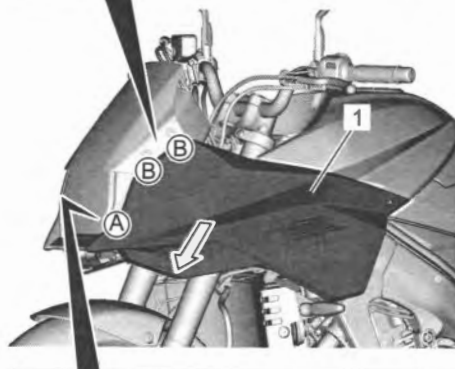
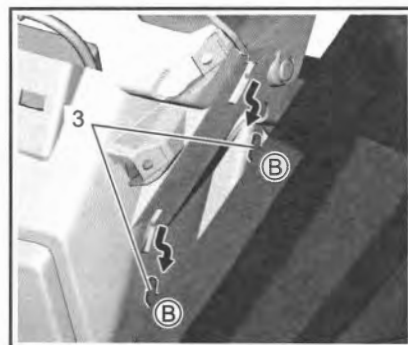
IK07L1940087-02

- 6) Pull the side cover assembly (1) outward to unhook the hooks (2) in order of "1" → "2" → "3".



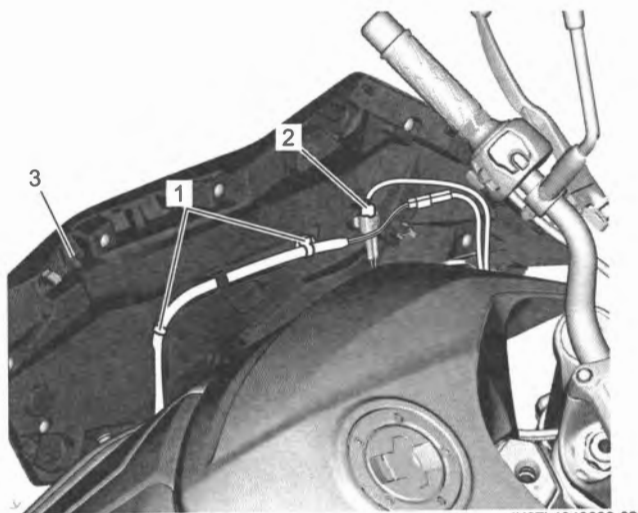
IK07L1940088-03

- 7) Pull the side cover assembly (1) outward to unhook the hooks (2).
- 8) Pull the side cover assembly downward to unhook the hooks (3).



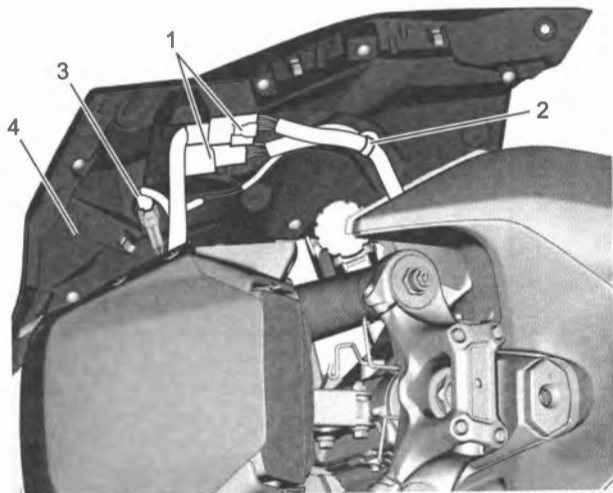
IK07L1940089-03

- 9) For left side, remove the fixed clamps (1) of the left front turn signal lead wire from the side inner cover.
- 10) Disconnect the left position light coupler (2) and remove the left side cover assembly (3).



IK07L1940090-02

- 11) For right side, remove the fixed clamp of the wiring harness couplers (1) and fixed clamp (2) of the wiring harness from the side inner cover.
- 12) Disconnect the right position light coupler (3) and right side cover assembly (4).

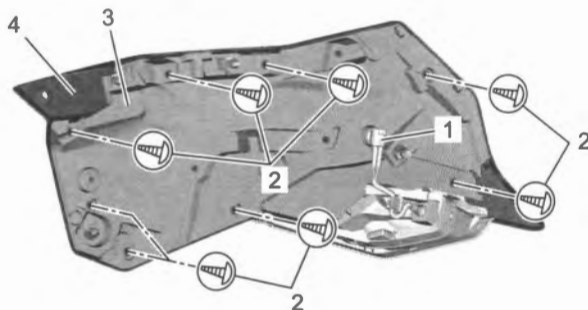


IK07L1940091-01

- 13) Remove the fixed clamp of the position light coupler (1).
- 14) Remove the side inner cover screws (2) and side inner cover (3) from the side cover (4).

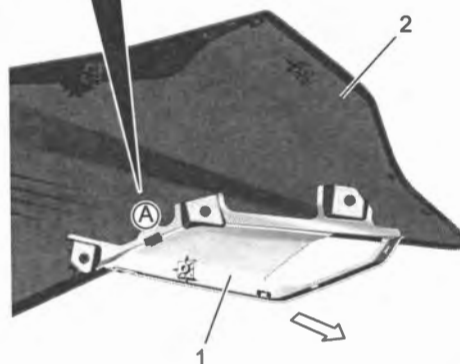
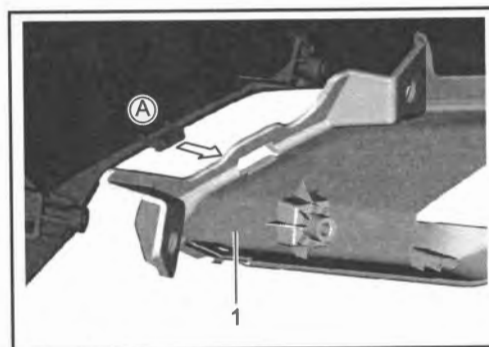
NOTE

The same procedures are applicable to both the right and left parts.



IK07L1940092-03

- 15) Remove the front position light. (Page 9B-7)
- 16) Pull the side lower cover (1) to unhook the hook and remove the side lower cover from the side cover (2).



IK07L1940093-03

Installation

Install the body cowling cover, side cover, side inner cover and side lower cover in the reverse order of removal. Pay attention to the following points:

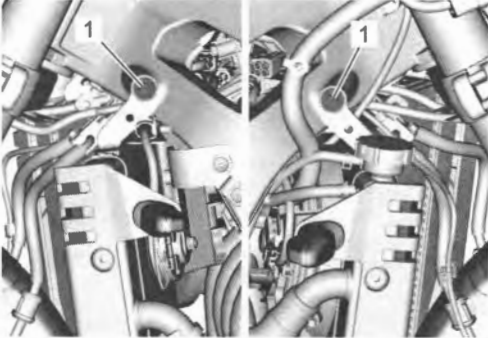
- For right side, route the wiring harness. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).
- For left side, route the left front turn signal lead wire. Refer to "Front Lighting System Construction" in Section 9B (Page 9B-2).

Lower Bracket Cover Removal and Installation

BENK07L29406017

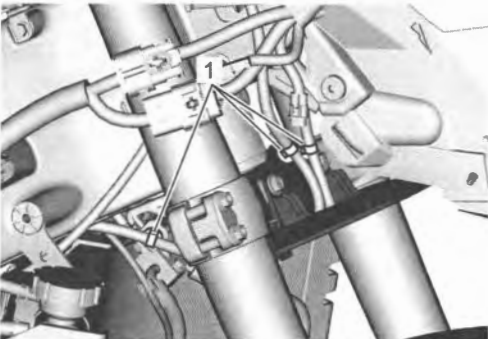
Removal

- 1) Remove the frame body upper cover assemblies. (Page 9D-26)
- 2) Remove the air cleaner box. (Page 1D-7)
- 3) Remove the left and right radiator mounting bolts (1).



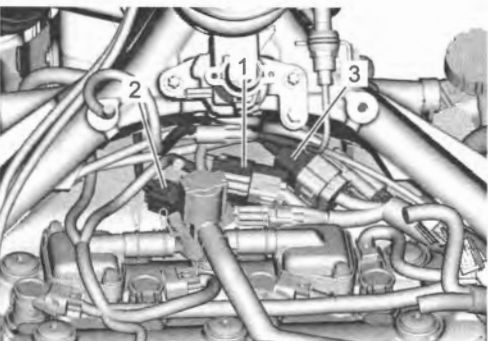
IK07L1940035-01

- 4) Remove the fixed clamps (1) from the front brake lower clamp and lower bracket cover.



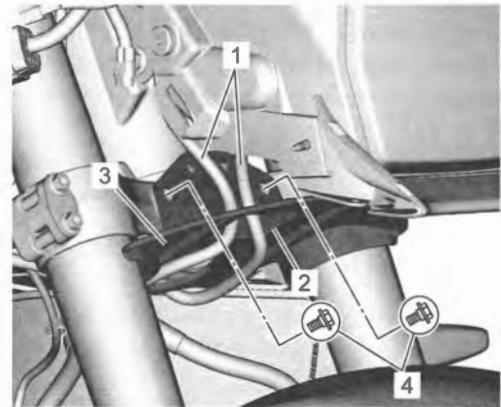
IK07L1940036-01

- 5) Remove the fixed clamp of the left handle switch coupler (1) from the radiator heat shield.
- 6) Disconnect the left handle switch couplers (1), (2) and right handle switch coupler (3).



IK07L1940037-01

- 7) Pull out the left and right handle switch lead wires (1) to the upper side from the hole (2) of the lower bracket cover (3).
- 8) Remove the lower bracket cover bolts (4) and lower bracket cover (3).



IK07L1940038-02

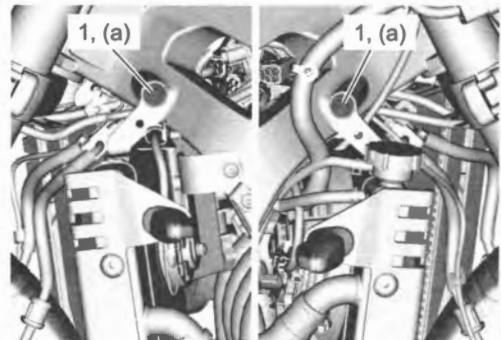
Installation

Install the lower bracket cover in the reverse order of removal. Pay attention to the following point:

- Tighten the left and right 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)



IK07L1940039-01

Frame Body Upper Cover Removal and Installation

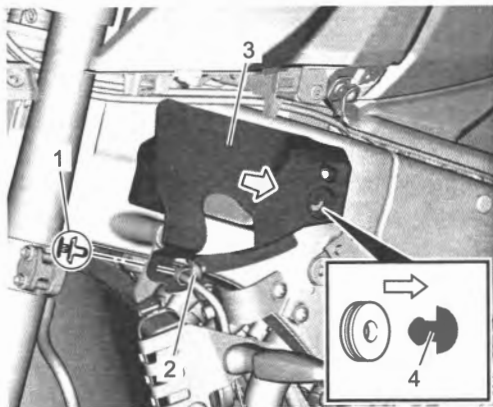
BENK07L29406018

NOTE

For removal and installation of the frame body upper covers, the same procedures are applicable to both the right and left sides except the fixed clamp at the left side.

Removal

- 1) Remove the side cover assembly. (Page 9D-22)
- 2) Remove the fastener (1). (Page 9D-18)
- 3) For left side, remove the fixed clamp (2) from the frame body upper cover (3).
- 4) Pull the frame body upper cover (3) outward to unhook the hook (4) and remove it.



IK07L1940080-03

Installation

Install the frame body upper cover in the reverse order of removal.

Frame Body Cover Removal and Installation

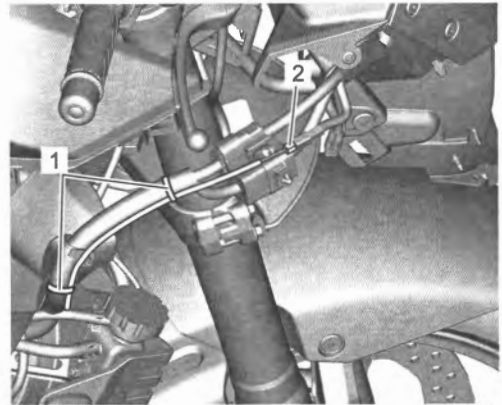
BENK07L29406019

NOTE

For removal and installation of the frame body covers, the same procedures are applicable to both the right and left sides except the clamp of wiring harness at the right side.

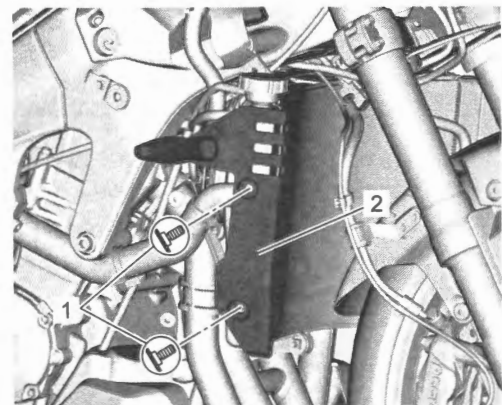
Removal

- 1) Remove the side cover assembly. (Page 9D-22)
- 2) For right side, remove the clamps (1).
- 3) Disconnect the front turn signal coupler (2).



IK07L1940081-01

- 4) Remove the frame body cover bolts (1) and frame body cover assembly (2).



IK07L1940082-02

- 5) Remove the front turn signal light. (Page 9B-12)

Installation

Install the frame body cover in the reverse order of removal. Pay attention to the following point:

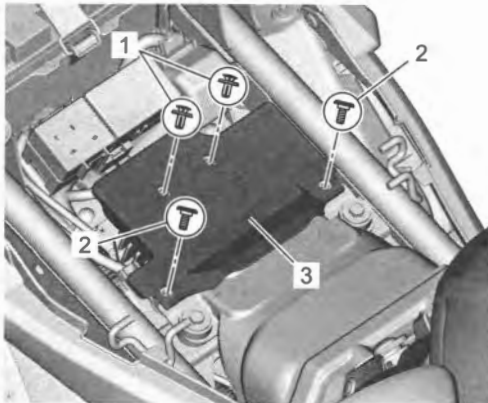
- For right side, clamp the front turn signal light lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).

Rectifier Cover / Electric Parts Holder Removal and Installation

BENK07L29406020

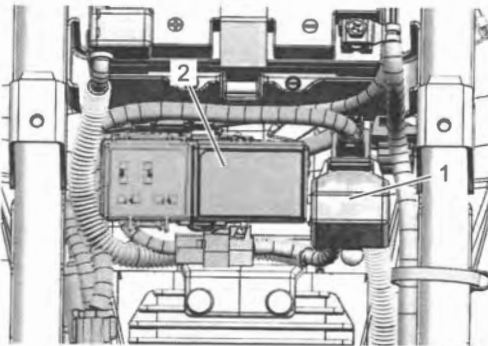
Removal

- 1) Remove the seat. (Page 9D-19)
- 2) Remove the fasteners (1). (Page 9D-18)
- 3) Remove the rectifier cover screws (2) and rectifier cover (3).



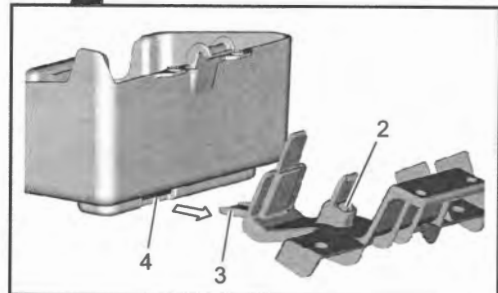
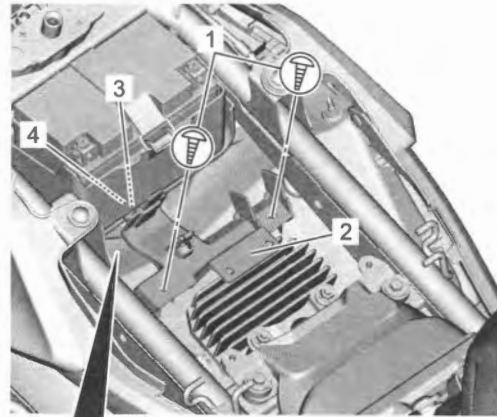
IK07L1940058-02

- 4) Remove the starter relay (1) and fuse box (2) from the rib of the rear fender front.



IK07L1940123-01

- 5) Remove the electric parts holder screws (1).
- 6) Move the electric parts holder (2) upward to remove the protrusion (3) of electric parts holder from the hole (4) of battery holder and remove the electric parts holder.



IK07L1940060-02

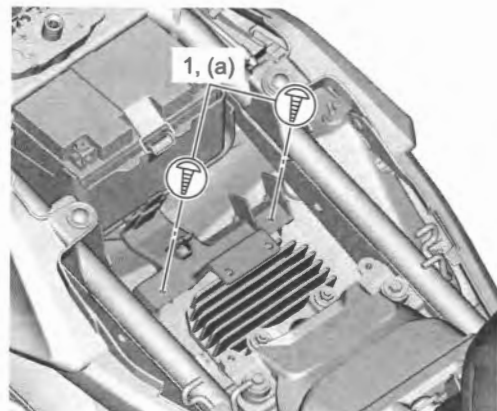
Installation

Install the rectifier cover and electric parts holder in the reverse order of removal. Pay attention to the following points:

- Tighten the electric parts holder screws (1) to the specified torque.

Tightening torque

Electric parts holder screw (a): 1.5 N·m (0.15 kgf·m, 1.10 lbf·ft)



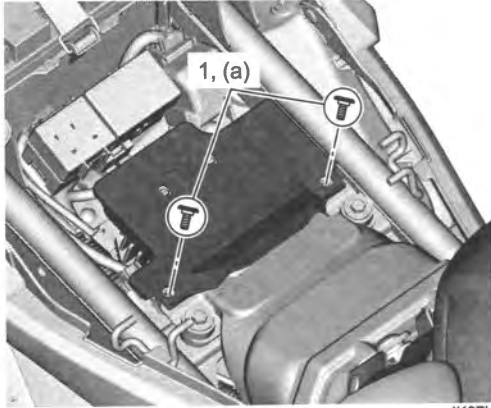
IK07L1940061-02

9D-28 Exterior Parts:

- Install the starter relay and fuse box to the rib of the rear fender front. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).
- Tighten the rectifier cover screws (1) to the specified torque.

Tightening torque

Rectifier cover screw (a): 4.7 N·m (0.48 kgf-m, 3.50 lbf-ft)



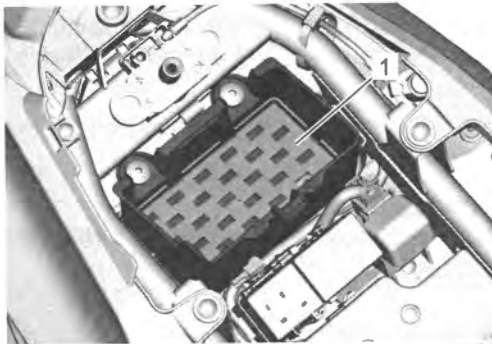
IK07L1940062-02

Battery Holder Removal and Installation

BENK07L29406021

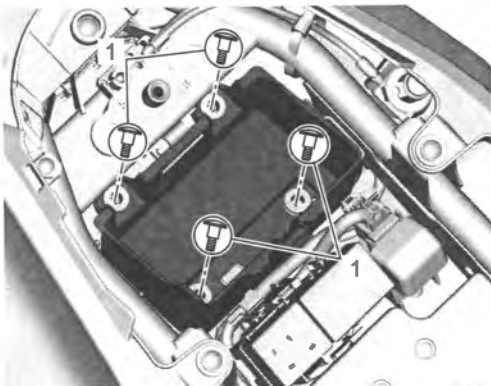
Removal

- 1) Remove the battery. (Page 1J-9)
- 2) Remove the battery protector (1).



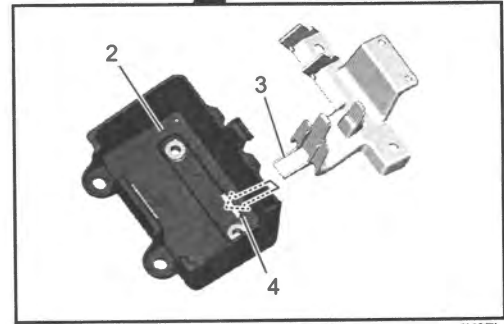
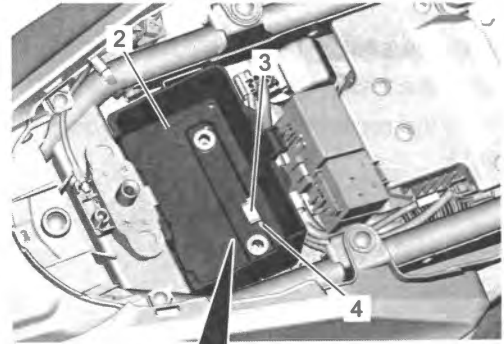
IK07L1940063-01

- 3) Remove the battery holder screws (1).



IK07L1940064-02

- 4) Move the battery holder (2) upward to remove the protrusions (3) of electric parts from the hole (4) of battery holder and remove the battery holder.



IK07L1940065-01

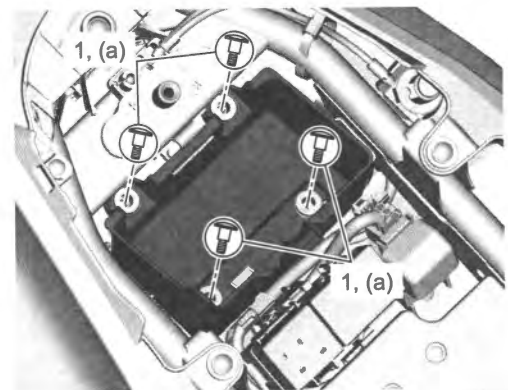
Installation

Install the battery holder in the reverse order of removal. Pay attention to the following point:

- Tighten the battery holder screws (1) to the specified torque.

Tightening torque

Battery holder screw (a): 8.4 N·m (0.86 kgf-m, 6.20 lbf-ft)



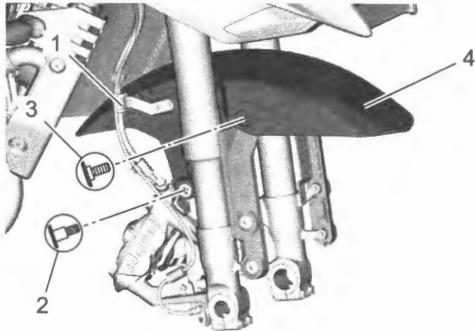
IK07L1940066-02

Front Fender Removal and Installation

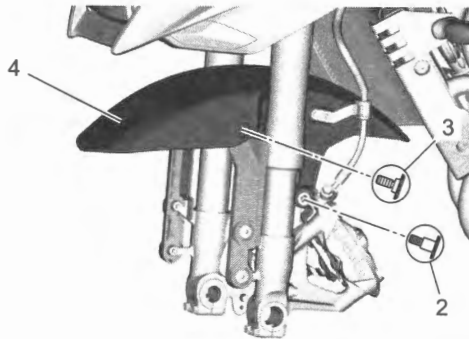
BENK07L29406022

Removal

- 1) Remove the front wheel. (Page 2D-4)
- 2) Disconnect the brake hose from brake hose clamps (1) on the front fender.
- 3) Remove the front fender rear screws (2), front fender upper screws (3) and front fender (4).

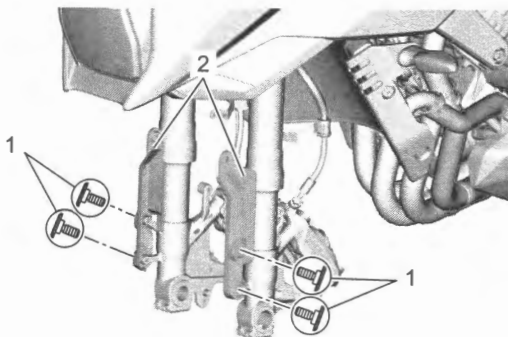


IK07L1940040-02



IK07L1940041-02

- 4) Remove the front side reflex reflectors (If equipped). Refer to "Reflex Reflector Removal and Installation" in Section 9B (Page 9B-13).
- 5) Remove the front fender front screws (1) and front fender brackets (2).



IK07L1940042-02

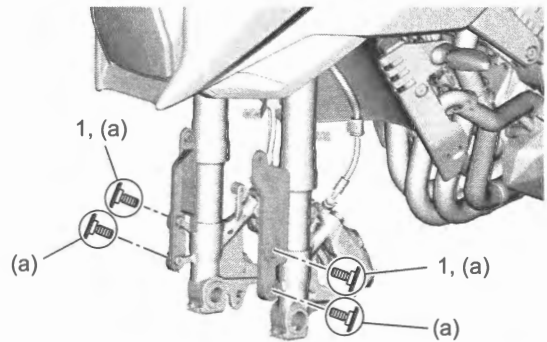
Installation

Install the front fender in the reverse order of removal. Pay attention to the following points:

- Tighten the upper side of front fender front screws (1) first and tighten the front fender front screws to the specified torque.

Tightening torque

Front fender front screw (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



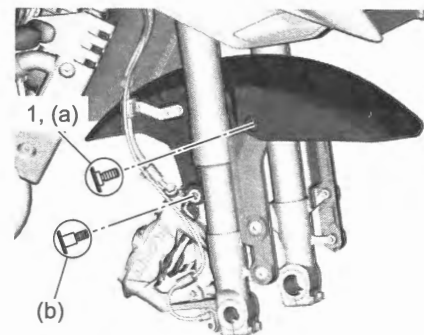
IK07L1940043-02

- Tighten the right side of front fender upper screw (1) first and tighten the front fender upper screws and front fender rear screws to the specified torque.

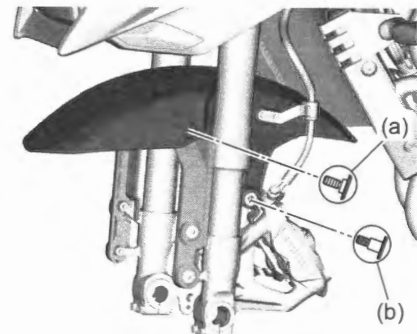
Tightening torque

Front fender upper screw (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Front fender rear screw (b): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IK07L1940044-02



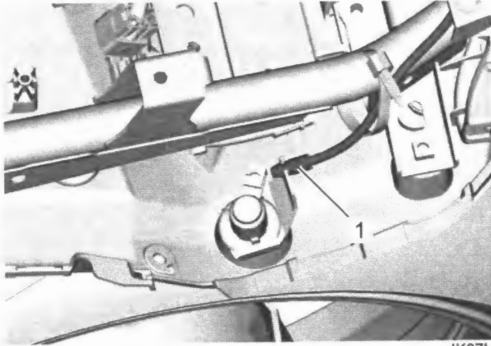
IK07L1940045-02

Rear Fender Front Removal and Installation

BENK07L29406023

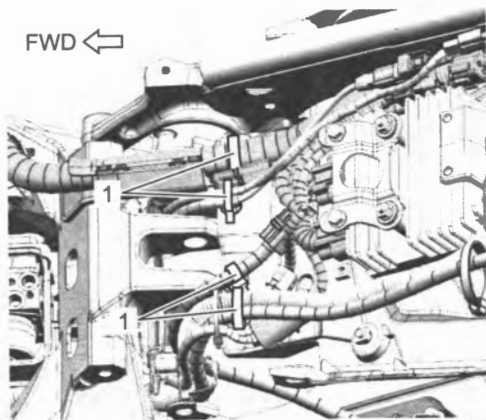
Removal

- 1) Remove the frame rear covers. (Page 9D-36)
- 2) Remove the battery holder. (Page 9D-28)
- 3) Remove the electric parts holder. (Page 9D-27)
- 4) Lift and support the fuel tank. (Page 1G-11)
- 5) Remove the seat lock cable (1) from the seat lock assembly.



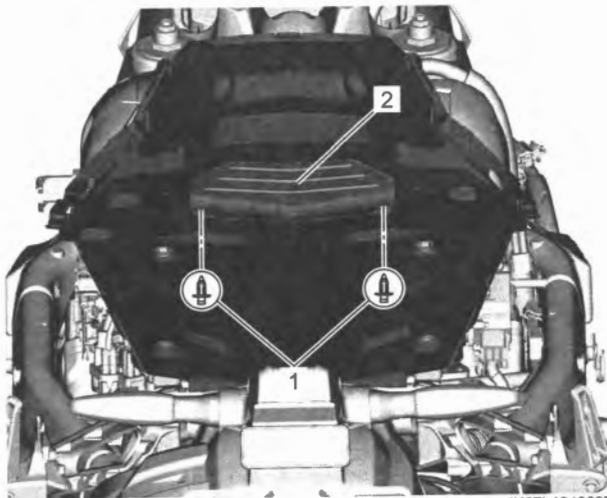
IK07L1940095-01

- 6) Remove the fixed clamps (1) to the rear fender front.



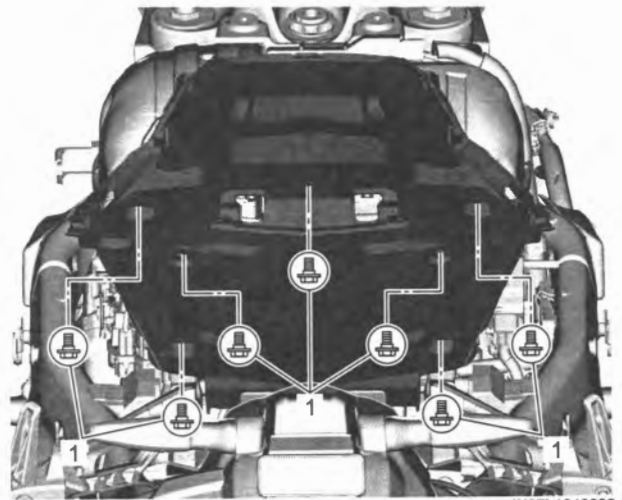
IK07L1940096-01

- 7) Remove the fasteners (1). (Page 9D-18)
- 8) Remove the rear fender front cover (2).



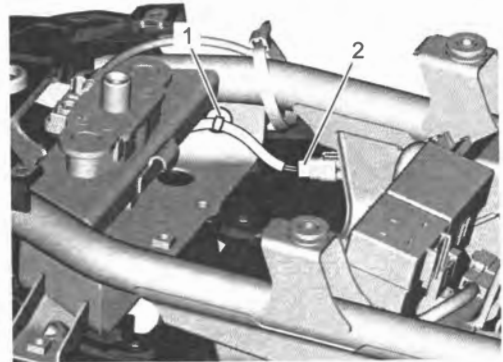
IK07L1940097-02

- 9) Remove the rear fender front bolts (1).



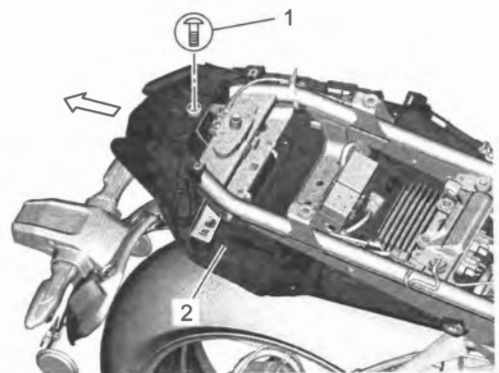
IK07L1940098-02

- 10) Remove the fixed clamp (1) and disconnect the rear combination light coupler (2).



IK07L1940099-02

- 11) Remove the rear combination light screw (M6) (1).
- 12) Pull the rear fender front assembly (2) backward and remove it.



IK07L1940100-03

- 13) Remove the following parts from the rear fender front.

- Seat lock assembly: (Page 9D-20)
- Rear combination light: (Page 9B-11)
- Rear fender mudguard: (Page 9D-9)

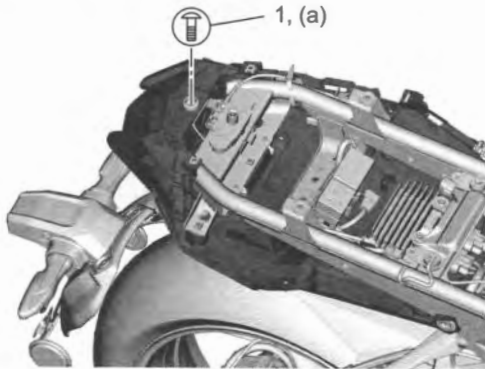
Installation

Install the rear fender front in the reverse order of removal. Pay attention to the following points:

- Tighten the rear combination light screw (M6) (1) to the specified torque.

Tightening torque

Rear combination light screw (M6) (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

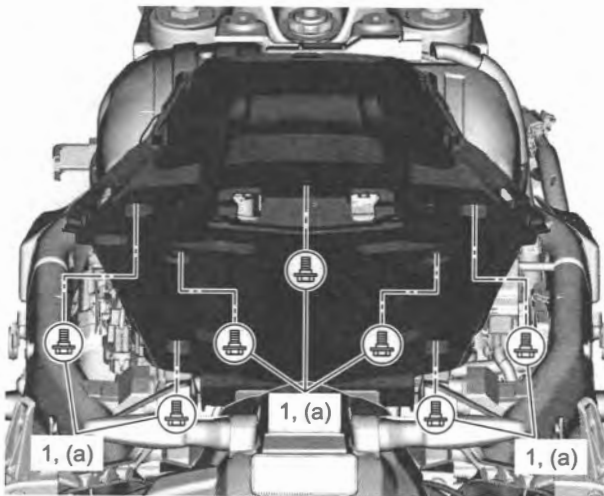


IK07L1940101-03

- Tighten the rear fender front bolts (1) to the specified torque.

Tightening torque

Rear fender front bolt (a): 8.4 N·m (0.86 kgf-m, 6.20 lbf-ft)



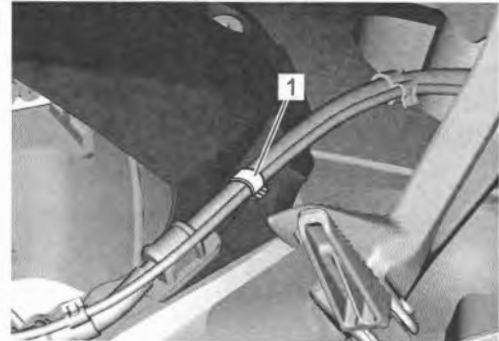
IK07L1940102-02

Rear Fender Lower Removal and Installation

BENK07L29406024

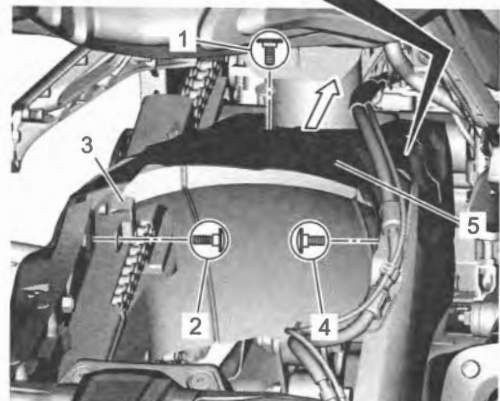
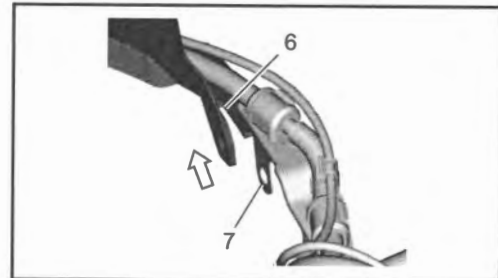
Removal

- 1) Remove the rear wheel. (Page 2D-10)
- 2) Remove the fixed clamp (1) from the rear fender lower.



IK07L1940034-02

- 3) Remove the rear fender lower bolt (1), left rear fender lower bolt (2), rear fender lower bracket (3) and right rear fender lower bolt (4).
- 4) Pull the rear fender lower (5) forward to remove the concave part (6) of rear fender lower from the rear brake hose guide (7) and remove the rear fender lower.



IK07L1940084-04

Installation

Install the rear fender lower in the reverse order of removal. Pay attention to the following point:

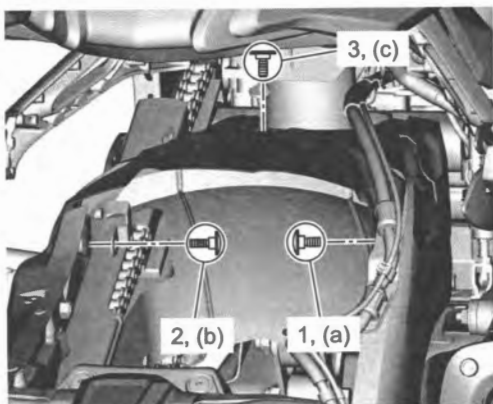
- Tighten the right rear fender lower bolt (1), new left rear fender lower bolt (2) and new rear fender lower bolt (3) to the specified torque.

Tightening torque

Right rear fender lower bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Left rear fender lower bolt (b): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Rear fender lower bolt (c): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



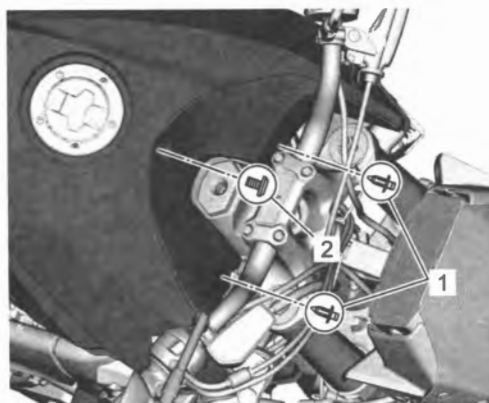
IK07L1940103-02

Fuel Tank Upper Cover / Fuel Tank Front Cover / Fuel Tank Lower Cover Removal and Installation

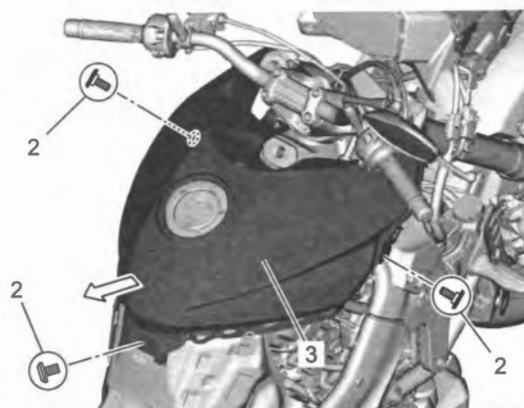
BENK07L29406025

Removal

- 1) Remove the frame front cover assemblies. (Page 9D-34)
- 2) Remove the fasteners (1). (Page 9D-18)
- 3) Remove the fuel tank cover screws (2).
- 4) Remove the fuel tank cover assembly (3) upward.

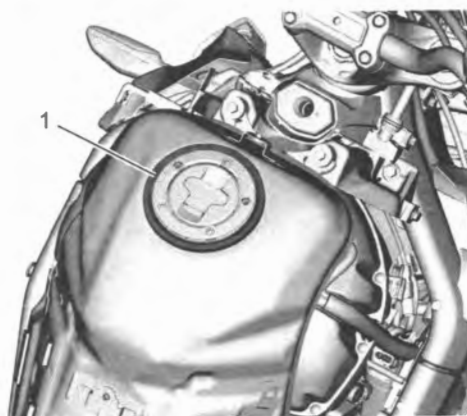


IK07L1940046-02



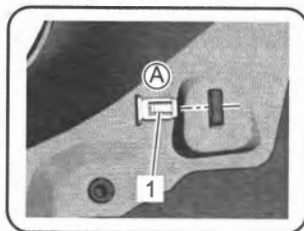
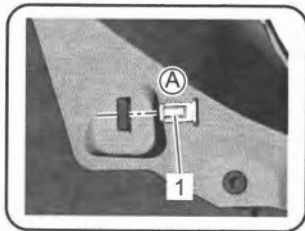
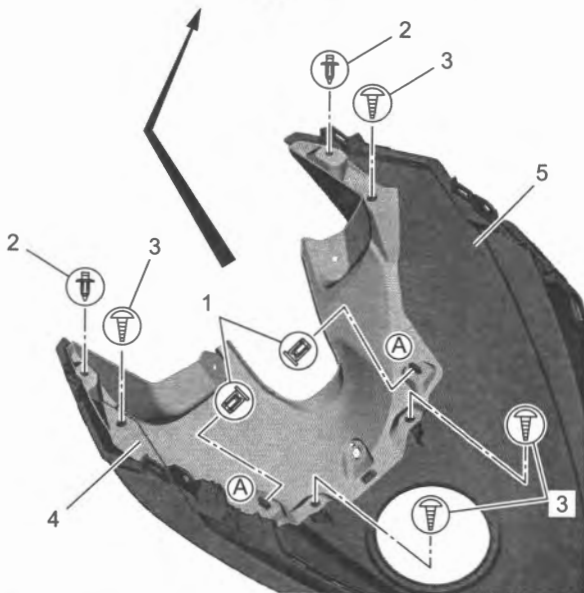
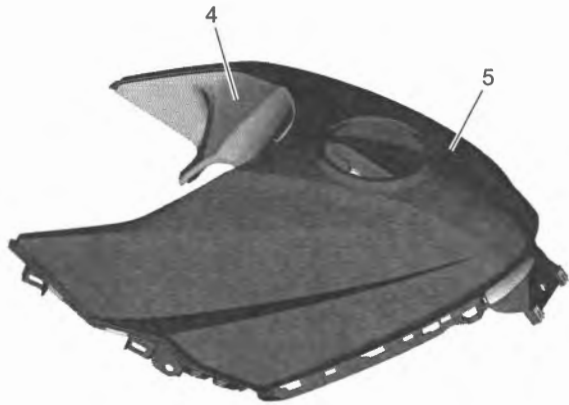
IK07L1940047-03

- 5) Remove the fuel tank cover rubber (1).



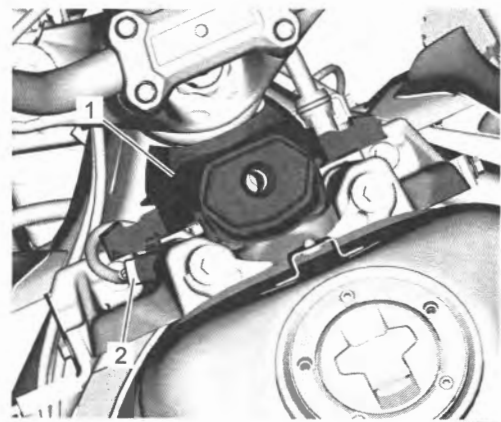
IK07L1940048-01

- 6) Remove the clips (1) to the inside. (Page 9D-19)
- 7) Remove the fasteners (2). (Page 9D-18)
- 8) Remove the fuel tank front cover screws (3).
- 9) Remove the fuel tank front cover (4) from the fuel tank upper cover (5).



IK07L1940049-03

- 10) Remove the fuel tank lower cover (1) and disconnect the immobilizer antenna coupler (2) (If equipped).



IK07L1940050-02

- 11) Remove the immobilizer antenna or ignition switch cover. Refer to "Immobilizer Antenna Removal and Installation (With Immobilizer System)" in Section 1H (Page 1H-9) and "Ignition Switch Cover Removal and Installation (Without Immobilizer System)" in Section 1H (Page 1H-10).

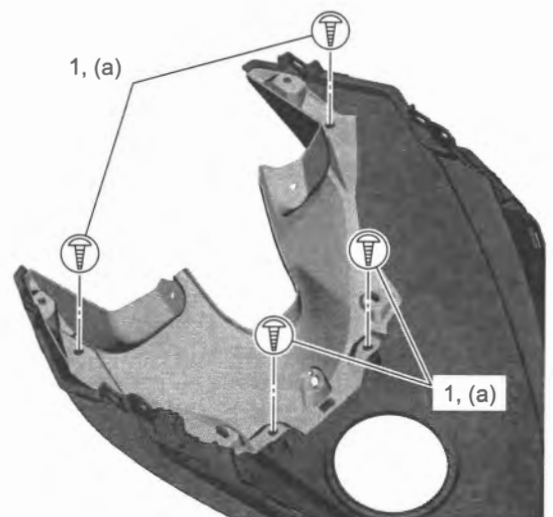
Installation

Install the fuel tank upper cover, fuel tank front cover and fuel tank lower cover in the reverse order of removal. Pay attention to the following points:

- Tighten the fuel tank front cover screws (1) to the specified torque.

Tightening torque

Fuel tank front cover screw (a): 2.0 N·m (0.20 kgf·m, 1.50 lbf·ft)



IK07L1940104-02

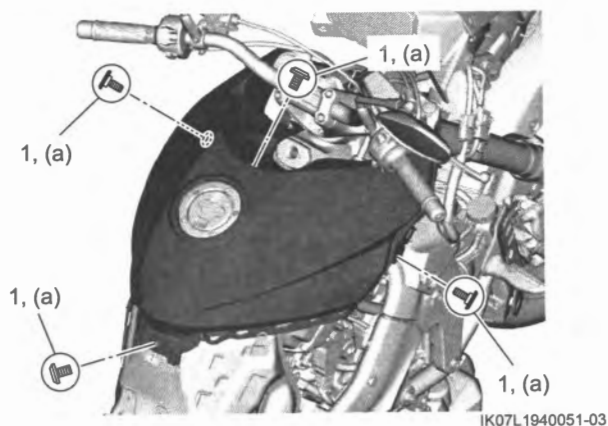
- When installing the fuel tank cover assembly (1), insert it into the inside of brackets (2) of fuel tank.



- Tighten the fuel tank cover screws (1) to the specified torque.

Tightening torque

Fuel tank cover screw (a): 5.5 N·m (0.56 kgf·m, 4.05 lbf·ft)



Frame Front Upper Cover / Frame Front Center Cover / Frame Front Lower Cover Removal and Installation

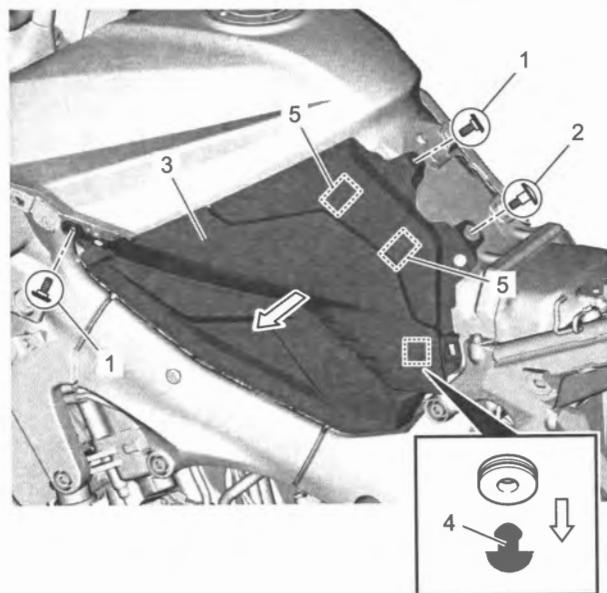
BENK07L29406026

NOTE

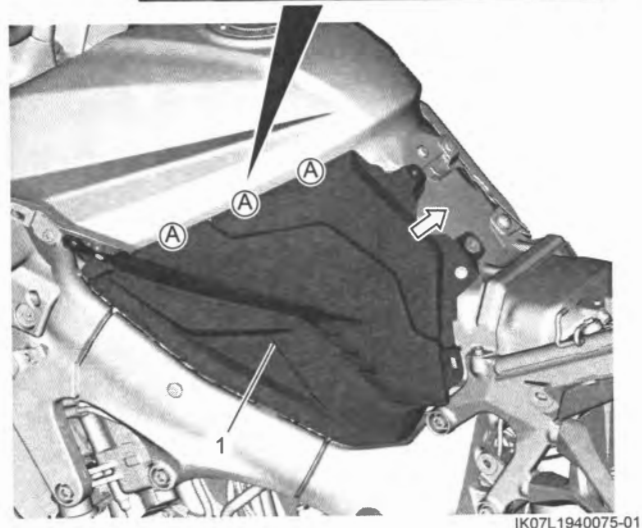
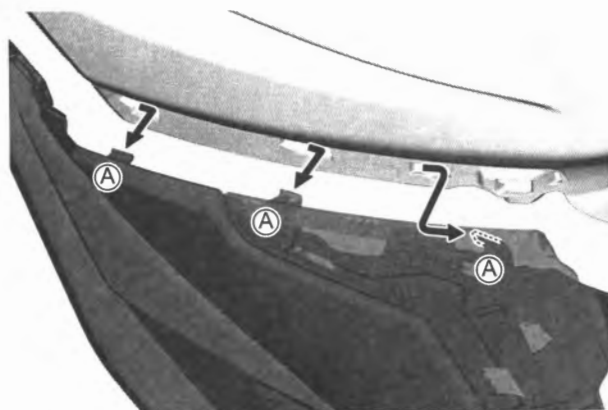
For removal and installation of the frame front upper cover, frame front center cover and frame front lower cover, the same procedures are applicable to both the right and left parts.

Removal

- 1) Remove the frame cover. (Page 9D-36)
- 2) Remove the side cover assembly. (Page 9D-22)
- 3) Remove the frame front center cover No.1 screws (1) and frame front center cover No.2 screw (2).
- 4) Pull the frame front cover assembly (3) outward to unhook the hook (4).
- 5) Pull the frame front cover assembly outward to unfasten the fasteners (5).

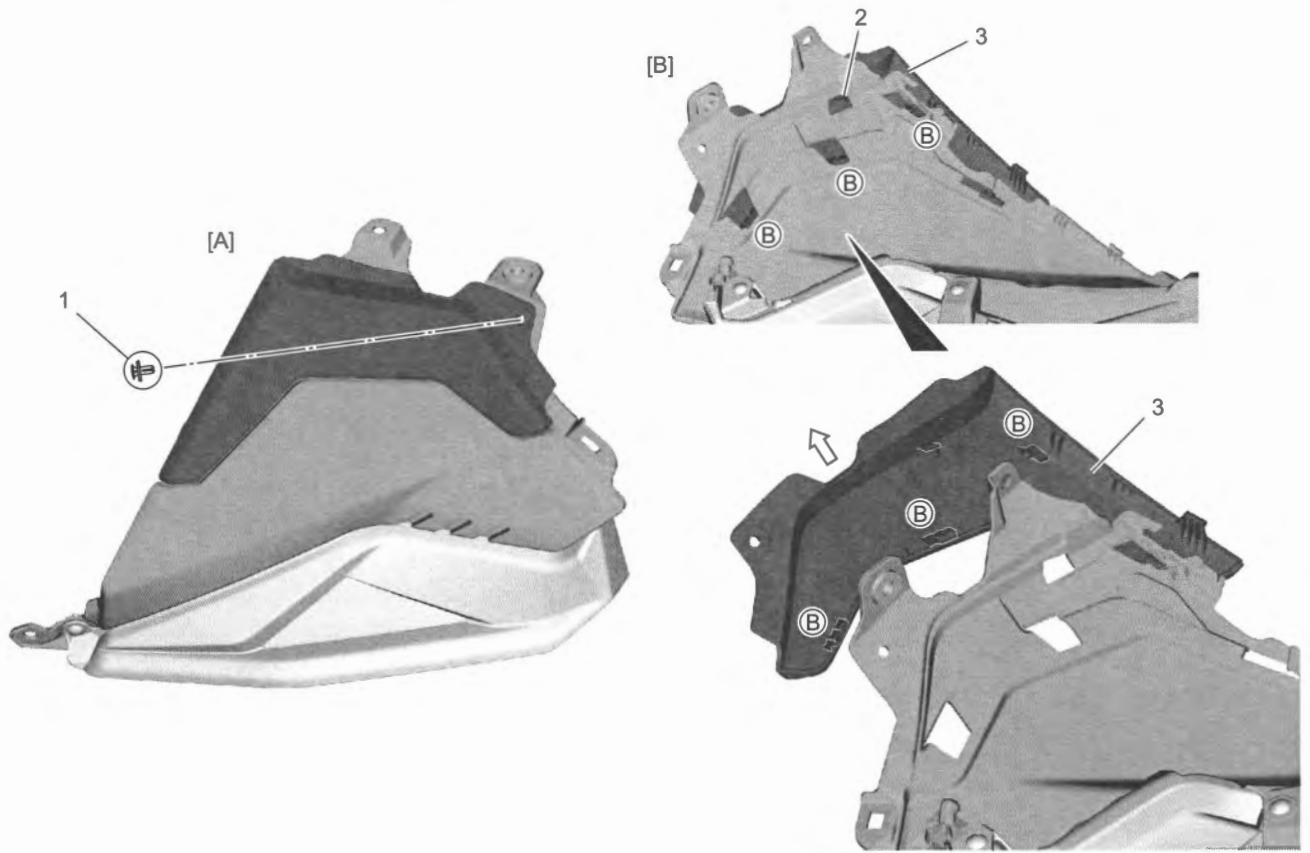


- 6) Pull the frame front cover assembly (1) backward to unhook the hooks and remove it.



7) Remove the frame front upper cover from the frame front center cover as follows.

- a) Remove the fastener (1). (Page 9D-18)
- b) Push out the hook (2) of the frame front upper cover (3) to unhook the hook.
- c) Pull out the frame front upper cover (3) to unhook the hooks and remove it.

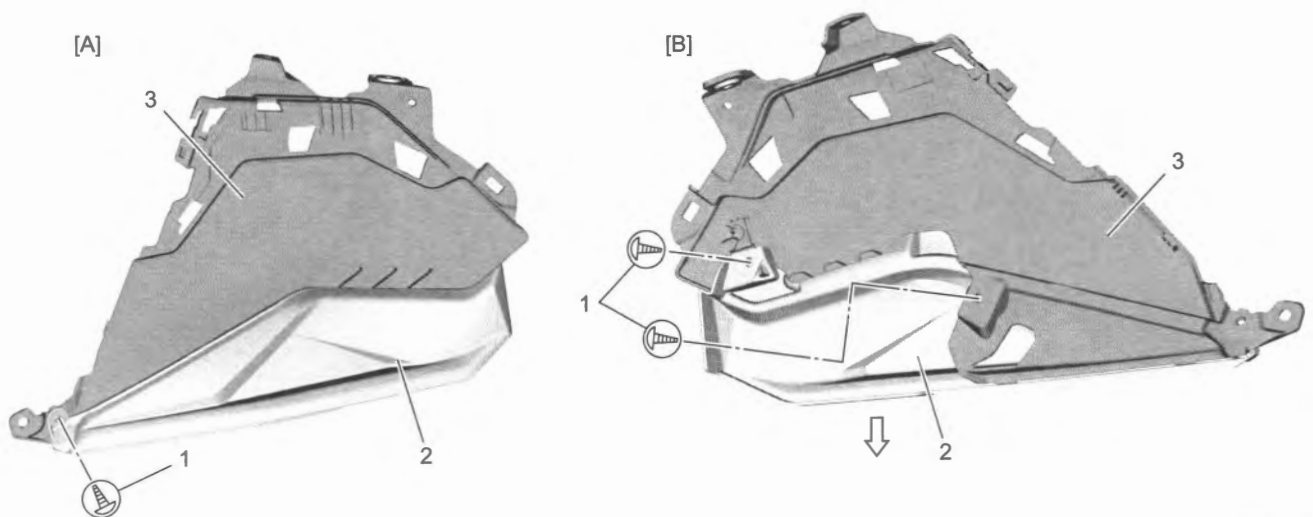


IK07L1940076-04

[A]: Front side	[B]: Back side
-----------------	----------------

8) Remove the frame cover screws (1).

9) Pull the frame front lower cover (2) from the frame front center cover (3) and remove it.



IK07L1940077-02

[A]: Front side	[B]: Back side
-----------------	----------------

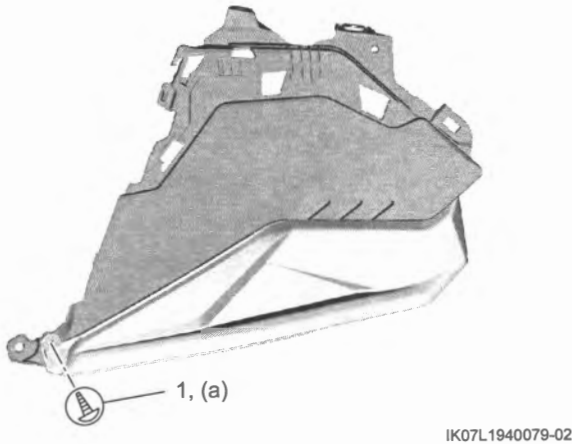
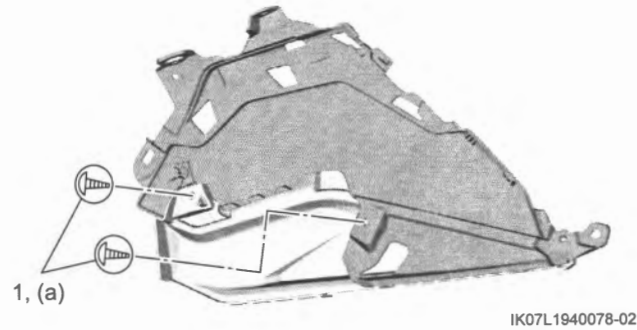
Installation

Install the frame front upper cover, frame front center cover and frame front lower cover in the reverse order of removal. Pay attention to the following points:

- Tighten the frame cover screws (1) to the specified torque.

Tightening torque

Frame cover screw (a): 2.0 N·m (0.20 kgf-m, 1.50 lbf-ft)

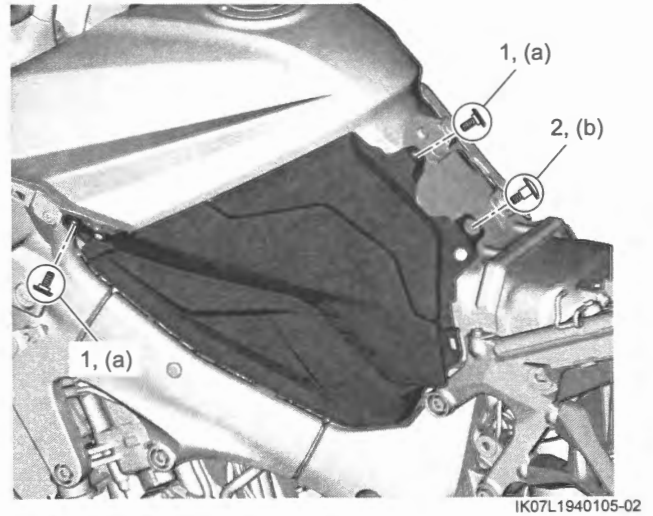


- Tighten the frame front center cover No.1 screws (1) and frame front center cover No.2 screw (2) to the specified torque.

Tightening torque

Frame front center cover No.1 screw (a): 4.7 N·m (0.48 kgf-m, 3.50 lbf-ft)

Frame front center cover No.2 screw (b): 4.7 N·m (0.48 kgf-m, 3.50 lbf-ft)



Frame Cover / Frame Rear Cover Removal and Installation

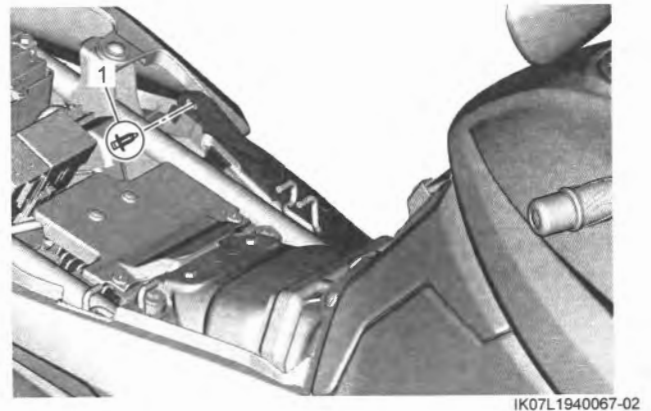
BENK07L29406027

NOTE

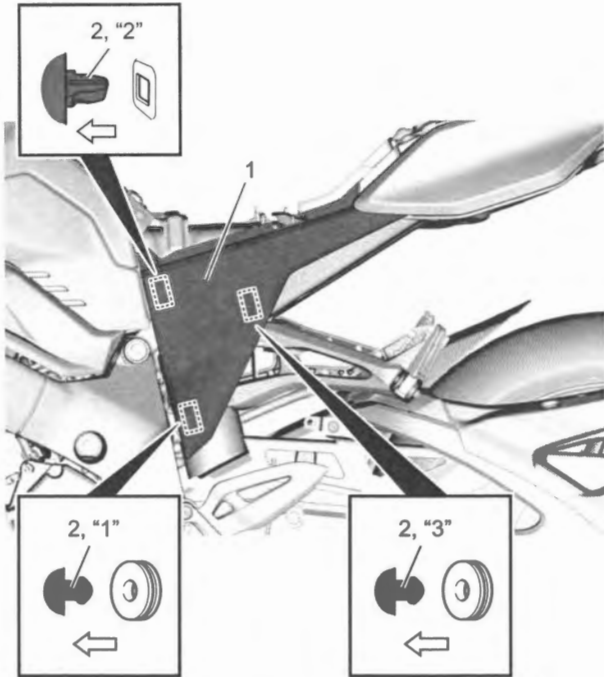
For removal and installation of the frame cover and frame rear cover, the same procedures are applicable to both the right and left parts.

Removal

- 1) Remove the seat. (Page 9D-19)
- 2) Remove the fastener (1). (Page 9D-18)

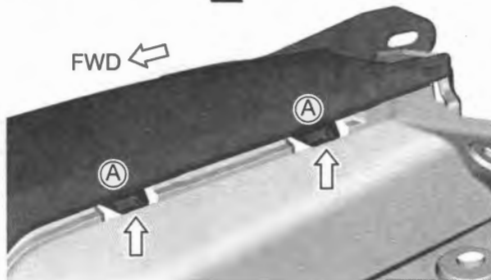
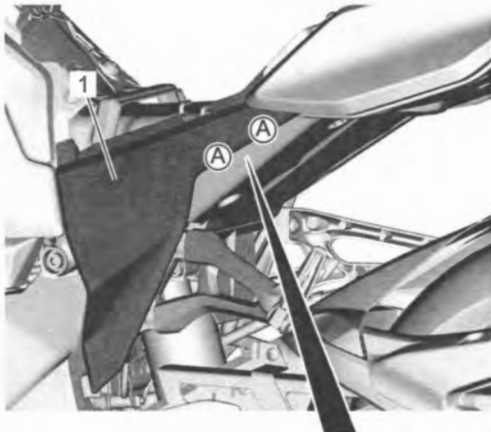


- 3) Pull the frame cover (1) outward to unhook the hooks (2) in order of "1" → "2" → "3".



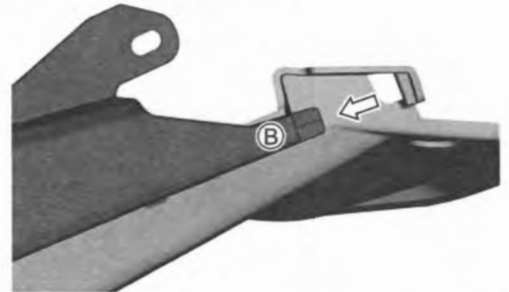
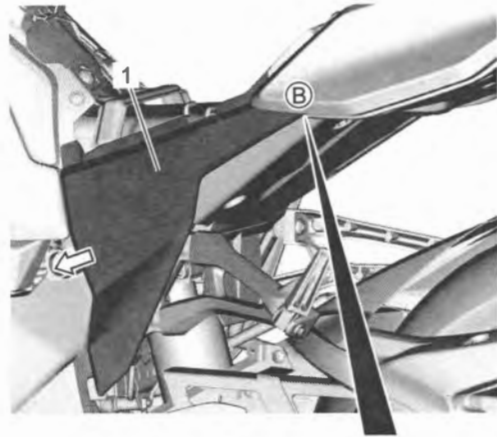
IK07L1940068-01

- 4) Unhook the hooks pushing the hooks of frame cover (1) from the under of frame cover.



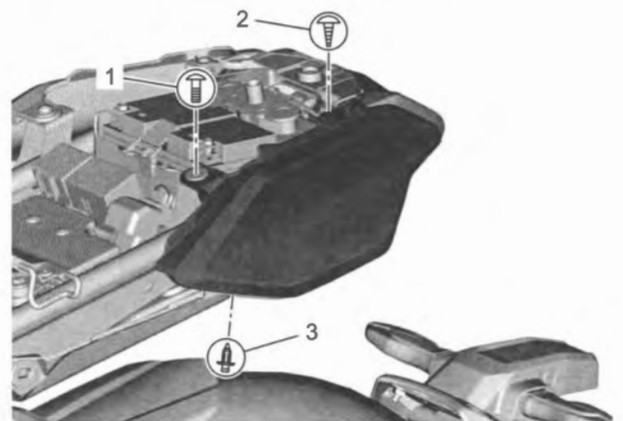
IK07L1940069-01

- 5) Pull the frame cover (1) forward to unhook the hooks and remove it.



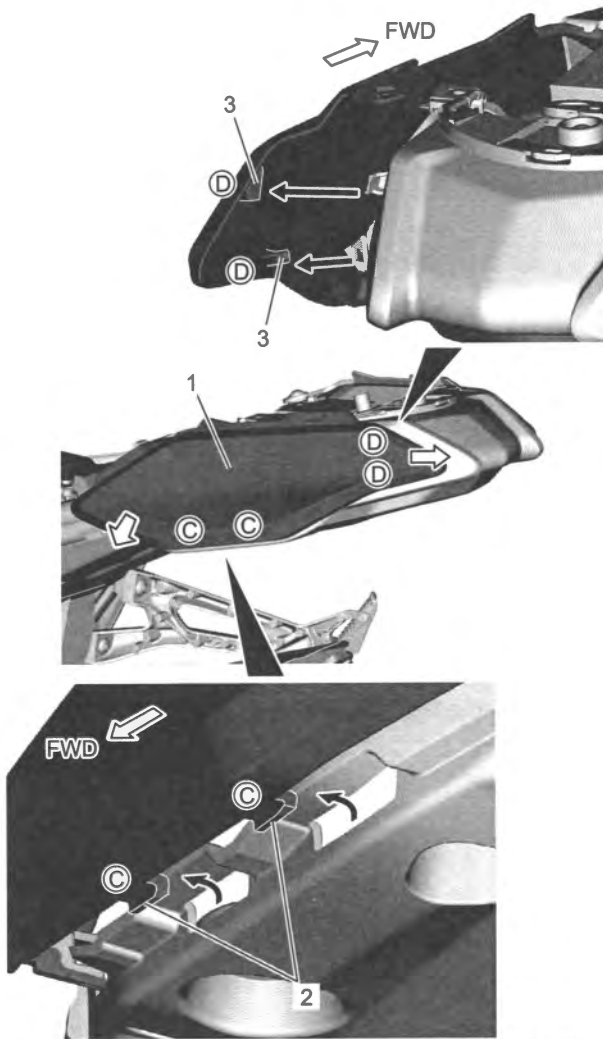
IK07L1940070-02

- 6) Remove the frame rear cover screw (1) and frame cover screw (2).
7) Remove the fastener (3). (Page 9D-18)



IK07L1940071-03

- 8) Remove the frame rear cover from the rear combination light and rear fender front as follows.
- Pull the frame rear cover (1) outward to unhook the hooks (2).
 - Pull the frame rear cover (1) backward to unhook the hooks (3) and remove it.



IK07L1940072-05

Installation

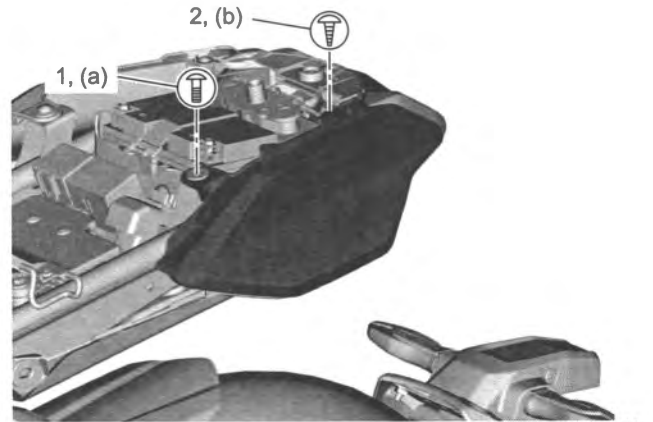
Install the frame cover and frame rear cover in the reverse order of removal. Pay attention to the following point:

- Tighten the frame rear cover screw (1) and frame cover screw (2) to the specified torque.

Tightening torque

Frame rear cover screw (a): 5.5 N·m (0.56 kgf-m, 4.05 lbf-ft)

Frame cover screw (b): 2.0 N·m (0.20 kgf-m, 1.50 lbf-ft)



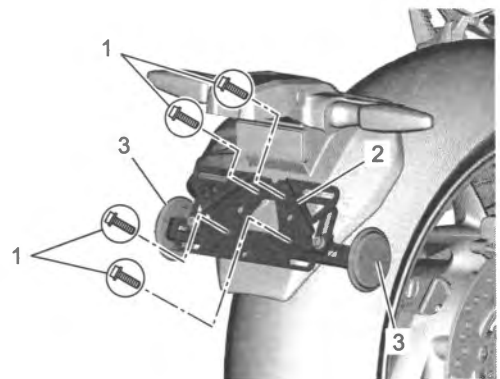
IK07L1940073-03

License Plate Holder / Rear Fender Cover / Rear Fender Rear / Rear Fender Brace Removal and Installation

BENK07L29406028

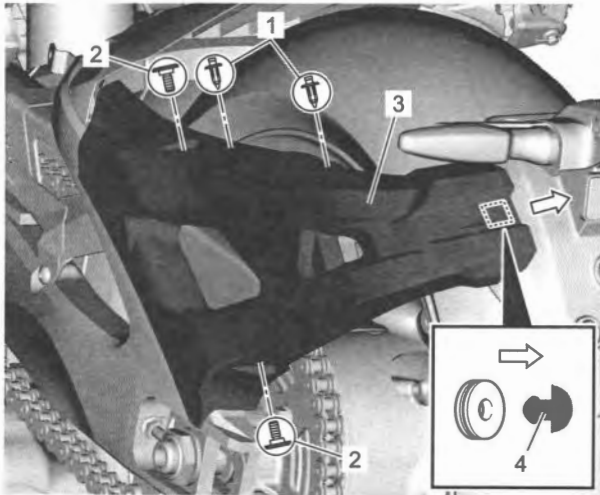
Removal

- Remove the license plate holder bolts (1) and license plate holder (2).
- Remove the rear side reflex reflectors (3). (Page 9B-13)



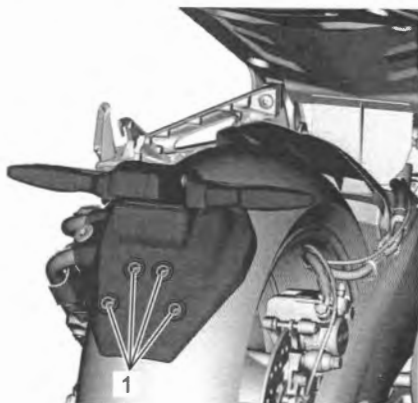
IK07L1940106-03

- 3) Remove the fasteners (1). (Page 9D-18)
- 4) Remove the left rear fender cover bolts (2).
- 5) Pull the left rear fender rear cover (3) backward to unhook the hook (4) and remove it.



IK07L1940107-02

- 6) Remove the rear fender rear spacers (1).



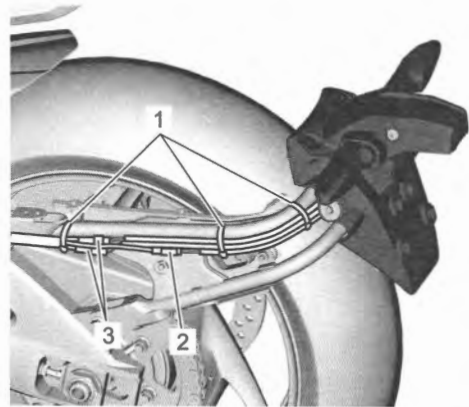
IK07L1940108-01

- 7) Remove the rear fender cover upper screws (1).



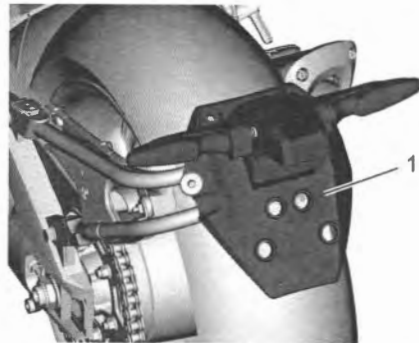
IK07L1940109-02

- 8) Remove the clamps (1).
- 9) Disconnect the license plate light coupler (2) and rear turn signal light couplers (3).



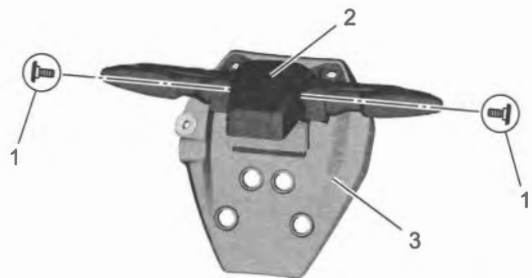
IK07L1940110-02

- 10) Remove the rear fender rear assembly (1).



IK07L1940111-01

- 11) Remove the rear fender cover screws (1).
- 12) Remove the rear fender rear cover assembly (2) from the rear fender rear (3).



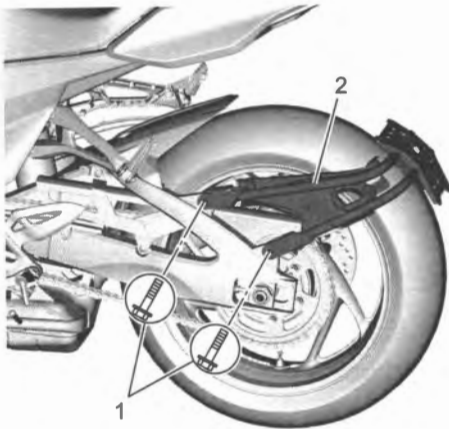
IK07L1940112-02

- 13) Remove the rear fender rear cover from the rear turn signal lights. (Page 9B-12)
- 14) Remove the following parts from the rear fender rear.
 - License plate light: (Page 9B-11)
 - Rear reflex reflector: (Page 9B-13)
- 15) Remove the clamp (1).



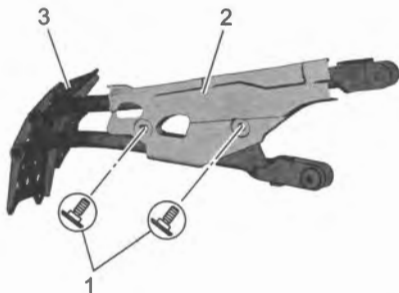
IK07L1940113-05

- 16) Remove the rear fender brace mounting bolts (1) and rear fender brace assembly (2).



IK07L1940114-02

- 17) Remove the left rear fender inner bolts (1) and rear fender inner (2) from the rear fender brace (3).



IK07L1940115-02

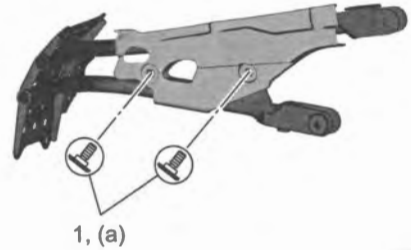
Installation

Install the license plate holder, rear fender cover, rear fender rear and rear fender brace in the reverse order of removal. Pay attention to the following points:

- Tighten the left rear fender inner bolts (1) to the specified torque.

Tightening torque

Left rear fender inner bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

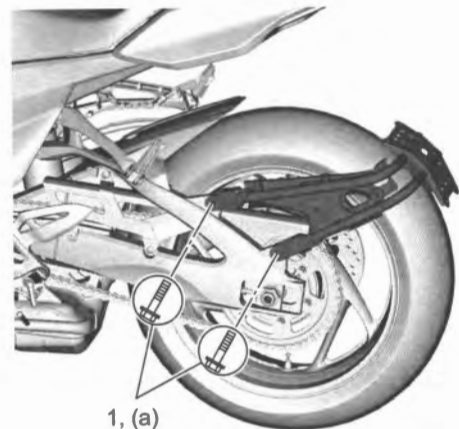


IK07L1940116-02

- Tighten the rear fender brace mounting bolts (1) to the specified torque.

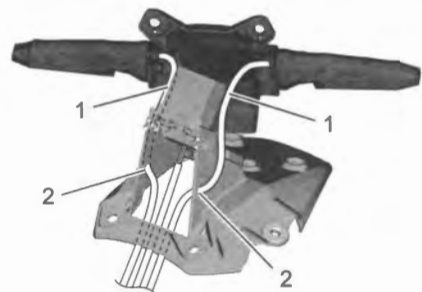
Tightening torque

Rear fender brace mounting bolt (a): 55 N·m (5.6 kgf-m, 40.5 lbf-ft)



IK07L1940117-02

- Fix the license plate light lead wire to the rear fender brace with the clamp. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-9).
- Pass the rear turn signal lead wires (1) into the holes (2) of the rear fender rear.



IK07L1940122-01

- Tighten the rear fender cover screws (1) to the specified torque.

Tightening torque

Rear fender cover screw (a): 4.7 N·m (0.48 kgf-m, 3.50 lbf-ft)

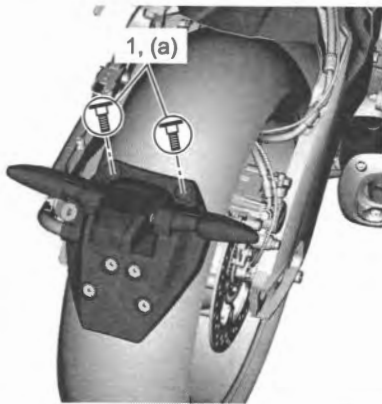


IK07L1940118-02

- Route the license plate light lead wire and rear turn signal lead wires to the rear fender brace. Refer to "Rear Lighting System Construction" in Section 9B (Page 9B-8).
- Tighten the rear fender cover upper screws (1) to the specified torque.

Tightening torque

Rear fender cover upper screw (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

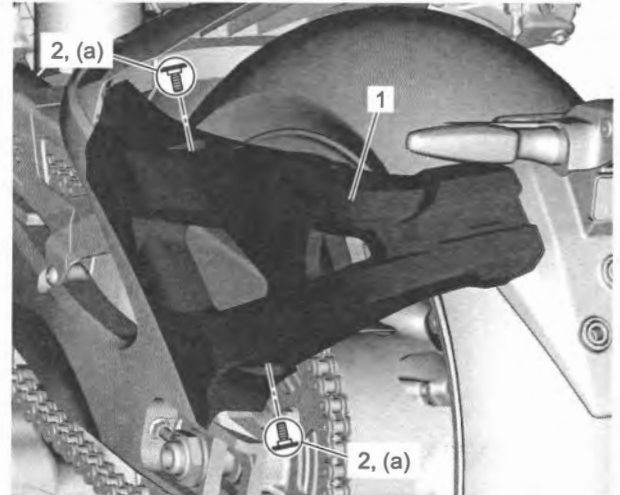


IK07L1940119-02

- When installing the left rear fender rear cover (1), do not pinch the license plate light lead wire and rear turn signal light lead wires between the left rear fender rear and rear fender inner. Refer to "Rear Lighting System Construction" in Section 9B (Page 9B-8).
- Tighten the left rear fender cover bolts (2) to the specified torque.

Tightening torque

Left rear fender cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

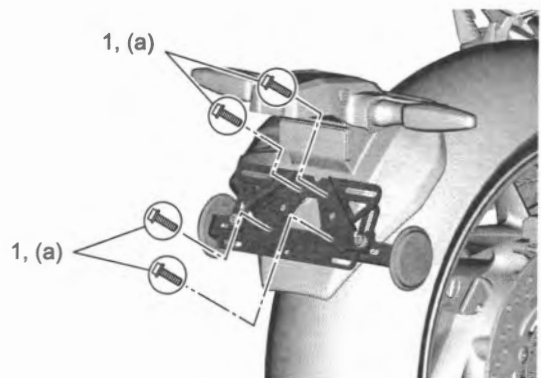


IK07L1940120-02

- Tighten the license plate holder bolts (1) to the specified torque.

Tightening torque

License plate holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IK07L1940121-02

Under Cowling / Under Cowling Cover Removal and Installation

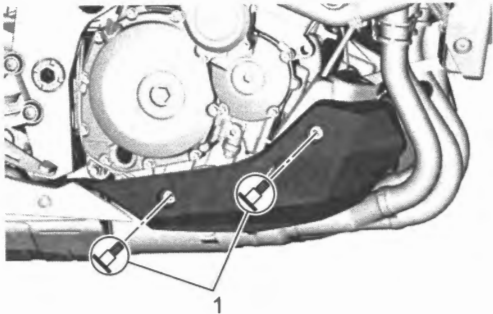
BENK07L29406029

NOTE

For removal and installation of the under cowlings, the same procedures are applicable to both the right and left sides except the reservoir tank overflow hose at the right side.

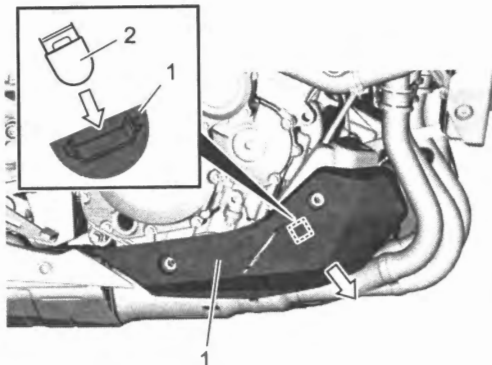
Removal

- 1) Remove the under cowling bolts (1).



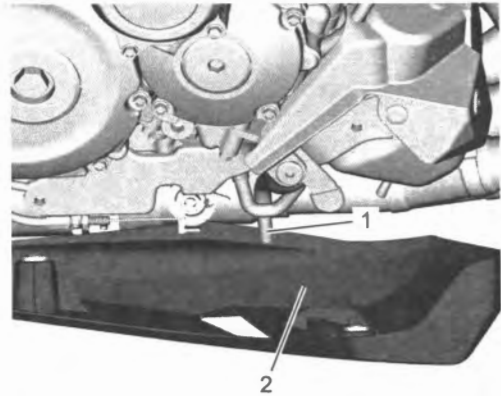
IK07L1940052-02

- 2) Pull the under cowling (1) downward to unhook the hook (2).



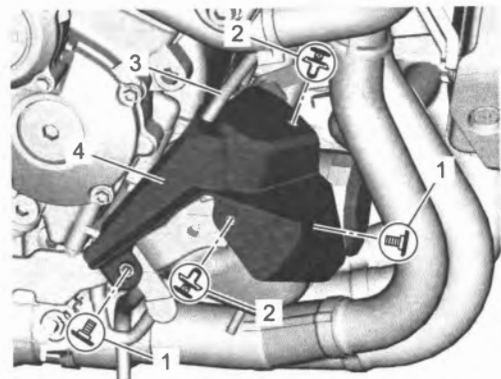
IK07L1940053-02

- 3) For right side under cowling, remove the reservoir tank overflow hose (1) from the concave of the under cowling.
- 4) Remove the under cowling (2).



IK07L1940054-01

- 5) Remove the under cowling cover bolts (1).
- 6) Remove the under cowling fasteners (2). (Page 9D-18)
- 7) Remove the reservoir tank overflow hose (3) from the concave of the under cowling cover (4) and remove the under cowling cover.



IK07L1940055-02

Installation

Install the under cowling and under cowling cover in the reverse order of removal. Pay attention to the following points:

- Install the under cowling fastener (1) first.

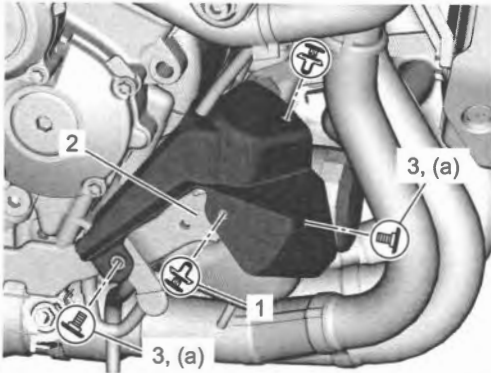
NOTE

Do not rotate the right under cowling bracket (2).

- Tighten the under cowling cover bolts (3) to the specified torque.

Tightening torque

Under cowling cover bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

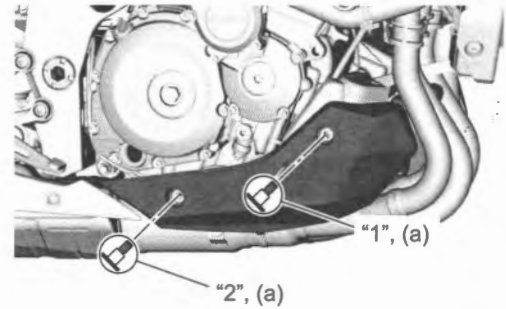


IK07L1940056-02

- Tighten the under cowling bolts to the specified torque in order of "1" → "2".

Tightening torque

Under cowling bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IK07L1940057-03

Specifications

Tightening Torque Specifications

BENK07L29407001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Striker support bracket screw	5.5	0.56	4.05	☞(Page 9D-20)
Radiator mounting bolt	10	1.0	7.5	☞(Page 9D-25)
Electric parts holder screw	1.5	0.15	1.10	☞(Page 9D-27)
Rectifier cover screw	4.7	0.48	3.50	☞(Page 9D-28)
Battery holder screw	8.4	0.86	6.20	☞(Page 9D-28)
Front fender front screw	10	1.0	7.5	☞(Page 9D-29)
Front fender upper screw	10	1.0	7.5	☞(Page 9D-29)
Front fender rear screw	10	1.0	7.5	☞(Page 9D-29)
Rear combination light screw (M6)	5.5	0.56	4.05	☞(Page 9D-31)
Rear fender front bolt	8.4	0.86	6.20	☞(Page 9D-31)
Right rear fender lower bolt	10	1.0	7.5	☞(Page 9D-32)
Left rear fender lower bolt	10	1.0	7.5	☞(Page 9D-32)
Rear fender lower bolt	10	1.0	7.5	☞(Page 9D-32)
Fuel tank front cover screw	2.0	0.20	1.50	☞(Page 9D-33)
Fuel tank cover screw	5.5	0.56	4.05	☞(Page 9D-34)
Frame cover screw	2.0	0.20	1.50	☞(Page 9D-36) / ☞(Page 9D-38)
Frame front center cover No.1 screw	4.7	0.48	3.50	☞(Page 9D-36)
Frame front center cover No.2 screw	4.7	0.48	3.50	☞(Page 9D-36)
Frame rear cover screw	5.5	0.56	4.05	☞(Page 9D-38)
Left rear fender inner bolt	10	1.0	7.5	☞(Page 9D-40)
Rear fender brace mounting bolt	55	5.6	40.5	☞(Page 9D-40)
Rear fender cover screw	4.7	0.48	3.50	☞(Page 9D-41)
Rear fender cover upper screw	10	1.0	7.5	☞(Page 9D-41)
Left rear fender cover bolt	10	1.0	7.5	☞(Page 9D-41)
License plate holder bolt	10	1.0	7.5	☞(Page 9D-41)
Under cowling cover bolt	10	1.0	7.5	☞(Page 9D-43)
Under cowling bolt	10	1.0	7.5	☞(Page 9D-43)

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

“Seat Lock Cable Routing Diagram” (Page 9D-1)

“Front Fender Construction” (Page 9D-8)

“Rear Fender Front Construction” (Page 9D-9)

“Rear Fender Rear / Rear Fender Lower / License Plate Holder Construction” (Page 9D-11)

“Frame Cover Construction” (Page 9D-13)

“Under Cowling / Under Cowling Cover Construction” (Page 9D-16)

“Fuel Tank Cover Construction” (Page 9D-17)

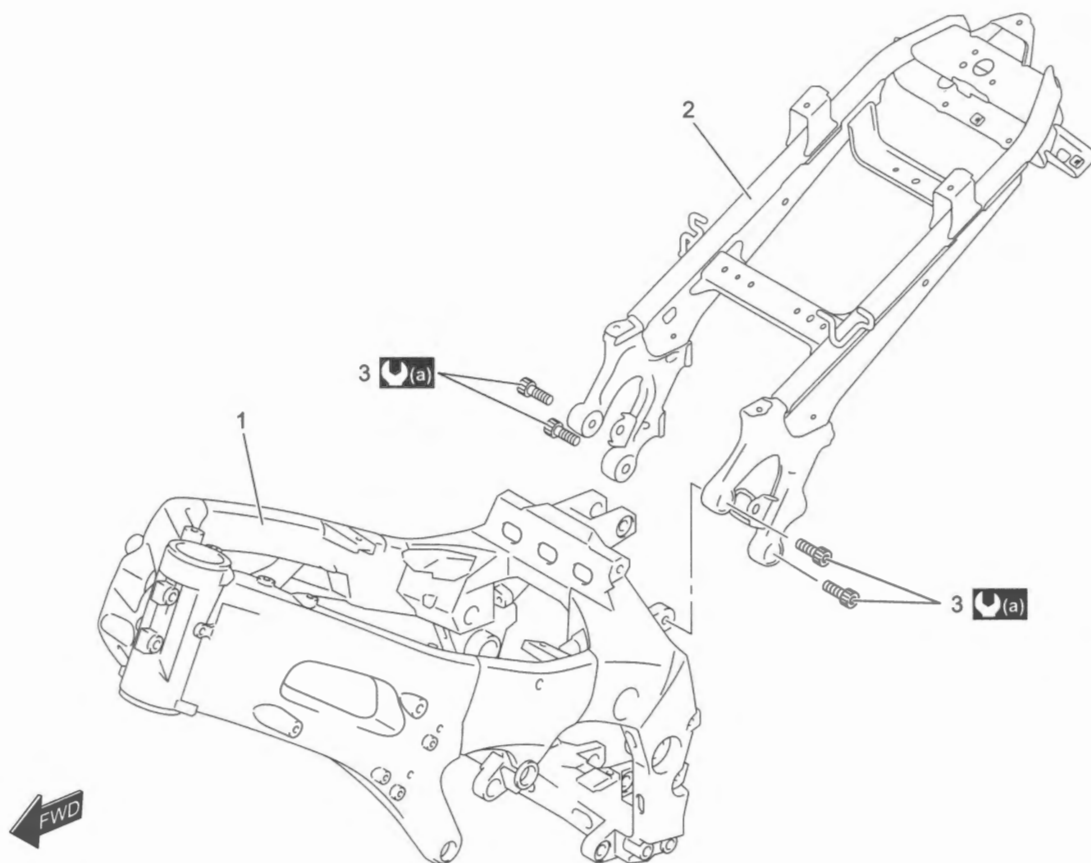
“Fasteners Information” in Section 0C (Page 0C-11)

Body Structure

Repair Instructions

Body Frame Construction

BENK07L29506001

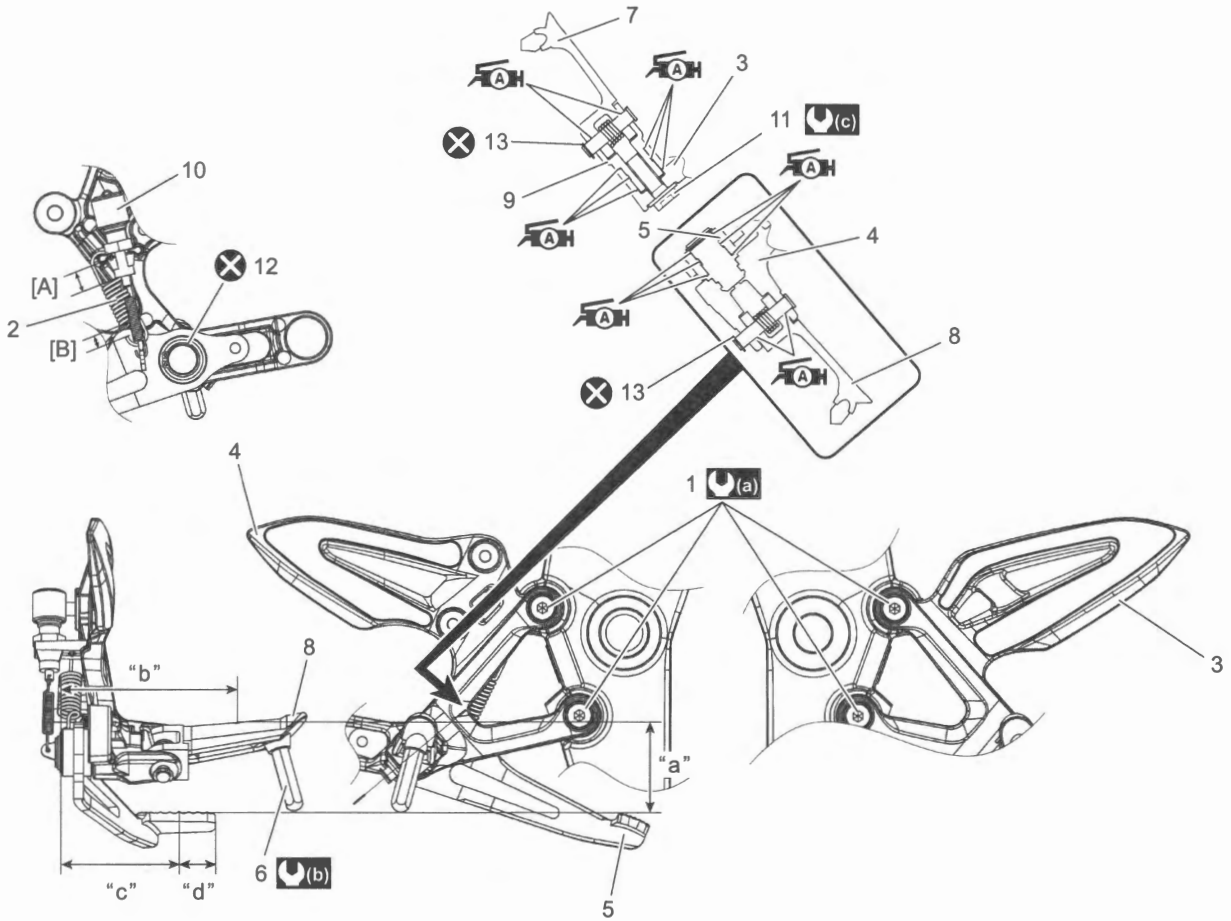


IK07L1950004-01

1. Frame	3. Seat rail bolt
2. Seat rail	 (a) : 50 N·m (5.1 kgf-m, 37.0 lbf-ft)

Front Footrest Bracket Construction

BENK07L29506002

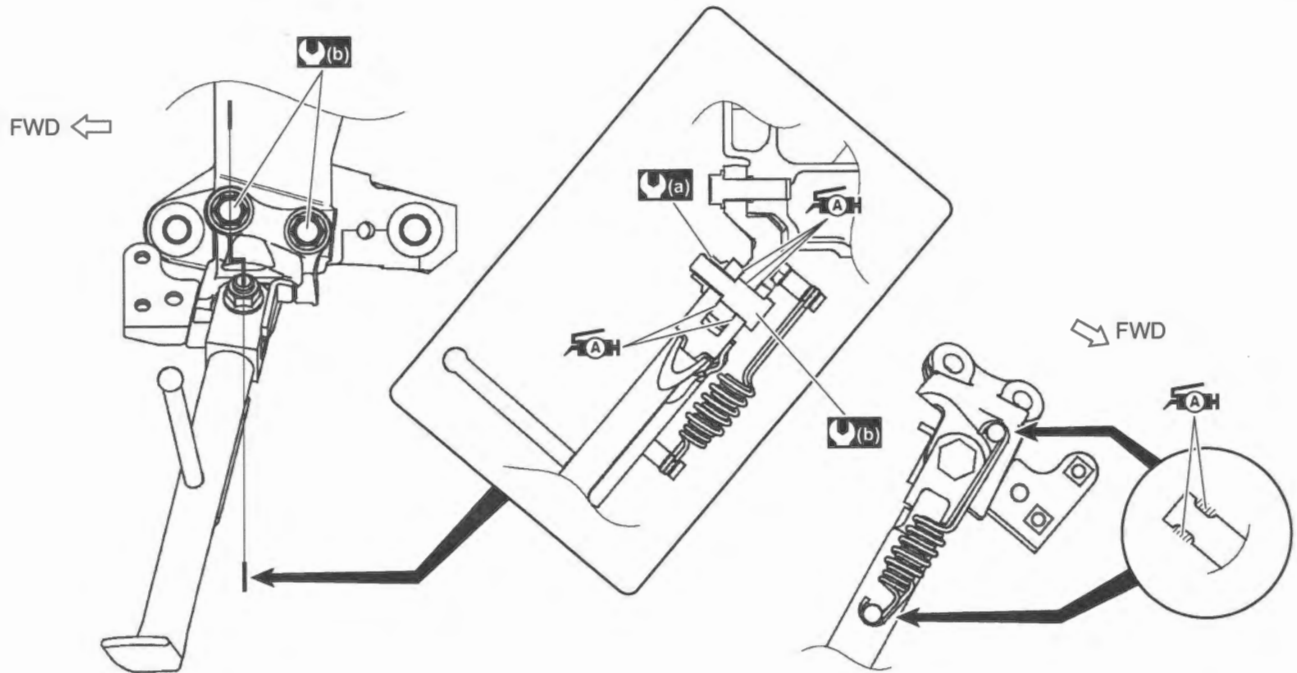


IK07L1950002-03

[A]: Long	7. Front footrest bar (Left)	"b": 105.5 mm (4.154 in)
[B]: Short	8. Front footrest bar (Right)	"c": 71.1 mm (2.80 in)
1. Front footrest bracket bolt	9. Footrest holder	"d": 21.8 mm (0.858 in)
2. Front brake pedal spring	10. Rear brake light switch	(a): 26 N-m (2.7 kgf-m, 19.5 lbf-ft)
3. Front footrest bracket (Left)	11. Footrest holder bolt	(b): 18 N-m (1.8 kgf-m, 13.5 lbf-ft)
4. Front footrest bracket (Right)	12. Snap ring	(c): 35 N-m (3.6 kgf-m, 26.0 lbf-ft)
5. Rear brake pedal	13. E-ring	AH: Apply grease.
6. Bank sensor bolt	"a": 50 – 60 mm (2.0 – 2.3 in)	X: Do not reuse.

Side-stand Construction

BENK07L29506003



IK07L1950003-02

(a) : 40 N-m (4.1 kgf-m, 29.5 lbf-ft)	AH : Apply grease to the sliding surface.
(b) : 50 N-m (5.1 kgf-m, 37.0 lbf-ft)	

Side-stand Removal and Installation

BENK07L29506004

Refer to "Side-stand Construction" (Page 9E-3).

Removal

- 1) Support the motorcycle with a jack or wooden block.

▲ CAUTION

- Do not support the motorcycle with the exhaust pipes.
- Make sure that the motorcycle is supported securely.

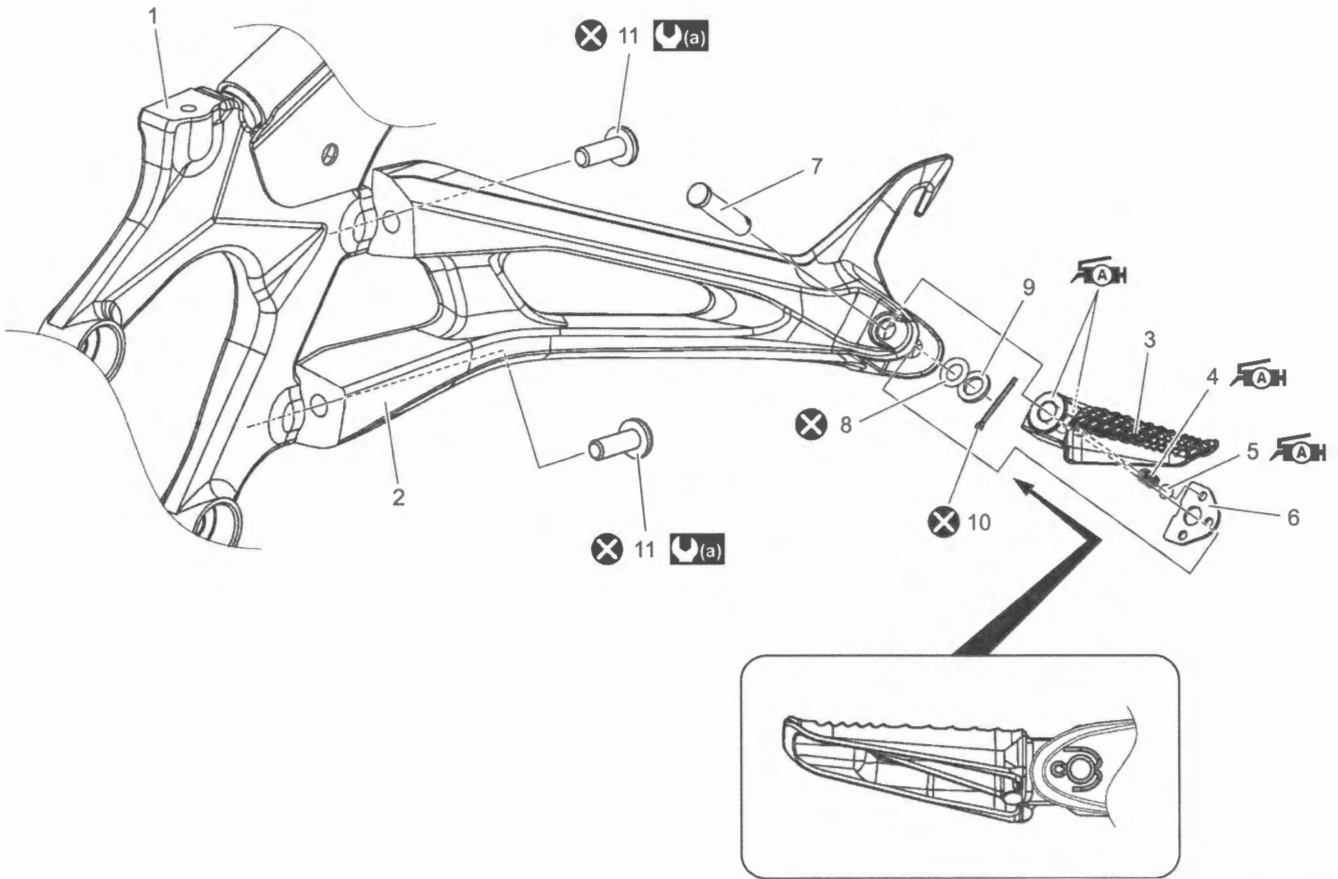
- 2) Remove the side-stand.

Installation

Install the side-stand.

Pillion Footrest Construction

BENK07L29506005



IK07L1950001-03

1. Seat rail	6. Pillion footrest plate	11. Pillion footrest bracket bolt
2. Pillion footrest bracket	7. Pillion footrest pin	(a) : 23 N-m (2.3 kgf-m, 17.0 lbf-ft)
3. Pillion footrest bar	8. O-ring	Apply grease.
4. Spring	9. Washer	Do not reuse.
5. Ball	10. Cotter pin	

Pillion Footrest Removal and Installation

BENK07L29506006

Refer to "Pillion Footrest Construction" (Page 9E-4).

Specifications

Tightening Torque Specifications

BENK07L29507001

Reference:

For the tightening torques of fasteners not specified in this page, refer to:

- “Body Frame Construction” (Page 9E-1)
- “Front Footrest Bracket Construction” (Page 9E-2)
- “Side-stand Construction” (Page 9E-3)
- “Pillion Footrest Construction” (Page 9E-4)
- “Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENK07L29508001

NOTE

Required service material(s) is also described in:

- “Front Footrest Bracket Construction” (Page 9E-2)
 - “Side-stand Construction” (Page 9E-3)
 - “Pillion Footrest Construction” (Page 9E-4)
-

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