

2014 - 2019



DL1000A/XA

SERVICE MANUAL

 **WARNING:** Cancer
and Reproductive Harm-
www.P65Warnings.ca.gov

99500-39503-03E

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 DL1000A/XA and procedures for its inspection/service and overhaul of its main components.

Other information considered as generally known is not included.

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

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

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

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

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

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

▲ WARNING

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

Applicable Model / VIN

Applicable model

DL1000A L4-L8 (2014-2018)

DL1000XA L8 (2018)

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
DL1000AL4	JS1VU51A#E2100001 - 999999	U.S.A.
DL1000AL5	JS1VU51A#F2100001 - 999999	U.S.A.
DL1000AL6	JS1VU51A#G2100001 - 999999	U.S.A.
DL1000AL8	JS1VU51A#J2100001 - 999999	U.S.A.
DL1000XAL8	JS1VU51A#J2100001 - 999999	U.S.A.

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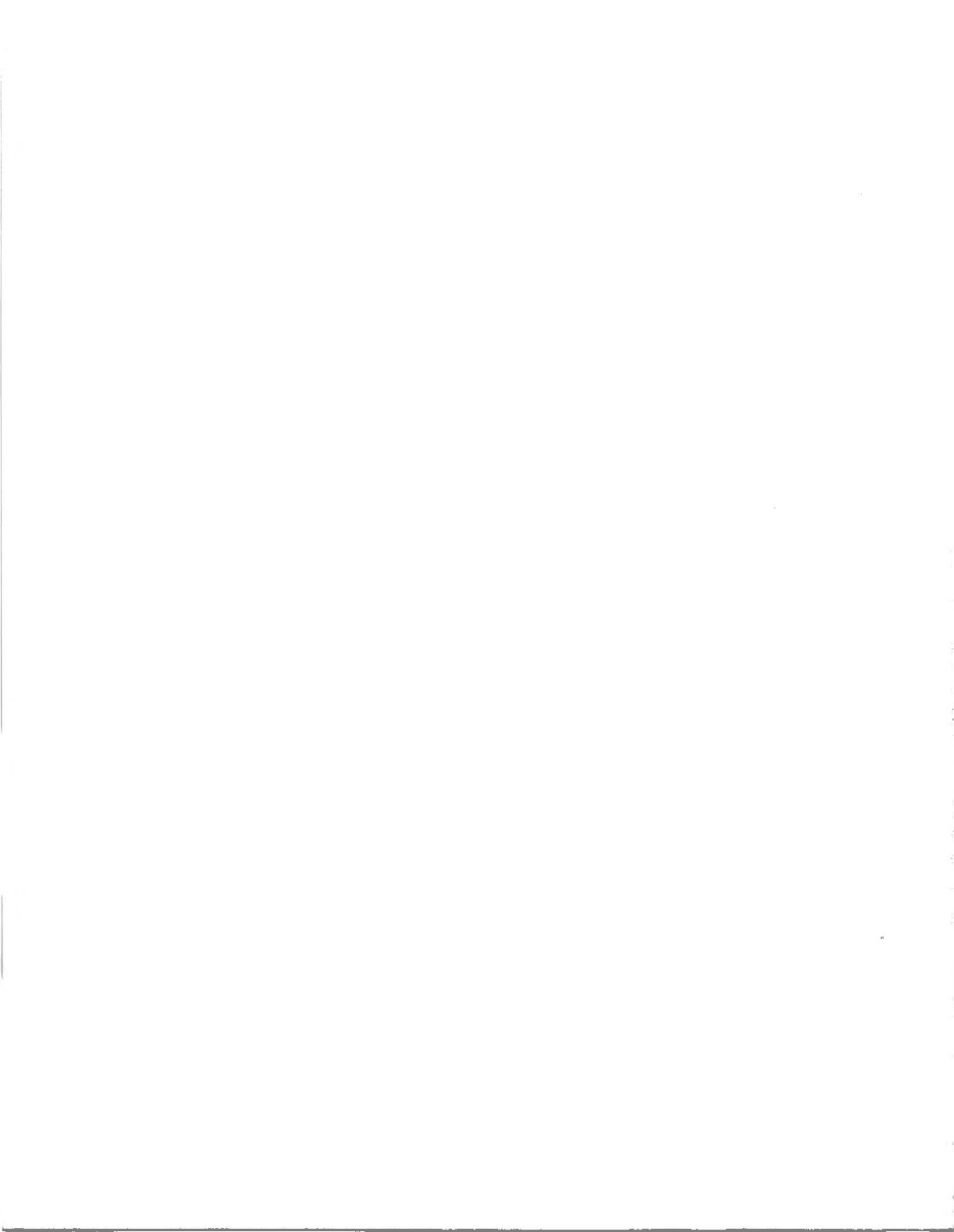
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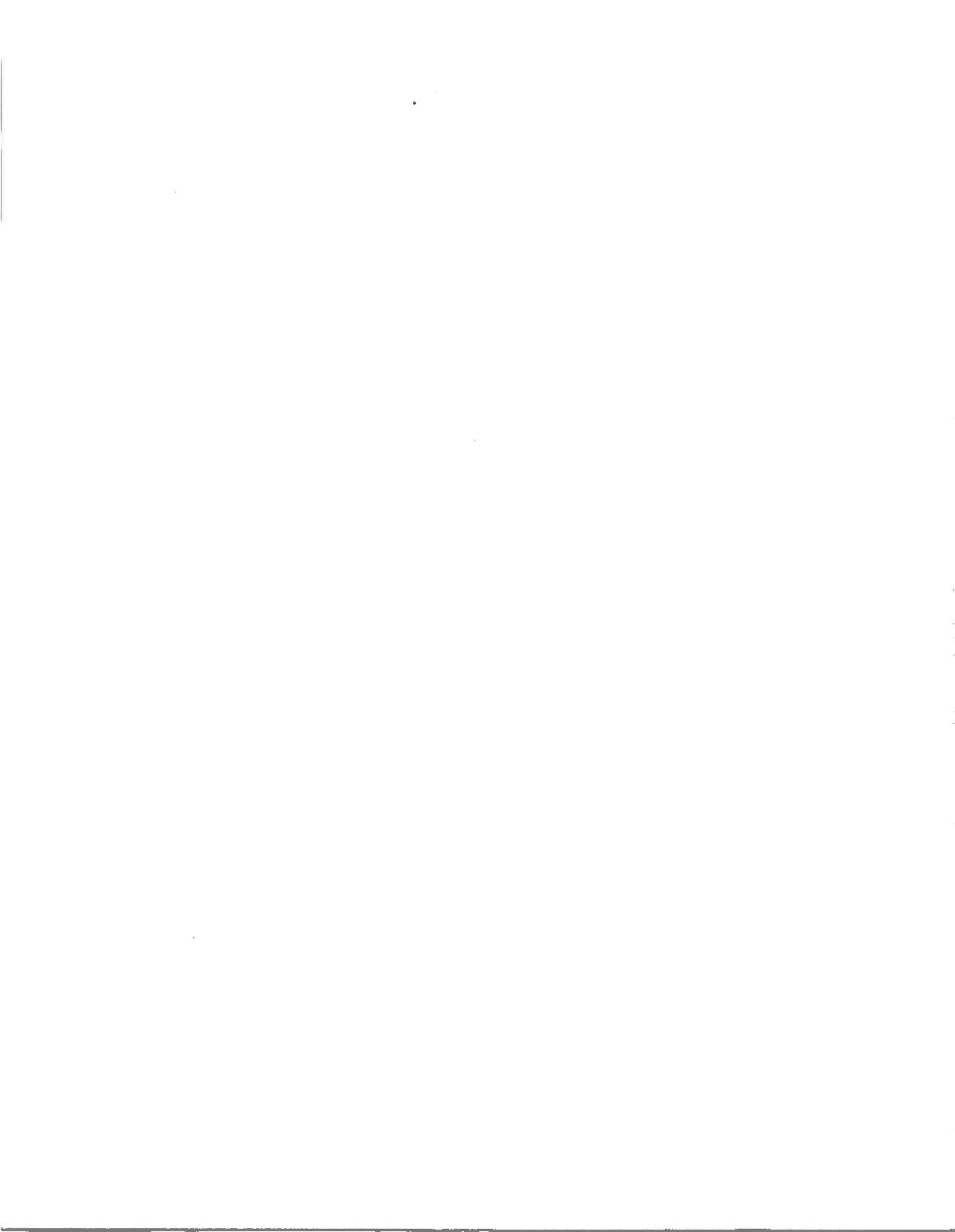
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SUPPLEMENTS

DL1000A/XAL4-L9
('14 - '19-MODELS)

10



Section 00

00

Precautions

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Precautions

Precautions

General Precautions

BENJ31J3000001

▲ 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 Electrical Circuit Service

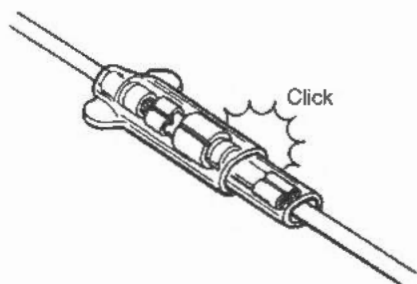
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When handling the electrical parts or servicing the FI system, observe the following points for the safety of the system.

Electrical Parts

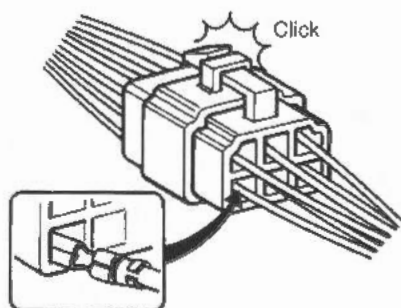
Connector / Coupler

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



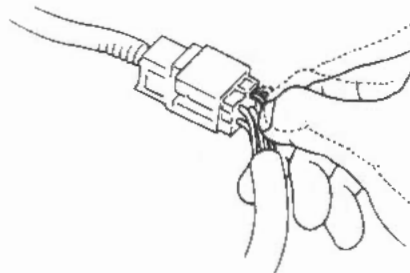
I310G1000001-01

- 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.



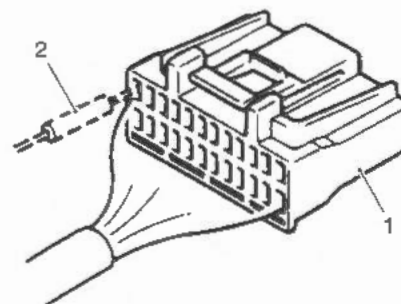
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- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found; repair or replace.



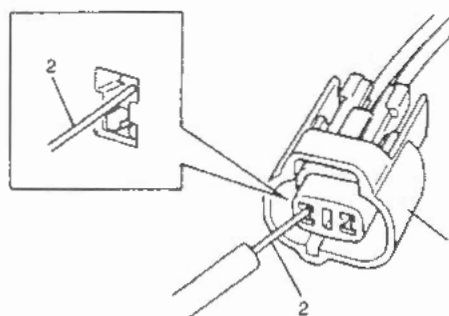
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- When taking measurements at electrical connector / coupler (1) using a tester probe (2), be sure to insert the probe from the wire harness side (rear) of the connector / coupler.



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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.





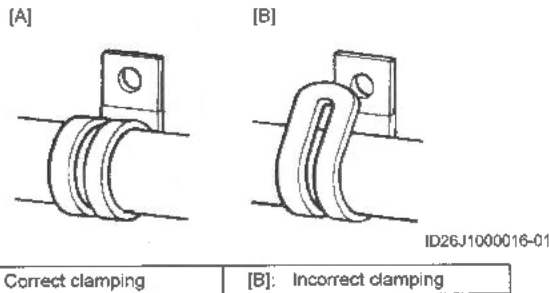
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- Avoid applying grease or other similar material to connector/coupler terminals to prevent electric trouble.

00-3 Precautions:

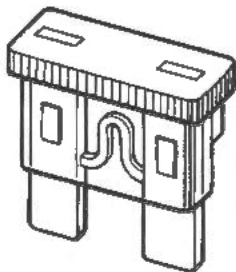
Clamp

- Clamp the wire harness at such positions as indicated in "Wiring Harness Routing Diagram".
 - L4 – L6 model:  (Page 9A-6)
 - L8 – model:  (Page 9A-24)
- 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.



Fuse

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



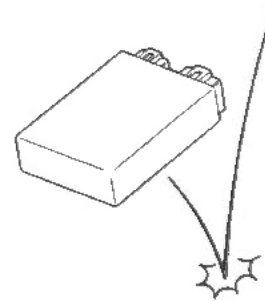
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Switch

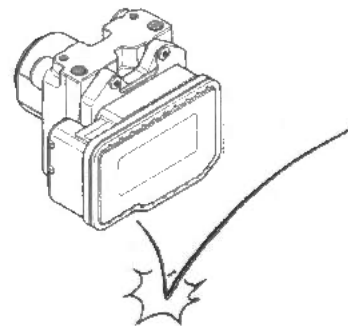
Never apply grease material to switch contact points to prevent damage.

ECM / ABS control unit / Various sensors

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

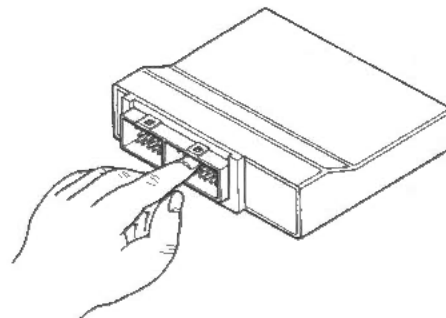


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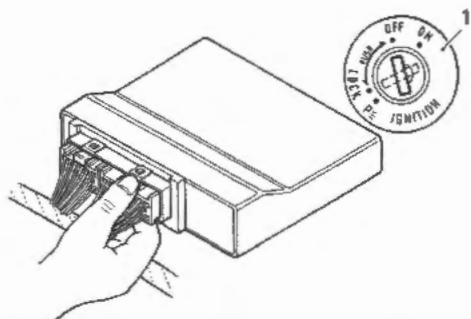
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- Be careful not to touch the electrical terminals of the electronic parts (ECM, etc.). The static electricity from your body may damage them.



I310G1000008-01

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



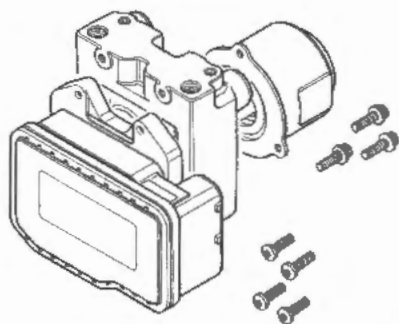
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- Never allow dust or water to contact the ABS control unit/HU.



I649G1000004-02

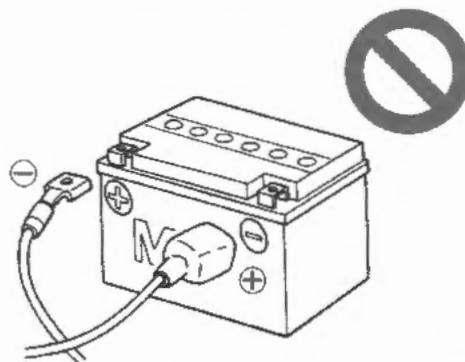
- The ABS control unit/HU cannot be disassembled. Replace the whole unit with a new one.



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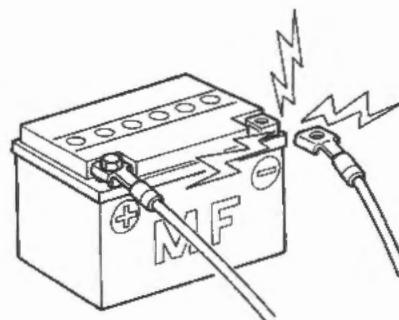
Battery

- 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 and ABS systems instantly when reverse power is applied.



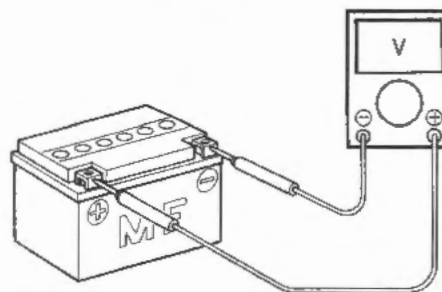
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- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the electronic unit which may result in serious damage.



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.



I310G1000012-02

00-5 Precautions:

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

Electrical Circuit Inspection Procedure

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

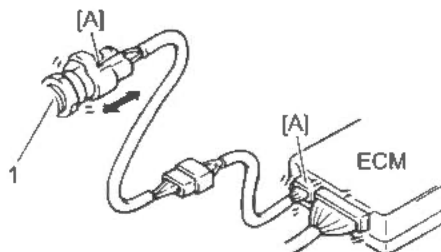
Open circuit check

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

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

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

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



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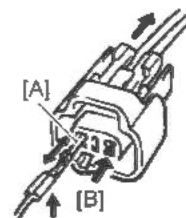
[A]: Check for loose connection

1. Sensor

- 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.

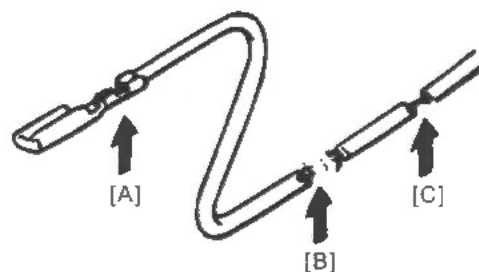


ID26J1000015-02

[A]: Check contact tension by inserting and removing.

[B]: Check each terminal for bend and proper alignment.

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



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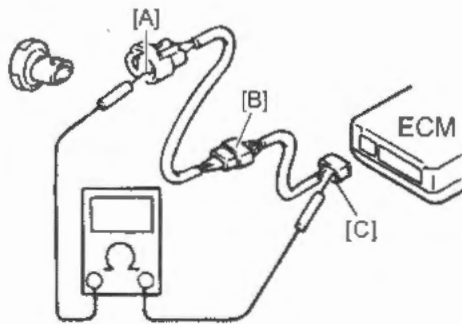
[A]: Looseness of crimping

[B]: Open

[C]: Thin wire (A few strands left)

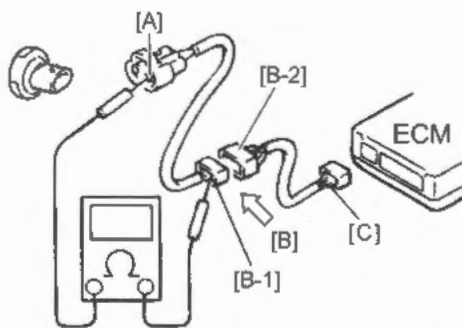
Continuity check

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



ID26J1000006-05

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



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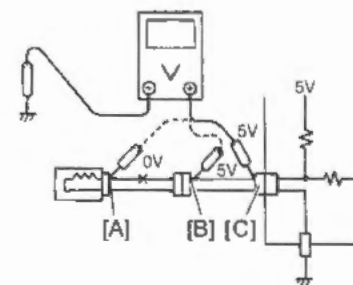
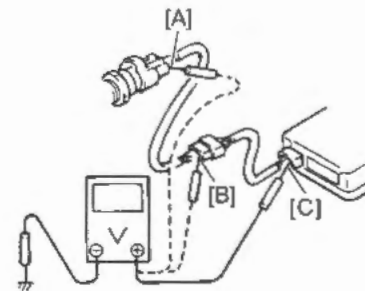
Voltage check

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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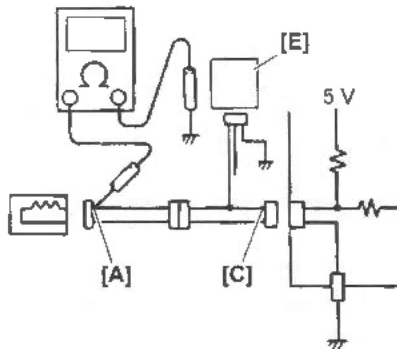
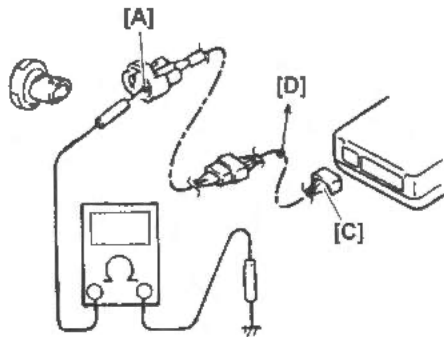
Short circuit check (Wire harness to ground)

- 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.

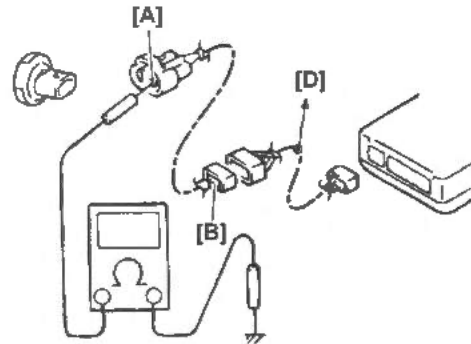
- 3) Measure resistance between terminal at one end of circuit ([A] terminal in the figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals [A] and [C].



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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

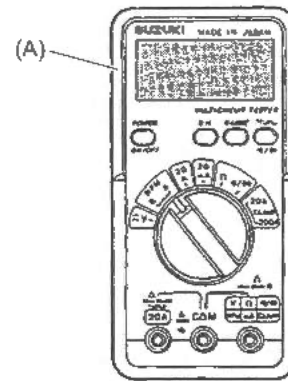
Precautions for Circuit Tester

BENJ31J30000003

- Use the Suzuki multi circuit tester set.

Special tool

(A): 09900-25008



IH18K1000001-01

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

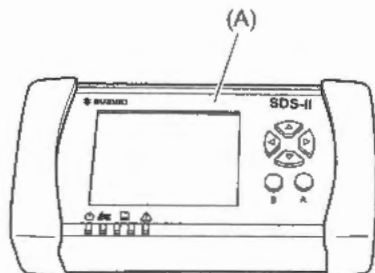
Special tool
09900-25009

Precautions for SDS-II

BENJ31J30000004

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

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



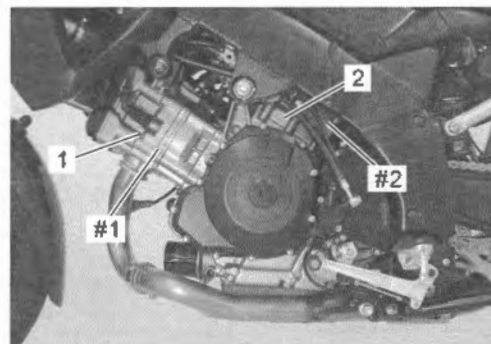
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Precautions for Identification

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When viewed from the state in sitting on the seat, the front cylinder (1) is distinguished as No. 1 cylinder or cylinder #1, and the rear cylinder (2) is as No. 2 cylinder or cylinder #2.

The sensor, actuator or the like for the front cylinder are distinguished as #1, and the ones for the rear cylinder are as #2.



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Section 0

General Information

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General Information

General Description

Abbreviations

BENJ31J30101001

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
ECU: Electronic Control Unit
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
IN.: Intake
IMU: Inertial Measurement Unit
ISC: Idle Speed Control

J:

JASO: Japanese Automobile Standards Organization

L:

LCD: Liquid Crystal Display
LED: Light Emitting Diode
LH: Left Hand
LO: Low

M:

Max: Maximum
MIL: Malfunction Indicator Light
Min.: Minimum
MTBE: Methyl Tertiary Butyl Ether

N:

NOx: Nitrogen Oxides

O:

O2: Oxygen
OBD: On-Board Diagnostic System
OHC: Over Head Camshaft
O.D.: Outside Diameter

P:

PAIR: Pulsed Secondary Air Injection
PCV: Positive Crankcase Ventilation
PP: Pulley Position

R:

RH: Right Hand
ROM: Read Only Memory
RON: Research Octane Number
RPM: Engine Speed

S:

SAE: Society of Automotive Engineers
SDS: Suzuki Diagnosis System
SRAD: Suzuki Ram Air Direct
STCS: Secondary Throttle Control System
STD: Standard
STP: Secondary Throttle Position
STV: Secondary Throttle Valve
STVA: Secondary Throttle Valve Actuator

T:

TC: Traction Control
TDC: Top Dead Center
TO: Tip-over
TP: Throttle Position
TPS: Throttle Position Sensor

SAE-to-Former SUZUKI Term

BENJ31J30101008

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.

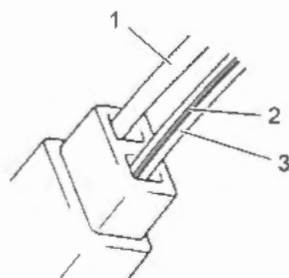
Symbol	Definition
	Torque control required. Data beside it indicate specified torque.
	Apply oil. Use engine oil unless otherwise specified.
	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1 : 1).
	Apply SUZUKI SUPER GREASE A. 99000-25011
	Apply SUZUKI MOLYBDENUM GREASE L. 99000-25280
	Apply SUZUKI MOLY PASTE. 99000-25140
	Apply SUZUKI SILICONE GREASE. 99000-25100
	Apply SUZUKI WATER RESISTANT GREASE EP2. 99000-25350
	Apply SUZUKI BOND 1207B. 99000-31140
	Apply SUZUKI BOND 1215. 99000-31110
	Apply THREAD LOCK CEMENT 1303B. 99000-32030
	Apply THREAD LOCK CEMENT 1322D. 99000-32150
	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
	Use SUZUKI FORK OIL G-10. 99000-99044-10G
	Apply or use brake fluid.
	Use special tool.
	Do not reuse.
	Note on reassembly.

Wire Color Symbols

BENJ31J30101003

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.



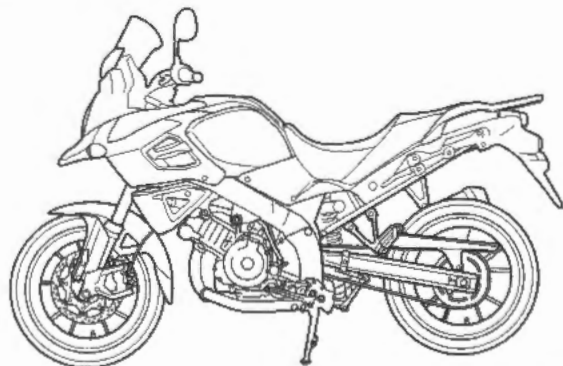
ID25J1010224-02

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

Vehicle Side View

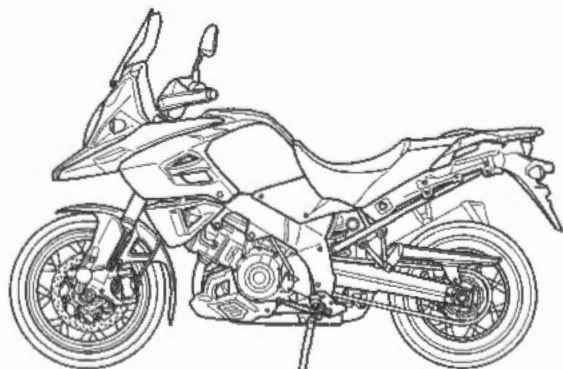
SUZUKI DL1000A

BENJ31J30101004



IE31J1010003-01

SUZUKI DL1000XA

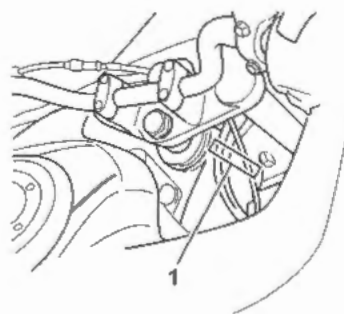


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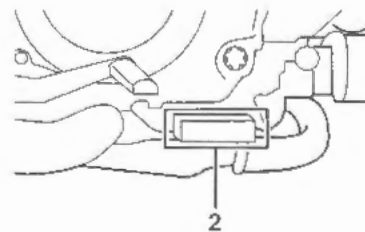
Vehicle Identification Number

BENJ31J30101005

The frame serial number or V.I.N. (Vehicle Identification Number) is stamped on the right side of the frame down tube (1). The engine serial number is located on the left side of the crankcase (2).



IE31J1010004-01



IE31J1010005-01

Country and Area Codes

BENJ31J30101006

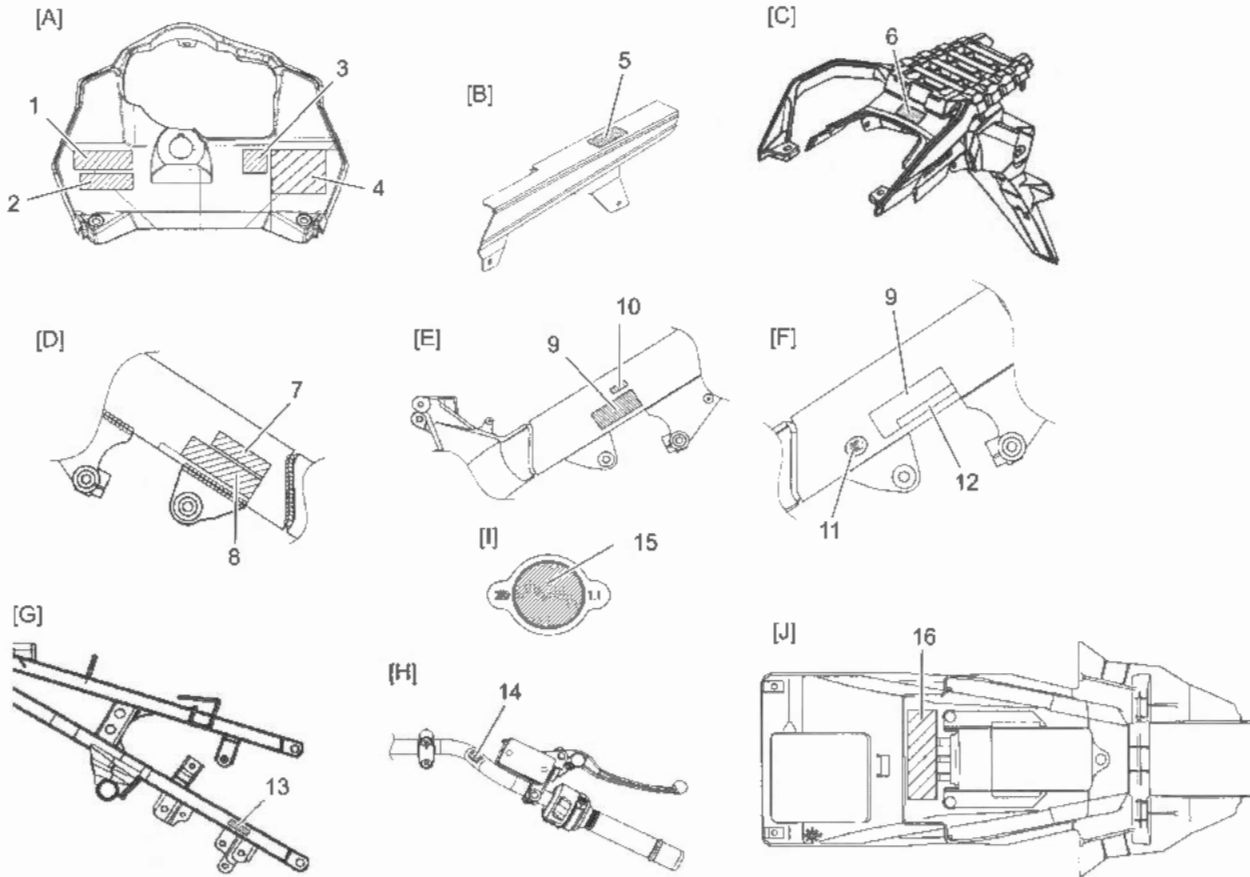
The following codes stand for the applicable country(-ies) and area(-s).

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

Warning, Caution and Information Labels Location

BENJ31J30101007

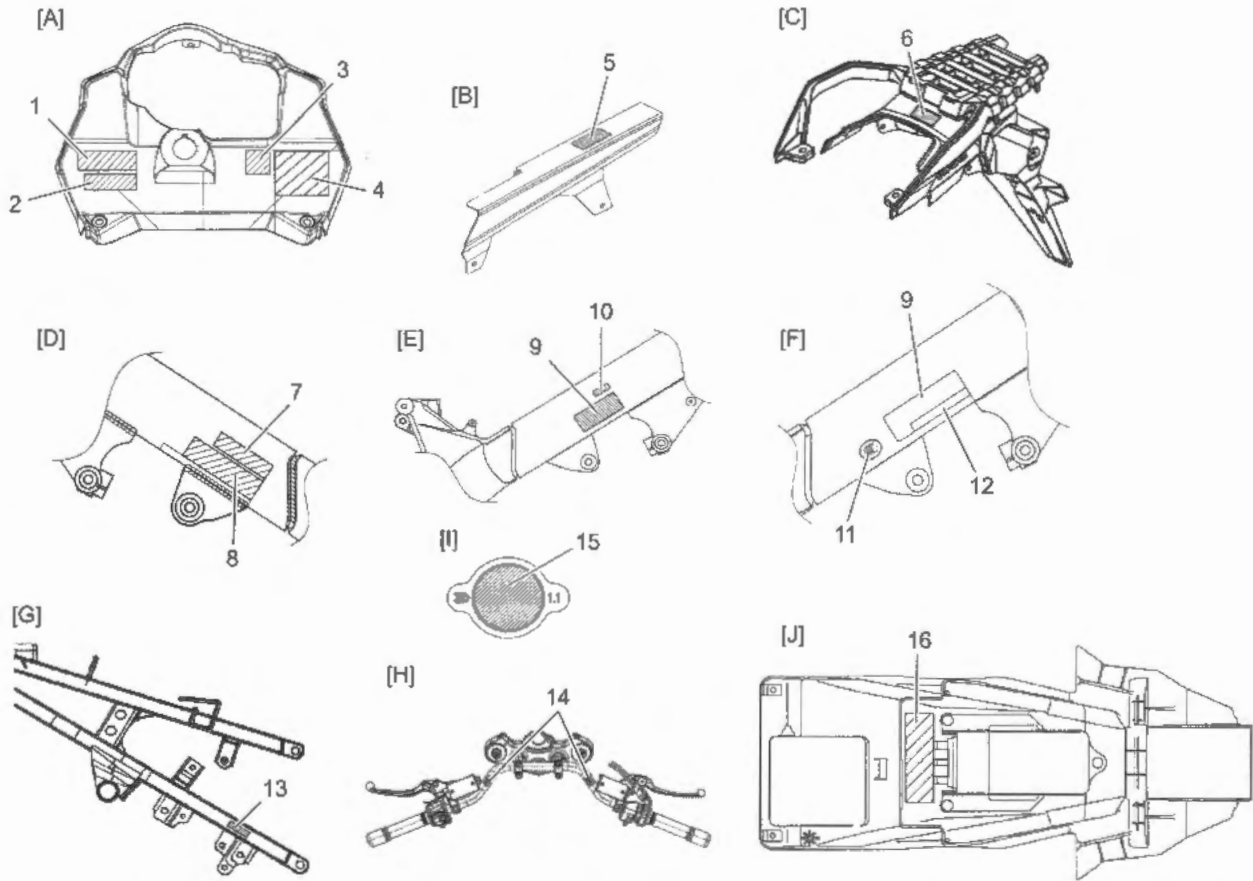
DL1000AL4



IE31J1010006-01

[A]: Meter panel	[J]: Rear fender (front)	9. Safety plate or ID plate (If equipped)
[B]: Chain case	1. Fuel information label or Helmet label (If equipped)	10. Brake approval label (If equipped)
[C]: Rear fender (rear)	2. Fuel information label (If equipped)	11. License label (If equipped)
[D]: Frame (left side)	3. Fuel limitation label (If equipped)	12. Manufacturer label (If equipped)
[E]: Frame (right side)	4. General warning label	13. Brake fluid information label (If equipped)
[F]: Frame (right side)	5. Tire information label	14. Brake fluid information label (If equipped)
[G]: Seat rail	6. Loading capacity label (If equipped)	15. Radiator cap label (If equipped)
[H]: Handlebars	7. Noise label or ICES Canada label (If equipped)	16. Vacuum hose routing label or Manual notice label (If equipped)
[I]: Radiator cap	8. Information label or Noise label (If equipped)	

DL1000AL5 -

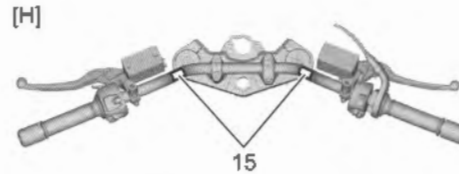
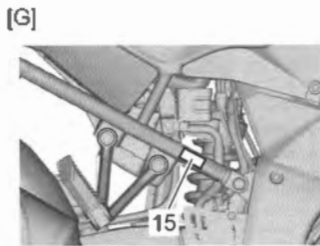
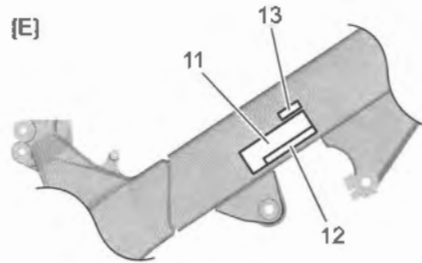
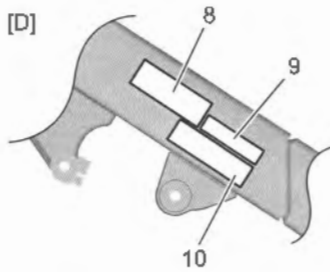
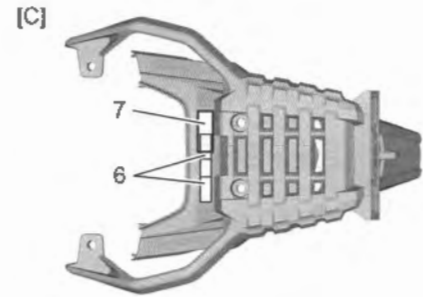
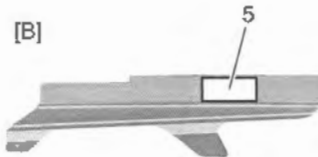
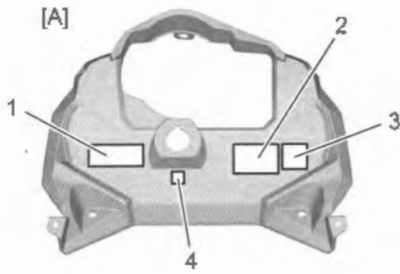


IF31J1010001-04

[A]: Meter panel	[J]: Rear fender (front)	9. Safety plate or ID plate (If equipped)
[B]: Chain case	1. Fuel information label or Helmet label (If equipped)	10. Brake approval label (If equipped)
[C]: Rear fender (rear)	2. Fuel information label (If equipped)	11. License label (If equipped)
[D]: Frame (left side)	3. Fuel limitation label (If equipped)	12. Manufacturer label (If equipped)
[E]: Frame (right side)	4. General warning label	13. Brake fluid information label (If equipped)
[F]: Frame (right side)	5. Tire information label	14. Brake fluid information label (If equipped)
[G]: Seat rail	6. Loading capacity label (If equipped)	15. Radiator cap label (If equipped)
[H]: Handlebars	7. Noise label or ICES Canada label (If equipped)	16. Vacuum hose routing label or Manual notice label (If equipped)
[I]: Radiator cap	8. Information label or Noise label (If equipped)	

0A-7 General Information:

DL1000A/XAL8 –



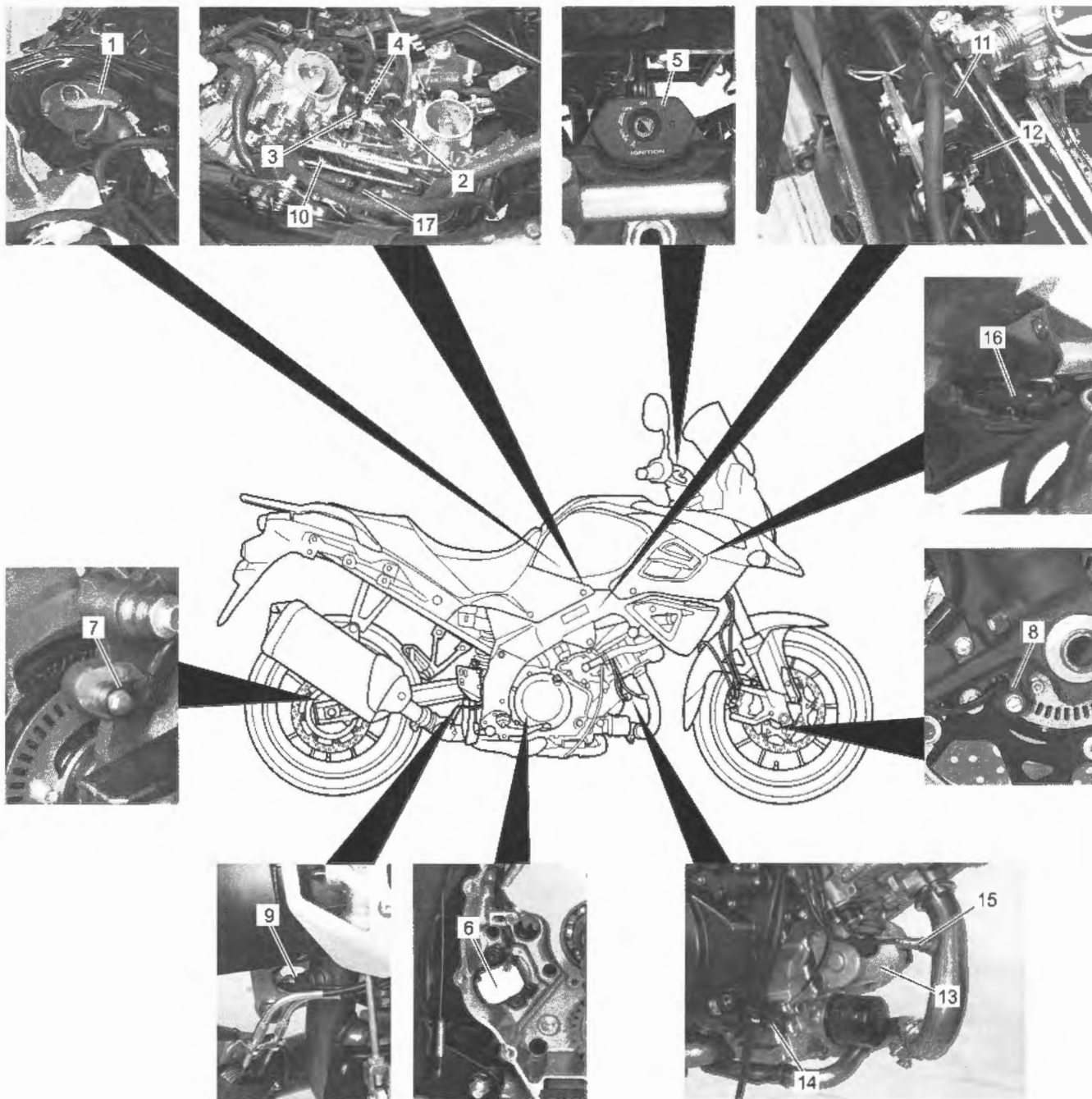
IJ31J1010001-02

[A]: Meter panel	1. Fuel information label or Helmet label	9. EPA noise label or Noise label (If equipped)
[B]: Chain case	2. General warning label	10. Information label or Un noise label (If equipped)
[C]: Rear fender (rear)	3. Gasoline label or Fuel limitation label (If equipped)	11. I.D. plate or Safety plate (If equipped)
[D]: Frame (left side)	4. Max amperage label	12. Manufacturer label (If equipped)
[E]: Frame (right side)	5. Tire information label	13. Brake approval mark label (If equipped)
[F]: Radiator cap	6. Loading capacity label	14. Radiator cap label (If equipped)
[G]: Seat rail	7. Manual notice label (If equipped)	15. Brake fluid information label (If equipped)
[H]: Handlebars	8. Vacuum hose routing label (If equipped)	

Component Location

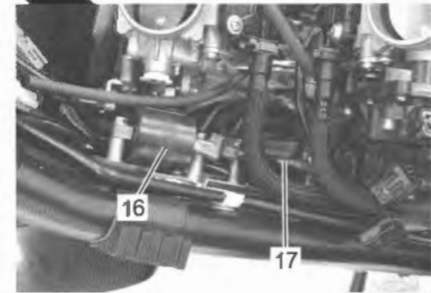
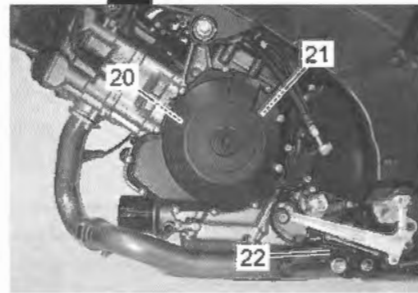
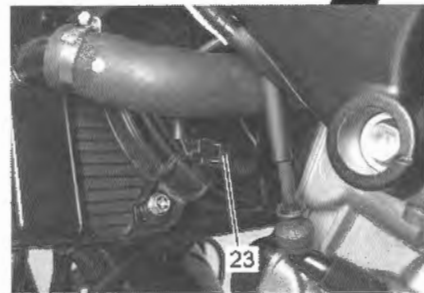
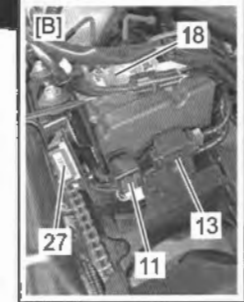
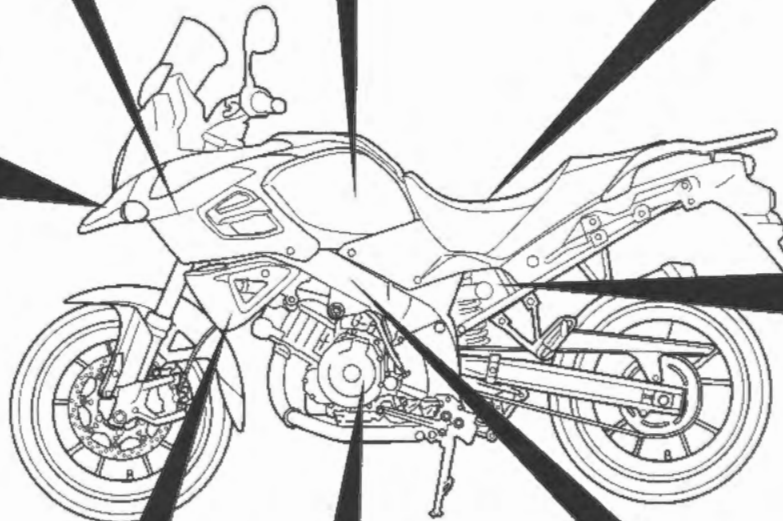
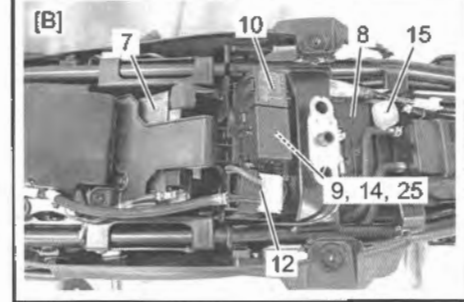
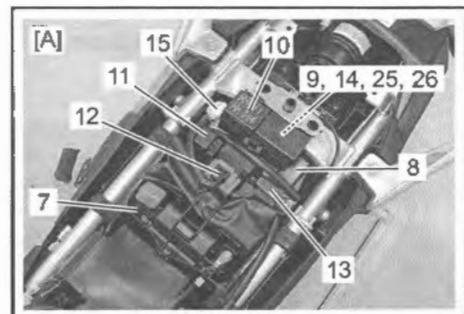
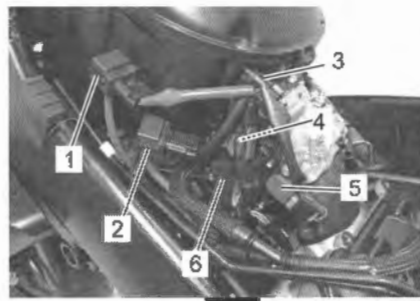
Electrical Components Location

BENJ31J30103001



LJ31J1010002-01

1. Fuel pump/Fuel level gauge	7. Rear wheel speed sensor	13. Starter motor
2. Fuel injector #1	8. Front wheel speed sensor	14. Oil pressure switch
3. Fuel injector #2	9. HO2 sensor #2	15. HO2 sensor #1
4. EVAP system purge control solenoid valve (If equipped)	10. ECT sensor	16. Ambient air temperature sensor
5. Immobilizer antenna (If equipped)	11. Ignition coil #1 (center)	17. PAIR control solenoid valve (If equipped)
6. GP switch	12. Ignition coil #2 (side)	



IJ31J1010003-03

[A]: L4 - L6	9. Cooling fan relay	19. Horn
[B]: L8 -	10. Fuse box	20. Generator
1. IAP sensor #1	11. Turn signal relay	21. CKP sensor
2. IAP sensor #2	12. Starter relay/main fuse	22. Side-stand switch
3. IAT sensor	13. TO sensor	23. Cooling fan
4. STP sensor	14. Fuel pump relay	24. Regulator/rectifier
5. TP sensor	15. Mode select coupler	25. Side-stand relay
6. STV/ISC actuator	16. Ignition coil #1 (side)	26. Starter sub relay (If equipped)
7. Battery	17. Ignition coil #2 (center)	27. IMU
8. ECM	18. ABS control unit/HU	

Maintenance and Lubrication

Precautions

Precautions for Maintenance

BENJ31J30200001

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

BENJ31J30205001

NOTE

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

L4 – L6

Item	Interval					
	months	2	12	24	36	48
	km	1000	6000	12000	18000	24000
	miles	600	4000	7500	11000	14500
Air cleaner element (I: (Page 0B-4), R: (Page 0B-4))	—	I	I	R	I	I
Exhaust pipe bolts and muffler bolts (T: (Page 0B-4))	T	—	T	—	—	T
Exhaust control valve (I: (Page 0B-4))	I	—	I	—	—	I
Valve clearance (I: (Page 0B-4))	—	—	—	—	—	I
Spark plugs (I: (Page 0B-4), R: (Page 0B-4))	—	I	R	I	I	R
Fuel line (I: (Page 0B-4), R: (Page 0B-4))	—	I	I	I	I	I
	Replace every 4 years.					
Engine oil (R: (Page 0B-4))	R	R	R	R	R	R
Engine oil filter (R: (Page 0B-4))	R	—	—	R	—	—
Idle speed (I: (Page 0B-4))	I	I	I	I	I	I
Throttle cable play (I: (Page 0B-4))	I	I	I	I	I	I
Throttle valve synchronization (I: (Page 0B-4))	(CA. only)	—	I	—	—	I
PAIR (air supply) system (DL1000AL5 –) (I: (Page 0B-4))	—	—	I	—	—	I
EVAP control system (if equipped) (I: (Page 0B-4), R: (Page 0B-4))	—	—	I	—	—	I
	Replace EVAP hose 4 years.					
Cooling system	—	I	I	I	I	I
Engine coolant (R: (Page 0B-5))	"SUZUKI SUPER LONG LIFE COOLANT" (Blue)	Replace every 4 years or 48000 km (29000 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-5))	—	I	I	I	I	I
Clutch hose (I: (Page 0B-5), R: (Page 0B-5))	—	I	I	I	I	I
	Replace every 4 years.					
Clutch fluid (I: (Page 0B-5), R: (Page 0B-5))	—	I	I	I	I	I
	Replace every 2 years.					
Drive chain (I: (Page 0B-5), I: (Page 0B-5))	I	I	I	I	I	I
	Clean and lubricate every 1000 km (600 miles).					
Brakes (I: (Page 0B-5))	I	I	I	I	I	I
Brake hose (I: (Page 0B-5), R: (Page 0B-5))	—	I	I	I	I	I
	Replace every 4 years.					
Brake fluid (I: (Page 0B-5), R: (Page 0B-5))	—	I	I	I	I	I
	Replace every 2 years.					
Tires (I: (Page 0B-5))	—	I	I	I	I	I
Steering (I: (Page 0B-5))	I	—	I	—	—	I
Front forks (I: (Page 0B-5))	—	—	I	—	—	I
Rear suspension (I: (Page 0B-5))	—	—	I	—	—	I
Chassis bolts and nuts (T: (Page 0B-6))	T	T	T	T	T	T

Item	Interval					
	months	2	12	24	36	48
	km	1000	6000	12000	18000	24000
miles	600	4000	7500	11000	14500	
Lubrication (I: ☞(Page 0B-9))	Lubricate at every 1000 km (600 miles).					

L8 -

Item	Interval					
	months	2	12	24	36	48
	km	1000	6000	12000	18000	24000
miles	600	4000	7500	11000	14500	
Air cleaner element (I: ☞(Page 0B-4), R: ☞(Page 0B-4))	—	I	I	R	I	I
Exhaust pipe bolts and muffler bolts (T: ☞(Page 0B-4))	T	—	T	—	T	T
Exhaust control valve (I: ☞(Page 0B-4))	I	—	I	—	I	I
Valve clearance (I: ☞(Page 0B-4))	—	—	—	—	—	I
Spark plugs (I: ☞(Page 0B-4), R: ☞(Page 0B-4))	—	I	R	I	R	R
Fuel hose (I: ☞(Page 0B-4))	—	I	I	I	I	I
Evaporative emission control system (if equipped) (I: ☞(Page 0B-4))	—	—	I	—	I	I
Engine oil (R: ☞(Page 0B-4))	R	R	R	R	R	R
Engine oil filter (R: ☞(Page 0B-4))	R	—	—	R	—	—
Idle speed (I: ☞(Page 0B-4))	I	I	I	I	I	I
Throttle cable play (I: ☞(Page 0B-4))	I	I	I	I	I	I
PAIR (air supply) system (if equipped) (I: ☞(Page 0B-4))	—	—	I	—	I	I
Throttle valve synchronization (I: ☞(Page 0B-4))	I (CA. only)	—	I	—	I	I
Engine coolant (R: ☞(Page 0B-5))	"SUZUKI SUPER LONG LIFE COOLANT" (Blue)	Replace every 4 years or 48000 km (29000 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-5))	—	I	I	I	I	I
Clutch hose (I: ☞(Page 0B-5), R: ☞(Page 0B-5))	—	Replace every 4 years				
Clutch fluid (I: ☞(Page 0B-5), R: ☞(Page 0B-5))	—	Replace every 2 years				
Drive chain (I: ☞(Page 0B-5), I: ☞(Page 0B-5))	I	I	I	I	I	I
Brakes (I: ☞(Page 0B-5))	I	I	I	I	I	I
Brake hose (I: ☞(Page 0B-5), R: ☞(Page 0B-5))	—	Replace every 4 years				
Brake fluid (I: ☞(Page 0B-5), R: ☞(Page 0B-5))	—	Replace every 2 years				
Tires (I: ☞(Page 0B-5))	—	I	I	I	I	I
Steering (I: ☞(Page 0B-5))	I	—	I	—	I	I
Front forks (I: ☞(Page 0B-5))	—	—	I	—	I	I
Rear suspension (I: ☞(Page 0B-5))	—	—	I	—	I	I
Chassis bolts and nuts (T: ☞(Page 0B-6))	T	T	T	T	T	T
Lubrication (I: ☞(Page 0B-9))	Lubricate every 1000 km (600 miles)					
Spoke wheels (DL1000XA) (I: ☞(Page 0B-5))	I	I	I	I	I	I

Repair Instructions

Air Cleaner Element Replacement

BENJ31J30206001

Replace the air cleaner element with a new one.

☞(Page 1D-3)

Air Cleaner Element Inspection and Cleaning

BENJ31J30206002

☞(Page 1D-3)

Exhaust Pipe Bolts and Muffler Bolts Inspection

BENJ31J30206003

Refer to "Exhaust System Inspection" in Section 1K (Page 1K-21).

Exhaust Control Valve Inspection

BENJ31J30206004

☞(Page 1K-8)

Valve Clearance Inspection and Adjustment

BENJ31J30206005

Inspect intake and exhaust valve clearance and adjust as necessary. ☞(Page 1D-15)

Spark Plug Replacement

BENJ31J30206006

Replace spark plugs with new ones. ☞(Page 1H-6)

Spark Plug Inspection and Cleaning

BENJ31J30206007

Inspect spark plugs and clean as necessary. ☞(Page 1H-7)

Fuel Line Inspection

BENJ31J30206008

Inspect fuel lines for loose connection, deterioration or damage which could cause leakage. ☞(Page 1G-6)

Fuel Line Replacement

BENJ31J30206009

Refer to "Fuel Feed Hose Removal and Installation" in Section 1G (Page 1G-15).

Engine Oil Replacement

BENJ31J30206010

☞(Page 1E-4)

Engine Oil Filter Replacement

BENJ31J30206011

☞(Page 1E-5)

Idle Speed Inspection

BENJ31J30206012

- 1) Warm up the engine.
- 2) Inspect the idle speed. When the idle speed is out of prescribed value, check conditions of air intake and operations of ISC valve, etc. Refer to "DTC P0506 (C65)": L4 - L6 in Section 1A (Page 1A-60) and "DTC P0507 (C65)": L4 - L6 in Section 1A (Page 1A-62), or "DTC P0506 / P0507 (C65)": L8 - in Section 1A (Page 1A-130).

NOTE

The idle speed is automatically regulated by ISC valve. Therefore, the engine is not equipped with a regulating adjuster.

Idle speed

Standard: (Without PAIR system): 1200 ± 100 rpm

Standard: (With PAIR system): 1300 ± 100 rpm

Throttle Cable Play Inspection and Adjustment

BENJ31J30206013

Inspect throttle cable play and adjust it if necessary.

☞(Page 1C-4)

PAIR System Inspection (If Equipped)

BENJ31J30206014

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

Throttle Valve Synchronization

BENJ31J30206015

Inspect throttle valve synchronization and adjust it as necessary. ☞(Page 1C-11)

EVAP Control System Inspection (If Equipped)

BENJ31J30206016

Inspect EVAP Hose, EVAP Canister and EVAP purge control solenoid valve. ☞(Page 1B-15)

EVAP Hose Replacement (If Equipped)

BENJ31J30206017

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

Cooling System Inspection

BENJ31J30206018

Inspect engine coolant level and adjust as necessary.

☞(Page 1F-6)

Engine Coolant Replacement

BENJ31J30206019

☞(Page 1F-6)

Radiator Hose Inspection

BENJ31J30206020

Inspect cooling system, hose and connections for leakage, damage and cracks. ☞(Page 1F-9)

Clutch Hose Inspection

BENJ31J30206021

Inspect clutch hose and connections for leakage, damage and cracks. ☞(Page 5C-4)

Clutch Hose Replacement

BENJ31J30206022

☞(Page 5C-6)

Clutch Fluid Inspection

BENJ31J30206023

Check clutch fluid. ☞(Page 5C-4)

Clutch Fluid Replacement

BENJ31J30206024

☞(Page 5C-5)

Drive Chain Inspection and Adjustment

BENJ31J30206025

Inspect drive chain and adjust it as necessary. ☞(Page 3A-2)

Drive Chain Cleaning and Lubricating

BENJ31J30206026

☞(Page 3A-3)

Brake System Inspection

BENJ31J30206027

Brake Pad

Inspect brake pads for excessive wear and damage.

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

Brake Disc

Inspect brake discs for excessive wear, damage and deflection.

- Front: ☞(Page 4B-6)
- Rear: ☞(Page 4C-8)

Brake Light Switch

Inspect brake light switch. ☞(Page 4A-10)

Brake Pedal Height

Inspect the brake pedal height between the pedal face and footrest. ☞(Page 4A-12)

Brake Hose Inspection

BENJ31J30206028

Inspect brake hoses and connections for leakage, damage and cracks. ☞(Page 4A-11) Repair leaky point if any.

Brake Hose Replacement

BENJ31J30206029

Refer to "Front Brake Hose Removal and Installation" in Section 4A (Page 4A-15) and "Rear Brake Hose Removal and Installation" in Section 4A (Page 4A-15).

Brake Fluid Inspection

BENJ31J30206030

Inspect the brake fluid level in both the front and rear brake fluid reservoirs. ☞(Page 4A-11)

Brake Fluid Replacement

BENJ31J30206031

☞(Page 4A-14)

Tire Inspection

BENJ31J30206032

Inspect tires for uneven or excessive wear or damage. If defective, replace. ☞(Page 2D-19)

Steering System Inspection

BENJ31J30206033

☞(Page 6B-7)

Front Fork Inspection

BENJ31J30206034

☞(Page 2B-2)

Rear Suspension Inspection

BENJ31J30206035

☞(Page 2C-2)

Spoke Wheel Inspection (DL1000XA)

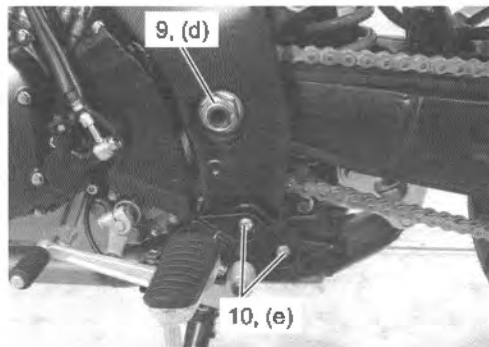
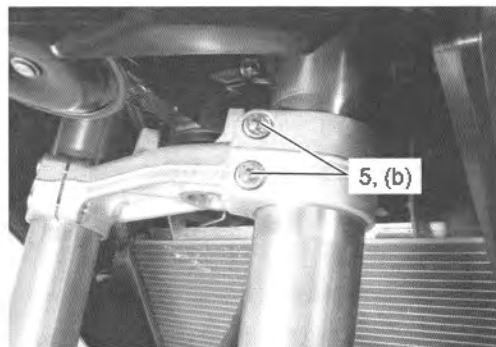
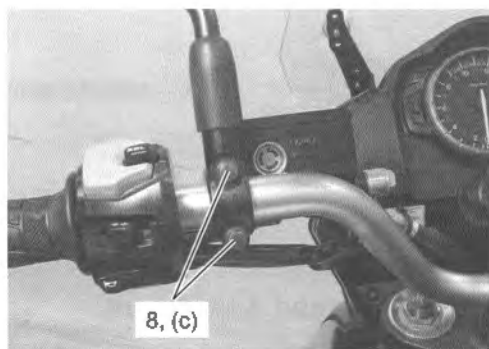
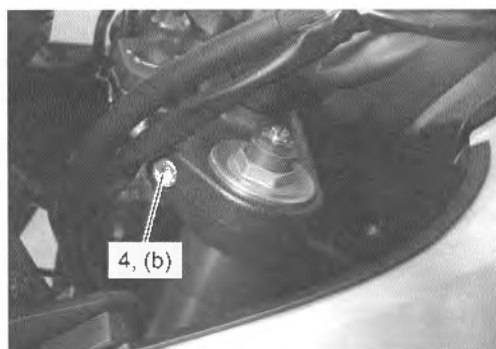
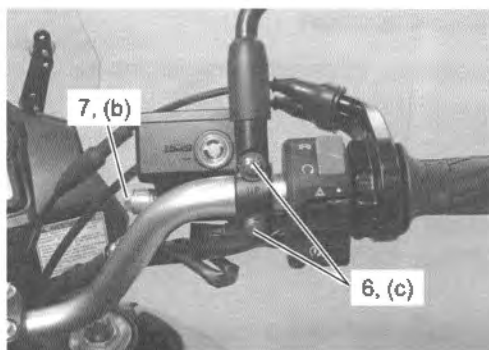
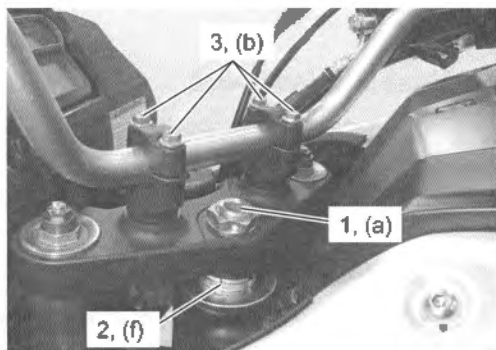
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Refer to "Wheel (DL1000XA)" under "Wheel / Wheel Axle Inspection" in Section 2D (Page 2D-15).

Chassis Bolts and Nuts Inspection

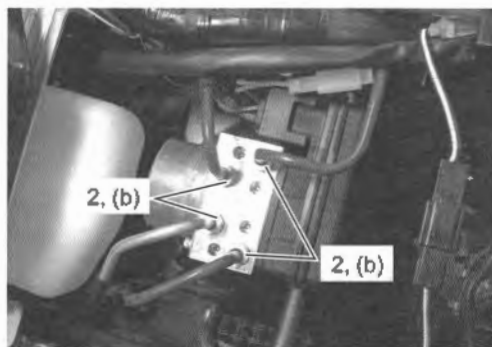
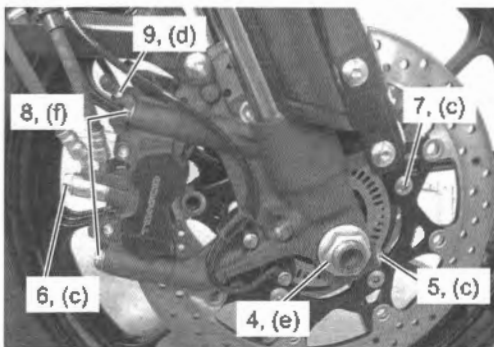
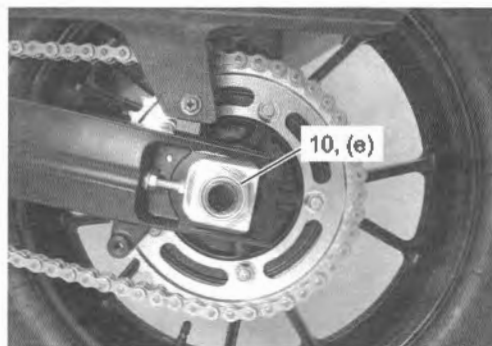
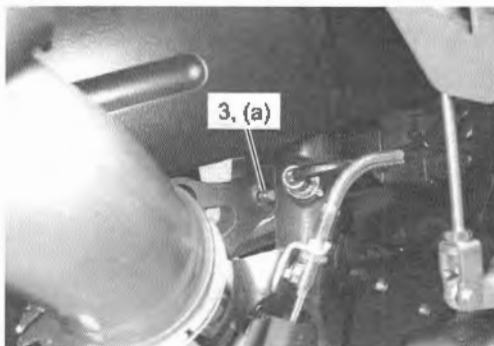
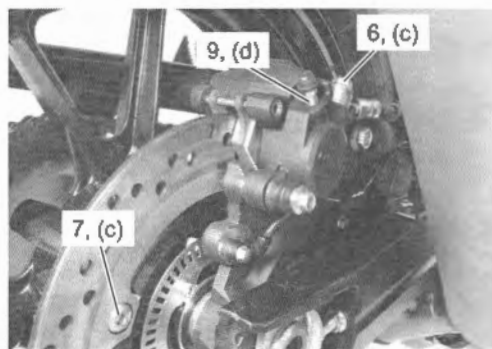
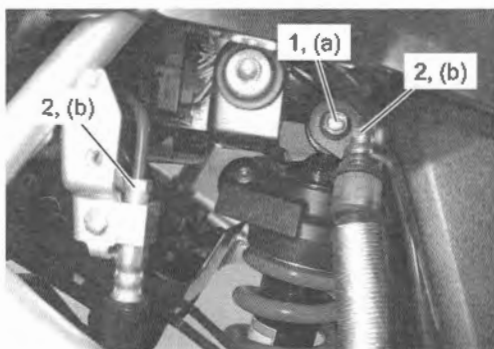
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Check that all chassis bolts and nuts are tightened to their specified torque.



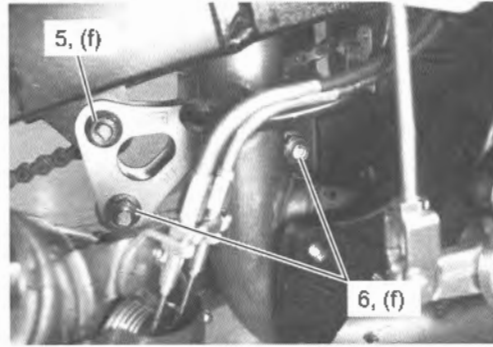
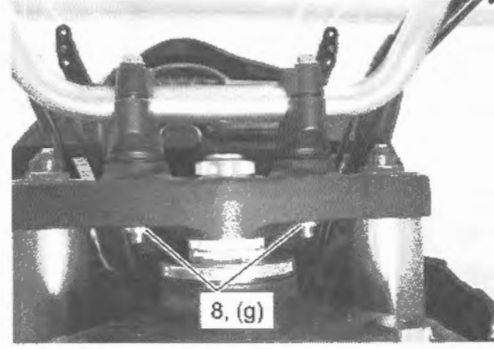
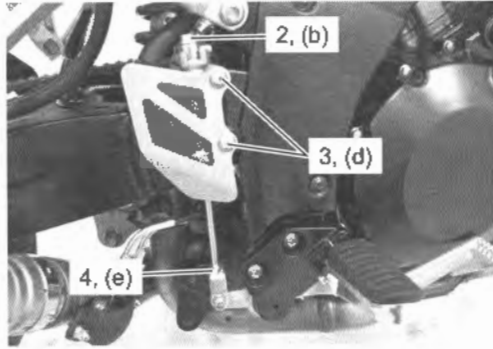
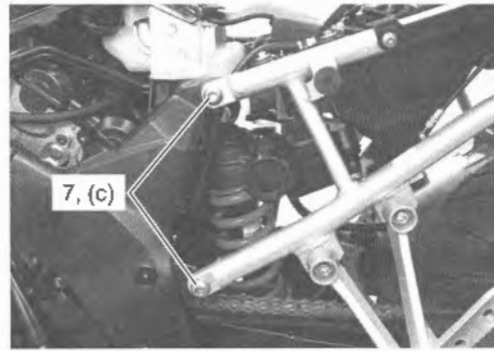
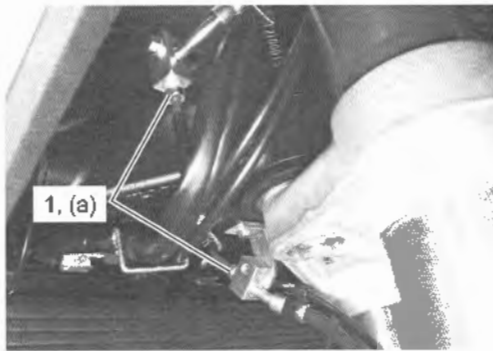
IE31J1020001-02

1. Steering stem head nut	5. Front fork lower clamp bolt	9. Swingarm pivot nut	(c): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
2. Steering stem lock-nut	6. Front brake master cylinder mounting bolt	10. Front footrest bracket bolt	(d): 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
3. Handlebar clamp bolt	7. Brake hose union bolt	(a): 90 N·m (9.0 kgf-m, 65.0 lbf-ft)	(e): 28 N·m (2.6 kgf-m, 19.0 lbf-ft)
4. Front fork upper clamp bolt	8. Clutch master cylinder mounting bolt	(b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)	(f): 80 N·m (8.0 kgf-m, 58.0 lbf-ft)



IE31J1020002-01

1. Rear shock absorber upper mounting nut	7. Brake disc bolt	(c): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2. Brake pipe flare nut	8. Front brake caliper mounting bolt	(d): 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)
3. Rear shock absorber lower mounting nut	9. Brake air bleeder valve	(e): 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
4. Front axle nut	10. Rear axle nut	(f): 39 N·m (3.9 kgf-m, 28.5 lbf-ft)
5. Front axle pinch bolt	(a): 50 N·m (5.0 kgf-m, 36.5 lbf-ft)	
6. Brake hose union bolt	(b): 16 N·m (1.6 kgf-m, 11.5 lbf-ft)	



IE31J1020003-01

1. Brake pipe flare nut	6. Cushion rod mounting nut	(c): 50 N·m (5.0 kgf-m, 36.5 lbf-ft)
2. Brake hose union bolt	7. Seat rail mounting bolt	(d): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
3. Rear brake master cylinder mounting bolt	8. Handlebar holder nut	(e): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
4. Rear brake master cylinder rod lock-nut	(a): 16 N·m (1.6 kgf-m, 11.5 lbf-ft)	(f): 98 N·m (9.8 kgf-m, 71.0 lbf-ft)
5. Cushion lever mounting bolt	(b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)	(g): 45 N·m (4.5 kgf-m, 32.5 lbf-ft)

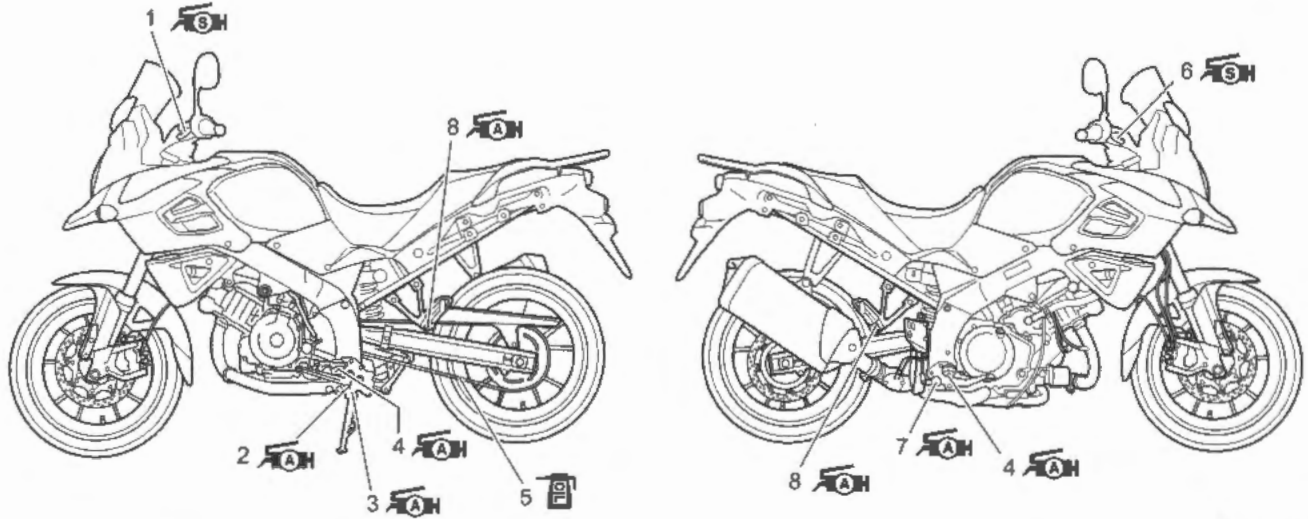
Lubrication Points

BENJ31J30206038

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.



IE31J1020004-01

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

Special Tools and Equipment

Recommended Service Material

BENJ31J30208001

NOTE

Required service material(s) is also described in: "Lubrication Points" (Page 0B-9)

Service Data

Precautions

Precautions for Service Data

BENJ31J3030001

NOTE

Specifications and service data are subject to change without notice.

Specifications

Specifications

BENJ31J30307001

Dimensions and curb mass

Item	Specification	Remark
Overall length	2285 mm (90.0 in)	L4 – L6
	2280 mm (89.8 in)	L8 –
Overall width	865 mm (34.1 in)	L4 – L6
	930 mm (36.6 in)	L8 –
Overall height	1410 mm (55.5 in)	L4 – L6
	1470 mm (57.9 in)	L8 –
Wheelbase	1555 mm (61.2 in)	—
Ground clearance	165 mm (6.5 in)	—
Seat height	850 mm (33.5 in)	—
Curb mass	228 kg (503 lbs)	L4 – L6
	232 kg (511 lbs)	DL1000AL8
	233 kg (514 lbs)	DL1000XAL8

Engine

Item	Specification	Remark
Type	4-stroke, liquid-cooled, DOHC, 90-degree V-twin	—
Number of cylinders	2	—
Bore	100.0 mm (3.937 in)	—
Stroke	66.0 mm (2.598 in)	—
Displacement	1037 cm ³ (63.3 cu. in)	—
Compression ratio	11.3 : 1	—
Fuel system	Fuel injection system	—
Air cleaner	Paper element	—
Starter system	Electric	—
Lubrication system	Wet sump	—
Idle speed	1100 – 1300 r/min	Without PAIR system
	1200 – 1400 r/min	With PAIR system

Drive train

Item	Specification	Remark
Clutch	Wet multi-plate	—
Transmission	6-speed constant mesh	—
Gearshift pattern	1-down, 5-up	—
Primary reduction ratio	1.838 (57/31)	—
Gear ratios	Low	3.000 (36/12)
	2nd	1.933 (29/15)
	3rd	1.500 (27/18)
	4th	1.227 (27/22)
	5th	1.086 (25/23)
	Top	1.000 (24/24)
Final reduction ratio	2.411 (41/17)	—
Drive chain	RK525SMOZ8, 116 links	—

Chassis

Item	Specification	Remark
Front suspension	Telescopic, coil spring, oil damped	—
Rear suspension	Link type, coil spring, oil damped	—
Front fork stroke	160 mm (6.3 in)	—
Rear wheel travel	160 mm (6.3 in)	—
Steering angle	36° (right & left)	—
Caster	25° 30'	—
Trail	109 mm (4.29 in)	—
Turning radius	2.9 m (9.5 ft)	—
Front brake	Disc brake, twin	—
Rear brake	Disc brake	—
Front tire	110/80R19M/C 59V, tubeless	—
Rear tire	150/70R17M/C 69V, tubeless	—

Electrical

Item		Specification	Remark
Ignition type		Electronic ignition (Transistorized)	—
Spark plug		NGK LMAR8BI-9	—
Battery		12 V 43.2 kC (12 Ah)/10 HR	L4 - L6
		12 V 40.3 kC (11.2 Ah)/10 HR	L8 -
Generator		Three-phase A.C. generator	—
Main fuse		30 A	—
Fuse		15/15/15/15/10/10/3 A	—
ABS fuse		25/15 A	—
Headlight	Hi beam	12 V 65 W H9	—
	Low beam	12 V 55 W H7	—
Position light		12 V 5 W	—
Brake light/Tail light		LED	—
Turn signal light		12 V 21 W	—
License plate light		12 V 5 W	—
Instrument panel light		LED	—
Turn signal indicator light		LED	—
Neutral indicator light		LED	—
Hi beam indicator light		LED	—
Engine coolant temperature indicator light/Oil pressure indicator light		LED	—
Fuel injection indicator light		LED	L4 - L6
MIL			L8 -
Freeze indicator light		LED	—
ABS indicator light		LED	—
Immobilizer indicator light		LED	If equipped
Traction control system indicator light		LED	—

Capacities

Item		Specification	Remark
Fuel tank		20.0 L (5.3 US gal, 4.4 Imp gal)	—
Engine oil	Oil change	2700 ml (2.9 US qt, 2.4 Imp qt)	—
	With filter change	3100 ml (3.3 US qt, 2.7 Imp qt)	—
Engine coolant		2.13 L (2.3 US qt, 1.9 Imp qt)	—

Service Data

Engine General Information and Diagnosis

Item	Standard / Specification		Limit / Note	
IAP sensor power supply voltage (#1 & #2)	4.5 – 5.5 V		—	
IAP sensor output voltage (#1 & #2)	Idle speed at 1 atm.	Approx. 2.5 V	—	
IAT sensor input voltage	4.5 – 5.5 V		—	
IAT sensor output voltage	0.15 – 4.85 V		—	
IAT sensor resistance	0 °C (32 °F)	5400 – 6600 Ω	—	
ECT sensor input voltage	4.5 – 5.5 V		—	
ECT sensor output voltage	0.15 – 4.85 V		—	
ECT sensor resistance	20 °C (68 °F)	2320 – 2590 Ω	—	
TP sensor power supply voltage	4.5 – 5.5 V		—	
TP sensor output voltage	Closed	1.10 – 1.14 V	—	
	Opened	Approx. 4.3 V	—	
HO2 sensor output voltage (#1 & #2)	Idle speed	Approx. 0.6 V or less	—	
	6000 r/min	Approx. 0.6 V or more	—	
HO2 sensor heater power supply voltage (#1 & #2)	Battery voltage		—	
HO2 sensor heater resistance (#1 & #2)	23 °C (73 °F)	6.7 – 9.5 Ω	—	
Injector power supply voltage	Battery voltage		—	
Injector resistance	20 °C (68 °F)	11.5 – 12.5 Ω	—	
Continuity between each injector terminal and ground	∞ Ω (Infinity)		—	
FP relay power supply voltage	Battery voltage		—	
CKP sensor resistance	145 – 225 Ω		—	
Continuity between each CKP sensor terminal and ground	∞ Ω (Infinity)		—	
CKP sensor peak voltage	4.5 V or more		When cranking	
EVAP system purge control solenoid valve power supply voltage	Battery voltage		If equipped	
EVAP system purge control solenoid valve resistance	20 °C (68 °F)	30 – 34 Ω	If equipped	
Cooling fan relay power supply voltage	Battery voltage		—	
Immobilizer antenna power supply voltage	Battery voltage		If equipped	
TO sensor power supply voltage	4.5 – 5.5 V		—	
TO sensor voltage	Normal	0.4 – 1.4 V	—	
	Leaning 65°	3.7 – 4.4 V	—	
TO sensor resistance	16.5 – 22.3 kΩ		—	
PAIR control solenoid valve power supply voltage	DL1000AL5 –	Battery voltage	If equipped	
PAIR control solenoid valve resistance	DL1000AL5 –	20 – 30 °C (68 – 86 °F)	20 – 24 Ω	If equipped
STP sensor power supply voltage	4.5 – 5.5 V		—	
STP sensor output voltage	Closed	Approx. 0.6 V	—	
	Opened	Approx. 4.5 V	—	
STVA resistance	Approx. 7 Ω		—	
ECM power supply voltage	Battery voltage		—	

Emission Control Devices

Item	Standard / Specification		Limit / Note	
EVAP system purge control solenoid valve resistance	20 °C (68 °F)	30 – 34 Ω	If equipped	
PAIR control solenoid valve resistance	DL1000AL5 –	20 – 30 °C (68 – 86 °F)	20 – 24 Ω	If equipped

Engine Electrical Devices

Item	Standard / Specification		Limit / Note
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)		—
Idle speed (When engine is warmed)	1100 – 1300 r/min		Without PAIR system
	1200 – 1400 r/min		With PAIR system
Fast idle speed	1500 r/min		—
IAT sensor resistance	0 °C (32 °F)	5400 – 6600 Ω	—
	80 °C (176 °F)	290 – 390 Ω	—
ECT sensor resistance	-20 °C (-4 °F)	13840 – 16330 Ω	—
	20 °C (68 °F)	2320 – 2590 Ω	—
	80 °C (176 °F)	310 – 326 Ω	—
GP switch voltage	0.6 V or more		From 1st to Top
Throttle body I.D. No.	Non-Euro4 model	31J1	With EVAP control system
		31J0	Without EVAP control system
	Euro4 model	31J2	—
Throttle body bore size	45 mm (1.8 in)		—

Engine Mechanical

Item	Standard / Specification		Limit / Note
Compression pressure (Automatic de-comp. actuated)	1000 – 1400 kPa (10 – 14 kgf/cm ² , 142 – 199 psi)		800 kPa (8 kgf/cm ² , 114 psi)
Compression pressure difference	—		200 kPa (2 kgf/cm ² , 28 psi)
Cam height	IN.	36.28 – 36.32 mm (1.428 – 1.430 in)	35.98 mm (1.417 in)
	EX.	35.68 – 35.72 mm (1.405 – 1.406 in)	35.38 mm (1.393 in)
Camshaft journal oil clearance	IN. & EX.	0.019 – 0.053 mm (0.0007 – 0.0021 in)	0.150 mm (0.0059 in)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 mm (0.8666 – 0.8671 in)	—
Camshaft journal O.D.	IN. & EX.	21.972 – 21.993 mm (0.8650 – 0.8659 in)	—
Camshaft runout	IN. & EX.	—	0.10 mm (0.004 in)
Valve clearance (When engine is cold)	IN.	0.10 – 0.20 mm (0.004 – 0.008 in)	—
	EX.	0.20 – 0.30 mm (0.008 – 0.012 in)	—
Valve diameter	IN.	36 mm (1.4 in)	—
	EX.	33 mm (1.3 in)	—
Valve stem runout	IN. & EX.	—	0.05 mm (0.002 in)
Valve head radial runout	IN. & EX.	—	0.03 mm (0.001 in)
Valve head thickness	IN. & EX.	—	0.5 mm (0.02 in)
Valve stem deflection	IN. & EX.	—	0.35 mm (0.014 in)
Valve stem O.D.	IN.	5.475 – 5.490 mm (0.2156 – 0.2161 in)	—
	EX.	5.455 – 5.470 mm (0.2148 – 0.2154 in)	—
Valve seat width	IN.	1.17 – 1.37 mm (0.046 – 0.054 in)	—
	EX.	1.31 – 1.51 mm (0.052 – 0.059 in)	—
Valve guide I.D.	IN. & EX.	5.500 – 5.512 mm (0.2165 – 0.2170 in)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 mm (0.0004 – 0.0015 in)	—
	EX.	0.030 – 0.057 mm (0.0012 – 0.0022 in)	—
Valve spring free length	IN. & EX.	—	39.6 mm (1.56 in)
Valve spring preload when compressed to 35.6 mm (1.40 in)	IN. & EX.	197 – 227 N (20.1 – 23.1 kgf, 44.3 – 51.0 lbf)	—
Cylinder head distortion	—		0.05 mm (0.002 in)
Cylinder distortion	—		0.05 mm (0.002 in)
Cylinder bore	100.000 – 100.015 mm (3.9370 – 3.9376 in)		No nicks or Scratches
Piston diameter	99.980 – 99.995 mm (3.9362 – 3.9368 in) Measure at 10 mm (0.4 in) from the skirt end.		99.880 mm (3.9323 in)
Piston to cylinder clearance	0.015 – 0.025 mm (0.0006 – 0.0010 in)		0.120 mm (0.0047 in)
Piston ring to groove clearance	1st	—	0.180 mm (0.0071 in)
	2nd	—	0.150 mm (0.0059 in)

Item	Standard / Specification		Limit / Note
Piston ring groove width	1st	L4 - L6 0.83 - 0.85 mm (0.0327 - 0.0335 in) 1.25 - 1.27 mm (0.0492 - 0.0500 in)	—
		L8 - 0.83 - 0.86 mm (0.0327 - 0.0339 in) 1.25 - 1.28 mm (0.0492 - 0.0504 in)	—
	2nd	1.01 - 1.03 mm (0.0398 - 0.0406 in)	—
	Oil	2.01 - 2.03 mm (0.0791 - 0.0799 in)	—
Piston ring thickness	1st	0.76 - 0.81 mm (0.0299 - 0.0319 in) 1.08 - 1.10 mm (0.0425 - 0.0433 in)	—
	2nd	0.97 - 0.99 mm (0.0382 - 0.0390 in)	—
Piston ring free end gap	1st	Approx. 11.0 mm (0.43 in)	8.8 mm (0.35 in)
	2nd	Approx. 13.9 mm (0.55 in)	11.1 mm (0.43 in)
Piston ring end gap	1st	0.10 - 0.25 mm (0.004 - 0.010 in)	0.50 mm (0.020 in)
	2nd	0.30 - 0.45 mm (0.012 - 0.018 in)	0.70 mm (0.028 in)
Piston pin bore I.D.	22.002 - 22.008 mm (0.8662 - 0.8665 in)		22.030 mm (0.8673 in)
Piston pin O.D.	21.995 - 22.000 mm (0.8659 - 0.8661 in)		21.980 mm (0.8654 in)
Conrod small end I.D.	22.010 - 22.018 mm (0.8665 - 0.8668 in)		22.040 mm (0.8677 in)
Conrod big end side clearance	0.17 - 0.32 mm (0.007 - 0.013 in)		0.50 mm (0.020 in)
Conrod big end width	21.95 - 22.00 mm (0.864 - 0.866 in)		—
Crank pin width	44.17 - 44.22 mm (1.739 - 1.741 in)		—
Conrod big end oil clearance	0.032 - 0.056 mm (0.0013 - 0.0022 in)		0.080 mm (0.0031 in)
Conrod big end I.D.	48.000 - 48.016 mm (1.8898 - 1.8904 in)		—
Crank pin O.D.	44.976 - 45.000 mm (1.7707 - 1.7717 in)		—
Crank pin bearing thickness	1.480 - 1.496 mm (0.0583 - 0.0589 in)		—
Crankshaft journal O.D.	47.985 - 48.000 mm (1.8892 - 1.8898 in)		—
Crankshaft journal oil clearance	0.023 mm (0.0009 in) or less		0.080 mm (0.0031 in)
Crankcase journal I.D.	52.000 - 52.018 mm (2.0472 - 2.0479 in)		—
Crankcase journal bearing thickness	1.999 - 2.008 mm (0.0787 - 0.0791 in)		—
Crankshaft journal holder width	25.2 - 25.4 mm (0.99 - 1.00 in)		—
Crankshaft journal width	25.50 - 25.55 mm (1.004 - 1.006 in)		—
Crankshaft runout	—		0.05 mm (0.002 in)

Engine Lubrication System

Item	Standard / Specification		Limit / Note
Oil pressure (at 60 °C, 140 °F)	3000 r/min	400 - 700 kPa (4 - 7 kgf/cm ² , 57 - 100 psi)	—
Necessary amount of engine oil	Oil change	2700 ml (2.9 US qt, 2.4 Imp qt)	—
	Oil and filter change	3100 ml (3.3 US qt, 2.7 Imp qt)	—
	Engine overhaul	3500 ml (3.7 US qt, 3.1 Imp qt)	—

Engine Cooling System

Item	Standard / Specification		Limit / Note
Engine coolant	Reservoir tank side	Approx. 230 ml (0.24 US qt, 0.20 Imp qt)	—
	Engine side	Approx. 1900 ml (2.0 US qt, 1.6 Imp qt)	—
Radiator cap valve opening pressure	108 - 137 kPa (1.1 - 1.4 kgf/cm ² , 15.4 - 19.5 psi)		—
Cooling fan operating temperature	ON → OFF	Approx. 100 °C (212 °F)	—
	OFF → ON	Approx. 105 °C (221 °F)	—
Thermostat valve opening temperature	86.5 - 89.5 °C (188 - 193 °F)		—
Thermostat valve lift	Over 8 mm (0.31 in) at 100 °C (212 °F)		—

Fuel System

Item	Standard / Specification	Limit / Note
Fuel pressure	Approx. 300 kPa (3.0 kgf/cm ² , 43 psi)	—
Fuel pump discharge amount per 10 seconds	167 ml (5.6 US oz, 5.9 Imp oz) or more	—

Ignition System

Item	Standard / Specification	Limit / Note	
Firing order	1-2	—	
Spark plug	Type	NGK: LMAR8BI-9	
	Gap	0.8 – 0.9 mm (0.031 – 0.035 in)	
Spark performance	Over 8 mm (0.3 in) at 1 atm.	—	
Ignition coil primary peak voltage	150 V or more	—	
Ignition coil resistance	Primary	3.06 – 4.14 Ω	(+) Terminal – (-) Terminal
	Secondary	24 – 36 kΩ	(+) Terminal – Plug cap

Starting System

Item	Standard / Specification	Limit / Note	
Starter motor brush length	12 mm (0.47 in)	6.5 mm (0.26 in)	
Starter relay resistance	3 – 6 Ω	—	
Side-stand switch voltage	ON (Side-stand retracted)	0.4 – 0.6 V	—
	OFF (Side-stand on the ground)	1.4 V or more	—
Starter torque limiter slip torque	20 – 45 N·m (2.0 – 4.5 kgf·m, 14.5 – 32.5 lbf·ft)	—	

Charging System

Item	Standard / Specification	Limit / Note	
Battery leakage current	3 mA or less	—	
Regulated voltage (charging output)	5000 r/min	13.5 – 15.0 V	
Generator coil resistance		0.21 – 0.27 Ω	
Generator no-load voltage (When engine is cold)	5000 r/min	75 V (AC) or more	
Recharging time		1.4 A for 5 to 10 hours or 6 A for 1 hour	
Generator maximum output	5000 r/min	Approx. 490 W	
Battery	Type designation	L4 – L6	FTX14-BS
		L8 –	FTZ14S
	Capacity	L4 – L6	12 V 43.2 kC (12 Ah)/10 HR
		L8 –	12 V 40.3 kC (11.2 Ah)/10 HR

Exhaust System

Item	Standard / Specification	Limit / Note
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	Approx. 3.1 kΩ	At adjustment position

Front Suspension

Item	Standard / Specification		Limit / Note
Front fork inner tube O.D.	43 mm (1.7 in)		—
Front fork oil level (Without spring, inner tube fully compressed)	120 mm (4.7 in)		—
Front fork spring free length	328 mm (12.9 in)		321 mm (12.6 in)
Front fork oil capacity (Each leg)	569 ml (19.2 US oz, 20.0 Imp oz)		—
Front fork spring adjuster	11 mm (0.4 in)		—
Front fork damping force adjuster	Rebound	8 clicks counterclockwise from stiffest position	—
	Compression	8 clicks counterclockwise from stiffest position	—

Rear Suspension

Item	Standard / Specification		Limit / Note
Rear shock absorber spring pre-load	11th clicks clockwise from softest position		—
Rear shock absorber damping force adjuster	Rebound	1.25 turns counterclockwise from stiffest position	—
Swingarm pivot shaft runout	—		0.3 mm (0.01 in)

Wheels and Tires

Item	Standard / Specification			Limit / Note
Wheel rim runout	Front & Rear	Axial	—	2.0 mm (0.08 in)
		Radial	—	2.0 mm (0.08 in)
Wheel axle runout	Front & Rear	—		0.25 mm (0.010 in)
Tire size	Front	110/80R19M/C 59V		—
	Rear	150/70R17M/C 69V		—
Tire type	Front	BRIDGESTONE: BW-501 RADIAL J		—
	Rear	BRIDGESTONE: BW-502 RADIAL J		—
Tire tread depth (Recommended depth)	Front	—		1.6 mm (0.06 in)
	Rear	—		2.0 mm (0.08 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)		—
Cold inflation tire pressure (Dual riding)	Front	250 kPa (2.50 kgf/cm ² , 36 psi)		—
	Rear	290 kPa (2.90 kgf/cm ² , 42 psi)		—
Wheel rim size	Front	19 M/C x MT 2.50		—
	Rear	17 M/C x MT 4.00		—

Drive Chain / Drive Train / Drive Shaft

Item	Standard / Specification		Limit / Note
Drive chain	Type	RK525SMOZ8	—
	Links	116 links	—
	20-pitch length	—	319.4 mm (12.57 in)
Drive chain slack (on side-stand)	20 – 30 mm (0.8 – 1.2 in)		—

Brake Control System and Diagnosis

Item	Standard / Specification		Limit / Note
Rear brake pedal height	20 – 30 mm (0.8 – 1.2 in)		—
Master cylinder bore / piston diameter	Front & Rear	Approx. 14.0 mm (0.55 in)	—

0C-9 Service Data:
Front Brakes

Item	Standard / Specification	Limit / Note
Brake disc thickness	4.8 – 5.2 mm (0.19 – 0.20 in)	4.5 mm (0.18 in)
Brake disc runout	—	0.30 mm (0.012 in)
Brake caliper cylinder bore / piston diameter	Approx. 30.3 mm (1.19 in) Approx. 32.1 mm (1.26 in)	—

Rear Brakes

Item	Standard / Specification	Limit / Note
Brake disc thickness	4.8 – 5.2 mm (0.19 – 0.20 in)	4.5 mm (0.18 in)
Brake disc runout	—	0.30 mm (0.012 in)
Brake caliper cylinder bore / piston diameter	Approx. 38.2 mm (1.50 in)	—

ABS

Item	Standard / Specification	Limit / Note
Wheel speed sensor – Sensor rotor clearance	Front	0.46 – 1.67 mm (0.018 – 0.066 in)
	Rear	0.51 – 1.62 mm (0.020 – 0.064 in)

Manual Transmission

Item	Standard / Specification	Limit / Note
Primary reduction ratio	1.838 (57/31)	—
Final reduction ratio	2.411 (41/17)	—
Gear ratios	Low	3.000 (36/12)
	2nd	1.933 (29/15)
	3rd	1.500 (27/18)
	4th	1.227 (27/22)
	5th	1.086 (25/23)
	Top	1.000 (24/24)
Gearshift fork to groove clearance	No.1, 2	0.1 – 0.3 mm (0.004 – 0.012 in)
Gearshift fork groove width	No.1, 2	5.0 – 5.1 mm (0.197 – 0.201 in)
Gearshift fork thickness	No.1, 2	4.8 – 4.9 mm (0.189 – 0.193 in)
Gearshift lever height		20 – 30 mm (0.8 – 1.2 in)

Clutch

Item	Standard / Specification	Limit / Note
Drive plate thickness	No.1, 2	3.72 – 3.88 mm (0.146 – 0.153 in)
Drive plate claw width	No.1, 2	13.90 – 14.00 mm (0.547 – 0.551 in)
Driven plate distortion	No.1, 2, 3, 4	—
Clutch spring free length		45.7 mm (1.80 in)
Master cylinder bore / piston diameter	L4 – L6	Approx. 14.0 mm (0.55 in)
	L8 –	Approx. 12.7 mm (0.500 in)
Release cylinder bore / piston diameter		Approx. 35.7 mm (1.41 in)

Steering / Handlebar

Item	Standard / Specification	Limit / Note
Steering tension initial force	2 – 5 N (0.2 – 0.5 kgf, 0.4 – 1.1 lbf)	—

Wiring Systems

Item		Standard / Specification	Limit / Note
Fuse size	Headlight	Hi	15 A
		Lo	15 A
	Fuel	10 A	—
	Ignition	10 A	—
	Signal	15 A	—
	Fan	15 A	—
	Main	30 A	—
	P-source	3 A	—
	ABS motor	25 A	—
ABS valve	15 A	—	

Lighting Systems

Item	Standard / Specification		Limit / Note
Headlight	Hi	12 V 65 W (H9)	—
	Lo	12 V 55 W (H7)	—
Position light	12 V 5 W		—
Front turn signal light	12 V 21 W × 2		—
Rear turn signal light	12 V 21 W × 2		—
Brake light/Tail light	LED		—
License plate light	12 V 5 W		—

Combination Meter / Fuel Meter / Horn

Item	Standard / Specification		Limit / Note
Ambient air temperature sensor resistance	-20 °C (-4 °F)	13779 – 19083 Ω	—
	-10 °C (14 °F)	8100 – 10609 Ω	—
	0 °C (32 °F)	4928 – 6125 Ω	—
	10 °C (50 °F)	3089 – 3656 Ω	—
	20 °C (68 °F)	1992 – 2251 Ω	—
	25 °C (77 °F)	1615 – 1785 Ω	—
	30 °C (86 °F)	1290 – 1456 Ω	—
	40 °C (104 °F)	838 – 986 Ω	—
Instrument panel light	LED		—
Turn signal indicator light	LED		—
Hi beam indicator light	LED		—
Neutral indicator light	LED		—
ABS indicator light	LED		—
Engine coolant temperature indicator light/Oil pressure indicator light	LED		—
FI indicator light	LED		L4 – L6
MIL	LED		L8 –
TC indicator light	LED		—
Immobilizer indicator light	LED		If equipped
Freeze indicator light	LED		—

Fasteners Information

BENJ31J30307003

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

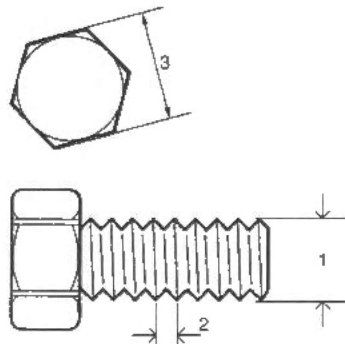
Combining male and female fasteners with different thread pitches will damage both fasteners.

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



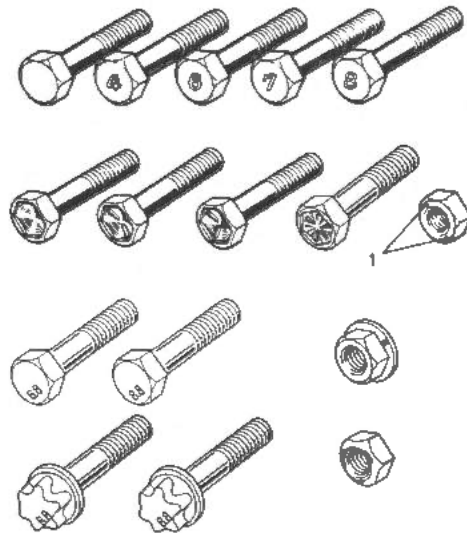
IE31J1030001-01

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).



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1. Nut strength identification

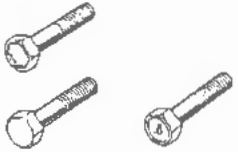





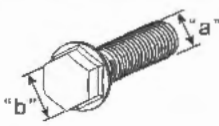
Standard Tightening Torques

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	0.30	0.55	1.3	2.9	4.5	6.5	10.5	16
	lbf-ft	1.0	2.5	4.0	9.5	21.0	32.5	47.0	76.0	116.0
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	0.47	0.84	2.0	4.2	8.0	12.5	19.3	28
	lbf-ft	2.0	3.5	6.0	14.5	30.5	58.0	90.5	139.5	202.5
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	0.49	0.88	2.1	4.4	8.4	13.3	20.3	29.8
	lbf-ft	2.0	3.5	6.5	15.5	32.0	61.0	96.5	147.0	215.5
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	0.45	1.0	2.3	5.0	8.5	13.5	21	24
	lbf-ft	2.0	3.5	7.5	17.0	36.5	61.5	98.0	152.0	174.0
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	0.31	0.63	1.1	2.7	5.6	10.5	16.8	25.8	37.3
	lbf-ft	2.5	4.5	8.0	19.5	40.5	76.0	121.5	187.0	270.0
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	0.32	0.65	1.2	2.9	5.9	11.3	17.5	27	39.5
	lbf-ft	2.5	5.0	9.0	21.0	43.0	82.0	126.5	195.5	286.0
Small crown shape bolt  ID26J1030004-01	Width across flats "b" [mm]	Thread diameter "a" [mm]		Unit						
	7	5		N-m	4.5	kgf-m	0.45	lbf-ft	3.5	
	8	6		N-m	10	kgf-m	1.0	lbf-ft	7.5	

*: Self-locking nut

Special Tools and Equipment

Fuel / Oil / Fluid Recommendation

BENJ31J30308001

Fuel

NOTICE

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

For U.S.A. and Canada

Use unleaded gasoline with an octane rating of 90 AKI or higher.

Unleaded gasoline containing up to 15% MTBE by volume may be used.

Unleaded gasoline containing up to 10% ethanol by volume may be used.

Unleaded gasoline containing up to 5% methanol by volume may be used if it contains appropriate co-solvents and corrosion inhibitors.

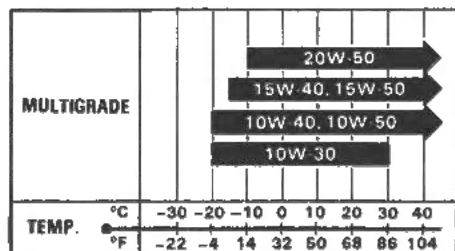
For other countries

Use unleaded gasoline with an octane rating of 95 RON or higher.

Engine Oil

Use engine oils which meet the following requirements.

- API service classification: SG or higher
 - 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.



I310G1010005-01

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.



ID26J1030005-01

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.)

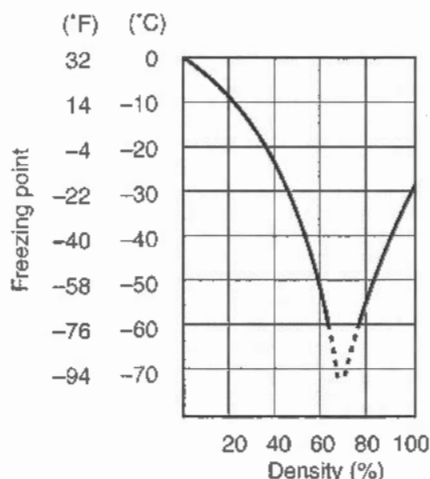
The 50:50 mixture of distilled water and ethylene glycol anti-freeze will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above -31°C (-24°F).

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

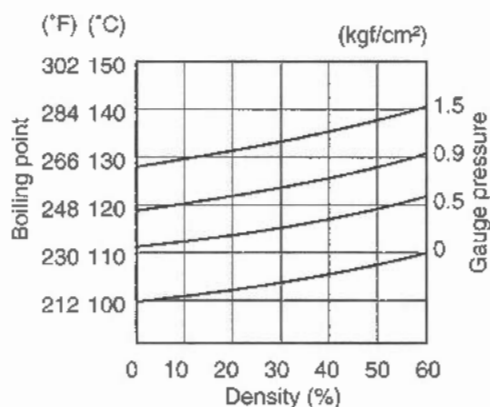
Anti-freeze density	Freezing point
50%	-31°C (-24°F)
55%	-40°C (-40°F)
60%	-55°C (-67°F)

Fig.1: Engine coolant density-freezing point curve



I310G1160001-01

Fig.2: Engine coolant density-boiling point curve



I310G1160002-01

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.

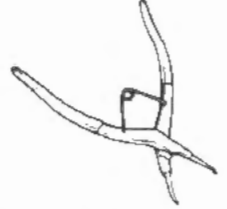
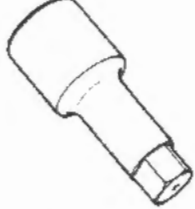
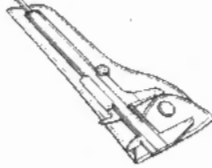
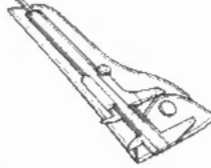


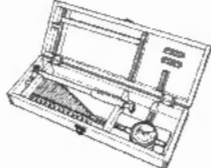

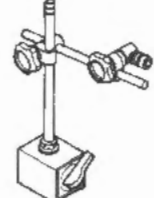
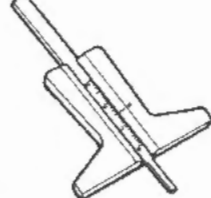
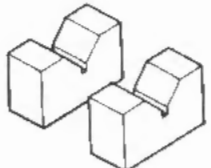


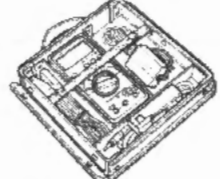
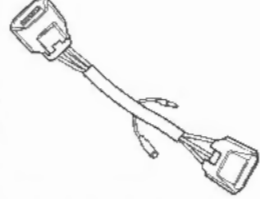
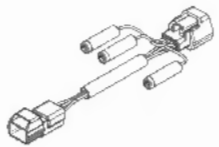


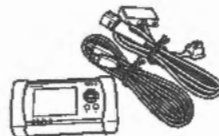
Fork oil 99000-99044-L01 (SUZUKI FORK OIL L-01)

Special Tool

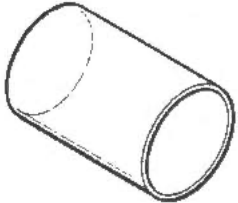
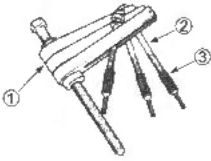

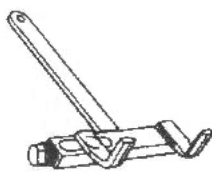
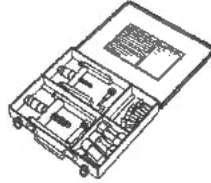

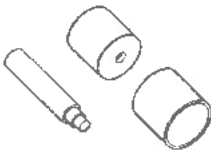


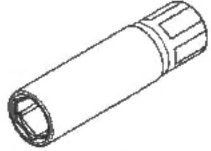

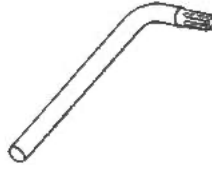
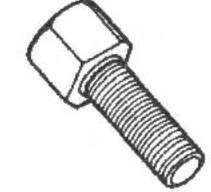
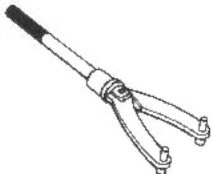
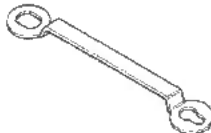
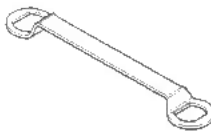
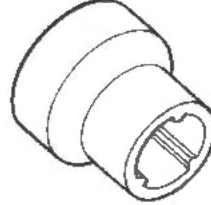
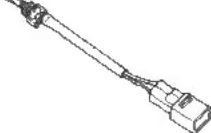
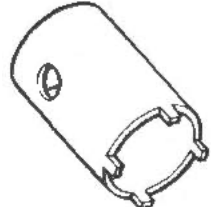


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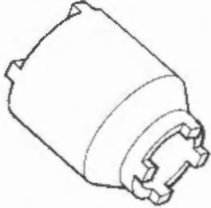
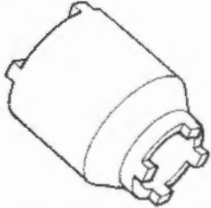

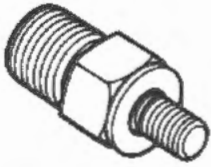
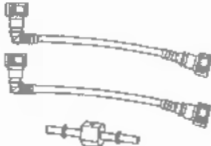

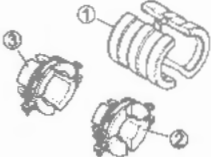
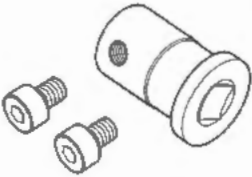
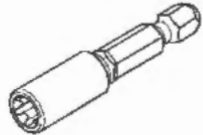



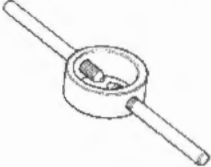


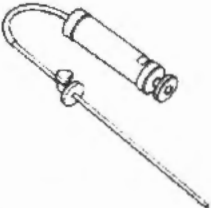



NOTE

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 <p>09900-06107 Snap ring pliers (External)</p>	 <p>09900-06108 Snap ring pliers (Internal)</p>	 <p>09900-18740 Hexagon bit socket (24 mm: 1/2 sq.)</p>	 <p>09900-20101 Vernier calipers (150 mm)</p>	 <p>09900-20102 Vernier calipers (200 mm)</p>
 <p>09900-20202 Micrometer (25 - 50 mm)</p>	 <p>09900-20204 Micrometer (75 - 100 mm)</p>	 <p>09900-20530 Cylinder gauge set</p>	 <p>09900-20602 Dial gauge (1 x 0.001 mm)</p>	 <p>09900-20607 Dial gauge (10 x 0.01 mm)</p>
 <p>09900-20701 Dial gauge chuck</p>	 <p>09900-20803 Thickness gauge</p>	 <p>09900-20805 Tire depth gauge</p>	 <p>09900-20806 Thickness gauge</p>	 <p>09900-21304 V blocks</p>
 <p>09900-22301 Plastigage (0.025 - 0.076 mm)</p>	 <p>09900-22302 Plastigage (0.051 - 0.152 mm)</p>	 <p>09900-22403 Small bore gauge (18 - 35 mm)</p>	 <p>09900-25008 Multi circuit tester set</p>	 <p>09900-25009 Needle point probe set</p>
 <p>09900-28630 TP Sensor test lead</p>	 <p>09900-28631 TP Sensor test lead</p>	 <p>09904-41010 SUZUKI Diagnostic system set</p>	 <p>09904-41030 SDS-II set</p>	 <p>09904-41040 SDS-II (oscilloscope) set</p>

 <p>09904-41051 Conversion cable</p>	 <p>09910-60611 Adjustable hook wrench</p>	 <p>09912-66310 Micrometer (0 - 25 mm)</p>	 <p>09913-50121 Oil seal remover</p>	 <p>09913-60230 Journal bearing remover / installer</p>
 <p>09913-60241 Journal bearing holder</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>09915-74521 Oil pressure gauge hose</p>	 <p>09915-74533 Oil pressure gauge attachment</p>	 <p>09915-77331 Oil pressure gauge (1000 kPa)</p>	 <p>09916-10911 Valve lapper set</p>	 <p>09916-14510 Valve lifter</p>
 <p>09916-14522 Valve lifter attachment</p>	 <p>09916-34542 Reamer handle</p>	 <p>09916-34550 Valve guide reamer (ø5.5)</p>	 <p>09916-34580 Valve guide reamer (ø10.8)</p>	 <p>09916-44910 Valve guide installer / remover</p>
 <p>09916-53340 Valve guide installer attachment</p>	 <p>09916-84511 Tweezers</p>	 <p>09917-47011 Vacuum pump gauge set</p>	 <p>09918-78211 Radiator cap tester kit</p>	 <p>09918-78220 Radiator cap tester adapter</p>

 <p>09919-28620 Sleeve protector</p>	 <p>09920-13120 Crankcase separator</p>	 <p>09920-31020 Extension handle</p>	 <p>09920-53740 Clutch sleeve hub holder</p>	 <p>09921-20240 Bearing remover set</p>
 <p>09922-22711 Drive chain cut / rivet tool set</p>	 <p>09924-74570 Bearing installer / remover</p>	 <p>09924-84510 Bearing installer set</p>	 <p>09924-84521 Bearing installer set</p>	 <p>09925-18011 Bearing installer</p>
 <p>09930-10190 Spark plug socket (14 mm : 3/8 sq.)</p>	 <p>09930-11920 Torx® bit (JT40H)</p>	 <p>09930-11940 Torx® bit holder (3/8 sq.)</p>	 <p>09930-11950 Torx® wrench (T25H)</p>	 <p>09930-30450 Rotor remover bolt</p>
 <p>09930-40113 Rotor holder</p>	 <p>09930-44530 Rotor holder</p>	 <p>09930-44541 Rotor holder</p>	 <p>09930-73110 Starter torque limiter holder</p>	 <p>09930-73120 Starter torque limiter socket</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>09940-14980 Engine mounting adjuster 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>09940-52841 Front fork inner rod holder</p>	 <p>09940-52861 Front fork oil seal installer set</p>	 <p>09940-54860 Front fork cylinder holder attachment</p>	 <p>09940-63110 Torx® bit (E8)</p>	 <p>09940-92720 Spring scale (400 - 1000 g)</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>09941-54911 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>	 <p>99565-01010-034 CD-ROM Ver.34</p>	

Section 1

Engine

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Precautions

Precautions

Precautions for Engine

BENJ31J31000001

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 Identification" in Section 00 (Page 00-8).

Precautions for DTC Trouble Shooting

BENJ31J31000002

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 SDS tool.

- L4 – L6 model: ⚡(Page 1A-20)
 - L8 – model: ⚡(Page 1A-96)
-

Engine General Information and Diagnosis

L4 - L6

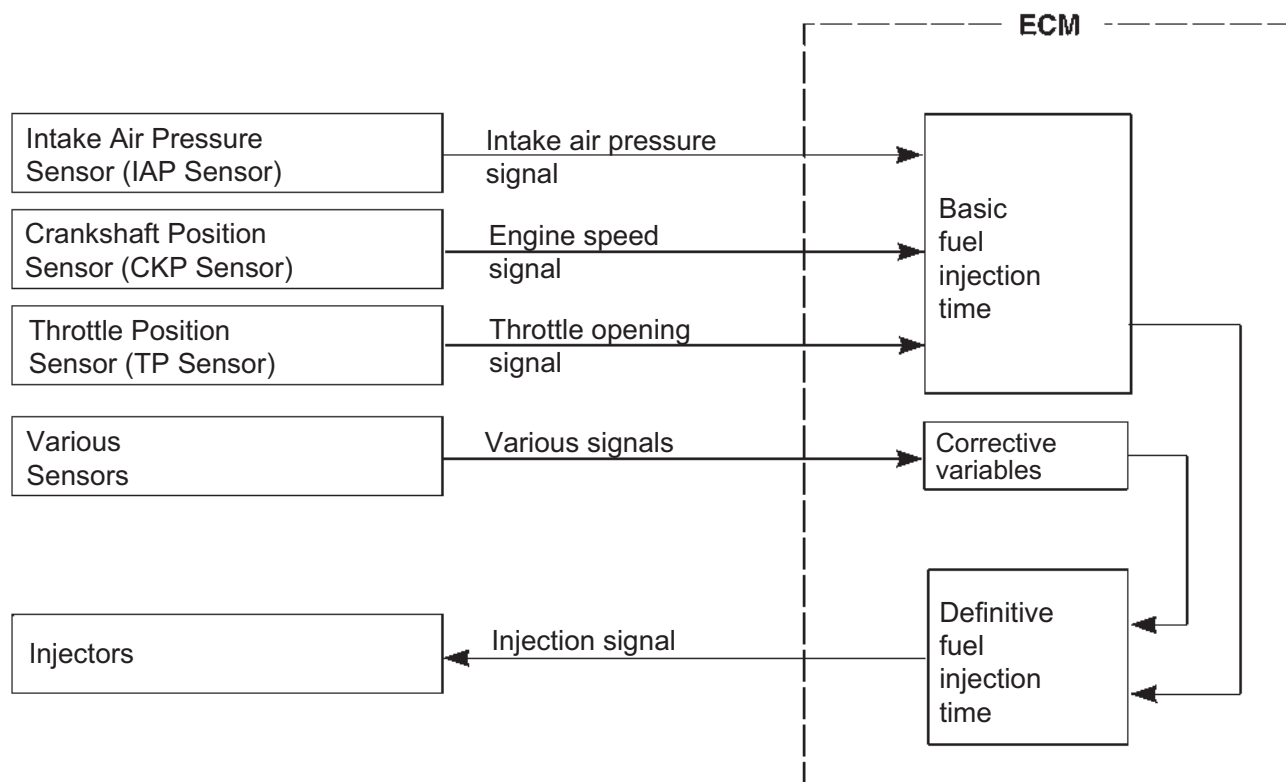
General Description

Injection Timing Description

BENJ31J31111001

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.



1A-2 Engine General Information and Diagnosis: L4 - L6

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
Atmospheric pressure sensor signal	When atmospheric pressure is low, the sensor sends the signal to the ECM and reduce the injection time (volume).
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

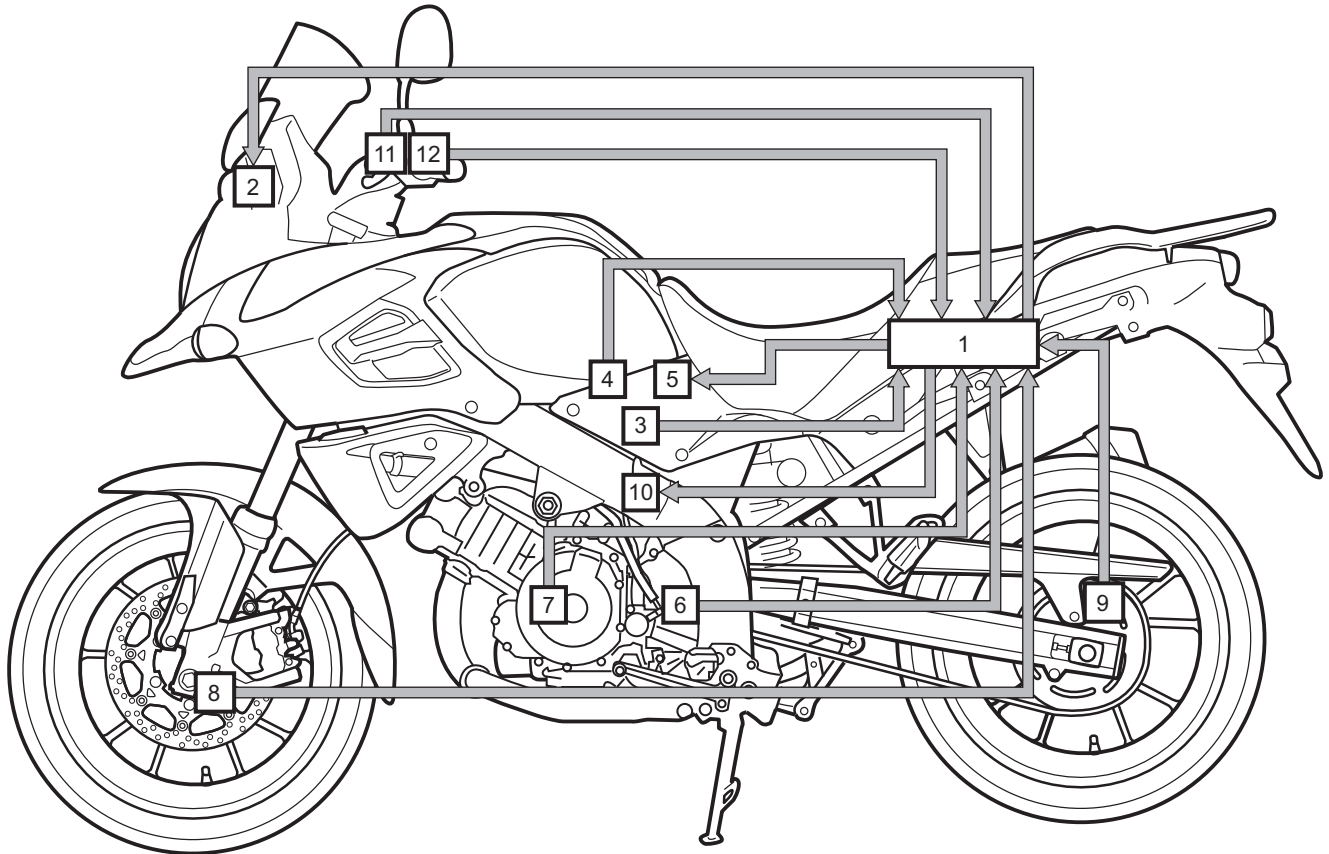
BENJ31J31111002

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.

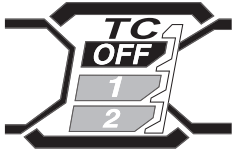
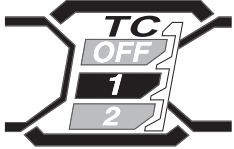
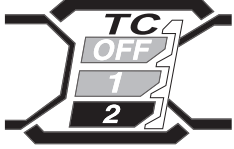
When the rear wheel spin has been detected, ECM reduces engine power output to prevent its spin by controlling ignition timing and STV actuator.



IJ31J1111001-02

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

Traction Control System Mode Description

	Display	Controlled Content
OFF	 <p>IJ31J1111002-01</p>	In "OFF mode", the traction control system does not make the engine control.
Mode 1	 <p>IJ31J1111003-01</p>	In "Mode 1", the system controls engine power output and allows a certain degree of wheel spin.
Mode 2	 <p>IJ31J1111004-01</p>	In "Mode 2", 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

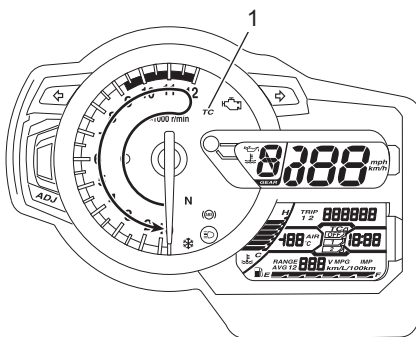
The traction control indicator light comes on when the ignition switch is turned "ON" and goes off after the motorcycle speed exceeds 5 km/h (3 mile/h).

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 with Mode Select Switch": L4 - L6 (Page 1A-19), "DTC Check with SDS": L4 - L6 (Page 1A-20) or "DTC Check": L8 - (Page 1A-95).



IJ31J1111005-01

1. Traction control indicator light

Self-Diagnosis Function

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

User Mode

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

***1**

Current letter displayed any one of the odometer, tripmeter A or tripmeter B.

***2**

When one of the signals is not received by ECM, the fail-safe circuit works and injection is not stopped. In this case, "FI" and odometer (*1) are indicated in the LCD panel and motorcycle can run.

***3**

The injection signal is stopped, when the crankshaft position sensor signal, tip-over sensor signal, #1 and #2 ignition signals, #1 and #2 injector signals, fuel pump relay signal or ignition switch signal is not sent to ECM. In this case, "FI" is indicated in the LCD panel. Motorcycle does not run.

"CHEC":

The LCD panel indicates "CHEC" when no communication signal from the ECM is received for 5 seconds or more.

For Example:

The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the combination meter does not receive any signal from the ECM, and the panel indicates "CHEC".

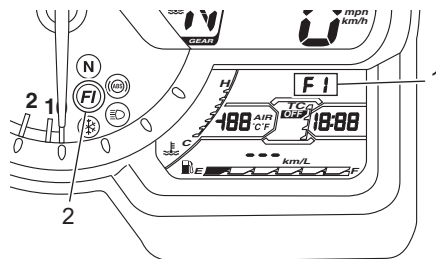
If CHEC is indicated, the LCD does not indicate the trouble code. It is necessary to check the wiring harness between ECM and combination meter couplers.

The possible cause of this indication is as follows:

Engine stop switch is in OFF position. Side-Stand/ignition inter-lock system is not working. Ignition fuse is burnt.

NOTE

The FI indicator light (2) turns ON about 3 seconds after turning the ignition switch ON.



1A-6 Engine General Information and Diagnosis: L4 - L6

Dealer Mode

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

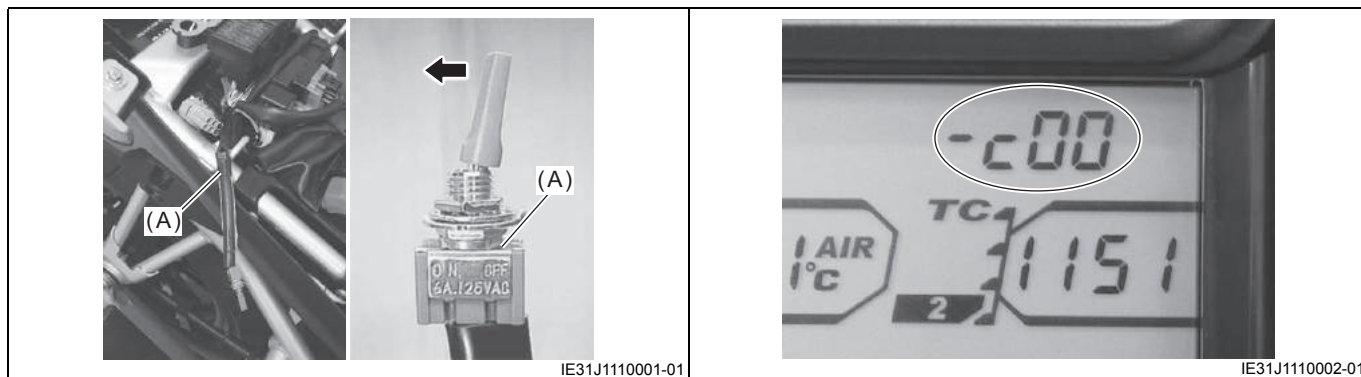
NOTE

Before checking the malfunction code, do not disconnect the ECM couplers.

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

Special tool

(A): 09930-82720



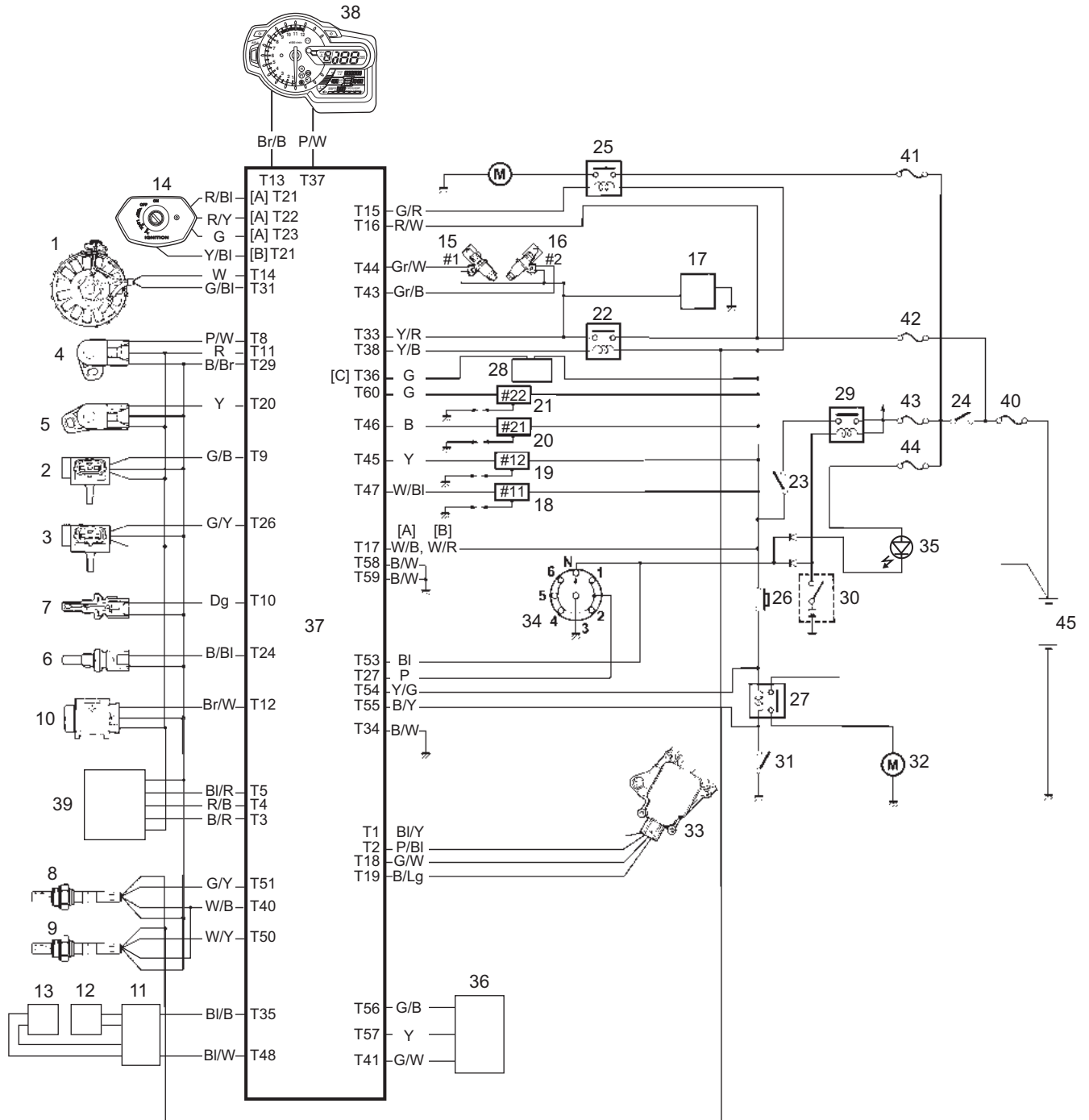
Malfunction	LCD (display) indication	FI light indication	Indication mode
"NO"	C00		—
"YES"	C** code is indicated from small numeral to large one.	FI indicator light turns OFF.	For each 2 sec., code is indicated.

Schematic and Routing Diagram

FI System Wiring Diagram

BENJ31J31112001

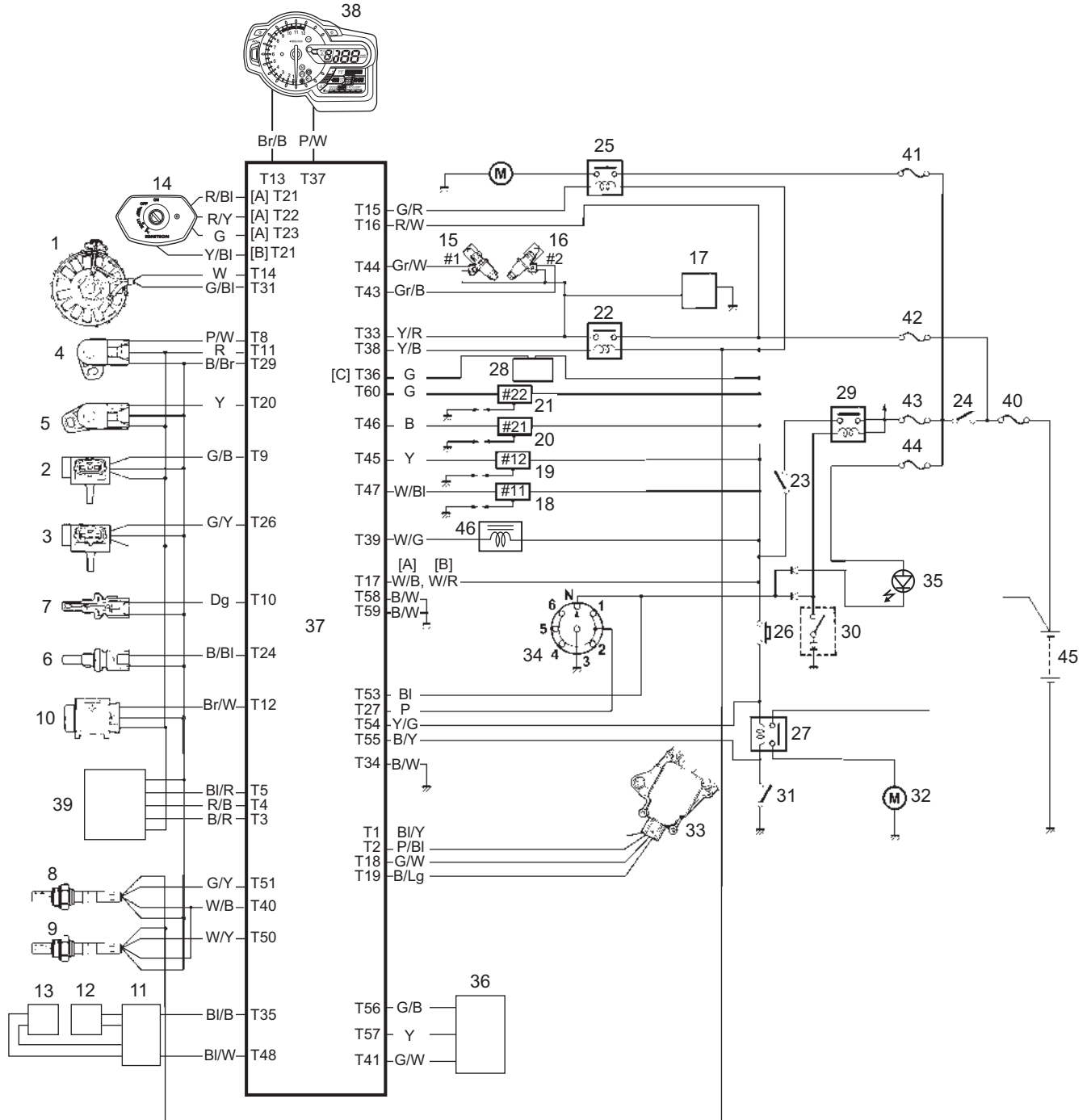
DL1000AL4



1A-8 Engine General Information and Diagnosis: L4 - L6

[A]: Except for U.S.A., Thailand, Canada and China	10. TO sensor	22. Fuel pump relay	34. Gear position switch
[B]: For U.S.A., Thailand, Canada and China	11. ABS control unit	23. Engine stop switch	35. Neutral indicator light (LED)
[C]: For California	12. Front wheel speed sensor	24. Ignition switch	36. Traction control mode select switch
1. CKP sensor	13. Rear wheel speed sensor	25. Cooling fan relay	37. ECM
2. IAP sensor #1	14. Ignition switch/ Immobilizer (If equipped)	26. Starter button	38. Combination meter
3. IAP sensor #2	15. Fuel injector #1	27. Starter relay	39. EXCVA/EXCVA position sensor
4. TP sensor	16. Fuel injector #2	28. EVAP system purge control solenoid valve (If equipped)	40. Main fuse (30 A)
5. STP sensor	17. Fuel pump	29. Side-stand relay	41. Fan fuse (15 A)
6. ECT sensor	18. Ignition coil #11	30. Side-stand switch	42. Fuel fuse (10 A)
7. IAT sensor	19. Ignition coil #12	31. Clutch lever position switch	43. Ignition fuse (10 A)
8. HO2 sensor #1	20. Ignition coil #21	32. Starter motor	44. Signal fuse (15 A)
9. HO2 sensor #2	21. Ignition coil #22	33. Secondary throttle valve actuator (STVA)	45. Battery

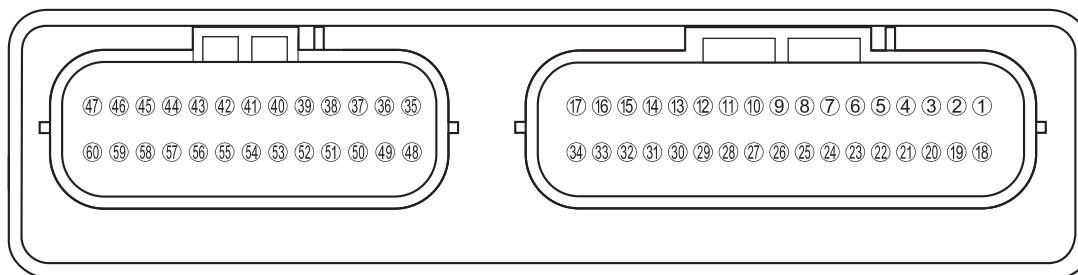
DL1000AL5 -



1A-10 Engine General Information and Diagnosis: L4 - L6

[A]: Except for U.S.A., Thailand, Canada, Taiwan and China	11. ABS control unit	24. Ignition switch	37. ECM
[B]: For U.S.A., Thailand, Canada, Taiwan and China	12. Front wheel speed sensor	25. Cooling fan relay	38. Combination meter
[C]: For California, Thailand, Taiwan and China	13. Rear wheel speed sensor	26. Starter button	39. EXCVA/EXCVA position sensor
1. CKP sensor	14. Ignition switch/ Immobilizer (If equipped)	27. Starter relay	40. Main fuse (30 A)
2. IAP sensor #1	15. Fuel injector #1	28. EVAP system purge control solenoid valve (If equipped)	41. Fan fuse (15 A)
3. IAP sensor #2	16. Fuel injector #2	29. Side-stand relay	42. Fuel fuse (10 A)
4. TP sensor	17. Fuel pump	30. Side-stand switch	43. Ignition fuse (10 A)
5. STP sensor	18. Ignition coil #11	31. Clutch lever position switch	44. Signal fuse (15 A)
6. ECT sensor	19. Ignition coil #12	32. Starter motor	45. Battery
7. IAT sensor	20. Ignition coil #21	33. Secondary throttle valve actuator (STVA)	46. PAIR control solenoid valve (If equipped)
8. HO2 sensor #1	21. Ignition coil #22	34. Gear position switch	
9. HO2 sensor #2	22. Fuel pump relay	35. Neutral indicator light (LED)	
10. TO sensor	23. Engine stop switch	36. Traction control mode select switch	

Terminal Arrangement of ECM Connector



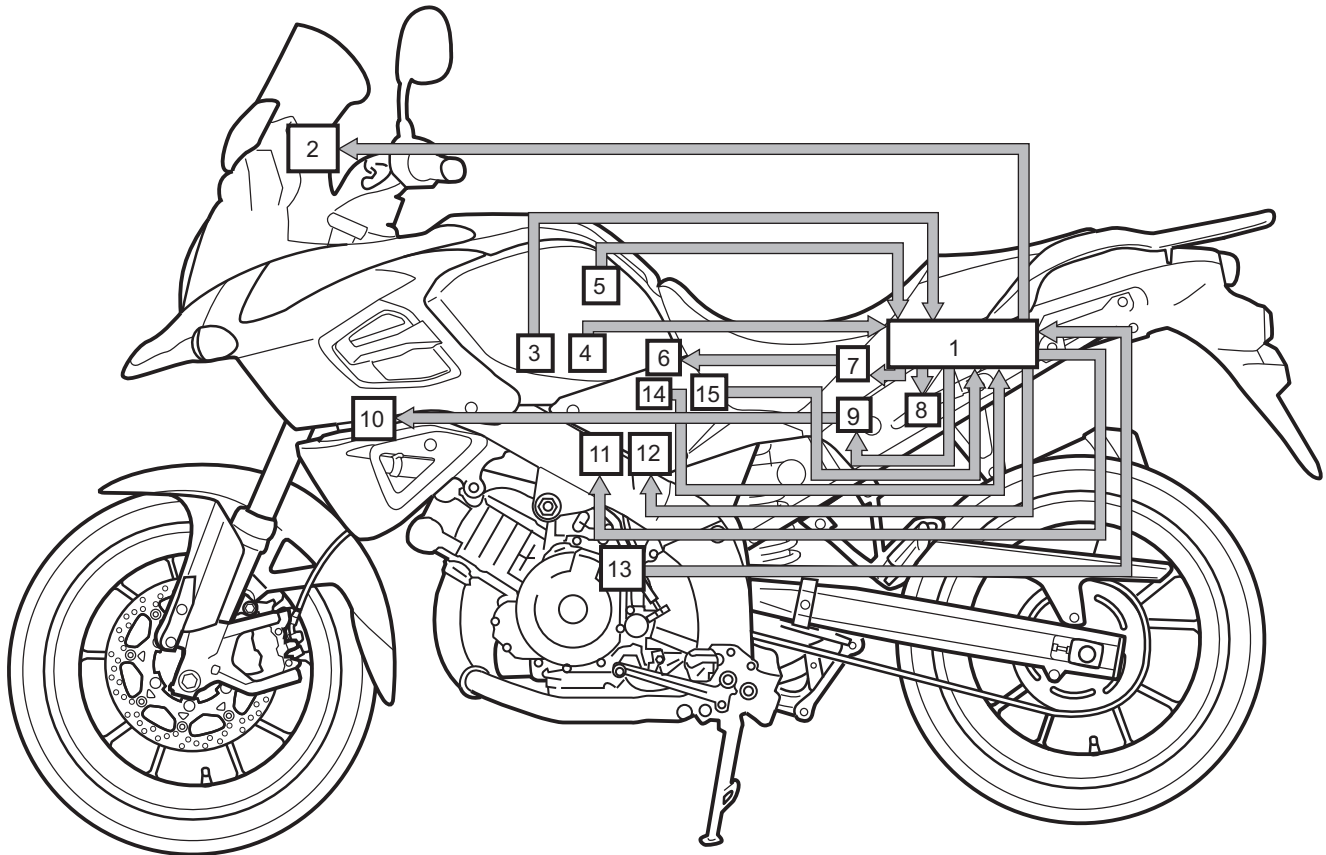
IE31J1110003-01

TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
T1	STVA signal (STVA. 2A)	T31	CKP sensor signal (CKP-)
T2	STVA signal (STVA. 1A)	T32	—
T3	EXCVA power (MO-)	T33	Power source for fuel injector (VM)
T4	EXCVA power (MO+)	T34	Ground (E1)
T5	EXCVA position sensor (MPS)	T35	Front speed sensor signal
T6	—	T36	EVAP control solenoid valve (If equipped)
T7	—	T37	Speed sensor output signal
T8	TP sensor signal	T38	Fuel pump relay
T9	IAP sensor signal #1	T39	PAIR control solenoid valve (If equipped)
T10	IAT sensor signal (IAT)	T40	HO2 sensor heater
T11	Power source for sensors (VCC)	T41	Mode selector 1 (SLT)
T12	TO sensor signal (TO)	T42	—
T13	Tachometer	T43	Fuel injector #2
T14	CKP sensor signal (CKP+)	T44	Fuel injector #1
T15	Cooling fan relay	T45	Ignition coil #12
T16	Power source for back-up (BATT)	T46	Ignition coil #21
T17	Power source (+B)	T47	Ignition coil #11
T18	STVA signal (STVA. 2B)	T48	Rear speed sensor signal
T19	STVA signal (STVA. 1B)	T49	—
T20	STP sensor signal (STP)	T50	HO2 sensor signal #2
T21	Immobilizer indicator (If equipped) Anti-theft switch (If equipped)/Ignition signal	T51	HO2 sensor signal #1
T22	Immobilizer signal (If equipped)	T52	—
T23	Immobilizer signal (If equipped)	T53	Neutral switch signal
T24	ECT sensor signal	T54	Starter switch signal
T25	—	T55	Clutch position switch signal
T26	IAP sensor signal #2	T56	Mode selector 2 (DTS1)
T27	GP switch signal	T57	Mode selector 3 (DTS2)
T28	—	T58	Ground (E01)
T29	Ground (E2)	T59	Ground (E03)
T30	—	T60	Ignition coil #22

Component Location

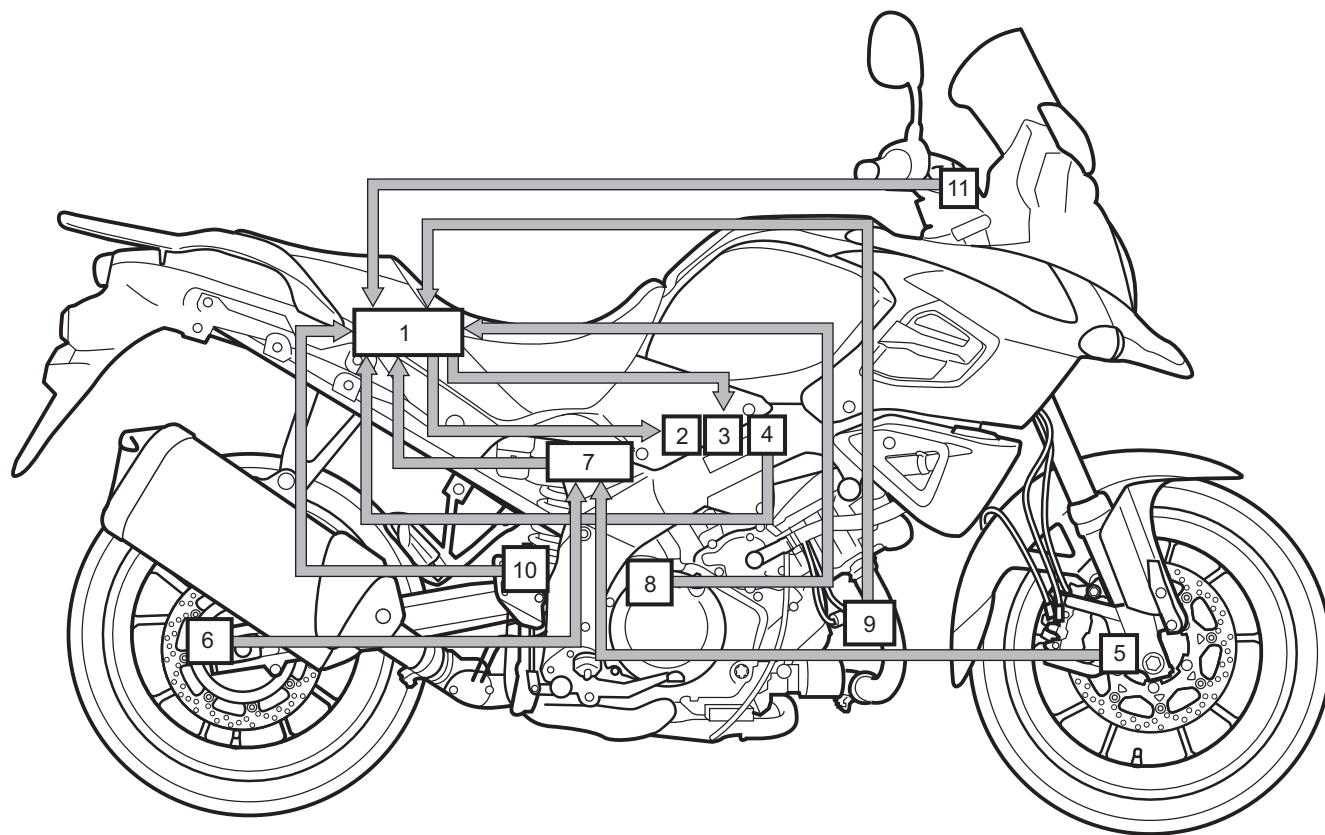
FI System Component Location

BENJ31J31113001



IE31J1110004-01

1. ECM	6. Fuel pump	11. Ignition coil #1 (center)
2. Combination meter	7. FP relay	12. Ignition coil #2 (side)
3. IAP sensor #1	8. TO sensor	13. CKP sensor
4. IAP sensor #2	9. Cooling fan relay	14. STVA
5. IAT sensor	10. Cooling fan	15. STP sensor



IE31J1110005-01

1. ECM	5. Front wheel speed sensor	9. HO2 sensor #1
2. Ignition coil #2 (center)	6. Rear wheel speed sensor	10. HO2 sensor #2
3. Ignition coil #1 (side)	7. ABS control unit	11. Ignition switch (Immobilizer (If equipped))
4. ECT sensor	8. GP switch	

Diagnostic Information and Procedures

Engine Symptom Diagnosis

BENJ31J31114001

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-15)
	Worn valve guide or poor seating of valve.	Repair or replace. ☞(Page 1D-47)
	Mistimed valve.	Adjust. ☞(Page 1D-15)
	Excessively worn piston rings.	Replace. ☞(Page 1D-50)
	Worn-down cylinder bores.	Replace. ☞(Page 1D-25) ☞(Page 1D-30)
	Too slow starter motor cranking.	Refer to "Starting System Diagram" in Section 1I (Page 1I-1).
	Poor seating of spark plugs.	Retighten. ☞(Page 1H-6)
Engine will not start or is hard to start (Plug not sparking)	Fouled spark plugs.	Clean. ☞(Page 1H-7)
	Wet spark plugs.	Clean and dry. ☞(Page 1H-7)
	Defective ignition coils.	Replace. ☞(Page 1H-8)
	Defective CKP sensor.	Replace. ☞(Page 1J-5) ☞(Page 1J-6)
	Defective ECM.	Replace. ☞(Page 1C-14)
	Open-circuited wiring connection.	Repair or replace. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
Engine will not start or is hard to start (No fuel reaching the intake manifold)	Clogged fuel filter or fuel hose.	Clean or replace. ☞(Page 1G-14)
	Defective fuel pump.	Replace. ☞(Page 1G-12)
	Defective fuel pressure regulator.	Replace. ☞(Page 1G-12)
	Defective fuel injectors.	Replace. ☞(Page 1G-15)
	Defective fuel pump relay.	Replace. ☞(Page 1G-14)
	Defective ECM.	Replace. ☞(Page 1C-14)
	Open-circuited wiring connection.	Check and repair. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
Engine will not start or is hard to start (Incorrect fuel/air mixture)	TP sensor out of adjustment.	Adjust. ☞(Page 1C-17)
	Defective fuel pump.	Replace. ☞(Page 1G-12)
	Defective fuel pressure regulator.	Replace. ☞(Page 1G-12)
	Defective TP sensor.	Replace. ☞(Page 1C-19)
	Defective CKP sensor.	Replace. ☞(Page 1J-5) ☞(Page 1J-6)
	Defective IAP sensor.	Replace. ☞(Page 1C-15)
	Defective ECM.	Replace. ☞(Page 1C-14)
	Defective ECT sensor.	Replace. ☞(Page 1C-16)
	Defective IAT sensor.	Replace. ☞(Page 1C-15)
	Clogged ISC valve air passage way.	Repair or replace. ☞(Page 1C-4)

Condition	Possible cause	Correction / Reference Item
Engine idles poorly	Valve clearance out of adjustment.	Adjust. ☞(Page 1D-15)
	Poor seating of valves.	Replace or repair. ☞(Page 1D-45)
	Defective valve guides.	Replace. ☞(Page 1D-47)
	Worn down camshafts.	Replace. ☞(Page 1D-6) ☞(Page 1D-8)
	Too wide spark plug gaps.	Adjust or replace. ☞(Page 1H-7)
	Defective ignition coils.	Replace. ☞(Page 1H-8)
	Defective CKP sensor.	Replace. ☞(Page 1J-5) ☞(Page 1J-6)
	Defective ECM.	Replace. ☞(Page 1C-14)
	Defective TP sensor.	Replace. ☞(Page 1C-19)
	Defective fuel pump.	Replace. ☞(Page 1G-12)
	Imbalanced throttle valve.	Adjust. ☞(Page 1C-11)
	Damaged or cracked vacuum hose.	Replace.
	Damaged or clogged ISC valve.	Repair or replace. ☞(Page 1C-6)
	Dirty throttle body.	Clean. ☞(Page 1C-11)
ISC incorrect leaning.	Reset learned value. ☞(Page 1C-13)	
Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.	Repair or replace. ☞(Page 1C-15)
	Clogged fuel filter.	Clean or replace. ☞(Page 1G-14)
	Defective fuel pump.	Replace. ☞(Page 1G-12)
	Defective fuel pressure regulator.	Replace. ☞(Page 1G-12)
	Defective ECT sensor.	Replace. ☞(Page 1C-16)
	Defective thermostat.	Replace. ☞(Page 1F-13)
	Defective IAT sensor.	Replace. ☞(Page 1C-15)
	Damaged or cracked vacuum hose.	Replace.
Damaged or clogged ISC valve.	Replace or repair. ☞(Page 1C-4)	
Engine stalls often (Fuel injector improperly operating)	Defective fuel injectors.	Replace. ☞(Page 1G-15)
	No injection signal from ECM.	Repair or replace. • L4 – L6 model: ☞(Page 1A-46) ☞(Page 1A-48) • L8 – model: ☞(Page 1A-114)
	Open or short circuited wiring connection.	Repair or replace. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
Defective battery or low battery voltage.	Replace or recharge. ☞(Page 1J-12)	
Engine stalls often (Control circuit or sensor improperly operating)	Defective ECM.	Replace. ☞(Page 1C-14)
	Defective fuel pressure regulator.	Replace. ☞(Page 1G-12)
	Defective TP sensor.	Replace. ☞(Page 1C-19)
	Defective IAT sensor.	Replace. ☞(Page 1C-15)
	Defective CKP sensor.	Replace. ☞(Page 1J-5) ☞(Page 1J-6)
	Defective ECT sensor.	Replace. ☞(Page 1C-16)
	Defective fuel pump relay.	Replace. ☞(Page 1G-14)
	Defective ISC valve.	Replace. ☞(Page 1C-4)
	ISC incorrect learning.	Reset learned value. ☞(Page 1C-13)
Engine stalls often (Engine internal parts improperly operating)	Fouled spark plugs.	Clean. ☞(Page 1H-7)
	Defective CKP sensor or ECM.	Replace. ☞(Page 1J-5) ☞(Page 1J-6) ☞(Page 1C-14)
	Clogged fuel hose.	Clean.
	Valve clearance out of adjustment.	Adjust. ☞(Page 1D-15)
	Dirty throttle body.	Clean. ☞(Page 1C-11)
Noisy engine (Excessive valve chatter)	Too large valve clearance.	Adjust. ☞(Page 1D-15)
	Weakened or broken valve springs.	Replace. ☞(Page 1D-40)
	Worn tappet or cam surface.	Replace. ☞(Page 1D-6) ☞(Page 1D-8)
	Worn or burnt camshaft journal.	Replace. ☞(Page 1D-6) ☞(Page 1D-8)

1A-16 Engine General Information and Diagnosis: L4 - L6

Condition	Possible cause	Correction / Reference Item
Noisy engine (Noise seems to come from piston)	Worn down pistons or cylinders.	Replace. ☞(Page 1D-49) ☞(Page 1D-25) ☞(Page 1D-30)
	Combustion chamber fouled with carbon.	Clean. ☞(Page 1D-47)
	Worn piston pins or piston pin bore.	Replace. ☞(Page 1D-49)
	Worn piston rings or ring grooves.	Replace. ☞(Page 1D-50)
Noisy engine (Noise seems to come from cam chain)	Stretched cam chain.	Replace. ☞(Page 1D-54) ☞(Page 1D-58)
	Worn sprockets.	Replace. ☞(Page 1D-54) ☞(Page 1D-58)
	Cam chain tension adjuster not working.	Repair or replace. ☞(Page 1D-25) ☞(Page 1D-30)
Noisy engine (Noise seems to come from clutch)	Worn splines of countershaft or sleeve hub.	Replace. ☞(Page 5B-5) ☞(Page 5C-15) ☞(Page 5C-17)
	Worn teeth of clutch plates.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
	Distorted clutch plates, driven and drive.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
	Worn clutch release bearing.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
	Weakened clutch dampers.	Replace the primary driven gear. ☞(Page 5C-15) ☞(Page 5C-17)
	Worn or rubbing primary gears.	Replace. ☞(Page 5C-15) ☞(Page 5C-17) ☞(Page 5C-25)
Noisy engine (Noise seems to come from crankshaft)	Rattling bearing due to wear.	Replace. ☞(Page 1D-65) ☞(Page 1D-66)
	Worn or burnt big-end bearings.	Replace. ☞(Page 1D-68)
	Worn or burnt journal bearings.	Replace. ☞(Page 1D-62)
Noisy engine (Noise seems to come from transmission)	Worn or rubbing gears.	Replace. ☞(Page 5B-5)
	Worn splines.	Replace. ☞(Page 5B-5)
	Worn or rubbing primary gears.	Replace. ☞(Page 5C-15) ☞(Page 5C-17) ☞(Page 5C-25)
	Worn bearings.	Replace. ☞(Page 5B-8) ☞(Page 5B-10)
Noisy engine (Noise seems to come from water pump)	Too much play on pump shaft bearing.	Replace. ☞(Page 1F-16)
	Worn or damaged impeller shaft.	Replace. ☞(Page 1F-16)
	Worn or damaged mechanical seal.	Replace. ☞(Page 1F-16)
	Contact between pump case and impeller.	Replace. ☞(Page 1F-16)

Condition	Possible cause	Correction / Reference Item
Engine runs poorly in high speed range (Defective engine internal/electrical parts)	Weakened valve spring.	Replace. ⌚(Page 1D-40)
	Worn camshafts.	Replace. ⌚(Page 1D-6) ⌚(Page 1D-8)
	Valve timing out of adjustment.	Adjust. ⌚(Page 1D-15)
	Too narrow spark plug gaps.	Adjust. ⌚(Page 1H-7)
	Ignition not advanced sufficiently due to poorly working timing advance circuit.	Replace ECM. ⌚(Page 1C-14)
	Defective ignition coils.	Replace. ⌚(Page 1H-8)
	Defective CKP sensor.	Replace. ⌚(Page 1J-5) ⌚(Page 1J-6)
	Defective ECM.	Replace. ⌚(Page 1C-14)
	Clogged air cleaner element.	Replace. ⌚(Page 1D-3)
	Clogged fuel hose, resulting in inadequate fuel supply to injector.	Clean and prime.
	Defective fuel pump.	Replace. ⌚(Page 1G-12)
	Defective TP sensor.	Replace. ⌚(Page 1C-19)
	Defective STP sensor or STVA.	Replace. ⌚(Page 1C-25) ⌚(Page 1C-6)
Engine runs poorly in high speed range (Defective air flow system)	Clogged air cleaner element.	Replace. ⌚(Page 1D-3)
	Sucking air from throttle body joint.	Repair or replace.
	Defective ECM.	Replace. ⌚(Page 1C-14)
	Unbalancing throttle valve synchronization.	Adjust. ⌚(Page 1C-11)
	Defective ISC valve.	Replace. ⌚(Page 1C-4)
Engine runs poorly in high speed range (Defective control circuit or sensor)	Low fuel pressure.	Repair or replace.
	Defective TP sensor.	Replace. ⌚(Page 1C-19)
	Defective IAT sensor.	Replace. ⌚(Page 1C-15)
	Defective CKP sensor.	Replace. ⌚(Page 1J-5) ⌚(Page 1J-6)
	Defective GP switch.	Replace. ⌚(Page 5B-11)
	Defective IAP sensor.	Replace. ⌚(Page 1C-15)
	Defective ECM.	Replace. ⌚(Page 1C-14)
	TP sensor out of adjustment.	Adjust. ⌚(Page 1C-17)
	Defective STP sensor or STVA.	Replace. ⌚(Page 1C-25) ⌚(Page 1C-4)
Engine lacks power (Defective engine internal/electrical parts)	Loss of valve clearance.	Adjust. ⌚(Page 1D-15)
	Weakened valve springs.	Replace. ⌚(Page 1D-40)
	Valve timing out of adjustment.	Adjust. ⌚(Page 1D-15)
	Worn piston rings or cylinders.	Replace. ⌚(Page 1D-50)
	Poor seating of valves.	Repair. ⌚(Page 1D-45)
	Fouled spark plugs.	Replace. ⌚(Page 1H-7)
	Incorrect spark plugs.	Adjust or replace. ⌚(Page 1H-7)
	Clogged fuel injectors.	Replace. ⌚(Page 1G-16)
	TP sensor out of adjustment.	Adjust. ⌚(Page 1C-17)
	Clogged air cleaner element.	Replace. ⌚(Page 1D-3)
	Unbalancing throttle valve synchronization.	Adjust. ⌚(Page 1C-11)
	Sucking air from throttle valve or vacuum hose.	Retighten or replace.
	Too much engine oil.	Drain out excess oil.
	Defective fuel pump or ECM.	Replace. ⌚(Page 1G-12) ⌚(Page 1C-14)
	Defective CKP sensor and ignition coils.	Replace. ⌚(Page 1J-5) ⌚(Page 1J-6) ⌚(Page 1H-8)
	Defective STP sensor or STVA.	Replace. ⌚(Page 1C-25) ⌚(Page 1C-4)

1A-18 Engine General Information and Diagnosis: L4 - L6

Condition	Possible cause	Correction / Reference Item
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	<i>Repair or replace.</i>
	Defective TP sensor.	<i>Replace. ☞(Page 1C-19)</i>
	Defective IAT sensor.	<i>Replace. ☞(Page 1C-15)</i>
	Defective CKP sensor.	<i>Replace. ☞(Page 1J-5) ☞(Page 1J-6)</i>
	Defective GP switch.	<i>Replace. ☞(Page 5B-11)</i>
	Defective IAP sensor.	<i>Replace. ☞(Page 1C-15)</i>
	TP sensor out of adjustment.	<i>Adjust. ☞(Page 1C-17)</i>
	Defective ECM.	<i>Replace. ☞(Page 1C-14)</i>
	Unbalancing throttle valve synchronization.	<i>Adjust. ☞(Page 1C-11)</i>
	Defective STP sensor or STVA.	<i>Replace. ☞(Page 1C-25) ☞(Page 1C-4)</i>
Engine overheats (Defective engine internal parts)	Heavy carbon deposit on piston crown.	<i>Clean.</i>
	Not enough oil in the engine.	<i>Add oil. ☞(Page 1E-4)</i>
	Defective oil pump or clogged oil circuit.	<i>Replace or clean. ☞(Page 1E-11)</i>
	Sucking air from intake pipes.	<i>Retighten or replace.</i>
	Use of incorrect engine oil.	<i>Change. ☞(Page 1E-4)</i>
	Defective cooling system.	<i>Refer to "Engine Cooling Symptom Diagnosis" in Section 1F (Page 1F-5).</i>
Engine overheats (Lean fuel/air mixture)	Short-circuited IAP sensors/lead wire.	<i>Repair or replace. ☞(Page 1C-15)</i>
	Short-circuited IAT sensor/lead wire.	<i>Repair or replace. ☞(Page 1C-15)</i>
	Sucking air from intake pipe joint.	<i>Repair or replace.</i>
	Defective fuel injectors.	<i>Replace. ☞(Page 1G-15)</i>
	Defective ECT sensor.	<i>Replace. ☞(Page 1C-16)</i>
Engine overheats (Other factors)	Ignition timing is too advanced due to defective timing advance system (ECT sensor, GP switch, CKP sensor or ECM).	<i>Replace.</i>
	ISC valve incorrect learning.	<i>Reset learned value. ☞(Page 1C-13)</i>
Dirty or heavy exhaust smoke	Too much engine oil.	<i>Check with inspection window, drain out excess oil.</i>
	Worn piston rings or cylinders.	<i>Replace. ☞(Page 1D-50)</i>
	Worn valve guides.	<i>Replace. ☞(Page 1D-47)</i>
	Scored or scuffed cylinder walls.	<i>Replace. ☞(Page 1D-25) ☞(Page 1D-30)</i>
	Worn valve stems.	<i>Replace. ☞(Page 1D-40)</i>
	Defective stem seal.	<i>Replace. ☞(Page 1D-40)</i>
	Worn oil ring side rails.	<i>Replace. ☞(Page 1D-50)</i>

DTC Check with Mode Select Switch

BENJ31J31114002

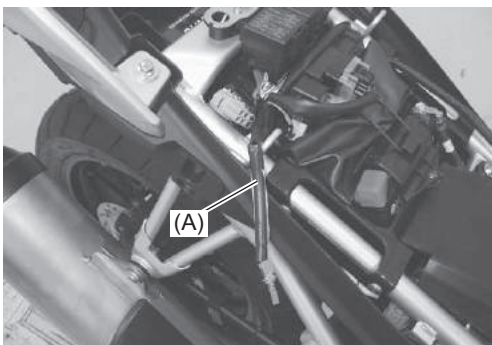
NOTE

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

- 1) Remove the seat. (Page 9D-10)
- 2) Connect the special tool to the mode select coupler at the wiring harness.

Special tool

(A): 09930-82720



IE31J1110006-01

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



ID26J1110213-01

- 5) Check the DTC to determine the malfunction part. (Page 1A-22)



IE31J1110007-01

- 6) After repairing the trouble, turn OFF the ignition switch and turn ON again. If DTC is indicated (C00), the malfunction is cleared.
- 7) Even though DTC (C00) is indicated, the previous malfunction history DTC still remains stored in the ECM. Therefore, erase the history DTC memorized in the ECM using SDS. (Page 1A-20)

NOTE

DTC 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 history DTC using SDS. (Page 1A-20)

DTC Check with SDS

BENJ31J31114003

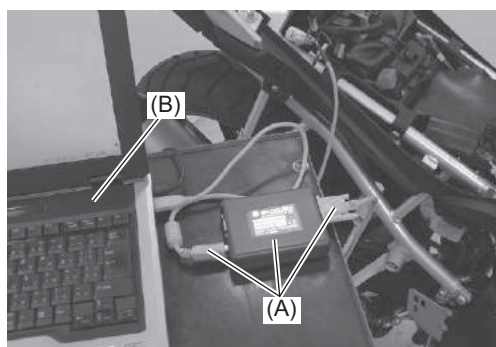
NOTE

- Do not disconnect the coupler from ECM, battery cable from battery, ECM ground wire from the engine or main fuse before confirming DTC stored in memory. Such disconnection will erase the memorized information in ECM memory.
- DTC stored in ECM memory can be checked by SDS.

- 1) Remove the seat. (Page 9D-10)
- 2) Set up the SDS tools referring to the SDS operation manual for further details.

Special tool

- (A): 09904-41010
 (B): 99565-01010-034



IE31J1110195-01

- 3) Click the "DTC inspection" button (1).



ID26J1110214-01

- 4) Start the engine or crank the engine for more than 4 seconds.
- 5) Check the DTC to determine the malfunction part. (Page 1A-22)

NOTE

- Not only SDS is used for detecting DTCs but also for reproducing and checking on screen the failure condition as described by customers using the trigger. (Page 1A-21)
- How to use trigger referring to SDS operation manual for further details.

- 6) After repairing the trouble, clear to delete history code (Past DTC). (Page 1A-20)

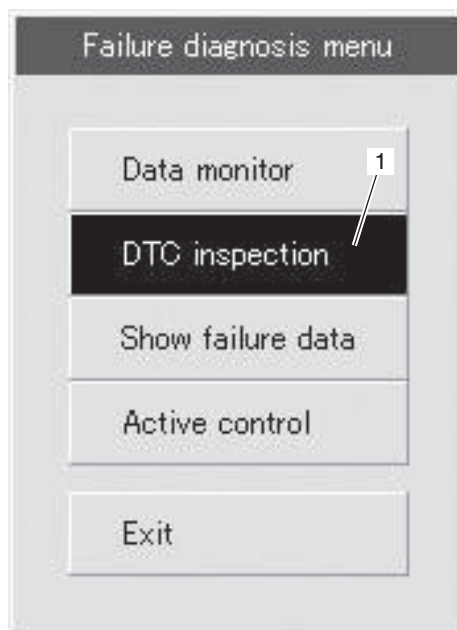
DTC Clearance with SDS

BENJ31J31114004

NOTE

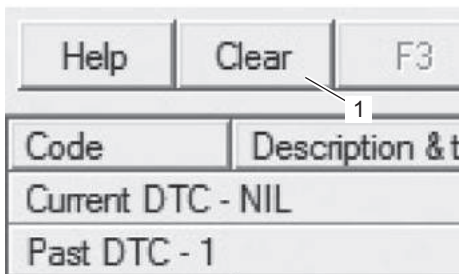
The malfunction code is memorized in the ECM also when the lead wire coupler of any sensor is disconnected. Therefore, when a lead wire coupler has been disconnected in the diagnosis, erase the stored malfunction history code using SDS.

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



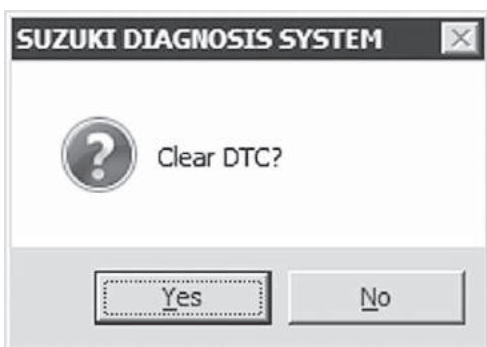
ID26J1110214-01

- 3) Check the DTC.
- 4) The previous malfunction history code (Past DTC) still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS tool.
- 5) Click "Clear" (1) to delete history code (Past DTC).

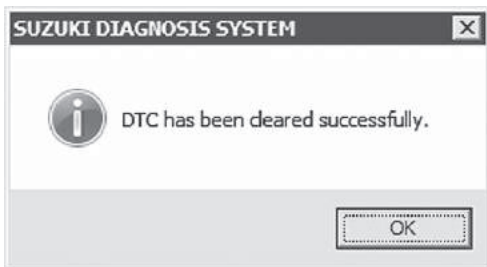


IE31J1110008-01

- 6) Follow the displayed instructions.

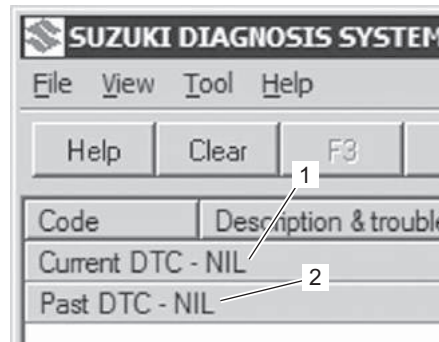


IE31J1110009-01



IE31J1110010-01

- 7) Check that both "Current DTC" (1) and "Past DTC" (2) are deleted (NIL).



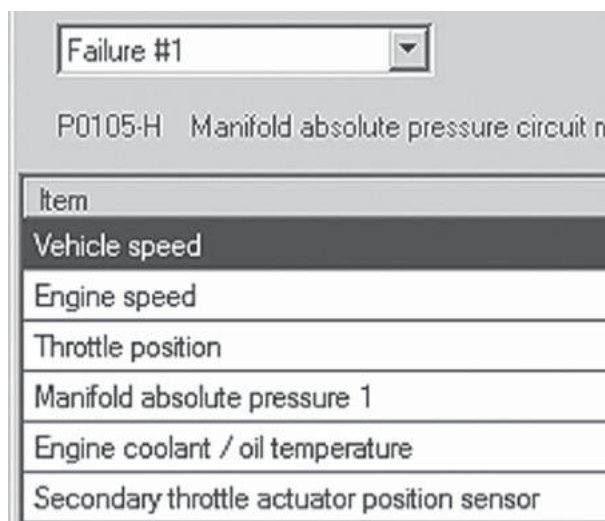
IE31J1110011-01

Monitoring Failure Detection Data with SDS

BENJ31J31114005

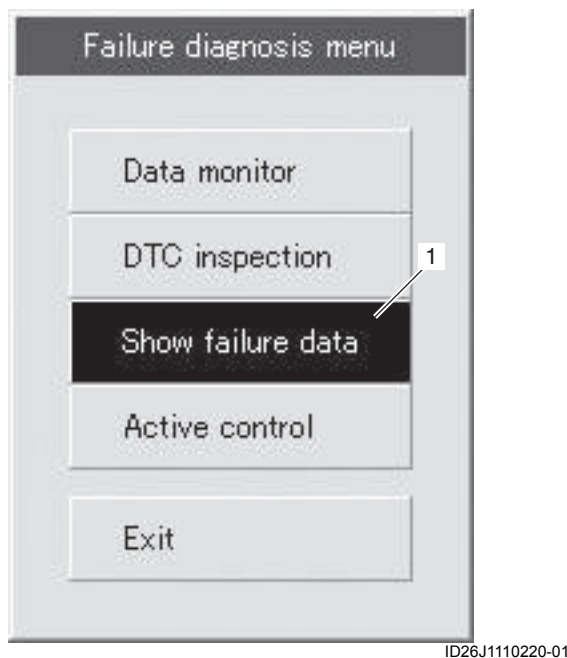
ECM stores the engine and driving conditions (in the form of data as shown in the figure) at the moment of the detection of a malfunction in its memory. This data is called "Show failure data".

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

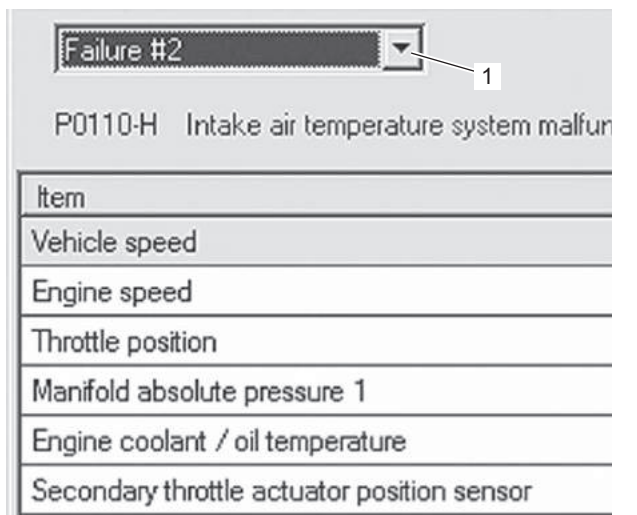


IE31J1110012-02

1) Click "Show failure data" (1) to display the data.



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



IE31J1110013-02

DTC Table

BENJ31J31114006

DTC	DTC name	DTC detecting condition
C00	None	—
P0105-H / P0105-L	IAP sensor #1 circuit high voltage / low voltage ☞ (Page 1A-28)	The sensor output voltage is higher than the specified value. / The sensor output voltage is lower than the specified value.
C17	IAP sensor #1 circuit malfunction ☞ (Page 1A-28)	The sensor output voltage is not within 0.50 V – 4.85 V.
P0110-H / P0110-L	IAT sensor circuit high voltage / low voltage ☞ (Page 1A-30)	The sensor output voltage is higher than the specified value. / The sensor output voltage is lower than the specified value.
C21	IAT sensor circuit malfunction ☞ (Page 1A-30)	The sensor output voltage is not within 0.15 V – 4.85 V.
P0115-H / P0115-L	ECT sensor circuit high voltage / low voltage ☞ (Page 1A-32)	The sensor output voltage is higher than the specified value. / The sensor output voltage is lower than the specified value.
C15	ECT sensor circuit malfunction ☞ (Page 1A-32)	The sensor output voltage is not within 0.15 V – 4.85 V.
P0120-H / P0120-L	TP sensor circuit high voltage / low voltage ☞ (Page 1A-34)	The sensor output voltage is higher than the specified value. / The sensor output voltage is lower than the specified value.
C14 *1	TP sensor circuit malfunction ☞ (Page 1A-34)	The sensor output voltage is not within 0.20 V – 4.80 V.
P0130	HO2 sensor #1 circuit malfunction	HO2 sensor #1 output voltage is not input to ECM during engine operation and running condition.
C64	☞ (Page 1A-36)	
P0135	HO2 sensor #1 heater circuit	The heater can not operate so that heater operation voltage is not supplied to the HO2 sensor #1 heater circuit.
C64	☞ (Page 1A-40)	
P0156	HO2 sensor #2 circuit malfunction	HO2 sensor #2 output voltage is not input to ECM during engine operation and running condition.
C44	☞ (Page 1A-42)	
P0161	HO2 sensor #2 heater circuit	The heater can not operate so that heater operation voltage is not supplied to the HO2 sensor #2 heater circuit.
C44	☞ (Page 1A-45)	

DTC	DTC name	DTC detecting condition
P0201	Fuel injector #1 circuit malfunction	Fuel injector signal is interrupted by 4 times or more continuity although CKP signal is detected.
C32	☞ (Page 1A-46)	
P0202	Fuel injector #2 circuit malfunction	Fuel injector signal is interrupted by 4 times or more continuity although CKP signal is detected.
C33	☞ (Page 1A-48)	
P0230-H / P0230-L	Unexpected power supply to fuel pump / Unexpected power cut to fuel pump	Voltage is applied to fuel pump although FP relay is turned OFF. / No voltage is applied to fuel pump although FP relay is turned ON.
C41	☞ (Page 1A-50)	
P0335	CKP sensor circuit malfunction	The signal does not reach ECM for 2 sec. or more, after receiving the starter signal.
C12	☞ (Page 1A-52)	
P0351	Ignition system malfunction	Ignition coil signal is interrupted by 4 times or more continuity although CKP signal is detected. P0351 (C24): Ignition coil #1 (center)
C24	☞ (Page 1A-54)	
P0352	Ignition system malfunction	Ignition coil signal is interrupted by 4 times or more continuity although CKP signal is detected. P0352 (C25): Ignition coil #2 (center)
C25	☞ (Page 1A-54)	
P0353	Ignition system malfunction	Ignition coil signal is interrupted by 4 times or more continuity although CKP signal is detected. P0353 (C26): Ignition coil #1 (side)
C26	☞ (Page 1A-54)	
P0354	Ignition system malfunction	Ignition coil signal is interrupted by 4 times or more continuity although CKP signal is detected. P0354 (C27): Ignition coil #2 (side)
C27	☞ (Page 1A-54)	
P0443 *2	EVAP system purge control solenoid valve circuit malfunction	EVAP system purge control solenoid valve voltage is not input to ECM.
C62 *2	☞ (Page 1A-54)	
P0480	Cooling fan relay circuit malfunction	Cooling fan relay signal is not input to ECM.
C60	☞ (Page 1A-56)	
P0500	Speed sensor circuit malfunction (Front)	The speed sensor signal is not input for more than 6 sec.
C16	☞ (Page 1A-59)	
P0506	ISC valve, lower than desired rpm / higher than desired rpm	Idle speed dropped lower than desired idle speed by more than specified range.
C65	☞ (Page 1A-60)	
P0507	ISC valve, lower than desired rpm / higher than desired rpm	Idle speed rose higher than desired idle speed by more than specified range.
C65	☞ (Page 1A-62)	
P0705	GP switch circuit malfunction	Gear position signal voltage is higher than the specified value.
C31	☞ (Page 1A-62)	
P1500	Speed sensor circuit malfunction (Rear)	The speed sensor signal is not input for more than 6 sec.
C91	☞ (Page 1A-64)	
P1650		Ignition switch signal is not input to the ECM. When the ID agreement is not verified. (Equipped with immobilizer system) ECM does not receive communication signal from the immobilizer antenna. (Equipped with immobilizer system)
C42	☞ (Page 1A-65)	
P1651-H / P1651-L	TO sensor circuit high voltage / low voltage	The sensor output voltage is higher than the specified value. / The sensor output voltage is lower than the specified value.
	☞ (Page 1A-66)	

1A-24 Engine General Information and Diagnosis: L4 - L6

DTC	DTC name	DTC detecting condition
C23	TO sensor circuit malfunction ☞ (Page 1A-66)	The sensor output voltage is not within 0.20 V – 4.80 V.
P1654-H / P1654-L	STP sensor circuit high voltage / low voltage ☞ (Page 1A-68)	The sensor output voltage is higher than the specified value. / The sensor output voltage is lower than the specified value.
C29	STP sensor circuit malfunction ☞ (Page 1A-68)	The sensor output voltage is not within 0.10 V – 4.80 V.
P1655	STVA circuit malfunction ☞ (Page 1A-70)	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.
C28		
P1656 *2	PAIR control solenoid valve circuit malfunction ☞ (Page 1A-73)	PAIR control solenoid valve voltage is not input to ECM.
C49 *2		
P1657-H / P1657-L	EXCVA position sensor circuit high voltage / low voltage ☞ (Page 1A-75)	The sensor output voltage is higher than the specified value. / The sensor output voltage is lower than the specified value.
C46	EXCVA position sensor circuit malfunction ☞ (Page 1A-75)	The sensor output voltage is not within 0.14 V – 4.90 V.
P1658	EXCVA motor circuit malfunction ☞ (Page 1A-81)	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.
C46		
P1750-H / P1750-L	IAP sensor #2 circuit high voltage / low voltage ☞ (Page 1A-83)	The sensor output voltage is higher than the specified value. / The sensor output voltage is lower than the specified value.
C13	IAP sensor #2 circuit malfunction ☞ (Page 1A-83)	The sensor output voltage is not within 0.50 V – 4.85 V.
P2505	ECM power input signal circuit malfunction ☞ (Page 1A-86)	No voltage is applied to the ECM, although the ignition switch is turned ON.
C41		

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

***1**

To get the proper signal from the TP sensor, the sensor basic position is indicated in the LCD (DISPLAY) panel. The DTC is indicated in three digits. In front of the three digits, a line appears in any of the three positions, upper, middle or lower line. If the indication is upper or lower line when engine rpm is 1200 r/min, slightly turn the TP sensor and bring the line to the middle.

***2**

If equipped.

Fail-Safe Function Table

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 101 kPa (760 mmHg).	“YES”	“YES”
TP sensor	The throttle opening is fixed to full open position. Ignition timing is also fixed.	“YES”	“YES”
ECT sensor	Engine coolant temperature value is fixed to 80 °C (176 °F). Cooling fan is fixed on position.	“YES”	“YES”
IAT sensor	Intake air temperature value is fixed to 40 °C (104 °F).	“YES”	“YES”
Ignition signal	#1 fuel-cut	“YES”	“YES”
		#2 cylinder can run.	
	#2 fuel-cut	“YES”	“YES”
Injection signal	#1 fuel-cut	“YES”	“YES”
		#2 cylinder can run.	
	#2 fuel-cut	“YES”	“YES”
		#1 cylinder can run.	
STV actuator	Secondary throttle valve is fixed to full close position. When motor disconnection or lock occurs, power from ECM is shut off.	“YES”	“YES”
STP sensor	Secondary throttle valve is fixed to full close position.	“YES”	“YES”
Gear position signal	Gear position signal is fixed to 6th gear.	“YES”	“YES”
HO2 sensor	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	“YES”	“YES”
PAIR control solenoid valve (If equipped)	ECM stops controlling PAIR control solenoid valve.	“YES”	“YES”
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

Customer Complaint Analysis

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

NOTE

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

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

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

Malfunction indicator light condition (LED)	<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 mode select switch or SDS, perform the following visual inspections. The reason for visual inspection is that mechanical failures (such as oil leakage) cannot be displayed on the screen with the use of mode select switch or SDS.

Inspection Item		Referring section
Engine oil	Level	☞(Page 1E-4)
	Leakage	
Engine coolant	Level	☞(Page 1F-6)
	Leakage	☞(Page 1F-7)
Fuel	Level	—
	Leakage	☞(Page 1G-3)
Air cleaner element	Dirt	☞(Page 1D-3)
	Clogging	
Battery	Corrosion of terminal	☞(Page 1J-13)
Throttle cable	Play	☞(Page 1C-4)
Vacuum hoses of air intake system	Disconnection	—
	Looseness	—
	Bend	—
Fuses	Burning	—
FI indicator light (L4 – L6)	Operation	☞(Page 1A-5)
MIL (L8 –)	Operation	☞(Page 1A-88)
Each warning indicator light	Operation	☞(Page 9C-5)
Speedometer	Operation	☞(Page 9C-8)
Exhaust system	Leakage of exhaust gas	☞(Page 1K-21)
	Noise	
Harness coupler	Disconnection	☞(Page 00-2)
	Poor contact	

DTC P0105-H / P0105-L (C17)

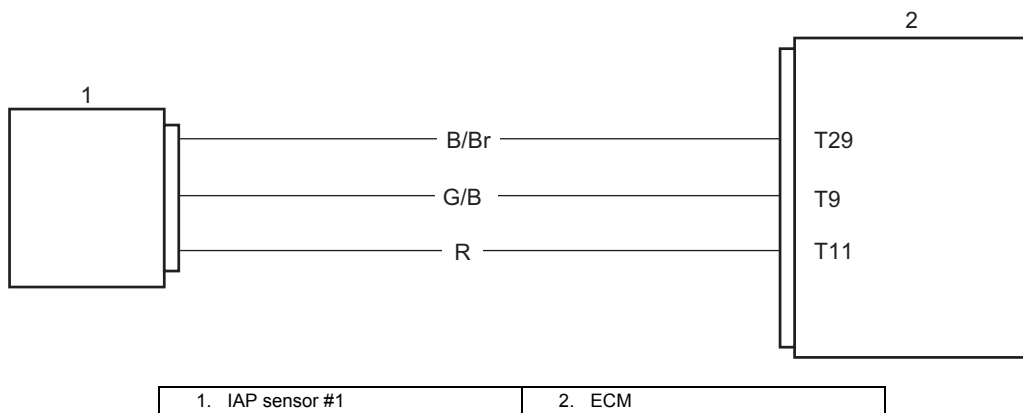
BENJ31J31114009

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0105-H: IAP Sensor #1 Circuit High Voltage The sensor output voltage is higher than the specified value.	<ul style="list-style-type: none"> • Vacuum passage between throttle body and IAP sensor #1 • IAP sensor #1 • IAP sensor #1 circuit • ECM
P0105-L: IAP Sensor #1 Circuit Low Voltage The sensor output voltage is lower than the specified value.	
C17: IAP Sensor #1 Circuit Malfunction The sensor output voltage is not within 0.50 – 4.85 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



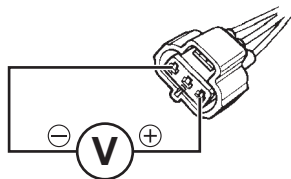
IE31J1110020-01

Troubleshooting

Step 1

IAP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the IAP sensor #1 coupler. (Page 1C-15)
- 3) Check for proper terminal connection to the IAP sensor #1 coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the R wire and B/Br wire.



IE31J1110022-01

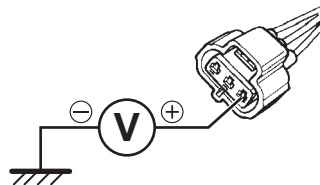
Is voltage 4.5 – 5.5 V?

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

Step 2

IAP sensor ground circuit check

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



ID26J1110028-04

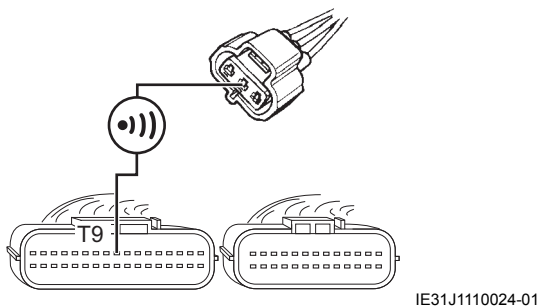
Is voltage 4.5 – 5.5 V?

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

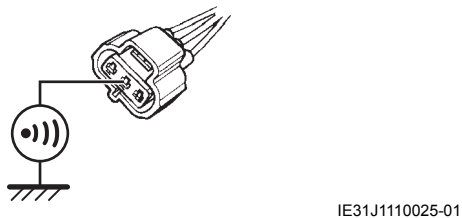
Step 3

IAP sensor signal circuit check

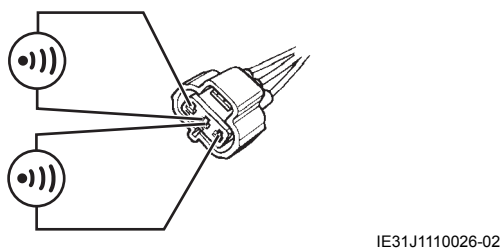
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - G/B wire: less than 1 Ω



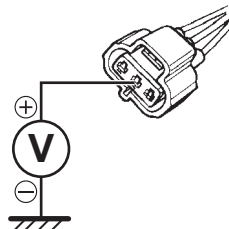
– Between G/B wire and ground: infinity



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



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



IE31J1110027-01

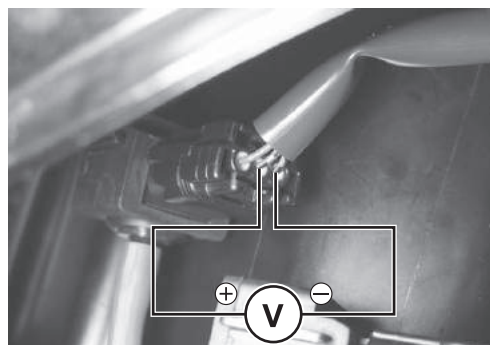
Is check result OK?

- 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 #1 coupler.
- 3) Run the engine at idle speed (atmospheric pressure: approx. 100 kPa (760 mmHg)) and measure the IAP sensor voltage between the G/B wire and B/Br wire.



IE31J1110028-01

Is voltage approx. 2.5 V?

- Yes Go to Step 5.
- No Check the vacuum hoses for crack or damage.
- If vacuum hoses are OK, replace the IAP sensor with a new one. (Page 1C-15)

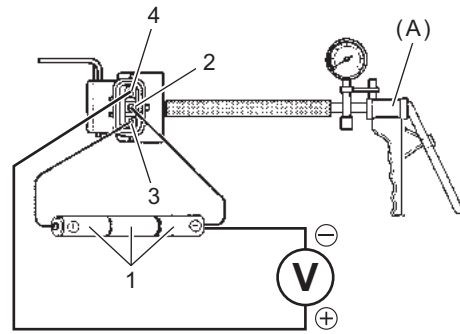
Step 5

IAP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the IAP sensor #1. (Page 1C-15)
- 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) Check the voltage between terminal (4) and ground. Also, check if voltage reduces when vacuum is applied using the vacuum pump gauge.

Special tool

(A): 09917–47011



ID26J1110034-03

ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
m	ft	kPa	mmHg	V
0 – 610	0 – 2000	100 – 94	760 – 707	3.1 – 3.6
611 – 1524	2001 – 5000	94 – 85	707 – 634	2.8 – 3.4
1525 – 2438	5001 – 8000	85 – 76	634 – 567	2.6 – 3.1
2439 – 3048	8001 – 10000	76 – 70	567 – 526	2.4 – 2.9

ID26J1110229-02

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the IAP sensor #1 with a new one. (Page 1C-15)

DTC P0110-H / P0110-L (C21)

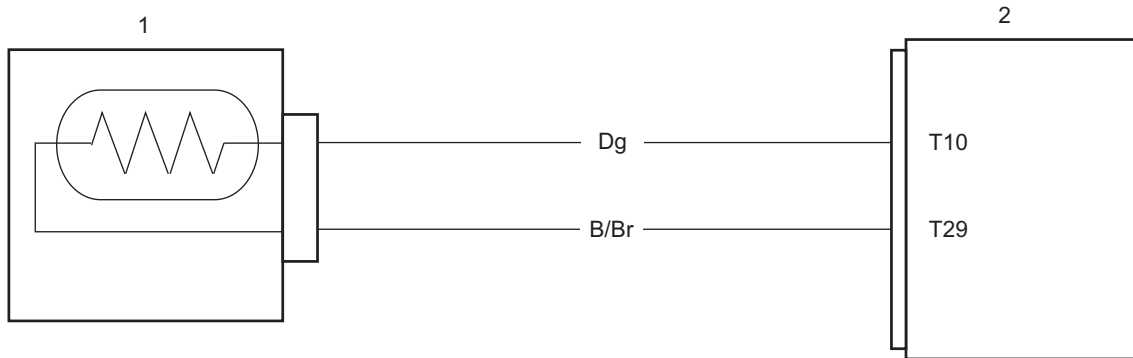
BENJ31J31114010

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0110-H: IAT Sensor Circuit High Voltage The sensor output voltage is higher than the specified valve.	<ul style="list-style-type: none"> • IAT sensor • IAT sensor circuit • ECM
P0110-L: IAT Sensor Circuit Low Voltage The sensor output voltage is lower than the specified valve.	
C21: IAT Sensor Circuit Malfunction The sensor output voltage is not within 0.15 – 4.85 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



IE31J1110029-01

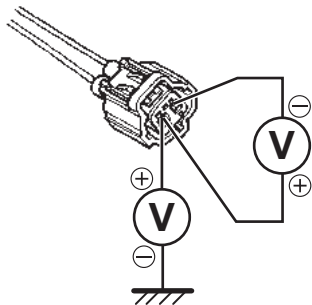
1. IAT sensor	2. ECM
---------------	--------

Troubleshooting

Step 1

IAT sensor input voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the IAT sensor coupler. (Page 1C-15)
- 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.



ID26J1110036-04

Is voltage 4.5 – 5.5 V?

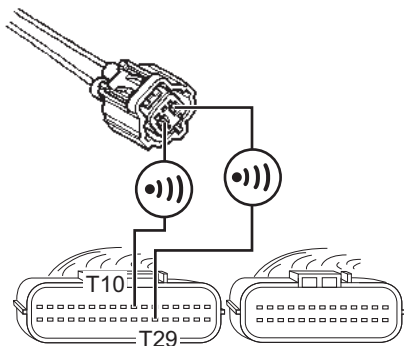
Yes Go to Step 3.

No Go to Step 2.

Step 2

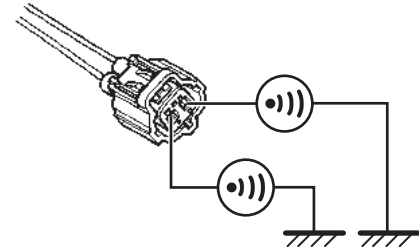
IAT sensor circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



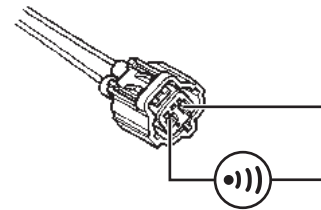
IE31J1110031-01

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



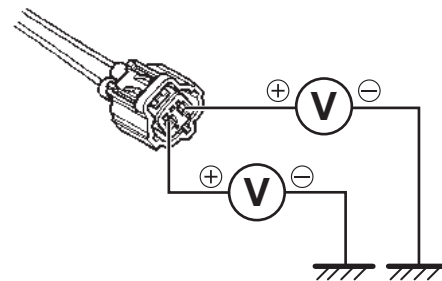
ID26J1110038-03

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



ID26J1110039-03

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



ID26J1110040-02

Is check result OK?

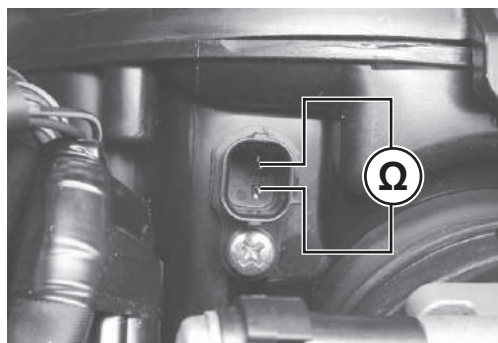
Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)

No Repair or replace the defective wire harness.

Step 3

IAT sensor check

- 1) Turn the ignition switch OFF.
- 2) Measure the IAT sensor resistance at 0 °C (32 °F). (Page 1C-15)



IE31J1110032-03

Is resistance 5400 – 6600 Ω?

- | | |
|-----|---|
| Yes | Replace the ECM with a known good one, and inspect it again. (Page 1C-14) |
| No | Replace the IAT sensor with a new one. (Page 1C-15) |

DTC P0115-H / P0115-L (C15)

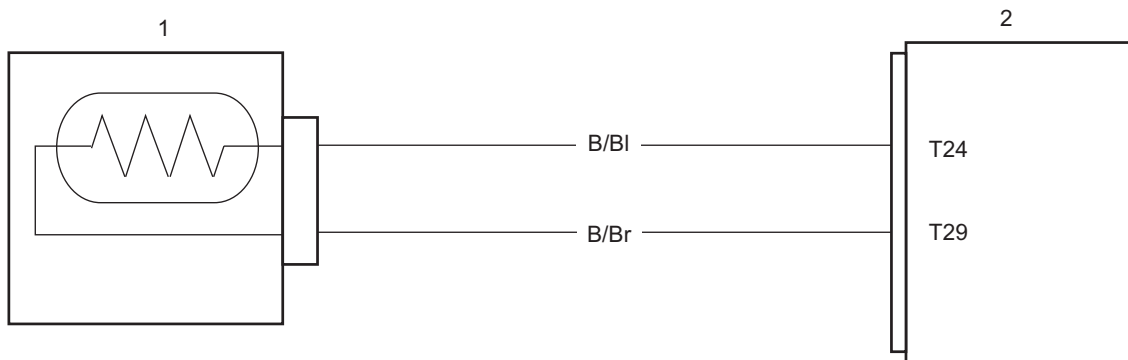
BENJ31J31114011

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0115-H: ECT Sensor Circuit High Voltage The sensor output voltage is higher than the specified value.	<ul style="list-style-type: none"> • ECT sensor • ECT sensor circuit • ECM
P0115-L: ECT Sensor Circuit Low Voltage The sensor output voltage is lower than the specified value.	
C15: ECT Sensor Circuit Malfunction The sensor output voltage is not within 0.15 – 4.85 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



IE31J1110033-01

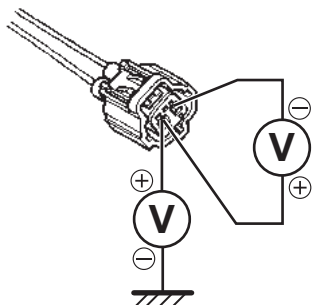
1. ECT sensor	2. ECM
---------------	--------

Troubleshooting

Step 1

ECT sensor input voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECT sensor coupler. (Page 1C-16)
- 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.



ID26J1110036-04

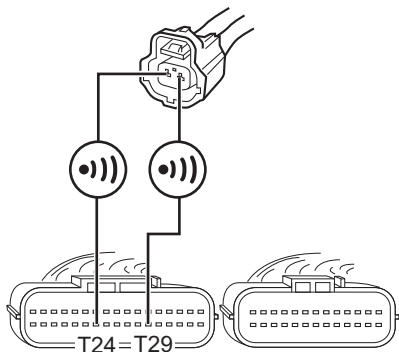
Is voltage 4.5 – 5.5 V?

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

Step 2

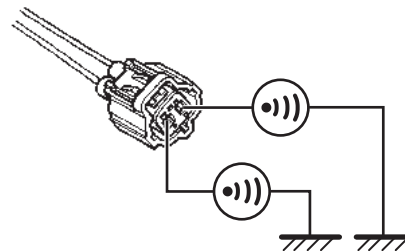
ECT sensor circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



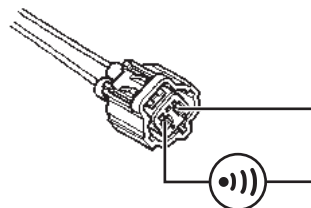
IE31J1110034-01

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



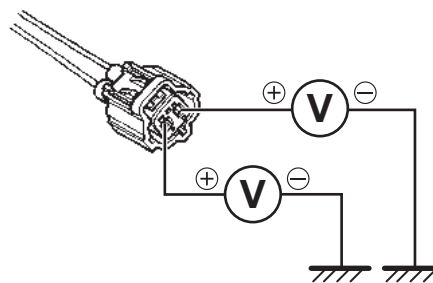
ID26J1110038-03

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



ID26J1110039-03

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



ID26J1110040-02

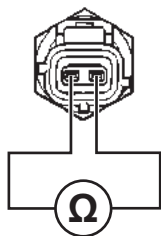
Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Repair or replace the defective wire harness.

Step 3

ECT sensor check

- 1) Turn the ignition switch OFF.
- 2) Measure the ECT sensor resistance at 20 °C (68 °F). (Page 1C-16)



ID26J1110041-02

Is resistance 2320 – 2590 Ω?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the ECT sensor with a new one. (Page 1C-16)

DTC P0120-H / P0120-L (C14)

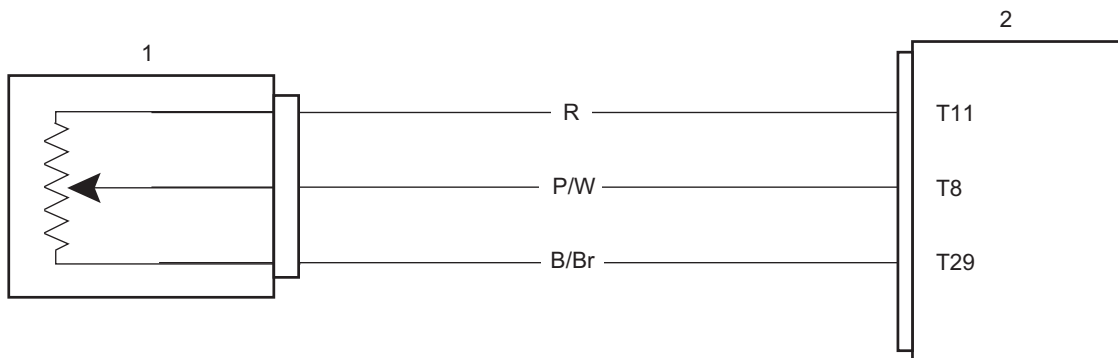
BENJ31J31114012

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0120-H: TP Sensor Circuit High Voltage The sensor output voltage is higher than the specified value.	<ul style="list-style-type: none"> • TP sensor • TP sensor circuit • ECM
P0120-L: TP Sensor Circuit Low Voltage The sensor output voltage is lower than the specified value.	
C14: TP Sensor Circuit Malfunction The sensor output voltage is not within 0.20 – 4.80 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



IE31J1110035-01

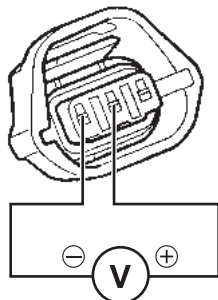
1. TP sensor	2. ECM
--------------	--------

Troubleshooting

Step 1

TP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the TP sensor coupler. (Page 1C-19)
- 3) Check for proper terminal connection to the TP sensor coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the R wire and B/Br wire.



IE31J1110036-02

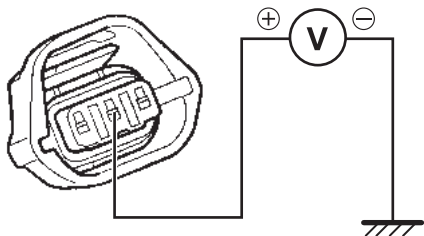
Is voltage 4.5 – 5.5 V?

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

Step 2

TP sensor ground circuit check

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



IE31J1110037-02

Is voltage 4.5 –5.5 V?

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

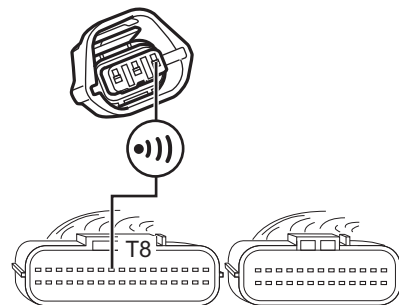
Step 3

TP sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.

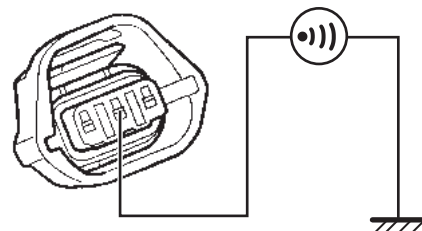
- 4) If connections are OK, check the following points.

- Resistance
 - P/W wire: less than 1 Ω



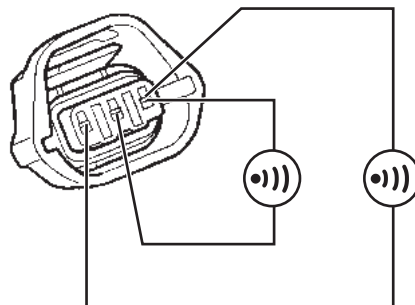
IE31J1110038-01

- Between P/W wire and ground: infinity



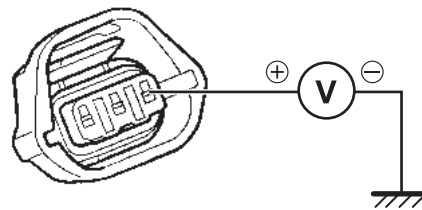
IE31J1110039-02

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



IE31J1110040-01

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



IE31J1110041-02

Is check result OK?

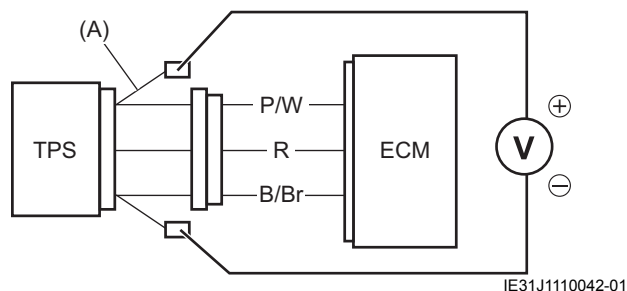
- Yes Go to Step 4.
- No Repair or replace the P/B wire.

Step 4

TP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM couplers.
- 3) Connect the special tool between the TP sensor and its coupler.
- 4) Turn the ignition switch ON.
- 5) Measure the TP sensor voltage between the P/W wire and B/Br wire with turning the throttle grip open and close.

Special tool
(A): 09900-28630



Is voltage approx. 1.1 V (when throttle valve is closed) and approx. 4.3 V (when throttle valve is opened)?

- Yes Replace the ECM with a known good one, and inspect it again. ☞ (Page 1C-14)
- No Replace the TP sensor with a new one. ☞ (Page 1C-19)

DTC P0130 (C64)

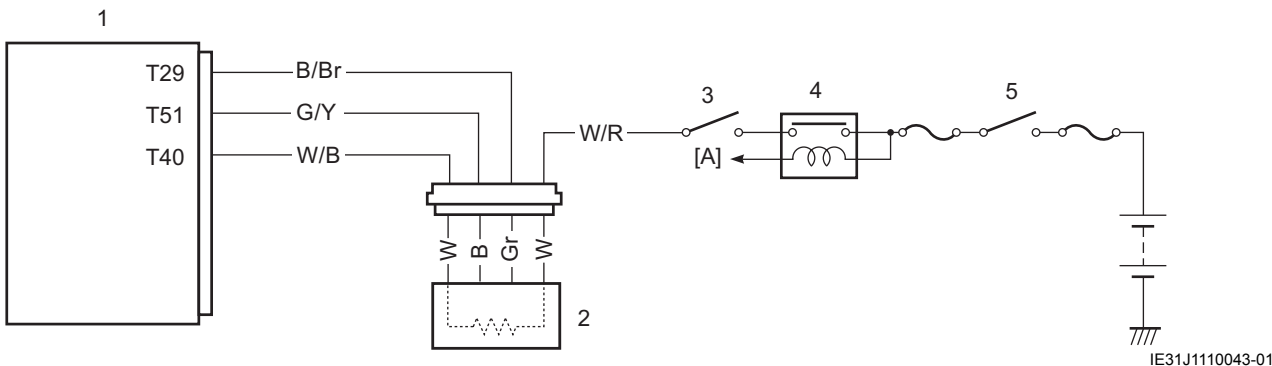
BENJ31J31114013

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble Area
P0130 (C64): HO2 Sensor #1 Circuit Malfunction HO2 sensor #1 output voltage is not input to ECM during engine operation and running condition.	<ul style="list-style-type: none"> • HO2 sensor #1 • HO2 sensor #1 circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).



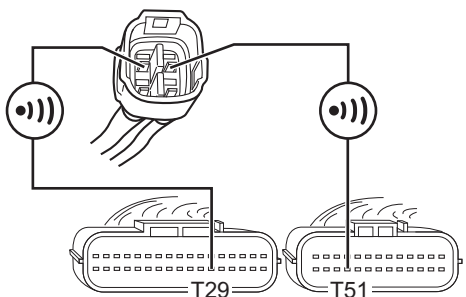
[A]: To GP switch	2. HO2 sensor #1	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

Troubleshooting (Use of SDS)

Step 1

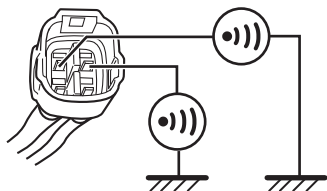
HO2 sensor circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor #1 coupler and the ECM couplers.
 - HO2 sensor #1: (Page 1C-20)
 - ECM: (Page 1C-14)
- 3) Check for proper terminal connection to the HO2 sensor #1 coupler and the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - G/Y wire and B/Br wire: less than 1 Ω



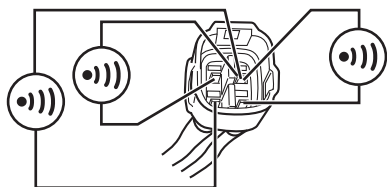
IE31J1110044-01

- Between each of G/Y wire and B/Br wire and ground: infinity



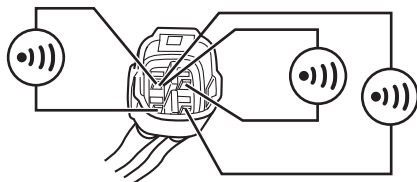
ID26J1110054-03

- Between G/Y wire terminal and other terminal at HO2 sensor #1 coupler: infinity



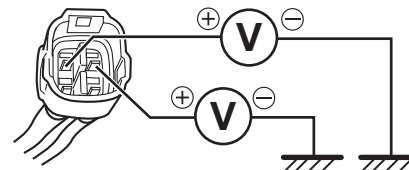
ID26J1110208-01

- Between B/Br wire terminal and other terminal at HO2 sensor #1 coupler: infinity



ID26J1110209-01

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



ID26J1110057-02

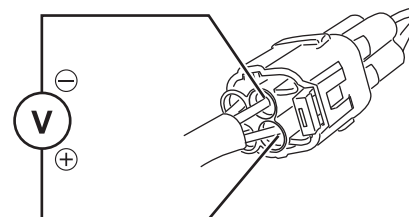
Is check result OK?

- | | |
|-----|---|
| 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 coupler and HO2 sensor #1 lead wire coupler.
- 3) Warm up the engine enough.
- 4) Measure the HO2 sensor output voltage between the B wire and Gr wire, in idling condition.
- 5) If OK, measure the HO2 sensor #1 output voltage while holding the engine speed at 6000 r/min.



IE31J1110198-01

Is voltage approx. 0.6 V or less (at idle speed) and approx. 0.6 V or more (at engine speed at 6000 r/min)?

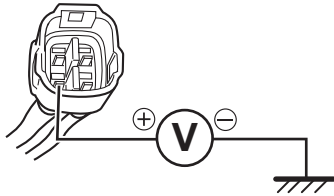
- | | |
|-----|---|
| Yes | Replace the ECM with a known good one, and inspect it again. (Page 1C-14) |
| No | Replace the HO2 sensor #1 with a new one. (Page 1C-20) |

Troubleshooting (Use of Mode Select Switch)

Step 1

HO2 sensor heater power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor #1 coupler. (Page 1C-20)
- 3) Check for proper terminal connection to the HO2 sensor #1 coupler.
- 4) If connections are OK, turn ignition switch ON.
- 5) Measure the voltage between W/R wire and ground.



IE31J1110199-02

Is voltage battery voltage?

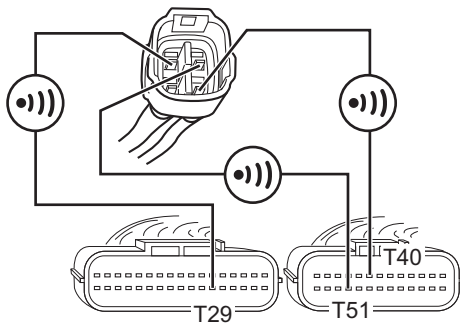
Yes Go to Step 2.

No Repair or replace the W/R wire.

Step 2

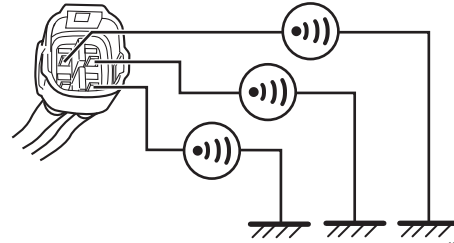
HO2 sensor circuit check

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



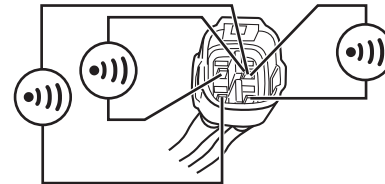
IE31J1110049-01

- Between each of G/Y, B/Br and W/R wire and ground: infinity



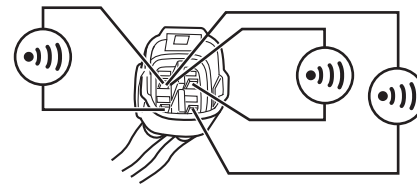
ID26J1110067-03

- Between G/Y wire terminal and other terminal at HO2 sensor #1 coupler: infinity



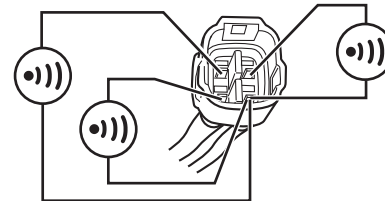
ID26J1110208-01

- Between B/Br wire terminal and other terminal at HO2 sensor #1 coupler: infinity



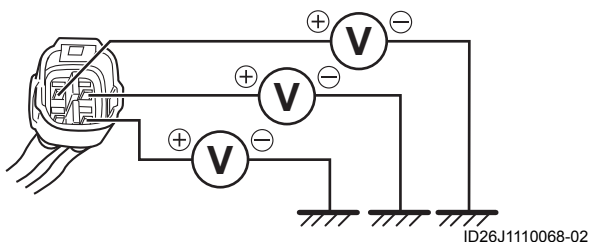
ID26J1110209-01

- Between W/B wire terminal and other terminal at HO2 sensor #1 coupler: infinity



ID26J1110055-05

- Voltage
 - Turn the ignition switch ON.
 - W/B, G/Y and B/Br wires: approx. 0 V



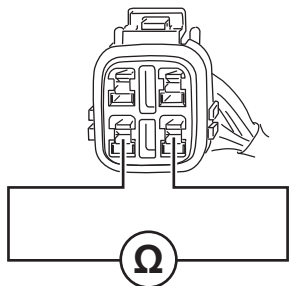
Is check result OK?

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

Step 3

HO2 sensor heater check

- 1) Turn the ignition switch OFF.
- 2) Measure the resistance between terminals.



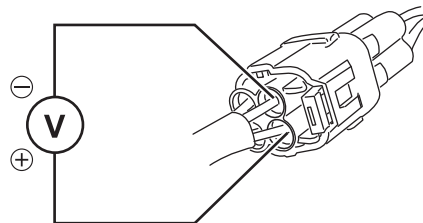
Is resistance 6.7 – 9.5 Ω (at 23 °C (73 °F))?

- Yes Go to Step 4.
- No Replace the HO2 sensor #1 with a new one. ☞ (Page 1C-20)

Step 4

HO2 sensor output voltage check

- 1) Connect the ECM coupler and HO2 sensor #1 coupler.
- 2) Warm up the engine enough.
- 3) Measure the HO2 sensor #1 output voltage between the B wire and Gr wire, in idling condition.
- 4) If OK, measure the HO2 sensor #1 output voltage while holding the engine speed at 6000 r/min.



Is voltage approx. 0.6 V or less (at idle speed) and approx. 0.6 V or more (at 6000 r/min)?

- Yes Replace the ECM with a known good one, and inspect it again. ☞ (Page 1C-14)
- No Replace the HO2 sensor #1 with a new one. ☞ (Page 1C-20)

DTC P0135 (C64)

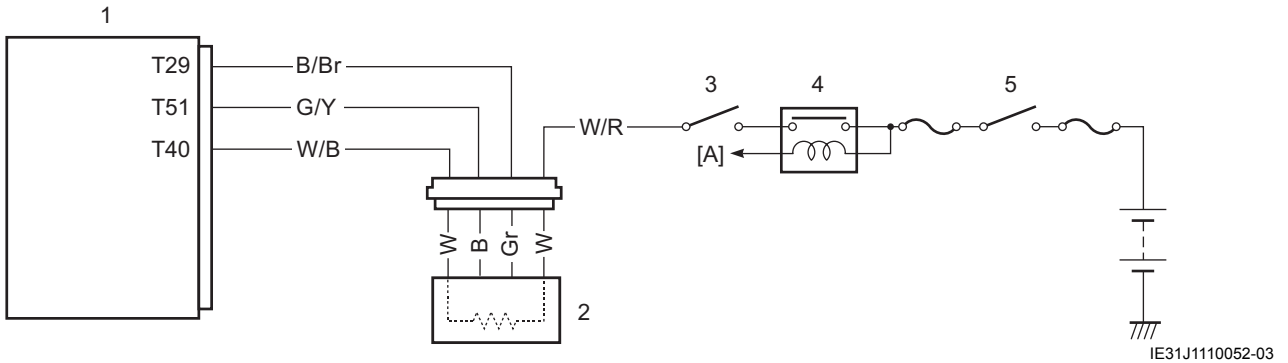
BENJ31J31114014

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble Area
<p>P0135 (C64): HO2 Sensor #1 Heater Circuit Malfunction The heater can not operate so that heater operation voltage is not supplied to the HO2 sensor heater circuit.</p>	<ul style="list-style-type: none"> • HO2 sensor #1 • HO2 sensor heater • HO2 sensor #1 heater circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).



IE31J1110052-03

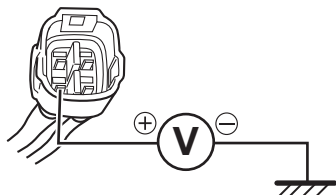
[A]: To GP switch	2. HO2 sensor #1	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

Troubleshooting (Use of SDS)

Step 1

HO2 sensor heater power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor #1 coupler. (Page 1C-20)
- 3) Check for proper terminal connection to the HO2 sensor #1 coupler.
- 4) If connections are OK, turn ignition switch ON.
- 5) Measure the voltage between W/R wire and ground.



IE31J1110202-01

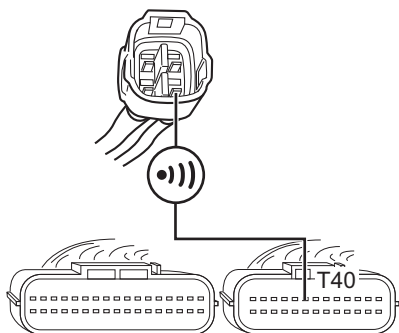
Is voltage battery voltage?

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

Step 2

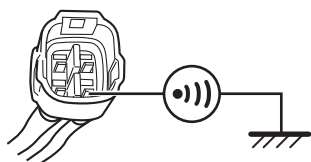
HO2 sensor heater drive circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



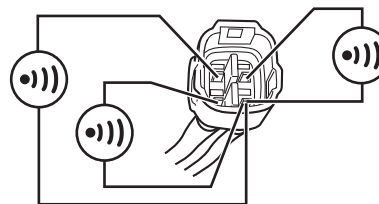
IE31J1110054-02

- Between W/B wire and ground: infinity



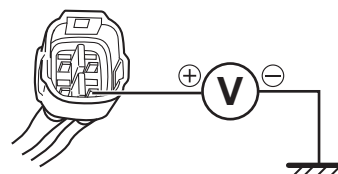
ID26J1110062-03

- Between W/B wire terminal and other terminal at HO2 sensor #1 coupler: infinity



ID26J1110055-05

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



ID26J1110064-03

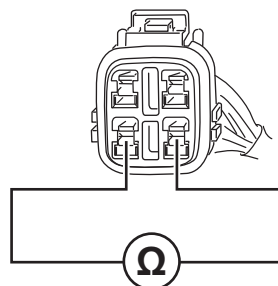
Is check result OK?

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

Step 3

HO2 sensor heater check

- 1) Turn the ignition switch OFF.
- 2) Measure the resistance between terminals.



IE31J1110203-01

Is resistance 6.7 – 9.5 Ω (at 20 °C (73 °F))?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the HO2 sensor #1 with a new one. (Page 1C-20)

Troubleshooting (Use of Mode Select Switch)

Refer to “DTC P0130 (C64)”: L4 - L6 (Page 1A-36).

DTC P0156 (C44)

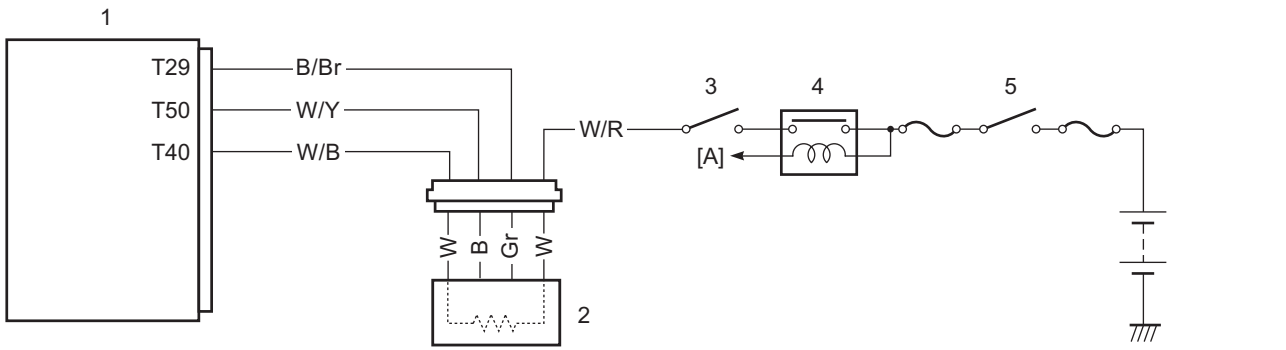
BENJ31J31114015

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble Area
P0156 (C44): HO2 Sensor #2 Circuit Malfunction HO2 sensor output voltage is not input to ECM during engine operation and running condition.	<ul style="list-style-type: none"> HO2 sensor #2 HO2 sensor #2 circuit ECM

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).



IE31J1110056-02

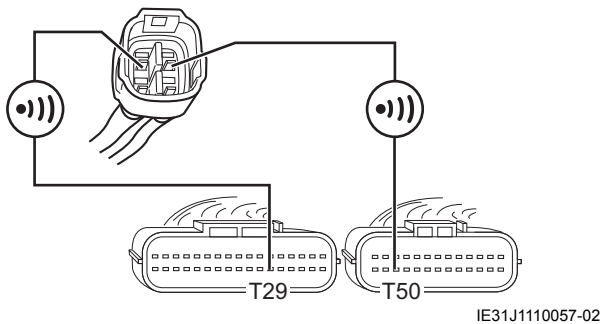
[A]: To GP switch	2. HO2 sensor #2	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

Troubleshooting (Use of SDS)

Step 1

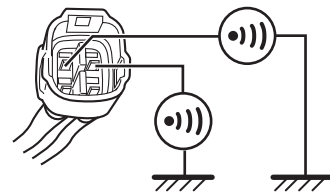
HO2 sensor circuit check

- Turn the ignition switch OFF.
- Disconnect the HO2 sensor #2 coupler and the ECM couplers.
 - HO2 sensor #2: (Page 1C-20)
 - ECM: (Page 1C-14)
- Check for proper terminal connection to the HO2 sensor #2 coupler and the ECM couplers.
- If connections are OK, check the following points.
 - Resistance
 - W/Y wire and B/Br wire: less than 1 Ω



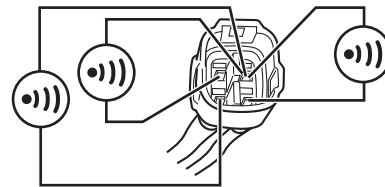
IE31J1110057-02

- Between each of W/Y wire and B/Br wire and ground: infinity



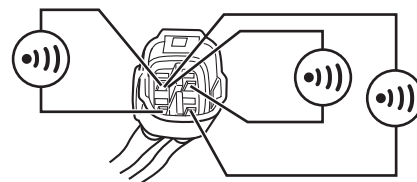
ID26J1110054-03

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



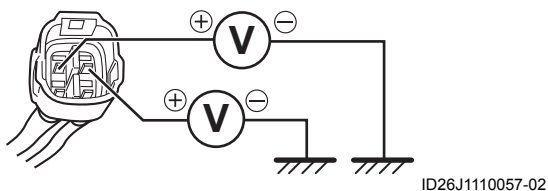
ID26J1110208-01

- Between B/Br wire terminal and other terminal at HO2 sensor #2 coupler: infinity



ID26J1110209-01

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



ID26J1110057-02

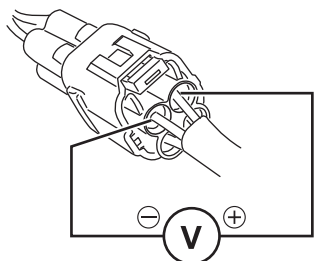
Is check result OK?

- 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 #2 coupler.
- 3) Warm up the engine enough.
- 4) Measure the HO2 sensor #2 voltage between the B wire and Gr wire, in idling condition.
- 5) If OK, measure the HO2 sensor #2 voltage while holding the engine speed at 6000 r/min.



IE31J1110204-01

Is voltage approx. 0.6 V or less (at idle speed) and approx. 0.6 V or more (at 6000 r/min)?

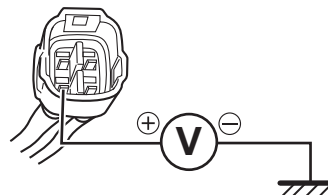
- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the HO2 sensor #2 with a new one. (Page 1C-20)

Troubleshooting (Use of Mode Select Switch)

Step 1

HO2 sensor heater power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor #2 coupler. (Page 1C-20)
- 3) Check for proper terminal connection to the HO2 sensor #2 coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between W/R wire and ground.



IE31J1110205-01

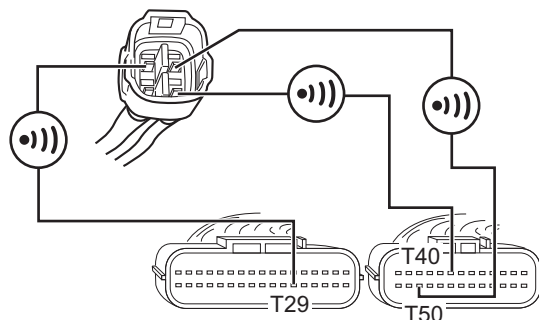
Is voltage battery voltage?

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

Step 2

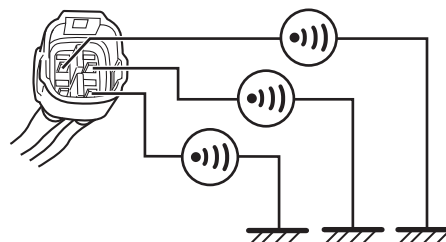
HO2 sensor circuit check

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



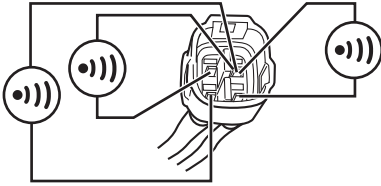
IE31J1110060-03

- Between each of W/Y, B/Br and W/B wire and ground: infinity



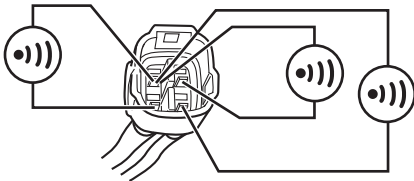
ID26J1110067-03

- Between W/Y wire terminal and other terminal at HO2 sensor #2 coupler: infinity



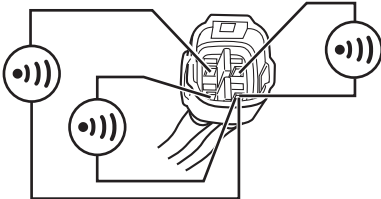
ID26J1110208-01

- Between B/Br wire terminal and other terminal at HO2 sensor #2 coupler: infinity



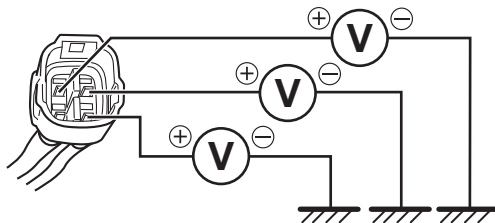
ID26J1110209-01

- Between W/B wire terminal and other terminal at HO2 sensor #2 coupler: infinity



ID26J1110055-05

- Voltage
 - Turn the ignition switch ON.
 - W/B, W/Y and B/Br wires: approx. 0 V



ID26J1110068-02

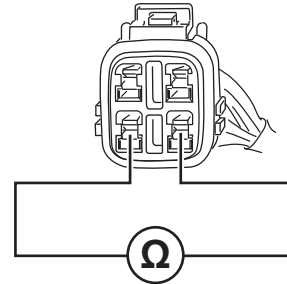
Is check result OK?

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

Step 3

HO2 sensor heater check

- 1) Turn the ignition switch OFF.
- 2) Measure the resistance between terminals.



IE31J1110206-01

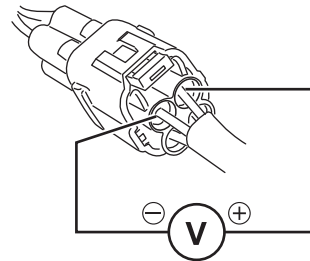
Is resistance 6.7 – 9.5 Ω (at 23 °C (73 °F))?

- Yes Go to Step 4.
- No Replace the HO2 sensor #2 with a new one. (Page 1C-20)

Step 4

HO2 sensor output voltage check

- 1) Connect the ECM couplers and HO2 sensor #2 coupler.
- 2) Warm up the engine enough.
- 3) Measure the HO2 sensor #2 voltage between the B wire and Gr wire, in idling condition.
- 4) If OK, measure the HO2 sensor #2 voltage while holding the engine speed at 6000 r/min.



IE31J1110207-01

Is voltage approx. 0.6 V or less (at idle speed) and approx. 0.6 V or more (at 6000 r/min)?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the HO2 sensor #2 with a new one. (Page 1C-20)

DTC P0161 (C44)

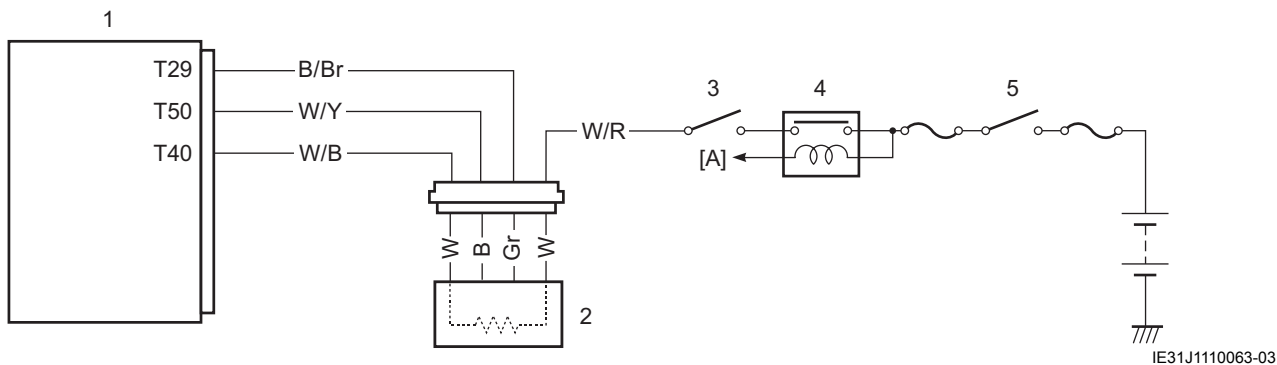
BENJ31J31114016

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble Area
P0161 (C44): HO2 Sensor #2 Heater Circuit Malfunction The heater can not operate so that heater operation voltage is not supplied to the HO2 sensor heater circuit.	<ul style="list-style-type: none"> • HO2 sensor #2 • HO2 sensor heater • HO2 sensor #2 heater circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).



IE31J1110063-03

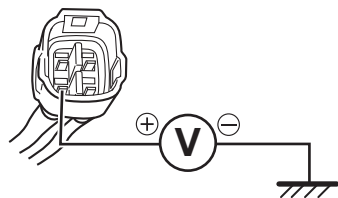
[A]: To GP switch	2. HO2 sensor #2	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

Troubleshooting (Use of SDS)

Step 1

HO2 sensor heater power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor #2 coupler. (Page 1C-20)
- 3) Check for proper terminal connection to the HO2 sensor #2 coupler.
- 4) If connections are OK, turn ignition switch ON.
- 5) Measure the voltage between W/R wire and ground.



IE31J1110208-01

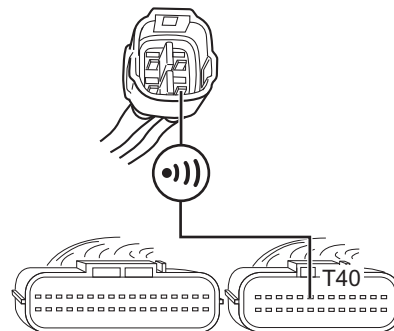
Is voltage battery voltage?

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

Step 2

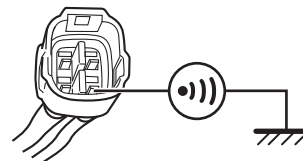
HO2 sensor heater drive circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



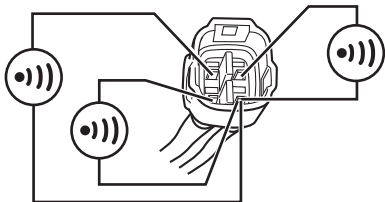
IE31J1110065-02

- Between W/B wire and ground: infinity



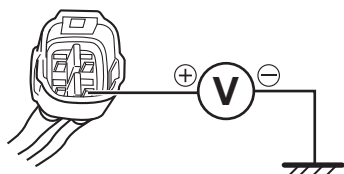
ID26J1110062-03

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



ID26J1110055-05

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



ID26J1110064-03

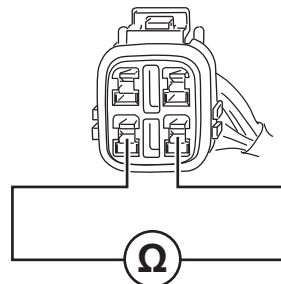
Is check result OK?

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

Step 3

HO2 sensor heater check

- 1) Turn the ignition switch OFF.
- 2) Measure the resistance between terminals.



IE31J1110209-01

Is resistance 6.7 – 9.5 Ω (at 23 °C (73 °F))?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the HO2 sensor #2 with a new one. (Page 1C-20)

Troubleshooting

Refer to “DTC P0156 (C44)”: L4 - L6 (Page 1A-42).

DTC P0201 (C32)

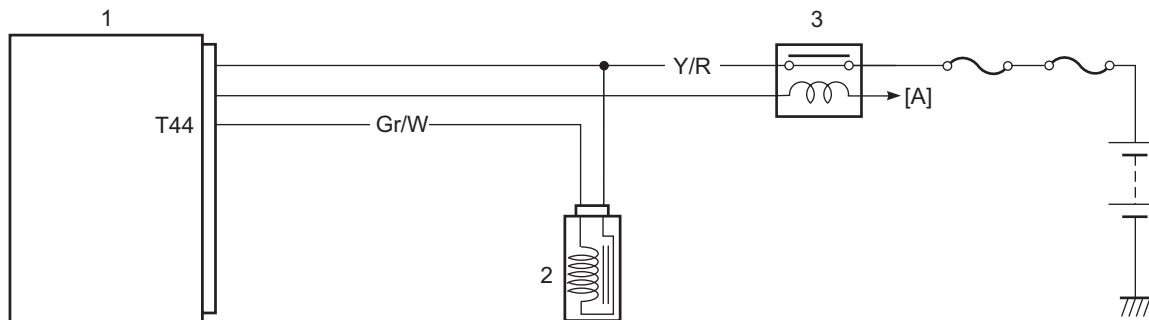
BENJ31J31114017

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0201 (C32): Fuel Injector #1 Malfunction Fuel injector 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

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



IE31J1110067-02

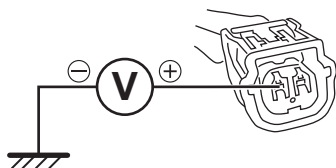
[A]: To engine stop switch	2. Fuel injector #1
1. ECM	3. FP relay

Troubleshooting

Step 1

Injector power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the injector #1 coupler. Refer to "Throttle Body Assembly Removal and Installation" in Section 1C (Page 1C-4).
- 3) Check for proper terminal connection to the injector #1 coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between Y/R wire and ground.



ID26J1110203-02

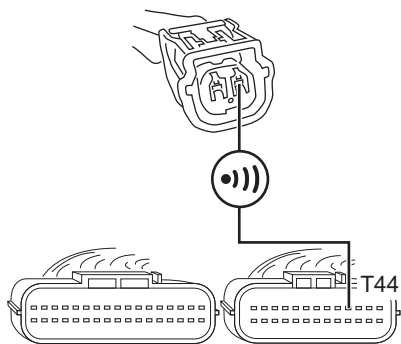
Is voltage battery voltage?

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

Step 2

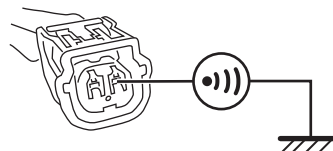
Injector drive circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - Gr/W wire: less than 1 Ω



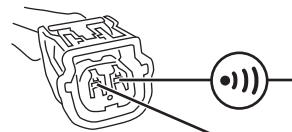
IE31J1110068-02

- Between Gr/W wire and ground: infinity



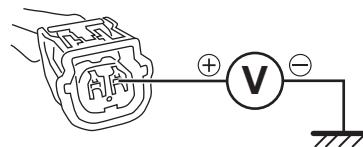
ID26J1110072-03

- Between Gr/W wire terminal and other terminal at injector #1 coupler: infinity



ID26J1110073-03

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



ID26J1110074-02

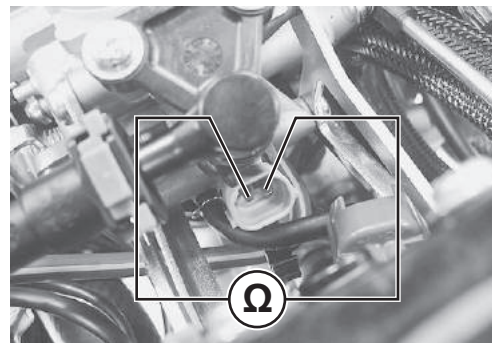
Is check result OK?

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

Step 3

Injector resistance check

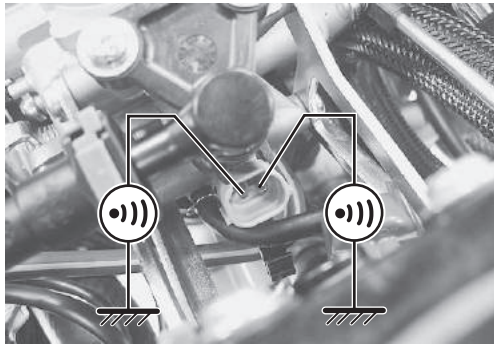
- 1) Turn the ignition switch OFF.
- 2) Check the following points.
 - Resistance
 - Terminal and Terminal: 11.5 – 12.5 Ω (at 20 °C (68 °F))



IE31J1110069-03

1A-48 Engine General Information and Diagnosis: L4 - L6

- Continuity
 - Each terminal and ground: infinity



IE31J1110070-01

Is check result OK?

- | | |
|-----|---|
| Yes | Replace the ECM with a known good one, and inspect it again. ☞ (Page 1C-14) |
| No | Replace the injector #1 with a new one. ☞ (Page 1G-15) |

DTC P0202 (C33)

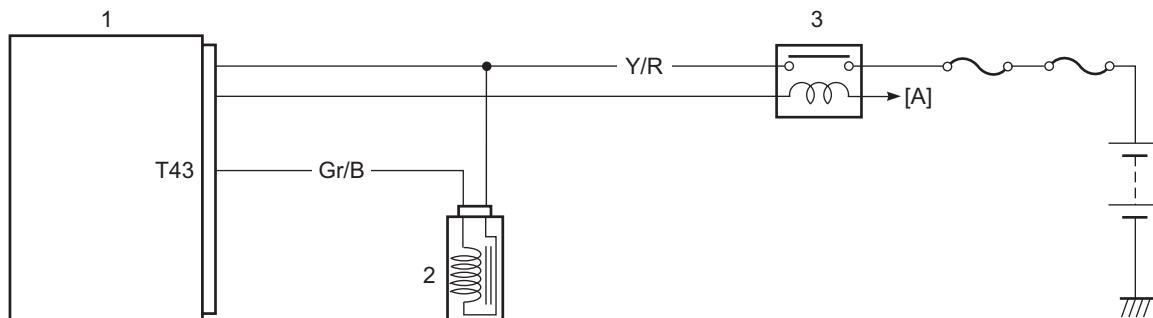
BENJ31J31114018

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0202 (C33): Fuel Injector #2 Malfunction Fuel injector 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

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).



IE31J1110071-01

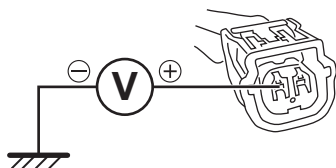
[A]: To engine stop switch	2. Fuel injector #2
1. ECM	3. FP relay

Troubleshooting

Step 1

Injector power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the injector #2 coupler. Refer to "Throttle Body Assembly Removal and Installation" in Section 1C (Page 1C-4).
- 3) Check for proper terminal connection to the injector coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between Y/R wire and ground.



ID26J1110203-02

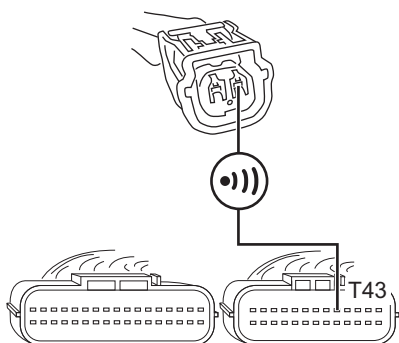
Is voltage battery voltage?

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

Step 2

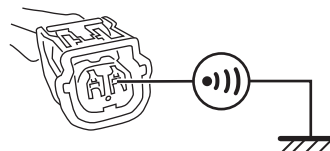
Injector drive circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - Gr/B wire: less than 1 Ω



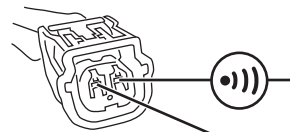
IE31J1110072-01

- Between Gr/B wire and ground: infinity



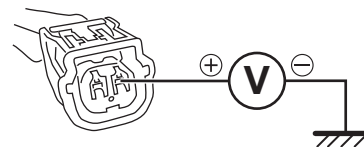
ID26J1110072-03

- Between Gr/B wire terminal and other terminal at injector #2 coupler: infinity



ID26J1110073-03

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



ID26J1110074-02

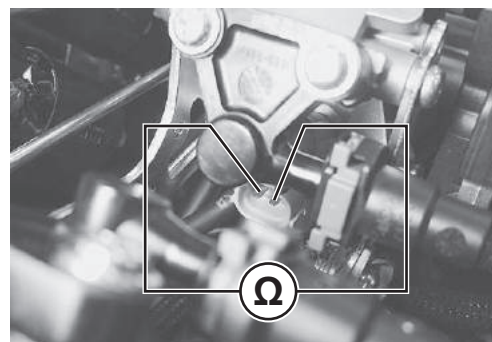
Is check result OK?

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

Step 3

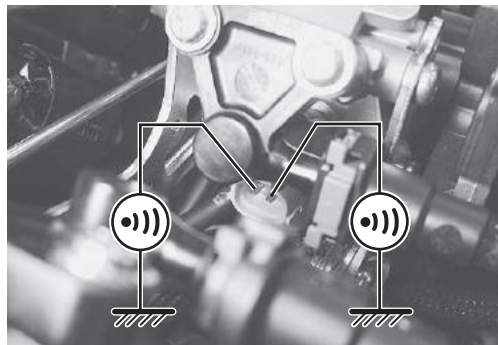
Injector resistance check

- 1) Turn the ignition switch OFF.
- 2) Check the following points.
 - Resistance
 - Terminal and Terminal: 11.5 – 12.5 Ω (at 20 °C (68 °F))



IE31J1110073-03

- Continuity
 - Each terminal and ground: infinity



IE31J1110074-02

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. ☞(Page 1C-14)
- No Replace the injector #2 with a new one. ☞(Page 1G-15)

DTC P0230-H / P0230-L (C41)

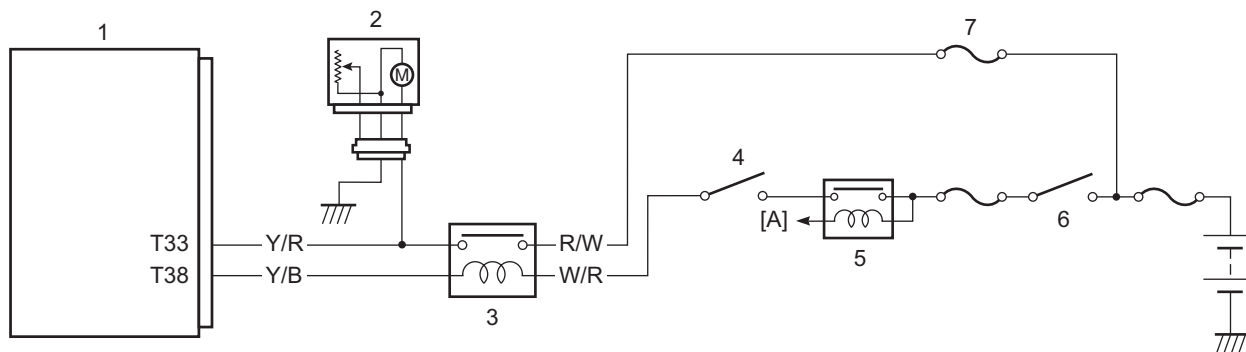
BENJ31J31114019

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0230-H: Unexpected Power Supply to Fuel Pump Voltage is applied to fuel pump although FP relay is turned OFF.	<ul style="list-style-type: none"> • Fuel pump relay • Fuel pump relay circuit • ECM
P0230-L: Unexpected Power Cut to Fuel Pump No voltage is applied to fuel pump although FP relay is turned ON.	
C41: FP Relay Circuit Malfunction No voltage is applied to fuel pump.	

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



IE31J1110075-01

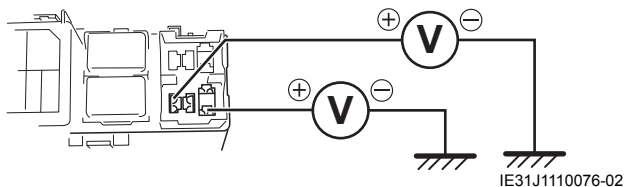
[A]: To side-stand switch	3. FP relay	6. Ignition switch
1. ECM	4. Engine stop switch	7. Fuel fuse
2. Fuel pump	5. Side-stand relay	

Troubleshooting

Step 1

FP relay power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Remove the FP relay. (Page 1G-14)
- 3) Check for proper terminal connection to the FP relay terminal.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Check the following points.
 - Voltage between W/R wire and ground is battery voltage.
 - Voltage between R/W wire and ground is battery voltage.



Is voltage battery voltage?

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

Step 2

FP relay check

Check the FP relay. (Page 1G-14)

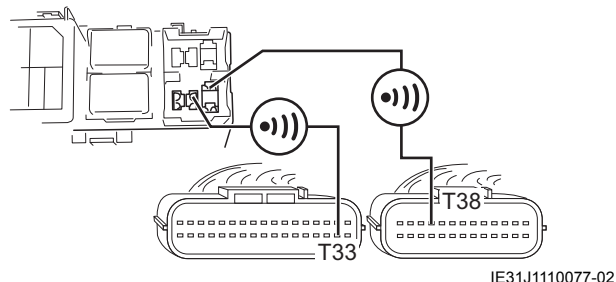
Is check result OK?

- Yes Go to Step 3.
- No Replace the FP relay.

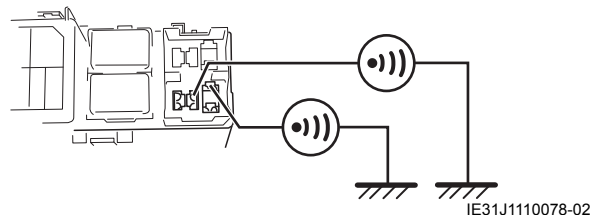
Step 3

FP relay drive circuit check

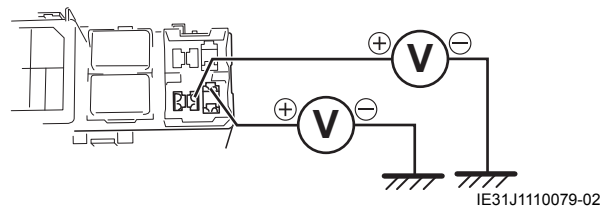
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - Y/R wire and Y/B wire: less than 1 Ω



- Between each of Y/R and 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-14)
- No Repair or replace the defective wire harness.

DTC P0335 (C12)

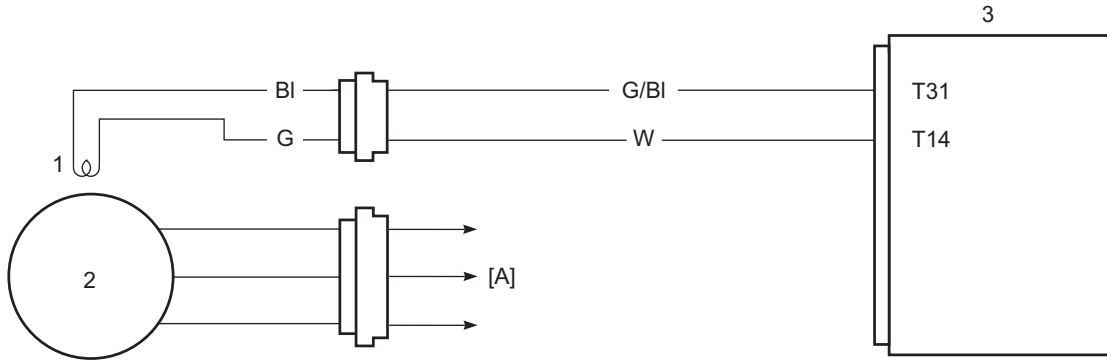
BENJ31J31114020

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P0335 (C12): CKP Sensor Circuit Malfunction The signal does not reach ECM for 2 sec. 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": L4 - L6 (Page 1A-7).



IE31J1110080-01

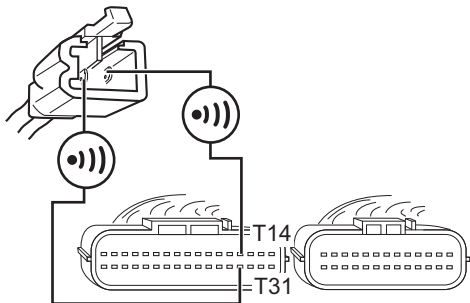
[A]: To regulator/rectifier	2. Generator
1. CKP sensor	3. ECM

Troubleshooting

Step 1

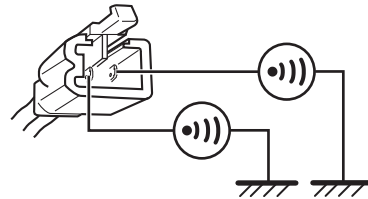
CKP sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the CKP sensor coupler and ECM couplers.
 - CKP sensor: (Page 1C-23)
 - ECM: (Page 1C-14)
- 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/BI wire and W wire: less than 1 Ω



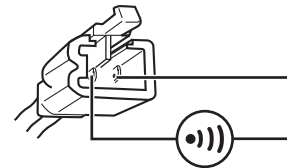
IE31J1110081-02

- Between each of the G/BI and W wire and ground: infinity



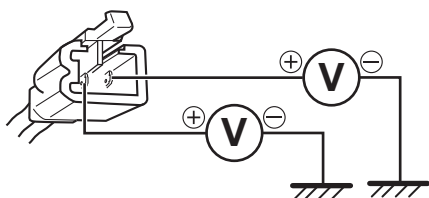
ID26J1110084-03

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



ID26J1110085-04

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



ID26J1110086-02

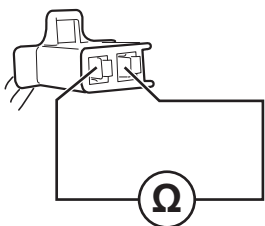
Is check result OK?

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

Step 2

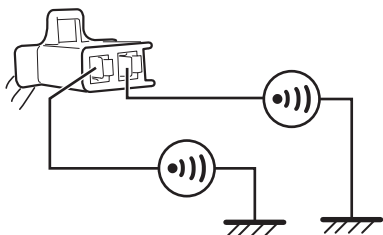
CKP sensor resistance check

- 1) Turn the ignition switch OFF.
- 2) Check the following points.
 - Resistance
 - Terminal to Terminal: 145 – 225 Ω



IE31J1110082-02

- Continuity
 - Each terminal and ground: infinity



IE31J1110083-01

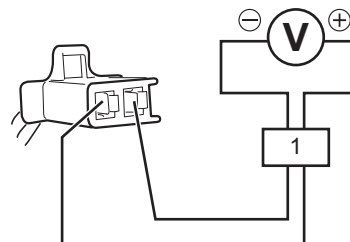
Is check result OK?

- Yes Go to Step 3.
- No Replace the CKP sensor with a new one. (Page 1C-23)

Step 3

CKP sensor peak voltage check

- 1) Connect the ECM couplers.
- 2) Crank the engine several seconds with the starter motor, and measure the CKP sensor peak voltage with the peak volt adapter (1).
- 3) Repeat the step 2) a few times and measure the highest peak voltage.



IE31J1110084-01

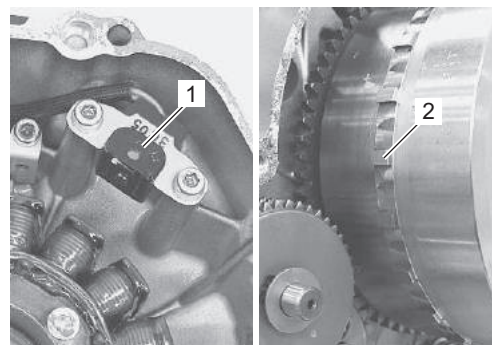
Is peak voltage 4.5 V or more?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Go to Step 4.

Step 4

CKP sensor and generator rotor check

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



IE31J1110085-01

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Clean or replace defective parts.

DTC P0351 (C24)

BENJ31J31114021

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0351 (C24): Ignition System #1 (Center) Malfunction Ignition coil #1 (center) signal is interrupted by 4 times or more continuity although CKP signal is detected.	Refer to “No Spark or Poor Spark” in Section 1H (Page 1H-4).

DTC P0352 (C25)

BENJ31J31114022

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0352 (C25): Ignition System #2 (Center) Malfunction Ignition coil #2 (center) signal is interrupted by 4 times or more continuity although CKP signal is detected.	Refer to “No Spark or Poor Spark” in Section 1H (Page 1H-4).

DTC P0353 (C26)

BENJ31J31114023

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0353 (C26): Ignition System #1 (Side) Malfunction Ignition coil #1 (side) signal is interrupted by 4 times or more continuity although CKP signal is detected.	Refer to “No Spark or Poor Spark” in Section 1H (Page 1H-4).

DTC P0354 (C27)

BENJ31J31114024

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0354 (C27): Ignition System #2 (Side) Malfunction Ignition coil #2 (side) signal is interrupted by 4 times or more continuity although CKP signal is detected.	Refer to “No Spark or Poor Spark” in Section 1H (Page 1H-4).

DTC P0443 (C62) (If Equipped)

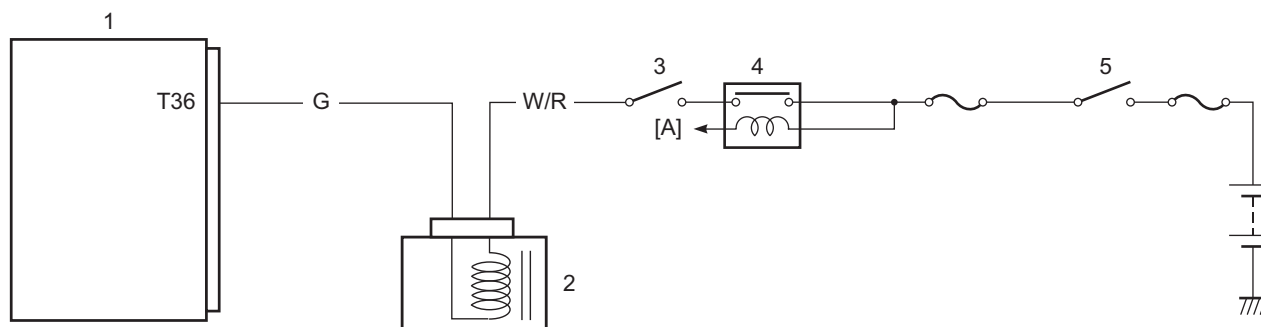
BENJ31J31114025

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0443 (C62): EVAP System Purge Solenoid Valve Circuit Malfunction EVAP system purge control valve voltage is not input to ECM.	<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”: L4 - L6 (Page 1A-7).



IE31J1110086-02

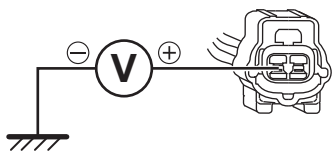
[A]: To side-stand switch	2. EVAP system purge control solenoid valve	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

Troubleshooting

Step 1

EVAP system purge control solenoid valve power supply circuit check

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



ID26J1110239-01

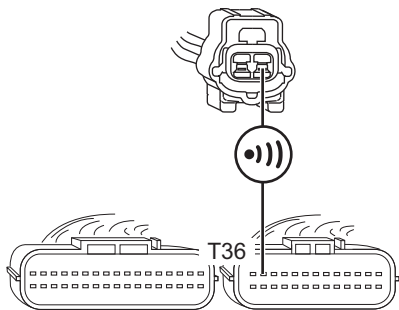
Is voltage battery voltage?

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

Step 2

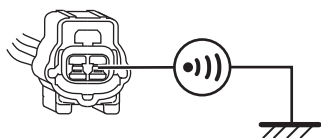
EVAP system purge control solenoid valve driver circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



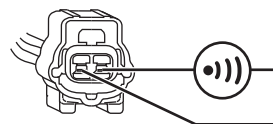
IE31J1110087-01

- Between G wire and ground: infinity



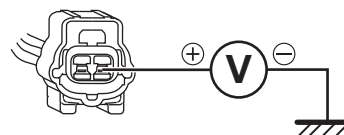
ID26J1110241-01

- Between G wire terminal and W/R 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

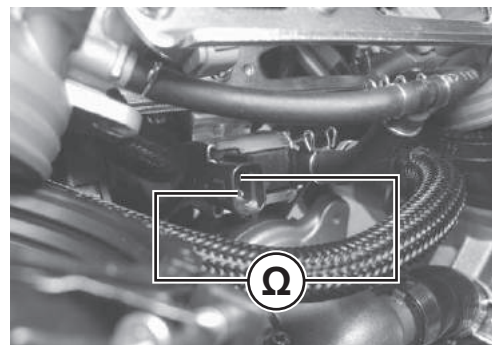
Is check result OK?

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

Step 3

EVAP system purge control solenoid valve check

- 1) Turn the ignition switch OFF.
- 2) Measure the EVAP system purge control solenoid valve resistance between terminals.



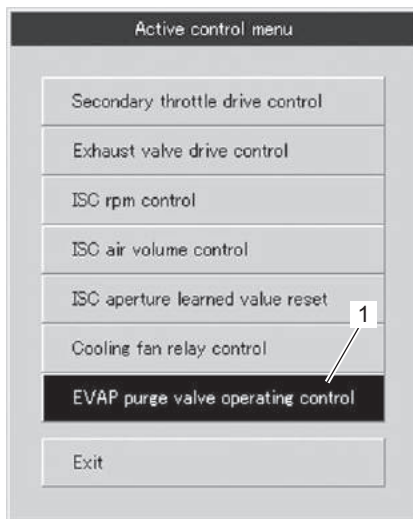
IE31J1110088-02

Is resistance 30 – 34 Ω (at 20 °C (68 °F))?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the EVAP system purge control solenoid valve with a new one. (Page 1B-13)

Active Control Inspection

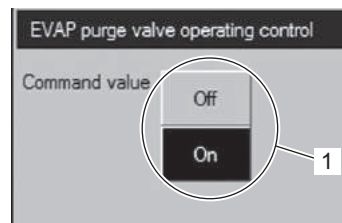
- 1) Set up the SDS tool referring to SDS operation manual for further details.
- 2) Turn the ignition switch ON.
- 3) Click “EVAP purge valve operating control” (1).



IE31J1110196-01

- 4) Click each button (1). At this time, if an operating sound is heard from the EVAP system purge control solenoid valve, the function is normal.

Item	Value	Unit
<input type="checkbox"/> EVAP purge valve	On	



IE31J1110089-03

DTC P0480 (C60)

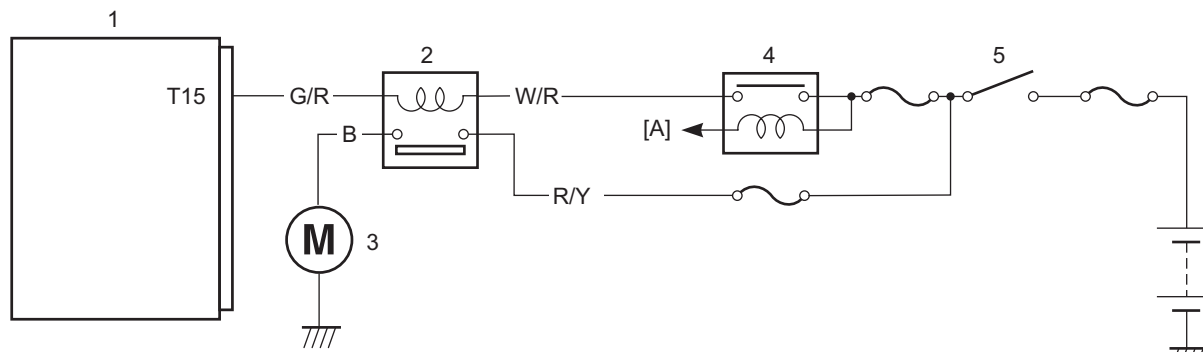
BENJ31J31114026

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0480 (C60): Cooling Fan Relay Malfunction 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”: L4 - L6 (Page 1A-7).



IE31J1110090-01

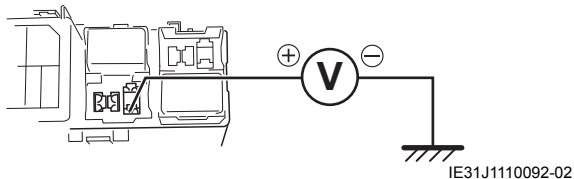
[A]: To side-stand switch	2. Cooling fan relay	4. Side-stand relay
1. ECM	3. Cooling fan motor	5. Ignition switch

Troubleshooting

Step 1

Cooling fan relay power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the cooling fan relay coupler. (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/R wire and ground.



Is voltage battery voltage?

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

Step 2

Cooling fan relay check

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

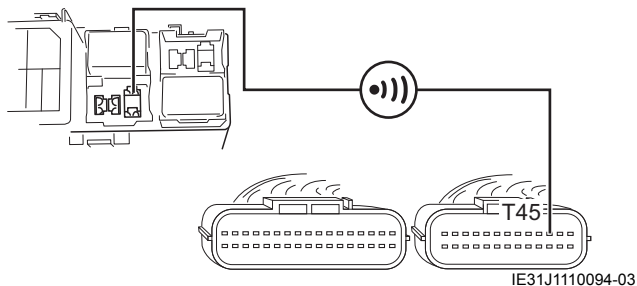
Is check result OK?

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

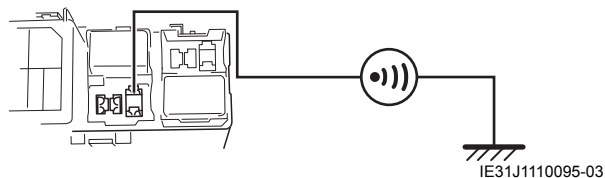
Step 3

Cooling fan relay drive circuit check

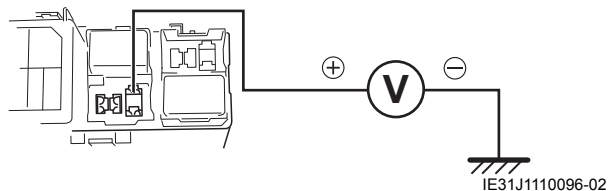
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - G/R wire: less than 1 Ω



- Between G/R wire and ground: infinity



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

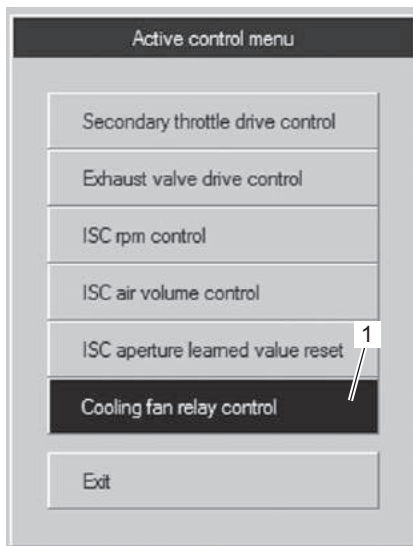


Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Repair or replace the G/R wire.

Active Control Inspection

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



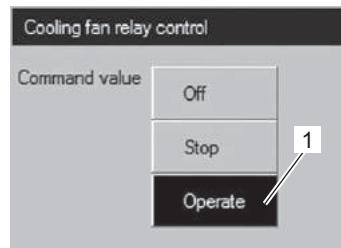
IE31J1110190-01

- 4) Click the “Operate” (1).
At this time, if an operation sound is heard from the cooling fan relay and cooling fan motor are operated, the function is normal.

NOTE

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

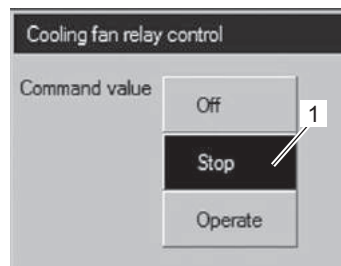
Item	Value	Unit	
<input type="checkbox"/> Exhaust control valve actuator position sensor	92	%	
<input type="checkbox"/> Cooling fan relay	On		



IE31J1110097-01

- 5) Click the “Stop” (1) to check the operation properly.

Item	Value	Unit	
<input type="checkbox"/> Exhaust control valve actuator position sensor	92	%	
<input type="checkbox"/> Cooling fan relay	Off		



IE31J1110098-01

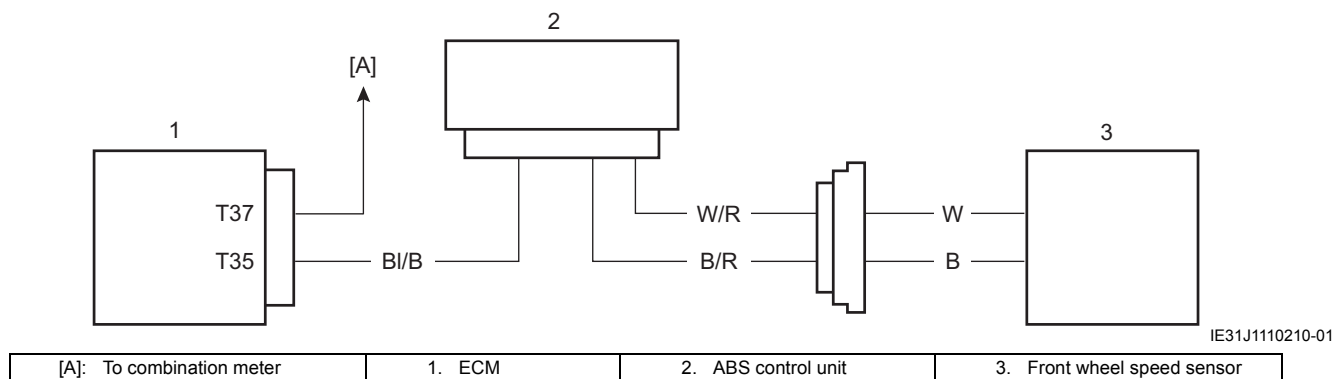
DTC P0500 (C16)

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0500 (C16): Vehicle Speed Sensor Circuit (Front) Malfunction The speed sensor signal is not input for more than 6 sec.	<ul style="list-style-type: none"> • Metal particles or foreign material being attached on the speed sensor • Speed sensor • Speed sensor circuit • ECM • ABS control unit

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).



Troubleshooting

Step 1

ABS DTC check

- 1) Turn the ignition switch OFF.
- 2) Set up the SDS tool according to the SDS operation manual.
- 3) Check the DTC of ABS. (Page 4E-18)

Is the DTC C1641 and C1642 indicate?

Yes Go to DTC C1641 (41) and C1642 (42).
(Page 4E-28) (Page 4E-29)

No Go to Step 2.

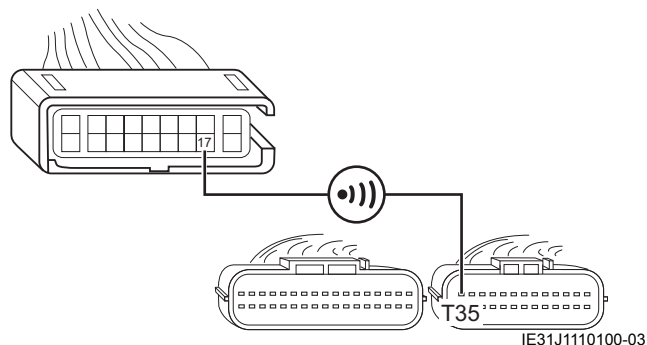
Step 2

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

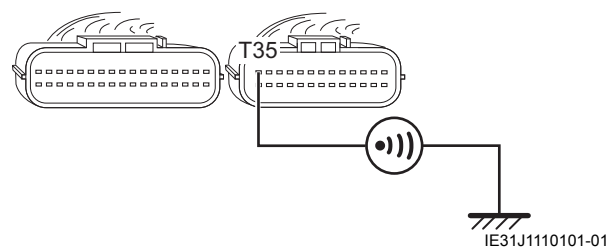
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ABS control unit coupler and ECM couplers.
 - ABS: (Page 4E-38)
 - ECM: (Page 1C-14)
- 3) Check for proper terminal connection to the ABS control unit coupler and ECM couplers.

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

- Resistance
 - BI/B wire: less than 1 Ω



- BI/B wire and ground: infinity



Is check result OK?

Yes Replace the ECM with a known good one, and inspect again. (Page 1C-14)

No Repair or replace the BI/B wire.

DTC P0506 (C65)

BENJ31J31114028

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0506 (C65): ISC Valve, Lower Than Desired RPM Idle speed dropped lower than desired idle speed by more than specified range.	<ul style="list-style-type: none"> • Air passage • STVA • Engine mechanism

Troubleshooting

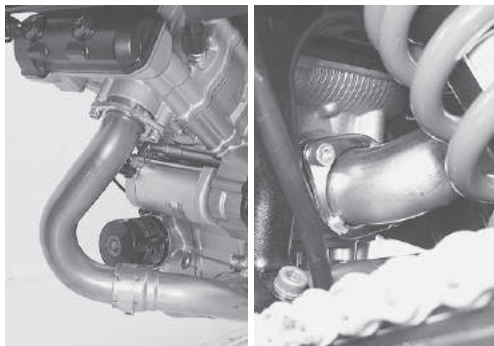
NOTICE

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

Step 1

Engine combustion check

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



IE31J1110102-01

Is check result OK?

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

Step 2

STVA operation check

- 1) Check STV actuator. (Page 1C-25)

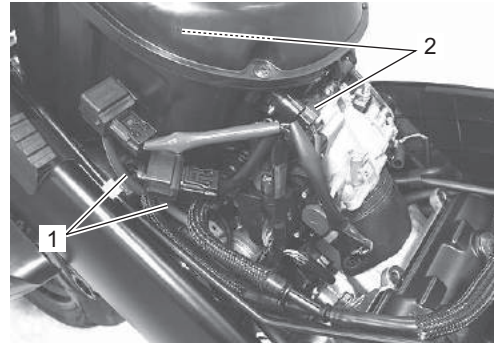
Is check result OK?

- Yes Go to Step 3.
- No Replace the throttle body. (Page 1C-6)

Step 3

Air intake system check

- 1) Check air intake system air passage ways (1) and (2) for clogging and leakage.



IE31J1110103-01

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-1)
 - Fuel pressure: (Page 1G-5)

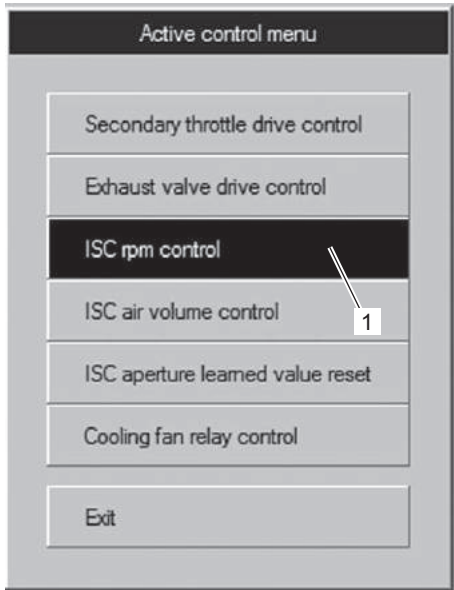
Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Repair or replace defective parts.

Active Control Inspection (ISC RPM Control)

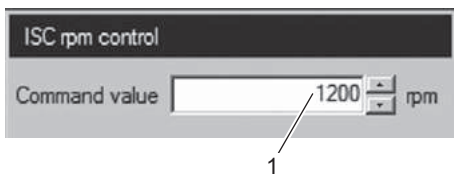
Check 1

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



IE31J1110104-01

- 5) Check that the “Spec” (1) is idle speed 1200 ± 100 rpm.
- 6) Check that the “Desired idle rpm” (2) is within the specified idle rpm.



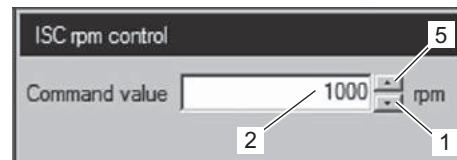
IE31J1110105-01

Item	Value	Unit
<input type="checkbox"/> Vehicle speed	0	km/h
<input checked="" type="checkbox"/> Engine speed	1222	rpm
<input checked="" type="checkbox"/> Secondary throttle actuator position sensor	28	%
<input type="checkbox"/> Desired idle rpm	1205	rpm

IE31J1110106-02

Check 2

- 1) Click the button (1) and decrease the “Spec” (2) to 1000 rpm slowly.
- 2) Check that the “Desired idle rpm” (3) is nearly equal to the “Spec” (2). At the same time, check that the number of percent (4) in the secondary throttle actuator position sensor decreases.
- 3) Click the button (5) and increase the “Spec” (2) slowly.
- 4) Check that the “Desired idle rpm” (3) is nearly equal to the “Spec” (2). Also, check that the number of percent (4) in the secondary throttle actuator position sensor increases.



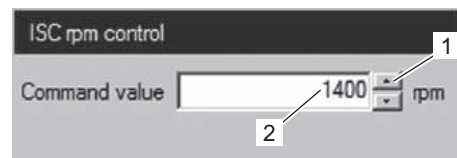
IE31J1110107-01

Item	Value	Unit
<input type="checkbox"/> Vehicle speed	0	km/h
<input checked="" type="checkbox"/> Engine speed	1067	rpm
<input checked="" type="checkbox"/> Secondary throttle actuator position sensor	4	%
<input type="checkbox"/> Desired idle rpm	1004	rpm

IE31J1110108-02

Check 3

- 1) Click the button (1) and increase the “Spec” (2) to 1400 rpm slowly.
- 2) Check that the “Desired idle rpm” (3) is nearly equal to the “Spec” (2). Also, check that the number of percent (4) in the secondary throttle actuator position sensor increases.



IE31J1110109-02

Item	Value	Unit
<input type="checkbox"/> Vehicle speed	0	km/h
<input checked="" type="checkbox"/> Engine speed	1422	rpm
<input checked="" type="checkbox"/> Secondary throttle actuator position sensor	4	%
<input type="checkbox"/> Desired idle rpm	1405	rpm

IE31J1110110-03

NOTE

Be careful not to increase the “Spec” to 1500 rpm, or the “Engine speed” may reach the upper limit.

If the secondary throttle valve actuator does not function properly, inspect the ISC or replace the throttle body assembly. Refer to “DTC P0506 (C65)”: L4 - L6 (Page 1A-60) or “Throttle Body Assembly Removal and Installation” in Section 1C (Page 1C-4).

DTC P0507 (C65)

BENJ31J31114029

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0507 (C65): ISC Valve, Higher Than Desired RPM Idle speed rose higher than desired idle speed by more than specified range.	<ul style="list-style-type: none"> • Air passage • STVA • Engine mechanism

Troubleshooting

NOTICE

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

Refer to “DTC P0506 (C65)”: L4 - L6 (Page 1A-60).

DTC P0705 (C31)

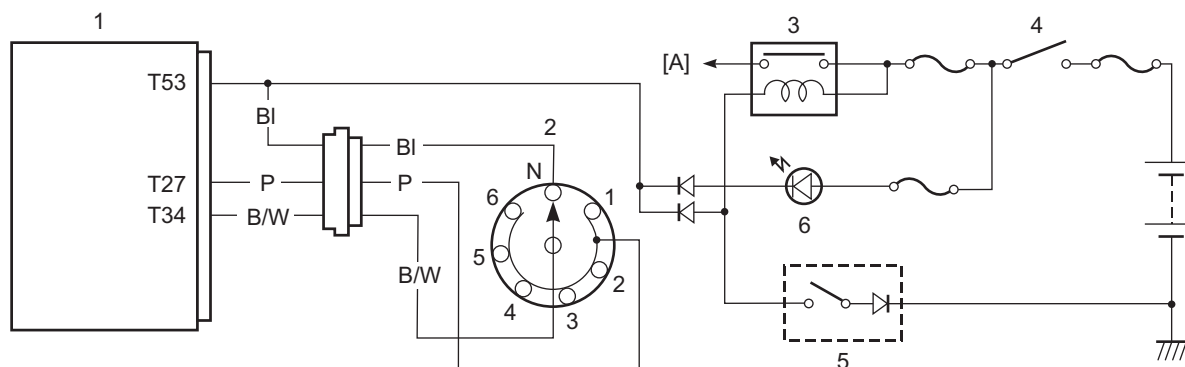
BENJ31J31114030

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0705 (C31): GP Switch Circuit Malfunction Gear position signal voltage should be higher than the specified value.	<ul style="list-style-type: none"> • GP switch circuit open or short • GP switch malfunction • ECM malfunction

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



IE31J1110111-01

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

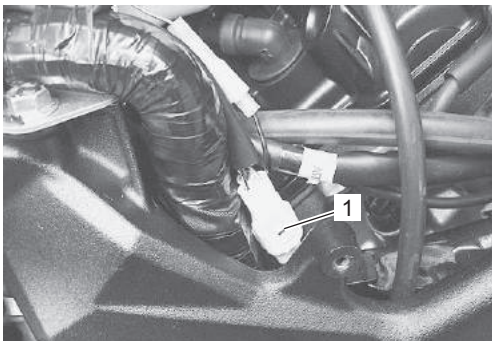
Troubleshooting

Step 1

GP switch input voltage check

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank. (Page 1G-9)
- 3) Check the GP switch coupler (1) for loose or poor contacts.

If OK, then measure the GP switch voltage.



IE31J1110112-01

- 4) Support the motorcycle with a jack.

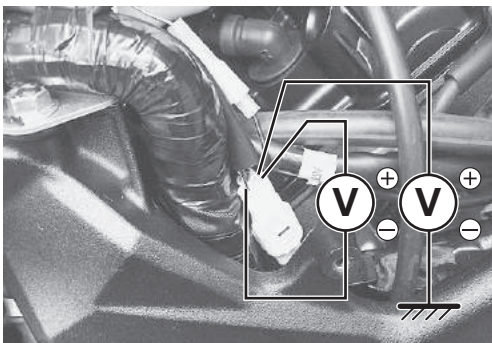
CAUTION

Make sure that the motorcycle is supported securely.

NOTICE

Do not support the motorcycle with the exhaust pipes.

- 5) Fold the side-stand to up position.
- 6) Insert the needle pointed probe to the lead wire coupler.
- 7) Turn the ignition switch ON.
- 8) Measure the voltage between the P wire and B/W wire and P wire and ground. When shifting the gearshift lever from 1st to Top.



IE31J1110113-03

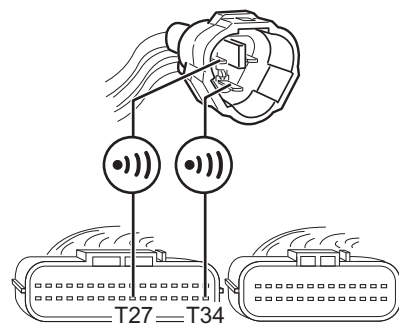
Is voltage 0.6 V or more?

- Yes Go to Step 2.
- No Open circuit in the P or B/W wire.

Step 2

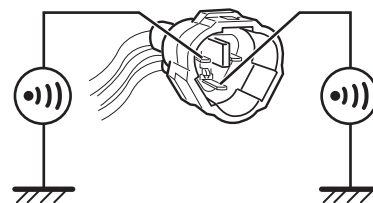
GP switch signal circuit and ground circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the GP switch coupler and ECM couplers.
 - GP switch: (Page 5B-11)
 - ECM: (Page 1C-14)
- 3) Check for proper terminal connection to the GP switch coupler and ECM couplers.
- 4) If connection are OK, check the following points:
 - Resistance
 - P wire and B/W wire: less than 1 Ω



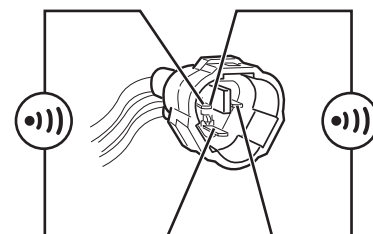
IE31J1110114-01

- Between each of P wire and B/W wire and ground: Infinity.



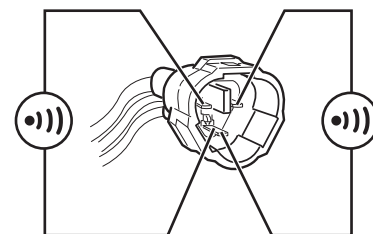
IE31J1110115-01

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



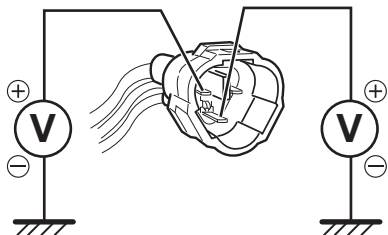
IE31J1110116-01

- Between B/W wire terminal and other terminal at GP switch coupler: Infinity



IE31J1110117-01

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



IE31J1110118-01

Is check result OK?

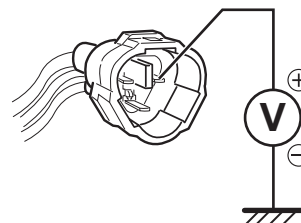
- Yes Go to Step 3.
- No Open or short circuit in the P wire or B/W wire.

Step 3

GP switch neutral position input voltage check

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM coupler. Refer to “ECM Removal and Installation” in Section 1C (Page 1C-14).
- 3) Turn the ignition switch ON.

- 4) Measure the voltage between the BI wire and ground.



IE31J1110191-01

Is voltage battery voltage?

- Yes Go to Step 4.
- No Open or short circuit in the BI wire.

Step 4

- 1) Check the GP switch. Refer to “Side-stand / Ignition Interlock System Parts Inspection” in Section 1I (Page 1I-10).

Is it in good condition?

- Yes Replace the ECM with a new one. (Page 1C-14)
- No Replace the GP switch with a new one. (Page 1C-23)

DTC P1500 (C91)

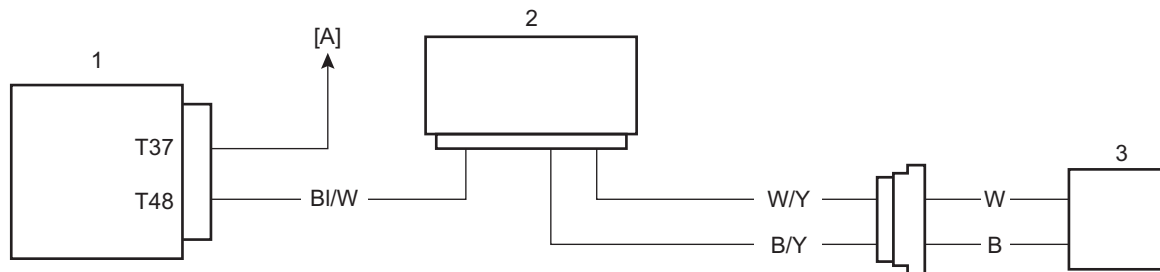
BENJ31J31114031

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P1500 (C91): Vehicle Speed Sensor Circuit (Rear) Malfunction The speed sensor signal is not input for more than 6 sec.</p>	<ul style="list-style-type: none"> • Metal particles or foreign material being attached on the speed sensor • Speed sensor • Speed sensor circuit • ECM • ABS control unit

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



IE31J1110211-01

[A]: To combination meter	1. ECM	2. ABS control unit	3. Speed sensor
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Troubleshooting

Step 1

ABS DTC check

- 1) Turn the ignition switch OFF.
- 2) Set up the SDS tool according to the SDS operation manual.
- 3) Check the DTC of ABS. (Page 4E-18)

Is the DTC C1644 and C1645 indicate?

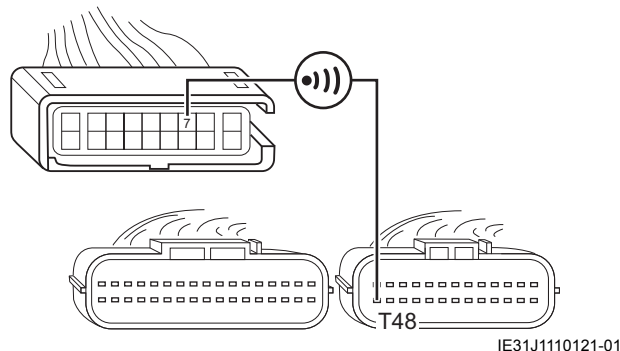
- Yes Go to DTC C1644 (44) and C1645 (45).
 (Page 4E-31) (Page 4E-32)
- No Go to Step 2.

Step 2

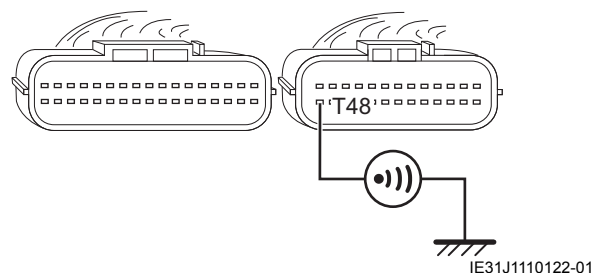
Speed sensor signal check (From ABS control unit to ECM)

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ABS control unit coupler and ECM couplers.
 - ABS: (Page 4E-38)
 - ECM: (Page 1C-14)

- 3) Check for proper terminal connection to the ABS control unit coupler and ECM couplers. If connections OK, check the following points.
 - Resistance
 - BI/W wire: less than 1 Ω



- BI/W wire and ground: infinity



Is check result OK?

- Yes Replace the ECM with a known good one, and inspect again. (Page 1C-14)
- No Repair or replace the BI/W wire.

DTC P1650 (C42)

BENJ31J31114032

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P1650 (C42): IG Switch Circuit Malfunction Ignition switch signal is not input to the ECM. When the ID agreement is not verified. ECM does not receive communication signal from the immobilizer antenna. (If equipped)</p>	<ul style="list-style-type: none"> • Ignition switch • ECM • Immobilizer system • Immobilizer system circuit

Troubleshooting

Refer to "Ignition Switch Inspection" in Section 9C (Page 9C-13) for details.

DTC P1651-H / P1651-L (C23)

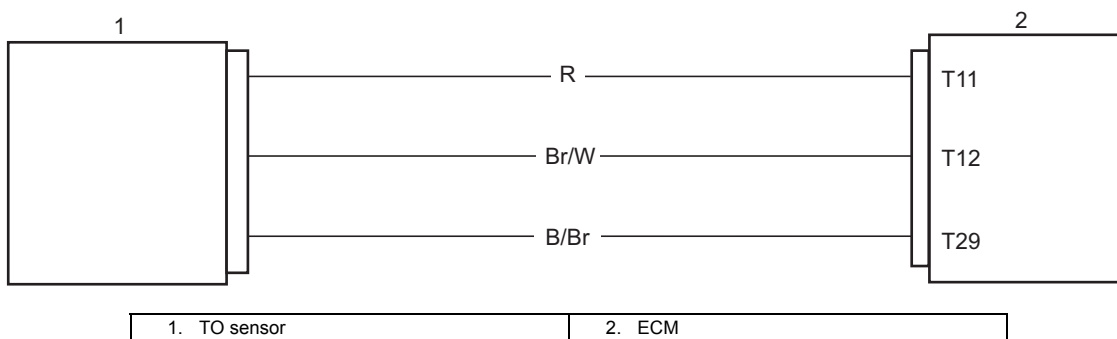
BENJ31J31114033

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1651-H: TO Sensor Circuit High Voltage The sensor output voltage is higher than the specified value.	<ul style="list-style-type: none"> • TO sensor • TO sensor circuit • ECM
P1651-L: TO Sensor Circuit Low Voltage The sensor output voltage is lower than the specified value.	
C23: TO Sensor Circuit Malfunction The sensor output voltage is not within 0.20 – 4.80 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



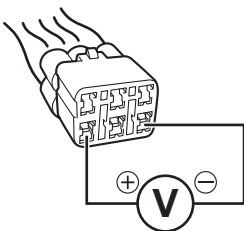
IE31J1110123-01

Troubleshooting

Step 1

TO sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the TO sensor coupler. (Page 1C-23)
- 3) Check for proper terminal connection to the TO sensor coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the R wire and B/Br wire.



ID26J1110153-02

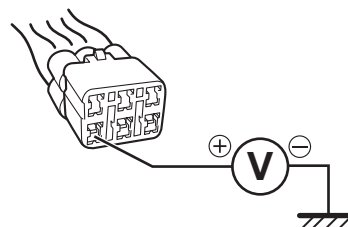
Is voltage 4.5 – 5.5 V?

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

Step 2

TO sensor ground circuit check

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



ID26J1110154-02

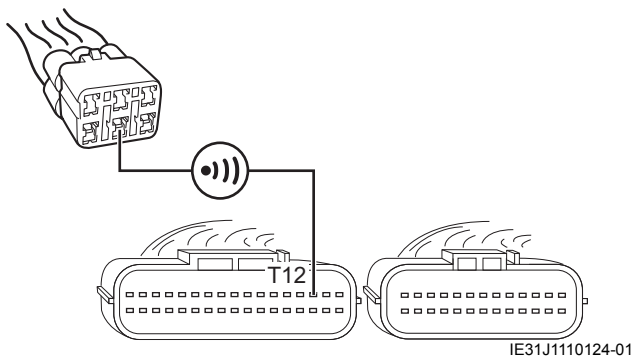
Is voltage 4.5 – 5.5?

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

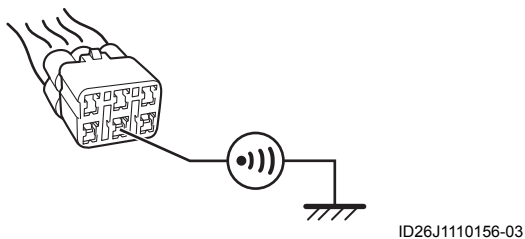
Step 3

TO sensor signal circuit check

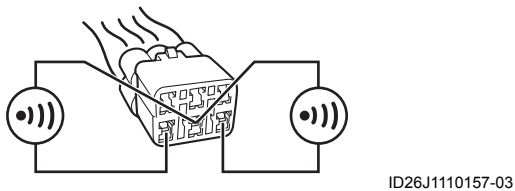
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - Br/W wire: less than 1 Ω



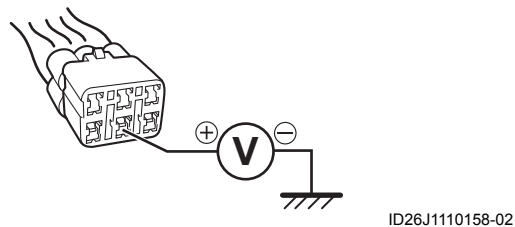
– Between Br/W wire and ground: infinity



– Between Br/W wire terminal and other terminal at TO sensor coupler: infinity



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



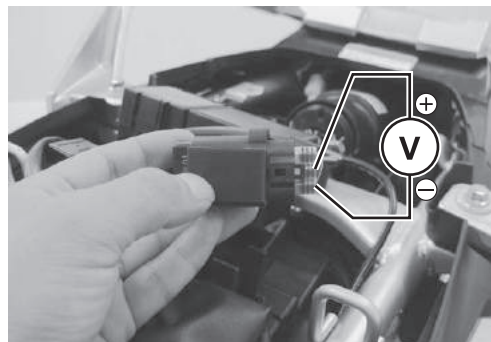
Is check result OK?

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

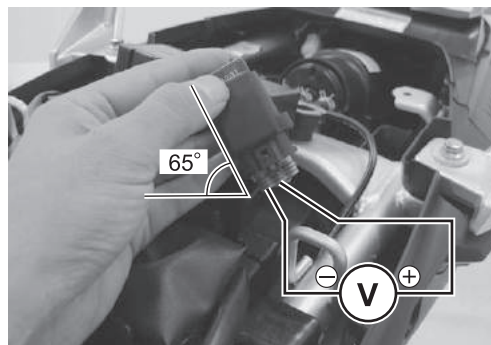
Step 4

TO sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM coupler and TO sensor coupler.
- 3) Check the following points.
 - Voltage
 - Br/W wire and B/Br wire: 0.4 – 1.4 V



– Br/W wire and B/Br wire when TO sensor is learned 65° or more, left and right, from the horizontal level: 3.7 – 4.4 V



Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the TO sensor with a new one. (Page 1C-23)

DTC P1654-H / P1654-L (C29)

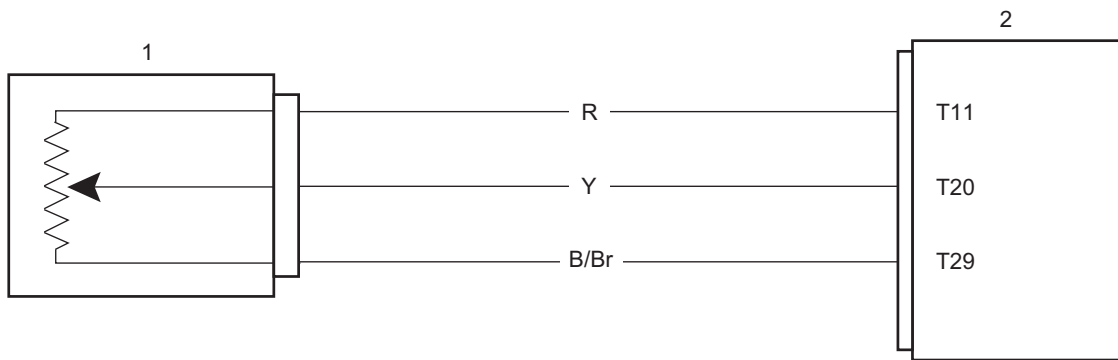
BENJ31J31114034

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1654-H: STP Sensor Circuit High Voltage The sensor output voltage is higher than the specified value.	<ul style="list-style-type: none"> • STP sensor • STP sensor circuit • ECM
P1654-L: STP Sensor Circuit Low Voltage The sensor output voltage is lower than the specified value.	
C29: STP Sensor Circuit Malfunction The sensor output voltage is not within 0.10 – 4.80 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



IE31J1110127-01

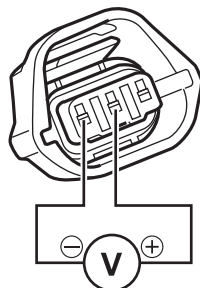
1. STP sensor	2. ECM
---------------	--------

Troubleshooting

Step 1

STP sensor power supply circuit check

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



IE31J1110128-01

Is voltage 4.5 – 5.5?

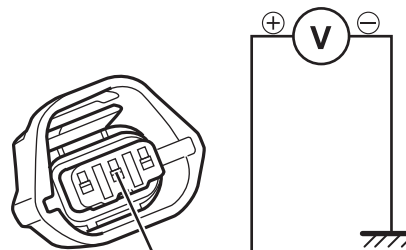
Yes Go to Step 3.

No Go to Step 2.

Step 2

STP sensor ground circuit check

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



IE31J1110129-02

Is voltage 4.5 – 5.5 V?

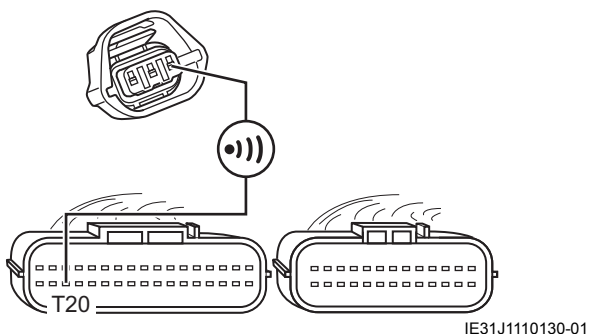
Yes Repair or replace the B/Br wire.

No Repair or replace the R wire.

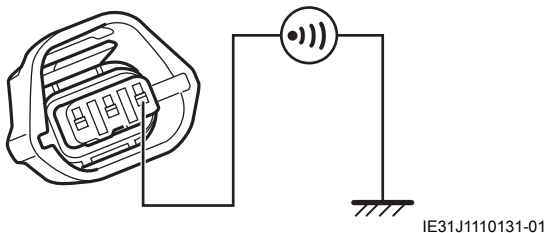
Step 3

STP sensor signal circuit check

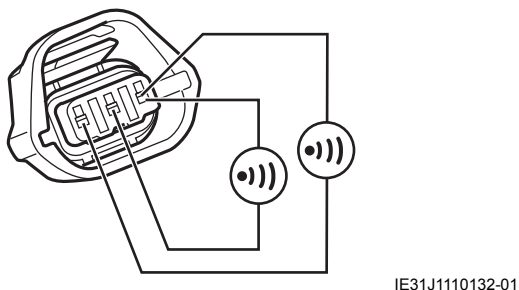
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - Y wire: less than 1 Ω



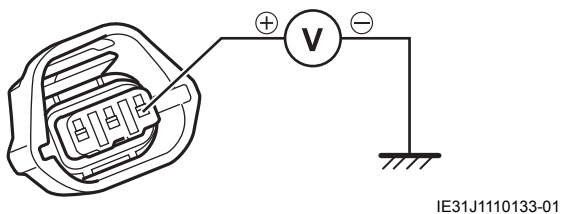
– Between Y wire and ground: infinity



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



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



Is check result OK?

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

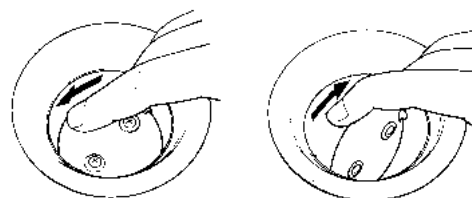
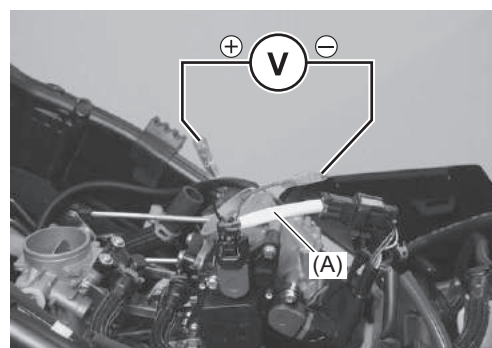
Step 4

STP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Connect the ECM couplers.
- 4) Connect the special tool between the STP sensor and its coupler.
- 5) Disconnect the STVA coupler. Refer to “Throttle Body Assembly Removal and Installation” in Section 1C (Page 1C-4).
- 6) Turn the ignition switch ON.
- 7) Measure the STP sensor voltage between the Y wire and B/Br wire with turning the secondary throttle valve close and open with your finger.

Special tool

(A): 09900-28630



Is voltage approx. 0.6 V (at secondary throttle valve is closed) and approx. 4.5 V (at secondary throttle valve is opened)?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the STP sensor with a new one. (Page 1C-6)

DTC P1655 (C28)

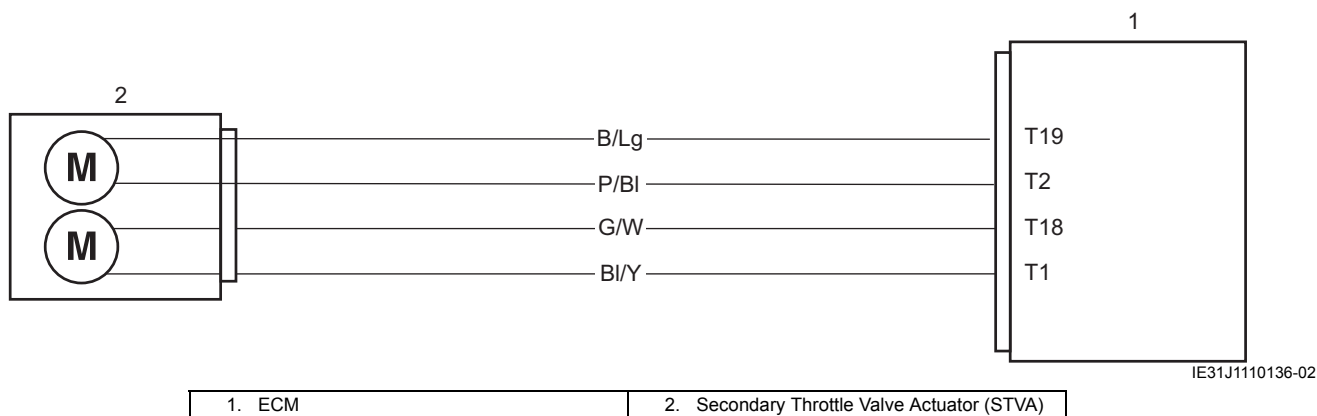
BENJ31J31114035

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P1655 (C28): STVA Circuit Malfunction The operation voltage does not reach the STVA. ECM does not receive communication signal from the STVA. STVA can not operate properly.</p>	<ul style="list-style-type: none"> • STVA malfunction • STVA circuit • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).

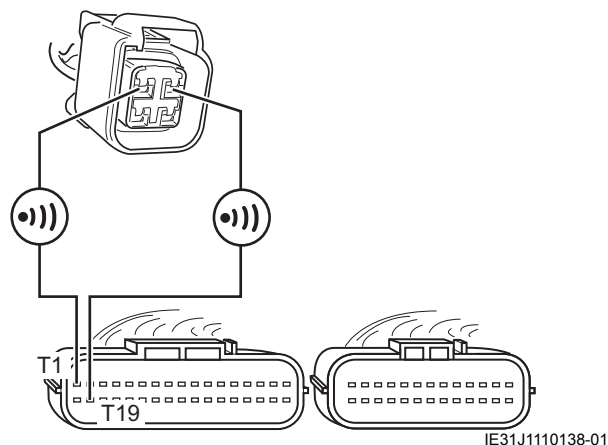
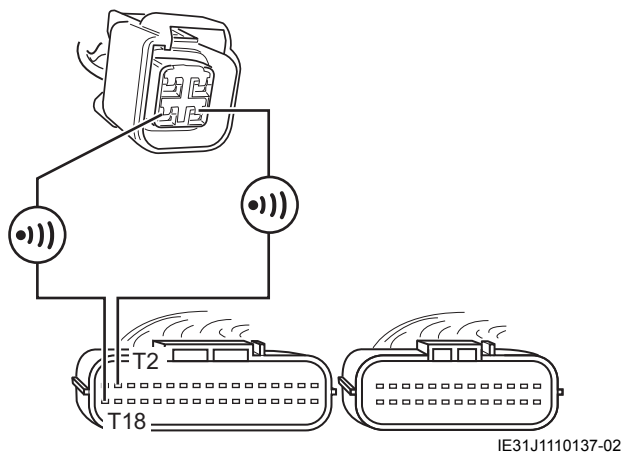


Troubleshooting

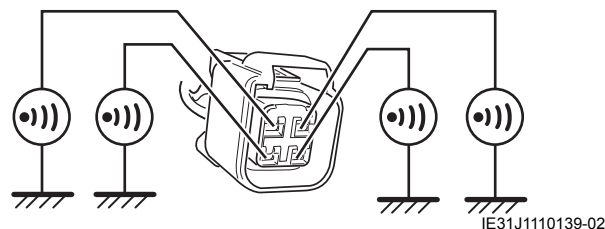
Step 1

STVA circuit check

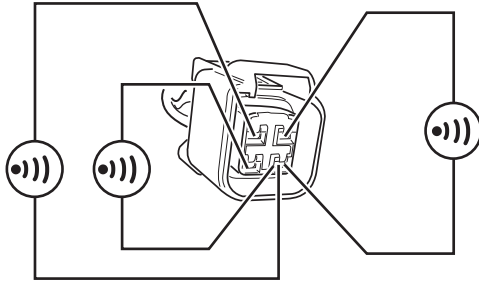
- 1) Turn the ignition switch OFF.
- 2) Disconnect the STVA coupler and ECM couplers.
 - STVA: (Page 1C-4)
 - ECM: (Page 1C-14)
- 3) Check for proper terminal connection to the STVA coupler and ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - P/Bl, G/W, B/Lg and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



– Between each of P/Bl, G/W, B/Lg and Bl/Y wire and ground: infinity

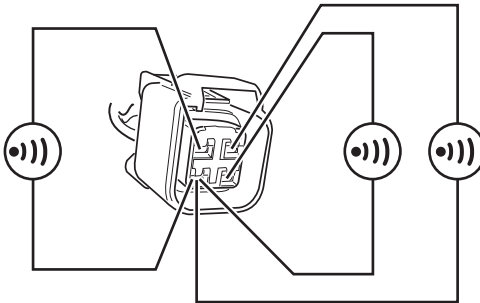


- Between P/BI wire terminal and other terminal at STVA coupler: infinity



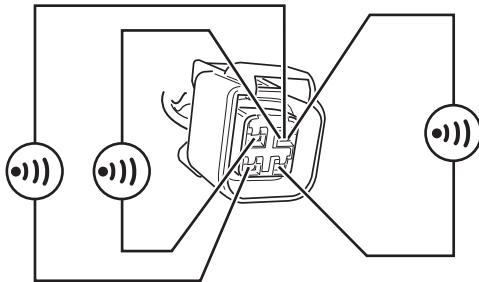
IE31J1110140-01

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



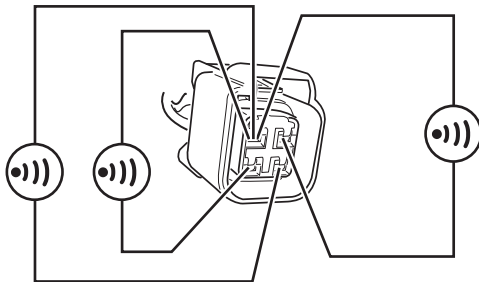
IE31J1110141-01

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



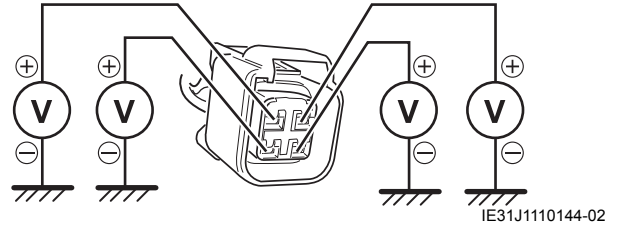
IE31J1110142-01

- Between BI/Y wire terminal and other terminal at STVA coupler: infinity



IE31J1110143-01

- Voltage
 - Turn the ignition switch ON.
 - P/BI, G/W, B/Lg and BI/Y wires: approx. 0 V



IE31J1110144-02

Is check result OK?

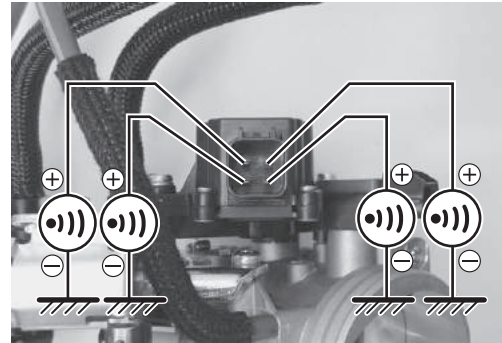
- Yes Go to Step 2.
- No Repair or replace the defective wire harness.

Step 2

STVA check

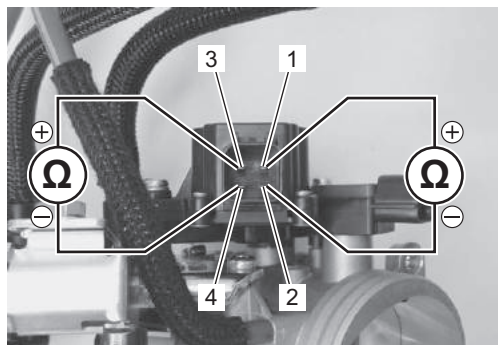
- 1) Turn the ignition switch OFF.
- 2) Remove the throttle body. (Page 1C-4)
- 3) Check the following points.

- Continuity
 - Each terminal and ground: infinity



IE31J1110145-01

- Resistance
 - Terminal (1) and Terminal (2): approx. 7 Ω
 - Terminal (3) and Terminal (4): approx. 7 Ω



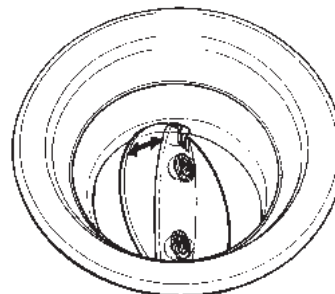
IE31J1110146-01

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the throttle body with a new one. (Page 1C-4)

Step 3
STV operation check

- 1) Install the throttle body assembly. (Page 1C-4)
- 2) Connect the STVA coupler and ECM coupler.
- 3) Check whether the STVs open by turning the ignition switch ON.



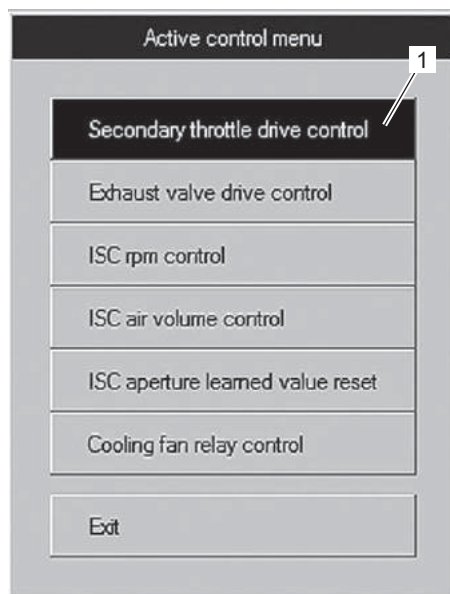
I705H1110063-01

Is the operation OK?

- Yes Replace the ECM with a new one. (Page 1C-14)
- No Replace the throttle body assembly with a new one. (Page 1C-4)

Active Control Inspection

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

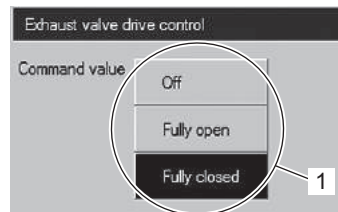


IE31J1110147-01

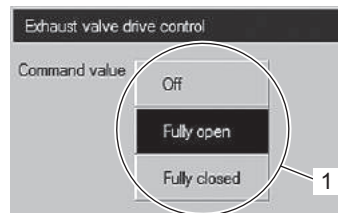
4) Click each button (1).

At this time, if an operation sound is heard from the STVA, the function is normal.

Item	Value	Unit
<input type="checkbox"/> Manifold absolute pressure 2	102.2	kPa
<input type="checkbox"/> Desired idle rpm	1205	rpm
<input type="checkbox"/> O2 sensor (Bank 2-Sensor 2)	5.0	V
<input type="checkbox"/> Secondary throttle actuator position sensor	0	%
<input type="checkbox"/> Exhaust control valve actuator position sensor	92	%



Item	Value	Unit
<input type="checkbox"/> Manifold absolute pressure 2	102.2	kPa
<input type="checkbox"/> Desired idle rpm	1205	rpm
<input type="checkbox"/> O2 sensor (Bank 2-Sensor 2)	5.0	V
<input type="checkbox"/> Secondary throttle actuator position sensor	100	%
<input type="checkbox"/> Exhaust control valve actuator position sensor	92	%



IE31J1110148-02

DTC P1656 (C49) (If Equipped)

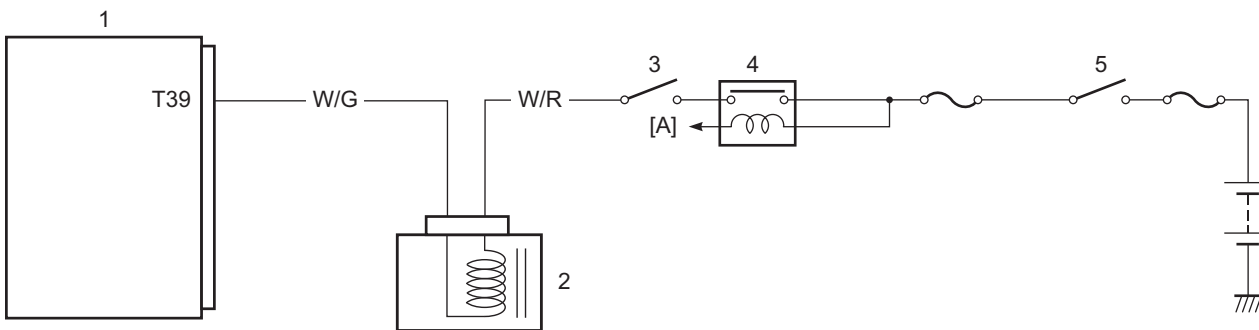
BENJ31J31114036

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1656 (C49): PAIR Control Solenoid Valve Circuit Malfunction 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": L4 - L6 (Page 1A-7).



IF31J1110004-02

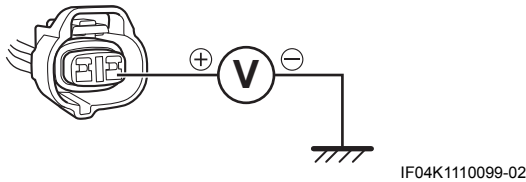
[A]: To side-stand switch	2. PAIR control solenoid valve	4. Side-stand relay
1. ECM	3. Engine stop switch	5. Ignition switch

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



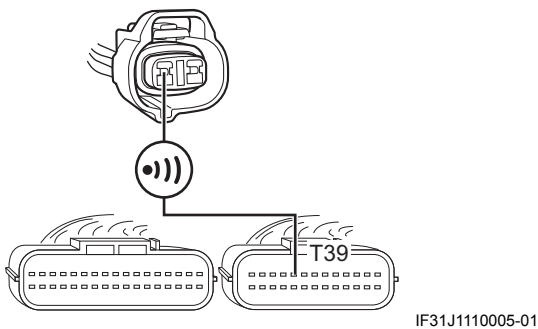
Is voltage battery voltage?

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

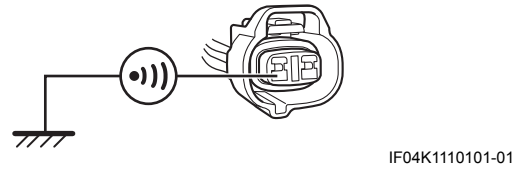
Step 2

PAIR control solenoid valve driver circuit check

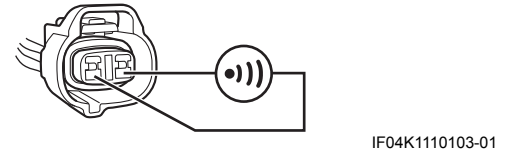
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - W/G wire: less than 1 Ω



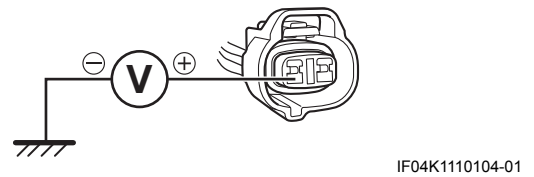
- Between W/G wire and ground: infinity



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



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



Is check result OK?

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

Step 3

PAIR control solenoid valve resistance check

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

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the PAIR control solenoid valve with a new one. (Page 1B-12)

DTC P1657-H / P1657-L (C46)

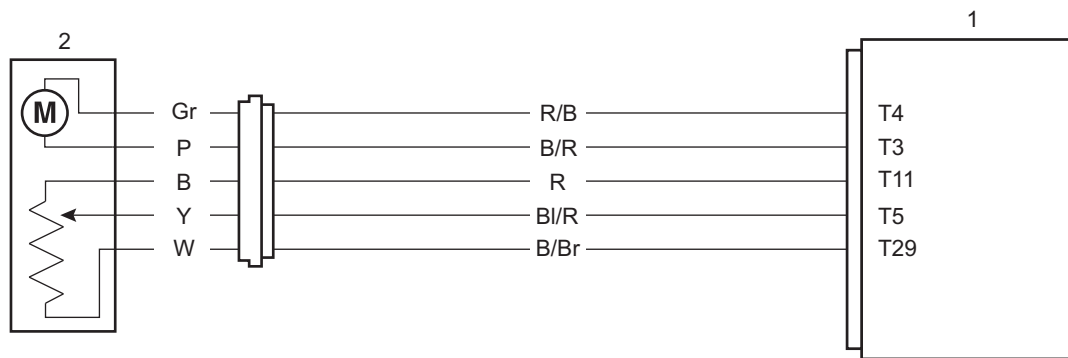
BENJ31J31114037

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1657-H: EXCVA Sensor Circuit High Voltage The sensor output voltage is higher than the specified value.	<ul style="list-style-type: none"> • EXCVA maladjustment • EXCVA circuit • ECM
P01657-L: EXCVA Sensor Circuit Low Voltage The sensor output voltage is lower than the specified value.	
C46: EXCVA Sensor Circuit Malfunction The sensor output voltage is not within 0.14 – 4.90 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).



IE31J1110149-01

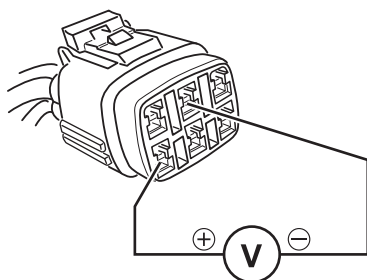


Troubleshooting (Use of SDS)

Step 1

EXCV position sensor power supply circuit check

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



IE31J1110151-01

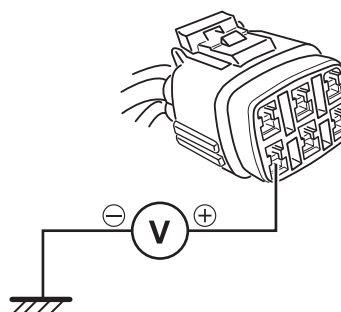
Is voltage 4.5 – 5.5 V?

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

Step 2

EXCV position sensor ground circuit check

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



IF31J1110001-01

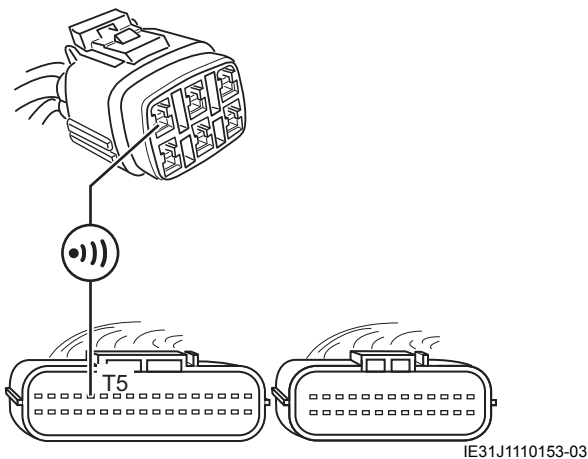
Is voltage 4.5 – 5.5 V?

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

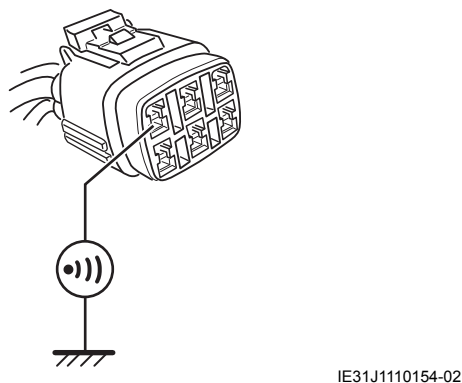
Step 3

EXCV position sensor signal circuit check

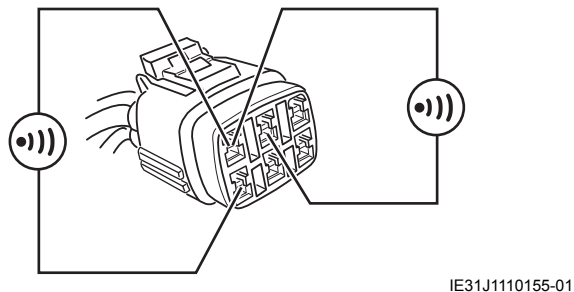
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - BI/R wire: less than 1 Ω



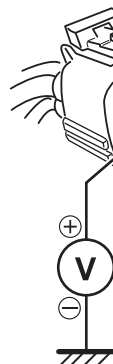
– Between BI/R wire and ground: infinity



– Between BI/R wire terminal and other terminal at EXCVA sensor circuit: infinity



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



IE31J1110156-02

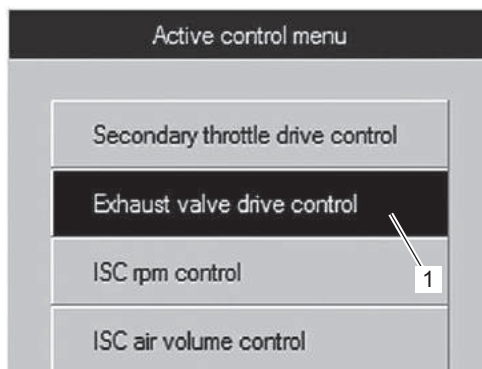
Is check result OK?

- Yes Go to Step 4.
- No Repair or replace the BI/R wire.

Step 4

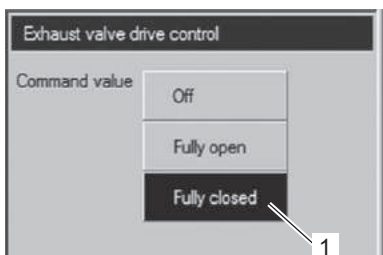
EXCV position sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM couplers and the EXCVA coupler.
- 3) Set up the SDS tool referring to SDS operation manual for further details.
- 4) Turn the ignition switch ON.
- 5) Click “Exhaust valve drive control” (1).



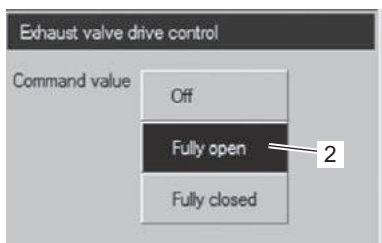
IE31J1110157-01

- 6) Click “Full closed” (1) and “Full open” (2).



Item	Value	Unit
<input type="checkbox"/> Exhaust control valve actuator position sensor	2	%

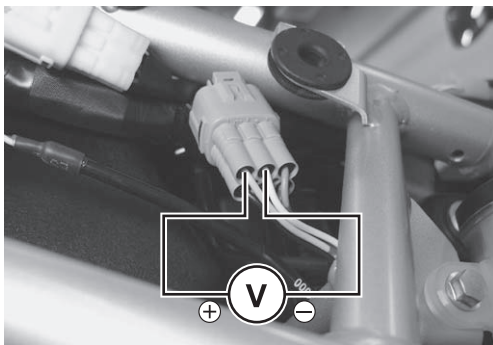
IE31J1110159-02



Item	Value	Unit
<input type="checkbox"/> Exhaust control valve actuator position sensor	98	%

IE31J1110192-02

- 7) Measure the EXCV position sensor voltage between the Y wire and B wire at EXCV position is fully closed and fully opened.



Is voltage 0.45 –1.4 V (at exhaust control valve is fully closed) and 3.6 – 4.55 V (at exhaust control valve is fully opened)?

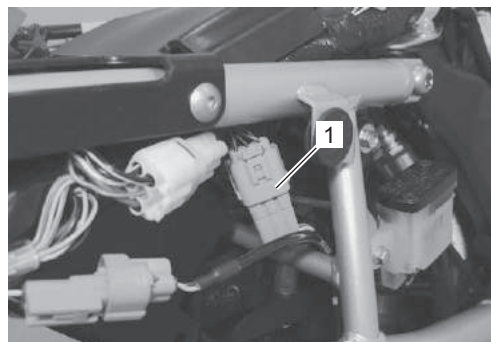
- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the EXCVA with a new one. (Page 1K-8)

Troubleshooting (Use of Mode Select Switch)

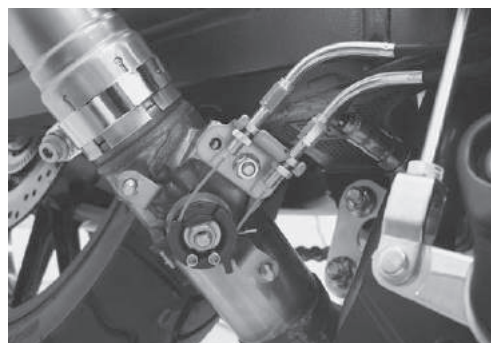
Step 1

EXCV operation check

- 1) Turn the ignition switch OFF.
- 2) Remove the right frame cover. (Page 9D-11)
- 3) Check the EXCVA coupler (1) for loose or poor contacts.



- 4) Remove the EXCV cover. Refer to “Exhaust Pipe / Muffler Removal” in Section 1K (Page 1K-15).
- 5) Turn the ignition switch ON.
- 6) Check the operation of EXCVA. (EXCVA operation order: Full close → Full open → Middle position)



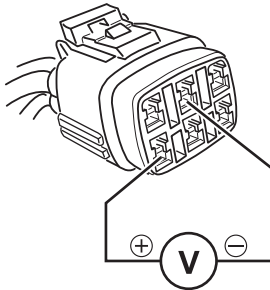
Is the operation OK?

- Yes Go to Step 2.
- No Go to Step 7.

Step 2

EXCV position sensor power supply voltage check

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



IE31J1110163-01

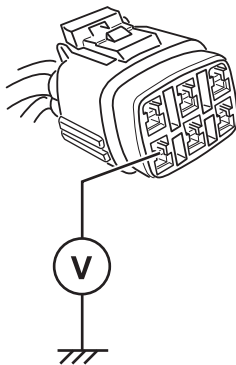
Is voltage 4.5 – 5.5 V?

- Yes Go to Step 4.
- No Go to Step 3.

Step 3

EXCV position sensor ground circuit check

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



IE31J1110164-02

Is voltage 4.5 – 5.5 V?

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

Step 4

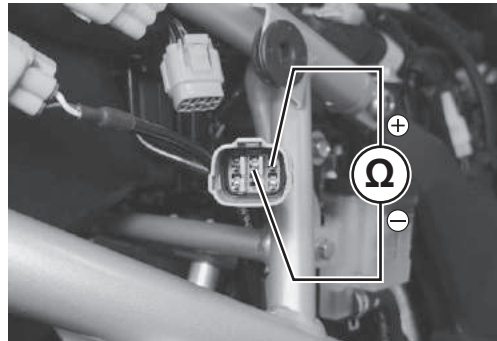
EXCVA position sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Check the following points.
 - Continuity
 - Y wire terminal and ground: infinity



IE31J1110165-01

- Resistance
 - Connect the ECM coupler.
 - Connect the EXCVA coupler and set the EXCVA to adjustment position. Refer to “EXCVA / EXCV Cable Removal and Installation” in Section 1K (Page 1K-8).
 - Turn the ignition switch OFF.
 - Disconnect the EXCVA coupler.
 - Y wire terminal and W wire terminal: approx. 3.1 kΩ



IE31J1110166-01

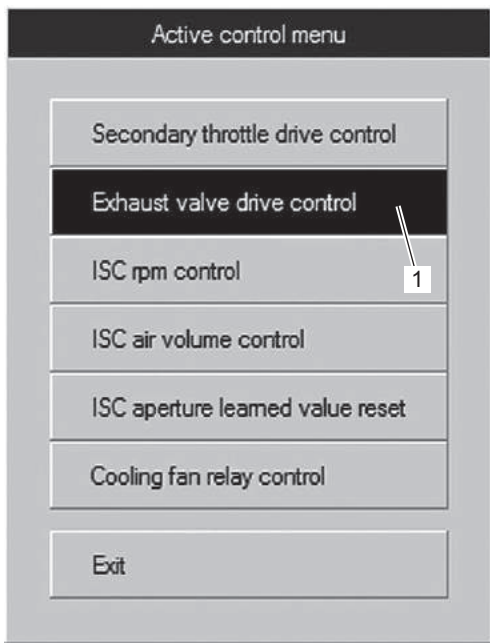
Is check result OK?

- Yes Go to Step 5.
- No Replace the EXCVA with a new one. (Page 1K-8)

Step 5

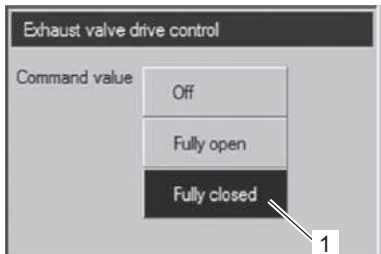
EXCVA sensor output voltage check

- 1) Connect the EXCVA coupler.
- 2) Set up the SDS tool according to the SDS operation manual.
- 3) Turn the ignition switch ON.
- 4) Click “Exhaust valve drive control” (1).



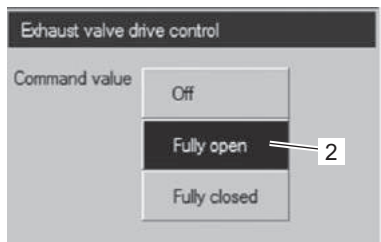
IE31J1110167-01

- 5) Click “Full closed” (1) and “Full open” (2).



Item	Value	Unit
<input type="checkbox"/> Exhaust control valve actuator position sensor	2	%

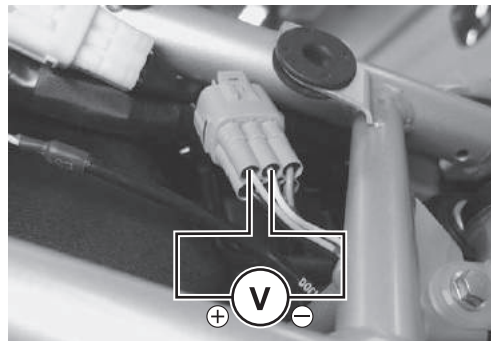
IE31J1110168-02



Item	Value	Unit
<input type="checkbox"/> Exhaust control valve actuator position sensor	98	%

IE31J1110193-02

- 6) Measure the EXCVA position sensor output voltage at EXCVA position is fully closed and fully opened.



IE31J1110169-01

Is voltage 0.45 – 1.4 V (at EXCVA is fully closed) and 3.6 – 4.55 V (at EXCVA is fully opened)?

- Yes Replace the ECM with a know good one, and inspect it again. (Page 1C-14)
- No Go to Step 6.

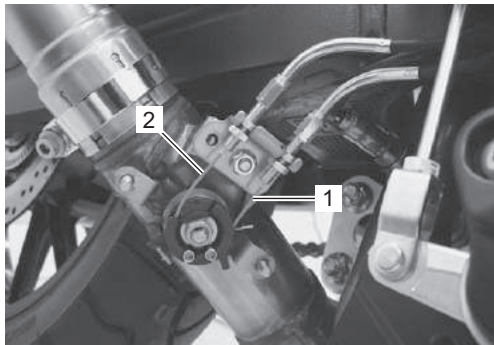
Step 6

EXCV cable installation 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 5 until the output voltage is set within the specified value. (If P1657 (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 and 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-12). Repeat the procedure in Step 5 until the output voltage is set within the specified value.



IE31J1110170-01

Is voltage 0.45 – 4.1 V (at EXCV is fully closed) and 3.6 – 4.55 V (at EXCV is fully opened)?

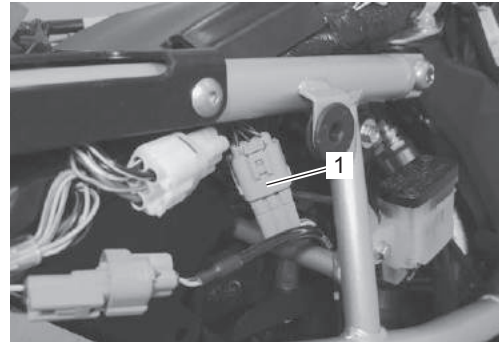
- | | |
|-----|---|
| Yes | Replace the ECM with a known good one, and inspect it again. (Page 1C-14) |
| No | Replace the EXCVA with a new one. (Page 1K-8) |

Step 7

EXCVA motor operating check

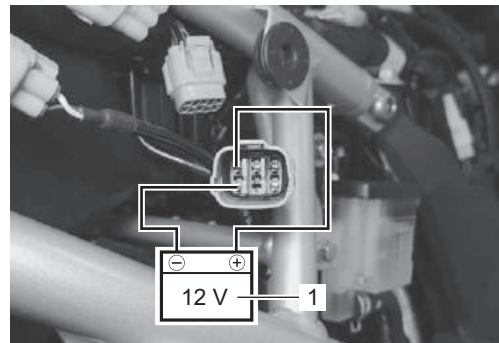
- 1) Turn the ignition switch OFF.

- 2) Disconnect the EXCVA coupler (1).



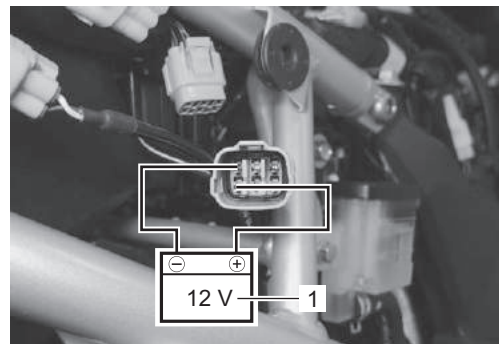
IE31J1110171-01

- 3) Apply 12 V to the terminals with a battery (1) and check the operation of EXCVA.



IE31J1110172-01

- 4) Then, switch the wires supplied 12 V with a battery (1) and check the operation of EXCVA. (Check the operation of EXCVA in both way.)



IE31J1110173-01

Is the operation OK?

- | | |
|-----|---|
| Yes | <ul style="list-style-type: none"> • Repair or replace the B/R wire or R/B wire. • Replace the ECM with a known good one, and inspect it again. (Page 1C-14) |
| No | <ul style="list-style-type: none"> • Replace the EXCVA with a new one. (Page 1K-8) • Inspect that the EXCV and two cables move smoothly. Refer to "Exhaust Control Valve Inspection" in Section 1K (Page 1K-8). |

DTC P1658 (C46)

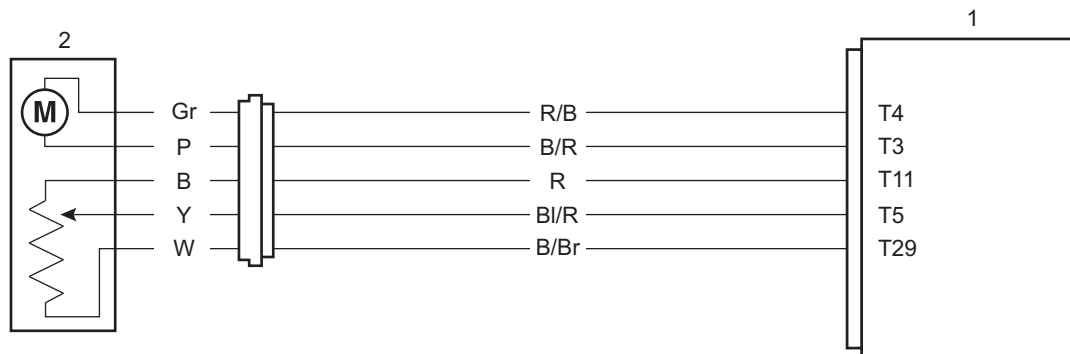
BENJ31J31114038

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1658 (C46): EXCVA Motor Circuit Malfunction The operation voltage does not reach the EXCVA motor. EXCVA motor can not operate properly.	<ul style="list-style-type: none"> EXCVA malfunction EXCVA circuit EXCVA motor malfunction ECM

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).



IE31J1110174-01

1. ECM	2. EXCVA
--------	----------

Troubleshooting

Step 1

EXCV cable check

- 1) Turn the ignition switch OFF.
- 2) Remove the right frame cover. (Page 9D-11)
- 3) Remove the EXCV cover. Refer to "Exhaust Pipe / Muffler Removal" in Section 1K (Page 1K-15).
- 4) Check the installation of EXCV cables.



IE31J1110175-01

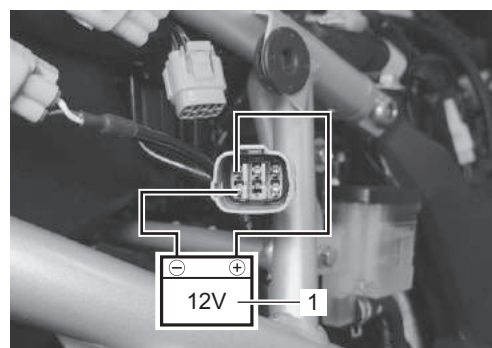
Is the EXCV cables installation OK?

- Yes Go to Step 2.
- No Replace or adjust the EXCV cables. (Page 1K-8)

Step 2

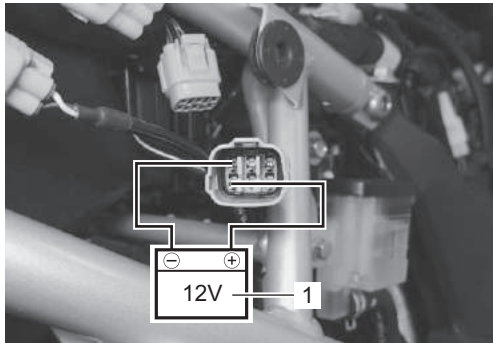
EXCVA motor circuit check

- 1) turn the ignition switch OFF.
- 2) Disconnect the EXCVA coupler. (Page 1K-8)
- 3) Apply 12 V to the terminals with a battery (1) and check the operation of EXCV.



IE31J1110176-01

- 4) Then, switch the wires supplied 12 V with a battery (1) and check the operation of EXCV. (Check the operation of EXCVA in both way.)



IE31J1110177-01

Is the operation OK?

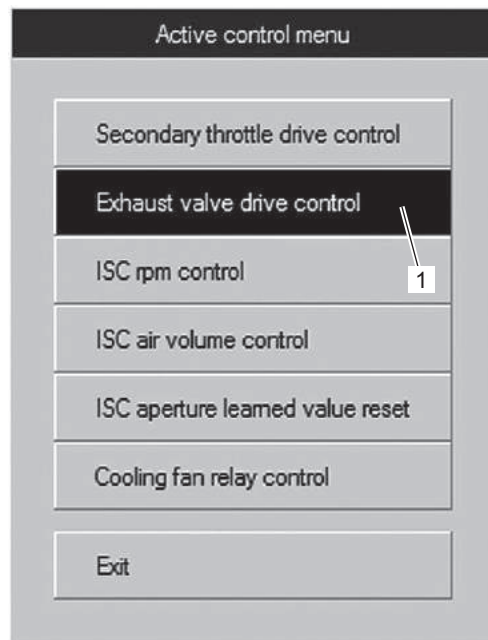
- Yes
- Repair or replace the defective wire harness.
 - Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No
- Replace the EXCVA with a new one. (Page 1K-8)

Troubleshooting (Use of Mode Select Switch)

Refer to “DTC P1657-H / P1657-L (C46)”: L4 - L6 (Page 1A-75).

Active Control Inspection

- 1) Set up the SDS tool.
- 2) Turn the ignition switch ON.
- 3) Click “Exhaust valve drive control” (1).

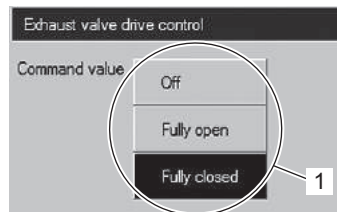


IE31J1110178-01

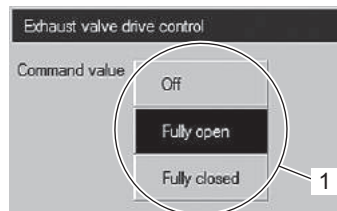
4) Click each button (1).

At this time, if an operation sound is heard from the EXCVA, the function is normal.

Item	Value	Unit
<input type="checkbox"/> O2 sensor (Bank 2-Sensor 2)	5.0	V
<input type="checkbox"/> Secondary throttle actuator position sensor	50	%
<input type="checkbox"/> Exhaust control valve actuator position sensor	2	%
<input type="checkbox"/> Cooling fan relay	Off	



Item	Value	Unit
<input type="checkbox"/> O2 sensor (Bank 2-Sensor 2)	5.0	V
<input type="checkbox"/> Secondary throttle actuator position sensor	50	%
<input type="checkbox"/> Exhaust control valve actuator position sensor	98	%
<input type="checkbox"/> Cooling fan relay	Off	



IE31J1110179-02

DTC P1750-H / P1750-L (C13)

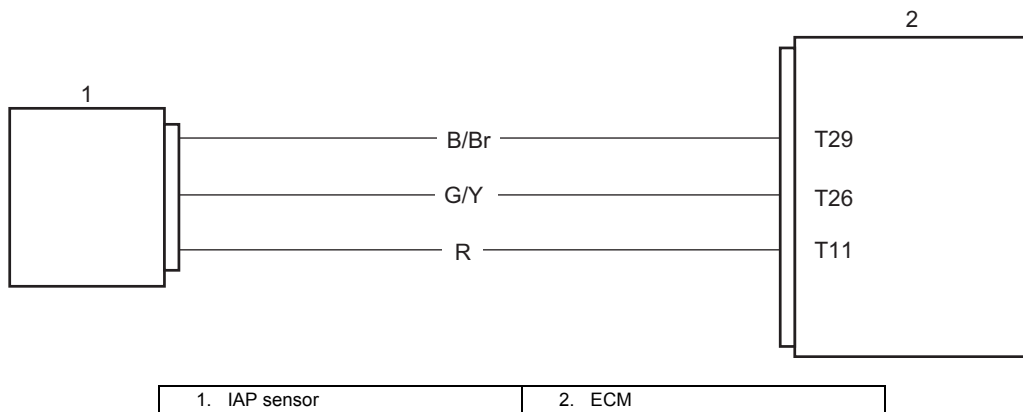
BENJ31J31114039

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1750-H: IAP Sensor #2 Circuit High Voltage The sensor output voltage is higher than the specified value.	<ul style="list-style-type: none"> • Vacuum passage between throttle body and IAP sensor #2 • IAP sensor #2 • IAP sensor circuit #2 • ECM
P1750-L: IAP Sensor #2 Circuit Low Voltage The sensor output voltage is lower than the specified value.	
C13: IAP Sensor #2 Circuit Malfunction The sensor output voltage is not within 0.50 – 4.85 V.	

Wiring Diagram

Refer to “FI System Wiring Diagram”: L4 - L6 (Page 1A-7).



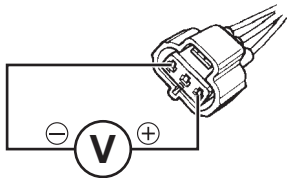
IE31J1110180-01

Troubleshooting

Step 1

IAP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the IAP sensor #2 coupler. (Page 1C-15)
- 3) Check for proper terminal connection to the IAP sensor #2 coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the R wire and B/Br wire.



IE31J1110181-01

Is voltage 4.5 – 5.5 V?

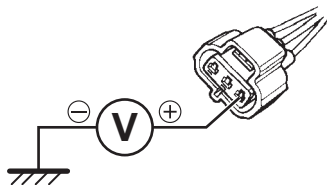
Yes Go to Step 3.

No Go to Step 2.

Step 2

IAP sensor ground circuit check

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



ID26J1110028-04

Is voltage 4.5 – 5.5 V?

Yes Repair or replace the B/Br wire.

No Repair or replace the R wire.

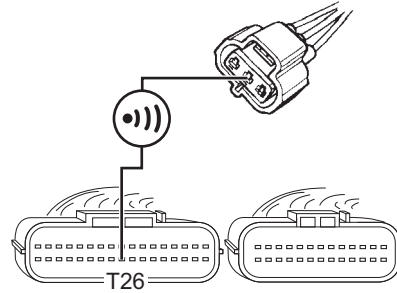
Step 3

IAP sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.

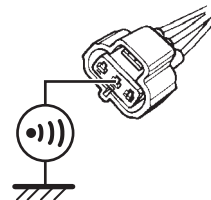
- 4) If connections are OK, check the following points.

- Resistance
 - G/Y wire: less than 1 Ω



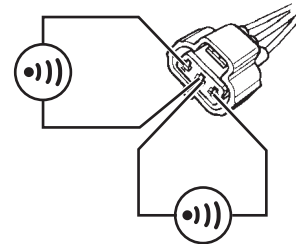
IE31J1110197-01

- Between G/Y wire and ground: infinity



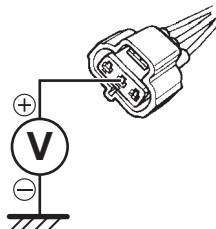
IE31J1110182-01

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



IE31J1110183-01

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



IE31J1110184-01

Is check result OK?

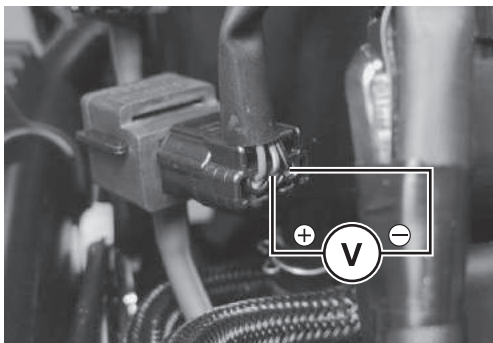
Yes Go to Step 4.

No Repair or replace the G/Y 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 #2 coupler.
- 3) Run the engine at idle speed (atmospheric pressure: approx. 100 kPa (760 mmHg)) and measure the IAP sensor voltage between the G/Y wire and B/Br wire.



IE31J1110185-01

Is voltage approx. 2.5 V?

- Yes Go to Step 5.
- No Check the vacuum hoses for crack or damage.
If vacuum hoses are OK, replace the IAP sensor #2 with a new one. (Page 1C-15)

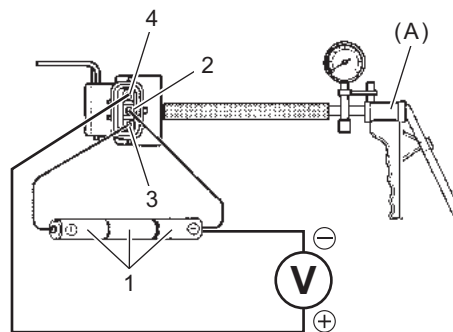
Step 5

IAP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the IAP sensor #2. (Page 1C-15)
- 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) Check the voltage between terminal (4) and ground. Also, check if voltage reduces when vacuum is applied using the vacuum pump gauge.

Special tool

(A): 09917-47011



ID26J1110034-03

ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
m	ft	kPa	mmHg	V
0 – 610	0 – 2000	100 – 94	760 – 707	3.1 – 3.6
611 – 1524	2001 – 5000	94 – 85	707 – 634	2.8 – 3.4
1525 – 2438	5001 – 8000	85 – 76	634 – 567	2.6 – 3.1
2439 – 3048	8001 – 10000	76 – 70	567 – 526	2.4 – 2.9

ID26J1110229-02

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the IAP sensor #2 with a new one. (Page 1C-15)

DTC P2505 (C41)

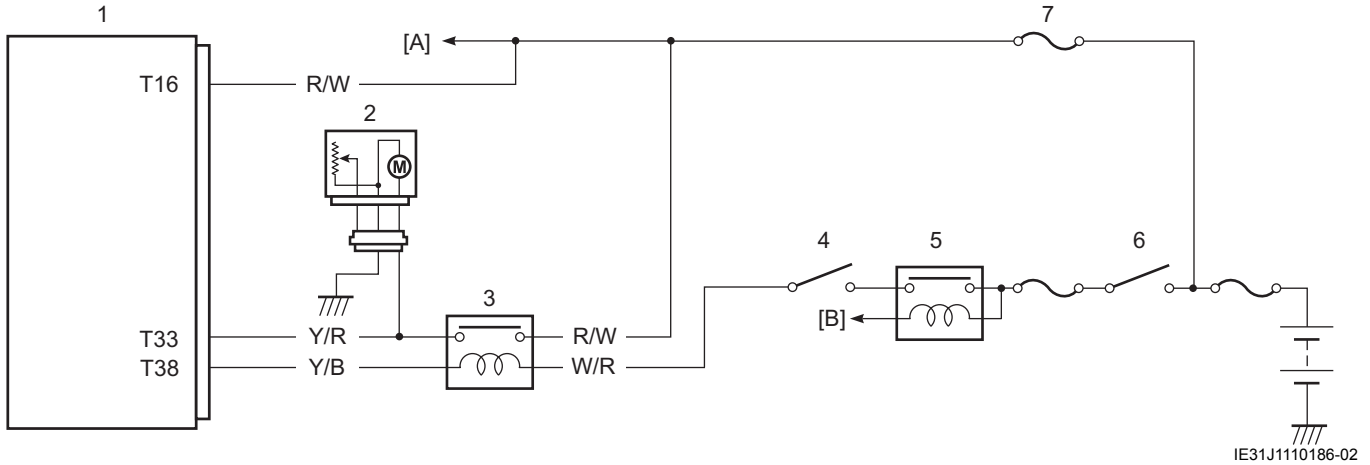
BENJ31J31114040

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
<p>P2505 (C41): ECM Power Input Signal Circuit Malfunction No voltage is applied to the ECM, although the ignition switch is turned ON.</p>	<ul style="list-style-type: none"> • Lead wire / coupler connection of ECM terminal to fuel fuse • Fuel fuse • ECM power supply • ECM

Wiring Diagram

Refer to "FI System Wiring Diagram": L4 - L6 (Page 1A-7).



IE31J1110186-02

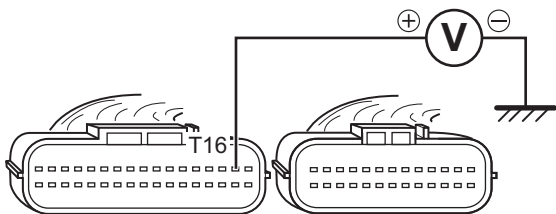
[A]: To combination meter	1. ECM	3. FP relay	5. Side-stand relay	7. Fuel fuse
[B]: To side-stand switch	2. Fuel pump	4. Engine stop switch	6. Ignition switch	

Troubleshooting

Step 1

ECM power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, Measure the voltage between R/W and ground.



IE31J1110187-01

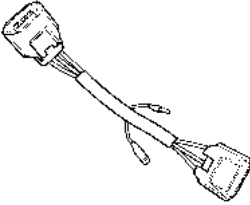
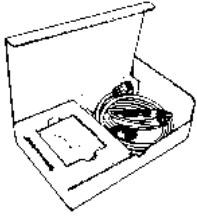
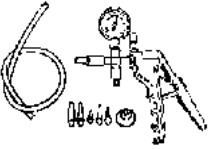
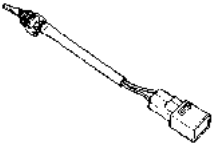
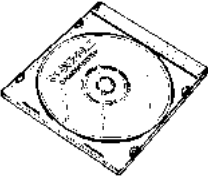
Is voltage battery voltage?

- | | |
|-----|--|
| Yes | Replace the ECM with a known good one, and inspect it again. (Page 1C-14) |
| No | Check FUEL fuse for blowout. If fuse is not blown, repair or replace the R/W wire. |

Special Tools and Equipment

Special Tool

BENJ31J31118001

<p>09900-28630 TP Sensor test lead</p> <p>☞ (Page 1A-36) / ☞ (Page 1A-69)</p>		<p>09904-41010 SUZUKI Diagnostic system set</p> <p>☞ (Page 1A-20)</p>	
<p>09917-47011 Vacuum pump gauge set</p> <p>☞ (Page 1A-30) / ☞ (Page 1A-85)</p>		<p>09930-82720 Mode selection switch</p> <p>☞ (Page 1A-6) / ☞ (Page 1A-19)</p>	
<p>99565-01010-034 CD-ROM Ver.34</p> <p>☞ (Page 1A-20)</p>			

L8 -

Precautions

Precautions for Section 1A: L8-

BENJ31J31120001

This section is applied to the Euro4 model vehicles after 2018MY. For other model vehicles, refer to Section 1A: L4-L6.

General Description

Injection Timing Description

BENJ31J31121001

Refer to "Injection Timing Description": L4 - L6 (Page 1A-1).

Traction Control System Description

BENJ31J31121002

Refer to "Traction Control System Description": L4 - L6 (Page 1A-3).

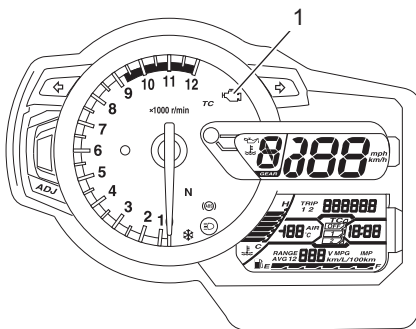
Self-Diagnosis Function

BENJ31J31121003

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

Warning Function

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



IJ31J1112001-01

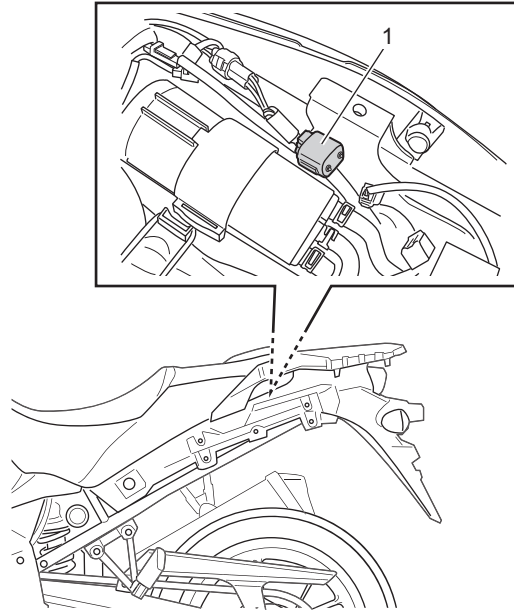
Supplementation

- The driving cycle (D/C) means the cycle beginning from turning the ignition switch ON through starting the engine until turning the ignition switch OFF. The 3 driving cycles are the term repeating 3 times of the above mentioned cycle.
- The warm up cycle means the cycle of engine warm up operation that the engine coolant temperature reaches more than 71 °C (159.8 °F) and also rises more than 22 °C (71.6 °F) from the one at engine starting.

Diagnostic coupler location

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

Special tool
09904-41051



IJ31J1112002-01

User Mode

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

*1

Current letter displayed any one of the odometer, tripmeter A or tripmeter B.

*2

When one of the signals is not received by ECM, the fail-safe circuit works and injection is not stopped. In this case, "FI" and odometer *1 are indicated in the LCD panel and motorcycle can run.

*3

The injection signal is stopped, when the crankshaft position sensor signal, tip-over sensor signal, #1 and #2 ignition signals, #1 and #2 fuel injector signals, fuel pump relay signal or ignition switch signal is not sent to ECM. In this case, "FI" is indicated in the LCD panel. Motorcycle does not run.

"CHEC":

The LCD panel indicates "CHEC" when no communication signal from the ECM is received for 3 seconds or more.

For Example:

The ignition switch is turned ON, and the ignition fuse is blown. In this case, the combination meter does not receive any signal from the ECM, and the panel indicates "CHEC".

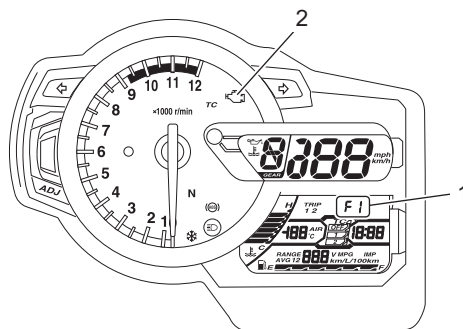
If CHEC is indicated, the LCD does not indicate the trouble code. It is necessary to check the wiring harness between ECM and combination meter couplers.

The possible cause of this indication is as follows:

Ignition fuse is blown. Ignition wire is open or shorted to ground.

NOTE

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



IJ31J1112003-01

Dealer Mode

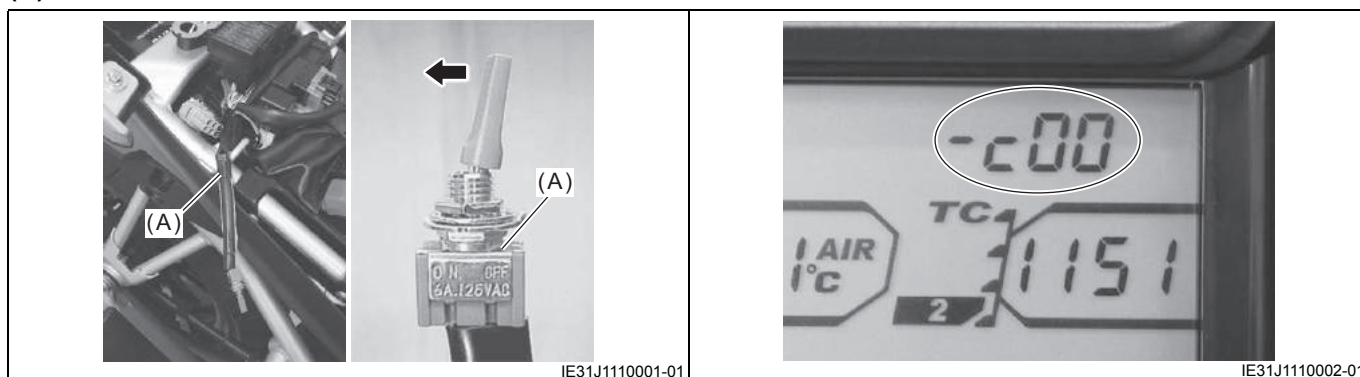
The defective function is memorized in the computer. Use the special tool's coupler to connect to the mode select switch. The memorized malfunction code is displayed on LCD (DISPLAY) panel. Malfunction means that the ECM does not receive signal from the devices. These affected devices are indicated in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

NOTE

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

Special tool

(A): 09930-82720



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

Comparison Table of DTC Name

BENJ31J31121004

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

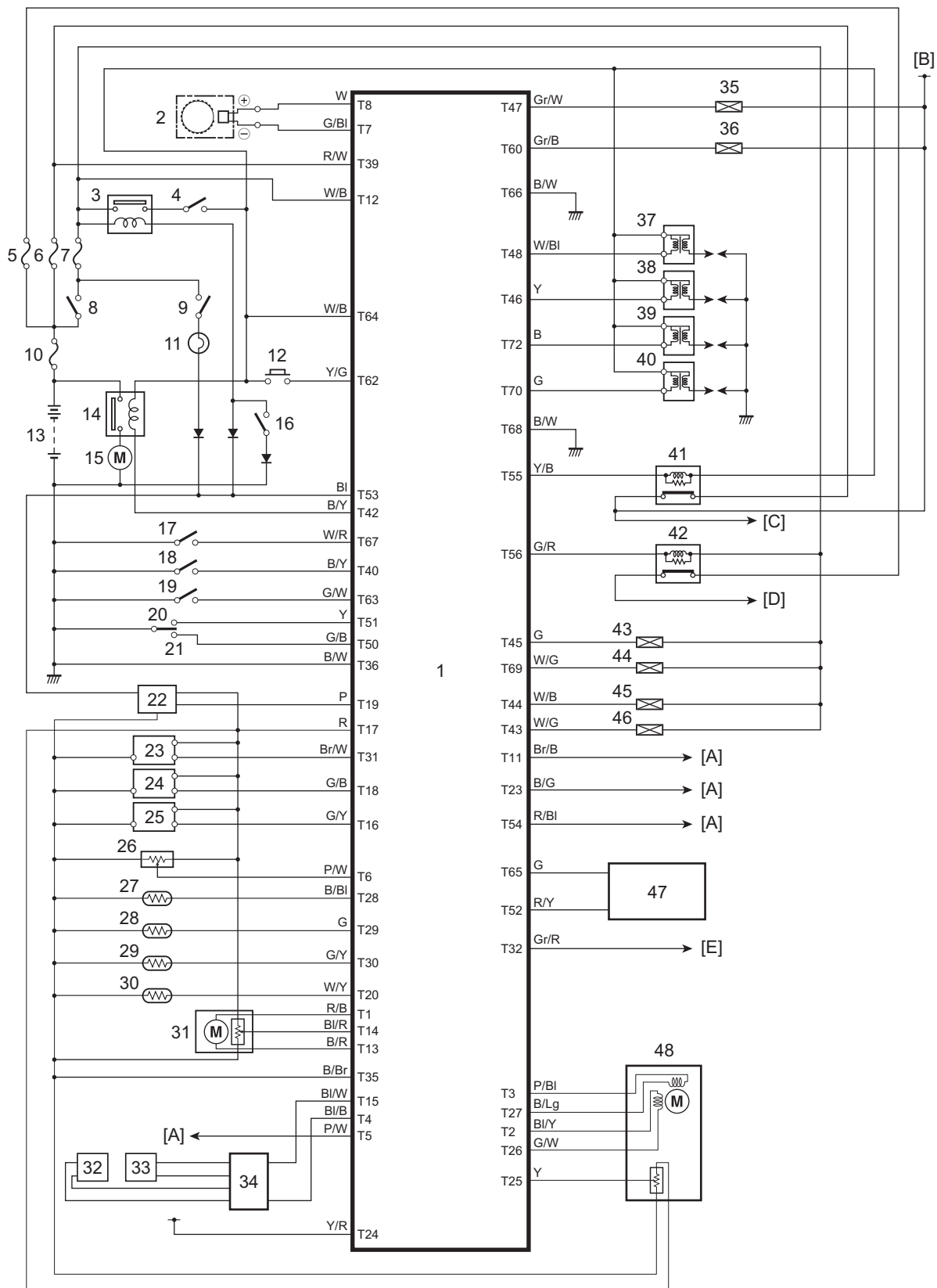
The comparison with the terms used in DTC name and this service manual are shown in the table below.

Terms in DTC name	Term in the service manual
CKP Sensor "A"	CKP Sensor
EVAP System Purge Control Valve	EVAP System Purge Control Solenoid Valve
Fan 1	Cooling Fan
HO2 Sensor Heater Bank 1 Sensor 1	HO2 Sensor #1
HO2 Sensor Heater Bank 2 Sensor 1	HO2 Sensor #2
IAP Sensor	IAP Sensor #1
IAP Sensor 2	IAP Sensor #2
IAT Sensor 1	IAT Sensor
Ignition Coil "A"	Ignition Coil #11, Ignition Coil #1 (Center)
Ignition Coil "B"	Ignition Coil #21, Ignition Coil #2 (Center)
Ignition Coil "C"	Ignition Coil #12, Ignition Coil #1 (Side)
Ignition Coil "D"	Ignition Coil #22, Ignition Coil #2 (Side)
Injector Cylinder 1	Fuel Injector #1
Injector Cylinder 2	Fuel Injector #2
O2 Sensor Bank 1 Sensor 1	HO2 Sensor #1
O2 Sensor Bank 2 Sensor 1	HO2 Sensor #2
PAIR System Control "A"	PAIR Control Solenoid Valve
Throttle Actuator "A"	STVA
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

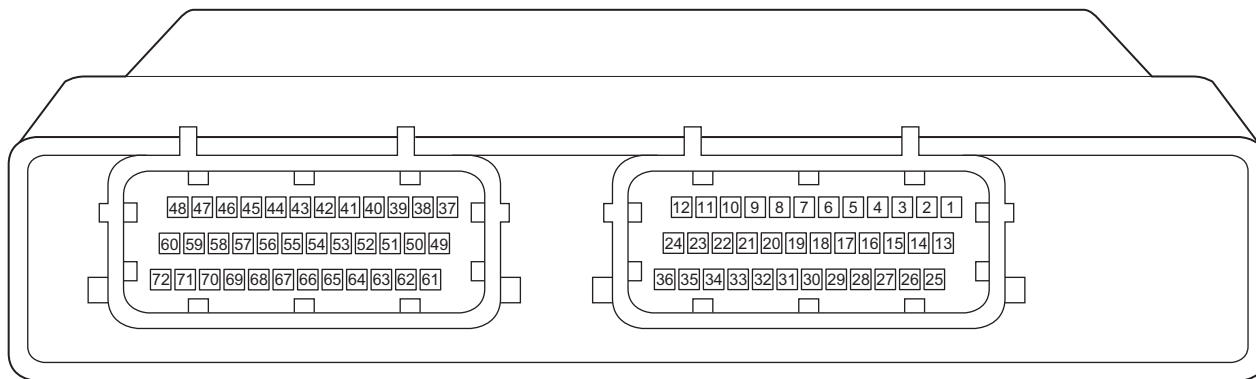
FI System Wiring Diagram

BENJ31J31122001



[A]: To Meter	14. Starter relay	32. Front wheel speed sensor
[B]: From T24	15. Starter motor	33. Rear wheel speed sensor
[C]: To FP	16. Side-stand switch	34. ABS control unit
[D]: To cooling fan motors	17. Mode select coupler (6P)	35. Fuel injector #1
[E]: To mode select coupler (6P) and ABS control unit	18. Clutch lever position switch	36. Fuel injector #2
1. ECM	19. Traction control system select switch	37. Ignition coil #11
2. CKP sensor	20. Mode switch 1	38. Ignition coil #12
3. Side-stand relay	21. Mode switch 2	39. Ignition coil #21
4. Engine stop switch	22. GP switch	40. Ignition coil #22
5. Cooling fan fuse (15 A)	23. TO sensor	41. FP relay
6. FP fuse (10 A)	24. IAP sensor #1	42. Cooling fan relay
7. Fuse (10 A)	25. IAP sensor #2	43. EVAP system purge control solenoid valve
8. Ignition switch	26. TP sensor	44. PAIR control solenoid valve
9. Signal fuse (10 A)	27. ECT sensor	45. O2 sensor #1 heater
10. Main fuse (30 A)	28. IAT sensor	46. O2 sensor #2 heater
11. Neutral indicator light	29. O2 sensor #1	47. Immobilizer antenna
12. Starter switch	30. O2 sensor #2	48. STV actuator
13. Battery	31. EXCVA	

Terminal Arrangement of ECM Connector "T"



IJ31J112047-01

TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
T1	EXCVA power (MO+)	T37	—
T2	STVA signal (STVA, 2A)	T38	—
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	—
T6	TP sensor signal	T42	Starter motor relay
T7	CKP sensor signal (CKP-)	T43	HO2 sensor #2 heater
T8	CKP sensor signal (CKP+)	T44	HO2 sensor #1 heater
T9	—	T45	EVAP system purge control solenoid valve
T10	—	T46	Ignition coil #21
T11	Tachometer	T47	Fuel injector #1
T12	Power source	T48	Ignition coil #11
T13	EXCVA power (MO-)	T49	—
T14	EXCVA position sensor	T50	Mode switch 2
T15	Front wheel speed sensor signal	T51	Mode switch 1
T16	IAP sensor (#2) signal	T52	Immobilizer communication
T17	Power source for sensors	T53	Neutral signal
T18	IAP sensor (#1) signal	T54	Immobilizer indicator
T19	GP switch signal	T55	Fuel pump relay
T20	HO2 sensor #2 signal	T56	Cooling fan relay
T21	—	T57	—
T22	—	T58	—
T23	Serial data for combination meter	T59	—
T24	Power source for fuel injectors	T60	Fuel injector #21
T25	STP sensor	T61	—
T26	STVA signal (STVA, 2B)	T62	Starter switch
T27	STVA signal (STVA, 1B)	T63	Traction control system select switch
T28	ECT sensor signal	T64	Engine stop switch
T29	IAT sensor signal	T65	Immobilizer communication
T30	HO2 sensor #1 signal	T66	General power ground (E01)
T31	TO sensor signal	T67	Mode select switch
T32	Serial data for self-diagnosis	T68	Ignition system ground (E03)
T33	—	T69	PAIR control solenoid valve
T34	—	T70	Ignition coil #22
T35	Sensor ground (E2)	T71	—
T36	ECM ground (E1)	T72	Ignition coil #12

Component Location

FI System Component Location

BENJ31J31123001

Refer to "FI System Component Location": L4 - L6 (Page 1A-12).

Diagnostic Information and Procedures

Engine Symptom Diagnosis

BENJ31J31124001

Refer to "Engine Symptom Diagnosis": L4 - L6 (Page 1A-14).

DTC Check

BENJ31J31124002

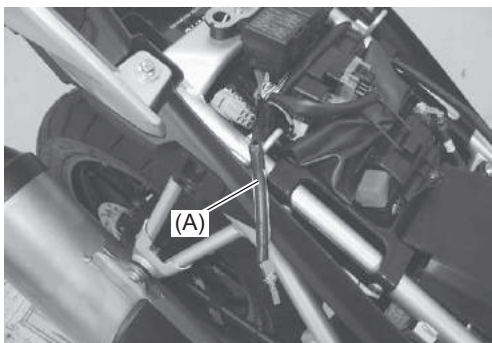
NOTE

- Do not disconnect the coupler from ECM, battery cable from battery, ECM ground wire from engine or main fuse before confirming DTC stored in memory. Such disconnection will erase memorized information in ECM memory.
- Before checking DTC, read self-diagnosis function "User mode and dealer mode" (Page 1A-88) carefully to have good understanding as to what functions are available and how to use it.
- DTC can be checked by using the SDS. Refer to the SDS operation manual for further details.

- 1) Remove the seat. (Page 9D-33)
- 2) Connect the special tool to the mode select coupler (6P) at the wiring harness.

Special tool

(A): 09930-82720



IE31J1110006-01

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



ID26J1110213-01

- 5) Check the DTC to determine the malfunction part. (Page 1A-97)



IE31J1110007-01

DTC Clearance

BENJ31J31124003

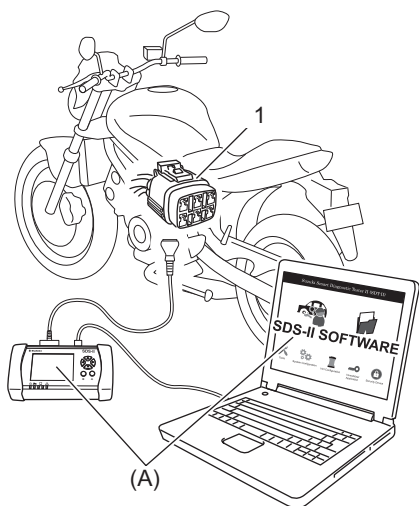
NOTE

- The DTC 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.
- After repairing the trouble, MIL dose not turn off the light soon.
- After repairing the trouble, even though the Current DTC is cleared, Past DTC still remains stored in the ECM. Therefore, erase the Past DTC memorized in the ECM.

- 1) Repair the trouble then turn the ignition switch "OFF".
- 2) Remove the seat. (Page 9D-33)
- 3) Connect the SDS-II tool to the mode select coupler (6P) (1).

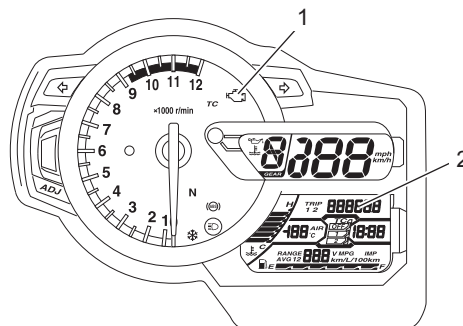
Special tool

(A): 09904-41030
09904-41040



IJ31J1452047-02

- 4) Turn the ignition switch "ON".
- 5) Check that the Current DTC is not displayed and then clear the Past DTC using the SDS-II tool. Refer to the SDS-II operation manual for further details.
- 6) Check that the MIL (1) has been turned off, and FI (2) is not displayed.



IJ31J1112077-01

- 7) Disconnect the SDS-II tool and turn the ignition switch "OFF".
- 8) Install the seat. (Page 9D-33)

DTC Table

BENJ31J31124004

DTC		DTC Naming	DTC detecting condition
—	C00	None	—
P0030	C64	HO2 Sensor Heater Control Circuit Bank 1 Sensor 1 ☞ (Page 1A-100)	HO2 sensor #1 heater drive circuit is shorted to ground or open.
P0050	C44	HO2 Sensor Heater Control Circuit Bank 2 Sensor 1 ☞ (Page 1A-100)	HO2 sensor #2 heater drive circuit is shorted to ground or open.
P0105	C17	IAP Sensor Circuit ☞ (Page 1A-102)	IAP sensor #1 output voltage is higher than 4.85 V.
P0106		IAP Sensor Circuit Range / Performance ☞ (Page 1A-102)	IAP sensor #1 vacuum hose has come off.
P0107		IAP Sensor Circuit Low ☞ (Page 1A-102)	IAP sensor #1 output voltage is lower than 0.5 V.
P0110	C21	IAT Sensor 1 Circuit ☞ (Page 1A-104)	IAT sensor output voltage is higher than 4.85 V.
P0112		IAT Sensor 1 Circuit Low ☞ (Page 1A-104)	IAT sensor output voltage is lower than 0.15 V.
P0115	C15	ECT Sensor Circuit ☞ (Page 1A-106)	ECT sensor output voltage is higher than 4.85 V.
P0117		ECT Sensor Circuit Low ☞ (Page 1A-106)	ECT sensor output voltage is lower than 0.15 V.
P0120	C14	TP Sensor / Switch "A" Circuit ☞ (Page 1A-108)	TP sensor output voltage is lower than 0.2 V.
P0123		TP Sensor / Switch "A" Circuit High ☞ (Page 1A-108)	TP sensor output voltage is higher than 4.8 V.
P0130	C64	O2 Sensor Circuit Bank 1 Sensor 1 ☞ (Page 1A-110)	HO2 sensor #1 output voltage is not within specified range.
P0150	C44	O2 Sensor Circuit Bank 2 Sensor 1 ☞ (Page 1A-110)	HO2 sensor #2 output voltage is not within specified range.
P0170	C45	Fuel Trim Bank 1 ☞ (Page 1A-112)	The fuel trim correction is out of its threshold value.
P0201	C32	Injector Circuit / Open – Cylinder 1 ☞ (Page 1A-114)	Fuel injector #1 signal is interrupted by several times or more continuity although CKP signal is detected.
P0202	C33	Injector Circuit / Open – Cylinder 2 ☞ (Page 1A-114)	Fuel injector #2 signal is interrupted by several times or more continuity although CKP signal is detected.
P0220	C29	TP Sensor / Switch "B" Circuit ☞ (Page 1A-116)	STP sensor output voltage is lower than 0.15 V.
P0223		TP Sensor / Switch "B" Circuit High ☞ (Page 1A-116)	STP sensor output voltage is higher than 4.85 V.
P0231	C41	FP Secondary Circuit Low ☞ (Page 1A-118)	No voltage is applied to fuel pump although FP relay is ON.
P0232		FP Secondary Circuit High ☞ (Page 1A-118)	Voltage is applied to fuel pump although the FP relay is OFF.
P0335	C12	CKP Sensor "A" Circuit ☞ (Page 1A-120)	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-122)	Ignition coil #11 signal is interrupted by several times or more continuity although CKP signal is detected.

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DTC		DTC Naming	DTC detecting condition
P0352	C25	Ignition Coil "B" Primary / Secondary Circuit ☞ (Page 1A-122)	Ignition coil #21 signal is interrupted by several times or more continuity although CKP signal is detected.
P0353	C26	Ignition Coil "C" Primary / Secondary Circuit ☞ (Page 1A-122)	Ignition coil #12 signal is interrupted by several times or more continuity although CKP signal is detected.
P0354	C27	Ignition Coil "D" Primary / Secondary Circuit ☞ (Page 1A-122)	Ignition coil #22 signal is interrupted by several times or more continuity although CKP signal is detected.
P0418	C49	PAIR System Control "A" Circuit ☞ (Page 1A-122)	PAIR control solenoid valve voltage is not input to ECM.
P0443	C62	EVAP System Purge Control Valve Circuit ☞ (Page 1A-124)	EVAP system purge control solenoid valve voltage is not input to ECM.
P0480	C60	Fan 1 Control Circuit ☞ (Page 1A-126)	Cooling fan relay signal is not input to ECM.
P0500	C16	Vehicle Speed Sensor "A" ☞ (Page 1A-128)	Front wheel speed sensor signal is not input for a few seconds or more.
P0506	C65	ISC System RPM Lower Than Expected ☞ (Page 1A-130)	Idle speed dropped lower than desired idle speed by more than specified range.
P0507		ISC System RPM Higher Than Expected ☞ (Page 1A-130)	Idle speed rose higher than desired idle speed by more than specified range.
P0914	C31	GP Sensor Circuit ☞ (Page 1A-131)	Gear position signal voltage is lower than specified value.
P1100	C13	IAP Sensor 2 Circuit ☞ (Page 1A-133)	IAP sensor #2 output voltage is higher than 4.85 V.
P1101		IAP Sensor 2 Circuit Range / Performance ☞ (Page 1A-133)	IAP sensor #2 vacuum hose has come off.
P1102		IAP Sensor 2 Circuit Low ☞ (Page 1A-133)	IAP sensor #2 output voltage is lower than 0.5 V.
P1400	C46	EXCVA Position Sensor Circuit ☞ (Page 1A-135)	EXCVA position sensor output voltage is higher than 4.9 V.
P1401		EXCVA Position Sensor Circuit Low ☞ (Page 1A-135)	EXCVA position sensor output voltage is lower than 0.14 V.
P1403		EXCVA Circuit Low Voltage ☞ (Page 1A-138)	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-140)	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-140)	The sensor output voltage is lower than 0.2 V.
P1702		TO sensor circuit High ☞ (Page 1A-140)	The sensor output voltage is higher than 4.8 V.
P2100	C28	Throttle Actuator "A" Control Motor Circuit ☞ (Page 1A-142)	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-128)	Rear wheel speed sensor signal is not input for a few seconds or more.

DTC		DTC Naming	DTC detecting condition
P2505	C41	ECM Power Input Signal ☞ (Page 1A-144)	No voltage is applied to the ECM although the ignition switch is turned ON.

Fail-Safe Function Table

BENJ31J31124005

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

Item	Fail-Safe Mode	Starting Ability	Running Ability
IAP sensor	When IAP sensor #1 is fail-safe, pressure the atmospheric pressure from the IAP sensor #2 value.	“YES”	“YES”
	When IAP sensor #2 is fail-safe, intake air pressure value is fixed to 101.3 kPa (760 mmHg).	“YES”	“YES”
TP sensor	The throttle opening is fixed to full open position. Ignition timing is also fixed.	“YES”	“YES”
ECT sensor	Engine coolant temperature value is fixed to 70 °C (158 °F). Cooling fan is fixed on position.	“YES”	“YES”
IAT sensor	Intake air temperature value is fixed to 25 °C (77 °F).	“YES”	“YES”
Ignition signal	Injector #1 fuel-cut	“YES”	“YES”
	Injector #2 fuel-cut	Cylinder #2 can run.	“YES”
Injection signal	Injector #1 fuel-cut	“YES”	“YES”
	Injector #2 fuel-cut	Cylinder #2 can run.	“YES”
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”
	Secondary throttle valve is fixed to full close position.	“YES”	“YES”
Gear position signal	Gear position signal is fixed to 6th gear.	“YES”	“YES”
HO2 sensor	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	“YES”	“YES”
PAIR control solenoid valve	ECM stops controlling PAIR control solenoid valve.	“YES”	“YES”
EVAP system purge control solenoid valve	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

BENJ31J31124006

Refer to “FI System Troubleshooting”: L4 - L6 (Page 1A-25).

DTC P0030 (C64) / P0050 (C44)

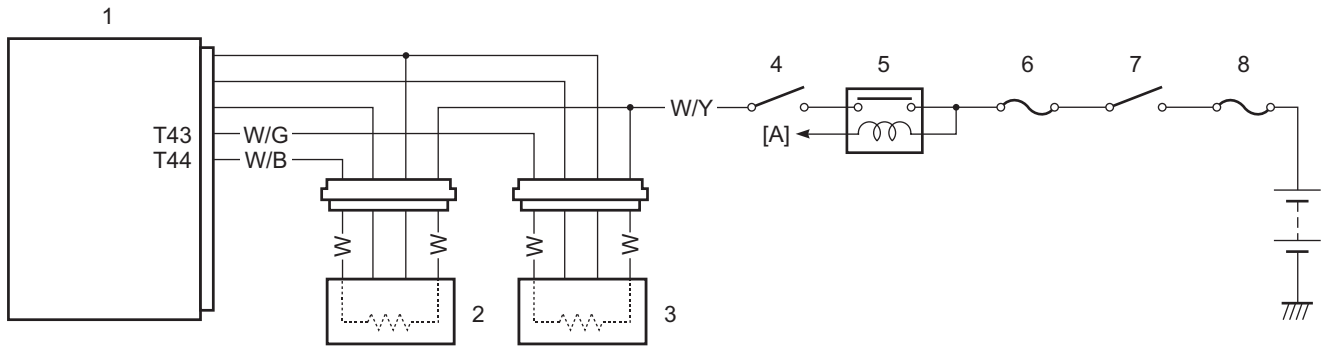
BENJ31J31124007

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0030 (C64): HO2 Sensor Heater Control Circuit Bank 1 Sensor 1 HO2 sensor #1 heater drive circuit is shorted to ground or open.	<ul style="list-style-type: none"> • HO2 sensor heater • HO2 sensor heater circuit • ECM
P0050 (C44): HO2 Sensor Heater Control Circuit Bank 2 Sensor 1 HO2 sensor #2 heater drive circuit is shorted to ground or open.	

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



IJ31J1112005-02

[A]: To side-stand switch	3. HO2 sensor #2	6. Ignition fuse
1. ECM	4. Engine stop switch	7. Ignition switch
2. HO2 sensor #1	5. Side-stand relay	8. Main fuse

Troubleshooting

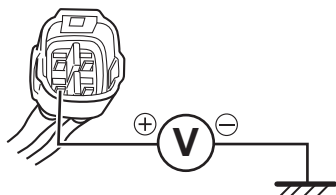
Step 1

HO2 sensor heater power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor coupler. (Page 1C-20)
- 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

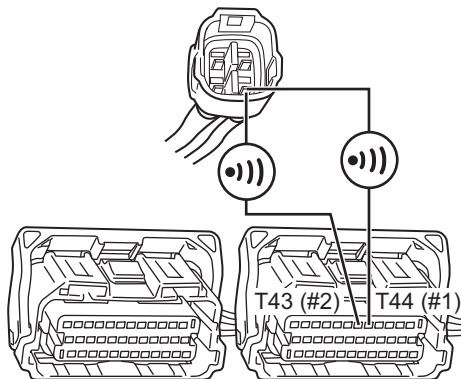
Is check result OK?

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

Step 2

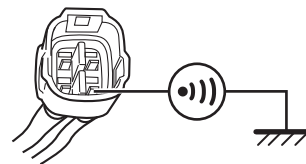
HO2 sensor heater drive circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - W wire (#1), W wire (#2): less than 1 Ω



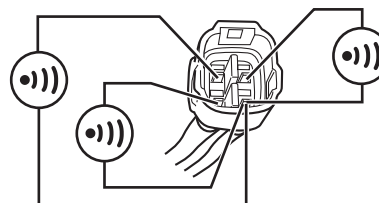
IJ31J1112006-01

- Between W wire (#1), W wire (#2) and ground: infinity



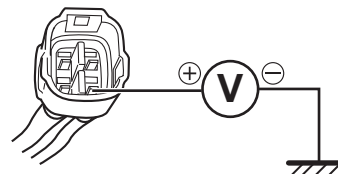
ID26J1110062-03

- Between W wire (#1), W wire (#2) terminal and other terminal at HO2 sensor coupler: infinity



ID26J1110055-05

- Voltage
 - Turn the ignition switch ON.
 - W wire (#1), W wire (#2): 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 “Step 3” under “DTC P0135 (C64)”: L4 - L6 (Page 1A-40).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the HO2 sensor with a new one. (Page 1C-20)

DTC P0105 / P0106 / P0107 (C17)

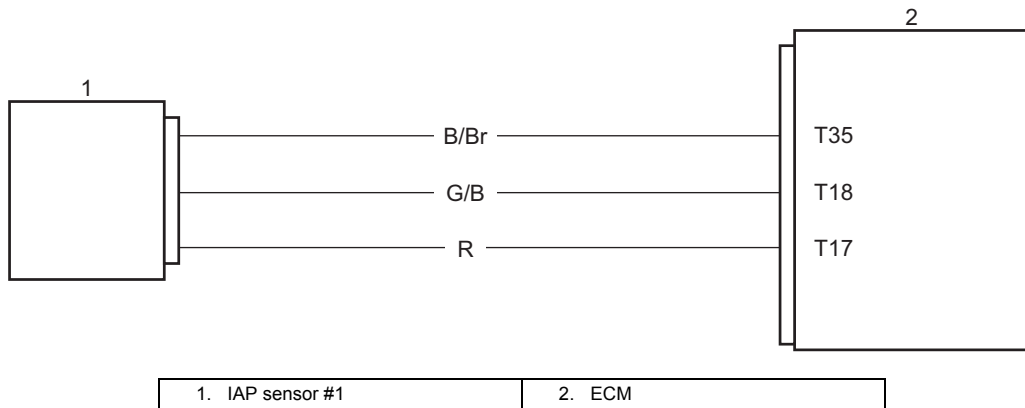
BENJ31J31124008

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0105 (C17): IAP Sensor Circuit IAP sensor #1 output voltage is higher than 4.85 V.	<ul style="list-style-type: none"> • Vacuum passage between throttle body and IAP sensor #1 • IAP sensor #1 • IAP sensor #1 circuit • ECM
P0106 (C17): IAP Sensor Circuit Range / Performance IAP sensor #1 vacuum hose has come off.	
P0107 (C17): IAP Sensor Circuit Low IAP sensor #1 output voltage is lower than 0.5 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



IJ31J1112007-01

Troubleshooting

NOTE

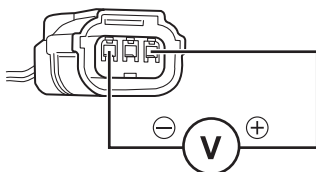
When DTC P0106 (C17) and P1101 (C13) are detected together, check that each IAP sensor vacuum hose is connected correctly.

Step 1

IAP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the IAP sensor #1 coupler. (Page 1C-15)
- 3) Check for proper terminal connection to the IAP sensor #1 coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the R wire and B/Br wire.

IAP sensor #1 power supply voltage
[Standard]: 4.75 – 5.25 V



IJ31J1112048-01

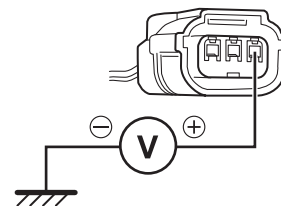
Is check result OK?

- 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.



IJ31J1112049-01

Is voltage same as Step 1?

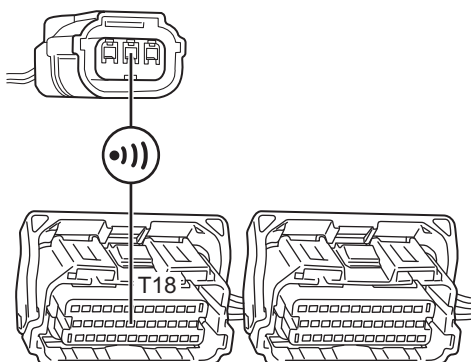
- Yes Repair or replace the B/Br wire.
- No Repair or replace the R wire.

Step 3

IAP sensor signal circuit check

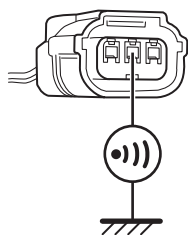
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.

- Resistance
 - G/B wire: less than 1 Ω



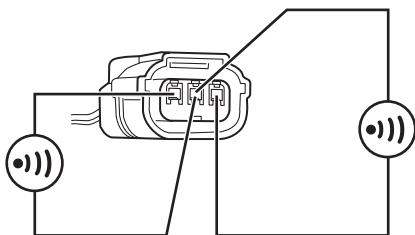
IJ31J1112050-01

- Between G/B wire and ground: infinity



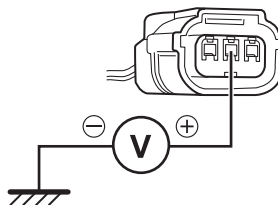
IJ31J1112051-01

- G/B wire terminal and other terminal at IAP sensor (#1) coupler: infinity



IJ31J1112052-01

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



IJ31J1112053-01

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 #1 coupler.
- 3) Measure the IAP sensor #1 output voltage at idle speed. Refer to “Step 4” under “DTC P0105-H / P0105-L (C17)”: L4 - L6 (Page 1A-28).

Is check result OK?

- Yes Go to Step 5.
- No Check the vacuum hose for crack or damage.
If vacuum hose is OK, replace the IAP sensor #1 with a new one. (Page 1C-15)

Step 5

IAP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the IAP sensor #1. (Page 1C-15)
- 3) Measure the IAP sensor #1 output voltage. Refer to “Step 5” under “DTC P0105-H / P0105-L (C17)”: L4 - L6 (Page 1A-28).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the IAP sensor #1 with a new one. (Page 1C-15)

DTC P0110 / P0112 (C21)

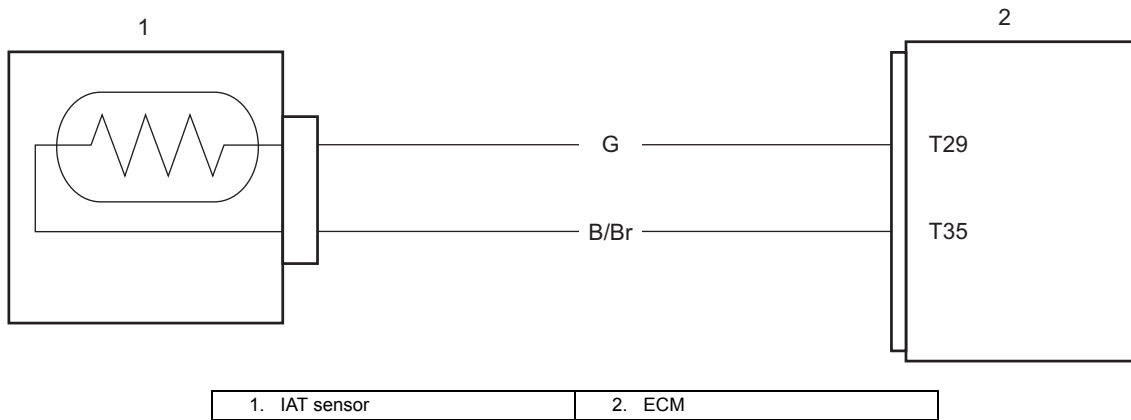
BENJ31J31124009

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0110 (C21): IAT Sensor 1 Circuit IAT 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 IAT sensor output voltage is lower than 0.15 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



IJ31J112008-01

1. IAT sensor	2. ECM
---------------	--------

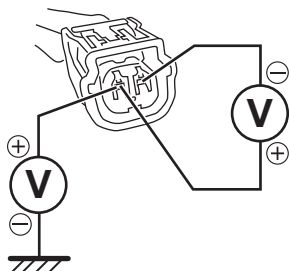
Troubleshooting

Step 1

IAT sensor input voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the IAT sensor coupler. (Page 1C-15)
- 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 G wire and ground.
- 6) If OK, measure the voltage between the G wire and B/Br wire.

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



IH18K1110010-02

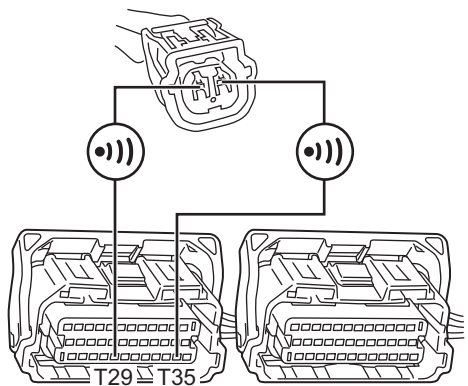
Is check result OK?

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

Step 2

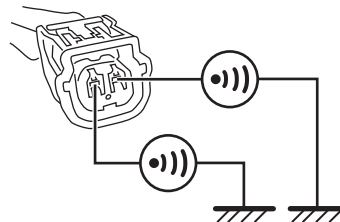
IAT sensor circuit check

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



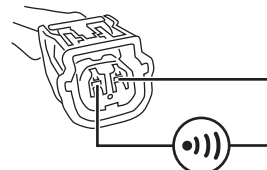
IJ31J1112054-01

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



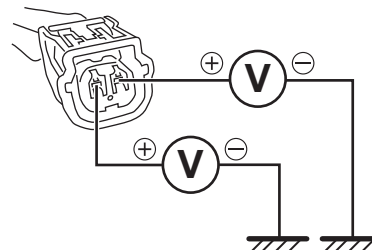
IH18K1110012-01

- Between G wire terminal and B/Br wire terminal at IAT sensor coupler: infinity



IH18K1110013-01

- Voltage
 - Turn the ignition switch ON.
 - G 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-14)
- 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-15)

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the IAT sensor with a new one. (Page 1C-15)

DTC P0115 / P0117 (C15)

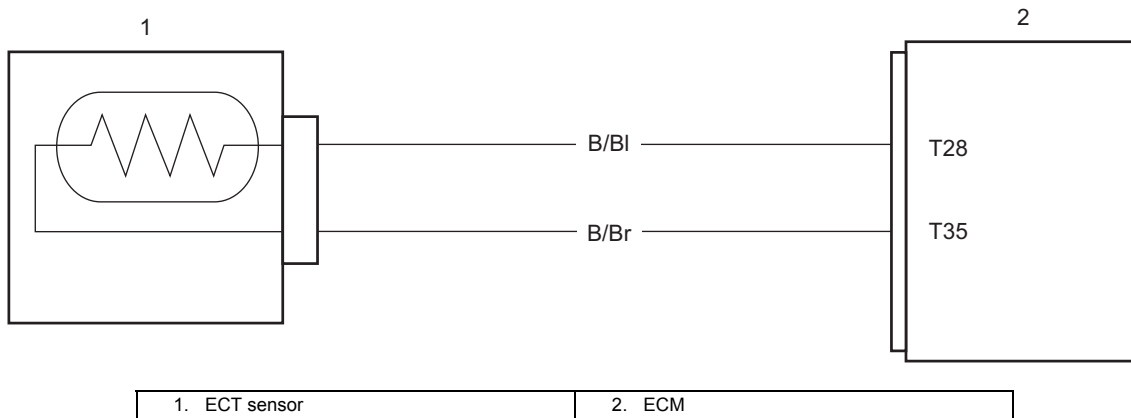
BENJ31J31124010

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0115 (C15): ECT Sensor Circuit ECT 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 ECT sensor output voltage is lower than 0.15 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



IJ31J1112009-01

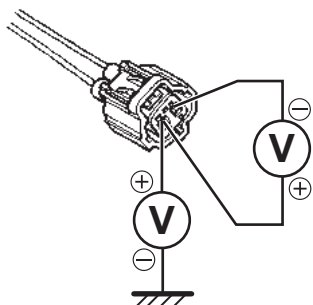
Troubleshooting

Step 1

ECT sensor power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECT sensor coupler. (Page 1C-16)
- 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



ID26J1110036-04

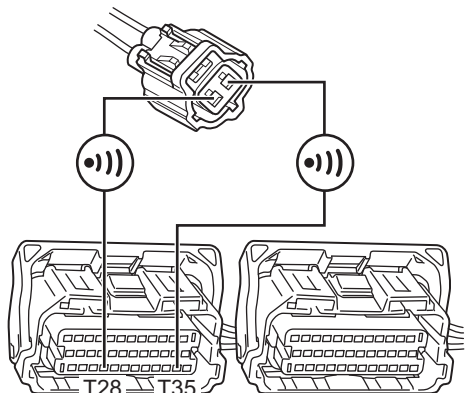
Is check result OK?

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

Step 2

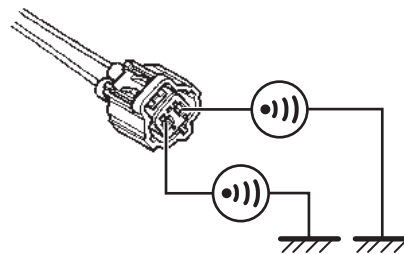
ECT sensor circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



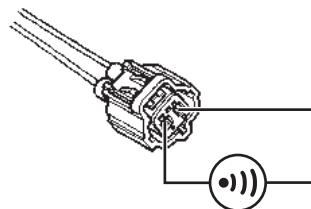
IJ31J1112055-01

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



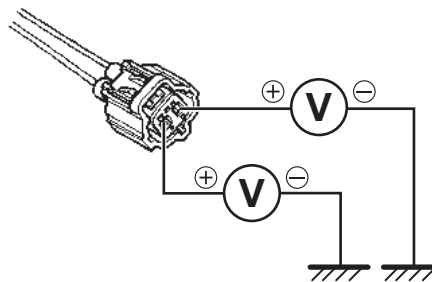
ID26J1110038-03

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



ID26J1110039-03

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



ID26J1110040-02

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- 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-16)

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the ECT sensor with a new one. (Page 1C-16)

DTC P0120 / P0123 (C14)

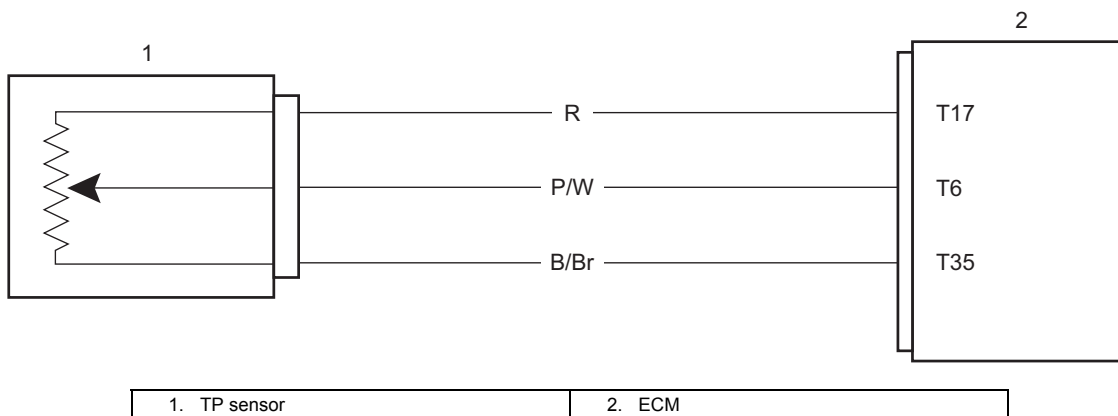
BENJ31J31124011

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0120 (C14): TP Sensor / Switch "A" Circuit TP 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 TP sensor output voltage is higher than 4.8 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



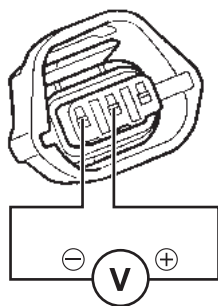
Troubleshooting

Step 1

TP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the TP sensor coupler. (Page 1C-19)
- 3) Check for proper terminal connection to the TP sensor coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the R wire and B/Br wire.

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



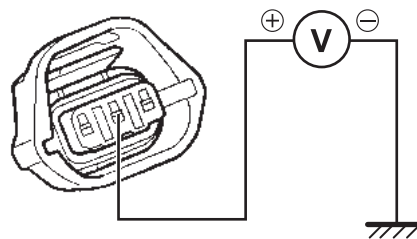
Is check result OK?

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

Step 2

TP sensor ground circuit check

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



Is voltage same as Step 1?

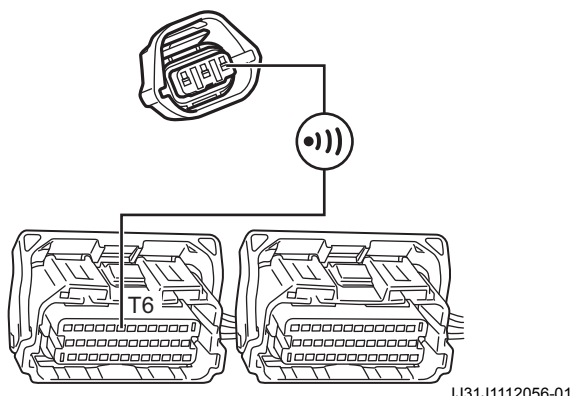
- Yes Repair or replace the B/Br wire.
- No Repair or replace the R wire.

Step 3

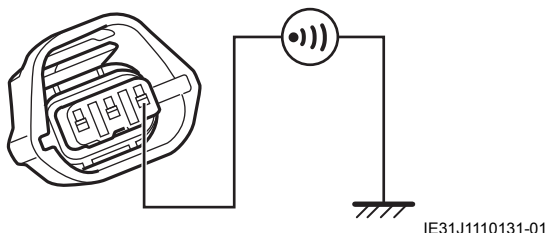
TP sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.

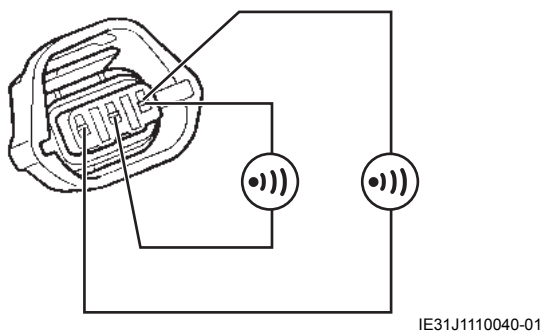
- Resistance
 - P/W wire: less than 1 Ω



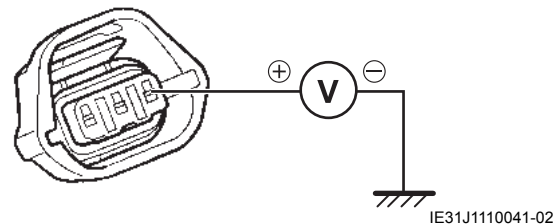
– Between P/W wire and ground: infinity



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



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



Is check result OK?

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

Step 4

TP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM couplers.
- 3) Measure the TP sensor output voltage. Refer to “Step 4” under “DTC P0120-H / P0120-L (C14)”: L4 - L6 (Page 1A-34).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the TP sensor with a new one. (Page 1C-19)

DTC P0130 (C64) / P0150 (C44)

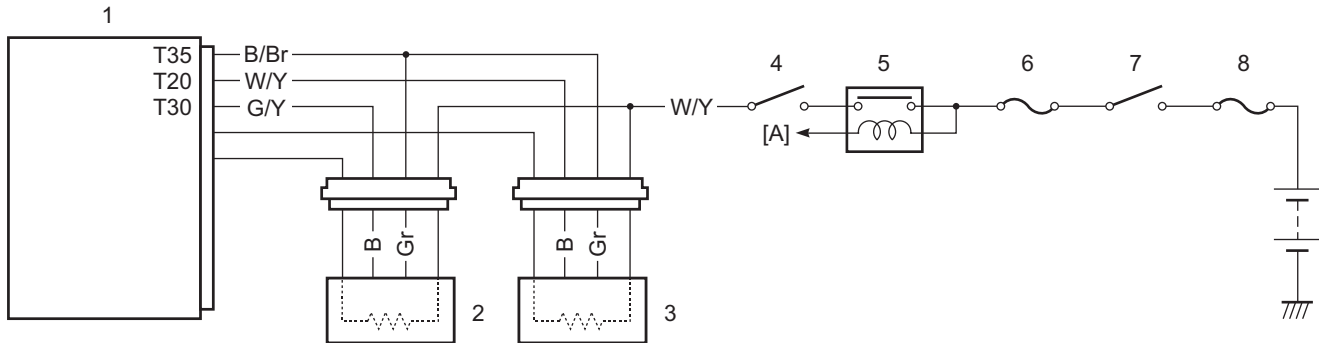
BENJ31J31124012

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble Area
P0130 (C64): O2 Sensor Circuit Bank 1 Sensor 1 HO2 sensor #1 output voltage is not within specified range.	<ul style="list-style-type: none"> • HO2 sensor • HO2 sensor circuit • ECM
P0150 (C44): O2 Sensor Circuit Bank 2 Sensor 1 HO2 sensor #2 output voltage is not within specified range.	

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



IJ31J1112011-02

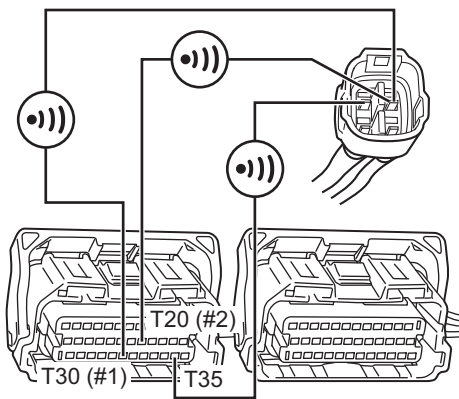
[A]: To side-stand switch	3. HO2 sensor #2	6. Ignition fuse
1. ECM	4. Engine stop switch	7. Ignition switch
2. HO2 sensor #1	5. Side-stand relay	8. Main fuse

Troubleshooting

Step 1

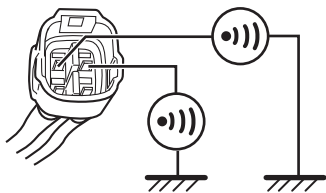
HO2 sensor circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the HO2 sensor coupler and ECM couplers.
 - HO2 sensor: (Page 1C-20)
 - ECM: (Page 1C-14)
- 3) Check for proper terminal connection to the HO2 sensor coupler and ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - G/Y wire (#1), W/Y wire (#2) and B/Br wire: less than 1 Ω



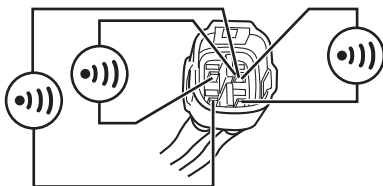
IJ31J1112012-02

- Between G/Y wire (#1), W/Y wire (#2) and ground: infinity
- Between B/Br wire and ground: infinity



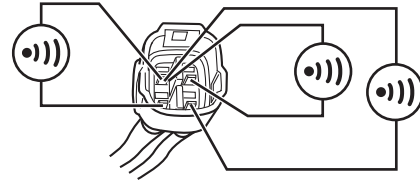
ID26J1110054-03

- Between G/Y wire (#1), W/Y wire (#2) terminal and other terminal at HO2 sensor coupler: infinity



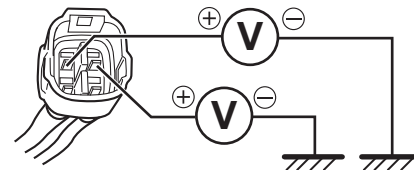
ID26J1110208-01

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



ID26J1110209-01

- Voltage
 - Turn the ignition switch ON.
 - G/Y wire (#1), W/Y wire (#2) 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.
 - HO2 sensor #1:
 - Use of SDS-II: Refer to “Step 2” under “DTC P0130 (C64)”: L4 - L6 (Page 1A-36).
 - Use of mode select switch: Refer to “Step 4” under “DTC P0130 (C64)”: L4 - L6 (Page 1A-36).
 - HO2 sensor #2:
 - Use of SDS-II: Refer to “Step 2” under “DTC P0156 (C44)”: L4 - L6 (Page 1A-42).
 - Use of mode select switch: Refer to “Step 4” under “DTC P0156 (C44)”: L4 - L6 (Page 1A-42).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the HO2 sensor with a new one. (Page 1C-20)

DTC P0170 (C45)

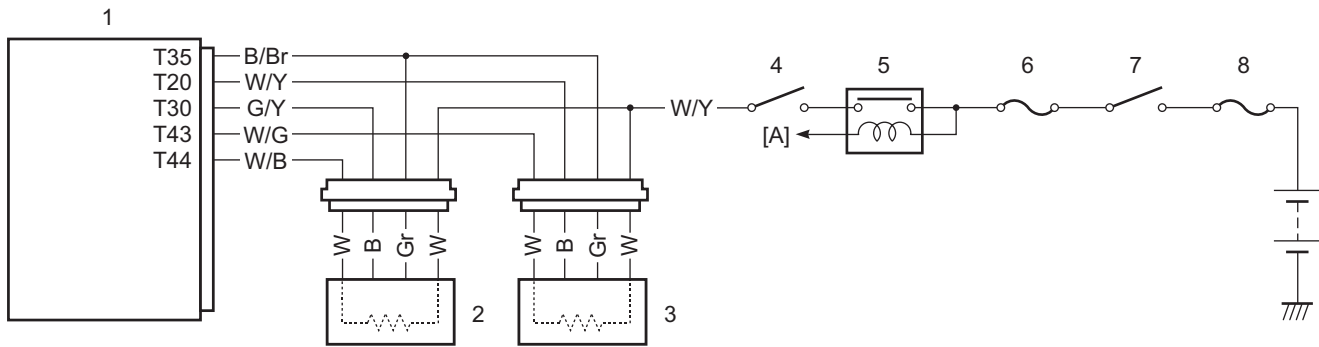
BENJ31J31124013

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": L8 - (Page 1A-92).



IJ31J1112013-02

[A]: To side-stand switch	3. HO2 sensor #2	6. Ignition fuse
1. ECM	4. Engine stop switch	7. Ignition switch
2. HO2 sensor #1	5. Side-stand relay	8. Main fuse

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)”: L8 - (Page 1A-114).
 - Fuel injector: ☞ (Page 1G-16)
 - IAP sensor #1: Refer to “Step 4 – 5” under “DTC P0105-H / P0105-L (C17)”: L4 - L6 (Page 1A-28).
 - IAP sensor #2: Refer to “Step 4 – 5” under “DTC P1750-H / P1750-L (C13)”: L4 - L6 (Page 1A-83).
 - PAIR system: ☞ (Page 1B-12)
 - EVAP control system: ☞ (Page 1B-15)
 - PCV hose: ☞ (Page 1B-13)

Is check result OK?

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

Step 2

Exhaust system and air intake system check

- 1) Check exhaust system and air intake system for clogging and leakage.
 - Exhaust system: ☞ (Page 1K-21)
 - Air intake system: Refer to “Step 3” under “DTC P0506 / P0507 (C65)”: L8 - (Page 1A-130).

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 – 2” under “DTC P0030 (C64) / P0050 (C44)”: L8 - (Page 1A-100) and “Step 1” under “DTC P0130 (C64) / P0150 (C44)”: L8 - (Page 1A-110).

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-20)
- 2) Perform “DTC Check”: L8 - (Page 1A-95) and check DTC.

Is DTC P0170 (C45) still detected?

- Yes Replace the ECM with a known good one, and inspect it again. ☞ (Page 1C-14)
- No End.

DTC P0201 (C32) / P0202 (C33)

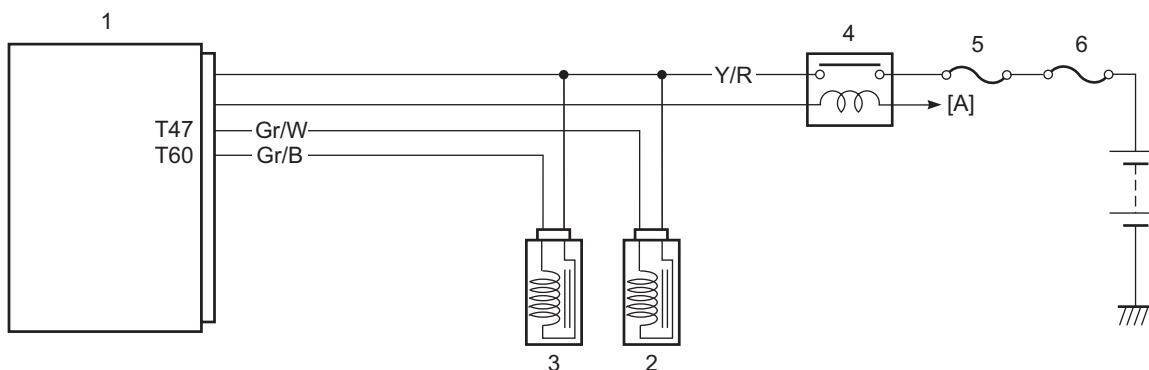
BENJ31J31124014

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 several 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 several times or more continuity although CKP signal is detected.	<ul style="list-style-type: none"> Fuel injector #2 Fuel injector #2 circuit ECM

Wiring Diagram

Refer to “FI System Wiring Diagram”: L8 - (Page 1A-92).



IJ31J1112014-02

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

Troubleshooting

Step 1

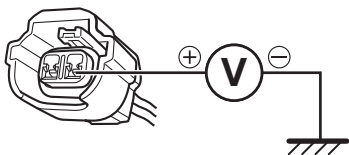
Fuel injector power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the fuel injector coupler. (Page 1G-15)
- 3) Check for proper terminal connection to the fuel injector coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between Y/R wire and ground.

NOTE

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

Fuel injector power supply voltage
[Standard]: Battery voltage



IJ31J1112057-01

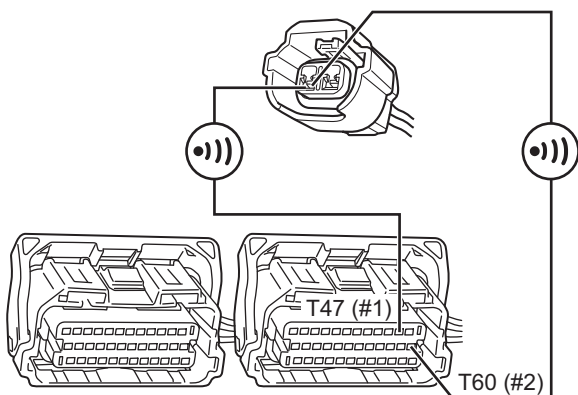
Is check result OK?

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

Step 2

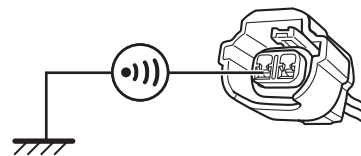
Fuel injector drive circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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) wire: less than 1 Ω



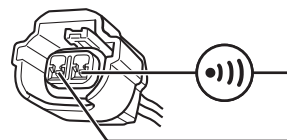
IJ31J1112015-01

- Between Gr/W (#1), Gr/B (#2) wire and ground: infinity



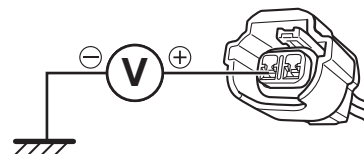
IJ31J1112058-01

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



IJ31J1112059-01

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



IJ31J1112060-01

Is check result OK?

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

Step 3

Fuel injector resistance check

- 1) Turn the ignition switch OFF.
- 2) Measure the fuel injector resistance.
 - Fuel injector #1: Refer to “Step 3” under “DTC P0201 (C32)”: L4 - L6 (Page 1A-46).
 - Fuel injector #2: Refer to “Step 3” under “DTC P0202 (C33)”: L4 - L6 (Page 1A-48).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the fuel injector with a new one. (Page 1G-15)

DTC P0220 / P0223 (C29)

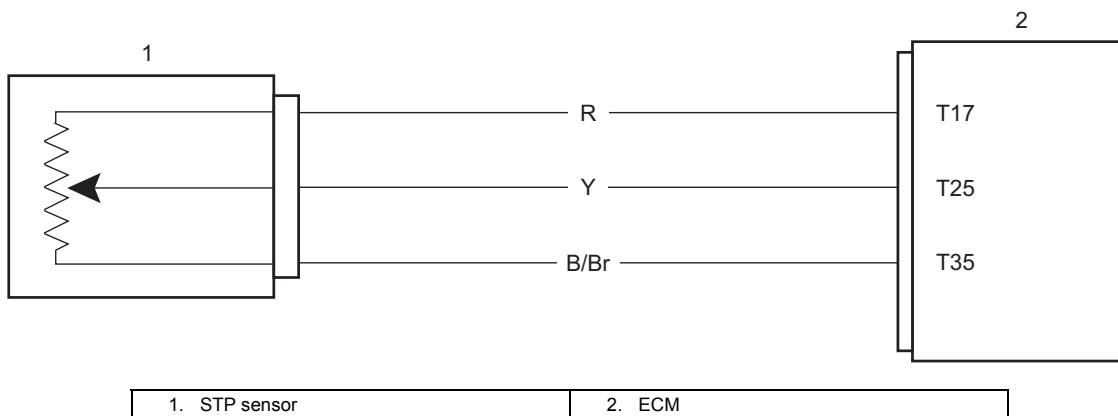
BENJ31J31124015

DTC Detecting Condition and Trouble Area

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

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



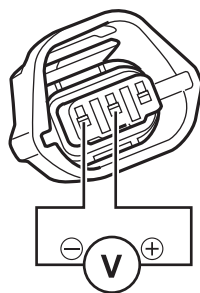
Troubleshooting

Step 1

STP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the STP sensor coupler. (Page 1C-25)
- 3) Check for proper terminal connection to the STP sensor coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the R wire and B/Br wire.

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



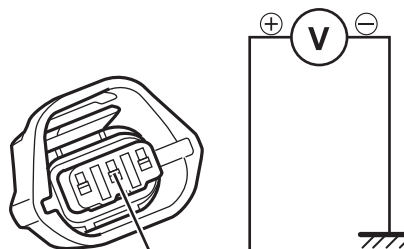
Is check result OK?

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

Step 2

STP sensor ground circuit check

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



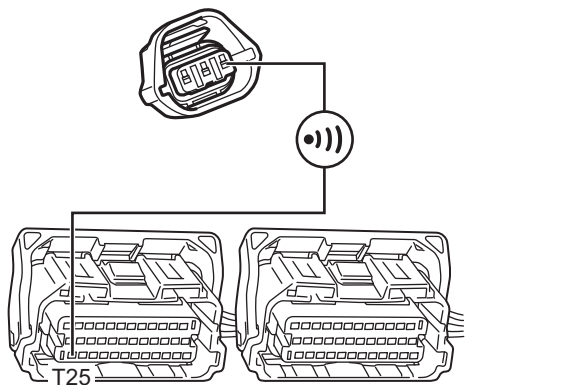
Is voltage same as Step 1?

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

Step 3

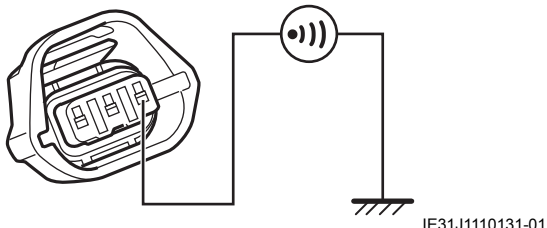
STP sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



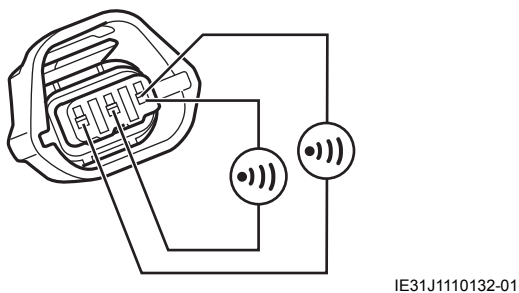
IJ31J1112061-01

– Between Y wire and ground: infinity



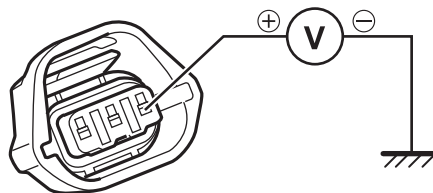
IE31J1110131-01

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



IE31J1110132-01

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



IE31J1110133-01

Is check result OK?

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

Step 4

STP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM couplers.
- 3) Measure the STP sensor output voltage. Refer to “Step 4” under “DTC P1654-H / P1654-L (C29)”: L4 - L6 (Page 1A-68).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the STP sensor with a new one. (Page 1C-25)

DTC P0231 / P0232 (C41)

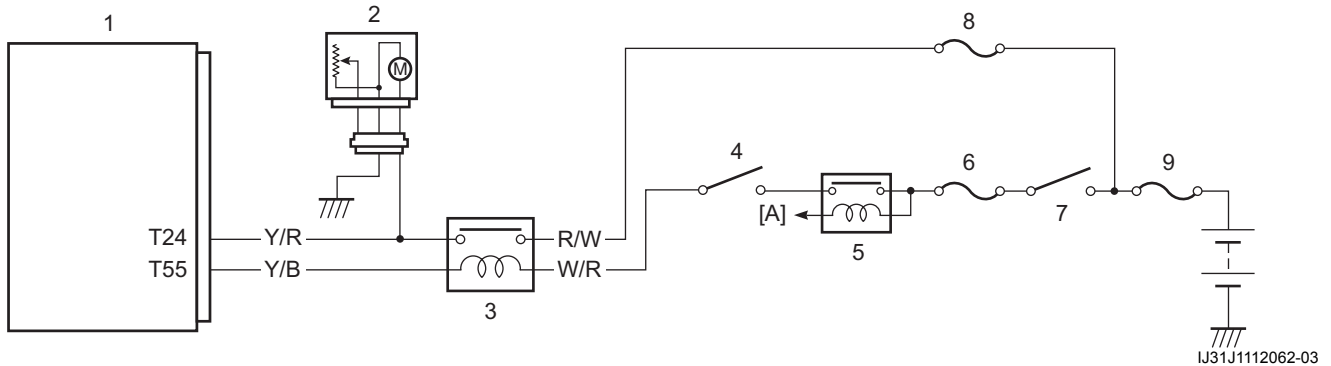
BENJ31J31124016

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": L8 - (Page 1A-92).



IJ31J112062-03

[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

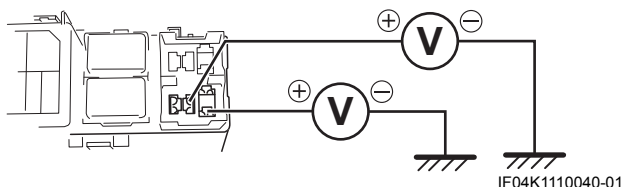
FP relay power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the FP relay. (Page 1G-14)
- 3) Check for proper terminal connection to the FP relay terminal.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between W/R wire and ground.
- 6) If OK, measure the voltage between R/W wire and ground.

NOTE

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

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

Check the FP relay. (Page 1G-14)

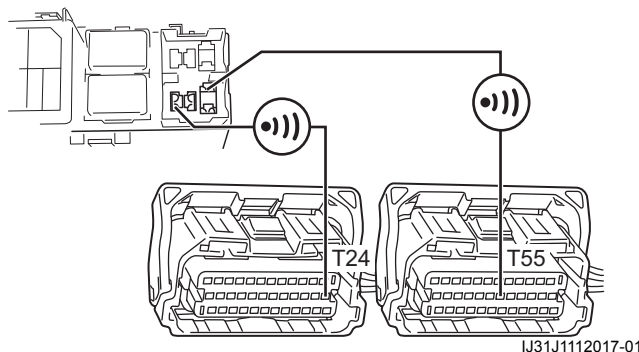
Is check result OK?

- Yes Go to Step 3.
- No Replace the FP relay with a new one. (Page 1G-14)

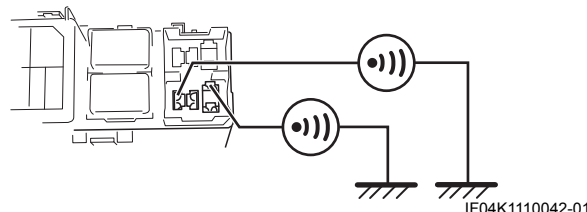
Step 3

FP relay drive circuit check

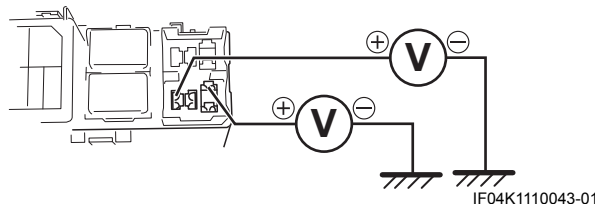
- 1) Turn the ignition switch OFF.
- 2) Disconnect the fuel pump coupler and ECM couplers.
 - Fuel pump: (Page 1G-9)
 - ECM: (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - Y/R wire and Y/B wire: less 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-14)
- No Repair or replace the defective wire harness.

DTC P0335 (C12)

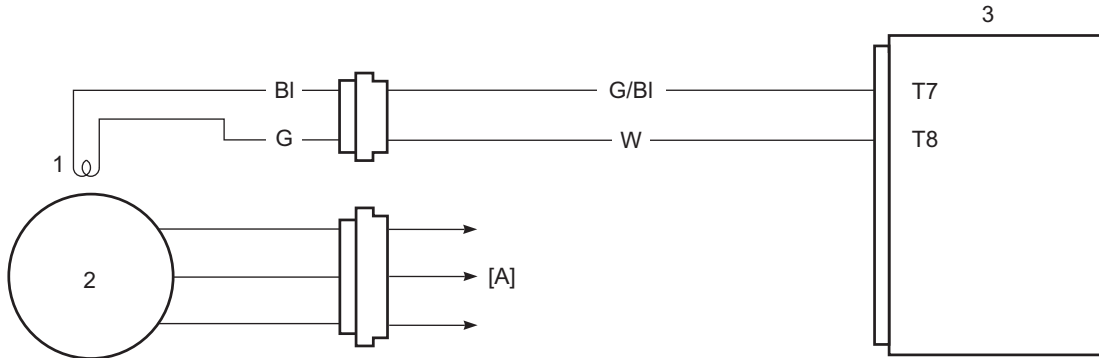
BENJ31J31124017

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": L8 - (Page 1A-92).



IJ31J112018-01

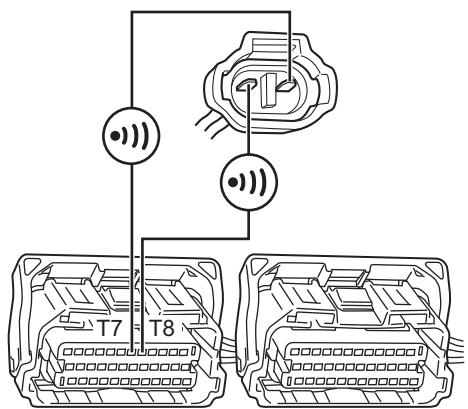
[A]: To regulator/rectifier	2. Generator
1. CKP sensor	3. ECM

Troubleshooting

Step 1

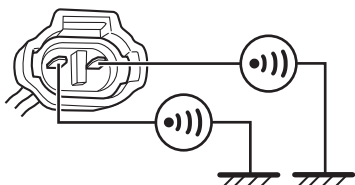
CKP sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the CKP sensor coupler and ECM couplers.
 - CKP sensor: (Page 1C-23)
 - ECM: (Page 1C-14)
- 3) Check for proper terminal connection to the CKP sensor coupler and ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - W wire and G/BI wire: less than 1 Ω



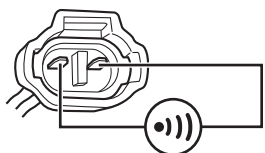
IJ31J1112063-01

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



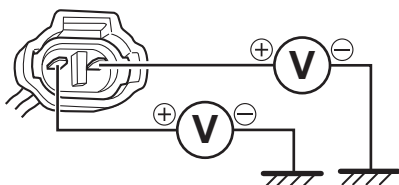
IF04K1110046-01

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



IF04K1110047-01

- Voltage
 - Turn the ignition switch ON.
 - 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 “Step 2” under “DTC P0335 (C12)”: L4 - L6 (Page 1A-52).

Is check result OK?

- Yes Go to Step 3.
- No Replace the CKP sensor with a new one. (Page 1C-23)

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 “Step 3” under “DTC P0335 (C12)”: L4 - L6 (Page 1A-52).

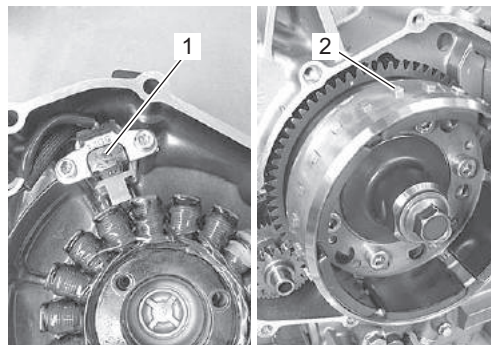
Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Go to Step 4.

Step 4

CKP sensor and generator rotor check

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



IH18K1110032-01

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Clean or replace defective parts.

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

BENJ31J31124018

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0351 (C24): Ignition Coil "A" Primary / Secondary Circuit Ignition coil #11 signal is interrupted by several 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 #21 signal is interrupted by several times or more continuity although CKP signal is detected.	
P0353 (C26): Ignition Coil "C" Primary / Secondary Circuit Ignition coil #12 signal is interrupted by several times or more continuity although CKP signal is detected.	
P0354 (C27): Ignition Coil "D" Primary / Secondary Circuit Ignition coil #22 signal is interrupted by several times or more continuity although CKP signal is detected.	

DTC P0418 (C49)

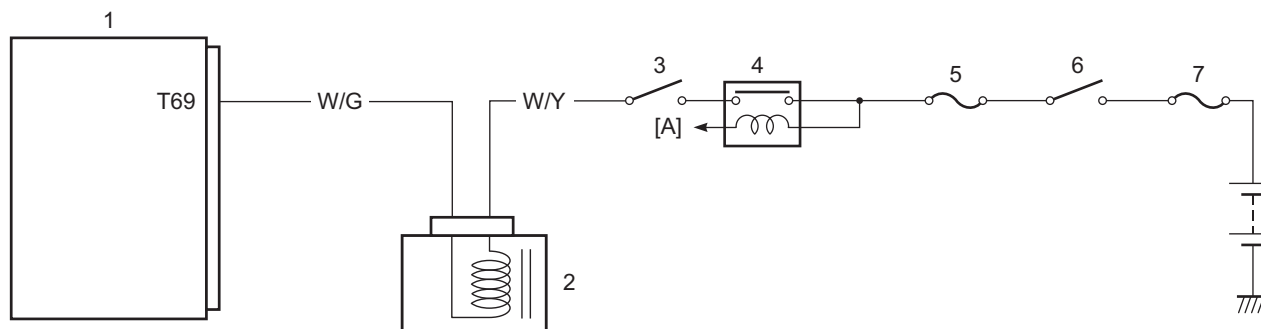
BENJ31J31124019

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": L8 - (Page 1A-92).



IJ31J1112019-03

[A]: To side-stand switch	3. Engine stop switch	6. Ignition switch
1. ECM	4. Side-stand relay	7. Main fuse
2. PAIR control solenoid valve	5. Ignition fuse	

Troubleshooting

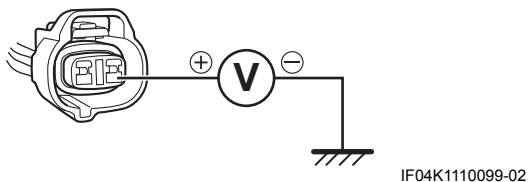
Step 1

PAIR control solenoid valve power supply voltage check

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

PAIR control solenoid valve power supply voltage

[Standard]: Battery voltage



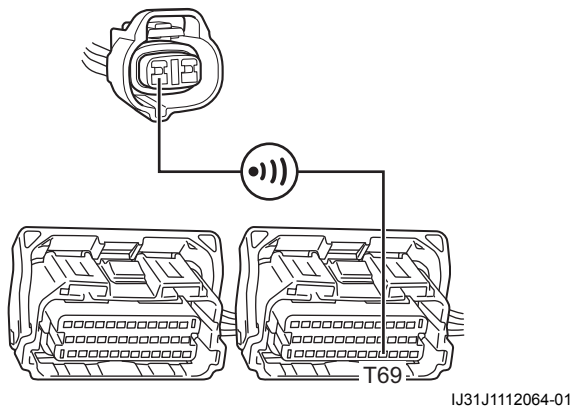
Is check result OK?

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

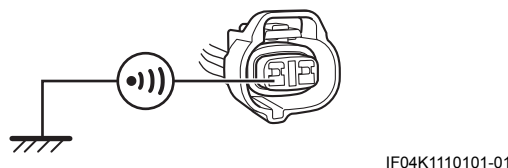
Step 2

PAIR control solenoid valve driver circuit check

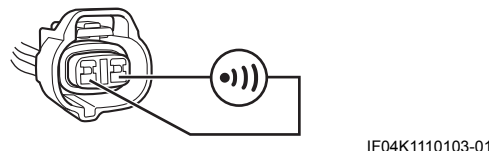
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - W/G wire: less than 1 Ω



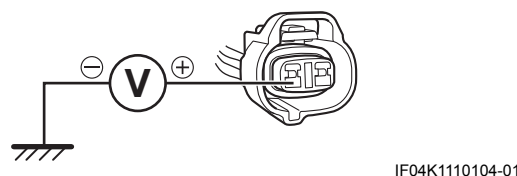
- Between W/G wire and ground: infinity



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



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



Is check result OK?

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

Step 3

PAIR control solenoid valve resistance check

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

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the PAIR control solenoid valve with a new one. (Page 1B-12)

DTC P0443 (C62)

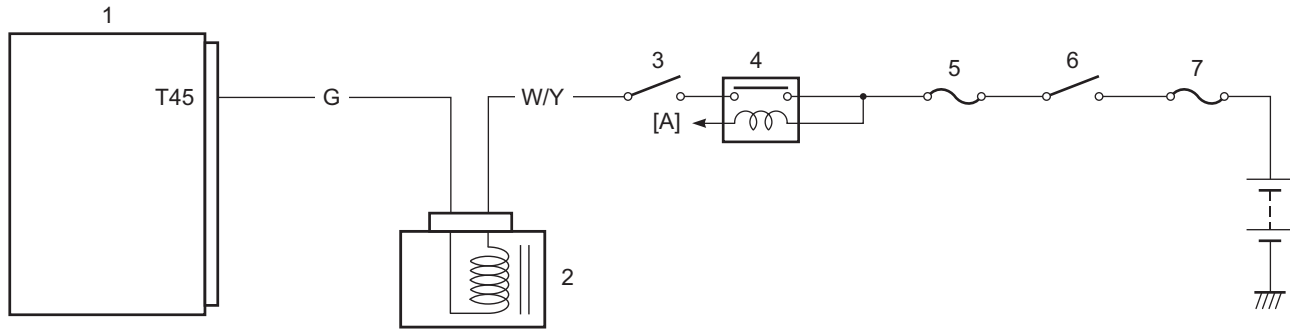
BENJ31J31124020

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P0443 (C62): EVAP System Purge Control Valve Circuit EVAP system purge control solenoid valve voltage is not input to ECM.	<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": L8 - (Page 1A-92).



IJ31J1112020-03

[A]: To side-stand switch	3. Engine stop switch	6. Ignition switch
1. ECM	4. Side-stand relay	7. Main fuse
2. EVAP system purge control solenoid valve	5. Ignition fuse	

Troubleshooting

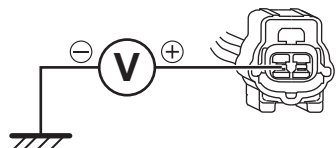
Step 1

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-13)
- 3) Check for proper terminal connection to the EVAP system purge control solenoid valve coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the W/Y wire and ground.

EVAP system purge control solenoid valve power supply voltage

[Standard]: Battery voltage



ID26J1110239-01

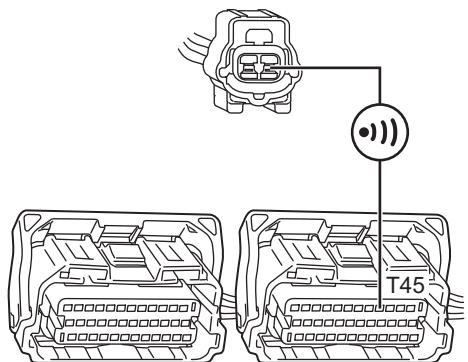
Is check result OK?

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

Step 2

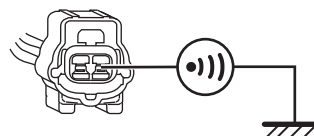
EVAP system purge control solenoid valve driver circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



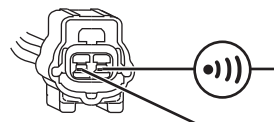
IJ31J1112065-01

- Between G wire and ground: infinity



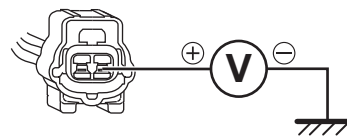
ID26J1110241-01

- 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.
 - Dbr 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-15).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the EVAP system purge control solenoid valve with a new one. (Page 1B-13)

DTC P0480 (C60)

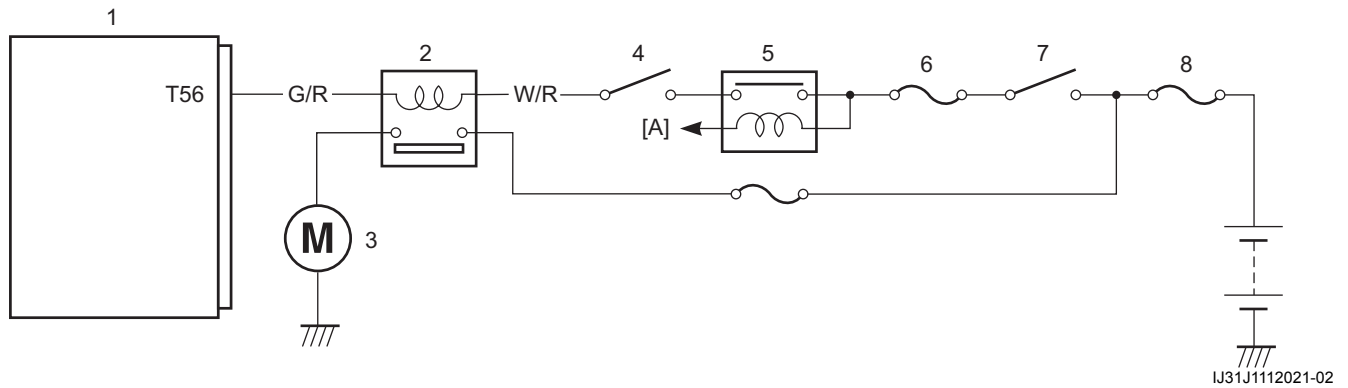
BENJ31J31124021

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": L8 - (Page 1A-92).



IJ31J1112021-02

[A]: To side-stand switch	3. Cooling fan motor	6. Ignition fuse
1. ECM	4. Engine stop switch	7. Ignition switch
2. Cooling fan relay	5. Side-stand relay	8. Main fuse

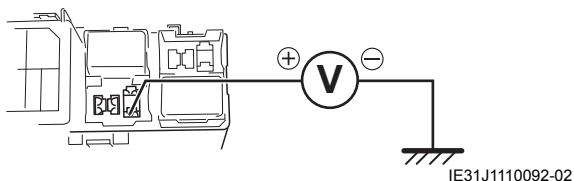
Troubleshooting

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/R 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/R wire.

Step 2

Cooling fan relay check

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

Is check result OK?

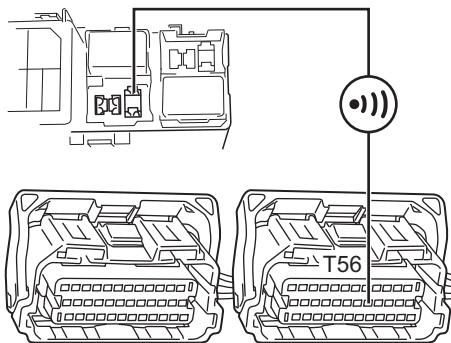
- Yes Go to Step 3.
- No Replace the cooling fan relay with a new one. (Page 1F-13)

Step 3

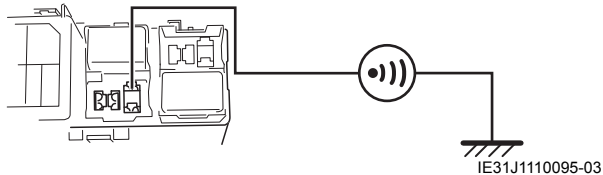
Cooling fan relay drive circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.

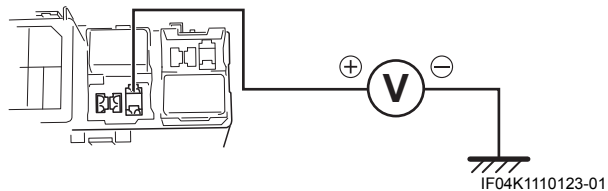
- Resistance
 - G/R wire: less than 1 Ω



- 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-14)
- No Repair or replace the G/R wire.

DTC P0500 (C16) / P2158 (C91)

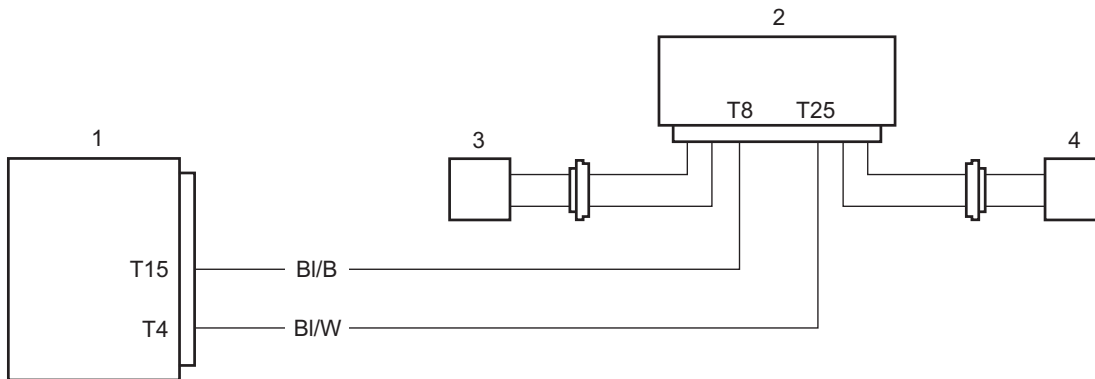
BENJ31J31124022

DTC Detecting Condition and Trouble Area

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

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



IJ31J1112023-02

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-54)

Is the DTC detected?

Yes Go to troubleshooting for DTCs. Refer to "DTC Table": L8 - in Section 4E (Page 4E-60).

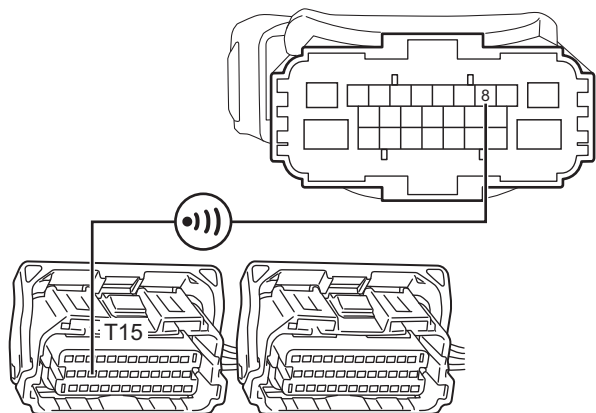
No Go to Step 2.

Step 2

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

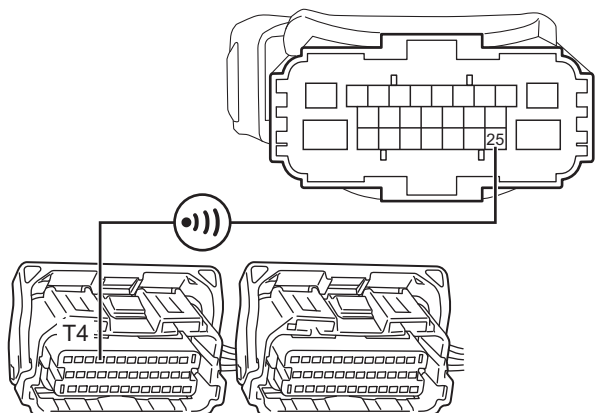
- 1) Turn the ignition switch OFF.
- 2) Disconnect the ABS control unit coupler and ECM couplers.
 - ABS control unit: (Page 4E-78)
 - ECM: (Page 1C-14)
- 3) Check for proper terminal connection to the ABS control unit coupler and ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - BI/B (Front), BI/W (Rear) wire: less than 1 Ω

Front



IJ31J1112024-02

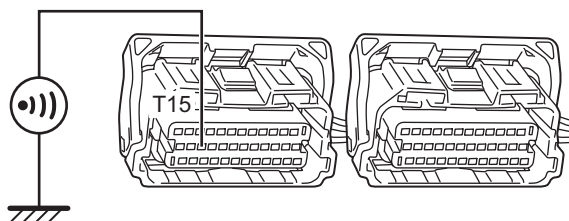
Rear



IJ31J1112025-02

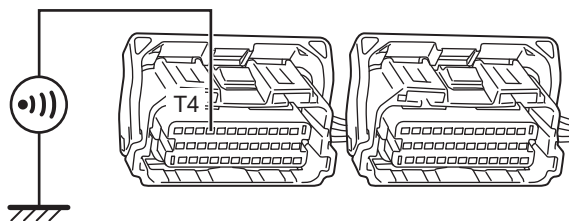
– BI/B (Front), BI/W (Rear) wire and ground: infinity

Front



IJ31J1112026-02

Rear



IJ31J1112027-02

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect again. (Page 1C-14)
- No Repair or replace the defective wire harness.

DTC P0506 / P0507 (C65)

BENJ31J31124023

DTC Detecting Condition and Trouble Area

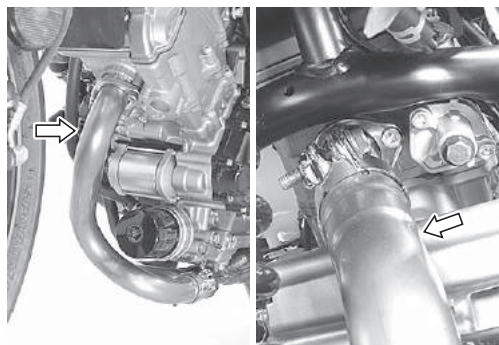
DTC detecting condition	Trouble area
P0506 (C65): ISC System RPM Lower Than Expected Idle speed dropped lower than desired idle speed by more than specified range.	<ul style="list-style-type: none"> • Air passage • STVA • Engine mechanism
P0507 (C65): ISC System RPM Higher Than Expected Idle speed rose higher than desired idle speed by more than specified range.	

Troubleshooting**NOTICE**

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

Step 1**Engine combustion check**

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



IH18K1110048-01

Is check result OK?

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

Step 2**STVA operation check**

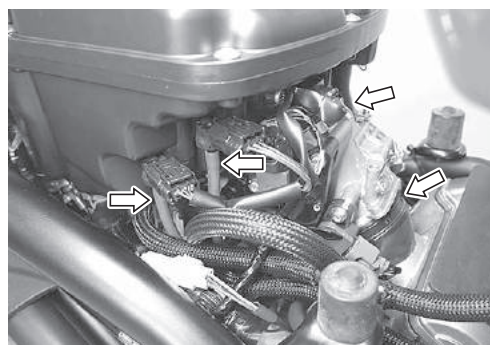
- 1) Check STV actuator. Refer to "Step 3" under "DTC P2100 (C28)": L8 - (Page 1A-142).

Is check result OK?

- Yes Go to Step 3.
No Replace the throttle body. (Page 1C-4)

Step 3**Air intake system check**

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



IH18K1110049-02

Is check result OK?

- Yes Go to Step 4.
No Repair or replace defective parts.

Step 4**Engine mechanical systems check**

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

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
No Repair or replace defective parts.

DTC P0914 (C31)

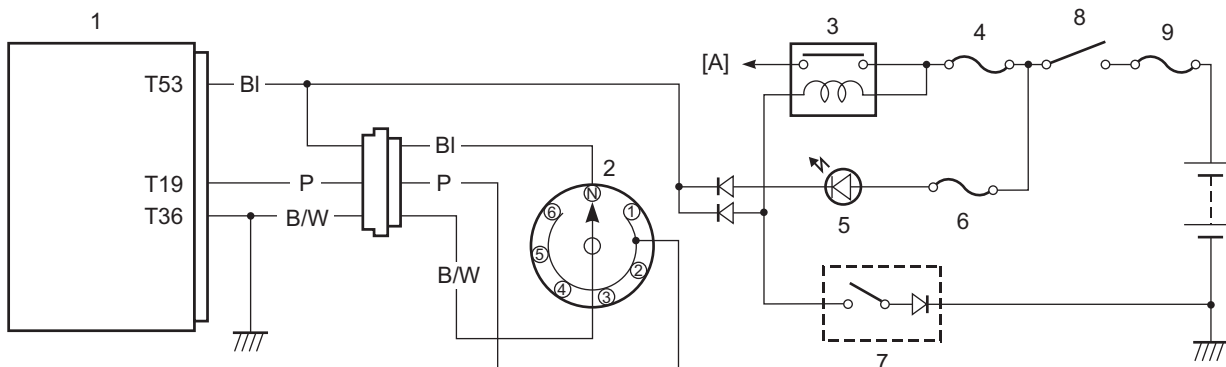
BENJ31J31124024

DTC Detecting Condition and Trouble Area

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

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



IJ31J1112028-01

[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

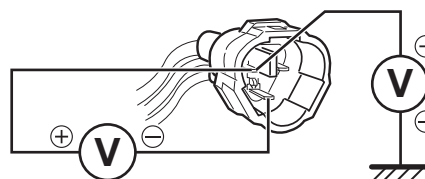
Step 1

GP switch power supply voltage check

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank. (Page 1G-9)
- 3) Disconnect the GP switch coupler. (Page 5B-11)
- 4) Check for proper terminal connection to the GP switch coupler.
- 5) If connections are OK, turn the ignition switch ON.
- 6) Measure the voltage between the P wire and ground.

- 7) If OK, measure the voltage between the P wire and B/W wire.

GP switch power supply voltage
[Standard]: 4.75 – 5.25 V



IF04K1110075-01

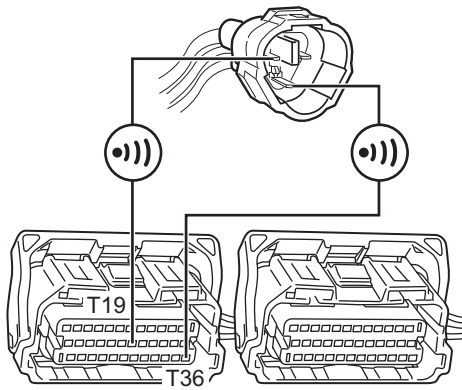
Is check result OK?

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

Step 2

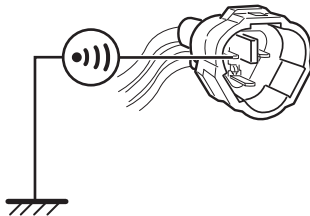
GP switch circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



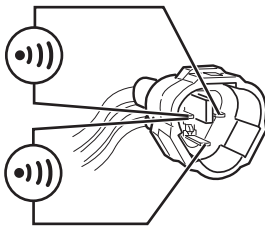
IJ31J1112066-01

– Between P wire and ground: infinity



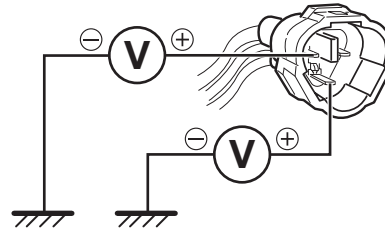
IJ31J1112067-01

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



IF04K1110078-01

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



IF04K1110079-01

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Repair or replace the defective wire harness.

Step 3

GP switch voltage check

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

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the GP switch with a new one. (Page 5B-11)

DTC P1100 / P1101 / P1102 (C13)

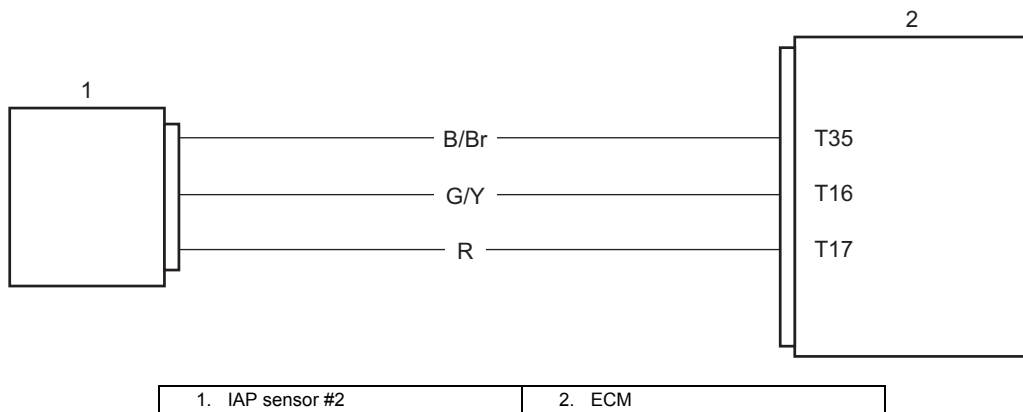
BENJ31J31124025

DTC Detecting Condition and Trouble Area

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

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



IJ31J112029-01

Troubleshooting

NOTE

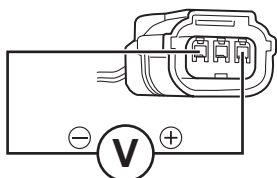
When DTC P1101 (C13) and P0106 (C17) are detected together, check that each IAP sensor vacuum hose is connected correctly.

Step 1

IAP sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the IAP sensor #2 coupler. (Page 1C-15)
- 3) Check for proper terminal connection to the IAP sensor #2 coupler.
- 4) If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the R wire and B/Br wire.

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



IJ31J112030-02

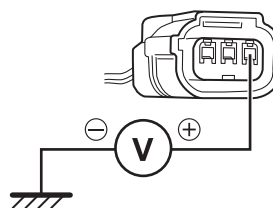
Is check result OK?

- 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.



IJ31J112068-01

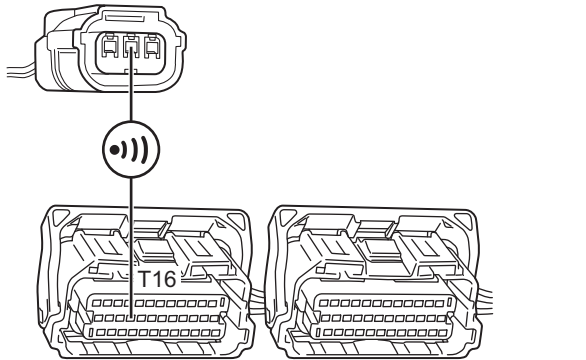
Is voltage same as Step 1?

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

Step 3

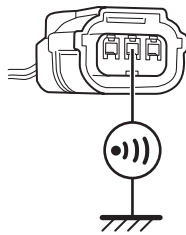
IAP sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 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



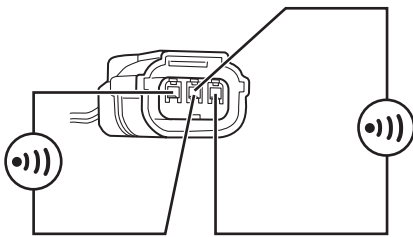
IJ31J1112069-01

– Between G/Y wire and ground: infinity



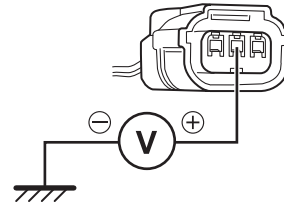
IJ31J1112070-01

– G/Y wire terminal and other terminal at IAP sensor (#2) coupler: infinity



IJ31J1112071-01

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



IJ31J1112072-01

Is check result OK?

- Yes Go to Step 4.
- No Repair or replace the G/Y 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 #2 coupler.
- 3) Measure the IAP sensor #2 output voltage at idle speed. Refer to “Step 4” under “DTC P1750-H / P1750-L (C13)”: L4 - L6 (Page 1A-83).

Is check result OK?

- Yes Go to Step 5.
- No Check the vacuum hoses for crack or damage.
If vacuum hoses are OK, replace the IAP sensor #2 with a new one. (Page 1C-15)

Step 5

IAP sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Remove the IAP sensor #2. (Page 1C-15)
- 3) Measure the IAP sensor #2 output voltage. Refer to “Step 5” under “DTC P1750-H / P1750-L (C13)”: L4 - L6 (Page 1A-83).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the IAP sensor #2 with a new one. (Page 1C-15)

DTC P1400 / P1401 (C46)

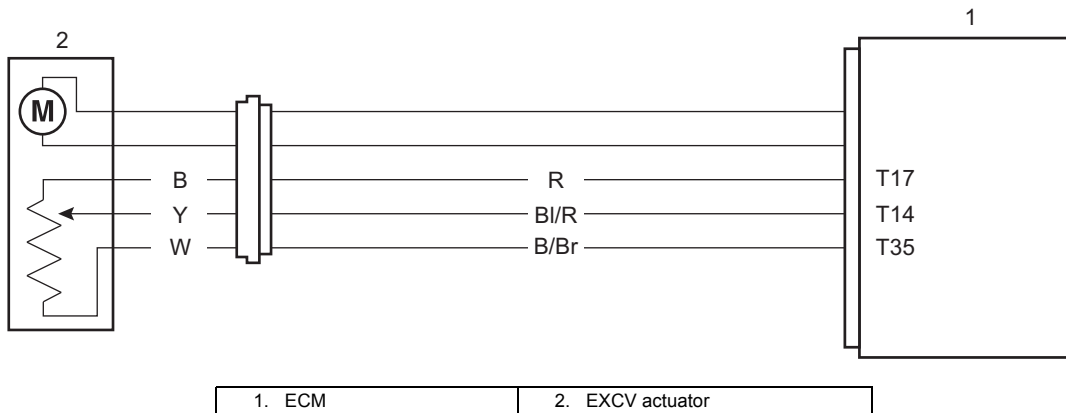
BENJ31J31124026

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1400 (C46): EXCVA Position Sensor Circuit EXCVA position 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 EXCVA position sensor output voltage is lower than 0.14 V.	

Wiring Diagram

Refer to "FI System Wiring Diagram": L8 - (Page 1A-92).



IJ31J1112031-01

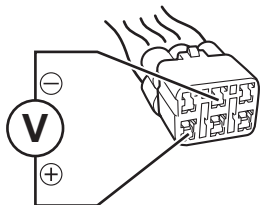
Troubleshooting

Step 1

EXCVA position sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the EXCVA coupler. (Page 1K-8)
- 3) Check for proper terminal connection to the EXCVA 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



IJ31J1112032-02

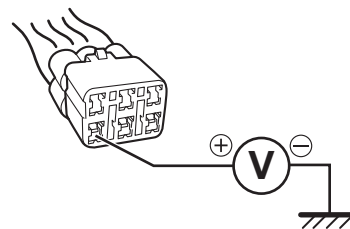
Is check result OK?

- 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.



ID26J1110154-02

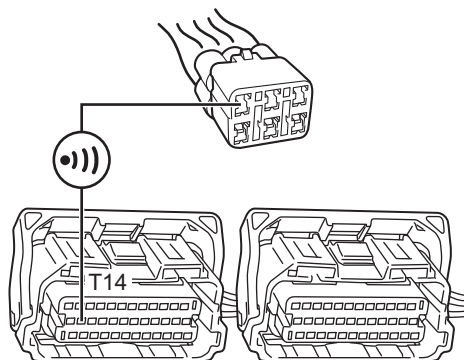
Is voltage same as Step 1?

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

Step 3

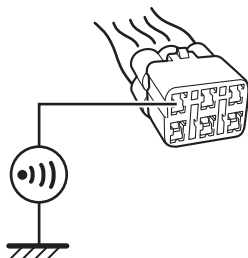
EXCVA position sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - BI/R wire: less than 1 Ω



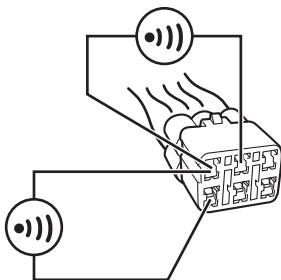
IJ31J1112033-01

– Between BI/R wire and ground: infinity



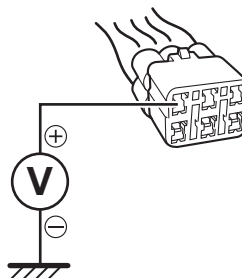
IJ31J1112034-01

– Between BI/R wire terminal and other terminal at EXCVA coupler: infinity



IJ31J1112035-01

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



IJ31J1112036-01

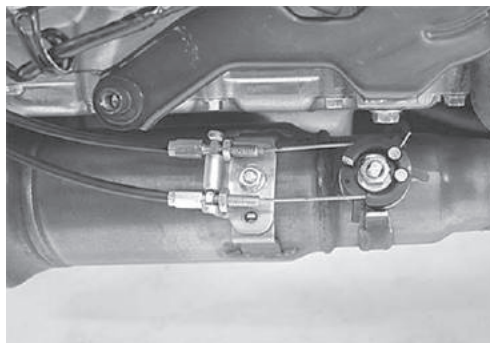
Is check result OK?

- Yes Go to Step 4.
- No Repair or replace the BI/R wire.

Step 4

EXCV cable check

- 1) Turn the ignition switch OFF.
- 2) Check the installation of EXCV cables. Refer to “EXCVA / EXCV Cable Removal and Installation” in Section 1K (Page 1K-8).



IJ31J1112046-01

Is check result OK?

- Yes Go to Step 5.
- No Replace or adjust the EXCV cables.
 - Replace: (Page 1K-8)
 - Adjust: (Page 1K-12)

Step 5

EXCVA position sensor resistance check

- 1) Connect the ECM couplers and EXCVA 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 coupler.
- 4) Measure the EXCVA position sensor resistance. Refer to "Step 4 (Use of Mode Select Switch)" under "DTC P1657-H / P1657-L (C46)": L4 - L6 (Page 1A-75).

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 coupler.
- 2) Measure the EXCVA position sensor output voltage.
 - Use of SDS-II: Refer to "Step 4" under "DTC P1657-H / P1657-L (C46)": L4 - L6 (Page 1A-75).
 - Use of mode select switch: Refer to "Step 5" under "DTC P1657-H / P1657-L (C46)": L4 - L6 (Page 1A-75).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. ☞ (Page 1C-14)
- No Go to Step 7.

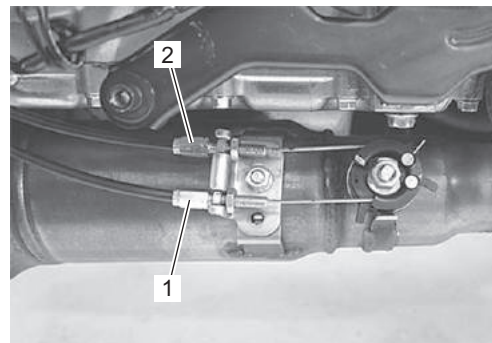
Step 7

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-12). Repeat the procedure in Step 6 until the output voltage is set within the specified value.



IJ31J1112037-01

Is the voltage OK?

- Yes Replace the ECM with a known good one, and inspect it again. ☞ (Page 1C-14)
- No Replace the EXCVA with a new one. ☞ (Page 1K-8)

DTC P1403 (C46)

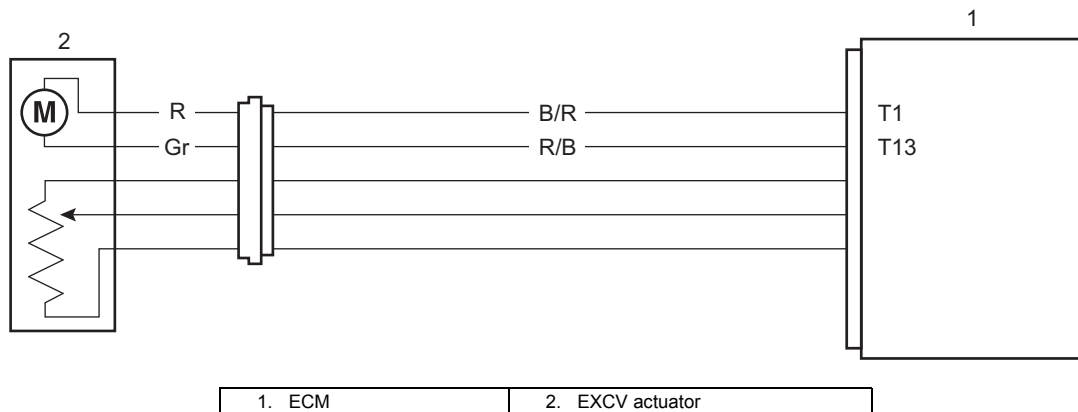
BENJ31J31124027

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": L8 - (Page 1A-92).



IJ31J1112038-02

Troubleshooting

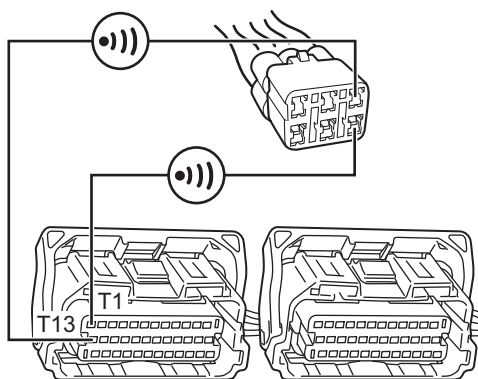
Step 1

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-14)
- 3) Check for proper terminal connection to the EXCVA coupler and ECM couplers.

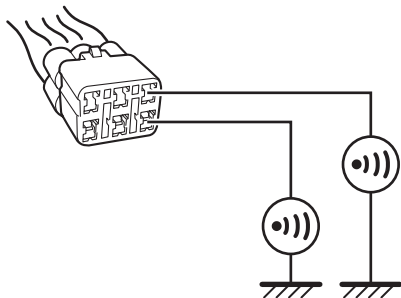
- 4) If connections are OK, check the following points.

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



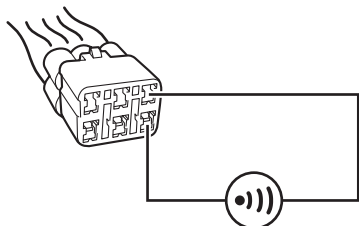
IJ31J1112039-02

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



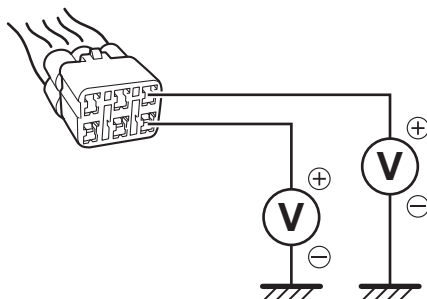
IJ31J1112040-01

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



IJ31J1112041-01

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



IJ31J1112042-01

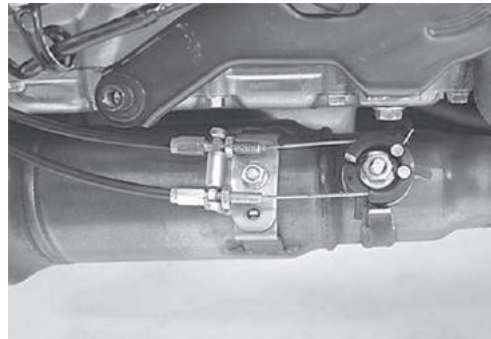
Is check result OK?

- 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) Check the installation of EXCV cables. Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-8).



IJ31J1112043-01

Is check result OK?

- Yes Go to Step 3.
- No Replace or adjust the EXCV cables.
 - Replace: ⚙️ (Page 1K-8)
 - Adjust: ⚙️ (Page 1K-12)

Step 3

EXCVA motor check

- 1) Check the operation of EXCVA motor. Refer to "Step 2" under "DTC P1658 (C46)": L4 - L6 (Page 1A-81).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. ⚙️ (Page 1C-14)
- No Replace the EXCVA with a new one. ⚙️ (Page 1K-8)

DTC P1610 (C42)

BENJ31J31124028

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-9) for details.

DTC P1700 / P1702 (C23)

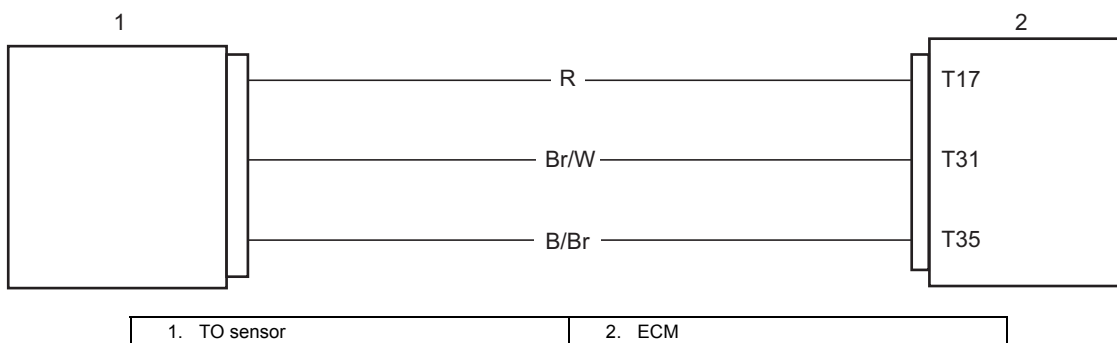
BENJ31J31124029

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": L8 - (Page 1A-92).



Troubleshooting

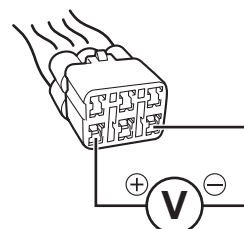
Step 1

TO sensor power supply circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the TO sensor coupler. (Page 1C-23)
- 3) Check for proper terminal connection to the TO sensor coupler.
- 4) Install the battery. (Page 1J-12)
- 5) If connections are OK, turn the ignition switch ON.

- 6) Measure the voltage between the R wire and B/Br wire.

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



ID26J1110153-02

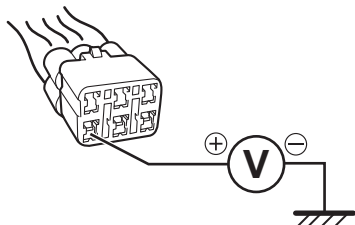
Is check result OK?

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

Step 2

TO sensor ground circuit check

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



ID26J1110154-02

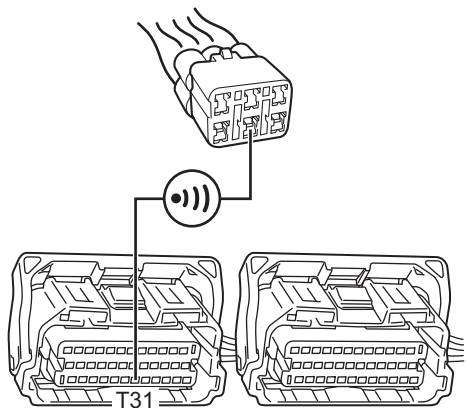
Is voltage same as Step 1?

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

Step 3

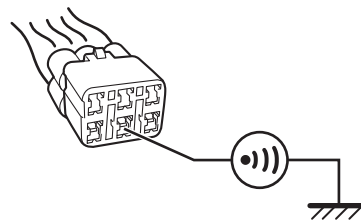
TO sensor signal circuit check

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECM couplers. (Page 1C-14)
- 3) Check for proper terminal connection to the ECM couplers.
- 4) If connections are OK, check the following points.
 - Resistance
 - Br/W wire: less than 1 Ω



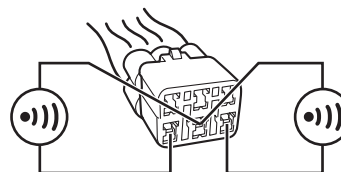
IJ31J1112073-01

- Between Br/W wire and ground: infinity



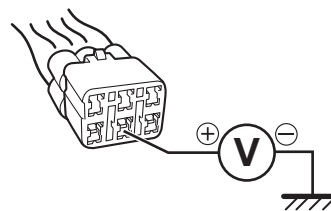
ID26J1110156-03

- Between Br/W wire terminal and other terminal at TO sensor coupler: infinity



ID26J1110157-03

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



ID26J1110158-02

Is check result OK?

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

Step 4

TO sensor output voltage check

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM couplers and TO sensor coupler.
- 3) Measure the TO sensor output voltage. Refer to “Step 4” under “DTC P1651-H / P1651-L (C23)”: L4 - L6 (Page 1A-66).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Replace the TO sensor with a new one. (Page 1C-23)

DTC P2100 (C28)

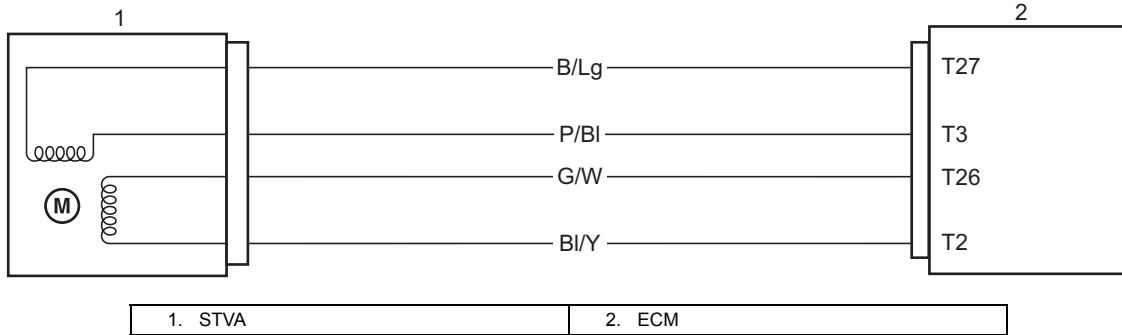
BENJ31J31124030

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": L8 - (Page 1A-92).



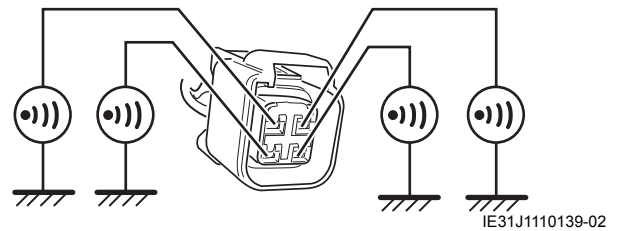
Troubleshooting

Step 1

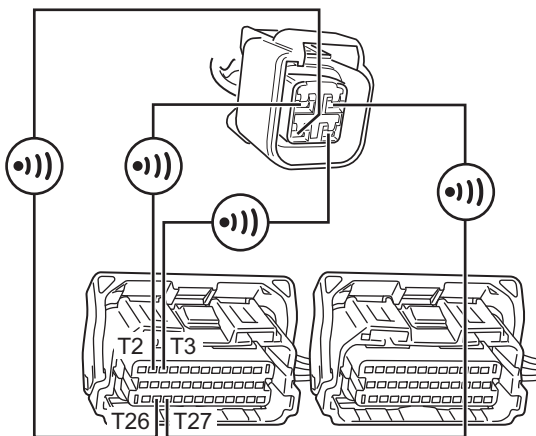
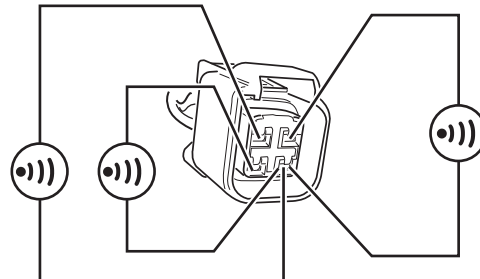
STVA circuit check

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

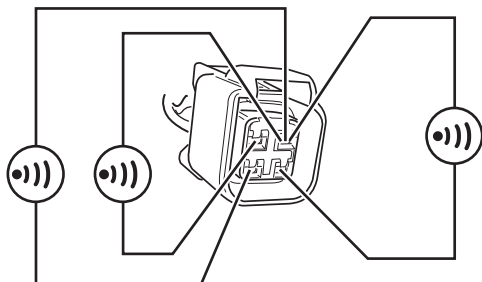
- Between B/Lg wire and ground: infinity
- Between P/BI wire and ground: infinity
- Between G/W wire and ground: infinity
- Between BI/Y wire and ground: infinity



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

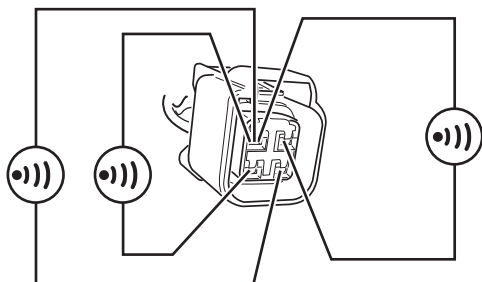


- Between B/Lg wire terminal and other terminal at STVA coupler: infinity



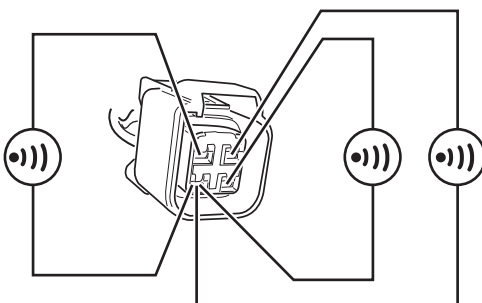
IE31J1110142-01

- Between BI/Y wire terminal and other terminal at STVA coupler: infinity



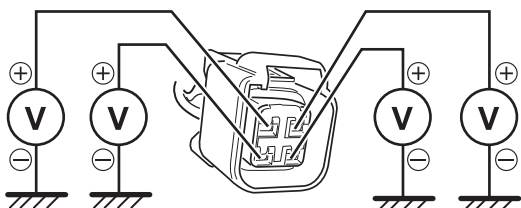
IE31J1110143-01

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



IE31J1110141-01

- Voltage
 - Turn the ignition switch ON.
 - B/Lg, P/BI, G/W and BI/Y 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. Refer to "Step 2" under "DTC P1655 (C28)": L4 - L6 (Page 1A-70).

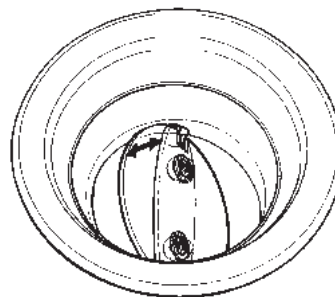
Is check result OK?

- Yes Go to Step 3.
- No Replace the throttle body assembly with a new one. (Page 1C-4)

Step 3

STV operation check

- 1) Remove the air cleaner element. (Page 1D-3)
- 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-14)
- No Replace the throttle body with a new one. (Page 1C-4)

DTC P2505 (C41)

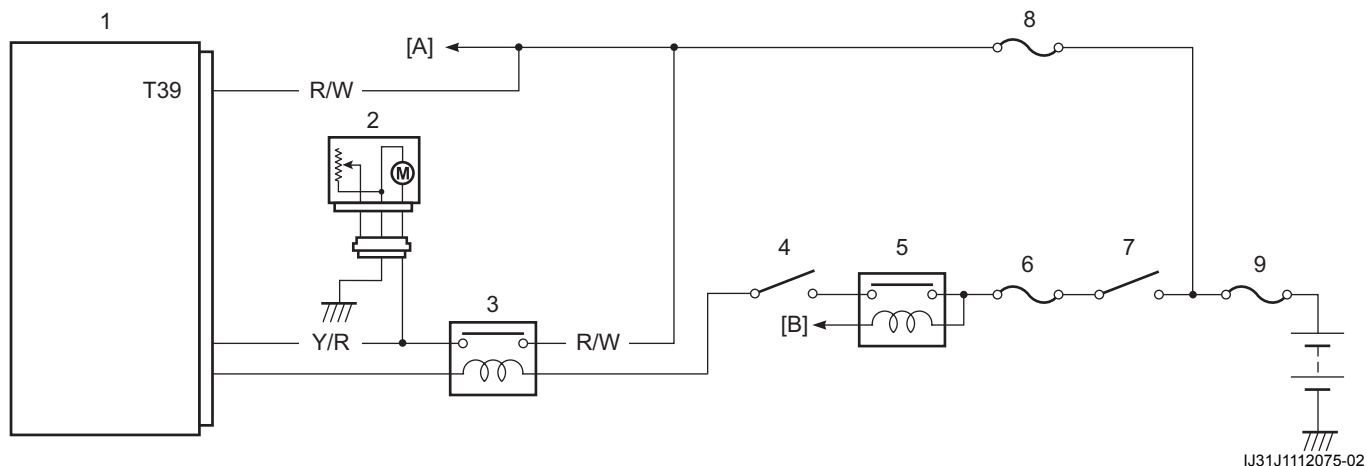
BENJ31J31124031

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": L8 - (Page 1A-92).



IJ31J1112075-02

[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

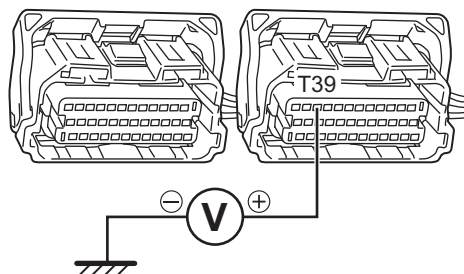
Step 1

ECM power supply voltage check

- Turn the ignition switch OFF.
- Disconnect the ECM couplers. (Page 1C-14)
- 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



IJ31J1112076-01

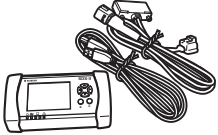
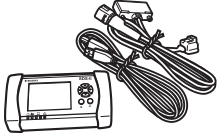
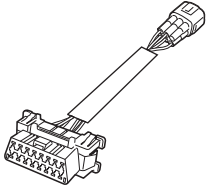
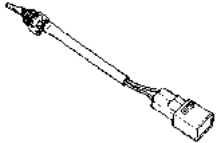
Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. (Page 1C-14)
- No Check FUEL fuse for blowout. If fuse is not blown, repair or replace the R/W wire.

Special Tools and Equipment

Special Tool

BENJ31J31128001

<p>09904-41030 SDS-II set ☞ (Page 1A-96)</p> 	<p>09904-41040 SDS-II (oscilloscope) set ☞ (Page 1A-96)</p> 
<p>09904-41051 Conversion cable ☞ (Page 1A-89)</p> 	<p>09930-82720 Mode selection switch ☞ (Page 1A-91) / ☞ (Page 1A-95)</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).

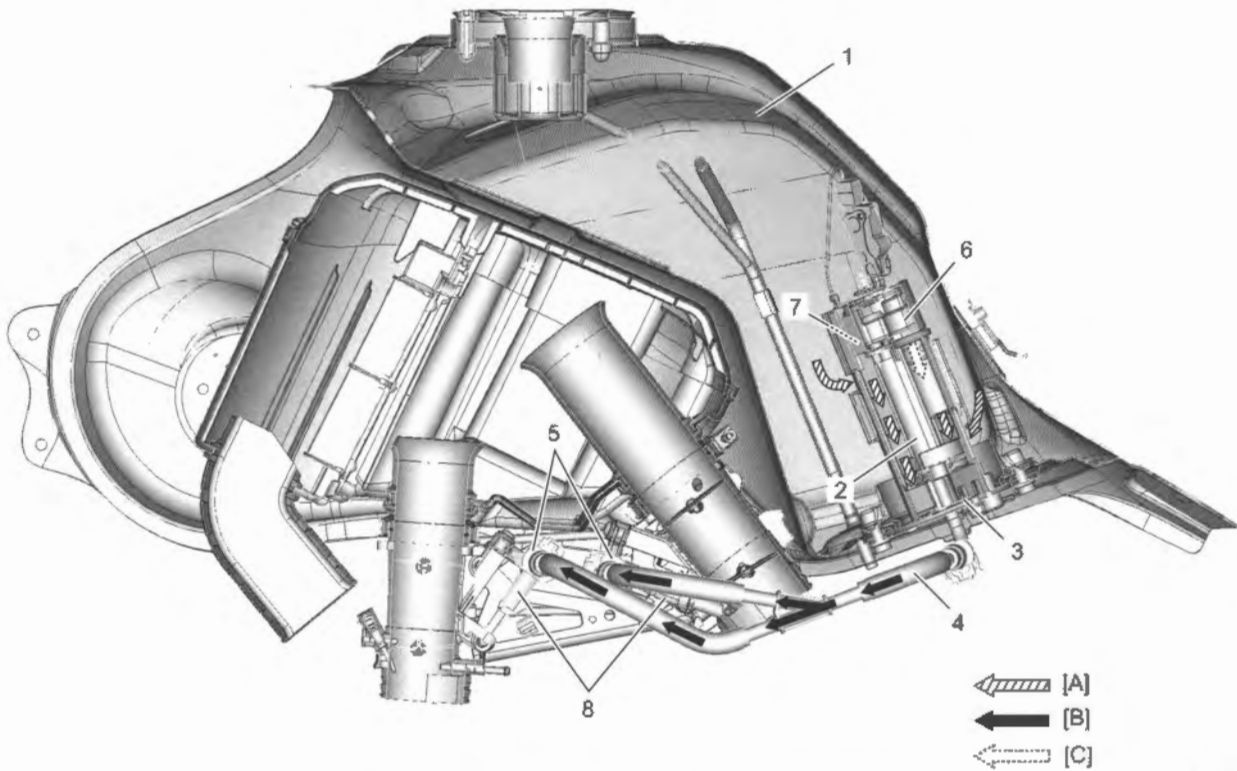
BENJ31J31200001

General Description

Fuel Injection System Description

DL1000A motorcycles are equipped with a fuel injection system for emission level control. This fuel injection system is precision designed, manufactured and adjusted to comply with the applicable emission limits. With varying engine conditions, all of the fuel injection volumes are precisely controlled by the programmed injection maps in the ECM to reduce CO, NOX and HC. Adjusting, interfering with, improper replacement, or resetting of any of the fuel injection components may adversely affect injection performance and cause the motorcycle to exceed the exhaust emission level limits.

BENJ31J31201001



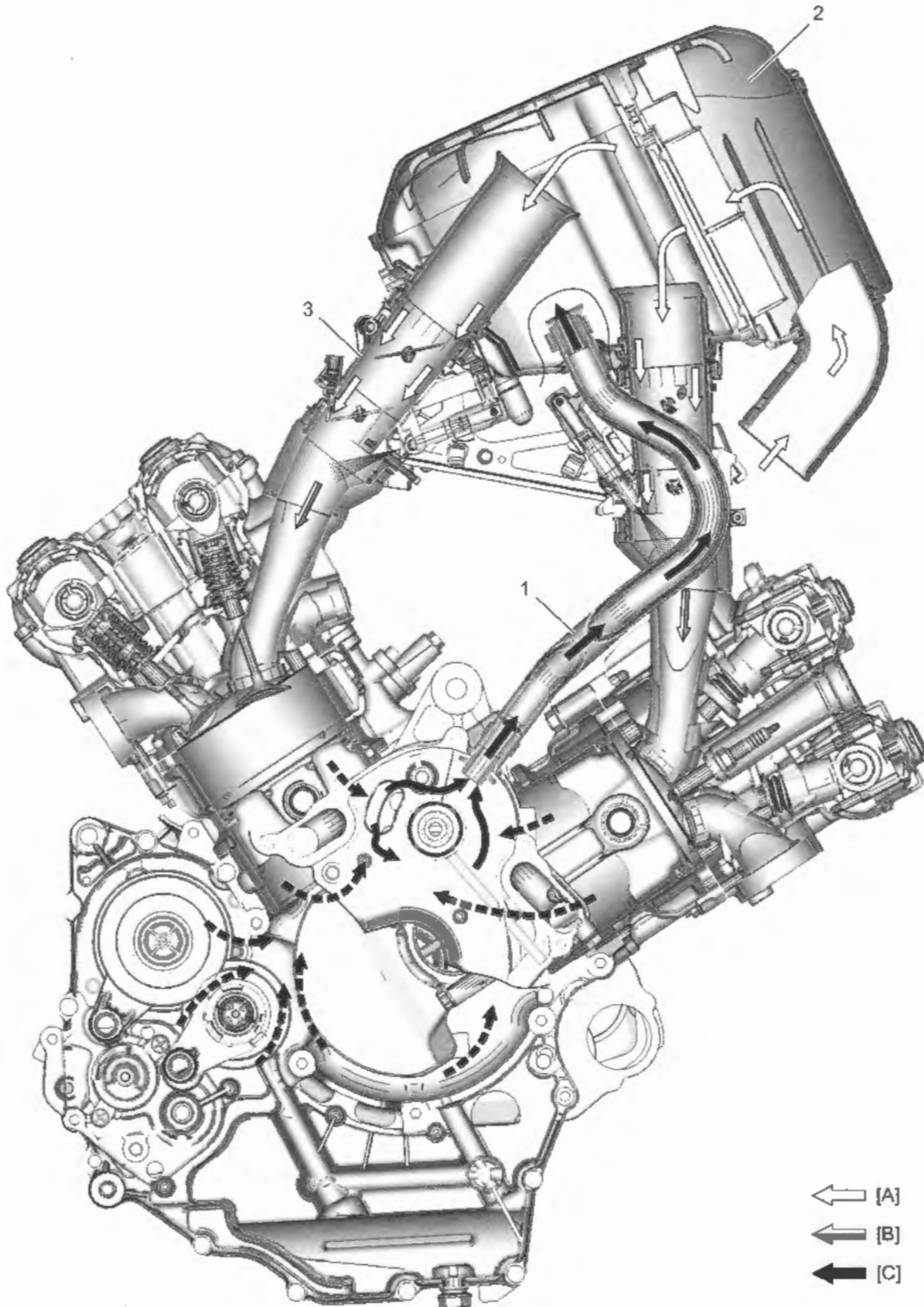
IE31J1120004-05

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

Crankcase Emission Control System Description

BENJ31J31201002

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



← [A]
 ← [B]
 ← [C]

[A]: Fresh air	[B]: Fuel/Air mixture	[C]: Blow-by gas
----------------	-----------------------	------------------

IE31J1120005-01

Noise Emission Control System Description

BENJ31J31201003

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

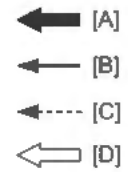
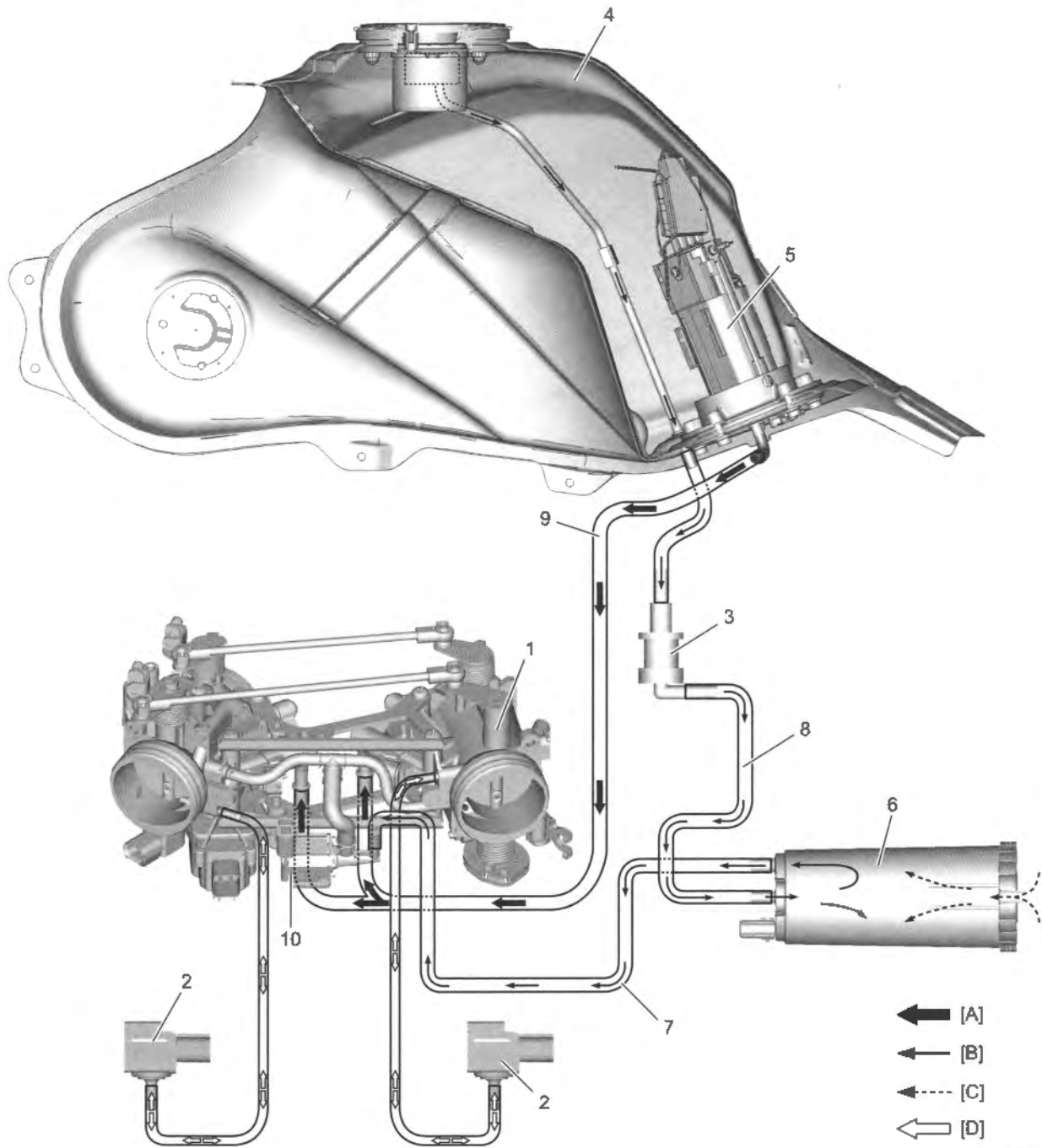
- The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use.
- The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

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

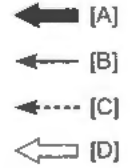
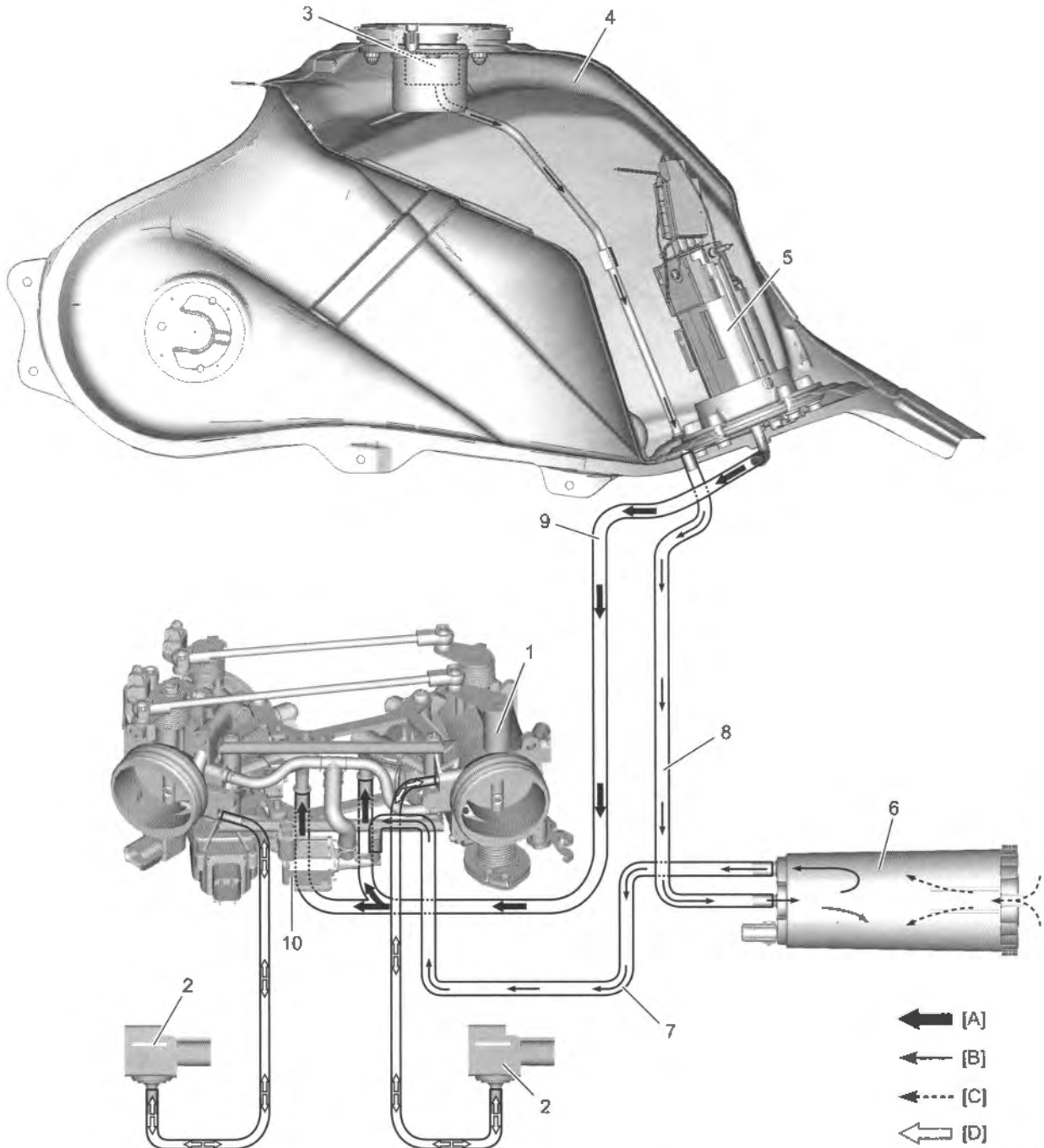
- Removing or puncturing the muffler, baffles, header pipes, screen type spark arrester (if equipped) or any other component which conducts exhaust gases.
- Removing or puncturing the air cleaner case, air cleaner cover, baffles or any other component which conducts intake air.
- Replacing the exhaust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

Evaporative Emission Control System Diagram (If Equipped)

L4 - L6



[A]: Fuel	2. IAP sensor	7. Purge hose
[B]: HC vapor	3. Fuel shut-off valve	8. Surge hose
[C]: Fresh air	4. Fuel tank	9. Fuel feed hose
[D]: Vacuum	5. Fuel pump	10. EVAP system purge control solenoid valve
1. Throttle body	6. EVAP canister	



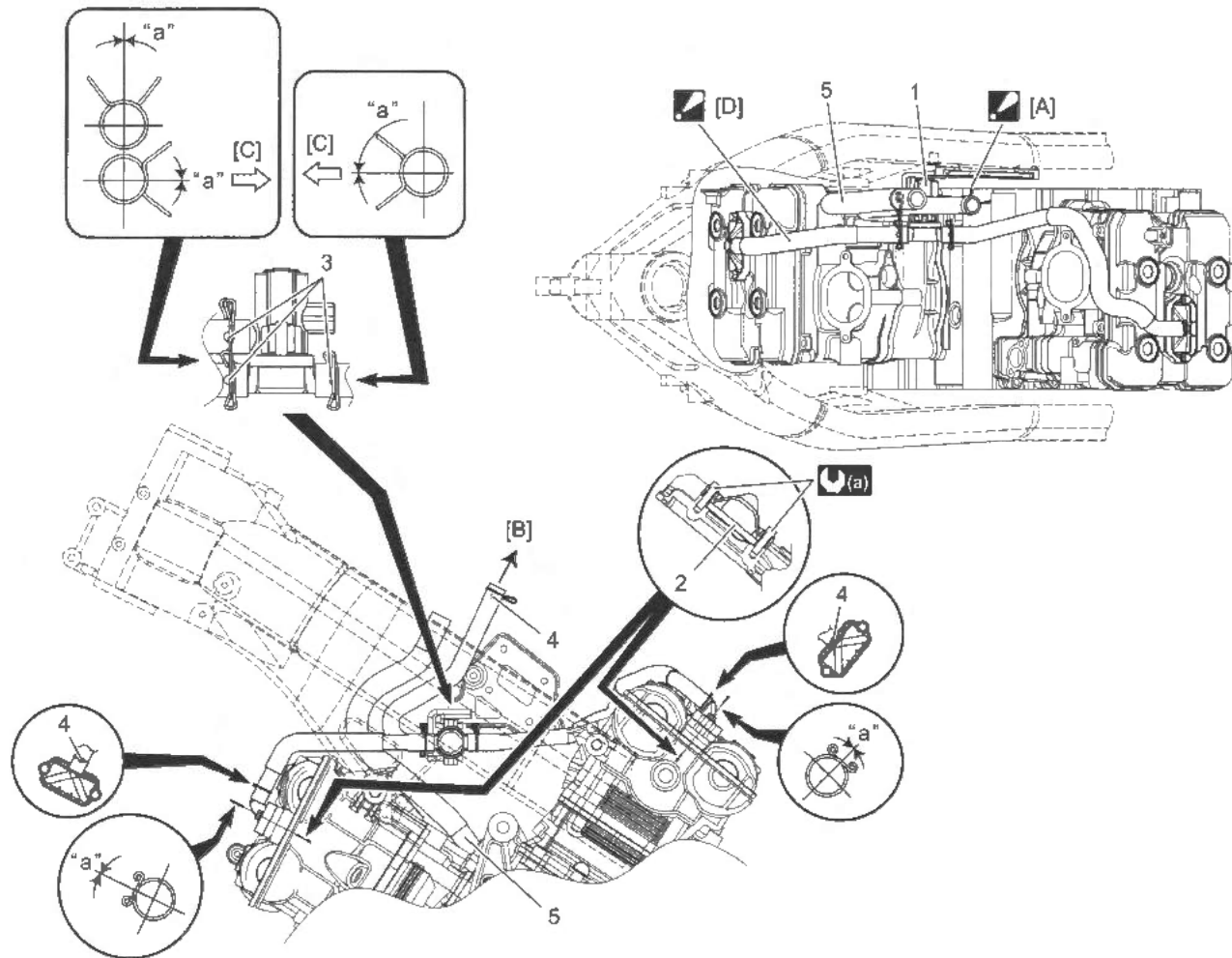
IJ31J1120004-01

[A]: Fuel	2. IAP sensor	7. Purge hose
[B]: HC vapor	3. Fuel shut-off valve	8. Surge hose
[C]: Fresh air	4. Fuel tank	9. Fuel feed hose
[D]: Vacuum	5. Fuel pump	10. EVAP system purge control solenoid valve
1. Throttle body	6. EVAP canister	

Schematic and Routing Diagram

PAIR System Hose Routing Diagram (If Equipped)

BENJ31J31202001



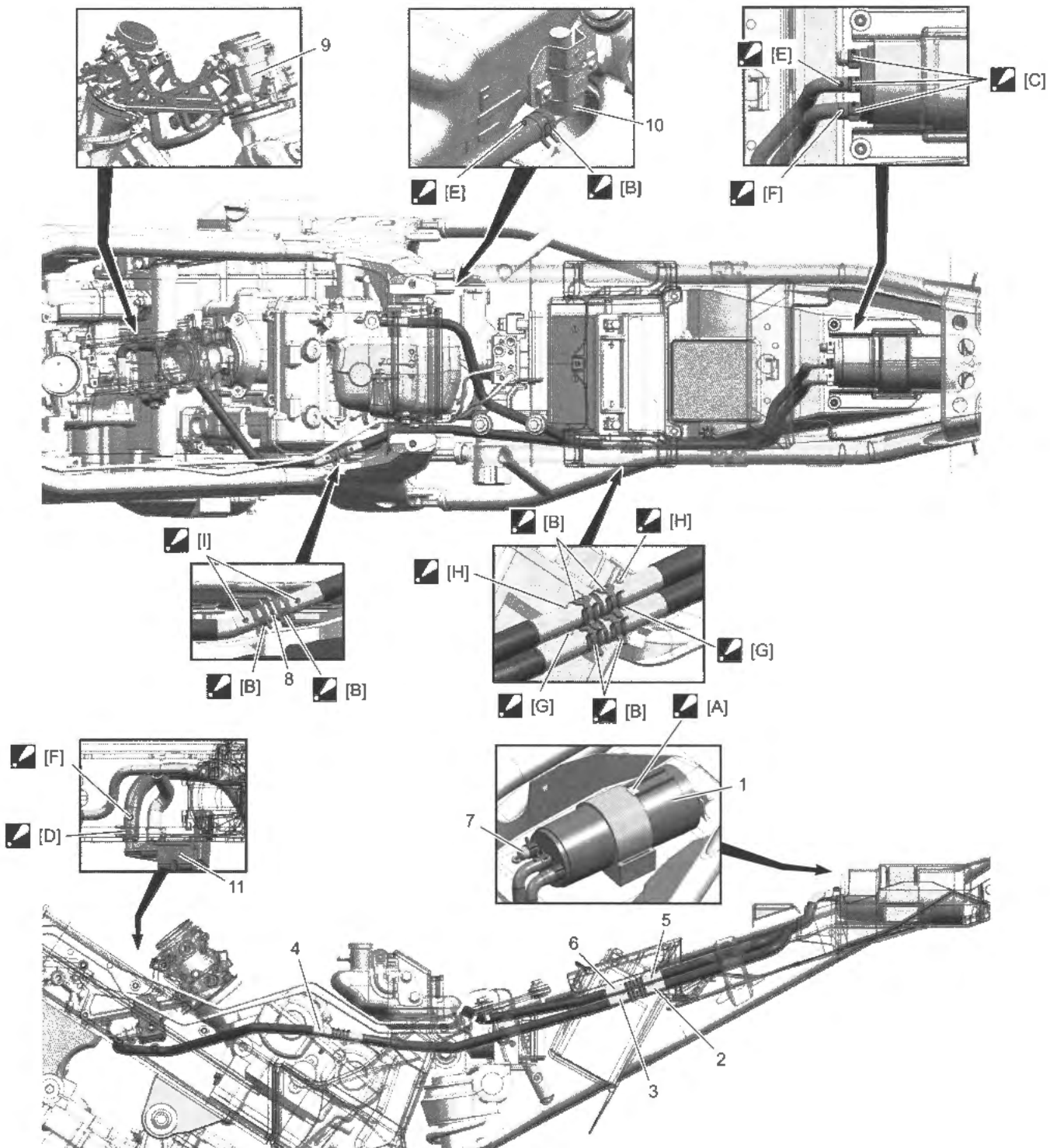
IJ31J1120001-02

[A]: Clamp end should face right side approx. 45° of the vehicle.	3. Yellow marking
[B]: To air cleaner	4. White marking
[C]: Upper side	5. PCV hose
[D]: Pass the PAIR hose inside of the PCV hose.	"a": Approx. 0°
1. PAIR control solenoid valve	(a) : 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
2. PAIR reed valve	

EVAP Canister Hose Routing Diagram (If Equipped)

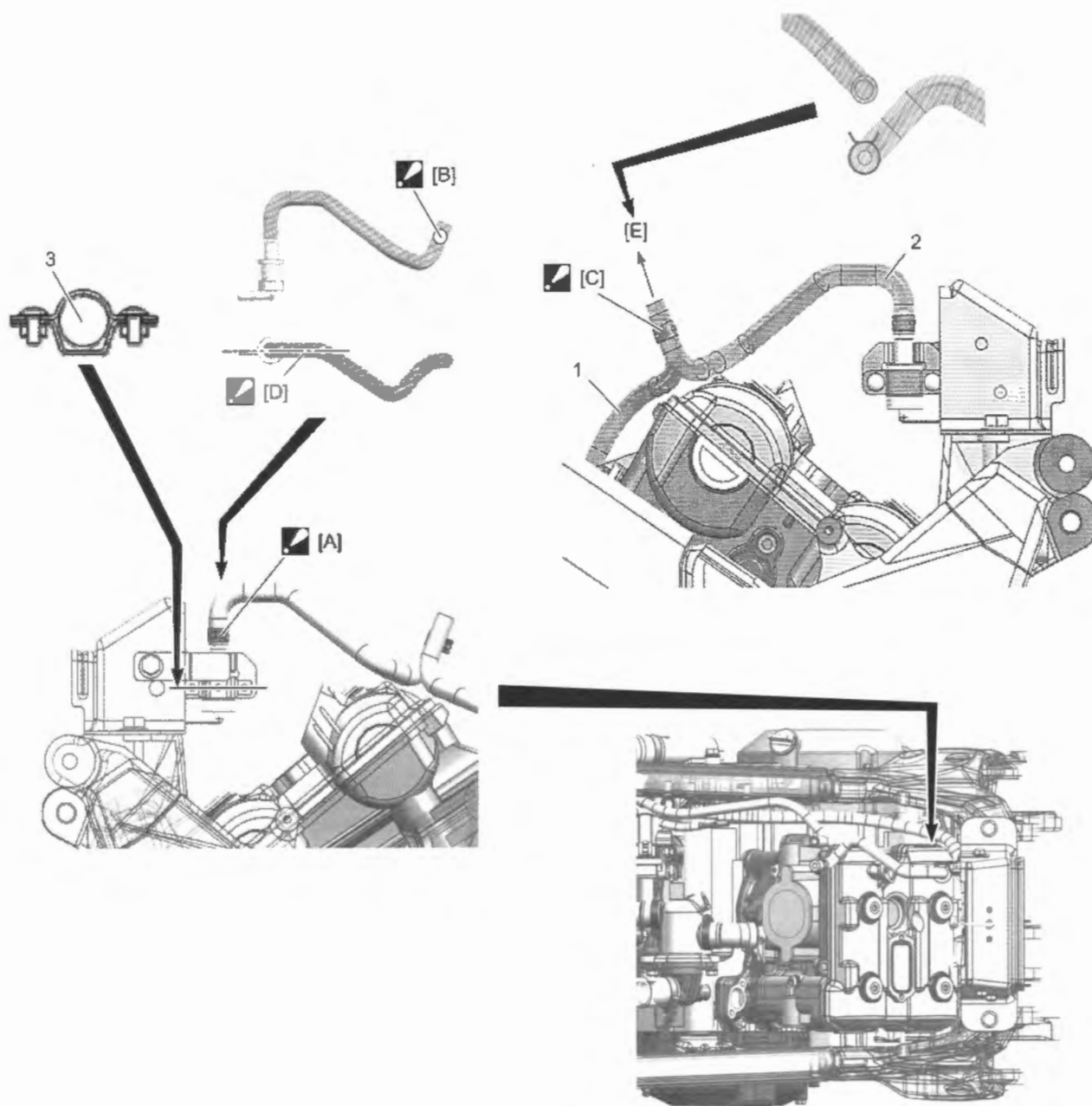
BENJ31J31202002

L4 - L6



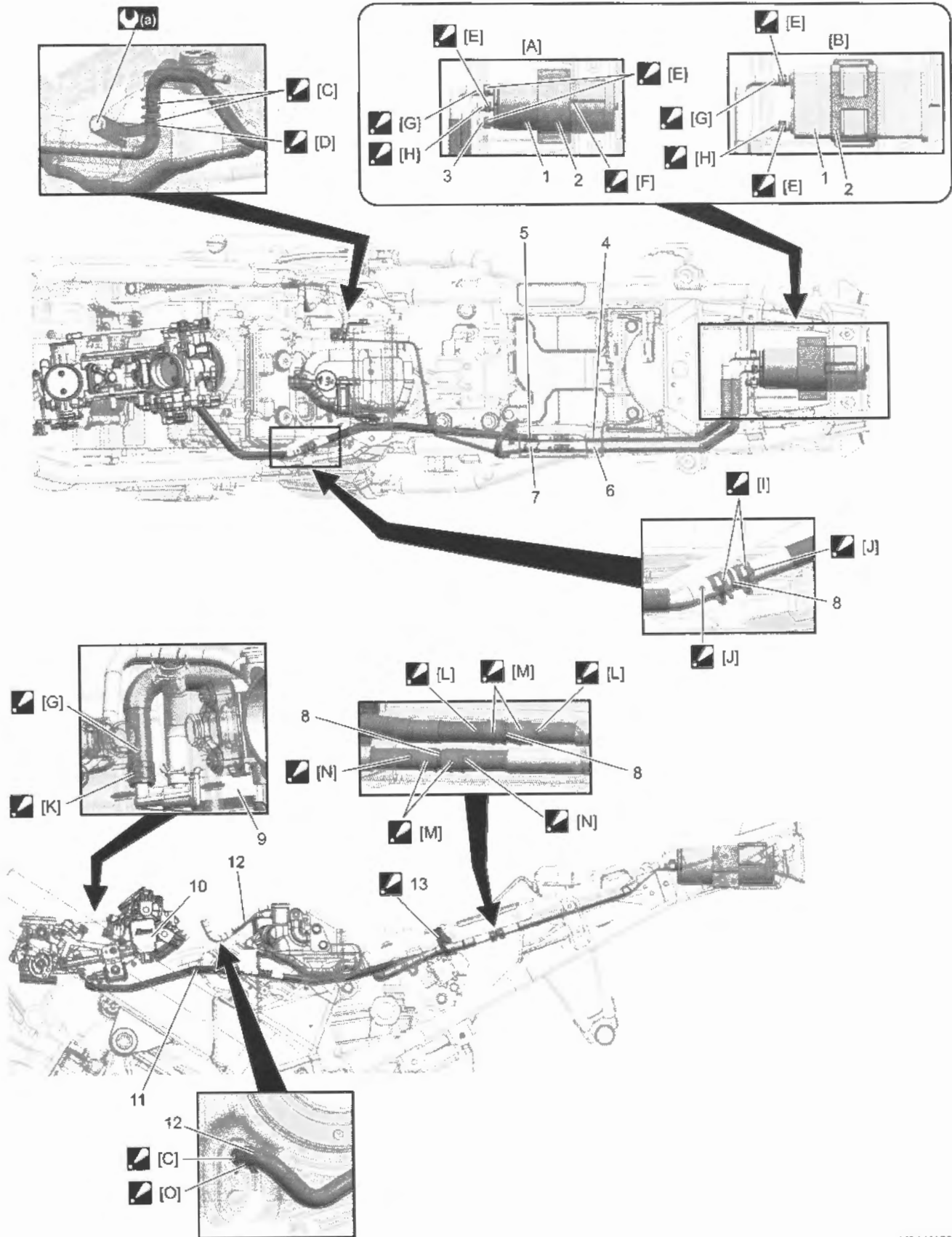
IE31J1120006-01


<p>☑ [A]: Align the boss of the cushion with the groove of the EVAP canister.</p>	<p>☑ [H]: Face the green mark upward.</p>	<p>6. Surge hose No. 2</p>
<p>☑ [B]: Face the clamp end outside.</p>	<p>☑ [I]: Face the pink mark upward.</p>	<p>7. Purge cap</p>
<p>☑ [C]: Face the clamp end upward.</p>	<p>1. EVAP canister</p>	<p>8. Purge hose joint</p>
<p>☑ [D]: Face the clamp end forward.</p>	<p>2. Purge hose No. 1</p>	<p>9. Throttle body</p>
<p>☑ [E]: Face the blue mark upward.</p>	<p>3. Purge hose No. 2</p>	<p>10. Fuel shut-off valve</p>
<p>☑ [F]: Face the white mark upward.</p>	<p>4. Purge hose No. 3</p>	<p>11. EVAP system purge control solenoid valve</p>
<p>☑ [G]: Face the yellow mark upward.</p>	<p>5. Surge hose No. 1</p>	



IF31J1120001-01

<p>☑ [A]: Face the clamp end outside.</p>	<p>☑ [D]: Connect the fuel tank breather hose in the parallel to the EVAP system purge control solenoid valve.</p>	<p>2. Fuel tank breather hose</p>
<p>☑ [B]: Face the white mark right side.</p>	<p>[E]: To fuel tank</p>	<p>3. Fuel shut-off valve</p>
<p>☑ [C]: Face the clamp end right side.</p>	<p>1. Fuel tank water drain hose</p>	



[A]: Round type	1. EVAP canister
[B]: Square type	2. Canister cushion
<input checked="" type="checkbox"/> [C]: Face the clamp end to right side.	3. Canister purge cap
<input checked="" type="checkbox"/> [D]: Face the blue mark to left side.	4. Purge hose No. 1
<input checked="" type="checkbox"/> [E]: Face the clamp end upward.	5. Purge hose No. 2
<input checked="" type="checkbox"/> [F]: Align the boss of the cushion with the groove of the EVAP canister.	6. Surge hose No. 1
<input checked="" type="checkbox"/> [G]: Face the white mark upward.	7. Surge hose No. 2
<input checked="" type="checkbox"/> [H]: Face the blue mark upward.	8. Purge hose joint
<input checked="" type="checkbox"/> [I]: Face the clamp end to left side.	9. EVAP system purge control solenoid valve
<input checked="" type="checkbox"/> [J]: Face the pink mark upward.	10. Throttle body
<input checked="" type="checkbox"/> [K]: Face the clamp end forward.	11. Purge hose No. 3
<input checked="" type="checkbox"/> [L]: Face the yellow mark upward.	12. Surge hose No. 3
<input checked="" type="checkbox"/> [M]: Face the clamp end downward.	<input checked="" type="checkbox"/> 13. Clamp : Fix the clamp between the battery holder and ABS control unit/HU holder. Face the locked part of clamp upward. Face the tip of clamp to right side.
<input checked="" type="checkbox"/> [N]: Face the green mark upward.	 (a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
<input checked="" type="checkbox"/> [O]: Face the white mark to right side.	

Repair Instructions

PAIR Reed Valve Removal and Installation (If Equipped)

BENJ31J31208001

Removal

▲ WARNING

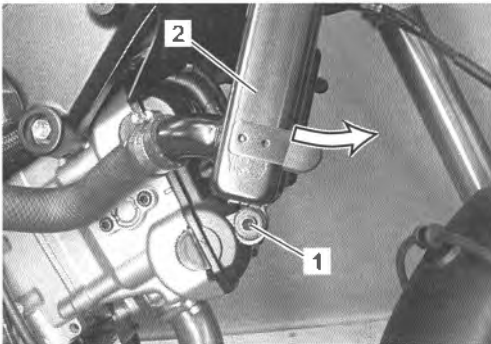
The hot radiator and hot engine can burn you.
Wait until the radiator and the engine are cool enough to touch.

Front side

- 1) Remove the side lower cowlings.
 - L4 – L6 model: (Page 9D-15)
 - L8 – model: (Page 9D-34)
- 2) Remove the radiator mounting bolt (1).
- 3) Move the radiator (2) forward.

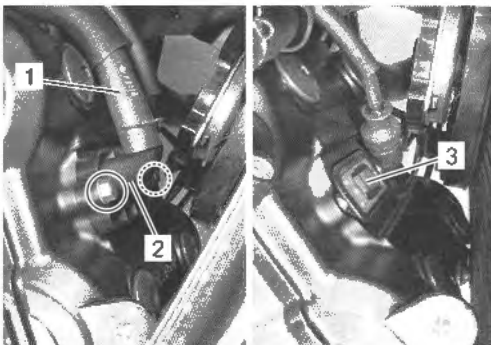
NOTICE

Be careful not to damage the radiator fins.



IF31J1120003-01

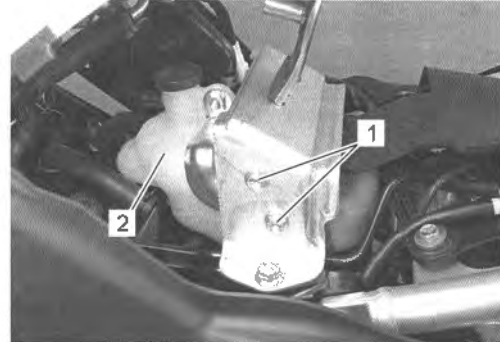
- 4) Disconnect the PAIR hose (1) and remove the PAIR reed valve cover (2).
- 5) Remove the PAIR reed valve (3).



IF31J1120004-01

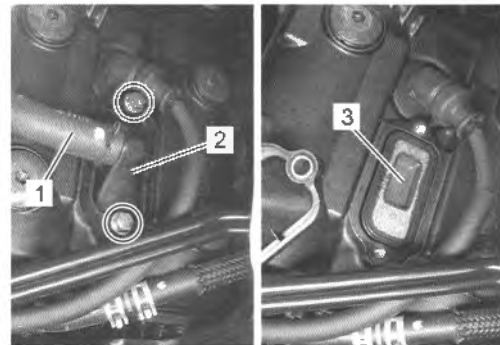
Rear side

- 1) Lift and support the fuel tank. (Page 1G-9)
- 2) Remove the radiator reservoir tank mounting bolts (1).
- 3) Move the radiator reservoir tank (2).



IF31J1120005-01

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



IF31J1120006-01

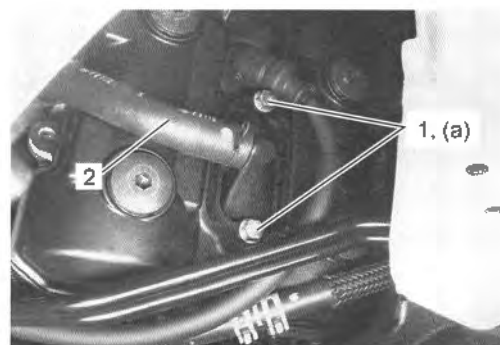
Installation

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

- Tighten PAIR reed valve coupler bolts (1) to the specified torque.
- Connect the PAIR hose (2). Refer to "PAIR System Hose Routing Diagram (If Equipped)" (Page 1B-6).

Tightening torque

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



IF31J1120007-01

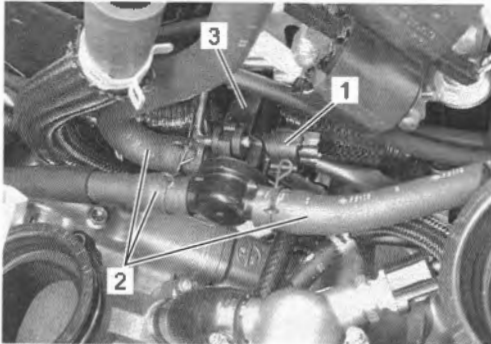
- Install the radiator reservoir tank. (Page 1F-11)
- Install the radiator. (Page 1F-9)

PAIR Control Solenoid Valve Removal and Installation (If Equipped)

BENJ31J31206002

Removal

- 1) Remove the throttle body assembly. (Page 1C-4)
- 2) Disconnect the PAIR control solenoid valve coupler (1) and PAIR hoses (2).
- 3) Remove the PAIR control solenoid valve (3).



IF31J1120008-01

Installation

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

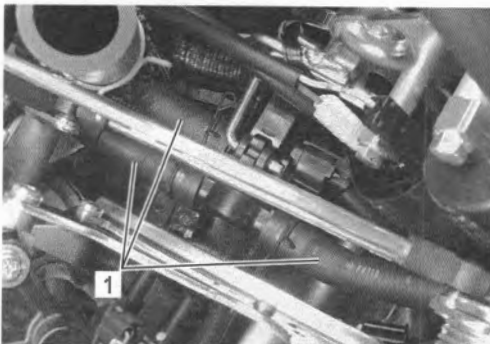
- Connect the PAIR hoses properly. Refer to "PAIR System Hose Routing Diagram (If Equipped)" (Page 1B-6).

PAIR System Inspection (If Equipped)

BENJ31J31206003

PAIR Hose

- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Inspect the PAIR hoses (1) for wear or damage. If it is worn or damaged, replace the PAIR hose with a new one. (Page 1B-13)



IF31J1120009-01

- 3) Install the removed parts.

PAIR Reed Valve

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



IF31J1120010-01

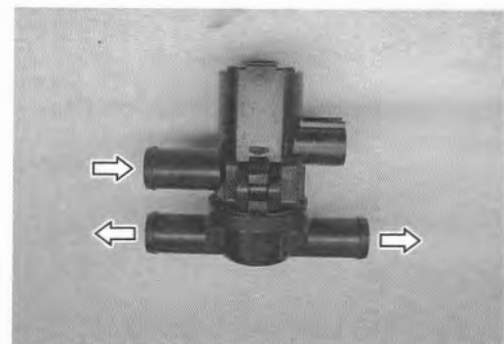
- 3) Install the PAIR reed valve. (Page 1B-11)

PAIR Control Solenoid Valve

NOTE

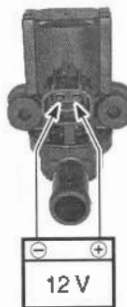
PAIR control solenoid valve can be checked without removing it from the motorcycle. Refer to "DTC P1656 (C49) (If Equipped)": L4 - L6 in Section 1A (Page 1A-73) or "DTC P0418 (C49)": L8 - in Section 1A (Page 1A-122).

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



IF31J1120011-01

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



IF31J1120012-01

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

PAIR solenoid valve resistance
 20 – 24 Ω at 20 – 30 °C (68 – 86 °F)



IF31J1120013-01

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

PAIR Hose Removal and Installation (If Equipped)

BENJ31J31206004

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

Removal

- 1) Remove the right side lower cowling.
 - L4 – L6 model: (Page 9D-15)
 - L8 – model: (Page 9D-34)
- 2) Remove the throttle body assembly. (Page 1C-4)
- 3) Remove the PAIR hose.

Installation

- 1) Install the PAIR hose. Refer to "Wiring Harness Routing Diagram": L4 - L6 in Section 9A (Page 9A-6) or "Wiring Harness Routing Diagram": L8 - in Section 9A (Page 9A-24).
- 2) Install the removed parts.

PCV Hose Inspection

BENJ31J31206005

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



IE31J1120008-01

- 4) Install the removed parts.

PCV Hose Removal and Installation

BENJ31J31206006

Refer to "Intake System Components" in Section 1D (Page 1D-2).

Removal

- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Remove the PCV hose.

Installation

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

EVAP Control System Removal and Installation (If Equipped)

BENJ31J31206007

Hose

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

Removal

- 1) Remove the throttle body assembly. (Page 1C-4)
- 2) Remove the left frame cover.
 - L4 – L6 model: (Page 9D-11)
 - L8 – model: (Page 9D-33)
- 3) Remove the EVAP hoses.

Installation

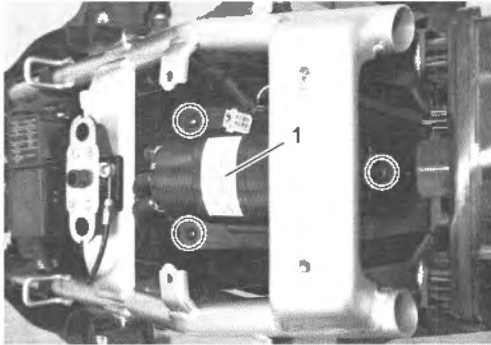
- 1) Install the EVAP hoses.
- 2) Install the removed parts.

EVAP Canister

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

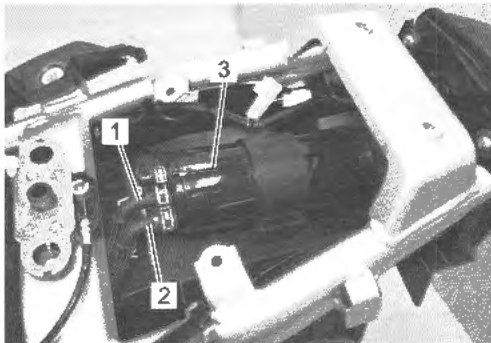
Removal

- 1) Remove the rear fender (Rear).
 - L4 – L6 model: ☞ (Page 9D-12)
 - L8 – model: ☞ (Page 9D-33)
- 2) Remove the EVAP canister holder (1). (L4 – L6)



IE31J1120009-01

- 3) Disconnect the surge hose (1) and purge hose (2).
- 4) Remove the EVAP canister (3).



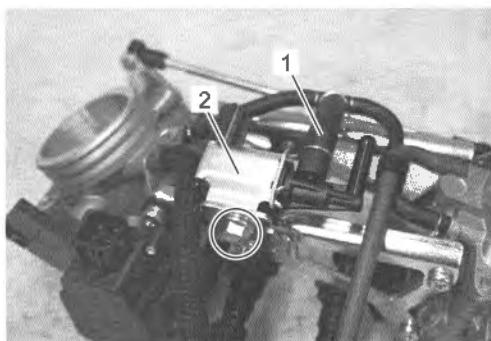
IE31J1120010-01

Installation

Install the EVAP canister in the reverse order of removal.

EVAP System Purge Control Solenoid Valve**Removal**

- 1) Remove the throttle body assembly. ☞ (Page 1C-4)
- 2) Disconnect the purge hose (1).
- 3) Remove the EVAP system purge control solenoid valve (2).



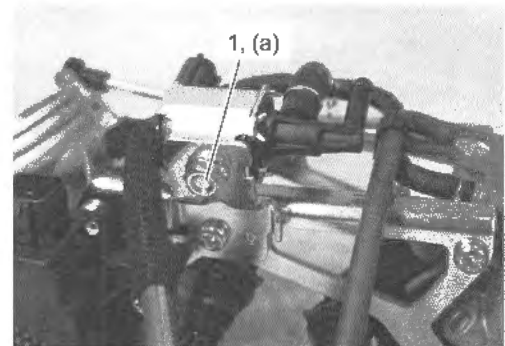
IE31J1120011-01

Installation

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

Tightening torque

EVAP system purge control solenoid valve nut (a): 7 N·m (0.7 kgf-m, 5.0 lbf-ft)

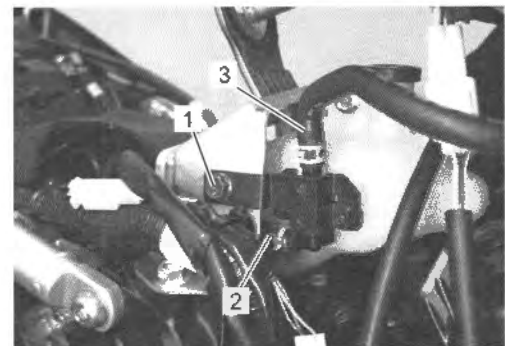


IE31J1120012-01

- 2) Install the removed parts.

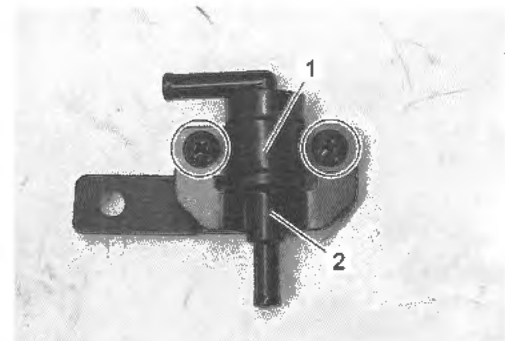
Fuel Shut-off Valve**L4 – L6****Removal**

- 1) Lift and support the fuel tank. ☞ (Page 1G-9)
- 2) Remove the valve plate No. 1 bolt (1).
- 3) Disconnect the surge hose (2) and fuel tank breather hose (3).



IE31J1120013-01

- 4) Remove the valve plate No. 2 (1) and fuel shut-off valve (2).



IE31J1120014-01

1B-15 Emission Control Devices:

Installation

Install the fuel shut-off valve in the reverse order of removal. Pay attention to the following point:

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

L8 -

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

EVAP Control System Inspection (If Equipped)

BENJ31J31206008

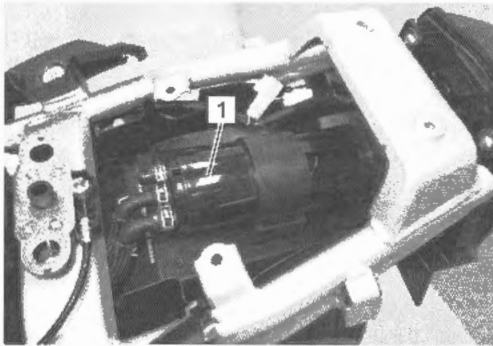
Refer to "EVAP Control System Removal and Installation (If Equipped)" (Page 1B-13).

Hose

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

EVAP Canister

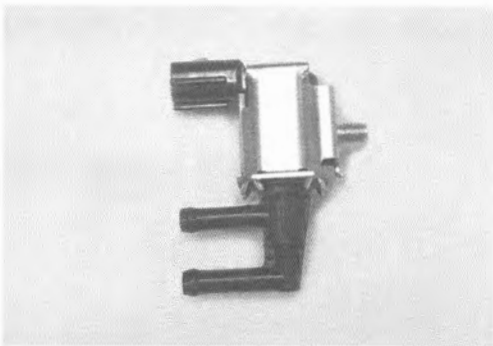
Inspect the EVAP canister body for damage to the body. If any defect is found, replace the EVAP canister (1) with a new one.



IE31J1120015-01

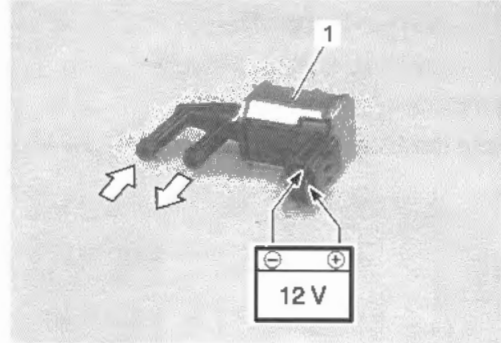
EVAP System Purge Control Solenoid Valve

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



I718H2120003-03

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

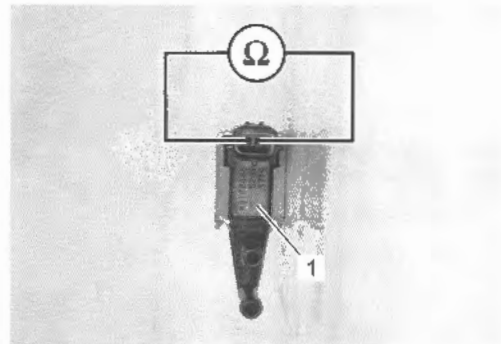


IE31J1120019-01

- 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

30 - 34 Ω at 20 °C (68 °F)



IE31J1120016-01

Fuel Shut-off Valve

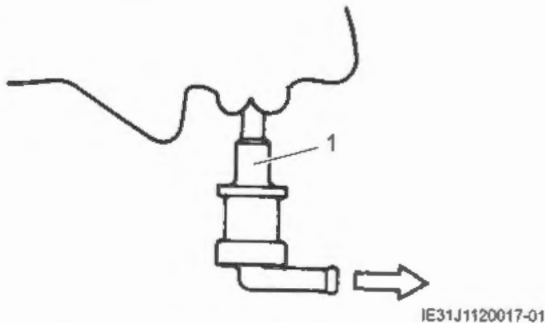
L4 - L6

▲ WARNING

Gasoline and gasoline vapor is toxic. A small amount of fuel remains in the fuel shut-off valve when checking it.

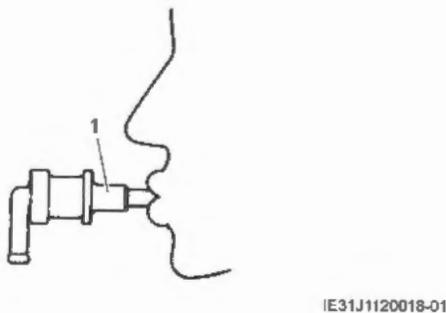
Do not swallow the fuel when blowing the fuel shut-off valve.

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



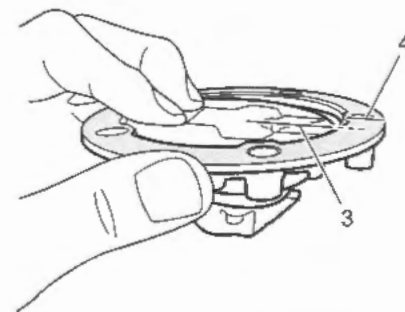
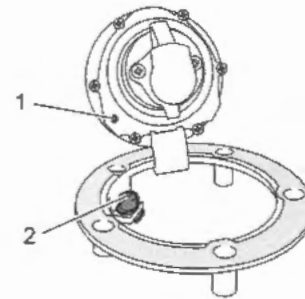
- 2) When air is blown into the fuel shut-off valve with its side (1) positioned sideways, the air cannot pass through to the canister side.

If the fuel shut-off valve operates otherwise, it must be replaced.

**L8 -**

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

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

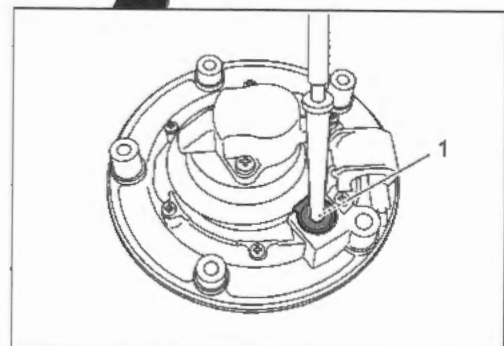
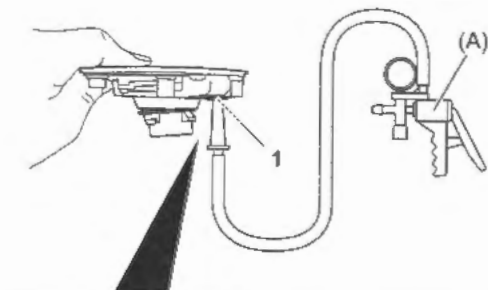


IH13K1120032-03

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

Special tool

(A): 09917-47011



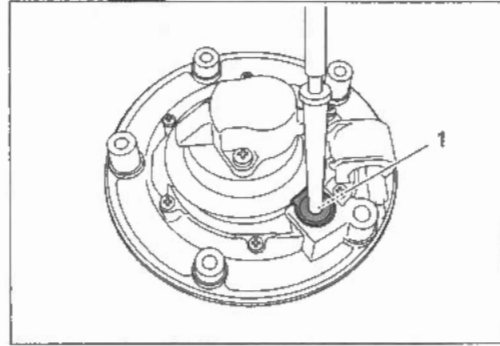
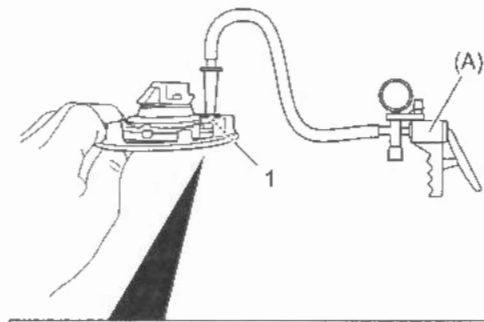
IH13K1120033-03

1B-17 Emission Control Devices:

- 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

BENJ31J31207001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
PAIR reed valve cover bolt	10	1.0	7.5	☞ (Page 1B-11)
EVAP system purge control solenoid valve nut	7	0.7	5.0	☞ (Page 1B-14)

Reference:

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

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

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

"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Special Tool

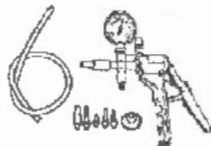
BENJ31J31208001

09917-47011

Vacuum pump gauge set

☞ (Page 1B-16) /

☞ (Page 1B-17)



Engine Electrical Devices

Precautions

Precautions for Engine Electrical Device

BENJ31J31300001

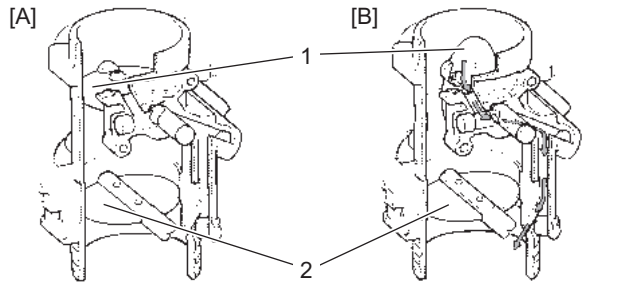
Refer to "General Precautions" in Section 00 (Page 00-1), "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2), "Precautions for Circuit Tester" in Section 00 (Page 00-7) and "Precautions for SDS-II" in Section 00 (Page 00-8).

General Description

ISC Valve System Description

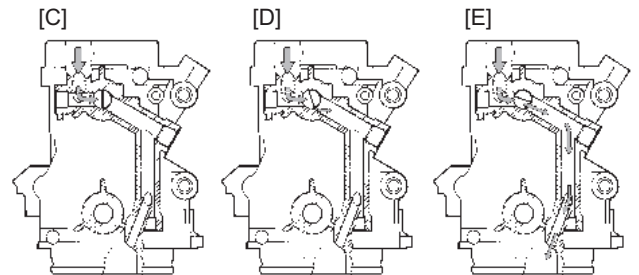
BENJ31J31301001

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



IE31J1130001-01

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



IE31J1130005-01

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

Component Location

Engine Electrical Components Location

BENJ31J31303001

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

Diagnostic Information and Procedures

Engine Symptom Diagnosis

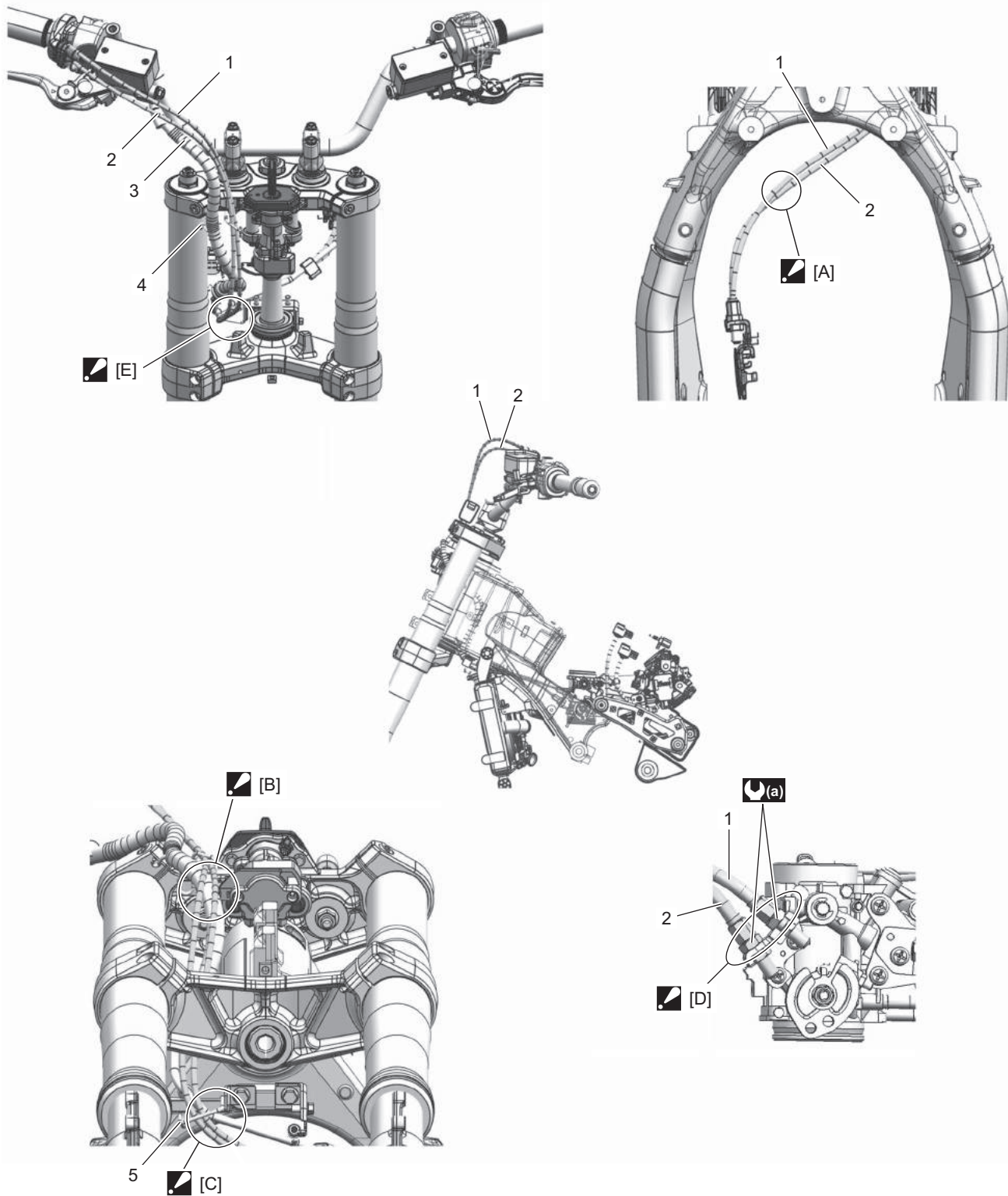
BENJ31J31304001

Refer to "Engine Symptom Diagnosis": L4 - L6 in Section 1A (Page 1A-14) or "Engine Symptom Diagnosis": L8 - in Section 1A (Page 1A-95).

Repair Instructions

Throttle Cable Routing Diagram

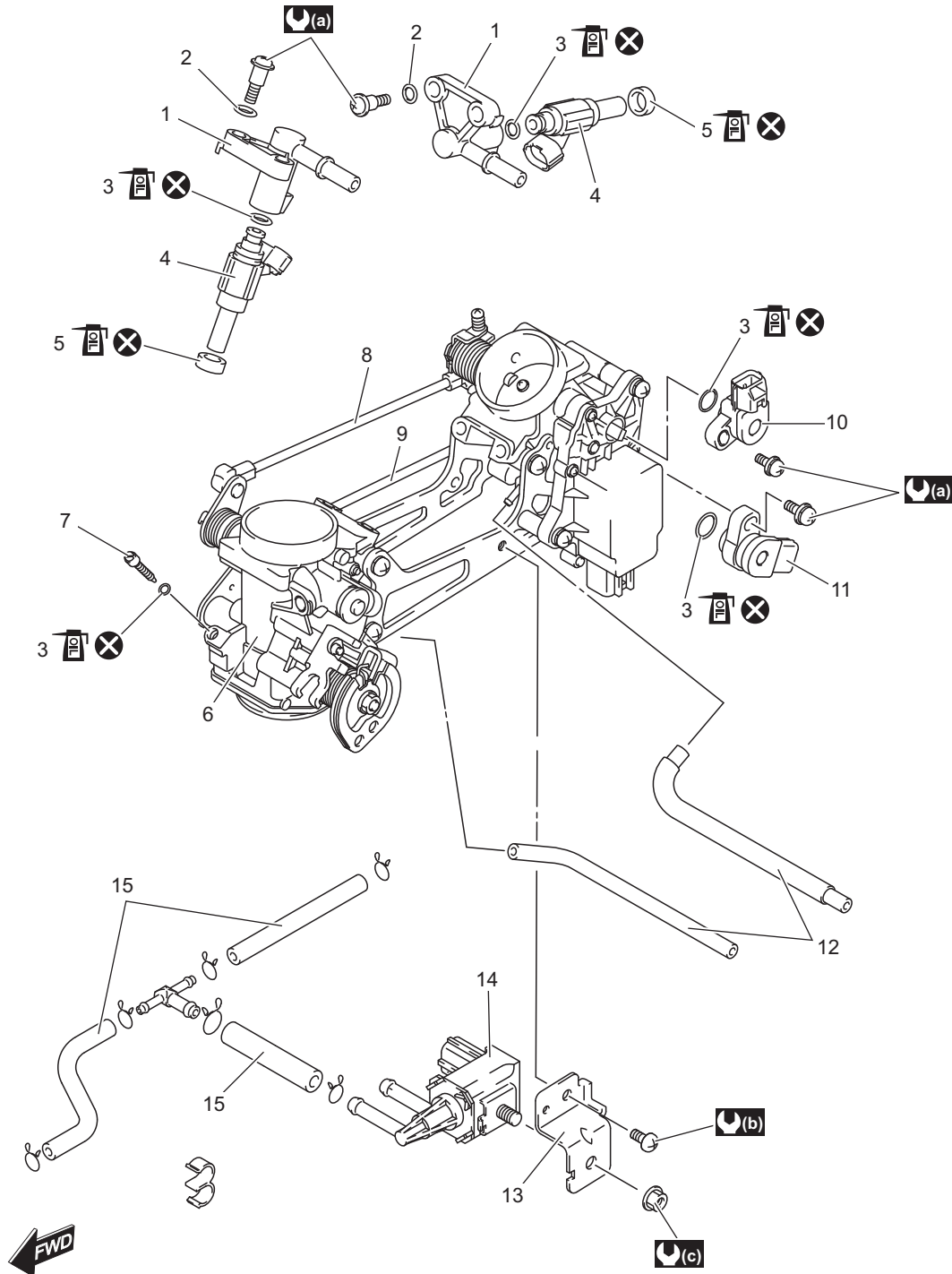
BENJ31J31306001








<p>☑ [A]: Pass the throttle pulling cable over the throttle returning cable.</p>	2. Throttle returning cable
<p>☑ [B]: Pass the throttle cables in front of the brake hose.</p>	3. Front brake hose
<p>☑ [C]: Pass the throttle pulling cable inside of the throttle returning cable. Pass the throttle cables under the brake pipe.</p>	4. Cable guide
<p>☑ [D]: The clearance between the throttle cable adjuster and the lock-nut is within one turn of the adjuster counterclockwise.</p>	5. Throttle cable guide
<p>☑ [E]: When turning the handlebars to right, check that the throttle cables are not pinched between the stopper and frame.</p>	<p>⤵(a) : 4.5 N·m (0.45 kgf·m, 3.5 lbf·ft)</p>
1. Throttle pulling cable	

Throttle Body Assembly Components

BENJ31J31306002



1C-4 Engine Electrical Devices:

1. Fuel delivery pipe	8. Secondary throttle link rod	15. Purge hose (If equipped)
2. Rubber washer	9. Throttle link rod	 (a) : 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)
3. O-ring	10. STP sensor	 (b) : 5 N·m (0.5 kgf-m, 4.0 lbf-ft)
4. Fuel injector	11. TP sensor	 (c) : 7 N·m (0.7 kgf-m, 5.0 lbf-ft)
5. Cushion seal	12. Vacuum hose	 : Apply engine oil.
6. Throttle body	13. EVAP system purge control solenoid valve bracket (If equipped)	 : Do not reuse.
7. Synchronizing screw	14. EVAP system purge control solenoid valve (If equipped)	

Throttle Cable Play On-vehicle Inspection and Adjustment

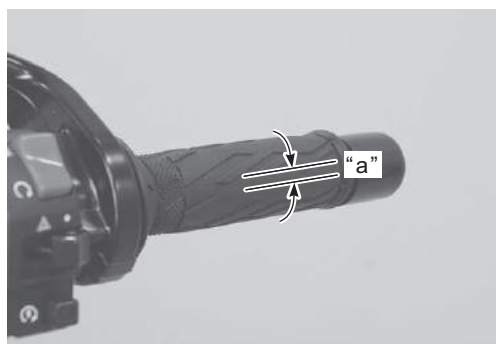
BENJ31J31306003

Inspection

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

Throttle cable play "a"

2.0 – 4.0 mm (0.08 – 0.16 in)



IE31J1130013-01

Adjustment

- 1) Remove the rubber boot (1).
- 2) Loosen the lock-nut (2) of the throttle pulling cable.
- 3) Turn the adjuster (3) in or out until the throttle cable play (at the throttle grip) is within the specification.

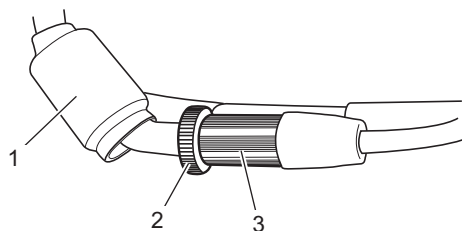
Throttle cable play

2.0 – 4.0 mm (0.08 – 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

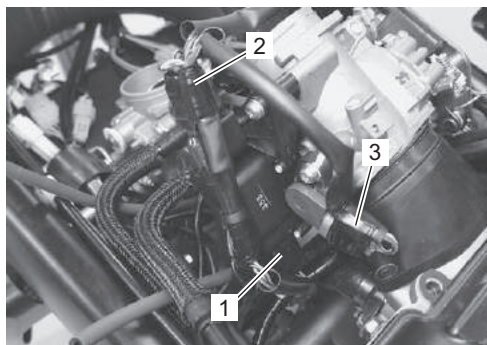
- 5) Reinstall the rubber boot.

Throttle Body Assembly Removal and Installation

BENJ31J31306004

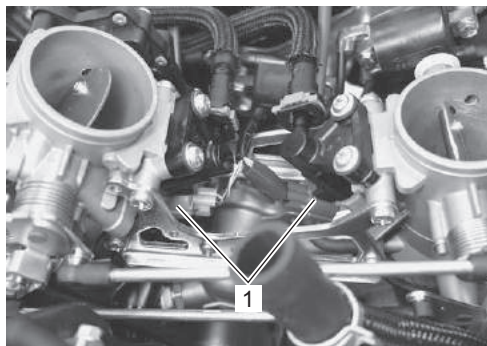
Removal

- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Disconnect the STVA coupler (1), STP sensor coupler (2) and TP sensor coupler (3).



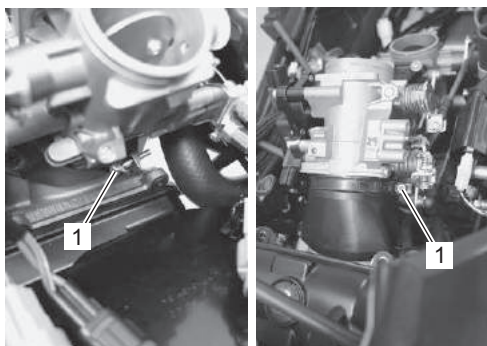
IE31J1130016-01

- 3) Disconnect the fuel injector couplers (1).



IE31J1130017-01

- 4) Loosen the intake pipe clamp screws (1) and remove the throttle body assembly upward.

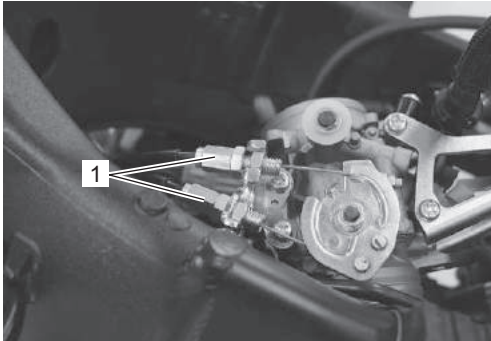


IE31J1130018-01

- 5) Disconnect the throttle cables (1) from the throttle body.

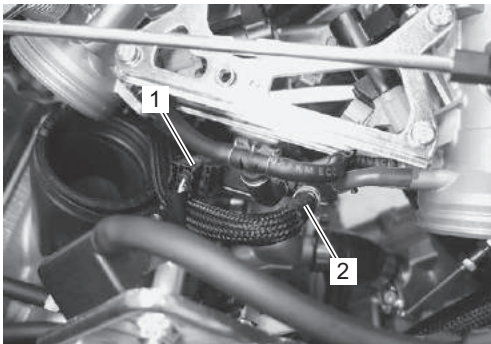
NOTICE

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



IE31J1130019-01

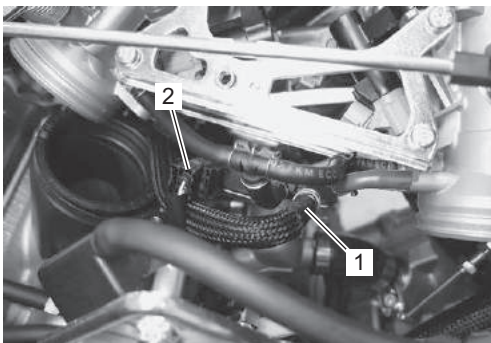
- 6) Disconnect the EVAP system purge control solenoid valve coupler (1) (If equipped) and purge hose (2) (If equipped).
- 7) Remove the throttle body assembly.



IE31J1130020-01

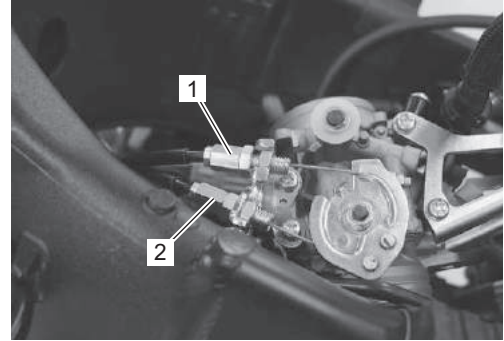
Installation

- 1) Connect the purge hose (1) (If equipped) and EVAP system purge control solenoid valve coupler (2) (If equipped).



IE31J1130021-01

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

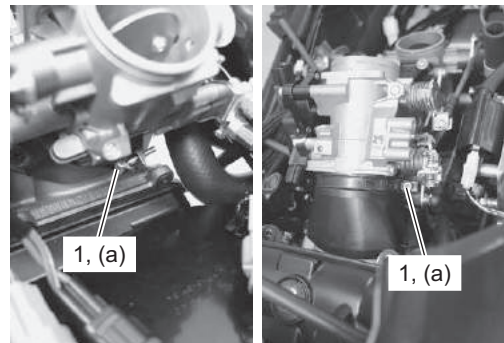


IE31J1130022-01

- 3) Install the throttle body to the intake pipes.
- 4) Position the intake pipe clamps and tighten the intake pipe clamp screws (1) to the specified torque. (Page 1D-2)

Tightening torque

Intake pipe clamp screw (a): 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)

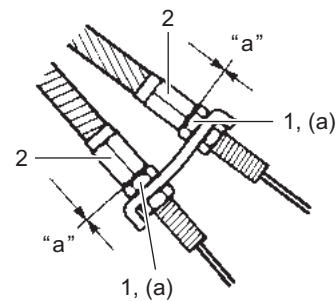


IE31J1130023-01

- 5) Loosen each throttle cable lock-nut (1).
- 6) Turn in each throttle cable adjuster (2) fully and then make the clearance "a", turning it back counterclockwise one turn or less.
- 7) Tighten each lock-nut (1) to the specified torque.

Tightening torque

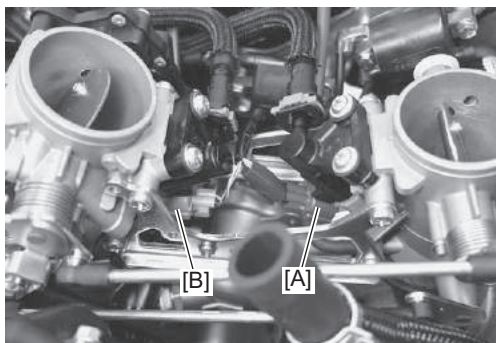
Throttle cable lock-nut (a): 4.5 N·m (0.45 kgf-m, 3.5 lbf-ft)



IE31J1130006-02

1C-6 Engine Electrical Devices:

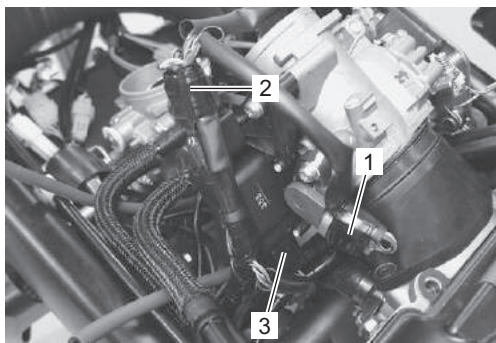
8) Connect the fuel injector couplers.



IE31J1130024-01

Coupler	Coupler color
Fuel injector #1 [A]	Br
Fuel injector #2 [B]	Gr

9) Connect the TP sensor coupler (1), STP sensor coupler (2) and STVA coupler (3).



IE31J1130025-01

10) Install the air cleaner box. (Page 1D-4)

11) Adjust the throttle cable play. (Page 1C-4)

12) Reset the ISC aperture learned value. (Page 1C-13)

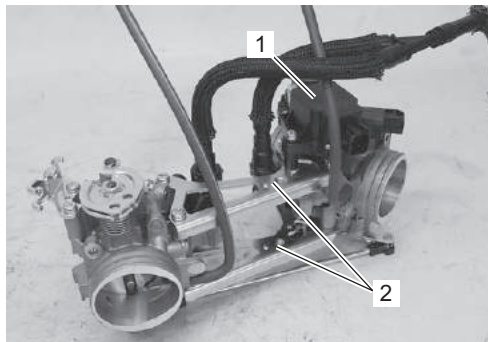
Throttle Body Disassembly and Reassembly

BENJ31J31306005

Refer to "Throttle Body Assembly Removal and Installation" (Page 1C-4).

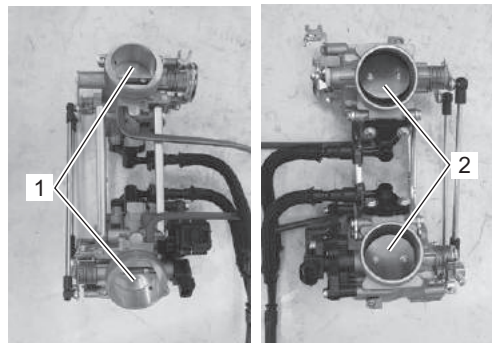
NOTICE

- 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) and link plates (2).



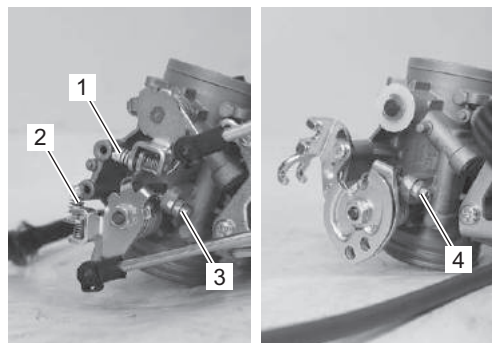
IE31J1130026-01

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



IE31J1130027-01

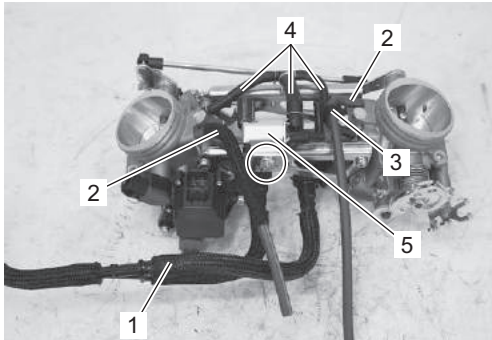
- These adjusting screws (1), (2), (3) and (4) are factory-adjusted at the time of delivery and therefore avoid removing or turning it unless otherwise necessary.



IE31J1130028-01

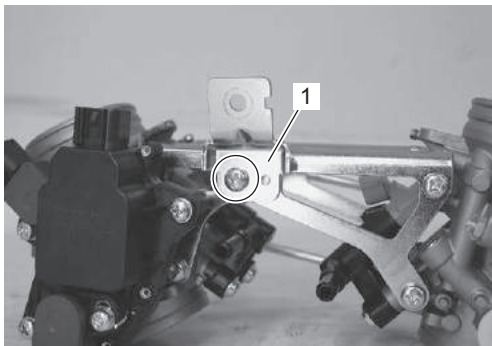
Disassembly

- 1) Remove the fuel feed hose (1) and IAP sensor vacuum hoses (2). (Page 1G-5)
- 2) Remove the clamp (3) (If equipped), purge hoses (4) (If equipped) and EVAP system purge control solenoid valve (5) (If equipped).



IE31J1130029-01

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

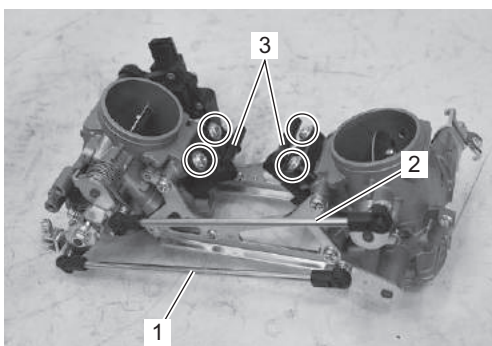


IE31J1130030-01

- 4) Remove the throttle link rod (1) and secondary throttle link rod (2).
- 5) Remove the fuel delivery pipe assemblies (3).

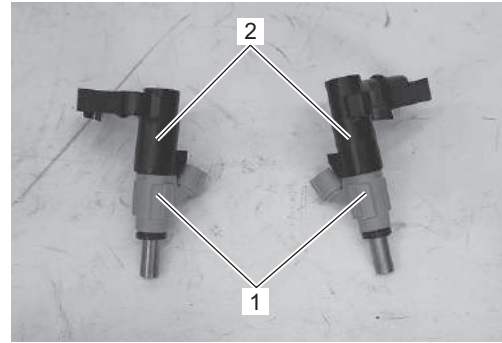
NOTICE

Do not twist the fuel delivery pipe, when removing the fuel delivery pipe.



IE31J1130031-01

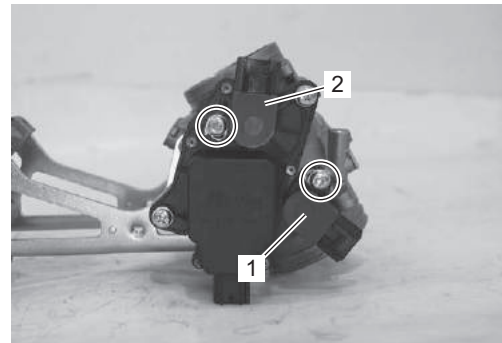
- 6) Remove the fuel injectors (1) from the fuel delivery pipes (2).



IE31J1130032-01

- 7) Prior to disassembly, mark each sensor's original position with a paint or scribe for accurate reinstallation.
- 8) Remove the TP sensor (1) and STP sensor (2).

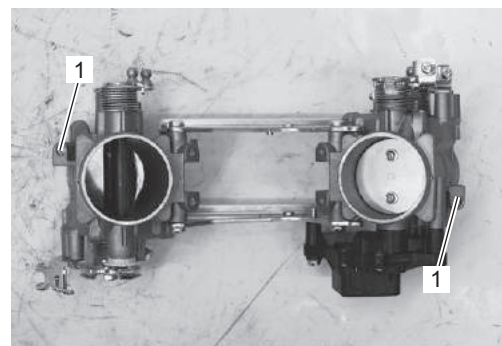
Special tool
09930-11950



IE31J1130033-01

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

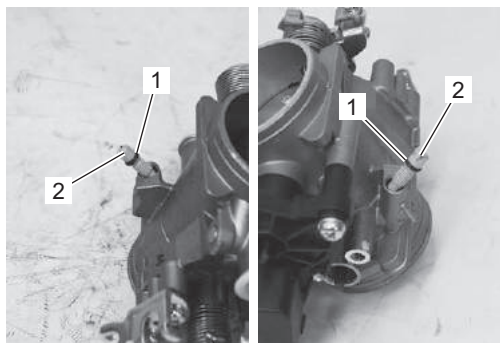
- 10) Remove the synchronizing screws (1).



IE31J1130034-01

Reassembly

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

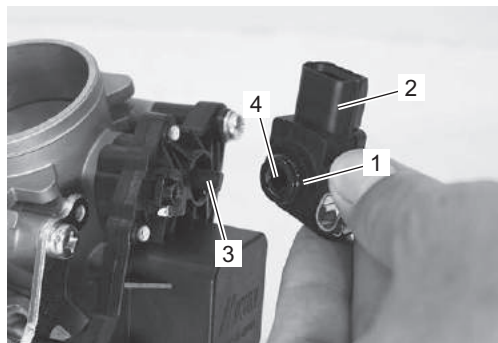


IE31J1130035-01

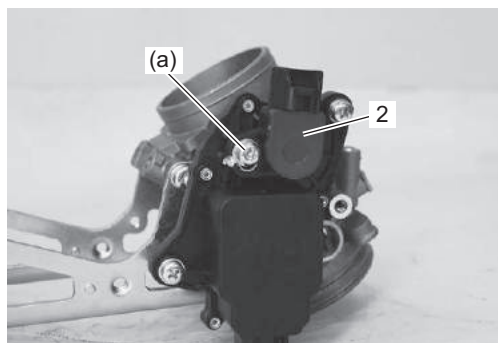
- 2) Apply a thin coat of the engine oil to the new O-ring (1).
- 3) With the STV fully closed, install the STP sensor (2) aligning the secondary throttle shaft end (3) with the groove (4) of the STP sensor.
- 4) Tighten the STP sensor mounting screw to the specified torque.

Special tool
09930-11950

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

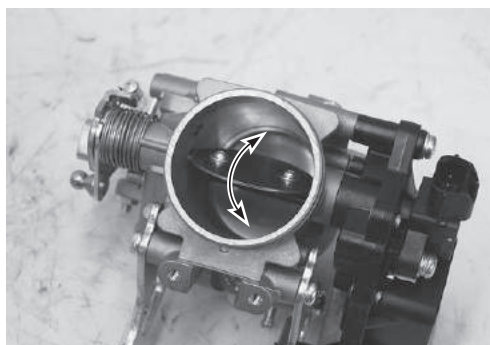


IE31J1130036-01



IE31J1130037-01

- 5) Check the STV operating smoothly.
- 6) Adjust the position of STP sensor, if necessary.
☞ (Page 1C-24)

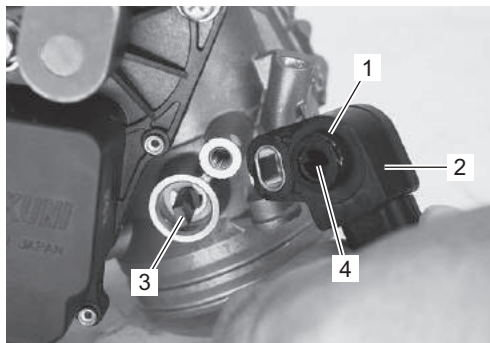


IE31J1130038-01

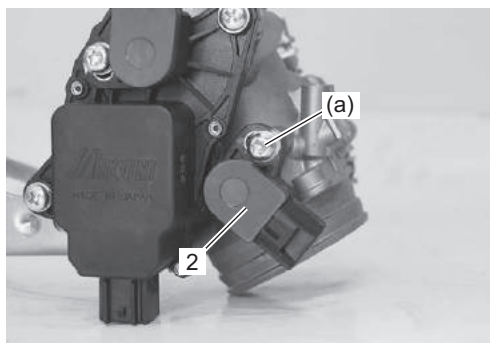
- 7) Apply a thin coat of the engine oil to the new O-ring (1).
- 8) With the throttle valve fully closed, install the TP sensor (2) aligning the throttle shaft end (3) with the groove (4) of the TP sensor.
- 9) Tighten the TP sensor mounting screw to the specified torque.

Special tool
09930-11950

Tightening torque
TP sensor mounting screw (a): 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)

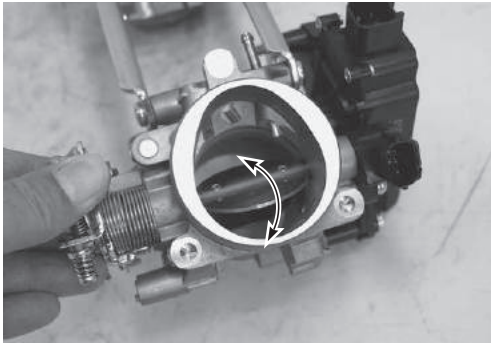


IE31J1130039-01



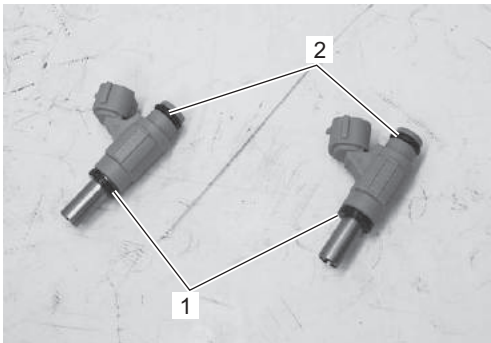
IE31J1130040-01

- 10) Check the throttle valve operating smoothly.
- 11) Adjust the position of TP sensor, if necessary.
☞ (Page 1C-17)



IE31J1130041-01

- 12) Apply a thin coat of the engine oil to the new cushion seals (1) and new O-rings (2).



IE31J1130042-01

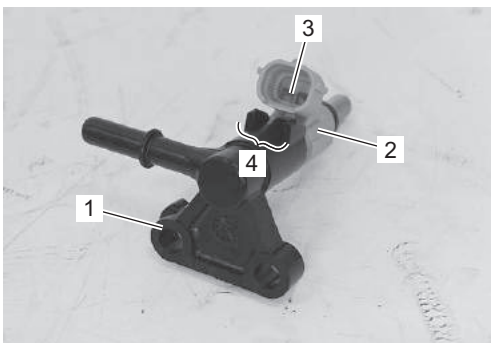
- 13) Wipe off the mounting surfaces on the delivery pipes (1) where the fuel injectors (2) will be seated with a clean rag.
- 14) Install the fuel injectors (2) by pushing them straight to the delivery pipes (1).

NOTICE

Never turn the fuel injectors (2) while pushing them.

NOTE

Align the coupler (3) of the fuel injector (2) with boss (4) of the delivery pipe (1).



IE31J1130043-01

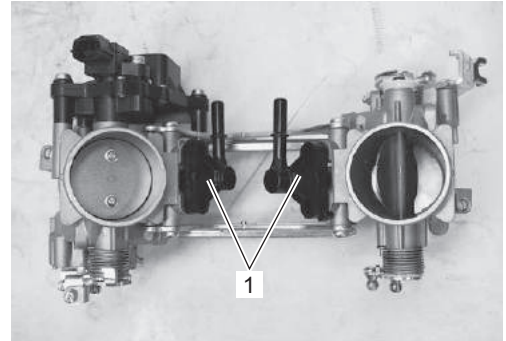
- 15) Install the fuel delivery pipe assemblies (1) to the throttle body.

NOTICE

Never turn the fuel injectors while installing them.

NOTE

When installing the fuel delivery pipes to the throttle body, pay attention to the difference of the fuel delivery pipes.

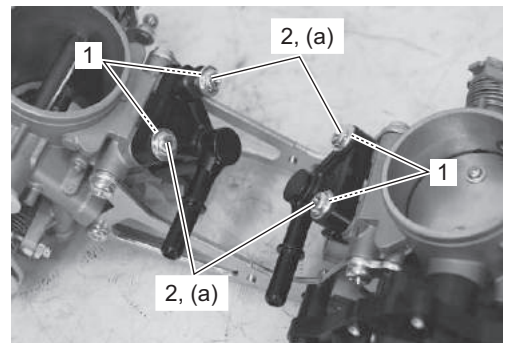


IE31J1130044-01

- 16) Install the rubber washers (1).
- 17) Tighten the fuel delivery pipe mounting screws (2) to the specified torque.

Tightening torque

Fuel delivery pipe mounting screw (a): 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



IE31J1130045-01

1C-10 Engine Electrical Devices:

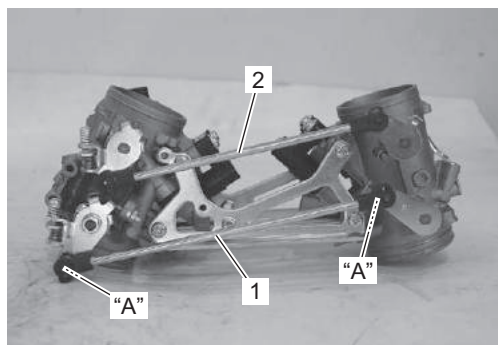
18) Apply grease to the throttle link rod joints.

“A”: Grease 99000–25350 (SUZUKI WATER RESISTANT GREASE EP2)

19) Install the throttle link rod (1) and secondary throttle link rod (2).

NOTE

The throttle link rod (1) is longer than the secondary throttle link rod (2).

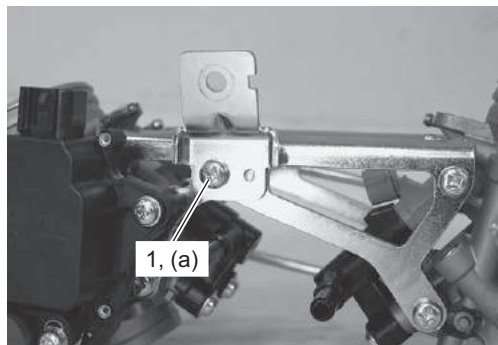


IE31J1130046-02

20) Tighten the EVAP system purge control solenoid valve bracket screw (1) (If equipped).

Tightening torque

EVAP system purge control solenoid valve bracket screw (a): 5 N·m (0.5 kgf-m, 4.0 lbf-ft)



IE31J1130047-01

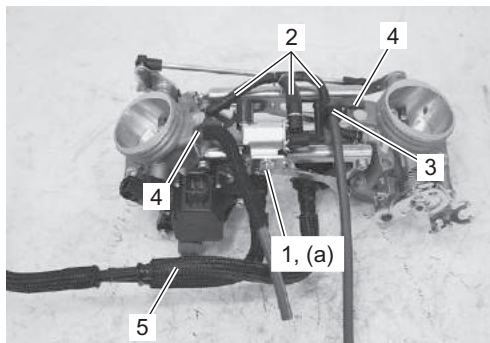
21) Tighten the EVAP system purge control solenoid valve nut (1) (If equipped).

Tightening torque

EVAP system purge control solenoid valve nut (a): 7 N·m (0.7 kgf-m, 5.0 lbf-ft)

22) Install the purge hoses (2) (If equipped), clamp (3) (If equipped).

23) Install the IAP sensor vacuum hoses (4) and fuel feed hose (5).



IE31J1130048-01

Throttle Body Inspection and Cleaning

BENJ31J31306006

Refer to “Throttle Body Assembly Removal and Installation” (Page 1C-4).

Inspection

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

- O-ring
- Throttle valve
- Secondary throttle valve
- Fuel delivery pipe
- Cushion seal
- Fuel injector

Cleaning

Clean each main bore, throttle valve and passage using a swab moistened with cleaning fluid (petroleum solvent), and then dry them with compressed air.

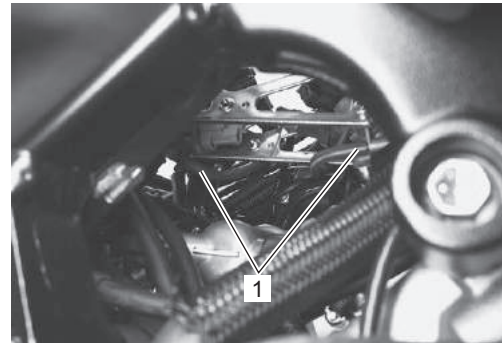
NOTICE

- **Do not use wire to clean passages. Wire may damage them.**
- **Never spray cleaning fluid (petroleum solvent) directly on throttle valve. Cleaning fluid, if splayed, may attack the sensors.**
- **If the throttle valve is molybdenum-coated, avoid applying cleaning fluid to the coated surfaces. Cleaning fluid loosens the coating, so the air-tightness of the throttle valve would be impaired.**
- **When the throttle body is contaminated with carbon deposits, varnish and/or gum, dip-type cleaning chemicals may be used for cleaning. When using such type of cleaning chemicals, closely follow the manufacturer’s instructions. Otherwise the throttle body could be damaged.**
- **Do not apply any cleaning fluid to parts made of rubber and plastic materials. Cleaning fluids may damage these parts.**

Throttle Valve Synchronization

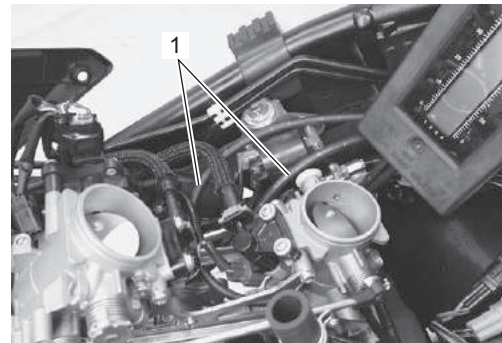
BENJ31J31306007

- 1) Disconnect the IAP sensor couplers and remove the air cleaner box. (Page 1D-4)
- 2) Disconnect the IAP sensor vacuum hoses (1) from the throttle body.



IE31J1130049-01

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



IE31J1130050-01

- 4) Connect the fuel feed hose and fuel pump coupler. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-9).
- 5) Set up the SDS tool referring to the SDS operation manual for further details.

Special tool
09904-41010
99565-01010-034

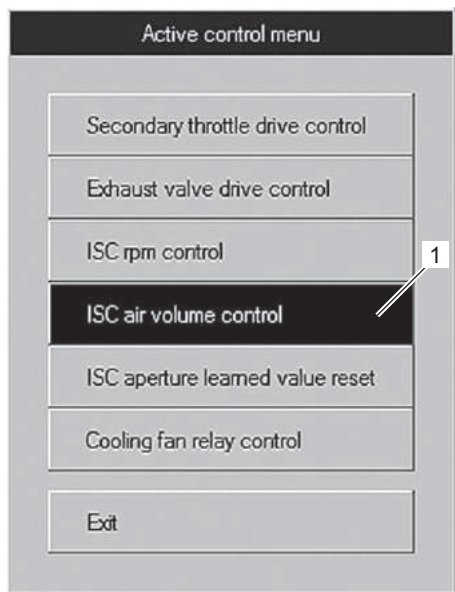
- 6) Start the engine.
- 7) Click “Data monitor”.
- 8) Warm up the engine (Water temp. more than 90 °C (194 °F) (1)).

Item	Value	Unit
<input type="checkbox"/> Engine coolant / oil temperature	1 — 99.3	°C

IE31J1130009-02

1C-12 Engine Electrical Devices:

- 9) Click "Active control".
- 10) Click "ISC air volume control" (1).

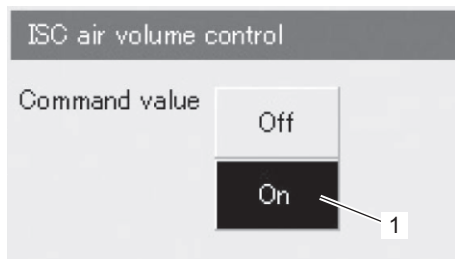


IE31J1130008-01

- 11) Click "On" button (1) to fix the ISC air volume among 2 cylinders.

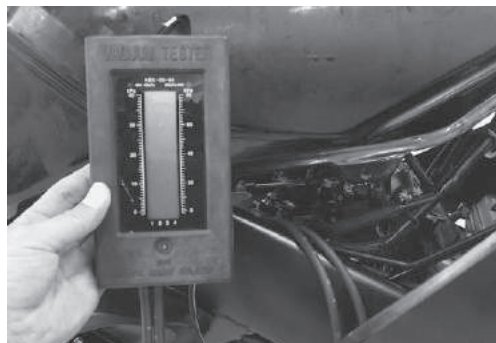
NOTE

When making this synchronization, be sure that the water temperature is within 90 – 105 °C (194 – 221 °F).



ID26J1130093-01

- 12) Check for the synchronization of vacuum from #1 and #2 cylinders.

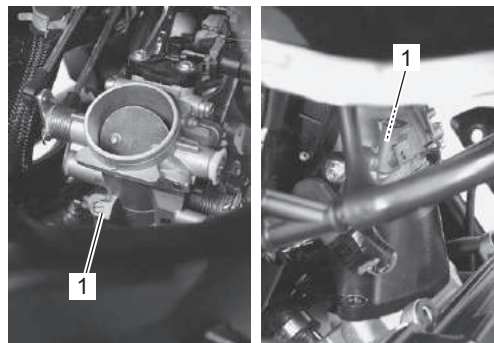


IE31J1130051-01

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

NOTE

Always set the engine speed at idle speed.



IE31J1130052-01

- 14) 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 synchronizing screw in 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.

- 15) Repeat the procedures of 5) to 13).
- 16) Close the SDS tool and turn the ignition switch OFF.
- 17) Disconnect the vacuum tester and install the removed parts.
- 18) After completing the throttle valve synchronization, clear the DTC and reset the ISC aperture learned value. (Page 1C-13)

ISC Valve (Secondary Throttle Valve Interlinked) Inspection

BENJ31J31306008

Refer to “DTC P0506 (C65)”: L4 - L6 in Section 1A (Page 1A-60) and “DTC P0507 (C65)”: L4 - L6 in Section 1A (Page 1A-62), or “DTC P0506 / P0507 (C65)”: L8 - in Section 1A (Page 1A-130).

ISC Aperture Learned Value Reset

BENJ31J31306009

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

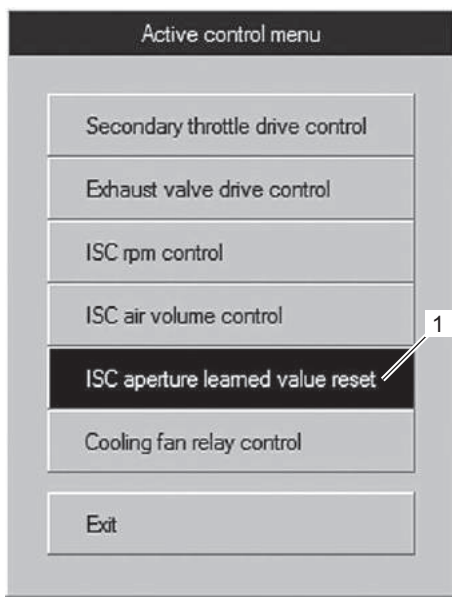
- 1) Turn the ignition switch ON.
- 2) Set up the SDS tool referring to the SDS operation manual for further details.

Special tool

09904-41010

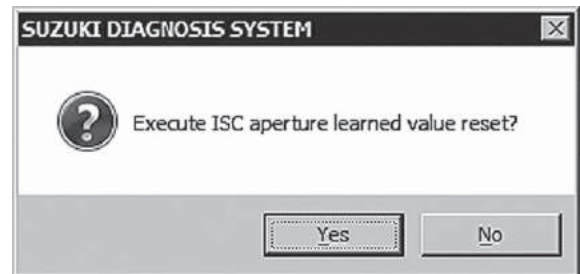
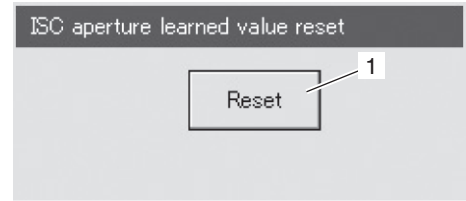
99565-01010-034

- 3) Click the “Active control”.
- 4) Click the “ISC aperture learned value reset” (1).



IE31J1130010-01

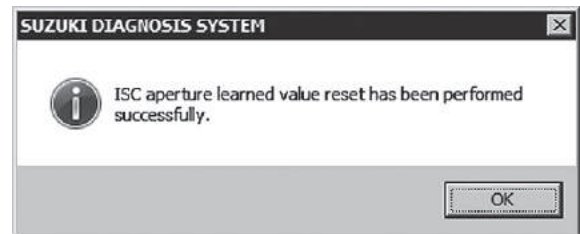
- 5) Click the “Reset” button (1) to clear the ISC aperture leaned valve.



IE31J1130011-01

NOTE

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



IE31J1130012-01

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

NOTE

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

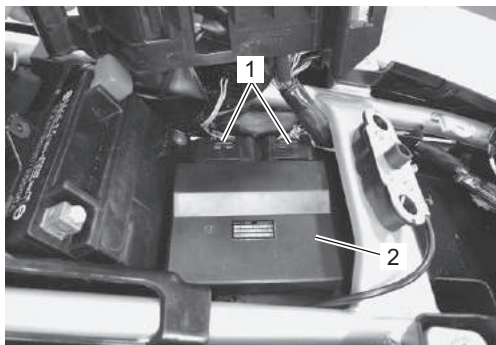
ECM Removal and Installation

BENJ31J31306010

L4 – L6

Removal

- 1) Disconnect the battery (–) lead wire and remove the tool holder. (Page 1J-12)
- 2) Disconnect the ECM couplers (1) and remove the ECM (2).



IE31J1130053-01

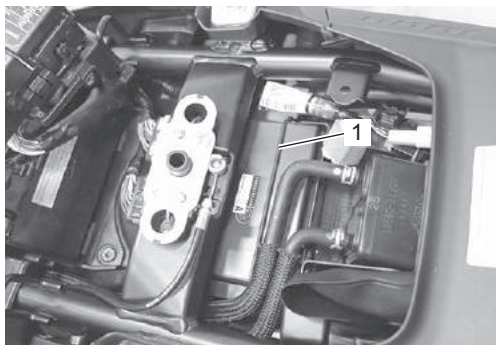
Installation

Install the ECM in the reverse order of removal.

L8 –

Removal

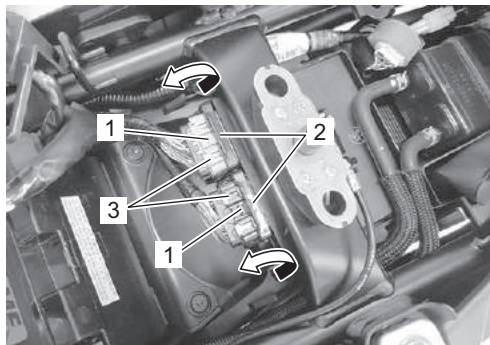
- 1) Disconnect the battery (–) lead wire and remove the battery holder lid. (Page 1J-12)
- 2) Remove the band (1).



IJ31J1130001-01

- 3) Disconnect the ECM couplers and remove the ECM.

- For Euro4 model, 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 and disconnect the ECM couplers (3).

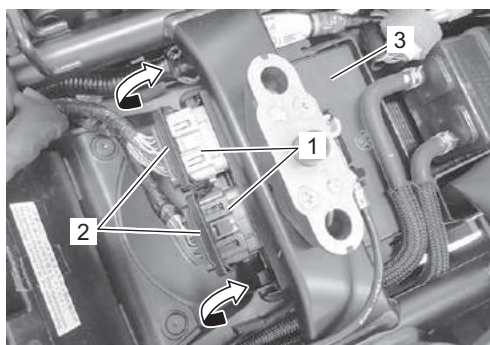


IJ31J1130002-01

Installation

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

- For Euro4 model, connect the ECM couplers (1) as follows:
 - a. Make sure that lock levers (2) are in unlock position.
 - b. Insert the couplers (1) to ECM (3) it stop with lock levers (2) in unlocked position.
 - c. Turn the lock levers (2) in direction of arrow to lock the couplers (1) securely.



IJ31J1130003-01

IAP Sensor Inspection

BENJ31J31306011

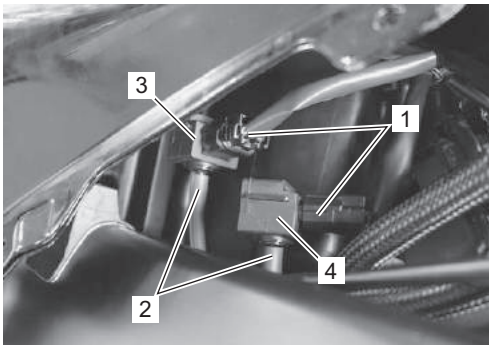
Refer to “DTC P0105-H / P0105-L (C17)”: L4 - L6 in Section 1A (Page 1A-28) and “DTC P1750-H / P1750-L (C13)”: L4 - L6 in Section 1A (Page 1A-83), or “DTC P0105 / P0106 / P0107 (C17)”: L8 - in Section 1A (Page 1A-102) and “DTC P1100 / P1101 / P1102 (C13)”: L8 - in Section 1A (Page 1A-133).

IAP Sensor Removal and Installation

BENJ31J31306012

Removal

- 1) Lift and support the fuel tank. ☞ (Page 1G-9)
- 2) Disconnect the IAP sensor couplers (1) and vacuum hoses (2).
- 3) Remove the IAP sensor #1 (3) and #2 (4).



IE31J1130054-01

Installation

Install the IAP sensor in the reverse order of removal.

IAT Sensor Inspection

BENJ31J31306013

Refer to “IAT Sensor Removal and Installation” (Page 1C-15).

Measure the resistance of the IAT sensor. Make sure that the resistance value decreases as temperature increase. If measured resistance does not change as specified, replace IAT sensor with a new one.

NOTE

IAT sensor resistance measurement method is the same way as that of the ECT sensor.
☞ (Page 1C-16)

IAT sensor resistance

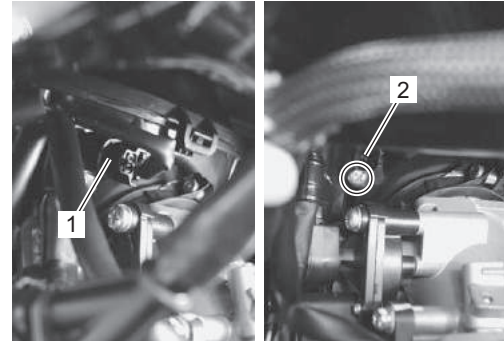
Temperature	Standard resistance
80 °C (176 °F)	290 – 390 Ω
0 °C (32 °F)	5400 – 6600 Ω

IAT Sensor Removal and Installation

BENJ31J31306014

Removal

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



IE31J1130055-01

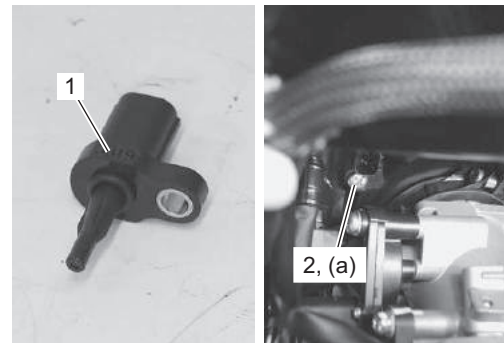
Installation

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, 1.0 lbf·ft)



IE31J1130056-01

ECT Sensor Inspection

BENJ31J31306015

Refer to "ECT Sensor Removal and Installation" (Page 1C-16).

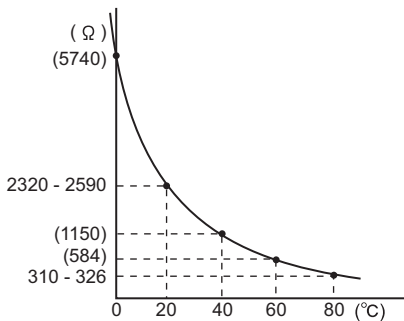
Check resistance between terminals of the ECT sensor (1). Make sure that the resistance value decreases as temperature increase. If measured resistance does not change as specified, replace ECT sensor with a new one.

NOTICE

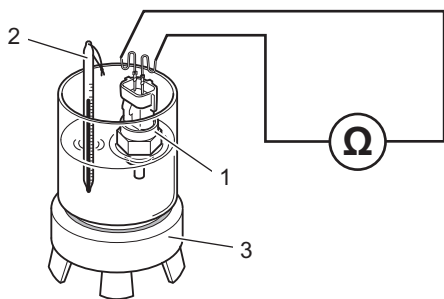
- Handle the ECT sensor carefully as it will easily be broken if it receives excessively large shocks or forces.
- Keep the ECT sensor and thermometer (2) not in contact with the heater's water container.

ECT sensor resistance

Temperature	Standard resistance
-20 °C (-4 °F)	13840 - 16330 Ω
20 °C (68 °F)	2320 - 2590 Ω
80 °C (176 °F)	310 - 326 Ω



ID26J1130061-02



ID26J1130060-01

3. Heater

ECT Sensor Removal and Installation

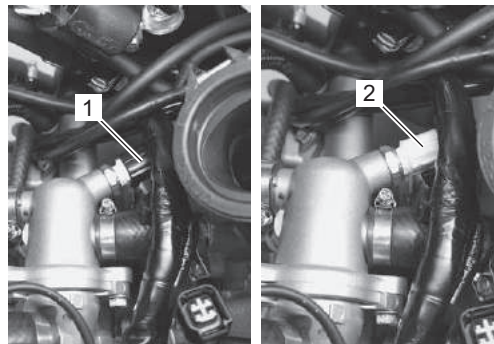
BENJ31J31306016

Removal

- 1) Drain engine coolant. (Page 1F-6)
- 2) Remove the throttle body assembly. (Page 1C-4)
- 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.



IE31J1130057-01

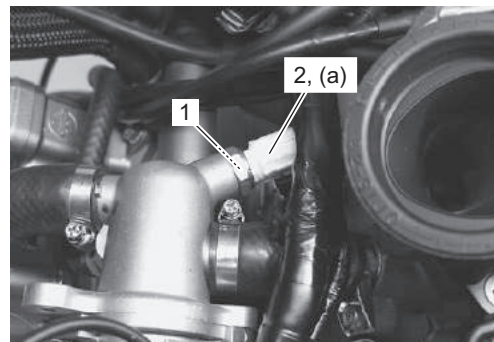
Installation

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

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

Tightening torque

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



IE31J1130058-01

TP Sensor Inspection

BENJ31J31306017

Refer to "DTC P0120-H / P0120-L (C14)": L4 - L6 in Section 1A (Page 1A-34) or "DTC P0120 / P0123 (C14)": L8 - in Section 1A (Page 1A-108).

TP Sensor Adjustment

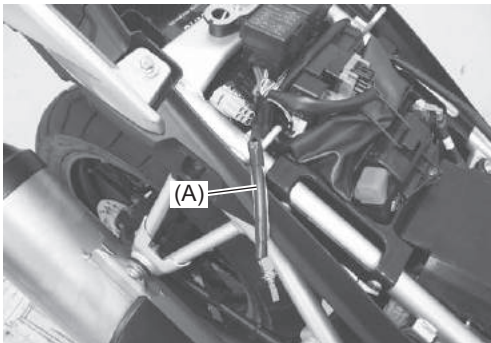
BENJ31J31306018

Non-Euro4 Model

- 1) Check that the throttle cable play is within the specification. (Page 1C-4)
- 2) Remove the seat.
 - L4 – L6 model: (Page 9D-10)
 - L8 – model: (Page 9D-33)
- 3) Connect the special tool (Mode select switch) to the mode select coupler.

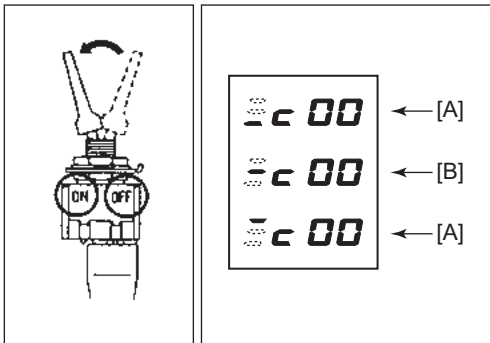
Special tool

(A): 09930–82720



IE31J1130059-02

- 4) Turn the mode select switch ON.
- 5) Check the position of the bar in the left of C code displayed on the LCD panel.



IE31J1130007-02

[A]: Incorrect position	[B]: Correct position
-------------------------	-----------------------

- 6) If the TP sensor adjustment is necessary, lift and support the fuel tank. (Page 1G-9)
- 7) Loosen the TP sensor mounting screw (1) with the special tool and turn the TP sensor (2) to bring the bar to the correct position.

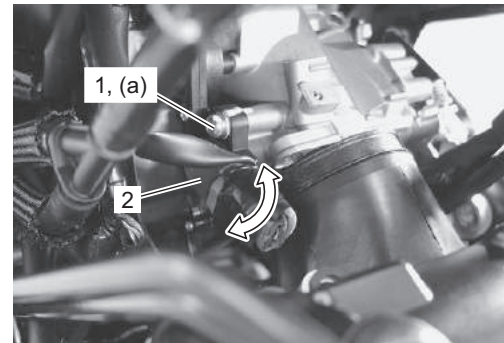
Special tool

09930–11950

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

Tightening torque

TP sensor mounting screw (a): 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



IE31J1130060-02

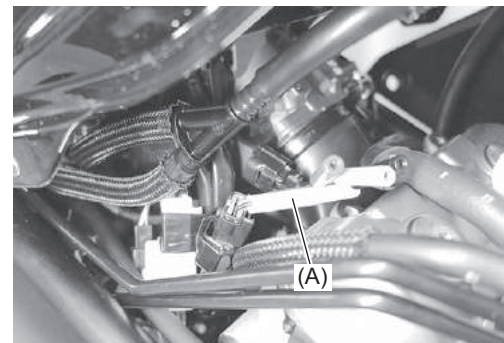
- 9) Disconnect the special tool (Mode select switch) and install the removed parts.

Euro4 Model

- 1) Check that the throttle cable play is within the specification. (Page 1C-4)
- 2) Check the TP sensor power supply voltage and circuit. (Page 1A-108)
- 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



IJ31J1130004-01

1C-18 Engine Electrical Devices:

- Turn the ignition switch ON.
- Measure the voltage between the P/W wire and B/Br wire by turning the throttle grip open and close.

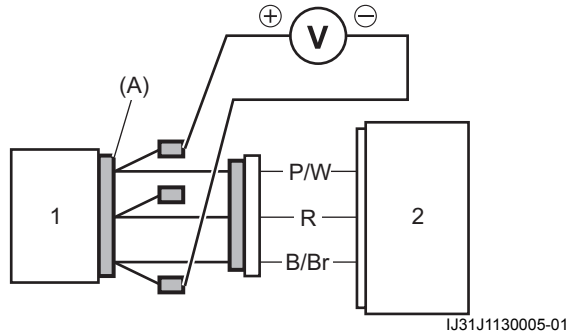
TP sensor output voltage

Closed [Standard]: 1.10 – 1.14 V

Opened [Standard]: Approx. 4.3 V

Special tool

(A): 09900–28631



1. TP sensor	2. ECM
--------------	--------

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

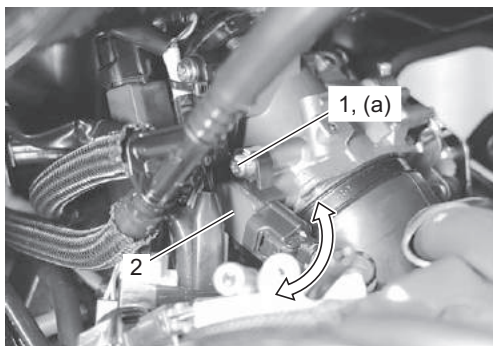
Special tool

09930–11950

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

Tightening torque

TP sensor mounting screw (a): 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



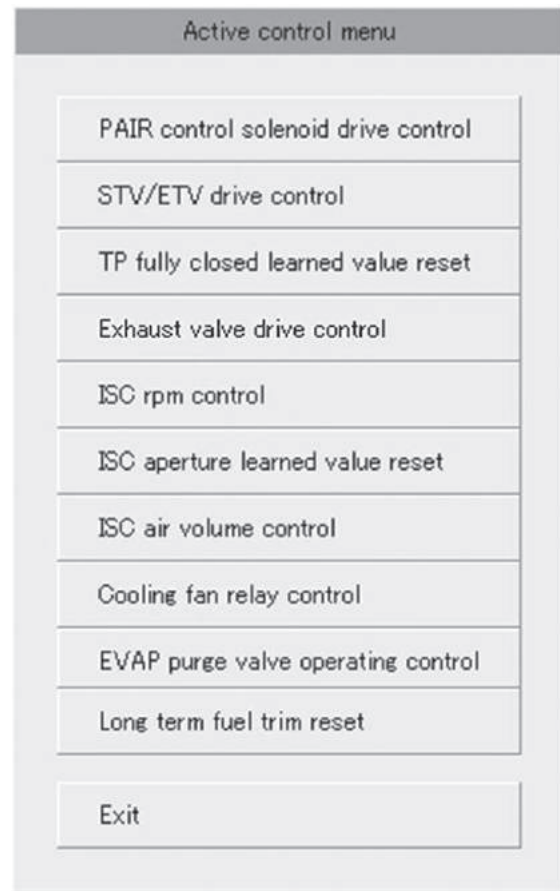
- Remove the special tool and connect the TP sensor coupler.
- Reset the TP fully closed learned value. (Page 1C-18)
- After finishing the TP sensor adjustment, install the removed parts.

TP Fully Closed Learned Value Reset (If Equipped)

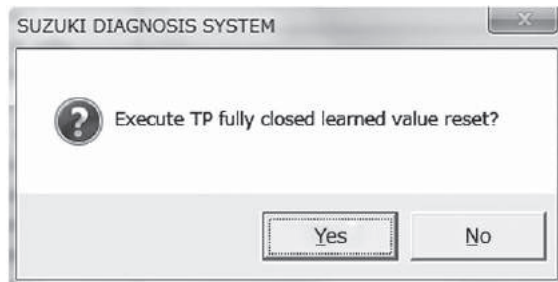
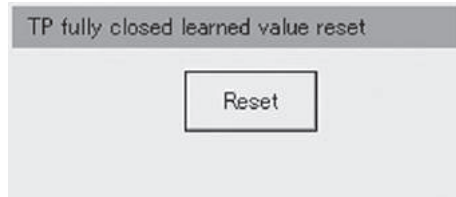
BENJ31J31306019

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 procedures:

- Remove the seat. (Page 9D-33)
- Set up the SDS-II tool referring to the SDS-II operation manual for further details.
- Turn the ignition switch ON.
- Click the “Active control”.
- Click the “TP fully closed learned value reset”.



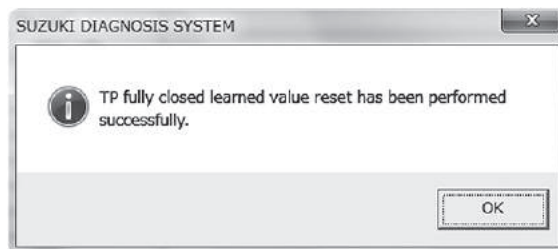
- 6) Click the "Reset" button to clear the TP fully closed learned value.



IF04K1130061-02

NOTE

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



IF04K1130055-02

- 7) Close the SDS-II tool 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.

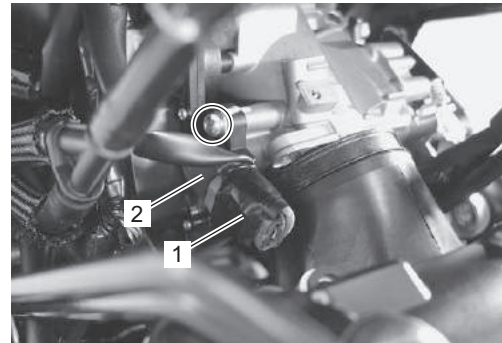
TP Sensor Removal and Installation

BENJ31J31306020

Removal

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

Special tool
09930-11950



IE31J1130061-01

Installation

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

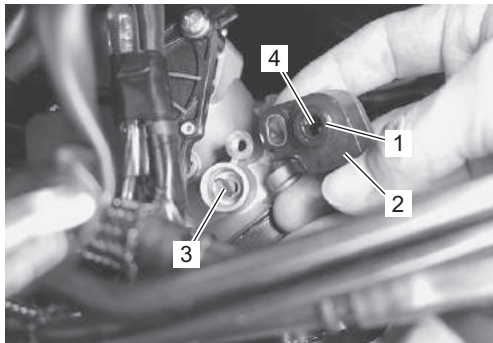
- Apply a thin coat of engine oil to the new O-ring (1).
- With the throttle valve fully closed, install the TP sensor (2) aligning the throttle shaft end (3) with the groove (4) of the TP sensor.
- Tighten the TP sensor mounting screw to the specified torque.

Special tool

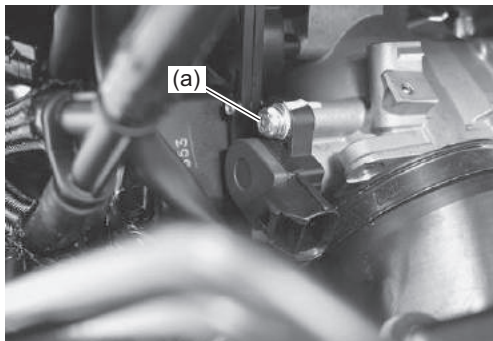
09930-11950

Tightening torque

TP sensor mounting screw (a): 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



IE31J1130062-01



IE31J1130063-01

- Check the throttle valve operating smoothly.
- Adjust the position of TP sensor. (Page 1C-17)
- Reset the TP fully closed learned value. (If equipped) (Page 1C-18)

HO2 Sensor Inspection

BENJ31J31306021

Refer to “DTC P0130 (C64)”: L4 - L6 in Section 1A (Page 1A-36), “DTC P0135 (C64)”: L4 - L6 in Section 1A (Page 1A-40), “DTC P0156 (C44)”: L4 - L6 in Section 1A (Page 1A-42) and “DTC P0161 (C44)”: L4 - L6 in Section 1A (Page 1A-45), or “DTC P0030 (C64) / P0050 (C44)”: L8 - in Section 1A (Page 1A-100) and “DTC P0130 (C64) / P0150 (C44)”: L8 - in Section 1A (Page 1A-110).

HO2 Sensor Removal and Installation

BENJ31J31306022

Removal

⚠ WARNING

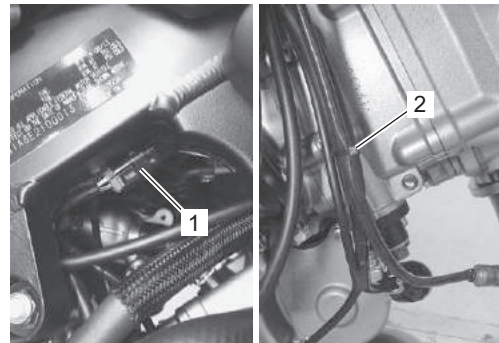
Do not remove the HO2 sensor while it is hot.

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.

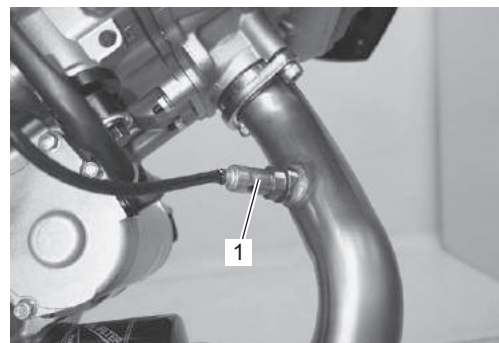
HO2 sensor #1

- 1) Disconnect the HO2 sensor coupler (1) and remove the clamp (2).



IE31J1130064-02

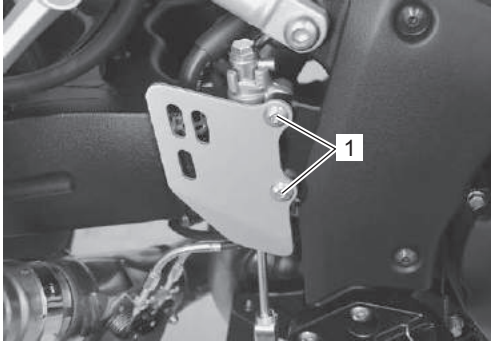
- 2) Remove the HO2 sensor (1).



IE31J1130065-01

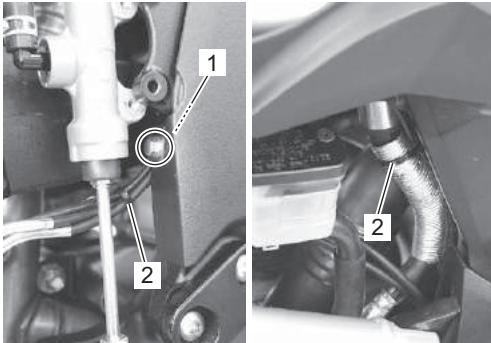
HO2 sensor #2

- 1) Remove the seat.
 - L4 – L6 model: (Page 9D-10)
 - L8 – model: (Page 9D-33)
- 2) Remove the rear brake master cylinder mounting bolts (1).



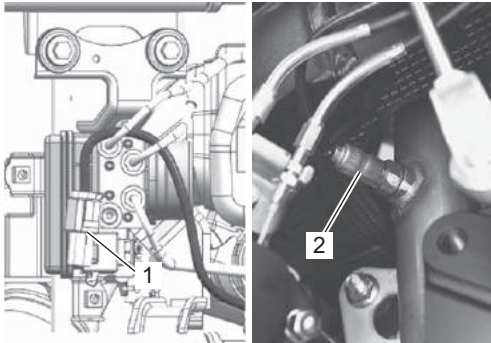
IE31J1130066-01

- 3) Remove the guide (1) and clamps (2).



IE31J1130067-03

- 4) Disconnect the HO2 sensor coupler (1) and remove the HO2 sensor (2).



IE31J1130068-03

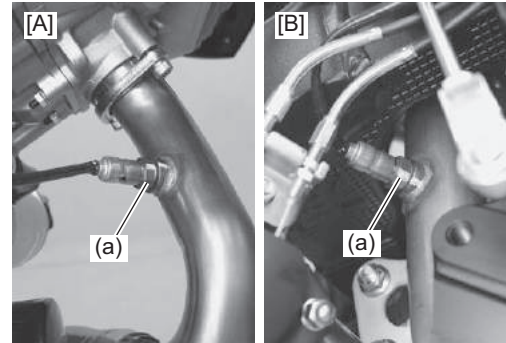
Installation

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 sensors.
- Tighten the HO2 sensors to the specified torque.

Tightening torque

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



IE31J1130069-01

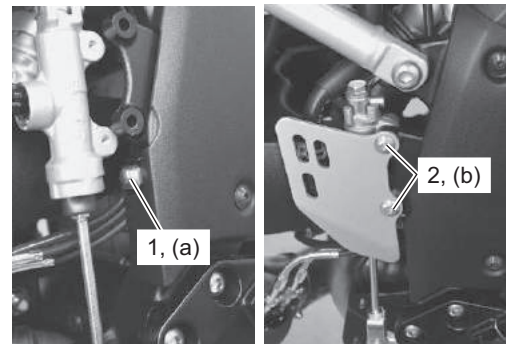
[A]: HO2 sensor #1	[B]: HO2 sensor #2
--------------------	--------------------

- Route the HO2 sensor lead wires. Refer to “Intake System Components” in Section 1D (Page 1D-2).
- For HO2 sensor #2, tighten the EXCV cable guide bolt (1) and rear brake master cylinder mounting bolts (2) to the specified torque.

Tightening torque

EXCV cable guide bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Rear brake master cylinder mounting bolt (b): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1130070-01

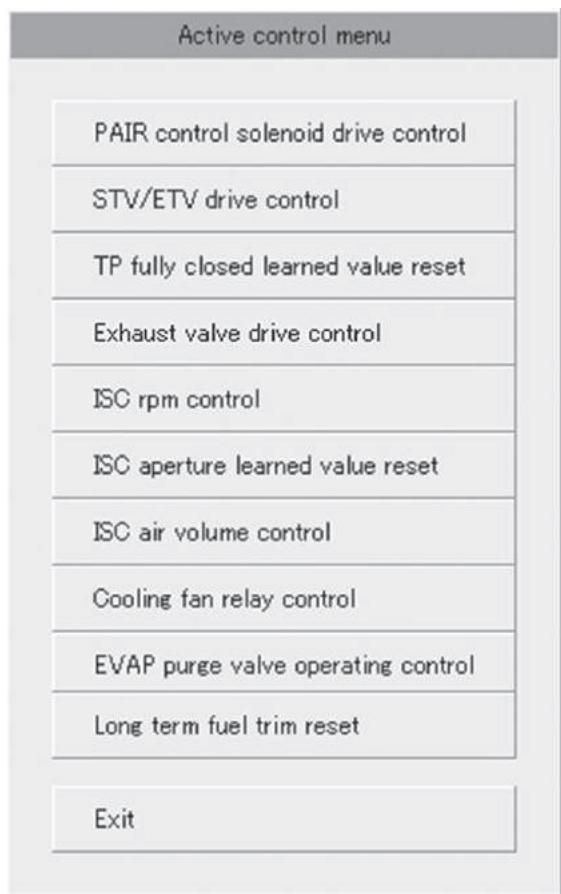
- When replacing the HO2 sensor, reset the long term fuel trim. (If equipped) (Page 1C-22)

Long Term Fuel Trim Reset (If Equipped)

BENJ31J31306023

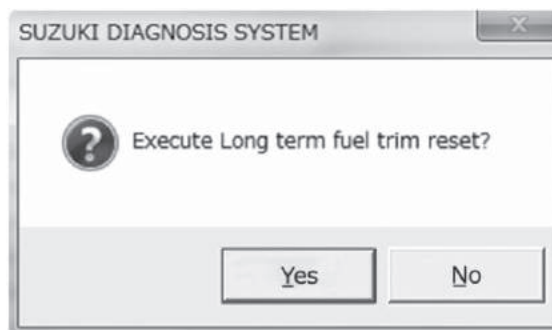
When replacing the HO2 sensor with a new one, reset the long term fuel trim in the following procedures:

- 1) Remove the seat. (Page 9D-33)
- 2) Set up the SDS-II tool 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”.



IJ31J1130014-01

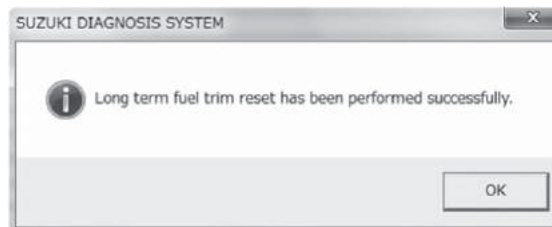
- 6) Click the “Reset” button to clear the long term fuel trim (HO2 sensor feedback learned value).



IJ31J1130007-01

NOTE

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



IJ31J1130008-01

- 7) Close the SDS-II tool 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.

- 8) Install the removed parts.

CKP Sensor Inspection

BENJ31J31306024

Refer to “DTC P0335 (C12)”: L4 - L6 in Section 1A (Page 1A-52) or “DTC P0335 (C12)”: L8 - in Section 1A (Page 1A-120).

CKP Sensor Removal and Installation

BENJ31J31306025

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

Wheel speed Sensor Inspection

BENJ31J31306026

Refer to “DTC P0500 (C16)”: L4 - L6 in Section 1A (Page 1A-59) and “DTC P1500 (C91)”: L4 - L6 in Section 1A (Page 1A-64), or “DTC P0500 (C16) / P2158 (C91)”: L8 - in Section 1A (Page 1A-128).

Wheel Speed Sensor Removal and Installation

BENJ31J31306027

Refer to “Front Wheel Speed Sensor Removal and Installation”: L4 - L6 in Section 4E (Page 4E-38) and “Rear Wheel Speed Sensor Removal and Installation”: L4 - L6 in Section 4E (Page 4E-38), or “Front Wheel Speed Sensor Removal and Installation”: L8 - in Section 4E (Page 4E-80) and “Rear Wheel Speed Sensor Removal and Installation”: L8 - in Section 4E (Page 4E-80).

GP Switch Inspection

BENJ31J31306028

Refer to “Side-stand / Ignition Interlock System Parts Inspection” in Section 1I (Page 1I-10).

GP Switch Removal and Installation

BENJ31J31306029

Refer to “GP Switch Removal and Installation” in Section 5B (Page 5B-11).

TO Sensor Inspection

BENJ31J31306030

Refer to “DTC P1651-H / P1651-L (C23)”: L4 - L6 in Section 1A (Page 1A-66) or “DTC P1700 / P1702 (C23)”: L8 - in Section 1A (Page 1A-140).

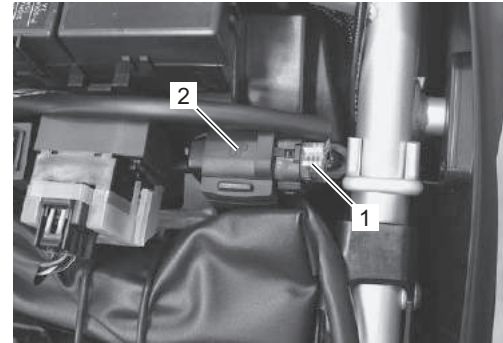
TO Sensor Removal and Installation

BENJ31J31306031

L4 – L6

Removal

- 1) Remove the seat. (Page 9D-10)
- 2) Disconnect the coupler (1) and remove the TO sensor (2).

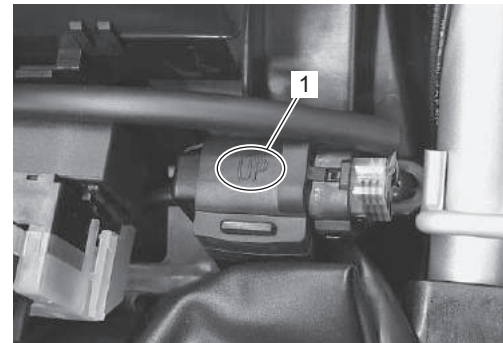


IE31J1130071-01

Installation

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

- When installing the TO sensor, bring the “UP” letters (1) upward.

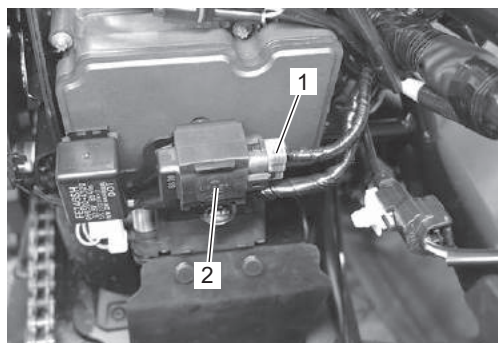


IE31J1130072-01

L8 –

Removal

- 1) Remove the battery holder. (Page 9D-37)
- 2) Disconnect the coupler (1) and remove the TO sensor (2).

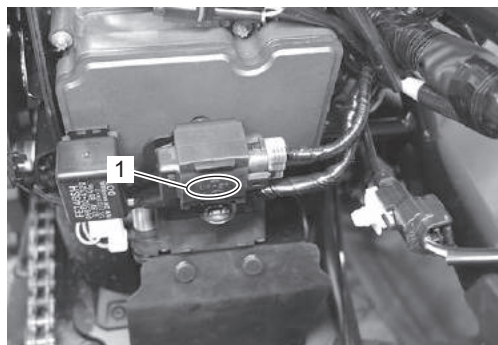


IJ31J1130009-01

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.



IJ31J1130010-01

STP Sensor Inspection

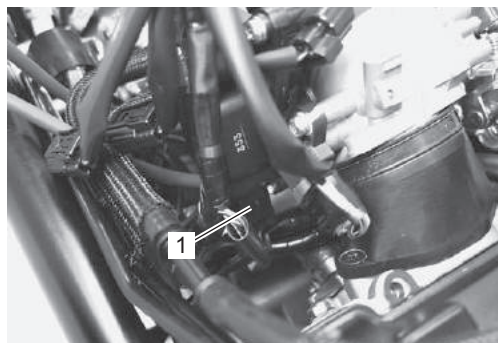
BENJ31J31306032

Refer to “DTC P1654-H / P1654-L (C29)”: L4 - L6 in Section 1A (Page 1A-68) or “DTC P0220 / P0223 (C29)”: L8 - in Section 1A (Page 1A-116).

STP Sensor Adjustment

BENJ31J31306033

- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Disconnect the STVA coupler (1).

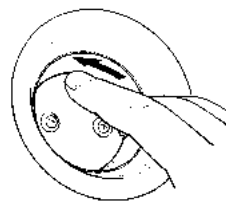


IE31J1130073-01

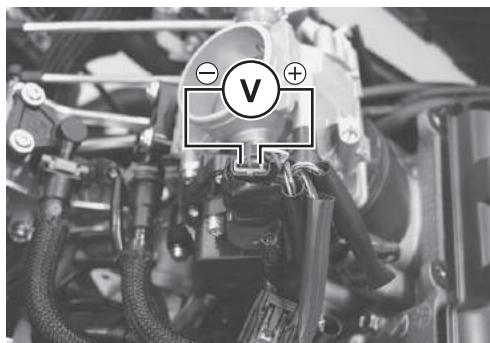
- 3) Turn the ignition switch ON.
- 4) Close the STV by finger and measure the voltage between the Y wire and B/Br wire.

STP sensor output voltage

STV is fully closed: Approx. 0.6 V



I718H1130017-01



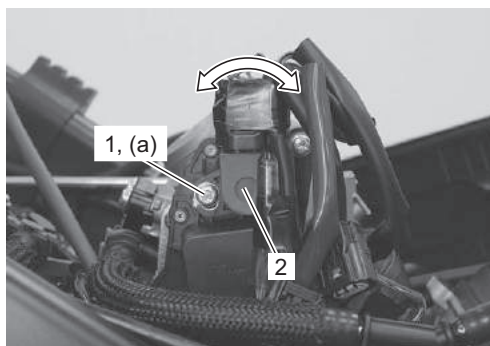
IE31J1130074-02

- 5) Loosen the STP sensor mounting screw (1) with the special tool and adjust the STP sensor (2) until the output voltage comes within the specified value.

Special tool
09930–11950

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

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



IE31J1130075-02

- 7) Install the removed parts.

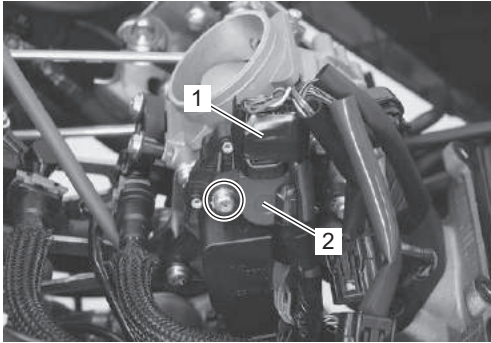
STP Sensor Removal and Installation

BENJ31J31306034

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 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.

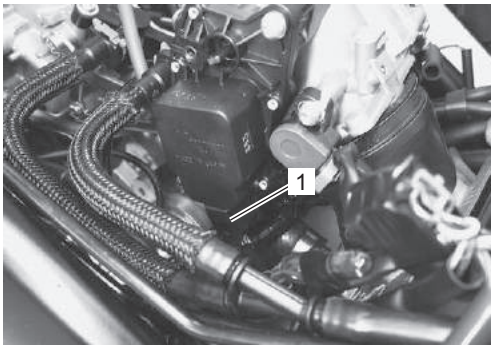
Special tool
09930-11950



IE31J1130076-01

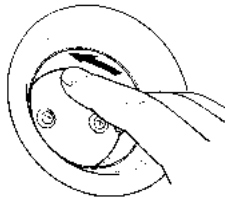
Installation

- 1) Disconnect the STVA coupler (1).



IE31J1130077-01

- 2) Close the STV by finger.

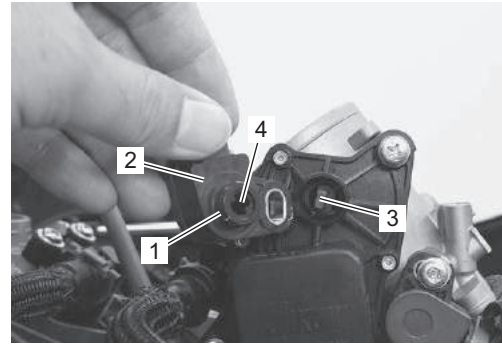


I718H1130017-01

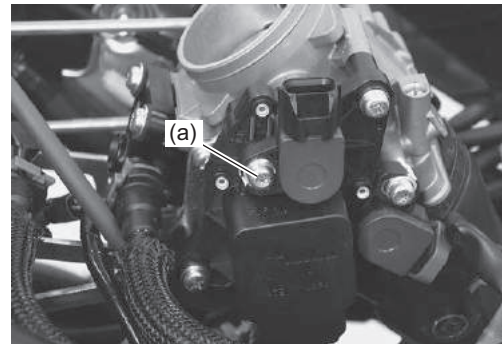
- 3) Apply a thin coat of engine oil to the new O-ring (1).
- 4) With the STV fully closed, install the STP sensor (2) aligning the secondary throttle shaft end (3) with the groove (4) of the STP sensor.
- 5) Tighten the STP sensor mounting screw to the specified torque.

Special tool
09930-11950

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



IE31J1130078-01



IE31J1130079-01

- 6) Check the STV operating smoothly.
- 7) Connect the STP sensor coupler and adjust the position of STP sensor. (Page 1C-24)
- 8) Install the removed parts.

STV Actuator Inspection

BENJ31J31306035

Refer to "DTC P1655 (C28)": L4 - L6 in Section 1A (Page 1A-70) or "DTC P2100 (C28)": L8 - in Section 1A (Page 1A-142).

STV Actuator Removal and Installation

BENJ31J31306036

Refer to “Throttle Body Disassembly and Reassembly” (Page 1C-6).

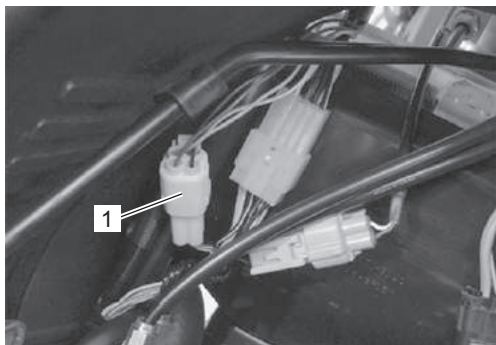
NOTICE

- Never remove the STVA from the throttle body.
- The STVA and throttle body are available only as an assembly.

Traction Control System Select Switch / Mode Switch Inspection

BENJ31J31306037

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Disconnect the left handlebar switch coupler (1).



IJ31J1130011-01

- 4) Inspect the traction control system select switch and mode switch for continuity with a circuit tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to “Handlebar Removal and Installation” in Section 6B (Page 6B-3).

Traction control system select switch

Color	P	B/G
Position		
•		
PUSH	○	○

IJ31J1130012-01

Mode switch

Color	Y/G	G	B/G
Position			
UP	○		○
•			
DOWN		○	○

IJ31J1130013-01

- 5) After finishing the traction control system select switch / mode switch inspection, install the removed parts.

Specifications

Tightening Torque Specifications

BENJ31J31307001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Intake pipe clamp screw	1.5	0.15	1.0	☞ (Page 1C-5)
Throttle cable lock-nut	4.5	0.45	3.5	☞ (Page 1C-5)
STP sensor mounting screw	3.5	0.35	2.5	☞ (Page 1C-8) / ☞ (Page 1C-24) / ☞ (Page 1C-25)
TP sensor mounting screw	3.5	0.35	2.5	☞ (Page 1C-8) / ☞ (Page 1C-17) / ☞ (Page 1C-18) / ☞ (Page 1C-20)
Fuel delivery pipe mounting screw	3.5	0.35	2.5	☞ (Page 1C-9)
EVAP system purge control solenoid valve bracket screw	5	0.5	4.0	☞ (Page 1C-10)
EVAP system purge control solenoid valve nut	7	0.7	5.0	☞ (Page 1C-10)
IAT sensor screw	1.3	0.13	1.0	☞ (Page 1C-15)
ECT sensor	18	1.8	13.0	☞ (Page 1C-16)
HO2 sensor	25	2.5	18.0	☞ (Page 1C-21)
EXCV cable guide bolt	10	1.0	7.5	☞ (Page 1C-21)
Rear brake master cylinder mounting bolt	10	1.0	7.5	☞ (Page 1C-21)

Reference:

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

“Throttle Cable Routing Diagram” (Page 1C-2)

“Throttle Body Assembly Components” (Page 1C-3)

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

Special Tools and Equipment

Recommended Service Material

BENJ31J31308001

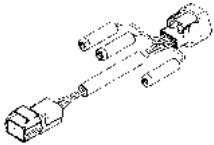
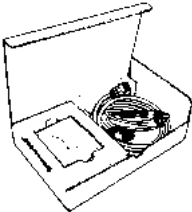
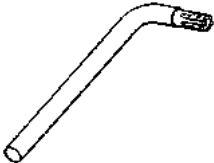
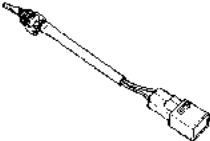
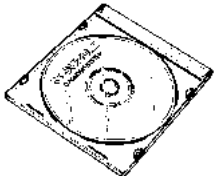
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI WATER RESISTANT GREASE EP2	P/No.: 99000-25350	☞ (Page 1C-10)

NOTE

Required service material(s) is also described in:

“Throttle Body Assembly Components” (Page 1C-3)

Special Tool

<p>09900-28631 TP Sensor test lead</p> <p>☞ (Page 1C-17) / ☞ (Page 1C-18)</p> 	<p>09904-41010 SUZUKI Diagnostic system set</p> <p>☞ (Page 1C-11) / ☞ (Page 1C-13)</p> 
<p>09930-11950 Torx® wrench (T25H) Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A.</p> <p>☞ (Page 1C-7) / ☞ (Page 1C-8) / ☞ (Page 1C-8) / ☞ (Page 1C-17) / ☞ (Page 1C-18) / ☞ (Page 1C-19) / ☞ (Page 1C-20) / ☞ (Page 1C-24) / ☞ (Page 1C-25) / ☞ (Page 1C-25)</p> 	<p>09930-82720 Mode selection switch</p> <p>☞ (Page 1C-17)</p> 
<p>99565-01010-034 CD-ROM Ver.34</p> <p>☞ (Page 1C-11) / ☞ (Page 1C-13)</p> 	

Engine Mechanical

Precautions

Precautions for Engine Mechanical

BENJ31J3140001

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

NOTE

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

Diagnostic Information and Procedures

Compression Pressure Check

BENJ31J31404001

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

NOTE

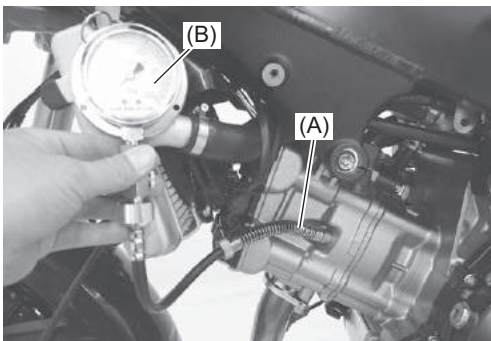
- Before checking the engine for compression pressure, make sure that the cylinder head bolts are tightened to the specified torque values and the valves are properly adjusted.
- Make sure that the battery is in fully-charged condition.

- 1) Warm up the engine.
- 2) Disconnect the all spark plug caps and remove each spark plug (Side). (Page 1H-6)
- 3) Install the compression gauge and adapter in the spark plug hole. Make sure that the connection is tight.

Special tool

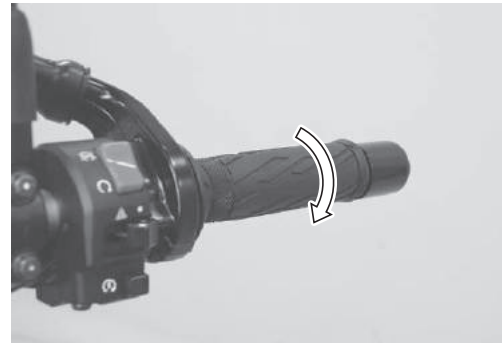
(A): 09915-64512

(B): 09915-63311



IE31J1140001-01

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



IE31J1140002-01

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

Compression pressure

Standard: 1000 – 1400 kPa (10 – 14 kgf/cm², 142 – 199 psi)

Service limit: 800 kPa (8 kgf/cm², 114 psi)

Compression pressure difference

Service limit: 200 kPa (2 kgf/cm², 28 psi)

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

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

1D-2 Engine Mechanical:

Overhaul the engine in the following cases:

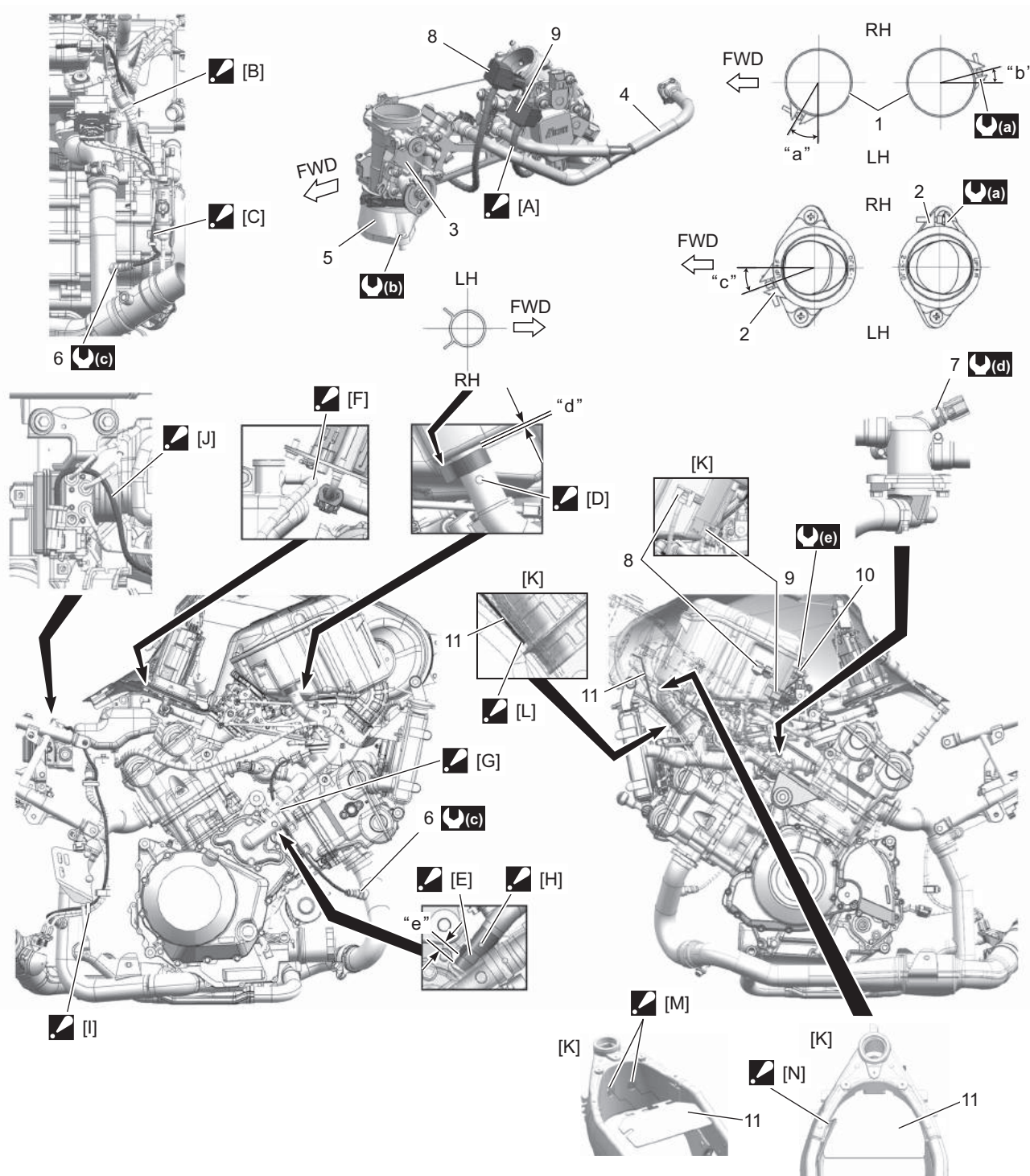
- Compression pressure in one of the cylinder is 800 kPa (8 kgf/cm², 114 psi) or less.
- Compression pressures of all cylinders are 1000 kPa (10 kgf/cm², 142 psi) or less.

- Compression pressure difference between 2 cylinders is more than 200 kPa (2 kgf/cm², 28 psi).
- 7) After checking the compression pressure, install the removed parts.

Repair Instructions

Intake System Components

BENJ31J31406001



IJ31J1140001-02

<p>☑ [A]: Pass the vacuum hose between the fuel feed hoses.</p>	5. Intake pipe
<p>☑ [B]: Clamp the HO2 sensor lead wire, rear brake light switch lead wire and brake hose. Put the HO2 sensor lead wire between the brake hose and frame.</p>	6. HO2 sensor
<p>☑ [C]: For L4 – L6 model, pass the HO2 sensor lead wire into the EXCV cable guide. For L8 – model, HO2 sensor lead wire may not pass into the EXCV cable guide.</p>	7. ECT sensor
<p>☑ [D]: Align the yellow mark with the bulge part.</p>	8. IAP sensor #1
<p>☑ [E]: Face the clamp end outside.</p>	9. IAP sensor #2
<p>☑ [F]: Pass the radiator reservoir tank overflow hose behind the fuel feed hose.</p>	10. IAT sensor
<p>☑ [G]: Pass the HO2 sensor lead wire inside of the water hose.</p>	11. Air cleaner inlet sheet (L8 –)
<p>☑ [H]: Align the blue mark with the bulge part.</p>	"a": 30°
<p>☑ [I]: Clamp the HO2 sensor lead wire and EXCV cables behind the frame.</p>	"b": 15°
<p>☑ [J]: Pass the HO2 sensor lead wire over the ABS control unit/HU.</p>	"c": 20°
<p>[K]: L8 –</p>	"d": 3 mm (0.1 in)
<p>☑ [L]: Push the air cleaner inlet tube to the air cleaner inlet sheet.</p>	"e": 5 mm (0.2 in)
<p>☑ [M]: Insert the air cleaner inlet sheet in the frame hole.</p>	ⓐ : 1.5 N·m (0.15 kgf·m, 1.0 lbf·ft)
<p>☑ [N]: Pass the front brake hoses into the groove of the air cleaner inlet sheet.</p>	ⓑ : 8.5 N·m (0.85 kgf·m, 6.5 lbf·ft)
1. Air cleaner outlet tube clamp	ⓒ : 25 N·m (2.5 kgf·m, 18.0 lbf·ft)
2. Intake pipe clamp	ⓓ : 18 N·m (1.8 kgf·m, 13.0 lbf·ft)
3. Throttle body assembly	ⓔ : 1.3 N·m (0.13 kgf·m, 1.0 lbf·ft)
4. Fuel feed hose	

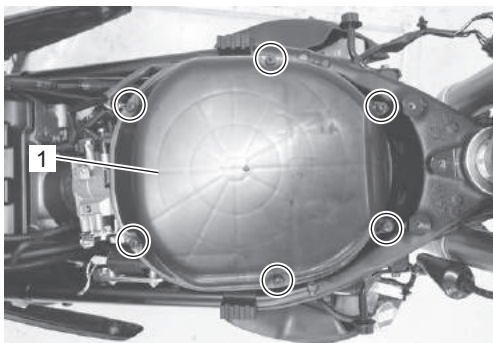
Air Cleaner Element Removal and Installation

BENJ31J31406002

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

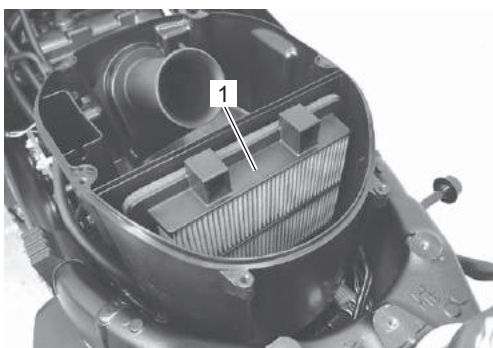
Removal

- 1) Remove the air cleaner cover (1).



IE31J1140004-01

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



IE31J1140005-01

Installation

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

Air Cleaner Element Inspection

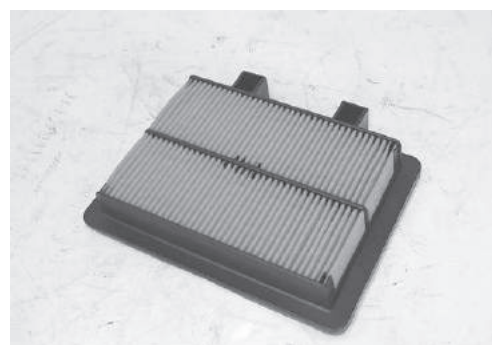
BENJ31J31406003

Refer to "Air Cleaner Element Removal and Installation" (Page 1D-3).

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

NOTICE

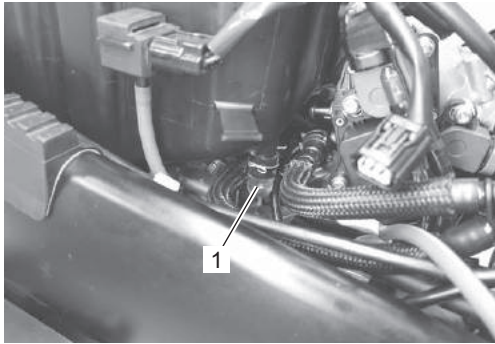
- Do not blow the air cleaner element with compressed air.
- If driving under dusty conditions, replace the air cleaner element more frequently. Make sure that the air cleaner is in good condition at all times. Life of the engine depends largely on this component.



IE31J1140006-01

1D-4 Engine Mechanical:

- 2) Remove the IAP sensor (#2). (Page 1C-15)
- 3) Remove the drain plug (1) and drain water from the air cleaner box.



IE31J1140007-01

- 4) Install the drain plug and IAP sensor (#2).

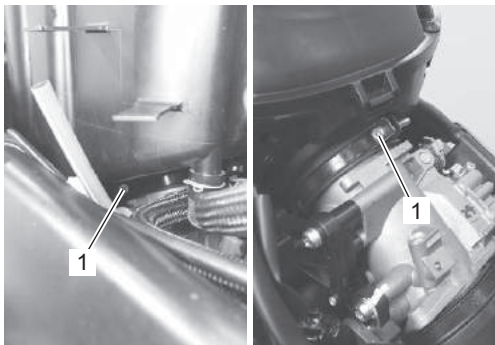
Air Cleaner Box Removal and Installation

BENJ31J31406004

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

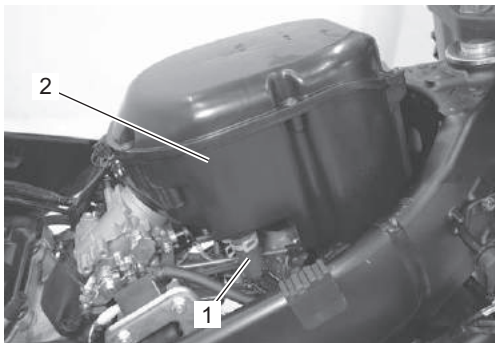
Removal

- 1) Remove the IAP sensors. (Page 1C-15)
- 2) Remove the IAT sensor. (Page 1C-15)
- 3) Loosen the air cleaner outlet tube clamp screws (1).



IE31J1140008-01

- 4) Disconnect the PAIR hose (If equipped).
- 5) Disconnect the PCV hose (1) and then remove the air cleaner box (2).



IE31J1140160-02

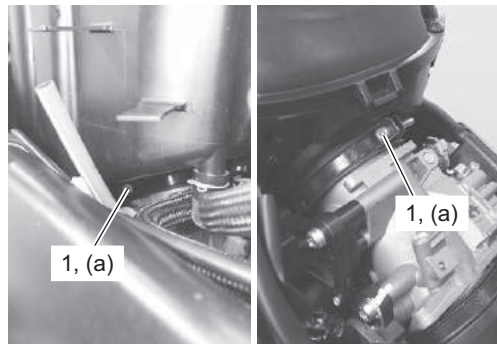
Installation

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

- Connect the PCV hose. Refer to "Intake System Components" (Page 1D-2).
- Connect the PAIR hose (If equipped). Refer to "PAIR System Hose Routing Diagram (If Equipped)" in Section 1B (Page 1B-6).
- Position the air cleaner outlet tube clamps and tighten the air cleaner outlet tube clamp screw (1) to the specified torque. (Page 1D-2)

Tightening torque

Air cleaner outlet tube clamp screw (a): 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)



IE31J1140009-02

Cylinder Head Cover Removal and Installation

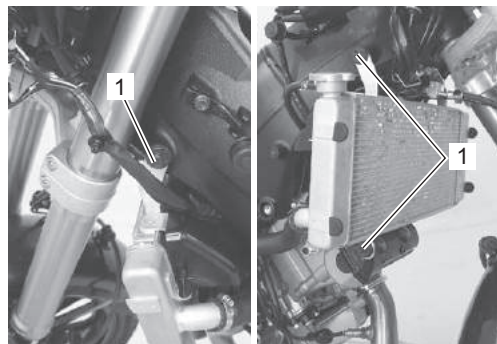
BENJ31J31406005

Refer to "Air Cleaner Box Removal and Installation" (Page 1D-4).

Removal

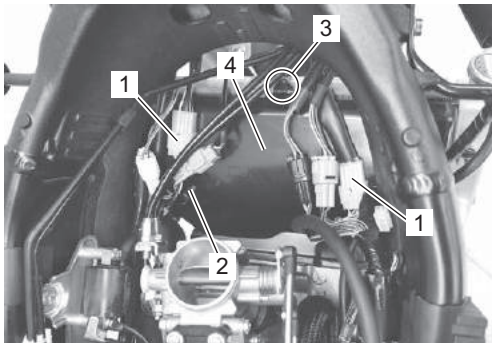
Front cylinder head cover

- 1) Remove the side lower cowlings.
 - L4 – L6 model: (Page 9D-15)
 - L8 – model: (Page 9D-34)
- 2) Remove the radiator mounting bolts (1).



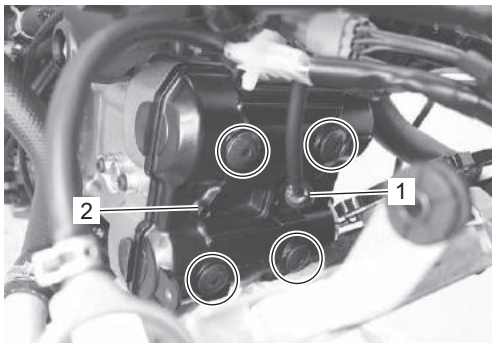
IE31J1140010-02

- 3) Remove the PAIR reed valve (If equipped). (Page 1B-11)
- 4) Remove the couplers (1) and clamp (2).
- 5) Remove the clip (3) and radiator heat shield (4).



IE31J1140011-01

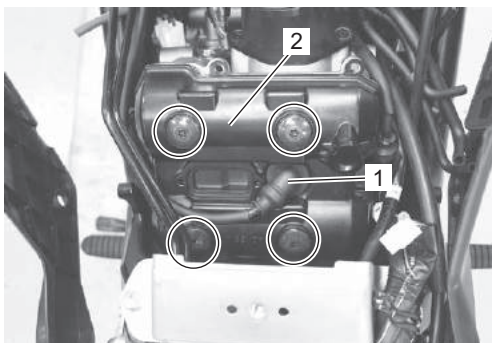
- 6) Disconnect the spark plug cap (Center) (1).
- 7) Remove the cylinder head cover (2) and its gaskets.



IE31J1140012-01

Rear cylinder head cover

- 1) Remove the radiator reservoir tank. (Page 1F-11)
- 2) Remove the PAIR reed valve (If equipped). (Page 1B-11)
- 3) Disconnect the spark plug cap (Center) (1).
- 4) Remove the cylinder head cover (2) and its gaskets.



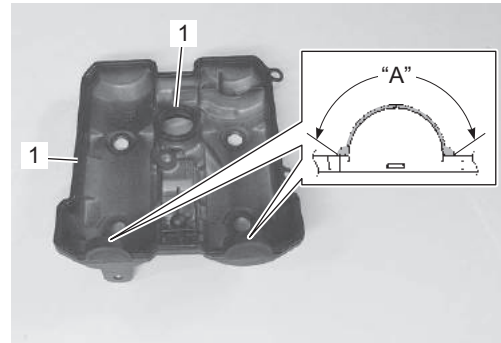
IE31J1140013-01

Installation

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

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

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



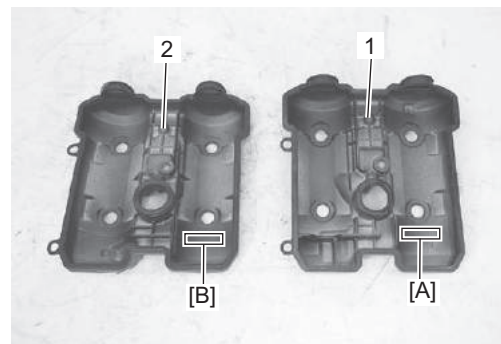
IE31J1140014-01

- Place the cylinder head covers on each cylinder head.

NOTE

Identify the cylinder head covers according to the following embossed letters.

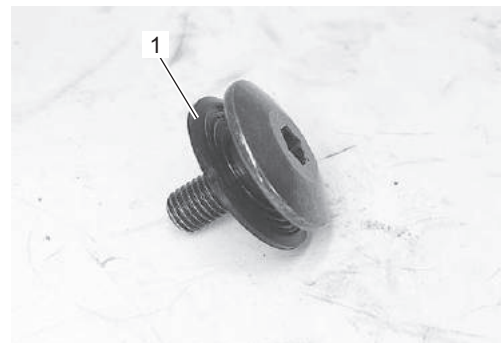
Front cylinder head cover (1): [A]
Rear cylinder head cover (2): [B]



IE31J1140015-01

[A]: FRONT	[B]: REAR
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- Set the new gaskets (1) to each cylinder head cover bolt and coat the both sides of the gasket with engine oil.



IE31J1140016-01

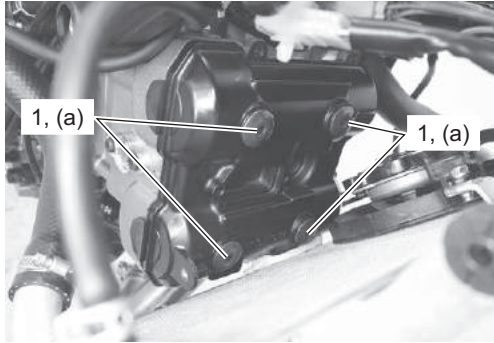
1D-6 Engine Mechanical:

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

Tightening torque

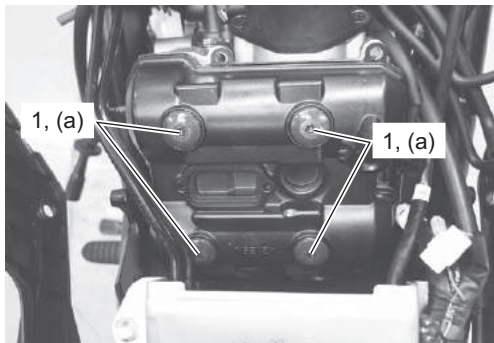
Cylinder head cover bolt (a): 14 N·m (1.4 kgf·m, 10.5 lbf·ft)

Front cylinder head cover



IE31J1140017-01

Rear cylinder head cover



IE31J1140018-01

- Connect the spark plug caps. (Page 1H-6)

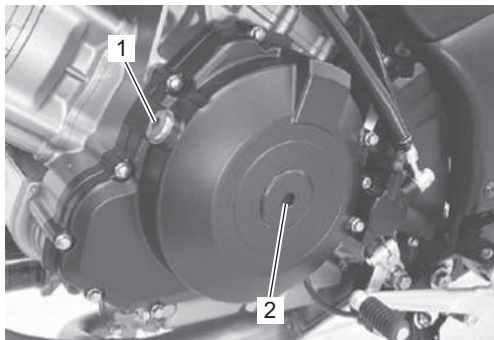
Camshaft Removal

BENJ31J31406006

Refer to "Cylinder Head Cover Removal and Installation" (Page 1D-4) and "Spark Plug Removal and Installation" in Section 1H (Page 1H-6).

Front Cylinder Camshaft

- 1) Remove the valve timing inspection plug (1) and generator cover plug (2).

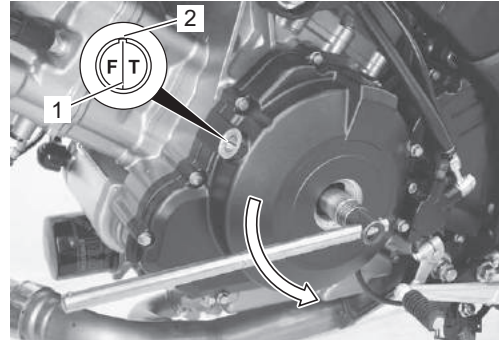


IE31J1140019-02

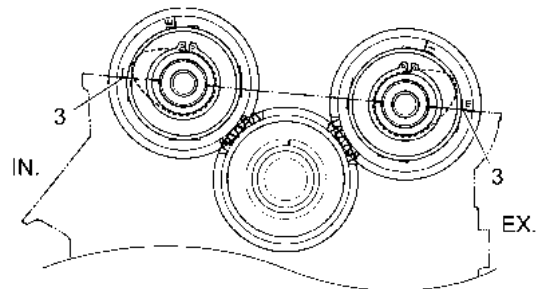
- 2) Turn the crankshaft to bring the "F | T" line (1) on generator rotor to the index mark (2) of the valve timing inspection hole and also to bring the camshafts to the position as shown.

NOTE

At the above condition, the front cylinder is at TDC on compression stroke and also the engraved lines (3) on the camshaft sprockets are parallel with the mating surface of the front cylinder head.



IE31J1140020-03

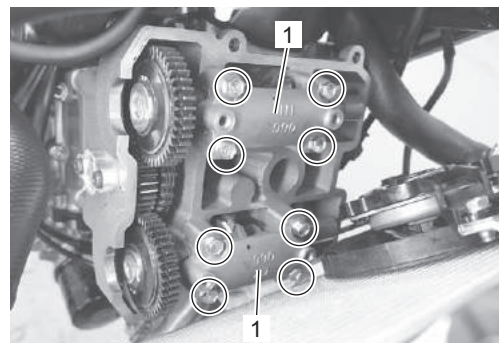


IE31J1140021-04

- 3) Remove the camshaft journal holders (1).

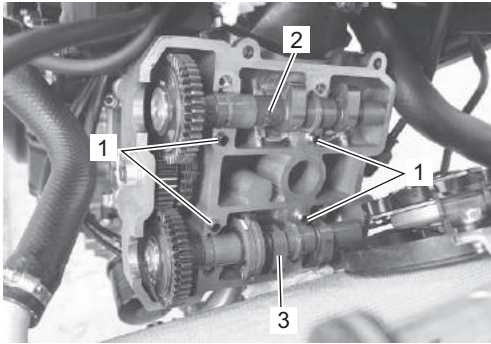
NOTICE

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



IE31J1140022-01

- 4) Remove the dowel pins (1).
- 5) Remove the intake camshaft (2) and exhaust camshaft (3).



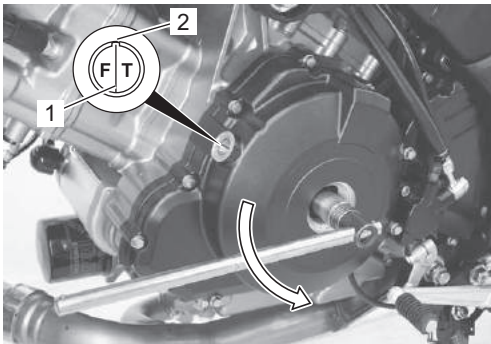
IE31J1140023-01

Rear Cylinder Camshaft

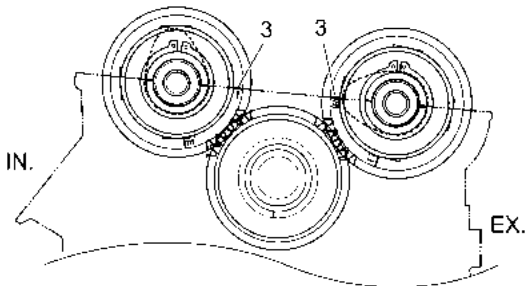
- 1) Rotate the crankshaft 360 degrees (1 turn) counterclockwise and align the "F | T" line (1) on the generator rotor with the index mark (2) of the valve timing inspection hole.

NOTE

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



IE31J1140024-01

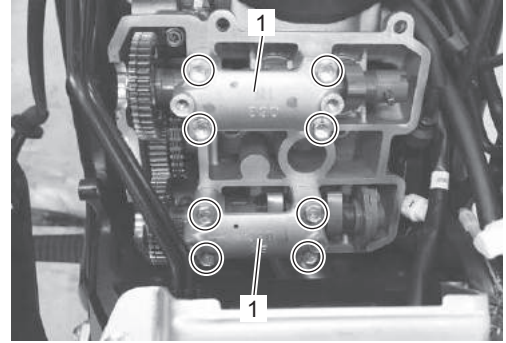


IE31J1140025-03

- 2) Remove the camshaft journal holders (1).

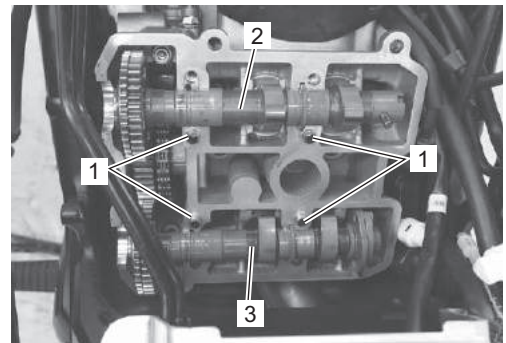
NOTICE

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



IE31J1140026-01

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



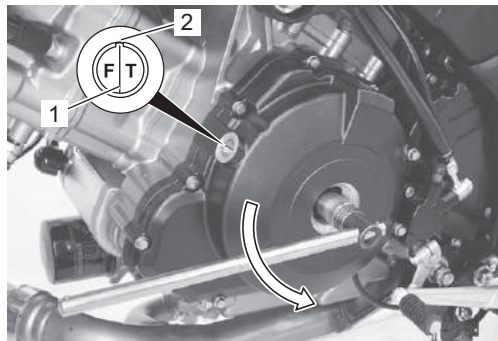
IE31J1140027-01

Camshaft Installation

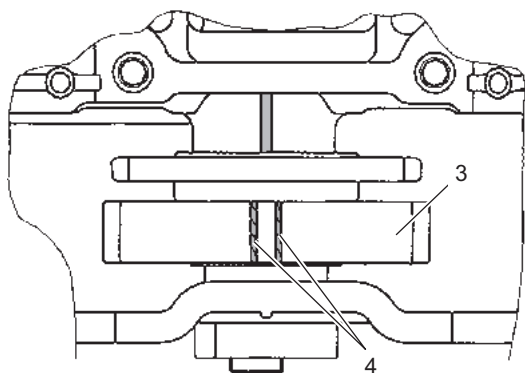
BENJ31J31406007

Front Cylinder Camshaft

- 1) Turn the crankshaft to bring the "F | T" line (1) on generator rotor to the index mark (2) of the valve inspection hole and also to bring the cam drive idle gear/sprocket No. 2 (Front cylinder) (3) to the position as shown.



IE31J1140028-01



IE31J1140029-01

4. Paint

- 2) Apply molybdenum oil solution to the camshaft journals and cam surfaces.

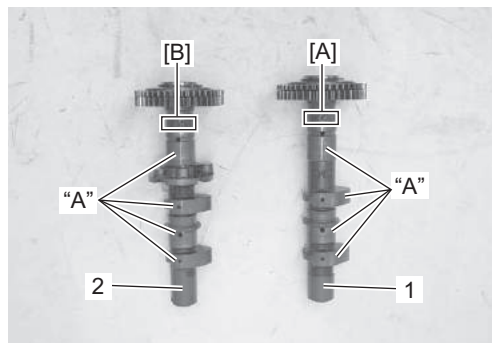
"A": Assembly lubrication (Molybdenum oil solution)

NOTE

Identify the camshafts according to the following embossed letters.

Intake camshaft (1): [A]

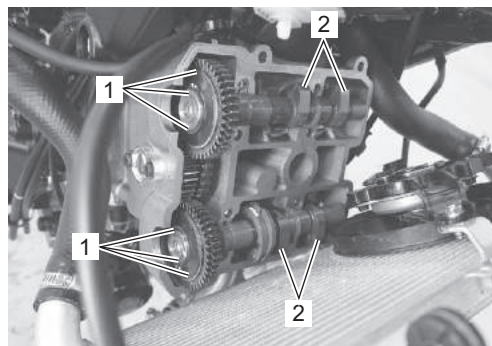
Exhaust camshaft (2): [B]



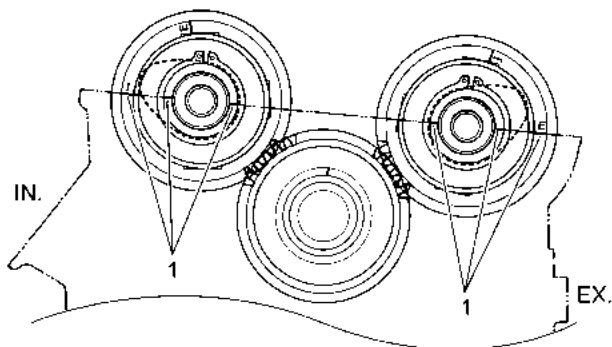
IE31J1140030-02

[A]: INF	[B]: EXF
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- 3) Align the engraved lines (1) on the camshafts so that it is parallel with mating surface of the cylinder head. Check that the cam faces (2) are located as shown.

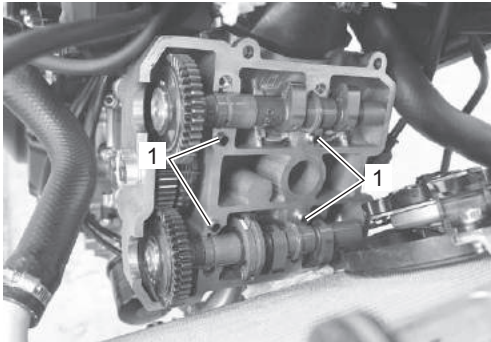


IE31J1140031-01



IE31J1140032-04

4) Install the dowel pins (1).



IE31J1140033-01

- 5) Apply engine oil to the camshaft journal holders (1).
- 6) Install the camshaft journal holders (1), intake and exhaust.
- 7) Fasten the camshaft journal holders (1) evenly by tightening the camshaft journal holder bolts sequentially and diagonally.

NOTICE

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

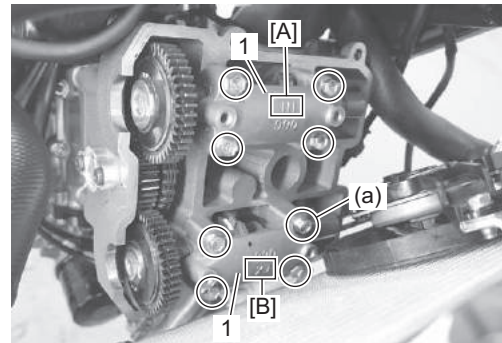
NOTE

Each camshaft journal holder (1) is identified with a cast-on letters.

- 8) Tighten the camshaft journal holder bolts to the specified torque.

Tightening torque

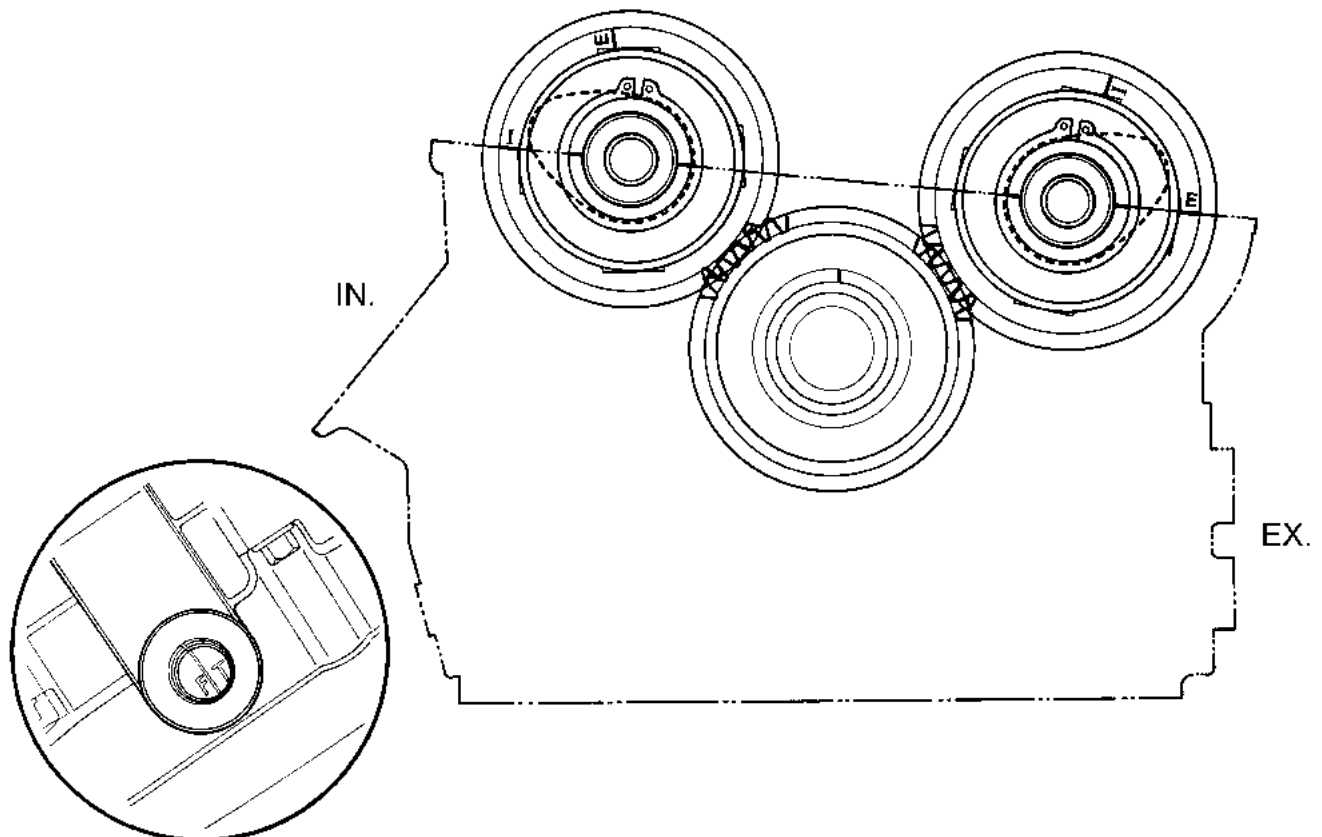
Camshaft journal holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1140034-02

[A]: IN	[B]: EX
---------	---------

9) Recheck the front cylinder camshaft positions, intake and exhaust.

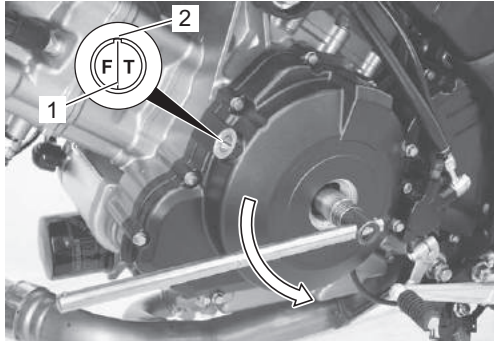


IE31J1140035-01

1D-10 Engine Mechanical:

Rear Cylinder Camshaft

- 1) From the position where the front cylinder camshafts have now been installed, rotate the crankshaft 360 degrees (1 turn) and align the "F | T" line (1) on the generator rotor with the index mark (2) of the valve timing inspection hole.



IE31J1140036-01

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

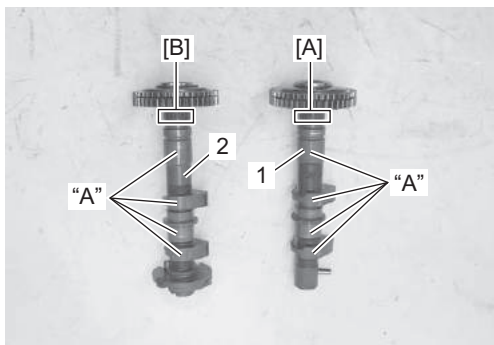
"A": Assembly lubrication (Molybdenum oil solution)

NOTE

Identify the camshafts according to the following embossed letters.

Intake camshaft (1): [A]

Exhaust camshaft (2): [B]

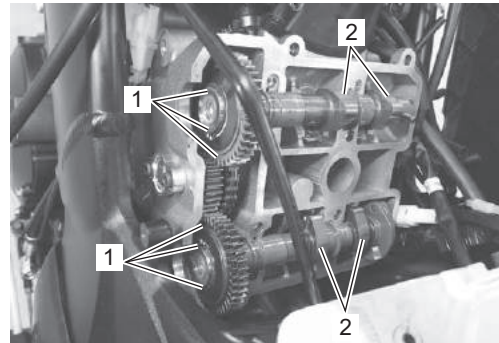


IE31J1140037-02

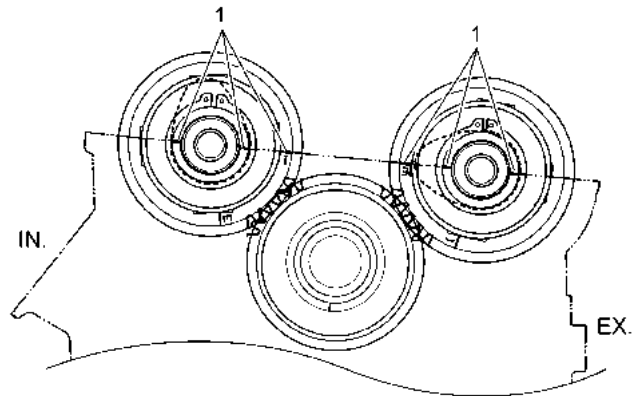
[A]: INR

[B]: EXR

- 3) Align the engraved lines (1) on the camshafts so that it is parallel with mating surface of the cylinder head. Check that the cam faces (2) are located as shown.

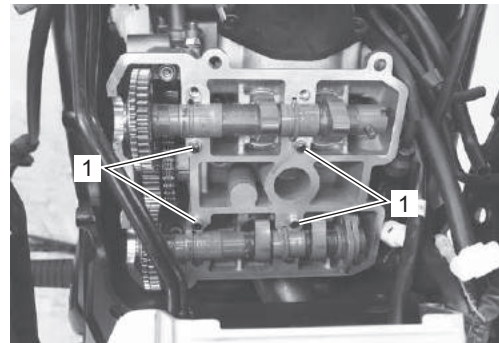


IE31J1140038-02



IE31J1140039-04

- 4) Install the dowel pins (1).



IE31J1140040-01

- 5) Apply engine oil to the camshaft journal holders (1).
- 6) Install the camshaft journal holders (1), intake and exhaust.
- 7) Fasten the camshaft journal holders (1) evenly by tightening the camshaft journal holder bolts sequentially and diagonally.

NOTICE

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

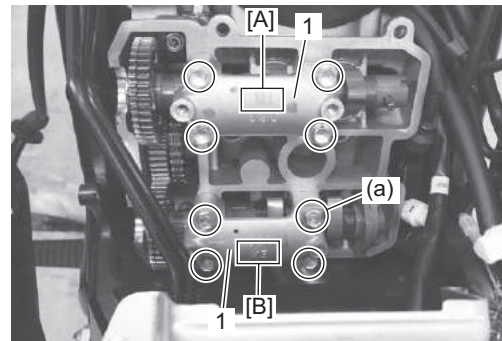
NOTE

Each camshaft journal holder (1) is identified with a cast-on letters.

- 8) Tighten the camshaft journal holder bolts to the specified torque.

Tightening torque

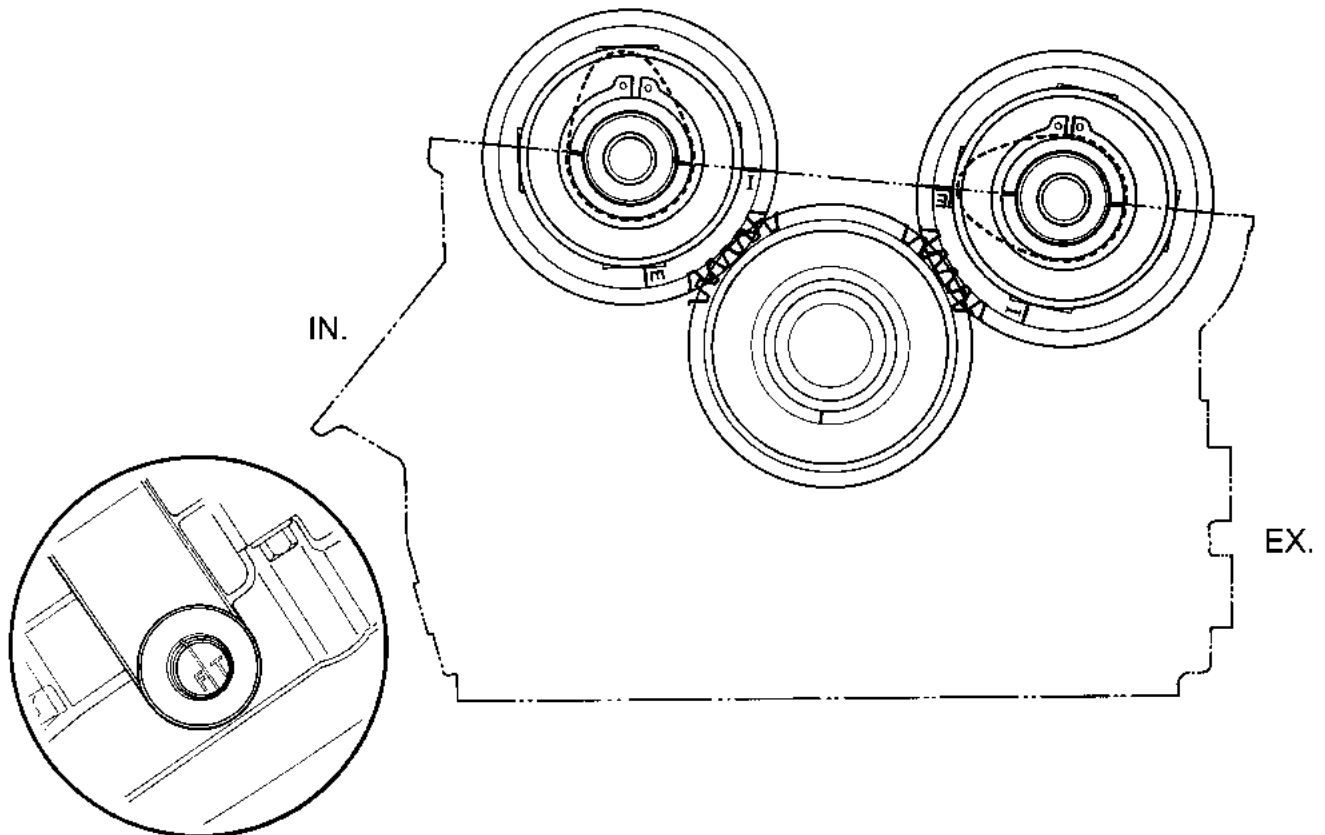
Camshaft journal holder bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1140041-02

[A]: IN	[B]: EX
---------	---------

- 9) Recheck the rear cylinder camshaft positions, intake and exhaust.



IE31J1140042-01

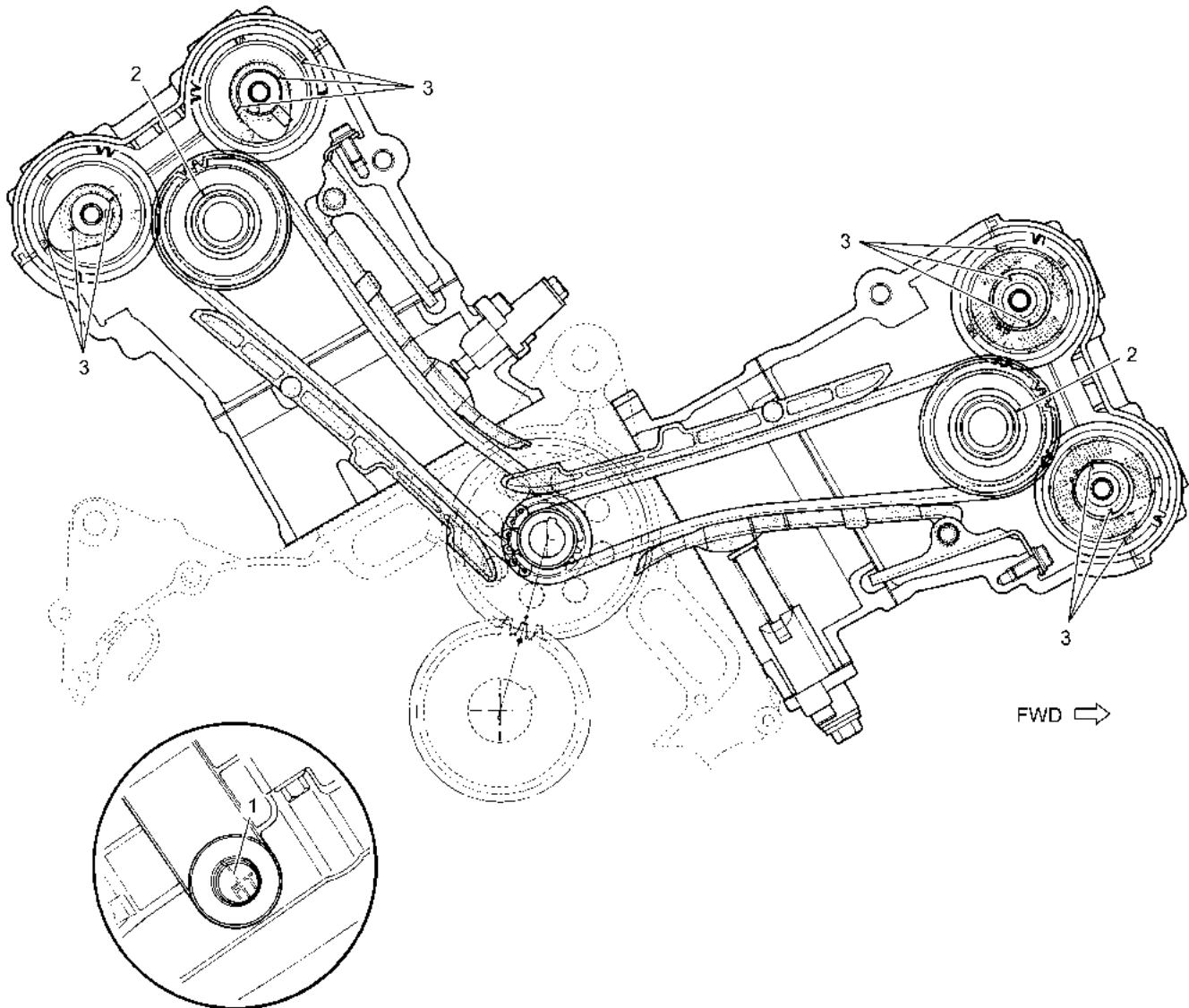
1D-12 Engine Mechanical:

- 10) After installing the rear cylinder camshafts, rotate the crankshaft 360 degrees (1 turn), and recheck the positions of the camshafts.

NOTICE

Be sure to check the positions of the “F | T” line (1) on the generator rotor, engraved lines (2) on each cam drive idle gear/sprocket No. 2 and the engraved lines (3) on the camshafts.

Front cylinder TDC of compression stroke

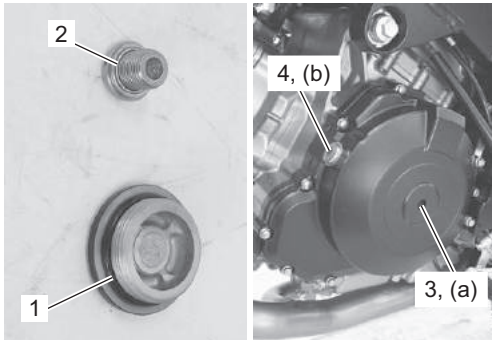


- 11) Check and adjust the valve clearance. (Page 0B-4)
- 12) Apply engine oil to the new O-ring (1).
- 13) Install the new gasket (2).
- 14) Tighten the generator cover plug (3) and valve timing inspection plug (4) to the specified torque.

Tightening torque

Generator cover plug (a): 15 N·m (1.5 kgf-m, 11.0 lbf-ft)

Valve timing inspection plug (b): 21 N·m (2.1 kgf-m, 15.5 lbf-ft)



IE31J1140044-01

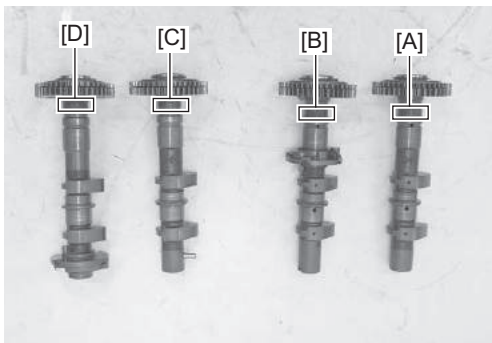
Camshaft Inspection

BENJ31J31406008

Refer to “Camshaft Removal” (Page 1D-6) and “Camshaft Installation” (Page 1D-8).

Camshaft Identification

The camshafts can be identified by the embossed letter.



IE31J1140045-01

[A]:	INF (Front cylinder intake camshaft)
[B]:	EXF (Front cylinder exhaust camshaft)
[C]:	INR (Rear cylinder intake camshaft)
[D]:	EXR (Rear cylinder exhaust camshaft)

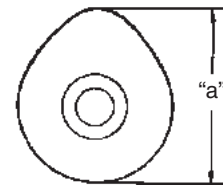
Cam Wear

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.

Special tool
09900-20202

Cam height (IN.)
Service limit: 35.98 mm (1.417 in)

Cam height (EX.)
Service limit: 35.38 mm (1.393 in)



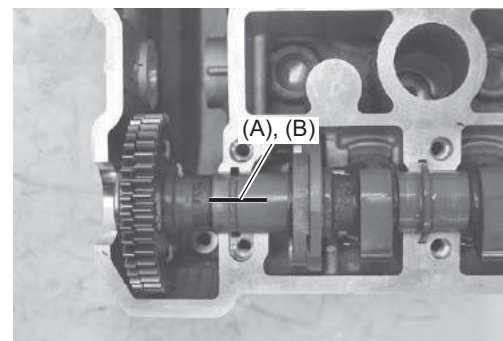
I649G1140199-02

Camshaft Journal Wear

Refer to “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-25) and “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-30).

- 1) Determine whether or not each journal is worn down to the limit by measuring the oil clearance with the camshaft installed in place.
- 2) Measure the clearance at the widest portion with the special tool.

Special tool
(A): 09900-22301
(B): 09900-22302



IE31J1140046-01

1D-14 Engine Mechanical:

- 3) Install camshaft journal holder and tighten the camshaft journal holder bolts evenly and diagonally to the specified torque. (Page 1D-8)

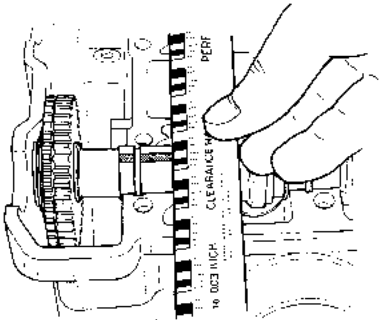
NOTE

Do not rotate the camshaft with the plastigage in place.

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

Camshaft journal oil clearance (IN. & EX.)

Service limit: 0.150 mm (0.0059 in)



IE31J1140047-01

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

Special tool

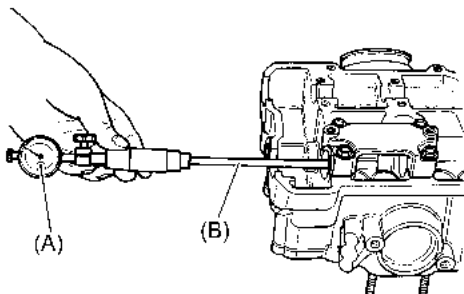
- (A): 09900-20602
- (B): 09900-22403
- (C): 09912-66310

Camshaft journal holder I.D. (IN. & EX.)

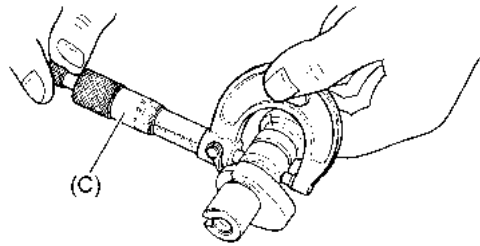
Standard: 22.012 – 22.025 mm (0.8666 – 0.8671 in)

Camshaft journal O.D. (IN. & EX.)

Standard: 21.972 – 21.993 mm (0.8650 – 0.8659 in)



IE31J1140048-01



IE31J1140049-01

Camshaft Runout

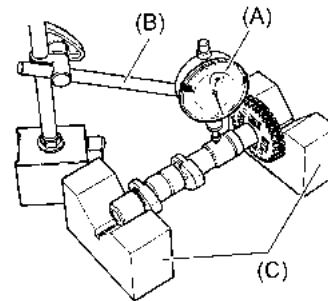
Measure the runout using the dial gauge. Replace the camshaft if the runout exceeds the limit.

Special tool

- (A): 09900-20607
- (B): 09900-20701
- (C): 09900-21304

Camshaft runout (IN. & EX.)

Service limit: 0.10 mm (0.004 in)



IE31J1140050-02

Camshaft Sprocket

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

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



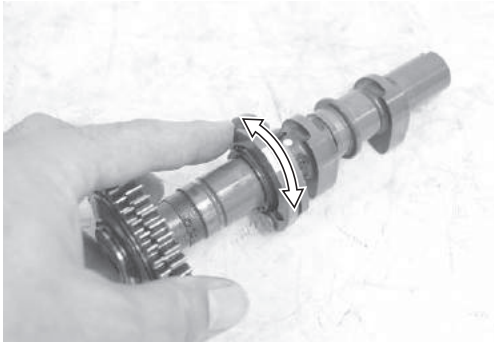
IE31J1140051-01

Automatic Decompression

NOTICE

Do not attempt to disassemble the automatic-decomp. assembly. They are unserviceable.

Inspect the automatic-decomp. for damage and smooth operation.
If any defects are found, replace the camshaft assembly.



IE31J1140052-02

Valve Clearance Inspection and Adjustment

BENJ31J31406009

Refer to "Cylinder Head Cover Removal and Installation" (Page 1D-4) and "Spark Plug Removal and Installation" in Section 1H (Page 1H-6).

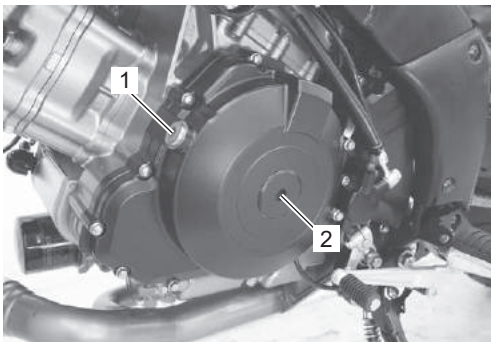
Inspection

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 clearance specification is for COLD state.

- 1) Remove the valve timing inspection plug (1) and generator cover plug (2).

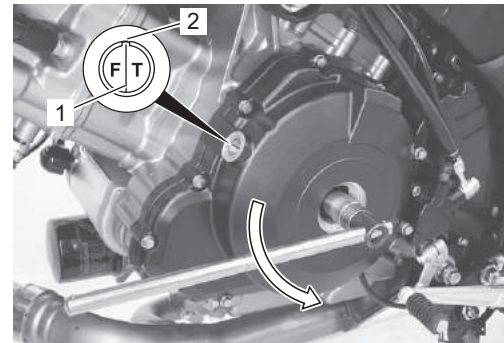


IE31J1140053-01

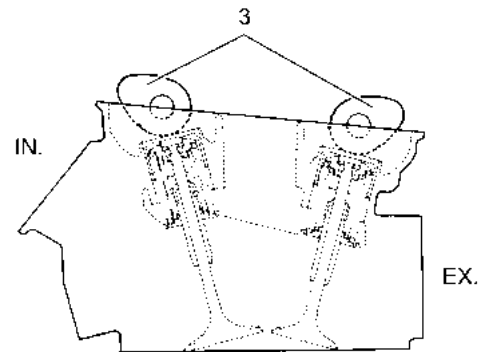
- 2) Turn the crankshaft to set the front cylinder at TDC of compression stroke. (Align the "F | T" line (1) on the generator rotor to the index mark (2) of valve timing inspection hole and also bring the camshafts to the position as shown.)

NOTE

If the camshafts are not in position (3), turn the crankshaft 360° (1 turns) and confirm the position again.



IE31J1140054-01



IE31J1140055-01

- 3) To inspect the front cylinder valve clearance, use a thickness gauge between the tappet and the cam. If the clearance is out of specification, adjust it into the specified range.

Special tool

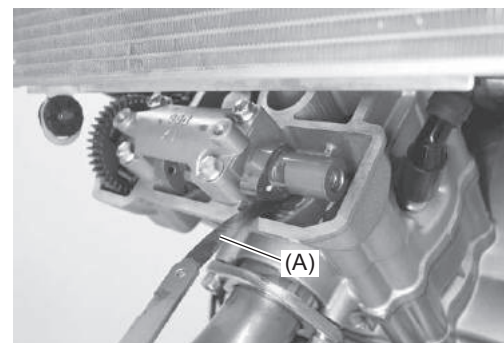
(A): 09900-20803

Valve clearance (cold) (IN.)

Standard: 0.10 – 0.20 mm (0.004 – 0.008 in)

Valve clearance (cold) (EX.)

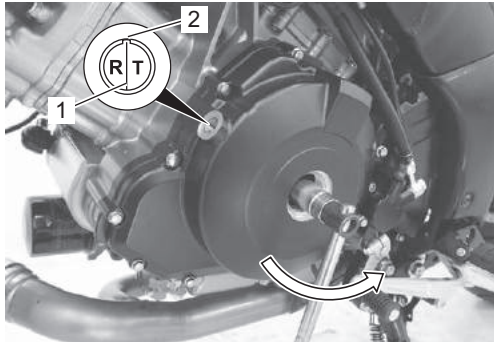
Standard: 0.20 – 0.30 mm (0.008 – 0.012 in)



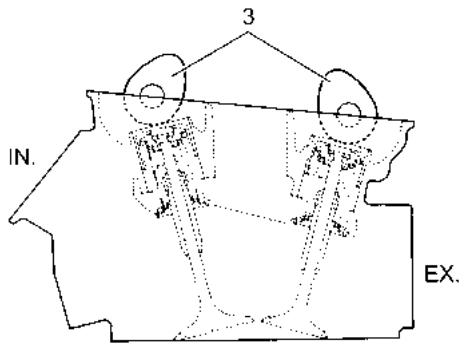
IE31J1140056-01

1D-16 Engine Mechanical:

- 4) Turn the crankshaft 270 degrees (3/4 turn) to set the rear cylinder at TDC of compression stroke. (Align the "R | T" line (1) on the generator rotor to the index mark (2) of valve timing inspection hole and also bring the camshafts to the position (3) as shown.)



IE31J1140057-01

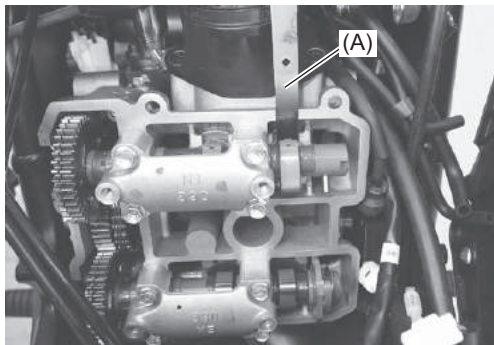


IE31J1140058-01

- 5) Inspect the rear cylinder valve clearance as the same manner of front cylinder and adjust the clearance if necessary.

Special tool

(A): 09900-20803



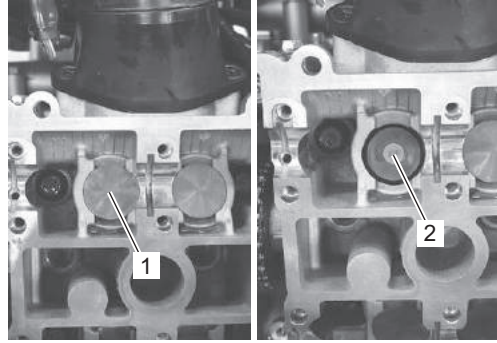
IE31J1140059-01

Adjustment

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

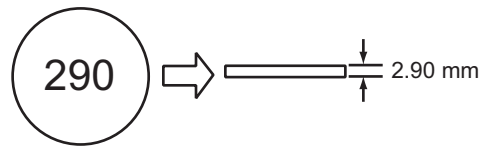
- 1) Remove the intake camshaft or exhaust camshaft.
 ☞ (Page 1D-6)

- 2) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



IE31J1140060-01

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



I822H1020024-01

- 4) Select a replacement shim that will provide a clearance within the specified range. For the purpose of this adjustment, a total of 25 sizes of tappet shim are available ranging from 2.30 to 3.50 mm (0.091 – 0.138 in) in steps of 0.05 mm (0.002 in).

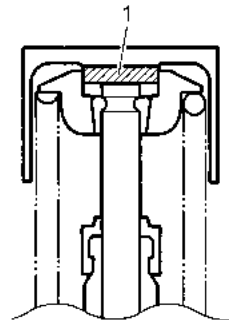
NOTICE

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

- 5) Fit the selected shim (1) to the valve stem end, with numbers toward tappet. Be sure to check shim size with micrometer to ensure its size.

NOTE

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



IE31J1140061-01

(INTAKE SIDE)

TAPPET SHIM SELECTION TABLE [INTAKE]
TAPPET SHIM NO. (12892-41C00-XXX)

MEASURED VALVE CLEARANCE (mm)	Option												TAPPET SHIM SET (12800-41810)												
	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350
0.00 - 0.04	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.05 - 0.09	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.10 - 0.20	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.21 - 0.25	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	
0.26 - 0.30	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	
0.31 - 0.35	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	
0.36 - 0.40	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	
0.41 - 0.45	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	
0.46 - 0.50	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.51 - 0.55	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.56 - 0.60	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.61 - 0.65	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.66 - 0.70	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.71 - 0.75	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.76 - 0.80	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.81 - 0.85	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.86 - 0.90	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.91 - 0.95	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
0.96 - 1.00	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
1.01 - 1.05	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
1.06 - 1.10	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
1.11 - 1.15	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
1.16 - 1.20	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
1.21 - 1.25	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
1.26 - 1.30	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
1.31 - 1.35	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	
1.36 - 1.40	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	

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 2.70 mm
- Shim size to be used 2.80 mm

(EXHAUST SIDE)

TAPPET SHIM SELECTION TABLE [EXHAUST]
TAPPET SHIM NO. (12892-41C00-XXX)

TAPPET SHIM SET (12800-41810)

MEASURED VALVE CLEARANCE (mm)	Option																								
	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350
0.00 - 0.04	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.05 - 0.09	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.10 - 0.14	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.15 - 0.19	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.20 - 0.30	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50
0.31 - 0.35	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50
0.36 - 0.40	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50
0.41 - 0.45	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50
0.46 - 0.50	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.51 - 0.55	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.56 - 0.60	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.61 - 0.65	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.66 - 0.70	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.71 - 0.75	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.76 - 0.80	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.81 - 0.85	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.86 - 0.90	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.91 - 0.95	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.96 - 1.00	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.01 - 1.05	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.06 - 1.10	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.11 - 1.15	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.16 - 1.20	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.21 - 1.25	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.26 - 1.30	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.31 - 1.35	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.36 - 1.40	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.41 - 1.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.46 - 1.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

SPECIFIED CLEARANCE NO ADJUSTMENT REQUIRED

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

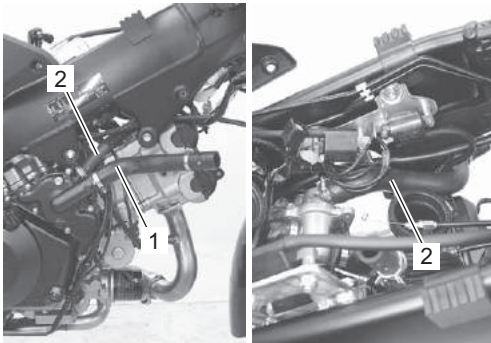
Valve clearance is 0.38 mm
Present shim size 2.90 mm
Shim size to be used 3.05 mm

- 6) Install the intake camshaft or exhaust camshaft.
☞ (Page 1D-8)
- 7) Rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement, then check the clearance again to confirm that it is within the specified range.
- 8) After finishing the valve clearance adjustment, check the engine for smooth starting and free from any abnormal noise.

Engine Assembly Removal

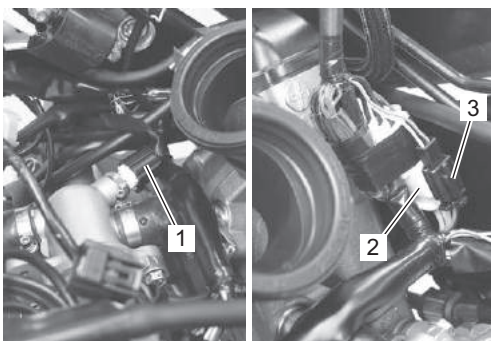
BENJ31J31406010

- 1) Remove the under cowl assembly. (If equipped)
☞ (Page 9D-39)
- 2) Drain engine oil. ☞ (Page 1E-4)
- 3) Drain engine coolant. ☞ (Page 1F-6)
- 4) Disconnect the battery (-) lead wire. ☞ (Page 1J-12)
- 5) Remove the throttle body assembly. ☞ (Page 1C-4)
- 6) Remove the radiator with the cooling fan motor.
☞ (Page 1F-9)
- 7) Remove the radiator hoses (1) and PCV hose (2).



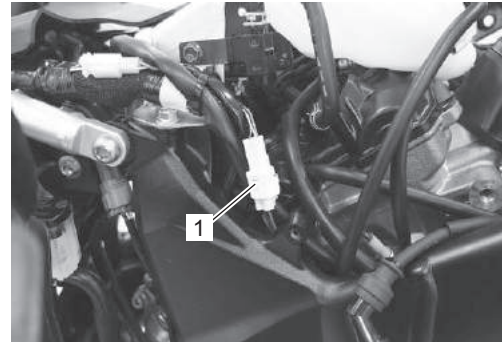
IE31J1140062-01

- 8) Remove the PAIR reed valves (If equipped). ☞ (Page 1B-11)
- 9) Remove the PAIR control solenoid valve (If equipped). ☞ (Page 1B-12)
- 10) Remove the all spark plug caps. ☞ (Page 1H-6)
- 11) Disconnect the ECT sensor coupler (1), generator coupler (2) and CKP sensor coupler (3).



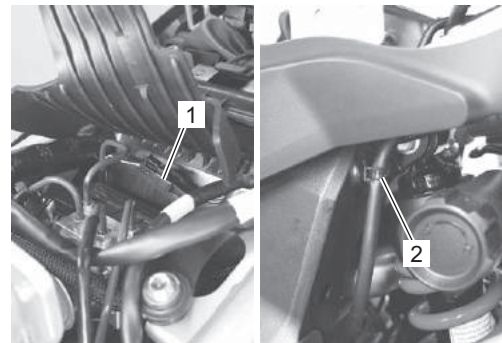
IE31J1140063-01

- 12) Disconnect the GP switch coupler (1).



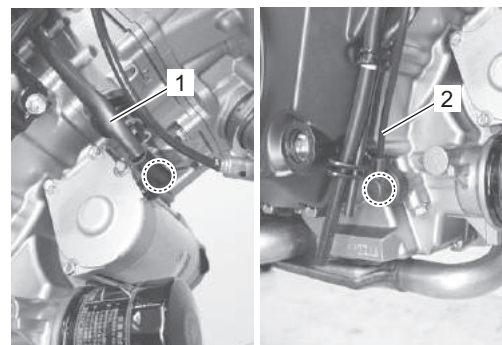
IE31J1140064-01

- 13) Disconnect the engine ground coupler (1) and remove the clamps (2).



IE31J1140065-01

- 14) Disconnect the starter motor lead wire (1) and oil pressure switch lead wire (2).



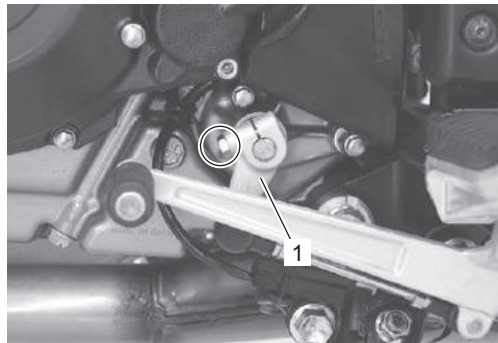
IE31J1140066-01

1D-20 Engine Mechanical:

15) Remove the gearshift link arm (1).

NOTE

Mark the gearshift shaft head at which the gearshift link arm slit is set for correct reinstallation.



IE31J1140067-01

16) Remove the engine sprocket. (Page 3A-3)

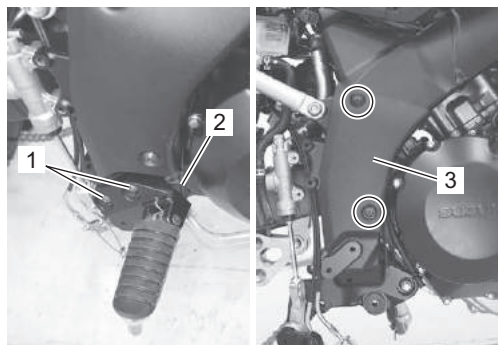
17) Remove the clutch push rod (Left). (Page 5C-11)

18) Remove the muffler and exhaust pipes. (Page 1K-15)

19) Temporarily install the rear shock absorber after removing the rear exhaust pipe. (Page 2C-2)

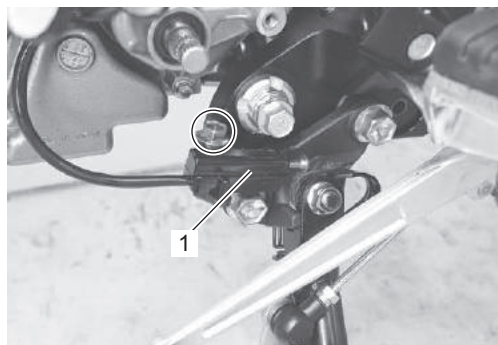
20) Remove the front footrest bracket bolt (1) and rear brake light switch spring (2).

21) Remove the right pivot cover (3).



IE31J1140068-01

22) Remove the side-stand switch (1).



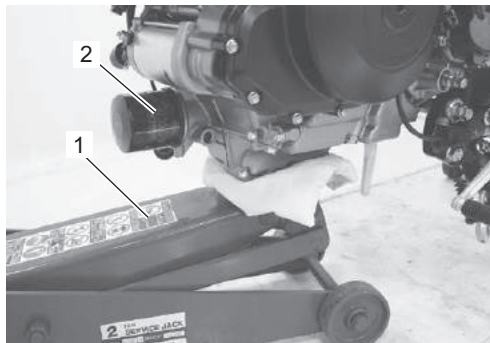
IE31J1140069-01

23) Support the motorcycle with a jock or wooden block securely.

24) Support the engine with a proper jack (1).

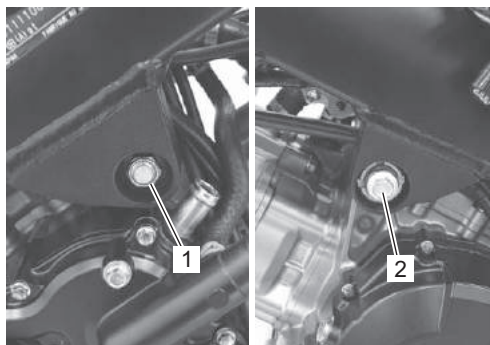
NOTICE

Do not support at the oil filter (2).



IE31J1140070-01

25) Remove the engine mounting nut (M12) (1) and bolt (M12) (L300) (2).

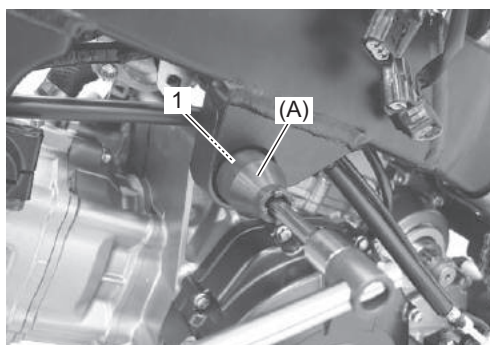


IE31J1140071-01

26) Loosen the engine mounting thrust adjuster lock-nut (1) with the special tool.

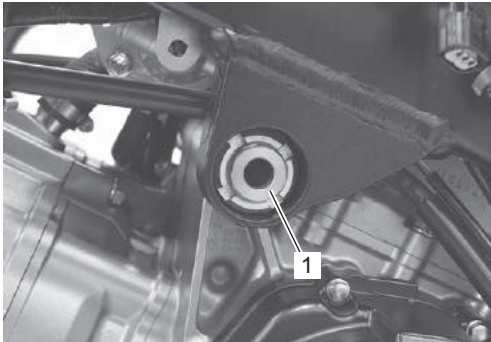
Special tool

(A): 09940-14990



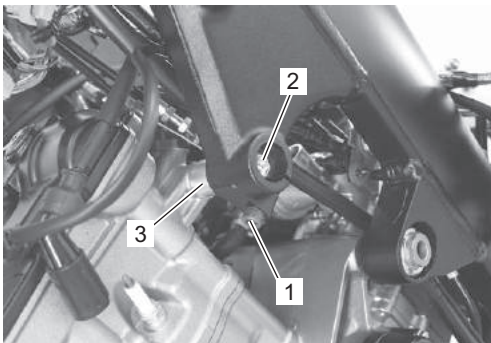
IE31J1140072-01

27) Loosen the engine mounting thrust adjuster (1).



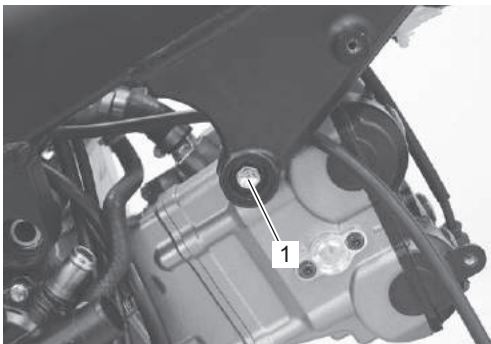
IE31J1140073-01

28) Loosen the pinch bolt (1) and remove the engine mounting bolt (M10) (L70) (2) and spacer (3).



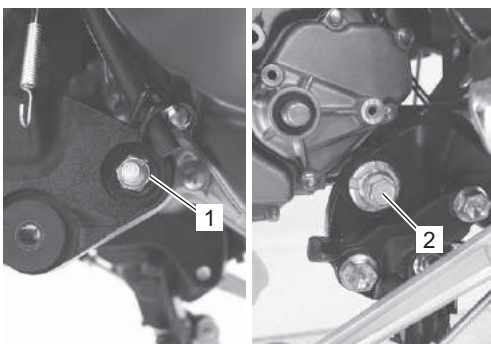
IE31J1140074-01

29) Remove the engine mounting bolt (M10) (L50) (1).



IE31J1140075-01

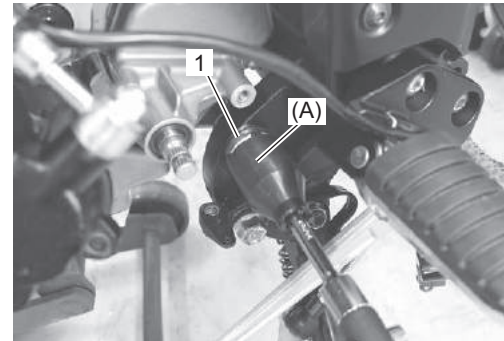
30) Remove the engine mounting nut (M10) (1) and bolt (M10) (L265) (2).



IE31J1140076-01

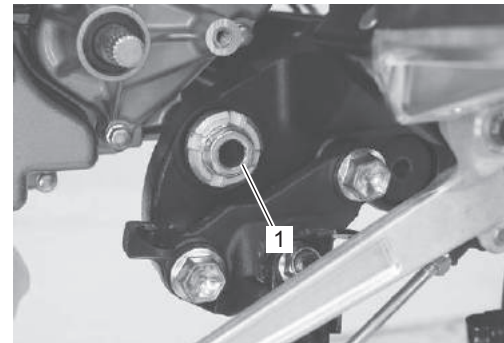
31) Loosen the engine mounting thrust adjuster lock-nut (1) with the special tool.

Special tool
(A): 09940-14980



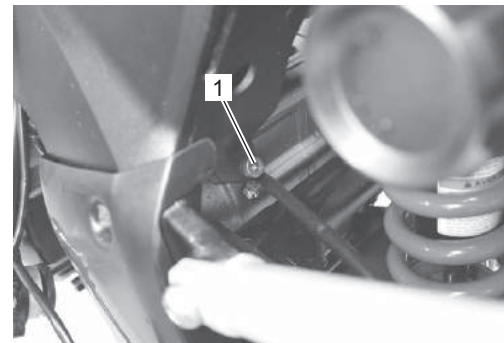
IE31J1140077-01

32) Loosen the engine mounting thrust adjuster (1).



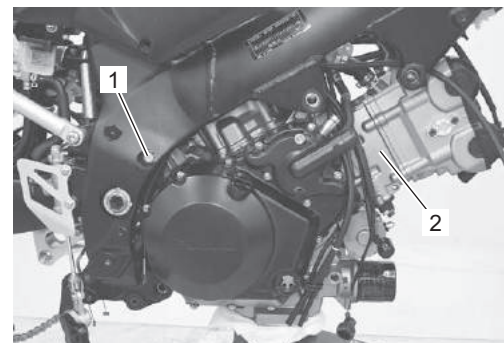
IE31J1140078-01

33) Loosen the pinch bolt (1).



IE31J1140079-01

34) Remove engine mounting bolt (M10) (L225) (1) and gradually lower the engine. Then, remove the engine assembly (2) from the frame.



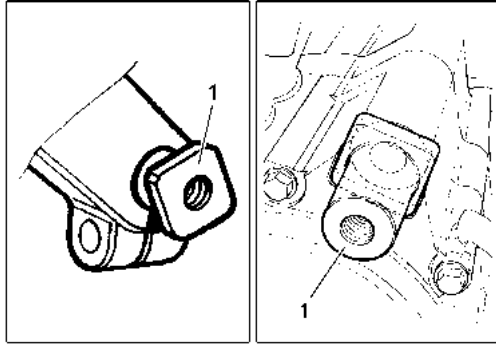
IE31J1140080-01

Engine Assembly Installation

BENJ31J31406011

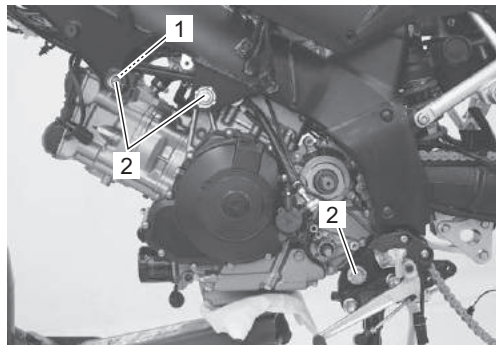
Reinstall the engine in the reverse order of engine removal. Pay attention to the following points:

- Mount the engine assembly in the following procedures:
 - a. Fit the collar (1) onto the crankcase as shown.

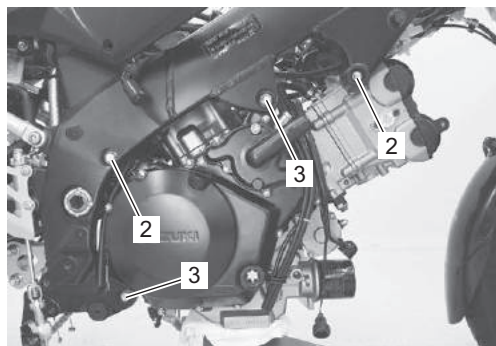


IE31J1140081-01

- b. Install the spacer (1).
- c. Temporarily tighten the engine mounting bolts (2) and new nuts (3).



IE31J1140083-01

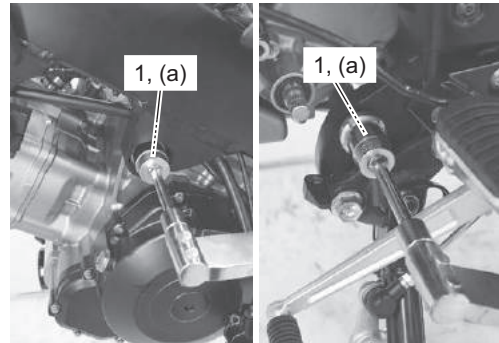


IE31J1140084-01

- d. Tighten the engine mounting thrust adjusters (1) to the specified torque.

Tightening torque

Engine mounting thrust adjuster (a): 12 N·m (1.2 kgf-m, 9.0 lbf-ft)



IE31J1140085-01

- e. Tighten the engine mounting thrust adjuster lock-nuts (1) to the specified torque with the special tools.

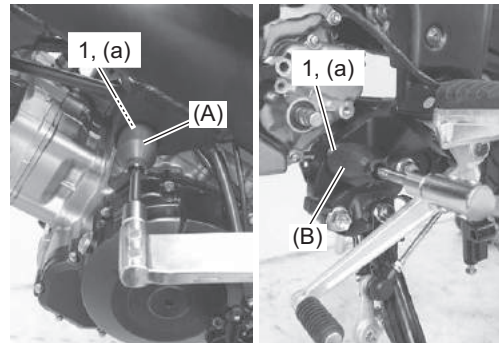
Special tool

(A): 09940-14990

(B): 09940-14980

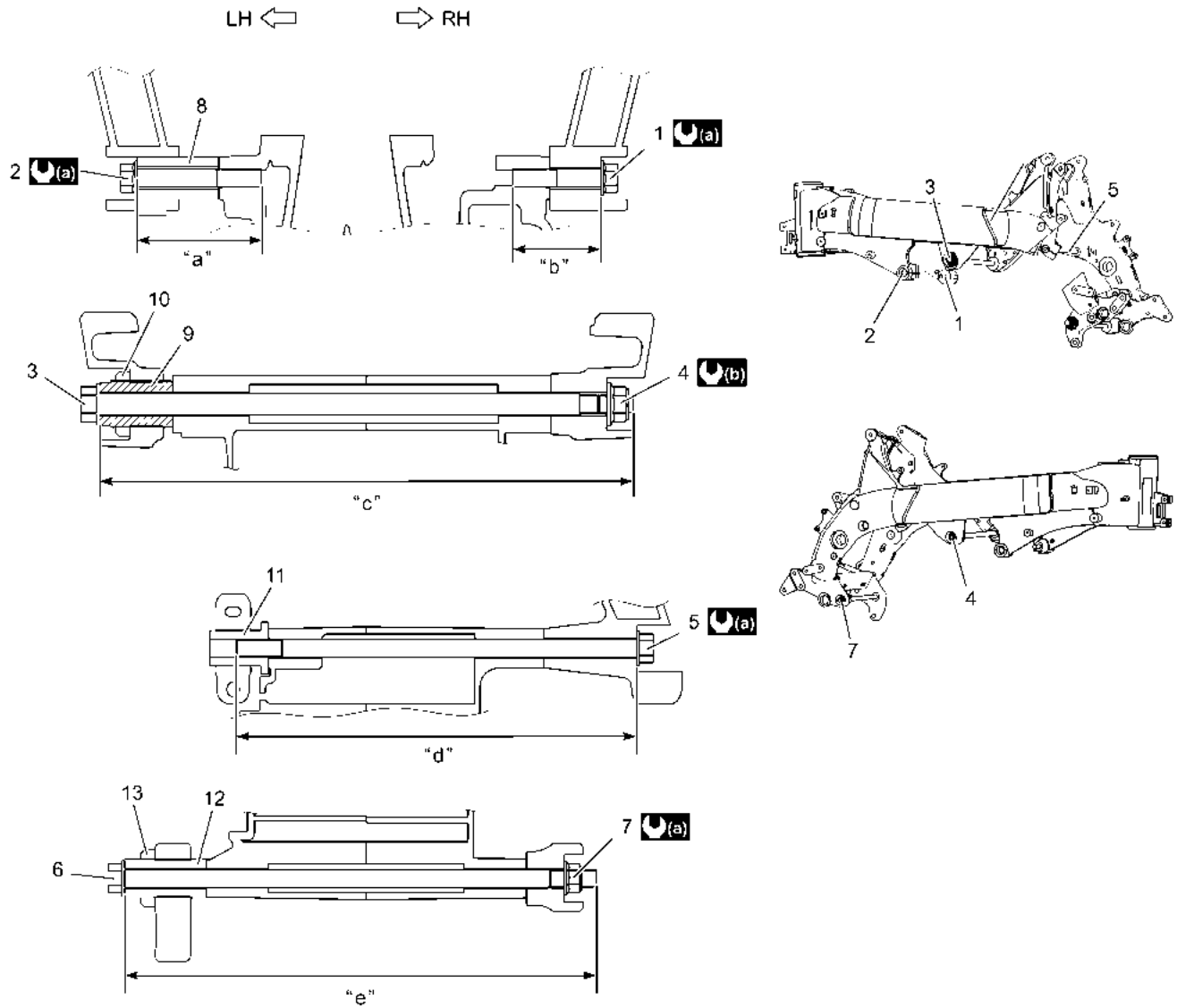
Tightening torque

Engine mounting thrust adjuster lock-nut (a): 45 N·m (4.5 kgf-m, 32.5 lbf-ft)



IE31J1140086-01

- f. Tighten the engine mounting bolts and nuts to the specified torque in order of (1) → (2) → (5) → (4) → (7).



IE31J1140087-01

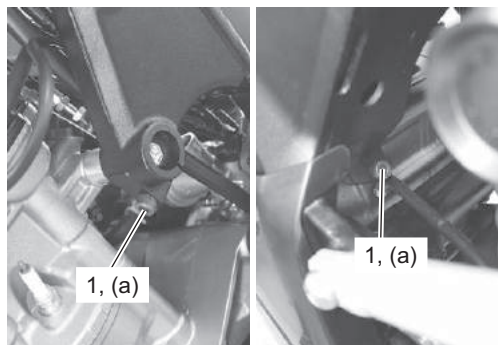
1. Engine mounting bolt (Front upper, Right)	8. Spacer	"b": 50 mm (2.0 in)
2. Engine mounting bolt (Front upper, Left)	9. Engine mounting thrust adjuster (Center)	"c": 300 mm (11.8 in)
3. Engine mounting bolt (Center upper)	10. Engine mounting thrust adjuster lock-nut (Center)	"d": 225 mm (8.9 in)
4. Engine mounting nut (Center upper)	11. Collar	"e": 265 mm (10.4 in)
5. Engine mounting bolt (Rear upper)	12. Engine mounting thrust adjuster (Lower)	(a) : 55 N-m (5.5 kgf-m, 40.0 lbf-ft)
6. Engine mounting bolt (Rear lower)	13. Engine mounting thrust adjuster lock-nut (Lower)	(b) : 93 N-m (9.3 kgf-m, 67.5 lbf-ft)
7. Engine mounting nut (Rear lower)	"a": 70 mm (2.8 in)	

1D-24 Engine Mechanical:

- g. Tighten the pinch bolts (1) to the specified torque.

Tightening torque

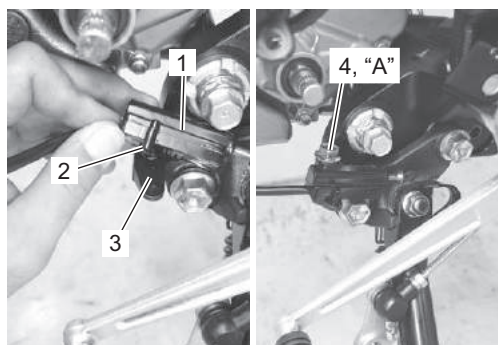
Engine mounting pinch bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IE31J1140088-01

- When installing the side-stand switch (1), insert the projection (2) of side-stand switch (1) into the hole (3) of side-stand bracket.
- Apply thread lock to the side-stand bolt (4) and tighten it.

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

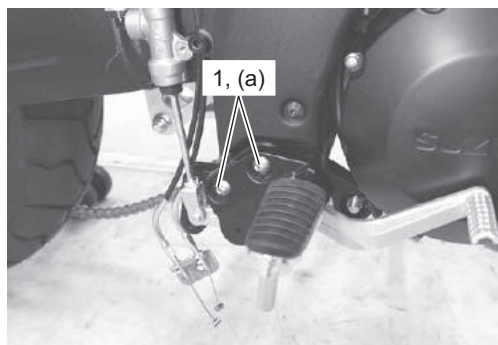


IE31J1140089-01

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

Tightening torque

Front footrest bracket bolt (a): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)



IE31J1140090-01

- Adjust the drive chain slack. (Page 3A-2)
- Check the gearshift lever height. (Page 5B-13)
- Check the radiator hose routing. (Page 1F-2)
- Check the wiring harness routing.
 - L4 – L6 model: (Page 9A-6)
 - L8 – model: (Page 9A-24)
- After finishing the engine installation, check the following items.
 - Throttle cable play: (Page 1C-4)
 - Throttle valve synchronization: (Page 1C-11)
 - Engine oil leakage: (Page 1E-4)
 - Engine coolant leakage: (Page 1F-7)

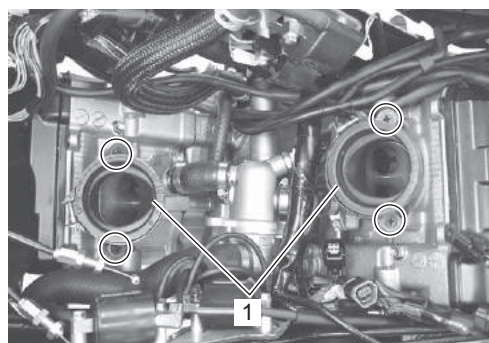
Intake Pipe Removal and Installation

BENJ31J31406012

Refer to “Throttle Body Assembly Removal and Installation” in Section 1C (Page 1C-4).

Removal

Remove the intake pipes (1).



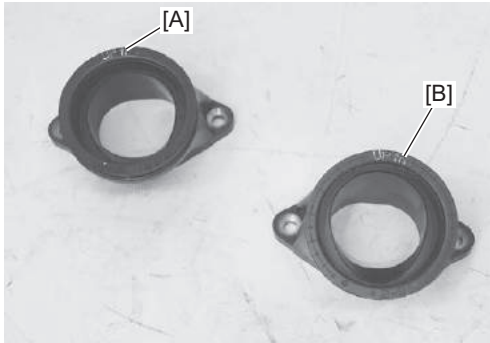
IE31J1140163-01

Installation

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

NOTE

The intake pipe can be identified by the marks.



IE31J1140164-01

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

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

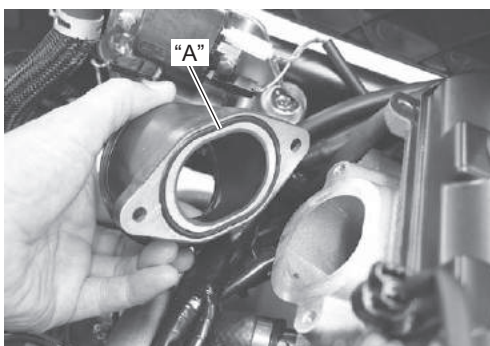
NOTE

Face the "UP" mark (1) on the intake pipe to upper.

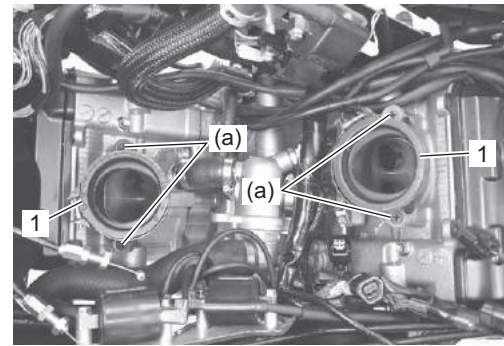
"A": Grease 99000-25011 (SUZUKI SUPER GREASE A)

Tightening torque

Intake pipe mounting screw (a): 8.5 N·m (0.85 kgf·m, 6.5 lbf·ft)



IE31J1140165-01



IE31J1140166-01

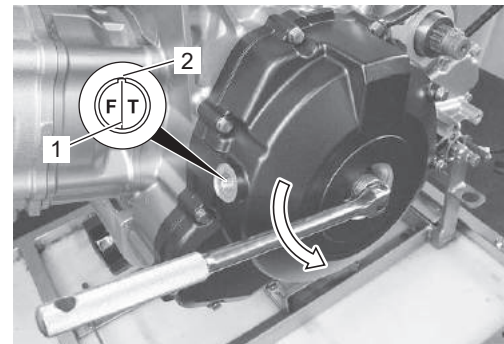
Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal

BENJ31J31406013

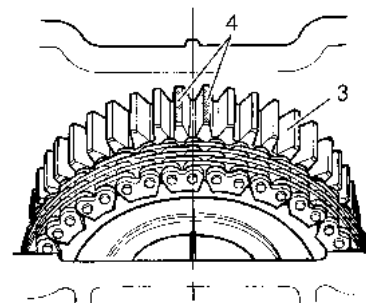
Refer to "Engine Assembly Removal" (Page 1D-19) and "Camshaft Removal" (Page 1D-6).

Front Cylinder Cam Chain Tension Adjuster

- Turn the crankshaft to bring the "F | T" line (1) on generator rotor to the index mark (2) of the valve inspection hole and also to bring the cam drive idle gear/sprocket No. 2 (Front cylinder) (3) to the position as shown.



IE31J1140091-01

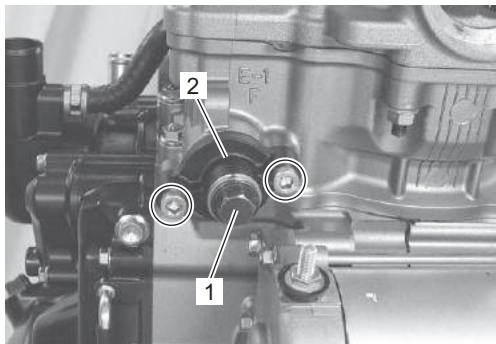


IE31J1140293-01

4. Paint

1D-26 Engine Mechanical:

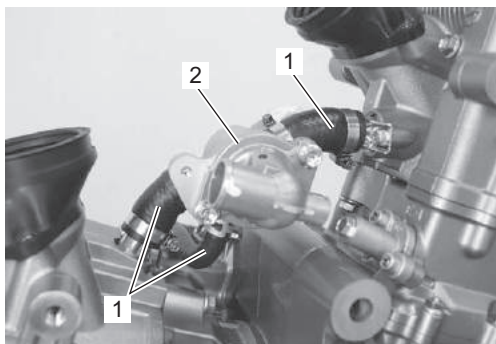
- 2) Remove the cam chain tension adjuster cap bolt (1) and cam chain tension adjuster (2).



IE31J1140093-01

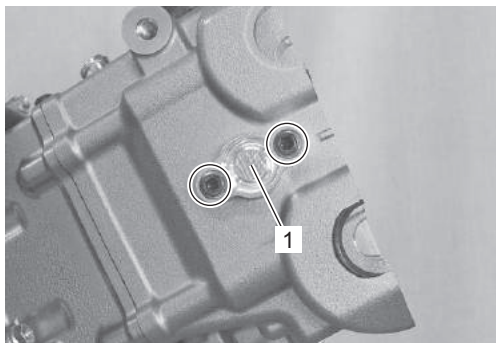
Front Cylinder Head Assembly

- 1) Disconnect the water hoses (1) and remove the thermostat connector assembly (2).



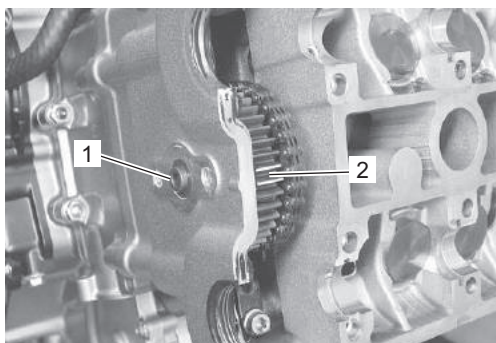
IE31J1140294-01

- 2) Remove the cylinder head cover No. 2 (1).



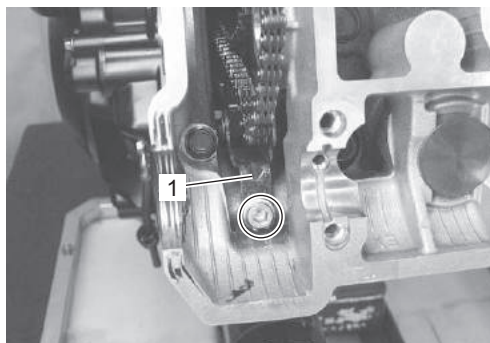
IE31J1140097-01

- 3) Pull out the idle shaft No. 2 (1) and remove the cam drive idle gear/sprocket No. 2 (2).



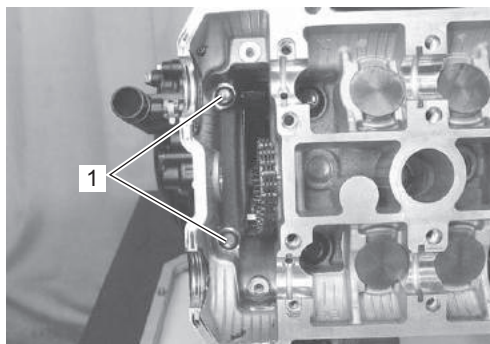
IE31J1140098-02

- 4) Remove the cam chain tensioner (1).



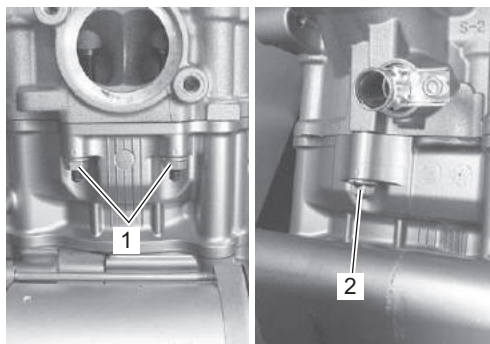
IE31J1140099-01

- 5) Remove the cylinder head bolts (M6) (1).



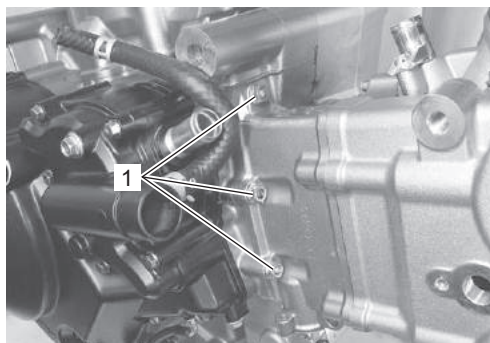
IE31J1140100-01

- 6) Remove the cylinder head nuts, (M6) (1) and (M8) (2).



IE31J1140101-01

- 7) Loosen the cylinder nuts (1).



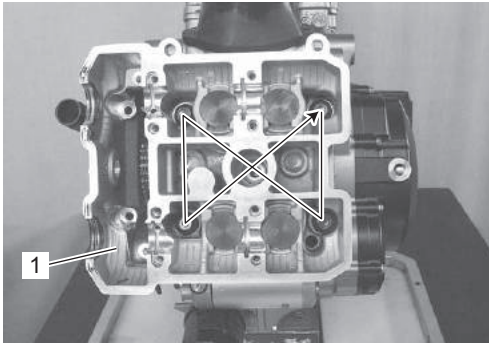
IE31J1140102-01

8) Remove the cylinder head bolts (M10).

NOTE

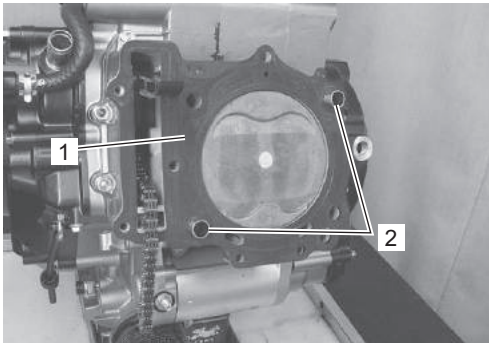
Loosen the cylinder head bolts little by little diagonally.

9) Remove the cylinder head assembly (1).



IE31J1140103-01

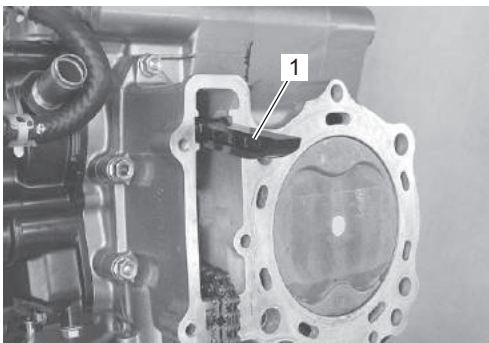
10) Remove the cylinder head gasket (1) and dowel pins (2).



IE31J1140104-02

Front Cylinder Cam Chain Guide

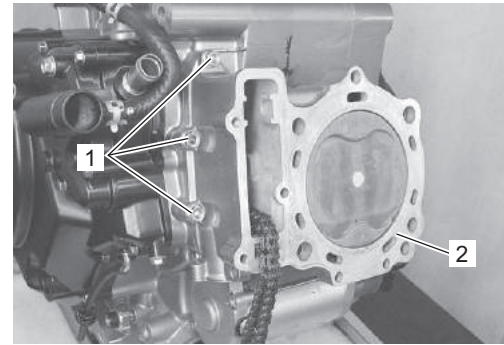
Remove the cam chain guide (1).



IE31J1140105-01

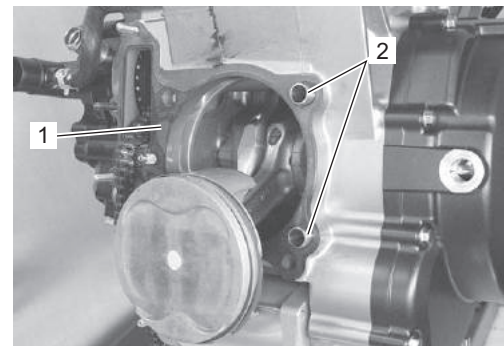
Front Cylinder

1) Remove the cylinder nuts (1) and cylinder (2).



IE31J1140106-01

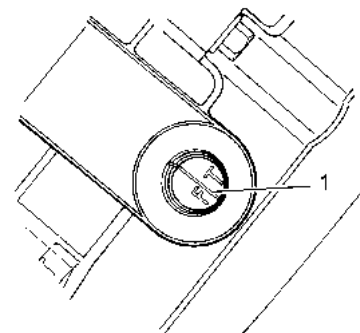
2) Remove the cylinder gasket (1) and dowel pins (2).



IE31J1140107-01

Rear Cylinder Cam Chain Tension Adjuster

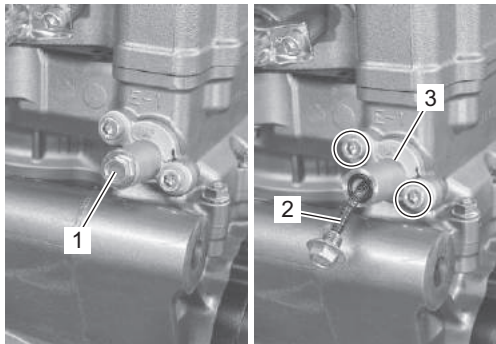
1) For the rear cylinder cam drive idle gear/sprocket No. 2 removal, the crankshaft setting position (1) must be set at the same position (TDC of compression stroke) as the front one.



IE31J1140108-01

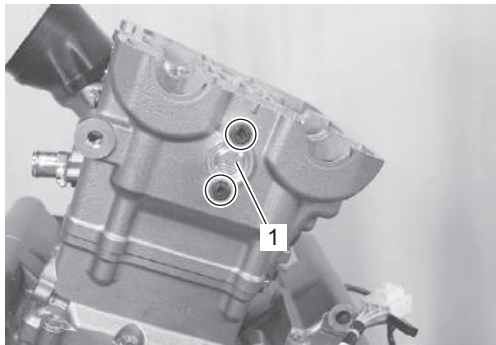
1D-28 Engine Mechanical:

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

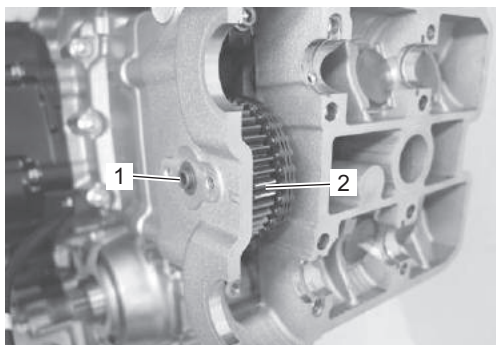


Rear Cylinder Head Assembly

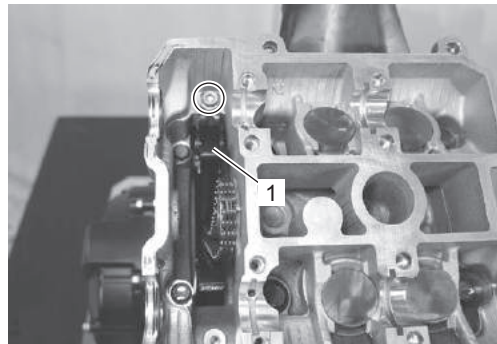
- 1) Remove the cylinder head cover No. 2 (1).



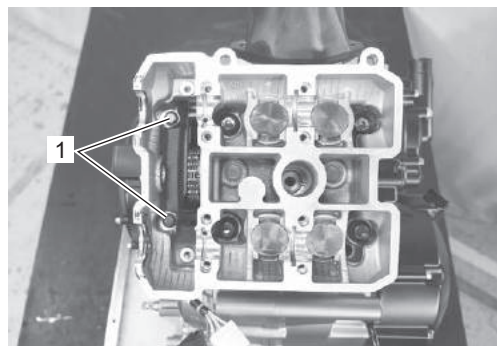
- 2) Pull out the idle shaft No. 2 (1) and remove the cam drive idle gear/sprocket No. 2 (2).



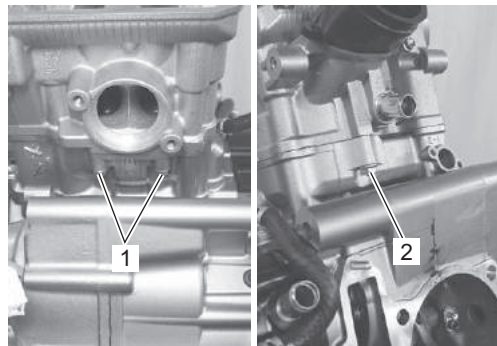
- 3) Remove the cam chain tensioner (1).



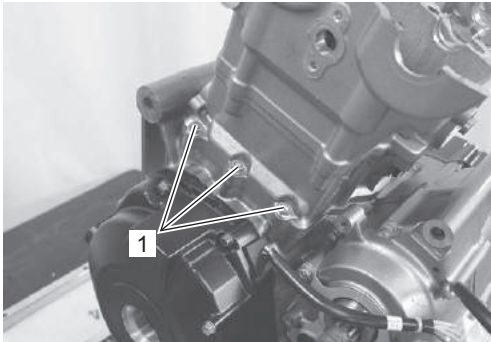
- 4) Remove the cylinder head bolts (M6) (1).



- 5) Remove the cylinder head nuts, (M6) (1) and (M8) (2).



6) Loosen the cylinder nuts (1).



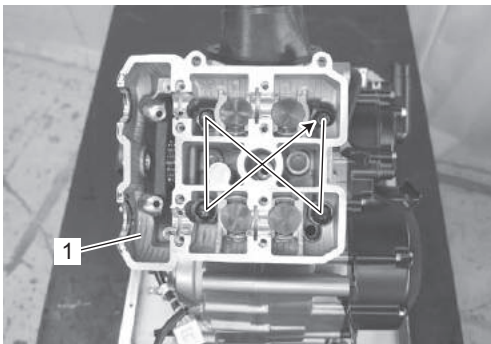
IE31J1140115-01

7) Remove the cylinder head bolts (M10).

NOTE

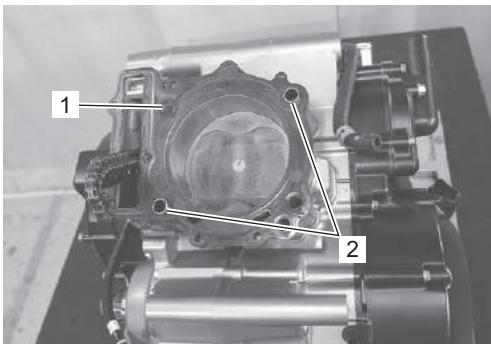
Loosen the cylinder head bolts little by little diagonally.

8) Remove the cylinder head assembly (1).



IE31J1140116-02

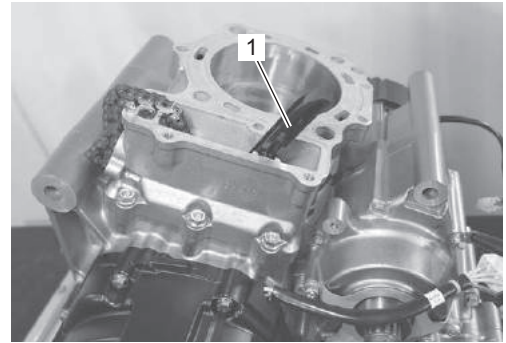
9) Remove the cylinder head gasket (1) and dowel pins (2).



IE31J1140117-01

Rear Cylinder Cam Chain Guide

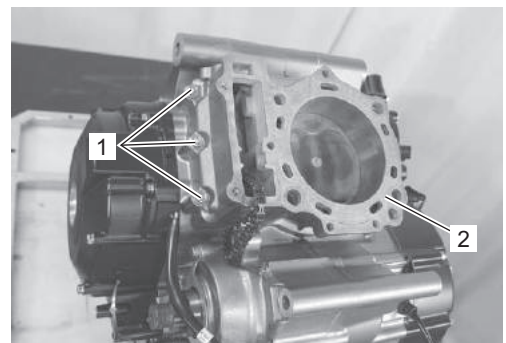
Remove the cam chain guide (1).



IE31J1140118-01

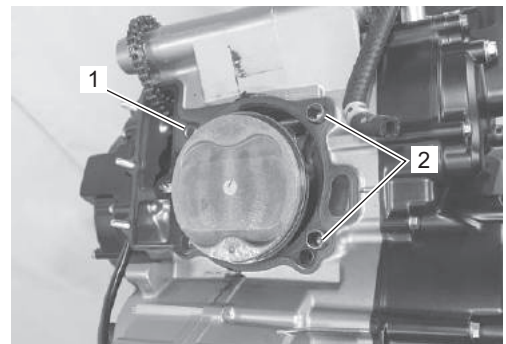
Rear Cylinder

1) Remove the cylinder nuts (1) and cylinder (2).



IE31J1140119-01

2) Remove the cylinder gasket (1) and dowel pins (2).



IE31J1140120-01

Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation

BENJ31J31406014

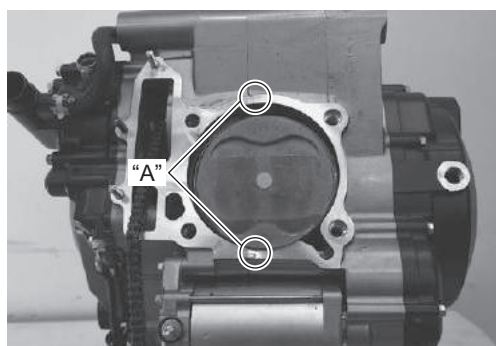
Refer to "Camshaft Installation" (Page 1D-8) and "Engine Assembly Installation" (Page 1D-22).

Cylinder

- 1) Thoroughly wipe off oil from the fitting surface of the crankcase.
- 2) Apply sealant lightly to the mating surfaces at the parting line between the right and left crankcases as shown.

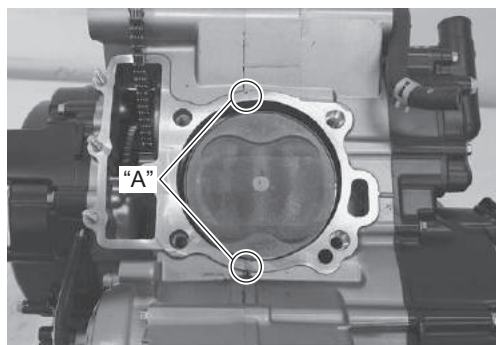
"A": Sealant 99000-31110 (SUZUKI BOND 1215)

Front cylinder side



IE31J1140121-01

Rear cylinder side



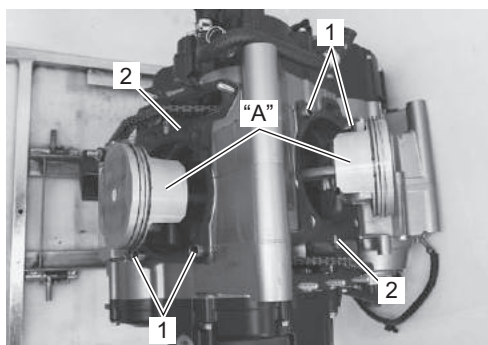
IE31J1140122-01

- 3) Install the dowel pins (1) and new cylinder gaskets (2).
- 4) Apply molybdenum oil solution to the sliding surface of the pistons and cylinder walls.

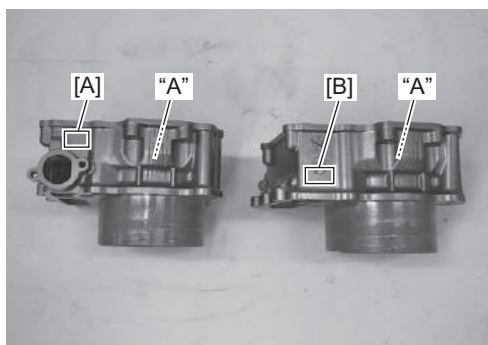
NOTE

The cylinders can be identified by the embossed letters.

"A": Assembly lubrication (Molybdenum oil solution)



IE31J1140123-01



IE31J1140124-01

[A]: 31JF (Front cylinder)

[B]: 31JR (Rear cylinder)

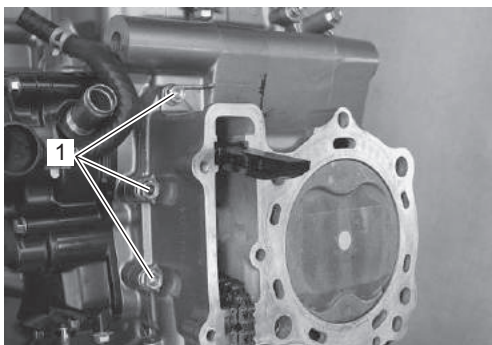
- 5) Hold the piston rings in proper positions, and insert each piston into the respective cylinders. (Page 1D-50)

NOTE

When installing the cylinders, keep the cam chains taut.

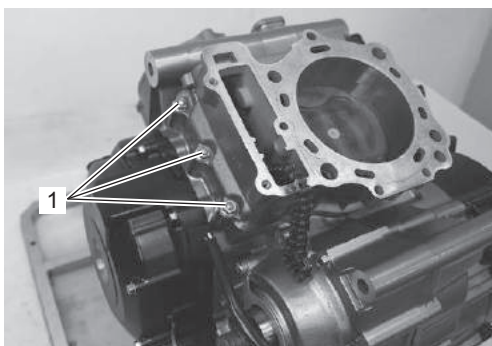
- 6) Tighten the cylinder nuts (1) temporarily.

Front cylinder



IE31J1140125-01

Rear cylinder



IE31J1140126-01

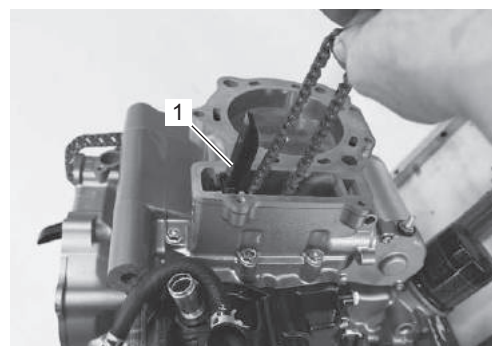
Cam Chain Guide

Pull the cam chains out of the cylinders and install the cam chain guides (1).

NOTE

There are the guide holders for the bottom ends of each cam chain guide cast in the crankcase. Be sure that the cam chain guides are inserted properly.

Front cylinder



IE31J1140127-01

Rear cylinder

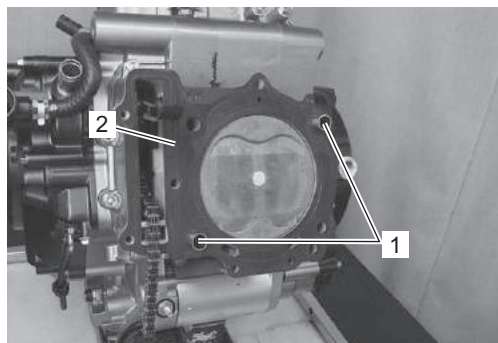


IE31J1140128-01

Cylinder Head Assembly

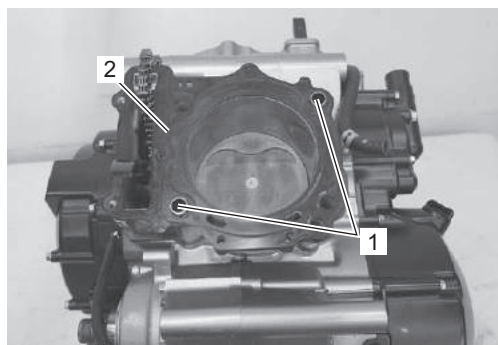
- 1) Install the dowel pins (1) and new cylinder head gaskets (2).

Front cylinder



IE31J1140129-01

Rear cylinder



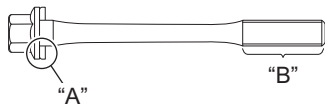
IE31J1140130-01

- 2) Place each cylinder head assembly on the respective cylinders.

NOTE

When installing the cylinder head assemblies, keep the cam chain taut.

- 3) Apply engine oil to the both side of the washers "A" and thread portion "B" of the bolts before installing the cylinder head bolts (M10).



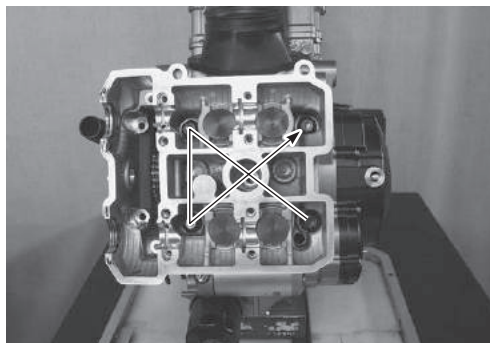
IE31J1140131-01

- 4) Tighten the cylinder head bolts (M10) to the specified two-step torque with a torque wrench sequentially and diagonally.

Tightening torque

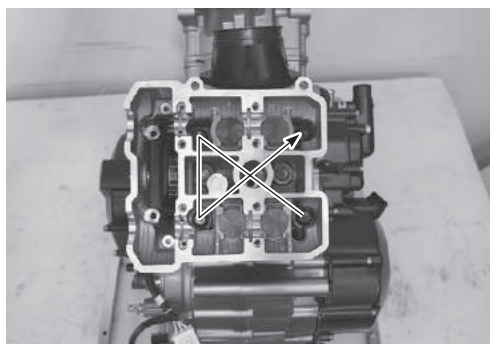
Cylinder head bolt (M10): 25 → 46 N·m (2.5 → 4.6 kgf-m, 18.0 → 33.5 lbf-ft)

Front cylinder head



IE31J1140132-01

Rear cylinder head



IE31J1140133-01

- 5) Tighten the cylinder head nuts (M8) (1), (M6) (2), cylinder head bolts (M6) (3) and cylinder nuts (4) to the specified torque.

Tightening torque

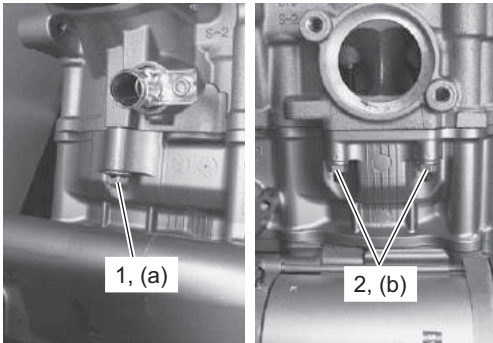
Cylinder head nut (M8) (a): 25 N·m (2.5 kgf-m, 18.0 lbf-ft)

Cylinder head nut (M6) (b): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

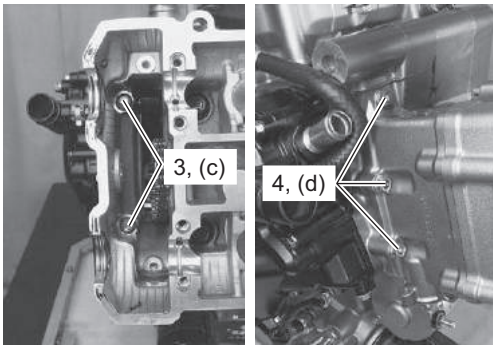
Cylinder head bolt (M6) (c): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Cylinder nut (d): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Front cylinder head

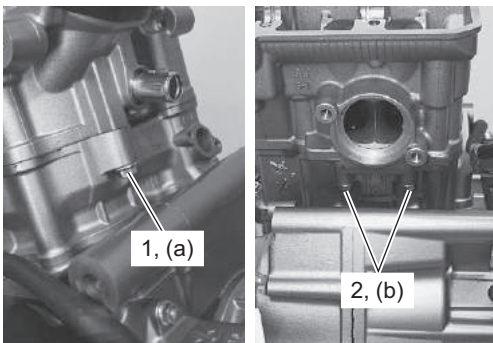


IE31J1140134-01

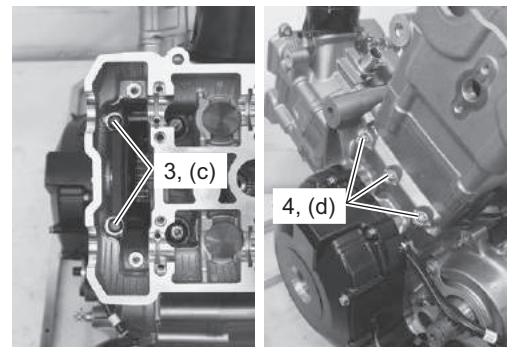


IE31J1140135-01

Rear cylinder head



IE31J1140136-01

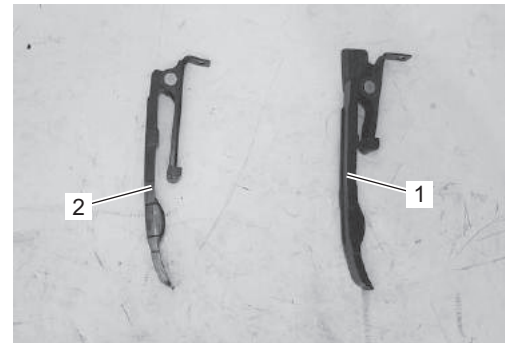


IE31J1140137-01

Cam Chain Tensioner

NOTE

Front cylinder cam chain tensioner (1) and rear cylinder cam chain tensioner (2) differ in shape.



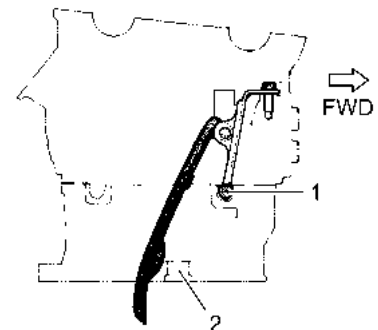
IE31J1140138-01

- 1) Pull the cam chains upward and install each cam chain tensioner into the respective cylinder heads.

NOTE

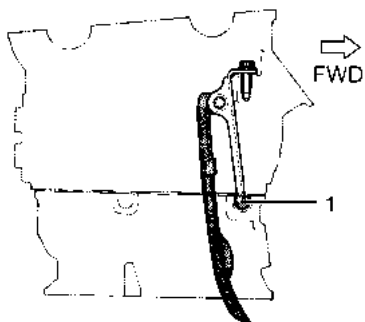
- When installing the cam chain tensioners, insert their holder ends (1) into each guide cast on the cylinder.
- When installing the front cylinder cam chain tensioner, through its rear side of the rib (2).

Front cylinder side



IE31J1140139-01

Rear cylinder side



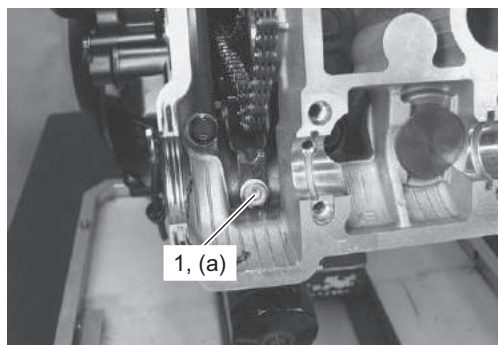
IE31J1140140-01

- 2) Tighten the cam chain tensioner mounting bolts (1) to the specified torque.

Tightening torque

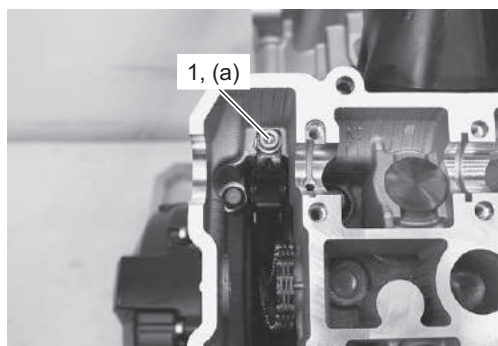
Cam chain tensioner mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Front cylinder side



IE31J1140141-01

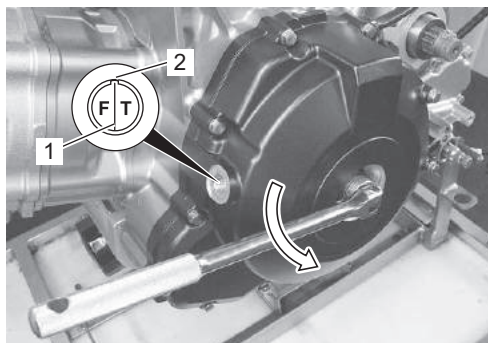
Rear cylinder side



IE31J1140142-01

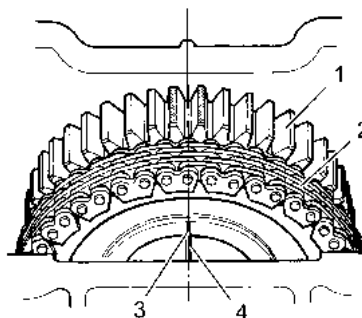
Front Cylinder Cam Drive Idle Gear / Sprocket No. 2

- 1) Turn the crankshaft counterclockwise and align "F | T" line (1) on the generator rotor with the index mark (2) of the valve timing inspection hole while keeping the cam chains pulled upward.



IE31J1140143-01

- 2) Install the cam drive idle gear/sprocket No. 2 (1) onto the front cylinder head and engage the cam chain (2) on it.
- 3) Align the engraved line (3) on the cam drive idle gear/sprocket No. 2 with the embossed line (4) on the cylinder head.

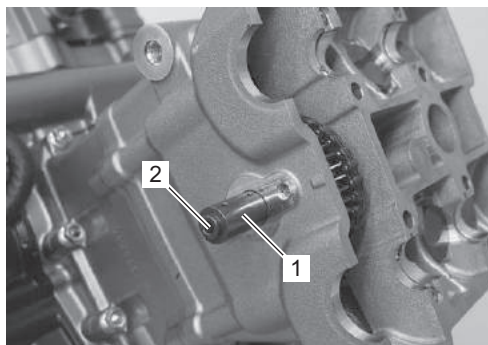


IE31J1140295-02

- 4) Apply engine oil to the idle shaft No. 2 (1) and install it.

NOTE

Face the convex part (2) of the idle shaft No. 2 (1) outside.

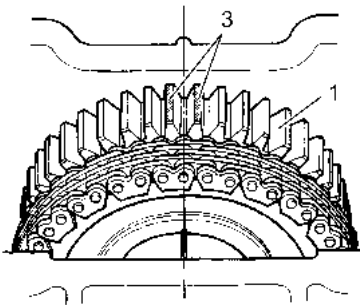


IE31J1140145-01

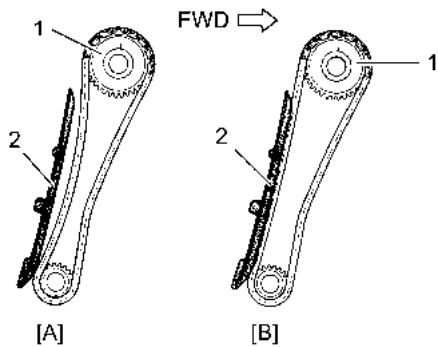
- 5) Check and correct the positions of the "F | T" line on the generator rotor and cam drive idle gear/sprocket No. 2 (1).

NOTICE

When checking the cam drive idle gear/sprocket No. 2 position, remove the cam chain slack at the cam chain guide (2) side by holding it by hand.



IE31J1140146-01



[A]: Incorrect [B]: Correct

IE31J1140147-01

- 6) If the engraved line (1) does not align the embossed line (2), remove the cam drive idle gear/sprocket No. 2.

NOTE

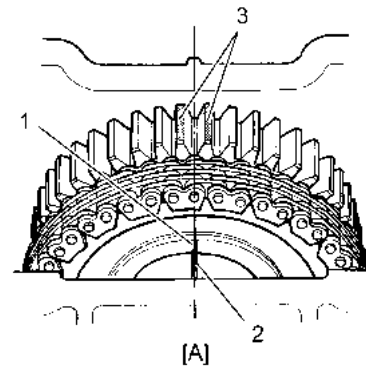
Due to special valve train mechanism, aligning of the three elements; the engraved line (1), embossed line (2) and the gear tooth root on the cam drive idle gear/sprocket No. 2; can occur once every other rotation of crankshaft.

- a) Rotate the crankshaft 360 degrees (1 turn) to bring the "F | T" line on the generator rotor to the index mark of the valve timing inspection hole again.

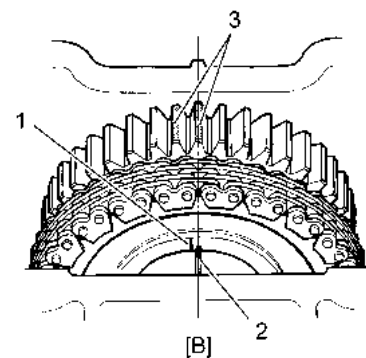
NOTICE

Rotate the crankshaft while pulling the cam chains upward.

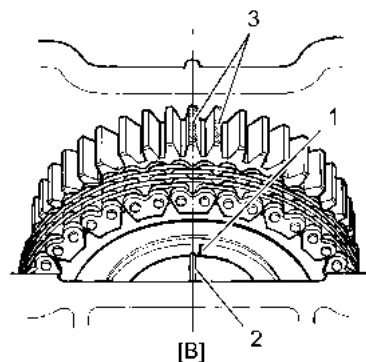
- b) Reinstall the cam drive idle gear/sprocket No. 2 to the correct position as shown.



IE31J1140094-01



IE31J1140095-01



IE31J1140096-01

3. Paint [A]: Correct [B]: Incorrect

1D-36 Engine Mechanical:

7) Apply grease to the new O-ring (1).

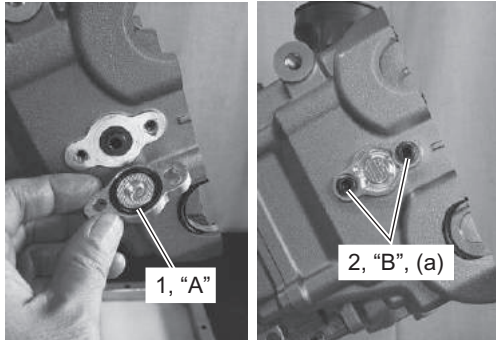
“A”: Grease 99000-25011 (SUZUKI SUPER GREASE A)

8) Apply thread lock to the cylinder head cover No. 2 bolts (2) and tighten them to the specified torque.

“B”: Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

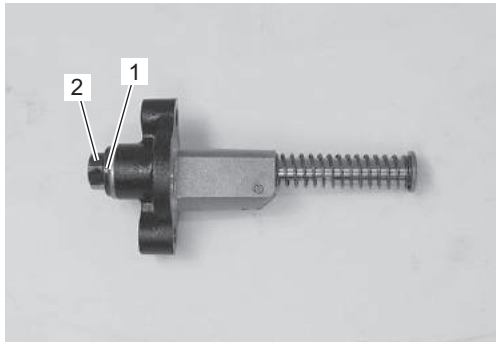
Cylinder head cover No. 2 bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1140148-01

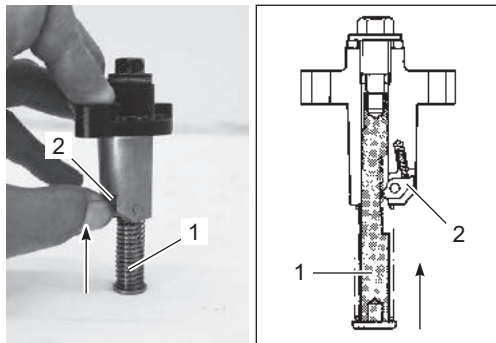
Front Cylinder Cam Chain Tension Adjuster

1) Install the new gasket (1) and tighten the cam chain tension adjuster cap bolt (2) fully.



IE31J1140149-02

2) Compress the cam chain tension adjuster rod (1) fully by releasing the ratchet (2).

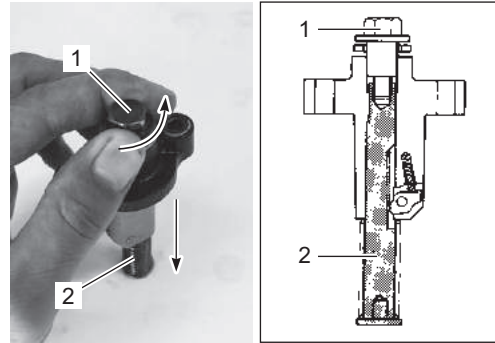


IE31J1140150-01

3) From this position, loosen the cam chain tension adjuster cap bolt (1) until locking the cam chain tension adjuster rod (2). Now the cam chain tension adjuster is ready to install.

NOTE

Loosen the cam chain tension adjuster cap bolt (1) while compressing the cam chain tension adjuster rod (2).



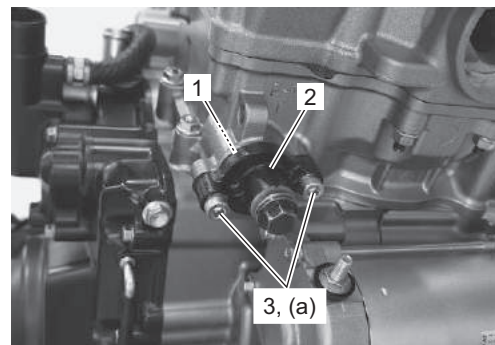
IE31J1140151-01

4) Install the new gasket (1) and cam chain tension adjuster (2).

5) Tighten the cam chain tension adjuster mounting bolts (3) to the specified torque.

Tightening torque

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



IE31J1140152-02

- 6) Release the cam chain tension adjuster by tightening the cap bolt (1).

NOTE

Click sound is heard when the cam chain tension adjuster rod is released.

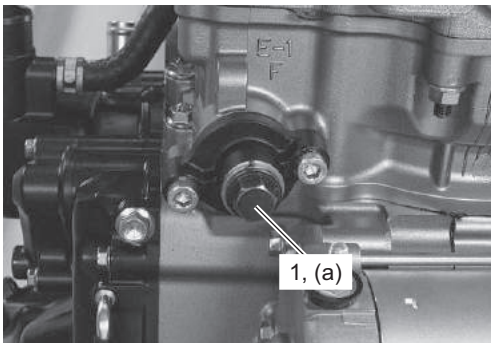
- 7) Tighten the cam chain tension adjuster cap bolt (1) to the specified torque.

Tightening torque

**Cam chain tension adjuster cap bolt (Front) (a):
23 N·m (2.3 kgf-m, 17.0 lbf-ft)**

NOTICE

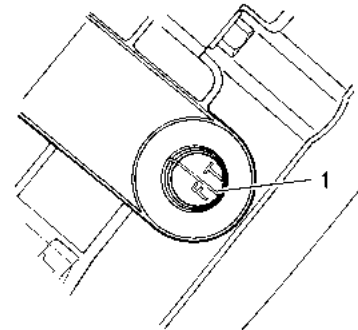
After installing the cam chain tension adjuster, check to be sure that the adjuster work properly by checking the slack of cam chain.



IE31J1140153-01

Rear Cylinder Cam Drive Idle Gear / Sprocket No. 2

- 1) For the rear cylinder cam drive idle gear/sprocket No. 2 installation, the crankshaft setting position (1) must be set at the same position (TDC of compression stroke) as the front one.



IE31J1140154-01

- 2) Install the rear cylinder cam drive idle gear/sprocket No. 2 to the correct position. Refer to "Front Cylinder Cam Drive Idle Gear / Sprocket No. 2" (Page 1D-34).

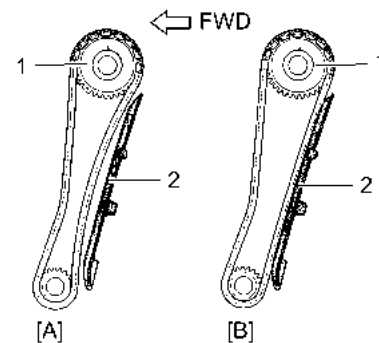
NOTE

The procedures are also the same as the front cylinder cam drive idle gear/sprocket No. 2 installation.

- 3) Check and correct the positions of the "F | T" line on the generator rotor and cam drive idle gear/sprocket No. 2 (1).

NOTICE

When checking the cam drive idle gear/sprocket No. 2 position, remove the cam chain slack at the cam chain guide (2) side by holding it by hand.

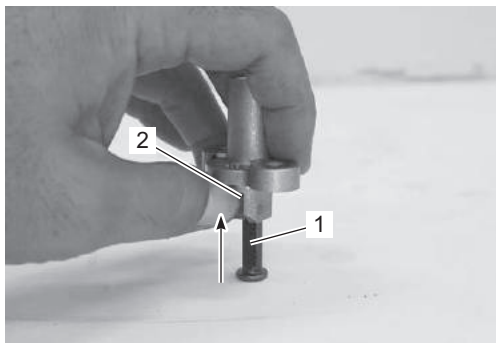


IE31J1140155-01

[A]: Incorrect	[B]: Correct
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Rear Cylinder Cam Chain Tension Adjuster

- 1) Compress the cam chain tension adjuster rod (1) by releasing the ratchet (2).

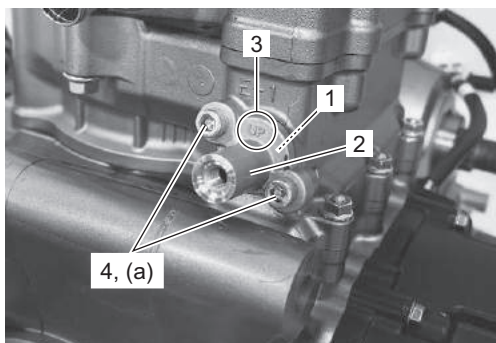


IE31J1140156-01

- 2) Install the new gasket (1).
- 3) Install the cam chain tension adjuster (2) with "UP" mark (3) faced to the top of cylinder head.
- 4) Tighten the cam chain tension adjuster mounting bolts (4) to the specified torque.

Tightening torque

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



IE31J1140157-01

- 5) Apply grease to the new O-ring (1) and install it.

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

- 6) Install the spring (2) and cam chain tension adjuster cap bolt (3).

NOTE

Click sound is heard when extending the cam chain tension adjuster rod.

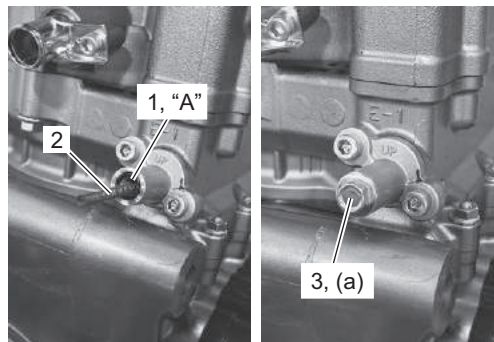
- 7) Tighten the cam chain tension adjuster cap bolt (3) to the specified torque.

Tightening torque

Cam chain tension adjuster cap bolt (Rear) (a):
7 N·m (0.7 kgf-m, 5.0 lbf-ft)

NOTICE

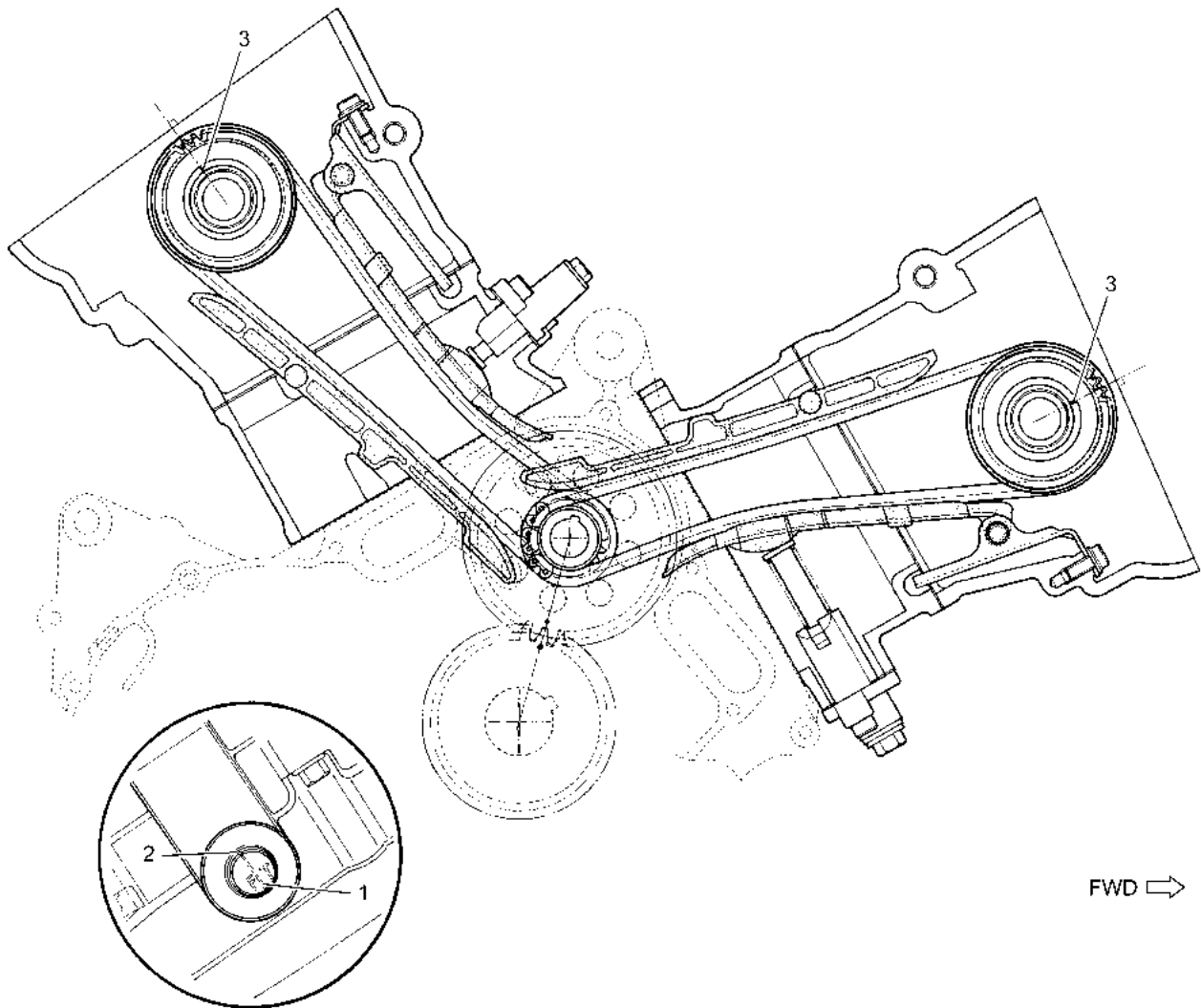
After installing the cam chain tension adjuster, check to be sure that the adjuster work properly by checking the slack of cam chain.



IE31J1140158-01

- 8) Rotate the generator rotor 720 degrees (2 turns) and align the "F | T" line (1) on the generator rotor with the index mark (2) of the valve timing inspection hole.
- 9) Recheck the positions of the engraved lines (3) on each cylinder cam drive idle gear/sprocket No. 2.

Front cylinder TDC of compression stroke

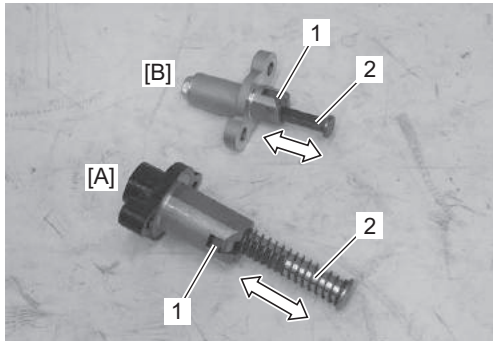


Cam Chain Tension Adjuster Inspection

BENJ31J31406015

Refer to “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-25) and “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-30).

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.



IE31J1140167-01

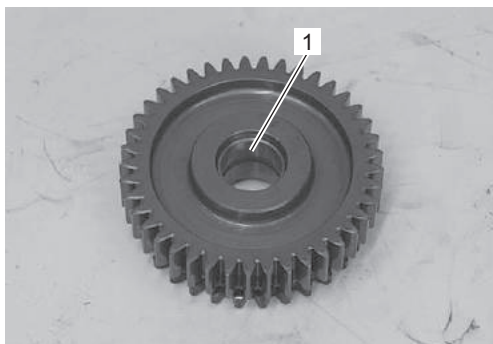
[A]:	Front cylinder cam chain tension adjuster
[B]:	Rear cylinder cam chain tension adjuster

Cam Drive Idle Gear / Sprocket No. 2 Bushing Inspection

BENJ31J31406016

Refer to “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-25) and “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-30).

Inspect the cam drive idle gear/sprocket No. 2 bushing (1) for wear or damage. If any defects are found, replace the cam drive idle gear/sprocket No. 2 with a new one.



IE31J1140168-01

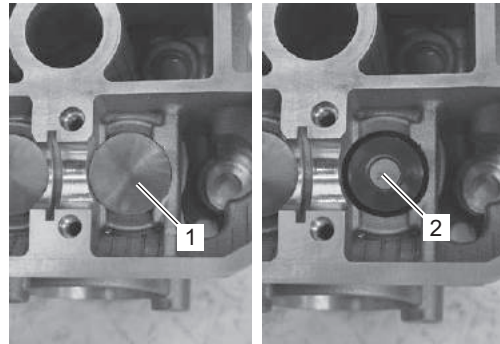
Valve / Valve Spring Removal and Installation

BENJ31J31406017

Refer to “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-25) and “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-30).

Removal

- 1) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



IE31J1140169-01

- 2) Install the sleeve protector between the valve spring and cylinder head.

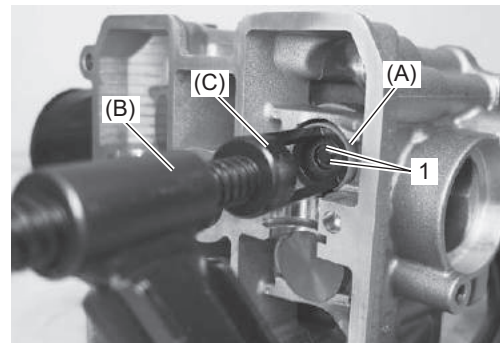
NOTICE

To prevent damage of the tappet sliding surface with the valve lifter attachment, use the special tool.

- 3) Using the special tools, compress the valve spring and remove the two cotter halves (1) from the valve stem.

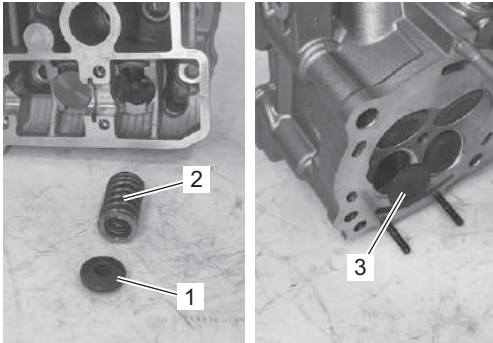
Special tool

- (A): 09919-28620
- (B): 09916-14510
- (C): 09916-14522
- 09916-84511



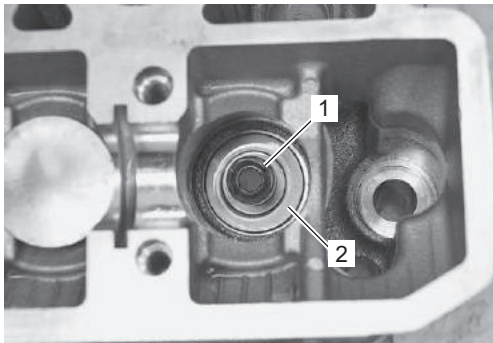
IE31J1140170-02

- 4) Remove the valve spring retainer (1) and valve spring (2).
- 5) Pull out the valve (3) from the combustion chamber side.



IE31J1140171-01

- 6) Remove the oil seal (1) and spring seat (2).

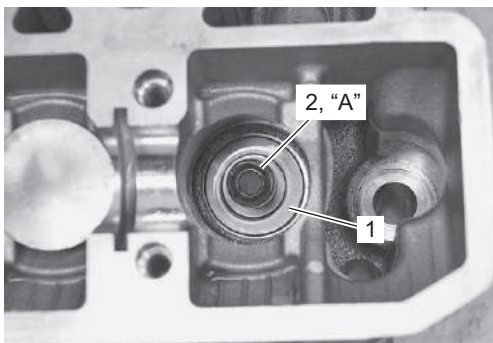


IE31J1140172-02

Installation

- 1) Install the valve spring seat (1).
- 2) Apply molybdenum oil solution to the new oil seal (2), and press-fit it into position.

“A”: Assembly lubrication (Molybdenum oil solution)



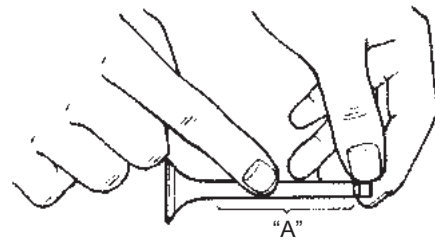
IE31J1140173-02

- 3) Insert the valve, with its stem coated with molybdenum oil solution all around and along the full stem length without any break.

NOTICE

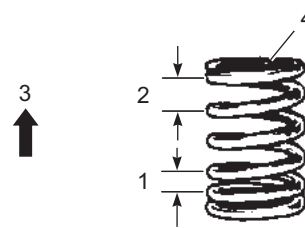
When inserting the valve, take care not to damage the lip of the oil seal.

“A”: Assembly lubrication (Molybdenum oil solution)



ID26J1140087-01

- 4) Install the valve spring with the small-pitch portion (1) facing cylinder head.



ID26J1140274-03

2. Large-pitch portion	4. Paint
3. UPWARD	

1D-42 Engine Mechanical:

- 5) Put on the valve spring retainer (1), and using the special tools, press down the spring, fit the cotter halves (2) to the stem end, 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.

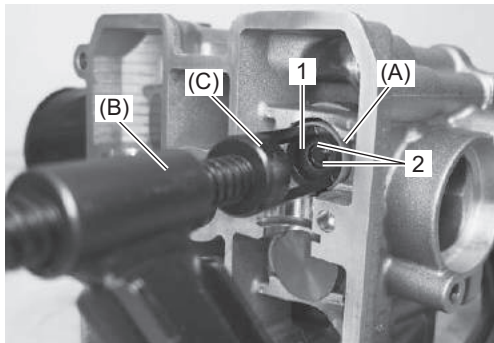
Special tool

(A): 09919-28620

(B): 09916-14510

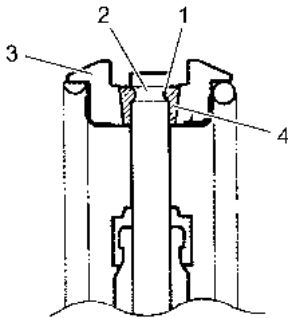
(C): 09916-14522

09916-84511



IE31J1140174-02

- 6) Be sure that the rounded lip (1) of the cotter fits snugly into the groove (2) in the stem end.



IE31J1140175-02

3. Valve spring retainer	4. Cotter
--------------------------	-----------

- 7) Apply engine oil to the stem ends and tappet shims (1).

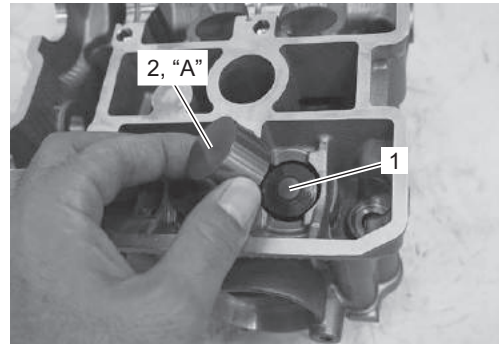
- 8) Apply molybdenum oil solution to the tappets (2).

“A”: Assembly lubrication (Molybdenum oil solution)

- 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.



IE31J1140176-01

Valve Inspection

BENJ31J31406018

Refer to “Valve / Valve Spring Removal and Installation” (Page 1D-40).

Valve Stem Runout

Support the valve using V-blocks, and check its runout using the dial gauge as shown in the figure. If the runout exceeds the service limit, replace the valve.

Special tool

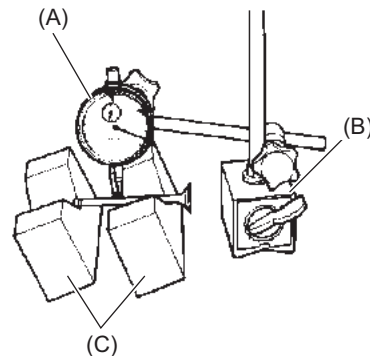
(A): 09900-20607

(B): 09900-20701

(C): 09900-21304

Valve stem runout (IN. & EX.)

Service limit: 0.05 mm (0.002 in)



ID26J1140091-01

Valve Head Radial Runout

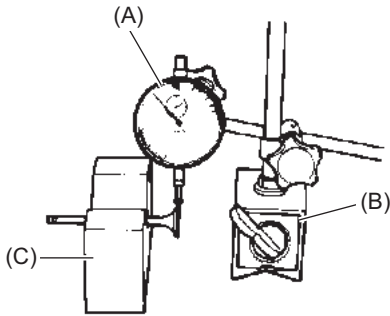
Place the dial gauge at a right angle to the valve head face and measure the valve head radial runout. If it measures more than the service limit, replace the valve.

Special tool

- (A): 09900-20607
- (B): 09900-20701
- (C): 09900-21304

Valve head radial runout (IN. & EX.)

Service limit: 0.03 mm (0.001 in)



ID26J1140092-01

Valve Face Wear

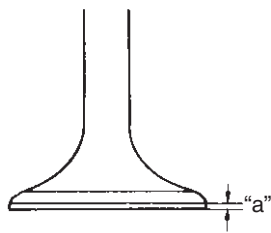
Visually inspect each valve face for wear. Replace any valve with an abnormally worn face. The thickness of the valve face decreases as the face wears. Measure the valve head "a". If it is out of specification replace the valve with a new one.

Special tool

09900-20102

Valve head thickness "a" (IN. & EX.)

Service limit: 0.5 mm (0.02 in)



I649G1140233-02

Valve Stem Deflection

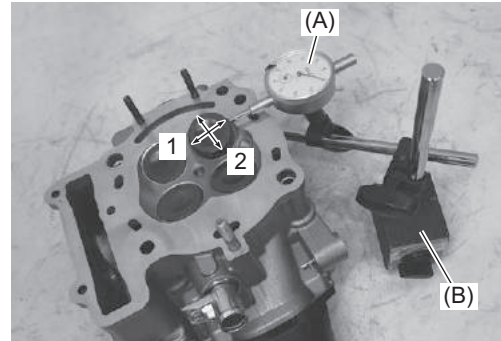
Lift the valve about 10 mm (0.39 in) from the valve seat. Measure the valve stem deflection in two directions, (1) and (2), perpendicular to each other, positioning the dial gauge as shown in the figure. If the deflection measured exceeds the service limit, then determine whether the valve or the guide should be replaced with a new one.

Special tool

- (A): 09900-20607
- (B): 09900-20701

Valve stem deflection (IN. & EX.)

Service limit: 0.35 mm (0.014 in)



IE31J1140177-01

Valve Stem Wear

Measure the valve stem O.D. using the micrometer. If the valve stem is worn down to the limit, as measured with a micrometer, replace the valve. If the stem is within the limit, then replace the guide. After replacing valve or guide, be sure to recheck the deflection.

Special tool

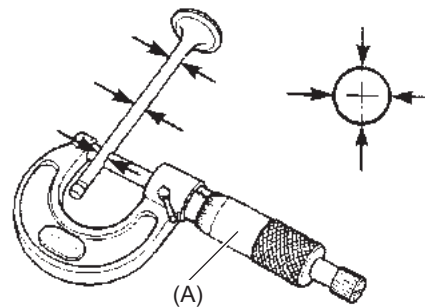
(A): 09912-66310

Valve stem O.D. (IN.)

Standard: 5.475 – 5.490 mm (0.2156 – 0.2161 in)

Valve stem O.D. (EX.)

Standard: 5.455 – 5.470 mm (0.2148 – 0.2154 in)



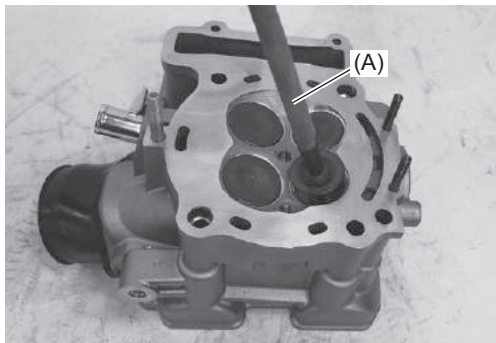
ID26J1140094-01

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): 09916-10911



IE31J1140178-01

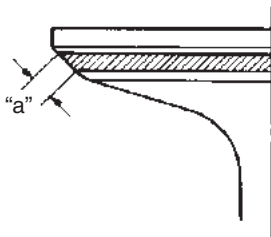
- 4) Check that the transferred red lead (Blue) on the valve face is uniform all around and in center of the valve face. If the seat width "a" measured exceeds the standard value, or seat width is not uniform reface the seat using the seat cutter. (Page 1D-45)

Valve seat width (IN.)

Standard: 1.17 – 1.37 mm (0.046 – 0.054 in)

Valve seat width (EX.)

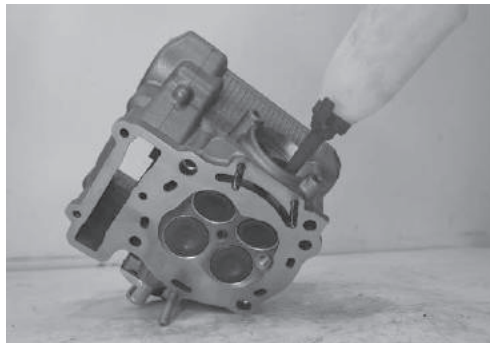
Standard: 1.31 – 1.51 mm (0.052 – 0.059 in)



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-45)



IE31J1140179-02

Valve Seat Repair

BENJ31J31406019

Refer to "Valve / Valve Spring Removal and Installation" (Page 1D-40).

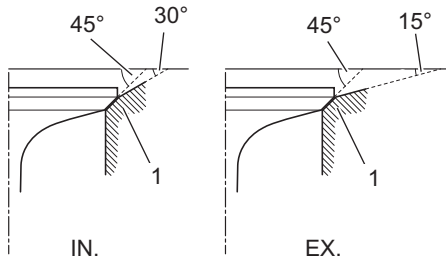
The valve seats (1) for both the intake and exhaust valves are machined to two different angles. The seat contact surface is cut at 45°.

NOTICE

- The valve seat contact area must be inspected after each cut.
- Do not use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish but not a highly polished or shiny finish. This will provide a soft surface for the final seating of the valve which will occur during the first few seconds of engine operation.

NOTE

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been installed. ↻(Page 1D-15)



IE31J1140180-01

	Intake	Exhaust
Seat angle	30°/45°	15°/45°
Seat width	1.17 – 1.37 mm (0.046 – 0.054 in)	1.31 – 1.51 mm (0.052 – 0.059 in)
Valve diameter	36 mm (1.4 in)	33 mm (1.3 in)
Valve guide I.D.	5.500 – 5.512 mm (0.2165 – 0.2170 in)	←

Valve Spring Inspection

BENJ31J31406020

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.

Special tool

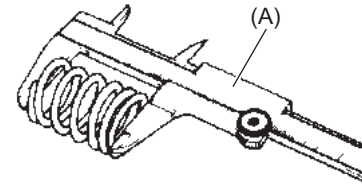
(A): 09900–20102

Valve spring free length (IN. & EX.)

Service limit: 39.6 mm (1.56 in)

Valve spring preload when compressed to 35.6 mm (1.40 in) (IN. & EX.)

Standard: 197 – 227 N (20.1 – 23.1 kgf, 44.3 – 51.0 lbf)



ID26J1140098-01



ID26J1140263-01

Cylinder Head Disassembly and Reassembly

BENJ31J31406021

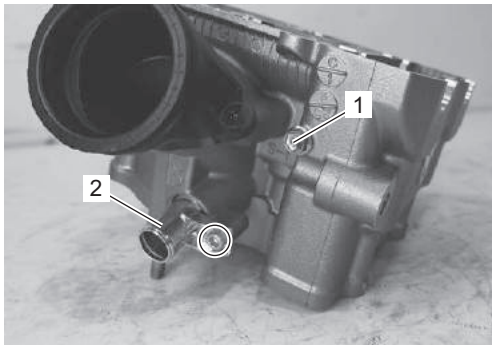
Refer to “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-25) and “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-30).

NOTE

The front and rear cylinder heads are assembled symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.

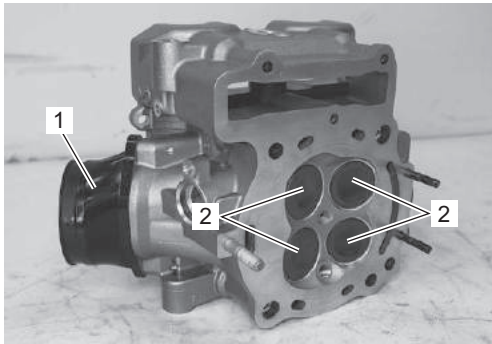
Disassembly

- 1) Remove the oil gallery plug (M6) (1) and water union (2).



IE31J1140181-01

- 2) Remove the following parts.
 - Intake pipe (1): (Page 1D-24)
 - Valves (2) and valve springs: (Page 1D-40)
 - Valve guides: (Page 1D-47)



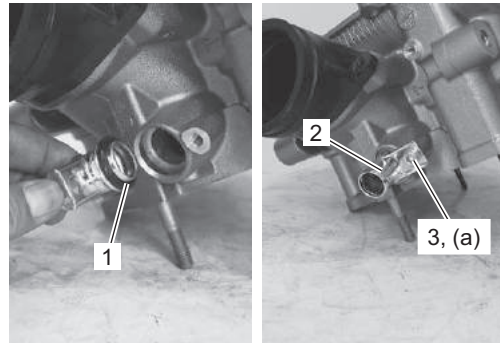
IE31J1140182-01

Reassembly

- 1) Install the following parts.
 - Intake pipe: (Page 1D-24)
 - Valves and valve springs: (Page 1D-40)
 - Valve guides: (Page 1D-47)
- 2) Apply engine coolant to the new O-ring (1) and install the water union (2).
- 3) Tighten the water union bolt (3) to the specified torque.

Tightening torque

Water union bolt (a): 10 N·m (1.0 kgf·m, 7.5 lbf·ft)

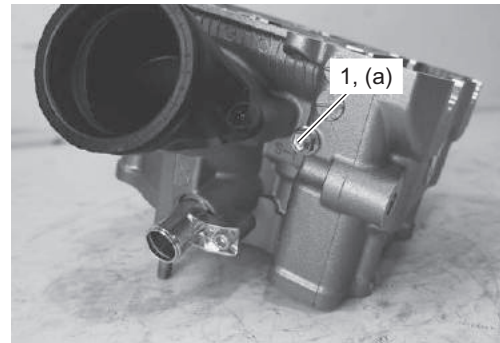


IE31J1140183-01

- 4) Install the oil gallery plug (M6) (1) with the new gasket and tighten it to the specified torque.

Tightening torque

Oil gallery plug (M6) (a): 10 N·m (1.0 kgf·m, 7.5 lbf·ft)



IE31J1140184-01

Cylinder Head Inspection

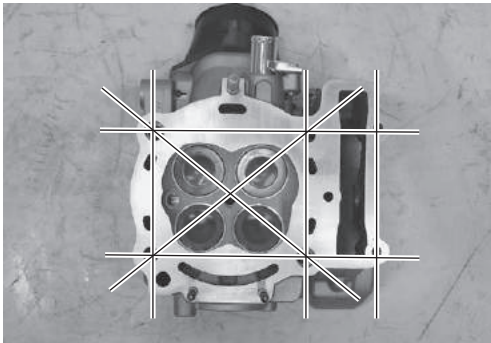
BENJ31J31406022

Refer to “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-25) and “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-30).

- 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.

Special tool
09900–20803

Cylinder head distortion
Service limit: 0.05 mm (0.002 in)



IE31J1140185-01

Valve Guide Replacement

BENJ31J31406023

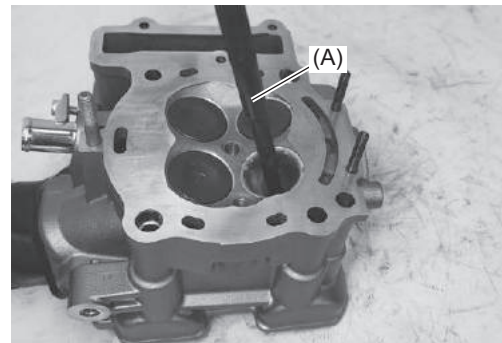
Refer to “Valve / Valve Spring Removal and Installation” (Page 1D-40).

- 1) Using the special tool, drive the valve guide out toward the intake or exhaust camshaft side.

Special tool
(A): 09916–44910

NOTE

- Discard the removed valve guide sub assemblies.
- Only oversized valve guides are available as replacement parts. (Part No. 11115-32E70)



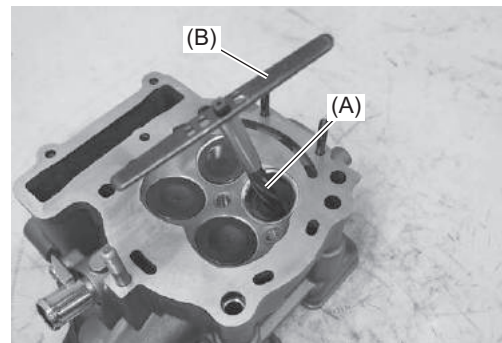
IE31J1140186-01

- 2) Refinish the valve guide holes in the cylinder head using the special tools.
- 3) Remove the special tools by turning clockwise and raising them at the same time.

NOTICE

Never turn the special tools counterclockwise, as this will dull the blades.

Special tool
(A): 09916–34580
(B): 09916–34542



IE31J1140187-01

1D-48 Engine Mechanical:

- 4) Cool down the new valve guides in a freezer for about one hour and heat the cylinder head to 100 – 150 °C (212 – 302 °F).

NOTICE

Do not use a burner to heat the valve guide hole to prevent cylinder head distortion.

- 5) Apply engine oil to each valve guide and valve guide hole.

NOTICE

Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.

- 6) Drive the guide into the guide hole using the valve guide installer and attachment.

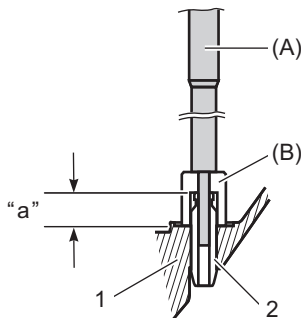
NOTE

Install the valve guide until the attachment contacts the cylinder head.

Special tool

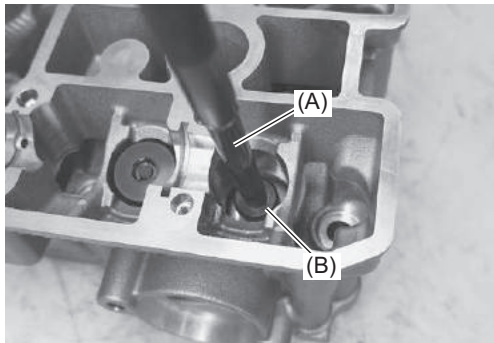
(A): 09916-44910

(B): 09916-53340



ID26J1140106-01

1. Cylinder head	"a": 17.0 mm (0.67 in)
2. Valve guide	



IE31J1140188-01

- 7) After installing the valve guides, refinish their guiding bores using the reamer. Be sure to clean and oil the guides after reaming.

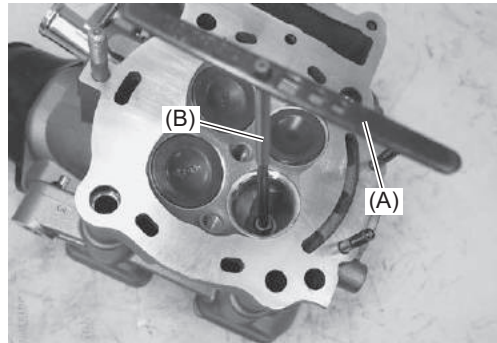
NOTE

- Cool down the cylinder head to ambient air temperature.
- Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.

Special tool

(A): 09916-34542

(B): 09916-34550



IE31J1140189-01

Cylinder Inspection

BENJ31J31406024

Refer to "Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal" (Page 1D-25) and "Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation" (Page 1D-30).

Cylinder Distortion

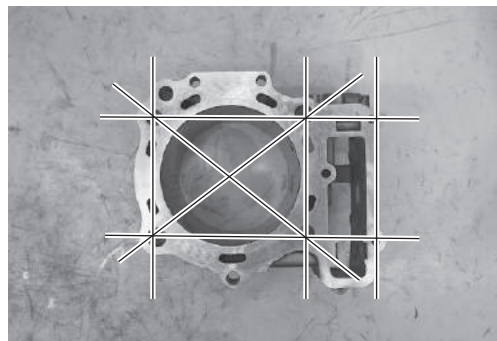
Check the gasket surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.

Special tool

09900-20803

Cylinder distortion

Service limit: 0.05 mm (0.002 in)



IE31J1140190-01

Cylinder Bore

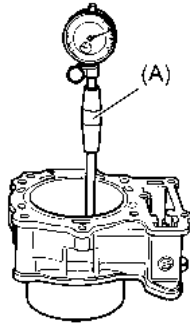
Check the cylinder wall for any scratches, nicks or other damage. Measure the cylinder bore diameter at six places.

Special tool

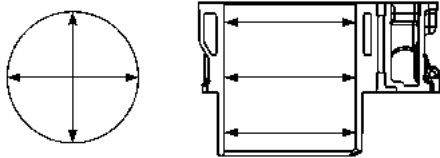
(A): 09900-20530

Cylinder bore

Standard: 100.000 – 100.015 mm (3.9370 – 3.9376 in)



IE31J1140191-01



IE31J1140192-01

Piston Removal and Installation

BENJ31J31406025

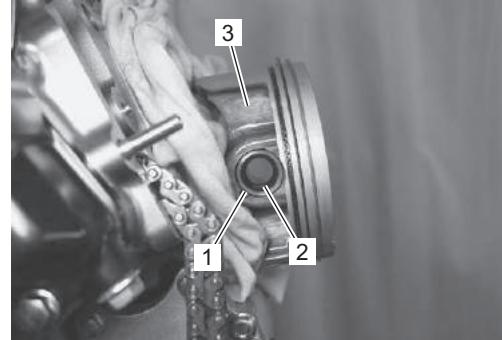
Refer to “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-25) and “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-30).

NOTE

The front and rear pistons are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

- 1) Place a clean rag over the cylinder base so as not to drop the piston pin circlips (1) into the crankcase.
- 2) Remove the piston pin circlip (1).
- 3) Draw out the piston pin (2) and remove the piston (3).



IE31J1140193-01

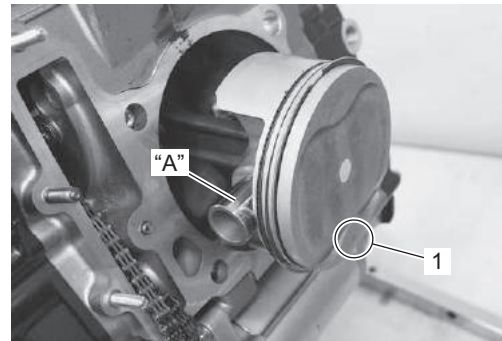
Installation

- 1) When installing the piston pin, apply molybdenum oil solution onto the piston pin.

NOTE

When installing the piston, the indent (1) on the piston head must be faced to exhaust side.

“A”: Assembly lubrication (Molybdenum oil solution)



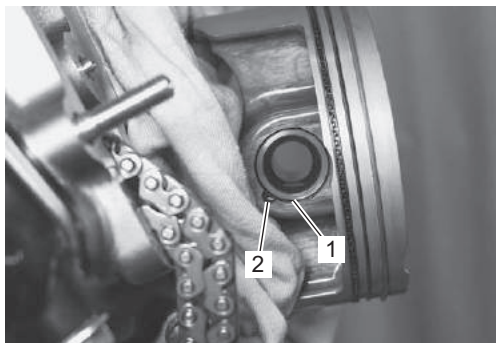
IE31J1140194-01

1D-50 Engine Mechanical:

- 2) Place a clean rag over the cylinder base so as not to drop the piston pin circlips (1) into the crankcase.
- 3) Install the new piston pin circlip (1).

NOTE

End gap of the circlip (1) should not be aligned with the cutaway (2) in the piston pin bore.



IE31J1140195-02

Piston Ring Removal and Installation

BENJ31J31406026

Refer to "Piston Removal and Installation" (Page 1D-49).

NOTE

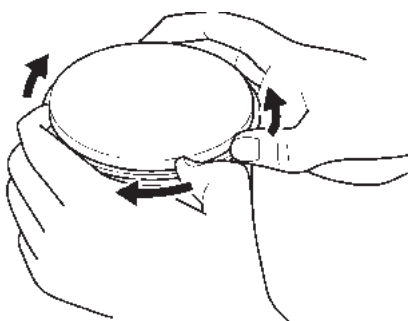
The front and rear piston rings are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

- 1) 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.



I831G1140178-01

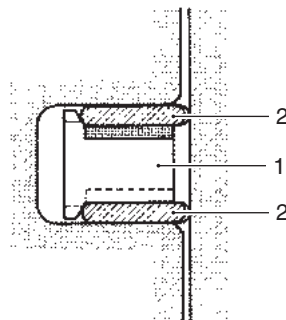
- 2) Remove the 2nd ring and oil ring in the same procedure.

Installation

NOTE

- When installing the piston ring, be careful not to damage the piston.
- Do not expand the piston ring excessively since it is apt to be broken down.

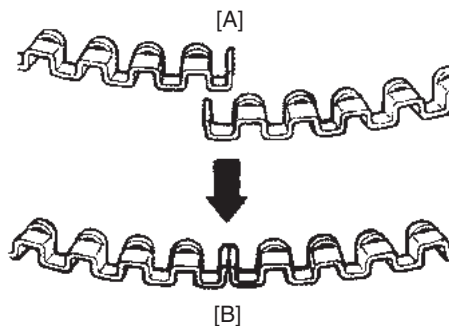
- 1) Install the piston rings in the order of the oil ring, 2nd ring and 1st ring.
 - a) The first member to go into the of the oil ring groove is a spacer (1). After placing the spacer, fit the two side rails (2).



I718H1140143-02

NOTICE

When installing the spacer, be careful not to allow its two ends to overlap in the groove.



ID26J1140275-03

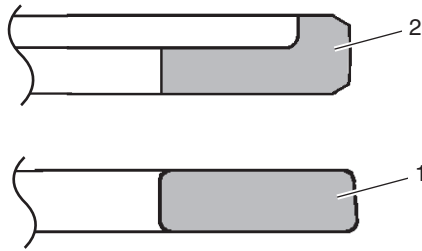
[A]: Incorrect

[B]: Correct

b) Install the 2nd ring (1) and 1st ring (2) to piston.

NOTE

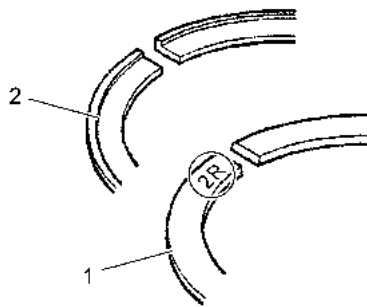
1st ring (2) and 2nd ring (1) differ in shape.



IE31J1140196-01

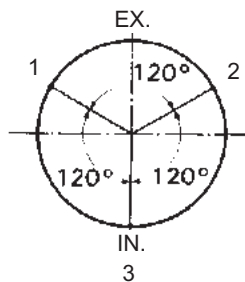
NOTE

- 2nd ring (1) has letters [2R] marked on the side. Be sure to bring the marked side to the top when fitting it to the piston.
- Bring the concave side of 1st ring (2) to the top when fitting it to the piston.



IE31J1140197-01

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.



ID26J1140121-04

1.	2nd ring and lower side rail
2.	Upper side rail
3.	1st ring and spacer

Piston and Piston Ring Inspection

BENJ31J31406027

Refer to "Piston Ring Removal and Installation" (Page 1D-50).

Piston Diameter

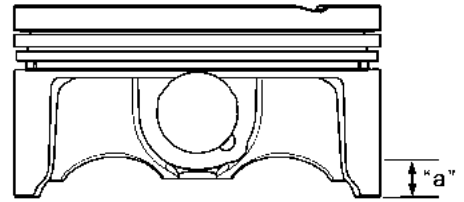
Measure the piston diameter using the micrometer at 10 mm (0.4 in) "a" from the skirt end. If the piston diameter is less than the service limit, replace the piston.

Special tool

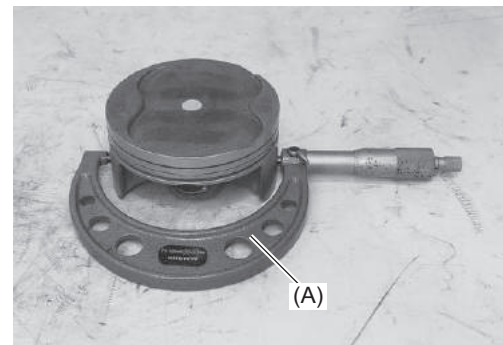
(A): 09900-20204

Piston diameter

Service limit: 99.880 mm (3.9323 in)



IE31J1140198-01



IE31J1140199-01

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

Service limit: 0.120 mm (0.0047 in)

Piston Ring to Groove Clearance

Measure the side clearances of the 1st and 2nd piston rings using the thickness gauge. If any of the clearances exceed the limit, replace both the piston and piston rings.

Special tool

(A): 09900-20803

(B): 09912-66310

Piston ring to groove clearance

Service limit: (1st): 0.180 mm (0.0071 in)

Service limit: (2nd): 0.150 mm (0.0059 in)

Piston ring groove width

Standard: (1st "a": L4 – L6): 0.83 – 0.85 mm (0.0327 – 0.0335 in)

Standard: (1st "a": L8 –): 0.83 – 0.86 mm (0.0327 – 0.0339 in)

Standard: (1st "b": L4 – L6): 1.25 – 1.27 mm (0.0492 – 0.0500 in)

Standard: (1st "b": L8 –): 1.25 – 1.28 mm (0.0492 – 0.0504 in)

Standard: (2nd): 1.01 – 1.03 mm (0.0398 – 0.0406 in)

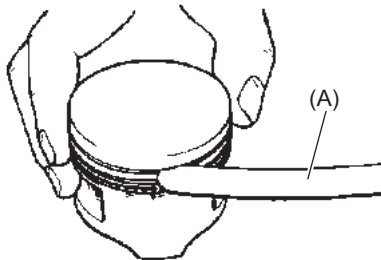
Standard: (Oil): 2.01 – 2.03 mm (0.0791 – 0.0799 in)

Piston ring thickness

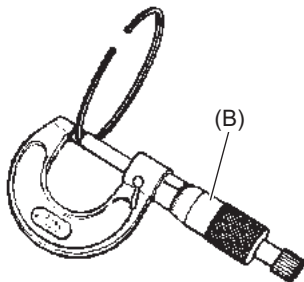
Standard: (1st "c"): 0.76 – 0.81 mm (0.0299 – 0.0319 in)

Standard: (1st "d"): 1.08 – 1.10 mm (0.0425 – 0.0433 in)

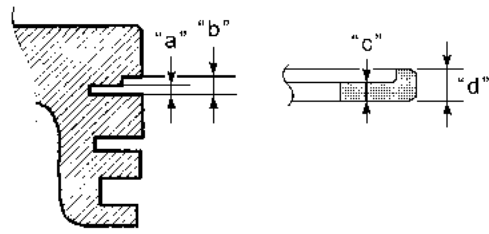
Standard: (2nd): 0.97 – 0.99 mm (0.0382 – 0.0390 in)



ID26J1140124-01



ID26J1140125-01



IE31J1140200-01

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.

Special tool

(A): 09900-20102

(B): 09900-20803

Piston ring free end gap

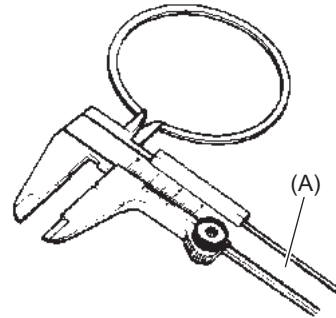
Service limit: (1st): 8.8 mm (0.35 in)

Service limit: (2nd): 11.1 mm (0.43 in)

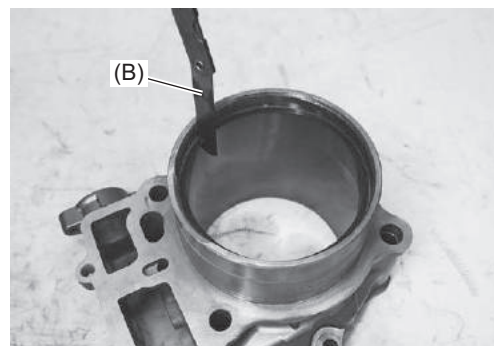
Piston ring end gap

Service limit: (1st): 0.50 mm (0.020 in)

Service limit: (2nd): 0.70 mm (0.028 in)



ID26J1140126-02



IE31J1140201-01

Piston Pin Bore

Measure the piston pin bore inside diameter using the small bore gauge. If measurement is out of specification, replace the piston.

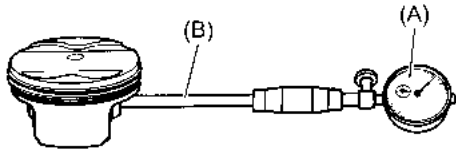
Special tool

(A): 09900-20602

(B): 09900-22403

Piston pin bore I.D.

Service limit: 22.030 mm (0.8673 in)



IE31J1140202-01

Piston Pin

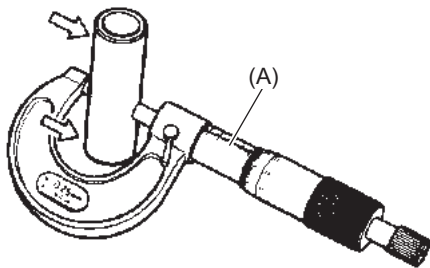
Measure the piston pin outside diameter at three positions using the micrometer. If any of the measurements are out of specification, replace the piston pin.

Special tool

(A): 09912-66310

Piston pin O.D.

Service limit: 21.980 mm (0.8654 in)



ID26J1140129-01

Cam Chain Guide Inspection

BENJ31J31406028

Refer to “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-25) and “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-30).

Check the contacting surface of the cam chain guide. If it is worn or damaged, replace it with a new one.



IE31J1140203-01

Cam Chain Tensioner Inspection

BENJ31J31406029

Refer to “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Removal” (Page 1D-25) and “Cam Chain Tension Adjuster / Cam Chain Tensioner / Cylinder Head Assembly / Cam Chain Guide / Cylinder Installation” (Page 1D-30).

Check the contacting surface of the cam chain tensioner. If it is worn or damaged, replace it with a new one.



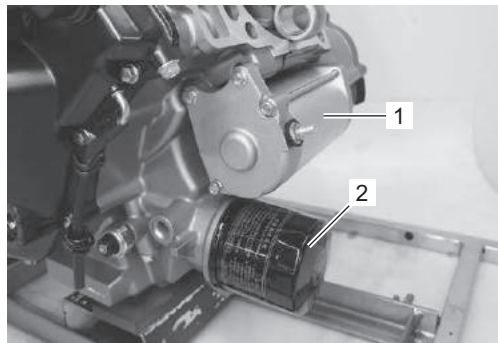
IE31J1140204-01

Crankcase Assembly Disassembly

BENJ31J31406030

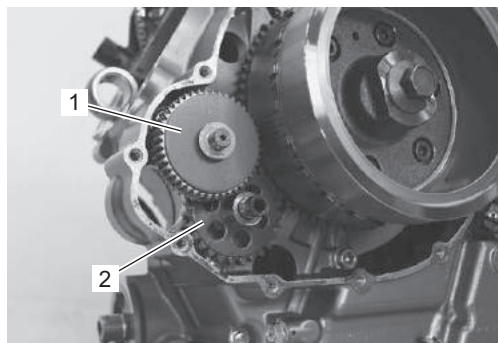
Refer to "Engine Assembly Removal" (Page 1D-19) and "Piston Removal and Installation" (Page 1D-49).

- 1) Remove the starter motor assembly (1). (Page 1I-6)
- 2) Remove the oil filter (2). (Page 1E-5)



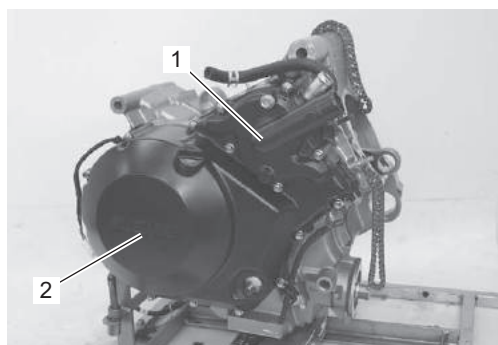
IE31J1140205-01

- 3) Remove the generator cover, starter torque limiter (1) and starter idle gear (2). (Page 1I-13)



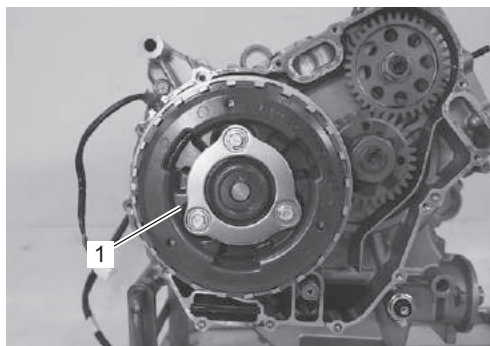
IE31J1140206-01

- 4) Remove the water pump case (1) and clutch cover (2). (Page 5C-15)



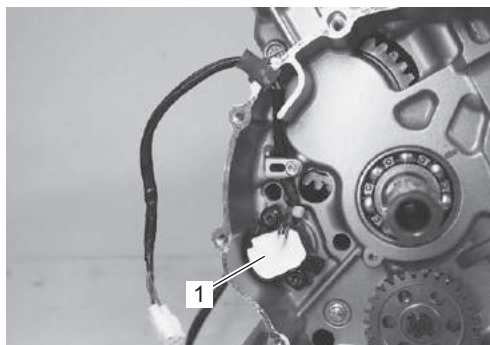
IE31J1140207-02

- 5) Remove the clutch component parts (1). (Page 5C-15)



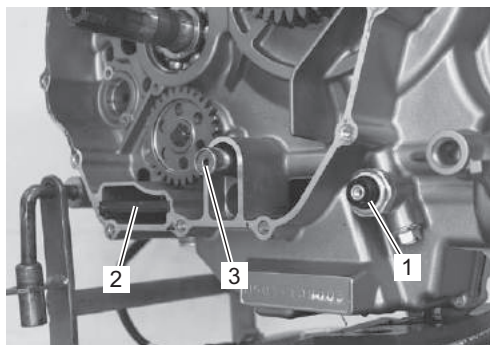
IE31J1140208-01

- 6) Remove the GP switch (1). (Page 5B-11)



IE31J1140209-01

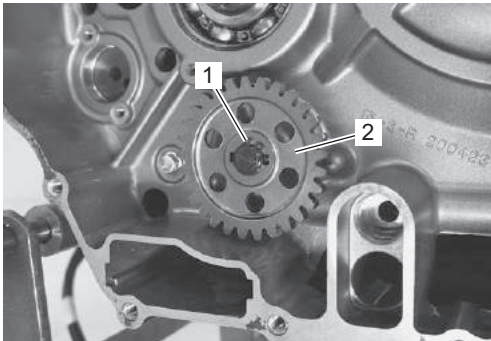
- 7) Remove the oil pressure switch (1). (Page 1E-7)
- 8) Remove the oil strainer (2) and oil pressure regulator (3). (Page 1E-6)



IE31J1140210-01

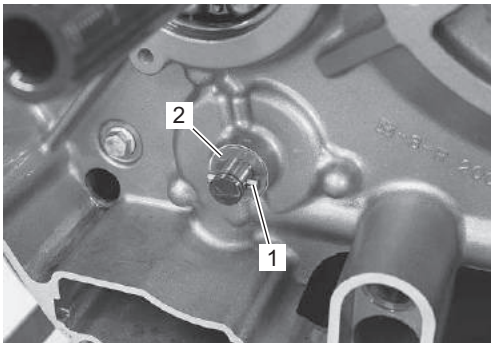
- 9) Remove the snap ring (1) and oil pump driven gear (2).

Special tool
09900-06107



IE31J1140211-01

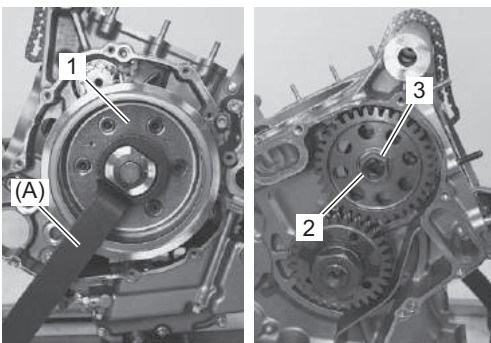
- 10) Remove the pin (1) and washer (2).



IE31J1140212-02

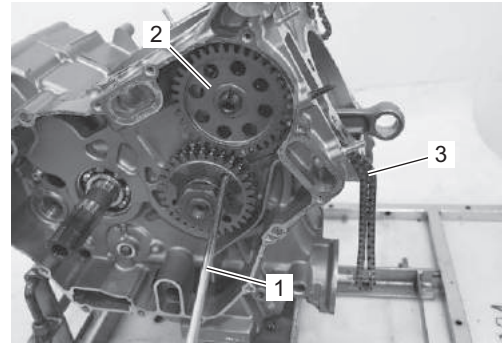
- 11) Hold the generator rotor (1) with the special tool and remove the cam drive idle gear/sprocket No. 1 nut (2) and washer (3).

Special tool
(A): 09930-44541



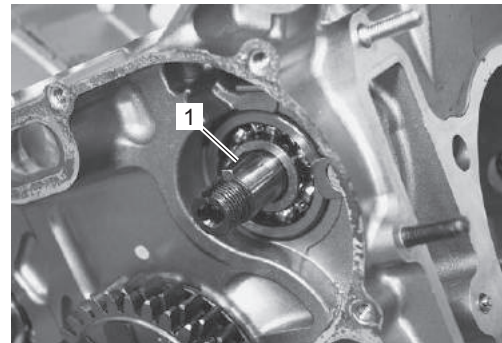
IE31J1140213-01

- 12) Insert a suitable bar (1) into the holes of primary drive gears to align the teeth of scissors gears.
13) Remove the cam drive idle gear/sprocket No. 1 (2) and cam chain (3).



IE31J1140214-01

- 14) Remove the key (1).



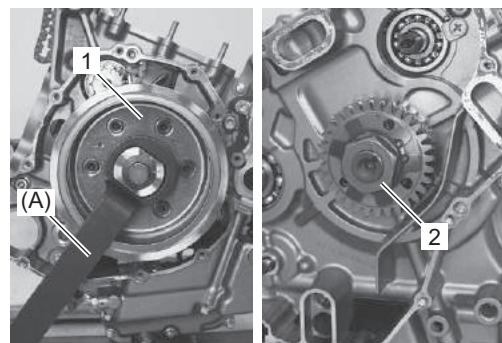
IE31J1140215-02

- 15) Hold the generator rotor (1) with the special tool and remove the primary drive gear nut (2).

NOTE

This primary drive gear nut (2) has left-hand threads.

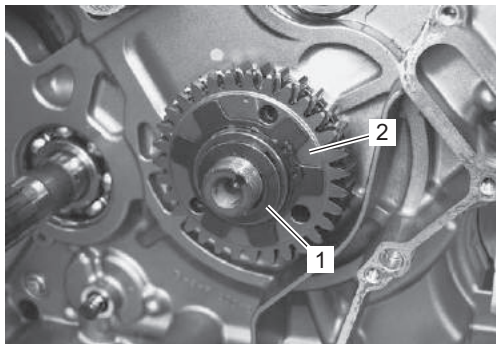
Special tool
(A): 09930-44541



IE31J1140216-01

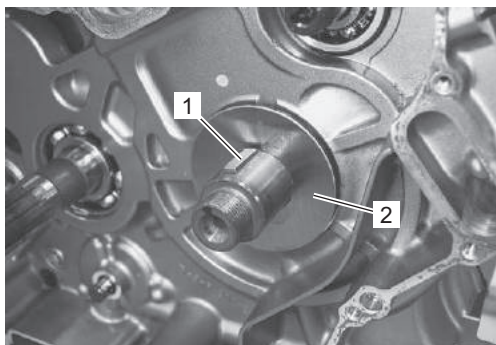
1D-56 Engine Mechanical:

- 16) Remove the conical spring washer (1) and primary drive gear assembly (2).



IE31J1140217-01

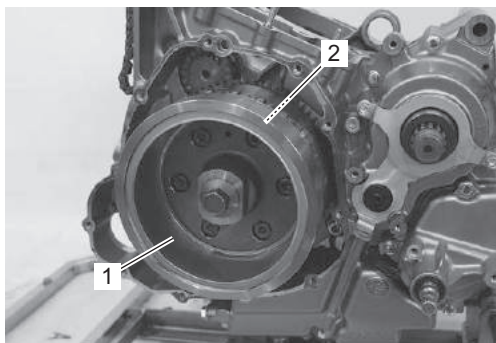
- 17) Remove the key (1) and thrust washer (2).



IE31J1140218-01

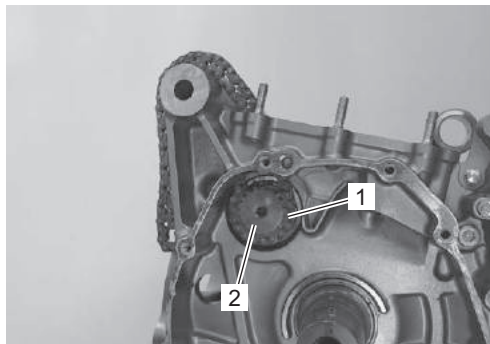
- 18) Remove the generator rotor (1). (Page 1J-5)

- 19) Remove the starter driven gear (2). (Page 1I-13)



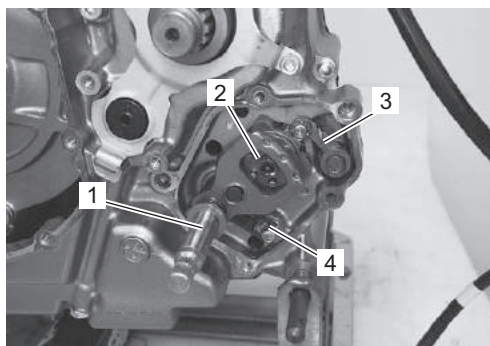
IE31J1140219-01

- 20) Remove the cam chain (1) and cam drive idle gear shaft (2).



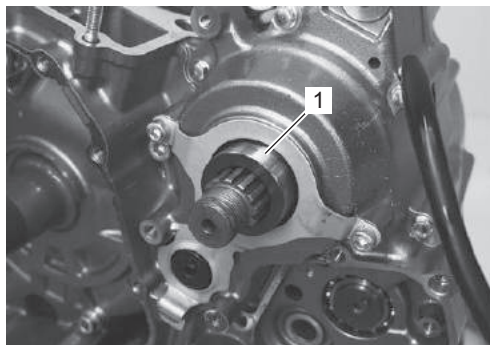
IE31J1140220-01

- 21) Remove the gearshift cover, gearshift shaft assembly (1), gearshift cam plate (2), gearshift cam stopper (3) and gearshift arm stopper (4). (Page 5B-14)



IE31J1140221-01

- 22) Remove the engine sprocket spacer (1).

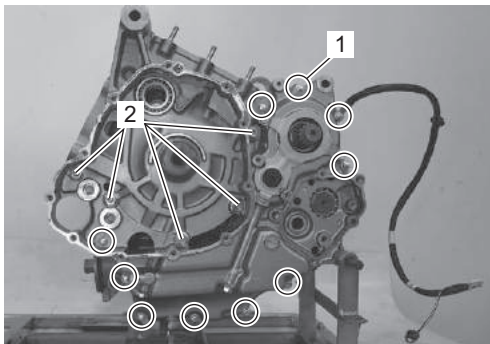


IE31J1140222-01

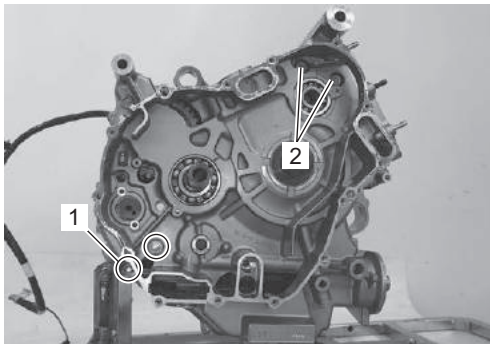
23) Remove the crankcase bolts (M6) (1) and (M8) (2).

NOTE

Loosen the crankcase bolts diagonally with the smaller size first.



IE31J1140223-02



IE31J1140224-01

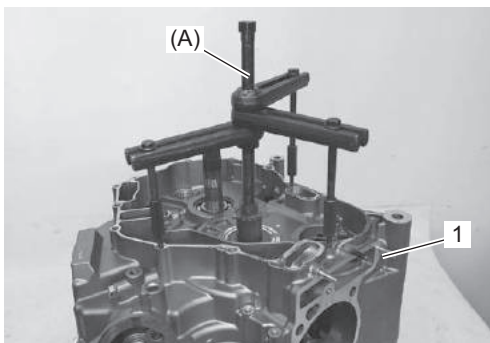
24) Remove the right crankcase (1) with the special tool.

NOTE

- **Fit the crankcase separating tool, so that the tool arms are in parallel with the side of crankcase.**
- **The crankshaft and transmission components should remain in the left crankcase half.**

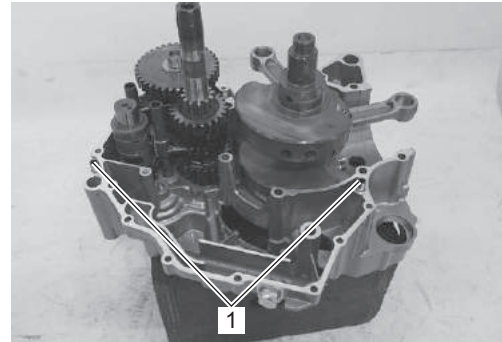
Special tool

(A): 09920-13120

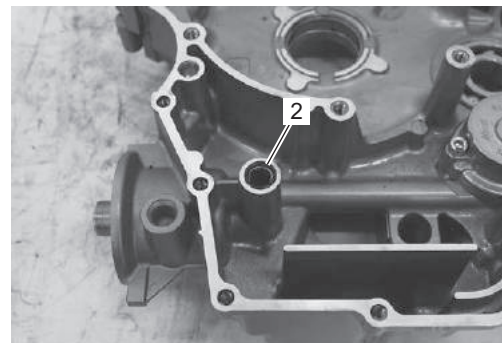


IE31J1140225-01

25) Remove the dowel pins (1) and O-ring (2).



IE31J1140226-01



IE31J1140227-02

26) Remove the following parts from the crankcases.

- Crankshaft assembly: ☞ (Page 1D-61)
- Transmission component parts: ☞ (Page 5B-3)
- Oil pump: ☞ (Page 1E-11)
- Left crankcase bearings and oil seals: ☞ (Page 1D-65)
- Right crankcase bearing: ☞ (Page 1D-66)

Crankcase Assembly Reassembly

BENJ31J31406031

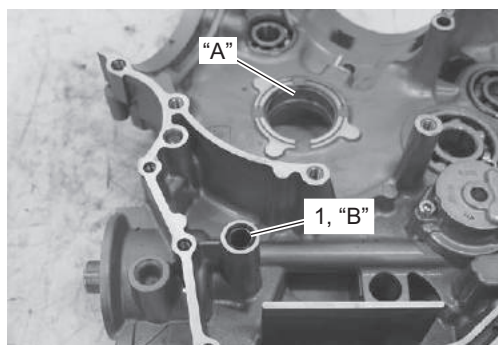
Refer to "Piston Removal and Installation" (Page 1D-49) and "Engine Assembly Installation" (Page 1D-22).

- 1) Install the following parts to the crankcases.
 - Right crankcase bearing: ☞ (Page 1D-66)
 - Left crankcase bearings and oil seals: ☞ (Page 1D-65)
 - Oil pump: ☞ (Page 1E-11)
 - Transmission component parts: ☞ (Page 5B-3)
 - Crankshaft assembly: ☞ (Page 1D-61)
- 2) Apply engine oil to each running and sliding part.
- 3) Apply molybdenum oil solution to the crankshaft journal bearing.

"A": Assembly lubrication (Molybdenum oil solution)

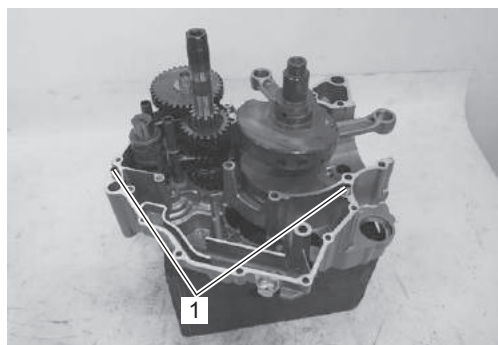
- 4) Apply grease to the new O-ring (1) and install it to the right crankcase.

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



IE31J1140228-02

- 5) Install the dowel pins (1).



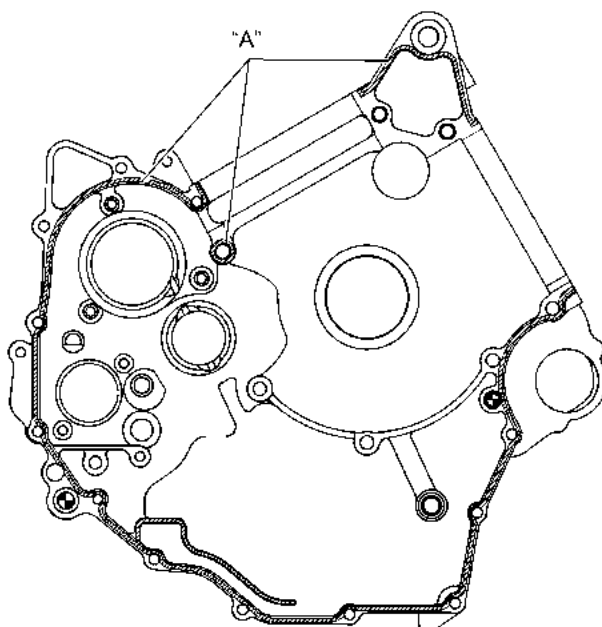
IE31J1140229-01

- 6) Clean the mating surfaces of the left and right crankcase halves. Apply sealant to the mating surface of the left crankcase.

NOTE

- **Make surfaces free from moisture, oil, dust and other foreign materials.**
- **Spread on surfaces thinly to form an even layer, and assemble the crankcases within few minutes.**
- **Take extreme care not to apply any sealant to the oil hole, oil groove and bearing.**
- **Apply to distorted surfaces as it forms a comparatively thick film.**

"A": Sealant 99000-31110 (SUZUKI BOND 1215)



IE31J1140230-01

7) Assemble the right and left crankcase halves.

NOTE

Be careful not to drop the O-ring into the crankcase.

8) Tighten the crankcase bolts a little at a time to equalize the pressure.

NOTE

- Tighten the larger diameter crankcase bolts first and then smaller ones diagonally and evenly.
- Fit the washer (1) to the crankcase bolt.
- Tighten the engine ground lead wire (2) by a crankcase bolt.

Tightening torque

Crankcase bolt (M8) (L110) (a): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)

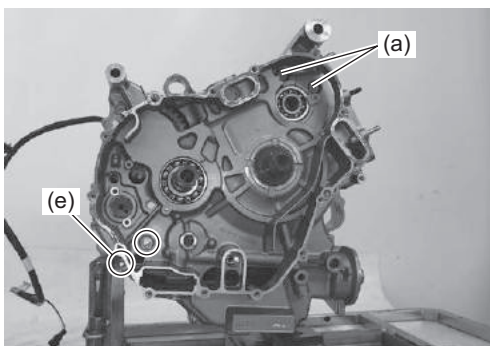
Crankcase bolt (M8) (L125) (b): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)

Crankcase bolt (M8) (L90) (c): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)

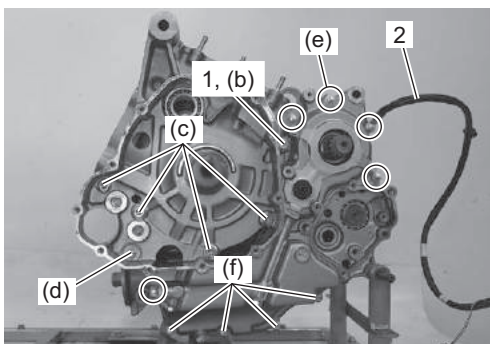
Crankcase bolt (M6) (L85) (d): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

Crankcase bolt (M6) (L70) (e): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

Crankcase bolt (M6) (L30) (f): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

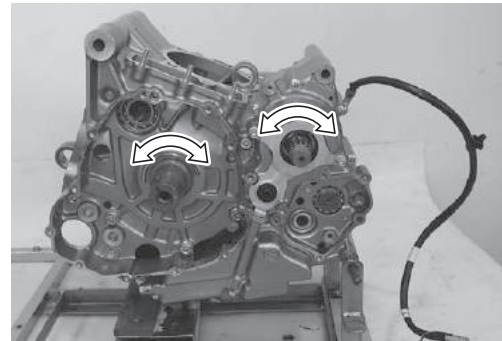


IE31J1140232-01

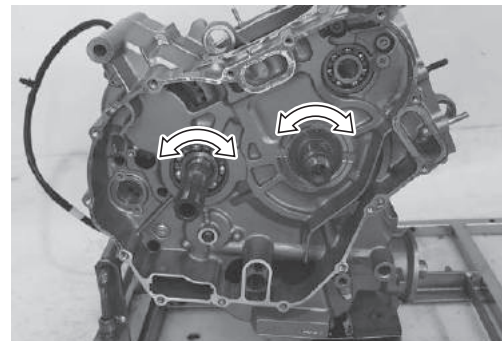


IE31J1140233-02

9) After the crankcase bolts have been tightened, check if the crankshaft, driveshaft and countershaft rotate smoothly.



IE31J1140234-01



IE31J1140235-01

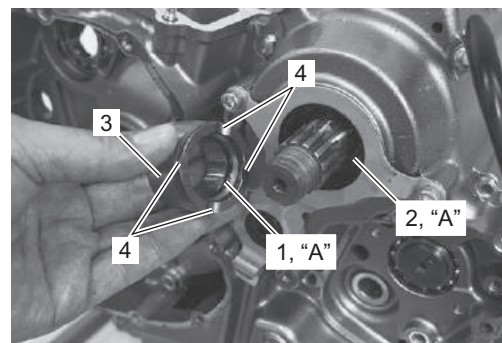
10) Apply grease to the new O-ring (1) and oil seal lip (2).

“A”: Grease 99000-25011 (SUZUKI SUPER GREASE A)

11) Install the engine sprocket spacer (3) onto the driveshaft.

NOTE

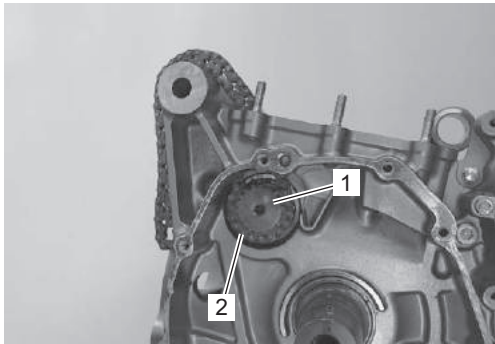
The grooved side (4) of the engine sprocket spacer faces crankcase side.



IE31J1140236-02

1D-60 Engine Mechanical:

- 12) Install the gearshift arm stopper, gearshift cam stopper, gearshift cam plate, gearshift shaft assembly and gearshift cover. (Page 5B-14)
- 13) Install the cam drive idle gear shaft (1) and cam chain (2).

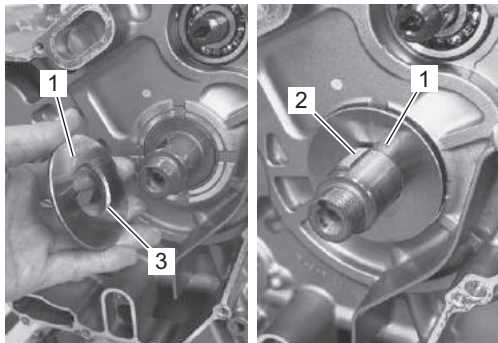


IE31J1140237-01

- 14) Install the starter driven gear. (Page 1I-13)
- 15) Install the generator rotor. (Page 1J-6)
- 16) Install the thrust washer (1) and key (2).

NOTE

The chamfer side (3) of the thrust washer (1) faces the crankcase side.

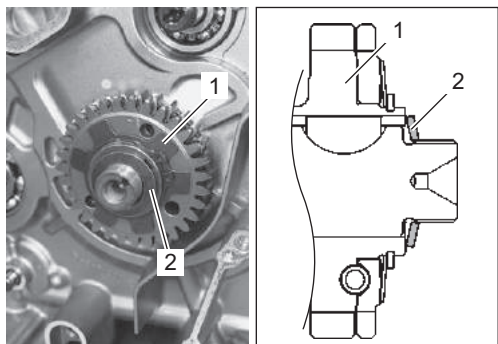


IE31J1140238-03

- 17) Install the primary drive gear assembly (1) and the conical spring washer (2).

NOTE

The conical curve side of the spring washer (2) faces outside.



IE31J1140239-02

- 18) Install the primary drive gear nut (1).

NOTE

The primary drive gear nut (1) has left-hand threads.
The "L" mark (2) on the nut (1) faces outside.

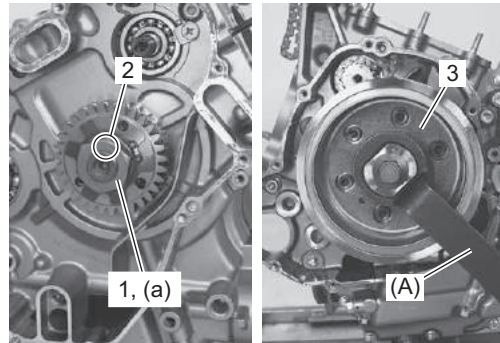
- 19) Hold the generator rotor (3) with the special tool and tighten the primary drive gear nut (1) to the specified torque.

Special tool

(A): 09930-44541

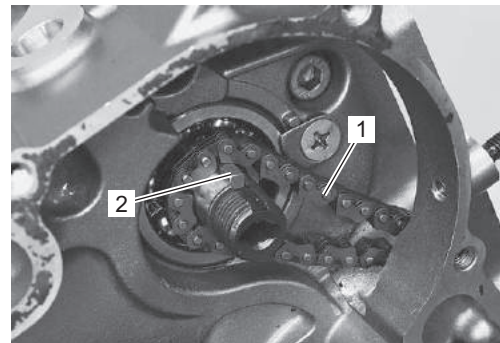
Tightening torque

Primary drive gear nut (a): 160 N·m (16.0 kgf-m, 116.0 lbf-ft)



IE31J1140240-02

- 20) Install the cam chain (1) and key (2).

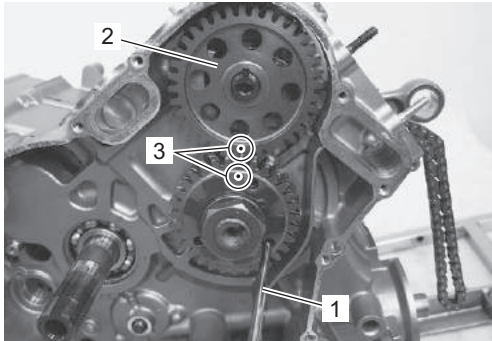


IE31J1140241-02

- 21) Insert a suitable bar (1) into the holes of primary drive gears and align the teeth of scissors gears.
- 22) Install the cam drive idle gear/sprocket No. 1 (2).

NOTE

Align the punch marks (3) on the cam drive idle gear/sprocket No. 1 (2) and primary drive gear.



IE31J1140242-02

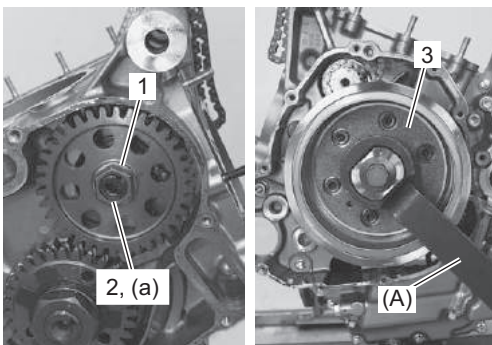
- 23) Install the washer (1) and cam drive idle gear/sprocket No. 1 nut (2).
- 24) Hold the generator rotor (3) with the special tool and tighten the cam drive idle gear/sprocket No. 1 nut (2) to the specified torque.

Special tool

(A): 09930-44541

Tightening torque

Cam drive idle gear/sprocket No. 1 nut (a): 71 N·m (7.1 kgf-m, 51.5 lbf-ft)



IE31J1140243-02

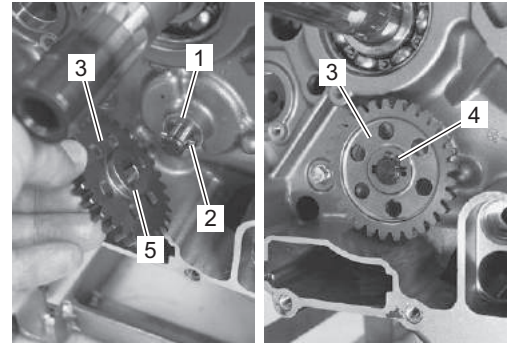
- 25) Install the washer (1) and pin (2).
- 26) Install the oil pump driven gear (3) and new snap ring (4).

NOTE

The boss (5) of the oil pump driven gear (3) faces crankcase side.

Special tool

09900-06107



IE31J1140244-03

- 27) Install the oil pressure regulator and oil strainer. ☞ (Page 1E-6)
- 28) Install the oil pressure switch. ☞ (Page 1E-7)
- 29) Install the GP switch. ☞ (Page 5B-11)
- 30) Install the clutch component parts. ☞ (Page 5C-17)
- 31) Install the clutch cover and water pump case. ☞ (Page 5C-17)
- 32) Install the starter idle gear and starter torque limiter. ☞ (Page 11-13)
- 33) Install the generator cover. ☞ (Page 1J-6)
- 34) Install the oil filter. ☞ (Page 1E-4)
- 35) Install the starter motor assembly. ☞ (Page 11-6)

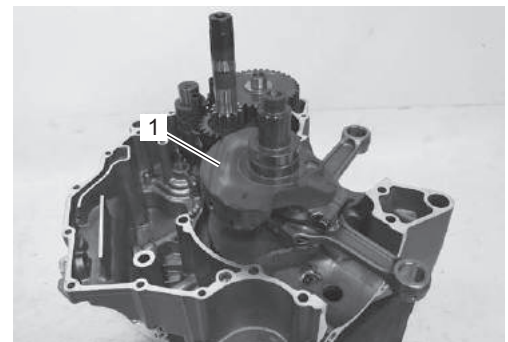
Crankshaft Assembly Removal and Installation

BENJ31J31406032

Refer to "Crankcase Assembly Disassembly" (Page 1D-54) and "Crankcase Assembly Reassembly" (Page 1D-58).

Removal

Remove the crankshaft assembly (1).

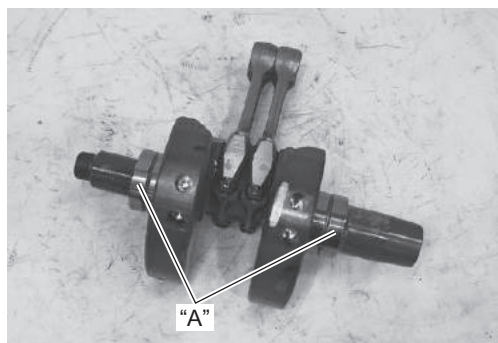


IE31J1140245-02

Installation

1) Apply molybdenum oil solution to the crankshaft journals.

“A”: Assembly lubrication (Molybdenum oil solution)



IE31J1140246-01

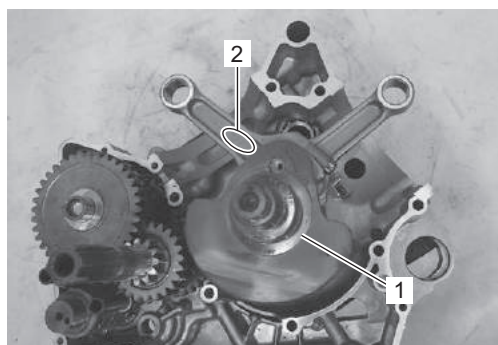
2) Install the crankshaft assembly (1) into the left crankcase.

NOTICE

Never strike the crankshaft assembly (1) with a plastic hammer when inserting it into the crankcase.

NOTE

- Be sure to set the crankshaft assembly (1) in the proper direction.
- Of the two conrods, the one with the embossed letter (2) marked should be brought to the rear cylinder.



IE31J1140247-01

Crankshaft Journal Bearing Removal and Installation

BENJ31J31406033

Refer to “Crankshaft Assembly Removal and Installation” (Page 1D-61) and “Transmission Removal and Installation” in Section 5B (Page 5B-3).

Removal

1) Set the special tool as shown to remove the crankshaft journal bearings (1) with the special tool.

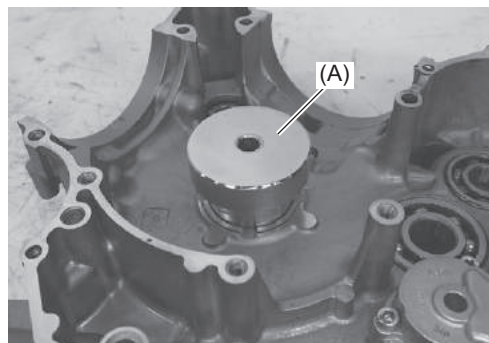
NOTE

Remove the crankshaft journal bearings in only one direction, from inside to outside of each crankcase half.

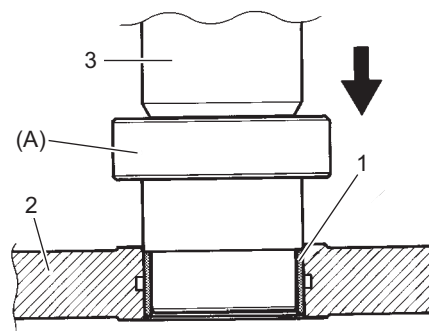
Special tool

(A): 09913-60230

2) Gradually press out the journal bearings with the special tool by using the hydraulic press.



IE31J1140248-01



ID26J1140177-03

1. Journal bearing	3. Hydraulic press
2. Crankcase	

NOTE

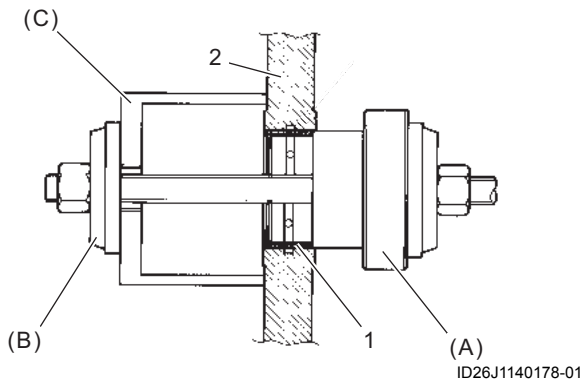
Using a hydraulic press is recommended to remove the crankshaft journal bearings. However, the crankshaft journal bearings can be removed by using the following special tools.

Special tool

(A): 09913-60230

(B): 09924-84510

(C): 09924-74570



ID26J1140178-01

1. Journal bearing	2. Crankcase
--------------------	--------------

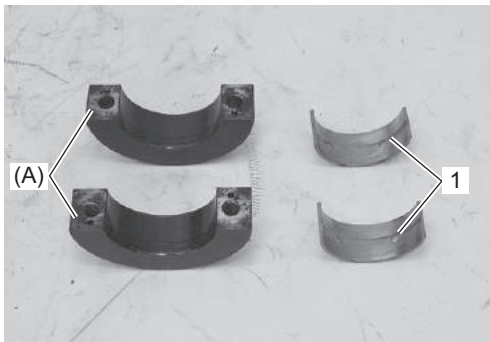
3) Do the same for the other bearings.

Installation

1) Apply engine oil to the inside surface of the special tool before fitting the bearing (1) in the special tool.

Special tool

(A): 09913-60241

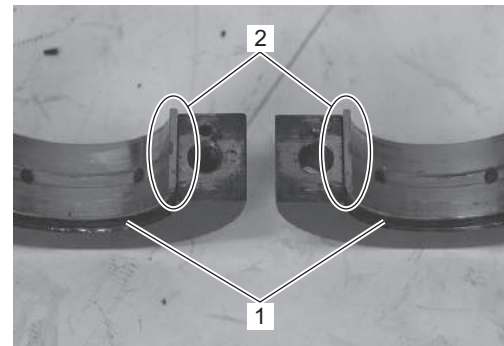


IE31J1140249-01

2) When setting the bearing into the special tool, align the side edge of the bearing with the line (1) engraved inside the tool and the end of the bearing with the mating surface (2) of the tool as well.

NOTE

The upper and lower bearings are same.

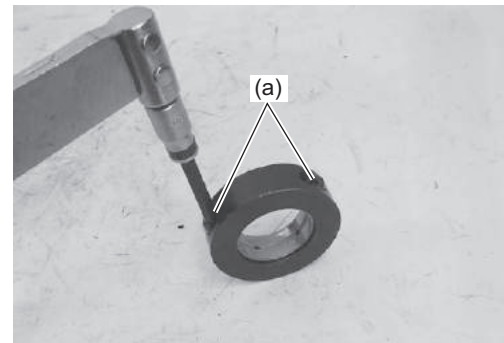


IE31J1140250-01

3) Combine the special tool and tighten the bolts to the specified torque.

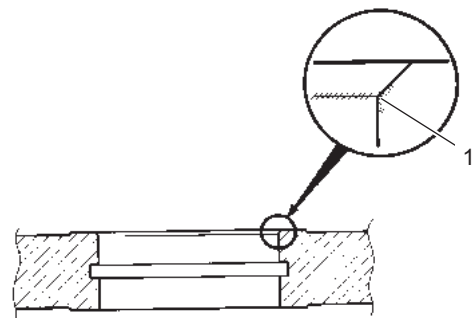
Tightening torque

Special tool bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IE31J1140251-01

4) Before installing the bearings, lightly shave off the sharp edge part (1) of the crankcase chamfer by using an oilstone.



ID26J1140181-07

1D-64 Engine Mechanical:

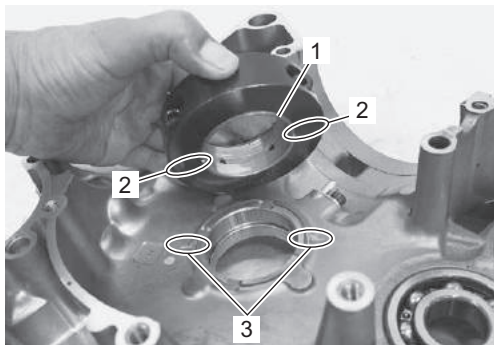
- 5) Apply engine oil to the inside surface of the crankcase.
- 6) Set the bearings installed in the special tool to the crankcase half as shown.

NOTICE

- Be sure the bearing protruded side (1) faces the crankcase bore.
- Align the bearing/special tool mating surface (2) with the line (3) on the crankcase.

NOTE

Install the bearing from inside to outside of each crankcase half.



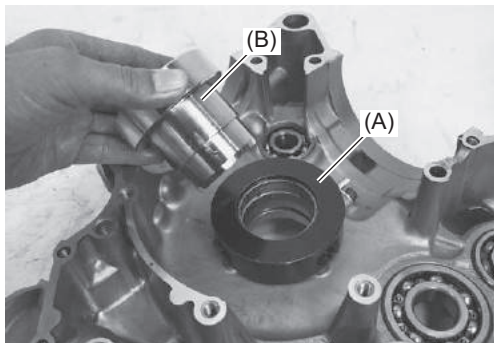
IE31J1140252-01

- 7) Apply enough engine oil to the special tool and the bearings and then set the special tool carefully.

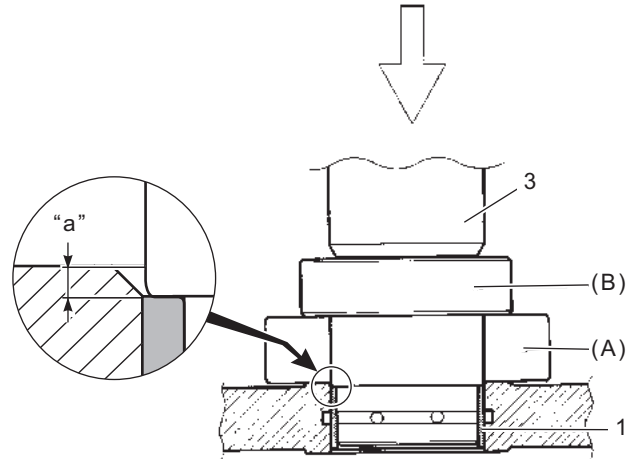
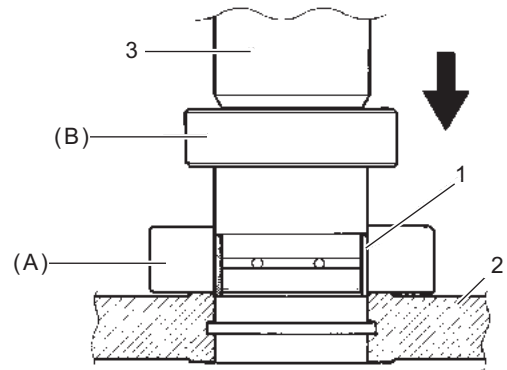
Special tool

(A): 09913-60241
(B): 09913-60230

- 8) Press fit the bearing gradually using a hydraulic press.



IE31J1140253-01



ID26J1140270-01

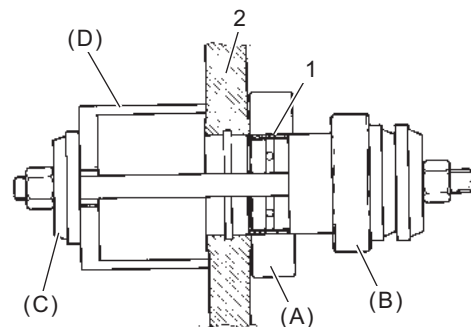
1. Journal bearing	3. Hydraulic press
2. Crankcase	"a": 2.2 mm (0.087 in)

NOTICE

Using a hydraulic press is recommended to install the crankshaft journal bearings. However, the crankshaft journal bearings can be installed by using the following special tools.

Special tool

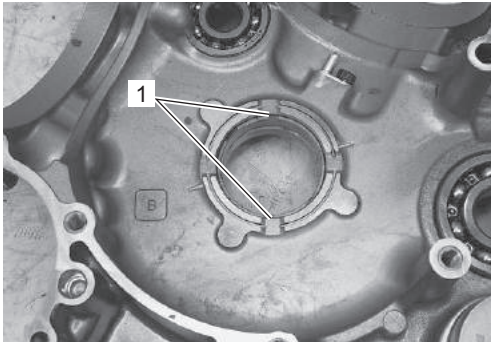
(C): 09941-34513
(D): 09924-74570



ID26J1140271-04

1. Journal bearing	2. Crankcase
--------------------	--------------

- 9) After installing the bearings (1), check the bearing surface for any scratch or damage.



IE31J1140254-01

- 10) Do the same for the other bearings.

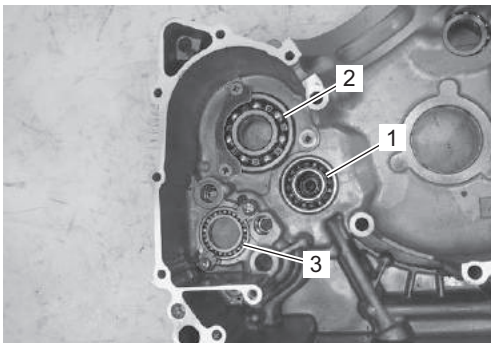
Left Crankcase Disassembly and Reassembly

BENJ31J31406034

Refer to "Crankshaft Assembly Removal and Installation" (Page 1D-61) and "Transmission Removal and Installation" in Section 5B (Page 5B-3).

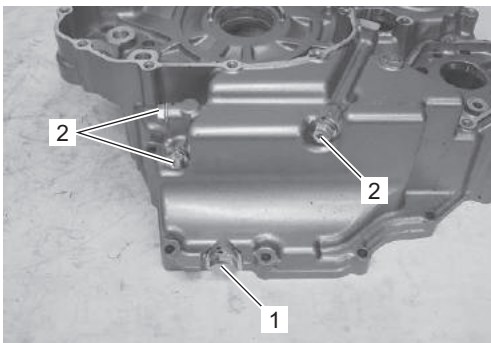
Disassembly

- 1) Remove the countershaft bearing (1), driveshaft bearing (2) and gearshift cam bearing (3). (Page 5B-8)



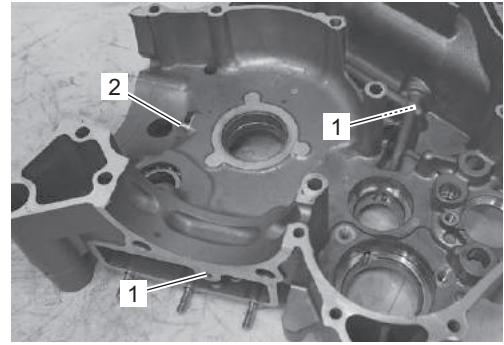
IE31J1140255-01

- 2) Remove the oil drain plug (1) and oil gallery plugs (M8) (2).



IE31J1140256-01

- 3) Remove the jets (1) and piston cooling nozzle (2). (Page 1E-8)



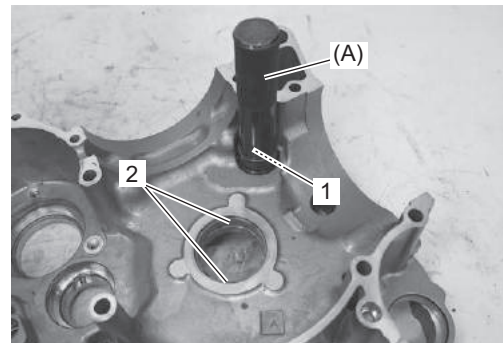
IE31J1140257-01

- 4) Remove the cam drive idle gear shaft bearing (1) using the special tool.

Special tool

(A): 09913-70210

- 5) Remove the crankshaft journal bearings (2). (Page 1D-62)



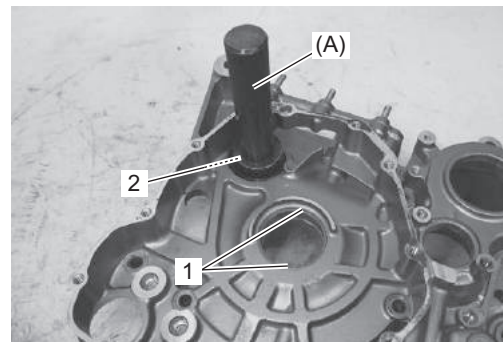
IE31J1140258-01

Reassembly

- 1) Install the new crankshaft journal bearings (1). (Page 1D-62)
- 2) Apply engine oil to the new cam drive idle gear shaft bearing (2).
- 3) Install the cam drive idle gear shaft bearing (2) using the special tool.

Special tool

(A): 09913-70210



IE31J1140259-01

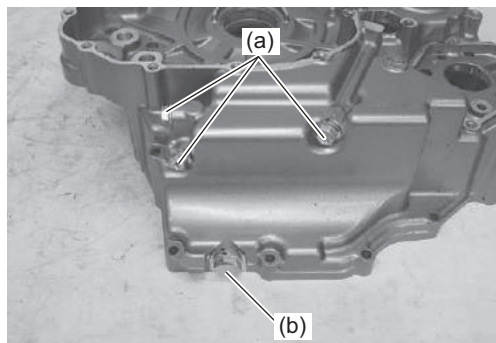
1D-66 Engine Mechanical:

- 4) Install the piston cooling nozzle and oil jets. (Page 1E-8)
- 5) Install the oil gallery plugs (M8) and oil drain plug with new gasket washers and tighten each plug to the specified torque.

Tightening torque

Oil gallery plug (M8) (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)

Oil drain plug (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IE31J1140260-01

- 6) Install the gearshift cam bearing, new driveshaft bearing, new countershaft bearing, new clutch push rod oil seal, new driveshaft oil seal, oil seal retainer. (Page 5B-8)

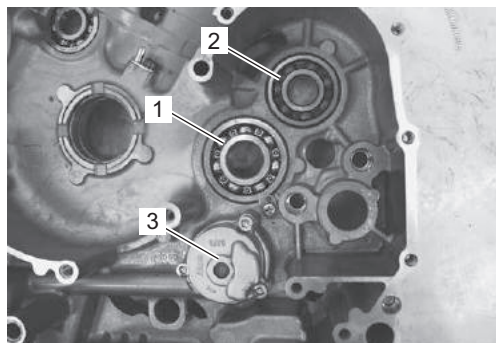
Right Crankcase Disassembly and Reassembly

BENJ31J31406035

Refer to "Crankcase Assembly Disassembly" (Page 1D-54) and "Crankcase Assembly Reassembly" (Page 1D-58).

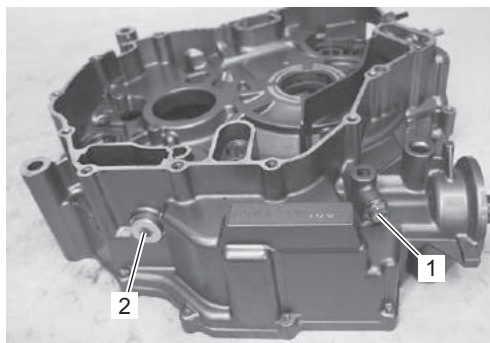
Disassembly

- 1) Remove the countershaft bearing (1) and driveshaft bearing (2). (Page 5B-10)
- 2) Remove the oil pump (3). (Page 1E-11)



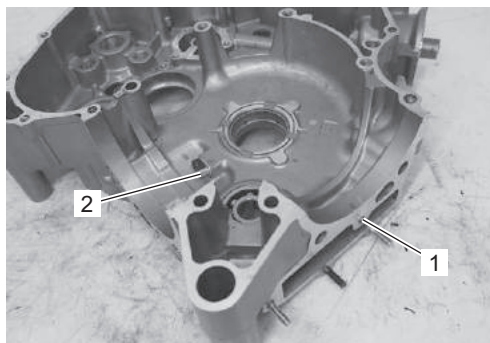
IE31J1140261-01

- 3) Remove the oil gallery plugs (M8) (1) and (M16) (2).



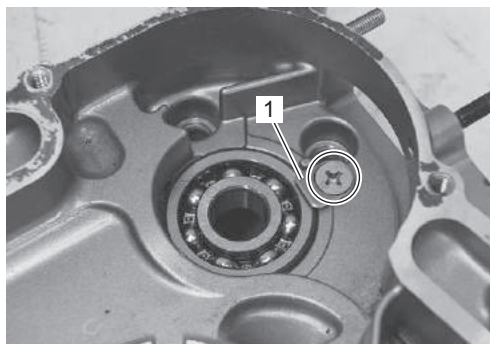
IE31J1140262-01

- 4) Remove the oil jet (1) and piston cooling nozzle (2). (Page 1E-8)



IE31J1140263-01

- 5) Remove the bearing retainer (1).



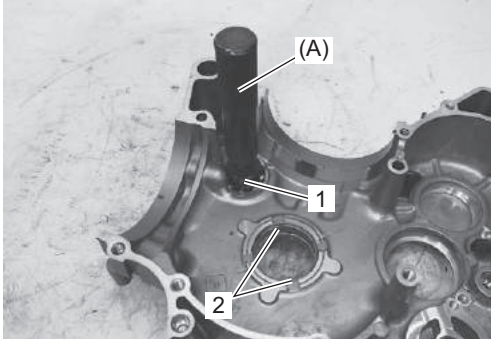
IE31J1140291-02

- Remove the cam drive idle gear shaft bearing (1) using the special tool.

Special tool

(A): 09913-70210

- Remove the crankshaft journal bearings (2). (Page 1D-62)



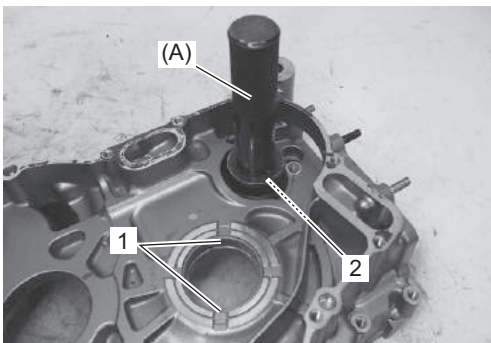
IE31J1140264-01

Reassembly

- Install the new crankshaft journal bearing (1). (Page 1D-62)
- Apply engine oil to the new cam drive idle gear shaft bearing (2).
- Install the cam drive idle gear shaft bearing (2) using the special tool.

Special tool

(A): 09913-70210



IE31J1140265-02

- Apply thread lock to the bearing retainer screw (1).

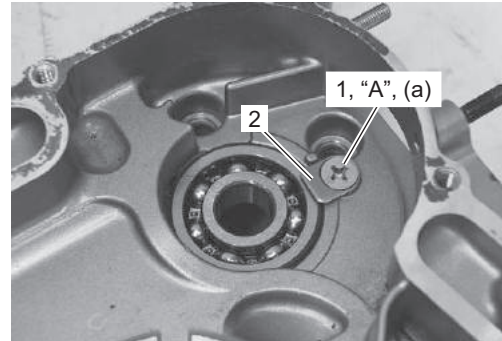
“A”: Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

- Install the bearing retainer (2) and tighten its screw (1) to the specified torque.

Tightening torque

Cam drive idle gear shaft bearing retainer screw

(a): 8.5 N·m (0.85 kgf-m, 6.5 lbf-ft)



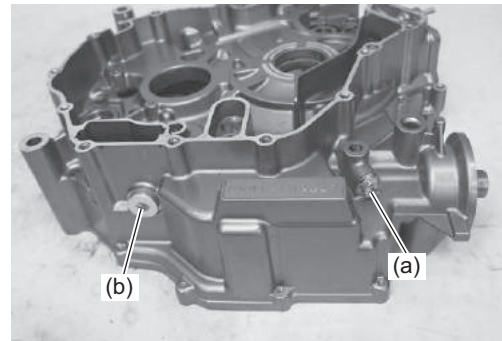
IE31J1140266-02

- Install the piston cooling nozzle and oil jet. (Page 1E-8)
- Install the oil gallery plugs with new gasket washers and tighten each plug to the specified torque.

Tightening torque

Oil gallery plug (M8) (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)

Oil gallery plug (M16) (b): 35 N·m (3.5 kgf-m, 25.5 lbf-ft)



IE31J1140267-01

- Install the oil pump. (Page 1E-11)
- Install the new driveshaft bearing and new countershaft bearing. (Page 5B-10)

Crankcase Bearing / Oil Seal Inspection

BENJ31J31406036

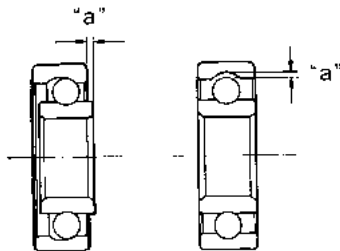
Refer to “Crankshaft Assembly Removal and Installation” (Page 1D-61) and “Transmission Removal and Installation” in Section 5B (Page 5B-3).

Bearing

Inspect the play of the bearing by hand while it is in the crankcase. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to “Left Crankcase Disassembly and Reassembly” (Page 1D-65) and “Right Crankcase Disassembly and Reassembly” (Page 1D-66).

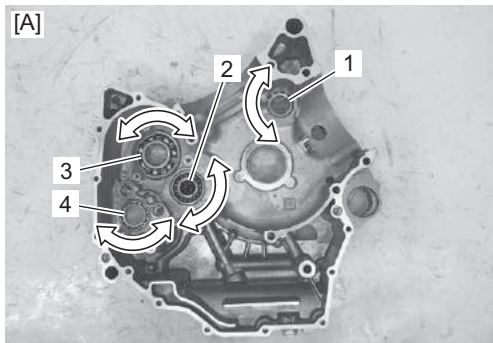
NOTE

If abnormal noise does not occur, it is not necessary to remove the bearing.

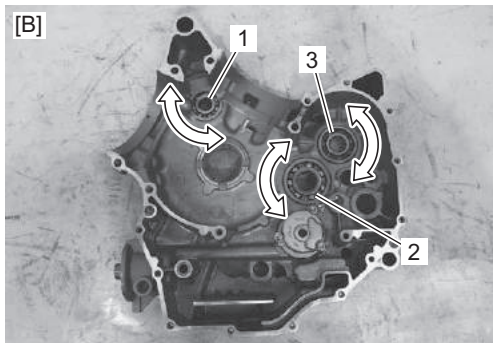


IE31J1140298-01

“a”: Play



IE31J1140268-02

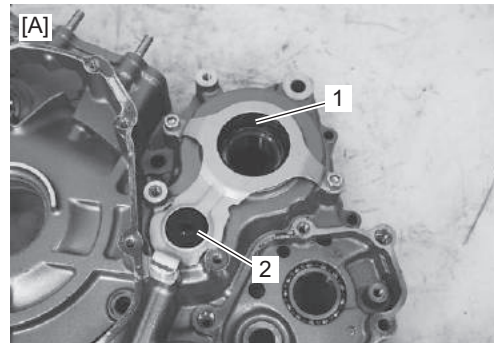


IE31J1140269-02

[A]: Left crankcase	2. Countershaft bearing
[B]: Right crankcase	3. Driveshaft bearing
1. Cam drive idle gear shaft bearing	4. Gearshift cam bearing

Oil Seal

Inspect oil seal lip for wear or damage. If any defects are found, replace the oil seal with a new one. (Page 5B-8)



IE31J1140270-01

[A]: Left crankcase	2. Clutch push rod oil seal
1. Driveshaft oil seal	

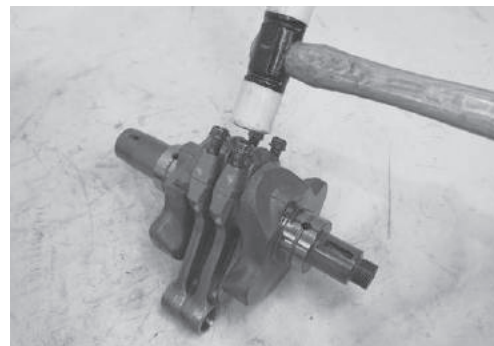
Conrod Removal and Installation

BENJ31J31406037

Refer to “Crankshaft Assembly Removal and Installation” (Page 1D-61).

Removal

- 1) Loosen the conrod cap bolts, and tap the conrod cap bolts lightly with plastic hammer to remove the conrod cap.
- 2) Remove the conrods and mark them to identify their respective cylinders.



IE31J1140271-01

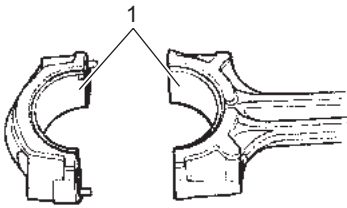
3) Remove the bearings (1).

NOTICE

When removing the bearings, be careful not to scratch the conrods and the bearings.

NOTE

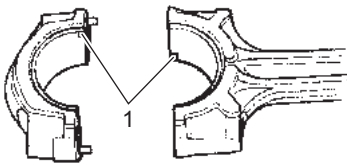
- Do not remove the bearings (1) unless absolutely necessary.
- Make a note of where the bearings are removed from so that they can be reinstalled in their original positions.



ID26J1140264-01

Installation

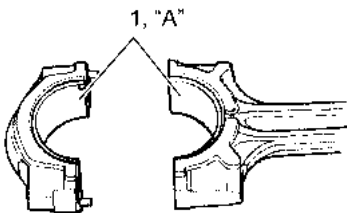
1) When installing the bearings into the conrod cap and conrod, be sure to fix the stopper part (1) first, and then press in the opposite side of the bearing.



ID26J1140277-03

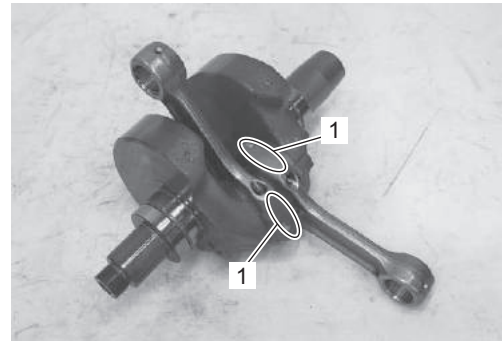
2) Clean the conrod big end and apply molybdenum oil solution to the crank pin and bearing surface (1).

“A”: Assembly lubrication (Molybdenum oil solution)

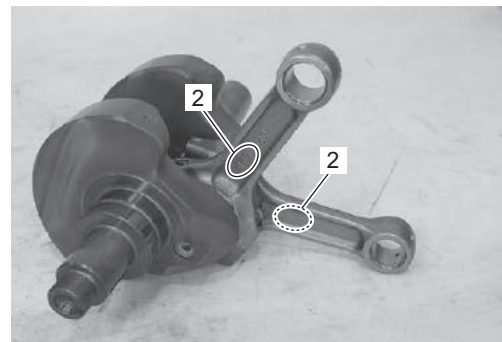


IE31J1140292-01

3) When fitting the conrod cap, make sure that I.D. code (1) on each conrod faces intake side and that embossed lettering (2) on each conrod faces outside.



IE31J1140272-01

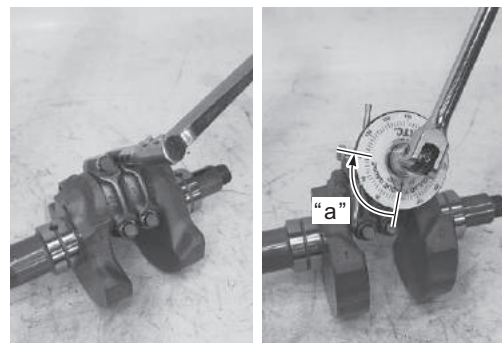


IE31J1140273-01

- 4) Apply engine oil to the flange and thread portion of the conrod cap bolts.
- 5) Tighten the conrod cap bolts as following two steps.

Tightening torque

Conrod cap bolt: 35 N·m (3.5 kgf·m, 25.5 lbf·ft) → turn clockwise 90°

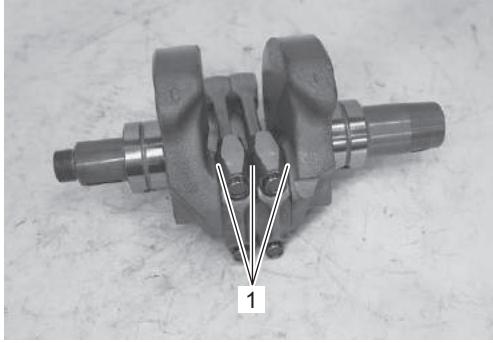


IE31J1140274-02

“a”: 90°

1D-70 Engine Mechanical:

- 6) Apply engine oil to the conrod big end side surfaces (1).



IE31J1140275-01

- 7) Check that the conrod moves smoothly.

Conrod / Crankshaft Inspection

BENJ31J31406038

Refer to "Conrod Removal and Installation" (Page 1D-68).

Conrod Small End I.D.

Measure the conrod small end inside diameter with the small bore gauge.

If the conrod small end inside diameter exceeds the service limit, replace the conrod.

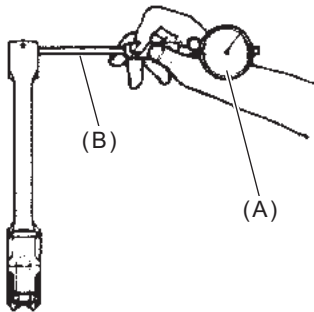
Special tool

(A): 09900-20602

(B): 09900-22403

Conrod small end I.D.

Service limit: 22.040 mm (0.8677 in)



ID26J1140219-01

Conrod Big End Side Clearance

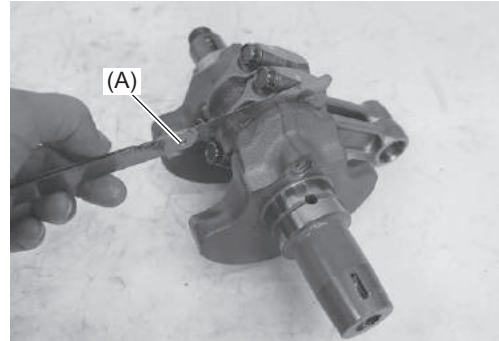
- 1) Check the conrod big end side clearance with thickness gauge.

Special tool

(A): 09900-20803

Conrod big end side clearance

Service limit: 0.50 mm (0.020 in)



IE31J1140276-01

- 2) If the clearance exceeds the limit, remove the conrod and measure the conrod big end width and crank pin width. If the width exceeded the limit, replace the conrod or crankshaft.

Special tool

(A): 09912-66310

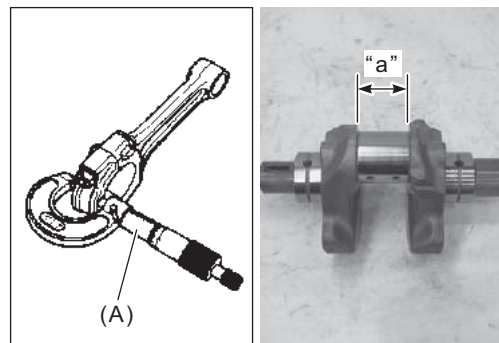
09900-20101

Conrod big end width

Standard: 21.95 – 22.00 mm (0.864 – 0.866 in)

Crank pin width "a"

Standard: 44.17 – 44.22 mm (1.739 – 1.741 in)



IE31J1140277-01

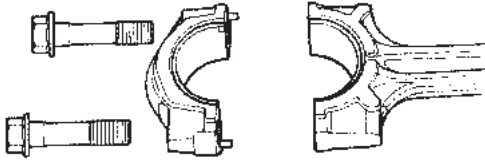
Conrod Crank Pin Bearing Inspection and Selection

BENJ31J31406039

Refer to "Conrod Removal and Installation" (Page 1D-68).

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.

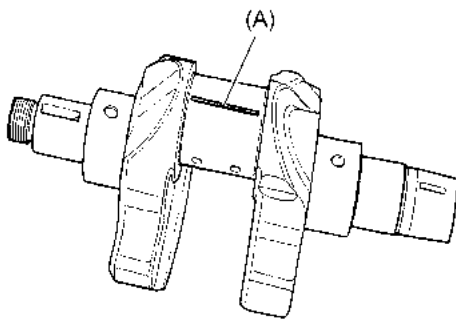


I718H1140285-01

- 2) Place the plastigage axially along the crank pin, avoiding the oil hole, as shown.

Special tool

(A): 09900-22301



IE31J1140278-02

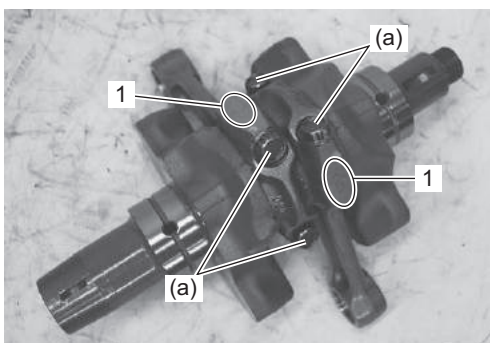
- 3) Tighten the conrod cap bolts to the specified torque, in two stages.

NOTE

- When installing the conrod cap to the crank pin, make sure that I.D code (1) on the conrod faces towards the intake side.
- Never rotate the crankshaft or conrod when a piece of plastigage is installed.

Tightening torque

Conrod cap bolt (a): 35 N·m (3.5 kgf·m, 25.5 lbf·ft) → turn clockwise 90°



IE31J1140279-02

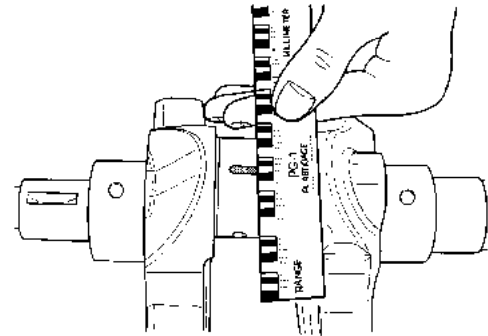
- 4) Remove the conrod caps and measure the width of the compressed plastigage using the envelope scale. This measurement should be taken at the widest part of the compressed plastigage. If the oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.

Conrod big end oil clearance

Standard: 0.032 – 0.056 mm (0.0013 – 0.0022 in)

Conrod big end oil clearance

Service limit: 0.080 mm (0.0031 in)



IE31J1140280-01

Selection

- 1) Check the corresponding conrod I.D. code numbers ([1] or [2]) (1).



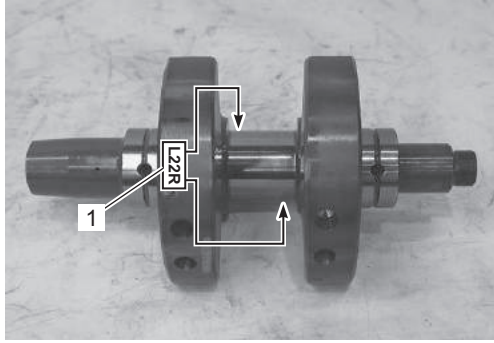
IE31J1140281-01

Conrod I.D. specification

Code (1)	I.D. specification
1	48.000 – 48.008 mm (1.8898 – 1.8901 in)
2	48.008 – 48.016 mm (1.8901 – 1.8904 in)

1D-72 Engine Mechanical:

- 2) Check the corresponding crank pin O.D. code numbers ([1], [2] or [3]) (1).



IE31J1140282-02

- 3) Measure the conrod crank pin O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

NOTE

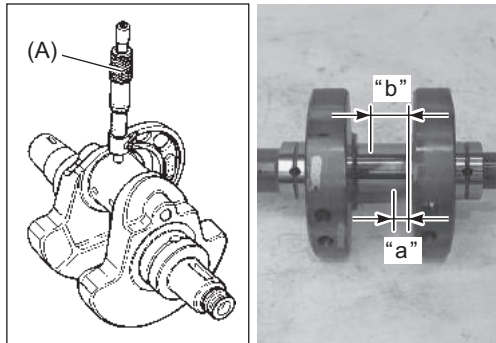
The crank pin O.D. measurement should be taken at 11 mm (0.4 in) and 33 mm (1.3 in) positions from the crank pin end.

Crank pin O.D. specification

Code (2)	O.D. specification
1	44.992 – 45.000 mm (1.7713 – 1.7717 in)
2	44.984 – 44.992 mm (1.7710 – 1.7713 in)
3	44.976 – 44.984 mm (1.7707 – 1.7710 in)

Special tool

(A): 09900-20202



IE31J1140283-01

"a": 11 mm (0.4 in)	"b": 33 mm (1.3 in)
---------------------	---------------------

- 4) Select the specified bearings from the bearing selection table.

NOTICE

The bearings should be replaced as a set.

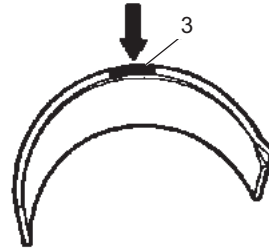
Bearing selection table

	Code	Crank pin O.D. (2)		
		1	2	3
Conrod I.D. (1)	1	Green	Black	Brown
	2	Black	Brown	Yellow

ID26J1140288-01

Bearing thickness specification

Color (3) (Part No.)	Thickness
Green (12164-31J00-0A0)	1.480 – 1.484 mm (0.0583 – 0.0584 in)
Black (12164-31J00-0B0)	1.484 – 1.488 mm (0.0584 – 0.0586 in)
Brown (12164-31J00-0C0)	1.488 – 1.492 mm (0.0586 – 0.0587 in)
Yellow (12164-31J00-0D0)	1.492 – 1.496 mm (0.0587 – 0.0589 in)



3. Color code

ID26J1140279-03

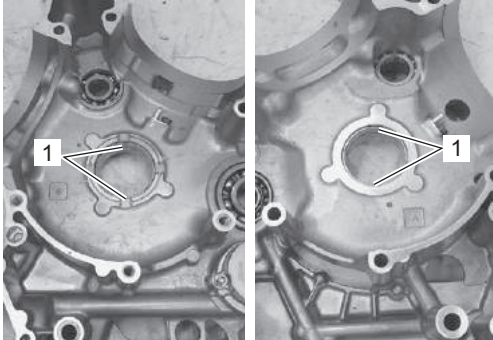
Crankshaft Journal Bearing Inspection and Selection

BENJ31J31406040

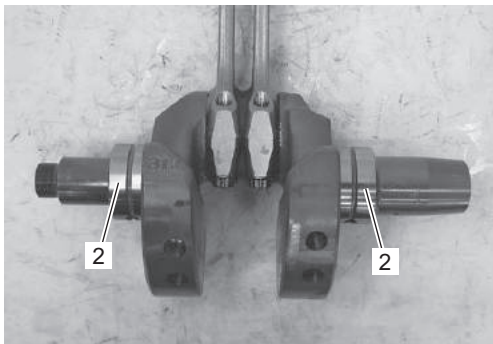
Refer to "Crankshaft Assembly Removal and Installation" (Page 1D-61) and "Transmission Removal and Installation" in Section 5B (Page 5B-3).

Inspection

- 1) Inspect the crankshaft journal bearings (1) and crankshaft journals (2) on right and left for any damage. If any, replace the bearings and crankshaft as a specified set.



IE31J1140284-01



IE31J1140285-01

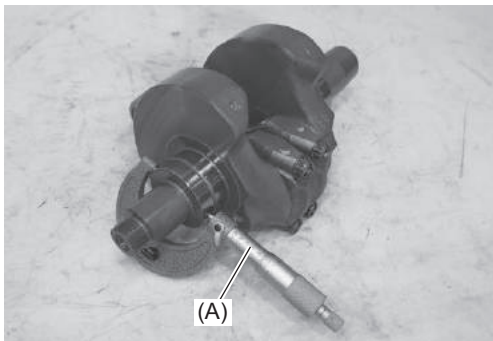
- 2) Measure the crankshaft O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft and bearings as a set.

Special tool

(A): 09900-20202

Crankshaft journal O.D.

Standard: 47.985 – 48.000 mm (1.8892 – 1.8898 in)



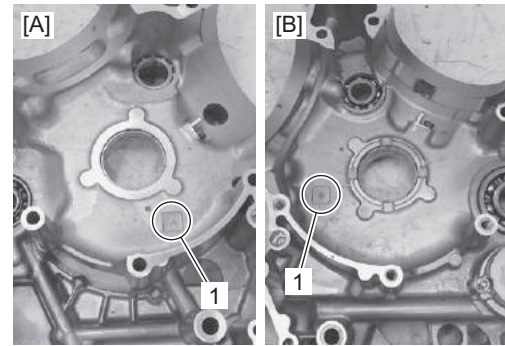
IE31J1140286-01

Selection

- 1) Select the specified bearings from the crankcase journal I.D. codes. The crankcase journal I.D. codes ((A), (B) or (C)) (1), is stamped on the inside of each crankcase half.

NOTICE

The bearings should be replaced as a set.



IE31J1140287-01

[A]: Left crankcase

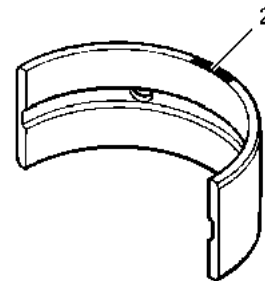
[B]: Right crankcase

Crankcase journal I.D. specification

Code (1)	I.D. specification	Bearing color
A	52.000 – 52.006 mm (2.0472 – 2.0475 in)	Green
B	52.006 – 52.012 mm (2.0475 – 2.0477 in)	Black
C	52.012 – 52.018 mm (2.0477 – 2.0479 in)	Brown

Bearing thickness specification

Color (2) (Part No.)	Thickness
Green (12229-31J00-0A0)	1.999 – 2.002 mm (0.0787 – 0.0788 in)
Black (12229-31J00-0B0)	2.002 – 2.005 mm (0.0788 – 0.0789 in)
Brown (12229-31J00-0C0)	2.005 – 2.008 mm (0.0789 – 0.0791 in)



IE31J1140288-01

2. Color code

Specifications

Tightening Torque Specifications

BENJ31J31407001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Air cleaner outlet tube clamp screw	1.5	0.15	1.0	☞ (Page 1D-4)
Cylinder head cover bolt	14	1.4	10.5	☞ (Page 1D-6)
Camshaft journal holder bolt	10	1.0	7.5	☞ (Page 1D-9) / ☞ (Page 1D-11)
Generator cover plug	15	1.5	11.0	☞ (Page 1D-13)
Valve timing inspection plug	21	2.1	15.5	☞ (Page 1D-13)
Engine mounting thrust adjuster	12	1.2	9.0	☞ (Page 1D-22)
Engine mounting thrust adjuster lock-nut	45	4.5	32.5	☞ (Page 1D-22)
Engine mounting pinch bolt	23	2.3	17.0	☞ (Page 1D-24)
Front footrest bracket bolt	26	2.6	19.0	☞ (Page 1D-24)
Intake pipe mounting screw	8.5	0.85	6.5	☞ (Page 1D-25)
Cylinder head bolt (M10)	25 → 46 N·m (2.5 → 4.6 kgf·m, 18.0 → 33.5 lbf·ft)			☞ (Page 1D-32)
Cylinder head nut (M8)	25	2.5	18.0	☞ (Page 1D-33)
Cylinder head nut (M6)	10	1.0	7.5	☞ (Page 1D-33)
Cylinder head bolt (M6)	10	1.0	7.5	☞ (Page 1D-33)
Cylinder nut	10	1.0	7.5	☞ (Page 1D-33)
Cam chain tensioner mounting bolt	10	1.0	7.5	☞ (Page 1D-34)
Cylinder head cover No. 2 bolt	10	1.0	7.5	☞ (Page 1D-36)
Cam chain tension adjuster mounting bolt	10	1.0	7.5	☞ (Page 1D-36) / ☞ (Page 1D-38)
Cam chain tension adjuster cap bolt (Front)	23	2.3	17.0	☞ (Page 1D-37)
Cam chain tension adjuster cap bolt (Rear)	7	0.7	5.0	☞ (Page 1D-38)
Water union bolt	10	1.0	7.5	☞ (Page 1D-46)
Oil gallery plug (M6)	10	1.0	7.5	☞ (Page 1D-46)
Crankcase bolt (M8) (L110)	26	2.6	19.0	☞ (Page 1D-59)
Crankcase bolt (M8) (L125)	26	2.6	19.0	☞ (Page 1D-59)
Crankcase bolt (M8) (L90)	26	2.6	19.0	☞ (Page 1D-59)
Crankcase bolt (M6) (L85)	11	1.1	8.0	☞ (Page 1D-59)
Crankcase bolt (M6) (L70)	11	1.1	8.0	☞ (Page 1D-59)
Crankcase bolt (M6) (L30)	11	1.1	8.0	☞ (Page 1D-59)
Primary drive gear nut	160	16.0	116.0	☞ (Page 1D-60)
Cam drive idle gear/sprocket No. 1 nut	71	7.1	51.5	☞ (Page 1D-61)
Special tool bolt	23	2.3	17.0	☞ (Page 1D-63)
Oil gallery plug (M8)	18	1.8	13.0	☞ (Page 1D-66) / ☞ (Page 1D-67)
Oil drain plug	23	2.3	17.0	☞ (Page 1D-66)
Cam drive idle gear shaft bearing retainer screw	8.5	0.85	6.5	☞ (Page 1D-67)
Oil gallery plug (M16)	35	3.5	25.5	☞ (Page 1D-67)
Conrod cap bolt	35 N·m (3.5 kgf·m, 25.5 lbf·ft) → turn clockwise 90°			☞ (Page 1D-69) / ☞ (Page 1D-71)

Reference:

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

“Intake System Components” (Page 1D-2)

“Engine Assembly Installation” (Page 1D-22)

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

Special Tools and Equipment

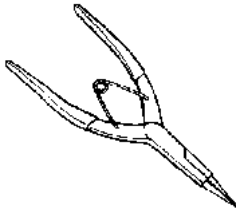
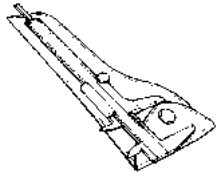
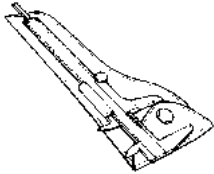

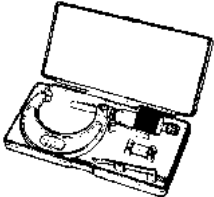
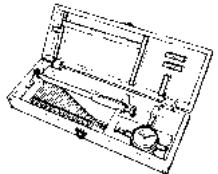
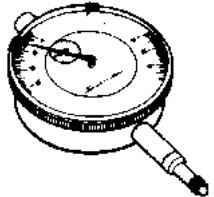
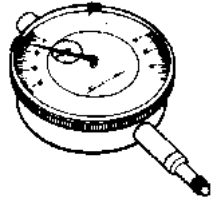
Recommended Service Material

BENJ31J31408001

Material	SUZUKI recommended product or Specification		Note
Assembly lubrication	Molybdenum oil solution	—	☞(Page 1D-8) / ☞(Page 1D-10) / ☞(Page 1D-30) / ☞(Page 1D-41) / ☞(Page 1D-41) / ☞(Page 1D-42) / ☞(Page 1D-49) / ☞(Page 1D-58) / ☞(Page 1D-62) / ☞(Page 1D-69)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞(Page 1D-25) / ☞(Page 1D-36) / ☞(Page 1D-38) / ☞(Page 1D-58) / ☞(Page 1D-59)
Sealant	SUZUKI BOND 1215	P/No.: 99000-31110	☞(Page 1D-30) / ☞(Page 1D-58)
	SUZUKI BOND 1207B	P/No.: 99000-31140	☞(Page 1D-5)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞(Page 1D-24) / ☞(Page 1D-36) / ☞(Page 1D-67)

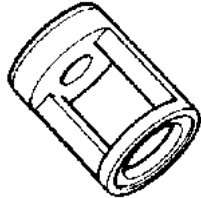
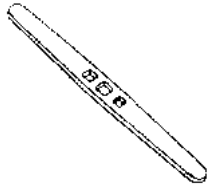



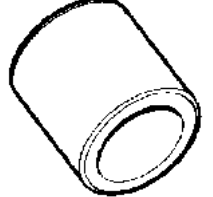

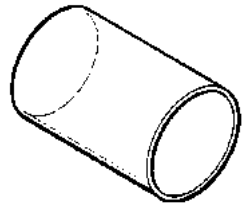
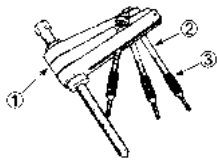
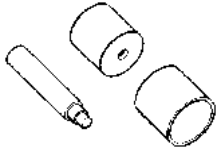
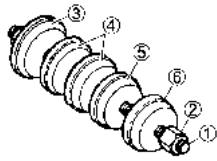
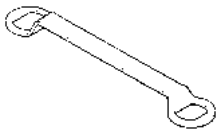
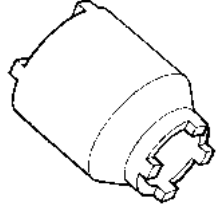
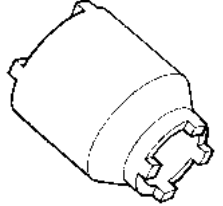
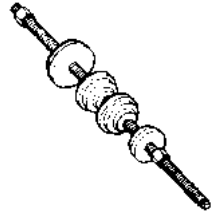
Special Tool

BENJ31J31408002

09900-06107 Snap ring pliers (External) ☞(Page 1D-55) / ☞(Page 1D-61)		09900-20101 Vernier calipers (150 mm) ☞(Page 1D-70)	
09900-20102 Vernier calipers (200 mm) ☞(Page 1D-43) / ☞(Page 1D-45) / ☞(Page 1D-52)		09900-20202 Micrometer (25 - 50 mm) ☞(Page 1D-13) / ☞(Page 1D-72) / ☞(Page 1D-73)	
09900-20204 Micrometer (75 - 100 mm) ☞(Page 1D-51)		09900-20530 Cylinder gauge set ☞(Page 1D-49)	
09900-20602 Dial gauge (1 x 0.001 mm) ☞(Page 1D-14) / ☞(Page 1D-53) / ☞(Page 1D-70)		09900-20607 Dial gauge (10 x 0.01 mm) ☞(Page 1D-14) / ☞(Page 1D-42) / ☞(Page 1D-43) / ☞(Page 1D-43)	

1D-76 Engine Mechanical:

<p>09900-20701 Dial gauge chuck ☞ (Page 1D-14) / ☞ (Page 1D-42) / ☞ (Page 1D-43) / ☞ (Page 1D-43)</p>	<p>09900-20803 Thickness gauge ☞ (Page 1D-15) / ☞ (Page 1D-16) / ☞ (Page 1D-47) / ☞ (Page 1D-48) / ☞ (Page 1D-52) / ☞ (Page 1D-52) / ☞ (Page 1D-70)</p>
<p>09900-21304 V blocks ☞ (Page 1D-14) / ☞ (Page 1D-42) / ☞ (Page 1D-43)</p>	<p>09900-22301 Plastigage (0.025 - 0.076 mm) ☞ (Page 1D-13) / ☞ (Page 1D-71)</p>
<p>09900-22302 Plastigage (0.051 - 0.152 mm) ☞ (Page 1D-13)</p>	<p>09900-22403 Small bore gauge (18 - 35 mm) ☞ (Page 1D-14) / ☞ (Page 1D-53) / ☞ (Page 1D-70)</p>
<p>09912-66310 Micrometer (0 - 25 mm) ☞ (Page 1D-14) / ☞ (Page 1D-43) / ☞ (Page 1D-52) / ☞ (Page 1D-53) / ☞ (Page 1D-70)</p>	<p>09913-60230 Journal bearing remover / installer This tool is used along with Journal bearing holder (09913-60241). ☞ (Page 1D-62) / ☞ (Page 1D-63) / ☞ (Page 1D-64)</p>
<p>09913-60241 Journal bearing holder This tool is used along with Journal bearing remover and installer (09913-60241). ☞ (Page 1D-63) / ☞ (Page 1D-64)</p>	<p>09913-70210 Bearing installer set ☞ (Page 1D-65) / ☞ (Page 1D-65) / ☞ (Page 1D-67) / ☞ (Page 1D-67)</p>
<p>09915-63311 Compression gauge adapter ☞ (Page 1D-1)</p>	<p>09915-64512 Compression gauge set (2500 kPa) 1. Gauge 2. Hose (Adapter) ☞ (Page 1D-1)</p>
<p>09916-10911 Valve lapper set ☞ (Page 1D-44)</p>	<p>09916-14510 Valve lifter 1. Main unit 2. Attachment ☞ (Page 1D-40) / ☞ (Page 1D-42)</p>

<p>09916-14522 Valve lifter attachment ☞(Page 1D-40) / ☞(Page 1D-42)</p>		<p>09916-34542 Reamer handle ☞(Page 1D-47) / ☞(Page 1D-48)</p>	
<p>09916-34550 Valve guide reamer (ø5.5) ☞(Page 1D-48)</p>		<p>09916-34580 Valve guide reamer (ø10.8) ☞(Page 1D-47)</p>	
<p>09916-44910 Valve guide installer / remover ☞(Page 1D-47) / ☞(Page 1D-48)</p>		<p>09916-53340 Valve guide installer attachment ☞(Page 1D-48)</p>	
<p>09916-84511 Tweezers ☞(Page 1D-40) / ☞(Page 1D-42)</p>		<p>09919-28620 Sleeve protector ☞(Page 1D-40) / ☞(Page 1D-42)</p>	
<p>09920-13120 Crankcase separator 1. Main unit 2. Bolt 3. Attachment ☞(Page 1D-57)</p>		<p>09924-74570 Bearing installer / remover ☞(Page 1D-63) / ☞(Page 1D-64)</p>	
<p>09924-84510 Bearing installer set ☞(Page 1D-63)</p>		<p>09930-44541 Rotor holder ☞(Page 1D-55) / ☞(Page 1D-55) / ☞(Page 1D-60) / ☞(Page 1D-61)</p>	
<p>09940-14980 Engine mounting adjuster wrench ☞(Page 1D-21) / ☞(Page 1D-22)</p>		<p>09940-14990 Engine mounting adjuster wrench ☞(Page 1D-20) / ☞(Page 1D-22)</p>	
<p>09941-34513 Bearing installer set ☞(Page 1D-64)</p>			

Engine Lubrication System

Precautions

Precautions for Engine Oil

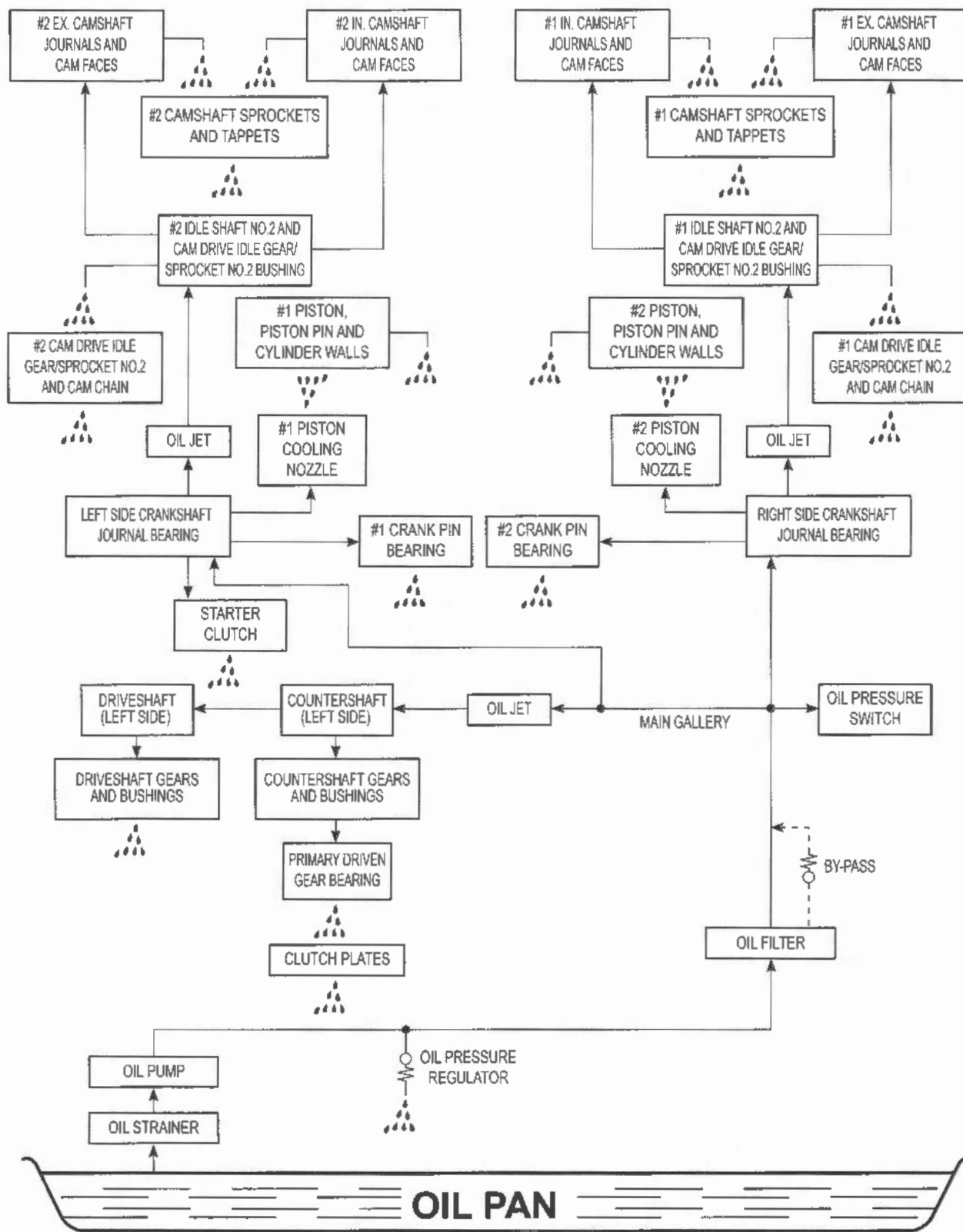
Refer to "Fuel / Oil / Fluid Recommendation" in Section 0C (Page 0C-13).

BENJ31J31500001

Schematic and Routing Diagram

Engine Lubrication System Chart Diagram

BENJ31J31502001



Diagnostic Information and Procedures

Engine Lubrication Symptom Diagnosis

BENJ31J31504001

Condition	Possible cause	Correction / Reference Item
Engine overheats	Insufficient amount of engine oil.	Check level and add. (Page 1E-4)
	Defective oil pump.	Replace. (Page 1E-11)
	Clogged oil circuit.	Clean.
	Incorrect engine oil.	Change. (Page 1E-4)
Exhaust smoke is dirty or thick	Excessive amount of engine oil.	Check level and drain. (Page 1E-4)
Engine lacks power	Excessive amount of engine oil.	Check level and drain. (Page 1E-4)

Oil Pressure Check

BENJ31J31504002

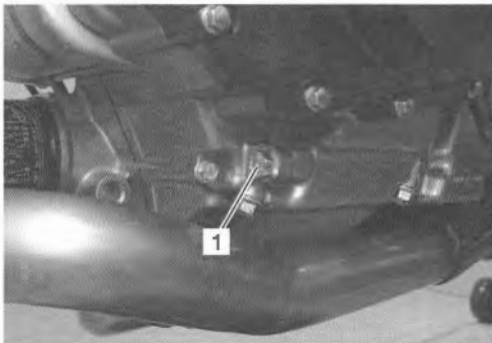
Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

NOTE

Before checking the oil pressure, check the following:

- Oil level: (Page 1E-4)
- Oil leaks (If leak is found, repair it.)
- Oil quality (If oil is discolored or deteriorated, replace it.)

- 1) Remove the under cowling assembly. (If equipped) (Page 9D-39)
- 2) 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.
- 3) Remove the oil gallery plug (M8) (1).

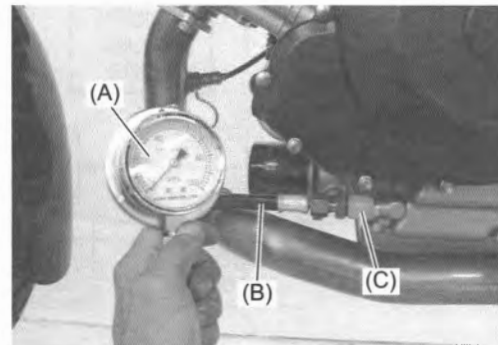


IE31J1150002-01

- 4) Install the oil pressure gauge and attachment into the oil gallery.

Special tool

- (A): 09915-77331
 (B): 09915-74521
 (C): 09915-74533



IE31J1150003-01

- 5) Warm up the engine as follows:
 Summer: 10 min. at 2000 r/min
 Winter: 20 min. at 2000 r/min
- 6) 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 specification when oil temp. is 60 °C (140 °F)

400 – 700 kPa (4 – 7 kgf/cm², 57 – 100 psi) at 3000 r/min

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

- 7) Stop the engine and remove the oil pressure gauge and attachment.

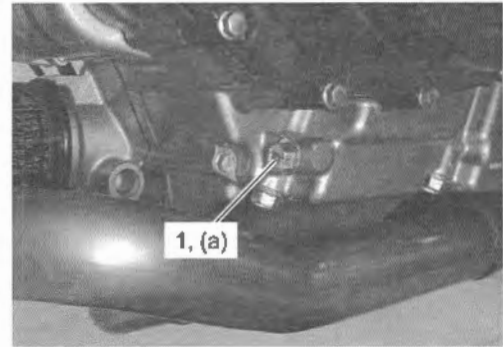
▲ WARNING

To avoid the risk of being burned, remove the oil pressure gauge when the oil has cooled.

- 8) Install the new gasket to the oil gallery plug (M8) (1).
- 9) Install the oil gallery plug (M8) and tighten it to the specified torque.

Tightening torque

Oil gallery plug (M8) (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



IE31J1150004-01

- 10) Check the engine oil level. (Page 1E-4)
- 11) Install the under cowl assembly. (If equipped)

Repair Instructions

Engine Oil Inspection

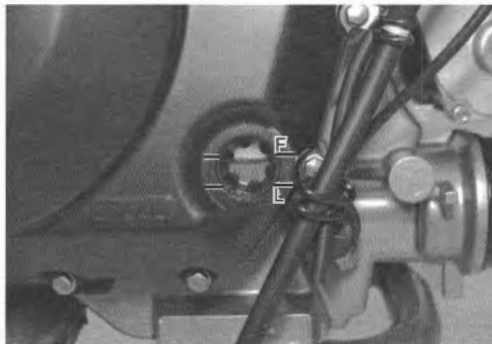
BENJ31J31506001

Engine Oil Leakage Inspection

Visually check the cylinder, crankcase, etc. for oil leakage.

Engine Oil Level Inspection

- 1) Keep the motorcycle upright.
- 2) Start the engine and allow it to run for three minutes at idling speed.
- 3) Turn off the engine and wait about three minutes, then check the oil level through the inspection window. If the level is below mark "L", add oil to "F" level. If the level is above mark "F", drain oil to "F" level.



IE31J1150005-02

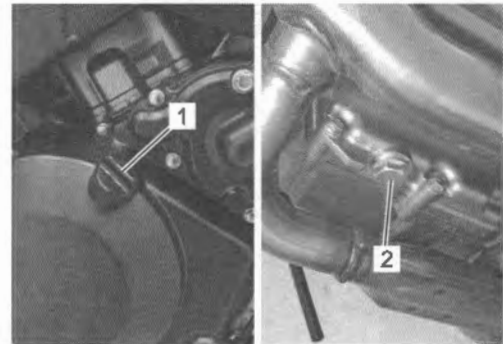
Engine Oil Replacement

BENJ31J31506002

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

NOTE

Warming up of the engine will facilitate draining of the engine oil due to reduction of the oil viscosity.



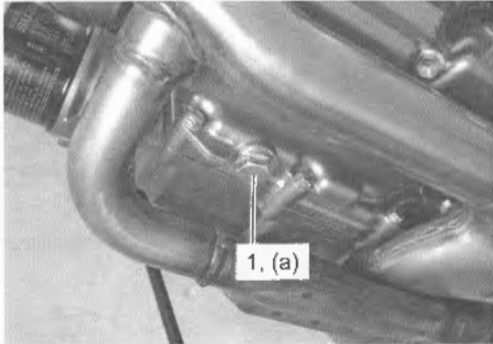
IE31J1150006-01

1E-5 Engine Lubrication System:

- 4) Install the new gasket washer to the oil drain plug (1).
- 5) Tighten the oil drain plug to the specified torque.

Tightening torque

Oil drain plug (a): 23 N·m (2.3 kgf·m, 17.0 lbf·ft)



IE31J1150007-01

- 6) Pour new oil through the oil filler hole.

Necessary amount of engine oil

Oil change: 2700 ml (2.9 US qt, 2.4 Imp qt)

Oil and filter change: 3100 ml (3.3 US qt, 2.7 Imp qt)

Engine overhaul: 3500 ml (3.7 US qt, 3.1 Imp qt)



IE31J1150008-01

- 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.

Oil Filter Replacement

BENJ31J31508003

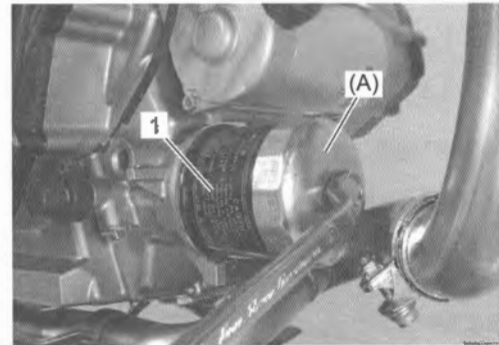
- 1) Remove the under cowling assembly. (If equipped)
☞ (Page 9D-39)
- 2) Drain engine oil. ☞ (Page 1E-4)
- 3) Remove the oil filter (1) with the special tool.

NOTE

Detach the special tool once the oil filter has come loose, and then remove the filter by hand.

Special tool

(A): 09915-40620



IE31J1150009-01

- 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

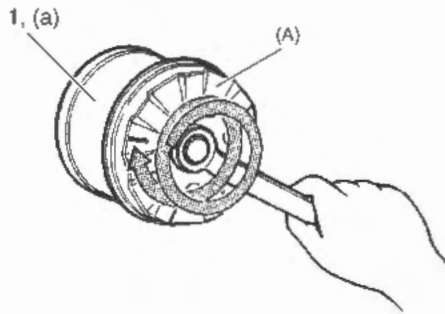
To properly tighten the oil filter, use the special tool. Never tighten the oil filter by hand only.

Special tool

(A): 09915-40620

Tightening torque

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



ID26J1150014-03

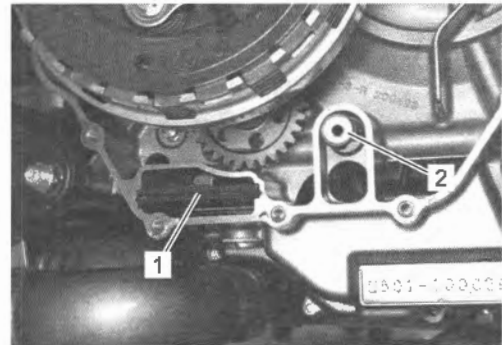
- 6) Add new engine oil. (Page 1E-4)
- 7) Check the engine oil level. (Page 1E-4)
- 8) Install the under cowling assembly. (If equipped)

Oil Strainer / Oil Pressure Regulator Removal and Installation

BENJ31J31506004

Removal

- 1) Remove the clutch cover and gasket. (Page 5C-15)
- 2) Remove the oil strainer (1) and oil pressure regulator (2).



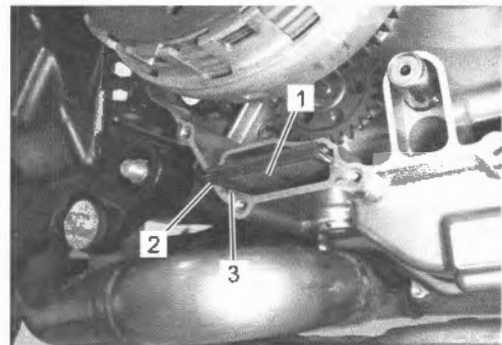
IE31J1150010-01

Installation

- 1) Install the oil strainer (1).

NOTICE

When installing the oil strainer, fit the convex part (2) of the oil strainer into the hole (3) of the crankcase.



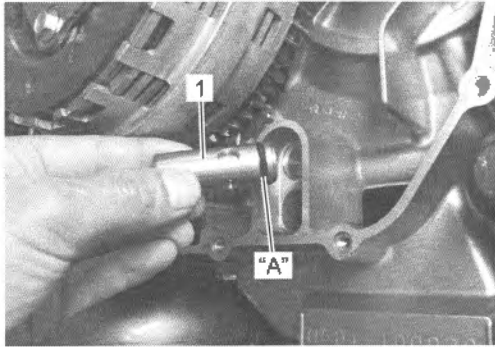
IE31J1150011-01

1E-7 Engine Lubrication System:

2) Apply grease to the new O-ring.

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

3) Install the oil pressure regulator (1).



IE31J1150012-01

4) Install the clutch cover. ☞(Page 5C-17)

Oil Strainer Inspection and Cleaning

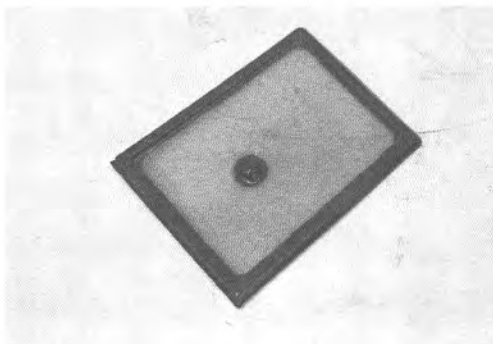
BENJ31J31506005

Refer to "Oil Strainer / Oil Pressure Regulator Removal and Installation" (Page 1E-6).

If the oil strainer is clogged with sediment or rust, clean the oil strainer using compressed air.

NOTE

When the filter is dirtied excessively, replace the oil strainer with a new one.



IE31J1150013-01

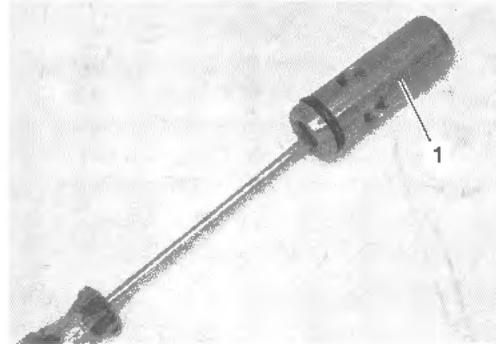
Oil Pressure Regulator Inspection

BENJ31J31506006

Refer to "Oil Strainer / Oil Pressure Regulator Removal and Installation" (Page 1E-6).

Inspect the operation of the oil pressure regulator (1) by pushing on the piston with a proper bar.

If the piston does not operate, replace the oil pressure regulator with a new one.



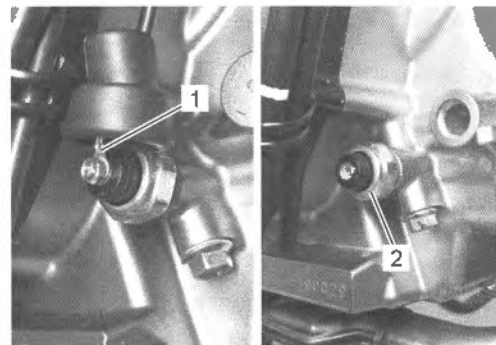
IE31J1150014-01

Oil Pressure Switch Removal and Installation

BENJ31J31508007

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the under cowling assembly. (If equipped) ☞(Page 9D-39)
- 3) Drain engine oil. ☞(Page 1E-4)
- 4) Disconnect the oil pressure switch lead wire (1).
- 5) Remove the oil pressure switch (2).



IE31J1150015-02

Installation

- 1) Install the oil pressure switch (1), apply the sealant to its thread part and tighten it to the specified torque.

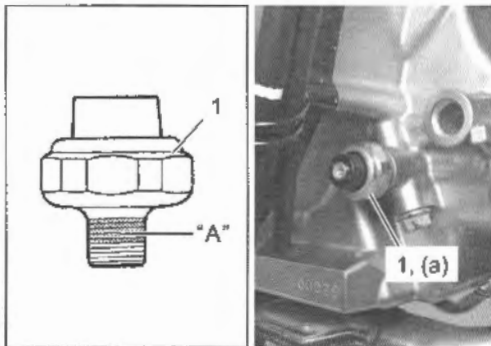
NOTE

Do not apply sealant to oil pressure switch hole.

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

Tightening torque

Oil pressure switch (a): 14 N·m (1.4 kgf-m, 10.5 lbf-ft)



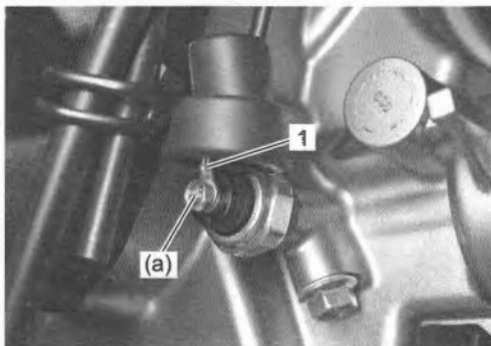
IE31J1150016-01

- 2) Connect the oil pressure switch lead wire (1).

- L4 – L6 model: (Page 9A-6)
- L8 – model: (Page 9A-24)

Tightening torque

Oil pressure switch lead wire bolt (a): 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)



IE31J1150017-02

- 3) Pour engine oil. (Page 1E-4)
- 4) Install the under cowling assembly. (If equipped)

Oil Pressure Switch Inspection

BENJ31J31506008

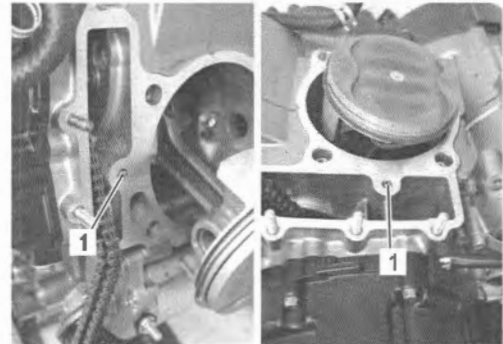
Refer to "Oil Pressure Indicator Inspection" in Section 9C (Page 9C-13).

Oil Jet / Piston Cooling Nozzle Removal and Installation

BENJ31J31506009

Oil Jet (For Cylinder Head) Removal

- 1) Remove the cylinders. (Page 1D-25)
- 2) Remove the oil jets (for cylinder head) (1).



IE31J1150018-01

Installation

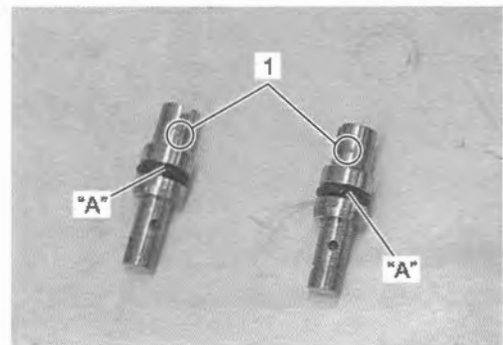
Install the oil jet (for cylinder head) in the reverse order of removal. Pay attention to the following point:

- Apply grease to the new O-rings.

NOTE

Identify the cylinder head side oil jets by stamped number [14] (1).

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



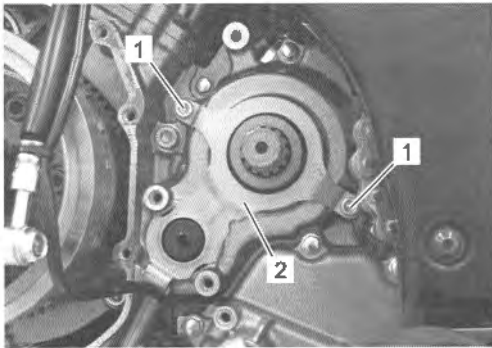
IE31J1150019-01

1E-9 Engine Lubrication System:

Oil Jet (For transmission)

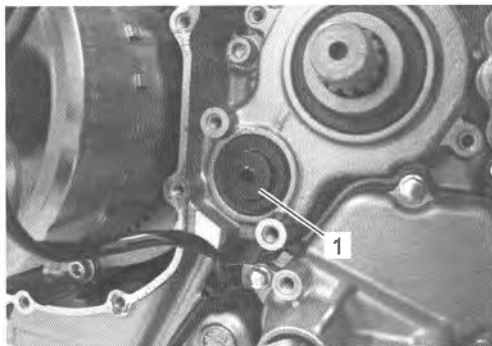
Removal

- 1) Drain engine oil. (Page 1E-4)
- 2) Remove the generator cover. (Page 1J-5)
- 3) Remove the engine sprocket. (Page 3A-3)
- 4) Remove the oil seal retainer mounting bolts (1) and oil seal retainer (2).



IE31J1150020-02

- 5) Remove the clutch push rod oil seal (1).



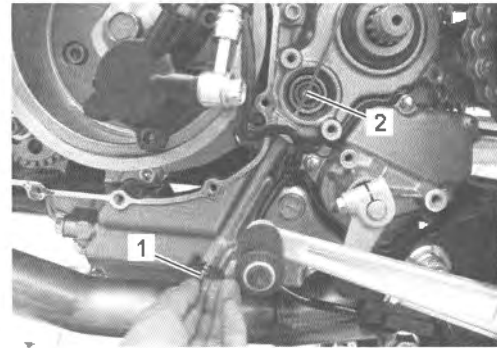
IE31J1150021-01

- 6) Remove the oil gallery plug (M8) (1).



IE31J1150022-01

- 7) Remove the oil gallery jet (for transmission) (1) with a suitable bar (2).



IE31J1150023-01

Installation

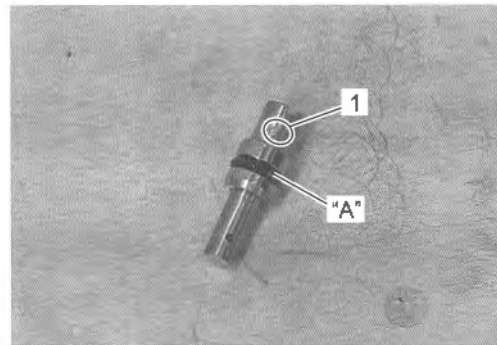
Install the oil jet (for clutch case) in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new O-ring.

NOTE

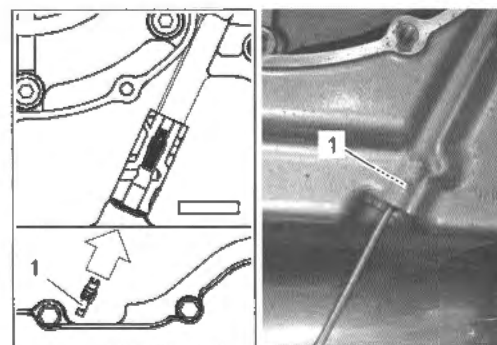
Identify the cylinder head side oil jet by stamped number [10] (1).

“A”: Grease 99000-25011 (SUZUKI SUPER GREASE A)



IE31J1150024-01

- Install the oil gallery jet (for transmission) (1) with a suitable bar.

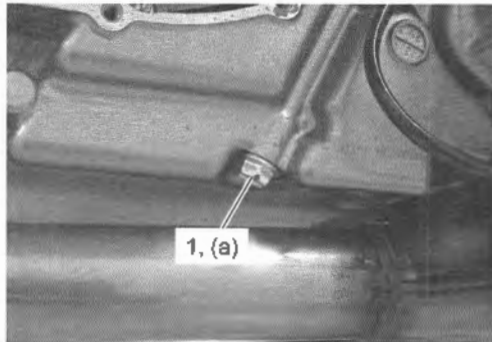


IE31J1150025-02

- Install the new gaskets.
- Tighten the oil gallery plug (M8) (1) to the specified torque.

Tightening torque

Oil gallery plug (M8) (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



IE31J1150026-01

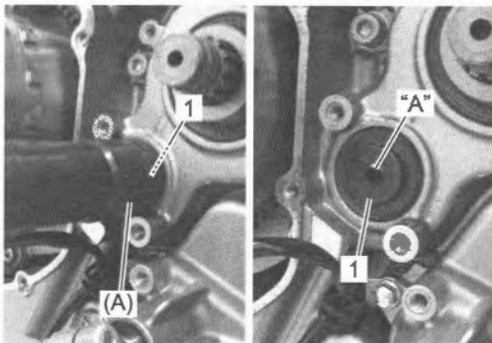
- Install the new clutch push rod oil seal (1) with the special tool.

Special tool

(A): 09913-70210

- Apply grease to lip of clutch push rod oil seal (1).

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



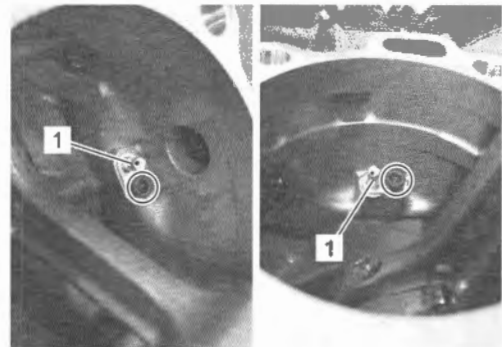
IE31J1150027-01

- Install the engine sprocket. ☞(Page 3A-3)
- Install the generator cover. ☞(Page 1J-6)

Piston Cooling Nozzle

Removal

- 1) Remove the pistons. ☞(Page 1D-49)
- 2) Remove the piston cooling nozzles (1).



IE31J1150028-01

Installation

Install the piston cooling nozzle in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new O-ring.

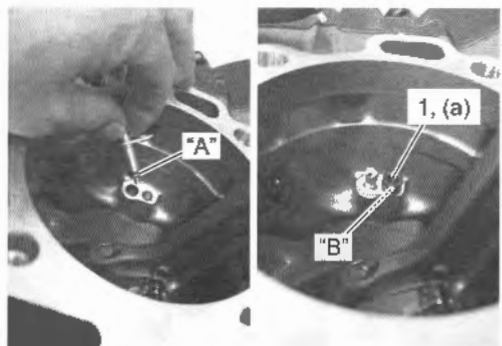
"A": Grease 99000-25011 (SUZUKI SUPER GREASE A)

- Apply thread lock to the piston cooling nozzle bolt (1) and tighten it to the specified torque.

"B": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

Piston cooling nozzle bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1150028-01

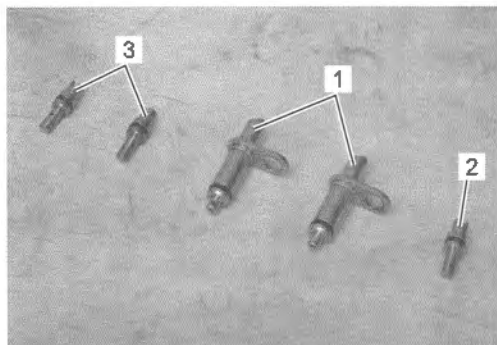
1E-11 Engine Lubrication System:

Oil Jet / Piston Cooling Nozzle Inspection

BENJ31J31506010

Refer to "Oil Jet / Piston Cooling Nozzle Removal and Installation" (Page 1E-8).

Make sure that the oil jets and piston cooling nozzle are not clogged. If they are clogged, clean their oil passage using a wire of the proper size and compressed air.



IE31J1150030-01

- | |
|--------------------------------|
| 1. Piston cooling nozzle |
| 2. Oil jet (for transmission) |
| 3. Oil jet (for cylinder head) |

Oil Pump Removal and Installation

BENJ31J31506011

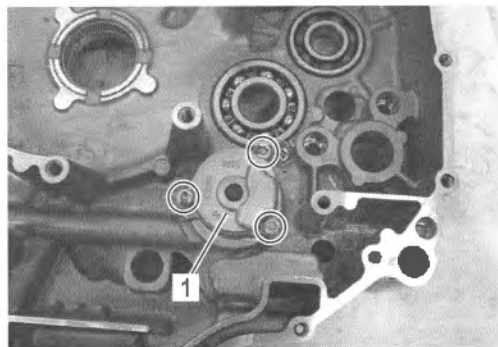
Refer to "Crankcase Assembly Disassembly" in Section 1D (Page 1D-54) and "Crankcase Assembly Reassembly" in Section 1D (Page 1D-58).

Removal

- 1) Remove the oil pump assembly (1).

NOTICE

Do not attempt to disassemble the oil pump assembly. The oil pump is available only as an assembly.



IE31J1150031-01

Installation

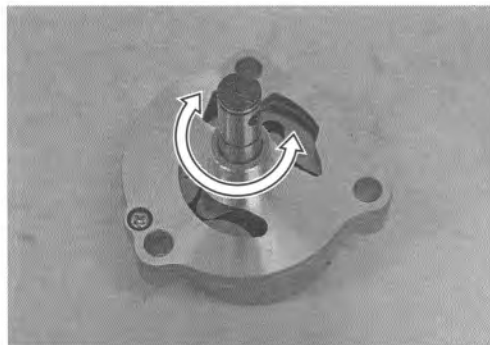
Install the oil pump in the reverse order of removal.

Oil Pump Inspection

BENJ31J31506012

Refer to "Oil Pump Removal and Installation" (Page 1E-11).

Rotate the oil pump by hand and check that it moves smoothly. If it does not move smoothly, replace the oil pump assembly.



IE31J1150032-02

Specifications

Tightening Torque Specifications

BENJ31J31507001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Oil gallery plug (M8)	18	1.8	13.0	☞(Page 1E-4) / ☞(Page 1E-10)
Oil drain plug	23	2.3	17.0	☞(Page 1E-5)
Oil filter	20	2.0	14.5	☞(Page 1E-6)
Oil pressure switch	14	1.4	10.5	☞(Page 1E-8)
Oil pressure switch lead wire bolt	1.5	0.15	1.0	☞(Page 1E-8)
Piston cooling nozzle bolt	10	1.0	7.5	☞(Page 1E-10)

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

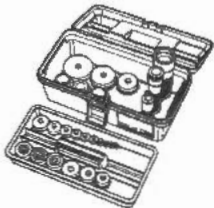


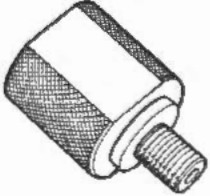

Recommended Service Material

BENJ31J31508001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞(Page 1E-7) / ☞(Page 1E-8) / ☞(Page 1E-9) / ☞(Page 1E-10) / ☞(Page 1E-10)
Sealant	SUZUKI BOND 1207B	P/No.: 99000-31140	☞(Page 1E-8)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞(Page 1E-10)

Special Tool

BENJ31J31508002

09913-70210 Bearing installer set ☞(Page 1E-10)		09915-40620 Oil filter wrench ☞(Page 1E-5) / ☞(Page 1E-6)	
09915-74521 Oil pressure gauge hose ☞(Page 1E-3)		09915-74533 Oil pressure gauge attachment ☞(Page 1E-3)	
09915-77331 Oil pressure gauge (1000 kPa) ☞(Page 1E-3)			

Engine Cooling System

Precautions

Precautions for Engine Cooling System

BENJ31J3160001

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

▲ WARNING

- You can be injured by boiling fluid or steam if you open the radiator cap when the engine is hot. After the engine cools, wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow pressure to escape and then turn the cap all the way off.
- The engine must be cool before servicing the cooling system.
- Coolant is harmful:
 - If it comes in contact with skin or eyes, flush with water.
 - If swallowed accidentally, do not induce vomiting and call physician immediately.
 - Keep it away from children.

Precautions for Engine Coolant

BENJ31J3160002

Refer to “Fuel / Oil / Fluid Recommendation” in Section 0C (Page 0C-13).

General Description

Engine Coolant Description

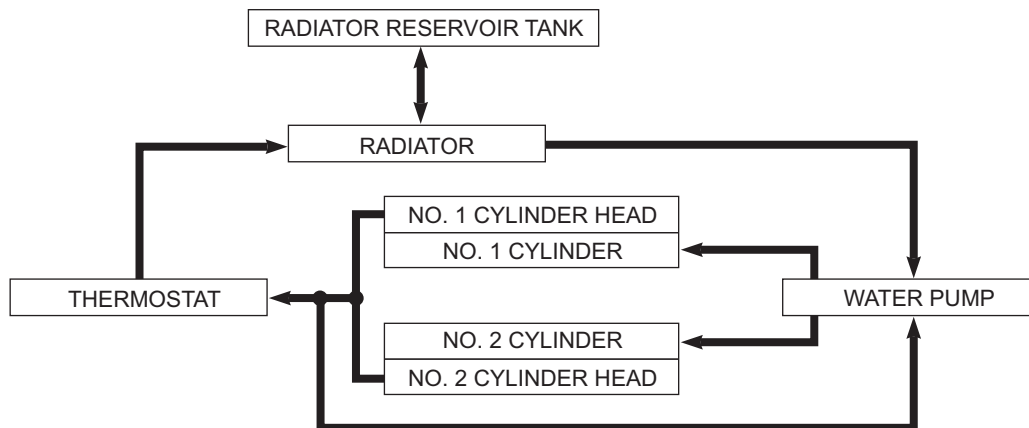
BENJ31J31601001

Refer to “Fuel / Oil / Fluid Recommendation” in Section 0C (Page 0C-13).

Schematic and Routing Diagram

Cooling Circuit Diagram

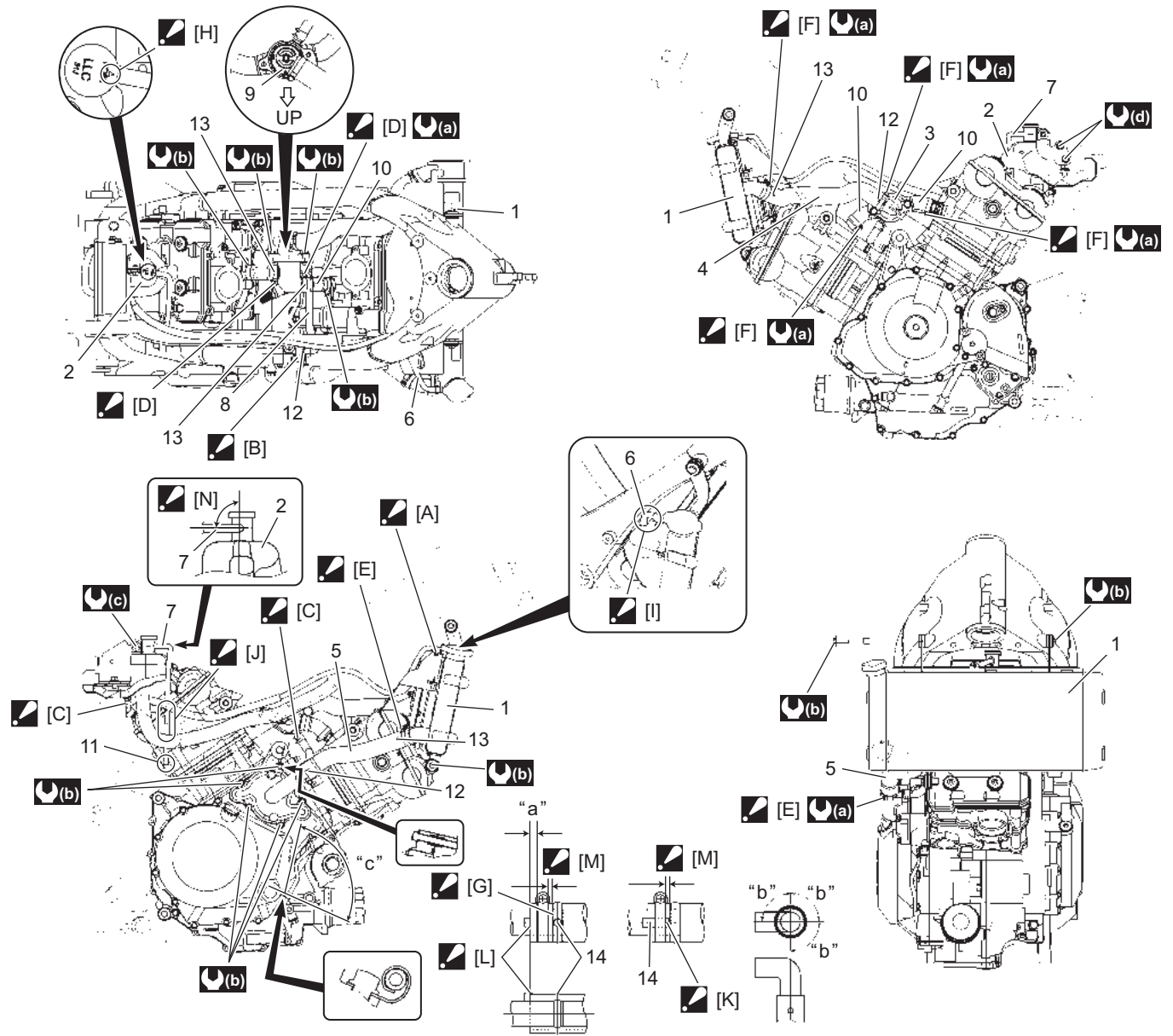
BENJ31J31602001



IE31J1160001-01

Water Hose Routing Diagram

DL1000AL4

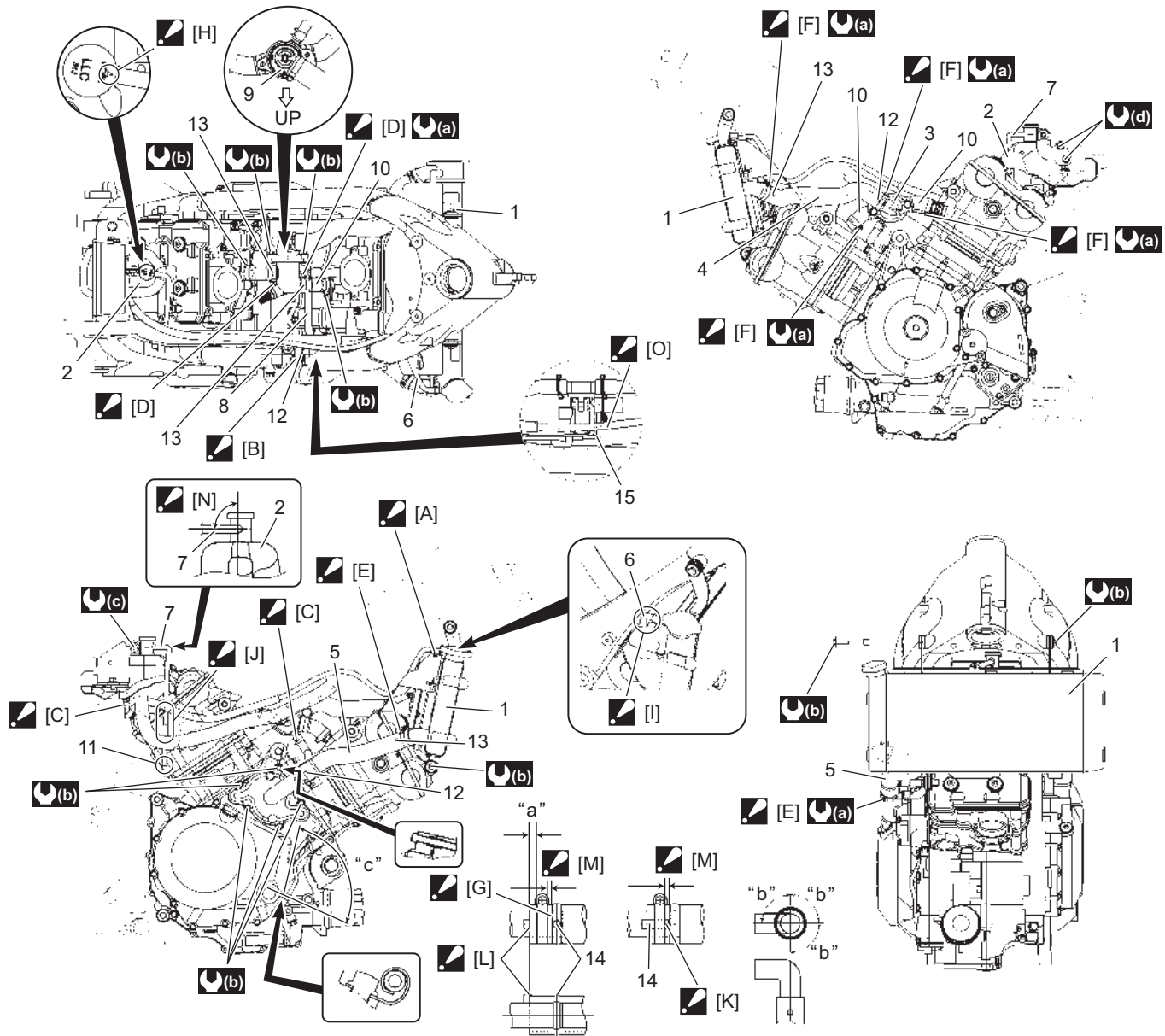


IE31J1160063-08

<p>[A]: Clamp end should face lower side.</p>	<p>[M]: Keep clearance.</p>	<p>11. 3 way joint</p>
<p>[B]: Clamp end should face front side.</p>	<p>[N]: Set the reservoir tank over flow hose horizontally.</p>	<p>12. White mark</p>
<p>[C]: Clamp end should face back side.</p>	<p>1. Radiator</p>	<p>13. Yellow mark</p>
<p>[D]: Screw head should face upper side.</p>	<p>2. Reservoir tank</p>	<p>14. Match mark</p>
<p>[E]: Screw head should face right side.</p>	<p>3. Thermostat connector cap</p>	<p>"a": 2 – 8 mm (0.08 – 0.3 in.)</p>
<p>[F]: Screw head should face left side.</p>	<p>4. Radiator inlet hose</p>	<p>"b": 90°</p>
<p>[G]: Do not clamp on the match mark.</p>	<p>5. Radiator outlet hose</p>	<p>"c": 75° – 105°</p>
<p>[H]: Align the "△" mark of the reservoir tank cap with the reservoir tank overflow hose.</p>	<p>6. Reservoir tank inlet hose</p>	<p>[a]: 1.5 N-m (0.15 kgf-m, 1.0 lbf-ft)</p>
<p>[I]: Pass the reservoir tank inlet hose on the concave part of heat shield. Pass the slack of hose to behind of the frame.</p>	<p>7. Reservoir tank overflow hose</p>	<p>[b]: 10 N-m (1.0 kgf-m, 7.5 lbf-ft)</p>
<p>[J]: Pass the reservoir tank overflow hose to the behind of wiring harness.</p>	<p>8. Water bypass hose</p>	<p>[c]: 6 N-m (0.6 kgf-m, 4.5 lbf-ft)</p>
<p>[K]: Tighten the clamp on match mark.</p>	<p>9. Jiggle valve</p>	<p>[d]: 11 N-m (1.1 kgf-m, 8.0 lbf-ft)</p>
<p>[L]: Insert the hose to the stopper.</p>	<p>10. Connector inlet hose</p>	

1F-3 Engine Cooling System:

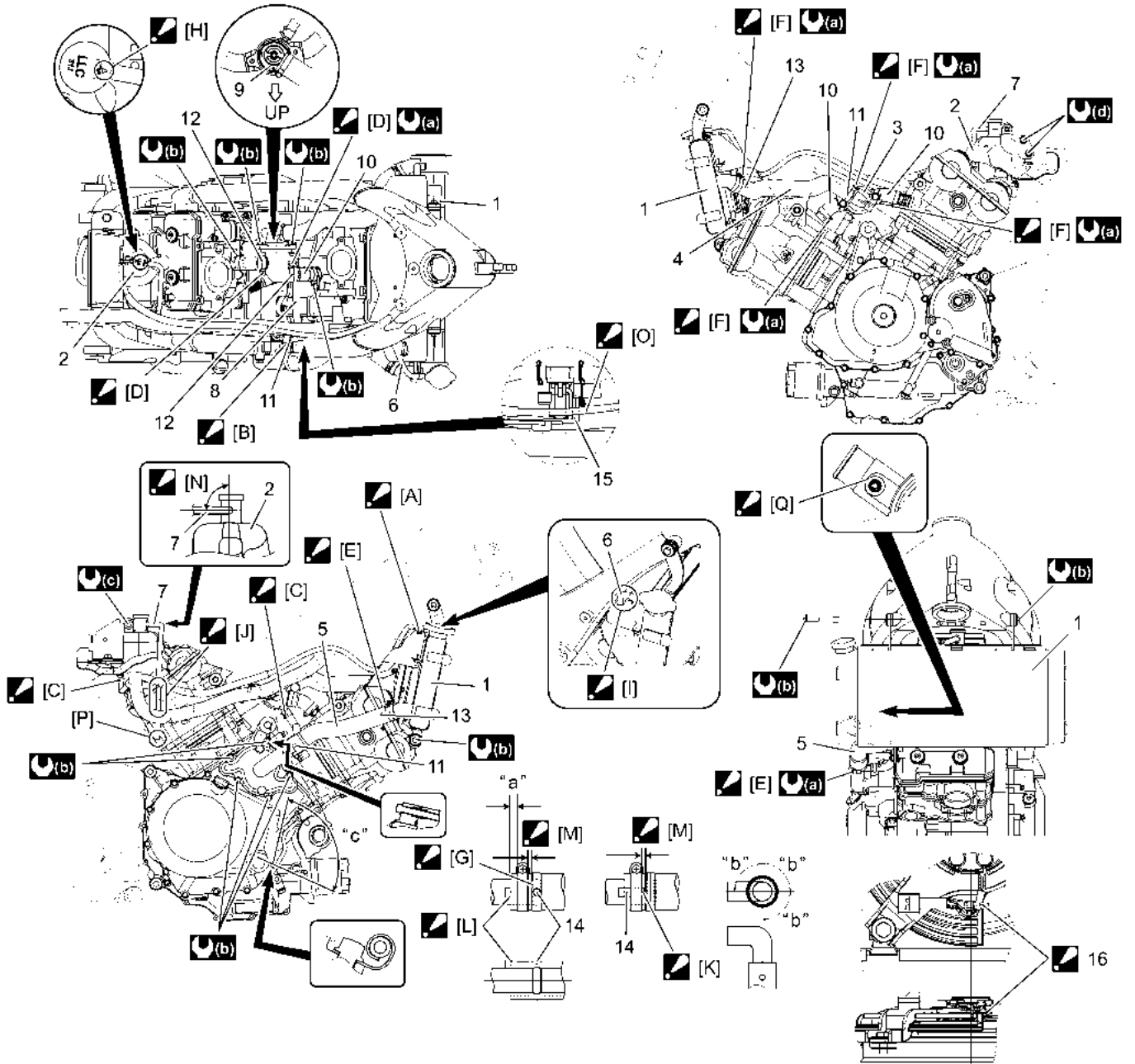
DL1000AL5 –



IF31J1160001-01

<ul style="list-style-type: none"> [A]: Clamp end should face lower side. 	<ul style="list-style-type: none"> [N]: Set the reservoir tank over flow hose horizontally. 	12. White mark
<ul style="list-style-type: none"> [B]: Clamp end should face front side. 	<ul style="list-style-type: none"> [O]: Pass the reservoir tank inlet hose above the PAIR control solenoid valve stay (If equipped). 	13. Yellow mark
<ul style="list-style-type: none"> [C]: Clamp end should face back side. 	<ul style="list-style-type: none"> 1. Radiator 	14. Match mark
<ul style="list-style-type: none"> [D]: Screw head should face upper side. 	<ul style="list-style-type: none"> 2. Reservoir tank 	15. PAIR control solenoid valve stay (If equipped)
<ul style="list-style-type: none"> [E]: Screw head should face right side. 	<ul style="list-style-type: none"> 3. Thermostat connector cap 	"a": 2 – 8 mm (0.08 – 0.3 in.)
<ul style="list-style-type: none"> [F]: Screw head should face left side. 	<ul style="list-style-type: none"> 4. Radiator inlet hose 	"b": 90°
<ul style="list-style-type: none"> [G]: Do not clamp on the match mark. 	<ul style="list-style-type: none"> 5. Radiator outlet hose 	"c": 75° – 105°
<ul style="list-style-type: none"> [H]: Align the "△" mark of the reservoir tank cap with the reservoir tank overflow hose. 	<ul style="list-style-type: none"> 6. Reservoir tank inlet hose 	(a) : 1.5 N-m (0.15 kgf-m, 1.0 lbf-ft)
<ul style="list-style-type: none"> [I]: Pass the reservoir tank inlet hose on the concave part of heat shield. Pass the slack of hose to behind of the frame. 	<ul style="list-style-type: none"> 7. Reservoir tank overflow hose 	(b) : 10 N-m (1.0 kgf-m, 7.5 lbf-ft)
<ul style="list-style-type: none"> [J]: Pass the reservoir tank overflow hose to the behind of wiring harness. 	<ul style="list-style-type: none"> 8. Water bypass hose 	(c) : 6 N-m (0.6 kgf-m, 4.5 lbf-ft)
<ul style="list-style-type: none"> [K]: Tighten the clamp on match mark. 	<ul style="list-style-type: none"> 9. Jiggle valve 	(d) : 11 N-m (1.1 kgf-m, 8.0 lbf-ft)
<ul style="list-style-type: none"> [L]: Insert the hose to the stopper. 	<ul style="list-style-type: none"> 10. Connector inlet hose 	
<ul style="list-style-type: none"> [M]: Keep clearance. 	<ul style="list-style-type: none"> 11. 3 way joint 	

DL1000A/XAL8 -



1F-5 Engine Cooling System:

☑ [A]: Clamp end should face lower side.	4. Radiator inlet hose
☑ [B]: Clamp end should face front side.	5. Radiator outlet hose
☑ [C]: Clamp end should face back side.	6. Reservoir tank inlet hose
☑ [D]: Screw head should face upper side.	7. Reservoir tank overflow hose
☑ [E]: Screw head should face right side.	8. Water bypass hose
☑ [F]: Screw head should face left side.	9. Jiggle valve
☑ [G]: Do not clamp on the match mark.	10. Connector inlet hose
☑ [H]: Align the "△" mark of the reservoir tank cap with the reservoir tank overflow hose.	11. White mark
☑ [I]: Pass the reservoir tank inlet hose on the concave part of heat shield. Pass the slack of hose to inside of the frame.	12. Red mark
☑ [J]: Pass the reservoir tank overflow hose to inside of wiring harness.	13. Yellow mark
☑ [K]: Tighten the clamp on match mark.	14. Match mark
☑ [L]: Insert the hose to the stopper.	15. PAIR control solenoid valve stay (If equipped)
☑ [M]: Keep clearance.	☑ 16. Clamp : Clamp the lead wire protector at the slit on nearest center of shroud. Face the tip of clamp to left side. Cut off the excess tip of the clamp. Do not contact the clamp to the cylinder head cover.
☑ [N]: Set the reservoir tank over flow hose horizontally.	"a": 2 – 8 mm (0.08 – 0.3 in.)
☑ [O]: Pass the reservoir tank inlet hose above the PAIR control solenoid valve stay (If equipped).	"b": 90°
[P]: To 3 way joint	"c": 75° – 105°
☑ [Q]: Match the white mark of the water bypass hose to the direction of the water pump case pipe.	☑(a) : 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)
1. Radiator	☑(b) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
2. Reservoir tank	☑(c) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
3. Thermostat connector cap	☑(d) : 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

Diagnostic Information and Procedures

Engine Cooling Symptom Diagnosis

BENJ31J31604001

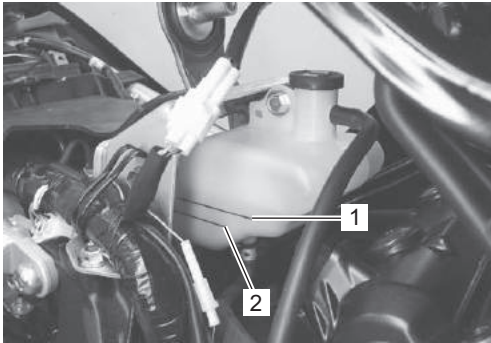
Condition	Possible cause	Correction / Reference Item
Engine overheats	Not enough engine coolant.	Add engine coolant. ☞(Page 1F-6)
	Radiator core clogged with dirt or scale.	Clean. ☞(Page 1F-10)
	Faulty cooling fan.	Repair or replace. ☞(Page 1F-9)
	Defective cooling fan relay, or open-or-short circuited.	Repair or replace. ☞(Page 1F-13)
	Clogged water passage.	Clean.
	Air trapped in the cooling circuit.	Bleed air. ☞(Page 1F-7)
	Defective water pump.	Replace. ☞(Page 1F-16)
	Use of incorrect engine coolant.	Replace. ☞(Page 1F-6)
	Defective thermostat.	Replace. ☞(Page 1F-13)
	Defective ECT sensor.	Replace. ☞(Page 1C-16)
	Defective ECM.	Replace. ☞(Page 1C-14)
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-13)
	Defective ECT sensor.	Replace. ☞(Page 1C-16)
	Defective ECM.	Replace. ☞(Page 1C-14)

Repair Instructions

Engine Coolant Level Inspection

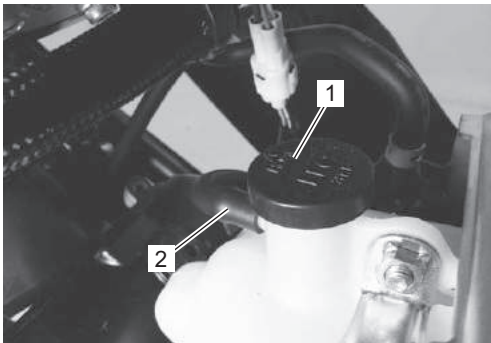
BENJ31J31606001

- 1) Keep the motorcycle upright.
- 2) Lift and support the fuel tank. (Page 1G-9)
- 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.



IE31J1160002-01

- 4) Install the reservoir tank cap by aligning the match mark (1) and reservoir tank overflow hose (2).



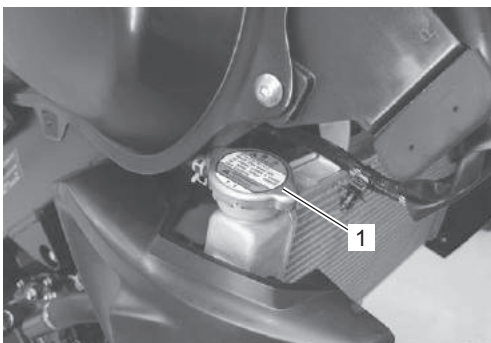
IE31J1160064-01

Engine Coolant Replacement

BENJ31J31606002

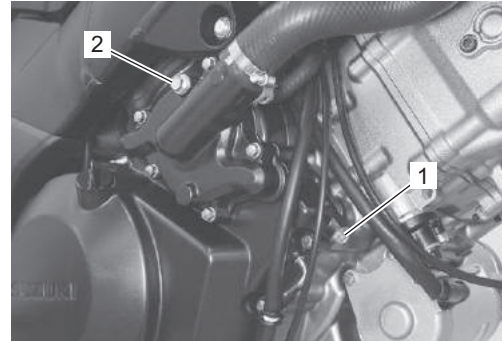
Refer to "Engine Coolant Description" (Page 1F-1).

- 1) Remove the fuel tank side cover (right).
 - L4 – L6 model: (Page 9D-14)
 - L8 – model: (Page 9D-34)
- 2) Remove the radiator cap (1).



IE31J1160003-01

- 3) Remove the under cowling assembly. (If equipped) (Page 9D-39)
- 4) Drain engine coolant by removing the drain bolt (1) and air bleeder bolt (2).



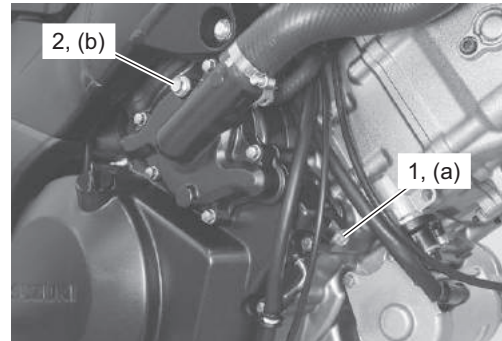
IE31J1160004-02

- 5) Flush the radiator with fresh water if necessary.
- 6) Tighten the drain bolt (1) and air bleeder bolt (2) to the specified torque.

Tightening torque

Clutch cover water drain bolt (a): 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)

Air bleeder bolt (b): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)



IE31J1160005-02

- 7) Pour the specified engine coolant up to the radiator inlet.


Engine coolant capacity (Engine side)
1900 ml (2.0 US qt, 1.6 Imp qt)

Engine coolant capacity (Reservoir tank side)
230 ml (0.24 US qt, 0.20 Imp qt)





IE31J1160006-01

1F-7 Engine Cooling System:

- 8) Bleed air from the cooling circuit.  (Page 1F-7)
- 9) Install the removed parts.

Air Bleeding of Engine Cooling System

BENJ31J31606003

- 1) Support the motorcycle upright.
- 2) Remove the fuel tank side cover.
 - L4 – L6 model:  (Page 9D-14)
 - L8 – model:  (Page 9D-34)
- 3) Pour engine coolant up to the radiator inlet.





IE31J1160007-01

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

Engine Cooling System Inspection

BENJ31J31606004

- 1) Remove the fuel tank side cover.
 - L4 – L6 model:  (Page 9D-14)
 - L8 – model:  (Page 9D-34)
- 2) Remove the radiator cap (1) and connect the special tool to the filler.
- 3) Pressurize the cooling system with approx. 135 kPa (1.35 kgf/cm, 19 psi) of pressure, and then check if it holds the pressure for 10 seconds.

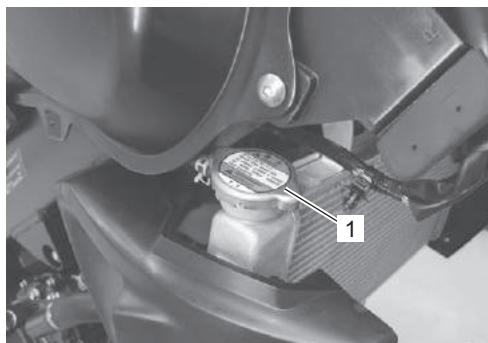
NOTICE

Do not exceed the radiator cap release pressure, or the radiator cap and subsequently the radiator, can be damaged.

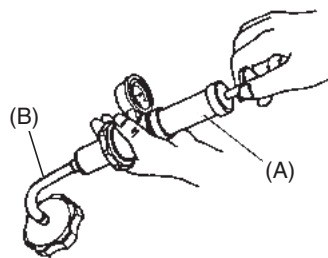
Special tool

(A): 09918-78211

(B): 09918-78220



IE31J1160008-01



ID26J1160006-05

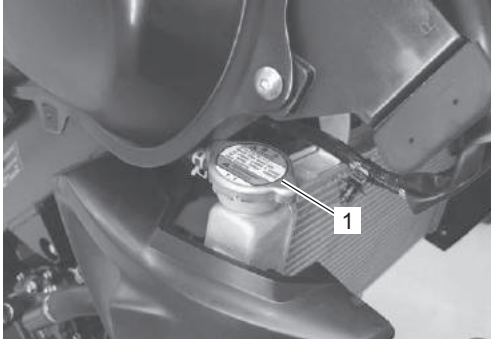
- 4) Install the removed parts.

Radiator Cap Inspection

BENJ31J31606005

Refer to "Engine Cooling System Inspection" (Page 1F-7).

- 1) Remove the right fuel tank side cover.
 - L4 – L6 model: ☞(Page 9D-14)
 - L8 – model: ☞(Page 9D-34)
- 2) Remove the radiator cap (1).



IE31J1160009-01

- 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.

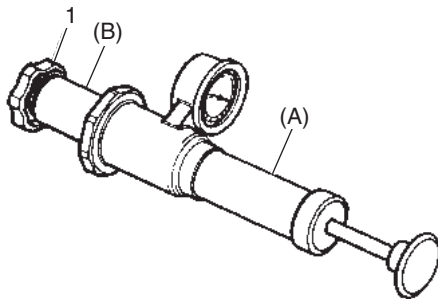
Special tool

(A): 09918-78211

(B): 09918-78220

Radiator cap release pressure

108 – 137 kPa (1.1 – 1.4 kgf/cm², 15.4 – 19.5 psi)

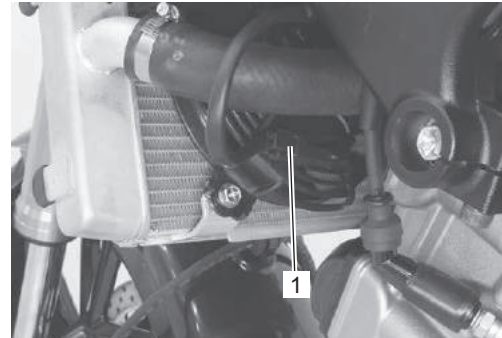


ID26J1160007-04

Cooling Fan On-Vehicle Inspection

BENJ31J31606006

- 1) Remove the left side lower cowling.
 - L4 – L6 model: ☞(Page 9D-15)
 - L8 – model: ☞(Page 9D-34)
- 2) Disconnect the cooling fan motor coupler (1).



IE31J1160010-02

- 3) 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

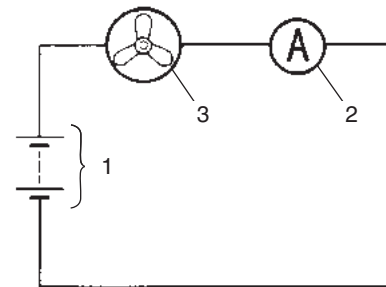
- When making this test, it is not necessary to remove the cooling fan.
- Make sure that the battery (1) has a capacity enough to supply the motor with 12 V.
- With the motor running at full speed, the ammeter should indicate an amperage not higher than 5 A.

Cooling fan operating temperature

Intake air temperature 40 °C (104 °F) or less

(ON→OFF): Approx. 100 °C (212 °F)

(OFF→ON): Approx. 105 °C (221 °F)



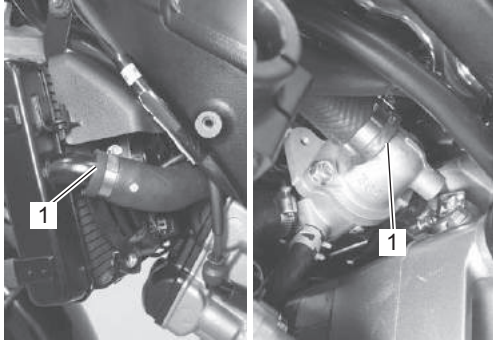
ID26J1160029-01

- 4) After finishing the cooling fan inspection, install the removed parts.

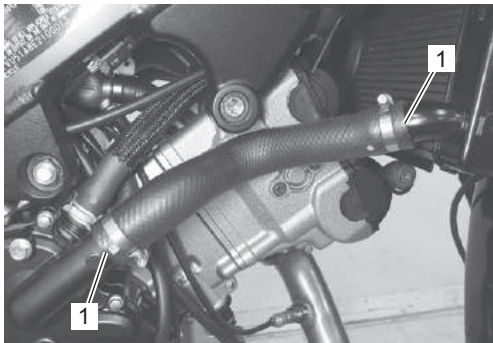
Radiator Hose Inspection

BENJ31J31606007

- 1) Check the radiator hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.
- 2) Any leakage from the connecting section (1) should be corrected by proper tightening. (Page 1F-2)



IE31J1160013-02



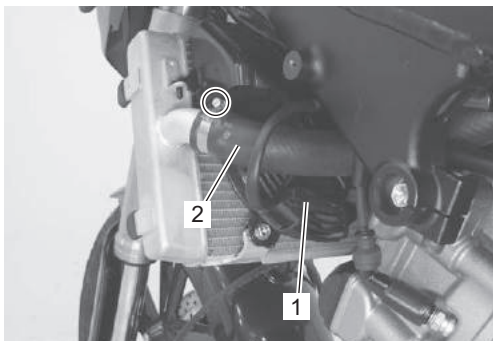
IE31J1160014-02

Radiator / Cooling Fan Motor Removal and Installation

BENJ31J31606008

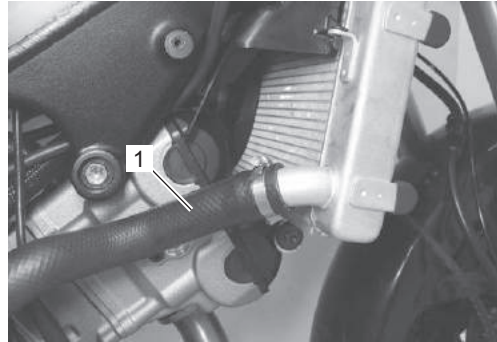
Removal

- 1) Drain engine coolant. (Page 1F-6)
- 2) Remove the fuel tank side covers.
 - L4 – L6 model: (Page 9D-14)
 - L8 – model: (Page 9D-34)
- 3) Remove the side lower cowlings.
 - L4 – L6 model: (Page 9D-15)
 - L8 – model: (Page 9D-34)
- 4) Disconnect the cooling fan motor coupler (1).
- 5) Disconnect the radiator inlet hose (2).



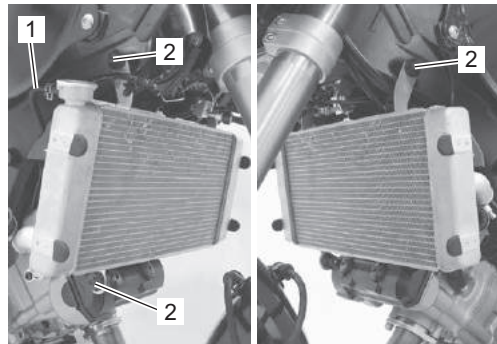
IE31J1160015-01

- 6) Disconnect the radiator outlet hose (1).



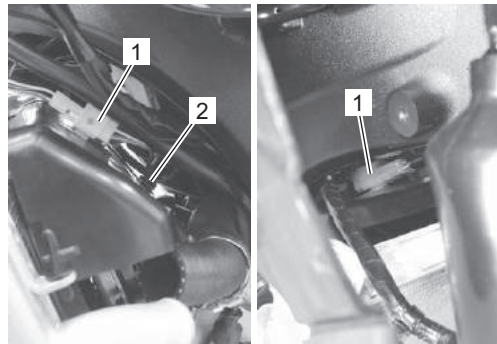
IE31J1160016-01

- 7) Disconnect the reservoir tank inlet hose (1).
- 8) Remove the bolts (2).



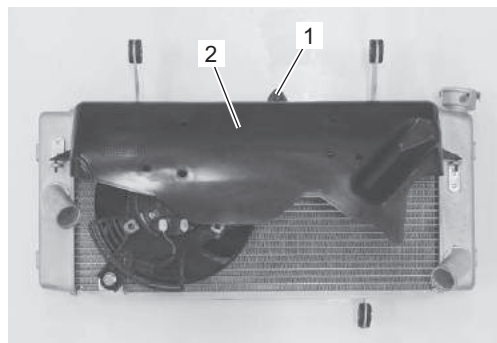
IE31J1160017-02

- 9) Remove the handlebar switch couplers (1) and clamp (2) and remove the radiator.



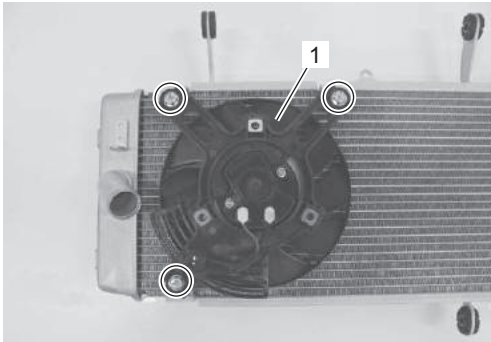
IE31J1160018-01

- 10) Remove the clip (1) and radiator heat shield (2).



IE31J1160019-02

11) Remove the cooling fan motor (1) from the radiator.



IE31J1160020-02

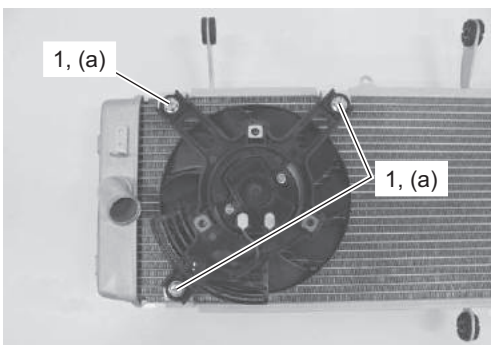
Installation

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 N·m (0.8 kgf-m, 6.0 lbf-ft)

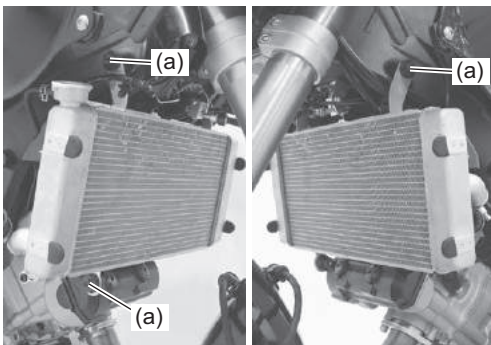


IE31J1160023-02

- Tighten the radiator mounting bolts to the specified torque.

Tightening torque

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

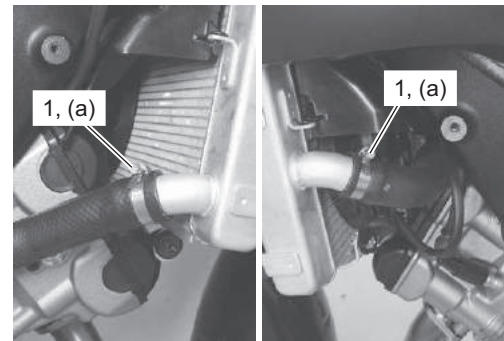


IE31J1160024-01

- 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, 1.0 lbf-ft)



IE31J1160025-01

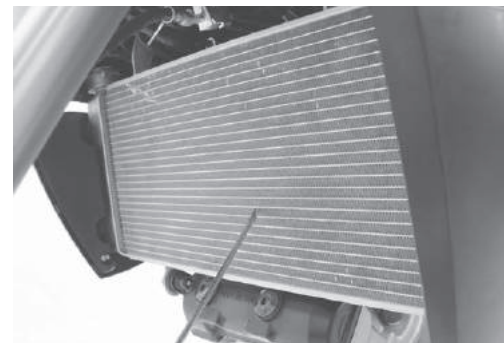
- Connect the radiator hoses securely. (Page 1F-2)
- Pour engine coolant. (Page 1F-6)

Radiator Inspection and Cleaning

BENJ31J31606009

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.





IE31J1160011-01

- 3) Install the removed parts.

1F-11 Engine Cooling System:

Cleaning

- 1) Remove the fuel tank side covers.
 - L4 – L6 model:  (Page 9D-14)
 - L8 – model:  (Page 9D-34)
- 2) 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.

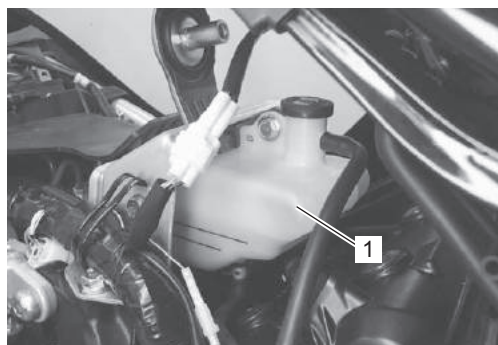


IE31J1160012-01

Radiator Reservoir Tank Inspection

BENJ31J31606010

- 1) Lift and support the fuel tank.  (Page 1G-9)
- 2) Inspect the radiator reservoir tank (1) coolant leaks. If any defects are found, replace the radiator reservoir tank with a new one.




IE31J1160026-01

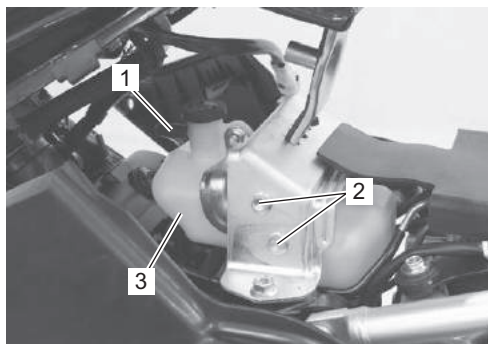
- 3) Install the removed parts.

Radiator Reservoir Tank Removal and Installation

BENJ31J31606011

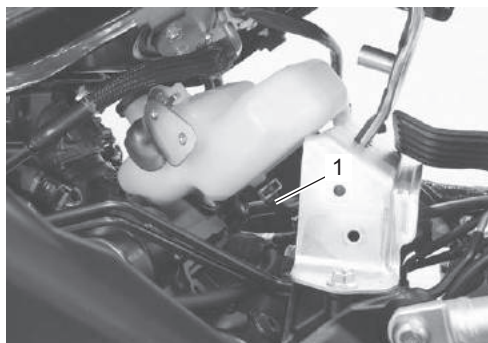
Removal

- 1) Lift and support the fuel tank.  (Page 1G-9)
- 2) Disconnect the overflow hose (1).
- 3) Remove the reservoir tank bracket bolts (2).
- 4) Remove the reservoir tank (3).



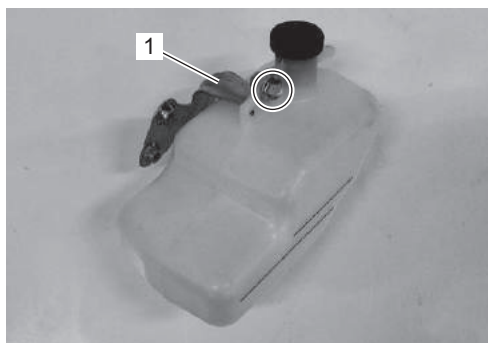
IE31J1160027-01

- 5) Disconnect the reservoir tank inlet hose (1) and drain the engine coolant.



IE31J1160028-01

- 6) Remove the reservoir tank bracket (1).



IE31J1160029-01

Installation

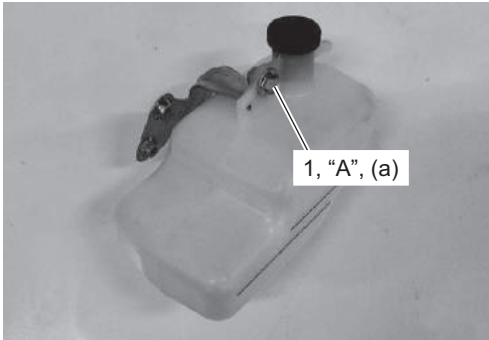
Install radiator reservoir tank in the reverse order of removal. Pay attention to the following points:

- Apply thread lock to the reservoir tank mounting 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 N·m (0.6 kgf-m, 4.5 lbf-ft)

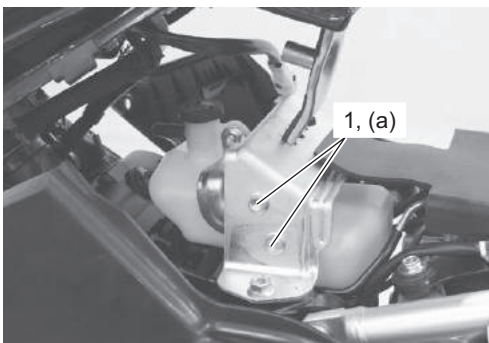


IE31J1160030-01

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

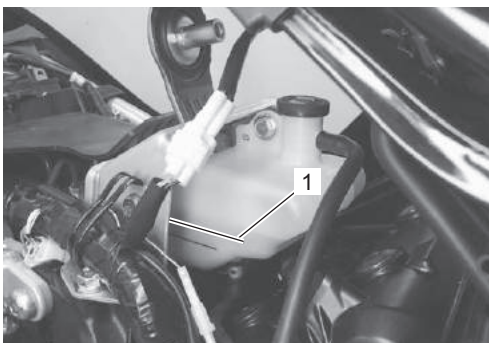
Tightening torque

Reservoir tank bracket bolt (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)



IE31J1160031-01

- Fill the reservoir tank to the upper level (1). (Page 1F-6)

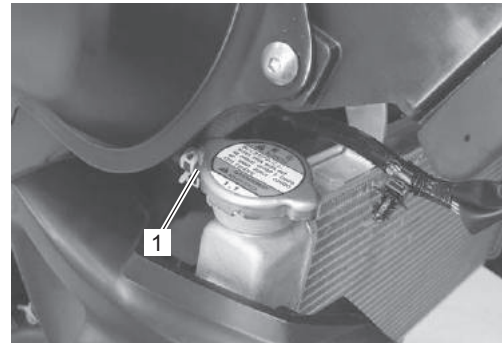


IE31J1160032-01

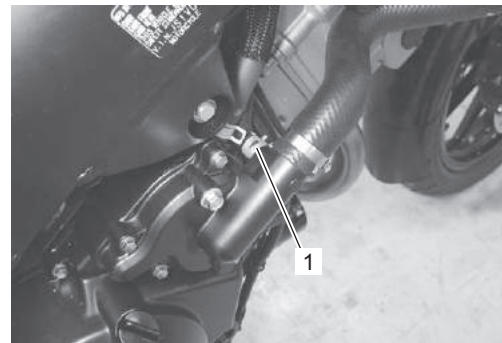
Water Hose Inspection

BENJ31J31606012

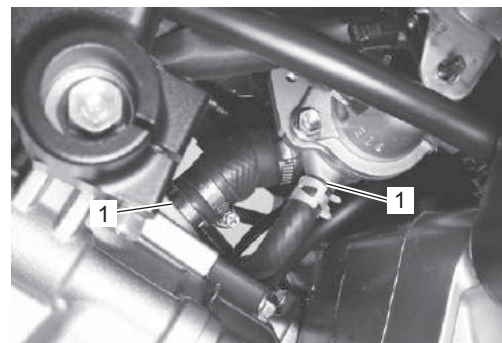
- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Check the water hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.
- 3) Any leakage from the connecting section (1) should be corrected by proper tightening. (Page 1F-2)



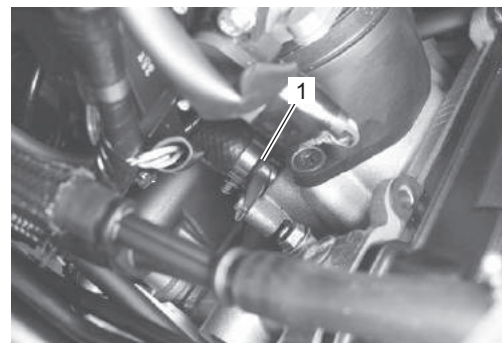
IE31J1160033-01



IE31J1160034-03



IE31J1160035-02



IE31J1160036-01

1F-13 Engine Cooling System:

- 4) After finishing the water hose inspection, install the removed parts.

Water Hose Removal and Installation

BENJ31J31606013

Removal

- 1) Drain engine coolant. (Page 1F-6)
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Remove the water hose. (Page 1F-2)

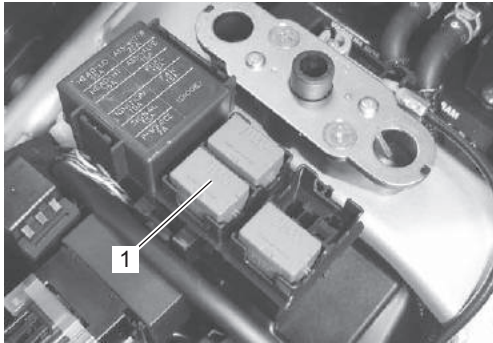
Installation

Install the water hose in the reverse order of removal.

Cooling Fan Relay Inspection

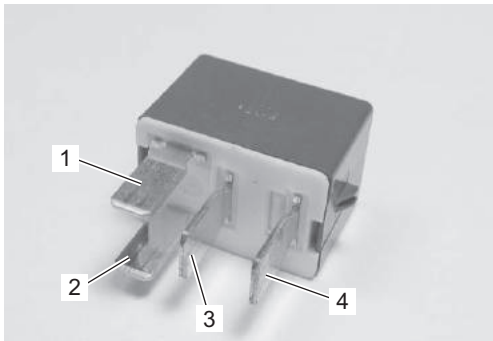
BENJ31J31606014

- 1) Remove the seat.
 - L4 – L6 model: (Page 9D-10)
 - L8 – model: (Page 9D-33)
- 2) Remove the cap and cooling fan relay (1).



IE31J1160037-02

- 3) First check the insulation between (3) and (4) terminals with a circuit tester. Then apply 12 V to (1) and (2) terminals, (+) to (1) and (–) to (2), and check the continuity between (3) and (4). If there is no continuity, replace it with a new one.



IE31J1160038-01

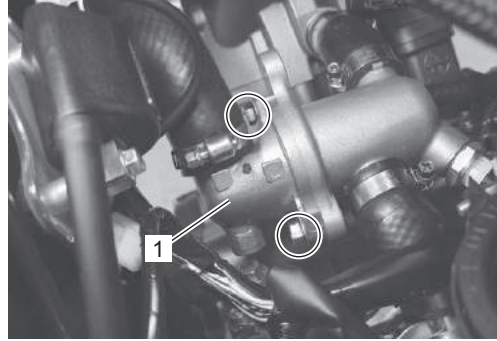
- 4) Install the removed parts.

Thermostat Removal and Installation

BENJ31J31606015

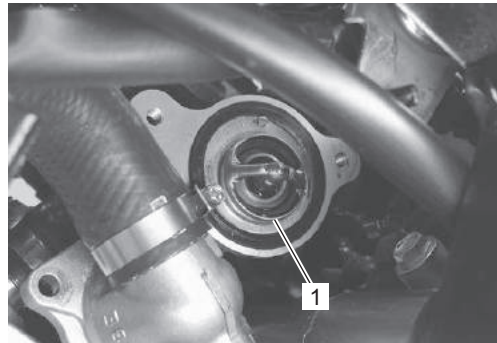
Removal

- 1) Drain engine coolant. (Page 1F-6)
- 2) Remove the throttle body. (Page 1C-4)
- 3) Place a rag under the thermostat connector cap (1) and then remove the thermostat connector cap (1).



IE31J1160039-02

- 4) Remove the thermostat (1).



IE31J1160040-02

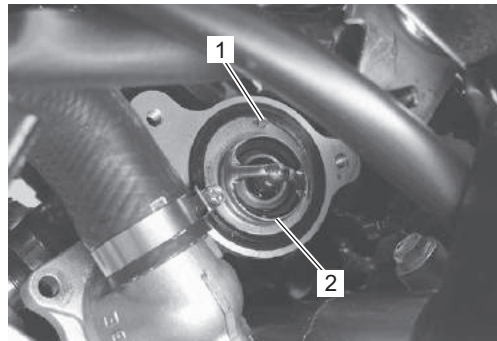
Installation

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

- Install the thermostat (2).

NOTE

The jiggle valve (1) of the thermostat faces upside.

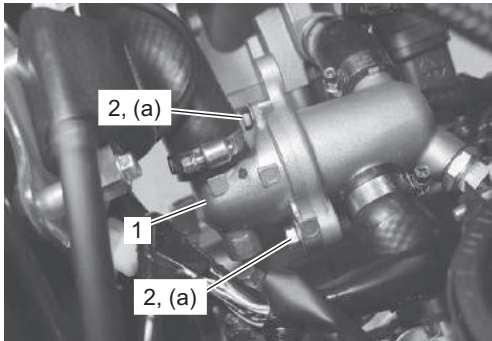


IE31J1160041-03

- Install the thermostat connector cap (1) and tighten the bolts (2) to the specified torque.

Tightening torque

Thermostat connector cap bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1160042-02

- Pour engine coolant and bleed air from the cooling system. Refer to “Engine Coolant Replacement” (Page 1F-6) and “Air Bleeding of Engine Cooling System” (Page 1F-7).

Thermostat Inspection

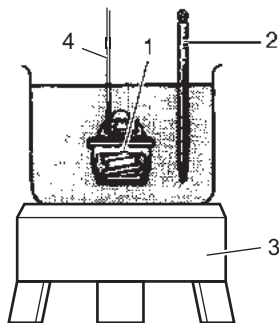
BENJ31J31606016

- 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.

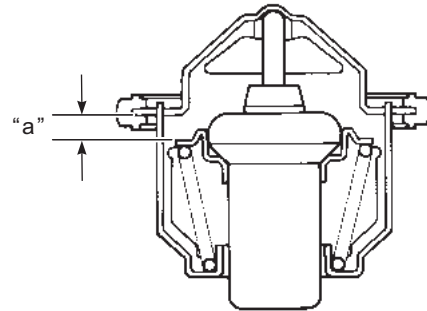
Thermostat valve opening temperature

Standard: 86.5 – 89.5 °C (188 – 193 °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 (0.31 in). A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.

Thermostat valve lift “a”

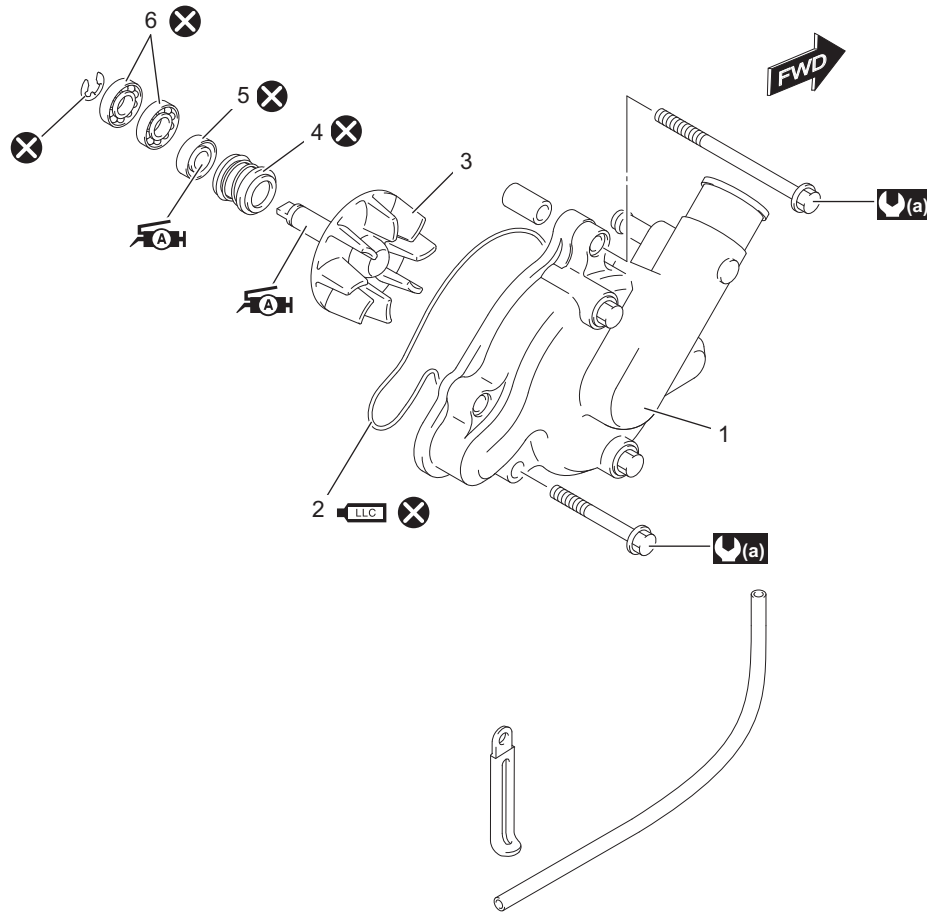
Standard: 8 mm or more at 100 °C (0.31 in or more at 212 °F)



I944H1160022-01

Water Pump Assembly Components

BENJ31J31606017



IE31J1160068-03

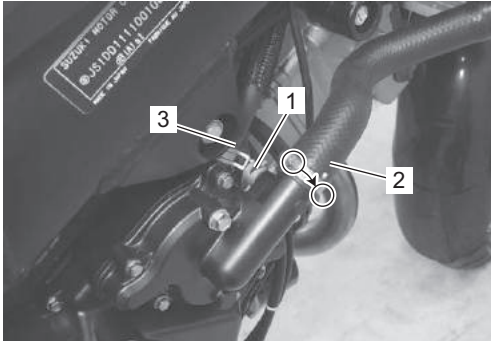
1. Water pump case	4. Mechanical seal	(a) : 10 N-m (1.0 kgf-m, 7.5 lbf-ft)	X : Do not reuse.
2. O-ring	5. Oil seal	(a) : Apply grease.	
3. Impeller	6. Bearing	(a) : Apply engine coolant.	

Water Pump Disassembly and Reassembly

BENJ31J31606018

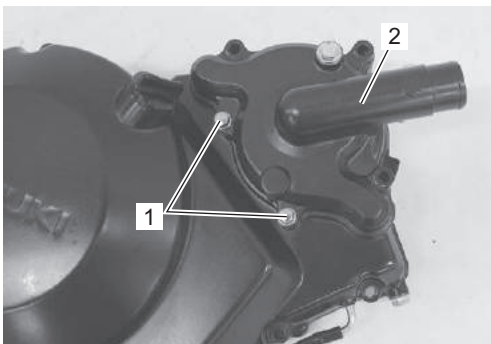
Disassembly

- 1) Drain engine oil and coolant. (Page 1E-4) (Page 1F-6)
- 2) Remove the water bypass hose (1), radiator outlet hose (2) and air cleaner breather tube (3).



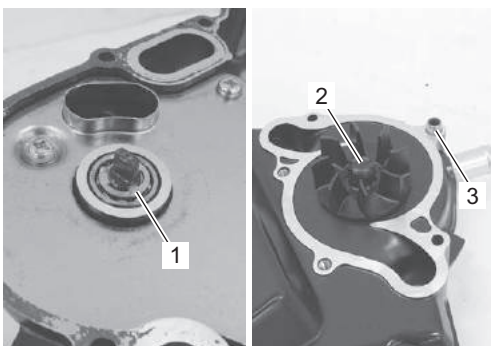
IE31J1160065-02

- 3) Remove the clutch cover. (Page 5C-15)
- 4) Remove the bolts (1) and water pump case (2).



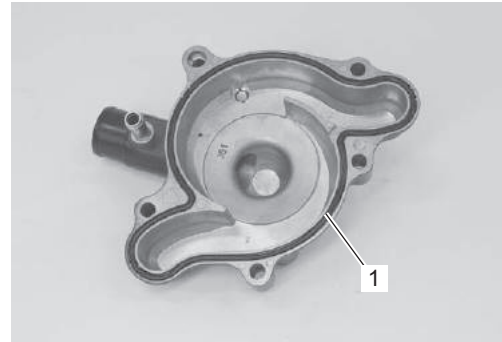
IE31J1160043-01

- 5) Remove the E-ring (1), pump impeller (2) and dowel pin (3).



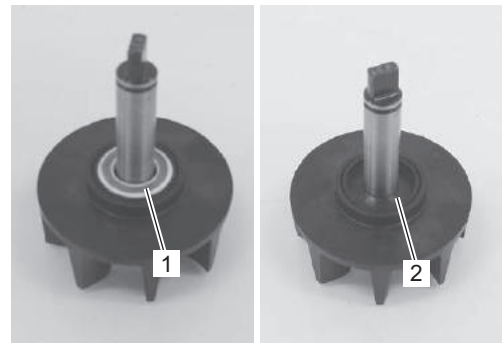
IE31J1160044-01

- 6) Remove the new O-ring (1).



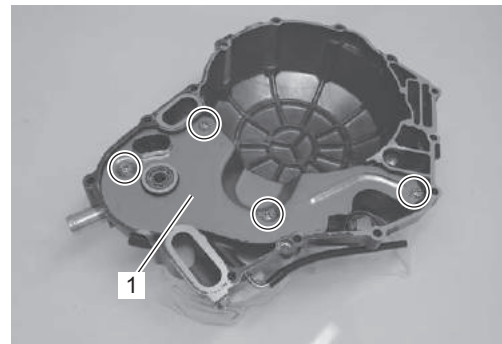
IE31J1160045-01

- 7) Remove the mechanical seal ring (1) and rubber seal (2).



IE31J1160046-01

- 8) Remove the oil separator (1).

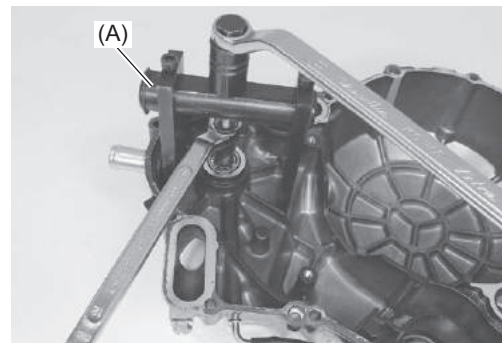


IE31J1160066-01

- 9) Remove the water pump bearings using the special tool.

Special tool

(A): 09921-20240



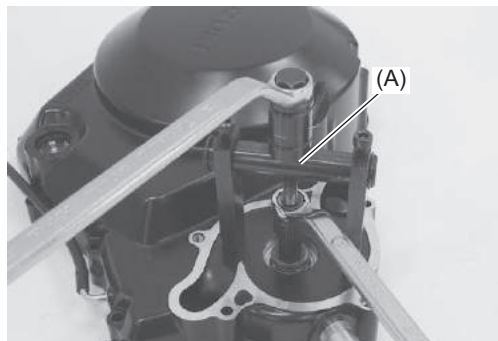
IE31J1160048-01

1F-17 Engine Cooling System:

10) Remove the mechanical seal using the special tool.

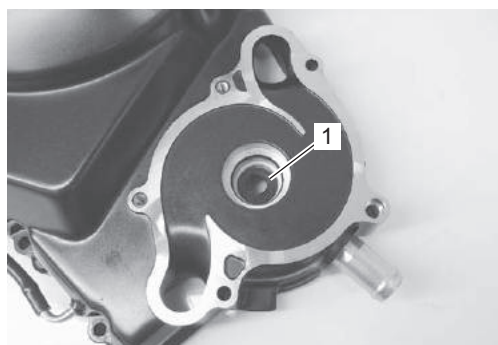
Special tool

(A): 09921-20240



IE31J1160047-01

11) Remove the oil seal (1).



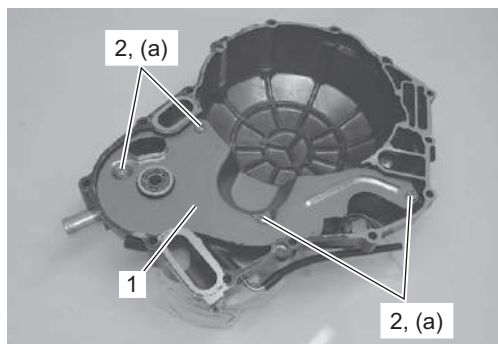
IE31J1160049-01

Reassembly

1) Install the oil separator (1) and tighten the screws (2) to the specified torque.

Tightening torque

Oil separator screw (a): 8.5 N·m (0.85 kgf-m, 6.5 lbf-ft)



IE31J1160067-01

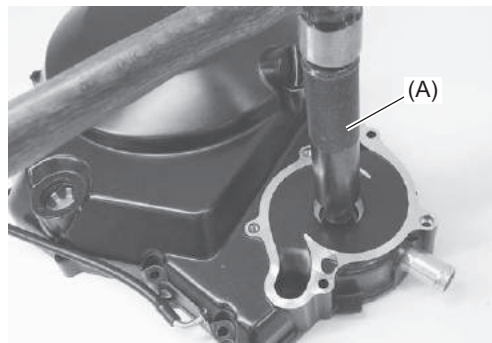
2) Install the new oil seal using the special tool.

Special tool

(A): 09913-70210

NOTE

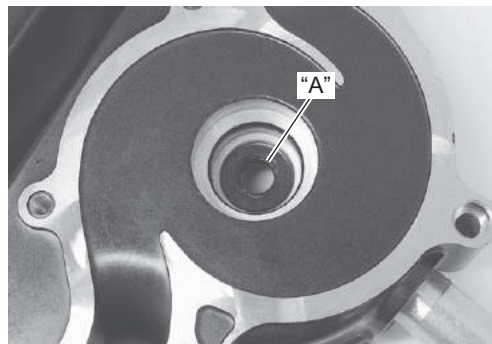
The stamped mark on the oil seal faces case side.



IE31J1160050-01

3) Apply grease to the oil seal lip.

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

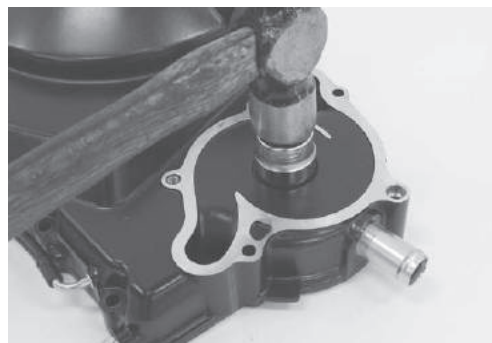


IE31J1160051-01

4) Install the new mechanical seal using a suitable size socket wrench.

NOTE

On the new mechanical seal, the sealer has been applied.

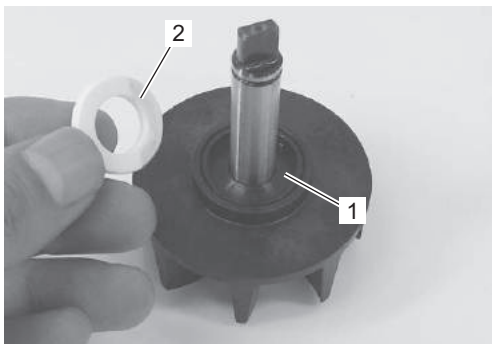


IE31J1160052-01

- 5) Install the rubber seal (1) into the impeller.
- 6) After wiping off the oily or greasy matter from the mechanical seal ring, install it into the impeller.

NOTE

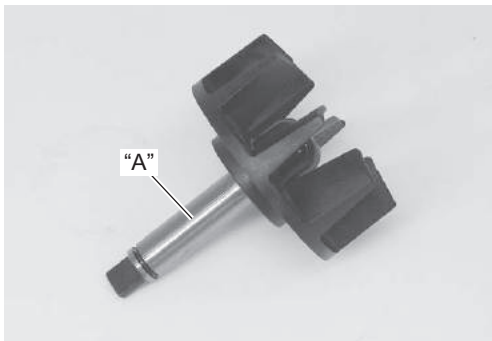
- The paint marked side (2) of the mechanical seal ring faces the impeller.
- Make sure the mechanical seal ring is fit into the impeller.



IE31J1160053-01

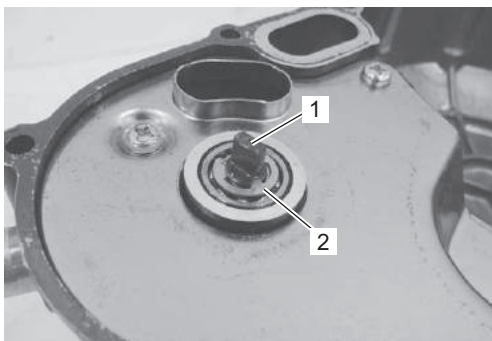
- 7) Apply grease to the impeller shaft.

“A”: Grease 99000–25011 (SUZUKI SUPER GREASE A)



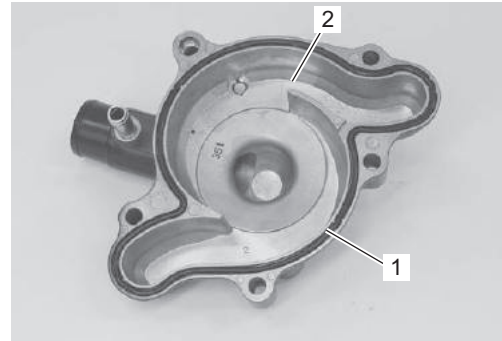
IE31J1160054-01

- 8) Install the impeller shaft (1).
- 9) Install the E-ring (2) to the impeller shaft.



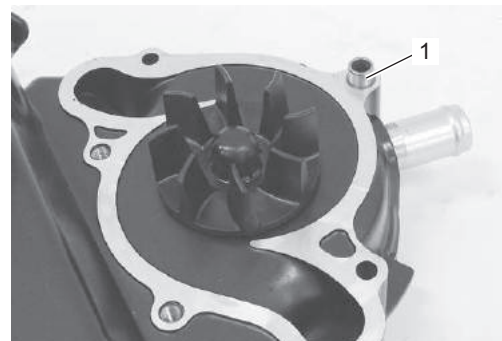
IE31J1160055-01

- 10) Install the new O-ring (1) to the water pump body (2) and apply engine coolant to it.



IE31J1160056-01

- 11) Install the dowel pin (1).

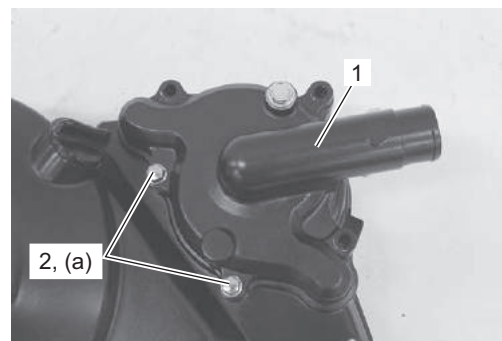


IE31J1160057-01

- 12) Install the water pump case (1) and tighten the bolts (2) to the specified torque.

Tightening torque

Water pump case bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1160058-01

- 13) Install the clutch cover. ☞ (Page 5C-17)
- 14) Pour engine coolant. ☞ (Page 1F-6)
- 15) Bleed air from the cooling system. ☞ (Page 1F-7)

1F-19 Engine Cooling System:

Water Pump Related Parts Inspection

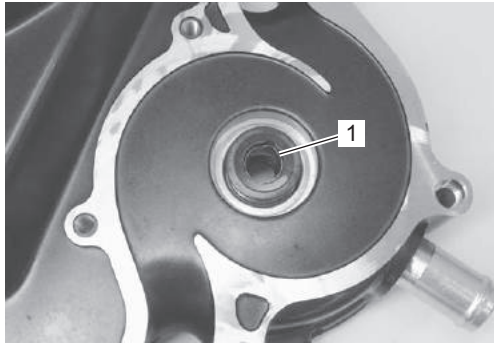
BENJ31J31606019

Refer to "Water Pump Disassembly and Reassembly" (Page 1F-16).

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.

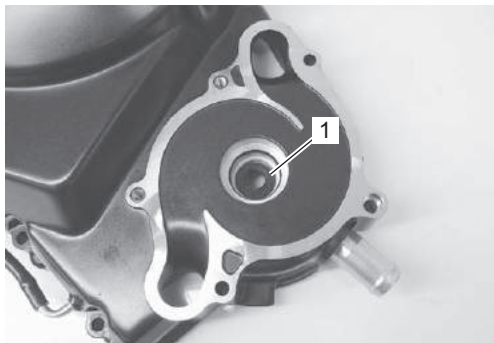


IE31J1160059-01

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.

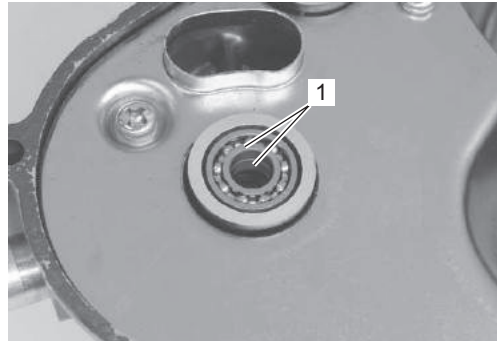


IE31J1160060-01

Bearing

Inspect the play of the outer bearings (1) and inner bearing by hand while it is in the water pump case. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.

Replace the bearings (1) if necessary.

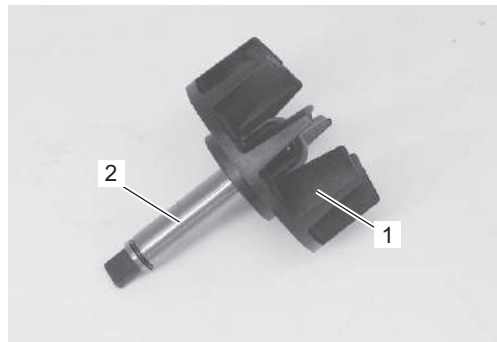


IE31J1160061-03

Impeller

Visually inspect the impeller (1) and its shaft (2) for damage.

Replace the impeller if necessary.



IE31J1160062-01

Specifications

Tightening Torque Specifications

BENJ31J31607001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Clutch cover water drain bolt	5.5	0.55	4.0	☞ (Page 1F-6)
Air bleeder bolt	13	1.3	9.5	☞ (Page 1F-6)
Cooling fan assembly mounting bolt	8	0.8	6.0	☞ (Page 1F-10)
Radiator mounting bolt	10	1.0	7.5	☞ (Page 1F-10)
Water hose clamp screw	1.5	0.15	1.0	☞ (Page 1F-10)
Reservoir tank mounting bolt	6	0.6	4.5	☞ (Page 1F-12)
Reservoir tank bracket bolt	11	1.1	8.0	☞ (Page 1F-12)
Thermostat connector cap bolt	10	1.0	7.5	☞ (Page 1F-14)
Oil separator screw	8.5	0.85	6.5	☞ (Page 1F-17)
Water pump case bolt	10	1.0	7.5	☞ (Page 1F-18)

Reference:

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

“Water Hose Routing Diagram” (Page 1F-2)

“Water Pump Assembly Components” (Page 1F-15)

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

Special Tools and Equipment

Recommended Service Material

BENJ31J31608001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞ (Page 1F-17) / ☞ (Page 1F-18)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞ (Page 1F-12)

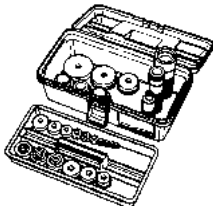
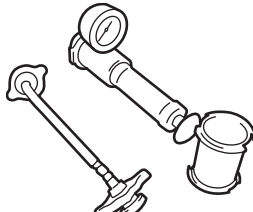
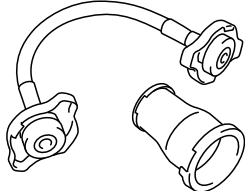
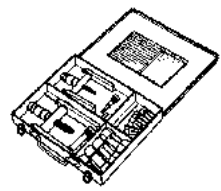
NOTE

Required service material(s) is also described in:

“Water Pump Assembly Components” (Page 1F-15)

Special Tool

BENJ31J31608002

<p>09913-70210 Bearing installer set ☞ (Page 1F-17)</p> 	<p>09918-78211 Radiator cap tester kit ☞ (Page 1F-7) / ☞ (Page 1F-8)</p> 
<p>09918-78220 Radiator cap tester adapter ☞ (Page 1F-7) / ☞ (Page 1F-8)</p> 	<p>09921-20240 Bearing remover set ☞ (Page 1F-16) / ☞ (Page 1F-17)</p> 

Fuel System

Precautions

Precautions for Fuel System

BENJ31J31700001

▲ 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

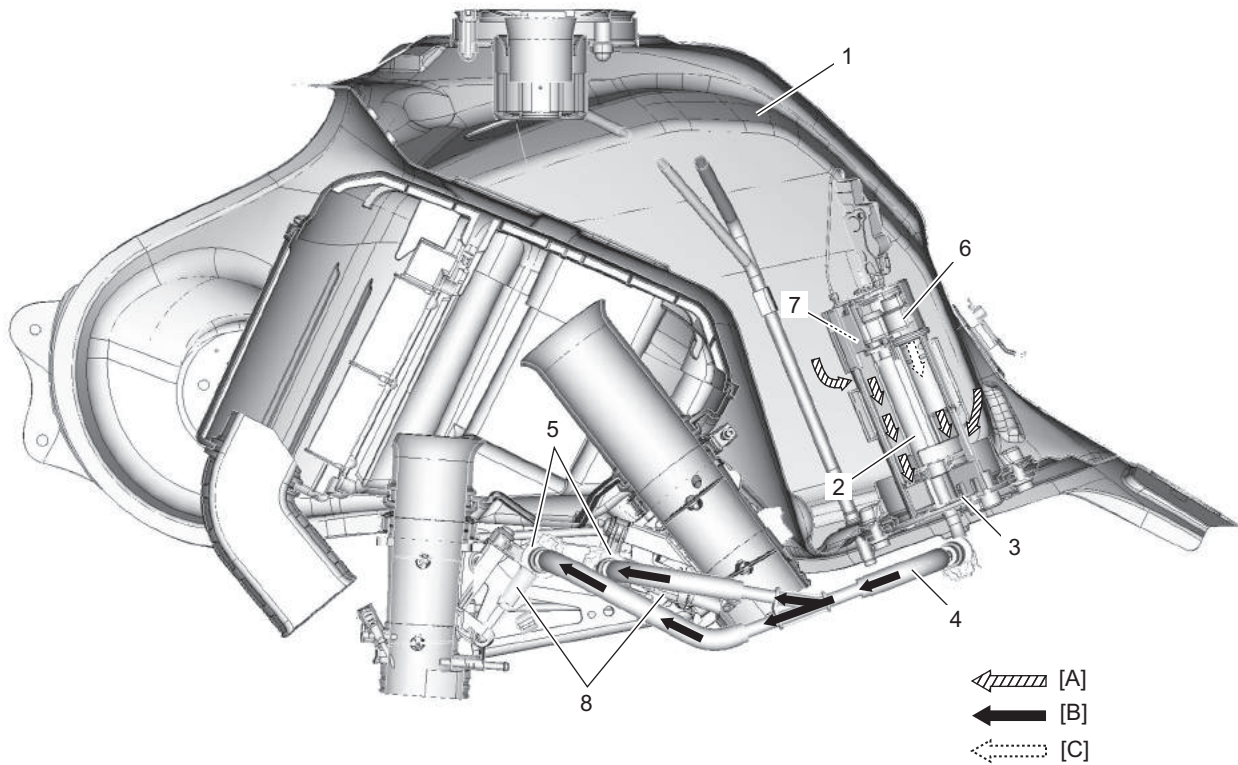
Fuel System Description

BENJ31J31701001

Fuel System

The fuel delivery system consists of the fuel tank (1), fuel pump (2), fuel mesh filter (3), fuel feed hose (4), fuel delivery pipe (5), fuel injectors (8) and fuel pressure regulator (6). There is no fuel return hose. The fuel in the fuel tank (1) is pumped up by the fuel pump (2) and pressurized fuel flows into the injector (8) installed in the fuel delivery pipe (5). Fuel pressure is regulated by the fuel pressure regulator (6). As the fuel pressure applied to the fuel injector (8) (the fuel pressure in the fuel delivery pipe) is always kept at absolute fuel pressure of 300 kPa (3.0 kgf/cm², 43 psi), the fuel is injected into the throttle body in conic dispersion when the injector (8) opens according to the injection signal from the ECM.

The fuel relieved by the fuel pressure regulator (6) flows back to the fuel tank (1).



IE31J1170036-01

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

Diagnostic Information and Procedures

Fuel System Diagnosis

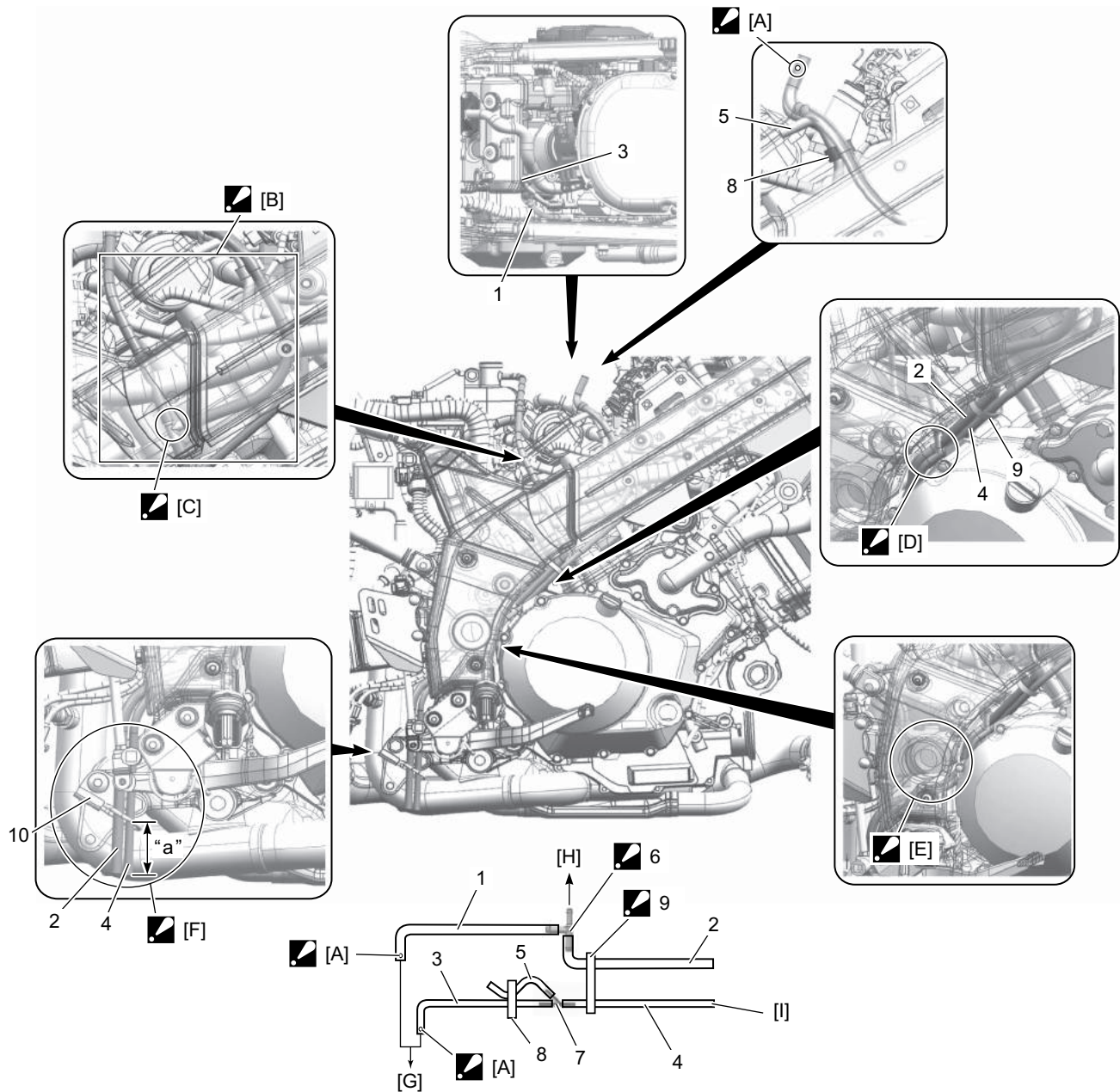
BENJ31J31704001

Condition	Possible cause	Correction / Reference Item
Engine will not start or is hard to start (No fuel reaching the intake manifold)	Clogged fuel filter or fuel hose.	Clean or replace. ⌚(Page 1G-14)
	Defective fuel pump.	Replace. ⌚(Page 1G-12)
	Defective fuel pressure regulator.	Replace. ⌚(Page 1G-12)
	Defective fuel injectors.	Replace. ⌚(Page 1G-15)
	Defective fuel pump relay.	Replace.
	Defective ECM.	Replace. ⌚(Page 1C-14)
	Open-circuited wiring connections.	Check and repair.
Engine will not start or is hard to start (Incorrect fuel/air mixture)	Defective fuel pump.	Replace. ⌚(Page 1G-12)
	Defective fuel pressure regulator.	Replace. ⌚(Page 1G-12)
	Defective TP sensor.	Replace. ⌚(Page 1C-19)
	Defective CKP sensor.	Replace. ⌚(Page 1C-23)
	Defective IAP sensor.	Replace. ⌚(Page 1C-15)
	Defective AP sensor.	Replace. ⌚(Page 1C-23)
	Defective ECM.	Replace. ⌚(Page 1C-14)
	Defective ECT sensor.	Replace. ⌚(Page 1C-16)
	Defective IAT sensors.	Replace. ⌚(Page 1C-15)
	Defective ISC valve.	Replace the throttle body. ⌚(Page 1C-4)
	TP sensor out of adjustment.	Adjust or replace. ⌚(Page 1C-17)
	Dirty throttle body.	Clean.
	Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.
Clogged fuel filter.		Clean or replace. ⌚(Page 1G-14)
Defective fuel pump.		Replace. ⌚(Page 1G-12)
Defective fuel pressure regulator.		Replace. ⌚(Page 1G-12)
Damaged or cracked vacuum hose.		Replace.
Defective ECT sensor.		Replace. ⌚(Page 1C-16)
Defective thermostat.		Replace. ⌚(Page 1F-13)
Defective IAT sensor.		Replace. ⌚(Page 1C-15)
Defective ISC valve.		Replace the throttle body. ⌚(Page 1C-4)
Engine stalls often (Fuel injector improperly operating)	Defective fuel injectors.	Replace. ⌚(Page 1G-15)
	No injection signal from ECM.	Repair or replace. ⌚(Page 1C-14)
	Open or short circuited wiring connection.	Repair or replace.
	Defective battery or low battery voltage.	Replace or recharge. ⌚(Page 1J-12)
Engine runs poorly in high speed range (Defective control circuit or sensor)	Low fuel pressure.	Repair or replace.
	Defective fuel pressure regulator.	Replace. ⌚(Page 1G-12)
	Defective TP sensor.	Replace. ⌚(Page 1C-19)
	Defective IAT sensor.	Replace. ⌚(Page 1C-15)
	Defective IAP sensor.	Replace. ⌚(Page 1C-15)
	Defective AP sensor.	Replace. ⌚(Page 1C-23)
	Defective ECM.	Replace. ⌚(Page 1C-14)
	Defective CKP sensor.	Replace. ⌚(Page 1C-23)
	TP sensor out of adjustment.	Adjust or replace. ⌚(Page 1C-17)
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	Repair or replace.
	Defective fuel pressure regulator.	Replace. ⌚(Page 1G-12)
	Defective TP sensor.	Replace. ⌚(Page 1C-19)
	Defective IAT sensor.	Replace. ⌚(Page 1C-15)
	Defective CKP sensor.	Replace. ⌚(Page 1C-23)
	Defective IAP sensor.	Replace. ⌚(Page 1C-15)
	Defective ECM.	Replace. ⌚(Page 1C-14)
	Defective FP relay.	Replace.
	Defective ECT sensor.	Replace. ⌚(Page 1C-16)
TP sensor out of adjustment.	Adjust or replace. ⌚(Page 1C-17)	

Repair Instructions

Fuel Tank Water Drain Hose and Breather Hose Routing Diagram

BENJ31J31706001



IE31J1170037-05

<p>☑ [A]: Face the white mark outside.</p>	<p>2. Fuel tank drain hose No. 2</p>
<p>☑ [B]: Pass the hoses between the cylinder head and wiring harness.</p>	<p>3. Fuel tank breather hose No. 1</p>
<p>☑ [C]: Face the joint (to fuel tank) of 3 way joint forward.</p>	<p>4. Fuel tank breather hose No. 2</p>
<p>☑ [D]: Pass the hoses between the engine mounting position and GP switch lead wire.</p>	<p>5. Fuel tank drain hose No. 3</p>
<p>☑ [E]: Pass the hoses under of the swingarm pivot part.</p>	<p>☑ 6. Fuel tank drain 3 way joint : Connect the reservoir tank overflow hose to the narrow shaped side of joint.</p>
<p>☑ [F]: Pass the hoses between the inside of brake pedal and EXCV cable.</p>	<p>7. Fuel tank breather 3 way joint</p>
<p>[G]: To fuel tank</p>	<p>8. Breather hose clamp</p>
<p>[H]: To reservoir tank</p>	<p>☑ 9. Hose clamp : Clamp the hoses at marking position. Face the tip of clamp upward and cut the tip after clamping.</p>
<p>[I]: Marking</p>	<p>10. Drain hose guide</p>
<p>1. Fuel tank drain hose No. 1</p>	<p>"a": 40 – 60 mm (1.6 – 2.4 in)</p>

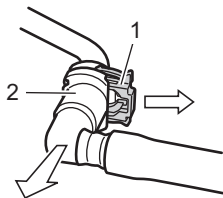
1G-5 Fuel System:

Fuel Feed Hose Disconnection and Reconnection

BENJ31J31706002

Disconnection

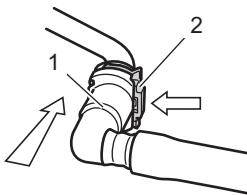
- 1) Pull the retainer (1).
- 2) Disconnect the fuel feed hose joint (2) from fuel pipe.



IE31J1170034-01

Reconnection

- 1) Insert the fuel feed hose joint (1) to fuel pipe.
- 2) Lock the retainer (2).



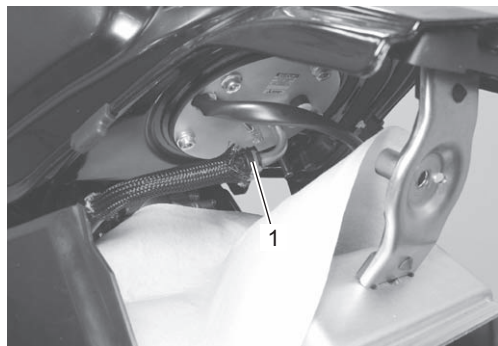
IE31J1170035-01

- 3) Confirm that fuel feed hose joint is not disconnected by hand.

Fuel Pressure Inspection

BENJ31J31706003

- 1) Lift and support the fuel tank. (Page 1G-9)
- 2) Place a rag over the fuel feed hose and disconnect fuel feed hose (1). (Page 1G-5)

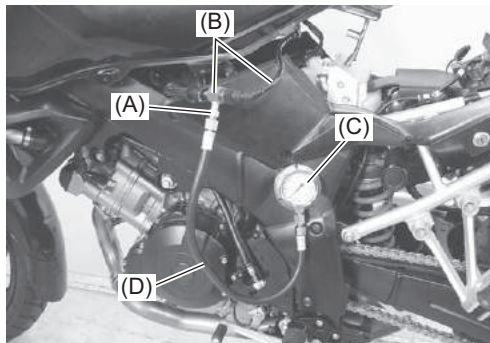


IE31J1170002-03

- 3) Install the special tools between the fuel pump and fuel feed hose.

Special tool

- (A): 09940-40211
- (B): 09940-40220
- (C): 09915-77331
- (D): 09915-74521



IE31J1170003-01

- 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 pumpIf the fuel pressure is higher than the specification, check for the followings:
 - Fuel pump
 - Pressure regulator

Fuel pressure

Approx. 300 kPa (3.0 kgf/cm², 43 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

BENJ31J31706004

- 1) Lift and support the fuel tank. (Page 1G-9)
- 2) Place a clean rag under the fuel feed hose (1) and disconnect the fuel feed hose (1). (Page 1G-5)

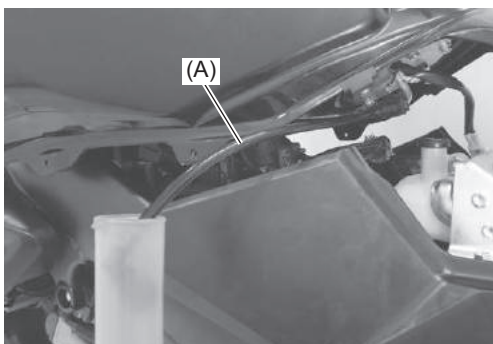


IE31J1170004-03

- 3) Connect a special tool to the fuel pump.
- 4) Place the measuring cylinder and insert the special tool into the measuring cylinder.

Special tool

(A): 09940-40220



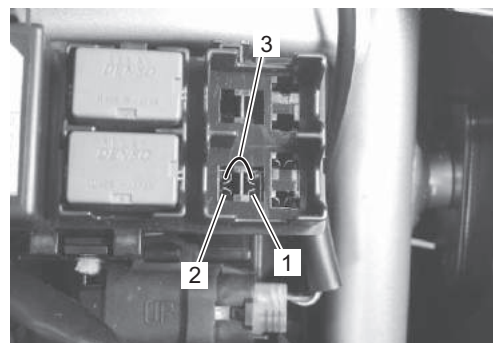
IE31J1170005-01

- 5) Remove the fuel pump relay. (Page 1G-14)
- 6) Connect the fuel pump relay lead wire terminal (between Y/R wire (1) and R/W wire (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 probable cause may be failure of the fuel pump or clogged fuel mesh filter.

NOTE

The battery must be in fully charged condition.

Fuel discharge amount per 10 seconds
167 ml (5.6 US oz, 5.9 Imp oz) or more



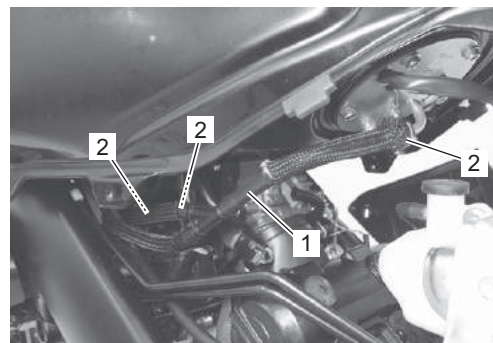
IE31J1170006-01

- 7) After finishing the fuel discharge inspection, install the removed parts.

Fuel Hose Inspection

BENJ31J31706005

- 1) Lift and support the fuel tank. (Page 1G-9)
- 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.
- 3) Any leakage from the connecting section (2), replace the fuel feed hose (1) with a new one. (Page 1G-15)

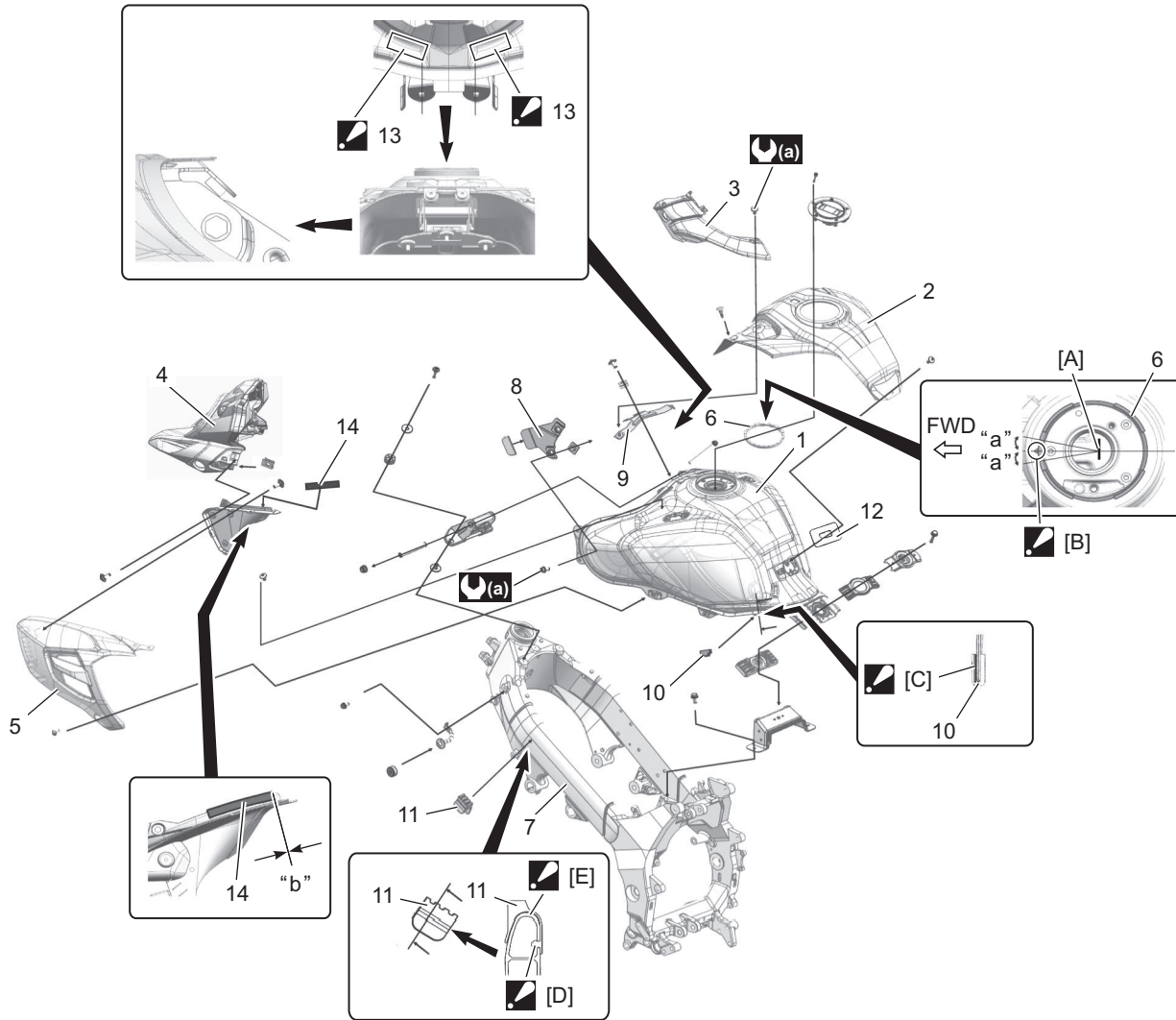


IE31J1170007-01

- 4) After finishing the fuel feed hose inspection, install the removed parts.

Fuel Tank Construction

BENJ31J31706006

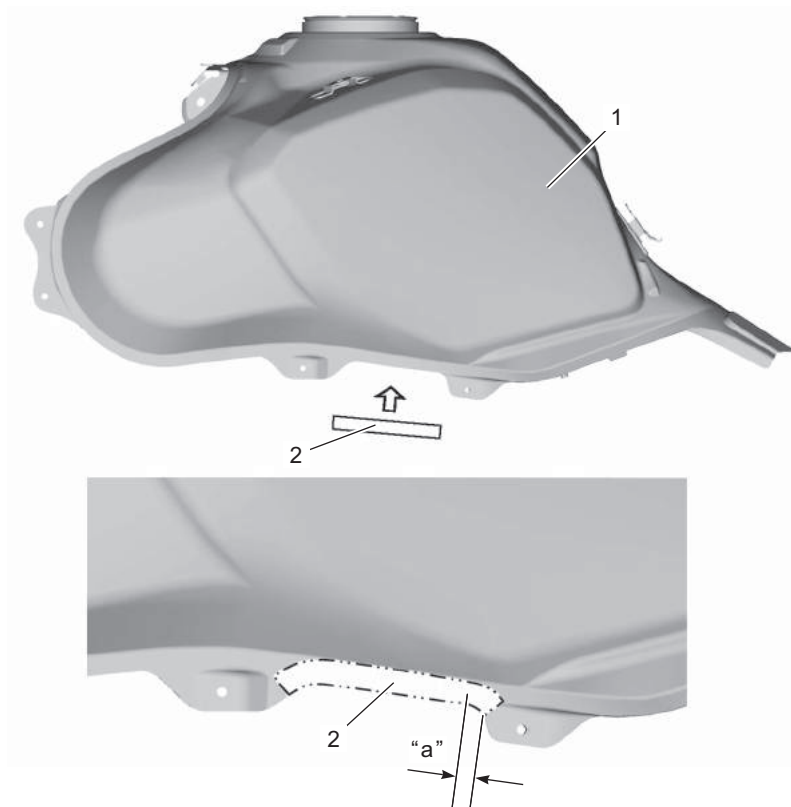


IF31J1170001-01

[A]: Center position	4. Body cowling	12. Fuel tank rear cushion
☑ [B]: Set the projection of fuel tank cover molding aligning with center position (less than 10°).	5. Fuel tank side cover	☑ 13. Fuel tank cushion : Stick the cushion aligning with this position.
☑ [C]: Adhere the cushion with a adhesive.	6. Fuel tank front cover molding	14. Fuel tank molding
☑ [D]: Install the boss of cushion.	7. Frame	"a": 10°
☑ [E]: Stick the cushion with a double sided tape.	8. Fuel tank cover bracket	"b": 0 – 10 mm (0 – 0.4 in)
1. Fuel tank	9. Front cover bracket	⤵ (a) : 5.5 N·m (0.55 kgf·m, 4.0 lbf·ft)
2. Fuel tank center cover	10. Fuel tank cover cushion	
3. Side cowling cover	11. Fuel tank side cushion	

Fuel Tank Molding Construction

BENJ31J31706007



1. Fuel tank	2. Fuel tank molding	"a": 5 – 15 mm (0.2 – 0.6 in)
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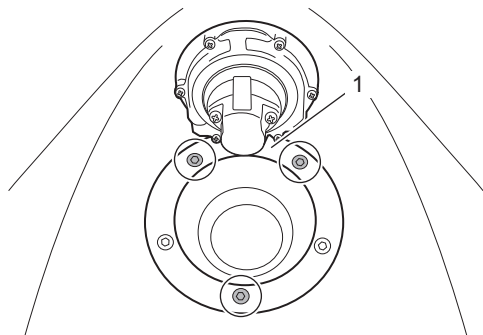
IE31J1170039-01

Fuel Tank Cap Removal and Installation

BENJ31J31706008

Removal

- 1) Open the fuel tank cap with the ignition key.
- 2) Remove the fuel tank cap (1).



IH13K1170066-06

Installation

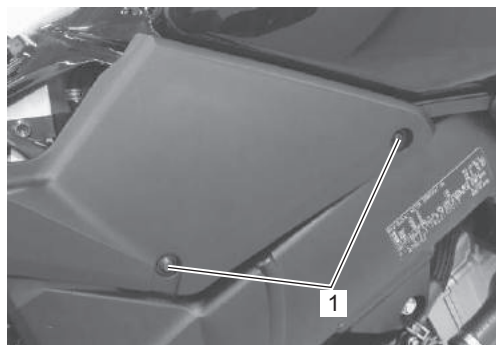
Install the fuel tank cap in the reverse order of removal.

Fuel Tank Removal and Installation

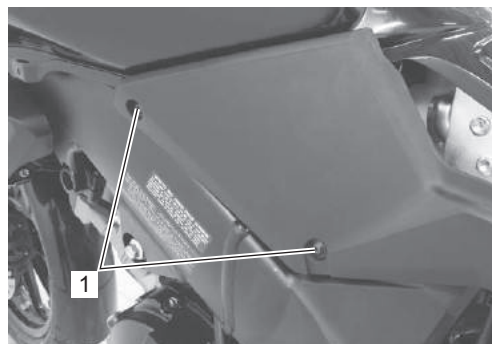
BENJ31J31706009

Removal

- 1) Remove the seat.
 - L4 – L6 model: (Page 9D-10)
 - L8 – model: (Page 9D-33)
- 2) Remove the fuel tank center cover.
 - L4 – L6 model: (Page 9D-13)
 - L8 – model: (Page 9D-34)
- 3) Remove the fuel tank side covers.
 - L4 – L6 model: (Page 9D-14)
 - L8 – model: (Page 9D-34)
- 4) Remove the frame cover screws (1).

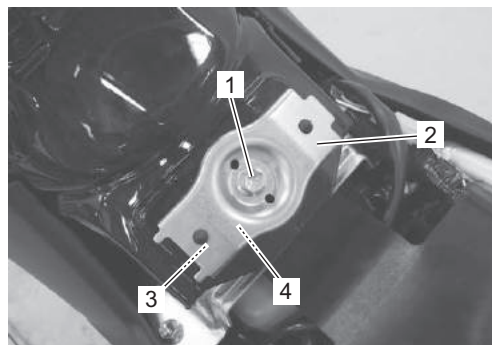


IE31J1170040-01



IE31J1170041-01

- 5) Remove the fuel tank rear mounting bolt (1), fuel tank mount stay (2) upper cushion (3) and lower cushion (4).



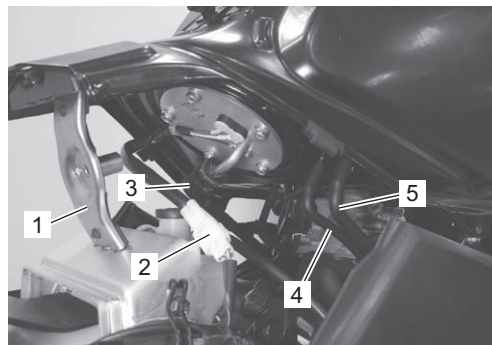
IE31J1170008-02

- 6) Lift and support the fuel tank with the fuel tank mounting stay (1).

NOTICE

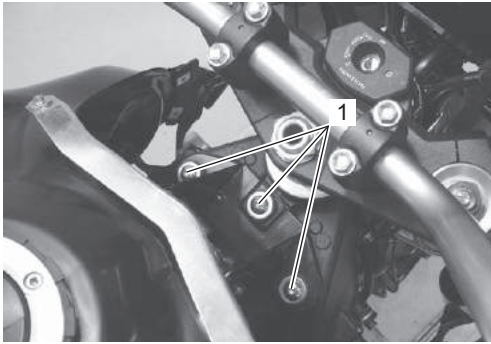
Lifting up the fuel tank by force can damage the hoses and wiring harness.

- 7) Disconnect the fuel pump lead wire coupler (2).
- 8) Place a clean rag under the fuel feed hose (3) and disconnect the fuel feed hose (3). (Page 1G-5)
- 9) Disconnect the fuel tank breather hose (4) and fuel tank water drain hose (5).



IE31J1170009-03

10) Remove the fuel tank front mounting bolts (1).



IE31J1170010-01

Installation

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

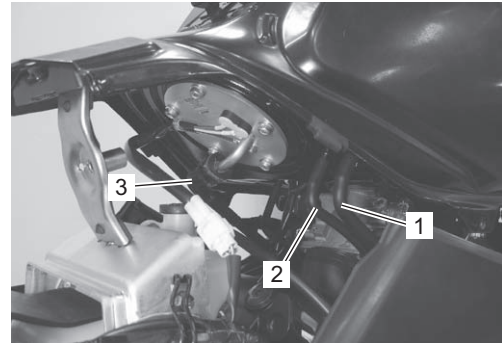
NOTICE

Be sure not to bend or twist the hoses when installing.

- Connect the fuel tank water drain hose (1) and breather hose (2). (Page 1B-7)

NOTE

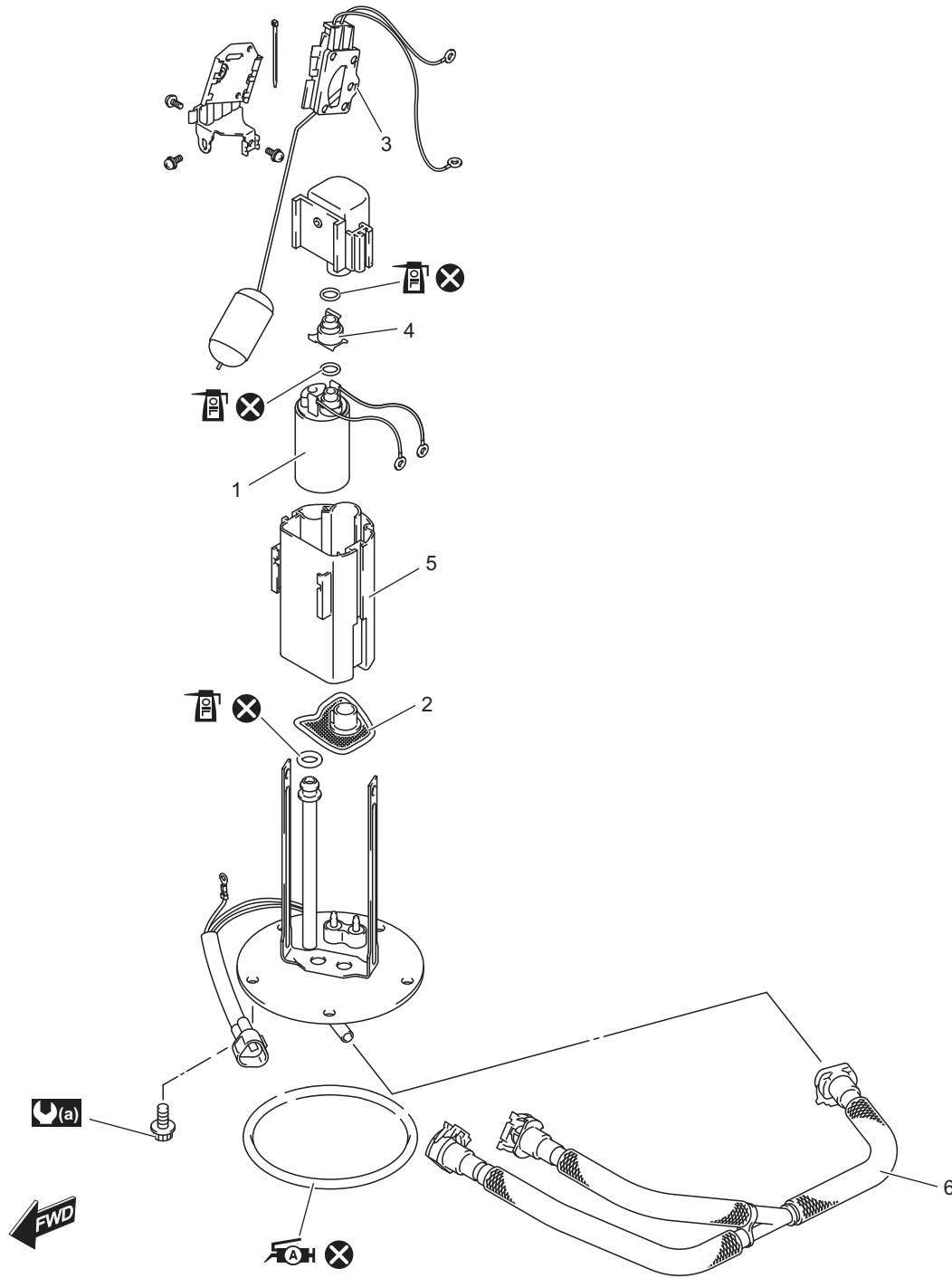
Connect the fuel feed hose (3) to the fuel pump until it locks securely. (Page 1G-5)



IE31J1170011-03

Fuel Pump Components

BENJ31J31706010



IE31J1170045-02

1. Fuel pump	5. Reservoir cup	: Apply engine oil.
2. Mesh filter	6. Fuel feed hose	: Do not reuse.
3. Fuel level gauge	: 10 N-m (1.0 kgf-m, 7.5 lbf-ft)	
4. Fuel pressure regulator	: Apply grease.	

Fuel Pump On-Vehicle Inspection

BENJ31J31706011

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-14)
- TO sensor:
 - L4 – L6 model: ☞ (Page 1A-66)
 - L8 – model: ☞ (Page 1A-140)

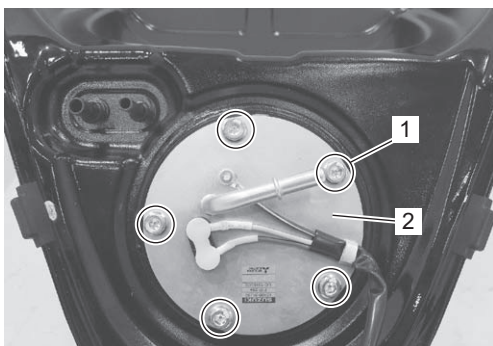
If the fuel pump relay, TO sensor and fuel pump circuit connections are OK, the fuel pump may be faulty, replace the fuel pump with a new one. ☞ (Page 1G-12)

Fuel Pump Assembly Removal and Installation

BENJ31J31706012

Removal

- 1) Remove the fuel tank. ☞ (Page 1G-9)
- 2) Remove the fuel pump mounting bolts (1) diagonally and remove the fuel pump assembly (2).



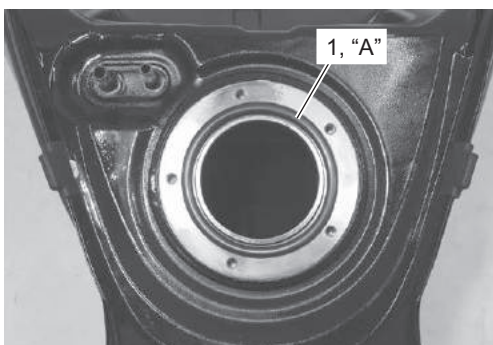
IE31J1170012-03

Installation

Install the fuel pump assembly in the reverse order of removal. Pay attention to the following points:

- Install the new O-ring (1) and apply grease to it.

“A”: Grease 99000–25011 (SUZUKI SUPER GREASE A)

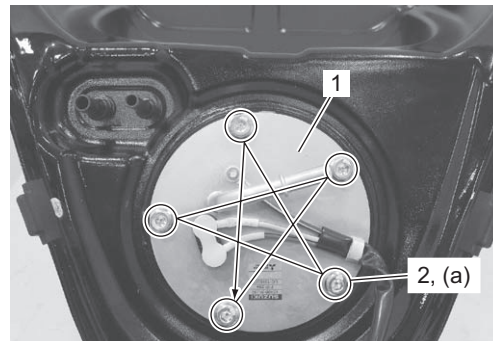


IE31J1170013-01

- Install the fuel pump assembly (1) and first tighten all the fuel pump mounting bolts (2) lightly in the ascending order and then tighten them to the specified torque in the figure.

Tightening torque

Fuel pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



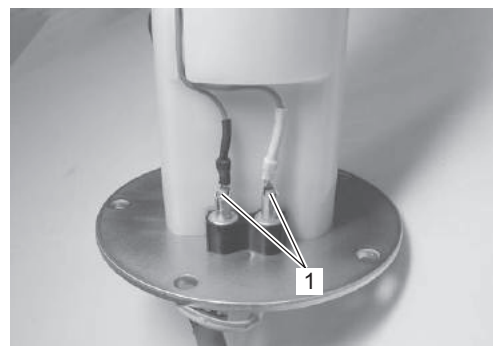
IE31J1170014-05

Fuel Pump Disassembly and Reassembly

BENJ31J31706013

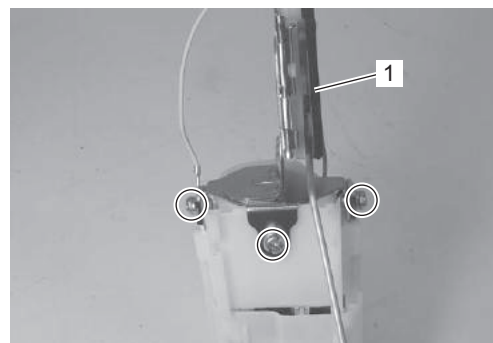
Disassembly

- 1) Disconnect the lead wires (1).



IE31J1170015-02

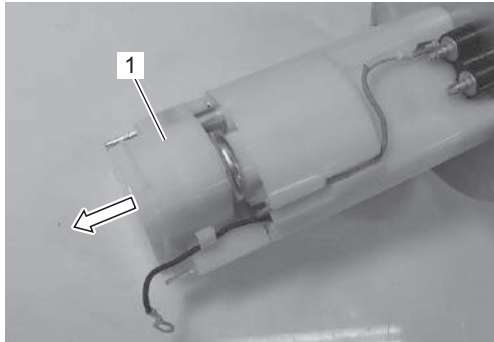
- 2) Remove the fuel level gauge (1).



IE31J1170016-02

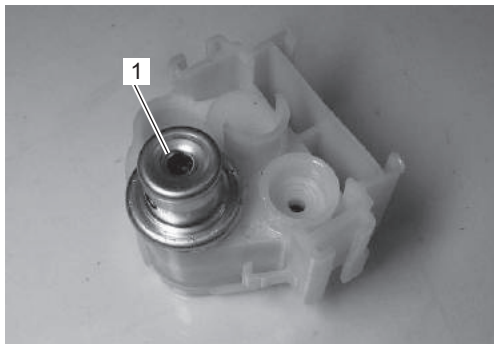
1G-13 Fuel System:

3) Remove the fuel regulator assembly (1).



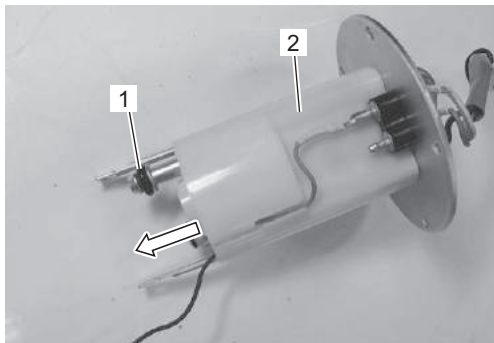
IE31J1170017-02

4) Remove the fuel pressure regulator (1).



IE31J1170018-02

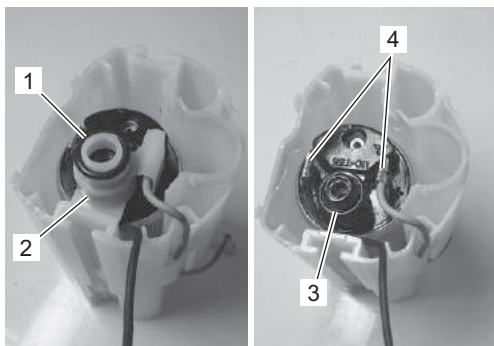
5) Remove the O-ring (1) and fuel pump assembly (2).



IE31J1170019-02

6) Remove the O-ring (1) and joint (2).

7) Remove the O-ring (3) and lead wires (4).

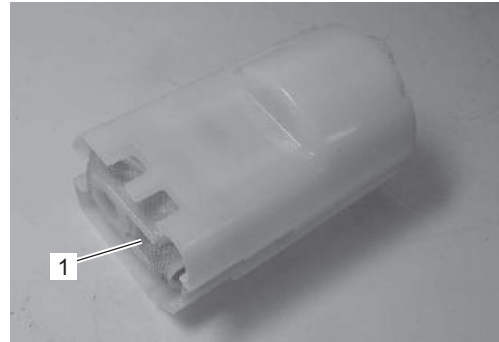


IE31J1170020-02



IE31J1170020-02

8) Remove the fuel mesh filter (1).



IE31J1170021-02

9) Remove the fuel pump (1) from the reservoir cup.

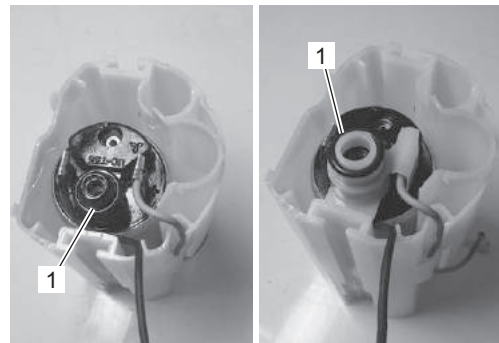


IE31J1170042-01

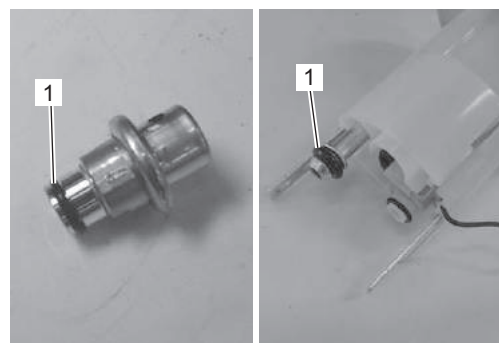
Reassembly

Reassemble the fuel tank pump in the reverse order of the disassembly. Pay attention to the following points:

- Replaced the removed fuel pump (+) lead wire and fuel level gauge (+) lead wire with the new ones.
- Apply engine oil lightly to the new O-rings (1) and install them.

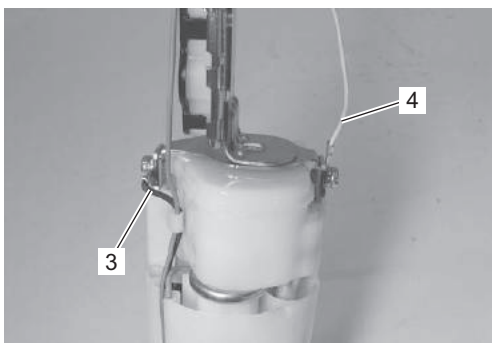


IE31J1170022-03

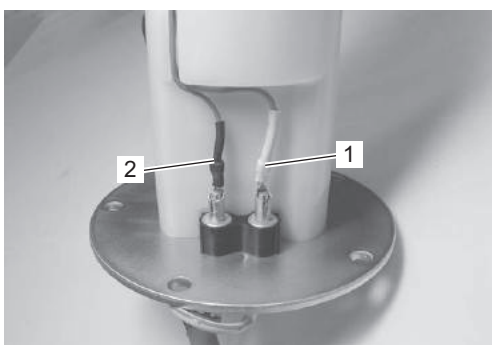


IE31J1170023-03

- Connect all lead wires securely so as not to cause contact failure.
- Route all lead wires securely.



IE31J1170024-02



IE31J1170025-02

1.	Fuel pump (+) lead wire (BI)
2.	Fuel level gauge (+) lead wire (R)
3.	Fuel pump (-) lead wire (B)
4.	Fuel level gauge (-) lead wire (W)

Fuel Mesh Filter Inspection

BENJ31J31706014

Refer to “Fuel Pump Disassembly and Reassembly” (Page 1G-12).

- Inspect the fuel mesh filter is clogged with foreign particles. If the fuel mesh filter is dirtied excessively, replace the fuel mesh filter with a new one.



IE31J1170028-02

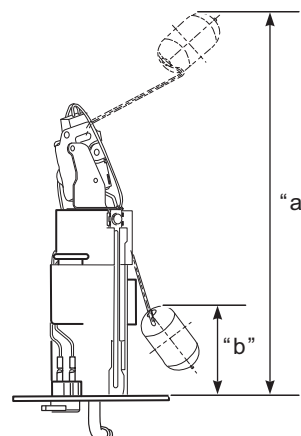
Fuel Level Gauge Inspection

BENJ31J31706015

Refer to “Fuel Pump Assembly Removal and Installation” (Page 1G-12).

- 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”	275.6 mm (10.85 in)	Approx. 10 Ω
“b”	65.1 mm (2.56 in)	Approx. 216 Ω

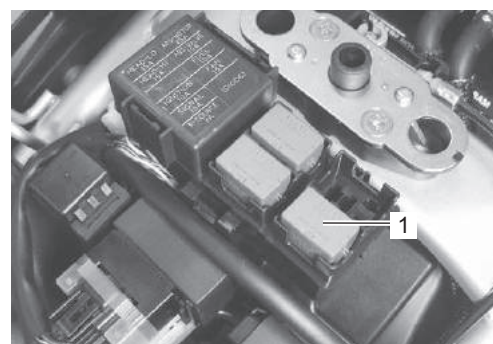


IE31J1170043-02

Fuel Pump Relay Inspection

BENJ31J31706016

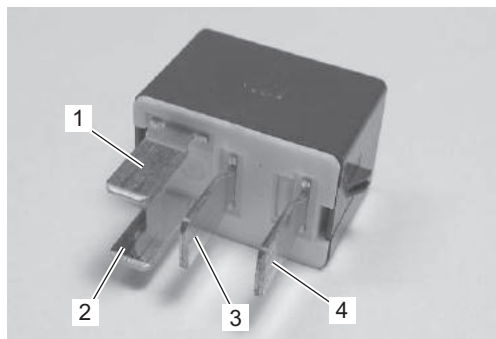
- 1) Remove the seat.
 - L4 – L6 model: ⚙ (Page 9D-10)
 - L8 – model: ⚙ (Page 9D-33)
- 2) Remove the fuel pump relay (1).



IE31J1170029-02

1G-15 Fuel System:

- 3) First, check for insulation with a circuit tester between terminals (3) and (4). Next, check for continuity between (3) and (4) with 12 V voltage applied, positive (+) to terminal (1) and negative (-) to terminal (2). If continuity does not exist, replace the relay with a new one.



IE31J1170030-01

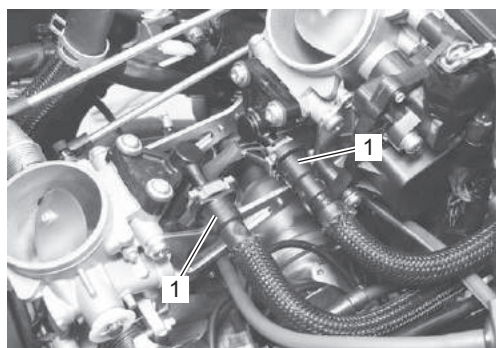
- 4) Reinstall the removed parts.

Fuel Feed Hose Removal and Installation

BENJ31J31706017

Removal

- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Disconnect the fuel feed hose (1). (Page 1G-5)



IE31J1170044-01

Installation

Install the fuel feed hose in the reverse of removal.

Fuel Injector / Fuel Delivery Pipe Removal and Installation

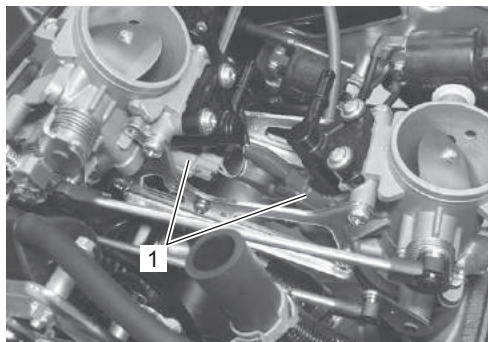
BENJ31J31706018

NOTE

The fuel injector can be removed without removing the throttle body.

Removal

- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Place a rag over the fuel feed hose and disconnect the fuel feed hose. (Page 1G-15)
- 3) Disconnect the fuel injector couplers (1).



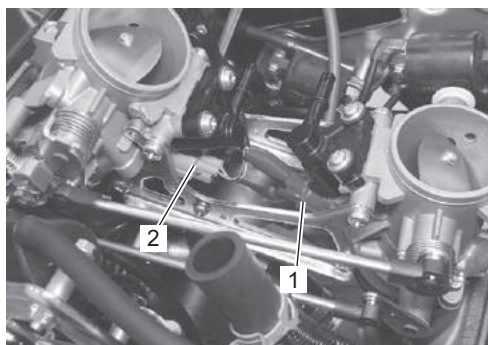
IE31J1170031-01

- 4) Remove the fuel injectors from fuel delivery pipes. (Page 1C-6)

Installation

Install the fuel injector in the reverse order of removal. Pay attention to the following points:

- When installing the fuel delivery pipes and fuel injectors to the throttle body, refer to "Throttle Body Disassembly and Reassembly" in Section 1C (Page 1C-6).
- Connect the fuel injector couplers to the fuel injector. Make sure that each coupler is installed in the correct position. The color on each lead wire refers to the appropriate fuel injector.



IE31J1170032-02

Coupler	Wire color
Front injector (1)	Y/R and Gr/W
Rear injector (2)	Y/R and Gr/B

Fuel Injector Inspection and Cleaning

BENJ31J31706019

Refer to “Fuel Injector / Fuel Delivery Pipe Removal and Installation” (Page 1G-15).

- Inspect the fuel mesh filter for clogging with foreign particles. Blow the fuel mesh filter with compressed air to clean the mesh, if clogged.



IE31J1170033-01

Specifications

Tightening Torque Specifications

BENJ31J31707001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Fuel pump mounting bolt	10	1.0	7.5	☞ (Page 1G-12)

Reference:

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

“Fuel Tank Construction” (Page 1G-7)

“Fuel Pump Components” (Page 1G-11)

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

Special Tools and Equipment

Recommended Service Material

BENJ31J31708001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞ (Page 1G-12)

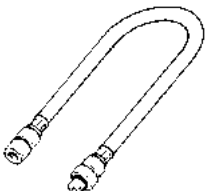
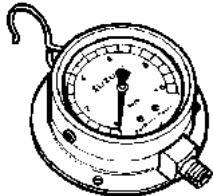
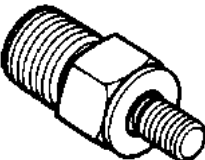
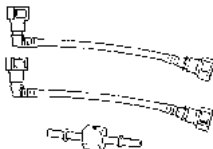
NOTE

Required service material(s) is also described in:

“Fuel Pump Components” (Page 1G-11)

Special Tool

BENJ31J31708002

09915-74521 Oil pressure gauge hose ☞ (Page 1G-5)		09915-77331 Oil pressure gauge (1000 kPa) ☞ (Page 1G-5)	
09940-40211 Fuel pressure gauge adapter Discontinued ☞ (Page 1G-5)		09940-40220 Fuel pressure gauge attachment ☞ (Page 1G-5) / ☞ (Page 1G-6)	

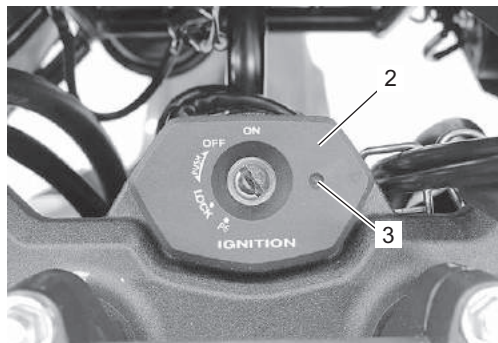
Ignition System

General Description

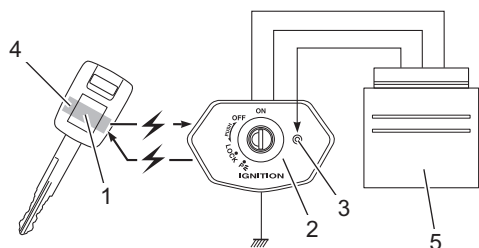
Immobilizer Description (If Equipped)

BENJ31J31801001

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.



IE31J1180001-01

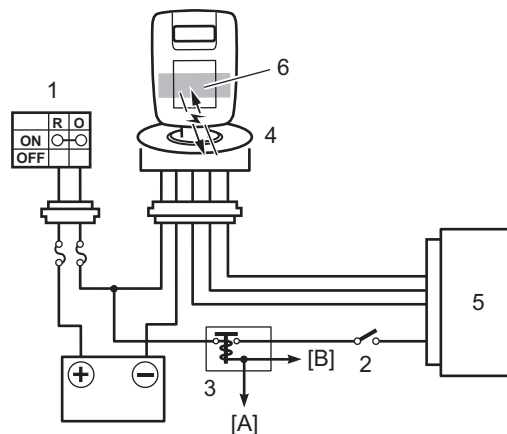


IE31J1180002-01

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.



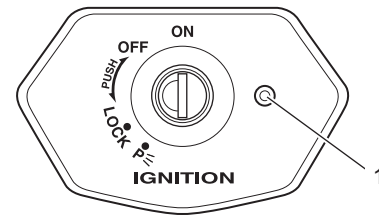
IE31J1180003-01

[A]: To side-stand switch	[B]: To GP switch
---------------------------	-------------------

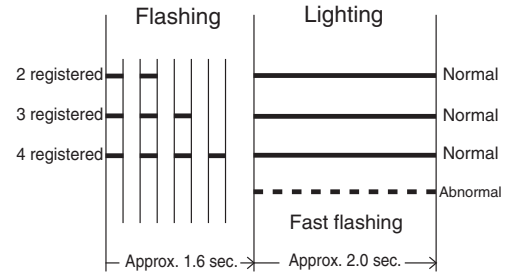
Also, when the ignition switch is turned ON, the indicator light (1) flashes as many as the number of IDs registered in ECM. Thereafter, if the IDs are in agreement, the indicator light turns on for two seconds to notify of completion in successful communication. If the indicator light (LED) (1) flashes 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

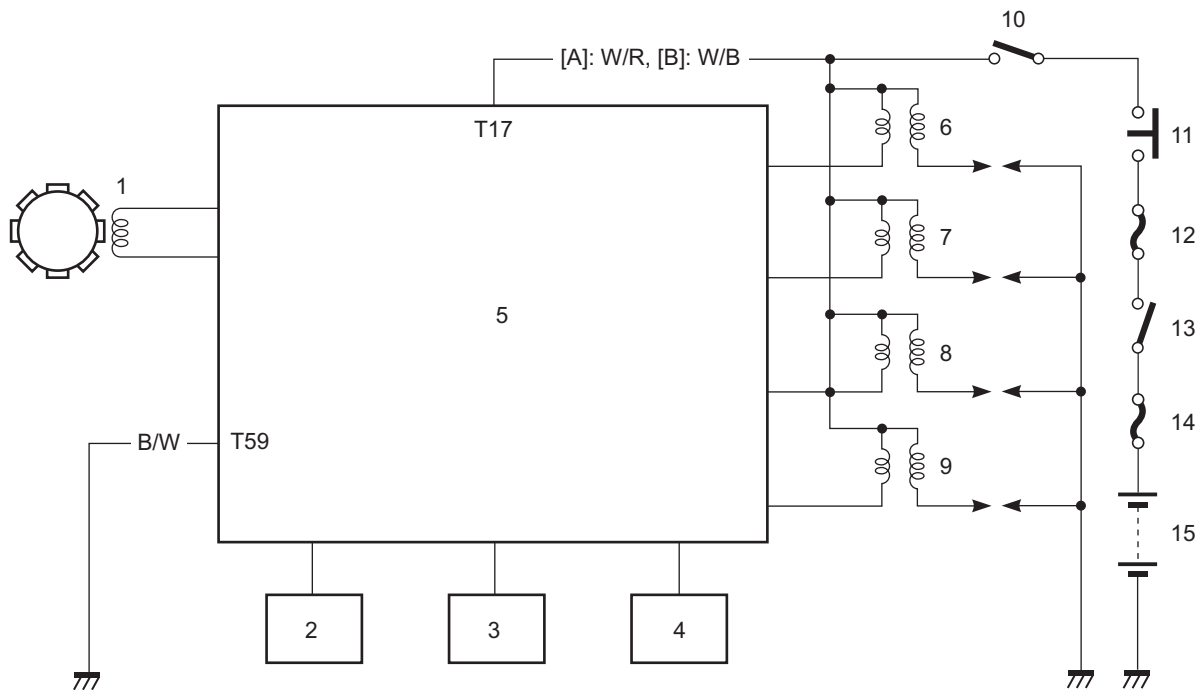


I705H1180006-01

Schematic and Routing Diagram

Ignition System Diagram

BENJ31J31802001



IE31J1180005-01

[A]: For Thailand, Canada, California (U.S.A.) and China	5. ECM	11. Side-stand relay
[B]: Except for Thailand, Canada, California (U.S.A.) and China	6. Ignition coil #1 (Center)	12. Ignition fuse
1. CKP sensor	7. Ignition coil #1 (Side)	13. Ignition switch
2. TP sensor	8. Ignition coil #2 (Center)	14. Main fuse
3. ECT sensor	9. Ignition coil #2 (Side)	15. Battery
4. GP switch	10. Engine stop switch	

Ignition System Components Location

BENJ31J31802002

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

Diagnostic Information and Procedures

Ignition System Symptom Diagnosis

BENJ31J31804001

Condition	Possible cause	Correction / Reference Item
Spark plug not sparking	Damaged spark plugs.	Replace. ☞(Page 1H-6)
	Fouled spark plugs.	Replace. ☞(Page 1H-6)
	Wet spark plugs.	Dry or replace. ☞(Page 1H-7)
	Defective ignition coils or spark plug caps.	Replace. ☞(Page 1H-8)
	Defective CKP sensor.	Replace. ☞(Page 1J-5) ☞(Page 1J-6)
	Defective ECM.	Replace. ☞(Page 1C-14)
	Open-circuited wiring connections.	Repair or replace. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
	Open or short in high-tension cords.	Replace. ☞(Page 1H-8)
Engine stalls easily (No spark)	Fouled spark plugs.	Replace. ☞(Page 1H-6)
	Defective CKP sensor.	Replace. ☞(Page 1J-5) ☞(Page 1J-6)
	Defective ECM.	Replace. ☞(Page 1C-14)
Spark plug is wet or quickly becomes fouled with carbon	Excessively rich air/fuel mixture.	Inspect FI system.
	Excessively idling speed.	Inspect FI system.
	Incorrect gasoline.	Change.
	Dirty air cleaner element.	Replace. ☞(Page 1D-3)
	Incorrect spark plugs (Cold type).	Change to standard spark plug. ☞(Page 1H-6)
Spark plug quickly becomes fouled with oil or carbon	Worn piston rings.	Replace. ☞(Page 1D-50)
	Worn pistons.	Replace. ☞(Page 1D-49)
	Worn cylinders.	Replace. ☞(Page 1D-25) ☞(Page 1D-30)
	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-6)
	Overheated engine.	Tune-up.
	Loose spark plugs.	Tighten. ☞(Page 1H-6)
	Excessively lean air/fuel mixture.	Inspect FI system.

No Spark or Poor Spark

BENJ31J31804002

Troubleshooting**NOTE**

Check that the transmission is in neutral and the engine stop switch is in the "RUN" position. Grasp the clutch lever. Check that the fuse is not blown and the battery is fully-charged before diagnosing.

Step 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 (For Thailand, Canada, California (U.S.A.) and China) or W/B (Except for Thailand, Canada, California (U.S.A.) and China) 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-8).

Is the peak voltage OK?

- Yes Go to Step 4.
No Go to Step 5.

Step 4

Inspect the spark plugs. ⚙️ (Page 1H-7)

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-8)

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 "DTC P0335 (C12)": L4 - L6 in Section 1A (Page 1A-52) or "DTC P0335 (C12)": L8 - in Section 1A (Page 1A-120).

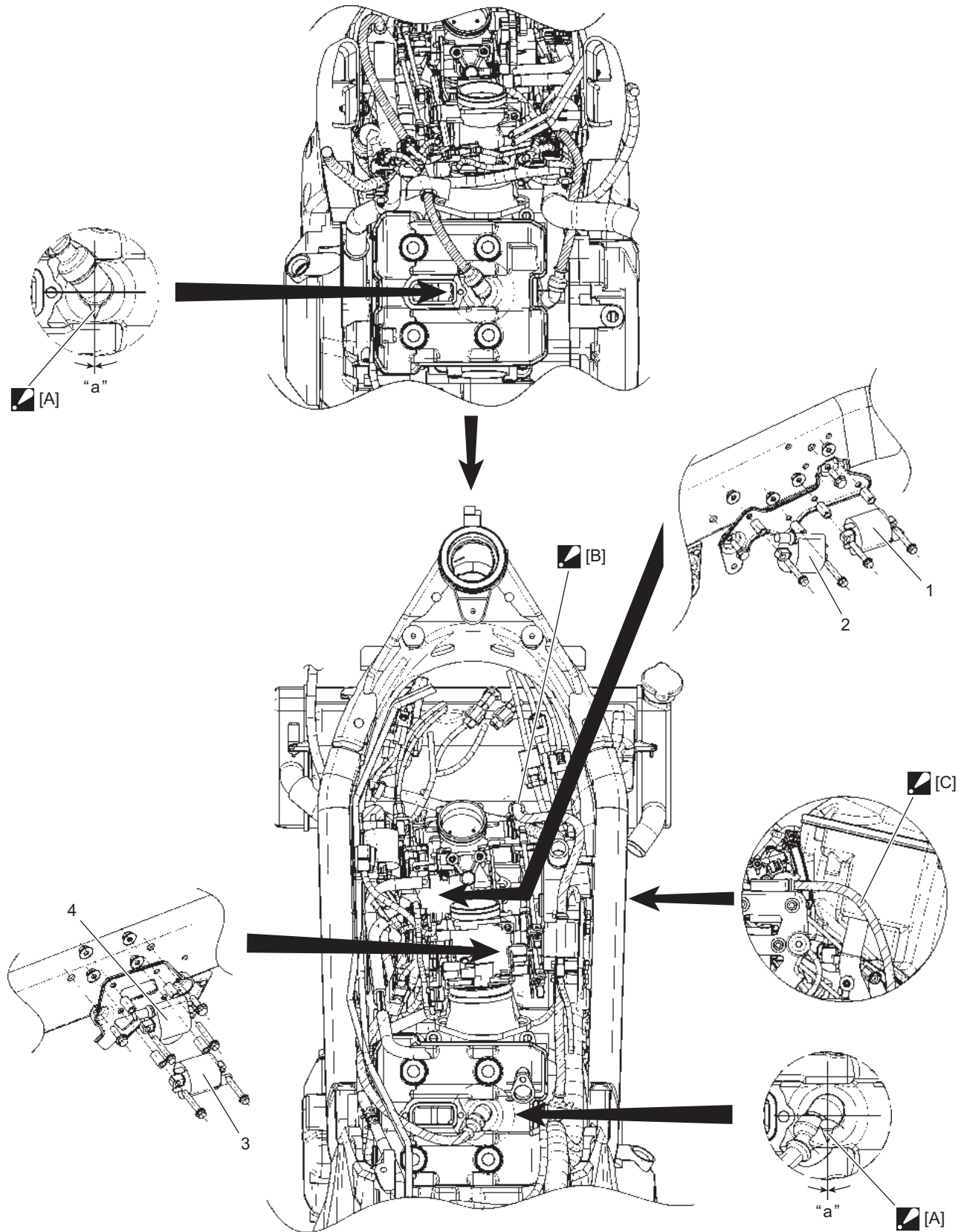
Are the peak voltage and resistance OK?

- Yes • Faulty ECM.
 • Open or short circuit in wire harness.
 • Poor connection of ignition couplers.
No • Faulty CKP sensor.
 • Metal particles or foreign material being stuck on the CKP sensor and rotor tip.

Repair Instructions

Ignition Coil Construction

BENJ31J31806001



<p>▲ [A]: Face the "△" mark to the exhaust side.</p>	2. Ignition coil #2 (Center)
<p>▲ [B]: Fit the high-tension cord to the clipping point of radiator heat shield.</p>	3. Ignition coil #2 (Side)
<p>▲ [C]: Pass the high-tension cord outside of the air cleaner box.</p>	4. Ignition coil #1 (Center)
1. Ignition coil #1 (Side)	"a": 0° ± 5°

Spark Plug Removal and Installation

BENJ31J31806002

Removal

▲ WARNING

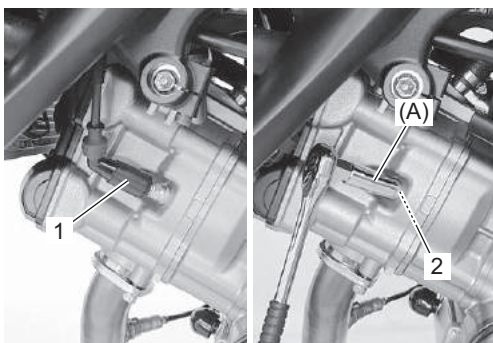
The hot radiator and hot engine can burn you.
Wait until the radiator and the engine are cool enough to touch.

#1 (Side)

- 1) Turn the ignition switch OFF.
- 2) Disconnect the spark plug cap (1).
- 3) Remove the spark plug (2) with a spark plug wrench.

Special tool

(A): 09930-10190



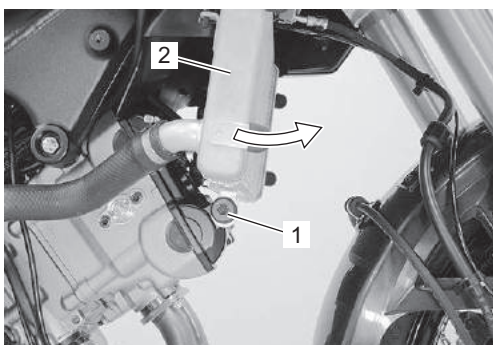
IE31J1180007-01

#1 (Center)

- 1) Remove the side lower cowlings.
 - L4 – L6 model: (Page 9D-15)
 - L8 – model: (Page 9D-34)
- 2) Remove the radiator mounting bolt (1).
- 3) Move the radiator (2) forward.

NOTICE

Be careful not to damage the radiator fins.

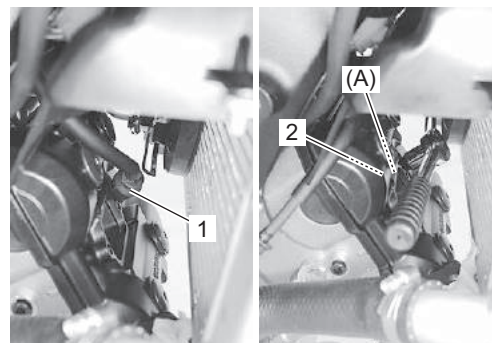


IE31J1180008-01

- 4) Disconnect the spark plug cap (1).
- 5) Remove the spark plug (2) with a spark plug wrench.

Special tool

(A): 09930-10190



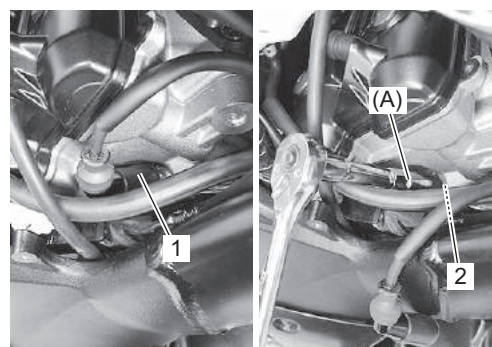
IE31J1180009-01

#2 (Side)

- 1) Lift and support the fuel tank. (Page 1G-9)
- 2) Disconnect the spark plug cap (1).
- 3) Remove the spark plug (2) with a spark plug wrench.

Special tool

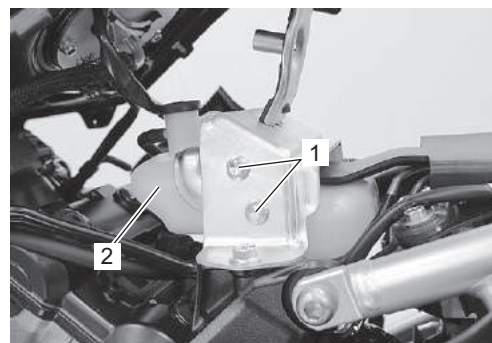
(A): 09930-10190



IE31J1180010-01

#2 (Center)

- 1) Remove the radiator reservoir tank mounting bolts (1).
- 2) Move the radiator reservoir tank (2).

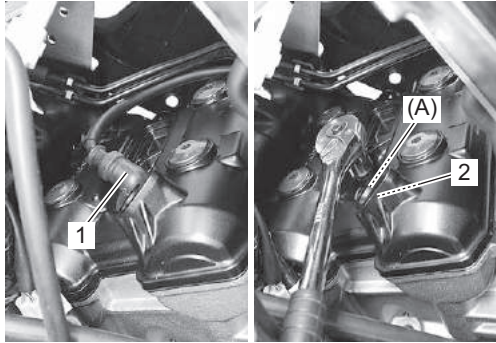


IE31J1180027-01

1H-7 Ignition System:

- 3) Disconnect the spark plug cap (1).
- 4) Remove the spark plug (2) with a spark plug wrench.

Special tool
(A): 09930-10190



IE31J1180028-01

Installation

Install the spark plug in the reverse order of removal. Pay attention to the following points:

- Screw the spark plugs into the cylinder head with fingers, and then tighten them to the specified torque.

NOTICE

Do not cross thread or over tighten the spark plug, or such an operation will damage the aluminum threads of the cylinder head.

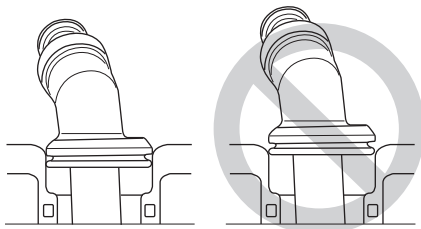
Special tool
09930-10190

Tightening torque

Spark plug: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

- Connect the spark plug caps. Refer to "Ignition Coil Construction" (Page 1H-5).

Center side of spark plug cap



IE31J1180030-01

- Install the radiator reservoir tank. (Page 1F-11)

Spark Plug Inspection

BENJ31J31806003

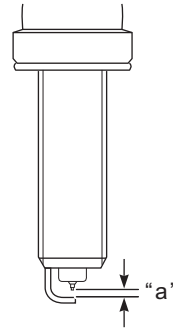
Refer to "Spark Plug Removal and Installation" (Page 1H-6).

Spark Plug Gap

Measure the spark plug gap "a" using a thickness gauge. Adjust the spark plug gap if necessary.

Spark plug gap

Standard: 0.8 – 0.9 mm (0.031 – 0.035 in)



IE31J1180011-01

Electrodes Condition

Check the worn or burnt condition of the electrodes. If it is extremely worn or burnt, replace the spark plug. And also replace the spark plug if it has a broken insulator, or damaged thread.

NOTICE

Confirm the thread size and reach when replacing the spark plug. If the reach is too short, carbon will be deposited on the screw portion of the spark plug hole and engine damage may result.

Ignition Coil Removal and Installation

BENJ31J31806004

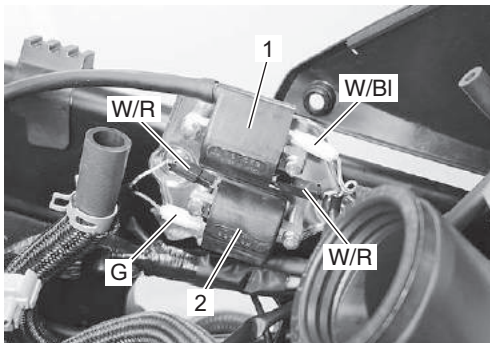
Refer to "Ignition Coil Construction" (Page 1H-5).

Removal

- 1) Remove the throttle body assembly. (Page 1C-4)
- 2) Remove the PAIR control solenoid valve (if equipped). (Page 1B-12)
- 3) Disconnect the all spark plug caps. (Page 1H-6)
- 4) Disconnect the all ignition coil couplers.
- 5) Mark the ignition coils to identify their respective cylinders.
- 6) Remove the ignition coil brackets.
- 7) Remove the ignition coils.

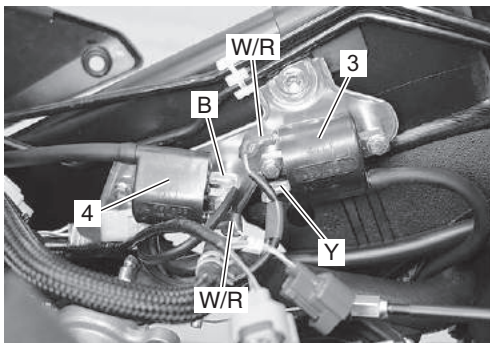
Installation

- 1) Install the ignition coil brackets and ignition coils.
- 2) Connect the ignition coil couplers.



IE31J1180012-01

1. Ignition coil #1 (Center)
2. Ignition coil #2 (Side)



IE31J1180013-02

3. Ignition coil #1 (Side)
4. Ignition coil #2 (Center)

- 3) Connect the spark plug caps. (Page 1H-6)
- 4) Install the removed parts.

Ignition Coil Inspection

BENJ31J31806005

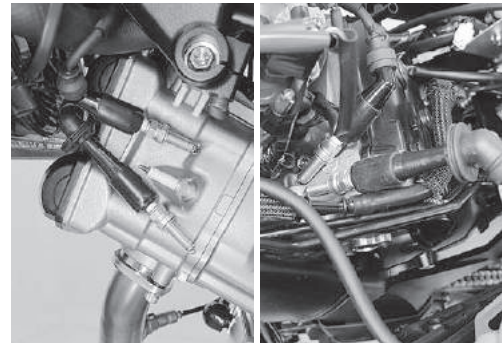
Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-4).

Ignition Coil Primary Peak Voltage

- 1) Disconnect the all spark plug caps. (Page 1H-6)
- 2) Connect the new spark plugs to each spark plug cap and ground them to the cylinder heads.

NOTE

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



IE31J1180014-01

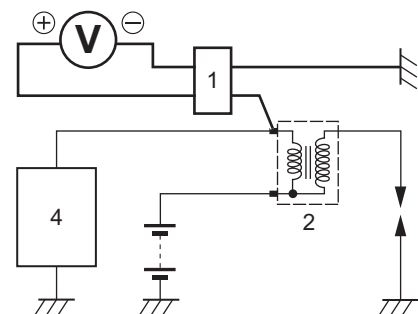
- 3) Connect the multi circuit tester with the peak voltage adapter (1) as follows:

NOTE

Do not disconnect the ignition coil terminals.

Ignition coil – circuit tester connection

	(+) Probe	(-) Probe
Ignition coil #1 (Center) (2)	W/BI wire terminal	Ground
Ignition coil #1 (Side) (2)	Y wire terminal	Ground
Ignition coil #2 (Center) (2)	B wire terminal	Ground
Ignition coil #2 (Side) (2)	G wire terminal	Ground



IE31J1180015-01

3. New spark plug	4. ECM
-------------------	--------

1H-9 Ignition System:

- 4) 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.

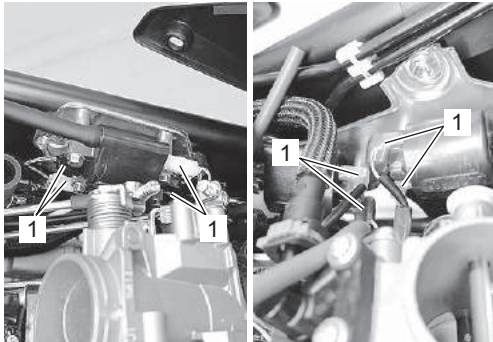
- Shift the transmission to the neutral and turn the ignition switch ON.
 - Grasp the clutch lever.
 - Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- 5) Repeat the c) procedure several times and measure the highest peak voltage.
If the voltage is lower than standard range, replace the ignition coil. (Page 1H-8)

Ignition coil primary peak voltage **150 V or more**

- 6) After measuring the ignition coil primary peak voltage, install the removed parts.

Ignition Coil Resistance

- Disconnect the spark plug caps. (Page 1H-6)
- Disconnect the ignition coil terminals (1).

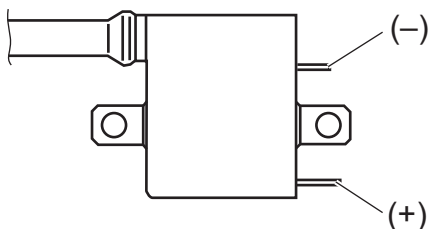


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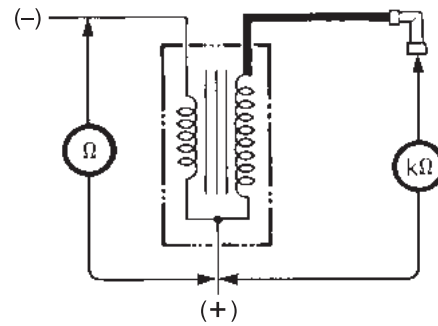
- 3) Measure the ignition coil for resistance in both primary and secondary coils. If the resistance is not within the standard range, replace the ignition coil with a new one.

Ignition coil resistance

Primary: 3.06 – 4.14 Ω ((+) terminal – (-) terminal)
Secondary: 24 – 36 kΩ ((+) terminal – Plug cap)



IE31J1180017-02



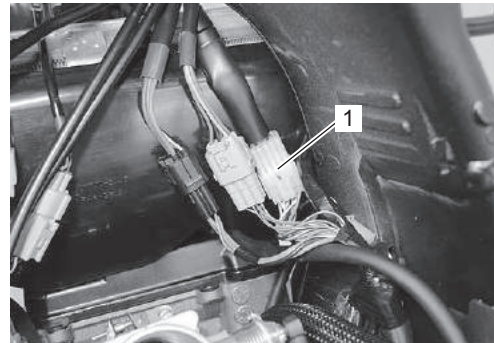
I933H1180014-02

- 4) After measuring the ignition coil resistance, install the removed parts.

Engine Stop Switch Inspection

BENJ31J31806006

- Turn the ignition switch OFF.
- Remove the air cleaner box. (Page 1D-4)
- Disconnect the right handlebar switch coupler (1).



IE31J1180018-01

- 4) Inspect the engine stop switch for continuity with a tester.
If any abnormality is found, replace the right handlebar switch assembly with a new one. (Page 6B-3)

Color	O/B	O/W
Position		
OFF (X)		
RUN (O)	○	○

I822H1180023-01

- 5) After finishing the engine stop switch inspection, install the removed parts.

Ignition Switch Inspection

BENJ31J31806007

Refer to "Ignition Switch Inspection" in Section 9C (Page 9C-13).

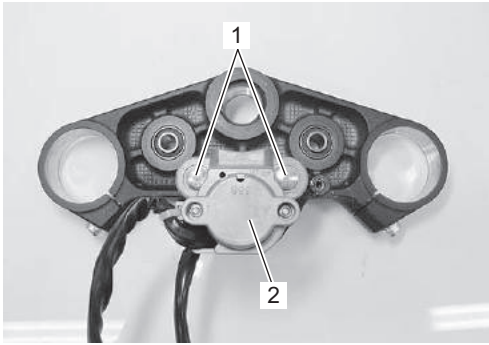
Ignition Switch Removal and Installation

BENJ31J31806008

Removal

For break head bolt

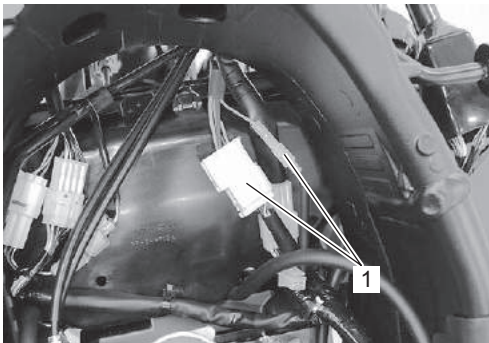
- 1) Remove the steering stem upper bracket. (Page 6B-8)
- 2) Remove the ignition switch mounting bolts (1) with a chisel.
- 3) Remove the ignition switch (2).



IE31J1180019-01

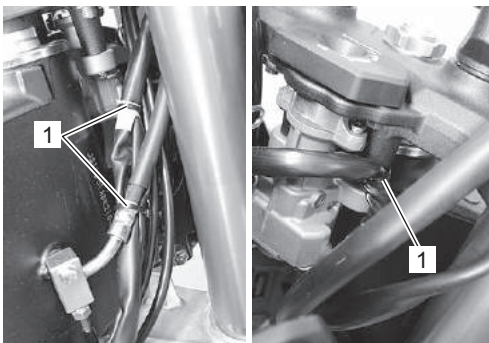
Except for break head bolt

- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Disconnect the ignition switch couplers (1).



IE31J1180020-01

- 3) Remove the clamps (1).



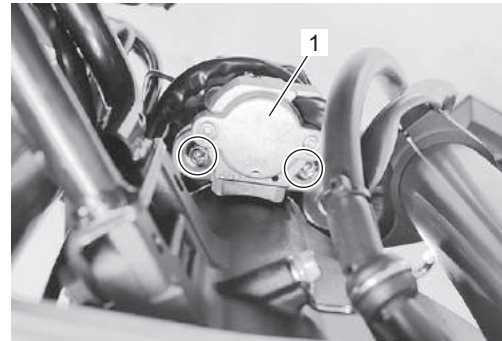
IE31J1180021-01

- 4) Remove the ignition switch (1) with the special tools.

Special tool

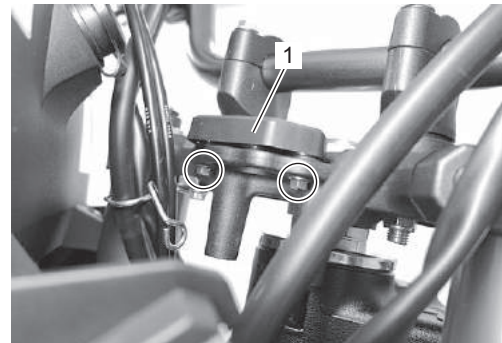
09930-11920

09930-11940



IE31J1180022-01

- 5) Remove the ignition switch cover (1).



IE31J1180023-01

Installation

Install the ignition switch in the reverse order of removal. Pay attention to the following points:

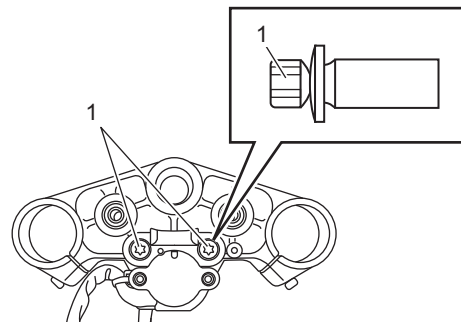
For break head bolt

- Tighten new ignition switch mounting bolts (1) with the special tool until head of each bolt is broken off.

Special tool

09930-11940

09940-63110



IE31J1180024-02

1H-11 Ignition System:

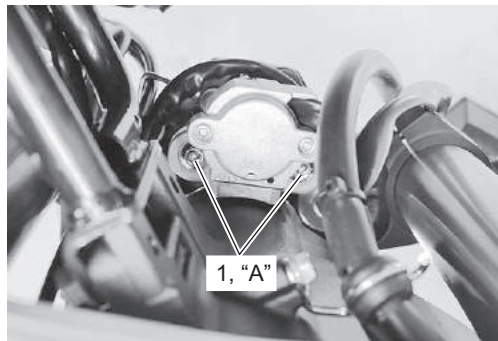
Except for break head bolt

- When reusing the ignition switch mounting bolts (1), clean the thread part and apply the thread lock to them.

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

- Tighten the ignition switch mounting bolts (1) with the special tools.

Special tool
09930–11920
09930–11940



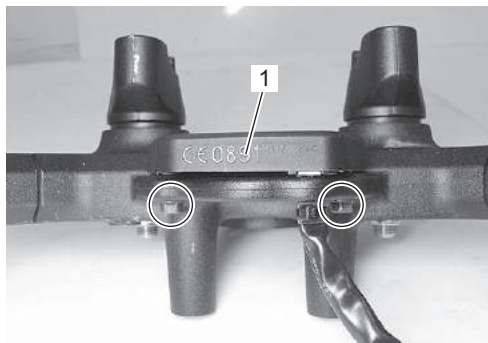
IE31J1180025-01

Immobilizer Antenna Removal and Installation (If Equipped)

BENJ31J31806009

Removal

- Remove the ignition switch. (Page 1H-10)
- Remove the immobilizer antenna (1).



IE31J1180026-01

Installation

Install the immobilizer antenna in the reverse order of removal.

Specifications

Tightening Torque Specifications

BENJ31J31807001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Spark plug	11	1.1	8.0	(Page 1H-7)

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

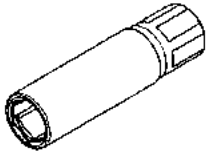
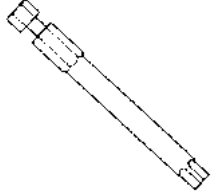
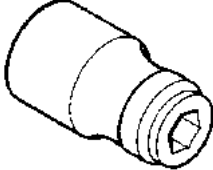
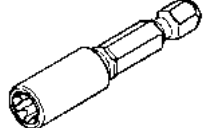
Recommended Service Material

BENJ31J31808001

Material	SUZUKI recommended product or Specification	Note
Thread lock cement	THREAD LOCK CEMENT 1322D P/No.: 99000-32150	☞ (Page 1H-11)

Special Tool

BENJ31J31808002

<p>09930-10190 Spark plug socket (14 mm : 3/8 sq.) ☞ (Page 1H-6) / ☞ (Page 1H-6) / ☞ (Page 1H-6) / ☞ (Page 1H-7) / ☞ (Page 1H-7)</p> 	<p>09930-11920 Torx® bit (JT40H) Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A. ☞ (Page 1H-10) / ☞ (Page 1H-11)</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-10) / ☞ (Page 1H-10) / ☞ (Page 1H-11)</p> 	<p>09940-63110 Torx® bit (E8) Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A. ☞ (Page 1H-10)</p> 

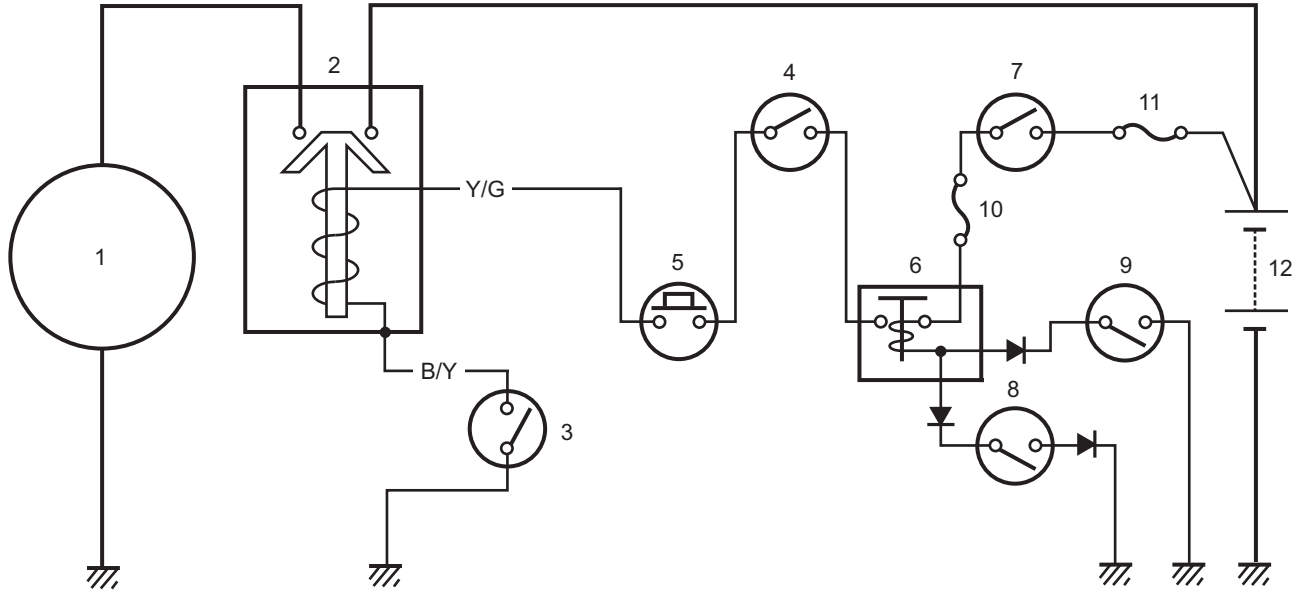
Starting System

Schematic and Routing Diagram

Starting System Diagram

BENJ31J31902001

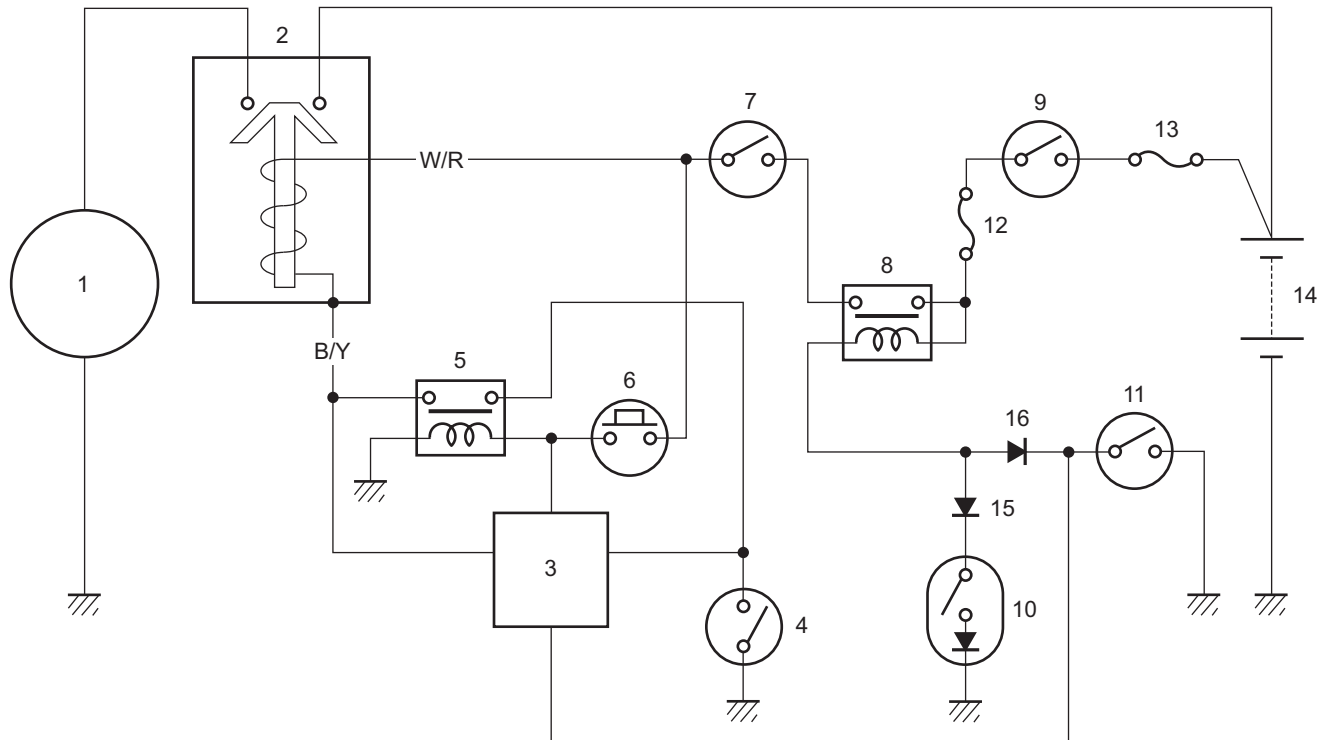
Non-Euro4 Model



IJ31J1190001-02

1. Starter motor	4. Engine stop switch	7. Ignition switch	10. Ignition fuse
2. Starter relay	5. Starter button	8. Side-stand switch	11. Main fuse
3. Clutch lever position switch	6. Side-stand relay	9. Gear position switch	12. Battery

Euro4 Model



IJ31J1190002-02

1. Starter motor	7. Engine stop switch	13. Main fuse
2. Starter relay	8. Side-stand relay	14. Battery
3. ECM	9. Ignition switch	15. Side-stand diode
4. Clutch lever position switch	10. Side-stand switch	16. Diode
5. Starter sub relay	11. GP switch	
6. Starter button	12. Ignition fuse	

Component Location

Starting System Components Location

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

BENJ31J31903001

Diagnostic Information and Procedures

Starting System Symptom Diagnosis

BENJ31J31904001

Condition	Possible cause	Correction / Reference Item
Engine does not turn though the starter motor runs	Faulty starter clutch.	Replace. ☞(Page 11-13)
Starter button is not effective	Run down battery.	Repair or replace. ☞(Page 1J-8)
	Defective switch contacts.	Replace. ☞(Page 6B-3)
	Brushes not seating properly on starter motor commutator.	Repair or replace. ☞(Page 11-7)
	Defective starter relay or starter interlock switch.	Replace. ☞(Page 11-8)
	Defective main fuse.	Replace.

Starter Motor Will Not Run

BENJ31J31904002

NOTE

Check the fuses and charge the battery fully before diagnosing.

Non-Euro4 Model Troubleshooting

Step 1

- 1) Shift the transmission into neutral.
- 2) Grasp the clutch lever, turn on the ignition switch with the engine stop switch in the "RUN" position and listen for a click from the starter relay when the starter button is pushed.

Does the starter relay click?

Yes Go to Step 2.

No Go to Step 3.

Step 2

Check if the starter motor runs when its terminal is connected to the battery (+) terminal.

NOTICE

Do not use thin "wire" because a large amount of current flows.

Does the starter motor run?

- Yes • Faulty starter relay.
 • Loose or disconnected starter motor lead wire.
 • Loose or disconnected between starter relay and battery (+) terminal.

No Faulty starter motor.

Step 3

Measure the voltage between Y/G wire (+) and B/Y wire (-) at the starter relay coupler when the starter button is pushed.

Is the voltage OK?

Yes Go to Step 4.

- No • Faulty ignition switch.
 • Faulty engine stop switch.
 • Faulty clutch lever position switch.
 • Faulty GP switch.
 • Faulty side-stand relay.
 • Faulty starter button.
 • Faulty side-stand switch.
 • Faulty diode.
 • Faulty side-stand diode.
 • Poor contact of coupler.
 • Open circuit in wire harness.

Step 4

Check the starter relay. ☞(Page 11-9)

Is the starter relay OK?

Yes Poor contact of the starter relay.

No Faulty starter relay.

Euro4 Model Troubleshooting

Step 1

- 1) Shift the transmission into neutral.
- 2) Turn on the ignition switch with the engine stop switch in the "RUN" position and listen for a click from the starter relay when the starter switch is pushed.

Is a click sound heard?

Yes Go to Step 2.

No Go to Step 3.

Step 2

Check if the starter motor runs when its terminal is connected to the battery (+) terminal.

NOTICE

Do not use thin "wire" because a large amount of current flows.

Does the starter motor run?

- Yes
- Faulty starter relay.
 - Loose or disconnected starter motor lead wire.
 - Loose or disconnected between starter relay and battery (+) terminal.

No Faulty starter motor.

Step 3

Measure the voltage between W/R wire (+) and B/Y wire (-) at the starter relay coupler when the starter switch is pushed. Refer to "Starting System Diagram" (Page 11-1).

Is the voltage OK?

Yes Go to Step 4.

- No
- Faulty ignition switch.
 - Faulty engine stop switch.
 - Faulty clutch lever position switch.

- Faulty ECM.
- Faulty GP switch.
- Faulty side-stand relay.
- Faulty starter sub relay.
- Faulty diode.
- Faulty side-stand diode.
- Faulty starter button.
- Faulty side-stand switch.
- Poor contact of coupler.
- Open circuit in wire harness.

Step 4

Check the starter relay. ⚙️ (Page 11-9)

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

BENJ31J31904003

NOTE

The starter motor does not run when the side-stand set on the ground.

Step 1

Check the side-stand switch. ⚙️ (Page 11-10)

Is the side-stand switch OK?

Yes Go to Step 2.

No Faulty side-stand switch.

Step 2

Check the starter clutch. ⚙️ (Page 11-16)

Is the starter clutch OK?

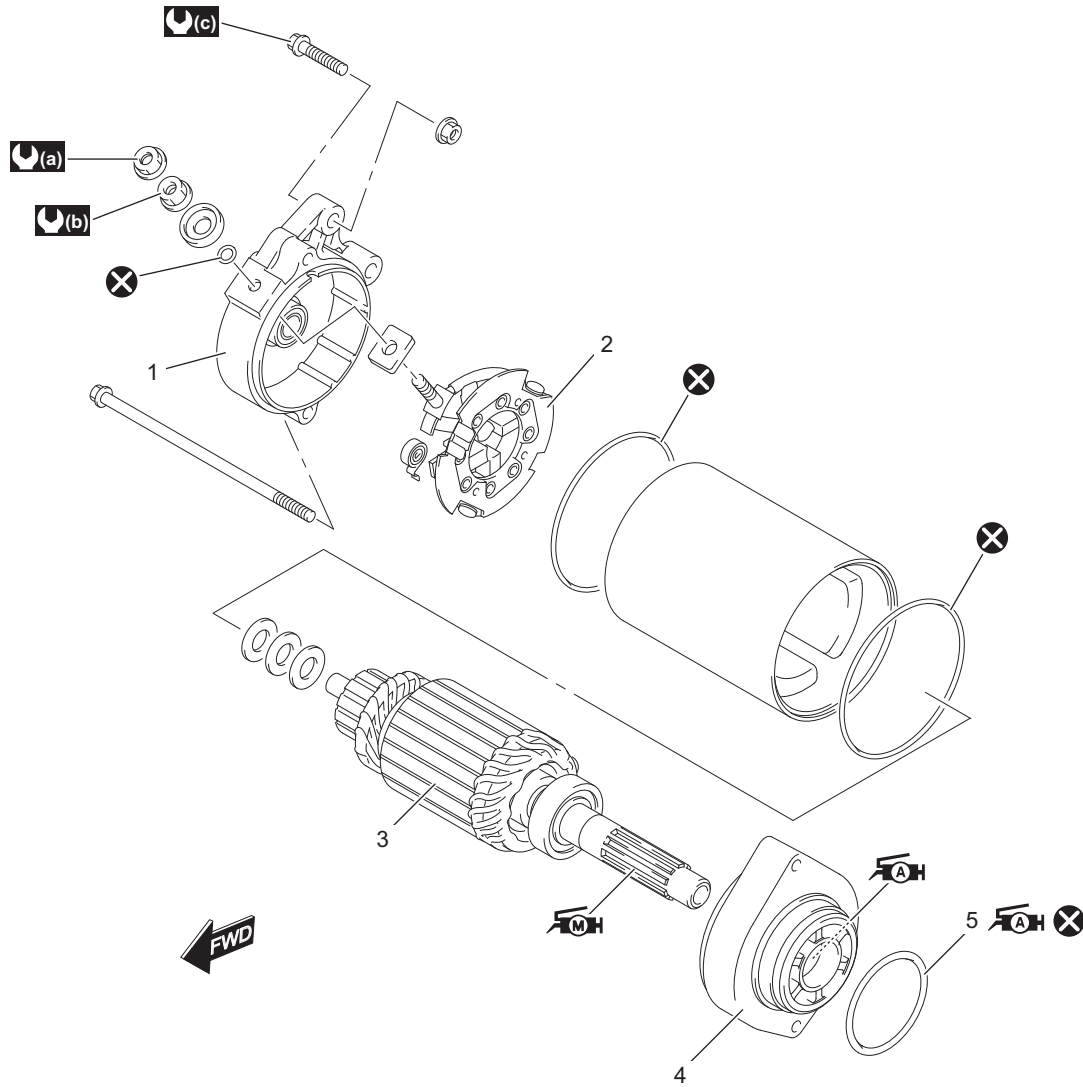
- Yes
- Open circuit in wire harness.
 - Poor contact of connector.

No Faulty starter clutch.

Repair Instructions

Starter Motor Components

BENJ31J31906001



IE31J1190051-02

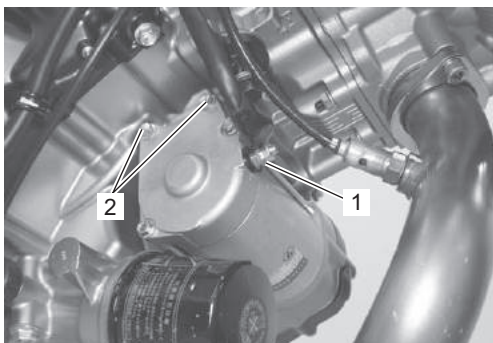
1. Frame	4. Housing	(b) : 5 N·m (0.5 kgf-m, 4.0 lbf-ft)	MH : Apply moly past to sliding surface.
2. Brush holder	5. O-ring	(c) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	X : Do not reuse.
3. Armature	(a) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)	AH : Apply grease.	

Starter Motor Assembly Removal and Installation

BENJ31J31906002

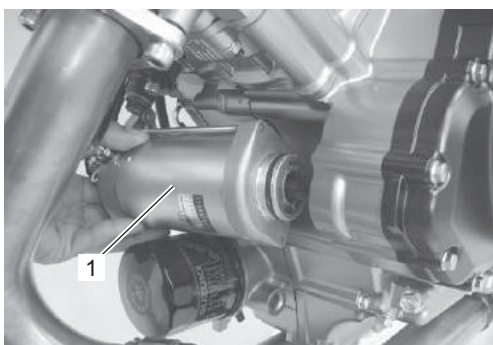
Removal

- 1) Remove the under cowling assembly. (If equipped)
☞(Page 9D-39)
- 2) Turn the ignition switch OFF and disconnect the battery (-) lead wire. ☞(Page 1J-12)
- 3) Disconnect the starter motor read wire (1) and remove the starter motor mounting bolts (2).



IE31J1190002-03

- 4) Remove the starter motor (1).



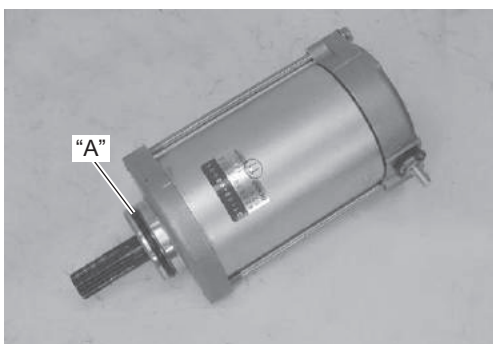
IE31J1190003-01

Installation

Install the starter motor in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new O-ring.

“A”: Grease 99000-25011 (SUZUKI SUPER GREASE A)



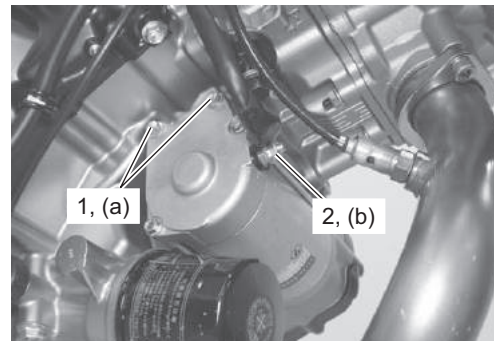
IE31J1190004-01

- Tighten the starter motor mounting bolts (1) and lead wire mounting nut (2) to the specified torque.

Tightening torque

Starter motor mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Starter motor lead wire mounting nut (b): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



IE31J1190005-02

Starter Motor Disassembly and Reassembly

BENJ31J31906003

Disassembly

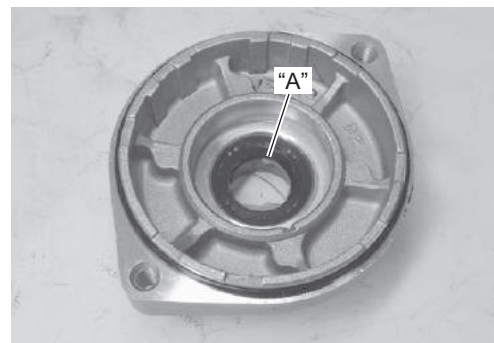
Disassemble the starter motor. ☞(Page 11-5)

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.

“A”: Grease 99000-25011 (SUZUKI SUPER GREASE A)

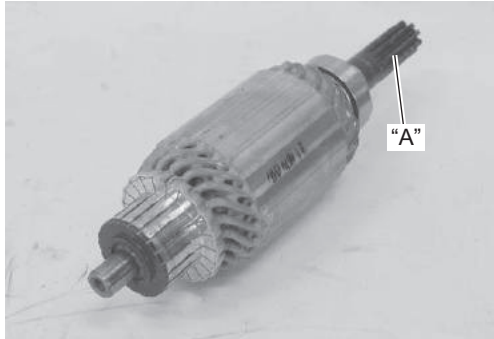


IE31J1190006-01

1I-7 Starting System:

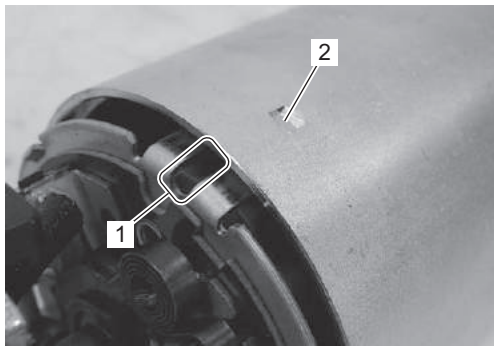
- Apply a small quantity of moly paste to the armature shaft.

“A”: Assembly lubrication 99000–25140 (SUZUKI MOLY PASTE)



IE31J1190007-01

- Align the groove (1) on the brush holder with the projection (2) on the starter motor case.



IE31J1190008-01

Starter Motor Inspection

BENJ31J31906004

Refer to “Starter Motor Disassembly and Reassembly” (Page 1I-6).

Carbon Brush

Inspect the carbon brushes for abnormal wear, cracks or smoothness in the brush holder.

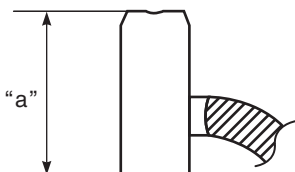
If any damages are found, replace the brush holder or brush terminal set with a new one.

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.

Brush length “a”

Service limit: 6.5 mm (0.26 in)

Special tool
09900–20102



I718H1190013-01

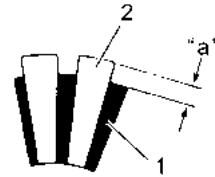
Commutator

Inspect the commutator for discoloration, abnormal wear or undercut “a”.

If the commutator is abnormally worn, replace the armature.

If the commutator surface is discolored, polish it with #400 sandpaper and wipe it using a clean, dry cloth.

If there is no undercut, scrape out the insulator (1) with a saw blade.



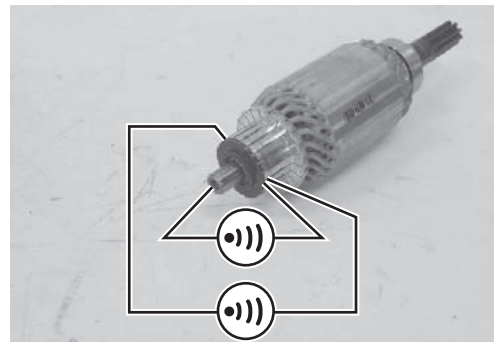
IE31J1190009-01

2. Segment

Armature Coil

Measure for continuity between each segment. Measure for continuity between each segment and the armature shaft.

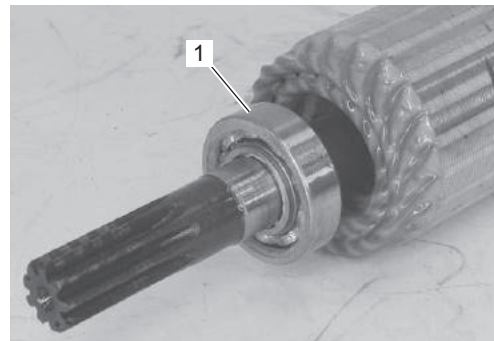
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.



IE31J1190010-01

Bearing

Inspect the armature shaft bearing (1) for abnormal noise and smooth rotation. If there is anything unusual, replace the new armature assembly.

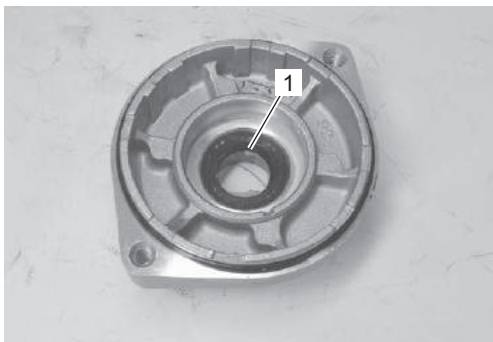


IE31J1190011-01

Oil Seal

Check the seal lip (1) for damage.

If any damage is found, replace the new housing end (Inside).



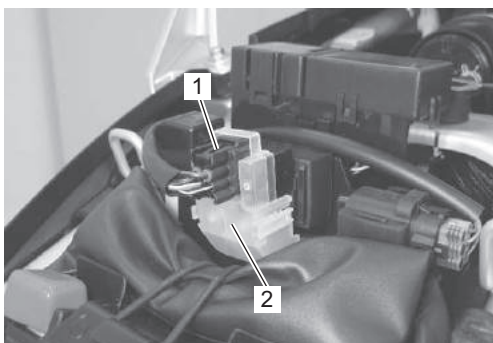
IE31J1190012-01

Starter Relay Removal and Installation

BENJ31J31906005

Removal

- 1) Remove the seat.
 - L4 – L6 model: ☞ (Page 9D-10)
 - L8 – model: ☞ (Page 9D-33)
- 2) Disconnect the battery (–) lead wire from the battery. ☞ (Page 1J-12)
- 3) Disconnect the starter relay coupler (1) and remove the starter relay cover (2).



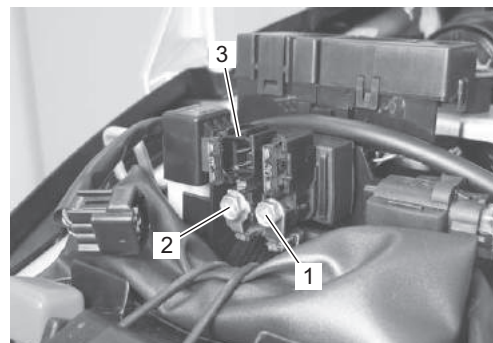
IE31J1190013-02

- 4) Disconnect the starter motor lead wire (1) and battery (+) lead wire (2).

NOTE

Be sure to disconnect the starter motor lead wire (1) first, then disconnect the battery (+) lead wire (2).

- 5) Remove the starter relay (3).



IE31J1190014-02

Installation

Install the starter relay in the reverse order of removal.

11-9 Starting System:

Starter Relay Inspection

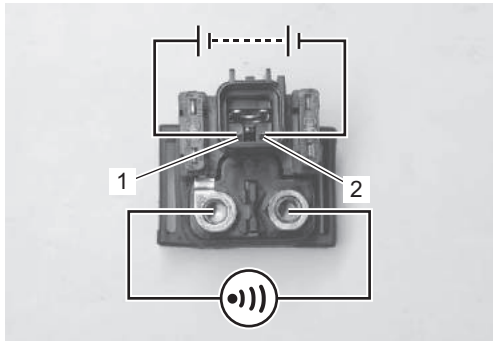
BENJ31J31906006

Refer to "Starter Relay Removal and Installation" (Page 11-8).

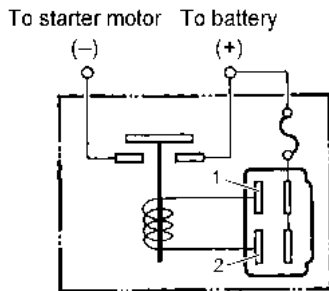
- 1) Apply 12 V to (1) and (2) terminals and check for continuity between the positive and negative terminals using the multi circuit tester. If the starter relay clicks and continuity is found, the relay is OK.

NOTICE

Do not apply battery voltage to the starter relay for five seconds or more, otherwise the relay coil may overheat and get damaged.



IE31J1190015-01

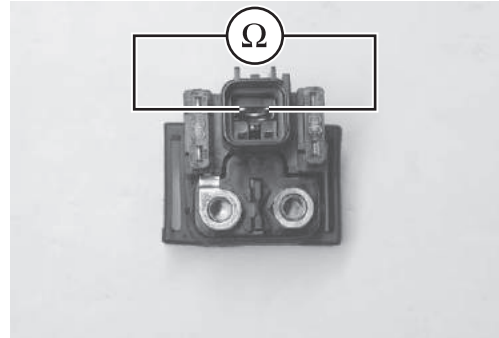


IE31J1190016-02

- 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

3 – 6 Ω



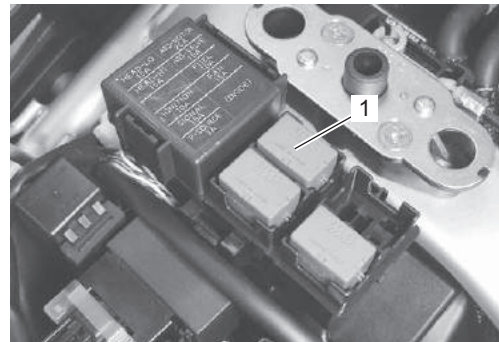
IE31J1190017-01

Side-stand Relay Removal and Installation

BENJ31J31906007

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the seat.
 - L4 – L6 model: ☞ (Page 9D-10)
 - L8 – model: ☞ (Page 9D-33)
- 3) Remove the cap and side-stand relay (1).



IE31J1190018-02

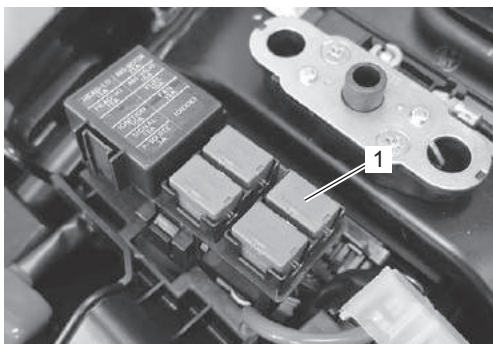
Installation

Install the side-stand relay in the reverse order of removal.

Starter Sub Relay Inspection (If Equipped)

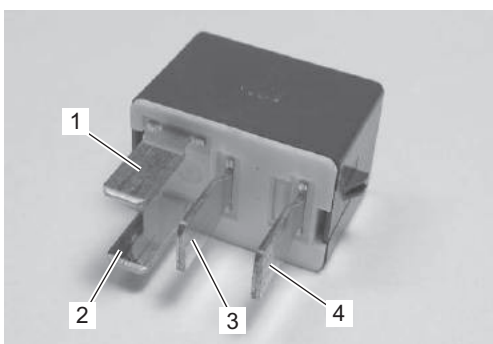
BENJ31J31906008

- 1) Remove the seat. (Page 9D-33)
- 2) Remove the starter sub relay (1).



IJ31J1190003-01

- 3) First, check for insulation with a circuit tester between terminals (3) and (4). Next, check for continuity between (3) and (4) with 12 V voltage applied, positive (+) to terminal (1) and negative (-) to terminal (2). If continuity does not exist, replace the relay with a new one.



IE31J1170030-01

- 4) Reinstall the removed parts.

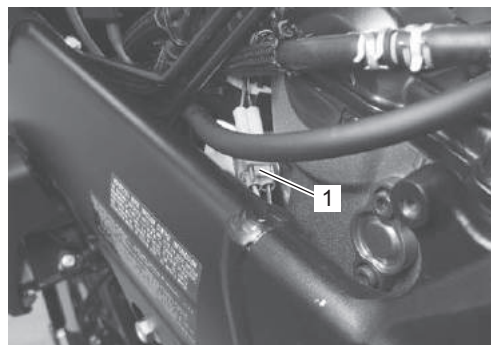
Side-stand / Ignition Interlock System Parts Inspection

BENJ31J31906009

Check the interlock system for proper operation. If the interlock system does not operate properly, check each component for damage or abnormalities. If any abnormality is found, replace the component with a new one.

Side-stand Switch

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank. (Page 1G-9)
- 3) Disconnect the side-stand switch coupler (1).



IE31J1190019-02

- 4) Set the "Diode test" of the multi circuit tester. Refer to "Precautions for Circuit Tester" in Section 00 (Page 00-7).
- 5) Check that the tester reads 1.4 V or more.

NOTE

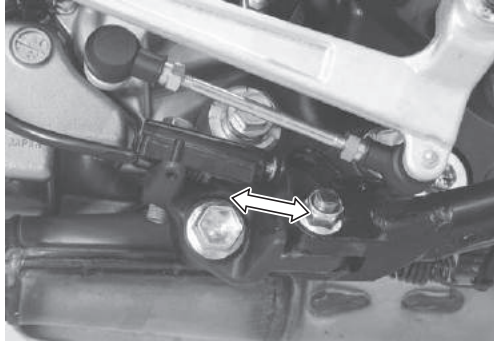
If the tester reads less than 1.4 V when the tester probes are not connected, replace its battery.

11-11 Starting System:

- 6) Measure the voltage between G and B/W lead wires of the side-stand switch.

Side-stand switch voltage

	G (+ probe)	B/W (- probe)
ON (Side-stand retracted)	0.4 – 0.6 V	
OFF (Side-stand on the ground)	1.4 V or more (Tester's battery voltage)	



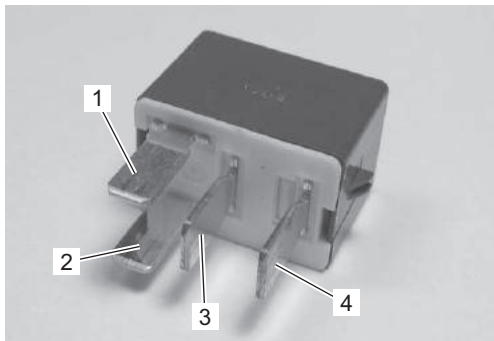
IE31J1190020-01

Side-stand Relay

Refer to "Side-stand Relay Removal and Installation" (Page 11-9).

First check the insulation between (3) and (4) terminals with a circuit tester. Then apply 12 V to (1) and (2) terminals, (+) to (1) and (-) to (2), and check the continuity between (3) and (4).

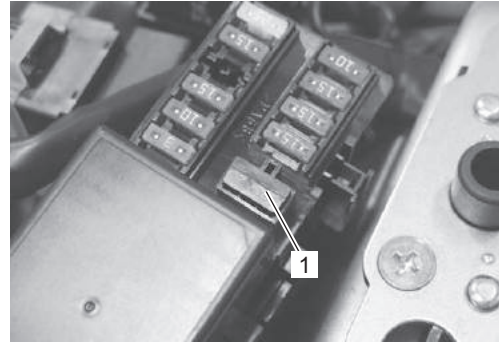
If there is no continuity, replace it with a new one.



IE31J1190021-01

Diode

- 1) Turn the ignition switch OFF.
- 2) Remove the seat.
 - L4 – L6 model: (Page 9D-10)
 - L8 – model: (Page 9D-33)
- 3) Remove the diode (1) from the fuse box.



IE31J1190022-01

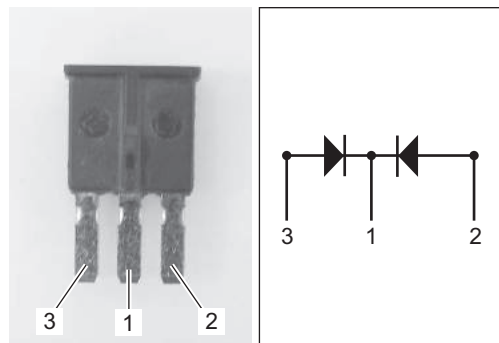
- 4) Set the "Diode test" of the multi circuit tester. Refer to "Precautions for Circuit Tester" in Section 00 (Page 00-7).
- 5) Check that the tester reads 1.4 V or more.

NOTE

If the tester reads less than 1.4 V when the tester probes are not connected, replace its battery.

- 6) Measure the voltage between the (1), (2) and (3) terminals.

Diode voltage





IE31J1190023-01

		(+ Probe of tester to:	
		2, 3	1
(-) Probe of tester to:	2, 3	—	1.4 V or more (Tester's battery voltage)
	1	0.4 – 0.6 V	—

IE31J1190049-01

Side-stand Diode

- 1) Turn the ignition switch OFF.
- 2) Remove the right rear frame cover.
 - L4 – L6 model:  (Page 9D-11)
 - L8 – model:  (Page 9D-33)
- 3) Set the “Diode test” of the multi circuit tester. Refer to “Precautions for Circuit Tester” in Section 00 (Page 00-7).
- 4) Check that the tester reads 1.4 V or more.

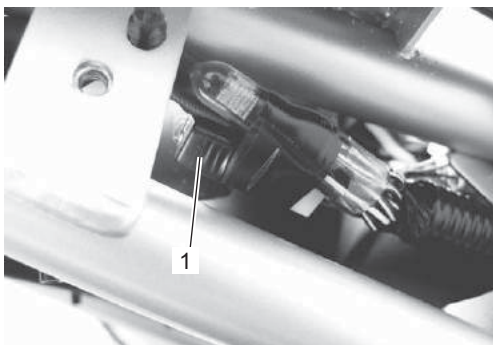
NOTE

If the tester reads less than 1.4 V when the tester probes are not connected, replace its battery.

- 5) Measure the voltage between G and G/B lead wires of the side-stand diode (1).


Side-stand diode voltage

	G (+ probe)	G/B (- probe)
ON (Side-stand retracted)	0.4 – 0.6 V	
OFF (Side-stand on the ground)	1.4 V or more (Tester's battery voltage)	



IE31J1190024-02

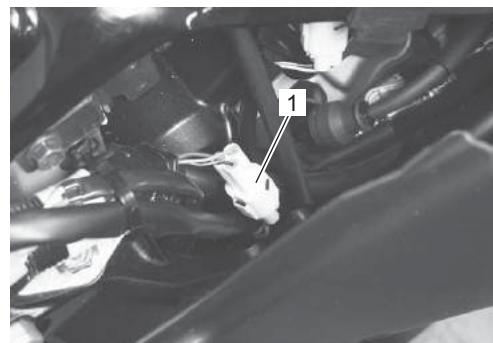
Gear Position Switch

- 1) Turn the ignition switch OFF
- 2) Lift and support the fuel tank.  (Page 1G-9)

- 3) Disconnect the gear position switch lead wire coupler (1).

NOTICE

When disconnecting and connecting the gear position switch lead wire coupler, make sure to turn off the ignition switch, or electronic parts may get damaged.



IE31J1190025-02

AMENDED

- 4) Check the continuity between BI and B lead wires with the transmission in “NEUTRAL”.

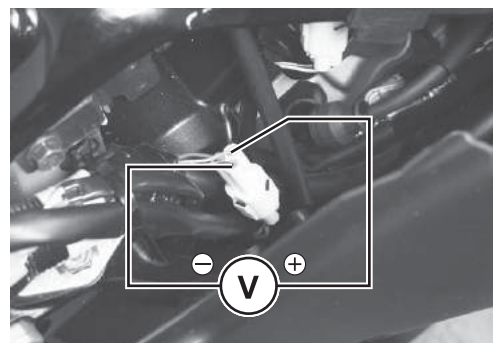
	BI	B
ON (Neutral)	○ — ○	○ — ○
OFF (Except neutral)		

I649G1190045-03

- 5) Connect the gear position switch lead wire coupler to the wiring harness.
- 6) Support the motorcycle with a jack or wooden block.
- 7) Turn the ignition switch ON and side-stand to upright position.
- 8) Measure the voltage between P and B/W lead wires when shifting the gearshift lever from low to top.

Gear position switch voltage (Except neutral position)

0.6 V or more



IE31J1190026-03

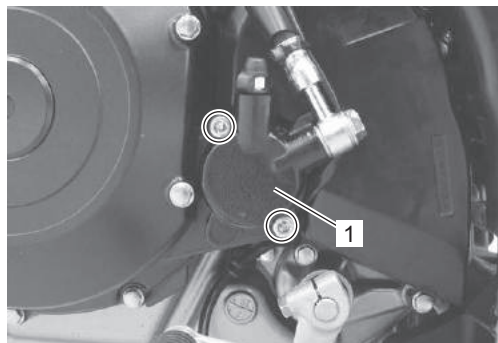
- 9) Turn the ignition switch OFF.

Starter Torque Limiter / Starter Clutch Removal and Installation

BENJ31J31906010

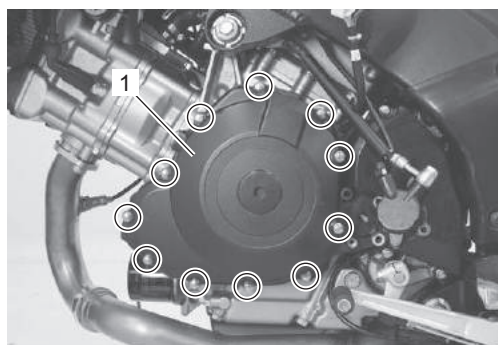
Removal

- 1) Remove the under cowling assembly. (If equipped)
☞ (Page 9D-39)
- 2) Drain the engine oil. ☞ (Page 1E-4)
- 3) Remove the clutch release cylinder (1). ☞ (Page 5C-11)



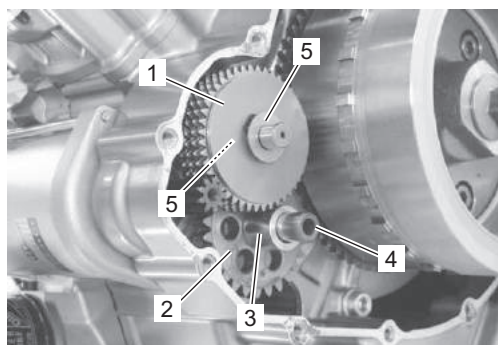
IE31J1190027-01

- 4) Remove the generator cover (1).



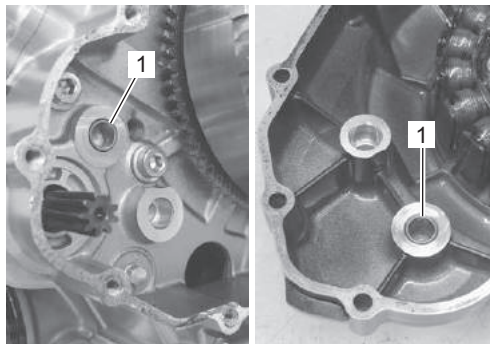
IE31J1190028-01

- 5) Remove the starter torque limiter (1), starter idle gear (2), spacer (3), shaft (4) and washers (5).



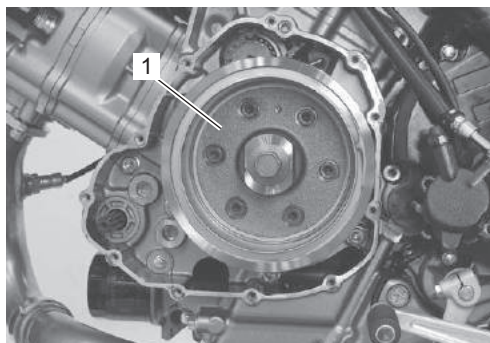
IE31J1190029-02

- 6) Remove the bushings (1) from the crankcase and generator cover.



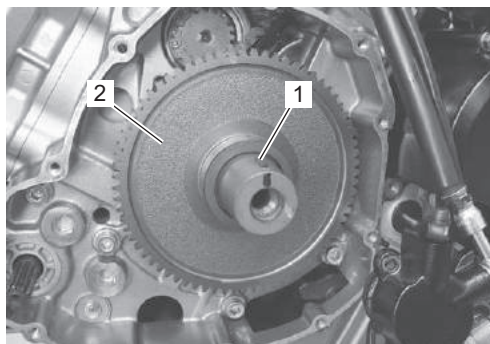
IE31J1190030-02

- 7) Remove the generator rotor (1). ☞ (Page 1J-5)



IE31J1190031-01

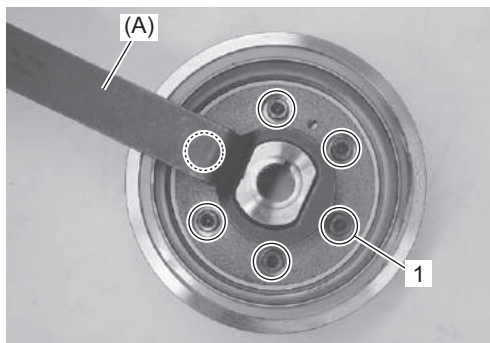
- 8) Remove the key (1) and starter driven gear (2).



IE31J1190032-01

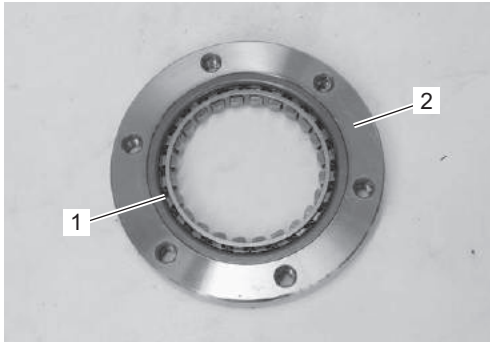
- 9) Hold the generator rotor with the special tool and remove the starter clutch bolts (1).

Special tool
(A): 09930-44541



IE31J1190033-02

10) Remove the one way clutch (1) from the guide (2).



IE31J1190034-01

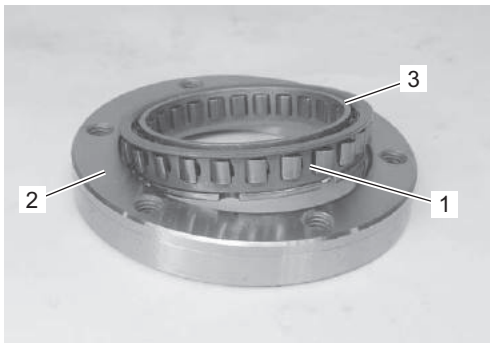
Installation

Install the starter clutch and starter torque limiter in the reverse order of removal. Pay attention to the following points:

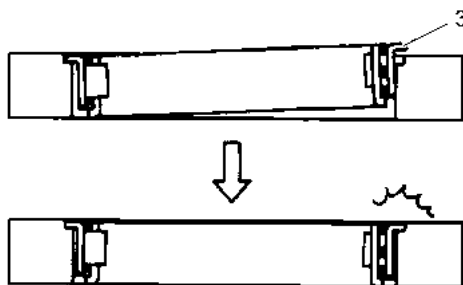
- Apply engine oil to the one way clutch (1).
- When inserting the one way clutch (1) into the guide (2), fit the flange (3) in the step of the guide (2).

NOTE

Be sure to seat the flange (3) of the one way clutch (1) to the guide (2).

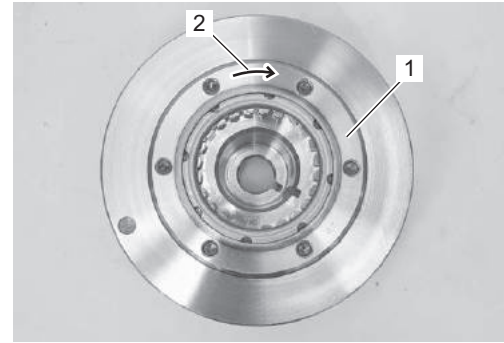


IE31J1190035-01



IE31J1190036-01

- Install the guide (1) to the generator rotor with the arrow mark (2) faced upward.



IE31J1190037-01

- Apply thread lock to the bolts (1), and then tighten them to the specified torque with the special tool.

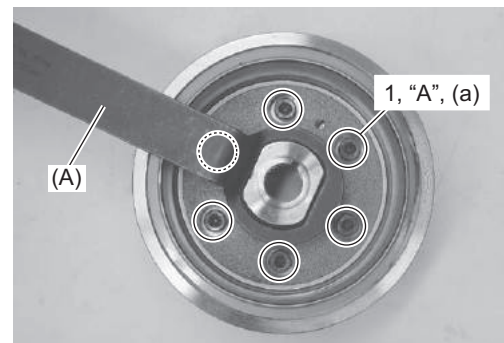
“A”: Thread lock cement 99000-32030 (THREAD LOCK CEMENT 1303B)

Special tool

(A): 09930-44530

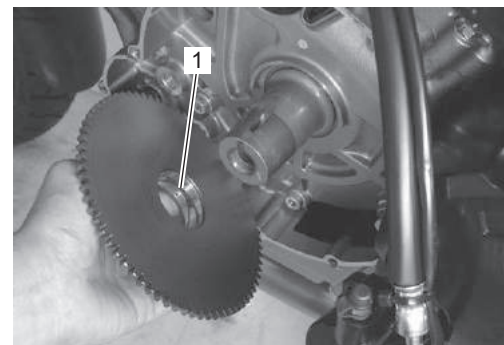
Tightening torque

Starter clutch bolt (a): 25 N·m (2.5 kgf-m, 18.0 lbf-ft)



IE31J1190038-01

- Apply engine oil to the bushing (1) of the starter driven gear.



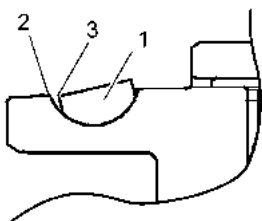
IE31J1190039-01

1I-15 Starting System:

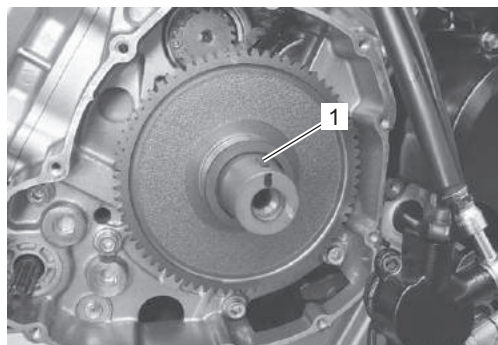
- Fit the key (1) in the key slot on the crankshaft.

NOTE

Align the crankshaft surface (2) and the edge (3) of key (1).



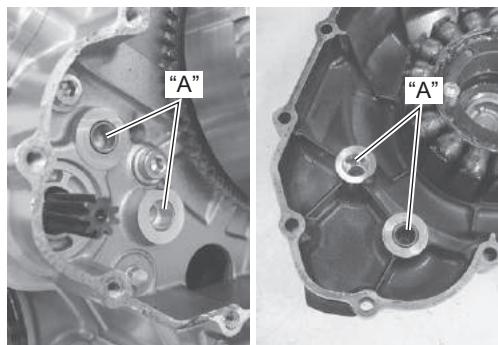
IE31J1190050-01



IE31J1190040-01

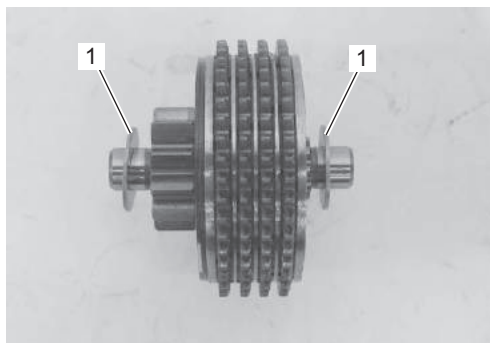
- Apply molybdenum oil solution to the starter idle gear shaft holes, and inside of bushings.

“A”: Assembly lubrication (Molybdenum oil solution)



IE31J1190041-02

- Fit the washers (1) onto the starter torque limiter.



IE31J1190042-01

- Install the generator rotor onto crankshaft. (Page 1J-6)

Starter Torque Limiter Inspection

BENJ31J31906011

NOTICE

- Do not attempt to disassemble the starter torque limiter.
- The starter torque limiter is available only as an assembly part.

- Hold the starter torque limiter with the special tools and vise.

Special tool

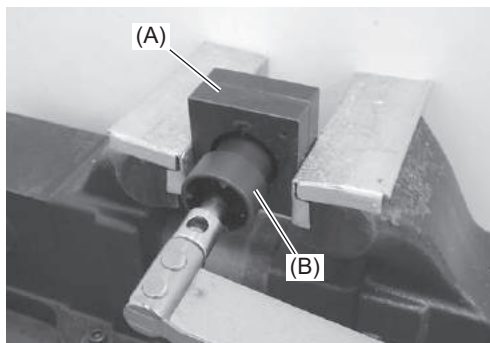
(A): 09930-73110

(B): 09930-73120

- Turn the starter torque limiter with a torque wrench and check the slip torque. If the slip torque is not within the specification, replace the starter torque limiter with a new one.

Starter torque limiter slip torque

Standard: 20 – 45 N·m (2.0 – 4.5 kgf-m, 14.5 – 32.5 lbf-ft)



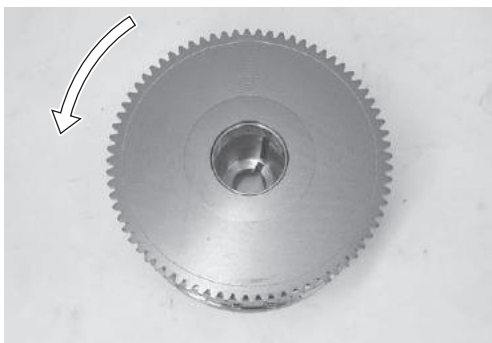
IE31J1190043-01

Starter Clutch Inspection

BENJ31J31906012

Starter Clutch

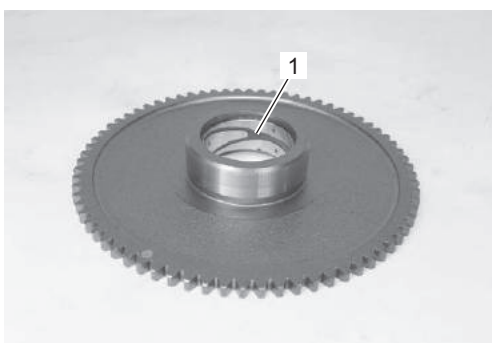
- 1) Install the starter driven gear onto the starter clutch.
- 2) Turn the starter driven gear by hand to inspect the starter clutch for a smooth movement. The gear turns in one direction only. If a large resistance is felt for rotation, inspect the starter clutch or the starter clutch contacting surface on the starter driven gear for wear or damage. If they are found to be damaged, replace them with new ones.



IE31J1190044-01

Starter Driven Gear Bushing

Inspect the starter driven gear bushing (1) for wear or damage. If any defects are found, replace the starter driven gear with a new one.



IE31J1190045-01

Starter Idle Gear

Inspect the starter idle gear for wear or damage. If any defects are found, replace it with a new one.

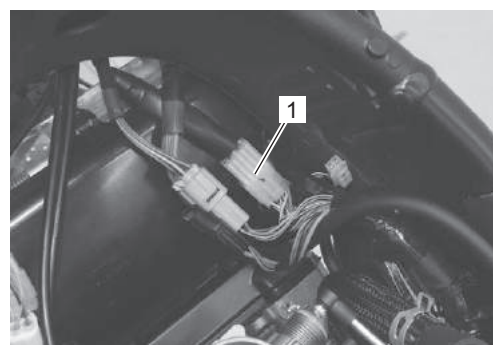


IE31J1190046-01

Starter Button Inspection

BENJ31J31906013

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Disconnect the right handlebar switch coupler (1).



IE31J1190047-01

- 4) Inspect the starter button for continuity with a tester. If any abnormality is found, replace the right handle switch assembly with a new one. (Page 6B-3)

Color Position	O/W	Y/G	O/R	Y/W
.			○ — ○	
PUSH	○ — ○			

IE31J1190048-01

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

Specifications

Tightening Torque Specifications

BENJ31J31907001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Starter motor mounting bolt	10	1.0	7.5	☞ (Page 11-6)
Starter motor lead wire mounting nut	6	0.6	4.5	☞ (Page 11-6)
Starter clutch bolt	25	2.5	18.0	☞ (Page 11-14)

Reference:

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

“Starter Motor Components” (Page 11-5)

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

Special Tools and Equipment

Recommended Service Material

BENJ31J31908001

Material	SUZUKI recommended product or Specification		Note
Assembly lubrication	Molybdenum oil solution	—	☞ (Page 11-15)
	SUZUKI MOLY PASTE	P/No.: 99000-25140	☞ (Page 11-7)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞ (Page 11-6) / ☞ (Page 11-6)
Thread lock cement	THREAD LOCK CEMENT 1303B	P/No.: 99000-32030	☞ (Page 11-14)

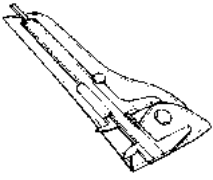
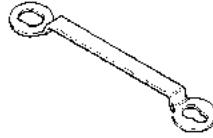

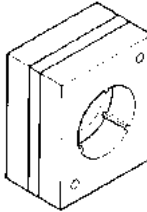
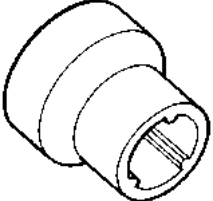
NOTE

Required service material(s) is also described in:

“Starter Motor Components” (Page 11-5)

Special Tool

BENJ31J31908002

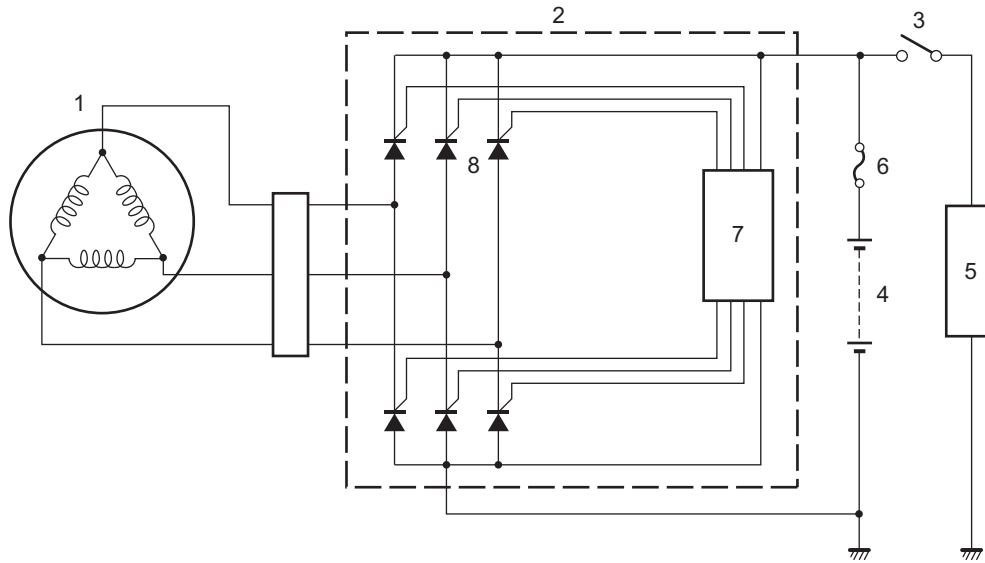
09900-20102 Vernier calipers (200 mm) ☞ (Page 11-7)		09930-44530 Rotor holder ☞ (Page 11-14)	
09930-44541 Rotor holder ☞ (Page 11-13)		09930-73110 Starter torque limiter holder ☞ (Page 11-15)	
09930-73120 Starter torque limiter socket ☞ (Page 11-15)			

Charging System

Schematic and Routing Diagram

Charging System Diagram

BENJ31J31A02001



IE31J11A0027-01

1. Generator	4. Battery	7. IC
2. Regulator/rectifier	5. Load	8. SCR
3. Ignition switch	6. Main fuse	

Component Location

Charging System Components Location

BENJ31J31A03001

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

Diagnostic Information and Procedures

Charging System Symptom Diagnosis

BENJ31J31A04001

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-5) ☞(Page 1J-6)</i>
	Short-circuited or punctured regulator/rectifier.	<i>Replace. ☞(Page 1J-8)</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-5) ☞(Page 1J-6)</i>
	Defective regulator/rectifier.	<i>Replace. ☞(Page 1J-8)</i>
	Defective cell plates in the battery.	<i>Replace the battery. ☞(Page 1J-12)</i>
Generator overcharges	Internal short-circuit in the battery.	<i>Replace the battery. ☞(Page 1J-12)</i>
	Damaged or defective regulator/rectifier.	<i>Replace. ☞(Page 1J-8)</i>
	Poorly grounded regulator/rectifier.	<i>Clean and tighten ground connection.</i>
Unstable charging	Lead wire insulation frayed due to vibration, resulting in intermittent short-circuiting.	<i>Repair or replace.</i>
	Internally short-circuited generator.	<i>Replace. ☞(Page 1J-5) ☞(Page 1J-6)</i>
	Defective regulator/rectifier.	<i>Replace. ☞(Page 1J-8)</i>
Battery overcharges	Faulty regulator/rectifier.	<i>Replace. ☞(Page 1J-8)</i>
	Faulty battery.	<i>Replace. ☞(Page 1J-12)</i>
	Poor contact of generator lead wire coupler.	<i>Repair.</i>
Battery runs down quickly	Trouble in charging system.	<i>Check the generator, regulator/rectifier and circuit connections and make necessary adjustments to obtain specified charging operation. ☞(Page 1J-4)</i>
	Cell plates have lost much of their active materials a result of overcharging.	<i>Replace the battery and correct the charging system. ☞(Page 1J-12)</i>
	Internal short-circuit in the battery.	<i>Replace the battery. ☞(Page 1J-12)</i>
	Too low battery voltage.	<i>Recharge the battery fully. ☞(Page 1J-8)</i>
	Too old battery.	<i>Replace the battery. ☞(Page 1J-12)</i>
Battery "sulfation"	Incorrect charging rate. (When not in use battery should be checked at least once a month to avoid sulfation.)	<i>Replace the battery. ☞(Page 1J-12)</i>
	The battery was left unused in a cold climate for too long.	<i>Replace the battery if badly sulfated. ☞(Page 1J-12)</i>
"Sulfation", acidic white powdery substance or spots on surface of cell plates	Cracked battery case.	<i>Replace the battery. ☞(Page 1J-12)</i>
	Battery has been left in a run-down condition for a long time.	<i>Replace the battery. ☞(Page 1J-12)</i>

Battery Runs Down Quickly

BENJ31J31A04002

Troubleshooting**Step 1**

Check accessories which use excessive amounts of electricity.

Are accessories installed?

- Yes Remove accessories.
 No Go to Step 2.

Step 2

Check the battery for current leakage. ⚡ (Page 1J-4)

Is the battery for current leakage OK?

- Yes Go to Step 3.
 No • Short circuit of wire harness.
 • Faulty electrical equipment.

Step 3

Measure the regulated voltage between the battery terminals. ⚡ (Page 1J-4)

Is the regulated voltage OK?

- Yes • Faulty battery.
 • Abnormal driving condition.
 No Go to Step 4.

Step 4

Measure the resistance of the generator coil. ⚡ (Page 1J-4)

Is the resistance of generator coil OK?

- Yes Go to Step 5.
 No • Faulty generator coil.
 • Poor contact of couplers.

Step 5

Measure the generator no-load performance. ⚡ (Page 1J-4)

Is the generator no-load performance OK?

- Yes Go to Step 6.
 No Faulty generator.

Step 6

Inspect the regulator/rectifier. ⚡ (Page 1J-7)

Is the regulator/rectifier OK?

- Yes Go to Step 7.
 No Faulty regulator/rectifier.

Step 7

Inspect wirings.

Is the wirings OK?

- Yes Faulty battery.
 No • Short circuit of wire harness.
 • Poor contact of couplers.

Repair Instructions

Battery Current Leakage Inspection

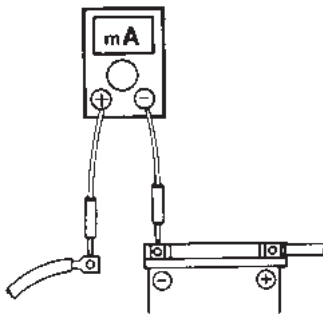
BENJ31J31A06001

- 1) Turn the ignition switch OFF.
- 2) Remove the seat and disconnect the battery (-) lead wire. (Page 1J-12)
- 3) Measure the current between battery (-) terminal and the battery (-) lead wire using the multi circuit tester. If the reading exceeds the specified value, leakage is evident.

NOTICE

- In case of a large current leak, turn the tester to high range first to avoid tester damage.
- Do not turn the ignition switch to ON position when measuring current.

Battery leakage current
Under 3 mA



I649G11A0002-02

- 4) Connect the battery (-) terminal and install the seat. (Page 1J-12)

Regulated Voltage Inspection

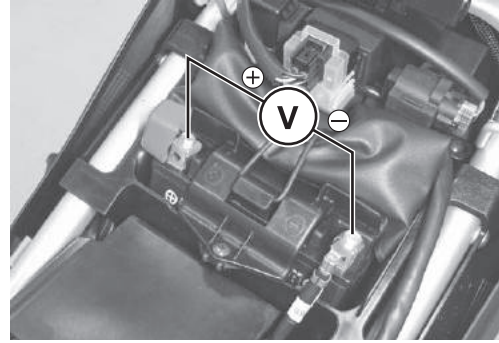
BENJ31J31A06002

- 1) Remove the seat.
 - L4 – L6 model: (Page 9D-10)
 - L8 – model: (Page 9D-33)
- 2) Start the engine and keep it running at 5000 r/min with the dimmer switch turned HI position.
- 3) Measure the DC voltage between the battery (+) and (-) terminals using the multi circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier.
 - Generator: (Page 1J-4)
 - Regulator/rectifier: (Page 1J-7)

NOTE

When making this test, be sure that the battery is in fully charged condition.

Regulated voltage (Charging output)
Standard: 13.5 – 15.0 V at 5000 r/min



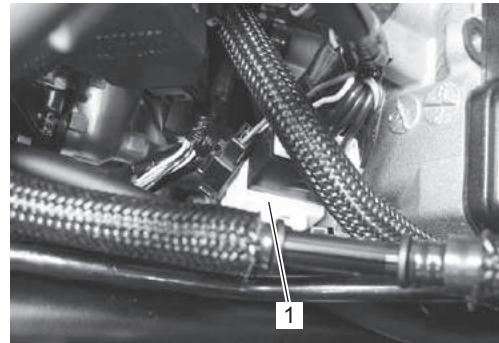
IE31J11A0002-03

Generator Inspection

BENJ31J31A06003

Generator Coil Resistance

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



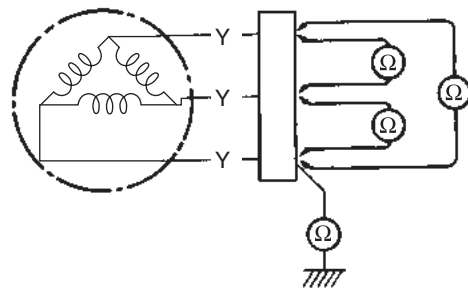
IE31J11A0003-02

- 3) 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

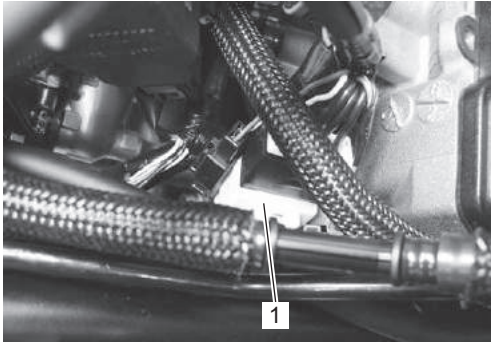
0.21 – 0.27 Ω (Y – Y)
∞ Ω (Y – Ground)



ID26J11A0037-02

No-load Performance

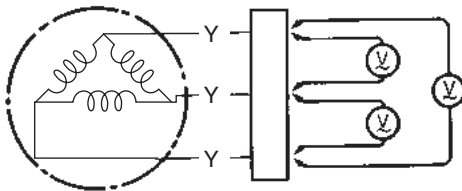
- 1) Lift and support the fuel tank. (Page 1G-9)
- 2) Disconnect the generator coupler (1).



IE31J11A0004-02

- 3) Start the engine and keep it running at 5000 r/min.
- 4) Using the multi circuit tester, measure the voltage between three lead wires.
If the tester reads under the specified value, replace the generator stator with a new one.

Generator no-load voltage (When engine is cold)
75 V (AC) or more at 5000 r/min

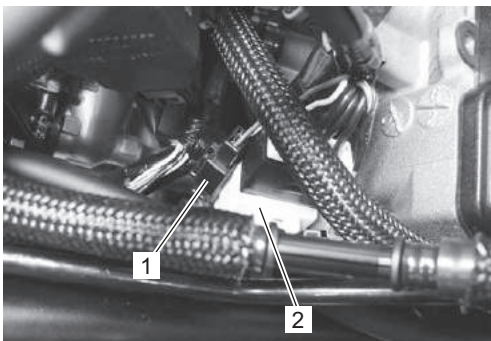


ID26J11A0038-02

Generator Removal

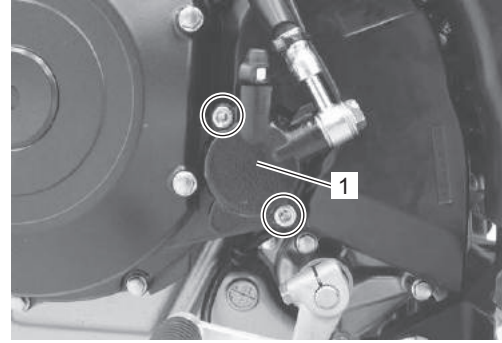
BENJ31J31A06004

- 1) Remove the under cowling assembly. (If equipped) (Page 9D-39)
- 2) Disconnect the battery (-) lead wire. (Page 1J-12)
- 3) Drain engine oil. (Page 1E-4)
- 4) Lift and support the fuel tank. (Page 1G-9)
- 5) Disconnect the CKP sensor coupler (1) and generator coupler (2).



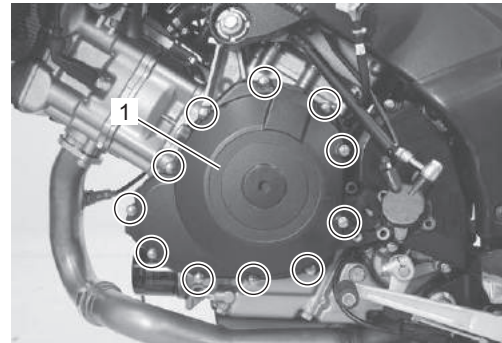
IE31J11A0005-02

- 6) Remove the clutch release cylinder (1). (Page 5C-11)



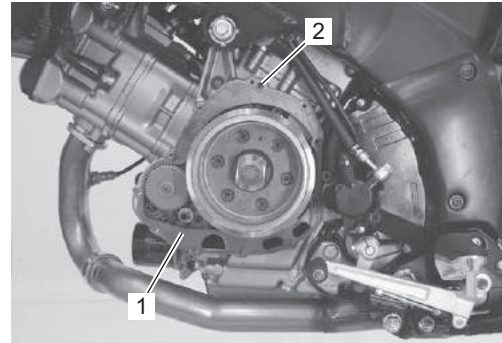
IE31J11A0006-01

- 7) Remove the generator cover (1).



IE31J11A0007-01

- 8) Remove the gasket (1) and dowel pin (2).



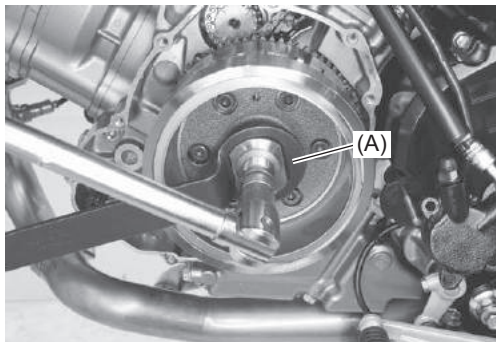
IE31J11A0023-01

1J-6 Charging System:

- 9) Remove the torque limiter and starter idle gear.
(Page 1I-13)
- 10) Hold the generator rotor with the special tool and remove the generator rotor bolt.

Special tool

(A): 09930-44541



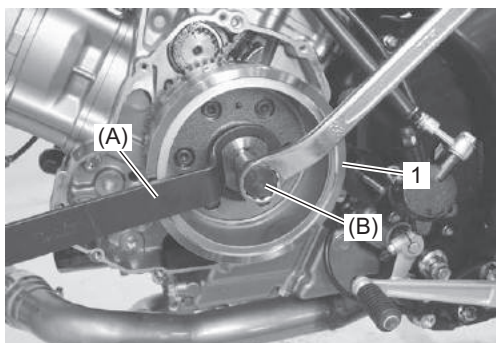
IE31J11A0008-01

- 11) Remove the generator rotor (1) with the special tools.

Special tool

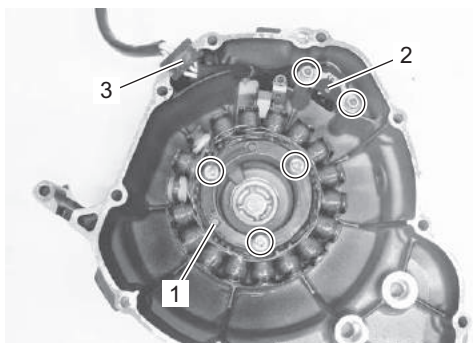
(A): 09930-44541

(B): 09930-30450



IE31J11A0009-02

- 12) Remove the generator stator (1), CKP sensor (2) and grommet (3).



IE31J11A0010-01

Generator Installation

BENJ31J31A06005

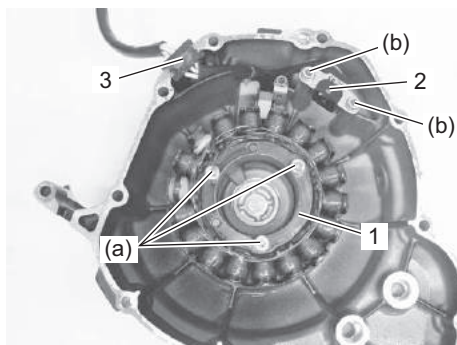
- 1) Install the generator stator (1) and CKP sensor (2), tighten the bolts to the specified torque.

Tightening torque

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

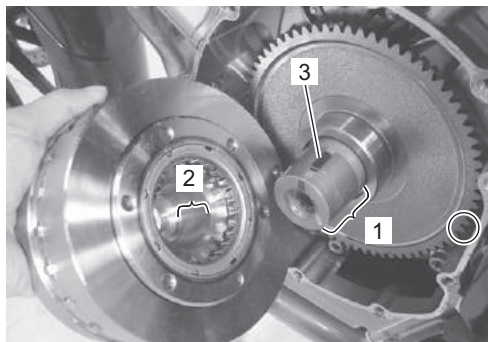
CKP sensor bolt (b): 6.5 N·m (0.65 kgf-m, 5.0 lbf-ft)

- 2) Install the grommet (3) to the generator cover.



IE31J11A0012-01

- 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.
- 4) Align the key (3) and key slot on the generator rotor.

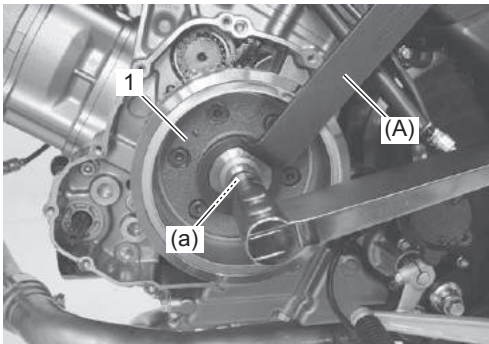


IE31J11A0011-01

- 5) Install the generator rotor (1) on the crankshaft.
- 6) Hold the generator rotor with the special tool and tighten its bolt to the specified torque.

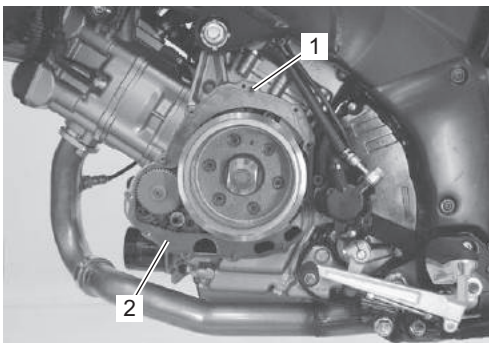
Special tool
(A): 09930-44541

Tightening torque
Generator rotor bolt (a): 180 N·m (18.0 kgf-m, 130.5 lbf-ft)



IE31J11A0013-01

- 7) Install the dowel pin (1) and new gasket (2).

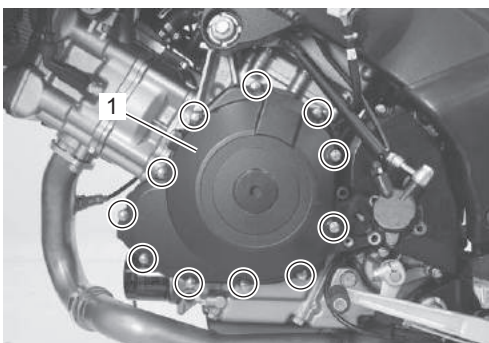


IE31J11A0014-01

- 8) Install the generator cover (1).

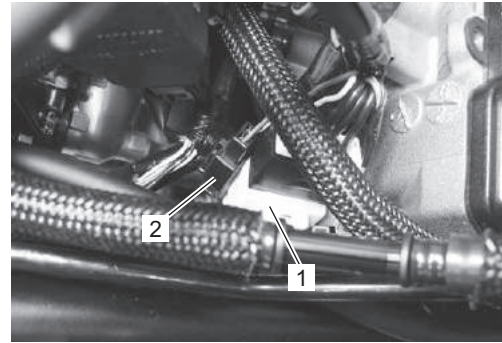
▲ CAUTION

Be careful not to pinch the finger between the generator cover and the crankcase.



IE31J11A0015-01

- 9) Connect the generator coupler (1) and CKP sensor coupler (2).



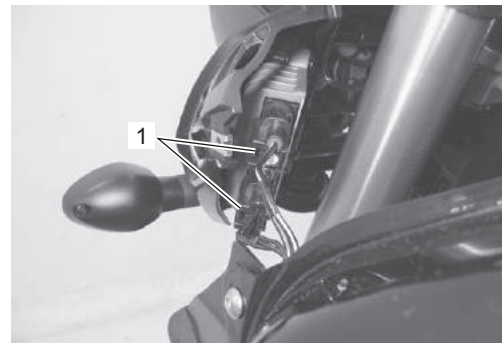
IE31J11A0016-02

- 10) Install the clutch release cylinder. (Page 5C-11)
- 11) Connect the battery (-) lead wire. (Page 1J-12)
- 12) Install the fuel tank. (Page 1G-9)
- 13) Pour engine oil. (Page 1E-4)
- 14) Install the under cowling assembly. (If equipped)

Regulator / Rectifier Inspection

BENJ31J31A06006

- 1) Turn the ignition switch to OFF position.
- 2) Remove the left fuel tank side cover.
 - L4 – L6 model: (Page 9D-14)
 - L8 – model: (Page 9D-34)
- 3) Disconnect the regulator/rectifier couplers (1).



IE31J11A0017-01

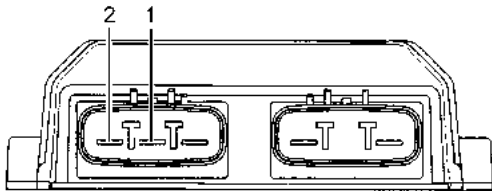
1J-8 Charging System:

- 4) Set the "Diode test" of the multi circuit tester. Refer to "Precautions for Circuit Tester" in Section 00 (Page 00-7).
- 5) Check that the tester reads 1.4 V or more.

NOTE

If the tester reads less than 1.4 V when the tester probes are not connected, replace its battery.

- 6) Measure the voltage between the terminals (1) and (2). If the voltage is not within the specified value, replace the regulator/rectifier with a new one.



IE31J11A0018-03

		(+) Probe of tester to:	
		1	2
(-) Probe of tester to:	1		
	2		0.3 – 0.8 V

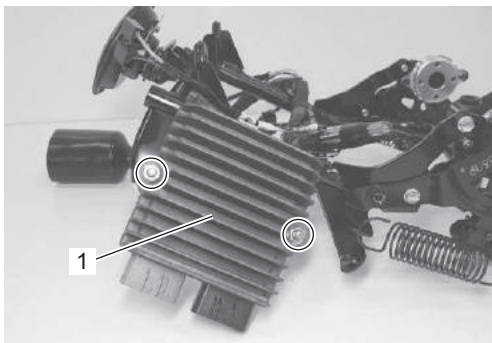
IE31J11A0026-02

Regulator / Rectifier Removal and Installation

BENJ31J31A06007

Removal

- 1) Remove the body cowling from cowling brace.
 - L4 – L6 model: (Page 9D-16)
 - L8 – model: (Page 9D-36)
- 2) Remove the regulator/rectifier (1).



IE31J11A0020-01

Installation

Install the regulator/rectifier in the reverse order of removal.

Battery Charging

BENJ31J31A06008

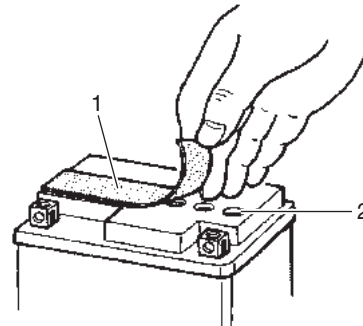
Initial Charging (L4 – L6)

Filling electrolyte

NOTE

When filling electrolyte, the battery must be removed from the vehicle and must be put on the level ground.

- 1) Remove the aluminum tape (1) which seals the battery filler holes (2).

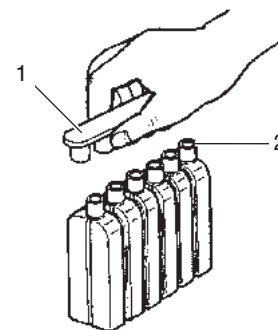


ID26J11A0022-05

- 2) Remove the caps (1) from the electrolyte container.

NOTE

- Do not remove or pierce the sealed areas (2) of the electrolyte container.
- After filling the electrolyte completely, use the removed cap as sealing caps of battery-filler holes.

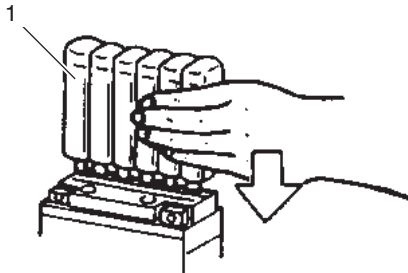


ID26J11A0023-04

- 3) Insert the nozzles of the electrolyte container (1) into the electrolyte filler holes of the battery.
- 4) Hold the electrolyte container firmly so that it does not fall.

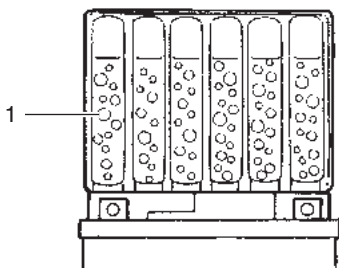
NOTE

Do not allow any of the electrolyte to spill.



ID26J11A0025-01

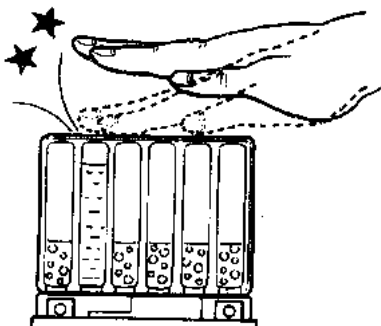
- 5) Make sure that air bubbles (1) rise to the top of each electrolyte container, and leave in this position for about more than 20 minutes.



ID26J11A0027-04

NOTE

If no air bubbles come out from a filler port, tap the bottom of the electrolyte container two or three times. Never remove the container from the battery.

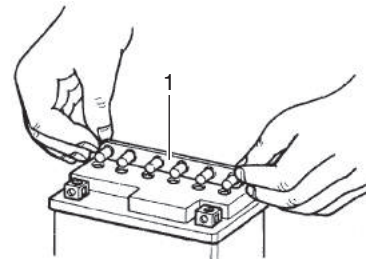


I310G11A0024-01

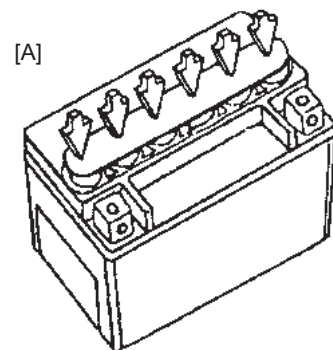
- 6) After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery.
- 7) Wait for about 20 minutes.
- 8) Insert the caps (1) into the filler holes, pressing in firmly so that the top of the caps do not protrude above the upper surface of the battery's top cover.

NOTICE

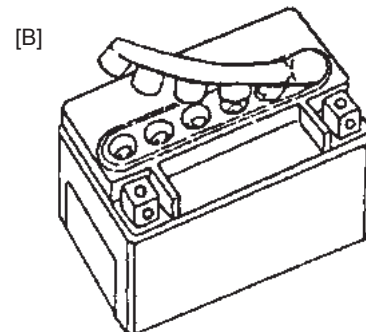
- **Once the caps are installed to the battery, do not remove the caps.**
- **Do not tap the caps with a hammer when installing them.**



ID26J11A0028-01



ID26J11A0029-05



ID26J11A0030-04

[A]:	Correct
[B]:	Incorrect

1J-10 Charging System:

Charging

For initial charging, use the charger specially designed for MF battery.

NOTICE

- For charging the battery, use the charger specially designed for MF battery. Otherwise, the battery may be overcharged resulting in shortened service life.
- Do not remove the cap during charging.
- Position the battery with the cap facing upward during charging.

Battery Recharging (L4 – L6)

NOTICE

Do not remove the caps on the battery top while recharging.

NOTE

When the motorcycle is not used for a long period, check the battery every 1 month to prevent the battery discharge.

- 1) Remove the battery from the motorcycle. (Page 1J-12)
- 2) Measure the battery voltage using the multi circuit tester.
If the voltage reading is less than the 12 V (DC), recharge the battery with a battery charger.

Recharging time

1.4 A for 5 to 10 hours or 6 A for 1 hour

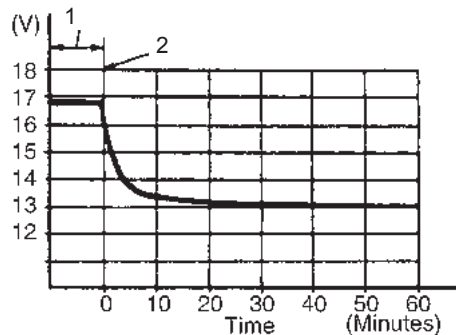
NOTICE

The charging current must not exceed 6 A.

- 3) After recharging, wait at least 30 minutes and then measure the battery voltage using the multi circuit tester.

If the battery voltage is less than 12.5 V, recharge the battery again.

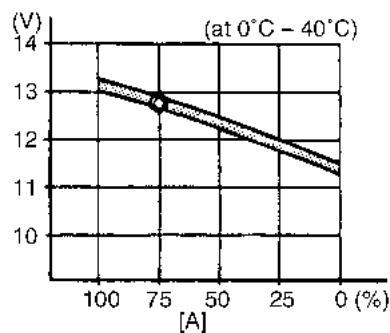
If the battery voltage is still less than 12.5 V after recharging, replace the battery with a new one.



ID26J11A0039-02

1. Charging period 2. Stop charging

- 4) Install the battery to the motorcycle. (Page 1J-12)



ID26J11A0041-01

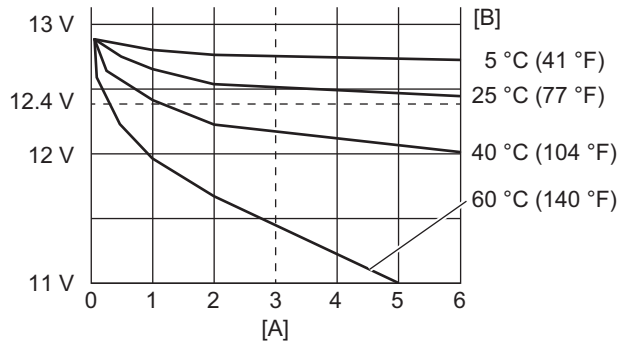
[A]: Battery charged condition

Battery Recharging (L8 –)

NOTICE

- 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.
- Do not remove the cap during charging.
- Position the battery with the cap facing upward during charging.
- 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.
- 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.

Self discharge rate by environment



IH13K11A0031-01

[A]: Time (Month)
[B]: Ambient temperature

NOTE

It is recommended to use the charger specially designed for MF battery.

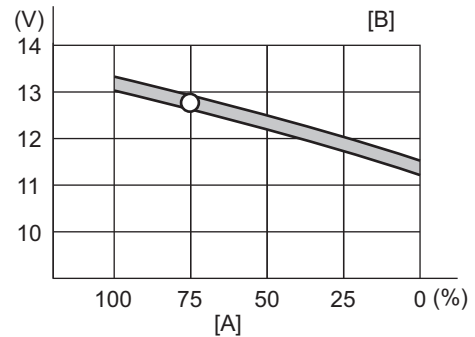
- 1) Remove the battery from the motorcycle. (Page 1J-12)
- 2) Measure the battery voltage. If the voltage reading is 12.4 V or less, recharge the battery.

Recharging time

Standard charging [Standard]: 1.1 A for 5 to 10 hours

Fast charging [Standard]: 5.5 A for 1 hour

- 3) After recharging, wait at least 30 minutes and then measure the battery voltage using the multi circuit tester. If the battery voltage is 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-12)



IH13K11A0032-02

[A]: Battery charged condition
[B]: Ambient temperature 0 – 40 °C (32 – 104 °F)

Battery Removal and Installation

BENJ31J31A06009

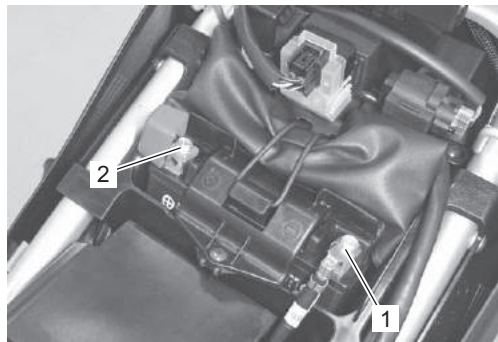
L4 – L6

Removal

- 1) Remove the seat. (Page 9D-10)
- 2) Disconnect the battery (–) lead wire (1).
- 3) Disconnect the battery (+) lead wire (2).

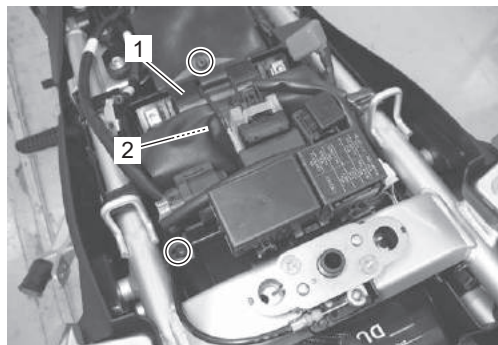
NOTE

Disconnect the battery (–) lead wire (1) first, then disconnect the battery (+) lead wire (2).



IE31J11A0024-01

- 4) Remove the tool holder (1) and battery (2) from the motorcycle.



IE31J11A0021-02

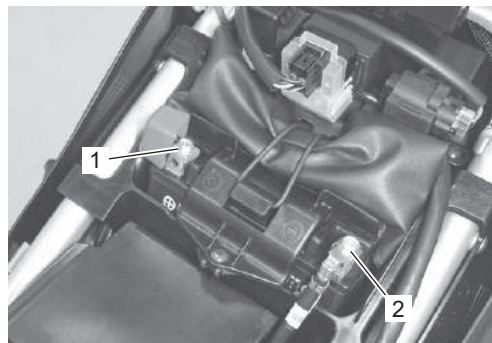
Installation

Install the tool holder and battery in the reverse order of removal. Pay attention to the following points:

- Tighten the battery lead wire mounting bolts securely.

NOTE

Connect the battery (+) lead wire (1) first, then connect battery (–) lead wire (2).

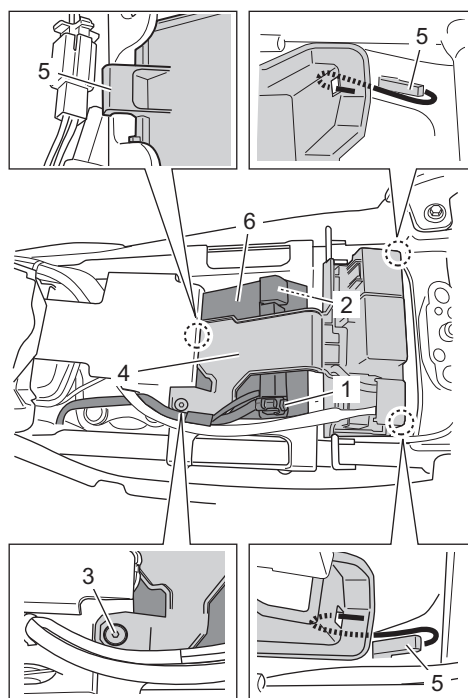


IE31J11A0022-02

L8 –

Removal

- 1) Remove the seat. (Page 9D-33)
- 2) Disconnect the battery (–) lead wire (1) first, then disconnect the battery (+) lead wire (2).
- 3) Remove the screw (3).
- 4) Remove the battery holder lid (4) unhooking the hooks (5).
- 5) Remove the battery (6).



IJ31J11A0001-02

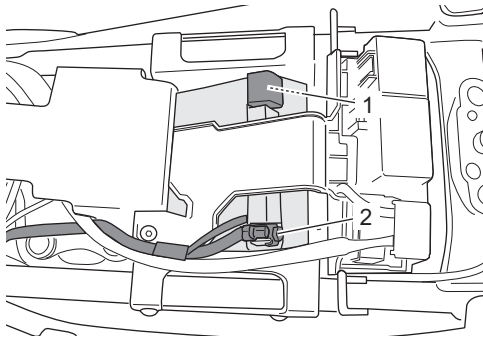
Installation

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

NOTICE

Never use anything except the specified battery.

- Set the battery protector to the battery. Refer to “Battery Protector Construction”: L8 - in Section 9D (Page 9D-31).
- Connect the battery (+) lead wire (1) first, then connect battery (-) lead wire (2).
- Tighten the battery lead wire mounting bolts securely.



IJ31J11A0002-03

Battery Visual Inspection

BENJ31J31A06010

- 1) Remove the seat.
 - L4 – L6 model: ☞ (Page 9D-10)
 - L8 – model: ☞ (Page 9D-33)
- 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

BENJ31J31A07001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Generator stator bolt	10	1.0	7.5	☞ (Page 1J-6)
CKP sensor bolt	6.5	0.65	5.0	☞ (Page 1J-6)
Generator rotor bolt	180	18.0	130.5	☞ (Page 1J-7)

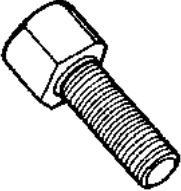

Reference:

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

BENJ31J31A08001

<p>09930–30450 Rotor remover bolt ☞ (Page 1J-6)</p> 	<p>09930–44541 Rotor holder ☞ (Page 1J-6) / ☞ (Page 1J-6) / ☞ (Page 1J-7)</p> 
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Exhaust System

Precautions

Precautions for Exhaust System

BENJ31J31B0001

▲ 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.

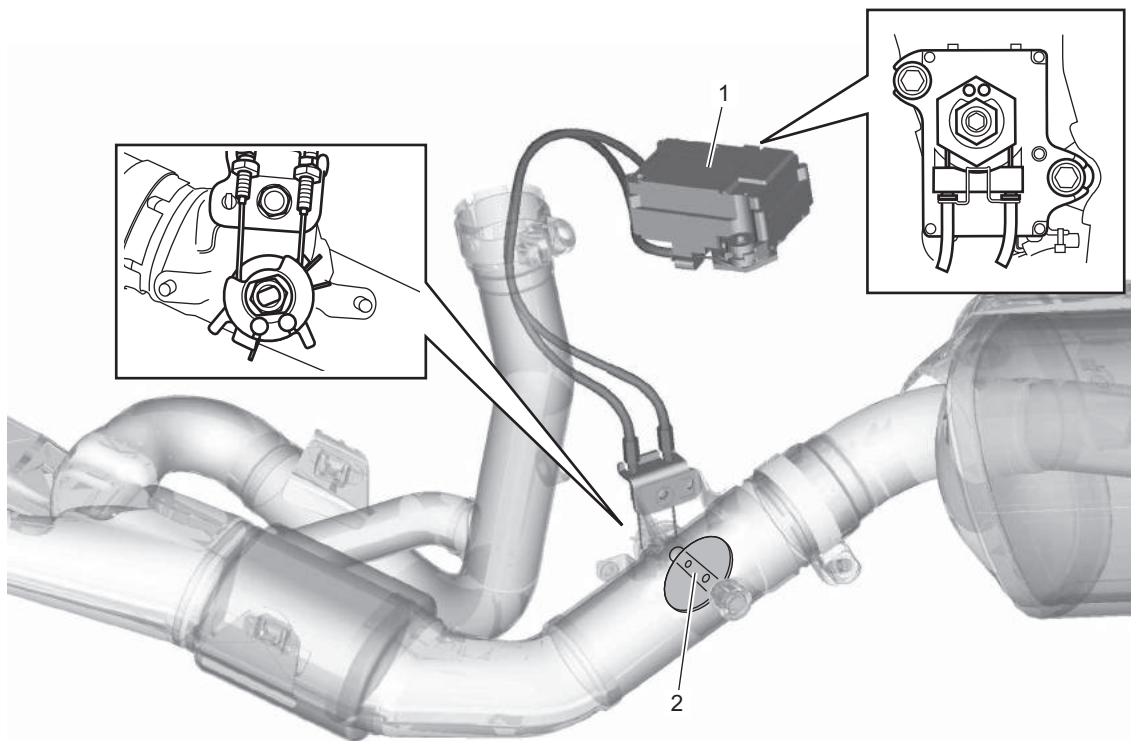
General Description

Exhaust Control System Description

BENJ31J31B01001

The EXCS consists of the EXCV, EXCVA and EXCV cables.

EXCV is installed in the exhaust pipe. EXCVA is mounted inside of the right frame. The EXCV is operated by the EXCVA via the cables. This system is designed to improve the engine torque at low engine rpm.



1. Exhaust control valve actuator (EXCVA)	2. Exhaust control valve (EXCV)
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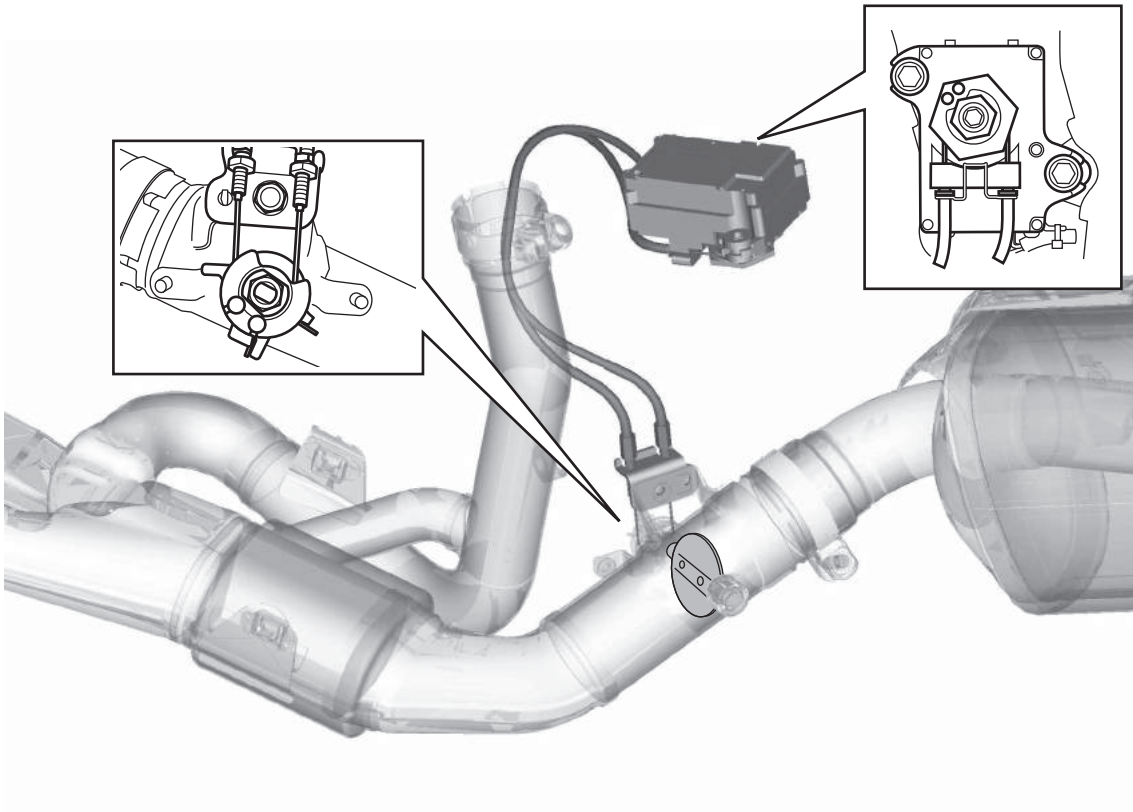
IE31J11B0001-01

Exhaust Control System Operation

BENJ31J31B01002

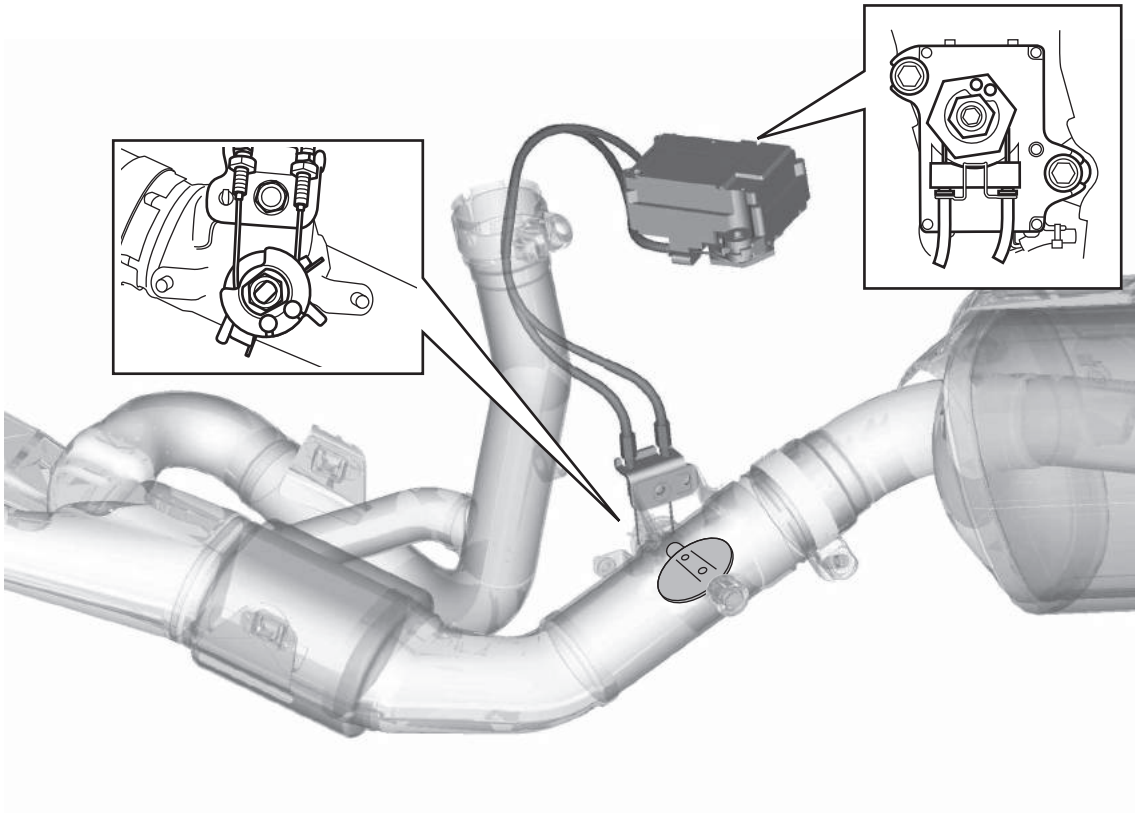
The EXCS is operated by the signal supplied from the ECM. The open/close operation of the EXCV is performed by the EXCVA which is controlled by the ECM by changing the current direction of the actuator motor. The position sensor (incorporated in the EXCVA) detects the EXCVA movement by measuring the voltage and then the ECM determines the EXCV opening angle based on the engine rpm 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



IE31J11B0002-04

FULL OPEN

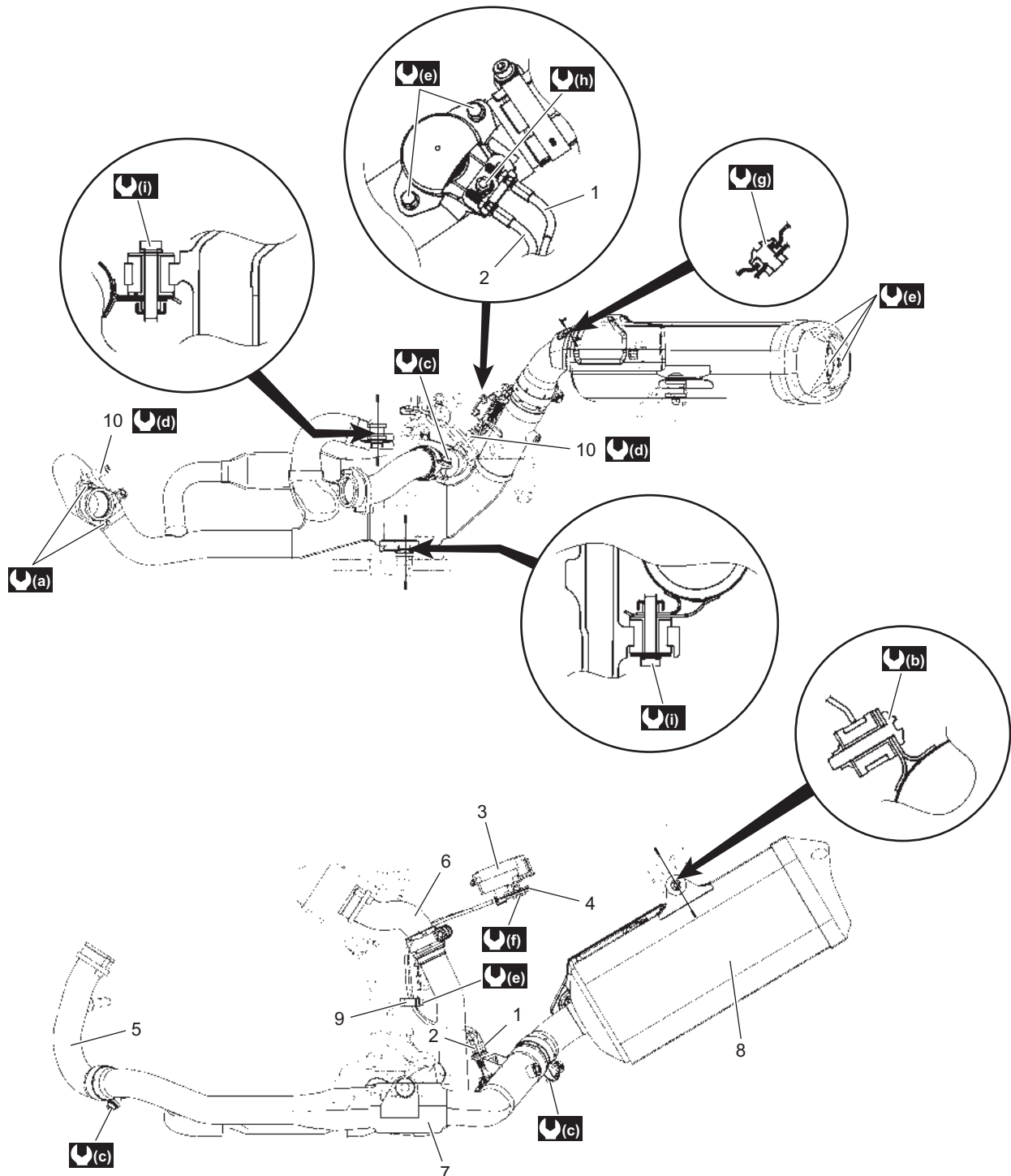


Repair Instructions

Exhaust Control System Construction

BENJ31J31B06001

DL1000AL4

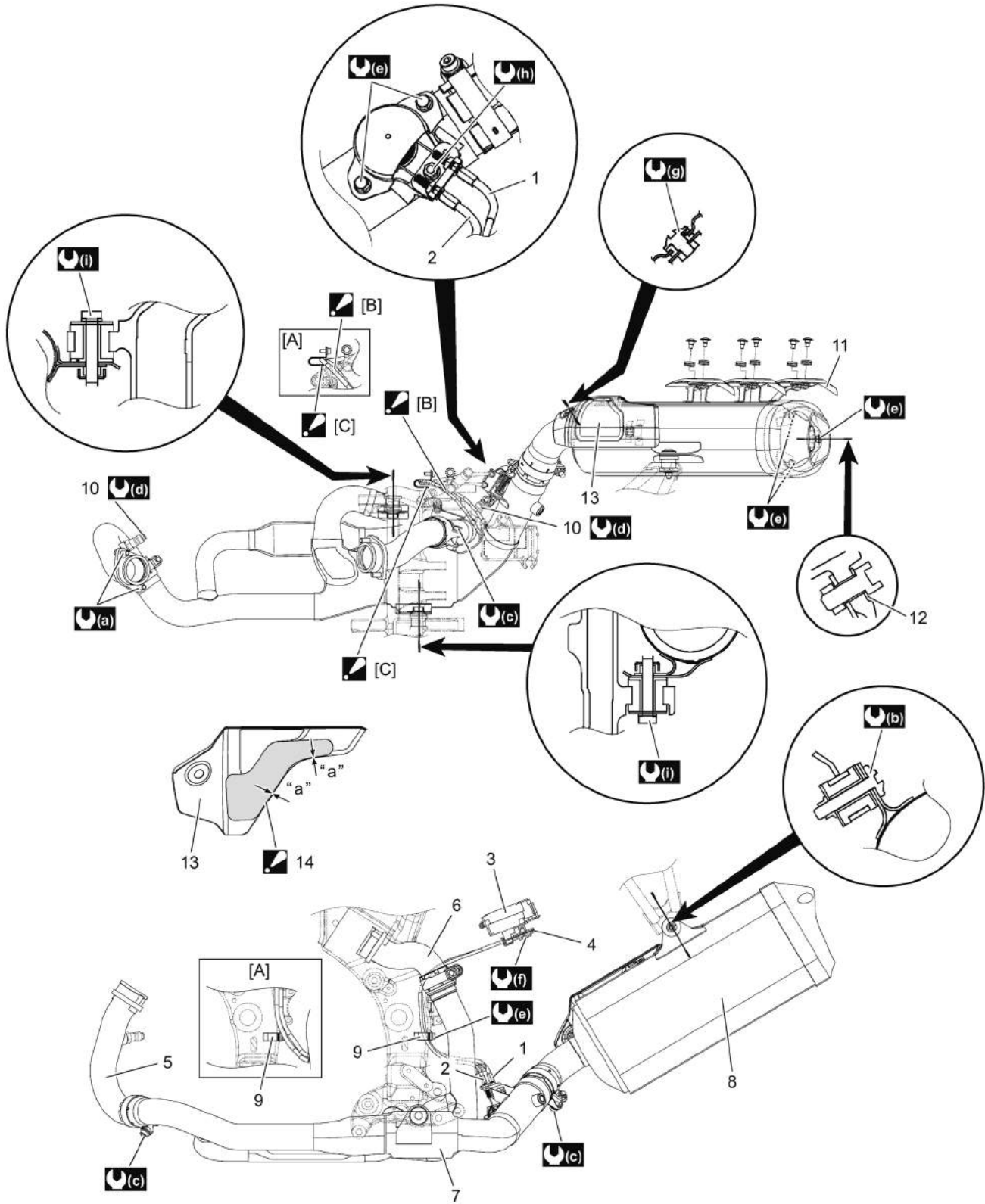














IF31J11B0001-01

1. EXCV cable No. 1	8. Muffler	(e) : 10 N-m (1.0 kgf-m, 7.5 lbf-ft)
2. EXCV cable No. 2	9. EXCV cable guide	(f) : 5 N-m (0.5 kgf-m, 4.0 lbf-ft)
3. EXCVA	10. HO2 sensor	(g) : 5.5 N-m (0.55 kgf-m, 4.0 lbf-ft)
4. EXCVA pulley		(a) : 23 N-m (2.3 kgf-m, 17.0 lbf-ft)
5. Front exhaust pipe		(b) : 30 N-m (3.0 kgf-m, 22.0 lbf-ft)
6. Rear exhaust pipe		(c) : 18 N-m (1.8 kgf-m, 13.0 lbf-ft)
7. Center exhaust pipe (catalyzer inside)		(d) : 25 N-m (2.5 kgf-m, 18.0 lbf-ft)
		(h) : 11 N-m (1.1 kgf-m, 8.0 lbf-ft)
		(i) : 26 N-m (2.6 kgf-m, 19.0 lbf-ft)

1K-5 Exhaust System:

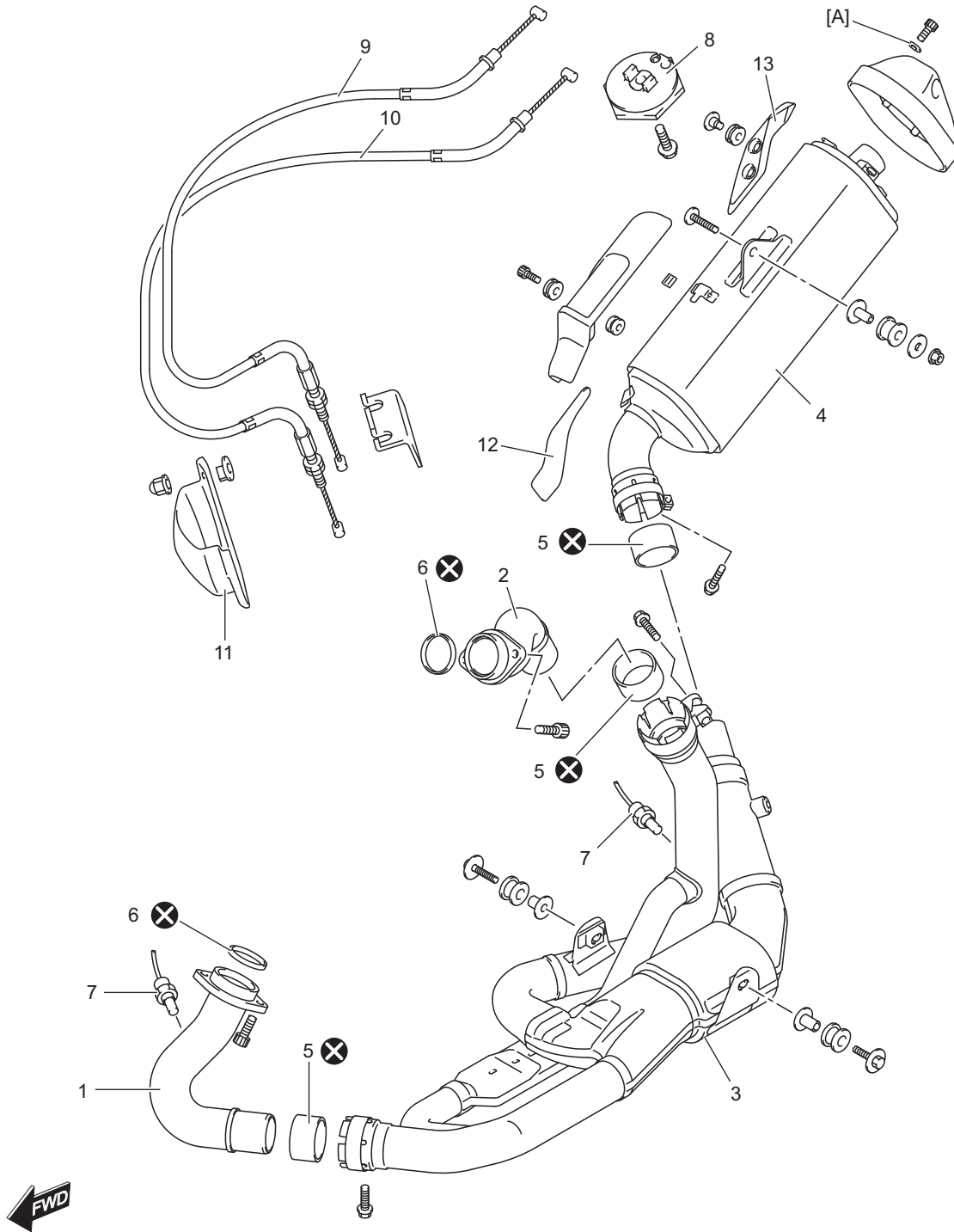
DL1000AL5 -, DL1000XAL8 -



[A]: L8 –	7. Center exhaust pipe (catalyzer inside)	 (a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
 [B]: Pass the EXCV cable between the brake hoses.	8. Muffler	 (b) : 30 N·m (3.0 kgf-m, 22.0 lbf-ft)
 [C]: Do not contact the clamp to the swingarm.	9. EXCV cable guide	 (c) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
1. EXCV cable No. 1	10. HO2 sensor	 (d) : 25 N·m (2.5 kgf-m, 18.0 lbf-ft)
2. EXCV cable No. 2	11. Muffler No. 1 cover (If equipped)	 (e) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
3. EXCVA	12. Washer (L8 –)	 (f) : 5 N·m (0.5 kgf-m, 4.0 lbf-ft)
4. EXCVA pulley	13. Muffler front cover	 (g) : 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)
5. Front exhaust pipe	 14. Muffler cover heat shield (If equipped) : Stick the muffler cover heat shield inside of the muffler front cover edge.	 (h) : 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
6. Rear exhaust pipe	"a": 1 mm (0.04 in)	 (i) : 26 N·m (2.6 kgf-m, 19.0 lbf-ft)

Exhaust System Components

BENJ31J31B06002



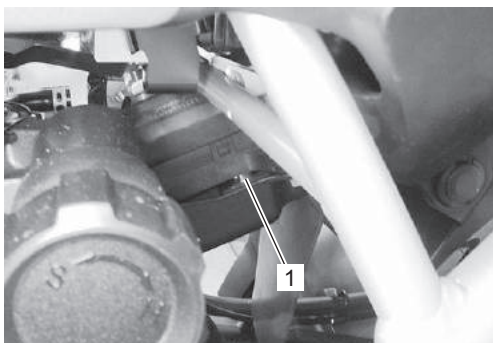
IJ31J11B0002-01

[A]: L8 -	5. Connector	10. EXCV cable No. 2
1. Front exhaust pipe	6. Exhaust pipe gasket	11. EXCV cover
2. Rear exhaust pipe	7. HO2 sensor	12. Muffler cover heat shield (If equipped)
3. Center exhaust pipe	8. EXCVA pulley	13. Muffler No. 1 cover (If equipped)
4. Muffler	9. EXCV cable No. 1	⊗ : Do not reuse.

Exhaust Control Valve Inspection

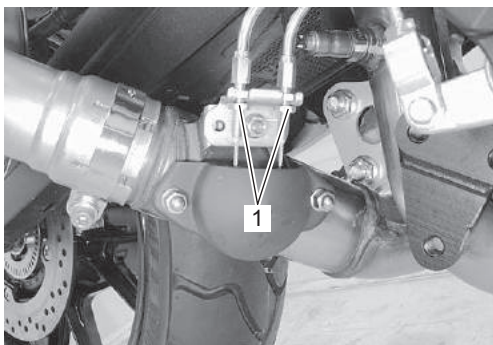
BENJ31J31B06003

- 1) 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).



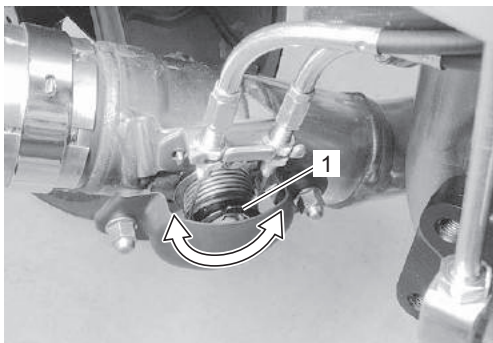
IE31J11B0006-01

- 2) Turn the ignition switch OFF.
- 3) 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).



IE31J11B0007-01

- 4) Check that the EXCV pulley (1) rotates to full open/close stopper positions, when turning the ignition switch ON.
- 5) Check that the voltage of EXCVA position sensor is within specification. If not, perform EXCVA adjustment. Refer to "EXCVA Adjustment" (Page 1K-12).



IE31J11B0008-01

- 6) Turn the ignition switch OFF.

EXCVA / EXCV Cable Removal and Installation

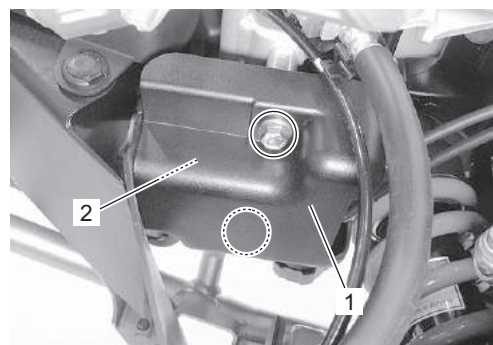
BENJ31J31B06004

Removal

NOTE

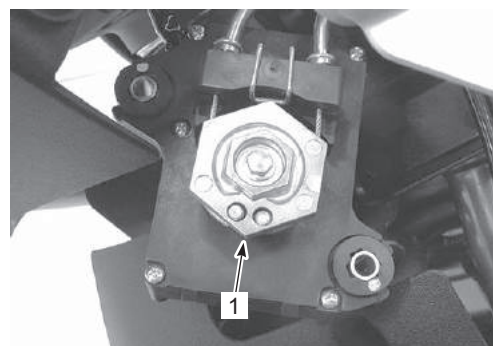
Before removing the EXCV cables, be sure to set the EXCVA pulley to the adjustment position.

- 1) Turn the ignition switch OFF.
- 2) Remove the EXCVA cover (1) with the EXCVA (2).



IE31J11B0009-01

- 3) Connect the special tool (Mode select switch) to the mode select coupler.
 - L4 – L6 model: ☞ (Page 1A-19)
 - L8 – model: ☞ (Page 1A-95)
- 4) After turning the mode select switch ON, turn the ignition switch ON.
- 5) Check that the cable slots of the EXCVA pulley comes to the middle (Adjustment position) (1).
- 6) Turn the ignition switch OFF.

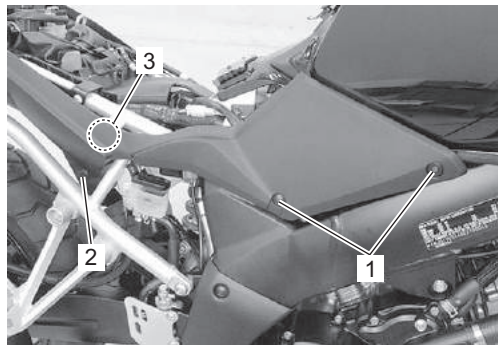


IE31J11B0010-01

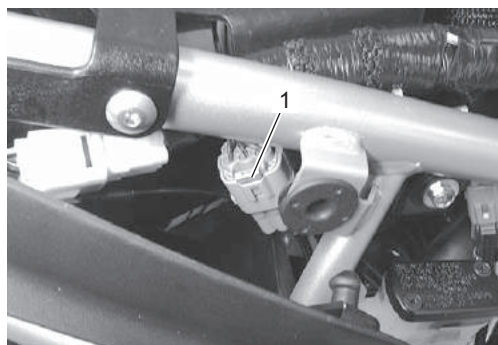
1K-9 Exhaust System:

7) Remove the screws (1) and clip (2).

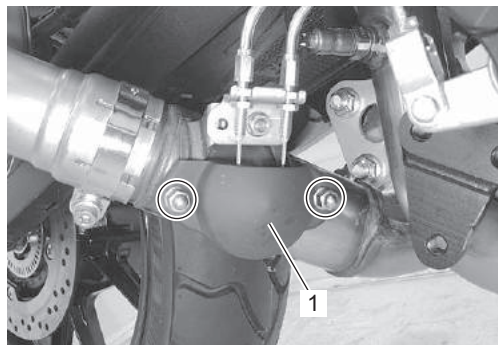
8) Disconnect the hook (3).



9) Disconnect the EXCVA coupler (1).

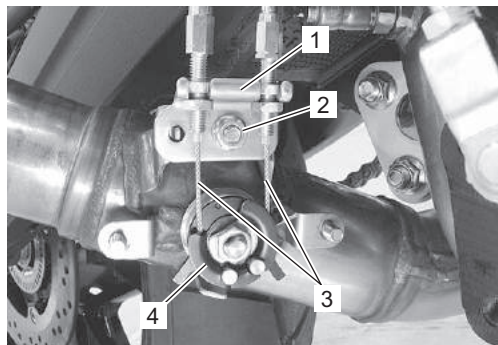


10) Remove the EXCV coupler (1).



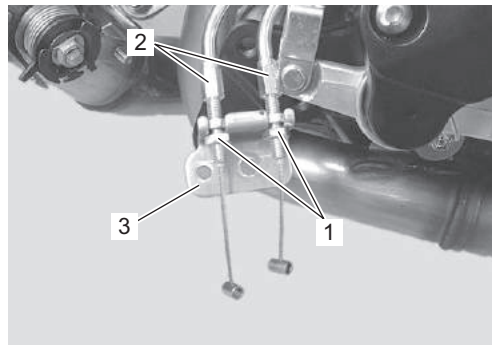
11) Remove the EXCV cable bracket (1) by removing the nut (2).

12) Remove the EXCV cables (3) from the EXCV pulley (4).

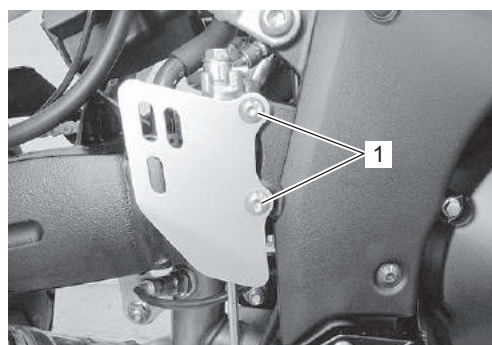


13) Loosen the lock-nuts (1).

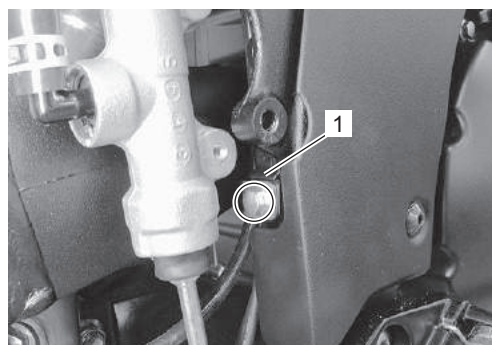
14) Remove the EXCV cables (2) from its bracket (3).



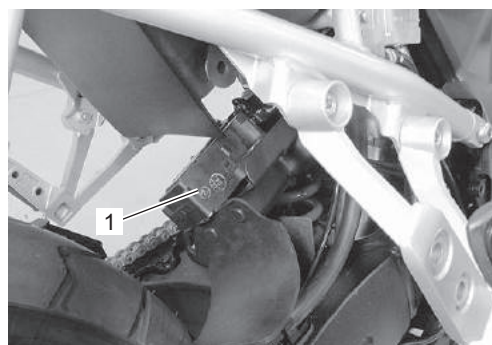
15) Remove the rear brake master cylinder mounting bolts (1).



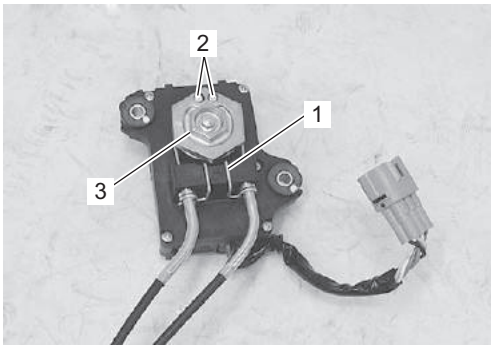
16) Remove the EXCV cable guide (1).



17) Remove the EXCVA (1) with the EXCV cables.



- 18) Remove the guide (1).
- 19) Disconnect the EXCV cables (2) from the EXCVA pulley (3).



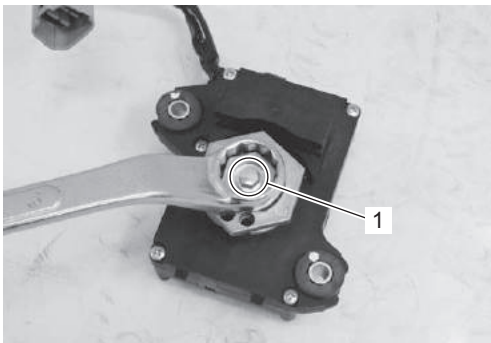
IE31J11B0019-02

- 20) 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.

- 21) Remove the pulley from the EXCVA body.



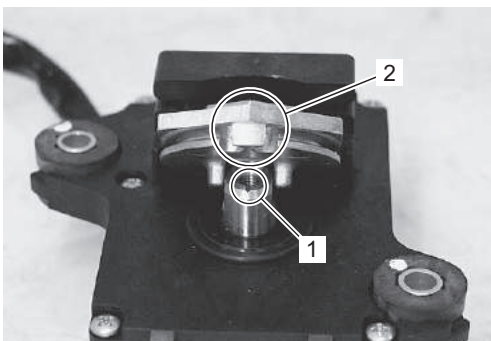
IE31J11B0020-01

Installation

- 1) Install the EXCVA pulley to the shaft.

NOTE

Align the shaft's line (1) and cable slots (2).



IE31J11B0021-01

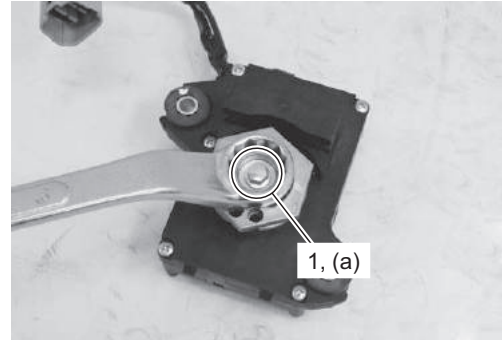
- 2) Hold the pulley with a box end wrench, and then tighten the pulley mounting bolt (1) to the specified torque.

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 mounting bolt (a): 5 N·m (0.5 kgf·m, 4.0 lbf·ft)



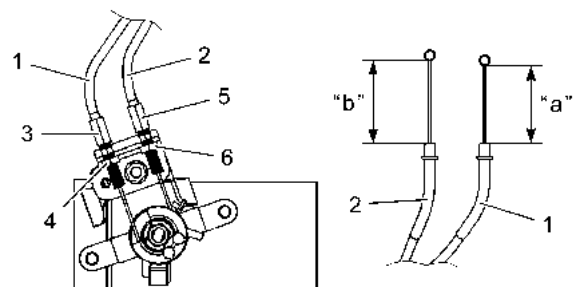
IE31J11B0022-01

- 3) Install the EXCVA with the EXCV cables as shown in the exhaust control system construction (Page 1K-4) and rear brake hose routing diagram. (Page 4A-6)
- 4) Temporarily install the EXCV cable No. 1 (31J0OL) (1) and No. 2 (31J0OP) (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): 31J0OL
 No. 2 cable (2): 31J0OP

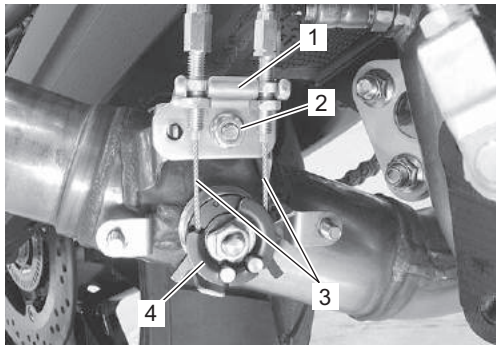
- 5) Install the EXCV cable No. 1 (1) and No. 2 (2) to the EXCV pulley.
- 6) Adjust the inner cable length "a" of No. 1 cable (1) in 46 – 47 mm (1.81 – 1.85 in) by turning the adjuster (3), then tighten the lock-nuts (4).
- 7) Adjust the inner cable length "b" of No. 2 cable (2) in 52.3 – 53.3 mm (2.06 – 2.10 in) by turning the adjuster (5), then tighten the lock-nuts (6).



IE31J11B0023-01

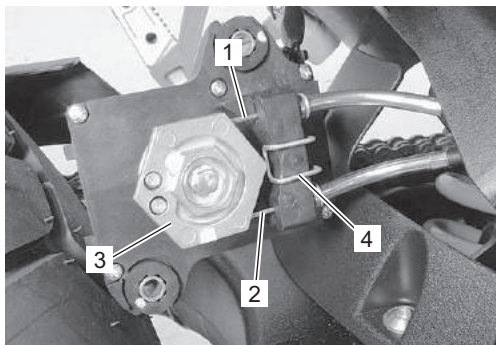
1K-11 Exhaust System:

- 8) Remove the EXCV cable bracket (1) by removing the nut (2).
- 9) Remove the EXCV cables (3) from the EXCV pulley (4).



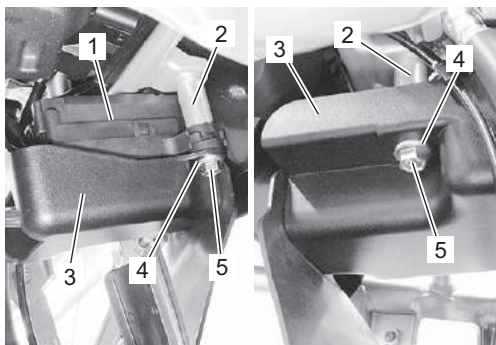
IE31J11B0076-01

- 10) Install the EXCV cable No. 1 (1) and No. 2 (2) to the EXCVA pulley (3).
- 11) Install the guide (4).



IE31J11B0077-01

- 12) Install the EXCVA (1), spacers (2), EXCVA cover (3), washers (4) and tighten the EXCVA mounting bolts (5).

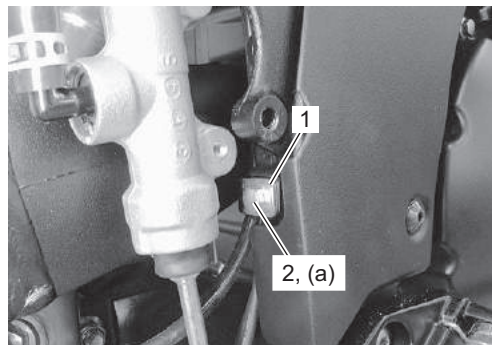


IE31J11B0027-01

- 13) Connect the EXCVA coupler.
- 14) Pass the EXCV cables and HO2 sensor #2 lead wire into the guide (1) and install the guide (1).
- 15) Tighten the EXCV cable guide bolt (2) to the specified torque.

Tightening torque

EXCV cable guide bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

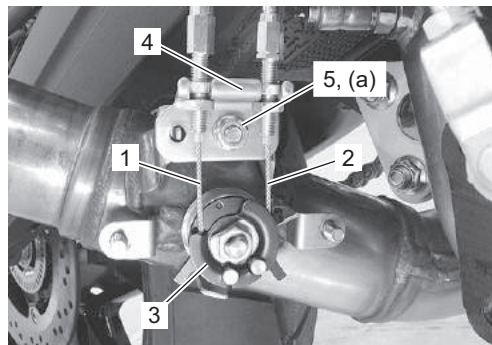


IE31J11B0028-01

- 16) Install the rear brake master cylinder. (Page 4A-22)
- 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, 8.0 lbf-ft)

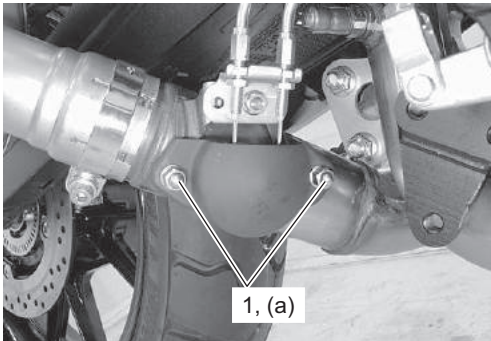


IE31J11B0029-01

- 19) Tighten the EXCV cover nut (1) to the specified torque.

Tightening torque

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



IE31J11B0030-01

- 20) Install the removed parts.
- 21) Inspect the EXCVA position sensor voltage. Refer to "EXCVA Adjustment" (Page 1K-12).

EXCVA Inspection

BENJ31J31B06005

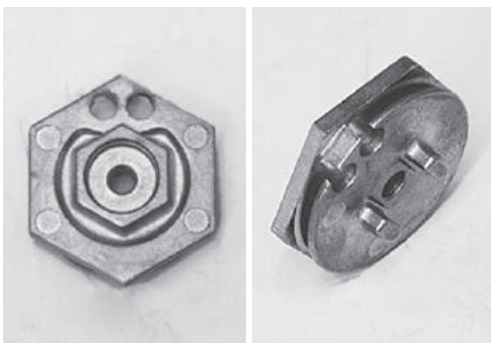
Refer to "DTC P1657-H / P1657-L (C46)": L4 - L6 in Section 1A (Page 1A-75) and "DTC P1658 (C46)": L4 - L6 in Section 1A (Page 1A-81), or "DTC P1400 / P1401 (C46)": L8 - in Section 1A (Page 1A-135) and "DTC P1403 (C46)": L8 - in Section 1A (Page 1A-138).

EXCVA Pulley Inspection

BENJ31J31B06006

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.



IB14J11B0014-02

EXCVA Adjustment

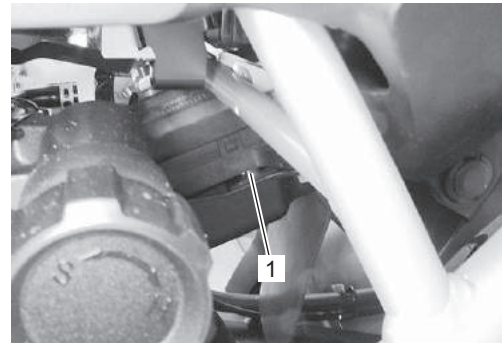
BENJ31J31B06007

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 (Mode select switch) to the mode select coupler.
 - L4 – L6 model: ⚙ (Page 1A-19)
 - L8 – model: ⚙ (Page 1A-95)
- 3) Turn the ignition switch ON and check the operation of EXCVA (1).
(EXCVA operation order: Full close → Full open → Middle position)



IE31J11B0031-01

- 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.

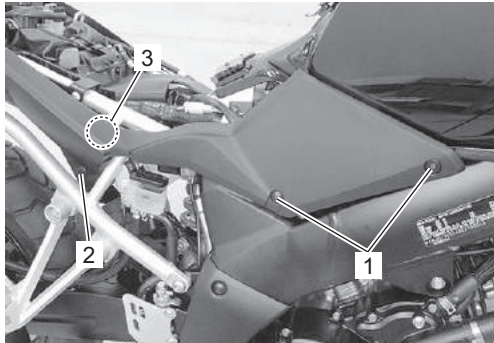


IE31J11B0032-01

1K-13 Exhaust System:

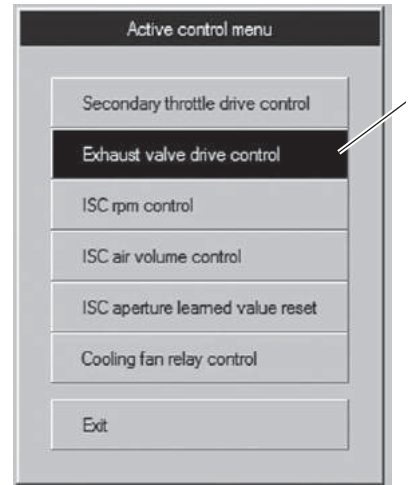
Step 3

- 1) Turn the ignition switch OFF.
- 2) Remove the screws (1) and clip (2).
- 3) Disconnect the hook (3).



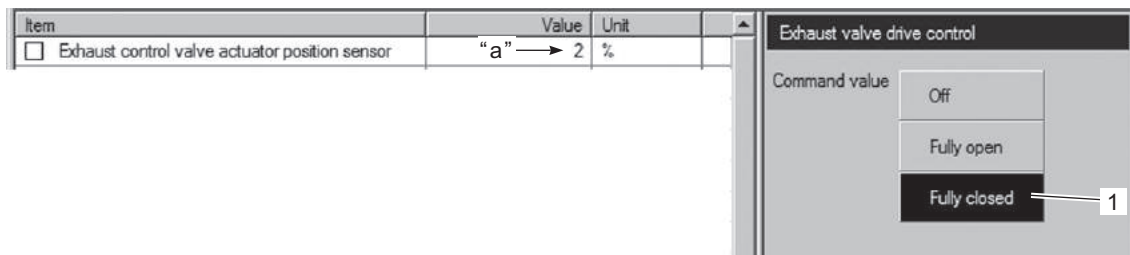
IE31J11B0011-01

- 4) Set up the SDS tools referring to the SDS operation manual for further details. (Page 1A-20)
- 5) Turn the ignition switch ON.
- 6) Click "Exhaust valve drive control" (1).



IE31J11B0034-01

- 7) Click "Full closed" (1).



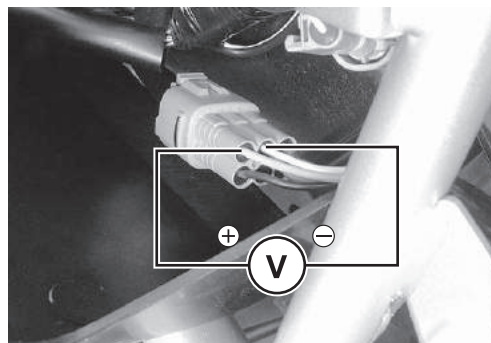
IE31J11B0035-01

"a": Exhaust control valve actuator position: 2%

- 8) Measure the EXCVA position sensor voltage between the Y wire and W wire at EXCV fully closed position.

EXCVA position sensor voltage

EXCV is fully closed: 0.45 – 1.40 V



IE31J11B0036-01

- 9) If the measured voltage is less than specification, adjust the No. 1 cable adjuster (1) as follows:
- Set the EXCVA to the adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).

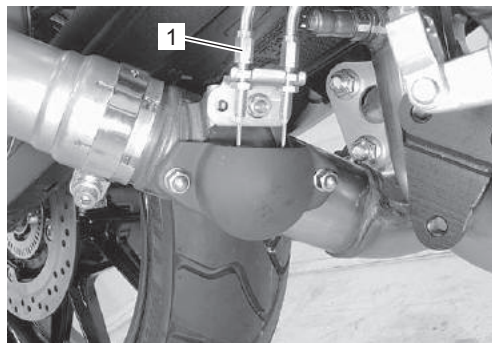
NOTICE

**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.**

- Turn the No. 1 cable adjuster (1) in or out to set the voltage within the specified value.

NOTE

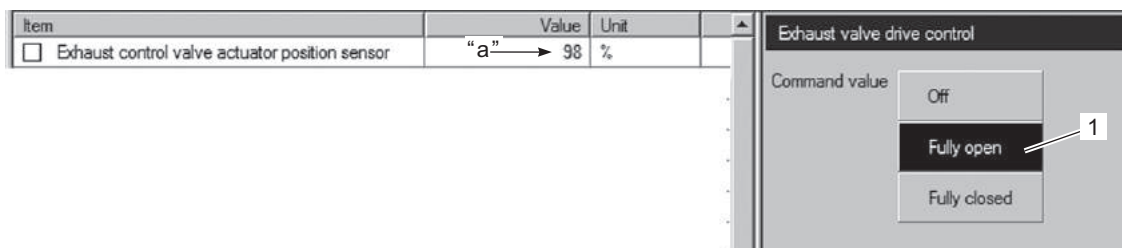
If C46 code is indicated after adjusting the voltage, increase the voltage to 0.9 V.



IE31J11B0037-01

Step 4

- Click "Full open" (1).



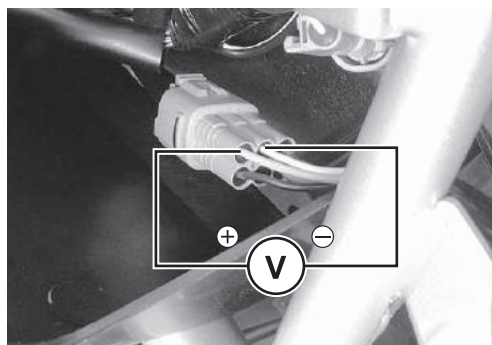
IE31J11B0038-01

"a": Exhaust control valve actuator position: 98%

- Measure the EXCVA position sensor voltage between the Y wire and W wire at EXCV fully opened position.

EXCVA position sensor voltage

EXCV is fully opened: 3.60 – 4.55 V



IE31J11B0039-01

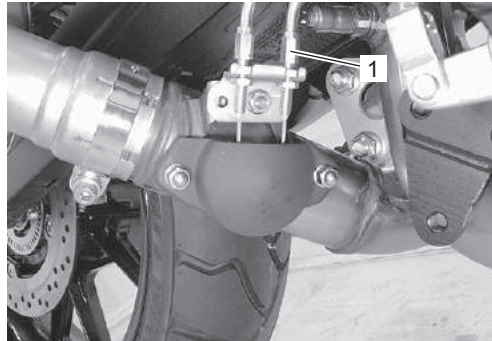
1K-15 Exhaust System:

- 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.

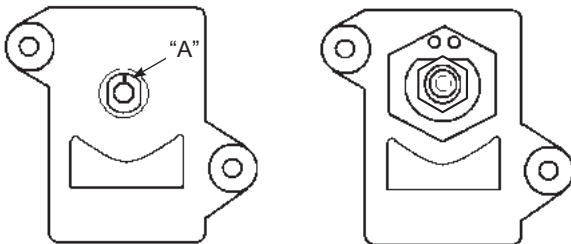


IE31J11B0040-01

- 4) After adjusting the EXCV cables, perform Step 2 to confirm DTC "46" 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 Gr wire and P wire to rotate the motor so that the line "A" or pulley comes to the adjacent position as shown.



IB14J11B0021-01

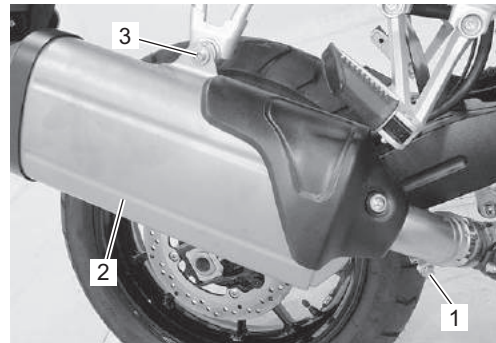
- 4) Connect the EXCVA coupler.
- 5) Check the EXCVA to the adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).
- 6) Turn the ignition switch OFF.
- 7) Connect the EXCV cables and install the EXCVA. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-8).
- 8) Inspect the EXCVA position sensor voltage. Refer to "EXCVA Adjustment" (Page 1K-12).

Exhaust Pipe / Muffler Removal

BENJ31J31B06008

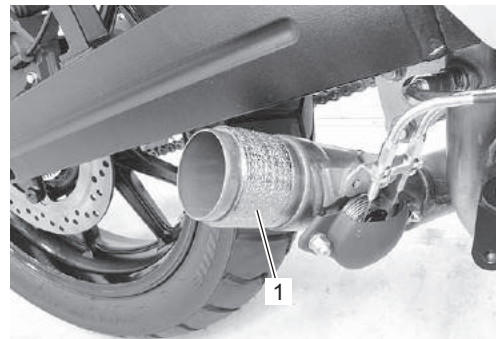
Muffler Removal

- 1) Loosen the muffler connecting bolt (1).
- 2) Remove the muffler (2) by removing the support bolt and nut (3).



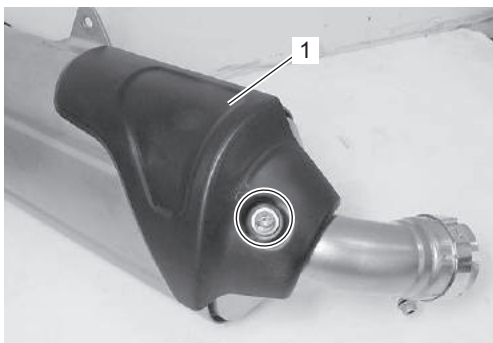
IE31J11B0041-02

- 3) Remove the muffler connector (1).



IE31J11B0042-01

4) Remove the muffler front cover (1).



IE31J11B0043-01

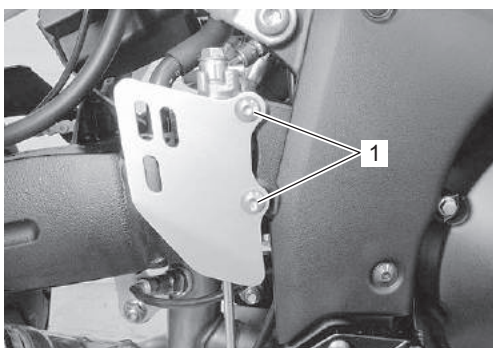
5) Remove the muffler rear cover (1).



IE31J11B0044-02

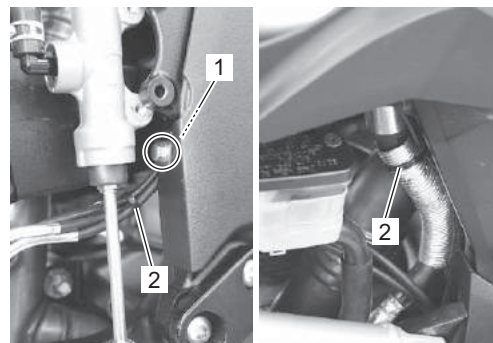
Exhaust Pipe Removal

- 1) Remove the under cowling assembly. (If equipped) [☞](#) (Page 9D-39)
- 2) Remove the seat.
 - L4 – L6 model: [☞](#) (Page 9D-10)
 - L8 – model: [☞](#) (Page 9D-33)
- 3) Remove the muffler.
- 4) Remove the rear brake master cylinder mounting bolts (1).



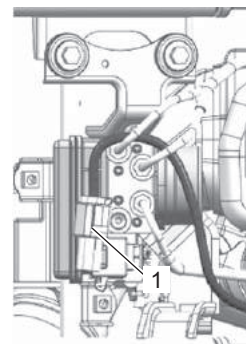
IE31J11B0045-01

5) Remove the EXCV cable guide (1) and clamps (2).



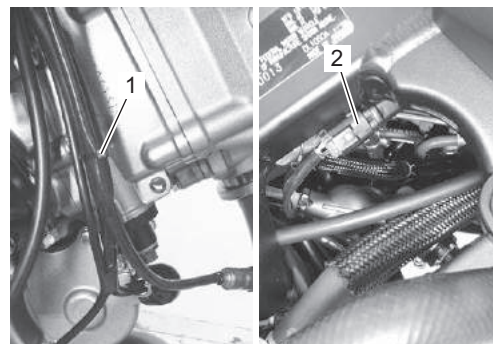
IE31J11B0046-03

6) Disconnect the HO2 sensor #2 lead wire coupler (1).



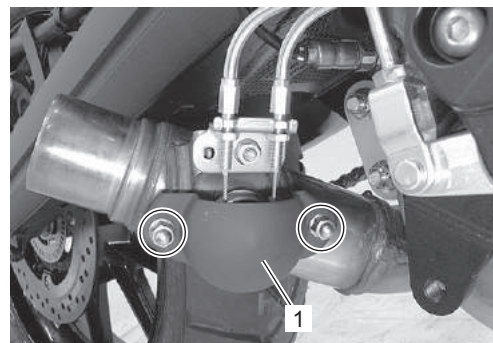
IE31J11B0047-03

7) Remove the clamp (1) and disconnect the HO2 sensor #1 lead wire coupler (2).



IE31J11B0048-02

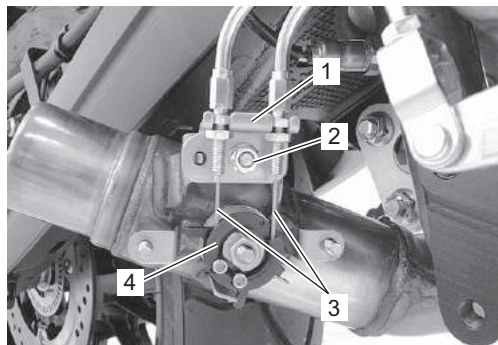
8) Remove the EXCV cover (1).



IE31J11B0049-01

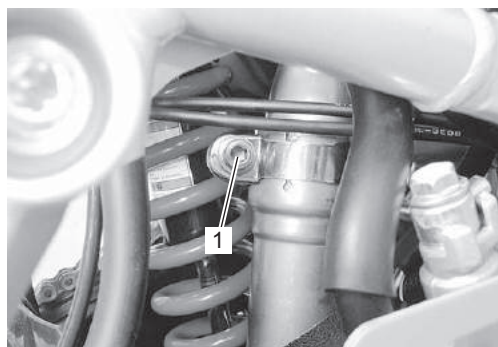
1K-17 Exhaust System:

- 9) Remove the EXCV cable bracket (1) by removing the nut (2).
- 10) Disconnect the EXCV cables (3) from EXCV pulley (4).



IE31J11B0050-01

- 11) Loosen the rear exhaust pipe connecting bolt (1).

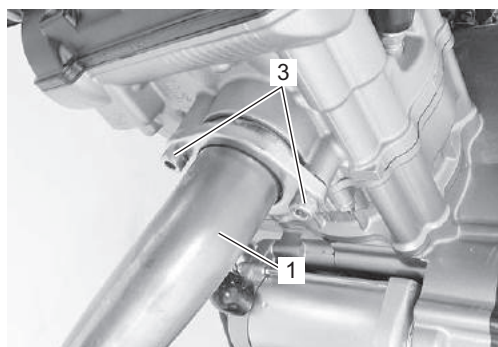


IE31J11B0051-01

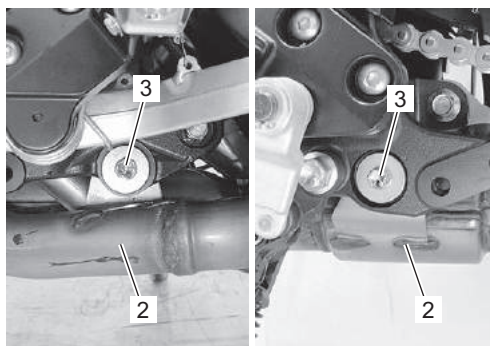
- 12) Remove the front exhaust pipe (1) with the center exhaust pipe (2) by removing the bolts (3).

NOTE

Support the front exhaust pipe with the center exhaust pipe to prevent it from falling.

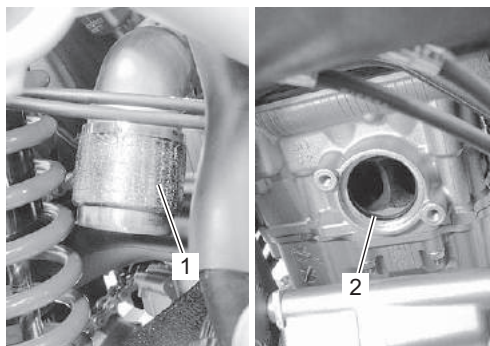


IE31J11B0052-01



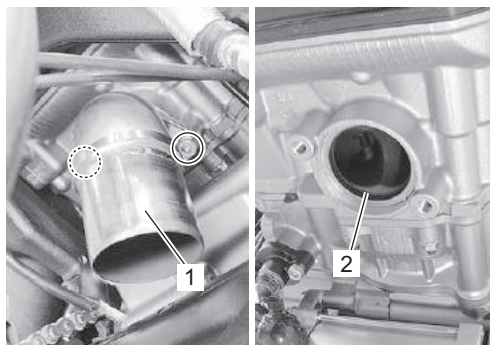
IE31J11B0053-01

- 13) Remove the rear exhaust pipe connector (1) and front exhaust pipe gasket (2).



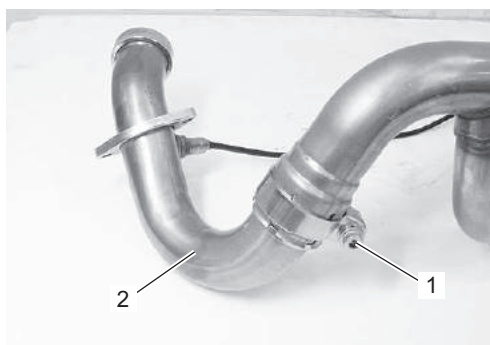
IE31J11B0054-01

- 14) Remove the rear shock absorber. (Page 2C-2)
- 15) Remove the rear exhaust pipe (1) and gasket (2).



IE31J11B0055-01

- 16) Loosen the front exhaust pipe connecting bolt (1) and remove the front exhaust pipe (2).



IE31J11B0056-01

17) Remove the front exhaust pipe connector (1).

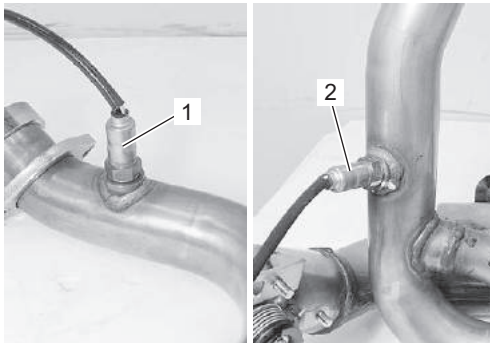


IE31J11B0057-01

18) Remove the HO2 sensor #1 (1) and #2 (2).

NOTICE

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



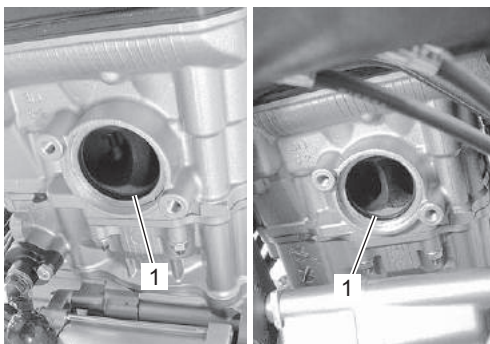
IE31J11B0058-01

Exhaust Pipe / Muffler Installation

BENJ31J31B06009

Exhaust Pipe Installation

- 1) Install the HO2 sensor #1 and #2. (Page 1C-20)
- 2) Install the new front and rear exhaust pipe gaskets (1).

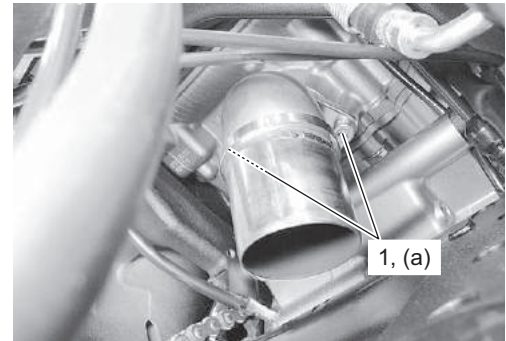


IE31J11B0059-01

3) Tighten the rear exhaust pipe bolts (1) to the specified torque.

Tightening torque

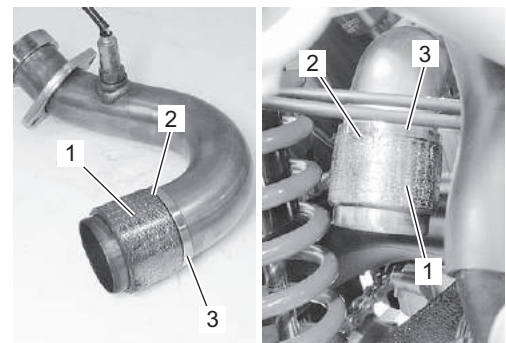
Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IE31J11B0060-01

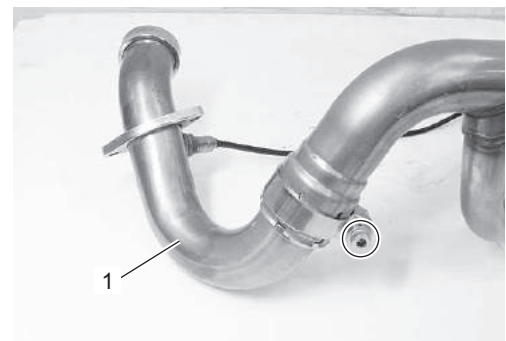
4) Install the rear shock absorber. (Page 2C-2)

5) Put the edge (2) of a new front and rear exhaust pipe connector (1) to the front and rear exhaust pipe stopper (3).



IE31J11B0061-01

6) Temporarily the front exhaust pipe (1).



IE31J11B0062-01

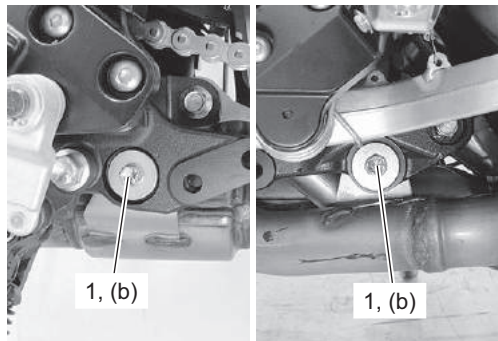
1K-19 Exhaust System:

- 7) Tighten the center exhaust pipe bolts (1) and front exhaust pipe bolts (2) to the specified torque.

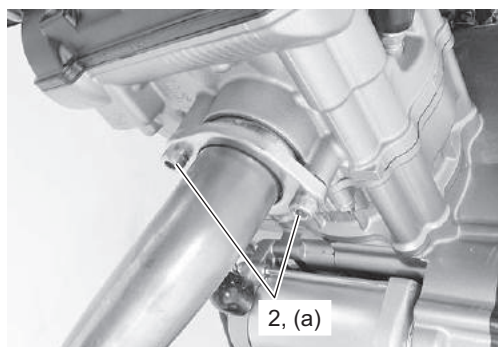
Tightening torque

Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

Center exhaust pipe bolt (b): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)



IF31J11B0002-01

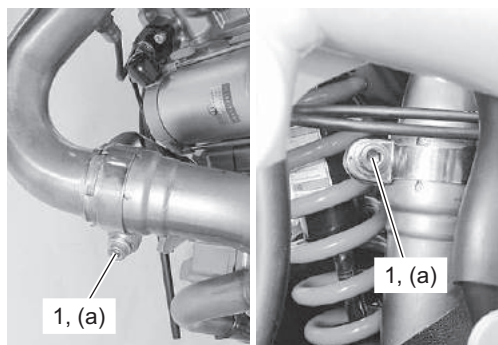


IE31J11B0064-01

- 8) Tighten the front and rear exhaust pipe connecting bolts (1) to the specified torque.

Tightening torque

Exhaust pipe connecting bolt (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



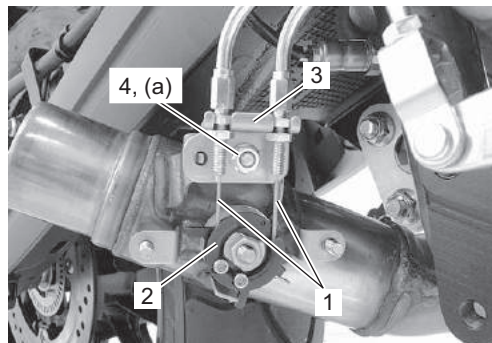
IE31J11B0065-01

- 9) Connect the EXCV cables (1) to the EXCV pulley (2).

- 10) Install the EXCV cable bracket (3) and tighten the nut (4) to the specified torque.

Tightening torque

EXCV cable bracket mounting nut (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

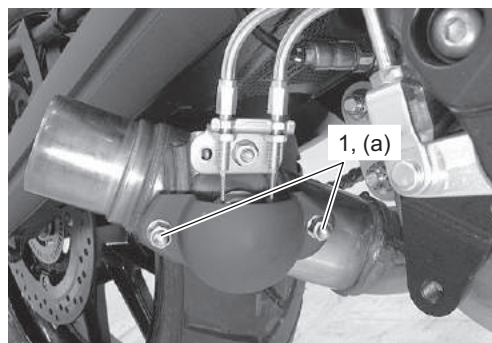


IE31J11B0067-01

- 11) Tighten the EXCV cover nuts (1) to the specified torque.

Tightening torque

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

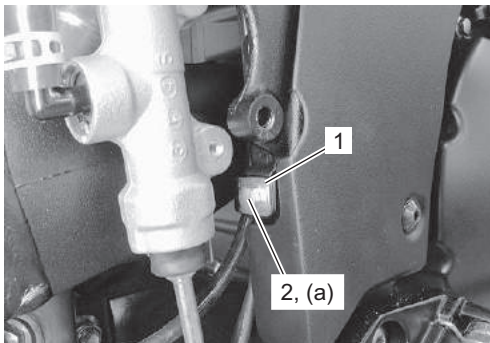


IE31J11B0068-01

- 12) Connect the HO2 sensor #1 and #2 lead wire coupler and clamps. Refer to "Intake System Components" in Section 1D (Page 1D-2).
- 13) Pass the HO2 sensor #2 lead wire and EXCV cables into the guide (1) and install the guide (1).
- 14) Tighten the EXCV cable guide bolt (2) to the specified torque.

Tightening torque

EXCV cable guide bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J11B0069-01

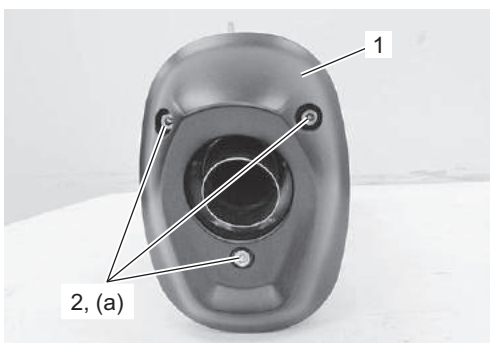
- 15) Install the rear brake master cylinder. (Page 4A-22)
- 16) Install the muffler.
- 17) Install the seat.
 - L4 – L6 model: (Page 9D-10)
 - L8 – model: (Page 9D-33)
- 18) Install the under cowling assembly. (If equipped)

Muffler Installation

- 1) Install the muffler rear cover (1) and tighten the muffler rear cover screws (2) to the specified torque.

Tightening torque

Muffler rear cover screw (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

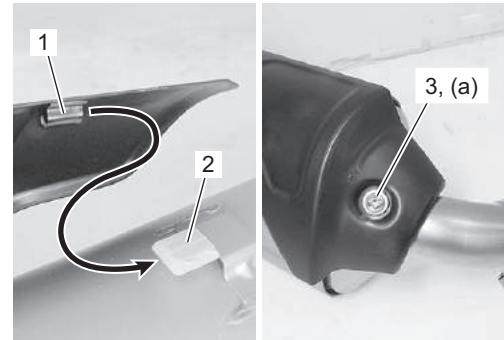


IE31J11B0070-01

- 2) Slide the muffler front cover retainer (1) to the hook (2) on the muffler and tighten the bolt (3) to the specified torque.

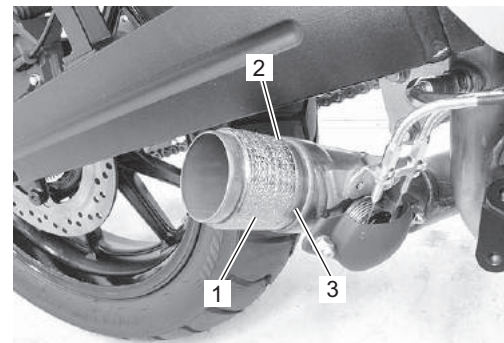
Tightening torque

Muffler front cover bolt (a): 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)



IE31J11B0071-01

- 3) Put the edge (2) of a new muffler connector (1) to the center exhaust pipe stopper (3).



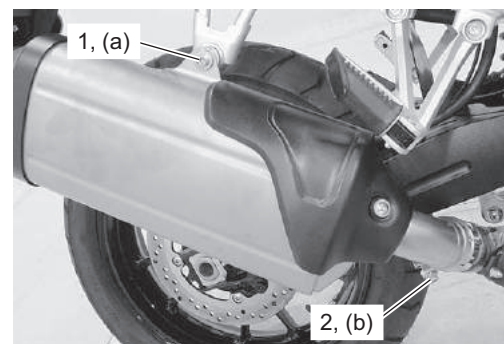
IE31J11B0072-01

- 4) Tighten the muffler support bolt (1) and muffler connecting bolt (2) to the specified torque.

Tightening torque

Muffler support bolt (a): 30 N·m (3.0 kgf-m, 22.0 lbf-ft)

Muffler connecting bolt (b): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



IE31J11B0073-01

1K-21 Exhaust System:

Exhaust System Inspection

BENJ31J31B06010

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, center exhaust pipe bolts, muffler connecting bolt, exhaust pipe connecting bolts and muffler support bolt are tightened to their specified torque.

Tightening torque

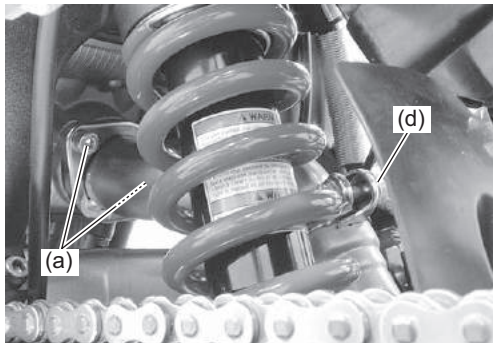
Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

Muffler connecting bolt (b): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)

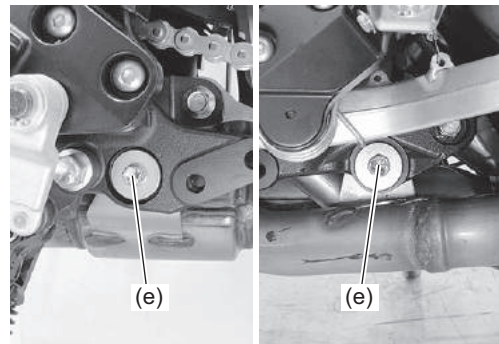
Muffler support bolt (c): 30 N·m (3.0 kgf-m, 22.0 lbf-ft)

Exhaust pipe connecting bolt (d): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)

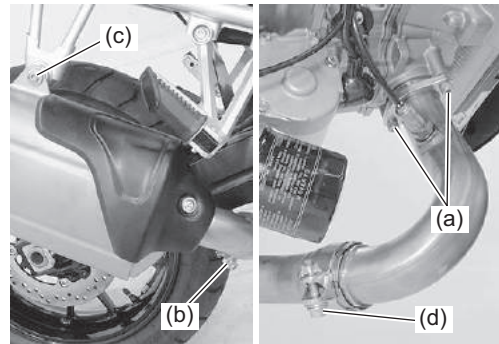
Center exhaust pipe bolt (e): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)



IE31J11B0074-01



IF31J11B0003-01



IE31J11B0078-02

Specifications

Tightening Torque Specifications

BENJ31J31B07001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
EXCVA pulley mounting bolt	5	0.5	4.0	☞ (Page 1K-10)
EXCV cable guide bolt	10	1.0	7.5	☞ (Page 1K-11) / ☞ (Page 1K-20)
EXCV cable bracket mounting nut	11	1.1	8.0	☞ (Page 1K-11) / ☞ (Page 1K-19)
EXCV cover nut	10	1.0	7.5	☞ (Page 1K-12) / ☞ (Page 1K-19)
Exhaust pipe bolt	23	2.3	17.0	☞ (Page 1K-18) / ☞ (Page 1K-19) / ☞ (Page 1K-21)
Center exhaust pipe bolt	26	2.6	19.0	☞ (Page 1K-19) / ☞ (Page 1K-21)
Exhaust pipe connecting bolt	18	1.8	13.0	☞ (Page 1K-19) / ☞ (Page 1K-21)
Muffler rear cover screw	10	1.0	7.5	☞ (Page 1K-20)
Muffler front cover bolt	5.5	0.55	4.0	☞ (Page 1K-20)
Muffler support bolt	30	3.0	22.0	☞ (Page 1K-20) / ☞ (Page 1K-21)
Muffler connecting bolt	18	1.8	13.0	☞ (Page 1K-20) / ☞ (Page 1K-21)

Reference:

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

“Exhaust Control System Construction” (Page 1K-4)

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

Section 2

Suspension

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Precautions

Precautions

Precautions for Suspension

BENJ31J3200001

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 muffler.**
-

Suspension General Diagnosis

Diagnostic Information and Procedures

Suspension and Wheel Symptom Diagnosis

BENJ31J32104001

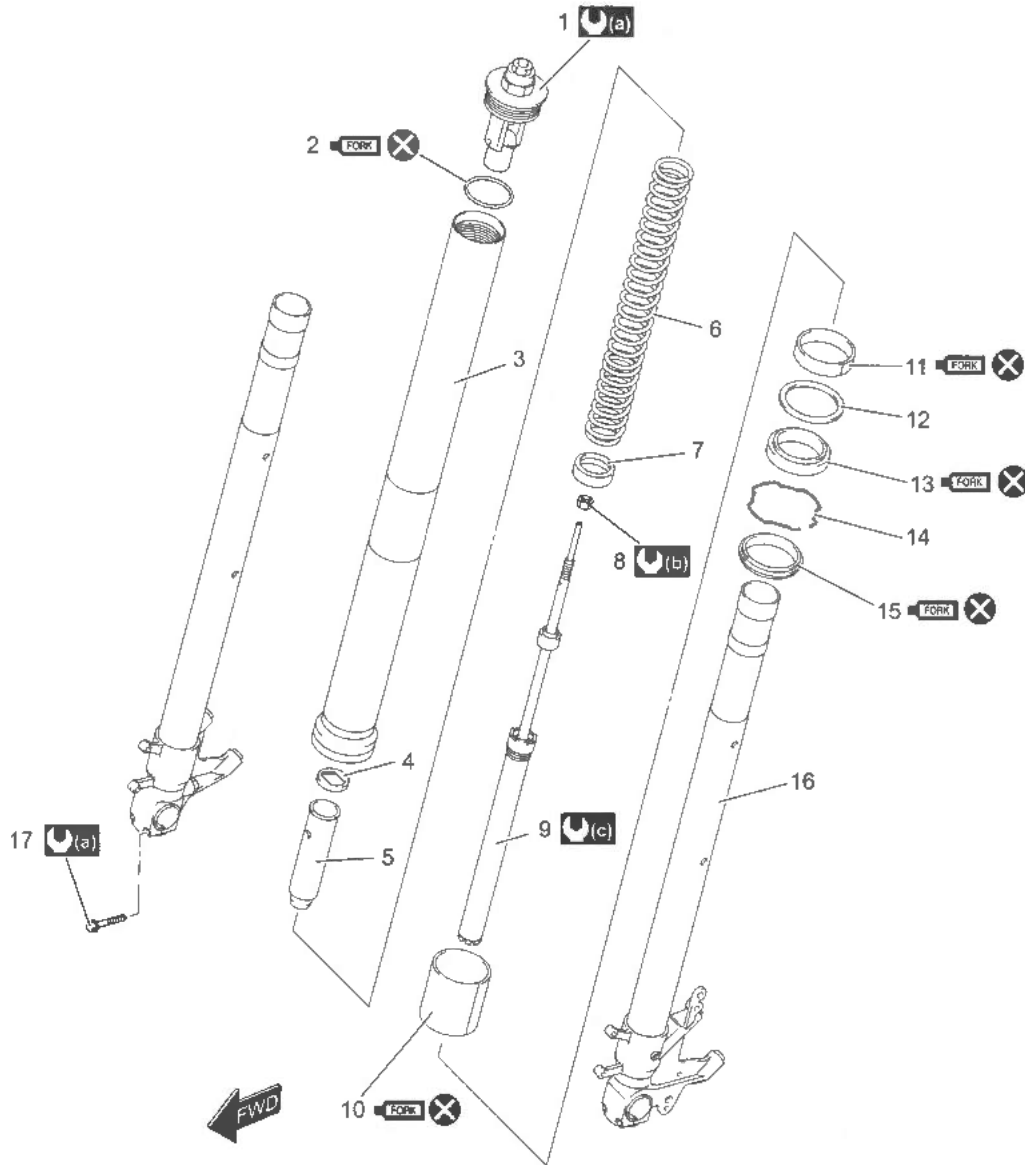
Condition	Possible cause	Correction / Reference Item
Wobbly front wheel	Distorted wheel rim.	Replace. ☞(Page 2D-20)
	Worn front wheel bearings.	Replace. ☞(Page 2D-7)
	Defective or incorrect tire.	Replace. ☞(Page 2D-20)
	Loose front axle nut.	Tighten. ☞(Page 2D-5)
	Loose front axle pinch bolts.	Tighten. ☞(Page 2D-5)
	Incorrect fork oil level.	Adjust. ☞(Page 2B-4)
	Incorrect front wheel weight balance.	Adjust. ☞(Page 2D-22)
Front suspension too soft	Insufficiently viscous fork oil.	Replace. ☞(Page 2B-4)
	Insufficient fork oil.	Check level and add. ☞(Page 2B-4)
	Weal spring.	Replace. ☞(Page 2B-4)
	Improperly set front fork spring pre-load 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-5)
	Improperly set front fork spring pre-load 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 suspension fastener.	Tighten. ☞(Page 2B-3)
Wobbly rear wheel	Distorted wheel rim.	Replace. ☞(Page 2D-20)
	Worn rear wheel bearings.	Replace. ☞(Page 2D-13)
	Defective or incorrect tire.	Replace. ☞(Page 2D-20)
	Worn swingarm bearings.	Replace. ☞(Page 2C-16)
	Loose rear suspension fastener.	Tighten. ☞(Page 2C-2)
	Loose rear axle nut.	Tighten. ☞(Page 2D-12)
	Worn rear suspension bearings.	Replace. ☞(Page 2C-4)
	Incorrect rear wheel weight balance.	Adjust. ☞(Page 2D-22)
Rear suspension too soft	Weak rear shock absorber spring.	Replace. ☞(Page 2C-2)
	Rear shock absorber leaks oil.	Replace. ☞(Page 2C-2)
	Improperly set rear shock absorber spring pre-load adjuster.	Adjust. ☞(Page 2C-2)
	Improperly set rear shock absorber damping force adjuster.	Adjust. ☞(Page 2C-2)
Rear suspension too stiff	Bent rear shock absorber shaft.	Replace. ☞(Page 2C-2)
	Worn swingarm bearings.	Replace. ☞(Page 2C-16)
	Worn rear suspension bearings.	Replace. ☞(Page 2C-4)
	Bent swingarm pivot shaft.	Replace. ☞(Page 2C-9)
	Improperly set rear shock absorber spring pre-load adjuster.	Adjust. ☞(Page 2C-2)
	Improperly set rear shock absorber damping force adjuster.	Adjust. ☞(Page 2C-2)
Rear suspension too noisy	Loose rear suspension fastener.	Tighten. ☞(Page 2C-2)
	Worn swingarm bearings.	Replace. ☞(Page 2C-16)
	Worn rear suspension bearings.	Replace. ☞(Page 2C-4)

Front Suspension

Repair Instructions

Front Fork Components

BENJ31J32206001



IE31J1220051-01

1. Front fork cap bolt	7. Spring seat	13. Oil seal	Ⓜ(b) : 15 N-m (1.5 kgf-m, 11.0 lbf-ft)
2. O-ring	8. Lock nut	14. Oil seal stopper ring	Ⓜ(c) : 70 N-m (7.0 kgf-m, 51.0 lbf-ft)
3. Outer tube	9. Inner rod/damper rod	15. Dust seal	FORK : Apply fork oil.
4. Spring retainer	10. Inner tube slide metal	16. Inner tube	⊗ : Do not reuse.
5. Spacer	11. Outer tube slide metal	17. Front axle pinch bolt	
6. Spring	12. Oil seal retainer	Ⓜ(a) : 23 N-m (2.3 kgf-m, 17.0 lbf-ft)	

Front Fork On-Vehicle Inspection

BENJ31J32206002

Inspect the front forks for oil leakage, scoring or scratches on the outer surface of the inner tubes (1). Replace any defective parts, if necessary. (Page 2B-4)



IE31J1220002-01

Front Suspension Adjustment

BENJ31J32206003

NOTICE

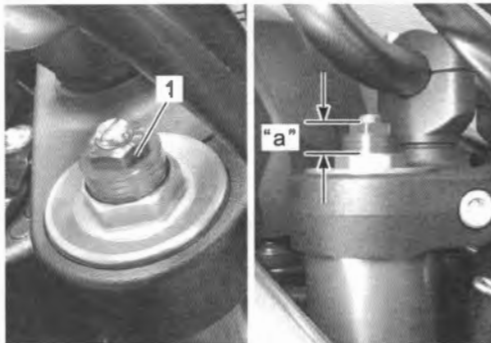
Adjust the left and right front forks to the same setting.

Spring Pre-load Adjustment

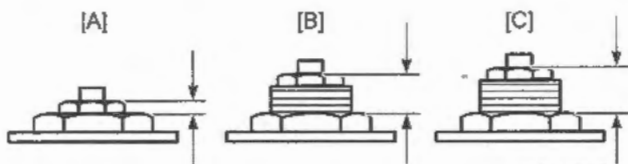
- Turn the spring pre-load adjuster (1) counterclockwise fully. From that position (softest), turn it clockwise to the specified position "a".

Front fork spring pre-load

Standard: 11 mm (0.4 in)



IE31J1220003-04



IE31J1220004-02

[A]: 4 mm (0.16 in) (maximum)	[C]: 14 mm (0.55 in) (minimum)
[B]: 11 mm (0.43 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 rebound damping force

Standard: 8 clicks counterclockwise out from stiffest position



IE31J1220005-01

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 compression damping force

Standard: 8 clicks counterclockwise from stiffest position



IE31J1220006-01

2B-3 Front Suspension:

Front Fork Assembly Removal and Installation

BENJ31J32206004

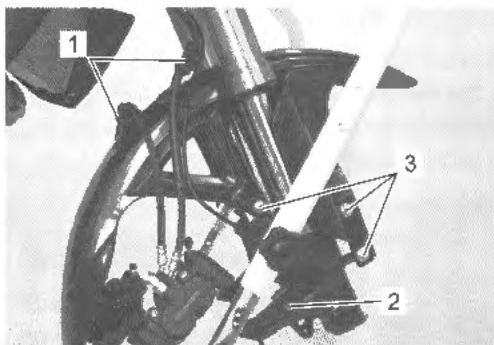
Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-5).

NOTE

The right and left front forks are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

- 1) Remove the reflex reflectors. (If equipped)
- 2) Disconnect the brake hoses from the clamps (1) on the front fender.
- 3) Remove the front wheel speed sensor lead wire clamp bolt (2).
- 4) Remove the front fender by removing the left and right bolts (3).

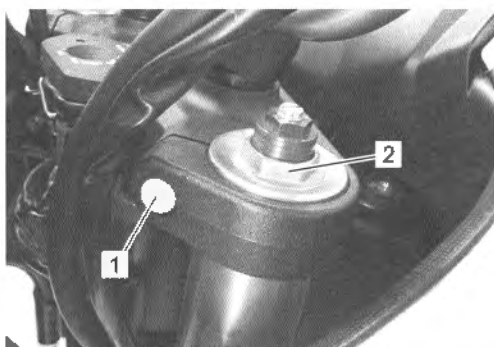


IE31J1220007-02

- 5) Loosen the front fork upper clamp bolt (1).

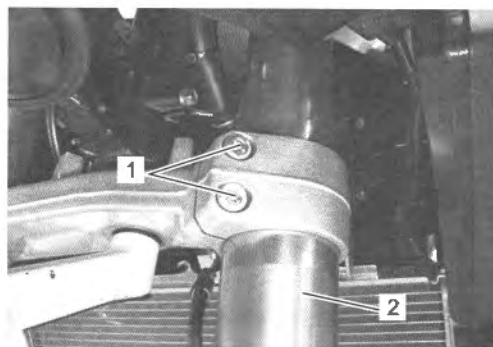
NOTE

Slightly loosen the front fork cap bolt (2) to facilitate later disassembly.



IE31J1220008-01

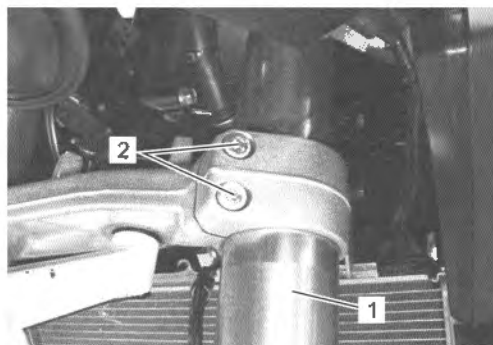
- 6) Loosen the front fork lower clamp bolts (1), and then remove the front fork (2) by supporting it.



IE31J1220009-02

Installation

- 1) Set the front fork (1) to the steering stem lower bracket temporarily by tightening the lower clamp bolts (2).



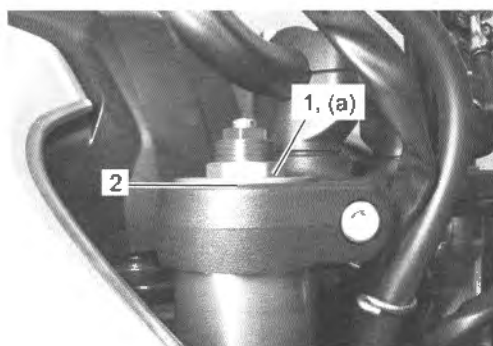
IE31J1220010-01

- 2) Tighten the front fork cap bolt (1) to the specified torque.

Tightening torque

Front fork cap bolt (a): 23 N-m (2.3 kgf-m, 17.0 lbf-ft)

- 3) Loosen the lower clamp bolts.
- 4) Set the top end of outer tube to the upper surface (2) of the steering stem upper bracket.

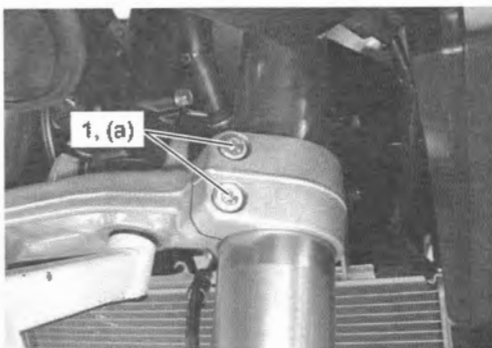


IE31J1220011-01

- 5) Tighten the front fork lower clamp bolts (1) to the specified torque.

Tightening torque

Front fork lower clamp bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

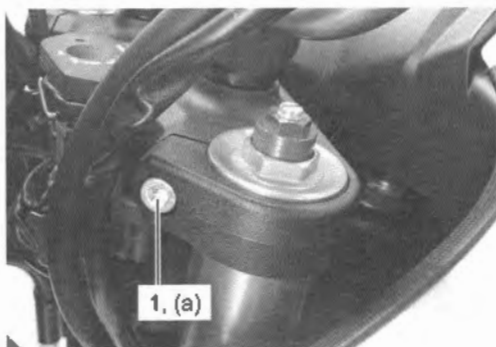


IE31J1220012-01

- 6) Tighten the front fork upper clamp bolt (1).

Tightening torque

Front fork upper clamp bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

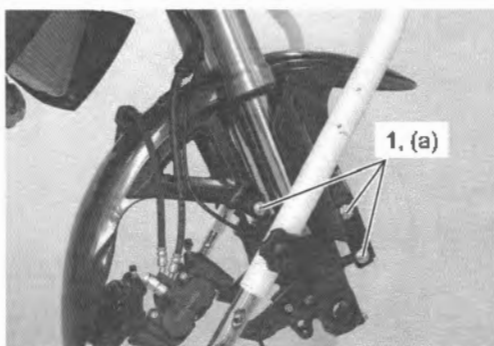


IE31J1220013-01

- 7) Install the front fender and tighten the front fender mounting bolts (1), left and right.

Tightening torque

Front fender mounting bolt (a): 12 N·m (1.2 kgf-m, 9.0 lbf-ft)



IE31J1220014-01

- 8) Install the removed parts.

Front Fork Disassembly and Reassembly

BENJ31J32206005

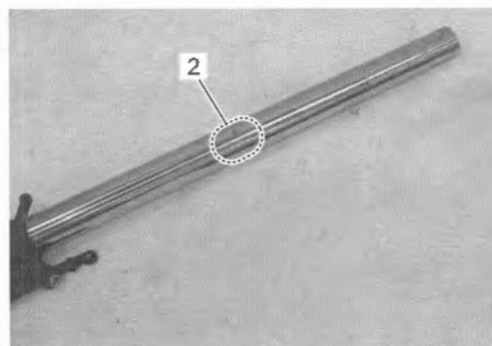
Refer to "Front Fork Assembly Removal and Installation" (Page 2B-3).

NOTICE

Do not disassemble the front fork cap bolt (1) and stopper (2).



IE31J1220015-01



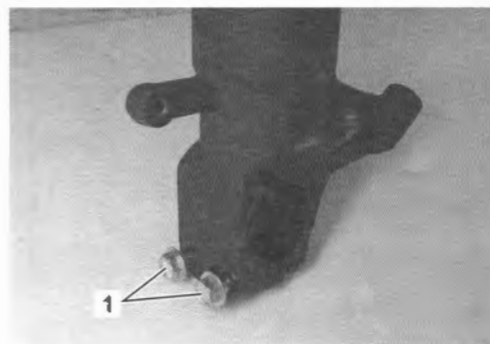
IE31J1220016-01

NOTE

The right and left front forks are installed symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.

Disassembly

- 1) Remove the front axle pinch bolts (1).



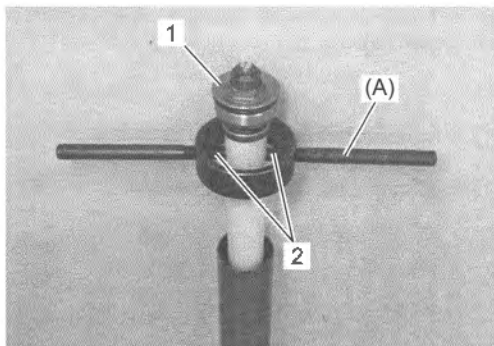
IE31J1220017-01

2B-5 Front Suspension:

- 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



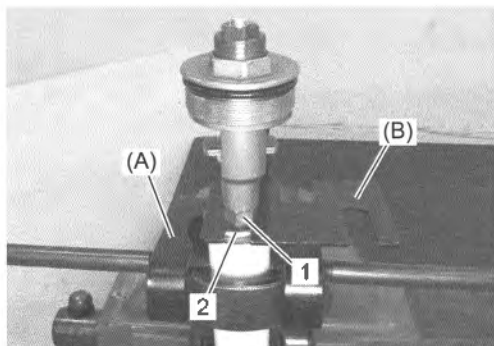
IE31J1220018-01

- 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).

Special tool

(A): 09940-93110

(B): 09940-94922



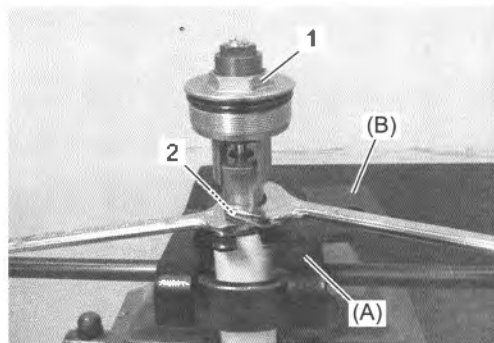
IE31J1220019-01

- 6) Remove the front fork cap bolt (1) from the inner rod/damper rod by loosening the lock-nut (2).
- 7) Remove the special tool (B).

Special tool

(A): 09940-93110

(B): 09940-94922



IE31J1220020-02

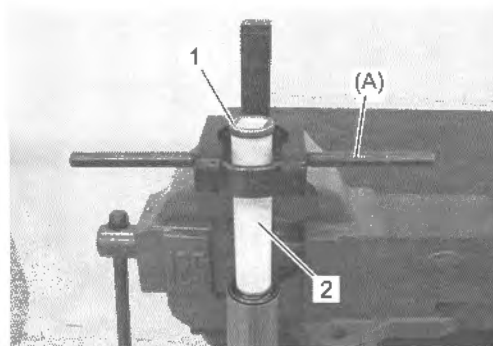
- 8) Remove the special tool (A) and remove the spring retainer (1) and spacer (2).

NOTE

Hold front fork leg by hand to prevent it sliding out of the outer tube.

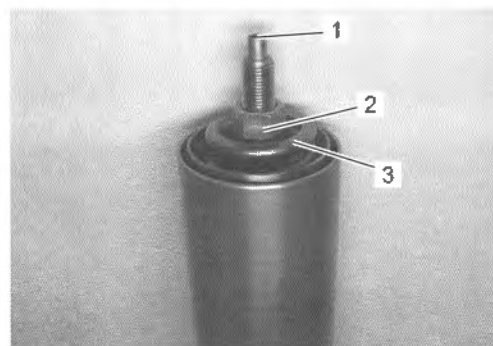
Special tool

(A): 09940-94930



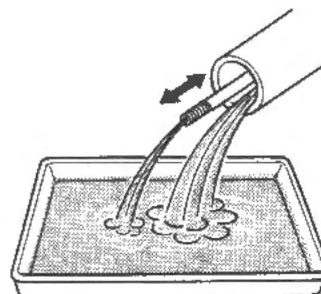
IE31J1220021-01

- 9) Remove the adjuster rod (1), lock-nut (2) and spring (3).



IE31J1220022-01

- 10) Invert the fork and stroke the inner rod/damper rod several times to drain out fork oil.
- 11) Hold the fork inverted for a few minutes to drain oil.

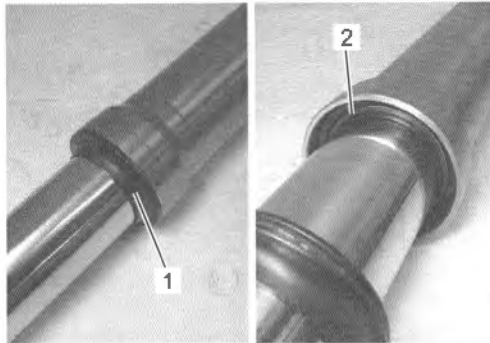


IE31J1220023-01

- 12) Remove the dust seal (1).
- 13) Remove the oil seal stopper ring (2).

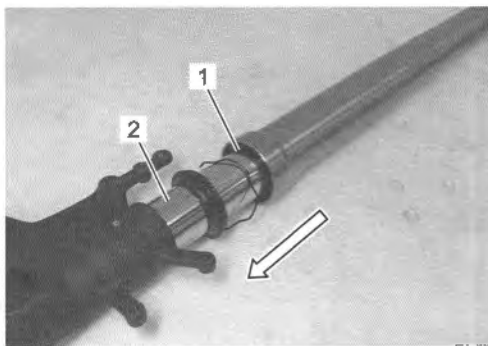
NOTICE

- Scratches on the inner tube could cause oil leaks.
- Avoid scratching when removing.



IE31J1220025-01

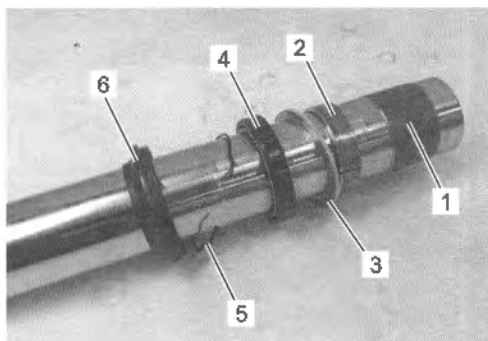
- 14) Remove the oil seal (1) by pulling out the inner tube (2).



IE31J1220026-01

- 15) Remove the following parts from the inner tube.

- Inner tube slide metal (1)
- Outer tube slide metal (2)
- Oil seal retainer (3)
- Oil seal (4)
- Oil seal stopper ring (5)
- Dust seal (6)

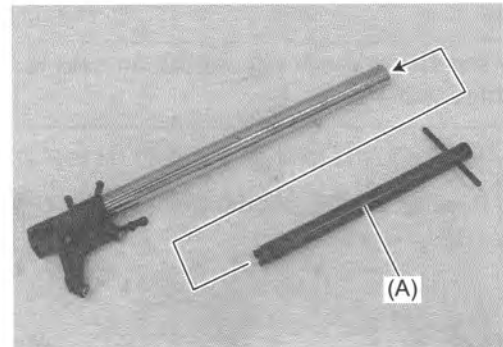


IE31J1220027-01

- 16) Loosen the inner rod/damper rod using the special tool.

Special tool

(A): 09940-30221

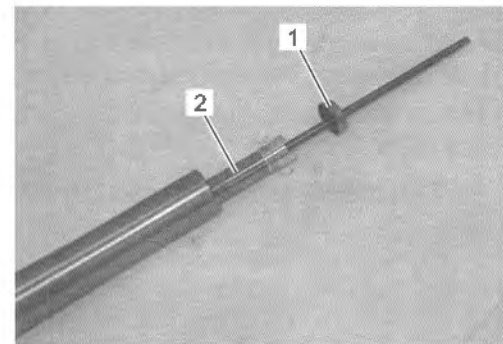


IE31J1220028-02

- 17) Remove the spring seat (1) and inner rod/damper rod (2).

NOTE

Do not disassemble the inner rod/damper rod.



IE31J1220029-01

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.

2B-7 Front Suspension:

2) Install the following parts to the inner tube.

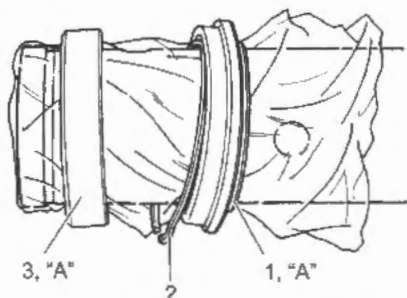
- New dust seal (1)
- Stopper ring (2)
- New oil seal (3)

NOTE

Face the stamp mark side of the oil seal to the dust seal side.

3) Apply fork oil to the dust seal lip and oil seal lip.

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

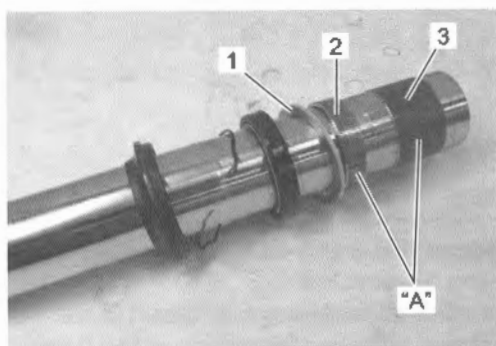


IE31J1220030-01

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 slide metal (2) and inner tube slide metal (3).

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



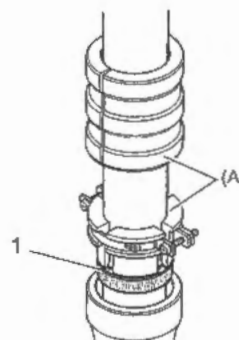
IE31J1220032-01

6) Insert the inner tube into the outer tube.

7) Press fit the oil seal (1) using the special tools until the stopper ring groove on the outer tube can be seen.

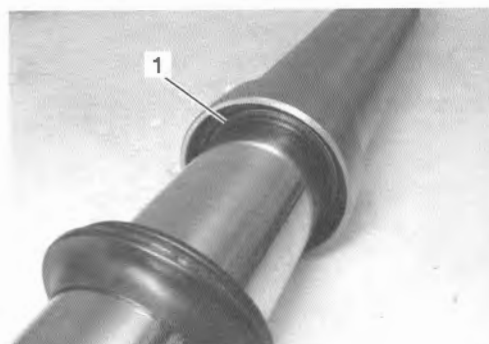
Special tool

(A): 09940-52861



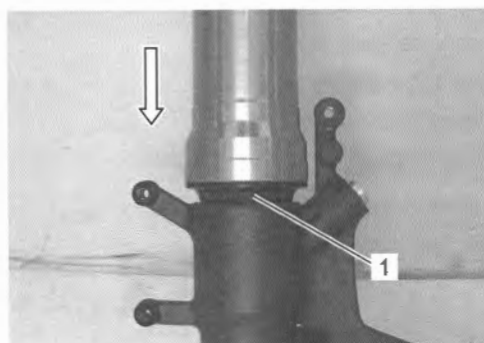
ID26J1220024-02

8) When installing the stopper ring (1), make sure that the stopper ring is fitted securely into the groove.



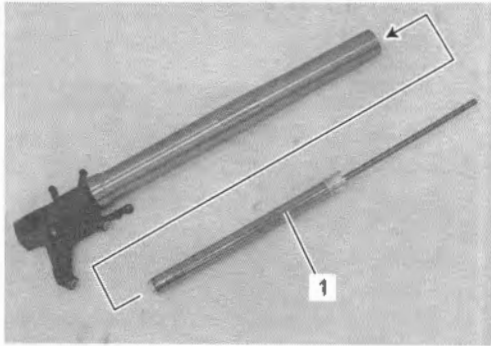
IE31J1220033-02

9) Press fit the dust seal (1).



IE31J1220034-01

- 10) Install the inner rod/damper rod (1) and into the inner tube.



IE31J1220035-01

- 11) Tighten inner rod/damper rod to the specified torque using the special tools.

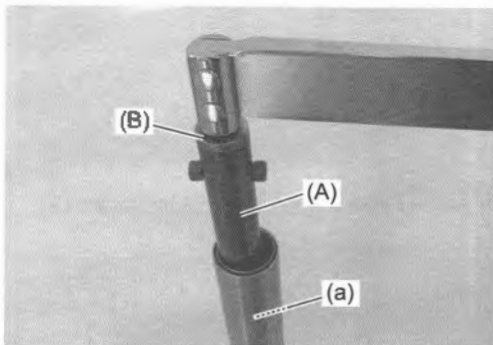
Special tool

(A): 09940-30221

(B): 09940-54860

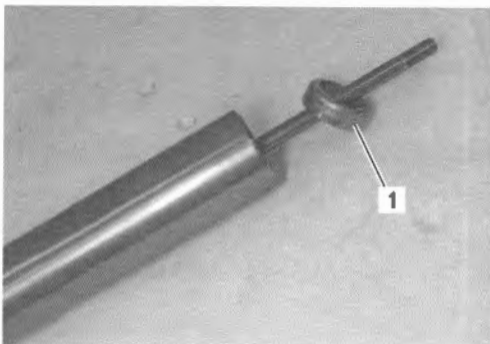
Tightening torque

Inner rod/damper rod (a): 70 N·m (7.0 kgf·m, 51.0 lbf·ft)



IE31J1220036-01

- 12) Install the spring seat (1) into the inner tube.



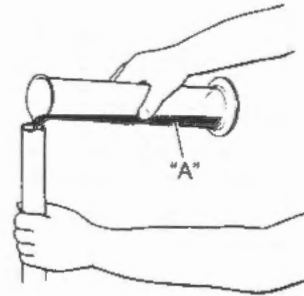
IE31J1220037-01

- 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.

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

Front fork oil capacity (each leg)

569 ml (19.2/20.0 US/Imp oz)



ID26J1220030-01

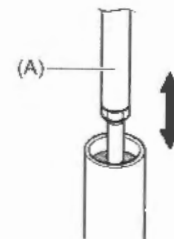
- 16) Move the inner rod/damper rod slowly using the special tool (A) more than ten times until bubbles do not come out from the oil.

NOTE

Refill front fork oil up to the top of the inner tube to find bubbles while bleeding air.

Special tool

(A): 09940-52841



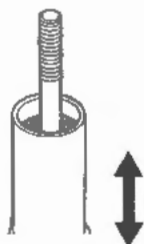
IE31J1220038-01

2B-9 Front Suspension:

- 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/damper rod top end, or air may enter the inner rod/damper rod during this procedure.
- Take extreme attention to pump out air completely.



IE31J1220039-01

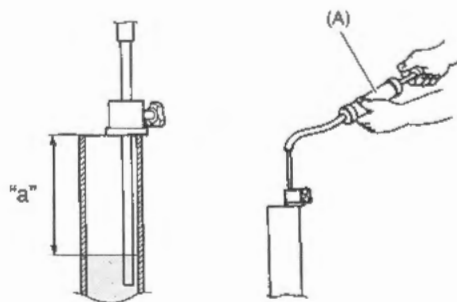
- 19) Hold the front fork vertically and adjust fork oil level "a" with the special tool.

NOTE

When adjusting the fork oil level, remove the fork spring and compress the outer tube fully.

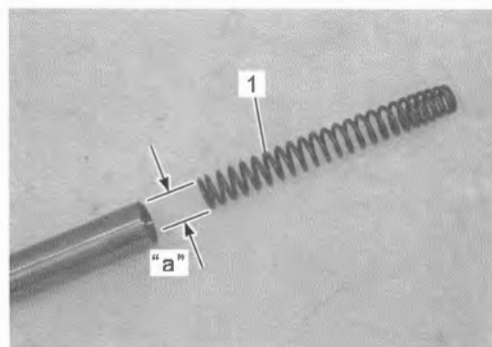
Front fork oil level
120 mm (4.7 in)

Special tool
(A): 09943-74111



ID26J1220031-01

- 20) Install the fork spring (1) into the inner tube with its larger diameter "a" facing the bottom side.



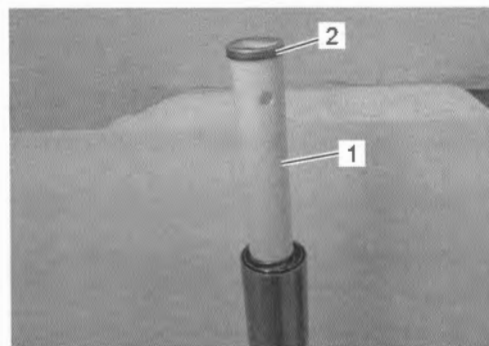
IE31J1220041-01

- 21) Install the adjuster rod (1).
- 22) Turn the lock-nut (2) until stops on the inner rod/damper rod threads.



IE31J1220042-02

- 23) Install the spacer (1) and spring retainer (2).

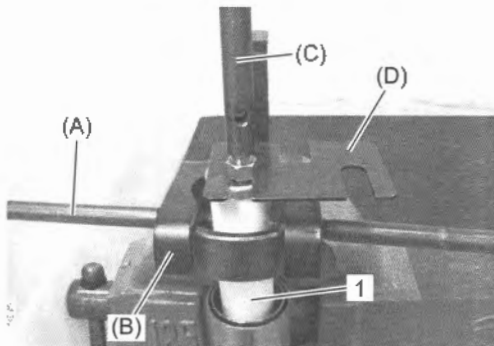


IE31J1220043-03

- 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/damper 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.

Special tool

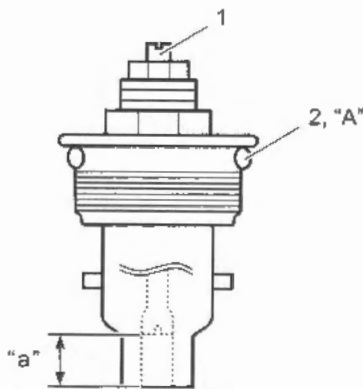
- (A): 09940-94930
- (B): 09940-93110
- (C): 09940-52841
- (D): 09940-94922



IE31J1220044-01

- 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).

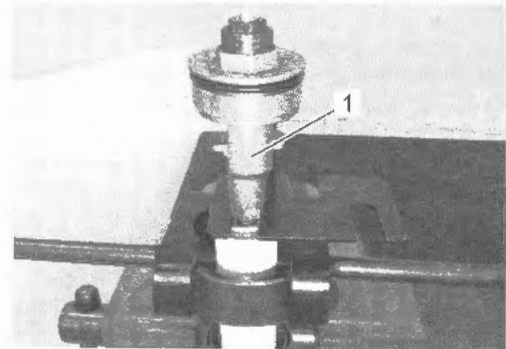
"A": Fork oil 99000-99044-L01 (SUZUKI FORK OIL L-01)



IE31J1220052-01

"a": 13 mm (0.5 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.

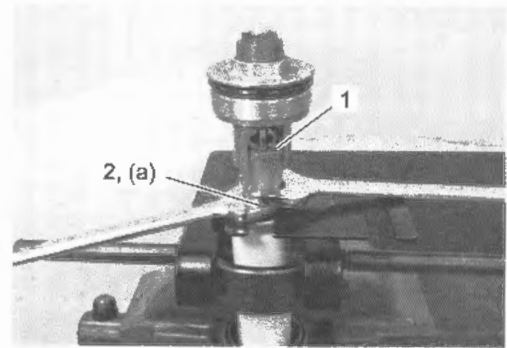


IE31J1220046-02

- 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)



IE31J1220047-01

- 32) Remove the special tools.
- 33) Tighten the front fork cap bolt to the outer tube temporarily.
- 34) After installing the front fork, adjust the spring pre-load and two kinds of damping force.

2B-11 Front Suspension:

Front Fork Inspection

BENJ31J32206006

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.



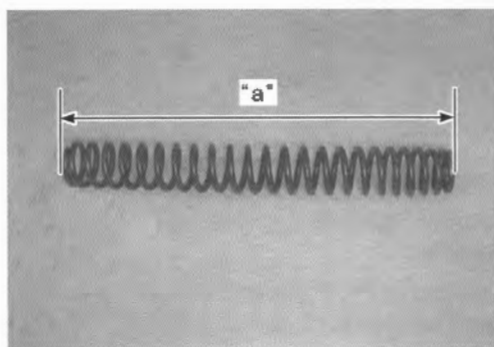
IE31J1220048-01

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

Service limit: 321 mm (12.6 in)

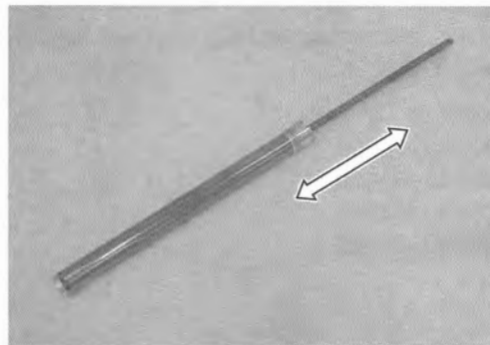


IE31J1220049-01

Inner Rod / Damper Rod

Move the inner rod by hand to examine it for smoothness.

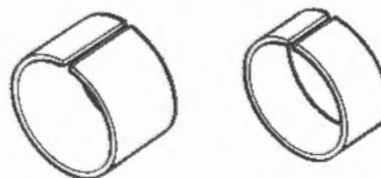
If any defects are found, replace inner rod/damper rod with a new one.



IE31J1220050-01

Outer Tube Slide Metal / Inner Tube Slide Metal

- Inspect the outer tube slide metal and inner tube slide metal for wear or damage. If any defect is found, replace the part with a new one.
- Check the Teflon coated surface for dirt. If any dirt is found, clean the surface with fork oil and nylon blush.



ID26J1220043-02

Specifications

Tightening Torque Specifications

BENJ31J32207001

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)
Front fender mounting bolt	12	1.2	9.0	☞(Page 2B-4)
Inner rod/damper rod	70	7.0	51.0	☞(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

BENJ31J32208001



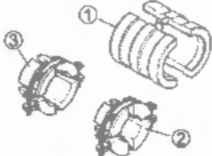
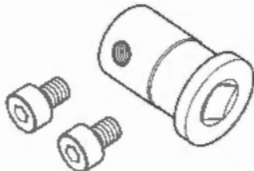


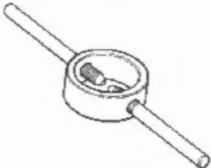
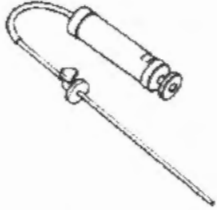
Material	SUZUKI recommended product or Specification	Note
Fork oil	SUZUKI FORK OIL L-01 P/No.: 99000-99044-L01	☞ (Page 2B-7) / ☞ (Page 2B-7) / ☞ (Page 2B-8) / ☞ (Page 2B-10)

NOTE

Required service material(s) is also described in:
"Front Fork Components" (Page 2B-1)

Special Tool

BENJ31J32208002

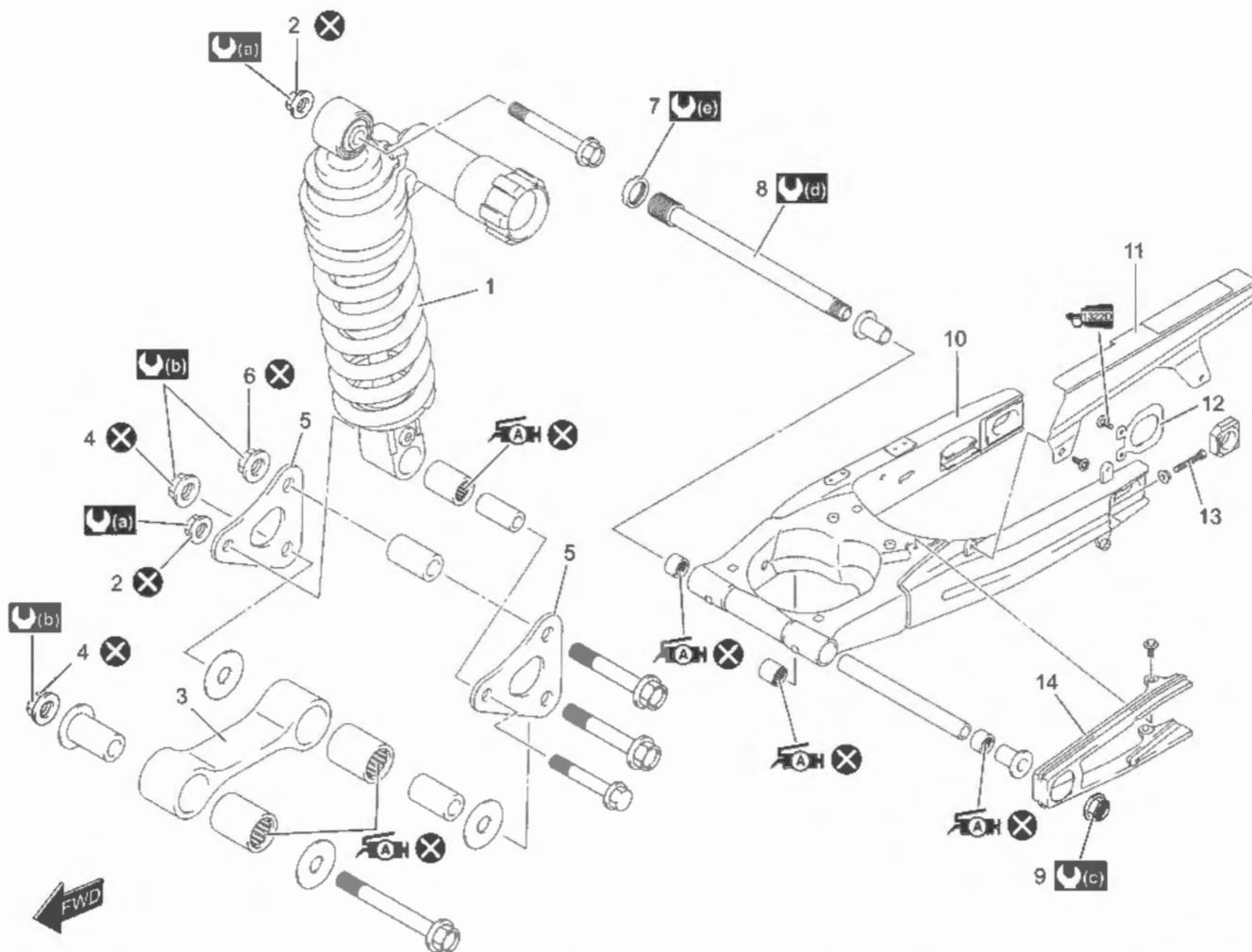
09940-30221 Front fork cylinder holder ☞ (Page 2B-6) / ☞ (Page 2B-8)		09940-52841 Front fork inner rod holder ☞ (Page 2B-8) / ☞ (Page 2B-10)	
09940-52861 Front fork oil seal installer set 1. Hammer (09941-53610) 2. Attachment (09940-52870) 3. Attachment (09940-52880) ☞ (Page 2B-7)		09940-54860 Front fork cylinder holder attachment ☞ (Page 2B-8)	
09940-93110 Fork spring compressor ☞ (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-5) / ☞ (Page 2B-5) / ☞ (Page 2B-10)	
09940-94930 Front fork spacer holder ☞ (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

BENJ31J32306001



IE31J1230071-05

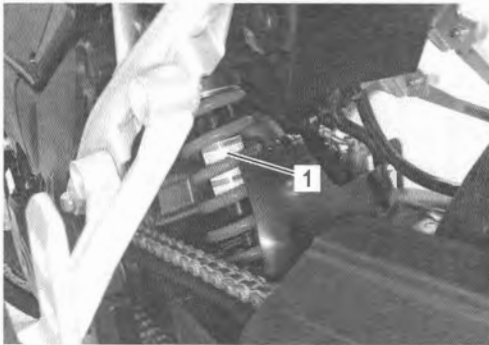
1. Rear shock absorber	9. Swingarm pivot nut	(c) : 100 N·m (10.0 kgf·m, 72.5 lbf·ft)
2. Rear shock absorber mounting nut	10. Swingarm	(d) : 15 N·m (1.5 kgf·m, 11.0 lbf·ft)
3. Cushion rod	11. Chain case	(e) : 90 N·m (9.0 kgf·m, 65.0 lbf·ft)
4. Cushion rod mounting nut	12. Plate	AH : Apply grease to the bearing.
5. Cushion lever	13. Chain adjuster	322B : Apply thread lock to the thread part.
6. Cushion lever mounting nut	14. Chain buffer	X : Do not reuse.
7. Swingarm pivot lock-nut	(a) : 50 N·m (5.0 kgf·m, 36.5 lbf·ft)	
8. Swingarm pivot shaft	(b) : 98 N·m (9.8 kgf·m, 71.0 lbf·ft)	

Rear Suspension On-vehicle Inspection

BENJ31J32306002

Inspect the rear shock absorber (1) for oil leakage and check that there is no play in the swingarm (2). Replace any defective parts, if necessary.

- Rear shock absorber replace: ☞ (Page 2C-2)
- Swingarm pivot shaft and bearing inspection: ☞ (Page 2C-15)
- Cushion lever inspection: ☞ (Page 2C-7)
- Cushion rod inspection: ☞ (Page 2C-8)
- Swingarm inspection: ☞ (Page 2C-15)



IE31J1230001-01



IE31J1230002-01

Rear Shock Absorber Adjustment

BENJ31J32306003

Spring Pre-load Adjustment

- Fully turn the adjuster (1) counterclockwise. From that position (softest), turn it counterclockwise to standard setting position.

Rear shock absorber spring pre-load

Standard: 11th clicks clockwise from soft position



IE31J1230003-01

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 adjusters by turning it slightly until punch marks align.

Fully turn the rebound damping force adjuster (1) clockwise. From full hard position, turn it out to standard setting position.

**Rear shock absorber rebound damping force
1.25 turns counterclockwise from full hard position**



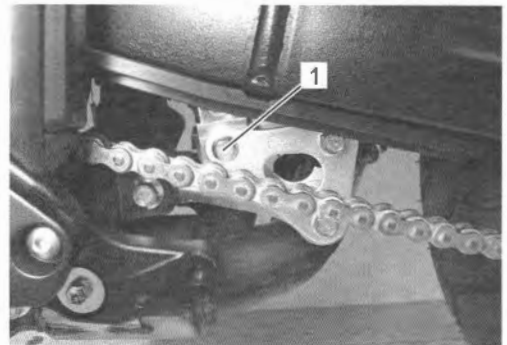
IE31J1230004-02

Rear Shock Absorber Removal and Installation

BENJ31J32306004

Removal

- 1) Support the motorcycle with a jack to relieve load on the rear shock absorber.
- 2) Remove the rear shock absorber lower mounting bolt and nut (1).



IE31J1230005-01

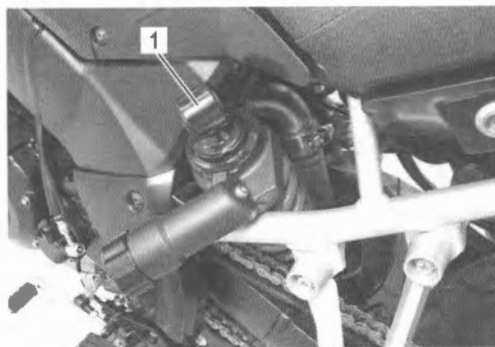
2C-3 Rear Suspension:

- 3) Remove the rear shock absorber upper mounting bolt and nut (1).



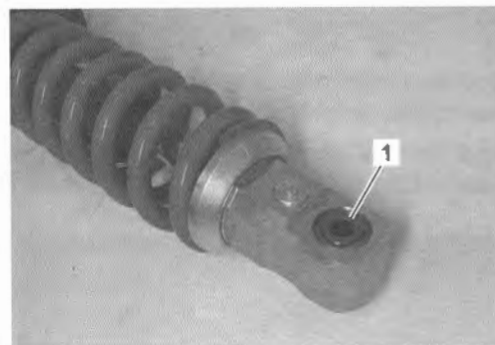
IE31J1230006-01

- 4) Remove the rear shock absorber (1) upward.



IE31J1230007-01

- 5) Remove the spacer (1) from the rear shock absorber.



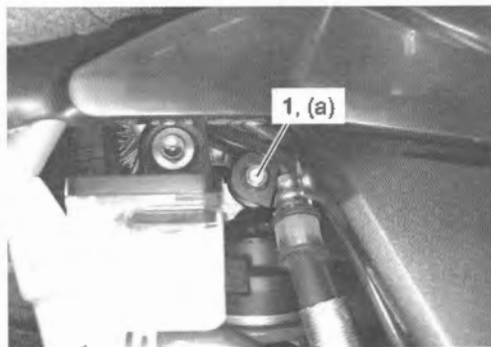
IE31J1230008-01

Installation

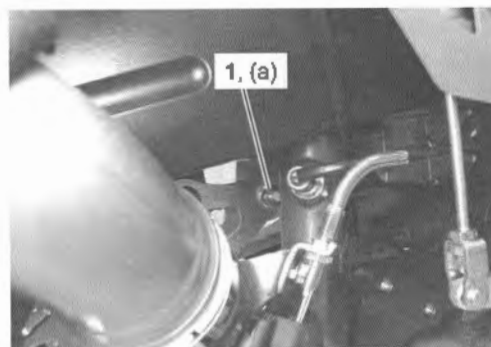
- 1) Install the spacer into the rear shock absorber.
- 2) Install the rear shock absorber.
- 3) Insert the rear shock absorber upper/lower mounting bolts from left side, and tighten their new nuts (1) to the specified torque.

Tightening torque

Rear shock absorber mounting nut (a): 50 N·m (5.0 kgf-m, 36.5 lbf-ft)



IE31J1230009-01



IE31J1230010-01

Rear Shock Absorber Inspection

BENJ31J32306005

Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-2).

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

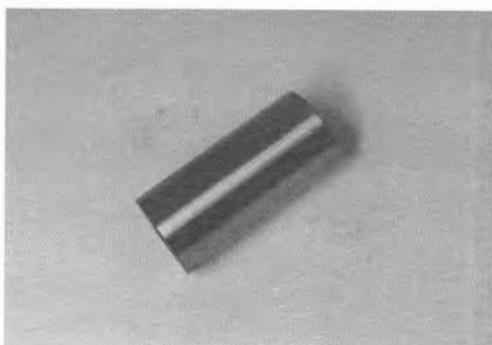
Do not attempt to disassemble the rear shock absorber. It is unserviceable.



IE31J1230011-01

Spacer

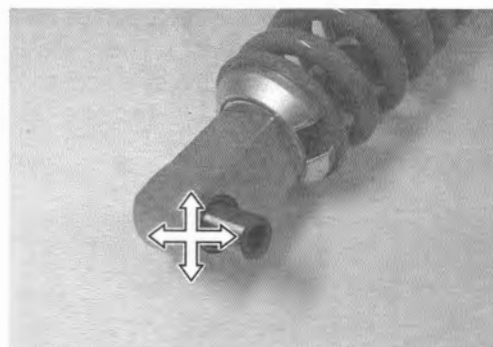
Inspect the spacer for any flaws or other damage. If any defect is found, replace the spacer with a new one.



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-4)



IE31J1230013-01

Rear Shock Absorber Bearing Removal and Installation

BENJ31J32306006

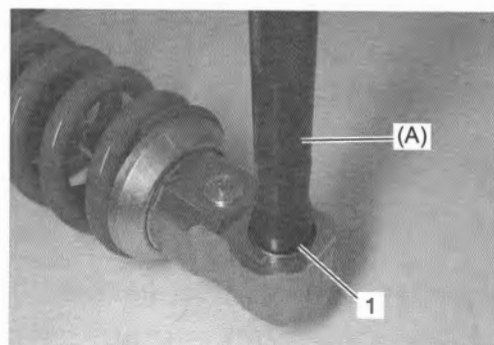
Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-2).

Removal

- 1) Remove the rear shock absorber bearing (1) with the special tool.

Special tool

(A): 09943-88211



IE31J1230014-01

Installation

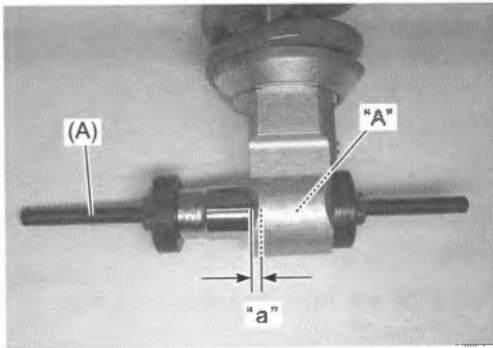
- 1) Apply a small quantity of the grease to housing when installing the bearing.

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

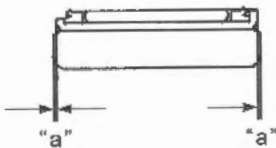
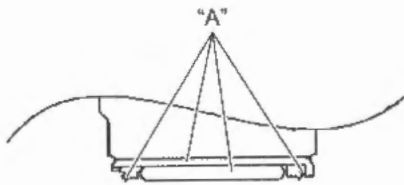
- 2) Press the new bearing into the rear shock absorber to the depth "a" of 0.5 mm (0.02 in) from the edge with the special tool and suitable size socket wrench.

Special tool

(A): 09924-84521



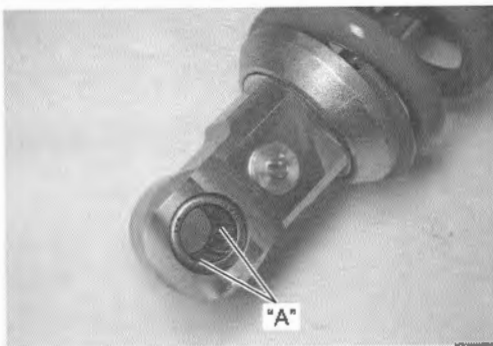
IE31J1230015-02



IE31J1230018-01

- 3) Apply grease to the bearing and dust seal.

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



IE31J1230018-01

Rear Shock Absorber Disposal

BENJ31J32306007

Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-2).

The rear shock absorber unit contains high-pressure nitrogen gas.

▲ WARNING

- Mishandling the rear shock absorber can cause explosion.
- Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.
- Never apply heat or disassemble the damper unit since it can explode or oil can splash hazardously.
- Release gas pressure before disposing.

Gas Pressure Release

- 1) Mark the drill center at the location (1) using a center punch.

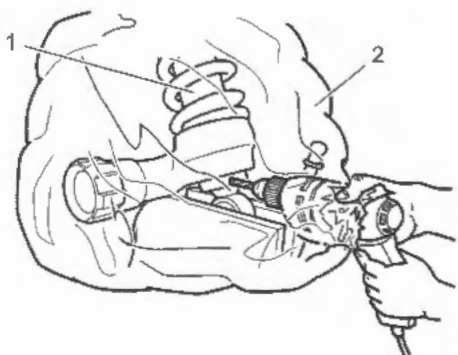


IE31J1230019-01

- 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.



IE31J1230070-02

Cushion Lever Removal and Installation

BENJ31J32306008

Removal

- 1) Support the motorcycle with a jack to relieve load on the cushion levers.
- 2) Remove the cushion levers (1) and washers.



IE31J1230021-01

Installation

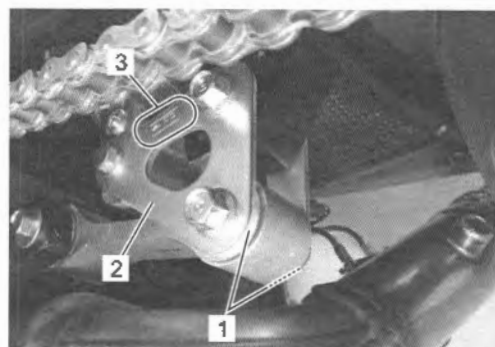
- 1) Install the washers (1) between the cushion rod and cushion levers.
- 2) Set the cushion levers (2) so that the arrow mark (3) points forward.
- 3) Insert the each mounting bolts from left side, and tighten their new nuts to the specified torque.

Tightening torque

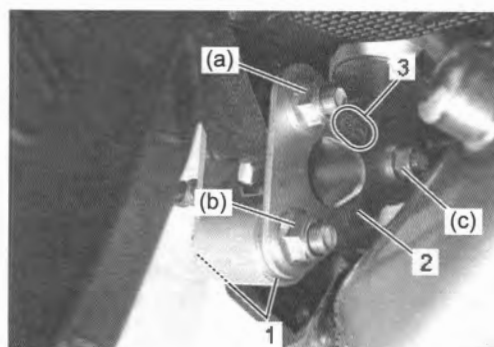
Cushion lever mounting nut (a): 98 N·m (9.8 kgf-m, 71.0 lbf-ft)

Cushion rod mounting nut (b): 98 N·m (9.8 kgf-m, 71.0 lbf-ft)

Rear shock absorber lower mounting nut (c): 50 N·m (5.0 kgf-m, 36.5 lbf-ft)



IE31J1230022-02



IE31J1230069-02

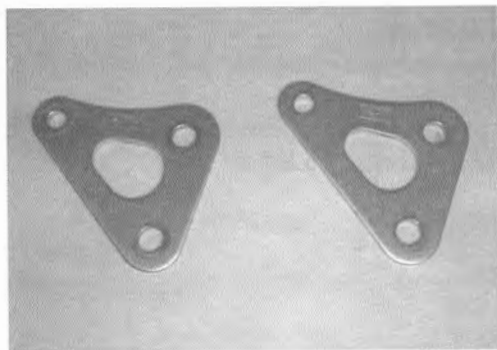
Cushion Lever Inspection

BENJ31J32306009

Refer to "Cushion Lever Removal and Installation" (Page 2C-6).

Cushion Lever

Inspect the cushion levers for damage and bend. If any defects are found, replace the cushion levers with new ones.



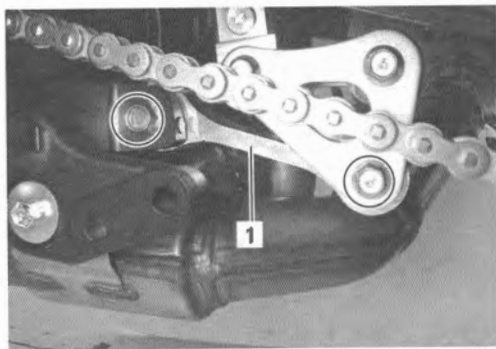
IE31J1230023-01

Cushion Rod Removal and Installation

BENJ31J32306010

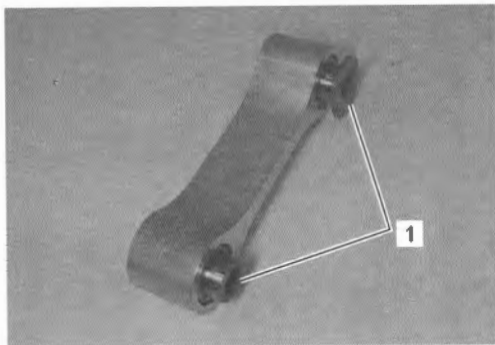
Removal

- 1) Support the motorcycle with a jack to relieve load on the cushion rod.
- 2) Remove the cushion rod (1) and washer.



IE31J1230024-01

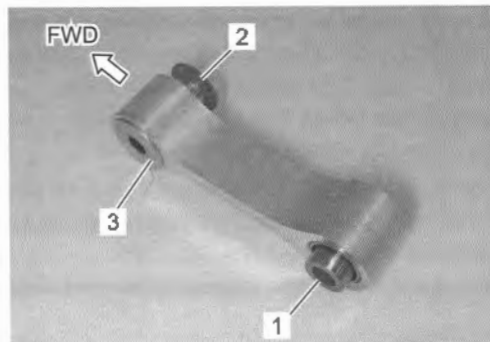
- 3) Remove the spacers (1).



IE31J1230025-01

Installation

- 1) Install the spacer (1) into the cushion rod.
- 2) Before installing the cushion rod to the frame, insert the spacer (2) into the bearing from the right side.
- 3) Install the washer (3) between the cushion rod left side and frame.



IE31J1230026-02

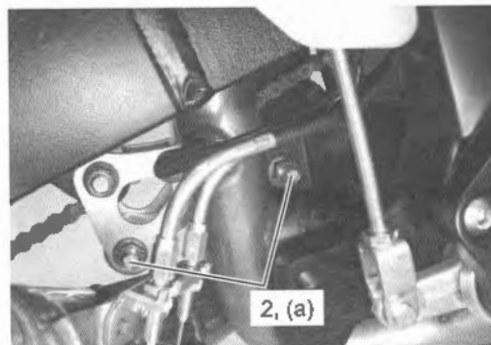
- 4) Install the washers (1) between cushion rod and cushion levers.
- 5) Insert the cushion rod mounting bolts from left side, and tighten their new nuts (2) to the specified torque.

Tightening torque

Cushion rod mounting nut (a): 98 N·m (9.8 kgf·m, 71.0 lbf·ft)



IE31J1230027-01



IE31J1230028-01

Cushion Rod Inspection

BENJ31J32306011

Refer to "Cushion Rod Removal and Installation" (Page 2C-7).

Spacer

Inspect the spacers for any flaws or other damage. If any defects are found, replace it with a new one.



IE31J1230029-01

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-8)



IE31J1230030-01

Cushion Rod

Inspect the cushion rod for damage. If any defect is found, replace the cushion rod with a new one.



IE31J1230031-01

Cushion Rod Bearing Removal and Installation

BENJ31J32306012

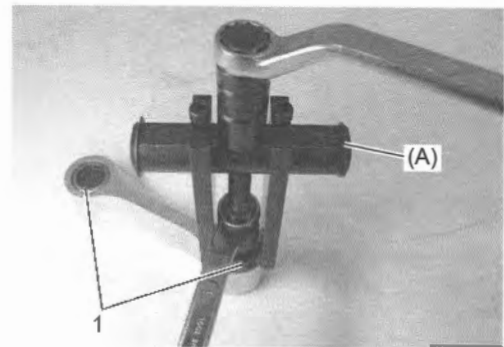
Refer to "Cushion Rod Removal and Installation" (Page 2C-7).

Removal

- 1) Remove the cushion rod bearings (1) with the special tool.

Special tool

(A): 09921-20240



IE31J1230032-01

2C-9 Rear Suspension:

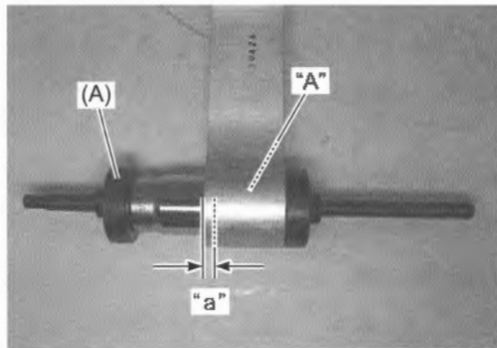
Installation

- 1) Apply a small quantity of the grease to housing.
- 2) Press the new bearings into the cushion rod to the depth "a" of 0.5 mm (0.02 in) from the edge with the special tool and suitable size socket wrench.

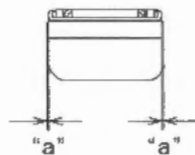
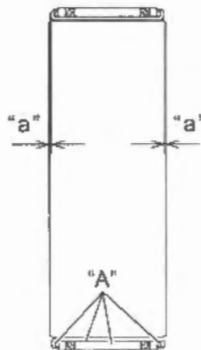
"A": Grease 99000-25011 (SUZUKI SUPER GREASE A)

Special tool

(A): 09924-84521



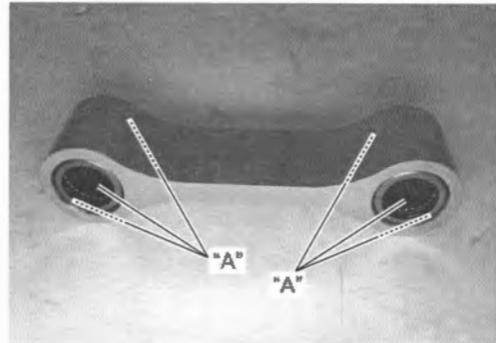
IE31J1230033-01



IE31J1230034-01

- 3) Apply grease to the bearings and dust seals.

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



IE31J1230035-01

Swingarm Removal and Installation

BENJ31J32306013

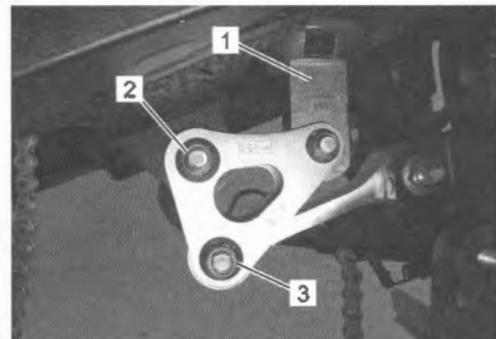
Removal

- 1) Remove the front exhaust pipe with the center exhaust pipe. (Page 1K-15)
- 2) Remove the rear wheel assembly. (Page 2D-12)
- 3) Disconnect the rear brake hose and remove the rear wheel speed sensor lead wire from the brake hose guide (1).
- 4) Remove the brake hose guide (2).



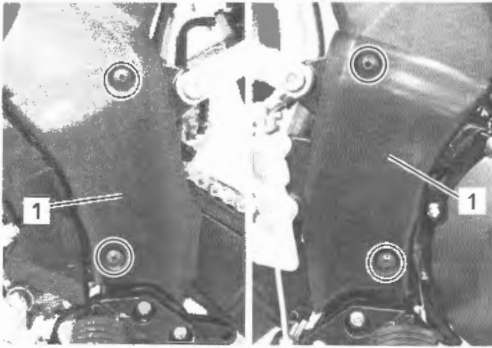
IE31J1230036-01

- 5) Remove the rear shock absorber (1). (Page 2C-2)
- 6) Remove the cushion lever mounting bolt and nut (2).
- 7) Loosen the cushion rod (rear) mounting nut (3).



IE31J1230037-01

- 8) Remove the left and right pivot covers (1).

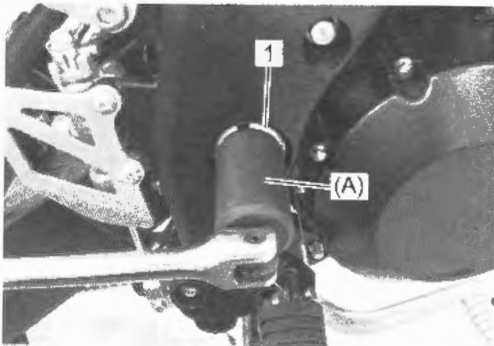


IE31J1230038-01

- 9) Remove the swingarm pivot shaft lock-nut (1) with the special tool.

Special tool

(A): 09940-14940

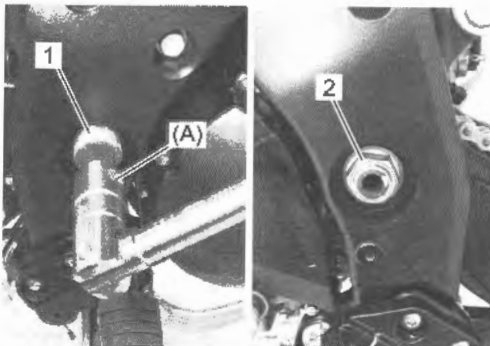


IE31J1230039-01

- 10) Hold the swingarm pivot shaft (1) with the special tool and remove the swingarm pivot nut (2).

Special tool

(A): 09944-28321

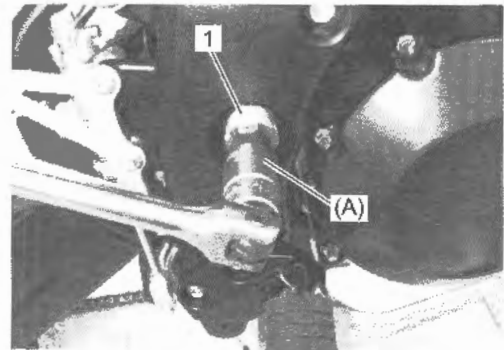


IE31J1230040-01

- 11) Remove the swingarm assembly by removing the swingarm pivot shaft (1) with the special tool.

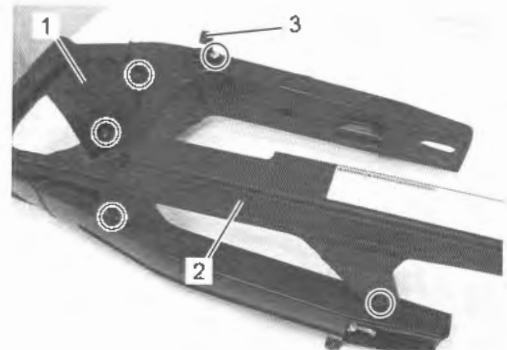
Special tool

(A): 09944-28321



IE31J1230041-01

- 12) Remove the mud guard (1), chain case (2) and guide (3) from the swingarm.



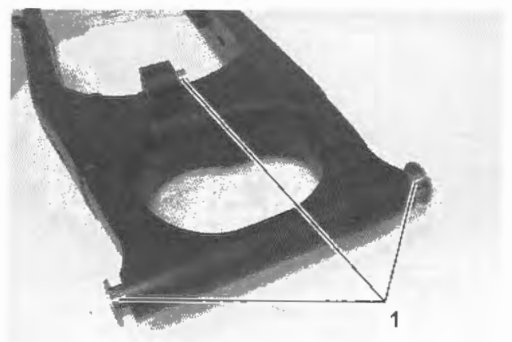
IE31J1230042-02

- 13) Remove the chain buffer (1).



IE31J1230044-01

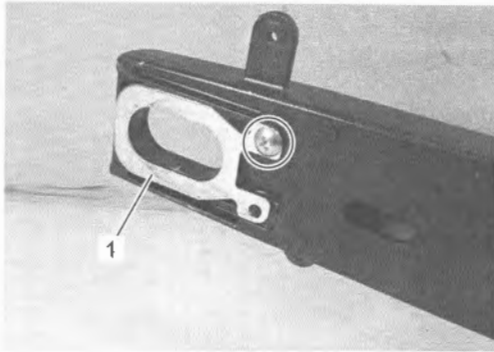
- 14) Remove the spacers (1) from the swingarm.



IE31J1230043-01

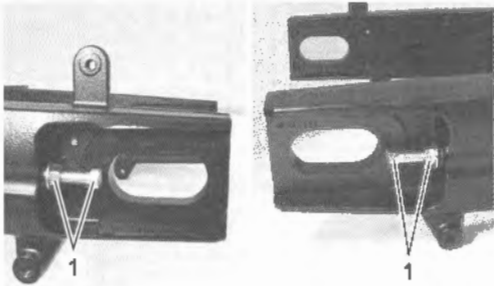
2C-11 Rear Suspension:

- 15) Remove the plate (1).



IE31J1230045-01

- 16) Remove the left and right drive chain adjuster bolts and nuts (1).

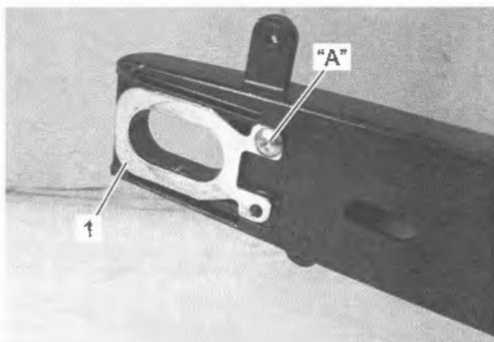


IE31J1230046-01

Installation DL1000AL4

- 1) Install the drive chain adjuster bolts and nuts to the swingarm.
- 2) When installing the plate (1), apply thread lock to the screw.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)



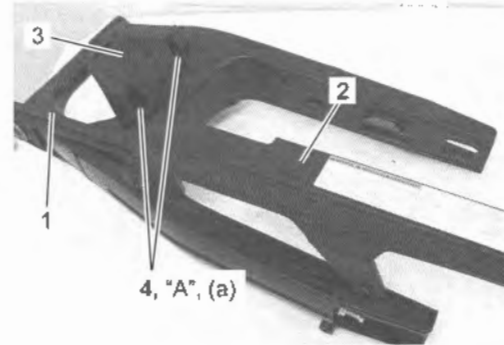
IE31J1230047-01

- 3) Install the spacers into the swingarm.
- 4) Install the chain buffer (1), chain case (2) and mud guard (3) to the swingarm.
- 5) Apply thread lock to the mud guard bolts (4) and tighten them to the specified torque.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

Mud guard bolt (a): 6.5 N·m (0.65 kgf·m, 5.0 lbf·ft)

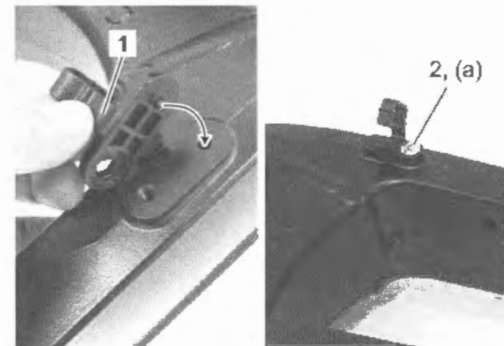


IE31J1230048-02

- 6) Insert the stopper of the brake hose guide (1) into the hole of the swingarm fully, before tighten the screw (2).

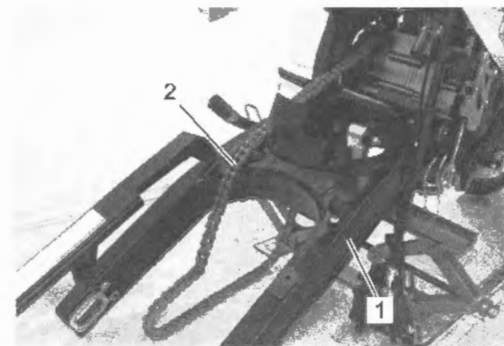
Tightening torque

Brake hose guide screw (a): 5 N·m (0.5 kgf·m, 4.0 lbf·ft)



IE31J1230049-02

- 7) When installing the swingarm assembly (1), pass the chain (2) to the swingarm.

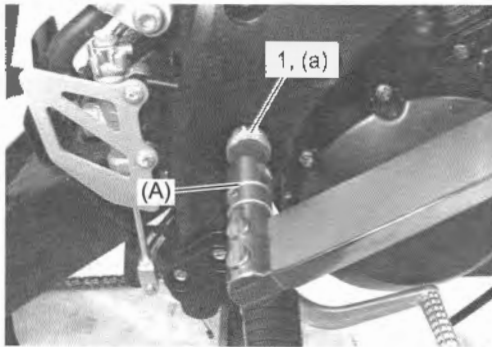


IE31J1230050-01

- 8) 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)

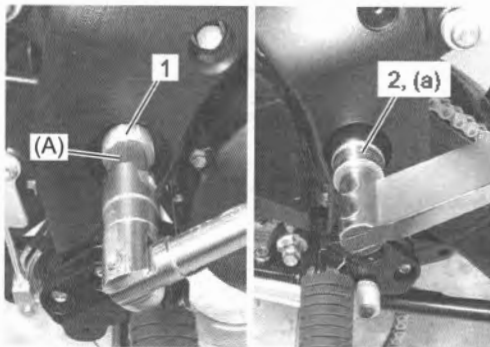


IE31J1230051-01

- 9) Hold the swingarm pivot shaft (1) with 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 (10.0 kgf-m, 72.5 lbf-ft)

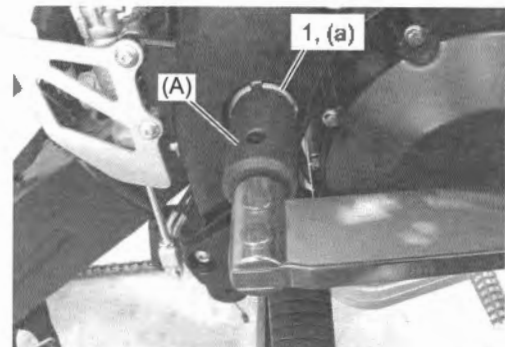


IE31J1230052-01

- 10) Tighten the swingarm pivot lock-nut (1) to the specified torque with the special tool.

Special tool
(A): 09940-14940

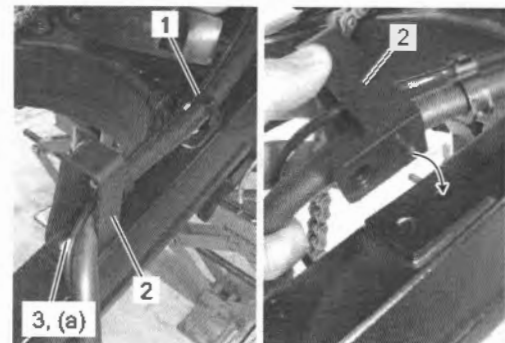
Tightening torque
Swingarm pivot lock-nut (a): 90 N·m (9.0 kgf-m, 65.0 lbf-ft)



IE31J1230053-01

- 11) Install the pivot covers.
- 12) Tighten the cushion rod (rear) mounting nut and cushion lever mounting nut. Refer to "Cushion Lever Removal and Installation" (Page 2C-6).
- 13) Install the rear shock absorber. ☞ (Page 2C-2)
- 14) Connect the rear wheel speed sensor lead wire and rear brake hose into the brake hose guide (1). Refer to "Rear Brake Hose Routing Diagram" in Section 4A (Page 4A-6) and "Rear Wheel Speed Sensor Routing Diagram": L4 - L6 in Section 4E (Page 4E-10).
- 15) Insert the stopper of the brake hose guide (2) into the hole of the swingarm fully, before tightening the screw (3).

Tightening torque
Brake hose guide screw (a): 5 N·m (0.5 kgf-m, 4.0 lbf-ft)



IE31J1230054-01

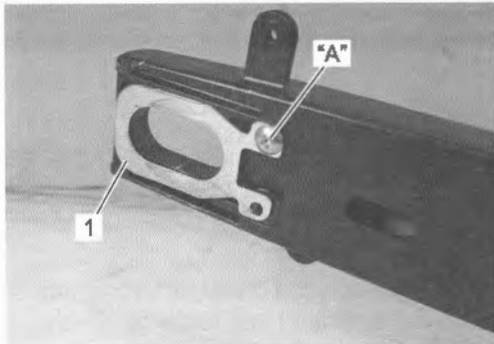
2C-13 Rear Suspension:

- 16) Install the rear wheel assembly. (Page 2D-12)
- 17) Install the front exhaust pipe with the center exhaust pipe. (Page 1K-18)

DL1000AL5 -

- 1) Install the drive chain adjuster bolts and nuts to the swingarm.
- 2) When installing the plate (1), apply thread lock to the screw.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)



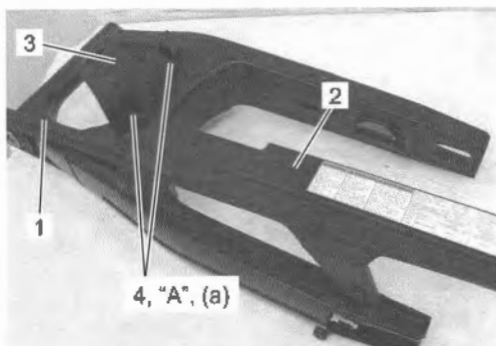
IE31J1230047-01

- 3) Install the spacers into the swingarm.
- 4) Install the chain buffer (1), chain case (2) and mud guard (3) to the swingarm.
- 5) Apply thread lock to the mud guard bolts (4) and tighten them to the specified torque.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

Mud guard bolt (a): 6.5 N·m (0.65 kgf-m, 5.0 lbf-ft)

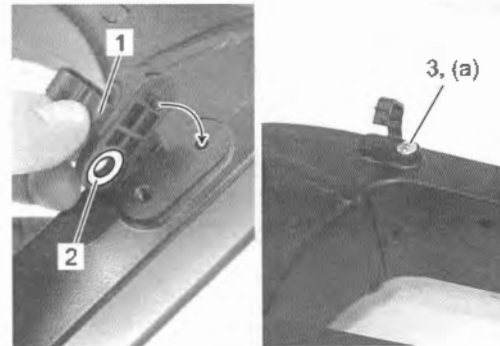


IE31J1230048-02

- 6) Install the washer (2) and insert the stopper of the brake hose guide (1) into the hole of the swingarm fully, before tighten the screw (3).

Tightening torque

Brake hose guide screw (a): 5 N·m (0.5 kgf-m, 4.0 lbf-ft)



IE31J1230001-01

- 7) When installing the swingarm assembly (1), pass the chain (2) to the swingarm.



IE31J1230050-01

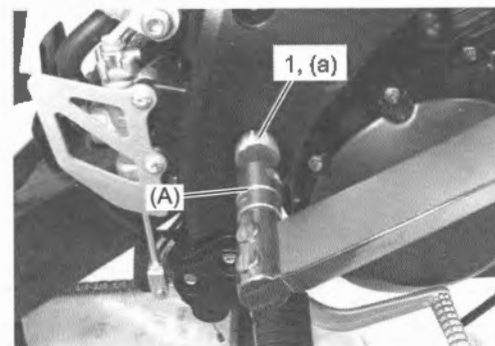
- 8) Insert the swingarm pivot shaft (1) and tighten it to the specified torque.

Special tool

(A): 09944-28321

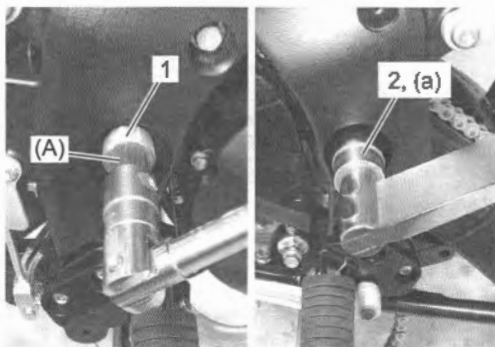
Tightening torque

Swingarm pivot shaft (a): 15 N·m (1.5 kgf-m, 11.0 lbf-ft)



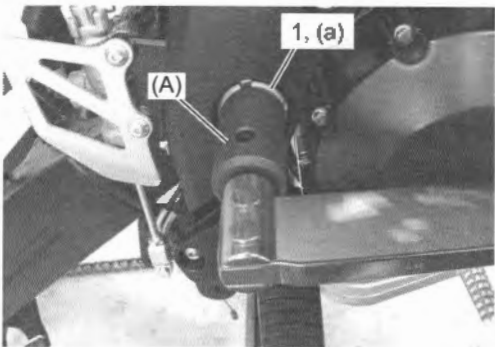
IE31J1230051-01

- 9) Hold the swingarm pivot shaft (1) with 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 (10.0 kgf-m, 72.5 lbf-ft)**

IE31J1230052-01

- 10) Tighten the swingarm pivot lock-nut (1) to the specified torque with the special tool.

Special tool**(A): 09940-14940****Tightening torque****Swingarm pivot lock-nut (a): 90 N·m (9.0 kgf-m, 65.0 lbf-ft)**

IE31J1230053-01

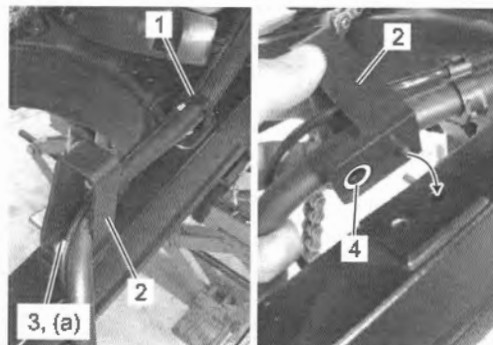
- 11) Install the pivot covers.

- 12) Tighten the cushion rod (rear) mounting nut and cushion lever mounting nut. Refer to "Cushion Lever Removal and Installation" (Page 2C-6).

- 13) Install the rear shock absorber. ☞ (Page 2C-2)

- 14) Connect the rear wheel speed sensor lead wire and rear brake hose into the brake hose guide (1). Refer to "Rear Brake Hose Routing Diagram" in Section 4A (Page 4A-6) and "Rear Wheel Speed Sensor Routing Diagram": L4 - L6 in Section 4E (Page 4E-10) or "Rear Wheel Speed Sensor Routing Diagram": L8 - in Section 4E (Page 4E-49).

- 15) Install the washer (4) and insert the stopper of the brake hose guide (2) into the hole of the swingarm fully, before tightening the screw (3).

Tightening torque**Brake hose guide screw (a): 5 N·m (0.5 kgf-m, 4.0 lbf-ft)**

IF31J1230002-01

- 16) Install the rear wheel assembly. ☞ (Page 2D-12)

- 17) Install the front exhaust pipe with the center exhaust pipe. ☞ (Page 1K-18)

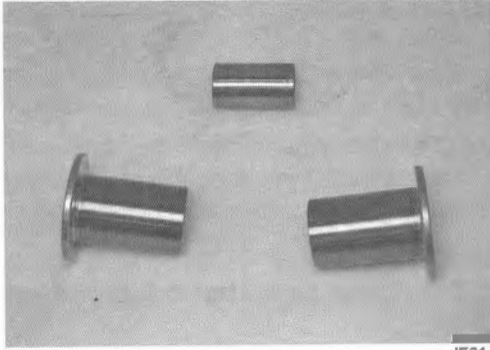
Swingarm Inspection

BENJ31J32306014

Refer to "Swingarm Removal and Installation" (Page 2C-9).

Spacers

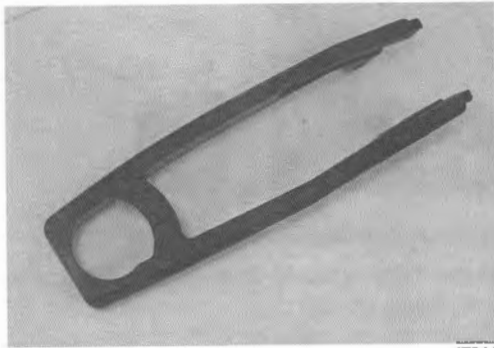
Inspect the spacers for wear and damage. If any defects are found, replace the spacers with new ones.



IE31J1230055-01

Chain Buffer

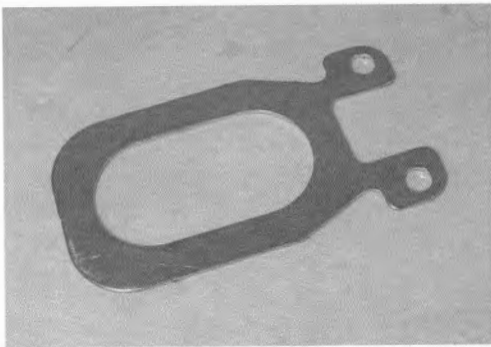
Inspect the chain buffer for wear and damage. If any defect is found, replace the chain buffer with a new one.



IE31J1230056-01

Plate

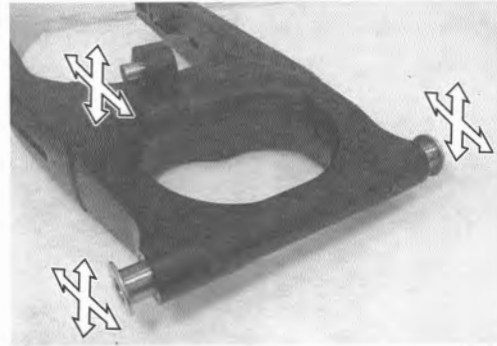
Inspect the plate for damage and excessive bend. If any defect is found, replace the plate with a new one.



IE31J1230057-01

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-16)



IE31J1230058-01

Swingarm

Inspect the swingarm for damage. If any defect is found, replace the swingarm with a new one.



IE31J1230059-01

Swingarm Pivot Shaft

Using a dial gauge, check the swingarm pivot shaft runout. If the runout exceeds the service limit, replace the pivot shaft.

Special tool

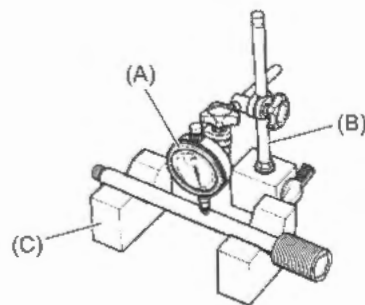
(A): 09900-20607

(B): 09900-20701

(C): 09900-21304

Swingarm pivot shaft runout

Service limit: 0.3 mm (0.01 in)



IE31J1230060-01

Swingarm Bearing Removal and Installation

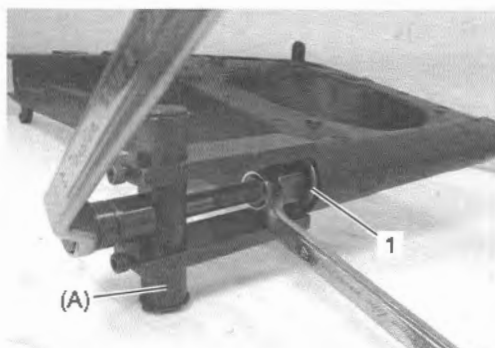
BENJ31J32306015

Refer to "Swingarm Removal and Installation" (Page 2C-9).

Refer to "Rear Suspension Components" (Page 2C-1).

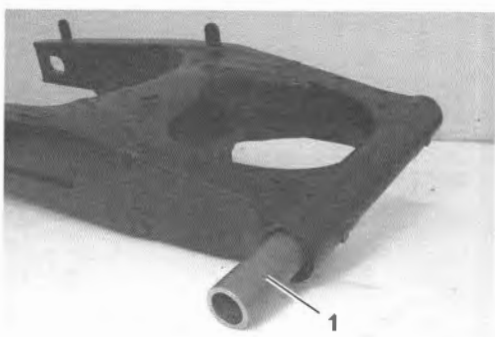
Removal

- 1) Remove the swingarm pivot bearings (1) on both sides using the special tool.

Special tool**(A): 09921-20240**

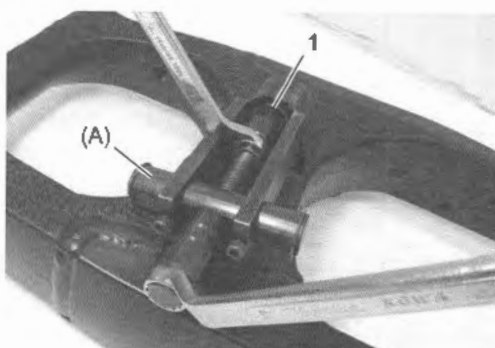
IE31J1230061-01

- 2) Remove the center spacer (1).



IE31J1230062-01

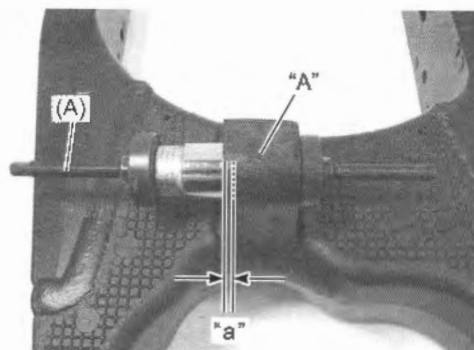
- 3) Remove the cushion lever bearing (1) using the special tool.

Special tool**(A): 09921-20240**

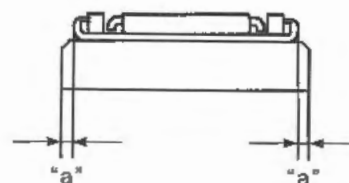
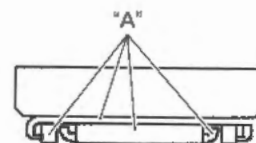
IE31J1230063-01

Installation

- 1) Apply a small quantity of the grease to housing when installing the bearing.
- 2) Press the new cushion lever bearing into the swingarm to the depth "a" of 1.5 mm (0.06 in) from the edge with the special tool and suitable size socket wrench.

"A": Grease 99000-25011 (SUZUKI SUPER GREASE A)**Special tool****(A): 09924-84521**

IE31J1230064-02



IE31J1230065-01

2C-17 Rear Suspension:

- 3) Install the center spacer.
- 4) Apply a small quantity of the grease to housing, when installing the bearing.

NOTE

The stamped mark side of the pivot bearing faces outside.

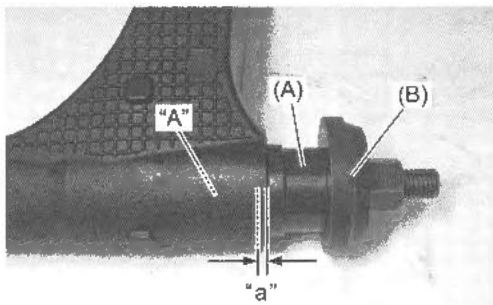
- 5) Press the new pivot bearings into the swingarm to the depth "a" of 0 – 0.5 mm (0 – 0.02 in) from the edge with the special tools.

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

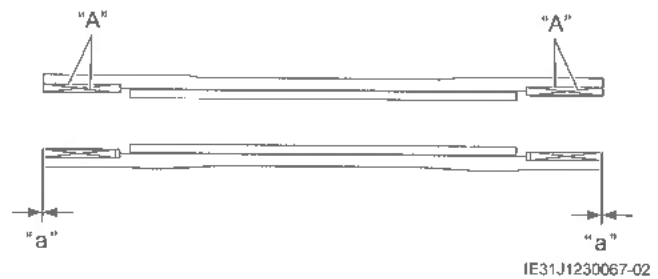
Special tool

(A): 09913-70210

(B): 09941-34513



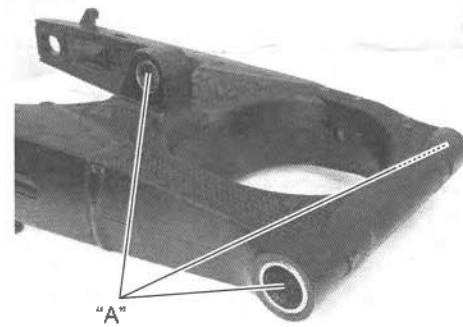
IE31J1230066-01



IE31J1230067-02

- 6) Apply grease to the bearings.

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



IE31J1230068-01

Specifications

Tightening Torque Specifications

BENJ31J32307001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Rear shock absorber mounting nut	50	5.0	36.5	☞(Page 2C-3)
Cushion lever mounting nut	98	9.8	71.0	☞(Page 2C-6)
Cushion rod mounting nut	98	9.8	71.0	☞(Page 2C-6) / ☞(Page 2C-7)
Rear shock absorber lower mounting nut	50	5.0	36.5	☞(Page 2C-6)
Mud guard bolt	6.5	0.65	5.0	☞(Page 2C-11) / ☞(Page 2C-13)
Brake hose guide screw	5	0.5	4.0	☞(Page 2C-11) / ☞(Page 2C-12) / ☞(Page 2C-13) / ☞(Page 2C-14)
Swingarm pivot shaft	15	1.5	11.0	☞(Page 2C-12) / ☞(Page 2C-13)
Swingarm pivot nut	100	10.0	72.5	☞(Page 2C-12) / ☞(Page 2C-14)
Swingarm pivot lock-nut	90	9.0	65.0	☞(Page 2C-12) / ☞(Page 2C-14)

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

BENJ31J32308001


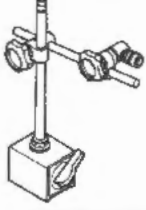
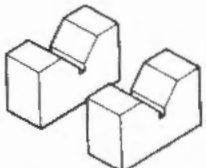
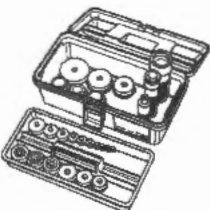
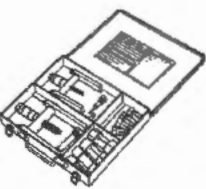

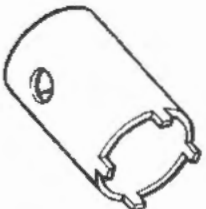



Material	SUZUKI recommended product or Specification	Note
Grease	SUZUKI SUPER GREASE A P/No.: 99000-25011	☞(Page 2C-5) / ☞(Page 2C-5) / ☞(Page 2C-9) / ☞(Page 2C-9) / ☞(Page 2C-16) / ☞(Page 2C-17) / ☞(Page 2C-17)
Thread lock cement	THREAD LOCK CEMENT 1322D P/No.: 99000-32150	☞(Page 2C-11) / ☞(Page 2C-11) / ☞(Page 2C-13) / ☞(Page 2C-13)

NOTE

Required service material(s) is also described in:
"Rear Suspension Components" (Page 2C-1)

Special Tool

BENJ31J32308002

09900-20607 Dial gauge (10 x 0.01 mm) ☞(Page 2C-15)		09900-20701 Dial gauge chuck ☞(Page 2C-15)	
09900-21304 V blocks ☞(Page 2C-15)		09913-70210 Bearing installer set ☞(Page 2C-17)	
09921-20240 Bearing remover set ☞(Page 2C-8) / ☞(Page 2C-16) / ☞(Page 2C-16)		09924-84521 Bearing installer set ☞(Page 2C-5) / ☞(Page 2C-9) / ☞(Page 2C-16)	
09940-14940 Swingarm pivot adjuster wrench ☞(Page 2C-10) / ☞(Page 2C-12) / ☞(Page 2C-14)		09941-34513 Bearing installer set ☞(Page 2C-17)	
09943-88211 Pinion bearing installer ☞(Page 2C-4)		09944-28321 Hexagon bit socket (19 mm : 1/2 sq.) ☞(Page 2C-10) / ☞(Page 2C-10) / ☞(Page 2C-12) / ☞(Page 2C-12) / ☞(Page 2C-13) / ☞(Page 2C-14)	

Wheels and Tires

Precautions

Precautions for Wheel and Tire

BENJ31J32400001

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

▲ WARNING

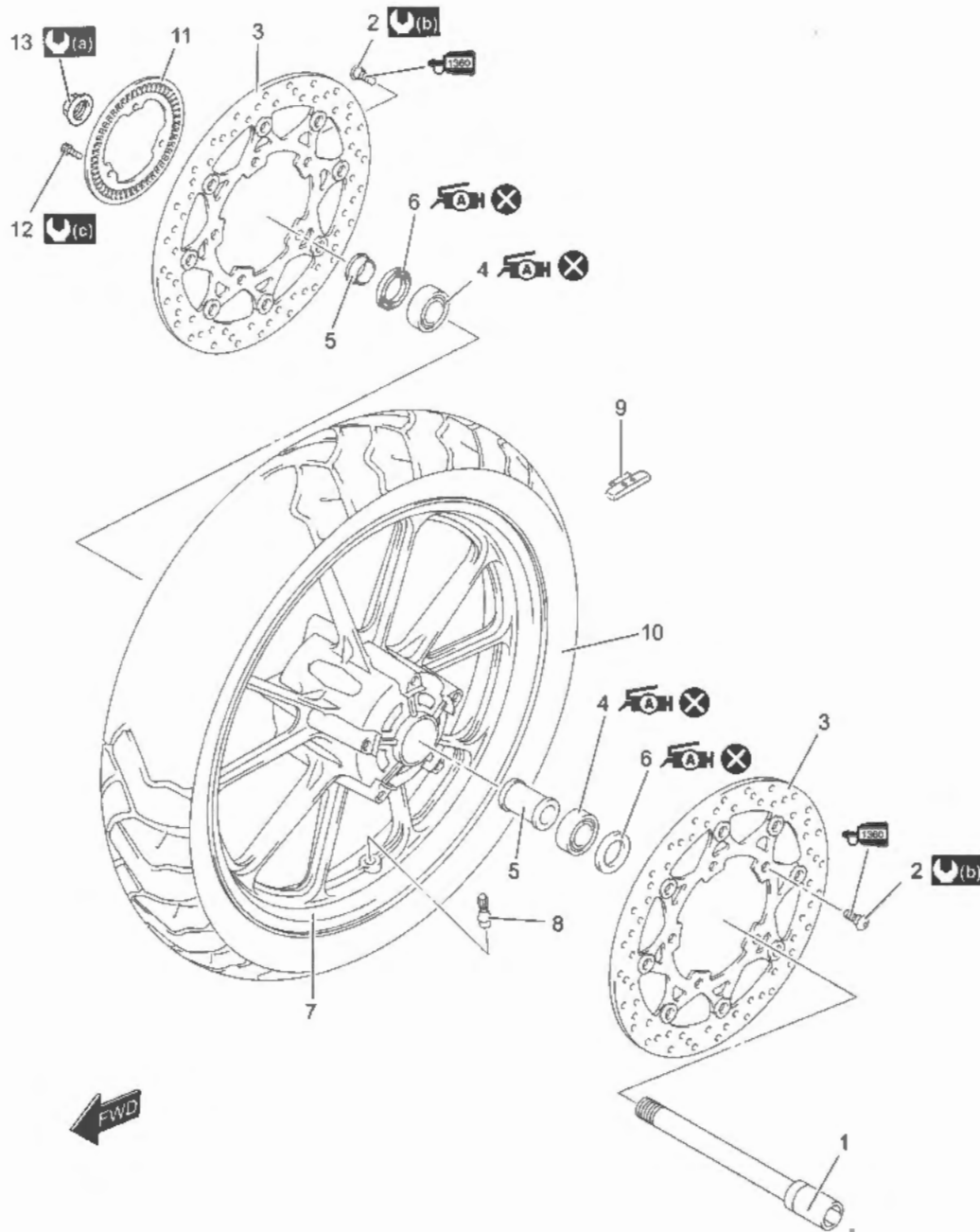
- **Replace the wheel when wheel runout exceed the service limit or if find damage such as distortion, crack, nick or scratch.**
 - **When tire replacement is necessary, the original equipment type tire should be used.**
-

Repair Instructions

Front Wheel Components

BENJ31J32406001

DL1000A

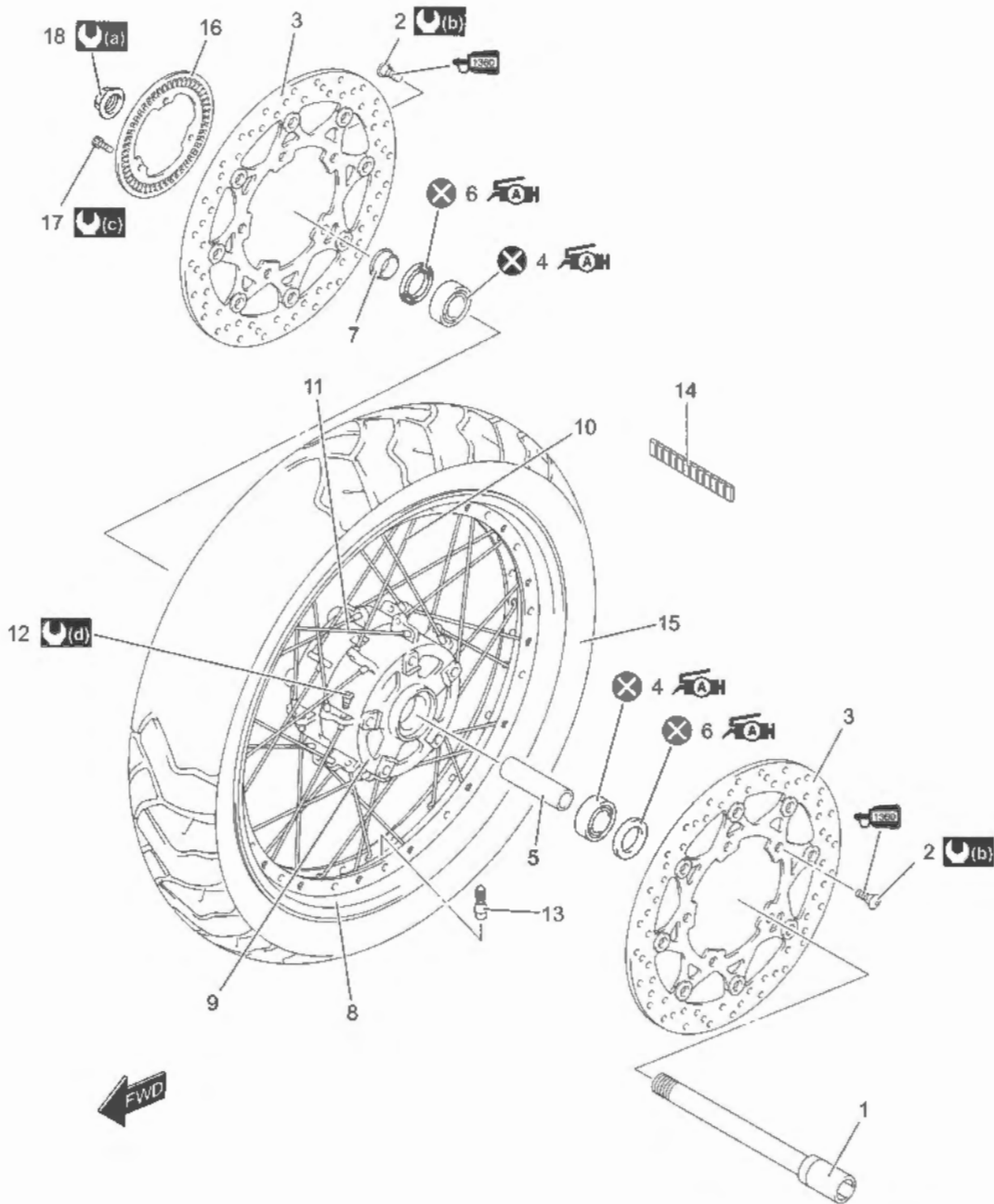


IE31J1240042-01

1. Front axle	6. Dust seal	11. Front wheel speed sensor rotor	(c) : 6.5 N-m (0.65 kgf-m, 5.0 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	1380 : Apply thread lock to thread part.
4. Bearing	9. Wheel balancer	(a) : 100 N-m (10.0 kgf-m, 72.5 lbf-ft)	⊗ : Do not reuse.
5. Collar	10. Front tire	(b) : 23 N-m (2.3 kgf-m, 17.0 lbf-ft)	

2D-3 Wheels and Tires:

DL1000XA



IJ31J1240014-02

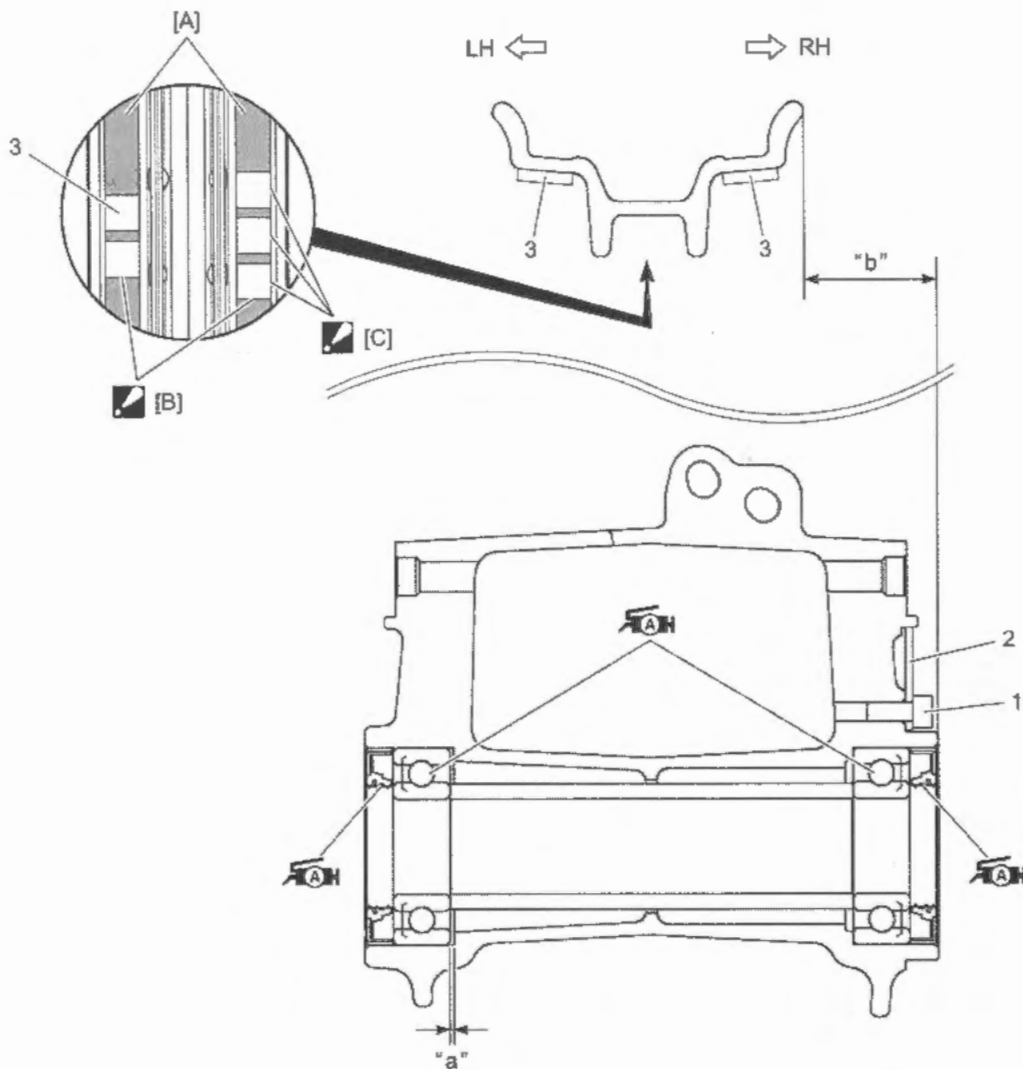
1. Front axle	10. Front inner spoke	(a) : 100 N·m (10.0 kgf·m, 72.5 lbf·ft)
2. Brake disc bolt	11. Front outer spoke	(b) : 23 N·m (2.3 kgf·m, 17.0 lbf·ft)
3. Brake disc	12. Spoke nipple	(c) : 6.5 N·m (0.65 kgf·m, 5.0 lbf·ft)
4. Bearing	13. Air valve	(d) : 5 N·m (0.5 kgf·m, 4.0 lbf·ft)
5. Spacer	14. Balancer weight	Apply grease.
6. Dust seal	15. Front tire	Apply thread lock to thread part.
7. Collar	16. Front wheel speed sensor rotor	Do not reuse.
8. Front wheel rim	17. Wheel speed sensor rotor bolt	
9. Front wheel hub	18. Front axle nut	

Front Wheel Assembly Construction (DL1000XA)

BENJ31J32406002

NOTE

DL1000XA differs from DL1000A in the wheel shape and installation of the balancer weight.

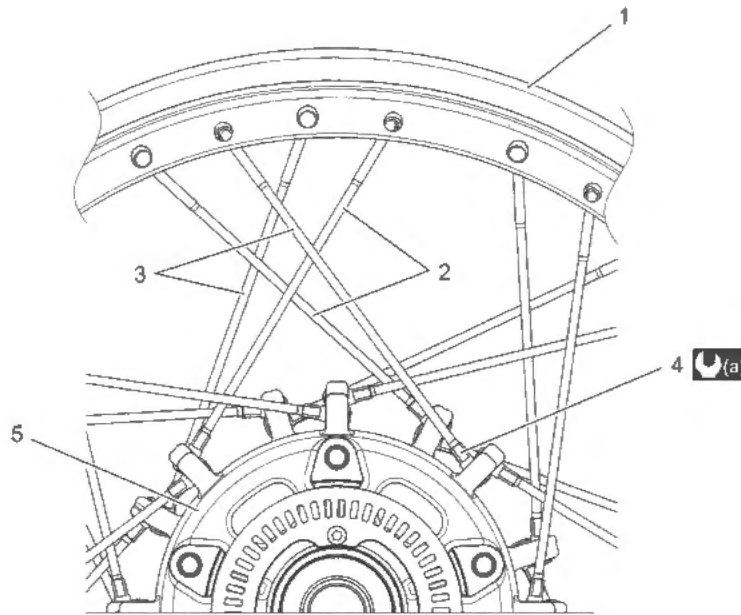


UJ31J1240001-02

[A]: Wheel rim flat surface	1. Wheel sensor rotor bolt	: Apply grease.
[B]: Asymmetric positioning of the balancer weights is allowed.	2. Wheel speed sensor rotor	"a": Clearance
[C]: When sticking a number of weights, a little opening between the adjoining weights is allowed. However, overlapping is prohibited.	3. Balancer weight	"b": 34.2 - 35.2 mm (1.35 - 1.39 in)

Front Wheel Spoke Construction (DL1000XA)

BENJ31J32406003



IJ31J1240002-02

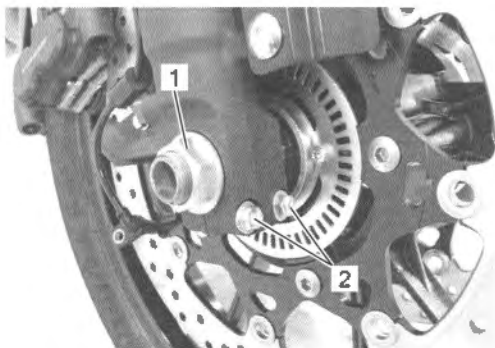
1. Front wheel rim	3. Front outer spoke	5. Front wheel hub
2. Front inner spoke	4. Spoke nipple	(a) : 5 N·m (0.5 kgf·m, 4.0 lbf·ft)

Front Wheel Assembly Removal and Installation

BENJ31J32406004

Removal

- 1) Remove the front wheel speed sensor mounting bolt.
 - L4 – L6 model: (Page 4E-38)
 - L8 – model: (Page 4E-80)
- 2) Remove the front brake calipers on the front fork legs. (Page 4B-3)
- 3) Remove the front axle nut (1).
- 4) Loosen the two axle pinch bolts (2) on the right front fork leg.



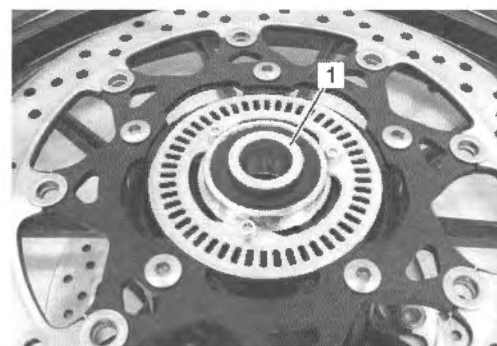
IE31J1240001-01

- 5) Raise the front wheel off the ground and support the motorcycle with a jack or a wooden block.
- 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.



IE31J1240002-01

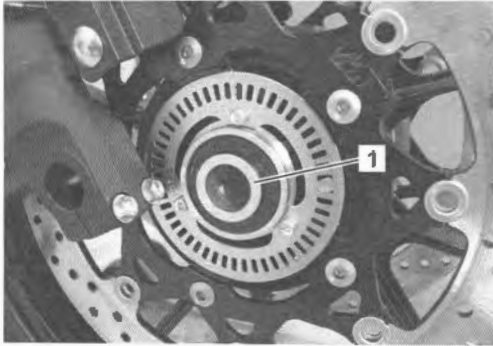
- 8) Remove the spacer (1).



IE31J1240003-01

Installation

- 1) Install the collar (1) into the right side of the wheel.



IE31J1240004-01

- 2) Install the front wheel inserting the front axle from left side, and tighten the front axle nut temporarily.

⚠ WARNING

The directional arrow on the tire should point to the wheel rotation, when installing the wheel.



IE31J1240005-01

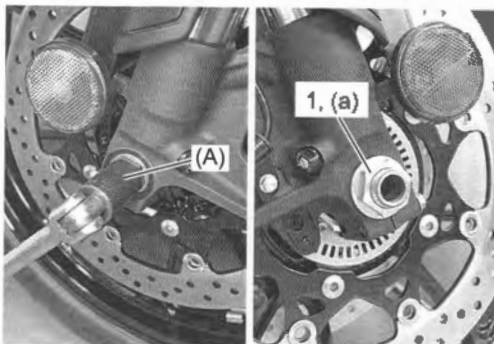
- 3) Remove a jack or a wooden block.
4) Hold the front axle with the special tool and tighten the front axle nut (1) to the specified torque.

Special tool

(A): 09900-18740

Tightening torque

Front axle nut (a): 100 N·m (10.0 kgf·m, 72.5 lbf·ft)

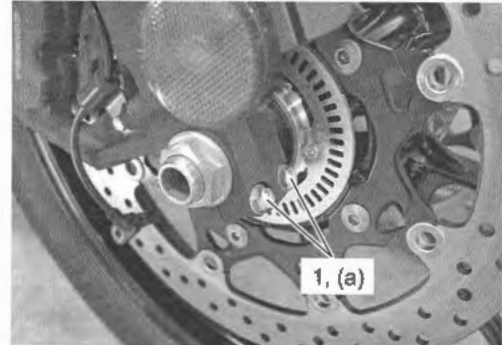


IJ31J1240008-01

- 5) Install the front brake calipers. (Page 4B-3)
6) Tighten the two axle pinch bolts (1) on the right front fork leg to the specified torque.

Tightening torque

Front axle pinch bolt (a): 23 N·m (2.3 kgf·m, 17.0 lbf·ft)



IJ31J1240009-01

- 7) Install the front wheel speed sensor.
• L4 – L6 model: (Page 4E-38)
• L8 – model: (Page 4E-80)
8) Move the front fork up and down 4 or 5 times to stabilize the front axle.

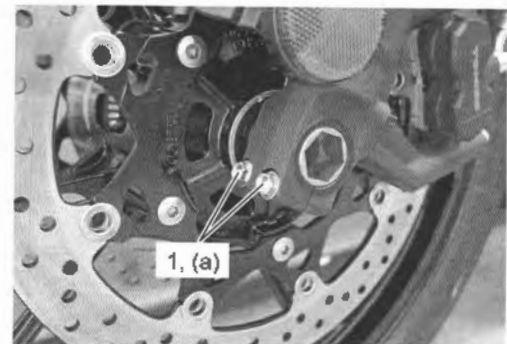


IE31J1240007-01

- 9) 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)



IJ31J1240010-01

Front Wheel Dust Seal / Front Wheel Bearing Removal and Installation

BENJ31J32406005

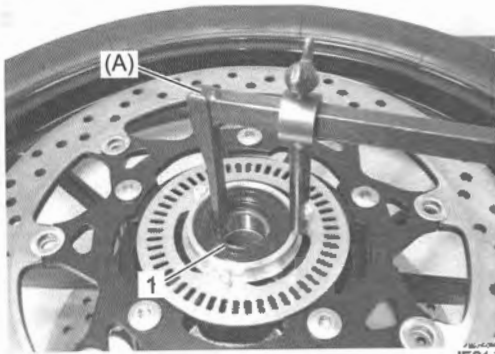
Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-5).

Removal

- 1) Remove the dust seals (1) on both sides with the special tool.

Special tool

(A): 09913-50121

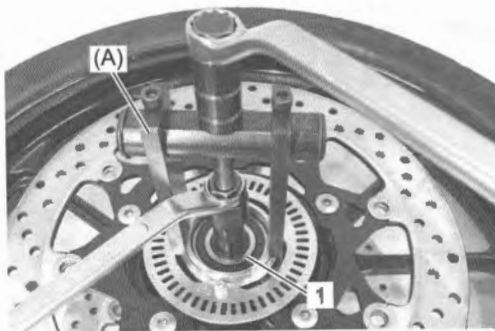


IE31J1240008-02

- 2) Remove the bearings (1) on both sides with the special tool.

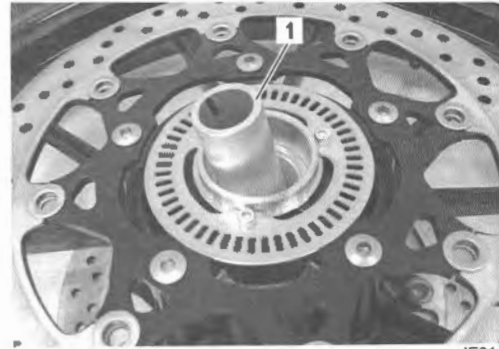
Special tool

(A): 09921-20240



IE31J1240010-02

- 3) Remove the spacer (1).



IE31J1240011-01

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 tool.

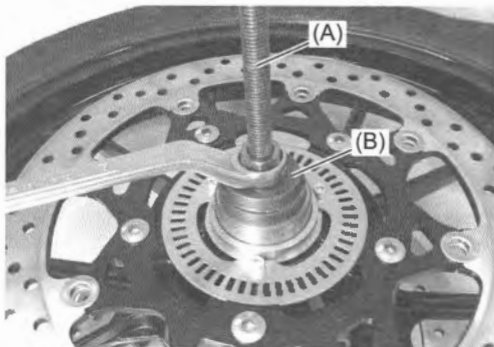
NOTICE

The sealed cover of the bearing must face outside.

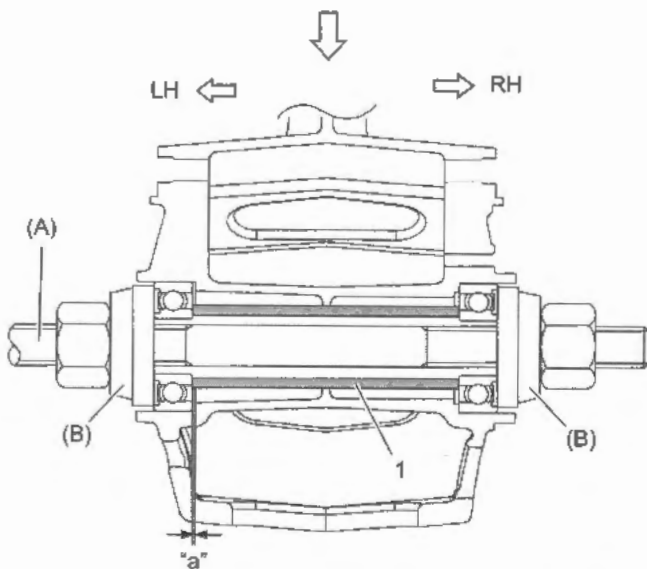
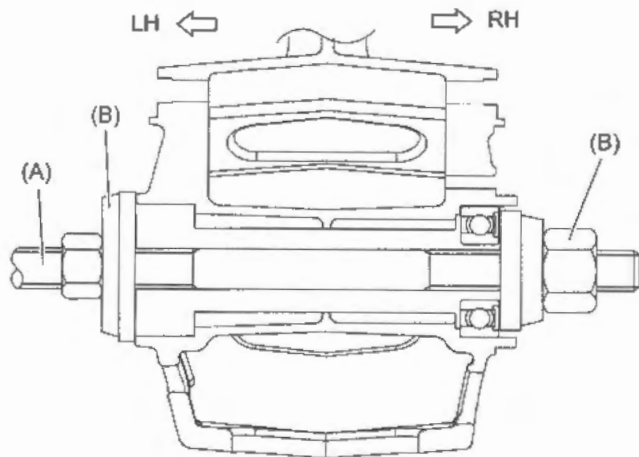
Special tool

(A): 09941-34513

(B): 09924-84510



IE31J1240012-01



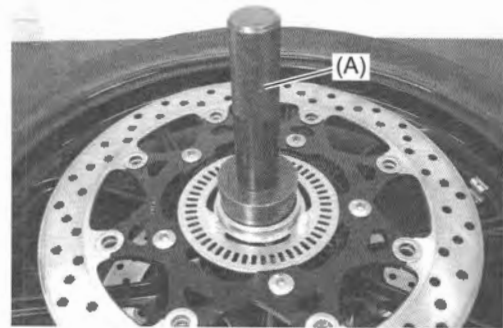
IE31J1240013-02

"a": Clearance

- 3) Install the new dust seals on both sides with the special tool.

Special tool

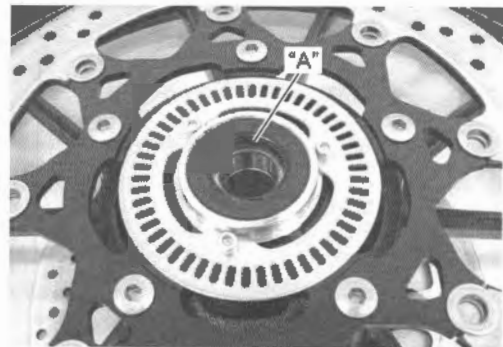
(A): 09913-70210



IE31J1240014-01

- 4) Apply grease to the lip of the dust seals.

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

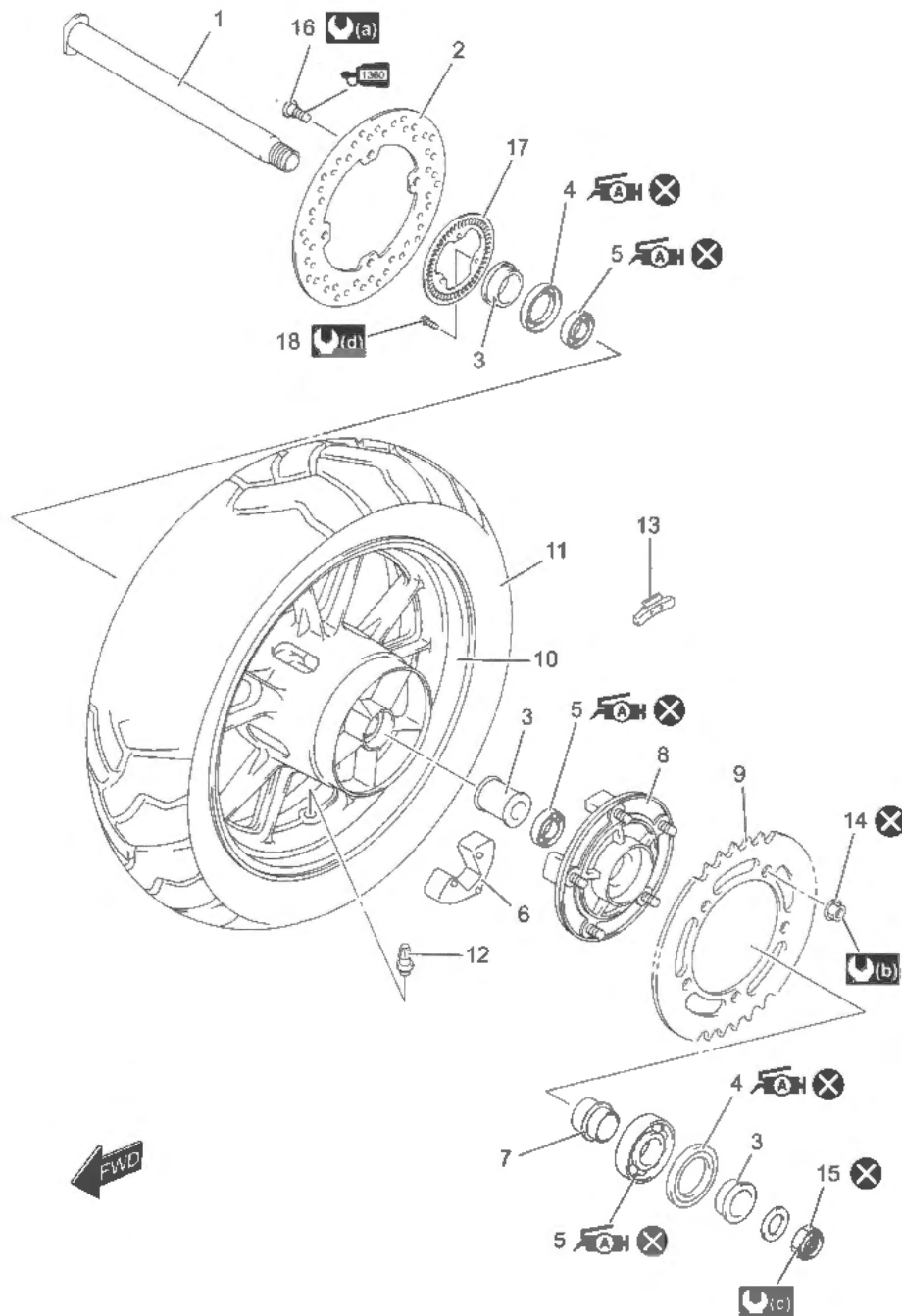


IE31J1240015-01

Rear Wheel Components

BENJ31J32406006

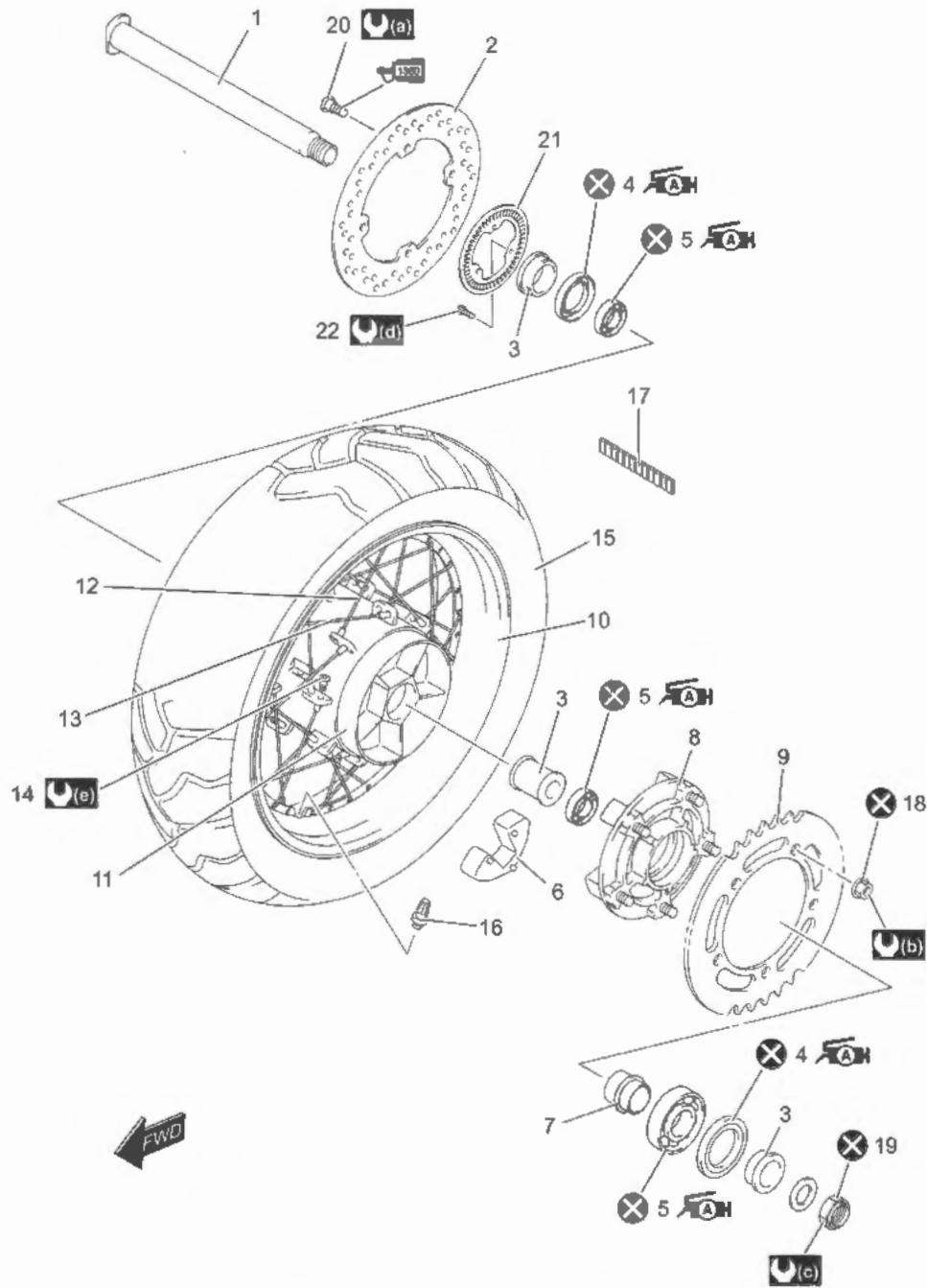
DL1000A



IJ31J1240015-01

1. Rear axle	10. Rear wheel	U(a) : 23 N-m (2.3 kgf-m, 17.0 lbf-ft)
2. Brake disc	11. Rear tire	U(b) : 80 N-m (6.0 kgf-m, 43.5 lbf-ft)
3. Spacer	12. Air valve	U(c) : 100 N-m (10.0 kgf-m, 72.5 lbf-ft)
4. Dust seal	13. Wheel balancer	U(d) : 6.5 N-m (0.65 kgf-m, 5.0 lbf-ft)
5. Bearing	14. Rear sprocket nut	Apply grease.
6. Rear wheel damper	15. Rear axle nut	Apply thread lock to 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	

DL1000XA



U31J1240016-02

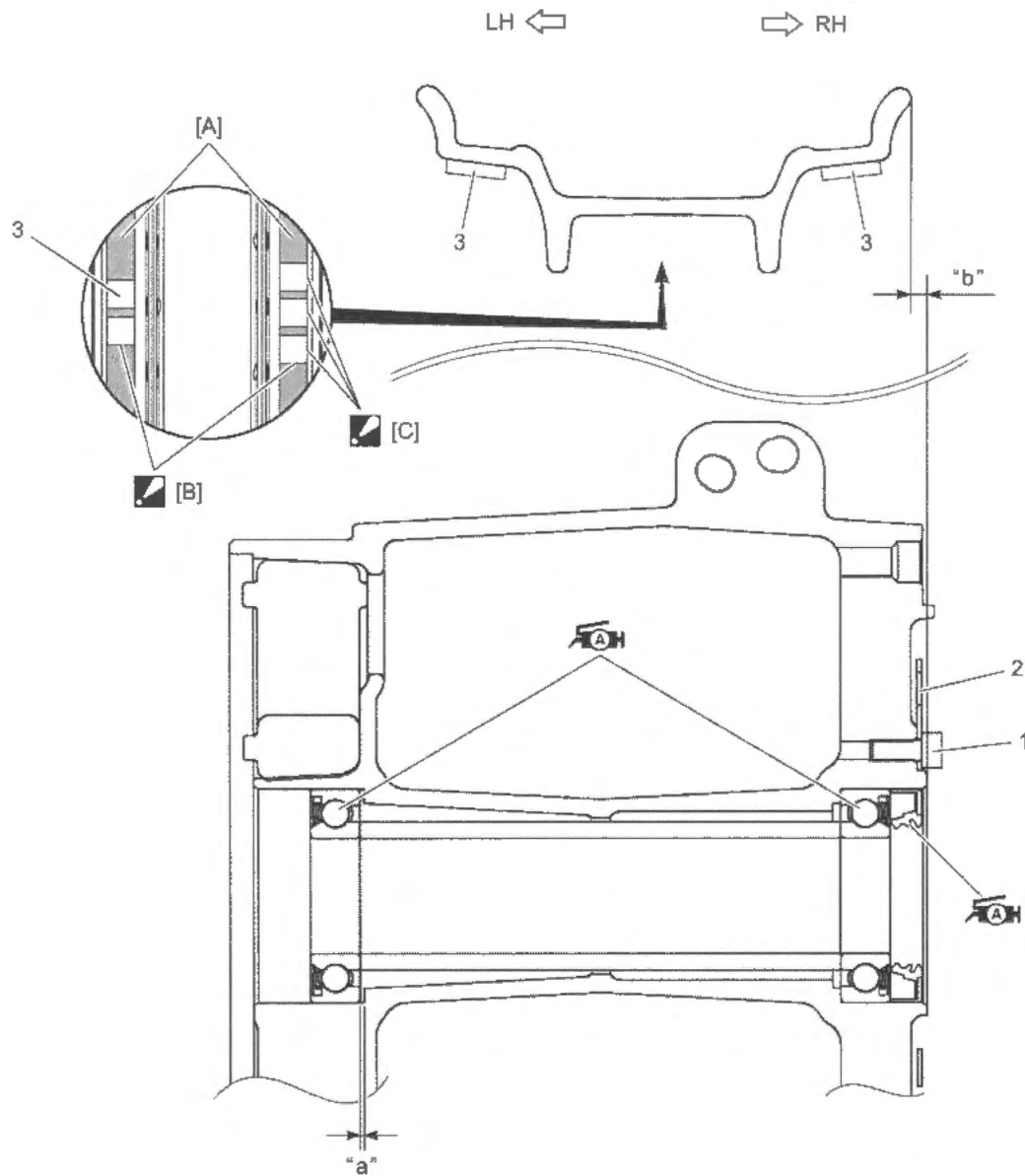
1. Rear axle	11. Rear wheel hub	21. Wheel speed sensor rotor
2. Brake disc	12. Rear inner spoke	22. Wheel speed sensor rotor bolt
3. Spacer	13. Rear outer spoke	(a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
4. Dust seal	14. Spoke nipple	(b) : 60 N·m (6.0 kgf-m, 43.5 lbf-ft)
5. Bearing	15. Rear tire	(c) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
6. Rear wheel damper	16. Air valve	(d) : 6.5 N·m (0.65 kgf-m, 5.0 lbf-ft)
7. Retainer	17. Balancer weight	(e) : 4.5 N·m (0.45 kgf-m, 3.5 lbf-ft)
8. Rear sprocket mounting drum	18. Rear sprocket nut	AH : Apply grease.
9. Rear sprocket	19. Rear axle nut	ISO : Apply thread lock to thread part.
10. Rear wheel rim	20. Brake disc bolt	X : Do not reuse.

Rear Wheel Assembly Construction (DL1000XA)

BENJ31J32406007

NOTE

DL1000XA differs from DL1000A in the wheel shape and installation of the balancer weight.

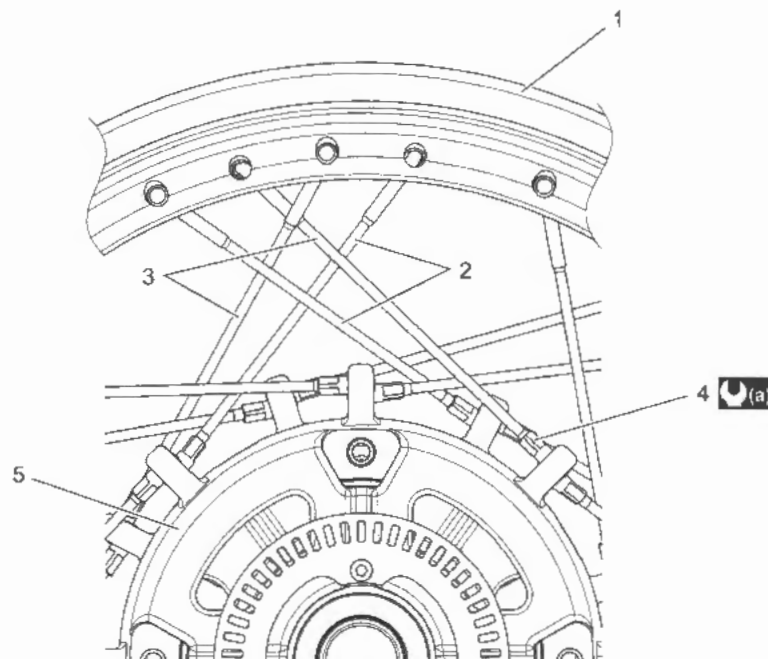


IJ31J1240004-02

[A]: Wheel rim flat surface	1. Wheel sensor rotor bolt	: Apply grease.
[B]: Asymmetric positioning of the balancer weights is allowed.	2. Wheel speed sensor rotor	"a": Clearance
[C]: When sticking a number of weights, a little opening between the adjoining weights is allowed. However, overlapping is prohibited.	3. Balancer weight	"b": 3.2 – 4.2 mm (0.13 – 0.17 in)

Rear Wheel Spoke Construction (DL1000XA)

BENJ31J32406008



IJ31J1240005-02

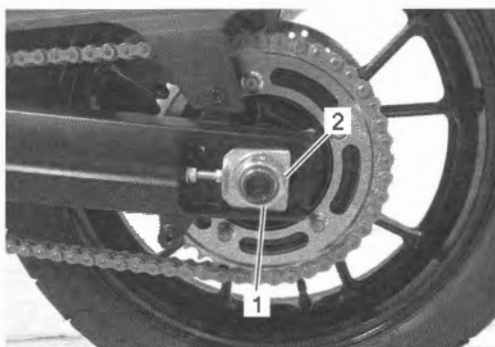
1. Rear wheel rim	3. Rear outer spoke	5. Rear wheel hub
2. Rear inner spoke	4. Spoke nipple	: 4.5 N·m (0.45 kgf-m, 3.5 lbf-ft)

Rear Wheel Assembly Removal and Installation

BENJ31J32406009

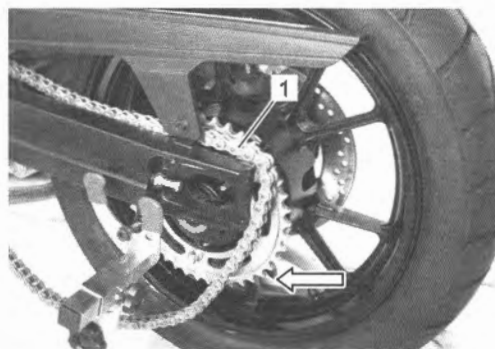
Removal

- 1) Remove the rear wheel speed sensor mounting bolt.
 - L4 – L6 model: (Page 4E-38)
 - L8 – model: (Page 4E-80)
- 2) Remove the rear axle nut (1) and washer (2).



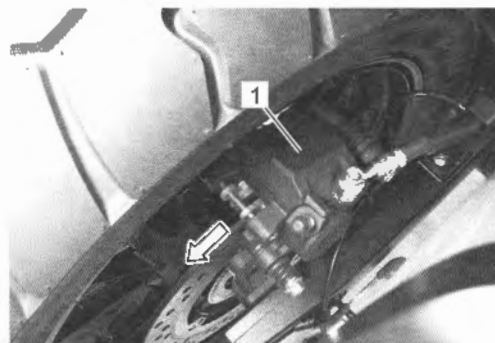
IE31J1240016-01

- 3) Raise the rear wheel off the ground and support the motorcycle with a jack or wooden block.
- 4) Draw out the rear axle.
- 5) Remove the drive chain (1) from the rear sprocket.



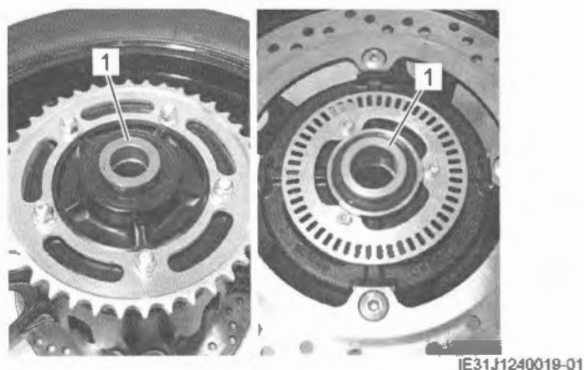
IE31J1240017-01

- 6) Remove the rear brake caliper (1) from the swingarm.
- 7) Remove the rear wheel.



IE31J1240018-01

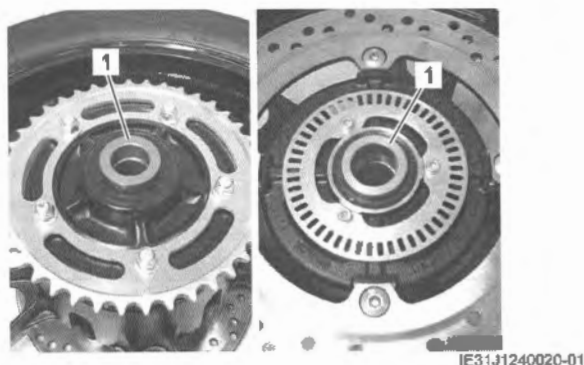
8) Remove the left and right spacers (1).



IE31J1240019-01

Installation

1) Install the left and right spacers (1).



IE31J1240020-01

2) Install the rear wheel.

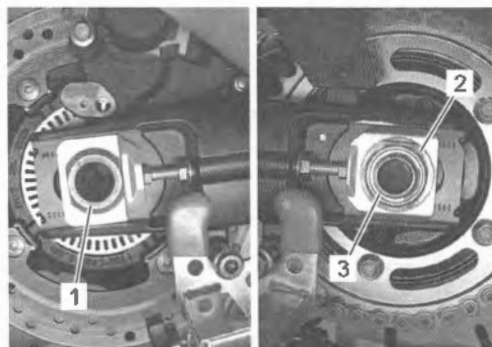
⚠ WARNING

The directional arrow on the tire should point to the wheel rotation, when installing the wheel.



IE31J1240021-01

- 3) Install the rear brake caliper to the swingarm.
- 4) Install the drive chain to the rear sprocket.
- 5) Install the rear axle (1) and washer (2).
- 6) Tighten the new rear axle nut (3) temporarily.



IE31J1240022-01

- 7) Remove the jack or a wooden block.
- 8) Adjust the chain slack. Refer to "Drive Chain Inspection and Adjustment" in Section 3A (Page 3A-2).
- 9) Install the rear wheel speed sensor.
 - L4 – L6 model: ☞(Page 4E-38)
 - L8 – model: ☞(Page 4E-80)

Rear Wheel Dust Seal / Rear Wheel Bearing Removal and Installation

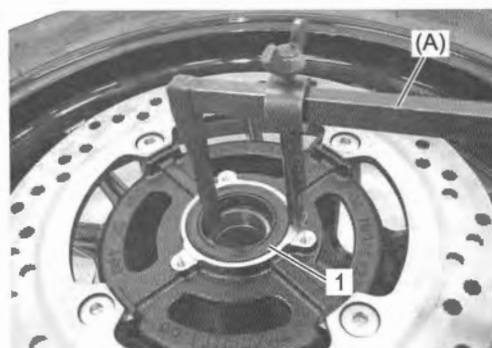
BENJ31J32406010

Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" in Section 3A (Page 3A-5).

Removal

- 1) Remove the rear wheel dampers. ☞(Page 2D-18)
- 2) Remove the rear wheel speed sensor rotor.
 - L4 – L6 model: ☞(Page 4E-40)
 - L8 – model: ☞(Page 4E-82)
- 3) Remove the dust seal (1) with the special tool.

Special tool
(A): 09913-50121

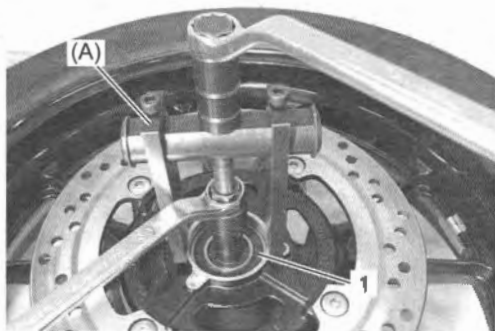


IE31J1240023-01

- 4) Remove the bearings (1) on both sides with the special tool.

Special tool

(A): 09921-20240



IE31J1240024-01

- 5) Remove the spacer (1).



IE31J1240025-01

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.

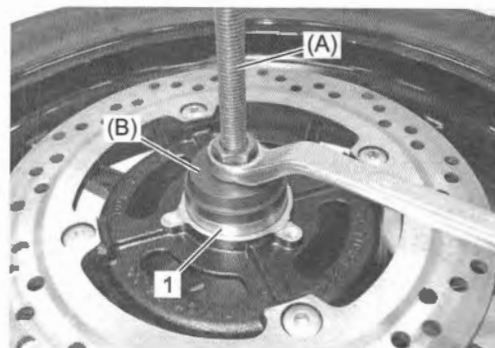
NOTICE

The sealed cover of the bearing must face outside.

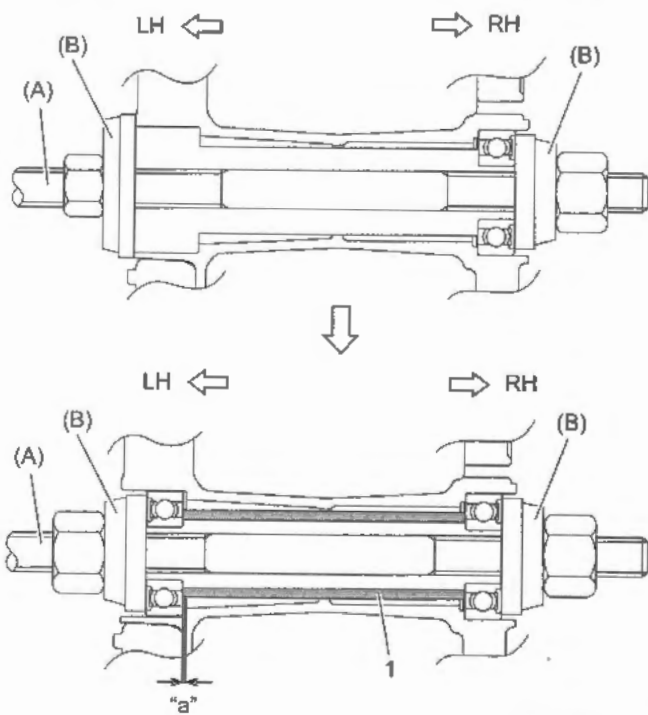
Special tool

(A): 09941-34513

(B): 09924-84510



IE31J1240026-01



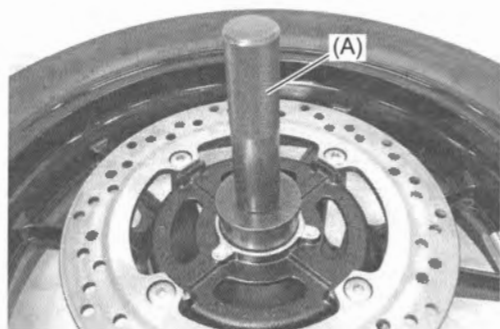
IE31J1240027-03

"a": Clearance

3) Install a new dust seal with the special tool.

Special tool

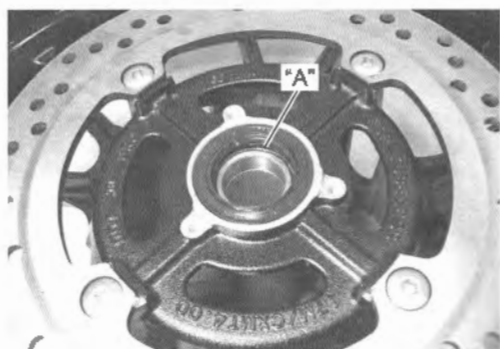
(A): 09913-70210



IE31J1240028-01

4) Apply grease to the dust seal lip.

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



IE31J1240029-01

5) Install the rear wheel speed sensor rotor.

- L4 - L6 model: ☞ (Page 4E-40)
- L8 - model: ☞ (Page 4E-82)

6) Install the rear wheel dampers. ☞ (Page 2D-18)

Wheel / Wheel Axle Inspection

BENJ31J32406011

Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-5).

Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-12).

Wheel (DL1000A)

Wheel rim runout

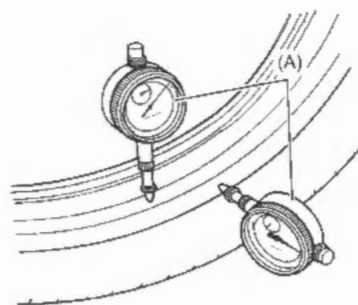
- 1) Remove the brake pads.
 - Front: ☞ (Page 4B-2)
 - Rear: ☞ (Page 4C-2)
- 2) Make sure that the wheel runout checked as shown does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings.
 - Front: ☞ (Page 2D-7)
 - Rear: ☞ (Page 2D-13)If bearing replacement fails to reduce the runout, replace the wheel.

Wheel rim runout

Service limit (Axial and Radial): 2.0 mm (0.08 in)

Special tool

(A): 09900-20607



ID26J1240033-01

3) Install the brake pads.

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

Wheel (DL1000XA)

Spoke

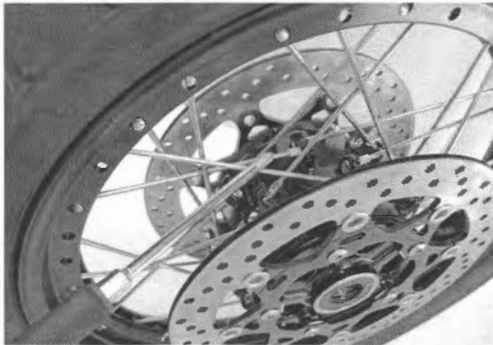
Inspect the spokes for damage and deformation. If any defects are found, replace the spokes with new ones.

Spoke nipple

- 1) Tap the spokes lightly with screwdriver to check for looseness.

NOTE

A dull sound is heard if the spoke is loose.



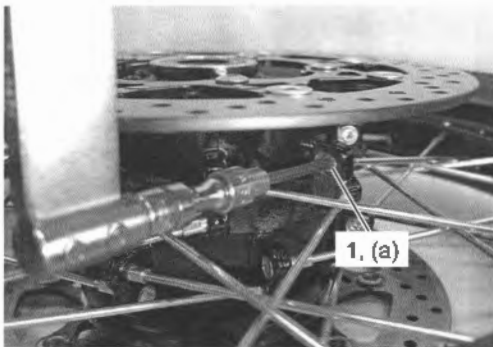
IJ31J1240011-01

- 2) Tighten the spoke nipples (1) so that all spokes have same tension, if necessary.

Tightening torque

Spoke nipple (front wheel) (a): 5 N·m (0.5 kgf-m, 4.0 lbf-ft)

Spoke nipple (rear wheel): 4.5 N·m (0.45 kgf-m, 3.5 lbf-ft)



IJ31J1240012-01

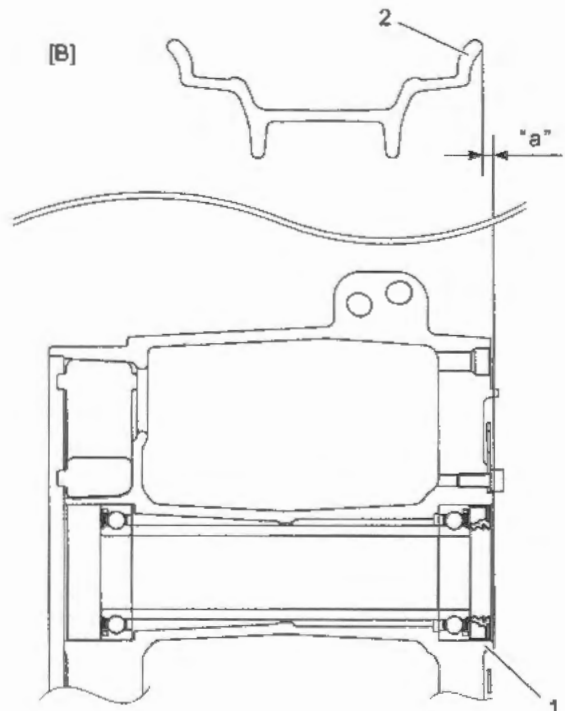
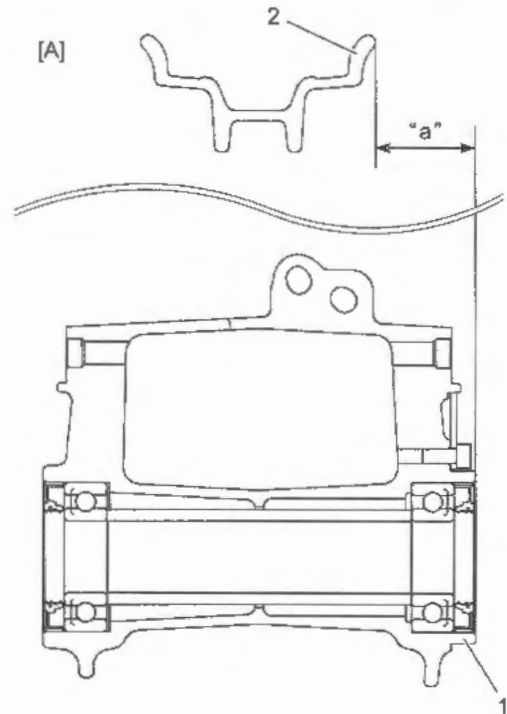
Distance between wheel hub and rim

- 1) Remove the brake disc.
 - Front: ♂ (Page 4B-6)
 - Rear: ♂ (Page 4C-7)

- 2) Place the wheel on a level surface, and then measure the right side distance "a" between the hub (1) and rim (2) using a straightedge and vernier caliper. Check that the distance is within the specified range.

Front wheel hub right end surface to rim distance
Standard: 34.2 – 35.2 mm (1.35 – 1.39 in)

Rear wheel hub right end surface to rim distance
Standard: 3.2 – 4.2 mm (0.13 – 0.17 in)



IJ31J1240006-03

2D-17 Wheels and Tires:

- 3) Adjust the distance if the measured value is out of the specified range.

Wheel rim runout

- 1) Remove the brake pads.
 - Front: (Page 4B-2)
 - Rear: (Page 4C-2)
- 2) Make sure that the wheel rim runout 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-7)
 - Rear: (Page 2D-13)If bearing replacement fails to reduce the runout, adjust or replace the wheel.

NOTE

The welded area of the wheel rim is excluded from the measurement of wheel runout.

Front wheel rim runout

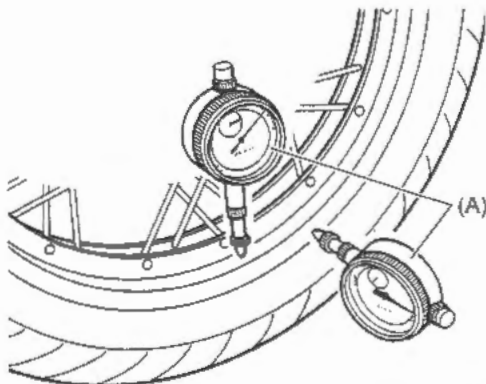
Service limit (Axial and Radial): 2.0 mm (0.08 in)

Rear wheel rim runout

Service limit (Axial and Radial): 2.0 mm (0.08 in)

Special tool

(A): 09900-20607



IJ31J1240007-01

- 3) Install the brake pads.
 - Front: (Page 4B-2)
 - Rear: (Page 4C-2)

Wheel Rim

Refer to "Wheel Rim / Air Valve Inspection and Cleaning" (Page 2D-21).

Wheel Axle

Using a dial gauge, check the wheel axle for runout. If the runout exceeds the limit, replace the wheel axle.

Wheel axle runout

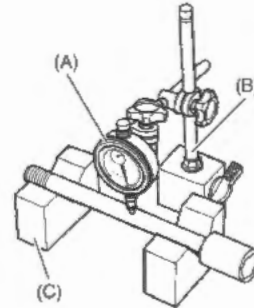
Service limit: 0.25 mm (0.010 in)

Special tool

(A): 09900-20607

(B): 09900-20701

(C): 09900-21304



ID26J1240034-03

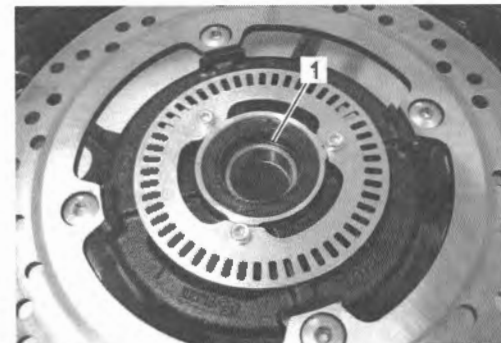
Dust Seal

Inspect the dust seals lip (1) for wear or damage. If any defects is found, replace the dust seals with new ones.

- Front: (Page 2D-7)
- Rear: (Page 2D-13)



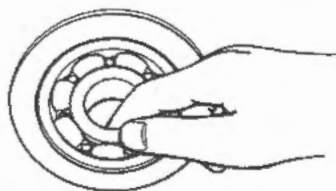
IE31J1240030-01



IE31J1240031-01

Wheel Bearing

- 1) Remove the rear sprocket mounting drum assembly (Rear wheel only). ☞ (Page 3A-5)
- 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-7)
 - Rear: ☞ (Page 2D-13)



I649G1240015-02

- 3) Install the rear sprocket mounting drum assembly (Rear wheel only). ☞ (Page 3A-5)

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-8).

Wheel Speed Sensor Rotor

Refer to "Wheel Speed Sensor and Sensor Rotor Inspection": L4 - L6 in Section 4E (Page 4E-40) or "Wheel Speed Sensor and Sensor Rotor Inspection": L8 - in Section 4E (Page 4E-82).

Rear Sprocket

Refer to "Rear Sprocket Mounting Drum / Sprocket Inspection" in Section 3A (Page 3A-6).

Tire

Refer to "Tire Inspection and Cleaning" (Page 2D-19).

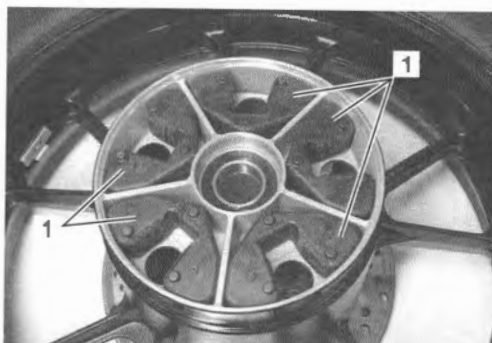
Rear Wheel Damper Removal and Installation

BENJ31J32406012

Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" in Section 3A (Page 3A-5).

Removal

- 1) Remove the rear wheel dampers (1).



IE31J1240032-01

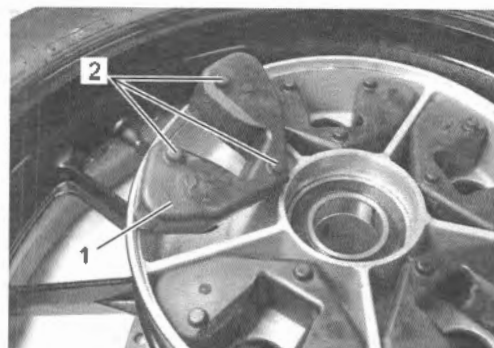
Installation

Install the rear wheel dampers in the reverse order of removal. Pay attention to the following points:

- Install the rear wheel dampers (1).

NOTE

Three protrusions (2) on the wheel damper must face outside.

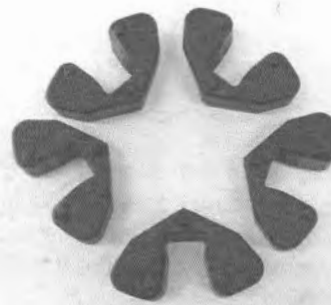


IE31J1240033-01

Rear Wheel Damper Inspection

BENJ31J32406013

Inspect the rear wheel dampers for wear and damage. Replace the damper if there is anything unusual.



IE31J1240034-01

Tire Inspection and Cleaning

BENJ31J32406D14

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

Front tire size

110/80R19M/C 59V, tubeless

Rear tire size

150/70R17M/C 69V, tubeless

Front tire type

BRIDGESTONE BW-501 RADIAL J

Rear tire type

BRIDGESTONE BW-502 RADIAL J



I649G1240042-02

Tire tread condition

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

Front tire tread depth

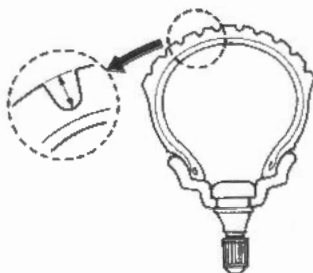
Service limit: 1.6 mm (0.06 in)

Rear tire tread depth

Service limit: 2.0 mm (0.08 in)

Special tool

09900-20805



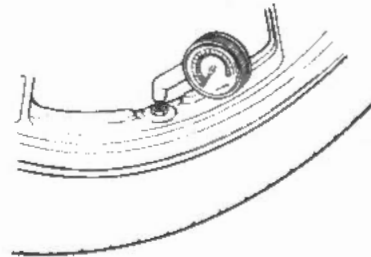
I310G1020068-02

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

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



I310G1020069-02

Tire Removal and Installation

BENJ31J32406015

Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-5).

Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" in Section 3A (Page 3A-5).

NOTICE

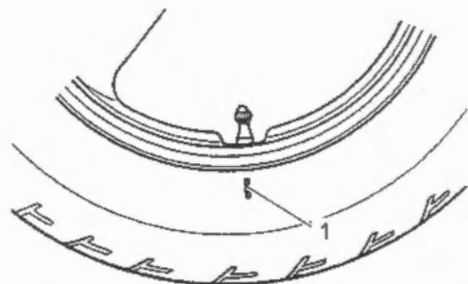
For removal and installation procedure of tire onto the wheel, follow the instructions given by the tire changer manufacturer.

Removal

The most critical factor of a tubeless tire is the seal between the wheel rim and the tire bead. For this reason, it is recommended to use a tire changer that can satisfy this sealing requirement and can make the operation efficient as well as functional.

NOTE

When replacing the tire with a new one, the tire mark (1) should be aligned with the valve position. However, when removing the tire in case of repair or inspection, mark the tire with a chalk to indicate the tire position relative to the valve position. Even though the tire is refitted to the original position after repairing puncture, the tire may have to be balanced again since such a repair can cause imbalance.



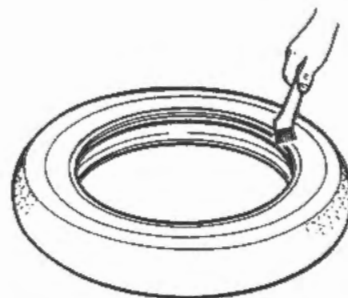
IE31J1240036-01

Installation

NOTICE

- Do not use oil, grease or gasoline on the tire bead in place of tire lubricant.
- Do not reuse the air valve which has been once removed.

- 1) Apply tire lubricant to the tire bead.

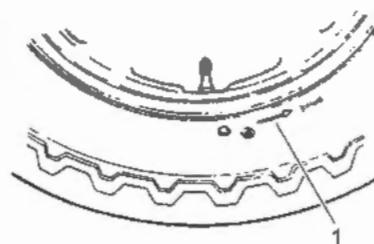


I649G1240038-02

- 2) Install the tire aligning the arrow (1) on the side wall with the direction of the wheel rotation.

NOTE

Align the chalk mark put on the tire at the time of removal with the valve position.



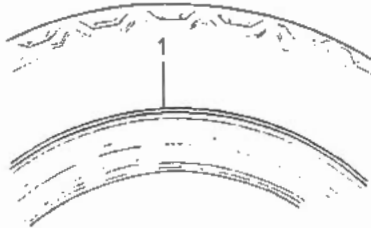
ID26J1240047-02

- 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 inflate the tire to more than 400 kPa (4.0 kgf/cm², 57 psi). If inflated beyond this limit, the tire can burst and possibly cause injury. Do not stand directly over the tire while inflating.
- In the case of preset pressure air inflator, pay special care for the set pressure adjustment.

- 5) In this condition, check the "rim line" (1) cast on the tire side walls. The line must be equidistant from the wheel rim all around.
- 6) If the distance between the rim line (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

- 7) When the bead has been fitted properly, install the valve core and adjust the pressure to specification. (Page 2D-19)
- 8) As necessary, adjust the tire balance. (Page 2D-22)

Wheel Rim / Air Valve Inspection and Cleaning

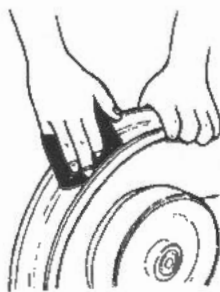
BENJ31J32406016

Refer to "Tire Removal and Installation" (Page 2D-20).
Refer to "Air Valve Removal and Installation" (Page 2D-21).

Wheel Rim

Wipe the wheel clean and check for the following points:

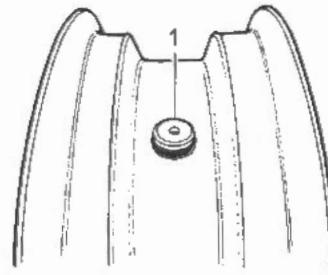
- Distortion and crack.
- Any flaws and scratches at the bead seating area.
- Wheel rim runout. (Page 2D-15)



1649G1240041-02

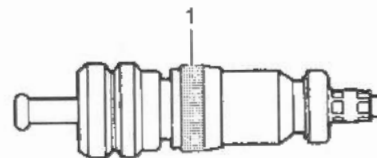
Air Valve

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

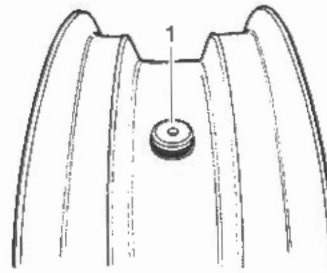
Air Valve Removal and Installation

BENJ31J32406017

Refer to "Tire Removal and Installation" (Page 2D-20).

Removal

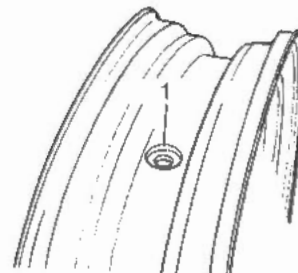
- 1) Remove the air valve (1) from the wheel.



IE31J1240040-01

Installation

- 1) Any dust or rust around the valve hole (1) must be cleaned off.

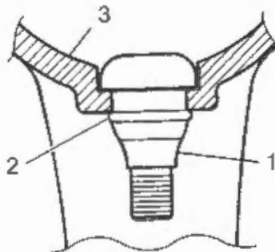


IE31J1240041-01

- 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

BENJ31J32406018

Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-5).

Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" in Section 3A (Page 3A-5).

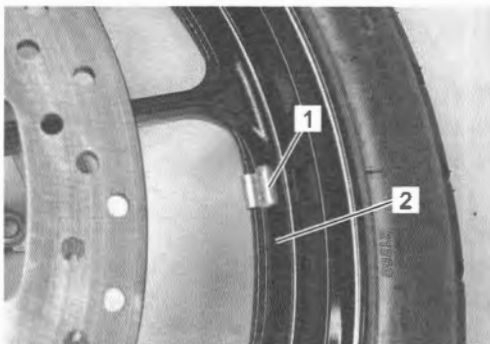
DL1000A

- 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.



IE31J1240035-02

- 3) Recheck the wheel balance.

DL1000XA

- 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.

NOTE

Before checking the wheel balance, prepare the wheel installed with the tire, brake disc, wheel speed sensor rotor, wheel bearings and dust seal, and adjust the balance to obtain the unbalance value of 10 g (0.353 oz, 0.0220 lbs) or below.

- 2) When installing the balancer weight (1) to the wheel (2), install it to the wheel rim. Refer to "Front Wheel Assembly Construction (DL1000XA)" (Page 2D-4) or "Rear Wheel Assembly Construction (DL1000XA)" (Page 2D-11).

When sticking a number of weights, assign them as follows.

- 1 – 3 pieces:
Stick all weight(s) on either one side.
- 4 – 12 pieces:
 - Even numbers: Assign them right and left equally.
 - Odd numbers: Assign them right and left with one difference.

NOTICE

For the adhesive type balancer weight, degrease the wheel rim before placing it.



IJ31J1240013-01

- 3) Recheck the wheel balance.

Specifications

Tightening Torque Specifications

BENJ31J32407001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Front axle nut	100	10.0	72.5	☞(Page 2D-6)
Front axle pinch bolt	23	2.3	17.0	☞(Page 2D-6) / ☞(Page 2D-6)
Spoke nipple (front wheel)	5	0.5	4.0	☞(Page 2D-16)
Spoke nipple (rear wheel)	4.5	0.45	3.5	☞(Page 2D-16)

Reference:

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

"Front Wheel Components" (Page 2D-2)

"Front Wheel Spoke Construction (DL1000XA)" (Page 2D-5)

"Rear Wheel Components" (Page 2D-9)

"Rear Wheel Spoke Construction (DL1000XA)" (Page 2D-12)

"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ31J32408001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞(Page 2D-7) / ☞(Page 2D-8) / ☞(Page 2D-14) / ☞(Page 2D-15)

NOTE

Required service material(s) is also described in:

"Front Wheel Components" (Page 2D-2)



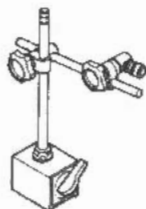

"Front Wheel Assembly Construction (DL1000XA)" (Page 2D-4)

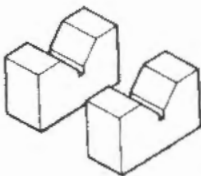


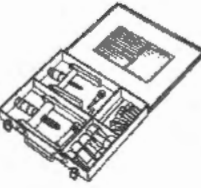
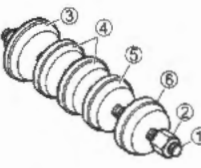

"Rear Wheel Components" (Page 2D-9)

"Rear Wheel Assembly Construction (DL1000XA)" (Page 2D-11)

Special Tool

BENJ31J32408002

09900-18740 Hexagon bit socket (24 mm: 1/2 sq.) ☞(Page 2D-6)		09900-20607 Dial gauge (10 x 0.01 mm) ☞(Page 2D-15) / ☞(Page 2D-17) / ☞(Page 2D-17)	
09900-20701 Dial gauge chuck ☞(Page 2D-17)		09900-20805 Tire depth gauge ☞(Page 2D-19)	

<p>09900-21304 V blocks ☞(Page 2D-17)</p>		<p>09913-50121 Oil seal remover ☞(Page 2D-7) / ☞(Page 2D-13)</p>	
<p>09913-70210 Bearing installer set ☞(Page 2D-8) / ☞(Page 2D-15)</p>		<p>09921-20240 Bearing remover set ☞(Page 2D-7) / ☞(Page 2D-14)</p>	
<p>09924-84510 Bearing installer set ☞(Page 2D-8) / ☞(Page 2D-14)</p>		<p>09941-34513 Bearing installer set ☞(Page 2D-8) / ☞(Page 2D-14)</p>	

Section 3

Driveline / Axle

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Precautions

Precautions

Precautions for Driveline / Axle

BENJ31J3300001

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

▲ WARNING

Never inspect or adjust the drive chain while the engine is running.

NOTICE

-
- Do not use trichloroethylene, gasoline or any similar solvent. These fluids will damage the O-rings of the drive chain.
 - Clean the drive chain with a spray-type chain cleaner and blow dry with compressed air. If the drive chain cannot be cleaned with a spray cleaner, it may be necessary to use a kerosine. Always follow the chemical manufacturer's instructions on proper use, handling and storage.
 - Lubricate the drive chain with a heavy weight motor oil. Wipe off any excess oil or chain lubricant. Do not use any oil sold commercially as "drive chain oil". Such oil can damage the O-rings.
-

Drive Chain / Drive Train / Drive Shaft

Diagnostic Information and Procedures

Drive Chain and Sprocket Symptom Diagnosis

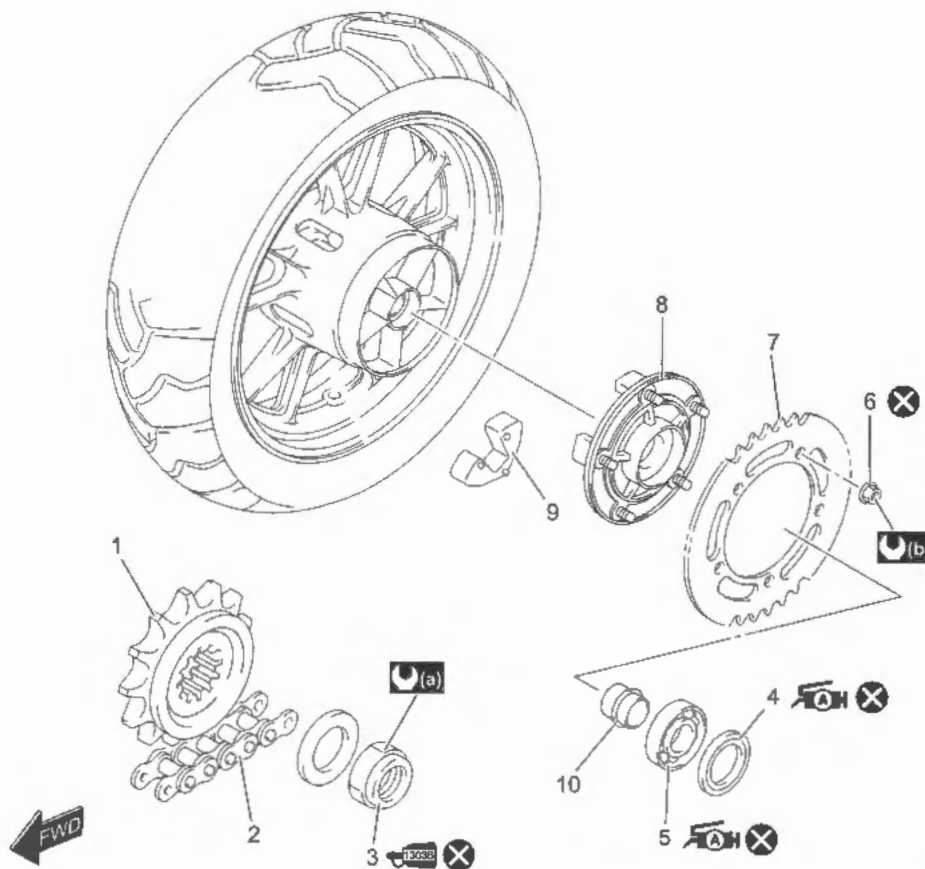
BENJ31J33104001

Condition	Possible cause	Correction / Reference Item
Noisy Drive Chain	Worn sprocket.	Replace. (Page 3A-3) (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

BENJ31J33106001



IJ31J1310001-01

1. Engine sprocket	6. Rear sprocket nut	(a) : 115 N·m (11.5 kgf·m, 83.5 lbf·ft)
2. Drive chain	7. Rear sprocket	(b) : 60 N·m (6.0 kgf·m, 43.5 lbf·ft)
3. Engine sprocket nut	8. Rear sprocket mounting drum	Apply grease.
4. Dust seal	9. Wheel damper	Apply thread lock to thread part.
5. Bearing	10. Retainer	Do not reuse.

Drive Chain Inspection and Adjustment

BENJ31J33106002

Drive Chain Visual Check

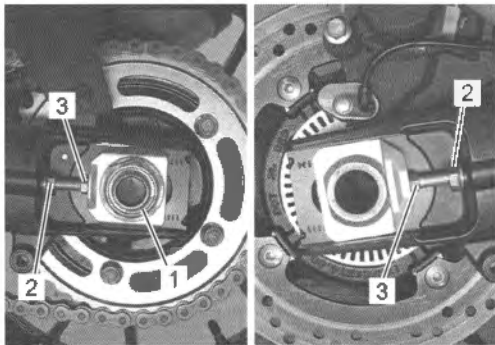
- 1) With the transmission in neutral, support the motorcycle a jack and turn the rear wheel slowly by hand.
- 2) Visually check the drive chain for the possible defects listed as follows. If any defects are found, the drive chain must be replaced. ☞ (Page 3A-8)
 - Loose pins
 - Damaged rollers
 - Dry or rusted links
 - Kinked or binding links
 - Excessive wear
 - Improper chain adjustment
 - Missing O-ring seals

NOTE

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

Drive Chain Length Inspection

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

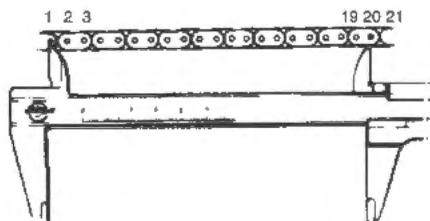


IE31J1310001-01

- 4) Count out 21 pins (20 pitches) on the chain and measure the distance between the two points. If the distance exceeds the service limit, the chain must be replaced. ☞ (Page 3A-8)

Drive chain 20-pitch length

Service limit: 319.4 mm (12.57 in)



I649G1020034-02

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

Drive Chain Slack Adjustment

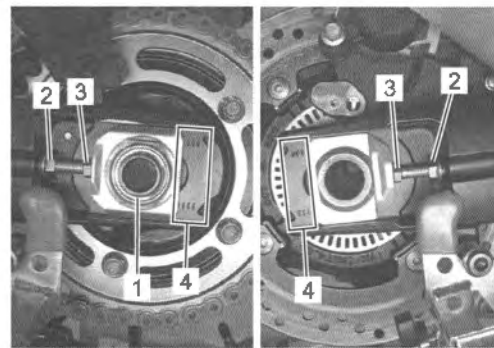
- 1) Loosen the rear axle nut (1).
- 2) Support the motorcycle with a jack or wooden block.
- 3) Loosen the left and right chain adjuster lock-nuts (2).
- 4) Loosen or tighten both chain adjuster bolts (3) until there is 20 – 30 mm (0.8 – 1.2 in) "a" of slack at the middle of the chain between the engine and rear sprockets.

NOTICE

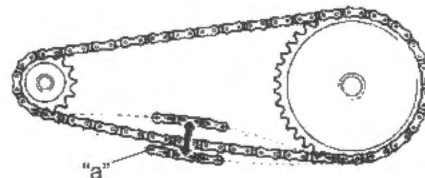
The reference marks (4) on both sides of the swingarm and the edge of each chain adjuster must be aligned to ensure that the front and rear wheels are correctly aligned.

Drive chain slack "a"

Standard: 20 – 30 mm (0.8 – 1.2 in)



IE31J1310002-01



I649G1020036-02

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

Tightening torque

Rear axle nut: 100 N·m (10.0 kgf·m, 72.5 lbf·ft)

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

Drive Chain Cleaning and Lubricating

BENJ31J33106003

- 1) Remove dirt and dust from the drive chain (1). Be careful not to damage the seal ring.
- 2) 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.

- 3) Use a soft brush to clean the drive chain (1). Be careful not to damage the seal ring even through using a soft brush.
- 4) Wipe off water and neutral detergent.
- 5) Lubricate with a motorcycle sealed drive chain (1) lubricant or high viscosity oil.

NOTICE

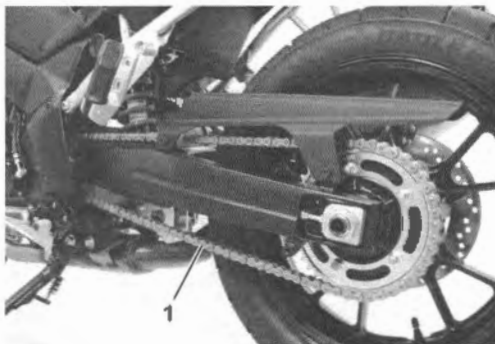
Some drive chain lubricant contains solvents and additives which could damage the seal rings in the drive chain.

Use sealed drive chain lubricant which is specifically intended for use with sealed drive chains.

- 6) Lubricate both front and back plates of the drive chain (1).
- 7) Wipe off excess lubricant after lubricating all around of the drive chain (1).

NOTE

The standard drive chain is a RK 525SMOZ8. SUZUKI recommends to use this standard drive chain as a replacement.



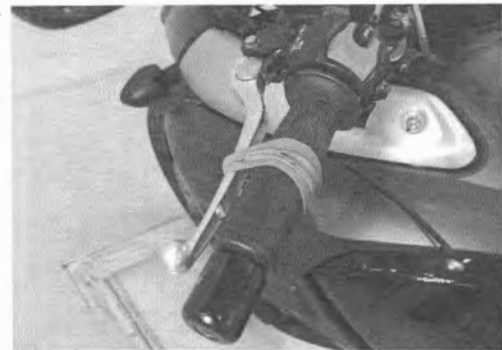
IE31J1310003-01

Engine Sprocket Removal and Installation

BENJ31J33106004

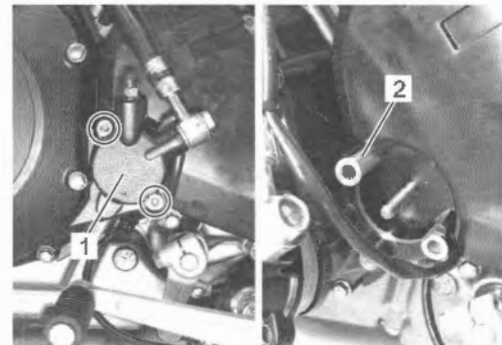
Removal

- 1) Bind the clutch lever with a rubber band to prevent the clutch release cylinder piston from coming out.



IE31J1310004-01

- 2) Remove the clutch release cylinder (1) and spacer (2).



IE31J1310005-01

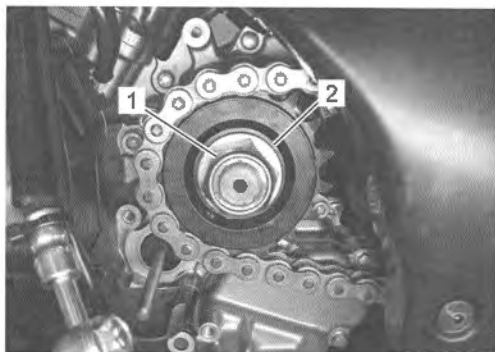
- 3) Remove the engine sprocket cover (1).



IE31J1310006-02

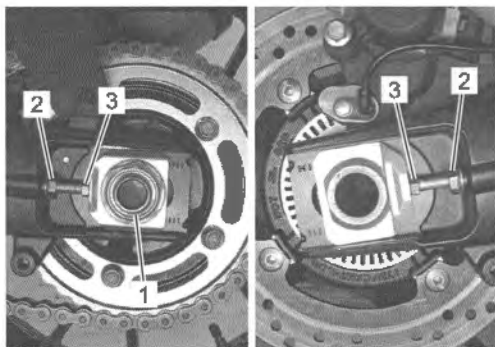
3A-4 Drive Chain / Drive Train / Drive Shaft:

- 4) Remove the engine sprocket nut (1) while depressing the rear brake pedal.
- 5) Remove the washer (2).



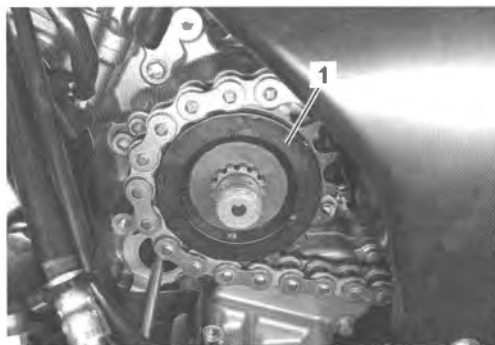
IE31J1310007-02

- 6) Loosen the rear axle nut (1).
- 7) Support the motorcycle with a jack or wooden block.
- 8) Loosen the left and right lock-nuts (2) and turn in the adjuster bolts (3) to provide additional chain slack.



IE31J1310008-01

- 9) Remove the engine sprocket (1).

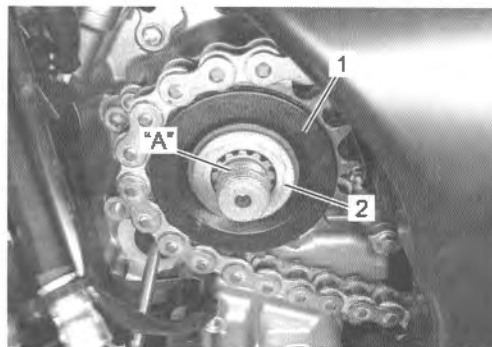


IE31J1310009-01

Installation

- 1) Install the engine sprocket (1) and washer (2).
- 2) Apply thread lock to the driveshaft.

"A": Thread lock cement 99000-32030 (THREAD LOCK CEMENT 1303B)

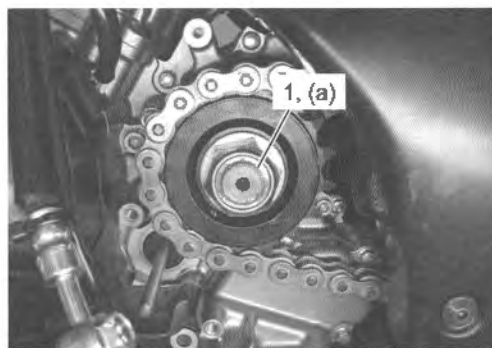


IE31J1310010-01

- 3) Tighten the engine sprocket new nut (1) to the specified torque.

Tightening torque

Engine sprocket nut (a): 115 N·m (11.5 kgf·m, 83.5 lbf·ft)



IE31J1310011-01

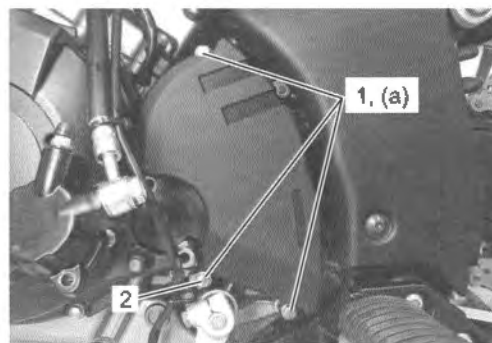
- 4) Tighten the engine sprocket cover bolts (1) to the specified torque.

NOTE

Fit the clamp to the bolt (2).

Tightening torque

Engine sprocket cover bolt (a): 11 N·m (1.1 kgf·m, 8.0 lbf·ft)

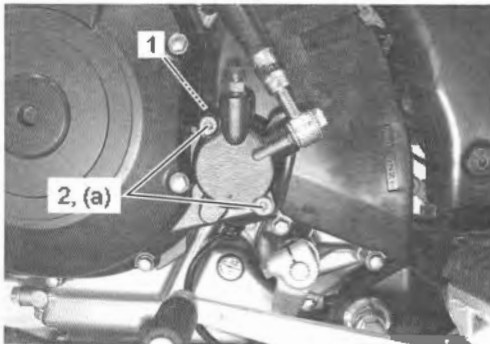


IE31J1310012-02

- 5) Install the spacer (1).
- 6) Tighten the clutch release cylinder mounting bolts (2) to the specified torque.

Tightening torque

Clutch release cylinder mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1310014-02

- 7) Adjust the drive chain slack. Refer to "Drive Chain Inspection and Adjustment" (Page 3A-2).

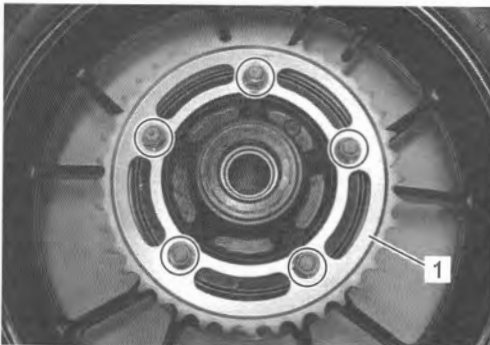
Rear Sprocket Removal and Installation

BENJ31J33106005

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-12).

Removal

- 1) Remove the rear sprocket (1).



IE31J1310015-01

Installation

Install the rear sprocket in the reverse order of removal. Pay attention to the following points:

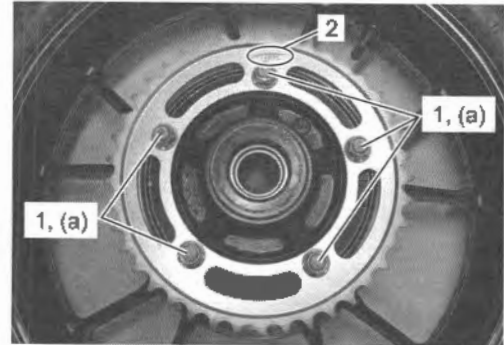
- Tighten the new rear sprocket nuts (1) to the specified torque.

NOTE

The stamped mark (2) on the sprocket should face outside.

Tightening torque

Rear sprocket nut (a): 60 N·m (6.0 kgf-m, 43.5 lbf-ft)



IE31J1310016-01

Rear Sprocket Mounting Drum Assembly Removal and Installation

BENJ31J33106006

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-12).

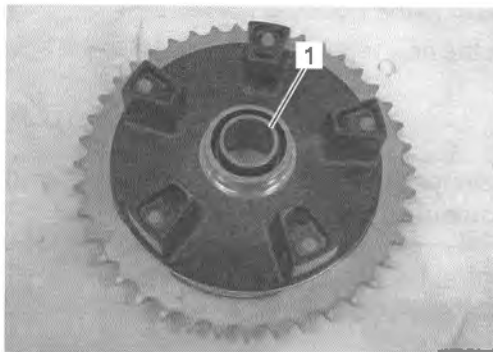
Removal

- 1) Remove the rear sprocket mounting drum assembly (1).



IE31J1310017-01

- 2) Remove the retainer (1).



IE31J1310018-01

Installation

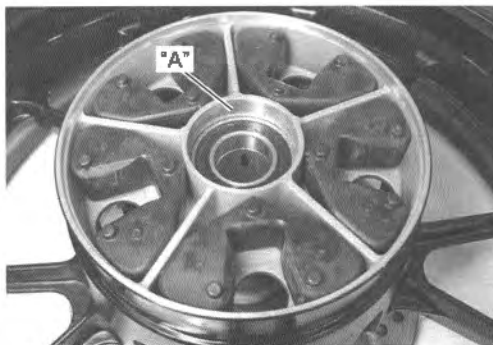
- 1) Install the retainer (1).



IJ31J1310002-01

- 2) Apply grease to the contacting surface between the rear wheel hub and the rear sprocket mounting drum.

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



IE31J1310020-01

- 3) Install the rear sprocket mounting drum assembly to the rear wheel assembly.

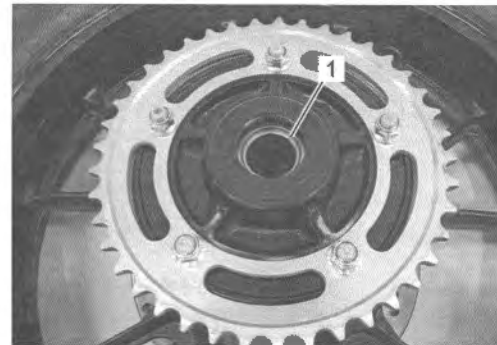
Rear Sprocket Mounting Drum / Sprocket Inspection

BENJ31J33106007

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-12).

Dust Seal

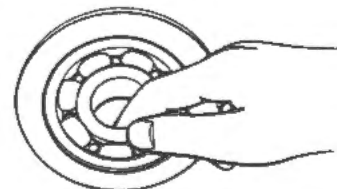
Inspect the sprocket mounting drum dust seal (1) for wear or damage. If any damage is found, replace the dust seal with a new one. (Page 3A-7)



IE31J1310021-01

Bearing

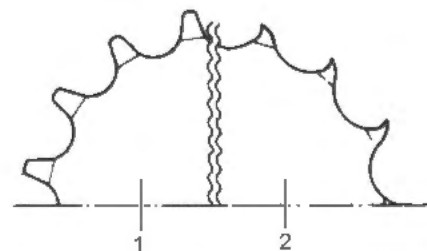
Inspect the play of the sprocket mounting drum bearings by hand while they are in the wheel and drum. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. (Page 3A-7)



I649G1310015-02

Sprocket

- 1) Remove the engine sprocket cover. (Engine sprocket only) (Page 3A-3)
- 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-3)
 - Rear: (Page 3A-5)



IE31J1310022-01

1. Normal wear	2. Excessive wear
----------------	-------------------

- 3) Install the engine sprocket cover (Engine sprocket only). (Page 3A-3)

Wheel Damper

Refer to "Rear Wheel Damper Inspection" in Section 2D (Page 2D-18).

Drive Chain

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

Rear Sprocket Mounting Drum Dust Seal / Bearing Removal and Installation

BENJ31J33106008

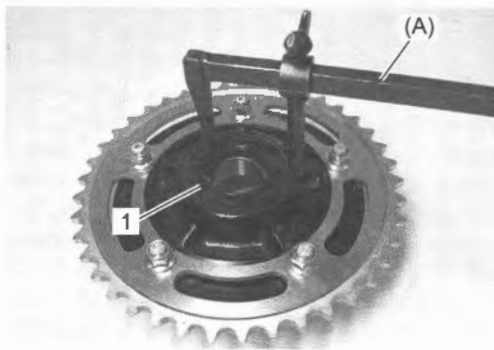
Refer to "Rear Sprocket Mounting Drum Assembly Removal and Installation" (Page 3A-5).

Removal

- 1) Remove the dust seal (1) using the special tool.

Special tool

(A): 09913-50121

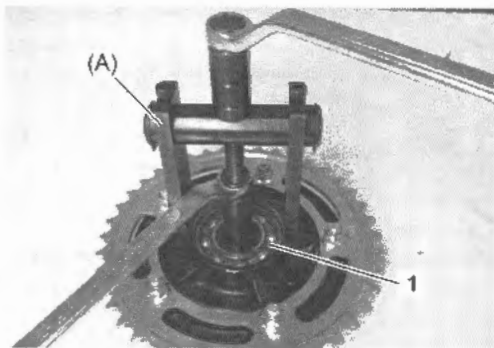


IE31J1310023-01

- 2) Remove the bearing (1) with the special tool.

Special tool

(A): 09921-20240



IE31J1310024-01

Installation

- 1) Apply grease to the new bearing.

Grease 99000-25011 (SUZUKI SUPER GREASE A)



IE49G1310020-02

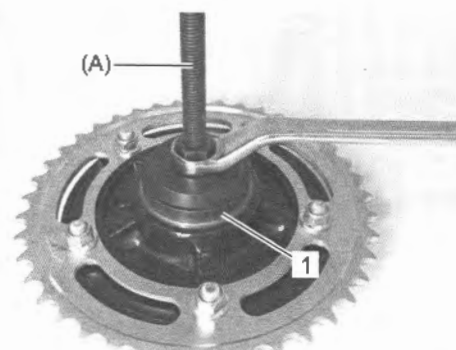
- 2) Install the bearing (1) with the special tool.

NOTICE

The sealed cover of the bearing must face inside.

Special tool

(A): 09924-84510

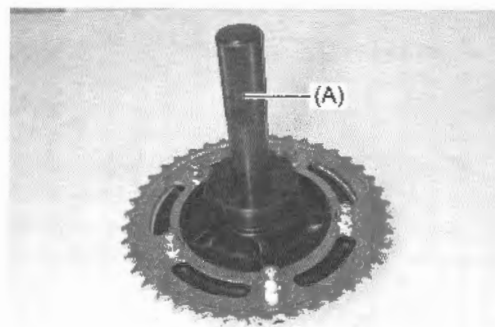


IE31J1310025-01

- 3) Install a new dust seal with the special tool.

Special tool

(A): 09913-70210



IE31J1310026-01

4) Apply grease to the dust seal lip.

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



IE31J1310027-01

Drive Chain Replacement

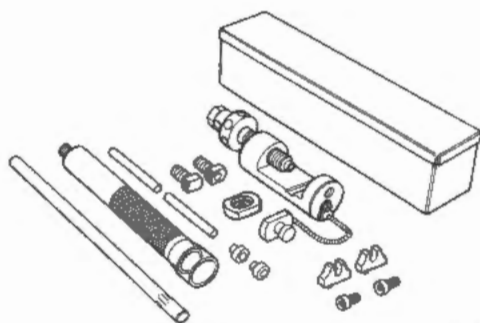
BENJ31J33106009

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.

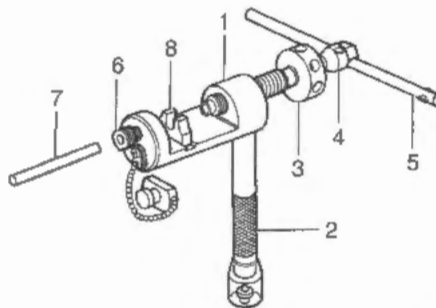
**Special tool
09922-22711**



I649G1310023-02

Drive Chain Cutting

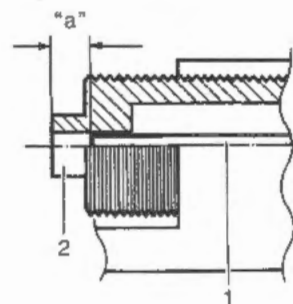
1) Set up the special tool.



IE31J1310026-01

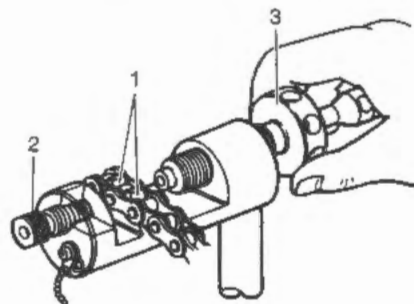
1.	Tool body
2.	Grip handle
3.	Pressure bolt A
4.	Pressure bolt B
5.	Bar
6.	Adjuster bolt (With through hole)
7.	Pin remover
8.	Chain holder (Engraved mark 500) with reamer bolt M5 x 10

2) The tip of pin remover (1) should be positioned inside "a" approximately 5 mm (0.2 in) from the end face of pressure bolt A (2).



IE31J1310029-01

- 3) Place the drive chain link being disjoined on the chain holder (1) of the tool.
- 4) Turn in both the adjuster bolt (2) and pressure bolt A (3) so that each of their end hole fits over the chain joint pin properly.
- 5) Tighten the pressure bolt A (3) with the bar.



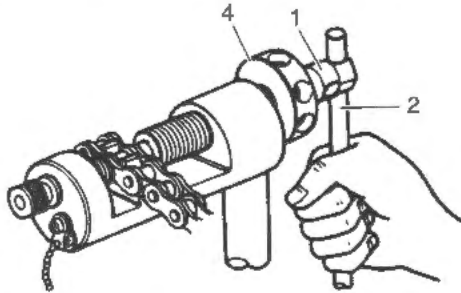
IE31J1310030-01

- Turn in the pressure bolt B (1) with the bar (2) and force out the drive chain joint pin (3).

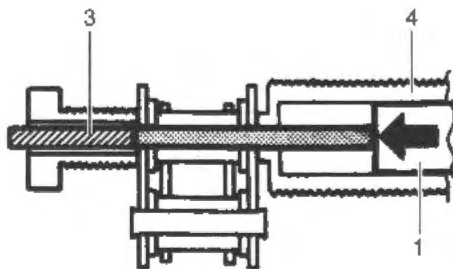
NOTE

Continue turning in the pressure bolt B (1) until the joint pin should be completely pushed out of the chain.

- After the joint pin (3) is removed, loosen the pressure bolt B (1) and then pressure bolt A (4).



IE31J1310031-01



IE31J1310032-01

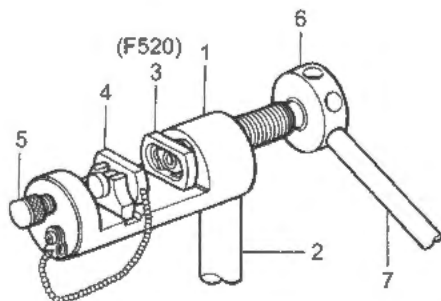
Drive Chain Connecting

▲ WARNING

Do not use joint clip type of drive chain. The joint clip may have a chance to drop which may cause severe damage to motorcycle and severe injury.

Joint plate installation

- Set up the special tool.



IE31J1310033-01

1. Tool body	5. Adjuster bolt (Without hole)
2. Grip handle	6. Pressure bolt A
3. Joint plate holder (Engraved mark "F520")	7. Bar
4. Wedge holder and wedge pin	

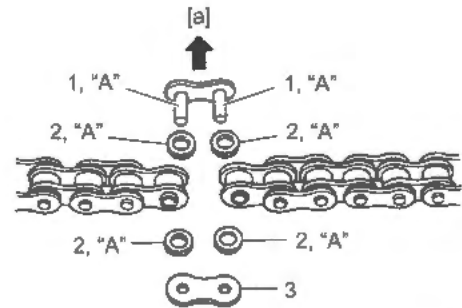
- Apply grease to the new joint pins (1), new O-rings (2) and new plates (3).

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

- Connect both ends of the drive chain with the joint pins (1) inserted from the wheel side [a] as installed on the motorcycle.

Joint set part number

RK: 27620 - 06G40

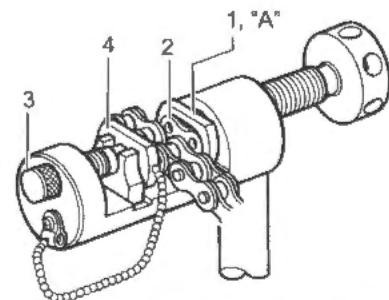


IE31J1310034-01

- Apply grease on the recessed portion of the joint plate holder (1). Then install the joint plate (2) on the tool, its stamp mark must face the joint plate holder (1) side.

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

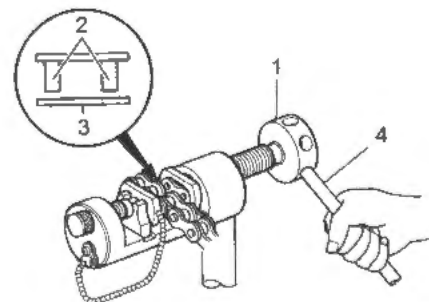
- Set the drive chain on the tool as illustrated and turn in the adjuster bolt (3) to secure the wedge holder and wedge pin (4).



IE31J1310035-01

- Turn in the pressure bolt A (1) and align two joint pins (2) properly with the respective holes of the joint plate (3).

- Turn in the pressure bolt A (1) further using the bar (4) to press the joint plate over the joint pins.



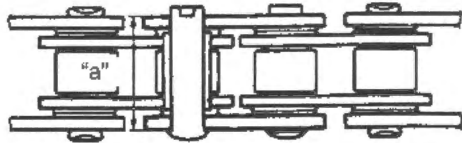
IE31J1310036-01

- Continue pressing the joint plate until the distance between the two joint plates come to the specification.

Joint plate distance specification "a"
 18.6 – 18.9 mm (0.73 – 0.74 in)

NOTICE

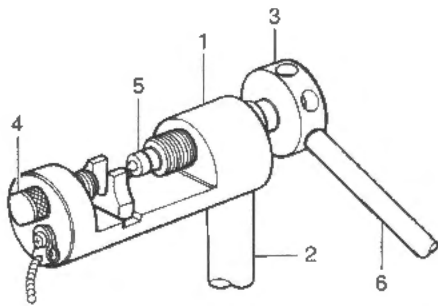
If pressing of the joint plate makes the dimension out of specification excessively, the work must be carried out again by using new joint parts.



IS49G1310033-03

Joint pin staking

- Set up the special tool.



IE31J1310037-01

1. Tool body
2. Grip handle
3. Pressure bolt A
4. Adjuster bolt (Without hole)
5. Staking pin (Stowed inside grip handle behind rubber cap)
6. Bar

- Apply grease to the staking pin (1).

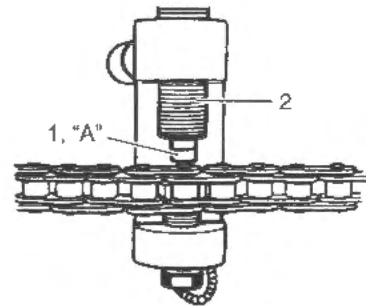
"A": Grease 99000-25011 (SUZUKI SUPER GREASE A)

- Stake the joint pin by turning (approximately 7/8 turn) the pressure bolt A (2) with the bar until the pin end diameter becomes the specified dimension.
- After joining of the chain has been completed, check to make sure that the link is smooth and no abnormal condition is found.

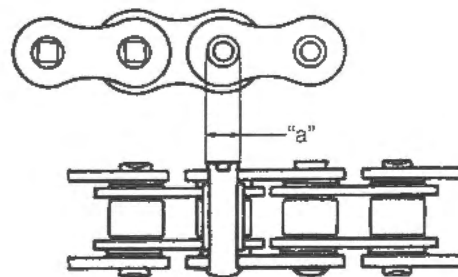
NOTE

Should any abnormal condition be found, reassemble the chain link using the new joint parts.

Pin end diameter specification "a"
 RK: 5.45 – 5.85 mm (0.215 – 0.230 in)



IE31J1310038-01



IS49G1310036-03

- Adjust the drive chain slack, after connecting it. Refer to "Drive Chain Inspection and Adjustment" (Page 3A-2).

Specifications

Tightening Torque Specifications

BENJ31J33107001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Rear axle nut	100	10.0	72.5	☞(Page 3A-2)
Engine sprocket nut	115	11.5	83.5	☞(Page 3A-4)
Engine sprocket cover bolt	11	1.1	8.0	☞(Page 3A-4)
Clutch release cylinder mounting bolt	10	1.0	7.5	☞(Page 3A-5)
Rear sprocket nut	60	6.0	43.5	☞(Page 3A-5)

Reference:

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

"Drive Chain Related Components" (Page 3A-1)

"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ31J33108001

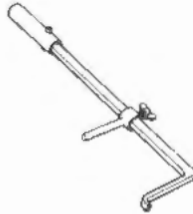

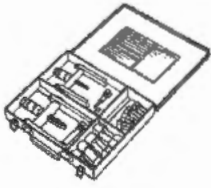

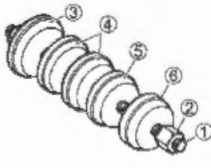
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞(Page 3A-6) / ☞(Page 3A-7) / ☞(Page 3A-8) / ☞(Page 3A-9) / ☞(Page 3A-9) / ☞(Page 3A-10)
Thread lock cement	THREAD LOCK CEMENT 1303B	P/No.: 99000-32030	☞(Page 3A-4)

NOTE

Required service material(s) is also described in:
"Drive Chain Related Components" (Page 3A-1)

Special Tool

BENJ31J33108002

09913-50121 Oil seal remover ☞(Page 3A-7)		09913-70210 Bearing installer set ☞(Page 3A-7)	
09921-20240 Bearing remover set ☞(Page 3A-7)		09922-22711 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

BENJ31J34000001

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

Brake Fluid Information

BENJ31J34000002

▲ 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.

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

Diagnostic Information and Procedures

Brake Symptom Diagnosis

BENJ31J34104001

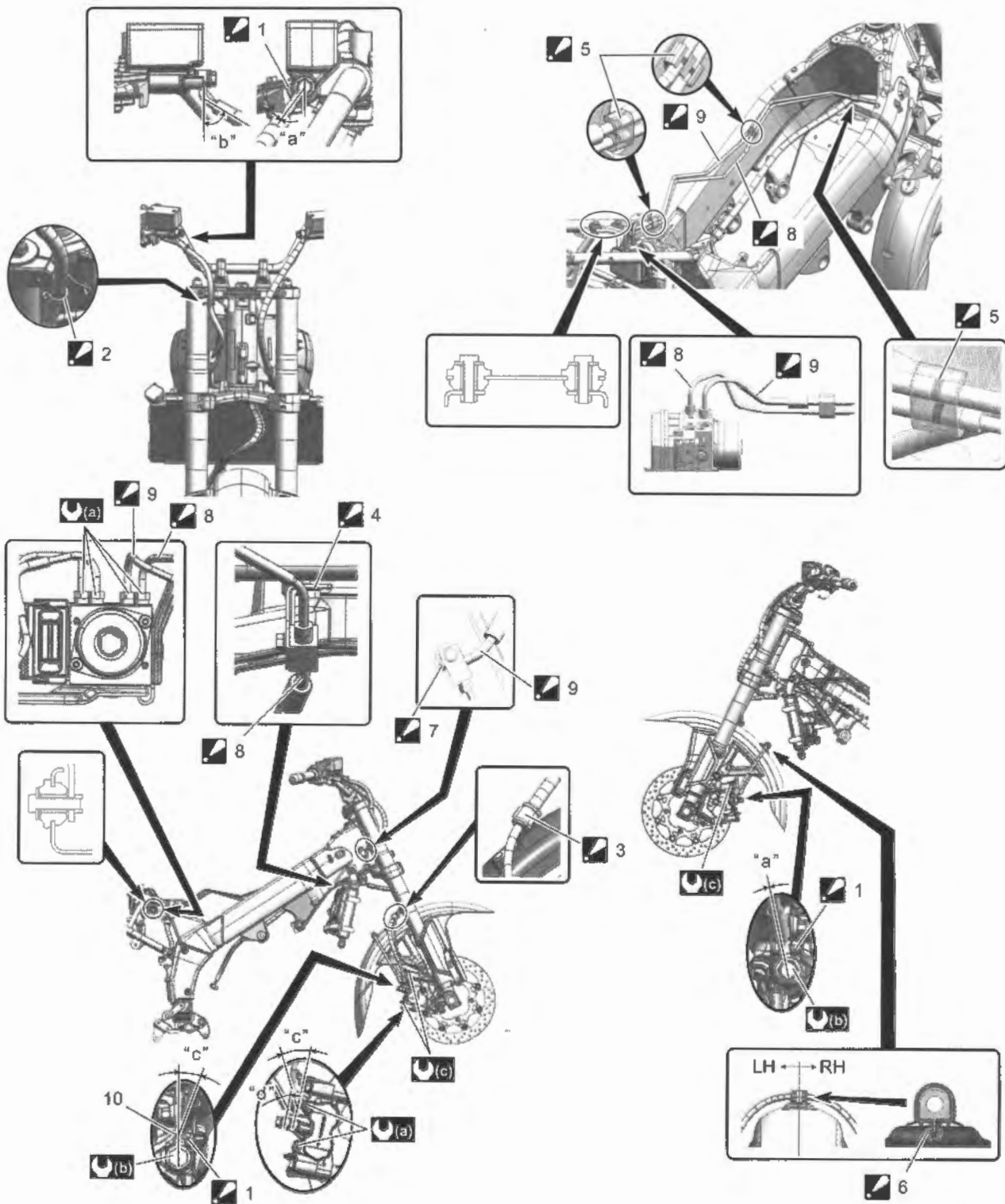
Condition	Possible cause	Correction / Reference Item
Insufficient brake power	Leakage of brake fluid from hydraulic system.	Repair or replace. ⌚(Page 4A-11)
	Worn pads.	Replace. ⌚(Page 4B-2) ⌚(Page 4C-2)
	Oil adhesion on friction surface of pads.	Clean disc and pads.
	Worn disc.	Replace. ⌚(Page 4B-6) ⌚(Page 4C-7)
	Air in hydraulic system.	Bleed air. ⌚(Page 4A-12)
	Not enough brake fluid in the reservoir.	Replenish. ⌚(Page 4A-11)
Brake squeaking	Carbon adhesion on pad surface.	Repair surface with sandpaper.
	Tilted pad.	Correct pad fitting or replace. ⌚(Page 4B-2) ⌚(Page 4C-2)
	Damaged wheel bearing.	Replace. ⌚(Page 2D-7) ⌚(Page 2D-13)
	Loose front wheel axle or rear wheel axle.	Tighten to specified torque.
	Worn pads.	Replace. ⌚(Page 4B-2) ⌚(Page 4C-2)
	Foreign material in brake fluid.	Replace brake fluid. ⌚(Page 4A-14)
	Clogged return port of master cylinder.	Disassemble and clean master cylinder.
	Worn disc.	Replace. ⌚(Page 4B-6) ⌚(Page 4C-7)
Excessive brake lever stroke	Air in hydraulic system.	Bleed air. ⌚(Page 4A-12)
	Insufficient brake fluid.	Replenish fluid to specified level. ⌚(Page 4A-11)
	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.
	Cracked hose.	Replace. ⌚(Page 4A-15) ⌚(Page 4A-15)
	Worn piston and/or cup.	Replace piston and/or cup. ⌚(Page 4A-18) ⌚(Page 4A-23)
	Worn piston seal and dust seal.	Replace piston seal and dust seal. ⌚(Page 4B-4) ⌚(Page 4C-4)
Brake drags	Rusty part.	Clean and lubricate. ⌚(Page 0B-9)
	Insufficient brake lever or brake pedal pivot lubrication.	Lubricate. ⌚(Page 0B-9)

Repair Instructions

Front Brake Hose Routing Diagram

L4 - L6

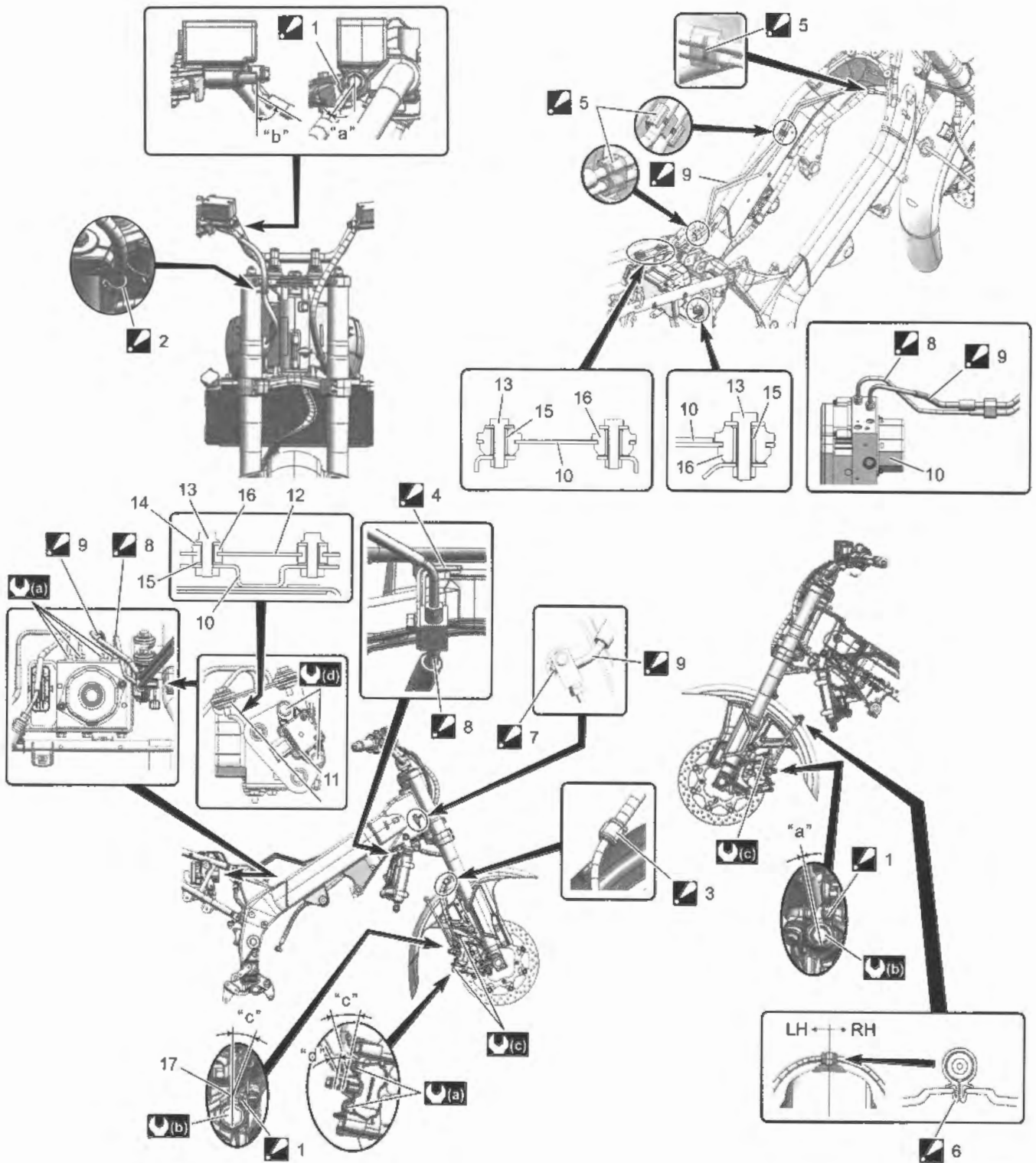
BENJ31J34106001







4A-3 Brake Control System and Diagnosis:

<input checked="" type="checkbox"/> 1. Stopper : After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.	<input checked="" type="checkbox"/> 7. Brake hose : After positioning the brake hose with the stopper, tighten the bolt.	*c*: 20°
<input checked="" type="checkbox"/> 2. Guide : Pass the brake hose into the guide.	<input checked="" type="checkbox"/> 8. Front brake hose : Front brake caliper to ABS control unit/HU.	*d*: 40°
<input checked="" type="checkbox"/> 3. Clamp : Fix the hose sleeve to the clamp firmly.	<input checked="" type="checkbox"/> 9. Front brake hose : Front brake master cylinder to ABS control unit/HU.	<input checked="" type="checkbox"/> (a) : 16 N·m (1.6 kgf-m, 11.5 lbf-ft)
<input checked="" type="checkbox"/> 4. Clamp : After positioning the clamp with the stopper of frame head, tighten the clamp bolt.	10. White paint	<input checked="" type="checkbox"/> (b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
<input checked="" type="checkbox"/> 5. Clamp : Clamp to the marking position of brake pipes.	*a*: 0°	<input checked="" type="checkbox"/> (c) : 39 N·m (3.9 kgf-m, 28.5 lbf-ft)
<input checked="" type="checkbox"/> 6. Clamp : Insert the clamp end into the hole of the front fender fully.	*b*: 56°	

L8 -



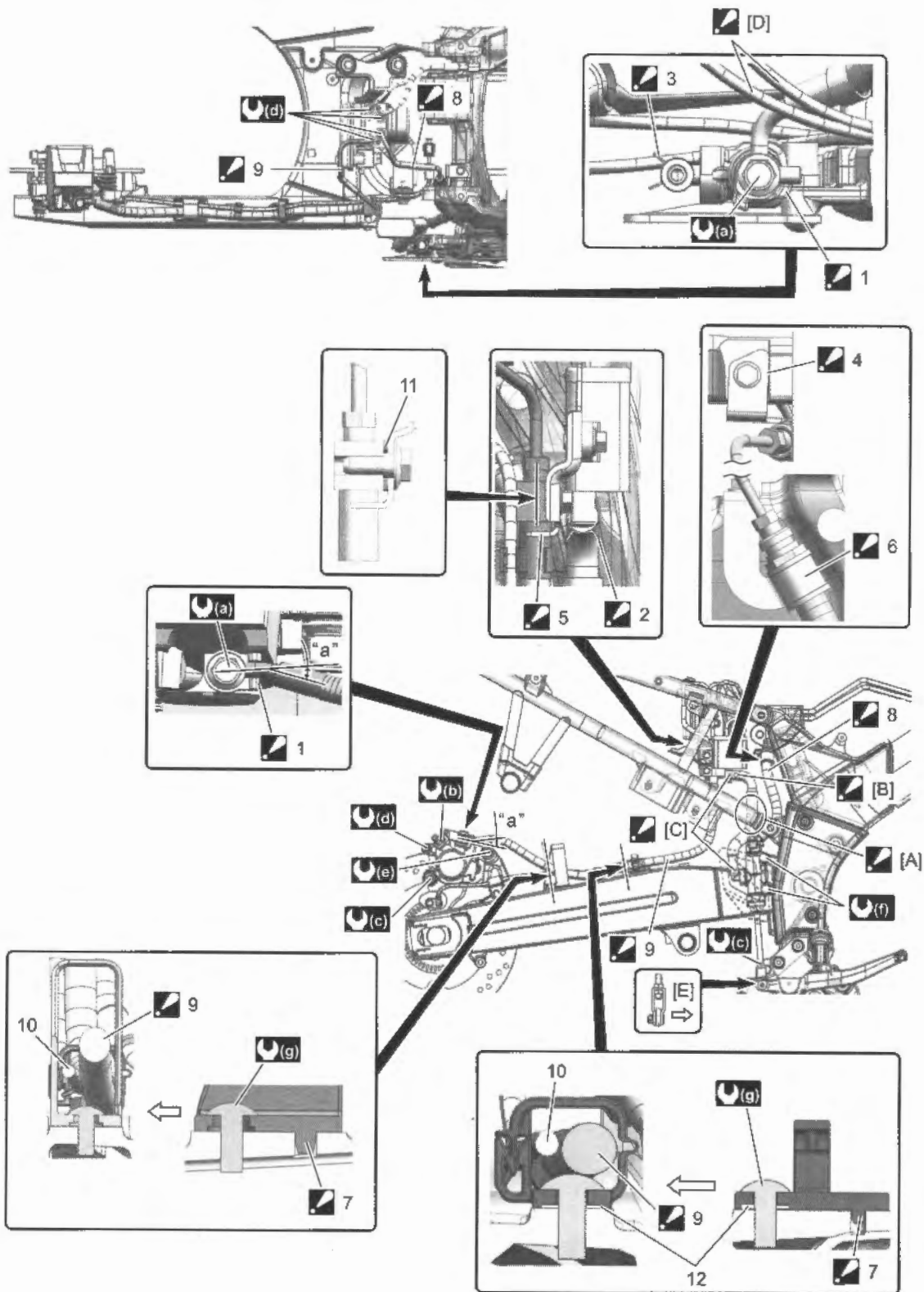
4A-5 Brake Control System and Diagnosis:

<p>1. Stopper : After the brake hose union has contacted the stopper, tighten the union bolt to the specified torque.</p>	14. Washer
<p>2. Guide : Pass the brake hose into the guide.</p>	15. Spacer
<p>3. Clamp : Fix the hose sleeve to the clamp firmly.</p>	16. Mounting rubber
<p>4. Clamp : After positioning the clamp with the stopper of frame head, tighten the clamp bolt.</p>	17. Blue paint
<p>5. Clamp : Clamp to the marking position of brake pipes.</p>	"a": 0°
<p>6. Clamp : Insert the clamp end into the hole of the front fender fully.</p>	"b": 56°
<p>7. Brake hose : After positioning the brake hose with the stopper, tighten the bolt.</p>	"c": 20°
<p>8. Front brake hose : Front brake caliper to ABS control unit/HU.</p>	"d": 40°
<p>9. Front brake hose : Front brake master cylinder to ABS control unit/HU.</p>	 (a) : 16 N·m (1.6 kgf-m, 11.5 lbf-ft)
<p>10. ABS control unit/HU</p>	 (b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
<p>11. Inertial sensor</p>	 (c) : 39 N·m (3.9 kgf-m, 28.5 lbf-ft)
<p>12. Bracket</p>	 (d) : 7 N·m (0.7 kgf-m, 5.5 lbf-ft)
<p>13. Bolt</p>	

Rear Brake Hose Routing Diagram

DL1000AL4

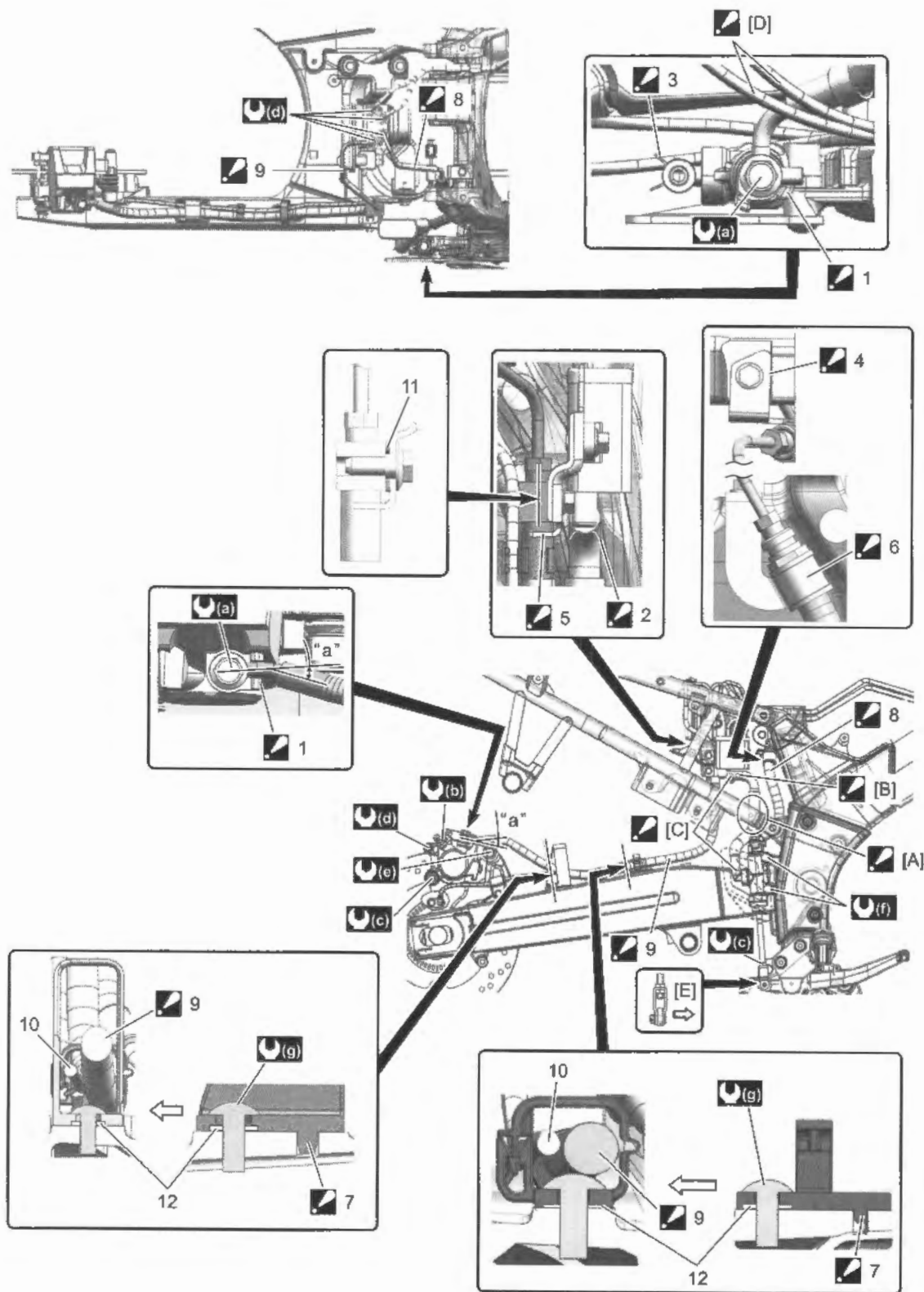
BENJ31J34106002



4A-7 Brake Control System and Diagnosis:

<p>☑ [A]: Pass the reservoir hose to inside of the seat rail.</p>	<p>☑ 5. Stopper : After positioning the brake hose with the stopper, tighten the bolt.</p>	<p>🔧(a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)</p>
<p>☑ [B]: Face the white paint making to outside.</p>	<p>☑ 6. Clamp : Fix the hose sleeve to the clamp firmly.</p>	<p>🔧(b) : 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)</p>
<p>☑ [C]: Insert the reservoir hose firmly.</p>	<p>☑ 7. Guide : Insert the stopper of the guide into the hole of the swingarm fully, before tightening the screw.</p>	<p>🔧(c) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)</p>
<p>☑ [D]: Pass the EXCV cable above the brake hose.</p>	<p>☑ 8. Rear brake hose : Rear brake master cylinder to ABS control unit/HU.</p>	<p>🔧(d) : 16 N·m (1.6 kgf-m, 11.5 lbf-ft)</p>
<p>[E]: Outside</p>	<p>☑ 9. Rear brake hose : Rear brake caliper to ABS control unit/HU.</p>	<p>🔧(e) : 33 N·m (3.3 kgf-m, 24.0 lbf-ft)</p>
<p>☑ 1. Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.</p>	<p>10. Rear wheel speed sensor lead wire</p>	<p>🔧(f) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)</p>
<p>☑ 2. Brake hose clamp : Brake hose clamp ends should face down.</p>	<p>11. Cushion</p>	<p>🔧(g) : 5 N·m (0.5 kgf-m, 4.0 lbf-ft)</p>
<p>☑ 3. Brake hose clamp : Brake hose clamp ends should face backward.</p>	<p>12. Washer</p>	
<p>☑ 4. Stopper : After positioning the clamp with the stopper, tighten the clamp bolt.</p>	<p>*a*: 21°</p>	

DL1000AL5 -



4A-9 Brake Control System and Diagnosis:

<input checked="" type="checkbox"/> [A]: Pass the reservoir hose to inside of the seat rail.	<input checked="" type="checkbox"/> 5. Stopper : After positioning the brake hose with the stopper, tighten the bolt.	<input checked="" type="checkbox"/> (a) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
<input checked="" type="checkbox"/> [B]: Face the white paint making to outside.	<input checked="" type="checkbox"/> 6. Clamp : Fix the hose sleeve to the clamp firmly.	<input checked="" type="checkbox"/> (b) : 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)
<input checked="" type="checkbox"/> [C]: Insert the reservoir hose firmly.	<input checked="" type="checkbox"/> 7. Guide : Insert the stopper of the guide into the hole of the swingarm fully, before tightening the screw.	<input checked="" type="checkbox"/> (c) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
<input checked="" type="checkbox"/> [D]: Pass the EXCV cable above the brake hose.	<input checked="" type="checkbox"/> 8. Rear brake hose : Rear brake master cylinder to ABS control unit/HU.	<input checked="" type="checkbox"/> (d) : 16 N·m (1.6 kgf-m, 11.5 lbf-ft)
<input type="checkbox"/> [E]: Outside	<input checked="" type="checkbox"/> 9. Rear brake hose : Rear brake caliper to ABS control unit/HU.	<input checked="" type="checkbox"/> (e) : 33 N·m (3.3 kgf-m, 24.0 lbf-ft)
<input checked="" type="checkbox"/> 1. Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.	10. Rear wheel speed sensor lead wire	<input checked="" type="checkbox"/> (f) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
<input checked="" type="checkbox"/> 2. Brake hose clamp : Brake hose clamp ends should face down.	11. Cushion	<input checked="" type="checkbox"/> (g) : 5 N·m (0.5 kgf-m, 4.0 lbf-ft)
<input checked="" type="checkbox"/> 3. Brake hose clamp : Brake hose clamp ends should face backward.	12. Washer	
<input checked="" type="checkbox"/> 4. Stopper : After positioning the clamp with the stopper, tighten the clamp bolt.	*a*: 21°	

Front Brake Light Switch Inspection

BENJ31J34106003

- 1) Disconnect the front brake light switch lead wire couplers (1).



IE31J1410003-01

- 2) Inspect the switch for continuity with a circuit tester. If any abnormality is found, replace the front brake light switch with a new one. (Page 4A-18)

Color Position	Terminal (B/R)	Terminal (B/BI)
OFF		
ON	○	○

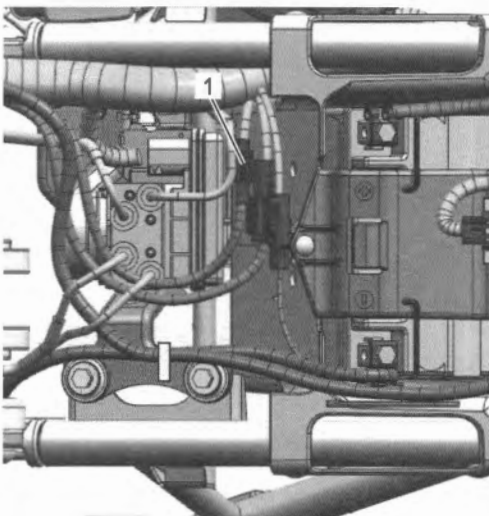
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- 3) Connect the front brake light switch lead wire couplers.

Rear Brake Light Switch Inspection

BENJ31J34106004

- 1) Remove the seat.
 - L4 – L6 model: (Page 9D-10)
 - L8 – model: (Page 9D-33)
- 2) Disconnect the rear brake light switch lead wire couplers (1).



IE31J1410004-03

- 3) Inspect the switch for continuity with a tester. If any abnormality is found, replace the rear brake light switch with a new one.

Color Position	Terminal (O)	Terminal (W/B)
OFF		
ON	○	○

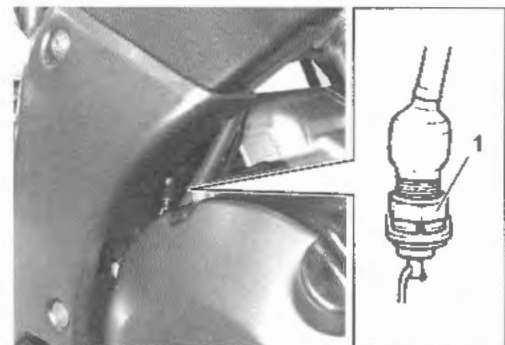
IJ31J1410002-01

- 4) Connect the rear brake light switch lead wire couplers.
- 5) Install the seat.
 - L4 – L6 model: (Page 9D-10)
 - L8 – model: (Page 9D-33)

Rear brake Light Switch Inspection and Adjustment

BENJ31J34106005

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.



IE31J1410006-01

Brake Fluid Level Check

BENJ31J34106006

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

Brake fluid (DOT 4)



IE31J1410007-01



IE31J1410008-02

Brake Hose Inspection

BENJ31J34106007

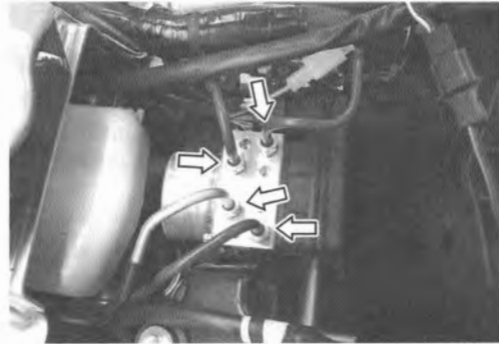
- 1) Remove the fuel tank. (Page 1G-9)
- 2) Inspect the brake hoses and hose joints for crack, damage or brake fluid leakage. If any defects are found, replace the brake hose with a new one.
 - Front: (Page 4A-15)
 - Rear: (Page 4A-15)



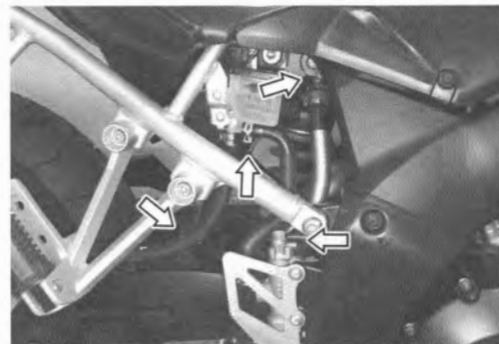
IE31J1410009-01



IE31J1410010-01



IE31J1410011-01



IE31J1410012-01



IE31J1410013-01

- 3) Install the removed parts.

Brake Pedal Height Inspection and Adjustment

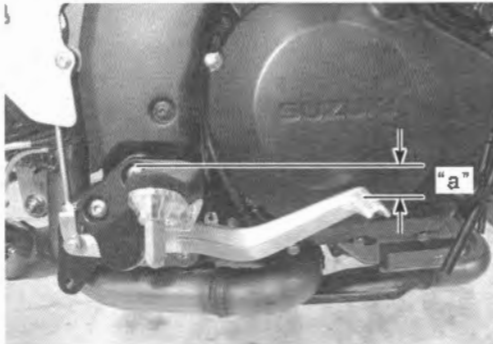
BENJ31J34106008

- 1) Inspect the brake pedal height "a" between the pedal top face and footrest.

Adjust the brake pedal height if necessary.

Brake pedal height "a"

Standard: 20 – 30 mm (0.8 – 1.2 in)

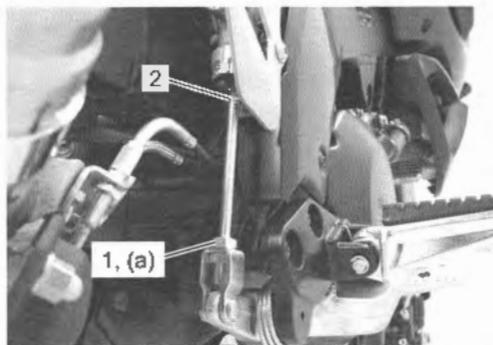


IE31J1410014-02

- 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) securely.

Tightening torque

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



IJ31J1410005-01

- 5) After finishing the brake pedal height inspection and adjustment, check the rear brake light switch. (Page 4A-10)

Air Bleeding from Brake Line

BENJ31J34106009

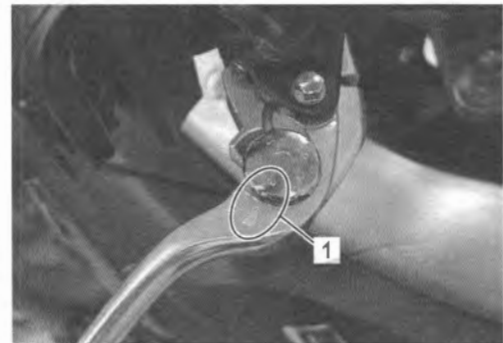
Air trapped in the brake lines acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus greatly reduces the braking force. The presence of air bubbles is indicated by a "spongy" feel in the brake lever and low braking force. This condition is extremely 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

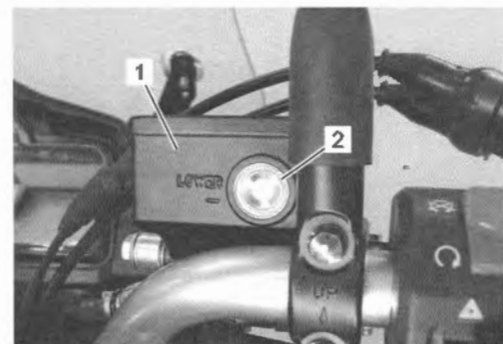
- 1) Place the motorcycle on a level surface and keep the handlebars straight.
- 2) Set the brake lever adjuster (1) to 3rd position.



IE31J1410016-01

- 3) Remove the reservoir cap (1) and diaphragm.
- 4) Fill the master cylinder reservoir with new brake fluid to the top of the inspection window (2). Place the reservoir cap to prevent dirt from entering.

Brake fluid (DOT 4)



IE31J1410017-01

4A-13 Brake Control System and Diagnosis:

- 5) Attach a clear hose to the air bleeder valve, and insert the free end of the hose into a receptacle.
- 6) Operate the brake lever several times and, while holding the lever gripped, loosen the air bleeder valve (1) and drain the brake fluid into a receptacle.



IE31J1410018-02



IE31J1410019-01

- 7) Tighten the air bleeder valve and release the brake lever slowly.
- 8) Repeat the steps 4) and 5) until the fluid is flowing out without bubbles.

NOTE

While bleeding the brake system, replenish the reservoir with the brake fluid as necessary to keep the fluid above the lower level.

- 9) Tighten the air bleeder valve to the specified torque.

Tightening torque

Brake air bleeder valve: 7.5 N·m (0.75 kgf·m, 5.5 lbf·ft)

- 10) Fill the reservoir with brake fluid to the upper line (1) of the reservoir.



IE31J1410020-03

- 11) Install the reservoir cap and diaphragm.

Rear Brake

Bleed air from the rear brake system as the same manner of front brake.

- Remove the right frame cover.
 - L4 – L6 model: ☞ (Page 9D-11)
 - L8 – model: ☞ (Page 9D-33)

NOTE

The only difference of bleeding operation from the front brake is that the rear master cylinder is actuated by a pedal.



IE31J1410021-02



IE31J1410022-01



IE31J1410023-01

- Install the right frame cover.
 - L4 – L6 model: ☞ (Page 9D-11)
 - L8 – model: ☞ (Page 9D-33)

Brake Fluid Replacement

BENJ31J34106010

Front Brake

- 1) Place the motorcycle on a level surface and keep the handlebars straight.

- 2) Remove the brake fluid reservoir cap and diaphragm.
- 3) Suck up the old brake fluid as much as possible.



IE31J1410024-01

- 4) Fill the reservoir with new brake fluid.

Brake fluid (DOT 4)

- 5) Attach a clear hose to the air bleeder valve (1) and insert the free end of the hose into a receptacle.
- 6) Loosen the air bleeder valve, squeeze and release the brake lever and drain the old brake fluid out of the brake system.

NOTE

While bleeding the brake system, replenish the reservoir with the brake fluid as necessary to keep the fluid above the lower level.



IE31J1410025-01



IE31J1410026-02

- 7) Bleed the air from the front brake system. ☞ (Page 4A-12)

4A-15 Brake Control System and Diagnosis:

Rear Brake

Replacement brake fluid from the rear brake system as the same manner of front brake.

- Remove the right frame cover.
 - L4 – L6 model: ☞(Page 9D-11)
 - L8 – model: ☞(Page 9D-33)

NOTE

The only difference of bleeding operation from the front brake is that the rear master cylinder is actuated by a pedal.



IE31J1410029-01



IE31J1410027-02



IE31J1410028-01

- Install the right frame cover.
 - L4 – L6 model: ☞(Page 9D-11)
 - L8 – model: ☞(Page 9D-33)

Front Brake Hose Removal and Installation

BENJ31J34106011

Refer to "Front Brake Hose Routing Diagram" (Page 4A-2).

Removal

- 1) Drain brake fluid. ☞(Page 4A-14)
- 2) Remove the air cleaner box. ☞(Page 1D-4)
- 3) Remove the front brake hoses.

Installation

- 1) Install the front brake hoses.
- 2) Install the air cleaner box. ☞(Page 1D-4)
- 3) Bleed air from the front brake system. ☞(Page 4A-12)

Rear Brake Hose Removal and Installation

BENJ31J34106012

Refer to "Rear Brake Hose Routing Diagram" (Page 4A-6).

Removal

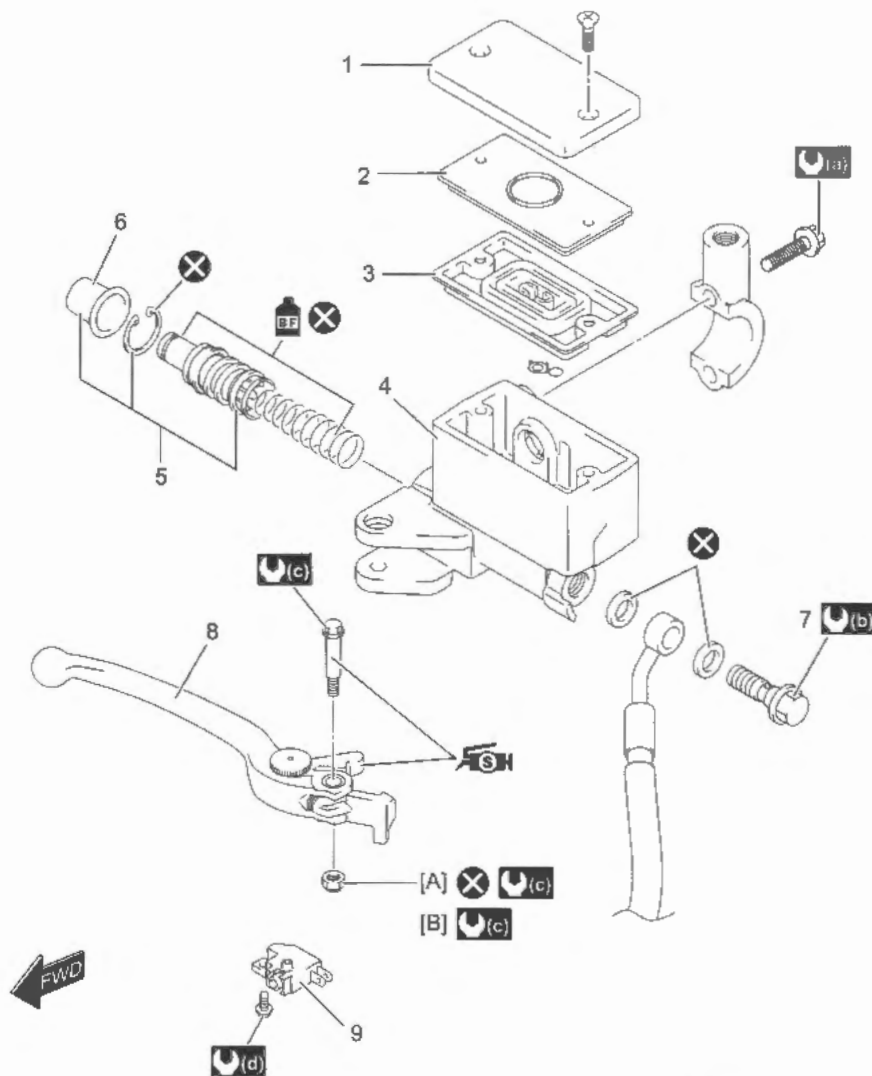
- 1) Remove the right frame cover.
 - L4 – L6 model: ☞(Page 9D-11)
 - L8 – model: ☞(Page 9D-33)
- 2) Drain brake fluid. ☞(Page 4A-14)
- 3) Remove the rear brake hoses.

Installation

- 1) Install the rear brake hose.
- 2) Bleed air from the rear brake system. ☞(Page 4A-12)
- 3) Install the right frame cover.
 - L4 – L6 model: ☞(Page 9D-11)
 - L8 – model: ☞(Page 9D-33)

Front Brake Master Cylinder Assembly / Brake Lever Components

BENJ31J34106013



IJ31J1410003-01

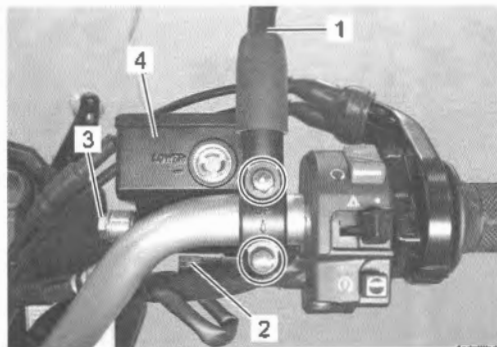
{A}: L4 - L6	5. Piston/Cup set	[b] : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
[B]: L8 -	6. Dust boot	[c] : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
1. Reservoir cap	7. Brake hose union bolt	[d] : 1.2 N·m (0.12 kgf-m, 1.0 lbf-ft)
2. Plate	8. Brake lever	SH : Apply silicone grease.
3. Diaphragm	9. Brake light switch	BF : Apply brake fluid.
4. Master cylinder	[a] : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	X : Do not reuse.

Front Brake Master Cylinder Assembly Removal and Installation

BENJ31J34106014

Removal

- 1) Remove the right knuckle cover. (If equipped)
☞(Page 9D-38)
- 2) Drain brake fluid. ☞(Page 4A-14)
- 3) Remove the right rear view mirror (1).
- 4) Disconnect the front brake light switch lead wire coupler (2).
- 5) Place a rag underneath the brake hose union bolt (3) on the master cylinder to catch any spilt brake fluid.
- 6) Remove the brake hose union bolt (3) and disconnect the brake hose.
- 7) Remove the master cylinder assembly (4) by removing the bolts.



IE31J1410030-01

Installation

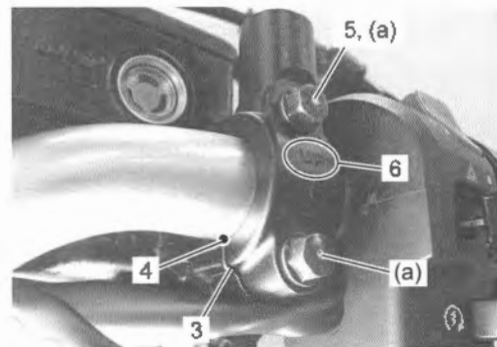
- 1) When installing the master cylinder assembly (1) onto the handlebars (2), align the edge of master cylinder holder's (3) with the punch mark (4) on the handlebars (2) and tighten the upper mounting bolt (5) first.

NOTE

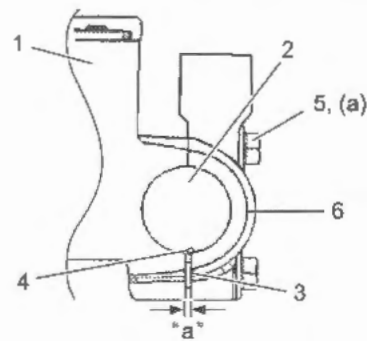
Face the up mark (6) upward.

Tightening torque

Front brake master cylinder mounting bolt (a):
10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1410031-01



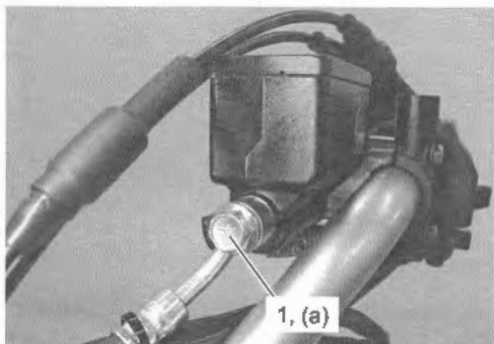
IE31J1410032-01

"a": Clearance

- 2) Install the brake hose union bolt and new seal washers to brake hose.
- 3) After setting the brake hose union to 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)



IE31J1410033-01

- 4) Connect the front brake light switch lead wire coupler.
- 5) Install the right rear view mirror.
- 6) Bleed air from the brake system. (Page 4A-12)
- 7) Install the right knuckle cover. (If equipped) (Page 9D-38)

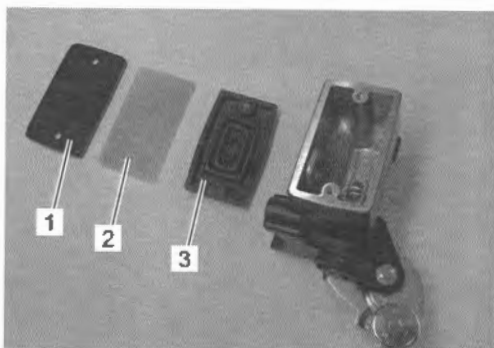
Front Brake Master Cylinder Assembly / Brake Lever Disassembly and Reassembly

BENJ31J34106015

Refer to "Front Brake Master Cylinder Assembly Removal and Installation" (Page 4A-17).

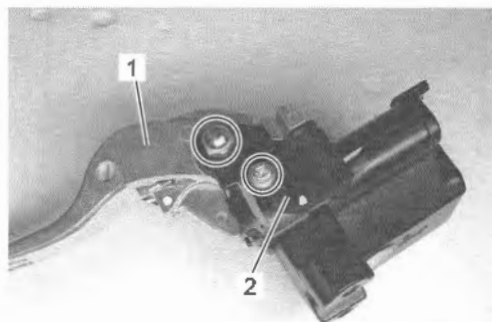
Disassembly

- 1) Remove the reservoir cap (1), plate (2) and diaphragm (3).



IE31J1410034-01

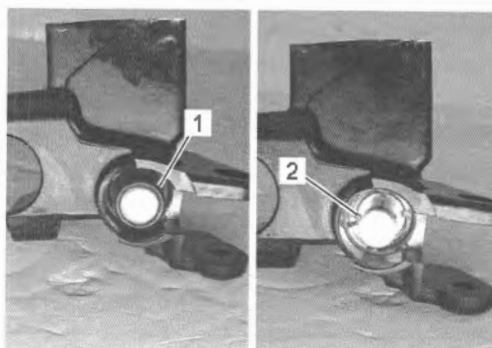
- 2) Remove the brake lever (1) and brake light switch (2).



IE31J1410035-01

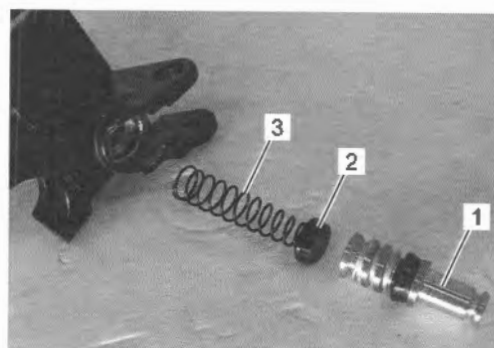
- 3) Pull out the dust boot (1) and remove the snap ring (2) with the special tool.

Special tool
09900-06108



IE31J1410036-01

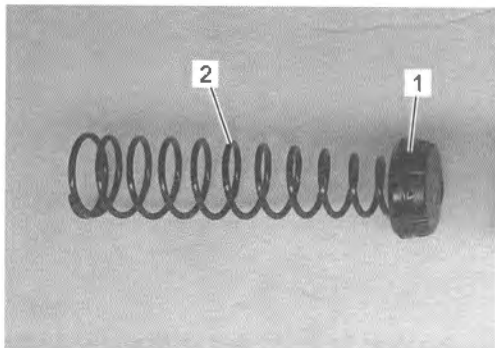
- 4) Remove the following parts from the master cylinder.
 - Piston/secondary cup set (1)
 - Primary cup (2)
 - Return spring (3)



IE31J1410037-01

Reassembly

- 1) Install the new primary cup (1) to the return spring (2).



IE31J1410038-01

NOTICE

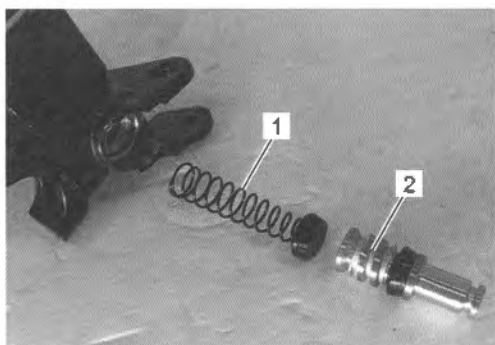
- Wash the master cylinder components with new brake fluid before reassembly.
- Do not wipe the brake fluid off after washing the components.
- When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosene, etc.
- Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.

Brake fluid (DOT 4)



1B48G1410024-02

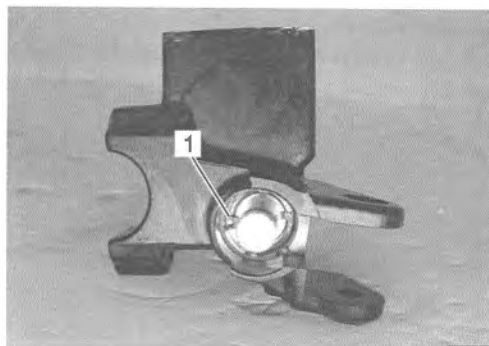
- 2) Install the primary cup/spring (1) and new secondary cup/piston (2) to the master cylinder.



IE31J1410039-01

- 3) Install the new snap ring (1) with the special tool.

Special tool
09900-06108

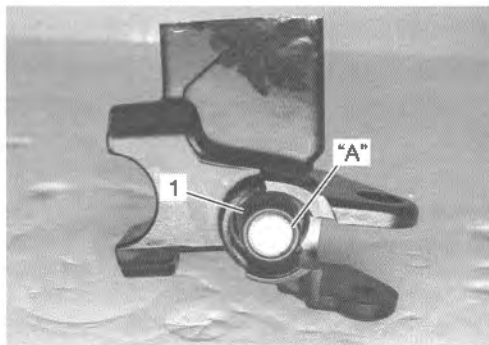


IE31J1410040-01

- 4) Apply grease to the lip of the dust boot (1).

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

- 5) Set the dust boot (1) to the master cylinder securely.



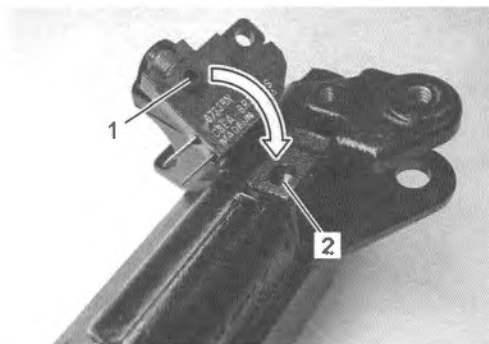
IE31J1410041-01

- 6) When installing the brake light switch, align the projection (1) on the switch with the hole (2) in the master cylinder.

- 7) Tighten the brake light switch mounting screw to the specified torque.

Tightening torque

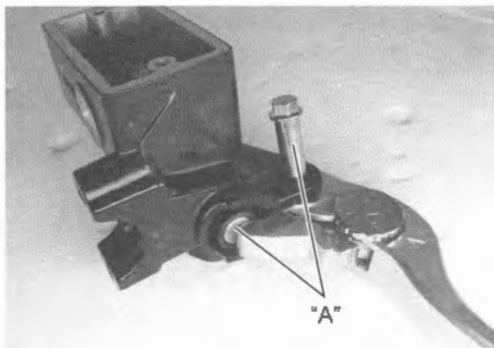
Brake light switch screw: 1.2 N·m (0.12 kgf·m, 1.0 lbf·ft)



IE31J1410042-02

- 8) Apply grease to the brake lever pivot bolt.
- 9) Apply grease to the contact point between piston and brake lever.

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)



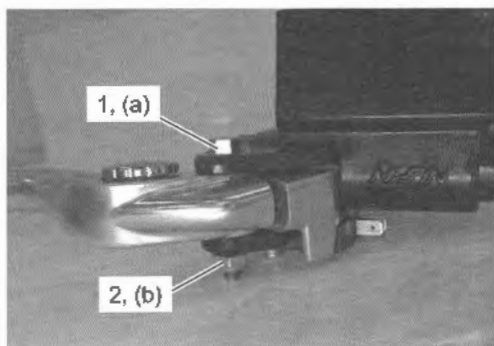
IE31J1410043-01

- 10) For L4 – L6 model, tighten the pivot bolt (1) and new lock-nut (2) to the specified torque.
- 11) For L8 – model, tighten the pivot bolt and lock-nut to the specified torque. Refer to "Knuckle Cover Construction": L8 - in Section 9D (Page 9D-26).

Tightening torque

Brake lever pivot bolt (a): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

Brake lever pivot bolt lock-nut (b): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



IJ31J1410004-01

- 12) Install the diaphragm, plate and reservoir cap to the master cylinder.

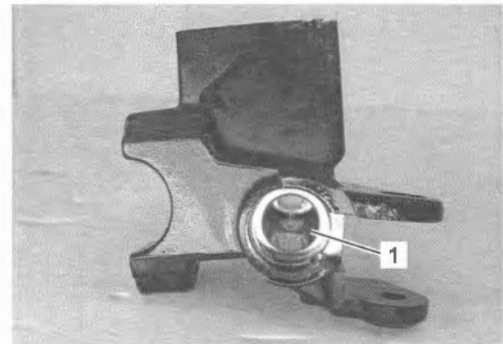
Front Brake Master Cylinder Parts Inspection

BENJ31J34106016

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 or other damage. If any damage is found, replace the master cylinder with a new one.



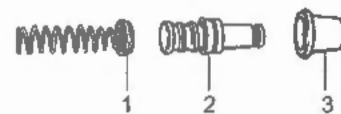
IE31J1410045-01

Piston

Inspect the piston surface for any scratches or other damage. If any damage is found, replace it with a new one.

Rubber Parts

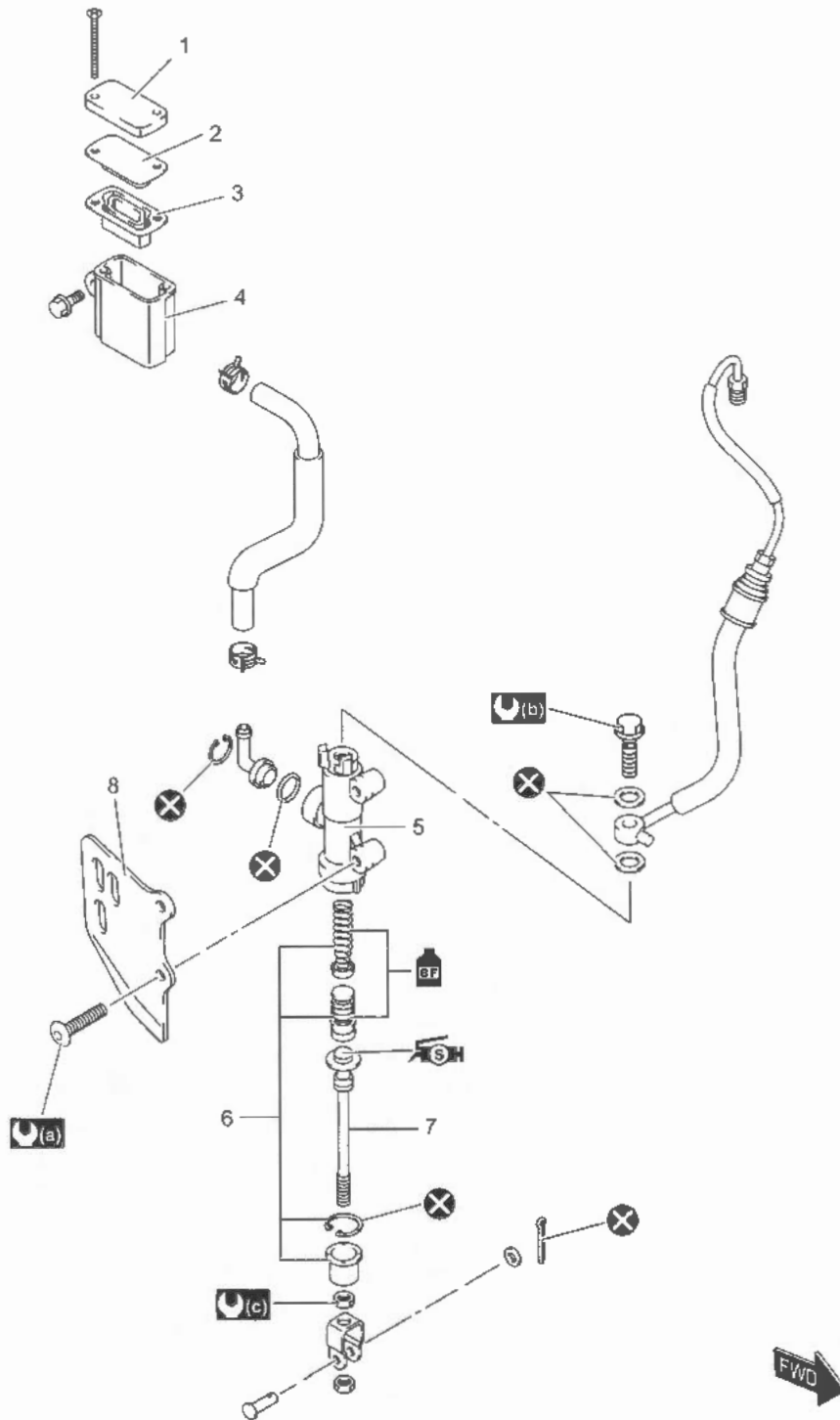
Inspect the primary cup (1), secondary cup (2) and dust boot (3) for wear or damage. If any damage is found, replace them with new ones.



IE31J1410046-01

Rear Brake Master Cylinder Assembly Components

BENJ31J34106017



IE31J1410063-02

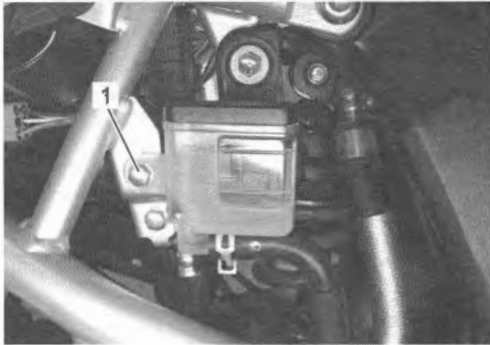
1. Reservoir cap	5. Master cylinder	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	BP : Apply brake fluid.
2. Plate	6. Piston/Cup set	(b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)	⊗ : Do not reuse.
3. Diaphragm	7. Push rod	(c) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)	
4. Reservoir tank	8. Cover	SH : Apply silicone grease.	

Rear Brake Master Cylinder Assembly Removal and Installation

BENJ31J34106018

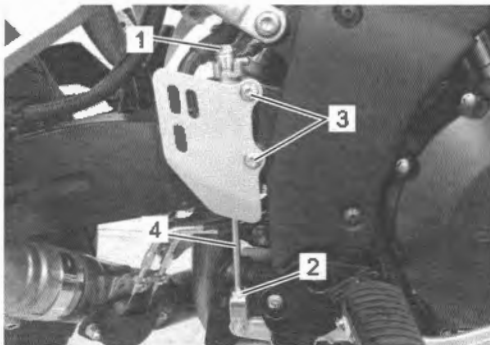
Removal

- 1) Drain brake fluid. (Page 4A-14)
- 2) Remove the reservoir tank mounting bolt (1).



IE31J1410047-01

- 3) Place a clean rag underneath the brake hose union bolt (1) on the master cylinder to catch any spilt brake fluid.
- 4) Remove the brake hose union bolt (1) and disconnect the brake hose.
- 5) Loosen the lock-nut (2).
- 6) Remove the master cylinder mounting bolts (3).
- 7) Remove the master cylinder with the reservoir by turning the push rod (4).



IE31J1410048-02

Installation

- 1) Install the master cylinder (1) and cover (2).
- 2) Tighten the master cylinder mounting bolts (3) to the specified torque.

Tightening torque

Rear brake master cylinder mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- 3) Tighten the lock-nut (4) to the specified torque.

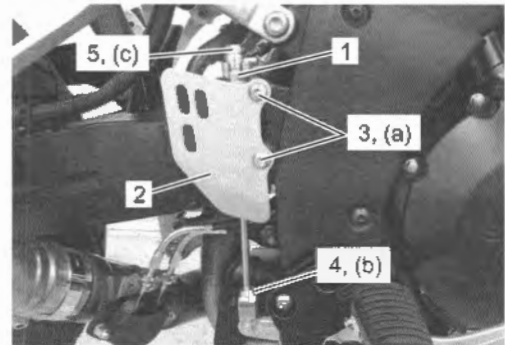
Tightening torque

Rear brake master cylinder rod lock-nut (b): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)

- 4) Install the new seal washers.
- 5) After setting the brake hose union to the stopper, tighten the union bolt (5) to the specified torque.

Tightening torque

Brake hose union bolt (c): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IE31J1410049-02

- 6) Tighten the reservoir tank mounting bolt.
- 7) Bleed air from the system after installing the master cylinder. "Air Bleeding from Brake Line" (Page 4A-12)
- 8) Adjust the brake pedal height. (Page 4A-12)

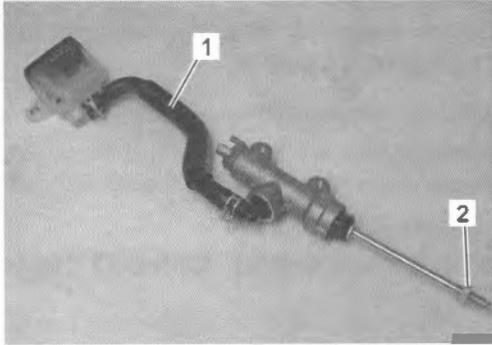
Rear Brake Master Cylinder Disassembly and Assembly

BENJ31J34106019

Refer to "Rear Brake Master Cylinder Assembly Removal and Installation" (Page 4A-22).

Disassembly

- 1) Disconnect the reservoir hose (1).
- 2) Remove the lock-nut (2).

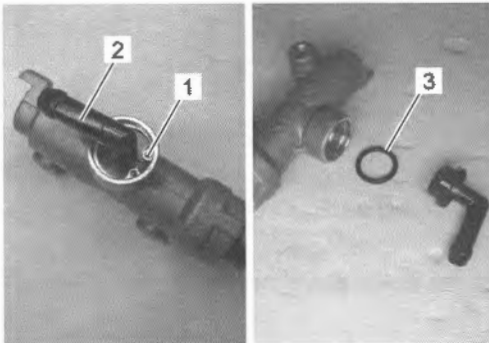


IE31J1410050-01

- 3) Remove the snap ring (1) with the special tool.

Special tool
09900-06108

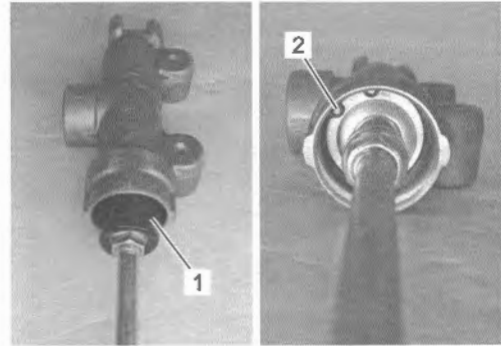
- 4) Remove the brake hose connector (2) and O-ring (3).



IE31J1410051-01

- 5) Pull out the dust boot (1) and remove the snap ring (2).

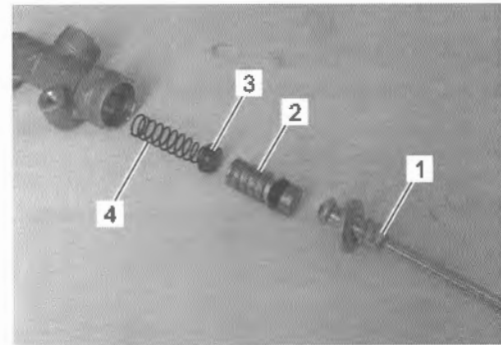
Special tool
09900-06108



IE31J1410052-01

- 6) Remove the following parts from the master cylinder.

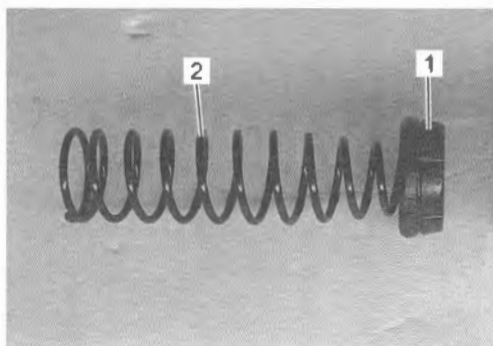
- Push rod (1)
- Piston/Secondary cup set (2)
- Primary cup (3)
- Return spring (4)



IE31J1410053-01

Assembly

- 1) Install the new primary cup (1) to the return spring (2).



IE31J1410061-01

NOTICE

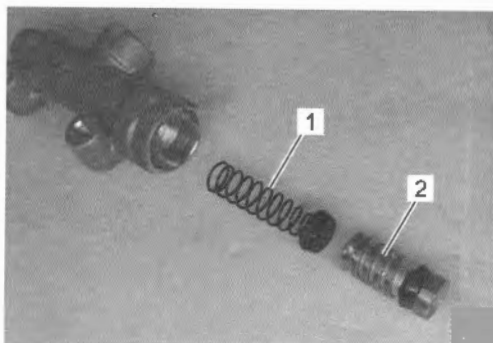
- Wash the master cylinder components with new brake fluid before reassembly.
- Do not wipe the brake fluid off after washing the components.
- When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.

Brake fluid (DOT 4)



IB14J1410051-02

- 2) Install the primary cup/spring (1) and new secondary cup/piston (2) to the master cylinder.



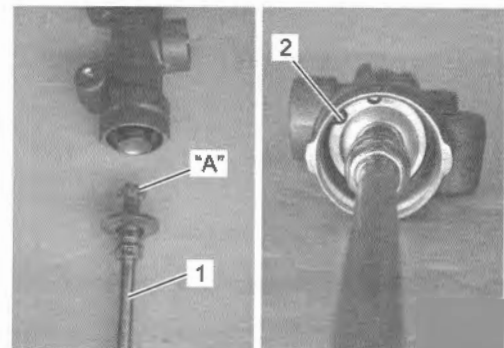
IE31J1410054-01

- 3) Apply grease to the push rod end.

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)

- 4) Install the push rod (1) to the master cylinder.
- 5) Install the new snap ring (2) with the special tool.

**Special tool
09900-06108**

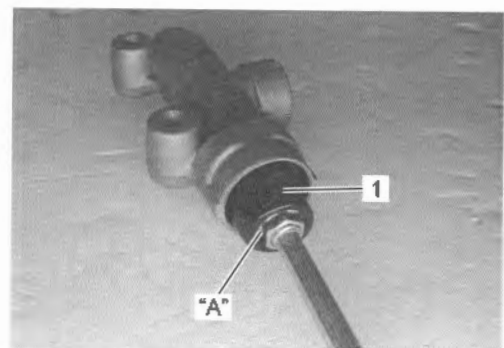


IE31J1410055-01

- 6) Apply grease to the lip of the dust boot (1).

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

- 7) Set the dust boot (1) to the master cylinder securely.



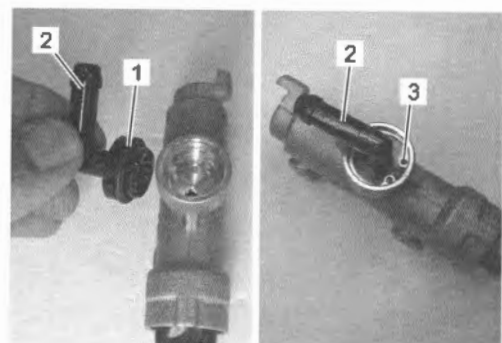
IE31J1410058-01

- 8) Install the new O-ring (1) to the brake hose connector (2).

- 9) Install the brake hose connector (2) to the master cylinder.

- 10) Install the new snap ring (3) with the special tool.

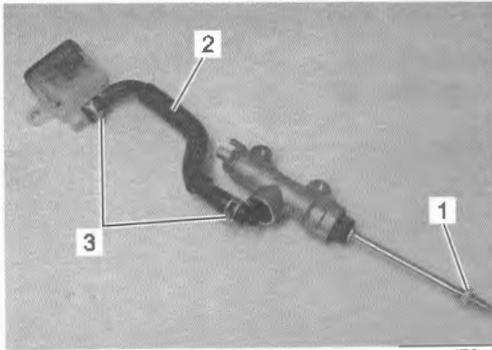
**Special tool
09900-06108**



IE31J1410057-02

4A-25 Brake Control System and Diagnosis:

- 11) Install the lock-nut (1).
- 12) Connect the reservoir hose (2) and set the clips (3). Refer to "Rear Brake Hose Routing Diagram" (Page 4A-6).



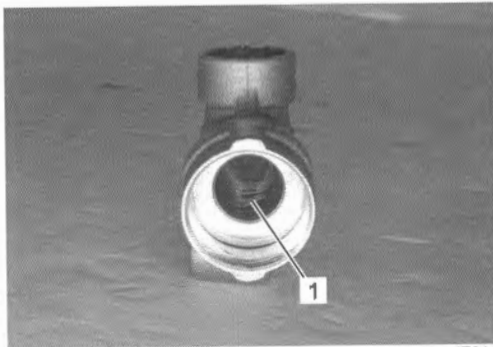
Rear Brake Master Cylinder Parts Inspection

BENJ31J34106020

Refer to "Rear Brake Master Cylinder Disassembly and Assembly" (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.

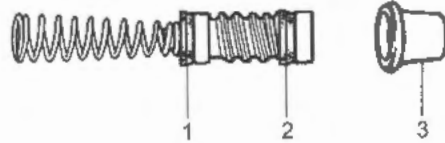


Piston

Inspect the piston surface for any scratches or other damage. If any damage is found, replace it piston with a new one.

Rubber Parts

Inspect the primary cup (1), secondary cup (2) and dust boot (3) for wear or damage. If any damage is found, replace them with new ones.



Specifications

Tightening Torque Specifications

BENJ31J34107001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Rear brake master cylinder rod lock-nut	18	1.8	13.0	☞(Page 4A-12) / ☞(Page 4A-22)
Brake air bleeder valve	7.5	0.75	5.5	☞(Page 4A-13)
Front brake master cylinder mounting 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 light switch screw	1.2	0.12	1.0	☞(Page 4A-19)
Brake lever pivot bolt	6	0.6	4.5	☞(Page 4A-20)
Brake lever pivot bolt lock-nut	6	0.6	4.5	☞(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-2)

"Rear Brake Hose Routing Diagram" (Page 4A-6)

"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

BENJ31J34108001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4A-11) / ☞(Page 4A-12) / ☞(Page 4A-14) / ☞(Page 4A-19) / ☞(Page 4A-24)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞(Page 4A-19) / ☞(Page 4A-24)
	SUZUKI SILICONE GREASE	P/No.: 99000-25100	☞(Page 4A-20) / ☞(Page 4A-24)

NOTE

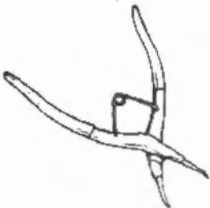
Required service material(s) is also described in:

"Front Brake Master Cylinder Assembly / Brake Lever Components" (Page 4A-16)

"Rear Brake Master Cylinder Assembly Components" (Page 4A-21)

Special Tool

BENJ31J34108002

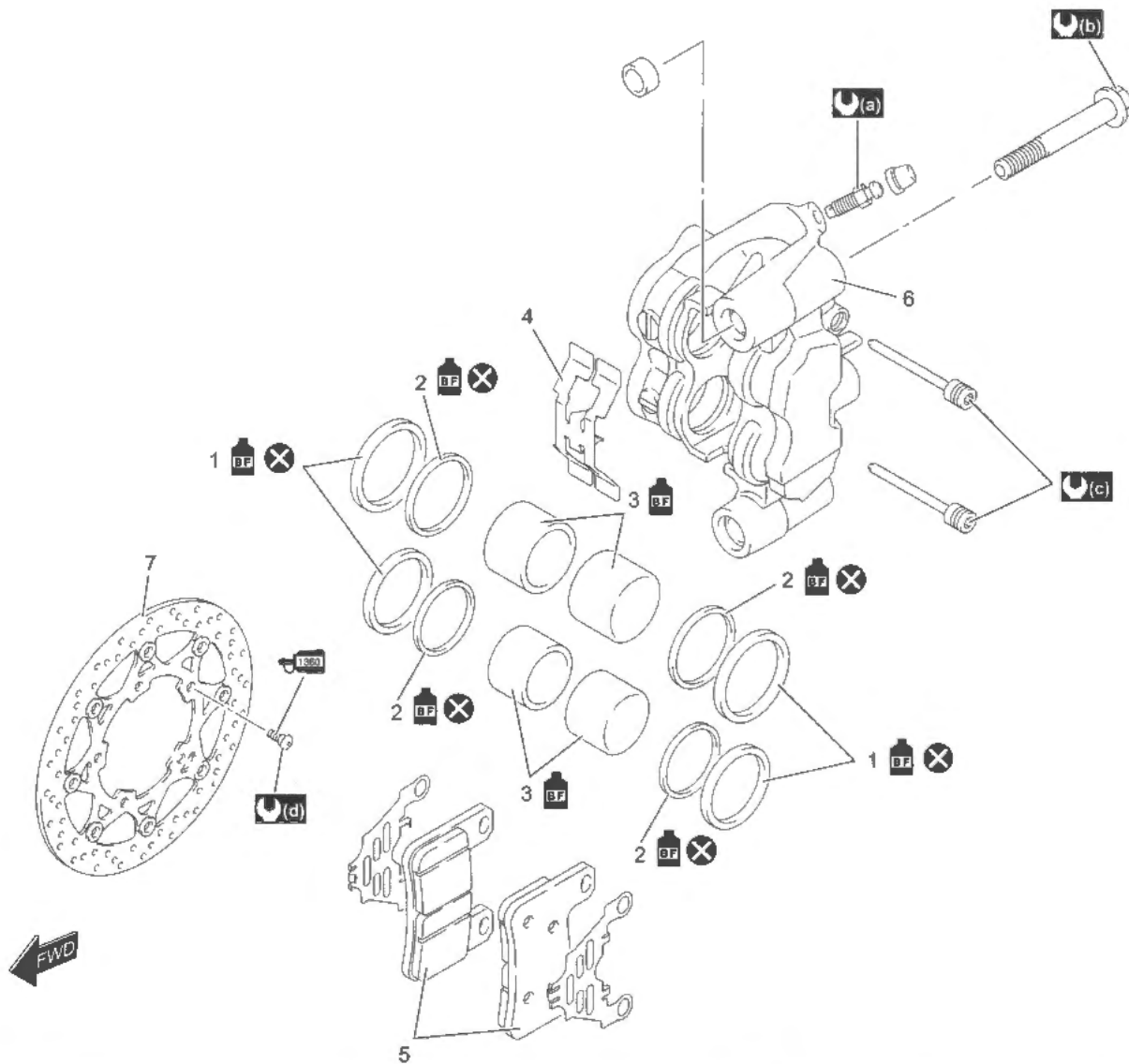
09900-06108 Snap ring pliers (Internal) ☞(Page 4A-18) / ☞(Page 4A-19) / ☞(Page 4A-23) / ☞(Page 4A-23) / ☞(Page 4A-24) / ☞(Page 4A-24)	
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Front Brakes

Repair Instructions

Front Brake Components

BENJ31J34206001



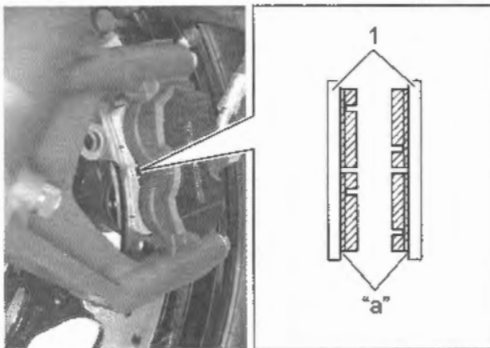
IE31J1420020-02

1. Piston seal	6. Front brake caliper	(d) : 23 N·m (2.3 kgf·m, 17.0 lbf·ft)
2. Dust seal	7. Front brake disc	1560 : Apply thread lock to the thread part.
3. Piston	(a) : 7.5 N·m (0.75 kgf·m, 5.5 lbf·ft)	BF : Apply brake fluid.
4. Brake pad spring	(b) : 39 N·m (3.9 kgf·m, 28.5 lbf·ft)	X : Do not reuse.
5. Brake pad	(c) : 16 N·m (1.6 kgf·m, 11.5 lbf·ft)	

Front Brake Pad Inspection

BENJ31J34206002

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)



IE31J1420002-02

Front Brake Pad Replacement

BENJ31J34206003

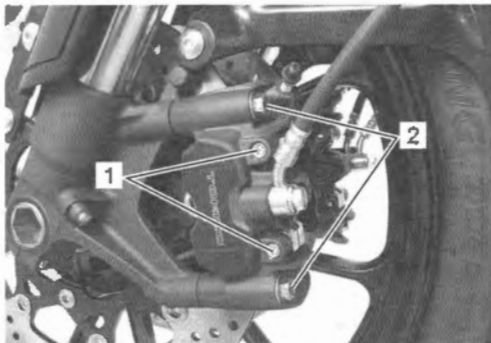
NOTICE

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) Loosen the pad mounting pins (1).
- 2) Remove the brake caliper by removing the caliper mounting bolts (2).

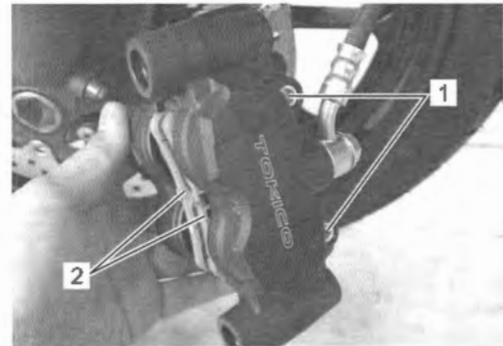


IE31J1420003-01

- 3) Remove the pad mounting pins (1) and brake pads (2).

NOTE

Do not operate the brake lever while removing the brake pads.

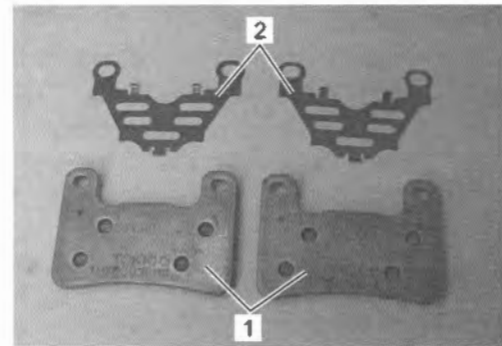


IE31J1420004-01

- 4) Clean up the caliper especially around the caliper pistons.
- 5) Assemble the new brake pad (1) and shim (2).

NOTE

- Replace the brake pads as a set.
- Pushing back the caliper pistons into the caliper will facilitate installation of the brake pads. At the time, observe the reservoir level not to exceed the upper level.



IE31J1420005-01

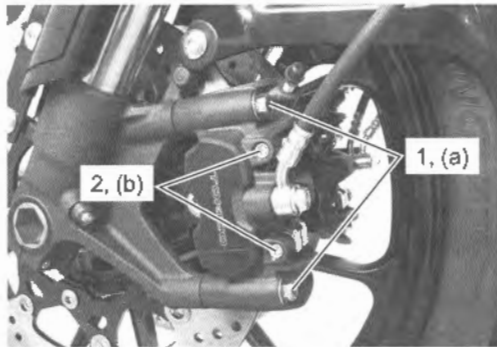
4B-3 Front Brakes:

- 6) Install the new brake pads and temporarily pad mounting pins.
- 7) Tighten the brake caliper mounting bolts (1) and pad mounting pins (2) to the specified torque.

Tightening torque

Caliper mounting bolt (a): 39 N·m (3.9 kgf-m, 28.5 lbf-ft)

Pad mounting pin (b): 16 N·m (1.6 kgf-m, 11.5 lbf-ft)



IE31J1420006-01

Front Brake Caliper Removal and Installation

BENJ31J34206004

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.

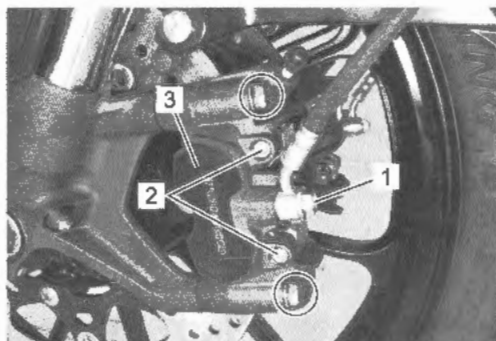
Removal

- 1) Drain brake fluid. (Page 4A-14)
- 2) Place a rag underneath the union bolt on the brake caliper to catch any spill 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.

NOTE

Slightly loosen the pad mounting pins (2) to facilitate later disassembly.

- 4) Remove the caliper (3) by removing the caliper mounting bolts.



IE31J1420007-01

Installation

- 1) Install the brake caliper (1).
- 2) Tighten caliper mounting bolts (2) and pad mounting pins (3) to the specified torque.

Tightening torque

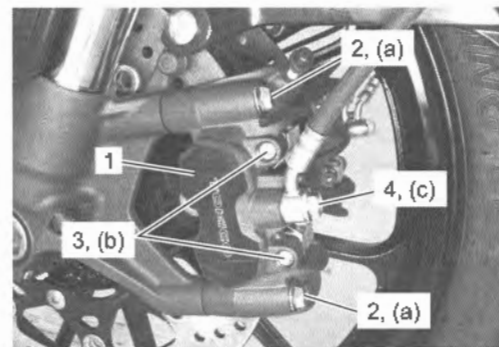
Caliper mounting bolt (a): 39 N·m (3.9 kgf-m, 28.5 lbf-ft)

Pad mounting pin (b): 16 N·m (1.6 kgf-m, 11.5 lbf-ft)

- 3) Install the brake hose union bolt (4) and new seal washers to brake hose.
- 4) After setting the brake hose union to the stopper, tighten the union bolt (4) to the specified torque.

Tightening torque

Brake hose union bolt (c): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IE31J1420008-01

- 5) Bleed air from the brake system after installing the caliper. (Page 4A-12)
- 6) Check the brake fluid leakage referring to "Brake Hose Inspection" in Section 4A (Page 4A-11) and brake operation.

Front Brake Caliper Disassembly and Reassembly

BENJ31J34206005

Refer to "Front Brake Caliper Removal and Installation" (Page 4B-3).

▲ CAUTION

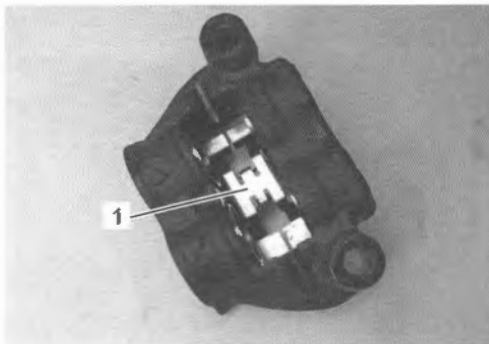
Take care not to damage piston and caliper cylinder of front brake caliper.

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. (Page 4B-2)
- 2) Remove the pad spring (1).



IE31J1420009-01

- 3) Remove the caliper pistons applying compressed air gradually from the hole for the brake hose.

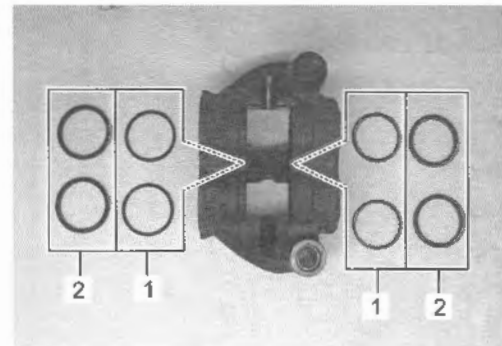
▲ WARNING

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.



IE31J1420010-01

- 4) Remove the dust seals (1) and piston seals (2).



IE31J1420011-01

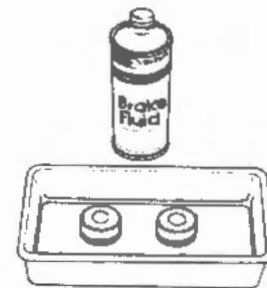
Reassembly

- 1) 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)



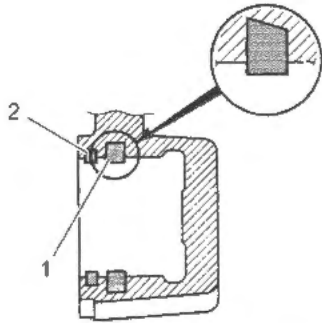
I649G1420012-02

4B-5 Front Brakes:

- 2) Apply the brake fluid to new piston seals (1) and new dust seals (2).

Brake fluid (DOT 4)

- 3) Install the piston seals (1) and dust seals (2).



IE31J1420012-02

- 4) Install the caliper pistons to the brake caliper.
- 5) When installing the spring to caliper, bring its winder side of pawl (1) face top.



IE31J1420013-01

- 6) Install the brake pads. (Page 4B-2)

Front Brake Caliper Parts Inspection

BENJ31J34206006

Refer to "Front Brake Caliper Disassembly and Reassembly" (Page 4B-4).

Brake Caliper Cylinder

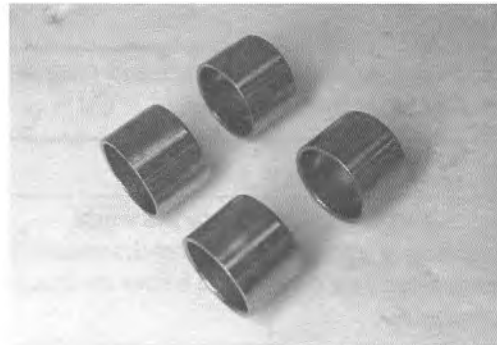
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damage is found, replace the caliper with a new one.



IE31J1420014-01

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.



IE31J1420015-01

Brake Pad Mounting Pin

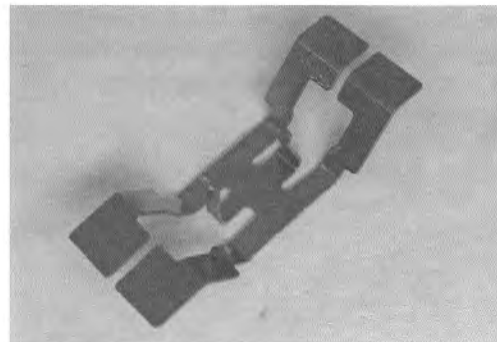
Inspect the brake pad mounting pins for wear and other damage. If any damage is found, replace them with new ones.



IE31J1420016-01

Brake Pad Spring

Inspect the brake pad spring for damage and excessive bend. If any defects are found, replace it with a new one.



IE31J1420017-01

Front Brake Disc Removal and Installation

BENJ31J34206007

Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-5).

Removal

- 1) Remove the front brake disc (1).



IE31J1420018-01

Installation

- 1) Make sure that the brake disc is clean and free of any grease.
- 2) Install the front brake disc.

NOTE

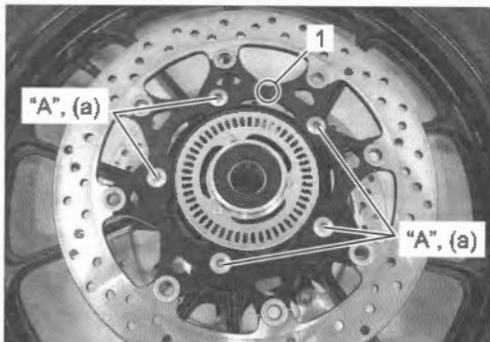
The stamped mark (1) on the brake disc should face to the outside.

- 3) Apply thread lock to the 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)



IE31J1420019-01

Front Brake Disc Inspection

BENJ31J34206008

Brake Disc Thickness

Check the brake disc for damage or cracks and measure the thickness using the micrometer.

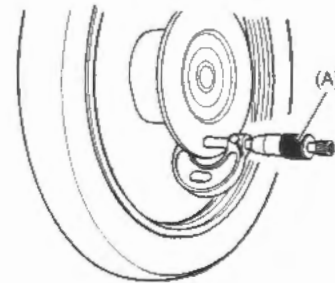
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Front brake disc thickness

Service limit: 4.5 mm (0.18 in)

Special tool

(A): 09912-66310



ID26J1420029-01

Brake Disc Runout

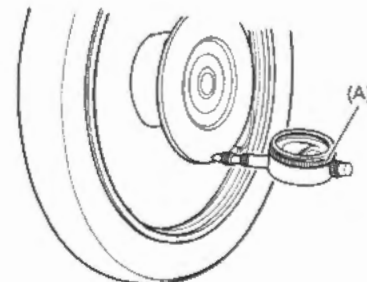
- 1) Dismount the front brake pads.
Refer to "Front Brake Pad Replacement" (Page 4B-2).
- 2) Measure the runout using the dial gauge.
Replace the disc if the runout exceeds the service limit.

Brake disc runout

Service 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

BENJ31J34207001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Caliper mounting bolt	39	3.9	28.5	☞(Page 4B-3) / ☞(Page 4B-3)
Pad mounting pin	16	1.6	11.5	☞(Page 4B-3) / ☞(Page 4B-3)
Brake hose union bolt	23	2.3	17.0	☞(Page 4B-3)
Brake disc bolt	23	2.3	17.0	☞(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

BENJ31J34208001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4B-4) / ☞(Page 4B-5)
Thread lock cement	THREAD LOCK CEMENT 1360	P/No.: 99000-32130	☞(Page 4B-6)



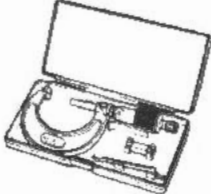
NOTE

Required service material(s) is also described in:

“Front Brake Components” (Page 4B-1)

Special Tool

BENJ31J34208002

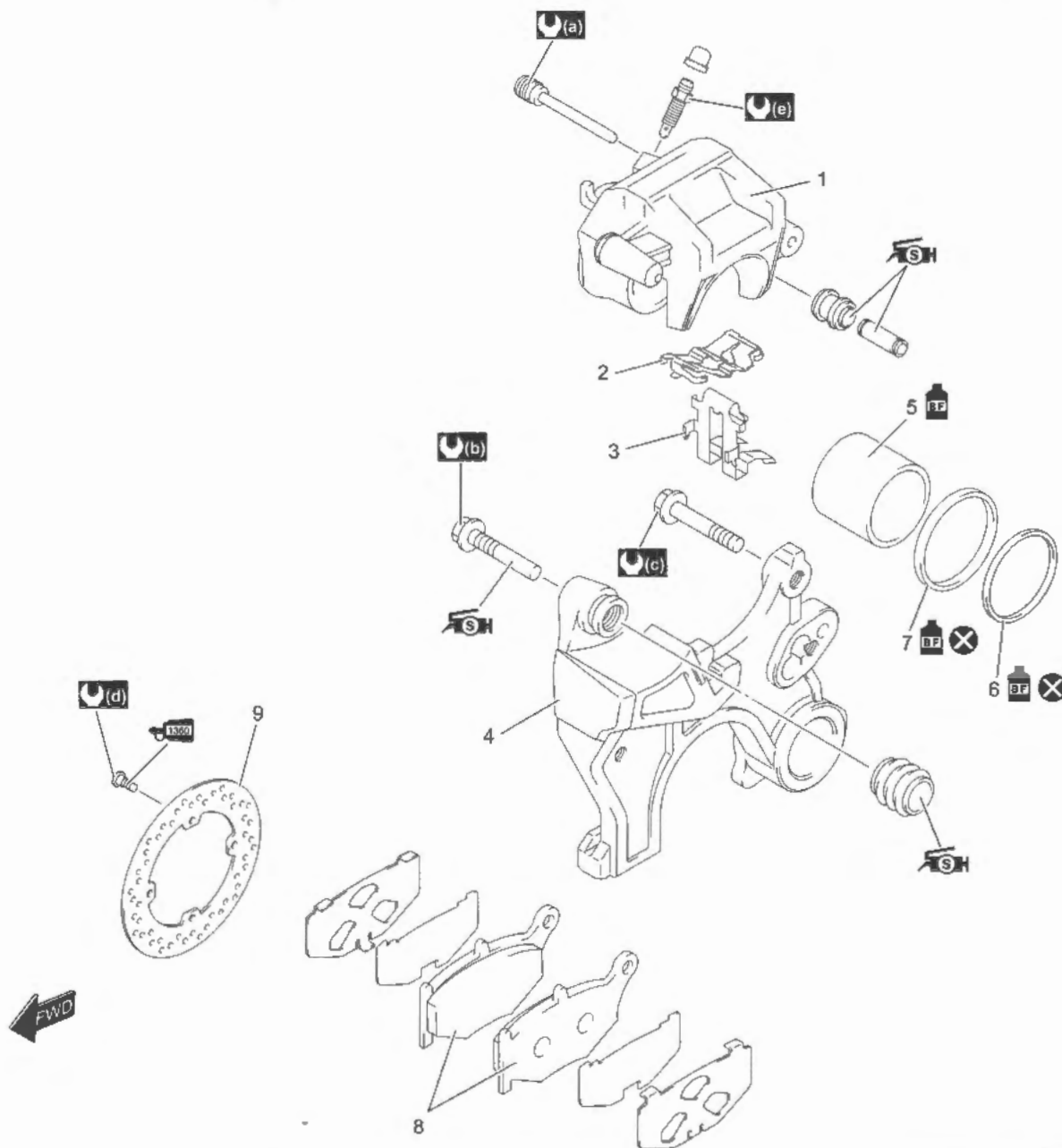
09900-20607 Dial gauge (10 x 0.01 mm) ☞(Page 4B-6) 	09900-20701 Dial gauge chuck ☞(Page 4B-6) 
09912-66310 Micrometer (0 - 25 mm) ☞(Page 4B-6) 	

Rear Brakes

Repair Instructions

Rear Brake Components

BENJ31J34306001



IJ31J1430001-01

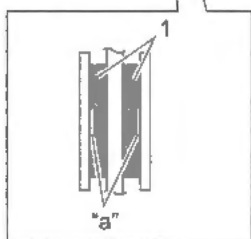
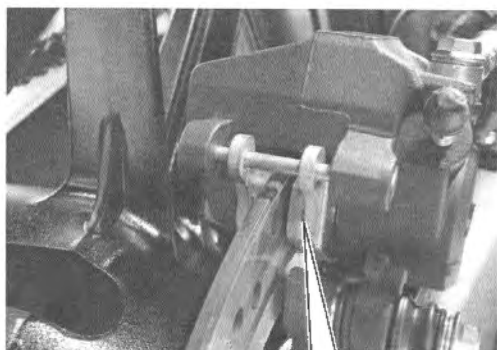
1. Rear brake caliper	7. Piston seal	(d) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2. Brake pad spring	8. Brake pad	(e) : 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)
3. Retainer	9. Rear brake disc	SH : Apply silicone grease.
4. Calliper bracket	(a) : 16 N·m (1.5 kgf-m, 11.5 lbf-ft)	1360 : Apply thread lock to the thread part.
5. Piston	(b) : 33 N·m (3.3 kgf-m, 24.0 lbf-ft)	BF : Apply brake fluid.
6. Dust seal	(c) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)	X : Do not reuse.

4C-2 Rear Brakes:

Rear Brake Pad Inspection

BENJ31J34306002

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 4C-2)



IE31J1430001-02

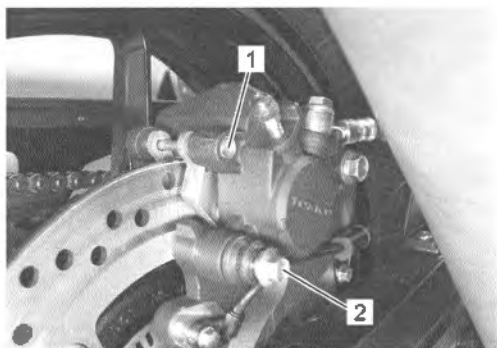
Rear Brake Pad Replacement

BENJ31J34306003

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 pad mounting pin (1).
- 2) Remove the caliper mounting bolt (2).

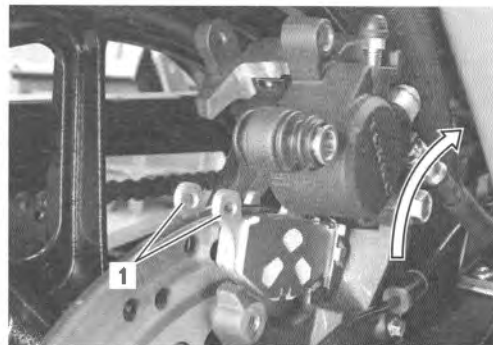


IE31J1430002-01

- 3) Remove the brake pads (1) with the rear caliper pivoted up.

NOTE

Do not operate the brake pedal while removing the brake pads.

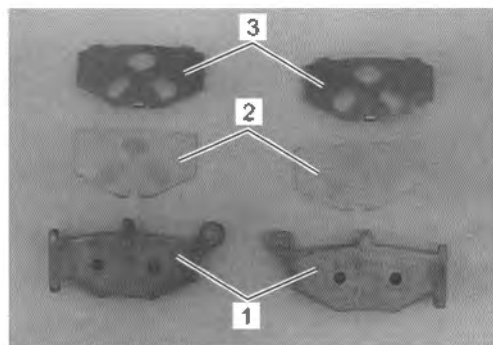


IE31J1430003-01

- 4) Clean up the caliper especially around the caliper piston.
- 5) 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.

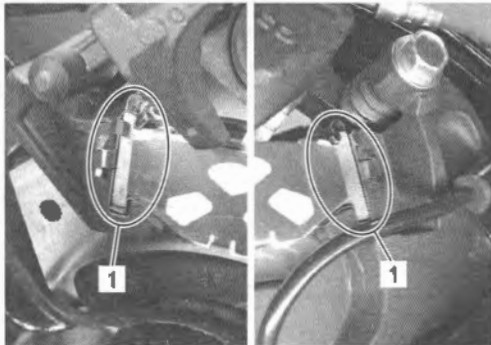


IE31J1430004-01

- 6) Install the new brake pads.

NOTE

Check the pads end (1) for proper fit to the brake pad spring.



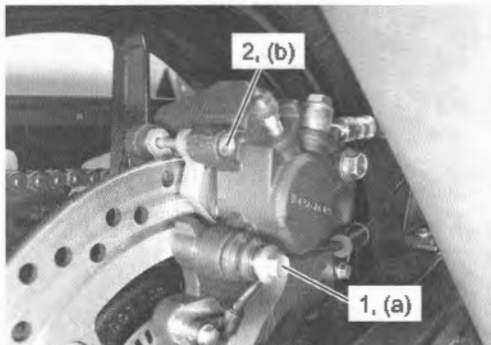
IE31J1430005-01

- 7) Tighten the caliper mounting bolt (1) and pad mounting pin (2) to the specified torque.

Tightening torque

Caliper mounting bolt (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)

Pad mounting pin (b): 16 N·m (1.6 kgf-m, 11.5 lbf-ft)



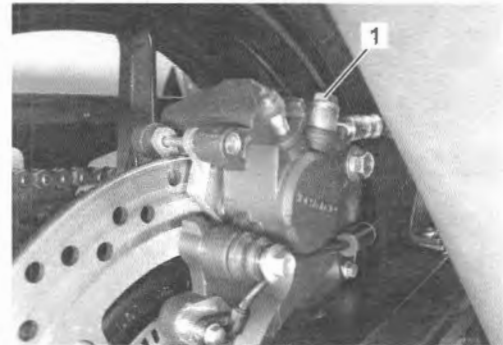
IE31J1430006-01

Rear Brake Caliper Removal and Installation

BENJ31J34306004

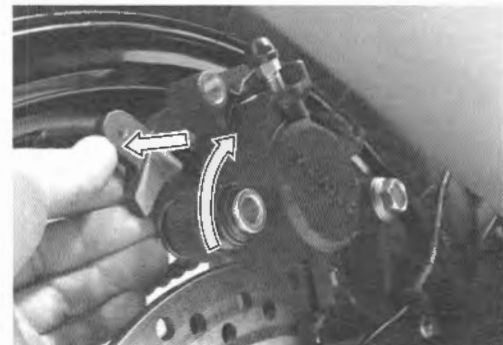
Removal

- 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.



IE31J1430007-01

- 4) Remove the brake pads. (Page 4C-2)
- 5) Pivot the caliper up and remove the caliper from the caliper bracket.



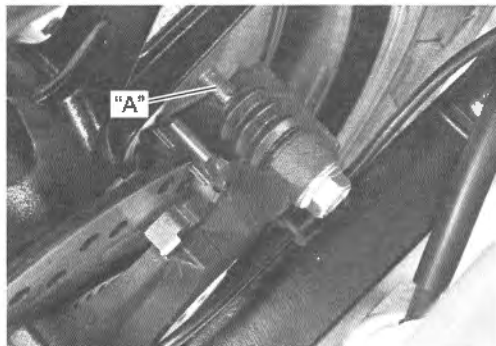
IE31J1430008-02

4C-4 Rear Brakes:

Installation

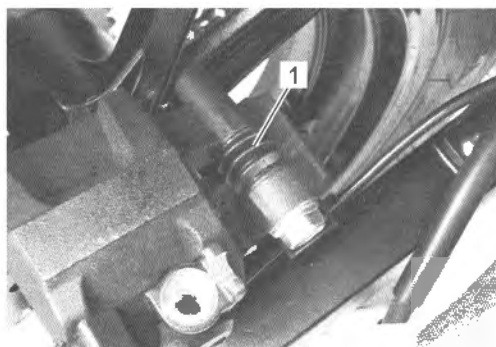
- 1) Apply grease to the sliding pin.

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)



IE31J1430009-01

- 2) Install the caliper to the caliper bracket.
- 3) Set the rubber boot (1) onto the caliper securely.

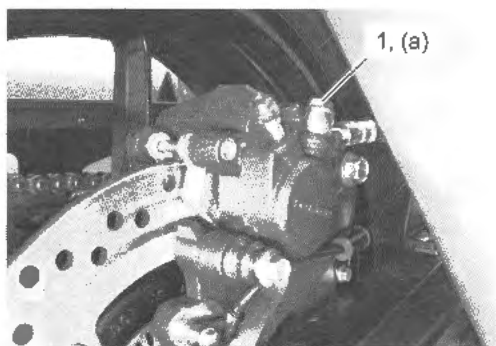


IE31J1430010-01

- 4) Install the brake pads. (Page 4C-2)
- 5) Install the brake hose union bolt (1) and new seal washers to brake hose.
- 6) After setting the brake hose union to 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)



IE31J1430011-01

- 7) Bleed air from the brake system after installing the caliper. (Page 4A-12)
- 8) Check the brake fluid leakage referring to "Brake Hose Inspection" in Section 4A (Page 4A-11) and brake operation.

Rear Brake Caliper Disassembly and Reassembly

BENJ31J34306005

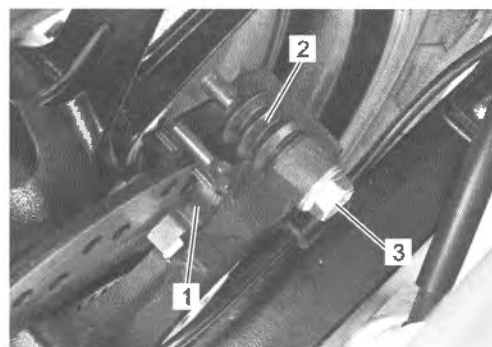
Refer to "Rear Brake Caliper Removal and Installation" (Page 4C-3).

▲ CAUTION

Take care not to damage piston and caliper cylinder of rear brake caliper.

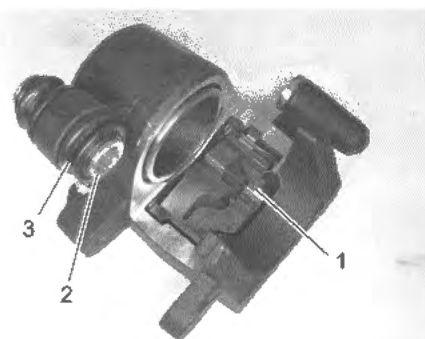
Disassembly

- 1) Remove the pad spring (1), rubber boot (2) and sliding pin (3).



IE31J1430012-01

- 2) Remove the retainer (1).
- 3) Remove the spacer (2) and rubber boot (3) from the caliper.

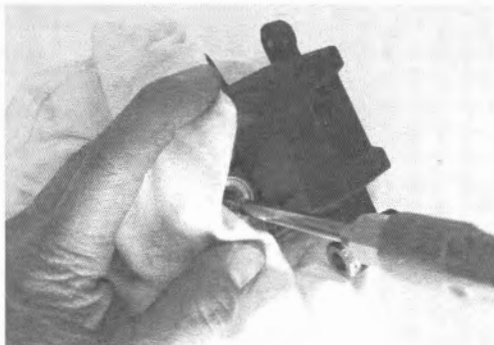


IE31J1430013-01

- 4) Remove the caliper piston applying compressed air gradually from the hole for the brake hose.

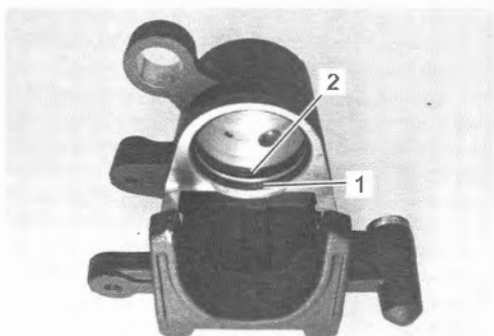
▲ WARNING

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.



IE31J1430014-01

- 5) Remove the dust seal (1) and piston seal (2).



IE31J1430015-01

Reassembly

- 1) 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)

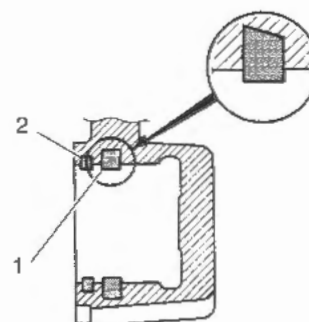


I649G1430018-02

- 2) Apply the brake fluid to new piston seal (1) and new dust seal (2).

Brake fluid (DOT 4)

- 3) Install the piston seal (1) and dust seal (2).



IE31J1430016-01

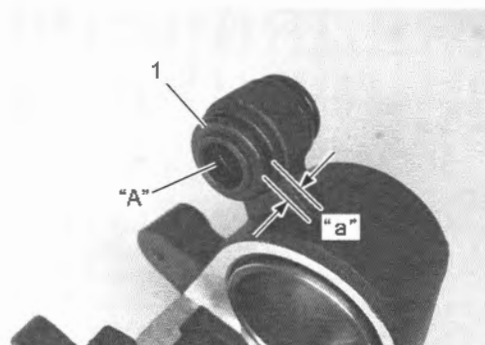
- 4) Install the caliper piston to the brake caliper.
5) Install the rubber boot (1) to the caliper.

NOTE

The wide side "a" of rubber boot inside.

- 6) Apply grease to the inside of the rubber boot (1).

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)



IE31J1430017-02

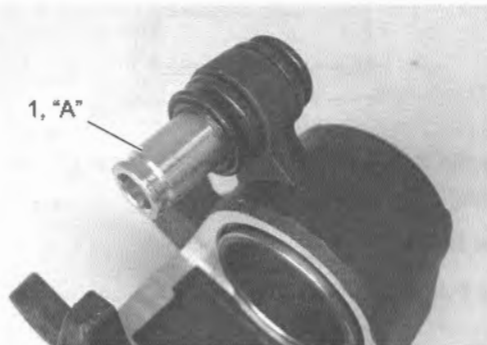
4C-6 Rear Brakes:

7) Apply grease to the spacer (1).

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)

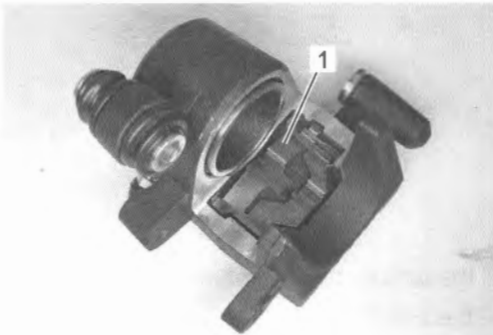
8) Install the spacer (1) into the rubber boot.

9) Set the rubber boot to the spacer securely.



IE31J1430018-01

10) Install the pad spring (1).



IE31J1430019-01

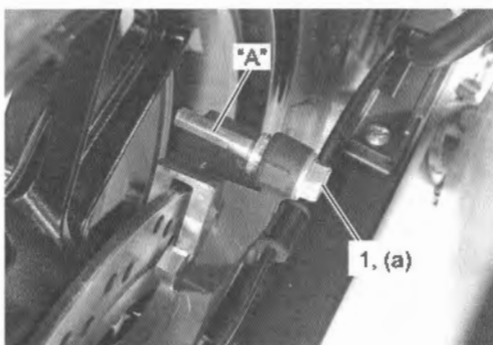
11) Tighten sliding pin (1) to the specified torque.

Tightening torque

Caliper sliding pin (a): 33 N·m (3.3 kgf·m, 24.0 lbf·ft)

12) Apply grease to the sliding pin (1).

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)



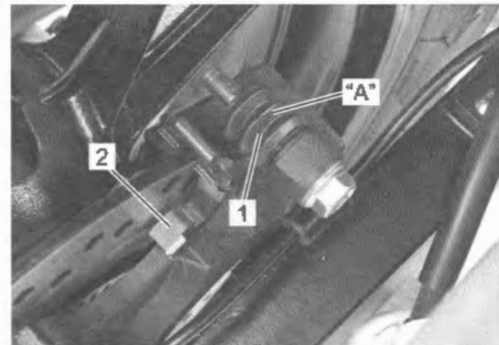
IE31J1430020-01

13) Apply grease to the inside of the rubber boot (1).

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)

14) Set the rubber boot (1) onto the caliper bracket.

15) Install the retainer (2).



IE31J1430021-01

Rear Brake Caliper Parts Inspection

BENJ31J34306006

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.



IE31J1430022-01

Brake Caliper Piston

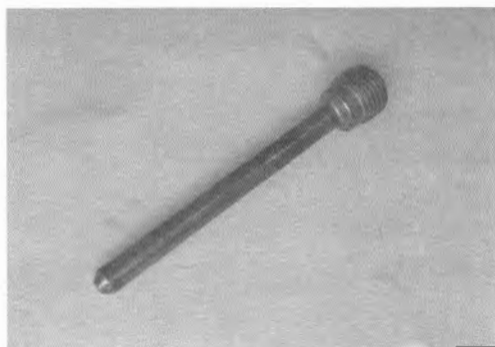
Inspect the brake caliper piston surface for any scratches or other damage. If any defects are found, replace the piston with a new one.



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.



IE31J1430024-01

Boot and Spacer

Inspect the boots and spacer for damage and wear. If any defects are found, replace them with new ones.



IE31J1430025-01

Brake Pad Spring

Inspect the brake pad springs for damage and excessive bend. If any defects are found, replace them with new ones.



IE31J1430026-01

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.



IE31J1430027-01

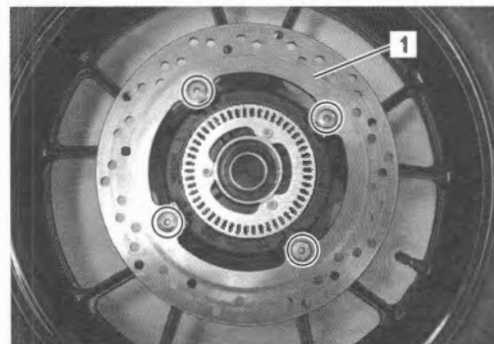
Rear Brake Disc Removal and Installation

BENJ31J34306007

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-12).

Removal

- 1) Remove the rear brake disc (1).



IE31J1430028-01

4C-8 Rear Brakes:

Installation

- 1) Make sure that the brake disc (1) is clean and free of any grease.
- 2) Install the rear brake disc (1).

NOTE

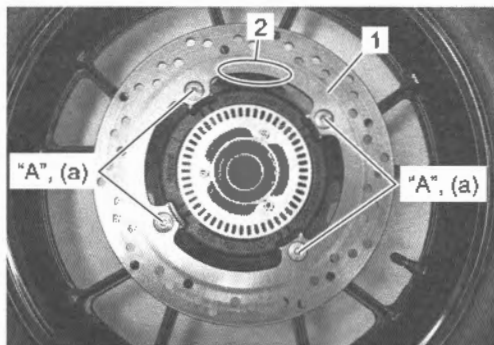
The stamped mark (2) on the brake disc should face to the outside.

- 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)



IE31J1430029-02

Rear Brake Disc Inspection

BENJ31J34306008

Brake Disc Thickness

Check the brake disc for damage or cracks and measure the thickness using the micrometer.

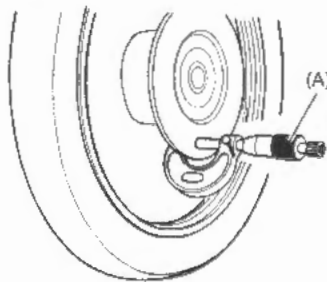
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Rear brake disc thickness

Service limit: 4.5 mm (0.18 in)

Special tool

(A): 09912-66310



ID26J1430036-01

Brake Disc Runout

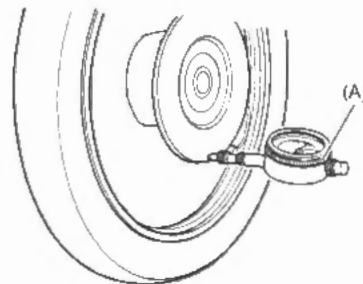
- 1) Dismount the rear brake pads.
Refer to "Rear Brake Pad Replacement" (Page 4C-2).
- 2) Measure the runout using the dial gauge.
Replace the disc if the runout exceeds the service limit.

Brake disc runout

Service 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

BENJ31J34307001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Caliper mounting bolt	18	1.8	13.0	☞(Page 4C-3)
Pad mounting pin	16	1.6	11.5	☞(Page 4C-3)
Brake hose union bolt	23	2.3	17.0	☞(Page 4C-4)
Caliper sliding pin	33	3.3	24.0	☞(Page 4C-6)
Brake disc bolt	23	2.3	17.0	☞(Page 4C-8)

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

BENJ31J34308001

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) / ☞(Page 4C-6) / ☞(Page 4C-6) / ☞(Page 4C-6)
Thread lock cement	THREAD LOCK CEMENT 1360	P/No.: 99000-32130	☞(Page 4C-8)

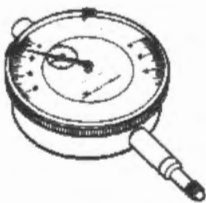


NOTE

Required service material(s) is also described in:

"Rear Brake Components" (Page 4C-1)

Special Tool

BENJ31J34308002

09900-20607 Dial gauge (10 x 0.01 mm) ☞(Page 4C-8)		09900-20701 Dial gauge chuck ☞(Page 4C-8)	
09912-66310 Micrometer (0 - 25 mm) ☞(Page 4C-8)			

ABS

L4 - L6

Precautions

Precautions for ABS Service

BENJ31J34510001

- Battery voltage is always applied to the ABS control unit. Therefore, disconnect the battery (–) read 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



BENJ31J34510002

To ensure that the trouble diagnosis is done accurately and smoothly, observe the following and follow “ABS Check”: L4 - L6 (Page 4E-12) or “ABS Check”: L8 - (Page 4E-52).

- The information on the DTCs detected by the ABS control unit can be checked and cleared using the SDS tool. For the usage and available functions of the SDS tool, refer to the SDS operation manual.

NOTE

After repairing the trouble, clear the DTC using SDS tool.

- L4 – L6 model:  (Page 4E-20)
- L8 – model:  (Page 4E-57)

- 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”: L4 - L6 (Page 4E-12) or “ABS Check”: L8 - (Page 4E-52). 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

BENJ31J34510003

Refer to “Precautions for Electrical Circuit Service” in Section 00 (Page 00-2) and “Precautions for ABS Service”: L4 - L6 (Page 4E-1).

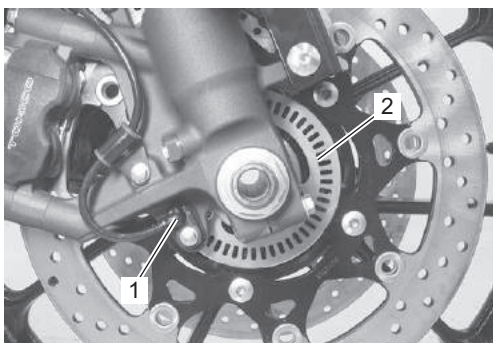
General Description

Wheel Speed Sensor Description

BENJ31J34511001

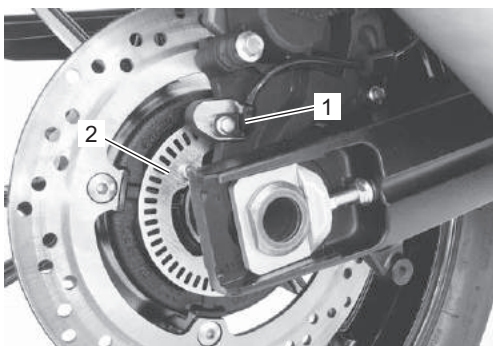
Wheel speed sensor consists of wheel speed sensor (1) and sensor rotor (2).

Front



IE31J1450001-01

Rear

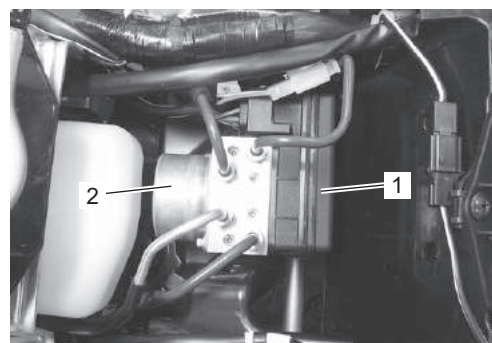


IE31J1450002-01

ABS Control Unit Description

BENJ31J34511002

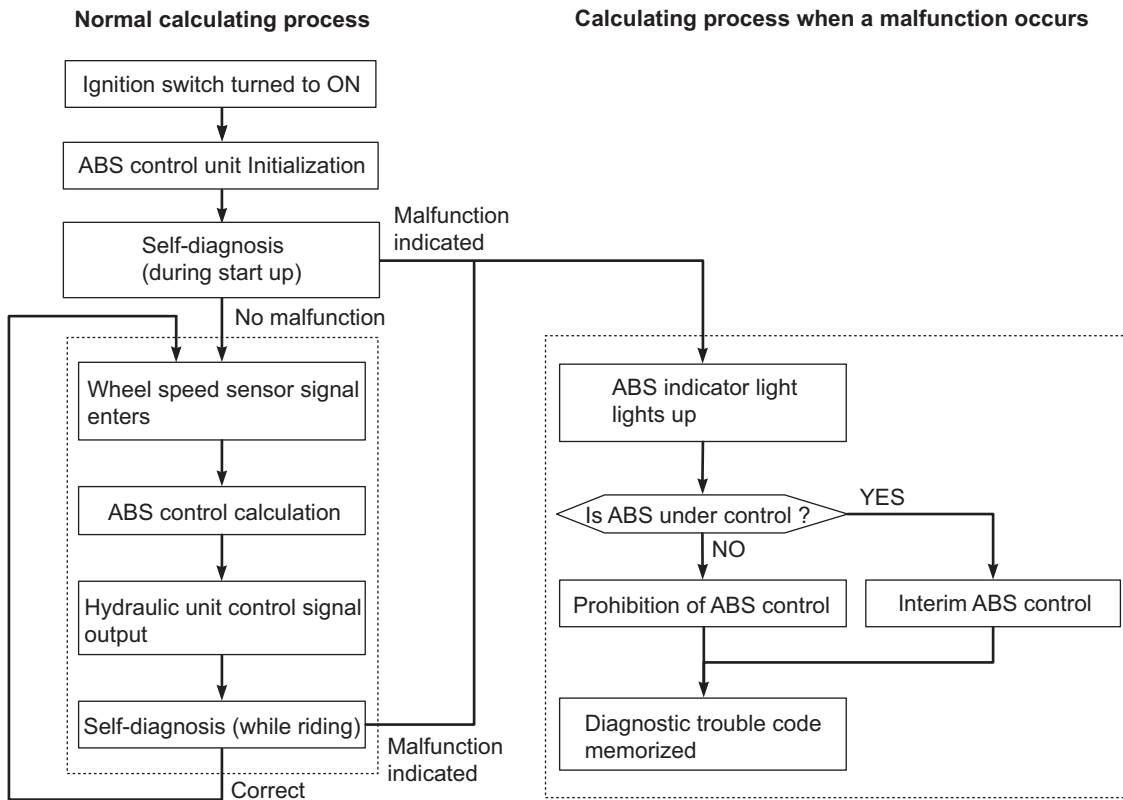
ABS control unit (1) calculates signals input from each one of front and rear wheel speed sensors, monitors the slipping conditions of the wheels and, at the same time, sends control signal to Hydraulic Unit (HU) (2). This ABS control unit/HU can not be disassembled.



IE31J1450003-01

ABS Control Unit Calculating Process

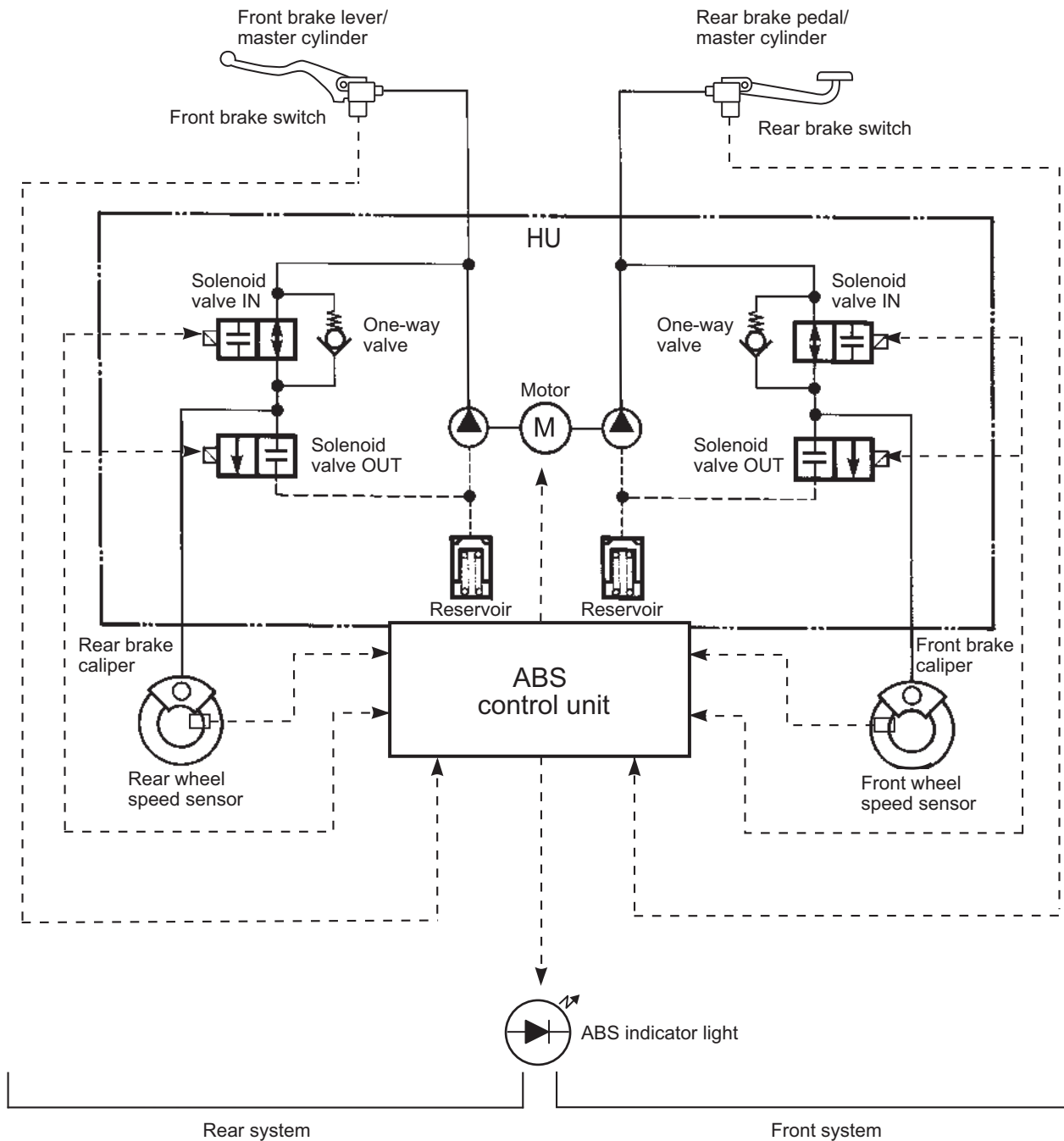
The ABS controls and its calculations, in addition to the self-diagnosing and the fail-safe processes, occur during the ABS control unit calculating process. In addition, if a malfunction is detected by the self-diagnosis function, the brake stops being controlled by the ABS and a diagnostic trouble code is stored.



Hydraulic Unit (HU) Description

BENJ31J34511003

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.



Self-diagnosis Function and ABS Indicator Light Description

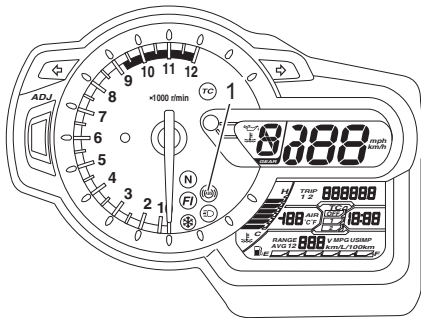
BENJ31J34511004

The ABS control unit performs the self-diagnosis and can store any electronically detected malfunctions as diagnostic trouble codes. If a malfunction has occurred, the indicator light lights up to inform the rider of the malfunction. The special tool, when connected to the mode select coupler, enables the ABS indicator light to display the diagnostic trouble codes.

ABS Indicator Light

The ABS indicator light (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 (3.1 mile/h).
- If an ABS malfunction has occurred, the ABS indicator light keeps lighting up.



IE31J1450076-01

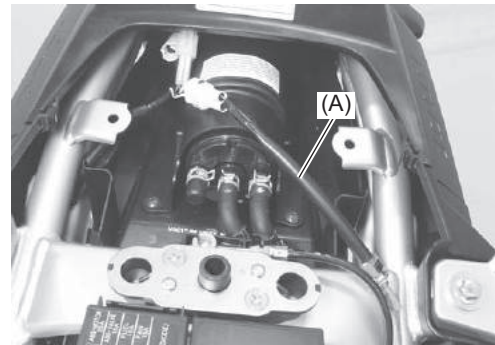
NOTE

When a malfunction has occurred in the ABS, connect the special tool to the mode select coupler to display the diagnostic trouble code on the ABS indicator light.

- L4 – L6 model: ☞ (Page 4E-18)
- L8 – model: ☞ (Page 4E-54)

Special tool

(A): 09930-82760

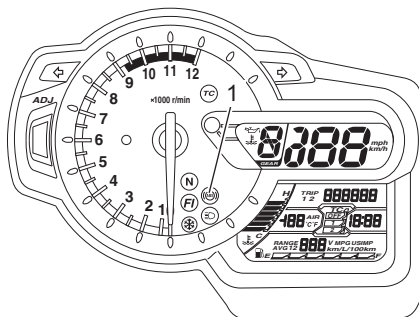


IE31J1450005-01

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 (3.1 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 (3.1 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 (3.1 mile/h).	One or more malfunction has been found and ABS activation been hanged up.
The ABS indicator light does not light up when turning the ignition switch ON.	Check the wire harness and combination meter. Refer to "ABS Indicator Light Inspection": L4 - L6 (Page 4E-15) or "ABS Indicator Light Inspection": L8 - (Page 4E-53).



IE31J1450075-01

Stored DTCs (Diagnostic Trouble Codes)

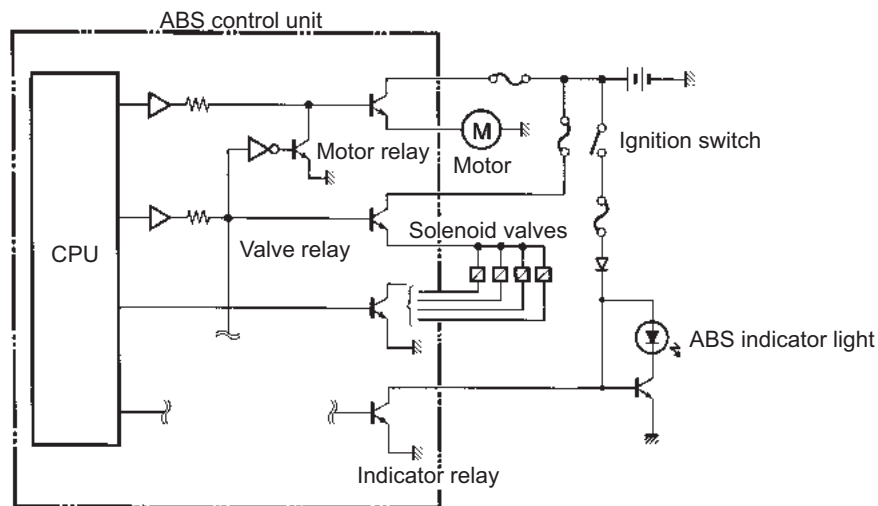
The maximum of six DTCs can be recorded. In these records, duplication of the same DTC will not occur. If the system detects the 7th DTC, it overwrites the record of the oldest DTC.

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

BENJ31J34511005

If malfunction occurs in the ABS electric system, this sets valve relay OFF. Consequently, motor relay will be set OFF and the indicator light ON, and no current will be applied to motor solenoid valve inactivating ABS and turning ABS indicator light ON. In this case, it functions as the normal brake. However, if malfunctions occurs while ABS is being activated, when ABS control unit diagnoses that the operation can continue, it will effectuate ABS provisional control (turning the ABS indicator light ON). Upon the moment when ABS provisional control is over, the valve relay will be set OFF.

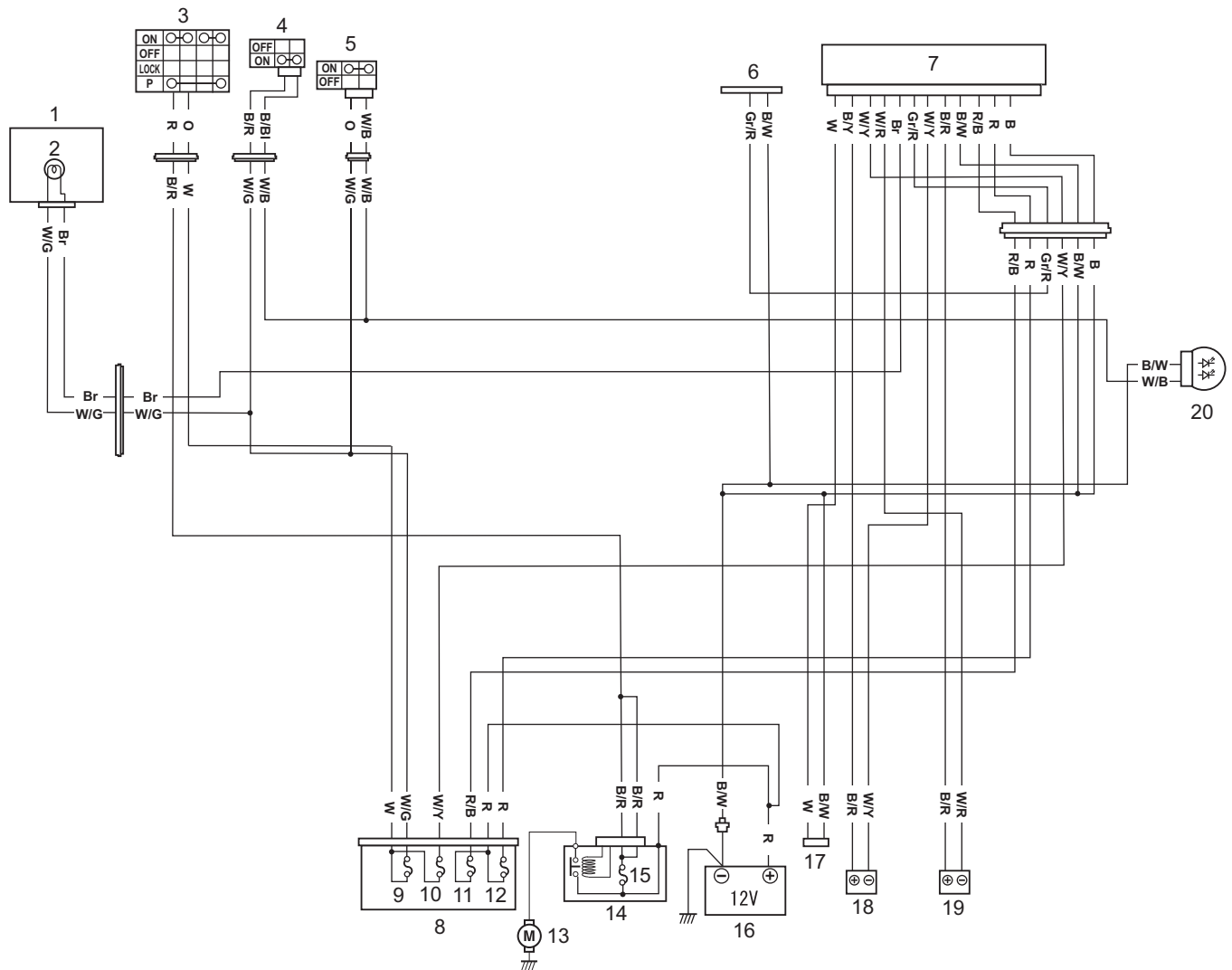


I823H3450010-02

Schematic and Routing Diagram

ABS Wiring Diagram

BENJ31J34512001

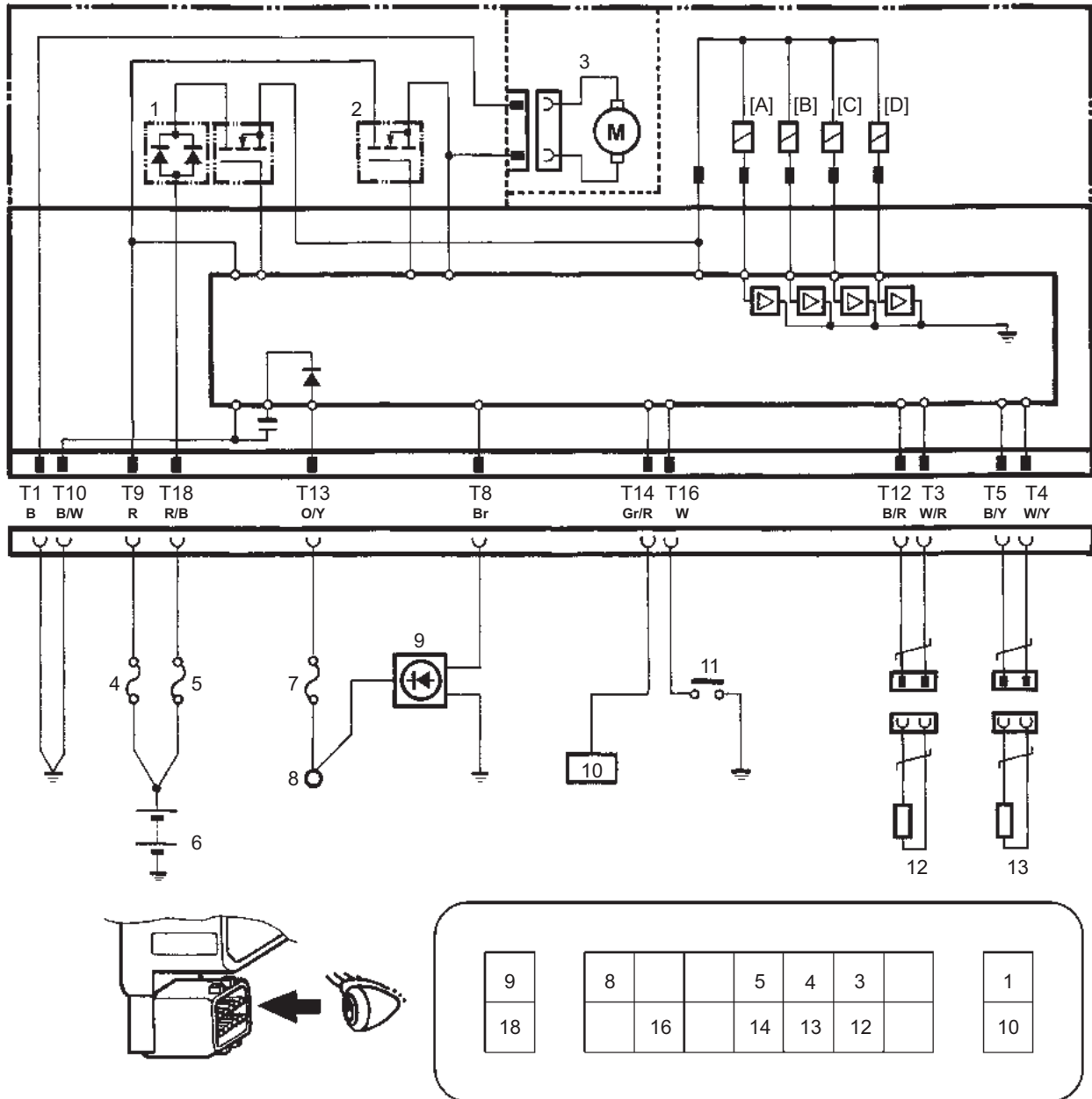


IE31J1450006-01

1. Combination meter	8. Fuse box	15. Main fuse (30 A)
2. ABS indicator light	9. Signal fuse (15 A)	16. Battery
3. Ignition switch	10. Ignition fuse (10 A)	17. Mode select coupler
4. Front brake switch	11. ABS valve fuse (15 A)	18. Rear wheel speed sensor
5. Rear brake switch	12. ABS motor fuse (25 A)	19. Front wheel speed sensor
6. SDS coupler	13. Starter motor	20. Rear combination light
7. ABS control unit	14. Starter relay	

ABS Control Unit / HU Diagram

BENJ31J34512002

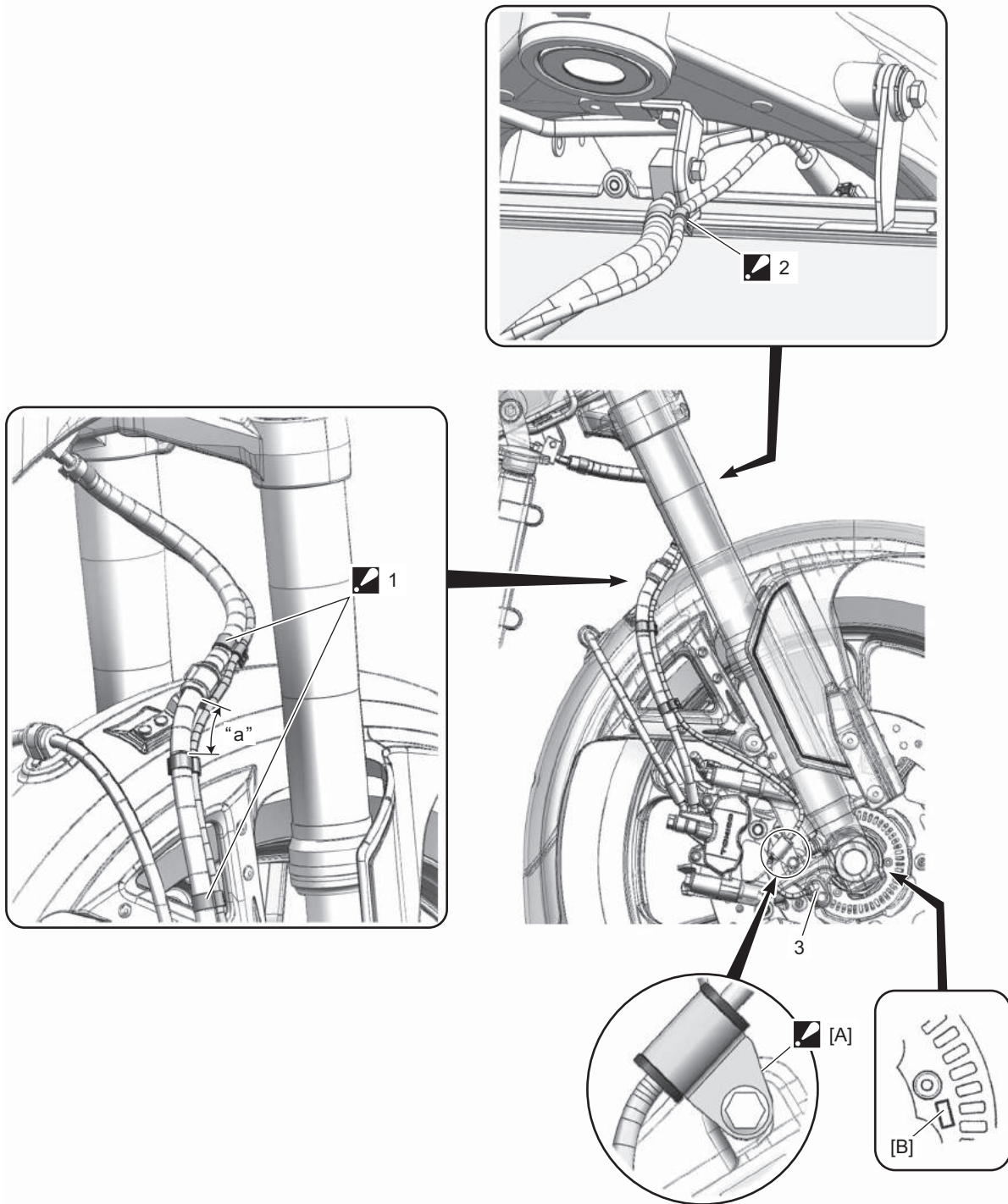


IE31J1450085-01

[A]: Rear brake solenoid OUT	3. Pump motor	9. ABS indicator light
[B]: Rear brake solenoid IN	4. ABS motor fuse (25 A)	10. SDS coupler
[C]: Front brake solenoid OUT	5. ABS valve fuse (15 A)	11. Mode select coupler
[D]: Front brake solenoid IN	6. Battery	12. Front wheel speed sensor
1. Valve relay	7. Ignition fuse (10 A)	13. Rear wheel speed sensor
2. Motor relay	8. Ignition switch	

Front Wheel Speed Sensor Routing Diagram

BENJ31J34512003

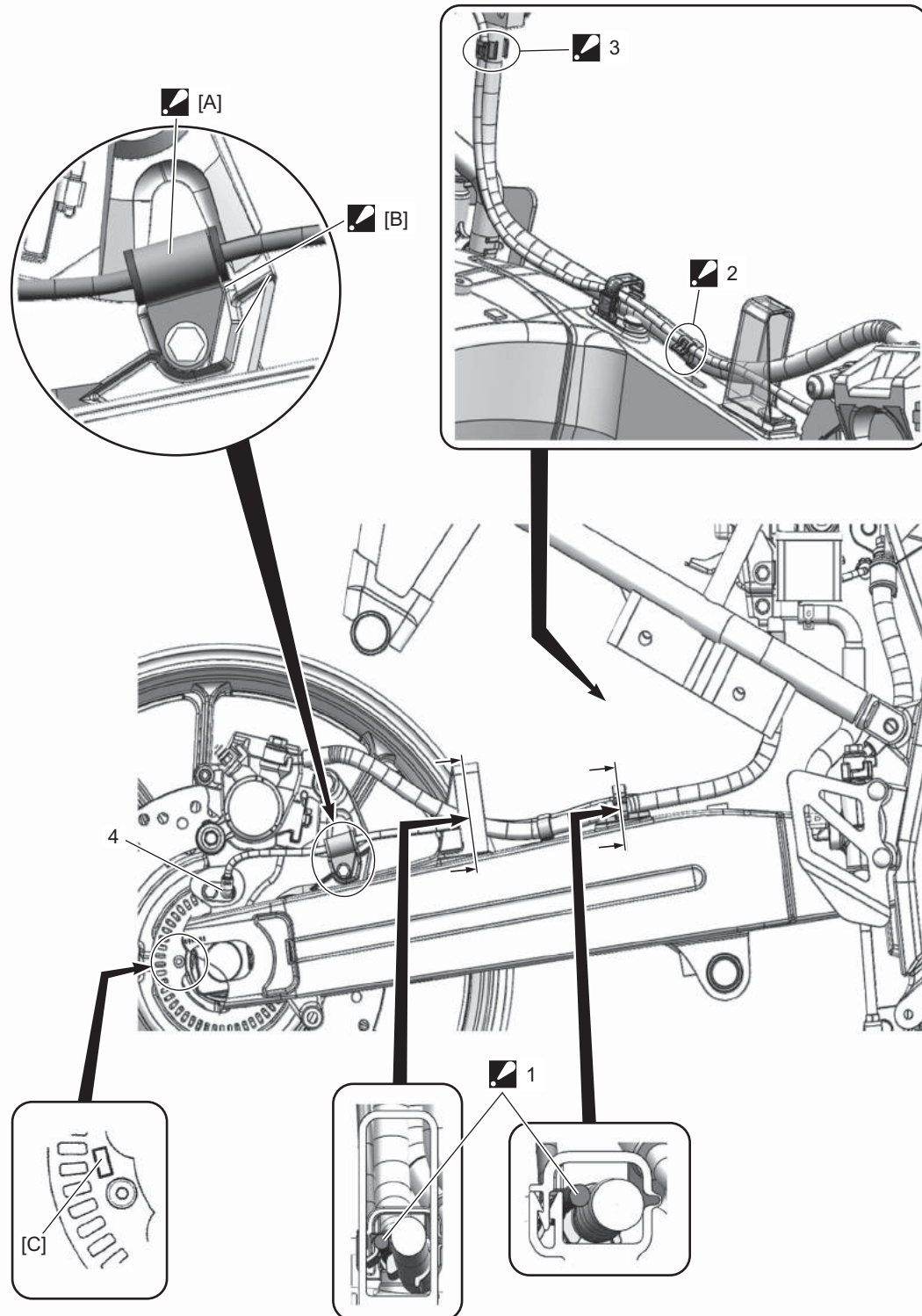


IE31J1450009-03

<p>▣ [A]: After positioning the clamp with the stopper, tighten the bolt.</p>	<p>▣ 2. Clamp : Clamp the marking of the wheel speed sensor lead wire to left side of the brake hose end fitting.</p>
<p>[B]: Outside marking</p>	<p>3. Front wheel speed sensor</p>
<p>▣ 1. Clamp : Clamp the marking of the wheel speed sensor lead wire in the front of the brake hose.</p>	<p>"a": 10 – 50 mm (0.4 – 2.0 in)</p>

Rear Wheel Speed Sensor Routing Diagram

BENJ31J34512004



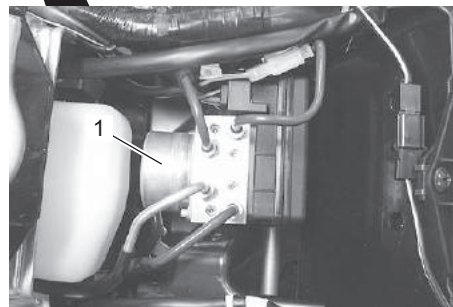
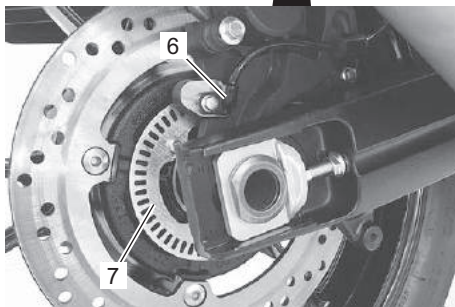
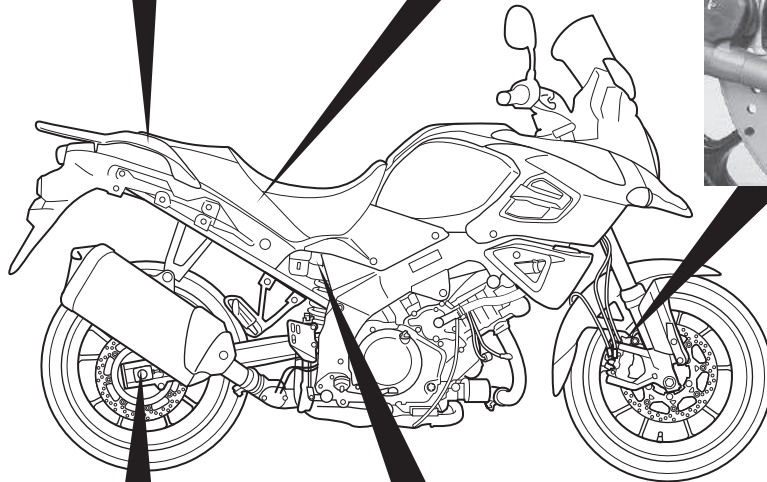
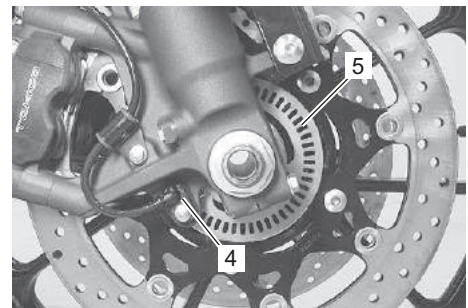
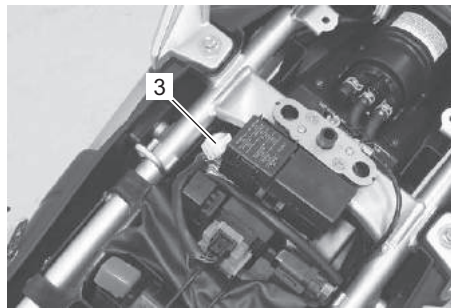
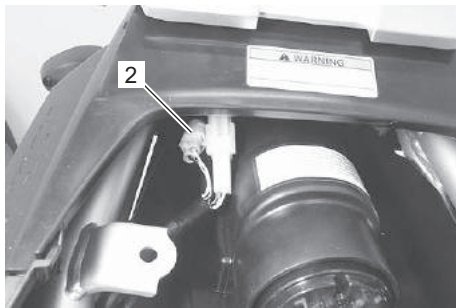
IE31J1450010-03

<p>☑ [A]: Fix the wheel speed sensor lead wire sleeve to the clamp firmly.</p>	<p>☑ 2. Clamp Clamp the wheel speed sensor lead wire at inside of the brake hose.</p>
<p>☑ [B]: After positioning the clamp with the stopper, tighten the bolt.</p>	<p>☑ 3. Clamp Clamp the white marking of the wheel speed sensor lead wire to inside of the brake hose end fitting.</p>
<p>[C]: Outside marking.</p>	<p>4. Rear wheel speed sensor</p>
<p>☑ 1. Rear wheel speed sensor lead wire : Pass the rear wheel speed sensor lead wire to inside of the guide.</p>	

Component Location

ABS Components Location

BENJ31J34513001



IE31J1450011-04

1. ABS control unit/HU	3. SDS coupler	5. Front wheel speed sensor rotor	7. Rear wheel speed sensor rotor
2. Mode select coupler	4. Front wheel speed sensor	6. Rear wheel speed sensor	

Diagnostic Information and Procedures

ABS Check

BENJ31J34514001

Refer to the description after the following general flow for details of each step.

Step 1

Malfunction analysis

- 1) Perform "Customer Complaint Analysis": L4 - L6 (Page 4E-13).
- 2) Perform "Problem Symptom Confirmation": L4 - L6 (Page 4E-14).
- 3) Perform "DTC Check, Record and Clearance": L4 - L6 (Page 4E-14) and recheck DTC.

Is the same DTC detected again after performing the DTC clearance?

- | | |
|-----|--|
| Yes | Inspect and repair referring to the applicable DTC troubleshooting, and then go to Step 6. |
| No | Go to Step 2. |

Step 2

Visual inspection

- 1) Perform "Visual Inspection": L4 - L6 (Page 4E-14) or "Visual Inspection": L8 - (Page 4E-52).

Is there any faulty condition?

- | | |
|-----|--|
| Yes | Repair or replace the malfunction part, and then go to Step 6. |
| No | Go to Step 3. |

Step 3

Riding test

- 1) Perform "Riding Test": L4 - L6 (Page 4E-14).

Is the malfunction detected?

- | | |
|-----|--|
| Yes | Repair or replace the malfunction part, and then go to Step 6. |
| No | Go to Step 4. |

Step 4

Brakes diagnosis

- 1) Inspect and repair the ABS.
 - L4 – L6 model: ☞ (Page 4E-15)
 - L8 – model: ☞ (Page 4E-52)

Is the malfunction detected?

- | | |
|-----|--|
| Yes | Repair or replace the malfunction part, and then go to Step 6. |
| No | Go to Step 5. |

Step 5

Intermittent problem check

- 1) Check for intermittent troubles. ☞ (Page 00-2)

Is the malfunction detected?

- | | |
|-----|--|
| Yes | Repair or replace the malfunction part, then go to step 6. |
| No | Go to Step 6. |

Step 6

Final confirmation test

- 1) Perform "Final Confirmation Test": L4 - L6 (Page 4E-14).

Does the trouble recur?

- | | |
|-----|---------------|
| Yes | Go to Step 4. |
| No | End. |

Customer Complaint Analysis

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

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

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

PROBLEM SYMPTOMS	
ABS operation	Past malfunctions and repairs
ABS does not work	
ABS works so often with	
Too long stopping distance	
Other	

CONDITION WHEN MALFUNCTION OCCURRED	
ABS indicator light	Riding conditions
Does not light up	While stopping
Lights up	Over 5 km/h (3.1 mile/h)
Goes off after running over 5 km/h (3.1 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:



IE31J1450074-01

NOTE

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



Problem Symptom Confirmation

If a symptom in “Customer Questionnaire” is found or reproduced in the vehicle, confirm the symptom is problem or not. (This step should be done with the customer if possible.) Check the ABS indicator light.



- L4 – L6 model:  (Page 4E-15)
- L8 – model:  (Page 4E-53)

DTC Check, Record and Clearance

Perform “DTC (Diagnostic Trouble Code) Output”: L4 - L6 (Page 4E-18) or “DTC Check”: L8 - (Page 4E-54) procedure, record it and then clear it.

- L4 – L6 model:  (Page 4E-20)
- L8 – model:  (Page 4E-57)

Recheck DTC.

- L4 – L6 model:  (Page 4E-18)
- L8 – model:  (Page 4E-54)

NOTE

After deleting the DTC, perform “Riding Test”: L4 - L6 (Page 4E-14) and then recheck the DTC.

Riding Test

Ride the motorcycle at more than 30 km/h (19 mile/h) and quickly apply the brakes to check that the ABS activates correctly.

Final Confirmation Test

Confirm that the problem symptom is not observed any more and ABS is free from any abnormal conditions. If what has been repaired is related to the malfunction DTC, clear the DTC referring to “DTC (Diagnostic Trouble Code) Deleting”: L4 - L6 (Page 4E-20) or “DTC Clearance”: L8 - (Page 4E-57), and perform test riding and confirm that the DTC is not indicated.

Visual Inspection

BENJ31J34514002

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-11)
ABS indicator light	Operation	“ABS Indicator Light Inspection”: L4 - L6 (Page 4E-15) or “ABS Indicator Light Inspection”: L8 - (Page 4E-53)
Tire	Pressure	“Tire Inspection and Cleaning” in Section 2D (Page 2D-19)
	Type, size	“Tire Inspection and Cleaning” in Section 2D (Page 2D-19)
	Damage, wear	“Tire Inspection and Cleaning” in Section 2D (Page 2D-19)
Wheel	Runout, play	“Wheel / Wheel Axle Inspection” in Section 2D (Page 2D-15)
Other parts that can be checked visually		—

NOTICE

- The standard tire fitted on this motorcycle is 110/80R19M/C 59V for front and 150/70R17M/C 69V for rear. The use of tires other than those specified may cause instability. It is highly recommended to use a SUZUKI Genuine Tire.
- Replace the tire as a set, otherwise the DTC C1625 (25) may be stored.

ABS Symptom Diagnosis

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 (3.1 mile/h).	Malfunctioning the ABS function.	Perform the ABS check. (Page 4E-12)
	Malfunctioning the ABS indicator light circuit.	Check the ABS indicator light circuit. (Page 4E-15)
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-12)
	Malfunctioning the ABS indicator light circuit.	Check the ABS indicator light circuit. (Page 4E-15)
	Malfunctioning the combination meter.	Check the combination meter. (Page 9C-5)

ABS Indicator Light Inspection

BENJ31J34514004

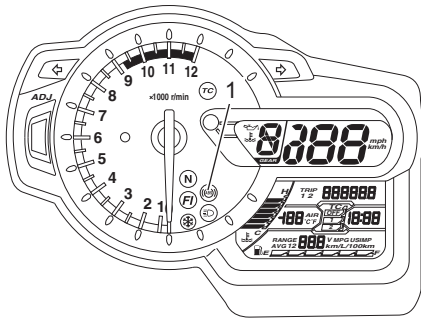
Wiring Diagram

Refer to "ABS Control Unit / HU Diagram": L4 - L6 (Page 4E-8).

Troubleshooting

Step 1

- 1) Check if the ABS indicator light (1) lights up when turning the ignition switch ON.



IE31J1450077-01

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 (3.1 mile/h).

Does the ABS indicator light go off?

- Yes Normal (No DTC exists)
- No
 - DTC output. (Page 4E-18)
 - If DTC can not be output (the ABS indicator light does not flash), go to Step 6.

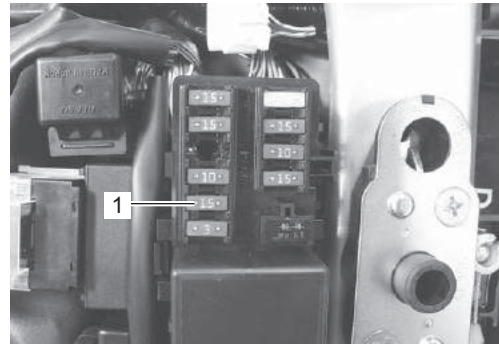
Step 3

(The ABS indicator light does not light up)

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-10)
- 3) Open the fuse box and inspect the signal fuse (15 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



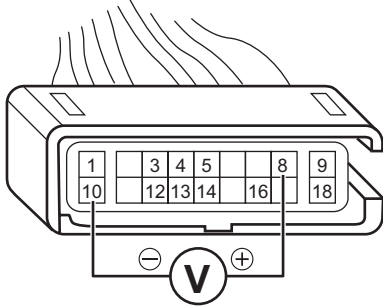
IE31J1450013-01

Is the signal fuse OK?

- Yes Go to Step 4.
- No Replace the signal fuse.

Step 4

- 1) Disconnect the ABS control unit coupler. (Page 4E-38)
- 2) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between "T8" (Br) and "T10" (B/W) at the coupler.



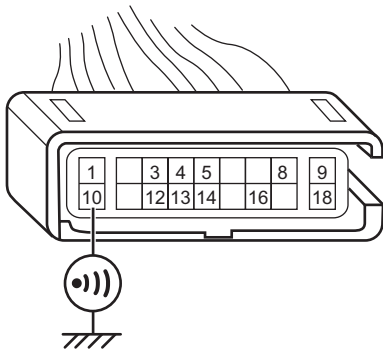
IE31J1450014-01

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 "T10" (B/W) at the coupler and body ground.



IE31J1450015-01

Is continuity indicated?

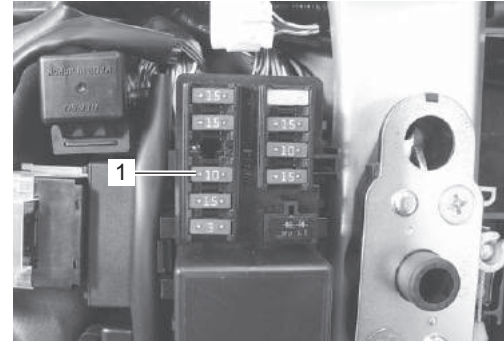
- Yes Replace the ABS control unit/HU. (Page 4E-41)
- No Inspect the wire harness. (Faulty ground wire)

Step 6**(The ABS indicator light does not go off)**

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-10)
- 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.



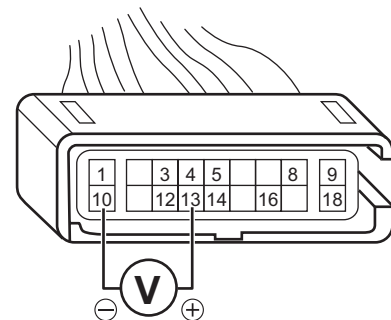
IE31J1450016-01

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-38)
- 2) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between "T13" (O/Y) terminal and "T10" (B/W) terminal at the coupler.



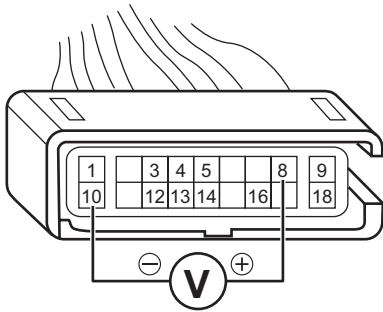
IE31J1450017-01

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) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between “T8” (Br) terminal and “T10” (B/W) terminal at the coupler.



IE31J1450018-01

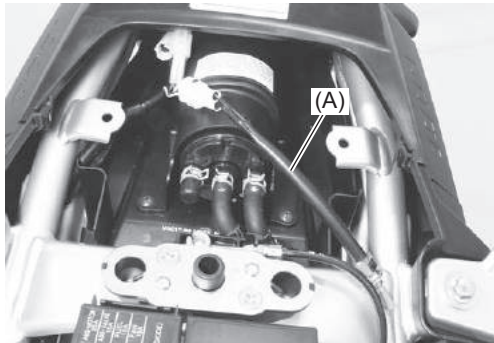
Is voltage 7.5 – 9.5 V?

- Yes Go to Step 9.
- No Inspect the wire harness. (Faulty indicator light wire or ground wire)

Step 9

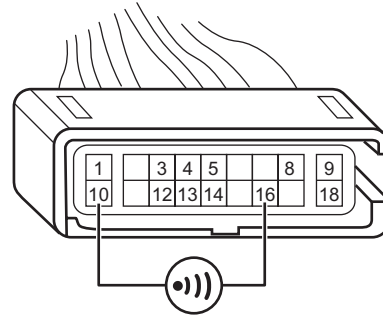
- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-10)
- 3) Short the mode select coupler terminals using the special tool.

Special tool
(A): 09930-82760



IE31J1450019-01

- 4) Check for continuity between “T16” (W) and “T10” (B/W) at the coupler.



IE31J1450020-01

Is continuity indicated?

- Yes Replace the ABS control unit/HU. (Page 4E-41)
- No Inspect the wire harness. (Faulty mode select coupler wire)

DTC (Diagnostic Trouble Code) Output

BENJ31J34514005

NOTE

- If there is a DTC recorded, the ABS indicator light repeatedly flashes in a cyclic manner. (However, when five minutes have elapsed from the start of self-diagnosis mode, the output of the DTC will be interrupted.)
- If no DTC is recorded, the light repeats flashing for 3.6 seconds in a cyclic manner.
- In the case that the mode select switch is turned OFF or the vehicle speed (both wheels) exceeds 10 km/h (6.2 mile/h), the output of DTC will be interrupted.
- Don't disconnect couplers from ABS HU, the battery cable from the battery, ABS HU ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase the memorized information in ABS HU memory.
- Be sure to read "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2) and "Precautions for ABS Service": L4 - L6 (Page 4E-1) before inspection and observe what is written there.
- After carrying out DTC deleting and ABS operation check, explain to the customer that the ABS is operating correctly. (Page 4E-20)

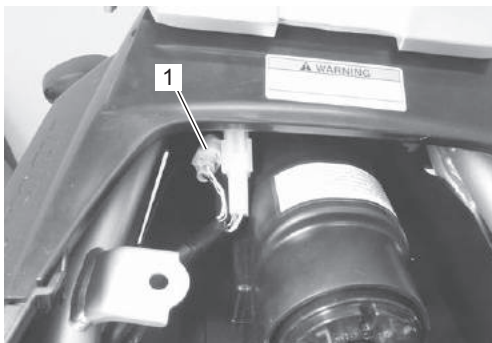
Use of Mode Select Switch

Connect the special tool to the mode select coupler to output the memorized DTCs on the ABS indicator light.

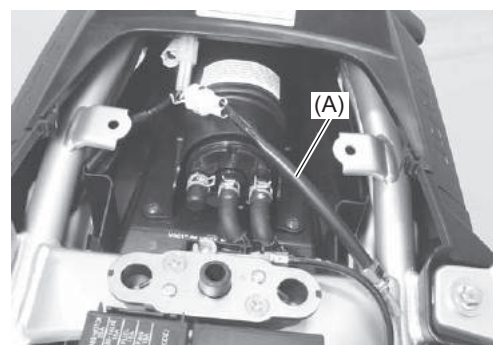
- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-10)
- 3) Connect the special tool to the mode select coupler (1).

Special tool

(A): 09930-82760



IE31J1450021-01



IE31J1450022-01

- 4) Switch the special tool to ON.

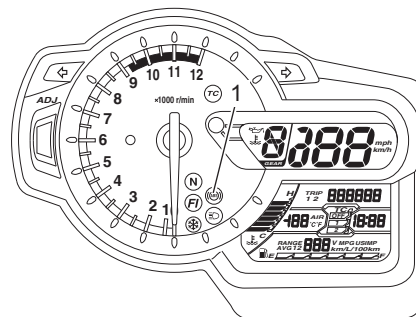


I718H1450040-02

- 5) Turn the ignition switch ON.
The ABS indicator light (1) starts flashing to indicate the DTC. (Page 4E-25)

NOTE

If the DTCs are to be output for a long time, remove the HEAD-LO fuse in order to prevent the battery from discharging.



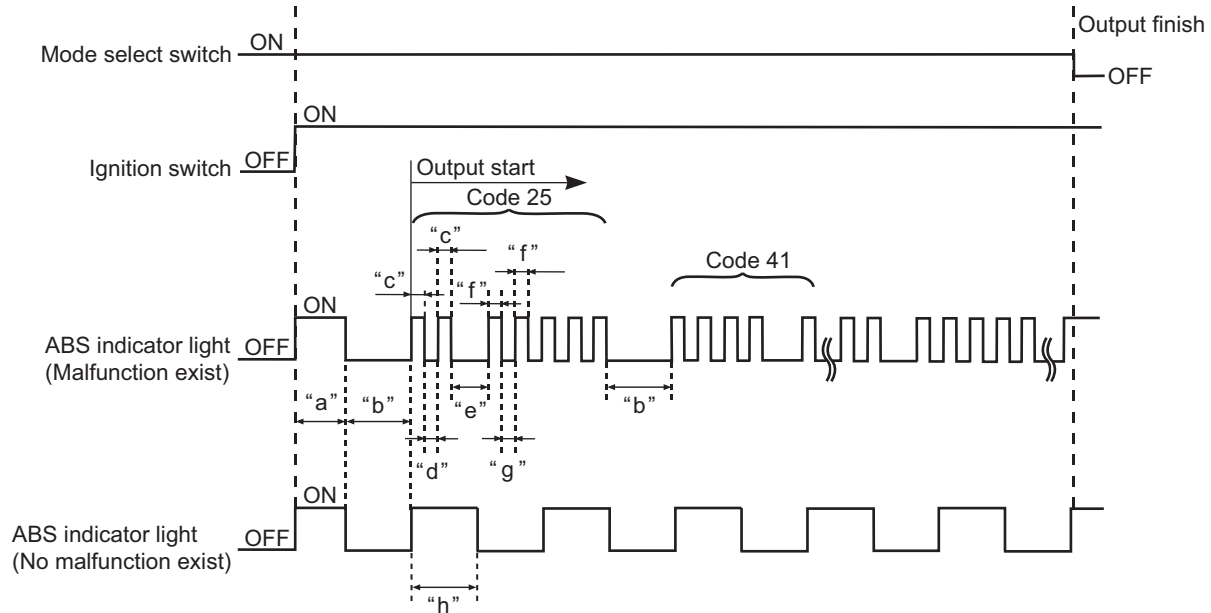
IE31J1450078-01

- 6) Turn the ignition switch OFF and disconnect the special tool.
- 7) Install the seat. (Page 9D-10)

Understanding the DTC (Diagnostic Trouble Code)

A two-digit DTC is shown through the flashing pattern of the ABS indicator light. A number between 1 and 9 is represented by the number of times that the ABS indicator light lights up in interval of 0.4 seconds and the separation between the tens and ones are indicated by the light staying off for 1.6 seconds. In addition, the separation between the start code and the DTC is indicated by the light being off for 3.6 seconds. After the start code is displayed, DTCs appear from the smallest number code.

If no DTC is recorded, the light repeats flashing for 3.6 seconds in a cyclic manner.



IE31J1450023-02

"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

Use of SDS

NOTE

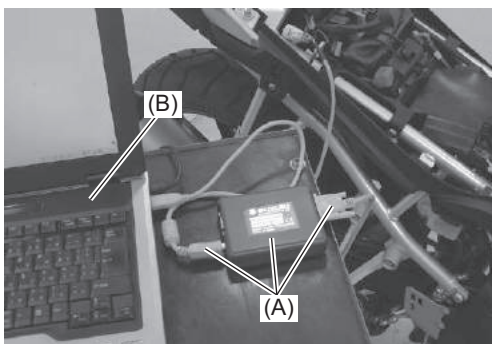
DTC stored in ABS HU memory can be checked by the SDS.

- 1) Remove the seat. ☞ (Page 9D-10)
- 2) Set up the SDS tool according to the SDS operation manual.

Special tool

(A): 09904-41010

(B): 99565-01010-034



IE31J1450080-01

- 3) Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS.

NOTE

- **Not only is SDS used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger.**
- **How to use trigger referring to the SDS operation manual for further details.**

- 4) Close the SDS tool and turn the ignition switch OFF.
- 5) Disconnect the SDS tool and install the seat. ☞ (Page 9D-10)

DTC (Diagnostic Trouble Code) Deleting

BENJ31J34514006

Use of Mode Select Switch

NOTE

- **The previous malfunction history code (Past DTC) still remains stored in the ABS HU. Therefore, erase the history code memorized in the ABS HU using SDS tool. ☞ (Page 4E-22)**
- **The DTC is memorized in the ABS HU also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS. ☞ (Page 4E-22)**

- 1) Connect the special tool to the mode select coupler. ☞ (Page 4E-18)
- 2) Switch the special tool to ON and turn the ignition switch ON.
- 3) While the DTCs are being output, set the special tool to OFF. The DTC deletion mode is started after the switch is set to OFF.



I718H1450050-01

- 4) In the DTC deletion mode, switch the special tool from OFF to ON three times within 12.5 seconds, each time leaving it at ON for more than 1 second.

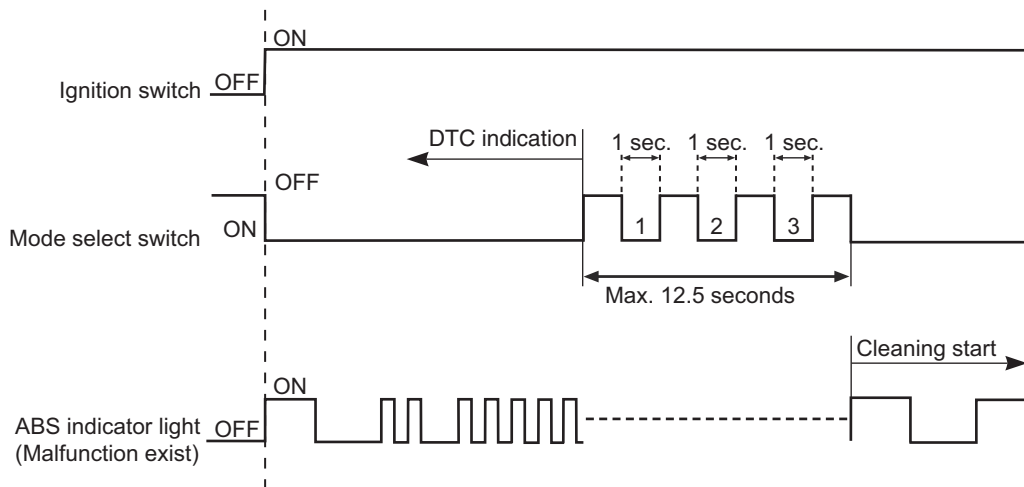
NOTE

After deleting DTC with the mode select switch in ON position, the system resumes the self-diagnosis mode again and outputs the DTC.



I718H1450051-01

DTC Deleting Diagram



I823H3450030-01

- 5) After deleting the DTCs, repeat the code output procedure and make sure that no DTCs remain (the ABS indicator light no longer flashes).

NOTE

If any DTCs remain, perform the appropriate procedures, then delete the codes. If DTCs are left stored, confusion may occur and unnecessary repairs may be made.

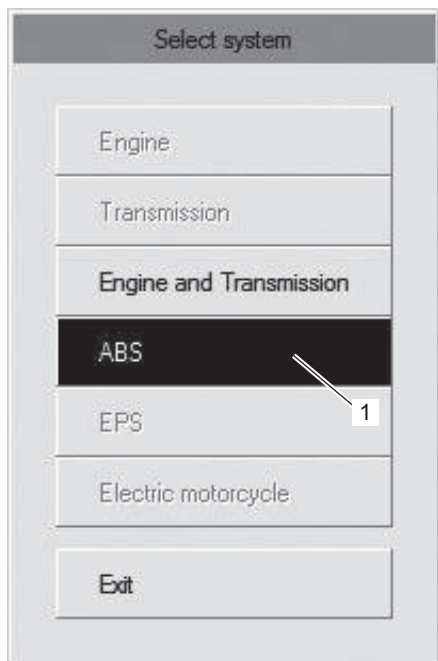
- 6) Turn the ignition switch OFF and disconnect the special tool.
 7) Install the removed parts.
 8) Afterwards, ride the motorcycle at more than 30 km/h (18.6 mile/h) and quickly apply the brakes to check that the ABS activates correctly.

Use of SDS

- 1) Remove the seat. (Page 9D-10)
- 2) Set up the SDS tool according to the SDS operation manual.

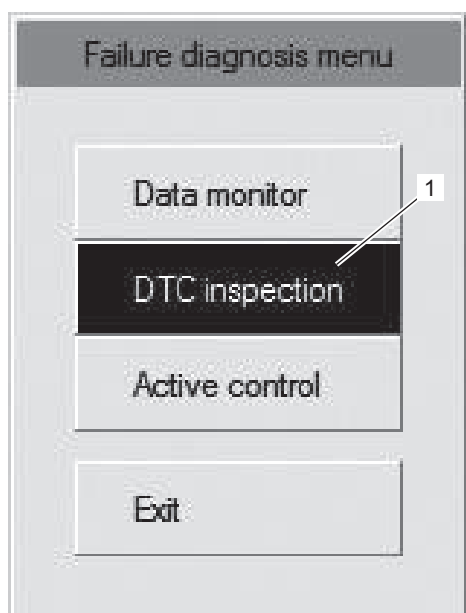
Special tool
09904-41010
99565-01010-034

- 3) After repairing the trouble, turn OFF the ignition switch.
- 4) Turn ON the ignition switch.
- 5) Click the ABS button (1).



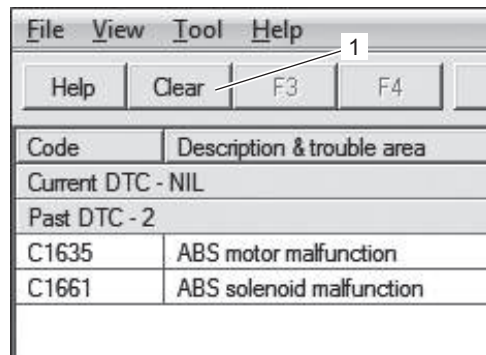
ID26J1450088-01

- 6) Click the "DTC inspection" button (1).



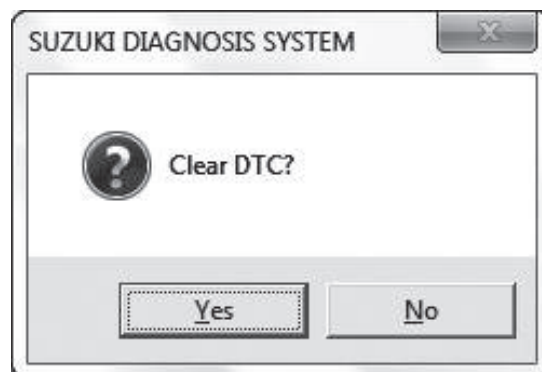
ID26J1450089-01

- 7) Check the DTC.
- 8) Click "Clear" (1) to delete history code (Past DTC).

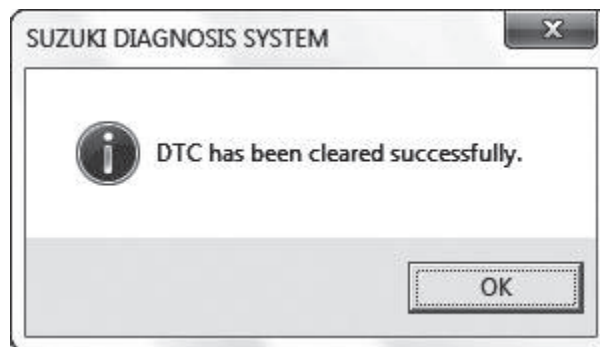


ID26J1450090-01

- 9) Follow the displayed instructions.

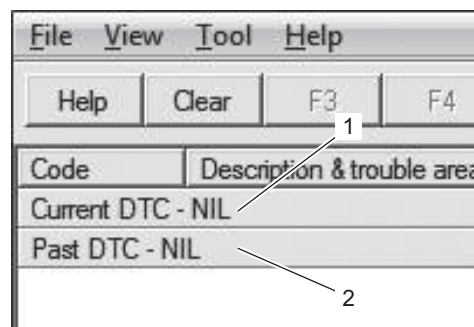


ID26J1450091-01



ID26J1450092-01

- 10) Check that both "Current DTC" (1) and "Past DTC" (2) are deleted (NIL).



ID26J1450093-01

- 11) Close the SDS tool and turn the ignition switch OFF.
- 12) Disconnect the SDS tool and install the seat. (Page 9D-10)

13) Ride the motorcycle at more than 30 km/h (18.6 mile/h) and quickly apply the brakes to check that the ABS activates correctly.

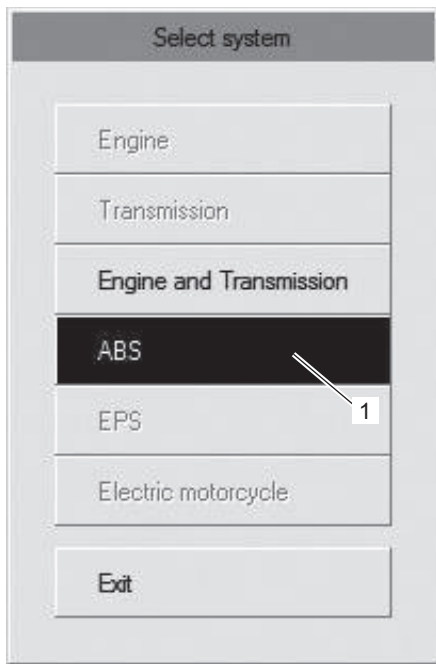
ABS Hydraulic Unit Operation Check

BENJ31J34514007

- 1) Remove the seat. (Page 9D-10)
- 2) Set up the SDS tool according to the SDS operation manual.

Special tool
09904-41010
99565-01010-034

3) Click “ABS” (1).



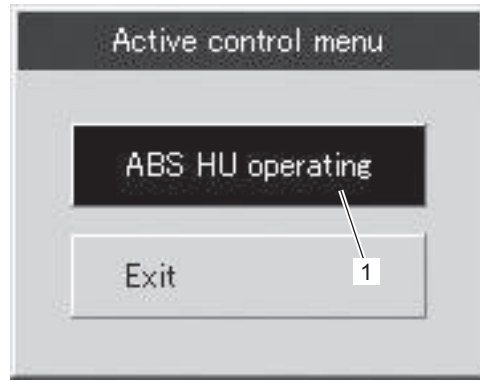
ID26J1450088-01

4) Click “Active control” (1).



ID26J1450095-01

5) Click “ABS HU operating” (1).

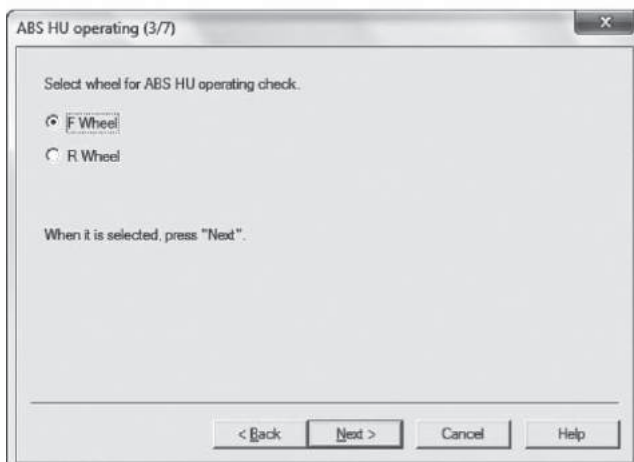
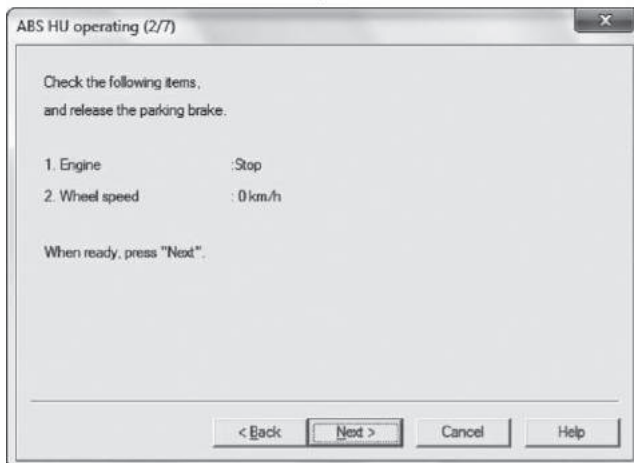
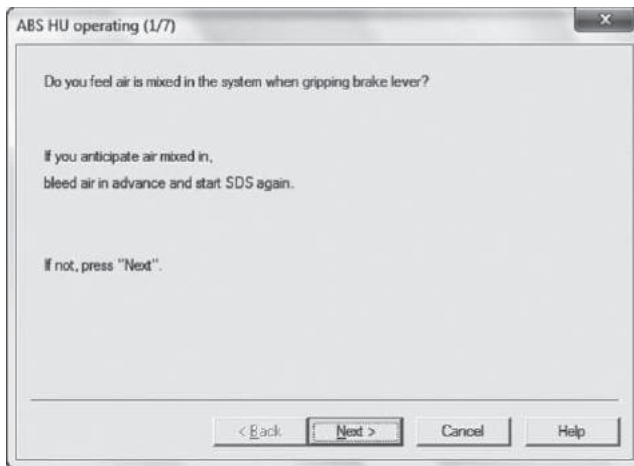


ID26J1450096-01

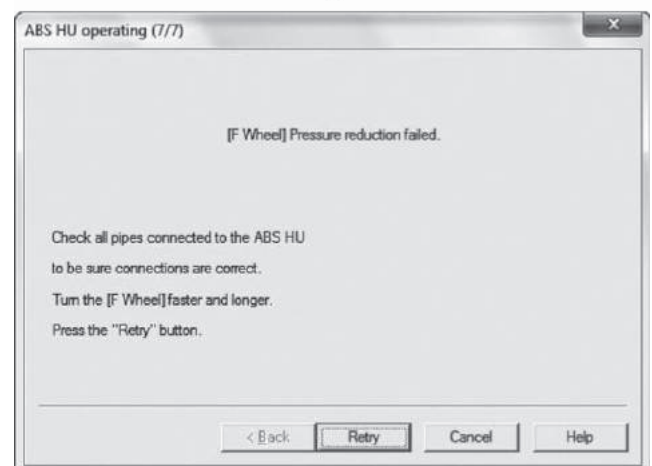
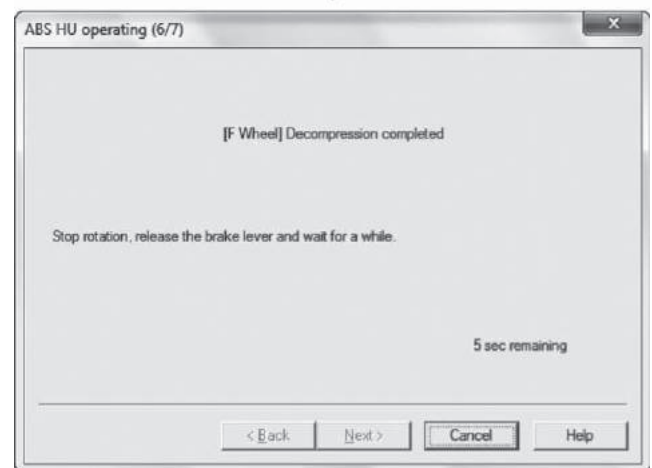
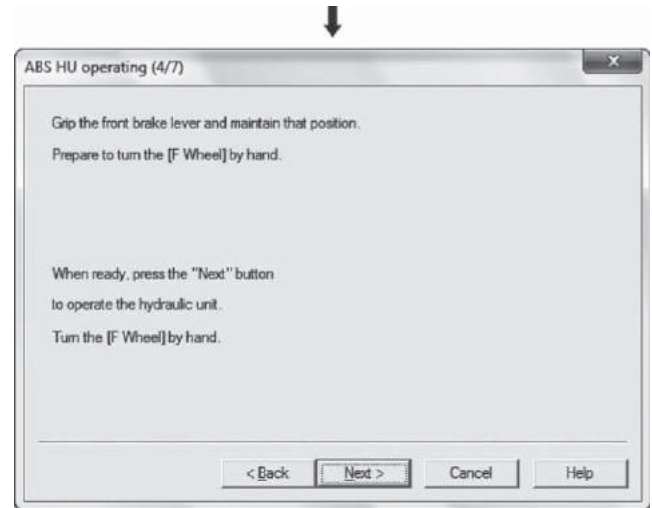
6) Click “Next” according to the screen indication.

NOTE

- Skip this screen as this vehicle is not equipped with parking brake.
- If the front wheel is selected, lift the front wheel off the ground using a jack.
- Two operators are needed in this work; One should apply a rotational force to the front wheel.
- In normal cases, the front brake lever feels a reaction force and the front wheel turns discontinuously. At the same time, the ABS HU operating sound will be heard.
- The ABS HU motor operates for 6 seconds and then stops automatically.
- Inspect the rear brake in the same manner of front brake.
- If the ABS does not function, the cause may lie in the ABS control unit/HU.
- In checking the rear brake at the time of pressure reduction drive (4/7), “brake lever” appears on the screen. This is because the present screen shares with other model having front brake only. Therefore, in the case of rear brake pedal equipped vehicle, ignore this instruction and operate the rear brake pedal.



IE31J1450081-02



IE31J1450083-02

- 7) Close the SDS tool and turn the ignition switch OFF.
- 8) Disconnect the SDS tool and install the seat.
☞ (Page 9D-10)

DTC Table

DTC	Malfunction cause	Indicator status	Reference
None	Normal	ON *1	—
C1625 (25)	Wheel speed sensor related malfunction	ON	☞ (Page 4E-26)
C1635 (35)	ABS motor malfunction	ON	☞ (Page 4E-27)
C1641 (41)	Wheel speed sensor signal malfunction (F) *2	ON	☞ (Page 4E-28)
C1642 (42)	Wheel speed sensor circuit open (F) *2	ON	☞ (Page 4E-29)
C1644 (44)	Wheel speed sensor signal malfunction (R) *2	ON	☞ (Page 4E-31)
C1645 (45)	Wheel speed sensor circuit open (R) *2	ON	☞ (Page 4E-32)
C1647 (47)	Supply voltage (Increased)	ON *3	☞ (Page 4E-34)
C1648 (48)	Supply voltage (Decreased)	ON *3	☞ (Page 4E-34)
C1655 (55)	ABS control unit malfunction	ON *4	☞ (Page 4E-35)
C1661 (61)	ABS solenoid malfunction	ON	☞ (Page 4E-36)

*1: It goes off after running at more than 5 km/h (3.1 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.

DTC C1625 (25)**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-19)

Are the tires OK?

- Yes Go to Step 2.
- No Use the specified tires.

Step 2

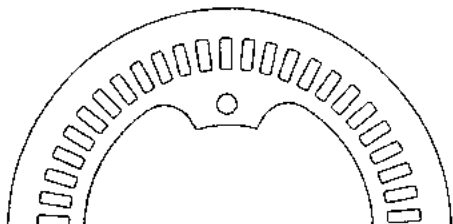
- 1) Make sure the tire pressure for each tire. ☞ (Page 2D-19)

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.



I718H1450064-01

Are the rotors OK?

- Yes Go to Step 4.
- No Clean or replace the rotor.
- Front wheel speed sensor rotor:
☞ (Page 4E-39)
 - Rear wheel speed sensor rotor:
☞ (Page 4E-40)

Step 4

- 1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge. ☞ (Page 4E-40)

Are the clearances OK?

- Yes Replace the ABS control unit/HU. ☞ (Page 4E-41)
- No Adjust the clearance.

DTC C1635 (35)

BENJ31J34514010

Possible Cause
<p>ABS Motor Malfunction Motor relay circuit open or short, broken fuse for motor relay, pump motor circuit open or short, faulty motor relay, faulty ABS motor, faulty ABS control unit, etc.</p>

Wiring Diagram

Refer to "ABS Control Unit / HU Diagram": L4 - L6 (Page 4E-8).

Troubleshooting

Step 1

- 1) Inspect if the pump motor makes turning noise by setting the ignition switch to ON from OFF when the vehicle stands still. (Page 4E-11)

Does the pump motor make any turning noise?

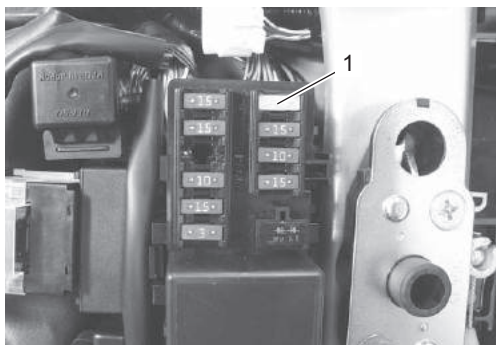
- Yes
- Faulty HU motor.
 - Replace the ABS control unit/HU. (Page 4E-41)
- No Go to Step 2.

Step 2

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-10)
- 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.



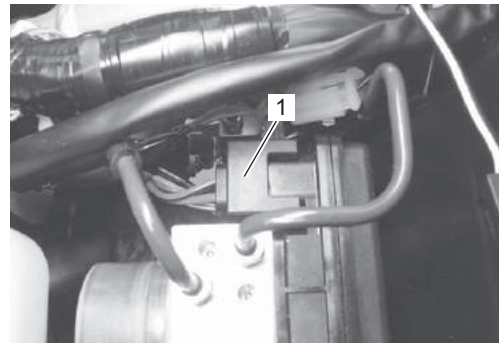
IE31J1450024-01

Is the ABS motor fuse OK?

- Yes Go to Step 3.
- No Replace the ABS motor fuse.

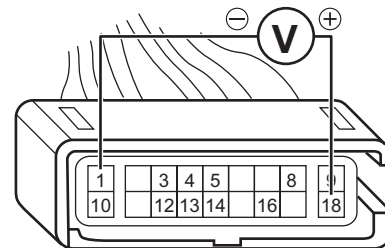
Step 3

- 1) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (Page 4E-38)



IE31J1450025-01

- 2) Measure the voltage between "T18" (R/B) and "T1" (B) at the coupler.



IE31J1450026-01

Is voltage 12.0 V or more?

- Yes Replace the ABS control unit/HU. (Page 4E-41)
- No Inspect the wire harness. (Faulty motor power supply or ground wire)

DTC C1641 (41)

BENJ31J34514011

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

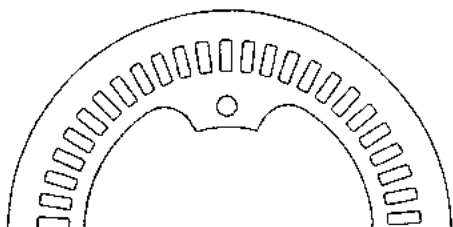
- 1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge. (Page 4E-40)

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.



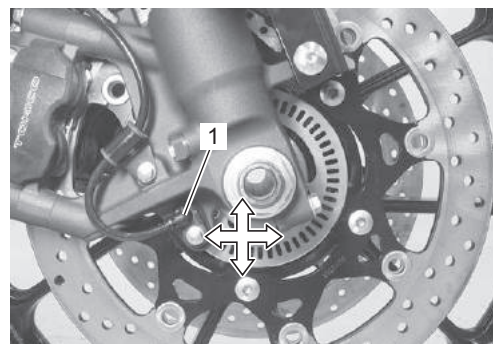
I718H1450064-01

Is the sensor rotor OK?

- Yes Go to Step 3.
No Clean or replace the sensor rotor. (Page 4E-39)

Step 3

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



IE31J1450027-01

Is the sensor mounted securely?

- Yes Go to DTC C1642 (42). (Page 4E-29)
No Tighten the mounting bolt.

DTC C1642 (42)

BENJ31J34514012

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.

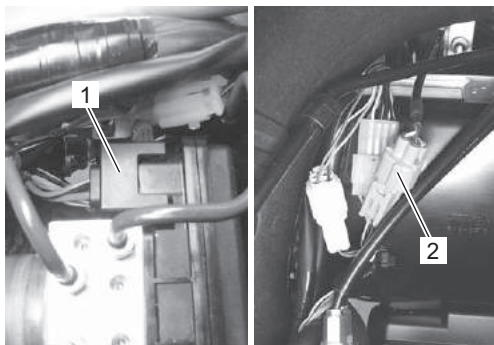
Wiring Diagram

Refer to “ABS Control Unit / HU Diagram”: L4 - L6 (Page 4E-8).

Troubleshooting

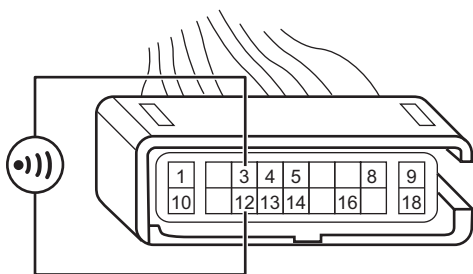
Step 1

- 1) Turn ignition switch OFF.
- 2) Remove the air cleaner box. ☞ (Page 1D-4)
- 3) Remove the seat heat shield. Refer to “ABS Control Unit Coupler Disconnect and Connect”: L4 - L6 (Page 4E-38).
- 4) 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.



IE31J1450028-01

- 5) Check for continuity between “T3” (W/R) and “T12” (B/R) at the ABS control unit coupler.



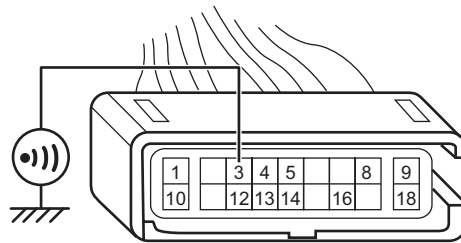
IE31J1450029-01

Is no continuity indicated?

- Yes Go to Step 2.
- No
- Inspect the wire harness. (Faulty sensor wire)
 - Faulty front wheel speed sensor. ☞ (Page 4E-38)

Step 2

- 1) Check for continuity between “T3” (W/R) and ground at the ABS control unit coupler.



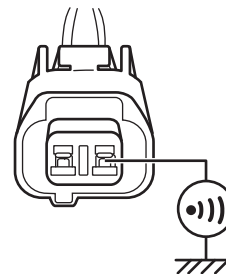
IE31J1450030-01

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 White wire and ground at the front wheel speed sensor coupler.



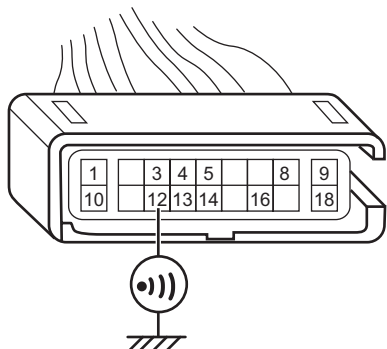
IE31J1450031-01

Is no continuity indicated?

- Yes Inspect the wire harness. (Faulty W/R wire)
- No Faulty front wheel speed sensor. ☞ (Page 4E-38)

Step 4

- 1) Check for continuity between "T12" (B/R) and ground at the ABS control unit coupler.



IE31J1450032-01

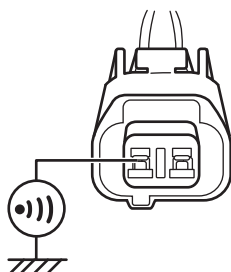
Is no continuity indicated?

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 Black wire and ground at the front wheel speed sensor coupler.



IE31J1450033-01

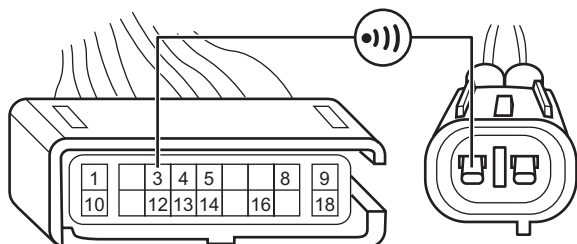
Is no continuity indicated?

Yes Inspect the wire harness. (Faulty B/R wire)

No Faulty front wheel speed sensor. (Page 4E-38)

Step 6

- 1) Disconnect the front wheel speed sensor coupler.
- 2) Check for continuity between "T3" (W/R) on the ABS control unit coupler and W/R wire on the front wheel speed sensor coupler.



IE31J1450034-01

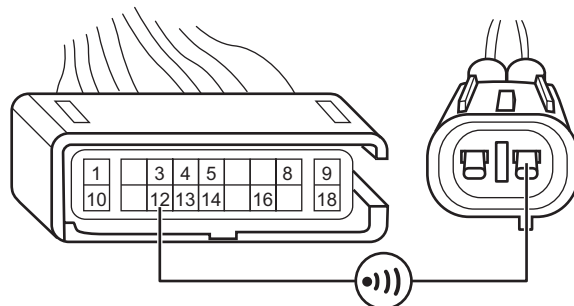
Is continuity indicated?

Yes Go to Step 7.

No Inspect the wire harness. (Faulty W/R wire)

Step 7

- 1) Check for continuity between "T12" (B/R) on the ABS control unit coupler and B/R wire on the front wheel speed sensor coupler.



IE31J1450035-01

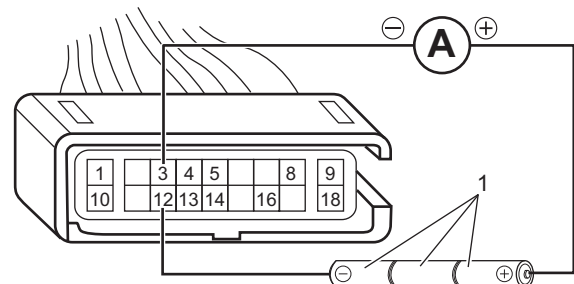
Is continuity indicated?

Yes Go to Step 8.

No Inspect the wire harness. (Faulty B/R wire)

Step 8

- 1) Connect the front wheel speed sensor coupler.
- 2) Connect three 1.5 V dry cells (1) in series as shown and make sure that their total voltage is more than 4.5 V. Measure the current between (+) dry cell terminal and "T3" (W/R) on the ABS control unit coupler.



IE31J1450036-01

Is current 5.9 – 16.8 mA?

Yes Replace the ABS control unit/HU. (Page 4E-41)

No Faulty front wheel speed sensor. (Page 4E-38)

DTC C1644 (44)

BENJ31J34514013

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-40)

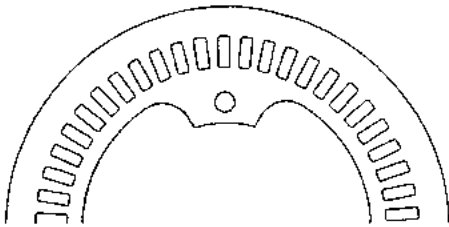
Is the clearance OK?

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.



I718H1450064-01

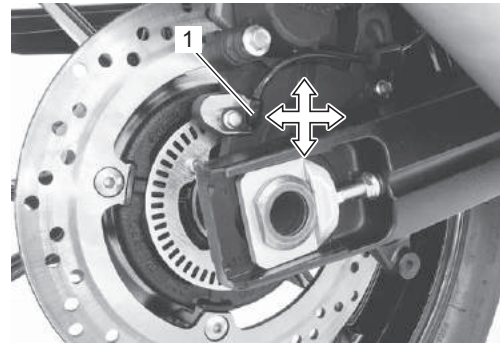
Is the sensor rotor OK?

Yes Go to Step 3.

No Clean or replace the sensor rotor. (Page 4E-40)

Step 3

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



IE31J1450037-01

Is the sensor mounted securely?

Yes Go to DTC C1645 (45). (Page 4E-32)

No Tighten the mounting bolt.



DTC C1645 (45)**Possible Cause****Wheel Speed Sensor Circuit Open (R)**

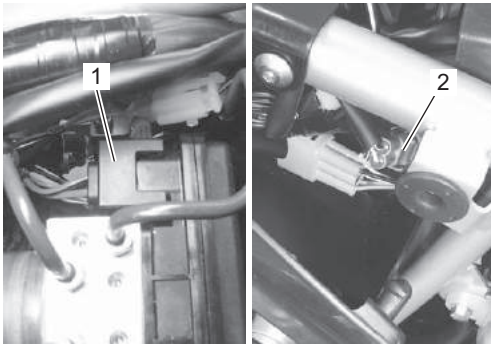
Wheel speed sensor circuit open or short, loosen contact in wheel speed sensor connector, input amplifier in ABS control unit failure, etc.

Wiring Diagram

Refer to "ABS Control Unit / HU Diagram": L4 - L6 (Page 4E-8).

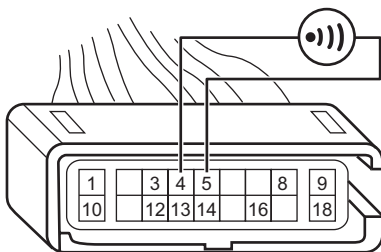
Troubleshooting**Step 1**

- 1) Turn ignition switch OFF.
- 2) Check the ABS control unit coupler (1) and rear wheel speed sensor coupler (2) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler.
 - Rear wheel speed sensor coupler:  (Page 4E-38)
 - ABS control unit coupler:  (Page 4E-38)




IE31J1450038-02

- 3) Check for continuity between "T4" (W/Y) and "T5" (B/Y) at the ABS control unit coupler.



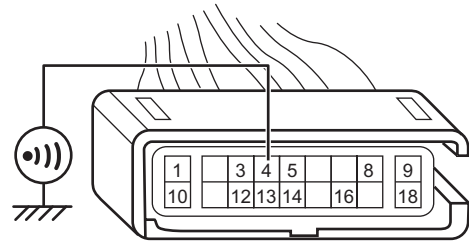
IE31J1450039-01

Is no continuity indicated?

- Yes Go to Step 2.
- No
- Inspect the wire harness. (Faulty sensor wire)
 - Faulty rear wheel speed sensor.  (Page 4E-38)

Step 2

- 1) Check for continuity between "T4" (W/Y) and ground at the ABS control unit coupler.



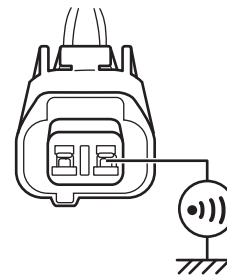
IE31J1450040-01

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 White wire and ground at the rear wheel speed sensor coupler.



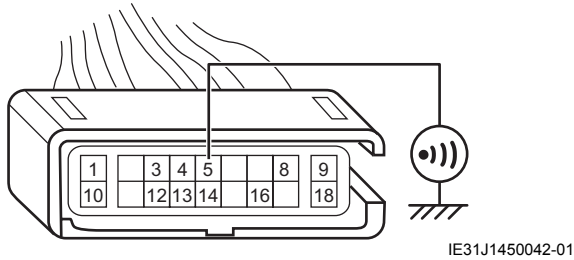
IE31J1450041-01

Is no continuity indicated?

- Yes Inspect the wire harness. (Faulty W/Y wire)
- No Replace the rear wheel speed sensor.  (Page 4E-38)

Step 4

- 1) Check for continuity between "T5" (B/Y) and ground at the ABS control unit coupler.

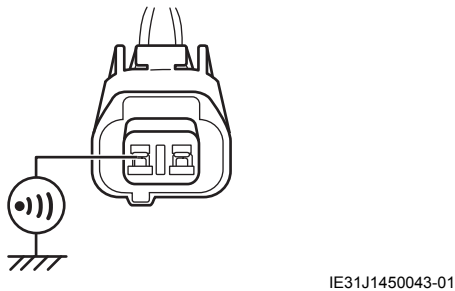


Is no continuity indicated?

- 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 Black wire and ground at the rear wheel speed sensor coupler.

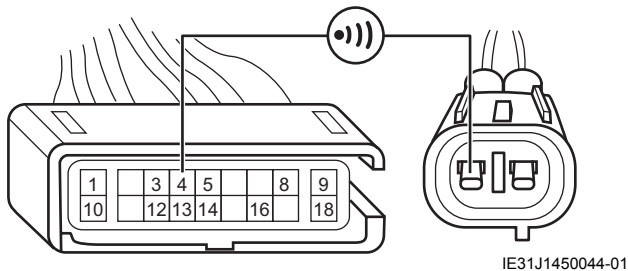


Is no continuity indicated?

- Yes Inspect the wire harness. (Faulty B/Y wire)
- No Replace the rear wheel speed sensor. (Page 4E-38)

Step 6

- 1) Disconnect the rear wheel speed sensor coupler.
- 2) Check for continuity between "T4" (W/Y) on the ABS control unit coupler and W/Y wire on the rear wheel speed sensor coupler.

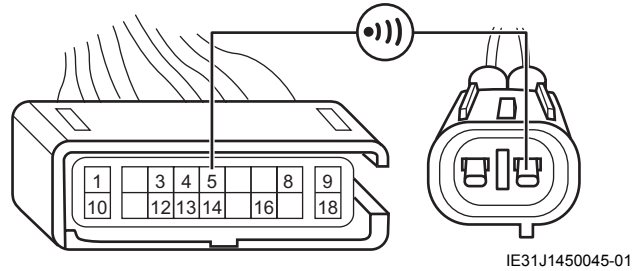


Is continuity indicated?

- Yes Go to Step 7.
- No Inspect the wire harness. (Faulty W/Y wire)

Step 7

- 1) Check for continuity between "T5" (B/Y) on the ABS control unit coupler and B/Y wire on the rear wheel speed sensor coupler.

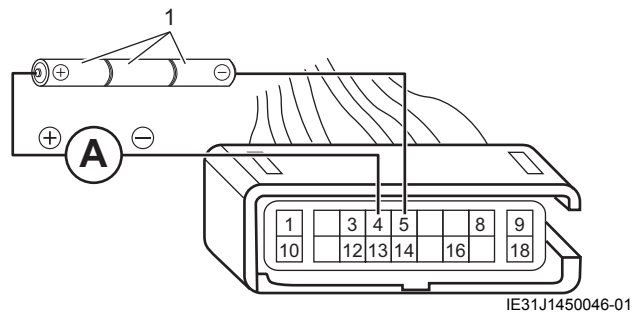


Is continuity indicated?

- Yes Go to Step 8.
- No Inspect the wire harness. (Faulty B/Y wire)

Step 8

- 1) Connect the rear wheel speed sensor coupler.
- 2) Connect three 1.5 V dry cells (1) in series as shown and make sure that their total voltage is more than 4.5 V. Measure the current between (+) dry cell terminal and "T4" (W/Y) on the ABS control unit coupler.



Is current 5.9 – 16.8 mA?

- Yes Replace the ABS control unit/HU. (Page 4E-41)
- No Replace the rear wheel speed sensor. (Page 4E-38)

DTC C1647 (47) / C1648 (48)**Possible Cause**

C1647 (47): Supply Voltage (Increased)
C1648 (48): Supply Voltage (Decreased)

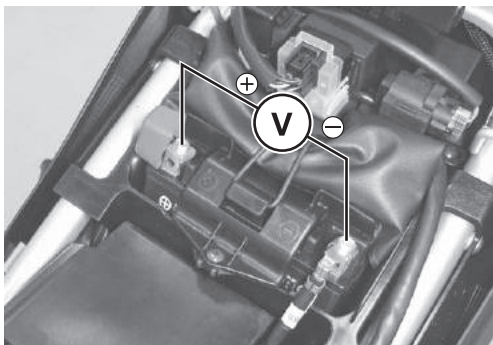
- Faulty generator or regulator/rectifier
- Faulty battery
- Faulty ABS control unit
- Faulty wire harness, etc.

Wiring Diagram

Refer to "ABS Control Unit / HU Diagram": L4 - L6 (Page 4E-8).

Troubleshooting**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-10)
- 3) Measure the voltage between the (+) and (-) battery terminals.



IE31J1450047-02

Is voltage 12 V or more?

- Yes Go to Step 2.
- No Charge or replace the battery. (Page 1J-12)

Step 2

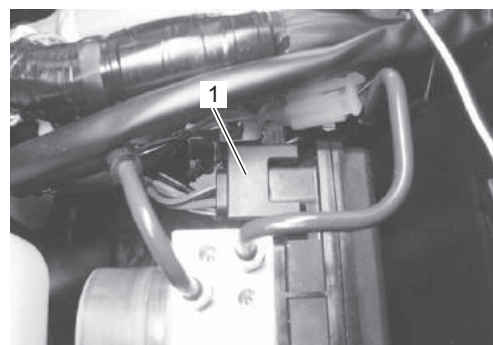
- 1) Start the engine at 5000 r/min with the dimmer switch set to HI.
- 2) Measure the voltage between the (+) and (-) battery terminals.

Is voltage 14.0 – 15.5 V?

- Yes Go to Step 3.
- No Inspect the generator and regulator/rectifier.
- Generator: (Page 1J-4)
 - Regulator/rectifier: (Page 1J-7)

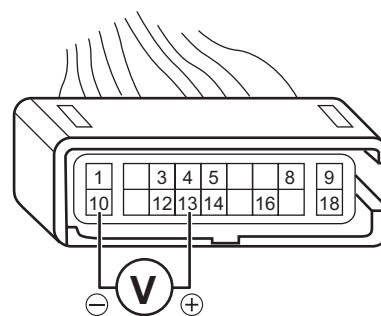
Step 3

- 1) Turn the ignition switch OFF.
- 2) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (Page 4E-38)



IE31J1450048-01

- 3) Start the engine at 5000 r/min with the dimmer switch set to HI.
- 4) Measure the voltage between "T13" (O/Y) and "T10" (B/W) at the coupler.



IE31J1450049-01

Is voltage 14.0 – 15.5 V?

- Yes Replace the ABS control unit/HU. (Page 4E-41)
- No Inspect the wire harness. (Faulty ignition or ground wire)

DTC C1655 (55)

BENJ31J34514016

Possible Cause
ABS Control Unit Malfunction Faulty ABS control unit

Troubleshooting

Step 1

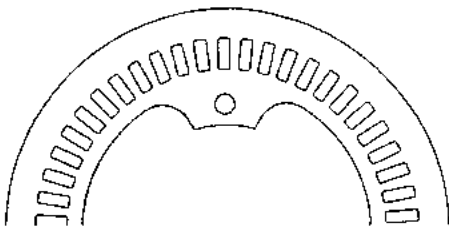
- 1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge. (Page 4E-40)

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.



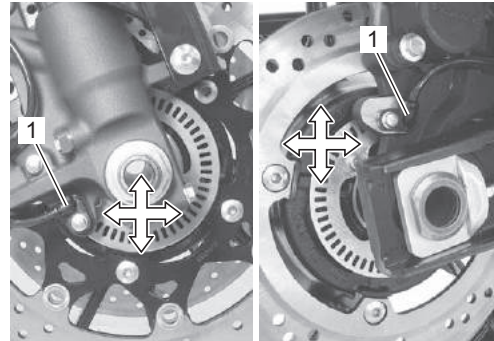
I718H1450064-01

Are the rotors OK?

- Yes Go to Step 3.
- No Clean or replace the rotor.
 - Front wheel speed sensor rotor: (Page 4E-39)
 - Rear wheel speed sensor rotor: (Page 4E-40)

Step 3

- 1) Check that the front and rear wheel speed sensors (1) are mounted securely.



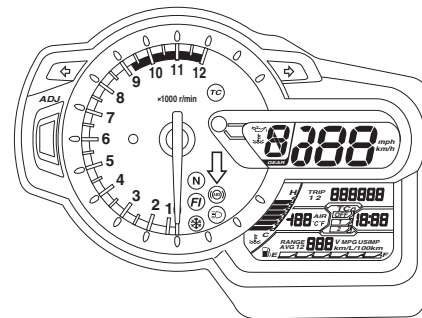
IE31J1450050-01

Are the sensors mounted securely?

- Yes Go to Step 4.
- No Tighten the mounting bolts.

Step 4

- 1) Delete DTCs (Page 4E-20) and repeat the code output procedure. (Page 4E-18)



IE31J1450079-01

Is the DTC C1655 (55) output again?

- Yes Replace the ABS control unit/HU. (Page 4E-41)
- No Intermittent trouble.

DTC C1661 (61)

BENJ31J34514017

Possible Cause

ABS Solenoid Malfunction

Valve relay circuit open or short, broken fuse for valve relay, faulty valve relay, interruption of valve, failure output from ABS control unit, etc.

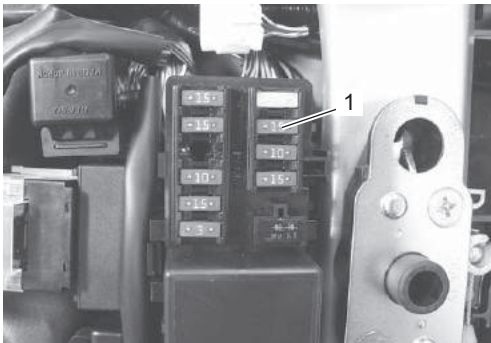
Troubleshooting

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-10)
- 3) Open the fuse box and inspect the ABS valve fuse (15 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



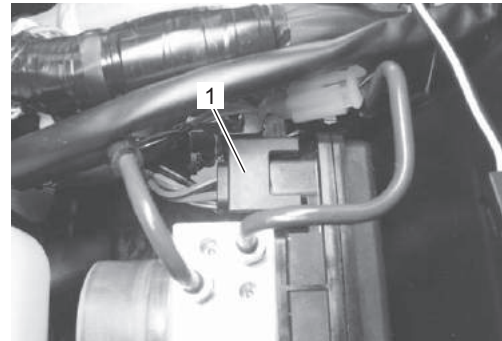
IE31J1450051-01

Is the ABS valve fuse OK?

- Yes Go to Step 2.
- No Replace the ABS valve fuse.

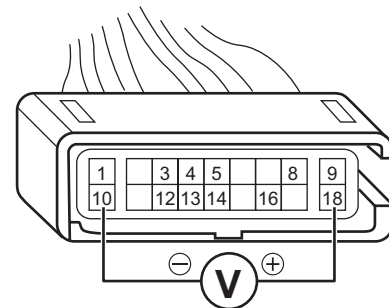
Step 2

- 1) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (Page 4E-38)



IE31J1450052-01

- 2) Measure the voltage between "T18" (R/B) and "T10" (B/W) at the coupler.



IE31J1450053-01

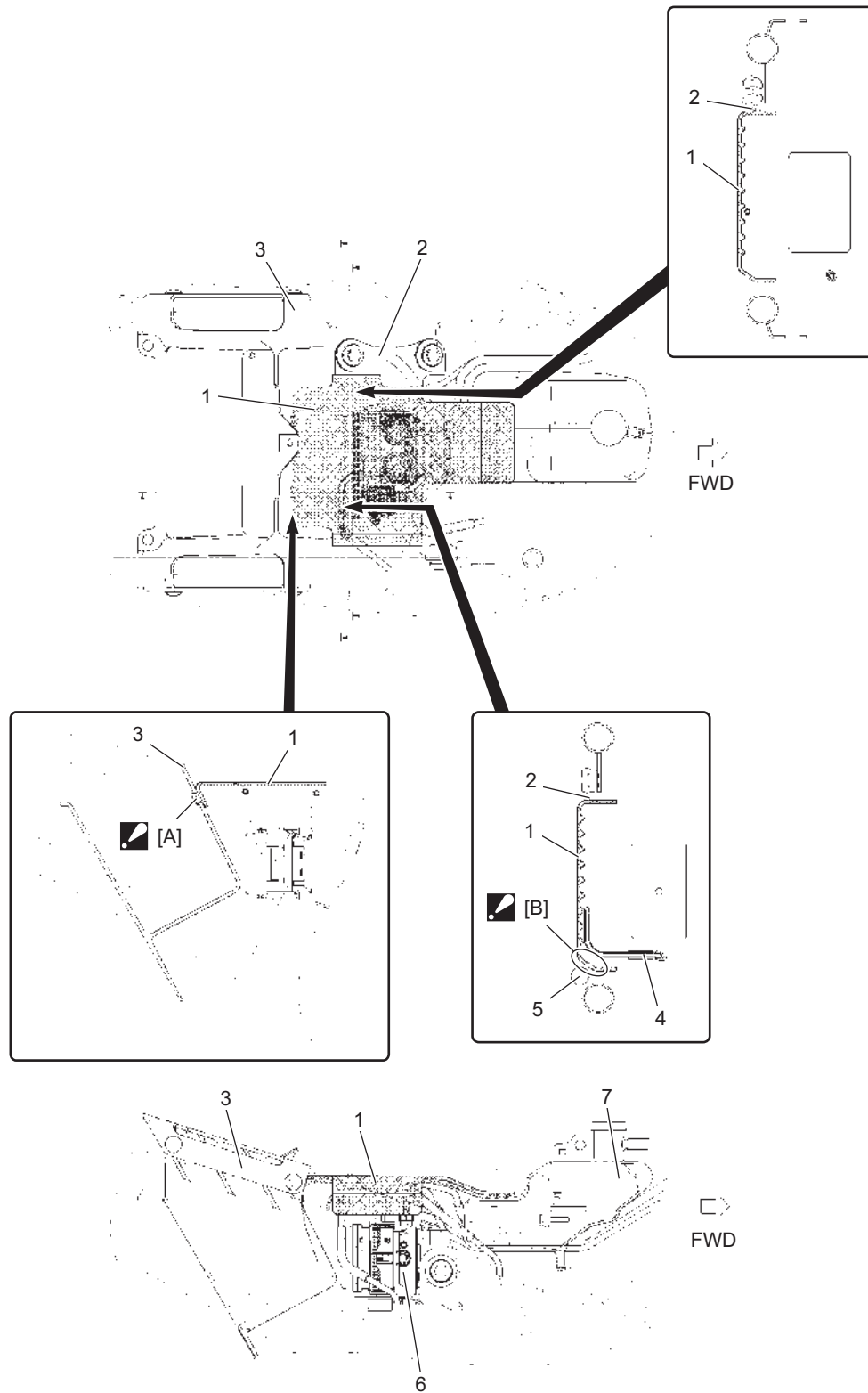
Is voltage 12.0 V or more?

- Yes Replace the ABS control unit/HU. (Page 4E-41)
- No Inspect the wire harness. (Faulty solenoid or ground wire)

Repair Instructions

Seat Heat Shield Construction

BENJ31J34516001



IE31J1450054-02

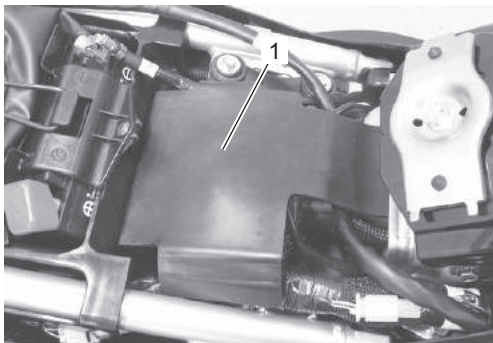
[A]: Fix the boss of the seat heat shield to the battery holder firmly.	2. Holder	5. Wiring harness
[B]: Pass the seat heat shield between the rear brake hose and wiring harness.	3. Battery holder	6. ABS control unit/HU
1. Seat heat shield	4. Rear brake hose	7. Reservoir tank

ABS Control Unit Coupler Disconnect and Connect

BENJ31J34516002

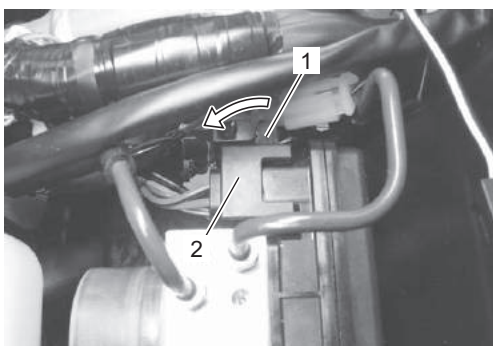
Disconnect

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. [☞](#)(Page 9D-10)
- 3) Remove the seat heat shield (1).



IE31J1450055-01

- 4) Pull up the lock lever (1) and disconnect the ABS control unit coupler (2).



IE31J1450056-01

Connect

- 1) Connect the ABS control unit coupler.
- 2) Install the seat heat shield. Refer to "Seat Heat Shield Construction": L4 - L6 (Page 4E-37).
- 3) Install the seat. [☞](#)(Page 9D-10)

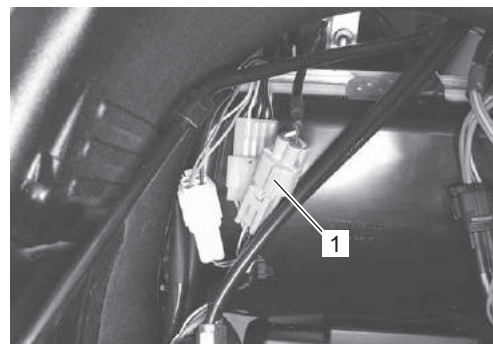
Front Wheel Speed Sensor Removal and Installation

BENJ31J34516003

Removal

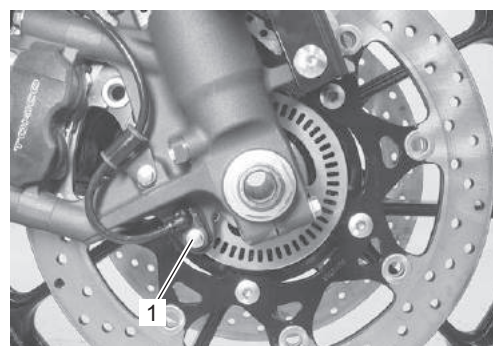
- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. [☞](#)(Page 1D-4)

- 3) Disconnect the front wheel speed sensor lead wire coupler (1).



IE31J1450057-01

- 4) Remove the front wheel speed sensor mounting bolt (1).



IE31J1450058-01

- 5) Remove the front wheel speed sensor as shown in the front wheel speed sensor routing diagram. [☞](#)(Page 4E-9)

Installation

Install the front wheel speed sensor in the reverse order of removal. Pay attention to the following points:

- Install the front wheel speed sensor as shown in the front wheel speed sensor routing diagram. [☞](#)(Page 4E-9)
- Check the clearance between the front wheel speed sensor and sensor rotor. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection": L4 - L6 (Page 4E-40).

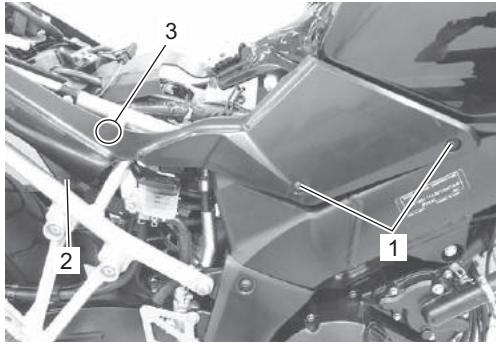
Rear Wheel Speed Sensor Removal and Installation

BENJ31J34516004

Removal

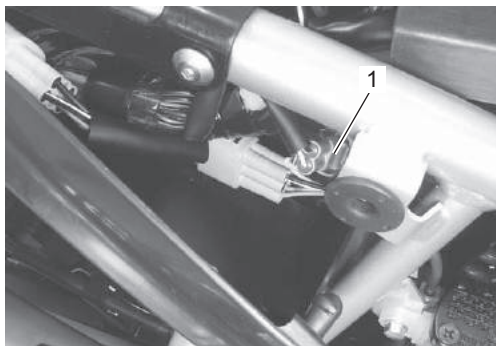
- 1) Turn the ignition switch OFF.
- 2) Remove the seat. [☞](#)(Page 9D-10)

- Remove the screws (1) and disconnect the clip (2) and hook (3).



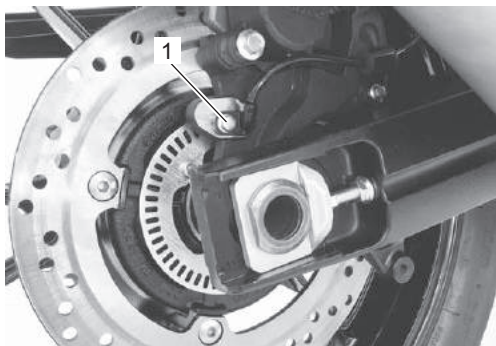
IE31J1450059-02

- Disconnect the rear wheel speed sensor lead wire coupler (1).



IE31J1450060-01

- Remove the rear wheel speed sensor mounting bolt (1).



IE31J1450061-01

- Remove the rear wheel speed sensor as shown in the rear wheel speed sensor routing diagram. (Page 4E-10)

Installation

Install the rear wheel speed sensor in the reverse order of removal. Pay attention to the following points:

- Install the rear wheel speed sensor as shown in the rear wheel speed sensor routing diagram. (Page 4E-10)
- Check the clearance between the rear wheel speed sensor and sensor rotor. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection": L4 - L6 (Page 4E-40).

Front Wheel Speed Sensor Rotor Removal and Installation

BENJ31J34516005

Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-5).

NOTICE

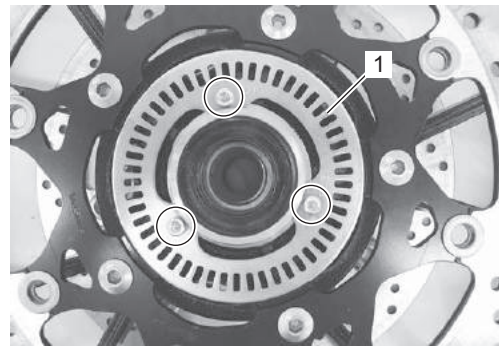
Do not hit the front wheel speed sensor rotor when dismantling the front wheel.

Removal

- Remove the front wheel speed sensor rotor (1) by removing the bolts.

NOTICE

When replacing the tire, make sure not to damage the sensor rotor.



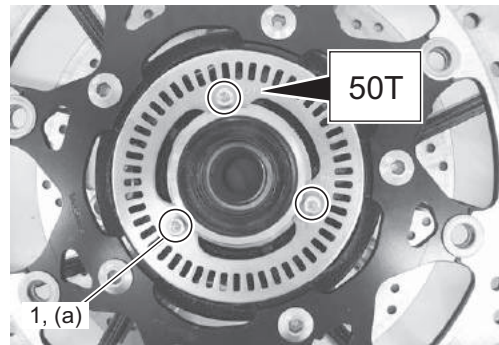
IE31J1450062-01

Installation

- Install the wheel speed sensor rotor as the letters "50T" face outside.
- 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 (0.65 kgf-m, 5.0 lbf-ft)



IE31J1450063-01

- Check the clearance between the front wheel speed sensor and sensor rotor. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection": L4 - L6 (Page 4E-40).

Rear Wheel Speed Sensor Rotor Removal and Installation

BENJ31J34516006

Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-12).

NOTICE

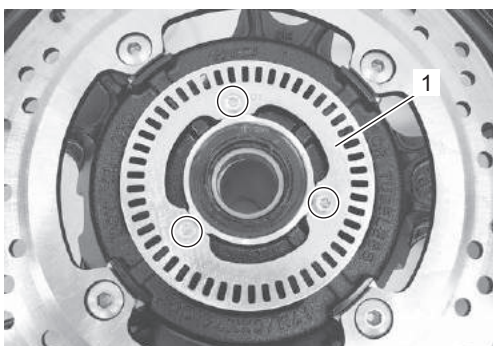
Do not hit the rear wheel speed sensor rotor when dismantling the rear wheel.

Removal

- 1) Remove the rear wheel speed sensor rotor (1) by removing the bolts.

NOTICE

When replacing the tire, make sure not to damage the sensor rotor.



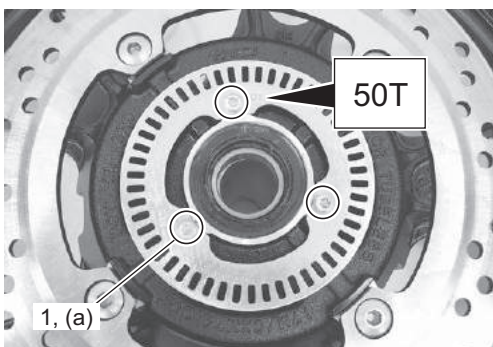
IE31J1450064-01

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 (0.65 kgf-m, 5.0 lbf-ft)



IE31J1450065-01

- 3) Check the clearance between the rear wheel speed sensor and sensor rotor. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection": L4 - L6 (Page 4E-40).

Wheel Speed Sensor and Sensor Rotor Inspection

BENJ31J34516007

Wheel Speed Sensor – Sensor Rotor Clearance

Check the clearance between the wheel speed sensor (1) and sensor rotor (2) using the thickness gauge.

Special tool

(A): 09900-20803

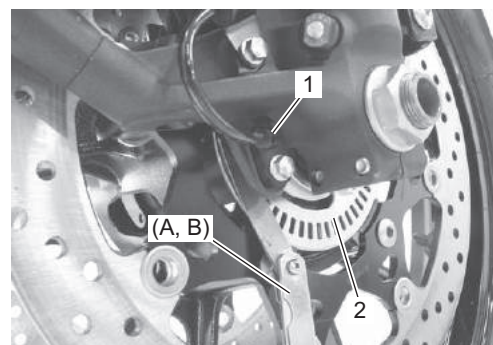
(B): 09900-20806

Front wheel speed sensor – Sensor rotor clearance

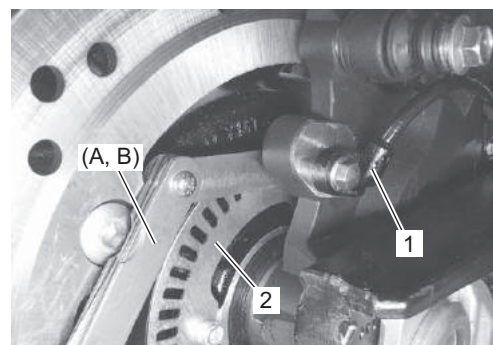
0.46 – 1.67 mm (0.018 – 0.066 in)

Rear wheel speed sensor – Sensor rotor clearance

0.51 – 1.62 mm (0.020 – 0.064 in)



IE31J1450066-01





IE31J1450067-01

Wheel Speed Sensor



- 1) Remove the wheel speed sensor.
 - Front wheel speed sensor: (Page 4E-38)
 - Rear wheel speed sensor: (Page 4E-38)
- 2) Inspect the wheel speed sensor for damage. Clean the sensor if any metal particle or foreign material stuck on it.

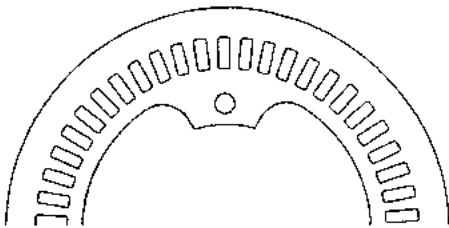


IE31J1450068-01

- 3) After finishing the speed sensor inspection, install the wheel speed sensor.
 - Front wheel speed sensor:  (Page 4E-38)
 - Rear wheel speed sensor:  (Page 4E-38)

Wheel Speed Sensor Rotor

- 1) Raise the wheel off the ground and support the motorcycle with a jack or wooden block.
- 2) Check that no wheel speed sensor rotor teeth are broken and that no foreign objects are caught in the wheel speed sensor. If any defects are found, replace the wheel speed sensor rotor with a new one.
 - Front:  (Page 4E-39)
 - Rear:  (Page 4E-40)



I718H1450064-01

ABS Control Unit / HU Removal and Installation

BENJ31J34516008


Removal


⚠ WARNING

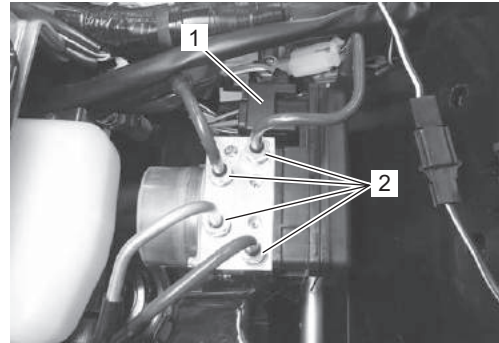
When storing the brake fluid, seal the container completely and keep away from children.

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.

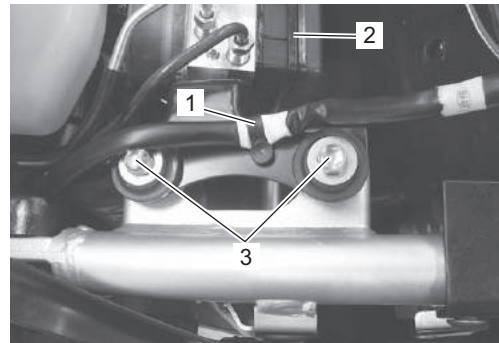
- 1) Turn the ignition switch OFF.
- 2) Drain the brake fluid.  (Page 4A-14)

- 3) Disconnect the ABS control unit coupler (1).  (Page 4E-38)
- 4) Loosen the flare nuts (2) and disconnect the brake pipes.

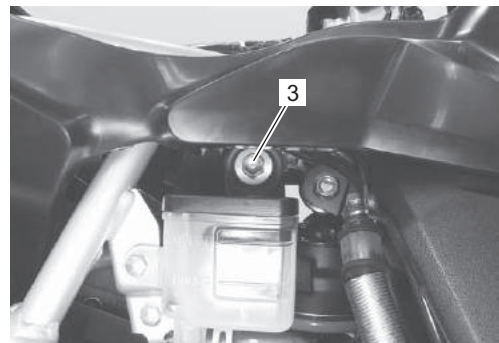


IE31J1450069-01

- 5) Remove the clamp (1).
- 6) Remove the ABS control unit/HU assembly (2) by removing the holder mounting bolts (3).

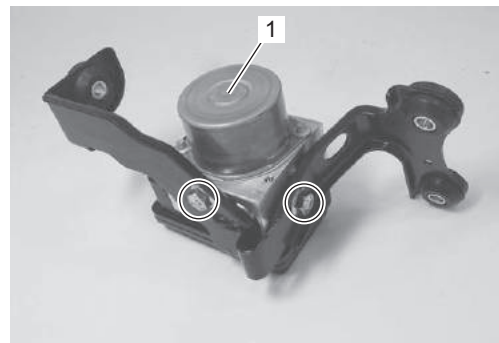


IE31J1450070-01



IE31J1450071-01

- 7) Remove the ABS control unit/HU (1) from the holder.



IE31J1450072-01

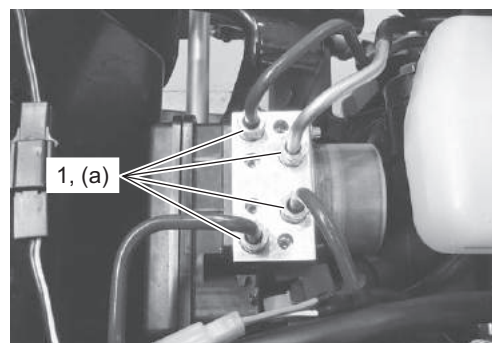
Installation

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

- Route the brake hoses correctly.
 - Front brake hose: ☞ (Page 4A-2)
 - Rear brake hose: ☞ (Page 4A-6)
- 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, 11.5 lbf-ft)



IE31J1450073-01

- Bleed air from the brake fluid circuit. ☞ (Page 4A-12)

Specifications

Tightening Torque Specifications

BENJ31J34517001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Wheel speed sensor rotor bolt	6.5	0.65	5.0	☞ (Page 4E-39) / ☞ (Page 4E-40)
Brake pipe flare nut	16	1.6	11.5	☞ (Page 4E-42)

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

BENJ31J34518001

09900-20803 Thickness gauge ☞ (Page 4E-40)		09900-20806 Thickness gauge ☞ (Page 4E-40)	
09904-41010 SUZUKI Diagnostic system set ☞ (Page 4E-20) / ☞ (Page 4E-22) / ☞ (Page 4E-23)		09930-82760 Mode selection switch ☞ (Page 4E-5) / ☞ (Page 4E-17) / ☞ (Page 4E-18)	
99565-01010-034 CD-ROM Ver.34 ☞ (Page 4E-20) / ☞ (Page 4E-22) / ☞ (Page 4E-23)			

L8 -

Precautions

Precautions for ABS Service

BENJ31J34520001

Refer to "Precautions for ABS Service": L4 - L6 (Page 4E-1).

Precautions for Diagnosing Troubles

BENJ31J34520002

Refer to "Precautions for Diagnosing Troubles": L4 - L6 (Page 4E-1).

Precautions for ABS

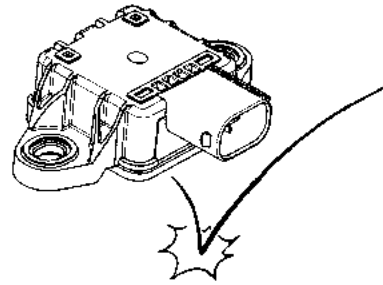
BENJ31J34520003

Refer to "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2) and "Precautions for ABS Service": L4 - L6 (Page 4E-1).

Precautions for IMU

BENJ31J34520004

- Pay attention not to expose the IMU to strong shocks, such as striking or dropping it.
- When IMU is removed / installed, do not use an impact wrench, as shock it generates may damage the IMU.
- In the case that IMU is dropped, do not use it after that.



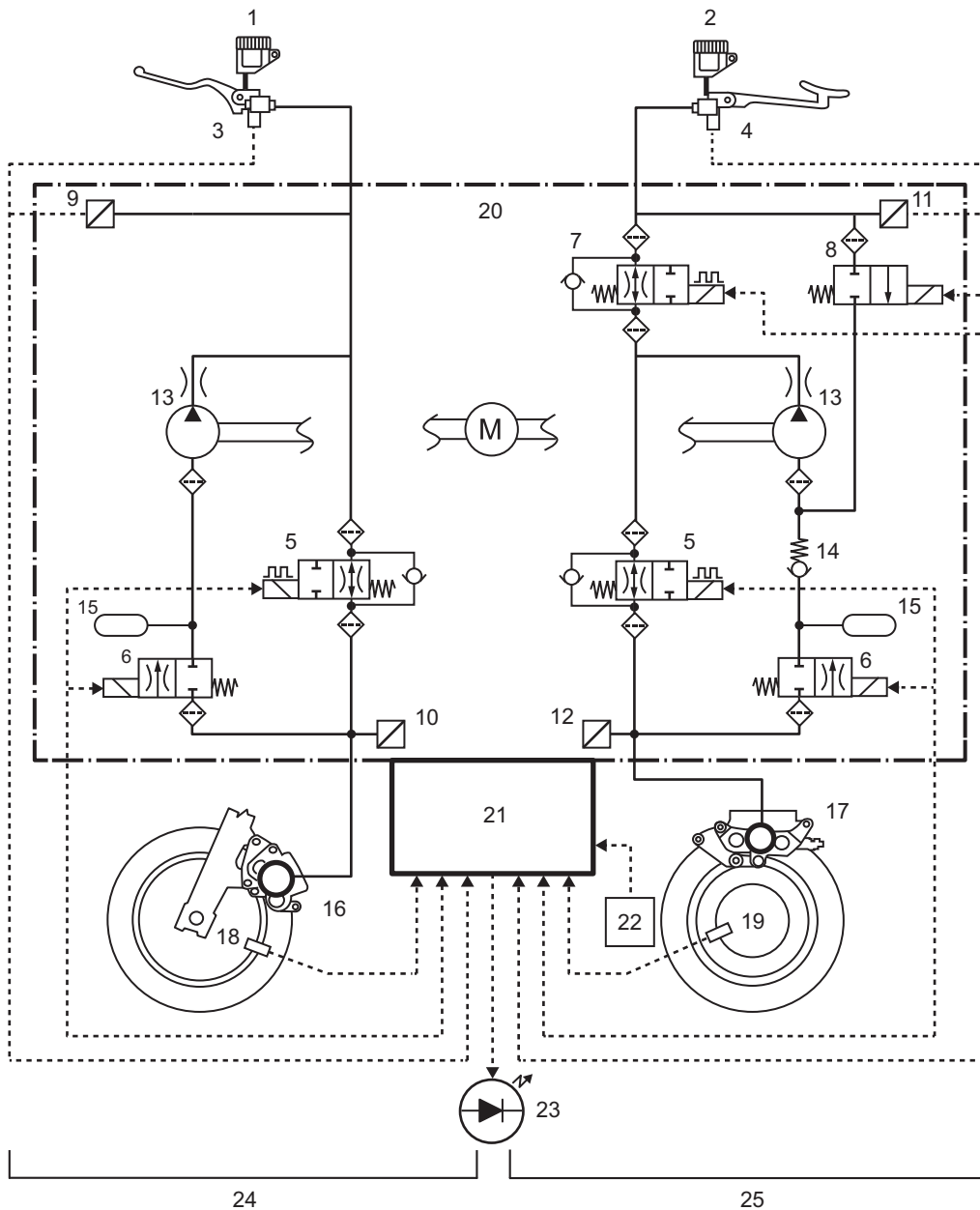
IJ31J1452001-01

General Description

ABS Description

BENJ31J34521001

Added an IMU to the ABS measurement system. The ABS control unit/HU controls brake pressure for the vehicle based on information from the wheel speed sensor, master cylinder pressure sensor, and caliper pressure sensors, and from the IMU. This allows conventional ABS control as well as Combined Brake Control, and Cornering Brake Control appropriate to the bank angle.

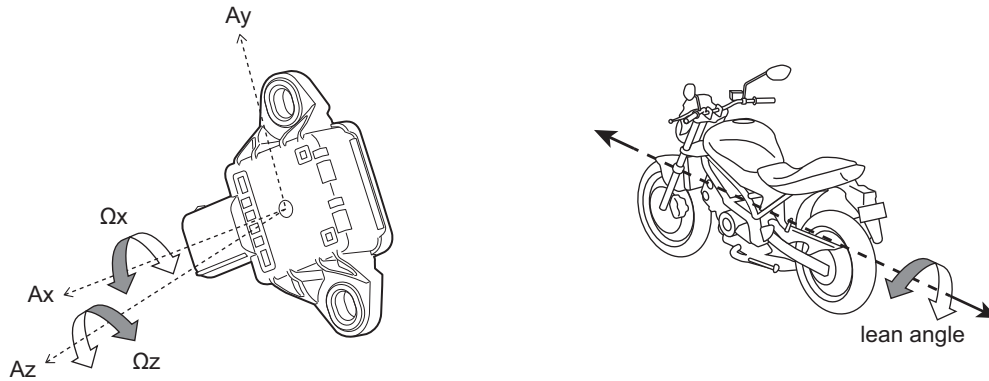


IJ31J1452002-04

1. Brake lever/master cylinder	10. Front brake caliper pressure sensor	19. Rear wheel speed sensor
2. Brake pedal/master cylinder	11. Rear brake master cylinder pressure sensor	20. HU
3. Front brake switch	12. Rear brake caliper pressure sensor	21. ABS control unit
4. Rear brake switch	13. Suction return flow pump	22. IMU
5. Inlet valve	14. Check valve	23. ABS indicator light
6. Outlet valve	15. Accumulator	24. Front system
7. Switching valve	16. Front brake caliper	25. Rear system
8. High pressure switch valve	17. Rear brake caliper	
9. Front brake master cylinder pressure sensor	18. Front wheel speed sensor	

IMU

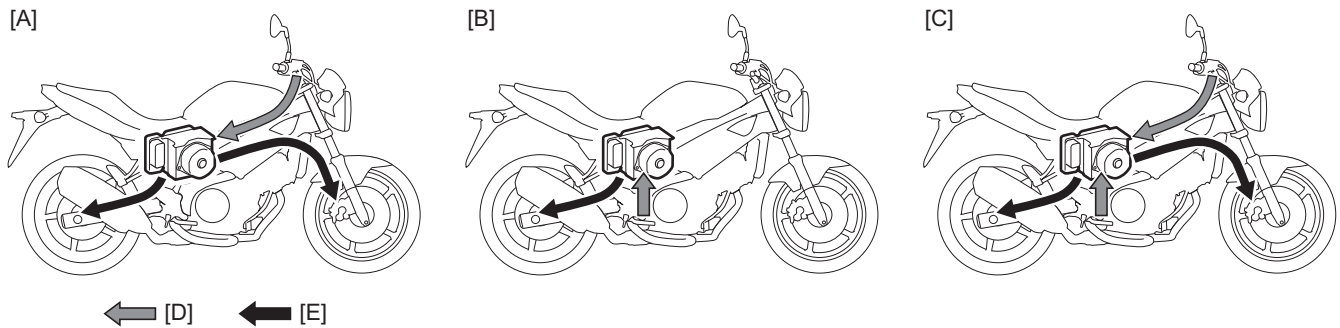
The IMU detects “Ax”, “Ay”, and “Az” acceleration, and “Ωx”, and “Ωz” angular velocity, and utilizes CAN communication to send it to the ABS control unit/HU. The ABS control unit/HU receives signals from the IMU, and calculates the lean angle of the vehicle. The ABS system uses the lean angle value for braking control, and performs Combined Brake Control, and Cornering Brake Control appropriate to the bank angle.



IJ31J1452003-02

Combined Brake Control

Combined Brake Control is linked control of the brakes on the front and rear wheels. Even when the rider operates the brake lever and not the brake pedal, the ABS control unit/HU activates the pump motor and boosts the rear brake caliper pressure automatically. This improves deceleration of the vehicle even when only the brake lever is operated. The ABS control unit/HU alters the braking distribution between the front and rear brakes according to the lean angle, with the proportion allocated to the rear braking decreasing as the lean angle increases.



IJ31J1452057-01

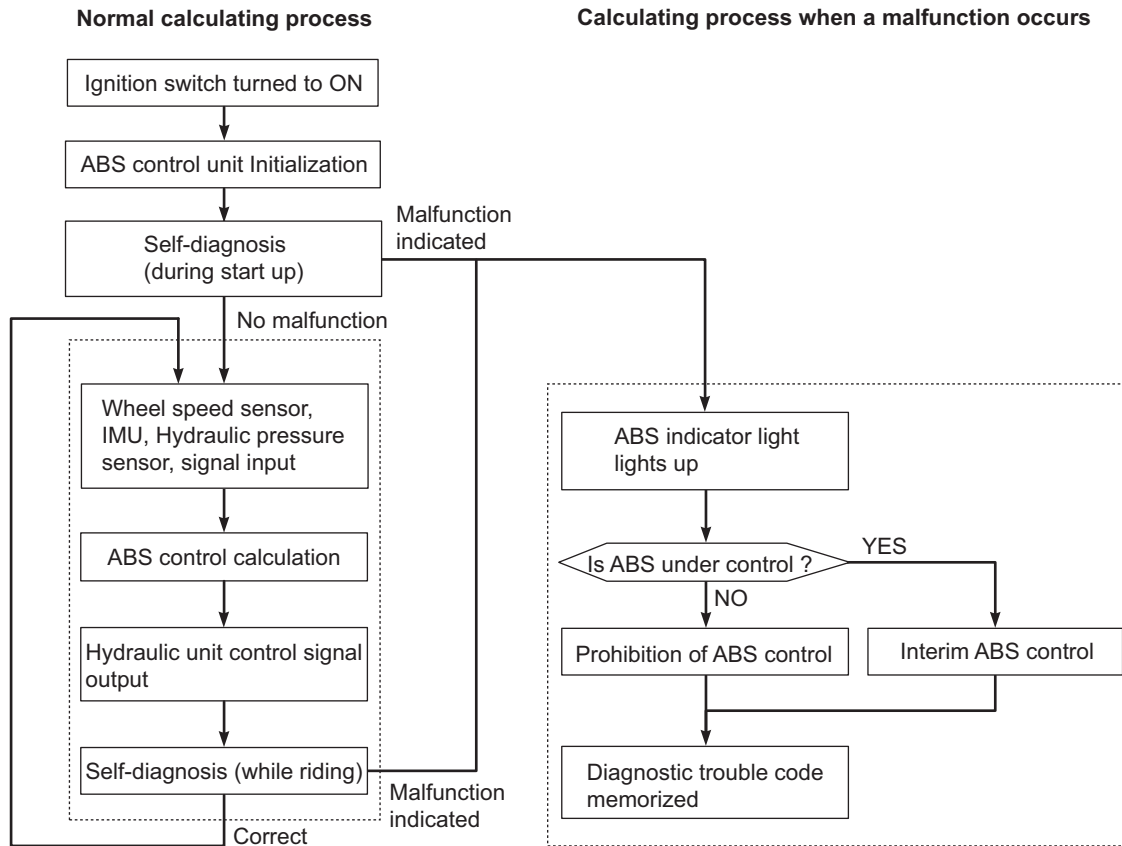
[A]: When only the front brake lever is operated	[D]: Brake input
[B]: When only the rear brake pedal is operated	[E]: Brake output
[C]: When the front brake lever and rear brake pedal is operated	

Cornering Brake Control

Cornering Brake Control is control of the front and rear caliper pressure based on the amount of lean angle. The ABS control unit/HU utilizes internal solenoid valves, with the ABS beginning to operate as the lean angle increases and the wheel slip rate is small. This prevents wheel lock within defined parameters when the rider applies excessive braking during cornering.

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.



CAN Communication System Description

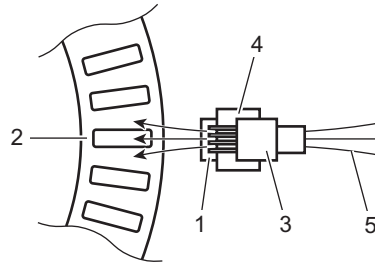
BENJ31J34521002

The ABS control unit and IMU send and receive information using CAN communication (CAN High signal and CAN Low signal). CAN communication is serial transmission for sending and receipt of a range of information between all controllers and devices using continuous input and output of digital signals. CAN communication is appropriate for use when transmission speed is high, and high speed processing of ECU control data, etc. is required.

Wheel Speed Sensor Description

BENJ31J34521003

The wheel speed is detected by the hall IC type wheel speed sensor (1) and sensor ring (2). The wheel speed sensor is fixed to the body and includes a hall IC (3) having 2 hall elements. As the sensor ring is located on the wheel hub, it turns along with the wheel. The wheel speed sensor feeds pulse signals in proportion to the wheel speed to ABS control unit, which then calculates the wheel speed based on such signal information.



IJ31J1452008-02

4. Magnet	5. Magnetic field lines
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Self-diagnosis Function and ABS Indicator Light Description

BENJ31J34521004

Refer to "Self-diagnosis Function and ABS Indicator Light Description": L4 - L6 (Page 4E-5).

Fail-safe Function Description

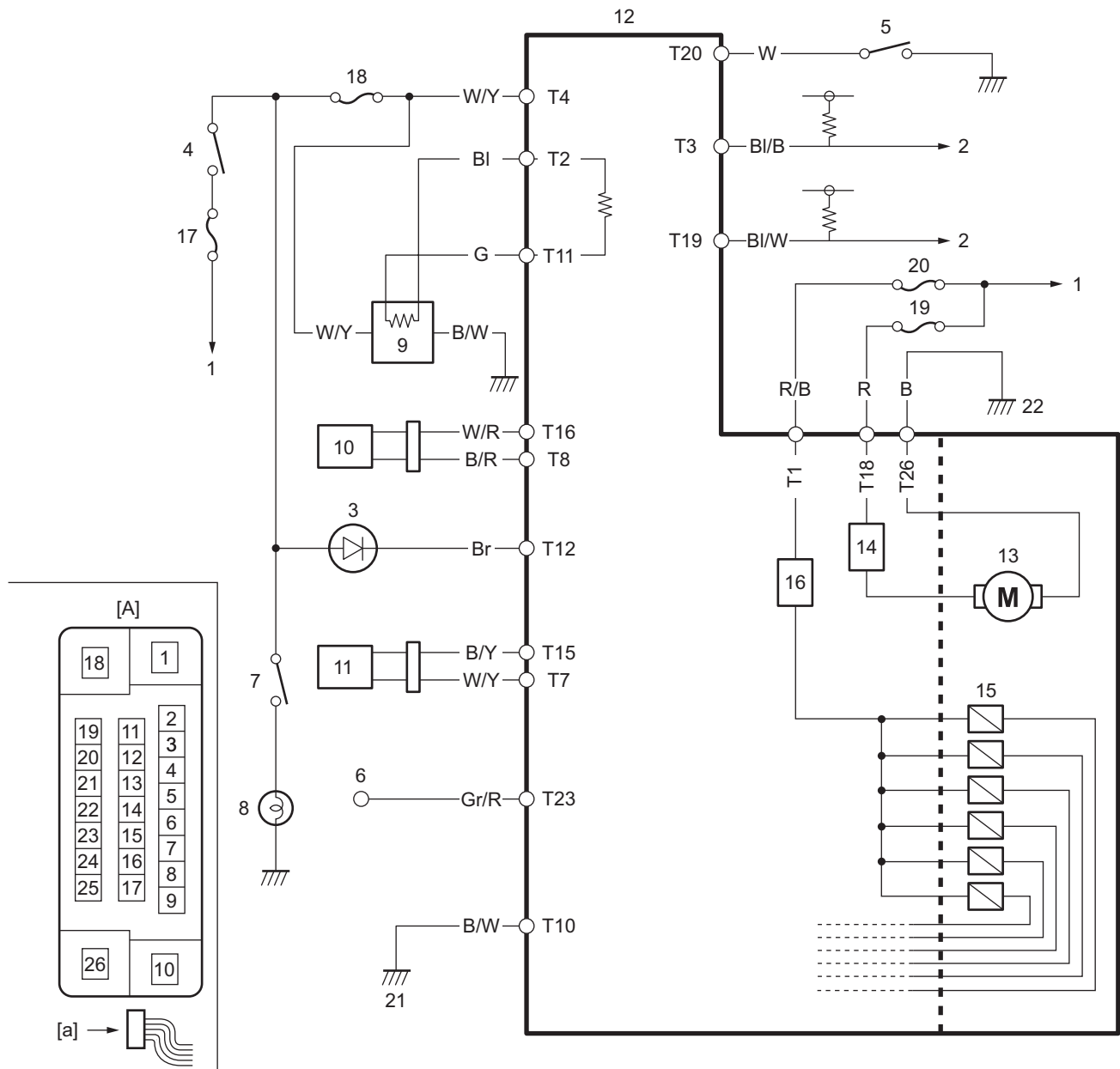
BENJ31J34521005

If malfunction occurs in the ABS electric system, this sets valve relay OFF. Consequently, motor relay will be set OFF and the indicator light ON, and no current will be applied to motor solenoid valve inactivating ABS and turning ABS indicator light ON. In this case, it functions as the normal brake. However, if malfunctions occurs while ABS is being activated, when ABS control unit diagnoses that the operation can continue, it will effectuate ABS provisional control (turning the ABS indicator light ON). Upon the moment when ABS provisional control is over, the valve relay will be set OFF.

Schematic and Routing Diagram

ABS Circuit Diagram

BENJ31J34522001



IJ31J1452009-02

[A]: ABS control coupler (View: [a])	8. Brake light	16. Solenoid valve relay
1. To the battery	9. IMU	17. Main fuse (30 A)
2. To the ECM	10. Front wheel speed sensor	18. Ignition fuse (10 A)
3. ABS indicator light	11. Rear wheel speed sensor	19. ABS motor fuse (25 A)
4. Ignition switch	12. ABS hydraulic unit / control module assembly	20. ABS solenoid valve fuse (15 A)
5. Mode select switch	13. Pump motor	21. ECU ground
6. Diagnosis K-line	14. Pump motor relay	22. Motor relay ground
7. Brake light switch	15. Solenoid valve	

Terminal	Wire color	Circuit
1	R/B	Solenoid valve power supply circuit
2	Bl	CAN communication line (Hi)
3	Bl/B	Front wheel speed sensor output circuit
4	W/Y	ABS controller power supply circuit
7	W/Y	Rear wheel speed sensor power supply circuit
8	B/R	Front wheel speed sensor signal circuit
10	B/W	Ground
11	G	CAN communication line (Low)
12	Br	ABS indicator light
15	B/Y	Rear wheel speed sensor signal circuit
16	W/R	Front wheel speed sensor power supply circuit
18	R	Pump motor power supply circuit
19	Bl/W	Rear wheel speed sensor output circuit
20	W	Diagnosis L-line
23	Gr/R	Diagnosis K-line
26	B	Pump motor ground circuit

Front Wheel Speed Sensor Routing Diagram

Refer to "Front Wheel Speed Sensor Routing Diagram": L4 - L6 (Page 4E-9).

BENJ31J34522002

Rear Wheel Speed Sensor Routing Diagram

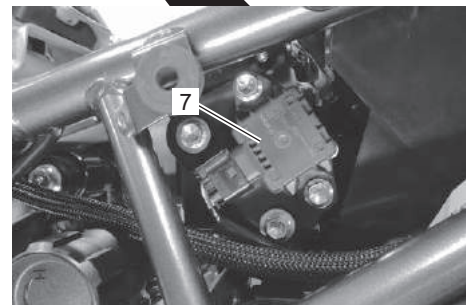
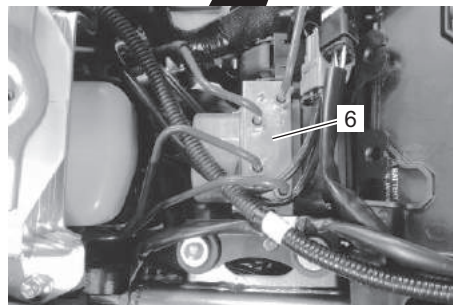
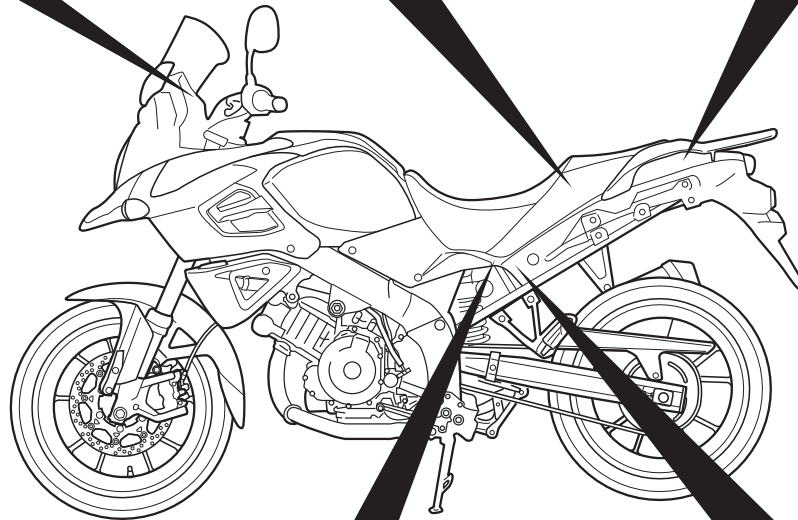
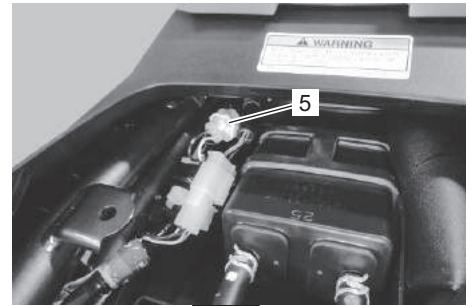
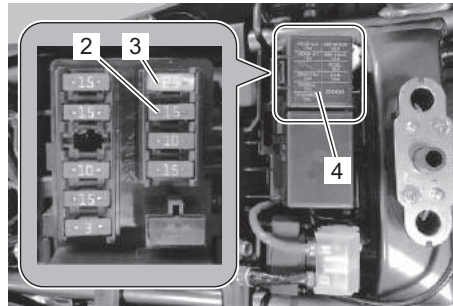
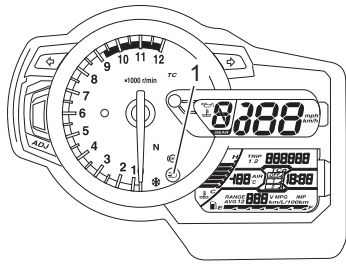
Refer to "Rear Wheel Speed Sensor Routing Diagram": L4 - L6 (Page 4E-10).

BENJ31J34522003

Component Location

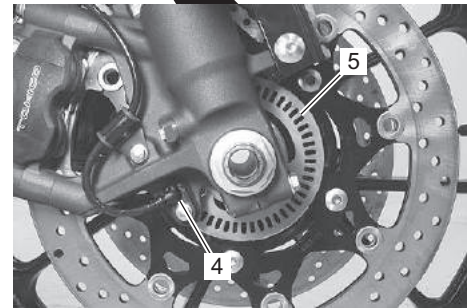
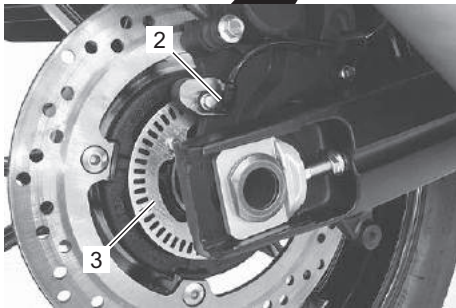
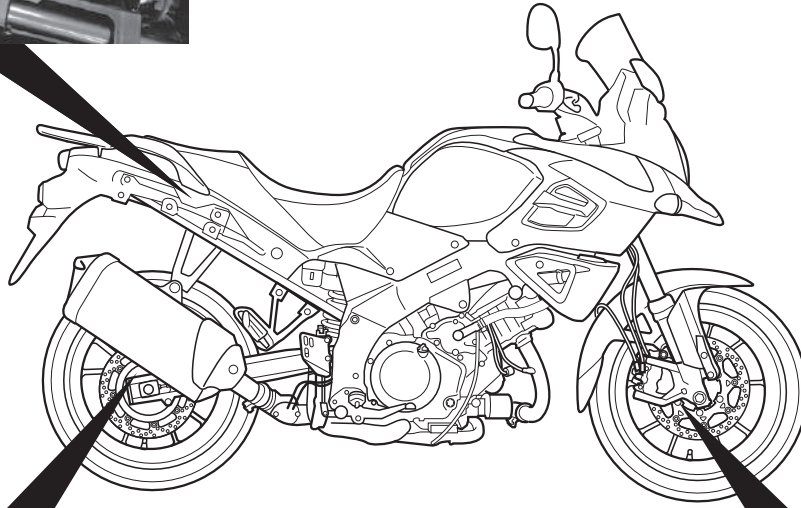
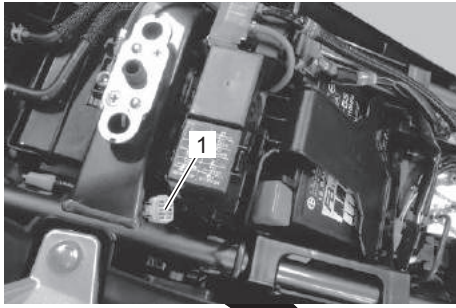
ABS Components Location

BENJ31J34523001



IJ31J1452044-02

1. ABS indicator light	3. ABS motor fuse (25 A)	5. Mode select coupler	7. IMU
2. ABS solenoid valve fuse (15 A)	4. Fuse box	6. ABS control unit/HU	



IJ31J1452045-03

1. SDS-II coupler	3. Rear wheel speed sensor rotor	5. Front wheel speed sensor rotor
2. Rear wheel speed sensor	4. Front wheel speed sensor	

Diagnostic Information and Procedures

ABS Check

BENJ31J34524001

Refer to "ABS Check": L4 - L6 (Page 4E-12).

Visual Inspection

BENJ31J34524002

Refer to "Visual Inspection": L4 - L6 (Page 4E-14).

ABS Symptom Diagnosis

BENJ31J34524003

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 (3.1 mile/h).	Malfunctioning the ABS function.	<i>Perform the ABS check. (Page 4E-52)</i>
	Malfunctioning the ABS indicator light circuit.	<i>Check the ABS indicator light circuit. (Page 4E-53)</i>
The ABS indicator light does not light up when turning the ignition switch to ON.	Malfunctioning the ABS function.	<i>Perform the ABS check. (Page 4E-52)</i>
	Malfunctioning the ABS indicator light circuit.	<i>Check the ABS indicator light circuit. (Page 4E-53)</i>
	Malfunctioning the combination meter.	<i>Check the combination meter. (Page 9C-5)</i>

ABS Indicator Light Inspection

BENJ31J34524004

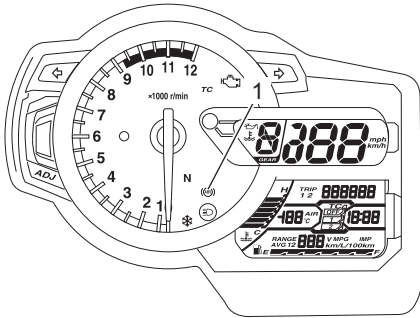
Wiring Diagram

Refer to "ABS Circuit Diagram": L8 - (Page 4E-48).

Troubleshooting

Step 1

- 1) Check if the ABS indicator light (1) lights up when turning the ignition switch ON.



IJ31J1452046-03

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 (3.1 mile/h).

Does the ABS indicator light go off?

- Yes Normal (No DTC exists)
No
- DTC output. (Page 4E-54)
 - If DTC can not be output (the ABS indicator light does not flash), go to Step 6.

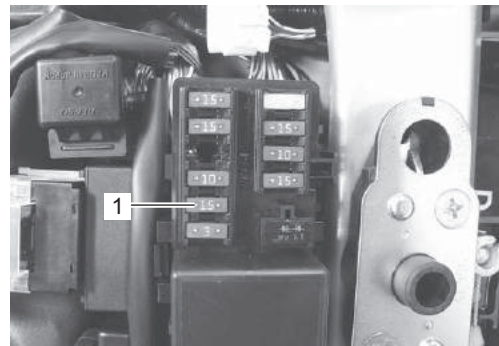
Step 3

(The ABS indicator light does not light up)

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-33)
- 3) Open the fuse box and inspect the signal fuse (15 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



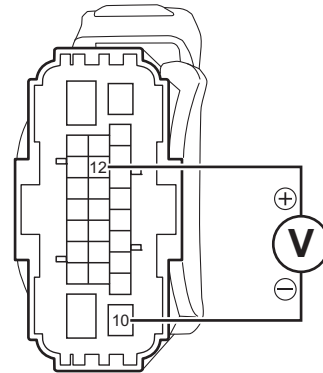
IE31J1450013-01

Is the signal fuse OK?

- Yes Go to Step 4.
No Replace the signal fuse.

Step 4

- 1) Disconnect the ABS control unit coupler. (Page 4E-78)
- 2) Turn the ignition switch ON with the ABS control unit coupler disconnected, measure the voltage between "T12" (Br) and "T10" (B/W) at the coupler.



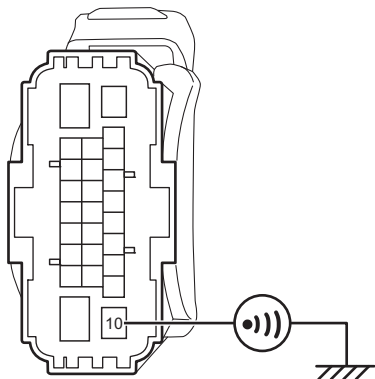
IJ31J1452010-01

Is voltage 7.5 – 9.5 V?

- Yes Go to Step 5.
No
- Repair 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 "T10" (B/W) at the coupler and body ground.



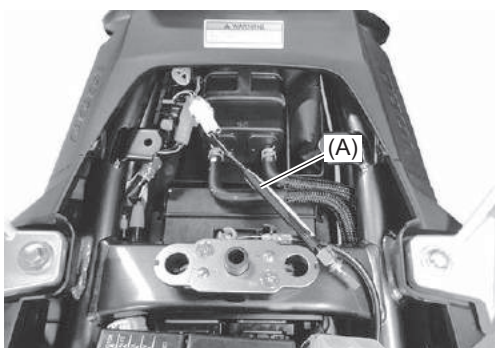
IJ31J1452011-01

Is continuity indicated?

- Yes Replace the ABS control unit/HU. (Page 4E-78)
- No Repair the wire harness. (Faulty ground wire)

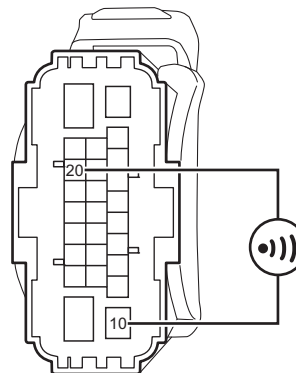
Step 6**(The ABS indicator light does not go off)**

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-33)
- 3) Short the mode select coupler terminals using the special tool.

Special tool**(A): 09930-82760**

IJ31J1452012-02

- 4) Check for continuity between "T20" (W) and "T10" (B/W) at the coupler.



IJ31J1452013-01

Is continuity indicated?

- Yes Repair the ABS control unit/HU. (Page 4E-78)
- No Repair the wire harness. (Faulty mode select coupler wire)

DTC Check

BENJ31J34524005

NOTE

- If there is a DTC recorded, the ABS indicator light repeatedly flashes in a cyclic manner. (However, when five minutes have elapsed from the start of self-diagnosis mode, the output of the DTC will be interrupted.)
- If no DTC is recorded, the light repeats flashing for 3.6 seconds in a cyclic manner.
- In the case that the mode select switch is turned OFF or the vehicle speed (both wheels) exceeds 10 km/h (6.2 mile/h), the output of DTC will be interrupted.
- Don't disconnect couplers from ABS HU, the battery cable from the battery, ABS HU ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase the memorized information in ABS HU memory.

- Be sure to read “Precautions for Electrical Circuit Service” in Section 00 (Page 00-2) and “Precautions for ABS Service”: L8 - (Page 4E-43) before inspection and observe what is written there.
- After carrying out DTC deleting and ABS operation check, explain to the customer that the ABS is operating correctly. (Page 4E-57)
- DTC can be checked by using the SDS-II. Refer to the SDS-II operation manual for further details.

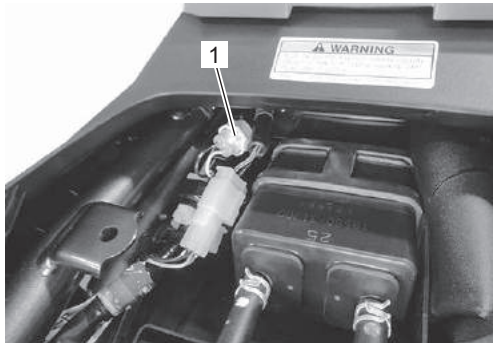
Use of Mode Select Switch

Connect the special tool to the mode select coupler to output the memorized DTCs on the ABS indicator light.

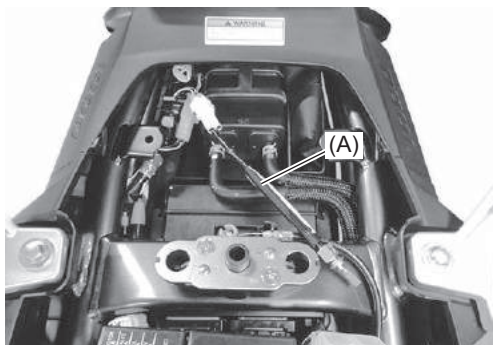
- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-33)
- 3) Connect the special tool to the mode select coupler (1).

Special tool

(A): 09930-82760



IJ31J1452014-02



IJ31J1452015-02

- 4) Switch the special tool to ON.

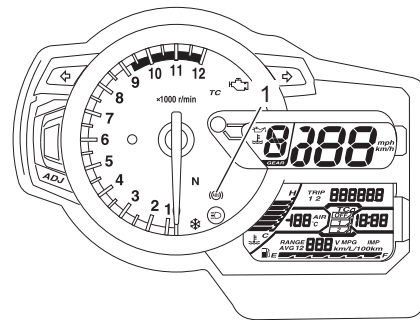


I718H1450040-02

- 5) Turn the ignition switch ON.
The ABS indicator light (1) starts flashing to indicate the DTC. (Page 4E-60)

NOTE

If the DTCs are to be output for a long time, remove the HEAD-LO fuse in order to prevent the battery from discharging.



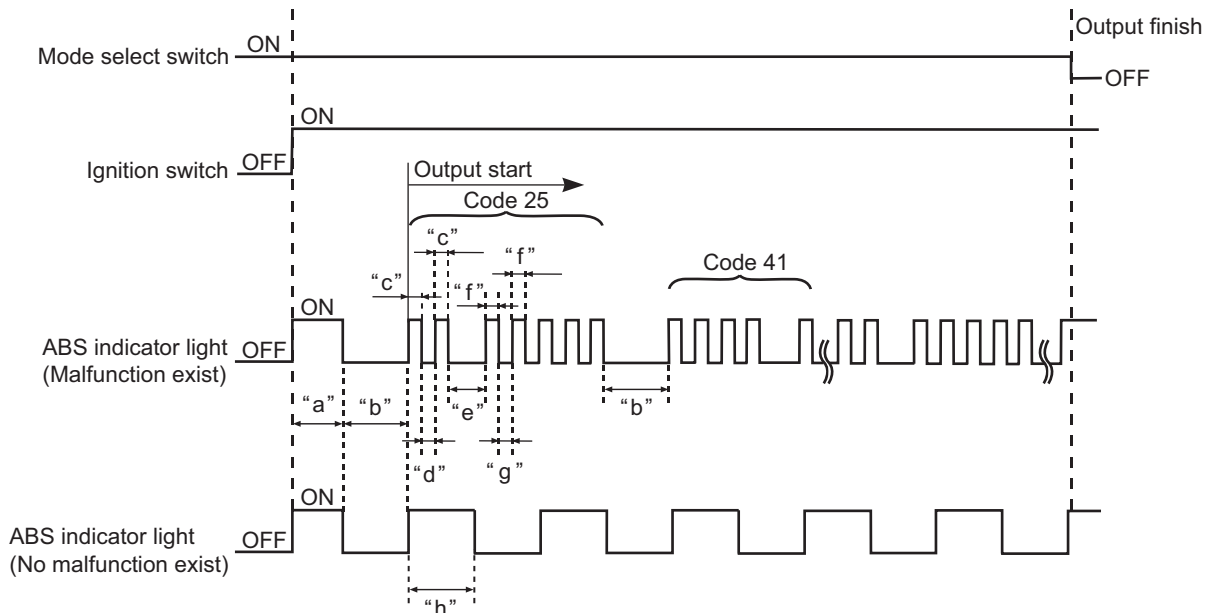
IJ31J1452046-03

- 6) Turn the ignition switch OFF and disconnect the special tool.
- 7) Install the seat. (Page 9D-33)

Understanding the DTC (Diagnostic Trouble Code)

A two-digit DTC is shown through the flashing pattern of the ABS indicator light. A number between 1 and 9 is represented by the number of times that the ABS indicator light lights up in interval of 0.4 seconds and the separation between the tens and ones are indicated by the light staying off for 1.6 seconds. In addition, the separation between the start code and the DTC is indicated by the light being off for 3.6 seconds. After the start code is displayed, DTCs appear from the smallest number code.

If no 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

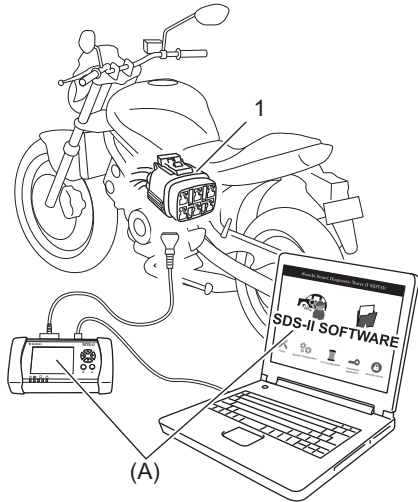
IE31J1450023-02

Use of SDS-II

- 1) Turn the ignition switch "OFF".
- 2) Remove the seat. (Page 9D-33)
- 3) Connect the SDS-II tool to mode select coupler (6P) (1). Refer to "Self-Diagnosis Function": L8 - in Section 1A (Page 1A-88).

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 tool and print it or write it down. Refer to Operation Manual of SDS-II for further details.

NOTE

- **Not only SDS-II used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger.**
- **How to use trigger referring to the SDS-II operation manual for further details.**

- 6) Close the SDS-II tool and turn the ignition switch OFF.
- 7) Disconnecting the SDS-II tool and install the seat. (Page 9D-33)

DTC Clearance

BENJ31J34524006

Use of Mode Select Switch

NOTE

- **The previous malfunction history code (Past DTC) still remains stored in the ABS HU. Therefore, erase the history code memorized in the ABS HU using SDS-II tool. (Page 4E-59)**
- **The DTC is memorized in the ABS HU also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS-II. (Page 4E-59)**

- 1) Connect the special tool to the mode select coupler. (Page 4E-54)
- 2) Switch the special tool to ON and turn the ignition switch ON.
- 3) While the DTCs are being output, set the special tool to OFF. The DTC deletion mode is started after the switch is set to OFF.



I718H1450050-01

- 4) In the DTC deletion mode, switch the special tool from OFF to ON three times within 12.5 seconds, each time leaving it at ON for more than 1 second.

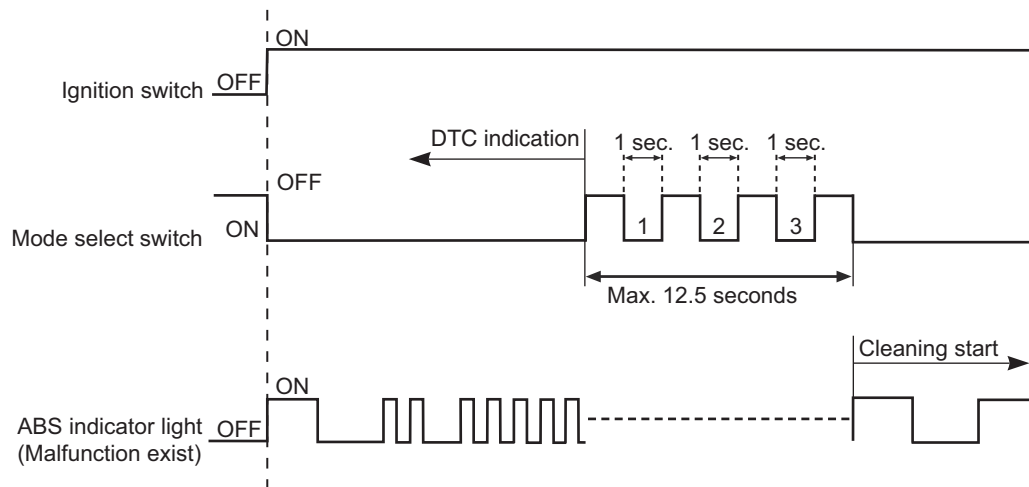
NOTE

After deleting DTC with the mode select switch in ON position, the system resumes the self-diagnosis mode again and outputs the DTC.



I718H1450051-01

DTC Deleting Diagram



I823H3450030-01

- 5) After deleting the DTCs, repeat the code output procedure and make sure that no DTCs remain (the ABS indicator light no longer flashes).

NOTE

If any DTCs remain, perform the appropriate procedures, then delete the codes. If DTCs are left stored, confusion may occur and unnecessary repairs may be made.

- 6) Turn the ignition switch OFF and disconnect the special tool.
- 7) Install the removed parts.
- 8) Afterwards, ride the motorcycle at more than 30 km/h (18.6 mile/h) and quickly apply the brakes to check that the ABS activates correctly.

Use of SDS-II

- 1) Turn the ignition switch "OFF".
- 2) Remove the seat. (Page 9D-33)
- 3) Connect the SDS-II tool to mode select coupler (6P). Refer to "Self-Diagnosis Function": L8 - in Section 1A (Page 1A-88).

Special tool

09904-41030

09904-41040

- 4) Turn the ignition switch "ON".
- 5) Clear DTC according to instructions displayed on SDS-II tool. Refer to Operation Manual of SDS-II for further details.
- 6) After completing the clearance, close the SDS-II tool and turn the ignition switch "OFF".
- 7) Disconnect the SDS-II tool and install the seat. (Page 9D-33)
- 8) Ride the motorcycle at more than 30 km/h (18.6 mile/h) and quickly apply the brakes to check that the ABS activates correctly.

ABS Hydraulic Unit Operation Check

BENJ31J34524007

NOTE

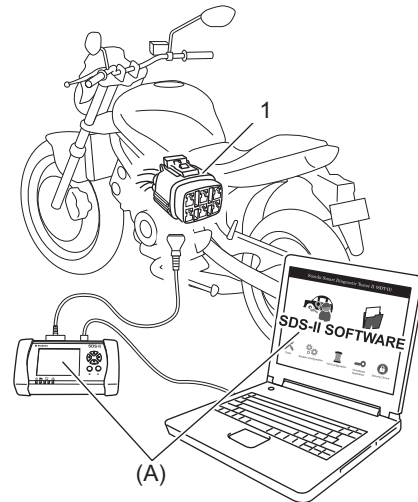
- **A false diagnosis may result if operation check of the ABS hydraulic unit is performed without satisfying all of the specified condition below. Check that all the following conditions are met before performing operation check of the ABS hydraulic unit.**
 - **Battery voltage is 12 V or more.**
 - **No air is trapped in the brake system.**
 - **Brakes do not drag.**
 - **No DTC is stored in ABS hydraulic unit / control module.**
- **Operation check must be performed by 2 persons.**

- 1) Turn the ignition switch "OFF".
- 2) Remove the seat. (Page 9D-33)
- 3) Connect the SDS-II tool to mode select coupler (6P) (1). Refer to "Self-Diagnosis Function": L8 - in Section 1A (Page 1A-88).

Special tool

(A): 09904-41030

09904-41040



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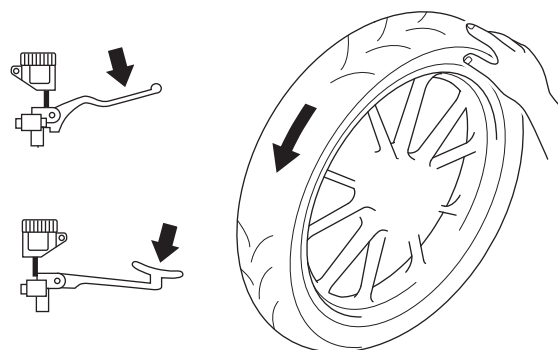
- 4) Jack-up the vehicle until tire can be rotated.
- 5) Set transmission to neutral position.
- 6) Turn the ignition switch "ON", and select "ABS HU operating" in "Active control" under "ABS" mode of SDS-II tool.

Refer to Operation Manual of SDS-II for further details.

- 7) Perform the following check with help of another person.
Apply the brake (lever or pedal) and then select testing wheel by SDS-II tool and the wheel should be turned by another person's hand. At this time, check whether the wheel rotates freely due to brake depressurization.

NOTE

Depressurization by SDS-II tool is available for 5 seconds.



IJ31J1452048-01

- 8) Check all 2-wheels respectively.
- 9) If any faulty condition is found in Step 6) – 7), replace ABS hydraulic unit / control module assembly.
- 10) After completing the check, close the SDS-II tool and turn the ignition switch "OFF".
- 11) Disconnect the SDS-II tool and install the seat.
☞ (Page 9D-33)

DTC Table

BENJ31J34524008

DTC	Malfunction cause	Indicator status	Reference
None	Normal	ON *1	—
C1625 (25)	Wheel speed sensor related malfunction	ON	☞ (Page 4E-64)
C1635 (35)	ABS motor malfunction	ON	☞ (Page 4E-65)
C1641 (41)	Wheel speed sensor signal malfunction (F) *2	ON	☞ (Page 4E-66)
C1642 (42)	Wheel speed sensor circuit open (F) *2	ON	☞ (Page 4E-67)
C1644 (44)	Wheel speed sensor signal malfunction (R) *2	ON	☞ (Page 4E-69)
C1645 (45)	Wheel speed sensor circuit open (R) *2	ON	☞ (Page 4E-70)
C1647 (47)	Supply voltage (Increased)	ON *3	☞ (Page 4E-72)
C1648 (48)	Supply voltage (Decreased)	ON *3	☞ (Page 4E-72)
C1649 (49)	CAN high voltage	ON	☞ (Page 4E-73)
C164A (4A)	CAN low voltage	ON	☞ (Page 4E-73)
C1655 (55)	ABS control unit malfunction	ON *4	☞ (Page 4E-74)
C1661 (61)	ABS solenoid malfunction	ON	☞ (Page 4E-74)
C1671 (71)	Inertial sensor signal value	ON	☞ (Page 4E-75)
C1672 (72)	Inertial sensor open / short	ON	☞ (Page 4E-77)
C1681 (81)	ABS pressure sensor	ON	☞ (Page 4E-77)

*1: It goes off after running at more than 5 km/h (3.1 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.

Fail-Safe Table

When any of the following DTCs is detected, ABS control unit enters fail-safe mode and ABS and combined brake control functions are deactivated until ABS control module judges the system is normal.

NOTE

- ○ : Activated
- - : Deactivated

DTC	Fail-safe operation		Fail-safe cancel condition
	ABS	CBS **1	
C1625 (25)	—	—	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)
C1635 (35)	The corresponding function is blocked after the end of control.	The control is gradually reduced, and the corresponding function is blocked after the end of control.	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment) However, the “pump motor power supply voltage monitor error” can be recovered if normal state occurs in the same ignition cycle.
C1641 (41)	—	—	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)
C1642 (42)	—	—	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)
C1644 (44)	—	—	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)
C1645 (45)	—	—	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)
C1647 (47)	—	—	Recovery can be performed if normal state occurs in the same ignition cycle.
C1648 (48)	—	—	Recovery can be performed if normal state occurs in the same ignition cycle.
C1649 (49)	The corresponding function is enabled (No cornering function)	The corresponding function is enabled (No cornering function)	Recovery can be performed if normal state occurs in the same ignition cycle.
C164A (4A)	The corresponding function is enabled (No cornering function)	The corresponding function is enabled (No cornering function)	Recovery can be performed if normal state occurs in the same ignition cycle.
C1655 (55)	—	—	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)
C1661 (61)	—	—	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)

DTC	Fail-safe operation		Fail-safe cancel condition
	ABS	CBS *1	
C1671 (71)	The corresponding function is enabled (No cornering function)	The corresponding function is enabled (No cornering function)	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)
C1672 (72)	The corresponding function is enabled (No cornering function)	The corresponding function is enabled (No cornering function)	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)
C1681 (81)	The corresponding function is blocked after the end of control.	The control is gradually reduced, and the corresponding function is blocked after the end of control.	Turn the ignition OFF and then ON, and perform diagnosis again. (Recovery is not performed based on normal judgment)

*1: Including ABS control in accordance with the cornering brake control

Scan Tool Data

BENJ31J34524010

As the data values are standard values estimated on the basis of values obtained from the new vehicles of the following conditions by using a scan tool, use them as reference values.

- Park vehicle in a flat area.
- Adjust air pressure of all tires to specified value.
- Use new genuine tires and genuine suspension.
- Do not modify suspension.

Even when the vehicle is in good condition, there may be cases where the checked value does not fall within each specified data range. Therefore, judgment as abnormal should not be made by checking with these data alone.

NOTE

If communication between SDS-II and ABS control unit is not possible, perform the following checks:

- **Check DIG cable.** If necessary, check DIG cable by substituting a known-good DIG cable.
- **Check ABS control unit power circuit and ground circuit.**

Scan tool data	Vehicle condition		Condition / Reference value
Wheel speed sensor (F)	At stop (Stationary vehicle)		0 km/h (0 mph)
	Turn a wheel		Numerical value increases
Wheel speed sensor (R)	At stop (Stationary vehicle)		0 km/h (0 mph)
	Turn a wheel		Numerical value increases
IG monitoring voltage	Ignition "ON" (Engine stopped)		Battery voltage
Inertial sensor Output Ω_z	Static	Side-stand position with steering fully turn to left side	0 ± 3.0 deg/s
	Dynamic	Raise to upright position from side-stand position (While raising)	0 ± 3.0 deg/s
Inertial sensor Output Ω_x	Static	Side-stand position with steering fully turn to left side	0 ± 3.0 deg/s
	Dynamic	Raise to upright position from side-stand position (While raising)	Numerical Value increases to the positive side
Inertial sensor Output Ax Axis	Side-stand position with steering fully turn to left side		4.81 – 5.99 m/s ²
	Upright position		Numerical Value increases to the positive side

Scan tool data	Vehicle condition	Condition / Reference value
Inertial sensor Output Ay Axis	Side-stand position with steering fully turn to left side	7.26 – 8.35 m/s ²
	Upright position	Numerical Value increases to the positive side
Inertial sensor Output Az Axis	Side-stand position with steering fully turn to left side	-3.28 – (-1.57) m/s ²
	Upright position	Numerical Value increases to the positive side
Pressure sensor Output caliper (R)	Not brake pedal operating	0.0 Mpa
	Brake pedal operating	Numerical value increases
ABS solenoid Input Voltage open or shorted (F)	Ignition "ON" (Engine stopped)	Normal
ABS solenoid Output Voltage open or shorted (F)	Ignition "ON" (Engine stopped)	Normal
ABS solenoid Input Voltage open or shorted (R)	Ignition "ON" (Engine stopped)	Normal
ABS solenoid Output Voltage open or shorted (R)	Ignition "ON" (Engine stopped)	Normal
ABS solenoid valve relay lock	Ignition "ON" (Engine stopped)	Normal
Solenoid pilot valve (R) open or short circuit	Ignition "ON" (Engine stopped)	Normal
Solenoid high pressure switching valve (R) open or short circuit	Ignition "ON" (Engine stopped)	Normal
ABS motor	Ignition "ON" (Engine stopped)	Normal
ABS motor relay lock (OFF)	Ignition "ON" (Engine stopped)	Normal
ABS motor relay lock (ON)	Ignition "ON" (Engine stopped)	Normal
Service check signal condition	Ignition "ON" (Engine stopped)	OFF
ABS motor	Ignition "ON" (Engine stopped)	OFF
ABS solenoid valve relay	Ignition "ON" (Engine stopped)	ON
ABS solenoid IN/V (F)	Ignition "ON" (Engine stopped)	OFF
ABS solenoid OUT/V (F)	Ignition "ON" (Engine stopped)	OFF
Pilot valve (R)	Ignition "ON" (Engine stopped)	OFF
High pressure switching valve (R)	Ignition "ON" (Engine stopped)	OFF
ABS solenoid IN/V (R)	Ignition "ON" (Engine stopped)	OFF
ABS solenoid OUT/V (R)	Ignition "ON" (Engine stopped)	OFF
Pressure sensor master cylinder side (F) open or short circuit	Ignition "ON" (Engine stopped)	Normal
Pressure sensor caliper side (F) open or short circuit	Ignition "ON" (Engine stopped)	Normal
Pressure sensor master cylinder side (R) open or short circuit	Ignition "ON" (Engine stopped)	Normal
Pressure sensor caliper side (R) open or short circuit	Ignition "ON" (Engine stopped)	Normal

DTC C1625 (25)

BENJ31J34524011


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-19)

Are the tires OK?

- Yes Go to Step 2.
- No Use the specified tires.

Step 2

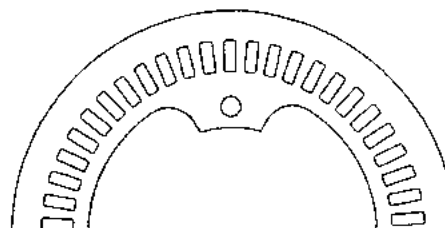
- 1) Make sure the tire pressure for each tire.  (Page 2D-19)

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.




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Are the rotors OK?

- Yes Go to Step 4.
- No Clean or replace the rotor.
- Front wheel speed sensor rotor:  (Page 4E-81)
 - Rear wheel speed sensor rotor:  (Page 4E-82)

Step 4

- 1) Inspect the clearances of the front and rear wheel speed sensor – sensor rotor using the thickness gauge.  (Page 4E-82)

Are the clearances OK?

- Yes Replace the ABS control unit/HU.  (Page 4E-78)
- No Adjust the clearance.

DTC C1635 (35)

BENJ31J34524012

Possible Cause

ABS Motor Malfunction

Motor relay circuit open or short, broken fuse for motor relay, pump motor circuit open or short, faulty motor relay, faulty ABS motor, faulty ABS control unit, etc.

Wiring Diagram

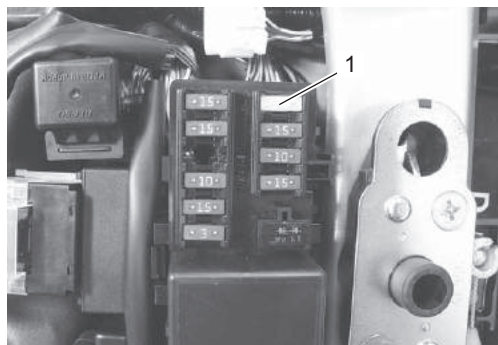
Refer to "ABS Circuit Diagram": L8 - (Page 4E-48).

Troubleshooting**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-33)
- 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.



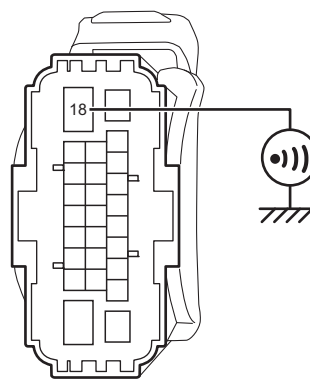
IE31J1450024-01

Is the ABS motor fuse OK?

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

Step 2

- 1) Remove the ABS motor fuse.
- 2) Disconnect the ABS control unit coupler. (Page 4E-78)
- 3) Measure the continuity between "T18" (R) at the coupler and ground.



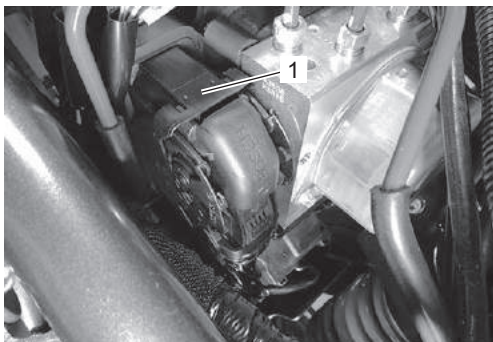
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Is no continuity indicated?

- Yes Faulty ABS control unit/HU.
No Repair the wire harness. (Faulty R wire)

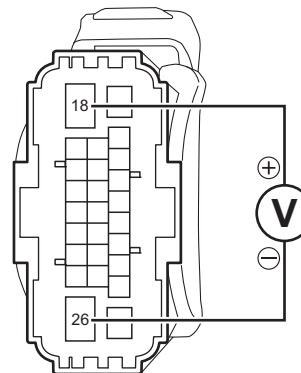
Step 3

- 1) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (Page 4E-78)



IJ31J1452042-01

- 2) Measure the voltage between “T18” (R) and “T26” (B) at the coupler.



IJ31J1452043-01

Is voltage 12.0 V or more?

- Yes Replace the ABS control unit/HU. (Page 4E-78)
- No Repair the wire harness. (Faulty motor power supply or ground wire)

DTC C1641 (41)

BENJ31J34524013

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

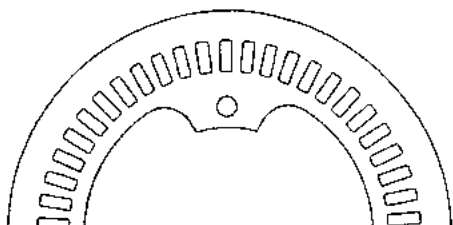
- 1) Inspect the clearance between the front wheel speed sensor and sensor rotor using the thickness gauge. (Page 4E-82)

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.



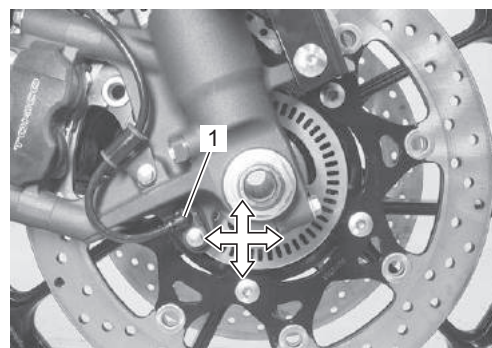
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Is the sensor rotor OK?

- Yes Go to Step 3.
- No Clean or replace the sensor rotor. (Page 4E-81)

Step 3

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



IE31J1450027-01

Is the sensor mounted securely?

- Yes Go to DTC C1642 (42). (Page 4E-67)
- No Tighten the mounting bolt.

DTC C1642 (42)

BENJ31J34524014

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.

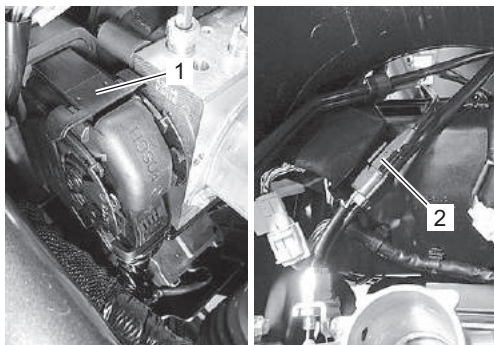
Wiring Diagram

Refer to "ABS Circuit Diagram": L8 - (Page 4E-48).

Troubleshooting

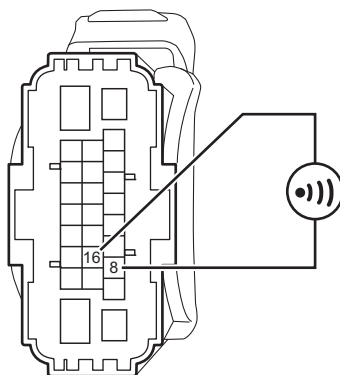
Step 1

- 1) Turn ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Remove the seat heat shield. Refer to "ABS Control Unit Coupler Disconnect and Connect": L8 - (Page 4E-78).
- 4) 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.



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- 5) Check for continuity between "T16" (W/R) and "T8" (B/R) at the ABS control unit coupler.



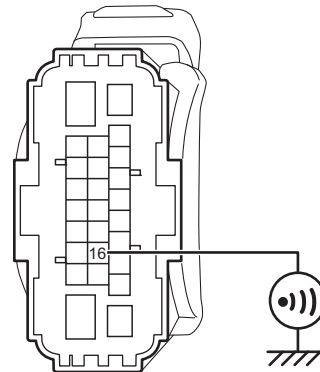
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Is no continuity indicated?

- | | |
|-----|--|
| Yes | Go to Step 2. |
| No | <ul style="list-style-type: none"> • Repair the wire harness. (Faulty sensor wire) • Faulty front wheel speed sensor. (Page 4E-80) |

Step 2

- 1) Check for continuity between "T16" (W/R) and ground at the ABS control unit coupler.



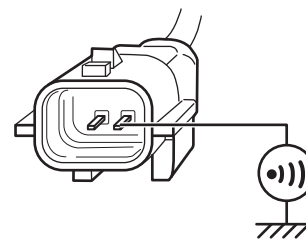
IJ31J1452018-01

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 power supply terminal and ground at the front wheel speed sensor coupler.



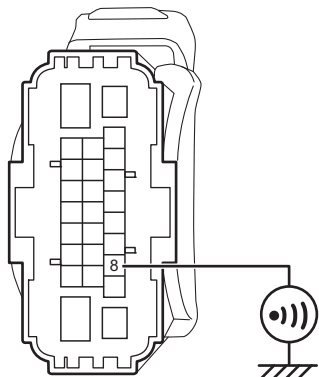
IJ31J1452019-02

Is no continuity indicated?

- | | |
|-----|---|
| Yes | Replace the wire harness. (Faulty W/R wire) |
| No | Faulty front wheel speed sensor. (Page 4E-80) |

Step 4

- 1) Check for continuity between “T8” (B/R) and ground at the ABS control unit coupler.



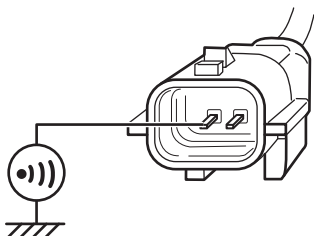
IJ31J1452020-01

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 signal terminal wire and ground at the front wheel speed sensor coupler.



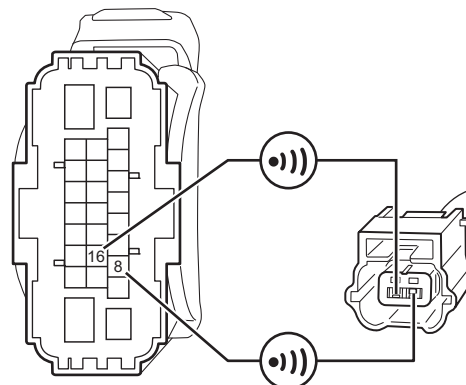
IJ31J1452021-02

Is no continuity indicated?

- Yes Inspect the wire harness. (Faulty B/R wire)
- No Faulty front wheel speed sensor. ☞ (Page 4E-80)

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 W/R wire on the front wheel speed sensor coupler.
- 3) Check for continuity between “T8” (B/R) on the ABS control unit coupler and B/R wire on the front wheel speed sensor coupler.



IJ31J1452022-02

Is continuity indicated?

- Yes Go to Step 7.
- No Repair the wire harness.

Step 7

- 1) Measure the front wheel speed sensor current. Refer to “Wheel Speed Sensor Current” under “Wheel Speed Sensor and Sensor Rotor Inspection”: L8 - (Page 4E-82).

Is current result OK?

- Yes Replace the ABS control unit/HU. ☞ (Page 4E-78)
- No Replace the front wheel speed sensor. ☞ (Page 4E-80)

DTC C1644 (44)

BENJ31J34524015

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-82)

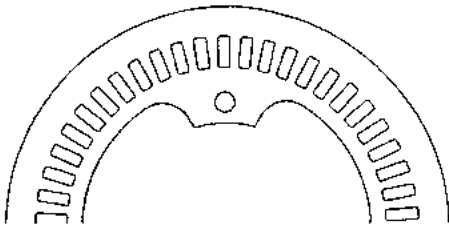
Is the clearance OK?

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.



I718H1450064-01

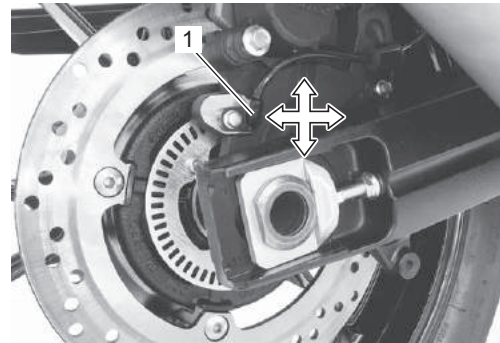
Is the sensor rotor OK?

Yes Go to Step 3.

No Clean or replace the sensor rotor. (Page 4E-82)

Step 3

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



IE31J1450037-01

Is the sensor mounted securely?

Yes Go to DTC C1645 (45). (Page 4E-70)

No Tighten the mounting bolt.

DTC C1645 (45)

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.

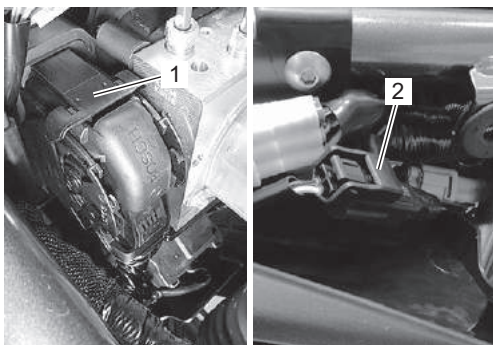
Wiring Diagram

Refer to "ABS Circuit Diagram": L8 - (Page 4E-48).

Troubleshooting

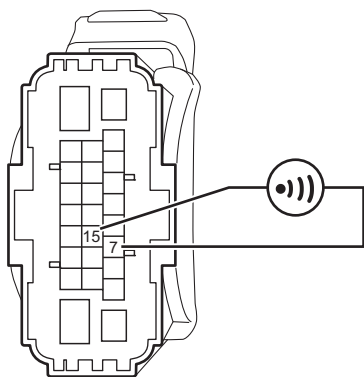
Step 1

- 1) Turn ignition switch OFF.
- 2) Check the ABS control unit coupler (1) and rear wheel speed sensor coupler (2) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler.
 - Rear wheel speed sensor coupler: (Page 4E-80)
 - ABS control unit coupler: (Page 4E-78)



IJ31J1452023-01

- 3) Check for continuity between "T7" (W/Y) and "T15" (B/Y) at the ABS control unit coupler.



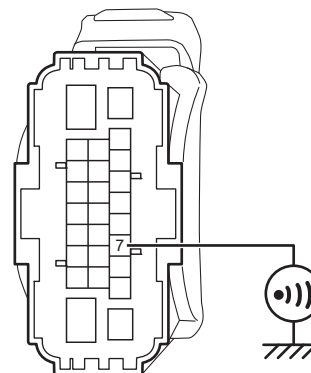
IJ31J1452024-01

Is no continuity indicated?

- | | |
|-----|---|
| Yes | Go to Step 2. |
| No | <ul style="list-style-type: none"> • Repair the wire harness. (Faulty sensor wire) • Faulty rear wheel speed sensor. (Page 4E-80) |

Step 2

- 1) Check for continuity between "T7" (W/Y) and ground at the ABS control unit coupler.



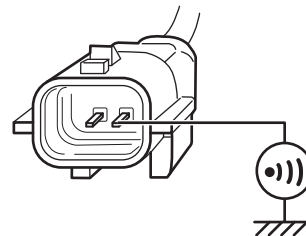
IJ31J1452025-01

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 power supply terminal and ground at the rear wheel speed sensor coupler.



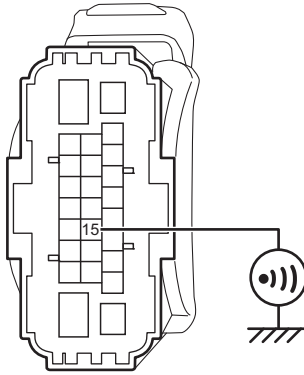
IJ31J1452026-02

Is no continuity indicated?

- | | |
|-----|--|
| Yes | Inspect the wire harness. (Faulty power supply wire) |
| No | Replace the rear wheel speed sensor. (Page 4E-80) |

Step 4

- 1) Check for continuity between "T15" (B/Y) and ground at the ABS control unit coupler.



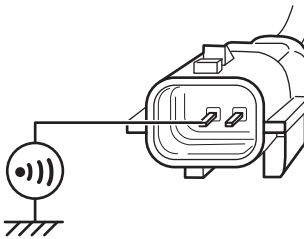
IJ31J1452027-01

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 signal terminal and ground at the rear wheel speed sensor coupler.



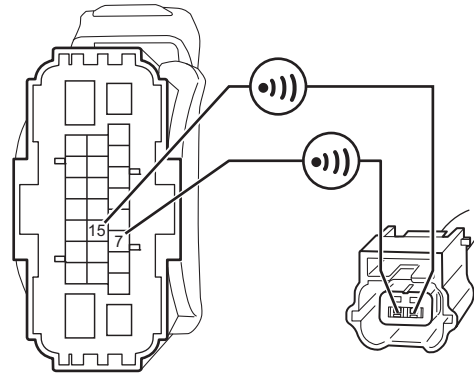
IJ31J1452028-02

Is no continuity indicated?

- Yes Inspect the wire harness. (Faulty B/Y wire)
- No Replace the rear wheel speed sensor. ☞ (Page 4E-80)

Step 6

- 1) Disconnect the rear wheel speed sensor coupler.
- 2) Check for continuity between "T7" (W/Y) on the ABS control unit coupler and W/Y wire on the rear wheel speed sensor coupler.
- 3) Check for continuity between "T15" (B/Y) on the ABS control unit coupler and B/Y wire on the rear wheel speed sensor coupler.



IJ31J1452029-04

Is continuity indicated?

- Yes Go to Step 7.
- No Repair the wire harness.

Step 7

- 1) Measure the rear wheel speed sensor. Refer to "Wheel Speed Sensor Current" under "Wheel Speed Sensor and Sensor Rotor Inspection": L8 - (Page 4E-82).

Is rear wheel speed sensor OK?

- Yes Replace the ABS control unit/HU. ☞ (Page 4E-78)
- No Replace the rear wheel speed sensor. ☞ (Page 4E-80)

DTC C1647 (47) / C1648 (48)

BENJ31J34524017

Possible Cause

C1647 (47): Supply Voltage (Increased)
C1648 (48): Supply Voltage (Decreased)

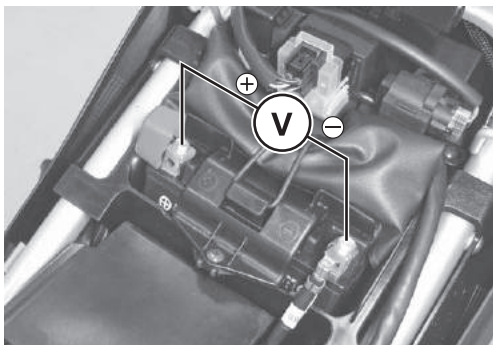
- Faulty generator or regulator/rectifier
- Faulty battery
- Faulty ABS control unit
- Faulty wire harness, etc.

Wiring Diagram

Refer to "ABS Circuit Diagram": L8 - (Page 4E-48).

Troubleshooting**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-33)
- 3) Measure the voltage between the (+) and (-) battery terminals.



IE31J1450047-02

Is voltage 12 V or more?

- Yes Go to Step 2.
- No Charge or replace the battery. (Page 1J-12)

Step 2

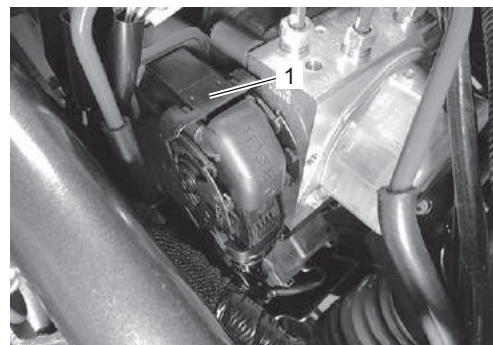
- 1) Start the engine at 5000 r/min with the dimmer switch set to HI.
- 2) Measure the voltage between the (+) and (-) battery terminals.

Is voltage 14.0 – 15.5 V?

- Yes Go to Step 3.
- No Inspect the generator and regulator/rectifier.
- Generator: (Page 1J-4)
 - Regulator/rectifier: (Page 1J-7)

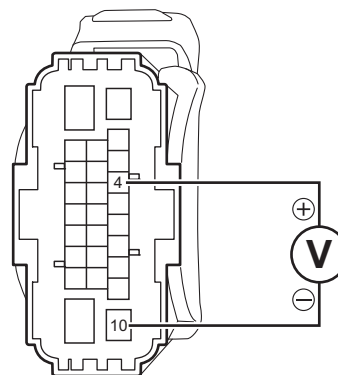
Step 3

- 1) Turn the ignition switch OFF.
- 2) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (Page 4E-78)



IJ31J1452030-01

- 3) Start the engine at 5000 r/min with the dimmer switch set to HI.
- 4) Measure the voltage between "T4" (W/Y) and "T10" (B/W) at the coupler.



IJ31J1452031-01

Is voltage 14.0 – 15.5 V?

- Yes Replace the ABS control unit/HU. (Page 4E-78)
- No Repair the wire harness. (Faulty ignition or ground wire)

DTC C1649 (49) / C164A (4A)

BENJ31J34524018

Possible Cause**C1649 (49): CAN High Voltage****C164A (4A): CAN Low Voltage**

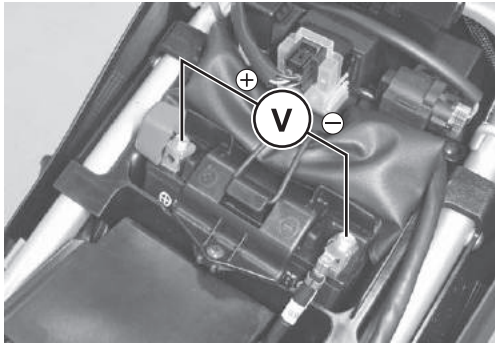
- Faulty generator or regulator/rectifier
- Faulty battery
- Faulty ABS control unit/HU
- Faulty wire harness, etc.

Wiring Diagram

Refer to "ABS Circuit Diagram": L8 - (Page 4E-48).

Troubleshooting**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-33)
- 3) Measure the voltage between the (+) and (-) battery terminals.



IE31J1450047-02

Is voltage 12.0 V or more?

- Yes Go to Step 2.
- No Charge or replace the battery. (Page 1J-12)

Step 2

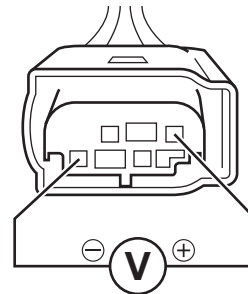
- 1) Start the engine at 5000 r/min with the dimmer switch set to HI.
- 2) Measure the voltage between the (+) and (-) battery terminals.

Is voltage 14.0 – 15.5 V?

- Yes Go to Step 3.
- No Inspect the generator and regulator/rectifier.
- Generator: (Page 1J-4)
 - Regulator/rectifier: (Page 1J-7)

Step 3

- 1) Turn the ignition switch OFF.
- 2) Check the IMU coupler for loose or poor contacts. If OK, then disconnect the IMU harness coupler. (Page 4E-79)
- 3) Start the engine at 5000 r/min with the dimmer switch set to HI.
- 4) Measure the voltage between the W/Y wire and B/W wire.



IJ31J1452058-01

Is voltage 14.0 – 15.5 V?

- Yes Replace the ABS control unit/HU. (Page 4E-78)
- No Repair the wire harness.

DTC C1655 (55)

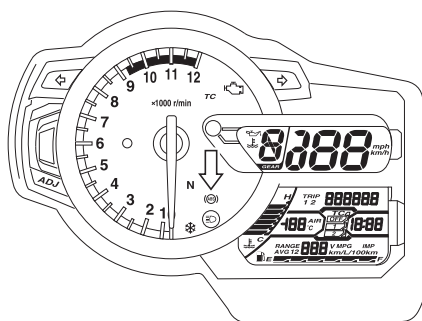
BENJ31J34524019

Possible Cause
ABS Control Unit Malfunction Faulty ABS control unit

Troubleshooting

Step 1

- 1) Delete DTCs (Page 4E-57) and repeat the code output procedure. (Page 4E-54)



IJ31J1452049-01

Is the DTC C1655 (55) output again?

- | | |
|-----|---|
| Yes | Replace the ABS control unit/HU. (Page 4E-78) |
| No | Intermittent trouble. |

DTC C1661 (61)

BENJ31J34524020

Possible Cause
ABS Solenoid Malfunction Valve relay circuit open or short, broken fuse for valve relay, faulty valve relay, interruption of valve, failure output from ABS control unit, etc.

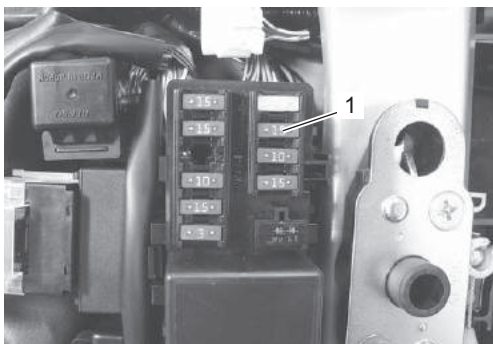
Troubleshooting

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-33)
- 3) Open the fuse box and inspect the ABS valve fuse (15 A) (1).

NOTE

If a fuse is blown, find the cause of the problem and correct it before replacing the fuse.



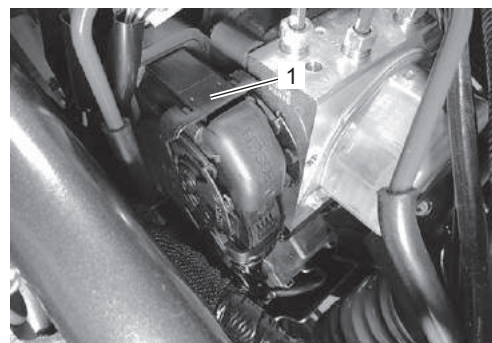
IE31J1450051-01

Is the ABS valve fuse OK?

- | | |
|-----|-----------------------------|
| Yes | Go to Step 2. |
| No | Replace the ABS valve fuse. |

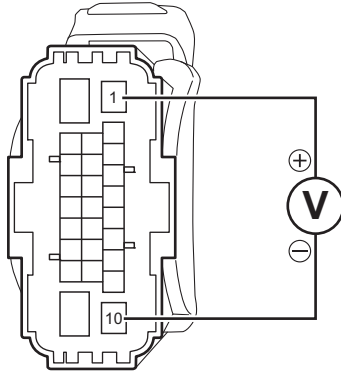
Step 2

- 1) Check the ABS control unit coupler (1) for loose or poor contacts. If OK, then disconnect the ABS control unit coupler. (Page 4E-78)



IJ31J1452032-01

- 2) Measure the voltage between "T1" (R/B) and "T10" (B/W) at the coupler.



IJ31J1452033-01

Is voltage 12.0 V or more?

- Yes Replace the ABS control unit/HU. (Page 4E-78)
- No Repair the wire harness. (Faulty solenoid or ground wire)

DTC C1671 (71)

BENJ31J34524021

Possible Cause

Inertial Sensor Signal Value

Loose contact in IMU coupler, IMU circuit open or short, Interference between lines, IMU not securely fastened, faulty IMU, faulty ABS control unit/HU.

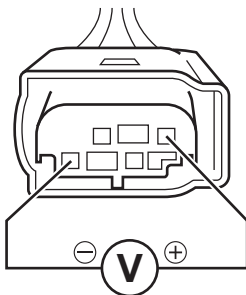
Wiring Diagram

Refer to "ABS Circuit Diagram": L8 - (Page 4E-48).

Troubleshooting

Step 1

- 1) Turn the ignition switch OFF.
- 2) Check that the IMU is mounted securely. (Page 4E-79)
- 3) Disconnect the IMU coupler.
- 4) Check for proper terminal connection to the IMU coupler.
If connections are OK, turn the ignition switch ON.
- 5) Measure the voltage between the W/Y wire and B/W wire.



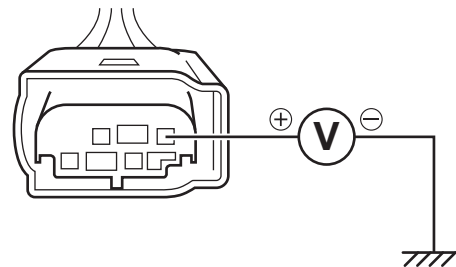
IJ31J1452059-01

Is the voltage 12.0 V or more?

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

Step 2

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



IJ31J1452060-01

Is voltage same as Step 1?

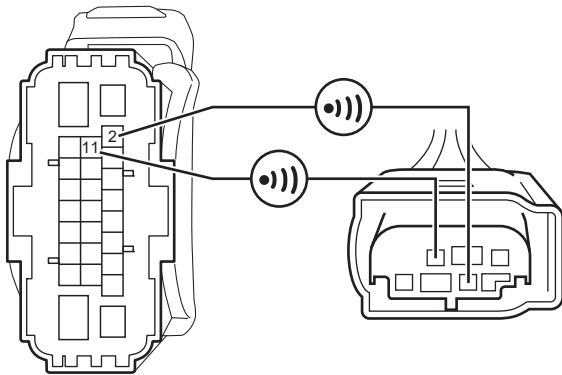
- Yes Repair or replace the B/W wire.
- No Repair or replace the W/Y wire.

Step 3

IMU signal circuit check

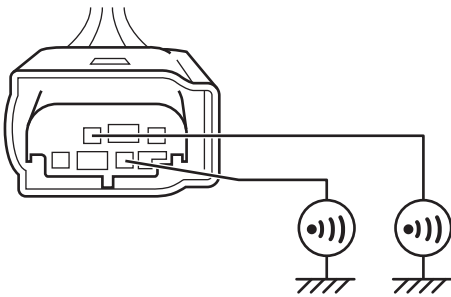
- 1) Turn the ignition switch OFF.
 - 2) Disconnect the ABS coupler. (Page 4E-78)
 - 3) Check for proper terminal connection to the ABS couplers.
- If connections are OK, check the following points.

- Resistance
 - Between “T2” (BI) on the ABS control unit coupler and BI wire on the IMU coupler: less than 1 Ω
 - Between “T11” (G) on the ABS control unit coupler and G wire on the IMU coupler: less than 1 Ω



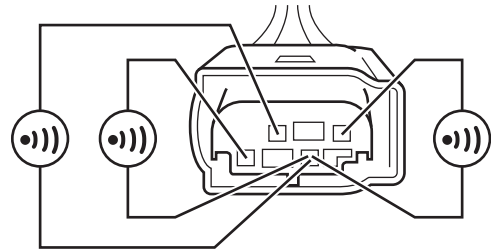
IJ31J1452061-01

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



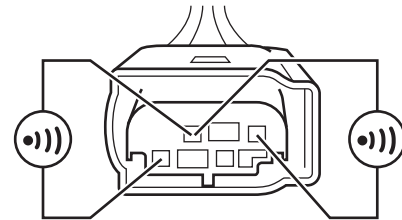
IJ31J1452062-01

- Between BI wire terminal and other terminal at IMU coupler: infinity



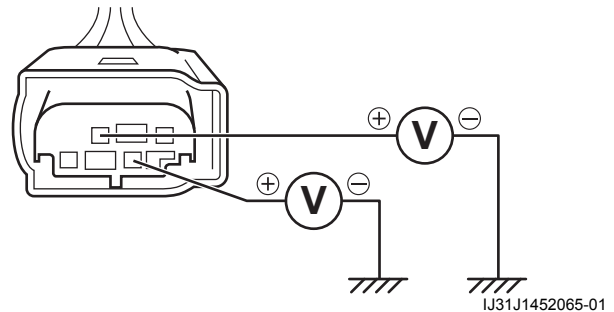
IJ31J1452063-01

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



IJ31J1452064-01

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



IJ31J1452065-01

Is check result OK?

- Yes Replace the IMU referring to “IMU Removal and Installation”: L8 - (Page 4E-79) or ABS control unit/HU referring to “ABS Control Unit / HU Removal and Installation”: L8 - (Page 4E-78) and inspect it again.
- No Repair or replace the defective wire harness.

DTC C1672 (72)

BENJ31J34524022

Possible Cause
CAN Bus Malfunction Faulty IMU, Faulty ABS control unit/HU

- 1) Replace the IMU referring to "IMU Removal and Installation": L8 - (Page 4E-79) or ABS control unit/HU referring to "ABS Control Unit / HU Removal and Installation": L8 - (Page 4E-78)
- 2) Confirm that the DTC is not indicated by using SDS-II or mode select switch. ⚙️ (Page 4E-54)

DTC C1681 (81)

BENJ31J34524023

Possible Cause
ABS Pressure Sensor Malfunction Faulty ABS control unit/HU

- 1) Replace the ABS control unit/HU. ⚙️ (Page 4E-78)
- 2) Confirm that the DTC is not indicated by using SDS-II or mode select switch. ⚙️ (Page 4E-54)

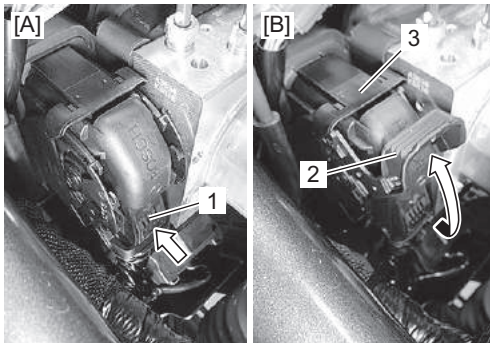
Repair Instructions

ABS Control Unit Coupler Disconnect and Connect

BENJ31J34526001

Disconnect

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-33)
- 3) Remove the seat heat shield. (Page 9D-32)
- 4) Push the tab (1) and pull up the lock lever (2) and disconnect the ABS control unit coupler (3).



IJ31J1452034-01

[A]: Locked position

[B]: Unlocked position

Connect

- 1) Connect the ABS control unit coupler.
- 2) Install the seat heat shield. (Page 9D-32)
- 3) Install the seat. (Page 9D-33)

ABS Control Unit / HU Removal and Installation

BENJ31J34526002

Removal

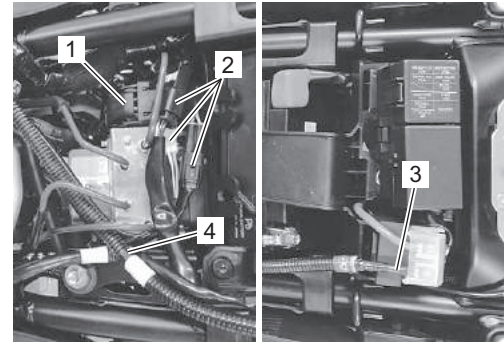
▲ WARNING

When storing the brake fluid, seal the container completely and keep away from children.

NOTICE

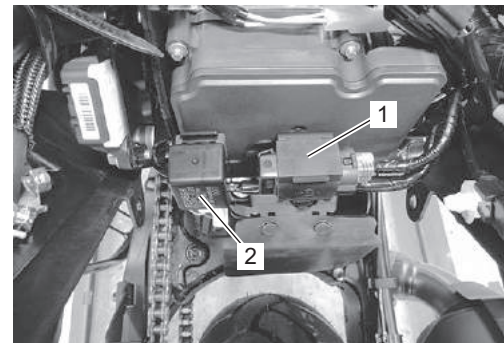
- This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not mix different types of fluid such as silicone-based or petroleum-based.
- Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for 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 ABS control unit coupler (1), harness couplers (2) and starter motor lead wire (3).
- 4) Remove the clamp (4).



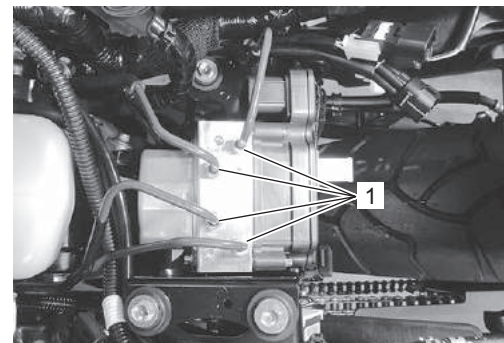
IJ31J1452050-01

- 5) Remove the battery holder. (Page 9D-37)
- 6) Disconnect the TO sensor (1) and turn signal relay (2).



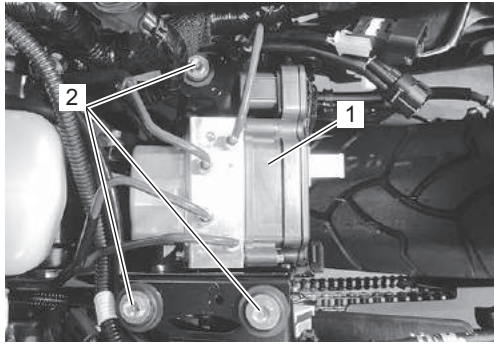
IJ31J1452051-01

- 7) Remove the IMU. (Page 4E-79)
- 8) Loosen the flare nuts (1) and disconnect the brake pipes.



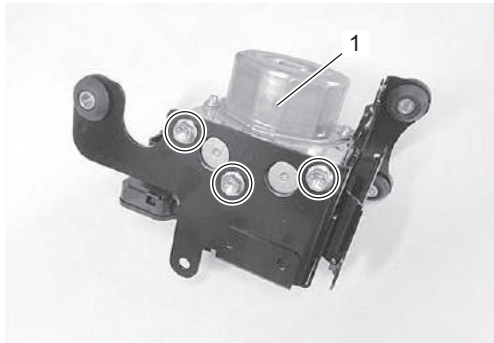
IJ31J1452052-01

- 9) Remove the ABS control unit/HU assembly (1) by removing the holder mounting bolts (2).



IJ31J1452053-01

- 10) Remove the ABS control unit/HU (1) from the holder.



IJ31J1452054-01

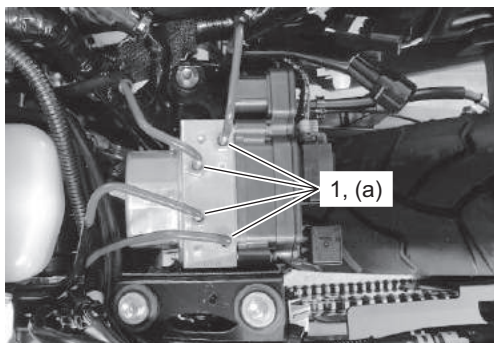
Installation

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

- Route the brake hoses correctly.
 - Front brake hose: (Page 4A-2)
 - Rear brake hose: (Page 4A-6)
- 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, 11.5 lbf-ft)



IJ31J1452055-01

- Bleed air from the brake fluid circuit. (Page 4A-12)

IMU Inspection

BENJ31J34526003

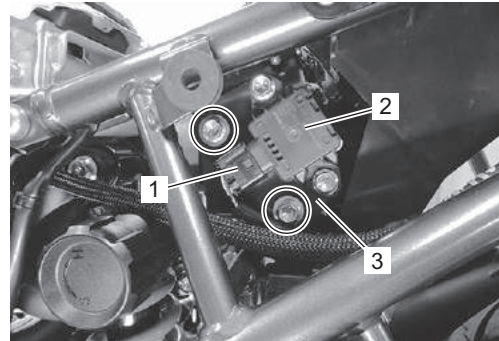
Check the IMU output value under the “Scan Tool Data”: L8 - (Page 4E-62).

IMU Removal and Installation

BENJ31J34526004

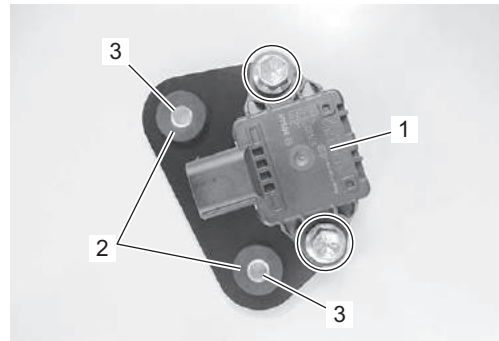
Removal

- 1) Turn the ignition switch “OFF”.
- 2) Remove the left frame cover. (Page 9D-33)
- 3) Disconnect the IMU coupler (1).
- 4) Remove the IMU (2) with a bracket (3).



IJ31J1452037-01

- 5) Remove the IMU (1), bushings (2) and collars (3).



IJ31J1452038-02

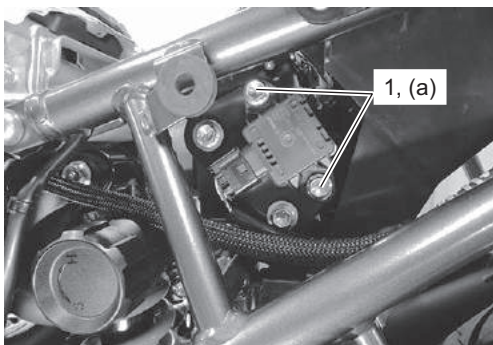
Installation

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

- If bushing is worn or damaged, replace the bushing with a new one.
- When replacing the bushing, replace all two bushings.
- Tighten the IMU bolts (1) to the specified torque.

Tightening torque

IMU bolt (a): 7 N·m (0.7 kgf-m, 5.5 lbf-ft)



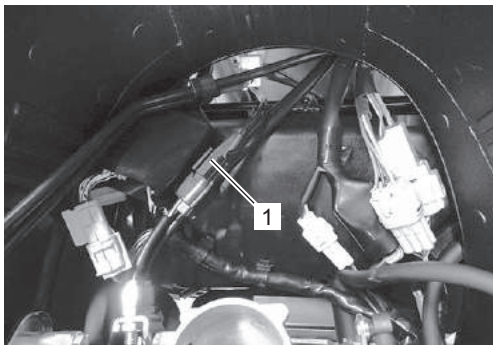
IJ31J1452039-01

Front Wheel Speed Sensor Removal and Installation

BENJ31J34526005

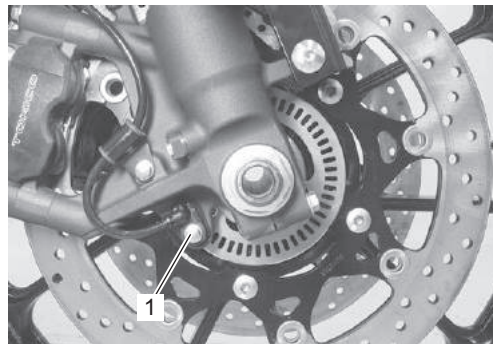
Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Disconnect the front wheel speed sensor lead wire coupler (1).



IJ31J1452035-01

- 4) Remove the front wheel speed sensor mounting bolt (1).



IE31J1450058-01

- 5) Remove the front wheel speed sensor as shown in the front wheel speed sensor routing diagram. (Page 4E-49)

Installation

Install the front wheel speed sensor in the reverse order of removal. Pay attention to the following points:

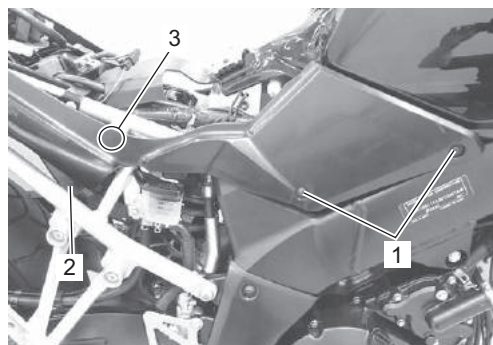
- Install the front wheel speed sensor as shown in the front wheel speed sensor routing diagram. (Page 4E-49)
- Check the clearance between the front wheel speed sensor and sensor rotor. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection": L8 - (Page 4E-82).

Rear Wheel Speed Sensor Removal and Installation

BENJ31J34526006

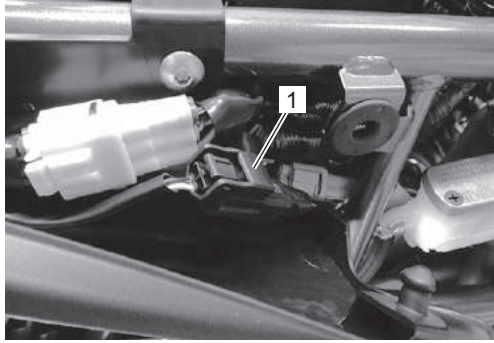
Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-33)
- 3) Remove the screws (1) and disconnect the clip (2) and hook (3).



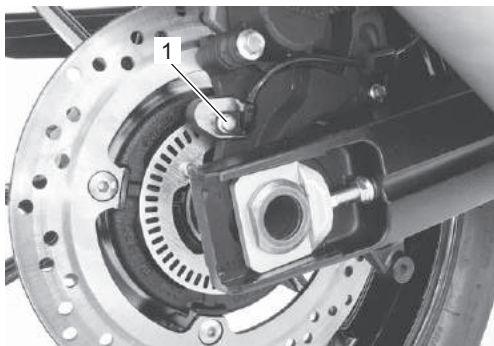
IE31J1450059-02

- 4) Disconnect the rear wheel speed sensor lead wire coupler (1).



IJ31J1452036-01

- 5) Remove the rear wheel speed sensor mounting bolt (1).



IE31J1450061-01

- 6) Remove the rear wheel speed sensor as shown in the rear wheel speed sensor routing diagram. (Page 4E-49)

Installation

Install the rear wheel speed sensor in the reverse order of removal. Pay attention to the following points:

- Install the rear wheel speed sensor as shown in the rear wheel speed sensor routing diagram. (Page 4E-49)
- Check the clearance between the rear wheel speed sensor and sensor rotor. Refer to “Wheel Speed Sensor and Sensor Rotor Inspection”: L8 - (Page 4E-82).

Front Wheel Speed Sensor Rotor Removal and Installation

BENJ31J34526007

NOTICE

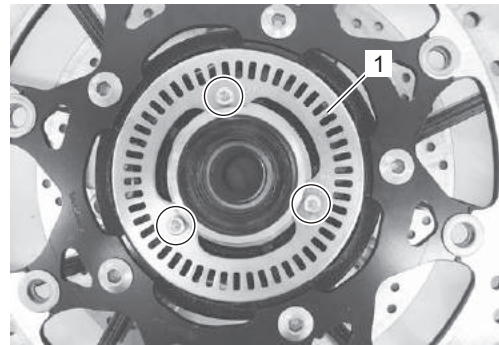
- Do not hit the front wheel speed sensor rotor when dismantling the front wheel.
- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel speed sensor or sensor rotor.

Removal

- 1) Remove the front wheel speed sensor rotor (1) by removing the bolts.

NOTICE

When replacing the tire, make sure not to damage the sensor rotor.



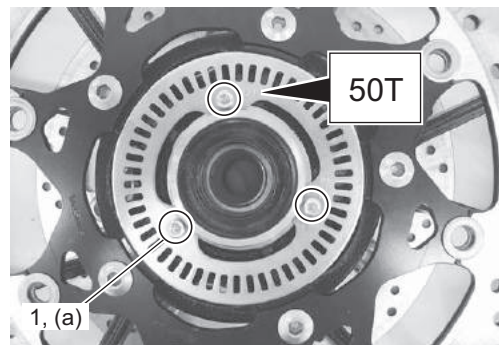
IE31J1450062-01

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 (0.65 kgf-m, 5.0 lbf-ft)



IE31J1450063-01

- 3) Check the clearance between the front wheel speed sensor and sensor rotor. Refer to “Wheel Speed Sensor and Sensor Rotor Inspection”: L8 - (Page 4E-82).

Rear Wheel Speed Sensor Rotor Removal and Installation

BENJ31J34526008

NOTICE

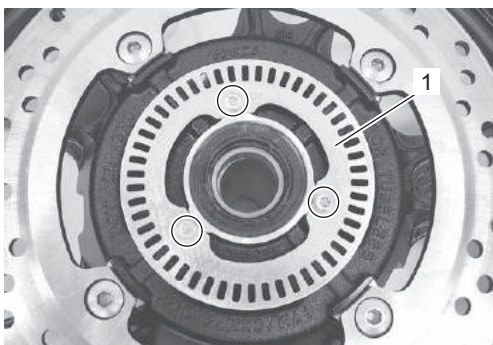
- Do not hit the rear wheel speed sensor rotor when dismantling the rear wheel.
- Keep any type of magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel speed sensor or sensor rotor.

Removal

- 1) Remove the rear wheel speed sensor rotor (1) by removing the bolts.

NOTICE

When replacing the tire, make sure not to damage the sensor rotor.



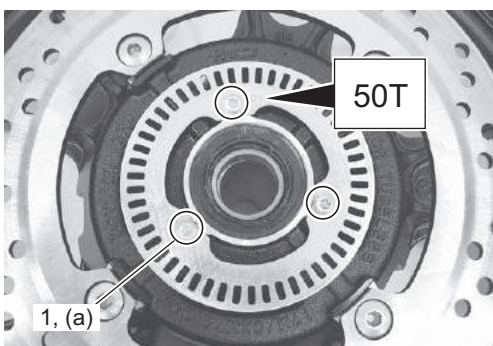
IE31J1450064-01

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 (0.65 kgf·m, 5.0 lbf·ft)



IE31J1450065-01

- 3) Check the clearance between the rear wheel speed sensor and sensor rotor. Refer to "Wheel Speed Sensor and Sensor Rotor Inspection": L8 - (Page 4E-82).

Wheel Speed Sensor and Sensor Rotor Inspection

BENJ31J34526009

Wheel Speed Sensor – Sensor Rotor Clearance

Check the clearance between the wheel speed sensor (1) and sensor rotor (2) using the thickness gauge.

Special tool

(A): 09900-20803

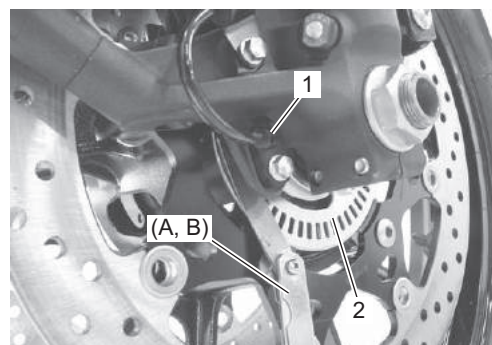
(B): 09900-20806

Front wheel speed sensor – Sensor rotor clearance

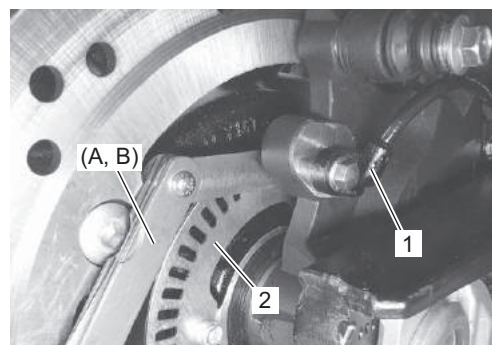
0.46 – 1.67 mm (0.018 – 0.066 in)

Rear wheel speed sensor – Sensor rotor clearance

0.51 – 1.62 mm (0.020 – 0.064 in)



IE31J1450066-01



IE31J1450067-01

Wheel Speed Sensor

- 1) Remove the wheel speed sensor.
 - Front: (Page 4E-80)
 - Rear wheel speed sensor: (Page 4E-80)
- 2) Inspect the wheel speed sensor for damage. Clean the sensor if any metal particle or foreign material stuck on it.



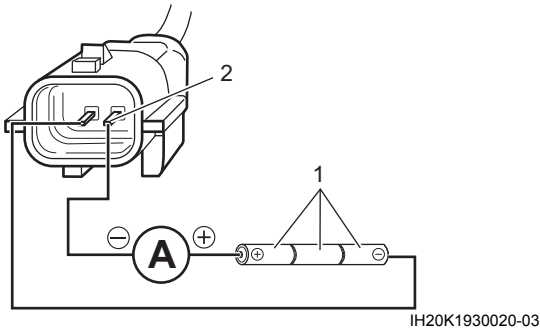
IE31J1450068-01

- 3) After finishing the speed sensor inspection, install the wheel speed sensor.
 - Front wheel speed sensor: ☞ (Page 4E-80)
 - Rear wheel speed sensor: ☞ (Page 4E-80)

Wheel Speed Sensor Current

- 1) Disconnect the wheel speed sensor coupler.
 - Front: ☞ (Page 4E-80)
 - Rear: ☞ (Page 4E-80)
- 2) Connect three 1.5 V dry cells (1) in series as shown and make sure that their total voltage is more than 4.5 V. Measure the current between (+) dry cells terminal and (2) (W) on the wheel speed sensor coupler.

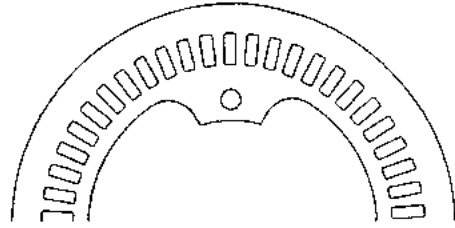
Normal value
5.9 – 16.8 mA



- 3) Install the removed parts.

Wheel Speed Sensor Rotor

- 1) Raise the wheel off the ground and support the motorcycle with a jack.
- 2) Check that no wheel speed sensor rotor teeth are broken and that no foreign objects are caught in the wheel speed sensor. If any defects are found, replace the wheel speed sensor rotor with a new one.
 - Front: ☞ (Page 4E-81)
 - Rear: ☞ (Page 4E-82)



I718H1450064-01

Specifications

Tightening Torque Specifications

BENJ31J34527001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Brake pipe flare nut	16	1.6	11.5	☞ (Page 4E-79)
IMU bolt	7	0.7	5.5	☞ (Page 4E-80)
Wheel speed sensor rotor bolt	6.5	0.65	5.0	☞ (Page 4E-81) / ☞ (Page 4E-82)

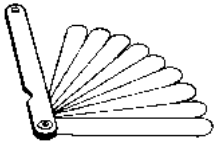
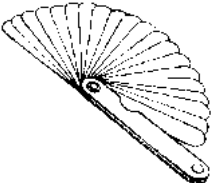
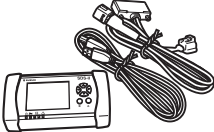
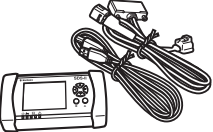
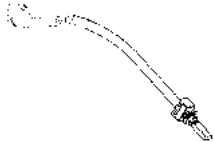
Reference:

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

BENJ31J34528001

<p>09900-20803 Thickness gauge ☞ (Page 4E-82)</p> 	<p>09900-20806 Thickness gauge ☞ (Page 4E-82)</p> 
<p>09904-41030 SDS-II set ☞ (Page 4E-57) / ☞ (Page 4E-59) / ☞ (Page 4E-59)</p> 	<p>09904-41040 SDS-II (oscilloscope) set ☞ (Page 4E-57) / ☞ (Page 4E-59) / ☞ (Page 4E-59)</p> 
<p>09930-82760 Mode selection switch ☞ (Page 4E-54) / ☞ (Page 4E-55)</p> 	

Section 5

Transmission / Transaxle

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Precautions

Precautions

Precautions for Transmission / Transaxle

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

BENJ31J35000001

Manual Transmission

Diagnostic Information and Procedures

Manual Transmission Symptom Diagnosis

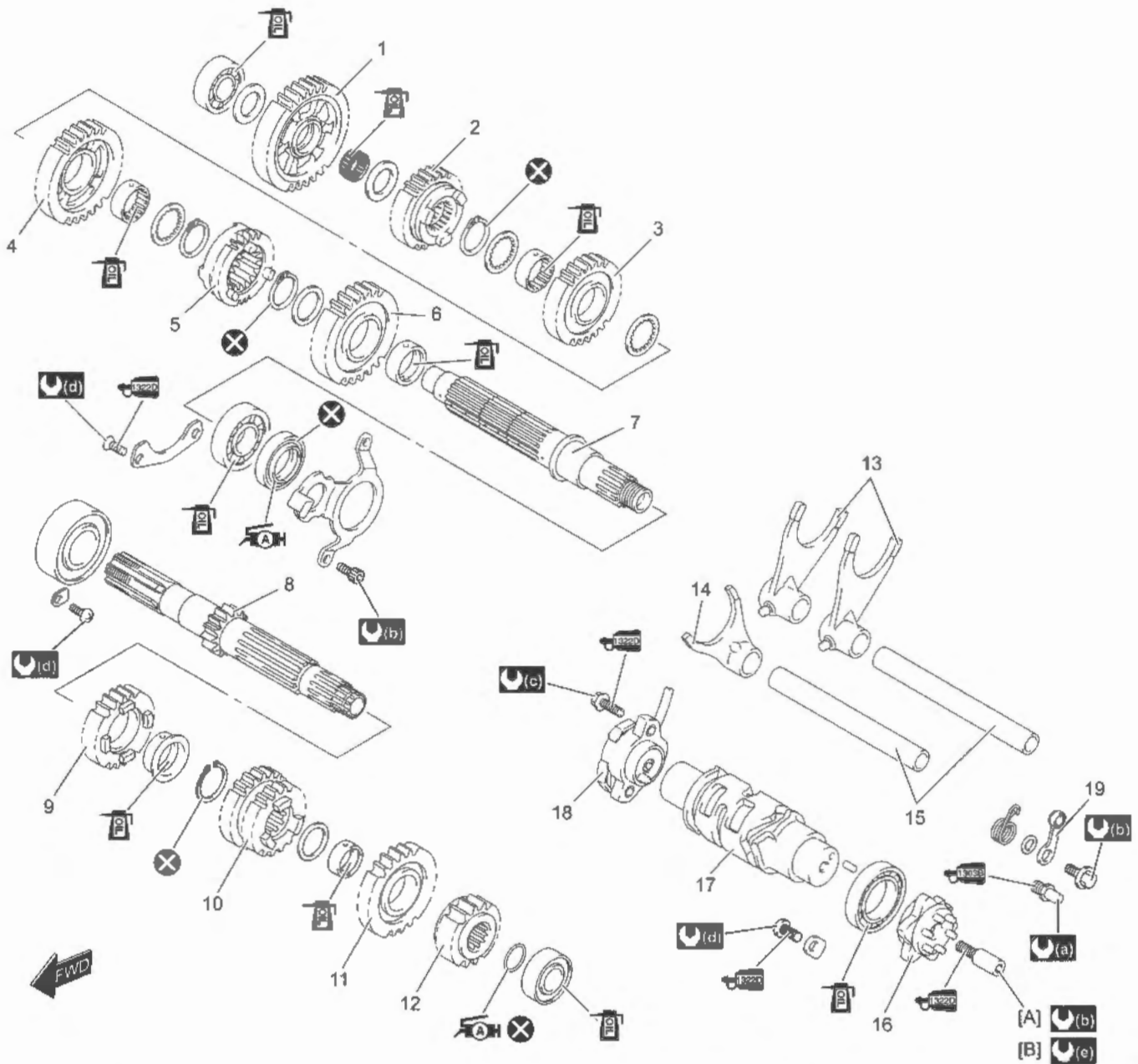
BENJ31J35204001

Condition	Possible cause	Correction / Reference Item
Noisy engine (Noise seems to come from the transmission)	Worn or rubbing gear.	Replace. ⌚(Page 5B-5)
	Worn countershaft spline.	Replace countershaft. ⌚(Page 5B-5)
	Worn driveshaft spline.	Replace driveshaft. ⌚(Page 5B-5)
	Worn bearing.	Replace. ⌚(Page 5B-8) ⌚(Page 5B-10)
Transmission will not shift	Broken gearshift cam.	Replace. ⌚(Page 5B-3)
	Distorted gearshift fork.	Replace. ⌚(Page 5B-3)
	Worn gearshift pawl.	Replace. ⌚(Page 5B-14)
Transmission will not shift back	Broken gearshift shaft return spring.	Replace. ⌚(Page 5B-14)
	Rubbing or stuck gearshift shaft.	Repair or replace. ⌚(Page 5B-14)
	Worn or distorted gearshift fork.	Replace. ⌚(Page 5B-3)
Transmission jumps out of gear	Worn shifting gears on driveshaft or countershaft.	Replace. ⌚(Page 5B-5)
	Worn or distorted gearshift fork.	Replace. ⌚(Page 5B-3)
	Weakened gearshift cam stopper spring.	Replace. ⌚(Page 5B-14)
	Worn gearshift cam plate.	Replace. ⌚(Page 5B-14)

Repair Instructions

Transmission Components

BENJ31J35206001



IJ31J1520001-01

[A]: L4 - L6	10. 3rd/4th drive gear	[b] : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
[B]: L8 -	11. 6th drive gear	[c] : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
1. 1st driven gear	12. 2nd drive gear	[d] : 8.5 N·m (0.85 kgf-m, 6.5 lbf-ft)
2. 5th driven gear	13. Gearshift fork No. 1	[e] : 13 N·m (1.3 kgf-m, 9.5 lbf-ft)
3. 4th driven gear	14. Gearshift fork No. 2	[A] : Apply engine oil.
4. 3rd driven gear	15. Gearshift fork shaft	[AH] : Apply grease.
5. 6th driven gear	16. Gearshift cam plate	[IR21X] : Apply thread lock to thread part.
6. 2nd driven gear	17. Gearshift cam	[IR22X] : Apply thread lock to thread part.
7. Driveshaft	18. GP switch	[X] : Do not reuse.
8. Countershaft/1st drive gear	19. Gearshift cam stopper	
9. 5th drive gear	[a] : 19 N·m (1.9 kgf-m, 14.0 lbf-ft)	

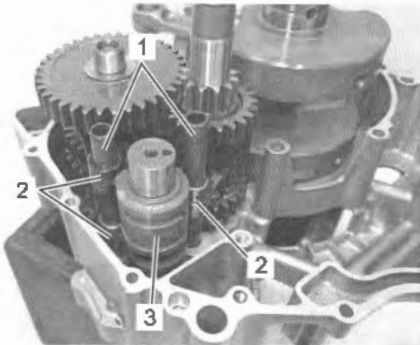
Transmission Removal and Installation

BENJ31J35206002

Refer to "Crankcase Assembly Disassembly" in Section 1D (Page 1D-54) and "Crankcase Assembly Reassembly" in Section 1D (Page 1D-58).

Removal

- 1) Remove the gearshift fork shafts (1), gearshift forks (2) and gearshift cam (3).



IE31J1520001-01

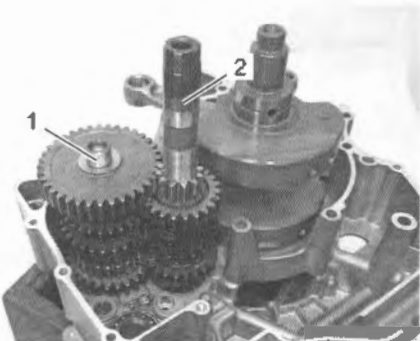
- 2) Remove the driveshaft assembly (1) with the countershaft assembly (2).



IE31J1520002-01

Installation

- 1) Install the driveshaft assembly (1) with the countershaft assembly (2).

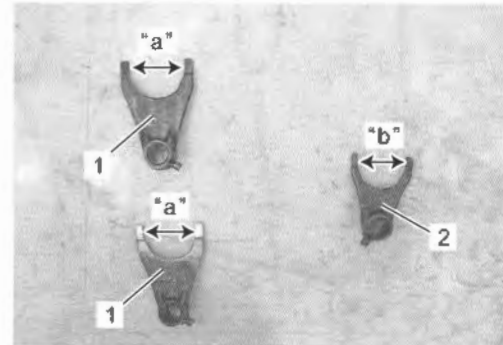


IE31J1520003-01

- 2) Install the gearshift forks No. 1 (1) and No. 2 (2).

NOTE

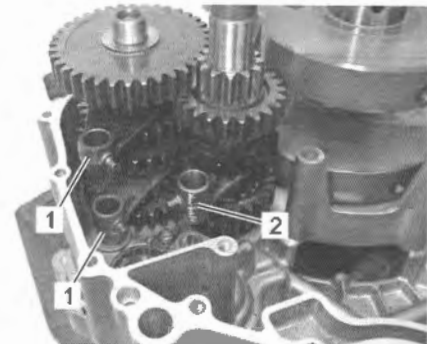
The gearshift forks No. 1 (1) are same parts.



IE31J1520004-02

"a": 40 mm (1.6 in)

"b": 36 mm (1.4 in)

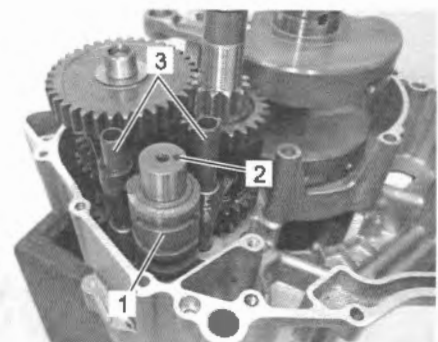


IE31J1520005-02

- 3) Install the gearshift cam (1) so that the hole (2) face upward.
- 4) Install the gearshift fork shafts (3).

NOTE

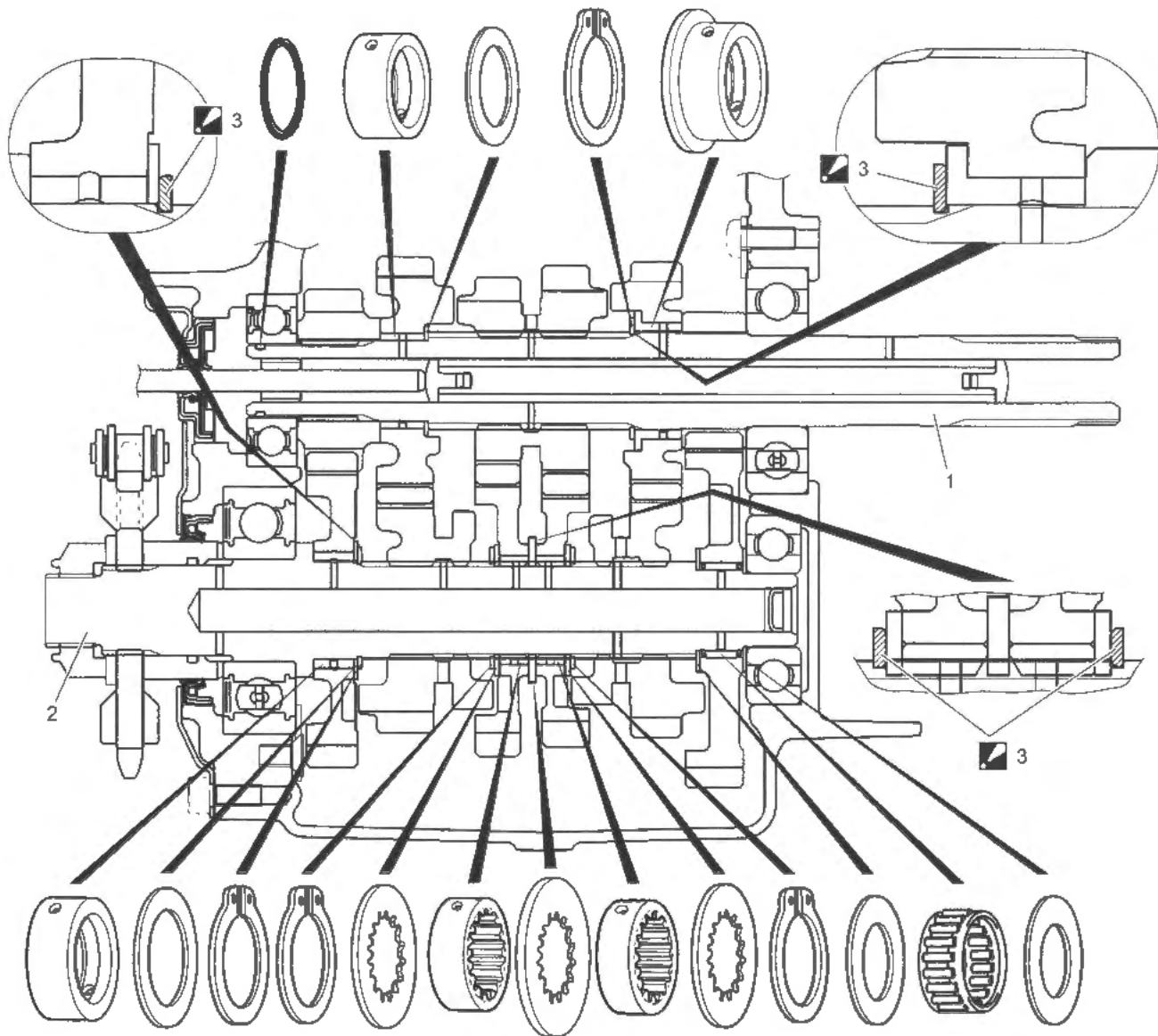
- After the gearshift fork shafts and gearshift forks have been fitted, make sure that the gears engage normally.
- Set the transmission gears to the neutral position.



IE31J1520006-01

Transmission Construction

BENJ31J35206003



IE31J1520007-02

1. Countershaft	2. Driveshaft	 3. Snap ring : Face the sharp edge outside.
-----------------	---------------	--

Countershaft Assembly / Driveshaft Assembly Disassembly and Reassembly

BENJ31J35206004

Refer to "Transmission Removal and Installation" (Page 5B-3).

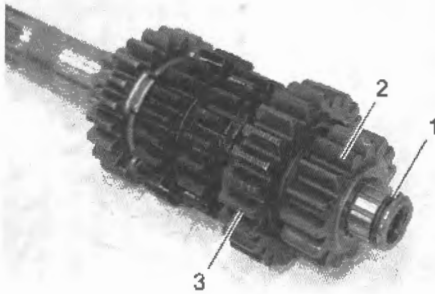
Disassembly

NOTE

Identify the position of each removed part.
Organize the parts in their respective groups
(i.e., drive or driven) so that they can be
reinstalled in their original positions.

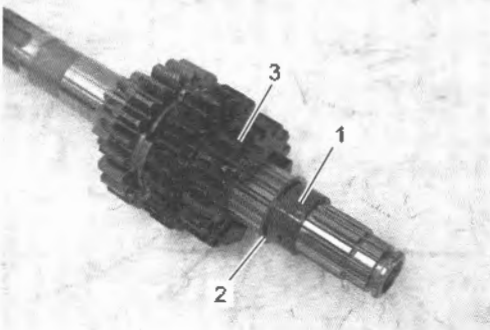
Countershaft

- 1) Remove the O-ring (1), 2nd drive gear (2) and 6th drive gear (3).



IE31J1520009-01

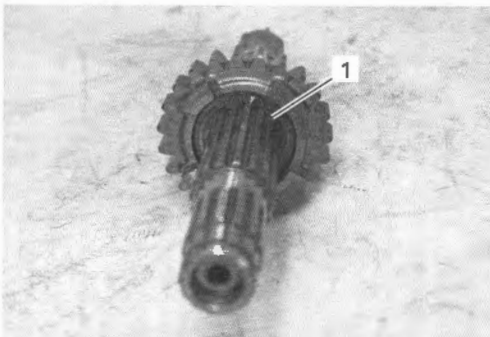
- 2) Remove the 6th drive gear bushing (1), washer (2), and 3rd/4th drive gear (3).



IE31J1520010-01

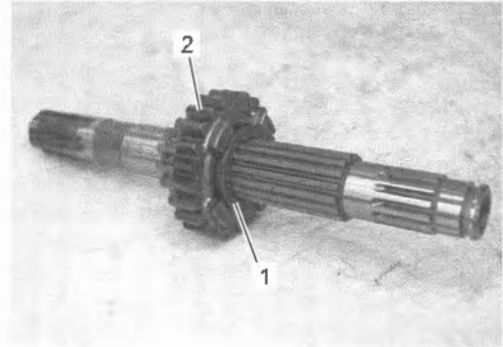
- 3) Remove the snap ring (1).

Special tool
09900-06107



IE31J1520011-01

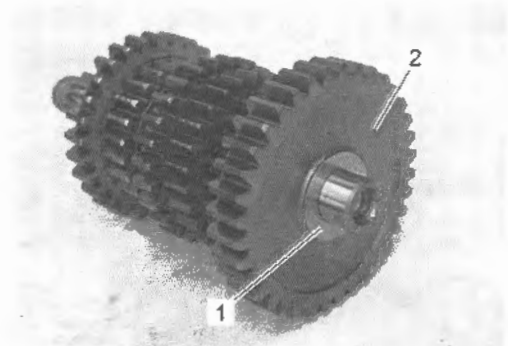
- 4) Remove the 5th drive gear bushing (1) and 5th drive gear (2).



IE31J1520012-01

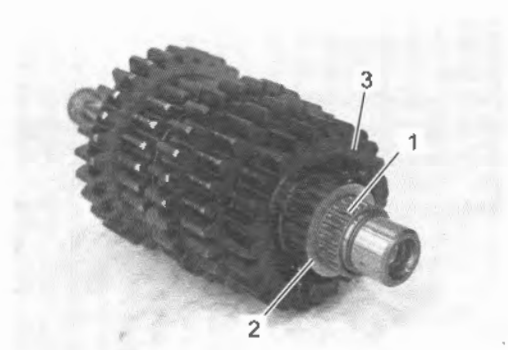
Driveshaft

- 1) Remove the washer (1) and 1st driven gear (2).



IE31J1520013-01

- 2) Remove the 1st driven gear bearing (1), washer (2) and 5th driven gear (3).

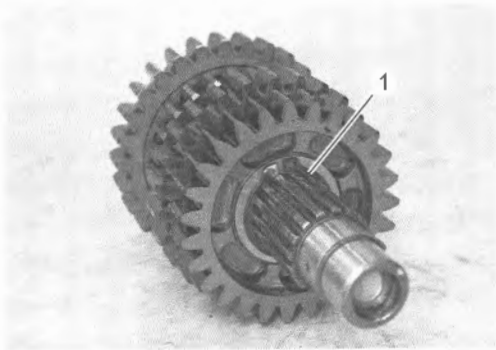


IE31J1520014-01

5B-6 Manual Transmission:

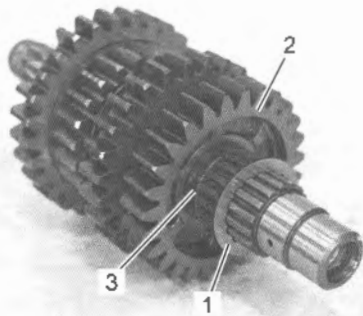
3) Remove the snap ring (1).

Special tool
09900-06107



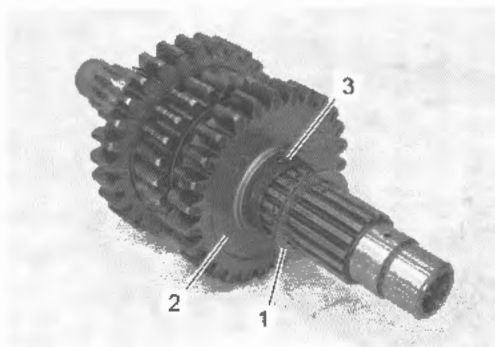
IE31J1520015-01

4) Remove the washer (1), 4th driven gear (2) and 4th driven gear bushing (3).



IE31J1520016-02

5) Remove the washer (1), 3rd driven gear (2) and 3rd driven gear bushing (3).

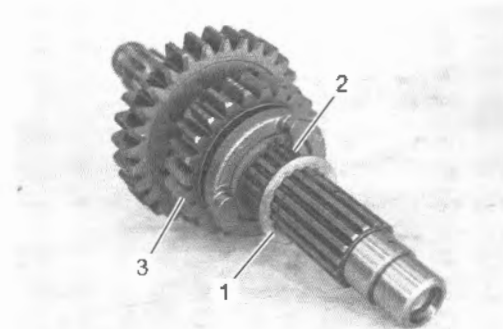


IE31J1520017-01

6) Remove the washer (1) and snap ring (2).

Special tool
09900-06107

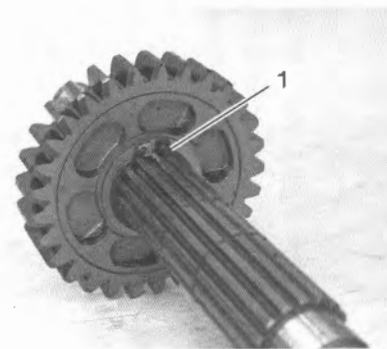
7) Remove the 6th driven gear (3).



IE31J1520018-01

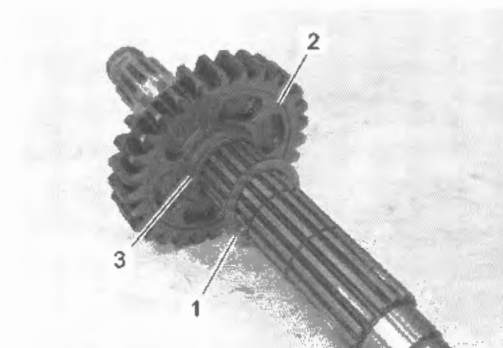
8) Remove the snap ring (1).

Special tool
09900-06107



IE31J1520020-01

9) Remove the washer (1), 2nd driven gear (2) and 2nd driven gear bushing (3).



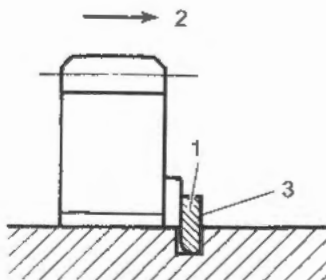
IE31J1520021-01

Reassembly

Reassemble the countershaft and driveshaft in the reverse order of disassembly. Pay attention to the following points:

NOTE

- When reassembling the transmission gears, attention must be given to the locations and positions of washers and snap rings. The cross sectional view shows the correct position of the gears, bushings, washers and snap rings. Refer to "Transmission Construction" (Page 5B-4).
 - When installing a new snap rings, do not expand the end gap larger than required to slip the snap rings over the shaft.
 - After installing a snap rings, make sure that it is completely seated in its groove and securely fitted.
 - Rotate the bearing to inspect for abnormal noises and smooth rotation. Replace the bearing if there is anything unusual.
 - Before installing the gears, apply engine oil to each rotating and sliding part.
- When installing a new snap ring (1), pay attention to its direction. Fit it to the side where the thrust (2) is as shown in the illustration.

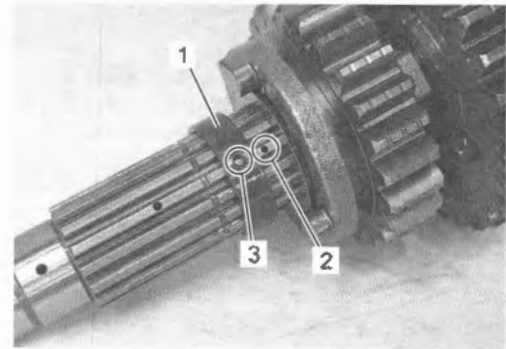


IE31J1520022-01

3. Sharp edge

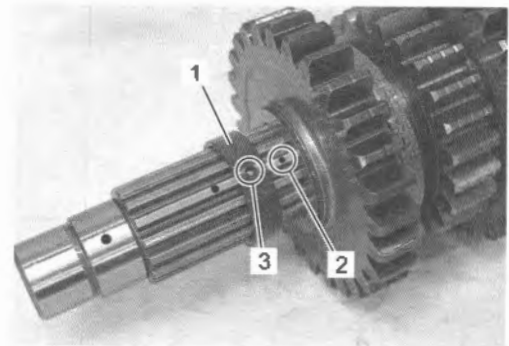
Driveshaft

- When installing the 3rd driven gear bushing (1) onto the driveshaft, align the shaft oil hole (2) with the bushing oil hole (3).



IE31J1520023-01

- When installing the 4th driven gear bushing (1) onto the driveshaft, align the shaft oil hole (2) with the bushing oil hole (3).



IE31J1520024-01

Countershaft

- Apply grease to the new O-ring (1).

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



IE31J1520025-01

Gearshift Fork / Gearshift Cam Inspection

BENJ31J35206005

Refer to "Countershaft Assembly / Driveshaft Assembly Disassembly and Reassembly" (Page 5B-5).

Gearshift Fork to Groove Clearance

NOTE

The clearance for each gearshift fork plays an important role in the smoothness and positiveness of the shifting action.

Using a thickness gauge, check the gearshift fork clearance in the groove of its gear. If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

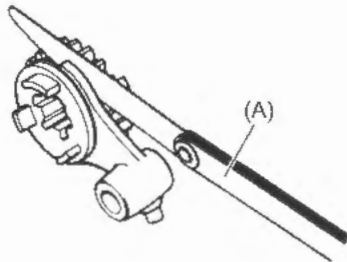
Special tool

(A): 09900-20803

Gearshift fork to groove clearance

Standard: 0.1 – 0.3 mm (0.004 – 0.012 in)

Service limit: 0.5 mm (0.020 in)



IE31J1520026-01

Gearshift Fork Groove Width

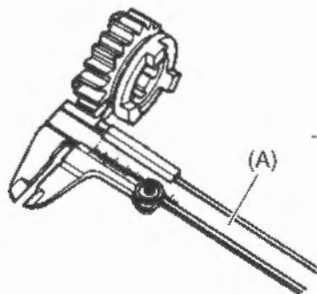
Measure the gearshift fork groove width using the vernier calipers.

Special tool

(A): 09900-20102

Gearshift fork groove width

Standard (No. 1, 2): 5.0 – 5.1 mm (0.197 – 0.201 in)



IE31J1520027-01

Gearshift Fork Thickness

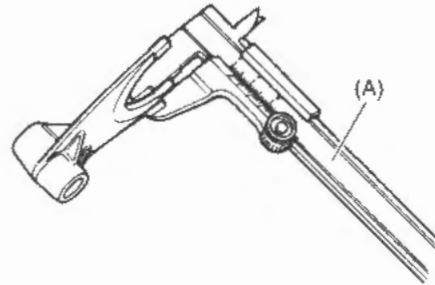
Measure the gearshift fork thickness using the vernier calipers.

Special tool

(A): 09900-20102

Gearshift fork thickness

Standard (No. 1, 2): 4.8 – 4.9 mm (0.189 – 0.193 in)



IE31J1520028-01

Gearshift Cam

Inspect the gearshift cam groove for abnormal wear and damage. If any defects are found, replace the gearshift cam with a new one.



IE31J1520029-01

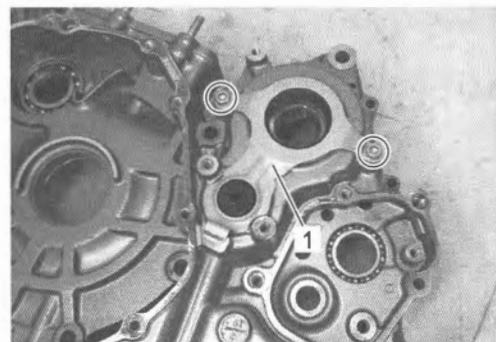
Left Crankcase Bearing / Oil Seal Removal and Installation

BENJ31J35206006

Refer to "Crankshaft Assembly Removal and Installation" in Section 1D (Page 1D-61) and "Transmission Removal and Installation" (Page 5B-3).

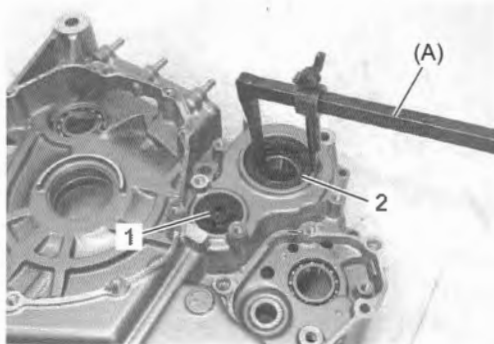
Removal

- 1) Remove the oil seal retainer (1).



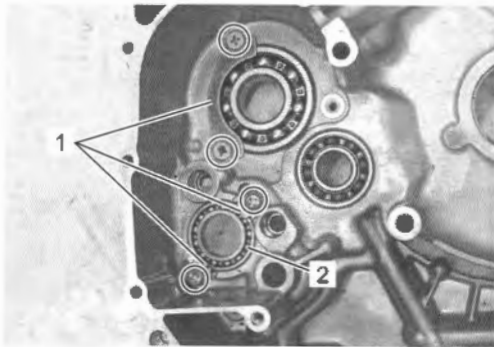
IE31J1520030-01

- 2) Remove the clutch push rod oil seal (1).
- 3) Remove the driveshaft oil seal (2) using the special tool.

Special tool**(A): 09913-50121**

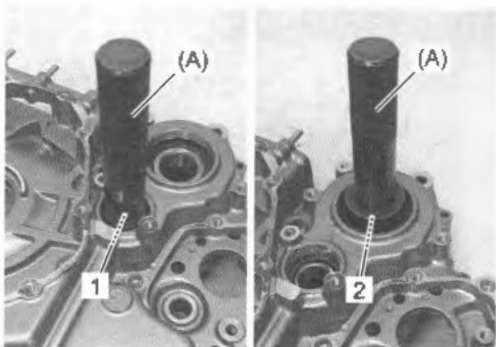
IE31J1520031-01

- 4) Remove the bearing retainers (1).
- 5) Remove the gearshift cam bearing (2).



IE31J1520032-01

- 6) Remove the countershaft bearing (1) and driveshaft bearing (2) using the special tool.

Special tool**(A): 09913-70210**

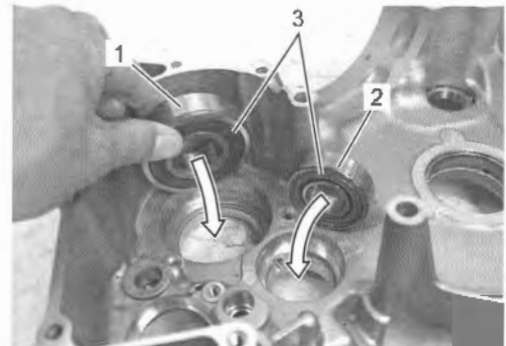
IE31J1520033-01

Installation

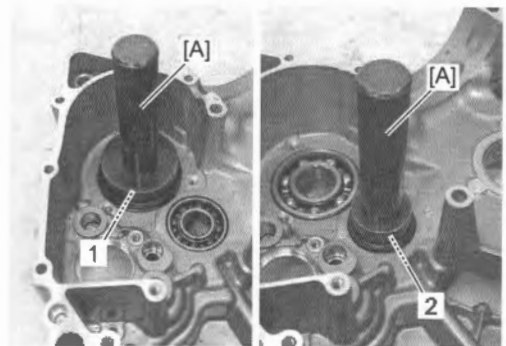
- 1) Install the new driveshaft bearing (1) and new countershaft bearing (2) using the special tool.

NOTE

The sealed side (3) of the bearings faces outside.

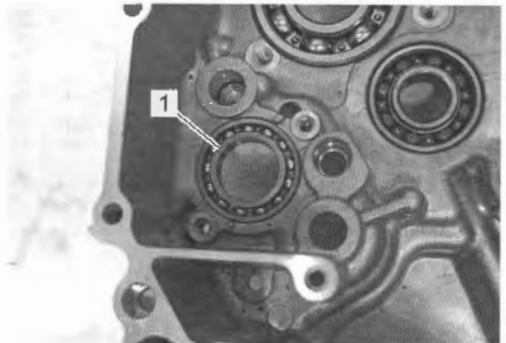
Special tool**(A): 09913-70210**

IE31J1520034-01



IE31J1520035-01

- 2) Install the gearshift cam bearing (1).



IE31J1520036-01

3) Apply thread lock to the bearing retainer screws (1).

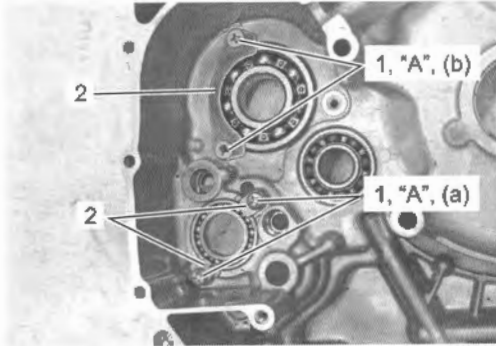
"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

4) Install the bearing retainers (2) and tighten the bearing retainer screws to the specified torque.

Tightening torque

Gearshift cam bearing retainer screw (a): 8.5 N·m (0.85 kgf-m, 6.5 lbf-ft)

Driveshaft bearing retainer screw (b): 8.5 N·m (0.85 kgf-m, 6.5 lbf-ft)

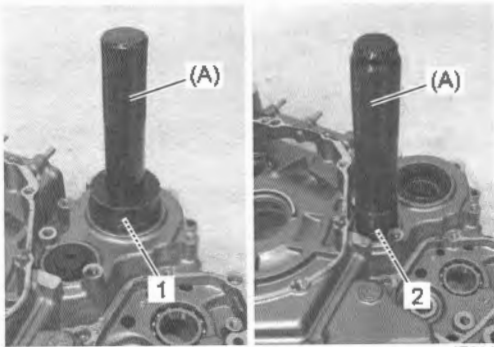


IE31J1520037-02

5) Install the new driveshaft oil seal (1) and new clutch push rod oil seal (2) using the special tool.

Special tool

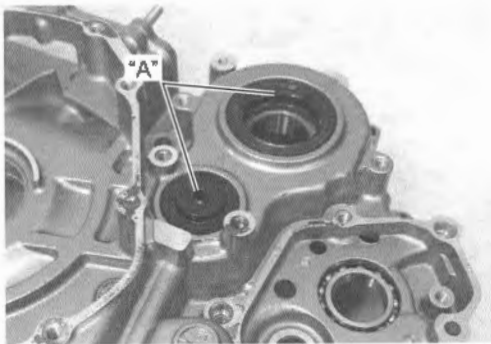
(A): 09913-70210



IE31J1520039-01

6) Apply grease to the oil seal lips.

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

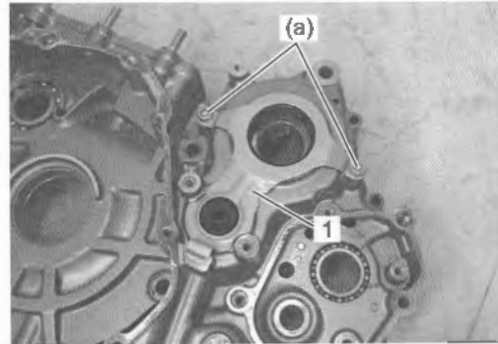


IE31J1520040-01

7) Install the oil seal retainer (1) and tighten its bolts to the specified torque.

Tightening torque

Driveshaft oil seal retainer bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1520041-01

Right Crankcase Bearing Removal and Installation

BENJ31J35206007

Refer to "Crankcase Assembly Disassembly" in Section 1D (Page 1D-54) and "Crankcase Assembly Reassembly" in Section 1D (Page 1D-58).

Removal

1) Remove the bearing retainer (1).



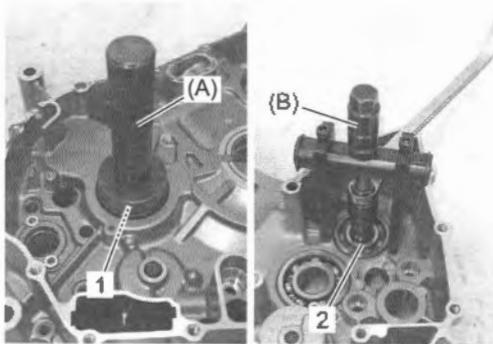
IE31J1520042-01

- 2) Remove the countershaft bearing (1) using the special tool.

Special tool
(A): 09913-70210

- 3) Remove the driveshaft bearing (2) using the special tool.

Special tool
(B): 09921-20240

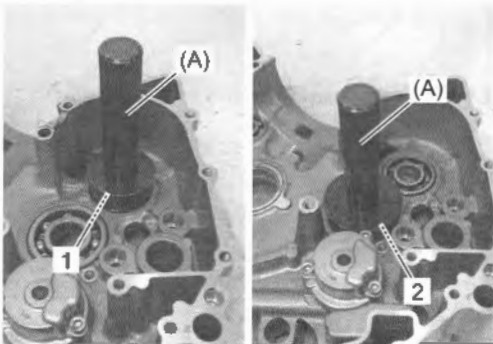


IE31J1520043-02

Installation

- 1) Install the new driveshaft bearing (1) and new countershaft bearing (2) using the special tool.

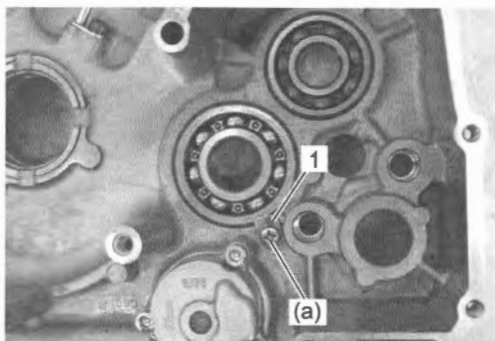
Special tool
(A): 09913-70210



IE31J1520044-01

- 2) Install the bearing retainer (1) and tighten its screw to the specified torque.

Tightening torque
Countershaft bearing retainer screw (a): 8.5 N·m
(0.85 kgf-m, 6.5 lbf-ft)



IE31J1520045-01

Transmission Bearing / Oil Seal Inspection

BENJ31J35206008

Refer to "Crankcase Bearing / Oil Seal Inspection" in Section 1D (Page 1D-68).

GP Switch Inspection

BENJ31J35206009

Refer to "Side-stand / Ignition Interlock System Parts Inspection" in Section 1I (Page 1I-10).

GP Switch Removal and Installation

BENJ31J35206010

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the seat.
 - L4 - L6 model: ☞ (Page 9D-10)
 - L8 - model: ☞ (Page 9D-33)
- 3) Remove the right frame cover screws (1).



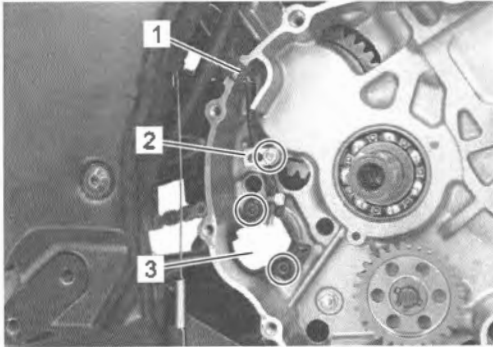
IE31J1520046-01

- 4) Disconnect the GP switch coupler (1).



IE31J1520047-01

- 5) Remove the clutch component parts. (Page 5C-15)
- 6) Remove the grommet (1), GP switch lead wire clamp (2) and GP switch (3).

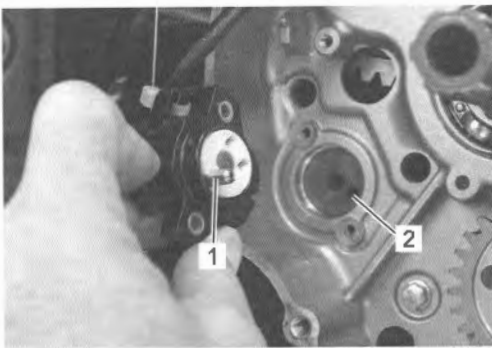


IE31J1520048-02

Installation

Install the GP switch in the reverse order of removal. Pay attention to the following points:

- Align the GP switch pin (1) with the gearshift cam hole (2).



IE31J1520049-01

- Apply thread lock to the GP switch mounting bolts (1) and tighten them to the specified torque.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

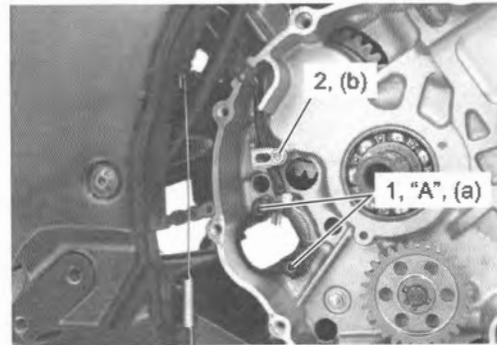
Tightening torque

GP switch mounting bolt (a): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

- Tighten the GP switch lead wire clamp bolt (2) to the specified torque.

Tightening torque

GP switch lead wire clamp bolt (b): 6.5 N·m (0.65 kgf-m, 5.0 lbf-ft)



IE31J1520050-01

- Route the GP switch lead wire. Refer to "Wiring Harness Routing Diagram": L4 - L6 in Section 9A (Page 9A-6) or "Wiring Harness Routing Diagram": L8 - in Section 9A (Page 9A-24).

Gearshift Lever Removal and Installation

BENJ31J35206011

Refer to "Gearshift Lever Construction" (Page 5B-13).

Removal

Remove the gearshift lever.

Installation

- 1) Install the gearshift lever.
- 2) Check the gearshift lever height. (Page 5B-13)

Gearshift Lever Height Inspection and Adjustment

BENJ31J35206012

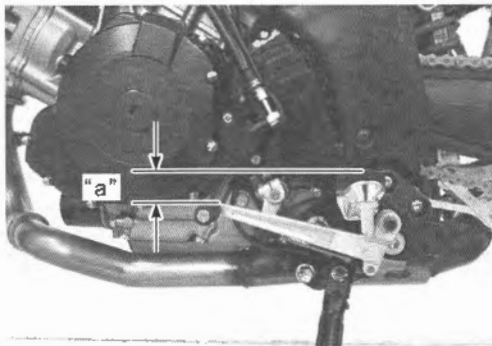
Inspection

Inspect the gearshift lever height "a" between the pedal top face and footrest.

Adjust the gearshift lever height if necessary.

Gearshift lever height "a"

Standard: 20 – 30 mm (0.8 – 1.2 in)



IE31J1520052-01

Adjustment

- 1) Loosen the lock-nuts (1).
- 2) Turn the gearshift link rod (2) in or out until the gearshift lever height is within the specification.

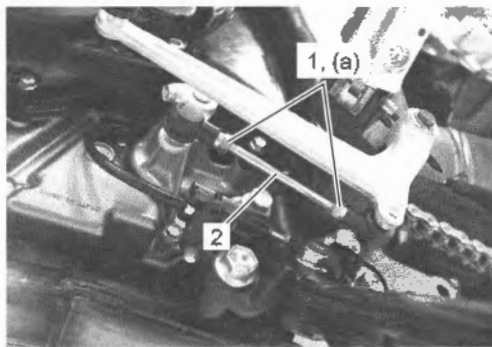
Gearshift lever height

Standard: 20 – 30 mm (0.8 – 1.2 in)

- 3) Tighten the lock-nuts (1) to the specified torque.

Tightening torque

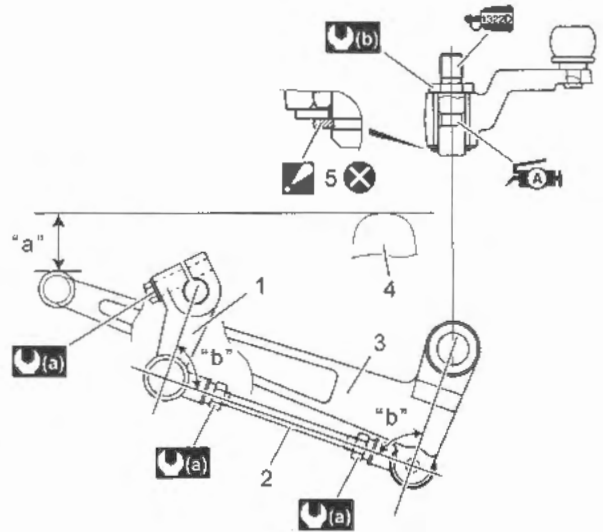
Gearshift link rod lock-nut (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1520053-02

Gearshift Lever Construction

BENJ31J35206013

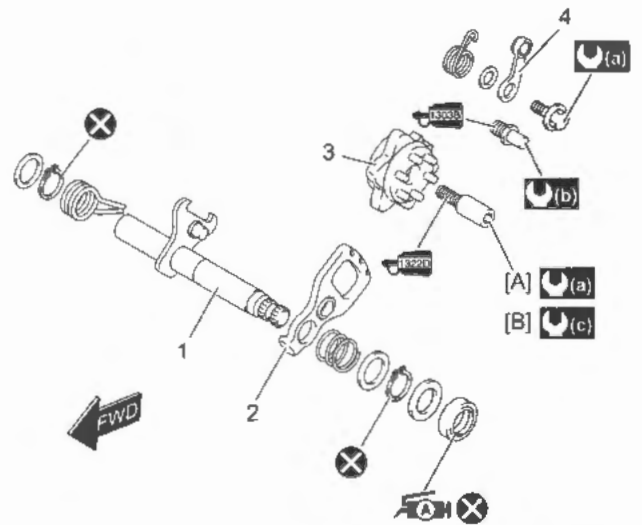


IE31J1520051-04

1. Gearshift link arm	"b": 90°
2. Gearshift link rod	(a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
3. Gearshift lever	(b): 40 N·m (4.0 kgf-m, 29.0 lbf-ft)
4. Footrest	TRIPLE: Apply thread lock to thread part.
5. Snap ring : Face the sharp edge outside.	TAH: Apply grease.
"a": 20 – 30 mm (0.8 – 1.2 in)	⊗: Do not reuse.

Gearshift Shaft / Gearshift Cam Plate Components

BENJ31J35206014



IJ31J1520002-01

[A]: L4 – L5	(b): 19 N·m (1.9 kgf-m, 14.0 lbf-ft)
[B]: L8 –	(c): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)
1. Gearshift shaft	TRIPLE: Apply thread lock to thread part.
2. Gearshift cam drive plate	TRIPLE: Apply thread lock to thread part.
3. Gearshift cam plate	TAH: Apply grease to oil seal lip.
4. Gearshift cam stopper	⊗: Do not reuse.
(a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	

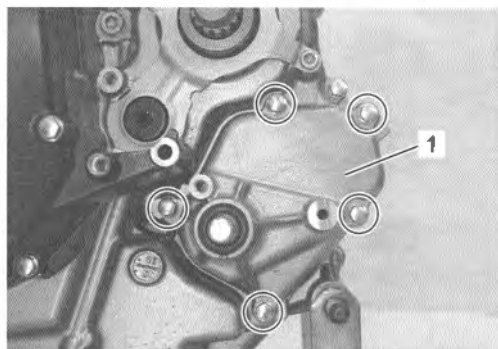
Gearshift Shaft / Gearshift Cam Plate Removal and Installation

BENJ31J35206015

Refer to "Engine Assembly Removal" in Section 1D (Page 1D-19) and "Engine Assembly Installation" in Section 1D (Page 1D-22).

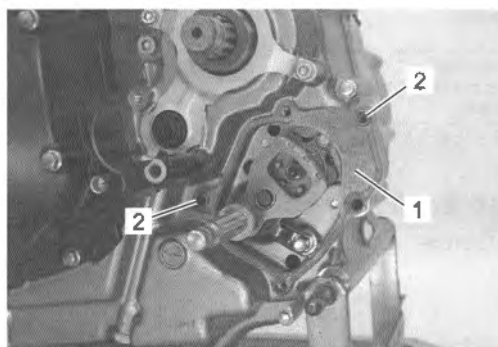
Removal

- 1) Remove the gearshift cover (1).



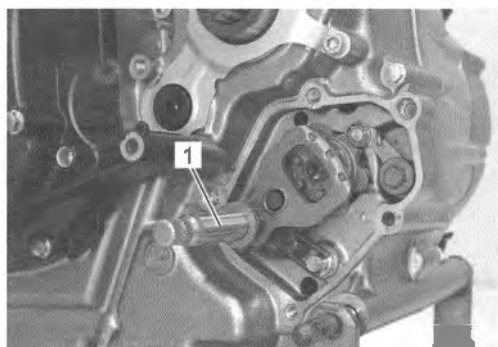
IE31J1520054-01

- 2) Remove the gasket (1) and dowel pins (2).



IE31J1520055-01

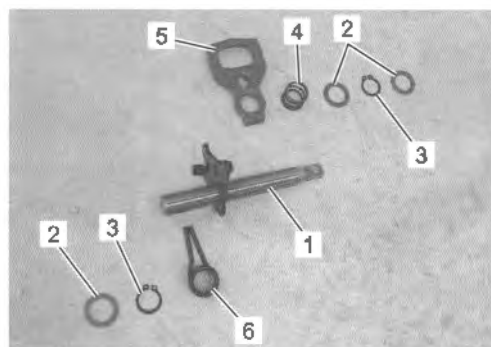
- 3) Remove the gearshift shaft assembly (1).



IE31J1520056-01

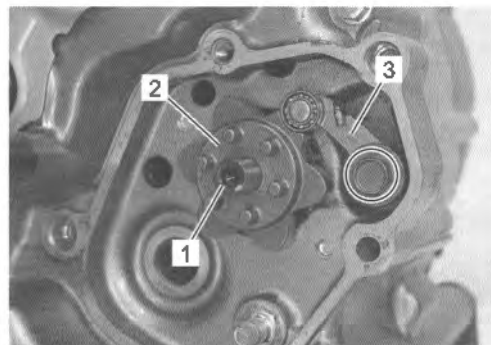
- 4) Remove the following parts from the gearshift shaft (1).
 - Washer (2)
 - Snap ring (3)
 - Spring (4)
 - Gearshift cam drive plate (5)
 - Gearshift shaft return spring (6)

Special tool
09900-06107



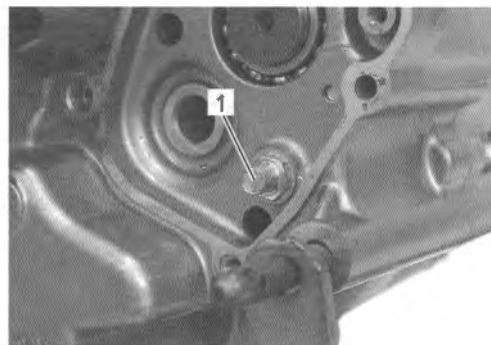
IE31J1520057-01

- 5) Remove the gearshift cam plate bolt (1) and gearshift cam plate (2).
- 6) Remove the gearshift cam stopper (3).



IE31J1520058-01

- 7) Remove the gearshift arm stopper (1).



IE31J1520059-01

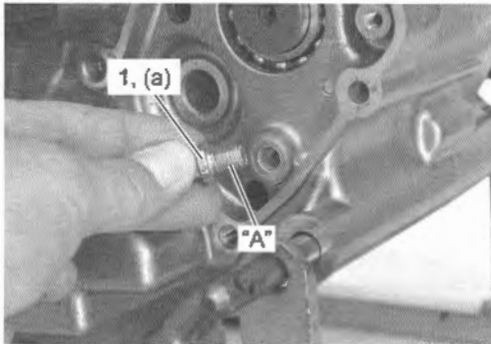
Installation

- 1) Apply a small quantity of thread lock to the gearshift arm stopper (1) and tighten it to the specified torque.

"A": Thread lock cement 99000-32030 (THREAD LOCK CEMENT 1303B)

Tightening torque

Gearshift arm stopper (a): 19 N·m (1.9 kgf-m, 14.0 lbf-ft)



IE31J1520060-01

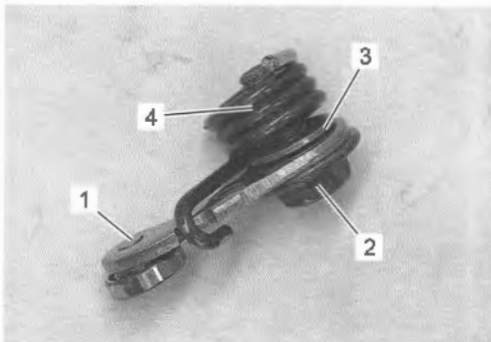
- 2) Install the gearshift cam stopper (1), bolt (2), washer (3) and spring (4).
- 3) Tighten the gearshift cam stopper bolt (2) to the specified torque.

NOTE

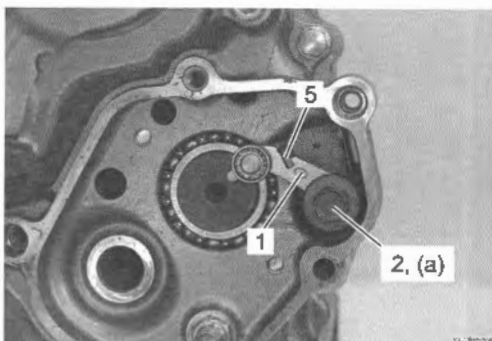
Hook the return spring end (5) to the gearshift cam stopper (1).

Tightening torque

Gearshift cam stopper bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1520061-01

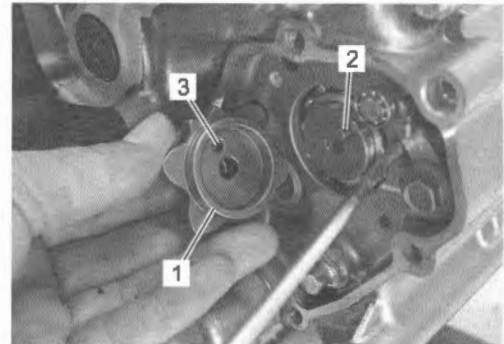


IE31J1520062-01

- 4) Check the gearshift cam stopper moves smoothly.
- 5) Locate the gearshift cam in the neutral position.
- 6) Install the gearshift cam plate (1).

NOTE

Align the gearshift cam pin (2) with the gearshift cam plate hole (3).



IE31J1520063-01

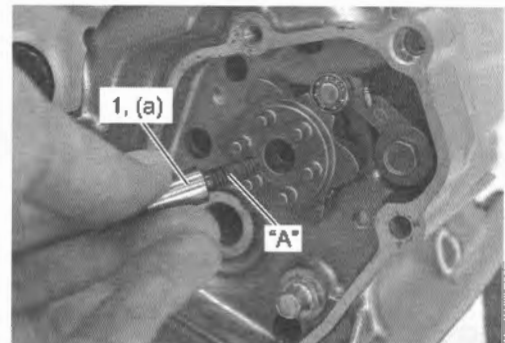
- 7) Apply a small quantity of thread lock to the gearshift cam plate bolt (1) and tighten it to the specified torque.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

Gearshift cam plate bolt (Up to L6 model) (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

Gearshift cam plate bolt (From L8 model) (a): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)

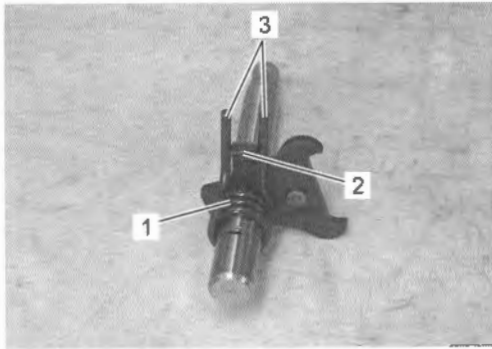


IE31J1520064-01

8) Install the gearshift shaft return spring (1).

NOTE

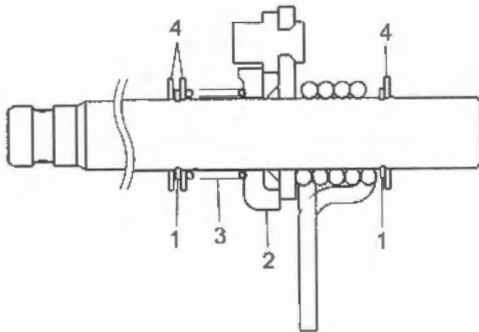
Position the stopper (2) of gearshift arm between the shaft return spring ends (3).



IE31J1520065-01

9) Install the following parts.

- New snap ring (1)
- Gearshift cam drive plate (2)
- Spring (3)
- Washer (4)

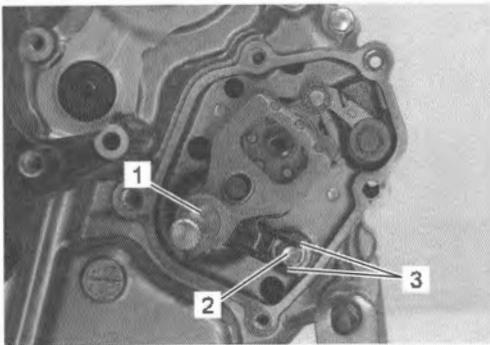


IE31J1520066-02

10) Install the gearshift shaft assembly (1).

NOTE

Pinch the gearshift arm stopper (2) with return spring ends (3).



IE31J1520067-01

11) Install the dowel pins (1) and new gasket (2).



IE31J1520068-01

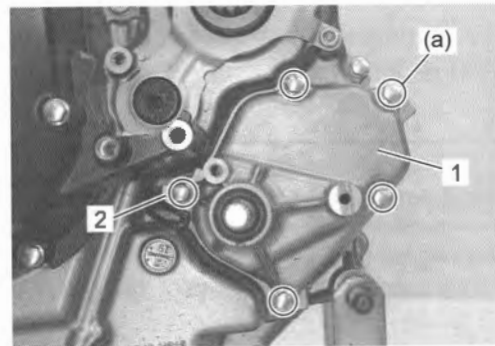
12) Install the gearshift cover (1) and tighten its bolts to the specified torque.

NOTE

Fit the clamp (2) to the bolt.

Tightening torque

Gearshift cover bolt (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)



IE31J1520069-01

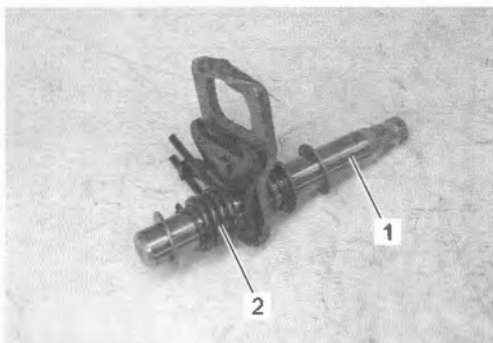
Gearshift Linkage Inspection

BENJ31J35206016

Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" (Page 5B-14).

Gearshift Shaft

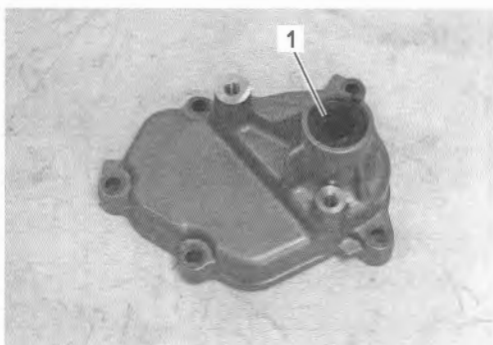
Check the gearshift shaft (1) for bend or wear.
Check the return spring (2) for damage or fatigue.
If any defects are found, replace the defective part(-s).



IE31J1520070-01

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.



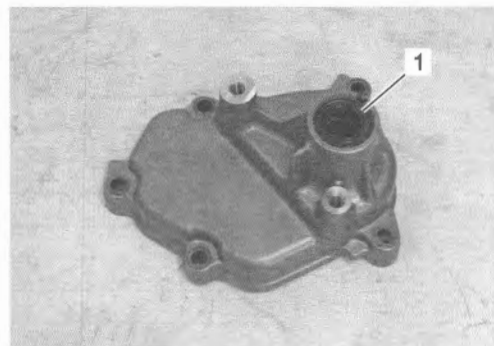
IE31J1520071-01

Gearshift Shaft Oil Seal Removal and Installation

BENJ31J35206017

Removal

- 1) Remove the gearshift cover. (Page 5B-14)
- 2) Remove the gearshift shaft oil seal (1).



IE31J1520072-01

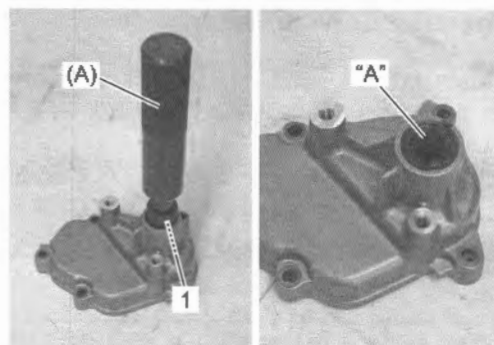
Installation

- 1) Install the new oil seal (1) with the special tool.

Special tool**(A): 09913-70210**

- 2) Apply grease to the oil seal lip.

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



IE31J1520073-01

Specifications

Tightening Torque Specifications

BENJ31J35207001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Gearshift cam bearing retainer screw	8.5	0.85	6.5	☞(Page 5B-10)
Driveshaft bearing retainer screw	8.5	0.85	6.5	☞(Page 5B-10)
Driveshaft oil seal retainer bolt	10	1.0	7.5	☞(Page 5B-10)
Countershaft bearing retainer screw	8.5	0.85	6.5	☞(Page 5B-11)
GP switch mounting bolt	6	0.6	4.5	☞(Page 5B-12)
GP switch lead wire clamp bolt	6.5	0.65	5.0	☞(Page 5B-12)
Gearshift link rod lock-nut	10	1.0	7.5	☞(Page 5B-13)
Gearshift arm stopper	19	1.9	14.0	☞(Page 5B-15)
Gearshift cam stopper bolt	10	1.0	7.5	☞(Page 5B-15)
Gearshift cam plate bolt (Up to L6 model)	10	1.0	7.5	☞(Page 5B-15)
Gearshift cam plate bolt (From L8 model)	13	1.3	9.5	☞(Page 5B-15)
Gearshift cover bolt	11	1.1	8.0	☞(Page 5B-16)

Reference:

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

“Transmission Components” (Page 5B-2)

“Gearshift Lever Construction” (Page 5B-13)

“Gearshift Shaft / Gearshift Cam Plate Components” (Page 5B-13)

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

Special Tools and Equipment

Recommended Service Material

BENJ31J35208001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞(Page 5B-7) / ☞(Page 5B-10) / ☞(Page 5B-17)
Thread lock cement	THREAD LOCK CEMENT 1303B	P/No.: 99000-32030	☞(Page 5B-15)
	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞(Page 5B-10) / ☞(Page 5B-12) / ☞(Page 5B-15)

NOTE

Required service material(s) is also described in:

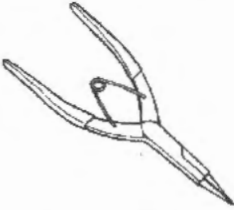

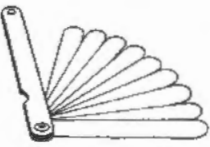


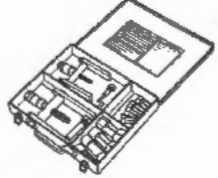
“Transmission Components” (Page 5B-2)

“Gearshift Lever Construction” (Page 5B-13)

“Gearshift Shaft / Gearshift Cam Plate Components” (Page 5B-13)

BENJ31J35208002

Special Tool

<p>09900-06107 Snap ring pliers (External) ☞ (Page 5B-5) / ☞ (Page 5B-6) / ☞ (Page 5B-6) / ☞ (Page 5B-6) / ☞ (Page 5B-14)</p>		<p>09900-20102 Vernier calipers (200 mm) ☞ (Page 5B-8) / ☞ (Page 5B-8)</p>	
<p>09900-20803 Thickness gauge ☞ (Page 5B-8)</p>		<p>09913-50121 Oil seal remover ☞ (Page 5B-9)</p>	
<p>09913-70210 Bearing installer set ☞ (Page 5B-9) / ☞ (Page 5B-9) / ☞ (Page 5B-10) / ☞ (Page 5B-11) / ☞ (Page 5B-11) / ☞ (Page 5B-17)</p>		<p>09921-20240 Bearing remover set ☞ (Page 5B-11)</p>	

Clutch

Precautions

Precautions for Clutch System

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

BENJ31J35300001

Clutch Fluid (Brake Fluid) Information

BENJ31J35300002

▲ WARNING

- This clutch control 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 clutch control system components, use new brake fluid. Never use cleaning solvent.
 - Clutch hose seal washers should be replaced with the new ones to prevent fluid leakage.
-

NOTICE

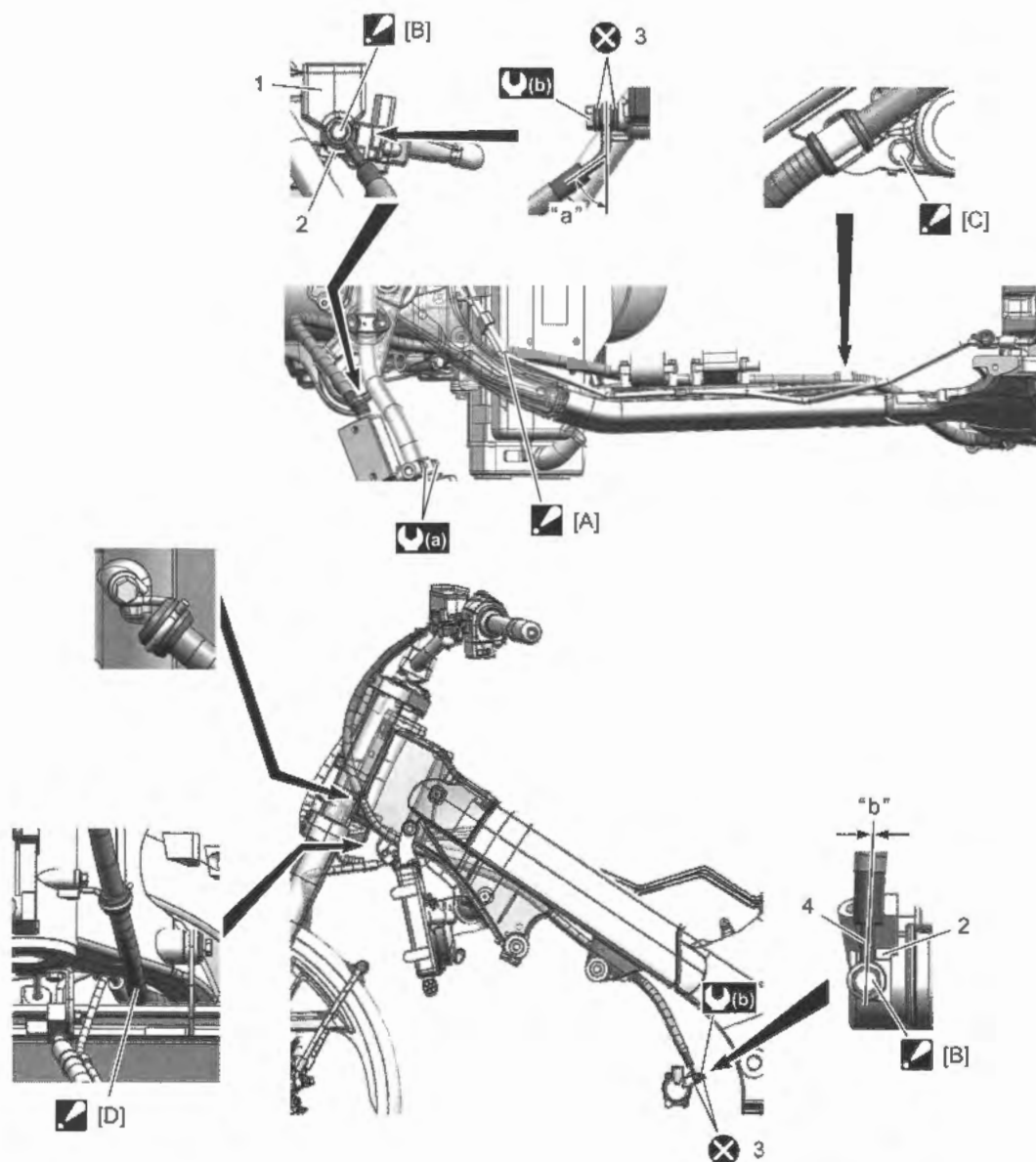
The brake fluid is damaging to painted surfaces, plastics and rubber materials, and do not allow the fluid to spill on the surrounding parts.

If the fluid is spilled, flush it with water immediately.

Schematic and Routing Diagram

Clutch Hose Routing Diagram

BENJ31J35302001



IE31J1530001-03

<p>☑ [A]: Pass the clutch hose under the brake pipes.</p>	2. Stopper	ⓐ (a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)
<p>☑ [B]: After the clutch hose union has contacted the stopper, tighten the union bolt to the specified torque.</p>	3. Washer	ⓑ (b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
<p>☑ [C]: After the clamp stopper has contacted the frame, tighten the bolt.</p>	4. Blue paint	ⓧ : Do not reuse.
<p>☑ [D]: Pass the clutch hose between the frame and radiator.</p>	"a": 56°	
1. Clutch master cylinder	"b": 0°	

Diagnostic Information and Procedures

Clutch System Symptom Diagnosis

BENJ31J35304001

Condition	Possible cause	Correction / Reference Item
Noisy engine (Noise seems to come from the clutch)	Worn countershaft spline.	Replace countershaft. ☞(Page 5B-5)
	Worn clutch sleeve hub spline.	Replace clutch sleeve hub. ☞(Page 5C-15) ☞(Page 5C-17)
	Worn clutch plate teeth.	Replace clutch plate. ☞(Page 5C-15) ☞(Page 5C-17)
	Distorted clutch plates, driven and drive.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
	Worn clutch release bearing.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
	Weakened clutch dampers.	Replace primary driven gear. ☞(Page 5C-15) ☞(Page 5C-17)
	Worn or rubbing primary gears.	Replace. ☞(Page 5C-15) ☞(Page 5C-17) ☞(Page 5C-25)
Clutch slips	Weakened clutch springs.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
	Worn or distorted clutch pressure plate.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
	Distorted clutch plates.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
Clutch drags	Leakage of clutch fluid.	Repair or replace.
	Worn or damaged clutch master cylinder/release cylinder.	Replace. ☞(Page 5C-9) ☞(Page 5C-12)
	Some clutch springs are weak, while others are not.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
	Worn or distorted clutch pressure plate.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
	Distorted clutch plates.	Replace. ☞(Page 5C-15) ☞(Page 5C-17)
Leakage of clutch fluid	Leakage of clutch fluid from system.	Repair or replace.
Excessive clutch lever stroke	Air in hydraulic system.	Bleed air. ☞(Page 5C-5)

Repair Instructions

Clutch Lever Position Switch Inspection

BENJ31J35306001

- 1) Disconnect the clutch lever position switch lead wires (1).



IE31J1530002-01

- 2) Inspect the clutch lever position switch for continuity with the tester.

If any abnormality is found, replace the switch with a new one. (Page 5C-9)

Color Position	Terminal (B/W)	Terminal (B/Y)
OFF		
ON	○	○

IE31J1530003-01

- 3) Connect the clutch lever position switch lead wire.

Clutch Fluid Level Inspection

BENJ31J35306002

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

Brake fluid (DOT 4)



IE31J1530004-01

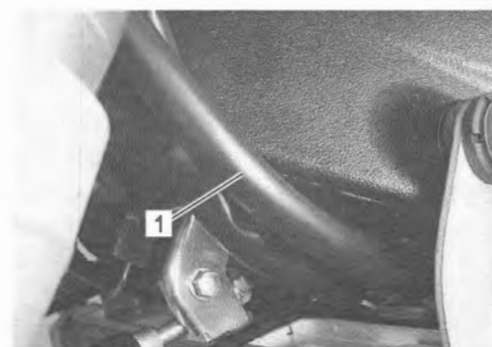
Clutch Hose Inspection

BENJ31J35306003

Inspect the clutch hose (1) for clacks, damage and clutch fluid leakage. If defects are found, replace clutch hose with a new one.



IE31J1530005-01



IE31J1530006-01



IE31J1530007-01

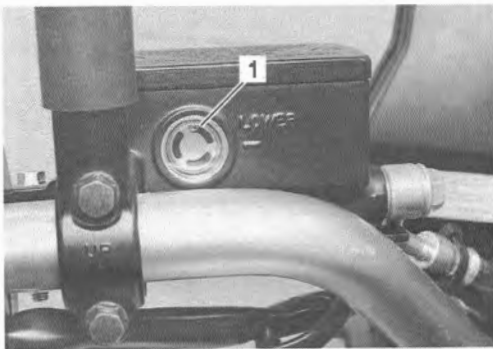
Air Bleeding from Clutch Line

BENJ31J35306004

The clutch line must be purged of air in the following manner:

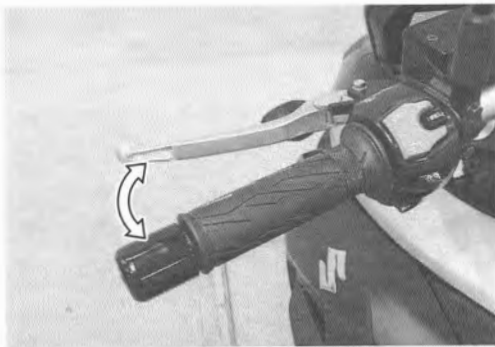
- 1) Place the motorcycle on a level surface and keep the handlebars straight.
- 2) Fill the master cylinder reservoir with new clutch fluid to the top of the inspection window (1). Place the reservoir cap to prevent dirt from entering.

Brake fluid (DOT 4)

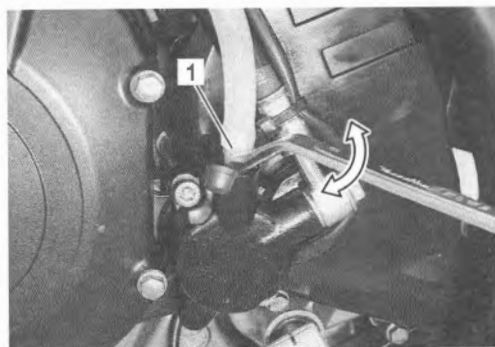


IE31J1530008-01

- 3) Attach a clear hose to the air bleeder valve, and insert the free end of the hose into a receptacle.
- 4) Operate the clutch lever several times and, while holding the lever gripped, loosen the air bleeder valve (1) and drain the clutch fluid into a receptacle.



IE31J1530009-01



IE31J1530010-02

- 5) Tighten the air bleeder valve and release the clutch lever slowly.
- 6) Repeat the steps 4) and 5) until the fluid is flowing out without bubbles.

NOTE

While bleeding the clutch system, replenish the reservoir with the clutch fluid as necessary to keep the fluid above the lower level.

- 7) Tighten the air bleeder valve to the specified torque.

Tightening torque

Clutch air bleeder valve: 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

- 8) Fill the reservoir with clutch fluid to the upper mark (1) of the reservoir.



IE31J1530107-01

- 9) Install the reservoir cap.

Clutch Fluid Replacement

BENJ31J35306005

- 1) Place the motorcycle on a level surface and keep the handlebars straight.
- 2) Remove the clutch fluid reservoir cap and diaphragm.
- 3) Suck up the old clutch fluid as much as possible.



IE31J1530108-01

- 4) Fill the reservoir with new clutch fluid.

Brake fluid (DOT 4)

- 5) Attach a clear hose to the air bleeder valve and insert the free end of the hose into a receptacle.
6) Loosen the air bleeder valve, squeeze and release the clutch lever and drain the old clutch fluid out of the clutch system.

NOTE

While bleeding the clutch system, replenish the reservoir with the clutch fluid as necessary to keep the fluid above the lower level.

- 7) Bleed the air from the clutch system. ☞ (Page 5C-5)



IE31J1530109-01

Clutch Hose Removal and Installation

BENJ31J35306006

Refer to "Wiring Harness Routing Diagram": L4 - L6 in Section 9A (Page 9A-6) or "Wiring Harness Routing Diagram": L8 - in Section 9A (Page 9A-24), and "Clutch Hose Routing Diagram" (Page 5C-2).

Removal

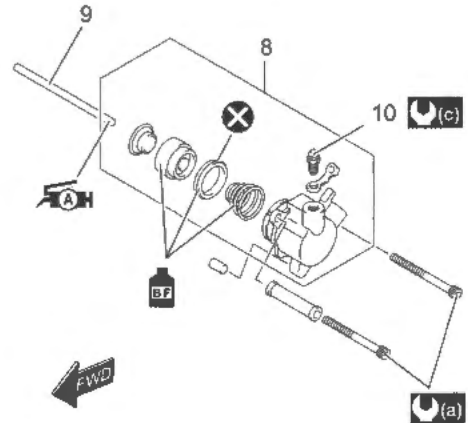
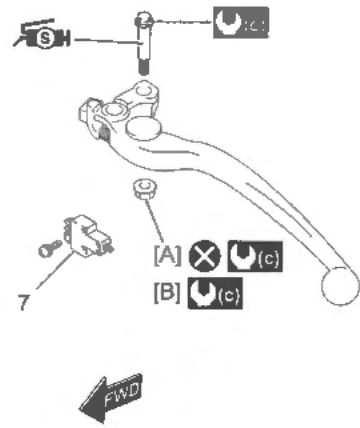
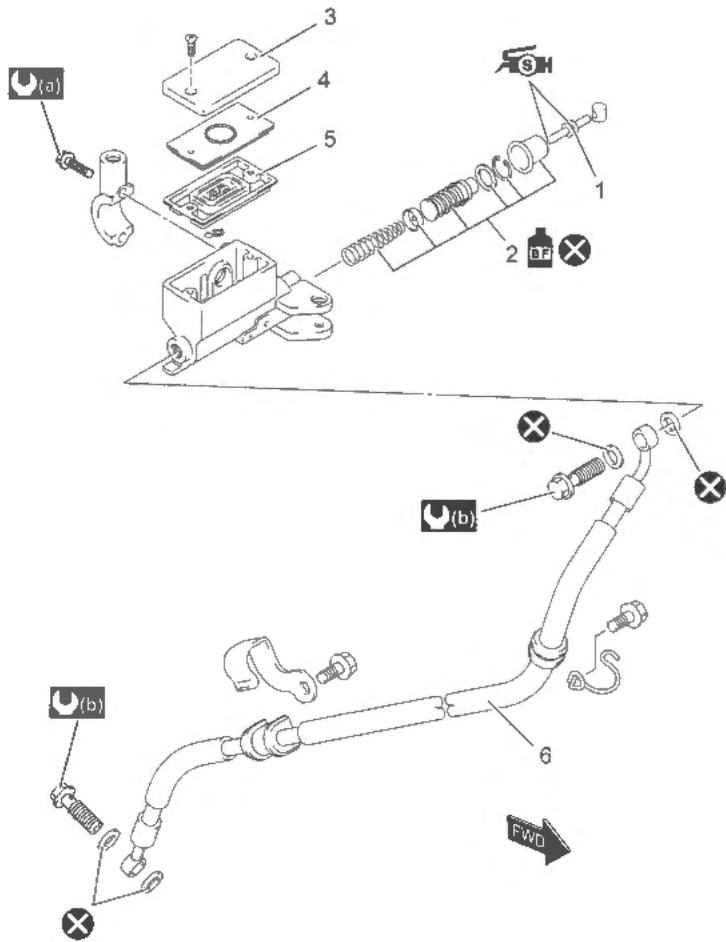
- 1) Drain clutch fluid. ☞ (Page 5C-5)
- 2) Remove the throttle body assembly. ☞ (Page 1C-4)
- 3) Remove the clamps and clutch hose.

Installation

- 1) Install the clutch hose and clamps.
- 2) Install the throttle body assembly. ☞ (Page 1C-4)
- 3) Bleed air from the clutch system. ☞ (Page 5C-5)

Clutch Control System Components

BENJ31J35308007



IJ31J1530001-01

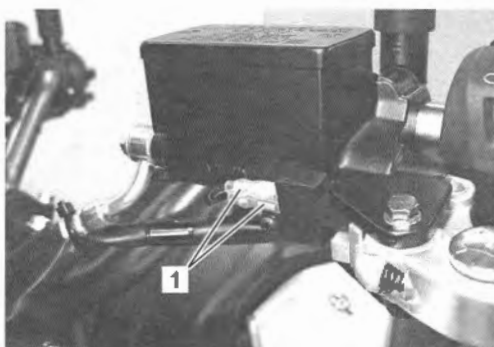
[A]: L4 – L6	6. Clutch hose	(c) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
[B]: LB –	7. Clutch lever position switch	BF : Apply brake fluid.
1. Push rod	8. Clutch release cylinder	AH : Apply grease.
2. Piston/cup set	9. Clutch push rod (left)	SH : Apply silicone grease.
3. Reservoir cap	10. Clutch air bleeder valve	X : Do not reuse.
4. Plate	(a) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	
5. Diaphragm	(b) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)	

Clutch Master Cylinder Assembly Removal and Installation

BENJ31J35306008

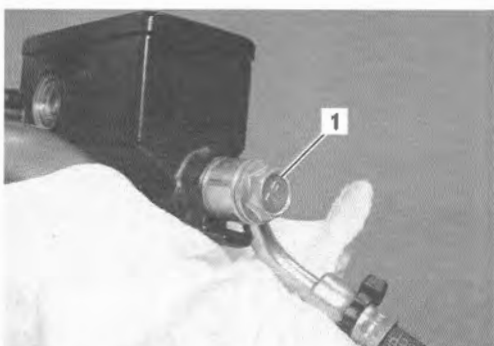
Removal

- 1) Remove the left knuckle cover. (If equipped) (Page 9D-38)
- 2) Drain clutch fluid. (Page 5C-5)
- 3) Disconnect the clutch lever position switch lead wires (1).



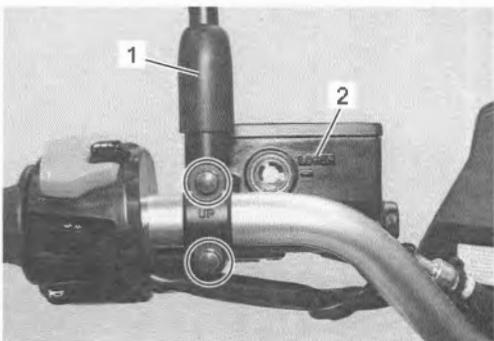
IE31J1530011-02

- 4) Place a rag underneath the clutch hose union bolt (1) on the master cylinder to catch any spilt clutch fluid.
- 5) Remove the clutch hose union bolt (1) and disconnect the clutch hose.



IE31J1530012-01

- 6) Remove the left rear view mirror (1).
- 7) Remove the clutch master cylinder assembly (2).



IE31J1530013-01

Installation

Install the clutch master cylinder in the reverse order of removal. Pay attention to the following points:

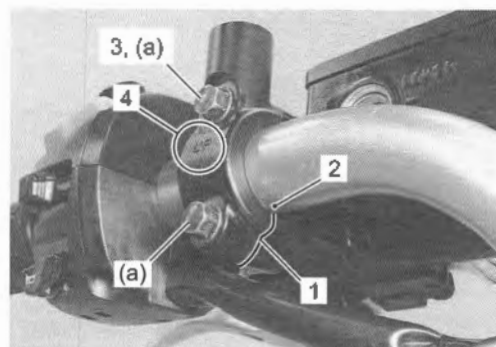
- When installing the master cylinder onto the handlebars, align the master cylinder's mating surface (1) with the punch mark (2) on the handlebars and tighten the upper mounting bolt (3) first.

NOTE

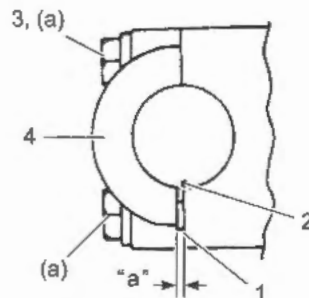
Face the up mark (4) upward.

Tightening torque

Clutch master cylinder mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)



IE31J1530014-02



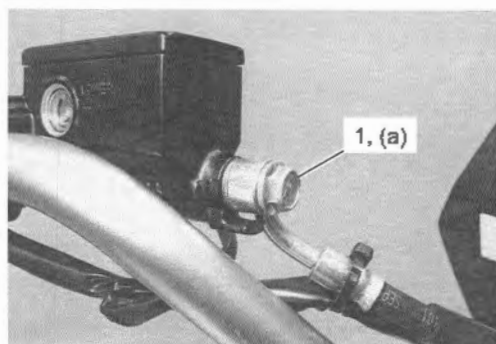
IE31J1530015-02

"a": Clearance

- Install the clutch hose union bolt and new washers to clutch hose.
- After the clutch hose union has contacted the stopper, tighten the union bolt (1) to the specified torque.

Tightening torque

Clutch hose union bolt (a): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IE31J1530016-01

5C-9 Clutch:

- Bleed air from the clutch system. (Page 5C-5)

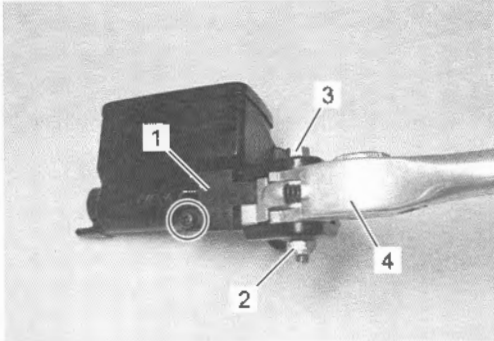
Clutch Master Cylinder / Clutch Lever Disassembly and Reassembly

BENJ31J35306009

Refer to "Clutch Master Cylinder Assembly Removal and Installation" (Page 5C-8).

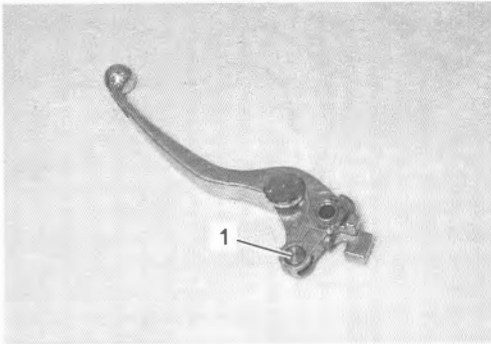
Disassembly

- 1) Remove the clutch lever position switch (1).
- 2) Remove the lock-nut (2) and clutch lever pivot bolt (3).
- 3) Remove the clutch lever (4).



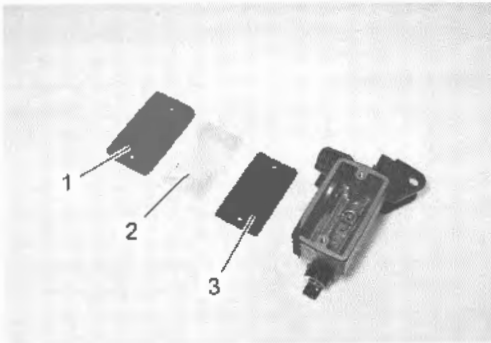
IE31J1530017-01

- 4) Remove the bushing (1).



IE31J1530018-01

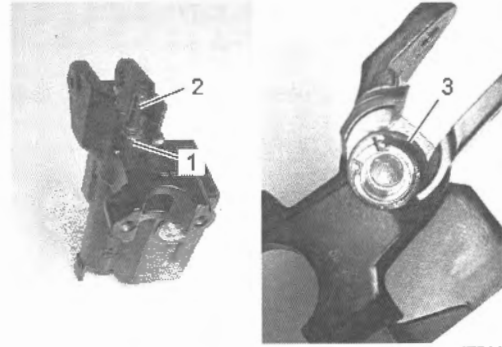
- 5) Remove the reservoir cap (1), plate (2) and diaphragm (3).



IE31J1530019-01

- 6) Remove the dust boot (1) and push rod (2).
- 7) Remove the snap ring (3) with the special tool.

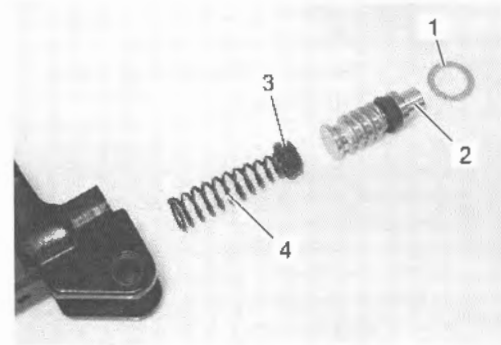
Special tool
09900-06108



IE31J1530020-03

- 8) Remove the following parts from the master cylinder.

- Stop plate (1)
- Piston (2)
- Primary cup (3)
- Spring (4)



IE31J1530021-01

Reassembly

Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

NOTICE

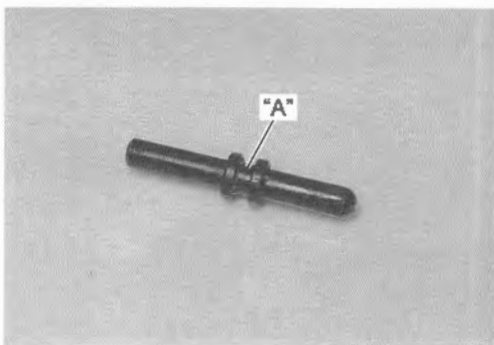
- Wash the master cylinder components with new brake fluid before reassembly.
- Do not wipe the brake fluid off after washing the components.
- When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
- Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.

Brake fluid (DOT 4)

IE49G1410024-02

- Apply grease to the push rod.

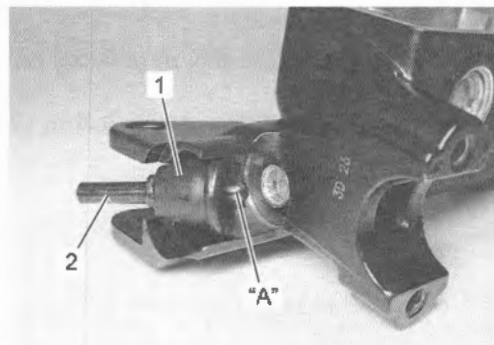
"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)



IE31J1530022-01

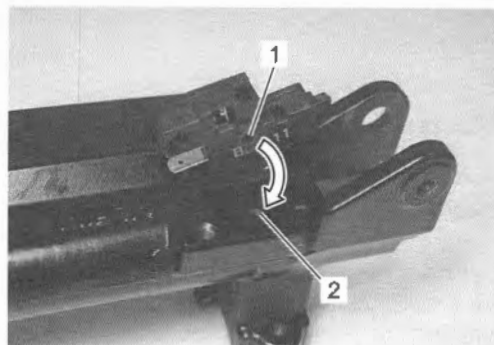
- Install the dust boot (1) to the push rod (2).
- Apply grease to the push rod end.

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)



IE31J1530023-01

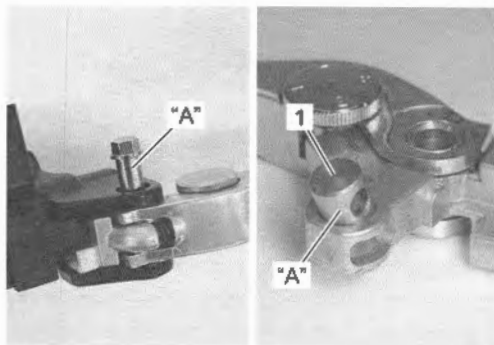
- When installing the clutch lever position switch, align the projection (1) on the switch with the hole (2) in the master cylinder.



IE31J1530024-01

- Apply grease to the clutch lever pivot bolt.
- Apply grease to the bushing (1).

"A": Grease 99000-25100 (SUZUKI SILICONE GREASE)



IE31J1530025-01

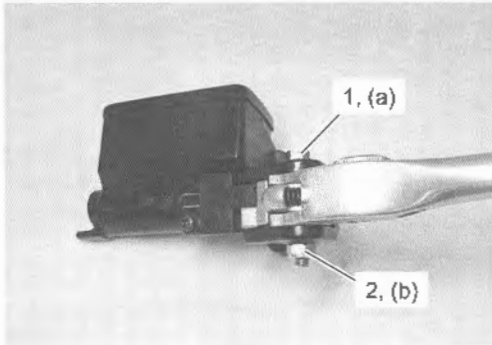
5C-11 Clutch:

- For L4 – L6 model, tighten the pivot bolt (1) and new lock-nut (2) to the specified torque.
- For L8 – model, tighten the pivot bolt and lock-nut to the specified torque. Refer to "Knuckle Cover Construction": L8 - in Section 9D (Page 9D-26).

Tightening torque

Clutch lever pivot bolt (a): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

Clutch lever pivot bolt lock-nut (b): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



IE31J1530026-01

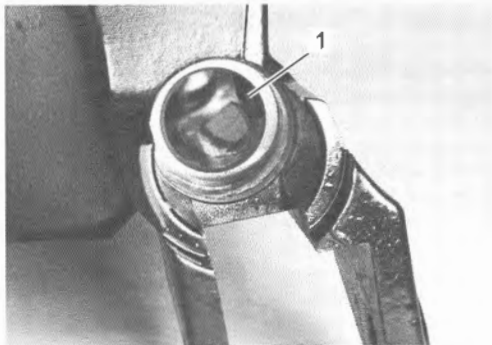
Clutch Master Cylinder Parts Inspection

BENJ31J35306010

Refer to "Clutch Master Cylinder / Clutch Lever Disassembly and Reassembly" (Page 5C-9).

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.



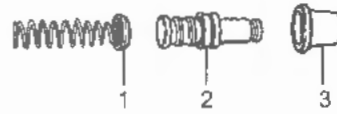
IE31J1530027-02

Piston

Inspect the piston surface for any scratches or other damage. If any damage is found, replace it with a new one.

Rubber Parts

Inspect the primary cup (1), secondary cup (2) and dust boot (3) for wear or damage. If any damage is found, replace them with new ones.



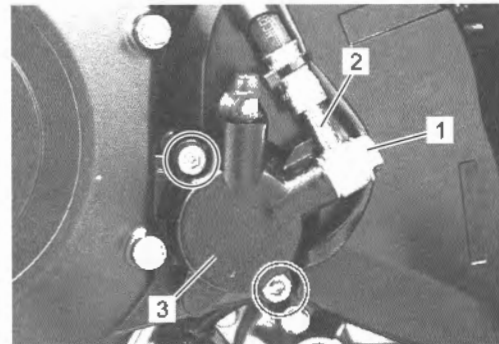
IE31J1410046-01

Clutch Release Cylinder / Clutch Push Rod (Left) Removal and Installation

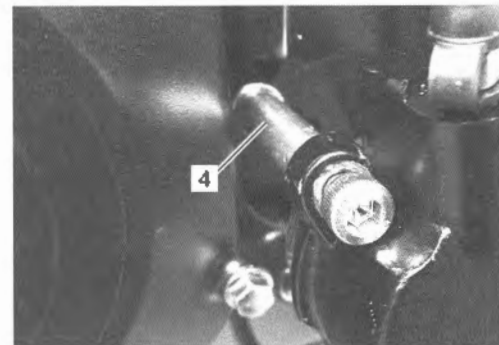
BENJ31J35306011

Removal

- 1) Drain clutch fluid. (Page 5C-5)
- 2) Remove the clutch hose union bolt (1) and disconnect the clutch hose (2).
- 3) Remove the clutch release cylinder (3) and release cylinder spacer (4).

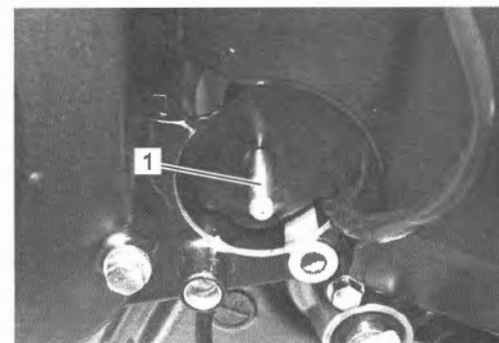


IE31J1530028-01



IE31J1530029-01

- 4) Remove the clutch push rod (left) (1).



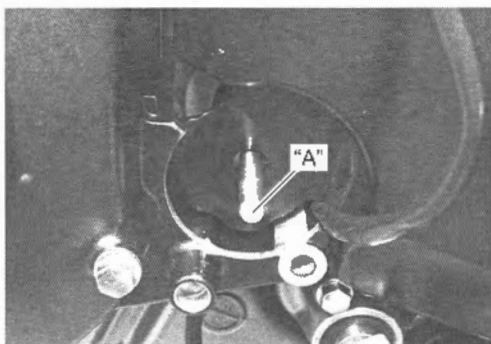
IE31J1530030-01

Installation

Install the clutch release cylinder/clutch push rod (left) in the reverse order of removal. Pay attention to the following points:

- Apply a small quantity of grease to the clutch push rod end.

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



IE31J1530031-01

- Tighten the clutch release cylinder mounting bolts (1) to the specified torque.

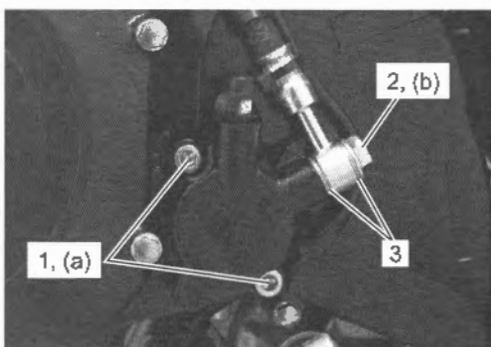
Tightening torque

Clutch release cylinder mounting bolt (a): 10 N·m (1.0 kgf-m, 7.5 lbf-ft)

- Install the clutch hose union bolt (2) and new washers (3) to clutch hose.
- After the clutch hose union has contacted the stopper, tighten the union bolt (2) to the specified torque.

Tightening torque

Clutch hose union bolt (b): 23 N·m (2.3 kgf-m, 17.0 lbf-ft)



IE31J1530111-01

Clutch Push Rod (Left) Inspection

BENJ31J35306012

Refer to "Clutch Release Cylinder / Clutch Push Rod (Left) Removal and Installation" (Page 5C-11).

Inspect the clutch push rod (left) for wear or bend. If any defects are found, replace it with a new one.



IE31J1530032-01

Clutch Release Cylinder Disassembly and Reassembly

BENJ31J35306013

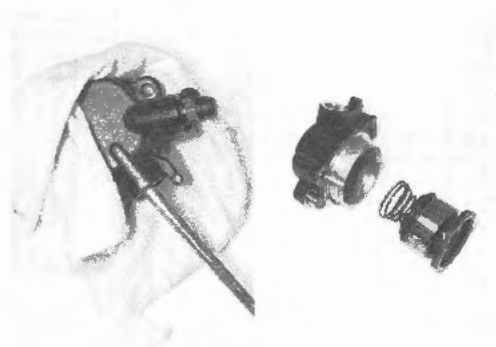
Refer to "Clutch Release Cylinder / Clutch Push Rod (Left) Removal and Installation" (Page 5C-11).

Disassembly

- 1) Place a rag over the piston to prevent popping out and then force out the piston applying compressed air gradually from the hole for the clutch hose.

NOTICE

Do not use high pressure air to prevent piston damage.



IE31J1530033-01

5C-13 Clutch:

Reassembly

Assemble the clutch release cylinder in the reverse order of disassembly. Pay attention to the following points:

- Wash the cylinder bore and piston with specified brake fluid.

Brake fluid (DOT 4)

NOTICE

- Wash the clutch release 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 clutch release cylinder bore and all of the clutch release cylinder component to be inserted into the bore.



IE31J1530034-01

- Bleed air from the clutch system. (Page 5C-5)

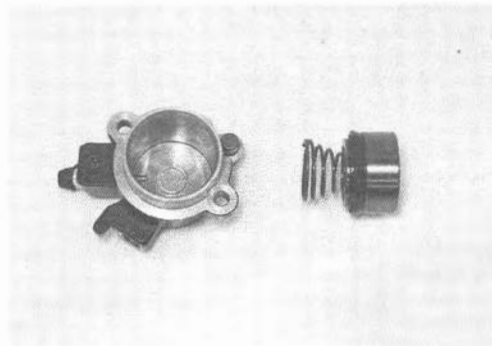
Clutch Release Cylinder Inspection

BENJ31J35306014

Refer to "Clutch Release Cylinder Disassembly and Reassembly" (Page 5C-12).

Inspect the clutch release cylinder bore wall for nicks, scratches or other damage. If any damage is found, replace it with a new one.

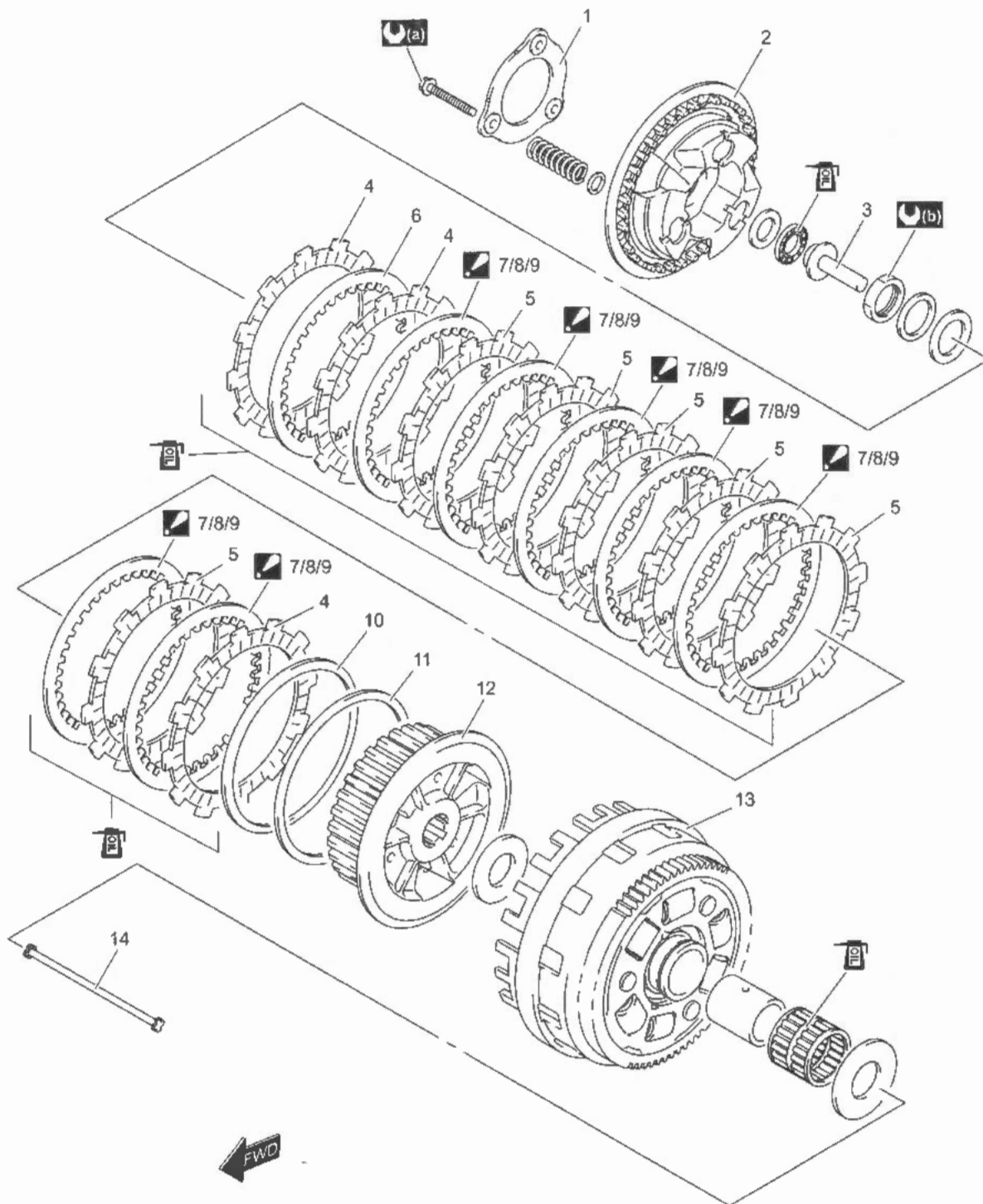
Inspect the piston surface for any scratches or other damage. If any damage is found, replace it with a new one.



IE31J1530035-01

Clutch Components

BENJ31J35306015



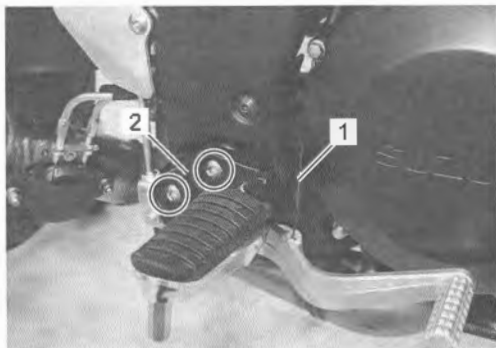
IE31J1530113-02

1. Stopper plate	7. Driven plate No. 1 (7 – 5 pcs.) : The driven plates No. 1, No. 3 and No. 4 are 7 pcs. in total.	13. Primary driven gear assembly
2. Clutch pressure plate	8. Driven plate No. 3 (0 – 2 pcs.) : The driven plates No. 1, No. 3 and No. 4 are 7 pcs. in total.	14. Clutch push rod (right)
3. Clutch push piece	9. Driven plate No. 4 (0 – 2 pcs.) : The driven plates No. 1, No. 3 and No. 4 are 7 pcs. in total.	: 10 N·m (1.0 kgf·m, 7.5 lbf·ft)
4. Drive plate No. 2	10. Spring washer	: 150 N·m (15.0 kgf·m, 108.5 lbf·ft)
5. Drive plate No. 1	11. Spring washer seat	: Apply engine oil.
6. Driven plate No. 2	12. Clutch sleeve hub	

Clutch Removal

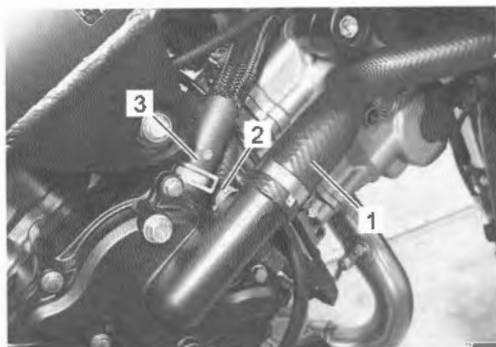
BENJ31J35306016

- 1) Remove the under cowling assembly. (If equipped) (Page 9D-39)
- 2) Drain engine oil. (Page 1E-4)
- 3) Drain engine coolant. (Page 1F-6)
- 4) Remove the rear brake light switch spring (1) and front footrest bracket (RH) (2).



IE31J1530046-01

- 5) Disconnect the radiator outlet hose (1), water bypass hose (2) and PCV hose (3).



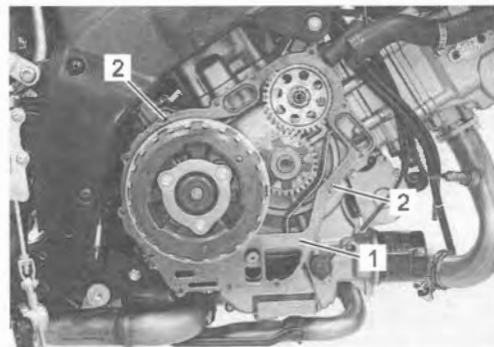
IE31J1530047-01

- 6) Remove the clutch cover (1).



IE31J1530048-03

- 7) Remove the gasket (1) and dowel pins (2).

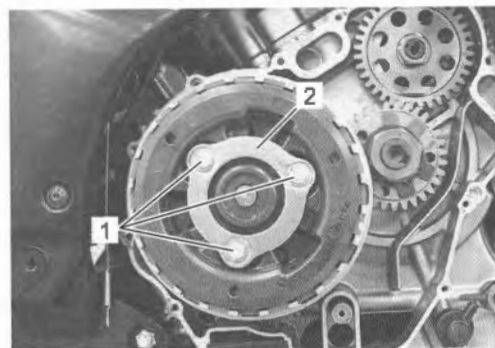


IE31J1530049-01

- 8) Remove the clutch spring set bolts (1), stopper plate (2) and clutch springs.

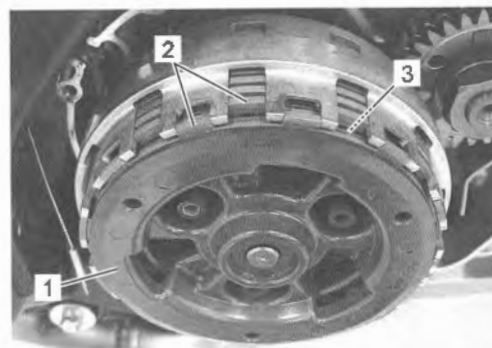
NOTE

Loosen the clutch spring set bolts little by little and diagonally.



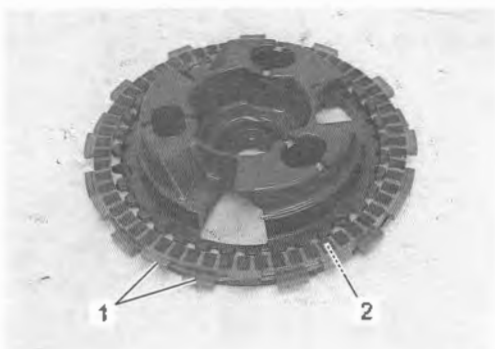
IE31J1530050-01

- 9) Remove the clutch pressure plate (1) with the clutch drive plates (No. 2) (2) and clutch driven plate (No. 2) (3).



IE31J1530051-01

- 10) Remove the clutch drive plates (No. 2) (1) and clutch driven plate (No. 2) (2).



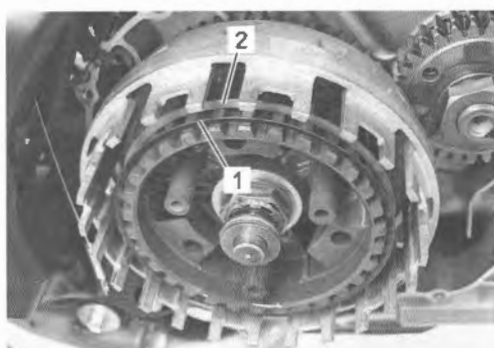
IE31J1530052-02

- 11) Remove the clutch driven plates (1) and drive plates (2).



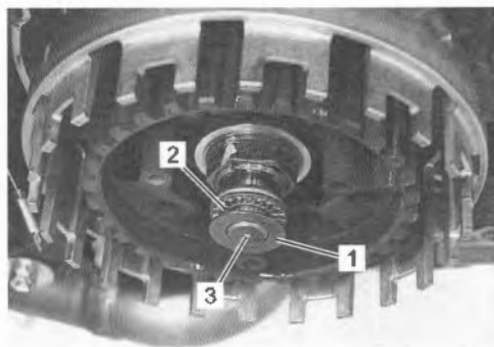
IE31J1530053-01

- 12) Remove the spring washer (1) and spring washer seat (2).



IE31J1530054-01

- 13) Remove the thrust washer (1), release bearing (2) and clutch push piece (3).

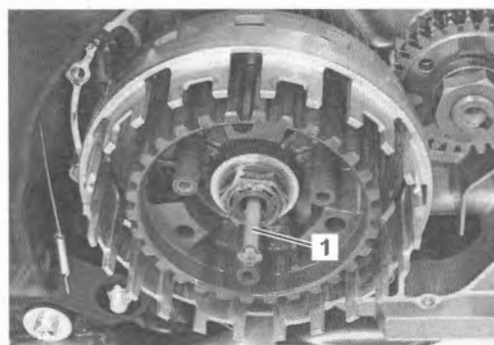


IE31J1530055-01

- 14) 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 a wire.



IE31J1530056-01

- 15) Unlock the clutch sleeve hub nut.



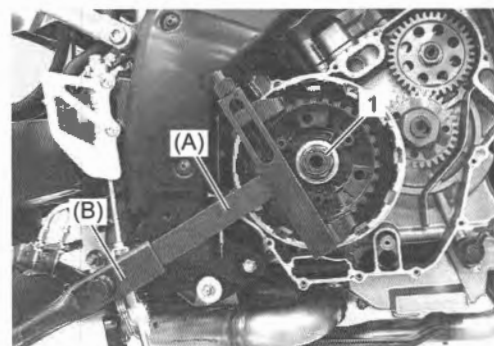
IE31J1530057-01

- 16) Hold the clutch sleeve hub with the special tools and remove the clutch sleeve hub nut (1).

Special tool

(A): 09920-53740

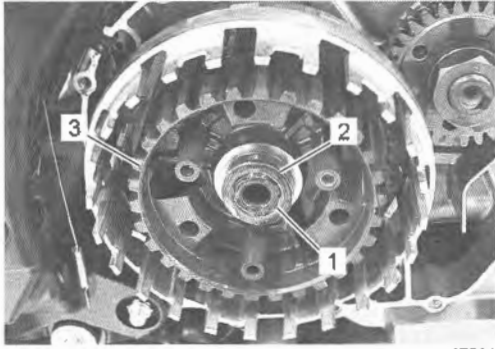
(B): 09920-31020



IE31J1530058-02

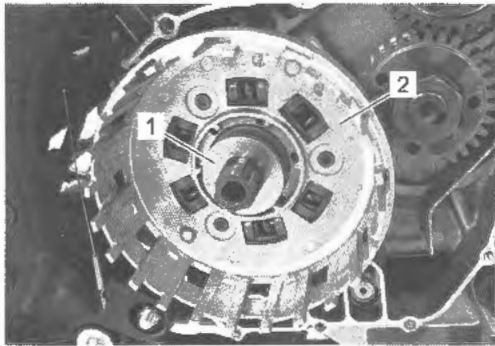
5C-17 Clutch:

- 17) Remove the conical spring washer (1), washer (2) and clutch sleeve hub (3).



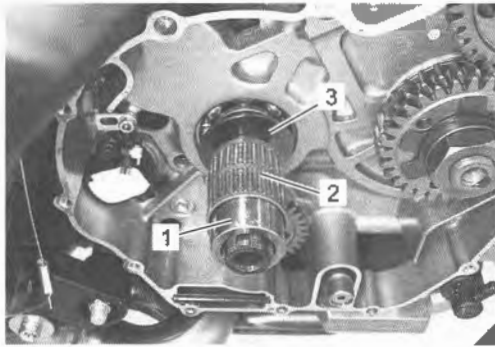
IE31J1530059-01

- 18) Remove the thrust washer (1) and primary driven gear assembly (2).



IE31J1530060-01

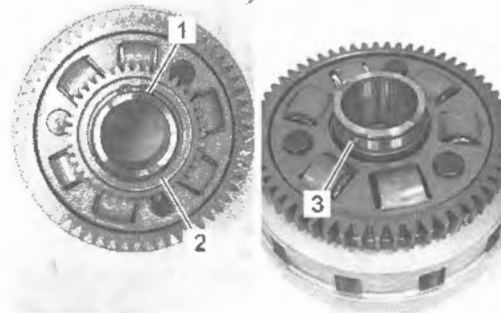
- 19) Remove the spacer (1), bearing (2) and thrust washer (3).



IE31J1530061-01

- 20) Remove the snap ring (1), oil pump drive gear (2) and pin (3).

Special tool
09900-06107



IE31J1530062-01

Clutch Installation

BENJ31J35306017

- 1) Install the pin (1).
- 2) Install the oil pump drive gear (2) with the flange side (3) facing the primary driven gear assembly.

NOTE

When installing the oil pump drive gear (2), align the pin (1) with the slot (4).



IE31J1530063-01

- 3) Install the new snap ring (1).

Special tool
09900-06107

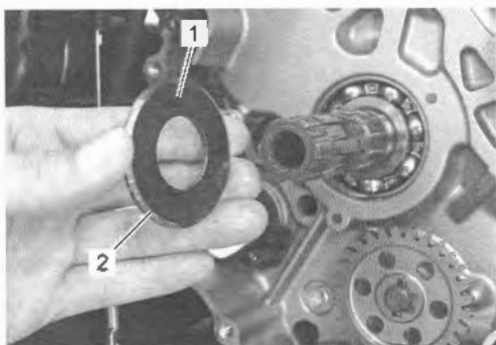


IE31J1530064-01

4) Install the thrust washer (1).

NOTE

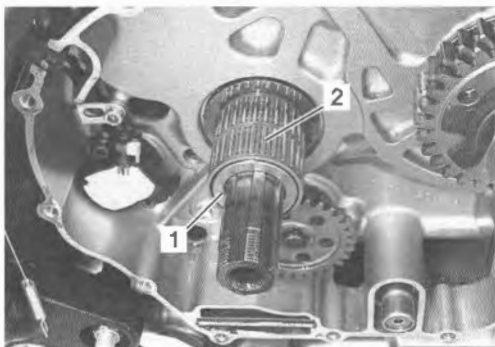
The tapered portion (2) of thrust washer (1) faces the crankcase side.



IE31J1530065-01

5) Install the spacer (1).

6) Apply engine oil to the bearing (2) and install it.



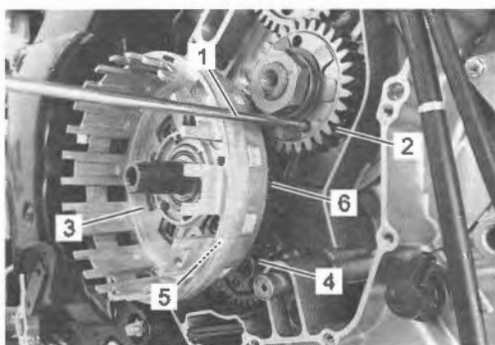
IE31J1530066-01

7) Insert a suitable bar (1) into the holes of primary drive gears (2) and align the teeth of scissors gears.

8) Install the primary driven gear assembly (3) onto the countershaft.

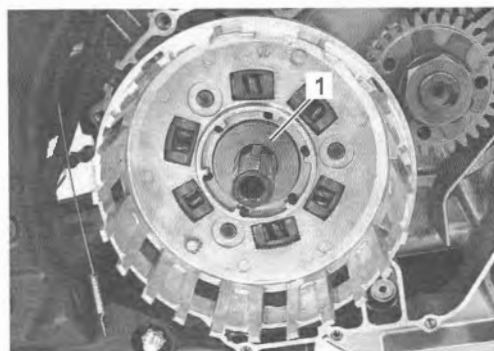
NOTE

Be sure to engage the oil pump driven gear (4) and oil pump drive gear (5), primary drive gears (2) and primary driven gear (6).



IE31J1530067-01

9) Install the thrust washer (1).



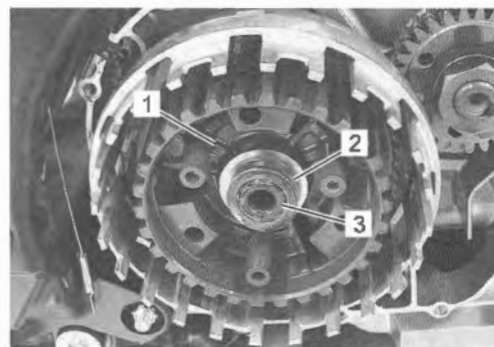
IE31J1530068-01

10) Install the clutch sleeve hub (1), washer (2) and conical spring washer (3).

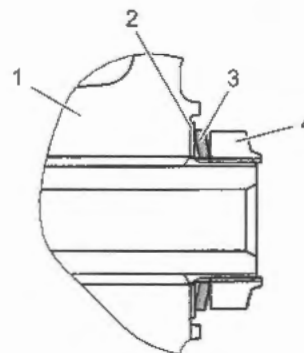
NOTE

The conical curve side of spring washer (3) faces outside.

11) Install the new clutch sleeve hub nut (4).



IE31J1530069-01



IE31J1530070-02

5C-19 Clutch:

- 12) Hold the clutch sleeve hub with the special tools and tighten the clutch sleeve hub nut (1) to the specified torque.

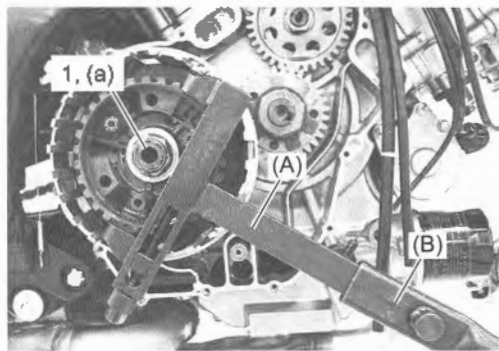
Special tool

(A): 09920-53740

(B): 09920-31020

Tightening torque

Clutch sleeve hub nut (a): 150 N·m (15.0 kgf·m, 108.5 lbf·ft)



IE31J1530071-01

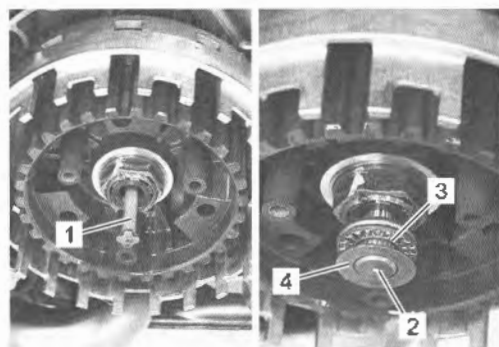
- 13) Lock the clutch sleeve hub nut (1) with a center punch.



IE31J1530072-01

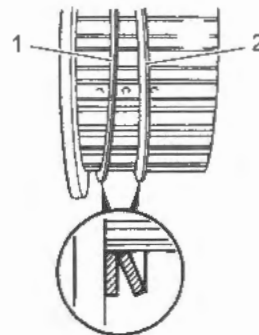
- 14) Install the clutch push rod (right) (1) into the countershaft.

- 15) Install the clutch push piece (2), release bearing (3) and thrust washer (4) to the countershaft.



IE31J1530073-02

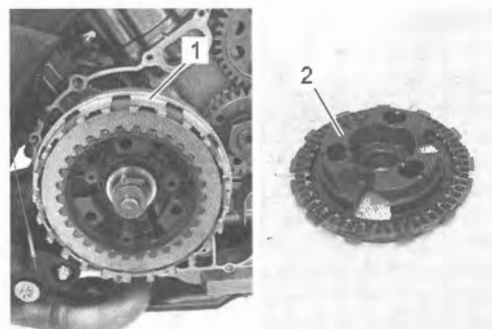
- 16) Install the spring washer seat (1) and spring washer (2) onto the clutch sleeve hub.



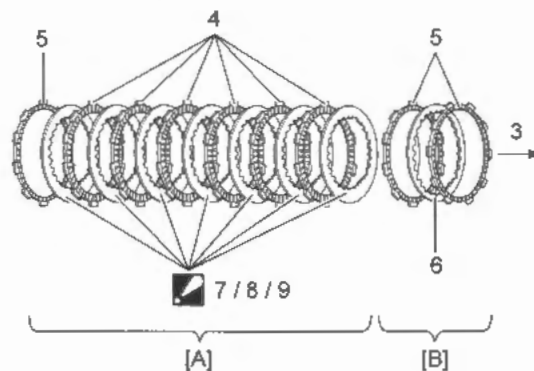
IE31J1530074-01

- 17) Apply engine oil to the clutch drive plates and driven plates.

- 18) Insert the clutch drive plates and driven plates one by one into the clutch sleeve hub (1) and clutch pressure plate (2) in the prescribed order.



IE31J1530075-01

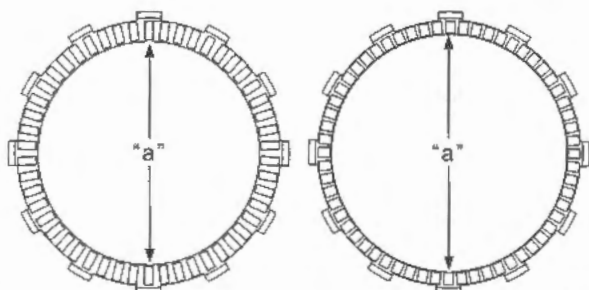


IE31J1530076-02

[A]: Insert the plates to the clutch sleeve hub.	6. Driven plate No. 2
[B]: Insert the plates to the clutch pressure plate.	7. Driven plate No. 1 (7 - 5 pcs.) : The driven plates No. 1, No. 3 and No. 4 are 7 pcs. in total.
3. Direction of outside (Clutch pressure plate side)	8. Driven plate No. 3 (0 - 2 pcs.) : The driven plates No. 1, No. 3 and No. 4 are 7 pcs. in total.
4. Drive plate No. 1	9. Driven plate No. 4 (0 - 2 pcs.) : The driven plates No. 1, No. 3 and No. 4 are 7 pcs. in total.
5. Drive plate No. 2	

NOTE

Two kinds of the drive plate (No. 1 and No. 2) are equipped in the clutch system, they can be distinguished by the inside diameter "a".



IE31J1530077-01

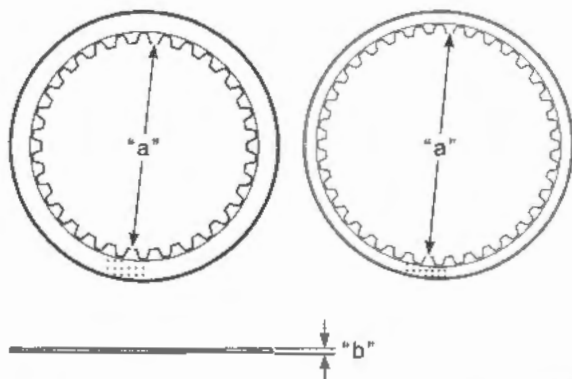
Drive plate	I.D. "a"
No. 1	127 mm (5.0 in)
No. 2	135 mm (5.3 in)

NOTE

Four kinds of the driven plate (No. 1, No. 2, No. 3 and No. 4) are equipped in the clutch system, they can be distinguished by the inside diameter "a" and thickness "b".

The No. 1, No. 2, No. 3 and No. 4 driven plates are 8 pcs. in total.

5 - 7 pcs. of No. 1 driven plates are used with 1 pc. of No. 2, 2 - 0 pc(-s). of No. 3 driven plate(-s) and 2 - 0 pc(-s). of No. 4 driven plate(-s) as a set.



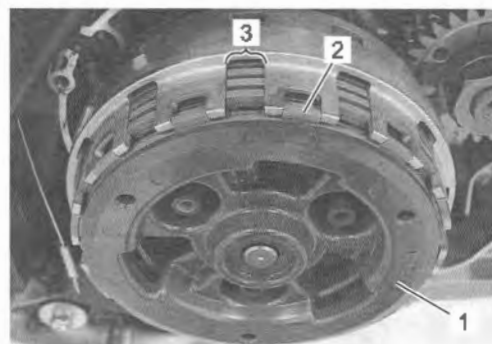
IE31J1530078-01

Driven plate	I.D. "a"	Thickness "b"
No. 1	115.5 mm (4.55 in)	2.0 mm (0.08 in)
No. 2	126.0 mm (4.96 in)	2.0 mm (0.08 in)
No. 3	115.5 mm (4.55 in)	1.6 mm (0.06 in)
No. 4	115.5 mm (4.55 in)	2.3 mm (0.09 in)

19) Install the clutch pressure plate (1) with the plates.

NOTE

Insert the outermost drive plate (No. 2) claws (2) to the other slits (3) of clutch housing as shown.



IE31J1530079-01

20) Install the clutch springs, stopper plate (1) and clutch spring set bolts (2).

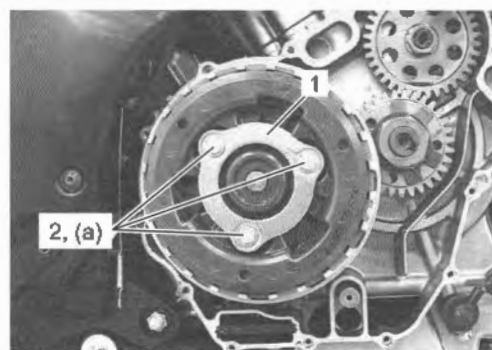
21) Tighten the clutch spring set bolts (2) to the specified torque.

NOTE

Tighten the clutch spring set bolts little by little and diagonally.

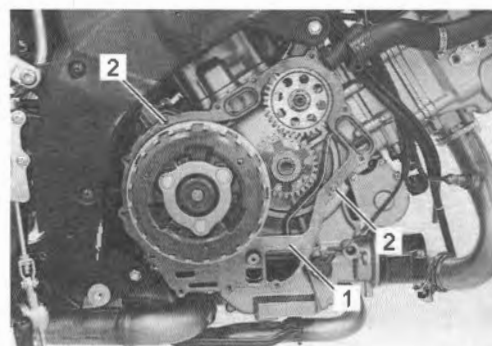
Tightening torque

Clutch spring set bolt (a): 10 N·m (1.0 kgf·m, 7.5 lbf·ft)



IE31J1530080-01

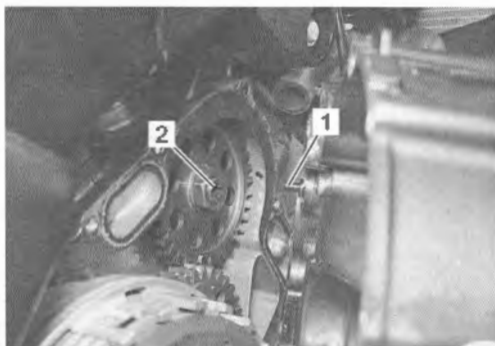
22) Install the new gasket (1) and the dowel pins (2).



IE31J1530081-02

5C-21 Clutch:

- 23) Install the clutch cover with the slot on the impeller shaft end (1) securely engaged with the groove (2) on the cam drive idle gear shaft.



IE31J1530082-01

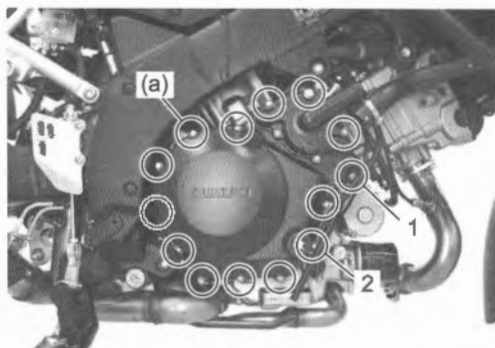
- 24) Tighten the clutch cover bolts to the specified torque.

Tightening torque

Clutch cover bolt (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

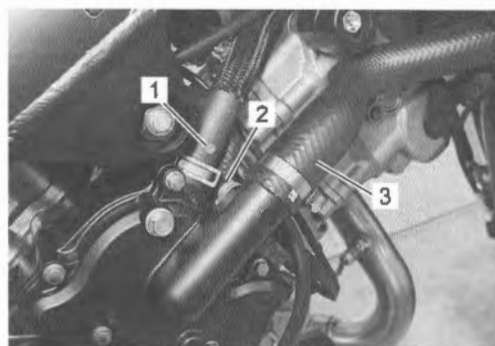
NOTE

- Fit the clamps to the bolt (1) and (2).
- Install the right under cowling brackets, if equipped. Refer to "Center Under Cowling / Under Cowling Removal and Installation": L8 - in Section 9D (Page 9D-39).



IE31J1530083-03

- 25) Connect the PCV hose (1). (Page 1D-2)
- 26) Connect the water bypass hose (2) and radiator outlet hose (3). (Page 1F-2)



IE31J1530084-01

- 27) Pour engine oil. (Page 1E-4)

- 28) Pour engine coolant. (Page 1F-6)

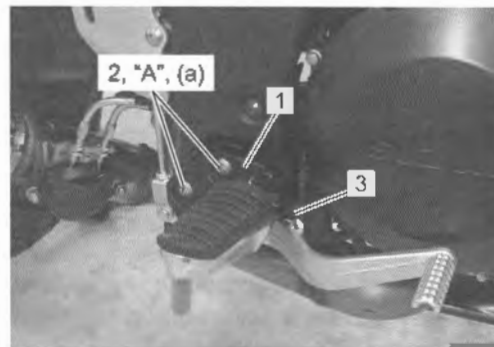
- 29) Install the front footrest bracket (RH) (1) and tighten the front footrest bracket bolts (2) to the specified torque.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)

Tightening torque

Front footrest bracket bolt (a): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)

- 30) Install rear brake light switch spring (3).



IE31J1530085-02

- 31) Adjust rear brake light switch. (Page 4A-10)

- 32) Install the under cowling assembly. (If equipped)

Clutch Parts Inspection

BENJ31J35308018

Refer to "Clutch Removal" (Page 5C-15) and "Clutch Installation" (Page 5C-17).

Clutch Drive / Driven Plate

NOTE

Wipe off the engine oil from the drive and driven plates with a clean rag.

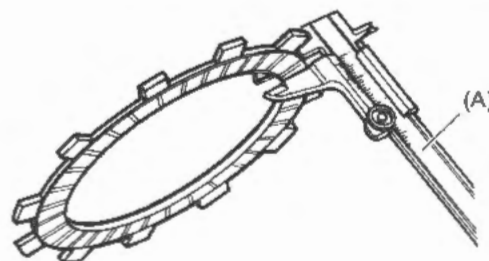
Measure the thickness of drive plates with a vernier calipers. If the drive plate thickness is found to have reached the limit, replace it with a new one.

Special tool

(A): 09900-20102

Clutch drive plate thickness

Service limit (No.1 and No.2): 3.42 mm (0.135 in)



IE31J1530086-01

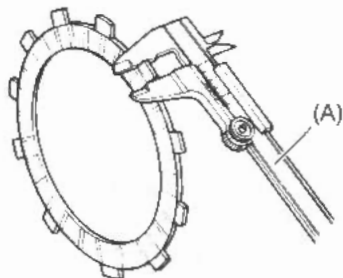
Measure the claw width of drive plates with a vernier calipers. Replace the drive plates found to have worn down to the limit.

Special tool

(A): 09900-20102

Clutch drive plate claw width

Service limit (No.1 and No.2): 13.10 mm (0.516 in)



IE31J1530087-01

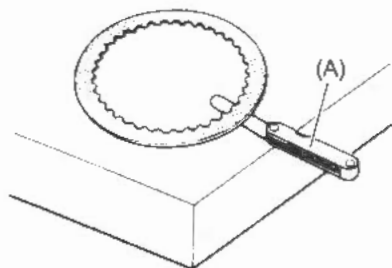
Measure each driven plate for distortion with a thickness gauge and surface plate. Replace driven plates which exceed the limit.

Special tool

(A): 09900-20803

Clutch driven plate distortion

Service limit: 0.10 mm (0.004 in)



IE31J1530088-01

Clutch Spring

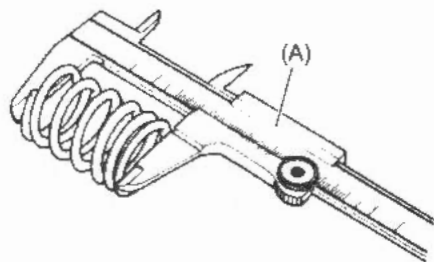
Measure the free length of each coil spring with a vernier calipers, and compare the length with the specified limit. Replace all the springs if any spring is not within the limit.

Special tool

(A): 09900-20102

Clutch spring free length

Service limit: 43.5 mm (1.71 in)

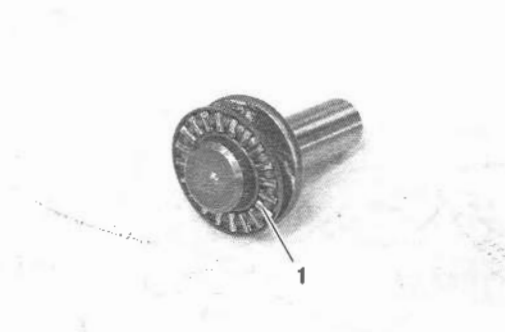


IE31J1530089-01

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.



IE31J1530090-01

Push Rod (Right)

Inspect the push rod for bend and damage.

If any defects are found, replace the push rod with a new one.

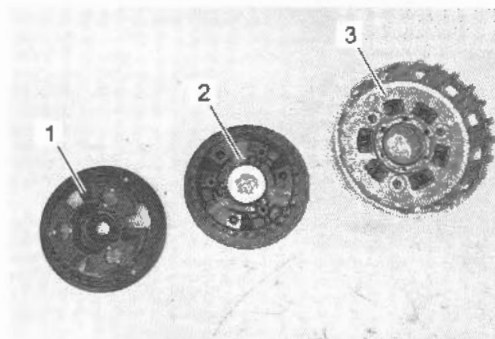


IE31J1530091-01

Clutch Sleeve Hub / Primary Driven Gear Assembly

Inspect the slot of the clutch pressure plate (1), clutch sleeve hub (2) and primary driven gear assembly (3) for damage or wear caused by the clutch plates. If necessary, replace it with a new one.

Inspect the cam faces on clutch pressure plate (1) and clutch sleeve hub (2) for wear and damage. If necessary, replace it with a new one. Inspect the springs of primary driven gear assembly (3) for any damages. If necessary, replace primary driven gear assembly with a new one.



IE31J1530092-01

Primary Drive Gear Removal and Installation

BENJ31J35306019

Refer to "Clutch Removal" (Page 5C-15), "Clutch Installation" (Page 5C-17) and "Spark Plug Removal and Installation" in Section 1H (Page 1H-6).

Removal

- 1) Turn the crankshaft until two punch marks (1) are aligned.



IE31J1530093-04

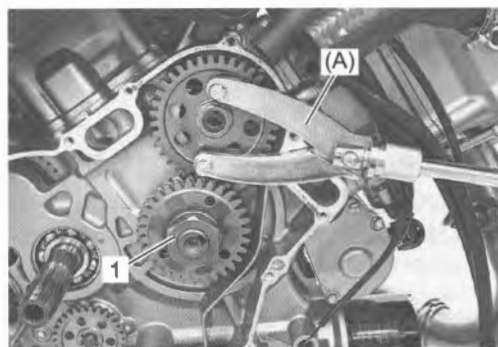
- 2) Hold the cam drive idle gear/sprocket No. 1 with the special tool and remove the primary drive gear nut (1).

Special tool

(A): 09930-40113

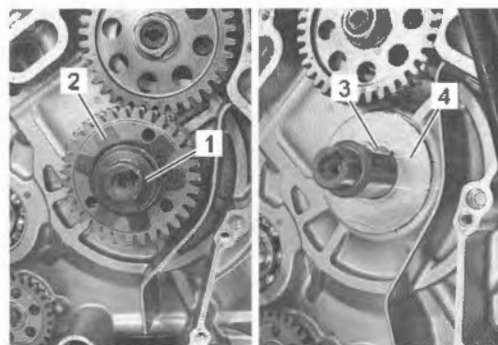
NOTE

The primary drive gear nut (1) has left-hand threads.



IE31J1530094-01

- 3) Remove the conical spring washer (1) and primary drive gear (2).
- 4) Remove the key (3) and thrust washer (4).



IE31J1530095-01

Installation

- 1) Install the thrust washer (1) and key (2).

NOTE

The chamfer side (3) of the thrust washer (1) faces the crankcase side.

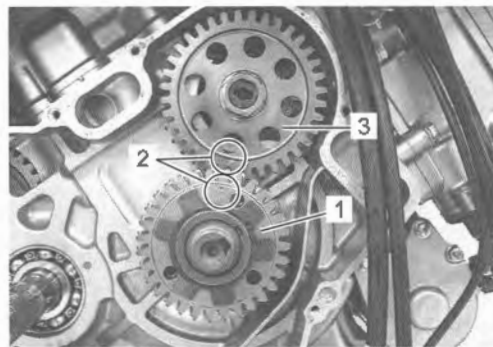


IE31J1530096-01

- 2) Install the primary drive gear (1).

NOTE

Align the punch marks (2) on the primary drive gear and cam drive idle gear/sprocket No. 1 (3).

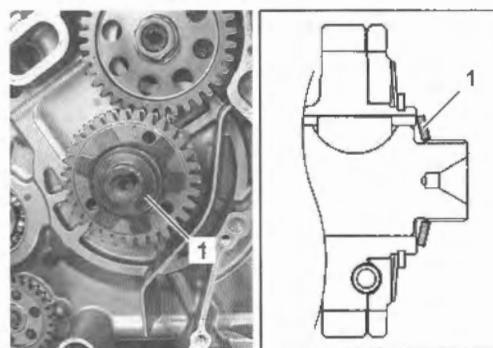


IE31J1530097-01

- 3) Install the conical spring washer (1).

NOTE

The conical curve side of spring washer (1) faces outside.

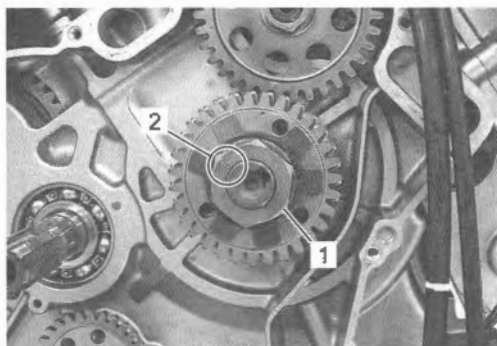


IE31J1530098-01

4) Install the primary drive gear nut (1).

NOTE

- The primary drive gear nut (1) has left-hand threads.
- The "L" mark (2) on the nut (1) faces outside.



IE31J1530099-02

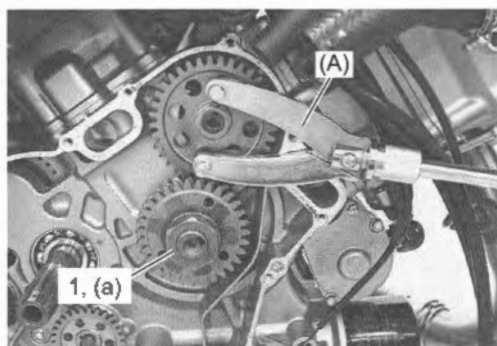
5) Hold the cam drive idle gear/sprocket No. 1 with the special tool and tighten the primary drive gear nut (1) to the specified torque.

Special tool

(A): 09930-40113

Tightening torque

Primary drive gear nut (a): 160 N·m (16.0 kgf-m, 116.0 lbf-ft)



IE31J1530100-01

Primary Drive Gear Inspection

BENJ31J35306020

Refer to "Primary Drive Gear Removal and Installation" (Page 5C-23).

Visually inspect the gear teeth for wear and damage. If they are worn, replace the gear with a new one. (Page 5C-25)



IE31J1530101-01

Primary Drive Gear Disassembly and Reassembly

BENJ31J35306021

Refer to "Primary Drive Gear Removal and Installation" (Page 5C-23).

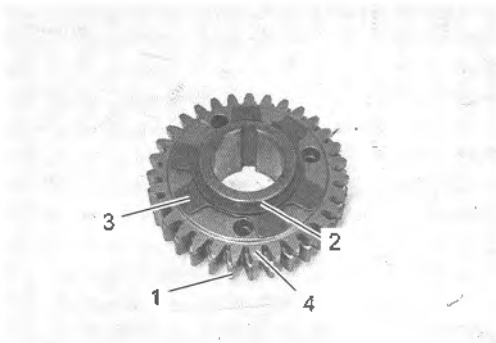
Disassembly

Remove the following parts from the primary drive gear (1).

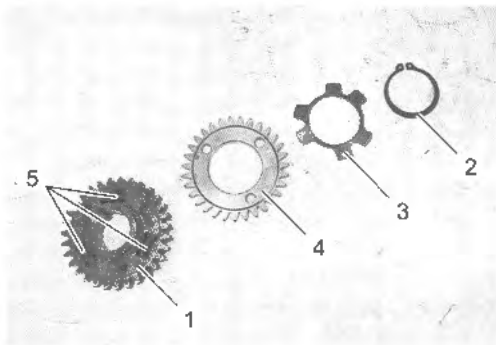
- Snap ring (2)
- Spring washer (3)
- Scissors gear (4)
- Springs (5)

Special tool

09900-06107



IE31J1530102-02



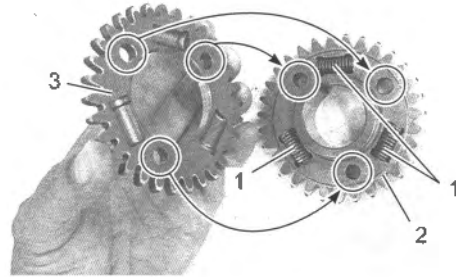
IE31J1530103-01

Reassembly

- 1) Set the springs (1) into the grooves on the primary drive gear (2).
- 2) Install the scissors gear (3).

NOTE

Align the holes of the primary drive gear (2) with the holes of the scissors gear (3).

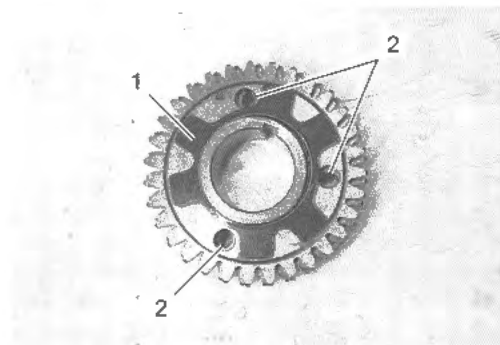


IE31J1530104-02

- 3) Install the spring washer (1) not to cover the holes (2) of the gears.

NOTE

The convex side of the spring washer (1) faces upward.

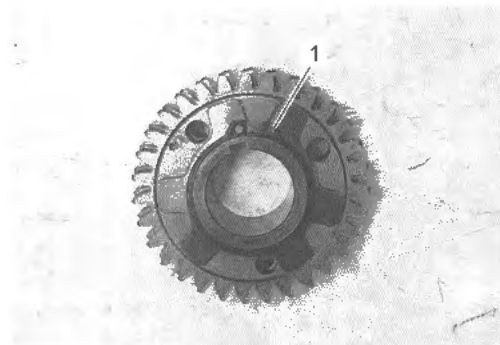


IE31J1530105-01

- 4) Install the new snap ring (1).

Special tool

09900-06107



IE31J1530106-01

Specifications

Tightening Torque Specifications

BENJ31J35307001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Clutch air bleeder valve	6	0.6	4.5	☞(Page 5C-5)
Clutch master cylinder mounting bolt	10	1.0	7.5	☞(Page 5C-8)
Clutch hose union bolt	23	2.3	17.0	☞(Page 5C-8) / ☞(Page 5C-12)
Clutch lever pivot bolt	6	0.6	4.5	☞(Page 5C-11)
Clutch lever pivot bolt lock-nut	6	0.6	4.5	☞(Page 5C-11)
Clutch release cylinder mounting bolt	10	1.0	7.5	☞(Page 5C-12)
Clutch sleeve hub nut	150	15.0	108.5	☞(Page 5C-19)
Clutch spring set bolt	10	1.0	7.5	☞(Page 5C-20)
Clutch cover bolt	11	1.1	8.0	☞(Page 5C-21)
Front footrest bracket bolt	26	2.6	19.0	☞(Page 5C-21)
Primary drive gear nut	160	16.0	116.0	☞(Page 5C-24)

Reference:

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

"Clutch Hose Routing Diagram" (Page 5C-2)

"Clutch Control System Components" (Page 5C-7)

"Clutch Components" (Page 5C-14)

"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ31J35308001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 5C-4) / ☞(Page 5C-5) / ☞(Page 5C-6) / ☞(Page 5C-10) / ☞(Page 5C-13)
Grease	SUZUKI SUPER GREASE A	P/No.: 99000-25011	☞(Page 5C-12)
	SUZUKI SILICONE GREASE	P/No.: 99000-25100	☞(Page 5C-10) / ☞(Page 5C-10) / ☞(Page 5C-10)
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞(Page 5C-21)

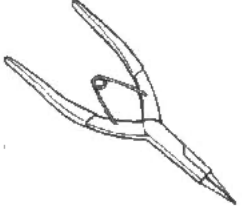
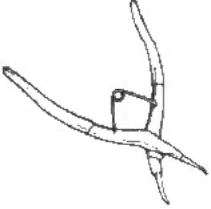
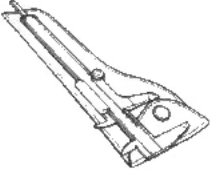
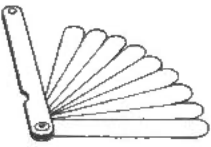

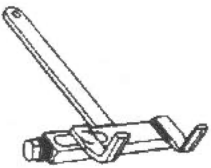
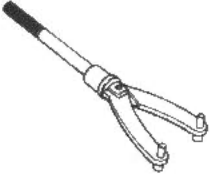
NOTE

Required service material(s) is also described in:

"Clutch Control System Components" (Page 5C-7)

"Clutch Components" (Page 5C-14)

Special Tool

<p>09900-06107 Snap ring pliers (External) ☞ (Page 5C-17) / ☞ (Page 5C-17) / ☞ (Page 5C-25) / ☞ (Page 5C-25)</p>		<p>09900-06108 Snap ring pliers (Internal) ☞ (Page 5C-9)</p>	
<p>09900-20102 Vernier calipers (200 mm) ☞ (Page 5C-21) / ☞ (Page 5C-22) / ☞ (Page 5C-22)</p>		<p>09900-20803 Thickness gauge ☞ (Page 5C-22)</p>	
<p>09920-31020 Extension handle ☞ (Page 5C-16) / ☞ (Page 5C-19)</p>		<p>09920-53740 Clutch sleeve hub holder ☞ (Page 5C-16) / ☞ (Page 5C-19)</p>	
<p>09930-40113 Rotor holder ☞ (Page 5C-23) / ☞ (Page 5C-24)</p>			

Section 6

Steering

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Precautions

Precautions

Precautions for Steering

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

BENJ31J36000001

Steering General Diagnosis

Diagnostic Information and Procedures

Steering Symptom Diagnosis

BENJ31J36104001

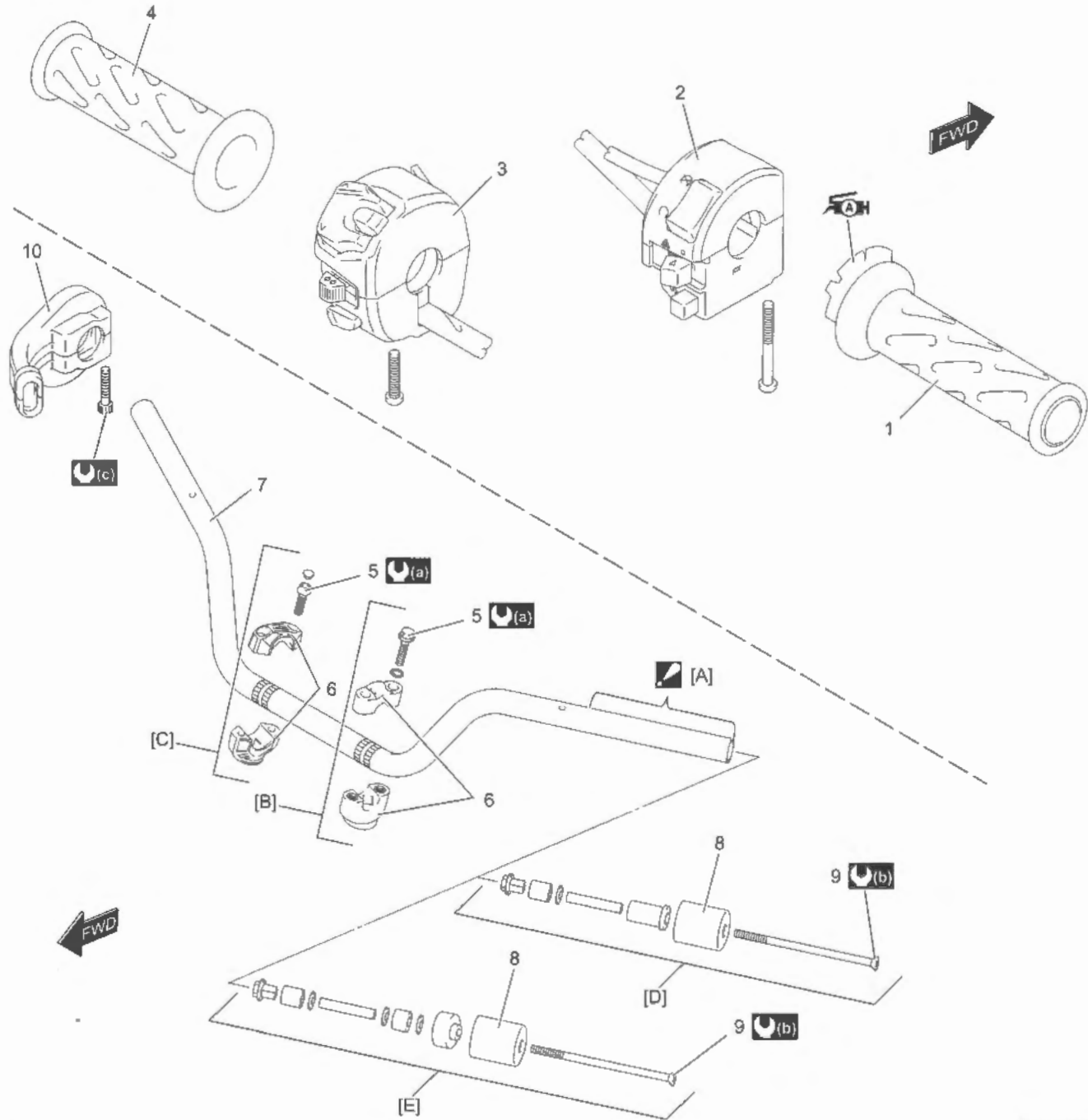
Condition	Possible cause	Correction / Reference Item
Heavy steering	Over tightened steering stem nut.	Adjust. ⌚(Page 6B-7)
	Broken bearing in steering stem.	Replace. ⌚(Page 6B-13)
	Distorted steering stem.	Replace. ⌚(Page 6B-10)
	Not enough pressure in tires.	Adjust. ⌚(Page 2D-19)
Wobbly handlebar	Loss 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-5) ⌚(Page 2D-20)
	Loose steering stem nut.	Adjust. ⌚(Page 6B-7)
	Worn or incorrect tire.	Replace. ⌚(Page 2D-20)
	Incorrect tire pressure.	Adjust. ⌚(Page 2D-19)
	Worn bearing/race in steering stem.	Replace. ⌚(Page 6B-13)

Steering / Handlebar

Repair Instructions

Handlebar Components

BENJ31J36206001

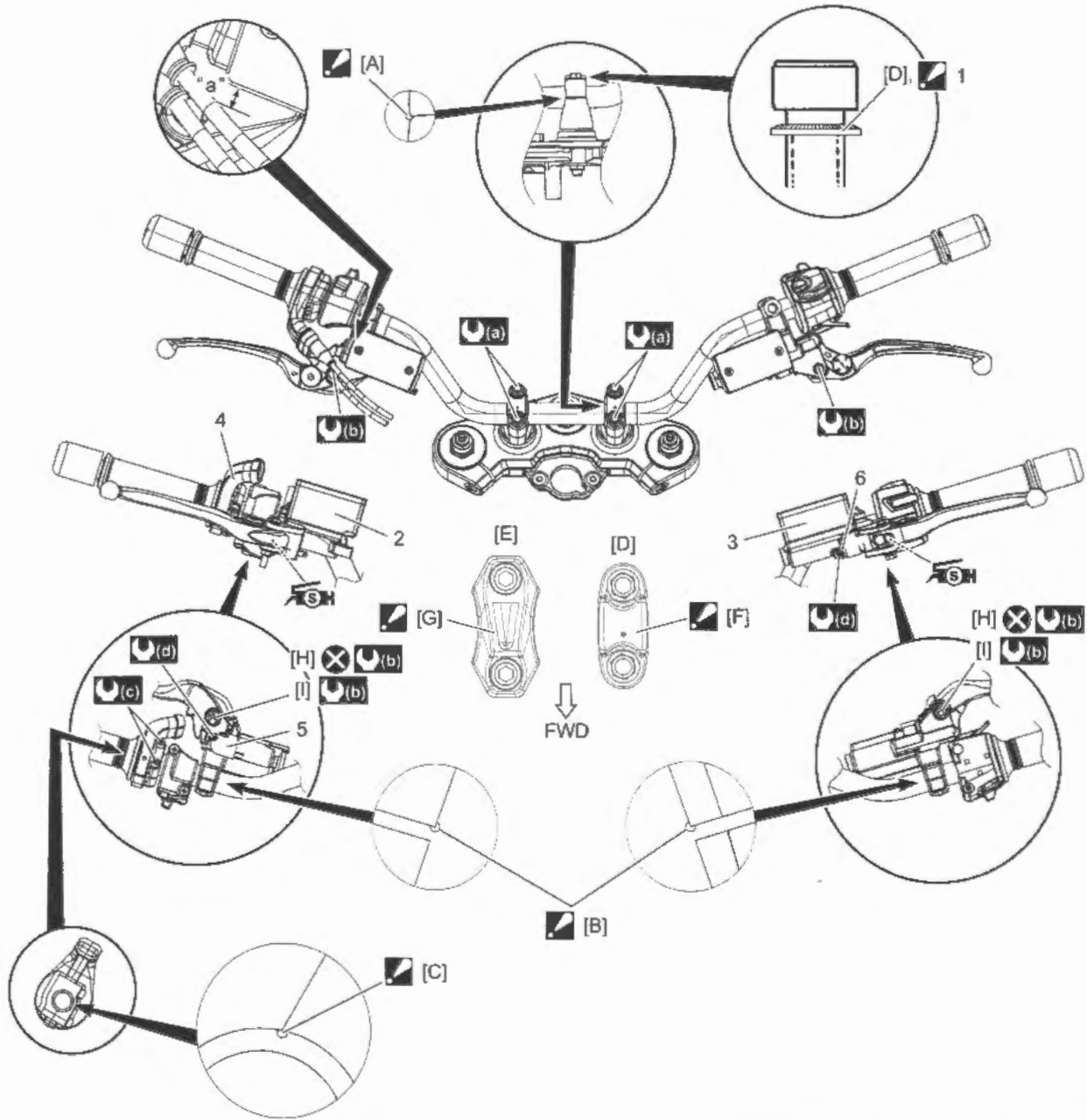


IJ31J1620006-02

<ul style="list-style-type: none"> [A]: Apply handle grip glue. [B]: DL1000A [C]: DL1000XA [D]: L4 - L8 [E]: L8 - 	<ul style="list-style-type: none"> 3. Left handlebar switch box 4. Left handlebar grip 5. Handlebar clamp bolt 6. Handlebar holder 7. Handlebars 8. Handlebar balancer 9. Handlebar balancer screw 	<ul style="list-style-type: none"> 10. Throttle case (a) : 23 N·m (2.3 kgf·m, 17.0 lbf·ft) (b) : 5.5 N·m (0.55 kgf·m, 4.0 lbf·ft) (c) : 3 N·m (0.3 kgf·m, 2.5 lbf·ft) ⊕ : Apply grease.
<ul style="list-style-type: none"> 1. Throttle grip 2. Right handlebar switch box 		

Handlebar Construction

BENJ31J36206002



IJ31J1620001-05

<p>☑ [A]: Align the matching surface of handlebar holder with punch mark of handlebars.</p>	<p>[I]: L8 –</p>	<p>⌚(a) : 23 N·m (2.3 kgf·m, 17.0 lbf·ft)</p>
<p>☑ [B]: Align the punch mark of handlebars with the edge of master cylinder.</p>	<p>☑ 1. Washer : The conical side of washer faces outside.</p>	<p>⌚(b) : 6 N·m (0.6 kgf·m, 4.5 lbf·ft)</p>
<p>☑ [C]: Align the matching surface of throttle case with punch mark of handlebars.</p>	<p>2. Front brake master cylinder</p>	<p>⌚(c) : 3 N·m (0.3 kgf·m, 2.5 lbf·ft)</p>
<p>[D]: DL1000A</p>	<p>3. Clutch master cylinder</p>	<p>⌚(d) : 1.2 N·m (0.12 kgf·m, 1.0 lbf·ft)</p>
<p>[E]: DL1000XA</p>	<p>4. Throttle case</p>	<p>⌚(S) : Apply silicone grease.</p>
<p>☑ [F]: Install the handlebar holder positioning the punch mark frontward.</p>	<p>5. Brake light switch</p>	<p>⊗ : Do not reuse.</p>
<p>☑ [G]: Install the handlebar holder in correct direction as shown.</p>	<p>6. Clutch lever position switch</p>	
<p>[H]: L4 – L6</p>	<p>*a*: 3 – 5 mm (0.1 – 0.2 in)</p>	

Handlebar Removal and Installation

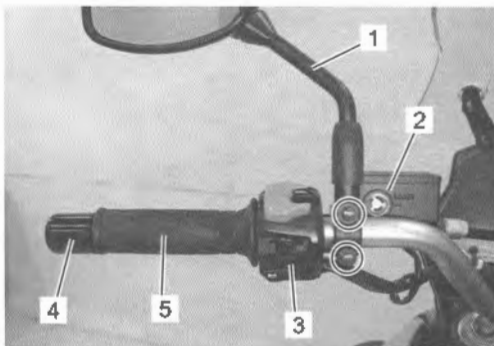
BENJ31J36206003

Removal

NOTE

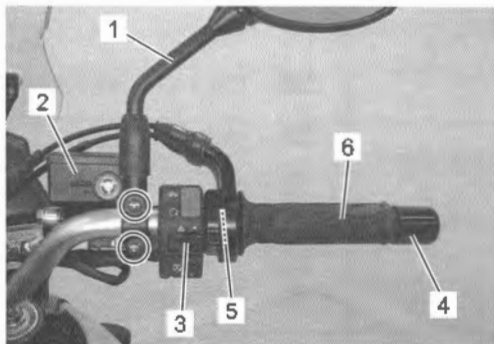
Do not turn the master cylinder upside down.

- 1) Remove the following parts from the left side of the handlebar.
 - a) Left knuckle cover (If equipped) (Page 9D-38)
 - b) Rear view mirror (1)
 - c) Clutch master cylinder assembly (2)
 - d) Left handlebar switch box (3)
 - e) Handlebar balancer (4)
 - f) Left handlebar grip (5)



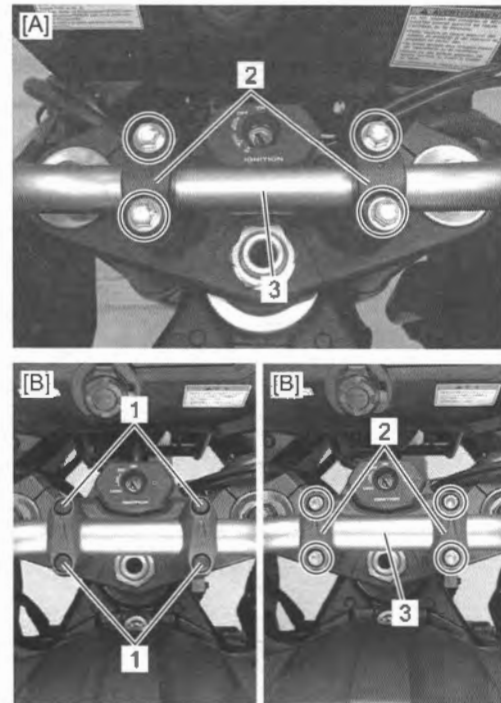
IE31J1620002-01

- 2) Remove the following parts from the right side of the handlebar.
 - a) Right knuckle cover (If equipped) (Page 9D-38)
 - b) Rear view mirror (1)
 - c) Front brake master cylinder assembly (2)
 - d) Right handlebar switch box (3)
 - e) Handlebar balancer (4)
 - f) Throttle case (5)
 - g) Throttle grip (6)



IE31J1620003-01

- 3) For DL1000XA, remove the handlebar clamp bolt caps (1).
- 4) Remove the handlebar holders (2), and then remove the handlebars (3).



IJ31J1620004-02

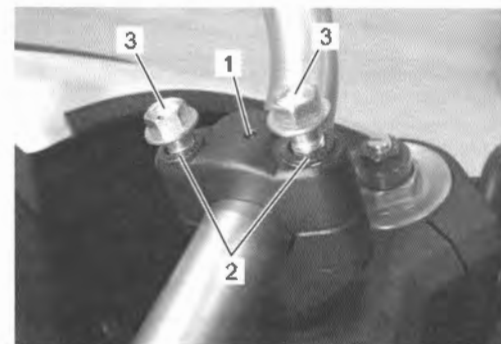
[A]: DL1000A
[B]: DL1000XA

Installation

- 1) Install the handlebars.
- 2) For DL1000A, install the handlebar holders positioning the punch mark (1) frontward.
- 3) For DL1000A, install the washers (2) and handlebar clamp bolts (3).

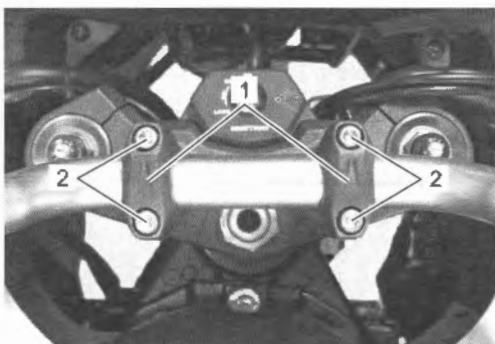
NOTE

Face the cone shape washers (2) upward.



IE31J1620005-01

- 4) For DL1000XA, install the handlebar holders (1) in correct direction as shown.
- 5) For DL1000XA, install the handlebar clamp bolts (2).

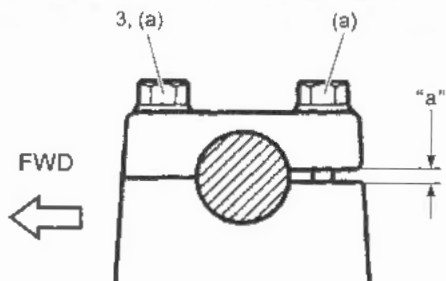
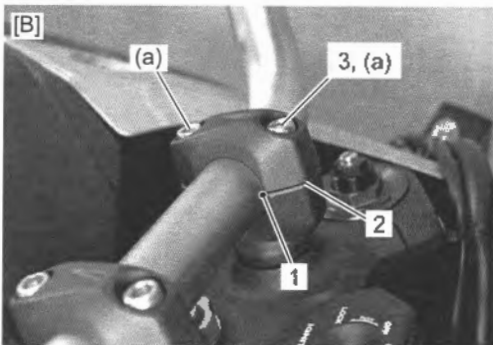
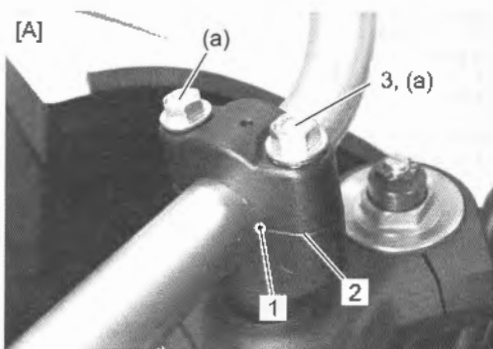


IJ31J1620005-01

- 6) Set the handlebars so that its punch mark (1) aligns with the mating surface (2) of the left handlebar holder and tighten the front side of the handlebar clamp bolts (3) first.

Tightening torque

Handlebar clamp bolt (a): 23 N·m (2.3 kgf·m, 17.0 lbf·ft)



IJ31J1620002-02

[A]:	DL1000A
[B]:	DL1000XA
"a":	Clearance

- 7) For DL1000XA, install the handlebar clamp bolt caps.
- 8) Apply grease onto the handlebars before installing the throttle grip.

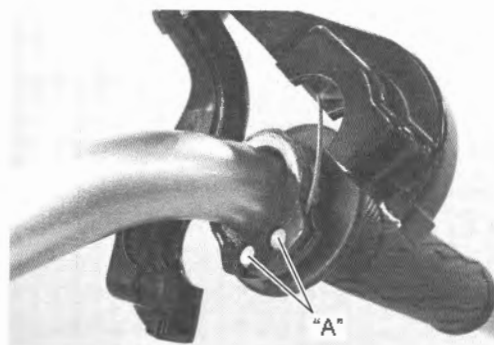
"A": Grease 99000-25011 (SUZUKI SUPER GREASE A)



IE31J1620008-01

- 9) Apply grease to the end of the throttle cables and cable pulley.

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



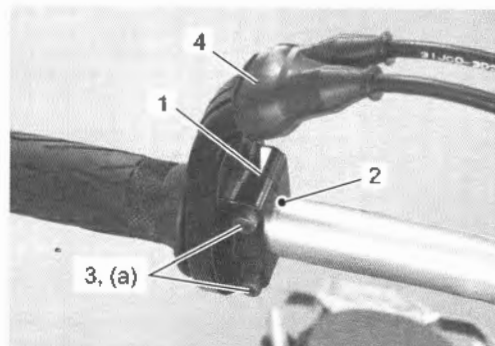
IE31J1620009-01

- 10) Align the mating surface (1) of the throttle case with the punch mark (2) on the handlebars and tighten the throttle case bolts (3) to the specified torque.

Tightening torque

Throttle case bolt (a): 3 N·m (0.3 kgf·m, 2.5 lbf·ft)

- 11) Set the boot (4) onto the throttle case securely.



IE31J1620010-01

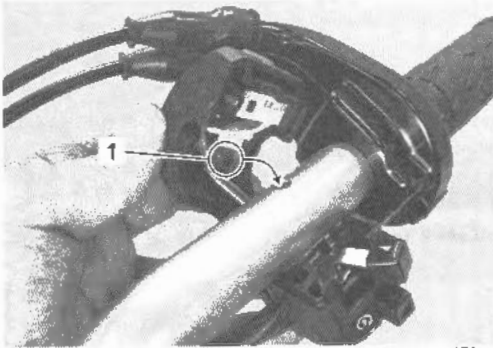
6B-5 Steering / Handlebar:

- 12) Install the right handlebar balancer and tighten the handlebar balancer screw.

Tightening torque

Handlebar balancer screw: 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)

- 13) Insert the projection (1) of the right handlebar switch box into the hole of the handlebars.



IE31J1620011-01

- 14) Install the front brake master cylinder assembly. (Page 4A-17)

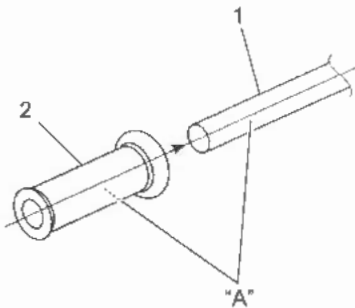
- 15) Install the right rear view mirror.

- 16) Install the right knuckle cover. (If equipped) (Page 9D-38)

- 17) Clean, decrease and dry both the left handlebar outer surface (1) on which the grip is being fitted and internal surface of the left handlebar grip (2).

- 18) Apply handle grip glue to both the left handlebar outer surface (1) on which the grip is being fitted and internal surface of the left handlebar grip (2) evenly.

“A”: Adhesive (Handle grip glue)



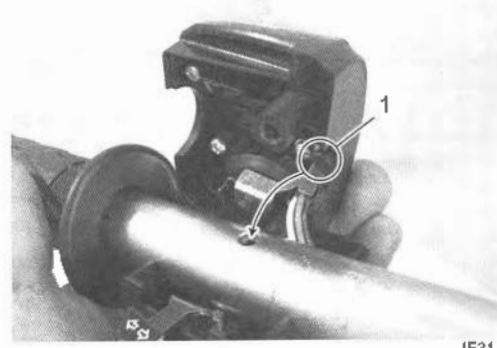
IE31J1620012-01

- 19) Install the left handlebar balancer and tighten the handlebar balancer screw.

Tightening torque

Handlebar balancer screw: 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)

- 20) Insert the projection (1) of the left handlebar switch box into the hole of the handlebars.



IE31J1620013-01

- 21) Install the clutch master cylinder. (Page 5C-8)

- 22) Install the left rear view mirror.

- 23) Install the left knuckle cover. (If equipped) (Page 9D-38)

- 24) Check to make sure that the wire harnesses, cables and hoses are properly routed.

- Wire harness:
 - L4 – L6 model: (Page 9A-6)
 - L8 – model: (Page 9A-24)
- Cable: (Page 1C-2)
- Hose: (Page 4A-2)

- 25) Check the throttle cable for the play and smooth operation. (Page 1C-4)

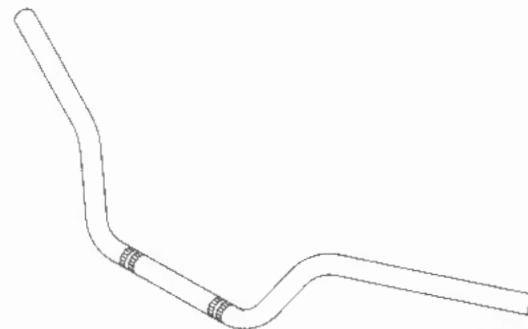
Handlebar Inspection

BENJ31J36206004

Refer to “Handlebar Removal and Installation” (Page 6B-3).

Inspect the handlebars for distortion and damage.

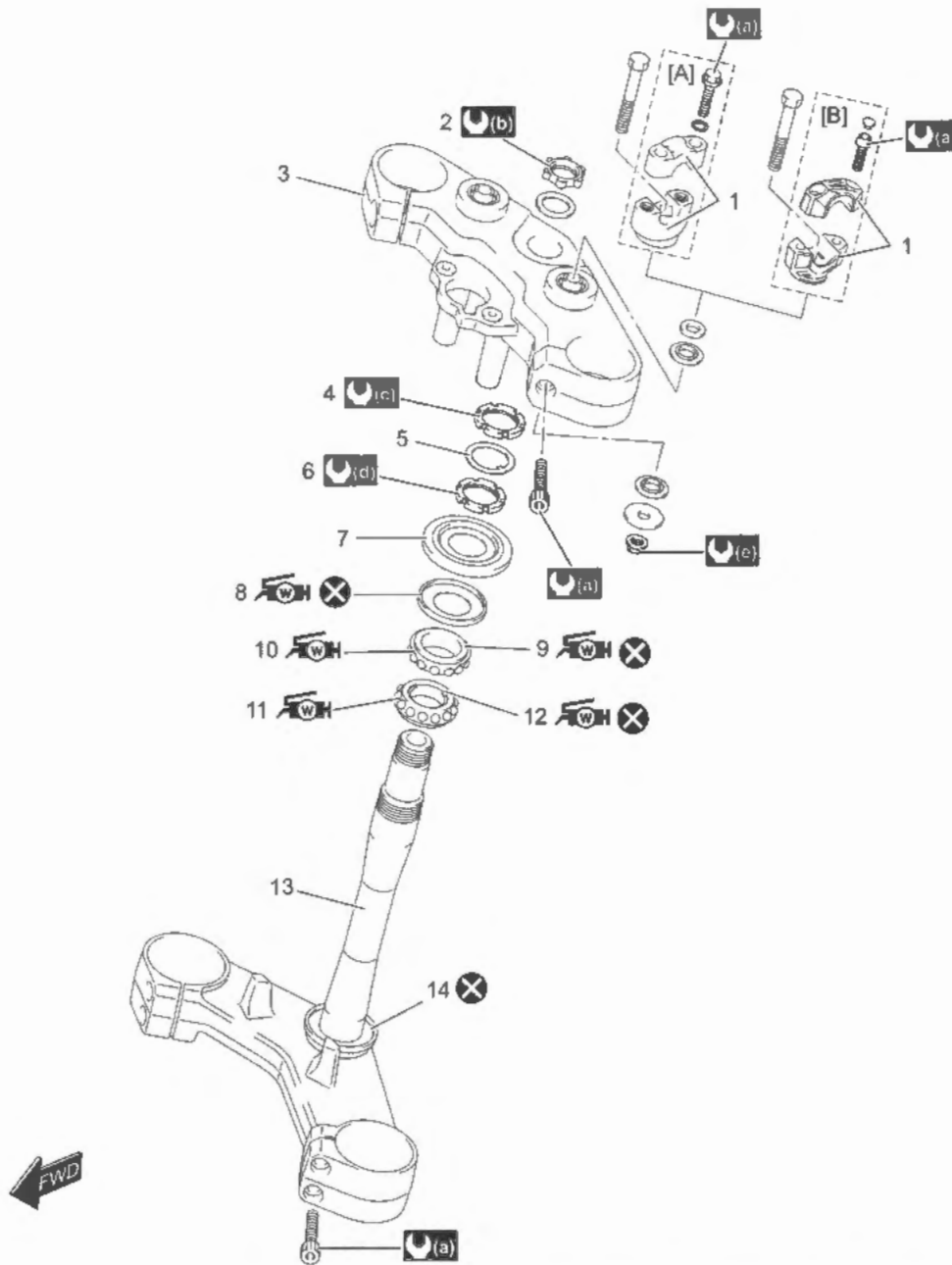
If any defect is found, replace the handlebars with a new one.



IE31J1620052-01

Steering Stem Components

BENJ31J36206005



IJ31J1620007-01

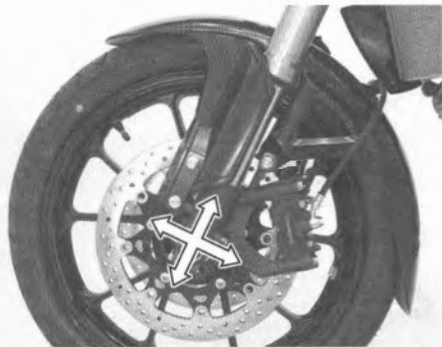
{A}: DL1000A	5. Washer	11. Steering stem lower bearing	(c) : 80 N·m (8.0 kgf·m, 58.0 lbf·ft)
{B}: DL1000XA	6. Steering stem nut	12. Steering stem lower bearing inner race	(d) : 20 N·m (2.0 kgf·m, 14.5 lbf·ft) → turn counterclockwise 0 - 1/4
1. Handlebar holder	7. Dust cover	13. Steering stem lower bracket	(e) : 45 N·m (4.5 kgf·m, 32.5 lbf·ft)
2. Steering stem head nut	8. Dust seal	14. Lower seal	WH : Apply grease.
3. Steering stem upper bracket	9. Steering stem upper bearing inner race	(a) : 23 N·m (2.3 kgf·m, 17.0 lbf·ft)	X : Do not reuse.
4. Steering stem lock-nut	10. Steering stem upper bearing	(b) : 90 N·m (9.0 kgf·m, 65.0 lbf·ft)	

Steering On-Vehicle Inspection

BENJ31J36206006

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

- 1) Check that there is no play in the front fork.
- 2) Check that there is no play in the steering stem bearings holding the handlebar, moving the motorcycle back-and-forth with the front brake applied. Or, support the motorcycle so that the front wheel is off the ground, grasp the lower fork tubes near the axle and move the tubes back-and-forth and up-and-down.
If play is found, readjust the steering. (Page 6B-7)



IE31J1620014-01

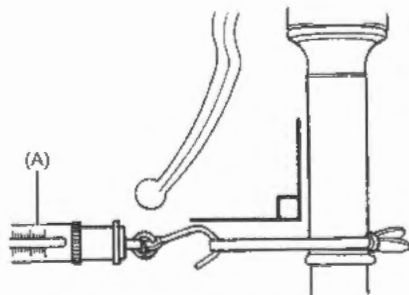
Steering Tension Adjustment

BENJ31J36206007

- 1) By supporting the motorcycle with a jack, 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 (special tool) on one handlebar grip end as shown in the figure and read the graduation when the handlebars start moving.

Steering tension initial force
2 – 5 N (0.2 – 0.5 kgf, 0.4 – 1.1 lbf)

Special tool
(A): 09940-92720



ID26J1620028-01

- 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 fuel tank side covers.
 - L4 – L6 model: (Page 9D-14)
 - L8 – model: (Page 9D-34)
 - b) First, loosen the front fork upper clamp bolts, steering stem head nut and steering stem lock-nut, and then adjust the steering stem nut by loosening or tightening it.

Special tool
(A): 09910-60611



IE31J1620015-01

- c) 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 (8.0 kgf-m, 58.0 lbf-ft)
Steering stem head nut: 90 N·m (9.0 kgf-m, 65.0 lbf-ft)
Front fork upper clamp bolt: 23 N·m (2.3 kgf-m, 17.0 lbf-ft)

- d) Make sure that the initial force is within the specified range and the steering is not loose.



IE31J1620016-01

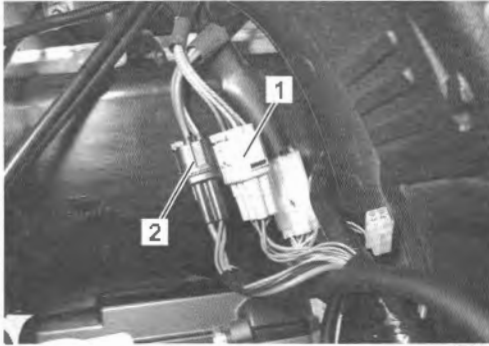
- e) Install the removed parts.

Steering Stem Upper Bracket Removal and Installation

BENJ31J36205008

Removal

- 1) Support the motorcycle with a jack or wooden block.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Disconnect the ignition switch lead wire coupler (1) and immobilizer antenna lead wire coupler (2). (If equipped)



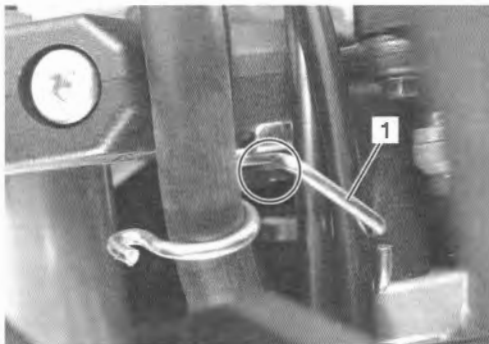
IE31J1620017-01

- 4) Disconnect the clamps (1).



IE31J1620018-01

- 5) Remove the guide (1).

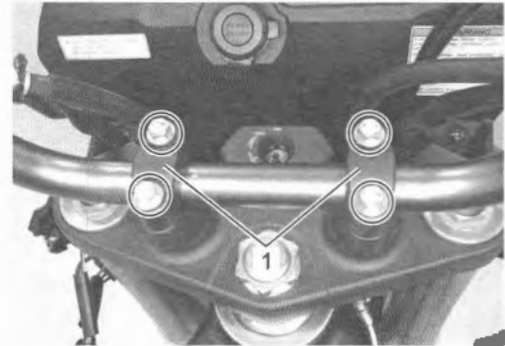


IE31J1620019-01

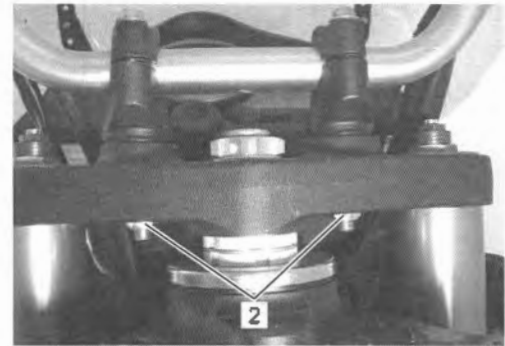
- 6) Remove the handlebar holders (1).

NOTE

Slightly loosen the handlebar holder nuts (2) to facilitate later disassembly.



J31J1620003-01



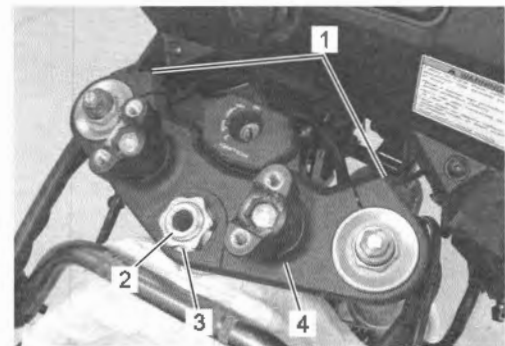
IE31J1620021-01

- 7) Remove the handlebars backward.

NOTE

Place a rag on the frame to prevent the handlebars scratched.

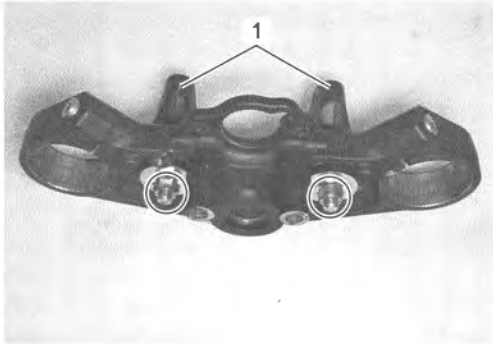
- 8) Loosen the front fork upper clamp bolts (1).
- 9) Remove the steering stem head nut (2), washer (3) and steering stem upper bracket assembly (4).



IE31J1620023-02

6B-9 Steering / Handlebar:

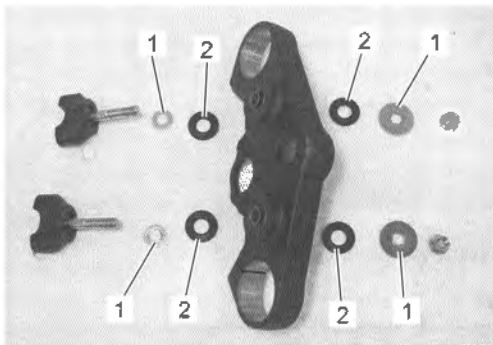
- 10) Remove the ignition switch and ignition switch cover.
☞(Page 1H-10)
- 11) Remove the immobilizer antenna. (If equipped)
☞(Page 1H-11)
- 12) Remove the handlebar holders (1).



IE31J1620024-01

- 13) Remove the following parts from the steering stem upper bracket.

- Washer (1)
- Rubber (2)

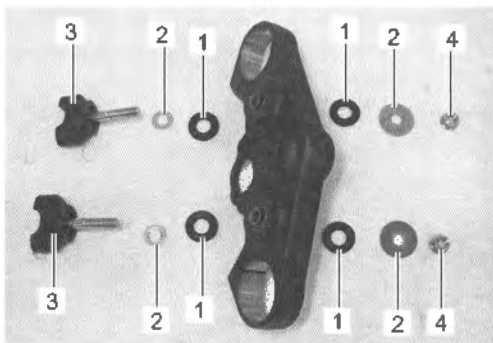


IE31J1620025-01

Installation

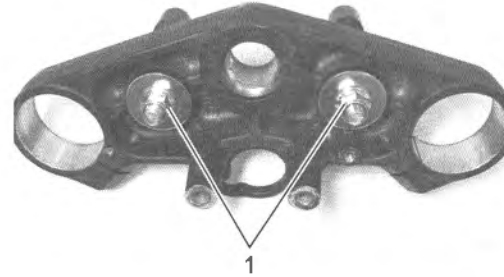
- 1) Install the following parts to the steering stem upper bracket.

- Rubber (1)
- Washer (2)
- Handlebar holder (3)
- Nut (4)

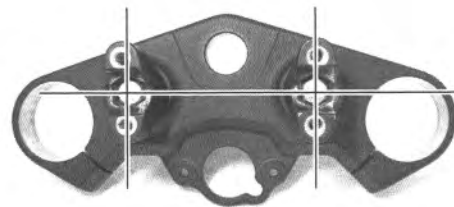


IE31J1620026-01

- 2) Place the handlebar holder at right angles with the steering stem upper bracket (1), then temporarily tighten it.



IE31J1620027-01



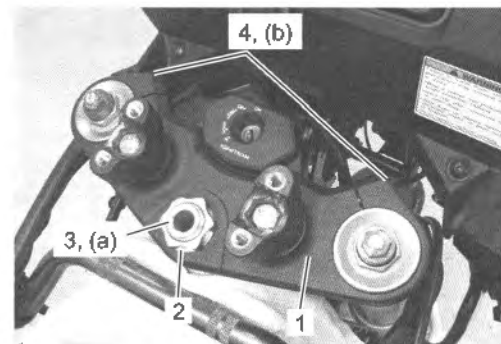
IE31J1620028-01

- 3) Install the immobilizer antenna. (If equipped)
☞(Page 1H-11)
- 4) Install the ignition switch and ignition switch cover.
☞(Page 1H-10)
- 5) Install the steering stem upper bracket assembly (1), washer (2) and steering stem head nut (3).
- 6) 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 (9.0 kgf·m, 65.0 lbf·ft)

Front fork upper clamp bolt (b): 23 N·m (2.3 kgf·m, 17.0 lbf·ft)

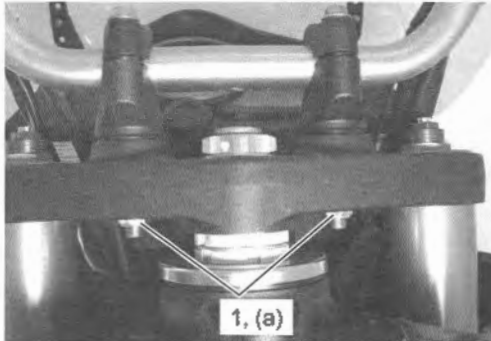


IE31J1620029-02

- 7) Install the handlebars. (Page 6B-3)
- 8) Tighten the handlebar holder nuts (1) to the specified torque.

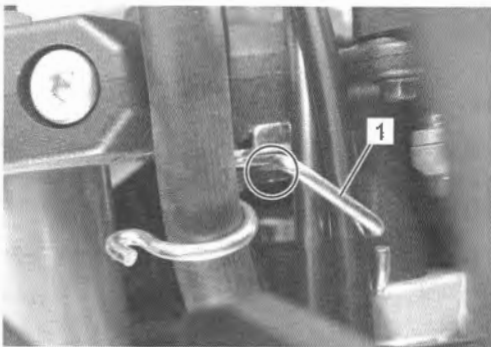
Tightening torque

Handlebar holder nut (a): 45 N·m (4.5 kgf·m, 32.5 lbf·ft)



IE31J1620030-01

- 9) Install the guide (1). Refer to "Throttle Cable Routing Diagram" in Section 1C (Page 1C-2) and "Front Brake Hose Routing Diagram" in Section 4A (Page 4A-2).



IE31J1620031-01

- 10) Pass the wire harness and connect the clamps (1).
- L4 – L6 model: (Page 9A-6)
 - L8 – model: (Page 9A-24)



IE31J1620032-01

- 11) Connect the ignition switch lead wire coupler and immobilizer antenna lead wire coupler. (If equipped)
- 12) Install the air cleaner box. (Page 1D-4)

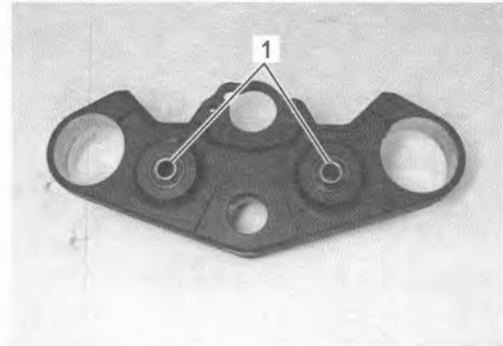
Steering Stem Upper Bracket Inspection

BENJ31J36206009

Refer to "Steering Stem Upper Bracket Removal and Installation" (Page 6B-8).

Inspect handlebar bushings (1) for damage.

If any damage is found, replace the steering stem upper bracket with a new one.



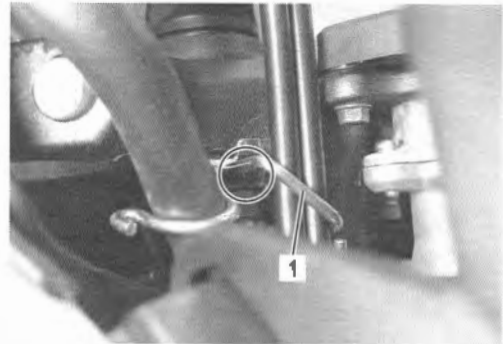
IE31J1620033-01

Steering Stem Removal and Installation

BENJ31J36206010

Removal

- 1) Remove the front forks. (Page 2B-3)
- 2) Remove the guide (1).

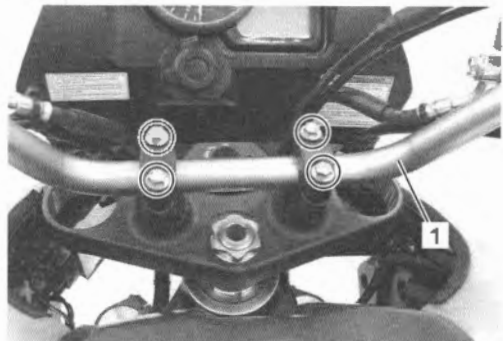


IE31J1620034-01

- 3) Remove the handlebars (1) backward.

NOTE

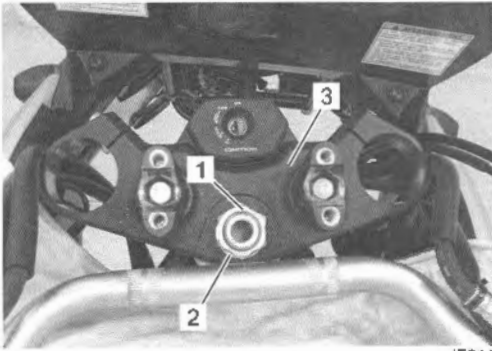
Place a rag on the fuel tank to prevent the fuel tank scratched.



IE31J1620035-01

6B-11 Steering / Handlebar:

- 4) Remove the steering stem head nut (1) and washer (2), and then remove the steering stem upper bracket assembly (3).



IE31J1620036-01

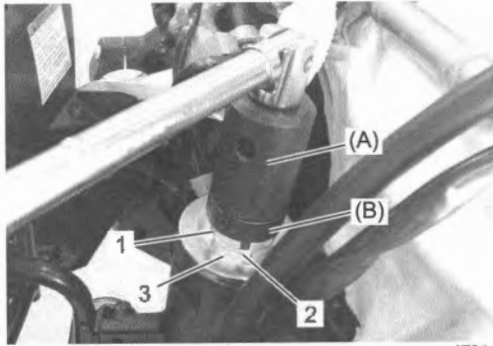
- 5) While holding the steering stem lower bracket, remove the steering stem lock-nut (1), washer (2) and steering stem nut (3) with the special tools.

Special tool

(A): 09940-14911

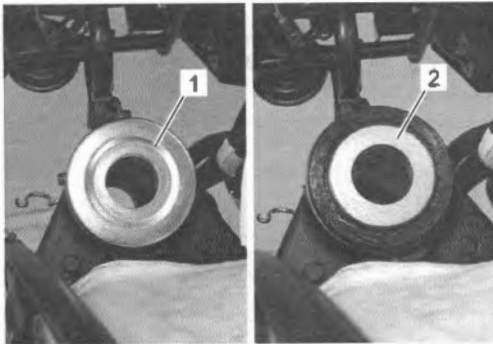
(B): 09940-14960

- 6) Remove the steering stem lower bracket.

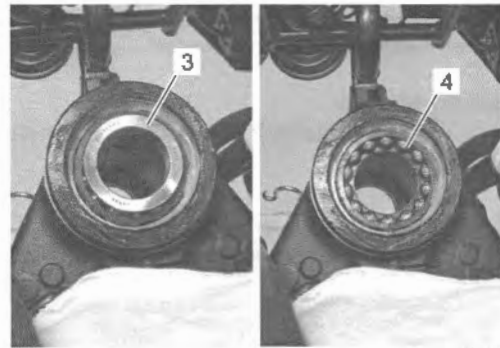


IE31J1620037-01

- 7) Remove the dust cover (1), dust seal (2), steering stem upper bearing inner race (3) and steering stem upper bearing (4).

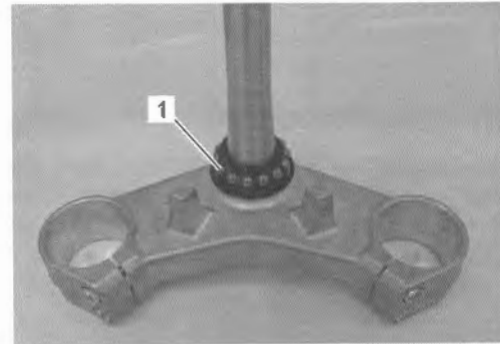


IE31J1620038-01



IE31J1620039-01

- 8) Remove the steering stem lower bearing (1).

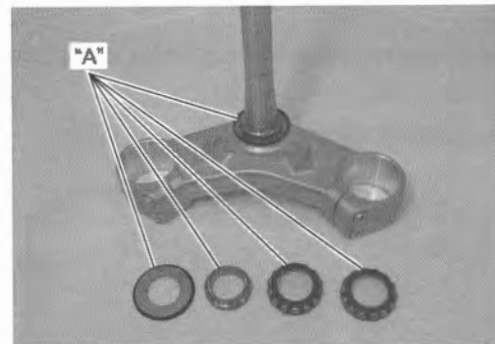


IE31J1620040-01

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 99000-25350 (SUZUKI WATER RESISTANT GREASE EP2)

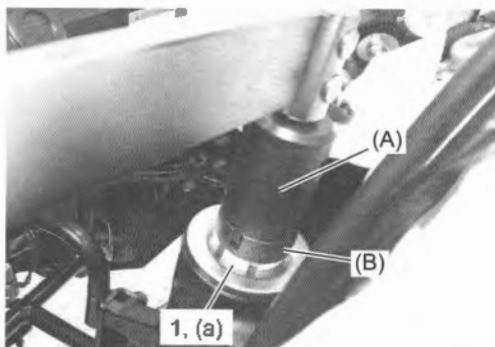


IE31J1620041-01

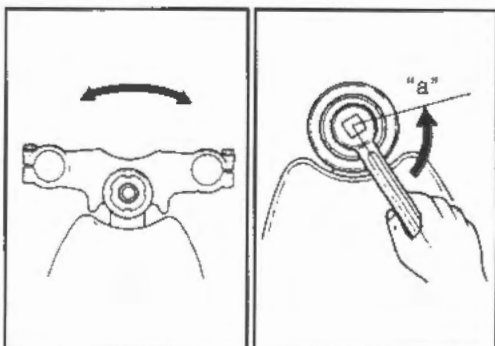
- 2) Install the steering stem nut (1) and temporarily tighten it to the specified torque (20 N·m (2.0 kgf·m, 14.5 lbf·ft)) with the special tools.

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 nut 0 – 1/4 turn "a".

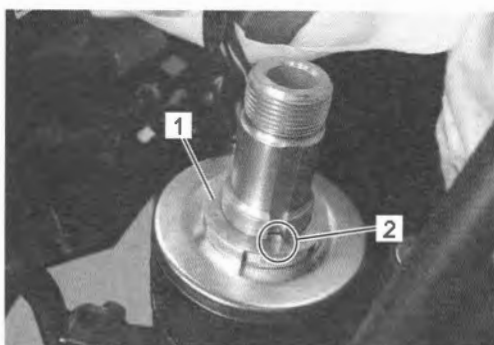
Tightening torque**Steering stem nut (a): 20 N·m (2.0 kgf·m, 14.5 lbf·ft) → turn counterclockwise 0 – 1/4**

IE31J1620042-01



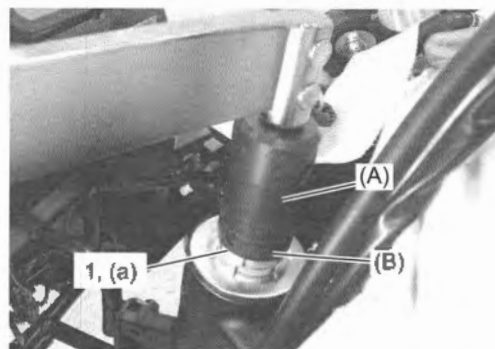
I649G1620026-02

- 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 nut.
- 6) When installing the washer (1), align the lug (2) of the washer to the groove of the steering stem.



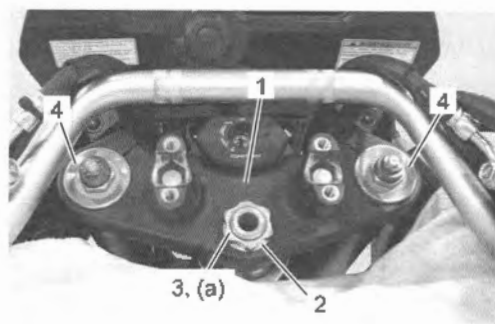
IE31J1620043-01

- 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 (8.0 kgf·m, 58.0 lbf·ft)**

IE31J1620044-01

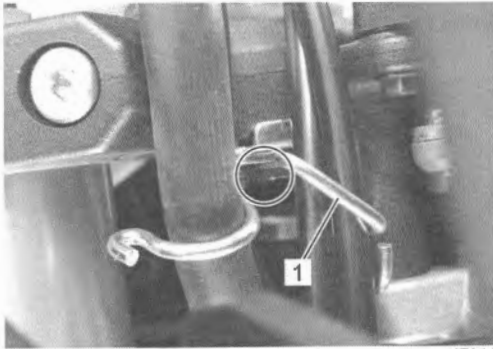
- 8) Install the steering stem upper bracket (1), washer (2) and steering stem head nut (3) temporarily.
- 9) Install the front forks (4) temporarily.
- 10) Tighten the steering stem head nut (3) to the specified torque.

Tightening torque**Steering stem head nut (a): 90 N·m (9.0 kgf·m, 65.0 lbf·ft)**

IE31J1620045-01

6B-13 Steering / Handlebar:

- 11) Install the front forks. ☞(Page 2B-3)
- 12) Install the handlebars. ☞(Page 6B-3)
- 13) Install the guide (1). Refer to "Throttle Cable Routing Diagram" in Section 1C (Page 1C-2) and "Front Brake Hose Routing Diagram" in Section 4A (Page 4A-2).



IE31J1620046-01

- 14) Check the steering tension. ☞(Page 6B-7)

Steering Stem Inspection

BENJ31J36206011

Refer to "Steering Stem Removal and Installation" (Page 6B-10).

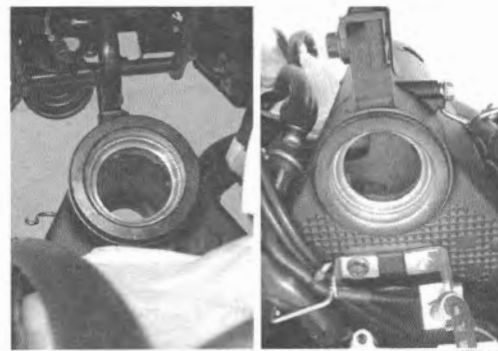
Inspect the removed parts for the following abnormalities:

- 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.



IE31J1620047-01



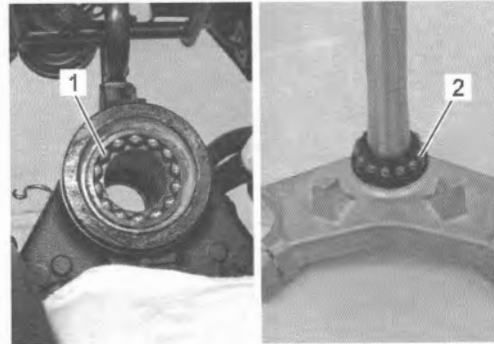
IE31J1620048-01

Steering Stem Bearing Removal and Installation

BENJ31J36206012

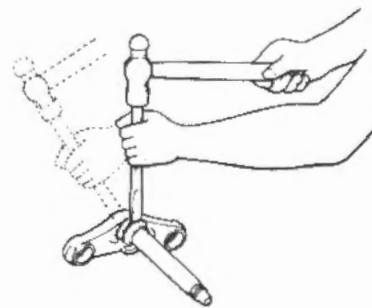
Removal

- 1) Remove the steering stem upper bearing (1) and steering stem lower bearing (2). Refer to "Steering Stem Removal and Installation" (Page 6B-10).



IE31J1620049-01

- 2) Remove the steering stem lower bearing inner race and lower seal with a chisel.



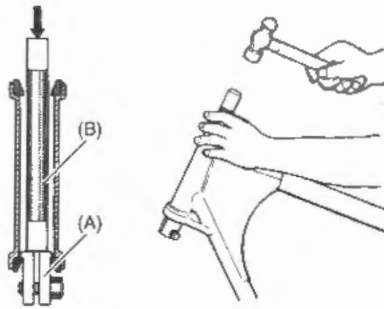
I649G1620033-02

- 3) Remove the steering stem upper and lower bearing outer races using the special tools.

Special tool

(A): 09941-54911

(B): 09925-18011



ID26J1620040-01

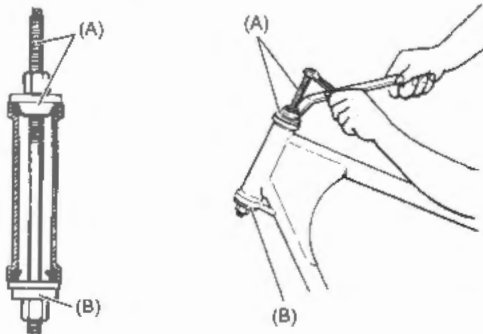
Installation

- 1) Press in the new upper and lower outer races using the special tools.

Special tool

(A): 09941-34513

(B): 09913-70210

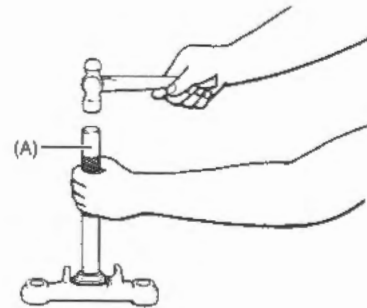


IE31J1620050-01

- 2) Press in the new lower inner 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

BENJ31J36207001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Handlebar clamp bolt	23	2.3	17.0	☞(Page 6B-4)
Throttle case bolt	3	0.3	2.5	☞(Page 6B-4)
Handlebar balancer screw	5.5	0.55	4.0	☞(Page 6B-5) / ☞(Page 6B-5)
Steering stem lock-nut	80	8.0	58.0	☞(Page 6B-7) / ☞(Page 6B-12)
Steering stem head nut	90	9.0	65.0	☞(Page 6B-7) / ☞(Page 6B-9) / ☞(Page 6B-12)
Front fork upper clamp bolt	23	2.3	17.0	☞(Page 6B-7) / ☞(Page 6B-9)
Handlebar holder nut	45	4.5	32.5	☞(Page 6B-10)
Steering stem nut	20 N·m (2.0 kgf·m, 14.5 lbf·ft) → turn counterclockwise 0 – 1/4			☞(Page 6B-12)

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-6)
- “Fasteners Information” in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ31J36208001









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-4) / ☞(Page 6B-4)
	SUZUKI WATER RESISTANT GREASE EP2	P/No.: 99000-25350	☞(Page 6B-11)

NOTE

Required service material(s) is also described in:

- “Handlebar Components” (Page 6B-1)
- “Handlebar Construction” (Page 6B-2)
- “Steering Stem Components” (Page 6B-6)

Special Tool

<p>09910-60611 Adjustable hook wrench ☞(Page 6B-7)</p> 	<p>09913-70210 Bearing installer set ☞(Page 6B-14)</p> 
<p>09925-18011 Bearing installer ☞(Page 6B-14) / ☞(Page 6B-14)</p> 	<p>09940-14911 Steering stem nut socket ☞(Page 6B-11) / ☞(Page 6B-12) / ☞(Page 6B-12)</p> 
<p>09940-14960 Steering stem nut socket wrench ☞(Page 6B-11) / ☞(Page 6B-12) / ☞(Page 6B-12)</p> 	<p>09940-92720 Spring scale (400 - 1000 g) ☞(Page 6B-7)</p> 
<p>09941-34513 Bearing installer set ☞(Page 6B-14)</p> 	<p>09941-54911 Bearing outer race remover ☞(Page 6B-14)</p> 

Section 9

Body and Accessories

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Precautions

Precautions

Precautions for Electrical System

BENJ31J39000001

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

Component Location

Electrical Components Location

BENJ31J39003001

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

Wiring Systems

L4 - L6

General Description

Abbreviations

Refer to the "Abbreviations" in Section 0A (Page 0A-1) for the general abbreviations.

BENJ31J39111001

Wire / Connector Color Symbols

Refer to "Wire Color Symbols" in Section 0A (Page 0A-4).

BENJ31J39111002

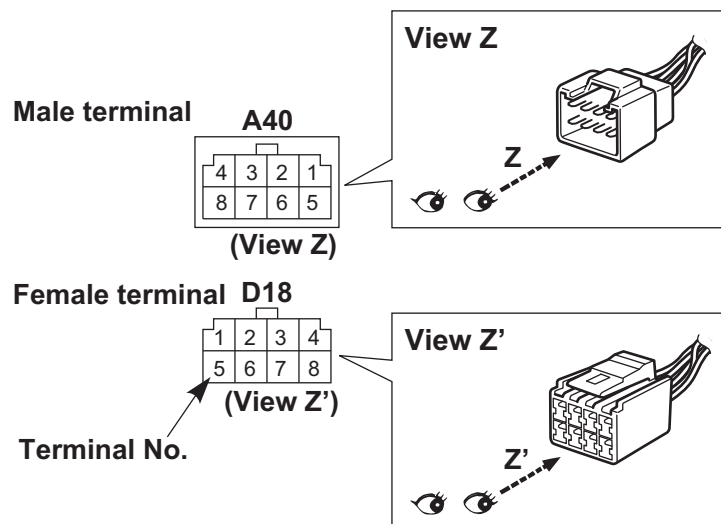
How to Read Terminal Nos.

The connector shape and terminal layout shown in this manual are those when viewed from "Z" in the illustration.

BENJ31J39111003

NOTE

- Molded terminal numbers that are different from the above can be found on some connectors in rare cases.
- These molded numbers are not applied in this manual.



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Glossary

BENJ31J39111004

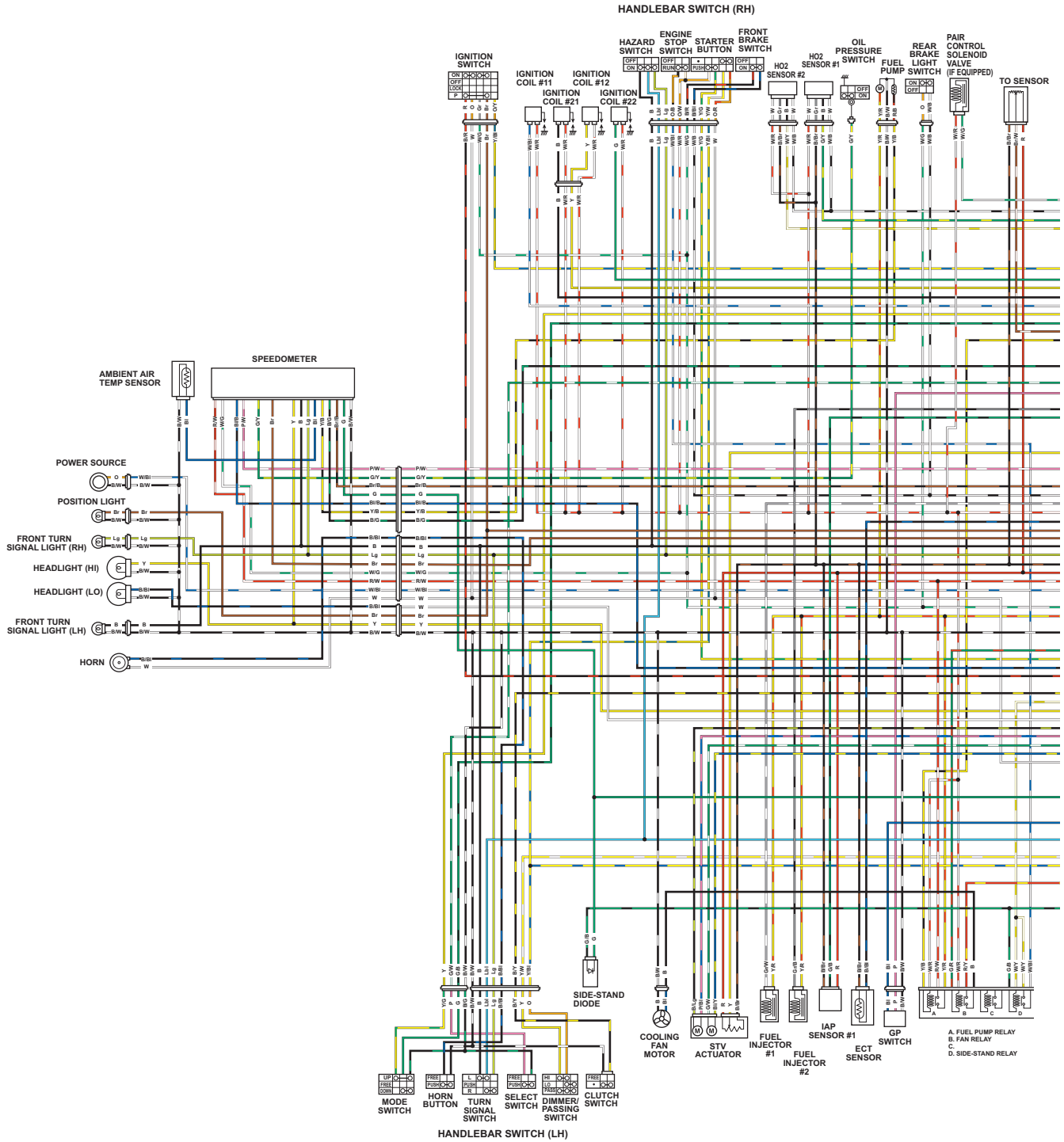
English	
ABS CONTROL UNIT	
ABS MOTOR	
ABS VALVE	
AMBIENT AIR TEMP SENSOR	
BATTERY	
CKP SENSOR	
CLUTCH SWITCH	
COOLING FAN MOTOR	
DIMMER/PASSING SWITCH	
ECM	
ECT SENSOR	
ENGINE STOP SWITCH	
EVAP SYSTEM PURGE CONTROL SOLENOID VALVE	
EXCV ACTUATOR	
FAN	
FAN RELAY	
FRONT BRAKE SWITCH	
FRONT TURN SIGNAL LIGHT	
FRONT WHEEL SPEED SENSOR	
FUEL	
FUEL INJECTOR	
FUEL PUMP	
FUEL PUMP RELAY	
FUSE BOX	
GENERATOR	
GP SWITCH	
HANDLEBAR SWITCH	
HAZARD SWITCH	
HEAD HI	
HEAD LO	
HEADLIGHT	
HI	
HO2 SENSOR	
HORN	
HORN BUTTON	
IAP SENSOR	
IAT SENSOR	
IF EQUIPPED	
IGNITION	
IGNITION COIL	
IGNITION SWITCH	
IMMOBILIZER ANTENNA	
LEFT HANDLEBAR SWITCH	
LH	
LICENSE PLATE LIGHT	
LO	
MAIN	
MODE SWITCH	
OIL PRESSURE SWITCH	
POSITION LIGHT	
POWER SOURCE	
REAR BRAKE LIGHT SWITCH	
REAR COMBINATION LIGHT	
REAR TURN SIGNAL LIGHT	
REAR WHEEL SPEED SENSOR	
REGULATOR RECTIFIER	
RH	

English	
SELECT SWITCH	
SIDE-STAND DIODE	
SIDE-STAND RELAY	
SIDE-STAND SWITCH	
SIGNAL	
SPEEDOMETER	
STARTER BUTTON	
STARTER MOTOR	
STARTER RELAY	
STV ACTUATOR	
TO SENSOR	
TP SENSOR	
TURN SIGNAL RELAY	
TURN SIGNAL SWITCH	

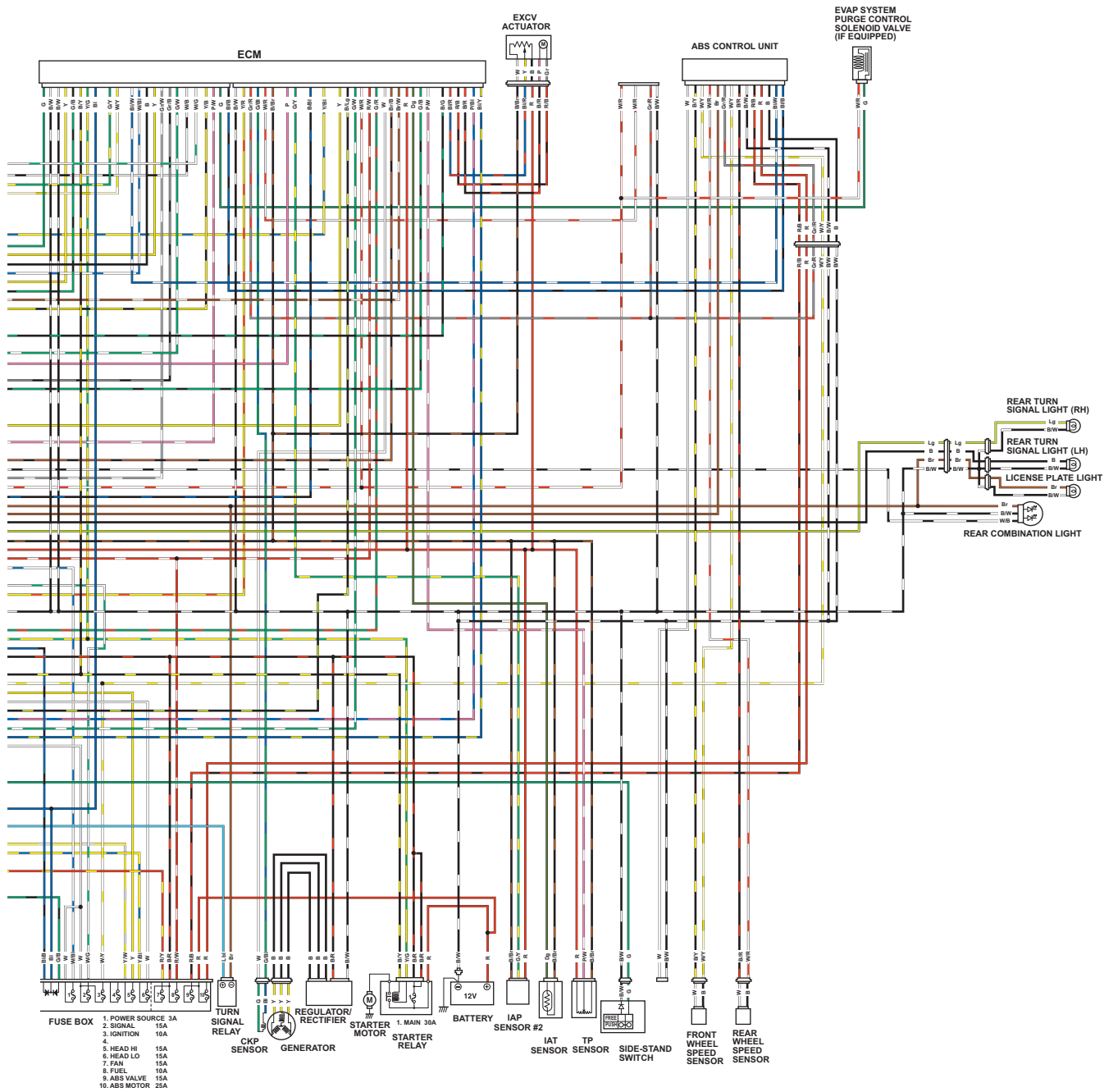
Schematic and Routing Diagram

Wiring Diagram

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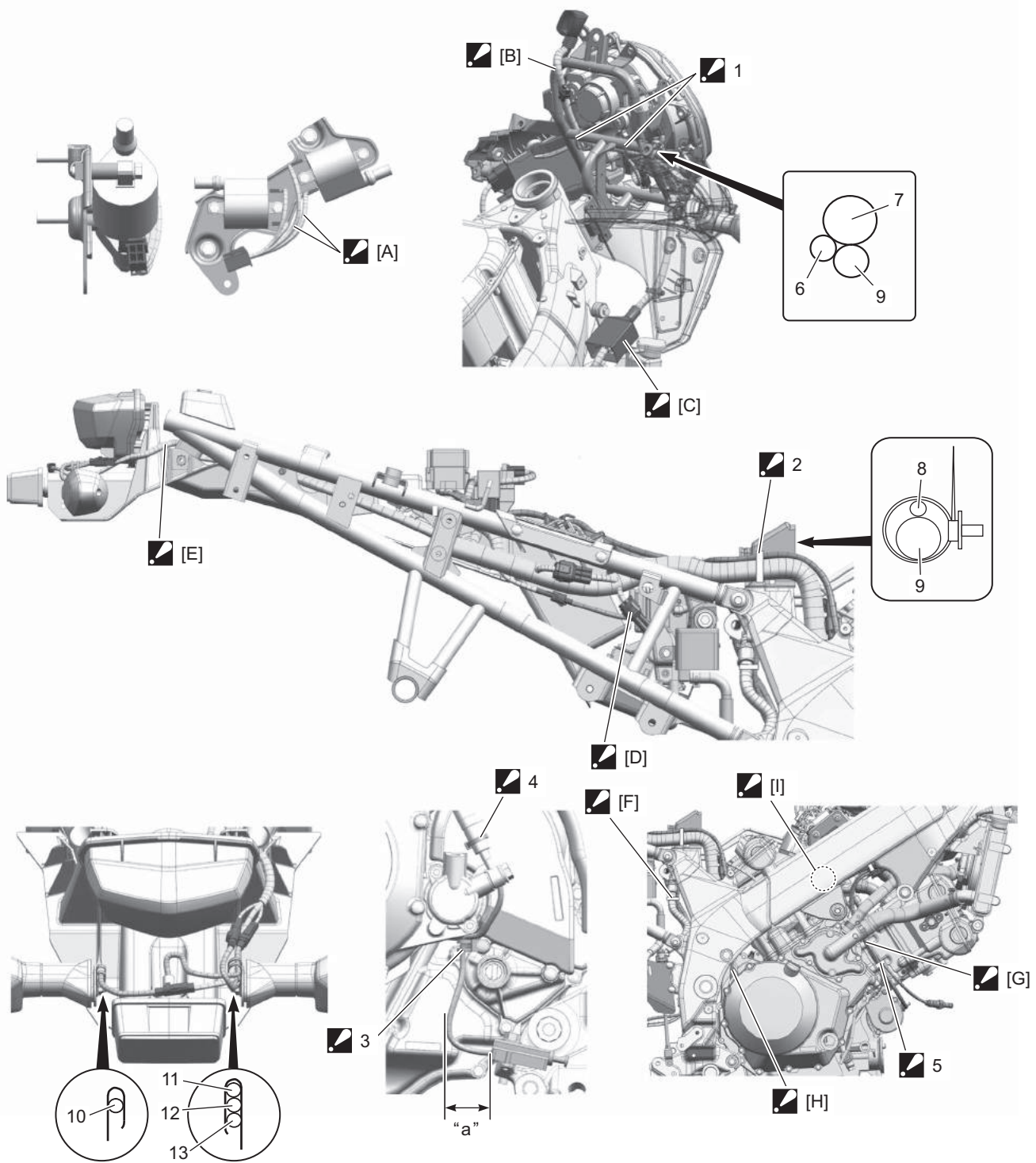
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Wiring Harness Routing Diagram

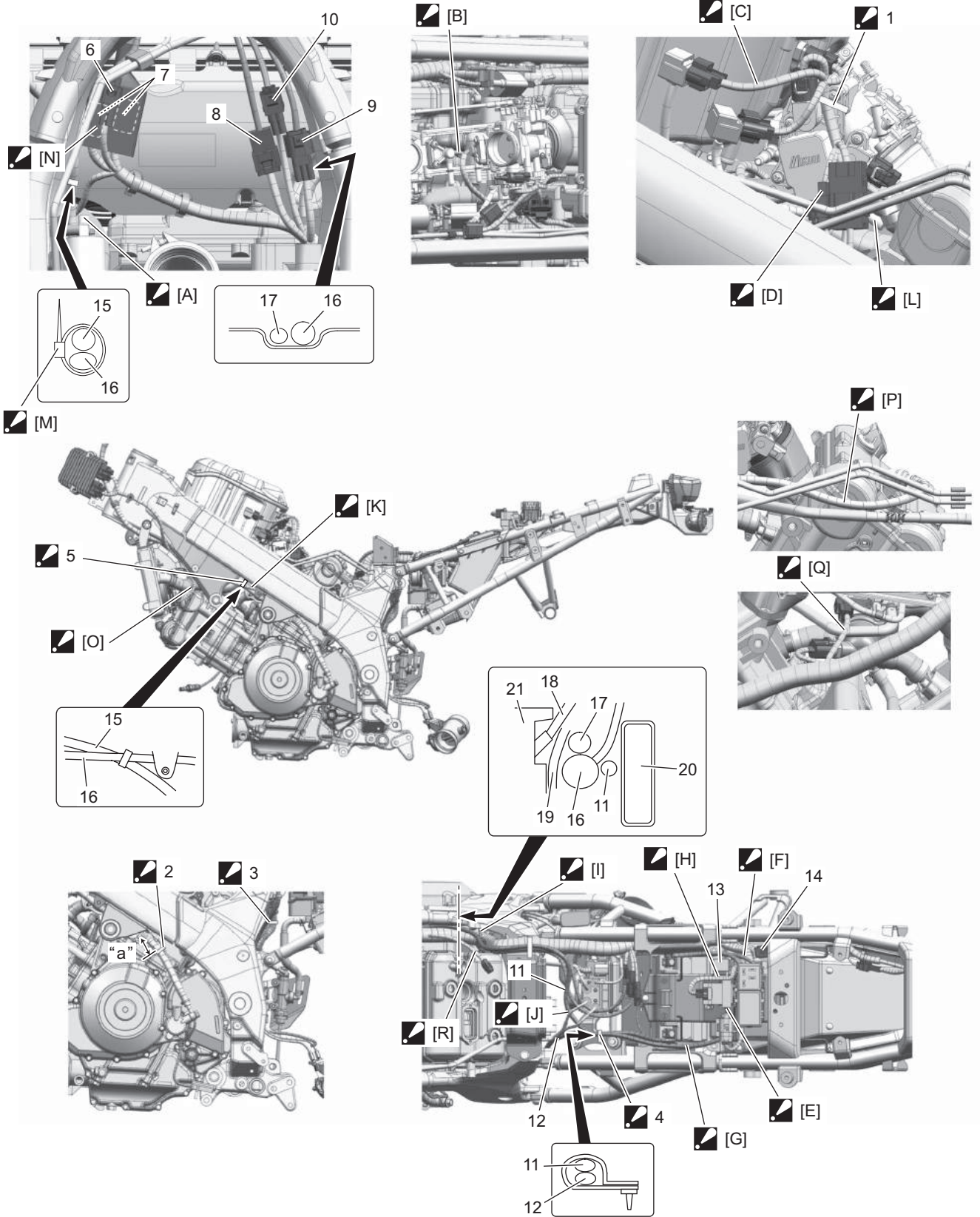
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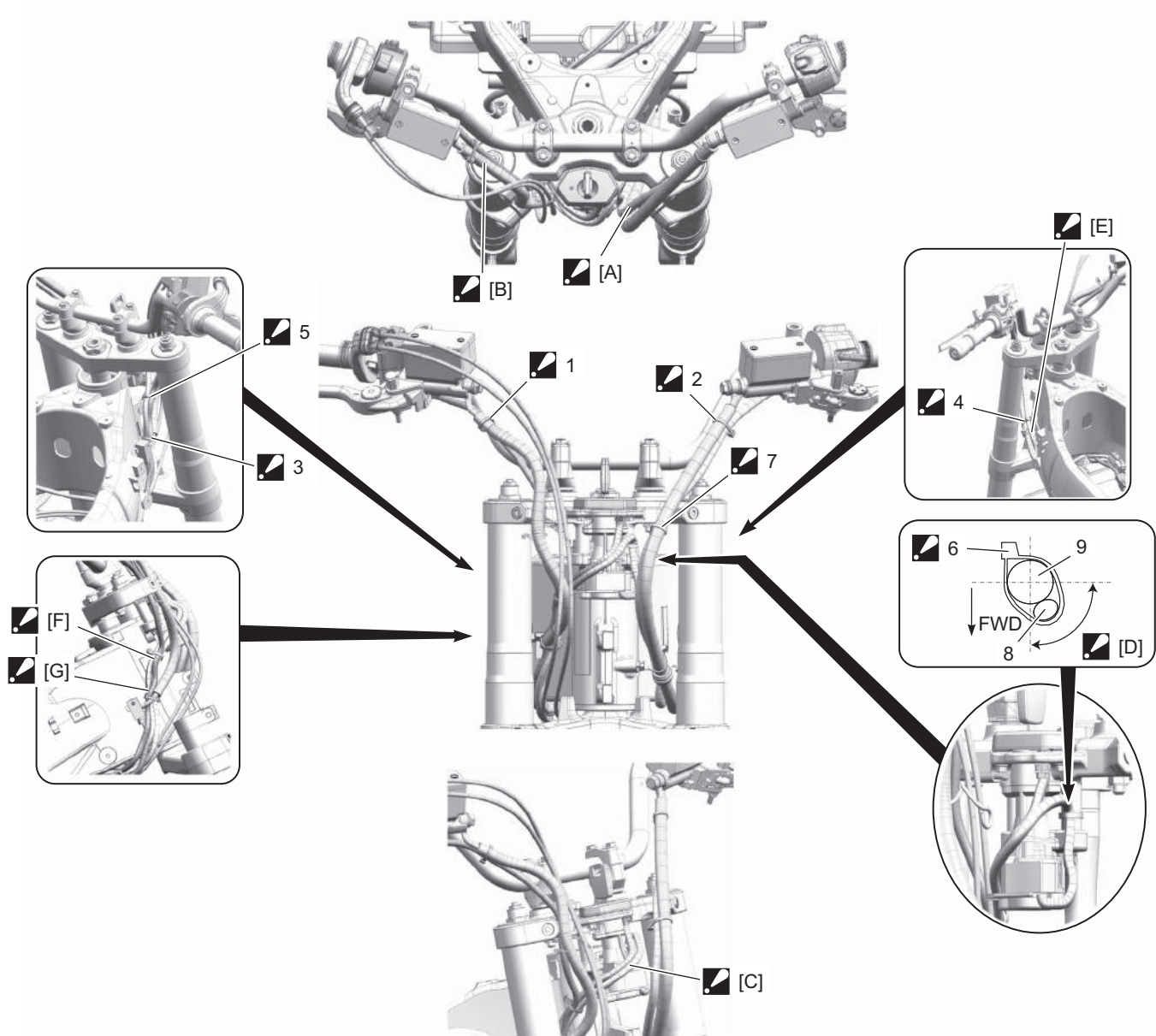


IF31J1910903-01

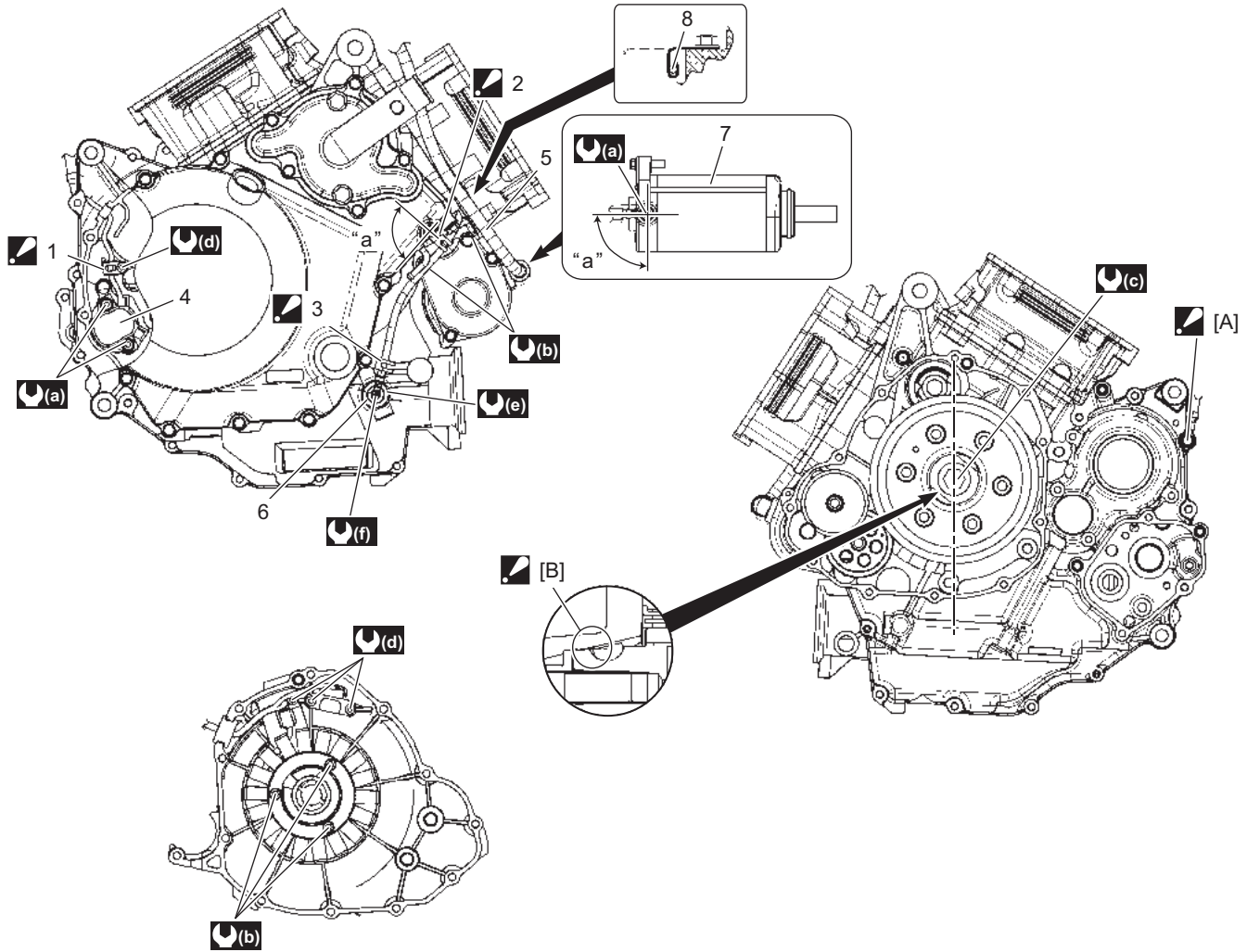
<p>☑ [A]: Connect the branching part of blue tape to the ignition coil #1.</p>	<p>☑ [I]: Pass the starter motor lead wire under the wiring harness and ECT sensor branch wire.</p>	<p>8. Starter motor lead wire</p>
<p>☑ [B]: Pass the combination meter branch wire behind the headlight brace.</p>	<p>☑ 1. Clamp : Pass the wiring harness No. 2 under the pipe of the cowling brace and clamp the wiring harness No. 2 at blue tape point.</p>	<p>9. Wiring harness</p>
<p>☑ [C]: After connecting the coupler, push in the PVC boot to the rear of the vehicle and set it with its opening part facing downward.</p>	<p>☑ 2. Clamp : Clamp the wiring harness at white tape point. Face the clamp end upward. Cut off the excess tip of the clamp.</p>	<p>10. Left turn signal lead wire</p>
<p>☑ [D]: Connect the EXCVA coupler outside of the rear wheel speed sensor lead wire.</p>	<p>☑ 3. Clamp : Clamp the side-stand switch lead wire. Clamp end should face inside.</p>	<p>11. License plate light lead wire</p>
<p>☑ [E]: To prevent the rear turn signal lead wire from pinched between the seat rail pipe and rear fender (front), pass the rear turn signal lead wire under the seat rail pipe.</p>	<p>☑ 4. Clamp : Clamp the clutch hose and side-stand switch lead wire. Face the clamp end inside. Cut off the excess tip of the clamp.</p>	<p>12. Rear combination light lead wire</p>
<p>☑ [F]: Pass the rear brake light switch lead wire and HO2 sensor #2 lead wire to inside of the reservoir hose.</p>	<p>☑ 5. Clamp : Clamp the starter motor lead wire and oil pressure switch lead wire and HO2 sensor lead wire. Cut off the excess tip of the clamp. Clamp end should face #1 cylinder.</p>	<p>13. Right turn signal lead wire</p>
<p>☑ [G]: Pass the water bypass hose under the HO2 sensor #1 lead wire, starter motor lead wire and oil pressure switch lead wire.</p>	<p>6. Position light</p>	<p>"a": Max. 50 mm (1.9 in)</p>
<p>☑ [H]: Pass the gear position switch lead wire in front of the engine mounting bolt. Pass the gear position switch lead wire between the inside of wiring harness and frame.</p>	<p>7. Brace</p>	



<p>☑ [A]: Pass the high-tension cord between the frame, wiring harness and clutch hose.</p>	<p>☑ 3. Clamp : Fix the HO2 sensor #2 lead wire and the rear brake light switch lead wire with a clamp at the aluminum protector upper part of the reservoir hose, taking care so that they should not get touch with the protector. Cut off the excess tip of the clamp.</p>
<p>☑ [B]: Connect the branching part of F label to the fuel injector #1.</p>	<p>☑ 4. Clamp Pass the starter motor lead wire above the battery (-) lead wire.</p>
<p>☑ [C]: Connect the branching part of blue tube wiring harness to the IAP sensor #1.</p>	<p>☑ 5. Clamp : Clamp the wiring harness and clutch hose. Cut off the excess tip of the clamp. Clamp end should face upside.</p>
<p>☑ [D]: Pass the CKP sensor coupler and side-stand switch coupler in front of the generator coupler.</p>	<p>6. Front wheel speed sensor lead wire coupler</p>
<p>☑ [E]: Pass the starter motor lead wire under the TO sensor.</p>	<p>7. Left handlebar switch lead wire couplers</p>
<p>☑ [F]: Pass the battery (+) lead wire above the fuse box branching wire.</p>	<p>8. Right handlebar switch lead wire coupler</p>
<p>☑ [G]: Pass the starter motor lead wire to inside of the battery box rib.</p>	<p>9. Immobilizer antenna coupler (If equipped)</p>
<p>☑ [H]: Pass the starter relay branching wire between the turn signal relay and starter relay.</p>	<p>10. Ignition switch lead wire coupler</p>
<p>☑ [I]: Pass the gear position switch lead wire to the rear of the starter motor lead wire taking care so that it should not get entangled. Pass the coupler inside the starter motor lead wire.</p>	<p>11. Starter motor lead wire coupler</p>
<p>☑ [J]: Pass the rear brake light switch lead wire, starter motor lead wire and HO2 sensor #2 lead wire under the front brake pipes.</p>	<p>12. Battery (-) lead wire coupler</p>
<p>☑ [K]: Pass the clutch hose inside of the wiring harness.</p>	<p>13. Turn signal relay</p>
<p>☑ [L]: Pass the side stand switch lead wire, magneto lead wire and wiring harness branch wire in front of the canister purge hose, and not to be inside of cylinder head. (If equipped)</p>	<p>14. SDS mode select coupler</p>
<p>☑ [M]: Clamp the wiring harness at white tape point and clamp end should face upper side.</p>	<p>15. Clutch hose</p>
<p>☑ [N]: Pass the left handlebar switch lead wire and front wheel speed sensor lead wire under the throttle cables.</p>	<p>16. Wiring harness</p>
<p>☑ [O]: Pass the cooling fan branch wire outside of the radiator inlet hose.</p>	<p>17. Reservoir tank hose</p>
<p>☑ [P]: Pass the high-tension cord of the ignition coil #2 (center) above the purge hose No. 3 (If equipped).</p>	<p>18. High-tension cord</p>
<p>☑ [Q]: Pass the EVAP system purge control solenoid valve branch wire above the purge hose No. 3 (If equipped).</p>	<p>19. Drain hose</p>
<p>☑ [R]: Pass the fuel pump lead wire behind the fuel tank drain hose and fuel tank breather hose. Pass the fuel pump lead wire above the surge hose No. 2 (If equipped).</p>	<p>20. Frame</p>
<p>☑ 1. Clamp : Pass the wiring harness in front of the screw. Clamp the wiring harness to the throttle body at white tape point.</p>	<p>21. Engine</p>
<p>☑ 2. Clamp : Clamp the side-stand switch lead wire and generator lead wire and clutch hose. Cut off the excess tip of the clamp. Clamp end should face inside.</p>	<p>"a": 40 – 80 mm (1.6 – 3.1 in)</p>



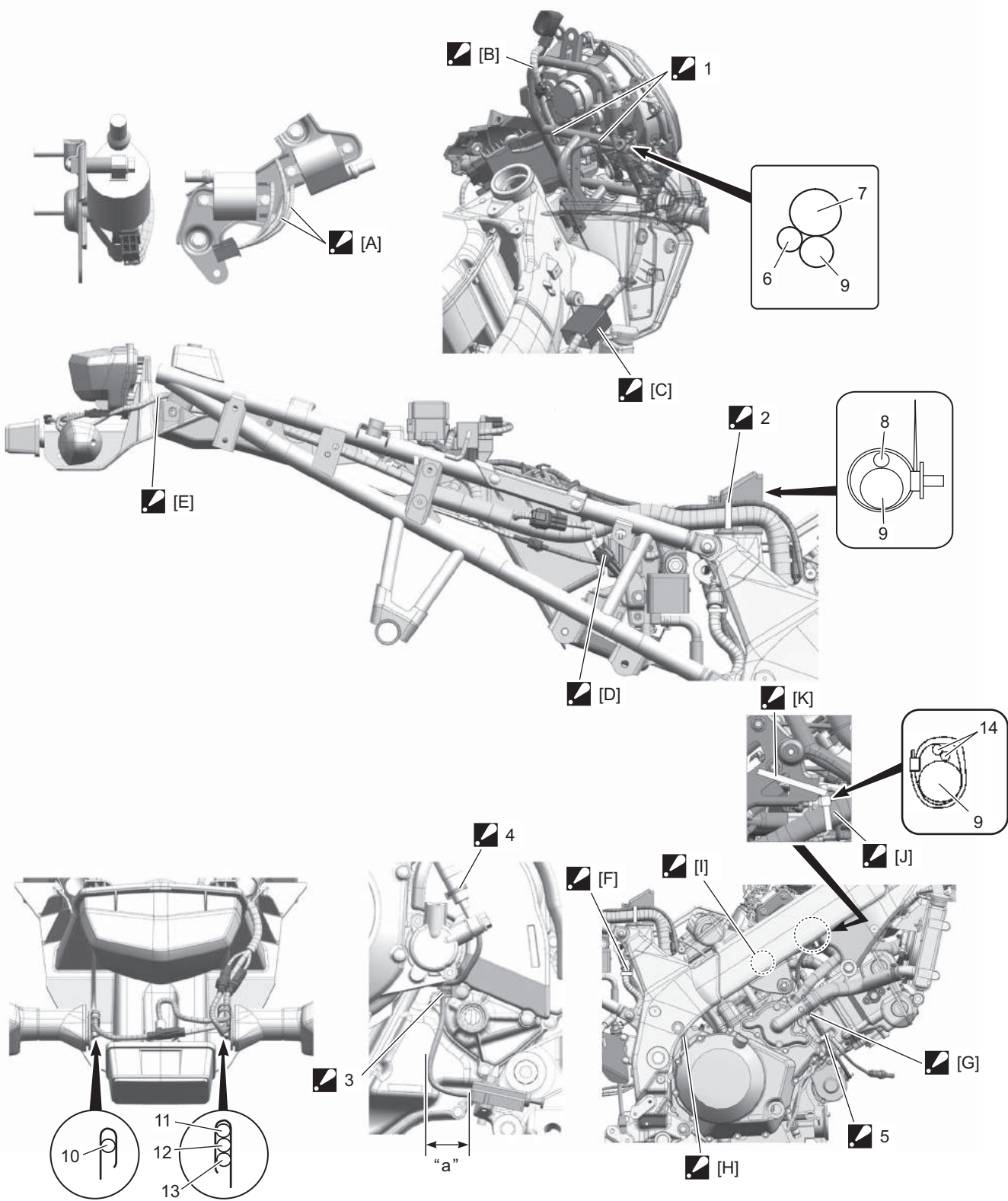
<p>☑ [A]: Pass the left handlebar switch lead wire behind of the clutch hose.</p>	<p>☑ 2. Clamp : Clamp the clutch hose and left handlebar switch lead wire. Clamp end should downward. Cut off the excess tip off the clamp.</p>
<p>☑ [B]: Pass the right handlebar switch lead wire behind of the front brake hose.</p>	<p>☑ 3. Clamp : Clamp the front brake hose, right handlebar switch lead wire, ignition switch lead wire and immobilizer antenna lead wire (If equipped). Cut off the excess tip off the clamp.</p>
<p>☑ [C]: Do not twist the ignition switch lead wire.</p>	<p>☑ 4. Clamp : Clamp the clutch hose and left handlebar switch lead wire. Cut off the excess tip off the clamp.</p>
<p>☑ [D]: Clamp the wiring harness to the area.</p>	<p>☑ 5. Clamp : Clamp the right handlebar switch lead wire, ignition switch lead wire and immobilizer antenna lead wire (If equipped). Clamp the wire harness at white tape point. Cut off the excess tip off the clamp.</p>
<p>☑ [E]: Pass the left handlebar switch lead wire above the clutch hose guide.</p>	<p>☑ 6. Clamp : Cut off the excess tip off the clamp.</p>
<p>☑ [F]: Pass the right handlebar switch lead wire, ignition switch lead wire and immobilizer antenna lead wire (If equipped) to inside and behind of the front brake hose.</p>	<p>☑ 7. Clamp : Clamp within 20 mm (0.8 in) from the steering stem upper bracket under surface. Cut off the excess tip off the clamp. Clamp end should face backward.</p>
<p>☑ [G]: Pass the wiring harness between the front brake hose and frame.</p>	<p>8. Ignition switch lead wire</p>
<p>☑ 1. Clamp : Clamp the front brake hose and right handlebar switch lead wire. Clamp end should downward. Cut off the excess tip off the clamp.</p>	<p>9. Steering stem upper bracket.</p>



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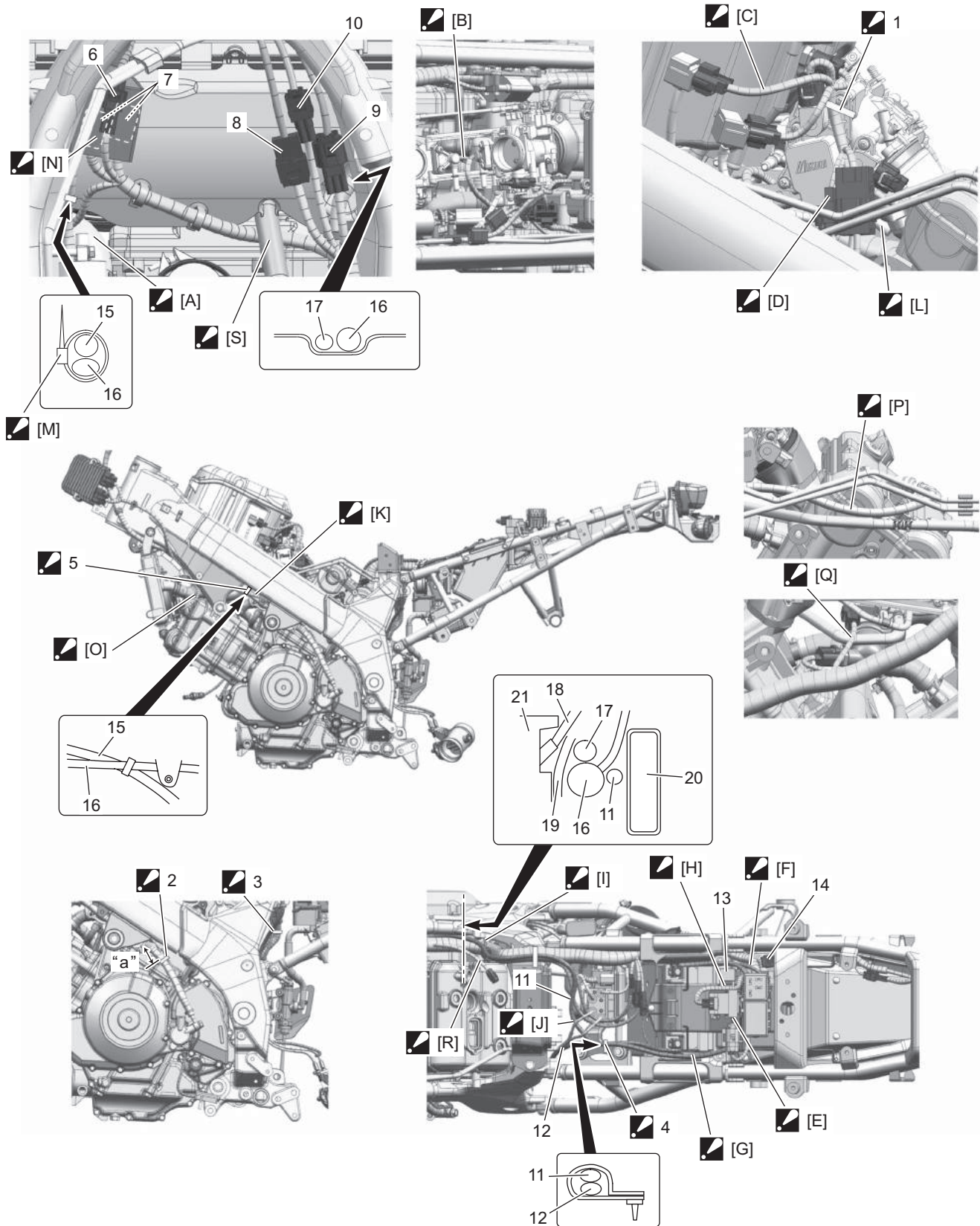
<p>☑ [A]: After the battery (-) lead wire contacted the crankcase, tighten the bolt.</p>	<p>8. Oil pressure switch lead wire</p>
<p>☑ [B]: Install the key in a manner so that the edge of keyway and the edge of the key should be horizontal.</p>	<p>"a": 85° - 95°</p>
<p>☑ 1. Clamp : Clamp the gear position switch lead wire.</p>	<p>☑ (a) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)</p>
<p>☑ 2. Clamp : Clamp the oil pressure switch lead wire.</p>	<p>☑ (b) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)</p>
<p>☑ 3. Clamp : Do not clamp the oil pressure switch lead wire.</p>	<p>☑ (c) : 180 N·m (18.0 kgf-m, 130.5 lbf-ft)</p>
<p>4. Gear position switch</p>	<p>☑ (d) : 6.5 N·m (0.65 kgf-m, 5.0 lbf-ft)</p>
<p>5. Starter motor lead wire</p>	<p>☑ (e) : 14 N·m (1.4 kgf-m, 10.5 lbf-ft)</p>
<p>6. Oil pressure switch</p>	<p>☑ (f) : 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)</p>
<p>7. Starter motor</p>	

DL1000AL5 -



9A-14 Wiring Systems: L4 - L6

<p>☑ [A]: Connect the branching part of blue tape to the ignition coil #1.</p>	<p>☑ [J]: Pass the wiring harness under the PAIR control solenoid valve (If equipped).</p>	8. Starter motor lead wire
<p>☑ [B]: Pass the combination meter branch wire behind the headlight brace.</p>	<p>☑ [K]: Set the clamp end under the ignition coil bracket bolt.</p>	9. Wiring harness
<p>☑ [C]: After connecting the coupler, push in the PVC boot to the rear of the vehicle and set it with its opening part facing downward.</p>	<p>☑ 1. Clamp : Pass the wiring harness No. 2 under the pipe of the cowling brace and clamp the wiring harness No. 2 at blue tape point.</p>	10. Left turn signal lead wire
<p>☑ [D]: Connect the EXCVA coupler outside of the rear wheel speed sensor lead wire.</p>	<p>☑ 2. Clamp : Clamp the wiring harness at white tape point. Face the clamp end upward. Cut off the excess tip of the clamp.</p>	11. License plate light lead wire
<p>☑ [E]: To prevent the rear turn signal lead wire from pinched between the seat rail pipe and rear fender (front), pass the rear turn signal lead wire under the seat rail pipe.</p>	<p>☑ 3. Clamp : Clamp the side-stand switch lead wire. Clamp end should face inside.</p>	12. Rear combination light lead wire
<p>☑ [F]: Pass the rear brake light switch lead wire and HO2 sensor #2 lead wire to inside of the reservoir hose.</p>	<p>☑ 4. Clamp : Clamp the clutch hose and side-stand switch lead wire. Face the clamp end inside. Cut off the excess tip of the clamp.</p>	13. Right turn signal lead wire
<p>☑ [G]: Pass the water bypass hose under the HO2 sensor #1 lead wire, starter motor lead wire and oil pressure switch lead wire.</p>	<p>☑ 5. Clamp : Clamp the starter motor lead wire and oil pressure switch lead wire and HO2 sensor lead wire. Cut off the excess tip of the clamp. Clamp end should face #1 cylinder.</p>	14. Ignition coil bracket
<p>☑ [H]: Pass the gear position switch lead wire in front of the engine mounting bolt. Pass the gear position switch lead wire between the inside of wiring harness and frame.</p>	6. Position light	"a": Max. 50 mm (1.9 in)
<p>☑ [I]: Pass the starter motor lead wire under the wiring harness and ECT sensor branch wire.</p>	7. Brace	



9A-16 Wiring Systems: L4 - L6

<p>☑ [A]: Pass the high-tension cord between the frame, wiring harness and clutch hose.</p>	<p>☑ 3. Clamp : Fix the HO2 sensor #2 lead wire and the rear brake light switch lead wire with a clamp at the aluminum protector upper part of the reservoir hose, taking care so that they should not get touch with the protector. Cut off the excess tip of the clamp.</p>
<p>☑ [B]: Connect the branching part of F label to the fuel injector #1.</p>	<p>☑ 4. Clamp Pass the starter motor lead wire above the battery (-) lead wire.</p>
<p>☑ [C]: Connect the branching part of blue tube wiring harness to the IAP sensor #1.</p>	<p>☑ 5. Clamp : Clamp the wiring harness and clutch hose. Cut off the excess tip of the clamp. Clamp end should face upside.</p>
<p>☑ [D]: Pass the CKP sensor coupler and side-stand switch coupler in front of the generator coupler.</p>	6. Front wheel speed sensor lead wire coupler
<p>☑ [E]: Pass the starter motor lead wire under the TO sensor.</p>	7. Left handlebar switch lead wire couplers
<p>☑ [F]: Pass the battery (+) lead wire above the fuse box branching wire.</p>	8. Right handlebar switch lead wire coupler
<p>☑ [G]: Pass the starter motor lead wire to inside of the battery box rib.</p>	9. Immobilizer antenna coupler (If equipped)
<p>☑ [H]: Pass the starter relay branching wire between the turn signal relay and starter relay.</p>	10. Ignition switch lead wire coupler
<p>☑ [I]: Pass the gear position switch lead wire to the rear of the starter motor lead wire taking care so that it should not get entangled. Pass the coupler inside the starter motor lead wire.</p>	11. Starter motor lead wire coupler
<p>☑ [J]: Pass the rear brake light switch lead wire, starter motor lead wire and HO2 sensor #2 lead wire under the front brake pipes.</p>	12. Battery (-) lead wire coupler
<p>☑ [K]: Pass the clutch hose inside of the wiring harness.</p>	13. Turn signal relay
<p>☑ [L]: Pass the side stand switch lead wire, magneto lead wire and wiring harness branch wire in front of the canister purge hose, and not to be inside of cylinder head. (If equipped)</p>	14. SDS mode select coupler
<p>☑ [M]: Clamp the wiring harness at white tape point and clamp end should face upper side.</p>	15. Clutch hose
<p>☑ [N]: Pass the left handlebar switch lead wire and front wheel speed sensor lead wire under the throttle cables.</p>	16. Wiring harness
<p>☑ [O]: Pass the cooling fan branch wire outside of the radiator inlet hose.</p>	17. Reservoir tank hose
<p>☑ [P]: Pass the high-tension cord of the ignition coil #2 (center) above the purge hose No. 3 (If equipped).</p>	18. High-tension cord
<p>☑ [Q]: Pass the EVAP system purge control solenoid valve branch wire above the purge hose No. 3 (If equipped).</p>	19. Drain hose
<p>☑ [R]: Pass the fuel pump lead wire behind the fuel tank drain hose and fuel tank breather hose. Pass the fuel pump lead wire above the surge hose No. 2 (If equipped).</p>	20. Frame
<p>☑ [S]: Pass the wiring harness under the PAIR hose (If equipped).</p>	21. Engine
<p>☑ 1. Clamp : Pass the wiring harness in front of the screw. Clamp the wiring harness to the throttle body at white tape point.</p>	"a": 40 – 80 mm (1.6 – 3.1 in)
<p>☑ 2. Clamp : Clamp the side-stand switch lead wire and generator lead wire and clutch hose. Cut off the excess tip of the clamp. Clamp end should face inside.</p>	

Component Location

Electrical Components Location

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

BENJ31J39113001

Specifications

Tightening Torque Specifications

BENJ31J3911S001

Reference:

For the tightening torques of fasteners not specified in this page, refer to:
"Wiring Harness Routing Diagram": L4 - L6 (Page 9A-6)
"Fasteners Information" in Section 0C (Page 0C-11)

L8 -**General Description****Abbreviations**

BENJ31J39121001

Refer to the "Abbreviations" in Section 0A (Page 0A-1) for the general abbreviations.

Wire / Connector Color Symbols

BENJ31J39121002

Refer to "Wire Color Symbols" in Section 0A (Page 0A-4).

How to Read Terminal Nos.

BENJ31J39121003

Refer to "How to Read Terminal Nos.": L4 - L6 (Page 9A-1).

Glossary

BENJ31J39121004

English	
ABS CONTROL UNIT	
ABS MOTOR	
ABS VALVE	
ALARM	
AP SENSOR	
AMBIENT AIR TEMP SENSOR	
BATTERY	
BRAKE LIGHT SWITCH	
CARBURETOR SWITCH	
CDI UNIT	
CKP SENSOR	
CLUTCH LEVER POSITION SWITCH	
CLUTCH SWITCH	
COMBINATION METER	
COOLING FAN MOTOR	
DIMMER SWITCH	
DIMMER/PASSING LIGHT SWITCH	
ECM	
ECT SENSOR	
ENGINE STOP SWITCH	
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	
GENERATOR	
GP SWITCH	
HANDLE SWITCH	
HANDLEBAR SWITCH	
HAZARD SWITCH	

9A-18 Wiring Systems: L8 -

English	
HEADLIGHT	
HI BEAM INDICATOR LIGHT	
HIGH BEAM INDICATOR LIGHT	
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	
ISC VALVE	
IMMOBILIZER ANTENNA	
INSTRUMENT PANEL LIGHT	
IMU	
LICENSE PLATE LIGHT	
LIGHTING SWITCH	
LIGHT/HORN RELAY	
LOW BEAM RELAY	
MAIN FUSE	
MALFUNCTION INDICATOR LAMP	
MODE SELECT COUPLER	
MODE SWITCH	
NEUTRAL INDICATOR LIGHT	
NEUTRAL SWITCH	
O2 SENSOR	
OIL PRESSURE SWITCH	
OPTION	
PASSING LIGHT SWITCH	
PASSING RELAY	
PAIR CONTROL SOLENOID VALVE	
POSITION LIGHT	
POWER SOURCE	
REAR BRAKE LIGHT SWITCH	
REAR COMBINATION LIGHT	
REAR TURN SIGNAL LIGHT	
REAR WHEEL SPEED SENSOR	
REGULATOR/RECTIFIER	
SELECT SWITCH	
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	
STP SENSOR	
STV ACTUATOR	

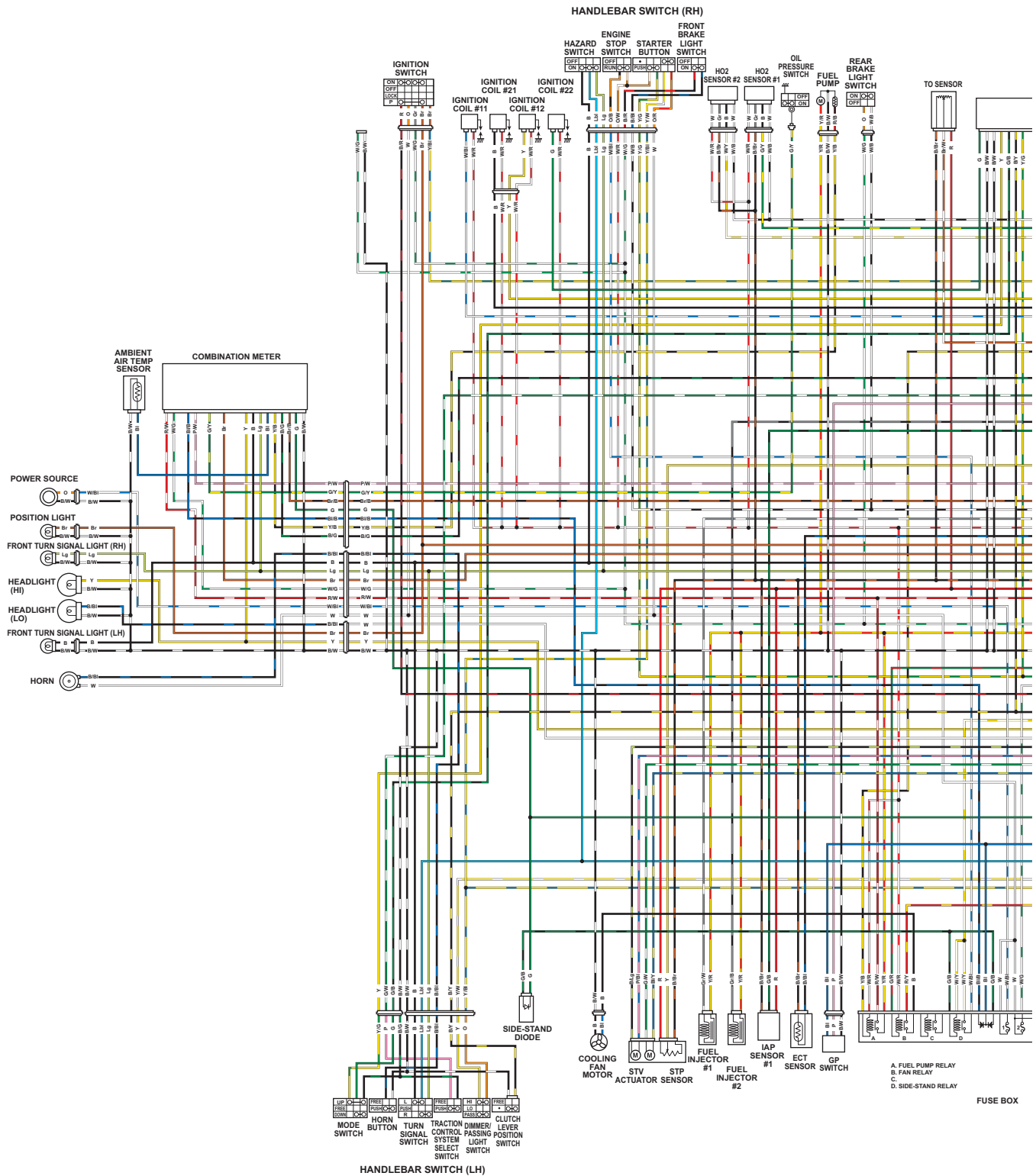
English	
SUB FUSE	
TO SENSOR	
TP SENSOR	
TRACTION CONTROL SYSTEM SWITCH	
TURN SIGNAL INDICATOR LIGHT	
TURN SIGNAL RELAY	
TURN SIGNAL SWITCH	

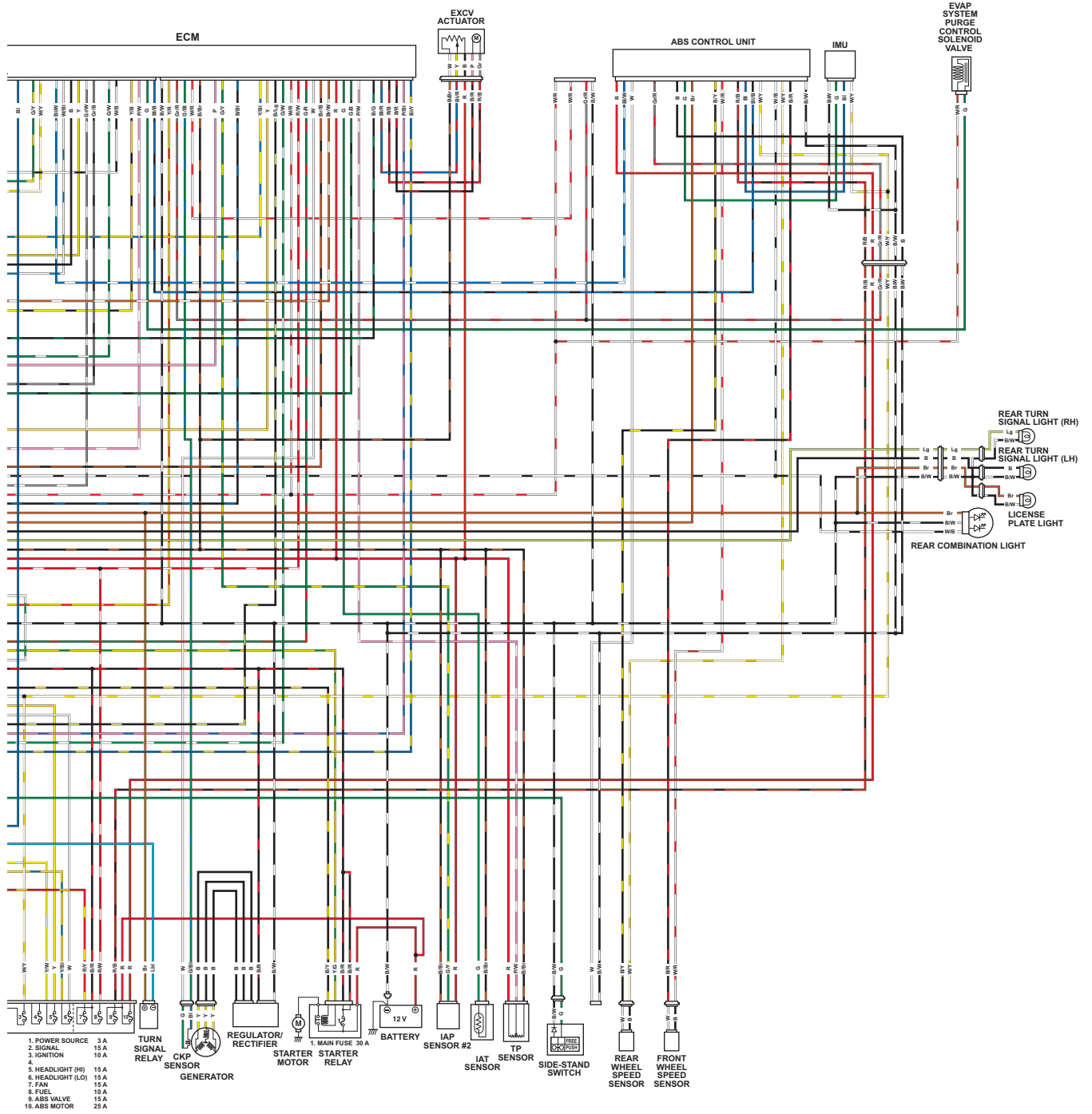
Schematic and Routing Diagram

Wiring Diagram

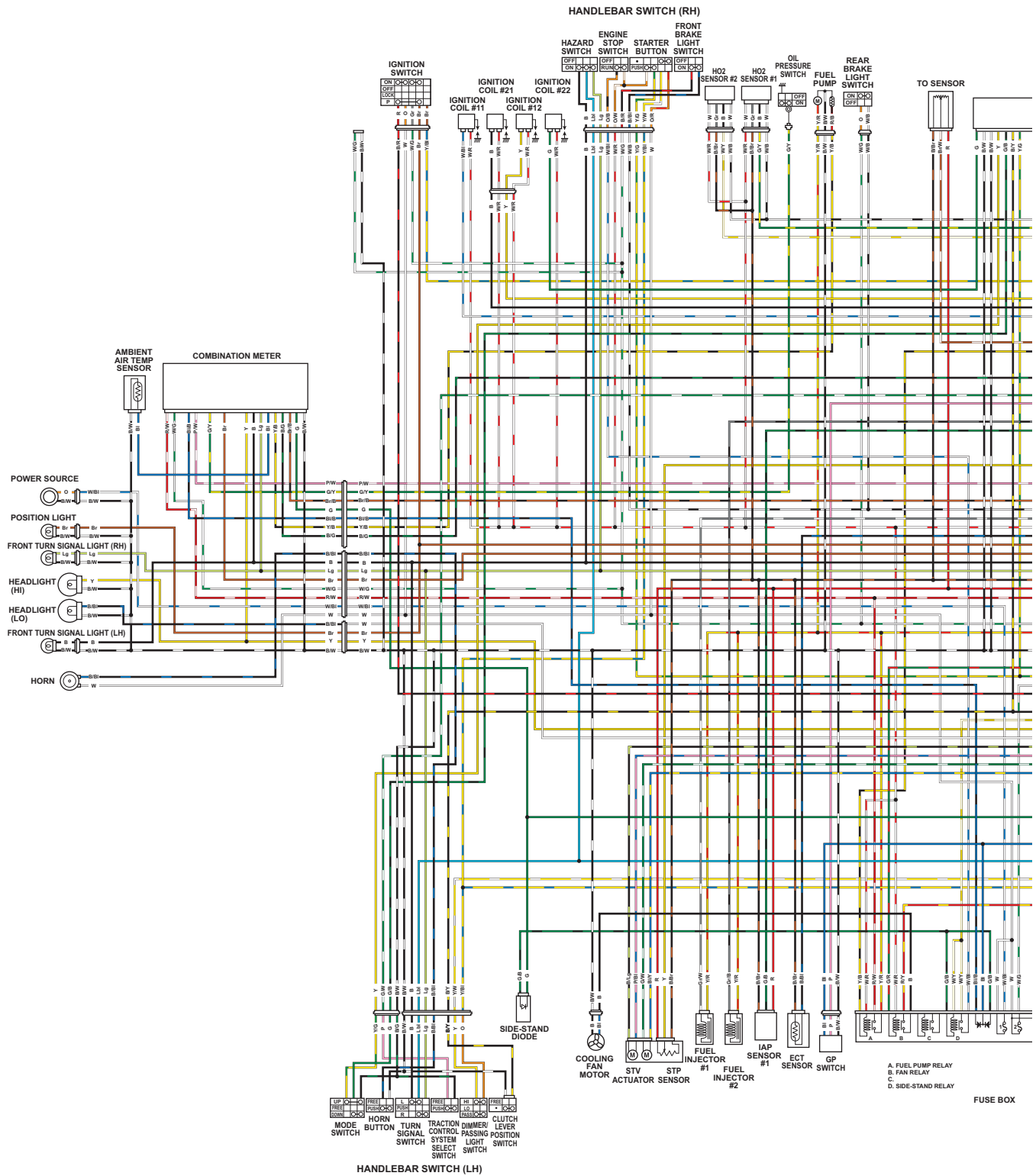
For California

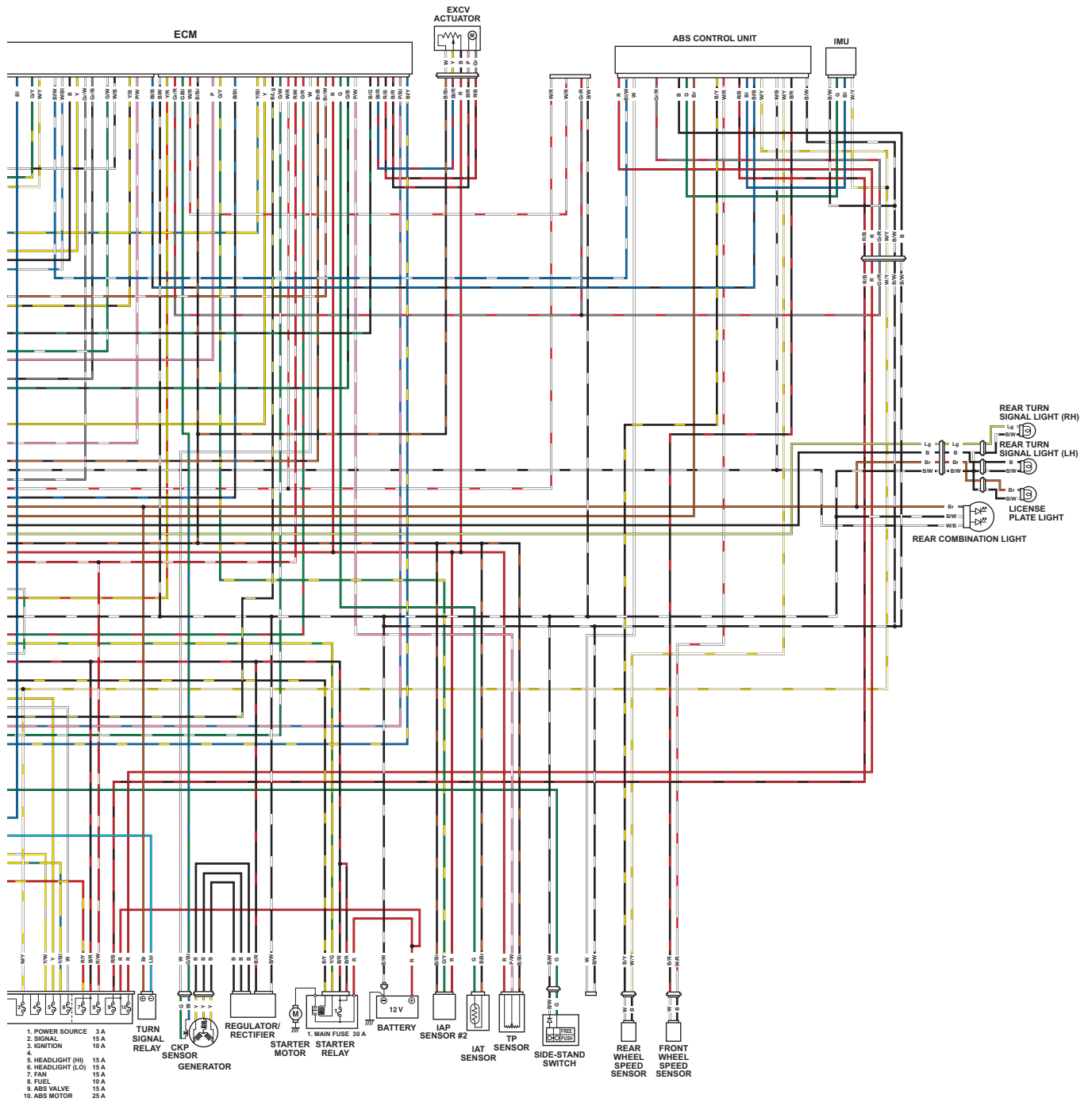
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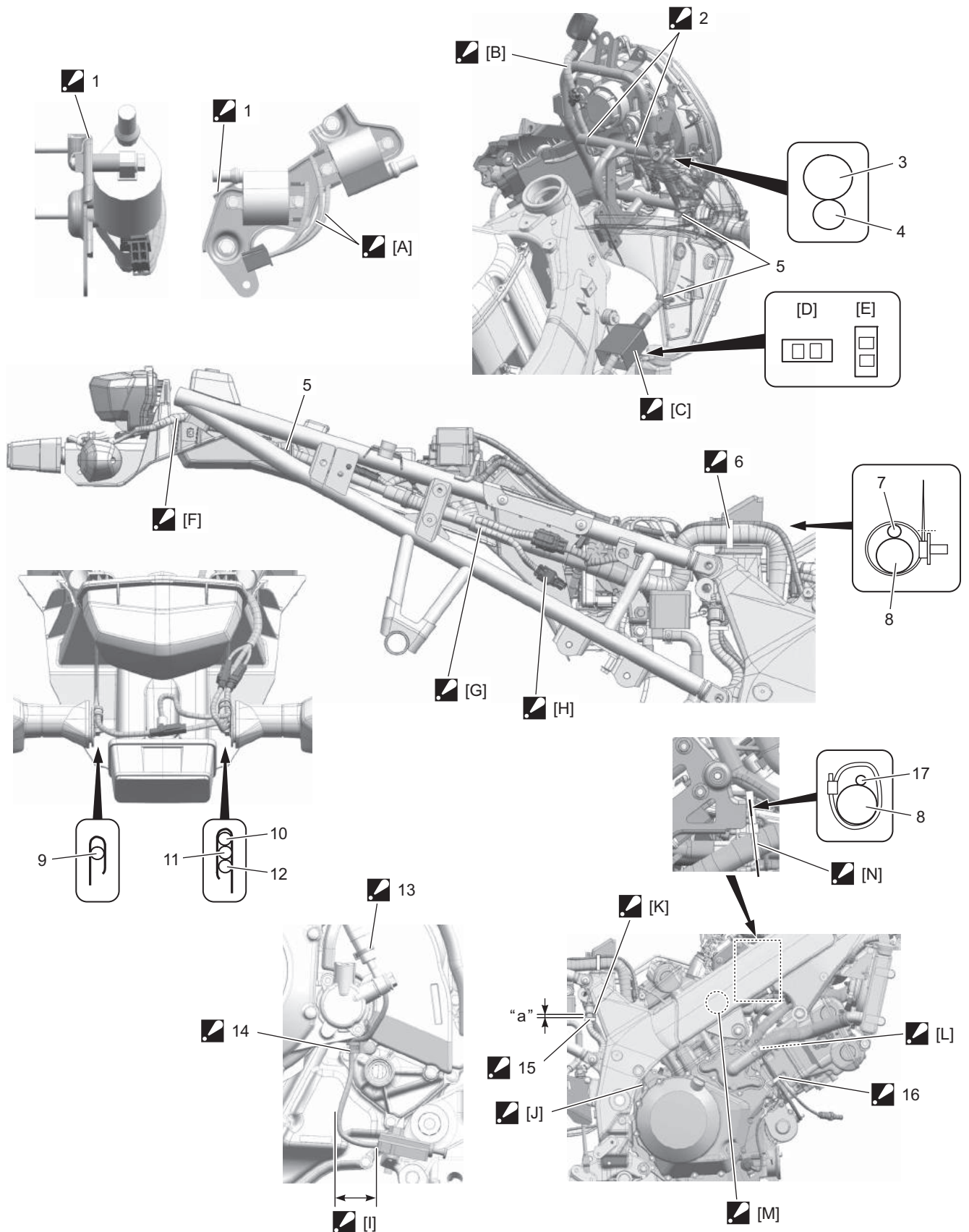
Except for California



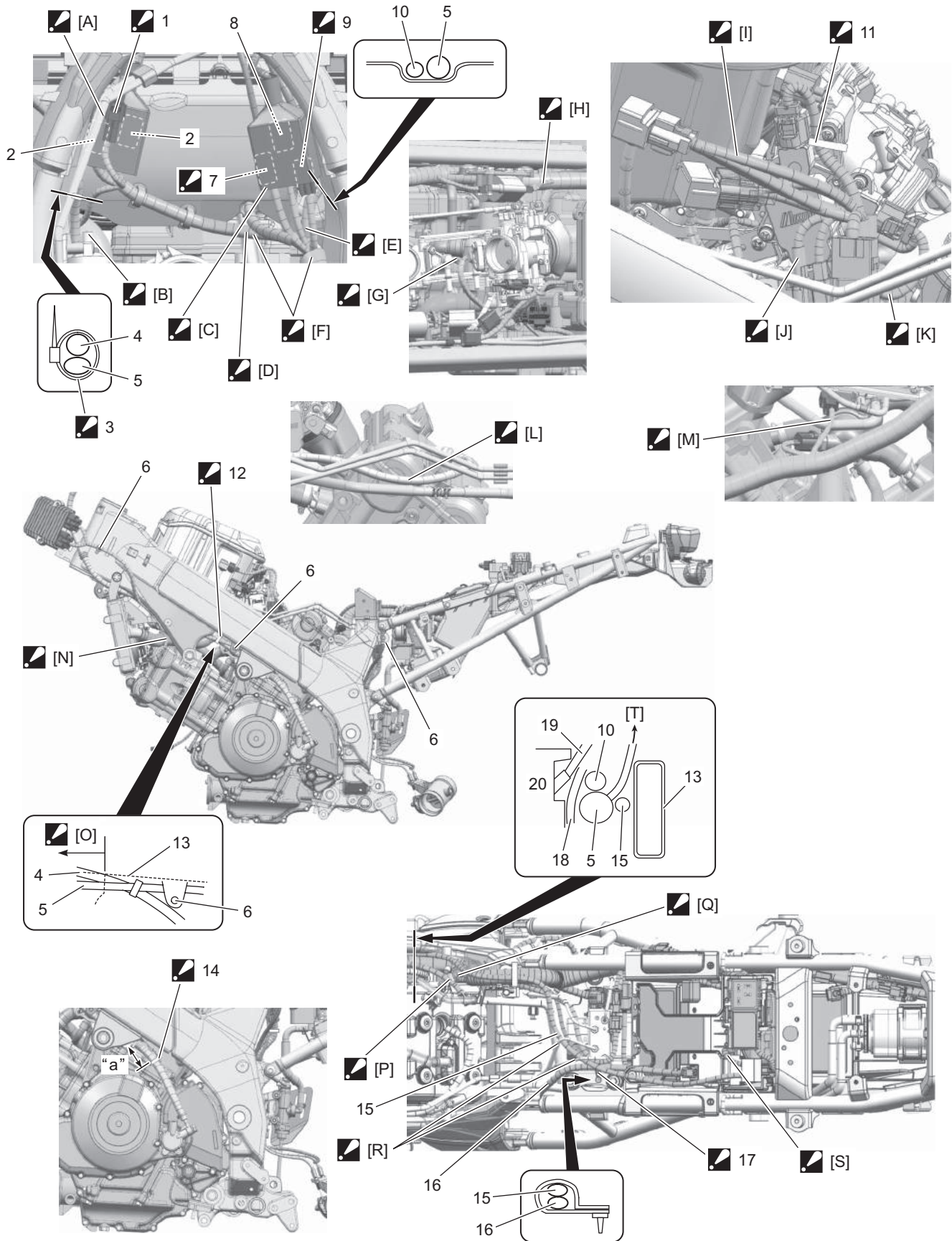


Wiring Harness Routing Diagram

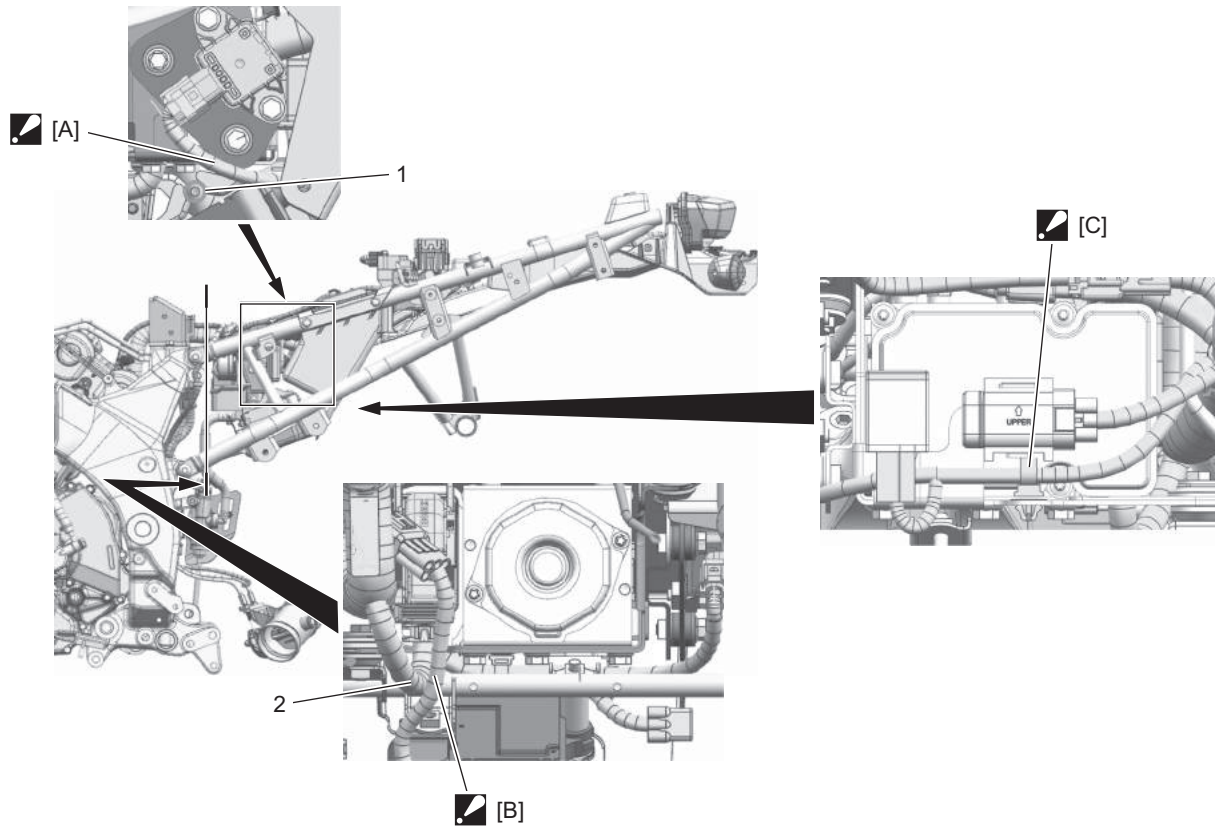
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<p>☑ [A]: Connect the coupler of blue tape on the branch wire to the ignition coil #1.</p>	3. Cowling brace
<p>☑ [B]: Pass the combination meter branch wire behind the cowling brace. When installing, be careful not to pull the boot.</p>	4. Wiring harness No. 2
<p>☑ [C]: After connecting the couplers, push in the PVC boot to the rear side and face the opening of PVC boot downward. Set the PVC boot in correct direction.</p>	5. Fixed clamp
<p>[D]: Correct</p>	<p>☑ 6. Clamp : Clamp the starter motor lead wire and wiring harness at white tape position. Bind the starter motor lead wire on the wiring harness with the clamp. Face the tip of clamp upward. Cut off the excess tip of the clamp.</p>
<p>[E]: Incorrect</p>	7. Starter motor lead wire
<p>☑ [F]: Pass the rear turn signal light lead wire under the seat rail pipe. Be careful not to pinch the lead wire between the seat rail pipe and rear fender (front).</p>	8. Wiring harness
<p>☑ [G]: When installing, push the wiring harness.</p>	9. Left turn signal light lead wire
<p>☑ [H]: After connecting the rear wheel speed sensor coupler, fix it to the battery holder.</p>	10. License plate light lead wire
<p>☑ [I]: Pass the curve part of side-stand switch lead wire within 50 mm (2.0 in) from the switch end.</p>	11. Rear combination light lead wire
<p>☑ [J]: Pass the GP switch lead wire in front of the engine mounting. Pass the GP switch lead wire between wiring harness and frame.</p>	12. Right turn signal light lead wire
<p>☑ [K]: Pass the rear brake light switch lead wire and HO2 sensor #2 lead wire outside of the brake hose.</p>	<p>☑ 13. Clamp : Clamp the clutch hose and side-stand switch lead wire. Face the locked part of clamp to inside. Cut off the excess tip of the clamp.</p>
<p>☑ [L]: Pass the HO2 sensor #1 lead wire, starter motor lead wire and oil pressure switch lead wire under the water bypass hose.</p>	<p>☑ 14. Clamp : Clamp the side-stand switch lead wire and face the clamp to inside.</p>
<p>☑ [M]: Pass the starter motor lead wire under the wiring harness and ECT sensor branch wire.</p>	<p>☑ 15. Clamp : Bind the rear brake light switch lead wire and HO2 sensor #2 lead wire to the gum protector on the brake hose with the clamp. Position the clamp between the brake hose sleeve and aluminum protector. Be careful not to clamp the aluminum protector. Face the locked part of clamp to inside at front side. Cut off the excess tip of the clamp.</p>
<p>☑ [N]: Pass the wiring harness under the PAIR control solenoid valve (if equipped). Clamp the wiring harness and ignition coil bracket.</p>	<p>☑ 16. Clamp : Clamp the starter motor lead wire, oil pressure switch lead wire and HO2 sensor #1 lead wire at the side of stud bolt on the cylinder #1. Face the locked part of clamp to engine side. Cut off the excess tip of the clamp.</p>
<p>☑ 1. Protector : Stick the protector aligning with the bracket edge and install it from the bracket edge toward the center of the bolt.</p>	17. Ignition coil bracket
<p>☑ 2. Clamp : Pass the wiring harness No. 2 under the pipe of the cowling brace and clamp the wiring harness No. 2 at the white tape position. Face the tip of clamp downward.</p>	"a": 0 – 10 mm (0 – 0.39 in)

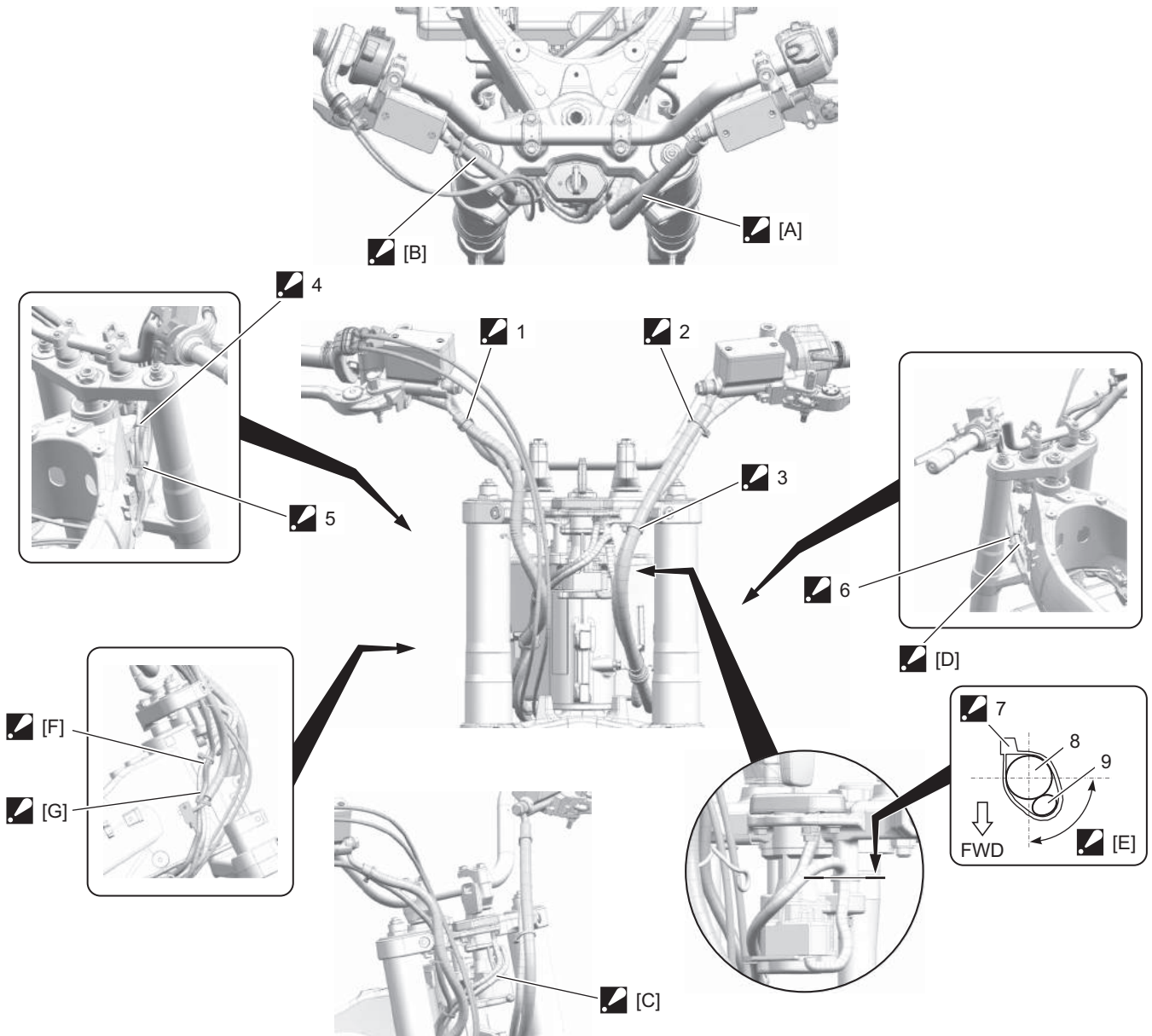


<p>☑ [A]: Pass the left handlebar switch lead wire and front wheel speed sensor lead wire under the throttle cables.</p>	2. Left handlebar switch coupler
<p>☑ [B]: Pass the high-tension cord between the frame and wiring harness, between the frame and clutch hose.</p>	<p>☑ 3. Clamp : Clamp the clutch hose and wiring harness at white tape position. Face the tip of clamp upward. Be careful not to contact the locked part of clamp with the high-tension cord.</p>
<p>☑ [C]: Face the opening of PVC boot downward.</p>	4. Clutch hose
<p>☑ [D]: Pass the wiring harness over the PAIR hose (if equipped). Pass the wiring harness under the high-tension cord.</p>	5. Wiring harness
<p>☑ [E]: Pass the wiring harness under the switches and Immobilizer antenna branch wire (if equipped).</p>	6. Fixed clamp
<p>☑ [F]: After branching, face the wire harness to lower side and slacken it downward.</p>	<p>☑ 7. Right handlebar switch coupler : Insert the right handlebar switch coupler to the radiator heat shield.</p>
<p>☑ [G]: Connect the coupler of the F label on the branch wire to the fuel injector #1.</p>	8. Ignition switch coupler
<p>☑ [H]: Pass the ignition coil #1 (center) branch wire outside of the hoses. Pass the ignition coil #1 (center) branch wire inside of the high-tension cord.</p>	<p>☑ 9. Immobilizer antenna coupler (If equipped) : Set the immobilizer antenna coupler in parallel with the frame.</p>
<p>☑ [I]: Connect the coupler of white tape on the branch wire to the IAP sensor #1.</p>	10. Reservoir tank inlet hose
<p>☑ [J]: Pass the CKP sensor coupler and side-stand switch coupler in front of the generator coupler.</p>	<p>☑ 11. Clamp : Pass the wiring harness in front of the screw. Clamp the wiring harness and throttle body at the white tape position. Cut off the excess tip of the clamp.</p>
<p>☑ [K]: Pass the side-stand switch lead wire, generator lead wire and branch wire in front of the purge hose No. 3 (if equipped). Do not pass the lead wires inside of the cylinder head.</p>	<p>☑ 12. Clamp : Pass the clutch hose inside of the wiring harness. Clamp the cross part of wiring harness and clutch hose. Face the locked part of clamp upward. Cut off the excess tip of the clamp.</p>
<p>☑ [L]: Pass the high-tension cord of the ignition coil #2 (center) over the purge hose No. 3. (If equipped)</p>	13. Frame
<p>☑ [M]: Pass the EVAP system purge control solenoid valve branch wire over the purge hose No. 3 (if equipped).</p>	<p>☑ 14. Clamp : Clamp the side-stand switch lead wire, generator lead wire and clutch hose. Face the locked part of clamp to inside. Cut off the excess tip of the clamp.</p>
<p>☑ [N]: Pass the cooling fan motor branch wire outside of the radiator inlet hose.</p>	15. Starter motor lead wire
<p>☑ [O]: Pass the wiring harness under the clutch hose in this area.</p>	16. Battery (-) lead wire
<p>☑ [P]: Pass the fuel pump lead wire behind the fuel tank drain hose and fuel tank breather hose. Pass the fuel pump lead wire over the surge hose No. 2 (if equipped).</p>	<p>☑ 17. Clamp : Pass the starter motor lead wire over the battery (-) lead wire. Clamp the battery (-) lead wire and starter motor lead wire. Pass the lead wires to right side of the inserted hole.</p>
<p>☑ [Q]: Pass the GP switch lead wire outside of wiring harness. Pass the GP switch lead wire behind the starter motor lead wire. Do not twist the lead wire. Set the coupler inside of the starter motor lead wire.</p>	18. Drain hose
<p>☑ [R]: Pass the rear brake light switch lead wire, starter motor lead wire and HO2 sensor #2 lead wire under the front brake pipes.</p>	19. High-tension cord
<p>☑ [S]: Pass the starter motor lead wire under the fuse box.</p>	20. Engine
<p>[T]: To fuel pump</p>	"a": 40 – 80 mm (1.6 – 3.1 in)
<p>☑ 1. Front wheel speed sensor coupler : Position the front wheel speed sensor coupler on the PVC boot.</p>	



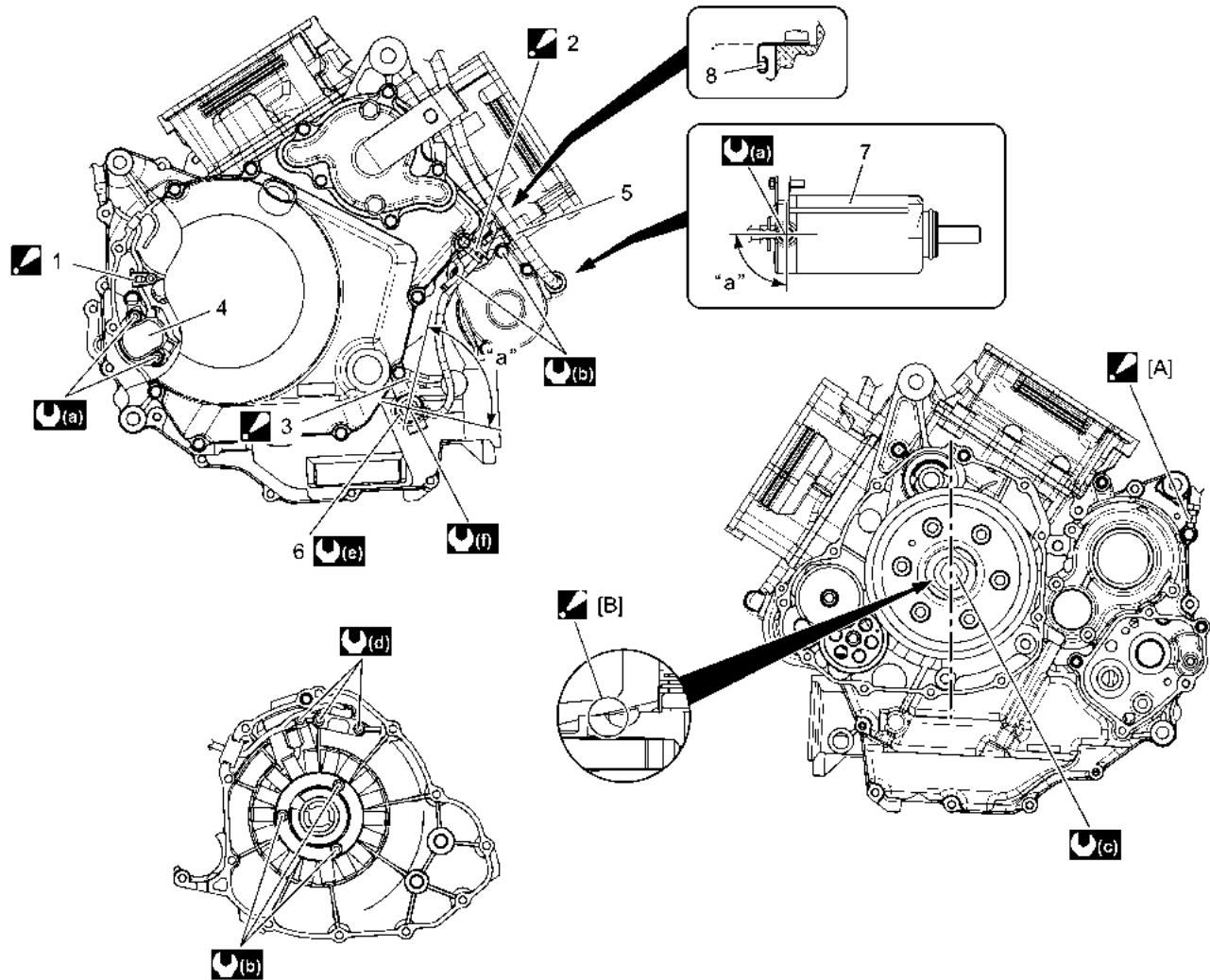
IJ31J1912913-02

<p>☑ [A]: Pass the IMU lead wire over the seat rail tube.</p>	<p>1. Seat rail tube</p>
<p>☑ [B]: Pass the EXCVA lead wire inside of the ABS control unit branch wire.</p>	<p>2. ABS control unit branch wire</p>
<p>☑ [C]: Insert the fixed clamp from upper side.</p>	



9A-30 Wiring Systems: L8 -

<p>🔪 [A]: Pass the left handlebar switch lead wire behind the clutch hose.</p>	<p>🔪 2. Clamp : Clamp the clutch hose and left handlebar switch lead wire. Face the locked part of clamp downward. Cut off the excess tip of the clamp.</p>
<p>🔪 [B]: Pass the right handlebar switch lead wire behind the front brake hose.</p>	<p>🔪 3. Clamp : Clamp the left handlebar switch lead wire and clutch hose within 20 mm (0.79 in) from the steering stem upper bracket under surface. Face the locked part of clamp backward. Cut off the excess tip of the clamp.</p>
<p>🔪 [C]: Do not twist the ignition switch lead wire between the clamps. Pass the ignition switch lead wire and immobilizer antenna lead wire (if equipped) as shown.</p>	<p>🔪 4. Clamp : Clamp the right handlebar switch lead wire, ignition switch lead wire and immobilizer antenna lead wire (if equipped) at the tape position. Face the locked part of clamp to left side at rear side. Cut off the excess tip of the clamp.</p>
<p>🔪 [D]: Pass the left handlebar switch lead wire over the clutch hose guide.</p>	<p>🔪 5. Clamp : Clamp the front brake hose, right handlebar switch lead wire, ignition switch lead wire and immobilizer antenna lead wire (if equipped). Cut off the excess tip of the clamp.</p>
<p>🔪 [E]: Clamp the ignition switch lead wire in this area.</p>	<p>🔪 6. Clamp : Clamp the clutch hose and left handlebar switch lead wire. Cut off the excess tip of the clamp.</p>
<p>🔪 [F]: Pass the right handlebar switch lead wire, ignition switch lead wire and immobilizer antenna lead wire (if equipped) inside of the front brake hose. Pass the lead wires behind the front brake hose.</p>	<p>🔪 7. Clamp : Cut off the excess tip of the clamp.</p>
<p>🔪 [G]: Pass the lead wires between the front brake hose and frame.</p>	<p>8. Steering stem upper bracket</p>
<p>🔪 1. Clamp : Clamp the front brake hose and right handlebar switch lead wire. Face the locked part of clamp downward. Cut off the excess tip of the clamp.</p>	<p>9. Ignition switch lead wire</p>



IJ31J1912912-02

<p>☑ [A]: Set the terminal in correct direction as shown. After the battery (-) lead wire contacted the crankcase, tighten the bolt.</p>	<p>8. Oil pressure switch lead wire</p>
<p>☑ [B]: Install the key in a manner so that the edge of keyway and the edge of the key should be horizontal.</p>	<p>"a": 85° - 95°</p>
<p>☑ 1. Clamp : Clamp the GP switch lead wire.</p>	<p>⤵ (a) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)</p>
<p>☑ 2. Clamp : Clamp the oil pressure switch lead wire.</p>	<p>⤵ (b) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)</p>
<p>☑ 3. Clamp : Do not clamp the oil pressure switch lead wire.</p>	<p>⤵ (c) : 180 N·m (18.0 kgf-m, 130.5 lbf-ft)</p>
<p>4. GP switch</p>	<p>⤵ (d) : 6.5 N·m (0.65 kgf-m, 5.0 lbf-ft)</p>
<p>5. Starter motor lead wire</p>	<p>⤵ (e) : 14 N·m (1.4 kgf-m, 10.5 lbf-ft)</p>
<p>6. Oil pressure switch</p>	<p>⤵ (f) : 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)</p>
<p>7. Starter motor</p>	

Component Location

Electrical Components Location

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

BENJ31J39123001

Specifications

Tightening Torque Specifications

Reference:

For the tightening torques of fasteners not specified in this page, refer to:
"Wiring Harness Routing Diagram": L8 - (Page 9A-24)
"Fasteners Information" in Section 0C (Page 0C-11)

BENJ31J3912S001

Lighting Systems

Precautions

Precautions for Lighting Systems

BENJ31J39200001

NOTICE

- When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soap water to prevent premature bulb failure.
- Do not use the bulb of a wattage other than specification.

Diagnostic Information and Procedures

Headlight Symptom Diagnosis

BENJ31J39204001

Condition	Possible cause	Correction / Reference Item
Low beam does not light up	Circuit fuse blown.	Replace fuse and check short circuit.
	Bulb blown.	Replace bulb. ☞(Page 9B-5)
	Wiring or ground faulty.	Repair wiring. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
	Dimmer switch faulty.	Check dimmer switch. ☞(Page 9B-16)
High beam does not light up	Circuit fuse blown.	Replace fuse and check short circuit.
	Bulb blown.	Replace bulb. ☞(Page 9B-5)
	Wiring or ground faulty.	Repair wiring. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
	Dimmer switch faulty.	Check dimmer switch. ☞(Page 9B-16)
	Passing switch faulty.	Check passing switch. ☞(Page 9B-16)

Turn Signal Light and Hazard Light Symptom Diagnosis

BENJ31J39204002

Condition	Possible cause	Correction / Reference Item
Flash rate high or one side only flashes	Bulb blown.	Replace bulb. ☞(Page 9B-13)
	Incorrect bulb.	Replace bulb. ☞(Page 9B-13)
	Turn signal relay faulty.	Check turn signal relay. ☞(Page 9B-14)
	Open circuit or high resistance existing either; between turn signal switch and non lighting bulb, or between hazard warning switch and non lighting bulb.	Repair wiring. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
	Hazard switch faulty.	Check hazard switch. ☞(Page 9B-15)
Flash rate low	Supply voltage low or high resistance.	Check charging system. ☞(Page 1J-4) Repair wiring. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
	Turn signal relay faulty.	Check turn signal relay. ☞(Page 9B-14)

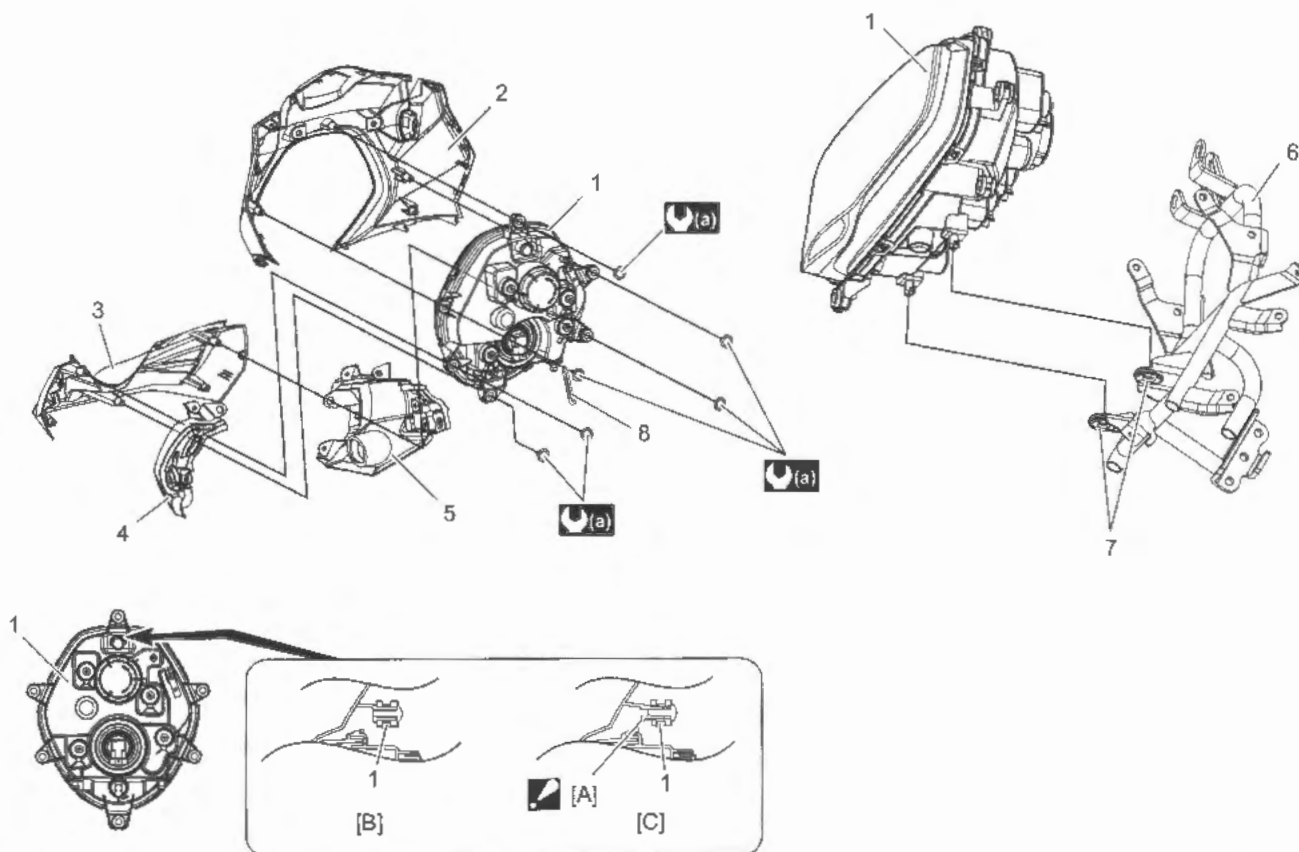
Rear Combination Light Symptom Diagnosis

Condition	Possible cause	Correction / Reference Item
All lights do not light up	Wiring or grounding faulty.	Repair wiring. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
Some lights do not light up	Bulbs (LED) blown.	Replace rear combination light assembly and check short circuit.
	Wiring or grounding faulty.	Repair wiring. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
Brake light do not light up	Front brake light switch faulty.	Check front brake light switch. ☞(Page 4A-10)
	Rear brake light switch faulty.	Check rear brake light switch. ☞(Page 4A-10)
	Wiring or grounding faulty.	Repair wiring. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)
	Rear combination light bulbs (LED) faulty.	Replace rear combination light assembly.
Brake light stay on	Front brake light switch faulty.	Check front brake light switch. ☞(Page 4A-10)
	Rear brake light switch faulty.	Check rear brake light switch. ☞(Page 4A-10)
	Rear combination light bulb (LED) faulty.	Replace rear combination light assembly.

Repair Instructions

Headlight Construction

BENJ31J39206001

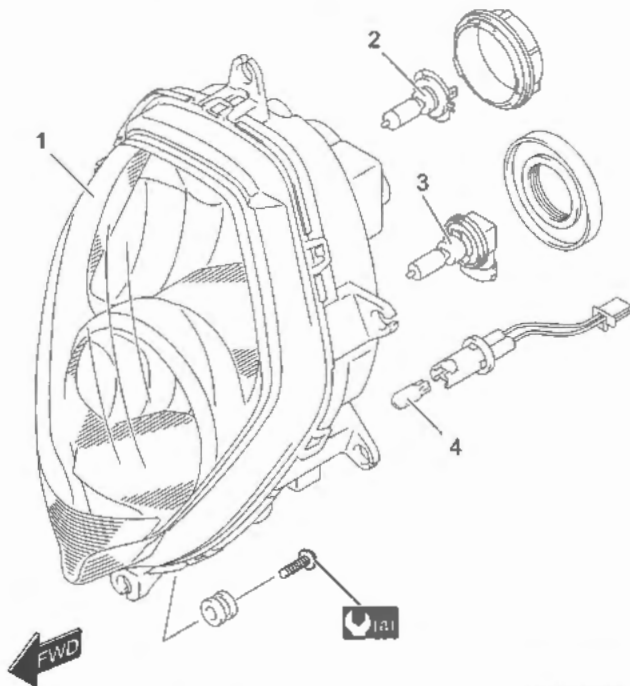


IJ31J1920006-02

<ul style="list-style-type: none"> <input checked="" type="checkbox"/> [A]: Install the headlight assembly so that there is no clearance. [B]: Correct [C]: Incorrect 	<ul style="list-style-type: none"> 2. Body cowling 3. Lower body cowling 4. Left front side cover 5. Right front side cover 	<ul style="list-style-type: none"> 6. Cowling brace 7. Cushion 8. Clamp (L8 -) <input checked="" type="checkbox"/> (a) : 2 N·m (0.2 kgf·m, 1.5 lbf·ft)
<ul style="list-style-type: none"> 1. Headlight assembly 		

Headlight / Position Light Components

BENJ31J39206002



IE31J1920039-01

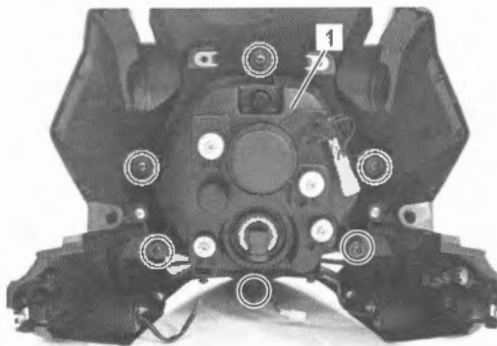
1.	Headlight
2.	Headlight bulb (Low beam) (12 V 65 W, H9)
3.	Headlight bulb (High beam) (12 V 55 W, H7)
4.	Position light bulb (12 V, 5 W)
1(a)	2 N·m (0.2 kgf·m, 1.5 lbf·ft)

Headlight Removal and Installation

BENJ31J39206003

Removal

- 1) Remove the body cowling from cowling brace.
 - L4 – L6 model: ☞ (Page 9D-16)
 - L8 – model: ☞ (Page 9D-36)
- 2) Remove the headlight (1).



IE31J1920001-01

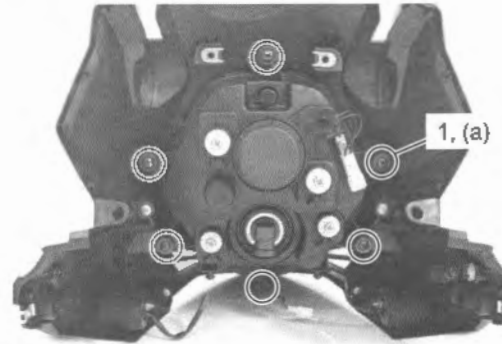
Installation

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

- For L8 – model, fit the clamp to the screw. Refer to "Front Turn Signal Light Construction" (Page 9B-10).
- Tighten the screws (1) to the specified torque.

Tightening torque

Headlight mounting screw (a): 2 N·m (0.2 kgf·m, 1.5 lbf·ft)



IE31J1920002-01

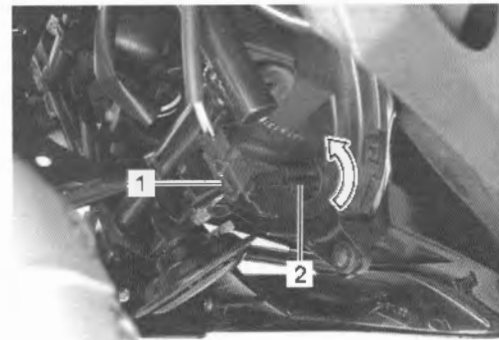
- After installing, be sure to inspect the headlight beam. ☞ (Page 9B-6)

Position Light Removal and Installation

BENJ31J39206004

Removal

- 1) Disconnect the position light coupler (1).
- 2) Turn the position light (2) counterclockwise and remove it.



IE31J1920003-03

Installation

Install the position light in the reverse order of removal.

Headlight Bulb / Position Light Bulb Replacement

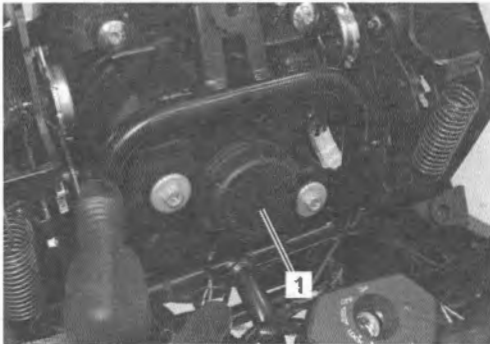
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▲ CAUTION

As the headlight bulb operates at a high temperature, handle the bulb after sufficiently cooled.

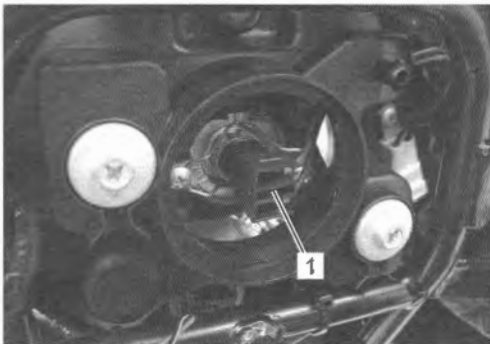
Low Beam Bulb

- 1) Remove the combination meter. (Page 9C-6)
- 2) Remove the cap (1).



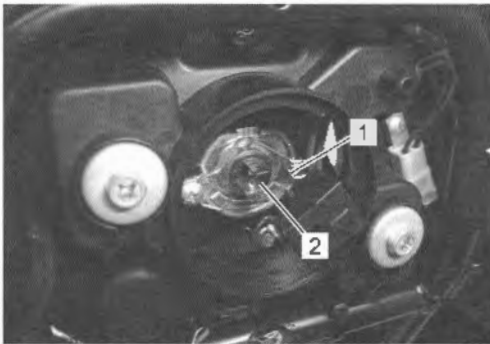
IE31J1920004-01

- 3) Disconnect the headlight coupler (1).



IE31J1920005-01

- 4) Unhook the bulb holder spring (1) and remove the headlight bulb (2).



IE31J1920006-01

- 5) After finishing the headlight bulb replacing, install the removed parts.
- 6) After installing the removed parts, be sure to inspect the headlight beam. (Page 9B-6)

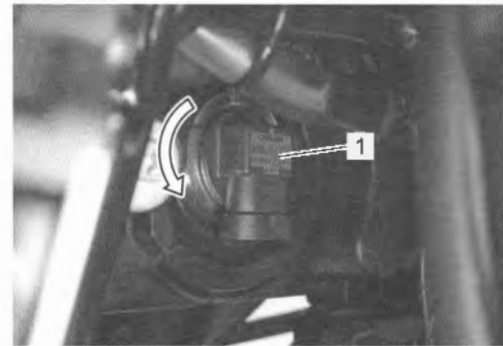
High Beam Bulb

- 1) Disconnect the headlight coupler (1) and remove the bulb socket rubber cap (2).



IE31J1920007-01

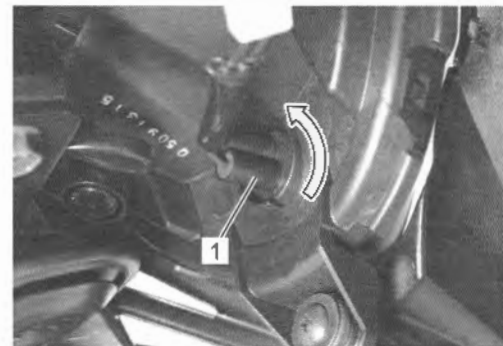
- 2) Turn the headlight bulb (1) counterclockwise and remove it.



IE31J1920008-01

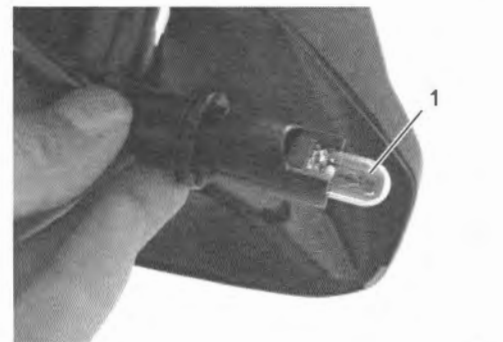
Position Light Bulb

- 1) Turn the socket (1) counterclockwise and remove it.



IE31J1920009-01

- 2) Replace the position light bulb (1).



IE31J1920010-01

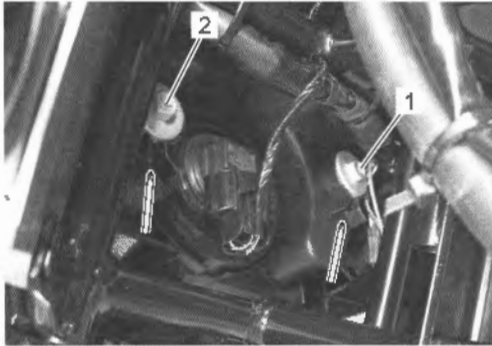
- 3) Install the socket.

Headlight Beam Adjustment

BENJ31J39206006

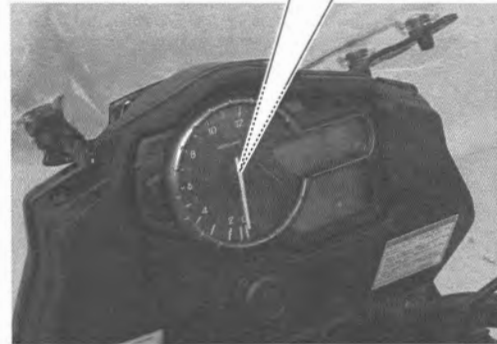
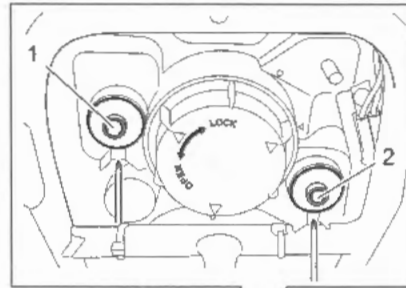
- 1) Adjust the headlight beam horizontally turning the bolt (1) by a screwdriver from the bottom side.
- 2) Adjust the headlight beam vertically turning the bolt (2) by a screwdriver from the bottom side.

High beam



IE31J1920011-04

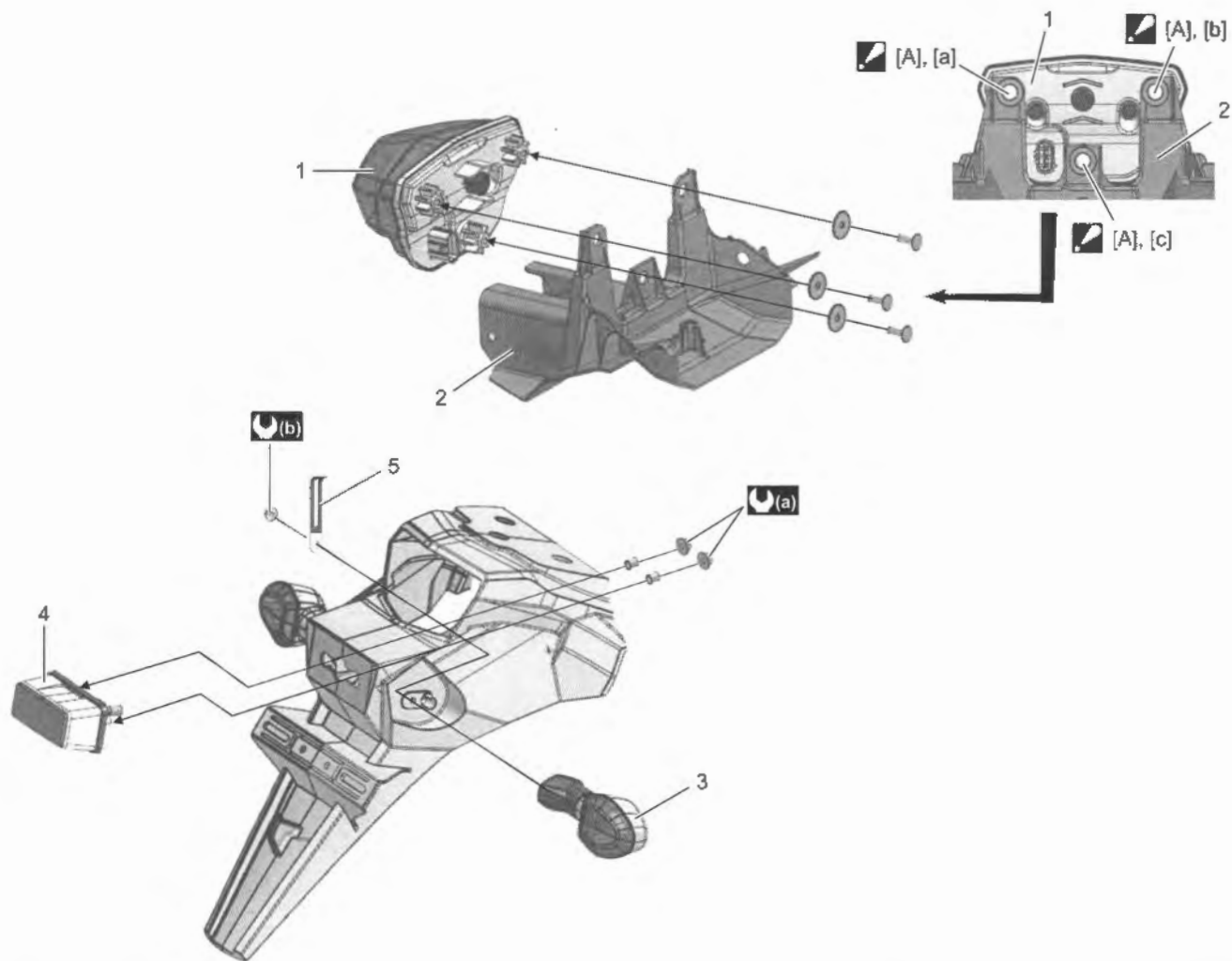
Low beam



IE31J1920035-01

Rear Lighting System Construction

BENJ31J39206007

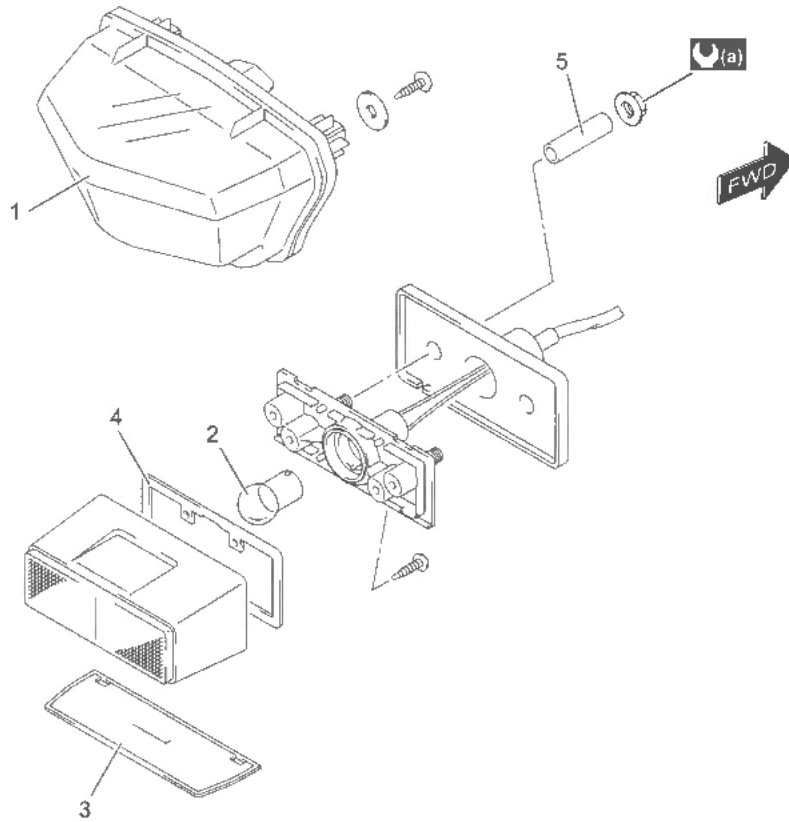


IE31J1920038-02

<p>[A]: Tighten the screws in order of [a] → [b] → [c].</p> <p>1. Rear combination light</p> <p>2. Rear fender (Front)</p>	<p>3. Rear turn signal light</p> <p>4. License plate light</p> <p>5. Clamp</p>	<p>(a): 5 N·m (0.5 kgf-m, 4.0 lbf-ft)</p> <p>(b): 1.8 N·m (0.18 kgf-m, 1.5 lbf-ft)</p>
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Rear Combination Light / License Plate Light Components

BENJ31J39206008



IE31J1920040-01

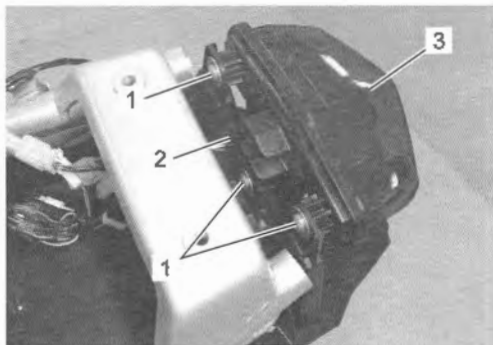
1. Rear combination light (LED)	3. License plate light lens	5. Spacer
2. License plate light bulb (12 V, 5 W)	4. Gasket	(a) : 5 N·m (0.5 kgf·m, 4.0 lbf·ft)

Rear Combination Light Removal and Installation

BENJ31J39206009

Removal

- 1) Remove the rear fender (rear).
 - L4 – L6 model: ☞(Page 9D-12)
 - L8 – model: ☞(Page 9D-33)
- 2) Remove the screws (1).
- 3) Disconnect the rear combination light coupler (2) and remove the rear combination light (3).

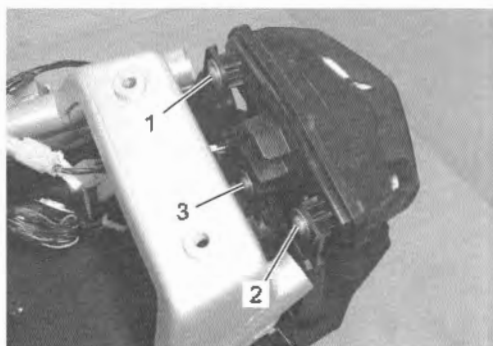


IE31J1920012-01

Installation

Install the rear combination light in the reverse order of removal. Pay attention to the following point:

- Tighten the screws in order of (1) → (2) → (3).



IE31J1920013-01

Rear Combination Light Replacement

BENJ31J39206010

NOTE

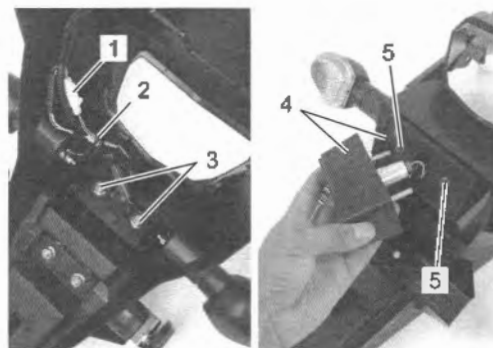
If LED operation is abnormal, replace the rear combination light with a new one.

License Plate Light Removal and Installation

BENJ31J39206011

Removal

- 1) Remove the rear fender (rear).
 - L4 – L6 model: ☞(Page 9D-12)
 - L8 – model: ☞(Page 9D-33)
- 2) Disconnect the license plate light lead wire coupler (1) and release the clamp (2).
- 3) Remove the nuts (3), license plate light assembly (4) and spacers (5).



IE31J1920014-02

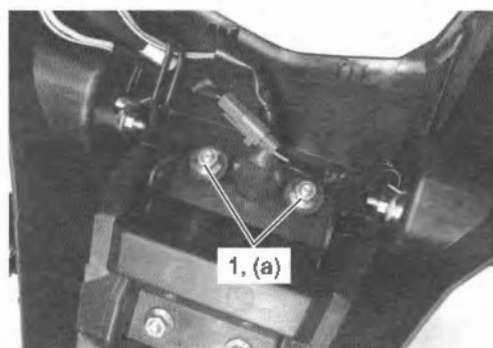
Installation

Install the license plate light in the reverse order of removal. Pay attention to the following point:

- Tighten the license plate light mounting nuts (1) to the specified torque.

Tightening torque

License plate light mounting nut (a): 5 N·m (0.5 kgf-m, 4.0 lbf-ft)

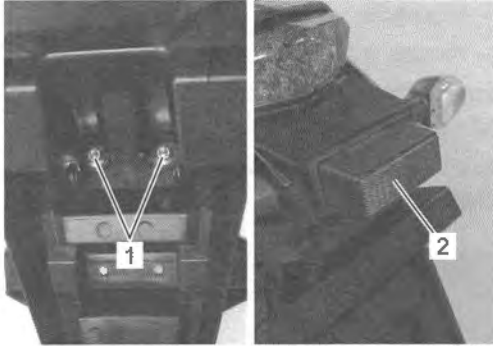


IE31J1920015-02

License Plate Light Bulb Replacement

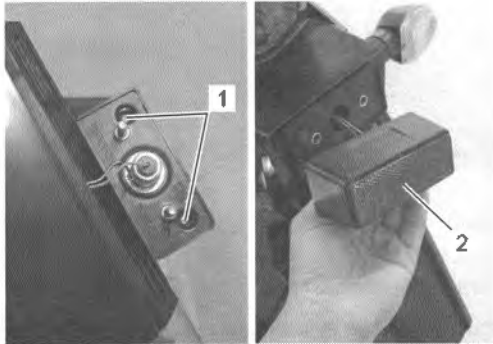
BENJ31J39206012

- 1) Remove the nuts (1) and license plate light assembly (2).



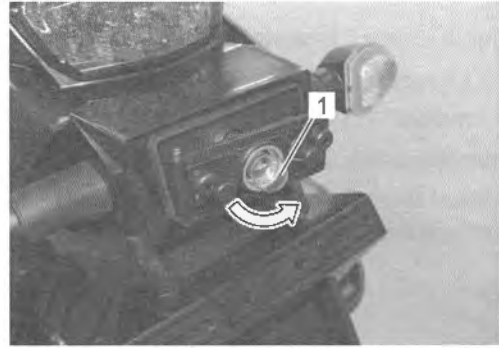
IE31J1920016-01

- 2) Remove the screws (1) and lens (2).



IE31J1920017-01

- 3) Push in on the bulb (1), turn it counterclockwise, and pull it out.



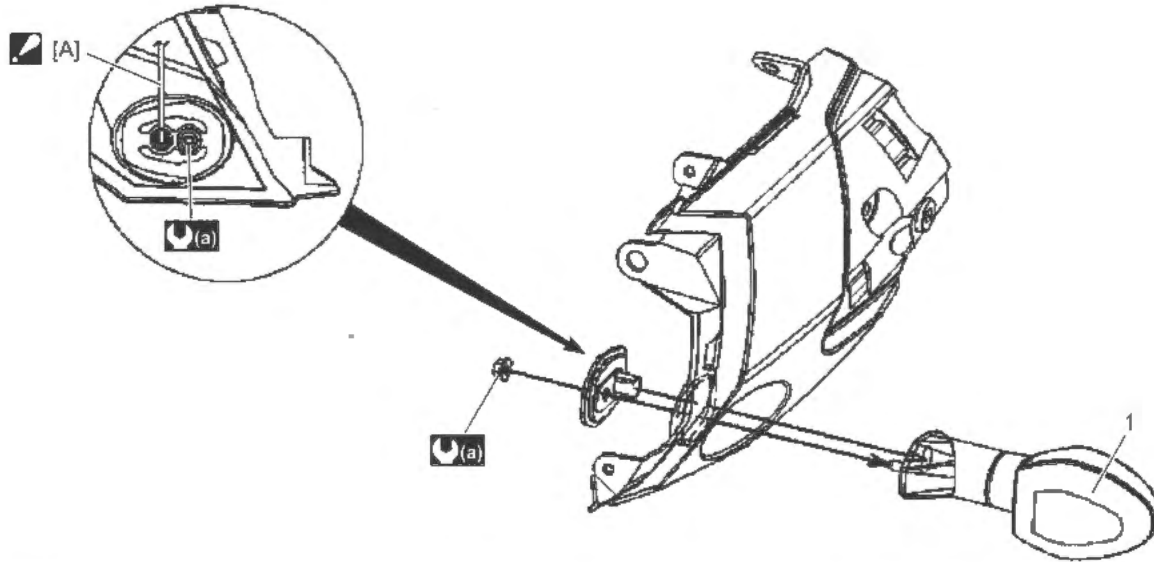
IE31J1920018-01

- 4) Install the license plate light assembly. (Page 9B-9)
- 5) Install the removed parts.

Front Turn Signal Light Construction

L4 – L6

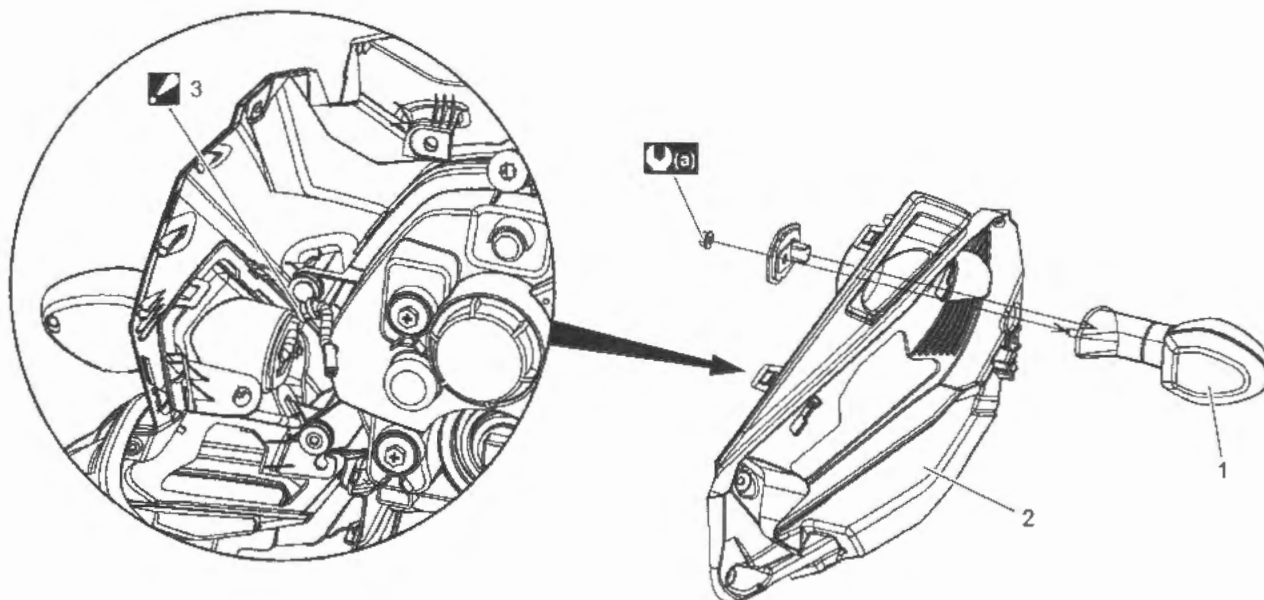
BENJ31J39206013



IE31J1920037-01

<p>[A]: Pass the lead wire upward.</p>	<p>1. Front turn signal</p>	<p>(a): 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)</p>
--	-----------------------------	--

L8 -

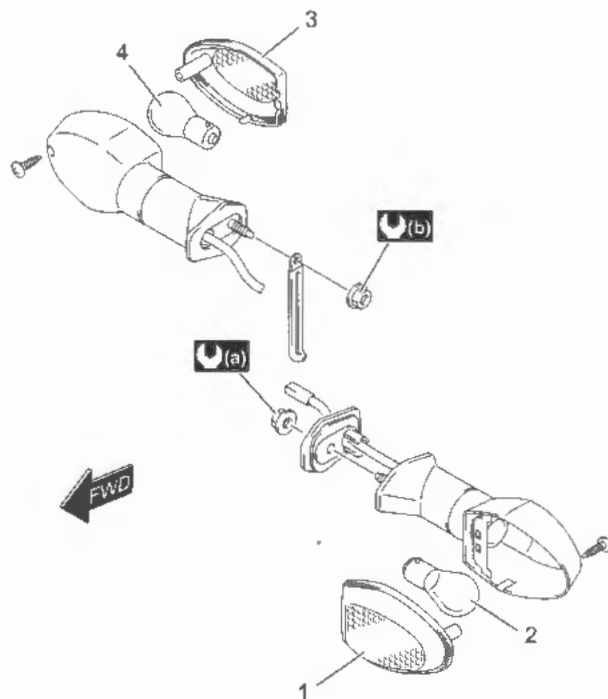


IJ31J1920004-02

1. Front turn signal light	3. Clamp (LH only) : Set the clamp in correct direction as shown.
2. Front side cover	(a) : 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)

Front Turn Signal Light / Rear Turn Signal Light Components

BENJ31J39206014



IE31J1920041-01

1. Front turn signal lens
2. Front turn signal light bulb (12 V, 21 W)
3. Rear turn signal lens
4. Rear turn signal light bulb (12 V, 21 W)
(a) : 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)
(b) : 1.8 N·m (0.18 kgf-m, 1.5 lbf-ft)

Front Turn Signal Light Removal and Installation

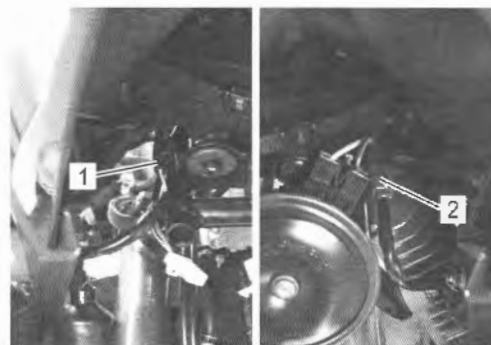
BENJ31J39206015

NOTE

The same procedures is applicable to both the right and left lights.

L4 - L6 Removal

- 1) Disconnect the front turn signal light lead wire coupler (1) and/or (2).

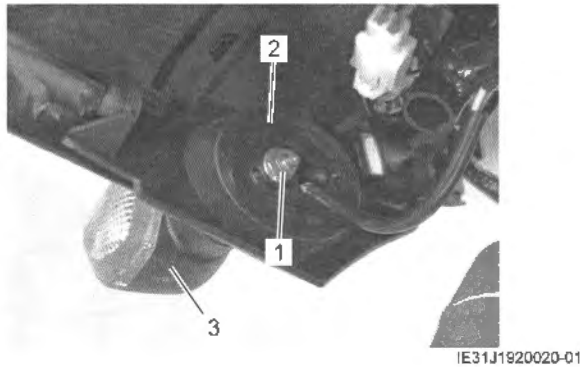


IE31J1920019-01

1. Right side (Black)	2. Left side (Gray)
-----------------------	---------------------

9B-12 Lighting Systems:

- 2) Remove the nut (1), plate (2) and front turn signal light (3).



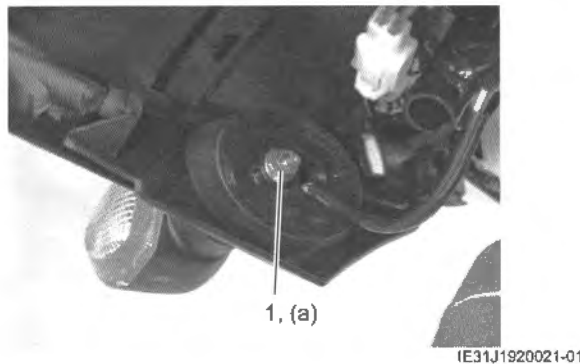
Installation

Install the front turn signal light in the reverse order of removal. Pay attention to the following point:

- Tighten the front turn signal light mounting nut (1) to the specified torque.

Tightening torque

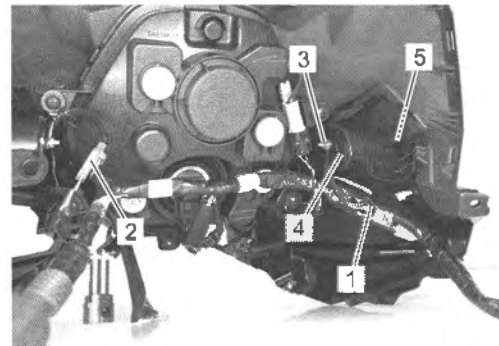
Front turn signal light mounting nut (a): 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)



L8 -

Removal

- 1) Remove the cowl brace. Refer to "Body Cowl Disassembly and Reassembly": L8 - in Section 9D (Page 9D-36).
- 2) Disconnect the front turn signal light lead wire coupler (1) or (2).
- 3) Remove the nut (3), plate (4) and front turn signal light (5).



1. Right side (Black)

2. Left side (Gray)

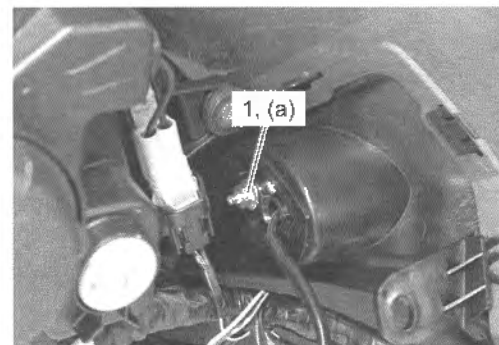
Installation

Install the front turn signal light in the reverse order of removal. Pay attention to the following points:

- Tighten the front turn signal light mounting nut (1) to the specified torque.

Tightening torque

Front turn signal light mounting nut (a): 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)



- For left turn signal light, clamp the lead wire. Refer to "Front Turn Signal Light Construction" (Page 9B-10).

Rear Turn Signal Light Removal and Installation

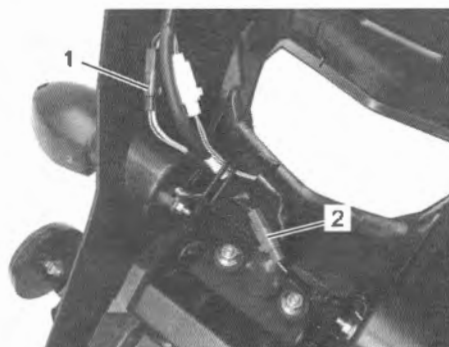
BENJ31J39206016

NOTE

The same procedures is applicable to both the right and left lights.

Removal

- 1) Remove the rear fender (rear).
 - L4 – L6 model: (Page 9D-12)
 - L8 – model: (Page 9D-33)
- 2) Disconnect the rear turn signal light coupler (1) and/or (2).

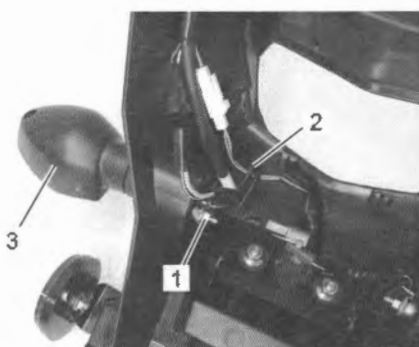


IE31J1920033-02

1. Right side (Black)

2. Left side (Gray)

- 3) Remove the nut (1), clamp (2) and remove the rear turn signal light (3).



IE31J1920022-02

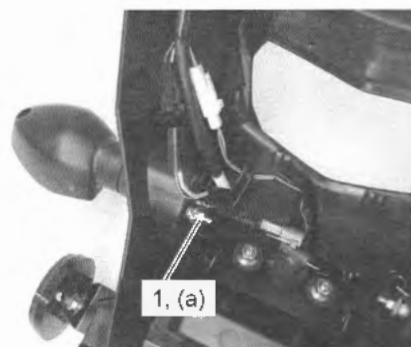
Installation

Install the rear turn signal light in the reverse order of removal. Pay attention to the following point:

- Tighten the rear turn signal light mounting nut (1) to the specified torque.

Tightening torque

Rear turn signal light mounting nut (a): 1.8 N·m (0.18 kgf·m, 1.5 lbf·ft)



IE31J1920023-02

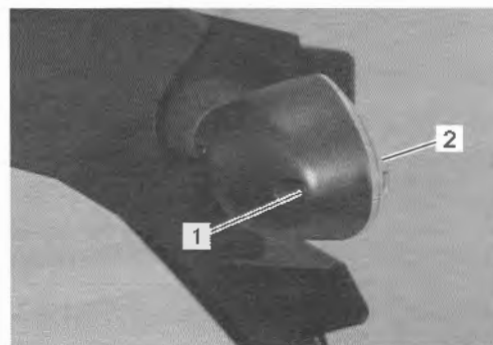
Turn Signal Light Bulb Replacement

BENJ31J39206017

NOTE

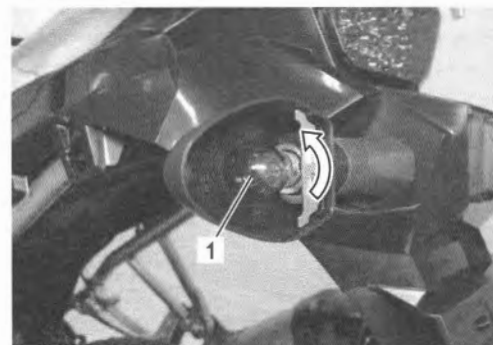
The same procedures is applicable to both the right and left lights.

- 1) Remove the screw (1) and lens (2).



IE31J1920024-01

- 2) Replace the bulb (1) with a new one.

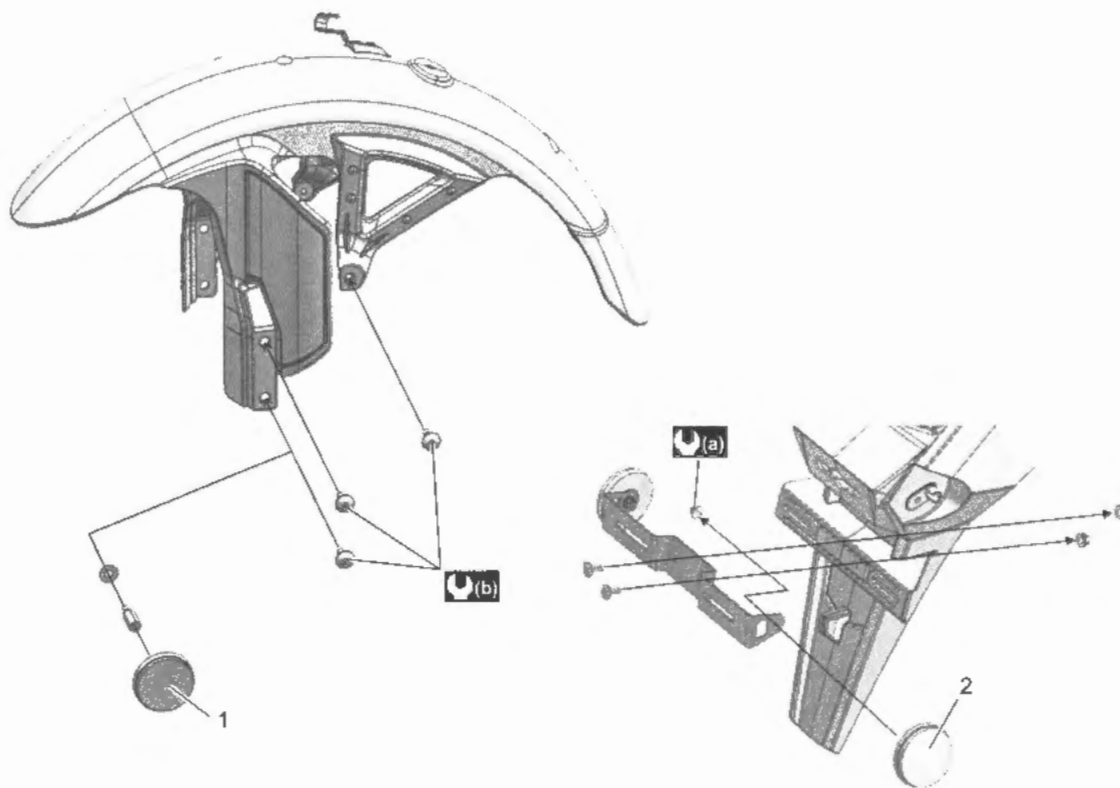


IE31J1920025-01

- 3) After finishing the front turn signal light bulb replacement, reinstall the front turn signal light.

Reflex Reflector Construction (If Equipped)

BENJ31J39206018



1. Front reflex reflector	(a) : 1.8 N-m (0.18 kgf-m, 1.5 lbf-ft)
2. Rear reflex reflector	(b) : 12 N-m (1.2 kgf-m, 9.0 lbf-ft)

IE31J1920038-02

Turn Signal Relay Inspection

BENJ31J39206019

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

NOTE

Make sure that the battery is fully charged.

Before removing the turn signal relay, check the operation of the turn signal light. If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connection. If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal relay with a new one. (Page 9B-14)

Turn Signal Relay Removal and Installation

BENJ31J39206020

L4 – L6

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the seat. (Page 9D-10)
- 3) Remove the turn signal relay (1).



IE31J1920026-02

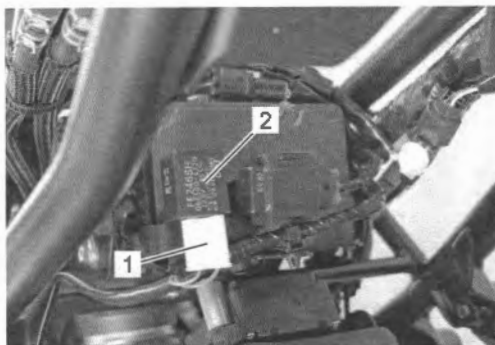
Installation

Install the turn signal relay in the reverse order of removal.

L8 -

Removal

- 1) Remove the battery holder. (Page 9D-37)
- 2) Disconnect the coupler (1) and remove the turn signal relay (2).



IJ31J192005-01

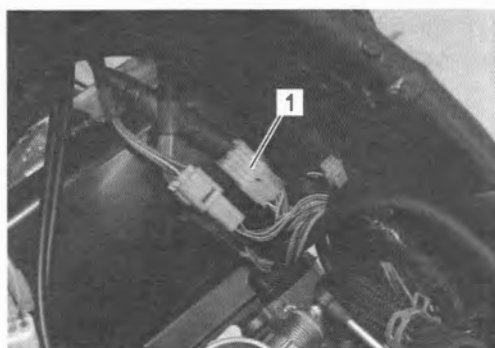
Installation

Install the turn signal relay in the reverse order of removal.

Hazard Switch Inspection

BENJ31J39206021

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Disconnect the right handlebar switch coupler (1).



IE31J1920027-01

- 4) Inspect the hazard switch for continuity with a circuit tester.
If any abnormality is found, replace the right handlebar switch assembly with a new one. (Page 6B-3)

Color Position	B	Lbl	Lg
OFF			
ON	○	○	○

I822H1920024-01

- 5) After finishing the hazard switch inspection, reinstall the removed parts.

Turn Signal Switch Inspection

BENJ31J39206022

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Disconnect the left handlebar switch coupler (1).



IE31J1920028-01

- 4) Inspect the turn signal switch for continuity with a circuit tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. (Page 6B-3)

Color Position	Lg	Lbl	B
L		○	○
PUSH			
R	○	○	

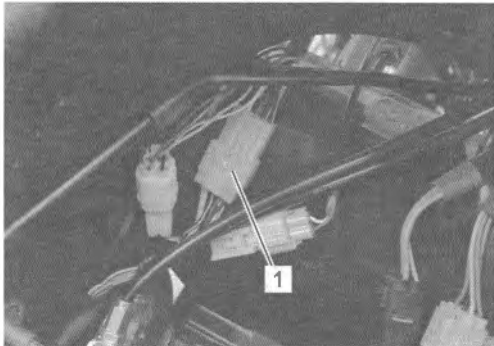
I822H1920026-01

- 5) After finishing the turn signal switch inspection, reinstall the removed parts.

Passing Light Switch Inspection

BENJ31J39206023

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Disconnect the left handlebar switch coupler (1).



IE31J1920029-01

- 4) Inspect the passing light switch for continuity with a circuit tester.
If any abnormality is found, replace the left handlebar switch assembly with a new one. (Page 6B-3)

Color Position	Y	O
•		
PUSH	○	○

IJ31J1920003-01

- 5) After finishing the passing light switch inspection, reinstall the removed parts.

Dimmer Switch Inspection

BENJ31J39206024

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. (Page 1D-4)
- 3) Disconnect the left handlebar switch coupler (1).



IE31J1920031-01

- 4) Inspect the dimmer switch for continuity with a circuit tester.
If any abnormality is found, replace the left handlebar switch assembly with a new one. (Page 6B-3)

AMENDED

Color Position		Y	O
HI (≡▷)		○	○
LO (≡▷)			

IE31J1920032-03

- 5) After finishing the dimmer switch inspection, reinstall the removed parts.

Specifications

Tightening Torque Specifications

BENJ31J39207001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Headlight mounting screw	2	0.2	1.5	☞(Page 9B-4)
License plate light mounting nut	5	0.5	4.0	☞(Page 9B-9)
Front turn signal light mounting nut	1.3	0.13	1.0	☞(Page 9B-12) / ☞(Page 9B-12)
Rear turn signal light mounting nut	1.8	0.18	1.5	☞(Page 9B-13)

Reference:

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

"Headlight Construction" (Page 9B-3)

"Headlight / Position Light Components" (Page 9B-4)

"Rear Lighting System Construction" (Page 9B-7)

"Rear Combination Light / License Plate Light Components" (Page 9B-8)

"Front Turn Signal Light Construction" (Page 9B-10)

"Front Turn Signal Light / Rear Turn Signal Light Components" (Page 9B-11)

"Reflex Reflector Construction (If Equipped)" (Page 9B-14)

"Fasteners Information" in Section 0C (Page 0C-11)

Combination Meter / Fuel Meter / Horn

General Description

Combination Meter System Description

BENJ31J39301001

This combination meter mainly consists of the stepping motor, LCD (Liquid Crystal Display) and LED (Light Emitting Diode).

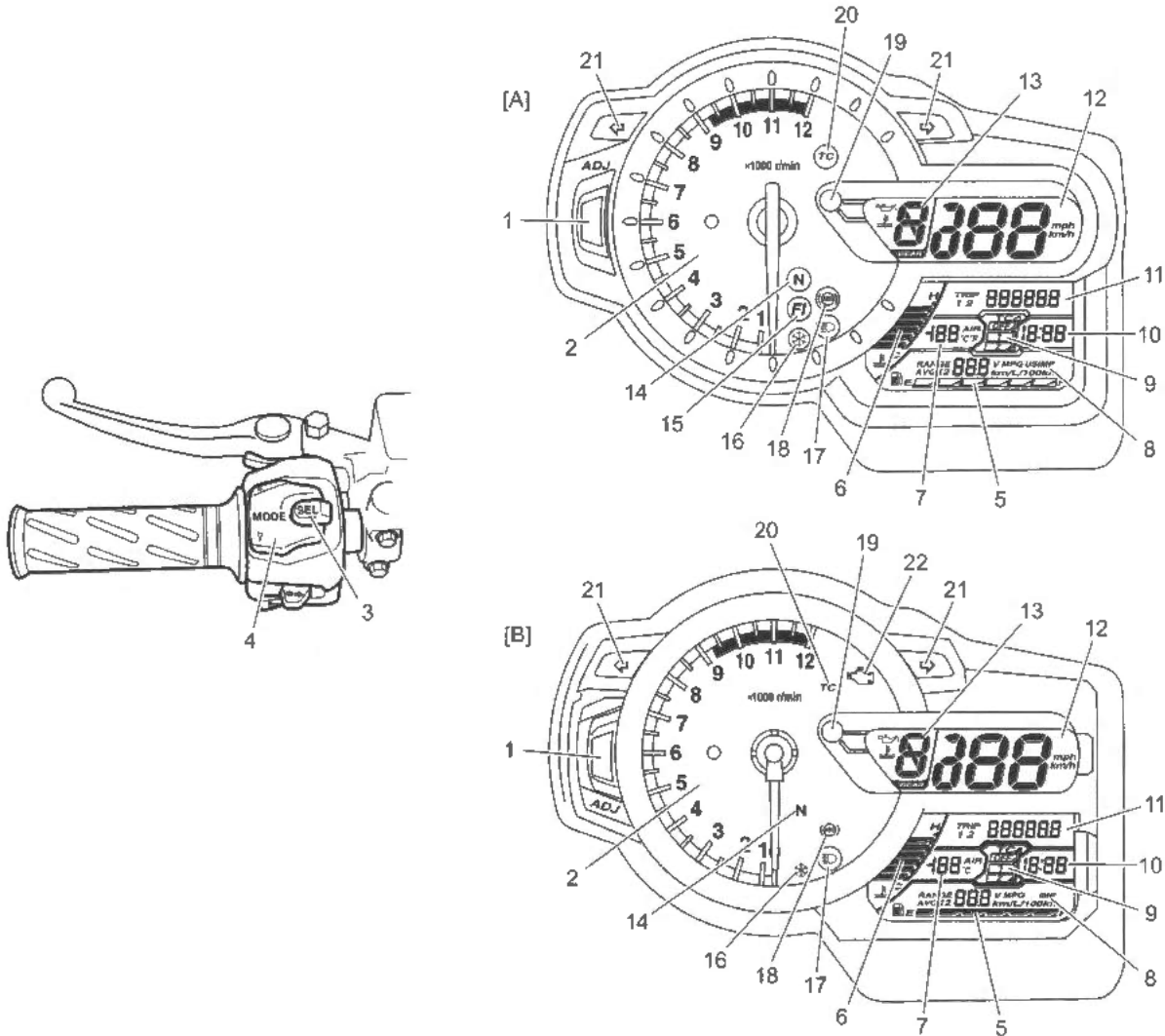
The pointer is driven by the stepping motor.

The LCDs indicate, Fuel level indicator (5), Engine coolant temperature indicator (6), Ambient air temperature indicator (7), Fuel consumption/Battery voltage indicator (8), TC mode OFF / 1 / 2 indicator (9), Clock (10), Odo / Trip1 / Trip2 / FI (DTC) / Instrument panel light brightness indicator (11), Speed (12) and Gear position / Oil pressure / Engine coolant temperature indicator (13) respectively.

LED (Light Emitting Diode)

LED is used for the illumination light and each indicator light.

LED is maintenance free. LED is less power consuming and more resistant to vibration resistance compared to the bulb.



[A]: L4 – L6	16. LED (Freeze indicator light)
[B]: L8 –	17. LED (Hi beam indicator light)
1. Adjust switch	18. LED (ABS indicator light)
2. Tachometer	19. LED (Engine coolant indicator light / Oil pressure indicator light)
3. Traction control system select switch	20. LED (TC indicator light)
4. Mode switch	21. LED (Turn signal indicator light)
14. LED (Neutral indicator light)	22. LED (MIL)
15. LED (FI indicator light)	

Diagnostic Information and Procedures

Combination Meter Symptom Diagnosis

BENJ31J39304001

- 1) Check combination meter power and ground circuit.
- 2) Check DTC with SDS or mode select switch.
 - If some DTC appears during inspection in Step 2), go to applicable DTC diag. flow.
 - If any of troubles described in table below has occurred independently even though DTC display is normal during inspection in Step 2), inspect subject place according to instructions in table below.

Condition	Possible cause	Correction / Reference Item
Speedometer does not operate	Wheel speed sensor	Check wheel speed sensor. • L4 – L6 model: (Page 4E-40) • L8 – model: (Page 4E-82)
	Speedometer	Check speedometer. (Page 9C-8)
	ECM	Check ECM. • L4 – L6 model: (Page 1A-59) (Page 1A-64) • L8 – model: (Page 1A-128)
	Speedometer circuit	Repair circuit. • L4 – L6 model: (Page 9A-4) • L8 – model: (Page 9A-20)
	Wheel speed sensor circuit	Repair circuit. • L4 – L6 model: (Page 9A-4) • L8 – model: (Page 9A-20)
Fuel level indicator does not operate	Fuel level gauge	Check fuel level sensor. (Page 9C-11)
	Fuel level indicator	Check fuel level indicator. (Page 9C-10)
	Fuel level gauge circuit	Repair circuit. • L4 – L6 model: (Page 9A-4) • L8 – model: (Page 9A-20)
Oil pressure indicator light does not operate	Oil pressure switch	Check oil pressure switch. (Page 9C-13)
	Oil pressure indicator	Check oil pressure indicator. (Page 9C-13)
	Oil pressure switch circuit	Repair circuit. • L4 – L6 model: (Page 9A-4) • L8 – model: (Page 9A-20)
Engine coolant temperature indicator does not operate	ECT sensor	Check ECT sensor. (Page 1C-16)
	ECT indicator	Check ECT indicator. (Page 9C-8)
	ECT sensor circuit	Repair circuit. • L4 – L6 model: (Page 9A-4) • L8 – model: (Page 9A-20)

Condition	Possible cause	Correction / Reference Item
Ambient air temperature indicator	Ambient air temperature sensor	Check ambient air temperature sensor. ☞(Page 9C-13)
	Ambient air temperature indicator	Check ambient air temperature indicator. ☞(Page 9C-12)
	Ambient air temperature sensor circuit	Repair circuit. • L4 – L6 model: ☞(Page 9A-4) • L8 – model: ☞(Page 9A-20)

Horn Symptom Diagnosis

BENJ31J39304002

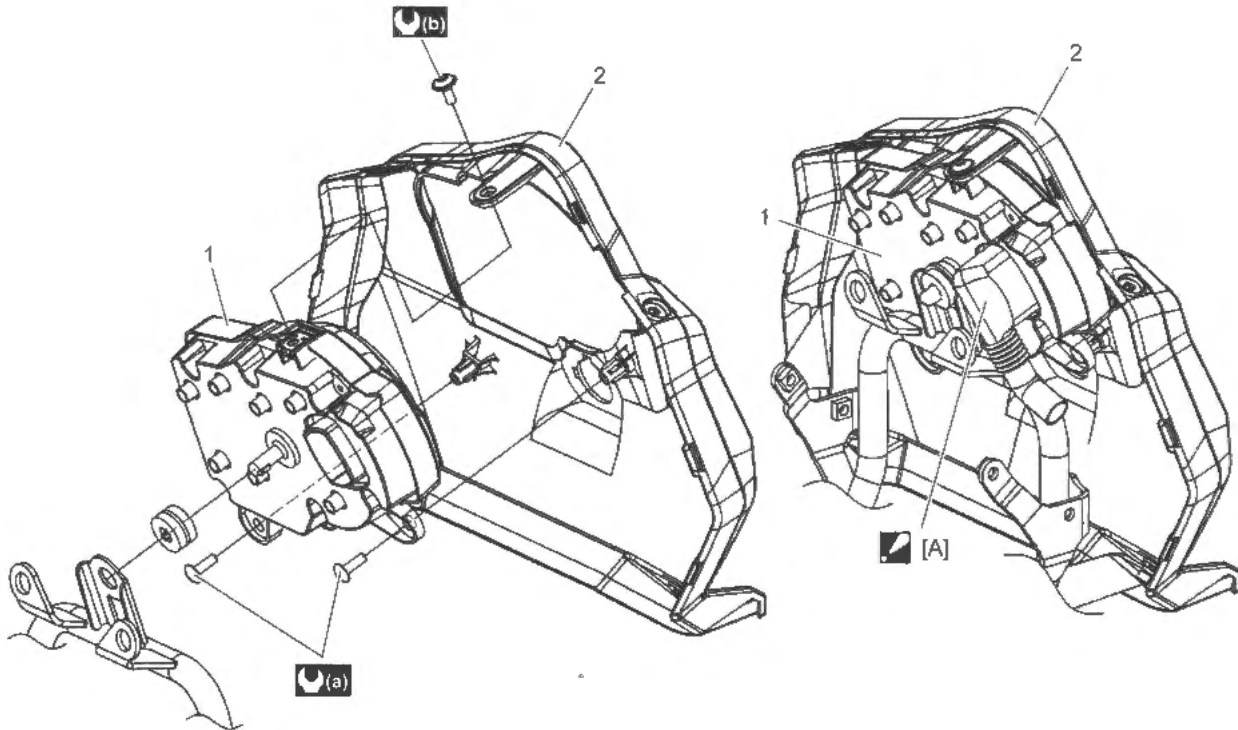
Condition	Possible cause	Correction / Reference Item
Horn does not operate	Horn button faulty	Check horn button. ☞(Page 9C-14)
	Wiring or ground faulty	Repair circuit.
	Horn faulty	Check horn. ☞(Page 9C-14)

Repair Instructions

Combination Meter Construction

BENJ31J39306001

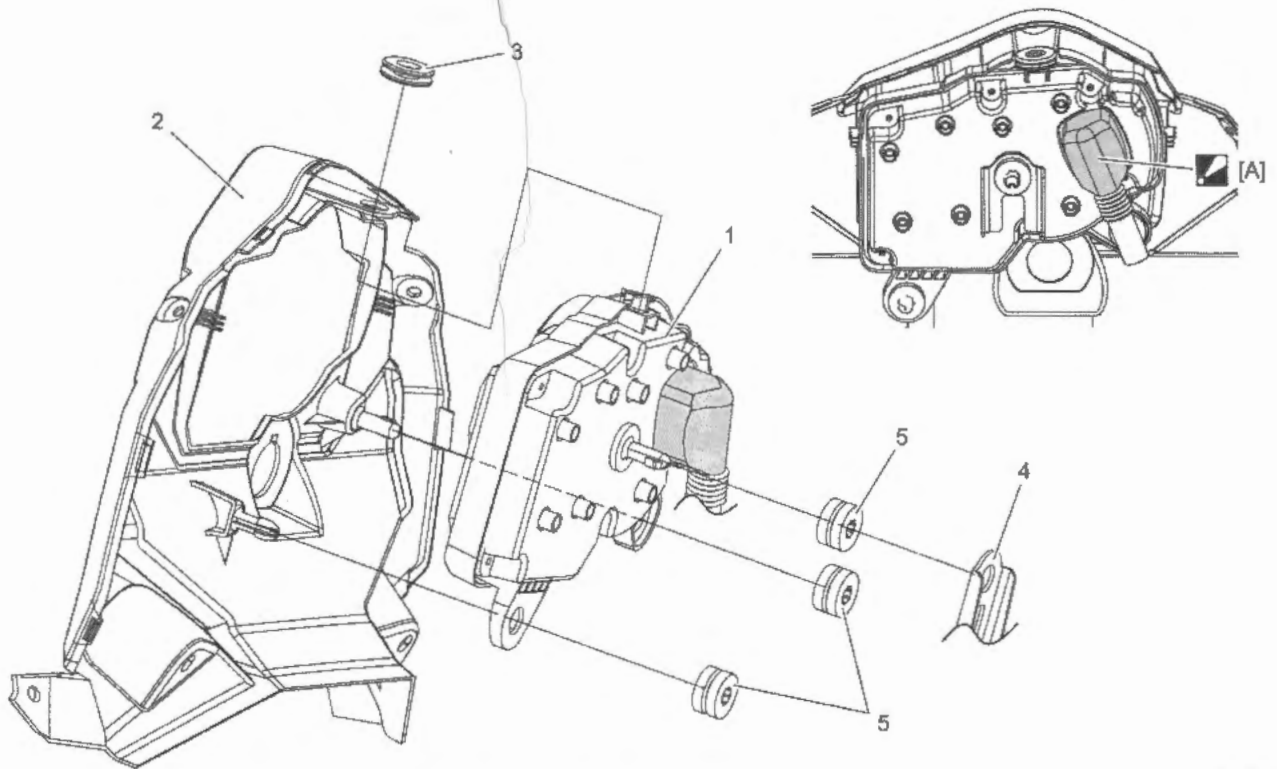
L4 – L6



IE31J1930028-01

☞ [A]: Install the coupler boots to the combination meter firmly.	2. Meter panel	☞ [b] : 4.5 N·m (0.45 kgf·m, 3.5 lbf·ft)
1. Combination meter	☞ [a] : 1.5 N·m (0.15 kgf·m, 1.0 lbf·ft)	

L8 --

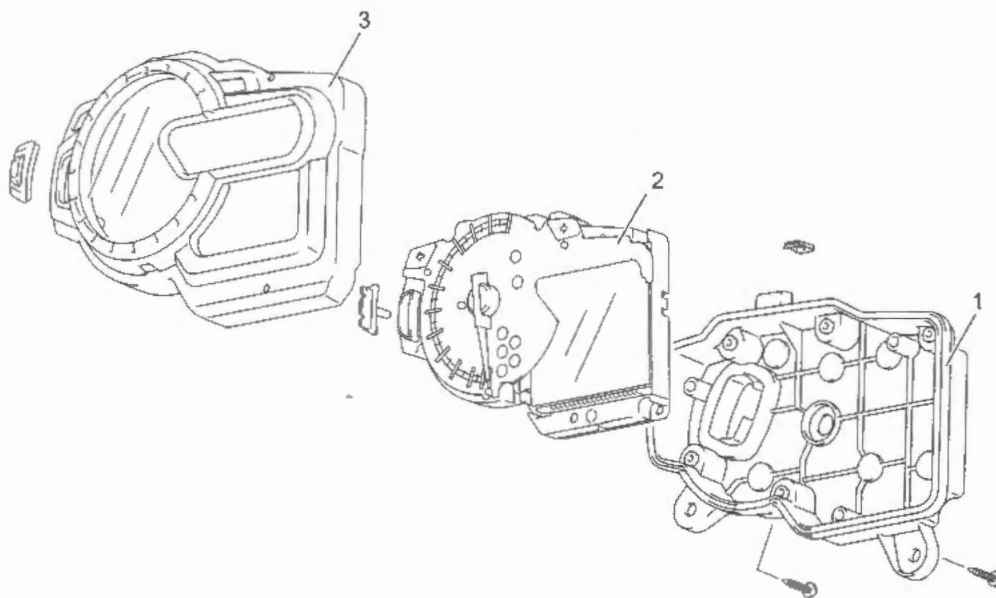


IJ31J1930002-02

<p>☑ [A]: Fit the coupler boot until it contacts bottom of the meter lower case.</p> <p>1. Combination meter</p> <p>2. Meter panel</p>	<p>3. Meter panel cushion</p> <p>4. Cowling brace</p> <p>5. Cushion</p>
--	---

Combination Meter Components

BENJ31J38306002



IE31J1930032-02

1. Lower case	2. Speedometer	3. Upper case
---------------	----------------	---------------

Combination Meter On-Vehicle Inspection

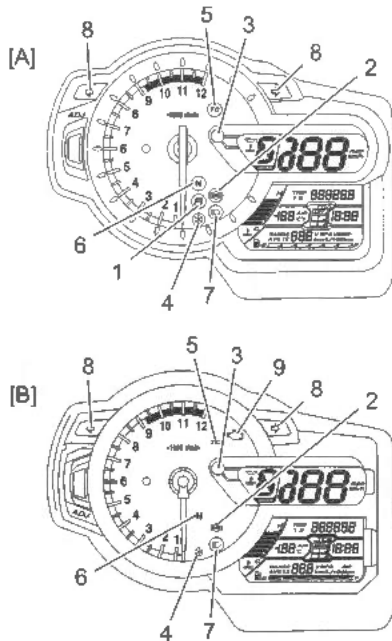
BENJ31J39306003

LED Inspection

Check that the LEDs (FI indicator light (1) or MIL (9), ABS indicator light (2), Engine coolant temperature indicator light / Oil pressure indicator light (3), Freeze indicator light (4), TC indicator light (5) and Neutral indicator (6)) immediately light up when the ignition switch is turned to ON.

Check that other LEDs (High-beam indicator light (7) and Turn signal indicator lights (8)) light up/go off by operating the brake lock lever, the dimmer and the turn signal switches.

If abnormal condition is found, replace the combination meter unit with a new one after checking its wire harness/coupler. (Page 9C-6)



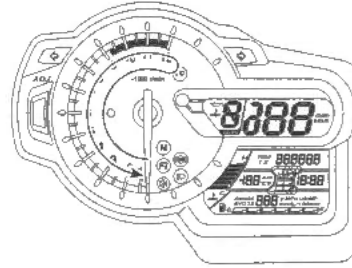
[A]:	L4 - L6
[B]:	L8 -

IJ31J1930003-02

Stepping Motor Inspection and Adjustment

- 1) Check that the pointer calibrates itself immediately after turning the ignition switch on and stops at zero point.

If abnormal condition is found, replace the combination meter unit with a new one after checking its wire harness/coupler.

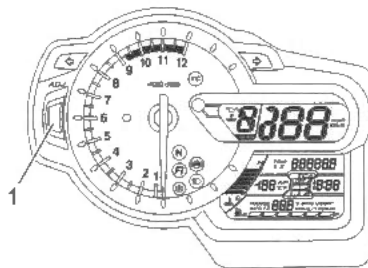


IE31J1930028-02

NOTE

The pointer may not return to the proper position even turning the ignition switch on under low temperature condition. In that case, you can reset the pointer to the proper position by the following instruction.

- 2) With the adjust switch (1) pressed, turn the ignition switch ON.
- 3) Hold the adjust switch pressed for more than 4 seconds, the needle shakes fully and returns "0".
- 4) Release the adjust switch.
- 5) If the pointer does not return to "0", replace the combination meter with a new one. (Page 9C-6)



IE31J1930029-01

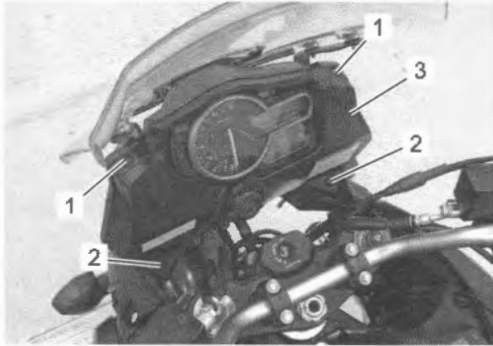
Combination Meter Assembly Removal and Installation

BENJ31J39306004

L4 – L6

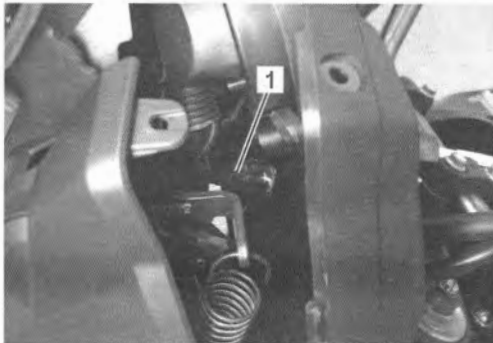
Removal

- 1) Remove the clips (1) and screws (2).
- 2) Remove the meter panel (3).

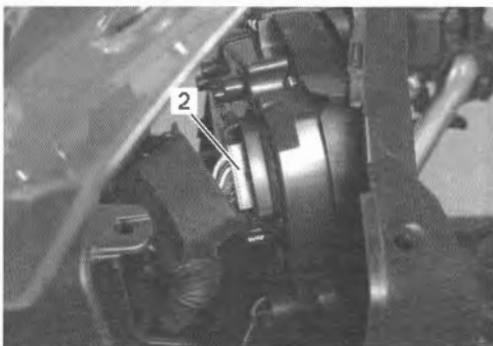


IE31J1930001-01

- 3) Disconnect the power source socket coupler (1) and combination meter coupler (2).

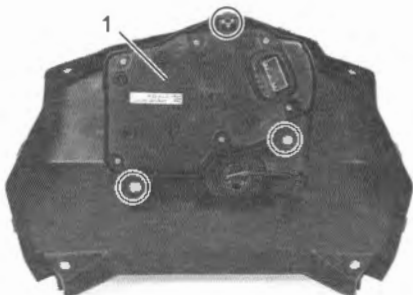


IE31J1930002-02



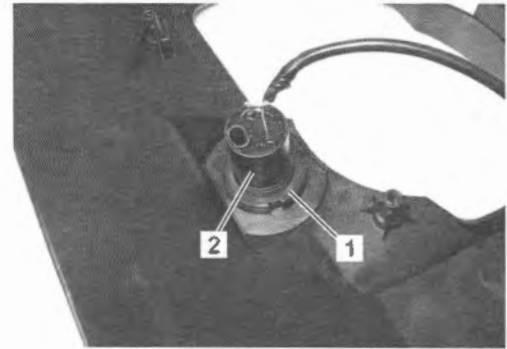
IE31J1930003-01

- 4) Remove the combination meter (1).



IE31J1930004-02

- 5) Remove the ring nut (1) and power source socket (2).

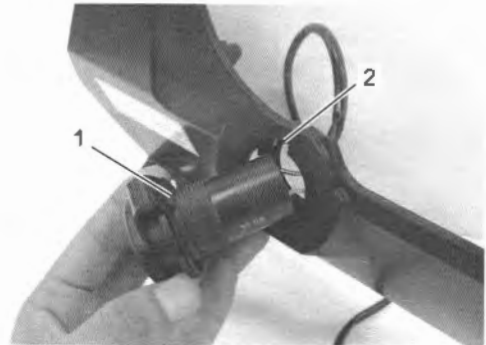


IE31J1930005-01

Installation

Install the combination meter in the reverse order of removal. Pay attention to the following points:

- Align the projection (1) of power source socket to the groove (2) of meter panel.

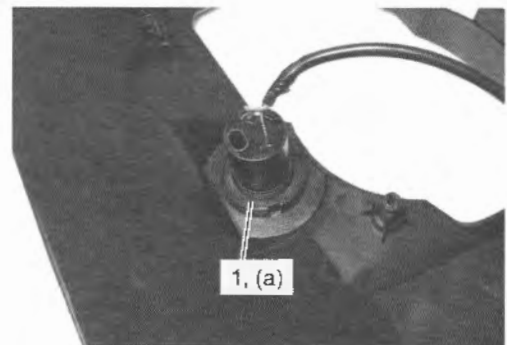


IE31J1930006-01

- Tighten the ring nut (1) to the specified torque.

Tightening torque

Ring nut (a): 3 N·m (0.3 kgf-m, 2.5 lbf-ft)



IE31J1930031-01

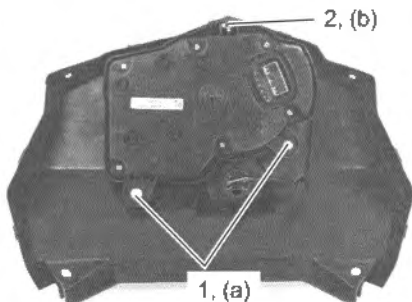
9C-7 Combination Meter / Fuel Meter / Horn:

- Tighten the screws (1) and (2) to the specified torque.

Tightening torque

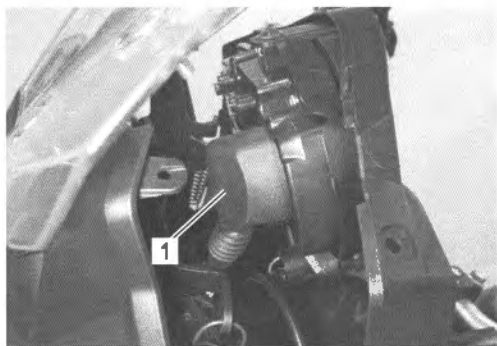
Speedometer screw (a): 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)

Speedometer panel screw (b): 4.5 N·m (0.45 kgf-m, 3.5 lbf-ft)



IE31J1930007-02

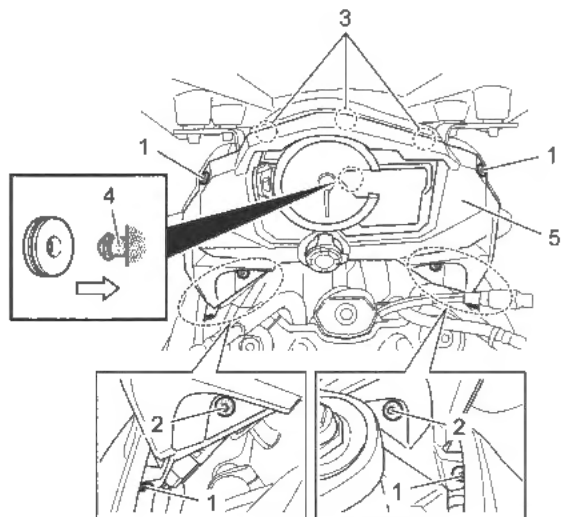
- Install the coupler boots (1).



IE31J1930008-01

L8 – Removal

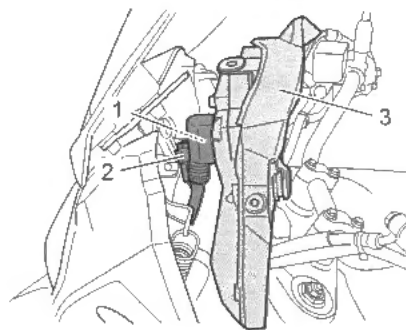
- 1) Remove the clips (1) and screws (2). (Page 9D-33)
- 2) Unhook the hooks (3) and (4) pulling the meter panel assembly (5).



IJ31J1930004-01

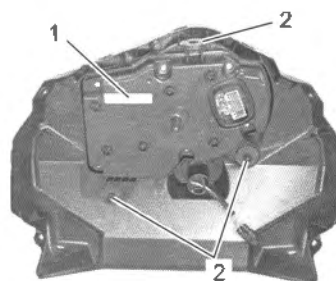
- 3) Disconnect the combination meter coupler (1) and power source socket coupler (2).

- 4) Remove the meter panel assembly (3).



IJ31J1930005-01

- 5) Remove the combination meter (1).



IJ31J1930006-01

2. Hooked point

- 6) Remove the power source socket from the meter panel. (Page 9C-6)

Installation

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

- Fit the coupler boot. Refer to "Combination Meter Construction" (Page 9C-3).

Combination Meter Disassembly and Reassembly

BENJ31J39306005

Disassemble/reassemble the combination meter as shown in the combination meter components. ⚡ (Page 9C-4)

Speedometer On-Vehicle Inspection

BENJ31J39306006

If the speedometer, odometer or tripmeter does not function properly, inspect the speed sensor and the coupler connections. If the speed sensor and coupler connections are OK, replace the combination meter unit with a new one. ⚡ (Page 9C-6)

Speed Sensor Removal and Installation

BENJ31J39306007

Refer to "Front Wheel Speed Sensor Removal and Installation": L4 - L6 in Section 4E (Page 4E-38) and "Rear Wheel Speed Sensor Removal and Installation": L4 - L6 in Section 4E (Page 4E-38), or "Front Wheel Speed Sensor Removal and Installation": L8 - in Section 4E (Page 4E-80) and "Rear Wheel Speed Sensor Removal and Installation": L8 - in Section 4E (Page 4E-80).

Speed Sensor Inspection

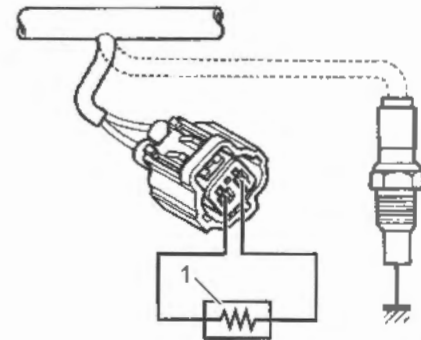
BENJ31J39306008

Refer to "Wheel Speed Sensor and Sensor Rotor Inspection": L4 - L6 in Section 4E (Page 4E-40) and "Wheel Speed Sensor and Sensor Rotor Inspection": L8 - in Section 4E (Page 4E-82).

ECT Indicator Inspection

BENJ31J39306009


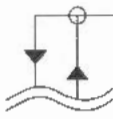



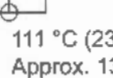







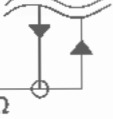
- 1) Disconnect the ECT sensor coupler. ⚡ (Page 1C-16)
- 2) Connect the variable resistor (1) between the terminals.



ID26J193009-01

- 3) Turn the ignition switch ON.

- 4) Check the LCD operation when the resistance is adjusted to the specified values.
 If either one or all indications are abnormal, replace the combination meter with a new one. (Page 9C-6)

Engine coolant temperature meter	Temperature and resistance
 <p>Flicker</p>	 <p>116 °C (241 °F) Approx. 122 Ω</p>
 <p>ON</p>	<p>113 °C (236 °F) Approx. 131 Ω</p>  <p>114 °C (238 °F) Approx. 128 Ω</p>
 <p>ON</p>	<p>110 °C (230 °F) Approx. 141 Ω</p>  <p>111 °C (232 °F) Approx. 138 Ω</p>
 <p>ON</p>	<p>70 °C (158 °F) Approx. 427 Ω</p>  <p>108 °C (227 °F) Approx. 149 Ω</p>
 <p>ON</p>	<p>50 °C (122 °F) Approx. 811 Ω</p>  <p>68 °C (155 °F) Approx. 454 Ω</p>
 <p>ON</p>	<p>40 °C (104 °F) Approx. 1149 Ω</p>  <p>48 °C (119 °F) Approx. 868 Ω</p>
 <p>ON</p>	 <p>38 °C (101 °F) Approx. 1235 Ω</p>

[A]: When decreasing the temperature

[B]: When increasing the temperature

Fuel Level Indicator Inspection

BENJ31J39306010

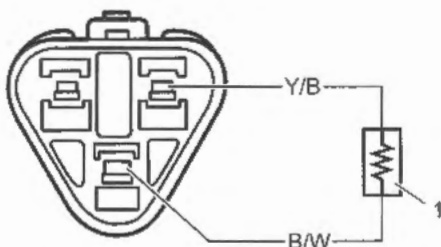
L4 – L6

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



IE31J1930011-03

- 3) Connect variable resistor (1) between the Y/B and B/W lead wires from the wire harness.



IG31J1930001-02

- 4) Turn the ignition switch ON.
- 5) Check the display of fuel level indicator (LCD) as shown.
If any abnormality is found, replace the combination meter with a new one. (Page 9C-6)

NOTE

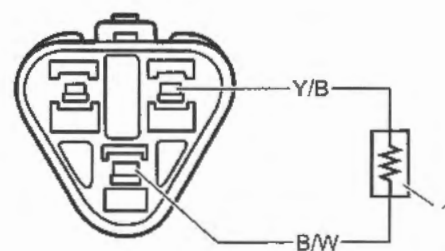
It takes approx. 40 seconds that the fuel level indicator indicates the detected fuel level.

Resistance	Fuel level indicator
188.8 – 211.6 Ω	
131.2 – 149.8 Ω	
98.6 – 112.4 Ω	
66.9 – 77.0 Ω	
41.2 – 48.2 Ω	
13.6 – 16.5 Ω	

IJ31J1930010-01

L8 –

- 1) Disconnect the fuel pump coupler. (Page 9C-10)
- 2) Connect variable resistor (1) between the Y/B and B/W lead wires from the wire harness.



IG31J1930001-02

- 3) Turn the ignition switch ON.
- 4) Check the display of fuel level indicator (LCD) as shown.
If any abnormality is found, replace the combination meter with a new one. (Page 9C-6)

NOTE

It takes approx. 40 seconds that the fuel level indicator indicates the detected fuel level.

Resistance	Fuel level indicator
188.8 – 211.6 Ω	
154.4 – 174.3 Ω	
125.3 – 142.0 Ω	
96.8 – 109.7 Ω	
71.8 – 81.6 Ω	
13.6 – 16.5 Ω	

IJ31J193009-03

Fuel Level Gauge Inspection

BENJ31J39306011

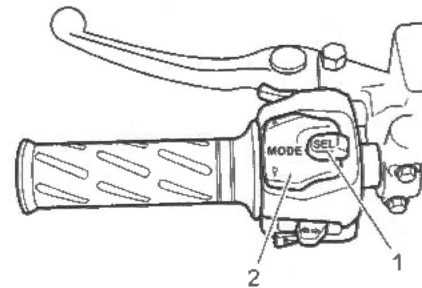
Refer to "Fuel Level Gauge Inspection" in Section 1G (Page 1G-14).

TC Mode Indicator Inspection

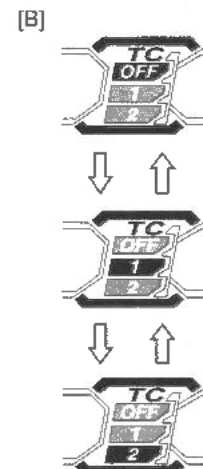
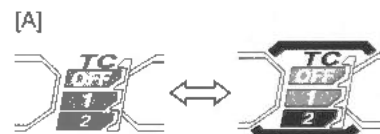
BENJ31J39306012

- 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 mode indicator changes when the traction control system select switch (1) or the mode 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 mode indicator changes by operating these switches again. Replace the combination meter unit or the ECM with a new one after confirmation of the defect. Refer to "Combination Meter Assembly Removal and Installation" (Page 9C-6) or "ECM Removal and Installation" in Section 1C (Page 1C-14).



IJ31J1930007-01



IJ31J1930008-01

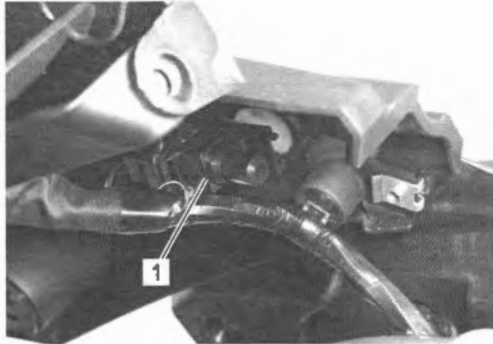
[A]: When traction control system select switch (1) is pushed.

[B]: When mode switch (UP, DOWN) (2) is pushed.

Freeze Indicator Inspection

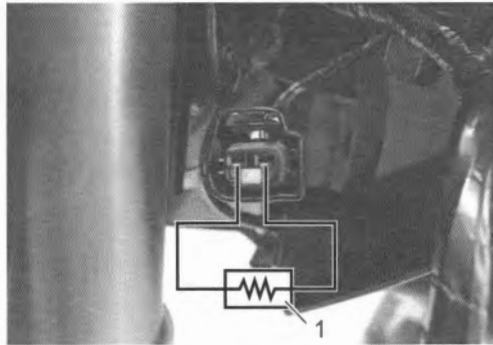
BENJ31J39306013

- 1) Remove the right side cowling cover. (L4 – L6)
☞ (Page 9D-13)
- 2) Remove the ambient air temperature sensor (1). (L4 – L6)



IE31J1930014-01

- 3) Disconnect the ambient air temperature sensor coupler and connect the variable resistor (1) between the terminals.



IE31J1930015-01

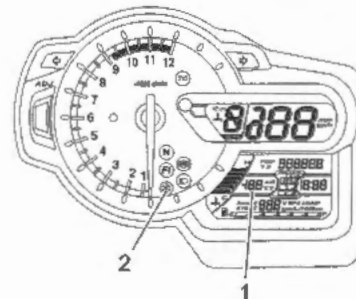
- 4) Turn the ignition switch ON.
- 5) Check the ambient air temperature meter (LCD) (1) and freeze indicator light (LED) (2) operations when the resistance is adjusted to the specified values. If either one or both indications are abnormal, replace the combination meter with a new one.
☞ (Page 9C-6)

Resistance	LCD
9300 Ω or more	Lo
600 Ω or less	HI

Freeze indicator light (LED) (2)	Ambient air temperature indicator (LCD) (1)	Temperature
Flicker 	Flicker 3°C 38°F	
OFF 	5°C 41°F	

IE31J1930016-03

- | |
|--------------------------------------|
| [A]: When increasing the temperature |
| [B]: When decreasing the temperature |



IE31J1930030-01

- 6) Connect the ambient air temperature sensor coupler.

Ambient Air Temperature Sensor Inspection

BENJ31J39306014

Refer to "Freeze Indicator Inspection" (Page 9C-12). Measure the resistance between terminals of ambient air temperature sensor.

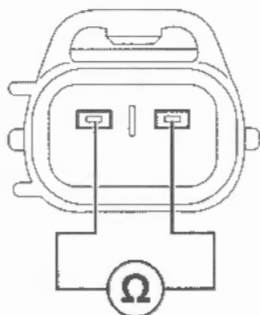
If any abnormality is found, replace the ambient air temperature sensor with a new one.

NOTE

Ambient air temperature sensor resistance measurement method is the same way as that of the ECT sensor. (Page 1C-16)

Ambient air temperature sensor resistance

Temperature	Standard resistance
-20 °C (-4 °F)	13779 - 19083 Ω
-10 °C (14 °F)	8100 - 10609 Ω
0 °C (32 °F)	4928 - 6125 Ω
10 °C (50 °F)	3089 - 3656 Ω
20 °C (68 °F)	1992 - 2251 Ω
25 °C (77 °F)	1615 - 1785 Ω
30 °C (86 °F)	1290 - 1456 Ω
40 °C (104 °F)	838 - 986 Ω



CHANGED

ID26J1930016-01

Oil Pressure Switch Inspection

BENJ31J39306015

NOTE

Before inspecting the oil pressure switch, check the engine oil level. (Page 1E-4)

- 1) Remove the under cowling assembly. (If equipped) (Page 9D-39)
- 2) Disconnect the oil pressure switch lead wire (1) from the oil pressure switch.



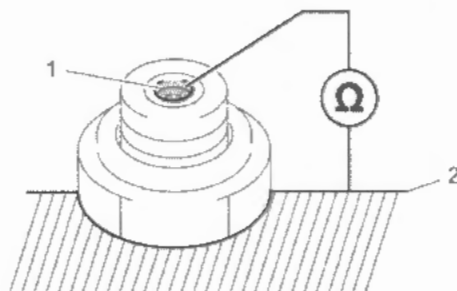
IE31J1930017-02

- 3) 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.

- 4) After finishing the oil pressure switch inspection, install the removed parts.

	Oil pressure switch terminal	Crankcase
Engine is at stop	○	○
Engine is running		

LJ04K1150002-01



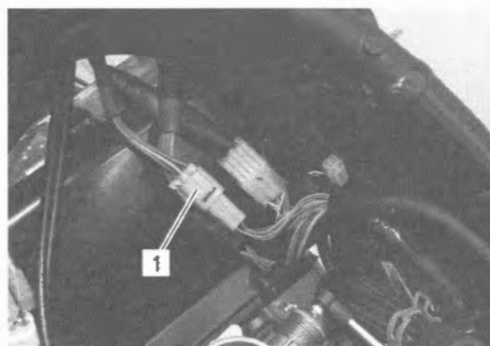
LJ04K1150003-01

- 5) Install the under cowling assembly. (If equipped)

Ignition Switch Inspection

BENJ31J39306016

- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Disconnect the ignition switch coupler (1).



IE31J1930019-01

- 3) Inspect the ignition switch for continuity with a circuit tester. If any abnormality is found, replace the ignition switch with a new one.

AMENDED

If immobilizer is equipped					
Color	R	O	Gr	Br	
Position					
ON	○	○	○	○	○
OFF					
LOCK					
P	○				○

IE31J1930020-01

If immobilizer is not equipped					
Color	O/Y	R	O	Gr	Br
Position					
ON	○	○	○	○	○
OFF					
LOCK					
P		○			○

IE31J1930021-01

- 4) After finishing the ignition switch inspection, reinstall the removed parts.

Ignition Switch Removal and Installation

BENJ31J39306017

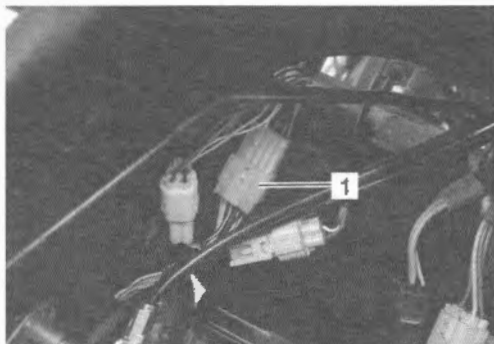
Refer to "Ignition Switch Removal and Installation" in Section 1H (Page 1H-10).

Horn Inspection

BENJ31J39306018

Horn Button Inspection

- 1) Remove the air cleaner box. (Page 1D-4)
- 2) Disconnect the left handlebar switch coupler (1).



IE31J1930022-01

- 3) Inspect the horn button for continuity with a tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. (Page 6B-3)

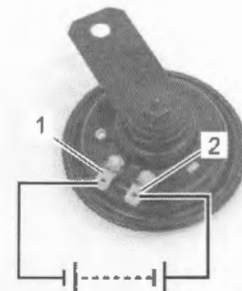
Color	B/BI	B/W
Position		
PUSH	○	○

I822H1930030-02

- 4) After finishing the horn button inspection, reinstall the removed parts.

Horn Inspection

Refer to "Horn Removal and Installation" (Page 9C-14). Connect a 12 V battery to terminal (1) and terminal (2). If the sound is not heard from the horn, replace the horn with a new one.



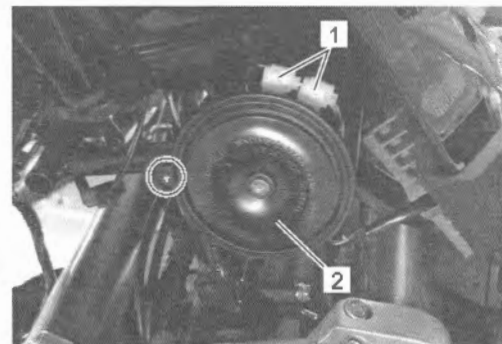
IE31J1930023-01

Horn Removal and Installation

BENJ31J39306019

Removal

- 1) Disconnect the horn couplers (1).
- 2) Remove the horn (2).



IE31J1930024-02

Installation

Install the horn in the reverse order of removal.

Specifications

Tightening Torque Specifications

BENJ31J39307001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Ring nut	3	0.3	2.5	☞(Page 9C-6)
Speedometer screw	1.5	0.15	1.0	☞(Page 9C-7)
Speedometer panel screw	4.5	0.45	3.5	☞(Page 9C-7)

Reference:

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

"Combination Meter Construction" (Page 9C-3)

"Fasteners Information" in Section 0C (Page 0C-11)

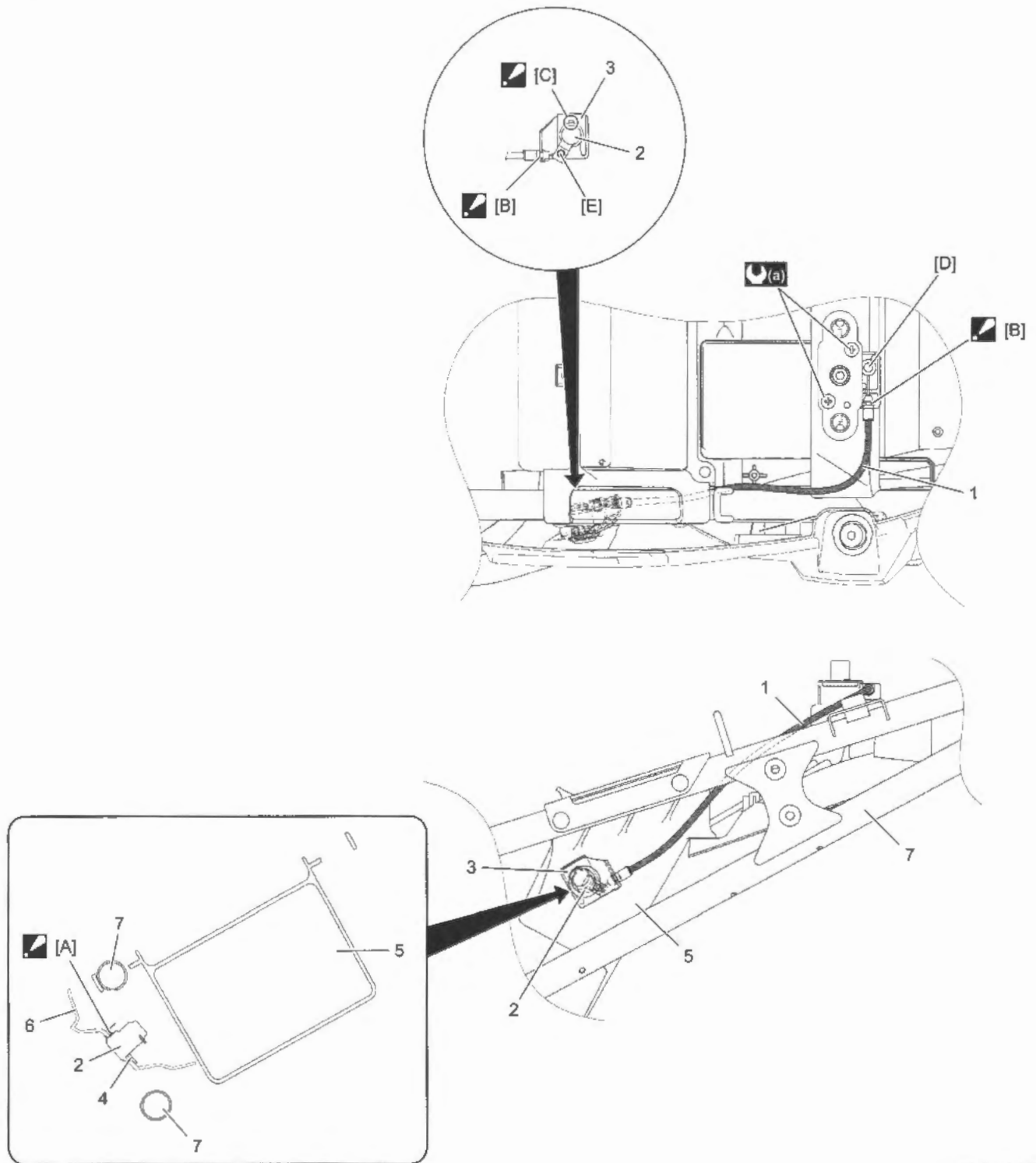
Exterior Parts

L4 - L6

Schematic and Routing Diagram

Seat Lock Cable Routing Diagram

BENJ31J39412001



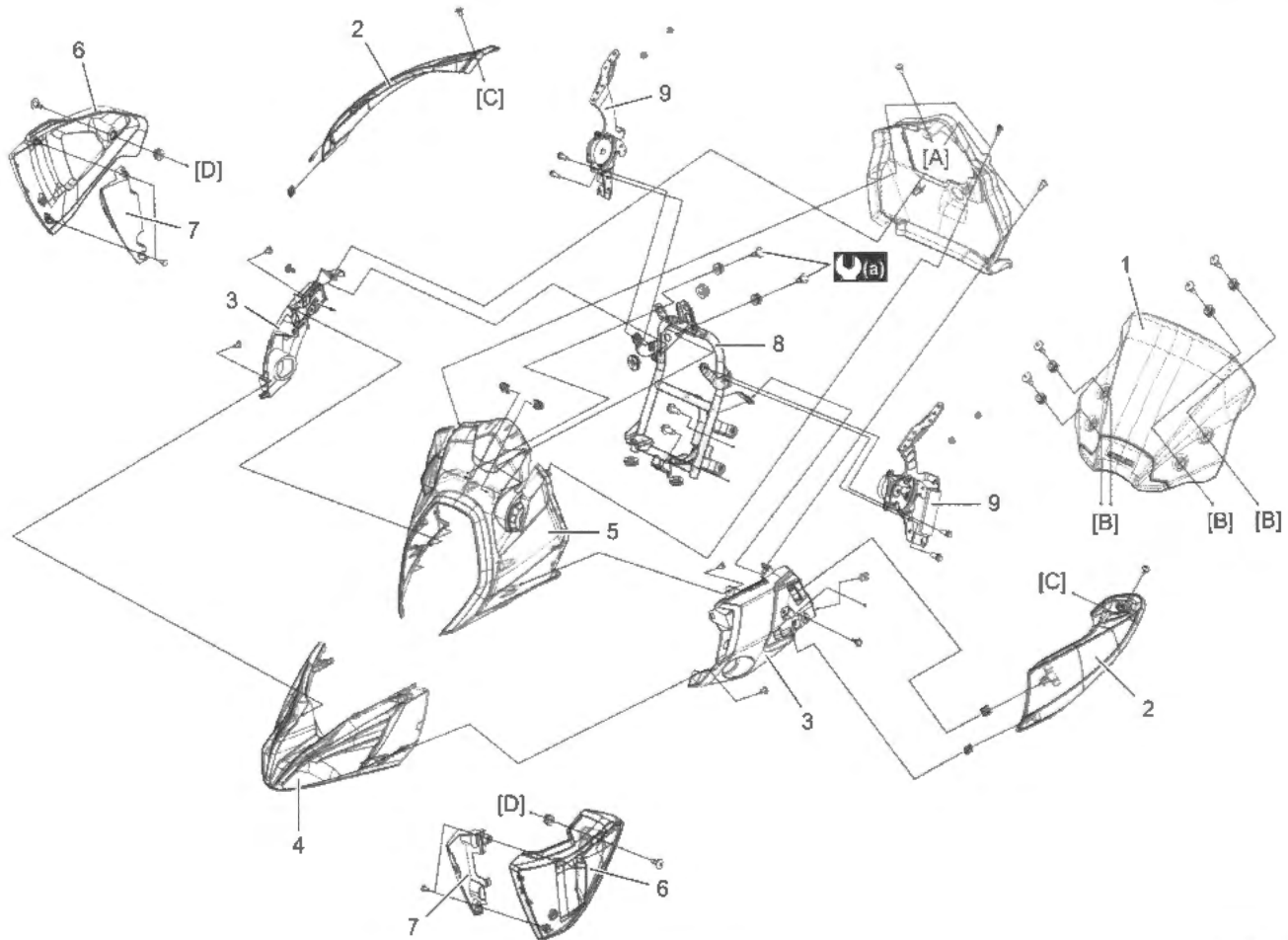
9D-2 Exterior Parts: L4 - L6

<ul style="list-style-type: none"> ☑ [A]: Install the seat lock assembly plate behind of the seat lock cable guide. ☑ [B]: Set the seat lock cable firmly. ☑ [C]: Align the rib of seat lock assembly and groove of each part. [D]: Spherical cable end 	<ol style="list-style-type: none"> 1. Seat lock cable 2. Seat lock 3. Seat lock assembly plate 4. Seat lock cable guide 	<ol style="list-style-type: none"> 5. Battery holder 6. Frame cover 7. Frame <p>⚙️ (a) : 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)</p>
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Repair Instructions

Body Cowling Construction

BENJ31J39416001

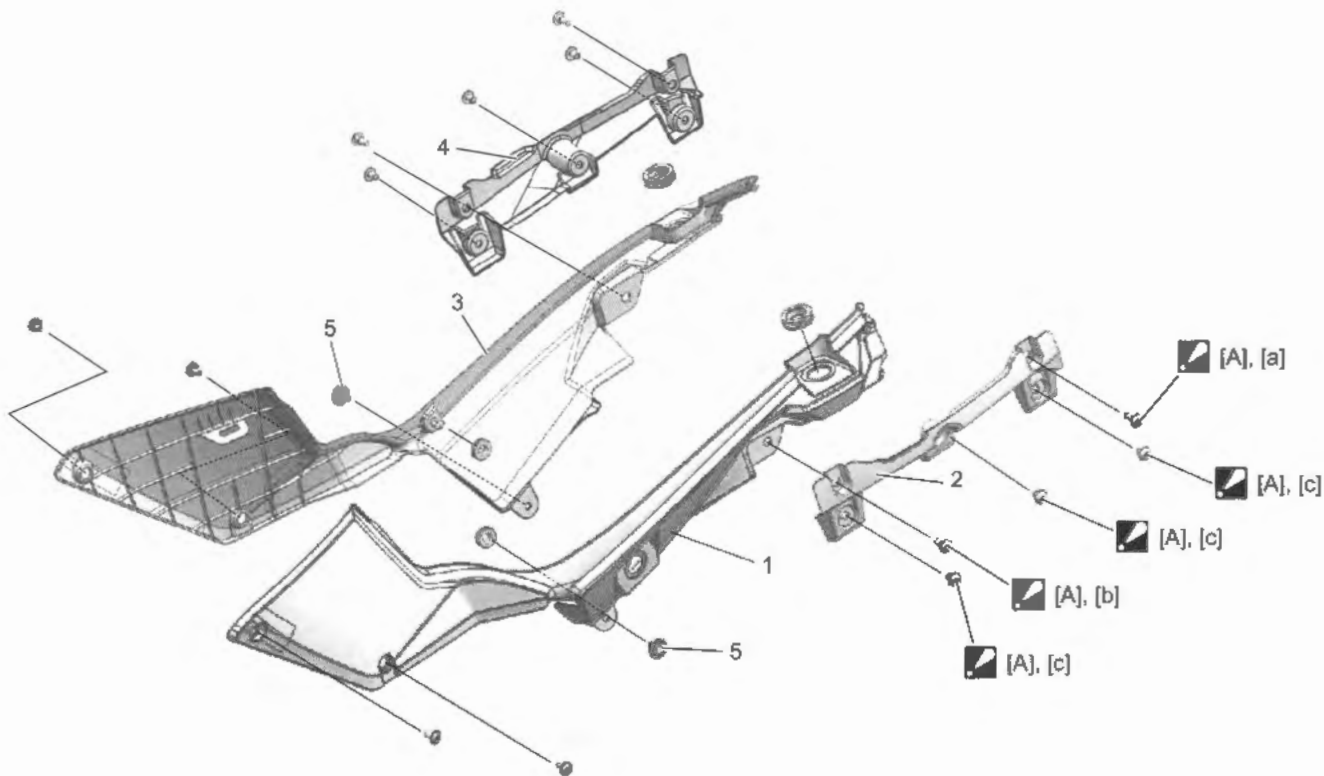


IE31J1940041-04

[A]: To combination meter	2. Side cowling cover	7. Side cowling inner cover
[B]: To windscreen brace	3. Front side cover	8. Cowling brace
[C]: To fuel tank center cover	4. Lower body cowling	9. Windscreen brace
[D]: To frame	5. Body cowling	⚙️ (a) : 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)
1. Windscreen	6. Side lower cowling	

Frame Cover Construction

BENJ31J39416002

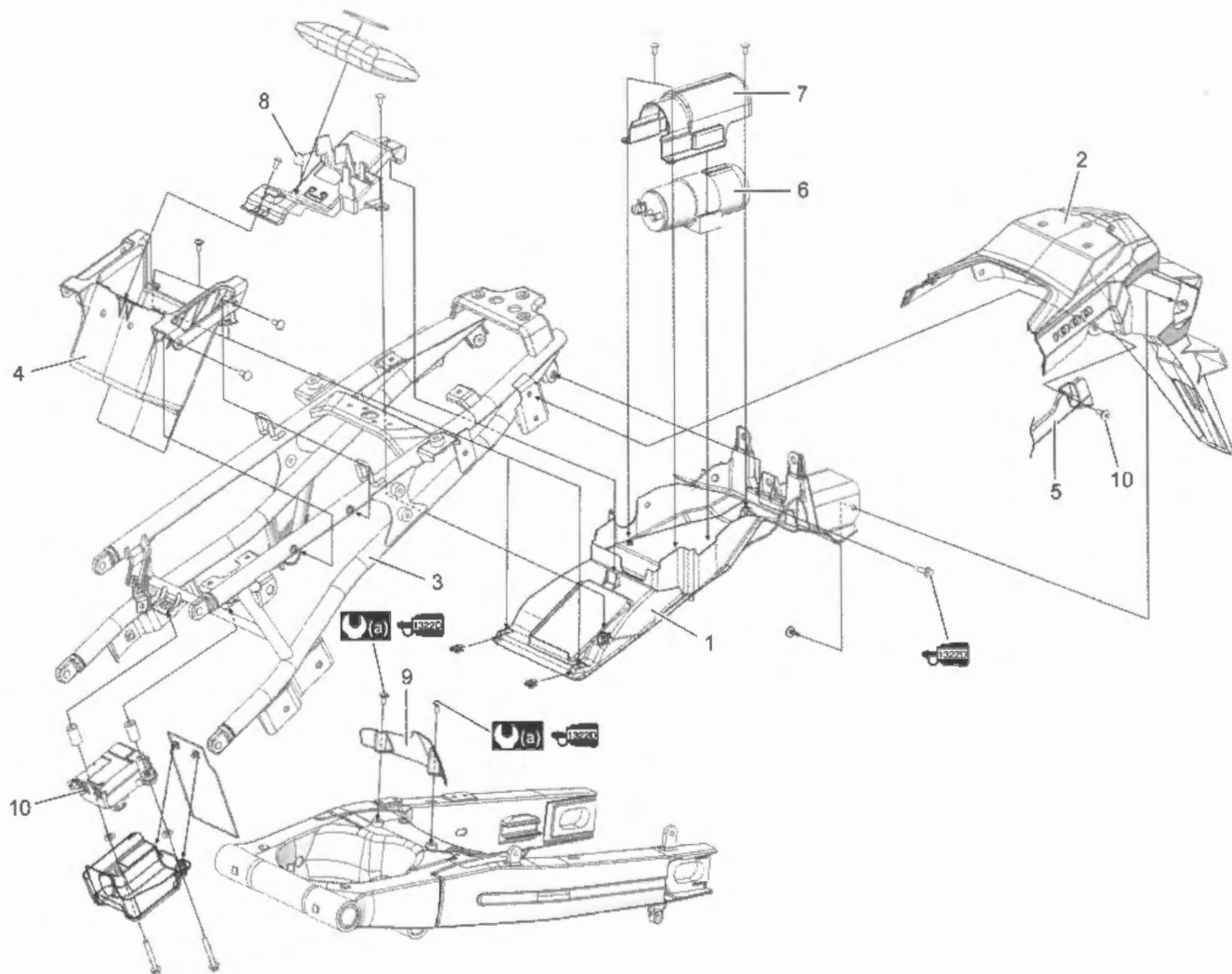


IE31J1940054-04

<p>▲ [A]: Tighten the screws in order of [a] → [b] → [c]</p>	2. Left rear frame cover	4. Right rear frame cover
1. Left frame cover	3. Right frame cover	5. Clip

Rear Fender Construction

BENJ31J39416003

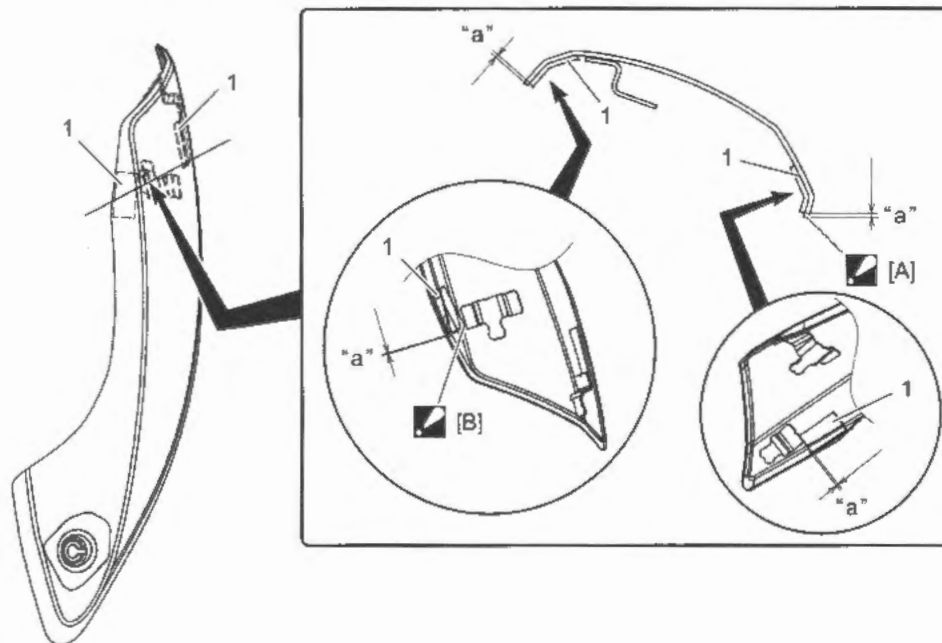


IJ31J1941003-01



1. Rear fender (front)	5. Rear frame cover	9. Rear fender mudguard
2. Rear fender (rear)	6. EVAP canister (If equipped)	10. Exhaust control valve actuator (EXCVA)
3. Seat rail	7. Canister holder (If equipped)	(a) : 6.5 N-m (0.65 kgf-m, 5.0 lbf-ft)
4. Battery holder	8. Tool holder	1322b : Apply thread lock to thread part.

Side Cover Cowling Molding Construction

BENJ31J39416004

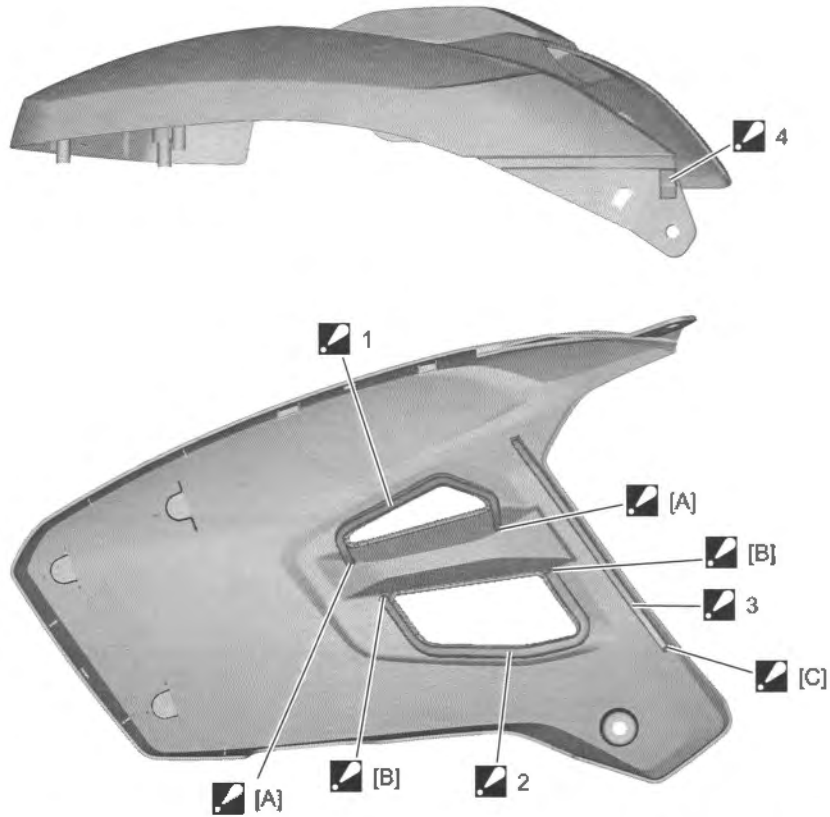


IE31J1940043-06

 [A]: Align the edge of cushion and cover.	1. Side cover cushion
 [B]: Align the edge of cushion and bracket.	"a": 0 - 1 mm (0 - 0.04 in)

Fuel Tank Side Cover Cushion Construction

BENJ31J39416005

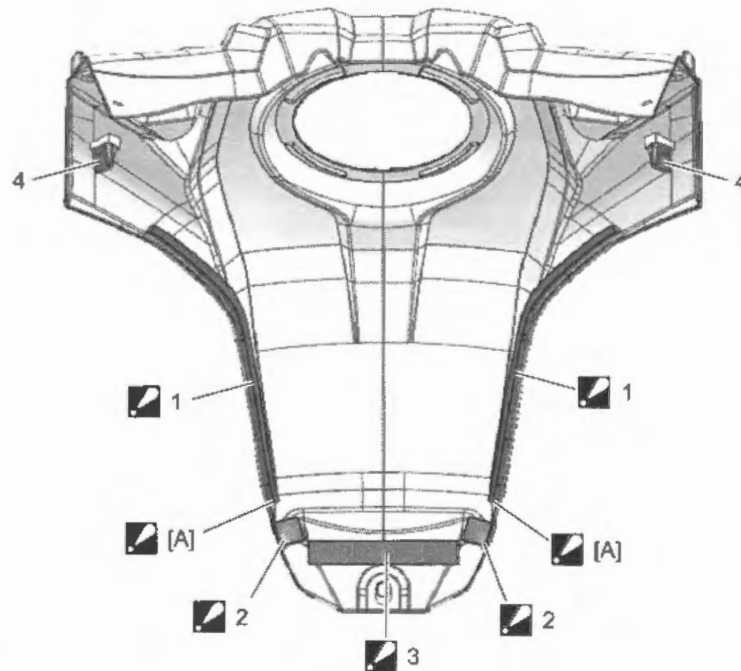


IE31J1940046-03

<p>☑ [A]: Stick the edge of cushion firmly.</p>	<p>☑ 1. Tank side cover cushion No. 1 : Stick the cushion aligning with the emboss line.</p>	<p>☑ 4. Tank side cover cushion No. 4 : Stick the cushion aligning with the emboss line.</p>
<p>☑ [B]: Stick the edge of cushion to the flat face of side cover.</p>	<p>☑ 2. Tank side cover cushion No. 2 : Stick the cushion aligning with the emboss line.</p>	
<p>☑ [C]: Stick the cushion from this point.</p>	<p>☑ 3. Tank side cover cushion No. 3 : Stick the cushion aligning with the emboss line.</p>	

Fuel Tank Center Cover Cushion Construction

BENJ31J39416006

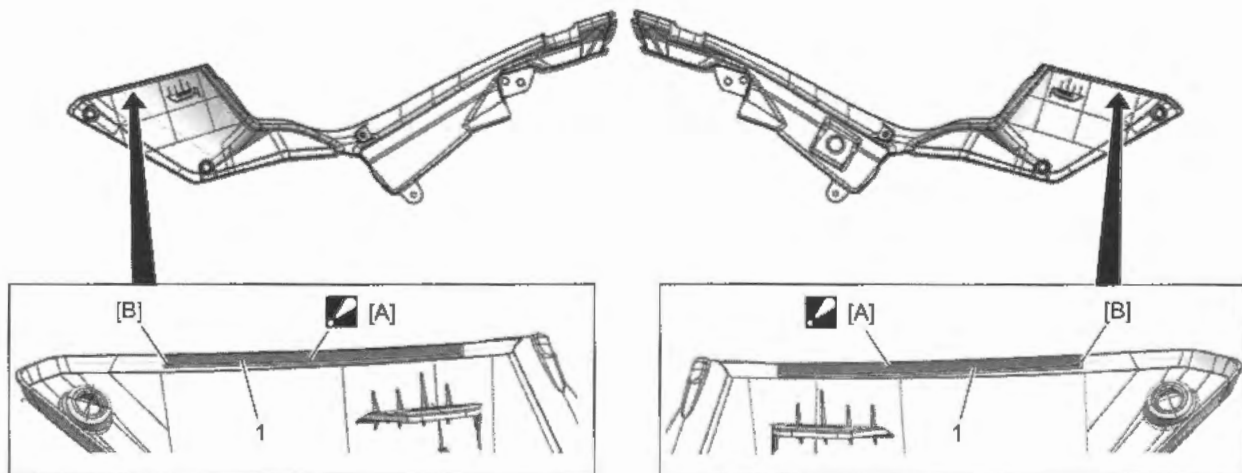


IF31J1940001-01

<p>☑ [A]: Stick the cushion from this point.</p>	<p>☑ 3. Fuel tank cover cushion No. 3 : Stick the cushion aligning with the edge of the fuel tank cover cushion No. 2.</p>
<p>☑ 1. Fuel tank cover cushion : Stick the cushion aligning with the emboss line.</p>	<p>4. Clip</p>
<p>☑ 2. Fuel tank cover cushion No. 2 : Stick the cushion aligning with the emboss line.</p>	

Frame Cover Cushion Construction

BENJ31J39416007

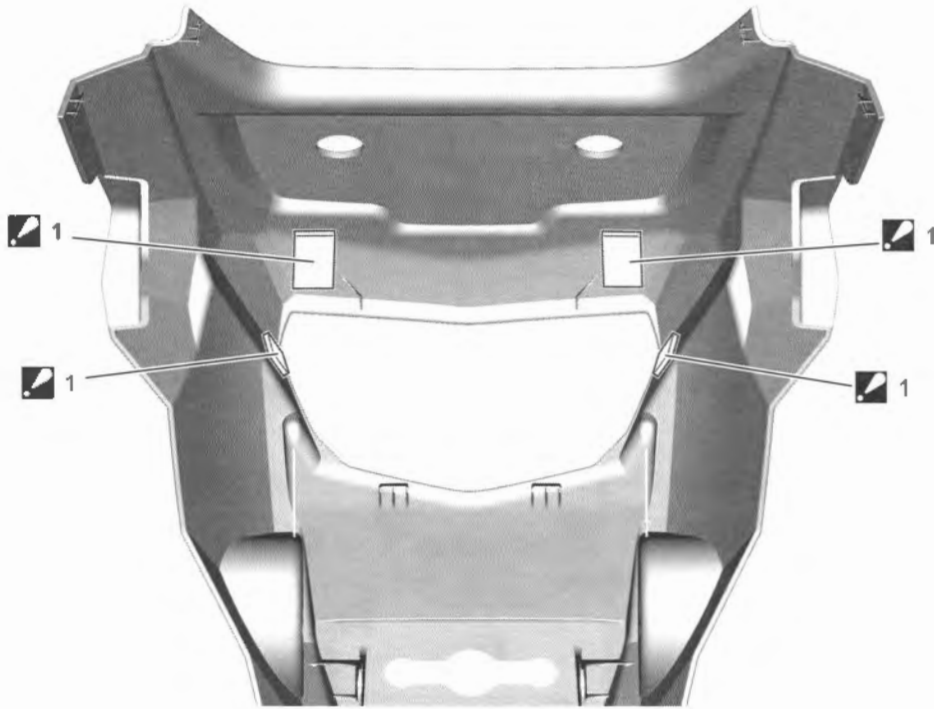


IE31J1940047-02

<p>☑ [A]: Stick the cushion aligning with the edge of frame cover.</p>	<p>1. Frame cover cushion</p>
<p>[B]: Emboss line</p>	

Rear Fender (Rear) Cushion Construction

BENJ31J39416008

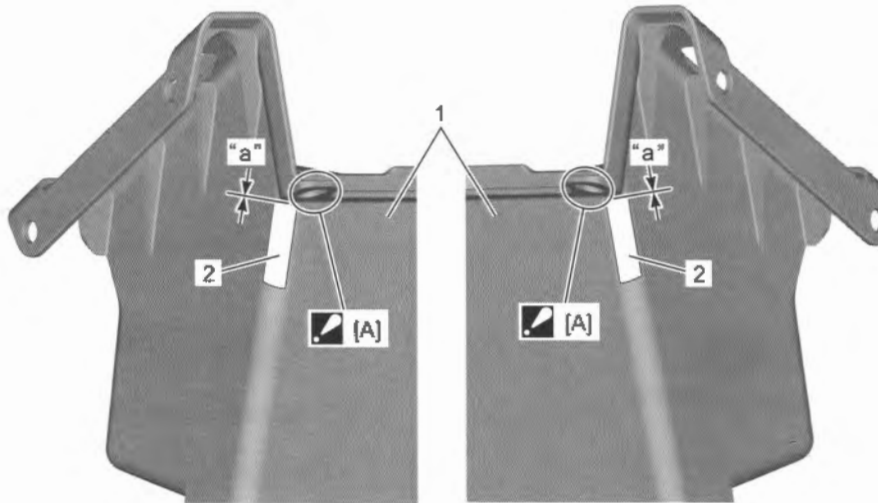


1. Rear combination light cushion
: Stick the cushion aligning with the emboss line.

IE31J1940048-03

Battery Box Cushion Construction

BENJ31J39416009

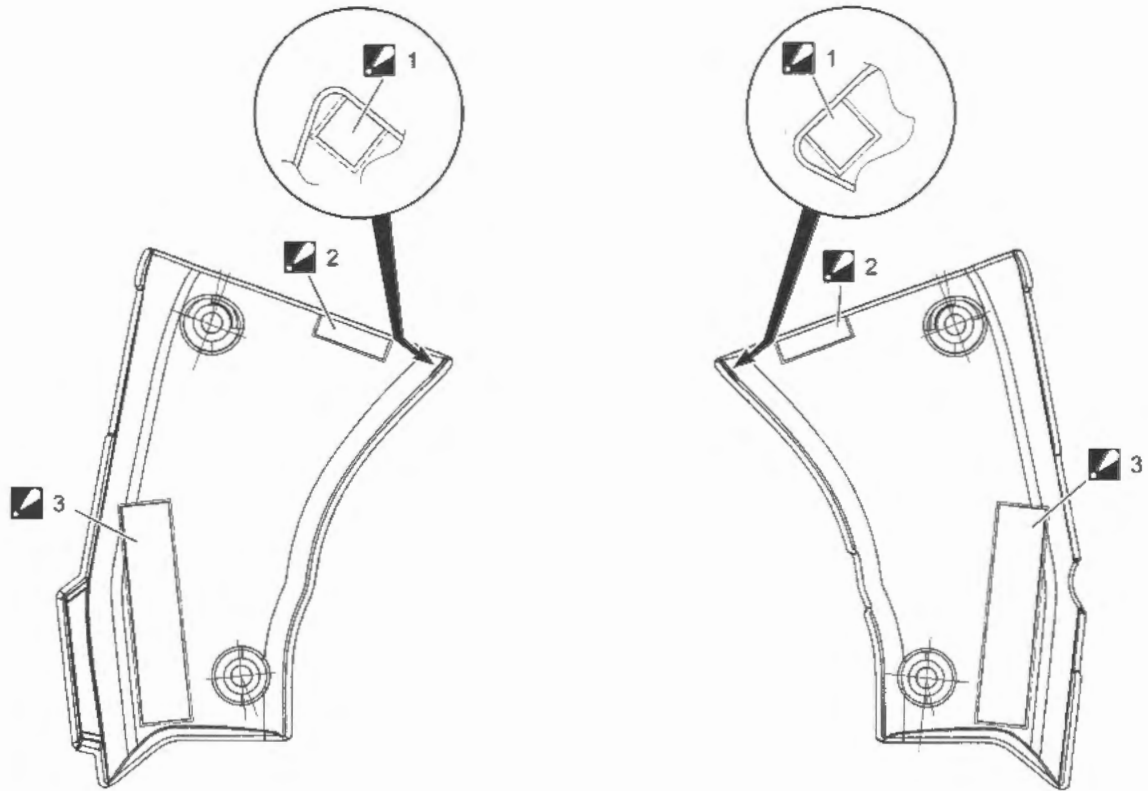


[A]: Align the edge of cushion at the center of hole.	2. Battery box cushion
1. Battery holder	"a": 0 mm (0 in)

IE31J1940049-02

Pivot Cover Cushion Construction

BENJ31J39416010



IE31J1940050-03

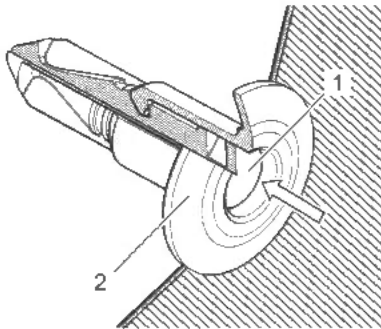
- | | | |
|--|--|--|
| <p>1. Pivot cover cushion No. 1
: Stick the cushion aligning with the end of curved surface and emboss line.</p> | <p>2. Pivot cover cushion No. 2
: Stick the cushion aligning with the end of curved surface and emboss line.</p> | <p>3. Pivot cover cushion No. 3
: Stick the cushion aligning with the emboss line.</p> |
|--|--|--|

Clip Removal and Installation

BENJ31J39416011

Type 1 Removal

- 1) Depress the head of clip center piece (1).
- 2) Pull out the clip (2).



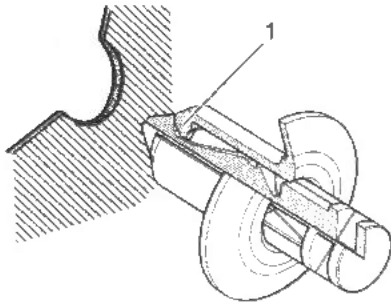
ID26J1940192-01

Installation

- 1) Let the center piece stick out toward the head so that the claws (1) closes.
- 2) Insert the clip into the installation hole.

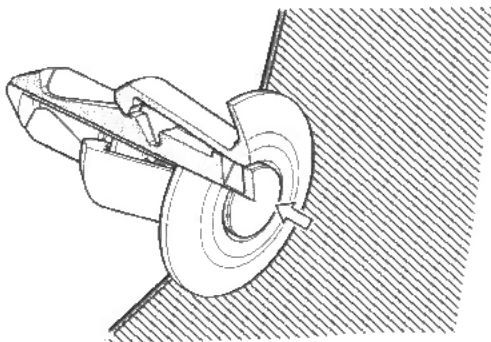
NOTE

To prevent the pawl (1) from damage, insert the clip all the way into the installation hole.



ID26J1940180-01

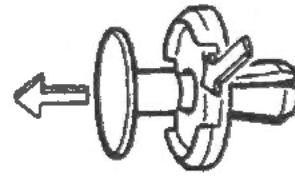
- 3) Push in the head of center piece until it becomes flush with the clip outside face.



I649G1940007-02

Type 2 Removal

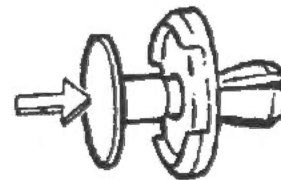
- 1) Pull up the center piece.
- 2) Remove the clip.



ID26J1940171-02

Installation

- 1) Keep the pin pulled out to close the claws.
- 2) Set the clip into the fitting hole.
- 3) Push in the center piece.



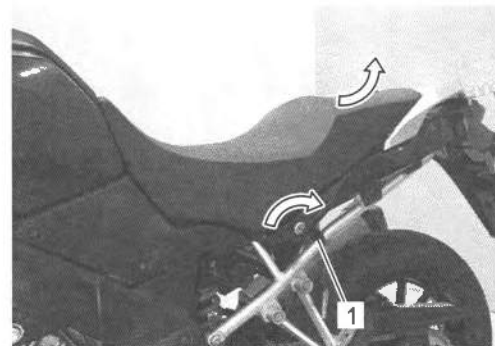
ID26J1940172-02

Seat Removal and Installation

BENJ31J39416012

Removal

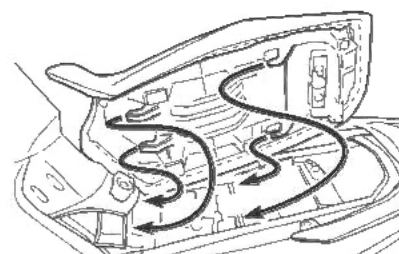
- 1) Unlock the seat with the ignition key (1).
- 2) Remove the seat.



IE31J1940001-01

Installation

Slide the seat hooks into the seat hook retainers and push down firmly until the seat snaps into the locked position.



IE31J1940051-01

Sport Carrier Removal and Installation

BENJ31J39416013

Removal

- 1) Remove the seat.
 - L4 – L6 model: ☞ (Page 9D-10)
 - L8 – model: ☞ (Page 9D-33)
- 2) Remove the sport carrier (1).



IE31J1940002-01

Installation

Install the sport carrier in the reverse order of removal. Pay attention to the following points:

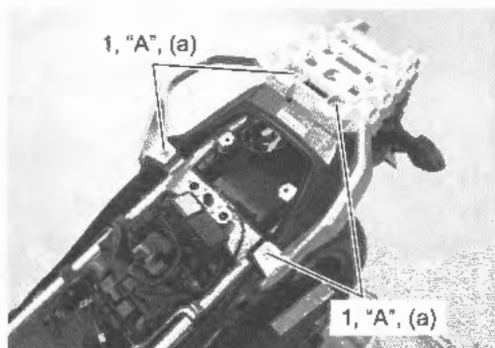
- Apply thread lock to the sport carrier bolts (1).

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

- Tighten the sport carrier bolts (1) to the specified torque.

Tightening torque

Sport carrier bolt (a): 27.5 N·m (2.75 kgf·m, 20.0 lbf·ft)



IE31J1940003-01

Rear Frame Cover / Frame Cover Removal and Installation

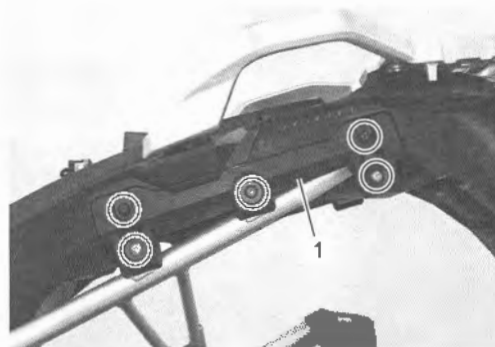
BENJ31J39416014

NOTE

To removal and installation the rear frame cover and frame cover, the same procedures is applicable to both the right and left parts.

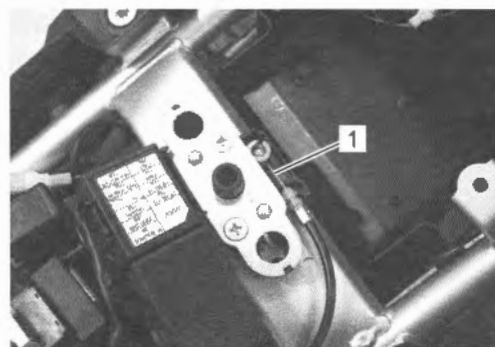
Removal

- 1) Remove the seat.
 - L4 – L6 model: ☞ (Page 9D-10)
 - L8 – model: ☞ (Page 9D-33)
- 2) Remove the rear frame cover (1).



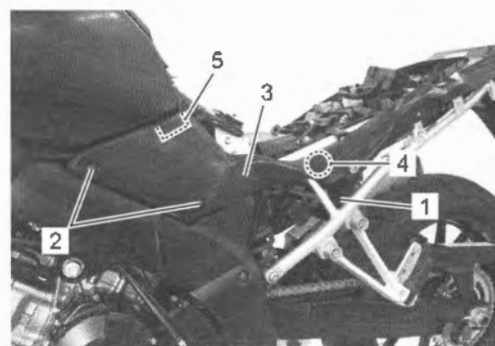
IE31J1940005-03

- 3) Remove the sport carrier.
 - L4 – L6 model: ☞ (Page 9D-11)
 - L8 – model: ☞ (Page 9D-33)
- 4) Disconnect the seat lock cable (1).



IE31J1940004-01

- 5) Remove the clip (1), screws (2) and frame cover (3).

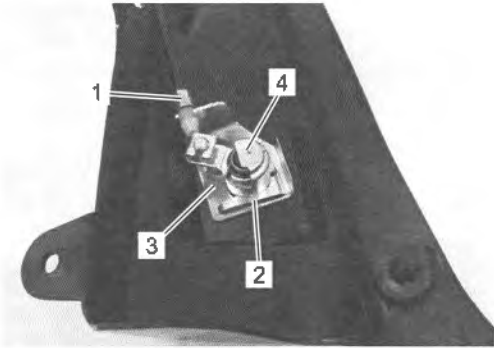


IE31J1940006-02

4. Bushing

5. Hooked point

- 6) Remove the seat lock cable (1), seat lock plate (2), guide (3) and seat lock (4).

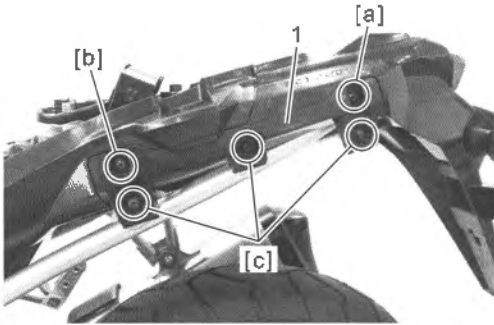


IE31J1940007-01

Installation

Install the frame cover and rear frame cover in the reverse order of removal. Pay attention following point:

- Install the rear frame cover (1) and tighten the screws in order of [a] → [b] → [c].



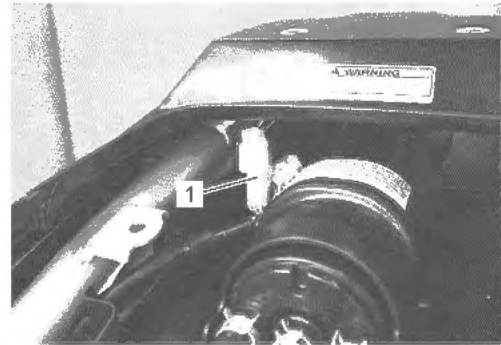
IE31J1940055-01

Rear Fender (Rear) Removal and Installation

BENJ31J39416015

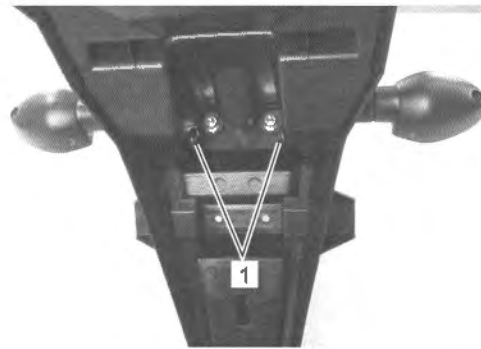
Removal

- 1) Remove the seat.
 - L4 – L6 model: ☞ (Page 9D-10)
 - L8 – model: ☞ (Page 9D-33)
- 2) Remove the sport carrier.
 - L4 – L6 model: ☞ (Page 9D-11)
 - L8 – model: ☞ (Page 9D-33)
- 3) Remove the rear frame cover.
 - L4 – L6 model: ☞ (Page 9D-11)
 - L8 – model: ☞ (Page 9D-33)
- 4) Disconnect the turn signal/license plate light lead wire coupler (1).



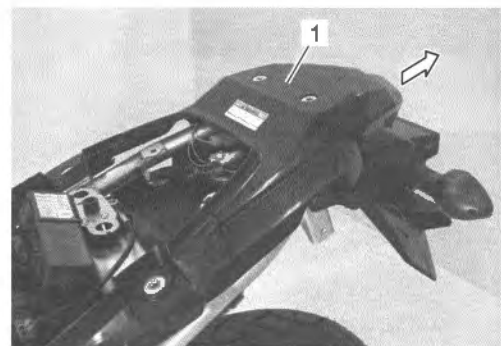
IE31J1940008-02

- 5) Remove the clips (1).



IE31J1940009-01

- 6) Remove the rear fender (rear) (1).



IE31J1940010-02

Installation

Install the rear fender (rear) in the reverse order of removal.

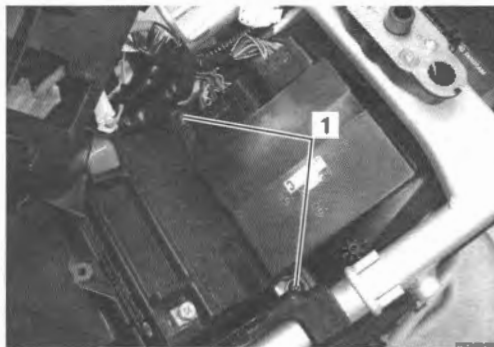
Rear Fender (Front) Removal and Installation

BENJ31J39416016

Refer to "Rear Fender Construction": L4 - L6 (Page 9D-4).

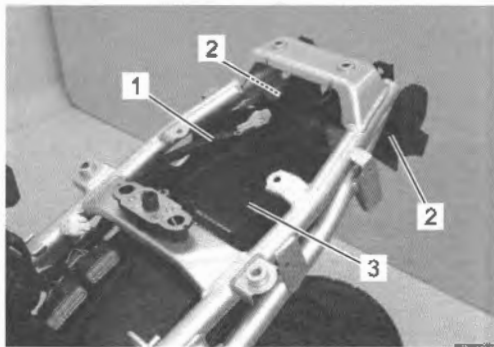
Removal

- 1) Remove the seat. (Page 9D-10)
- 2) Remove the sport carrier. (Page 9D-11)
- 3) Remove the frame covers. (Page 9D-11)
- 4) Remove the rear fender (rear). (Page 9D-12)
- 5) Remove the EVAP canister (If equipped). (Page 1B-13)
- 6) Remove the rear combination light. (Page 9B-9)
- 7) Remove the tool holder. Refer to "Battery Removal and Installation" in Section 1J (Page 1J-12).
- 8) Remove the screws (1).



IE31J1940011-02

- 9) Remove the wiring harness (1) and bolts (2).
- 10) Remove the rear fender (front) (3).



IE31J1940012-02

Installation

Install the rear fender (front) in the reverse order of removal. Pay attention to the following point:

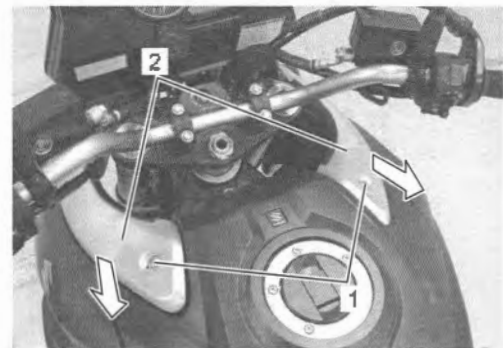
- Route the wiring harness. Refer to "Wiring Harness Routing Diagram": L4 - L6 in Section 9A (Page 9A-6).

Side Cowling Cover / Fuel Tank Center Cover Removal and Installation

BENJ31J39416017

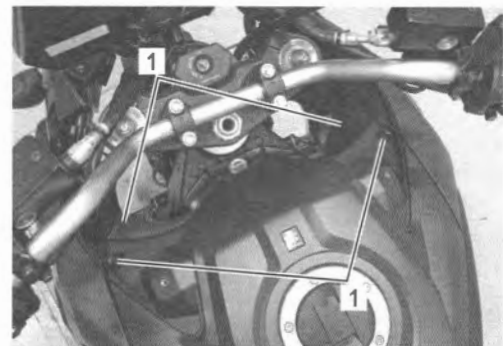
Removal

- 1) Remove the seat. (Page 9D-10)
- 2) Remove the screws (1) and side cowling covers (2).



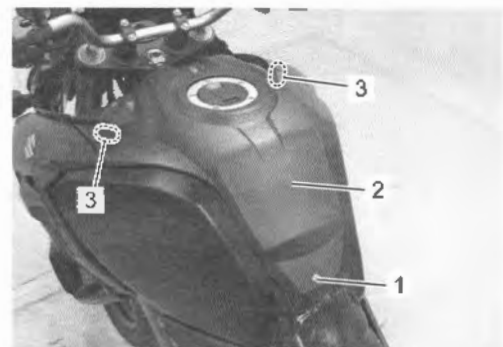
IE31J1940013-01

- 3) Remove the clips (1).



IE31J1940014-01

- 4) Remove the screw (1) and fuel tank center cover (2).



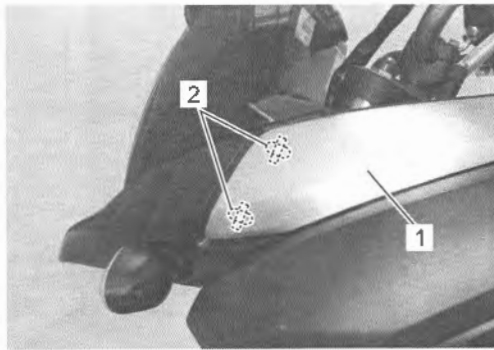
IE31J1940015-01

3. Clip position

Installation

Install the fuel tank center cover and side cowling cover in the reverse order of removal. Pay attention to the following points:

- Install the side cowling cover (1).



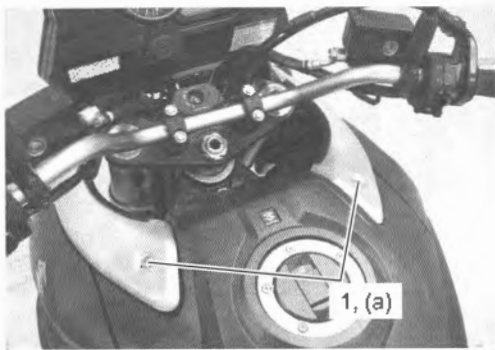
IE31J1940016-03

2. Hooked point

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

Tightening torque

Rear cowling screw (a): 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)



IE31J1940057-01

Fuel Tank Side Cover / Fuel Tank Front Cover Removal and Installation

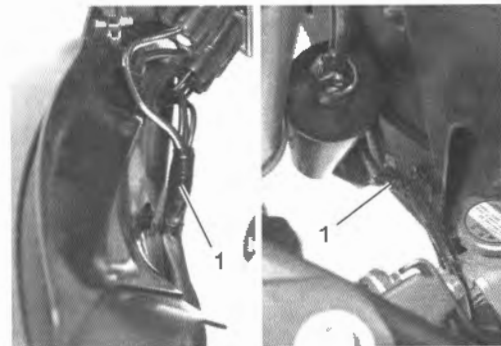
BENJ31J39416018

NOTE

To removal and installation the fuel tank side cover and fuel tank side inner cover, the same procedures is applicable to both the right and left parts.

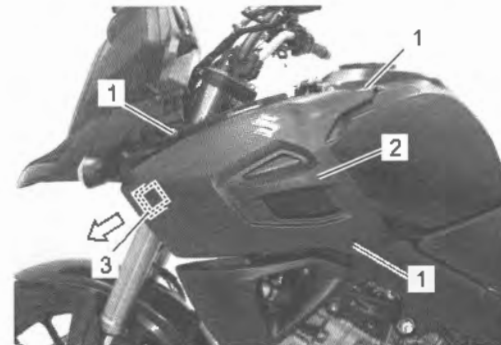
Removal

- 1) Remove the fuel tank center cover.
 - L4 – L6 model: (Page 9D-13)
 - L8 – model: (Page 9D-34)
- 2) Remove the wiring harness (1).



IE31J1940017-01

- 3) Remove the screws (1) and fuel tank side cover (2).



IE31J1940018-01

3. Hooked point

- 4) Remove the fuel tank front cover (1).



IJ31J1941001-01

2. Hooked point

Installation

Install the fuel tank front cover and fuel tank side cover in reverse order of removal.

Side Lower Cowling / Side Cowling Inner Cover Removal and Installation

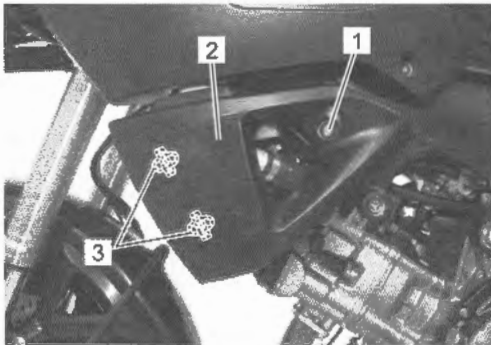
BENJ31J39416019

NOTE

To removal and installation the side lower cowling and side cowling inner cover, the same procedures is applicable to both the right and left parts.

Removal

- 1) Remove the screw (1) and side lower cowling (2).



IE31J1940020-01

3. Hooked point

- 2) Remove the side cowling inner cover (1).



IJ31J1941002-01

2. Hooked point

Installation

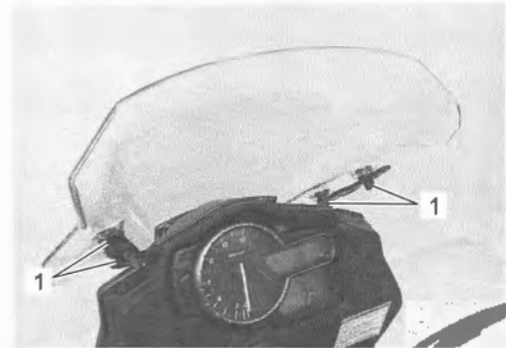
Install the side cowling inner cover and side lower cowling in reverse order of removal.

Windscreen Removal and Installation

BENJ31J39416020

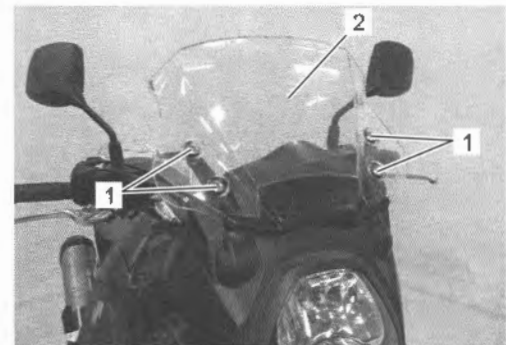
Removal

- 1) Remove the caps (1).



IE31J1940052-01

- 2) Remove the bolts (1) and windscreen (2).



IE31J1940022-01

Installation

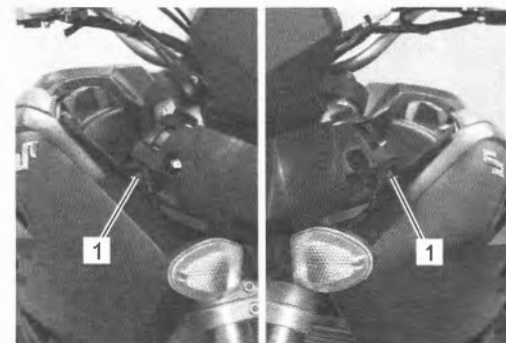
Install the windscreen in the reverse order of removal.

Body Cowling Assembly Removal and Installation

BENJ31J39416021

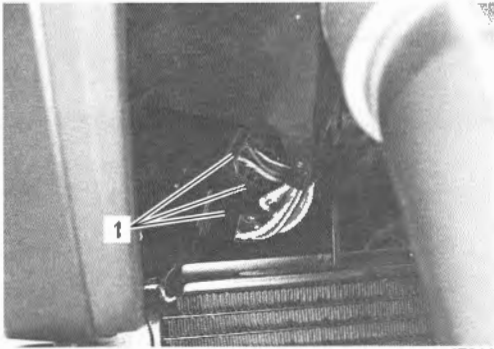
Removal

- 1) Remove the seat. (Page 9D-10)
- 2) Remove the side cowling cover. (Page 9D-13)
- 3) Remove the screws (1).



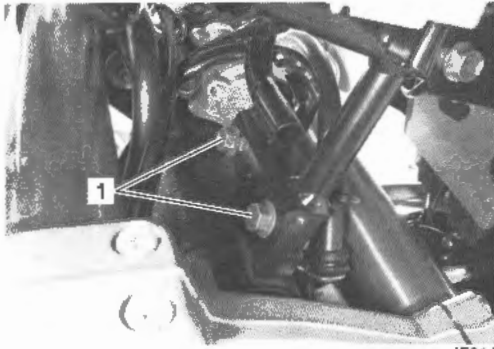
IE31J1940023-01

4) Disconnect the lead wire couplers (1).



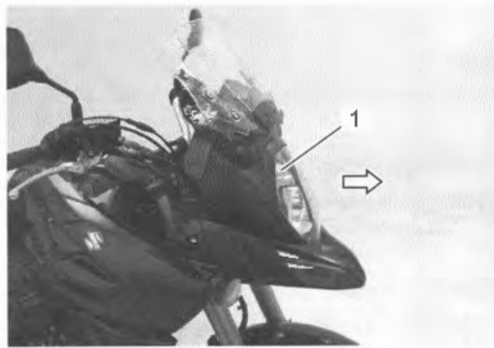
IE31J1940053-01

5) Remove the bolts (1).



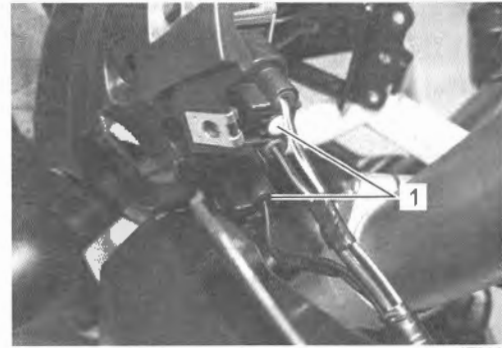
IE31J1940025-01

6) Remove the body cowling assembly (1).



IE31J1940026-01

7) Hold the body cowling assembly and disconnect the regulator/rectifier couplers (1).



IE31J1940027-01

Installation

Install the body cowling assembly in the reverse order of removal. Pay attention to the following point:

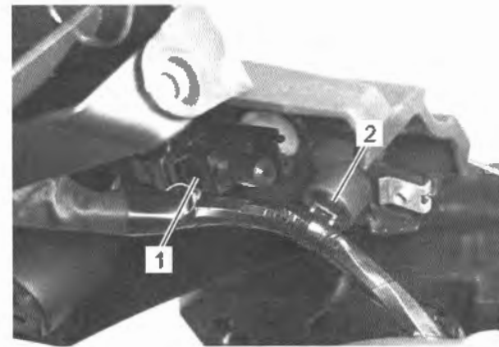
- After installation of the body cowling assembly, check the headlight aiming. ☞ (Page 9B-6)

Body Cowling Disassembly and Reassembly

BENJ31J39416022

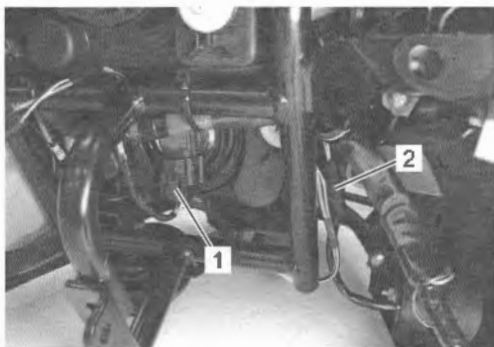
Disassembly

- 1) Remove the body cowling assembly. ☞ (Page 9D-15)
- 2) Remove the windscreen. ☞ (Page 9D-15)
- 3) Remove the combination meter. ☞ (Page 9C-6)
- 4) Remove the ambient air temperature sensor (1) and clamp (2).



IE31J1940028-01

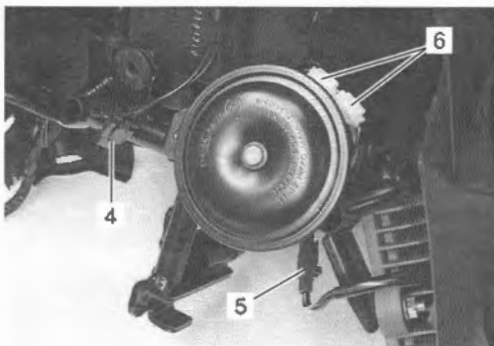
5) Disconnect the lead wire couplers.



IE31J1940029-01



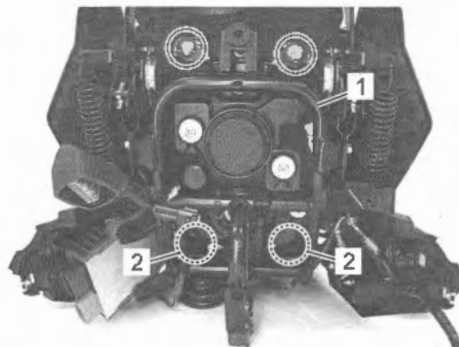
IE31J1940030-01



IE31J1940031-02

1. Low beam headlight coupler	4. Position light coupler
2. Right turn signal light coupler	5. Left turn signal light coupler
3. High beam headlight coupler	6. Horn coupler

6) Remove the cowling brace (1).



IE31J1940032-02

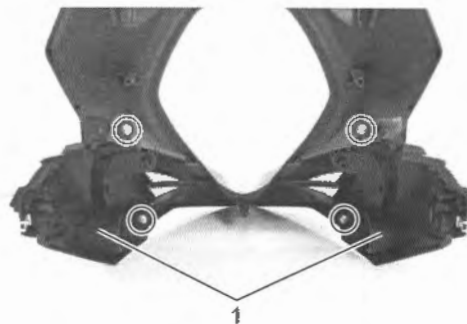
2. Hooked point

7) Remove the wiring harness from cowling brace.
 ☞(Page 9A-6)

8) Remove the headlight. ☞(Page 9B-4)

9) Remove the front turn signal lights. ☞(Page 9B-11)

10) Remove the front side covers (1).



IE31J1940033-01

11) Remove the lower body cowling (1).

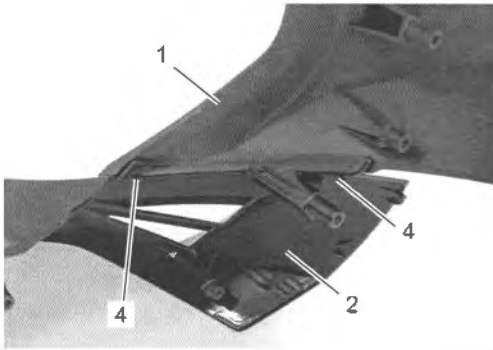


IE31J1940034-01

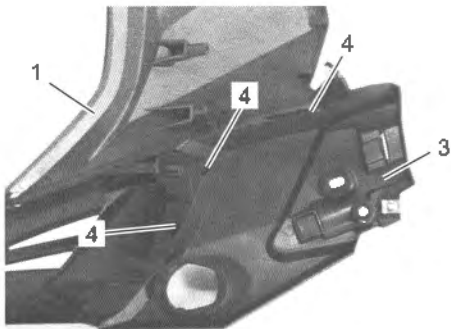
Reassembly

Assemble the body cowling in the reverse order of disassembly. Pay attention to the following points:

- Assemble the body cowling (1), lower cowling (2) and front side covers (3).



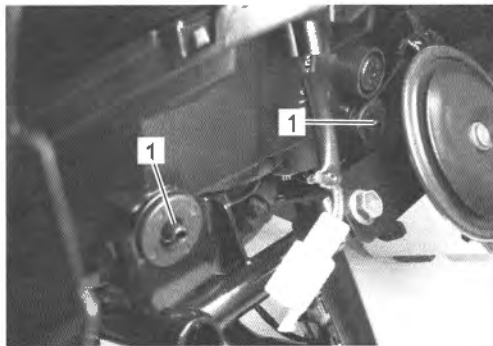
IE31J1940035-01



IE31J1940036-01

4. Hooked point

- Assemble the cowling brace and body cowling.



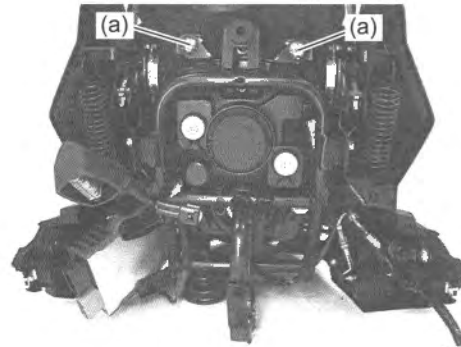
IE31J1940037-01

1. Bushing

- Tighten the screws to the specified torque.

Tightening torque

Body cowling screw (a): 5.5 N·m (0.55 kgf·m, 4.0 lbf·ft)



IE31J1940056-01

- After installation of the body cowling assembly, check the headlight aiming. ☞ (Page 9B-6)

Windscreen Brace Removal and Installation

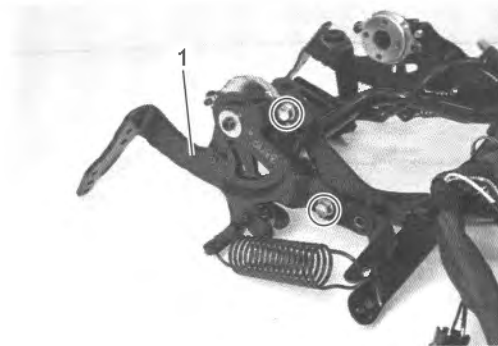
BENJ31J39416023

NOTE

To removal and installation the cowling brace, the same procedures is applicable to both the right and left brace.

Removal

- 1) Remove the body cowling assembly from the cowling brace.
 - L4 – L6 model: ☞ (Page 9D-15)
 - L8 – model: ☞ (Page 9D-35)
- 2) Remove the windscreen brace (1).



IE31J1940038-02

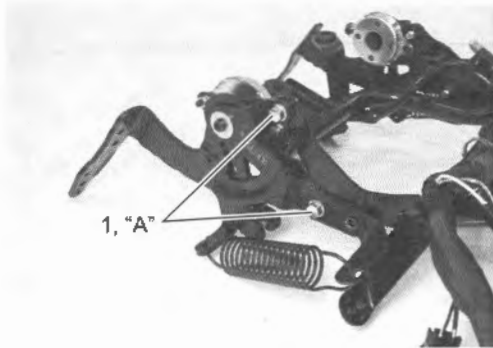
Installation

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

- For L4 – L6 model, apply thread lock to the bolts (1) and tighten them.

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

- For L8 – model, install the new bolts (1) and tighten them.



IE31J1940058-01

Pivot Cover Removal and Installation

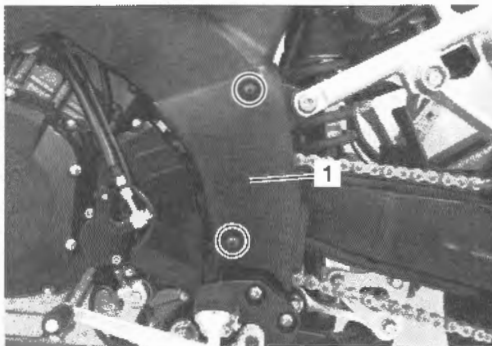
BENJ31J39416024

NOTE

To removal and installation the pivot cover, the same procedures is applicable to both the right and left covers.

Removal

- 1) Remove the pivot cover (1).



IE31J1940039-01

Installation

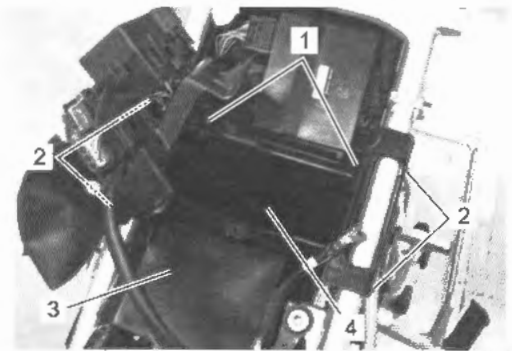
Install the pivot cover in the reverse order of removal.

Battery Holder Removal and Installation

BENJ31J39416025

Removal

- 1) Remove the frame covers. (Page 9D-11)
- 2) Remove the battery. (Page 1J-12)
- 3) Remove the screws (1), bolts (2) and seat heat shield (3).
- 4) Remove the battery holder (4).



IE31J11A0025-01

Installation

Install the battery holder in order of removal.

Specifications

Tightening Torque Specifications

BENJ31J39417001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Sport carrier bolt	27.5	2.75	20.0	☞(Page 9D-11)
Rear cowling screw	5.5	0.55	4.0	☞(Page 9D-14)
Body cowling screw	5.5	0.55	4.0	☞(Page 9D-18)

Reference:

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

"Seat Lock Cable Routing Diagram": L4 - L6 (Page 9D-1)

"Body Cowling Construction": L4 - L6 (Page 9D-2)

"Rear Fender Construction": L4 - L6 (Page 9D-4)

"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ31J39418001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞(Page 9D-11) / ☞(Page 9D-19)

NOTE

Required service material(s) is also described in:

"Rear Fender Construction": L4 - L6 (Page 9D-4)

L8 -

Schematic and Routing Diagram

Seat Lock Cable Routing Diagram

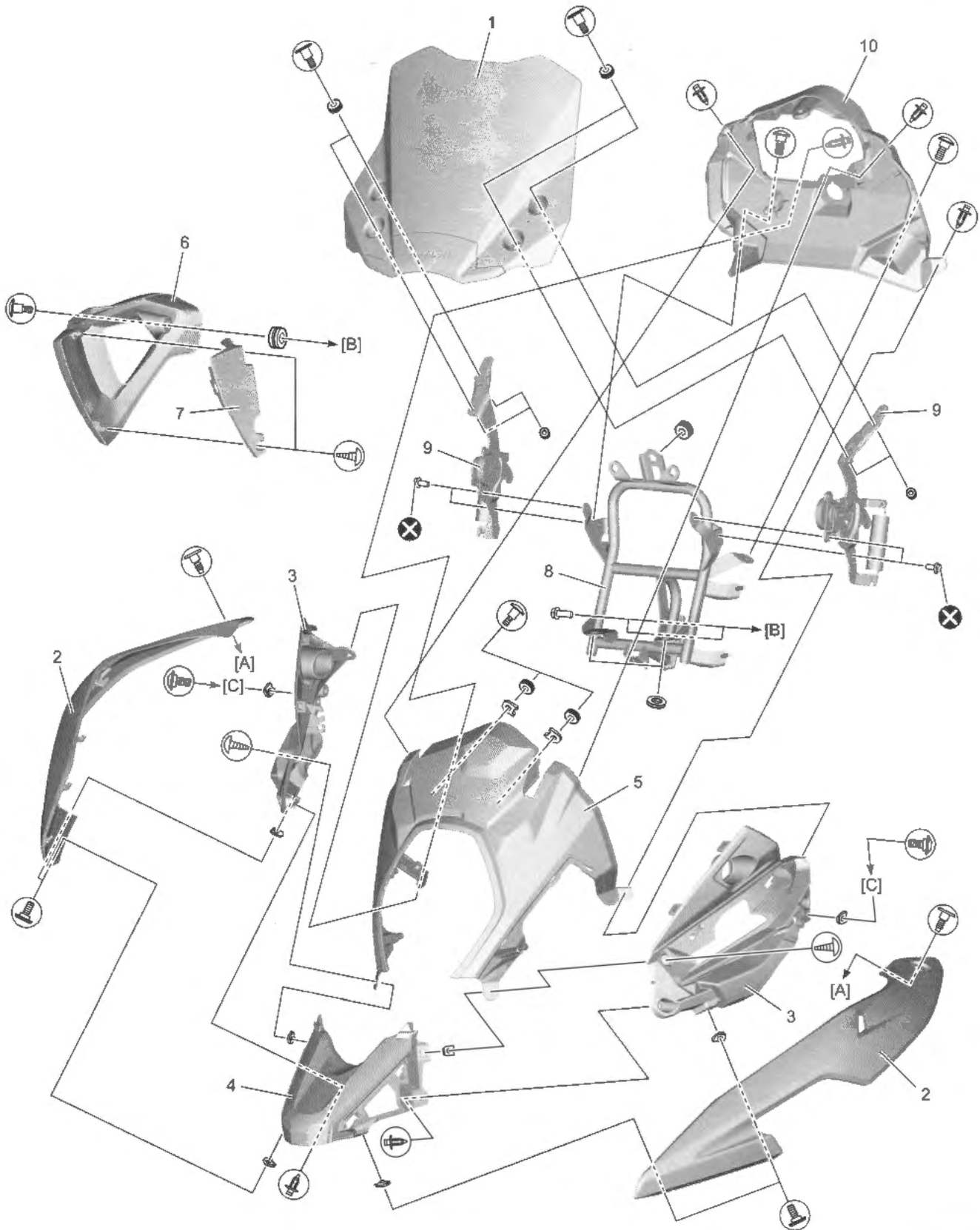
Refer to "Seat Lock Cable Routing Diagram": L4 - L6 (Page 9D-1).

BENJ31J39422001

Repair Instructions

Body Cowling Construction

BENJ31J39426001



[A]: To fuel tank	3. Front side cover	8. Cowling brace
[B]: To frame	4. Lower body cowling	9. Windscreen brace
[C]: To fuel tank front cover	5. Body cowling	10. Meter panel
1. Windscreen	6. Side lower cowling	⊗ : Do not reuse.
2. Side cowling cover	7. Side cowling inner cover	

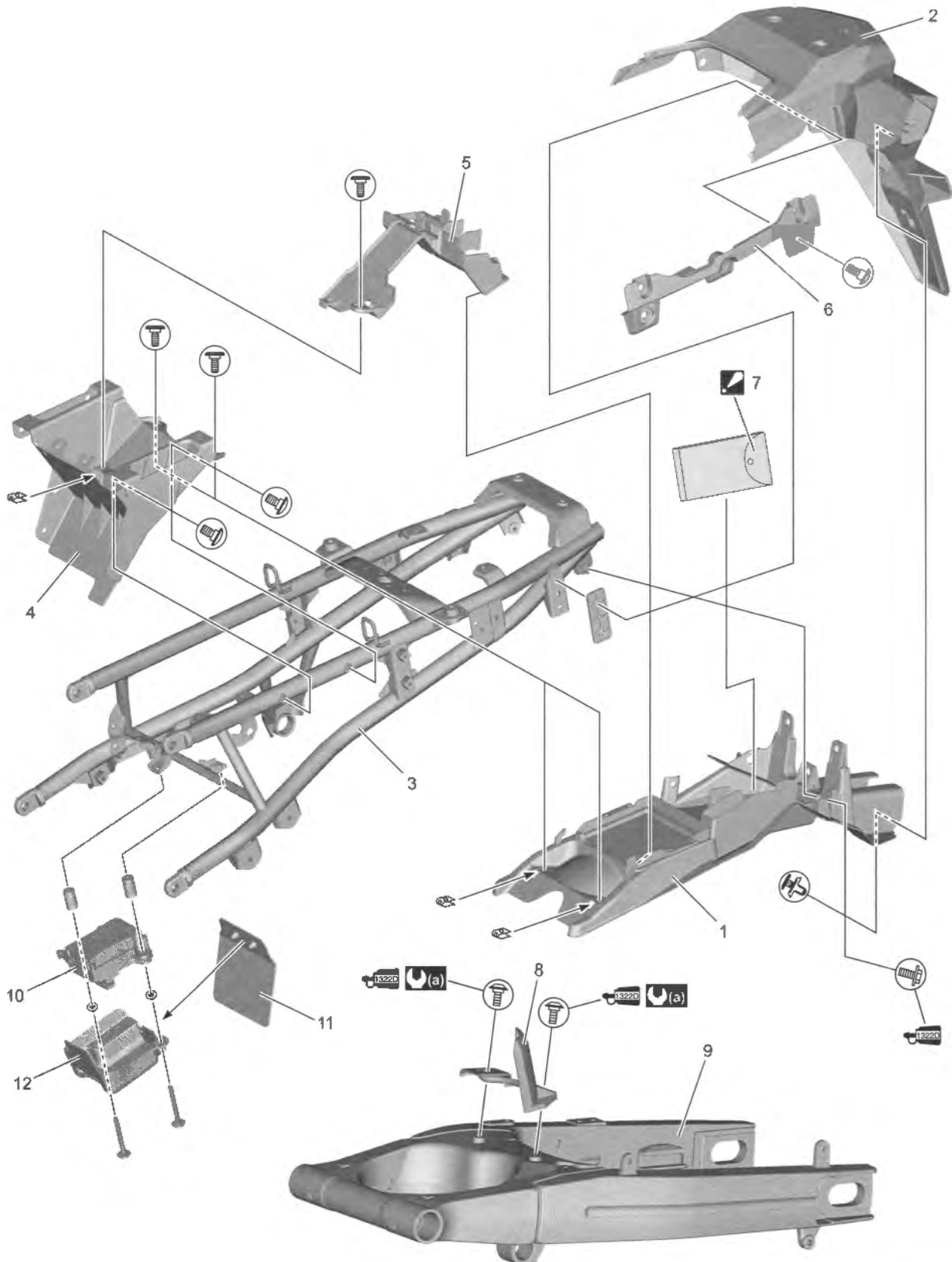
Frame Cover Construction



Refer to "Frame Cover Construction": L4 - L6 (Page 9D-3).

BENJ31J39426002

Rear Fender Construction

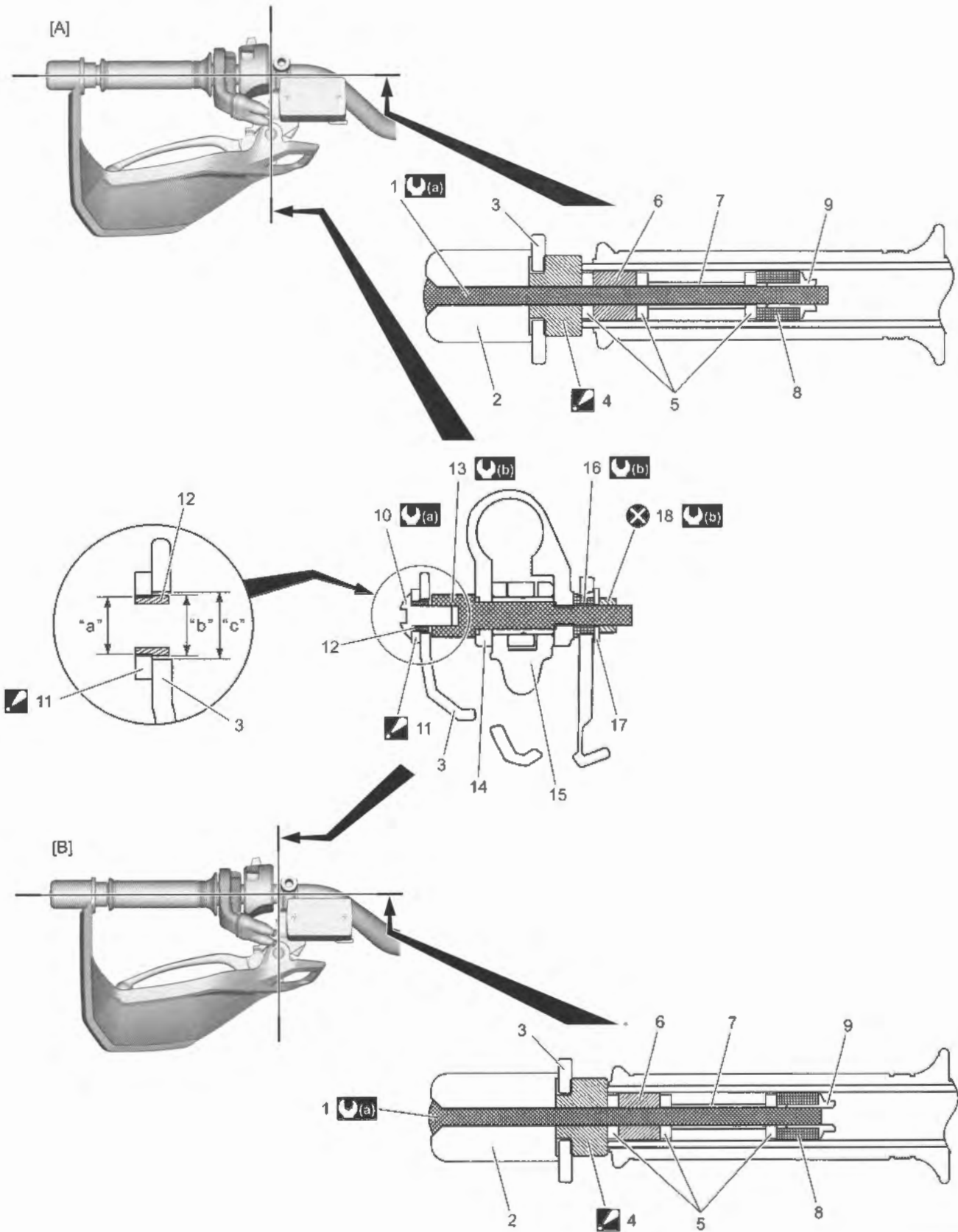
BENJ31J39426003






1. Rear fender (front)	6. Rear frame cover	11. Actuator cover mudguard
2. Rear fender (rear)	7. Tool kit : Set the tool kit by facing the opening of the tool bag backward.	12. Actuator cover
3. Seat rail	8. Rear fender mudguard	 (a) : 8.5 N·m (0.65 kgf-m, 5.0 lbf-ft)
4. Battery holder	9. Swingarm	 : Apply thread lock to thread part.
5. Battery holder lid	10. EXCV actuator	

Knuckle Cover Construction

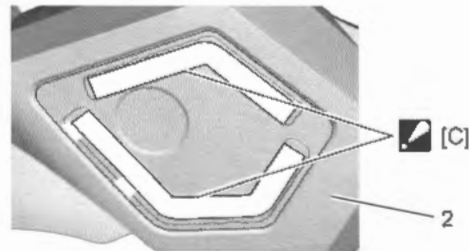
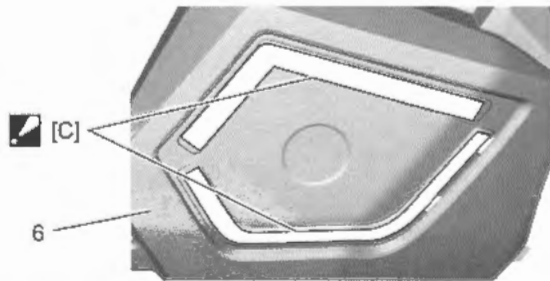
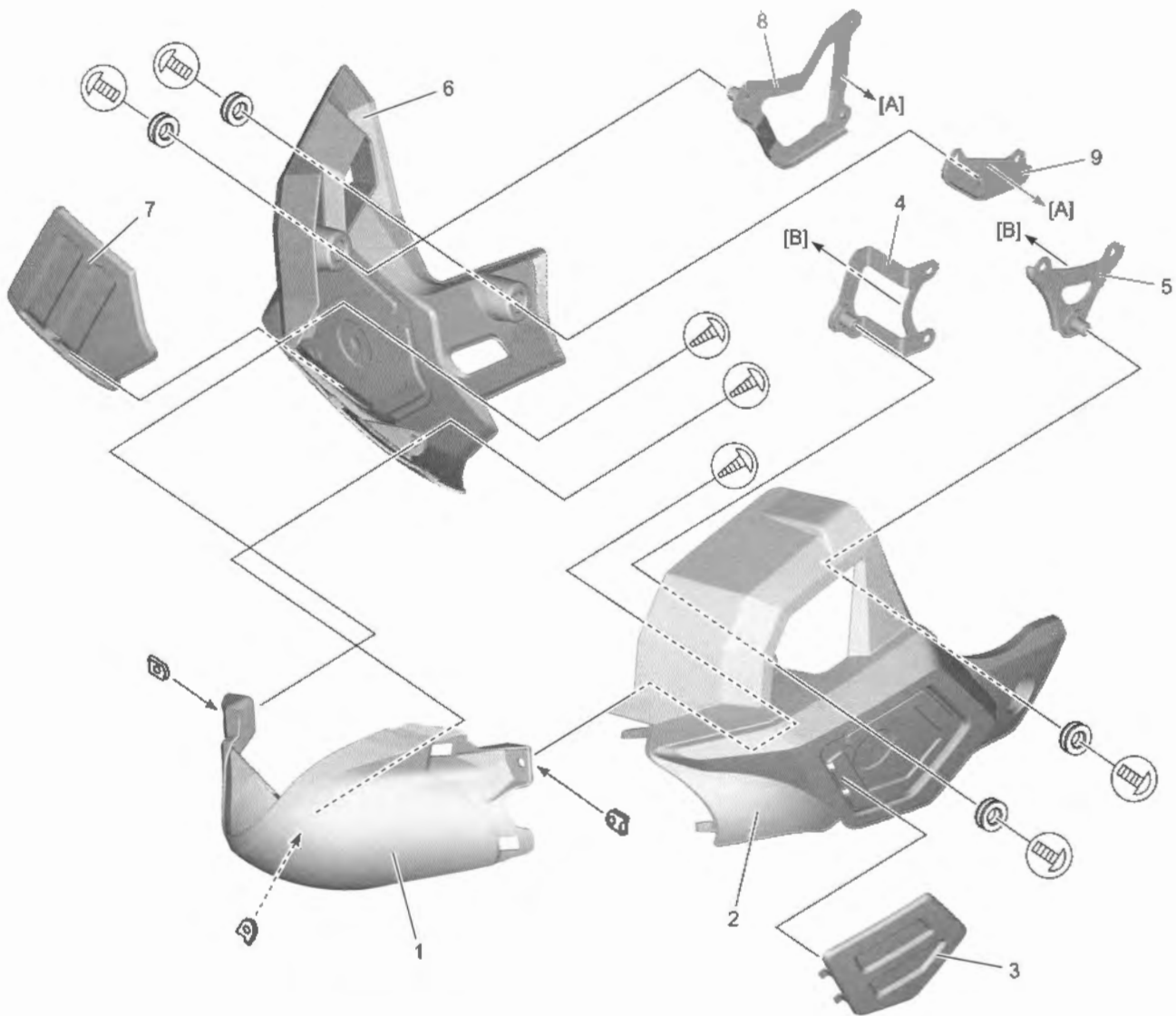
BENJ31J39426004




[A]: DL1000A	12. Knuckle cover spacer
[B]: DL1000XA	13. Brake lever pivot bolt or clutch lever pivot bolt
1. Handlebar balancer screw	14. Brake master cylinder or clutch master cylinder
2. Handlebar balancer	15. Brake lever or clutch lever
3. Knuckle cover	16. Brake lever pivot bolt lock-nut or clutch lever pivot bolt lock-nut
<input checked="" type="checkbox"/> 4. Balancer spacer : After the balancer spacer has contacted the handlebar, tighten the handlebar balancer screw to the specified torque.	17. Knuckle cover lower washer
5. Expander washer	18. Knuckle cover lower nut
6. Handlebar balancer expander	"a": 8.5 – 8.7 mm (0.33 – 0.34 in)
7. Expander spacer	"b": 8.9 – 9.0 mm (0.350 – 0.354 in)
8. Handlebar balancer expander	"c": 10.0 – 10.5 mm (0.394 – 0.413 in)
9. Handlebar balancer nut	 (a) : 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)
10. Knuckle cover upper screw	 (b) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
<input checked="" type="checkbox"/> 11. Knuckle cover upper washer : Adhere the knuckle cover upper washer to the knuckle cover.	 : Do not reuse.

Under Cowling Construction

BENJ31J39426005

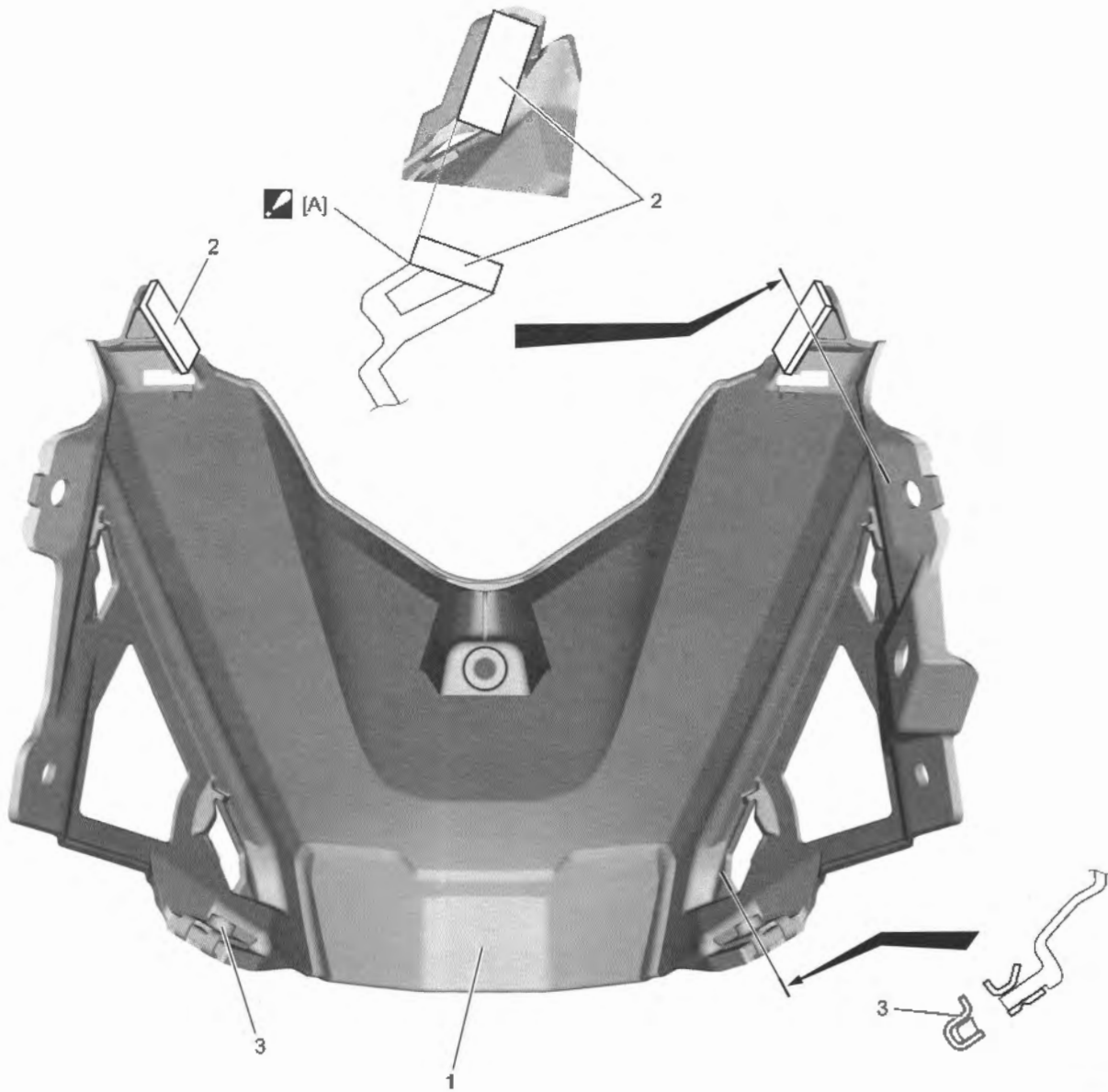


IJ31J1942036-02


[A]: To clutch cover	2. Left under cowling	6. Right under cowling
[B]: To generator cover	3. Left under cowling cover	7. Right under cowling cover
 [C]: Clean the adhesive surface before sticking the cushion. Stick the cushion aligning with the end of curved surface.	4. Left under cowling front bracket	8. Right under cowling front bracket
1. Center under cowling	5. Left under cowling rear bracket	9. Right under cowling rear bracket

Lower Body Cowling Cushion Construction

BENJ31J39426006



IJ31J1942001-01

<p> [A]: Stick the cushion aligning with the end of curved surface.</p>	<p>2. Cushion</p>
<p>1. Lower body cowling</p>	<p>3. Nut</p>

Fuel Tank Side Cover Cushion Construction

BENJ31J39426007

Refer to "Fuel Tank Side Cover Cushion Construction": L4 - L6 (Page 9D-6).

Fuel Tank Center Cover Cushion Construction

BENJ31J39426008

Refer to "Fuel Tank Center Cover Cushion Construction": L4 - L6 (Page 9D-7).

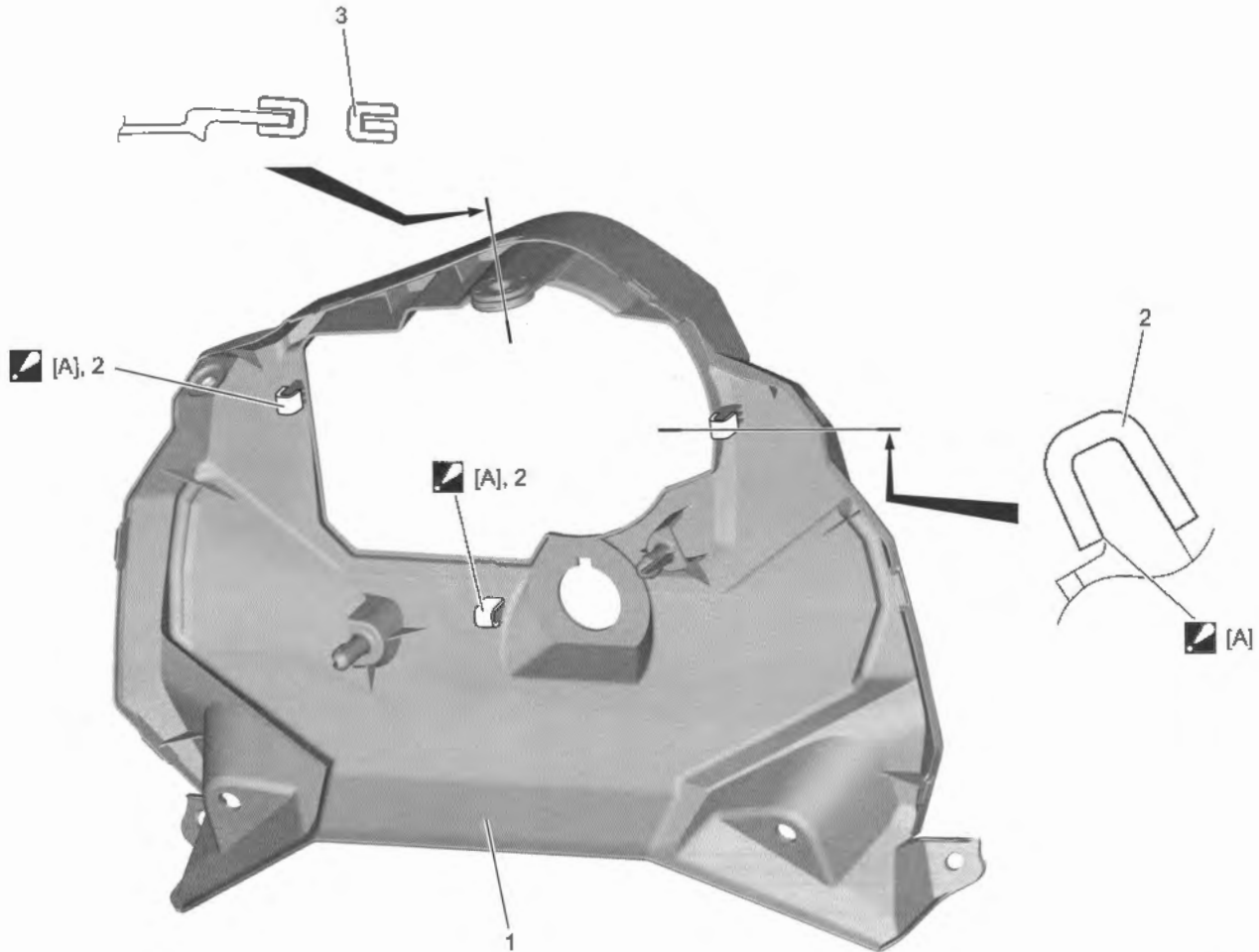
Frame Cover Cushion Construction

BENJ31J39426009

Refer to "Frame Cover Cushion Construction": L4 - L6 (Page 9D-7).

Meter Panel Cushion Construction

BENJ31J39426010



IJ31J1942002-01

<p>■ [A]: Stick the No.2 cushion aligning with the end of curved surface.</p>	<p>2. No. 2 cushion</p>
<p>1. Meter panel</p>	<p>3. Cushion</p>

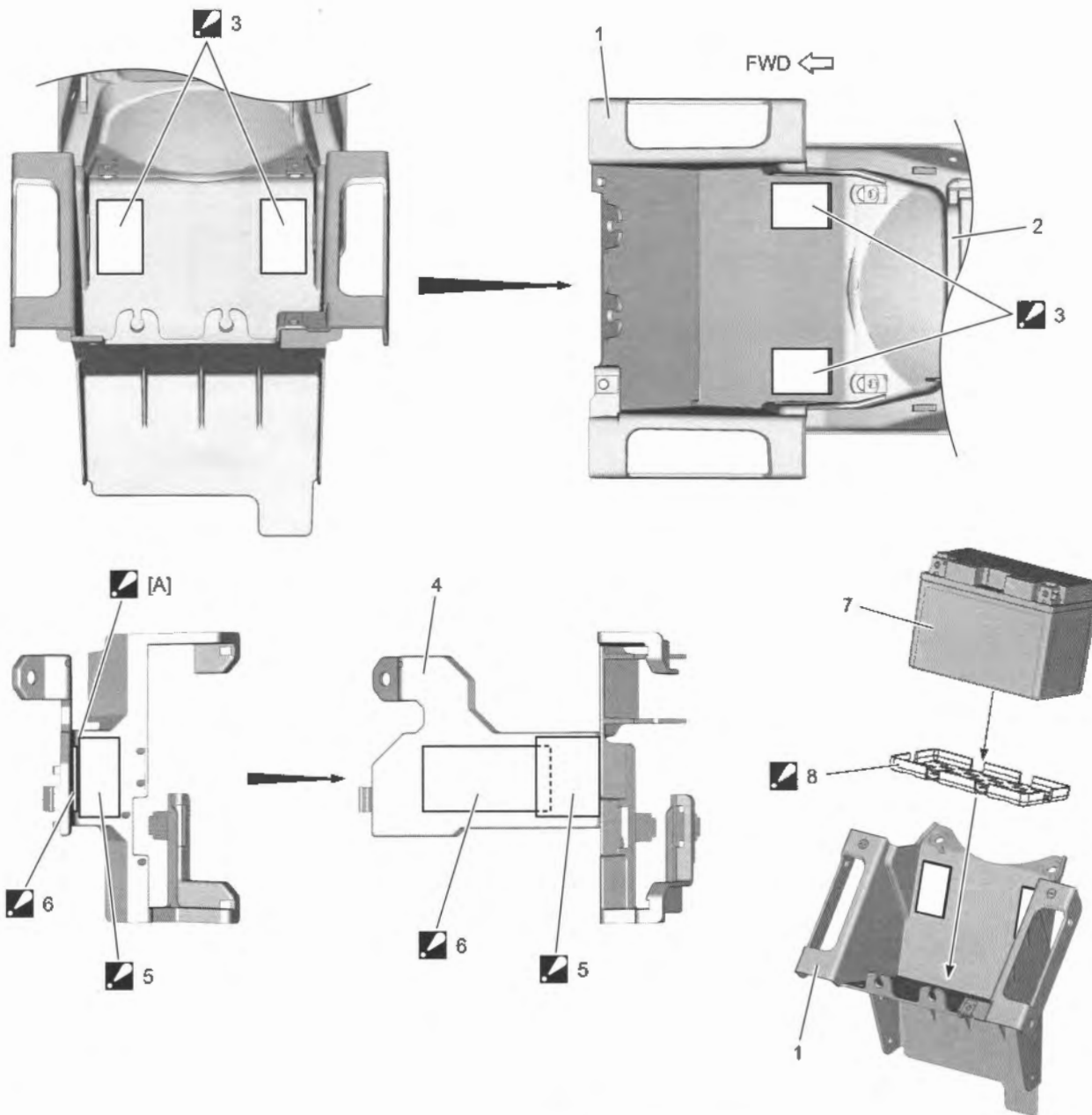
Rear Fender (Rear) Cushion Construction

BENJ31J39426011

Refer to "Rear Fender (Rear) Cushion Construction": L4 - L6 (Page 9D-8).

Battery Protector Construction

BENJ31J39426012



IJ31J1942040-02

<p>☑ [A]: Match the edge of battery protector with the curved surface end of battery holder lid.</p>	<p>☑ 5. Battery protector : Clean the adhesive surface before sticking the battery protector. Sticking the battery protector aligning with the emboss line.</p>
<p>1. Battery holder</p>	<p>☑ 6. Battery protector : Clean the adhesive surface before sticking the battery protector. Sticking the battery protector aligning with the emboss line.</p>
<p>2. Rear fender (front)</p>	<p>7. Battery</p>
<p>☑ 3. Battery protector : Clean the adhesive surface before sticking the battery protector. Sticking the battery protector aligning with the emboss line.</p>	<p>☑ 8. Battery protector : Set the battery protector to the battery and then put them on the battery holder.</p>
<p>4. Battery holder lid</p>	

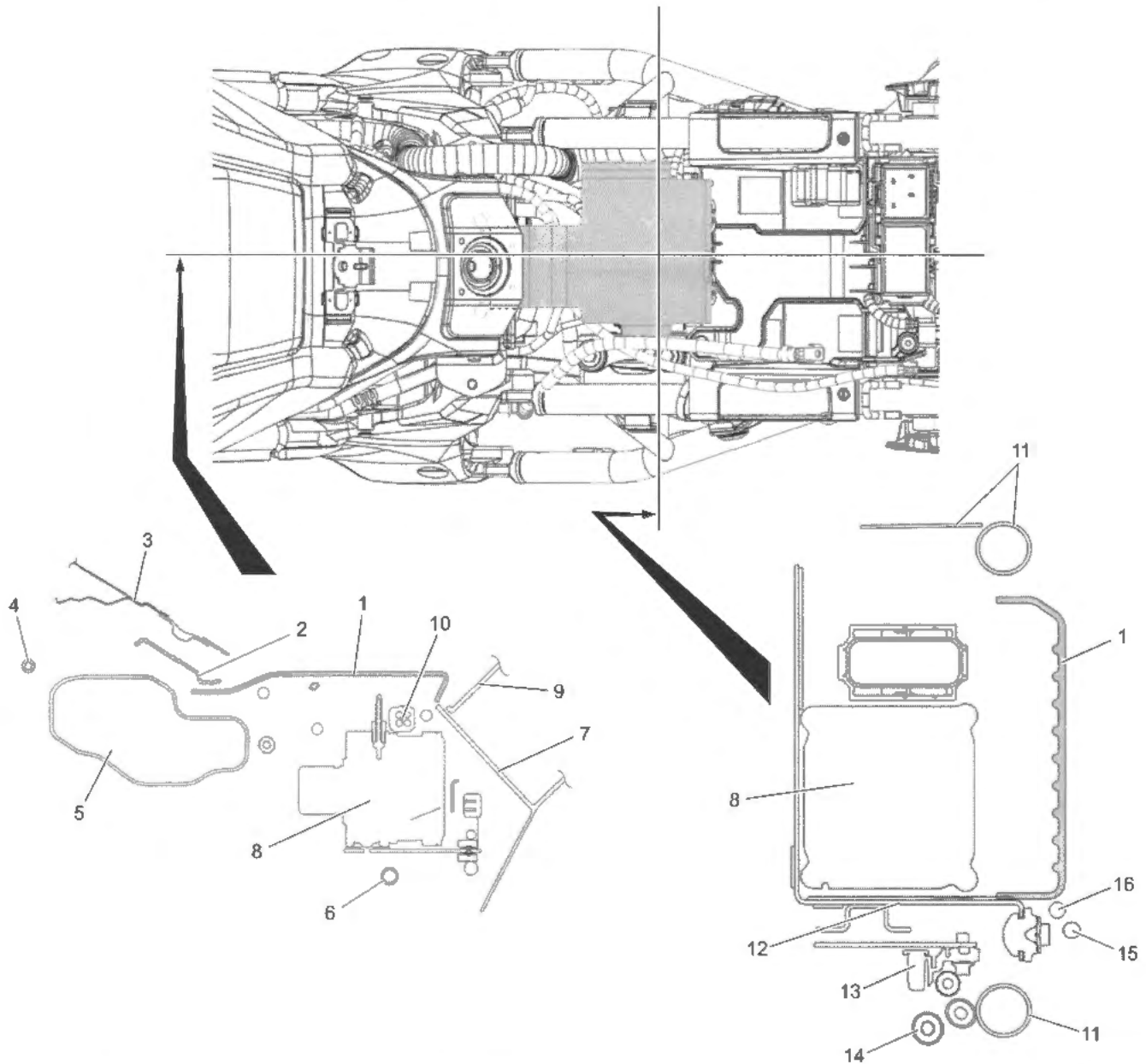
Pivot Cover Cushion Construction

BENJ31J39426013

Refer to "Pivot Cover Cushion Construction": L4 - L6 (Page 9D-9).

Heat Shield Construction

BENJ31J39426014



UJ31J1942037-01

1. Heat shield rubber sheet	7. Battery holder	13. IMU
2. Fuel tank rear bracket	8. ABS control unit/HU	14. Purge hose No. 2
3. Fuel tank	9. Battery holder lid	15. Starter motor lead wire
4. Reservoir tank overflow hose	10. Rear turn signal light coupler	16. Battery (-) lead wire
5. Reservoir tank	11. Frame	
6. Seat rail	12. ABS control unit/HU holder	

Clip Removal and Installation

BENJ31J39426015

Refer to "Clip Removal and Installation": L4 - L6 (Page 9D-10).

Seat Removal and Installation

BENJ31J39426016

Refer to "Seat Removal and Installation": L4 - L6 (Page 9D-10).

Sport Carrier Removal and Installation

BENJ31J39426017

Refer to "Sport Carrier Removal and Installation": L4 - L6 (Page 9D-11).

Rear Frame Cover / Frame Cover Removal and Installation

BENJ31J39426018

Refer to "Rear Frame Cover / Frame Cover Removal and Installation": L4 - L6 (Page 9D-11).

Rear Fender (Rear) Removal and Installation

BENJ31J39426019

Refer to "Rear Fender (Rear) Removal and Installation": L4 - L6 (Page 9D-12).

Rear Fender (Front) Removal and Installation

BENJ31J39426020

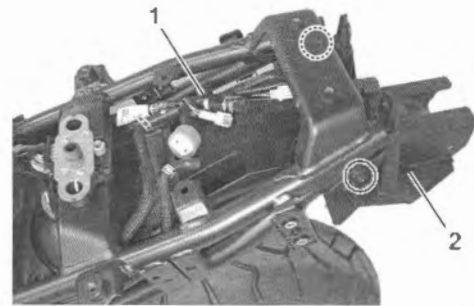
Removal

- 1) Remove the frame covers. (Page 9D-33)
- 2) Remove the rear fender (rear). (Page 9D-33)
- 3) Remove the EVAP canister (if equipped). (Page 1B-13)
- 4) Remove the battery. (Page 1J-12)
- 5) Remove the rear combination light. (Page 9B-9)
- 6) Remove the ECM. (Page 1C-14)
- 7) Remove the screws (1).



IJ31J1942003-01

- 8) Remove the wiring harness clamp (1).
- 9) Remove the rear fender (front) (2).



IJ31J1942004-02

Installation

Install the rear fender (front) in the reverse order of removal. Pay attention to the following points:

- Apply thread lock to the bolts (1) and tighten them.

"A": Thread lock cement 99000-32150 (THREAD LOCK CEMENT 1322D)



IJ31J1942005-02

- Route the wiring harness. Refer to "Wiring Harness Routing Diagram": L8 - in Section 9A (Page 9A-24).

Side Cowling Cover / Fuel Tank Center Cover Removal and Installation

BENJ31J39426021

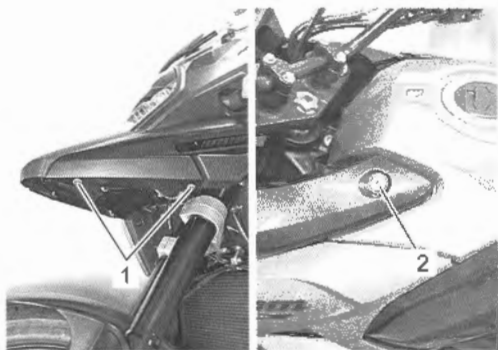
Side Cowling Cover

NOTE

For removal and installation of the side cowling cover, the same procedures are applicable to both right and left parts.

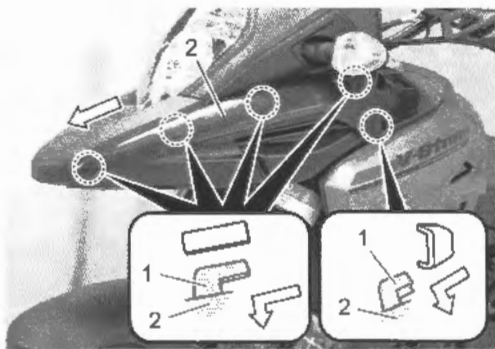
Removal

- 1) Remove the screws (1) and (2).



IJ31J1942006-01

- 2) Unhook the hooks (1) moving the side cowling cover (2) forward and remove it.



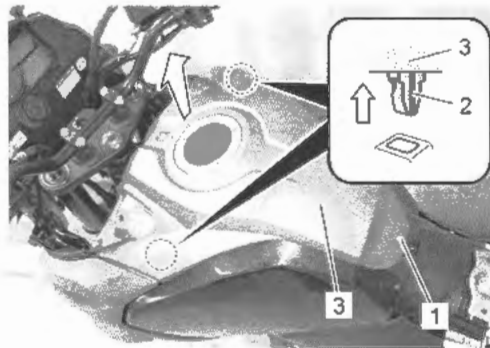
IJ31J1942007-02

Installation

Install the side cowling cover in the reverse order of removal.

Fuel Tank Center Cover Removal

- 1) Remove the seat. (Page 9D-33)
- 2) Remove the side cowling covers. (Page 9D-34)
- 3) Remove the screw (1).
- 4) Unhook the hooks (2) pulling the fuel tank center cover (3) upward and remove it.



IJ31J1942008-01

Installation

Install the fuel tank center cover in the reverse order of removal.

Fuel Tank Side Cover / Fuel Tank Front Cover Removal and Installation

BENJ31J39426022

Refer to "Fuel Tank Side Cover / Fuel Tank Front Cover Removal and Installation": L4 - L6 (Page 9D-14).

Side Lower Cowling / Side Cowling Inner Cover Removal and Installation

BENJ31J39426023

Refer to "Side Lower Cowling / Side Cowling Inner Cover Removal and Installation": L4 - L6 (Page 9D-15).

Windscreen Removal and Installation

BENJ31J39426024

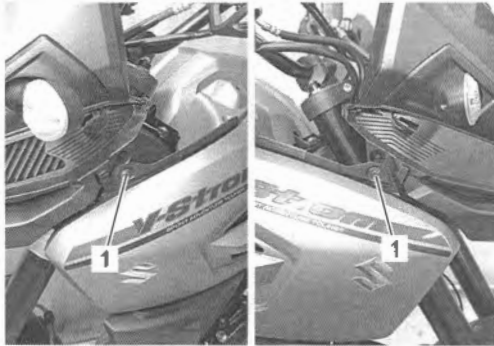
Refer to "Windscreen Removal and Installation": L4 - L6 (Page 9D-15).

Body Cowling Assembly Removal and Installation

BENJ31J39426025

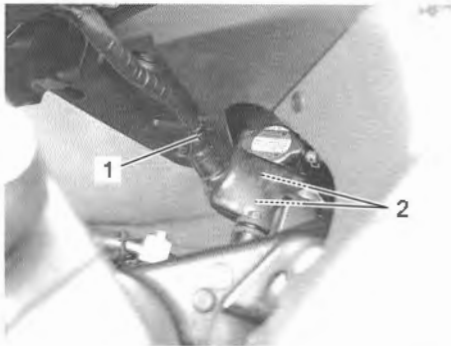
Removal

- 1) Remove the side cowling covers. ⚙️ (Page 9D-34)
- 2) Remove the screws (1).



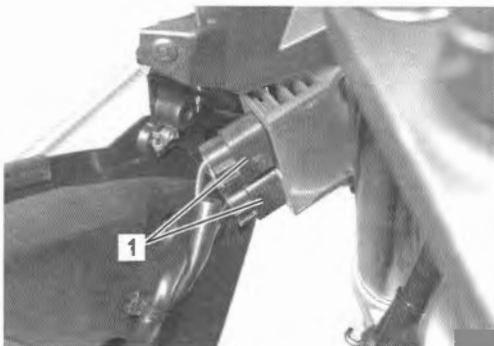
IJ31J1942009-01

- 3) Disconnect the wiring harness clamp (1) and lead wire couplers (2).



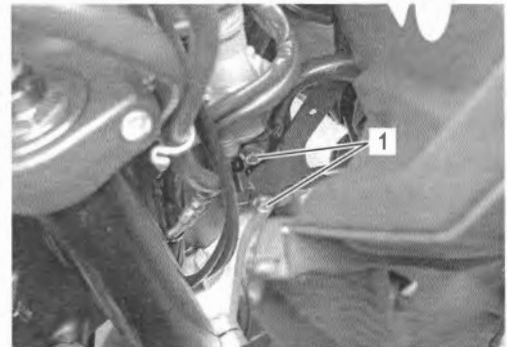
IJ31J1942010-01

- 4) Disconnect the regulator/rectifier couplers (1).



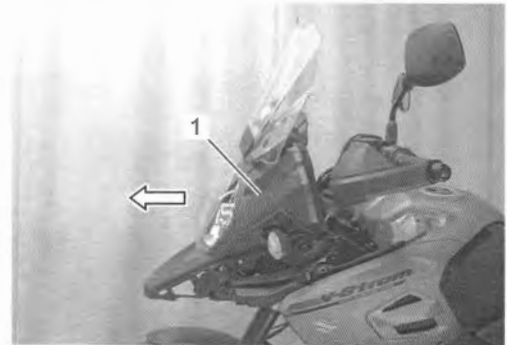
IJ31J1942011-01

- 5) Remove the bolts (1).



IJ31J1942012-01

- 6) Remove the body cowling assembly (1).



IJ31J1942013-01

Installation

Install the body cowling assembly in the reverse order of removal. Pay attention to the following point:

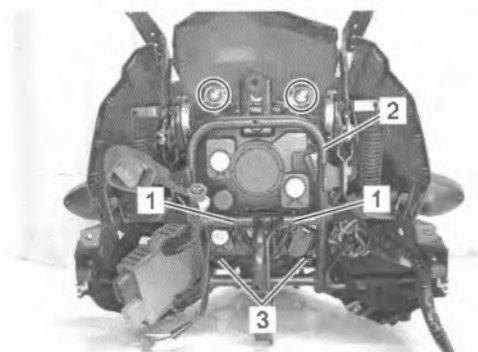
- After installation of the body cowling assembly, check the headlight aiming. ⚙️ (Page 9B-6)

Body Cowling Disassembly and Reassembly

BENJ31J39426026

Disassembly

- 1) Remove the body cowling assembly. (Page 9D-35)
- 2) Remove the windscreen. (Page 9D-34)
- 3) Remove the combination meter. (Page 9C-6)
- 4) Remove the horn. (Page 9C-14)
- 5) Remove the clamps (1).
- 6) Remove the cowling brace (2).

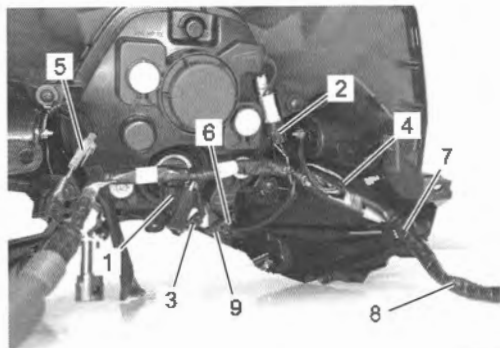


IJ31J1942014-01

3. Hooked point

7) Disconnect the following couplers.

- Low beam headlight coupler (1)
 - High beam headlight coupler (2)
 - Position light coupler (3)
 - Right turn signal light coupler (Black) (4)
 - Left turn signal light coupler (Gray) (5)
 - Ambient air temperature sensor coupler (6)
- 8) Disconnect the wiring harness clamp (7) and remove the wiring harness No. 2 (8).
 - 9) Remove the ambient air temperature sensor (9).



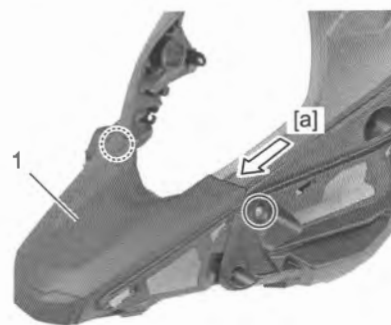
IJ31J1942015-02

- 10) Remove the headlight. (Page 9B-4)
- 11) Remove the front turn signal lights. (Page 9B-11)
- 12) Remove the clips (1). (Page 9D-33)



IJ31J1942016-01

13) Remove the lower body cowling (1).



IJ31J1942017-01

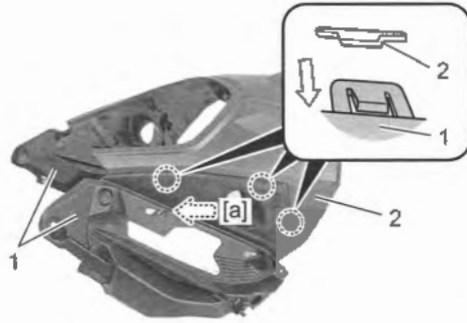
[A]



IJ31J1942018-01

[A]: View [a]

- 14) Remove the front side covers (1) from the body cowling (2).



IJ31J1942019-02



IJ31J1942020-01

[A]: View [a]

Reassembly

Assemble the body cowling in the reverse order of disassembly. Pay attention to the following point:

- Route the wiring harness. Refer to "Wiring Harness Routing Diagram": L8 - in Section 9A (Page 9A-24).

Windscreen Brace Removal and Installation

BENJ31J39426027

Refer to "Windscreen Brace Removal and Installation": L4 - L6 (Page 9D-18).

Pivot Cover Removal and Installation

BENJ31J39426028

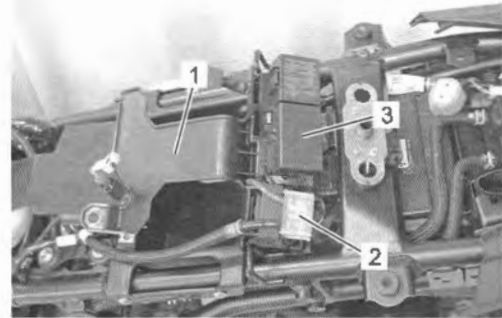
Refer to "Pivot Cover Removal and Installation": L4 - L6 (Page 9D-19).

Battery Holder Removal and Installation

BENJ31J39426029

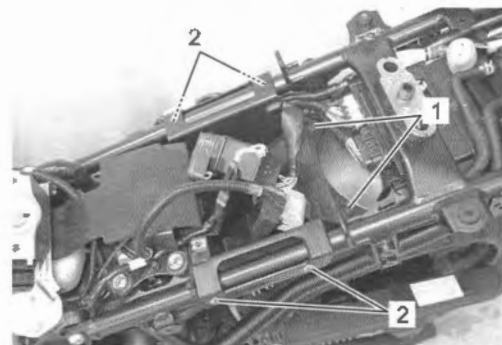
Removal

- 1) Remove the frame covers. (Page 9D-33)
- 2) Remove the battery. (Page 1J-12)
- 3) Remove the battery box lid (1) from the starter relay (2) and fuse box (3).



IJ31J1942021-01

- 4) Remove the screws (1) and bolts (2).



IJ31J1942022-01

- 5) Remove the coupler clamp (1), heat shield rubber sheet (2) and battery holder (3).



IJ31J1942023-01

Installation

Install the battery holder in order of removal.

Knuckle Cover Removal and Installation

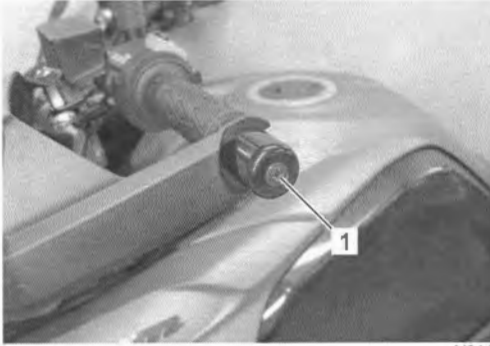
BENJ31J39426030

NOTE

For removal and installation of the knuckle cover, the same procedures are applicable to both right and left parts.

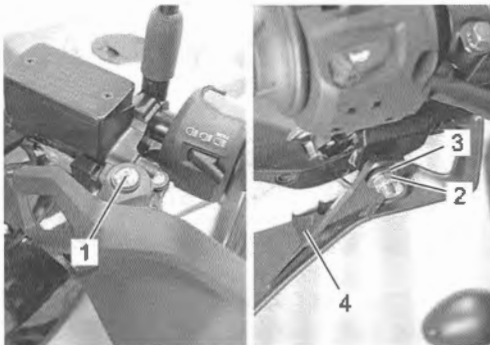
Removal

- 1) Loosen the handlebar balancer screw (1).



IJ31J1942024-01

- 2) Remove the screw (1), nut (2) and washer (3).
- 3) Remove the knuckle cover (4).

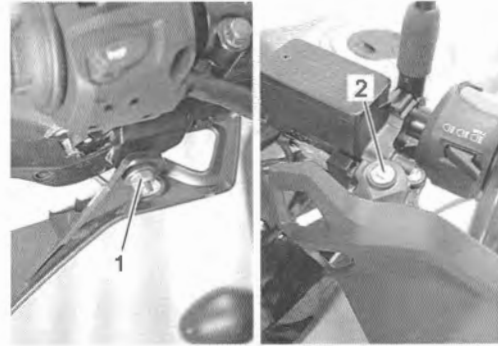


IJ31J1942025-01

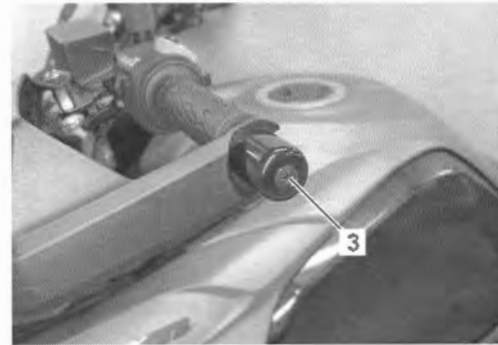
Installation

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

- Install the new nut (1).
- Tighten the nut (1), screw (2) and handlebar balancer screw (3) to the specified torque. Refer to "Knuckle Cover Construction": L8 - (Page 9D-26).



IJ31J1942026-01



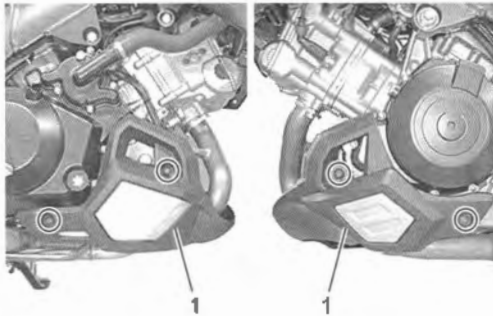
IJ31J1942027-01

Center Under Cowling / Under Cowling Removal and Installation

BENJ31J39426031

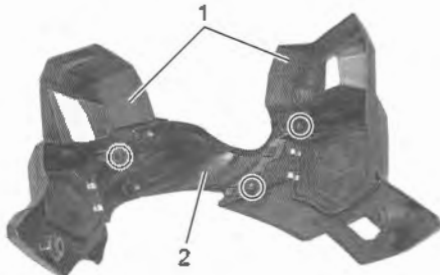
Removal

- 1) Remove the under cowling assembly (1).



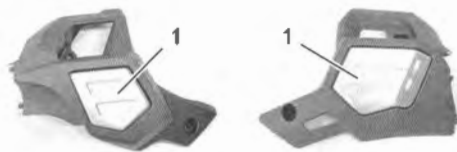
IJ31J1942028-01

- 2) Remove the left and right under cowlings (1) from the center under cowling (2).



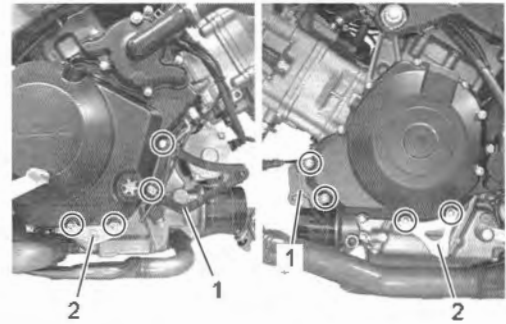
IJ31J1942029-01

- 3) Remove the under cowling covers (1), if necessary. Refer to "Under Cowling Construction": L8 - (Page 9D-28).



IJ31J1942030-01

- 4) Remove the under cowling front brackets (1) and under cowling rear brackets (2), if necessary.



IJ31J1942031-01

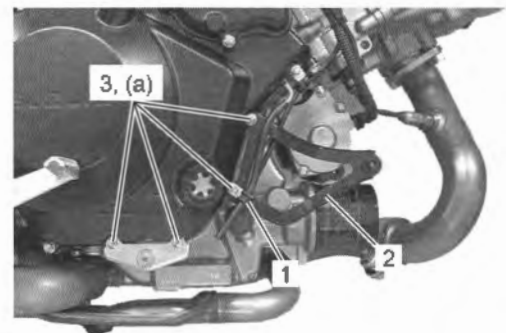
Installation

Install the center under cowling and under cowlings in the reverse order of removal. Pay attention to the following points:

- Set the clamp (1) outside of the right under cowling front bracket (2) and tighten the clutch cover bolts (3) to the specified torque, if removed.

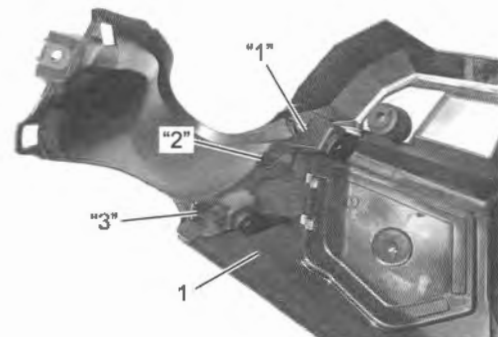
Tightening torque

Clutch cover bolt (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)



IJ31J1942032-01

- When installing the right under cowling (1), hook the hooks in order of "1" → "2" → "3".



IJ31J1942033-02

Specifications

Tightening Torque Specifications

BENJ31J39427001

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Clutch cover bolt	11	1.1	8.0	☞(Page 9D-39)

Reference:

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

“Rear Fender Construction”: L8 - (Page 9D-24)

“Knuckle Cover Construction”: L8 - (Page 9D-26)

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

Special Tools and Equipment

Recommended Service Material

BENJ31J39428001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT 1322D	P/No.: 99000-32150	☞(Page 9D-33)

NOTE

Required service material(s) is also described in:

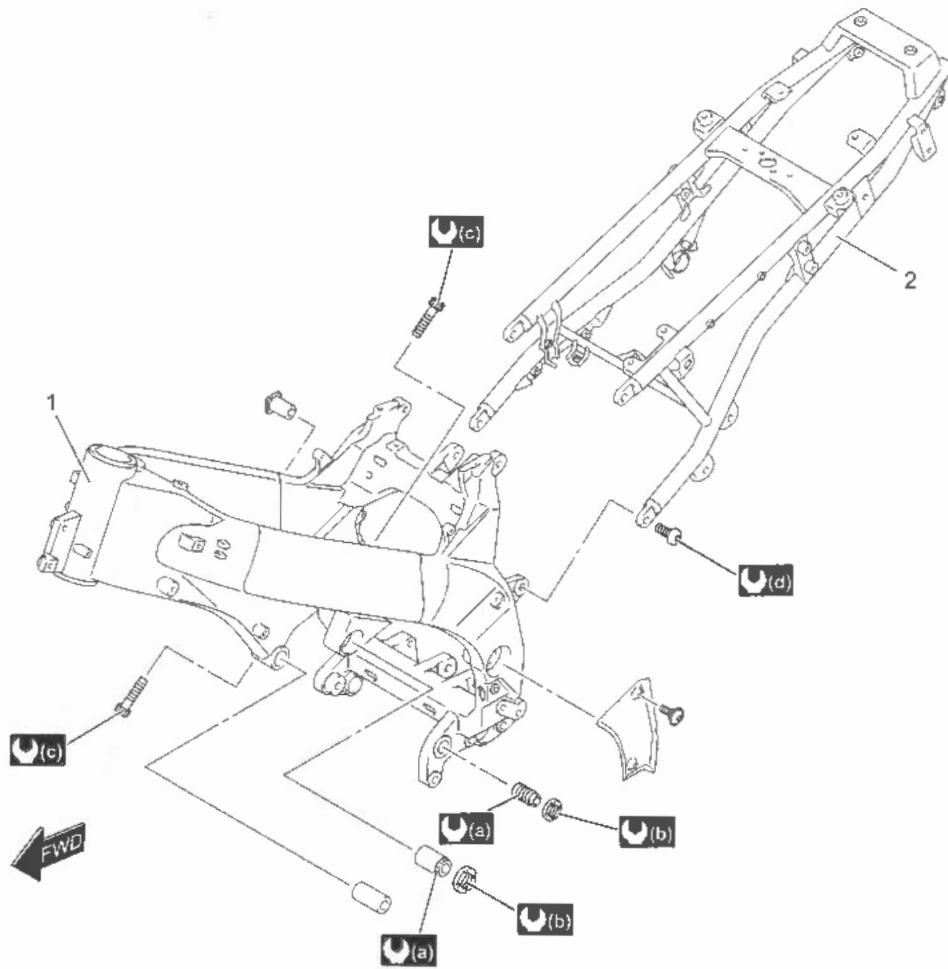
“Rear Fender Construction”: L8 - (Page 9D-24)

Body Structure

Repair Instructions

Frame Construction

BENJ31J39506001



IE31J1950004-01

1. Frame	(a) : 12 N·m (1.2 kgf-m, 9.0 lbf-ft)	(c) : 23 N·m (2.3 kgf-m, 17.0 lbf-ft)
2. Seat rail	(b) : 45 N·m (4.5 kgf-m, 32.5 lbf-ft)	(d) : 50 N·m (5.0 kgf-m, 36.5 lbf-ft)

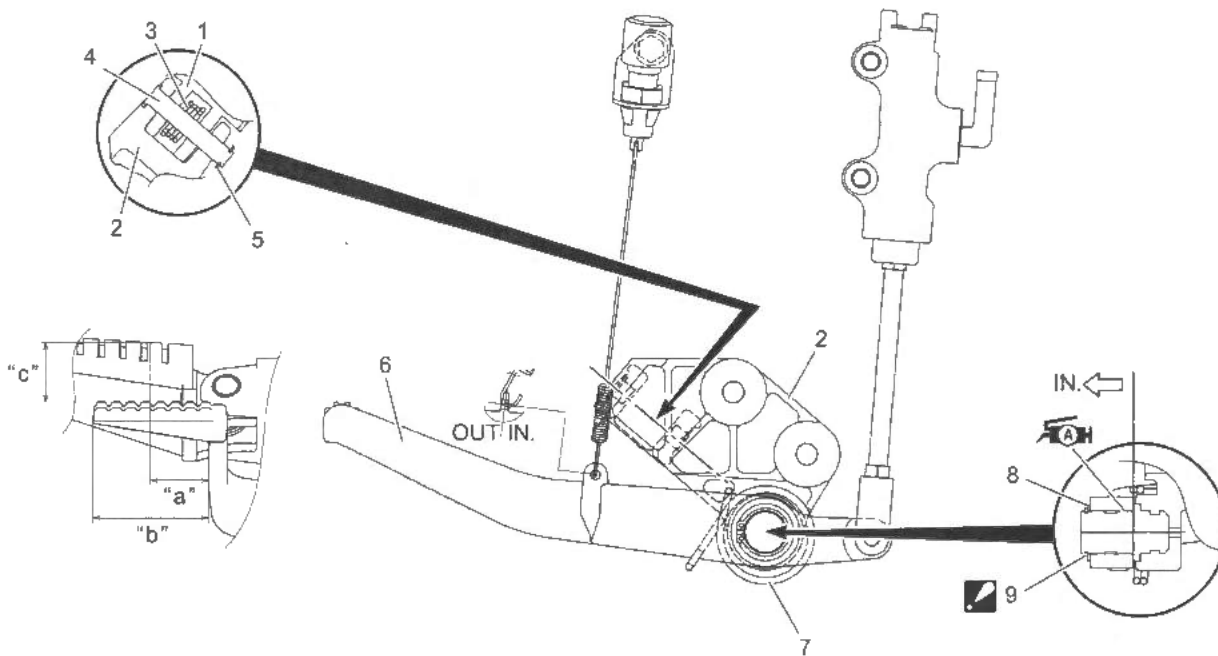
Seat Rail Removal and Installation

BENJ31J39506002

Refer to "Frame Construction" (Page 9E-1).

Front Footrest Construction

BENJ31J39506003



IE31J1950001-03

1. Front footrest	5. Front footrest E-ring	9. Brake pedal clip : Assemble the clip with sharp edge side in.	: Apply grease to sliding surface.
2. Front footrest bracket	6. Rear brake pedal	"a": 24 mm (0.9 in)	
3. Front footrest spring	7. Rear brake pedal spring	"b": 48.9 mm (1.9 in)	
4. Front footrest pin	8. Brake pedal washer	"c": 20 - 30 mm (0.8 - 1.2 in)	

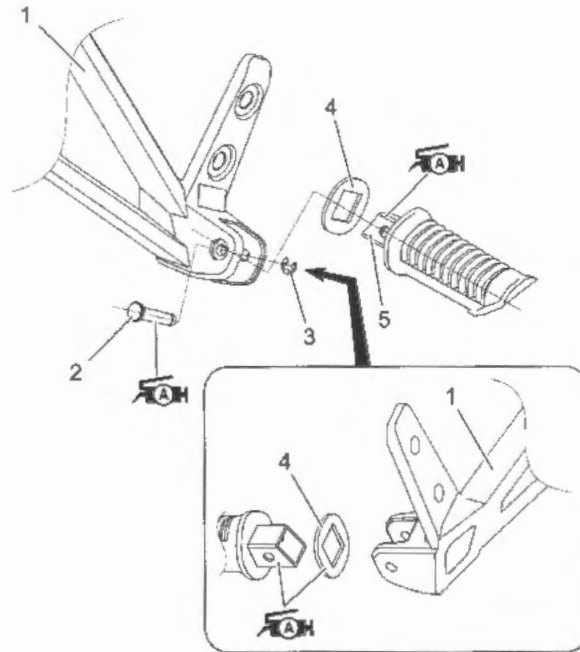
Front Footrest Removal and Installation

BENJ31J39506004

Refer to "Front Footrest Construction" (Page 9E-2).

Pillion Footrest Construction

BENJ31J39506005



IE31J1950002-02

1. Pillion footrest bracket	3. Pillion footrest E-ring	5. Pillion footrest bar
2. Pillion footrest pin	4. Footrest rubber washer	AH : Apply grease to sliding surface.

9E-4 Body Structure:

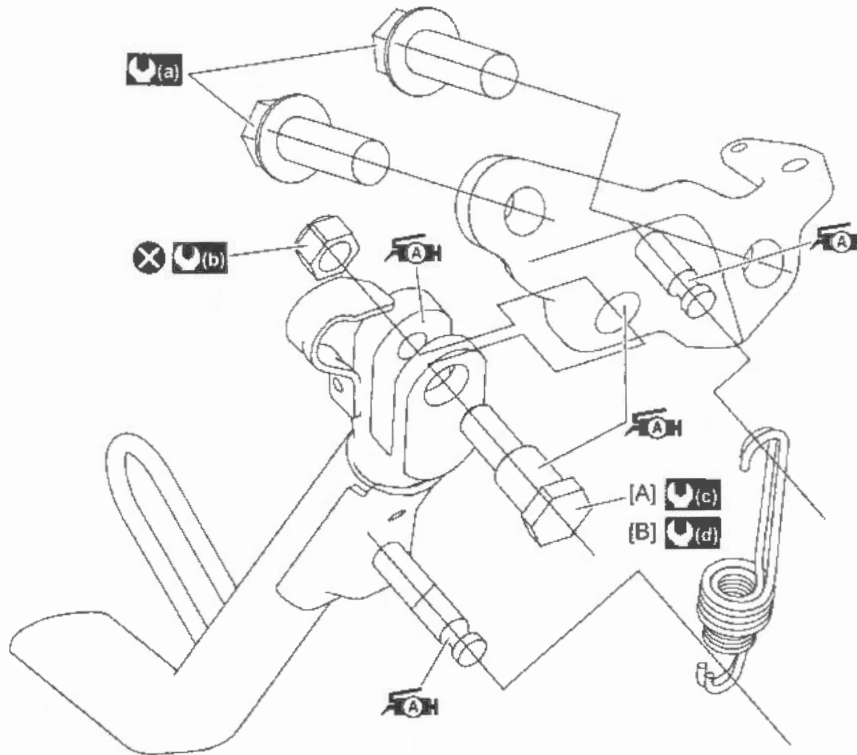
Pillion Footrest Removal and Installation

BENJ31J39506006

Refer to "Pillion Footrest Construction" (Page 9E-3).

Side-stand Construction

BENJ31J39506007



IJ31J1950001-03

[A]: L4 – L6	(b) : 40 N·m (4.0 kgf-m, 29.0 lbf-ft)	Ⓐ : Apply grease to sliding surface.
[B]: L8 –	(c) : 10 N·m (1.0 kgf-m, 7.5 lbf-ft)	⊗ : Do not reuse.
(a) : 95 N·m (9.5 kgf-m, 68.5 lbf-ft)	(d) : 50 N·m (5.0 kgf-m, 36.0 lbf-ft)	

Side-stand Removal and Installation

BENJ31J39506008

Refer to "Side-stand Construction" (Page 9E-4).

Specifications

Tightening Torque Specifications

BENJ31J39507001

Reference:

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

"Frame Construction" (Page 9E-1)

"Side-stand Construction" (Page 9E-4)

"Fasteners Information" in Section 0C (Page 0C-11)

Special Tools and Equipment

Recommended Service Material

BENJ31J39508001

NOTE

Required service material(s) is also described in:

"Front Footrest Construction" (Page 9E-2)

"Pillion Footrest Construction" (Page 9E-3)

"Side-stand Construction" (Page 9E-4)



Section 10

DL1000A/XAL4-L9 ('14 - '19 MODELS)

When you service the above models, please refer to the information contained in this supplement chapter, as well as the base manual Sections 0 – 9.

CONTENTS

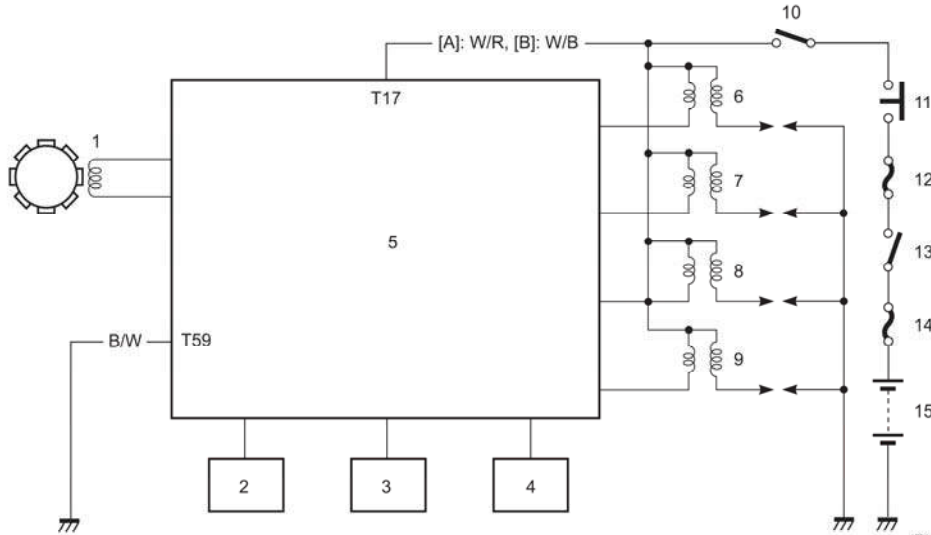
Ignition System Diagram	10-2
DTC P1657-H / P1657-L (C46) Section 1A	10-3
DTC P1400 / P1401 (C46) Section 1A	10-5
EXCVA Adjustment Section 1K	10-7
Oil Pressure Switch Removal and Installation	10-8

Section 1H

Ignition System Diagram

L4 - L6 — **ADDED**

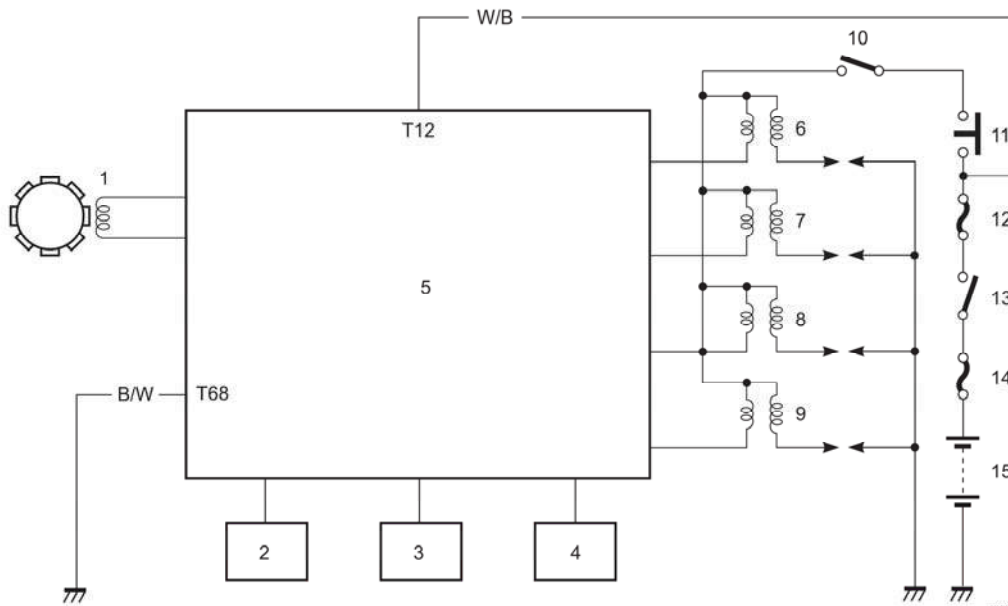
BENK31J71802001



IE31J1180005-01

[A]: For Thailand, Canada, California (U.S.A.) and China	5. ECM	11. Side-stand relay
[B]: Except for Thailand, Canada, California (U.S.A.) and China	6. Ignition coil #1 (Center)	12. Ignition fuse
1. CKP sensor	7. Ignition coil #1 (Side)	13. Ignition switch
2. TP sensor	8. Ignition coil #2 (Center)	14. Main fuse
3. ECT sensor	9. Ignition coil #2 (Side)	15. Battery
4. GP switch	10. Engine stop switch	

L8 -



IK31J7180001-01

1. CKP sensor	6. Ignition coil #1 (Center)	11. Side-stand relay
2. TP sensor	7. Ignition coil #1 (Side)	12. Ignition fuse
3. ECT sensor	8. Ignition coil #2 (Center)	13. Ignition switch
4. GP switch	9. Ignition coil #2 (Side)	14. Main fuse
5. ECM	10. Engine stop switch	15. Battery

ADDED

Section 1A

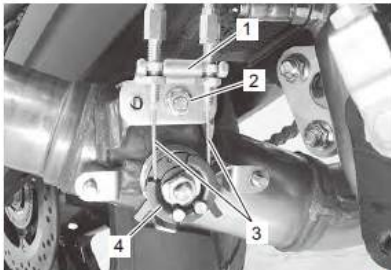
DTC P1657-H / P1657-L (C46)

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
P1657-H: EXCVA Sensor Circuit High Voltage The sensor output voltage is higher than the specified value.	<ul style="list-style-type: none"> EXCVA cables maladjustment CHANGED EXCVA circuit ECM
P01657-L: EXCVA Sensor Circuit Low Voltage The sensor output voltage is lower than the specified value.	
C46: EXCVA Sensor Circuit Malfunction The sensor output voltage is not within 0.14 – 4.90 V.	

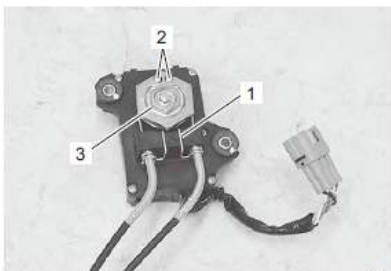
Step 4**EXCV cable adjustment**

- Remove the EXCV cable bracket (1) by removing the nut (2).
- Remove the EXCV cables (3) from the EXCV pulley (4). Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-8).



IE31J11B0014-01

- Remove the guide (1).
- Disconnect the EXCV cables (2) from the EXCVA pulley (3).

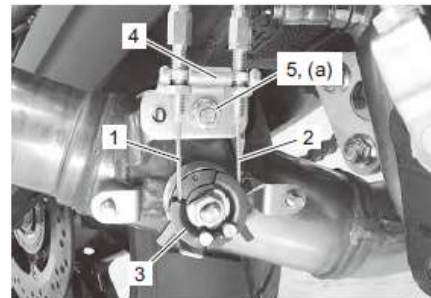


IE31J11B0019-02

- Install the EXCV cable No.1 (1) and No.2 (2) to the EXCV Pulley (3).
- Install the EXCV cable bracket (4) and tighten the nut (5) to the specified torque.

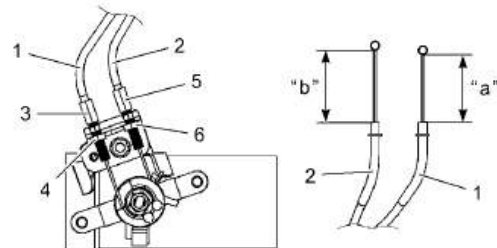
Tightening torque

EXCV cable bracket mounting nut (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)



IE31J11B0029-01

- Adjust the inner cable length "a" of No. 1 cable (1) in 46 – 47 mm (1.81 – 1.85 in) by turning the adjuster (3), then tighten the lock-nuts (4).
- Adjust the inner cable length "b" of No. 2 cable (2) in 52.3 – 53.3 mm (2.06 – 2.10 in) by turning the adjuster (5), then tighten the lock-nuts (6).



IE31J11B0023-01

Are the EXCVA side inner cable lengths [A] OK?

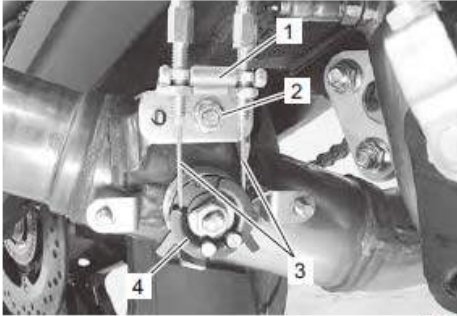
- Yes Go to Step 5.
- No Replace the EXCV cable No. 1 and No. 2 with new ones. ↗ (Page 1K-8)

ADDED

Section 1A

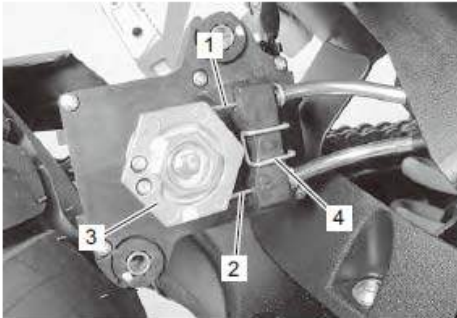
Step 5**DTC recheck**

- 1) Remove the EXCV cable bracket (1) by removing the nut (2).
- 2) Remove the EXCV cables (3) from the EXCV pulley (4).



IE31J11B0076-01

- 3) Install the EXCV cable No. 1 (1) and No. 2 (2) to the EXCVA pulley (3).
- 4) Install the guide (4).



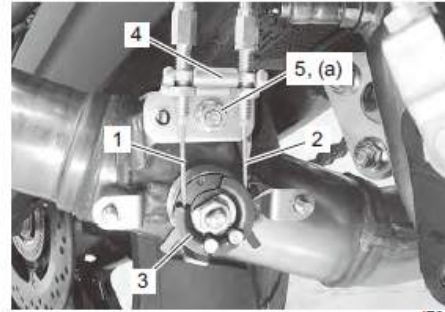
IE31J11B0077-01

- 5) Install the EXCV cable No. 1 (1) and No. 2 (2) to the EXCV pulley (3).

- 6) 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, 8.0 lbf-ft)**



IE31J11B0029-01

- 7) Perform "DTC Check with SDS": L4 - L6 (Page 1A-20) and check DTC.

Is DTC P1657-H/P1657-L(C46) still detected?

- Yes Replace the ECM with a known good one, and inspect it again. ☞ (Page 1C-14)
- No End.

ADDED

Section1A

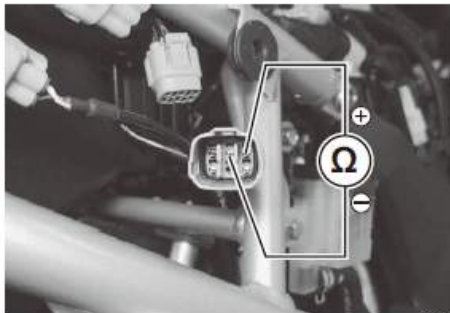
DTC P1400 / P1401 (C46)

DTC Detecting Condition and Trouble Area

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

CHANGED**Step 4****EXCVA position sensor resistance check**

- 1) Connect the ECM couplers and EXCVA 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 coupler.
- 4) Measure the EXCVA position sensor resistance.
 - Resistance
 - Y wire terminal and W wire terminal: approx. 3.1 kΩ



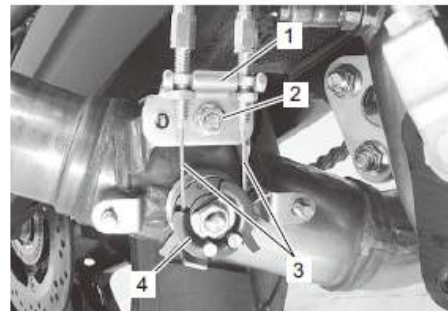
IE31J11101066-01

Is check result OK?

- Yes Go to Step 5.
- No Replace the EXCVA with a new one.
 ☞(Page 1K-8)

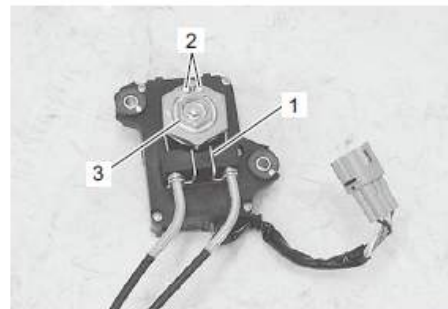
CHANGED**Step 5****EXCV cable adjustment**

- 1) Remove the EXCV cable bracket (1) by removing the nut (2).
- 2) Remove the EXCV cables (3) from the EXCV pulley (4). Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-8).



IE31J1180014-0

- 3) Remove the guide (1).
- 4) Disconnect the EXCV cables (2) from the EXCVA pulley (3).



IE31J1180019-0

- 5) Install the EXCV cable No.1 (1) and No.2 (2) to the EXCV Pulley (3).

ADDED

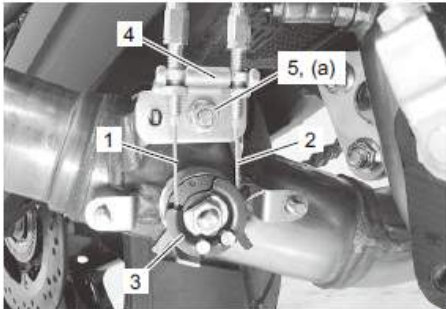
Section1A

ADDED

- 6) Install the EXCV cable bracket (4) and tighten the nut (5) to the specified torque.

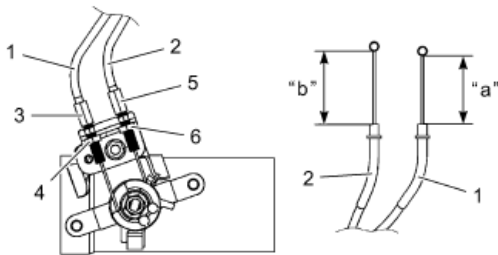
Tightening torque

EXCV cable bracket mounting nut (a): 11 N·m
(1.1 kgf-m, 8.0 lbf-ft)



IE31J11B0029-01

- 7) Adjust the inner cable length "a" of No. 1 cable (1) in 46 – 47 mm (1.81 – 1.85 in) by turning the adjuster (3), then tighten the lock-nuts (4).
- 8) Adjust the inner cable length "b" of No. 2 cable (2) in 52.3 – 53.3 mm (2.06 – 2.10 in) by turning the adjuster (5), then tighten the lock-nuts (6).



IE31J11B0023-01

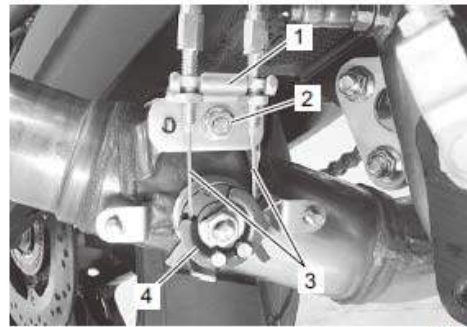
Are the EXCVA side inner cable lengths [A] OK?

Yes Go to Step 6.

No Replace the EXCV cable No. 1 and No. 2 with new ones. ↻(Page 1K-8)

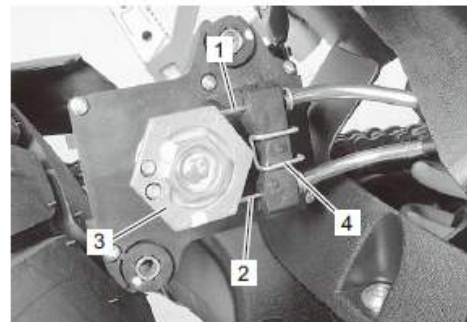
Step 6**DTC recheck**

- 1) Remove the EXCV cable bracket (1) by removing the nut (2).
- 2) Remove the EXCV cables (3) from the EXCV pulley (4).



IE31J11B0076-01

- 3) Install the EXCV cable No. 1 (1) and No. 2 (2) to the EXCV pulley (3).
- 4) Install the guide (4).

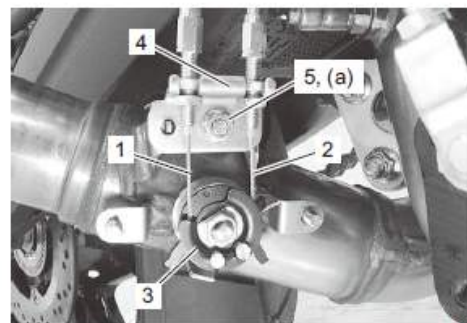


IE31J11B0077-01

- 5) Install the EXCV cable No. 1 (1) and No. 2 (2) to the EXCV pulley (3).
- 6) 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, 8.0 lbf-ft)



IE31J11B0029-01

- 7) Perform "DTC Check": L8 - (Page 1A-92) and check DTC.

Is DTC P1400/P1401(C46) still detected?

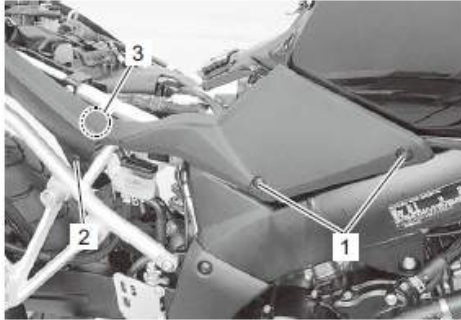
Yes Replace the ECM with a known good one, and inspect it again. ↻(Page 1C-14)

No End.

Section1K

EXCVA Adjustment**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Remove the screws (1) and clip (2).
- 3) Disconnect the hook (3).



IE31J11B0011-01

- 4) Set up the SDS tools referring to the SDS operation manual for further details. (Page 1A-20)
- 5) Turn the ignition switch ON.
- 6) Make sure that no DTCs remain.

Step 2

- 1) Click "Exhaust valve drive control" (1).



IE31J11B0034-01

- 2) Click "Full closed" (1).

- a) Turn the No. 1 cable adjuster (1) in or out to set the output voltage within the specified value.



IE31J11B0040-01

Step 3

- 1) Click "Full open" (1).



- 4) After adjusting the EXCV cables, turn the ignition switch OFF then ON to confirm DTC "C46" is not indicated.
- 5) Install the removed parts.



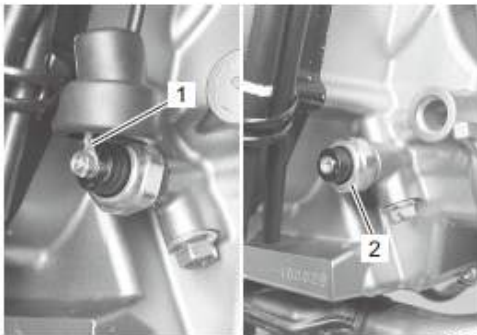
CHANGED

Section1E

Oil Pressure Switch Removal and Installation

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the under cowling assembly. (If equipped)
↔(Page 9D-39)
- 3) Drain engine oil. ↔(Page 1E-4)
- 4) Disconnect the oil pressure switch lead wire (1).
- 5) Remove the oil pressure switch (2).



IE31J1150015-02

Installation

- 1) Install the oil pressure switch (1), apply the sealant to its thread part and tighten it to the specified torque.

NOTE

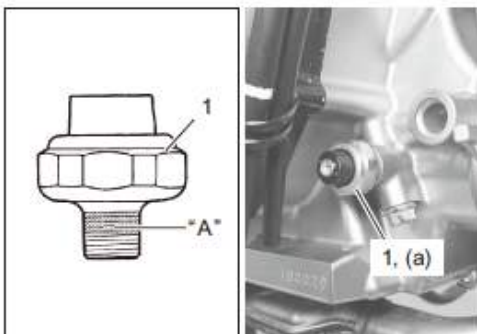
Do not apply sealant to oil pressure switch hole.

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

Tightening torque

Oil pressure switch (a): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)

CHANGED



IE31J1150016-01

