



GSX-R750

SERVICE MANUAL

99500-37150-03E

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Section 00

00

Precautions

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Precautions

Precautions

General Precautions

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▲ WARNING

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

NOTICE

- 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.
- When performing service to electrical parts, if the service procedures do not require use of battery power, disconnect the negative (-) cable the battery.
- When tightening the cylinder head or case bolts and nuts, tighten the larger sizes first. Always tighten the bolts and nuts diagonally from the inside toward outside and to the specified tightening torque.
- Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, self-locking nuts, cotter pins, circlips and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces.
- Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.
- Use a torque wrench to tighten fasteners to the specified torque. Wipe off grease and oil if a thread is smeared with them.
- After reassembling, check parts for tightness and proper operation.
- To protect the environment, do not unlawfully dispose of used motor oil, engine coolant and other fluids: batteries, and tires.
- To protect Earth's natural resources, properly dispose of used motorcycle and parts.

Precautions for Electrical Circuit Service

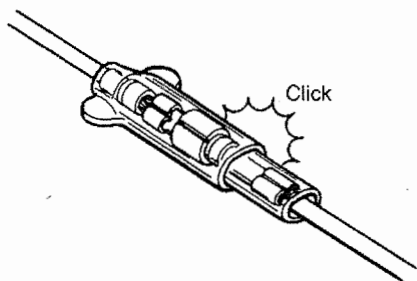
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When handling the electrical parts or servicing FI system, observe the following points for the safety of the systems.

Electrical Parts

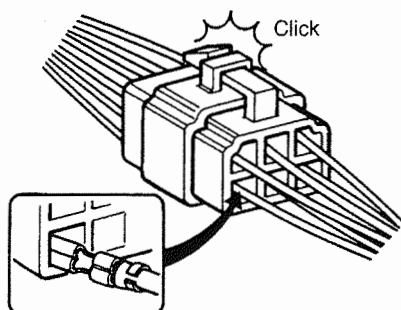
Connector / Coupler

- 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.



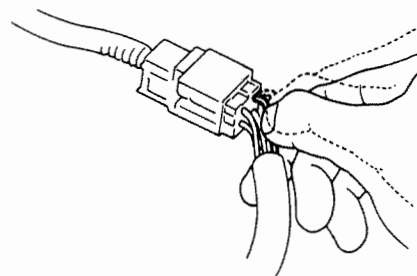
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- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal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



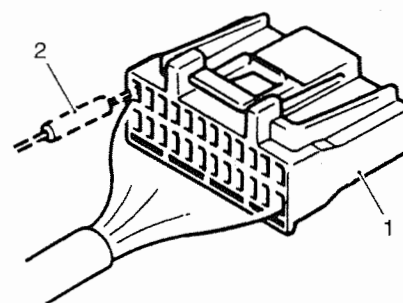
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- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



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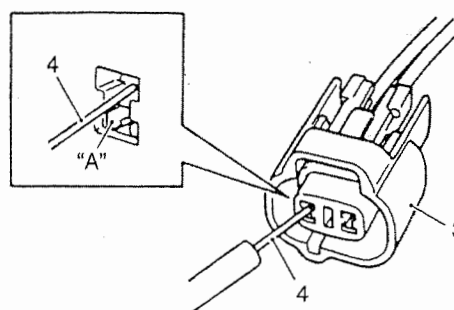
- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (rear) of the connector/coupler.



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1. Coupler	2. Probe
------------	----------

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



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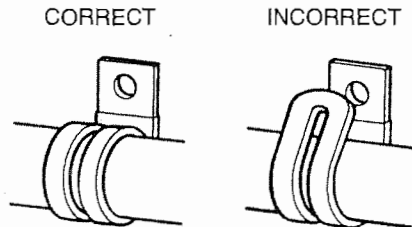
3. Coupler	4. Probe	"A": Where male terminal fits
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- Avoid applying grease or other similar material to connector/coupler terminals to prevent electric trouble.

00-3 Precautions:

Clamp

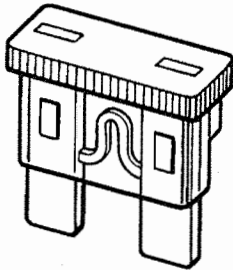
- Clamp the wire harness at such positions as indicated in "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).
- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute for the band type clamp.



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Fuse

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



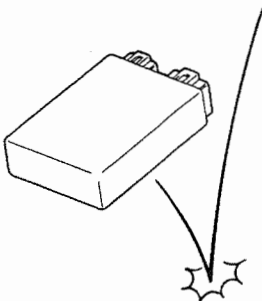
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Switch

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

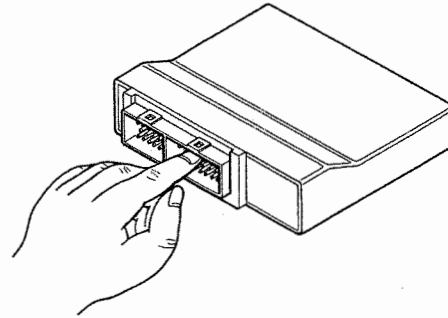
ECM / Various sensors

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



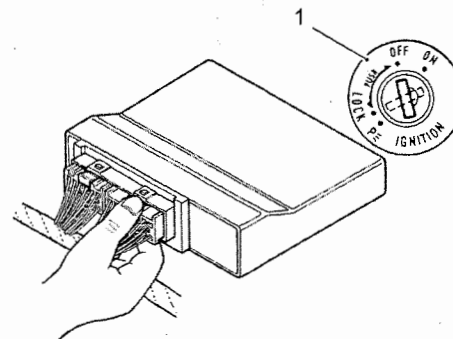
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- Be careful not to touch the electrical terminals of the electronic parts (ECM, etc.). The static electricity from your body may damage them.



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

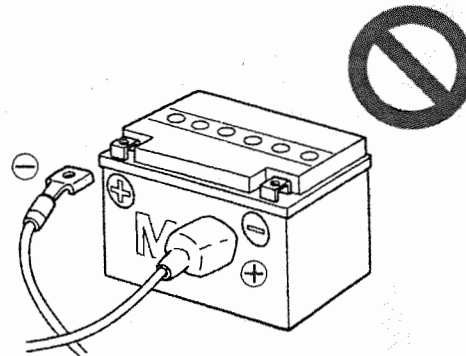


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1. Ignition switch

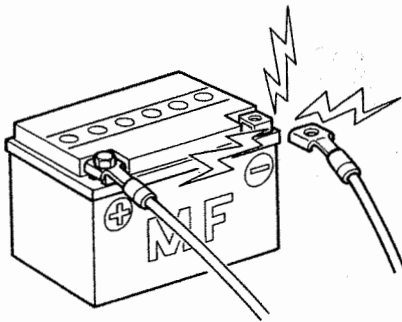
Battery

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



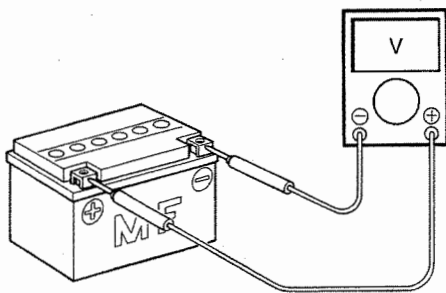
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- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the electronic unit which may result in serious damage.



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



I310G1000012-02

- 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.

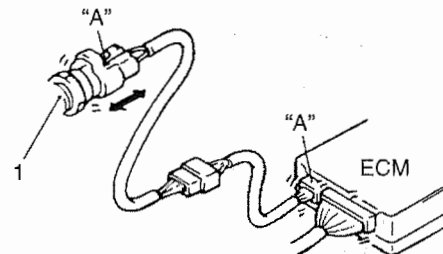
Open circuit check

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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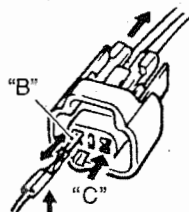
1. Sensor	"A": Check for loose connection
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00-5 Precautions:

- 3) Using a test male terminal, check the female terminals of the circuit being checked for contact tension.

Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust, entry of foreign object, etc.). At the same time, check to make sure that each terminal is fully inserted in the coupler and locked.

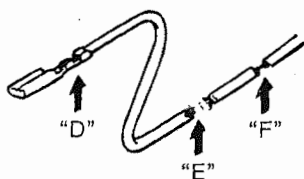
If contact tension is not enough, rectify the contact to increase tension or replace. The terminals must be clean and free of any foreign material which could impede proper terminal contact.



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

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



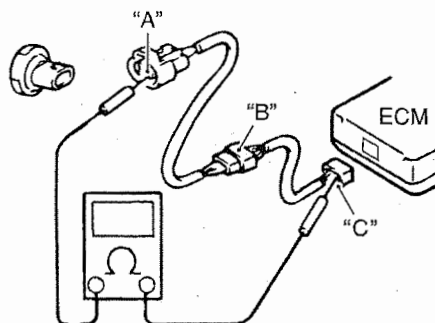
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"D": Looseness of crimping
"E": Open
"F": Thin wire (A few strands left)

Continuity check

- 1) Measure resistance across coupler "B" (between "A" and "C" in figure).

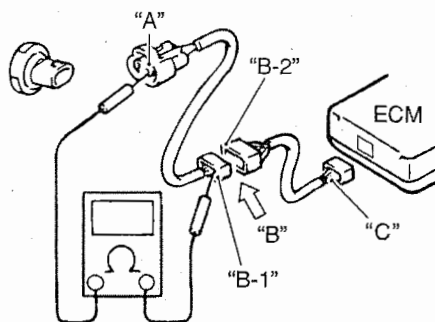
If no continuity is indicated (infinity or over limit), the circuit is open between terminals "A" and "C".



I705H1000006-02

- 2) Disconnect the coupler "B" and measure resistance between couplers "A" and "B-1".

If no continuity is indicated, the circuit is open between couplers "A" and "B-1". If continuity is indicated, there is an open circuit between couplers "B-2" and "C" or an abnormality in coupler "B-2" or coupler "C".



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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: Approx. 5 V

"B" and body ground: Approx. 5 V

"C" and body ground: 0 V

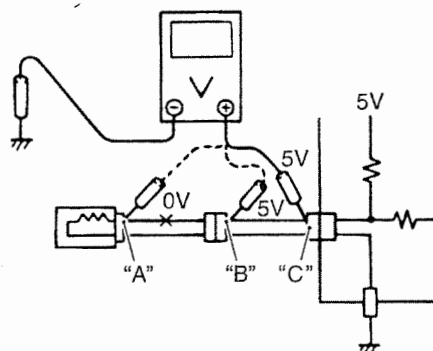
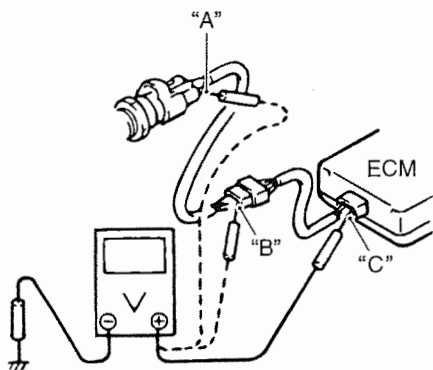
- 3) Also, if measured values are as listed following, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals "A" and "B".

Voltage between

"A" and body ground: Approx. 5 V

"B" and body ground: Approx. 5 V – 2 V voltage drop

"C" and body ground: 3 V – 2 V voltage drop



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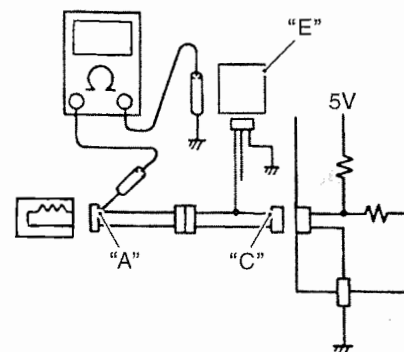
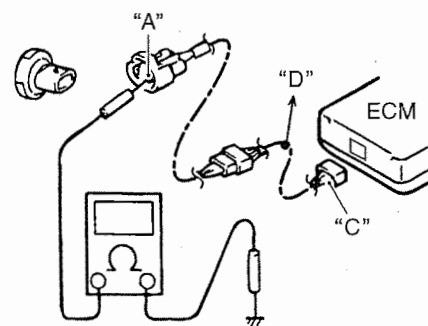
Short circuit check (Wire harness to ground)

- 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 "E" as shown, disconnect all connectors/couplers of those parts. Otherwise, diagnosis will be wrong.

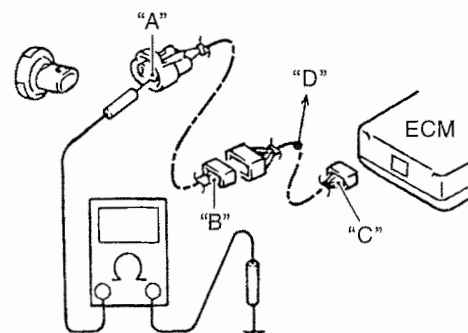
- 3) Measure resistance between terminal at one end of circuit ("A" terminal in figure) and body ground. If continuity is indicated, there is a short circuit to ground between terminals "A" and "C".



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"D": To other parts

- 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 ground between terminals "A" and "B".



"D": To other parts


I705H1000009-02

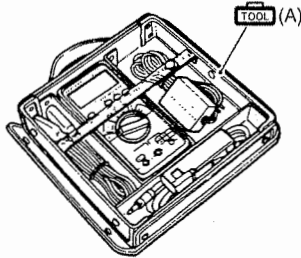
00-7 Precautions:

Using The Multi Circuit Testers

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

Special tool

 (A): 09900-25008 (Multi circuit tester set)



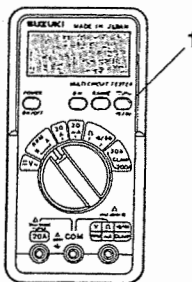
I649G1000024-03

Using the testers

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

Special tool

 : 09900-25008 (Multi circuit tester set)




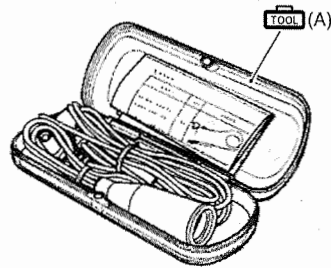
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NOTICE

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

Special tool

 (A): 09900-25009 (Needle-point probe set)



I649G1000025-03

Section 0

General Information

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0

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








General Information

General Description

Symbols

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

Symbol	Definition
	Torque control required. Data beside it indicate specified torque.
	Apply oil. Use engine oil unless otherwise specified.
	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1:1).
	Apply SUZUKI SUPER GREASE "A" or equivalent. 99000-25010
	Apply SUZUKI MOLYBDENUM GREASE L or equivalent. 99000-25280
	Apply SUZUKI MOLY PASTE or equivalent. 99000-25140
	Apply SUZUKI SILICONE GREASE or equivalent. 99000-25100
	Apply SUZUKI BOND "1207B" or equivalent. 99000-31140
	Apply THREAD LOCK CEMENT SUPER "1303" or equivalent. 99000-32030
	Apply THREAD LOCK CEMENT SUPER "1322" or equivalent. 99000-32110
	Apply THREAD LOCK CEMENT SUPER "1360" or equivalent. 99000-32130
	Use engine coolant or equivalent. 99000-99032-11X
	Use fork oil SS-47 or equivalent.
	Apply MUFFLER SEAL LOCTITE "5920" (commercially available) or equivalent.
	Apply or use brake fluid.
	Use special tool.
	Do not reuse.
	Note on reassembly.

Abbreviations

BENB15J20101002

A:	H:
ABDC: After Bottom Dead Center	HC: Hydrocarbons
AC: Alternating Current	HO2 sensor: Heated Oxygen Sensor (HO2S)
ACL: Air Cleaner, Air Cleaner Box	I:
API: American Petroleum Institute	IAP Sensor: Intake Air Pressure Sensor (IAPS)
ATDC: After Top Dead Center	IAT Sensor: Intake Air Temperature Sensor (IATS)
ATM Pressure: Atmospheric Pressure, Atmospheric Pressure Sensor (APS, AP Sensor)	IG: Ignition
A/F: Air Fuel Mixture	ISC Valve: Idle Speed Control Valve (ISCV)
B:	J:
BARO: Barometric pressure (Atmospheric pressure)	JASO: Japanese Automobile Standards Organization
BBDC: Before Bottom Dead Center	L:
BTDC: Before Top Dead Center	LCD: Liquid Crystal Display
B+: Battery Positive Voltage	LED: Light Emitting Diode (Malfunction Indicator Lamp)
C:	LH: Left Hand
CKP Sensor: Crankshaft Position Sensor (CKPS)	M:
CKT: Circuit	MAL-CODE: Malfunction Code (Diagnostic Code)
CLP Switch: Clutch Lever Position Switch (Clutch Switch)	Max: Maximum
CMP Sensor: Camshaft Position Sensor (CMPS)	MIL: Malfunction Indicator Lamp (LED)
CO: Carbon Monoxide	Min: Minimum
CPU: Central Processing Unit	N:
D:	NOx: Nitrogen Oxides
DC: Direct Current	O:
DOHC: Double Over Head Camshaft	OHC: Over Head Camshaft
DRL: Daytime Running Light	OPS: Oil Pressure Switch
DTC: Diagnostic Trouble code	P:
E:	PAIR: Pulsed Secondary Air Injection
ECM: Engine Control Module Engine Control Unit (ECU) (FI Control Unit)	PCM: Power Control Module
ECT Sensor: Engine Coolant Temperature Sensor (ECTS)	PCV: Positive Crankcase Ventilation (Crankcase Breather)
Water Temp. Sensor (WTS)	R:
EVAP: Evaporative Emission	RH: Right Hand
EXC System: Exhaust Control System (EXCS)	ROM: Read Only Memory
EXC Valve: Exhaust Control Valve (EXCV)	S:
EXCV Actuator: Exhaust Control Valve Actuator (EXCVA)	SAE: Society of Automotive Engineers
F:	SDS: Suzuki Diagnosis System
FI: Fuel Injection, Fuel Injector	SRAD: Suzuki Ram Air Direct
FP: Fuel pump	STC System: Secondary Throttle Control System (STCS)
FPR: Fuel Pressure Regulator	STP Sensor: Secondary Throttle Position Sensor (STPS)
FP Relay: Fuel Pump Relay	ST Valve: Secondary Throttle Valve (STV)
G:	STV Actuator: Secondary Throttle Valve Actuator (STVA)
GEN: Generator	T:
GND: Ground	TO Sensor: Tip-over Sensor (TOS)
GP Switch: Gear Position Switch	TP Sensor: Throttle Position Sensor (TPS)

SAE-to-Former SUZUKI Term

BENB15J20101012

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 Lamp, Malfunction Indicator Lamp (MIL)

Manifold Absolute Pressure (MAP): Intake Air Pressure (IAP), Intake Vacuum

Mass Air Flow (MAF): Air Flow

O:

On-Board Diagnostic (OBD): Self-Diagnosis Function, Diagnostic

Open Loop (OL): —

P:

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)

V:

Voltage Regulator (VR): Voltage Regulator

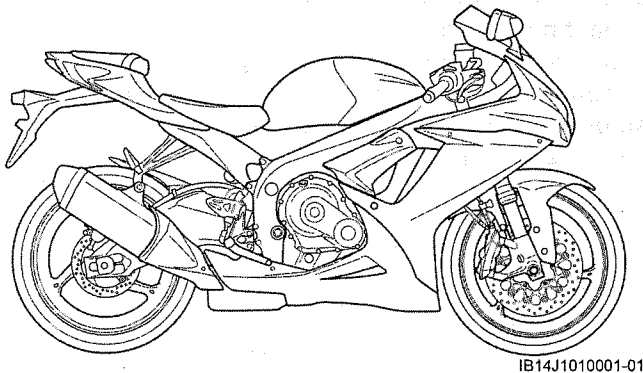
Volume Air Flow (VAF): Air Flow

Vehicle Side View

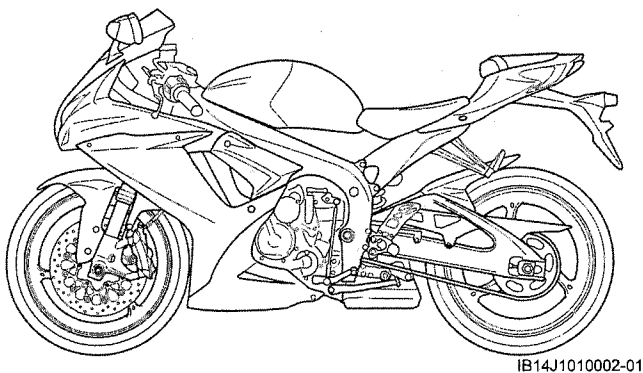
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NOTE

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

SUZUKI GSX-R750 (2011-model)**Right Side**

IB14J1010001-01

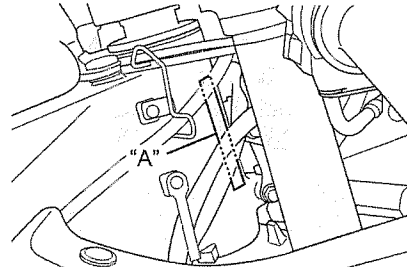
Left Side

IB14J1010002-01

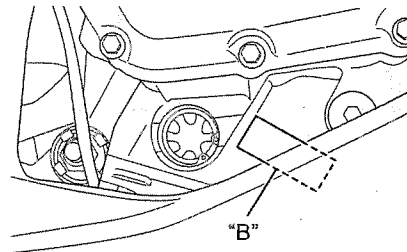
Vehicle Identification Number

BENB15J20101004

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



IB14J1010003-02



IB14J1010004-02

Fuel and Oil Recommendation

BENB15J20101005

Fuel (For USA and Canada)

Use only unleaded gasoline of at least 90 pump octane (R/2 + M/2).

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

Fuel (For Other Countries)

Gasoline used should be graded 95 octane (Research Method) or higher. Unleaded gasoline is recommended.

Engine Oil (For USA)

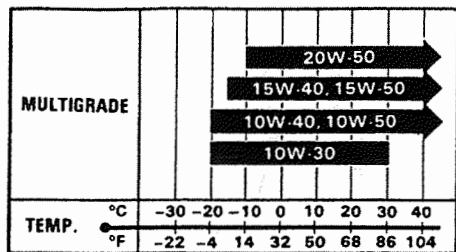
Oil quality is a major contributor to your engine's performance and life. Always select good quality engine oil.

Suzuki recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL or equivalent engine oil. Use of SF/SG or SH/SJ in API with MA in JASO. Suzuki recommends the use of SAE 10W-40 engine oil. If SAE 10W-40 engine oil is not available, select and alternative according to the chart.

0A-5 General Information:

Engine Oil (For Other Countries)

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



I310G1010005-01

Brake Fluid

Specification and classification: DOT 4

▲ WARNING

Since the brake system of this motorcycle is filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid such as silicone-based and petroleum-based fluid for refilling the system, otherwise serious damage will result.

Do not use any brake fluid taken from old or used or unsealed containers.

Never reuse brake fluid left over from a previous servicing, which has been stored for a long period.

Front Fork Oil

Use fork oil SS-47 or equivalent fork oil.

Engine Coolant Recommendation

BENB15J20101006

Engine Coolant

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

Water for mixing

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

Anti-freeze / Engine coolant

The engine coolant perform as a corrosion and rust inhibitor as well as anti-freeze. Therefore, the engine coolant should be used at all times even though the atmospheric temperature in your area does not go down to freezing point.

Suzuki recommends the use of SUZUKI COOLANT anti-freeze/engine coolant. If this is not available, use an equivalent which is compatible with an aluminum radiator.

Liquid amount of water / Engine coolant

Solution capacity (total)

2 650 ml (2.8/2.3 US/Imp qt)

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

NOTE

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.

BREAK-IN Procedures

BENB15J20101007

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

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

Speed limits

Initial 800 km (500 miles): Below 7 000 r/min

Up to 1 600 km (1 000 miles): Below 10 500 r/min

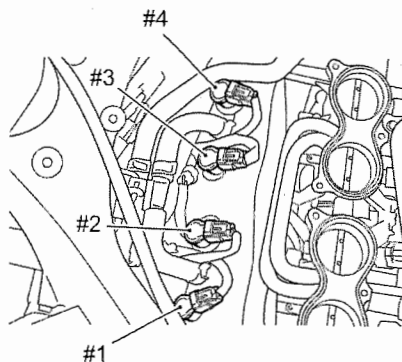
Over 1 600 km (1 000 miles): Below 14 250 r/min

2) Upon reaching an odometer reading of 1 600 km (1 000 miles) you can subject the motorcycle to full throttle operation. However, do not exceed 14 250 r/min at any time.

Cylinder Identification

BENB15J20101008

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



IB14J1010005-01

Country and Area Codes

BENB15J20101009

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

Code	Country or Area	Effective Frame No.
GSX-R750 L1 (E-21)	E.U.	JS1C4111100100001 –
GSX-R750UF L1 (E-21)	E.U.	JS1C4211100100001 –
GSX-R750 L1 (E-03)	U.S.A (Except for California)	JS1GR7MA B2100001 –
GSX-R750 L1 (E-24)	Australia	JS1C4111200100001 –
GSX-R750 L1 (E-28)	Canada	JS1GR7MA B2100001 –
GSX-R750 L1 (E-33)	California (U.S.A)	JS1GR7MA B2100001 –

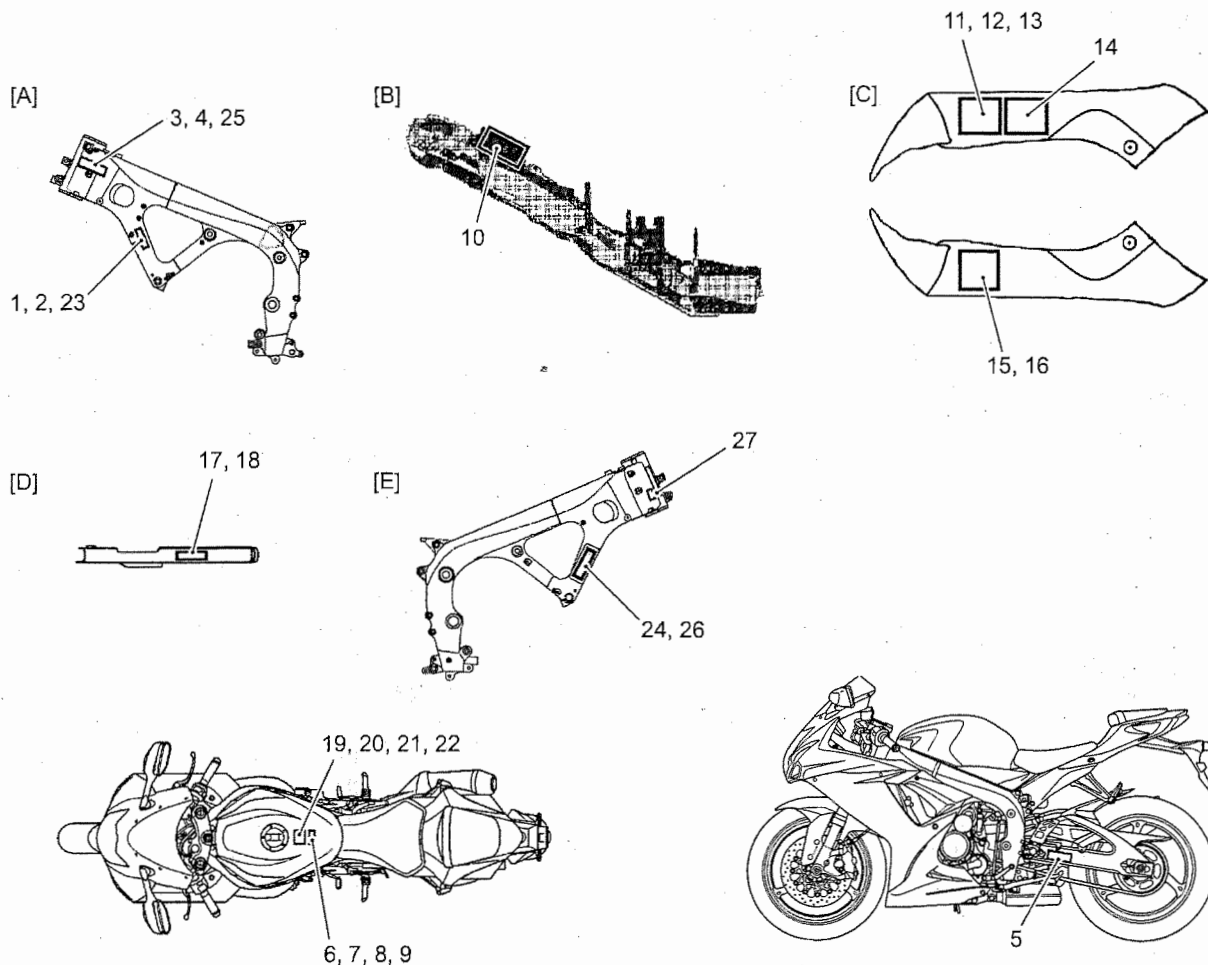
Wire Color Symbols

BENB15J20101010

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

Warning, Caution and Information Labels Location

BENB15J20101011



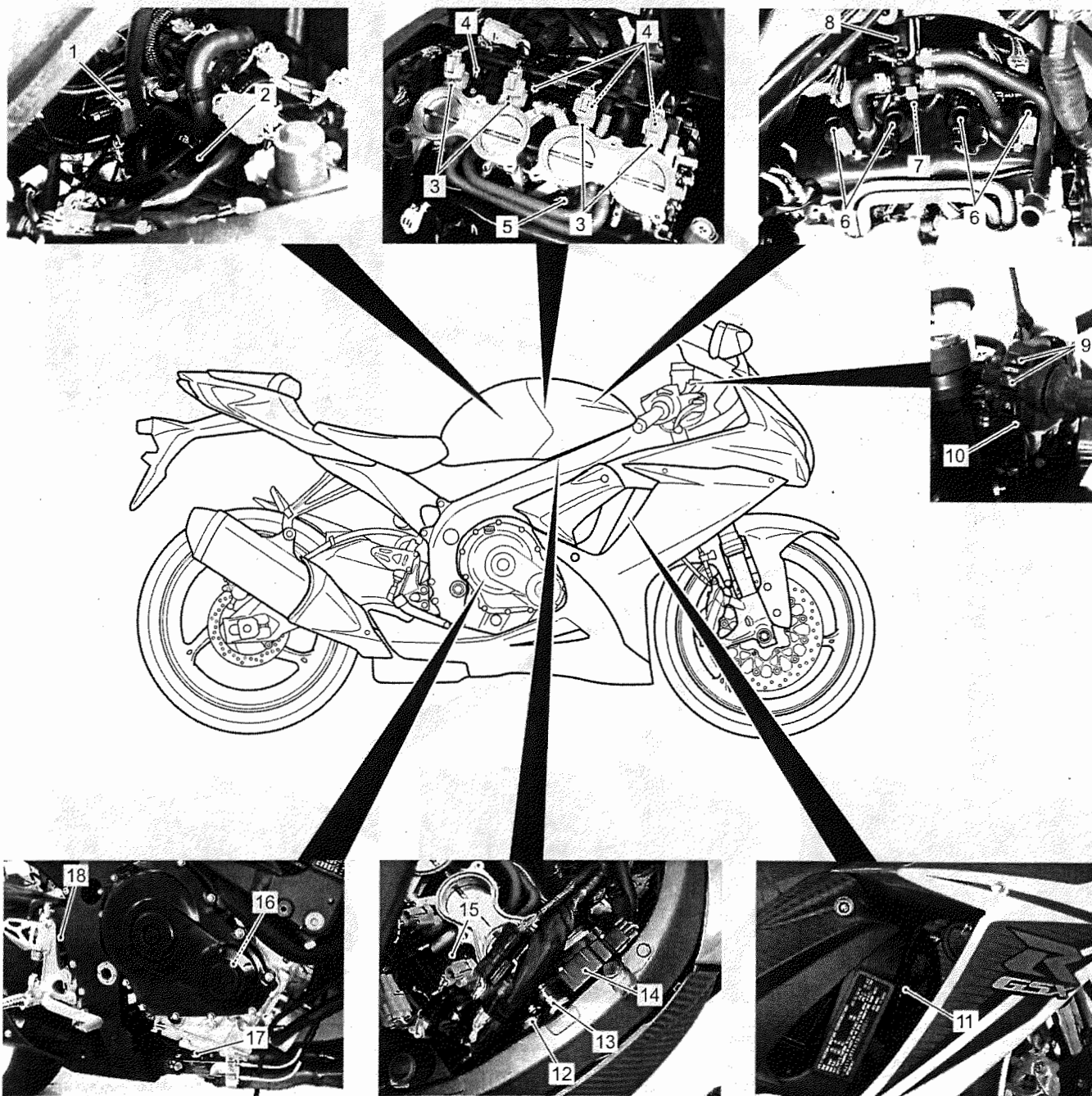
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1. Noise label [EPA] (English) (For E-03, 33)	17. Tire information label (English) (For E-03, 33)
2. Noise label [ADR] (English) (For E-24)	18. Tire information label (English/French/German) (For E-21, 24, 28)
3. Information label [EPA] (English/French) (For E-03, 28)	19. General warning label (English) (For E-03, 21, 24, 33)
4. Information label [EPA & CARB] (English) (For E-33)	20. General warning label (English/French) (For E-28)
5. Vacuum hose routing label (English) (For E-33)	21. General warning label (French) (For GSX-R750UF E-21)
6. Fuel information label [95 octance] (English) (For E-24)	22. General warning label (French/German/Italian/Swedish) (For E-21)
7. Fuel information label [90 octance] (English) (For E-03, 33)	23. ICES Canada label (English/French) (For E-28)
8. Fuel information label [95 octance] (English/French/German/Italian/Swedish) (For E-21)	24. I.D. plate (For E-21, 24)
9. Fuel information label [90 octance] (English/French) (For E-28)	25. E-21 I.D. label (For GSX-R750UF E-21)
10. Manual notice label (English) (For E-03, 33)	26. Safety plate (English) (For E-03, 28, 33)
11. Screen label (English) (For E-03, 21, 24, 28, 33)	27. Brake approval mark (For E-21)
12. Screen label (French) (For E-21)	[A]: Frame (LH)
13. Screen label (German/Italian/Swedish) (For E-21)	[B]: Rear fender, front
14. Screen label (French) (For E-28)	[C]: Intake cover
15. Steering warning label (English) (For E-03, 33)	[D]: Chain case
16. Steering warning label (English/French/German) (For E-21, 24, 28)	[E]: Frame (RH)

Component Location

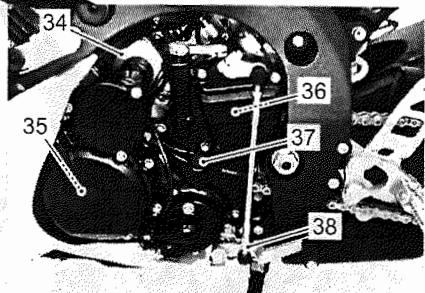
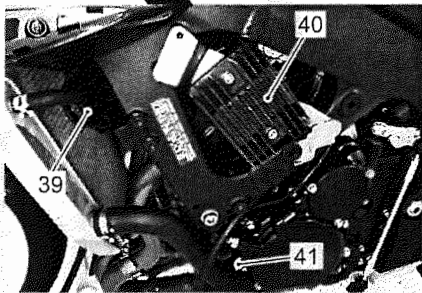
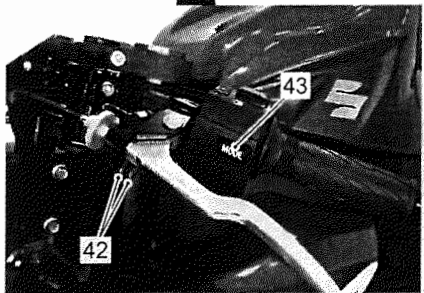
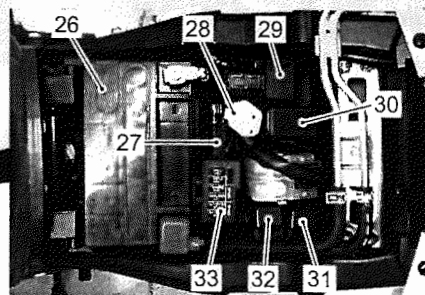
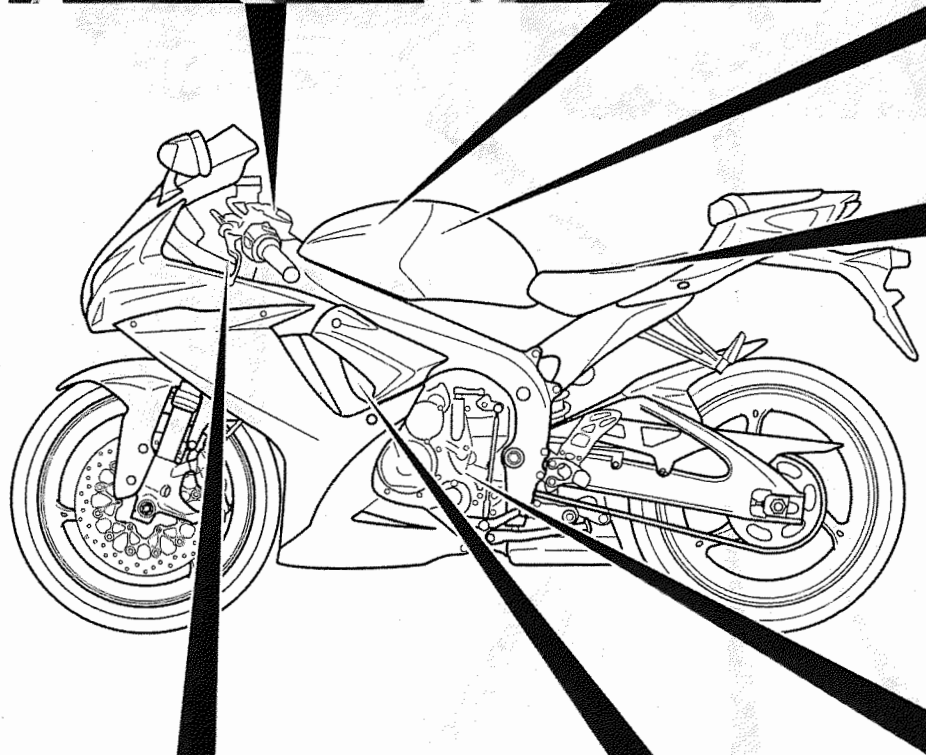
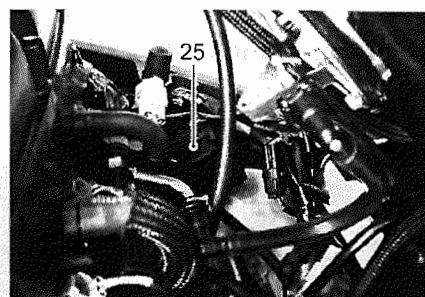
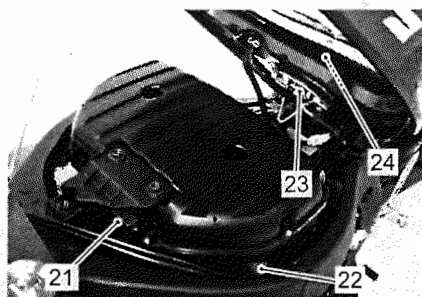
Electrical Components Location

BENB15J20103001



IB14J1010006-06

1. EVAP system purge control solenoid valve (E-33 only)	7. CMP sensor	13. STP sensor
2. ECT sensor	8. PAIR control solenoid valve	14. STV actuator
3. Secondary fuel injector	9. Lap time counter switch	15. IAP sensor
4. Primary fuel injector	10. Front brake light switch	16. CKP sensor
5. ISC valve	11. Cooling fan	17. HO2 sensor
6. Ignition coil/plug cap	12. TP sensor	18. Rear brake light switch



IB14J1010007-03

19. Ignition switch	26. Battery	33. Fuse box	40. Regulator/Rectifier
20. Steering damper solenoid valve	27. To sensor	34. Starter motor	41. Oil pressure switch
21. ECM	28. Mode selection coupler	35. Generator	42. Clutch lever position switch
22. IAT sensor	29. AP sensor	36. GP switch	43. Drive mode selector
23. Fuel pump	30. Turn signal/Side-stand relay	37. Speed sensor	
24. Fuel level gauge	31. Cooling fan relay	38. Side-stand switch	
25. EXCV actuator	32. Fuel pump relay	39. Horn	

Specifications

Specifications

BENB15J20107001

NOTE

These specifications are subject to change without notice.

Dimensions and curb mass

Item	Specification	Remark
Overall length	2 030 mm (79.9 in)	
Overall width	710 mm (27.9 in)	
Overall height	1 135 mm (44.7 in)	
Wheelbase	1 390 mm (54.7 in)	
Ground clearance	130 mm (5.1 in)	
Seat height	810 mm (31.9 in)	
Curb mass	190 kg (419 lbs)	

Engine

Item	Specification	Remark
Type	4-stroke, Liquid-cooled, DOHC	
Number of cylinders	4	
Bore	70.0 mm (2.756 in)	
Stroke	48.7 mm (1.917 in)	
Displacement	750 cm ³ (45.8 cu. in)	
Compression ratio	12.5 : 1	
Fuel system	Fuel injection system	
Air cleaner	Paper element	
Starter system	Electric	
Lubrication system	Wet sump	
Idle speed	1 200 ± 100 r/min	

Drive train

Item	Specification	Remark
Clutch	Wet multi-plate type	
Transmission	6-speed constant mesh	
Gearshift pattern	1-down, 5-up	
Primary reduction ratio	1.761 (74/42)	
Gear ratios	Low	2.785 (39/14)
	2nd	2.052 (39/19)
	3rd	1.714 (36/21)
	4th	1.500 (36/24)
	5th	1.347 (31/23)
	Top	1.208 (29/24)
Final reduction ratio	2.647 (45/17)	
Drive chain	RK 525ROZ5Y, 116 links	

Chassis

Item	Specification	Remark
Front suspension	Inverted telescopic, coil spring, oil damped	
Rear suspension	Link type, coil spring, oil damped	
Front suspension stroke	120 mm (4.7 in)	
Rear wheel travel	130 mm (5.1 in)	
Caster	23° 45'	
Trail	97 mm (3.8 in)	
Steering angle	27° (right & left)	
Turning radius	3.4 m (11.2 ft)	
Front brake	Disc brake, twin	
Rear brake	Disc brake	
Front tire size	120/70ZR17M/C (58W), tubeless	
Rear tire size	180/55ZR17M/C (73W), tubeless	

Electrical

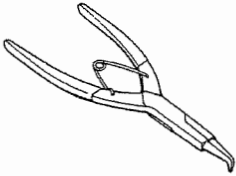
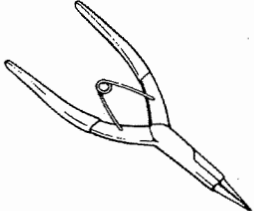
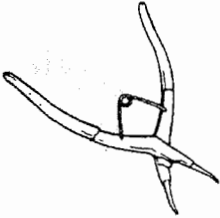
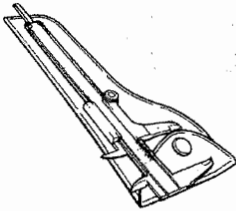
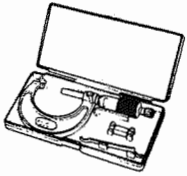
Item		Specification	Remark
Ignition type		Electronic ignition (Transistorized)	
Ignition timing		3° B.T.D.C. at 1 200 r/min	
Spark plug		NGK CR9EIA-9 or DENSO IU27D	
Battery		12 V 36.0 kC (10 Ah)/10 HR	
Generator		Three-phase A.C. generator	
Main fuse		30 A	
Fuse		10/10/10/10/10/15 A	
Headlight	High	12 V 65 W (H9)	
	Low	12 V 55 W (H7)	
Position light		12 V 5 W x 2	
Brake/Tail light		LED	
License plate light		12 V 5 W	
Turn signal light		12 V 21 W	
Combination meter light		LED	
Fuel level indicator light		LED	
Turn signal indicator light		LED	
Neutral indicator light		LED	
High beam indicator light		LED	
Oil pressure/Coolant temperature light		LED	
FI indicator light/Sd indicator light		LED	
Engine R.P.M. indicator light		LED	
Immobilizer indicator light		LED	E-21, 24


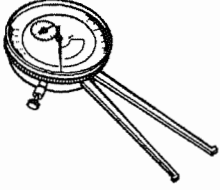
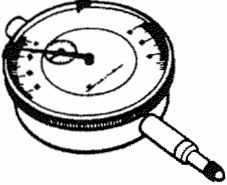
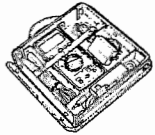
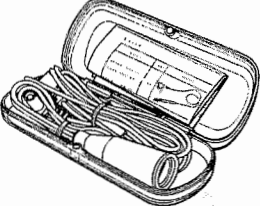

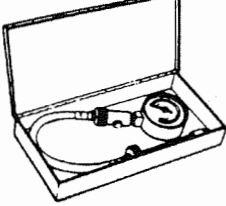
Capacities

Item		Specification	Remark
Fuel tank		16 L (4.2/3.5 US/Imp gal)	E-33
		17 L (4.5/3.7 US/Imp gal)	Others
Engine oil	Oil change	2 200 ml (2.3/1.9 US/Imp qt)	
	With filter change	2 500 ml (2.6/2.2 US/Imp qt)	
	Overhaul	2 900 ml (3.1/2.6 US/Imp qt)	
Engine coolant		2.65 L (2.8/2.3 US/Imp qt)	

Special Tools and Equipment**Special Tool**

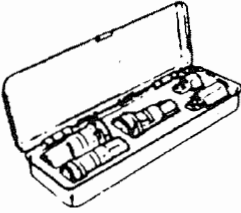
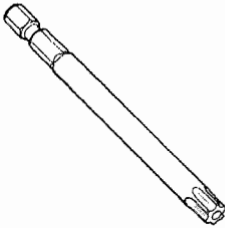
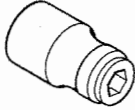
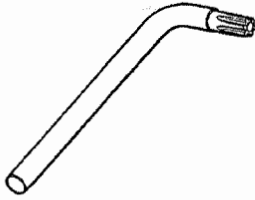
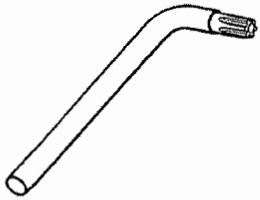
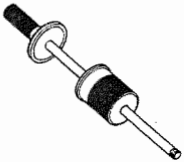
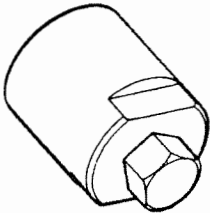
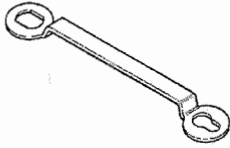

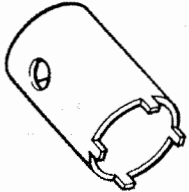
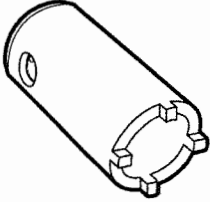

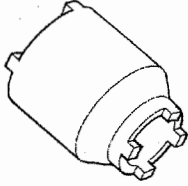
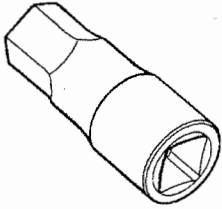
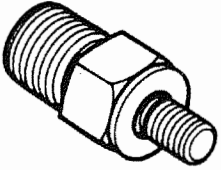
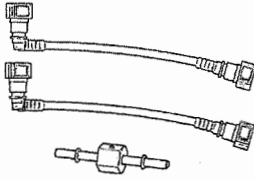
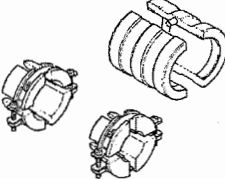
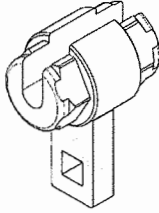

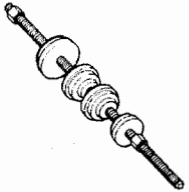
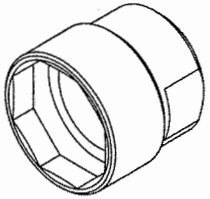
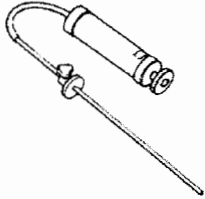
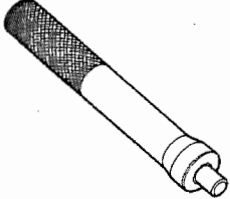
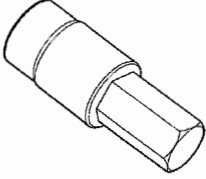
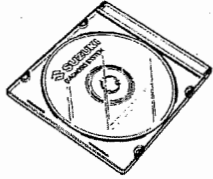
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09900-06104 Snap ring remover (Open type)	09900-06107 Snap ring remover (Open type)	09900-06108 Snap ring remover (Close type)	09900-20102 Vernier calipers (200 mm)	09900-20202 Micrometer (25 - 50 mm)

 <p>09900-20203 Micrometer (50 – 75 mm)</p>	 <p>09900-20205 Micrometer (0 – 25 mm)</p>	 <p>09900-20530 Cylinder gauge set</p>	 <p>09900-20602 Dial gauge</p>	 <p>09900-20605 Dial calipers (10 – 34 mm)</p>
 <p>09900-20607 Dial gauge</p>	 <p>09900-20701 Dial gauge chuck</p>	 <p>09900-20803 Thickness gauge</p>	 <p>09900-20805 Tire depth 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>09900-22401 Small bore gauge (10 – 18 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>09904-41010 SUZUKI Diagnostic system set</p>	 <p>09910-60611 Universal clamp wrench</p>	 <p>09913-10750 Compression gauge adapter</p>
 <p>09913-50121 Oil seal remover</p>	 <p>09913-70210 Bearing installing set (10 – 75 Φ)</p>	 <p>09915-40620 Oil filter wrench</p>	 <p>09915-64512 Compression gauge</p>	 <p>09915-74521 Adapter hose</p>

0A-13 General Information:

 <p>09915-74540 Oil pressure gauge adapter</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>09916-14530 Valve lifter attachment</p>	 <p>09916-33210 Valve guide reamer (4.5 mm)</p>	 <p>09916-33320 Valve guide reamer (9.8 mm)</p>	 <p>09916-34542 Reamer handle</p>	 <p>09916-43211 Valve guide installer & remover</p>
 <p>09916-43240 Valve guide installer attachment</p>	 <p>09916-43250 Valve guide installer attachment</p>	 <p>09916-77310 Piston ring compressor</p>	 <p>09916-84511 Tweezer</p>	 <p>09917-47011 Vacuum pump gauge set</p>
 <p>09919-28620 Sleeve protector</p>	 <p>09920-31020 Extension handle</p>	 <p>09920-53740 Clutch sleeve hub holder</p>	 <p>09921-20210 Bearing remover (12 mm)</p>	 <p>09921-20240 Bearing remover set</p>
 <p>09922-22711 Drive chain cutting and joint tool set</p>	 <p>09923-74511 Bearing remover</p>	 <p>09924-84510 Bearing installer set</p>	 <p>09924-84521 Bearing installer set</p>	 <p>09925-18011 Bearing installer</p>

				
09930-10121 Spark plug wrench set	09930-11920 Torx® bit (JT40H)	09930-11940 Torx® bit holder (3/8 sq.)	09930-11950 Torx® wrench (T25H)	09930-11960 Torx® wrench (T20H)
				
09930-30104 Rotor remover sliding shaft	09930-34980 Rotor remover	09930-44521 Rotor holder	09930-82720 Mode selection switch	09940-14911 Steering stem nut socket wrench
				
09940-14940 Swingarm pivot thrust adjuster wrench	09940-14960 Steering stem nut socket wrench	09940-14980 Engine mounting adjust wrench	09940-30230 Hexagon socket (17 mm)	09940-40211 Fuel pressure gauge adapter
				
09940-40220 Fuel pressure gauge attachment	09940-52861 Front fork oil seal installer set	09940-84711 Rod guide case wrench	09940-92720 Spring scale	09941-34513 Bearing installer
				
09941-53670 Front fork cap socket wrench (45 mm)	09943-74111 Front fork oil level gauge	09943-88211 Pinion bearing installer	09944-28321 Hexagon socket (19 mm)	99565-01010-023 CD-ROM Ver.23

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Maintenance and Lubrication

Precautions

Precautions for Maintenance

BENB15J20200001

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.

General Description

Recommended Fluids and Lubricants

BENB15J20201001

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

Scheduled Maintenance

Periodic Maintenance Schedule Chart

BENB15J20205001

NOTE

I = Inspect and clean, adjust, replace or lubricate as necessary.

R = Replace.

T = Tighten.

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

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

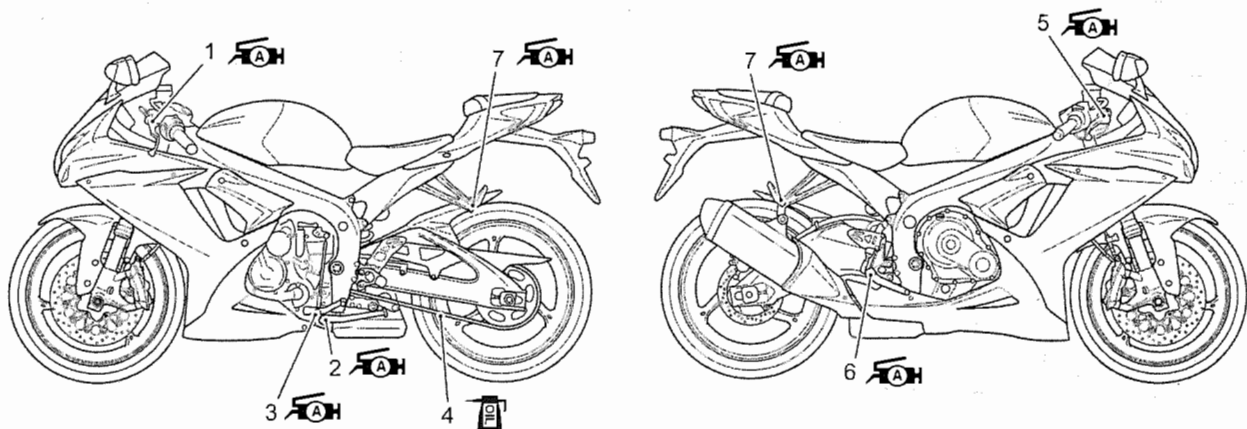
Lubrication Points

BENB15J20205002

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.



IB14J1020001-04

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

Repair Instructions

Air Cleaner Element Replacement

BENB15J20206001

Replace air cleaner element

Every 18 000 km (11 000 miles, 36 months)

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

Air Cleaner Element Inspection

BENB15J20206002

Inspect air cleaner element

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

Inspection

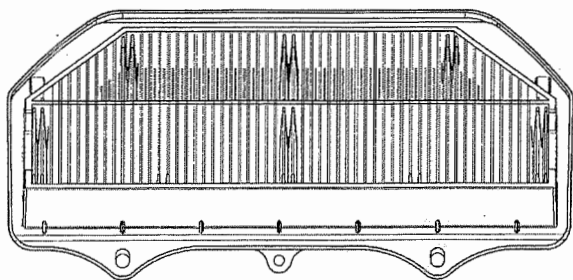
- 1) Remove the air cleaner element. Refer to "Air Cleaner Element Removal and Installation" in Section 1D (Page 1D-7).
- 2) Inspect the air cleaner element for clogging. If it is clogged with dirt, replace it with a new one.

NOTICE

Do not blow the air cleaner element with compressed air.

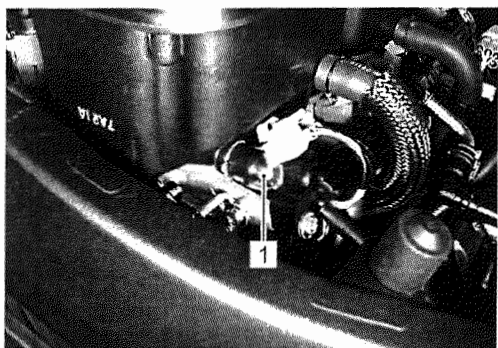
NOTE

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. The life of the engine depends largely on this component.



IB14J1020058-01

- 3) Drain water from the air cleaner box by removing the drain plug (1).



IB14J1020003-01

- 4) Reinstall the removed parts.

Exhaust Pipe Bolt and Muffler Bolt Inspection

BENB15J20206003

Tighten exhaust pipe bolts and muffler bolts

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

Inspect the exhaust pipe bolts and muffler bolts in the following procedures:

- 1) Remove the left and right cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Check the exhaust pipe bolts and muffler bolts to the specified torque.

Tightening torque

Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

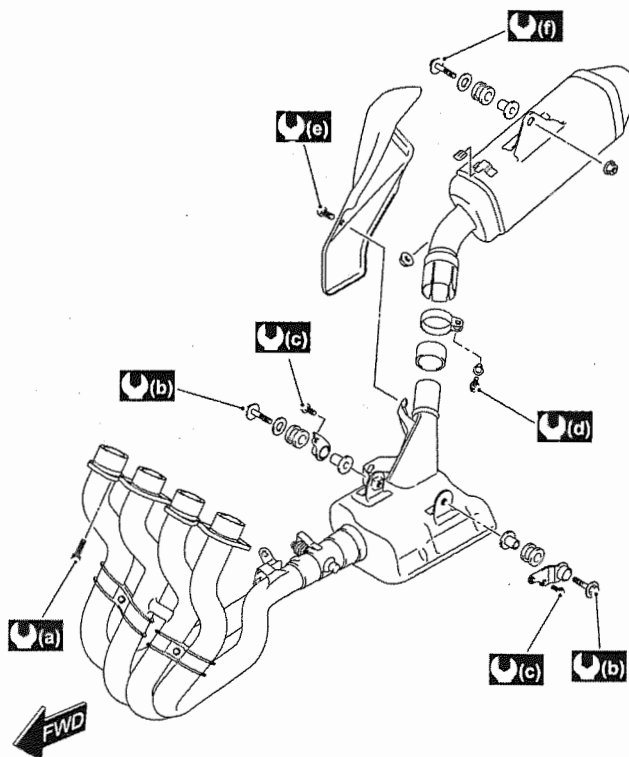
Exhaust chamber support bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

Exhaust chamber support bracket bolt (c): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)

Muffler connecting bolt (d): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

Muffler cover bolt (e): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

Muffler support bolt (f): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)



IB14J1020004-02

- 3) Install the left and right cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

Exhaust Control Valve Inspection

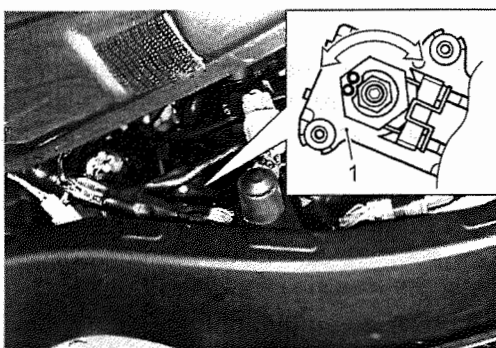
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Inspect exhaust control valve

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

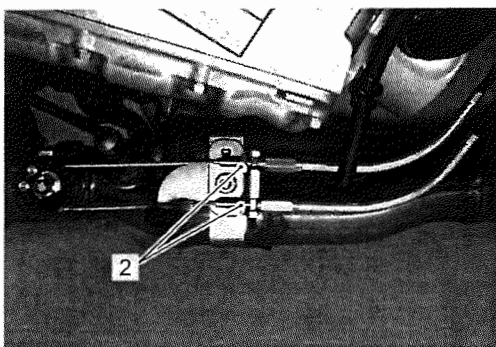
Inspect exhaust control valve as follows:

- 1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Check the exhaust control valve actuator (1) for its smooth movement when the ignition switch is turned on. If the exhaust valve actuator does not move smoothly, check exhaust valve actuator electrical circuit. Refer to "EXCVA Inspection" in Section 1K (Page 1K-10).



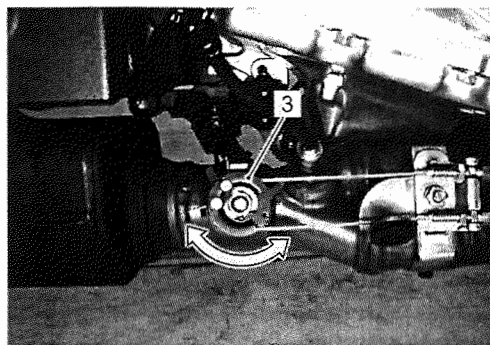
IB14J1020005-01

- 3) Turn the ignition switch OFF.
- 4) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 5) Check the lock-nuts (2) for tightness. If the lock-nuts (2) are loose, tighten them after adjusting the cable length. Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-7).



IB14J1020006-01

- 6) Check that the EXCV pulley (3) rotates to full open/close stopper positions, when turning the ignition switch ON.
- 7) Check that the output voltage of EXCVA position sensor is within specification. If not, perform EXCVA adjustment. Refer to "EXCVA Adjustment" in Section 1K (Page 1K-10).



IB14J1020007-01

- 8) Turn the ignition switch OFF.
- 9) Reinstall the removed parts.

Valve Clearance Inspection and Adjustment

BENB15J20206005

Inspect valve clearance

Initially every 24 000 km (14 500 miles, 48 months)

Inspection

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

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Remove the spark plugs. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-6).
- 4) Remove the cylinder head cover. Refer to "PAIR Reed Valve Removal and Installation" in Section 1B (Page 1B-9).

NOTE

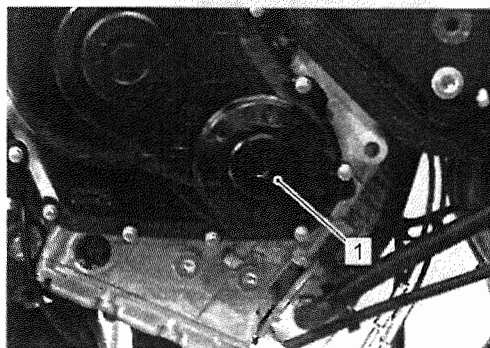
The valve clearance specification of intake and exhaust valve is different.

Valve clearance (When cold)

IN: 0.08 – 0.18 mm (0.003 – 0.007 in)

EX: 0.18 – 0.28 mm (0.007 – 0.011 in)

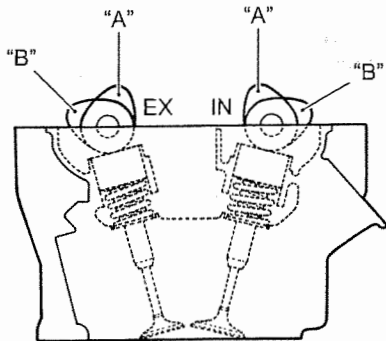
- 5) Remove the crankshaft hole plug (1).



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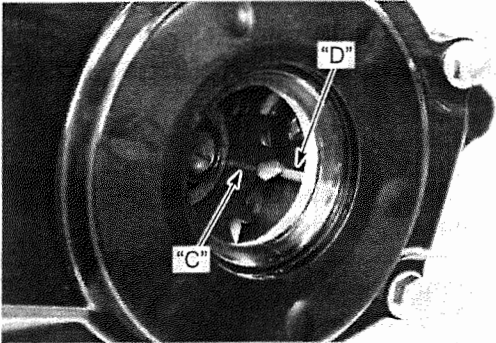
NOTE

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

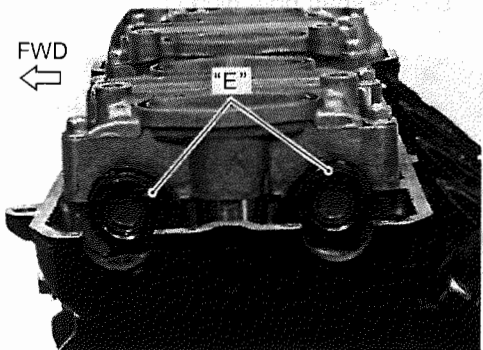


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6) Turn the crankshaft to bring the line "C" on the CKP sensor rotor to the rib "D" behind the clutch cover and also to bring the notches "E" on the left ends of both camshafts (EX and IN) to the positions as shown.




IB37H1020008-01

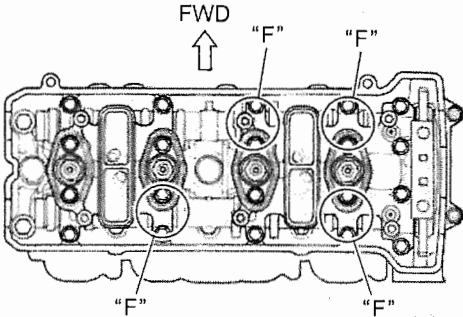


IB14J1020008-02

7) In this condition, read the valve clearance at the valves "F" (IN and EX of No. 4 cylinder, EX of No. 3 and IN of No. 2). If the clearance is out of specification, adjust the clearance.

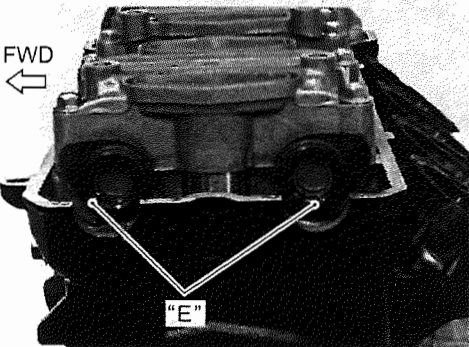
Special tool

 : 09900-20803 (Thickness gauge)



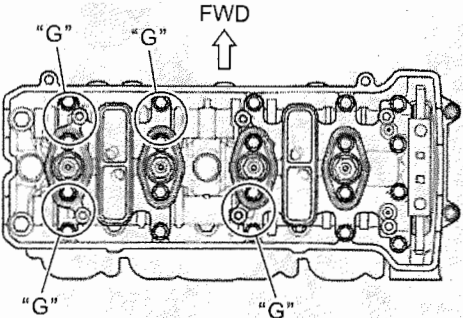
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8) Turn the crankshaft 360 degrees (one rotation) to bring the line on the CKP sensor rotor to the rib behind the clutch cover and also to bring the notches "E" to the position as shown.







IB14J1020009-01

9) Read the clearance at the rest of the valves "G" and adjust the clearance if necessary.



IB37H1020012-01

Cam position	Notch "E" position	
	Exhaust camshaft	Intake camshaft
"F"	← FWD 	← FWD 
"G"	← FWD 	← FWD 

IB37H1020013-01

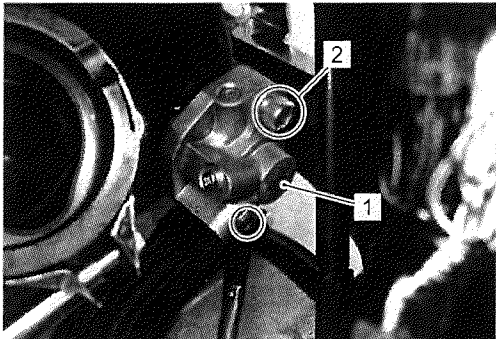
Adjustment

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

- 1) Remove the throttle body. Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-12).
- 2) Remove the cam chain tension adjuster (1).

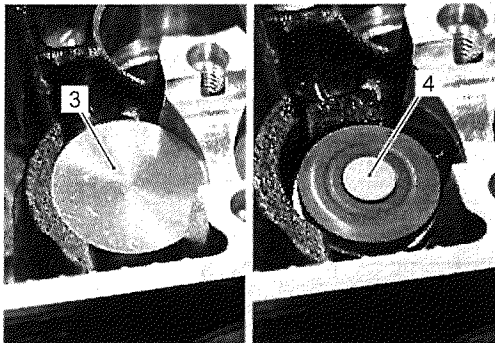
NOTE

When loosening or tightening the mounting bolts (2), use the short head hexagon wrench.



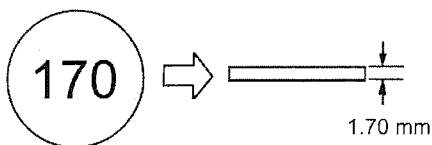
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- 3) Remove the intake or exhaust camshaft. Refer to "Engine Top Side Disassembly" in Section 1D (Page 1D-27).
- 4) Remove the tappet (3) and shim (4) by fingers or magnetic hand.



IB14J1020011-01

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

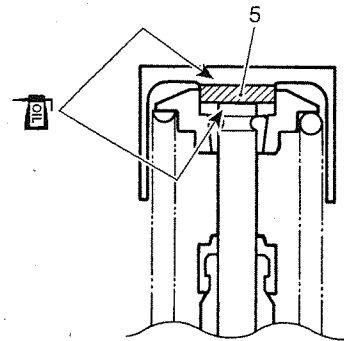


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- 6) Select a replacement shim that will provide a clearance within the specified range. For the purpose of this adjustment, a total of 21 sizes of tappet shim are available ranging from 1.20 to 2.20 mm in steps of 0.05 mm.
- 7) Apply engine oil to tappet shim top and bottom faces.
- 8) Fit the selected shim (5) to the valve stem end, with numbers toward tappet. Be sure to check shim size with micrometer to ensure its size.

NOTE

When seating the tappet shim, be sure the figure printed surface faces the tappet.



IB14J1020012-01

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

TAPPET SHIM SET (12800-05830)

MEASURED VALVE CLEARANCE (mm)	SUFFIX NO.	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	
	PRESENT SHIM SIZE (mm)	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	
0.00 – 0.02				1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15
0.03 – 0.07			1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	
0.08 – 0.18	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																						
0.19 – 0.28		1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20		
0.29 – 0.33		1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20				
0.34 – 0.38		1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20					
0.39 – 0.43		1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20						
0.44 – 0.48		1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20							
0.49 – 0.53		1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20								
0.54 – 0.58		1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20									
0.59 – 0.63		1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20										
0.64 – 0.68		1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20											
0.69 – 0.73		1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20												
0.74 – 0.78		1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20													
0.79 – 0.83		1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20														
0.84 – 0.88		1.90	1.95	2.00	2.05	2.10	2.15	2.20															
0.89 – 0.93		1.95	2.00	2.05	2.10	2.15	2.20																
0.94 – 0.98		2.00	2.05	2.10	2.15	2.20																	
0.99 – 1.03		2.05	2.10	2.15	2.20																		
1.04 – 1.08		2.10	2.15	2.20																			
1.09 – 1.13		2.15	2.20																				
1.14 – 1.18		2.20																					

HOW TO USE THIS CHART:

I. Measure valve clearance. "ENGINE IS COLD"

II. Measure present shim size.

III. Match clearance in vertical column with present shim size in horizontal column.

HOW TO USE THIS CHART:

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

EXAMPLE

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

(INTAKE SIDE)

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

TAPPET SHIM SET (12800-05830)

MEASURED VALVE CLEARANCE (mm)	SUFFIX NO.	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220
	PRESENT SHIM SIZE (mm)	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20
0.03 – 0.07					1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05
0.08 – 0.12				1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10
0.13 – 0.17			1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15
0.18 – 0.28		SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																				
0.29 – 0.38		1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.20	
0.39 – 0.43		1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20			
0.44 – 0.48		1.40	1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20				
0.49 – 0.53		1.45	1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20					
0.54 – 0.58		1.50	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20						
0.59 – 0.63		1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20							
0.64 – 0.68		1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20								
0.69 – 0.73		1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20									
0.74 – 0.78		1.70	1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20										
0.79 – 0.83		1.75	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20											
0.84 – 0.88		1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20												
0.89 – 0.93		1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20													
0.94 – 0.98		1.90	1.95	2.00	2.05	2.10	2.15	2.20														
0.99 – 1.03		1.95	2.00	2.05	2.10	2.15	2.20															
1.04 – 1.08		2.00	2.05	2.10	2.15	2.20																
1.09 – 1.13		2.05	2.10	2.15	2.20																	
1.14 – 1.18		2.10	2.15	2.20																		
1.19 – 1.23		2.15	2.20																			
1.24 – 1.28		2.20																				

HOW TO USE THIS CHART:

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

EXAMPLE

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

(EXHAUST SIDE)

0B-9 Maintenance and Lubrication:

- 9) Install the camshafts and cam chain tension adjuster. Refer to "Engine Top Side Assembly" in Section 1D (Page 1D-30).
- 10) 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.
- 11) After finishing the tappet clearance adjustment, reinstall the removed parts. Refer to "Engine Top Side Assembly" in Section 1D (Page 1D-30).

Spark Plug Replacement

BENB15J20206006

Replace spark plug

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

Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-6).

Spark Plug Inspection

BENB15J20206007

Inspect spark plug

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

Heat Range

- 1) Remove the spark plugs. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-6).
- 2) Check spark plug heat range by observing electrode color. If the electrode of the spark plug is wet appearing or dark color, replace the spark plug with hotter type one. If it is white or glazed appearing, replace the spark plug with colder type one.

Heat range

	Hot type	Standard	Cold type
NGK	CR8EIA-9	CR9EIA-9	CR10EIA-9
ND	IU24D	IU27D	IU31D

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

Tightening torque

Spark plug: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

Spark Plug Gap

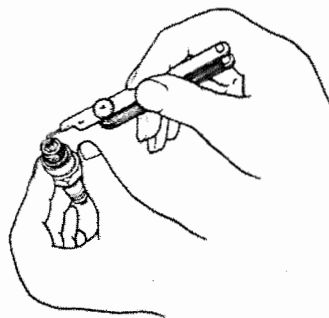
- 1) Remove the spark plugs. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-6).
- 2) Measure the spark plug gap using a wire gauge. If it is not within the specification, replace the spark plug.

NOTICE

- To prevent the damage of iridium center electrode, use a wire gauge to check the gap.
- Never adjust the spark plug gap.

Spark plug gap

0.8 – 0.9 mm (0.031 – 0.035 in)



I823H1020005-01

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

Tightening torque

Spark plug: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

Electrodes Condition

- 1) Remove the spark plugs. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-6).
- 2) 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 plug. If the reach is too short, carbon will be deposited on the screw portion of the plug hole and engine damage may result.

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

Tightening torque

Spark plug: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

Fuel Line Inspection

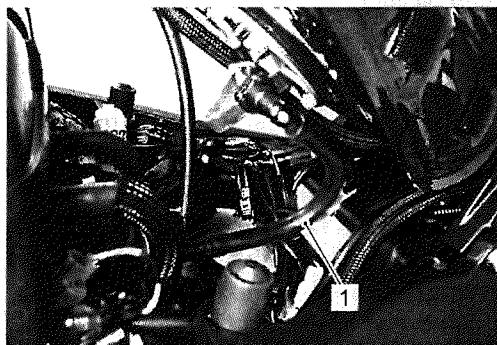
BENB15J20206008

Inspect fuel line

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

Inspect the fuel line in the following procedures:

- 1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Inspect the fuel feed hose (1) for damage and fuel leakage. If any defects are found, the fuel feed hose must be replaced.



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- 3) After finishing the fuel feed hose inspection, reinstall the removed parts.

Evaporative Emission Control System Inspection (E-33 only)

BENB15J20206009

Inspect evaporative emission control system

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

Inspect the evaporative emission control system periodically (E-33 only). Refer to "Evaporative Emission Control System Inspection (Only for E-33)" in Section 1B (Page 1B-16).

Engine Oil and Filter Replacement

BENB15J20206010

Replace engine oil

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

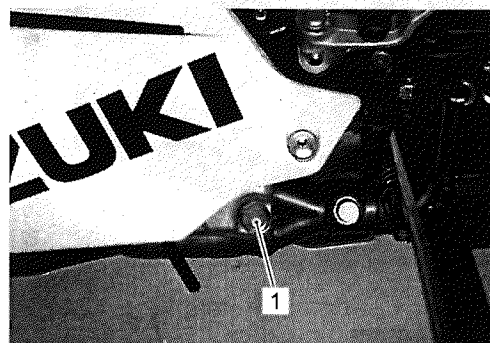
Replace oil filter

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

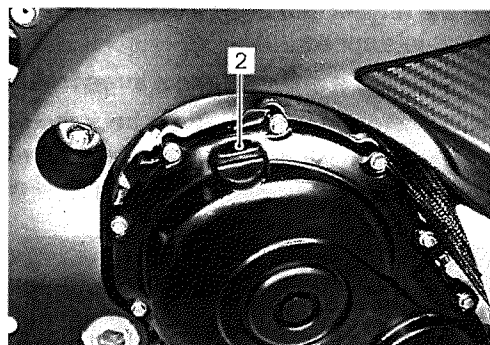
Oil should be changed while the engine is warm. Oil filter replacement at the above intervals, should be done together with the engine oil change.

Engine Oil Replacement

- 1) Place the motorcycle on the side-stand.
- 2) Place an oil pan below the engine, and drain engine oil by removing the oil drain plug (1) and filler cap (2).



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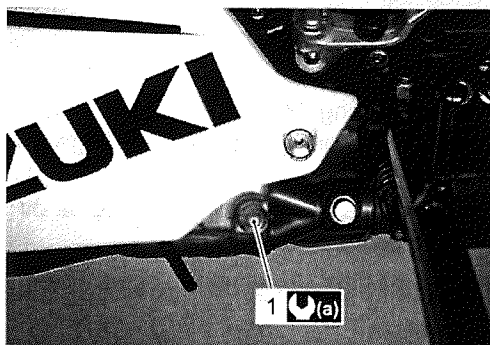


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- 3) Install the new gasket washer to the oil drain plug (1) and tighten the oil drain plug (1) to the specified torque.

Tightening torque

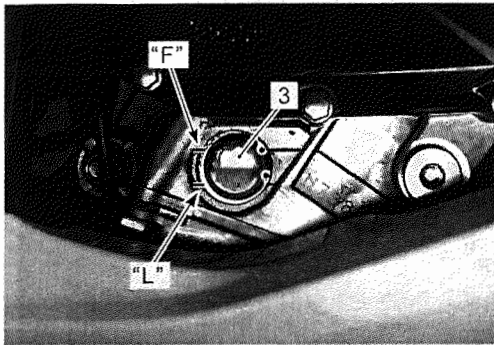
Oil drain plug (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



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- 4) Pour new oil through the oil filler. When performing an oil change (without oil filter replacement), the engine will hold about 2.2 L (2.3/1.9 US/Imp qt) of oil. Use of SF/SG or SH/SJ in API with MA in JASO.
- 5) Start up the engine and allow it to run for several minutes at idling speed.
- 6) Turn off the engine and wait about three minutes.

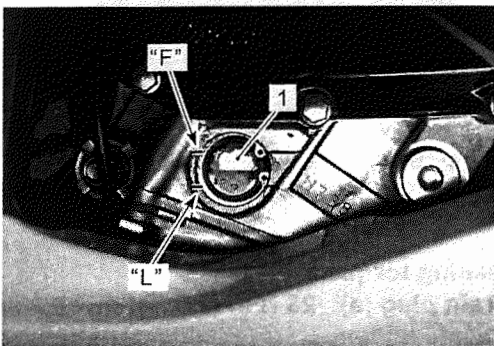
- 7) Hold the motorcycle vertically and check the oil level through the inspection window (3). The oil level should be between the low level "L" and full level "F".



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Oil Level Inspection

- 1) Place the motorcycle on the side-stand.
- 2) Start up the engine and allow it to run for several minutes at idle speed.
- 3) Turn off the engine and wait about three minutes.
- 4) Hold the motorcycle vertically and check the oil level through the inspection window (1). The oil level should be between the low level "L" and full level "F".




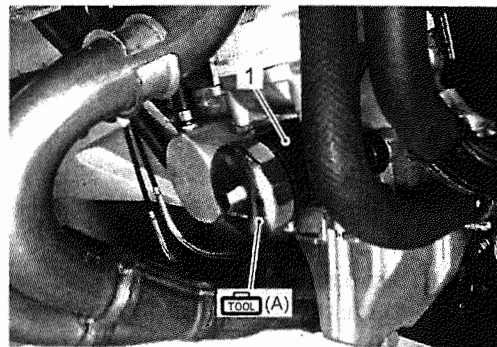
IB14J1020018-01

Oil Filter Replacement

- 1) Remove the left cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Drain engine oil as described in the engine oil replacement procedure.
- 3) Remove the oil filter (1) using the special tool.

Special tool

 (A): 09915-40620 (Oil filter wrench)



IB14J1020019-01

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

NOTE

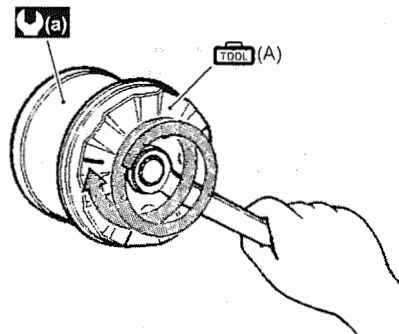
To properly tighten the oil filter, use the special tool. Never tighten the oil filter by hand only.

Special tool

 (A): 09915-40620 (Oil filter wrench)

Tightening torque

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



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

Necessary amount of engine oil

Oil change: 2 200 ml (2.3/1.9 US/lmp qt)

Oil and filter change: 2 500 ml (2.6/2.2 US/lmp qt)

Engine overhaul: 2 900 ml (3.1/2.6 US/lmp qt)

- 7) Reinstall the removed parts.

Throttle Cable Play Inspection and Adjustment

BENB15J20206011

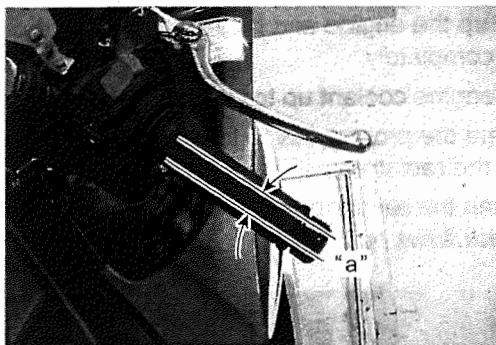
Inspect throttle cable play

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

Inspect and adjust the throttle cable play "a" as follows:

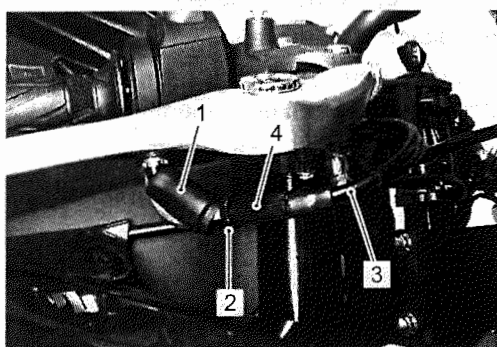
Throttle cable play "a"

2.0 – 4.0 mm (0.08 – 0.16 in)



IB14J1020020-01

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



IB14J1020021-01

- 5) Install the rubber boot (1) firmly.

⚠ 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.

PAIR System Inspection

BENB15J20206012

Inspect PAIR system

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

Inspect the PAIR (air supply) system periodically. Refer to "PAIR System Inspection" in Section 1B (Page 1B-11).

Throttle Valve Synchronization

BENB15J20206013

Inspect throttle valve synchronization

Initially at 1 000 km (600 miles, 2 months) (E-33 only) and every 12 000 km (7 500 miles, 24 months)

Inspect the throttle valve synchronization periodically. Refer to "Throttle Valve Synchronization" in Section 1D (Page 1D-19).

Cooling System Inspection

BENB15J20206014

Inspect cooling system

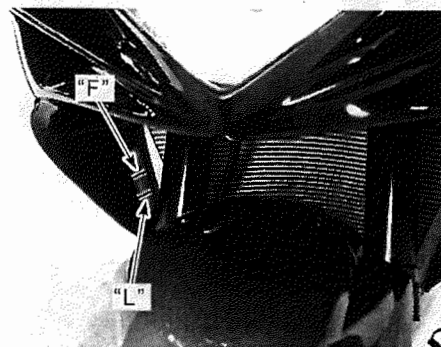
Every 6 000 km (4 000 miles, 12 months)

Replace engine coolant

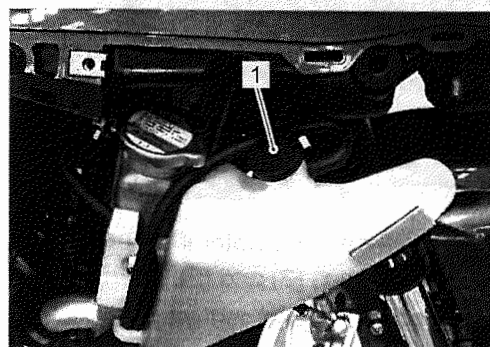
Every 2 years

Engine Coolant Level Inspection

- 1) Hold the motorcycle vertically.
- 2) Check the engine coolant level by observing the "F" and "L" lines on the engine coolant reservoir tank. If the level is below the "L" line, add engine coolant to the "F" line from the engine coolant reservoir tank filler (1) behind the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).



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IB14J1020023-01

- 3) Reinstall the removed parts.

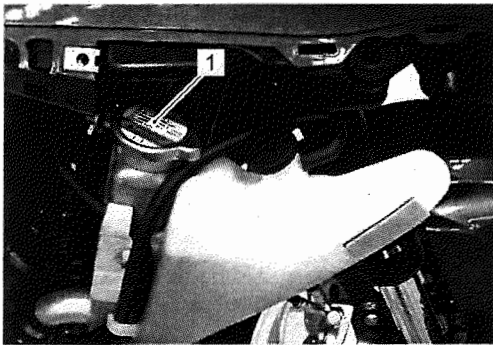
Engine Coolant Change

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

▲ WARNING

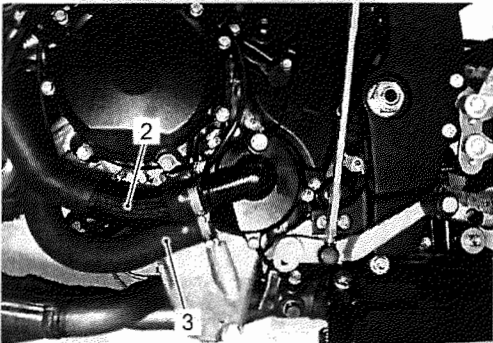
Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor. Engine coolant may be harmful if swallowed or if it comes in contact with skin or eyes. If engine coolant gets into the eyes or in contact with the skin, flush thoroughly with plenty of water.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

- 1) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the radiator cap (1).



IB14J1020024-01

- 3) Drain engine coolant by disconnecting the radiator outlet hose (2) and cylinder inlet hose (3).



IB14J1020025-01

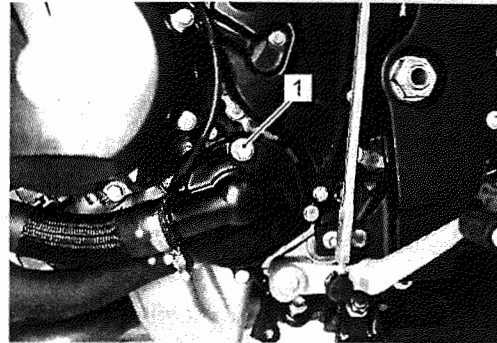
- 4) Flush the radiator with fresh water if necessary.
- 5) Reconnect the hoses (3) and (2).
- 6) Pour the specified engine coolant up to the radiator inlet.

Engine coolant capacity (excluding reservoir)
2 400 ml (2.5/2.1 US/Imp qt)

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

Air Bleeding From the Cooling Circuit

- 1) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Add engine coolant up to the radiator inlet.
- 3) Support the motorcycle upright.
- 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 procedures 5) to 6) until no air bleeds from the radiator inlet.
- 9) Loosen the air bleeder bolt (1) and check the engine coolant flows out.



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- 10) Tighten the air bleeder bolt securely.
- 11) Close the radiator cap securely.
- 12) After warming up and cooling down the engine several times, add the engine coolant up to the full level of the reservoir.
- 13) Reinstall the removed parts.

Radiator Hose Inspection

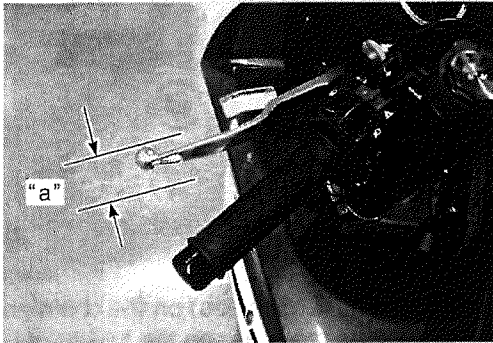
Check the radiator hoses for crack, damage or engine coolant leakage. Refer to "Water Hose Inspection" in Section 1F (Page 1F-7).

Clutch Cable Play Inspection and Adjustment

BENB15J20206015

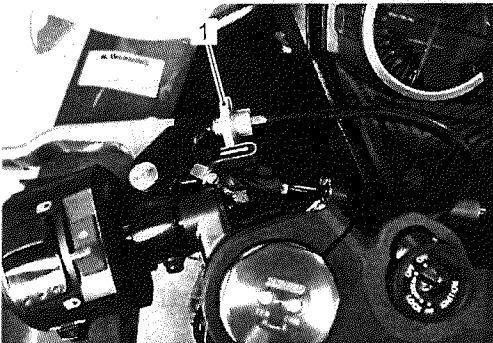
Inspect clutch cable play**Every 6 000 km (4 000 miles, 12 months)**

Inspect and adjust the clutch cable play "a" as follows.

Clutch cable play "a"**10 – 15 mm (0.4 – 0.6 in)**

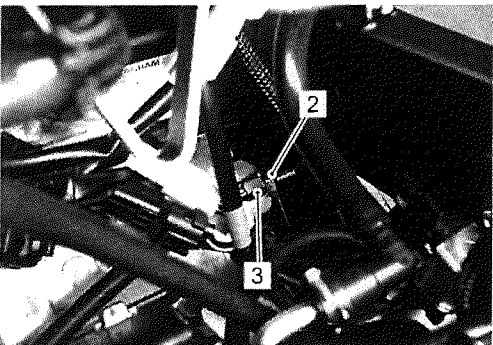
IB14J1020027-01

- 1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Turn in the adjuster (1) all the way into the clutch lever assembly.



IB14J1020028-01

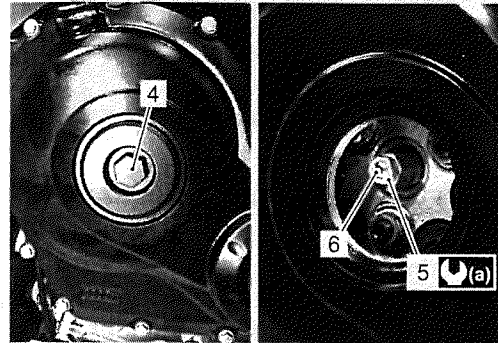
- 3) Loosen the lock-nut (2) and turn the clutch cable adjuster (3) to obtain proper cable play.



IB14J1020029-01

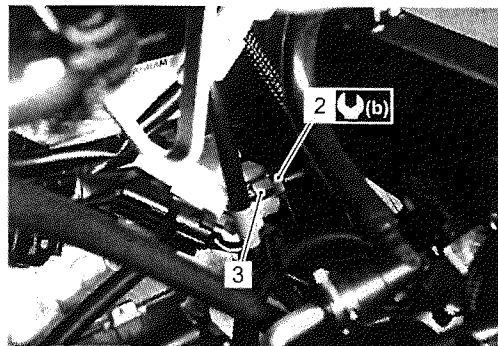
- 4) Remove the clutch release adjuster cap (4).
- 5) Loosen the lock-nut (5) and turn out the adjusting screw (6) two or three rotations.

- 6) From that position, slowly turn in the adjusting screw (6) until resistance is felt.
- 7) From this position, turn out the adjusting screw (6) 1 rotation, and tighten the lock-nut (5) while holding the screw (6).

Tightening torque**Clutch release adjusting screw lock-nut (a): 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)**

IB14J1020030-02

- 8) Turn the cable adjuster (3) to approximate 10 – 15 mm (0.4 – 0.6 in) of free play "a" at the clutch lever end.
- 9) Tighten the lock-nut (2).

Tightening torque**Clutch cable lock-nut (b): 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)**

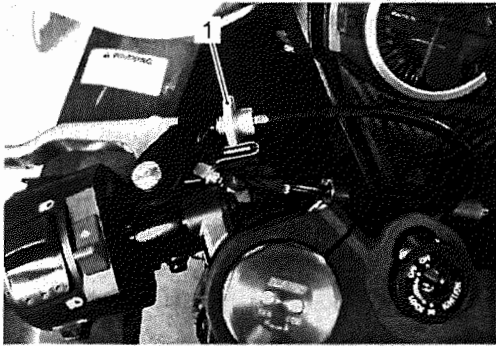
IB14J1020031-02

- 10) Tighten the clutch release adjuster cap (4) to the specified torque.

Tightening torque**Clutch release adjuster cap: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)**

- 11) Reinstall the fuel tank.

- 12) Turn the adjuster (1) to obtain 10 – 15 mm of free play “a” at the clutch lever end.



IB14J1020057-01

Drive Chain Inspection and Adjustment

BENB15J20206016

Inspect drive chain

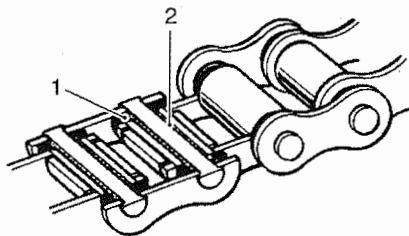
Initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter

Drive Chain Visual Check

- 1) With the transmission in neutral, support the motorcycle using 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. Refer to “Drive Chain Replacement” in Section 3A (Page 3A-7).
 - Loose pins
 - Damaged rollers
 - Dry or rusted links
 - Kinked or binding links
 - Excessive wear
 - Improper chain adjustment
 - Missing O-ring seals

NOTE

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



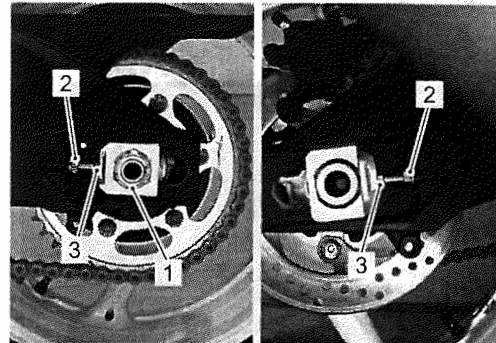
I649G1020032-02

1. O-ring seal

2. Grease

Drive Chain Length Inspection

- 1) Loosen the 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).

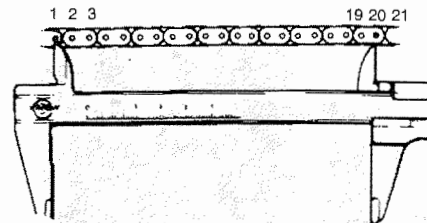


IB14J1020032-01

- 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.

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

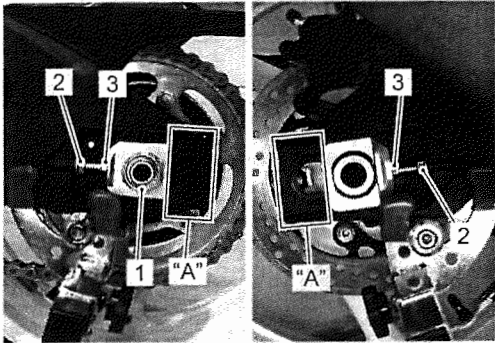
- 1) Support the motorcycle with a jack.
- 2) Loosen the axle nut (1).
- 3) Loosen the left and right chain adjuster lock-nuts (2).
- 4) Loosen or tighten both chain adjuster bolts (3) until there is 20 – 30 mm (0.8 – 1.2 in) of slack "a" at the middle of the chain between the engine and rear sprockets as shown in the figure.

NOTICE

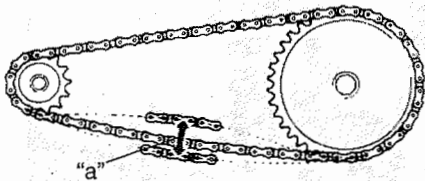
The reference marks "A" on both sides of the swingarm and the edge of each chain adjuster must be aligned to ensure that the front and rear wheels are correctly aligned.

Drive chain slack "a"

Standard: 20 – 30 mm (0.8 – 1.2 in)



IB14J1020033-01



I649G1020036-02

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

Tightening torque

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

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

Drive Chain Cleaning and Lubricating

BENB15J20206017

Clean and lubricate drive chain

Every 1 000 km (600 miles)

Clean and lubricate the drive chain in the following procedures:

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

NOTICE

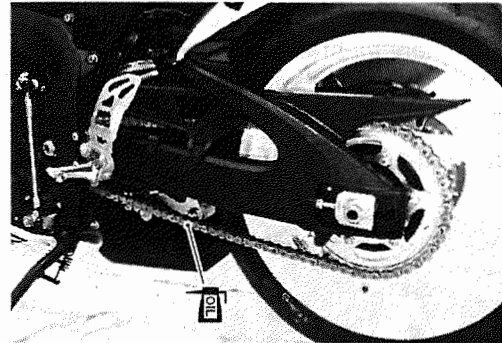
Do not use trichloroethylene, gasoline or any similar solvent. These fluids have too great a dissolving power for this chain and they can damage the O-rings.

Use only kerosine to clean the drive chain.

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

NOTICE

- Do not use any oil sold commercially as "drive chain oil". Such oil can damage the O-rings.
- The standard drive chain is a RK 525ROZ5Y. SUZUKI recommends to use this standard drive chain as a replacement.



IB14J1020034-01

Brake System Inspection

BENB15J20206018

Inspect brake system

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

Inspect brake hose and brake fluid

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

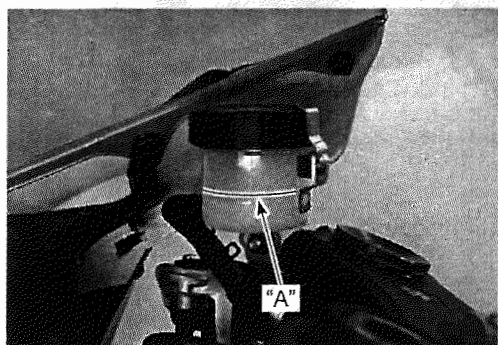
▲ WARNING

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

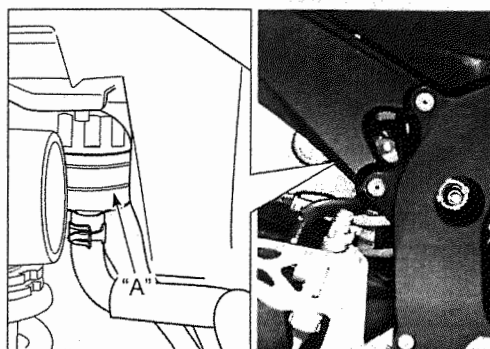
Brake Fluid Level Check

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

BF: Brake fluid (DOT 4)



IB14J1020035-02



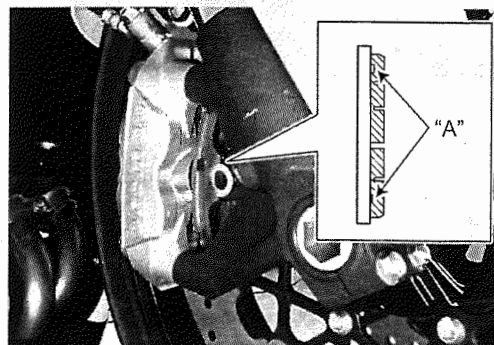
IB14J1020036-01

Brake Pads Check

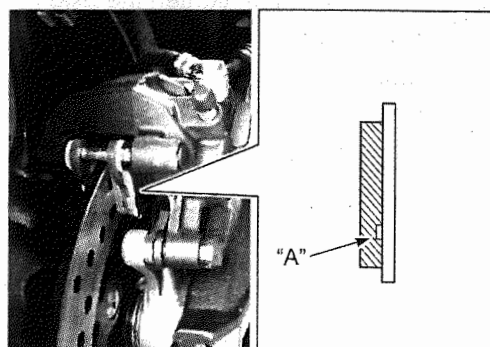
The extent of brake pad wear can be checked by observing the grooved limit line "A" on the pad. When the wear exceeds the grooved limit line, replace the pads with new ones. Refer to "Front Brake Pad Replacement" in Section 4B (Page 4B-2) and "Rear Brake Pad Replacement" in Section 4C (Page 4C-2).

NOTICE

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



IB14J1020037-03



IB14J1020038-01

Brake Pedal Height Inspection and Adjustment

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

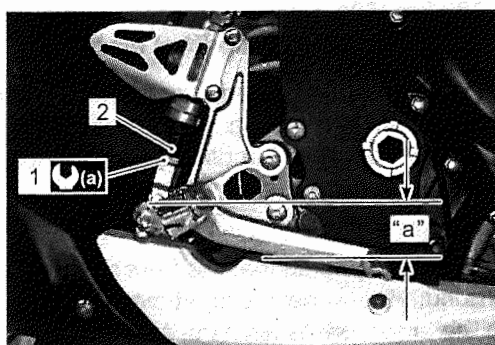
Brake pedal height "a"

Standard: 65 – 75 mm (2.6 – 3.0 in)

- 2) Loosen the lock-nut (1).
- 3) Turn the push rod (2) until the brake pedal becomes 65 – 75 mm (2.6 – 3.0 in) "a" below the top of the footrest.
- 4) Tighten the lock-nut (1) securely.

Tightening torque

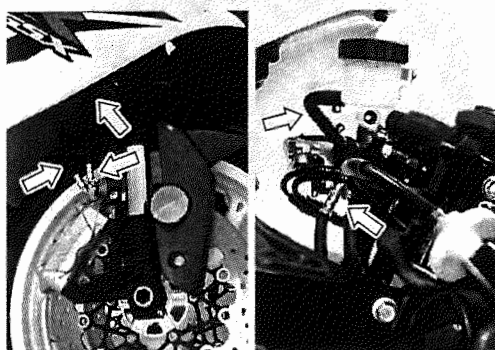
Rear master cylinder rod lock-nut (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



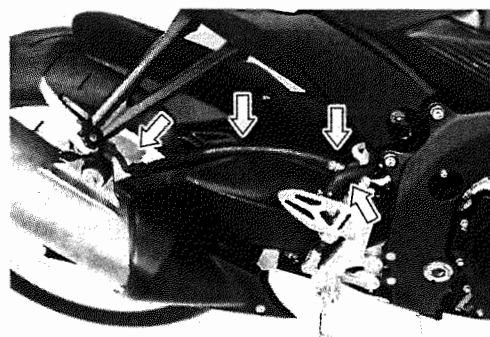
IB14J1020039-02

Front and Rear Brake Hose Inspection

Inspect the brake hoses and hose joints for crack, damage or brake oil leakage. If any defects are found, replace the brake hose with a new one. Refer to "Front Brake Hose Removal and Installation" in Section 4A (Page 4A-8) and "Rear Brake Hose Removal and Installation" in Section 4A (Page 4A-8).



IB14J1020040-01



IB14J1020041-01

Brake Hose Replacement

Replace brake hose **Every 4 years**

Refer to "Front Brake Hose Removal and Installation" in Section 4A (Page 4A-8) and "Rear Brake Hose Removal and Installation" in Section 4A (Page 4A-8).

Brake Fluid Replacement

Replace brake fluid **Every 2 years**

Refer to "Brake Fluid Replacement" in Section 4A (Page 4A-7).

Air Bleeding from Brake Fluid Circuit

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

Rear Brake Light Switch Adjustment

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

Tire Inspection

BENB15J20206019

Inspect tire

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

Tire Tread Condition

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

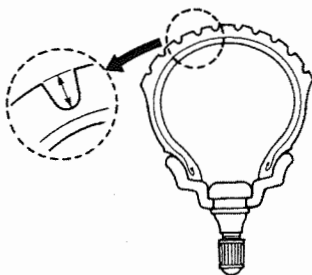
Special tool

Tool : 09900-20805 (Tire depth gauge)

Tire tread depth (Service limit)

Front: 1.6 mm (0.06 in)

Rear: 2.0 mm (0.08 in)



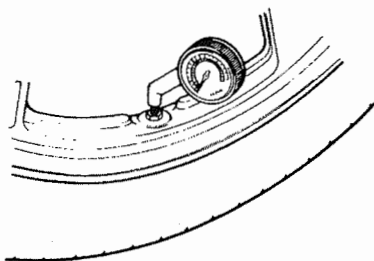
I310G1020068-02

Tire Pressure

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

Cold inflation tire pressure

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



I310G1020069-02

NOTICE

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

Tire type

BRIDGESTONE BATTLAX

- Front: BT016F G
- Rear: BT016R G

Steering System Inspection

BENB15J20206020

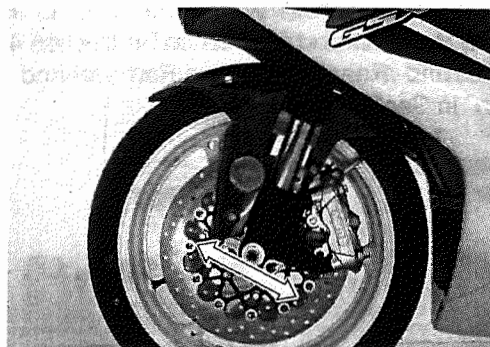
Inspect steering system

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

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

- 1) Check that there is no play in the front fork.
- 2) Support the motorcycle so that the front wheel is off the ground, with the wheel facing straight ahead, grasp the lower fork tubes near the axle and pull forward.

If play is found, readjust the steering. Refer to "Steering Tension Adjustment" in Section 6B (Page 6B-13).



IB14J1020042-01

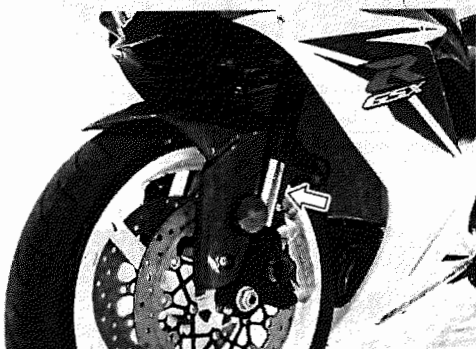
Front Fork Inspection

BENB15J20206021

Inspect front fork

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

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



IB14J1020043-01

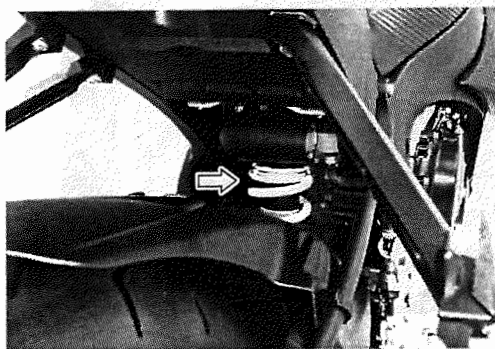
Rear Suspension Inspection

BENB15J20206022

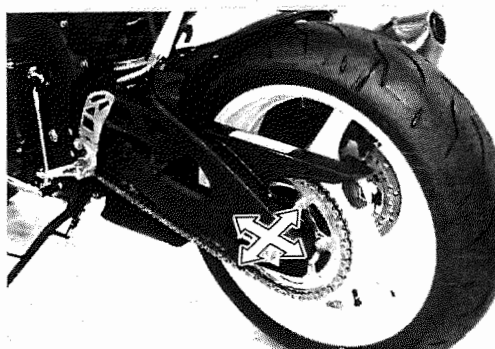
Inspect rear suspension

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

Inspect the rear shock absorber for oil leakage and check that there is no play in the swingarm. Replace any defective parts, if necessary. Refer to "Rear Shock Absorber Removal and Installation" in Section 2C (Page 2C-3), "Cushion Lever Removal and Installation" in Section 2C (Page 2C-7) and "Swingarm Removal and Installation" in Section 2C (Page 2C-9).



IB14J1020044-01



IB14J1020045-01

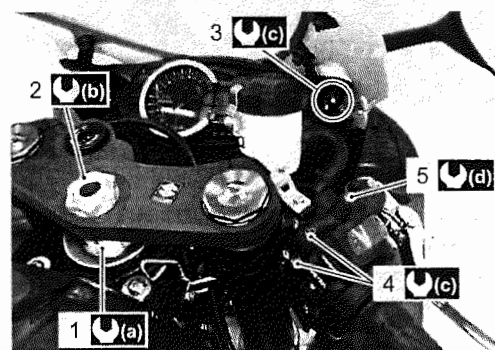
Chassis Bolt and Nut Inspection

BENB15J20206023

Tighten chassis bolt and nut

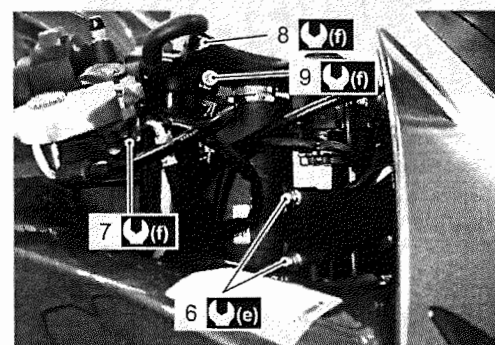
Initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter

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



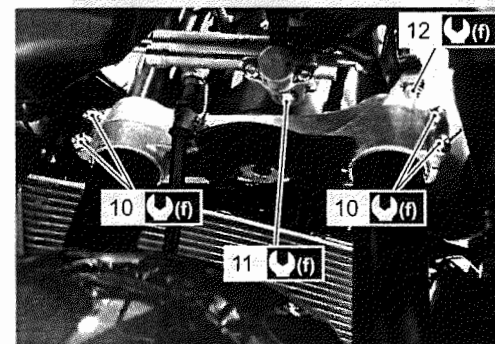
IB14J1020046-01

1	(a)	Steering stem lock-nut 80 N·m (8.0 kgf-m, 58.0 lbf-ft)
2	(b)	Steering stem head nut 90 N·m (9.0 kgf-m, 65.0 lbf-ft)
3	(c)	Rear view mirror mounting nut 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
4	(c)	Front brake master cylinder holder bolt 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
5	(d)	Front master cylinder air bleeder valve 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



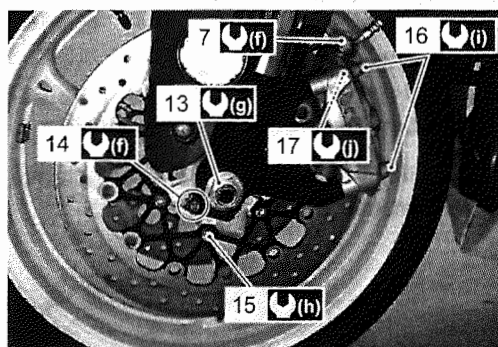
IB14J1020047-02

6	(e)	Cowling brace mounting nut 38 N·m (3.8 kgf-m, 27.5 lbf-ft)
7	(f)	Brake hose union bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
8	(f)	Front fork upper clamp bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
9	(f)	Handlebar clamp bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



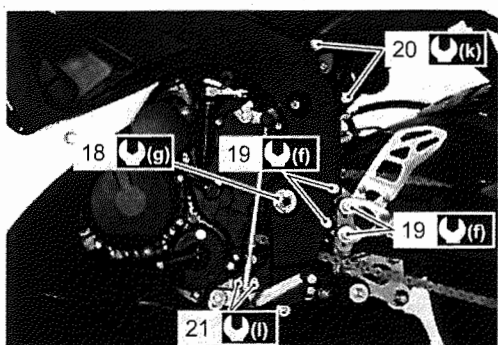
IB14J1020048-01

10	(f)	Front fork lower clamp bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
11	(f)	Steering damper bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
12	(f)	Steering damper nut 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



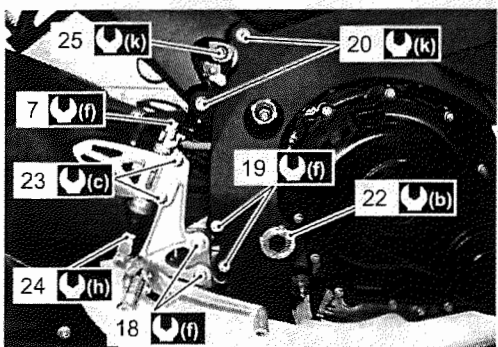
IB14J1020049-02

7	(f)	Brake hose union bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
13	(g)	Front axle nut 100 N-m (10.0 kgf-m, 72.5 lbf-ft)
14	(f)	Front axle pinch bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
15	(h)	Front brake disc bolt 18 N-m (1.8 kgf-m, 13.0 lbf-ft)
16	(i)	Front brake caliper mounting bolt 39 N-m (3.9 kgf-m, 28.0 lbf-ft)
17	(j)	Front brake air bleeder valve 7.5 N-m (0.75 kgf-m, 5.5 lbf-ft)



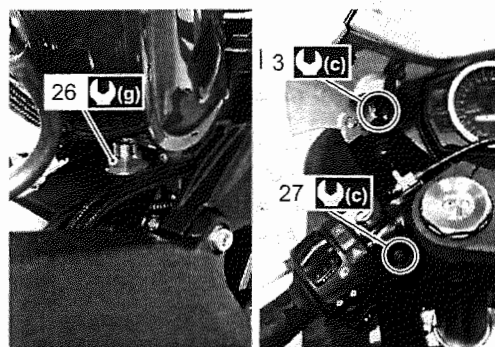
IB14J1020050-03

18	(g)	Swingarm pivot nut 100 N-m (10.0 kgf-m, 72.5 lbf-ft)
19	(f)	Front footrest bracket bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
20	(k)	Seat rail mounting bolt 50 N-m (5.0 kgf-m, 36.0 lbf-ft)
21	(l)	Gear shift lever bracket bolt 28 N-m (2.8 kgf-m, 20.0 lbf-ft)



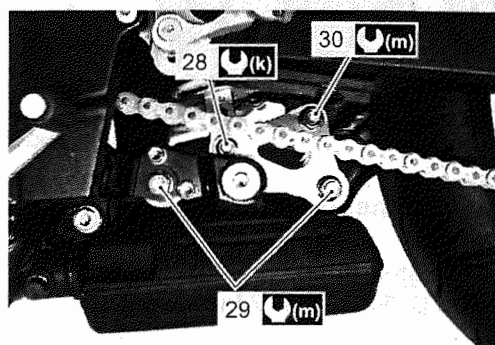
IB14J1020051-06

7	(f)	Brake hose union bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
19	(f)	Front footrest bracket bolt 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
20	(k)	Seat rail mounting bolt 50 N-m (5.0 kgf-m, 36.0 lbf-ft)
22	(b)	Swingarm pivot lock-nut 90 N-m (9.0 kgf-m, 65.0 lbf-ft)
23	(c)	Rear brake master cylinder mounting bolt 10 N-m (1.0 kgf-m, 7.0 lbf-ft)
24	(h)	Rear brake master cylinder rod lock-nut 18 N-m (1.8 kgf-m, 13.0 lbf-ft)
25	(k)	Rear shock absorber upper mounting nut 50 N-m (5.0 kgf-m, 36.0 lbf-ft)



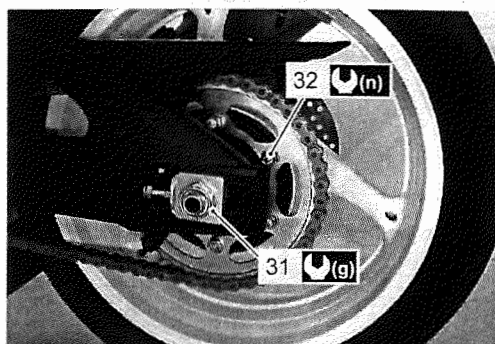
IB14J1020052-03

3	(c)	Rear view mirror mounting nut 10 N-m (1.0 kgf-m, 7.0 lbf-ft)
26	(g)	Rear shock absorber bracket nut 100 N-m (10.0 kgf-m, 72.5 lbf-ft)
27	(c)	Clutch lever holder bolt 10 N-m (1.0 kgf-m, 7.0 lbf-ft)



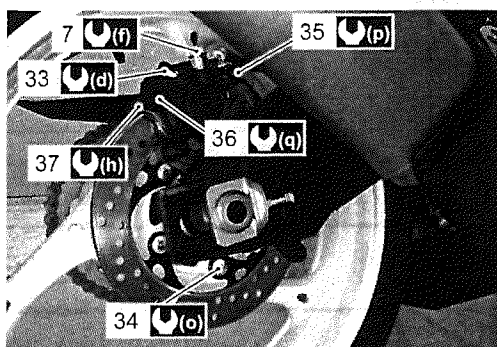
IB14J1020053-03

28	(k)	Rear shock absorber lower mounting nut 50 N-m (5.0 kgf-m, 36.0 lbf-ft)
29	(m)	Cushion rod nut 98 N-m (9.8 kgf-m, 71.0 lbf-ft)
30	(m)	Cushion lever mounting nut 98 N-m (9.8 kgf-m, 71.0 lbf-ft)



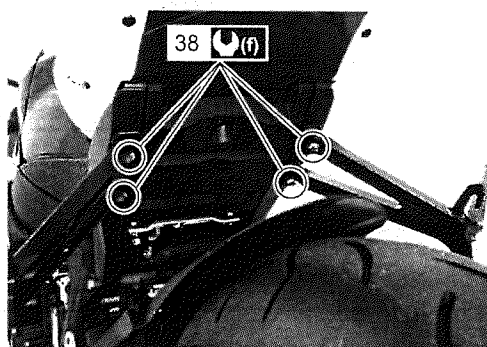
IB14J1020054-03

31	(g)	Rear axle nut 100 N-m (10.0 kgf-m, 72.5 lbf-ft)
32	(n)	Rear sprocket nut 60 N-m (6.0 kgf-m, 43.0 lbf-ft)



IB14J1020055-03

7		Brake hose union bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
33		Rear brake caliper air bleeder valve 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
34		Rear brake disc bolt 35 N·m (3.5 kgf-m, 25.5 lbf-ft)
35		Rear brake caliper sliding pin 27 N·m (2.7 kgf-m, 19.5 lbf-ft)
36		Rear brake pad mounting pin plug 2.5 N·m (0.25 kgf-m, 2.0 lbf-ft)
37		Rear brake pad mounting pin 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



IB14J1020056-03

38		Pillion footrest bracket bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
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Compression Pressure Check

BENB15J20206024

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

Oil Pressure Check

BENB15J20206025

Refer to "Oil Pressure Check" in Section 1E (Page 1E-5).

SDS Check

BENB15J20206026

Refer to "SDS Check" in Section 1A (Page 1A-16).

Specifications

Tightening Torque Specifications

BENB15J20207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Exhaust pipe bolt	23	2.3	16.5	☞ (Page 0B-3)
Exhaust chamber support bolt	23	2.3	16.5	☞ (Page 0B-3)
Exhaust chamber support bracket bolt	26	2.6	19.0	☞ (Page 0B-3)
Muffler connecting bolt	23	2.3	16.5	☞ (Page 0B-3)
Muffler cover bolt	11	1.1	8.0	☞ (Page 0B-3)
Muffler support bolt	26	2.6	19.0	☞ (Page 0B-3)
Spark plug	11	1.1	8.0	☞ (Page 0B-9) / ☞ (Page 0B-9) / ☞ (Page 0B-9)
Oil drain plug	23	2.3	16.5	☞ (Page 0B-10)
Oil filter	20	2.0	14.5	☞ (Page 0B-11)
Clutch release adjusting screw lock-nut	5.5	0.55	4.0	☞ (Page 0B-14)
Clutch cable lock-nut	4.5	0.45	3.0	☞ (Page 0B-14)
Clutch release adjuster cap	11	1.1	8.0	☞ (Page 0B-14)
Rear axle nut	100	10.0	72.5	☞ (Page 0B-16)
Rear master cylinder rod lock-nut	18	1.8	13.0	☞ (Page 0B-18)

NOTE

The tightening torque(s) also specified in:
"Chassis Bolt and Nut Inspection" (Page 0B-20)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J20208001

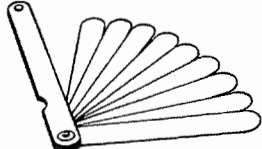
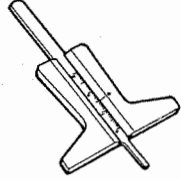

Material	SUZUKI recommended product or Specification	Note
Brake fluid	DOT 4	(Page 0B-17)

NOTE

Required service material(s) also described in:
 “Lubrication Points” (Page 0B-2)

Special Tool

BENB15J20208002

09900-20803 Thickness gauge (Page 0B-5) 	09900-20805 Tire depth gauge (Page 0B-19) 
09915-40620 Oil filter wrench (Page 0B-11) / (Page 0B-11) 	

Service Data

Specifications

Service Data

BENB15J20307001

Valve + Guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	29.0 (1.14)	—
	EX.	23.0 (0.91)	—
Valve clearance (when cold)	IN.	0.08 – 0.18 (0.003 – 0.007)	—
	EX.	0.18 – 0.28 (0.007 – 0.011)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	4.500 – 4.512 (0.1772 – 0.1776)	—
Valve stem O.D.	IN.	4.475 – 4.490 (0.1762 – 0.1768)	—
	EX.	4.455 – 4.470 (0.1754 – 0.1760)	—
Valve stem deflection	IN. & EX.	—	0.25 (0.010)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	IN. & EX.	—	37.1 (1.46)
Valve spring tension	IN. & EX.	142 – 157 N (14.5 – 16.0 kgf, 31.9 – 35.3 lbs) at length 33.55 mm (1.321 in)	—

Camshaft + Cylinder Head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	36.58 – 36.63 (1.440 – 1.442)	36.28 (1.428)
	EX.	35.78 – 35.83 (1.409 – 1.411)	35.48 (1.397)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	24.012 – 24.025 (0.9454 – 0.9459)	—
Camshaft journal O.D.	IN. & EX.	23.959 – 23.980 (0.9433 – 0.9441)	—
Camshaft runout	—		0.10 (0.004)
Cam chain pin (at arrow "3")	12th pin		—
Cylinder head distortion	—		0.20 (0.008)

0C-2 Service Data:**Cylinder + Piston + Piston Ring**

Unit: mm (in)

Item	Standard			Limit
Compression pressure	1 300 – 1 700 kPa (13 – 17 kgf/cm ² , 185 – 242 psi)			1 000 kPa (10 kgf/cm ² , 142 psi)
Compression pressure difference	—			200 kPa (2 kgf/cm ² , 28 psi)
Piston-to-cylinder clearance	0.030 – 0.040 (0.0012 – 0.0016)			0.120 (0.0047)
Cylinder bore	70.000 – 70.015 (2.7599 – 2.7565)			No nicks or Scratches
Piston diam.	69.965 – 69.980 (2.7545 – 2.7551) Measure 15 mm (0.6 in) from the skirt end.			69.880 (2.7512)
Cylinder distortion	—			0.20 (0.008)
Piston ring free end gap	1st	IR	Approx. 9.2 (0.36)	7.3 (0.29)
	2nd	R	Approx. 7.3 (0.29)	5.8 (0.23)
Piston ring end gap	1st	IR	0.06 – 0.21 (0.002 – 0.008)	0.50 (0.020)
	2nd	R	0.06 – 0.18 (0.002 – 0.007)	0.50 (0.020)
Piston ring-to-groove clearance	1st	—		0.180 (0.0071)
	2nd	—		0.150 (0.0059)
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)		—
	2nd	0.81 – 0.83 (0.0319 – 0.0327)		—
	Oil	1.51 – 1.53 (0.0594 – 0.0602)		—
Piston ring thickness	1st	0.97 – 0.99 (0.0382 – 0.0390)		—
	2nd	0.77 – 0.79 (0.0303 – 0.0311)		—
Piston pin bore	15.002 – 15.008 (0.5906 – 0.5909)			15.030 (0.5917)
Piston pin O.D.	14.995 – 15.000 (0.5903 – 0.5906)			14.980 (0.5898)

Conrod + Crankshaft

Unit: mm (in)

Item	Standard		Limit
Conrod small end I.D.	15.010 – 15.018 (0.5909 – 0.5913)		15.040 (0.5921)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)		0.30 (0.012)
Conrod big end width	19.95 – 20.00 (0.7854 – 0.7874)		—
Crank pin width	20.10 – 20.15 (0.7913 – 0.7933)		—
Conrod big end oil clearance	0.032 – 0.056 (0.0013 – 0.0022)		0.080 (0.0031)
Crank pin O.D.	32.976 – 33.000 (1.2983 – 1.2992)		—
Crankshaft journal oil clearance	0.010 – 0.028 (0.0004 – 0.0011)		0.080 (0.0031)
Crankshaft journal O.D.	31.982 – 32.000 (1.2591 – 1.2598)		—
Crankshaft thrust bearing thickness	Right side	2.425 – 2.450 (0.0955 – 0.0965)	—
	Left side	2.350 – 2.500 (0.0925 – 0.0984)	—
Crankshaft thrust clearance	0.055 – 0.110 (0.0022 – 0.0043)		—
Crankshaft runout	—		0.05 (0.002)

Balancer

Unit: mm (in)

Item	Standard	Limit
Balancer shaft journal oil clearance	0.028 – 0.052 (0.0011 – 0.0020)	0.080 (0.0031)
Balancer shaft journal O.D.	22.976 – 22.992 (0.9046 – 0.9052)	—

Oil Pump

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

Clutch

Unit: mm (in)

Item	Standard		Limit
Clutch drive plate thickness	No. 1, 2 & 3	2.72 – 2.88 (0.107 – 0.113)	2.42 (0.095)
Clutch drive plate claw width	No. 1, 2 & 3	13.85 – 13.96 (0.545 – 0.550)	13.05 (0.514)
Clutch driven plate distortion	—		0.10 (0.004)
Clutch spring free length	66.47 (2.617)		63.2 (2.49)
Clutch lifter pin height	0.2 – 0.4 (0.008 – 0.016)		—
Wave spring washer height	—		4.30 (0.169)
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1 turn back		—

Drive Train

Unit: mm (in) Except ratio

Item	Standard		Limit
Primary reduction ratio	1.761 (74/42)		—
Final reduction ratio	2.647 (45/17)		—
Gear ratios	Low	2.785 (39/14)	—
	2nd	2.052 (39/19)	—
	3rd	1.714 (36/21)	—
	4th	1.500 (36/24)	—
	5th	1.347 (31/23)	—
	Top	1.208 (29/24)	—
Gearshift fork to groove clearance	0.1 – 0.3 (0.004 – 0.012)		0.5 (0.02)
Gearshift fork groove width	5.0 – 5.1 (0.197 – 0.201)		—
Gearshift fork thickness	4.8 – 4.9 (0.189 – 0.193)		—
Drive chain	Type	RK 525ROZ5Y	—
	Links	116 links	—
	20-pitch length	—	319.4 (12.57)
Drive chain slack (on side-stand)	20 – 30 (0.8 – 1.2)		—
Gearshift lever height	65 – 75 (2.6 – 3.0)		—

Thermostat + Radiator + Fan + Coolant

Item	Standard/Specification		Note
Thermostat valve opening temperature	Approx. 82 °C (180 °F)		—
Thermostat valve lift	Over 8 mm (0.31 in) and at 95 °C (203 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	50 °C (122 °F)	Approx. 0.811 kΩ	—
	80 °C (176 °F)	Approx. 0.318 kΩ	—
	110 °C (230 °F)	Approx. 0.142 kΩ	—
Radiator cap valve opening pressure	108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 15.4 – 19.5 psi)		—
Cooling fan operating temperature	OFF → ON	Approx. 105 °C (221 °F)	IAT 40 °C (104 °F) and less
	ON → OFF	Approx. 100 °C (212 °F)	
	OFF → ON	Approx. 100 °C (212 °F)	IAT 40 °C (104 °F) and more
	ON → OFF	Approx. 95 °C (203 °F)	
Engine coolant type	Use an anti-freeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant including reserve	Reserve tank side	Approx. 250 ml (0.3/0.2 US/Imp qt)	—
	Engine side	Approx. 2 400 ml (2.5/2.1 US/Imp qt)	—

0C-4 Service Data:**Injector + Fuel Pump + Fuel Pressure Regulator**

Item	Specification	Note
Injector resistance	Approx. 12 Ω at 20 °C (68 °F)	Primary and secondary
Fuel pump discharge amount	167 ml (5.6/5.9 US/Imp oz) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm ² , 43 psi)	

FI Sensors

Item	Standard/Specification		Note
CKP sensor resistance	Approx. 168 Ω at 20 °C (68 °F)		
CKP sensor peak voltage	0.28 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.7 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	1.02 – 1.22 V	
	Opened	4.34 – 4.54 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor output voltage	0.15 – 4.85 V		
ECT sensor resistance	Approx. 2.45 k Ω at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	0.15 – 4.85 V		
IAT sensor resistance	Approx. 2.58 k Ω at 20 °C (68 °F)		
AP sensor input voltage	4.5 – 5.5 V		
AP sensor output voltage	Approx. 3.6 V at 100 kPa (760 mmHg)		
TO sensor resistance	Approx. 19.4 k Ω at 20 °C (68 °F)		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		Primary and secondary
Ignition coil primary peak voltage	80 V and more		When cranking
HO2 sensor output voltage	0.4 V and less at idle speed		
	0.6 V and more at 5 000 r/min		
HO2 sensor heater resistance	6.7 – 9.5 Ω at 23 °C (73 °F)		
PAIR control solenoid valve resistance	20 – 24 Ω at 20 – 30 °C (68 – 86 °F)		
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	0.52 – 0.72 V	
	Opened	4.12 – 4.32 V	
STVA resistance	Approx. 6.5 Ω		
EXCVA position sensor input voltage	4.5 – 5.5 V		
EXCVA position sensor output voltage	Closed	0.45 – 1.4 V	
	Opened	3.6 – 4.55 V	
EXCVA position sensor resistance	Approx. 3.1 k Ω		At adjustment position
EVAP system purge control solenoid valve resistance	Approx. 32 Ω at 20 °C (68 °F)		E-33 only
ISC valve resistance	Approx. 20 Ω at 20 °C (68 °F)		
Steering damper solenoid valve resistance	Approx. 12.5 Ω at 20 °C (68 °F)		
Steering damper solenoid valve voltage	Approx. 10 V		When battery fully charged

Throttle Body

Item	Specification
Bore size	42 mm (1.65 in)
I.D. No.	15J1 (For E-33), 15J0 (For others)
Idle r/min	1 200 ± 100 r/min
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

Electrical

Unit: mm (in)

Item	Specification		Note
Firing order	1 · 2 · 4 · 3		
Spark plug	Type	NGK: CR9EIA-9 DENSO: IU27D	
	Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance	Over 8 (0.3) at 1 atm.		
CKP sensor resistance	Approx. 168 Ω at 20 °C (68 °F)		
CKP sensor peak voltage	0.28 V and more		When cranking
Ignition coil resistance	Primary	1.1 – 1.5 Ω at 20 °C (68 °F)	Terminal – Terminal
	Secondary	6.4 – 9.6 kΩ at 20 °C (68 °F)	Plug cap – Terminal
Ignition coil primary peak voltage	80 V and more		When cranking
Generator coil resistance	0.2 – 1.0 Ω		
Generator maximum output	Approx. 400 W at 5 000 r/min		
Generator no-load voltage (When engine is cold)	65 V (AC) and more at 5 000 r/min		
Regulated voltage	14.0 – 15.5 V at 5 000 r/min		
Starter motor brush length	Standard	12.0 (0.47)	
	Limit	6.5 (0.26)	
Starter relay resistance	3 – 6 Ω		
Battery	Type designation	FT12A-BS	
	Capacity	12 V 36.0 kC (10 Ah)/10 HR	
	Standard electrolyte S.G.	1.320 at 20 °C (68 °F)	
Fuse size	Headlight	HI	10 A
		LO	10 A
	Ignition		10 A
	Signal		10 A
	Fuel		10 A
	Fan		15 A
	Main		30 A

0C-6 Service Data:
Wattage

Unit: W

Item		Specification	
		E-21, 24	E-03, 28, 33
Headlight	HI	65	←
	LO	55	←
Position light		5 x 2	←
Brake/Tail light		LED	←
Turn signal light		21 x 4	←
License plate light		5	←
Combination meter light		LED	←
Turn signal indicator light		LED	←
High beam indicator light		LED	←
Neutral position indicator light		LED	←
Oil pressure indicator light/Engine coolant temp. indicator light		LED	←
FI indicator light/Sd indicator light		LED	←
Fuel level indicator light		LED	←
Engine RPM indicator light		LED	←
Immobilizer indicator light		LED	—

Brake + Wheel

Unit: mm (in)

Item	Standard			Limit
Rear brake pedal height	65 – 75 (2.6 – 3.0)			—
Brake disc thickness	Front	4.8 – 5.2 (0.19 – 0.20)		4.5 (0.18)
	Rear			
Brake disc runout	—			0.30 (0.012)
Master cylinder bore & piston diam.	Front	Approx. 17.5 (0.69)		—
	Rear	Approx. 14.0 (0.55)		—
Brake caliper cylinder bore & piston diam.	Front	Leading	Approx. 32.0 (1.26)	—
		Trailing		—
	Rear	Approx. 30.2 (1.19)		—
Brake fluid type	DOT 4			—
Wheel rim runout	Axial	—		2.0 (0.08)
	Radial			
Wheel rim size	Front	17 M/C x MT 3.50		—
	Rear	17 M/C x MT 5.50		—
Wheel axle runout	Front	—		0.25 (0.010)
	Rear			

Tire

Item	Standard		Limit
Cold inflation tire pressure (Solo riding)	Front	250 kPa (2.50 kgf/cm ² , 36 psi)	—
	Rear	290 kPa (2.90 kgf/cm ² , 42 psi)	—
Cold inflation tire pressure (Dual riding)	Front	250 kPa (2.50 kgf/cm ² , 36 psi)	—
	Rear	290 kPa (2.90 kgf/cm ² , 42 psi)	—
Tire size	Front	120/70 ZR17M/C (58 W)	—
	Rear	180/55 ZR17M/C (73 W)	—
Tire type	Front	BRIDGESTONE BATTLAX BT016F G	—
	Rear	BRIDGESTONE BATTLAX BT016R G	—
Tire tread depth (Recommended depth)	Front	—	1.6 mm (0.06 in)
	Rear	—	2.0 mm (0.08 in)

Suspension

Unit: mm (in)

Item	Standard		Limit
Front fork stroke	120 (4.7)		—
Front fork spring free length	233.4 (9.19)		228 (9.0)
Front fork oil level	90 (3.5)		—
	80 (3.1) 10 min. after adjustment		
Front fork oil type	FORK OIL SS-47 or an equivalent fork oil		—
Front fork oil capacity (Each leg)	420 ml (14.2/14.8 US/Imp oz)		—
Front fork inner tube O.D	41 (1.6)		—
Front fork spring adjuster	4 turns in from full soft position		—
Front fork damping force adjuster	Rebound	4 turns out from full hard position	—
	Compression	5 turns out from full hard position	—
Rear shock absorber spring pre-set length	181 (7.1)		—
Rear shock absorber damping force adjuster	Rebound	2 turns out from full hard position	—
	Compression	Lo: 2-1/4 turns out from full hard position Hi: 3 turns out from full hard position	—
Rear wheel travel	130 (5.1)		—
Swingarm pivot shaft runout	—		0.3 (0.01)

Fuel + Oil

Item	Specification		Note
Fuel type	Use only unleaded gasoline of at least 90 pump octane (R/2 + M/2). Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
	Gasoline used should be graded 95 octane (Research Method) or higher. Unleaded gasoline is recommended.		Others
Fuel tank capacity	Including reserve	16 L (4.2/3.5 US/Imp gal)	E-33
		17 L (4.5/3.7 US/Imp gal)	Others
	Fuel level indicator light lighting	blink Approx. 3.9 L (1.0/0.9 US/Imp gal)	
		lighting Approx. 1.5 L (0.4/0.3 US/Imp gal)	
Engine oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	2 200 ml (2.3/1.9 US/Imp qt)	
	Filter change	2 500 ml (2.6/2.2 US/Imp qt)	
	Overhaul	2 900 ml (3.1/2.6 US/Imp qt)	

Tightening Torque List

BENB15J20307002

Engine

Item	N·m	kgf·m	lbf·ft
Exhaust pipe bolt	23	2.3	16.5
Exhaust chamber support bolt	23	2.3	16.5
Exhaust chamber support bracket bolt	26	2.6	19.0
Muffler connecting bolt	23	2.3	16.5
Muffler cover bolt	11	1.1	8.0
Muffler support bolt	26	2.6	19.0
Speed sensor rotor bolt	28	2.8	20.0
Speed sensor bolt	4.5	0.45	3.0
Engine sprocket nut	115	11.5	83.0
Engine mounting bolt (Cylinder)	55	5.5	39.8
Engine mounting nut (Crankcase)	75	7.5	54.0
Engine mounting thrust adjuster	23	2.3	16.5
Engine mounting thrust adjuster lock-nut	45	4.5	32.5
Engine mounting pinch bolt	23	2.3	16.5

0C-8 Service Data:

Item		N·m	kgf·m	lbf·ft
Cylinder head cover bolt		14	1.4	10.0
Spark plug		11	1.1	8.0
Cam chain guide No. 1 bolt		23	2.3	16.5
Camshaft journal holder bolt		10	1.0	7.0
Cam chain tension adjuster service cap		23	2.3	16.5
Cam chain tension adjuster mounting bolt		10	1.0	7.0
Cam chain tensioner bolt		23	2.3	16.5
CKP sensor rotor/cam chain drive sprocket bolt		54	5.4	39.0
Cylinder head bolt	[M10]	31 N·m (3.1 kgf·m, 22.5 lbf·ft) then turn in 1/6 (60°) turn		
	[M6]	10	1.0	7.0
Clutch sleeve hub nut		95	9.5	68.5
Clutch spring set bolt		10	1.0	7.0
Clutch release adjuster cap		11	1.1	8.0
Clutch push rod adjusting screw lock-nut		5.5	0.55	4.0
Clutch lifter pin lock-nut		23	2.3	16.5
Clutch cable lock-nut		4.5	0.45	3.0
Crankshaft hole plug		11	1.1	8.0
Starter clutch bolt		15	1.5	11.0
Generator rotor bolt		120	12.0	87.0
Generator stator set bolt		11	1.1	8.0
Generator lead wire clamp bolt		5.5	0.55	4.0
Oil pressure switch		14	1.4	10.0
Oil pressure switch lead wire screw		1.5	0.15	1.0
Oil filter		20	2.0	14.5
Crankshaft journal bolt	[M9]	18 N·m (1.8 kgf·m, 13.0 lbf·ft) then turn in 50°		
Crankcase bolt	[M6]	Initial	6	0.6
		Final	11	1.1
	[M8]	Initial	15	1.5
		Final	26	2.6
Oil gallery plug		7	0.7	5.0
Oil gallery plug	[M6]	10	1.0	7.0
	[M12]	15	1.5	11.0
	[M16]	35	3.5	25.5
Oil drain plug		23	2.3	16.5
Oil gallery jet		27	2.7	19.5
Piston cooling oil jet bolt		10	1.0	7.0
Conrod cap bolt		15 N·m (1.5 kgf·m, 11.0 lbf·ft) then turn in 1/4 (90°) turn		
Oil cooler mounting bolt		10	1.0	7.0
Driveshaft bearing cover bolt	Initial	6	0.6	4.5
	Final	12	1.2	8.5
Driveshaft bearing case bolt (LH and RH)		12	1.2	8.5
Driveshaft retainer bolt		12	1.2	8.5
Gearshift arm stopper		19	1.9	13.5
Gearshift cam stopper bolt		10	1.0	7.0
Gearshift cam plate bolt		13	1.3	9.5
Gearshift cam bearing retainer screw		10	1.0	7.0
Gearshift shaft end screw		8.5	0.85	6.1
Gearshift lever shaft		40	4.0	29.0
Gearshift lever bracket bolt		28	2.8	20.0
Push rod oil seal retainer bolt		10	1.0	7.0
Starter motor mounting bolt		10	1.0	7.0
Starter motor lead wire mounting nut		6	0.6	4.5
Starter motor housing bolt		5	0.5	3.5
Starter motor brush holder nut		11	1.1	8.0
PAIR solenoid valve bracket mounting bolt		11	1.1	8.0
Throttle cable nut		4.5	0.45	3.0

FI System + Intake Air System

Item	N·m	kgf·m	lbf·ft
CMP sensor bolt	10	1.0	7.0
TP sensor mounting screw	3.5	0.35	2.5
STP sensor mounting screw	3.5	0.35	2.5
ISC valve mounting screw	2	0.2	1.5
CKP sensor mounting screw	5.5	0.55	4.0
CKP sensor clamp screw	5.5	0.55	4.0
HO2 sensor	25	2.5	18.0
Fuel delivery pipe mounting screw	3.5	0.35	2.5
Fuel pump mounting bolt	10	1.0	7.0
EXCVA pulley mounting bolt	5	0.5	3.5
EXCV cable bracket mounting nut	11	1.1	8.0
IAP sensor mounting screw	3.5	0.35	2.5
IAT sensor mounting bolt	1.5	0.15	1.0
GP switch mounting bolt	6.5	0.65	4.5
Intake pipe bolt	10	1.0	7.0
Intake pipe clamp screw	1.5	0.15	1.0
Air cleaner box cover screw	1.5	0.15	1.0
Air cleaner holder bolt	10	1.0	7.0
Funnel bolt	4.3	0.43	3.0
EVAP pipe mounting bolt (E-33 only)	10	1.0	7.0
EVAP system purge control solenoid valve mounting nut (E-33 only)	10	1.0	7.0
EVAP system purge control solenoid valve bracket bolt (E-33 only)	10	1.0	7.0

Cooling System

Item	N·m	kgf·m	lbf·ft
Impeller securing bolt	8	0.8	6.0
Water pump case screw	5.5	0.55	4.0
Water pump air bleeder bolt	13	1.3	9.5
Water pump mounting bolt	10	1.0	7.0
ECT sensor	18	1.8	13.0
Radiator reservoir tank bolt	6	0.6	4.5
Water hose clamp screw	1.5	0.15	1.0

Chassis

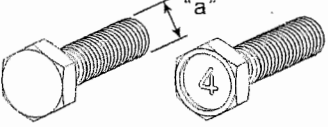
Item	N·m	kgf·m	lbf·ft
Steering stem head nut	90	9.0	65.0
Steering stem lock-nut	80	8.0	58.0
Steering damper bolt	23	2.3	16.5
Steering damper nut	23	2.3	16.5
Front fork upper clamp bolt	23	2.3	16.5
Front fork lower clamp bolt	23	2.3	16.5
Front fork cap bolt	35	3.5	25.5
Front fork piston rod nut	28	2.8	20.0
Front fork rod guide case	90	9.0	65.0
Front axle nut	100	10.0	72.5
Front axle pinch bolt	23	2.3	16.5
Handlebar clamp bolt	23	2.3	16.5
Handlebar balancer screw	5.5	0.55	4.0
Master cylinder holder bolt (Upper and Lower)	10	1.0	7.0
Front brake caliper mounting bolt	39	3.9	28.0
Brake hose union bolt	23	2.3	16.5
Air bleeder valve (Front caliper)	7.5	0.75	5.5
Air bleeder valve (Rear caliper)	6.0	0.6	4.5
Air bleeder valve (Front master cylinder)	6.0	0.6	4.5
Brake disc bolt (Front)	18	1.8	13.0
Brake disc bolt (Rear)	35	3.5	25.5

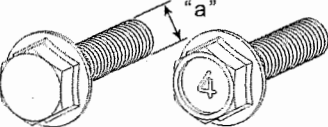
0C-10 Service Data:

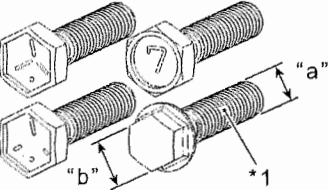
Item	N-m	kgf-m	lbf-ft
Rear brake pad mounting pin	18	1.8	13.0
Rear brake pad mounting pin plug	2.5	0.25	2.0
Rear brake caliper sliding pin A	27	2.7	19.5
Rear brake caliper sliding pin B	13	1.3	9.5
Rear brake master cylinder mounting bolt	10	1.0	7.0
Rear brake master cylinder rod lock-nut	18	1.8	13.0
Brake lever pivot bolt	1	0.1	0.7
Brake lever pivot bolt lock-nut	6	0.6	4.5
Clutch lever pivot nut	6.5	0.65	4.7
Clutch lever holder bolt	10	1.0	7.0
Swingarm pivot shaft	15	1.5	11.0
Swingarm pivot nut	100	10.0	72.5
Swingarm pivot lock-nut	90	9.0	65.0
Cushion lever mounting nut	98	9.8	71.0
Cushion rod mounting nut	98	9.8	71.0
Rear shock absorber bracket nut	100	10.0	72.5
Rear shock absorber mounting nut (Upper and Lower)	50	5.0	36.0
Spring adjuster lock-nut	35	3.5	25.5
Rear axle nut	100	10.0	72.5
Rear sprocket nut	60	6.0	43.0
Rear combination light mounting bolt	5	0.5	3.5
License plate light mounting nut	5	0.5	3.5
Side-stand nut	40	4.0	29.0
Side-stand bolt	50	5.0	36.0
Side-stand bracket mounting bolt	50	5.0	36.0
Bank sensor bolt	18	1.8	13.0
Footrest bracket bolt	23	2.3	16.5
Footrest guard screw (Left side)	4.5	0.45	3.0
Footrest holder bolt	35	3.5	25.5
Pillion footrest bracket bolt	23	2.3	16.5
Seat rail mounting bolt	50	5.0	36.0
Cowling brace mounting nut	38	3.8	27.5
Rear fender (Lower) mounting bolt	10	1.0	7.0
Rear view mirror mounting nut	10	1.0	7.0
Front reflector bolt (E-03, 24, 28, 33)	10	1.0	7.0
Front reflex reflector (E-03, 24, 28, 33)	1.8	0.18	1.3
Rear reflex reflector nut (E-03, 28, 33)	1.8	0.18	1.3
Under cowling mounting screw (right side)	6.5	0.65	4.7

Tightening Torque Chart

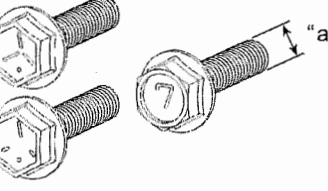
Each fastener should be tightened to the torque specified in "TIGHTENING LIST". If no description or specification is provided, refer to the following tightening torque chart for the applicable torque for each fastener.

Bolt type	Thread diameter (Nominal diameter) "a" [mm]	Unit		
		N·m	kgf-m	lbf-ft
 IB14J1030006-02	4	1.5	0.15	1.0
	5	3.0	0.30	2.0
	6	5.5	0.55	4.0
	8	13	1.3	9.5
	10	29	2.9	21.0
	12	45	4.5	32.5
	14	65	6.5	47.0
	16	105	10.5	76.0
A equivalent of 4T strength fastener without flange	18	160	16.0	115.5

Bolt type	Thread diameter (Nominal diameter) "a" [mm]	Unit		
		N·m	kgf-m	lbf-ft
 IB14J1030007-02	4	1.7	0.17	1.0
	5	3.3	0.33	2.5
	6	6	0.6	4.5
	8	14	1.4	10.0
	10	32	3.2	23.0
	12	50	5.0	36.0
	14	72	7.2	52.0
	16	116	11.6	84.0
A equivalent of 4T strength fastener with flange	18	176	17.6	127.5

Bolt type	Thread diameter (Nominal diameter) "a" [mm]	Unit		
		N·m	kgf-m	lbf-ft
 IB14J1030008-03	4	2.3	0.23	1.5
	5	4.5	0.45	3.5
	6	10	1.0	7.0
	8	23	2.3	16.5
	10	50	5.0	36.0
	12	85	8.5	61.5
	14	135	13.5	97.5
	16	210	21.0	152.0
A equivalent of 7T strength fastener without flange and small crown shape bolt *1	18	240	24.0	173.5

*1: Small crown shape bolt (crown shape bolt with flange either "a" = 5 and "b" = 7 or "a" = 6 and "b" = 8)

Bolt type	Thread diameter (Nominal diameter) "a" [mm]	Unit		
		N·m	kgf-m	lbf-ft
 IB14J1030009-03	4	2.5	0.25	2.0
	5	5	0.5	3.5
	6	11	1.1	8.0
	8	25	2.5	18.0
	10	55	5.5	40.0
	12	94	9.4	68.0
	14	149	14.9	107.5
	16	231	23.1	167.0
A equivalent of 7T strength fastener with flange except small crown shape bolt	18	264	26.4	191.0

Section 1

Engine

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Precautions

Precautions

Precautions for Engine

BENB15J21000001

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

Engine General Information and Diagnosis

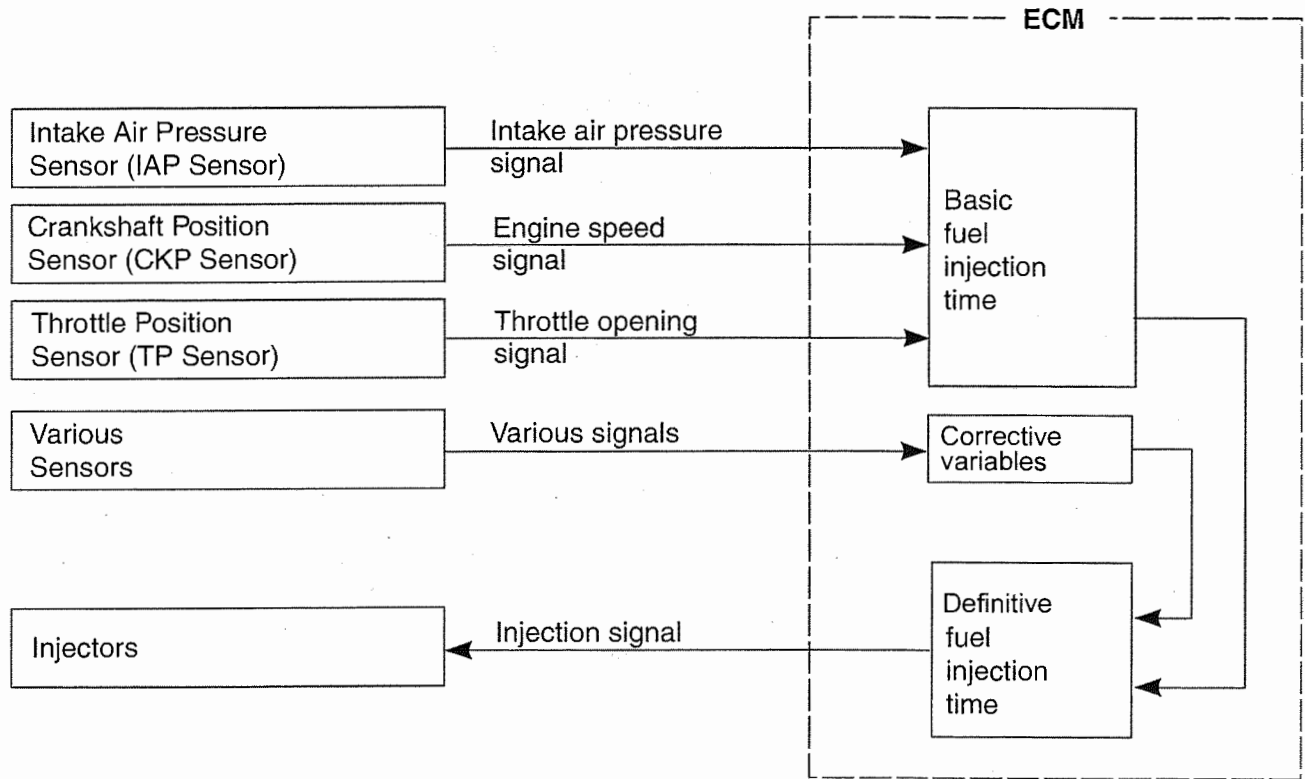
General Description

Injection Timing Description

BENB15J21101001

Injection Time (Injection Volume)

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



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1A-2 Engine General Information and Diagnosis:

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).
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL	When engine coolant temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
HEATED OXYGEN SENSOR SIGNAL	Air/fuel ratio is compensated to the theoretical ratio from density of oxygen in exhaust gas. 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. This is the compensation of the SRAD.
STARTING SIGNAL	When starting engine, additional fuel is injected during cranking engine.
ACCELERATION SIGNAL/DECELERATION SIGNAL	During acceleration, the fuel injection time (volume) is increased, in accordance with the throttle opening speed and engine rpm. During deceleration, the fuel injection time (volume) is decreased.

Injection Stop Control

Signal	Descriptions
TIP-OVER SENSOR SIGNAL (FUEL SHUT-OFF)	When the motorcycle tips over, the tip-over sensor sends a signal to the ECM. Then, this signal cuts OFF current supplied to the fuel pump, fuel injectors and ignition coils.
OVER-REV. LIMITER SIGNAL	<p>The fuel injectors stop operation when engine rpm reaches rev. limit rpm.</p> <p>The fuel cut-off circuit is incorporated in this ECM in order to prevent over-running of engine. When engine speed reaches 14 500 r/min, this circuit cuts off fuel at the fuel injectors. But under no load, the clutch lever is pulled or the gear position is in neutral, this circuit cuts off fuel when engine speed reaches 14 100 r/min.</p> <p>NOTICE</p> <p>Under no load, the engine can run over 14 100 r/min through the fuel cut-off circuit is effective, which may possibly cause engine damage. Do not run the engine without load over 14 100 r/min at anytime.</p>

Self-Diagnosis Function

BENB15J21101002

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

User Mode

Malfunction		LCD (DISPLAY) INDICATION "A"	FI INDICATOR LIGHT INDICATION "B"	INDICATION MODE
"NO"		Odo / Trip / Clock / Panel light brightness / Lap time counter	—	—
"YES"	Engine can start	Odo / Trip / Clock / Panel light brightness / Lap time counter and "FI" letters *1	FI indicator light turns ON.	Each 2 sec. Odo / Trip / Clock / Panel light brightness / Lap time counter and "FI" is indicated.
	Engine can not start	"FI" letters *2	FI indicator light turns ON and blinks.	"FI" is indicated continuously.

*1

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 Odo / Trip / Clock / Panel light brightness / Lap time counter are indicated in the LCD panel and motorcycle can run.

*2

The injection signal is stopped, when the camshaft position sensor signal, crankshaft position sensor signal, tip-over sensor signal, #1, #2, #3 and #4 ignition signals, #1, #2, #3 and #4 injector signals, fuel pump relay signal or ignition switch signal is not sent to ECM. In this case, "FI" is indicated in the LCD panel. Motorcycle does not run.

"CHEC":

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

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 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:

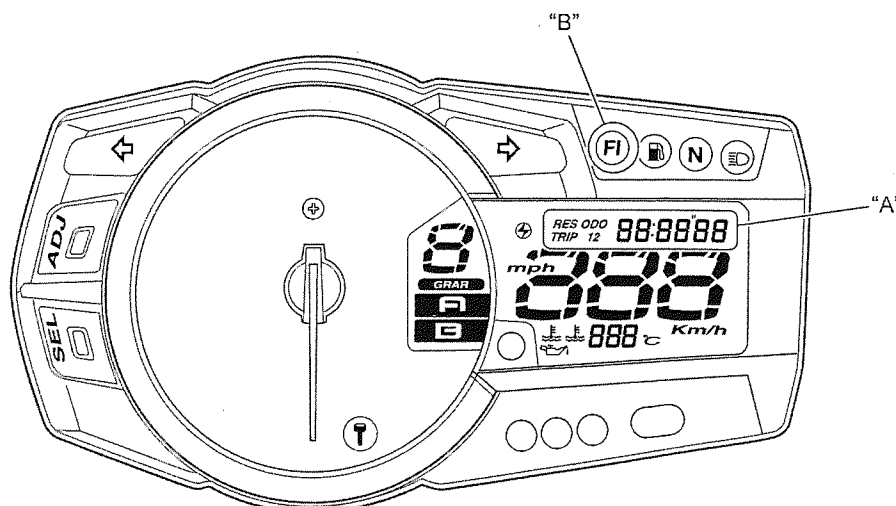
Engine stop switch is in OFF position. Side-stand/ignition inter-lock system is not working. Ignition fuse is burnt.

"Sd":

The LCD panel indicates "Sd" when the steering damper solenoid malfunction, battery abnormal voltage and speed sensor malfunction occurred.

NOTE

The FI indicator light "B" turn ON about 2 seconds after turning the ignition switch ON.



1A-4 Engine General Information and Diagnosis:

Dealer Mode

The defective function is memorized in the computer. Use the special tool's coupler to connect to the mode selection 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.

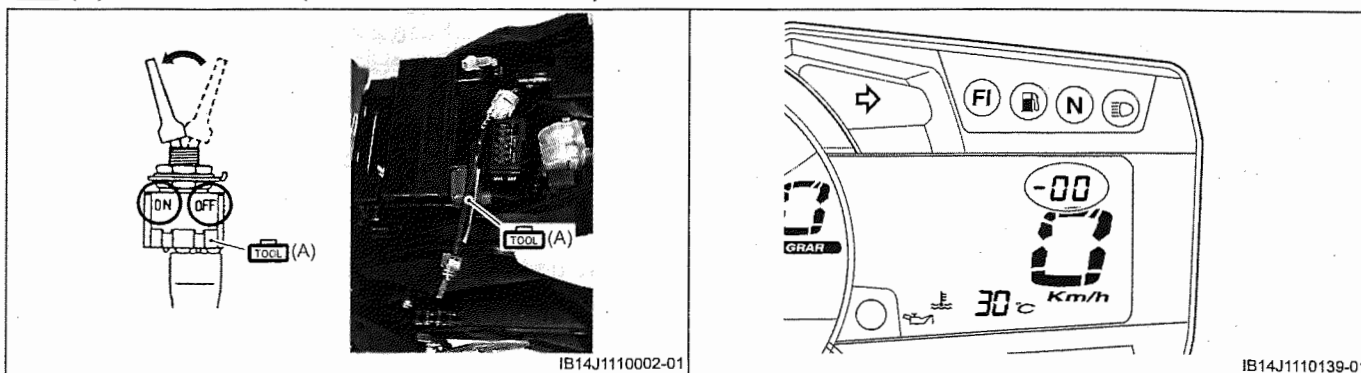
NOTE

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

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

Special tool

TOOL (A): 09930-82720 (Mode selection switch)

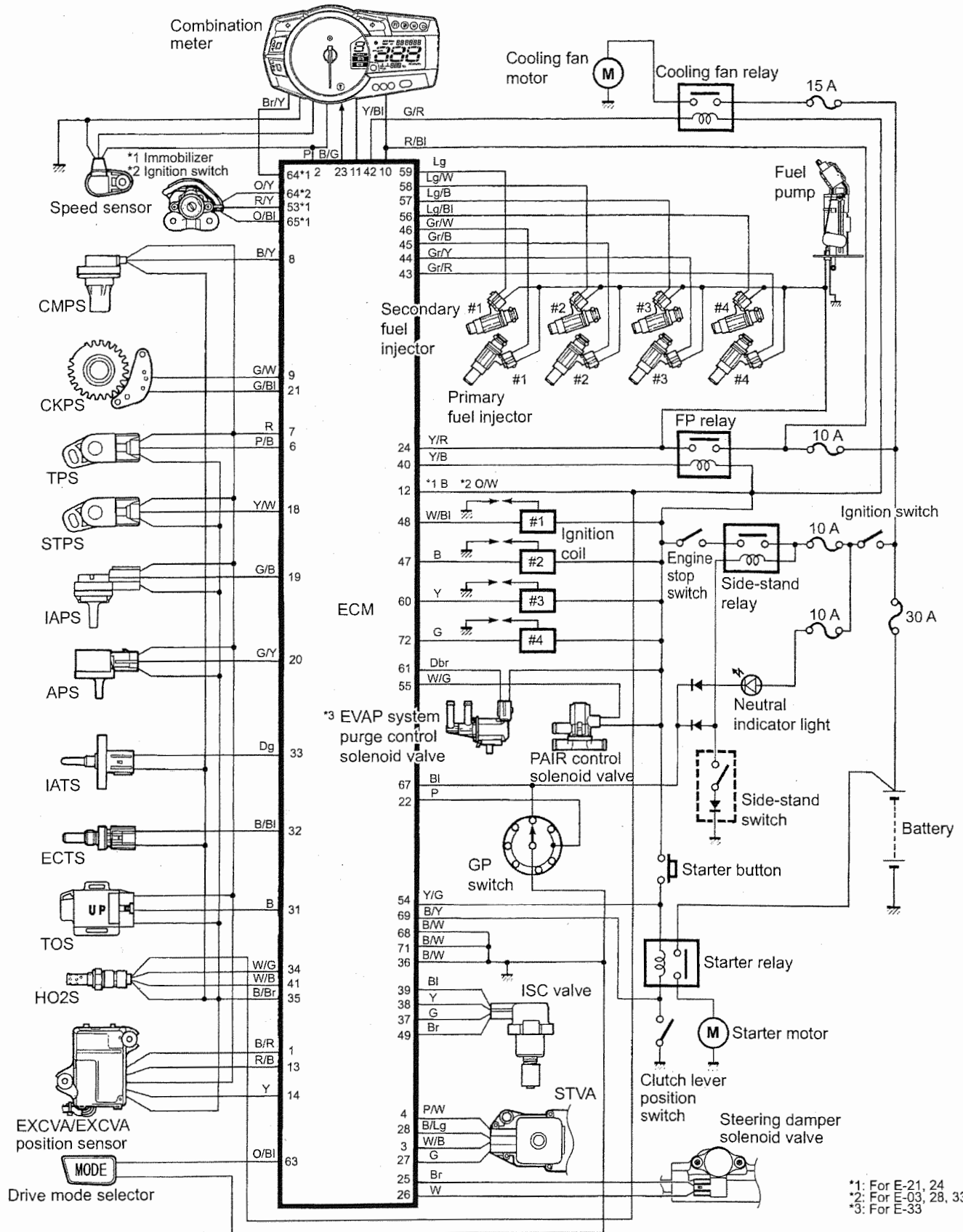


Malfunction	LCD (display) indication	FI light indication	Indication mode
"NO"	C00		—
"YES"	C** code is indicated from small numeral to large one.	FI indicator light turns OFF.	For each 2 sec., code is indicated.

Schematic and Routing Diagram

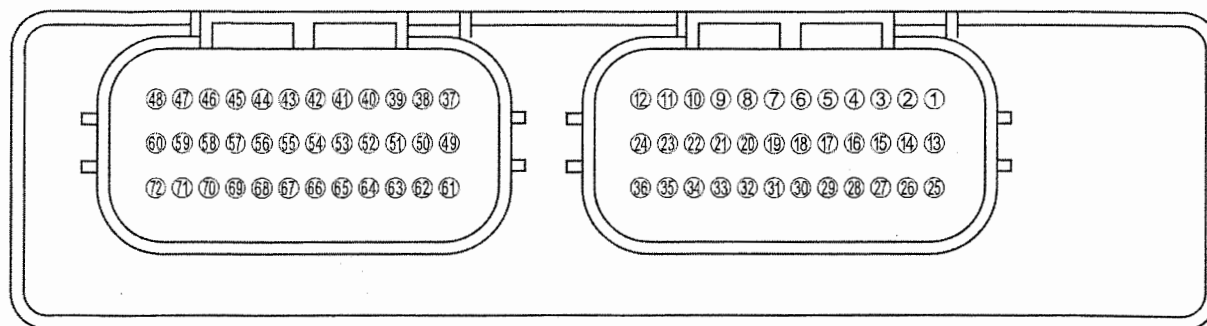
FI System Wiring Diagram

BENB15J21102001



Terminal Alignment of ECM Coupler

BENB15J21102002



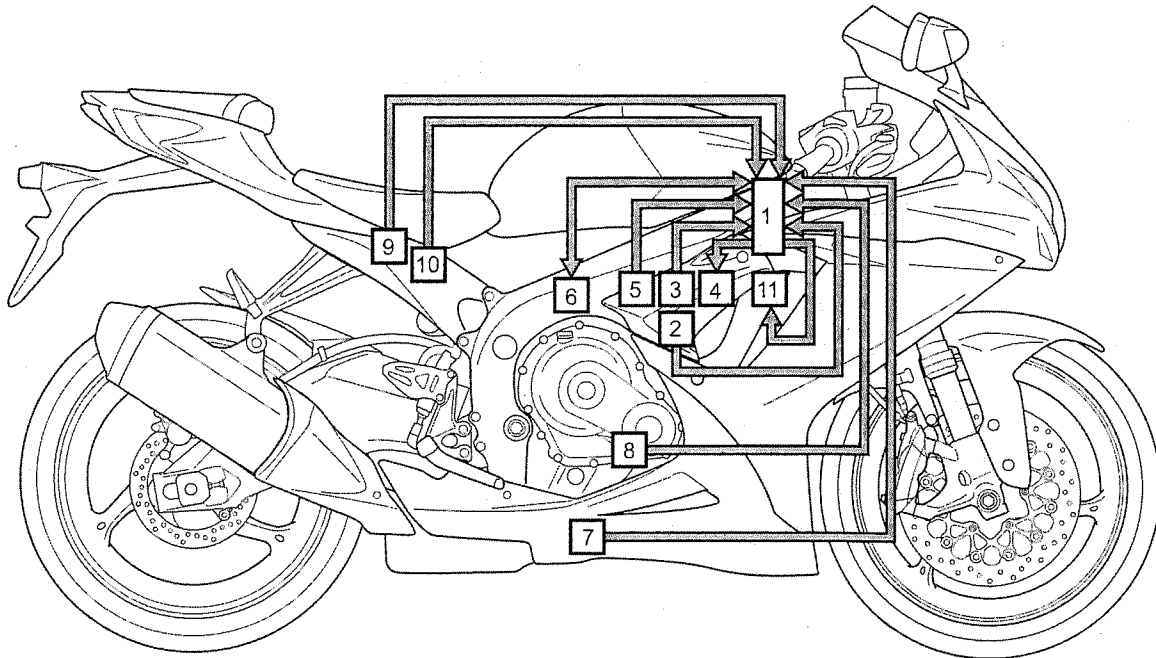
I837H1110004-01

TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
1	EXCVA power (MO+)	37	ISC valve signal (ISC. 2B)
2	Speed sensor signal	38	ISC valve signal (ISC. 1A)
3	STVA signal (STVA. 2A)	39	ISC valve signal (ISC. 1B)
4	STVA signal (STVA. 1A)	40	Fuel pump relay (FP relay)
5	—	41	HO2 sensor heater (HO2SH)
6	TP sensor signal (TPS)	42	Cooling fan relay (FAR)
7	Power source for sensors (VCC)	43	Primary fuel injector #4 (#41)
8	CMP sensor (CMPS+)	44	Primary fuel injector #3 (#31)
9	CKP sensor (CKPS+)	45	Primary fuel injector #2 (#21)
10	Power source for back-up (BATT)	46	Primary fuel injector #1 (#11)
11	Tachometer	47	Ignition coil #2
12	Power source (+B)	48	Ignition coil #1
13	EXCVA power (MO-)	49	ISC valve signal (ISC. 2A)
14	EXCVA position sensor (MPS)	50	Blank
15	—	51	—
16	—	52	—
17	Blank	53	Immobilizer communication [For E-21, 24]
18	STP sensor (STPS)	54	Starter switch
19	IAP sensor signal (IAPS)	55	PAIR control solenoid (PAIR)
20	AP sensor signal (APS)	56	Secondary fuel injector #4 (#42)
21	CKP sensor signal (CKPS-)	57	Secondary fuel injector #3 (#32)
22	Gear position switch signal (GP)	58	Secondary fuel injector #2 (#22)
23	Serial data for Combination meter	59	Secondary fuel injector #1 (#12)
24	Power source for fuel injectors (VM)	60	Ignition coil #3
25	Steering damper solenoid (SSO-)	61	EVAP system purge control solenoid valve (EVAP) [For E-33]
26	Steering damper solenoid (SSO+)	62	Serial data for self-diagnosis
27	STVA signal (STVA. 2B)	63	Drive mode selector 1 (DMS1)
28	STVA signal (STVA. 1B)	64	Immobilizer indicator [For E-21, 24]/ Ignition switch signal [For E-03, 28, 33]
29	Blank	65	Immobilizer communication [For E-21, 24]
30	Blank	66	—
31	TO sensor signal (TOS)	67	Neutral signal
32	ECT sensor signal (ECTS)	68	General ground (E01)
33	IAT sensor signal (IATS)	69	Clutch lever switch
34	HO2 sensor (HO2S)	70	Mode selection switch
35	Sensor ground (E2)	71	Ignition system ground (E03)
36	ECM ground (E1)	72	Ignition coil #4

Component Location

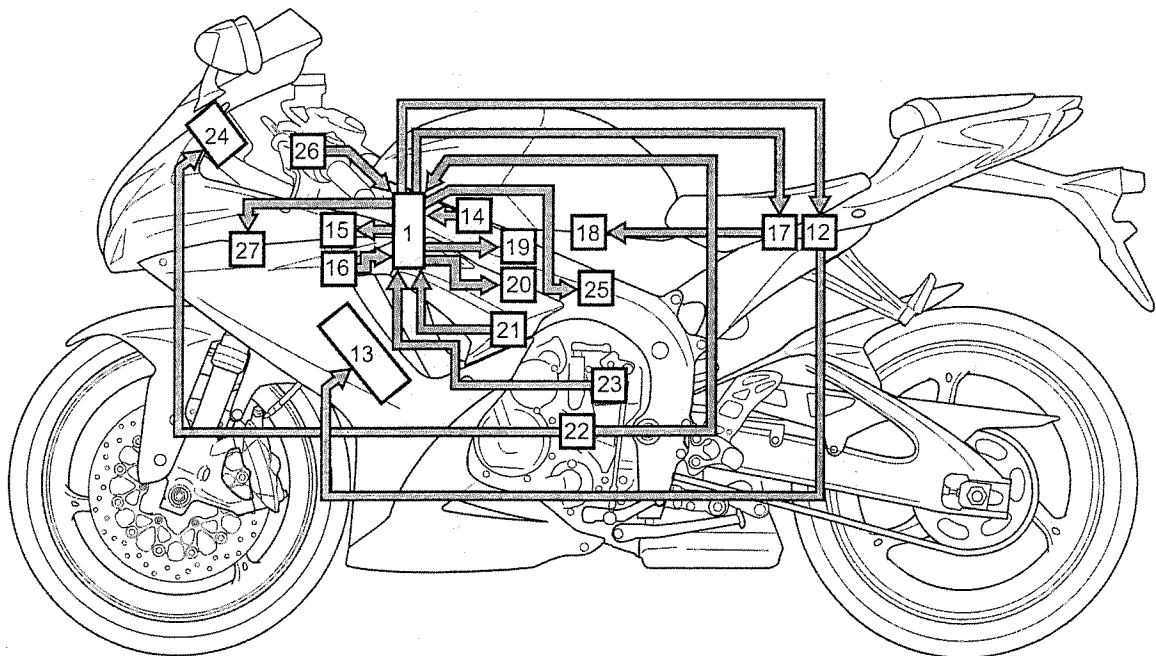
FI System Parts Location

BENB15J21103001



IB14J1110005-04

1. ECM	5. Intake air pressure sensor (IAPS)	9. Atmospheric pressure sensor (APS)
2. Throttle position sensor (TPS)	6. Exhaust control valve actuator (EXCVA)	10. Tip-over sensor (TOS)
3. Secondary throttle position sensor (STPS)	7. Heated oxygen sensor (HO2S)	11. Ignition coil (IG coil)
4. Secondary throttle valve actuator (STVA)	8. Crankshaft position sensor (CKPS)	



IB14J1110006-04

1. ECM	17. Fuel pump relay (FP relay)	23. Gear position switch (GP switch)
12. Cooling fan relay	18. Fuel pump (FP)	24. Combination meter
13. Cooling fan	19. Secondary fuel injector	25. EVAP system purge control solenoid valve (E-33 only)
14. Intake air temperature sensor (IATS)	20. Primary fuel injector	26. Drive mode selector
15. PAIR control solenoid valve	21. Engine coolant temperature sensor (ECTS)	27. Steering damper solenoid valve
16. Camshaft position sensor (CMPS)	22. Speed sensor	

Diagnostic Information and Procedures

Engine Symptom Diagnosis

BENB15J21104001

Condition	Possible cause	Correction / Reference Item
Engine will not start or is hard to start (Compression too low)	Valve clearance out of adjustment.	Adjust.
	Worn valve guide or poor seating of valve.	Repair or replace.
	Mistimed valve.	Adjust.
	Excessively worn piston ring.	Replace.
	Worn-down cylinder bore.	Replace.
	Too slow Starter motor cranking.	Refer to "Starting System Diagram" in Section 1I (Page 1I-1).
	Poor seating of spark plug.	Retighten.
Engine will not start or is hard to start (Plug not sparking)	Fouled spark plug.	Clean.
	Wet spark plug.	Clean and dry.
	Defective ignition coil/plug cap.	Replace.
	Defective CKP sensor.	Replace.
	Defective ECM.	Replace.
	Open-circuited wiring connection.	Repair or replace.
Engine will not start or is hard to start (No fuel reaching the intake manifold)	Clogged fuel filter or fuel hose.	Clean or replace.
	Defective fuel pump.	Replace.
	Defective fuel pressure regulator.	Replace.
	Defective fuel injector.	Replace.
	Defective fuel pump relay.	Replace.
	Defective ECM.	Replace.
	Open-circuited wiring connection.	Check and repair.
Engine will not start or is hard to start (Incorrect fuel/air mixture)	TP sensor out of adjustment.	Adjust.
	Defective fuel pump.	Replace.
	Defective fuel pressure regulator.	Replace.
	Defective TP sensor.	Replace.
	Defective CKP sensor.	Replace.
	Defective IAP sensor.	Replace.
	Defective ECM.	Replace.
	Defective ECT sensor.	Replace.
	Defective IAT sensor.	Replace.
	Defective AP sensor.	Replace.
	Clogged ISC valve air passage way.	Repair or replace.
Engine idles poorly	Valve clearance out of adjustment.	Adjust.
	Poor seating of valve.	Replace or repair.
	Defective valve guide.	Replace.
	Worn down camshaft.	Replace.
	Too wide spark plug gap.	Adjust or replace.
	Defective ignition coil/plug cap.	Replace.
	Defective CKP sensor.	Replace.
	Defective ECM.	Replace.
	Defective TP sensor.	Replace.
	Defective fuel pump.	Replace.
	Imbalanced throttle valve.	Adjust.
	Damaged or cranked vacuum hose.	Replace.
	Damaged or clogged ISC valve.	Repair or replace.
	ISC incorrect learning.	Reset learned value.

Condition	Possible cause	Correction / Reference Item
Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.	<i>Repair or replace.</i>
	Clogged fuel filter.	<i>Clean or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel pressure regulator.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective thermostat.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
	Damaged or cracked vacuum hose.	<i>Replace.</i>
	Damaged or clogged ISC valve.	<i>Replace or repair.</i>
Engine stalls often (Fuel injector improperly operating)	Defective fuel injector.	<i>Replace.</i>
	No injection signal from ECM.	<i>Repair or replace.</i>
	Open or short circuited wiring connection.	<i>Repair or replace.</i>
	Defective battery or low battery voltage.	<i>Replace or recharge.</i>
Engine stalls often (Control circuit or sensor improperly operating)	Defective ECM.	<i>Replace.</i>
	Defective fuel pressure regulator.	<i>Replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective IAT sensors.	<i>Replace.</i>
	Defective CMP sensors.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective fuel pump relay.	<i>Replace.</i>
	Defective ISC valve.	<i>Replace.</i>
Engine stalls often (Engine internal parts improperly operating)	ISC inconnect learning.	<i>Reset learned value.</i>
	Fouled spark plug.	<i>Clean.</i>
	Defective CKP sensor or ECM.	<i>Replace.</i>
	Clogged fuel hose.	<i>Clean.</i>
	Out of valve clearance adjustment.	<i>Adjust.</i>
Noisy engine (Excessive valve chatter)	Too large valve clearance.	<i>Adjust.</i>
	Weakened or broken valve spring.	<i>Replace.</i>
	Worn tappet or cam surface.	<i>Replace.</i>
	Worn or burnt camshaft journal.	<i>Replace.</i>
Noisy engine (Noise seems to come from piston)	Worn down piston or cylinder.	<i>Replace.</i>
	Combustion chamber fouled with carbon.	<i>Clean.</i>
	Worn piston pin or piston pin bore.	<i>Replace.</i>
	Worn piston ring or ring groove.	<i>Replace.</i>
Noisy engine (Noise seems to come from cam chain)	Stretched cam chain.	<i>Replace.</i>
	Worn sprocket.	<i>Replace.</i>
	Cam chain tension adjuster not working.	<i>Repair or replace.</i>
Noisy engine (Noise seems to come from clutch)	Worn splines of countershaft or hub.	<i>Replace.</i>
	Worn teeth of clutch plate.	<i>Replace.</i>
	Distorted clutch plate.	<i>Replace.</i>
	Worn clutch release bearing.	<i>Replace.</i>
	Weakened clutch damper.	<i>Replace the primary driven gear.</i>
	Worn clutch lifter related parts.	<i>Replace related parts as a set.</i>
Noisy engine (Noise seems to come from crankshaft)	Rattling bearing due to wear.	<i>Replace.</i>
	Worn or burnt big-end bearing.	<i>Replace.</i>
	Worn or burnt journal bearing.	<i>Replace.</i>
	Too large thrust clearance.	<i>Replace thrust bearing.</i>
Noisy engine (Noise seems to come from balancer)	Worn and burnt journal bearings.	<i>Replace.</i>
Noisy engine (Noise seems to come from transmission)	Worn or rubbing gear.	<i>Replace.</i>
	Worn spline.	<i>Replace.</i>
	Worn or rubbing primary gear.	<i>Replace.</i>
	Worn bearing.	<i>Replace.</i>

1A-10 Engine General Information and Diagnosis:

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

Condition	Possible cause	Correction / Reference Item
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	Repair or replace.
	Defective TP sensor.	Replace.
	Defective IAT sensor.	Replace.
	Defective CKP sensor.	Replace.
	Defective GP switch.	Replace.
	Defective IAP sensor.	Replace.
	Defective AP sensor.	Replace.
	TP sensor out of adjustment.	Adjust.
	Defective STP sensor and/or STVA.	Replace.
	Defective EXCVA.	Replace.
Engine overheats (Defective engine internal parts)	Heavy carbon deposit on piston crown.	Clean.
	Not enough oil in the engine.	Add oil.
	Defective oil pump or clogged oil circuit.	Replace or clean.
	Sucking air from intake pipe.	Retighten or replace.
	Use of incorrect engine oil.	Change.
	Defective cooling system.	See radiator section.
Engine overheats (Lean fuel/air mixture)	Short-circuited IAP sensor/lead wire.	Repair or replace.
	Short-circuited IAT sensor/lead wire.	Repair or replace.
	Sucking air from intake pipe joint.	Repair or replace.
	Defective fuel injector.	Replace.
	Defective ECT sensor.	Replace.
Engine overheats (Other factors)	Ignition timing is too advanced due to defective timing advance system (ECT sensor, GP switch, CKP sensor or ECM).	Replace.
	Too tight drive chain.	Adjust.
	ISC inconnect learning.	Reset learned value.
Dirty or heavy exhaust smoke	Too much engine oil.	Check with inspection window, drain out excess oil.
	Worn piston ring or cylinder.	Replace.
	Worn valve guide.	Replace.
	Scored or scuffed cylinder wall.	Replace.
	Worn valve stem.	Replace.
	Defective stem seal.	Replace.
	Worn oil ring side rail.	Replace.

Self-Diagnostic Procedures

BENB15J21104002

Use of Mode Selection Switch

NOTE

- Do not disconnect the coupler from ECM, battery cable from battery, ECM ground wire from engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection may erase memorized information in ECM memory.
- DTC stored in ECM memory can be checked by the special tool.
- Before checking DTC, read self-diagnosis function "User mode and dealer mode" (Refer to "Self-Diagnosis Function" (Page 1A-3).) carefully to have good understanding as to what functions are available and how to use it.
- Be sure to read "Precautions for Electrical Circuit Service" (Refer to "Precautions for Electrical Circuit Service" in Section 00 (Page 00-2).) before inspection and observe what is written there.

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Connect the special tool to the mode selection coupler.

Special tool

TOOL (A): 09930-82720 (Mode selection switch)



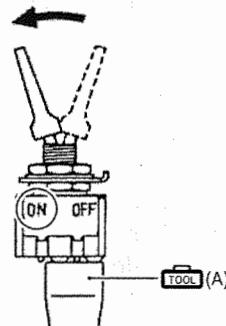
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- 3) Start the engine or crank the engine for more than 4 seconds.
- 4) Turn the special tool's switch ON.

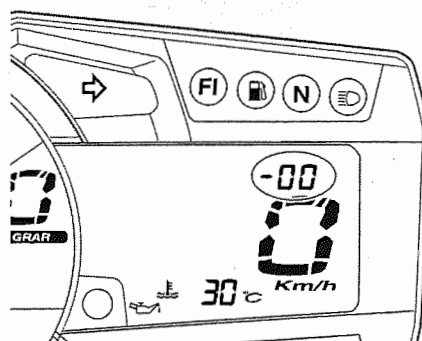
- 5) Check the DTC to determine the malfunction part. Refer to "DTC Table" (Page 1A-20).

Special tool

TOOL (A): 09930-82720 (Mode selection switch)



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IB14J1110139-01

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

NOTE

- Even though DTC (C00) is indicated, the previous malfunction history DTC still remains stored in the ECM. Therefore, erase the history DTC memorized in the ECM using SDS.
- DTC is memorized in the ECM also when the lead wire coupler of any sensor is disconnected. Therefore, when a lead wire coupler has been disconnected at the time of diagnosis, erase the stored history DTC using SDS. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

- 7) Turn the ignition switch OFF and disconnect the special tool from the mode selection coupler.
- 8) Reinstall the front seat.

Use of SDS

NOTE

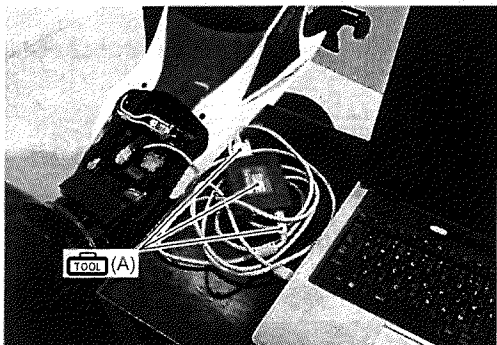
- Do not disconnect the coupler from ECM, battery cable from battery, ECM ground wire from the engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection may erase the memorized information in ECM memory.
- DTC stored in ECM memory can be checked by SDS.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

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Set up the SDS tools. (Refer to the SDS operation manual for further details.)

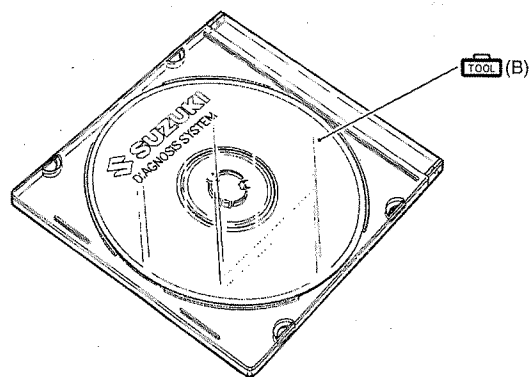
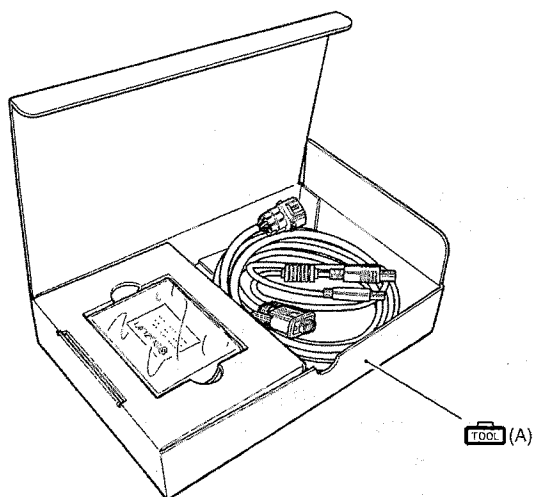
Special tool

TOOL (A): 09904-41010 (SUZUKI Diagnostic system set)

TOOL (B): 99565-01010-023 (CD-ROM Ver.23)

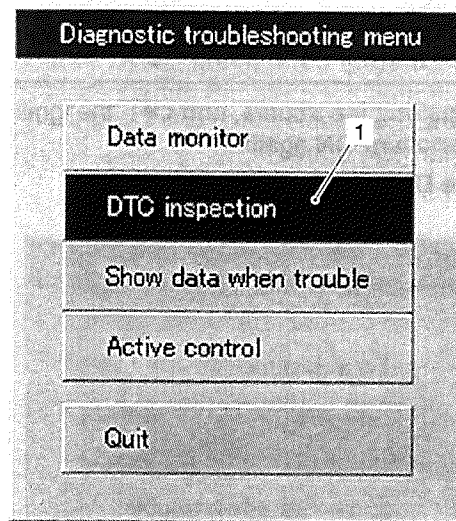


IB14J1110009-02



I705H1110116-03

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



I705H1110003-01

- 4) Start the engine or crank the engine for more than 4 seconds.

1A-14 Engine General Information and Diagnosis:

- 5) Check the DTC to determine the malfunction part. Refer to "DTC Table" (Page 1A-20).

NOTE

- Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS.
 - SDS is not only used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger. (Refer to "Show Data When Trouble (Displaying Data at the Time of DTC)" (Page 1A-15).)
 - How to use trigger. (Refer to the SDS operation manual for further details.)
- 6) After repairing the trouble, clear to delete history code (Past DTC). Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).
- 7) Close the SDS tool and turn the ignition switch OFF.
- 8) Disconnect the SDS tool and install the front seat.

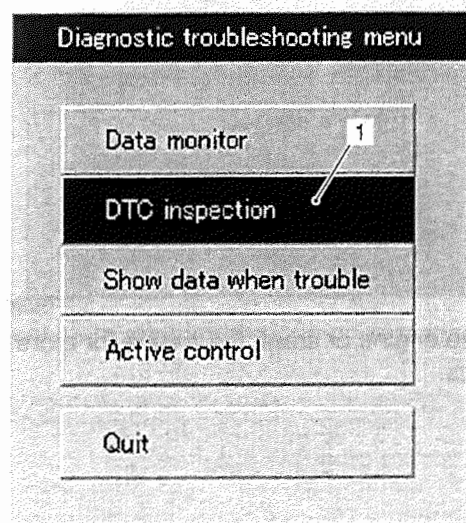
Use of SDS Diagnosis Reset Procedures

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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 at the time of diagnosis, erase the stored malfunction history code using SDS.

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



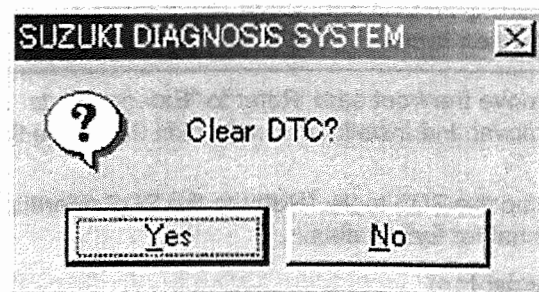
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- 3) Check the DTC.
- 4) The previous malfunction history code (Past DTC) still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS tool.
- 5) Click "Clear" (2) to delete history code (Past DTC).

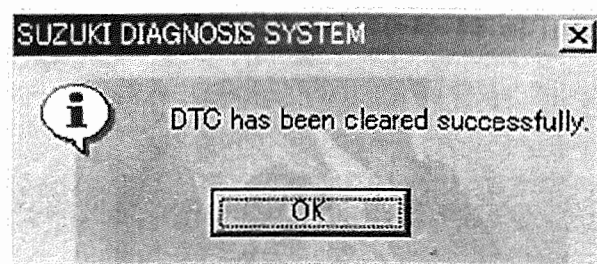
Help	Clear	F3
Code	Description & trout	
Current DTC - NIL		2
Past DTC - 2		
P0335	Crankshaft positior	
P0480	Cooling fan control	

IB14J1110010-01

- 6) Follow the displayed instructions.



I705H1110006-01



I705H1110009-01

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

File	View	Tool	Help
Help	Clear	F3	
Code	Description & t		
Current DTC - NIL		3	4
Past DTC - NIL			

I705H1110008-01

- 8) Close the SDS tool and turn the ignition switch OFF.
- 9) Disconnect the SDS tool and install the front seat.

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

BENB15J21104004

Use of SDS

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

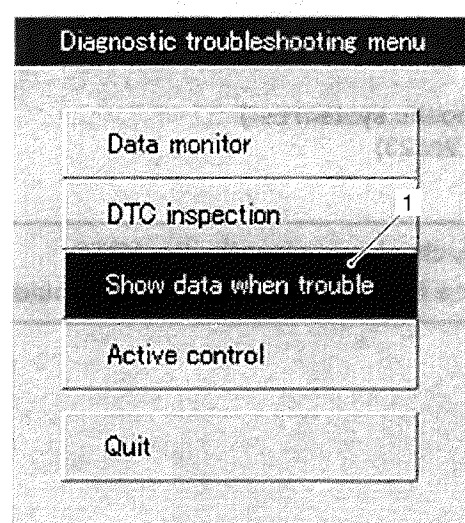
Therefore, it is possible to know engine and driving conditions (e.g., whether the engine was warm or not, where the motorcycle was running or stopped) when a malfunction was detected by checking the show data when trouble. This show data when trouble function can record the maximum of two Diagnostic Trouble Codes in the ECM.

Also, ECM has a function to store each show data when trouble for two different malfunctions in the order of occurrence as the malfunction is detected. Utilizing this function, it is possible to know the order of malfunctions that have been detected. Its use is helpful when rechecking or diagnosing a trouble.

Failure #1			
P1450-H Barometric pressure sensor circuit malfunction			
Item	Pre-detect	Detect poi.	Post-dete.
Vehicle speed	0.0	0.0	0.0
Engine speed	1197	1161	1149
Throttle position	28.4	28.4	28.4
Manifold absolute pressure 1	74.1	77.4	73.5
Engine coolant / oil temperature	114.9	114.9	114.9
Gear position	N	N	N
Secondary throttle actuator position sensor	29.0	29.0	29.0

IB15J1110001-01

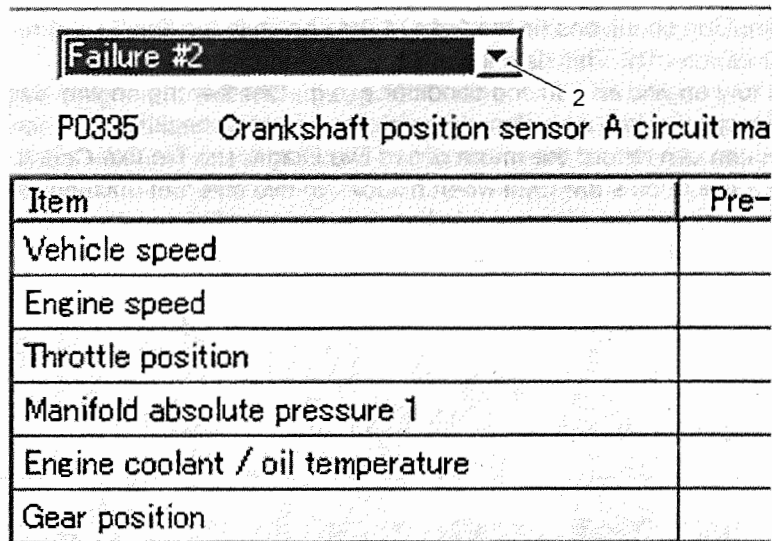
- 1) Click "Show data when trouble" (1) to display the data.



I718H1110269-02

1A-16 Engine General Information and Diagnosis:

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



The screenshot shows a diagnostic tool interface. At the top, there is a dropdown menu labeled "Failure #2" with a small arrow icon next to it, pointing to the number "2". Below the dropdown, the text "P0335 Crankshaft position sensor A circuit ma" is visible. Below this, there is a table with two columns: "Item" and "Pre-". The table contains the following rows:

Item	Pre-
Vehicle speed	
Engine speed	
Throttle position	
Manifold absolute pressure 1	
Engine coolant / oil temperature	
Gear position	

IB14J1110012-01

SDS Check

BENB15J21104005

Using SDS, sample the data at the time of new and periodic vehicle inspections.

After saving the sampled data in the computer, file them by model and by user.

The periodically filed data help improve the accuracy of troubleshooting since they can indicate the condition of vehicle functions that has changed with time.

For example, when a vehicle is brought in for service but the troubleshooting of a failure is not easy, comparing the current data value to past filed data value at time of normal condition can allow the specific engine failure to be determined.


Also, in the case of a customer vehicle which is not periodically brought in for service with no past data value having been saved, if the data value of a good vehicle condition have been already saved as a master (STD), comparison between the same models helps to facilitate the troubleshooting.

1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

Special tool

 : 09904-41010 (SUZUKI Diagnostic system set)

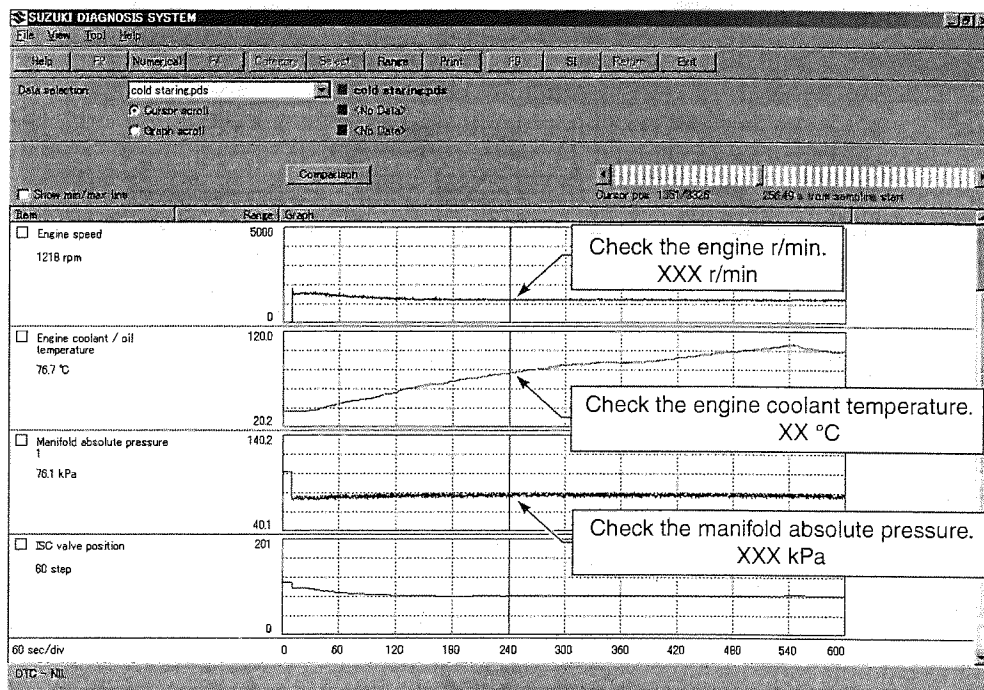
 : 99565-01010-023 (CD-ROM Ver.23)

NOTE

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

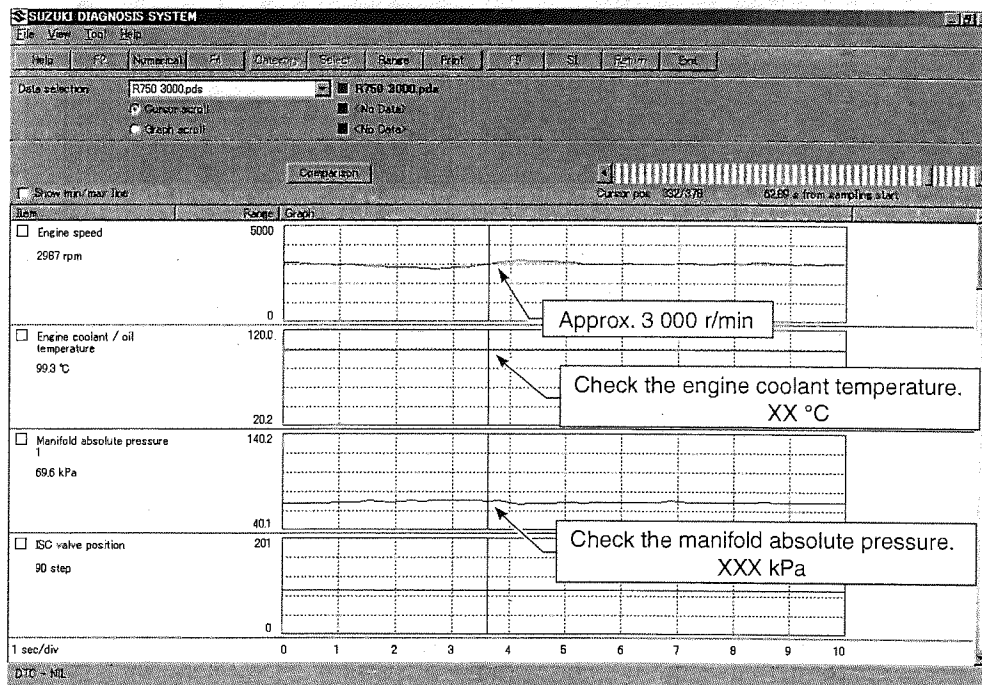
Sample

Data sampled from cold starting through warm-up



IB15J1110002-01

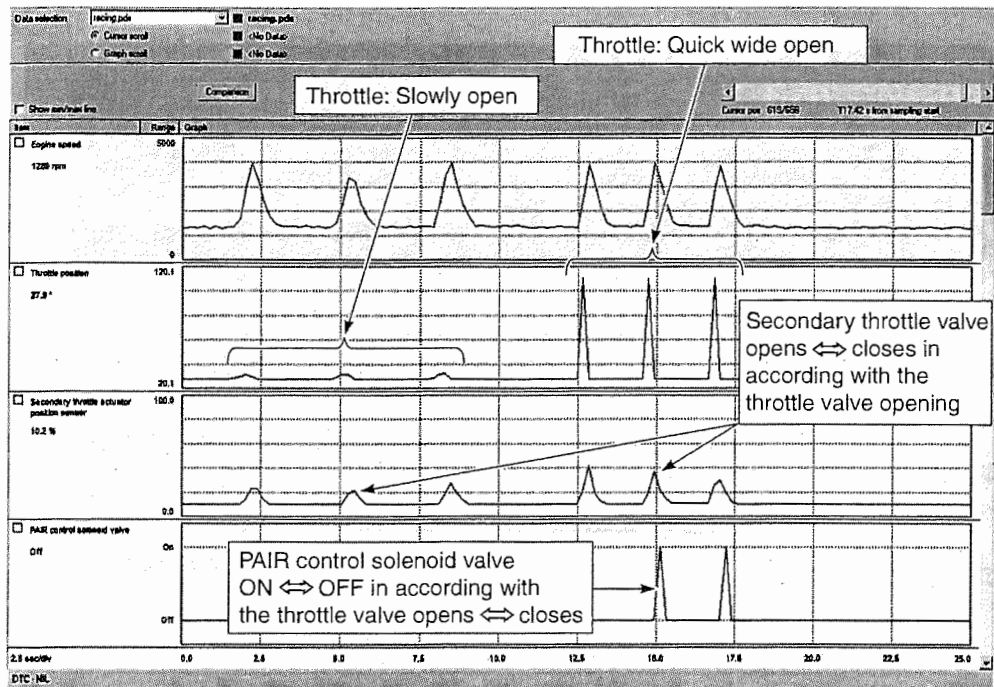
Data at 3 000 r/min under no load



IB15J1110003-01

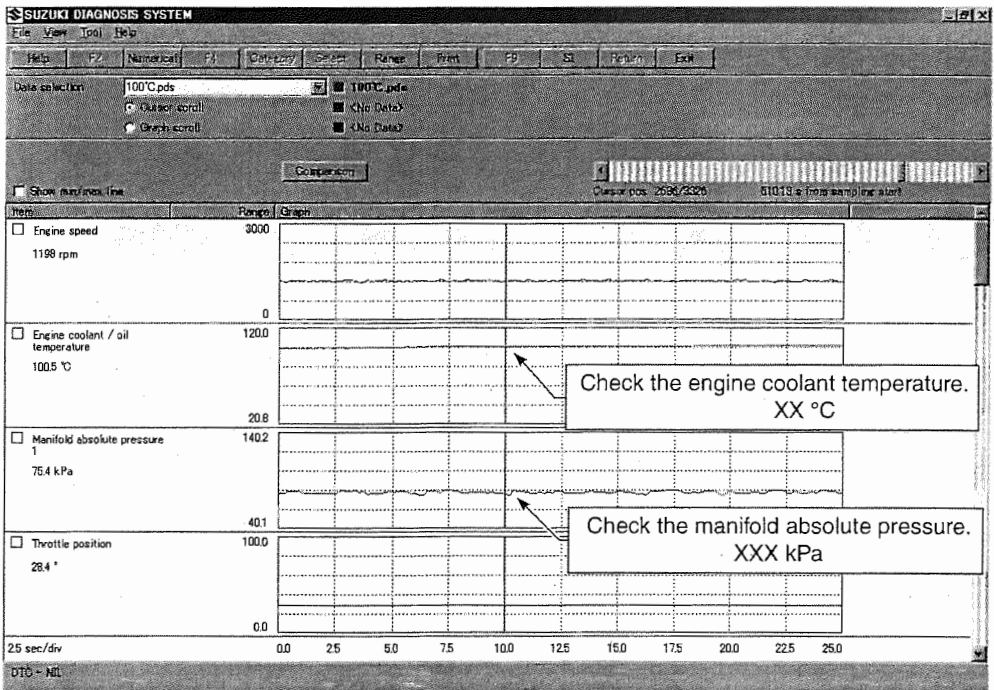
1A-18 Engine General Information and Diagnosis:

Data at the time of racing



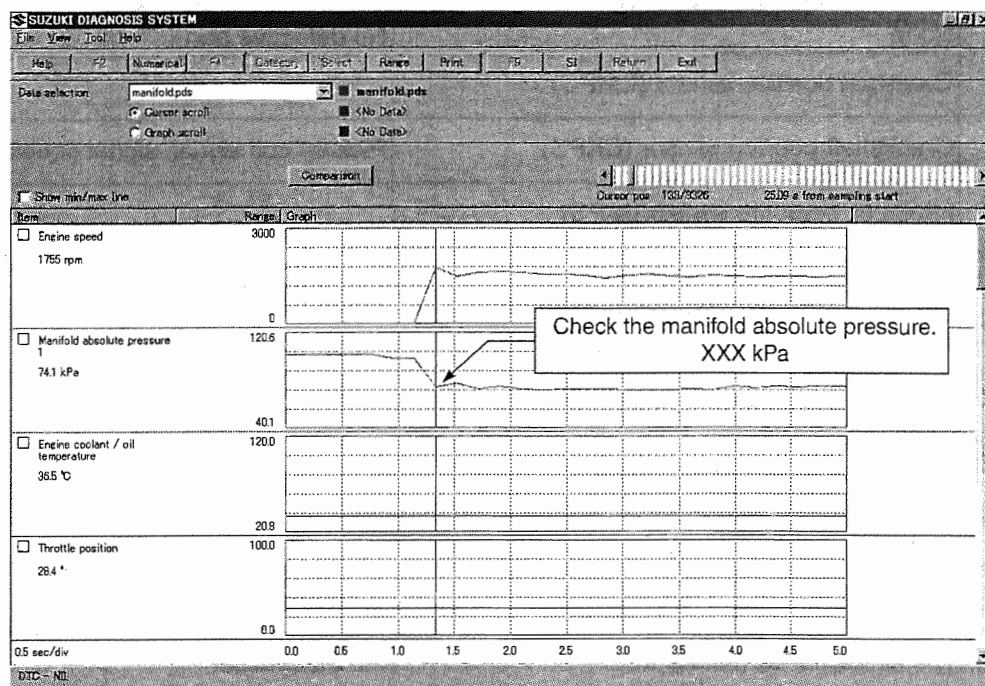
IB14J1110146-01

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



IB15J1110004-01

Data of manifold absolute pressure operation at the time of starting



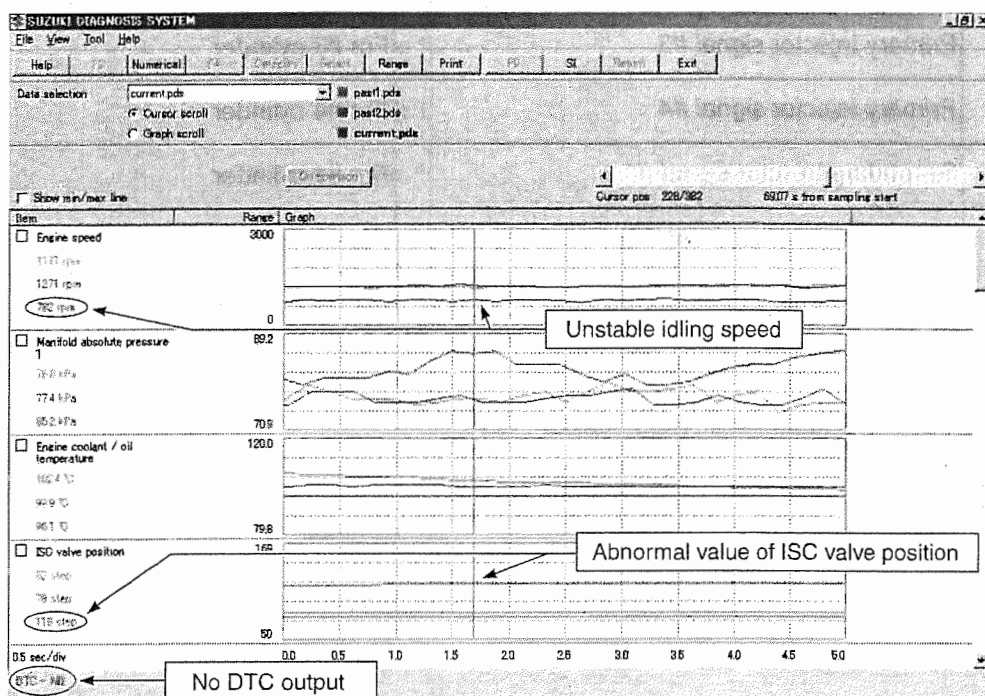
IB15J1110005-01

Example of Trouble

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

NOTE

With DTC not output, if the engine idling speed and ISC valve stepping position are found to be abnormal than the data saved previously, the possible cause may probably lie in the hardware side such as ISC valve air inlet hose crumple, bend, etc.



IB15J1110006-01

DTC Table

BENB15J21104006

Code	Malfunction Part	Remarks
C00	None	No defective part
C11 (P0340) ☞(Page 1A-28)	Camshaft position sensor (CMPS)	
C12 (P0335) ☞(Page 1A-30)	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
C13 (P0105-H/L) ☞(Page 1A-32)	Intake air pressure sensor (IAPS)	
C14 (P0120-H/L) ☞(Page 1A-37)	Throttle position sensor (TPS)	*1
C15 (P0115-H/L) ☞(Page 1A-41)	Engine coolant temperature sensor (ECTS)	
C21 (P0110-H/L) ☞(Page 1A-44)	Intake air temperature sensor (IATS)	
C22 (P1450-H/L) ☞(Page 1A-48)	Atmospheric pressure sensor (APS)	
C23 (P1651-H/L) ☞(Page 1A-53)	Tip-over sensor (TOS)	
C24 (P0351) ☞(Page 1A-57)	Ignition signal #1 (IG coil #1)	For #1 cylinder
C25 (P0352) ☞(Page 1A-57)	Ignition signal #2 (IG coil #2)	For #2 cylinder
C26 (P0353) ☞(Page 1A-57)	Ignition signal #3 (IG coil #3)	For #3 cylinder
C27 (P0354) ☞(Page 1A-57)	Ignition signal #4 (IG coil #4)	For #4 cylinder
C28 (P1655) ☞(Page 1A-57)	Secondary throttle valve actuator (STVA)	
C29 (P1654-H/L) ☞(Page 1A-60)	Secondary throttle position sensor (STPS)	
C31 (P0705) ☞(Page 1A-64)	Gear position signal (GP switch)	
C32 (P0201) ☞(Page 1A-66)	Primary Injector signal #1	For #1 cylinder
C33 (P0202) ☞(Page 1A-66)	Primary Injector signal #2	For #2 cylinder
C34 (P0203) ☞(Page 1A-66)	Primary Injector signal #3	For #3 cylinder
C35 (P0204) ☞(Page 1A-66)	Primary Injector signal #4	For #4 cylinder
C36 (P1764) ☞(Page 1A-68)	Secondary Injector signal #1	For #1 cylinder
C37 (P1765) ☞(Page 1A-68)	Secondary Injector signal #2	For #2 cylinder
C38 (P1766) ☞(Page 1A-68)	Secondary Injector signal #3	For #3 cylinder
C39 (P1767) ☞(Page 1A-68)	Secondary Injector signal #4	For #4 cylinder
C40 (P0505) ☞(Page 1A-70)	Idle speed control valve (ISC valve)	
C41 (P0230-H/L, P2505) ☞(Page 1A-74) / ☞(Page 1A-76)	Fuel pump control system (FP control system), ECM/PCM power input signal	Fuel pump, fuel pump relay
C42 (P1650) ☞(Page 1A-77)	Ignition switch signal (Anti-theft)	Ignition switch for E-03, 28, 33/immobilizer for E-21, 24

Code	Malfunction Part	Remarks
C44 (P0130, P0135) ☞ (Page 1A-78)	Heated oxygen sensor (HO2S)	
C46 (P1657-H/L, P1658) ☞ (Page 1A-82)	Exhaust control valve actuator (EXCVA)	
C49 (P1656) ☞ (Page 1A-90)	PAIR control solenoid valve	
C60 (P0480) ☞ (Page 1A-93)	Cooling fan control system	Cooling fan relay
C62 (P0443) ☞ (Page 1A-96)	EVAP system purge control solenoid valve	E-33 only
C65 (P0506/P0507) ☞ (Page 1A-99)	Idle speed control system	
C91 (P0500) ☞ (Page 1A-100)	Vehicle speed sensor	
C93 (P1769) ☞ (Page 1A-102)	Steering damper solenoid valve	

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

*1 To get the proper signal from the throttle position sensor, the sensor basic position is indicated in the LCD (DISPLAY) panel. The malfunction code 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 1 200 r/min, slightly turn the throttle position sensor and bring the line to the middle.

Fail-Safe Function Table

BENB15J21104007

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
CMP sensor	When camshaft position signal has failed during running, the ECM determines the cylinder positions as # to be the same as before occurrence of such a failure.	"NO"	"YES"
		Motorcycle can run, but once engine stops, engine can not start.	
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"
AP sensor	Atmospheric pressure is fixed to 101 kPa (760 mmHg).	"YES"	"YES"
Ignition signal	#1 fuel-cut (primary side and secondary side)	"YES"	"YES"
		#2, #3 & #4 cylinders can run.	
	#2 fuel-cut (primary side and secondary side)	"YES"	"YES"
		#1, #3 & #4 cylinders can run.	
	#3 fuel-cut (primary side and secondary side)	"YES"	"YES"
		#1, #2 & #4 cylinders can run.	
	#4 fuel-cut (primary side and secondary side)	"YES"	"YES"
		#1, #2 & #3 cylinders can run.	

1A-22 Engine General Information and Diagnosis:

Item	Fail-Safe Mode	Starting Ability	Running Ability
Primary injection signal	—	"YES"	"YES"
		#2, #3 & #4 cylinders can run.	
	—	"YES"	"YES"
		#1, #3 & #4 cylinders can run.	
	—	"YES"	"YES"
		#1, #2 & #4 cylinders can run.	
Secondary injection signal	—	"YES"	"YES"
		#1, #2 & #3 cylinders can run.	
	—	—	"YES"
		#2, #3 & #4 cylinders can run.	
	—	—	"YES"
		#1, #3 & #4 cylinders can run.	
STV actuator	Secondary throttle valve is fixed to full close position. When motor disconnection or lock occurs, power from ECM is shut off.	—	"YES"
		#2, #3 & #4 cylinders can run.	
STP sensor	Secondary throttle valve is fixed to full open position.	—	"YES"
Gear position signal	Gear position signal is fixed to 6th gear.	—	"YES"
HO2 sensor	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	—	"YES"
PAIR control solenoid valve	ECM stops controlling PAIR control solenoid valve.	—	"YES"
EXCV actuator	EXCV actuator is fixed to full open position. When motor disconnection or lock occurs, power from ECM is shut off.	—	"YES"
ISC valve	When motor disconnection or lock occurs, power from ECM is shut off.	—	"YES"
EVAP system purge control solenoid valve (E-33 only)	ECM stops controlling EVAP system purge control solenoid valve.	—	"YES"
Vehicle speed sensor	ECM stops controlling steering damper solenoid valve.	—	"YES"
Steering damper solenoid valve	ECM stops controlling steering damper solenoid valve.	—	"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 selection 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 selection switch or SDS.

- Engine oil level and leakage. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- Engine coolant level and leakage. Refer to "Cooling Circuit Inspection" in Section 1F (Page 1F-5).
- Fuel level and leakage. Refer to "Fuel Line Inspection" in Section 0B (Page 0B-10).
- Clogged air cleaner element. Refer to "Air Cleaner Element Inspection" in Section 0B (Page 0B-3).
- Battery condition.
- Throttle cable play. Refer to "Throttle Cable Play Inspection and Adjustment" in Section 0B (Page 0B-12).
- Vacuum hose looseness, bend and disconnection.
- Broken fuse.
- FI indicator light operation. Refer to "Combination Meter Inspection" in Section 9C (Page 9C-3).
- Each warning indicator light operation. Refer to "Combination Meter Inspection" in Section 9C (Page 9C-3).
- Combination meter operation. Refer to "Combination Meter Inspection" in Section 9C (Page 9C-3).
- Exhaust gas leakage and noise. Refer to "Exhaust System Inspection" in Section 1K (Page 1K-15).
- Each coupler disconnection.
- Clogged radiator fins. Refer to "Radiator Inspection and Cleaning" in Section 1F (Page 1F-5).

Malfunction Code and Defective Condition Table

BENB15J21104009

Malfunction Code		Detected Item	Detected Failure Condition	Check For
C00		NO FAULT	—	—
C11		CMP sensor	The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	CMP sensor wiring and mechanical parts CMP sensor, intake cam pin, wiring/coupler connection
P0340				
C12		CKP sensor	The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	CKP sensor wiring and mechanical parts CKP sensor, lead wire/coupler connection
P0335				
C13		IAP sensor	The sensor should produce following voltage. 0.5 V ≤ Sensor voltage < 4.85 V In other than the above range, C13 (P0105) is indicated.	IAP sensor, lead wire/coupler connection
P0105	H		Sensor voltage is higher than specified value.	IAP sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	IAP sensor circuit open or shorted to ground or VCC circuit open
C14		TP sensor	The sensor should produce following voltage. 0.2 V ≤ Sensor voltage < 4.8 V In other than the above range, C14 (P0120) is indicated.	TP sensor, lead wire/coupler connection
P0120	H		Sensor voltage is higher than specified value.	TP sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to ground or VCC circuit open

Malfunction Code	Detected Item		Detected Failure Condition	Check For
C15	ECT sensor		The sensor voltage should be the following. $0.15\text{ V} \leq \text{Sensor voltage} < 4.85\text{ V}$ In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection
P0115		H	Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open
		L	Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground
C21	IAT sensor		The sensor voltage should be the following. $0.15\text{ V} \leq \text{Sensor voltage} < 4.85\text{ V}$ In other than the above range, C21 (P0110) is indicated.	IAT sensor, lead wire/coupler connection
P0110		H	Sensor voltage is higher than specified value.	IAT sensor circuit open or ground circuit open
		L	Sensor voltage is lower than specified value.	IAT sensor circuit shorted to ground
C22	AP sensor		The sensor voltage should be the following. $0.5\text{ V} \leq \text{Sensor voltage} < 4.85\text{ V}$ In other than the above range, C22 (P1450) is indicated.	AP sensor, lead wire/coupler connection
P1450		H	Sensor voltage is higher than specified value.	AP sensor circuit shorted to VCC or ground circuit open
		L	Sensor voltage is lower than specified value.	AP sensor circuit open or shorted to ground or VCC circuit open
C23	TO sensor		The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. $0.2\text{ V} \leq \text{Sensor voltage} < 4.8\text{ V}$ In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection
P1651		H	Sensor voltage is higher than specified value.	TO sensor circuit shorted to VCC or ground circuit open
		L	Sensor voltage is lower than specified value.	TO sensor circuit open or shorted to ground or VCC circuit open
C24/C25 C26/C27	Ignition signal		CKP sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted 8 times or more continuously. In this case, the code C24 (P0351), C25 (P0352), C26 (P0353) or C27 (P0354) is indicated.	Ignition coil, wiring/coupler connection, power supply from the battery
P0351/P0352 P0353/P0354				
C28	STV actuator		When no actuator control signal is supplied from the ECM, communication signal does not reach ECM or operation voltage does not reach STVA motor, C28 (P1655) is indicated. STVA can not operate properly or its motor locked.	STVA motor, lead wire/coupler connection
P1655				
C29	STP sensor		The sensor should produce following voltage. $0.15\text{ V} \leq \text{Sensor voltage} < 4.85\text{ V}$ In other than the above range, C29 (P1654) is indicated.	STP sensor, lead wire/coupler connection
P1654		H	Sensor voltage is higher than specified value.	STP sensor circuit shorted to VCC or ground circuit open
		L	Sensor voltage is lower than specified value.	STP sensor circuit open or shorted to ground or VCC circuit open

1A-26 Engine General Information and Diagnosis:

Malfunction Code		Detected Item	Detected Failure Condition	Check For
C31		Gear position signal	Gear position signal voltage should be higher than the following for 3 seconds and more. Gear position sensor voltage ≥ 0.6 V If lower than the above value, C31 (P0705) is indicated.	GP switch, wiring/coupler connection, gearshift cam, etc.
P0705				
C32/C33 C34/C35		Primary fuel injector	CKP sensor (pickup coil) signal is produced, but fuel injector signal is interrupted 4 times or more continuously. In this case, the code C32 (P0201), C33 (P0202), C34 (P0203) or C35 (P0204) is indicated.	Primary fuel injector, wiring/ coupler connection, power supply to the injector
P0201/P0202 P0203/P0204				
C36/C37 C38/C39		Secondary fuel injector	Some failure exists in the fuel injector signal in a high load, high revolution condition. In this case, the code C36 (P1764), C37 (P1765), C38 (P1766) or C39 (P1767) is indicated.	Secondary fuel injector, wiring/ coupler connection, power supply to the injector
P1764/P1765 P1766/P1767				
C40/P0505		ISC valve	The circuit voltage of motor drive is unusual.	ISC valve circuit open or shorted to ground
C41		FP relay	No voltage is applied to the fuel pump, although fuel pump relay is turned ON, or voltage is applied to fuel pump although fuel pump relay is turned OFF.	Fuel pump relay, lead wire/ coupler connection, power source to fuel pump relay and fuel injectors
P0230	H		Voltage is applied to fuel pump although fuel pump relay is turned OFF.	Fuel pump relay switch circuit shorted to power source Fuel pump relay (switch side)
	L		No voltage is applied to the fuel pump, although fuel pump relay is turned ON.	Fuel pump relay circuit open or short Fuel pump relay (coil side)
C41/P2505		ECM/PCM power input signal	No voltage is applied to the ECM.	Lead wire/coupler connection of ECM terminal to fuel fuse
C42		Ignition switch	Ignition switch signal is not input to the ECM. * When the I.D. agreement is not verified. * ECM does not receive communication signal from the immobilizer antenna.	Ignition switch, lead wire/ coupler, etc. * Immobilizer/anti-theft system
P1650				
C44/P0130		HO2 sensor	HO2 sensor output voltage is not input to ECM during engine operation and running condition. (Sensor voltage > 1.0 V) C44 (P0130) is indicated.	HO2 sensor is circuit open or shorted to the power source
C44/P0135			The Heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit, C44 (P0135) is indicated.	Heated circuit open or shorted to ground Battery voltage supply to the HO2 sensor

Malfunction Code		Detected Item	Detected Failure Condition	Check For
C46		EXCV actuator	EXCVA position sensor produces following voltage. 0.1 V ≤ sensor voltage < 4.9 V In other than the above range, C46 (P1675) is indicated. When no actuator control signal is supplied from the ECM, communication signal does not reach ECM or operation voltage does not reach EXCVA motor, C46 (P1658) is indicated. EXCVA can not operate.	EXCVA, EXCVA lead wire/ coupler
P1657	H		EXCVA position sensor voltage is higher than specified value.	EXCVA position sensor circuit shorted to VCC or ground circuit open
	L		EXCVA position sensor voltage is lower than specified value.	EXCVA position sensor circuit open or shorted to ground or VCC circuit open
P1658			When no operation voltage reaches EXCVA motor, C46 (P1658) is indicated. EXCVA motor can not be operated.	EXCVA, EXCVA motor lead wire/coupler
C49		PAIR control solenoid valve	PAIR control solenoid valve voltage is not input to ECM.	PAIR control solenoid valve, lead wire/coupler connection
P1656				
C60		Cooling fan relay	Cooling fan relay signal is not input to ECM.	Cooling fan relay, lead wire/ coupler connection
P0480				
C62		EVAP system purge control solenoid valve (E-33 only)	EVAP system purge control solenoid valve voltage is not input to ECM.	EVAP system purge control solenoid valve, lead wire/ coupler connection
P0443				
C65/P0506		ISC valve	Idle speed dropped lower than desired idle speed by more than specified range.	Air passage clogged ISC valve is fixed ISC valve preset position is incorrect
C65/P0507			Idle speed rose higher than desired idle speed by more than specified range.	ISC valve hose connection ISC valve is fixed ISC valve preset position is incorrect
C91		Vehicle speed sensor	Combination meter does not receive signal from the vehicle speed sensor for more than 6 sec. when the motorcycle is running. ECM does not receive signal from the vehicle speed sensor for more than 6 sec. when the motorcycle is running. Failure in communication between ECM and combination meter with reference to vehicle speed.	Speed sensor and combination meter wiring/coupler connection between ECM and combination meter
P0500				

Malfunction Code		Detected Item	Detected Failure Condition	Check For
C93		Steering damper solenoid valve	Steering damper control current does not flow to the solenoid valve. With IG turned ON, ECM detects a failure of internal circuit element. Solenoid current does not converge to the target value. Battery voltage is 10 V or below with the engine running.	Steering damper solenoid valve circuit interrupter element shorted, feedback current convergence failure, low battery voltage
P1769	H		Steering damper control current is higher than specified value. An abnormal current is detected during the vehicle standstill. Solenoid current is 0.7 A or above.	Steering damper solenoid valve circuit shorted to VCC
	L		Steering damper control current is lower than specified value. With IG turned ON, ECM detects a discontinuity. An abnormal current is detected during the vehicle standstill.	Steering damper solenoid valve circuit open or shorted

*: Immobilizer system equipped model only. (E-21, 24)

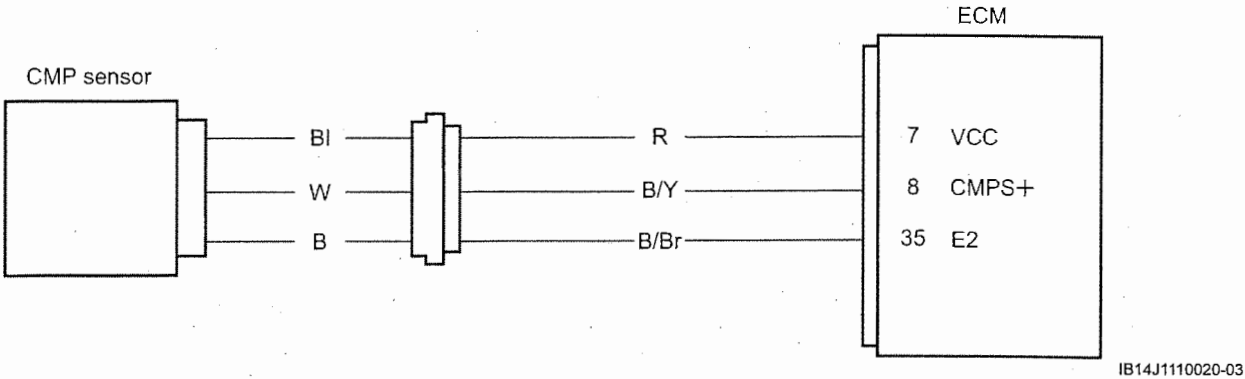
DTC “C11” (P0340): CMP Sensor Circuit Malfunction

BENB15J21104010

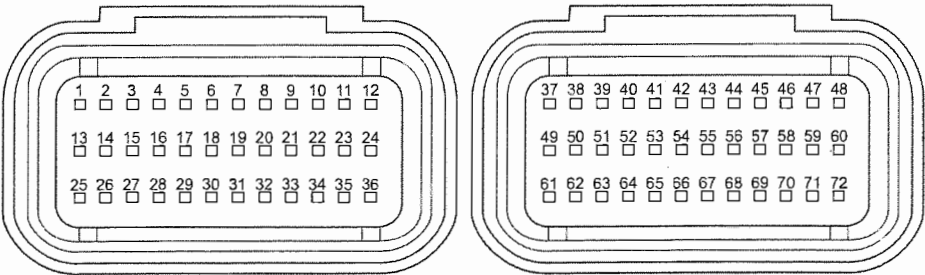
Detected Condition and Possible Cause

Detected Condition	Possible Cause
The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	<ul style="list-style-type: none"> • CMP sensor circuit open or short. • CMP sensor malfunction. • ECM malfunction.

Wiring Diagram



ECM coupler (Harness side)



Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 4) Check the CMP sensor coupler (1) for loose or poor contacts.
If OK, remove the CMP sensor. Refer to "CMP Sensor Removal and Installation" in Section 1C (Page 1C-2).



IB14J1110021-01

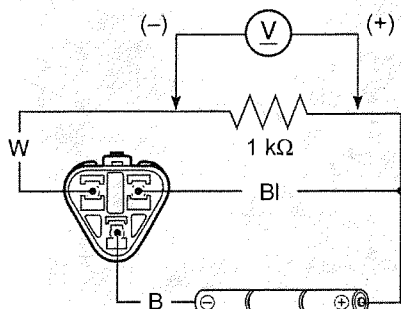
- 5) Connect 3 new 1.5 V batteries in series, 1 k Ω resistor and the multi circuit tester as shown in the figure.

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

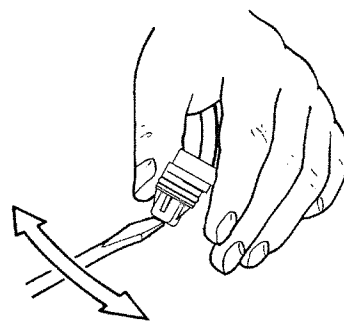
Tester knob indication

Voltage (---)



IB14J1110135-02

- 6) Under this condition, if a suitable screwdriver touching the pick-up surface of the CMP sensor is moved, the tester reading voltage changes (0.8 V and less \leftrightarrow 4.3 V and more).



IB23H1110007-01

Is the voltage OK?

- | | |
|-----|---|
| Yes | <ul style="list-style-type: none"> • B/Y, R or B/Br wire open or shorted to ground. • Loose or poor contacts on the CMP sensor coupler or ECM coupler (Terminal "7", "8" or "35"). • If wires and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. |
| No | <ul style="list-style-type: none"> • Inspect that metal particles or foreign material stuck on the CMP sensor and camshaft tip. • If there are no metal particles and foreign material, then replace the CMP sensor with a new one. |

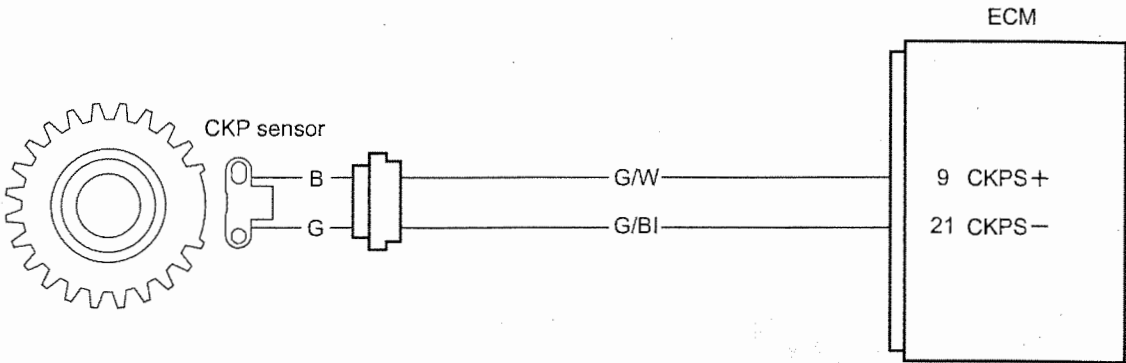
DTC “C12” (P0335): CKP Sensor Circuit Malfunction

BENB15J21104011

Detected Condition and Possible Cause

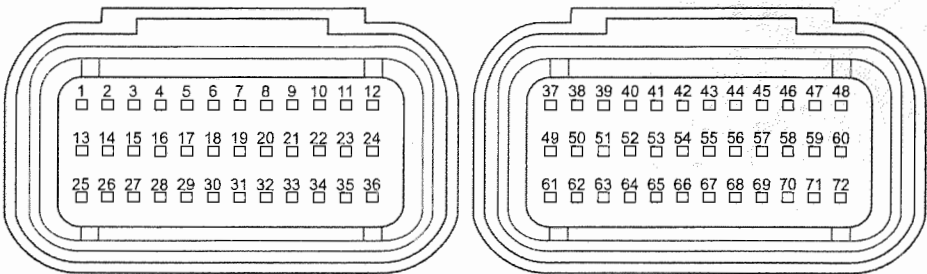
Detected Condition	Possible Cause
The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	<ul style="list-style-type: none">• Metal particles or foreign material being stuck on the CKP sensor and rotor tip.• CKP sensor circuit open or short.• CKP sensor malfunction.• ECM malfunction.

Wiring Diagram



IB14J1110023-02

ECM coupler (Harness side)



IB37H1110007-02

Troubleshooting

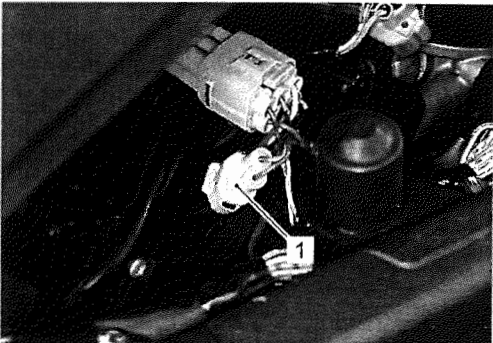
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-9).

- 3) Check the CKP sensor coupler (1) for loose or poor contacts. If OK, then measure the CKP sensor resistance.



IB14J1110024-01

- 4) Disconnect the CKP sensor coupler and measure the CKP sensor resistance.

Special tool

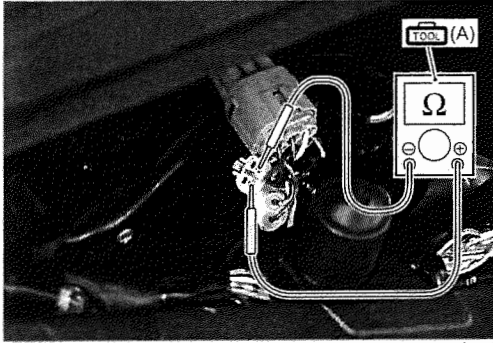
TOOL (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Resistance (Ω)

CKP sensor resistance

Approx. 168 Ω at 20 °C (68 °F)



IB14J1110025-01

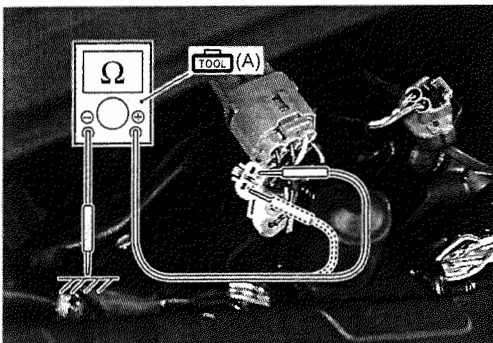
- 5) If OK, then check the continuity between each terminal and ground.

Special tool

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

CKP sensor continuity

∞ Ω (Infinity) (B – Ground, G – Ground)



IB14J1110026-01

Are the resistance and continuity OK?

Yes Go to Step 2.

No Replace the CKP sensor with a new one.

Step 2

- 1) Crank the engine several seconds with the starter motor, and measure the CKP sensor peak voltage at the coupler.

Special tool

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

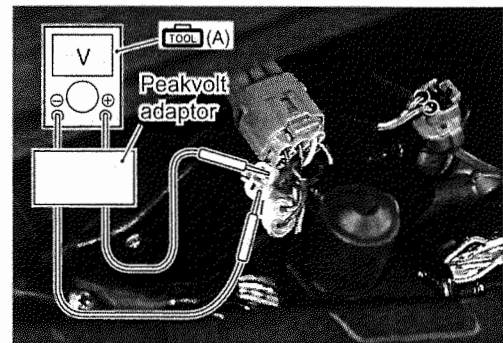
Tester knob indication

Voltage (V)

CKP sensor peak voltage

0.28 V and more

((+) terminal: B – (–) terminal: G)



IB14J1110027-01

- 2) Repeat the 1) test procedures several times and measure the highest peak voltage.

Is the voltage OK?

- Yes**
- G/W or G/BI wire open or shorted to ground.
 - Loose or poor contacts on the CKP sensor coupler or ECM coupler (Terminal "9" or "21").
 - If the wires and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No**
- Inspect that metal particles or foreign material stuck on the CKP sensor and rotor tip.
 - If there are no metal particles and foreign material, then replace the CKP sensor with a new one. Refer to "CKP Sensor Removal and Installation" in Section 1C (Page 1C-3).

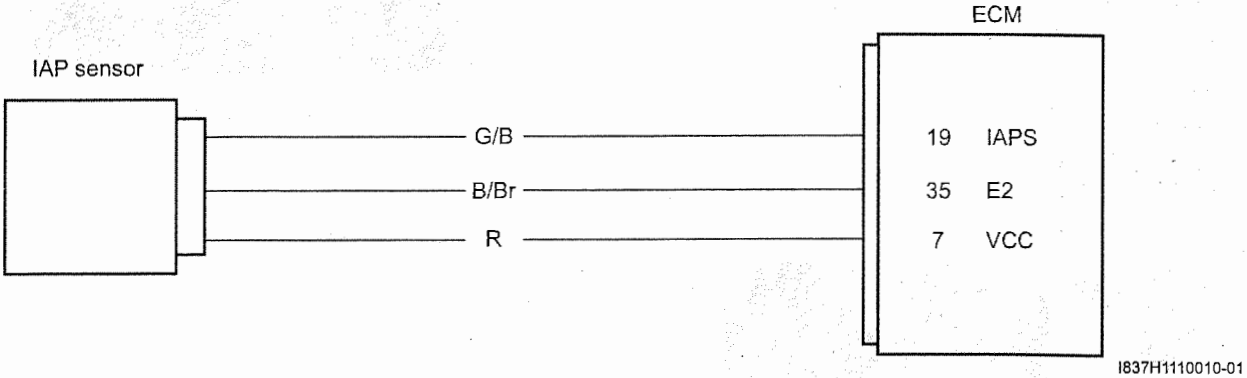
DTC “C13” (P0105-H/L): IAP Sensor Circuit Malfunction

BENB15J21104012

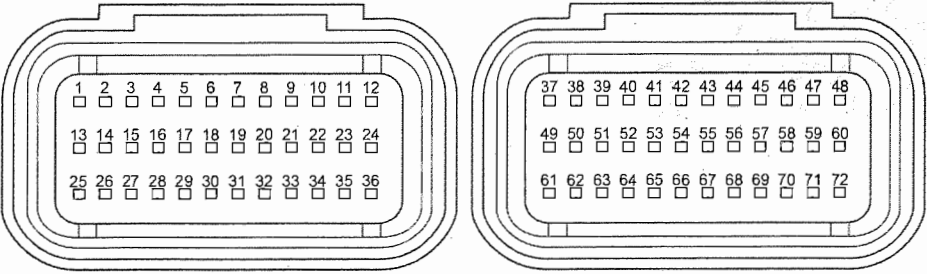
Detected Condition and Possible Cause

Detected Condition			Possible Cause
C13		IAP sensor voltage is not within the following range. 0.5 V ≤ Sensor voltage < 4.85 V	<ul style="list-style-type: none">• Clogged vacuum passage between throttle body and IAP sensor.• Air being drawn from vacuum passage between throttle body and IAP sensor.• IAP sensor circuit open or shorted to ground.• IAP sensor malfunction.• ECM malfunction.
		NOTE Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.	
P0105	H	Sensor voltage is higher than specified value.	<ul style="list-style-type: none">• IAP sensor circuit is open or shorted to VCC or ground circuit open.• IAP sensor circuit is shorted to ground or VCC circuit open.
	L	Sensor voltage is lower than specified value.	

Wiring Diagram



ECM coupler (Harness side)



Troubleshooting

NOTICE

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

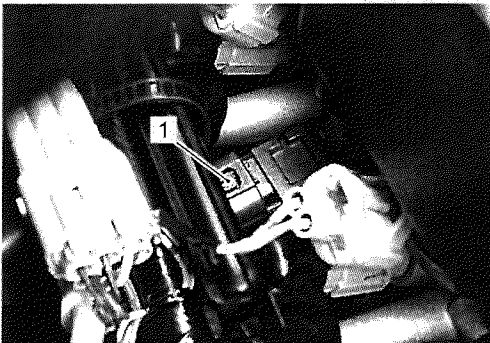
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

C13 (Use of mode selection switch)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the IAP sensor coupler (1) for loose or poor contacts. If OK, then measure the IAP sensor input voltage.



IB14J1110028-01

- 4) Disconnect the IAP sensor coupler.
- 5) Turn the ignition switch ON.

- 6) Measure the input voltage between the R wire and ground.

If OK, then measure the voltage between the R wire and B/Br wire.

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

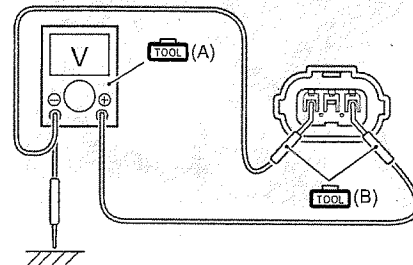
Tester knob indication

Voltage (---)

IAP sensor input voltage

4.5 – 5.5 V

((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)



IB14J1110029-01

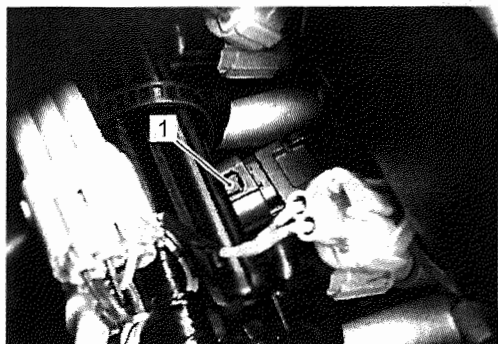
Is the voltage OK?

- | | |
|-----|--|
| Yes | Go to P0105-L (Use of SDS) Step 3. |
| No | <ul style="list-style-type: none"> • Loose or poor contacts on the ECM coupler. • Open or short circuit in the R or B/Br wire. |

P0105-H (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the IAP sensor coupler (1) for loose or poor contacts. If OK, then check the IAP sensor lead wire continuity.



IB14J1110030-02

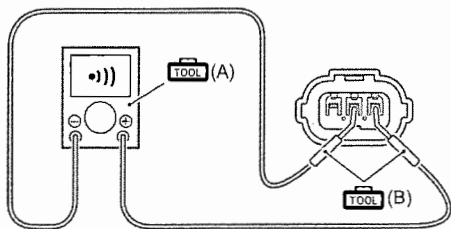
- 4) Disconnect the IAP sensor coupler.
- 5) Check the continuity between the R wire and G/B wire. If the sound is not heard from the tester, the circuit condition is OK.

Special tool

- TOOL (A): 09900-25008 (Multi circuit tester set)**
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity (•••)



IB14J1110031-01

- 6) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 7) Insert the needle-point probes to the lead wire coupler.

- 8) Check the continuity between the G/B wire and terminal "19". If OK, then check the continuity between the B/Br wire and terminal "35".

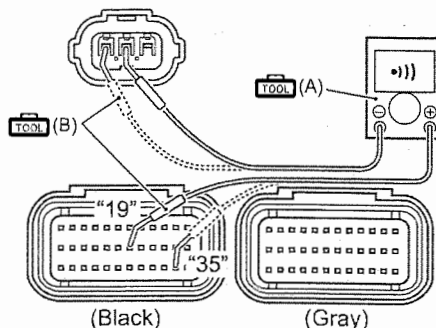
Special tool

- TOOL (A): 09900-25008 (Multi circuit tester set)**
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•••)

ECM couplers (Harness side)



IB14J1110032-01

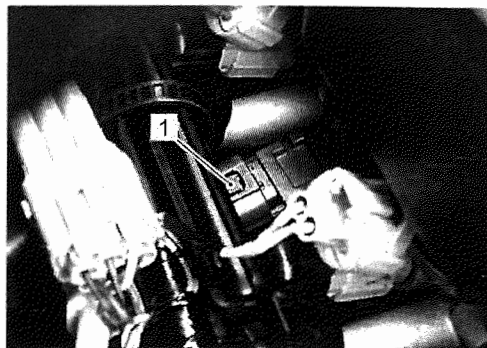
Is the continuity OK?

- Yes Go to P0105-L (Use of SDS) Step 3.
No G/B wire shorted to VCC, or B/Br wire open.

P0105-L (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the IAP sensor coupler (1) for loose or poor contacts. If OK, then check the IAP sensor lead wire continuity.



IB14J1110033-01

- 4) Disconnect the IAP sensor coupler.

- 5) Check the continuity between the G/B wire and ground. Also, check the continuity between the G/B wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK.

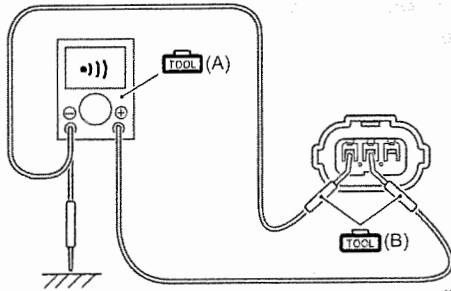
Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity (•))



IB14J1110034-01

- 6) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 7) Insert the needle-point probes to the lead wire coupler.
- 8) Check the continuity between the R wire and terminal "7". Also, check the continuity between the G/B wire and terminal "19".

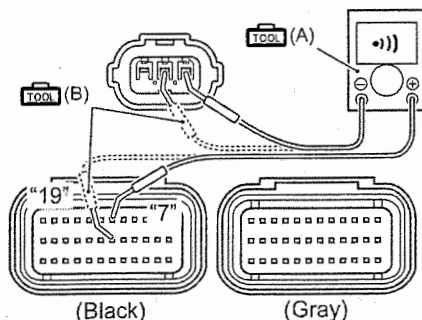
Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity (•))

ECM couplers (Harness side)

IB14J1110035-02

Is the continuity OK?

Yes Go to Step 2.

No R and G/B wire open, G/B wire shorted to ground.

Step 2

- 1) Connect the ECM couplers.
- 2) Turn the ignition switch ON.
- 3) Measure the input voltage between the R wire and ground.

If OK, then measure the voltage between the R wire and B/Br wire.

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

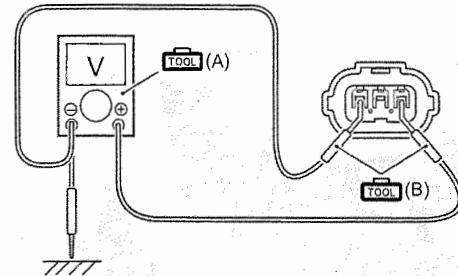
Tester knob indication

Voltage (---)

IAP sensor input voltage

4.5 – 5.5 V

((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)



IB14J1110036-01

Is the voltage OK?

Yes Go to Step 3.

No

- Loose or poor contacts on the ECM coupler.
- Open or short circuit in the R or B/Br wire.

Step 3

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM couplers and IAP sensor coupler.
- 3) Insert the needle-point probes to the lead wire coupler.
- 4) Run the engine at idle speed and measure the IAP sensor output voltage between the G/B wire and B/Br wire.

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

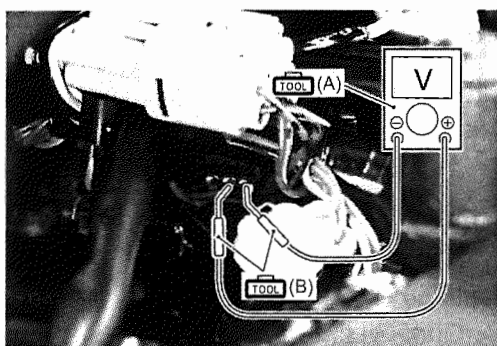
Tester knob indication

Voltage (---)

IAP sensor output voltage

Approx. 2.7 V at idle speed

((+) terminal: G/B – (–) terminal: B/Br)



IB14J1110037-01

Is the voltage OK?

- Yes Go to Step 4.
- No
- Check the vacuum hose for crack or damage.
 - Open or short circuit in the G/B wire.
 - If vacuum hose and wire are OK, replace the IAP sensor with a new one. Refer to "IAP Sensor Removal and Installation" in Section 1C (Page 1C-3).

Step 4

- 1) Turn the ignition switch OFF.
- 2) Remove the IAP sensor. Refer to "IAP Sensor Removal and Installation" in Section 1C (Page 1C-3).
- 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 "B" and (+) terminal to the VCC terminal "A".
- 5) Check the voltage between Vout terminal "C" and ground. Also, check if voltage reduces when vacuum is applied by using vacuum pump gauge.

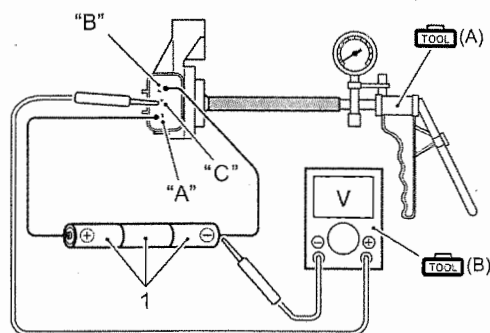
Special tool

TOOL (A): 09917-47011 (Vacuum pump gauge set)

TOOL (B): 09900-25008 (Multi circuit tester set)

Tester knob indication

Voltage (---)



IB14J1110038-01

ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
m	ft	kPa	mmHg	V
0 – 610	0 – 2 000	100 – 94	760 – 707	3.1 – 3.6
611 – 1 524	2 001 – 5 000	94 – 85	707 – 634	2.8 – 3.4
1 525 – 2 438	5 001 – 8 000	85 – 76	634 – 567	2.6 – 3.1
2 439 – 3 048	8 001 – 10 000	76 – 70	567 – 526	2.4 – 2.9

IB23H1110023-02

Is the voltage OK?

- Yes
- G/B, R or B/Br wire open or shorted to ground, or poor "19", "7" or "35" connection.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No
- If check result is not satisfactory, replace the IAP sensor with a new one. Refer to "IAP Sensor Removal and Installation" in Section 1C (Page 1C-3).

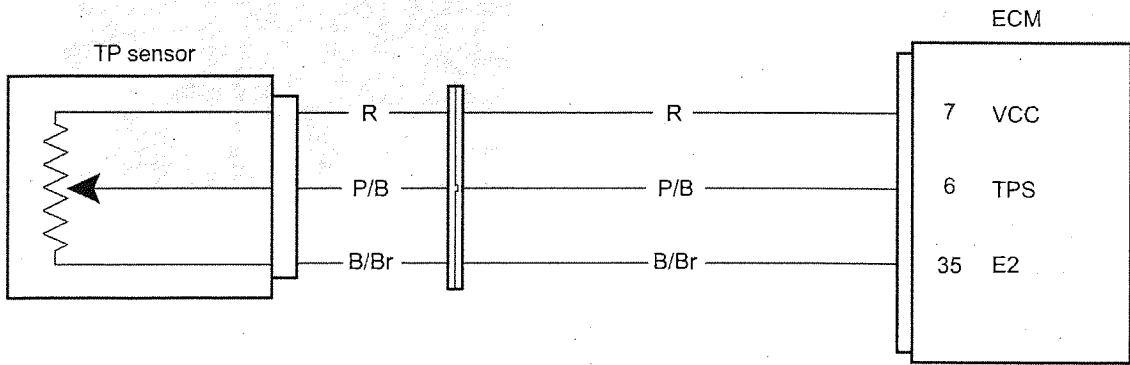
DTC “C14” (P0120-H/L): TP Sensor Circuit Malfunction

BENB15J21104013

Detected Condition and Possible Cause

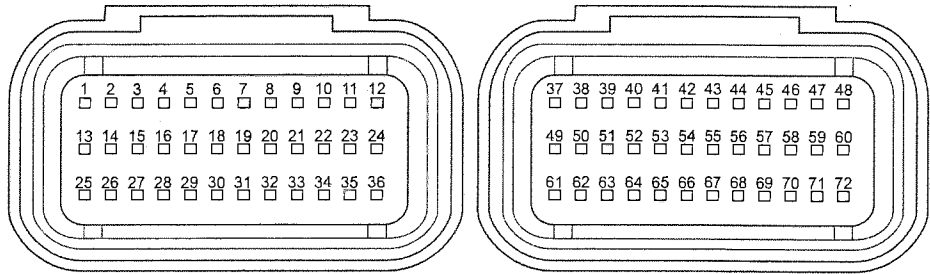
Detected Condition		Possible Cause
C14	Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. $0.2\text{ V} \leq \text{Sensor voltage} < 4.8\text{ V}$	<ul style="list-style-type: none">• TP sensor maladjusted.• TP sensor circuit open or short.• TP sensor malfunction.• ECM malfunction.
P0120	H	• TP sensor circuit is shorted to VCC or ground circuit is open.
	L	• TP sensor circuit is open or shorted to ground or VCC circuit is open.

Wiring Diagram



IB14J1110039-01

ECM coupler (Harness side)



IB37H1110007-02

Troubleshooting

NOTICE

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

NOTE

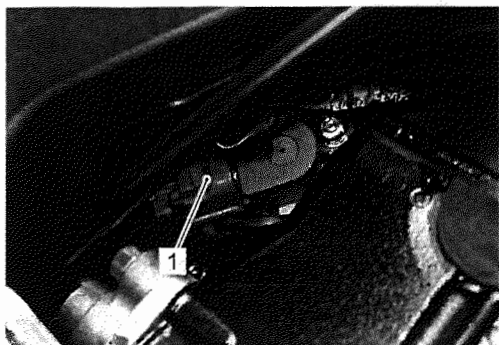
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-14).

C14 (Use of mode selection switch)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the right cowl side cover. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-7).

- 3) Check the TP sensor coupler (1) for loose or poor contacts.
If OK, then measure the TP sensor input voltage.



IB14J1110040-01

- 4) Disconnect the TP sensor coupler.
- 5) Turn the ignition switch ON.
- 6) Measure the input voltage between the R wire and ground.
If OK, then measure the input voltage between the R wire and B/Br wire.

Special tool

- TOOL (A): 09900-25008 (Multi circuit tester set)**
TOOL (B): 09900-25009 (Needle-point probe set)

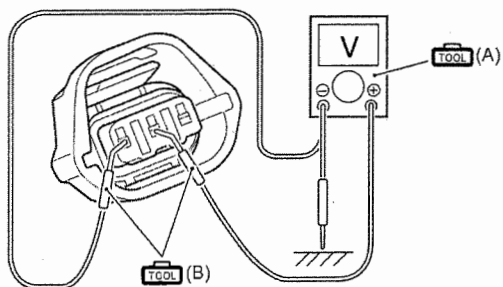
Tester knob indication

Voltage (---)

TP sensor input voltage

4.5 – 5.5 V

((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)



IB14J1110136-01

Is the voltage OK?

- Yes Go to P0120-L (Use of SDS) Step 3.
 No
- Loose or poor contacts on the ECM coupler.
 - Open or short circuit in the R or B/Br wire.

P0120-H (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the right cowling side cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the TP sensor coupler (1) for loose or poor contacts.
If OK, then check the TP sensor lead wire continuity.



IB14J1110041-02

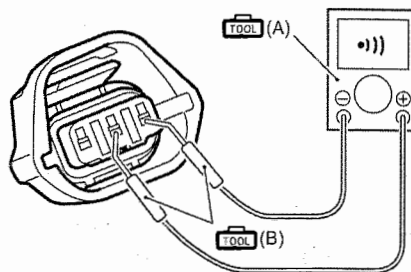
- 4) Disconnect the TP sensor coupler.
- 5) Check the continuity between the P/B wire and R wire.
If the sound is not heard from the tester, the circuit condition is OK.

Special tool

- TOOL (A): 09900-25008 (Multi circuit tester set)**
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity (•••)





IB14J1110042-01

- 6) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 7) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).

- 8) Check the continuity between the P/B wire and terminal "6". Also, check the continuity between the B/Br wire and terminal "35".

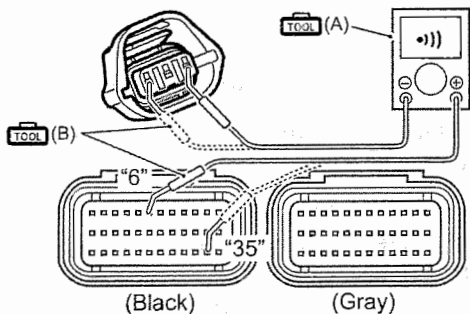
Special tool

 (A): 09900-25008 (Multi circuit tester set)

 (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity (•••)

ECM coupler (Harness side)

IB37H1110024-01

Is the continuity OK?

- Yes Go to P0120-L (Use of SDS) Step 3.
No P/B wire shorted to VCC, or B/Br wire open.

P0120-L (Use of SDS)**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Remove the right cowling side cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the TP sensor coupler (1) for loose or poor contacts.
If OK, then check the TP sensor lead wire continuity.




IB14J1110043-02


- 4) Disconnect the TP sensor coupler.

- 5) Check the continuity between the P/B wire and ground. Also, check the continuity between the P/B wire and B/Br wire.

If the sound is not heard from the tester, the circuit condition is OK.

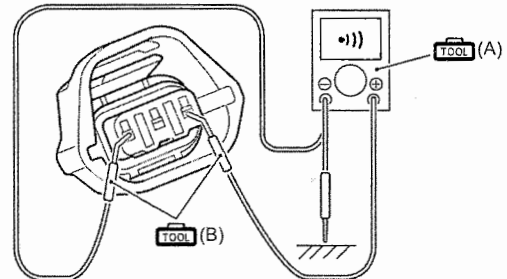
Special tool

 (A): 09900-25008 (Multi circuit tester set)

 (B): 09900-25009 (Needle-point probe set)

Tester knob indication


Continuity test (•••)




IB14J1110044-01

- 6) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 7) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 8) Check the continuity between the P/B wire and terminal "6". Also, check the continuity between the R wire and terminal "7".

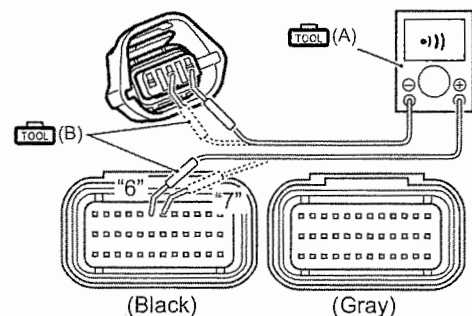
Special tool

 (A): 09900-25008 (Multi circuit tester set)

 (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•••)

ECM coupler (Harness side)

IB37H1110026-01

Is the continuity OK?

- Yes Go to Step 2.
No R and P/B wire open, or P/B wire shorted to ground.

Step 2

- 1) Connect the ECM couplers.
- 2) Turn the ignition switch ON.
- 3) Measure the input voltage between the R wire and ground.
If OK, the measure the input voltage between the R wire and B/Br wire.

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

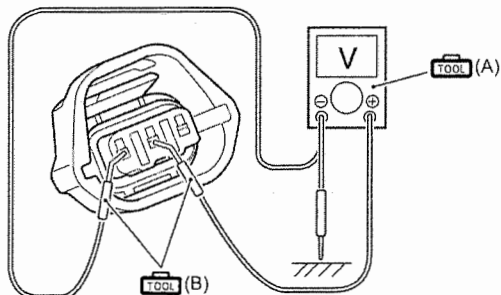
Voltage (---)

TP sensor input voltage

4.5 – 5.5 V

((+) terminal: R – (–) terminal: Ground, (+)

terminal: R – (–) terminal: B/Br)



IB14J1110045-01

Is the voltage OK?

Yes Go to Step 3.

No Open or short circuit in the R or B/Br wire.

Step 3

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

Special tool

TOOL (A): 09900-28630 (TP Sensor test lead)

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

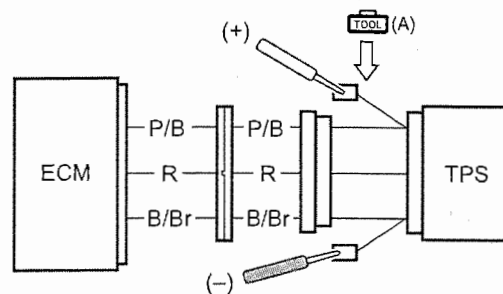
Voltage (---)

TP sensor output voltage

Throttle valve is closed: 1.02 – 1.22 V

Throttle valve is opened: 4.34 – 4.54 V

((+) terminal: P/B – (–) terminal: B/Br)



IB14J1110046-01

Is the voltage OK?

Yes • P/B, R or B/Br wire open or shorted to ground, or poor "6", "7" or "35" connection.

• If wire and connection are OK, intermittent trouble or faulty ECM:

• Recheck each terminal and wire harness for open circuit and poor connection.

• Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).

No • Open or short circuit in the P/B wire.

• If check result is not satisfactory, replace TP sensor with a new one. Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

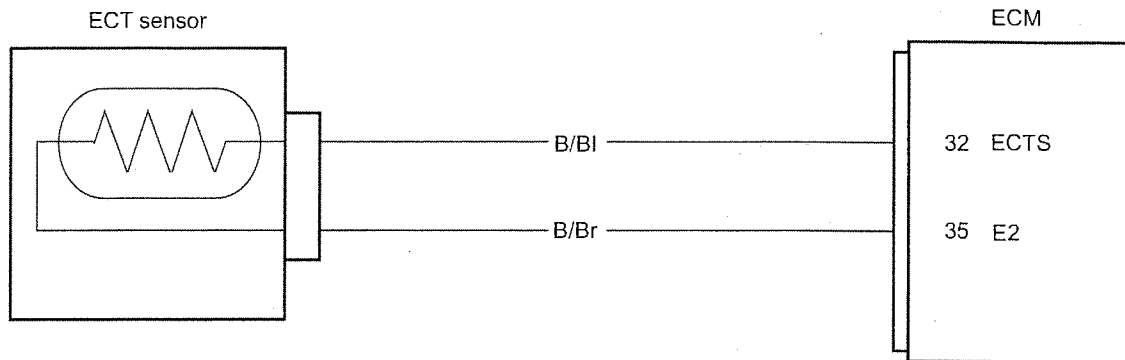
DTC "C15" (P0115-H/L): ECT Sensor Circuit Malfunction

BENB15J21104014

Detected Condition and Possible Cause

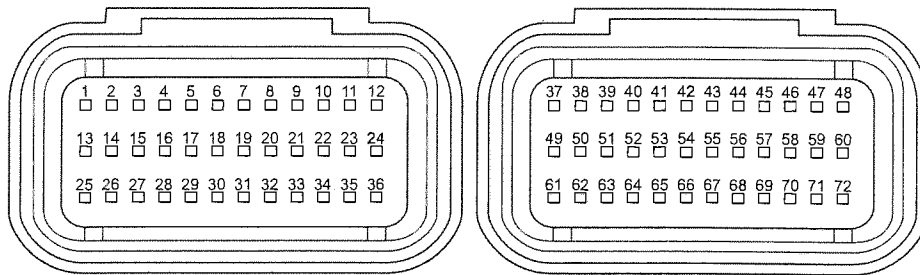
Detected Condition		Possible Cause
C15	Output voltage is not with in the following range. $0.15\text{ V} \leq \text{Sensor voltage} < 4.85\text{ V}$	<ul style="list-style-type: none"> ECT sensor circuit open or short. ECT sensor malfunction. ECM malfunction. ECT sensor circuit is open or ground circuit open.
P0115	H	<ul style="list-style-type: none"> ECT sensor circuit is open or ground circuit open.
	L	
		<ul style="list-style-type: none"> ECT sensor circuit shorted to ground.

Wiring Diagram



I837H1110027-01

ECM coupler (Harness side)



I837H1110007-02

Troubleshooting

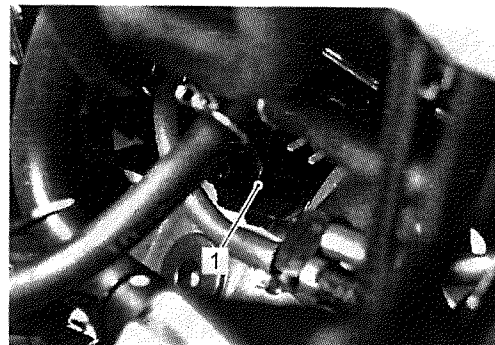
NOTICE

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

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

- Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- Check the ECT sensor coupler (1) for loose or poor contacts. If OK, then measure the ECT sensor input voltage.



IB14J1110047-01

C15 (Use of mode selection switch)

Step 1

- Turn the ignition switch OFF.

1A-42 Engine General Information and Diagnosis:

- 4) Disconnect the ECT coupler and turn the ignition switch ON.
- 5) Measure the input voltage between the B/BI wire and ground.
If OK, then measure the input voltage between the B/BI wire and B/Br wire.

Special tool

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

Tester knob indication

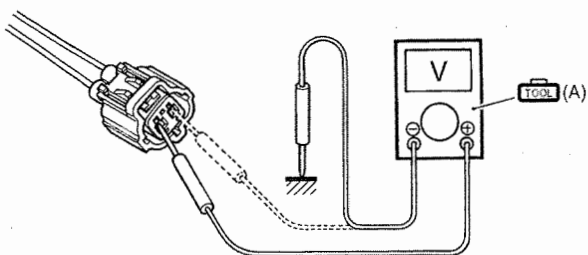
Voltage (—)

ECT sensor input voltage

4.5 – 5.5 V

((+) terminal: B/BI – (–) terminal: Ground, (+)

terminal: B/BI – (–) terminal: B/Br)



1718H1110048-03

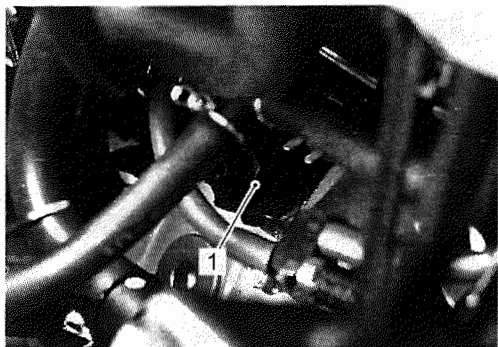
Is the voltage OK?

- | | |
|-----|--|
| Yes | Go to P0115-L (Use of SDS) Step 2. |
| No | <ul style="list-style-type: none">• Loose or poor contacts on the ECM coupler.• Open or short circuit in the B/BI or B/Br wire. |

P0115-H (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the ECT sensor coupler (1) for loose or poor contacts.
If OK, then check the ECT sensor lead wire continuity.



1B14J1110048-01

- 4) Disconnect the ECT sensor coupler.
- 5) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 6) Insert the needle-point probes to the lead wire coupler.
- 7) Check the continuity between the B/BI wire and terminal "32". Also, check the continuity between the B/Br wire and terminal "35".

Special tool

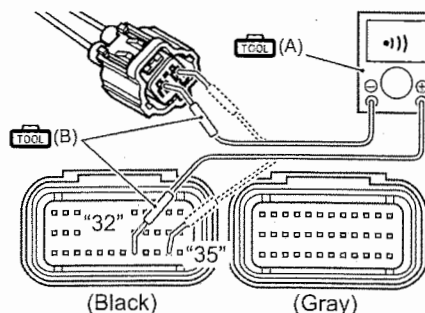
TOOL (A): 09900-25008 (Multi circuit tester set)

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•))

ECM couplers (Harness side)



1B37H1110030-01

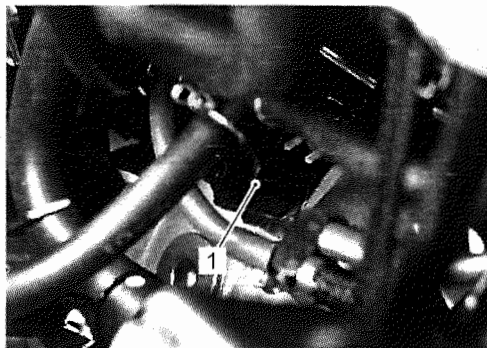
Is the continuity OK?

- | | |
|-----|------------------------------------|
| Yes | Go to P0115-L (Use of SDS) Step 2. |
| No | B/BI or B/Br wire open. |

P0115-L (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the ECT sensor coupler (1) for loose or poor contacts.
If OK, then check the ECT sensor lead wire continuity.



1B14J1110049-01

- 4) Disconnect the ECT sensor coupler.

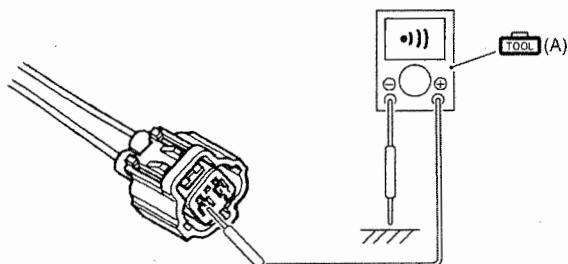
- 5) Check the continuity between the B/BI wire and ground. If the sound is not heard from the tester, the circuit condition is OK.

Special tool

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

Tester knob indication

Continuity test (•))



I718H1110054-03

- 6) Connect the ECT sensor coupler.
7) Insert the needle-point probes to the lead wire coupler.
8) Turn the ignition switch ON.
9) Measure the output voltage between the B/BI wire and ground.

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

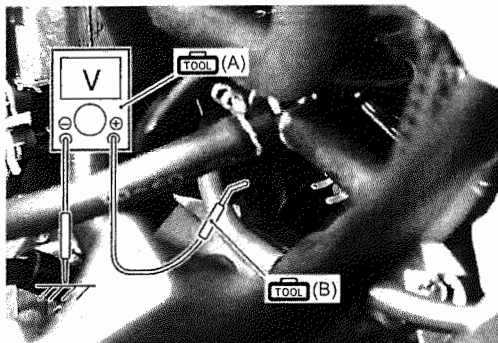
Tester knob indication

Voltage (—)

ECT sensor output voltage

0.15 – 4.85 V

((+) terminal: B/BI – (–) terminal: Ground)



IB14J1110050-01

Are the continuity and voltage OK?

- Yes Go to Step 2.
No • B/BI wire shorted to ground.
• If wire is OK, go to Step 2.

Step 2

- 1) Turn the ignition switch OFF.
- 2) Disconnect the ECT sensor coupler.
- 3) Measure the ECT sensor resistance.

Special tool

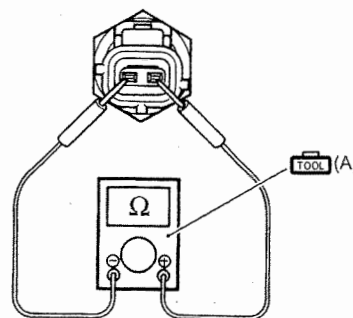
TOOL (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Resistance (Ω)

ECT sensor resistance

Approx. 2.45 kΩ at 20 °C (68 °F)
(Terminal – Terminal)



I944H1110036-01

NOTE

Refer to "ECT Sensor Inspection" in Section 1C (Page 1C-5) for details.

Is the resistance OK?

- Yes • B/BI or B/Br wire open or shorted to ground, or poor "32" or "35" connection.
• If wire and connection are OK, intermittent trouble or faulty ECM.
• Recheck each terminal and wire harness for open circuit and poor connection.
• Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Replace the ECT sensor with a new one. Refer to "ECT Sensor Removal and Installation" in Section 1C (Page 1C-4).

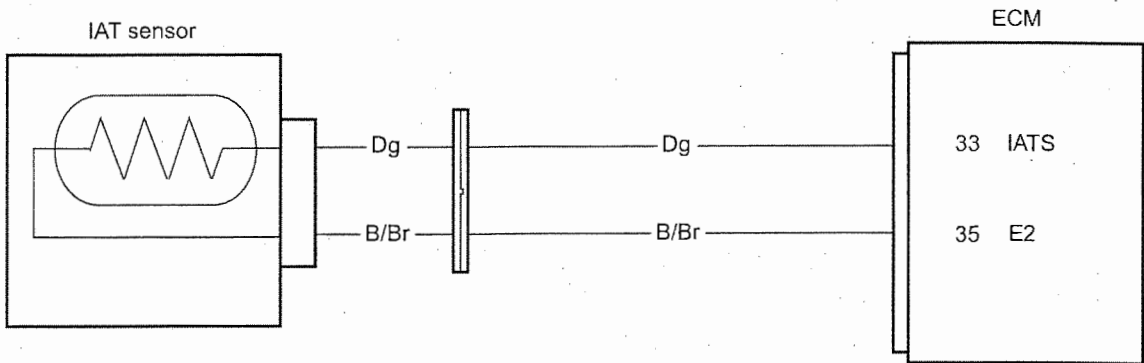
DTC “C21” (P0110-H/L): IAT Sensor Circuit Malfunction

BENB15J21104015

Detected Condition and Possible Cause

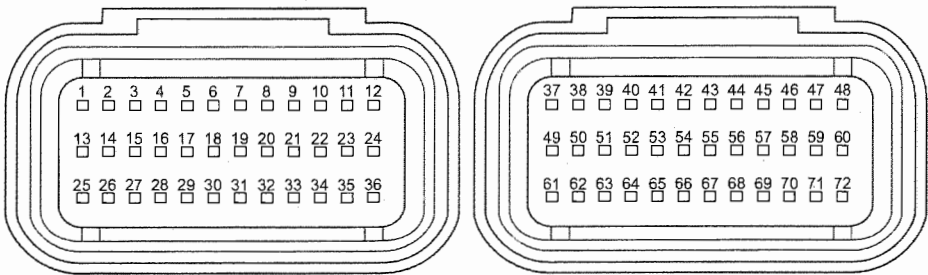
Detected Condition			Possible Cause
C21	H	Output voltage is not with in the following range. 0.15 V ≤ Sensor voltage < 4.85 V	<ul style="list-style-type: none">• IAT sensor circuit open or short.• IAT sensor malfunction.• ECM malfunction.• IAT sensor circuit open or ground circuit open.
P0110	H	Sensor voltage is higher than specified value.	<ul style="list-style-type: none">• IAT sensor circuit shorted to ground.
	L	Sensor voltage is lower than specified value.	

Wiring Diagram



IB14J1110051-01

ECM coupler (Harness side)



IB37H1110007-02

Troubleshooting

NOTICE

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

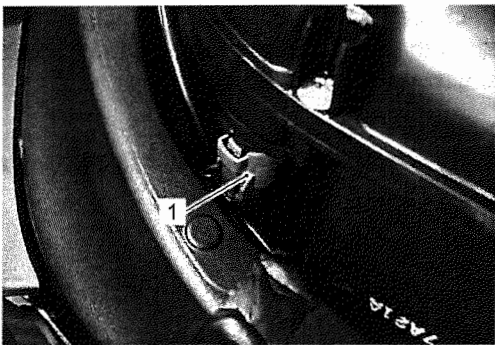
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

C21 (Use of mode selection switch)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the IAT sensor coupler (1) for loose or poor contacts.
If OK, then measure the IAT sensor input voltage.



IB14J1110052-01

- 4) Disconnect the IAT sensor coupler and turn the ignition switch ON.

- 5) Measure the input voltage between the Dg wire terminal and ground.
If OK, then measure the input voltage between the Dg wire terminal and B/Br wire terminal.

Special tool

(A): 09900-25008 (Multi circuit tester set)

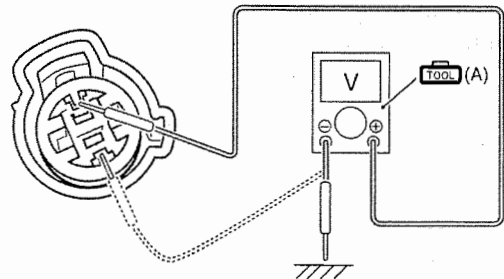
Tester knob indication

Voltage (---)

IAT sensor input voltage

4.5 – 5.5 V

((+) terminal: Dg – (–) terminal: Ground, (+) terminal: Dg – (–) terminal: B/Br)



IB23H1110040-03

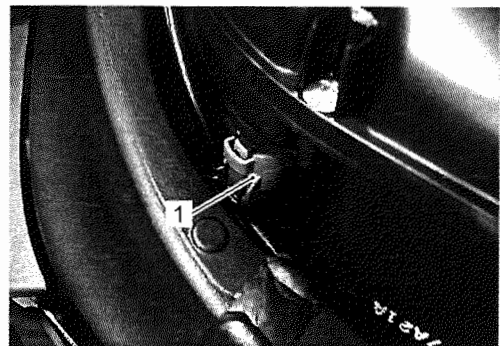
Is the voltage OK?

- | | |
|-----|---|
| Yes | Go to P0110-L (Use of SDS) Step 2. |
| No | <ul style="list-style-type: none"> • Loose or poor contacts on the ECM coupler. • Open or short circuit in the Dg or B/Br wire. |

P0110-H (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the IAT sensor coupler (1) for loose or poor contacts.
If OK, then check the IAT sensor lead wire continuity.



IB14J1110052-01

- 4) Disconnect the IAT sensor coupler.
- 5) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 6) Insert the needle-point probes to the lead wire coupler.
- 7) Check the continuity between the Dg wire and terminal "33". Also, check the continuity between the B/Br wire and terminal "35".

Special tool

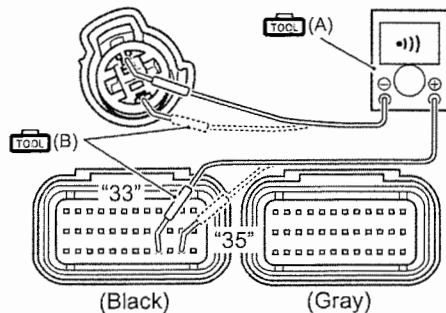
TOOL (A): 09900-25008 (Multi circuit tester set)

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•)))

ECM couplers (Harness side)



1837H1110037-01

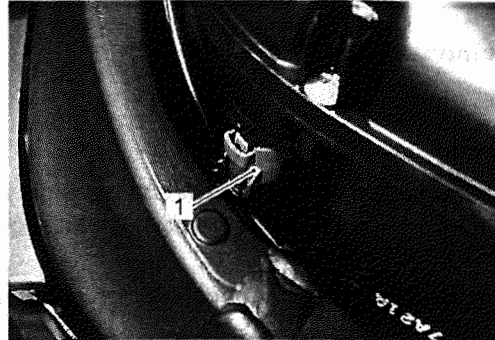
Is the continuity OK?

- | | |
|-----|------------------------------------|
| Yes | Go to P0110-L (Use of SDS) Step 2. |
| No | Dg or B/Br wire open. |

P0110-L (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the IAT sensor coupler (1) for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.



1B14J1110052-01

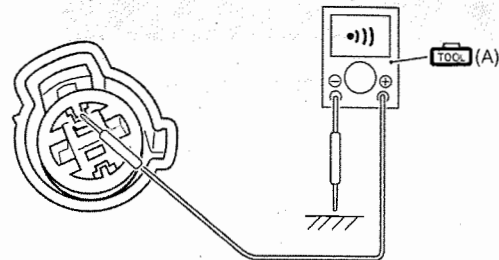
- 4) Disconnect the IAT sensor coupler.
- 5) Check the continuity between the Dg wire and ground. If the sound is not heard from the tester, the circuit condition is OK.

Special tool

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

Tester knob indication

Continuity test (•)))






1B23H1110042-03

- 6) Connect the IAT sensor coupler.
- 7) Insert the needle-point probes to the lead wire coupler.

- 8) Turn the ignition switch ON.
- 9) Move the air cleaner box upward. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 10) Measure the output voltage between the Dg wire and ground.

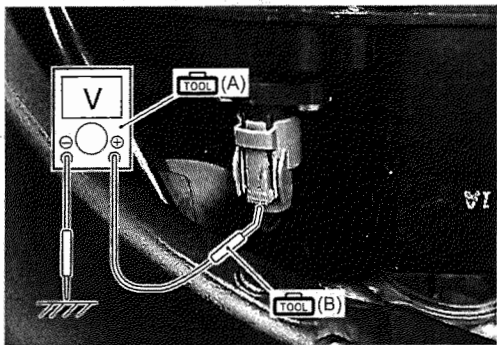
Special tool

-  (A): 09900-25008 (Multi circuit tester set)
 (B): 09900-25009 (Needle-point probe set)

Tester knob indicationVoltage ()**IAT sensor output voltage**

0.15 – 4.85 V

((+) terminal: Dg – (–) terminal: Ground)



IB14J1110053-01

Are the continuity and voltage OK?


- Yes Go to Step 2.
 No • Dg wire shorted to ground.
 • If wire is OK, go to Step 2.

Step 2

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).

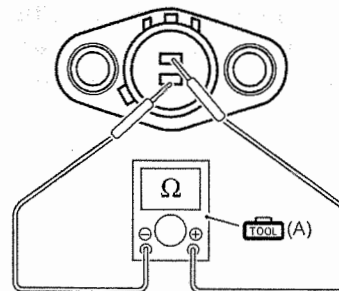
- 3) Measure the IAT sensor resistance.

Special tool

-  (A): 09900-25008 (Multi circuit tester set)

Tester knob indicationResistance (Ω)**IAT sensor resistance**Approx. 2.58 k Ω at 20 °C (68 °F)

(Terminal – Terminal)



IB15H1110031-01

NOTE

IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to "ECT Sensor Inspection" in Section 1C (Page 1C-5).

Is the resistance OK?

- Yes • Dg or B/Br wire open or shorted to ground, or poor "33" or "35" connection.
 • If wire and connection are OK, intermittent trouble or faulty ECM.
 • Recheck each terminal and wire harness for open circuit and poor connection.
 • Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Replace the IAT sensor with a new one. Refer to "IAT Sensor Removal and Installation" in Section 1C (Page 1C-5).

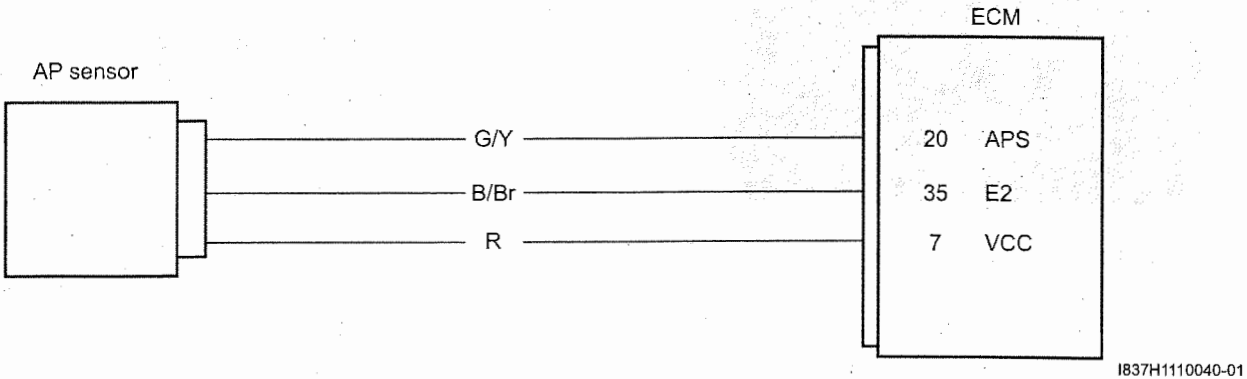
DTC “C22” (P1450-H/L): AP Sensor Circuit Malfunction

BENB15J21104016

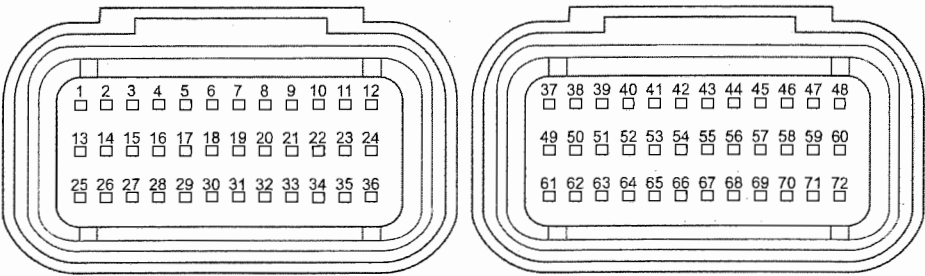
Detected Condition and Possible Cause

Detected Condition		Possible Cause
C22	AP sensor voltage is not within the following range. 0.5 V ≤ Sensor voltage < 4.85 V	<ul style="list-style-type: none">• Clogged vacuum passage with dust.• AP sensor circuit open or shorted to ground.• AP sensor malfunction.• ECM malfunction.
	NOTE Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.	
P1450	H Sensor voltage is higher than specified value.	<ul style="list-style-type: none">• AP sensor circuit is open or shorted to VCC or ground circuit open.• AP sensor circuit is shorted to ground or VCC circuit open.
	L Sensor voltage is lower than specified value.	

Wiring Diagram



ECM coupler (Harness side)



Troubleshooting

NOTICE

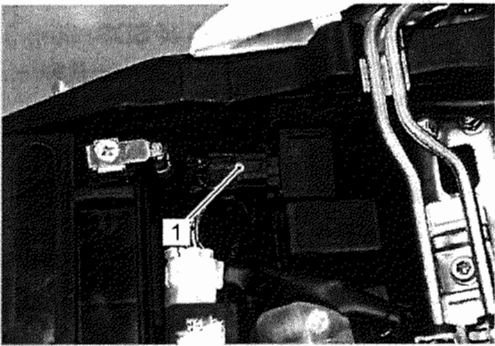
When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point probe to prevent terminal damage.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

C22 (Use of mode selection switch)**Step 1**


- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the AP sensor coupler (1) for loose or poor contacts.
If OK, then measure the AP sensor input voltage.



IB14J1110054-01

- 4) Disconnect the AP sensor coupler.
- 5) Turn the ignition switch ON.
- 6) Measure the input voltage between the R wire and ground.
If OK, then measure the voltage between the R wire and B/Br wire.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

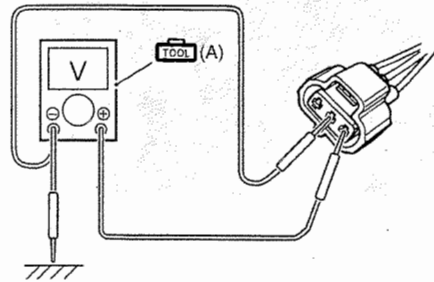
Tester knob indication

Voltage (---)

AP sensor input voltage

4.5 – 5.5 V

((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)



I823H1110016-05

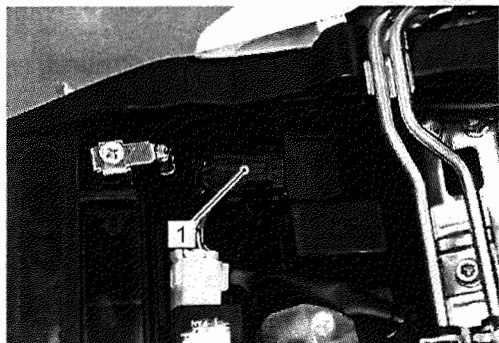
Is the voltage OK?

- | | |
|-----|--|
| Yes | Go to P1450-L (Use of SDS) Step 3. |
| No | <ul style="list-style-type: none"> • Loose or poor contacts on the ECM coupler. • Open or short circuit in the R or B/Br wire. |

P1450-H (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the AP sensor coupler (1) for loose or poor contacts.
If OK, then check the AP sensor lead wire continuity.



IB14J1110054-01

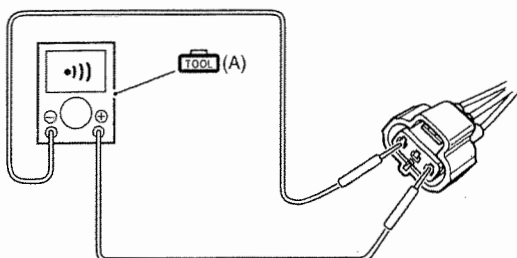
- 4) Disconnect the AP sensor coupler.
- 5) Check the continuity between the R wire and G/Y wire.
If the sound is not heard from the tester, the circuit condition is OK.

Special tool

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

Tester knob indication

Continuity (•••)



IB23H1110017-05

- 6) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 7) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 8) Insert the needle-point probes to the lead wire coupler.

- 9) Check the continuity between the G/Y wire and terminal "20".
If OK, then check the continuity between the B/Br wire and terminal "35".

Special tool

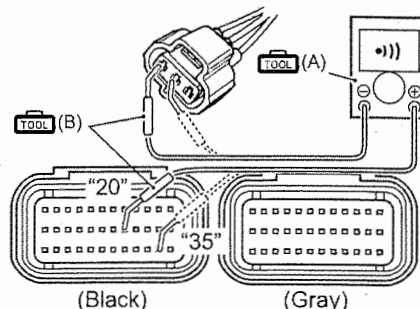
TOOL (A): 09900-25008 (Multi circuit tester set)

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•••)

ECM coupler (Harness side)



IB37H1110043-01

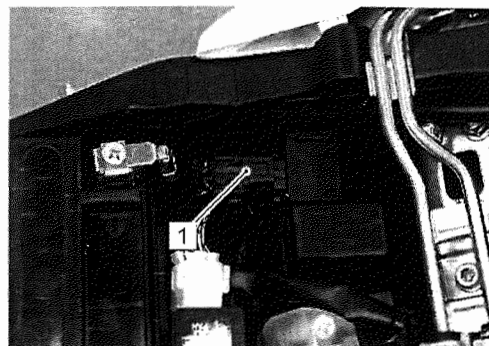
Is the continuity OK?

- | | |
|-----|---|
| Yes | Go to P1450-L (Use of SDS) Step 3. |
| No | G/Y wire shorted to VCC, or B/Br wire open. |

P1450-L (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the AP sensor coupler (1) for loose or poor contacts.
If OK, then check the AP sensor lead wire continuity.



IB14J1110054-01

- 4) Disconnect the AP sensor coupler.

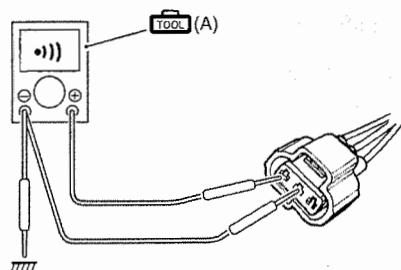
- 5) Check the continuity between the G/Y wire and ground. Also, check the continuity between the G/Y wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK.

Special tool

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

Tester knob indication

Continuity (•••)



I823H1110019-02

- 6) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 7) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 8) Insert the needle-point probes to the lead wire coupler.
- 9) Check the continuity between the R wire and terminal "7". Also, check the continuity between the G/Y wire and terminal "20".

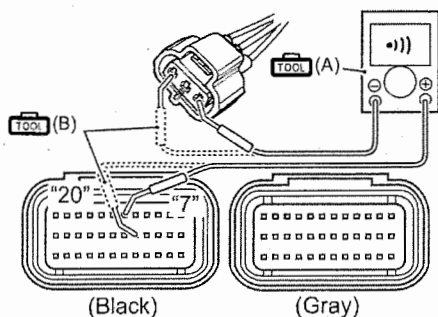
Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity (•••)

ECM coupler (Harness side)

I837H1110045-02

Is the continuity OK?

Yes Go to Step 2.

No R and G/Y wire open, G/Y wire shorted to ground.

Step 2

- 1) Connect the ECM couplers.
- 2) Turn the ignition switch ON.
- 3) Measure the input voltage between the R wire and ground.

If OK, then measure the voltage between the R wire and B/Br wire.

Special tool

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

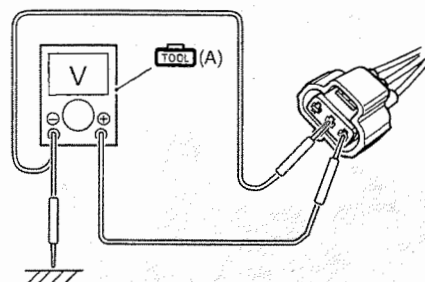
Tester knob indication

Voltage (---)

AP sensor input voltage

4.5 – 5.5 V

((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)



I823H1110016-05

Is the voltage OK?

Yes Go to Step 3.

No

- Loose or poor contacts on the ECM coupler.
- Open or short circuit in the R or B/Br wire.

Step 3

- 1) Turn the ignition switch OFF.
- 2) Connect the ECM couplers and AP sensor coupler.
- 3) Insert the needle-point probes to the lead wire coupler.
- 4) Turn the ignition switch ON and measure the AP sensor output voltage between the G/Y wire and B/Br wire.

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

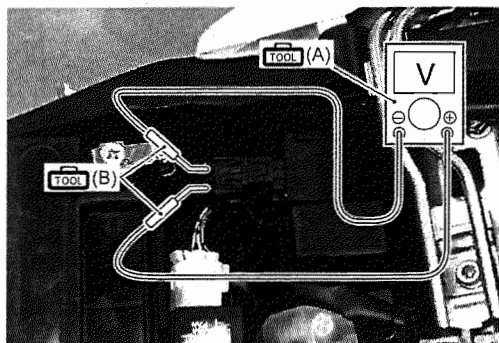
Tester knob indication

Voltage (---)

AP sensor output voltage

Approx. 3.6 V at 100 kPa (760 mmHg)

((+) terminal: G/Y – (–) terminal: B/Br)



IB14J1110055-01

Is the voltage OK?

- Yes Go to Step 4.
- No
- Check the vacuum port for crack or damage.
 - Open or short circuit in the G/Y wire.
 - If wire is OK, replace the AP sensor with a new one. Refer to "AP Sensor Removal and Installation" in Section 1C (Page 1C-6).

Step 4

- 1) Turn the ignition switch OFF.
- 2) Remove the AP sensor. Refer to "AP Sensor Removal and Installation" in Section 1C (Page 1C-6).
- 3) Connect the vacuum pump gauge to the vacuum port of the AP sensor.

- 4) Arrange 3 new 1.5 V batteries in series (1) (check that total voltage is 4.5 – 5.0 V) and connect (–) terminal to the ground terminal "B" and (+) terminal to the VCC terminal "A".
- 5) Check the voltage between Vout terminal "C" and ground. Also, check if voltage reduces when vacuum is applied by using vacuum pump gauge.

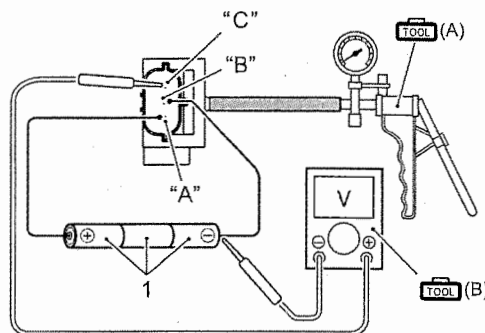
Special tool

TOOL (A): 09917-47011 (Vacuum pump gauge set)

TOOL (B): 09900-25008 (Multi circuit tester set)

Tester knob indication

Voltage (---)



IB14J1110056-01

ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
m	ft	kPa	mmHg	V
0 – 610	0 – 2 000	100 – 94	760 – 707	3.1 – 3.6
611 – 1 524	2 001 – 5 000	94 – 85	707 – 634	2.8 – 3.4
1 525 – 2 438	5 001 – 8 000	85 – 76	634 – 567	2.6 – 3.1
2 439 – 3 048	8 001 – 10 000	76 – 70	567 – 526	2.4 – 2.9

IB23H1110023-02

Is the voltage OK?

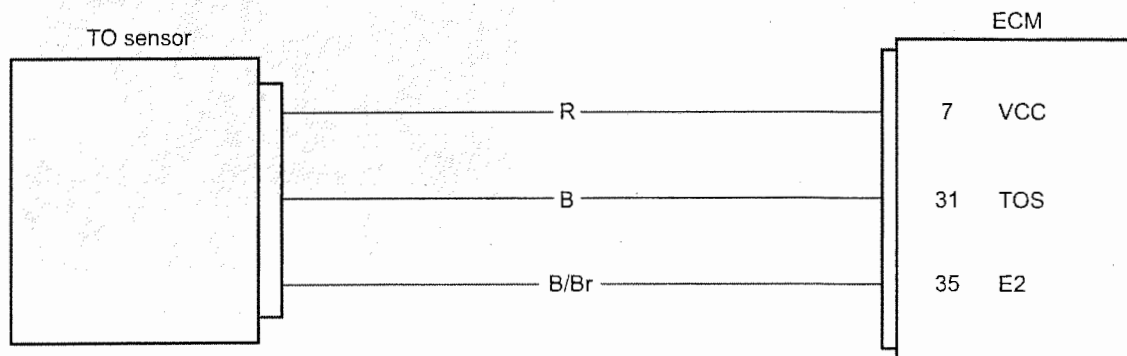
- Yes
- G/Y, R or B/Br wire open or shorted to ground, or poor "7", "20" or "35" connection.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No
- If check result is not satisfactory, replace the AP sensor with a new one. Refer to "AP Sensor Removal and Installation" in Section 1C (Page 1C-6).

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

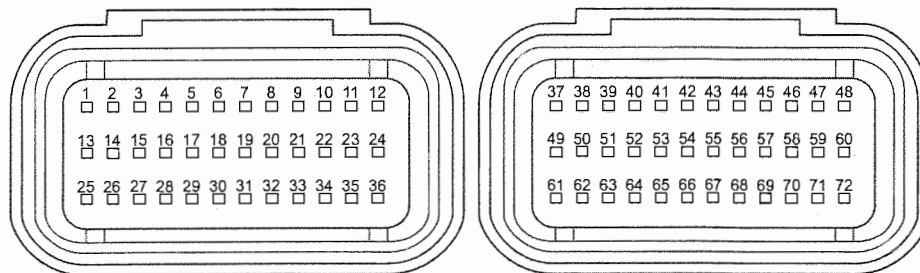
BENB15J21104017

Detected Condition and Possible Cause

Detected Condition		Possible Cause
C23	The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. $0.2\text{ V} \leq \text{Sensor voltage} < 4.8\text{ V}$	<ul style="list-style-type: none"> • TO sensor circuit open or short. • TO sensor malfunction. • ECM malfunction.
P1651	H Sensor voltage is higher than specified value.	• TO sensor circuit is open or ground circuit open.
	L Sensor voltage is lower than specified value.	• TO sensor circuit is open or shorted to ground or VCC circuit open.

Wiring Diagram

I837H1110047-01

ECM coupler (Harness side)

I837H1110007-02

Troubleshooting**NOTICE**

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

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

C23 (Use of mode selection switch)**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).


- 3) Check the TO sensor coupler (1) for loose or poor contacts.
If OK, then measure the TO sensor resistance.



IB14J1110057-01

- 4) Remove the TO sensor. Refer to "TO Sensor Removal and Installation" in Section 1C (Page 1C-6).
- 5) Measure the resistance between terminal "A" and terminal "C".

Special tool

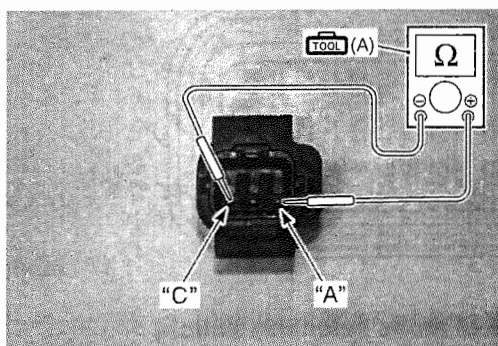
 (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Resistance (Ω)

TO sensor resistance

Approx. 19.4 k Ω at 20 °C (68 °F)
(Terminal "A" – Terminal "C")



IB37H1110049-01

Is the resistance OK?

- | | |
|-----|---|
| Yes | Go to P1651-L (Use of SDS) Step 2. |
| No | Replace the TO sensor with a new one.
Refer to "TO Sensor Removal and Installation" in Section 1C (Page 1C-6). |

P1651-H (Use of SDS)

Step 1


- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the TO sensor coupler (1) for loose or poor contacts.
If OK, then check the TO sensor lead wire continuity.



IB14J1110057-01

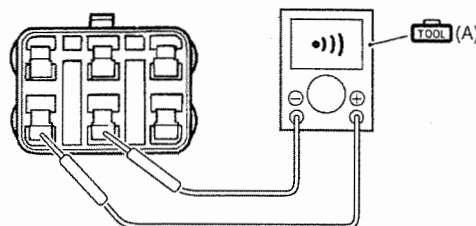
- 4) Disconnect the TO sensor coupler.
- 5) Check the continuity between the R wire and B wire. If the sound is not heard from the tester, the circuit condition is OK.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity test (•••)



IB23H1110051-01

- 6) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 7) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 8) Insert the needle-point probes to the lead wire coupler.

- 9) Check the continuity between the B wire and terminal "31". Also, check the continuity between B/Br wire and terminal "35".

Special tool

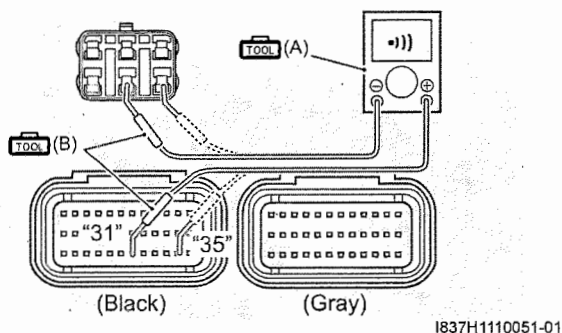
TOOL (A): 09900-25008 (Multi circuit tester set)

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•||)

ECM coupler (Harness side)



1B37H1110051-01

Is the continuity OK?

Yes Go to P1651-L (Use of SDS) Step 2.

No B wire shorted to VCC, or B/Br wire open.

P1651-L (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the TO sensor coupler (1) for loose or poor contacts. If OK, then check the TO sensor lead wire continuity.



1B14J1110057-01

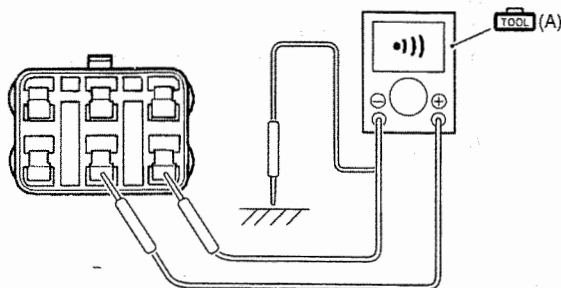
- 4) Disconnect the TO sensor coupler.
- 5) Check the continuity between the B wire and ground. Also, check the continuity between the B wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK.

Special tool

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

Tester knob indication

Continuity test (•||)



1B23H1110053-02

- 6) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 7) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 8) Insert the needle-point probes to the lead wire coupler.
- 9) Check the continuity between the R wire and terminal "7". Also, then check the continuity between B wire and terminal "31".

Special tool

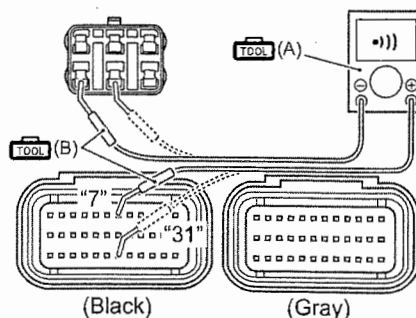
TOOL (A): 09900-25008 (Multi circuit tester set)

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•||)

ECM coupler (Harness side)



1B14J1110058-01

Is the continuity OK?

Yes Go to Step 2.

No R or B wire open, or B wire shorted to ground.

Step 2

- 1) Connect the ECM couplers and TO sensor coupler.
- 2) Insert the needle-point probes to the lead wire coupler.
- 3) Turn the ignition switch ON.
- 4) Dismount the TO sensor from its bracket.
- 5) Measure the voltage at the wire side coupler between B wire and B/Br wire.

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

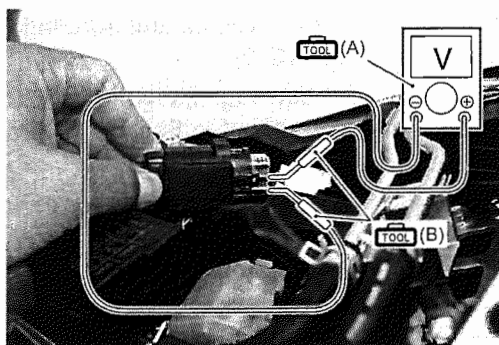
Tester knob indication

Voltage (---)

TO sensor voltage (Normal)

0.4 – 1.4 V

((+) terminal: B – (–) terminal: B/Br)



IB14J1110059-01

- 6) Measure the voltage when it is leaned 65° and more, left and right, from the horizontal level.

Special tool

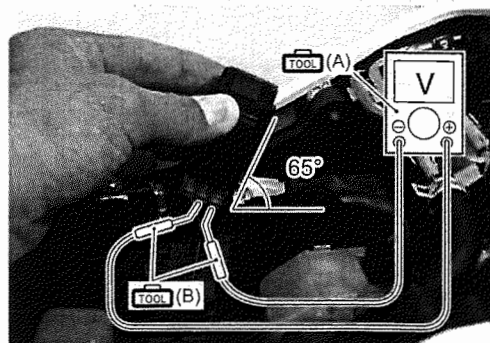
TOOL (A): 09900-25008 (Multi circuit tester set)

TOOL (B): 09900-25009 (Needle-point probe set)

TO sensor voltage (Leaning)

3.7 – 4.4 V

((+) terminal: B – (–) terminal: B/Br)



IB14J1110060-01

Is the voltage OK?

- Yes
- R, B or B/Br wire open or shorted to ground, or poor "7", "31" or "35" connection.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No
- Loosen or poor contacts on the ECM coupler.
 - Open or short circuit.
 - Replace the TO sensor with a new one. Refer to "TO Sensor Removal and Installation" in Section 1C (Page 1C-6).

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

BENB15J21104018

NOTE

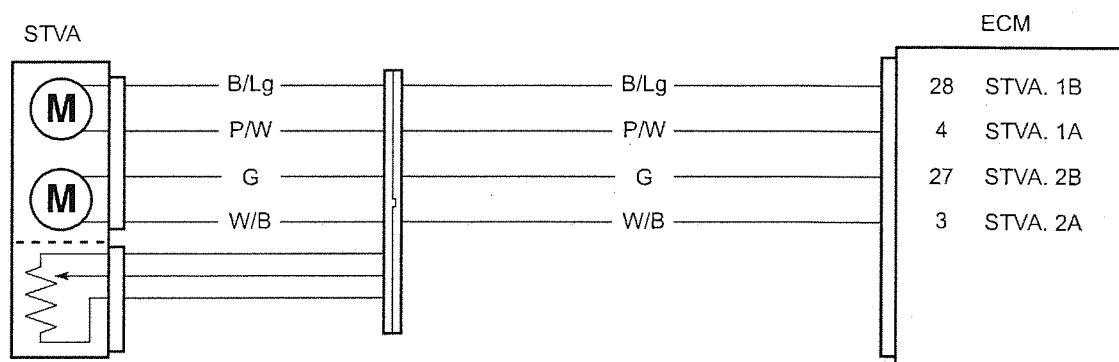
Refer to "No Spark or Poor Spark" in Section 1H (Page 1H-5) for details.

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

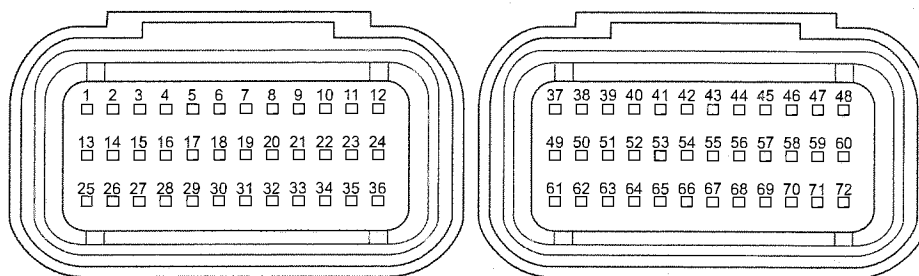
BENB15J21104019

Detected Condition and Possible Cause

Detected Condition	Possible Cause
The operation voltage does not reach the STVA. ECM does not receive communication signal from the STVA. STVA can not operate properly or its motor locked.	<ul style="list-style-type: none"> STVA malfunction. STVA circuit open or short. STVA motor malfunction.

Wiring Diagram

IB14J1110137-01

ECM coupler (Harness side)

IB37H1110007-02

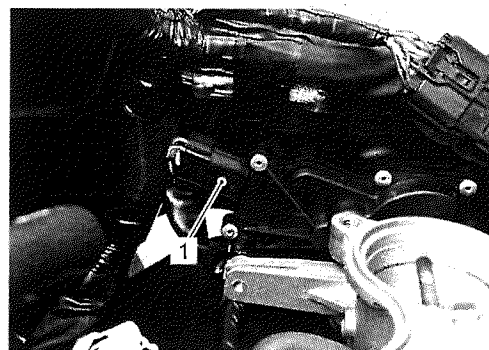
Troubleshooting**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).

- 3) Check the STVA coupler (1) for loose or poor contacts.

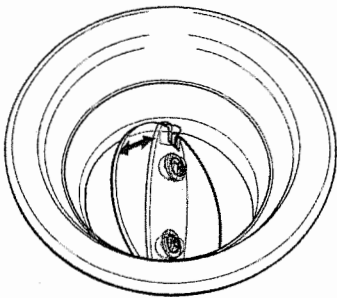


IB14J1110061-01

- 4) Connect the ECM couplers.

1A-58 Engine General Information and Diagnosis:

- 5) Check whether the STVs open by turning the ignition switch ON.



I705H1110063-01

Is the operation OK?

- Yes Go to Step 2.
- No
- Loose or poor contacts on the STVA coupler.
 - Open or short circuit in the B/Lg, P/W, G or W/B wire.
 - If wire and connection are OK, go to Step 2.

Step 2

- 1) Turn the ignition switch OFF.
- 2) Disconnect the STVA coupler.
- 3) Check the continuity between each terminal and ground.

Special tool

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

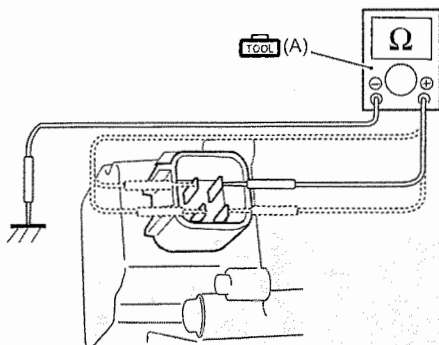
Tester knob indication

Resistance (Ω)

STVA continuity

$\infty \Omega$ (Infinity)

(Terminal – Ground)



IB14J1110062-01

- 4) If OK, then measure the STVA resistance (between the W/B wire terminal "A" and G wire terminal "B") and (between the B/Lg wire terminal "C" and P/W wire terminal "D").

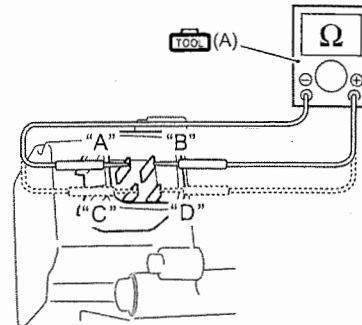
Special tool

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

STVA resistance

Approx. 6.5Ω

(Terminal "A" – Terminal "B", Terminal "C" – Terminal "D")



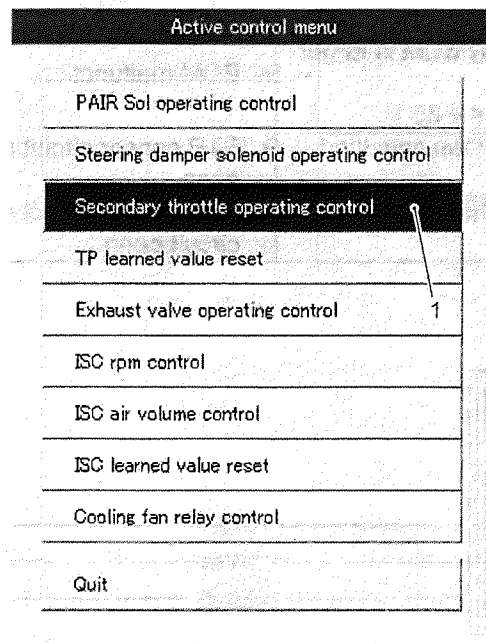
IB14J1110063-01

Is the resistance OK?

- Yes
- W/B, P/W, G and B/Lg wire open or shorted to ground, or poor "3", "4", "27" and "28" connection.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No
- Loose or poor contacts on the ECM coupler.
 - Replace the throttle body assembly with a new one. Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

Active Control Inspection

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

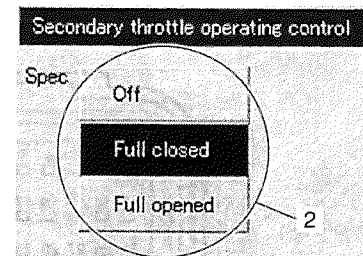


IB14J1110064-02

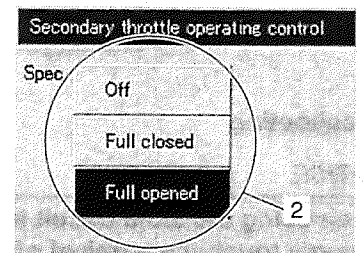
- 4) Click each button (2).

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

Item	Value	Unit
<input type="checkbox"/> Engine speed	0	rpm
<input type="checkbox"/> Throttle position	27.9	°
<input type="checkbox"/> Secondary throttle full opened	Except full opn	
<input type="checkbox"/> Secondary throttle full closed	Full closed	
<input type="checkbox"/> Manifold absolute pressure 1	101.6	kPa
<input type="checkbox"/> Vehicle speed	0.0	km/h



Item	Value	Unit
<input type="checkbox"/> Engine speed	0	rpm
<input type="checkbox"/> Throttle position	27.9	°
<input type="checkbox"/> Secondary throttle full opened	Full opened	
<input type="checkbox"/> Secondary throttle full closed	Except full cls	
<input type="checkbox"/> Manifold absolute pressure 1	101.6	kPa
<input type="checkbox"/> Vehicle speed	0.0	km/h



IB14J1110013-03

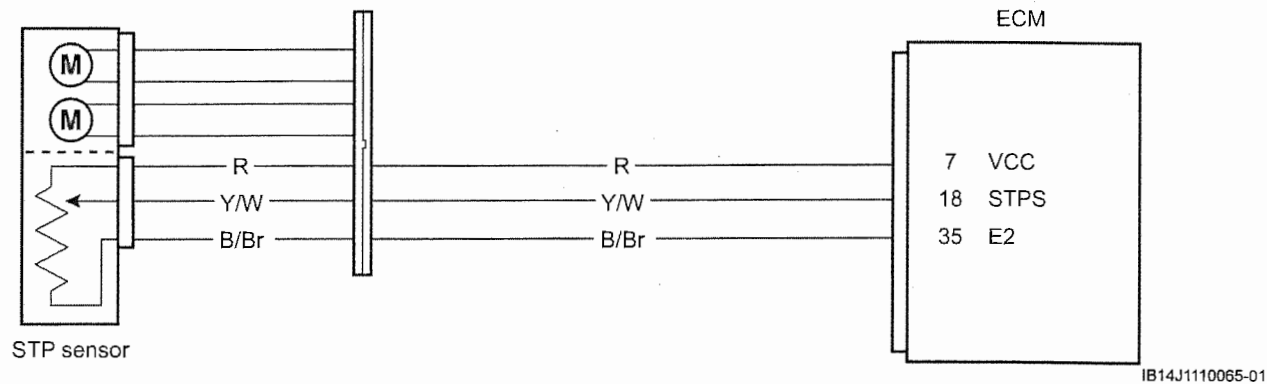
DTC “C29” (P1654-H/L): Secondary Throttle Position Sensor (STPS) Circuit Malfunction

BENB15J21104020

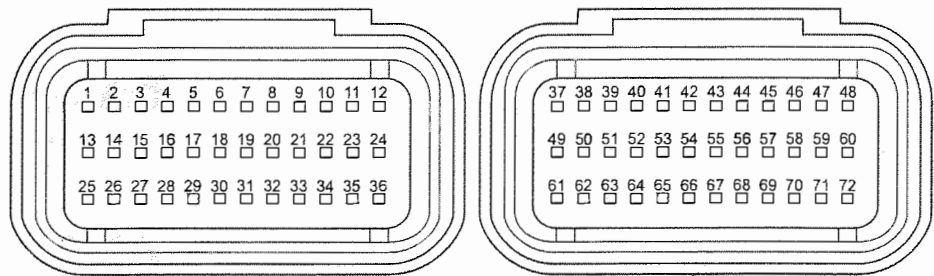
Detected Condition and Possible Cause

Detected Condition			Possible Cause
C29		Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. $0.15\text{ V} \leq \text{Sensor voltage} < 4.85\text{ V}$	<ul style="list-style-type: none">• STP sensor maladjusted.• STP sensor circuit open or short.• STP sensor malfunction.• ECM malfunction.
P1654	H	Sensor voltage is higher than specified value.	<ul style="list-style-type: none">• STP sensor circuit shorted to VCC or ground circuit open.• STP sensor circuit open or shorted to ground or VCC circuit open.
	L	Sensor voltage is lower than specified value.	

Wiring Diagram



ECM coupler (Harness side)



I837H1110007-02

Troubleshooting

NOTICE

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

NOTE

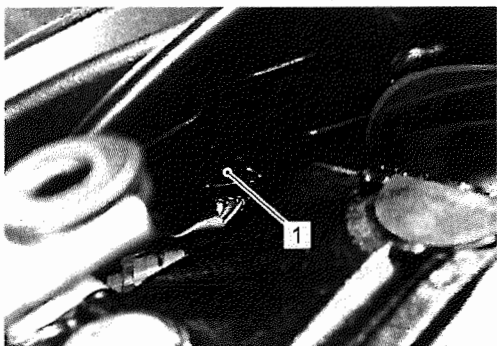
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-14).

C29 (Use of mode selection switch)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the right cowling side cover. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-7).

- 3) Check the STP sensor coupler (1) for loose or poor contacts.
If OK, then measure the STP sensor input voltage.



IB14J1110066-01

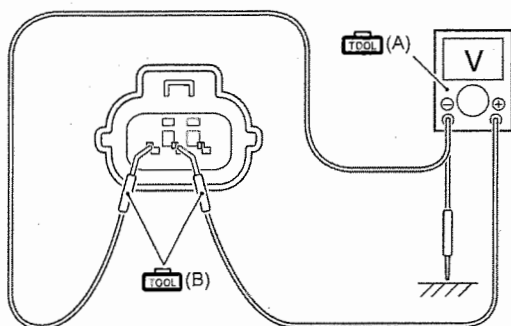
- 4) Disconnect the STP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the input voltage between the R wire and ground.
If OK, then measure the input voltage between the R wire and B/Br wire.

Special tool

- TOOL (A): 09900-25008 (Multi circuit tester set)**
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication**Voltage (---)****STP sensor input voltage****4.5 – 5.5 V**

((+) terminal: R – (–) terminal: Ground, (+)
terminal: R – (–) terminal: B/Br)



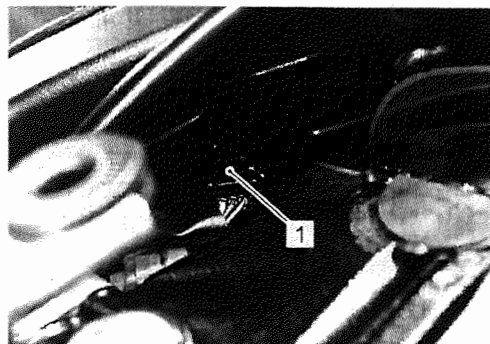
IB14J1110067-02

Is the voltage OK?

- Yes Go to P1654-L (Use of SDS) Step 3.
No
- Loose or poor contacts on the ECM coupler.
 - Open or short circuit in the R or B/Br wire.

P1654-H (Use of SDS)**Step 1**

- 1) Turn the ignition switch OFF.
2) Remove the right cowling side cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
3) Check the STP sensor coupler (1) for loose or poor contacts.
If OK, then check the STP sensor lead wire continuity.

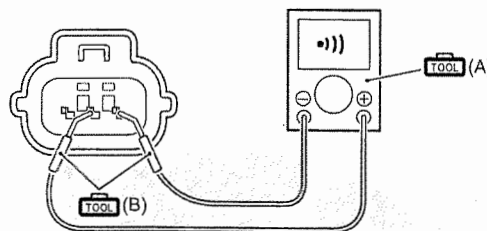


IB14J1110066-01

- 4) Disconnect the STP sensor coupler.
5) Check the continuity between the Y/W wire and R wire.
If the sound is not heard from the tester, the circuit condition is OK.

Special tool

- TOOL (A): 09900-25008 (Multi circuit tester set)**
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication**Continuity (•••)**

IB14J1110069-02

- 6) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
7) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).

- 8) Check the continuity between the Y/W wire and terminal "18". Also, check the continuity between the B/Br wire and terminal "35".

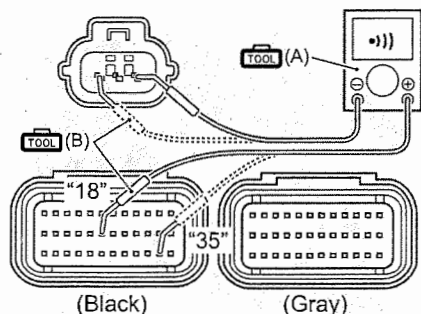
Special tool

- TOOL (A): 09900-25008 (Multi circuit tester set)**
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•)))

ECM couplers (Harness side)



IB14J1110068-04

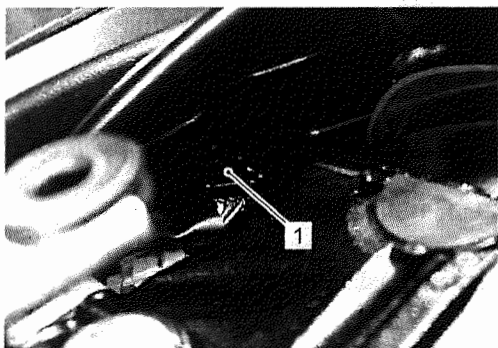
Is the continuity OK?

- Yes Go to P1654-L (Use of SDS) Step 3.
 No Y/W wire shorted to VCC, or B/Br wire open.

P1654-L (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the right cowling side cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the STP sensor coupler (1) for loose or poor contacts.
If OK, then check the STP sensor lead wire continuity.



IB14J1110066-01

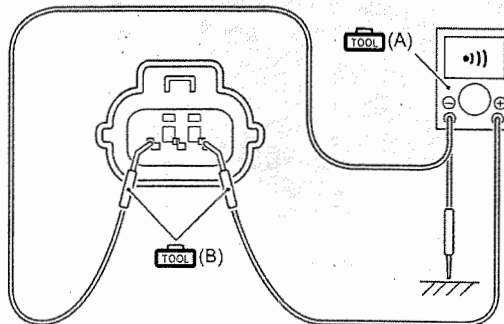
- 4) Disconnect the STP sensor coupler.
- 5) Check the continuity between the Y/W wire and ground. Also, check the continuity between the Y/W wire and B/Br wire.
If the sound is not heard from the tester, the circuit condition is OK.

Special tool

- TOOL (A): 09900-25008 (Multi circuit tester set)**
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•)))



IB14J1110070-02

- 6) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 7) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 8) Check the continuity between the Y/W wire and terminal "18". Also, check the continuity between the R wire and terminal "7".

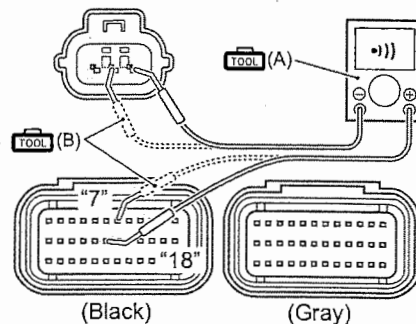
Special tool

- TOOL (A): 09900-25008 (Multi circuit tester set)**
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•)))

ECM couplers (Harness side)



IB14J1110071-03

Is the continuity OK?


- Yes Go to Step 2.
 No R or Y/W wire open, or Y/W wire shorted to ground.


Step 2

- 1) Connect the ECM couplers.
- 2) Turn the ignition switch ON.

- 3) Measure the input voltage between the R wire and ground.
If OK, then measure the input voltage between the R wire and B/Br wire.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

 (B): 09900-25009 (Needle-point probe set)

Tester knob indication

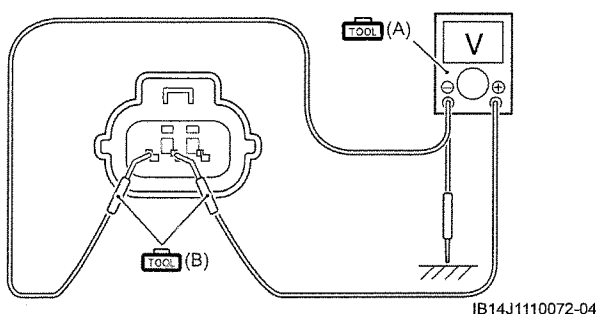
Voltage (---)

STP sensor input voltage

4.5 – 5.5 V

((+) terminal: R – (–) terminal: Ground, (+)

terminal: R – (–) terminal: B/Br)



IB14J1110072-04

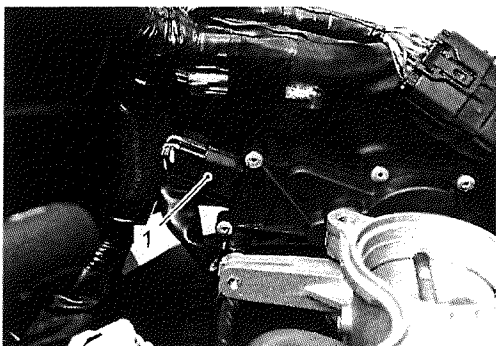
Is the voltage OK?

Yes Go to Step 3.

No Open or short circuit in the R or B/Br wire.

Step 3

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Disconnect the STVA coupler (1).





IB14J1110073-01

- 4) Connect the ECM couplers and STP sensor coupler.
- 5) Insert the needle point probes to the lead wire coupler.
- 6) Turn the ignition switch ON.

- 7) Measure the STP sensor output voltage at the coupler (between the Y/W wire (+) and B/Br wire (–)) by turning the secondary throttle valve (close and open) with your finger.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

 (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Voltage (---)

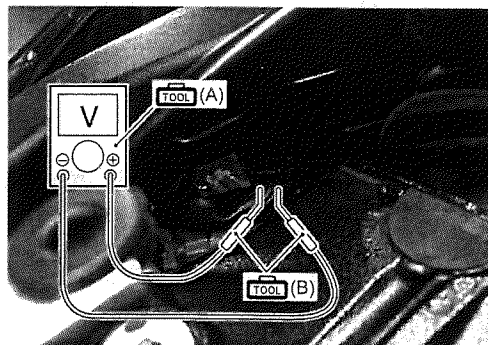
STP sensor output voltage

Secondary throttle valve is closed: 0.52 – 0.72 V

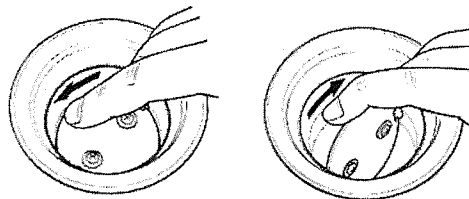
Secondary throttle valve is opened: 4.12 – 4.32 V

V

((+) terminal: Y/W – (–) terminal: B/Br)



IB14J1110074-01



I705H1110071-01

Is the voltage OK?

Yes • R, Y/W or B/Br wire open or shorted to ground, or poor "7", "18" or "35" connection.

• If wire and connection are OK, intermittent trouble or faulty ECM.

• Recheck each terminal and wire harness for open circuit and poor connection.

• Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).

No • Open or short circuit in the Y/W wire.

• If check result is not satisfactory, replace the STP sensor with a new one. Refer to "STP Sensor Removal and Installation" in Section 1C (Page 1C-7).

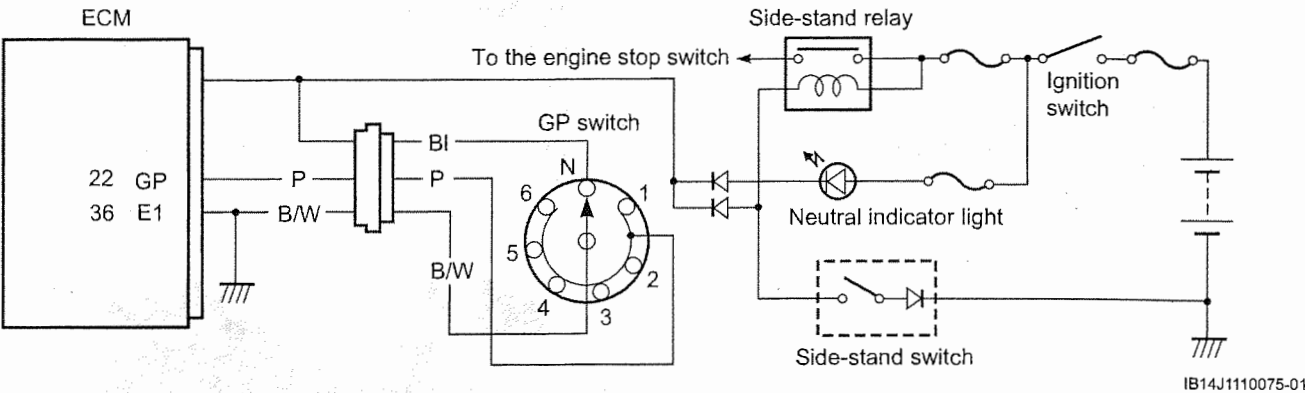
DTC “C31” (P0705): GP Switch Circuit Malfunction

BENB15J21104021

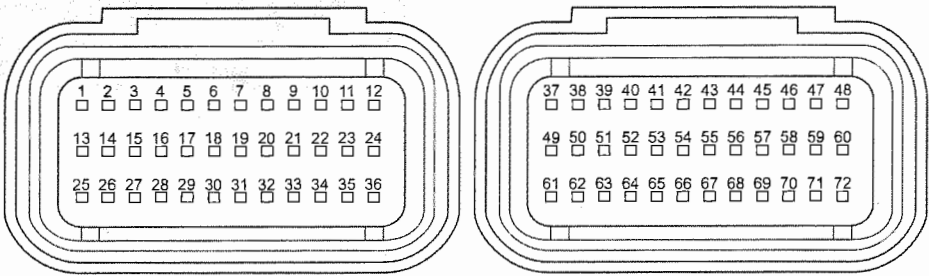
Detected Condition and Possible Cause

Detected Condition	Possible Cause
No Gear Position switch voltage GP switch voltage is not within the following range. GP switch voltage ≥ 0.6 V	<ul style="list-style-type: none">GP switch circuit open or short.GP switch malfunction.ECM malfunction.

Wiring Diagram



ECM coupler (Harness side)



I837H1110007-02

Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the GP switch coupler (1) for loose or poor contacts.
If OK, then measure the GP switch voltage.



IB14J1110076-01

- 4) Support the motorcycle with a jack.
- 5) Fold the side-stand to up position.
- 6) Make sure the engine stop switch is in the "RUN" position.
- 7) Insert the needle-point probe to the lead wire coupler.
- 8) Turn the ignition switch ON.

- 9) Measure the voltage between the P and B/W wire, when shifting the gearshift lever from 1st to Top.

Special tool

- TOOL (A):** 09900-25008 (Multi circuit tester set)
TOOL (B): 09900-25009 (Needle-point probe set)

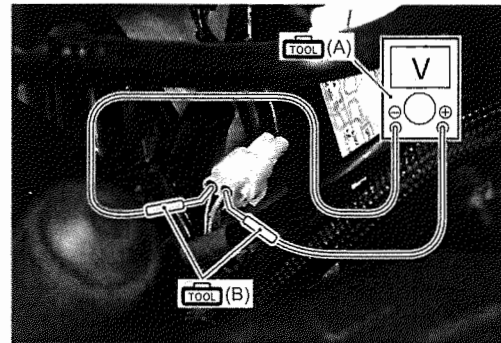
Tester knob indication

Voltage (---)

GP switch voltage

0.6 V and more

((+) terminal: P – (–) terminal: B/W)



IB14J1110077-01

Is the voltage OK?

- | | |
|-----|--|
| Yes | <ul style="list-style-type: none"> • P wire open or shorted to ground. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1). |
| No | <ul style="list-style-type: none"> • P or B/W wire open, or P wire shorted to ground. • Loose or poor contacts on the ECM coupler. • If wire and connection are OK, replace the GP switch with a new one. Refer to "Gear Position (GP) Switch Removal and Installation" in Section 5B (Page 5B-13). |

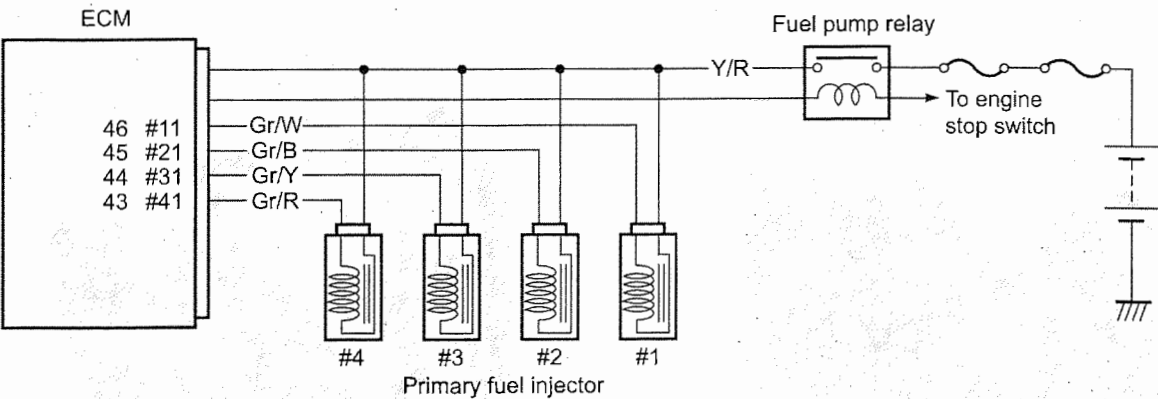
DTC “C32” (P0201), “C33” (P0202), “C34” (P0203) or “C35” (P0204): Primary Fuel Injector Circuit Malfunction

BENB15J21104022

Detected Condition and Possible Cause

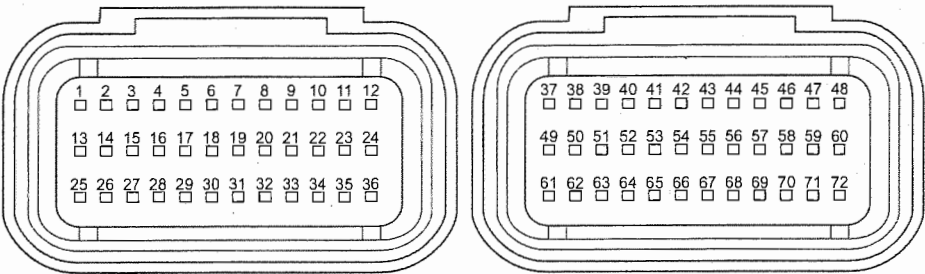
Detected Condition	Possible Cause
CKP signal is produced but fuel injector signal is interrupted by 4 times or more continuity.	<ul style="list-style-type: none">• Injector circuit open or short.• Injector malfunction.• ECM malfunction.

Wiring Diagram



IB37H1110070-02

ECM coupler (Harness side)



IB37H1110070-02

Troubleshooting

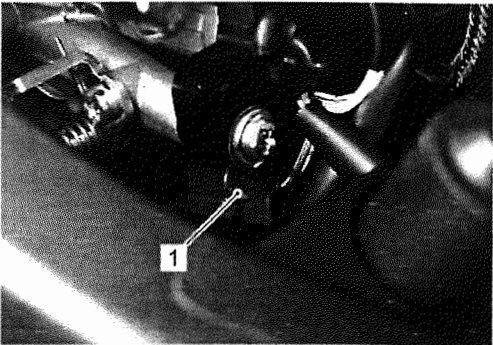
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-9).


- 3) Check the primary fuel injector coupler (1) for loose or poor contacts. If OK, then measure the injector resistance.



IB14J1110078-01

- 4) Disconnect the injector coupler and measure the resistance between terminals.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

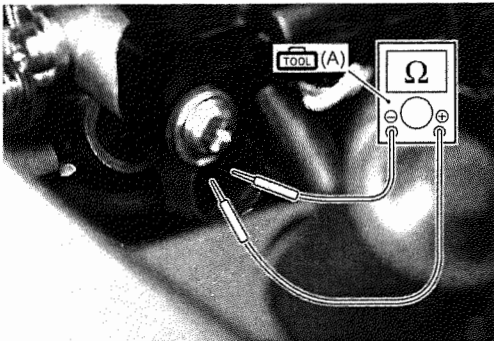
Tester knob indication

Resistance (Ω)

Injector resistance

Approx. 12 Ω at 20 °C (68 °F)


(Terminal – Terminal)



IB14J1110079-01

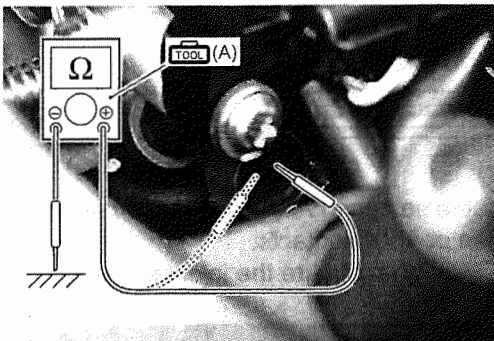
- 5) If OK, then check the continuity between each terminal and ground.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

Injector continuity

∞ Ω (Infinity)



IB14J1110080-01

Are the resistance and continuity OK?

- Yes Go to Step 2.
- No Replace the injector with a new one. Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).


Step 2

- 1) Turn the ignition switch ON.
- 2) Measure the injector voltage between the Y/R wire and ground.

NOTE

Injector voltage can be detected only for 3 seconds after ignition switch is turned ON.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

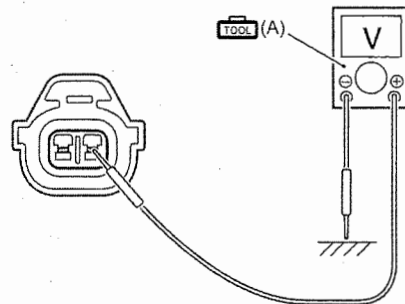
Tester knob indication

Voltage (V)

Injector voltage

Battery voltage

((+) terminal: Y/R – (-) terminal: Ground)



IB14J1110081-01

Is the voltage OK?

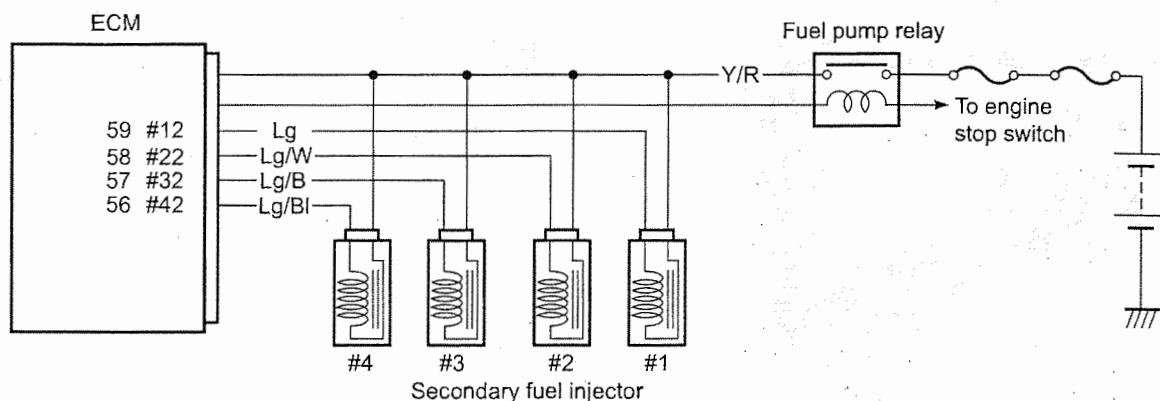
- Yes
- Gr/W wire open or shorted to ground, or poor "46" connection (#1 cylinder side).
 - Gr/B wire open or shorted to ground, or poor "45" connection (#2 cylinder side).
 - Gr/Y wire open or shorted to ground, or poor "44" connection (#3 cylinder side).
 - Gr/R wire open or shorted to ground, or poor "43" connection (#4 cylinder side).
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Open circuit in the Y/R wire.

DTC "C36" (P1764), "C37" (P1765), "C38" (P1766) or "C39" (P1767): Secondary Fuel Injector Circuit Malfunction

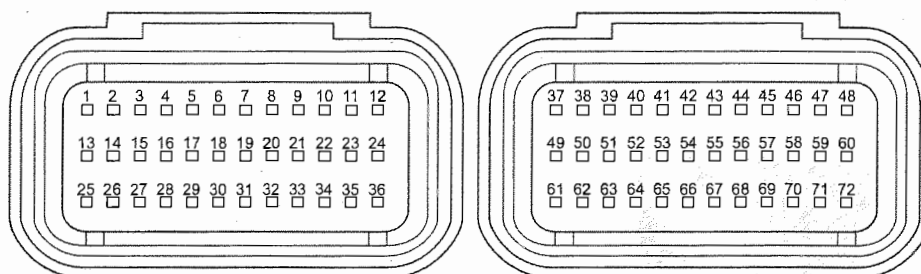
BENB15J21104023

Detected Condition and Possible Cause

Detected Condition	Possible Cause
Some failure exists in the fuel injector signal in a high load, high revolution condition.	<ul style="list-style-type: none"> • Injector circuit open or short. • Injector malfunction. • ECM malfunction.

Wiring Diagram

IB14J1110082-01

ECM coupler (Harness side)

IB37H1110007-02

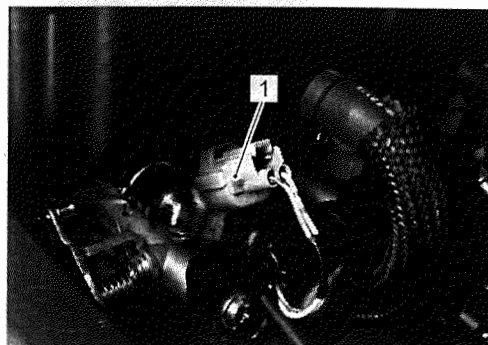
Troubleshooting**NOTE**

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).

- 3) Check the secondary fuel injector coupler (1) for loose or poor contacts. If OK, then measure the injector resistance.



IB14J1110083-01

- 4) Disconnect the injector coupler and measure the resistance between terminals.

Special tool

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

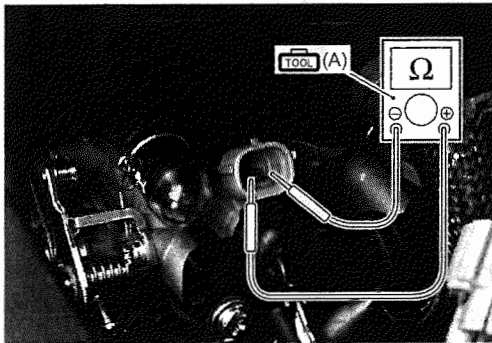
Tester knob indication

Resistance (Ω)

Injector resistance

Approx. 12 Ω at 20 °C (68 °F)

(Terminal – Terminal)



IB14J1110084-01

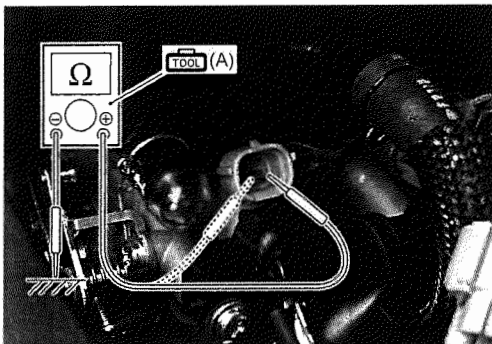
- 5) If OK, then check the continuity between each terminal and ground.

Special tool

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

Injector continuity

∞ Ω (Infinity)



IB14J1110085-01

Are the resistance and continuity OK?

- Yes Go to Step 2.
- No Replace the injector with a new one. Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

Step 2

- 1) Turn the ignition switch ON.
- 2) Measure the injector voltage between the Y/R wire and ground.

NOTE

Injector voltage can be detected only for 3 seconds after ignition switch is turned ON.

Special tool

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

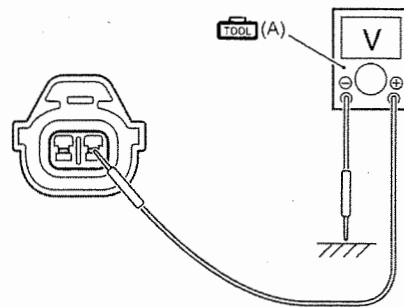
Tester knob indication

Voltage (---)

Injector voltage

Battery voltage

(+) terminal: Y/R – (–) terminal: Ground)



IB14J1110086-01

Is the voltage OK?

- Yes
- Lg wire open or shorted to ground, or poor "59" connection (#1 cylinder side).
 - Lg/W wire open or shorted to ground, or poor "58" connection (#2 cylinder side).
 - Lg/B wire open or shorted to ground, or poor "57" connection (#3 cylinder side).
 - Lg/Bl wire open or shorted to ground, or poor "56" connection (#4 cylinder side).
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Open circuit in the Y/R wire.

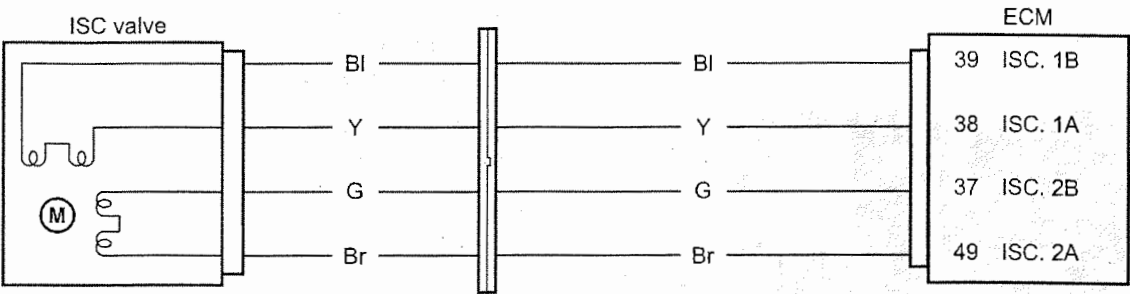
DTC “C40” (P0505): ISC Valve Circuit Malfunction

BENB15J21104024

Detected Condition and Possible Cause

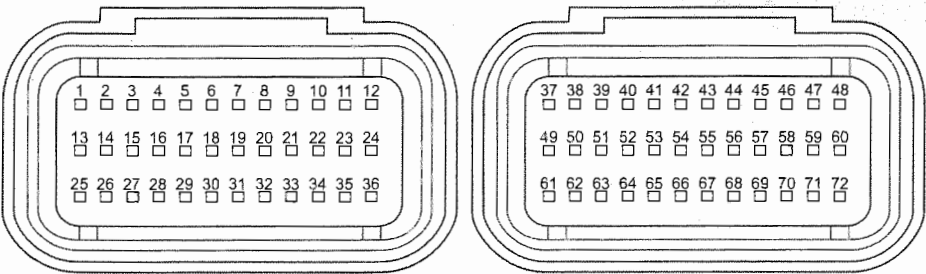
Detected Condition	Possible Cause
C40/P0505 The circuit voltage of motor drive is unusual.	• ISC valve circuit open or shorted to ground.

Wiring Diagram



IB14J1110087-01

ECM coupler (Harness side)



IB37H1110007-02

Troubleshooting

NOTICE

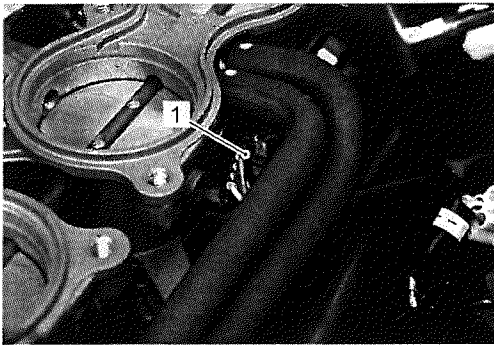
When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point probe to prevent terminal damage.

NOTE

- Be careful not to disconnect the ISC valve coupler at least 5 seconds after ignition switch is turned to OFF.
If the ECM coupler or ISC valve coupler is disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual valve being written in the ECM and causing an error of ISC valve operation.
- After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Check the ISC valve coupler (1) for loose or poor contacts.
If OK, then check the ISC valve lead wire continuity.



IB14J1110088-01

- 4) Disconnect the ISC valve coupler and ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 5) Check the continuity between terminal "A" and terminal "38", terminal "B" and terminal "37", terminal "C" and terminal "39", terminal "D" and terminal "49".

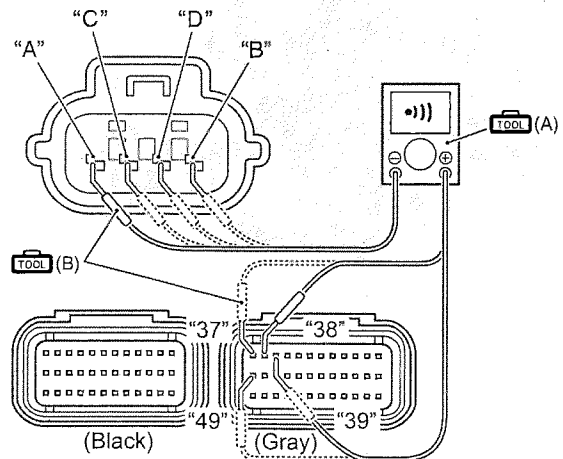
Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity test (•||))

ECM couplers (Harness side)

IB14J1110089-02

Is the continuity OK?

- Yes Go to Step 2.
No Bl, Y, G or Br wire open.

Step 2

- 1) Check the continuity between each ISC valve terminal and ground.

Special tool

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

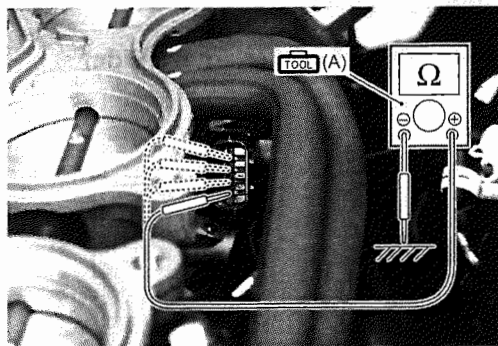
Tester knob indication

Resistance (Ω)

ISC valve continuity

$\infty \Omega$ (Infinity)

(Terminal – Ground)



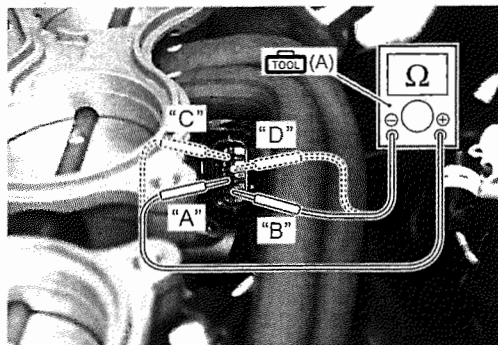
IB14J1110090-01

- 2) If OK, then measure the resistance (between the BI wire terminal "A" and Y wire terminal "B") and (between the G wire terminal "C" and Br wire terminal "D").

ISC valve resistance

Approx. 20Ω at 20°C (68°F)

(Terminal: "A" – Terminal: "B", Terminal: "C" – Terminal: "D")



IB14J1110091-01

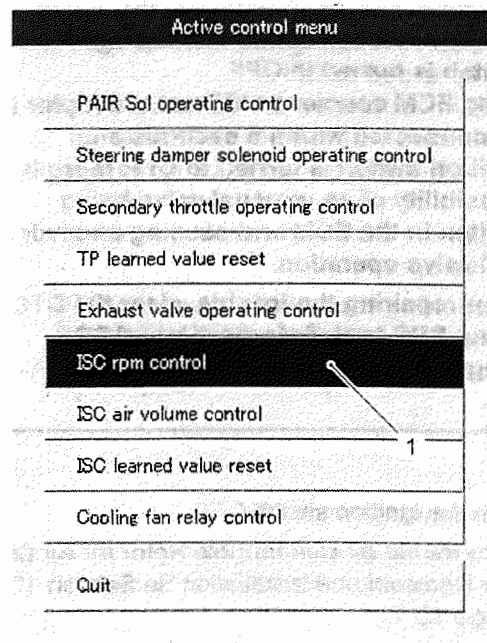
Is the resistance OK?

- Yes** If wire is OK, intermittent trouble or faulty ECM.
- No** Replace the ISC valve with a new one. Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-12).

ACTIVE CONTROL INSPECTION (ISC RPM CONTROL)

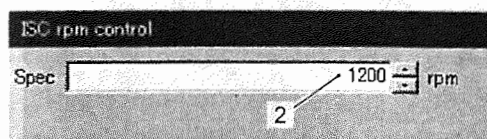
Check 1

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



IB14J1110092-01

- 5) Check that the "Spec" (2) is idle speed 1200 ± 100 rpm.
- 6) Check that the "Desired idle speed" (3) is within the specified idle rpm.



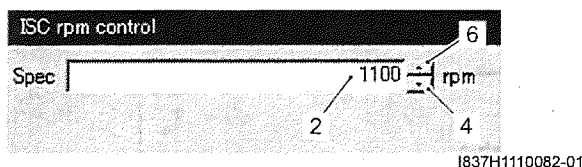
IB38H1110004-01

Item	Value	Unit
<input type="checkbox"/> Engine speed	1200	rpm
<input type="checkbox"/> Desired idle speed	1205	rpm
<input type="checkbox"/> Throttle position	28.4	°
<input type="checkbox"/> Manifold absolute pressure 1	75.4	kPa

IB15J1110007-01

Check 2

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

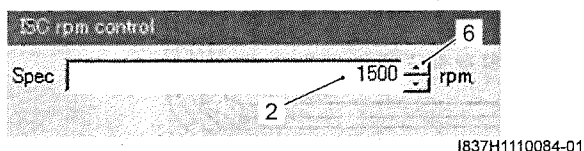


Item	Value	Unit
<input type="checkbox"/> Engine speed	3 1094	rpm
<input type="checkbox"/> Desired idle speed	1104	rpm
<input type="checkbox"/> ISC valve position	5 70	step
<input type="checkbox"/> Throttle position	28.4	°

IB15J1110008-01

Check 3

- 1) Click the button (6) and increase the "Spec" (2) to 1 500 rpm slowly.
- 2) Check that the "Desired idle speed" (3) is nearly equal to the "Spec" (2). Also, check that the number of steps (5) in the ISC valve position increases.



Item	Value	Unit
<input type="checkbox"/> Engine speed	3 1504	rpm
<input type="checkbox"/> Desired idle speed	1506	rpm
<input type="checkbox"/> ISC valve position	5 86	step
<input type="checkbox"/> Throttle position	28.4	°

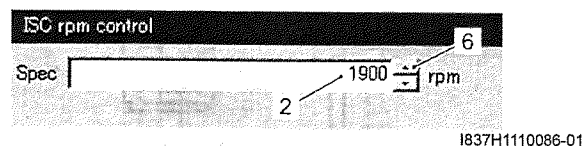
IB15J1110009-01

Check 4

- 1) Click the button (6) and increase the "Spec" (2) to 1 900 rpm.
- 2) Check that the "Desired idle speed" (3) is approx. 1 900 rpm.
- 3) Check that the "Engine speed" (7) is close to 1 900 rpm.

NOTE

Be careful not to increase the "Spec" to 2 000 rpm, or the "Engine speed" may reach the upper limit.



Item	Value	Unit
<input type="checkbox"/> Engine speed	7 1896	rpm
<input type="checkbox"/> Desired idle speed	3 1907	rpm
<input type="checkbox"/> Throttle position	28.4	°
<input type="checkbox"/> Manifold absolute pressure 1	72.8	kPa

IB15J1110010-01

If the ISC valve does not function properly, inspect the ISC valve or replace the ISC valve. Refer to "DTC "C40" (P0505): ISC Valve Circuit Malfunction" (Page 1A-70) and "DTC "C65" (P0506/P0507): Idle Speed Malfunction" (Page 1A-99) or "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

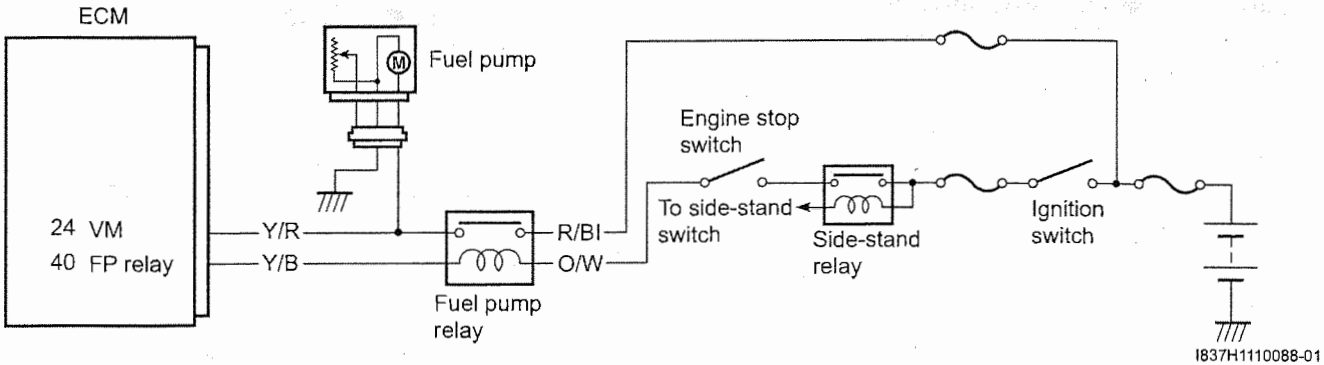
DTC “C41” (P0230-H/L): FP Relay Circuit Malfunction

BENB15J21104025

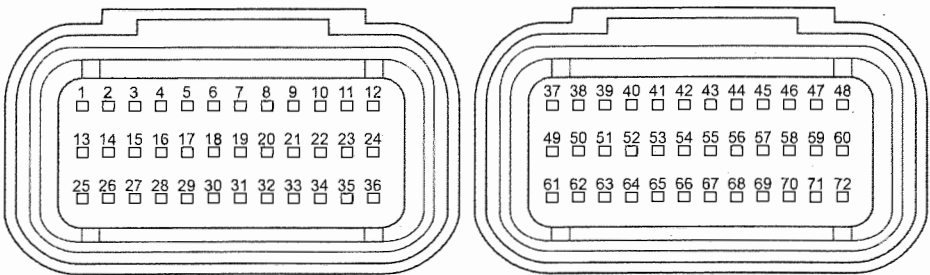
Detected Condition and Possible Cause

Detected Condition			Possible Cause
C41		No voltage is applied to fuel pump.	<ul style="list-style-type: none">Fuel pump relay circuit open or short.Fuel pump relay malfunction.Fuel pump relay switch circuit is shorted to power source.Faulty pump relay (switch side).Fuel pump relay coil circuit open or short.Faulty pump relay (coil side).
P0230	H	Voltage is applied to fuel pump although fuel pump relay is turned OFF.	
	L	No voltage is applied to fuel pump although fuel pump relay is turned ON.	

Wiring Diagram



ECM coupler (Harness side)



Troubleshooting

NOTE

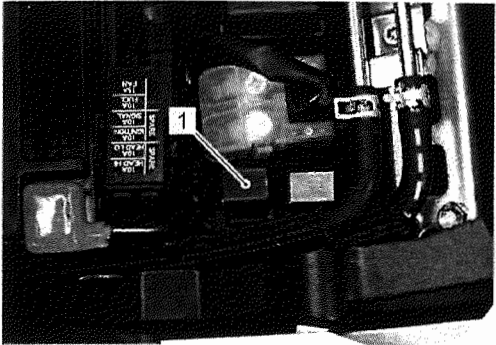
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-14).

C41 (Use of mode selection switch)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to “Exterior Parts Removal and Installation” in Section 9D (Page 9D-7).

- 3) Check the FP relay coupler (1) for loose or poor contacts.
If OK, then check the FP relay. Refer to “Fuel Pump Relay Inspection” in Section 1G (Page 1G-7).



IB14J1110097-01

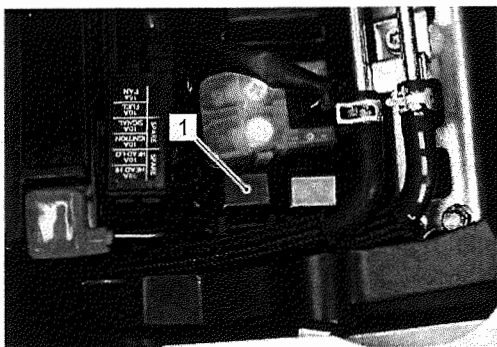
Is the FP relay OK?

- Yes
- ECM power input signal malfunction. Refer to "DTC "C41" (P2505): ECM Power Input Signal Malfunction" (Page 1A-76).
 - Y/B or O/W wire open or short or poor "40" connection.
 - Y/R or R/BI wire open, shorted or poor "24" connection.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).

No Replace the FP relay with a new one.

P0230-H (Use of SDS)**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the FP relay coupler (1) for loose or poor contacts. If OK, then check the FP relay. Refer to "Fuel Pump Relay Inspection" in Section 1G (Page 1G-7).



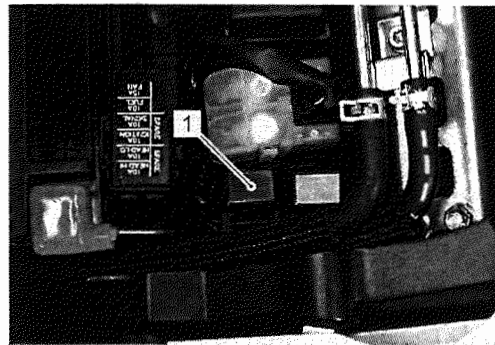
IB14J1110097-01

Is the FP relay OK?

- Yes
- Y/B wire shorted to power source.
 - Y/B wire shorted to ground.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Replace the FP relay with a new one.

P0230-L (Use of SDS)**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the FP relay coupler (1) for loose or poor contacts. If OK, then check the FP relay. Refer to "Fuel Pump Relay Inspection" in Section 1G (Page 1G-7).



IB14J1110097-01

Is the FP relay OK?

- Yes
- Y/B wire open or poor "40" connection.
 - O/W wire open or shorted to ground.
 - R/BI or Y/R wire open or shorted to ground, or poor "24" connection.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Replace the FP relay with a new one.

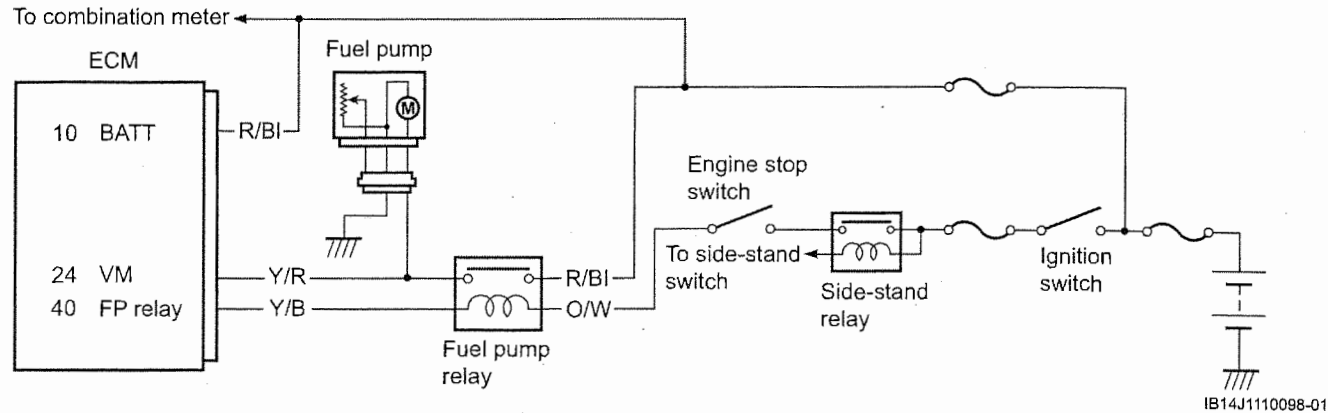
DTC “C41” (P2505): ECM Power Input Signal Malfunction

BENB15J21104026

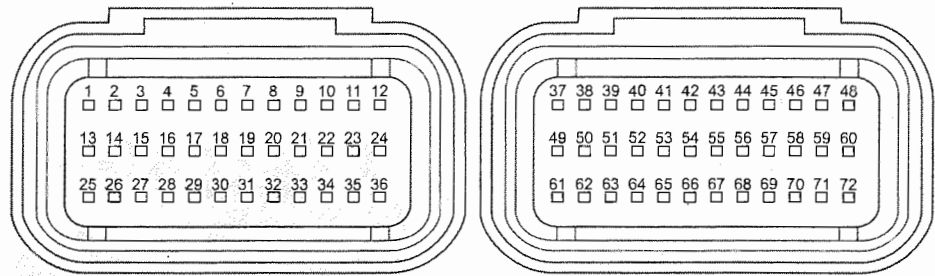
Detected Condition and Possible Cause

Detected Condition		Possible Cause
C41/P2505	No voltage is applied to the ECM.	<ul style="list-style-type: none">Lead wire/coupler connection of ECM terminal to fuel fuse.Fuel fuse.

Wiring Diagram



ECM coupler (Harness side)



Troubleshooting

NOTICE

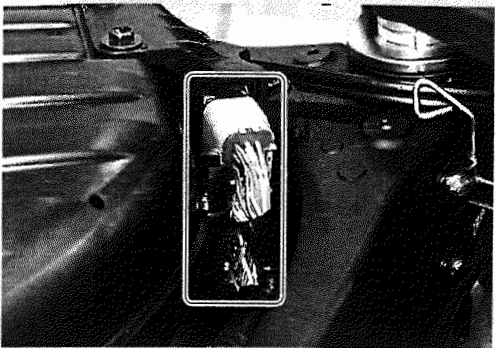
When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point probe to prevent terminal damage.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures” (Page 1A-14).


Step 1


- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-9).
- 3) Check the ECM couplers for loose or poor contacts. If OK, then measure the ECM input voltage.



- 4) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 5) Insert the needle-point probe to ECM coupler.
- 6) Measure the voltage between terminal "10" and ground.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

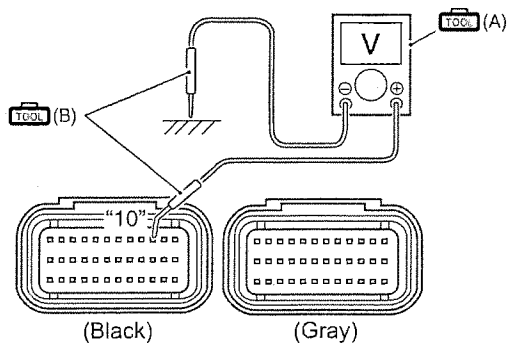
 (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Voltage (---)

ECM input voltage**Battery voltage**

((+) terminal: "10" – (–) terminal: Ground)

ECM couplers (Harness side)

IB14J1110100-01

Is the voltage OK?

- Yes
- Fuel pump relay circuit malfunction. Refer to "DTC "C41" (P0230-H/L): FP Relay Circuit Malfunction" (Page 1A-74).
 - R/B1 wire open or short or poor "10" connection.
 - Power source of combination meter shorted to the ground or open.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Open or short circuit in the R/B1 wire.

DTC "C42" (P1650): IG Switch Circuit Malfunction

BENB15J21104027

Detected Condition and Possible Cause

Detected Condition	Possible Cause
Ignition switch signal is not input to the ECM.	<ul style="list-style-type: none"> • Ignition system circuit open or short. • ECM malfunction.
When the ID agreement is not verified. ECM does not receive communication signal from the immobilizer antenna. (For E-21, 24)	<ul style="list-style-type: none"> • Immobilizer system malfunction. (For E-21, 24)

Troubleshooting**NOTE**

- Refer to "Ignition Switch Inspection" in Section 9C (Page 9C-7) for details.
- After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

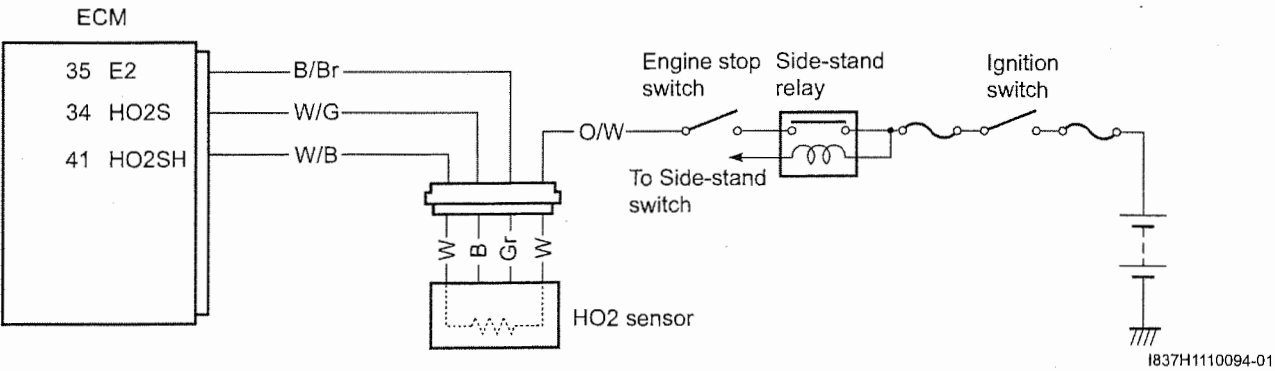
DTC “C44” (P0130/P0135): HO2 Sensor (HO2S) Circuit Malfunction

BENB15J21104028

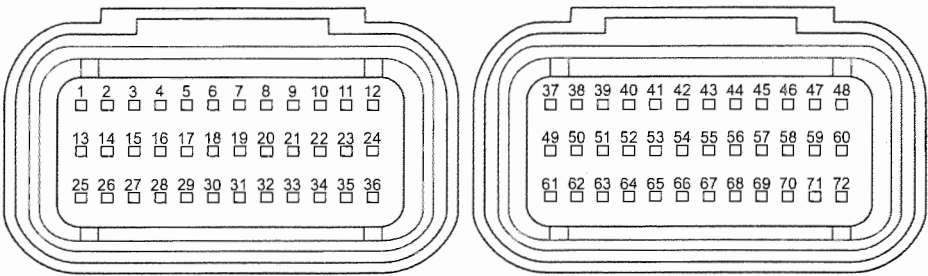
Detected Condition and Possible Cause

Detected Condition		Possible Cause
C44/P0130	HO2 sensor output voltage is not input to ECM during engine operation and running condition. Sensor voltage > 1.0 V	• HO2 sensor circuit is open or shorted to the power source.
C44/P0135	The heater can not operate so that heater operation voltage is not supplied to the oxygen heater circuit.	• Heated circuit is open or shorted to ground. • Battery voltage is not supply to the HO2 sensor.

Wiring Diagram



ECM coupler (Harness side)



Troubleshooting (When Indicating C44/P0130:)**NOTICE**

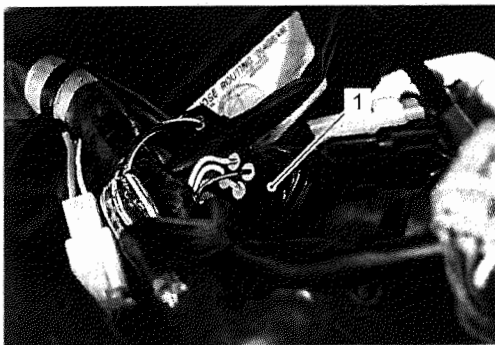
When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point probe to prevent terminal damage.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the HO2 sensor coupler (1) for loose or poor contacts. If OK, then check the HO2 sensor lead wire continuity.



IB14J1110101-01

- 4) Disconnect the HO2 sensor coupler.

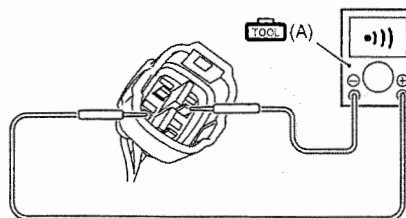
- 5) Check the continuity between the W/G wire and O/W wire. If the sound is not heard from the tester, the circuit condition is OK.

Special tool

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

Tester knob indication

Continuity test (•)))



IB14J1110102-01

- 6) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 7) Check the continuity between the W/G wire and terminal "34". Also, check the continuity between the B/Br wire and terminal "35".

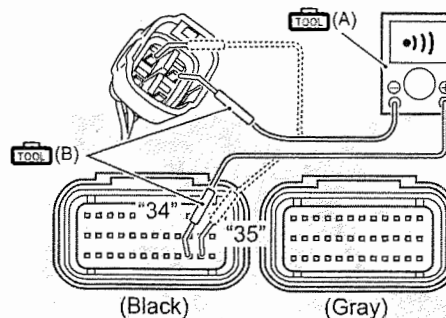
Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Continuity (•)))

ECM couplers (Harness side)

I837H1110095-03

Is the continuity OK?

- Yes Go to Step 2.
- No W/G wire shorted to the power source, or W/G or B/Br wire open.

Step 2

- 1) Connect the ECM couplers and HO2 sensor coupler.
- 2) Warm up the engine enough.
- 3) Insert the needle-point probes to the lead wire coupler.
- 4) Measure the HO2 sensor output voltage between the W/G wire and B/Br wire, in idling condition.

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

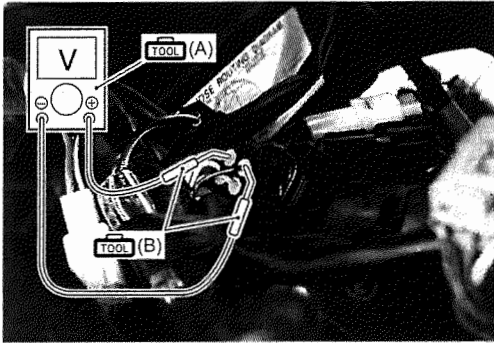
Tester knob indication

Voltage (---)

HO2 sensor output voltage at idle speed

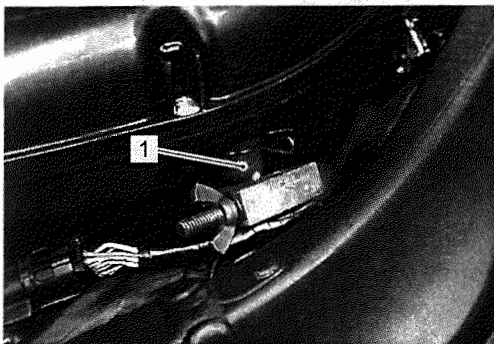
0.4 V and less

(+) terminal: W/G – (–) terminal: B/Br)



IB14J1110103-01

- 5) If OK, then pinch the PAIR hose (1) with a proper hose clamp.



IB14J1110104-01

- 6) Measure the HO2 sensor output voltage while holding the engine speed at 5 000 r/min.

HO2 sensor output voltage at 5 000 r/min

0.6 V and more

(+) terminal: W/G – (–) terminal: B/Br)

Is the voltage OK?

- Yes**
- W/G or B/Br wire open or shorted to the power source, or poor "34" or "35" connection.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No**
- Replace the HO2 sensor with a new one. Refer to "HO2 Sensor Removal and Installation" in Section 1C (Page 1C-9).

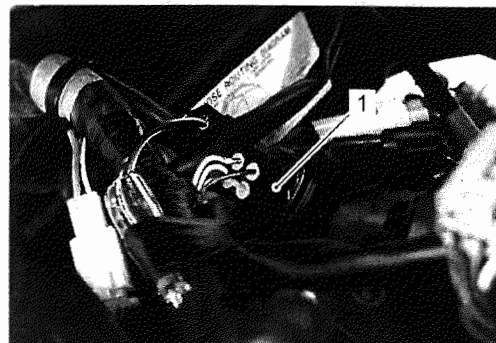
Troubleshooting (When Indicating C44/P0135:)

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
 - 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
 - 3) Check the HO2 sensor coupler (1) for loose or poor contacts.
- If OK, then measure the HO2 sensor resistance.



IB14J1110101-01

- 4) Disconnect the HO2 sensor coupler and measure the resistance between terminals.

NOTE

- Temperature of the sensor affects resistance value largely.
- Make sure that the sensor heater is in atmospheric temperature.

Special tool

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

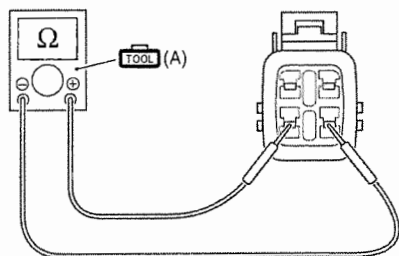
Tester knob indication

Resistance (Ω)

HO2 sensor heater resistance

6.7 – 9.5 Ω at 23 °C (73 °F)

(W – W)



IB14J1110105-03

Is the resistance OK?

- Yes Go to Step 2.
- No Replace the HO2 sensor with a new one. Refer to "HO2 Sensor Removal and Installation" in Section 1C (Page 1C-9).

Step 2

- 1) Connect the HO2 sensor coupler.
- 2) Insert the needle-point probes to the lead wire coupler.
- 3) Turn the ignition switch ON and measure the heater voltage between the W/B wire and ground. If the tester voltage indicates the battery voltage, it is good condition.

NOTE

Battery voltage can be detected only before starting the engine.

Special tool

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

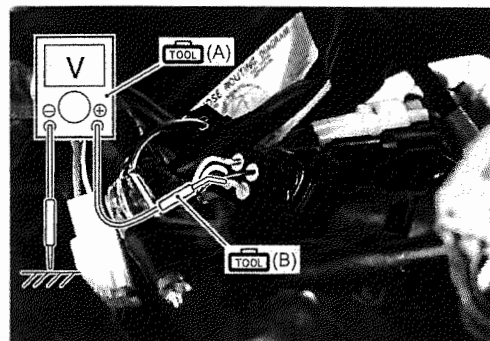
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Voltage (V)

Heater voltage**Battery voltage**

((+) terminal: W/B – (–) terminal: Ground)



IB14J1110106-01

Is the voltage OK?

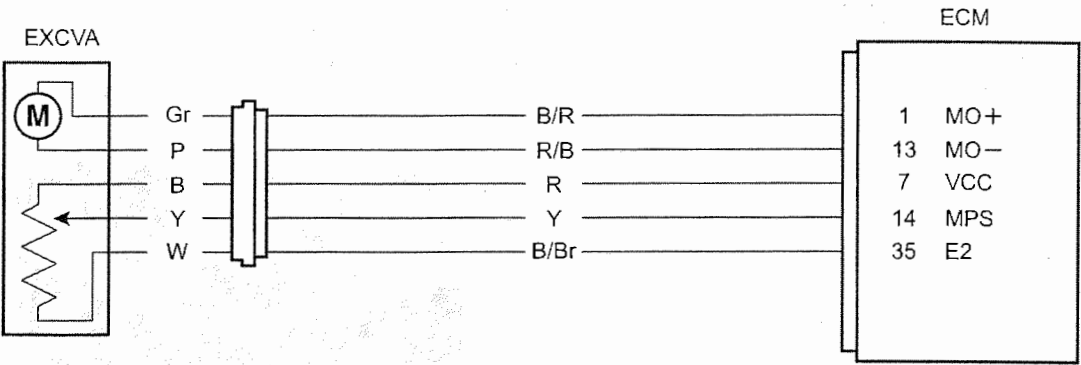
- Yes
- O/W or W/B wire open or shorted to ground, or poor "41" connection.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No
- Open or short circuit in the W/B wire or O/W wire.
 - Loose or poor contacts on the ECM coupler or HO2 sensor coupler.

DTC “C46” (P1657-H/L or P1658): EXCV Actuator Circuit Malfunction

BENB15J21104029

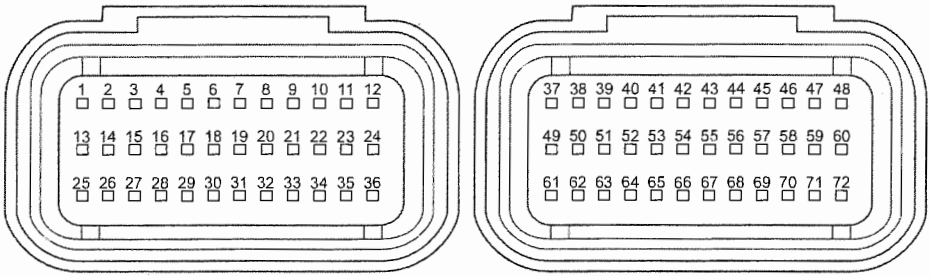
Detected Condition			Possible Cause
C46		The operation signal does not reach the EXCV actuator. EXCVA position sensor voltage low or high $0.1\text{ V} \leq \text{Sensor voltage} < 4.9\text{ V}$ (without the above range) EXCVA can not operate properly.	<ul style="list-style-type: none">EXCVA maladjusted.EXCVA circuit open or short.EXCVA motor malfunction.EXCVA position sensor malfunction.
P1657	H	Sensor voltage is higher than specified value.	<ul style="list-style-type: none">EXCVA position sensor circuit shorted to VCC or ground circuit open.EXCVA position sensor circuit open or shorted to ground or VCC circuit open.
	L	Sensor voltage is lower than specified value.	
P1658		The operation signal does not reach the EXCVA motor. EXCVA can not operate properly.	<ul style="list-style-type: none">EXCVA motor circuit open or short.EXCVA motor malfunction.

Wiring Diagram



IB14J1110138-01

ECM coupler (Harness side)



IB37H1110007-02

Troubleshooting

NOTICE

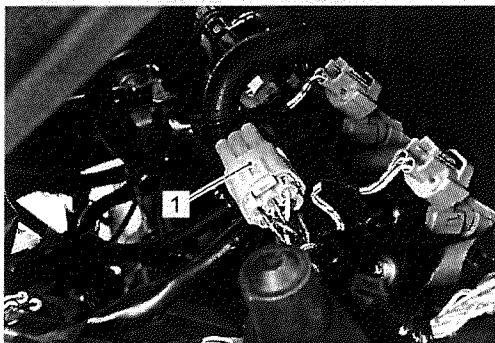
When using the multi circuit tester, do not strongly touch the terminal of the ECM coupler with a needle-point probe to prevent terminal damage.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

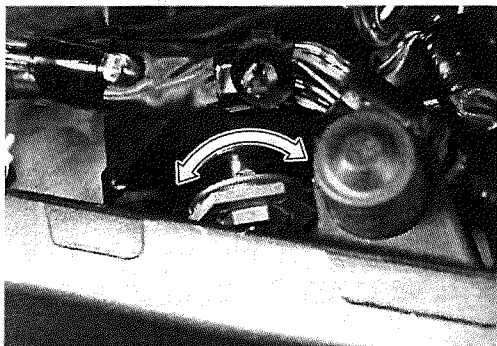
C46 (Use of mode selection switch)**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the EXCVA coupler (1) for loose or poor contacts.



IB14J1110107-01

- 4) Turn the ignition switch ON.
- 5) Check the operation of the EXCVA.
(EXCVA operation order: Full close → Full open → Approx. 35% open)



IB14J11B0015-01

Is the operation OK?

- | | |
|-----|----------------------------------|
| Yes | Go to P1658 (Use of SDS) Step 2. |
| No | Go to P1658 (Use of SDS) Step 6. |

P1657-H (Use of SDS)**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the EXCVA coupler (1) for loose or poor contacts.
If OK, then check the EXCVA position sensor lead wire continuity.



IB14J1110107-01

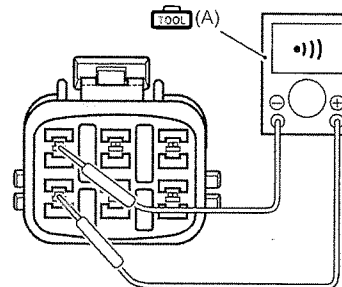
- 4) Disconnect the EXCVA coupler.
- 5) Check the continuity between R wire and Y wire.
If the sound is not heard from the tester, the circuit condition is OK.

Special tool

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

Tester knob indication

Continuity (•••)



I947H1110085-01

- 6) Disconnect the ECM couplers.
- 7) Check the continuity between Y wire and terminal "14".
- 8) Also, check the continuity between B/Br wire and terminal "35".

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

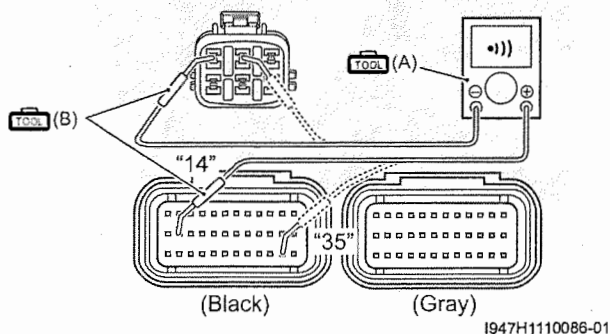
Tester knob indication

Continuity (•••)

EXCVA lead wire continuity

Continuity (•••)

ECM couplers (Harness side)



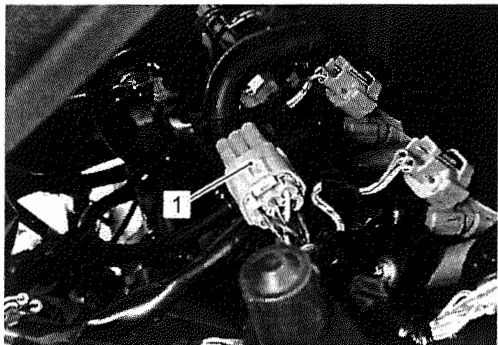
Is the continuity OK?

- Yes Go to P1658 (Use of SDS) Step 4.
No Y wire shorted to VCC, or B/Br wire open.

P1657-L (Use of SDS)

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the EXCVA coupler (1) for loose or poor contacts. If OK, then check the EXCVA position sensor lead wire continuity.



IB14J1110107-01

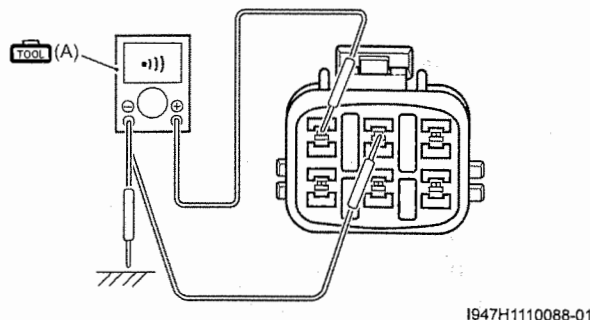
- 4) Disconnect the EXCVA coupler.
- 5) Check the continuity between Y wire and ground.
- 6) Also, check the continuity between Y wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK.

Special tool

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

Tester knob indication

Continuity (•••)



- 7) Disconnect the ECM couplers. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 8) Check the continuity between Y wire and terminal "14".
- 9) Also, check the continuity between R wire and terminal "7".

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

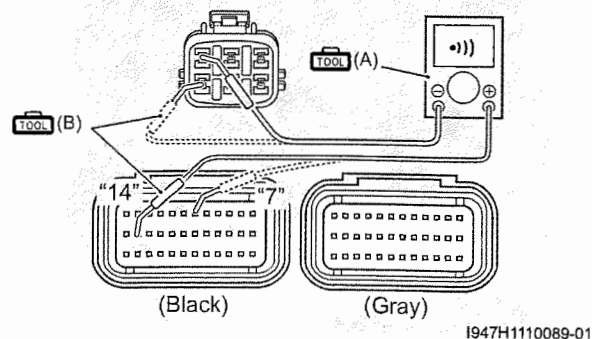
Tester knob indication

Continuity (•••)

EXCVA lead wire continuity

Continuity (•••)

ECM couplers (Harness side)

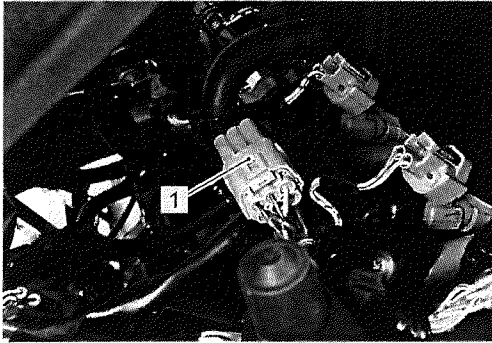


Is the continuity OK?

- Yes Go to P1658 (Use of SDS) Step 2 and go to P1658 (Use of SDS) Step 4.
No R or Y wire open, or Y wire shorted to ground.

P1658 (Use of SDS)**Step 1**

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the EXCVA coupler (1) for loose or poor contacts.



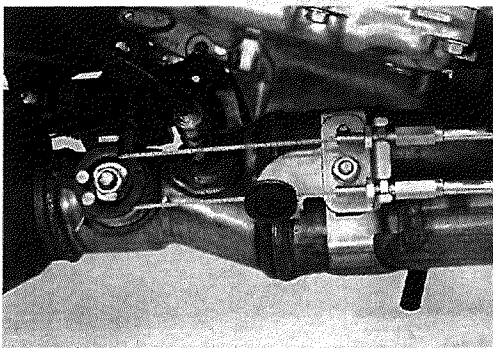
IB14J1110107-01

Is the contacting OK?

- Yes Go to Step 6.
- No Loose or poor contacts on the EXCVA coupler.

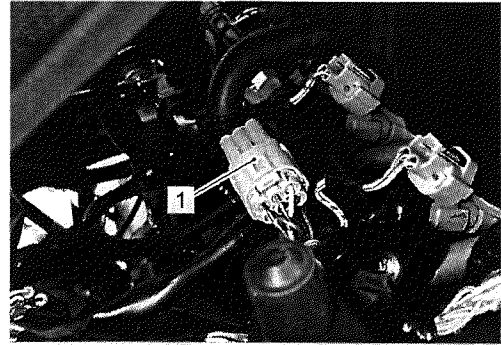
Step 2

- 1) Turn the ignition switch OFF.
- 2) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the installation of EXCV cables. If it is necessary, adjust the EXCV cables. Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-7).



IB14J1110108-01

- 4) Disconnect the EXCVA coupler (1).



IB14J1110107-01

- 5) Turn the ignition switch ON.
- 6) Measure the voltage between the R wire and ground.
If OK, then measure the voltage between the R wire and B/Br wire.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

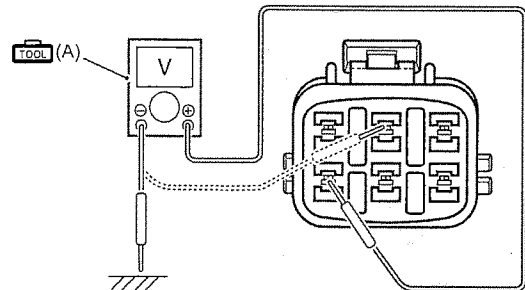
Voltage (---)

EXCVA position sensor input voltage

4.5 – 5.5 V

((+) terminal: R – (–) terminal: Ground)

((+) terminal: R – (–) terminal: B/Br)



I947H1110093-01

Is the voltage OK?

- Yes Go to Step 3.
- No
- Loose or poor contacts on the ECM coupler (terminal "7" or "35").
 - Open or short circuit in the R or B/Br wire.

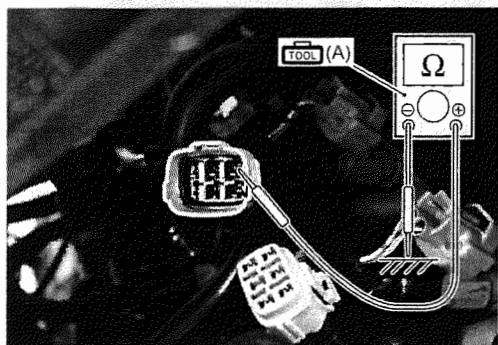
Step 3

- 1) Turn the ignition switch OFF.
- 2) Check the continuity between Y wire and ground.

Special tool

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

EXCVA position sensor continuity $\infty \Omega$ (Infinity)



IB14J1110109-01

- 3) If OK, then measure the EXCVA position sensor resistance.
- 4) Connect the EXCVA position sensor coupler and set the EXCVA to adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-7).
- 5) Disconnect the EXCVA coupler and measure the resistance between Y and W wires.

Special tool

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

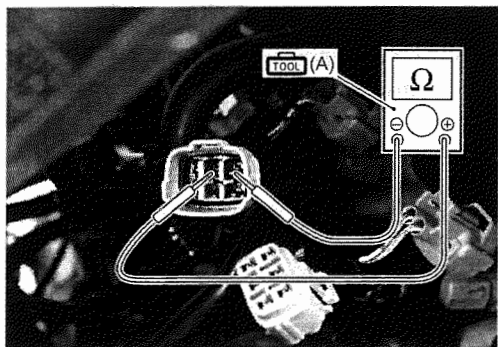
Tester knob indication

Resistance (Ω)

EXCVA position sensor resistance at adjustment position

Approx. 3.1 k Ω

((+) Y - (-) W)



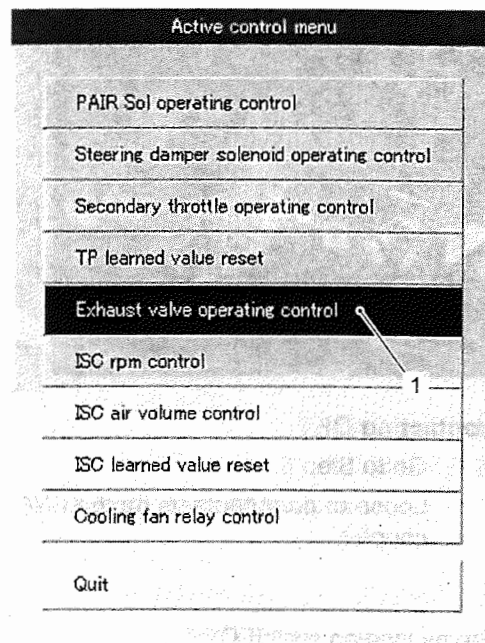
IB14J1110110-01

Is the resistance OK?

- Yes Go to Step 4.
- No Replace the EXCVA with a new one.

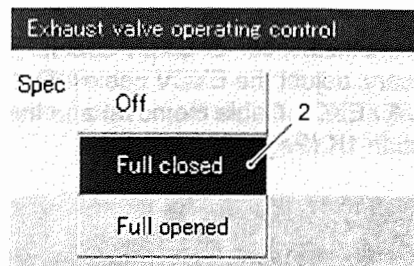
Step 4

- 1) Turn the ignition switch OFF.
- 2) Connect the EXCVA coupler.
- 3) Set up the SDS tool. Refer to "Self-Diagnostic Procedures" (Page 1A-12).
- 4) Turn the ignition switch ON.
- 5) Click "Exhaust valve operating control" (1).



IB14J1110111-01

- 6) Click "Full closed" (2).





I947H1110132-01

- 7) Insert the needle-point probes into the back side of the EXCVA coupler (3). ((+) Y - (-) W)

- 8) Measure the EXCVA position sensor output voltage at EXCV fully closed position.

Special tool

 (A): 09900-25008 (Multi circuit tester set)

 (B): 09900-25009 (Needle-point probe set)

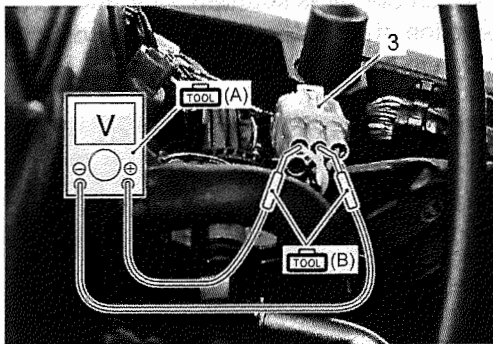
Tester knob indication

Voltage (---)

EXCVA position sensor output voltage

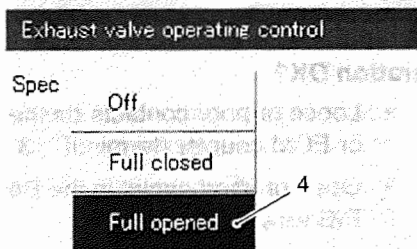
EXCV is fully closed: 0.45 – 1.4 V

((+) Y – (–) W)



IB14J1110144-01


- 9) Click "Full opened" (4).




I947H1110098-02

- 10) Measure the EXCVA position sensor output voltage at EXCV fully opened position.

Special tool

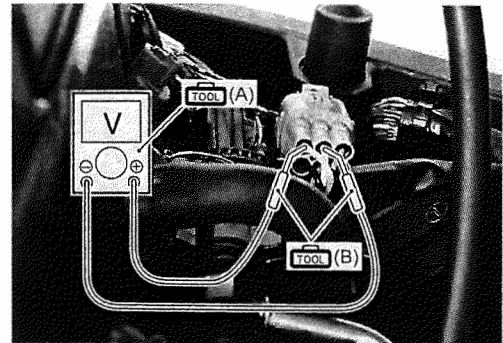
 (A): 09900-25008 (Multi circuit tester set)

 (B): 09900-25009 (Needle-point probe set)

EXCVA position sensor output voltage

EXCV is fully opened: 3.6 – 4.55 V

((+) Y – (–) W)



IB14J11B0019-01

Is the voltage OK?

Yes Replace the ECM with a known good one, and inspect it again.

No Go to Step 5.

Step 5

- 1) If the EXCVA position sensor output voltage is 0.45 V and less at EXCV fully closed position, adjust the output voltage to the specified value by turning the No. 1 cable adjuster (1). Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-7).
- 2) Repeat the procedure in Step 4 until the output voltage is set within the specified value. (If C46/ P1657 code is indicated after adjusting the voltage, increase the voltage to 0.9 V).

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. Refer to "EXCVA / EXCV Cable Removal and Installation" in Section 1K (Page 1K-7).

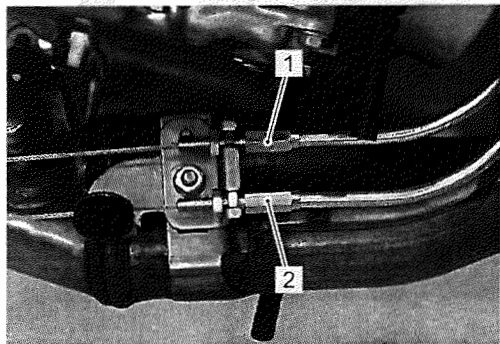
- Do not turn the EXCVA pulley using the wrench.

- 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 / EXCV Cable Removal and Installation" in Section 1K (Page 1K-7). Repeat the procedure in Step 4 until the output voltage is set within the specified value.

EXCVA position sensor output voltage

EXCV is fully closed: 0.45 – 1.4 V

EXCV is fully opened: 3.6 – 4.55 V



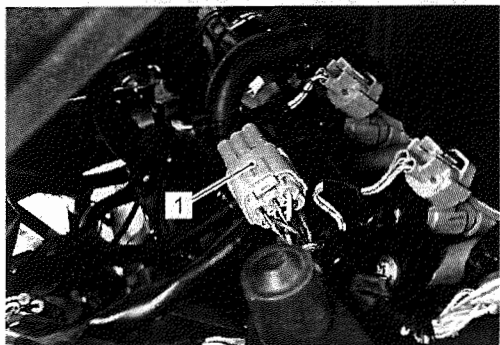
IB14J1110112-01

Is the voltage OK?

- | | |
|-----|--|
| Yes | Replace the ECM with a known good one, and inspect it again. |
| No | Replace the EXCVA with a new one. |

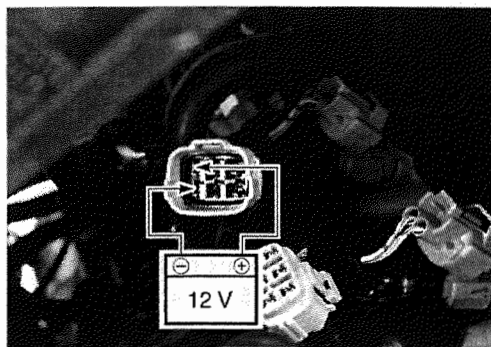
Step 6

- 1) Turn the ignition switch OFF.
- 2) Disconnect the EXCVA coupler (1).



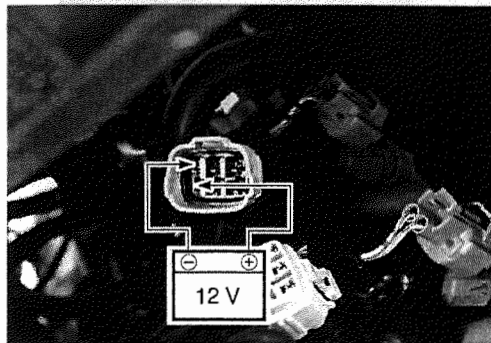
IB14J1110107-01

- 3) Apply 12 V to the terminals and check the operation of EXCVA.



IB14J1110113-03

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



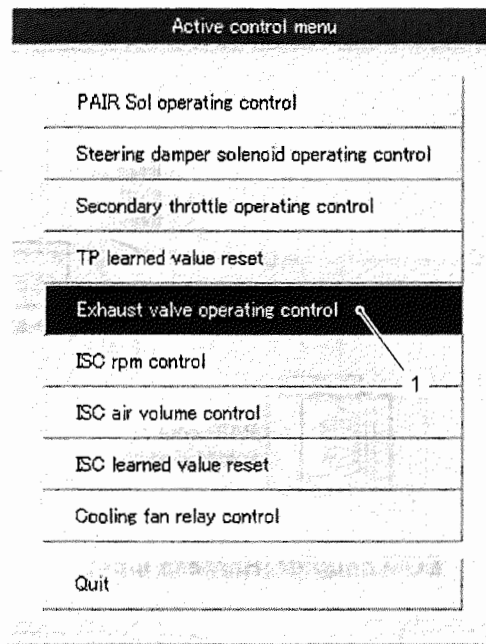
IB14J1110114-02

Is the operation OK?

- | | |
|-----|--|
| Yes | <ul style="list-style-type: none"> • Loose or poor contacts on the EXCVA or ECM coupler (terminal "13" or "1"). • Open or short circuit in the B/R wire or R/B wire. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. |
| No | <ul style="list-style-type: none"> • Replace the EXCVA with a new one. • Inspect that the EXCV and two cables move smoothly. |

Active Control Inspection

- 1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
- 2) Turn the ignition switch ON.
- 3) Click "Exhaust valve operating control" (1).

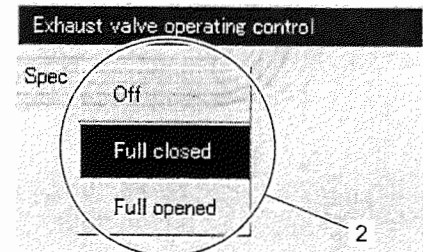


IB14J1110115-01

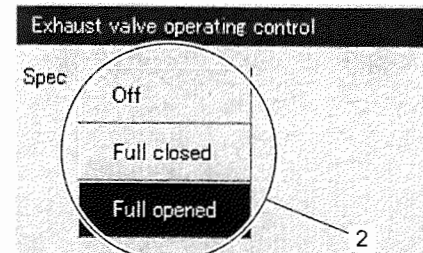
- 4) Click each button (2).

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

Item	Value	Unit
<input type="checkbox"/> Engine speed	0	rpm
<input type="checkbox"/> Throttle position	28.4	°
<input type="checkbox"/> Exhaust valve full opened	Except full opn	
<input type="checkbox"/> Exhaust valve full closed	Full closed	
<input type="checkbox"/> Manifold absolute pressure 1	101.6	kPa
<input type="checkbox"/> Vehicle speed	0.0	km/h



Item	Value	Unit
<input type="checkbox"/> Engine speed	0	rpm
<input type="checkbox"/> Throttle position	28.4	°
<input type="checkbox"/> Exhaust valve full opened	Full opened	
<input type="checkbox"/> Exhaust valve full closed	Except full cls	
<input type="checkbox"/> Manifold absolute pressure 1	101.6	kPa
<input type="checkbox"/> Vehicle speed	0.0	km/h



IB15J1110011-01

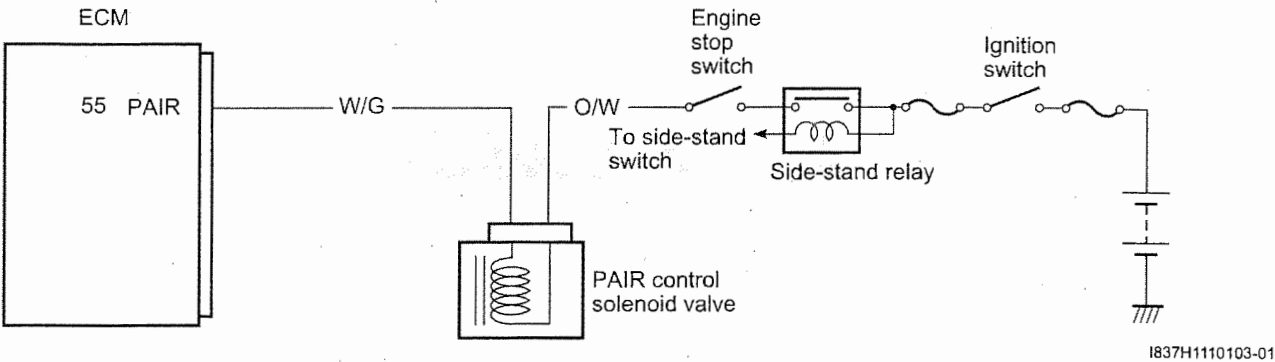
DTC “C49” (P1656): PAIR Control Solenoid Valve Circuit Malfunction

BENB15J21104030

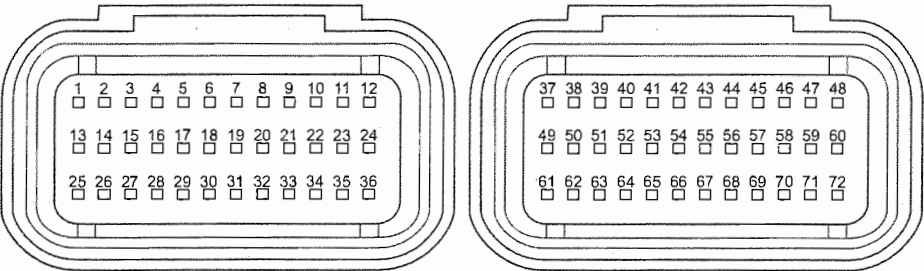
Detected Condition and Possible Cause

Detected Condition	Possible Cause
PAIR control solenoid valve voltage is not input to ECM.	<ul style="list-style-type: none">• PAIR control solenoid valve circuit open or short.• PAIR control solenoid valve malfunction.• ECM malfunction.

Wiring Diagram



ECM coupler (Harness side)



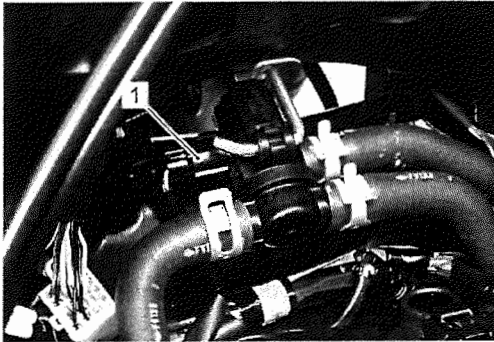
Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Check the PAIR control solenoid valve coupler (1) for loose or poor contacts.
If OK, then measure the PAIR control solenoid valve resistance.



IB14J1110118-01

- 4) Measure the resistance between terminals.

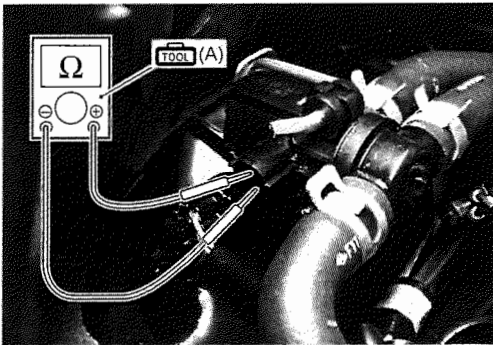
Special tool

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

Tester knob indication

Resistance (Ω)

PAIR control solenoid valve resistance
 20 – 24 Ω at 20 – 30 °C (68 – 86 °F)
 (Terminal – Terminal)



IB14J1110119-01

Is the resistance OK?

- Yes Go to Step 2.
- No Replace the PAIR control solenoid valve with a new one. Refer to "PAIR Control Solenoid Valve Removal and Installation" in Section 1B (Page 1B-10).

Step 2

- 1) Turn the ignition switch ON.
- 2) Measure the voltage between the O/W wire and ground.

Special tool

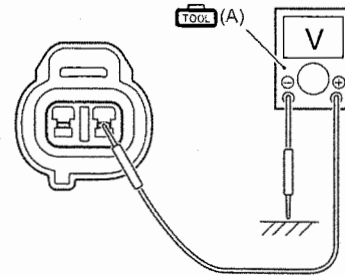
TOOL (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Voltage (V)

PAIR control solenoid valve voltage**Battery voltage**

((+) terminal: O/W – (–) terminal: Ground)



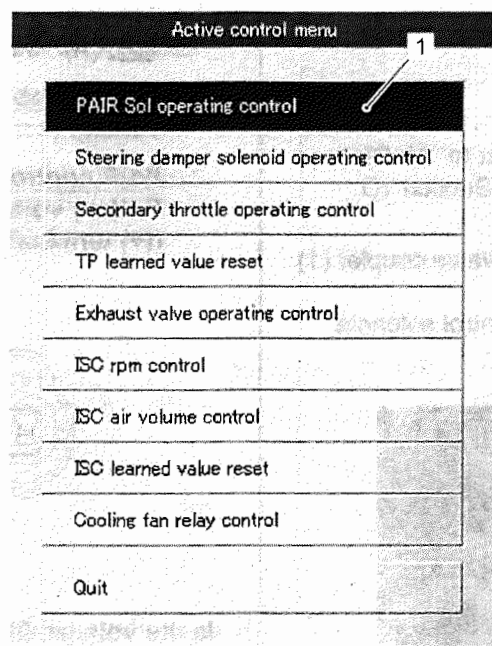
IB14J1110120-01

Is the voltage OK?

- Yes
- W/G wire open or shorted to ground, or poor "55" connection failure.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Open or short circuit in the O/W wire.

Active Control Inspection

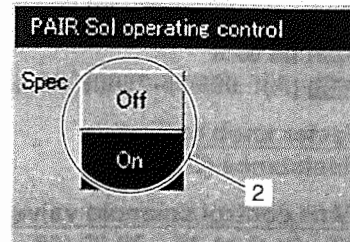
- 1) Set up the SDS tool. (Refer to SDS operation manual for further details.)
- 2) Turn the ignition switch ON.
- 3) Click "PAIR Sol operating control" (1).



IB14J1110121-01

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

Item	Value	Unit
<input type="checkbox"/> Engine speed	0	rpm
<input type="checkbox"/> PAIR control solenoid valve	On	
<input type="checkbox"/> Throttle position	27.9	°



IB37H1110108-02

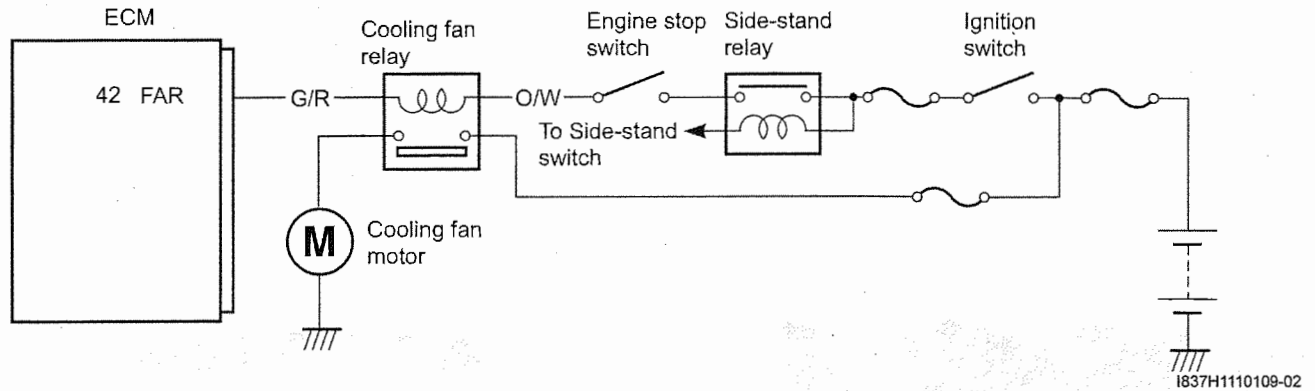
DTC "C60" (P0480): Cooling Fan Relay Circuit Malfunction

BENB15J21104031

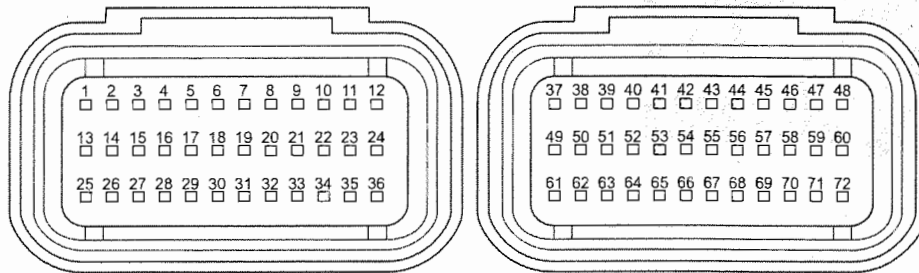
Detected Condition and Possible Cause

Detected Condition	Possible Cause
Cooling fan relay signal is not input to ECM.	<ul style="list-style-type: none"> Cooling fan relay circuit open or short. ECM malfunction.

Wiring Diagram



ECM coupler (Harness side)



I837H1110007-02

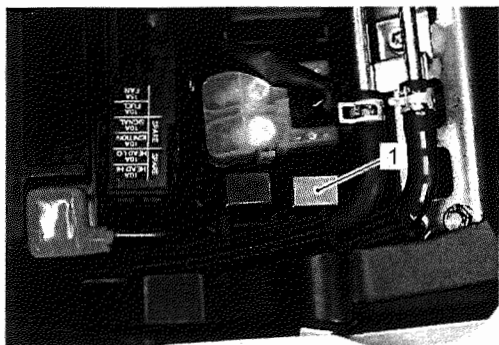
Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Check the cooling fan relay (1) coupler for loose or poor contacts.
If OK, then inspection the cooling fan relay. Refer to "Cooling Fan Inspection" in Section 1F (Page 1F-8).



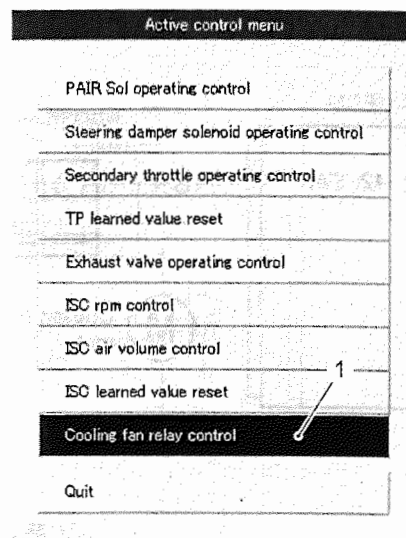
IB14J1110122-01

Is the cooling fan relay OK?

- | | |
|-----|---|
| Yes | <ul style="list-style-type: none"> • O/W and G/R wire open or shorted to ground, or poor "42" connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1). |
| No | Replace the cooling fan relay with a new one. |

Active Control Inspection

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



IB14J1110123-01

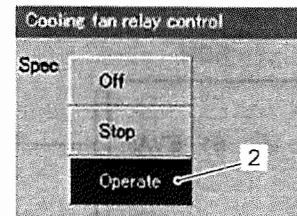
4) Click the "Operate" (2).

At this time, if an operation sound is heard from the cooling fan relay and cooling fan motors are operated, the function is normal.

NOTE

The cooling fan relay and cooling fan motor inspection is operational at any engine coolant temperature until reaching 100 °C (212 °F).

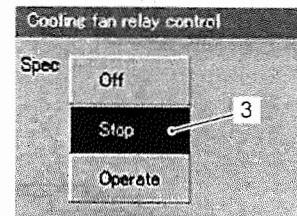
<input type="checkbox"/> Throttle position	27.9 °	
<input type="checkbox"/> Cooling fan relay	On	
<input type="checkbox"/> PAIR control solenoid valve	Off	



IB14J1110142-01

5) Click the "Stop" (3) to check the operation properly.

<input type="checkbox"/> Throttle position	27.9 °	
<input type="checkbox"/> Cooling fan relay	Off	
<input type="checkbox"/> PAIR control solenoid valve	Off	



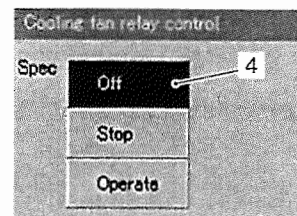
IB14J1110126-02

6) Click the "Off" (4) to check the cooling fan relay and cooling fan motor operation.

NOTE

- This inspection should be begun from when the engine coolant temperature is below 50 °C (122 °F). Check that the cooling fan relay operates for a few seconds as the engine coolant temperature reaches each temp. of 50 °C (122 °F), 70 °C (158 °F) and 90 °C (194 °F)/above 4 000 r/min. It is cooling fan motor malfunction or its circuit failure when the motor would not run even if the relay turns ON.
- There is a tolerance of operating temperature of cooling fan relay.

<input type="checkbox"/> Throttle position	27.9 °	
<input type="checkbox"/> Cooling fan relay	On	
<input type="checkbox"/> PAIR control solenoid valve	Off	



IB14J1110127-02

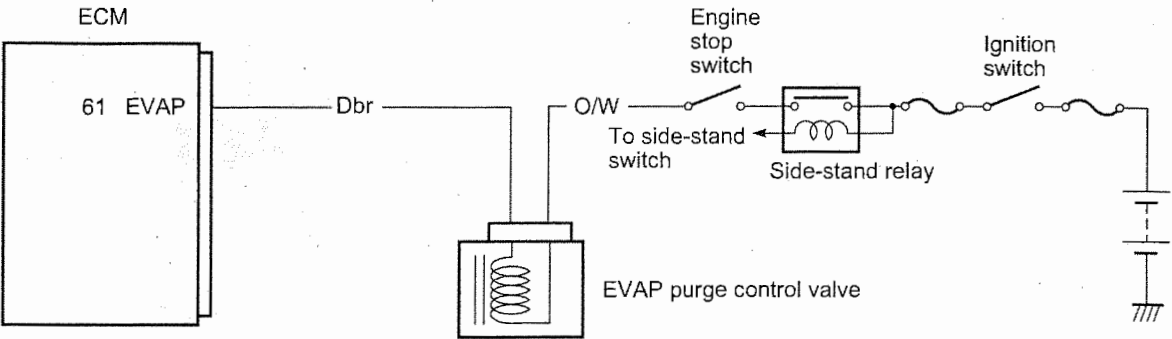
DTC “C62” (P0443): EVAP System Purge Control Solenoid Valve Circuit Malfunction (E-33 only)

BENB15J21104032

Detected Condition and Possible Cause

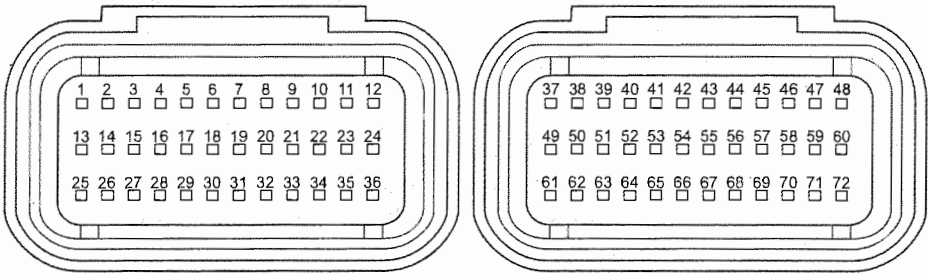
Detected Condition	Possible Cause
EVAP system purge control valve voltage is not input to ECM.	<ul style="list-style-type: none">• EVAP system purge control valve circuit open or short.• EVAP system purge control valve malfunction.• ECM malfunction.

Wiring Diagram



I837H1110113-01

ECM coupler (Harness side)



I837H1110007-02

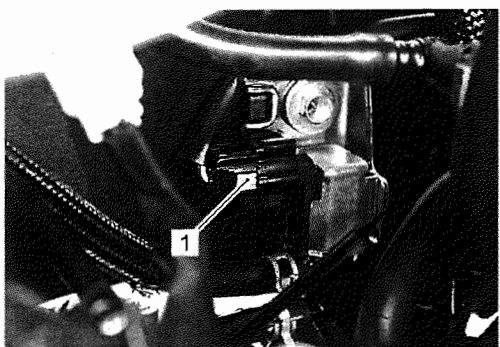
Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the EVAP system purge control valve coupler (1) for loose or poor contacts. If OK, then measure the EVAP system purge control valve resistance.



IB14J1110128-01

- 4) Disconnect the EVAP system purge control valve coupler.
- 5) Measure the resistance between terminals.

Special tool

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

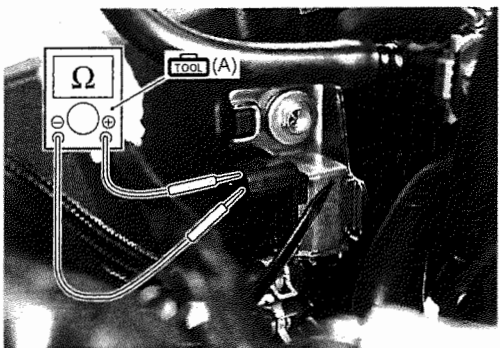
Tester knob indication

Resistance (Ω)

EVAP system purge control valve resistance

Approx. 32Ω at 20°C (68°F)

(Terminal – Terminal)



IB14J1110129-01

Is the resistance OK?

- Yes Go to Step 2.
- No Replace the EVAP system purge control with a new one. Refer to "Evaporative Emission Control System Removal and Installation (Only for E-33)" in Section 1B (Page 1B-13).

Step 2

- 1) Turn the ignition switch ON.
- 2) Measure the voltage between the O/W wire and ground.

Special tool

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

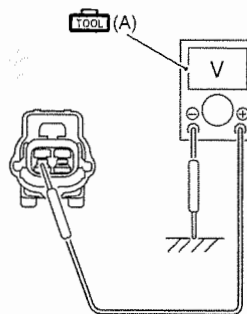
Tester knob indication

Voltage (V)

EVAP system purge control valve voltage

Battery voltage

((+) terminal: O/W – (–) terminal: Ground)



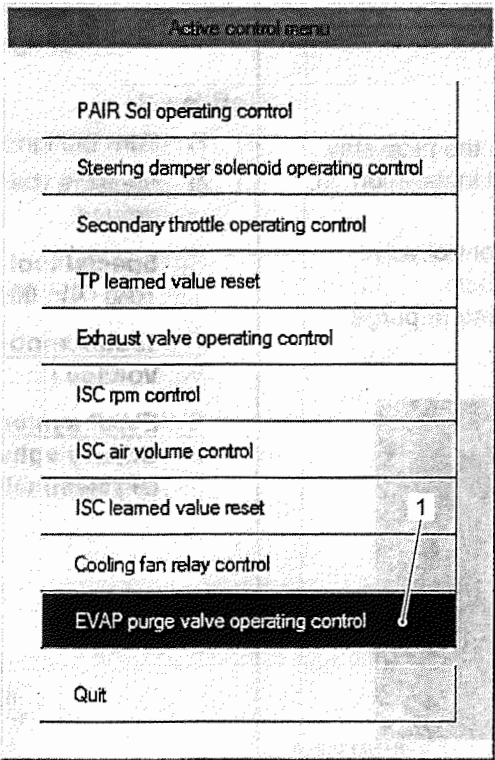
I718H2110003-01

Is the voltage OK?

- Yes
- Dbr wire open or shorted to ground, or poor "61" connection failure.
 - If wire and connection are OK, intermittent trouble or faulty ECM.
 - Recheck each terminal and wire harness for open circuit and poor connection.
 - Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Open or short circuit in the O/W wire.

Active Control Inspection

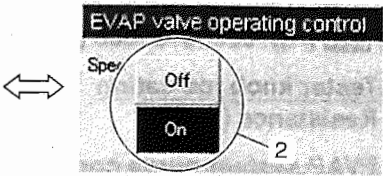
- 1) Set up the SDS tool. (Refer to SDS operation manual for further details.)
- 2) Turn the ignition switch ON.
- 3) Click “EVAP purge valve operating control” (1).



IB14J1110141-01

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

<input type="checkbox"/> Engine speed	0	rpm
<input type="checkbox"/> Engine coolant / oil temperature	25.8	°C
<input type="checkbox"/> EVAP purge valve	On	
<input type="checkbox"/> Manifold absolute pressure 1	100.3	kPa
<input type="checkbox"/> Intake air temperature	25.8	°C



I823H1110219-01

DTC "C65" (P0506/P0507): Idle Speed Malfunction

BENB15J21104035

Detected Condition and Possible Cause

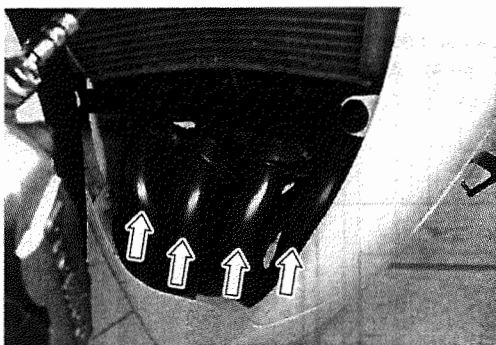
	Detected Condition	Possible Cause
C65/P0506	Idle speed dropped lower than desired idle speed by more than specified range.	<ul style="list-style-type: none"> • Air passage clogged. • ISC valve is fixed.
C65/P0507	Idle speed rose higher than desired idle speed by more than specified range.	<ul style="list-style-type: none"> • Idle speed malfunction. • Air leakage.

Troubleshooting**NOTE**

- **Be careful not to disconnect the ISC valve coupler at least 5 seconds after ignition switch is turned to OFF.**
If the ECM coupler or ISC valve coupler is disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual valve being written in the ECM and causing an error of ISC valve operation.
- After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Run the engine at idle speed.
- 2) By spraying water to exhaust pipes from #1 to #4, check evaporation from each of them to make sure for equal combustion among cylinders.



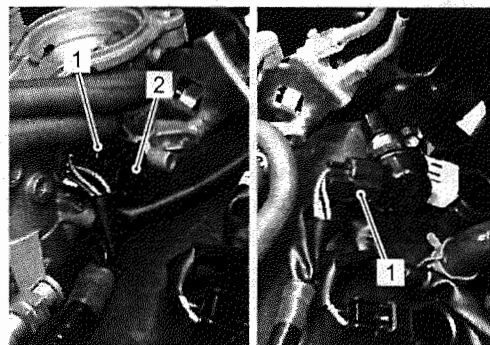
IB14J1110147-01

Is check result OK?

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

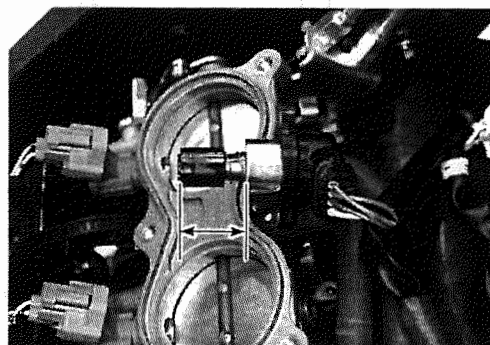
Step 2

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Connect the ECM couplers.
- 4) Disconnect the ISC valve coupler (1) and remove the ISC valve (2). Refer to "ISC Valve Removal and Installation" in Section 1C (Page 1C-8).
- 5) Connect the ISC valve coupler (1).



IB14J1110148-01

- 6) Turn the ignition switch ON and then OFF again.
- 7) While performing above step 6), check that the ISC valve moves from fully open position to fully closed position.



IB14J1110149-01

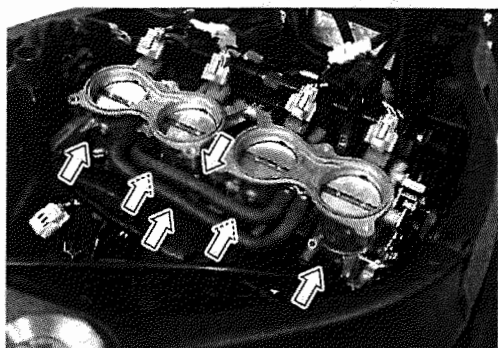
- 8) Execute ISC Valve Learned Preset and Opening Initialization. Refer to "ISC Valve Learned Preset and Opening Initialization" in Section 1C (Page 1C-8).

Is check result OK?

- Yes Go to Step 3.
No Replace the ISC valve with a new one.
Refer to "ISC Valve Removal and Installation" in Section 1C (Page 1C-8).

Step 3

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



IB14J1110150-01

Is check result OK?

- Yes Go to Step 4.
- No Repair or replace defective parts.

Step 4

- 1) Check the following points related to engine mechanical system.
 - Engine compression. Refer to "Compression Pressure Check" in Section 1D (Page 1D-3).
 - Fuel pressure. Refer to "Fuel Pressure Inspection" in Section 1G (Page 1G-5).

Is check result OK?

- Yes Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- No Repair or replace defective parts.

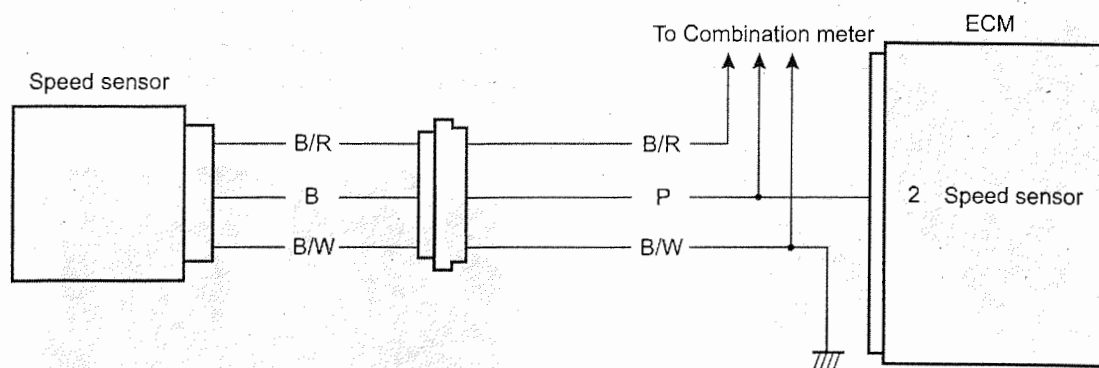
DTC "C91" (P0500): Vehicle Speed Sensor Circuit Malfunction

BENB15J21104033

Detected Condition and Possible Cause

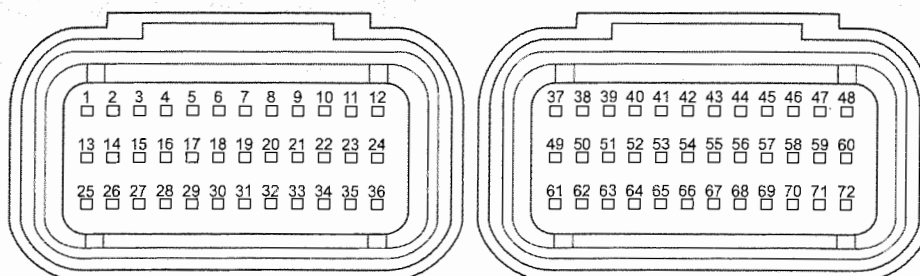
Detected Condition	Possible Cause
Combination meter does not receive signal from the vehicle speed sensor for more than 6 sec. when the motorcycle is running. ECM does not receive signal from the vehicle speed sensor for more than 6 sec. when the motorcycle is running. Failure in communication between ECM and combination meter with reference to vehicle speed.	<ul style="list-style-type: none"> • Speed sensor circuit open or short. • Speed sensor malfunction. • Combination meter malfunction. • ECM malfunction.

Wiring Diagram



IB14J1110140-01

ECM coupler (Harness side)



IB37H1110007-02

Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Check the speed sensor coupler (1) for loose or poor contacts.
If OK, remove the speed sensor. Refer to "Speed Sensor Removal and Installation" in Section 9C (Page 9C-6).



IB14J1110130-01

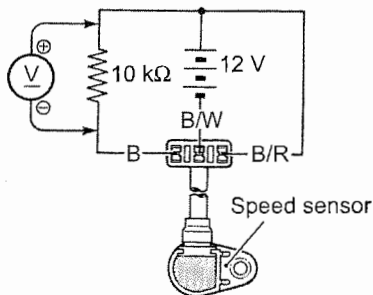
- 4) Connect 12 V battery, 10 k Ω resistor and the multi circuit tester as shown in the figure.

Special tool

 : 09900-25008 (Multi circuit tester set)

Tester knob indication

Voltage (---)

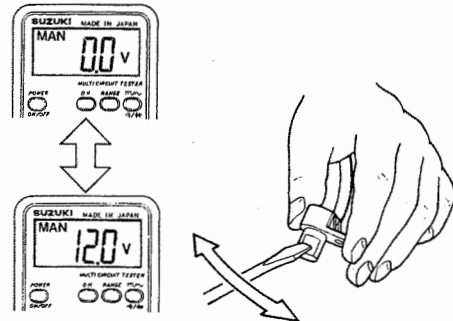


IB37H1110118-01

- 5) Under this condition, if a suitable screwdriver touching the pick-up surface of the speed sensor is moved, the tester reading voltage changes (0 V \rightarrow 12 V or 12 V \rightarrow 0 V). If the tester reading voltage does not change, replace the speed sensor with a new one.

NOTE

While testing, the highest voltage reading should be the same as the battery voltage (12 V).



IB37H1110119-01

Is the voltage OK?

- | | |
|-----|---|
| Yes | <ul style="list-style-type: none"> • P wire open or shorted to ground. • Loose or poor contacts on the speed sensor coupler or ECM coupler (terminal "2"). • If wires and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. |
| No | <ul style="list-style-type: none"> • Inspect that metal particles or foreign material stuck on the speed sensor and rotor tip. • If there are no metal particles and foreign material, then replace the speed sensor with a new one. |

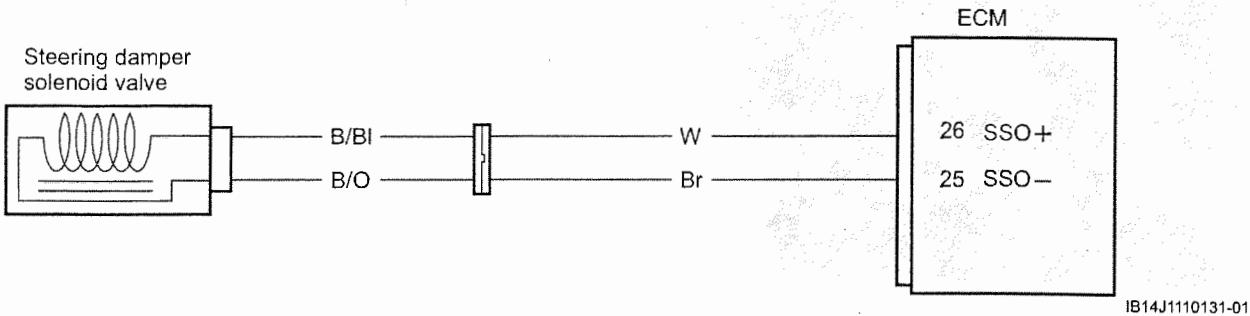
DTC “C93” (P1769-H/L): Steering Damper Solenoid Valve Circuit Malfunction

BENB15J21104034

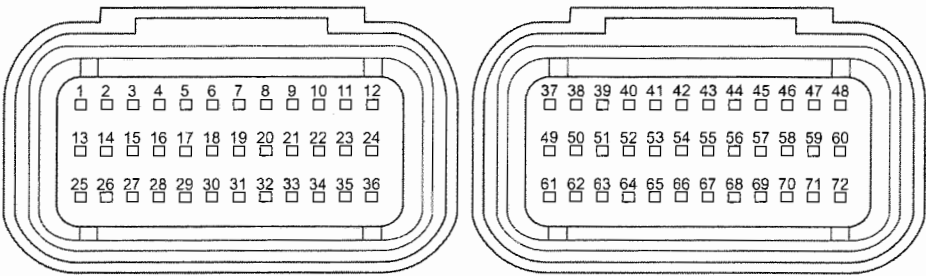
Detected Condition and Possible Cause

Detected Condition		Possible Cause
C93	Steering damper control current does not flow to the solenoid valve. With IG turned ON, ECM detects a failure of internal circuit element. Solenoid current does not converge to the target value. Battery voltage is 10 V or below with the engine running.	<ul style="list-style-type: none">Steering damper solenoid valve circuit interrupter element shorted.Feedback current convergence failure.Low battery voltage.ECM malfunction.
P1769	H Steering damper control current is higher than specified value. An abnormal current is detected during the vehicle standstill. Solenoid current is 0.7 A or above.	<ul style="list-style-type: none">Steering damper solenoid valve circuit shorted to VCC.
	L Steering damper control current is lower than specified value. With IG turned ON, ECM detects a discontinuity. An abnormal current is detected during the vehicle standstill.	<ul style="list-style-type: none">Steering damper solenoid valve circuit open.Steering damper solenoid valve circuit shorted.

Wiring Diagram



ECM coupler (Harness side)



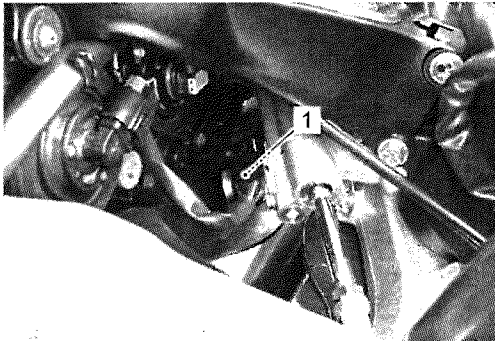
Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures" (Page 1A-14).

Step 1

- 1) Turn the ignition switch OFF.
- 2) Check the steering damper solenoid valve coupler (1) for loose or poor contacts.
If OK, then measure the steering damper solenoid valve resistance.



IB37H1110166-01

- 3) Disconnect the steering damper solenoid valve coupler.
- 4) Measure the steering damper solenoid valve resistance.

Special tool

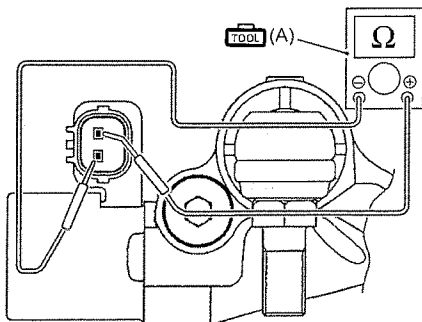
TOOL (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Resistance (Ω)

Steering damper solenoid valve resistance

Approx. 12.5 Ω at 20 °C (68 °F)



IB37H1110121-01

Is the resistance OK?

- | | |
|-----|---|
| Yes | Go to Step 2. |
| No | Replace the steering damper with a new one. |

Step 2

- 1) Turn the ignition switch ON.
- 2) Measure the voltage between B/BI wire and ground.

Special tool

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

TOOL (B): 09900-25009 (Needle-point probe set)

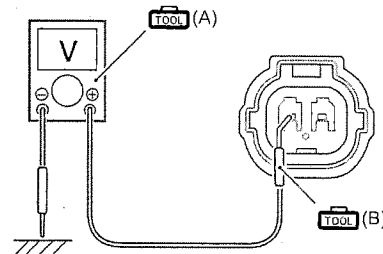
Tester knob indication

Voltage (V)

Steering damper solenoid valve voltage

Approx. 10 V when battery is fully charged condition

((+) terminal: B/BI – (–) terminal: Ground)



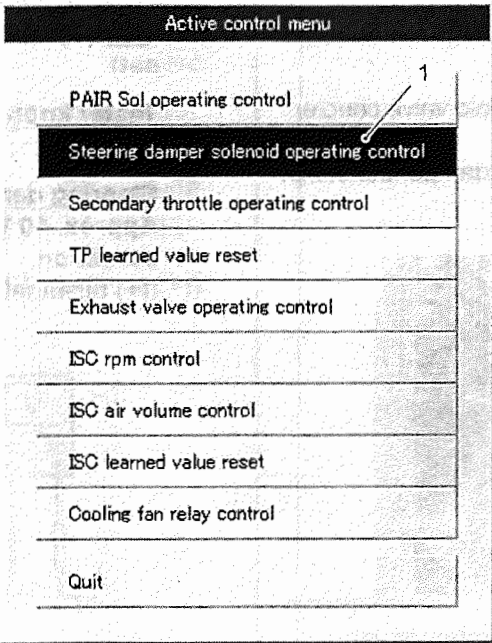
IB14J1110132-01

Is the voltage OK?

- | | |
|-----|---|
| Yes | <ul style="list-style-type: none"> • B/BI (W) wire shorted to VCC, or poor "26" connection failure. • B/O (Br) wire open or shorted to ground, or poor "25" connection failure. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. |
| No | <ul style="list-style-type: none"> • Low battery voltage or fuse is blown. • B/BI (W) wire open or shorted to ground, or poor "26" connection failure. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. |

Active Control Inspection

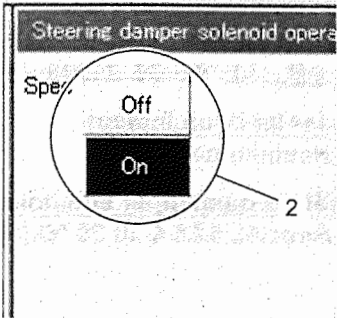
- 1) Set up the SDS tool. (Refer to SDS operation manual for further details.)
- 2) Raise the front wheel off the ground.
- 3) Turn the ignition switch ON.
- 4) Click "Steering damper solenoid operating control" (1).



IB14J1110133-01

- 5) Click each button (2) ON/OFF while turning the handlebars left and right.

<input checked="" type="checkbox"/> Engine speed	0	rpm
<input type="checkbox"/> Steering damper solenoid ampere	0.5	A
<input type="checkbox"/> Throttle position	27.9	°



IB14J1110134-01

NOTE
At this time, if the steering damping resistance changes from light to heavy by switching ON/OFF, the function is normal.

Specifications

Service Data

BENB15J21107001

Injector + Fuel Pump + Fuel Pressure Regulator

Item	Specification	Note
Injector resistance	Approx. 12 Ω at 20 °C (68 °F)	

FI Sensors

Item	Standard/Specification		Note
CKP sensor resistance	Approx. 168 Ω		
CKP sensor peak voltage	0.28 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.7 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	1.02 – 1.22 V	
	Opened	4.34 – 4.54 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor output voltage	0.15 – 4.85 V		
ECT sensor resistance	Approx. 2.45 k Ω at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	0.15 – 4.85 V		
IAT sensor resistance	Approx. 2.58 k Ω at 20 °C (68 °F)		
AP sensor input voltage	4.5 – 5.5 V		
AP sensor output voltage	Approx. 3.6 V at 100 kPa (760 mmHg)		
TO sensor resistance	Approx. 19.4 k Ω at 20 °C (68 °F)		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	80 V and more		When cranking
HO2 sensor output voltage	0.4 V and less at idle speed		
	0.6 V and more at 5 000 r/min		
HO2 sensor heater resistance	6.7 – 9.5 Ω at 23 °C (73 °F)		
PAIR control solenoid valve resistance	20 – 24 Ω at 20 – 30 °C (68 – 86 °F)		
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	0.52 – 0.72 V	
	Opened	4.12 – 4.32 V	
STVA resistance	Approx. 6.5 Ω		
EXCVA position sensor input voltage	4.5 – 5.5 V		
EXCVA position sensor output voltage	Closed	0.45 – 1.4 V	
	Opened	3.6 – 4.55 V	
EXCVA position sensor resistance	Approx. 3.1 k Ω		At adjustment position
EVAP system purge control solenoid valve resistance	Approx. 32 Ω at 20 °C (68 °F)		E-33 only
ISC valve resistance	Approx. 20 Ω at 20 °C (68 °F)		
Steering damper solenoid valve resistance	Approx. 12.5 Ω at 20 °C (68 °F)		
Steering damper solenoid valve voltage	Approx. 10 V		When battery fully charged

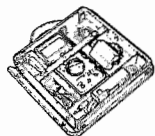
Special Tools and Equipment

Special Tool

BENB15J21108001

09900-25008

Multi circuit tester set



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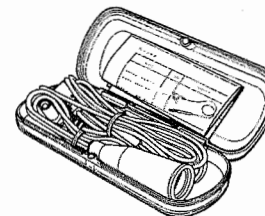
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09900-25009

Needle-point probe set



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<p>09900-28630 TP Sensor test lead ☞ (Page 1A-40)</p>	<p>09904-41010 SUZUKI Diagnostic system set ☞ (Page 1A-13) / ☞ (Page 1A-16)</p>
<p>09917-47011 Vacuum pump gauge set ☞ (Page 1A-36) / ☞ (Page 1A-52)</p>	<p>09930-82720 Mode selection switch ☞ (Page 1A-4) / ☞ (Page 1A-12) / ☞ (Page 1A-12)</p>
<p>99565-01010-023 CD-ROM Ver.23 ☞ (Page 1A-13) / ☞ (Page 1A-16)</p>	

Emission Control Devices

Precautions

Precautions for Emission Control Devices

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

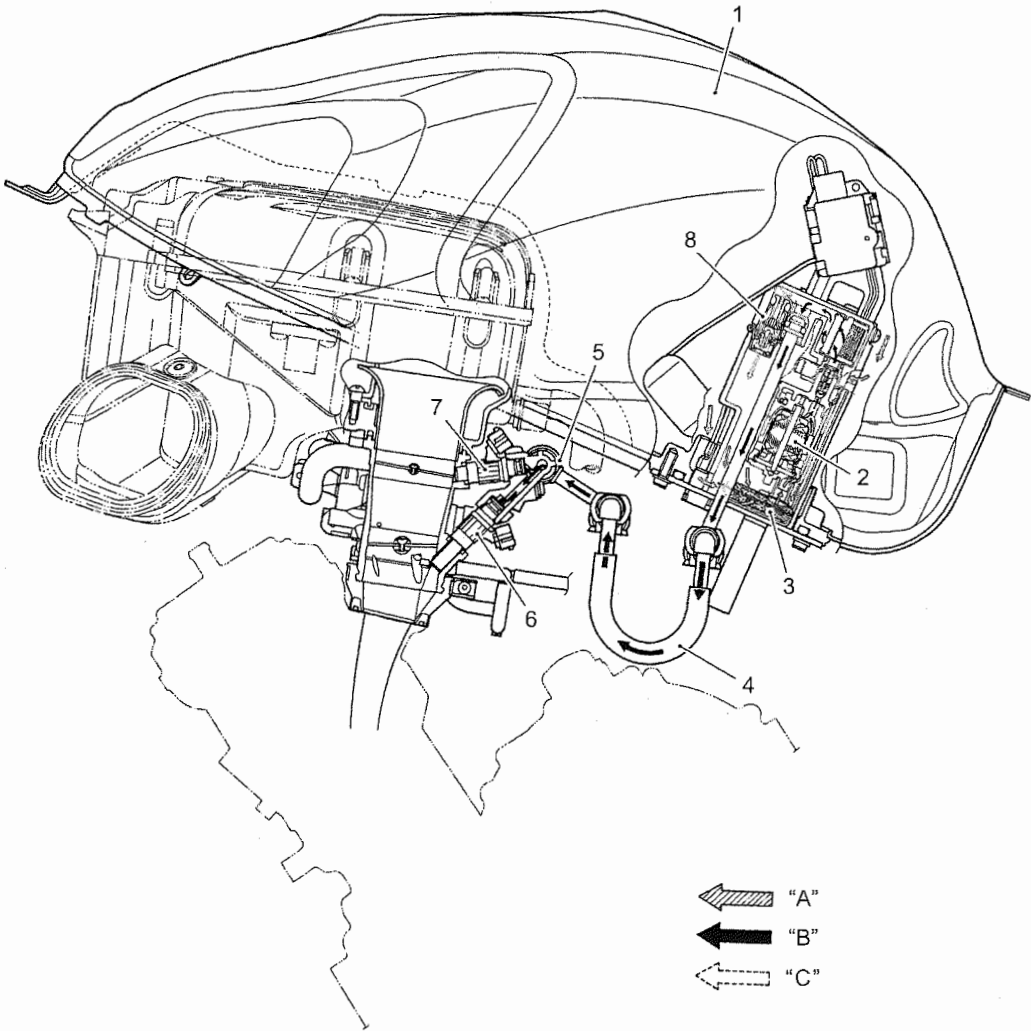
BENB15J21200001

General Description

Fuel Injection System Description

BENB15J21201001

GSX-R750 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.



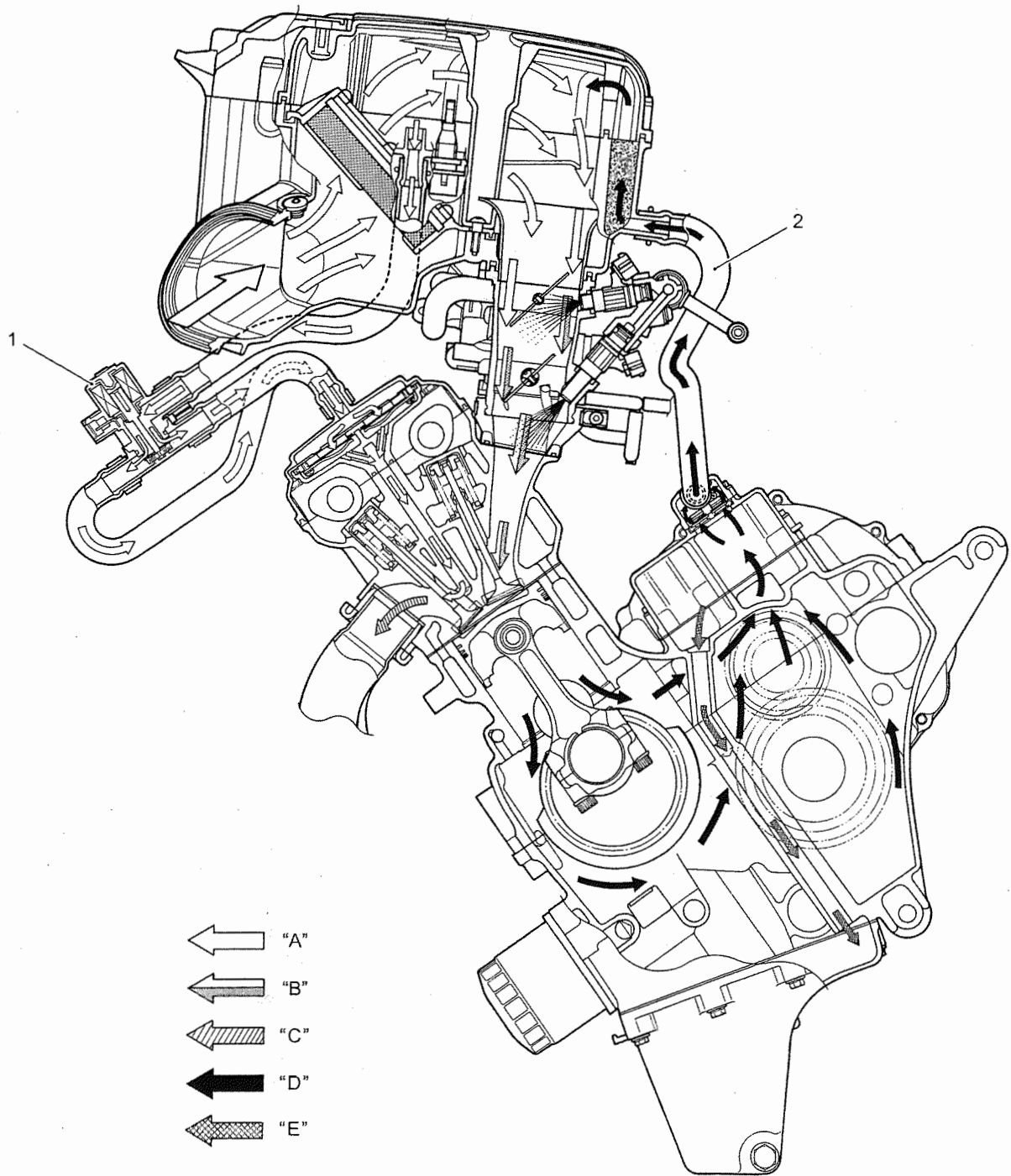
1. Fuel tank	4. Fuel feed hose	7. Secondary fuel injector	"B": Pressurized fuel
2. Fuel pump	5. Fuel delivery pipe	8. Fuel pressure regulator	"C": Relieved fuel
3. Fuel mesh filter	6. Primary fuel injector	"A": Before-pressurized fuel	

IB14J1120033-01

Crankcase Emission Control System Description

BENB15J21201002

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



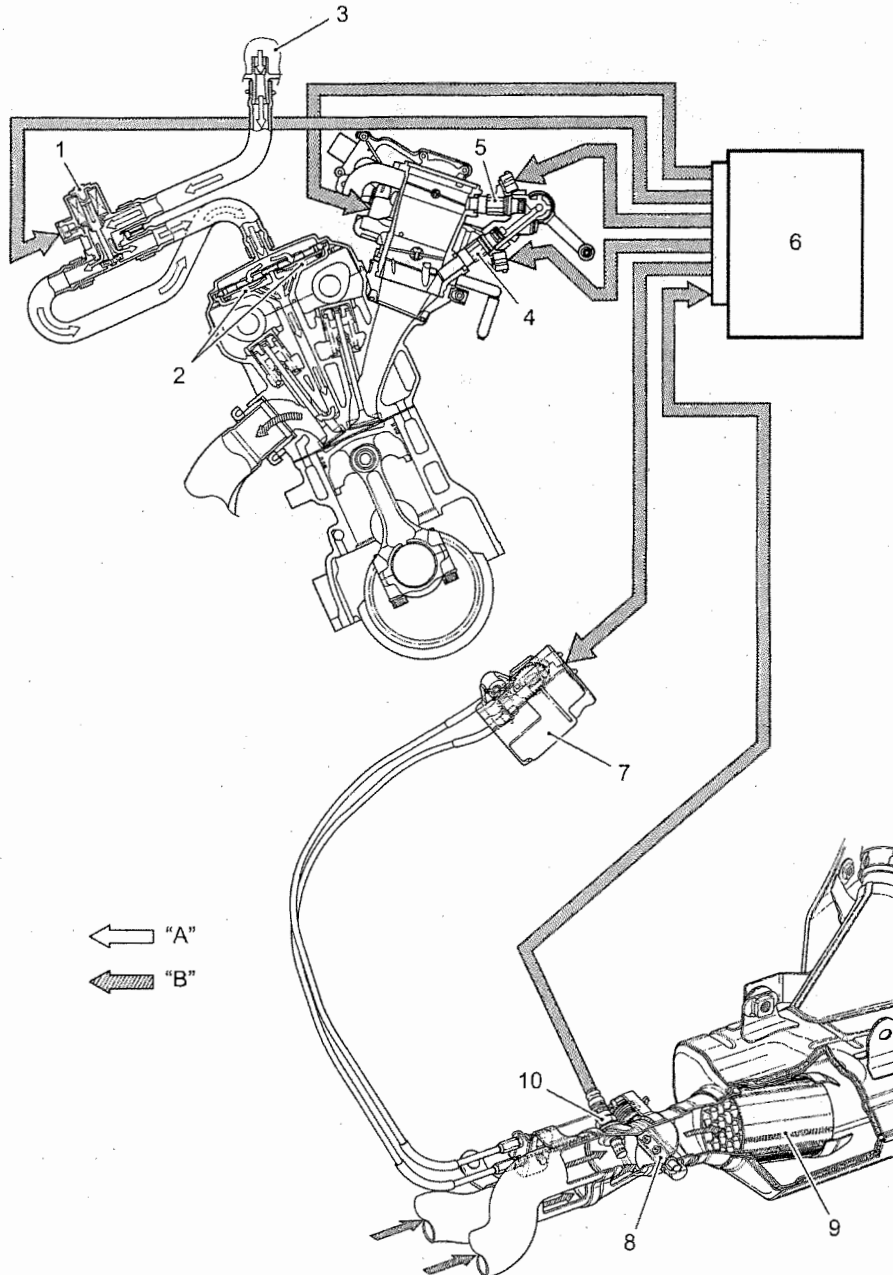
IB14J1120034-01

1. PAIR control solenoid valve	"A": Fresh air	"C": Exhaust gas	"E": Return oil
2. PCV hose	"B": Fuel/Air mixture	"D": Blow-by gas	

Exhaust Emission Control System Description

BENB15J21201003

The exhaust emission control system is composed of the PAIR system, exhaust control system, HO2 sensor, three-way catalyst system and ISC system. The fresh air is drawn into the exhaust port through the PAIR control solenoid valve and PAIR reed valve. The PAIR control solenoid valve is operated by the ECM, which is controlled according to the signals from TPS, ECTS, IAPS and CKPS. The exhaust gas flow is performed by the exhaust control valve actuator which is controlled by the ECM by changing the exhaust control valve angle. ISC valve adjusts the bypass air volume of the throttle body to control engine idling speed with various sensor signals by varying engine running conditions.



IB14J1120035-01

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

Noise Emission Control System Description

BENB15J21201004

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

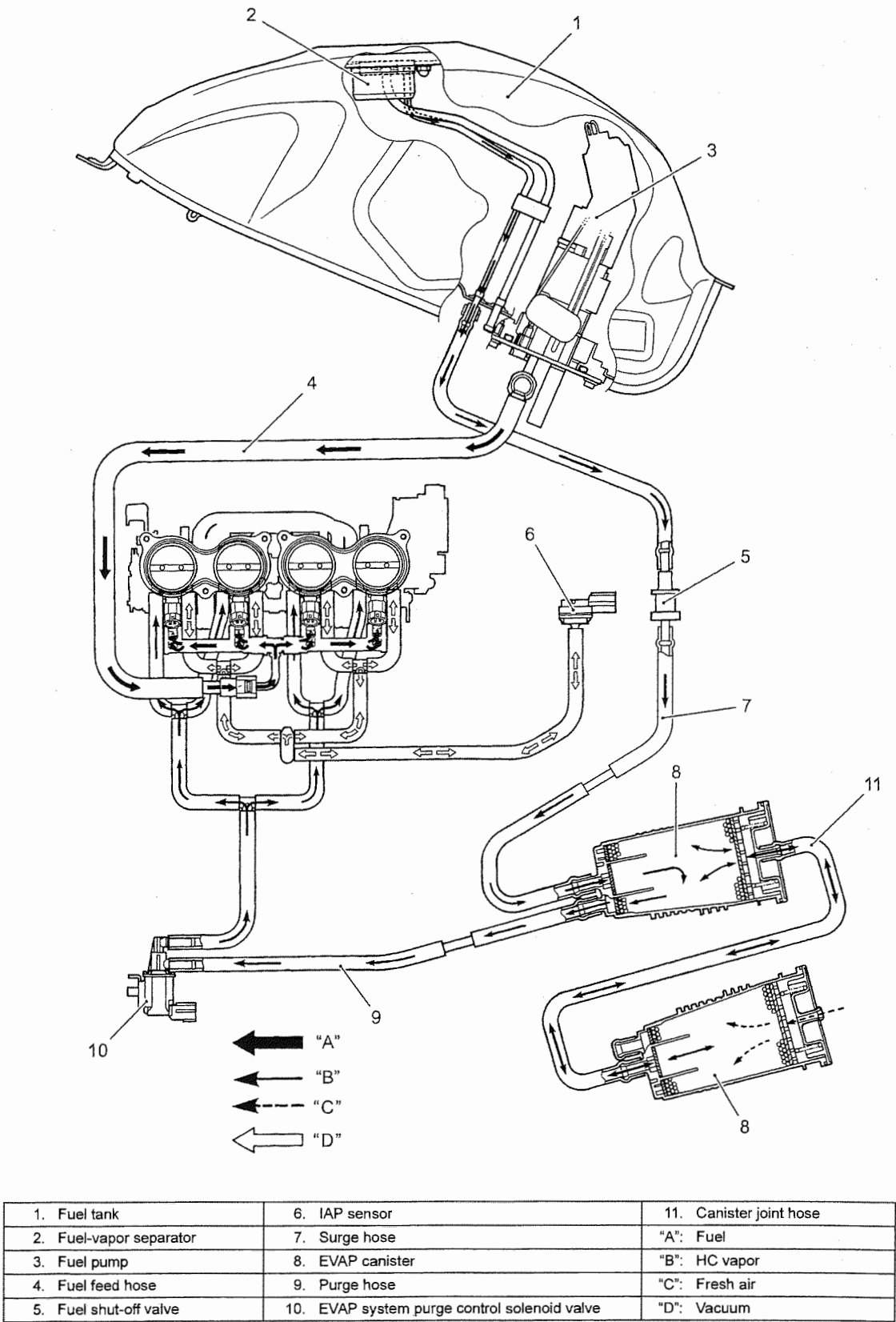
- The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or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

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

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

Evaporative Emission Control System Diagram (Only for E-33)

BENB15J21201005

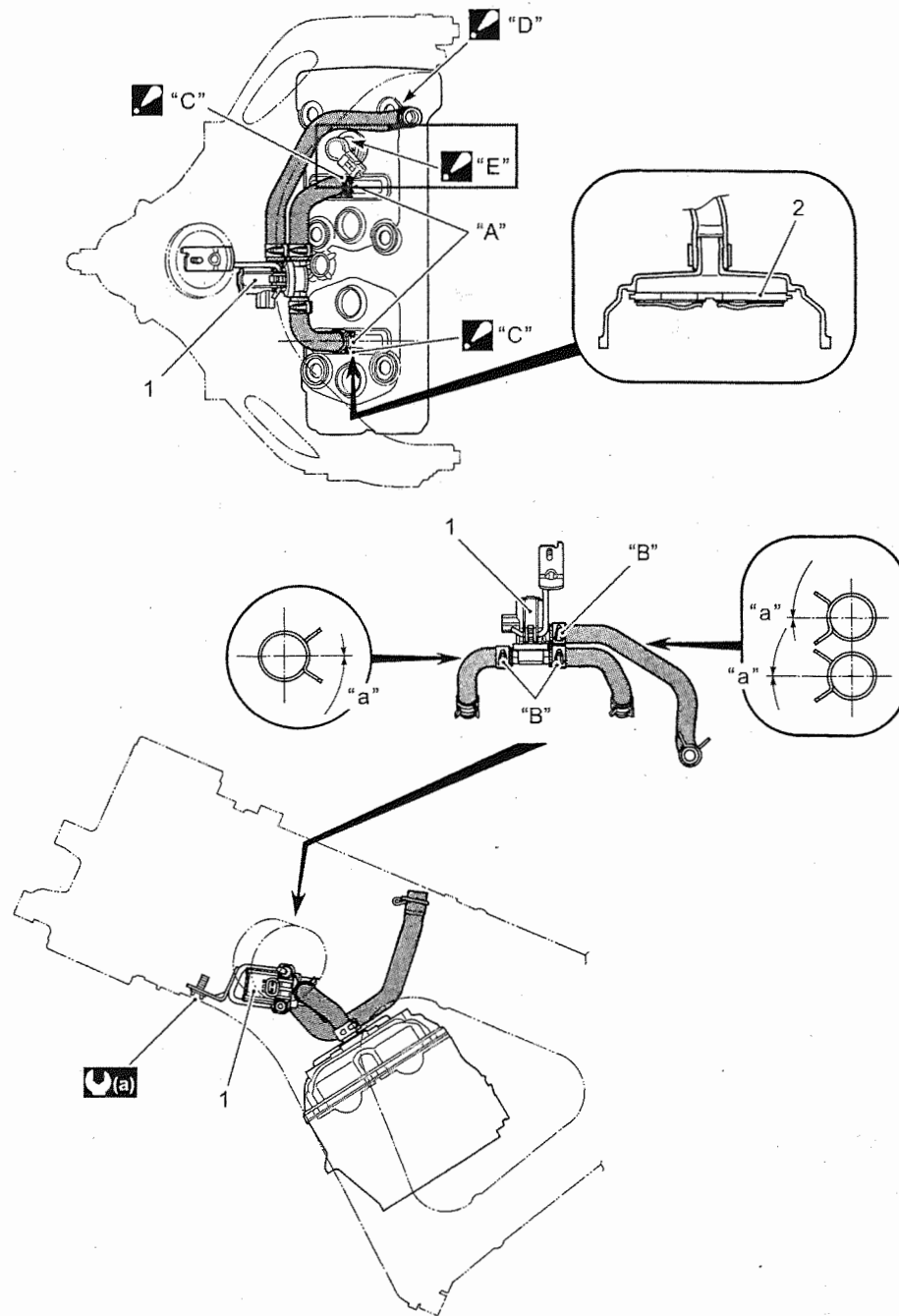


IB14J1120036-07

Schematic and Routing Diagram

PAIR System Hose Routing Diagram

BENB15J21202001

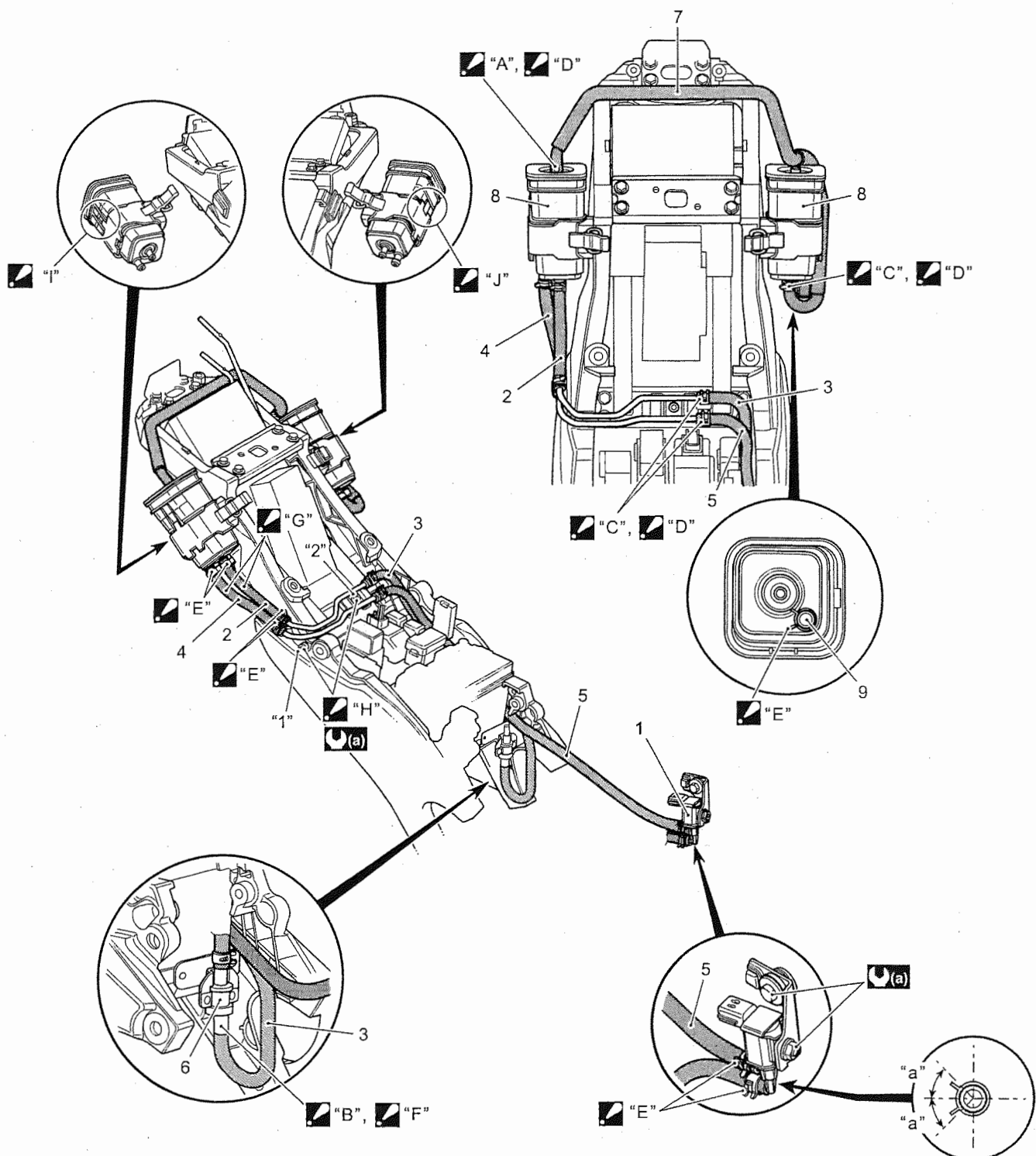


IB14J1120042-02

1. PAIR control solenoid valve	"B": Yellow marking	"E": Don't be PAIR hose on ignition coil/plug cap #4 and the coupler.
2. PAIR reed valve	"C": Face the clamp end backward.	"a": Approx. 0°
"A": White marking	"D": Make sure the clamp is not contacted to the frame or air cleaner box. Face the clamp end forward.	(a) : 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

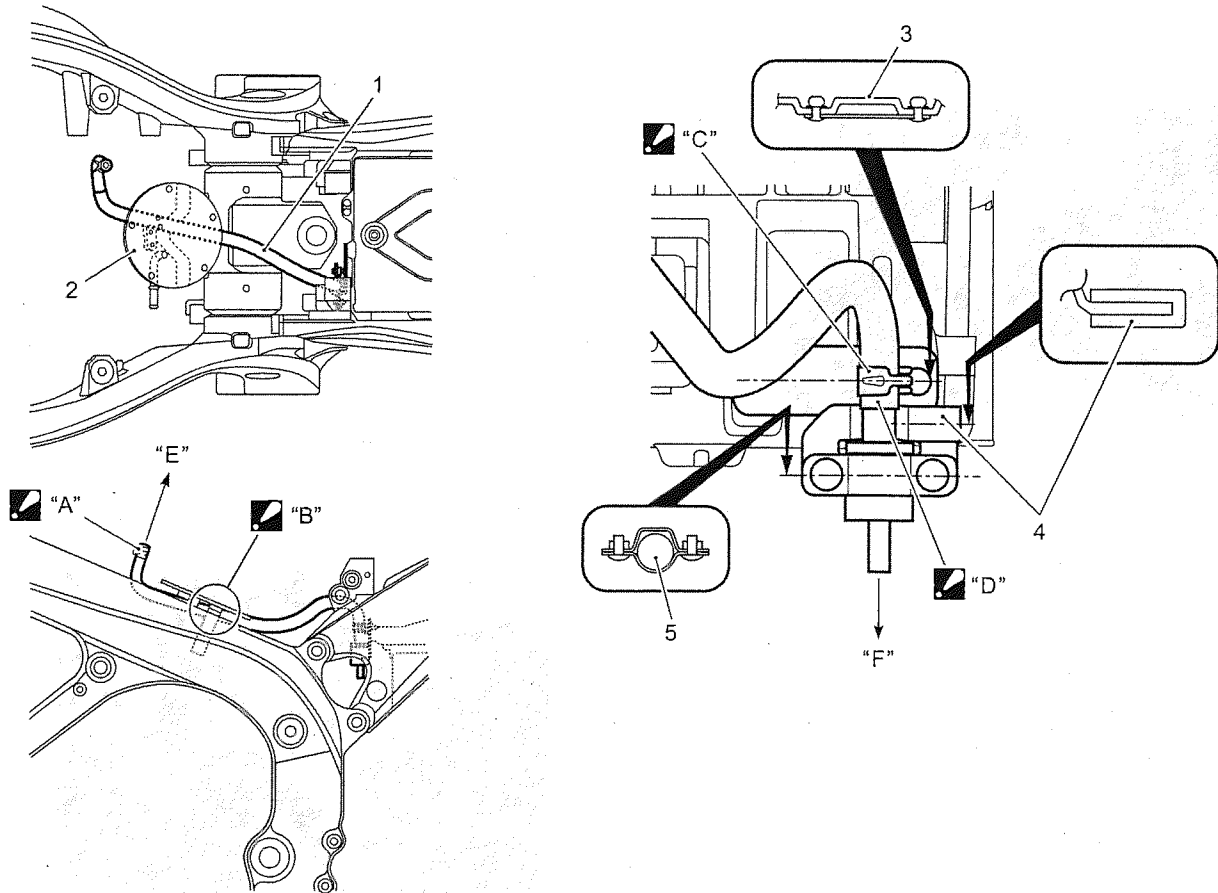
EVAP Canister Hose Routing Diagram (Only for E-33)

BENB15J21202002



IB14J1120038-06

1. EVAP system purge control solenoid valve	8. EVAP canister	☐ "F": Face the clamp end forward.
2. Surge hose No. 1 (White stripe)	9. Canister cap	☐ "G": Connect the expand side of hoses to the EVAP canister.
3. Surge hose No. 2 (White stripe)	☐ "A": White marking must face upward.	☐ "H": Tighten the bolts to the specified torque in order of "1" → "2".
4. Purge hose No. 1	☐ "B": White marking must face forward.	☐ "I": Match the boss of holder and slit of EVAP canister.
5. Purge hose No. 2	☐ "C": Yellow marking must face upward.	☐ "J": Match the slit of holder and boss of EVAP canister.
6. Fuel shut-off valve	☐ "D": Face the clamp end upward.	"a": 45°
7. Canister joint hose	☐ "E": Face the clamp end right side.	☐ (a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1120039-03

1. Fuel tank breather hose	5. Fuel shaft-off valve	☑ "D": White marking must face forward.
2. Fuel pump	☑ "A": Face the clamp end forward.	"E": To fuel tank
3. Rear fender	☑ "B": Pass the fuel tank breather hose into the fuel pump guard.	"F": To surge hose No. 2
4. Cushion	☑ "C": Face the clamp end left side.	

Repair Instructions

Heated Oxygen Sensor (HO2S) Removal and Installation

BENB15J21206001

Removal

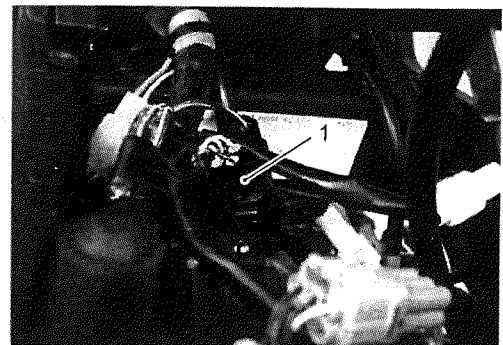
⚠ WARNING

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 wires.

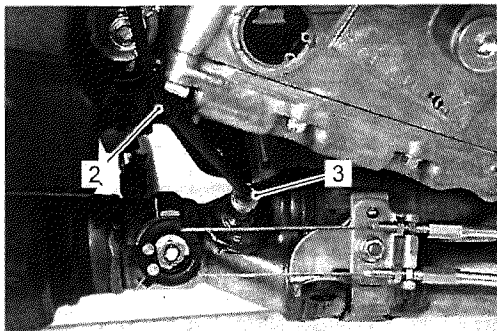
- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Disconnect the HO2 sensor coupler (1).



IB14J1120001-02

1B-9 Emission Control Devices:

- 4) Release the HO2 sensor lead wire from the clamp (2).
- 5) Remove the HO2 sensor (3).



IB14J1120002-02

Installation

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

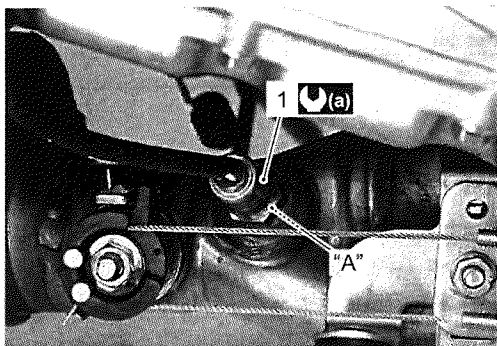
NOTICE

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

- Apply anti-seize compound to thread part "A" of HO2 sensor (1).
- Tighten the HO2 sensor (1) to the specified torque.

Tightening torque

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



IB14J1120003-01

- Route the HO2 sensor lead wire properly. Refer to "Throttle Body Construction" in Section 1D (Page 1D-11).

Heated Oxygen Sensor (HO2S) Inspection

BENB15J21206002

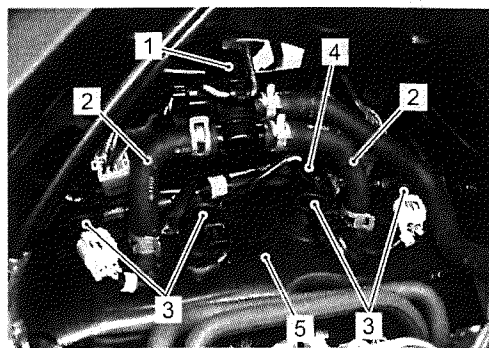
Refer to "DTC "C44" (P0130/P0135): HO2 Sensor (HO2S) Circuit Malfunction" in Section 1A (Page 1A-78).

PAIR Reed Valve Removal and Installation

BENB15J21206003

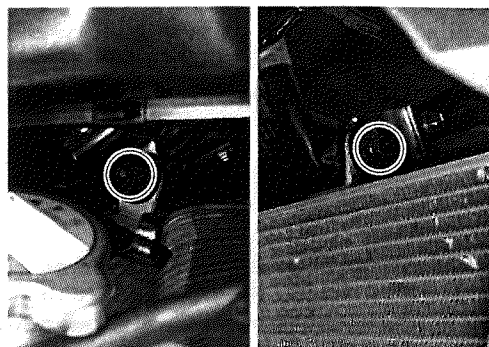
Removal

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Remove the PAIR control solenoid valve (1) and PAIR hoses (2). Refer to "PAIR Control Solenoid Valve Removal and Installation" (Page 1B-10).
- 4) Remove the ignition coil/caps (3). Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-6).
- 5) Disconnect the CMP sensor coupler (4) and remove the cylinder head cover shield (5).

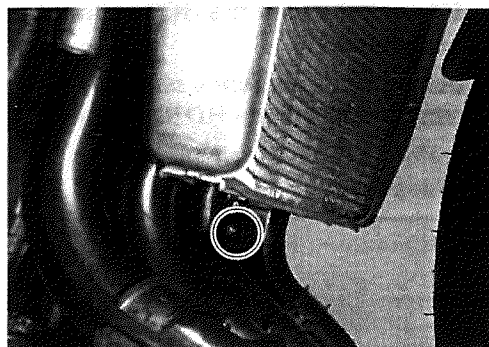


IB14J1120004-03

- 6) Remove the cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 7) Remove the radiator mounting bolts.

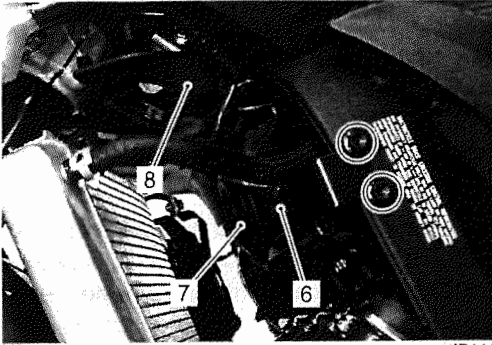


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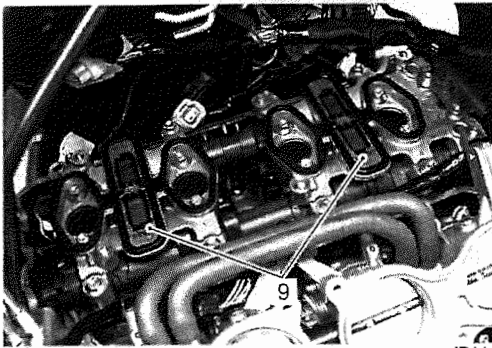
IB14J1120006-02

- 8) Move the radiator forward.
- 9) Disconnect the horn coupler (6) and remove the horn (7).
- 10) Remove the radiator heat shield (8).



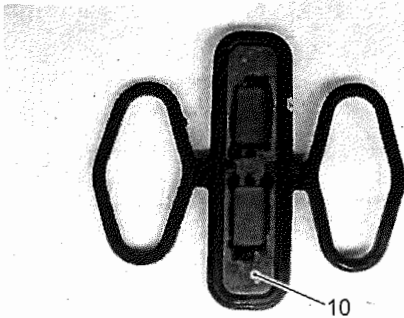
IB14J1120007-02

- 11) Remove the cylinder head cover. Refer to "Engine Top Side Disassembly" in Section 1D (Page 1D-27).
- 12) Remove the PAIR reed valves (9) along with the gaskets.



IB14J1120008-01

- 13) Remove the PAIR reed valve (10) from the gasket.



IB14J1120032-01

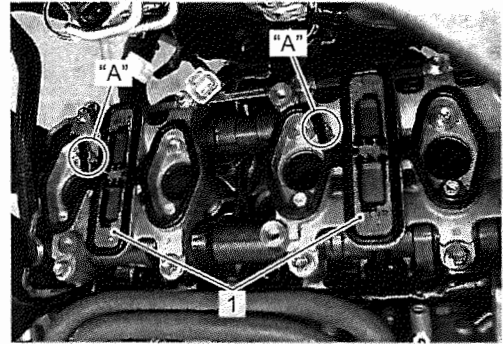
Installation

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

- Install the PAIR reed valves (1) along with the new gaskets.

NOTE

Fit the projection "A" of the gaskets to the depression of the camshaft holders.



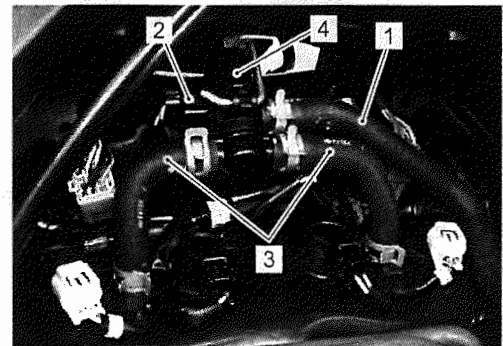
IB14J1120009-01

PAIR Control Solenoid Valve Removal and Installation

BENB15J21206004

Removal

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Remove the PAIR hose (1).
- 4) Disconnect the PAIR control solenoid valve coupler (2) and PAIR hoses (3).
- 5) Remove the PAIR control solenoid valve (4) from the bracket.



IB14J1120010-02

Installation

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

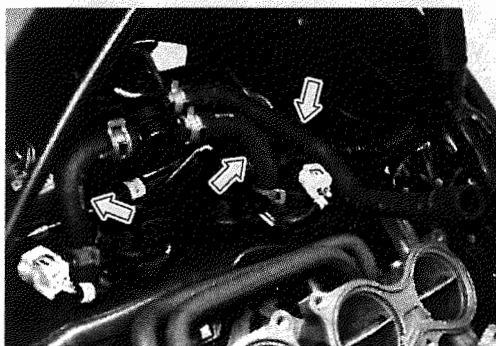
- Connect the PAIR hoses securely. Refer to "PAIR System Hose Routing Diagram" (Page 1B-6).

PAIR System Inspection

BENB15J21206005

PAIR Hose

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Inspect the PAIR hoses for wear or damage. If it is worn or damaged, replace the PAIR hose with a new one. Refer to "PAIR System Hose Routing Diagram" (Page 1B-6).

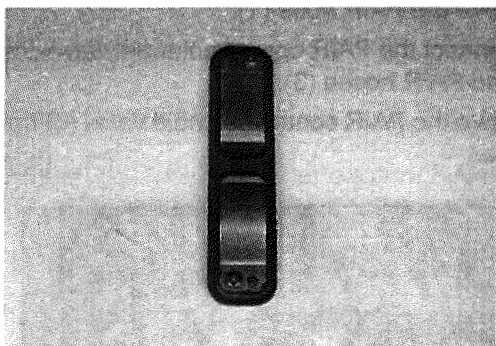


IB14J1120011-02

- 4) Reinstall the removed parts.

PAIR Reed Valve

- 1) Remove the PAIR reed valves. Refer to "PAIR Reed Valve Removal and Installation" (Page 1B-9).
- 2) Inspect the reed valves for carbon deposit. If carbon deposit is found on the reed valve, replace the PAIR reed valve with a new one.



IB37H1120013-01

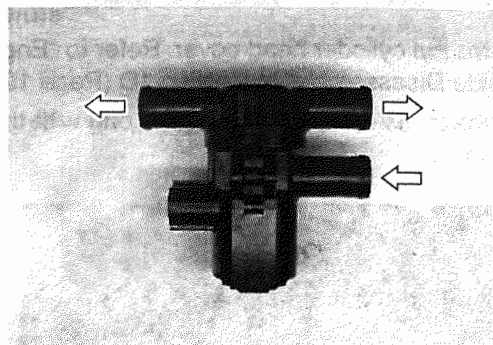
- 3) Reinstall the PAIR reed valves. Refer to "PAIR Reed Valve Removal and Installation" (Page 1B-9).

PAIR Control Solenoid Valve

NOTE

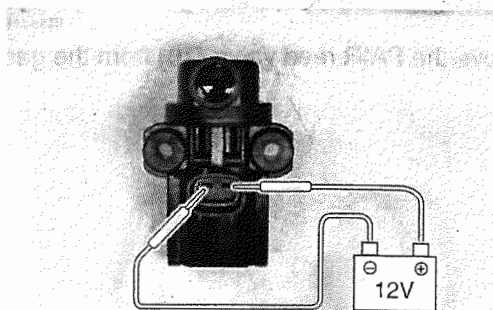
PAIR control solenoid valve can be checked without removing it from the motorcycle. Refer to "DTC "C49" (P1656): PAIR Control Solenoid Valve Circuit Malfunction" in Section 1A (Page 1A-90).

- 1) Remove the PAIR control solenoid valve. Refer to "PAIR Control Solenoid Valve Removal and Installation" (Page 1B-10).
- 2) Check that air flows through the air inlet port to the air outlet port. If air does not flow out, replace the PAIR control solenoid valve with a new one.



IB37H1120014-01

- 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.



IB37H1120015-01

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

Special tool

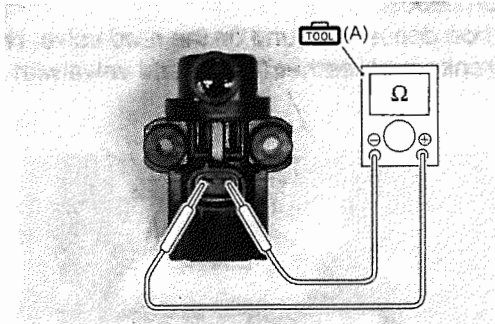
TOOL (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Resistance (Ω)

PAIR control solenoid valve resistance

20 – 24 Ω at 20 – 30 °C (68 – 86 °F)



IB37H1120016-01

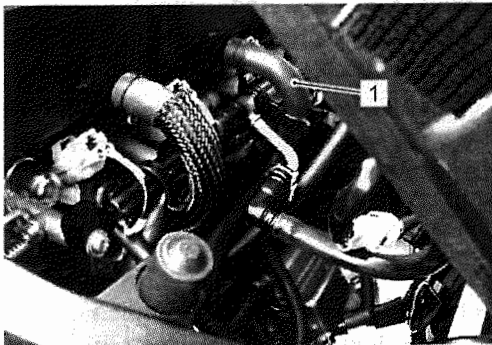
- 5) Reinstall the PAIR control solenoid valve. Refer to "PAIR Control Solenoid Valve Removal and Installation" (Page 1B-10).

Crankcase Breather (PCV) Hose Inspection

BENB15J21206006

Inspect the crankcase breather (PCV) hose in the following procedures:

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Inspect the crankcase breather (PCV) hose (1) for wear and damage.
If it is worn or damaged, replace the crankcase breather (PCV) hose with a new one.
- 3) Check that the crankcase breather (PCV) hose (1) is securely connected.



IB14J1120040-01

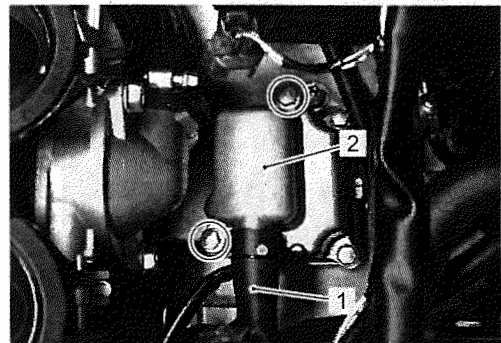
- 4) Install the removed parts.

Crankcase Breather (PCV) Hose / Reed Valve / Cover Removal and Installation

BENB15J21206007

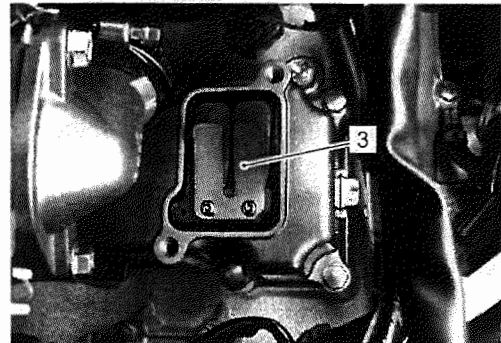
Removal

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Remove the throttle body. Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-12).
- 4) Remove the crankcase breather (PCV) hose (1).
- 5) Remove the crankcase breather (PCV) reed valve cover (2).



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- 6) Remove the crankcase breather (PCV) reed valve (3).

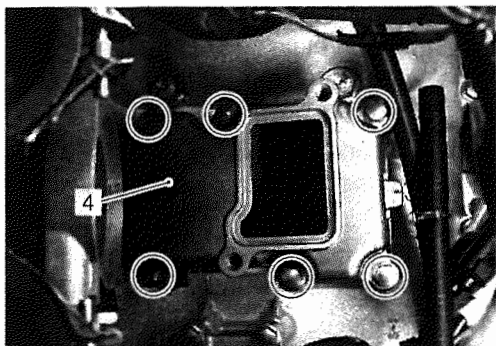


IB14J1120013-02

- 7) Remove the thermostat cover and thermostat. Refer to "Thermostat Removal and Installation" in Section 1F (Page 1F-10).

1B-13 Emission Control Devices:

- 8) Remove the crankcase breather (PCV) cover (4) and gasket.



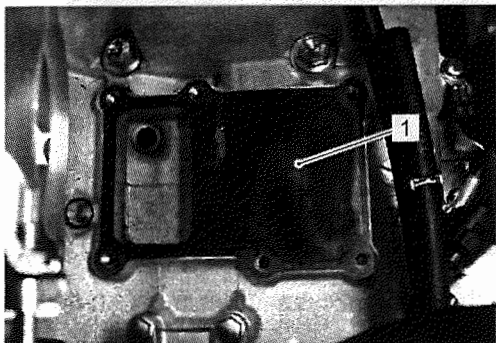
IB14J1120014-03

Installation

Installation is in the reverse order of removal.

Pay attention to the following points:

- Install a new gasket (1).



IB14J1120015-02

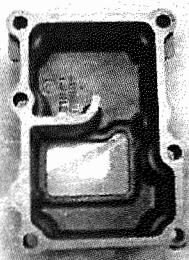
- Connect the crankcase breather (PCV) hose securely.

Crankcase Breather (PCV) Cover Inspection

BENB15J21206008

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

- 1) Remove the crankcase breather (PCV) cover. Refer to "Crankcase Breather (PCV) Hose / Reed Valve / Cover Removal and Installation" (Page 1B-12).
- 2) Inspect the crankcase breather (PCV) cover in the carbon deposit. If carbon deposit is found in the crankcase breather (PCV) cover, remove the carbon.



IB37H1120023-01

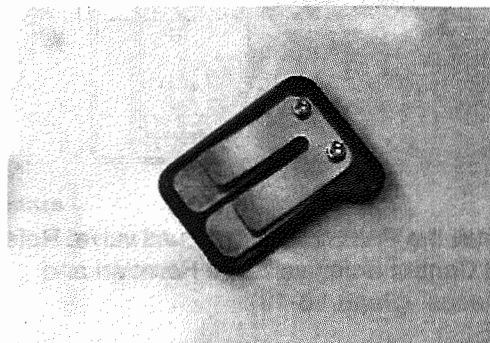
- 3) Reinstall the crankcase breather (PCV) cover. Refer to "Crankcase Breather (PCV) Hose / Reed Valve / Cover Removal and Installation" (Page 1B-12).

Crankcase Breather (PCV) Reed Valve Inspection

BENB15J21206009

Inspect the crankcase breather (PCV) reed valve in the following procedures:

- 1) Remove the crankcase breather (PCV) reed valve. Refer to "Crankcase Breather (PCV) Hose / Reed Valve / Cover Removal and Installation" (Page 1B-12).
- 2) Inspect the crankcase breather (PCV) reed valve for carbon deposit.
If carbon deposit is found on the reed valve, replace the crankcase breather (PCV) reed valve with a new one.



IB37H1120024-01

- 3) Reinstall the crankcase breather (PCV) reed valve. Refer to "Crankcase Breather (PCV) Hose / Reed Valve / Cover Removal and Installation" (Page 1B-12).

Evaporative Emission Control System Removal and Installation (Only for E-33)

BENB15J21206010

Hose

Removal

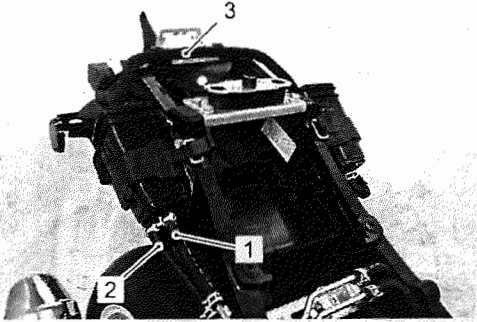
- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the frame covers and center frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Remove the EVAP hoses as shown in the EVAP canister hose routing diagram. Refer to "EVAP Canister Hose Routing Diagram (Only for E-33)" (Page 1B-7).

Installation

- 1) Install the EVAP hoses as shown in the EVAP canister hose routing diagram. Refer to "EVAP Canister Hose Routing Diagram (Only for E-33)" (Page 1B-7).
- 2) Reinstall the removed parts.

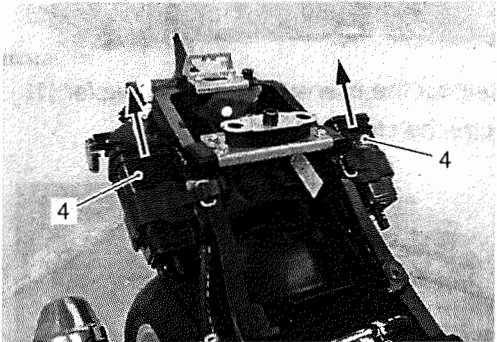
EVAP Canister Removal

- 1) Remove the frame covers and center frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Disconnect the surge hose No. 1 (1) and purge hose No. 1 (2).
- 3) Remove the canister joint hose (3).



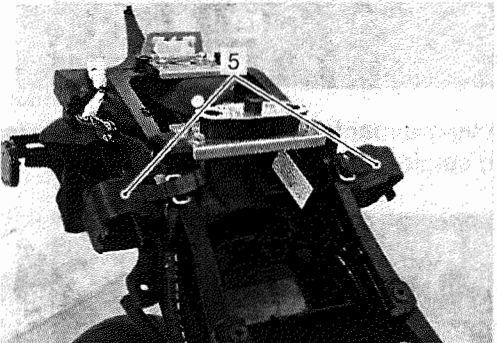
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- 4) Pull out the EVAP canisters (4).



IB14J1120017-01

- 5) Remove the canister cushions (5).



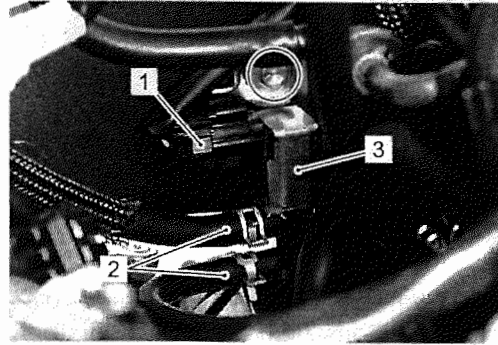
IB14J1120018-01

Installation

- 1) Install the EVAP canister as shown in the EVAP canister hose routing diagram. Refer to "EVAP Canister Hose Routing Diagram (Only for E-33)" (Page 1B-7).
- 2) Reinstall the removed parts.

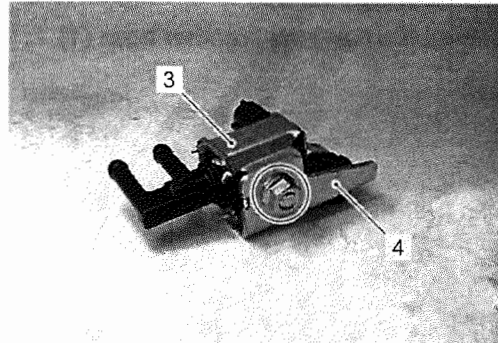
EVAP System Purge Control Solenoid Valve Removal

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Disconnect the coupler (1) and purge hoses (2).
- 3) Remove the EVAP system purge control solenoid valve (3) with the bracket.



IB14J1120019-01

- 4) Remove the bracket (4) from the EVAP system purge control solenoid valve (3).



IB14J1120020-01

Installation

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

- Tighten the EVAP system purge control solenoid valve mounting nut (1) and bracket bolt (2) to the specified torque.

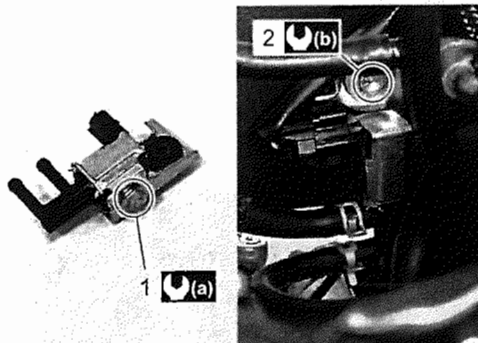
Tightening torque

EVAP system purge control solenoid valve mounting nut (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

EVAP system purge control solenoid valve bracket bolt (b): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

1B-15 Emission Control Devices:

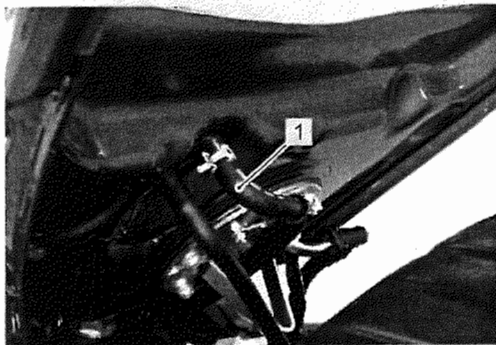
- Connect the purge hoses securely. Refer to "EVAP Canister Hose Routing Diagram (Only for E-33)" (Page 1B-7).



IB14J1120021-01

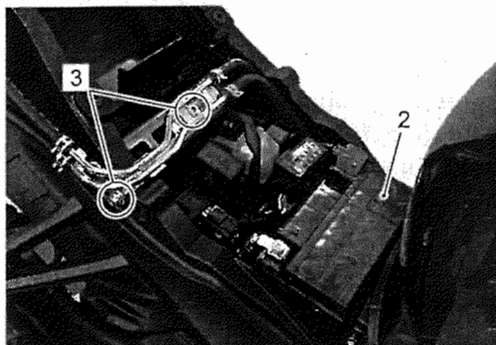
Fuel Shut-off Valve Removal

- 1) Remove the frame covers and center frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Disconnect the fuel tank breather hose (1).



IB14J1120022-01

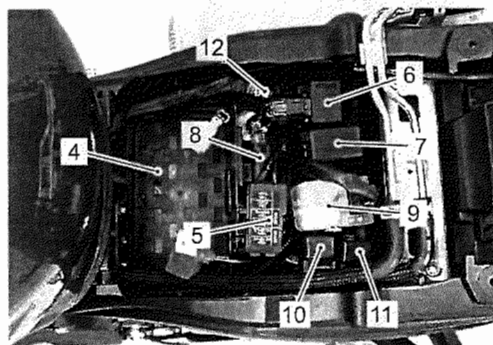
- 4) Remove the battery (2) and EVAP pipe mounting bolts (3). Refer to "Battery Removal and Installation" in Section 1J (Page 1J-13).



IB14J1120023-01

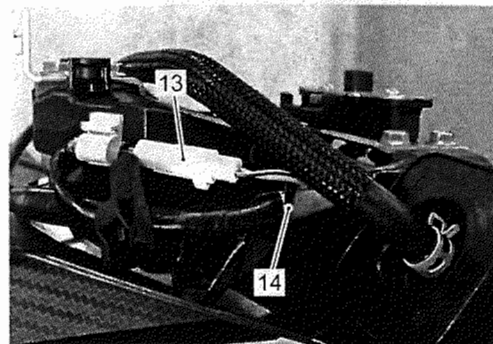
- 5) Remove the following parts from the rear fender (front).

- Battery protector (4)
- Fuse box (5)
- AP sensor (6)
- Turn signal/side-stand relay (7)
- TO sensor (8)
- Starter relay (9)
- Fuel pump relay (10)
- Cooling fan relay (11)
- Fixed clamp (12)



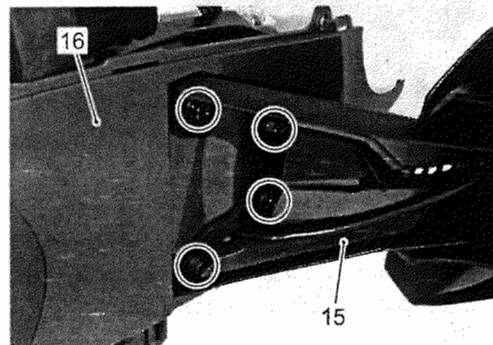
IB14J1120024-01

- 6) Disconnect the license plate light coupler (13).
- 7) Remove the clamp (14).



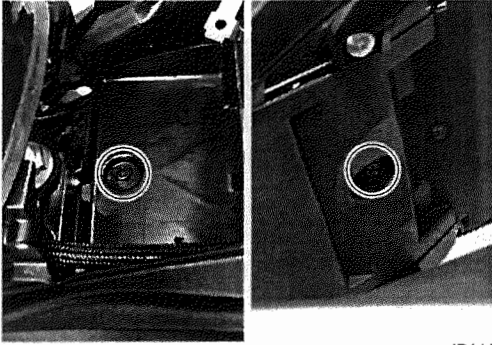
IB14J1120025-01

- 8) Remove the rear fender (rear) (15) and rear fender (front) cover (16).



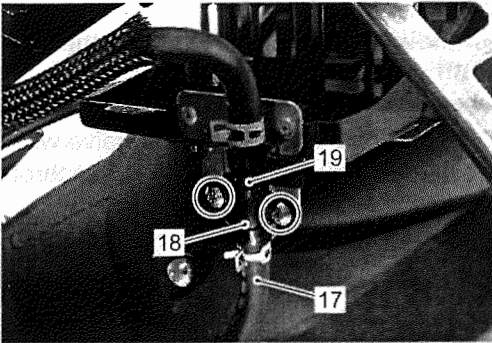
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- 9) Remove the rear fender (front) mounting bolts.



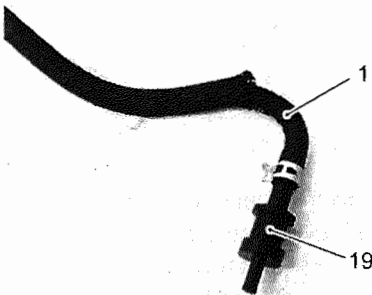
IB14J1120027-01

- 10) Move the rear fender (front) backward.
 11) Disconnect the surge hose No. 2 (17).
 12) Remove the bracket (18) and fuel shut-off valve (19).



IB14J1120028-01

- 13) Remove the fuel tank breather hose (1) from the fuel shut-off valve (19).

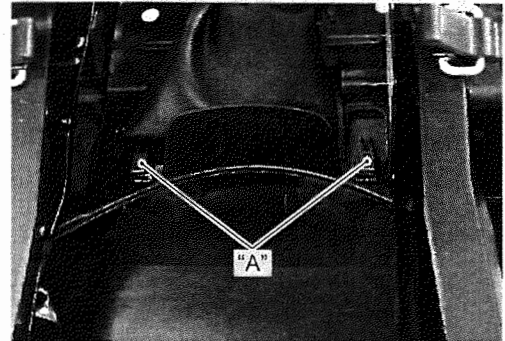


IB14J1120029-01

Installation

Install the fuel shut-off valve in the reverse order of removal. Pay attention to the following points:

- Install the fuel shut-off valve as shown in the EVAP canister hose routing diagram. Refer to "EVAP Canister Hose Routing Diagram (Only for E-33)" (Page 1B-7).
- Insert the rear fender (front) cover hook "A" to the rear fender (front). Refer to "Exterior Parts Construction" in Section 9D (Page 9D-2).



IB14J1120030-01

Evaporative Emission Control System Inspection (Only for E-33)

BENB15J21206011

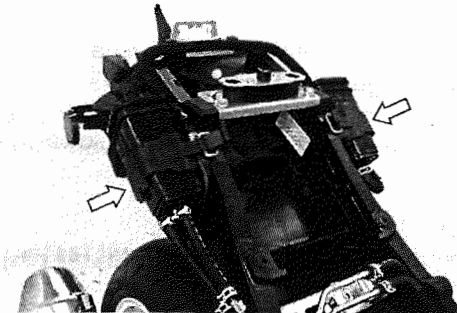
Refer to "Evaporative Emission Control System Removal and Installation (Only for E-33)" (Page 1B-13).

Hose

- 1) Inspect the hoses for wear or damage. If it is worn or damaged, replace the hose with a new one.
- 2) Check that the hoses are securely connected.

EVAP Canister

Inspect the EVAP canister bodies for damage. If any defects are found, replace the EVAP canister with a new one.



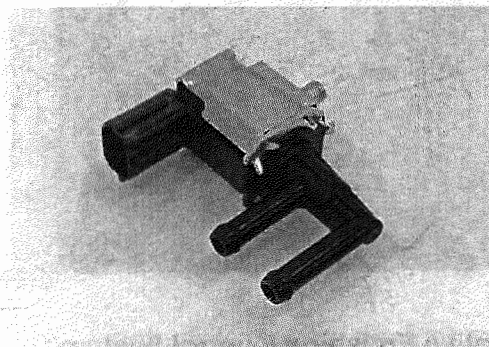
IB14J1120031-01

EVAP System Purge Control Solenoid Valve

NOTE

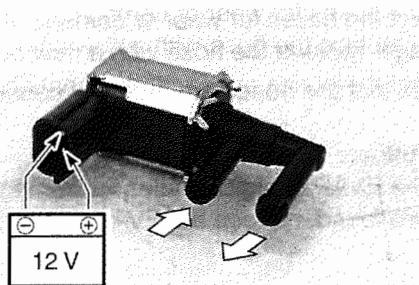
EVAP system purge control solenoid valve can be checked without removing it from the motorcycle. Refer to "DTC "C62" (P0443): EVAP System Purge Control Solenoid Valve Circuit Malfunction (E-33 only)" in Section 1A (Page 1A-96).

- 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.



I947H1120038-01

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



IB14J1120041-01

- 3) Check the resistance between the terminals of the EVAP system purge control solenoid valve. If the resistance is not within the standard range, replace the EVAP system purge control solenoid valve with a new one.

Special tool

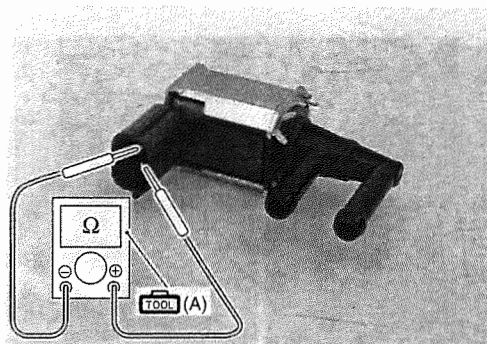
TOOL (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Resistance (Ω)

EVAP system purge control solenoid valve resistance

Approx. 32Ω at 20°C (68°F)



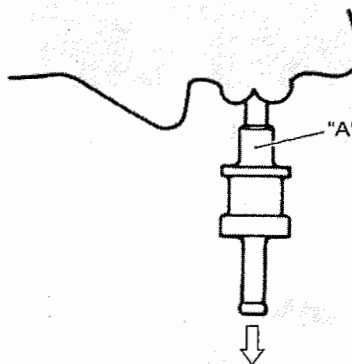
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Fuel Shut-off Valve

⚠ WARNING

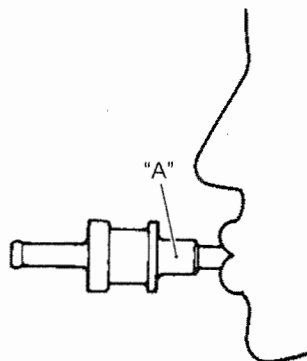
Gasoline and gasoline vapor is toxic. A small amount of fuel remains in the fuel shut-off valve when checking it. Do not swallow the fuel when blowing the fuel shut-off valve.

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



I940H1170029-03

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



I940H1170030-02

Specifications

Service Data

BENB15J21207001

FI sensors

Item	Specification	Note
HO2 sensor output voltage	0.4 V and less at idle speed	
	0.6 V and more at 5 000 r/min	
HO2 sensor heater resistance	6.7 – 9.5 Ω at 23 °C (73 °F)	
PAIR control solenoid valve resistance	20 – 24 Ω at 20 – 30 °C (68 – 86 °F)	
EVAP system purge control solenoid valve resistance	Approx. 32 Ω at 20 °C (68 °F)	E-33 only

Tightening Torque Specifications

BENB15J21207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
HO2 sensor	25	2.5	18.0	☞ (Page 1B-9)
EVAP system purge control solenoid valve mounting nut	10	1.0	7.0	☞ (Page 1B-14)
EVAP system purge control solenoid valve bracket bolt	10	1.0	7.0	☞ (Page 1B-14)

NOTE

The tightening torque(s) also specified in:

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

“EVAP Canister Hose Routing Diagram (Only for E-33)” (Page 1B-7)

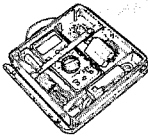
Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Special Tool

BENB15J21208001

09900–25008 Multi circuit tester set ☞ (Page 1B-12) / ☞ (Page 1B-17)		
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Engine Electrical Devices

Precautions

Precautions for Engine Electrical Device

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

BENB15J21300001

Component Location

Engine Electrical Components Location

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

BENB15J21303001

Diagnostic Information and Procedures

Engine Symptom Diagnosis

Refer to "Engine Symptom Diagnosis" in Section 1A (Page 1A-8).

BENB15J21304001

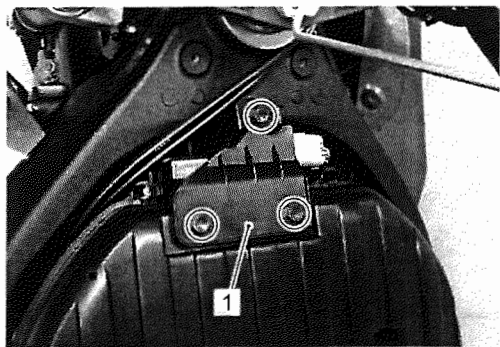
Repair Instructions

ECM Removal and Installation

BENB15J21306001

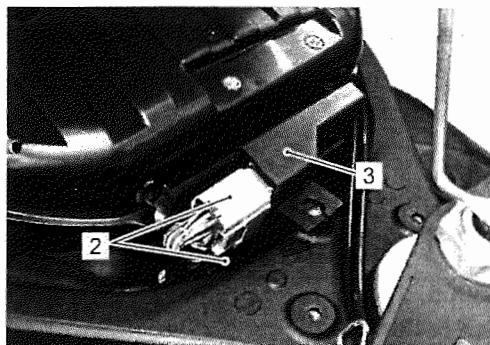
Removal

- 1) Lift and support the fuel tank with the prop stay.
Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the battery (-) lead wire.
- 3) Remove the air cleaner holder (1).



IB14J1130001-01

- 4) Disconnect the couplers (2) and remove the ECM (3).



IB14J1130002-01

Installation

Install the ECM in the reverse order of removal.

CMP Sensor Inspection

Refer to "DTC 'C11' (P0340): CMP Sensor Circuit Malfunction" in Section 1A (Page 1A-28).

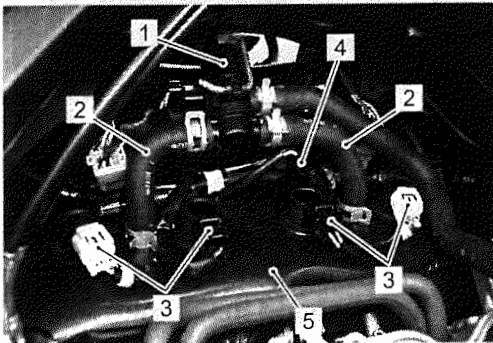
BENB15J21306002

CMP Sensor Removal and Installation

BENB15J21306003

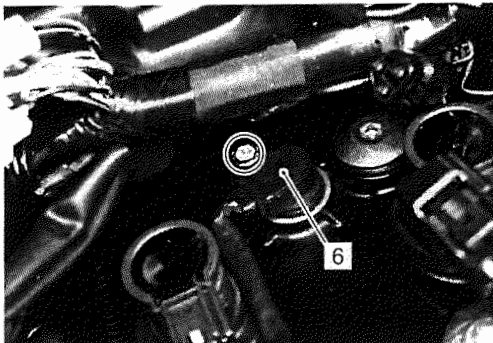
Removal

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Remove the PAIR control solenoid valve (1) and PAIR hoses (2). Refer to "PAIR Control Solenoid Valve Removal and Installation" in Section 1B (Page 1B-10).
- 4) Disconnect the ignition coil/plug cap couplers (3).
- 5) Disconnect the CMP sensor coupler (4) and remove the cylinder head cover shield (5).



IB14J1130003-02

- 6) Remove the CMP sensor (6).

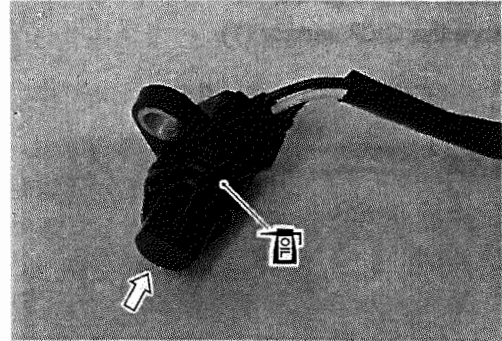


IB14J1130004-01

Installation

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

- When installing the CMP sensor, make sure to clean the sensor surface.
- Apply engine oil to the new O-ring and install it.

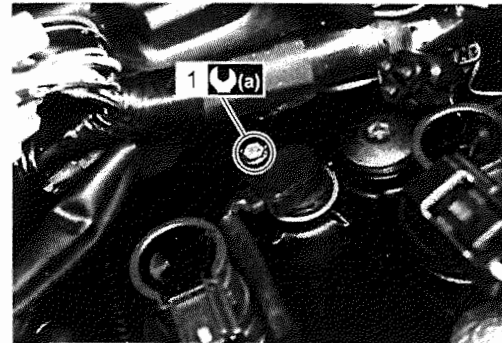


IB14J1130005-01

- Tighten the CMP sensor bolt (1) to the specified torque.

Tightening torque

CMP sensor bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1130006-01

CKP Sensor Inspection

BENB15J21306004

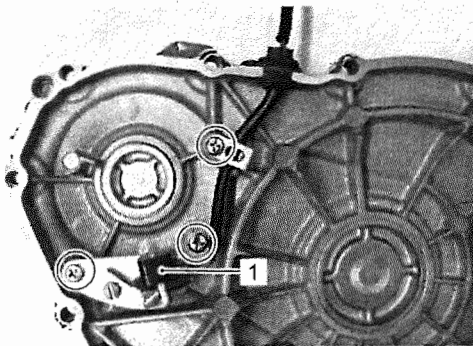
Refer to "CKP Sensor Inspection" in Section 1H (Page 1H-9).

CKP Sensor Removal and Installation

BENB15J21306005

Removal

- 1) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the clutch cover. Refer to "Clutch Removal" in Section 5C (Page 5C-8).
- 3) Remove the CKP sensor (1).



IB37H1130011-01

Installation

Install the CKP sensor in the reverse order of removal. Refer to "Clutch Installation" in Section 5C (Page 5C-10).

IAP Sensor Inspection

BENB15J21306006

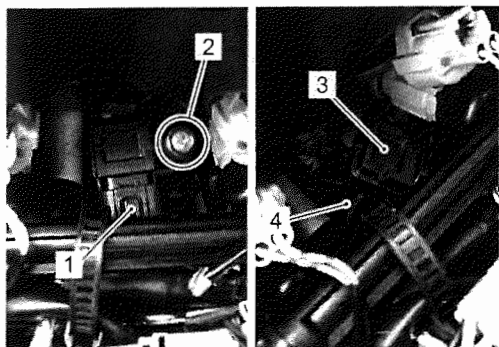
Refer to "DTC 'C13' (P0105-H/L): IAP Sensor Circuit Malfunction" in Section 1A (Page 1A-32).

IAP Sensor Removal and Installation

BENB15J21306007

Removal

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Disconnect the coupler (1) and remove the mounting screw (2).
- 3) Remove the IAP sensor (3) by disconnecting the vacuum hose (4).



IB14J1130007-02

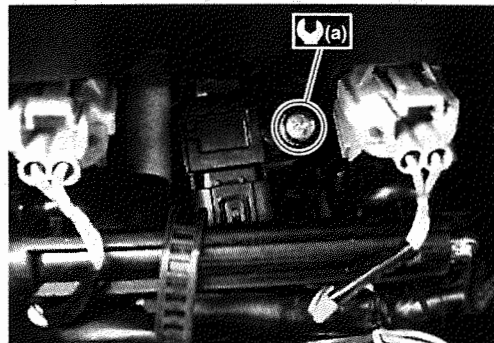
Installation

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

- Tighten the IAP sensor mounting screw to the specified torque.

Tightening torque

IAT sensor mounting screw (a): 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



IB14J1130008-01

TP Sensor Inspection

BENB15J21306008

Refer to "DTC 'C14' (P0120-H/L): TP Sensor Circuit Malfunction" in Section 1A (Page 1A-37).

TP Sensor Removal and Installation


BENB15J21306009

Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

Removal

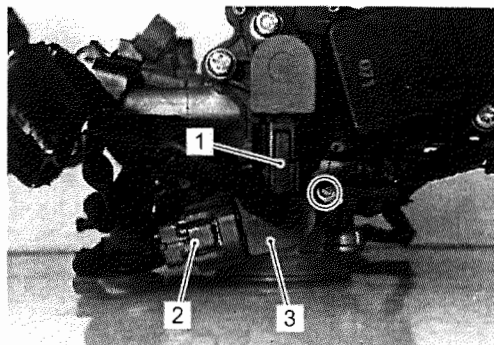
- 1) Remove the throttle body. Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-12).
- 2) Disconnect the STP sensor coupler (1) and TP sensor coupler (2).
- 3) Remove the TP sensor (3) with the special tool.

Special tool

 : 09930-11950 (Torx® wrench (T25H))

NOTE

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



IB14J1130009-01

Installation

Install the TP sensor in the reverse order of removal. Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

TP Sensor Adjustment

BENB15J21306010

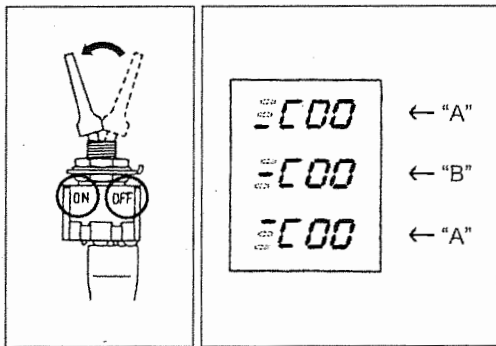
Inspect the TP sensor setting position and adjust it if necessary in the following procedures:

- 1) Connect the special tool (Mode selection switch) to the mode selection coupler. Refer to "Self-Diagnostic Procedures" in Section 1A (Page 1A-12).

Special tool

Tool : 09930-82720 (Mode selection switch)

- 2) Warm up the engine and keep it running in idling speed.
- 3) Turn the mode selection switch ON.
- 4) Check the position of the bar in the left of C code displayed on the LCD panel.

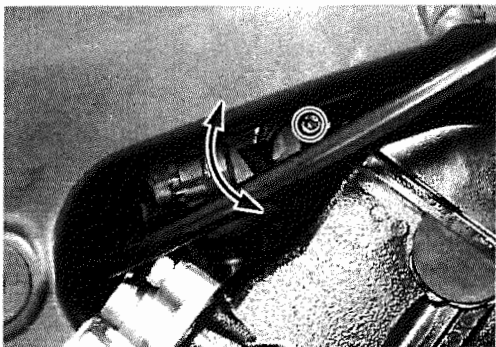


I823H1130022-01

"A": Incorrect position

"B": Correct position

- 5) If the TP sensor adjustment is necessary, remove the right cowling side cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 6) Loosen the TP sensor mounting screw using the torx® wrench (T25H) and turn the TP sensor to bring the bar to the correct position.



IB14J1130010-02

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

Tightening torque

TP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)

- 8) Turn off the engine and reinstall the removed parts.

ECT Sensor Removal and Installation

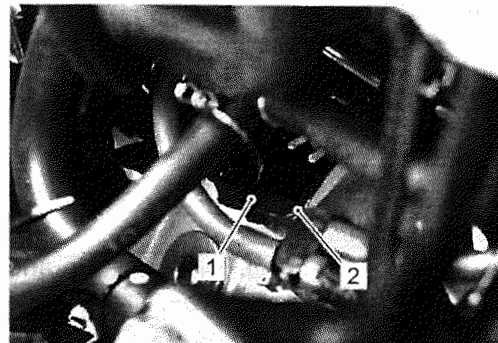
BENB15J21306011

Removal

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Drain engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).
- 3) Disconnect the 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.



IB14J1130011-02

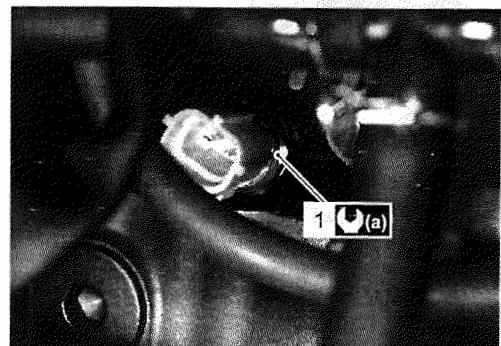
Installation

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

- Fit the new gasket washer to the ECT sensor (1).
- Tighten the ECT sensor (1) to the specified torque.

Tightening torque

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



IB14J1130012-02

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

ECT Sensor Inspection

BENB15J21306012

Refer to "DTC "C15" (P0115-H/L): ECT Sensor Circuit Malfunction" in Section 1A (Page 1A-41).

Inspect the ECT sensor in the following procedures:

- 1) Remove the ECT sensor. Refer to "ECT Sensor Removal and Installation" (Page 1C-4).

NOTICE

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

- 2) Check the ECT sensor by testing it at the bench as shown in the figure.


If the ECT sensor ohmic value does not change in the proportion indicated, replace it with a new one.

- a) Connect the ECT sensor (1) to a circuit tester and place it in the oil (2) contained in a pan.
- b) Heat the oil to raise its temperature slowly and read the column thermometer (3) and the ohmmeter.

NOTE

Do not contact the ECT sensor and column thermometer with a pan.

Special tool

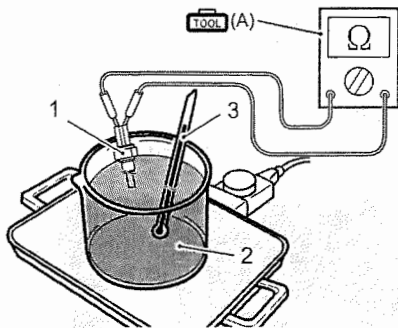
 (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Resistance (Ω)

ECT sensor specification

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



IB14J1130013-03

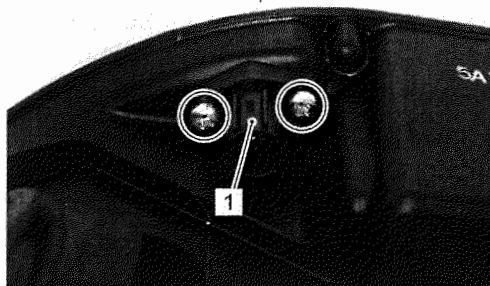
- 3) Install the ECT sensor. Refer to "ECT Sensor Removal and Installation" (Page 1C-4).

IAT Sensor Removal and Installation

BENB15J21306013

Removal

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 2) Remove the IAT sensor (1) from the air cleaner box.



IB14J1130014-01

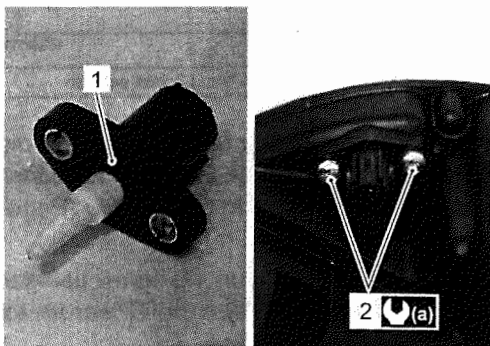
Installation

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

- Install a new O-ring (1).
- Tighten the IAT sensor screws (2) to the specified torque.

Tightening torque

IAT sensor mounting screw (a): 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)



IB14J1130015-01

IAT Sensor Inspection

BENB15J21306014

Refer to "DTC "C21" (P0110-H/L): IAT Sensor Circuit Malfunction" in Section 1A (Page 1A-44).
Inspect the IAT sensor.

NOTE

IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to "ECT Sensor Inspection" (Page 1C-5).

NOTICE

- The IAT sensor operative temperature range is -30 to 120 °C (-22 to 248 °F).
- Do not heat the oil up to 120 °C (248 °F) or more for this inspection.

IAT sensor specification

Temperature	Standard resistance
20 °C (68 °F)	Approx. 2.58 kΩ
40 °C (104 °F)	Approx. 1.14 kΩ
100 °C (212 °F)	Approx. 0.16 kΩ

AP Sensor Inspection

BENB15J21306015

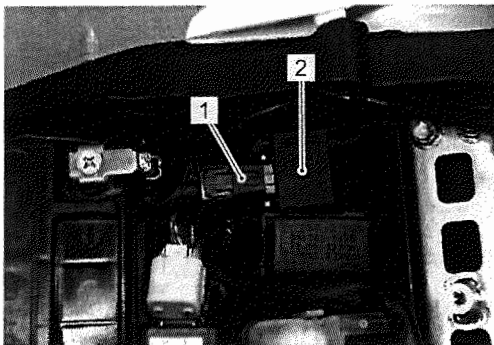
Refer to "DTC "C22" (P1450-H/L): AP Sensor Circuit Malfunction" in Section 1A (Page 1A-48).

AP Sensor Removal and Installation

BENB15J21306016

Removal

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Disconnect the coupler (1) and remove the AP sensor (2).



IB14J1130016-01

Installation

Install the AP sensor in the reverse order of removal.

TO Sensor Inspection

BENB15J21306017

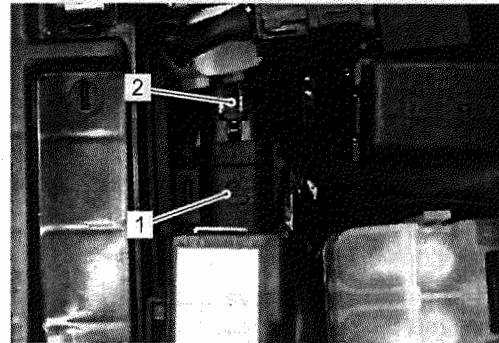
Refer to "DTC "C23" (P1651-H/L): TO Sensor Circuit Malfunction" in Section 1A (Page 1A-53).

TO Sensor Removal and Installation

BENB15J21306018

Removal

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Dismount the TO sensor (1) from its bracket.
- 3) Disconnect the TO sensor coupler (2).

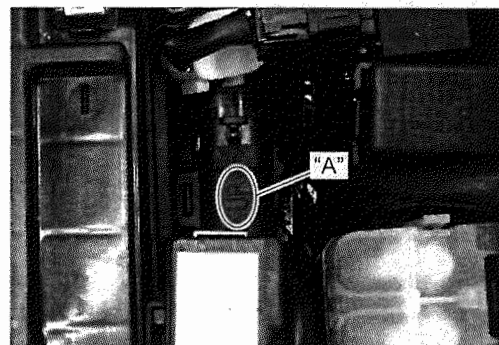


IB14J1130017-02

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 "A" upward.



IB14J1130018-01

STP Sensor Inspection

BENB15J21306019

Refer to "DTC "C29" (P1654-H/L): Secondary Throttle Position Sensor (STPS) Circuit Malfunction" in Section 1A (Page 1A-60).

STP Sensor Adjustment

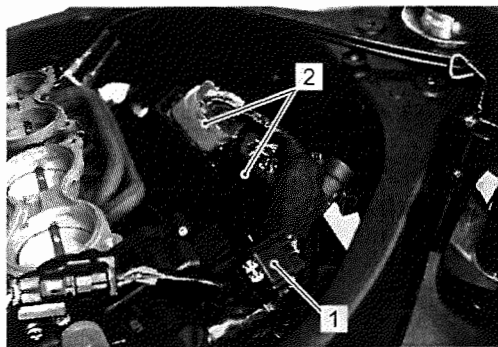
BENB15J21306020

Adjust the STP sensor in the following procedures:

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 2) Lift up the throttle body from the intake pipes. Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-12).

1C-7 Engine Electrical Devices:

- 3) Disconnect the STVA coupler (1) and connect the ECM couplers (2).



IB14J1130019-01

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

Special tool

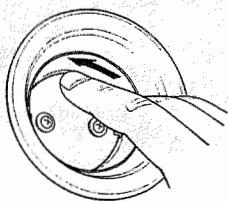
- TOOL (A):** 09900-25008 (Multi circuit tester set)
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

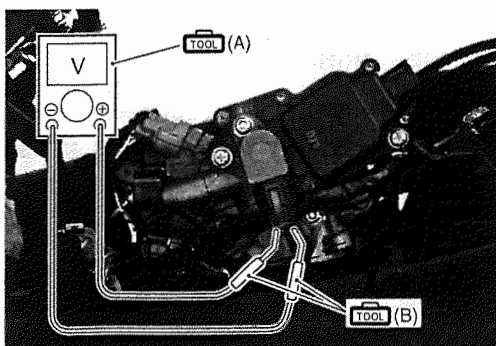
Voltage (---)

STP sensor output voltage

ST valve is fully closed: 0.52 – 0.72 V ((+): Y/W – (-): B/Br)



I718H1130017-01



IB14J1130020-01

- 7) Loosen the STP sensor mounting screw using the special tool and adjust the STP sensor until the output voltage comes within the specified value.

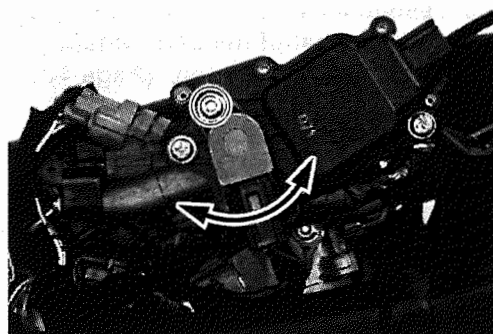
Special tool

TOOL : 09930-11950 (Torx® wrench (T25H))

- 8) Tighten the STP sensor mounting screw to the specified torque.

Tightening torque

STP sensor mounting screw: 3.5 N·m (0.35 kgf·m, 2.5 lbf·ft)



IB14J1130021-01

- 9) Reinstall the removed parts.

STP Sensor Removal and Installation

BENB15J21306021

Removal

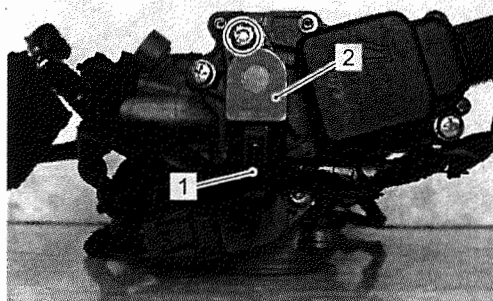
- 1) Remove the throttle body. Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-12).
- 2) Disconnect the STP sensor coupler (1).
- 3) Remove the STP sensor (2) with the special tool.

Special tool

TOOL : 09930-11950 (Torx® wrench (T25H))

NOTE

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



IB14J1130022-01

Installation

Install the STP sensor in the reverse order of removal. Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

STV Actuator Inspection

BENB15J21306022

Refer to "DTC "C28" (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction" in Section 1A (Page 1A-57).

STV Actuator Removal and Installation

BENB15J21306023

Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

NOTICE

Never remove the STVA from the throttle body.

ISC Valve Inspection

BENB15J21306024

Refer to "DTC "C40" (P0505): ISC Valve Circuit Malfunction" in Section 1A (Page 1A-70) and "DTC "C65" (P0506/P0507): Idle Speed Malfunction" in Section 1A (Page 1A-99).

ISC Valve Removal and Installation

BENB15J21306025

Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

NOTE

- Be careful not to disconnect the ISC valve coupler at least 5 seconds after ignition switch is turned to OFF. If the ECM coupler or ISC valve coupler is disconnected within 5 seconds after ignition switch is turned to OFF, there is a possibility of an unusual valve position being written in ECM and causing an error of ISC valve operation.
- When the throttle body assembly is replaced with a new one, the ISC valve must be set present position. Refer to "ISC Valve Learned Preset and Opening Initialization" (Page 1C-8).

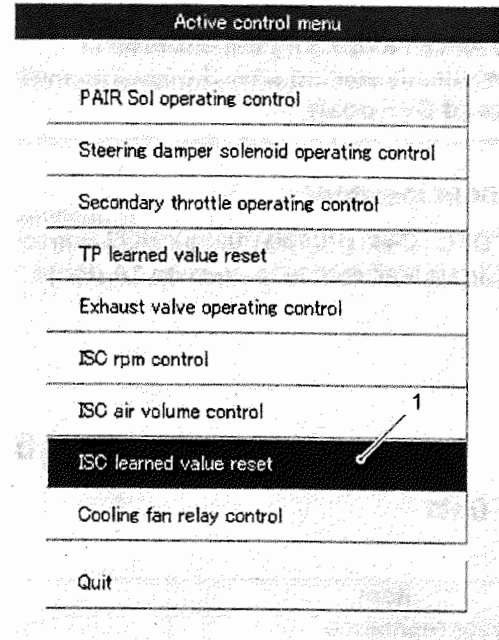
ISC Valve Learned Preset and Opening Initialization

BENB15J21306026

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

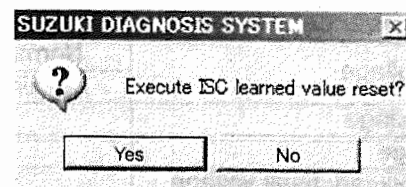
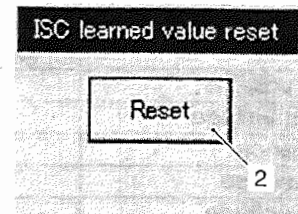
- 1) Turn the ignition switch ON.
- 2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
- 3) Click the "Active control".

- 4) Click the "ISC learned value reset" (1).



IB14J1130023-01

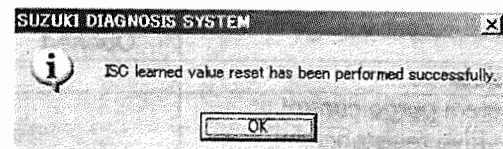
- 5) Click the "Reset" button (2) to clear the ISC leaned value.



IB14J1130025-01

NOTE

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



IB14J1130024-01

1C-9 Engine Electrical Devices:

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

NOTE

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

HO2 Sensor Inspection

BENB15J21306027

Refer to "DTC "C44" (P0130/P0135): HO2 Sensor (HO2S) Circuit Malfunction" in Section 1A (Page 1A-78).

HO2 Sensor Removal and Installation

BENB15J21306028

Refer to "Heated Oxygen Sensor (HO2S) Removal and Installation" in Section 1B (Page 1B-8).

GP Switch Inspection

BENB15J21306029

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

GP Switch Removal and Installation

BENB15J21306030

Refer to "Gear Position (GP) Switch Removal and Installation" in Section 5B (Page 5B-13).

Specifications

Service Data

BENB15J21307001

FI Sensors

Item	Standard/Specification		Note
CKP sensor resistance	Approx. 168 Ω at 20 °C (68 °F)		
CKP sensor peak voltage	0.28 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.7 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	1.02 – 1.22 V	
	Opened	4.34 – 4.54 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor output voltage	0.15 – 4.85 V		
ECT sensor resistance	Approx. 2.45 k Ω at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	0.15 – 4.85 V		
IAT sensor resistance	Approx. 2.58 k Ω at 20 °C (68 °F)		
AP sensor input voltage	4.5 – 5.5 V		
AP sensor output voltage	Approx. 3.6 V at 100 kPa (760 mmHg)		
TO sensor resistance	Approx. 19.4 k Ω at 20 °C (68 °F)		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	80 V and more		When cranking
HO2 sensor output voltage	0.4 V and less at idle speed		
	0.6 V and more at 5 000 r/min		
HO2 sensor heater resistance	6.7 – 9.5 Ω at 23 °C (73 °F)		
PAIR control solenoid valve resistance	20 – 24 Ω at 20 – 30 °C (68 – 86 °F)		
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	0.52 – 0.72 V	
	Opened	4.12 – 4.32 V	
STVA resistance	Approx. 6.5 Ω		
EVAP system purge control solenoid valve resistance	Approx. 32 Ω at 20 °C (68 °F)		E-33 only
ISC valve resistance	Approx. 20 Ω at 20 °C (68 °F)		

Tightening Torque Specifications

BENB15J21307002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
CMP sensor bolt	10	1.0	7.0	☞ (Page 1C-2)
IAT sensor mounting screw	3.5	0.35	2.5	☞ (Page 1C-3)
TP sensor mounting screw	3.5	0.35	2.5	☞ (Page 1C-4)
ECT sensor	18	1.8	13.0	☞ (Page 1C-4)
IAT sensor mounting screw	1.5	0.15	1.0	☞ (Page 1C-5)
STP sensor mounting screw	3.5	0.35	2.5	☞ (Page 1C-7)

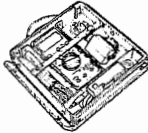
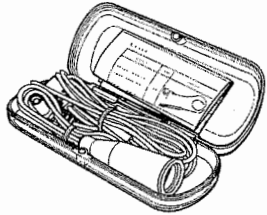
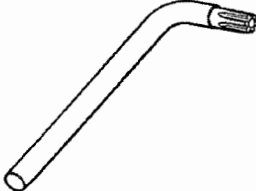

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment

Special Tool

BENB15J21308001

09900-25008 Multi circuit tester set ☞ (Page 1C-5) / ☞ (Page 1C-7)		09900-25009 Needle-point probe set ☞ (Page 1C-7)	
09930-11950 Torx® wrench (T25H) ☞ (Page 1C-3) / ☞ (Page 1C-7) / ☞ (Page 1C-7)		09930-82720 Mode selection switch ☞ (Page 1C-4)	

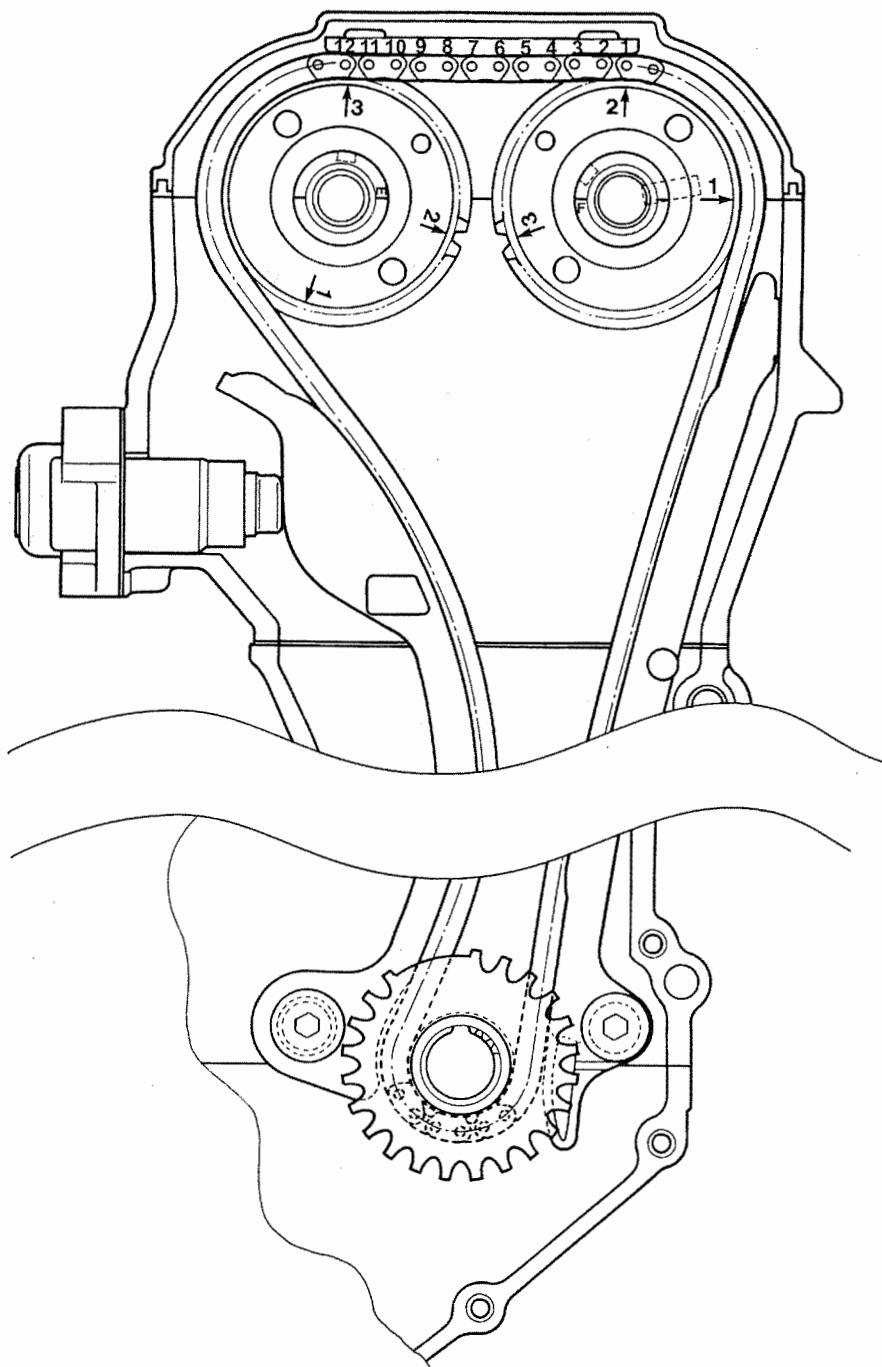
Torx® is the registered trademark of Camcar Division of Textron inc. U.S.A.

Engine Mechanical

Schematic and Routing Diagram

Camshaft and Sprocket Assembly Diagram

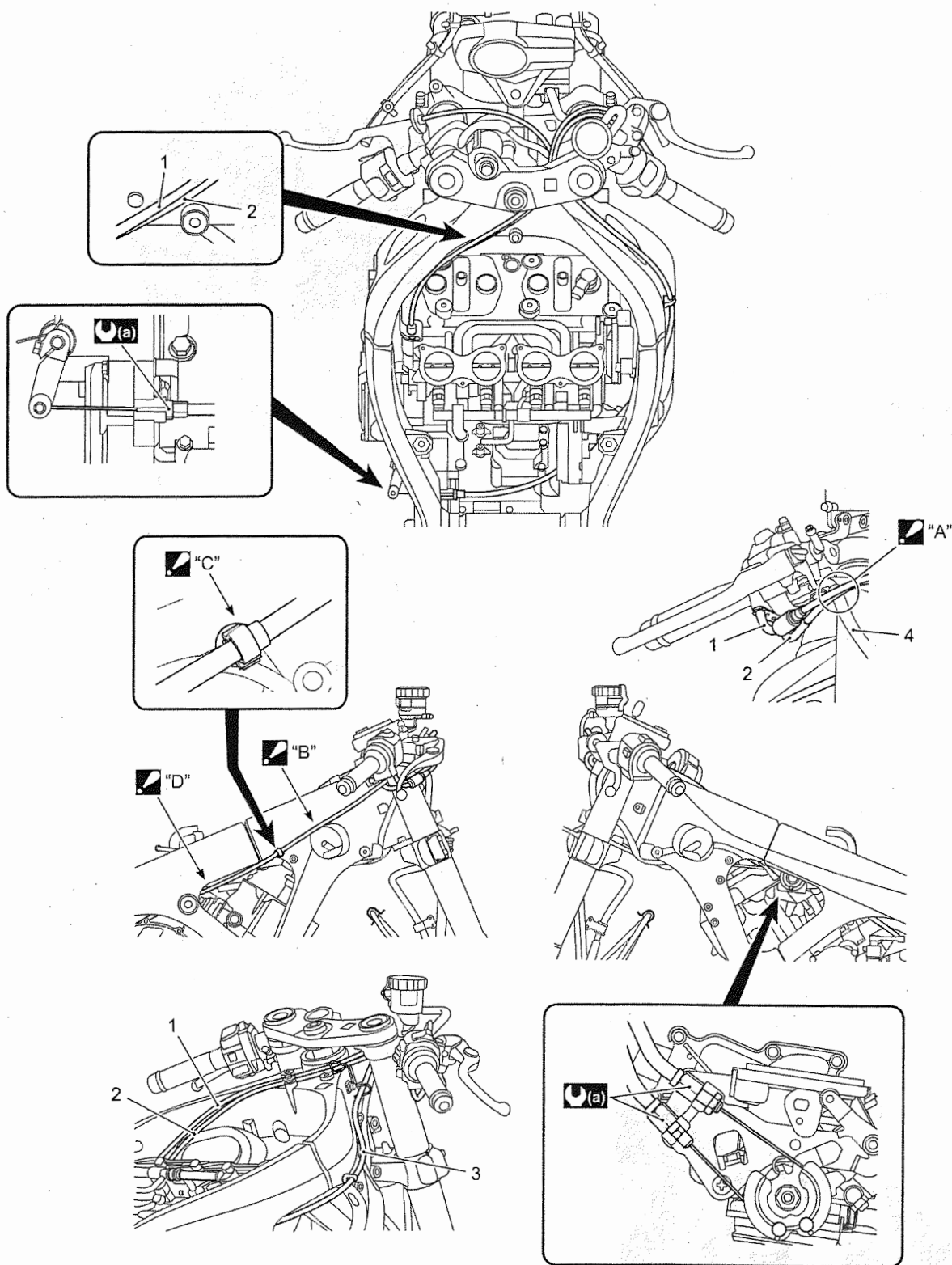
BENB15J21402001



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Throttle Cable Routing Diagram

BENB15J21402002



IB14J1140001-06

1. Throttle cable No. 1	☑ "B": Pass the clutch cable above the right air intake pipe.
2. Throttle cable No. 2	☑ "C": Clamp the clutch cable at the marked point backside. Face the tip of the clamp downward and cut off the excess tip of the clamp.
3. Clutch cable	☑ "D": Pass the clutch cable outside of the water bypass hose. Pass the clutch cable behind of the EXCV cables.
4. Front brake hose	⚙ (a) : 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)
☑ "A": Pass the throttle cables in front of the front brake hose.	

Diagnostic Information and Procedures

Engine Mechanical Symptom Diagnosis

BENB15J21404001

Refer to "Engine Symptom Diagnosis" in Section 1A (Page 1A-8).

Compression Pressure Check

BENB15J21404002

The compression pressure reading of a cylinder is a good indicator of its internal condition.


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


NOTE

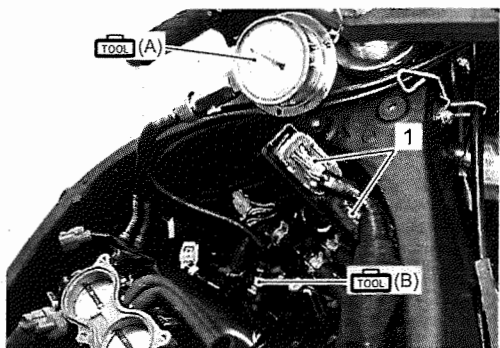
- Before checking the engine for compression pressure, make sure that the cylinder head nuts are tightened to the specified torque values and the valves are properly adjusted.
- Make sure that the battery is in fully-charged condition.

- 1) Warm up the engine.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" (Page 1D-7).
- 4) Remove all the spark plugs. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-6).
- 5) Connect the ECM couplers (1).
- 6) Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.

Special tool

 (A): 09915-64512 (Compression gauge)

 (B): 09913-10750 (Compression gauge adapter)



IB14J1140002-01

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



IB14J1140003-01

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

Compression pressure specification

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

Low compression pressure can indicate any of the following conditions:

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

Overhaul the engine in the following cases:

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

Repair Instructions

Engine Components Removable with the Engine in Place

BENB15J21406001

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

Center of Engine

Item	Removal	Inspection	Installation
Air cleaner element	Refer to "Air Cleaner Element Removal and Installation" (Page 1D-7).	Refer to "Air Cleaner Element Inspection" in Section 0B (Page 0B-3).	Refer to "Air Cleaner Element Removal and Installation" (Page 1D-7).
PAIR control solenoid valve	Refer to "PAIR Control Solenoid Valve Removal and Installation" in Section 1B (Page 1B-10).	Refer to "PAIR System Inspection" in Section 1B (Page 1B-11).	Refer to "PAIR Control Solenoid Valve Removal and Installation" in Section 1B (Page 1B-10).
Cylinder head cover	Refer to "Engine Top Side Disassembly" (Page 1D-27).	—	Refer to "Engine Top Side Assembly" (Page 1D-30).
Camshafts	Refer to "Engine Top Side Disassembly" (Page 1D-27).	Refer to "Camshaft Inspection" (Page 1D-36).	Refer to "Engine Top Side Assembly" (Page 1D-30).
Throttle body	Refer to "Throttle Body Removal and Installation" (Page 1D-12).	Refer to "Throttle Body Inspection and Cleaning" (Page 1D-18).	Refer to "Throttle Body Removal and Installation" (Page 1D-12).
Thermostat	Refer to "Thermostat Removal and Installation" in Section 1F (Page 1F-10).	Refer to "Thermostat Inspection" in Section 1F (Page 1F-11).	Refer to "Thermostat Removal and Installation" in Section 1F (Page 1F-10).
Crankcase breather cover	Refer to "Crankcase Breather (PCV) Hose / Reed Valve / Cover Removal and Installation" in Section 1B (Page 1B-12).	Refer to "Crankcase Breather (PCV) Cover Inspection" in Section 1B (Page 1B-13).	Refer to "Crankcase Breather (PCV) Hose / Reed Valve / Cover Removal and Installation" in Section 1B (Page 1B-12).
Starter motor	Refer to "Starter Motor Removal and Installation" in Section 1I (Page 1I-4).	Refer to "Starter Motor Inspection" in Section 1I (Page 1I-5).	Refer to "Starter Motor Removal and Installation" in Section 1I (Page 1I-4).
Oil filter	Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).	—	Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
Oil cooler	Refer to "Oil Cooler Removal and Installation" in Section 1E (Page 1E-8).	—	Refer to "Oil Cooler Removal and Installation" in Section 1E (Page 1E-8).

1D-5 Engine Mechanical:**Engine Right Side**

Item	Removal	Inspection	Installation
Exhaust pipe/Muffler	Refer to "Exhaust Pipe / Muffler Removal and Installation" in Section 1K (Page 1K-12).	Refer to "Exhaust System Inspection" in Section 1K (Page 1K-15).	Refer to "Exhaust Pipe / Muffler Removal and Installation" in Section 1K (Page 1K-12).
Cam chain tension adjuster	Refer to "Engine Top Side Disassembly" (Page 1D-27).	Refer to "Cam Chain Tension Adjuster Inspection" (Page 1D-38).	Refer to "Engine Top Side Assembly" (Page 1D-30).
Clutch cover	Refer to "Clutch Removal" in Section 5C (Page 5C-8).	—	Refer to "Clutch Installation" in Section 5C (Page 5C-10).
Clutch plates	Refer to "Clutch Removal" in Section 5C (Page 5C-8).	Refer to "Clutch Parts Inspection" in Section 5C (Page 5C-14).	Refer to "Clutch Installation" in Section 5C (Page 5C-10).
Clutch sleeve hub	Refer to "Clutch Removal" in Section 5C (Page 5C-8).	—	Refer to "Clutch Installation" in Section 5C (Page 5C-10).
Primary driven gear	Refer to "Clutch Removal" in Section 5C (Page 5C-8).	Refer to "Clutch Parts Inspection" in Section 5C (Page 5C-14).	Refer to "Clutch Installation" in Section 5C (Page 5C-10).
Oil pump drive sprocket	Refer to "Engine Bottom Side Disassembly" (Page 1D-49).	—	Refer to "Engine Bottom Side Assembly" (Page 1D-57).
Gearshift shaft	Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-16).	Refer to "Gearshift Linkage Inspection" in Section 5B (Page 5B-19).	Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-16).
CKP sensor rotor/Cam chain drive sprocket	Refer to "Engine Bottom Side Disassembly" (Page 1D-49).	—	Refer to "Engine Bottom Side Assembly" (Page 1D-57).
Cam chain tensioner	Refer to "Engine Bottom Side Disassembly" (Page 1D-49).	Refer to "Cam Chain Tensioner Inspection" (Page 1D-70).	Refer to "Engine Bottom Side Assembly" (Page 1D-57).
CKP sensor	Refer to "CKP Sensor Removal and Installation" in Section 1C (Page 1C-3).	Refer to "CKP Sensor Inspection" in Section 1C (Page 1C-2).	Refer to "CKP Sensor Removal and Installation" in Section 1C (Page 1C-3).

Engine Left Side

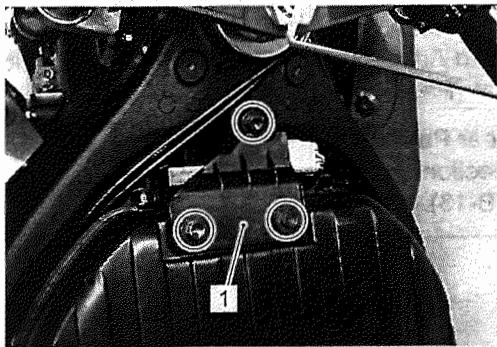
Item	Removal	Inspection	Installation
Speed sensor	Refer to "Speed Sensor Removal and Installation" in Section 9C (Page 9C-6).	Refer to "Speed Sensor Inspection" in Section 9C (Page 9C-6).	Refer to "Speed Sensor Removal and Installation" in Section 9C (Page 9C-6).
Engine sprocket	Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-2).	Refer to "Drive Chain Related Parts Inspection" in Section 3A (Page 3A-5).	Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-2).
Driven chain	Refer to "Drive Chain Replacement" in Section 3A (Page 3A-7).	Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-15).	Refer to "Drive Chain Replacement" in Section 3A (Page 3A-7).
Gear position switch	Refer to "Gear Position (GP) Switch Removal and Installation" in Section 5B (Page 5B-13).	Refer to "Gear Position (GP) Switch Inspection" in Section 5B (Page 5B-13).	Refer to "Gear Position (GP) Switch Removal and Installation" in Section 5B (Page 5B-13).
Starter idle gear cover	Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).	—	Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).
Starter idle gear	Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).	—	Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).
Generator cover	Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).	—	Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).
Generator rotor	Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).	—	Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).
Starter clutch	Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).	Refer to "Starter Clutch Inspection" in Section 1I (Page 1I-13).	Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).
Water pump	Refer to "Water Pump Removal and Installation" in Section 1F (Page 1F-13).	Refer to "Water Pump Related Parts Inspection" in Section 1F (Page 1F-17).	Refer to "Water Pump Removal and Installation" in Section 1F (Page 1F-13).
Oil pressure switch	Refer to "Oil Pressure Switch Removal and Installation" in Section 1E (Page 1E-9).	Refer to "Oil Pressure Indicator Inspection" in Section 9C (Page 9C-7).	Refer to "Oil Pressure Switch Removal and Installation" in Section 1E (Page 1E-9).

Air Cleaner Element Removal and Installation

BENB15J21406002

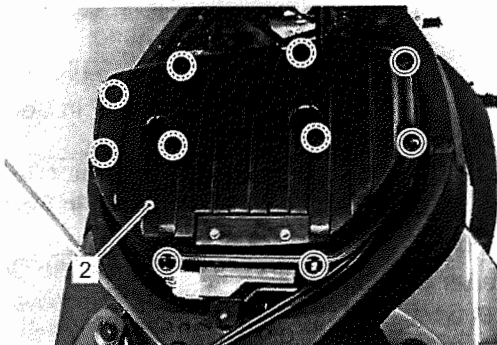
Removal

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the air cleaner holder (1).



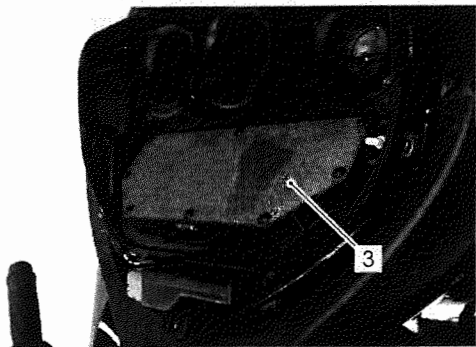
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- 3) Remove the air cleaner box cover (2).



IB14J1140005-02

- 4) Remove the air cleaner element (3).

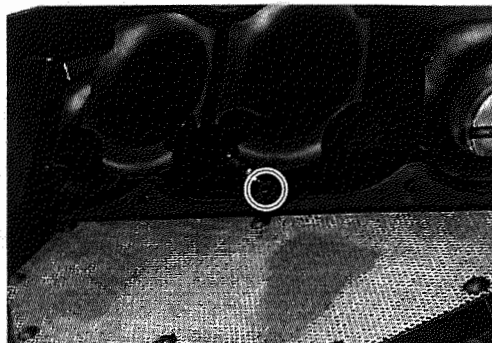


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Installation

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

- Insert the air cleaner box pin into the air cleaner element hole.



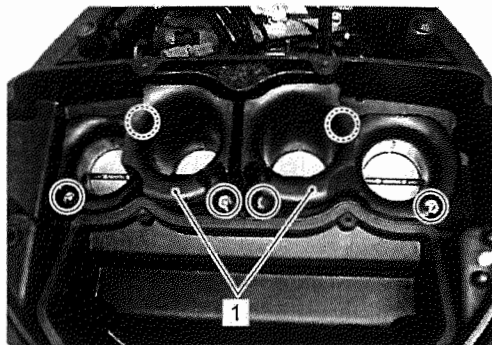
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Air Cleaner Box Removal and Installation

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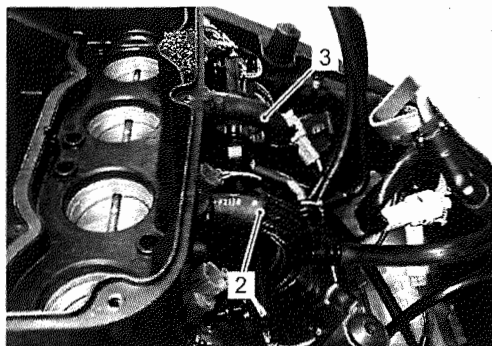
Removal

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the air cleaner box cover and air cleaner element. Refer to "Air Cleaner Element Removal and Installation" (Page 1D-7).
- 3) Remove the ECM. Refer to "ECM Removal and Installation" in Section 1C (Page 1C-1).
- 4) Remove the funnels (1).



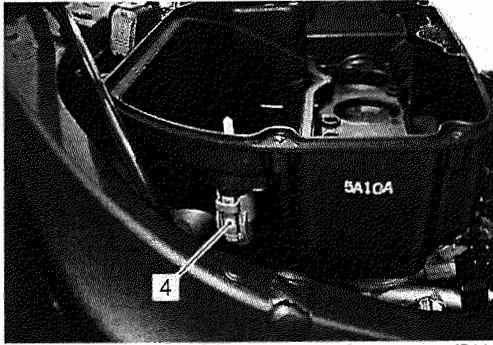
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- 5) Disconnect the ISC valve hose (2) and PCV hose (3).



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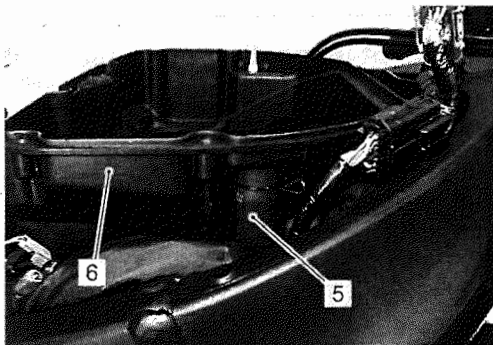
- 6) Disconnect the IAT sensor coupler (4).



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- 7) Disconnect the PAIR hose (5).

- 8) Remove the air cleaner box (6).

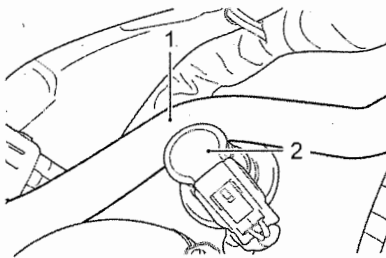


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Installation

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

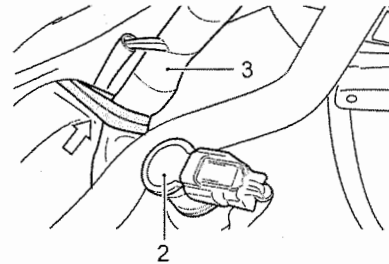
- 1) Position the PAIR hose (1) by the ignition coil/plug cap (2) as shown.



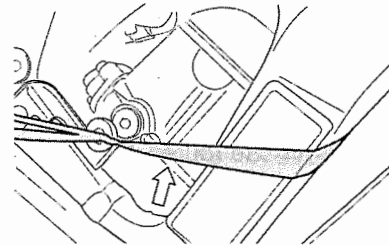
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- 2) Remove the right cowling side cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

- 3) Pull the harness (3) ahead by a string in order to avoid the harness (3) pushing the PAIR hose on the ignition coil/plug cap (2) as shown.



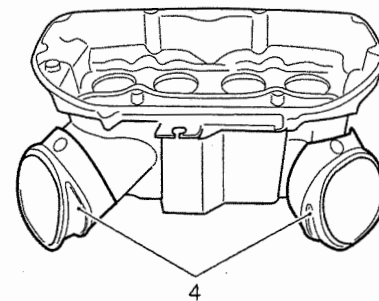
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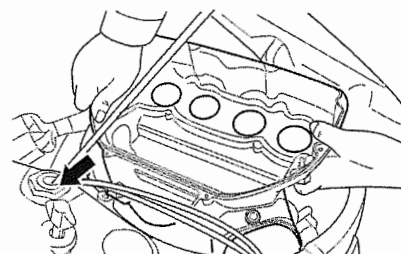
NOTE

- Before installing the air cleaner box, check that the air cleaner box gaskets are installed correctly.
- Be careful to check that the inlet tubes (4) are fitted securely when reinstalling the air cleaner box.



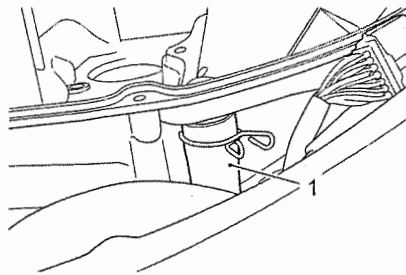
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- 4) Install the air cleaner box in the following order.
- a) Fit the right side air inlet tube to the frame hole first, then fit the left side inlet tube.



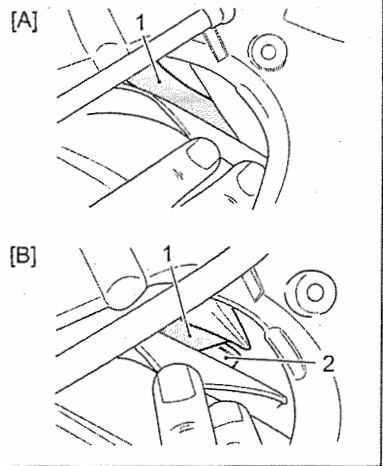
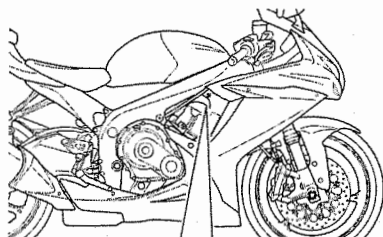
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b) Fit the PAIR hose (1) to the air cleaner box.



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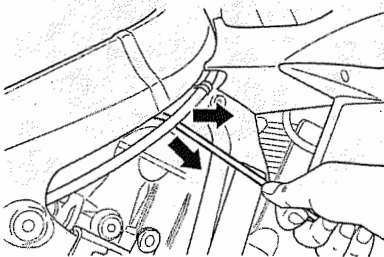
- c) Connect the IAT sensor coupler, ISC valve hose and PCV hose. Refer to "Throttle Body Construction" (Page 1D-11).
 - d) Remove the string from the harness.
 - e) Install the funnels, air cleaner element, air cleaner box cover, ECM and fuel tank. Refer to "Throttle Body Construction" (Page 1D-11).
- 5) Check if the PAIR hose routed correctly.



IB14J1140226-03

1. PAIR hose	[A]: OK
2. Ignition coil/plug cap	[B]: NG

6) If the PAIR hose is pinched between the ignition coil/plug cap and the air cleaner box, hook the PAIR hose by a hook-shape bar which has no sharp edge and pull the hose out to the front-right direction. Check if the PAIR hose became free from the ignition coil/plug cap.



IB14J1140227-02

7) Install the right cowl side cover.

Air Cleaner Element Inspection and Cleaning

BENB15J21406004

Refer to "Air Cleaner Element Inspection" in Section 0B (Page 0B-3).

Throttle Cable Removal and Installation

BENB15J21406005

Removal

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" (Page 1D-7).
- 2) Remove the right handlebar switch box. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).
- 3) Remove the throttle cables as shown in the cable routing diagram. Refer to "Throttle Cable Routing Diagram" (Page 1D-2).

Installation

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

- Install the throttle cables as shown in the cable routing diagram. Refer to "Throttle Cable Routing Diagram" (Page 1D-2).
- Check the throttle cable play and proper operation. Refer to "Throttle Cable Play Inspection and Adjustment" in Section 0B (Page 0B-12).

Throttle Cable Inspection

BENB15J21406006

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

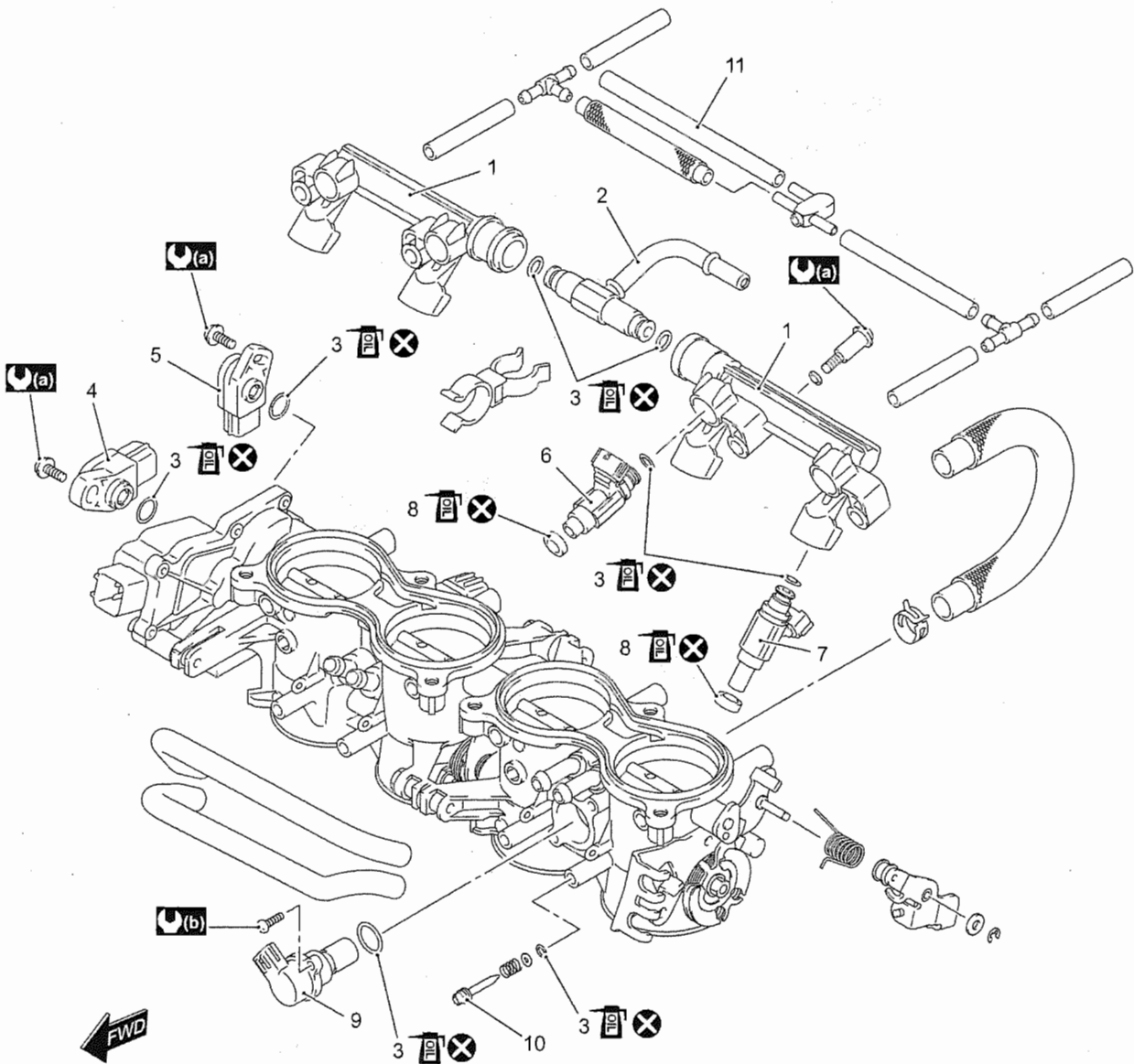
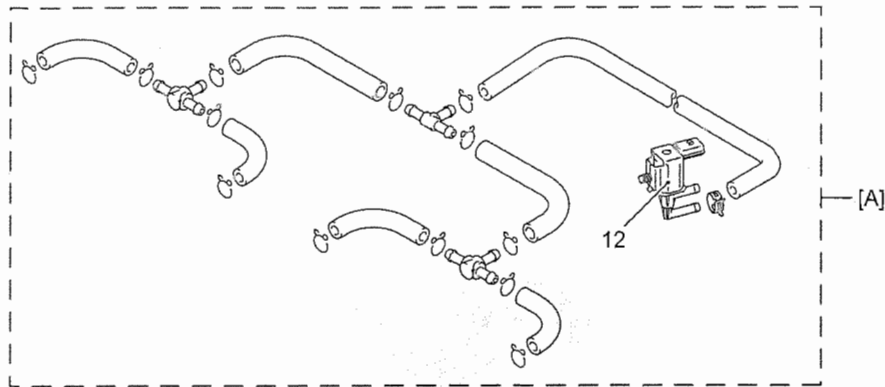
Throttle Cable Play Inspection and Adjustment

BENB15J21406007

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

Throttle Body Components

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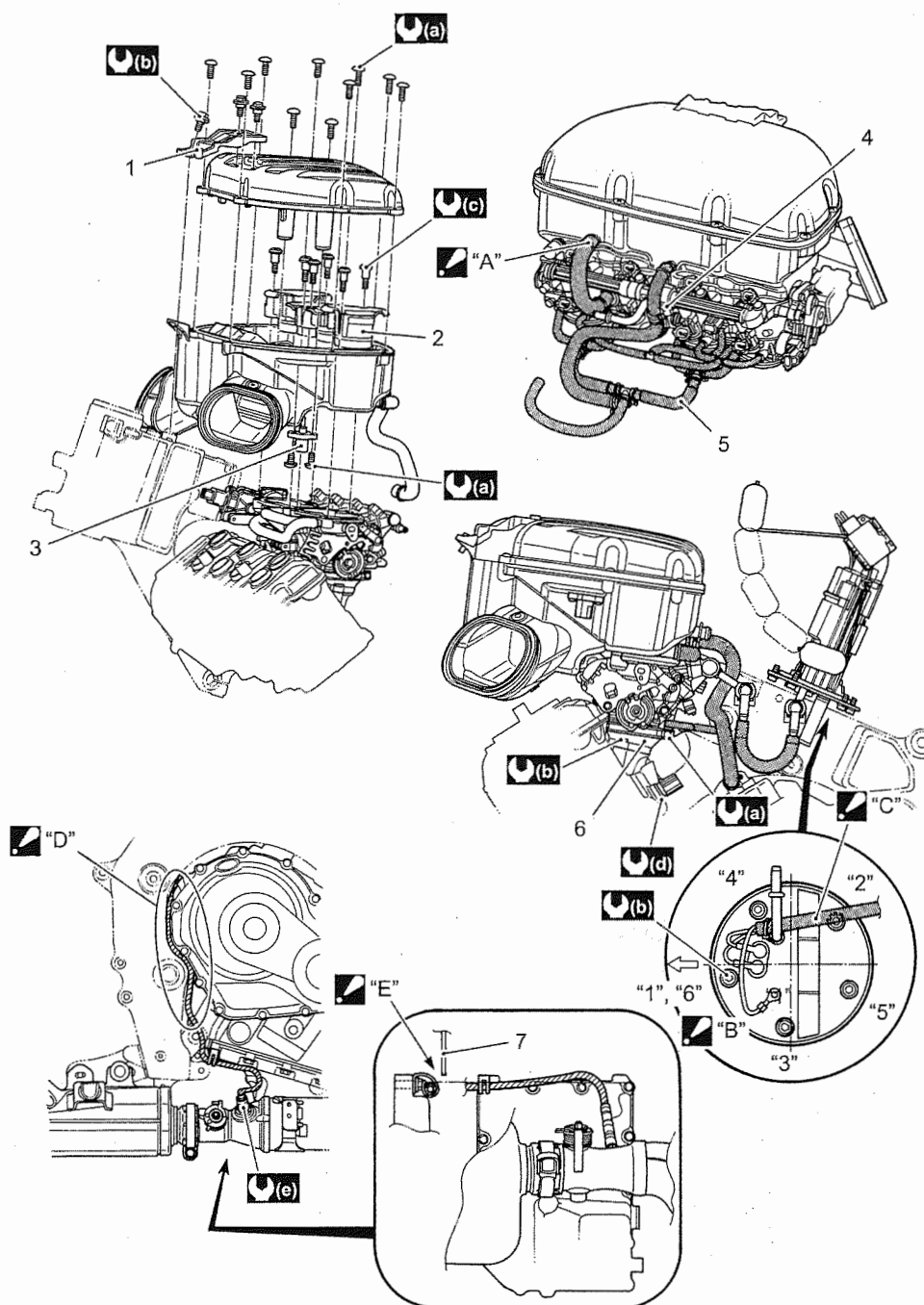


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1. Fuel delivery pipe	6. Secondary fuel injector	11. Vacuum hose	: Apply engine oil.
2. T-joint	7. Primary fuel injector	12. EVAP system purge control solenoid valve	: Do not reuse.
3. O-ring	8. Cushion seal	[A]: For E-33 only	
4. TP sensor	9. ISC valve	(a) : 3.5 Nm (0.35 kgf-m, 2.5 lbf-ft)	
5. STP sensor	10. Air screw	(b) : 2 Nm (0.2 kgf-m, 1.5 lbf-ft)	

Throttle Body Construction

BENB15J21406009



IB14J1140011-02

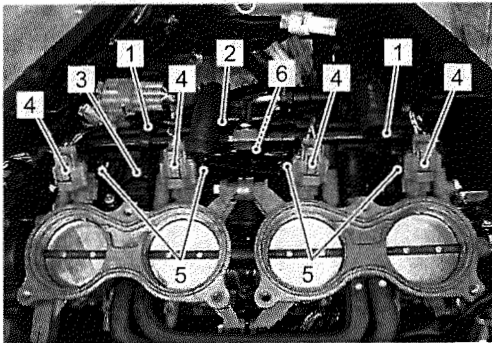
1. Air cleaner holder	7. Cowling (Right side)	U(a) : 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)
2. Funnel	▣ "A": Face the clamp end downward.	U(b) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
3. IAT sensor	▣ "B": Tighten the fuel pump mounting bolts in the ascending of numbers.	U(c) : 4.3 N·m (0.43 kgf-m, 3.0 lbf-ft)
4. PCV hose clamp	▣ "C": Pass the fuel pump lead wire over the fuel nipple.	U(d) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
5. Purge hose (E-33 only)	▣ "D": Pass the HO2 sensor lead wire between the frame and engine.	U(e) : 25 N·m (2.5 kgf-m, 18.0 lbf-ft)
6. Intake pipe	▣ "E": Make sure the HO2 sensor lead wire is contacted to the cowling.	

Throttle Body Removal and Installation

BENB15J21406010

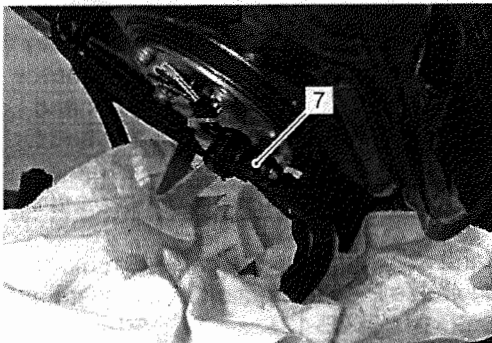
Removal

- 1) Remove the cowl side covers. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" (Page 1D-7).
- 3) Remove the clamps (1) and PCV hose clamp (2).
- 4) Disconnect the IAP sensor coupler (3), secondary fuel injector couplers (4) and primary fuel injector couplers (5).
- 5) Disconnect the purge hose (6). (E-33 only)



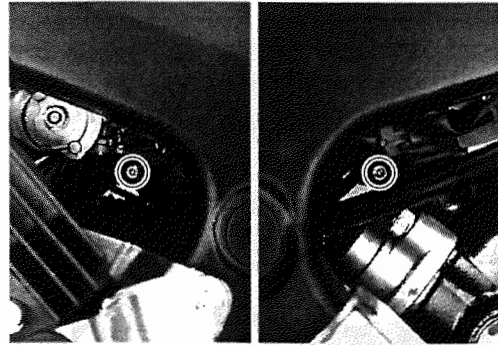
IB14J1140012-02

- 6) Drain fuel from the fuel tank. (For E-33)
- 7) Place a rag under the fuel feed hose (7) and disconnect the fuel feed hose (7) from the fuel pump. Refer to "Fuel Feed Hose Disconnecting and Reconnecting" in Section 1G (Page 1G-7).



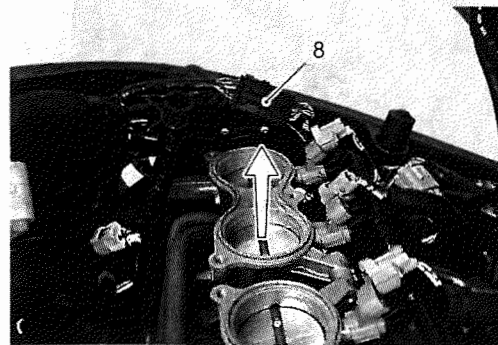
IB14J1140013-02

- 8) Loosen the intake pipe clamp screws, left and right.



IB14J1140014-01

- 9) Lift up the throttle body from the intake pipes.
- 10) Disconnect the wiring harness No. 3 coupler (8).



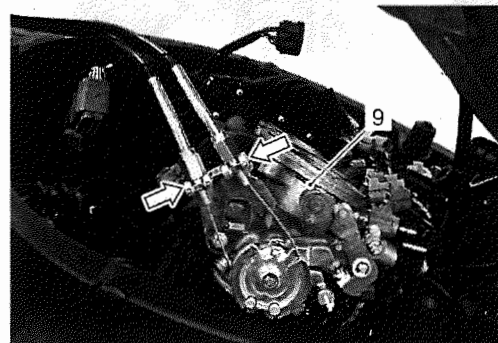
IB14J1140015-01

- 11) Disconnect the throttle cables.

NOTICE

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

- 12) Remove the throttle body (9).



IB14J1140016-02

- 13) After removing the throttle body, tape the cylinder intake section to prevent foreign particles from entering.

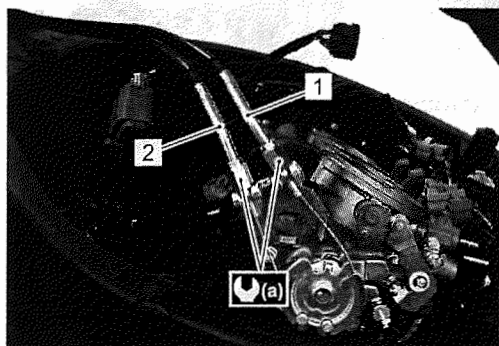
Installation

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

- Connect the throttle cable No. 1 (1) and throttle cable No. 2 (2) to the throttle cable drum.
- Tighten the throttle cable nuts to the specified torque.

Tightening torque

Throttle cable nut (a): 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)

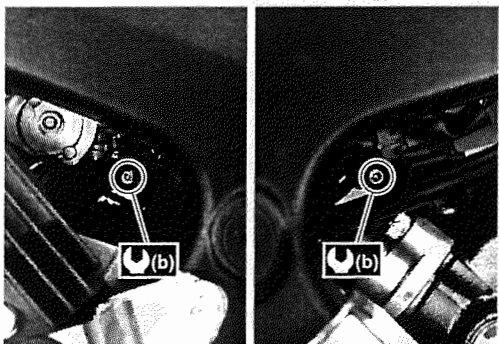


IB14J1140017-01

- Tighten the intake pipe clamp screws to the specified torque.

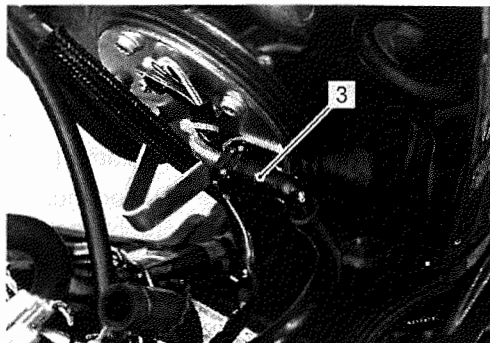
Tightening torque

Intake pipe clamp screw (b): 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)



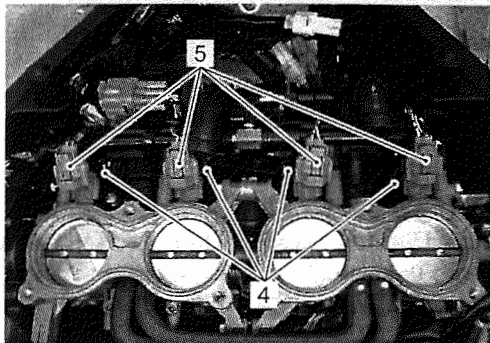
IB14J1140018-01

- Connect the fuel feed hose (3) securely. Refer to "Fuel Feed Hose Disconnecting and Reconnecting" in Section 1G (Page 1G-7).



IB14J1140019-01

- Connect the primary fuel injector couplers (4) and secondary fuel injector couplers (5) to the respective fuel injectors. Make sure that each coupler is installed in the correct position. The color on each lead wire refers to the appropriate fuel injector.



IB14J1140020-01

	Primary fuel injector	Secondary fuel injector
#1	Y/R and Gr/W	Y/R and Lg
#2	Y/R and Gr/B	Y/R and Lg/W
#3	Y/R and Gr/Y	Y/R and Lg/B
#4	Y/R and Gr/R	Y/R and Lg/Bl

- Check and adjust the throttle cable play. Refer to "Throttle Cable Play Inspection and Adjustment" in Section 0B (Page 0B-12).
- Reset the ISC valve and TP sensor learned values. Refer to "ISC Learned Valve Reset" (Page 1D-20) and "TP Reset" (Page 1D-20).

Throttle Body Disassembly and Assembly

BENB15J21406011

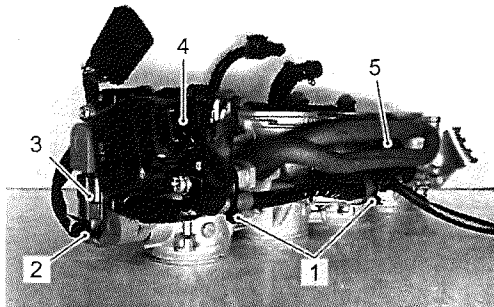
Refer to "Throttle Body Removal and Installation" (Page 1D-12).

Disassembly

NOTE

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

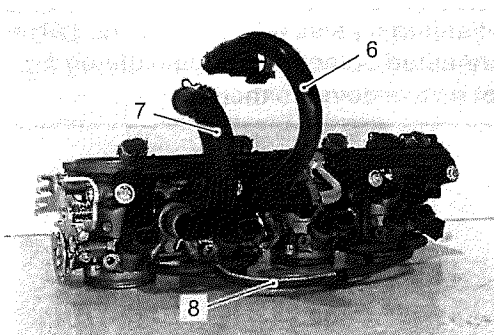
- 1) Remove the clamps (1).
- 2) Disconnect the TP sensor coupler (2), STP sensor coupler (3), STVA coupler (4) and ISC valve coupler (5).



IB14J1140021-02

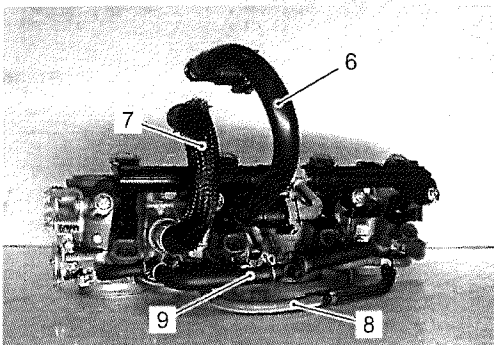
- 3) Disconnect the fuel feed hose (6), ISC valve hose (7) and vacuum hoses (8).
- 4) Disconnect the purge hoses (9). (E-33 only)

Except for E-33



IB14J1140022-01

E-33 only



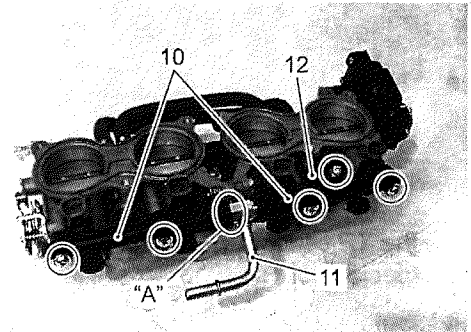
IB14J1140023-01

- 5) Remove the fuel delivery pipe assembly (10).

NOTICE

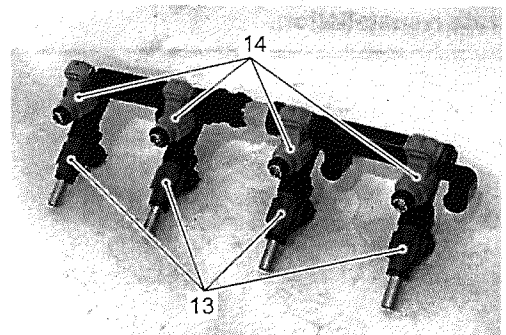
Be careful not to twist the fuel delivery pipe T-joint (11) when removing the fuel delivery pipes, or joint part "A" of the fuel delivery pipe get damage.

- 6) Remove the IAP sensor (12).



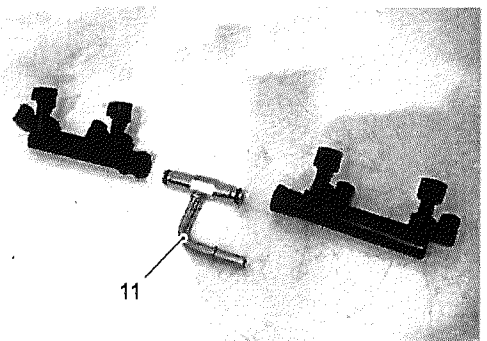
IB14J1140024-01

- 7) Remove the primary fuel injectors (13) and secondary fuel injectors (14) from the fuel delivery pipes.



IB14J1140025-01

- 8) Remove the T-joint (11) from the fuel delivery pipes.




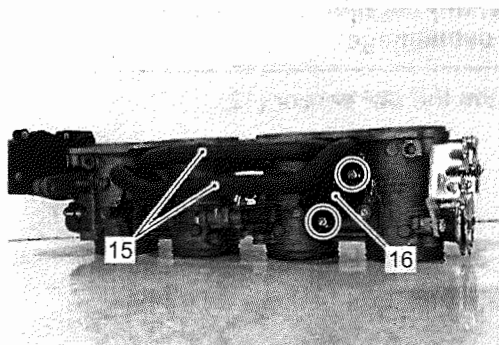
IB14J1140026-02

1D-15 Engine Mechanical:

- 9) Remove the ISC valve hoses (15) and ISC valve (16).

Special tool


 : 09930-11960 (Torx® wrench (T20H))



IB14J1140027-02

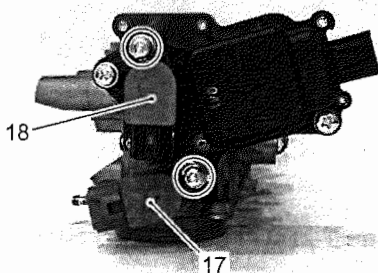
- 10) Remove the TP sensor (17) and STP sensor (18) with the special tool.

Special tool

 : 09930-11950 (Torx® wrench (T25H))

NOTE

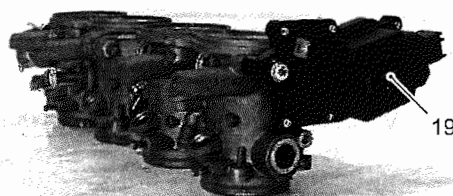
Prior to disassembly, mark each sensor's original position with a paint or scribe for accurate reinstallation.



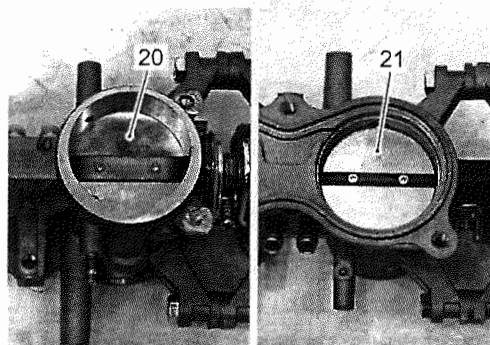
IB14J1140028-02

NOTICE

- Never remove the STVA (19) from the throttle body.
- Do not separate the throttle body.
- Never remove the throttle valves (20) and secondary throttle valves (21).



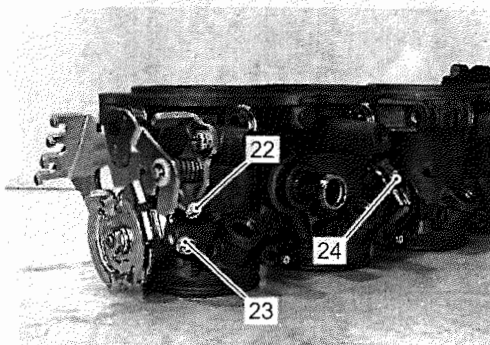
IB14J1140029-02



IB14J1140030-02

NOTE

These adjusting screws (22), (23) and (24) are factory-adjusted at the time of delivery and do not turn or remove them.



IB14J1140031-03


Assembly

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

- Apply thin coat of engine oil to the new O-ring.
- With the secondary throttle valves fully closed, install the STP sensor (Black) and tighten the STP sensor mounting screw to the specified torque.

NOTE

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

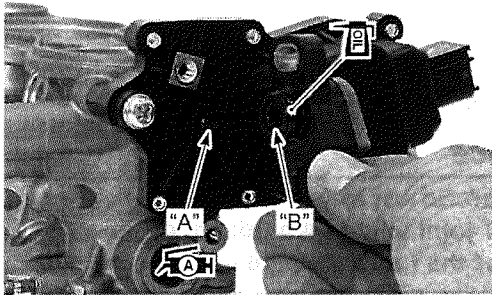
 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

Special tool

 **09930-11950 (Torx® wrench (T25H))**

Tightening torque

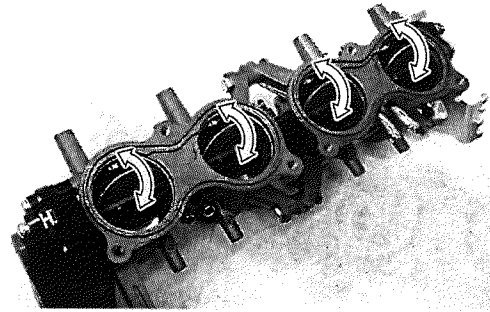
STP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



IB14J1140032-01

- Make sure the secondary throttle valves smoothly open and close.

- Adjust the STP sensor, if necessary. Refer to "STP Sensor Adjustment" in Section 1C (Page 1C-6).




IB14J1140033-02


- Apply thin coat of engine oil to the O-ring.
- With the throttle valves fully closed, install the TP sensor (Gray) and tighten the TP sensor mounting screw to the specified torque.

NOTE

- Align the throttle shaft end "C" with the groove "D" of the TP sensor.
- Apply grease to the throttle shaft end "C" if necessary.

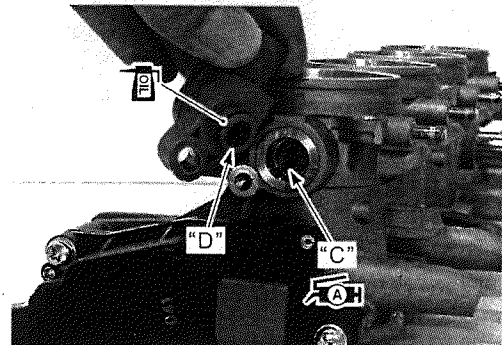
 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

Special tool

 **09930-11950 (Torx® wrench (T25H))**

Tightening torque

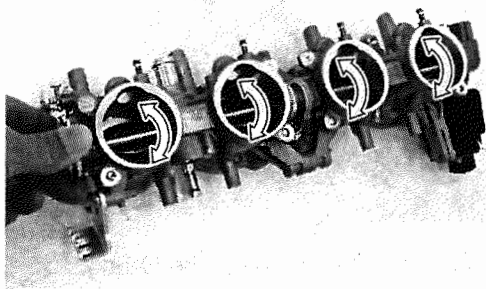
TP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



IB14J1140034-01

1D-17 Engine Mechanical:

- Make sure the throttle valves smoothly open and close.
- Adjust the TP sensor, if necessary. Refer to "TP Sensor Adjustment" in Section 1C (Page 1C-4).



IB14J1140035-01

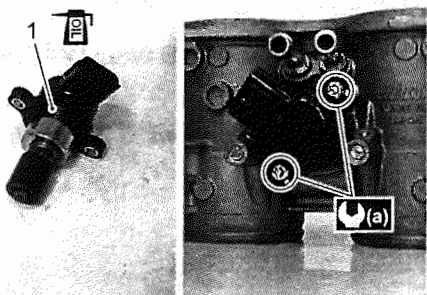
- Apply thin coat of engine oil to the new O-ring (1).
- Tighten the ISC valve mounting screws to the specified torque.

Special tool

TOOL : 09930-11960 (Torx® wrench (T20H))

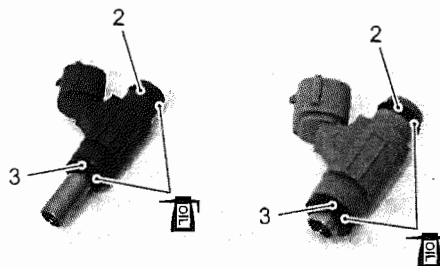
Tightening torque

ISC valve mounting screw (a): 2 N·m (0.2 kgf-m, 1.5 lbf-ft)

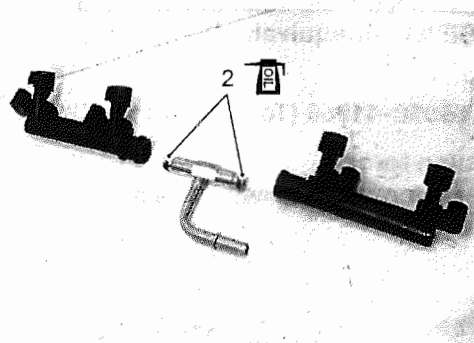


IB14J1140036-01

- Apply thin coat of engine oil to the new O-rings (2) and new cushion seals (3).



IB14J1140037-01

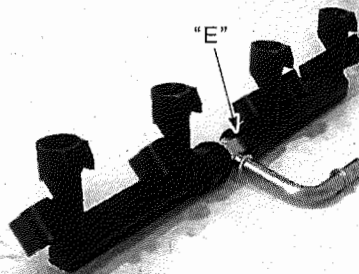


IB14J1140038-01

- Assemble the fuel delivery pipes so the T-joint is set in proper angle as shown.

NOTICE

Be careful not to twist the fuel delivery pipes and T-joint when installing them, or joint part "E" of the fuel delivery pipe may get damage.

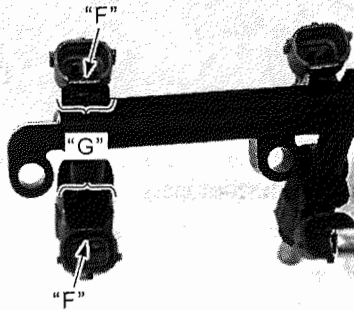


IB14J1140039-01

- Install the fuel injector by pushing it straight to the delivery pipe.

NOTE

- Never turn the injector while pushing it.
- Align the coupler "F" of injector with boss "G" of the delivery pipe.

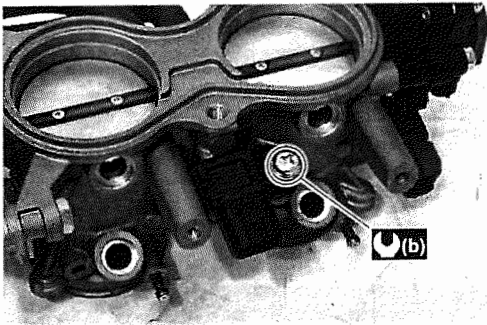


IB14J1140040-01

- Tighten the IAP sensor mounting screw to the specified torque.

Tightening torque

IAP sensor mounting screw (b): 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)

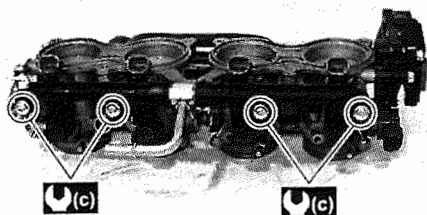


IB14J1140041-01

- Install the fuel delivery pipe assembly to the throttle body.
- Tighten the fuel delivery pipe mounting screws to the specified torque.

Tightening torque

Fuel delivery pipe mounting screw (c): 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



IB14J1140042-01

- Connect the hoses properly. Refer to "Throttle Body Construction" (Page 1D-11).
- Route the wiring harness No. 3. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

Throttle Body Inspection and Cleaning

BENB15J21406012

Refer to "Throttle Body Disassembly and Assembly" (Page 1D-14).

Cleaning**⚠ WARNING**

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

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

NOTICE

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

Inspection

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

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

ISC Valve Visual Inspection

BENB15J21406013

Visually inspect the ISC valve if necessary.

- 1) Remove the ISC valve. Refer to "Throttle Body Disassembly and Assembly" (Page 1D-14).

1D-19 Engine Mechanical:

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



IB14J1140043-01

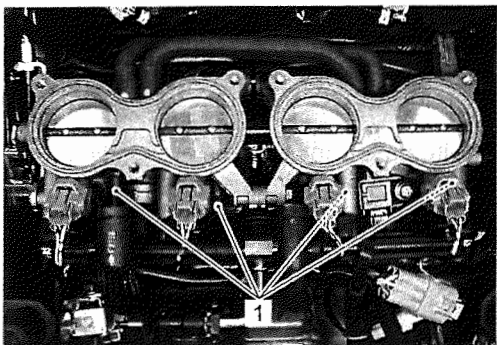
- 3) Reinstall the removed parts.

Throttle Valve Synchronization

BENB15J21406014

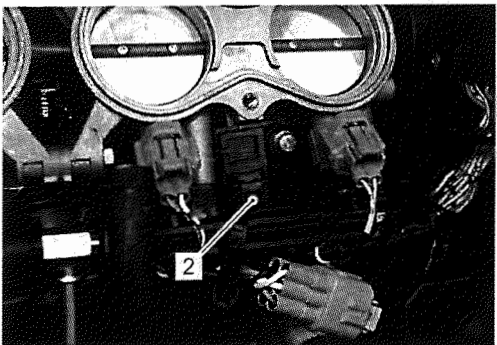
Check and adjust the throttle valve synchronization among four cylinders.

- 1) Start up the engine and run it in idling condition for warming up.
- 2) Stop the warmed-up engine.
- 3) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 4) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" (Page 1D-7).
- 5) Connect the ECM couplers.
- 6) Disconnect the respective vacuum hoses (1) from vacuum nipples on the throttle body.



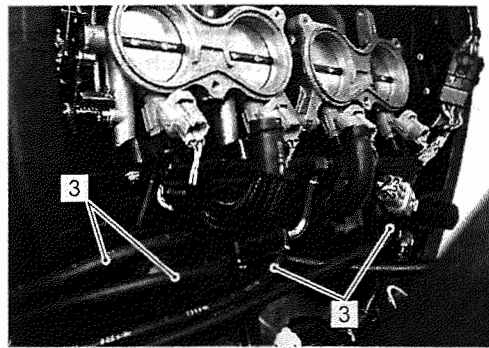
IB14J1140044-01

- 7) Disconnect the IAP sensor coupler (2).



IB14J1140045-01

- 8) Connect the respective vacuum tester hoses (3) to the vacuum nipples.



IB14J1140046-01

- 9) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
- 10) Start the engine.

NOTICE

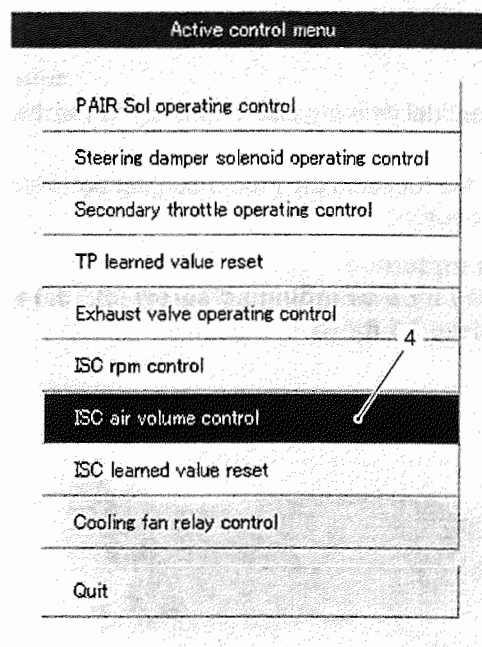
Avoid dirt drawn into the throttle body while running the engine without air cleaner box cover. Dirt drawn into the engine will damage the internal engine parts.

- 11) Click "Data monitor".
- 12) Warm up the engine (Engine coolant temp. more than 80°C (176°F)).

Item	Value	Unit
<input type="checkbox"/> Throttle position	27.9	°
<input type="checkbox"/> Engine coolant / oil temperature	81.7	°C
<input type="checkbox"/> Manifold absolute pressure 1	79.4	kPa

IB14J1140047-02

- 13) Click "Active control".
- 14) Click "ISC air volume control" (4).

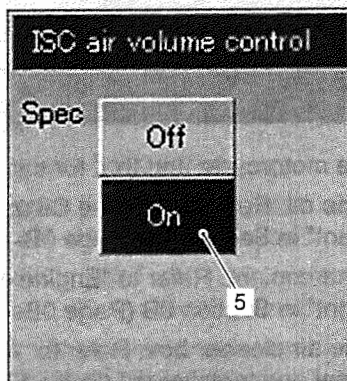


IB14J1140048-02

- 15) Click "ON" button (5) to fix the ISC air volume of four cylinders.

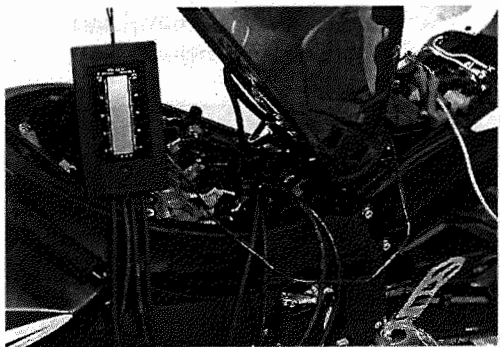
NOTE

When making this synchronization, be sure that the water temperature is within 80 – 95 °C (176 – 203 °F).



IB37H1140295-03

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

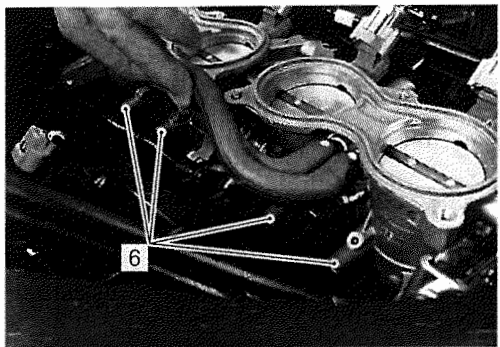


IB14J1140049-01

- 17) Equalize the vacuum of the cylinders by turning each air screw (6) and keep it running at idling speed.

NOTE

Always set the engine rpm at idle rpm.



IB14J1140050-02

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

NOTE

- Slowly turn the air screw 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.

- 19) Repeat the procedures from 9) to 16).
 20) Close the SDS tool and turn the ignition switch OFF.
 21) Disconnect the vacuum tester and reinstall the removed parts.
 22) After completing the throttle valve synchronization, clear the DTC and reset the ISC learned value using SDS tool. Refer to "ISC Valve Learned Preset and Opening Initialization" in Section 1C (Page 1C-8).

ISC Learned Valve Reset

BENB15J21406015

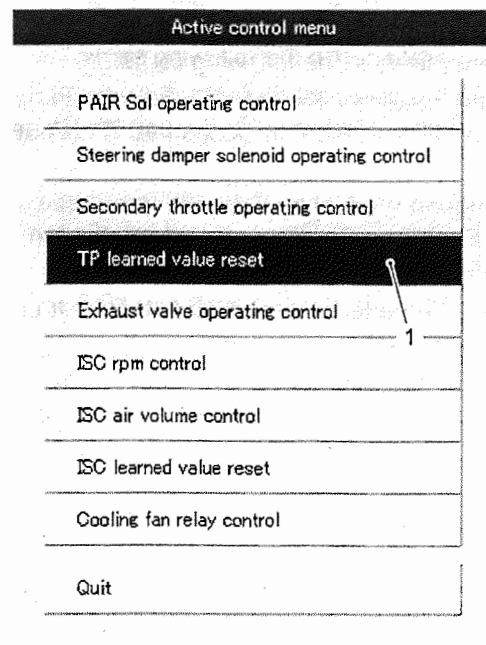
Refer to "ISC Valve Learned Preset and Opening Initialization" in Section 1C (Page 1C-8).

TP Reset

BENB15J21406016

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

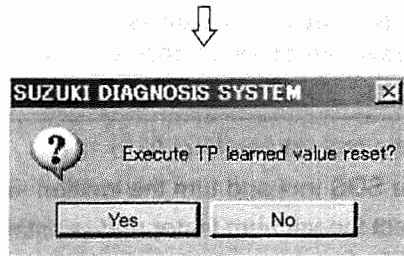
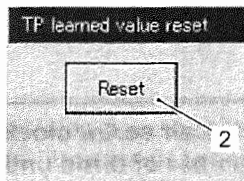
- 1) Turn the ignition switch ON.
- 2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
- 3) Click the "Active control".
- 4) Click the "TP learned value reset" (1).



IB14J1140051-01

1D-21 Engine Mechanical:

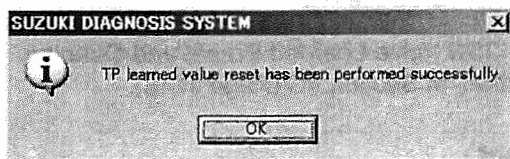
- 5) Click the "Reset" button (2) to clear the TP learned value.



IB14J1140052-01

NOTE

The leaned value of the TP sensor is set at Preset position.



IB14J1140053-01

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

NOTE

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

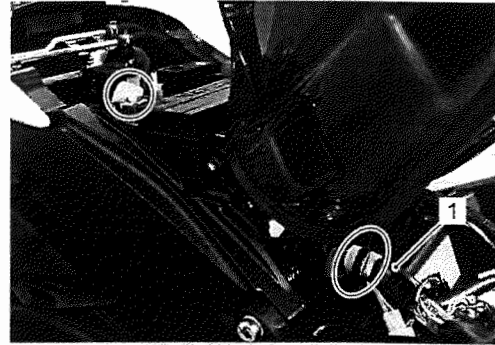
Engine Assembly Removal

BENB15J21406017

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

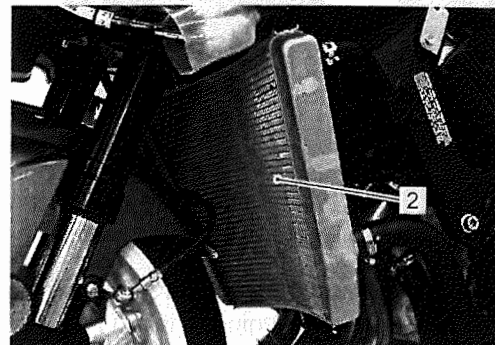
- 1) Remove the cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Disconnect the battery (-) lead wire (1) from the battery (-) terminal.

- 4) Release the battery (-) lead wire (1) from the clamp.



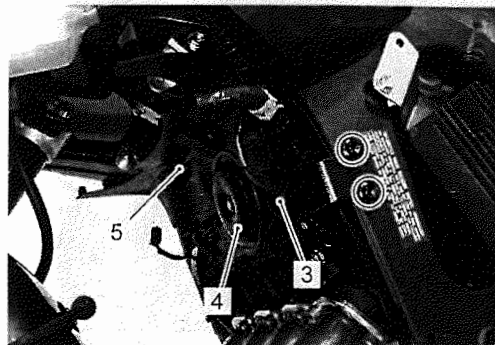
IB14J1140054-01

- 5) Jack up the motorcycle and fix it for safety.
- 6) Drain engine oil. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- 7) Drain engine coolant. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- 8) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" (Page 1D-7).
- 9) Remove the throttle body. Refer to "Throttle Body Removal and Installation" (Page 1D-12).
- 10) Remove the radiator assembly (2). Refer to "Radiator / Cooling Fan Motor Removal and Installation" in Section 1F (Page 1F-6).



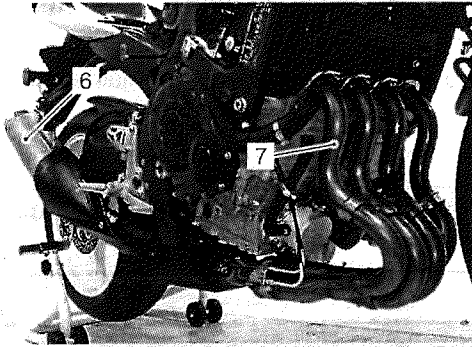
IB14J1140055-01

- 11) Disconnect the horn coupler (3) and remove the horn (4).
- 12) Remove the radiator heat shield (5).



IB14J1140057-01

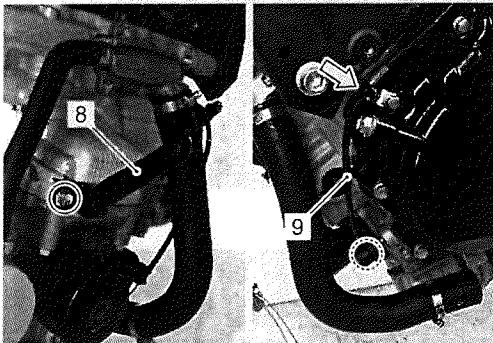
- 13) Remove the muffler (6) and exhaust pipe assembly (7). Refer to "Exhaust Pipe / Muffler Removal and Installation" in Section 1K (Page 1K-12).



IB14J1140056-01

- 14) Remove the radiator mounting bracket (8).

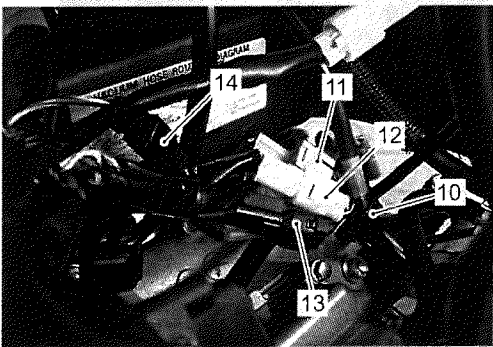
- 15) Disconnect the oil pressure switch lead wire (9).



IB14J1140058-02

- 16) Remove the clamp (10).

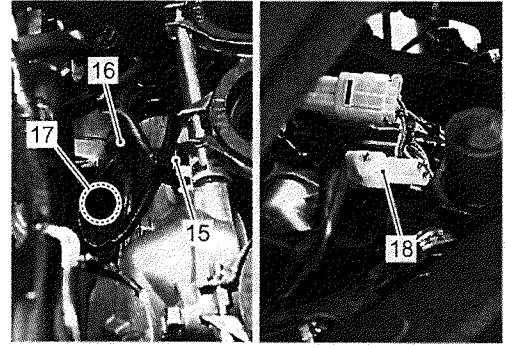
- 17) Disconnect the side-stand switch coupler (11), GP switch coupler (12), speed sensor coupler (13) and ground lead wire coupler (14).



IB14J1140059-01

- 18) Disconnect the ECT sensor coupler (15), generator coupler (16) and starter motor lead wire (17).

- 19) Disconnect the CKP sensor coupler (18).



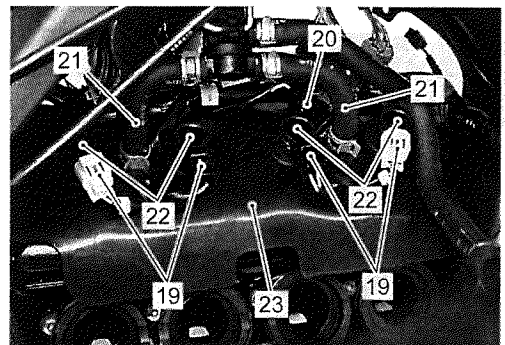
IB14J1140060-01

- 20) Disconnect the ignition coil/plug cap lead wire couplers (19), CMP sensor coupler (20) and PAIR hoses (21).

- 21) Remove the ignition coil/plug caps (22) and cylinder head cover shield (23).

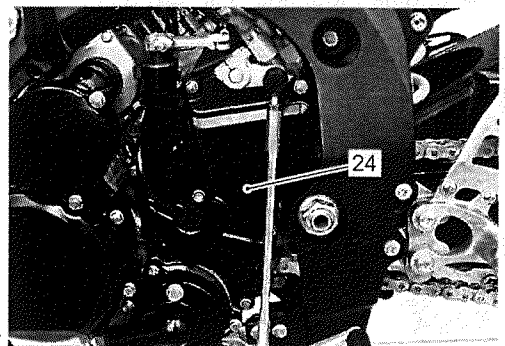
NOTICE

- Do not remove the ignition coil/plug cap before disconnecting its coupler.
- Do not pry up the ignition coil/plug cap with a screwdriver or a bar to avoid its damage.
- Be careful not to drop the ignition coil/plug cap to prevent its short or open circuit.



IB14J1140061-01

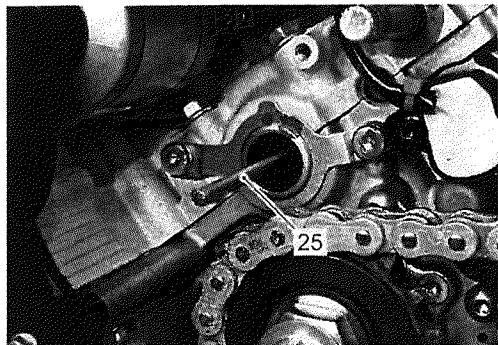
- 22) Remove the engine sprocket cover (24). Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-2).



IB14J1140062-01

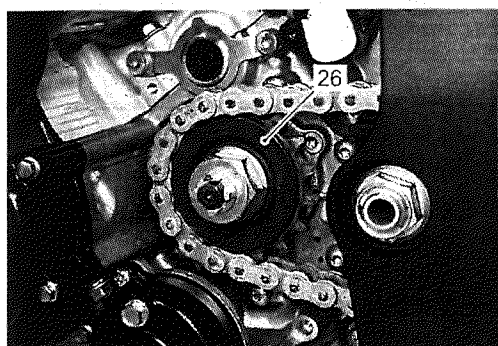
1D-23 Engine Mechanical:

- 23) Remove the clutch push rod (25).



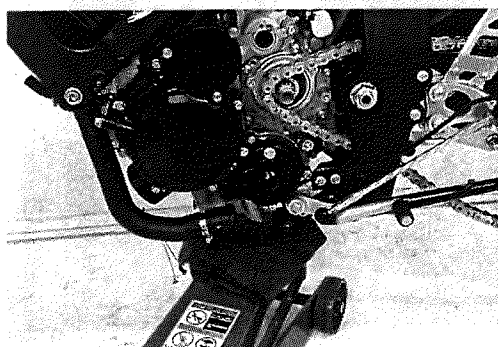
IB14J1140063-01

- 24) Remove the engine sprocket (26). Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-2).



IB14J1140064-01

- 25) Support the engine using an engine jack.

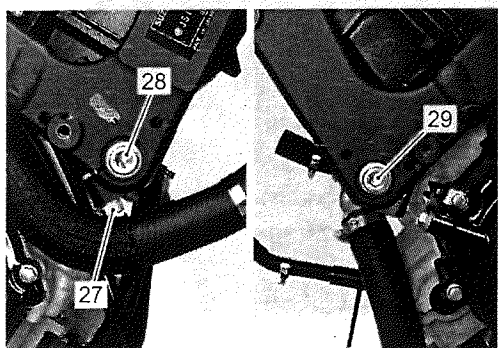


IB14J1140065-01

- 26) Loosen the engine mounting pinch bolt (27) (RH).

- 27) Remove the engine mounting bolt (28) (RH).

- 28) Remove the engine mounting bolt (29) (LH).




IB14J1140066-01

- 29) Remove the engine mounting nut (30).

- 30) Remove the engine mounting thrust adjuster lock-nut (31) with the special tool.

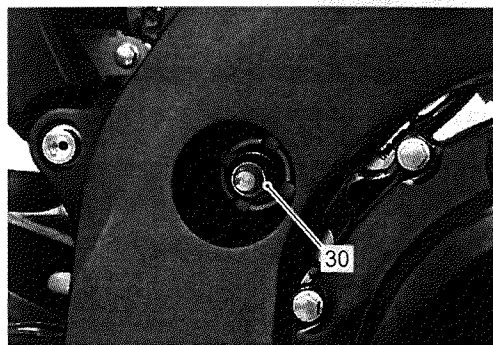
Special tool

 (A): 09940-14980 (Engine mounting adjust wrench)

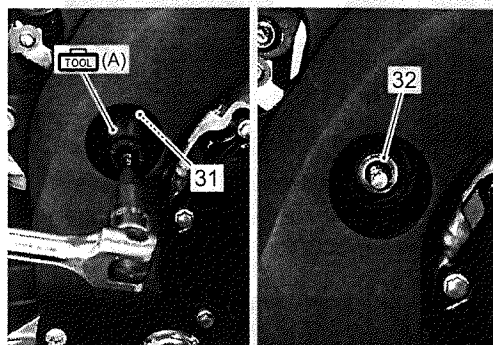
- 31) Loosen the engine mounting thrust adjuster (32) fully.

NOTE

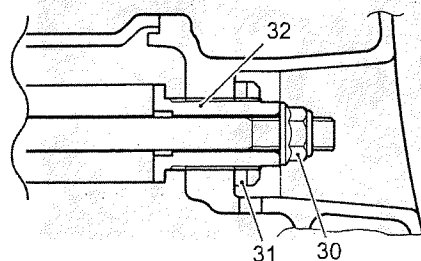
Do not remove the engine mounting bolt at this stage.



IB14J1140067-01



IB14J1140068-01




IB14J1140069-01

- 32) Remove the engine mounting nut (33).

- 33) Loosen the engine mounting thrust adjuster lock-nut (34) with the special tool.

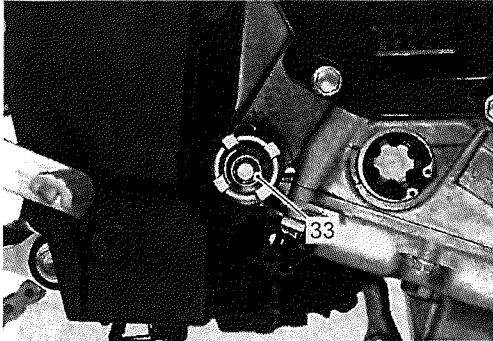
Special tool

 (A): 09940-14980 (Engine mounting adjust wrench)

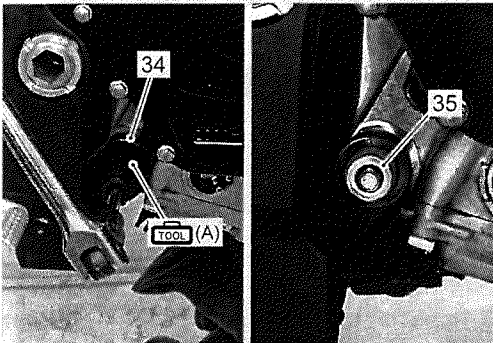
- 34) Loosen the engine mounting thrust adjuster (35) fully.

NOTE

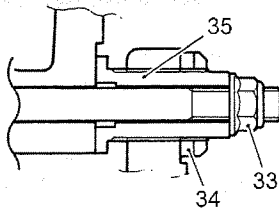
Do not remove the engine mounting bolt at this stage.



IB14J1140070-01



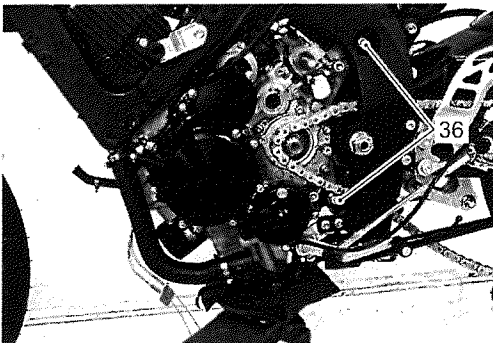
IB14J1140071-01



IB14J1140072-01

- 35) Remove the engine mounting bolts (36) and gradually lower the front side of the engine. Then, take off the drive chain from the driveshaft.

- 36) Remove the engine assembly.



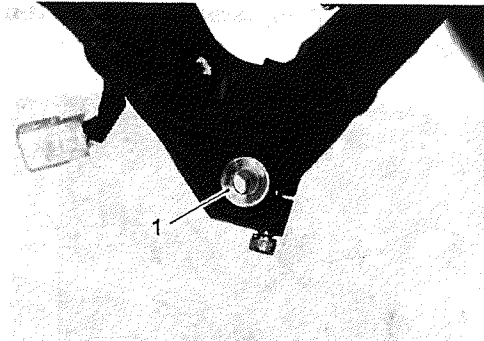
IB14J1140073-01

Engine Assembly Installation

BENB15J21406018

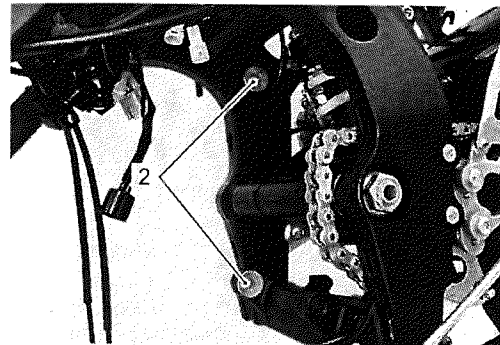
Install the engine in the reverse order of engine removal. Pay attention to the following points:

- Before installing the engine, install the collar (1).



IB14J1140074-01

- Before installing the engine, install the engine mounting thrust adjusters (2).

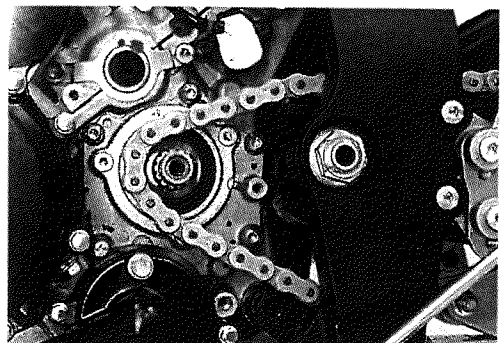


IB14J1140075-01

- Gradually raise the rear side of the engine assembly, and then put the drive chain on the driveshaft.

NOTICE

Be careful not to catch the wiring harness between the frame and the engine.



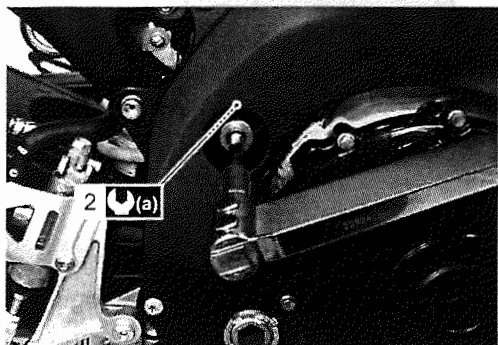
IB14J1140076-01

1D-25 Engine Mechanical:

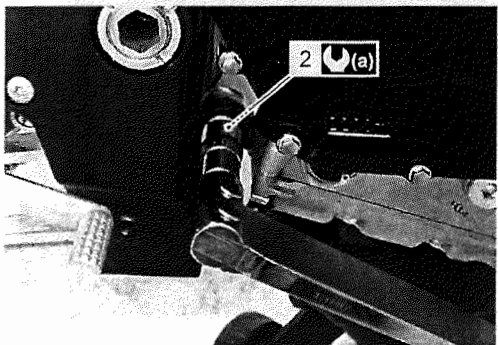
- Install all engine mounting bolts and tighten them temporarily.
- Tighten the engine mounting thrust adjusters (2) to the specified torque.

Tightening torque

Engine mounting thrust adjuster (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1140077-01



IB14J1140078-01

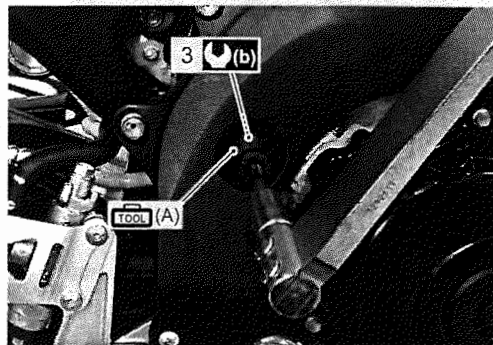
- Tighten the engine mounting thrust adjuster lock-nuts (3) to the specified torque with the special tool.

Special tool

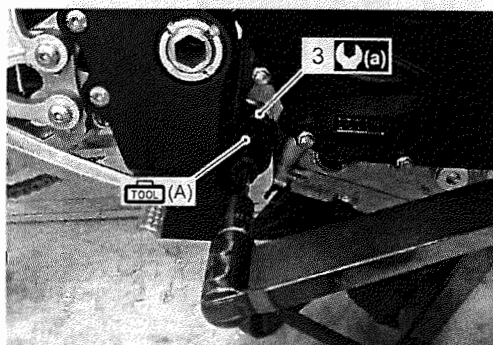
TOOL (A): 09940-14980 (Engine mounting adjust wrench)

Tightening torque

Engine mounting thrust adjuster lock-nut (b): 45 N·m (4.5 kgf-m, 32.5 lbf-ft)



IB14J1140079-03



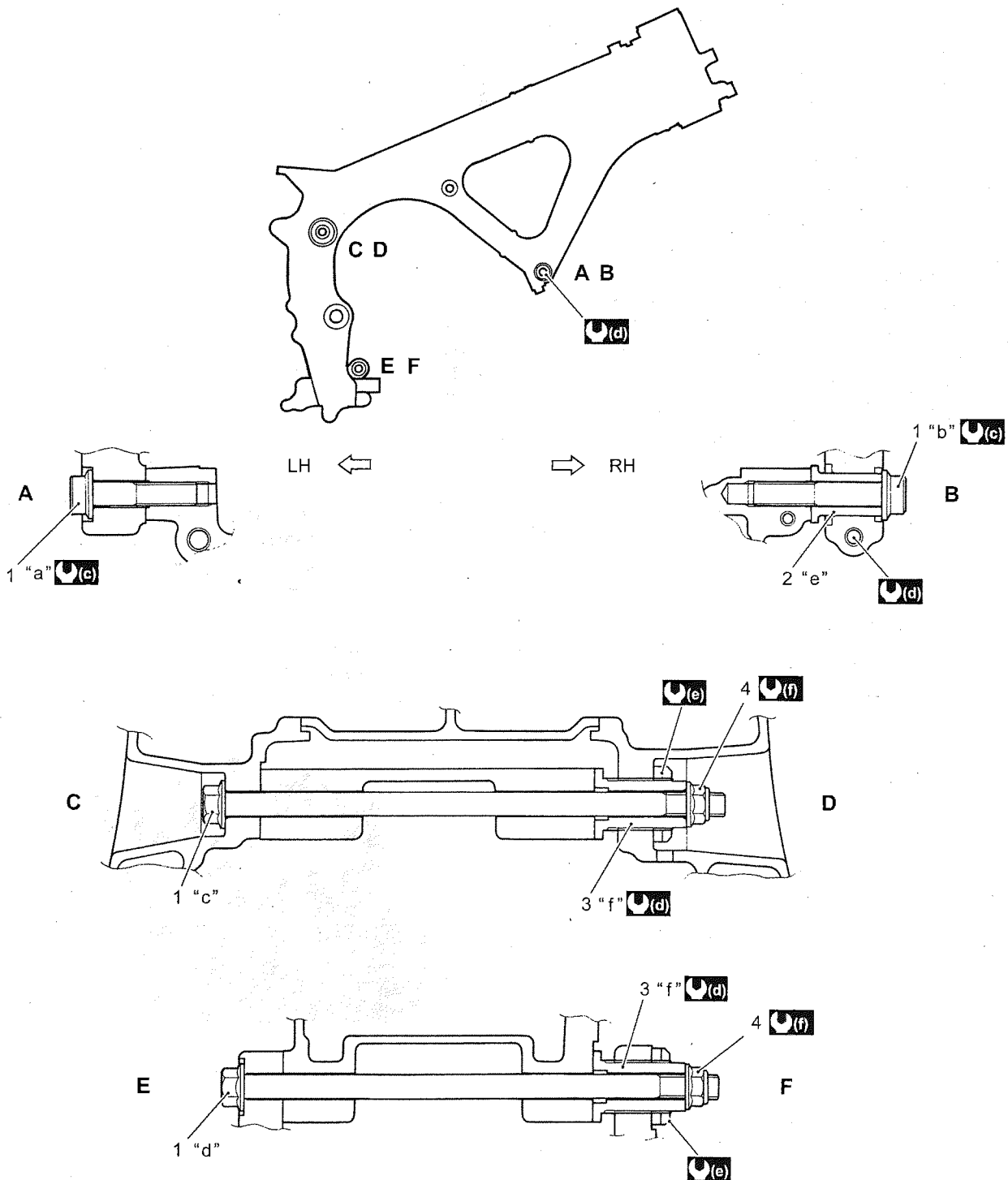
IB14J1140080-01

- Tighten all engine mounting bolts and nuts to the specified torque, as shown in the following illustration.

NOTE

The engine mounting nuts are self-locking. Once the nuts have been removed, they are no longer of any use.

- Tighten the engine mounting pinch bolt to the specified torque, as shown in the following illustration.



IB14J1140081-01

1. Engine mounting bolt	"a": 45 mm (1.77 in)	"e": 30.5 mm (1.20 in)	(c) : 45 N·m (4.5 kgf-m, 32.5 lbf-ft)
2. Collar	"b": 55 mm (2.17 in)	"f": 40 mm (1.57 in)	(f) : 75 N·m (7.5 kgf-m, 54.0 lbf-ft)
3. Engine mounting thrust adjuster	"c": 215 mm (8.46 in)	(c) : 55 N·m (5.5 kgf-m, 40.0 lbf-ft)	
4. Engine mounting nut	"d": 205 mm (8.07 in)	(d) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	

- Install the engine sprocket. Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-2).
- Install the exhaust pipe assembly and muffler. Refer to "Exhaust Pipe / Muffler Removal and Installation" in Section 1K (Page 1K-12).
- Install the radiator assembly. Refer to "Radiator / Cooling Fan Motor Removal and Installation" in Section 1F (Page 1F-6).
- Install the throttle body. Refer to "Throttle Body Removal and Installation" (Page 1D-12).
- Install the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" (Page 1D-7).
- After remounting the engine, route the wiring harness, cable and hoses properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5), "Throttle Cable Routing Diagram" (Page 1D-2) and "Water Hose Routing Diagram" in Section 1F (Page 1F-3).
- Pour engine coolant and engine oil. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12) and "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- After finishing the engine installation, check the following items.
 - Throttle cable play
Refer to "Throttle Cable Play Inspection and Adjustment" in Section 0B (Page 0B-12).
 - Throttle valve synchronization
Refer to "Throttle Valve Synchronization" (Page 1D-19).
 - Clutch cable play
Refer to "Clutch Cable Play Inspection and Adjustment" in Section 0B (Page 0B-14).
 - Drive chain slack
Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-15).
 - Engine oil and coolant leakage
Refer to "Cooling Circuit Inspection" in Section 1F (Page 1F-5).

Engine Top Side Disassembly

BENB15J21406019

It is unnecessary to remove the engine assembly from the frame when servicing the cylinder head cover and camshafts.

NOTE

Before servicing the engine top side components (until camshafts removal) with the engine in place, remove the following parts:

- Air cleaner box
- Throttle body

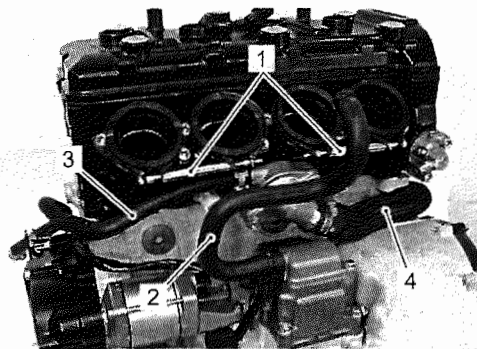
Other parts except for these "Engine Top Side Components" can not be serviced with the engine installed in the frame. Refer to "Engine Assembly Removal" (Page 1D-21) and "Engine Assembly Installation" (Page 1D-24).

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.

Clamp / Hose

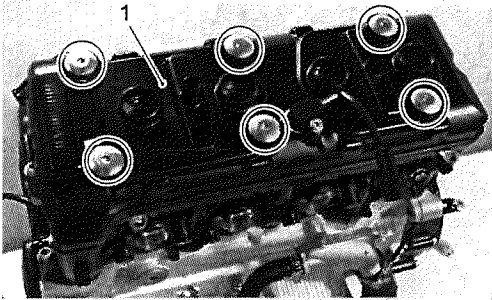
- 1) Remove the intake pipe clamps (1).
- 2) Remove the PCV hose (2), water bypass hose (3) and radiator inlet hose (4).



IB14J1140082-01

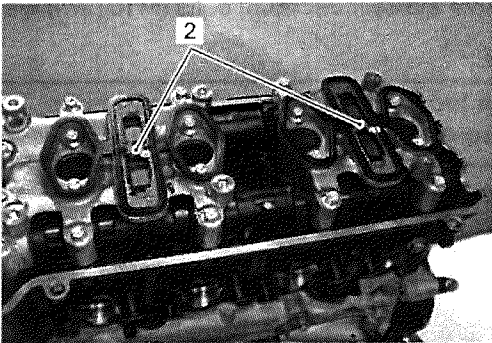
Cylinder Head Cover

- 1) Remove the spark plugs. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-6).
- 2) Remove the cylinder head cover (1) and its gasket.



I837H1140199-01

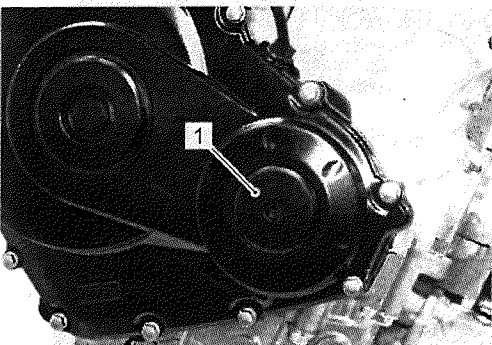
- 3) Remove the PAIR reed valves (2) along with the gaskets.



I837H1140200-01

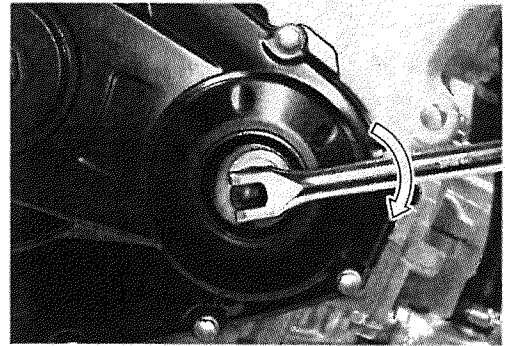
Camshaft

- 1) Remove the crankshaft hole plug (1).

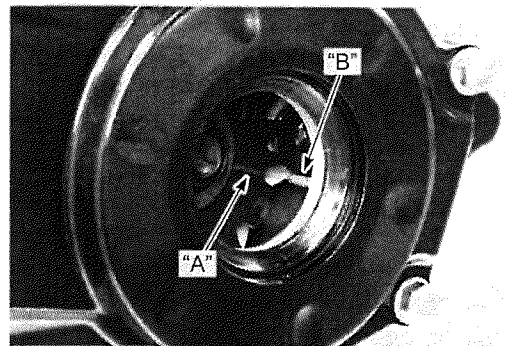


I837H1140201-01

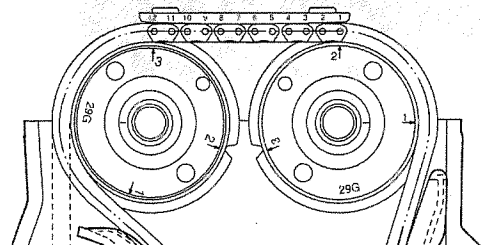
- 2) Turn the crankshaft to bring the line "A" on the CKP sensor rotor to the rib "B" behind the clutch cover and also to bring the camshafts to the position as shown.



I837H1140202-01



I837H1140203-01

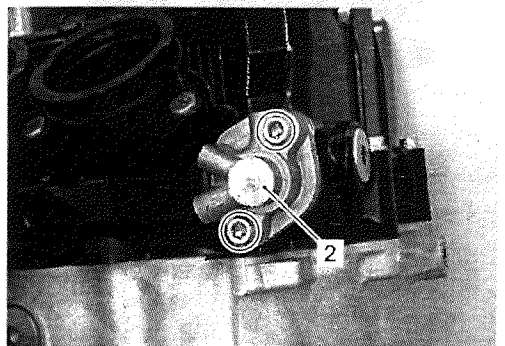


I837H1140204-01

- 3) Remove the cam chain tension adjuster (2).

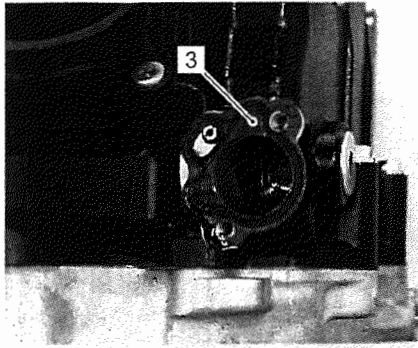
NOTE

Use the short head hexagon wrench when loosening the mounting bolts with the engine installed in the frame.



IB14J1140083-02

- 4) Remove the gasket (3).

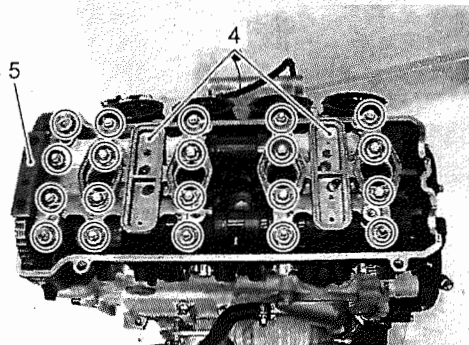


IB14J1140084-02

- 5) Remove the camshaft journal holders (4) and cam chain guide No. 2 (5).

NOTE

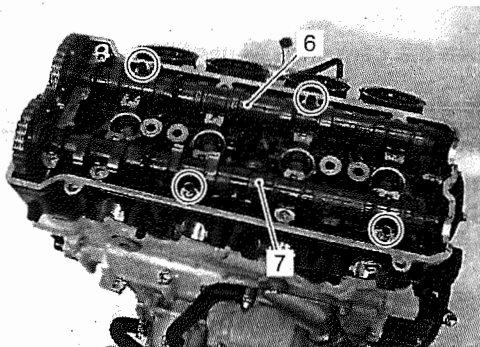
Be sure to loosen the camshaft journal holder bolts evenly by shifting the wrench in the descending order of numbers.



IB14J1140085-02

- 6) Remove the dowel pins.

- 7) Remove the intake camshaft (6) and exhaust camshaft (7).



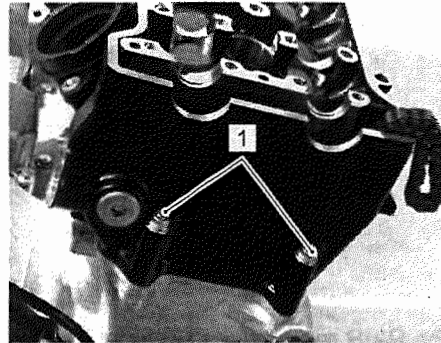
IB14J1140086-01

Cylinder Head

NOTE

The cylinder head can not be serviced with the engine installed in the frame.

- 1) Remove the cylinder head bolts (M6) (1).



IB37H1140209-01

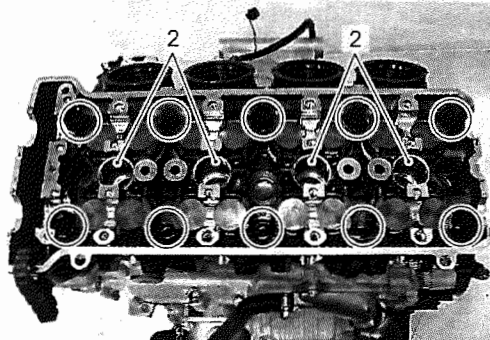
- 2) Remove the O-rings (2).

- 3) Remove the cylinder head bolts (M10) and washers.

NOTE

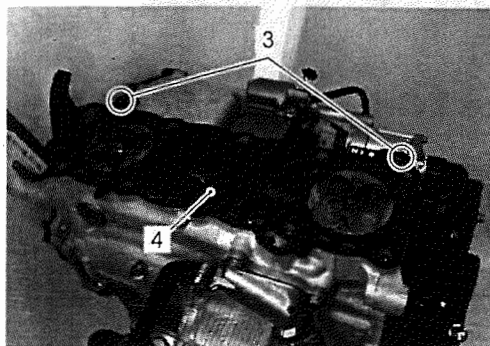
When loosening the cylinder head bolts, loosen each bolt little by little diagonally.

- 4) Remove the cylinder head.



IB14J1140087-01

- 5) Remove the dowel pins (3) and cylinder head gasket (4).



IB15J1140003-01

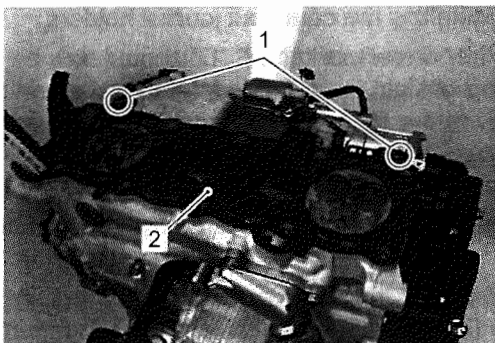
Engine Top Side Assembly

BENB15J21406020

Assemble the engine top side in the reverse order of disassembly. Pay attention to the following points:

Cylinder Head

- Fit the dowel pins (1) and new cylinder head gasket (2) to the cylinder.



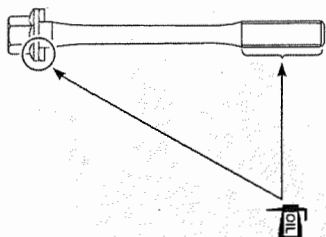
IB15J1140004-01

- Place the cylinder head on the cylinder head gasket.

NOTE

When installing the cylinder head, keep the cam chain taut.

- Apply engine oil to the washers and thread portion of the bolts before installing the cylinder head bolts.

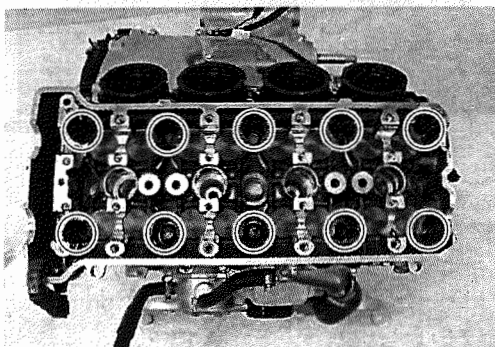


IB23H1140063-01

- Tighten the cylinder head bolts (M10) to the specified torque with a torque wrench sequentially and diagonally.
- Additionally tighten the cylinder head bolts with the specified angles diagonally using an angular torque gauge.

Tightening torque

Cylinder head bolt (M10): 31 N·m (3.1 kgf-m, 22.5 lbf-ft) then turn in 1/6 (60°) turn

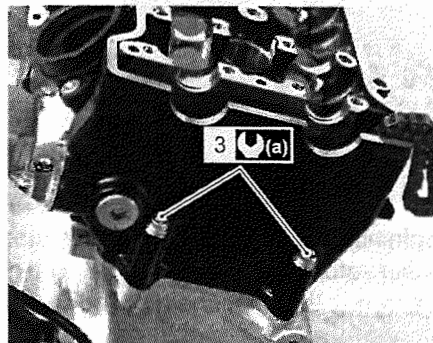


IB14J1140090-01

- After firmly tightening the cylinder head bolts (M10), tighten the cylinder head bolts (M6) (3).

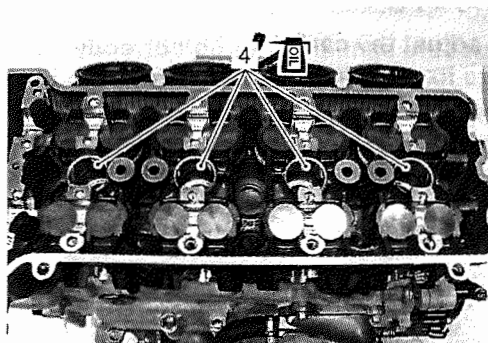
Tightening torque

Cylinder head bolt (M6) (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB37H1140214-01

- Apply engine oil to the new O-rings (4) and install them.

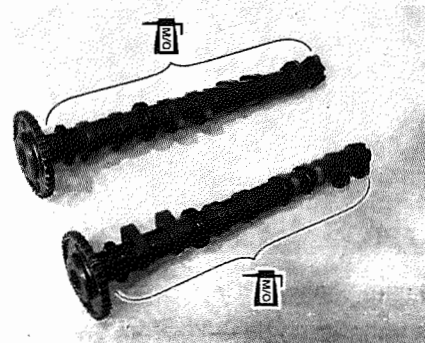


IB14J1140091-01

Camshaft

- The cam shafts are identified by the embossed letters.
IN: Intake camshaft
EX: Exhaust camshaft
- Before placing the camshafts on the cylinder head, apply molybdenum oil to their journals and cam faces.

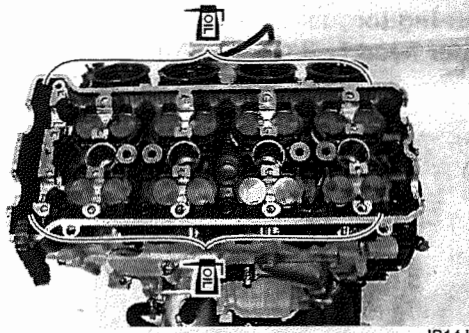
M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



IB14J1140092-01

1D-31 Engine Mechanical:

- Apply engine oil to journal holders.

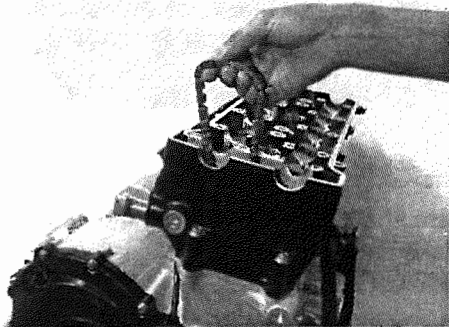


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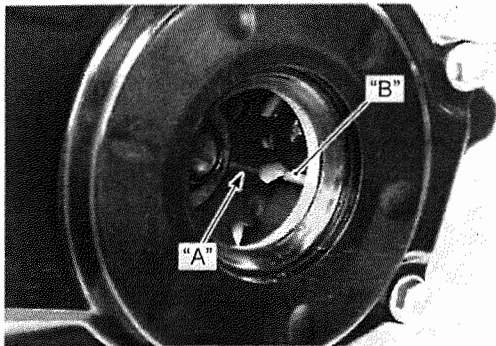
- Turn the crankshaft clockwise and align the line "A" on the CKP sensor rotor to the rib "B" behind the clutch cover while keeping the cam chain pulled upward.

NOTE

- Pull the cam chain upward, or the chain will be caught between crankcase and cam drive sprocket.
- To adjust the camshaft timing correctly, be sure to align the line "A" with rib "B" and hold this position when installing the camshafts.



IB837H1140217-01



IB837H1140218-01

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

- Engage the cam chain with the exhaust camshaft sprocket.

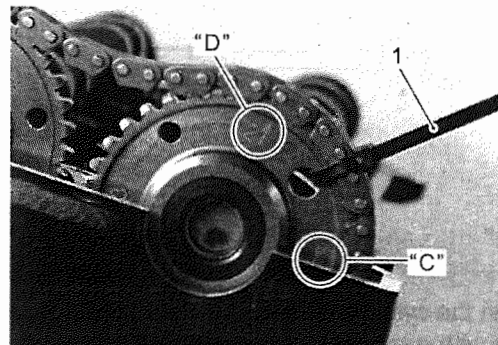
NOTE

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

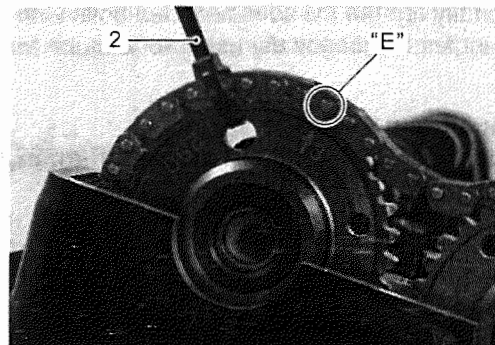
- Bind the cam chain and the sprocket with a proper clamp (1) to prevent the cam chain disengagement while installing the camshaft journal holders.
- The other arrow marked "2" "D" should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked "2" "D", count out 12 roller pins (from the exhaust camshaft side going towards the intake camshaft side).
- Engage the 12th roller pin "E" on the cam chain with the arrow marked "3" on the intake sprocket.
- Bind the cam chain and the sprocket with a proper clamp (2) to prevent the cam chain disengagement while installing the camshaft journal holders.

NOTE

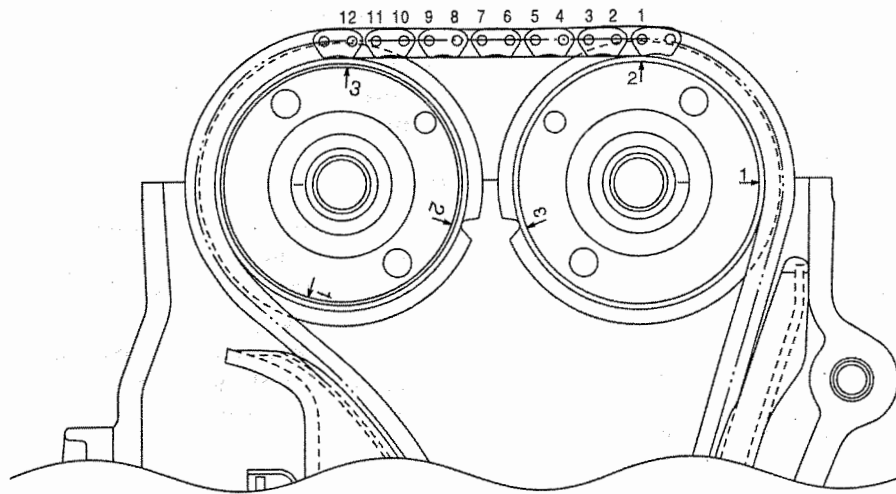
The cam chain should now be on all three sprockets. Be careful not to move the crankshaft until the camshaft journal holders and cam chain tension adjuster are secured.



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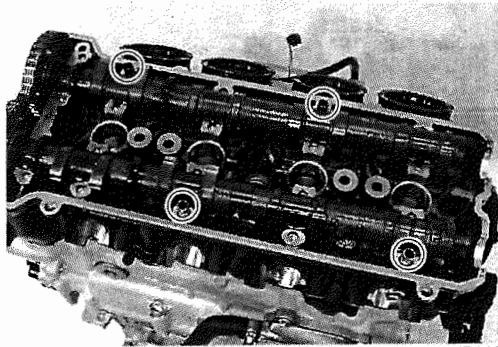


IB837H1140220-01



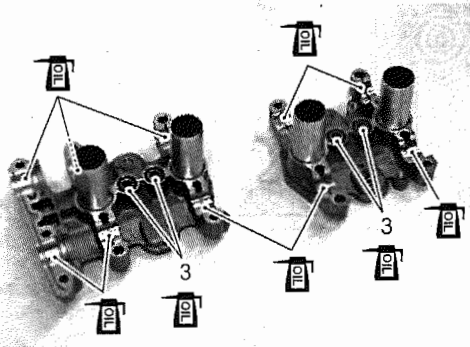
IB37H1140222-03

- Install the dowel pins.



IB14J1140094-01

- Apply engine oil to the new O-rings (3) and install them.
- Apply engine oil to journal holders.

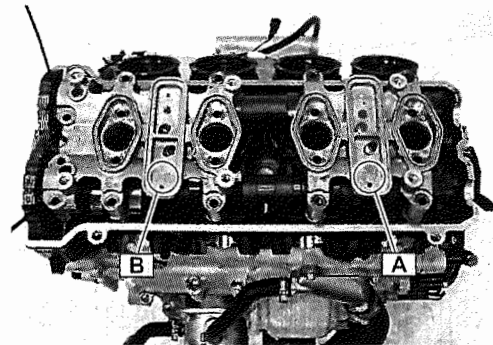


IB14J1140095-01

- Install the camshaft journal holders.

NOTE

- Each camshaft journal holder is identified with an embossed letter.
- Check that embossed letter on each holder faces exhaust side.



IB14J1140096-02

Embossed letter	Cylinder
A	No. 1 and No. 2
B	No. 3 and No. 4

1D-33 Engine Mechanical:

- Install the cam chain guide No. 2 (4).
- Fit the copper washer to the camshaft journal holder bolts "F".
- Fasten the camshaft journal holders evenly by tightening the camshaft journal holder bolts lightly, in the ascending order of numbers.

NOTE

- Damage to head or camshaft journal holder thrust surfaces may result if the camshaft journal holders are not drawn down evenly.
- The ascending order of numbers are indicated on the camshaft journal holders.

- Tighten the camshaft journal holder bolts in ascending order of numbers to the specified torque.

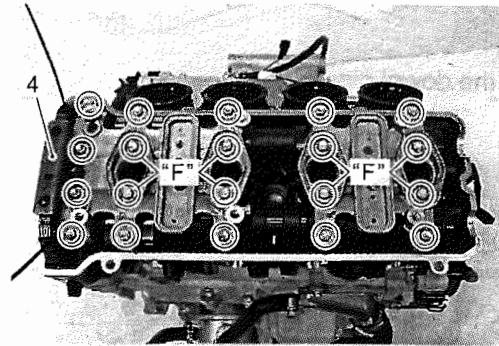
Tightening torque

Camshaft journal holder bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

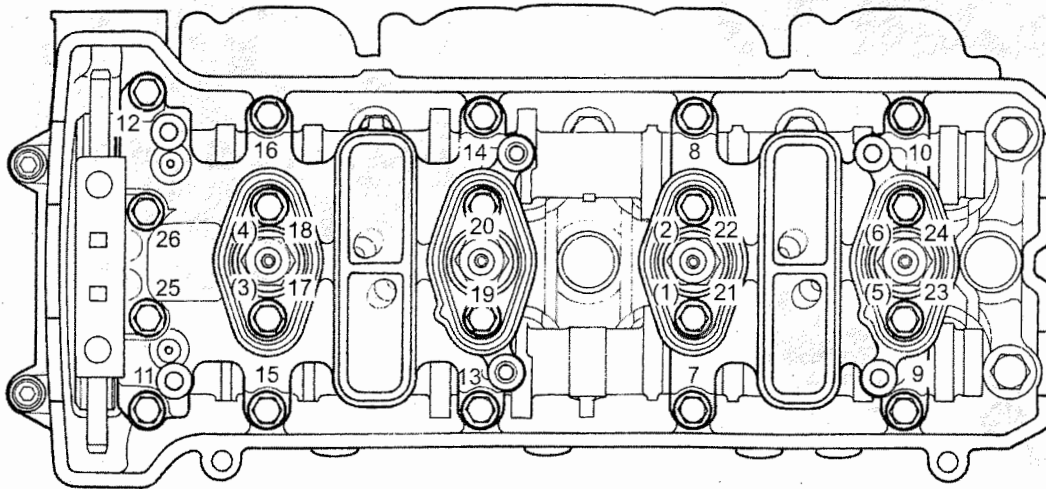
NOTICE

The camshaft journal holder bolts are made of a special material and much superior in strength, compared with other types of high strength bolts.

Take special care not to use other types of bolts instead of these special bolts.

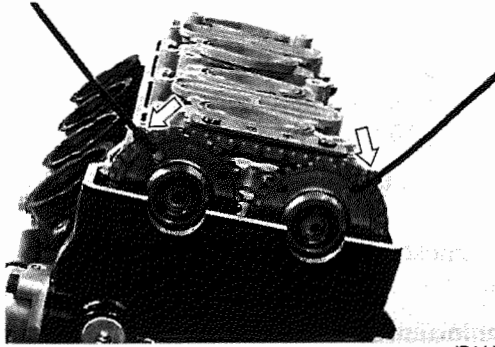


IB14J1140205-01



I837H1140228-01

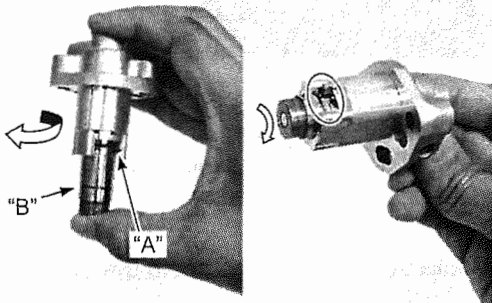
- Remove the clamps.



IB14J1140097-01

Cam Chain Tension Adjuster

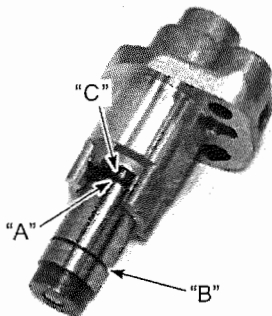
- Holding the cam chain tension adjuster as shown in the figure, compress the plunger by turning the adjuster body until the outer circlip "A" reaches the groove "B".
- Hook the outer circlip "A" into the groove "B", then turn the plunger head clockwise more than 90° to make a little play in the inner thread mechanism.



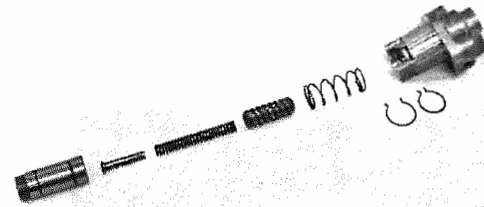
IB23H1140355-01

NOTE

Do not turn the adjuster body until the outer circlip "A" exceeds the groove "B". If the inner circlip "C" is caught in the groove "B", plunger may not go out automatically from the adjuster body even if pushing force is applied on the head. In such case, it needs to be disassembled.

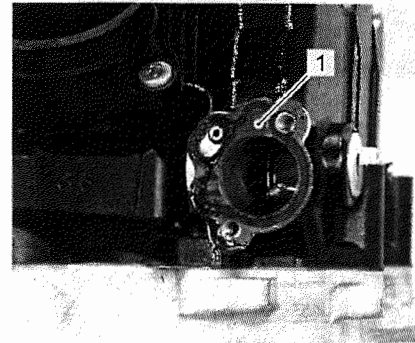


IB23H1140365-01



IB23H1140366-01

- Fit a new gasket (1).



IB14J1140098-02

- Install the cam chain tension adjuster (2).

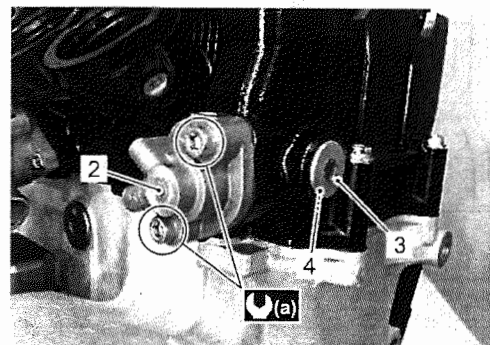
NOTE

Use the short head hexagon wrench when tightening the mounting bolts with the engine installed in the frame.

Tightening torque

Cam chain tension adjuster mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

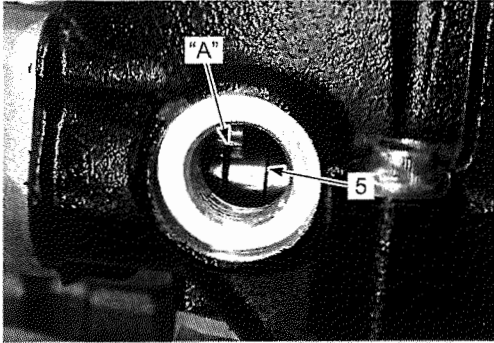
- Remove the cam chain tension adjuster service cap (3) and gasket (4).



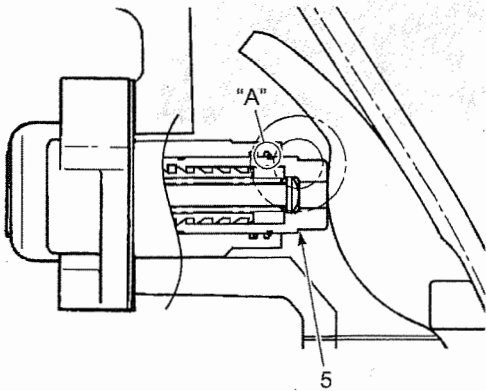
IB14J1140099-02

1D-35 Engine Mechanical:

- Unhook the outer circlip "A" from its groove by pushing the stepped part (5) of the plunger head with a screwdriver.
- Rotate the crankshaft (some turns) and recheck the valve timing.

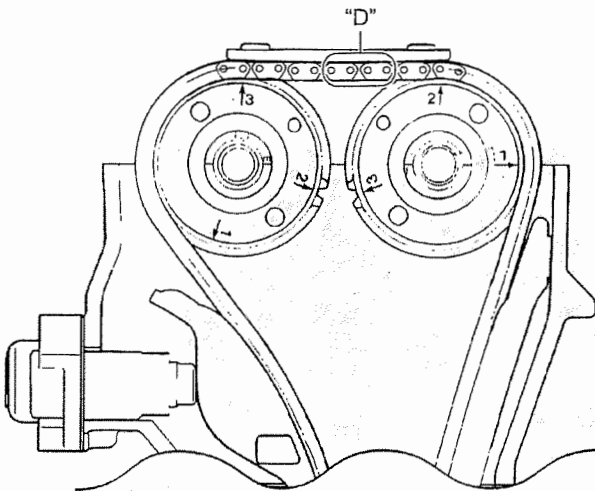


IB14J1140100-01



IB37H1140308-02

- Make sure that the adjuster works properly by checking no slack at point "D".



IB14J1140101-01

NOTE

The cam chain tension adjuster can be serviced with the engine installed in the frame.

- Fit the new gasket to the service cap (6).
- Tighten the cam chain tension adjuster service cap (6) to the specified torque.

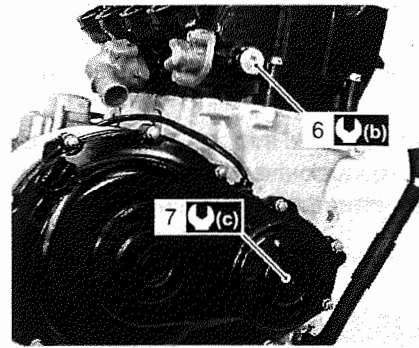
Tightening torque

Cam chain tension adjuster service cap (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

- Apply engine oil to the new O-ring and fit it to the plug (7).
- Tighten the crankshaft hole plug (7) to the specified torque.

Tightening torque

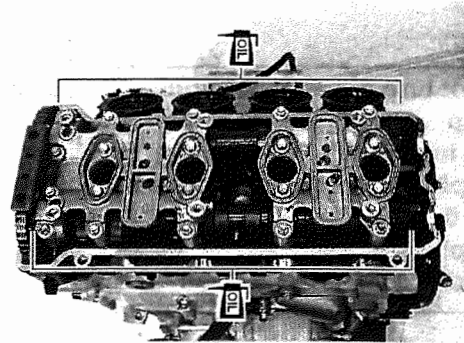
Crankshaft hole plug (c): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)



IB14J1140102-02

Cylinder Head Cover

- Check and adjust the valve clearance. Refer to "Valve Clearance Inspection and Adjustment" in Section 0B (Page 0B-4).
- Pour engine oil in each oil pocket in the cylinder head.

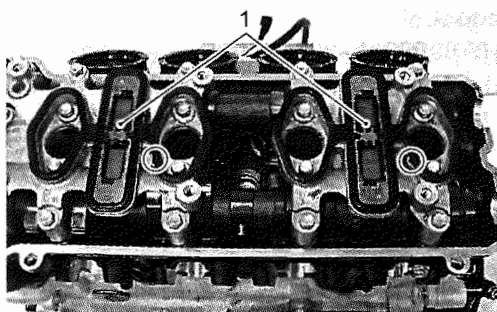


IB14J1140206-01

- Install the PAIR reed valves (1) along with the new gaskets.

NOTE

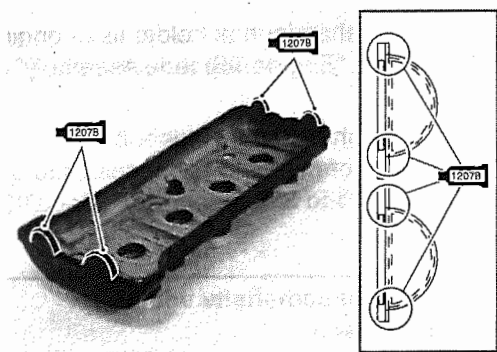
Fit the projection of the gaskets to the depression of the camshaft holders.



IB14J1140207-01

- Install the new gasket to the cylinder head cover.
- Apply bond to the cam end cap points of the gasket as shown.

1207B : Sealant 99000-31140 (SUZUKI BOND No.1207B or equivalent)



I837H1140236-01

- Place the cylinder head cover on the cylinder head.
- Fit the new gasket (2) to each head cover bolt.
- Apply engine oil to both sides of the gaskets.

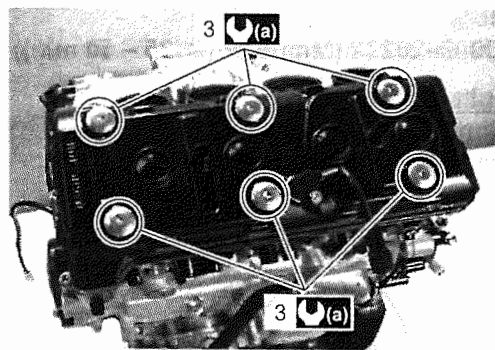


IB14J1140103-01

- Tighten the head cover bolts (3) to the specified torque.

Tightening torque

Head cover bolt (a): 14 N·m (1.4 kgf-m, 10.0 lbf-ft)



I837H1140238-01

- Install the spark plugs. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" in Section 1H (Page 1H-6).
- Install the intake pipe clamps, PCV hose and water hoses. Refer to "Water Hose Routing Diagram" in Section 1F (Page 1F-3).

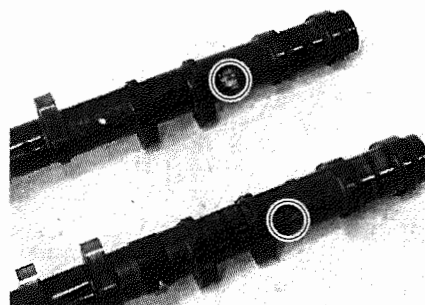
Camshaft Inspection

BENB15J21406021

Refer to "Engine Top Side Disassembly" (Page 1D-27).
Refer to "Engine Top Side Assembly" (Page 1D-30).

Camshaft Identification

The exhaust camshaft has the embossed letters "EX" and the intake camshaft has the embossed letters "IN".



IB14J1140104-01

Cam Wear

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

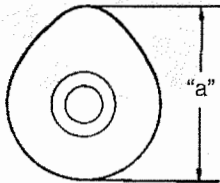
Special tool

TOOL: 09900-20202 (Micrometer (25 – 50 mm))

Cam height "a"

Service limit (IN.): 36.28 mm (1.428 in)

Service limit (EX.): 35.48 mm (1.397 in)



1649G1140199-02

Camshaft Runout

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

Special tool

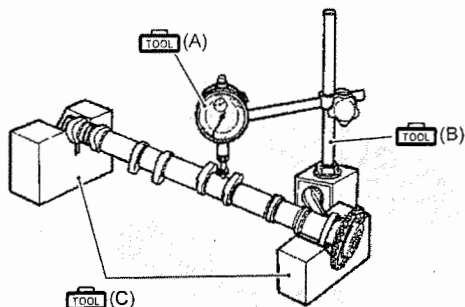
TOOL (A): 09900-20607 (Dial gauge)

TOOL (B): 09900-20701 (Dial gauge chuck)

TOOL (C): 09900-21304 (V blocks)

Camshaft runout (IN. & EX.)

Service limit: 0.10 mm (0.004 in)



1837H1140240-02

Camshaft Journal Wear

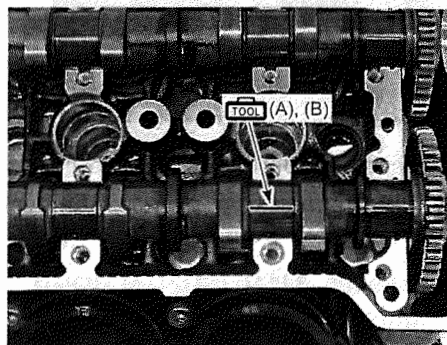
Inspect the camshaft journal wear in the following procedures:

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

Special tool

TOOL (A): 09900-22301 (Plastigage (0.025 – 0.076 mm))

TOOL (B): 09900-22302 (Plastigage (0.051 – 0.152 mm))



1B14J1140106-01

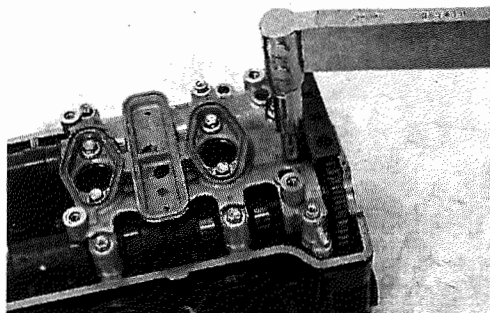
- 3) Install each camshaft journal holder to its original position. Refer to "Engine Top Side Assembly" (Page 1D-30).
- 4) Tighten the camshaft journal holder bolts in ascending order of numbers to the specified torque. Refer to "Engine Top Side Assembly" (Page 1D-30).

NOTE

Do not rotate the camshafts with the plastigage in place.

Tightening torque

Camshaft journal holder bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

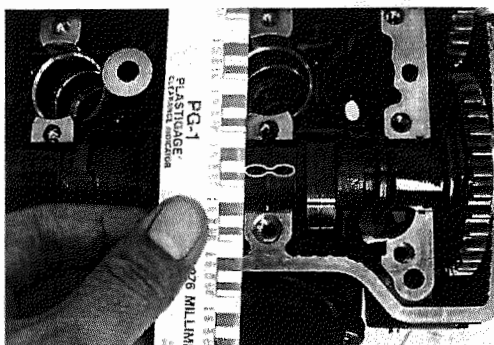


1B14J1140107-01

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

Camshaft journal oil clearance (IN. & EX.)

Service limit: 0.150 mm (0.0059 in)



IB14J1140108-01

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

Special tool

TOOL (C): 09900-20602 (Dial gauge)

TOOL (D): 09900-22403 (Small bore gauge (18 – 35 mm))

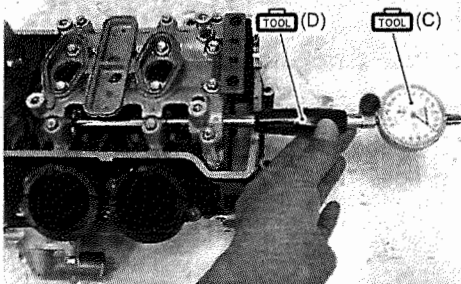
TOOL (E): 09900-20205 (Micrometer (0 – 25 mm))

Camshaft journal holder I.D. (IN. & EX.)

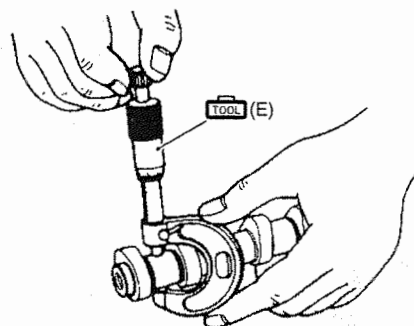
Standard: 24.012 – 24.025 mm (0.9454 – 0.9459 in)

Camshaft journal O.D. (IN. & EX.)

Standard: 23.959 – 23.980 mm (0.9433 – 0.9441 in)



IB14J1140109-01



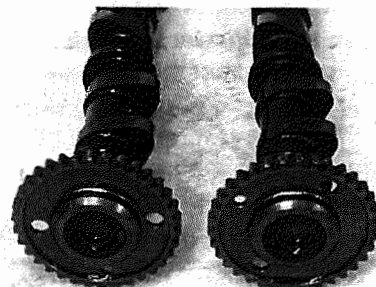
IB49G1140204-03

Camshaft Sprocket

BENB15J21406022

Inspect the camshaft sprocket in the following procedures:

- 1) Remove the intake and exhaust camshafts. Refer to "Engine Top Side Disassembly" (Page 1D-27).
- 2) Inspect the teeth of each camshaft sprocket for wear or damage.
If they are worn or damaged, replace the sprocket/camshaft assembly and cam chain as a set.



IB14J1140110-01

- 3) Install the camshafts. Refer to "Engine Top Side Assembly" (Page 1D-30).

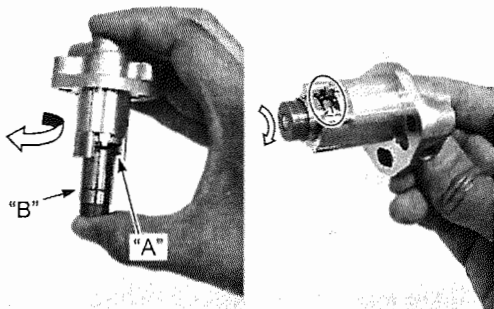
Cam Chain Tension Adjuster Inspection

BENB15J21406023

The cam chain tension adjuster is maintained to proper tension automatically.

- 1) Remove the cam chain tension adjuster. Refer to "Engine Top Side Disassembly" (Page 1D-27).

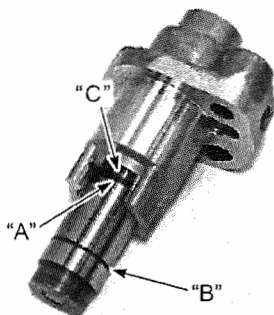
- 2) Holding the cam chain tension adjuster as shown, compress the plunger by turning the adjuster body until the outer circlip "A" reaches the groove "B".
- 3) Hook the outer circlip "A" into the groove "B", then turn the plunger head clockwise more than 90° to make a little play in the inner thread mechanism.



I823H1140355-01

NOTE

- If it is difficult to compress the plunger because of internal engine oil, disassemble the adjuster by releasing the inner circlip "C" and spill out the oil.
- Do not turn the adjuster body until the outer circlip "A" exceeds the groove "B". If the inner circlip "C" is caught in the groove "B", plunger may not go out automatically from the adjuster body even if pushing force is applied on the head. In such case, it needs to be disassembled.

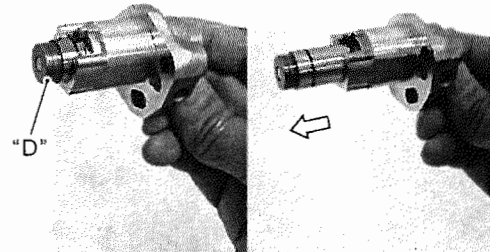


I823H1140365-01



I823H1140366-01

- 4) Check that the plunger goes out automatically when tapping its head "D". If it does not work smoothly, replace the cam chain tension adjuster with a new one.



I823H1140367-01

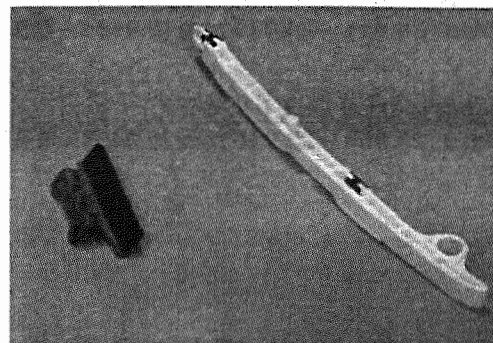
- 5) Install the cam chain tension adjuster. Refer to "Engine Top Side Assembly" (Page 1D-30).

Cam Chain Guide Inspection

BENB15J21406024

Inspect the cam chain guides in the following procedures:

- 1) Remove the camshaft journal holders and cam chain guide No. 2. Refer to "Engine Top Side Disassembly" (Page 1D-27).
- 2) Remove the cam chain guide No. 1. Refer to "Engine Bottom Side Disassembly" (Page 1D-49).
- 3) Check the contacting surface of the cam chain guides. If it is worn or damaged, replace it with a new one.



I837H1140278-01

- 4) Install the removed parts. Refer to "Engine Top Side Assembly" (Page 1D-30) and "Engine Bottom Side Assembly" (Page 1D-57).

Cylinder Head Disassembly and Assembly

BENB15J21406025

Refer to "Engine Top Side Disassembly" (Page 1D-27).

Refer to "Engine Top Side Assembly" (Page 1D-30).

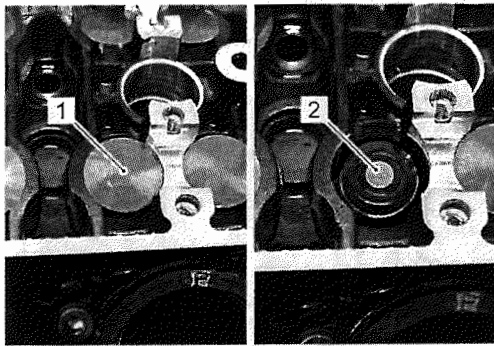
NOTE

Identify the position of each removed part.
Organize the parts in their respective groups (i.e., intake, exhaust, No. 1 or No. 2) so that they can be installed in their original locations.

Disassembly

Tappet / Shim

Remove the tappet (1) and shim (2) by fingers or magnetic hand.




IB14J1140111-01

Valve spring / Valve Intake side

- 1) Insert the special tool (A) between the valve spring and cylinder head.

Special tool


 (A): 09919-28620 (Sleeve protector)


- 2) Using the special tools, compress the valve spring and remove the two cotter halves (1) from the valve stem.


NOTICE

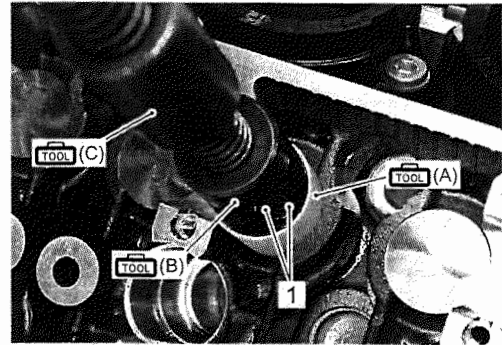
Be careful not to damage the tappet sliding surface with the special tool.

Special tool

 (B): 09916-14522 (Valve lifter attachment)

 (C): 09916-14510 (Valve lifter)

 : 09916-84511 (Tweezer)

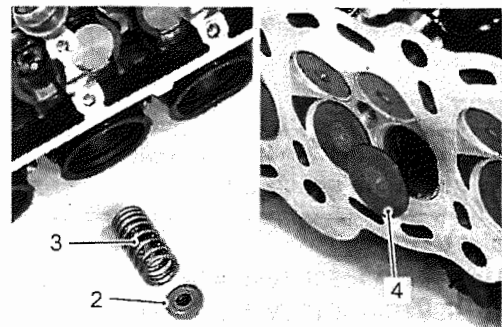


IB14J1140112-01

- 3) Remove the valve spring retainer (2) and valve spring (3).
- 4) Pull out the valve (4) from the combustion chamber side.

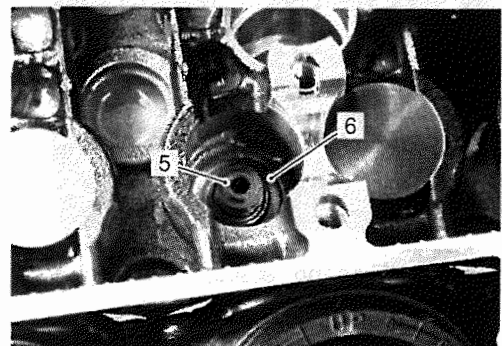
NOTICE

Be careful not to damage the valve head and valve stem when handling it.



IB14J1140113-01

- 5) Remove the oil seal (5) and spring seat (6).
- 6) Remove the other intake valves in the same manner as described previously.



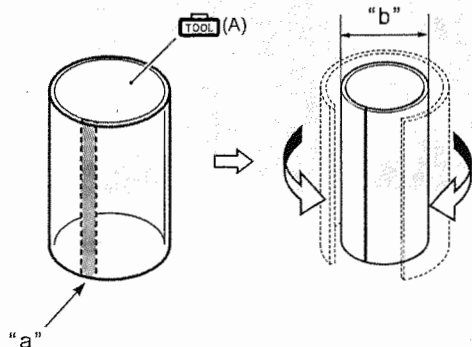
IB14J1140220-01

Exhaust side

- 1) Cut the special tool (A) as shown in the illustration.

Special tool

TOOL (A): 09919-28620 (Sleeve protector)



IB14J1140115-01

"a": Cut section

"b": 24 mm (0.9 in)

- 2) Insert the special tool (A) between the valve spring and cylinder head.
- 3) Using the special tools, compress the valve spring and remove the two cotter halves (1) from the valve stem.

NOTICE

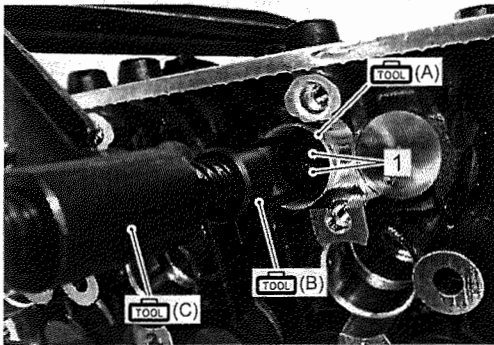
Be careful not to damage the tappet sliding surface with the special tool.

Special tool

TOOL (B): 09916-14530 (Valve lifter attachment)

TOOL (C): 09916-14510 (Valve lifter)

TOOL : 09916-84511 (Tweezer)

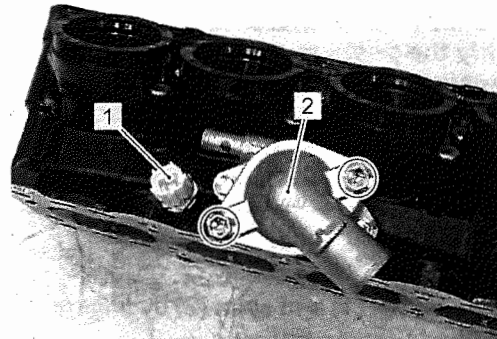


IB14J1140116-01

- 4) Remove the valve spring retainer, valve spring and valve in the same manner as intake side.
- 5) Remove the oil seal and spring seat in the same manner as intake side.
- 6) Remove the other exhaust valves in the same manner as described previously.

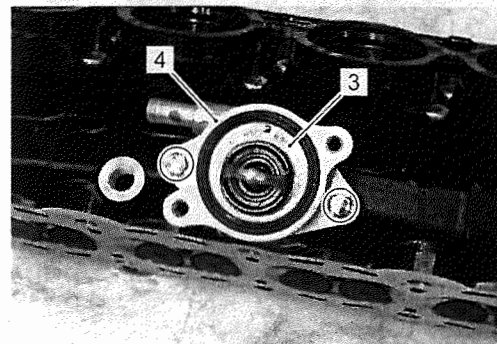
ECT sensor / Thermostat

- 1) Remove the ECT sensor (1).
- 2) Remove the thermostat cover (2).



IB14J1140117-01

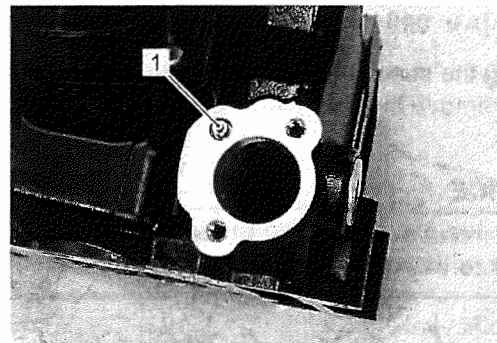
- 3) Remove the thermostat (3).
- 4) Remove the thermostat connector (4).



IB14J1140118-02

Oil jet

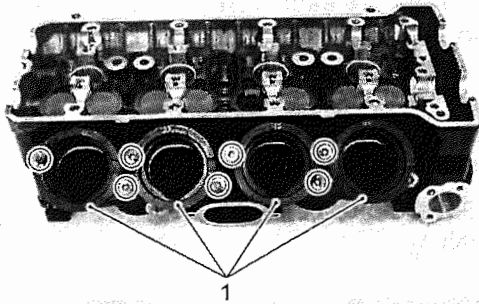
Remove the oil jet (1).



IB14J1140119-01

Intake pipe

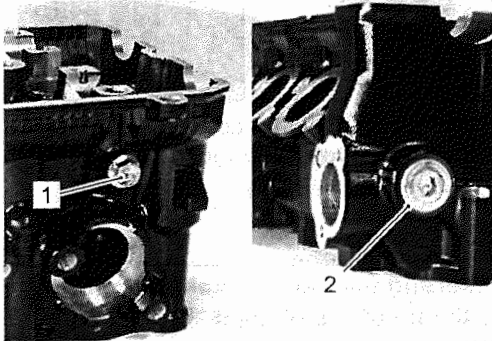
Remove the intake pipes (1).



IB14J1140120-01

Plug / Cap

- 1) Remove the oil gallery plug (1).
- 2) Remove the cam chain tension adjuster service cap (2).



IB14J1140121-01

Assembly

Assembly is in the reverse order of disassembly. Pay attention to the following points:

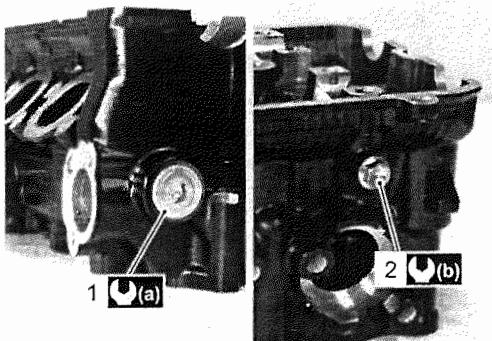
Plug / Cap

- Fit the new gaskets to the cap (1) and plug (2).
- Tighten the cam chain tension adjuster service cap (1) and oil gallery plug (2) to the specified torque.

Tightening torque

Cam chain tension adjuster service cap (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

Oil gallery plug (M6) (b): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

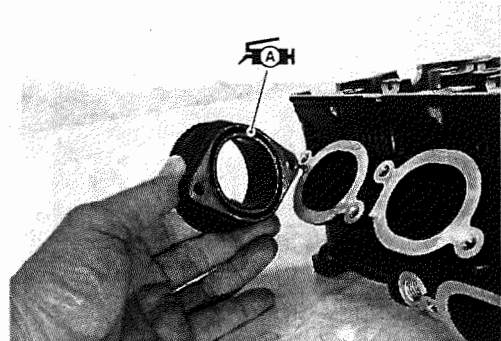


I837H1140048-01

Intake pipe

- Apply grease to the new O-rings of the intake pipes.

FAH : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



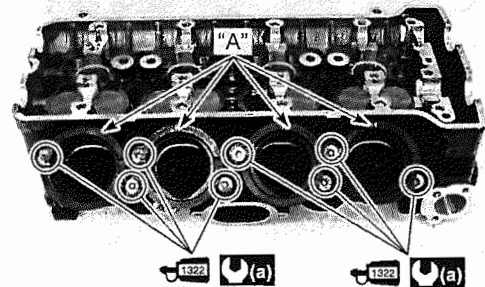
IB14J1140122-01

- Install the intake pipes with the UP mark "A" facing topside.
- Apply thread lock to the intake pipe mounting bolts and tighten them to the specified torque.

1322 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

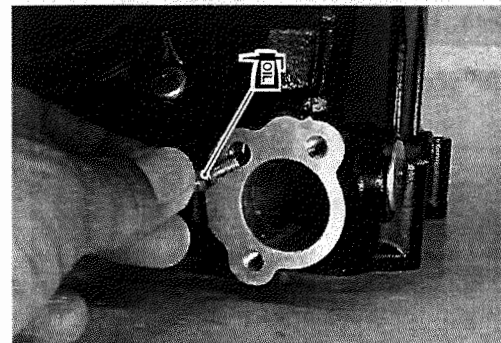
Intake pipe bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1140123-01

Oil jet

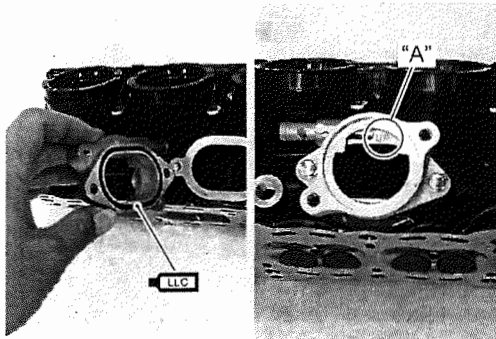
Apply engine oil to the new O-ring and install the oil jet.



IB14J1140124-01

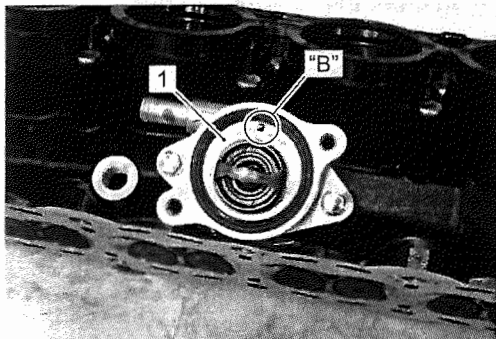
ECT sensor / Thermostat

- Apply engine coolant to the new O-ring of the thermostat connector.
- Install the thermostat connector with the UP mark "A" facing topside.



IB14J1140125-01

- Install the thermostat (1) with the air bleeder hole "B" facing topside.



IB14J1140126-02

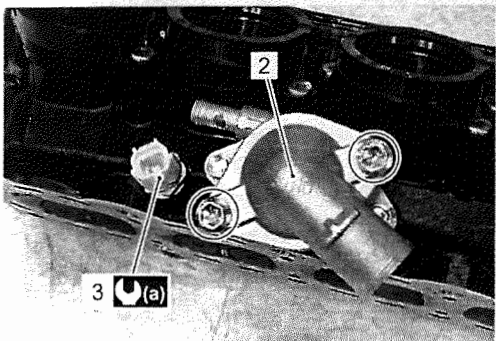
- Install the thermostat cover (2).
- Fit the new gasket to the ECT sensor (3).
- Tighten the ECT sensor (3) to the specified torque.

NOTICE

Take special care when handling the temperature sensor. It may cause damage if it gets a sharp impact.

Tightening torque

Engine coolant temperature sensor (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



IB14J1140127-02

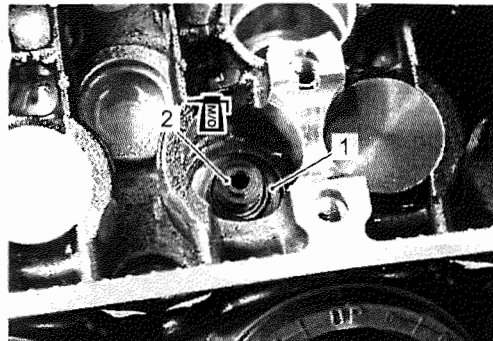
Valve / Valve spring

NOTICE

Be sure to restore each spring and valve to their original positions.

- Install the valve spring seat (1).
- Apply molybdenum oil to the new oil seal (2), and press-fit it into the position.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



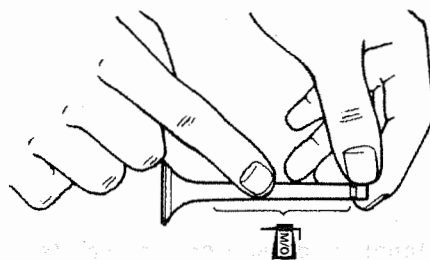
IB14J1140128-01

- Insert the valve, with its stem coated with molybdenum oil solution all around and along the full stem length without any break.

NOTICE

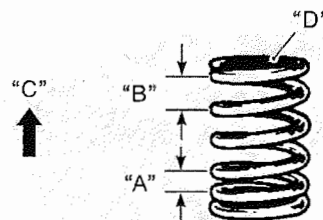
When inserting the valve, take care not to damage the lip of the oil seal.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



I705H1140165-01

- Install the valve spring with the small-pitch portion "A" facing cylinder head.



IB14J1140129-01

"A": Small-pitch portion	"C": Upward
"B": Large-pitch portion	"D": Paint

- Put on the valve spring retainer (3), and using the special tools, press down the spring, fit the cotter halves to the stem end, and release the lifter to allow the cotter halves to wedge in between retainer and stem.

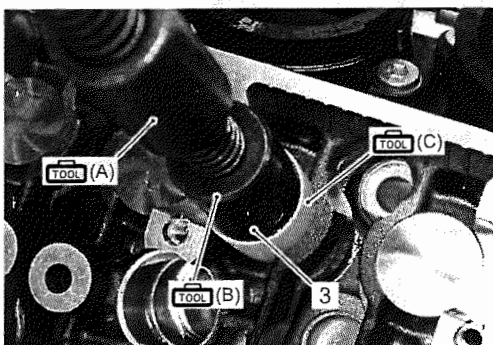
NOTICE

- Be careful not to damage the valve head and valve stem when handling it.
- Be careful not to damage the tappet sliding surface with the special tool.

Intake side

Special tool

- TOOL (A):** 09916-14510 (Valve lifter)
TOOL (B): 09916-14522 (Valve lifter attachment)
TOOL (C): 09919-28620 (Sleeve protector)
TOOL : 09916-84511 (Tweezer)



IB14J1140130-02

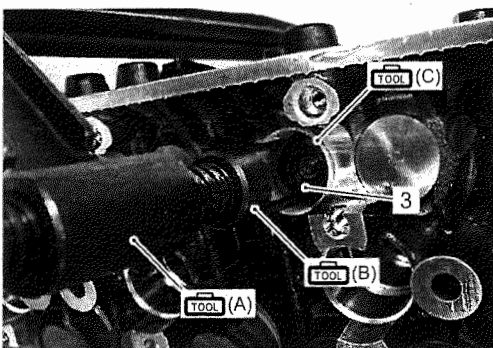
Exhaust side

Special tool

- TOOL (A):** 09916-14510 (Valve lifter)
TOOL (B): 09916-14530 (Valve lifter attachment)
TOOL (C): 09919-28620 (Sleeve protector)
TOOL : 09916-84511 (Tweezer)

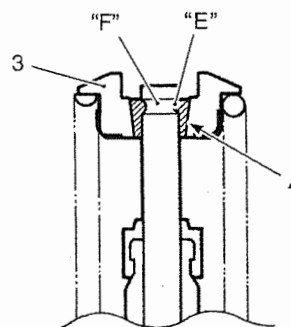
NOTE

Use the special tool (C) by cutting it. Refer to "Exhaust side" (Page 1D-41).



IB14J1140131-02

- Be sure that the rounded lip "E" of the cotter fits snugly into the groove "F" in the stem end.



IB14J1140132-01

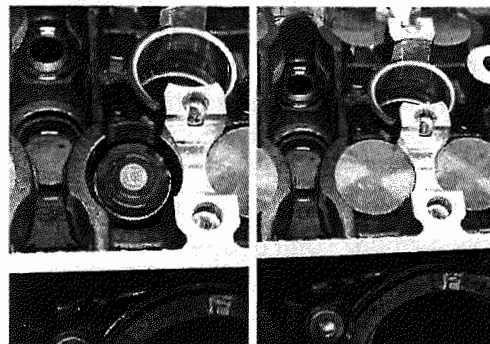
3. Valve spring retainer

4. Cotter

- Install the other valves and springs in the same manner as described previously.
- Apply engine oil to the stem end, shim and tappet before fitting them.
- Install the tappet shims and the tappets to their original positions.

NOTE

When seating the tappet shim, be sure the figure printed surface faces the tappet.



IB14J1140133-01

Cylinder Head Related Parts Inspection

BENB15J21406026

Refer to "Cylinder Head Disassembly and Assembly" (Page 1D-40).

Cylinder Head Distortion

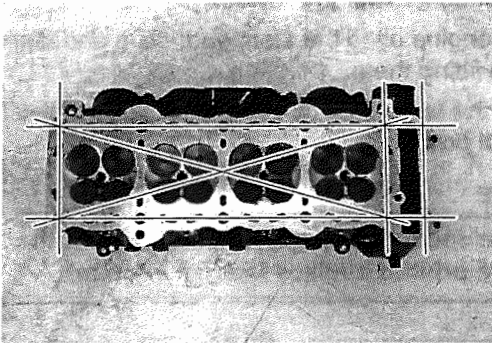
- 1) Decarbonize the combustion chambers.
- 2) Check the gasket surface of the cylinder head for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If readings exceed the service limit, replace the cylinder head.

Special tool

TOOL : 09900-20803 (Thickness gauge)

Cylinder head distortion

Service limit: 0.20 mm (0.008 in)



IB14J1140134-01

Valve Stem Runout

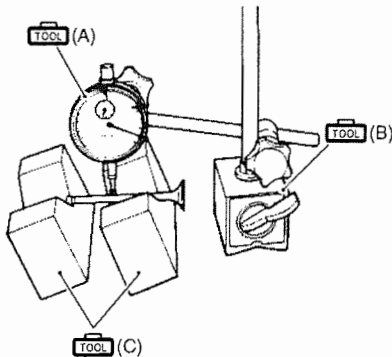
Support the valve using V-blocks, as shown in the figure, and check its runout using the dial gauge. If the runout exceeds the service limit, replace the valve.

Special tool

- TOOL** (A): 09900-20607 (Dial gauge)
TOOL (B): 09900-20701 (Dial gauge chuck)
TOOL (C): 09900-21304 (V blocks)

Valve stem runout (IN. & EX.)

Service limit: 0.05 mm (0.002 in)



IB49G1140231-03

Valve Head Radial Runout

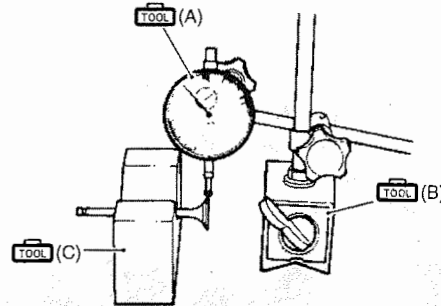
Place the dial gauge at a right angle to the valve head face and measure the valve head radial runout. If it measures more than the service limit, replace the valve.

Special tool

- TOOL** (A): 09900-20607 (Dial gauge)
TOOL (B): 09900-20701 (Dial gauge chuck)
TOOL (C): 09900-21304 (V blocks)

Valve head radial runout (IN. & EX.)

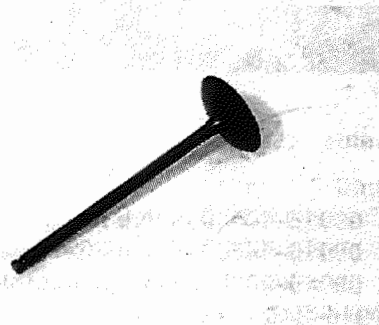
Service limit: 0.03 mm (0.001 in)



IB49G1140232-03

Valve Stem and Valve Face Wear Condition

Visually inspect each valve stem and valve face for wear and pitting. If it is worn or damaged, replace the valve with a new one.



IB14J1140135-01

Valve Stem Deflection

Lift the valve about 10 mm (0.39 in) from the valve seat. Measure the valve stem deflection in two directions, "X" and "Y", perpendicular to each other. Position the dial gauge as shown. If the deflection exceeds the service limit, then determine whether the valve or the guide should be replaced with a new one.

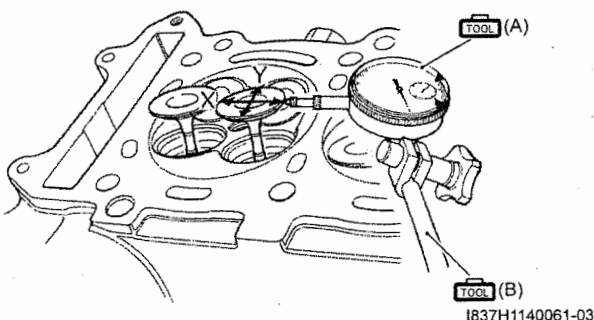
Special tool

TOOL (A): 09900-20607 (Dial gauge)

TOOL (B): 09900-20701 (Dial gauge chuck)

Valve stem deflection (IN. & EX.)

Service limit: 0.25 mm (0.010 in)

**Valve Stem Wear**

Measure the valve stem O.D. using the micrometer. If it is out of specification, replace the valve with a new one. If the valve stem O.D. is within specification but the valve stem deflection is not, replace the valve guide. After replacing the valve or valve guide, recheck the deflection.

Special tool

TOOL (A): 09900-20205 (Micrometer (0 – 25 mm))

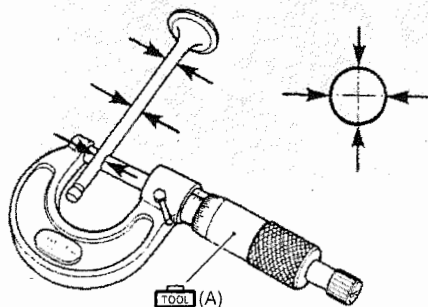
Valve stem O.D.

Standard (IN.): 4.475 – 4.490 mm (0.1762 – 0.1768 in)

Standard (EX.): 4.455 – 4.470 mm (0.1754 – 0.1760 in)

NOTE

If valve guides have to be removed for replacement after inspecting related parts, carry out the steps shown in valve guide replacement. Refer to "Valve Guide Replacement" (Page 1D-47).

**Valve Spring**

The force of the coil spring keeps the valve seat tight. A weakened spring results in reduced engine power output and often accounts for the chattering noise coming from the valve mechanism.

Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the spring does not fall within the specified range, replace the valve spring.

Special tool

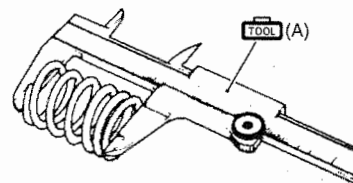
TOOL (A): 09900-20102 (Vernier calipers (200 mm))

Valve spring free length (IN. & EX.)

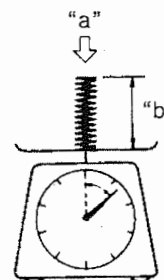
Service limit: 37.1 mm (1.46 in)

Valve spring tension (IN. & EX.)

Standard: 142 – 157 N (14.5 – 16.0 kgf, 31.9 – 35.3 lbs)/33.55 mm (1.321 in)



I649G1140237-03



I649G1140238-03

Tension "a"	Length "b"
142 – 157 N (14.5 – 16.0 kgf, 31.9 – 35.3 lbs)	33.55 mm (1.321 in)

Valve Seat Width

- 1) Visually check for valve seat width on each valve face. If the valve face has worn abnormally, replace the valve.
- 2) Coat the valve seat with a red lead (Prussian Blue) and set the valve in place.

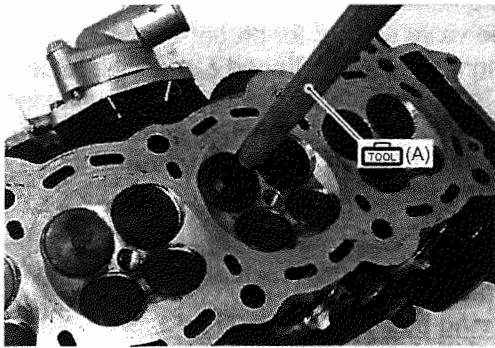
NOTICE

Do not use lapping compound.

- 3) Rotate the valve with light pressure.

Special tool

TOOL (A): 09916-10911 (Valve lapper set)



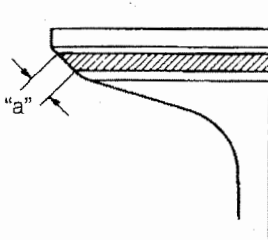
IB14J1140136-01

- 4) Check that the transferred red lead (blue) on the valve face is uniform all around and in center of the valve face.

If the seat width "a" measured exceeds the standard value, or seat width is not uniform reface the seat using the seat cutter. Refer to "Valve Seat Repair" (Page 1D-49).

Valve seat width "a" (IN. & EX.)

Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)



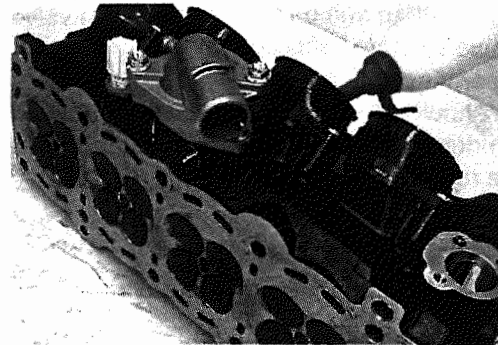
I649G1140246-02

Valve Seat Sealing Condition

- 1) Clean and assemble the cylinder head and valve components.
- 2) Fill the intake and exhaust ports with gasoline to check for leaks. If any leaks occur, inspect the valve seat and face for burrs or other things that could prevent the valve from sealing. Refer to "Valve Seat Repair" (Page 1D-49).

▲ WARNING

Always use extreme caution when handling gasoline.



IB14J1140137-01

NOTE

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. Refer to "Valve Clearance Inspection and Adjustment" in Section 0B (Page 0B-4).

Valve Guide Replacement

BENB15J21406027

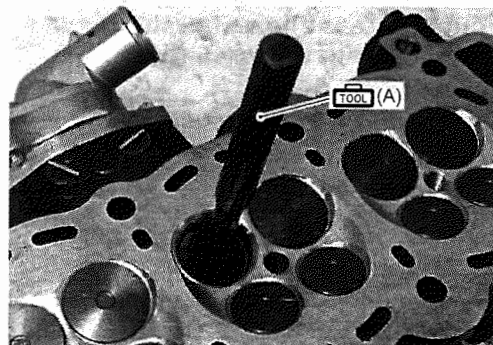
- 1) Remove the cylinder head. Refer to "Engine Top Side Disassembly" (Page 1D-27).
- 2) Remove the valves. Refer to "Cylinder Head Disassembly and Assembly" (Page 1D-40).
- 3) Using the valve guide remover, drive the valve guide out toward the intake or exhaust camshaft side.

Special tool

TOOL (A): 09916-43211 (Valve guide installer & remover)

NOTE

- Discard the removed valve guide sub-assemblies.
- Only oversized valve guides are available as replacement parts. (Part No. 11115-29G70)



IB14J1140138-01

- 4) Refinish the valve guide holes in the cylinder head using the reamer and handle.

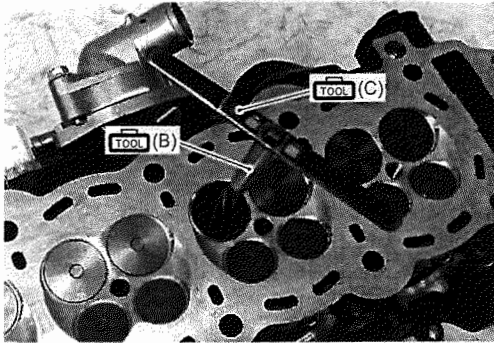
NOTICE

When refinishing or removing the reamer from the valve guide hole, always turn it clockwise.

Special tool

TOOL (B): 09916-33320 (Valve guide reamer (9.8 mm))

TOOL (C): 09916-34542 (Reamer handle)



IB14J1140139-01

- 5) Cool down the new valve guides in a freezer for about one hour and heat the cylinder head to 100 – 150 °C (212 – 302 °F) with a hot plate.

NOTICE

Do not use a burner to heat the valve guide hole to prevent cylinder head distortion.

- 6) Apply engine oil to each valve guide and valve guide hole.
7) Drive the guide into the guide hole using the valve guide installer.

NOTICE

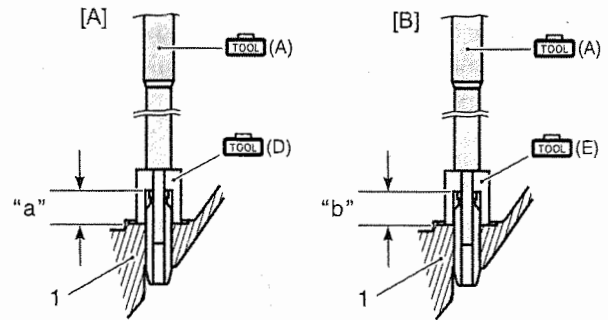
Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.

Special tool

TOOL (A): 09916-43211 (Valve guide installer & remover)

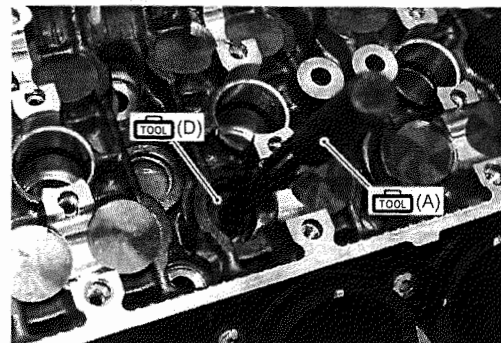
TOOL (D): 09916-43250 (Valve guide installer attachment)

TOOL (E): 09916-43240 (Valve guide installer attachment)



IB15J1140005-01

1. Cylinder head	"a": 15.2 mm (0.60 in)
[A]: IN.	"b": 15.7 mm (0.62 in)
[B]: EX.	



IB15J1140006-01

- 8) After installing the valve guides, refinish their guiding bores using the reamer. Be sure to clean and oil the guides after reaming.

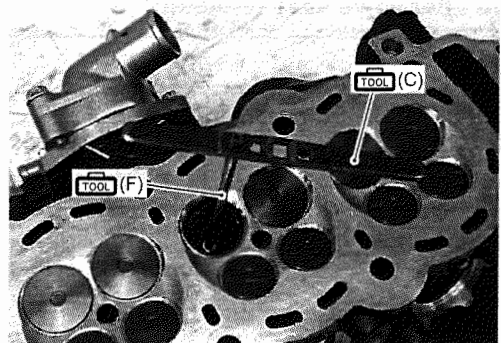
NOTE

- Be sure to cool down the cylinder head to ambient air temperature.
- Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.

Special tool

TOOL (C): 09916-34542 (Reamer handle)

TOOL (F): 09916-33210 (Valve guide reamer (4.5 mm))



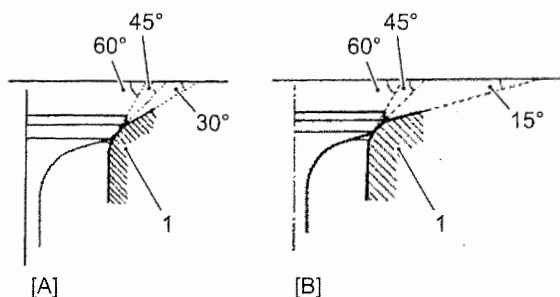
IB15J1140007-01

- 9) Reassemble the cylinder head. Refer to "Cylinder Head Disassembly and Assembly" (Page 1D-40).
10) Install the cylinder head. Refer to "Engine Top Side Assembly" (Page 1D-30).

Valve Seat Repair

BENB15J21406028

The valve seats (1) for both the intake and exhaust valves are machined to three different angles. The seat contact surface is cut at 45°.



I837H1140069-02

[A]: Intake valve

[B]: Exhaust valve

	Intake	Exhaust
Seat angle	30°/45°/60°	15°/45°/60°
Seat width	0.9 – 1.1 mm (0.035 – 0.043 in)	←
Valve diameter	29.0 mm (1.14 in)	23.0 mm (0.91 in)
Valve guide I.D.	4.500 – 4.512 mm (0.1772 – 0.1776 in)	←

NOTE

The valve seat contact area must be inspected after each cut.

NOTICE

- 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.
- The titanium valves are coated with an oxidized membrane treatment to resist wear but the membrane tends to be removed if lapped after valve seat servicing.

NOTE

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. Refer to "Valve Clearance Inspection and Adjustment" in Section 0B (Page 0B-4).

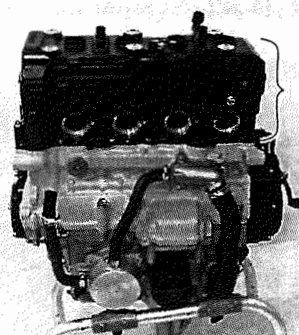
Engine Bottom Side Disassembly

BENB15J21406029

NOTE

The crankcase must be separated to service the crankshaft and conrod.

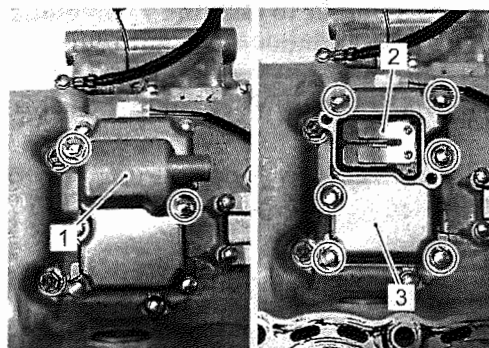
- Remove the engine assembly from the frame. Refer to "Engine Assembly Removal" (Page 1D-21).
- Remove the engine top side (1). Refer to "Engine Top Side Disassembly" (Page 1D-27).



IB14J1140141-01

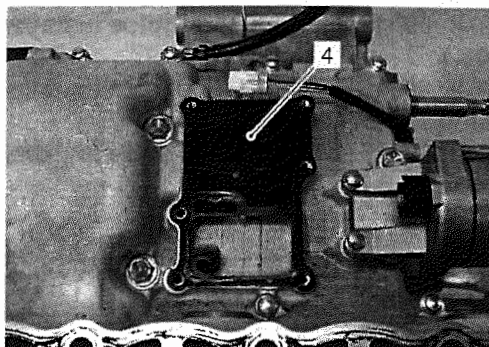
Crankcase Breather (PCV) Cover

- Remove the crankcase breather (PCV) reed valve cover (1).
- Remove the reed valve (2) and crankcase breather (PCV) cover (3).



IB14J1140142-01

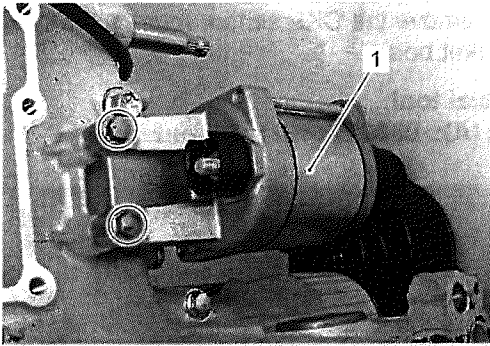
- Remove the gasket (4).



IB14J1140143-01

Starter Motor

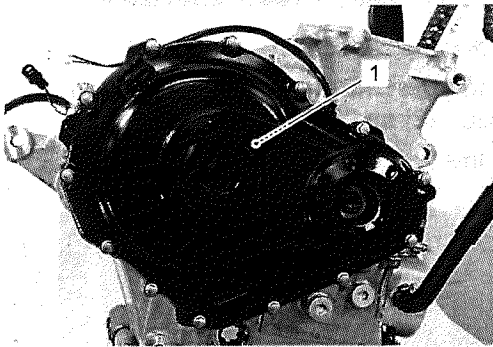
Remove the starter motor (1).



IB14J1140144-01

Clutch

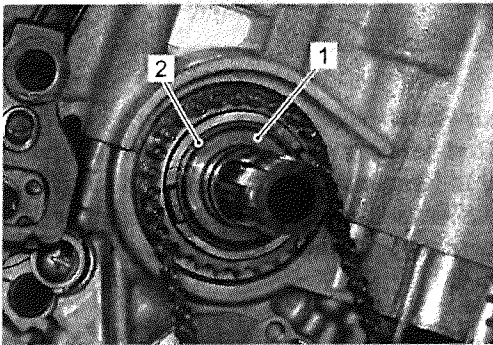
Remove the clutch component parts (1). Refer to "Clutch Removal" in Section 5C (Page 5C-8).



IB14J1140145-01

Oil Pump Drive Sprocket

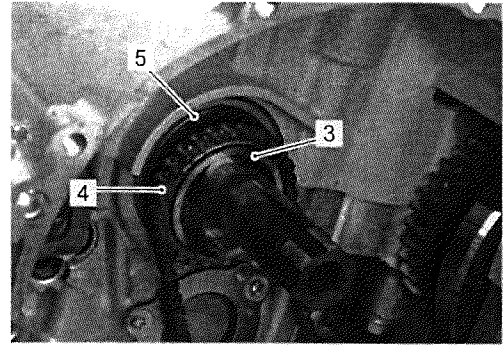
1) Remove the spacer (1) and bearing (2).



IB37H1140074-01

2) Remove the oil pump drive sprocket (3) and chain (4).

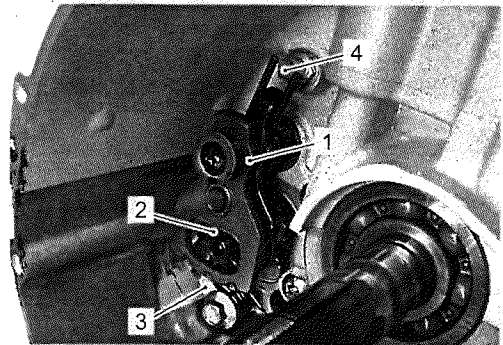
3) Remove the thrust washer (5).



IB37H1140075-01

Gearshift System

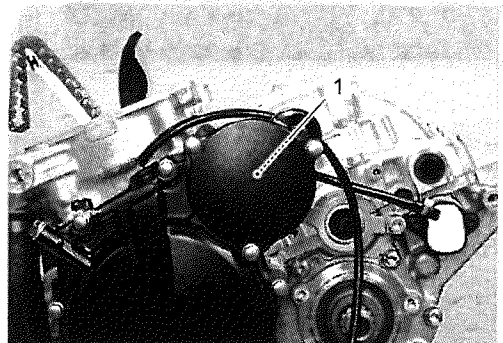
Remove the gearshift shaft assembly (1), gearshift cam plate (2), gearshift cam stopper (3) and gearshift arm stopper (4). Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" in Section 5B (Page 5B-16).



IB14J1140146-01

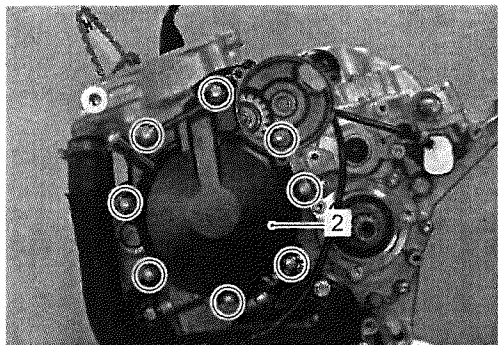
Starter Idle Gear / Generator Cover

1) Remove the starter idle gear No. 1 component parts (1). Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).



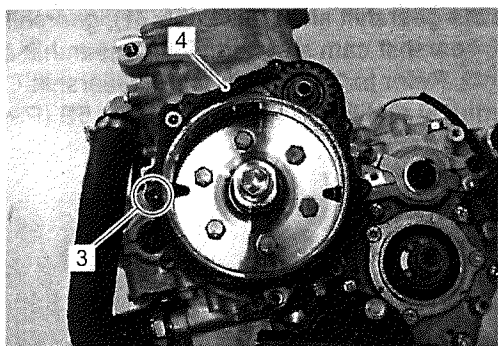
IB14J1140147-01

- 2) Remove the generator cover (2).



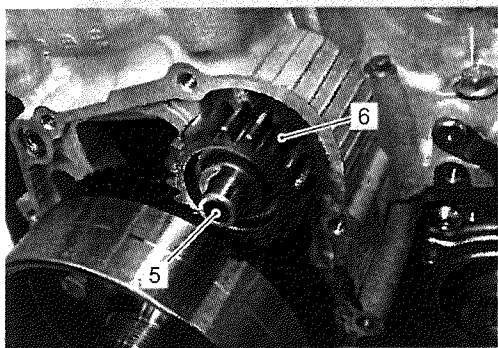
IB37H1140280-01

- 3) Remove the dowel pin (3) and gasket (4).



IB14J1140148-02

- 4) Remove the idle gear shaft (5) and starter idle gear No. 2 (6).



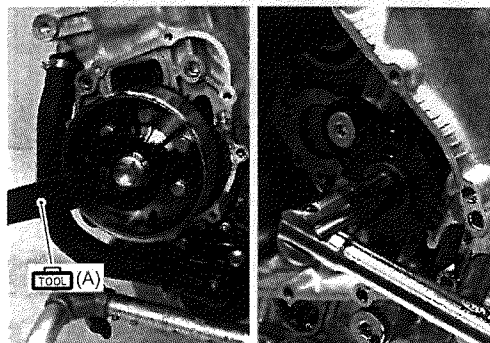
IB14J1140149-02

Cam Chain / Cam Chain Tensioner / Cam Chain Guide No. 1

- 1) While holding the generator rotor with the special tool, remove the CKP sensor rotor/cam chain drive sprocket bolt.

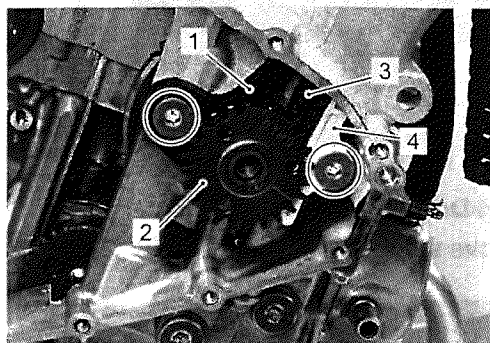
Special tool

TOOL (A): 09930-44521 (Rotor holder)



IB14J1140150-02

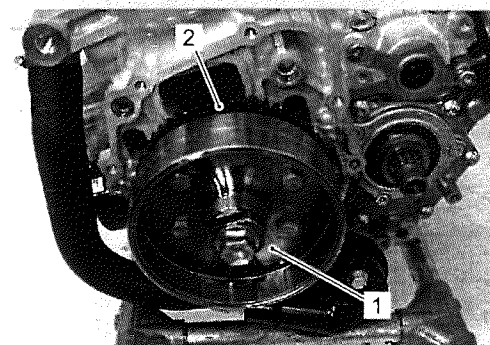
- 2) Remove the cam chain tensioner (1).
3) Remove the CKP sensor rotor/cam chain drive sprocket (2) and cam chain (3).
4) Remove the cam chain guide No. 1 (4).



IB14J1140151-01

Generator Rotor / Starter Driven Gear

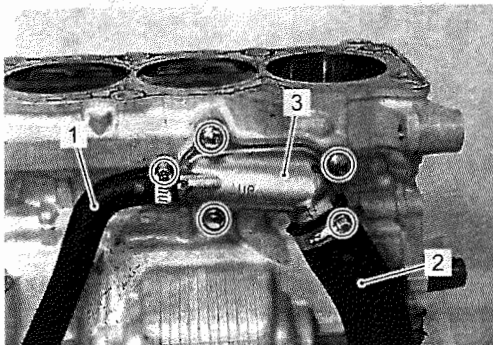
Remove the generator rotor (1) and starter driven gear (2). Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4) and "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).



IB14J1140152-03

Water Inlet Connector

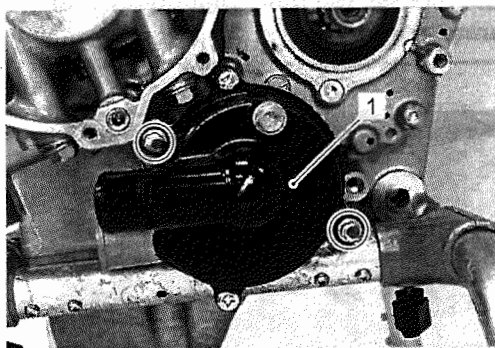
- 1) Disconnect the oil cooler water inlet hose (1) and remove the cylinder inlet hose (2).
- 2) Remove the water inlet connector (3).



IB14J1140153-01

Water Pump

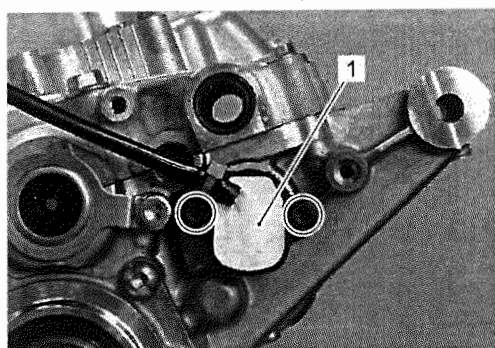
Remove the water pump (1).



IB14J1140154-01

Gear Position Switch

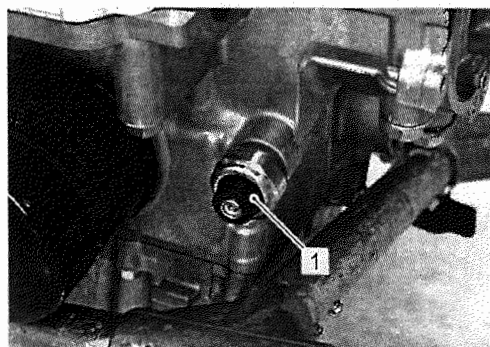
Remove the gear position switch (1).



IB14J1140155-01

Oil Pressure Switch

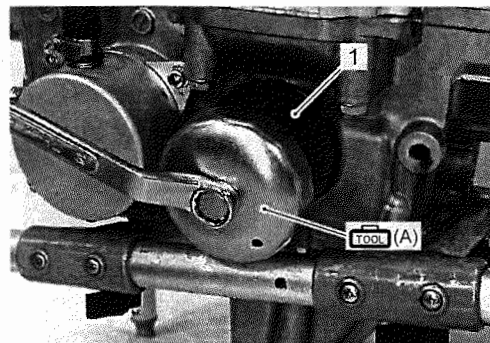
Remove the oil pressure switch (1).



IB14J1140156-01

Oil Filter

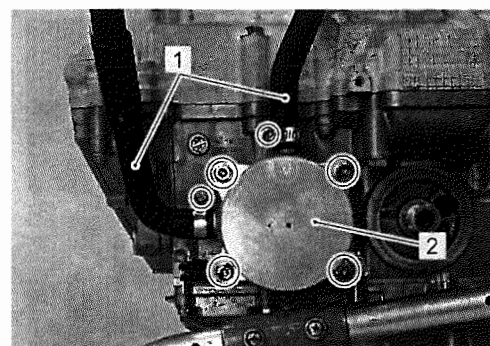
Remove the oil filter (1) with the special tool.

Special tool**TOOL (A): 09915-40620 (Oil filter wrench)**

IB14J1140157-01

Oil Cooler

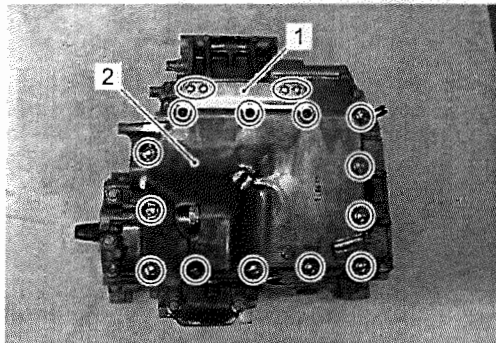
- 1) Remove the oil cooler water hoses (1).
- 2) Remove the oil cooler (2).



IB14J1140158-01

Oil Pan

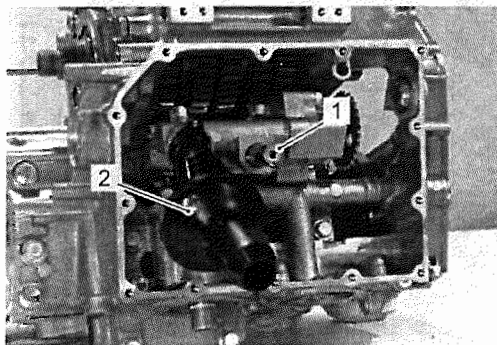
- 1) Remove the plate (1).
- 2) Remove the oil pan (2) and its gasket.



IB14J1140159-01

Oil Pressure Regulator / Oil Strainer

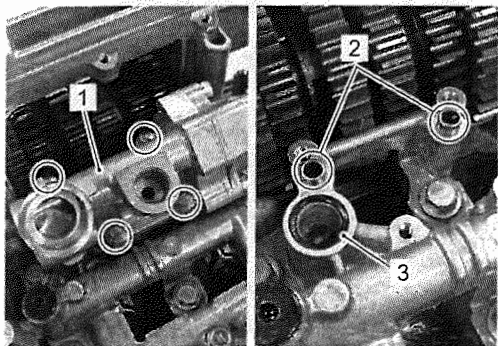
- 1) Remove the oil pressure regulator (1).
- 2) Remove the oil strainer (2).



IB37H1140091-01

Oil Pump

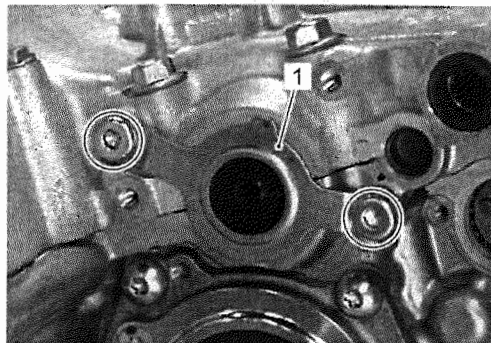
- 1) Remove the oil pump (1).
- 2) Remove the dowel pins (2) and O-ring (3).



IB37H1140092-01

Crankcase

- 1) Remove the clutch push rod oil seal retainer (1).

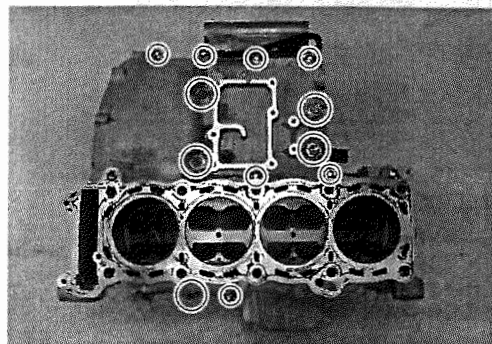


IB37H1140093-02

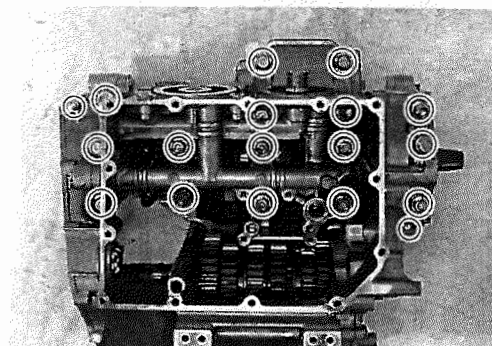
- 2) Remove the upper crankcase bolts.
- 3) Remove the lower crankcase bolts.
- 4) Remove the crankshaft journal bolts (M9).

NOTE

Loosen the crankcase bolts diagonally and the smaller sizes first.



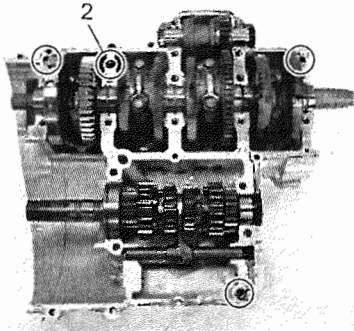
IB15J1140008-01



IB14J1140161-01

- 5) Make sure that all of the bolts are removed. Then, tap the sides of the lower crankcase using a plastic hammer to separate the upper and lower crankcase halves and then lift the lower crankcase off the upper crankcase.

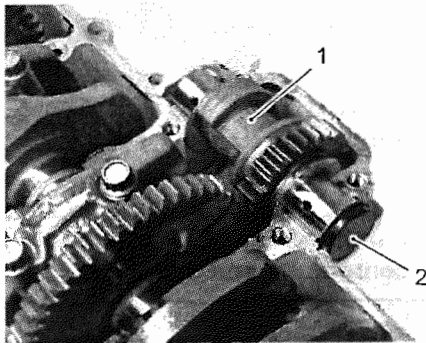
6) Remove the dowel pins and O-ring (2).



I838H1140020-01

Balancer Shaft

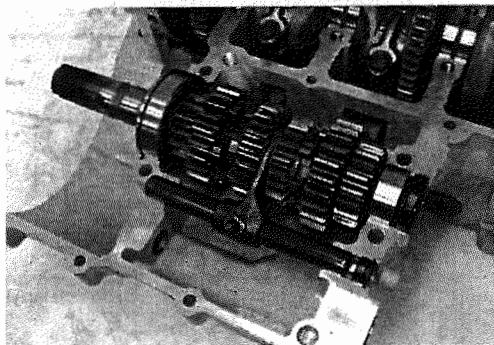
Remove the balancer shaft assembly (1) and plug (2).



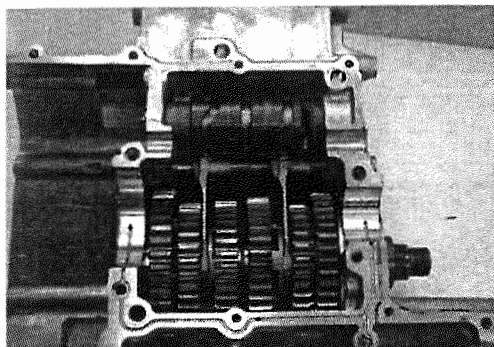
I838H1140021-01

Transmission

Remove the transmission component parts. Refer to "Transmission Removal" in Section 5B (Page 5B-3).



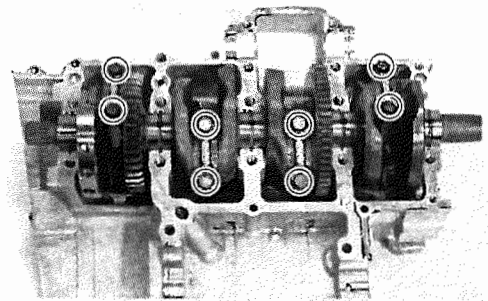
IB15J1140009-01



I837H1140098-01

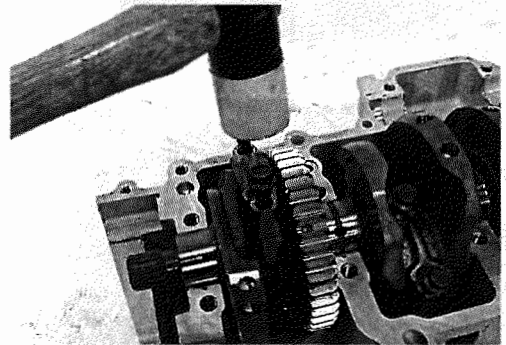
Crankshaft

1) Loosen the conrod cap bolts by using a 10 mm, 12-point socket wrench.



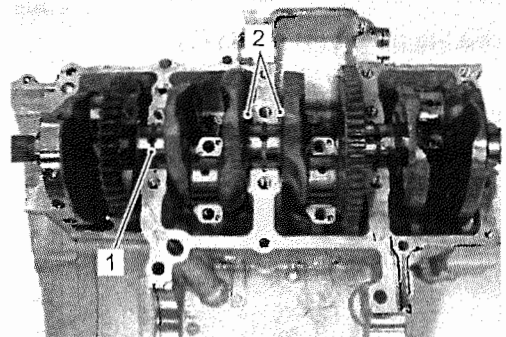
I838H1140022-01

2) Remove the conrod caps by tapping the bolts lightly with a plastic hammer.



IB14J1140163-01

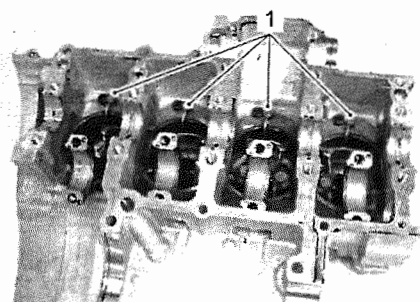
3) Remove the crankshaft (1) and thrust bearings (2).



I838H1140023-01

Piston Cooling Oil Jet

Remove the piston cooling oil jets (1) from the upper crankcase.



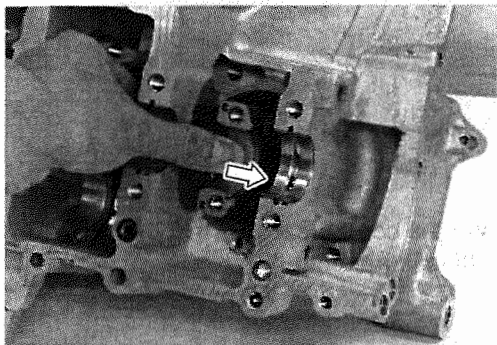
I838H1140024-01

Piston / Conrod

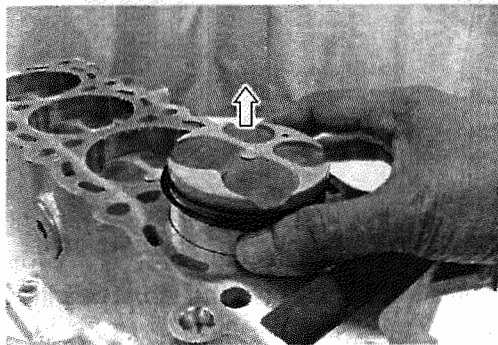
- 1) Push the conrod to cylinder head side and remove the piston and conrod from the upper crankcase.

NOTICE

Be careful not to damage the cylinder wall by the conrod.

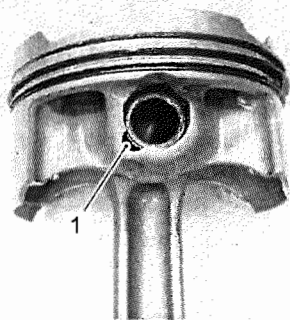


I837H1140102-01



I838H1140025-01

- 2) Remove the piston pin circlip (1).

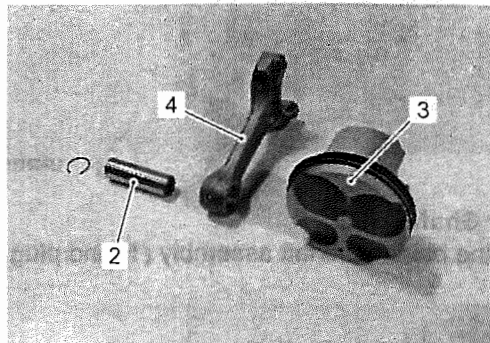


I838H1140026-01

- 3) Draw out the piston pin (2) and remove the piston (3) from the conrod (4).

NOTE

Scribe the cylinder number on the piston head.



IB15J1140010-01

Conrod Crank Pin Bearing

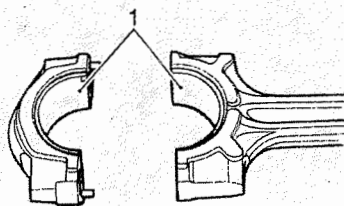
Remove the conrod crank pin bearings (1).

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.



I718H1140269-01

Crankshaft Journal Bearing

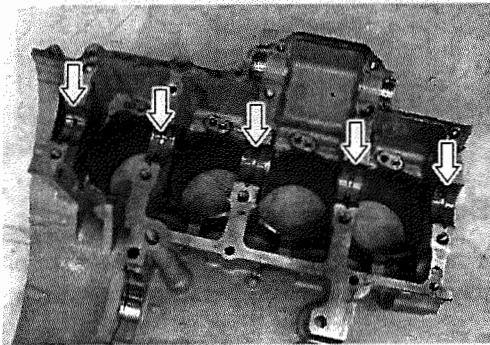
Remove the crankshaft journal bearings, upper and lower.

NOTICE

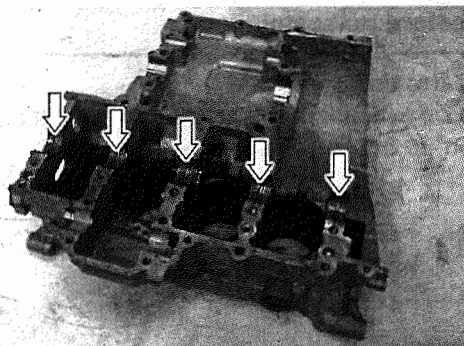
When removing the crankshaft journal bearings, be careful not to scratch the crankcases and the crankshaft journal bearings.

NOTE

- Do not touch the bearing surfaces with your hands. Grasp the bearings by their edges.
- Do not remove the crankshaft journal bearings unless absolutely necessary.
- Make a note of where the crankshaft journal bearings are removed from so that they can be reinstalled in their original positions.



IB15J1140011-01



IB15J1140012-01

Balancer Shaft Journal Bearing

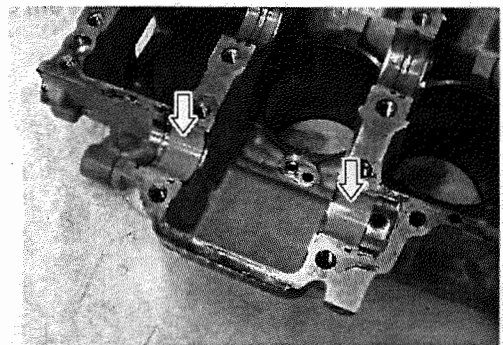
Remove the balancer shaft journal bearings, upper and lower.

NOTICE

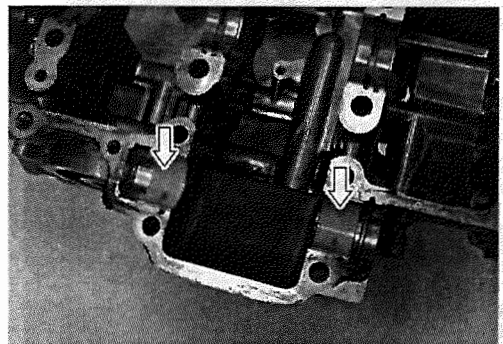
When removing the bearings, be careful not to scratch the crankcases and the bearings.

NOTE

- Do not remove the bearings unless absolutely necessary.
- Make a note of where the bearings are removed from so that they can be reinstalled in their original positions.



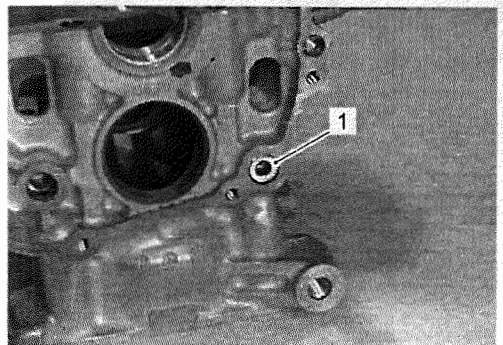
IB15J1140013-01



IB15J1140014-01

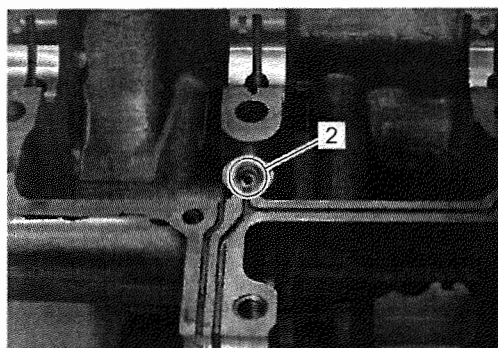
Oil Jet

- 1) Remove the oil gallery jet (1) (for generator) from the lower crankcase.



IB37H1140108-01

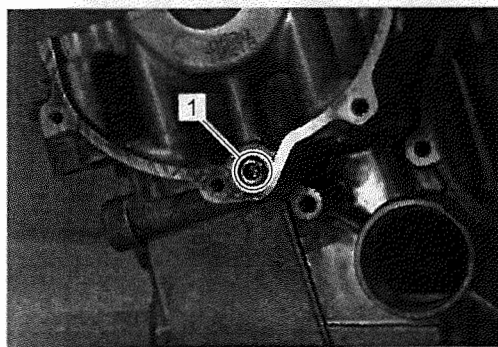
- 2) Remove the oil jet (2) (for transmission) from the lower crankcase.



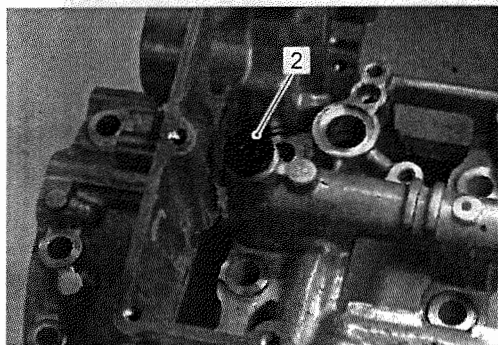
I837H1140115-03

Oil Gallery Plug

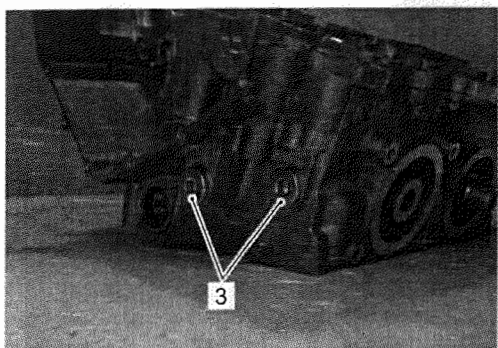
Remove the oil gallery plugs (1), (2) and (3) from the lower crankcase.



I837H1140116-01



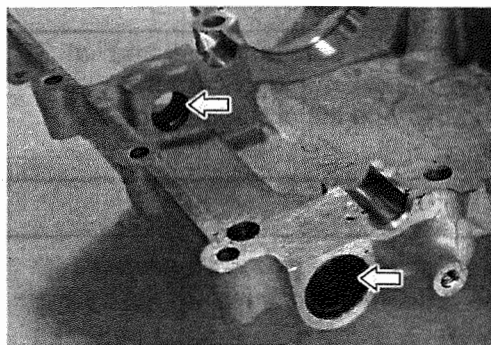
I837H1140117-01



I837H1140118-01

Oil seal / Bearing

Remove the oil seal and bearings if necessary. Refer to "Transmission Removal" in Section 5B (Page 5B-3).



I837H1140120-01



I837H1140121-01

Engine Bottom Side Assembly

BENB15J21406030

Assemble the engine bottom side in the reverse order of disassembly. Pay attention to the following points:

NOTE

Apply engine oil to each running and sliding part before reassembling.

Oil Seal / Bearing

Install the oil seal and bearings. Refer to "Transmission Installation" in Section 5B (Page 5B-5).

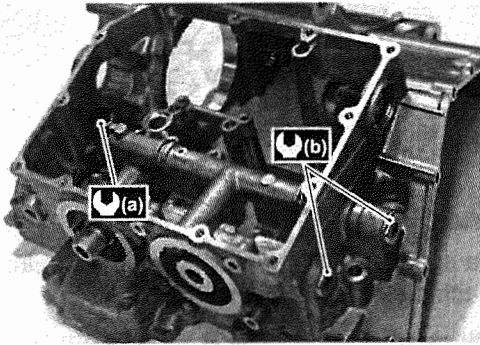
Oil Gallery Plug

- Fit the new gaskets to each plug.
- Tighten each plugs (for lower crankcase) to the specified torque.

Tightening torque


Oil gallery plug (M12) (a): 15 N·m (1.5 kgf-m, 11.0 lbf-ft)

Oil gallery plug (M16) (b): 35 N·m (3.5 kgf-m, 25.5 lbf-ft)



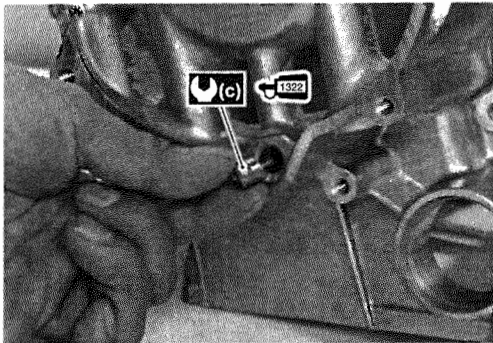
I837H1140123-01

- Apply thread lock to the oil gallery plug (for upper crankcase) and tighten it to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Oil gallery plug (c): 7 N·m (0.7 kgf-m, 5.0 lbf-ft)



I837H1140124-02

Oil Jet

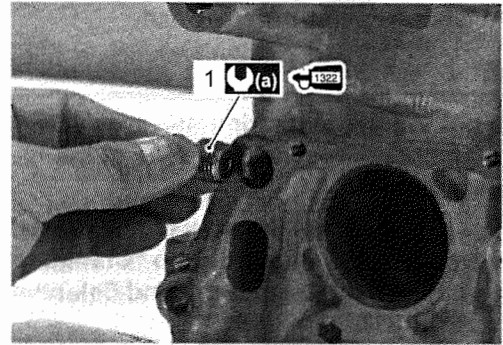
- Apply thread lock to the oil gallery jet (1) (for generator) and tighten it to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

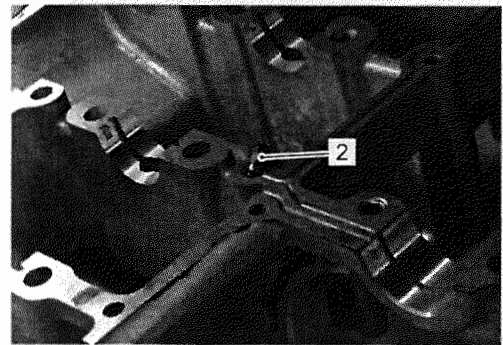
Oil gallery jet (a): 27 N·m (2.7 kgf-m, 19.5 lbf-ft)

- After tightening the jet, make sure that the jet end is flush with the cover mating surface.



I837H1140125-02

- Install the oil jet (2) (for transmission).



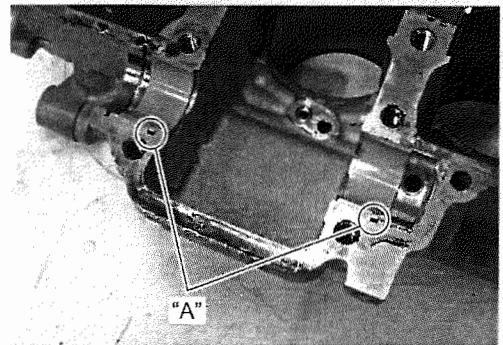
I837H1140126-01

Balancer Shaft Journal Bearing

- When installing the bearings to the crankcases, be sure to install the tab "A" first, and then press in the other opposite side of the bearing.

NOTE

Inspect and select the balancer shaft journal bearing if necessary. Refer to "Balancer Shaft Journal Bearing Inspection and Selection" (Page 1D-76).



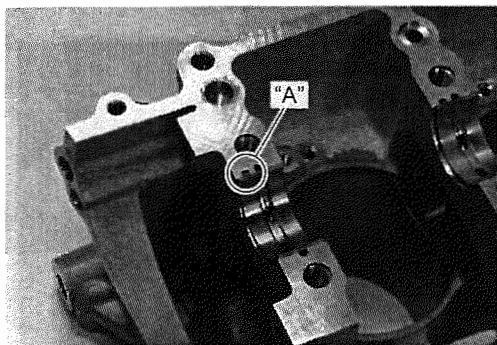
IB15J1140015-01

Crankshaft Journal Bearing

- When fitting the crankshaft journal bearings to the upper and lower crankcases, be sure to fix the stopper part "A" first and press the other end.

NOTE


- Do not touch the bearing surfaces with your hands. Grasp by the edge of the bearing shell.
- Inspect and select the crankshaft journal bearing if necessary. Refer to "Crankshaft Journal Bearing Inspection and Selection" (Page 1D-81).

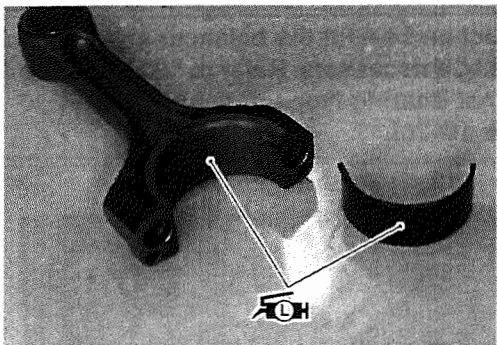


1837H1140127-01

Conrod Crank Pin Bearing

- Apply molybdenum grease to the conrod and conrod crank pin bearing. (Conrod side only)

: Grease 99000-25280 (SUZUKI MOLYBDENUM GREASE L or equivalent)

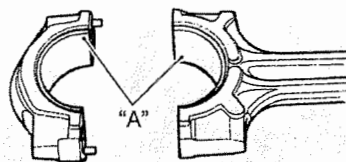


1B14J1140216-01

- When installing the bearings into the conrod cap and conrod, be sure to install the tap "A" first, and then press in the other opposite side of the bearing.

NOTE

Inspect and select the conrod crank pin bearing if necessary. Refer to "Conrod Crank Pin Bearing Inspection and Selection" (Page 1D-79).



1823H1140578-01

Piston and Conrod

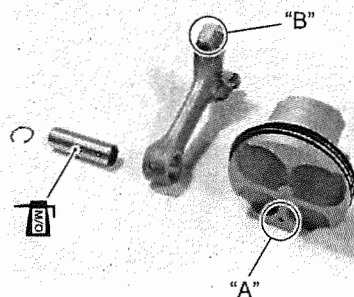
- Apply a small quantity of molybdenum oil solution onto each piston pin.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

- Assemble the piston and conrod.

NOTE

When installing the pistons, the indent "A" on the piston head must be brought to the other side of ID code "B" on the conrod big end.

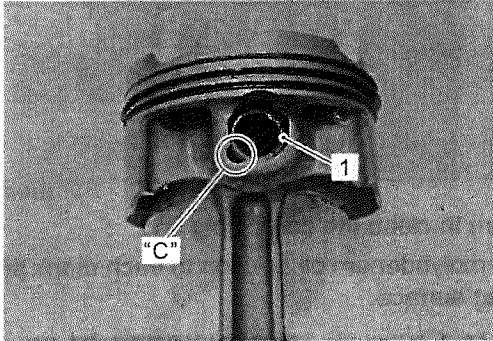


1838H1140029-01

- Install the new piston pin circlips (1).

NOTE

End gap of the circlip "C" should not be aligned with the cutaway in the piston pin bore.



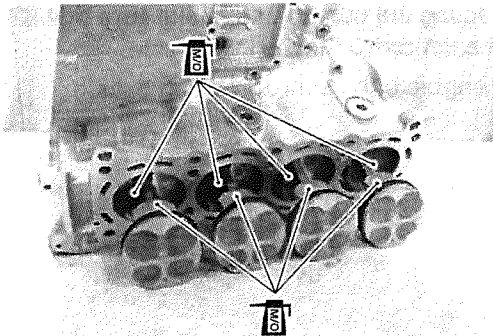
IB15J1140016-01

- Apply a small quantity of molybdenum oil solution to the sliding surface of the pistons and cylinder walls.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

NOTE

Be sure to install the pistons in the cylinders from which they were removed in disassembly, referring to the cylinder numbers, #1 through #4, scribed on the piston.



IB38H1140031-01

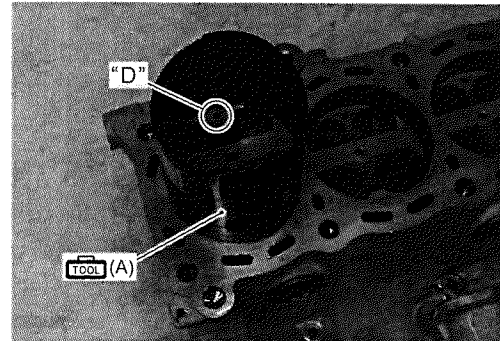
- Install the pistons with conrods into the cylinders from topside using the special tool.

NOTE

When installing the pistons, the indent "D" of each piston head must be brought to the exhaust side.

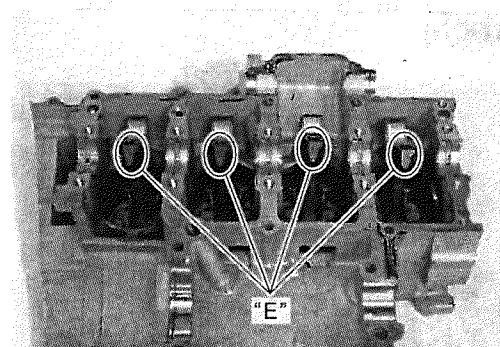
Special tool

TOOL (A): 09916-77310 (Piston ring compressor)



IB15J1140017-01

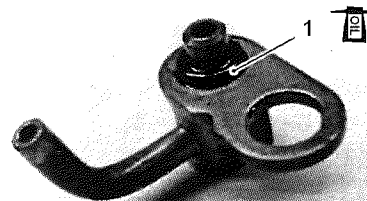
- Be sure to clean the conrod big end.
- Check that I.D. code "E" on each conrod faces intake side.



IB38H1140032-01

Piston Cooling Oil Jet

- Fit the new O-rings (1) to each piston cooling oil jet and apply engine oil to them.



IB37H1140133-01

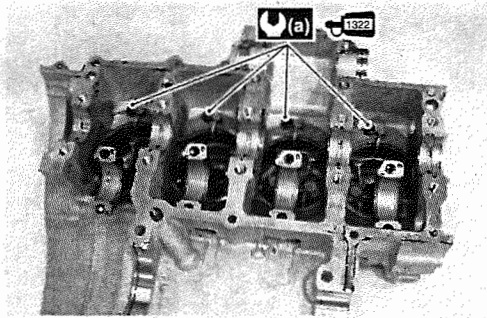
1D-61 Engine Mechanical:

- Apply a small quantity of thread lock to the bolts and tighten them to the specified torque.

1322 : Thread lock cement 99000-32110
(THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Piston cooling oil jet bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

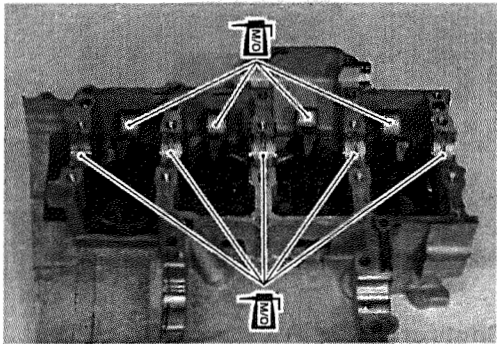


1838H1140033-01

Crankshaft

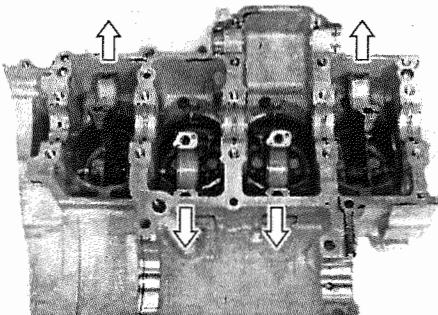
- Apply molybdenum oil to each crank pin bearing surface and crankshaft journal bearing surface.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



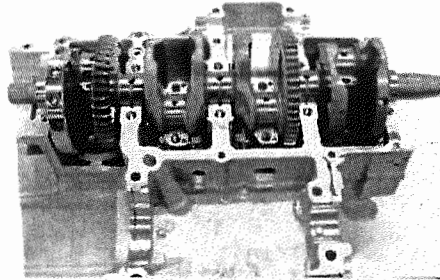
1815J1140018-01

- Position the No. 2 and No. 3 conrod big ends on the same side, and the No. 1 and No. 4 conrod big ends on the opposite side of No. 2 and No. 3.



1838H1140035-01

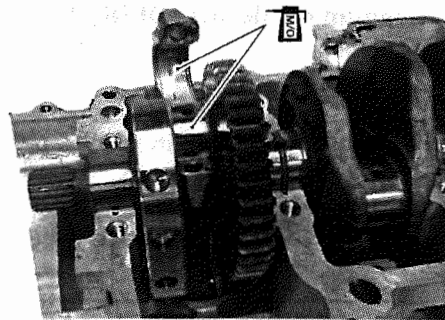
- Set the crankshaft to the conrods and upper crankcase.



1837H1140111-01

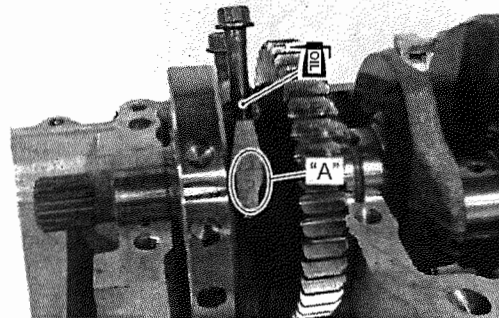
- Be sure to clean the conrod big end.
- Apply molybdenum oil solution to each crank pin and bearing surface.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



1815J1140019-01

- When fitting the conrod cap, make sure that I.D. code "A" on each conrod faces intake side.
- Apply engine oil to the conrod cap bolts.

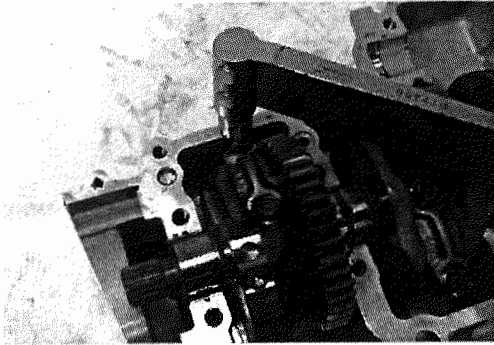


1838H1140038-01

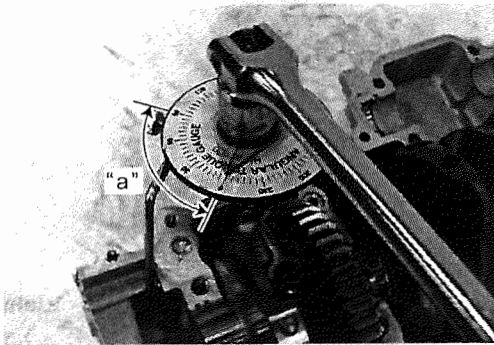
- Tighten the conrod cap bolt by using a 10 mm, 12 point socket wrench in the following two steps.

Tightening torque

Conrod cap bolt: 15 N·m (1.5 kgf-m, 11.0 lbf-ft)
then turn in 1/4 (90°) turn



IB15J1140020-01



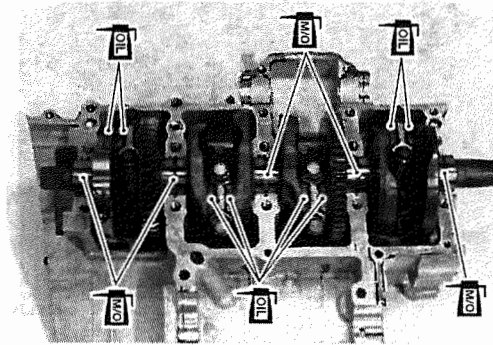
IB15J1140021-01

"a": 90°

- Apply engine oil to the conrod big end side surfaces.
- Check the conrod movement for smooth turning.

- Apply molybdenum oil to each crankshaft journal and bearing lightly.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

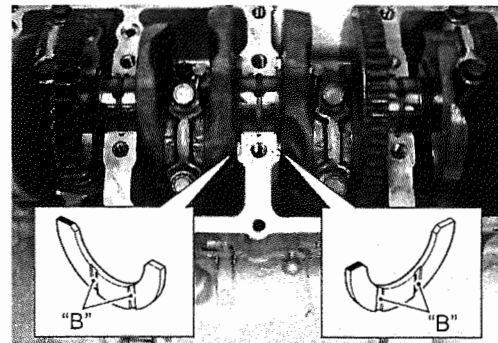


IB15J1140022-01

- Insert the right and left-thrust bearings with the oil grooves "B" facing towards the crankshaft web.

NOTE

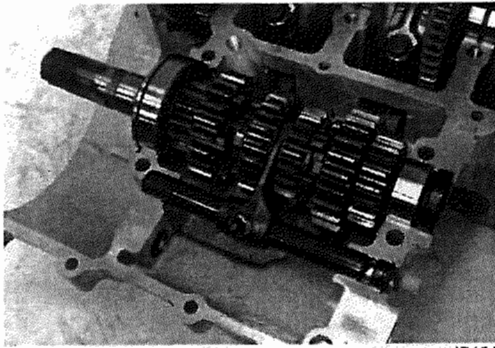
- Right-thrust bearing has green painting.
- Inspect and select the crankshaft thrust clearance if necessary. Refer to "Crankshaft Thrust Clearance Inspection and Selection" (Page 1D-83).



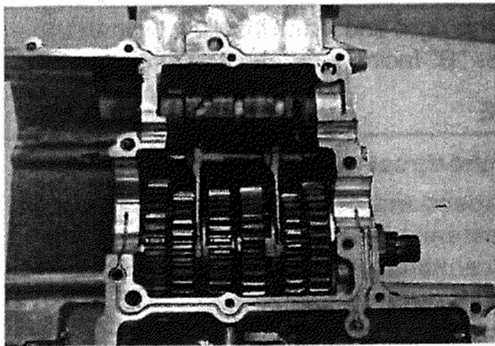
IB15J1140023-01

Transmission

- Install the transmission. Refer to "Transmission Installation" in Section 5B (Page 5B-5).



IB15J1140024-01



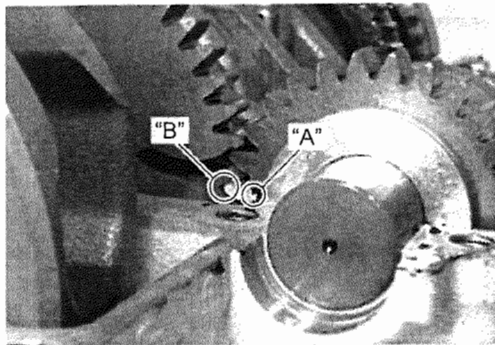
IB37H1140139-01

Balancer Shaft

- Apply a molybdenum oil solution to each balancer shaft journal and bearing lightly.

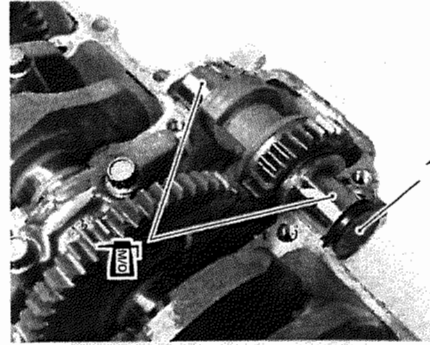
M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

- Set the balancer shaft so that its punch mark "A" is aligned with the index "B" on the crankshaft.



IB38H1140042-02

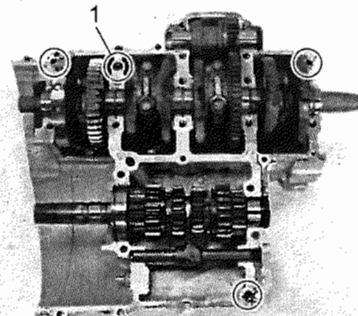
- Install the plug (1).



IB38H1140043-01

Crankcase

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

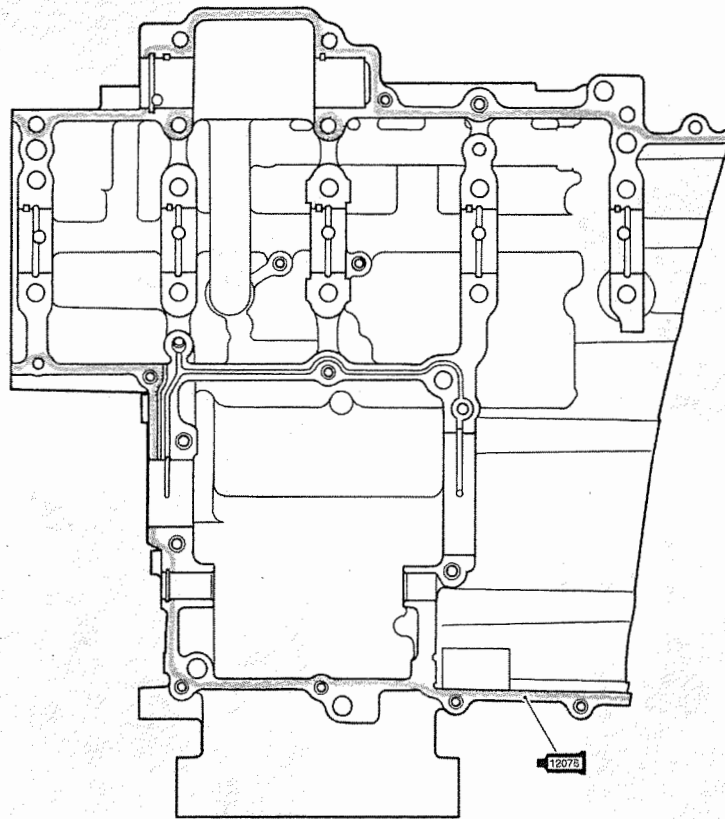


IB38H1140044-01

- Apply bond to the mating surface of the lower crankcase as follows.
 - Make mating surfaces free from moisture, oil, dust and other foreign materials.
 - Spread the sealant on surfaces thinly to form an even layer, and assemble the crankcases within a few minutes.

- Take extreme care not to apply sealant to any oil hole, oil groove and bearing.
- Apply sealant to distorted surfaces as it forms a comparatively thick film.

1207B : Sealant 99000-31140 (SUZUKI BOND No.1207B or equivalent)



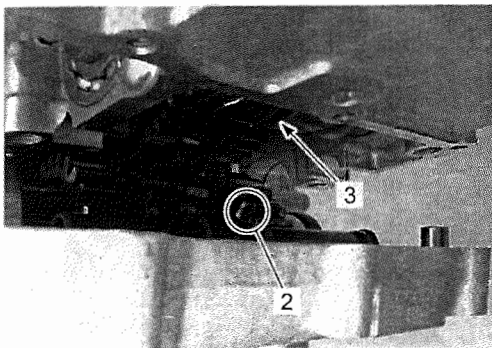
1207B : Apply bond.

IB37H1140281-02

- Match the upper and lower crankcases.

NOTE

Align the gearshift fork (2) with its groove (3).



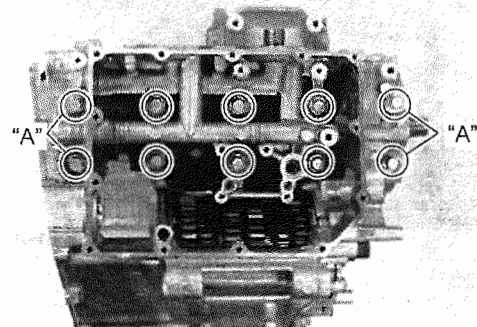
IB15J1140025-01

- Fit the new gasket washers to the bolts "A".

- Tighten the crankshaft journal bolts (M9). Tighten each bolt a little at a time to equalize the pressure in the following two steps.

Tightening torque

Crankshaft journal bolt (M9): 18 N·m (1.8 kgf·m, 13.0 lbf·ft) then turn in 50°



IB37H1140141-01

- Tighten the other crankcase bolts a little at a time to equalize the pressure.
- Fit the new gasket washers to the bolts "B".

1D-65 Engine Mechanical:

- Fit the engine ground lead wire to the bolt "C".

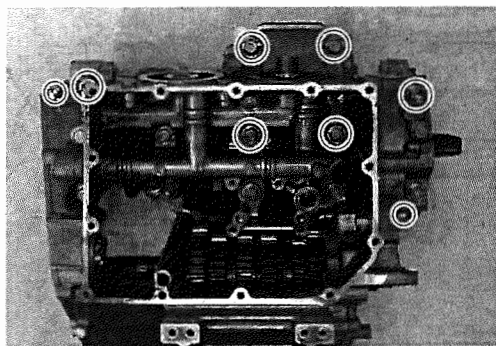
Tightening torque

Crankcase bolt (M6) (Initial): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

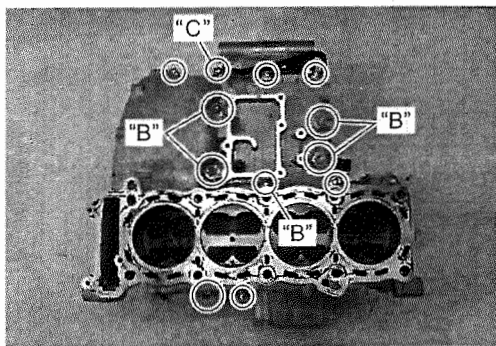
Crankcase bolt (M6) (Final): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

Crankcase bolt (M8) (Initial): 15 N·m (1.5 kgf-m, 11.0 lbf-ft)

Crankcase bolt (M8) (Final): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)

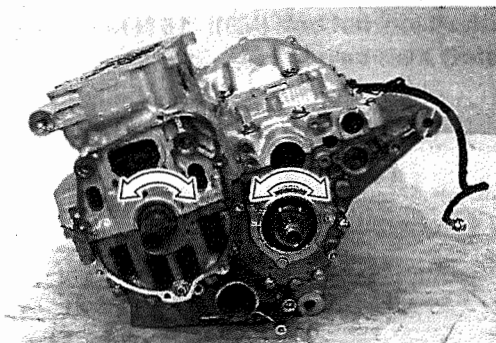


IB15J1140026-02

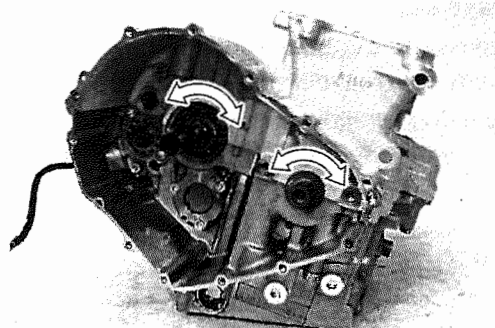


IB15J1140027-01

- After the crankshaft journal bolts and crankcase bolts have been tightened, check that the crankshaft rotates smoothly.
- Also check that the driveshaft and countershaft rotate smoothly.




IB14J1140177-01



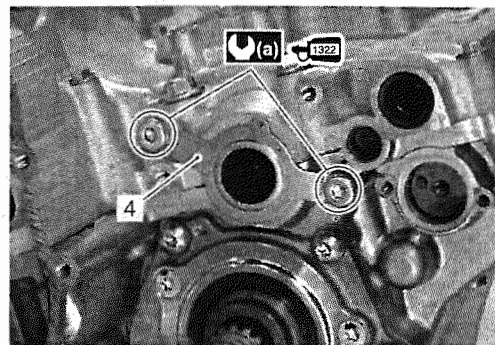
IB14J1140178-01

- Install the clutch push rod oil seal retainer (4).
- Apply thread lock to the bolts and tighten them to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque


Push rod oil seal retainer bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



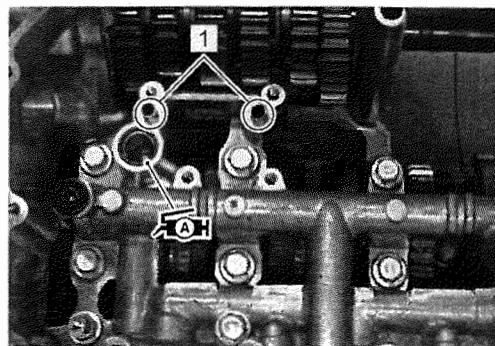
IB15J1140028-02

Oil Pump

- Apply grease to the new O-ring and install it.

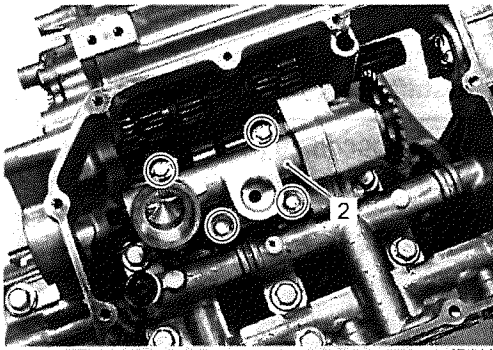
 : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

- Install the dowel pins (1).



IB37H1140147-01

- Install the oil pump (2) and tighten the oil pump mounting bolts.




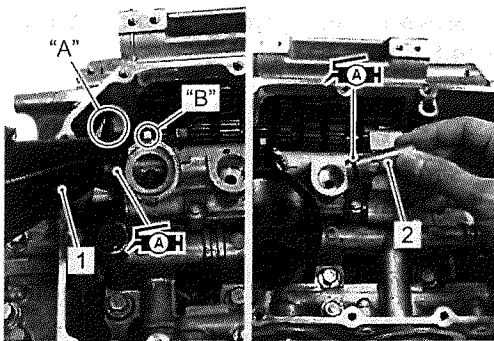
Oil Pressure Regulator / Oil Strainer

- Apply grease to the new O-rings and press in the oil strainer (1) and oil pressure regulator (2) to the oil pump.

NOTE

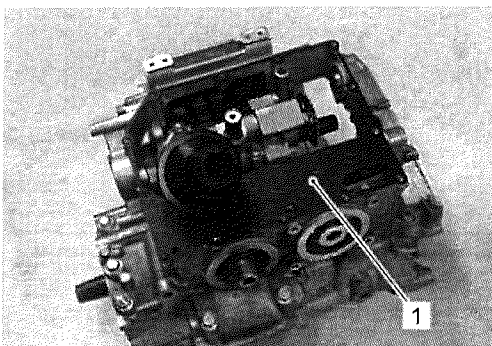
When installing the oil strainer, fit the concave part "A" of the oil strainer onto the convex part "B" of the oil pump.

 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**



Oil Pan

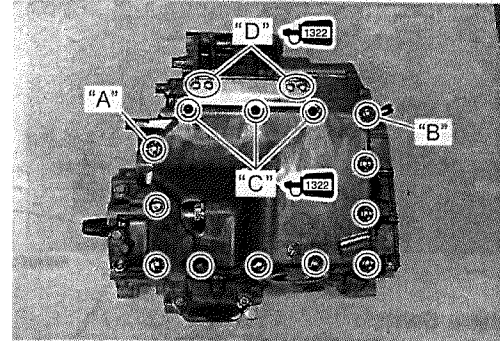
- Install a new gasket (1).



- Fit the new gasket washer to the oil pan bolt "A".
- Fit the clamp to the oil pan bolt "B".
- Apply thread lock to the oil pan bolts "C" and plate bolts "D".


 **Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)**

- Tighten the oil pan bolts and plate bolts diagonally.




Oil Cooler

- Apply grease to the new O-ring (1).

 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

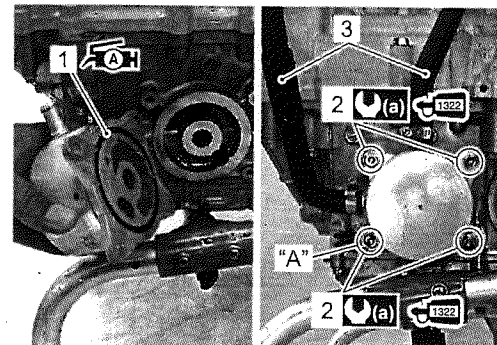
- Apply thread lock to the oil cooler bolts (2) and tighten them to the specified torque.
- Fit the clamp to the oil cooler bolt "A". Refer to "Water Hose Routing Diagram" in Section 1F (Page 1F-3).

 **Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)**

Tightening torque

Oil cooler mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

- Connect the oil cooler hoses (3) securely. Refer to "Water Hose Routing Diagram" in Section 1F (Page 1F-3).

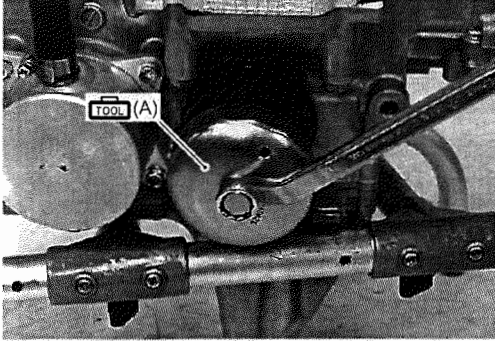


Oil Filter

- Install the oil filter with the special tool. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).

Special tool

TOOL (A): 09915-40620 (Oil filter wrench)



IB14J1140183-01

Oil Pressure Switch

- Apply bond to the thread part of oil pressure switch and tighten oil pressure switch to the specified torque.

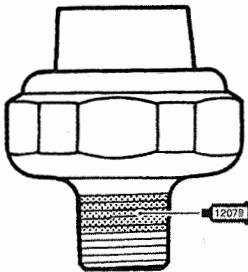
NOTE

Be careful not to apply bond to the hole of thread end.

1207B : Sealant 99000-31140 (SUZUKI BOND No.1207B or equivalent)

Tightening torque

Oil pressure switch: 14 N·m (1.4 kgf-m, 10.0 lbf-ft)



I718H1140233-01

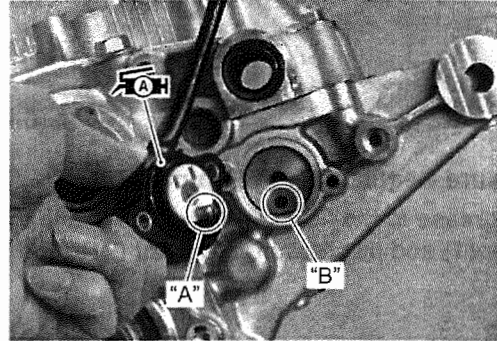
Gear Position Switch

- Apply grease to the new O-ring and install it.

NOTE

Insert the gear position switch pin "A" into the gearshift cam hole "B".

FAH : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



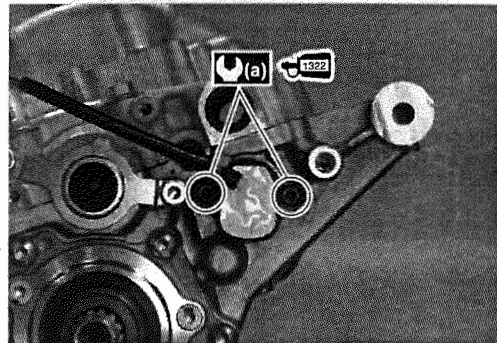
I837H1140154-01

- Apply thread lock to the gear position switch bolts and tighten them to the specified torque.

1322 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Gear position switch mounting bolt (a): 6.5 N·m (0.65 kgf-m, 4.5 lbf-ft)



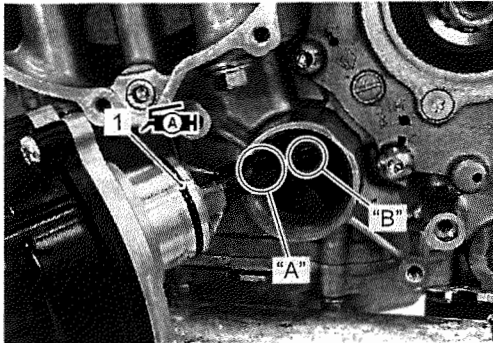
I837H1140155-01

Water Pump

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

⚠ : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

- Install the water pump with the slot on the pump shaft end "A" securely engaged with the flat "B" of the oil pump shaft.

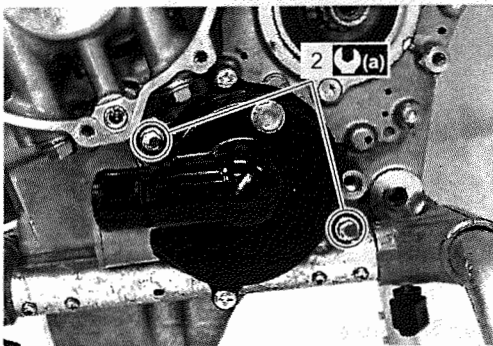


IB14J1140184-01

- Tighten the water pump mounting bolts (2) to the specified torque.

Tightening torque

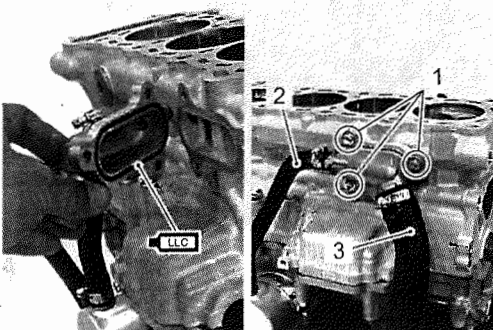
Water pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1140185-02

Water Inlet Connector

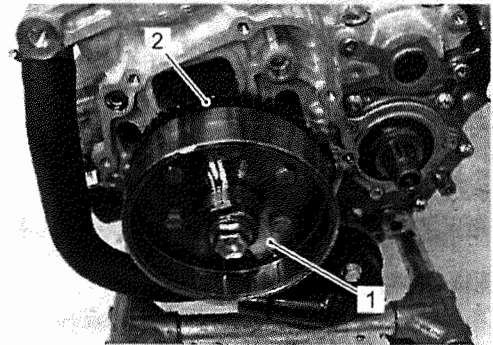
- Apply engine coolant to the new O-ring and install it.
- Tighten the water inlet connector mounting bolts (1) securely.
- Connect the oil cooler inlet hose (2) and cylinder inlet hose (3) securely. Refer to "Water Hose Removal and Installation" in Section 1F (Page 1F-7).



IB14J1140186-01

Generator Rotor / Starter Driven Gear

- Install the generator rotor (1) and starter driven gear (2). Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).



IB14J1140167-03

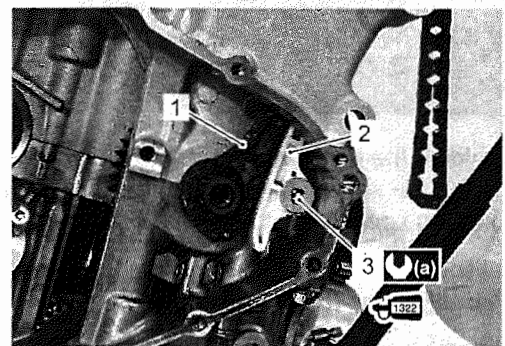
Cam Chain / Cam Chain Tensioner / Cam Chain Guide No. 1

- Install the cam chain (1) and insert the cam chain guide No. 1 (2).
- Apply thread lock to the cam chain guide No. 1 bolt (3) and tighten it to the specified torque.

⚠ : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Cam chain guide No. 1 bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



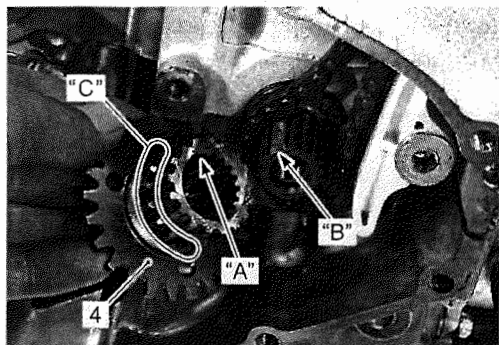
IB14J1140187-01

- Install the CKP sensor rotor/cam chain drive sprocket (4) onto the crankshaft.

NOTE

When installing the cam chain drive sprocket, align the wide spline tooth of the sprocket "A" and crankshaft "B".

- Engage the cam chain with the sprocket tooth "C".



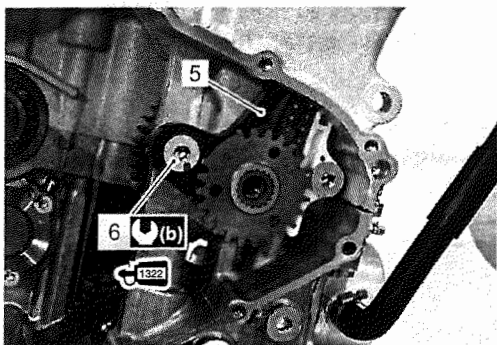
IB14J1140189-02

- Insert the cam chain tensioner (5).
- Apply thread lock to the cam chain tensioner bolt (6) and tighten it to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Cam chain tensioner bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1140190-01

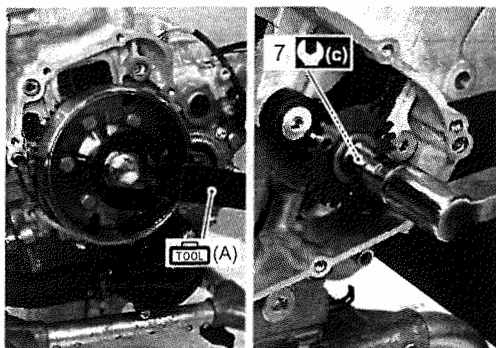
- While holding the generator rotor with the special tool, tighten the CKP sensor rotor/cam chain drive sprocket bolt (7) to the specified torque.

Special tool

 (A): 09930-44521 (Rotor holder)

Tightening torque

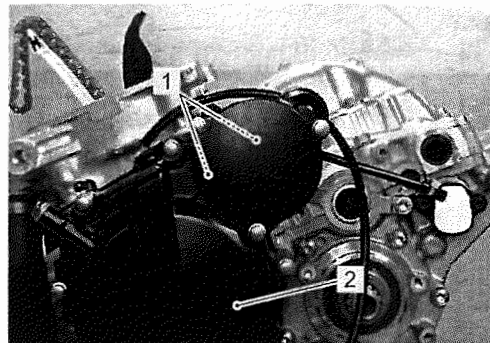
CKP sensor rotor/cam chain drive sprocket bolt (c): 54 N·m (5.4 kgf-m, 39.0 lbf-ft)



IB14J1140191-03

Starter Idle Gear / Generator Cover

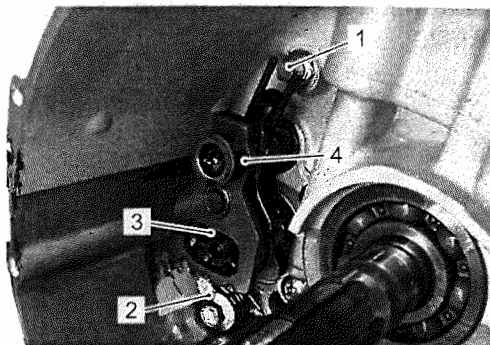
- Install the starter idle gear component parts (1) and generator cover (2). Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10) and "Generator Removal and Installation" in Section 1J (Page 1J-4).



IB14J1140192-01

Gearshift System

- Install the gearshift arm stopper (1), gearshift cam stopper (2), gearshift cam plate (3) and gearshift shaft assembly (4).



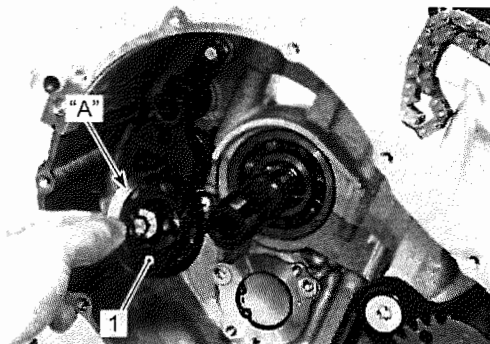
IB14J1140193-01

Oil Pump Drive Sprocket

- Install the thrust washer (1) to the countershaft.

NOTE

The chamfer side "A" of thrust washer must face the crankcase side.



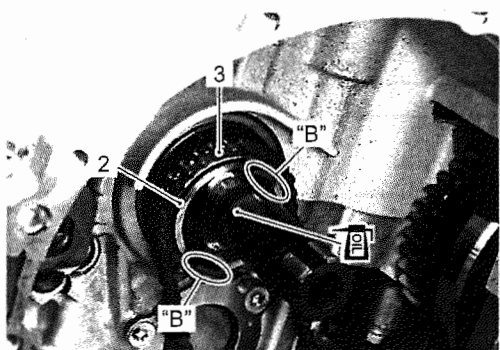
IB14J1140210-01

- Install the oil pump drive sprocket (2) to the countershaft.

NOTE

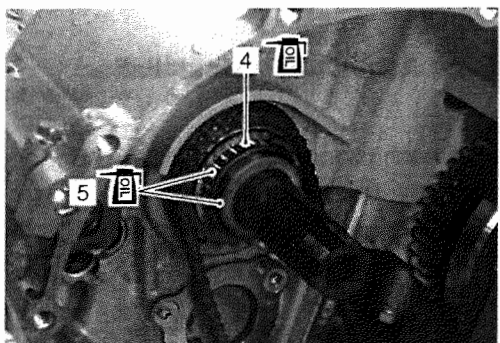
Teeth "B" on the sprocket must face the clutch side.

- Pass the chain (3) between the oil pump drive and driven sprockets.
- Apply engine oil to the countershaft.



IB14J1140194-01

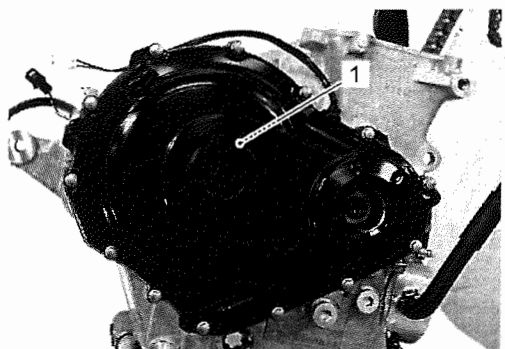
- Install the bearing (4) and spacer (5), and apply engine oil to them.



IB37H1140173-02

Clutch

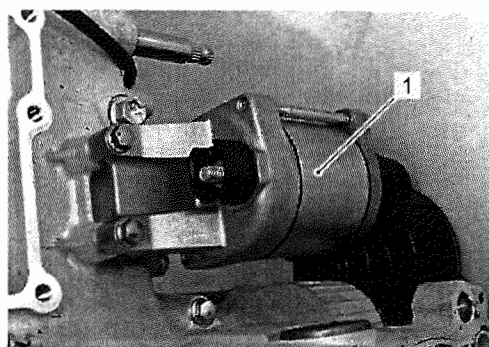
- Install the clutch component parts (1). Refer to "Clutch Installation" in Section 5C (Page 5C-10).



IB14J1140195-01

Starter Motor

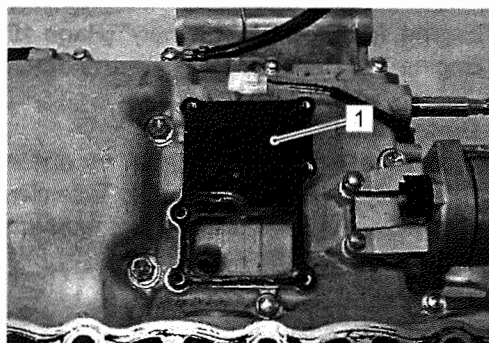
- Install the starter motor (1). Refer to "Starter Motor Removal and Installation" in Section 1I (Page 1I-4).



IB14J1140196-01

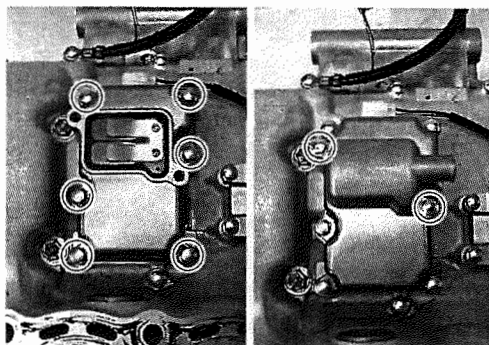
Crankcase Breather (PCV) Cover

- Install a new gasket (1).



IB14J1140197-01

- Tighten the crankcase breather (PCV) cover bolts and crankcase breather (PCV) reed valve cover bolts.



IB14J1140198-01

Engine Top Side

- Assemble the engine top side. Refer to "Engine Top Side Disassembly" (Page 1D-27).

Cam Chain Tensioner Inspection

BENB15J21406031

Inspect the cam chain tensioner in the following procedures:

- 1) Remove the cam chain tensioner. Refer to "Engine Bottom Side Disassembly" (Page 1D-49).

- 2) Check the contacting surface of the cam chain tensioner. If it is worn or damaged, replace it with a new one.



I837H1140279-01

- 3) Install the removed parts. Refer to "Engine Bottom Side Assembly" (Page 1D-57).

Cylinder Inspection

BENB15J21406032

Refer to "Engine Top Side Disassembly" (Page 1D-27).
Refer to "Engine Top Side Assembly" (Page 1D-30).

Cylinder Distortion

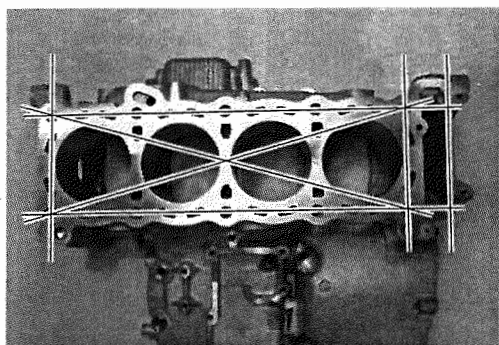
Check the gasket surface of the cylinder for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If any reading exceeds the service limit, replace the crankcase set.

Special tool

TOOL : 09900-20803 (Thickness gauge)

Cylinder distortion

Service limit: 0.20 mm (0.008 in)



I837H1140178-01

Cylinder Bore

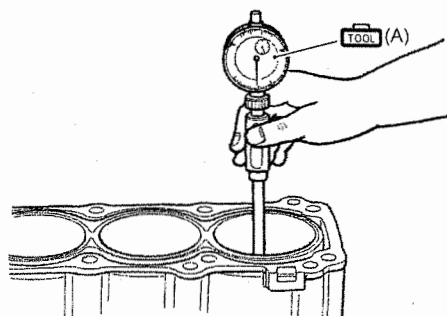
Measure the cylinder bore diameter at six places. If any one of the measurements exceed the limit, overhaul the cylinder and replace the piston with an oversize piston. The remaining cylinders must also be rebored accordingly; otherwise, the imbalance might cause excessive vibration.

Special tool

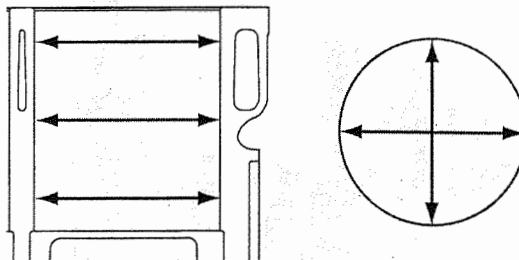
TOOL (A): 09900-20530 (Cylinder gauge set)

Cylinder bore

Standard: 70.000 – 70.015 mm (2.7559 – 2.7565 in)



I947H1140217-02



I814J1140199-01

Piston-to-cylinder Clearance

Refer to "Piston and Piston Ring Inspection" (Page 1D-73).

Piston Ring Removal and Installation

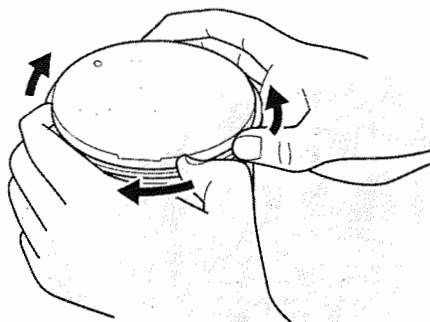
BENB15J21406033

Removal

- 1) Remove each piston. Refer to "Engine Bottom Side Disassembly" (Page 1D-49).
- 2) Carefully spread the ring opening with your thumbs and then push up the opposite side of the 1st ring to remove it.

NOTE

Do not expand the piston ring excessively since it is apt to be broken down.



I837H1140181-01

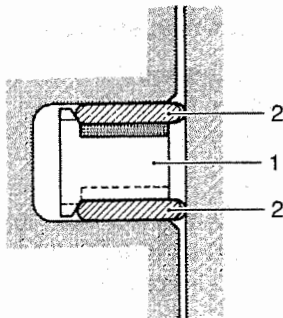
- 3) Remove the 2nd ring and oil ring in the same manner.

Installation

NOTE

- When installing the piston ring, be careful not to damage the piston.
- Do not expand the piston ring excessively since it is apt to be broken down.

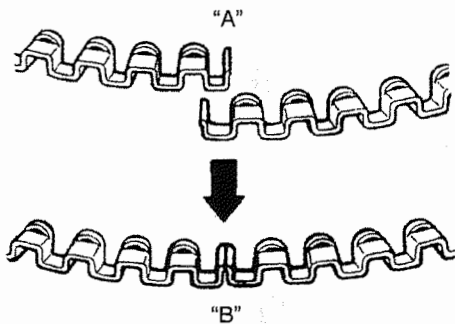
- 1) Install the piston rings in the order of the oil ring, second ring and top ring.
 - a) The first member to go into the oil ring groove is the spacer (1).
After placing the spacer, fit the two side rails (2).



I718H1140143-02

NOTE

When installing the spacer, be careful not to allow its two ends to overlap in the groove.



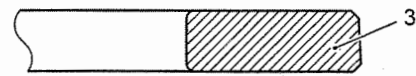
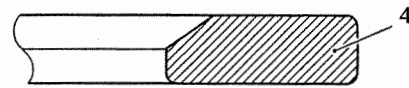
I705H1140170-02

"A": INCORRECT	"B": CORRECT
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- b) Install the 2nd ring (3) and 1st ring (4) to piston.

NOTE

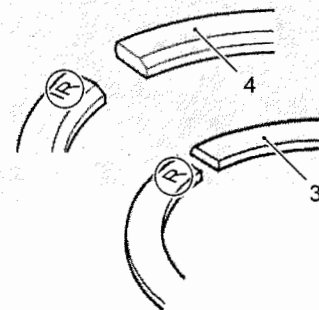
1st ring (4) and 2nd ring (3) differ in shape.



I837H1140182-01

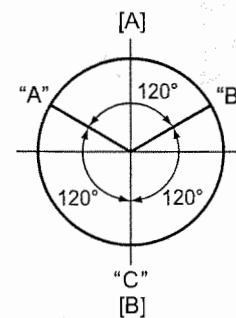
NOTE

Face the side with the stamped mark upward when assembling.



I838H1140053-01

- 2) Position the gaps of the piston rings and side rails as shown. Before inserting piston into the cylinder, check that the gaps are so located.



"A": 2nd ring and lower side rail	[A]: EX
"B": Upper side rail	[B]: IN
"C": 1st ring and spacer	

- 3) Install each piston. Refer to "Engine Bottom Side Assembly" (Page 1D-57).

Piston and Piston Ring Inspection

BENB15J21406034

Refer to "Piston Ring Removal and Installation" (Page 1D-71).

Piston Diameter

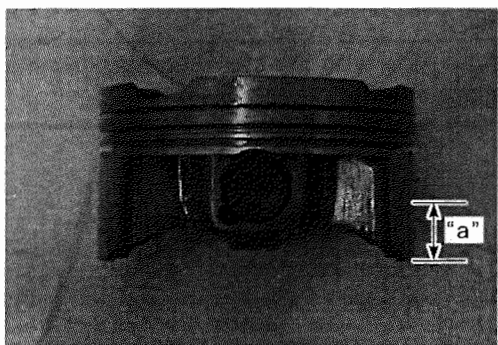
Measure the piston diameter using the micrometer at 15 mm (0.6 in) "a" from the skirt end. If the piston diameter is less than the service limit, replace the piston.

Special tool

TOOL (A): 09900-20203 (Micrometer (50 – 75 mm))

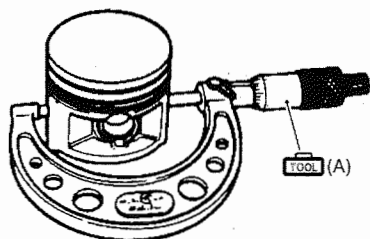
Piston diameter

Service limit: 69.880 mm (2.7512 in)



IB15J1140029-01

"a": 15 mm (0.6 in)



I649G1140262-03

Piston-to-cylinder Clearance

Subtract the piston diameter from the cylinder bore diameter. If the piston-to-cylinder clearance exceeds the service limit, replace both the cylinder and the piston.

Piston-to-cylinder clearance

Service limit: 0.120 mm (0.0047 in)

Piston Ring-to-groove Clearance

Measure the side clearances of the 1st and 2nd piston rings using the thickness gauge. If any of the clearances exceed the limit, replace both the piston and piston rings.

Special tool

TOOL (A): 09900-20803 (Thickness gauge)

TOOL (B): 09900-20205 (Micrometer (0 – 25 mm))

Piston ring-to-groove clearance

Service limit (1st): 0.180 mm (0.0071 in)

Service limit (2nd): 0.150 mm (0.0059 in)

Piston ring groove width

Standard (1st): 1.01 – 1.03 mm (0.0398 – 0.0406 in)

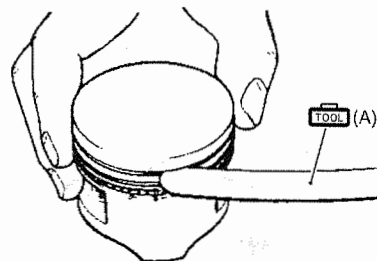
Standard (2nd): 0.81 – 0.83 mm (0.0319 – 0.0327 in)

Standard (Oil): 1.51 – 1.53 mm (0.0594 – 0.0602 in)

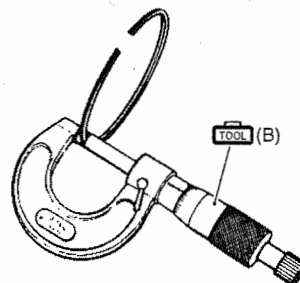
Piston ring thickness

Standard (1st): 0.97 – 0.99 mm (0.0382 – 0.0390 in)

Standard (2nd): 0.77 – 0.79 mm (0.0303 – 0.0311 in)



I649G1140263-03



I649G1140264-03

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

TOOL (A): 09900-20102 (Vernier calipers (200 mm))

Piston ring free end gap

Service limit (1st): 7.3 mm (0.29 in)

Service limit (2nd): 5.8 mm (0.23 in)

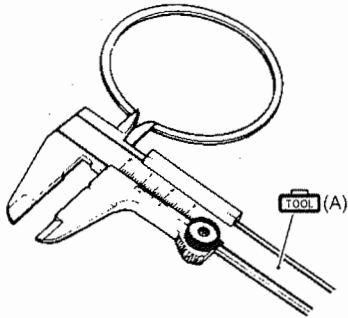
Special tool

TOOL (B): 09900-20803 (Thickness gauge)

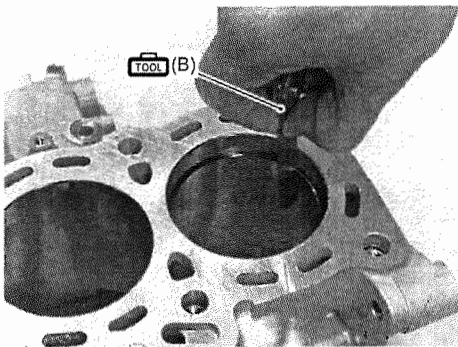
Piston ring end gap

Service limit (1st): 0.50 mm (0.020 in)

Service limit (2nd): 0.50 mm (0.020 in)



I649G1140265-03



I837H1140185-01

Piston Pin and Pin Bore

Measure the piston pin bore inside diameter using the small bore gauge. If either is out of specification or the difference between these measurements surpasses limits, replace the piston.

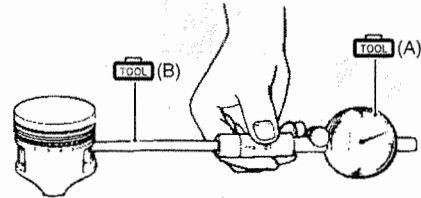
Special tool

TOOL (A): 09900-20602 (Dial gauge)

TOOL (B): 09900-22401 (Small bore gauge (10 – 18 mm))

Piston pin bore

Service limit: 15.030 mm (0.5917 in)



I649G1140267-03

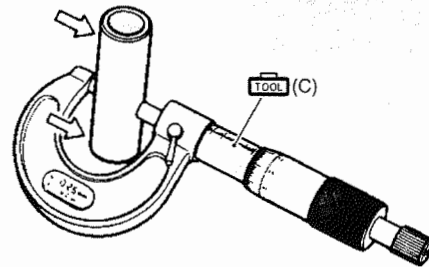
Measure the piston pin outside diameter at three positions using the micrometer. If any of the measurements are out of specification, replace the piston pin.

Special tool

TOOL (C): 09900-20205 (Micrometer (0 – 25 mm))

Piston pin O.D.

Service limit: 14.980 mm (0.5898 in)



I649G1140268-03

Balancer Shaft Disassembly and Assembly

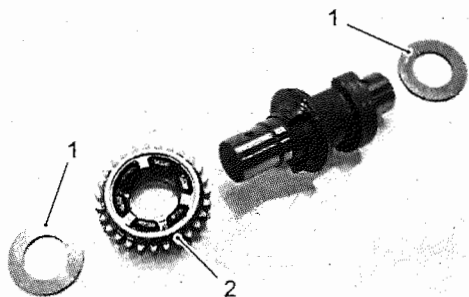
BENB15J21406035

Refer to "Engine Bottom Side Disassembly" (Page 1D-49).

Refer to "Engine Bottom Side Assembly" (Page 1D-57).

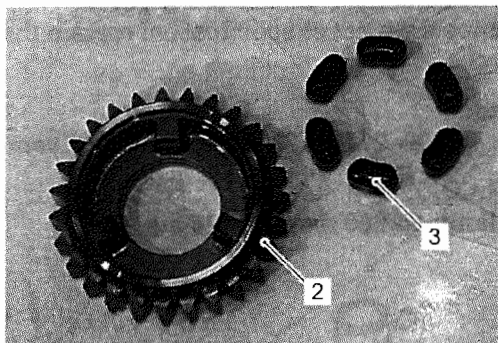
Disassembly

- 1) Remove the washers (1) and balancer gear (2) from the shaft.



IB15J1140030-01

- 2) Remove the dampers (3) from the balancer gear (2).



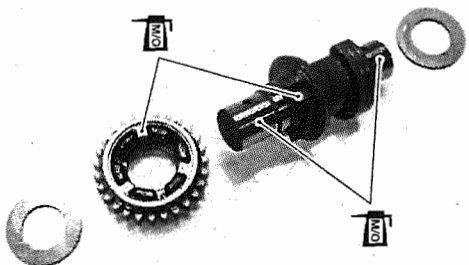
IB15J1140031-01

Assembly

Assembly is in the reverse order of disassembly. Pay attention to the following points:

- Apply molybdenum oil solution to each part.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

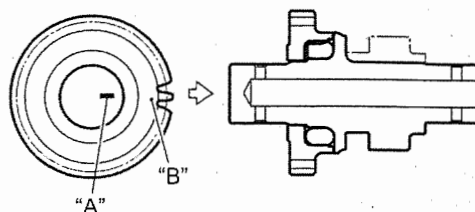


IB15J1140032-01

- Set the dampers and install the balancer shaft to balancer gear.

NOTE

- Fit the stopper of the balancer shaft between the dampers.
- Align the line "A" on the balancer shaft with the punch "B" on the balancer gear.



IB15J1140033-01

Balancer Shaft Inspection

BENB15J21406036

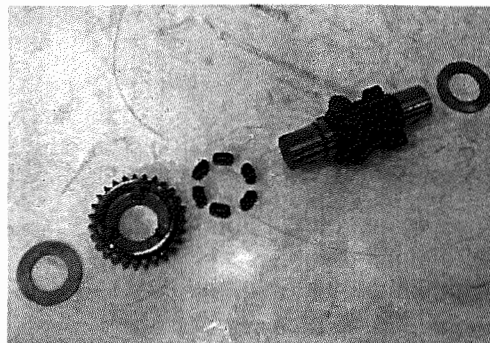
Refer to "Balancer Shaft Disassembly and Assembly" (Page 1D-75).

Balancer Shaft

Inspect the balancer shaft for wear or damage. Replace the balancer shaft if there is anything unusual.

Damper

Inspect the dampers for wear and damage, replace them if any defects are found.



IB15J1140034-01

Balancer Shaft Journal Bearing Inspection and Selection

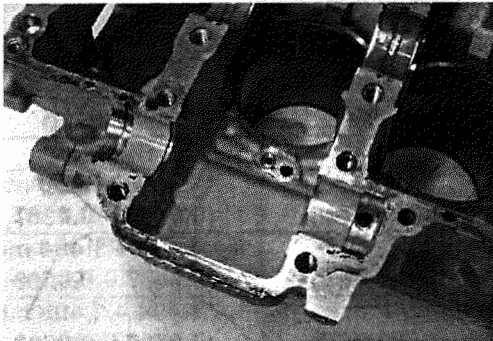
BENB15J21406037

Refer to "Engine Bottom Side Disassembly" (Page 1D-49).

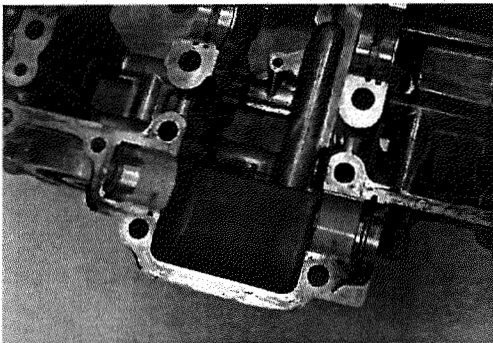
Refer to "Engine Bottom Side Assembly" (Page 1D-57).

Inspection

Inspect the bearing surfaces for any signs of fusion, pitting, burn or flaws. If any, replace them with a specified set of bearings.



IB15J1140035-01



IB15J1140036-01

Selection

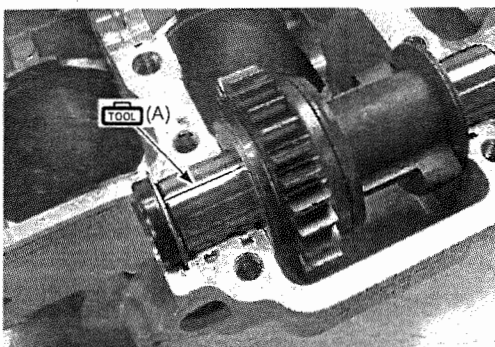
- 1) Place the plastigage axially along the balancer shaft journal as shown.

NOTE

Never rotate the balancer shaft when a piece of plastigage is installed.

Special tool

TOOL (A): 09900-22301 (Plastigage (0.025 – 0.076 mm))



IB38H1140062-01

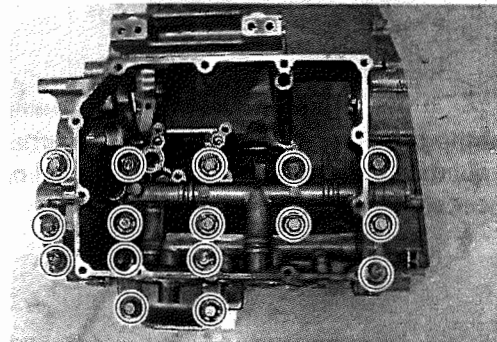
- 2) Mate the lower crankcase with the upper crankcase, and tighten the crankcase bolts (M8) and crankshaft journal bolts (M9) to the specified torque.

Tightening torque

Crankshaft journal bolt (M9): 18 N·m (1.8 kgf-m, 13.0 lbf-ft) then turn in 50°

Crankcase bolt (M8) (Initial): 15 N·m (1.5 kgf-m, 11.0 lbf-ft)

Crankcase bolt (M8) (Final): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)



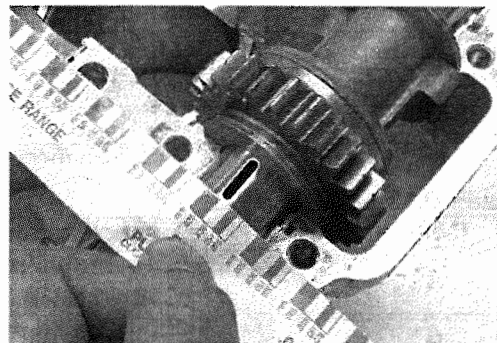
IB15J1140037-01

- 3) Remove the lower crankcase and measure the width of the compressed plastigage using the envelope scale. This measurement should be taken at the widest part of the compressed plastigage. If the oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.

Balancer shaft journal oil clearance

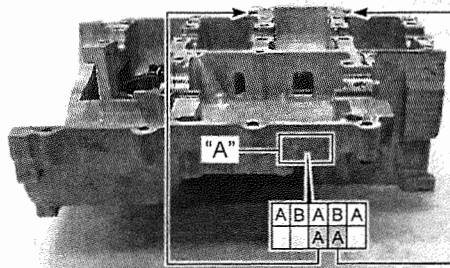
Standard: 0.028 – 0.052 mm (0.0011 – 0.0020 in)

Service limit: 0.080 mm (0.0031 in)



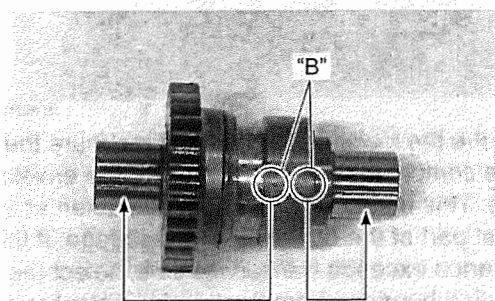
IB38H1140064-01

- 4) Check the corresponding crankcase journal I.D. code number "A", [A] or [B] which is stamped on the rear of upper crankcase.



I838H1140065-02

- 5) Check the corresponding balancer shaft journal O.D. code number "B" [A] or [B] which is stamped on the balancer shaft.



I838H1140066-01

Bearing selection table

		Balancer shaft journal O.D. "B"	
Code		A	B
Crankcase I.D. "A"	A	Green	Black
	B	Black	Brown

I838H1140067-01

Crankcase I.D. specification

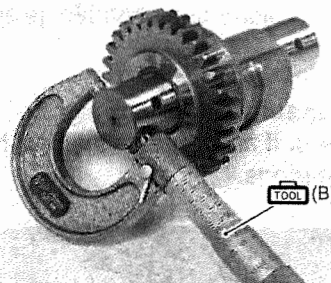
Code	I.D. specification
A	26.000 – 26.008 mm (1.0236 – 1.0239 in)
B	26.008 – 26.016 mm (1.0239 – 1.0243 in)

Balancer shaft journal O.D. specification

Code	O.D. specification
A	22.984 – 22.992 mm (0.9049 – 0.9052 in)
B	22.976 – 22.984 mm (0.9046 – 0.9049 in)

Special tool

TOOL (B): 09900-20205 (Micrometer (0 – 25 mm))



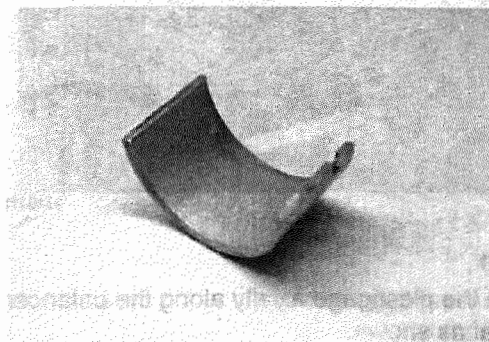
I838H1140068-01

Bearing thickness specification

Color (Part No.)	Thickness
Green (12229-40F50-0A0)	1.486 – 1.490 mm (0.0585 – 0.0587 in)
Black (12229-40F50-0B0)	1.490 – 1.494 mm (0.0587 – 0.0588 in)
Brown (12229-40F50-0C0)	1.494 – 1.498 mm (0.0588 – 0.0590 in)

NOTE

The balancer shaft journal bearings on upper and lower crankcases are the same.



I838H1140069-01

Conrod and Crankshaft Inspection

BENB15J21406038

Refer to "Engine Bottom Side Disassembly" (Page 1D-49).

Refer to "Engine Bottom Side Assembly" (Page 1D-57).

Conrod Small End I.D.

Measure the conrod small end inside diameter using the small bore gauge.

If the conrod small end inside diameter exceeds the service limit, replace the conrod.

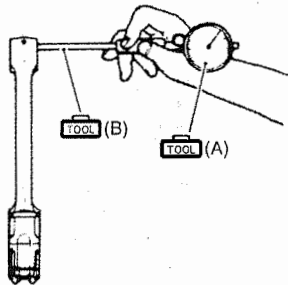
Special tool

TOOL (A): 09900-20602 (Dial gauge)

TOOL (B): 09900-22401 (Small bore gauge (10 – 18 mm))

Conrod small end I.D.

Service limit: 15.040 mm (0.5921 in)



I823H1140280-01

Conrod Big End Side Clearance

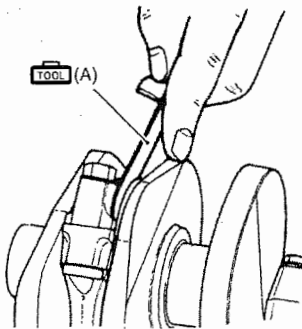
- 1) Check the conrod big end side clearance using the thickness gauge.

Special tool

TOOL (A): 09900-20803 (Thickness gauge)

Conrod big end side clearance

Service limit: 0.30 mm (0.012 in)



I823H1140281-01

- 2) If the clearance exceeds the limit, remove the conrod and measure the conrod big end width and crank pin width. Refer to "Engine Bottom Side Assembly" (Page 1D-57). If any of the measurements are out of specification, replace the conrod or crankshaft.

Special tool

TOOL (B): 09900-20205 (Micrometer (0 – 25 mm))

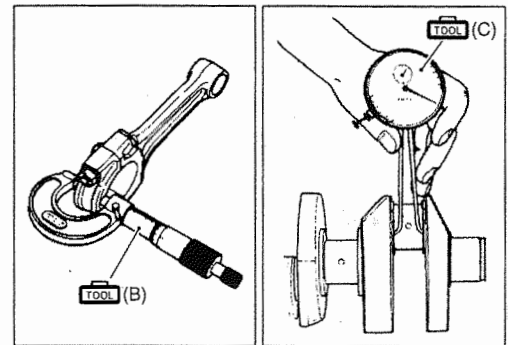
TOOL (C): 09900-20605 (Dial calipers (10 – 34 mm))

Conrod big end width

Standard: 19.95 – 20.00 mm (0.7854 – 0.7874 in)

Crank pin width

Standard: 20.10 – 20.15 mm (0.7913 – 0.7933 in)



I823H1140282-01

Crankshaft Runout

Support the crankshaft using V-blocks as shown, with the two end journals resting on the blocks. Set up the dial gauge as shown, and rotate the crankshaft slowly to read the runout. Replace the crankshaft if the runout exceeds the service limit.

Special tool

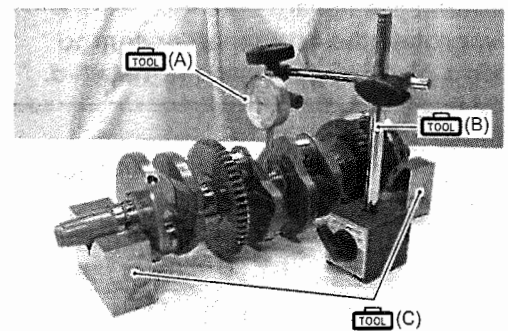
TOOL (A): 09900-20607 (Dial gauge)

TOOL (B): 09900-20701 (Dial gauge chuck)

TOOL (C): 09900-21304 (V blocks)

Crankshaft runout

Service limit: 0.05 mm (0.002 in)



I838H1140076-01

Conrod Crank Pin Bearing Inspection and Selection

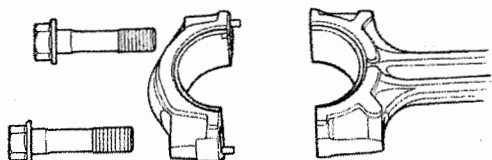
BENB15J21406039

Refer to "Engine Bottom Side Disassembly" (Page 1D-49).

Refer to "Engine Bottom Side Assembly" (Page 1D-57).

Inspection

- 1) Inspect the bearing surfaces for any signs of fusion, pitting, burn or flaws. If any, replace them with a specified set of bearings.

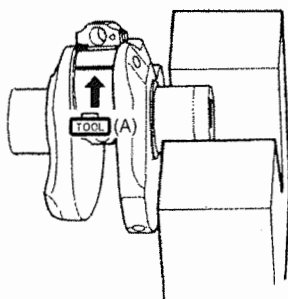


I718H1140285-01

- 2) Place the plastigage axially along the crank pin, avoiding the oil hole, as shown in the figure.

Special tool

TOOL (A): 09900-22301 (Plastigage (0.025 – 0.076 mm))



I718H1140286-01

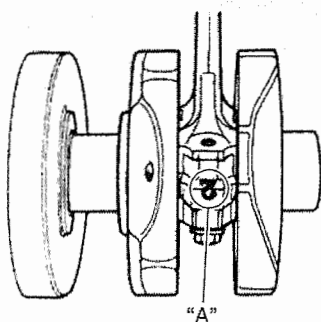
- 3) Tighten the conrod cap bolts to the specified torque, in two stages.

NOTE

- When installing the conrod cap bolts to the crank pin, make sure that I.D code "A" on the conrod faces towards the intake side.
- Never rotate the crankshaft or conrod when a piece of plastigage is installed.

Tightening torque

Conrod cap bolt: 15 N·m (1.5 kgf-m, 11.0 lbf-ft) then turn in 1/4 (90°) turn



I823H1140284-01

- 4) Remove the conrod cap bolts and measure the width of the compressed plastigage using the envelope scale. This measurement should be taken at the widest part of the compressed plastigage. If the oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.

Special tool

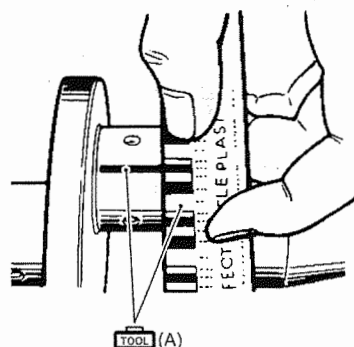
TOOL (A): 09900-22301 (Plastigage (0.025 – 0.076 mm))

Conrod big end oil clearance

Standard: 0.032 – 0.056 mm (0.0013 – 0.0022 in)

Conrod big end oil clearance

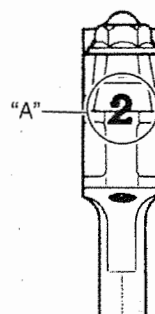
Service limit: 0.080 mm (0.0031 in)



I718H1140289-01

Selection

- 1) Check the corresponding conrod I.D. code numbers ([1] or [2]) "A".

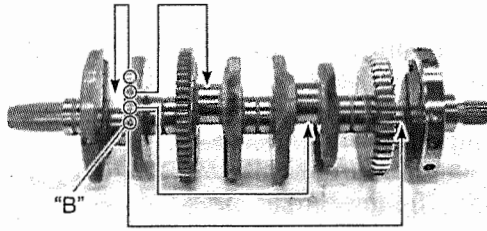


I718H1140290-01

Conrod I.D. specification

Code "A"	I.D. specification
1	36.000 – 36.008 mm (1.4173 – 1.4176 in)
2	36.008 – 36.016 mm (1.4176 – 1.4179 in)

- 2) Check the corresponding crank pin O.D. code numbers ([1], [2] or [3]) "B".




I838H1140071-01

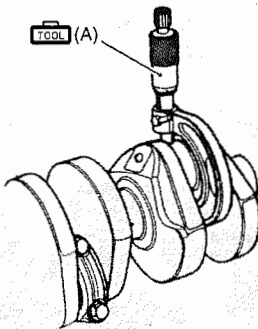
- 3) Measure the conrod crank pin O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

Crank pin O.D. specification

Code "B"	O.D. specification
1	32.992 – 33.000 mm (1.2989 – 1.2992 in)
2	32.984 – 32.992 mm (1.2986 – 1.2989 in)
3	32.976 – 32.984 mm (1.2983 – 1.2986 in)

Special tool

 (A): 09900-20202 (Micrometer (25 – 50 mm))



I823H1140286-01

- 4) Select the specified bearings from the bearing selection table.

NOTE

The bearings must be replaced as a set.

Bearing selection table

		Crank pin O.D. "B"		
Conrod I.D. "A"	Code	1	2	3
	1	Green	Black	Brown
	2	Black	Brown	Yellow

I718H1140293-01

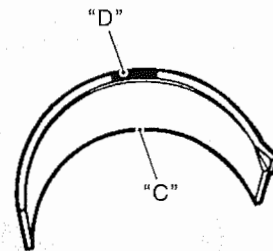
Bearing thickness specification

Conrod side

Color "C" (Part No.)	Thickness
Yellow (12164-15J00-0D0)	1.492 – 1.496 mm (0.0587 – 0.0589 in)
Brown (12164-15J00-0C0)	1.488 – 1.492 mm (0.0586 – 0.0587 in)
Black (12164-15J00-0B0)	1.484 – 1.488 mm (0.0584 – 0.0586 in)
Green (12164-15J00-0A0)	1.480 – 1.484 mm (0.0583 – 0.0584 in)

Cap side

Color "D" (Part No.)	Thickness
Yellow (12164-30G00-0D0)	1.492 – 1.496 mm (0.0587 – 0.0589 in)
Brown (12164-30G00-0C0)	1.488 – 1.492 mm (0.0586 – 0.0587 in)
Black (12164-30G00-0B0)	1.484 – 1.488 mm (0.0584 – 0.0586 in)
Green (12164-30G00-0A0)	1.480 – 1.484 mm (0.0583 – 0.0584 in)



IB14J1140213-01

"C": Color code (Conrod side)

"D": Color code (Cap side)

Crankshaft Journal Bearing Inspection and Selection

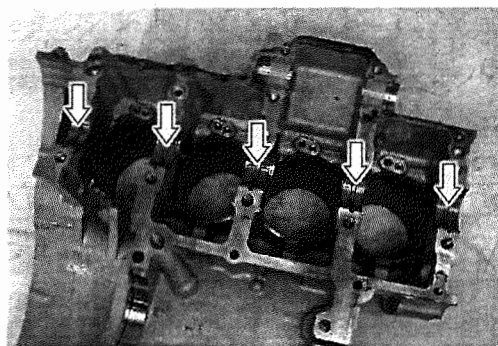
BENB15J21406040

Refer to "Engine Bottom Side Disassembly" (Page 1D-49).

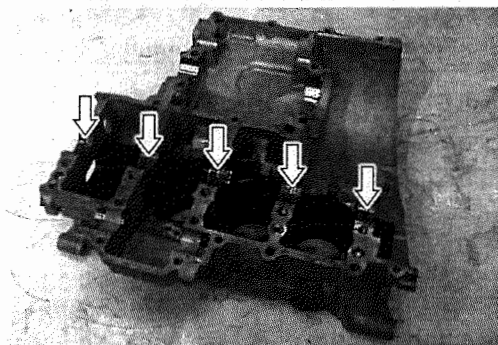
Refer to "Engine Bottom Side Assembly" (Page 1D-57).

Inspection

- 1) Inspect each upper and lower crankcase bearing for any damage.



IB15J1140038-01



IB15J1140039-01

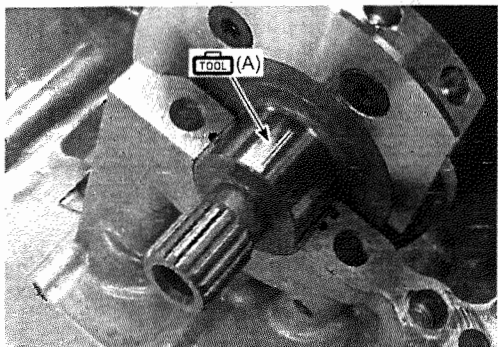
- 2) Set the crankshaft onto the upper crankcase.
- 3) Place the plastigage onto each crankshaft journal as shown.

NOTE

Do not place the plastigage on the oil hole.

Special tool

TOOL (A): 09900-22301 (Plastigage (0.025 – 0.076 mm))



IB37H1140190-01

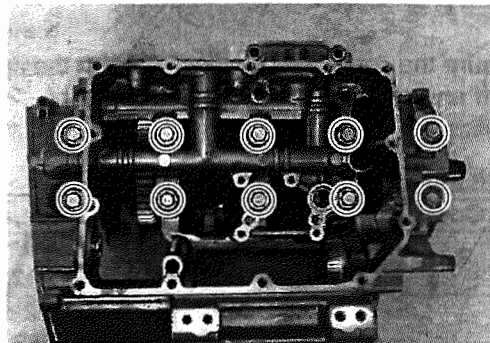
- 4) Mate the lower crankcase with the upper crankcase.
- 5) Tighten the crankshaft journal bolts (M9). Tighten each bolt a little at a time to equalize the pressure in the following two steps.

NOTE

Do not rotate the crankshaft when a piece of plastigage is installed.

Tightening torque

Crankshaft journal bolt (M9): 18 N·m (1.8 kgf-m, 13.0 lbf-ft) then turn in 50°



IB15J1140040-01

- 6) Remove the lower crankcase and measure the width of compressed plastigage using the envelope scale. This measurement should be taken at the widest part of the compressed plastigage. If the oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.

Crankshaft journal oil clearance

Standard: 0.010 – 0.028 mm (0.0004 – 0.0011 in)

Crankshaft journal oil clearance

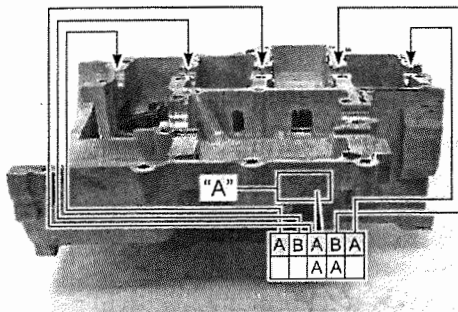
Service limit: 0.080 mm (0.0031 in)



IB14J1140202-01

Selection

- 1) Check the corresponding crankcase journal I.D. codes "A" ([A], [B] or [C]), which are stamped on the rear of the upper crankcase.

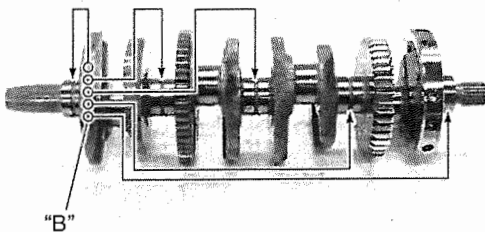


I838H1140073-02

Crankcase journal I.D. specification

Code "A"	I.D. specification
A	35.000 – 35.006 mm (1.3780 – 1.3782 in)
B	35.006 – 35.012 mm (1.3782 – 1.3784 in)
C	35.012 – 35.018 mm (1.3784 – 1.3787 in)

- 2) Check the corresponding crankshaft journal O.D. codes "B" ([A], [B] or [C]), which are stamped on the crankshaft.




I838H1140074-01

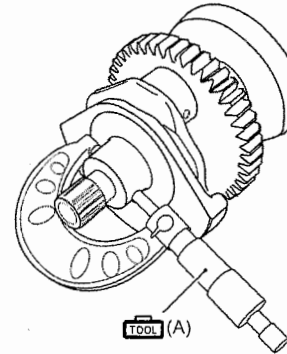
- 3) Measure the crankshaft O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

Crankshaft journal O.D. specification

Code "B"	O.D. specification
A	31.994 – 32.000 mm (1.2596 – 1.2598 in)
B	31.988 – 31.994 mm (1.2594 – 1.2596 in)
C	31.982 – 31.988 mm (1.2591 – 1.2594 in)

Special tool

 (A): 09900-20202 (Micrometer (25 – 50 mm))



IB14J1140203-01

- 4) Select the specified bearings from the bearing selection table.

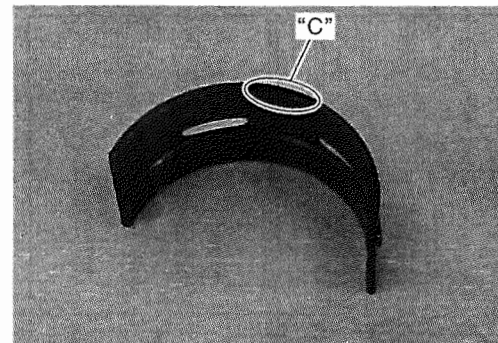
Bearing selection table

		Crankshaft O.D. "B"			
		Code	A	B	C
Crankcase I.D. "A"	A	Green	Black	Brown	
	B	Black	Brown	Yellow	
	C	Brown	Yellow	Blue	

I823H1140299-01

Bearing thickness specification

Color "C" (Part No.)	Thickness
Blue (12229-02H00-0E0)	1.504 – 1.507 mm (0.0592 – 0.0593 in)
Yellow (12229-02H00-0D0)	1.501 – 1.504 mm (0.0591 – 0.0592 in)
Brown (12229-02H00-0C0)	1.498 – 1.501 mm (0.0590 – 0.0591 in)
Black (12229-02H00-0B0)	1.495 – 1.498 mm (0.0589 – 0.0590 in)
Green (12229-02H00-0A0)	1.492 – 1.495 mm (0.0587 – 0.0589 in)



I718H1140303-01

"C": Color code

Crankshaft Thrust Clearance Inspection and Selection

BENB15J21406041

Refer to "Engine Bottom Side Disassembly" (Page 1D-49).

Refer to "Engine Bottom Side Assembly" (Page 1D-57).

Inspection

- 1) With the crankshaft's right-side and left-side thrust bearings inserted into the upper crankcase.
- 2) Measure the thrust clearance "a" between the left-side thrust bearing and crankshaft using the thickness gauge. If the thrust clearance exceeds the standard range, adjust the thrust clearance.

NOTE

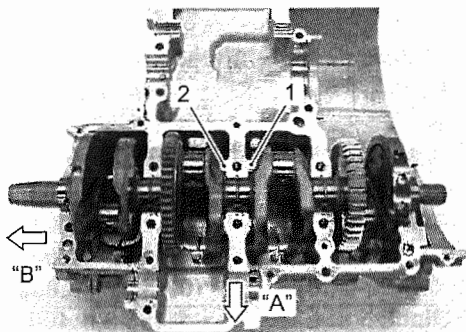
Pull the crankshaft to the left (generator side) so that there is no clearance on the right-side thrust bearing.

Special tool

TOOL (A): 09900-20803 (Thickness gauge)

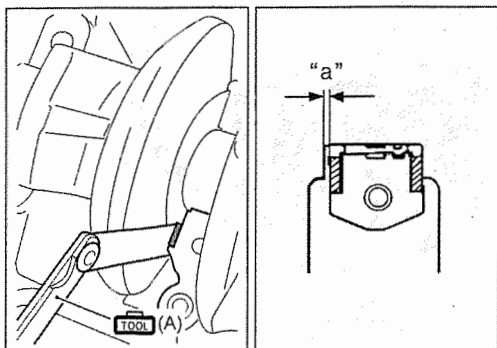
Crankshaft thrust clearance "a"

Standard: 0.055 – 0.110 mm (0.0022 – 0.0043 in)



I838H1140075-01

1. Right-side thrust bearing	"A": Front side
2. Left-side thrust bearing	"B": Left side



I837H1140197-02

Selection

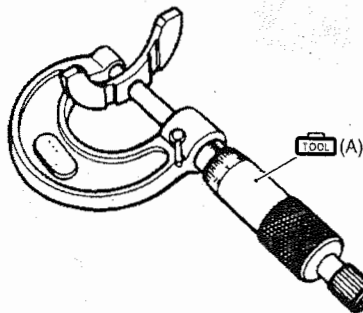
- 1) Remove the right-side thrust bearing and measure its thickness using the micrometer. If the thickness of the right-side thrust bearing is below standard, replace it with a new bearing and measure the thrust clearance again, as described in Inspection 1) and 2).

Special tool

TOOL (A): 09900-20205 (Micrometer (0 – 25 mm))

Right-side thrust bearing thickness

Standard: 2.425 – 2.450 mm (0.0955 – 0.0965 in)

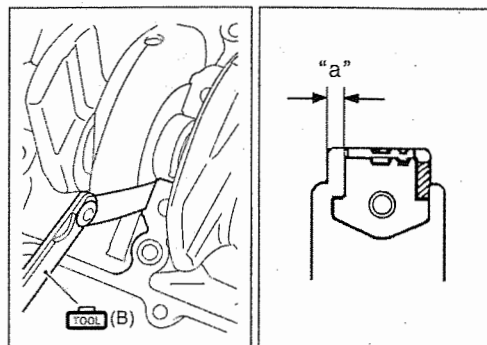


I649G1140343-02

- 2) If the right-side thrust bearing is within the standard range, reinsert the right-side thrust bearing and remove the left-side thrust bearing.
- 3) With the left-side thrust bearing removed, measure the clearance "a" using the thickness gauge as shown.

Special tool

TOOL (B): 09900-20803 (Thickness gauge)



I837H1140198-02

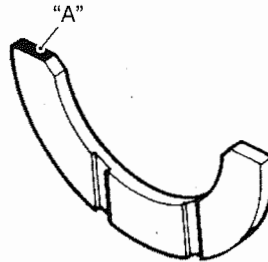
4) Select a left-side thrust bearing from the selection table.

NOTE

Right-side thrust bearing has the same specification as the GREEN (12228-17E00-0D0) of left-side thrust bearing.

Thrust bearing selection table

Clearance before inserting the left-side thrust bearing	Color "A" (Part No.)	Thrust bearing thickness	Thrust clearance
2.560 – 2.585 mm (0.1008 – 0.1018 in)	White (12228-17E00-0F0)	2.475 – 2.500 mm (0.0974 – 0.0984 in)	0.060 – 0.110 mm (0.0024 – 0.0043 in)
2.535 – 2.560 mm (0.0998 – 0.1008 in)	Yellow (12228-17E00-0E0)	2.450 – 2.475 mm (0.0965 – 0.0974 in)	
2.510 – 2.535 mm (0.0988 – 0.0998 in)	Green (12228-17E00-0D0)	2.425 – 2.450 mm (0.0955 – 0.0965 in)	
2.485 – 2.510 mm (0.0978 – 0.0988 in)	Blue (12228-17E00-0C0)	2.400 – 2.425 mm (0.0945 – 0.0955 in)	
2.460 – 2.485 mm (0.0969 – 0.0978 in)	Black (12228-17E00-0B0)	2.375 – 2.400 mm (0.0935 – 0.0945 in)	
2.430 – 2.460 mm (0.0957 – 0.0969 in)	Red (12228-17E00-0A0)	2.350 – 2.375 mm (0.0925 – 0.0935 in)	0.055 – 0.110 mm (0.0022 – 0.0043 in)



I649G1140345-02

"A": Color code

5) After selecting a left-side thrust bearing, install it and then measure the thrust clearance again.

Specifications

Service Data

BENB15J21407001

Valve + Guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	29.0 (1.14)	—
	EX.	23.0 (0.91)	—
Valve clearance (when cold)	IN.	0.08 – 0.18 (0.003 – 0.007)	—
	EX.	0.18 – 0.28 (0.007 – 0.011)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve guide I.D.	IN. & EX.	4.500 – 4.512 (0.1772 – 0.1776)	—
Valve stem O.D.	IN.	4.475 – 4.490 (0.1762 – 0.1768)	—
	EX.	4.455 – 4.470 (0.1754 – 0.1760)	—
Valve stem deflection	IN. & EX.	—	0.25 (0.010)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	IN. & EX.	—	37.1 (1.46)
Valve spring tension	IN. & EX.	142 – 157 N (14.5 – 16.0 kgf, 31.9 – 35.3 lbs) at length 33.55 mm (1.321 in)	—

Camshaft + Cylinder Head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	36.58 – 36.63 (1.440 – 1.442)	36.28 (1.428)
	EX.	35.78 – 35.83 (1.409 – 1.411)	35.48 (1.397)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	24.012 – 24.025 (0.9454 – 0.9459)	—
Camshaft journal O.D.	IN. & EX.	23.959 – 23.980 (0.9433 – 0.9441)	—
Camshaft runout	—		0.10 (0.004)
Cam chain pin (at arrow "3")	12th pin		—
Cylinder head distortion	—		0.20 (0.008)

Cylinder + Piston + Piston Ring

Unit: mm (in)

Item	Standard			Limit
Compression pressure	1 300 – 1 700 kPa (13 – 17 kgf/cm ² , 185 – 242 psi)			1 000 kPa (10 kgf/cm ² , 142 psi)
Compression pressure difference	—			200 kPa (2 kgf/cm ² , 28 psi)
Piston-to-cylinder clearance	0.030 – 0.040 (0.0012 – 0.0016)			0.120 (0.0047)
Cylinder bore	70.000 – 70.015 (2.7559 – 2.7565)			No nicks or Scratches
Piston diam.	69.965 – 69.980 (2.7545 – 2.7551) Measure 15 mm (0.6 in) from the skirt end.			69.880 (2.7512)
Cylinder distortion	—			0.20 (0.008)
Piston ring free end gap	1st	IR	Approx. 9.2 (0.36)	7.3 (0.29)
	2nd	R	Approx. 7.3 (0.29)	5.8 (0.23)
Piston ring end gap	1st	IR	0.06 – 0.21 (0.002 – 0.008)	0.50 (0.020)
	2nd	R	0.06 – 0.18 (0.002 – 0.007)	0.50 (0.020)
Piston ring-to-groove clearance	1st	—		0.180 (0.0071)
	2nd	—		0.150 (0.0059)
Piston ring groove width	1st	1.01 – 1.03 (0.0398 – 0.0406)		—
	2nd	0.81 – 0.83 (0.0319 – 0.0327)		—
	Oil	1.51 – 1.53 (0.0594 – 0.0602)		—
Piston ring thickness	1st	0.97 – 0.99 (0.0382 – 0.0390)		—
	2nd	0.77 – 0.79 (0.0303 – 0.0311)		—
Piston pin bore	15.002 – 15.008 (0.5906 – 0.5909)			15.030 (0.5917)
Piston pin O.D.	14.995 – 15.000 (0.5903 – 0.5906)			14.980 (0.5898)

Conrod + Crankshaft

Unit: mm (in)

Item	Standard		Limit
Conrod small end I.D.	15.010 – 15.018 (0.5909 – 0.5913)		15.040 (0.5921)
Conrod big end side clearance	0.10 – 0.20 (0.004 – 0.008)		0.30 (0.012)
Conrod big end width	19.95 – 20.00 (0.7854 – 0.7874)		—
Crank pin width	20.10 – 20.15 (0.7913 – 0.7933)		—
Conrod big end oil clearance	0.032 – 0.056 (0.0013 – 0.0022)		0.080 (0.0031)
Crank pin O.D.	32.976 – 33.000 (1.2983 – 1.2992)		—
Crankshaft journal oil clearance	0.010 – 0.028 (0.0004 – 0.0011)		0.080 (0.0031)
Crankshaft journal O.D.	31.982 – 32.000 (1.2591 – 1.2598)		—
Crankshaft thrust bearing thickness	Right side	2.425 – 2.450 (0.0955 – 0.0965)	—
	Left side	2.350 – 2.500 (0.0925 – 0.0984)	—
Crankshaft thrust clearance	0.055 – 0.110 (0.0022 – 0.0043)		—
Crankshaft runout	—		0.05 (0.002)

Balancer

Unit: mm (in)

Item	Standard	Limit
Balancer shaft journal oil clearance	0.028 – 0.052 (0.0011 – 0.0020)	0.080 (0.0031)
Balancer shaft journal O.D.	22.976 – 22.992 (0.9046 – 0.9052)	—

Throttle Body

Item	Specification
Bore size	42 mm (1.65 in)
I.D. No.	15J1 (For E-33), 15J0 (For others)
Idle r/min	1 200 ± 100 r/min
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

Tightening Torque Specifications

BENB15J21407002

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Throttle cable nut	4.5	0.45	3.0	☞ (Page 1D-13)
Intake pipe clamp screw	1.5	0.15	1.0	☞ (Page 1D-13)
STP sensor mounting screw	3.5	0.35	2.5	☞ (Page 1D-16)
TP sensor mounting screw	3.5	0.35	2.5	☞ (Page 1D-16)
ISC valve mounting screw	2	0.2	1.5	☞ (Page 1D-17)
IAP sensor mounting screw	3.5	0.35	2.5	☞ (Page 1D-18)
Fuel delivery pipe mounting screw	3.5	0.35	2.5	☞ (Page 1D-18)
Engine mounting thrust adjuster	23	2.3	16.5	☞ (Page 1D-25)
Engine mounting thrust adjuster lock-nut	45	4.5	32.5	☞ (Page 1D-25)
Cylinder head bolt (M10)	31 N-m (3.1 kgf-m, 22.5 lbf-ft) then turn in 1/6 (60°) turn			☞ (Page 1D-30)
Cylinder head bolt (M6)	10	1.0	7.0	☞ (Page 1D-30)
Camshaft journal holder bolt	10	1.0	7.0	☞ (Page 1D-33) / ☞ (Page 1D-37)
Cam chain tension adjuster mounting bolt	10	1.0	7.0	☞ (Page 1D-34)
Cam chain tension adjuster service cap	23	2.3	16.5	☞ (Page 1D-35) / ☞ (Page 1D-42)
Crankshaft hole plug	11	1.1	8.0	☞ (Page 1D-35)
Head cover bolt	14	1.4	10.0	☞ (Page 1D-36)
Oil gallery plug (M6)	10	1.0	7.0	☞ (Page 1D-42)
Intake pipe bolt	10	1.0	7.0	☞ (Page 1D-42)
Engine coolant temperature sensor	18	1.8	13.0	☞ (Page 1D-43)
Oil gallery plug (M12)	15	1.5	11.0	☞ (Page 1D-58)
Oil gallery plug (M16)	35	3.5	25.5	☞ (Page 1D-58)
Oil gallery plug	7	0.7	5.0	☞ (Page 1D-58)
Oil gallery jet	27	2.7	19.5	☞ (Page 1D-58)
Piston cooling oil jet bolt	10	1.0	7.0	☞ (Page 1D-61)
Conrod cap bolt	15 N-m (1.5 kgf-m, 11.0 lbf-ft) then turn in 1/4 (90°) turn			☞ (Page 1D-62) / ☞ (Page 1D-79)
Crankshaft journal bolt (M9)	18 N-m (1.8 kgf-m, 13.0 lbf-ft) then turn in 50°			☞ (Page 1D-64) / ☞ (Page 1D-76) / ☞ (Page 1D-81)
Crankcase bolt (M6) (Initial)	6	0.6	4.5	☞ (Page 1D-65)
Crankcase bolt (M6) (Final)	11	1.1	8.0	☞ (Page 1D-65)
Crankcase bolt (M8) (Initial)	15	1.5	11.0	☞ (Page 1D-65) / ☞ (Page 1D-76)
Crankcase bolt (M8) (Final)	26	2.6	19.0	☞ (Page 1D-65) / ☞ (Page 1D-76)
Push rod oil seal retainer bolt	10	1.0	7.0	☞ (Page 1D-65)
Oil cooler mounting bolt	10	1.0	7.0	☞ (Page 1D-66)
Oil pressure switch	14	1.4	10.0	☞ (Page 1D-67)
Gear position switch mounting bolt	6.5	0.65	4.5	☞ (Page 1D-67)
Water pump mounting bolt	10	1.0	7.0	☞ (Page 1D-68)
Cam chain guide No. 1 bolt	23	2.3	16.5	☞ (Page 1D-68)
Cam chain tensioner bolt	23	2.3	16.5	☞ (Page 1D-69)
CKP sensor rotor/cam chain drive sprocket bolt	54	5.4	39.0	☞ (Page 1D-69)

NOTE

The tightening torque(s) also specified in:
 "Throttle Cable Routing Diagram" (Page 1D-2)
 "Throttle Body Components" (Page 1D-10)
 "Throttle Body Construction" (Page 1D-11)
 "Engine Assembly Installation" (Page 1D-24)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J21408001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞(Page 1D-16) / ☞(Page 1D-16) / ☞(Page 1D-42) / ☞(Page 1D-65) / ☞(Page 1D-66) / ☞(Page 1D-66) / ☞(Page 1D-67) / ☞(Page 1D-68)
	SUZUKI MOLYBDENUM GREASE L or equivalent	P/No.: 99000-25280	☞(Page 1D-59)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞(Page 1D-30) / ☞(Page 1D-43) / ☞(Page 1D-43) / ☞(Page 1D-59) / ☞(Page 1D-60) / ☞(Page 1D-61) / ☞(Page 1D-61) / ☞(Page 1D-62) / ☞(Page 1D-63) / ☞(Page 1D-75)
Sealant	SUZUKI BOND No.1207B or equivalent	P/No.: 99000-31140	☞(Page 1D-36) / ☞(Page 1D-64) / ☞(Page 1D-67)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞(Page 1D-42) / ☞(Page 1D-58) / ☞(Page 1D-58) / ☞(Page 1D-61) / ☞(Page 1D-65) / ☞(Page 1D-66) / ☞(Page 1D-66) / ☞(Page 1D-67) / ☞(Page 1D-68) / ☞(Page 1D-69)

NOTE

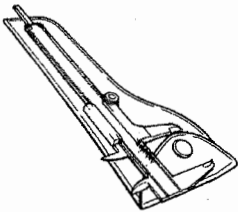
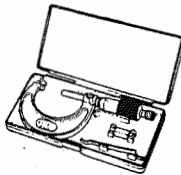


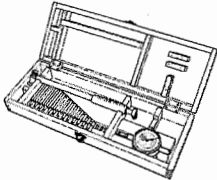
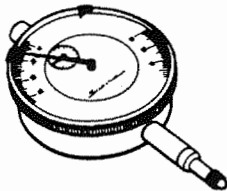
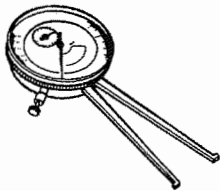
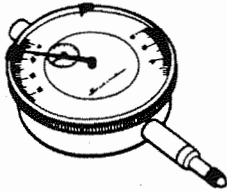
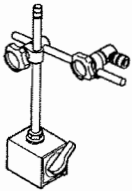
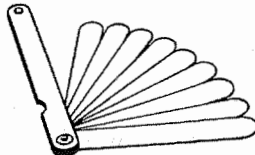
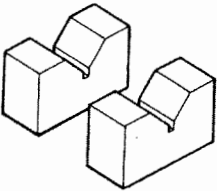


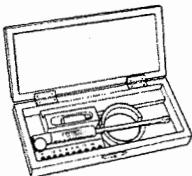
Required service material(s) also described in:

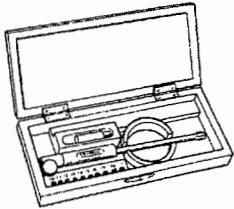
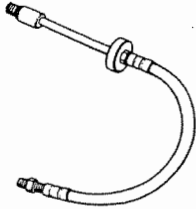

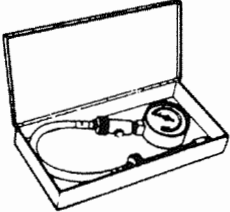
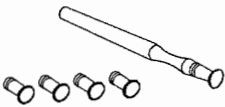
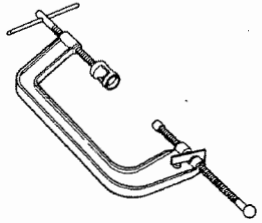
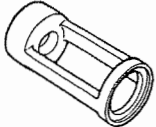
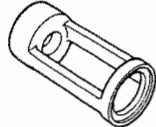




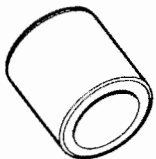
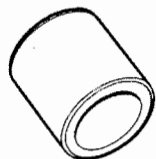
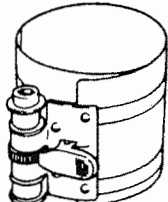

"Throttle Body Components" (Page 1D-10)

"Engine Bottom Side Assembly" (Page 1D-57)

Special Tool

BENB15J21408002

09900-20102 Vernier calipers (200 mm) (Page 1D-46) / (Page 1D-74)		09900-20202 Micrometer (25 – 50 mm) (Page 1D-37) / (Page 1D-80) / (Page 1D-82)	
09900-20203 Micrometer (50 – 75 mm) (Page 1D-73)		09900-20205 Micrometer (0 – 25 mm) (Page 1D-38) / (Page 1D-46) / (Page 1D-73) / (Page 1D-74) / (Page 1D-77) / (Page 1D-78) / (Page 1D-83)	
09900-20530 Cylinder gauge set (Page 1D-71)		09900-20602 Dial gauge (Page 1D-38) / (Page 1D-74) / (Page 1D-78)	
09900-20605 Dial calipers (10 – 34 mm) (Page 1D-78)		09900-20607 Dial gauge (Page 1D-37) / (Page 1D-45) / (Page 1D-45) / (Page 1D-46) / (Page 1D-78)	
09900-20701 Dial gauge chuck (Page 1D-37) / (Page 1D-45) / (Page 1D-45) / (Page 1D-46) / (Page 1D-78)		09900-20803 Thickness gauge (Page 1D-45) / (Page 1D-71) / (Page 1D-73) / (Page 1D-74) / (Page 1D-78) / (Page 1D-83) / (Page 1D-83)	
09900-21304 V blocks (Page 1D-37) / (Page 1D-45) / (Page 1D-45) / (Page 1D-78)		09900-22301 Plastigage (0.025 – 0.076 mm) (Page 1D-37) / (Page 1D-76) / (Page 1D-79) / (Page 1D-79) / (Page 1D-81)	
09900-22302 Plastigage (0.051 – 0.152 mm) (Page 1D-37)		09900-22401 Small bore gauge (10 – 18 mm) (Page 1D-74) / (Page 1D-78)	

09900-22403 Small bore gauge (18 – 35 mm) (Page 1D-38)		09913-10750 Compression gauge adapter (Page 1D-3)	
09915-40620 Oil filter wrench (Page 1D-52) / (Page 1D-67)		09915-64512 Compression gauge (Page 1D-3)	
09916-10911 Valve lapper set (Page 1D-47)		09916-14510 Valve lifter (Page 1D-40) / (Page 1D-41) / (Page 1D-44) / (Page 1D-44)	
09916-14522 Valve lifter attachment (Page 1D-40) / (Page 1D-44)		09916-14530 Valve lifter attachment (Page 1D-41) / (Page 1D-44)	
09916-33210 Valve guide reamer (4.5 mm) (Page 1D-48)		09916-33320 Valve guide reamer (9.8 mm) (Page 1D-48)	
09916-34542 Reamer handle (Page 1D-48) / (Page 1D-48)		09916-43211 Valve guide installer & remover (Page 1D-47) / (Page 1D-48)	
09916-43240 Valve guide installer attachment (Page 1D-48)		09916-43250 Valve guide installer attachment (Page 1D-48)	
09916-77310 Piston ring compressor (Page 1D-60)		09916-84511 Tweezer (Page 1D-40) / (Page 1D-41) / (Page 1D-44) / (Page 1D-44)	

1D-91 Engine Mechanical:

<p>09919-28620 Sleeve protector ☞ (Page 1D-40) / ☞ (Page 1D-41) / ☞ (Page 1D-44) / ☞ (Page 1D-44)</p>	<p>09930-11950 Torx® wrench (T25H) ☞ (Page 1D-15) / ☞ (Page 1D-16) / ☞ (Page 1D-16)</p>
<p>09930-11960 Torx® wrench (T20H) ☞ (Page 1D-15) / ☞ (Page 1D-17)</p>	<p>09930-44521 Rotor holder ☞ (Page 1D-51) / ☞ (Page 1D-69)</p>
<p>09940-14980 Engine mounting adjust wrench ☞ (Page 1D-23) / ☞ (Page 1D-23) / ☞ (Page 1D-25)</p>	

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Engine Lubrication System

Precautions

Precautions for Engine Oil

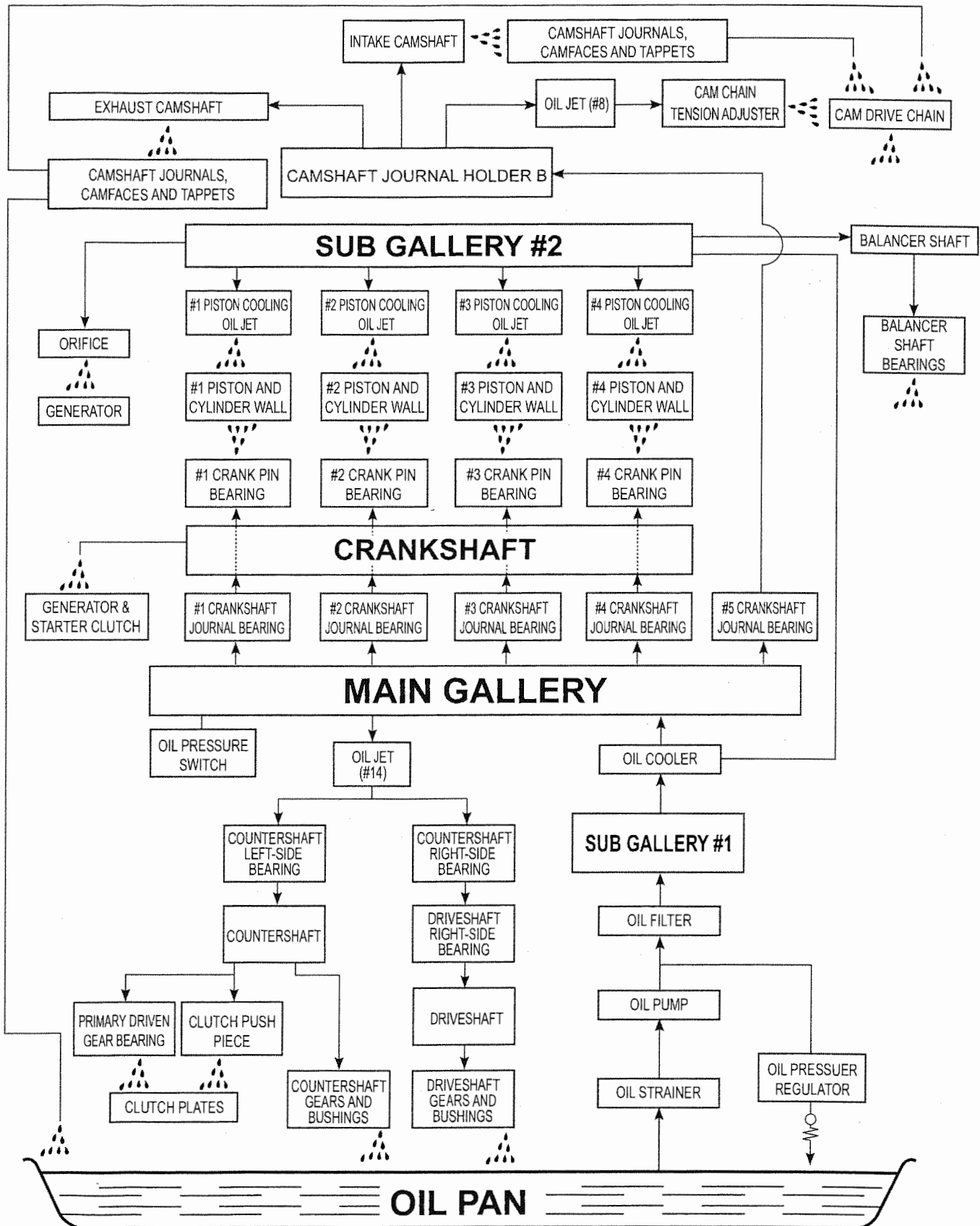
Refer to "Fuel and Oil Recommendation" in Section 0A (Page 0A-4).

BENB15J21500001

Schematic and Routing Diagram

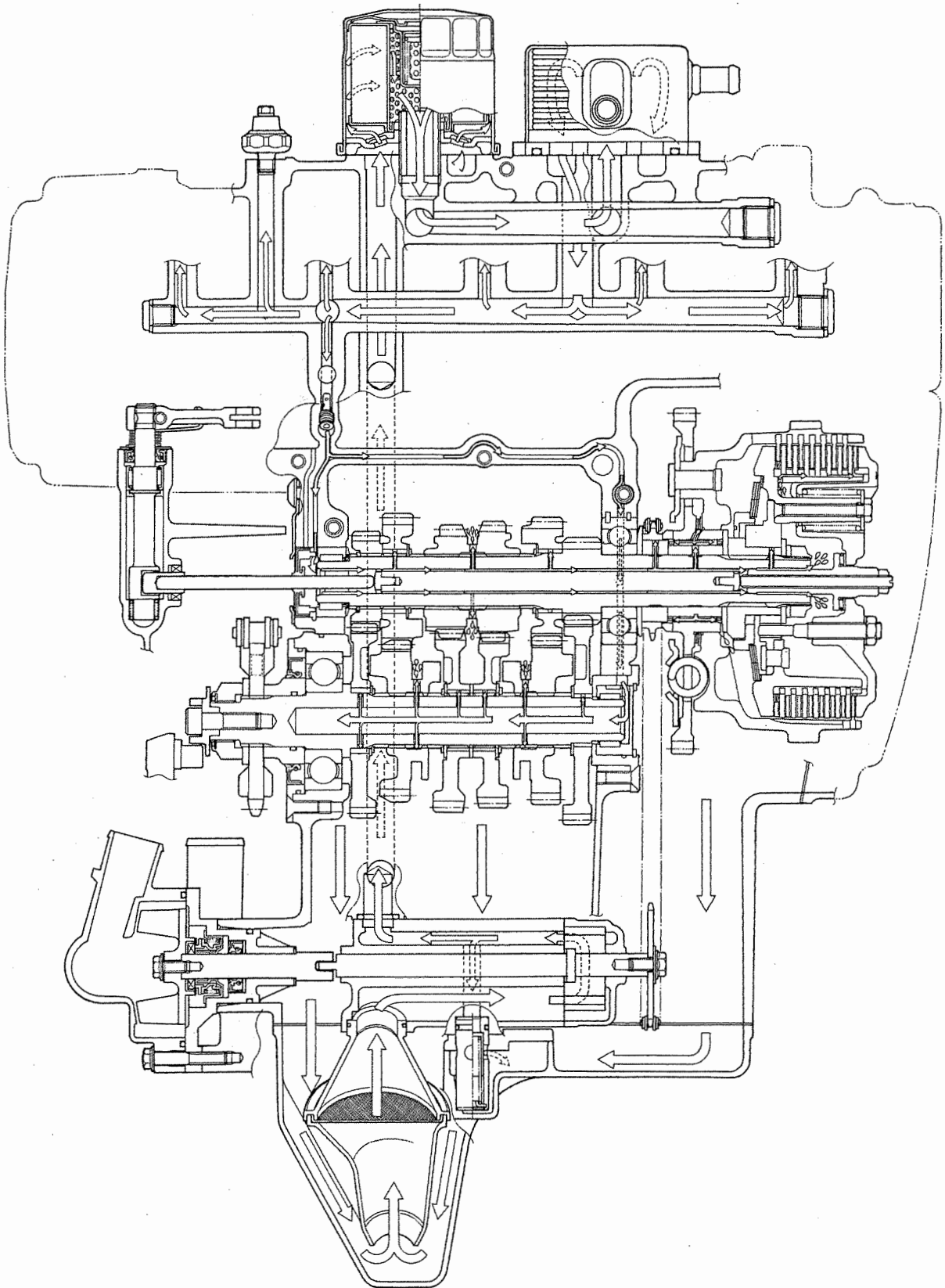
Engine Lubrication System Chart Diagram

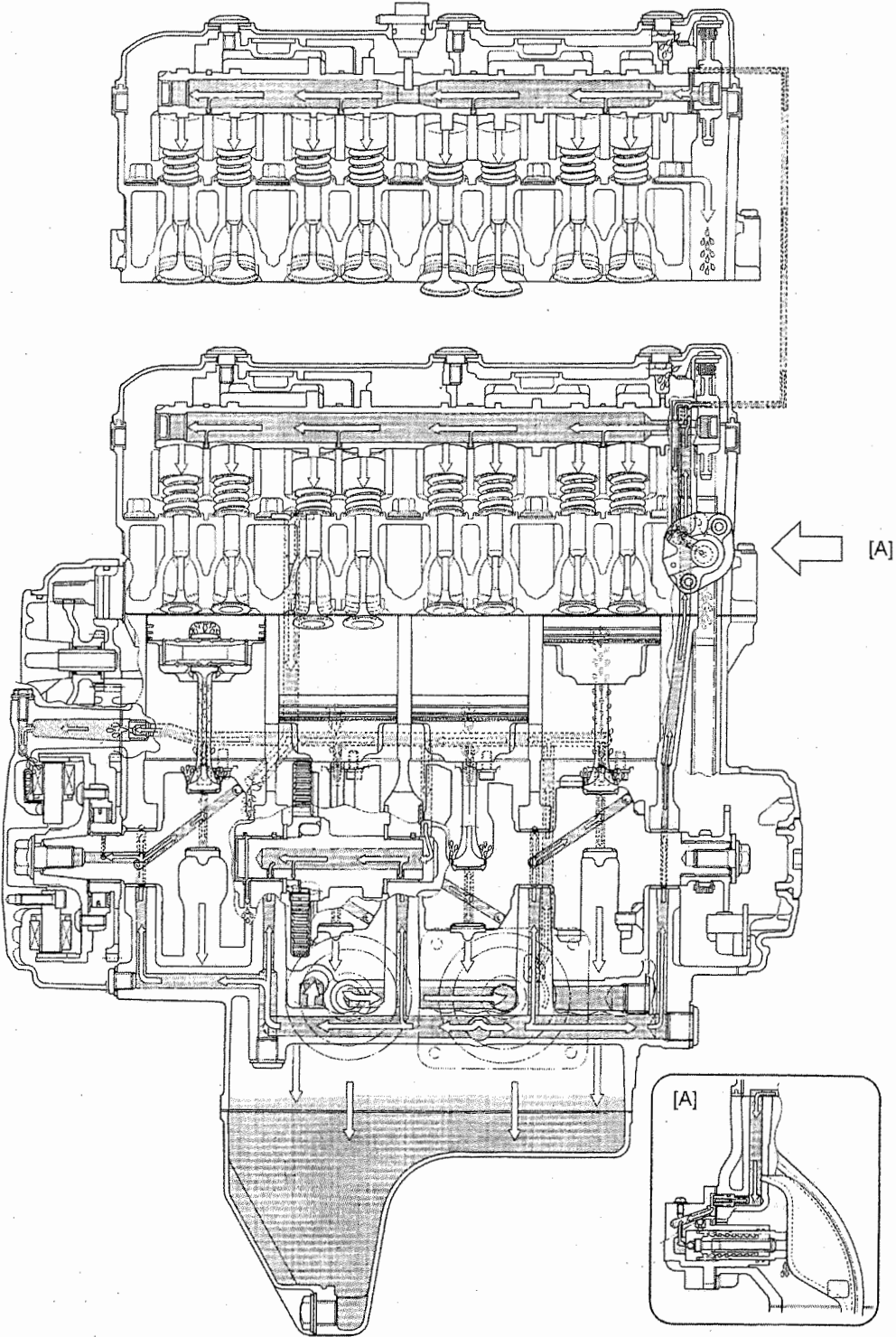
BENB15J21502001



Engine Lubrication Circuit Diagram

BENB15J21502002





Diagnostic Information and Procedures

Engine Lubrication Symptom Diagnosis

BENB15J21504001

Condition	Possible cause	Correction / Reference Item
Engine overheats	Insufficient amount of engine oil.	Check level and add.
	Defective oil pump.	Replace.
	Clogged oil circuit.	Clean.
	Clogged oil cooler.	Clean or replace.
	Incorrect engine oil.	Change.
Exhaust smoke is dirty or thick	Excessive amount of engine oil.	Check level and drain.
Engine lacks power	Excessive amount of engine oil.	Check level and drain.

Oil Pressure Check

BENB15J21504002

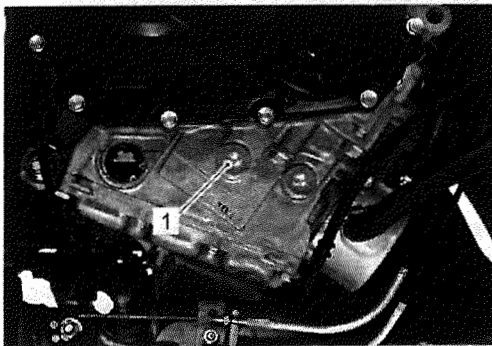
Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

NOTE

Before checking the oil pressure, check the following.

- Oil level (Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).)
- Oil leaks (If leak is found, repair it.)
- Oil quality (If oil is discolored or deteriorated, replace it.)

- 1) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 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 main oil gallery plug (1).



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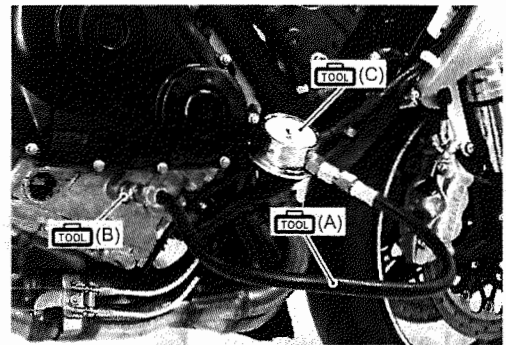
- 4) Install the special tools to the main oil gallery.

Special tool

TOOL (A): 09915-74521 (Adapter hose)

TOOL (B): 09915-74540 (Oil pressure gauge adapter)

TOOL (C): 09915-77331 (Oil pressure gauge (1000 kPa))



IB14J1150002-01

- 5) Warm up the engine as follows:
Summer: 10 min. at 2 000 r/min
Winter: 20 min. at 2 000 r/min

1E-6 Engine Lubrication System:

- 6) After warming up, increase the engine speed to 3 000 r/min (Observe the tachometer), and read the oil pressure gauge.
If the oil pressure is lower or higher than the specification, the following causes may be considered.

Oil pressure specification

100 – 400 kPa (1.0 – 4.0 kgf/cm², 14 – 57 psi) at 3 000 r/min, Oil temp. at 60 °C (140 °F)

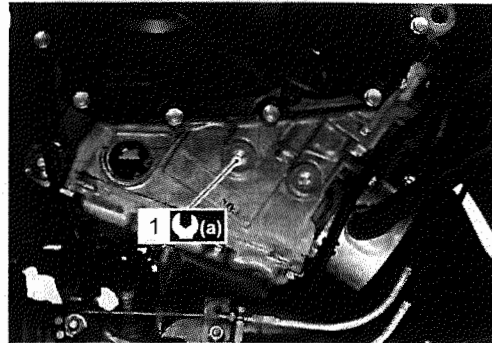
High oil pressure	Low oil pressure
<ul style="list-style-type: none">• Engine oil viscosity is too high• Clogged oil passage• Combination of the above items	<ul style="list-style-type: none">• Clogged oil filter• Oil leakage from the oil passage• Damaged O-ring• Defective oil pump• Combination of the above items

- 7) Stop the engine and remove the oil pressure gauge and attachment.

- 8) Fit the new gasket to the main oil gallery plug (1).
9) Reinstall the main oil gallery plug (1) and tighten it to the specified torque.

Tightening torque

Oil gallery plug (M16) (a): 35 N·m (3.5 kgf-m, 25.5 lbf-ft)



IB14J1150003-01

- 10) Check the engine oil level. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
11) Install the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

Repair Instructions

Engine Oil and Filter Replacement

BENB15J21506001

Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).

Engine Oil Level Inspection

BENB15J21506002

Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).

Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation

BENB15J21506003

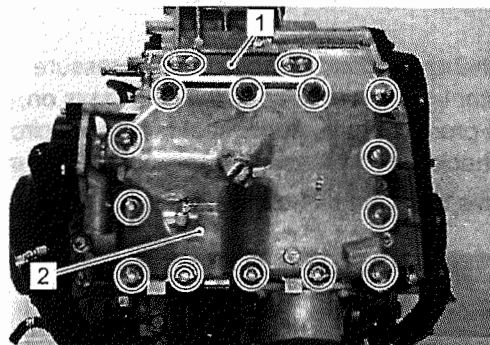
NOTE

The oil pan/oil strainer/oil pressure regulator cannot be serviced with the engine installed in the frame.

Removal

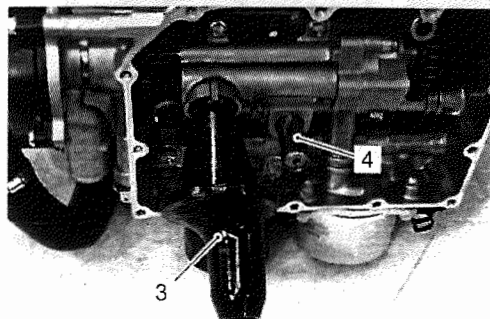
- 1) Remove the engine assembly from the frame. Refer to "Engine Assembly Removal" in Section 1D (Page 1D-21).
2) Remove the plate (1).

- 3) Remove the oil pan (2) and its gasket.



IB14J1150004-01

- 4) Remove the oil strainer (3) and oil pressure regulator (4).




IB14J1150005-01

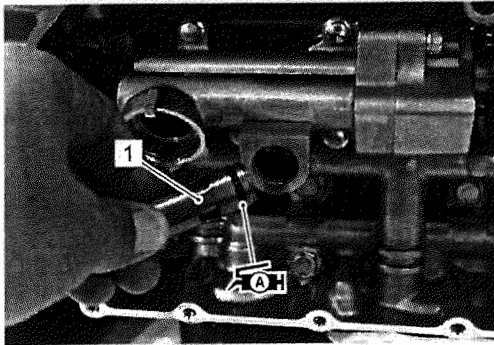
Installation

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

- Apply grease to the new O-rings and install them.

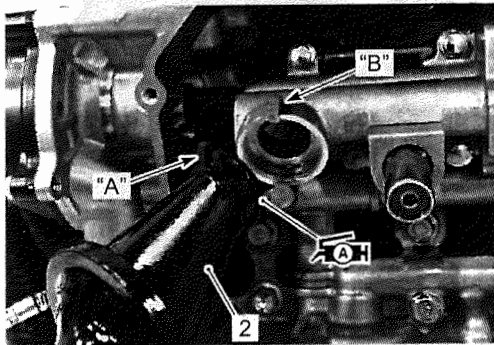
 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

- Install the oil pressure regulator (1).



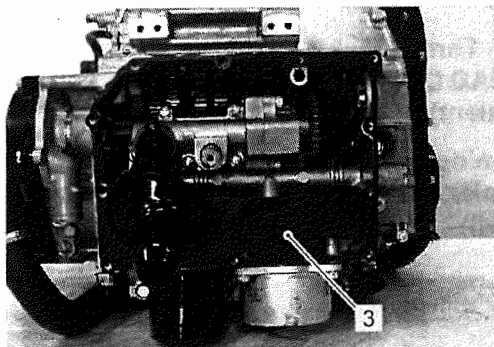
IB14J1150006-01

- When installing the oil strainer (2), fit the concave part "A" of the oil strainer onto the convex part "B" of the oil pump.




IB14J1150007-01

- Install a new gasket (3).

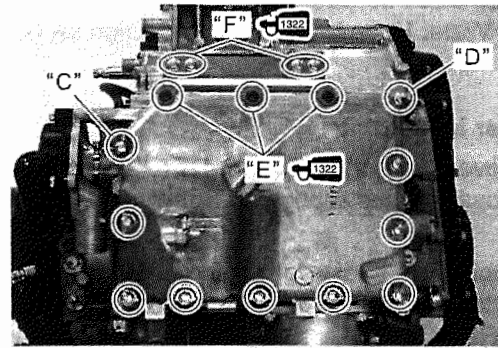


IB14J1150008-01

- Fit the new gasket washer to the oil pan bolt "C".
- Fit the clamp to the bolt "D".
- Apply thread lock to the oil pan bolts "E" and plate bolts "F".

 **Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)**

- Tighten the oil pan bolts and plate bolts diagonally.



IB14J1150009-01

- Remount the engine assembly. Refer to "Engine Assembly Installation" in Section 1D (Page 1D-24).

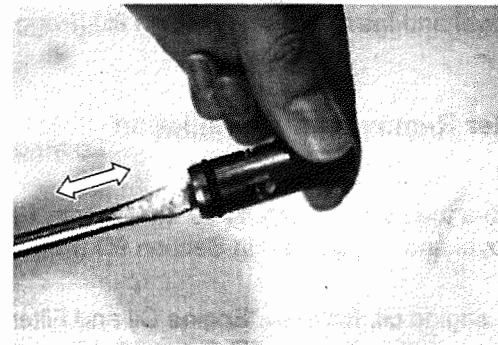
Oil Pressure Regulator / Oil Strainer Inspection

BENB15J21506004

Refer to "Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation" (Page 1E-6).

Oil Pressure Regulator

Inspect the operation of the oil pressure regulator by pushing on the piston with a proper bar. If the piston does not operate, replace the oil pressure regulator with a new one.



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Oil Strainer

Clean the oil strainer if necessary. Inspect the oil strainer body for damage. If necessary, replace it with a new one.



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Oil Cooler / Oil Cooler Hose Inspection

BENB15J21506005

Oil Cooler Hose Inspection

Refer to "Water Hose Inspection" in Section 1F (Page 1F-7).

Oil Cooler Inspection

- 1) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Inspect the oil cooler for engine oil leakage. If any defects are found, replace the oil cooler with a new one. Refer to "Oil Cooler Removal and Installation" (Page 1E-8).



IB14J1150011-01

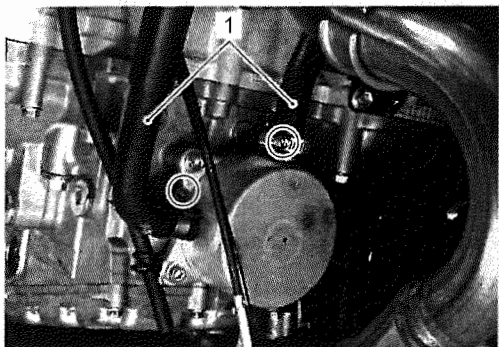
- 3) Install the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

Oil Cooler Removal and Installation

BENB15J21506006

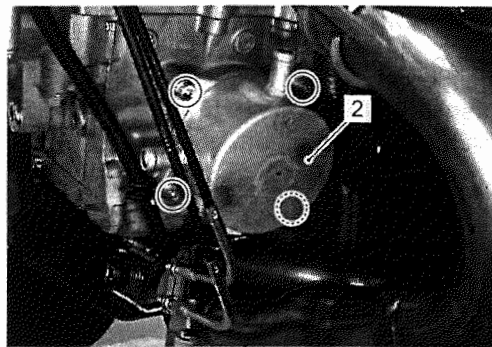
Removal

- 1) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Drain engine oil. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- 3) Disconnect the oil cooler hoses (1) and drain engine coolant.



IB14J1150012-01

- 4) Remove the oil cooler (2).




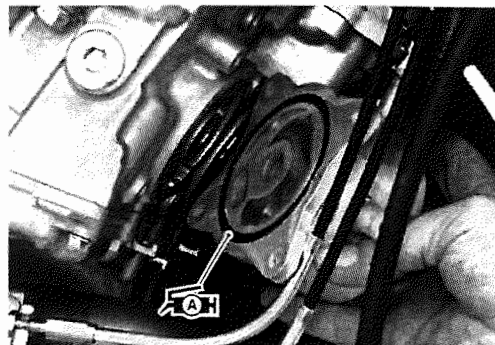
IB14J1150013-01

Installation

Install the oil cooler in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new O-ring and install it.

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



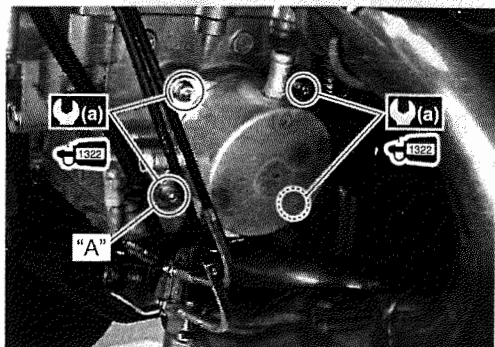
IB14J1150014-01

- Fit the clamp to the bolt "A". Refer to "Water Hose Routing Diagram" in Section 1F (Page 1F-3).
- Apply a small quantity of thread lock to the oil cooler mounting bolts and tighten them to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Oil cooler mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1150015-02

- Connect the oil cooler hoses securely. Refer to "Water Hose Routing Diagram" in Section 1F (Page 1F-3).
- Pour engine coolant and engine oil. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12) and "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).

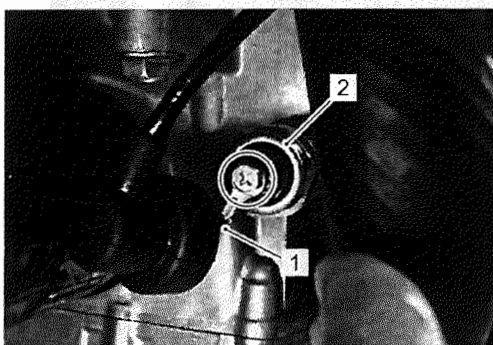
Oil Pressure Switch Removal and Installation

BENB15J21506007

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

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the left cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Drain engine oil. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- 4) Disconnect the oil pressure switch lead wire (1).
- 5) Remove the oil pressure switch (2).



IB14J1150016-01

Installation

- 1) Apply bond to the thread part of oil pressure switch and tighten oil pressure switch to the specified torque.

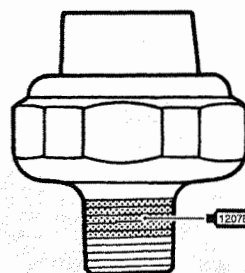
NOTE

Be careful not to apply bond to the hole of thread end.

1207B : Sealant 99000-31140 (SUZUKI BOND No.1207B or equivalent)

Tightening torque

Oil pressure switch: 14 N·m (1.4 kgf-m, 10.0 lbf-ft)

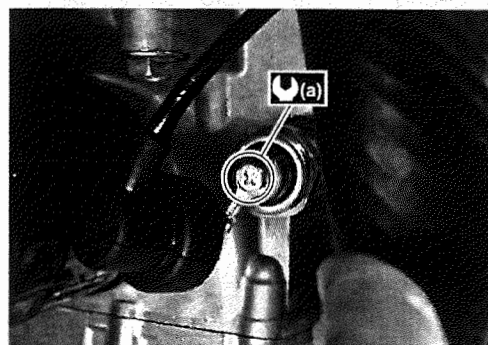


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- 2) Route the oil pressure switch lead wire properly and tighten the screw to the specified torque. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

Tightening torque

Oil pressure switch lead wire screw (a): 1.5 N·m (0.15 kgf-m, 1.1 lbf-ft)



IB14J1150017-01

- 3) Pour engine oil. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- 4) Install the left cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

Oil Pressure Switch Inspection

BENB15J21506008

Refer to "Oil Pressure Indicator Inspection" in Section 9C (Page 9C-7).

Oil Jet / Oil Gallery Jet Removal and Installation

BENB15J21506009

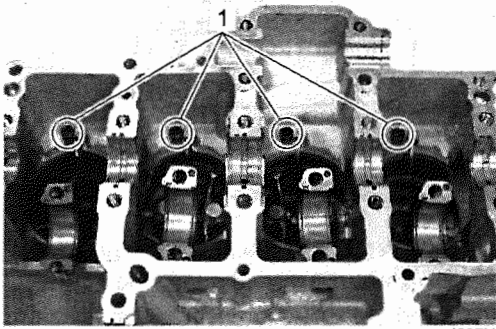
Oil Jet (For Pistons)

Removal

- 1) Remove the engine assembly. Refer to "Engine Assembly Removal" in Section 1D (Page 1D-21).
- 2) Remove the Crankshaft assembly. Refer to "Engine Bottom Side Disassembly" in Section 1D (Page 1D-49).

1E-10 Engine Lubrication System:

- 3) Remove the piston cooling oil jets (1) from the upper crankcase.

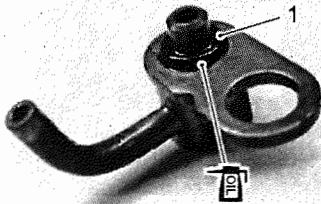


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Installation


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

- Fit the new O-ring (1) to each piston cooling oil jet and apply engine oil to them.



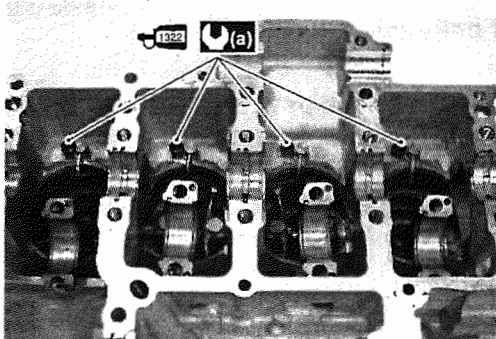
IB37H1150021-01

- Apply a small quantity of thread lock to the bolts and tighten them to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Piston cooling oil jet bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



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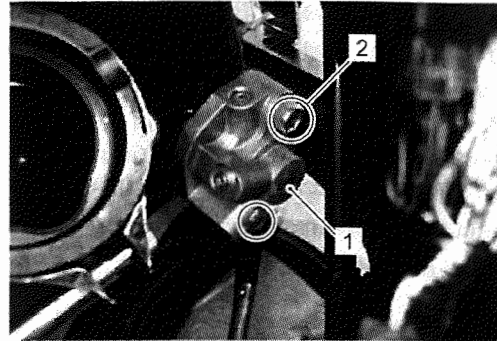
Oil Jet (For Cam Chain Tension Adjuster)

Removal

- 1) Remove the throttle body. Refer to "Throttle Body Removal and Installation" in Section 1D (Page 1D-12).
- 2) Remove the cam chain tension adjuster (1).

NOTE

When loosening or tightening the mounting bolts (2), use the short head hexagon wrench.



IB14J1150018-02

- 3) Remove the oil jet (3).

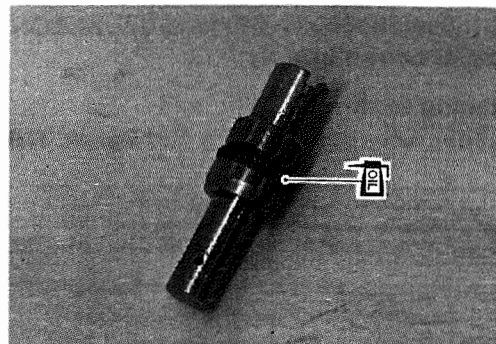


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Installation

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

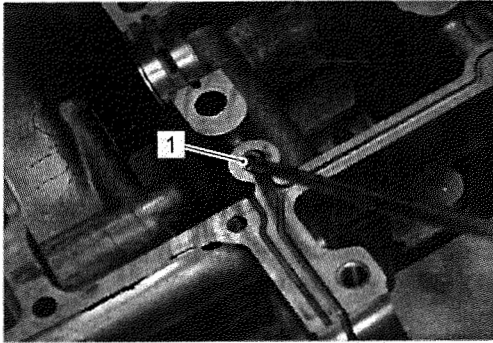
- Apply engine oil to the new O-ring and install it.



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Oil Jet (For Transmission)**Removal**

- 1) Remove the engine assembly. Refer to "Engine Assembly Removal" in Section 1D (Page 1D-21).
- 2) Separate the crankcases, upper and lower. Refer to "Engine Bottom Side Disassembly" in Section 1D (Page 1D-49).
- 3) Remove the oil jet (1) (for transmission) from the lower crankcase.



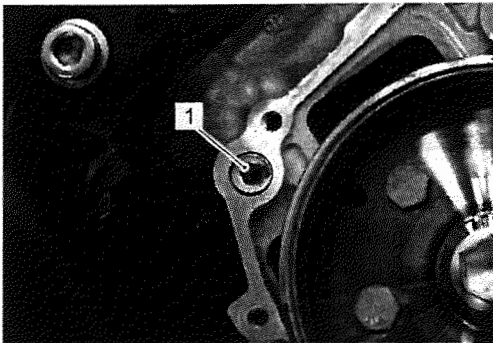
IB37H1150026-01

Installation

Installation is in the reverse order of removal.

Oil Gallery Jet**Removal**

- 1) Remove the generator cover and gasket. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).
- 2) Remove the oil gallery jet (1).



IB14J1150021-02

Installation

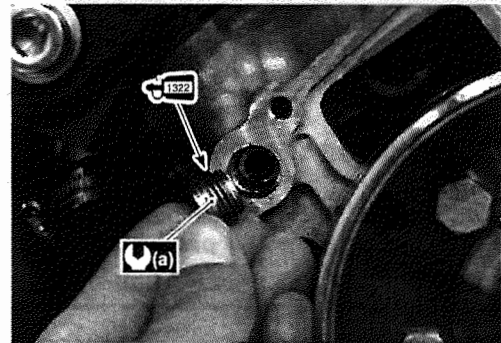
Installation is in the reverse order of removal. Pay attention to the following points:

- Apply thread lock to the oil gallery jet and tighten it to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Oil gallery jet (a): 27 N·m (2.7 kgf-m, 19.5 lbf-ft)



IB14J1150022-02

- After tightening the jet, make sure that the jet end is not protruding beyond the magnet cover mating surface.

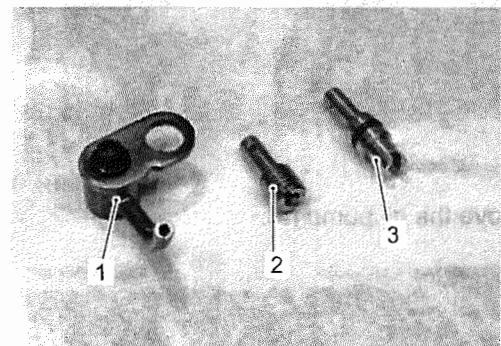
Oil Jet / Oil Gallery Jet Inspection

BENB15J21506010

Refer to "Oil Jet / Oil Gallery Jet Removal and Installation" (Page 1E-9).

Oil Jet

Make sure that the oil jets are not clogged. If they are clogged, clean their oil passage using a wire of the proper size and compressed air.



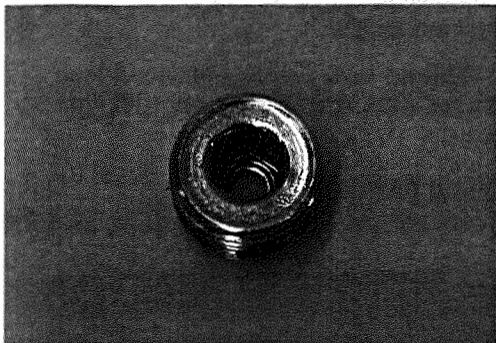
IB37H1150029-01

1.	Piston cooling jet
2.	Oil jet (For transmission)
3.	Oil jet (For cam chain tension adjuster)

1E-12 Engine Lubrication System:

Oil Gallery Jet

Inspect the oil gallery jet for clogging. Clean the oil gallery if necessary.



IB14J1150023-01

Oil Pump Removal and Installation

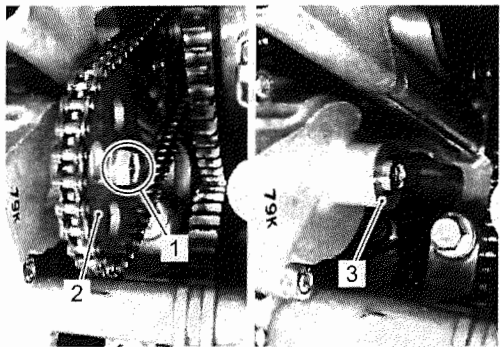
BENB15J21506011

NOTE

Be careful not to drop any parts into the crankcase.

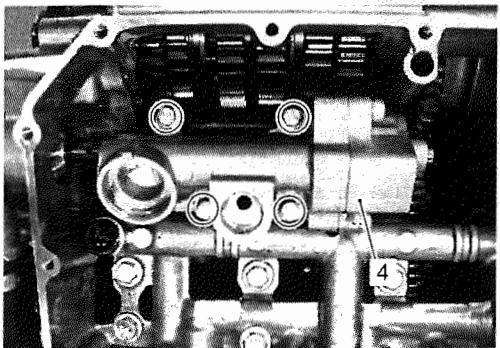
Removal

- 1) Remove the oil pan, oil strainer and oil pressure regulator. Refer to "Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation" (Page 1E-6).
- 2) Remove the oil pump driven sprocket bolt (1).
- 3) Remove the oil pump driven sprocket (2).
- 4) Remove the washer (3).



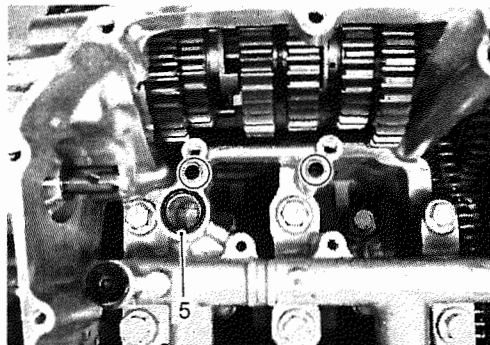
IB14J1150024-01

- 5) Remove the oil pump (4).



IB14J1150025-01


- 6) Remove the O-ring (5) and dowel pins.

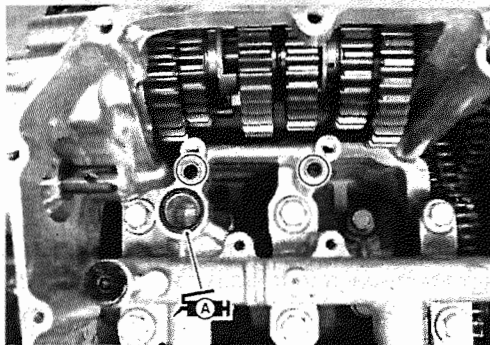


IB14J1150026-01

Installation

- 1) Install the dowel pins.
- 2) Apply grease to the new O-ring and install it.

 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

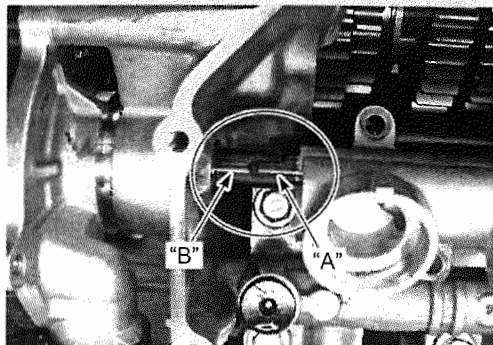


IB37H1150034-01

- 3) Install the oil pump.

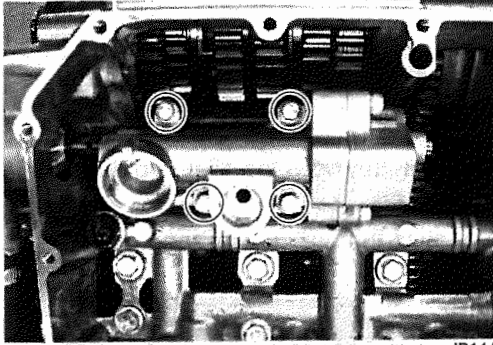
NOTE

Engage the oil pump shaft end "A" with the water pump shaft slot "B".



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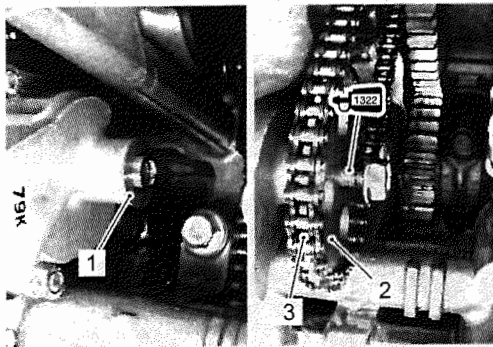
- 4) Tighten the oil pump mounting bolts.



IB14J1150027-01

- 5) Install the washer (1).
6) Install the oil pump driven sprocket (2) with the chain (3).
7) Apply a small quantity of thread lock to the oil pump driven sprocket bolt and tighten it.

1322 : Thread lock cement 99000-32110
(THREAD LOCK CEMENT SUPER "1322" or equivalent)



IB37H1150037-01

- 8) Install the oil pan, oil strainer and oil pressure regulator. Refer to "Oil Pan / Oil Strainer / Oil Pressure Regulator Removal and Installation" (Page 1E-6).

Oil Pump Inspection

BENB15J21506012

Inspect the oil pump in the following procedures:

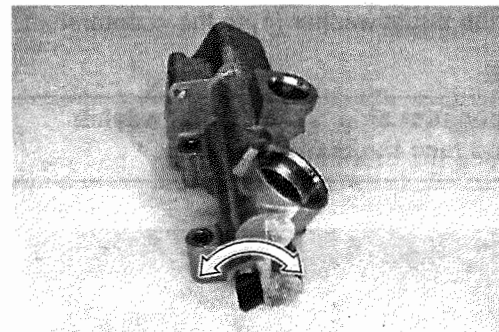
- 1) Remove the oil pump. Refer to "Oil Pump Removal and Installation" (Page 1E-12).
- 2) Rotate the oil pump by hand and check that it moves smoothly. If it does not move smoothly, replace the oil pump assembly.

NOTICE

Do not attempt to disassemble the oil pump.

NOTE

The oil pump is available only as an assembly.



IB37H1150038-01

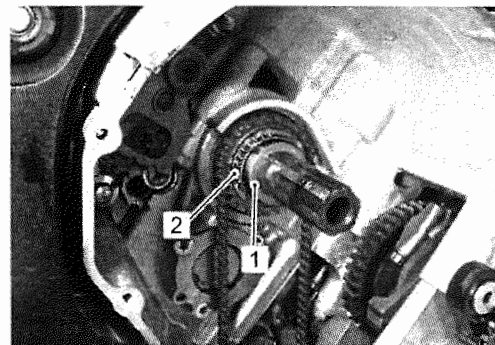
- 3) Install the oil pump. Refer to "Oil Pump Removal and Installation" (Page 1E-12).

Oil Pump Drive Sprocket Removal and Installation

BENB15J21506013

Removal

- 1) Remove the clutch component parts. Refer to "Clutch Removal" in Section 5C (Page 5C-8).
- 2) Remove the spacer (1) and bearing (2).

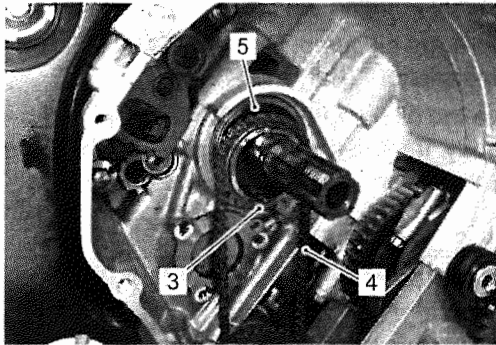


IB37H1150041-01

- 3) Remove the oil pump drive sprocket (3) and chain (4).

1E-14 Engine Lubrication System:

- 4) Remove the thrust washer (5).



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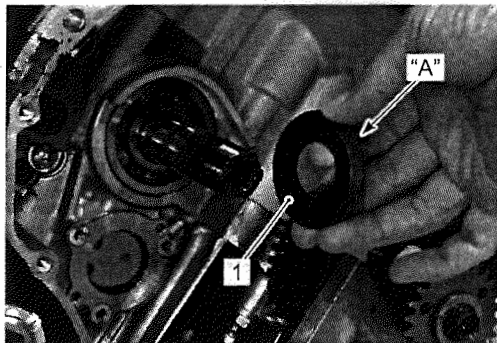
Installation

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

- Install the thrust washer (1) to the countershaft.

NOTE

The chamfer side "A" of thrust washer should face the crankcase side.



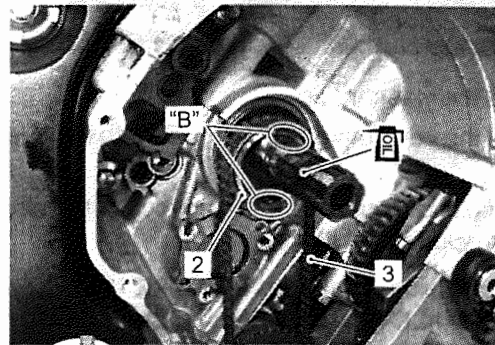
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- Install the oil pump drive sprocket (2) to the countershaft.

NOTE

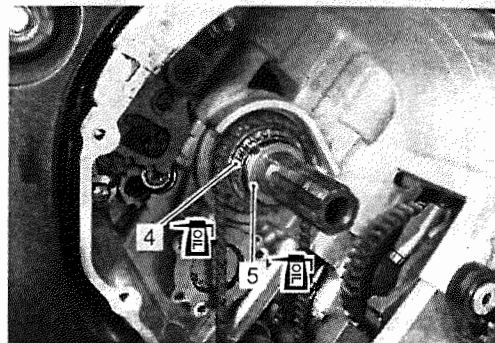
Teeth "B" on the sprocket must face the clutch side.

- Pass the chain (3) between the oil pump drive and driven sprockets.
- Apply engine oil to the countershaft.



I837H1150044-02

- Install the bearing (4) and spacer (5), and apply engine oil to them.



I837H1150045-01

- Install the clutch component parts. Refer to "Clutch Installation" in Section 5C (Page 5C-10).

Specifications

Service Data

BENB15J21507001

Oil Pump

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

Oil

Item	Specification	Note
Engine oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA	
Engine oil capacity	Change	2 200 ml (2.3/1.9 US/Imp qt)
	Filter change	2 500 ml (2.6/2.2 US/Imp qt)
	Overhaul	2 900 ml (3.1/2.6 US/Imp qt)

Tightening Torque Specifications

BENB15J21507002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Oil gallery plug (M16)	35	3.5	25.5	☞ (Page 1E-6)
Oil cooler mounting bolt	10	1.0	7.0	☞ (Page 1E-8)
Oil pressure switch	14	1.4	10.0	☞ (Page 1E-9)
Oil pressure switch lead wire screw	1.5	0.15	1.1	☞ (Page 1E-9)
Piston cooling oil jet bolt	10	1.0	7.0	☞ (Page 1E-10)
Oil gallery jet	27	2.7	19.5	☞ (Page 1E-11)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment


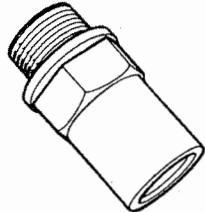

Recommended Service Material

BENB15J21508001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞(Page 1E-7) / ☞(Page 1E-8) / ☞(Page 1E-12)
Sealant	SUZUKI BOND No.1207B or equivalent	P/No.: 99000-31140	☞(Page 1E-9)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞(Page 1E-7) / ☞(Page 1E-8) / ☞(Page 1E-10) / ☞(Page 1E-11) / ☞(Page 1E-13)

Special Tool

BENB15J21508002

09915-74521 Adapter hose ☞(Page 1E-5) 	09915-74540 Oil pressure gauge adapter ☞(Page 1E-5) 
09915-77331 Oil pressure gauge (1000 kPa) ☞(Page 1E-5) 	

Engine Cooling System

Precautions

Precautions for Engine Cooling System

BENB15J21600001

⚠ WARNING

- You can be injured by boiling fluid or steam if you open the radiator cap when the engine is hot.
- After the engine cools, wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow pressure to escape and then turn the cap all the way off.
- The engine must be cool before servicing the cooling system.
- Coolant is harmful:
 - If it comes in contact with skin or eyes, flush with water.
 - If swallowed accidentally, induce vomiting and call physician immediately.
 - Keep it away from children.

Precautions for Engine Coolant

BENB15J21600002

Refer to "Engine Coolant Recommendation" in Section 0A (Page 0A-5).

General Description

Engine Coolant Description

BENB15J21601001

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.

NOTE

Do not put in more than 60% anti-freeze or less than 50%. (Refer to Fig. 1 and 2.)

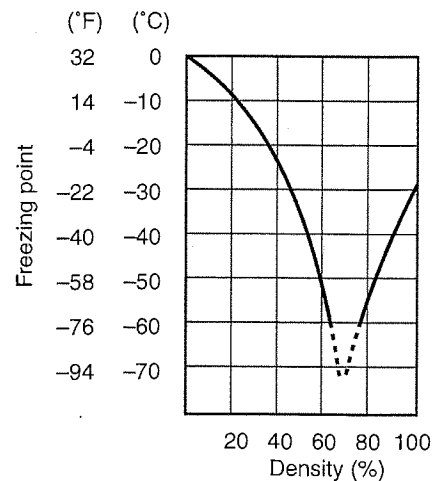
The cooling system is filled with a 50:50 mixture of distilled water and ethylene glycol anti-freeze. This 50:50 mixture will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above -31°C (-24°F).

If the vehicle is to be exposed to temperatures below -31°C (-24°F), this mixing ratio should be increased up to 55% or 60% according to the figure.

Anti-freeze Proportioning Chart

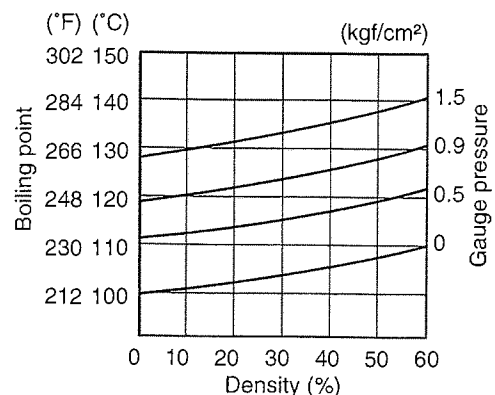
Anti-freeze density	Freezing point
50%	-31°C (-24°F)
55%	-40°C (-40°F)
60%	-55°C (-67°F)

Fig. 1: Engine coolant density-freezing point curve



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Fig. 2: Engine coolant density-boiling point curve

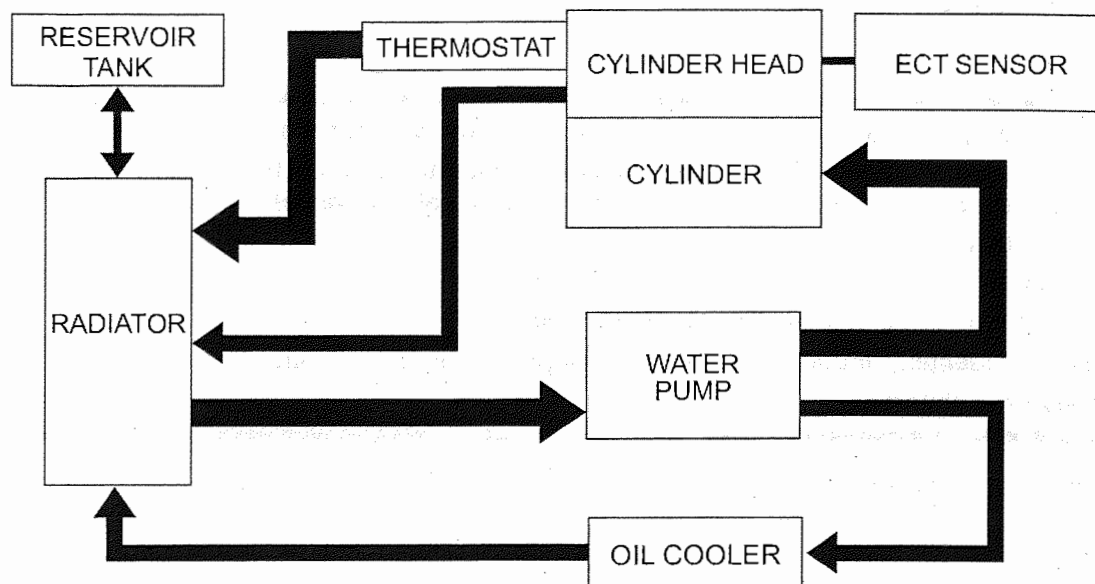


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Schematic and Routing Diagram

Cooling Circuit Diagram

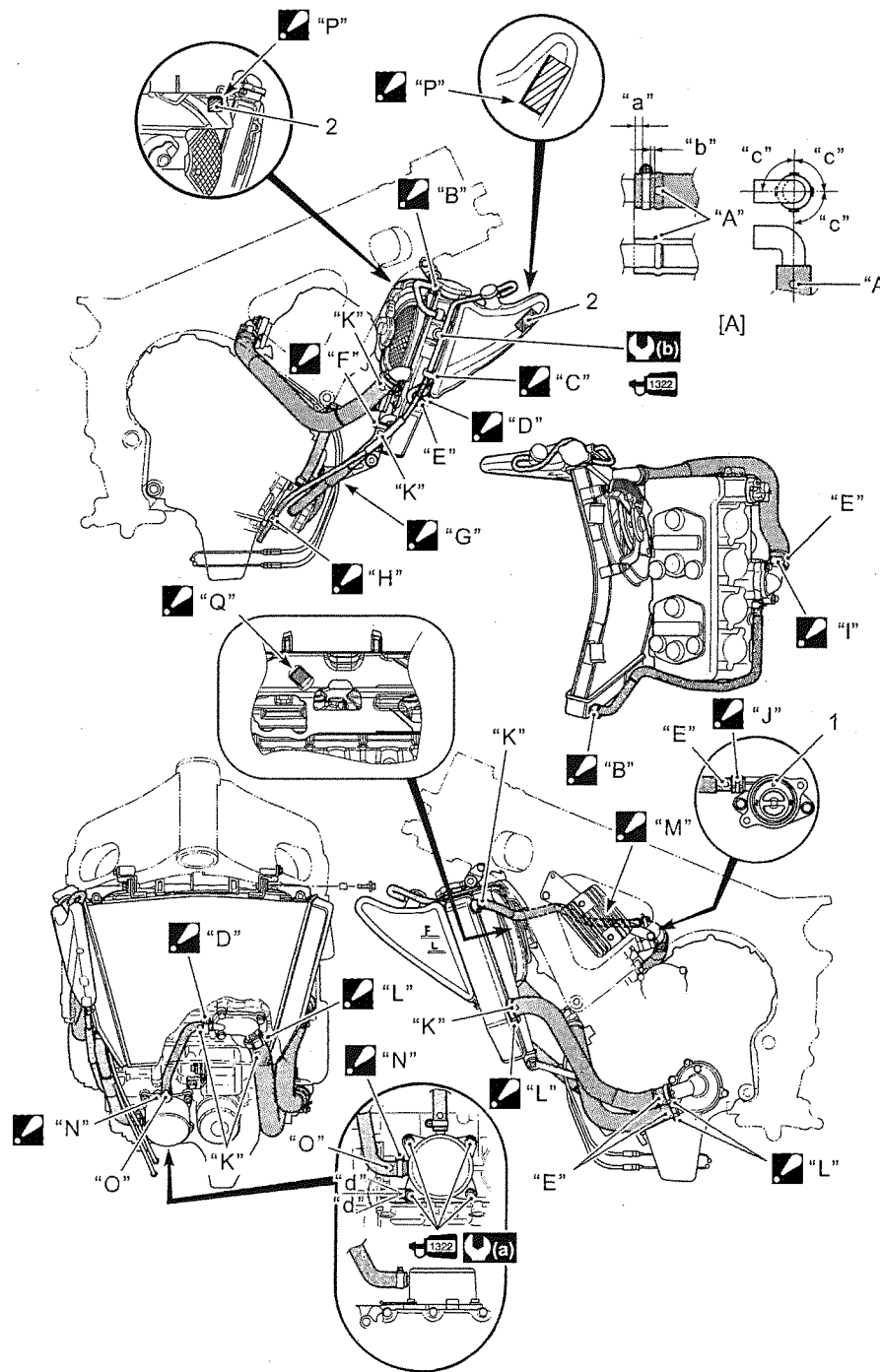
BENB15J21602001



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Water Hose Routing Diagram

BENB15J21602002



IB14J1160027-07

1. Jiggle valve	"H": Clamp the hose at marking position.	"Q": Align the cushion with the concave of radiator heat shield.
2. Cushion	"I": Face the screw head backward.	"a": 2 – 8 mm (0.1 – 0.3 in)
"A": Marking	"J": Face the clamp end backward.	"b": Clearance
"B": Face the clamp end downward.	"K": Yellow marking	"c": 90°
"C": Clamp the hoses at marking position.	"L": Face the screw head left side.	"d": 30°
"D": Face the clamp end forward.	"M": Pass the hose between the regulator/rectifier mounting bolts.	(a) : 10 N·m (1.0 kgf·m, 7.0 lbf·ft)
"E": White marking	"N": Face the screw head forward.	(b) : 6 N·m (0.6 kgf·m, 4.5 lbf·ft)
"F": Face the screw head right side.	"O": Red marking	(822) : Apply thread lock to the thread part.
"G": Pass the hoses outside of the EXCV cables.	"P": Stick the cushion along the emboss line.	[A]: Outline of marking position

Diagnostic Information and Procedures

Engine Cooling Symptom Diagnosis

BENB15J21604001

Condition	Possible cause	Correction / Reference Item
Engine overheats	Not enough engine coolant.	Add engine coolant.
	Radiator core clogged with dirt or scale.	Clean.
	Faulty cooling fan.	Repair or replace.
	Defective cooling fan relay, or open-or-short circuited.	Repair or replace.
	Clogged water passage.	Clean.
	Air trapped in the cooling circuit.	Bleed air.
	Defective water pump.	Replace.
	Use of incorrect engine coolant.	Replace.
	Defective thermostat.	Replace.
	Defective ECT sensor.	Replace.
	Defective ECM.	Replace.
	Damaged ISC valve.	Replace.
	Incorrect ISC learning.	Reset learned value.
Engine over cools	Defective cooling fan relay, or open-or-short circuited.	Repair or replace.
	Extremely cold weather.	Put on radiator cover.
	Defective thermostat.	Replace.
	Defective ECT sensor.	Replace.
	Defective ECM.	Replace.

Repair Instructions

Cooling Circuit Inspection

BENB15J21606001

⚠ WARNING

- Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.
- When removing the radiator cap tester, put a rag on the filler to prevent the engine coolant from spraying out.

Inspect the cooling circuit in the following procedures:

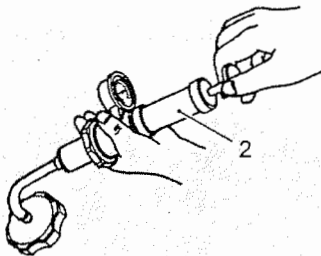
- 1) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the radiator cap (1) and connect the radiator tester (2) to the filler.
- 3) Pressurize the cooling system with 135 kPa (13.5 kgf/cm², 19.2 psi) of pressure, and then check if it holds 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.



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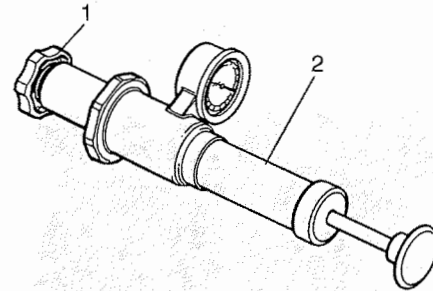
- 4) Place a rag on the filler to prevent spouting of engine coolant and disconnect the radiator tester.
- 5) Reinstall the removed parts.

Radiator Cap Inspection

BENB15J21606002

Inspect the radiator cap in the following procedures:

- 1) Remove the radiator cap. Refer to "Cooling Circuit Inspection" (Page 1F-5).
- 2) Attach the radiator cap (1) to the radiator tester (2) as shown.



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- 3) Slowly apply pressure to the radiator cap. If the radiator cap does not hold the pressure for at least 10 seconds, replace it with a new one.

Radiator cap release pressure

108 – 137 kPa (1.1 – 1.4 kgf/cm², 15.4 – 19.5 psi)

- 4) After finishing the radiator cap inspection, reinstall the removed parts.

Radiator Inspection and Cleaning

BENB15J21606003

Radiator Hose

Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).

Radiator

Inspect the radiator for water leaks. If any defects are found, replace the radiator with a new one.

If the fins are bent or dented, repair them by carefully straightening them with the blade of a small screwdriver.



IB14J1160002-02

1F-6 Engine Cooling System:

Radiator Cleaning

Blow out any foreign matter that is stuck in the radiator fins using compressed air.

NOTICE

- Make sure not to bend the fins when using compressed air.
- Always apply compressed air from the engine side of engine. If compressed air is applied from the front side, dirt will be forced into the pores of radiator.



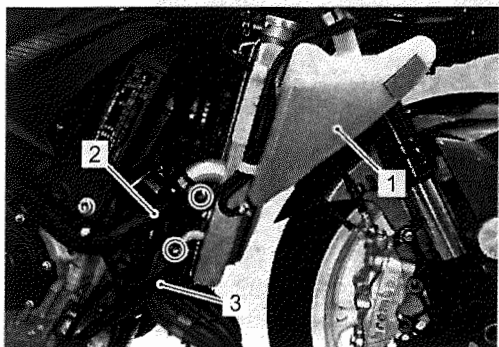
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Radiator / Cooling Fan Motor Removal and Installation

BENB15J21606004

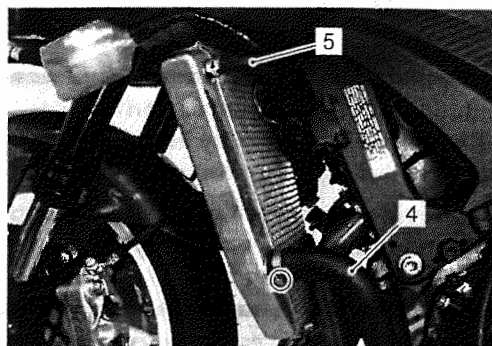
Removal

- 1) Remove the cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Drain engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).
- 3) Remove the radiator reservoir tank (1). Refer to "Radiator Reservoir Tank Removal and Installation" (Page 1F-8).
- 4) Disconnect the radiator inlet hose (2) and oil cooler water outlet hose (3).



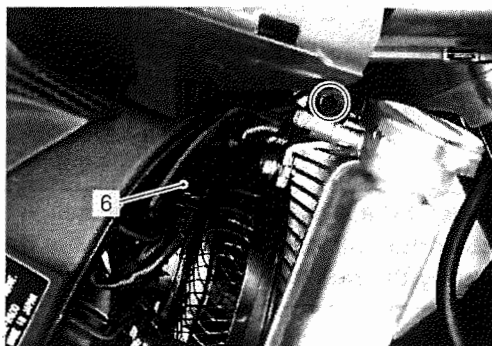
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- 5) Disconnect the radiator outlet hose (4) and water bypass hose (5).

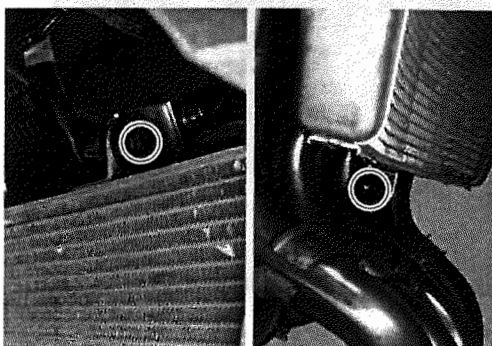


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- 6) Disconnect the cooling fan motor coupler (6).
- 7) Remove the radiator assembly by removing the bolts.

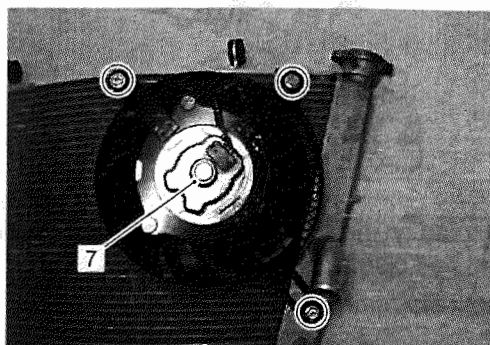


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IB14J1160007-02

- 8) Remove the cooling fan motor (7) from the radiator.



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Installation

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

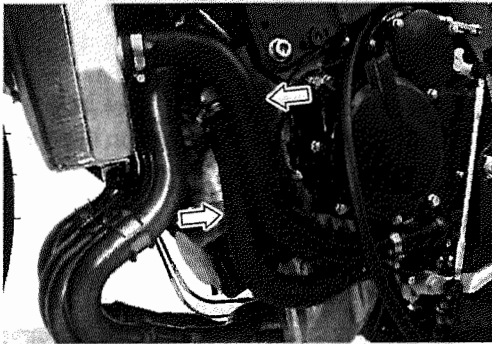
- Connect the radiator hoses securely. Refer to "Water Hose Routing Diagram" (Page 1F-3).
- Pour engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).
- Bleed air from the cooling circuit. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).

Water Hose Inspection

BENB15J21606005

Inspect the water hoses in the following procedures:

- 1) Remove the cowlings and left cowl side cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Check the water hoses for crack, damage or engine coolant leakage. If any defect is found, replace the water hose with a new one.
- 3) Any leakage from the connecting section should be corrected by proper tightening. Refer to "Water Hose Routing Diagram" (Page 1F-3).



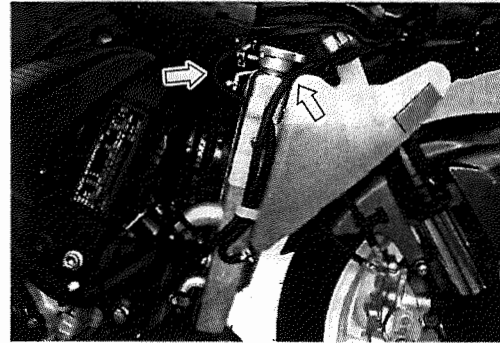
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IB14J1160010-02



IB14J1160011-02



IB14J1160012-02

- 4) After finishing the water hoses inspection, reinstall the removed parts.

Water Hose Removal and Installation

BENB15J21606006

Removal

- 1) Remove the cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Drain engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).
- 3) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 4) Remove the water hoses as shown in the water hose routing diagram. Refer to "Water Hose Routing Diagram" (Page 1F-3).

Installation

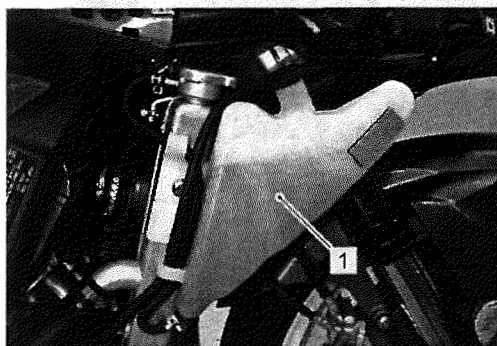
- 1) Install the water hoses as shown in the water hose routing diagram. Refer to "Water Hose Routing Diagram" (Page 1F-3).
- 2) Pour engine coolant and bleed air from the cooling circuit. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).
- 3) Reinstall the removed parts.

Radiator Reservoir Tank Inspection

BENB15J21606007

Inspect the radiator reservoir tank in the following procedures:

- 1) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Inspect the radiator reservoir tank (1) for leaks. If any defects are found, replace the radiator reservoir tank with a new one.



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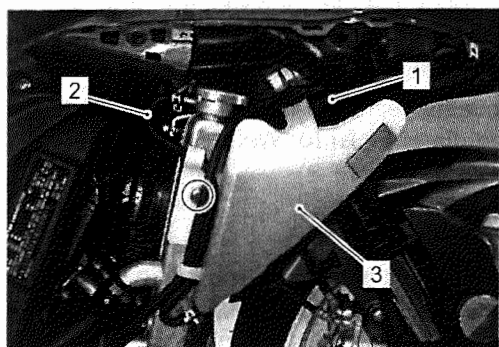
- 3) Reinstall the removed parts.

Radiator Reservoir Tank Removal and Installation

BENB15J21606008

Removal

- 1) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Disconnect the reservoir tank over flow hose (1), reservoir tank inlet hose (2) and drain the engine coolant.
- 3) Remove the reservoir tank (3).



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Installation

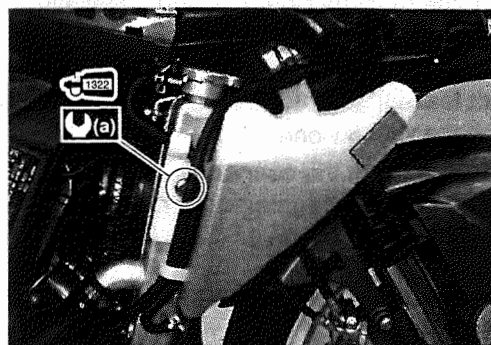
Install the radiator reservoir tank in the reverse order of removal. Pay attention to the following points:

- Connect the hoses securely. Refer to "Water Hose Routing Diagram" (Page 1F-3).
- Apply thread lock to the reservoir tank bolt and tighten it to the specified torque.

1322 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Reservoir tank bolt (a): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



IB14J1160015-03

- Fill the reservoir tank to the upper level. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).

Cooling Fan Inspection

BENB15J21606009

Cooling fan operating temperature

	IAT 40 °C (104 °F) and less	IAT 40 °C (104 °F) and more
OFF → ON	Approx. 105 °C (221 °F)	Approx. 100 °C (212 °F)
ON → OFF	Approx. 100 °C (212 °F)	Approx. 95 °C (203 °F)

Inspect the cooling fan in the following procedures:

- 1) Disconnect the cooling fan motor coupler (1).

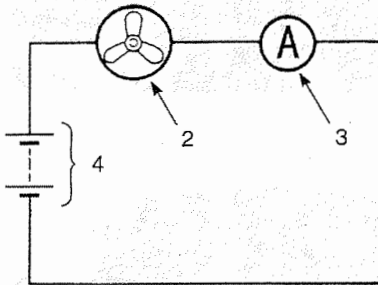


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- 2) Test the cooling fan motor for load current with an ammeter connected as shown in the figure. If the fan motor does not turn, replace the cooling fan assembly with a new one. Refer to "Radiator / Cooling Fan Motor Removal and Installation" (Page 1F-6).

NOTE

- When making this test, it is not necessary to remove the cooling fan.
- Make sure that the battery 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.



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2. Fan motor	3. Ammeter	4. Battery
--------------	------------	------------

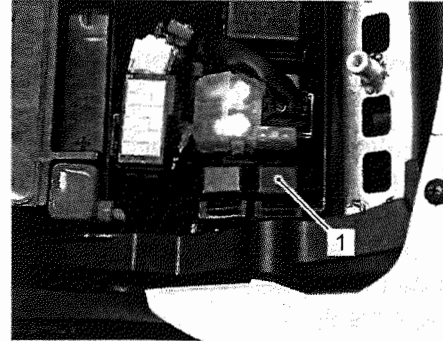
- 3) Connect the cooling fan motor coupler.

Cooling Fan Relay Inspection

BENB15J21606010

Inspect the fan relay in the following procedures:

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the cooling fan relay (1).



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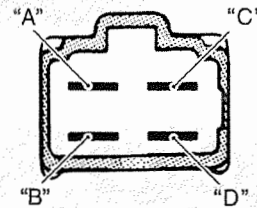
- 3) First check the insulation between "A" and "B" terminals with tester. Then apply 12 volts to "C" and "D" terminals, (+) to "C" and (-) to "D", and check the continuity between "A" and "B". If there is no continuity, replace it with a new one.

Special tool

 : 09900-25008 (Multi circuit tester set)

Tester knob indication set

Continuity test (•))



I718H1160006-03

- 4) Reinstall the removed parts.

1F-10 Engine Cooling System:

ECT Sensor Removal and Installation

BENB15J21606011

Refer to "ECT Sensor Removal and Installation" in Section 1C (Page 1C-4).

ECT Sensor Inspection

BENB15J21606012

Refer to "ECT Sensor Inspection" in Section 1C (Page 1C-5).

Thermostat Removal and Installation

BENB15J21606013

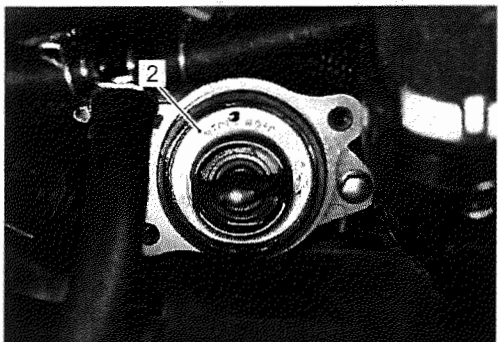
Removal

- 1) Drain a small amount of engine coolant. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Remove the thermostat cover (1).



IB14J1160018-03

- 4) Remove the thermostat (2).



IB14J1160019-02

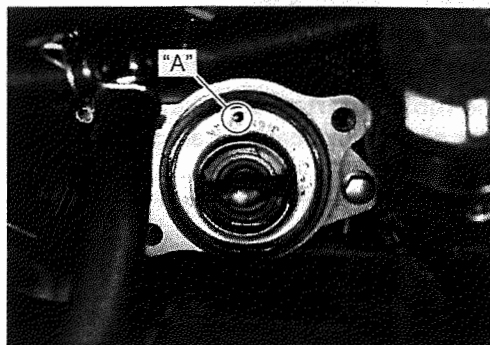
Installation

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

- Install the thermostat.

NOTE

The jiggle valve "A" of the thermostat faces upside.



IB14J1160020-02

- Tighten the thermostat cover (1) securely.



IB14J1160018-03

- Pour engine coolant and bleed air from the cooling circuit. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).

Thermostat Inspection

BENB15J21606014

Inspect the thermostat in the following procedures:

- 1) Remove the thermostat. Refer to "Thermostat Removal and Installation" (Page 1F-10).
- 2) Inspect the thermostat pellet for signs of cracking.



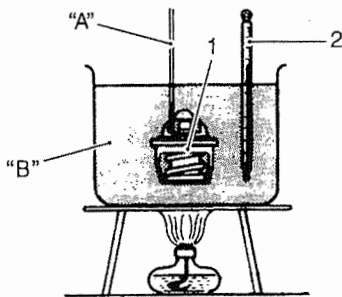
I837H1160025-01

- 3) Test the thermostat at the bench for control action.

NOTE

- Do not contact the thermostat (1) and 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.

- a) Immerse the thermostat (1) in the water contained in a beaker and note that the immersed thermostat is in suspension.
- b) Heat the water by placing the beaker on a stove and observe the rising temperature on a thermometer (2).



I705H1160030-03

"A": String	"B": Water
-------------	------------

- c) Read the thermometer just when opening the thermostat. If this reading, which is the temperature level at which the thermostat valve begins to open, is out of the standard value, replace the thermostat with a new one.

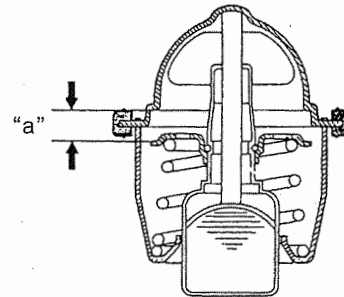
Thermostat valve opening temperature

Standard: Approx. 82 °C (180 °F)

- d) Keep on heating the water to raise its temperature.
- e) 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: Over 8 mm (0.31 in) and at 95 °C (203 °F)

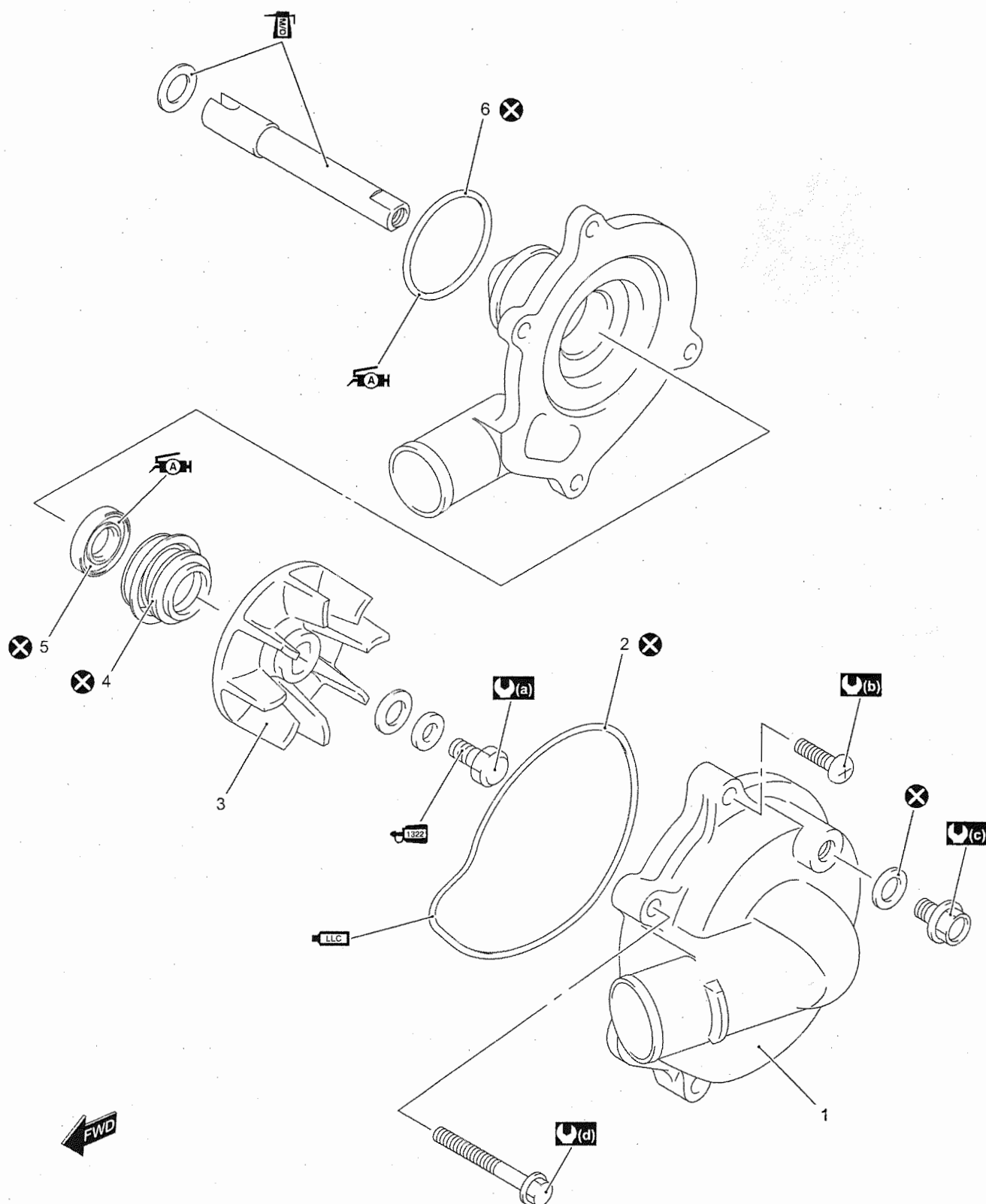


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- 4) Reinstall the removed parts.

Water Pump Components

BENB15J21606015

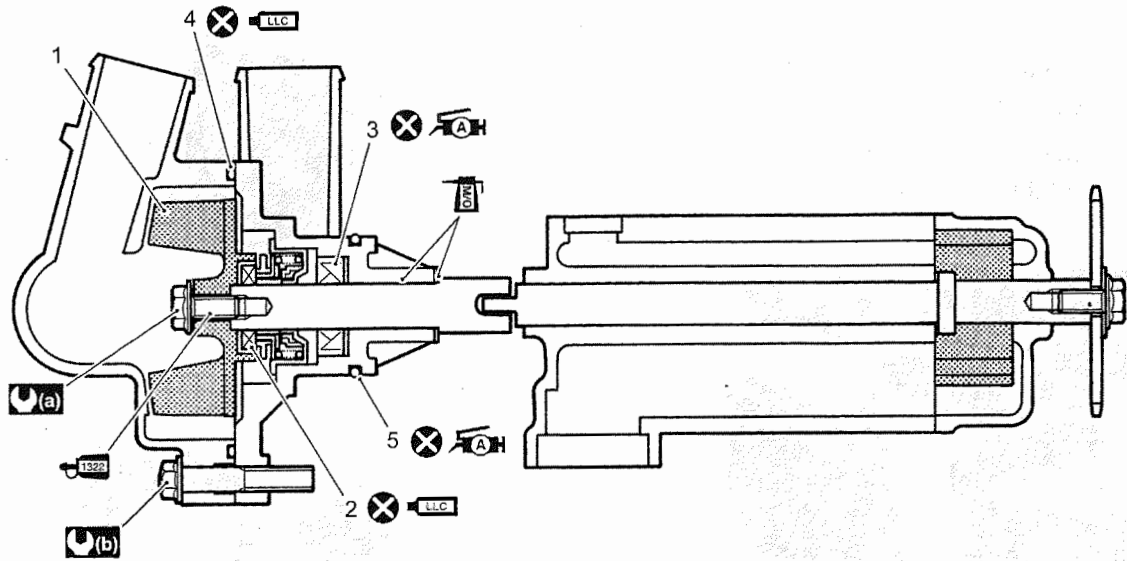


IB14J1160022-03

1. Water pump case	6. O-ring	AH : Apply grease.
2. O-ring	(a) : 8 N·m (0.8 kgf·m, 6.0 lbf·ft)	LLC : Apply engine coolant.
3. Impeller	(b) : 5.5 N·m (0.55 kgf·m, 4.0 lbf·ft)	1322 : Apply thread lock to thread part.
4. Mechanical seal	(c) : 13 N·m (1.3 kgf·m, 9.5 lbf·ft)	X : Do not reuse.
5. Oil seal	(d) : 10 N·m (1.0 kgf·m, 7.0 lbf·ft)	

Water Pump Construction

BENB15J21606016



IB14J1160023-02

1. Impeller	5. O-ring	LLC : Apply engine coolant.
2. Mechanical seal	(a) : 8 N·m (0.8 kgf-m, 6.0 lbf-ft)	MOL : Apply molybdenum oil solution.
3. Oil seal	(b) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	1322 : Apply thread lock.
4. O-ring	AH : Apply grease.	X : Do not reuse.

Water Pump Removal and Installation

BENB15J21606017

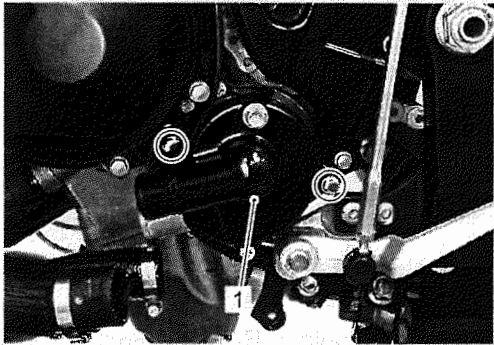
Removal

NOTE

Before draining engine oil and engine coolant, inspect engine oil and coolant leakage between the water pump and crankcase. If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the mechanical seal and seal washer. Refer to "Water Pump Related Parts Inspection" (Page 1F-17).

- 1) Remove the left cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

- 2) Drain engine oil and coolant. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10) and "Cooling System Inspection" in Section 0B (Page 0B-12).
- 3) Remove the water pump (1).



IB14J1160021-02

1F-14 Engine Cooling System:

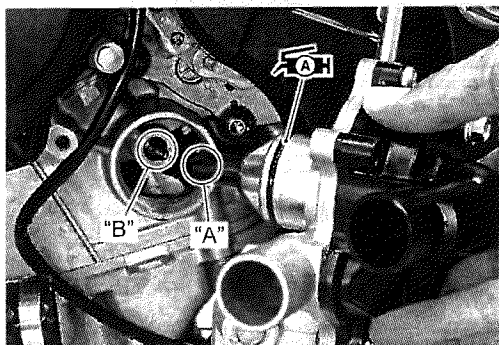
Installation

Install the water pump in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new O-ring and install it.

FAH: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

- Install the water pump with the slot on the pump shaft end "A" securely engaged with the flat "B" of the oil pump shaft.

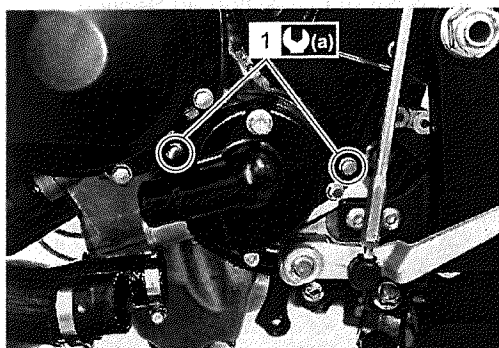


IB14J1160024-01

- Tighten the water pump mounting bolts (1) to the specified torque.

Tightening torque

Water pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1160025-02

- Connect the water hoses securely. Refer to "Water Hose Routing Diagram" (Page 1F-3).
- Pour engine oil and coolant. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10) and "Cooling System Inspection" in Section 0B (Page 0B-12).
- Bleed air from the cooling circuit. Refer to "Cooling System Inspection" in Section 0B (Page 0B-12).

Water Pump Disassembly and Assembly

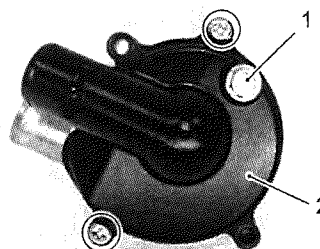
BENB15J21606018

Refer to "Water Pump Removal and Installation" (Page 1F-13).

Disassembly

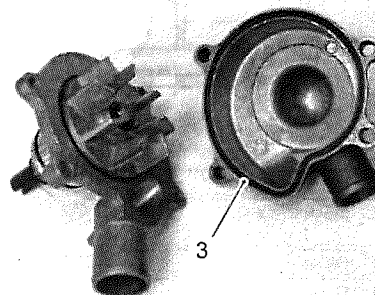
- 1) Remove the air bleeder bolt (1) if necessary.

- 2) Remove the water pump case (2).



IB37H1160031-01

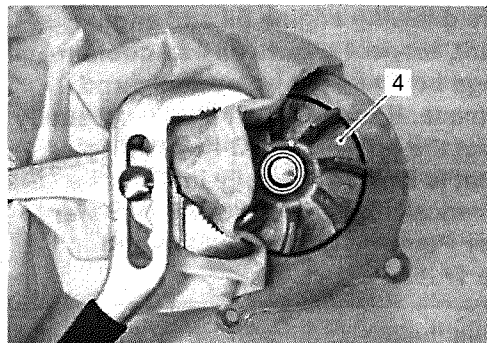
- 3) Remove the O-ring (3).



IB37H1160032-02

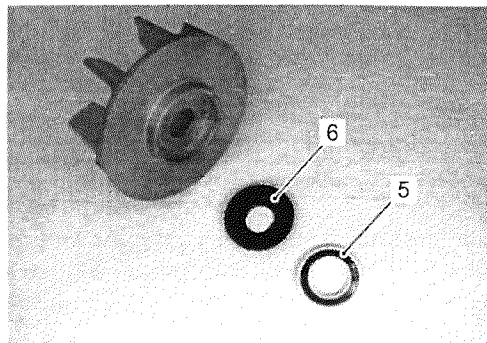
- 4) Remove the impeller securing bolt by holding the impeller (4) with a water pump pliers.

- 5) Remove the impeller (4).



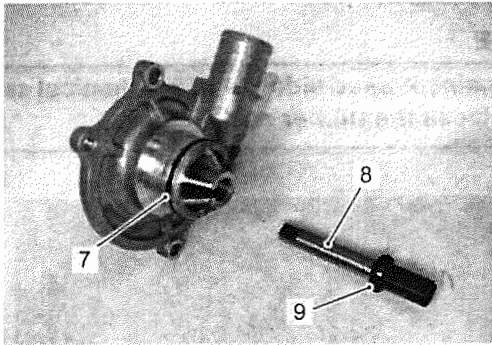
IB37H1160033-01

- 6) Remove the mechanical seal ring (5) and rubber seal (6) from the impeller.



IB37H1160034-01

- 7) Remove the O-ring (7), impeller shaft (8) and washer (9) from the water pump holder.



I837H1160035-01

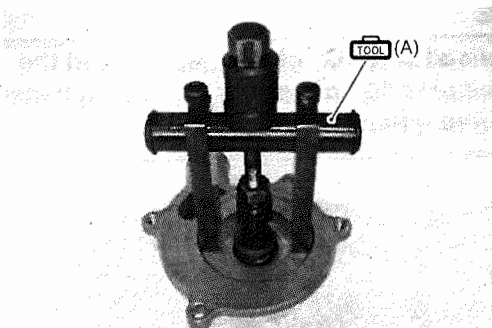
- 8) Remove the mechanical seal with the special tool.

NOTE

If there is no abnormal condition, the mechanical seal removal is not necessary.

Special tool

TOOL (A): 09921-20240 (Bearing remover set)

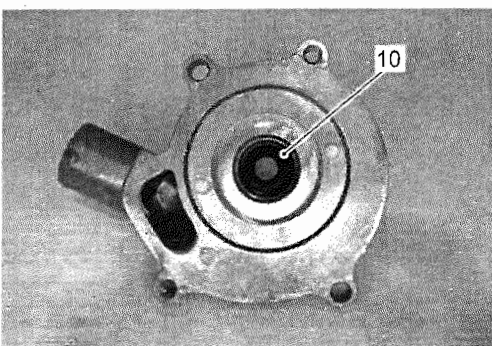


I837H1160036-01

- 9) Remove the oil seal (10).

NOTE

If there is no abnormal condition, the oil seal removal is not necessary.



I837H1160037-02

Assembly

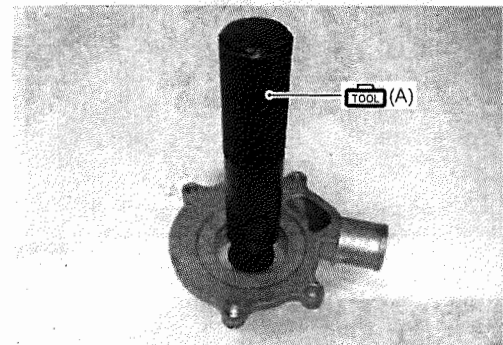
- 1) Install a new oil seal with the special tool.

NOTE

The stamped mark on the oil seal should face mechanical seal side.

Special tool

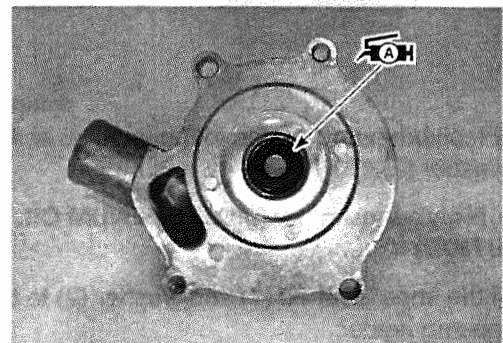
TOOL (A): 09913-70210 (Bearing installing set (10 – 75 Φ))



I837H1160038-01

- 2) Apply a small quantity of the grease to the oil seal lip.

FAH : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



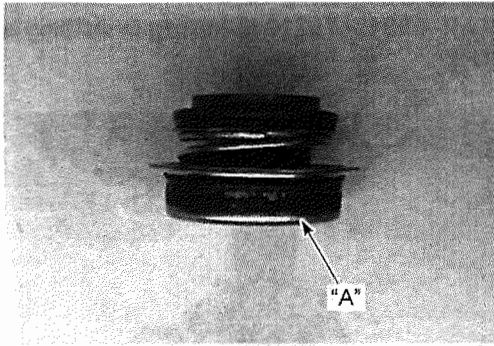
I837H1160039-01

1F-16 Engine Cooling System:

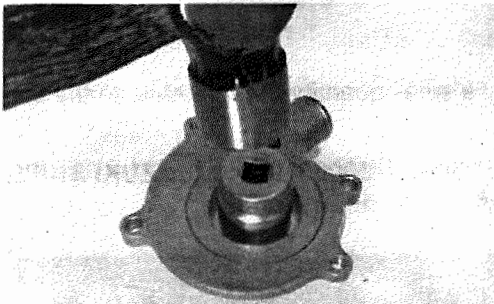
- 3) Install a new mechanical seal using a suitable size socket wrench.

NOTE

On new mechanical seals, the sealer "A" has been applied.



I837H1160040-02

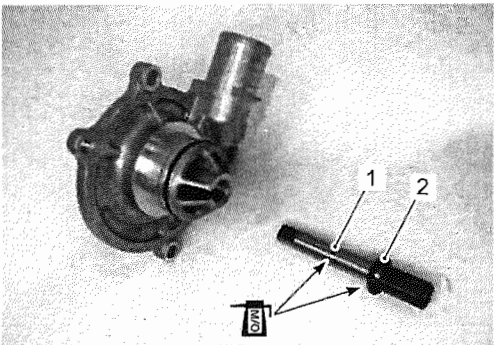


I837H1160041-01

- 4) Apply molybdenum solution to the impeller shaft (1) and washer (2).

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

- 5) Install the impeller shaft (1) and washer (2) to the water pump holder.

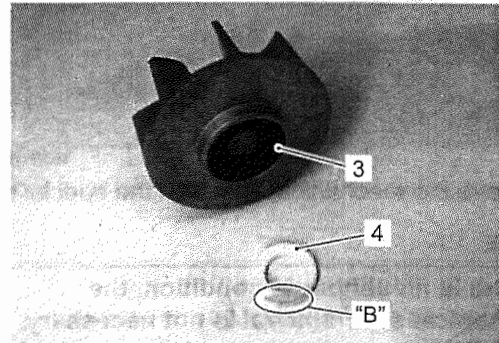


I837H1160042-01

- 6) Install the rubber seal (3) into the impeller.
- 7) After wiping off the oily or greasy matter from the mechanical seal ring (4), install it into the impeller.

NOTE

The paint marked side "B" of mechanical seal ring faces the rubber seal.

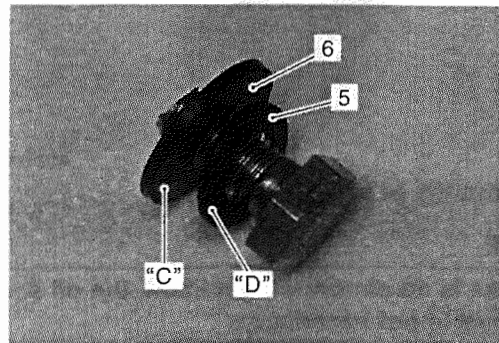


I837H1160043-01

- 8) Install the washer (5) and seal washer (6) onto the impeller securing bolt.

NOTE

The metal side "C" of seal washer and the curved side "D" of washer face the impeller securing bolt head.



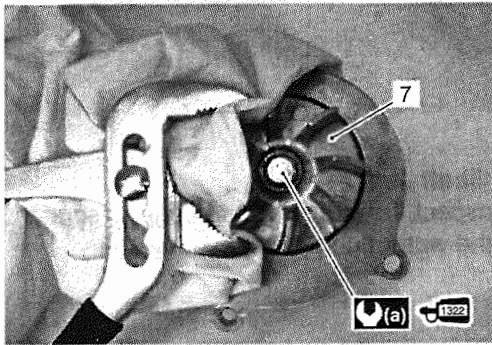
I837H1160044-01

- 9) Install the impeller (7).
- 10) Apply a small quantity of thread lock to the impeller securing bolt and tighten it to the specified torque.

1322 : Thread lock cement 99000-32110
(THREAD LOCK CEMENT SUPER "1322" or equivalent)

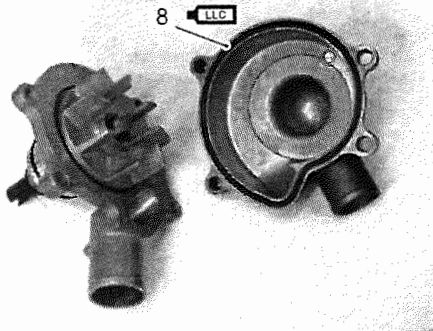
Tightening torque

Impeller securing bolt (a): 8 N·m (0.8 kgf-m, 6.0 lbf-ft)



I837H1160045-02

- 11) Install a new O-ring (8) and apply engine coolant to it.



I837H1160046-01

- 12) Fit the water pump case and tighten the water pump case screws (9) to the specified torque.

Tightening torque

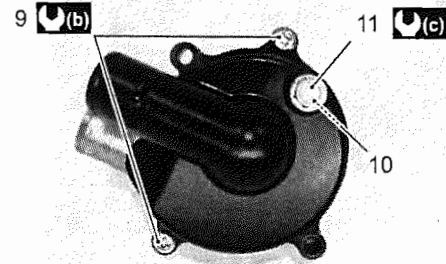
Water pump case screw (b): 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)

- 13) Install a new gasket washer (10).

- 14) Tighten the water pump air bleeder bolt (11) to the specified torque.

Tightening torque

Water pump air bleeder bolt (c): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)



IB14J1160026-01

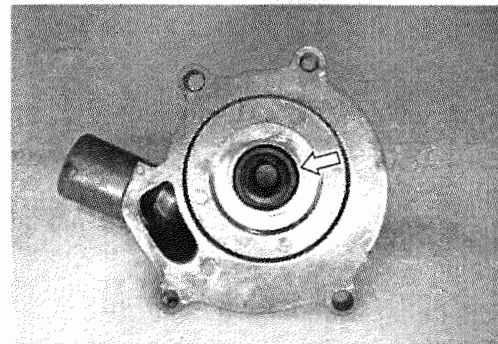
Water Pump Related Parts Inspection

BENB15J21606019

Refer to "Water Pump Disassembly and Assembly" (Page 1F-14).

Mechanical Seal

Visually inspect the mechanical seal for damage, with particular attention given to the sealing face. Replace the mechanical seal that shows indications of leakage.



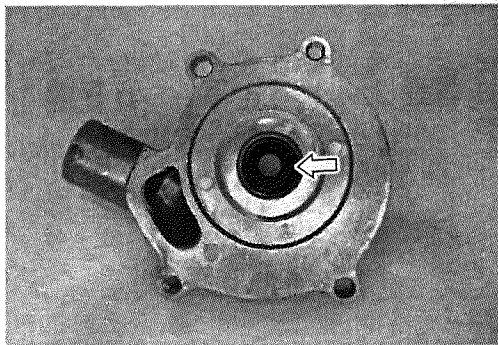
I837H1160047-01

1F-18 Engine Cooling System:

Oil Seal

Visually inspect the oil seal for damage, with particular attention given to the lip.

Replace the oil seal that shows indications of leakage.

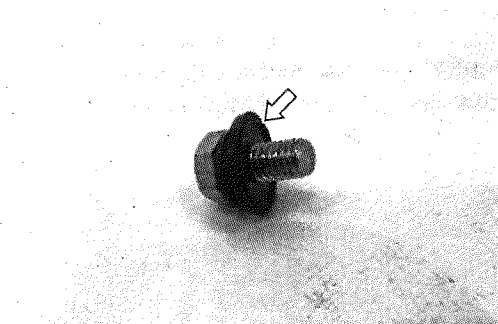


I837H1160048-01

Seal Washer

Visually inspect the seal washer for damage, with particular attention given to the sealing face.

Replace the seal washer that shows indications of leakage.

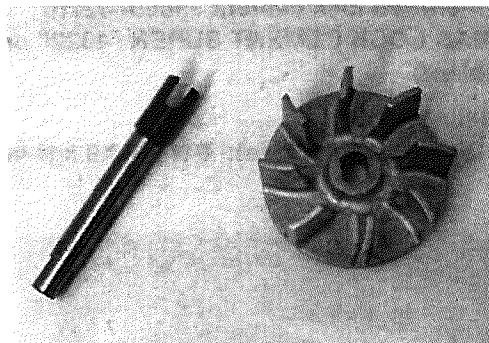


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Impeller / Shaft

Visually inspect the impeller and its shaft for damage.

Replace the impeller or shaft if necessary.

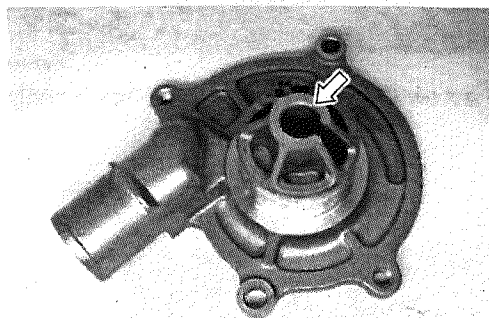


I837H1160050-01

Impeller Shaft Journal

Visually inspect the journal for damage or scratch.

Replace the water pump holder if necessary.



I837H1160051-01

Specifications

Service Data

BENB15J21607001

Thermostat + Radiator + Fan + Coolant

Item	Specification		Note
Thermostat valve opening temperature	Approx. 82 °C (180 °F)		—
Thermostat valve lift	Over 8 mm (0.31 in) and at 95 °C (203 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	50 °C (122 °F)	Approx. 0.811 kΩ	—
	80 °C (176 °F)	Approx. 0.318 kΩ	—
	110 °C (230 °F)	Approx. 0.142 kΩ	—
Radiator cap valve opening pressure	108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 15.4 – 19.5 psi)		—
Cooling fan operating temperature	OFF → ON	Approx. 105 °C (221 °F)	IAT 40 °C (104 °F) and less
	ON → OFF	Approx. 100 °C (212 °F)	
	OFF → ON	Approx. 100 °C (212 °F)	IAT 40 °C (104 °F) and more
	ON → OFF	Approx. 95 °C (203 °F)	
Engine coolant type	Use an anti-freeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant including reserve	Reserve tank side	Approx. 250 ml (0.3/0.2 US/lmp qt)	—
	Engine side	Approx. 2 400 ml (2.5/2.1 US/lmp qt)	—

Tightening Torque Specifications

BENB15J21607002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Reservoir tank bolt	6	0.6	4.5	☞ (Page 1F-8)
Water pump mounting bolt	10	1.0	7.0	☞ (Page 1F-14)
Impeller securing bolt	8	0.8	6.0	☞ (Page 1F-17)
Water pump case screw	5.5	0.55	4.0	☞ (Page 1F-17)
Water pump air bleeder bolt	13	1.3	9.5	☞ (Page 1F-17)

NOTE

The tightening torque(s) also specified in:
 “Water Hose Routing Diagram” (Page 1F-3)
 “Water Pump Components” (Page 1F-12)
 “Water Pump Construction” (Page 1F-13)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J21608001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞ (Page 1F-14) / ☞ (Page 1F-15)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞ (Page 1F-16)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞ (Page 1F-8) / ☞ (Page 1F-17)

NOTE

Required service material(s) also described in:

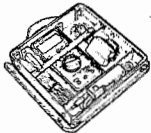
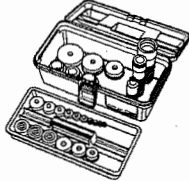
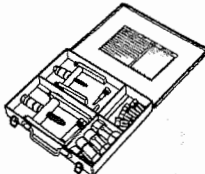
"Water Hose Routing Diagram" (Page 1F-3)

"Water Pump Components" (Page 1F-12)

"Water Pump Construction" (Page 1F-13)

Special Tool

BENB15J21608002

09900-25008 Multi circuit tester set ☞ (Page 1F-9) 	09913-70210 Bearing installing set (10 – 75 Φ) ☞ (Page 1F-15) 
09921-20240 Bearing remover set ☞ (Page 1F-15) 	

Fuel System

Precautions

Precautions for Fuel System

BENB15J21700001

▲ 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.
 - For E-33 models, drain fuel from the fuel tank before disconnecting the fuel feed hose to prevent fuel leakage.
-

NOTE

To prevent the fuel system (fuel tank, fuel hose, etc.) from contamination with foreign particles, blind all openings.

General Description

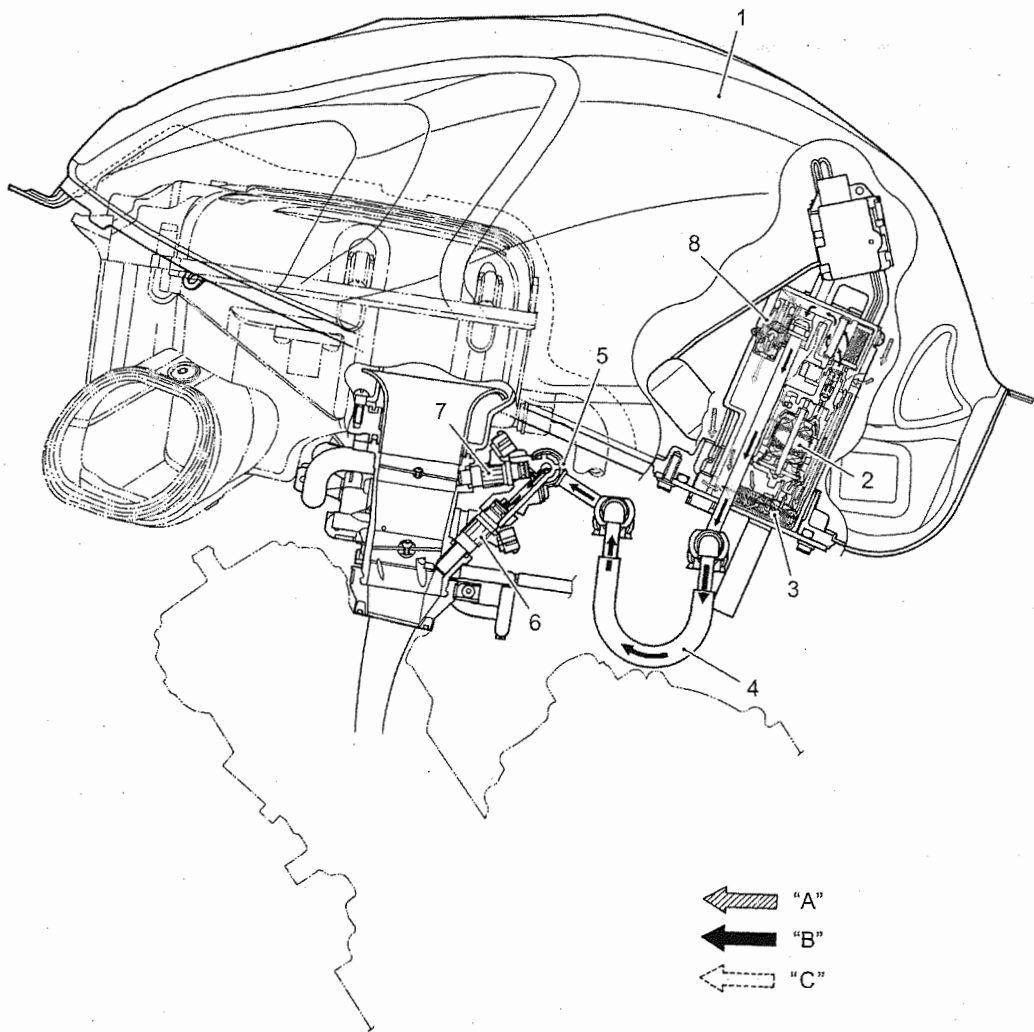
Fuel Injection System Description

BENB15J21701001

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 pipes (5) including primary fuel injectors (6) and secondary fuel injectors (7), fuel pressure regulator (8). There is no fuel return hose. The fuel in the fuel tank is pumped up by the fuel pump and pressurized fuel flows into the injectors installed in the fuel delivery pipe. Fuel pressure is regulated by the fuel pressure regulator. As the fuel pressure applied to the fuel injectors (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 opens according to the injection signal from the ECM.

The fuel relieved by the fuel pressure regulator flows back to the fuel tank.



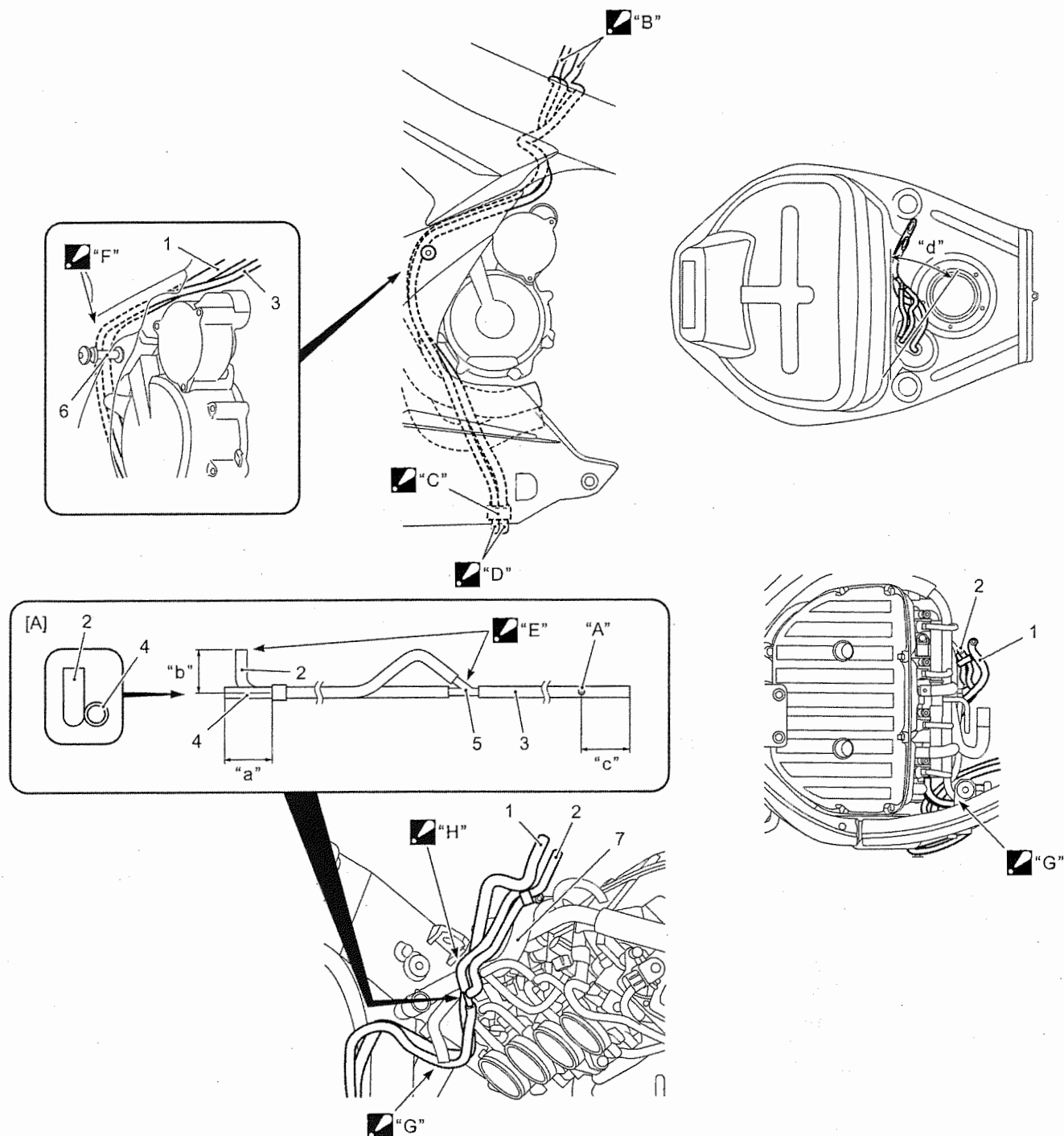
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1. Fuel tank	4. Fuel feed hose	7. Secondary fuel injector	"B": Pressurized fuel
2. Fuel pump	5. Fuel delivery pipe	8. Fuel pressure regulator	"C": Relieved fuel
3. Fuel mesh filter	6. Primary fuel injector	"A": Before-pressurized fuel	

Schematic and Routing Diagram

Fuel Tank Water Drain Hose and Breather Hose Routing Diagram

BENB15J21702001



IB14J1170032-07

1. Fuel tank water drain hose	"A": White marking	☑ "H": Pass the hoses under the PCV hose.
2. Fuel tank breather hose No. 1	☑ "B": Set the hose end to the root of tank nipple.	"a": 30 ± 10 mm (1.2 ± 0.4 in)
3. Fuel tank breather hose No. 2	☑ "C": Stick the hose clamp along the mark-off line behind the cowling.	"b": 45 mm (1.8 in)
4. Fuel tank breather hose No. 3	☑ "D": Clamp the hoses at white marking position. Match the length of hoses.	"c": 40 mm (1.6 in)
5. 3-way joint	☑ "E": Match the direction of 3-way joint and hoses.	"d": Approx. 45°
6. Side cowling spacer	☑ "F": Pass the hoses in front of the side cowling spacer.	[A]: Except for E-33
7. PCV hose	☑ "G": Pass the hoses in front of the harness bunch.	

Diagnostic Information and Procedures

Fuel System Diagnosis

BENB15J21704001

Condition	Possible cause	Correction / Reference Item
Engine will not start or is hard to start (No fuel reaching the intake manifold)	Clogged fuel filter or fuel hose.	Clean or replace.
	Defective fuel pump.	Replace.
	Defective fuel pressure regulator.	Replace.
	Defective fuel injector.	Replace.
	Defective fuel pump relay.	Replace.
	Defective ECM.	Replace.
	Open-circuited wiring connection.	Check and repair.
Engine will not start or is hard to start (Incorrect fuel/air mixture)	TP sensor out of adjustment.	Adjust.
	Defective fuel pump.	Replace.
	Defective fuel pressure regulator.	Replace.
	Defective TP sensor.	Replace.
	Defective CKP sensor.	Replace.
	Defective IAP sensor.	Replace.
	Defective ECM.	Replace.
	Defective ECT sensor.	Replace.
	Defective IAT sensors.	Replace.
	Defective AP sensors.	Replace.
	Clogged ISC valve air passage way.	Repair or replace.
Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.	Repair or replace.
	Clogged fuel filter.	Clean or replace.
	Defective fuel pump.	Replace.
	Defective fuel pressure regulator.	Replace.
	Defective ECT sensor.	Replace.
	Defective thermostat.	Replace.
	Defective IAT sensor.	Replace.
	Damaged or cracked vacuum hose.	Replace.
Engine stalls often (Fuel injector improperly operating)	Damaged or cracked ISC valve.	Repair or replace.
	Defective fuel injector.	Replace.
	No injection signal from ECM.	Repair or replace.
	Open or short circuited wiring connection.	Repair or replace.
Engine runs poorly in high speed range (Defective control circuit or sensor)	Defective battery or low battery voltage.	Replace or recharge.
	Low fuel pressure.	Repair or replace.
	Defective TP sensor.	Replace.
	Defective IAT sensor.	Replace.
	Defective CMP sensor.	Replace.
	Defective CKP sensor.	Replace.
	Defective GP switch.	Replace.
	Defective IAP sensor.	Replace.
	Defective ECM.	Replace.
	TP sensor out of adjustment.	Replace.
	Defective STP sensor and/or STVA.	Replace.

Repair Instructions

Fuel Pressure Inspection

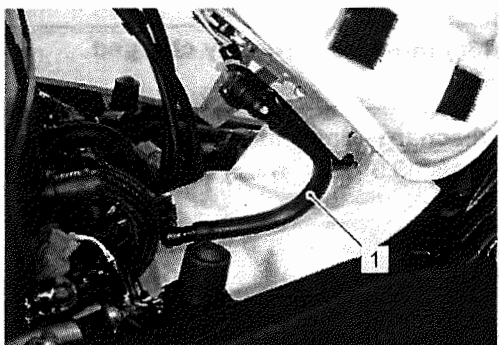
BENB15J21706001

▲ WARNING

- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

Inspect the fuel pressure in the following procedures:





- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" (Page 1G-9).
- 2) Place a rag under the fuel feed hose (1) and remove the fuel feed hose (1). Refer to "Fuel Feed Hose Disconnecting and Reconnecting" (Page 1G-7).

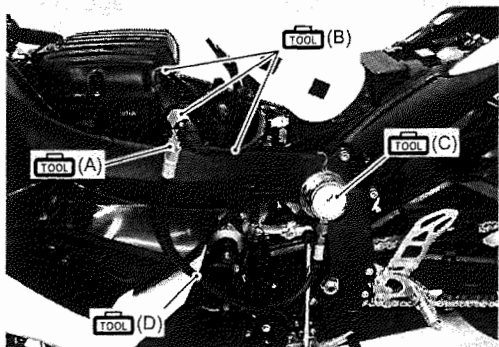


IB14J1170001-01

- 3) Install the special tools between the fuel pump and fuel delivery pipe.

Special tool

-  (A): 09940-40211 (Fuel pressure gauge adapter)
-  (B): 09940-40220 (Fuel pressure gauge attachment)
-  (C): 09915-77331 (Oil pressure gauge (1000 kPa))
-  (D): 09915-74521 (Adapter hose)



IB14J1170002-01

- 4) Turn the ignition ON and check for fuel pressure.

Fuel pressure

Approx. 300 kPa (3.0 kgf/cm², 43 psi)

If the fuel pressure is lower than the specification, check for the followings:

- Fuel hose leakage
- Clogged fuel filter
- Pressure regulator
- Fuel pump

If the fuel pressure is higher than the specification, check for the followings:

- Fuel pump
- Pressure regulator

- 5) Remove the special tools.

▲ WARNING

Before removing the special tools, turn the ignition switch OFF and release the fuel pressure slowly.

- 6) Reconnect the fuel feed hose and reinstall the fuel tank. Refer to "Fuel Feed Hose Disconnecting and Reconnecting" (Page 1G-7) and "Fuel Tank Removal and Installation" (Page 1G-9).

Fuel Pump Inspection

BENB15J21706002

Turn the ignition switch ON and check that the fuel pump operates for a few seconds.

If the fuel pump motor does not make operating sound, inspect the fuel pump circuit connections or inspect the fuel pump relay and TO sensor. Refer to "Fuel Pump Relay Inspection" (Page 1G-7) and "DTC 'C23' (P1651-H/L): TO Sensor Circuit Malfunction" in Section 1A (Page 1A-53).

If the fuel pump relay, TO sensor and fuel pump circuit connections are OK, the fuel pump may be faulty, replace the fuel pump with a new one. Refer to "Fuel Pump Disassembly and Assembly" (Page 1G-12).

Fuel Discharge Amount Inspection

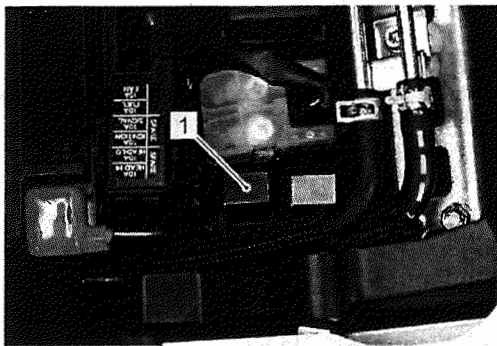
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▲ WARNING

- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

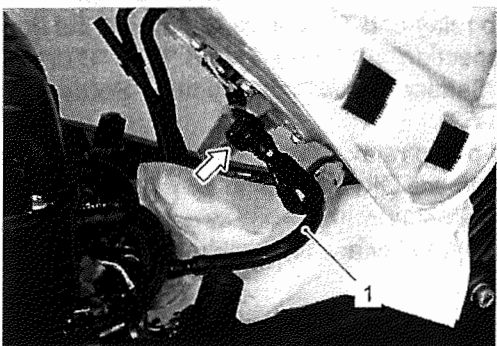
Inspect the fuel discharge amount in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Remove the fuel pump relay (1).



IB14J1110097-01

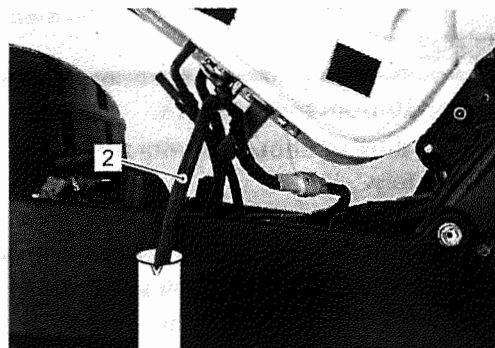
- 4) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" (Page 1G-9).
- 5) Place a rag under the fuel feed hose (1) and disconnect fuel feed hose (1) from the fuel pump.



IB14J1170003-01

- 6) Connect a proper fuel hose (2) to the fuel pump.

- 7) Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.



IB14J1170004-02

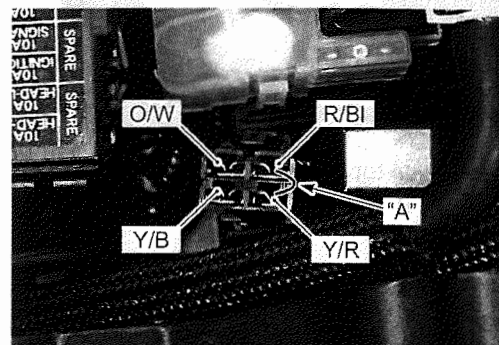
- 8) Connect the fuel pump relay lead wire coupler (between R/BI wire and Y/R wire) using a jumper wire "A" for 10 seconds and measure the amount of fuel discharged.

NOTE

The battery must be in fully charged condition.

Fuel discharge amount

167 ml (5.6/5.9 US/lmp oz) and more/10 seconds



IB14J1170005-02

- 9) After finishing the fuel discharge inspection, reconnect the fuel feed hose and reinstall the removed parts. Refer to "Fuel Feed Hose Disconnecting and Reconnecting" (Page 1G-7) and "Fuel Tank Removal and Installation" (Page 1G-9).

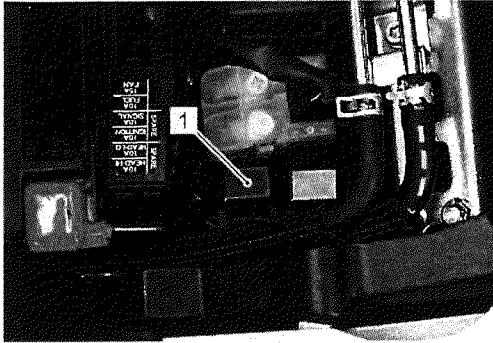
Fuel Pump Relay Inspection

BENB15J21706004

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

Inspect the fuel pump relay in the following procedures:

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the fuel pump relay (1).



IB14J1110097-01

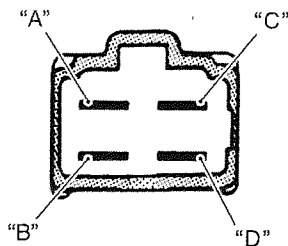
- 3) First, check for insulation with the tester between terminals "A" and "B". Next, check for continuity between "A" and "B" with 12 V voltage applied, positive (+) to terminal "C" and negative (-) to terminal "D". If continuity does not exist, replace the relay with a new one.

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity test (•))



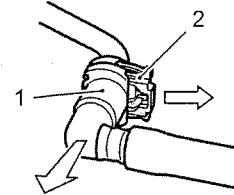
I718H1170013-01

Fuel Feed Hose Disconnecting and Reconnecting

BENB15J21706005

Disconnecting

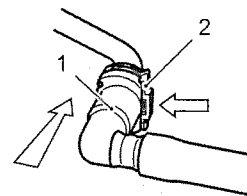
- 1) Unlock the fuel feed hose joint (1) by pulling the retainer (2).
- 2) Disconnect the fuel feed hose joint (1) from fuel pipe.



IB14J1170007-01

Reconnecting

- 1) Insert the fuel feed hose joint (1) to fuel pipe securely.
- 2) Lock the fuel feed hose joint (1) by pushing the retainer (2).



IB14J1170008-01

- 3) Confirm that fuel feed hose joint is not disconnected by hand.

Fuel Feed Hose Inspection

BENB15J21706006

Refer to "Fuel Line Inspection" in Section 0B (Page 0B-10).

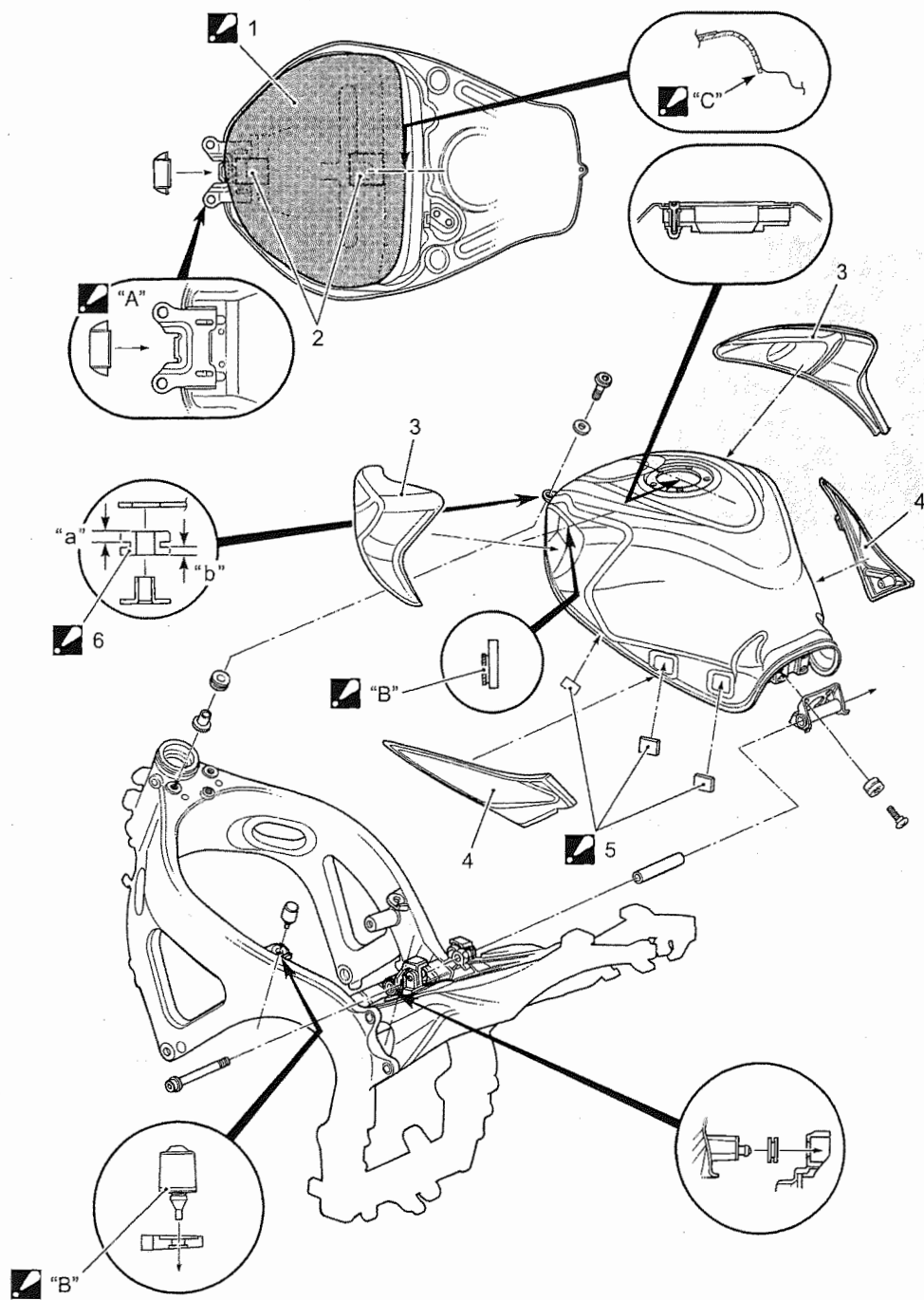
Fuel Level Gauge Inspection

BENB15J21706007







Refer to "Fuel Level Gauge Inspection" in Section 9C (Page 9C-5).

Fuel Tank Construction

BENB15J21706008



IB14J1170033-07

<div>  1. Fuel tank heat shield : Aluminum film side must face the engine side. </div>	<div>  5. Velcro fastenings : Clean the adhesive surface before adhering the velcro fastenings. </div>	<div>  "C": Align the end of heat shield with the fuel tank surface. </div>
<div> 2. Double-faced tape </div>	<div>  6. Cushion : When install the cushion, pay attention to its direction. </div>	<div> "a": 5 mm (0.20 in) </div>
<div> 3. Fuel tank front cover </div>	<div>  "A": Insert the fuel tank front rubber to the bracket end and flange. </div>	<div> "b": 4 mm (0.16 in) </div>
<div> 4. Side frame cover </div>	<div>  "B": Apply adhesive agent. </div>	

Fuel Tank Removal and Installation

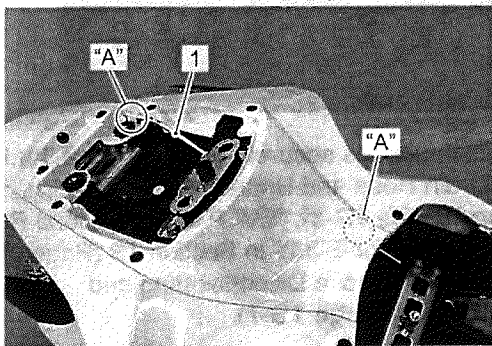
BENB15J21706009

Removal

⚠ WARNING

- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

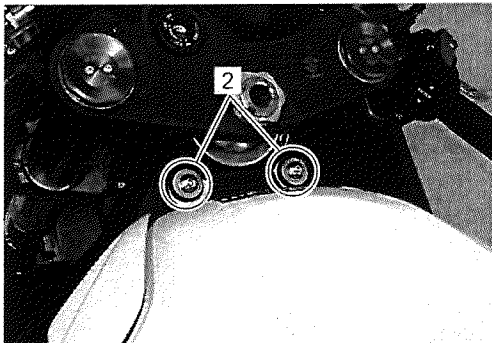
- 1) Remove the front and rear seats. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Take out the fuel tank prop stay (1), if equipped.



IB14J1170009-02

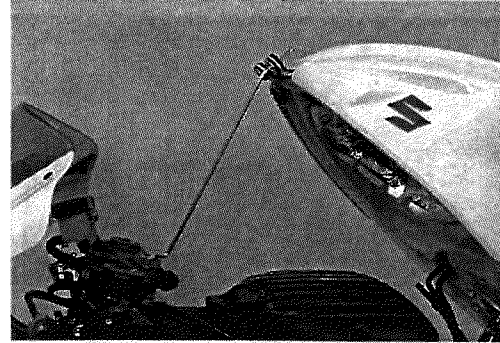
"A": Hooked point

- 3) Remove the bolts (2).



IB14J1170010-01

- 4) Lift and support the fuel tank.

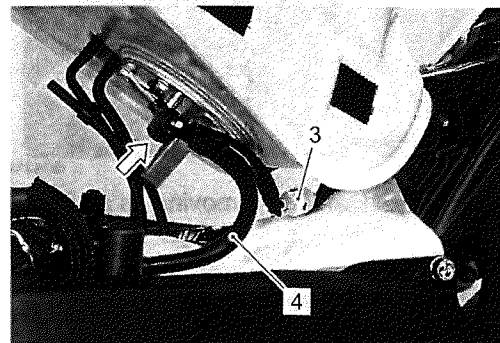


IB14J1170011-01

- 5) Disconnect the fuel pump lead wire coupler (3).
- 6) Place a rag under the fuel feed hose (4) and disconnect the fuel feed hose (4) from the fuel pump.

NOTE

When removing the fuel tank, do not leave the fuel feed hose on the fuel pump side.

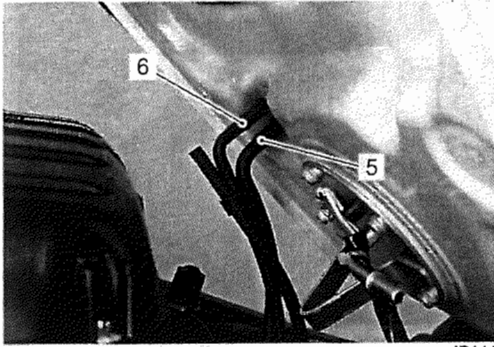


IB14J1170012-01

- 7) Disconnect the fuel tank water drain hose (5).

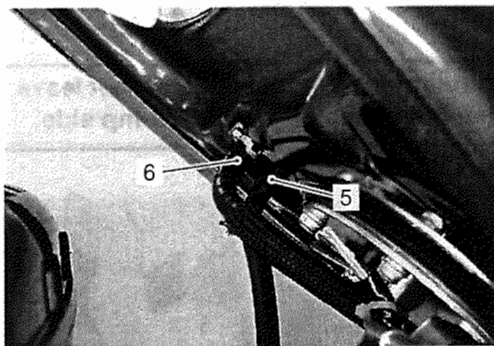
1G-10 Fuel System:

- 8) Disconnect the fuel tank breather hose (6).
Except for E-33



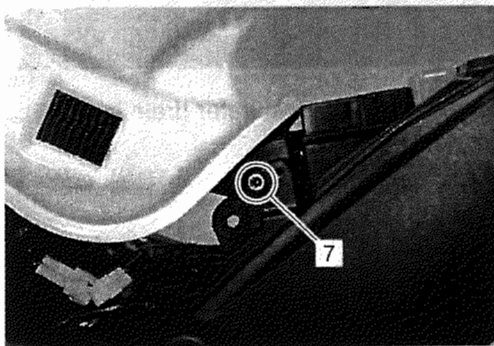
IB14J1170013-01

E-33 only



IB14J1170034-02

- 9) Remove the fuel tank by removing its bracket bolt (7).



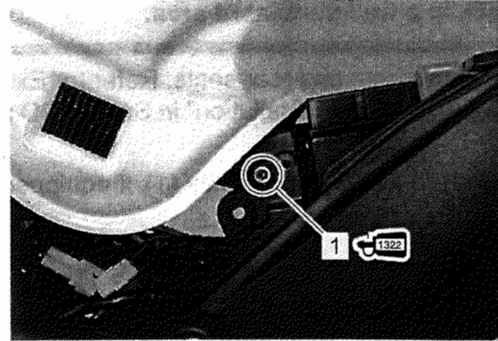
IB14J1170014-01

Installation

Install the fuel tank in the reverse order of removal. Pay attention to the following points:

- Apply thread lock to the fuel tank bracket bolt (1) and tighten it.

 : Thread lock cement 99000-32110
(THREAD LOCK CEMENT SUPER "1322" or equivalent)

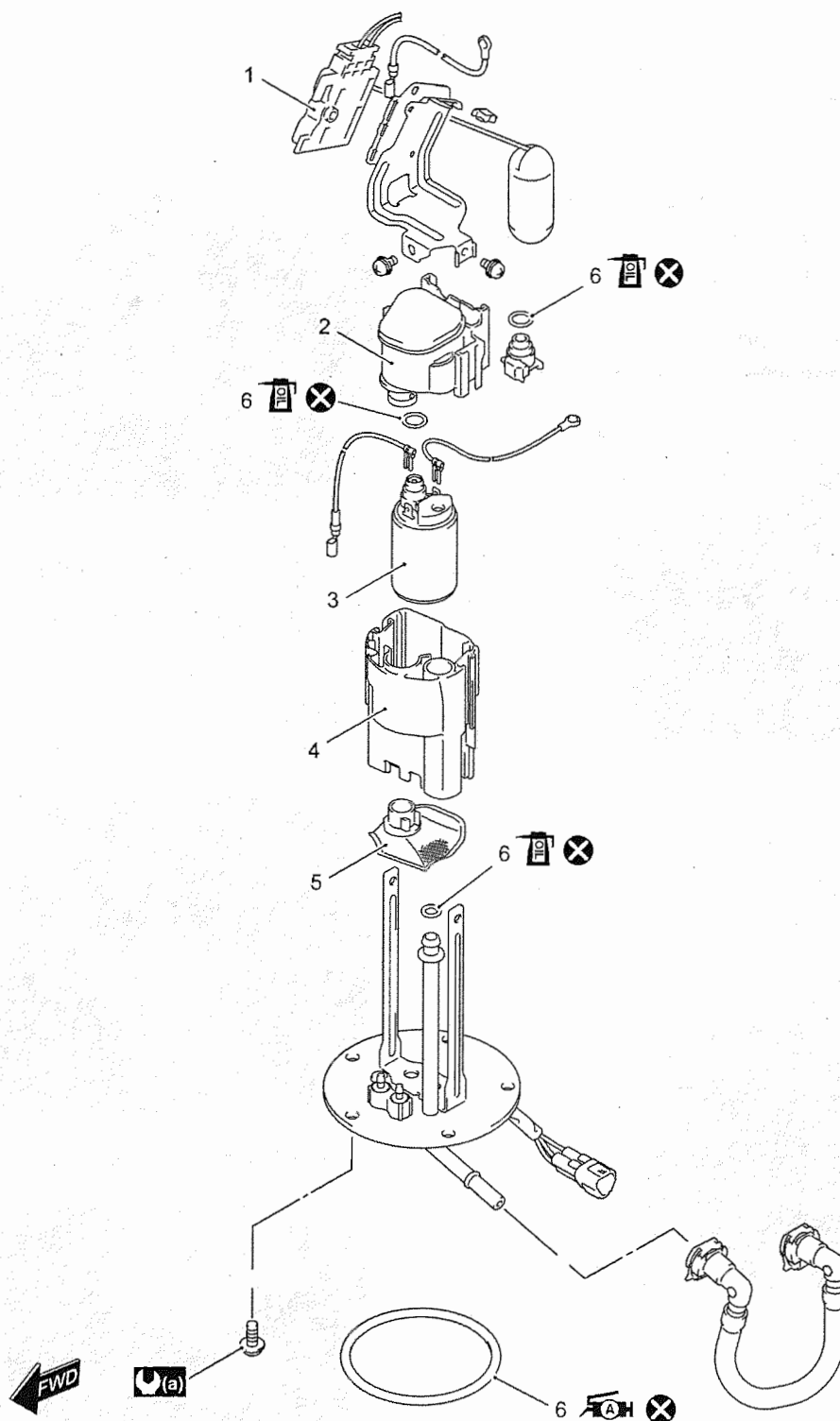


IB15J1170001-01

- Connect the hoses securely. Refer to "Fuel Tank Water Drain Hose and Breather Hose Routing Diagram" (Page 1G-3), "EVAP Canister Hose Routing Diagram (Only for E-33)" in Section 1B (Page 1B-7) and "Fuel Feed Hose Disconnecting and Reconnecting" (Page 1G-7).

Fuel Pump Components

BENB15J21706010



IB14J1170035-01

1. Fuel level gauge	4. Reservoir cup	U(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	X : Do not reuse.
2. Fuel regulator assembly	5. Fuel mesh filter	P : Apply engine oil.	
3. Fuel pump	6. O-ring	AH : Apply grease.	

Fuel Pump Assembly Removal and Installation

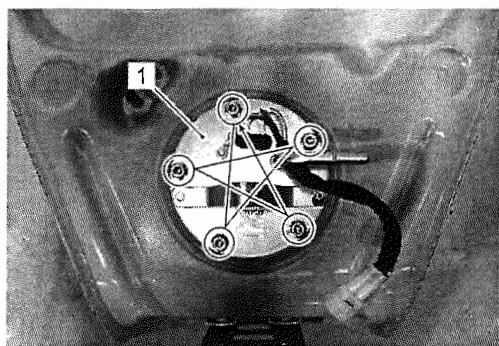
BENB15J21706011

Removal

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation" (Page 1G-9).
- 2) Remove the fuel pump assembly (1) by removing its mounting bolts diagonally.

⚠ WARNING

- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

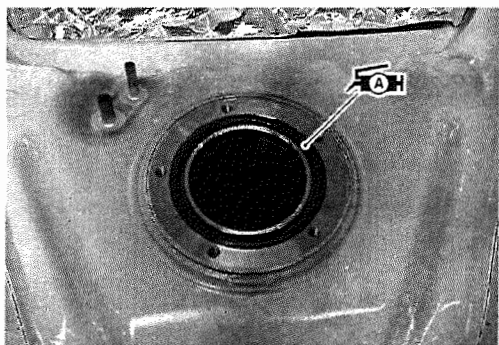


IB14J1170016-02

Installation

- Apply grease to the new O-ring and install it.

⚠ Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

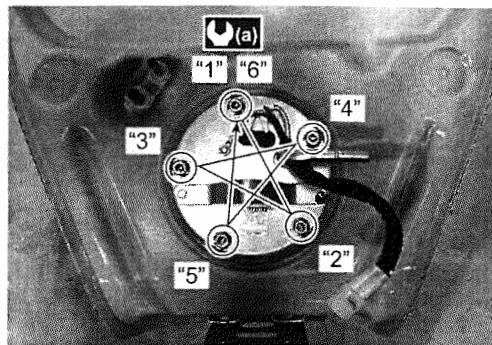


IB14J1170017-01

- When installing the fuel pump assembly, first tighten all the fuel pump mounting bolts lightly in the ascending order and then tighten them to the specified torque.

Tightening torque

Fuel pump mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1170018-03

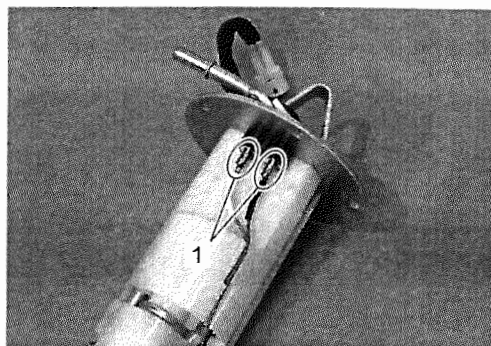
Fuel Pump Disassembly and Assembly

BENB15J21706012

Refer to "Fuel Pump Assembly Removal and Installation" (Page 1G-12).

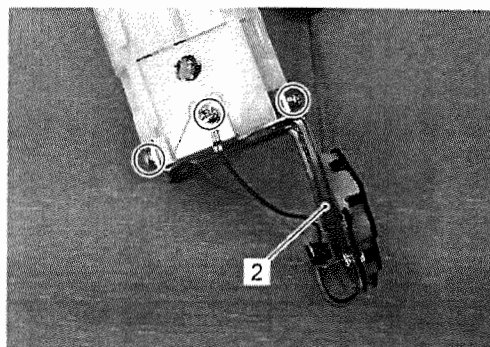
Disassembly

- 1) Disconnect the lead wires (1).



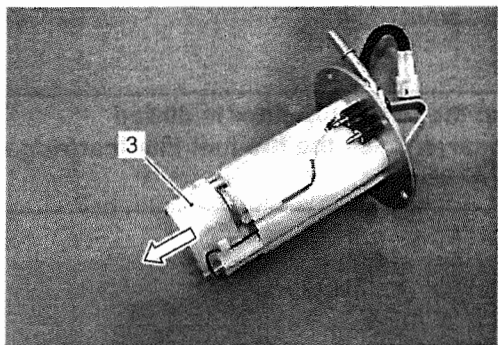
IB14J1170019-01

- 2) Remove the fuel level gauge (2).



IB14J1170020-02

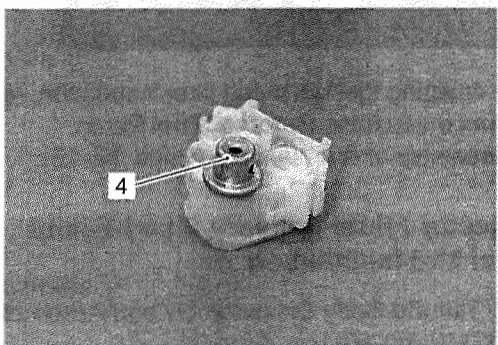
- 3) Remove the fuel regulator assembly (3).



IB14J1170021-01

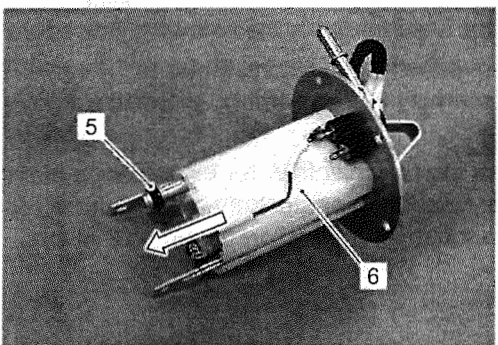
NOTICE

Never remove the fuel pressure regulator (4) from the holder.



IB14J1170022-01

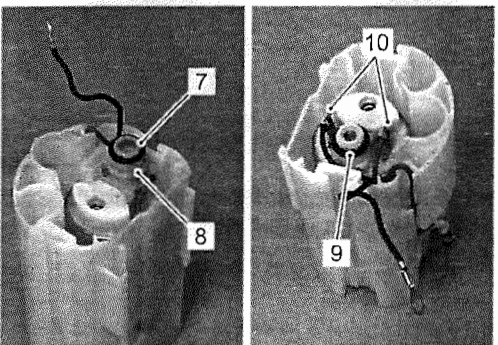
- 4) Remove the O-ring (5) and fuel pump assembly (6).



IB14J1170023-01

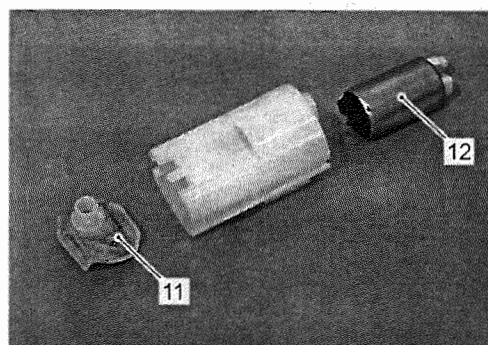
- 5) Remove the O-ring (7) and joint (8).

- 6) Remove the O-ring (9) and lead wires (10).



IB14J1170024-01

- 7) Remove the fuel mesh filter (11) and fuel pump (12) from the reservoir cup.



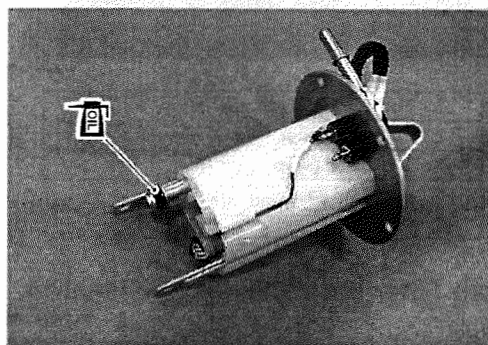
IB15J1170002-01

Assembly

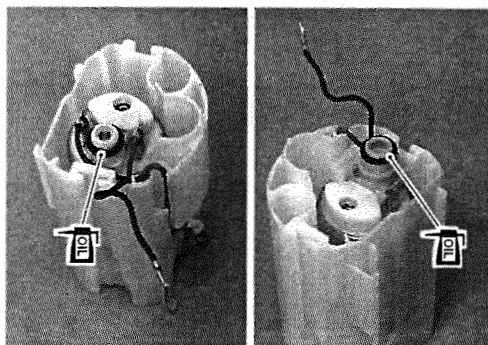
Refer to "Fuel Mesh Filter Inspection and Cleaning" (Page 1G-14).

Assemble the fuel tank pump in the reverse order of the disassembly. Pay attention to the following points:

- 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 and install them.



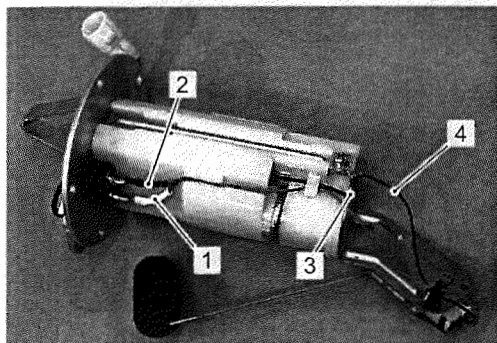
IB14J1170026-01



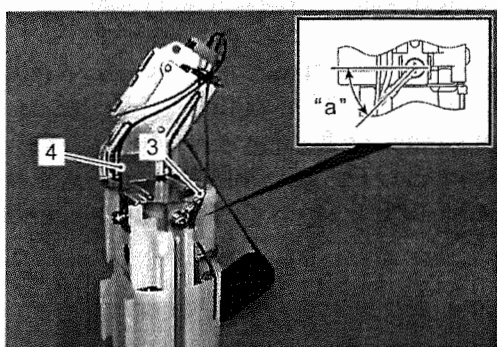
IB14J1170027-01

1G-14 Fuel System:

- Connect all lead wires securely so as not to cause contact failure.
- Route all lead wires securely.



IB14J1170028-05



IB14J1170029-05

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 (B)
"a": 45° ± 15°

Fuel Mesh Filter Inspection and Cleaning

BENB15J21706013

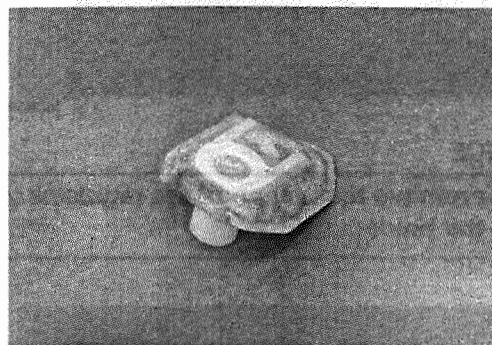
Inspect the fuel mesh filter in the following procedures:

- 1) Remove the fuel mesh filter. Refer to "Fuel Pump Disassembly and Assembly" (Page 1G-12).

- 2) If the fuel mesh filter is clogged with foreign particles, it hinders smooth gasoline flow resulting in loss of engine power.

NOTE

When the fuel mesh filter is dirtied excessively, replace the fuel filter cartridge with a new one.



IB14J1170030-01

- 3) After finishing the fuel mesh filter inspection, reinstall the fuel mesh filter. Refer to "Fuel Pump Disassembly and Assembly" (Page 1G-12).

Fuel Injector / Fuel Delivery Pipe / T-joint Removal and Installation

BENB15J21706014

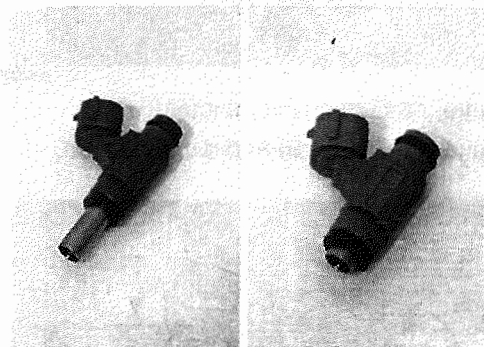
Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

Fuel Injector Inspection and Cleaning

BENB15J21706015

Inspect the fuel injector in the following procedures:

- 1) Remove the fuel injectors. Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).
- 2) Check the fuel injector filter for evidence of dirt and contamination. If present, clean and check for presence of dirt in the fuel lines and fuel tank.



IB14J1170031-01

- 3) Install the fuel injectors. Refer to "Throttle Body Disassembly and Assembly" in Section 1D (Page 1D-14).

Specifications

Service Data

BENB15J21707001

Injector + Fuel Pump + Fuel Pressure Regulator

Item	Specification	Note
Injector resistance	Approx. 12 at 20 °C (68 °F)	Primary and Secondary
Fuel pump discharge amount	167 ml (5.6/5.9 US/Imp oz) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 300 kPa (3.0 kgf/cm ² , 43 psi)	

Fuel

Item	Specification			Note
Fuel type	Use only unleaded gasoline of at least 90 pump octane (R/2 + M/2). Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.			E-03, 28, 33
	Gasoline used should be graded 95 octane (Research Method) or higher. Unleaded gasoline is recommended.			
				Others
Fuel tank capacity	Including reserve	16 L (4.2/3.5 US/Imp gal)		E-33
		17 L (4.5/3.7 US/Imp gal)		Others
	Fuel level indicator light lighting	blink	Approx. 3.9 L (1.0/0.9 US/Imp gal)	
		lighting	Approx. 1.5 L (0.4/0.3 US/Imp gal)	

Tightening Torque Specifications

BENB15J21707002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Fuel pump mounting bolt	10	1.0	7.0	☞ (Page 1G-12)

NOTE

The tightening torque(s) also specified in:
"Fuel Pump Components" (Page 1G-11)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J21708001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞ (Page 1G-12)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞ (Page 1G-10)

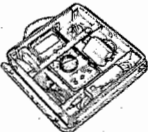


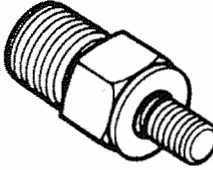
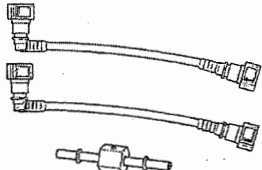
NOTE

Required service material(s) also described in:

"Fuel Pump Components" (Page 1G-11)

Special Tool

BENB15J21708002

09900-25008 Multi circuit tester set ☞ (Page 1G-7)		09915-74521 Adapter hose ☞ (Page 1G-5)	
09915-77331 Oil pressure gauge (1000 kPa) ☞ (Page 1G-5)		09940-40211 Fuel pressure gauge adapter ☞ (Page 1G-5)	
09940-40220 Fuel pressure gauge attachment ☞ (Page 1G-5)			

Ignition System

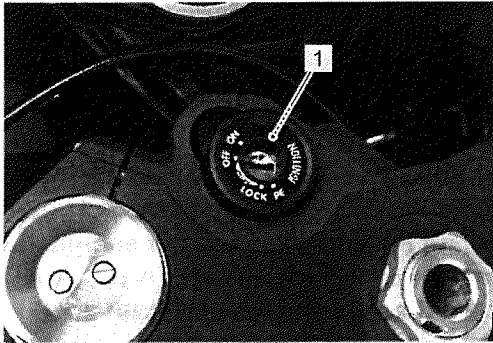
General Description

Immobilizer Description (For E-21, 24)

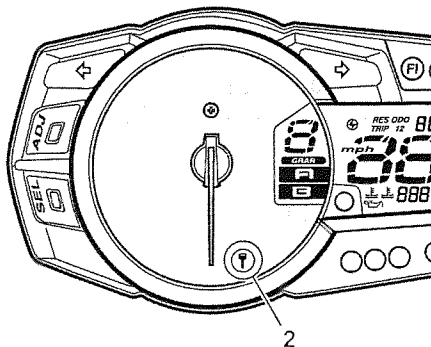
BENB15J21801001

The immobilizer, an anti-theft system, is installed as a standard equipment.

The immobilizer verifies that the key ID agrees with ECM ID by means of radio communication through the immobilizer antenna. When the ID agreement is verified, the system makes the engine ready to start.

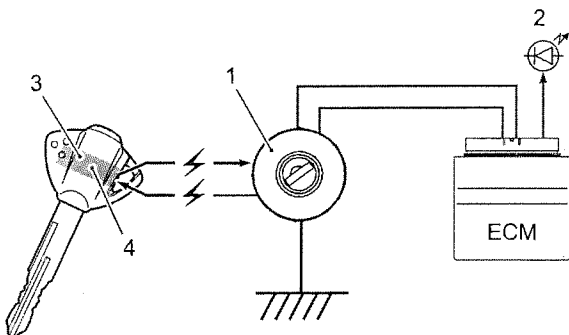


IB14J1180001-01



IB14J1180002-01

1. Immobilizer antenna	2. Indicator light
------------------------	--------------------



IB15H1180002-02

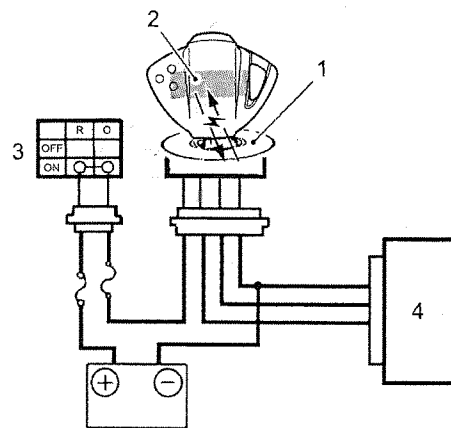
1. Immobilizer antenna	3. Transponder
2. Indicator light	4. ID

Operation

When the ignition switch is turned ON with the engine stop switch in ON, the immobi-antenna and ECM are powered ON.

The ECM transmits a signal to the transponder through the immobi-antenna 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 so that ECM can make comparison with its own ID, and if it matches, the engine is made ready to start.

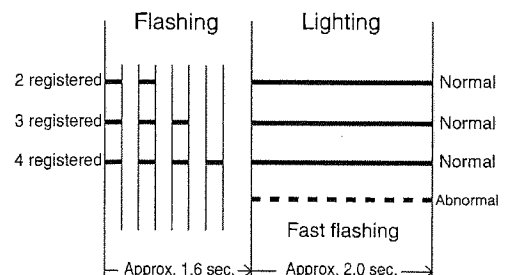


IB15H1180003-01

1. Immobilizer antenna	3. Ignition switch
2. Transponder	4. ECM

Also, when the ignition switch is turned ON, the indicator light 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.

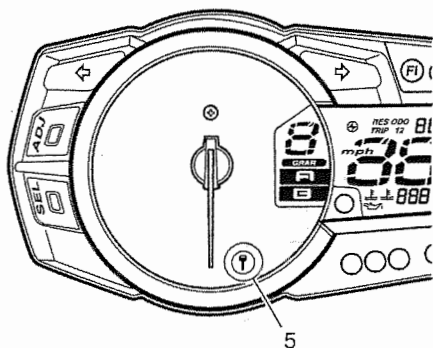
If the indicator light (LED) flashes fast, it notifies of communication error or disagreement of ID.



I705H1180006-01

NOTE

- If the indicator light 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 operation starts immediately after the starter operation.



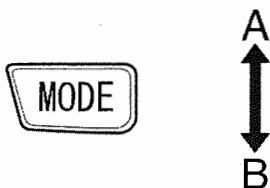
5. Indicator light

IB14J1180003-01

Drive Mode Selector Description

BENB15J21801002

Engine power characteristics can be changed in 2 modes by operating the drive mode selector to meet various riding conditions and rider's preference.



IB14J1180004-01

Operation

Drive mode is preset at A-mode when the ignition switch and engine stop switch are turned on. At this time, the drive mode indicator shows nothing. Follow the procedure below to operate the drive mode selector.

- 1) Turn on the ignition switch and engine stop switch.
- 2) Push the drive mode selector until the drive mode indicator shows A.
- 3) Push the drive mode selector to change drive mode. The drive mode indicator indicates actual drive mode.

NOTE

- Operating the drive mode selector while riding with the throttle opened will change the engine speed because of engine power characteristics change.
- The drive mode indicator blinks when drive mode change operation is failed.
- Turning off the ignition switch or engine stop switch will return the drive mode to A-mode. Start the engine and reset the drive mode.

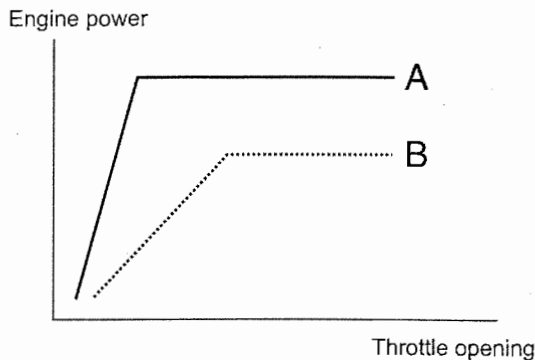
Drive Mode

A-mode

A-mode provides sharp throttle response at all throttle opening range to obtain maximum engine power.

B-mode

B-mode provides soft throttle response at all throttle opening range by reducing engine power.

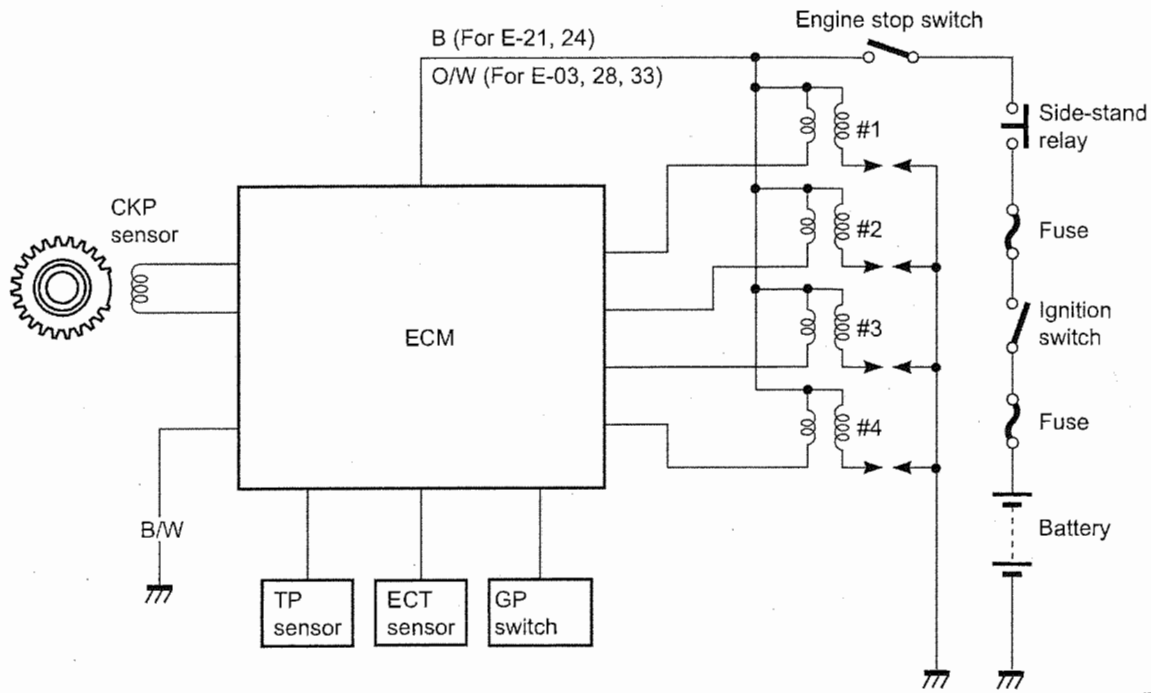


IB14J1180022-01

Schematic and Routing Diagram

Ignition System Diagram

BENB15J21802001



IB14J1180005-01

Ignition System Components Location

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

BENB15J21802002

Diagnostic Information and Procedures

Ignition System Symptom Diagnosis

BENB15J21804001

Condition	Possible cause	Correction / Reference Item
Spark plug not sparking	Damaged spark plug.	<i>Replace.</i>
	Fouled spark plugs.	<i>Clean or replace.</i>
	Wet spark plugs.	<i>Clean and dry or replace.</i>
	Defective ignition coil/plug caps.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Repair or replace.</i>
Engine stalls easily (No spark)	Fouled spark plugs.	<i>Clean or replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
Spark plug is wet or quickly becomes fouled with carbon	Excessively rich air/fuel mixture.	<i>Inspect FI system.</i>
	Excessively high idling speed.	<i>Inspect FI system.</i>
	Incorrect gasoline.	<i>Change.</i>
	Dirty air cleaner element.	<i>Clean or replace.</i>
	Incorrect spark plug (Cold type).	<i>Change to hot type spark plug.</i>
Spark plug quickly becomes fouled with oil or carbon	Worn piston rings.	<i>Replace.</i>
	Worn pistons.	<i>Replace.</i>
	Worn cylinders.	<i>Replace.</i>
	Excessive valve-stem to valve-guide clearance.	<i>Replace.</i>
	Worn valve stem oil seals.	<i>Replace.</i>
Spark plug electrodes overheat or burn	Incorrect spark plug (Hot type).	<i>Change to cold type spark plug.</i>
	Overheated engine.	<i>Tune-up.</i>
	Loose spark plugs.	<i>Tighten.</i>
	Excessively lean air/fuel mixture.	<i>Inspect FI system.</i>

No Spark or Poor Spark

BENB15J21804002

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

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

Measure the battery voltage between input lead wires at the ECM with the ignition switch in the "ON" position. (E-21, 24: B and B/W, E-03, 28, 33: O/W and B/W)

Is the voltage OK?

- Yes Go to Step 3.
- No
 - Faulty ignition switch.
 - Faulty turn signal/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 / Plug Cap Inspection" (Page 1H-7).

NOTE

This inspection method is applicable only with the multi circuit tester and the peak volt adaptor.

Is the peak voltage OK?

- Yes Go to Step 4.
- No Go to Step 5.

Step 4

Inspect the spark plugs. Refer to "Spark Plug Inspection" in Section 0B (Page 0B-9).

Is the spark plug(-s) OK?

- Yes Go to Step 5.
- No Faulty spark plug(-s).

Step 5

Inspect the ignition coil/plug cap(-s). Refer to "Ignition Coil / Plug Cap Inspection" (Page 1H-7).

Is the ignition coil/plug cap(-s) OK?

- Yes Go to Step 6.
- No
 - Faulty ignition coil/plug cap(-s).
 - Poor connection of the ignition coil/plug cap(-s).

Step 6

Measure the CKP sensor peak voltage and its resistance. Refer to "CKP Sensor Inspection" (Page 1H-9).

NOTE

The CKP sensor peak voltage inspection is applicable only with the multi circuit tester and peak volt adaptor.

Are the peak voltage and resistance OK?

- 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 / Plug Cap and Spark Plug Removal and Installation

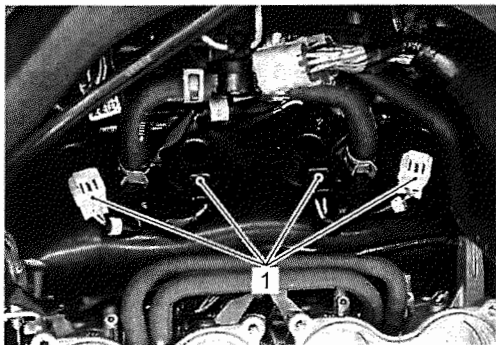
BENB15J21806001

Removal

▲ WARNING

The hot engine can burn you.
Wait until the engine is cool enough to touch.

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Disconnect the ignition coil/plug cap lead wire couplers (1).



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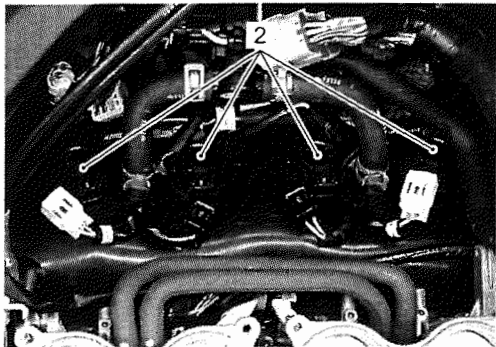
NOTICE

Disconnect the lead wire coupler before removing the ignition coil/plug cap to avoid lead wire coupler damage.

- 4) Remove the ignition coil/plug caps (2).

NOTICE

- Do not pry up the ignition coil/plug cap with a screwdriver or a bar to avoid its damage.
- Be careful not to drop the ignition coil/plug cap to prevent short/open circuit.

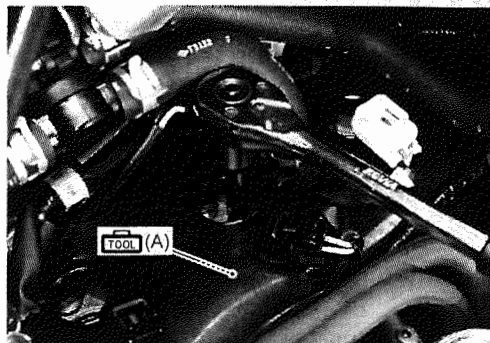


IB14J1180007-02

- 5) Remove the spark plugs with the spark plug wrench.

Special tool

TOOL (A): 09930-10121 (Spark plug wrench set)



IB14J1180008-02

Installation

Install the ignition coil/plug cap and 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

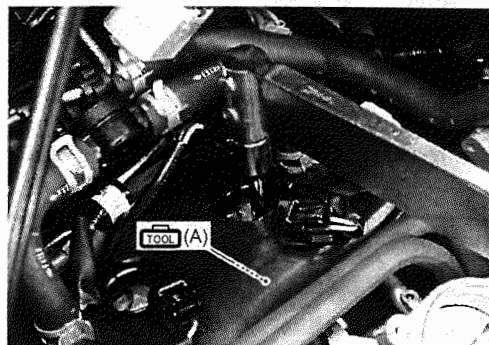
Do not cross thread or over tighten the spark plug, or such an operation will damage the aluminum threads of the cylinder head.

Special tool

TOOL (A): 09930-10121 (Spark plug wrench set)

Tightening torque

Spark plug: 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

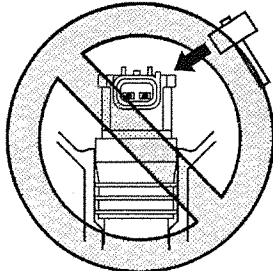


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- Install the ignition coil/plug caps and connect their lead wire couplers.

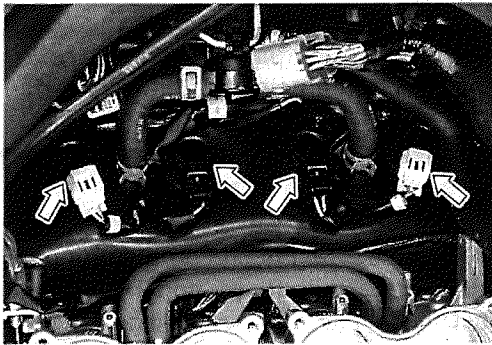
NOTICE

Do not hit the ignition coil/plug cap with a plastic hammer when installing it.



INCORRECT

I718H1180012-01



IB14J1180010-02

Spark Plug Inspection and Cleaning

BENB15J21806002

Refer to "Spark Plug Inspection" in Section 0B (Page 0B-9).

Ignition Coil / Plug Cap Inspection

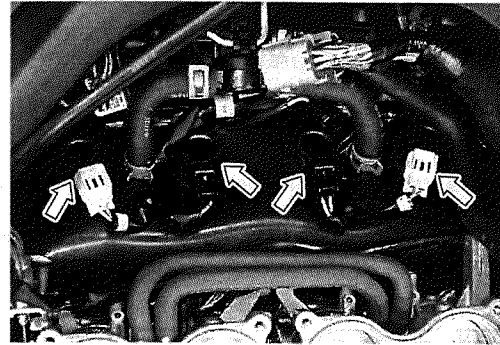
BENB15J21806003

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

Ignition Coil Primary Peak Voltage

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).

- 2) Disconnect all ignition coil/plug caps. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" (Page 1H-6).



IB14J1180010-02

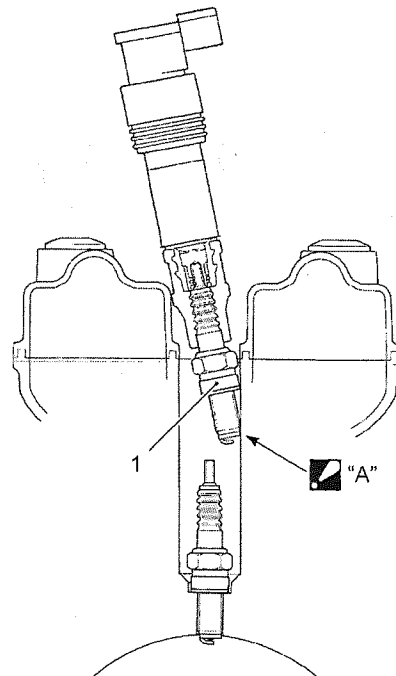
- 3) Connect the new spark plug to each ignition coil/ spark plug cap.
- 4) Connect all the ignition coil/plug cap lead wire couplers to the ignition coil/plug caps respectively, and ground them on the cylinder head (each spark plug hole).

NOTICE

Avoid grounding the spark plugs and supplying the electrical shock to the cylinder head cover (magnesium parts) to prevent the magnesium material from damage.

NOTE

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



I823H1180011-02

1. New spark plug

"A": Contact the spark plug to the cylinder head.

1H-8 Ignition System:

- 5) Connect the ECM couplers.
- 6) Insert the needle-point probe to the lead wire coupler.

NOTE

Use the special tool to prevent the rubber of the water proof coupler from damage.

Special tool

TOOL (A): 09900-25009 (Needle-point probe set)

- 7) Connect the multi circuit tester with the peak voltage adaptor as follows.

NOTE

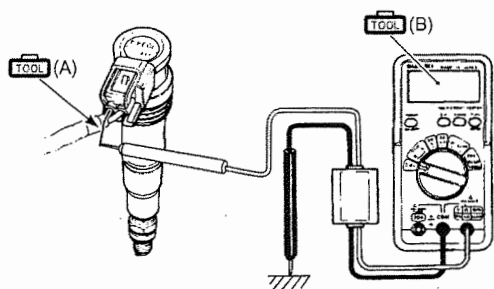
Before using the multi circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.

Special tool

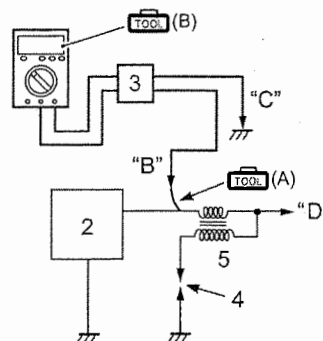
TOOL (B): 09900-25008 (Multi circuit tester set)

Tester knob indication: Voltage (---)

	(+) Probe	(-) Probe
Ignition coil/Plug cap #1	W/BI wire terminal	Ground
Ignition coil/Plug cap #2	Black wire terminal	Ground
Ignition coil/Plug cap #3	Yellow wire terminal	Ground
Ignition coil/Plug cap #4	Green wire terminal	Ground



IB14J1180027-01



IB14J1180028-01

2. ECM	"B": (+) probe
3. Peak voltage adaptor	"C": (-) probe
4. New spark plug	"D": To engine stop switch
5. Ignition coil	

- 8) Measure the ignition coil primary peak voltage in the following procedures:

⚠ WARNING

Do not touch the tester probes and spark plugs to prevent an electric shock while testing.

- a) Shift the transmission into neutral, turn the ignition switch ON and grasp the clutch lever.
 - b) Press the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.
- 9) Repeat the b) procedure several times and measure the highest peak voltage.
- If the voltage is lower than standard range, inspect the ignition coil/plug cap and the CKP sensor.

Ignition coil primary peak voltage 80 V and more

- 10) After measuring the ignition coil primary peak voltage, reinstall the removed parts.

Ignition Coil / Plug Cap Resistance

- 1) Remove the ignition coil/plug caps. Refer to "Ignition Coil / Plug Cap and Spark Plug Removal and Installation" (Page 1H-6).
- 2) Measure the ignition coil/plug cap for resistance in both primary and secondary coils. If the resistance is not within the standard range, replace the ignition coil/plug cap with a new one.

Special tool

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

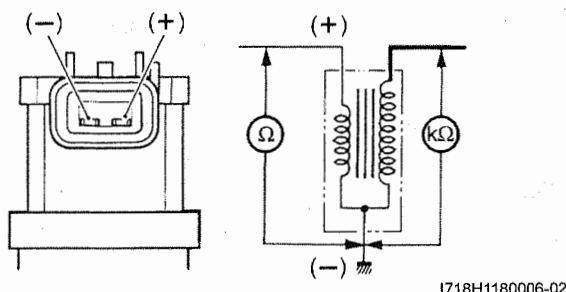
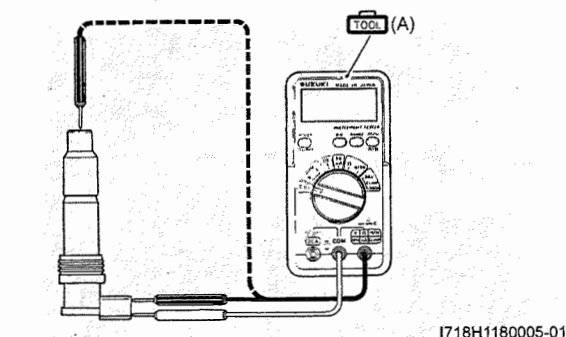
Tester knob indication

Resistance (Ω)

Ignition coil resistance

Primary: 1.1 – 1.5 Ω at 20 °C (68 °F) ((+) terminal – (–) terminal)

Secondary: 6.4 – 9.6 k Ω at 20 °C (68 °F) (Spark plug cap – (–) terminal)



- 3) After measuring the ignition coil/plug cap resistance, reinstall the removed parts.

CKP Sensor Inspection

BENB15J21806004

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

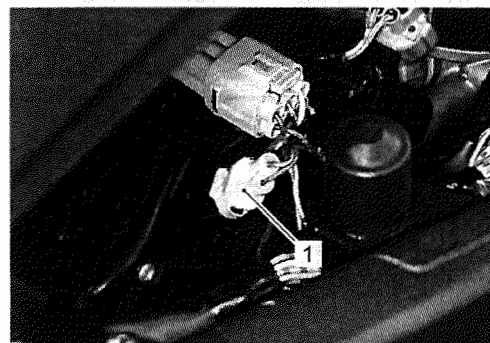
CKP Sensor Peak Voltage

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).

- 2) Disconnect the CKP sensor coupler (1).

NOTE

Be sure that all of the couplers are connected properly and the battery is fully-charged.



- 3) Connect the multi circuit tester with the peak volt adaptor as follows.

NOTE

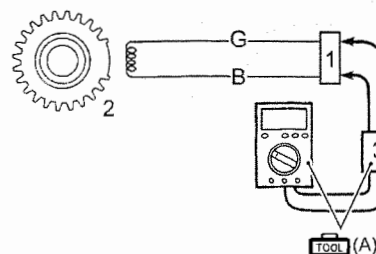
Before using the multi circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.

Special tool

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

Tester knob indication: Voltage (V)

CKP sensor	(+) Probe	(–) Probe
	B	G



1. CKP sensor coupler	3. Peak voltage adaptor
2. CKP sensor	

- 4) Measure the CKP sensor peak voltage in the following procedures:
 - a) Shift the transmission into neutral, turn the ignition switch ON and grasp the clutch lever.
 - b) Press the starter button and allow the engine to crank for a few seconds, and then measure the CKP sensor peak voltage.

1H-10 Ignition System:

- 5) Repeat the b) procedure several times and measure the highest CKP sensor peak voltage.

CKP sensor peak voltage

0.28 V and more (B – G)

- 6) If the peak voltage is within the specification, check the continuity between the CKP sensor coupler and ECM coupler.

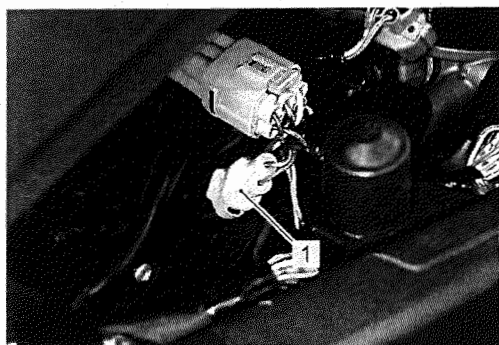
NOTICE

Normally, use the needle-point probe to the backside of the lead wire coupler to prevent the terminal bend and terminal alignment.

- 7) After measuring the CKP sensor peak voltage, connect the CKP sensor coupler.

CKP Sensor Resistance

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Disconnect the CKP sensor coupler (1).



IB14J1110024-01

- 3) Measure the resistance between the lead wires and ground. If the resistance is not within the standard range, replace the CKP sensor with a new one. Refer to "CKP Sensor Removal and Installation" (Page 1H-10).

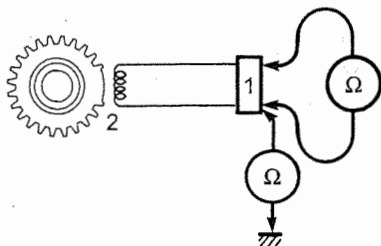
Tester knob indication

Resistance (Ω)

CKP sensor resistance

Approx. 168 Ω (B – G)

∞ Ω (B – Ground)



IB37H1180011-01

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

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

CKP Sensor Removal and Installation

BENB15J21806005

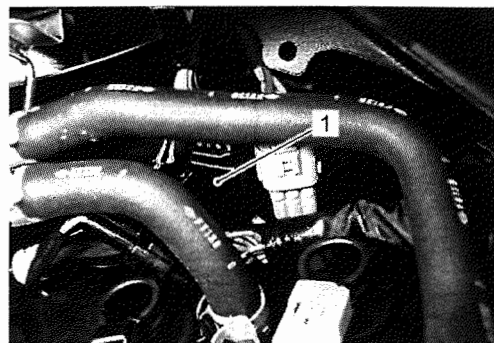
Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).

Engine Stop Switch Inspection

BENB15J21806006

Inspect the engine stop switch in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 3) Disconnect the right handlebar switch coupler (1).



IB14J1180014-02

- 4) Inspect the engine stop switch for continuity with a tester.

If any abnormality is found, replace the right handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity (••••)

Color	O/B	O/W
Position		
OFF (X)		
RUN (•)	○	○

IB15H1180012-01

- 5) After finishing the engine stop switch inspection, reinstall the removed parts.

Ignition Switch Inspection

BENB15J21806007

Refer to "Ignition Switch Inspection" in Section 9C (Page 9C-7).

1. CKP sensor coupler

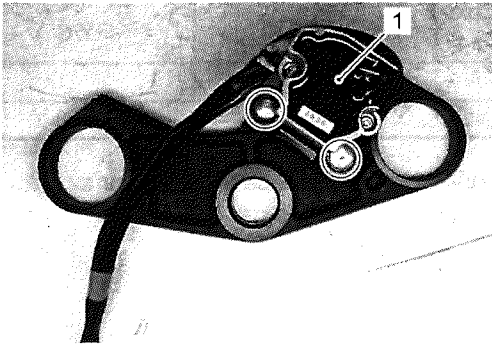
2. CKP sensor

Ignition Switch Removal and Installation (E-21 Only)

BENB15J21806008

Removal

- 1) Remove the steering stem upper bracket. Refer to "Steering / Steering Damper Removal and Installation" in Section 6B (Page 6B-7).
- 2) Using a center punch, remove the ignition switch mounting bolts.
- 3) Remove the ignition switch (1) from the upper bracket.



IB14J1180015-01

Installation

Install the ignition switch in the reverse order of removal. Pay attention to the following points:

- Install the ignition switch and new bolts.
- Tighten each bolt until its head is broken off.

NOTE

The spare ignition switch comes equipped with the special bolts, however, the bolts are also individually available as spare parts.



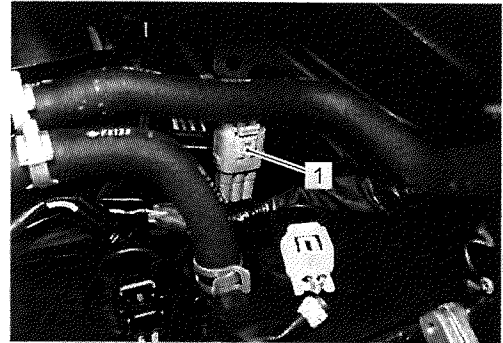
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Ignition Switch Removal and Installation (Except for E-21)

BENB15J21806009

Removal

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 2) Disconnect the ignition switch lead wire coupler (1).
- 3) Disconnect the immobilizer lead wire coupler. (E-24 only)



IB14J1180023-01

- 4) Remove the harness clamp (2).



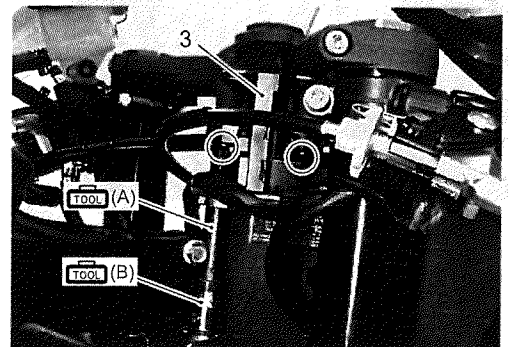
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- 5) Remove the ignition switch (3) with the special tools.

Special tool

TOOL (A): 09930-11920 (Torx® bit (JT40H))

TOOL (B): 09930-11940 (Torx® bit holder (3/8 sq.))



IB14J1180025-01




1H-12 Ignition System:

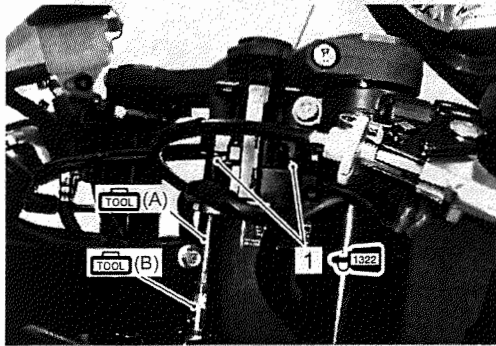
Installation

Install the ignition switch in the reverse order of removal. Pay attention to the following points:

- When reusing the ignition switch bolts, clean the threaded part and apply a thread lock to them.
- Tighten the ignition switch mounting bolts (1) with the special tools.

Special tool

-  (A): 09930-11920 (Torx® bit (JT40H))
-  (B): 09930-11940 (Torx® bit holder (3/8 sq.))
-  : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER “1322” or equivalent)



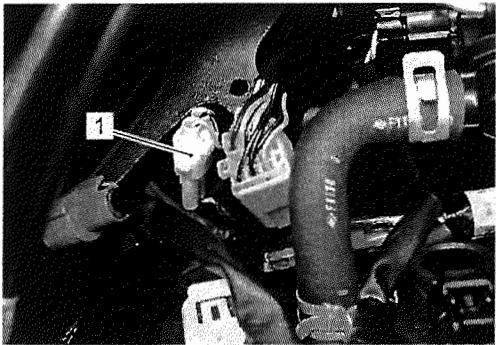
IB14J1180026-02

Drive Mode Selector Switch Inspection

BENB15J21806010

Inspect the drive mode selector switch in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation” in Section 1D (Page 1D-7).
- 3) Disconnect the left handlebar switch coupler (1).



IB14J1180017-02



- 4) Inspect the drive mode selector switch for continuity with a tester.
If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to “Handlebars Removal and Installation” in Section 6B (Page 6B-3).

Special tool

 : 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity (·))

Color Position	B/W	Y/G
·		
PUSH		

IB14J1180029-01

- 5) After finishing the drive mode selector switch inspection, reinstall the removed parts.

Drive Mode Selector Inspection

BENB15J21806011

Inspect the drive mode selector in the following procedures:

- 1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
- 2) Turn the ignition switch ON.
- 3) Click "Data monitor".
- 4) Make sure that the "Driving mode selection 1" on the monitor is indicated "Open".

<input type="checkbox"/> Gear position	N
<input type="checkbox"/> Driving mode selection 1	Open
<input type="checkbox"/> Driving mode selection 2	GND
<input type="checkbox"/> Tip over sensor	Off

IB14J1180021-02

- 5) Push the drive mode selector (1). At this time, if the indication is changed to "GND", the function is normal.

<input type="checkbox"/> Gear position	N
<input type="checkbox"/> Driving mode selection 1	GND
<input type="checkbox"/> Driving mode selection 2	GND
<input type="checkbox"/> Tip over sensor	Off



IB14J1180019-03

Specifications

Service Data

BENB15J21807001

Electrical

Unit: mm (in)

Item	Specification		Note
Firing order	1 · 2 · 4 · 3		
Spark plug	Type	NGK: CR9EIA-9 DENSO: IU27D	
	Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance	Over 8 (0.3) at 1 atm.		
CKP sensor resistance	Approx. 168 Ω at 20 °C (68 °F)		
CKP sensor peak voltage	0.28 V and more		When cranking
Ignition coil resistance	Primary	1.1 – 1.5 Ω at 20 °C (68 °F)	Terminal – Terminal
	Secondary	6.4 – 9.6 k Ω at 20 °C (68 °F)	Plug cap – Terminal
Ignition coil primary peak voltage	80 V and more		When cranking

Tightening Torque Specifications

BENB15J21807002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Spark plug	11	1.1	8.0	☞ (Page 1H-6)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment



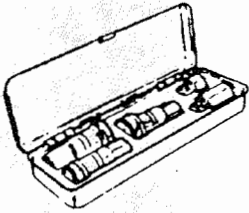
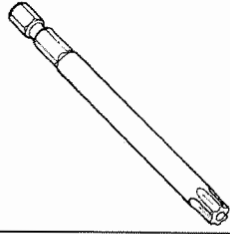
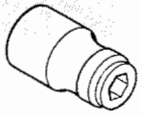
Recommended Service Material

BENB15J21808001

Material	SUZUKI recommended product or Specification	Note
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110 (Page 1H-12)

Special Tool

BENB15J21808002

09900-25008 Multi circuit tester set (Page 1H-8) / (Page 1H-9) / (Page 1H-9) / (Page 1H-10) / (Page 1H-12)		09900-25009 Needle-point probe set (Page 1H-8)	
09930-10121 Spark plug wrench set (Page 1H-6) / (Page 1H-6)		09930-11920 Torx® bit (JT40H) (Page 1H-11) / (Page 1H-12)	
09930-11940 Torx® bit holder (3/8 sq.) (Page 1H-11) / (Page 1H-12)			

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

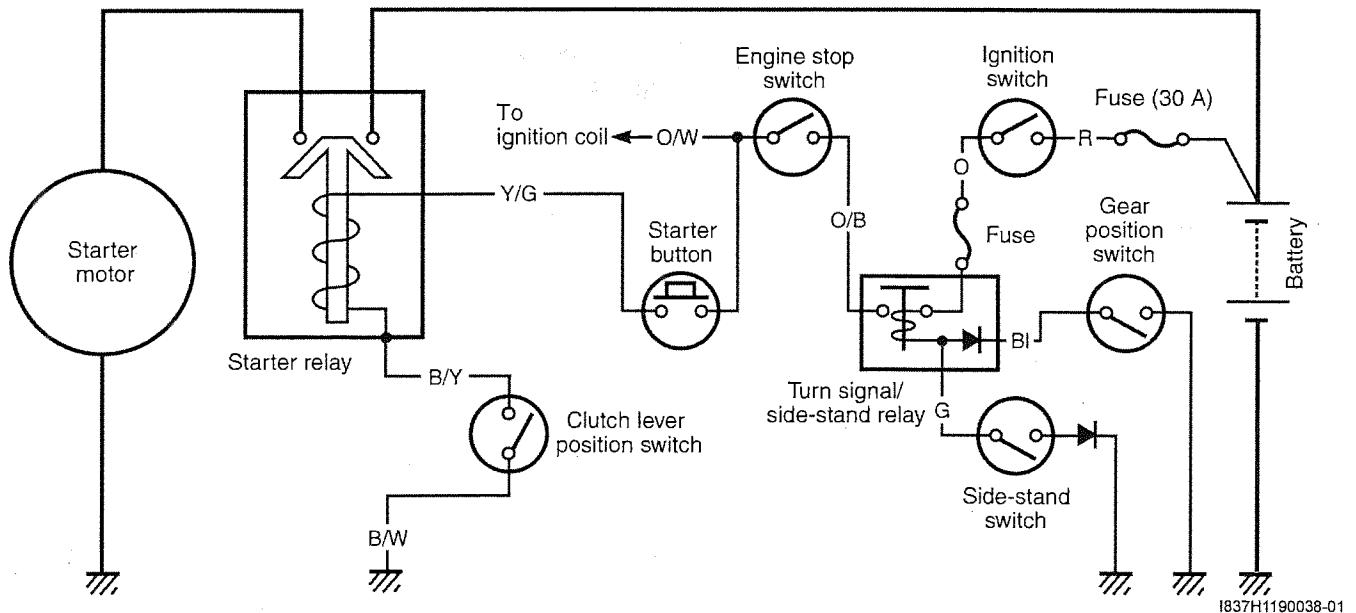
Starting System

Schematic and Routing Diagram

Starting System Diagram

Refer to "Wire Color Symbols" in Section 0A (Page 0A-6).

BENB15J21902001



Component Location

Starting System Components Location

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

BENB15J21903001

Diagnostic Information and Procedures

Starting System Symptom Diagnosis

BENB15J21904001

Condition	Possible cause	Correction / Reference Item
Engine does not turn though the starter motor runs	Faulty starter clutch.	Replace.
Starter button is not effective	Run down battery.	Repair or replace.
	Defective switch contacts.	Replace.
	Brushes not seating properly on starter motor commutator.	Repair or replace.
	Defective starter relay or starter interlock switch.	Replace.
	Defective main fuse.	Replace.

Starter Motor Will Not Run

BENB15J21904002

NOTE

Make sure the fuses are not blown and the battery is fully-charged before diagnosing.

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.

Is the 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. (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 starter relay voltage at the starter relay terminal (between Y/G (+) and B/Y (-)) 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 gear position switch.
 • Faulty turn signal/side-stand relay.
 • Faulty starter button.
 • Faulty side-stand switch.
 • Poor contact of the coupler.
 • Open circuit in wire harness.

Step 4

Check the starter relay. Refer to "Starter Relay Inspection" (Page 11-7).

Is the starter relay OK?

- Yes Poor contact of the starter relay.
No Faulty starter relay.

Starter Motor Runs But Does Not Crank The Engine

BENB15J21904003

The starter motor runs when the transmission is in neutral, but does not run when the transmission is in any position other than neutral, with the side-stand up.

Step 1

Check the side-stand switch. Refer to "Side-stand / Ignition Interlock System Parts Inspection" (Page 11-8).

Is the side-stand switch OK?

- Yes Go to Step 2.
No Faulty side-stand switch.

Step 2

Check the starter clutch. Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" (Page 11-10).

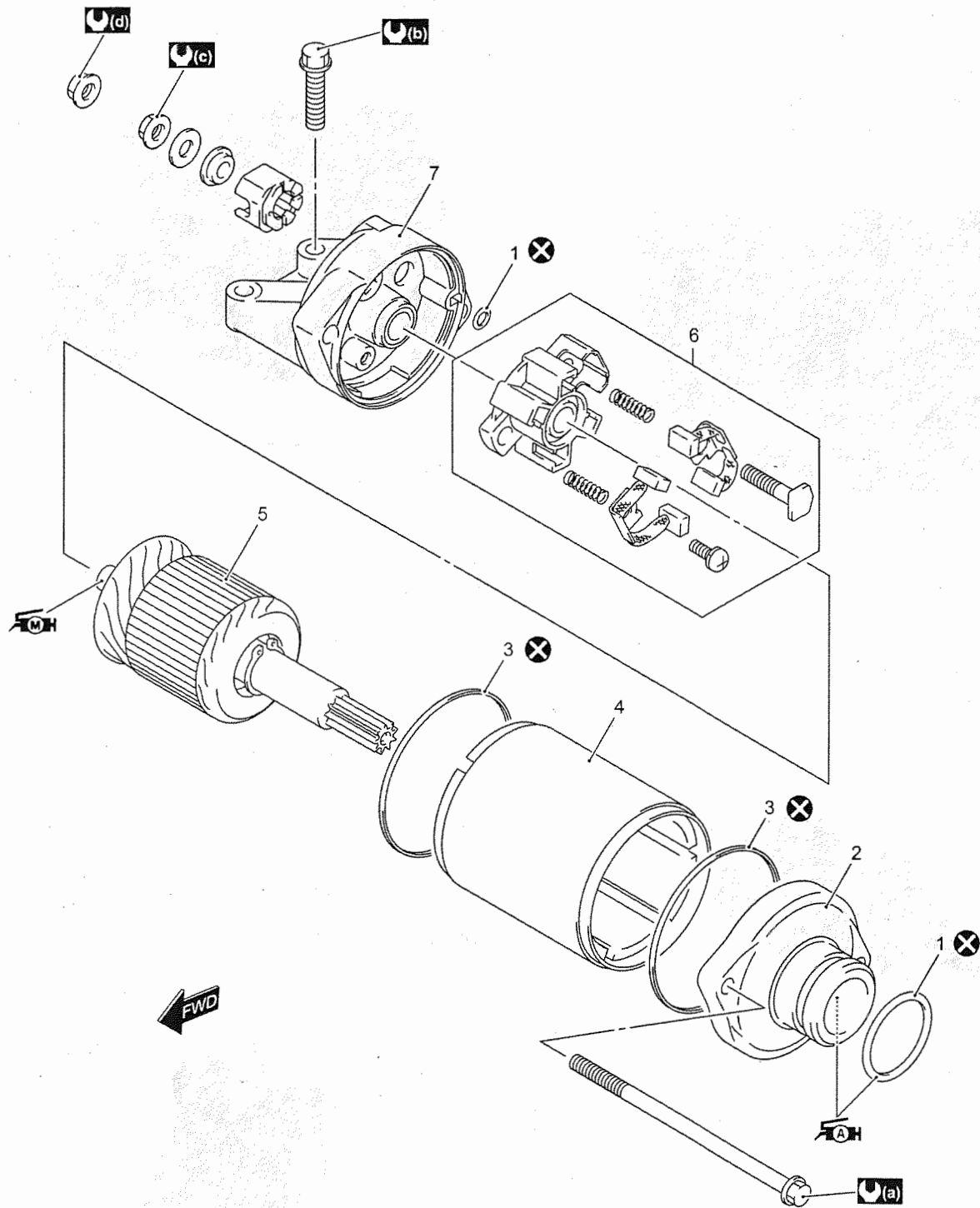
Is the starter clutch OK?

- Yes • Open circuit in wire harness.
 • Poor contact of connector.
- No Faulty starter clutch.

Repair Instructions

Starter Motor Components

BENB15J21906001



IB14J1190037-01

1. O-ring	6. Brush holder set	(d) : 6 N-m (0.6 kgf-m, 4.5 lbf-ft)
2. Housing end (Inside)	7. Housing end (Outside)	AH : Apply grease.
3. Square ring	(a) : 5 N-m (0.5 kgf-m, 3.5 lbf-ft)	AH : Apply moly paste to sliding surface.
4. Starter motor case	(b) : 10 N-m (1.0 kgf-m, 7.0 lbf-ft)	⊗ : Do not reuse.
5. Armature	(c) : 11 N-m (1.1 kgf-m, 8.0 lbf-ft)	

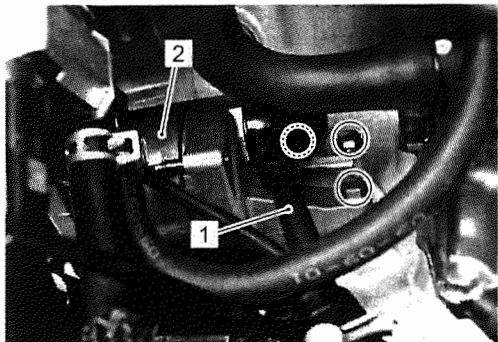
11-4 Starting System:

Starter Motor Removal and Installation

BENB15J21906002

Removal

- 1) Turn the ignition switch OFF and disconnect the battery (–) lead wire. Refer to “Battery Removal and Installation” in Section 1J (Page 1J-13).
- 2) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation” in Section 1G (Page 1G-9).
- 3) Disconnect the starter motor lead wire (1).
- 4) Remove the starter motor (2).




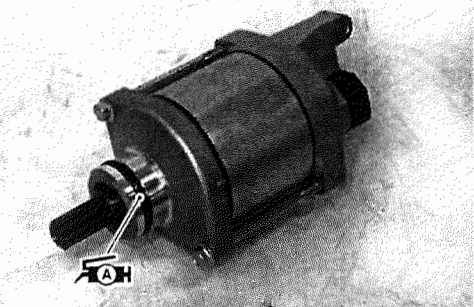
IB14J1190001-03

Installation

Install the starter motor in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new O-ring and install it.

 **Grease 99000–25010 (SUZUKI SUPER GREASE “A” or equivalent)**



IB14J1190002-01

- Tighten the starter motor mounting bolts (1) to the specified torque.

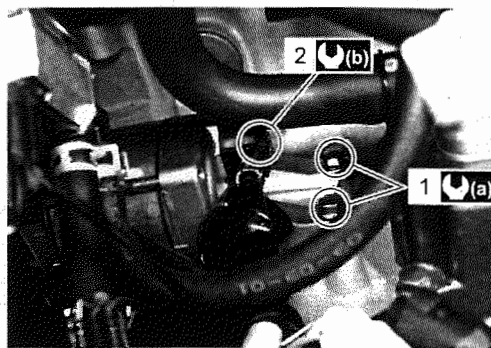
Tightening torque

Starter motor mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

- Route the starter motor lead wire and tighten the mounting bolt (2) to the specified torque. Refer to “Wiring Harness Routing Diagram” in Section 9A (Page 9A-5).

Tightening torque

Starter motor lead wire mounting nut (b): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



IB14J1190003-02

Starter Motor Disassembly and Assembly

BENB15J21906003

Refer to “Starter Motor Removal and Installation” (Page 11-4).

Disassembly

Disassemble the starter motor as shown in the starter motor components diagram. Refer to “Starter Motor Components” (Page 11-3).

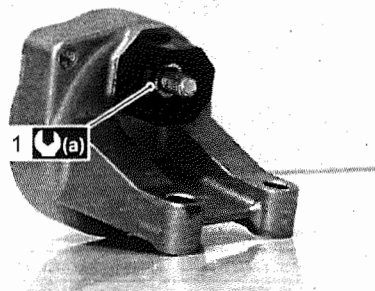
Assembly

Reassemble the starter motor in the reverse order of removal. Pay attention to the following points:

- Replace the O-rings and square rings with new ones.
- Tighten the starter motor brush holder nut (1) to the specified torque.


Tightening torque

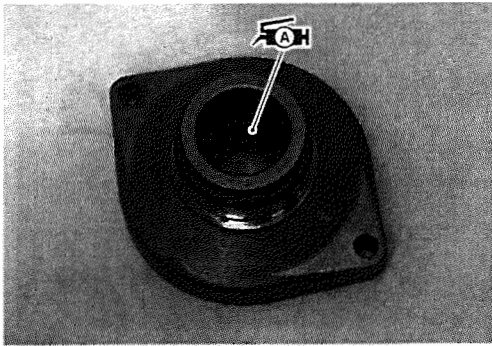
Starter motor brush holder nut (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)



IB14J1190036-01


- Apply grease to the lip of the oil seal.

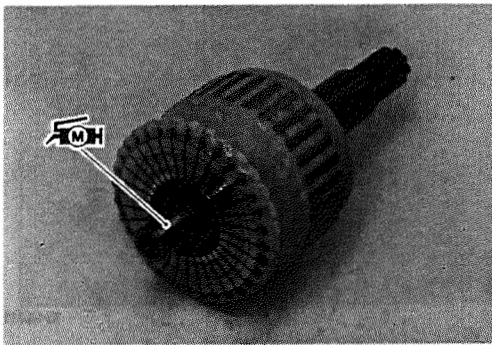
 **TOH : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**



IB14J1190004-01

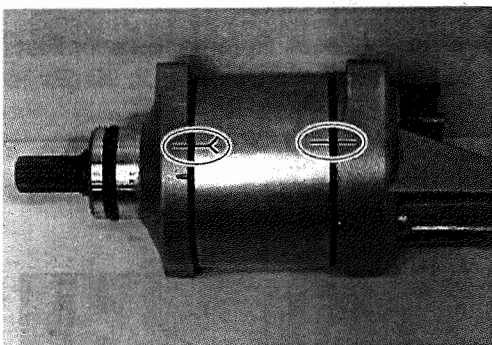
- Apply a small quantity of moly paste to the armature shaft.

 **TOH : Moly paste 99000-25140 (SUZUKI MOLY PASTE or equivalent)**



IB14J1190005-01

- Align the match marks on the starter motor case with the match mark on each housing end.

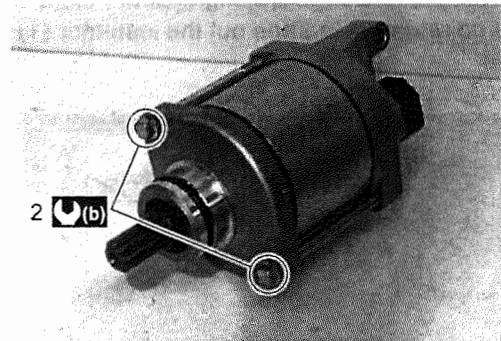


IB14J1190006-01

- Tighten the starter motor housing bolts (2) to the specified torque.

Tightening torque

Starter motor housing bolt (b): 5 N·m (0.5 kgf-m, 3.5 lbf-ft)



IB14J1190007-02

Starter Motor Inspection

BENB15J21906004

Refer to "Starter Motor Disassembly and Assembly" (Page 11-4).

Carbon Brush

Inspect the carbon brushes for abnormal wear, cracks or smoothness in the brush holder.

If either carbon brush is defective, replace the brush holder set with a new one.

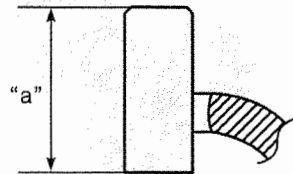
Measure the length "a" of the carbon brushes using a vernier calipers. If the measurement is less than the service limit, replace the brush holder set with a new one.

Brush length "a"

Service limit: 6.5 mm (0.26 in)

Special tool

 **TOOL : 09900-20102 (Vernier calipers (200 mm))**



IB14J1190008-01

11-6 Starting System:

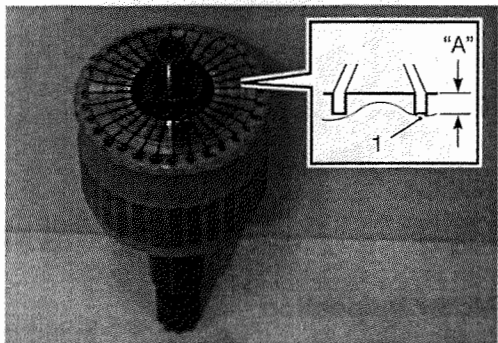
Commutator

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.



IB14J1190009-01

Armature Coil

Inspect for continuity between each segment.

Inspect for continuity between each segment and the armature shaft.

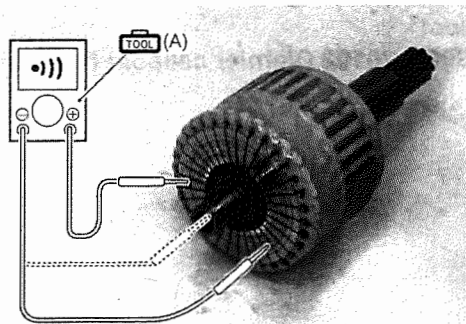
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

Special tool

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

Tester knob indication

Continuity set (•)))

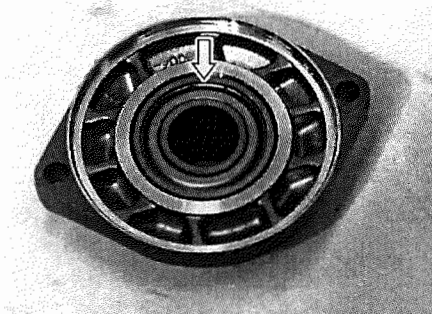


IB14J1190010-01

Bearing

Check the bearing for damage.

If any damage is found, replace the housing end.

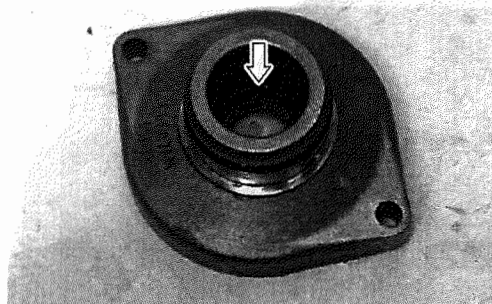


IB14J1190011-01

Oil Seal

Check the seal lip for damage.

If any damage is found, replace the housing end.



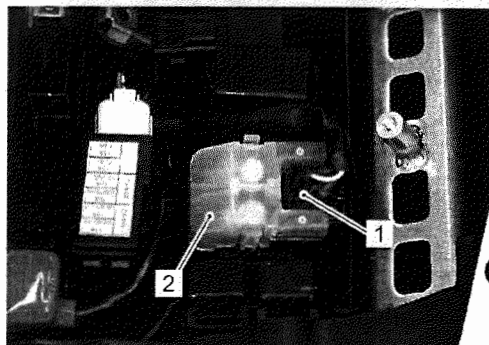
IB14J1190012-01

Starter Relay Removal and Installation

BENB15J21906005

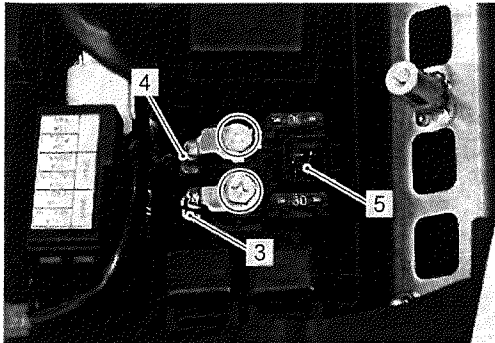
Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Disconnect the battery (-) lead wire from the battery.
- 4) Disconnect the starter relay coupler (1) and remove the starter relay cover (2).



IB14J1190013-01

- 5) Disconnect the starter motor lead wire (3) and battery (+) lead wire (4).
- 6) Remove the starter relay (5).



IB14J1190014-01

Installation

Install the starter relay in the reverse order of removal.

Starter Relay Inspection

BENB15J21906006

Inspect the starter relay in the following procedures:

- 1) Remove the starter relay. Refer to "Starter Relay Removal and Installation" (Page 11-6).
- 2) Apply 12 V to "A" and "B" terminals and check for continuity between the positive and negative terminals using the multi circuit tester. If the starter relay clicks and continuity is found, the relay is ok.

NOTICE

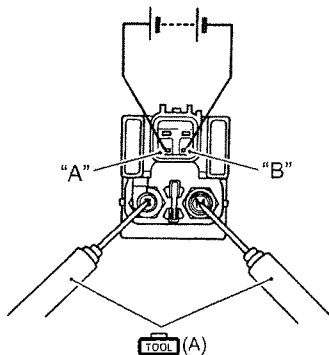
Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.

Special tool

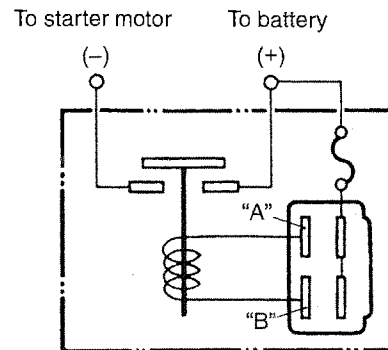
TOOL (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity test (•))



IB14J1190015-01



I823H1190040-02

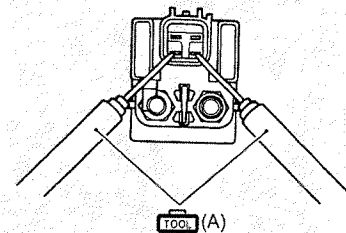
- 3) Measure the relay coil resistance between the terminals using the multi circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

Special tool

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

Starter relay resistance

3 – 6 Ω



IB14J1190016-02

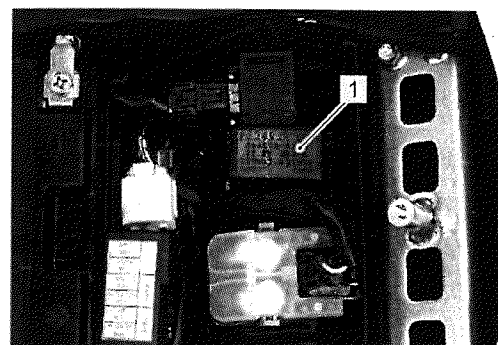
- 4) Install the starter relay. Refer to "Starter Relay Removal and Installation" (Page 11-6).

Turn Signal / Side-stand Relay Removal and Installation

BENB15J21906007

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Remove the turn signal/side-stand relay (1).



IB14J1190017-01

11-8 Starting System:

Installation

Install the turn signal/side-stand relay in the reverse order of removal.

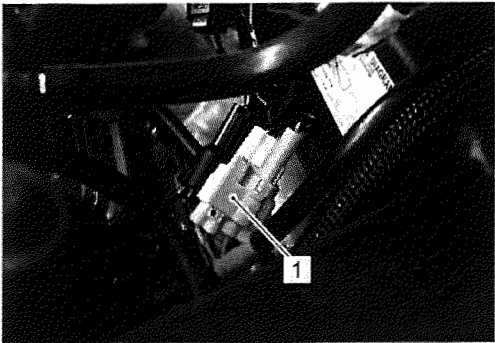
Side-stand / Ignition Interlock System Parts Inspection

BENB15J21906008

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 with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Disconnect the side-stand switch coupler (1).



IB14J1190018-02

- 4) Measure the voltage between G and B/W lead wires.

Special tool

 : 09900-25008 (Multi circuit tester set)

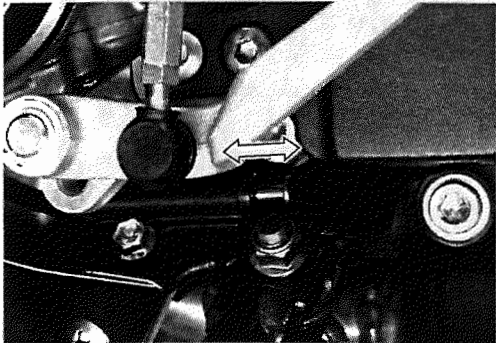
Tester knob indication

Diode test ()

	G (+ probe)	B/W (- probe)
ON (Side-stand up)	0.4 – 0.6 V	
OFF (Side-stand down)	1.4 V and more (Tester's battery voltage)	

NOTE

If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

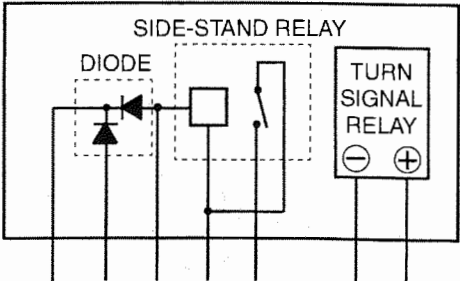


IB14J1190019-01

- 5) Connect the side-stand switch coupler.
- 6) Install the removed parts.

Turn Signal / Side-stand Relay

The turn signal/side-stand relay is composed of the turn signal relay, side-stand relay and diode.



I649G1190027-02

Side-stand relay

- 1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation" (Page 11-7).

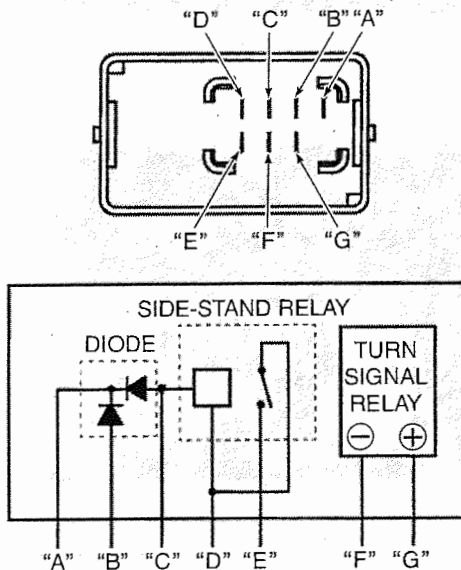
- 2) Check the insulation between "D" and "E" terminals using the multi circuit tester.
- 3) Apply 12 V to terminals "D" and "C" ((+) to "D" and (-) to "C") and check the continuity between "D" and "E". If there is no continuity, replace the turn signal/side-stand relay with a new one.

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity test (•)))



I649G1190028-02

- 4) Install the removed parts.

Diode inspection

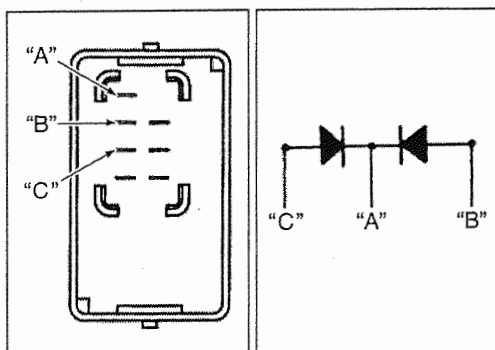
- 1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation" (Page 11-7).
- 2) Measure the voltage between the "A", "B" and "C" terminals using the multi circuit tester.

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

Diode test (+ ←)



I649G1190029-02

Probe of tester to:	⊕ Probe of tester to:		
	"B", "C"	"A"	
	"B", "C"	"A"	
Ⓛ	"B", "C"	—	1.4 V and more (Tester's battery voltage)
	"A"	0.4 – 0.6 V	—

I649G1190046-04

NOTE

If the multi circuit tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

- 3) Install the removed parts.

Gear Position Switch

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Disconnect the gear position switch coupler (1).

NOTICE

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



IB14J1190020-02

- 3) Check the continuity between BI and B/W lead wires with the transmission in "neutral".

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity test (•)))

	BI	B/W
ON (Neutral)	○	○
OFF (Except neutral)		

IB14J1190021-01

- 4) Connect the gear position switch coupler to the wiring harness.
- 5) Insert the needle-point probes to the lead wire coupler.

1I-10 Starting System:

- 6) Turn the ignition switch ON and side-stand to upright position.
- 7) Measure the voltage between P and B/W lead wires using the multi circuit tester when shifting the gearshift lever from low to top.

Special tool

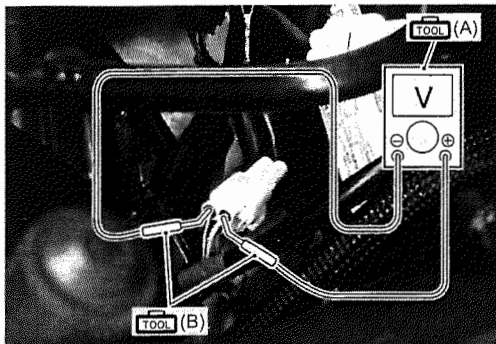
- TOOL (A):** 09900-25008 (Multi circuit tester set)
TOOL (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Voltage (---)

Gear position switch voltage (Except neutral position)

0.6 V and more ((+) P - (-) B/W)



IB14J1190022-02

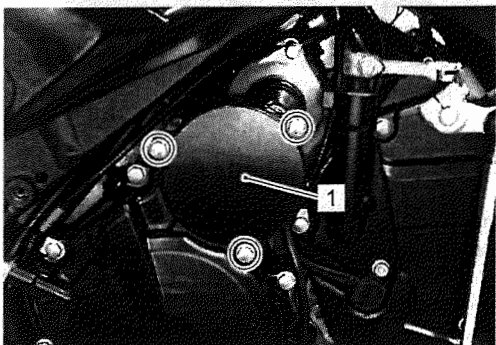
- 8) Turn the ignition switch OFF.
- 9) Install the removed parts.

Starter Idle Gear / Starter Clutch Removal and Installation

BENB15J21906009

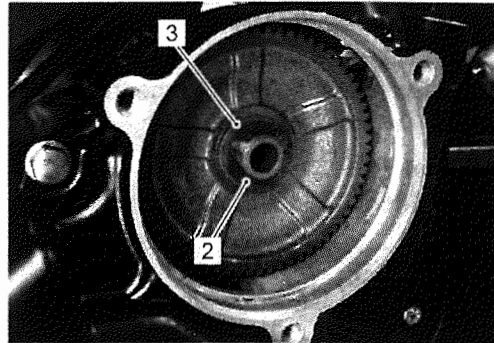
Removal

- 1) Remove the left cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the starter idle gear cover (1).



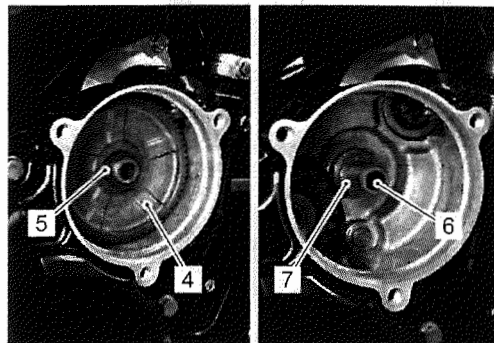
IB14J1190023-01

- 3) Remove the wave washer (2) and washer (3).



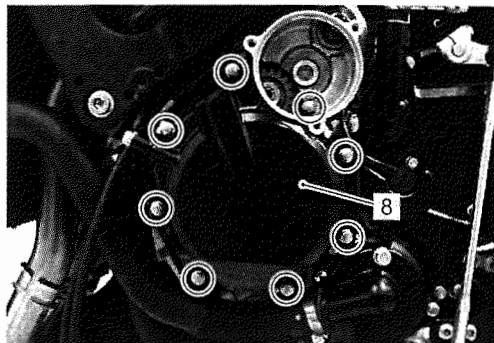
IB14J1190024-01

- 4) Remove the starter idle gear No. 1 (4), bearing (5), shaft (6) and washer (7).



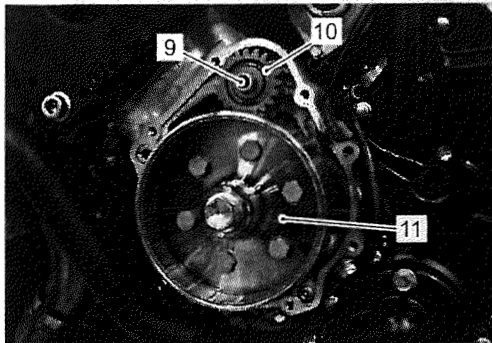
IB14J1190025-02

- 5) Drain engine oil. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- 6) Remove the generator coupler and generator cover (8). Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).



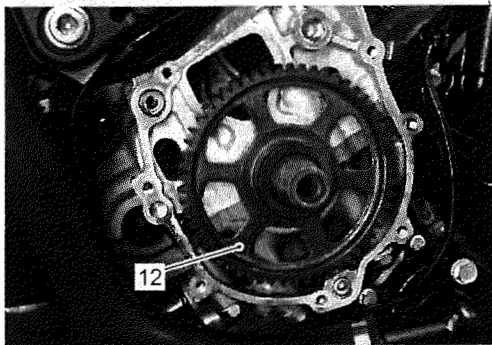
IB14J1190026-01

- 7) Remove the idle gear shaft (9) and starter idle gear No. 2 (10).
- 8) Remove the generator rotor assembly (11). Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).



IB14J1190027-02

- 9) Remove the starter driven gear (12).

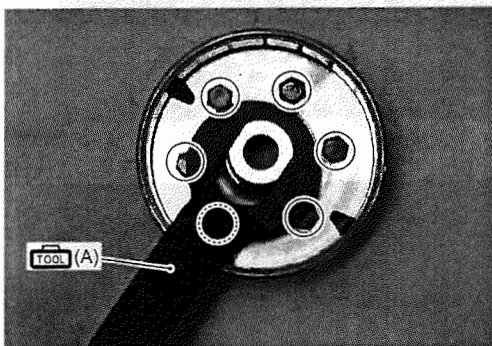


IB14J1190028-01

- 10) Hold the generator rotor with the special tool and remove the starter clutch bolts.

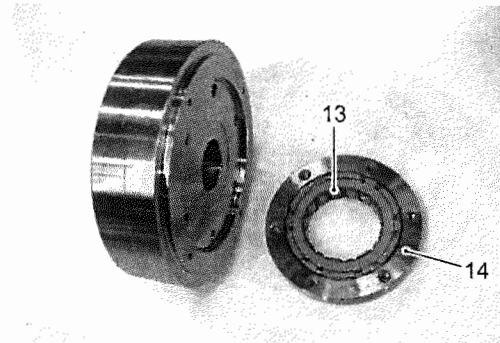
Special tool

TOOL (A): 09930-44521 (Rotor holder)



IB14J1190029-03

- 11) Remove the one way clutch (13) from the starter clutch guide (14).



IB37H1190025-02

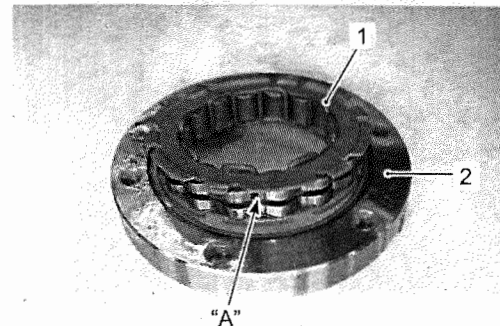
Installation

Install the starter idle gear and starter clutch in the reverse order of removal. Pay attention to the following points:

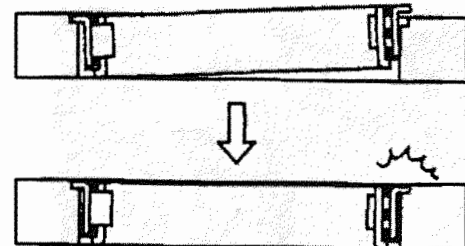
- When inserting the one way clutch (1) into the starter clutch guide (2), fit the flange "A" in the step of the starter clutch guide (2).

NOTE

Be sure to seat the flange "A" of the one way clutch (1) to the starter clutch guide (2).



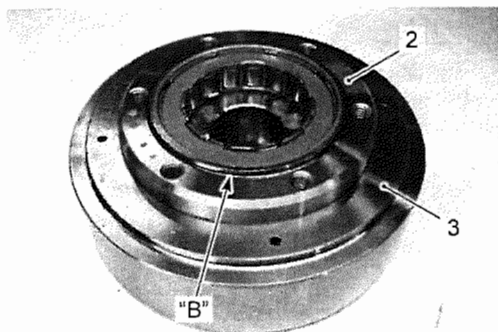
IB37H1190026-01



I718H1190031-01

1I-12 Starting System:

- When installing the starter clutch guide (2) to the generator rotor (3), face the convex part side "B" of the starter clutch guide (2) outside.



IB37H1190027-03

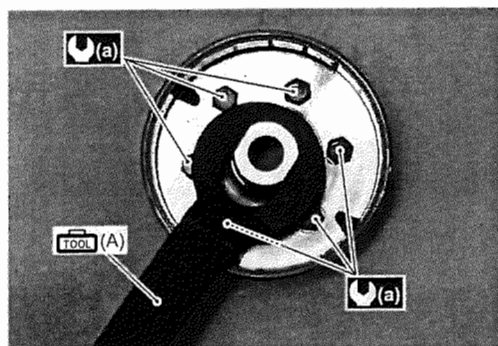
- Degrease the bolt holes.
- Tighten the new precoated starter clutch bolts to the specified torque while holding the rotor with the special tool.

Special tool

TOOL (A): 09930-44521 (Rotor holder)

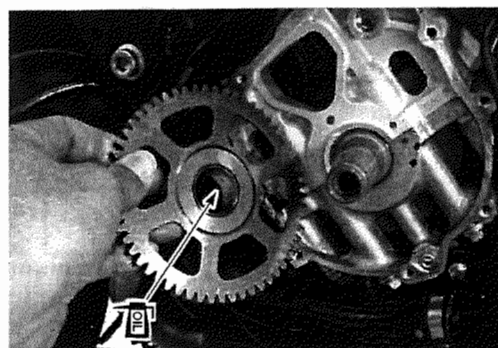
Tightening torque

Starter clutch bolt (a): 15 N·m (1.5 kgf-m, 11.0 lbf-ft)



IB14J1190030-02

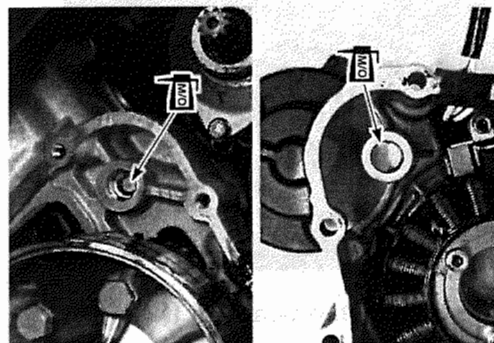
- Apply engine oil to the bushing of the starter driven gear.



IB14J1190031-01

- Install the generator rotor assembly onto crankshaft. Refer to "Generator Removal and Installation" in Section 1J (Page 1J-4).
- Apply molybdenum oil solution to the starter idle gear No. 2 shaft holes.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



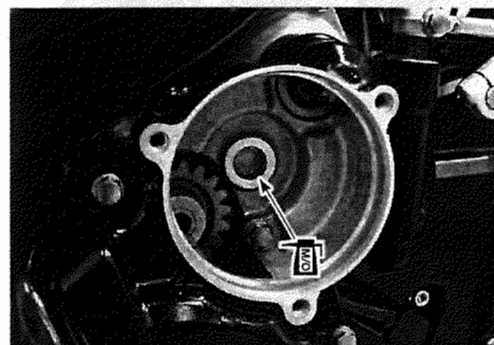
IB14J1190032-02

- Apply molybdenum oil solution to the starter idle gear No. 1 shaft holes.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

- Apply grease to the new O-ring and install it.

FAH: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



IB14J1190033-01



IB14J1190034-02

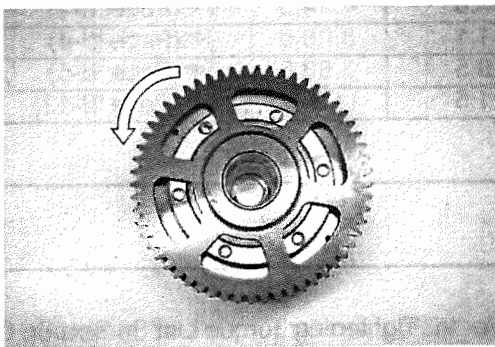
Starter Clutch Inspection

BENB15J21906010

Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" (Page 11-10).

Starter Clutch

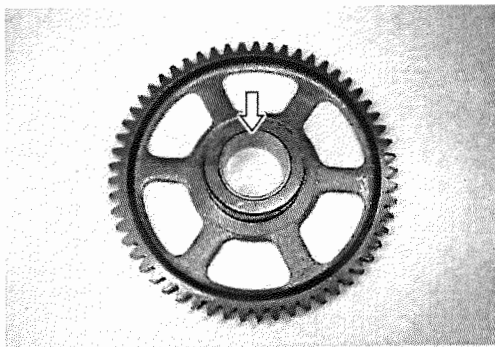
- 1) Install the starter driven gear onto the starter clutch.
- 2) Turn the starter driven gear by hand to inspect the starter clutch for a smooth movement. The gear turns in one direction only. If a large resistance is felt for rotation, inspect the starter clutch or the starter clutch contacting surface on the starter driven gear for wear or damage. If they are found to be damaged, replace them with new ones.



1837H1190034-01

Starter Driven Gear Bearing

Inspect the starter driven gear bearing for wear or damage.



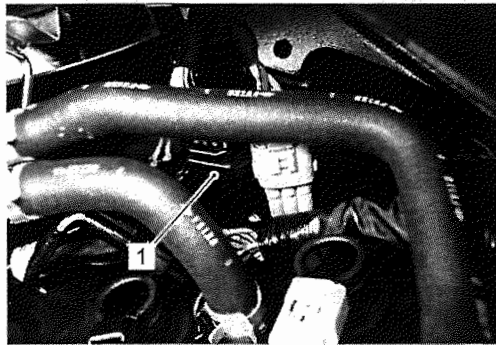
1837H1190033-01

Starter Button Inspection

BENB15J21906011

Inspect the starter button in the following procedures:

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 2) Disconnect the right handlebar switch coupler (1).



1814J1190035-02

- 3) Inspect the starter button for continuity with the tester. If any abnormality is found, replace the right handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity (•))

Color	O/W	Y/G	O/R	Y/W
Position				
•			○	○
PUSH	○	○		

1815H1190019-01

- 4) After finishing the starter button inspection, reinstall the removed parts.

Specifications

Service Data

BENB15J21907001

Electrical

Unit: mm (in)

Item	Specification		Note
Starter motor brush length	Standard	12.0 (0.47)	
	Limit	6.5 (0.26)	
Starter relay resistance	3 – 6 Ω		

Tightening Torque Specifications

BENB15J21907002

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Starter motor mounting bolt	10	1.0	7.0	☞ (Page 11-4)
Starter motor lead wire mounting nut	6	0.6	4.5	☞ (Page 11-4)
Starter motor brush holder nut	11	1.1	8.0	☞ (Page 11-4)
Starter motor housing bolt	5	0.5	3.5	☞ (Page 11-5)
Starter clutch bolt	15	1.5	11.0	☞ (Page 11-12)

NOTE

The tightening torque(s) also specified in:
 “Starter Motor Components” (Page 11-3)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J21908001

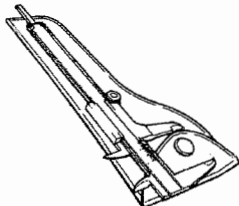
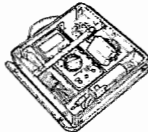
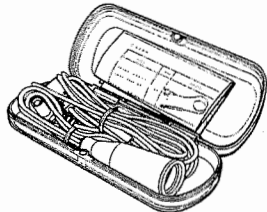
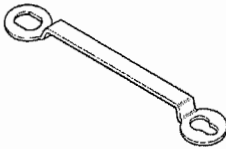
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞ (Page 11-4) / ☞ (Page 11-5) / ☞ (Page 11-12)
Moly paste	SUZUKI MOLY PASTE or equivalent	P/No.: 99000-25140	☞ (Page 11-5)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞ (Page 11-12) / ☞ (Page 11-12)

NOTE

Required service material(s) also described in:
"Starter Motor Components" (Page 11-3)

Special Tool

BENB15J21908002

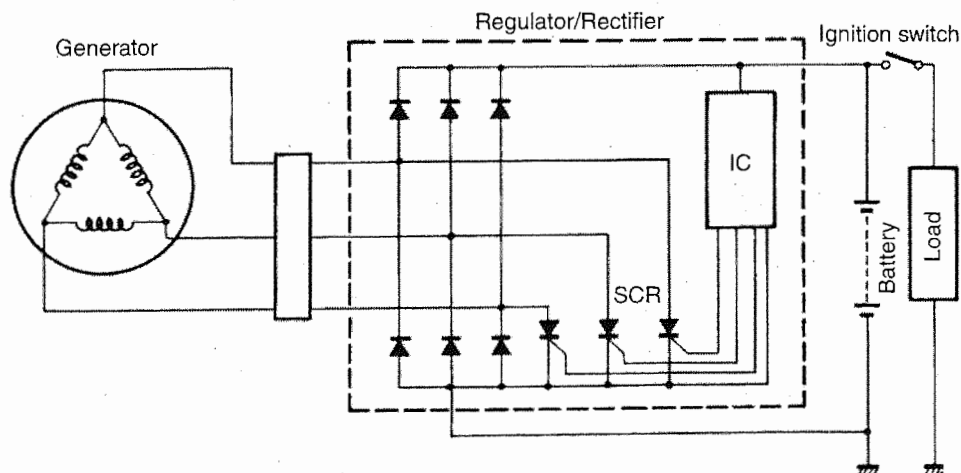
09900-20102 Vernier calipers (200 mm) ☞ (Page 11-5)		09900-25008 Multi circuit tester set ☞ (Page 11-6) / ☞ (Page 11-7) / ☞ (Page 11-7) / ☞ (Page 11-8) / ☞ (Page 11-9) / ☞ (Page 11-9) / ☞ (Page 11-9) / ☞ (Page 11-10) / ☞ (Page 11-13)	
09900-25009 Needle-point probe set ☞ (Page 11-10)		09930-44521 Rotor holder ☞ (Page 11-11) / ☞ (Page 11-12)	

Charging System

Schematic and Routing Diagram

Charging System Diagram

BENB15J21A02001



I718H11A0001-01

Component Location

Charging System Components Location

BENB15J21A03001

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

Diagnostic Information and Procedures

Charging System Symptom Diagnosis

BENB15J21A04001

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.</i>
	Short-circuited or punctured regulator/rectifier.	<i>Replace.</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.</i>
	Defective regulator/rectifier.	<i>Replace.</i>
	Defective cell plates in the battery.	<i>Replace the battery.</i>
Generator overcharges	Internal short-circuit in the battery.	<i>Replace the battery.</i>
	Damaged or defective regulator/rectifier.	<i>Replace.</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.</i>
	Defective regulator/rectifier.	<i>Replace.</i>

Condition	Possible cause	Correction / Reference Item
Battery overcharges	Faulty regulator/rectifier.	Replace.
	Faulty battery.	Replace.
	Poor contact of generator lead wire coupler.	Repair.
Battery runs down quickly	Trouble in charging system.	Check the generator, regulator/rectifier and circuit connections and make necessary adjustments to obtain specified charging operation.
	Cell plates have lost much of their active materials a result of overcharging.	Replace the battery and correct the charging system.
	Internal short-circuit in the battery.	Replace the battery.
	Too low battery voltage.	Recharge the battery fully.
	Too old battery.	Replace the battery.
Battery "sulfation"	Incorrect charging rate. (When not in use battery should be checked at least once a month to avoid sulfation.)	Replace the battery.
	The battery was left unused in a cold climate for too long.	Replace the battery if badly sulfated.

Battery Runs Down Quickly

BENB15J21A04002

Troubleshooting

Step 1

Check accessories which use excessive amounts of electricity.

Are accessories being installed?

Yes Remove accessories.

No Go to Step 2.

Step 2

Check the battery for current leakage. Refer to "Battery Current Leakage Inspection" (Page 1J-3).

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. Refer to "Regulated Voltage Inspection" (Page 1J-3).

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. Refer to "Generator Inspection" (Page 1J-3).

Is the resistance of generator coil OK?

Yes Go to Step 5.

No

- Faulty generator coil.
- Disconnected lead wires.

Step 5

Measure the generator no-load performance. Refer to "Generator Inspection" (Page 1J-3).

Is the generator no-load performance OK?

Yes Go to Step 6.

No Faulty generator.

Step 6

Inspect the regulator/rectifier. Refer to "Regulator / Rectifier Inspection" (Page 1J-10).

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

BENB15J21A06001

Inspect the battery current leakage in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Disconnect the battery (-) lead wire.
- 4) Measure the current between battery (-) terminal and the battery (-) lead wire using the multi circuit tester. If the reading exceeds the specified value, leakage is evident.

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 ON when measuring current.

Special tool

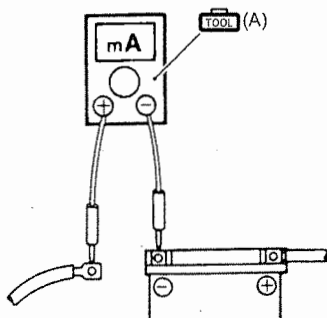
TOOL (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Current (---, 20 mA)

Battery current (Leak)

Under 3 mA



I837H11A0025-01

- 5) Connect the battery (-) lead wire and install the front seat. Refer to "Battery Removal and Installation" (Page 1J-13) and "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

Regulated Voltage Inspection

BENB15J21A06002

Inspect the regulated voltage in the following procedures:

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Start the engine and keep it running at 5 000 r/min with the dimmer switch turned HI position.

- 3) Measure the DC voltage between the battery (+) and (-) terminals using the multi circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier. Refer to "Generator Inspection" (Page 1J-3) and "Regulator / Rectifier Inspection" (Page 1J-10).

NOTE

When making this test, be sure that the battery is in fully charged condition.

Special tool

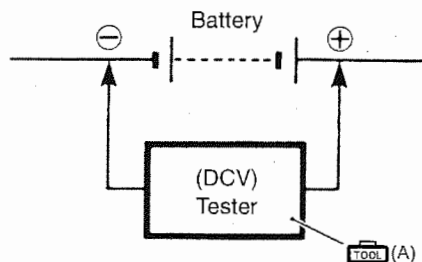
TOOL (A): 09900-25008 (Multi circuit tester set)

Tester knob indication

Voltage (---)

Regulated voltage (Charging output)

Standard: 14.0 – 15.5 V at 5 000 r/min



I837H11A0026-01

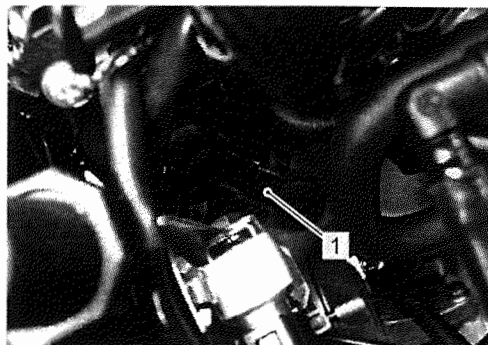
- 4) Install the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

Generator Inspection

BENB15J21A06003

Generator Coil Resistance

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Disconnect the generator coupler (1).



IB14J11A0001-02

- 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.

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

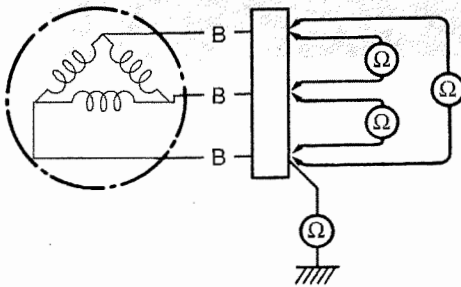
Tester knob indication

Resistance (Ω)

Generator coil resistance

0.2 – 1.0 Ω (B – B)

∞ Ω (B – Ground)



IB14J11A0002-01

- 4) Connect the generator coupler.

- 5) Reinstall the removed parts.

No-load Performance

- 1) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Disconnect the generator coupler (1).



IB14J11A0003-02

- 3) Start the engine and keep it running at 5 000 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 with a new one.

Special tool

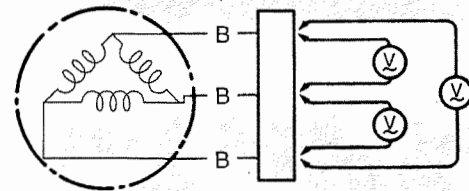
TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

Voltage (\sim)

Generator no-load performance (When engine is cold)

65 V (AC) and more at 5 000 r/min



IB14J11A0004-01

- 5) Connect the generator coupler.

- 6) Reinstall the removed parts.

Generator Removal and Installation

BENB15J21A06004

Removal

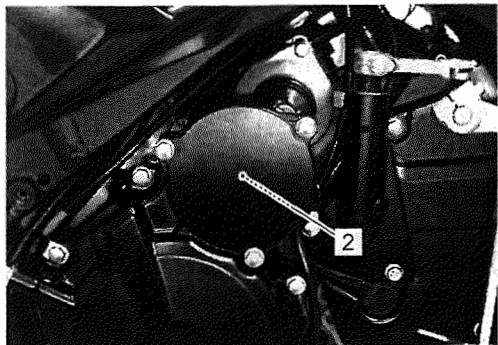
- 1) Drain engine oil. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- 2) Remove the left cowl. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 4) Disconnect the generator coupler (1) and clamp.



IB14J11A0005-02

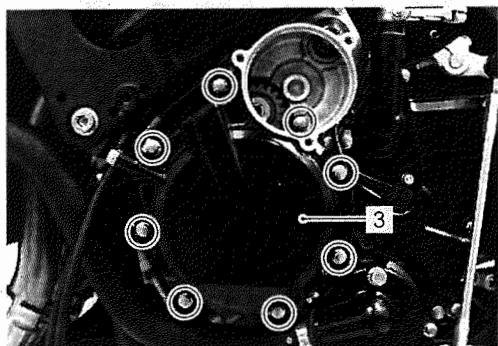
1J-5 Charging System:

- 5) Remove the starter idle gear No. 1 component parts (2). Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).



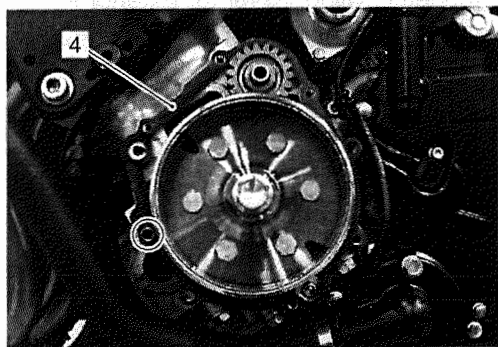
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- 6) Remove the generator cover (3).



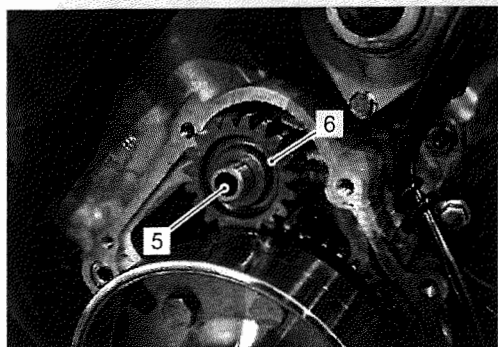
IB14J11A0007-01

- 7) Remove the gasket (4) and dowel pin.



IB14J11A0008-02

- 8) Remove the shaft (5) and starter idle gear No. 2 (6).



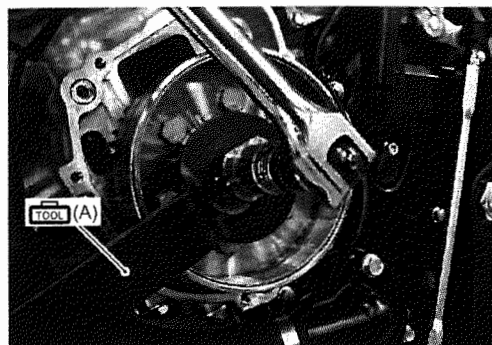
IB14J11A0009-02

- 9) Hold the generator rotor with the special tool.

Special tool

TOOL (A): 09930-44521 (Rotor holder)

- 10) Remove the generator rotor bolt.



IB14J11A0010-03

- 11) Install a bolt "A" of suitable size to the left end of crankshaft.

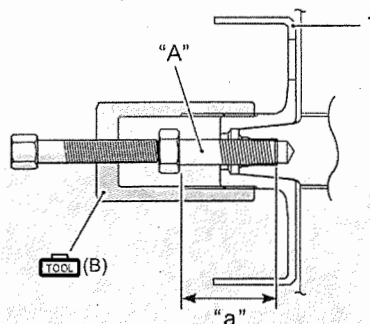
- 12) Remove the generator rotor assembly (7) with the special tool.

NOTE

Remove the starter clutch if necessary. Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).

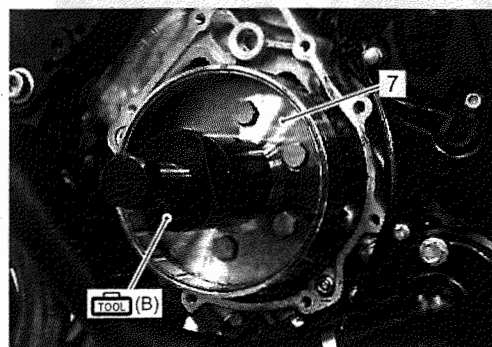
Special tool

TOOL (B): 09930-34980 (Rotor remover)



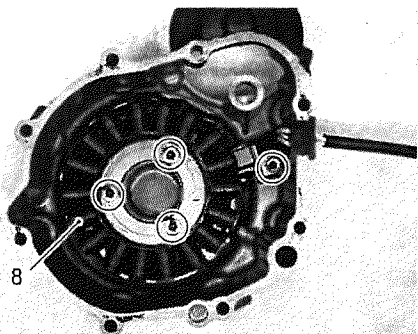
IB37H11A0011-03

"a": M12, length: 28 - 38 mm (1.1 - 1.5 in)



IB14J11A0011-03

13) Remove the generator stator (8).



IB37H11A0013-01

Installation

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

- Tighten the generator stator set bolts and generator lead wire set bolt to the specified torque.

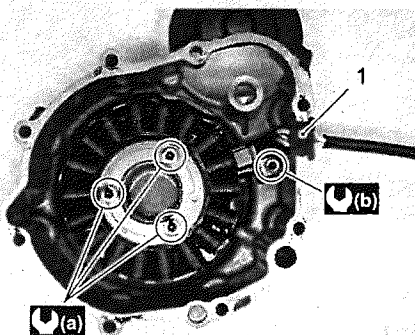
NOTE

Be sure the grommet (1) is set to the generator cover.

Tightening torque

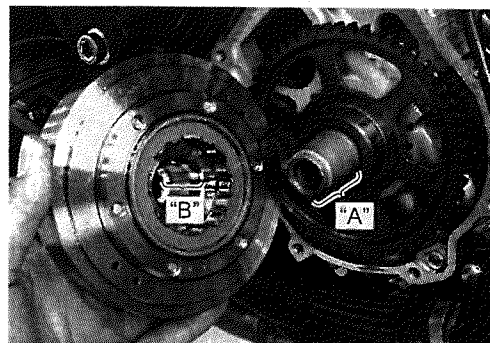
Generator stator set bolt (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

Generator lead wire clamp bolt (b): 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)



IB37H11A0014-02

- Degrease the tapered portion "A" of generator rotor and also the crankshaft "B". Use nonflammable cleaning solvent to wipe off oily or greasy matter and make these surfaces completely dry.
- Install the generator rotor onto crankshaft.



IB14J11A0012-01

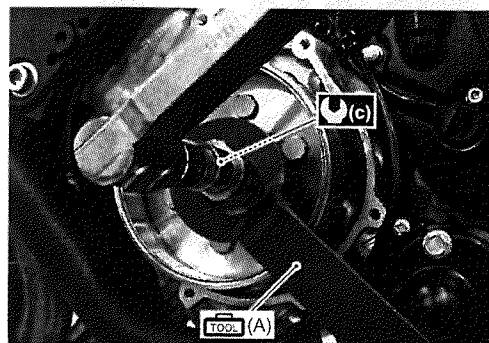
- Hold the generator rotor with the special tool and tighten its bolt to the specified torque.

Special tool

TOOL (A): 09930-44521 (Rotor holder)

Tightening torque

Generator rotor bolt (c): 120 N·m (12.0 kgf-m, 87.0 lbf-ft)

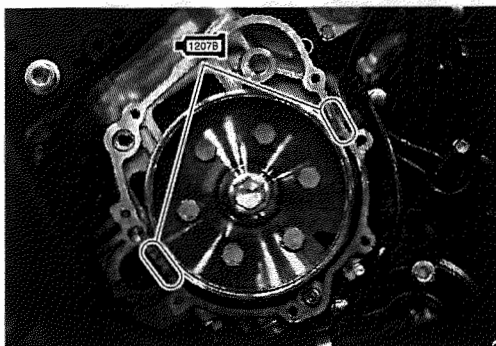


IB14J11A0013-02

1J-7 Charging System:

- Apply a bond lightly to the mating surfaces at the parting line between the upper and lower crankcases as shown.

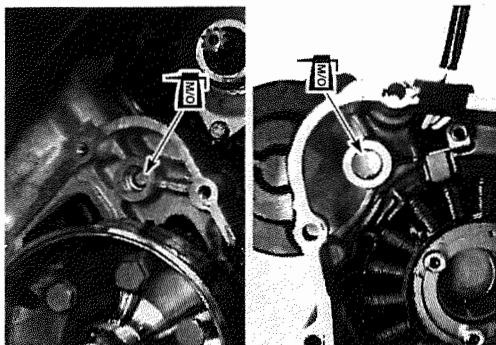
1207B : Sealant 99000-31140 (SUZUKI BOND No.1207B or equivalent)



IB14J11A0014-03

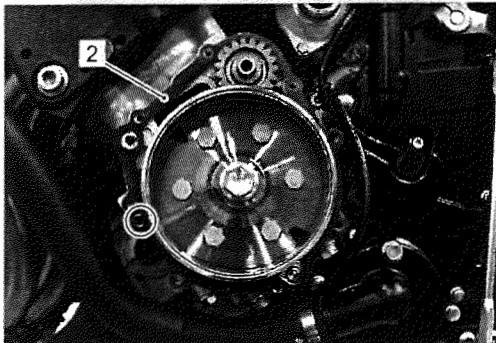
- Apply molybdenum oil solution to the starter idle gear No. 2 shaft holes.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



IB14J11A0015-02

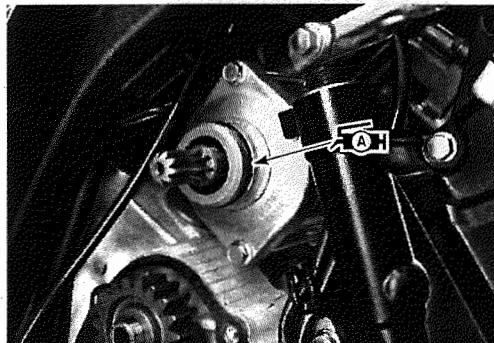
- Install the dowel pin and new gasket (2).



IB14J11A0016-02

- Apply grease to the new starter motor O-ring and install it.

AH : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



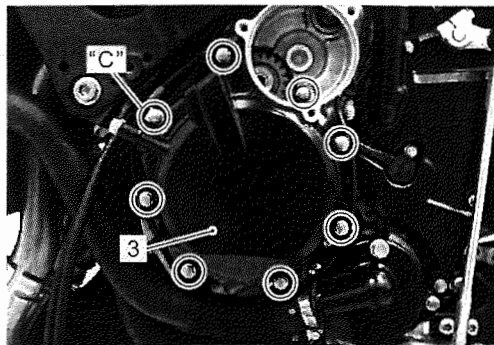
IB14J11A0017-01

- Install the generator cover (3).

⚠ CAUTION

Be careful not to pinch the finger between the generator cover and crankcase.

- Fit the clamp to the generator cover bolt "C".
- Tighten the generator cover bolts.

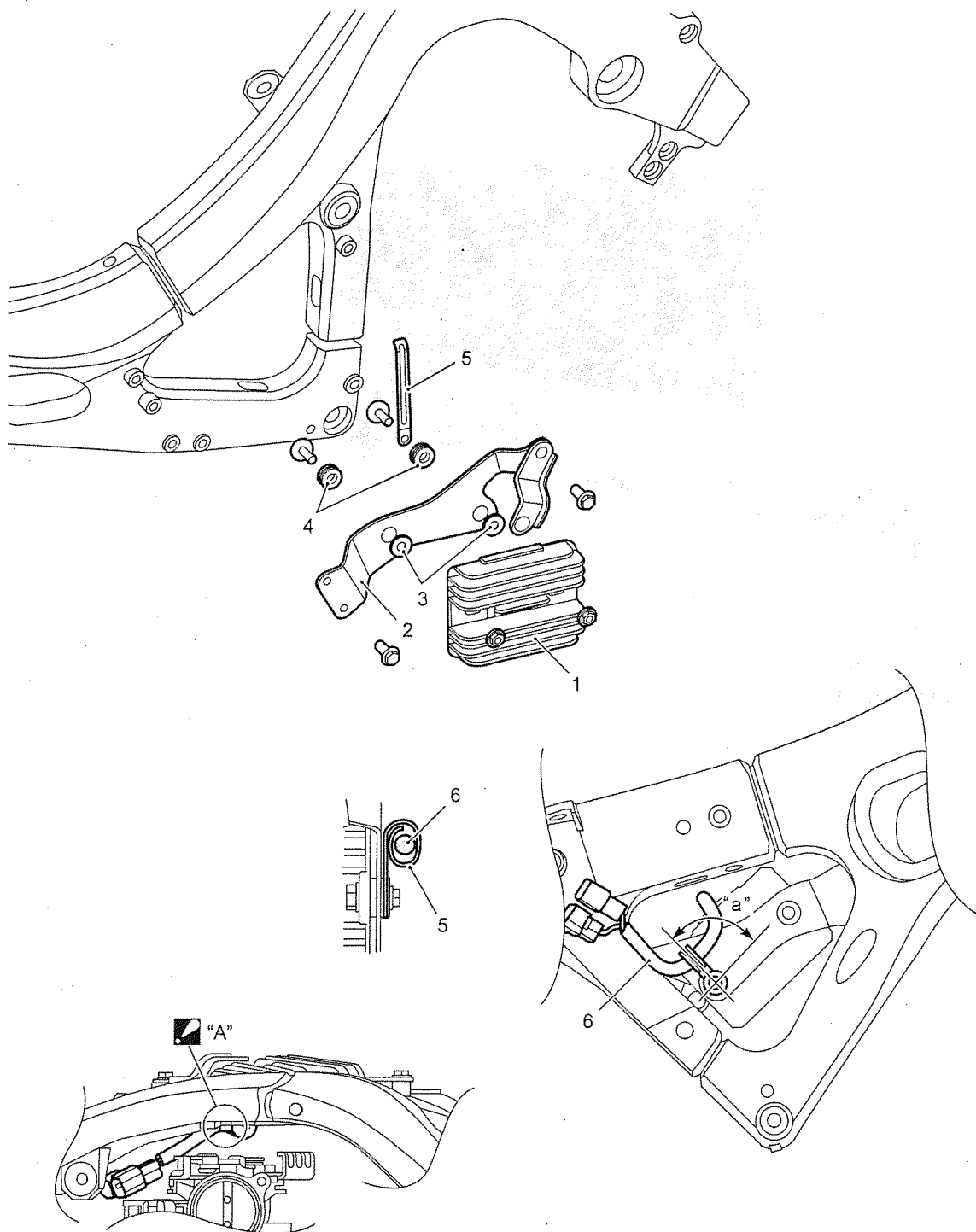


IB14J11A0018-01

- Install the starter idle gear No. 1 component parts. Refer to "Starter Idle Gear / Starter Clutch Removal and Installation" in Section 1I (Page 1I-10).
- Route the generator lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

Regulator / Rectifier Construction

BENB15J21A06005



IB14J11A0023-01

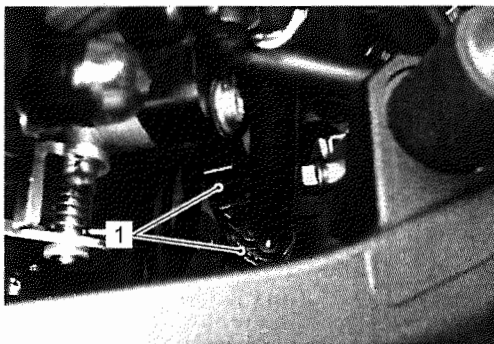
1. Regulator/rectifier	4. Cushion	"A": Make sure that the regulator/rectifier harness does not contact to the throttle body. "a": 90° ± 20°
2. Regulator/rectifier bracket	5. Clamp	
3. Spacer	6. Regulator/rectifier harness	

Regulator / Rectifier Removal and Installation

BENB15J21A06006

Removal

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Disconnect the regulator/rectifier couplers (1).



IB14J11A0019-02

- 4) Remove the left cowling side cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 5) Remove the regulator/rectifier as shown in the regulator/rectifier construction. Refer to "Regulator / Rectifier Construction" (Page 1J-8).

Installation

- 1) Install the regulator/rectifier as shown in the regulator/rectifier construction. Refer to "Regulator / Rectifier Construction" (Page 1J-8).
- 2) Reinstall the removed parts.

Regulator / Rectifier Inspection

Inspect the regulator/rectifier in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Remove the regulator/rectifier. Refer to "Regulator / Rectifier Removal and Installation" (Page 1J-9).
- 3) Measure the voltage between the terminals using the multi circuit testers as indicated in the following table. If the voltage is not within the specified value, replace the regulator/rectifier with a new one. Refer to "Regulator / Rectifier Removal and Installation" (Page 1J-9).


NOTE

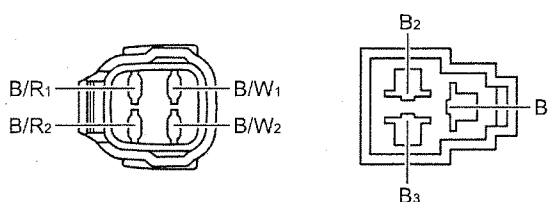
If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

Special tool

 : 09900-25008 (Multi circuit tester set)

Tester knob indication

Diode test ()



IB14J11A0022-02

Unit: V

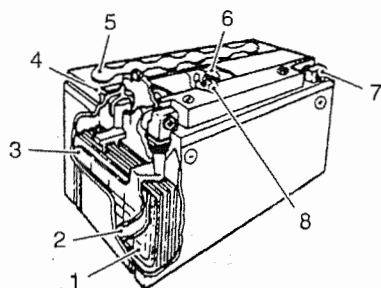
		(+) probe of tester to:						
		B/R ₁	B/R ₂	B ₁	B ₂	B ₃	B/W ₁	B/W ₂
(-) probe of tester to:	B/R ₁	—	0	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.6 – 0.9	0.6 – 0.9
	B/R ₂	0	—	0.3 – 0.6	0.3 – 0.6	0.3 – 0.6	0.6 – 0.9	0.6 – 0.9
	B ₁	*	*	—	*	*	0.3 – 0.6	0.3 – 0.6
	B ₂	*	*	*	—	*	0.3 – 0.6	0.3 – 0.6
	B ₃	*	*	*	*	—	0.3 – 0.6	0.3 – 0.6
	B/W ₁	*	*	*	*	*	—	0
	B/W ₂	*	*	*	*	*	0	—
*1.4 V and more (tester's battery voltage)								

- 4) Connect the regulator/rectifier couplers and bind the clamp.
- 5) Reinstall the removed parts.

1J-11 Charging System:

Battery Components

BENB15J21A06008



I649G11A0046-03

1. Anode plates	5. Stopper
2. Separator (Fiberglass plate)	6. Filter
3. Cathode plates	7. Terminal
4. Upper cover breather	8. Safety valve

Battery Charging

BENB15J21A06009

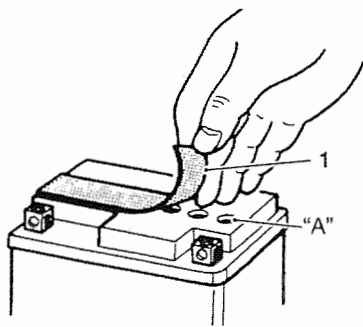
Initial Charging

Filling electrolyte

NOTE

When filling electrolyte, the battery must be removed from the vehicle and must be put on the level ground.

- 1) Remove the aluminum tape (1) which seals the battery filler holes "A".

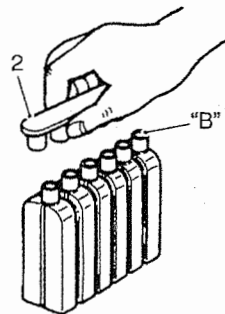


I649G11A0039-03

- 2) Remove the cap (2) from the electrolyte container.

NOTE

- Do not remove or pierce the sealed areas "B" of the electrolyte container.
- After filling the electrolyte completely, use the removed cap (2) as sealing cap of battery-filler holes.

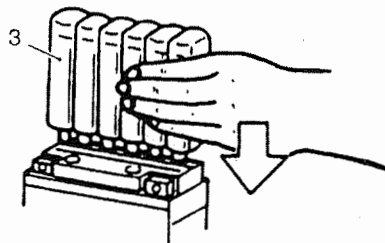


I649G11A0040-03

- 3) Insert the nozzles of the electrolyte container (3) into the electrolyte filler holes of the battery.
- 4) Hold the electrolyte container firmly so that it does not fall.

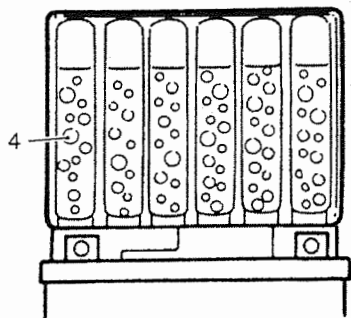
NOTE

Do not allow any of the electrolyte to spill.



I649G11A0041-03

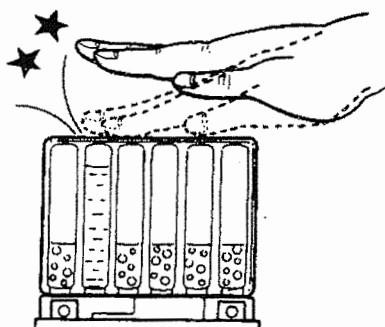
- 5) Make sure that air bubbles (4) rise to the top of each electrolyte container, and leave in this position for about more than 20 minutes.



I649G11A0042-03

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.



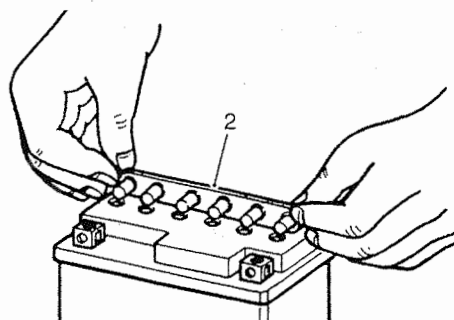
I310G11A0024-01

- 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 cap (2) into the filler holes, pressing in firmly so that the top of the cap do not protrude above the upper surface of the battery's top cover.

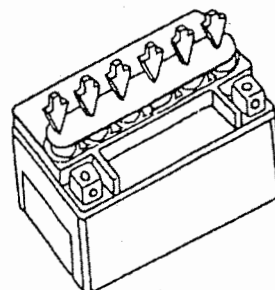
NOTICE

- Once the caps are installed to the battery, do not remove the caps.
- Do not tap the caps with a hammer when installing them.

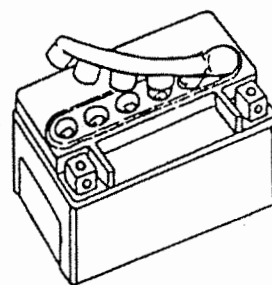


I718H11A0027-01

Correct



Incorrect



I649G11A0047-02

1J-13 Charging System:

Charging

For initial charging, use the charger specially designed for MF battery.

NOTICE

- For charging the battery, make sure to use the charger specially designed for MF battery. Otherwise, the battery may be overcharged resulting in shortened service life.
- Do not remove the cap during charging.
- Position the battery with the cap facing upward during charging.

Battery Recharging

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. Refer to "Battery Removal and Installation" (Page 1J-13).
- 2) Measure the battery voltage using the multi circuit tester.
If the voltage reading is less than the 12 V (DC), recharge the battery with a battery charger.

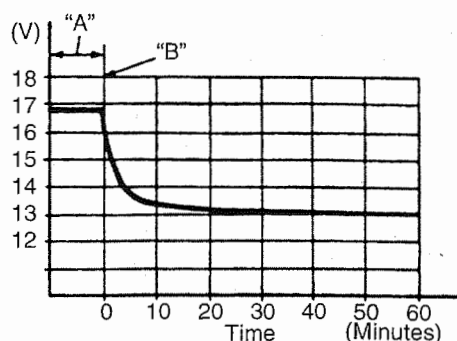
Recharging time

1.2 A for 5 to 10 hours or 5 A for 1 hour

NOTICE

Be careful not to permit the charging current to exceed 5 A at any time.

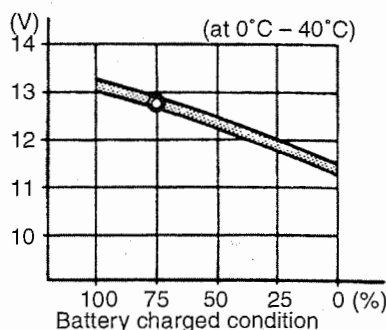
- 3) After recharging, wait at least 30 minutes and then measure the battery voltage using the multi circuit tester.
If the battery voltage is less than 12.5 V, recharge the battery again.
If the battery voltage is still less than 12.5 V after recharging, replace the battery with a new one.



"A": Charging period

"B": Stop charging

- 4) Install the battery to the motorcycle. Refer to "Battery Removal and Installation" (Page 1J-13).



Battery Removal and Installation

BENB15J21A06010

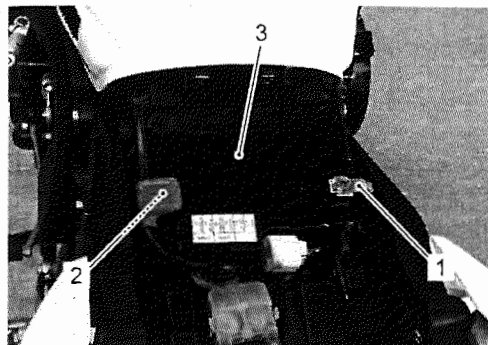
Removal

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Disconnect the battery (-) lead wire (1).
- 3) Disconnect the battery (+) lead wire (2).

NOTE

Be sure to disconnect the battery (-) lead wire (1) first, then disconnect the battery (+) lead wire (2).

- 4) Remove the battery (3) from the motorcycle.



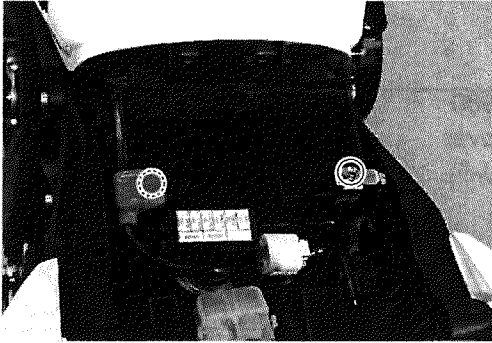
Installation

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

NOTICE

Never use anything except the specified battery.

- Tighten the battery lead wire bolts securely.



IB14J11A0021-01

Battery Visual Inspection

BENB15J21A06011

Inspect the battery in the following procedures:

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 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 front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

Specifications**Service Data**

BENB15J21A07001

Electrical

Item		Specification	Note
Generator coil resistance		0.2 – 1.0 Ω	
Generator maximum output		Approx. 400 W at 5 000 r/min	
Generator no-load voltage (When engine is cold)		65 V (AC) and more at 5 000 r/min	
Regulated voltage		14.0 – 15.5 V at 5 000 r/min	
Battery	Type designation	FT-12A-BS	
	Capacity	12 V 36.0 kC (10 Ah)/10 HR	
	Standard electrolyte S.G.	1.320 at 20 °C (68 °F)	

NOTICE

Never use anything except the specified battery.

Tightening Torque Specifications

BENB15J21A07002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Generator stator set bolt	11	1.1	8.0	☞ (Page 1J-6)
Generator lead wire clamp bolt	5.5	0.55	4.0	☞ (Page 1J-6)
Generator rotor bolt	120	12.0	87.0	☞ (Page 1J-6)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment

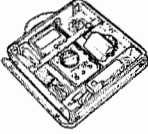
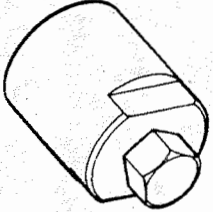
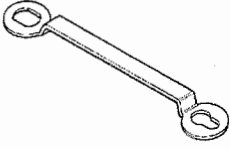
Recommended Service Material

BENB15J21A08001

Material	SUZUKI recommended product or Specification	Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010 ☞ (Page 1J-7)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	— ☞ (Page 1J-7)
Sealant	SUZUKI BOND No.1207B or equivalent	P/No.: 99000-31140 ☞ (Page 1J-7)

Special Tool

BENB15J21A08002

09900-25008 Multi circuit tester set ☞ (Page 1J-3) / ☞ (Page 1J-3) / ☞ (Page 1J-4) / ☞ (Page 1J-4) / ☞ (Page 1J-10)		09930-34980 Rotor remover ☞ (Page 1J-5)	
09930-44521 Rotor holder ☞ (Page 1J-5) / ☞ (Page 1J-6)			

Exhaust System

Precautions

Precautions for Exhaust System

BENB15J21B00001

▲ WARNING

To avoid the risk of being burned, do not touch the exhaust system when the system is hot. Any service on the exhaust system should be performed when the system is cool.

NOTICE

Make sure that the exhaust pipes and muffler have enough clearance from the rubber parts and plastic parts to avoid melting.

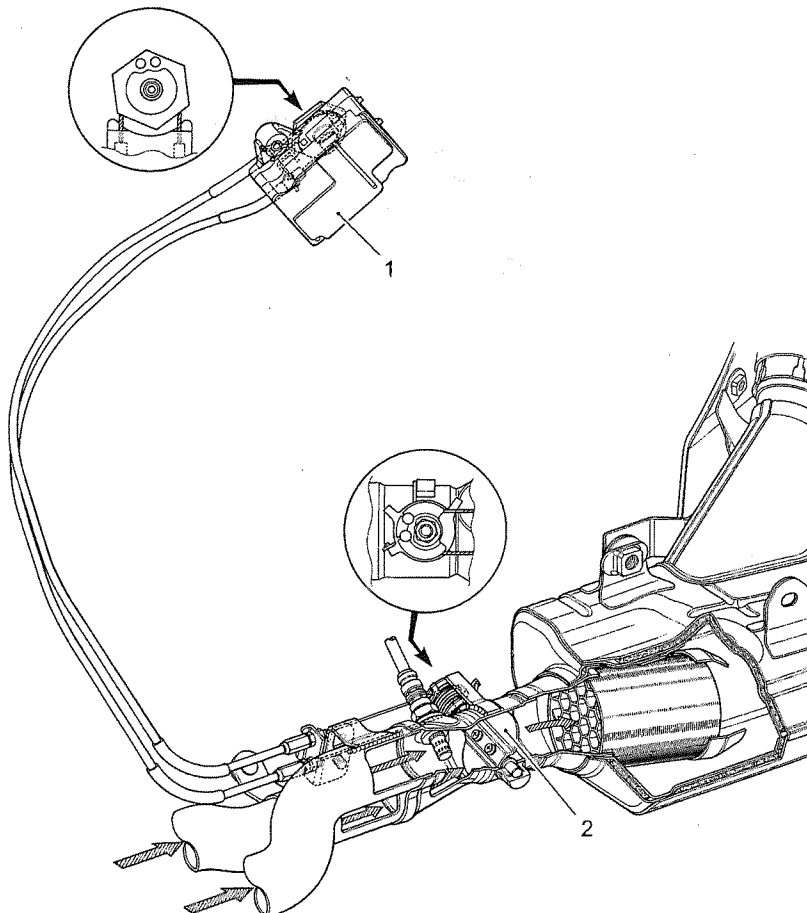
General Description

Exhaust Control System Description

BENB15J21B01001

The exhaust control system (EXCS) consists of the exhaust control valve (EXCV), exhaust control valve actuator (EXCVA) and exhaust control valve cables (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)

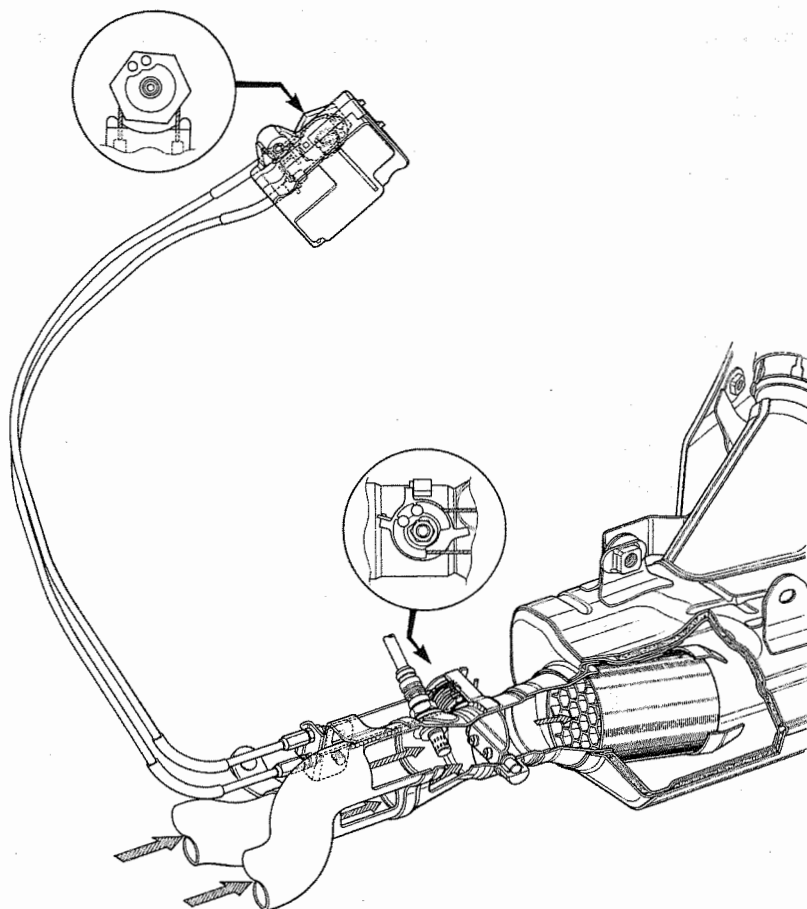
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Exhaust Control System Operation

BENB15J21B01002

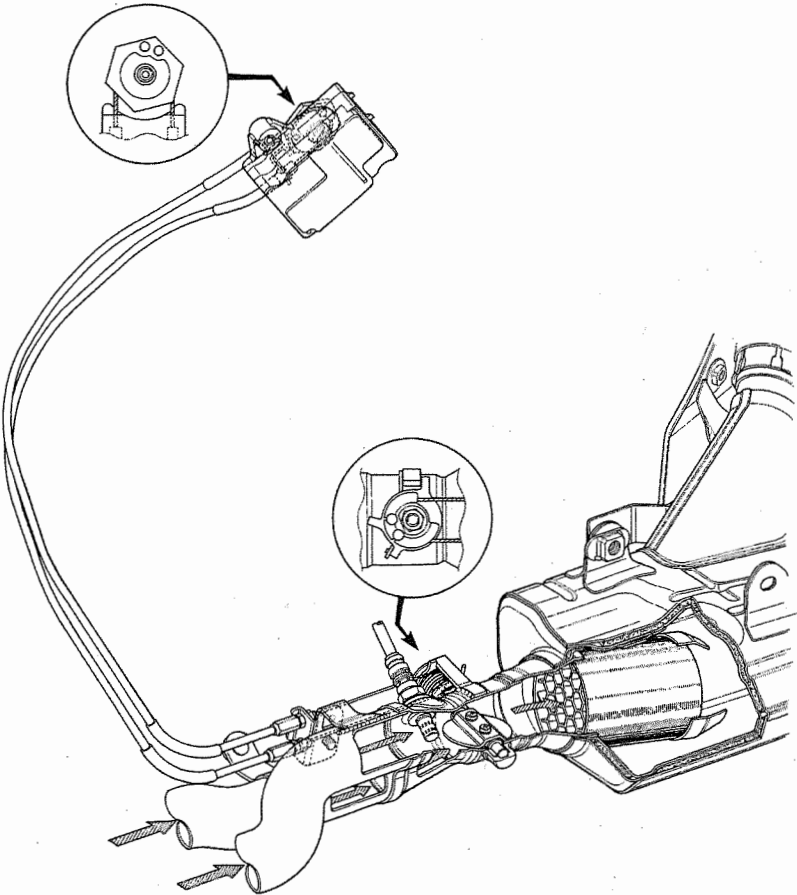
The EXCS is operated by the signal supplied from the ECM. The open/close operation of the EXCV is performed by the EXCVA which is controlled by the ECM by changing the current direction of the actuator motor. The position sensor (incorporated in the EXCVA) detects the EXCVA movement by measuring the 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



IB14J11B0040-01

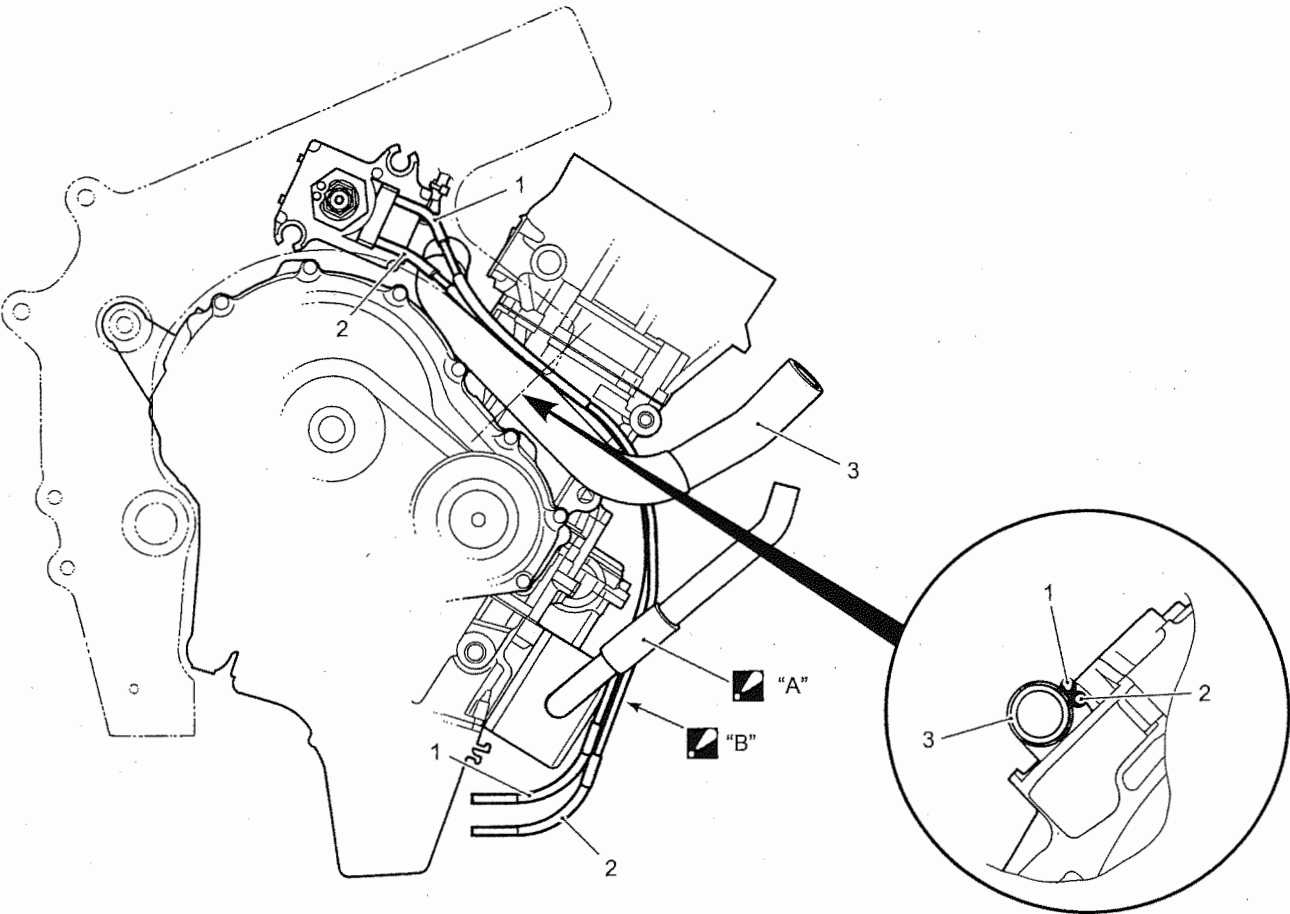
FULL OPEN



Schematic and Routing Diagram

EXCV Cable Routing Diagram

BENB15J21B02001



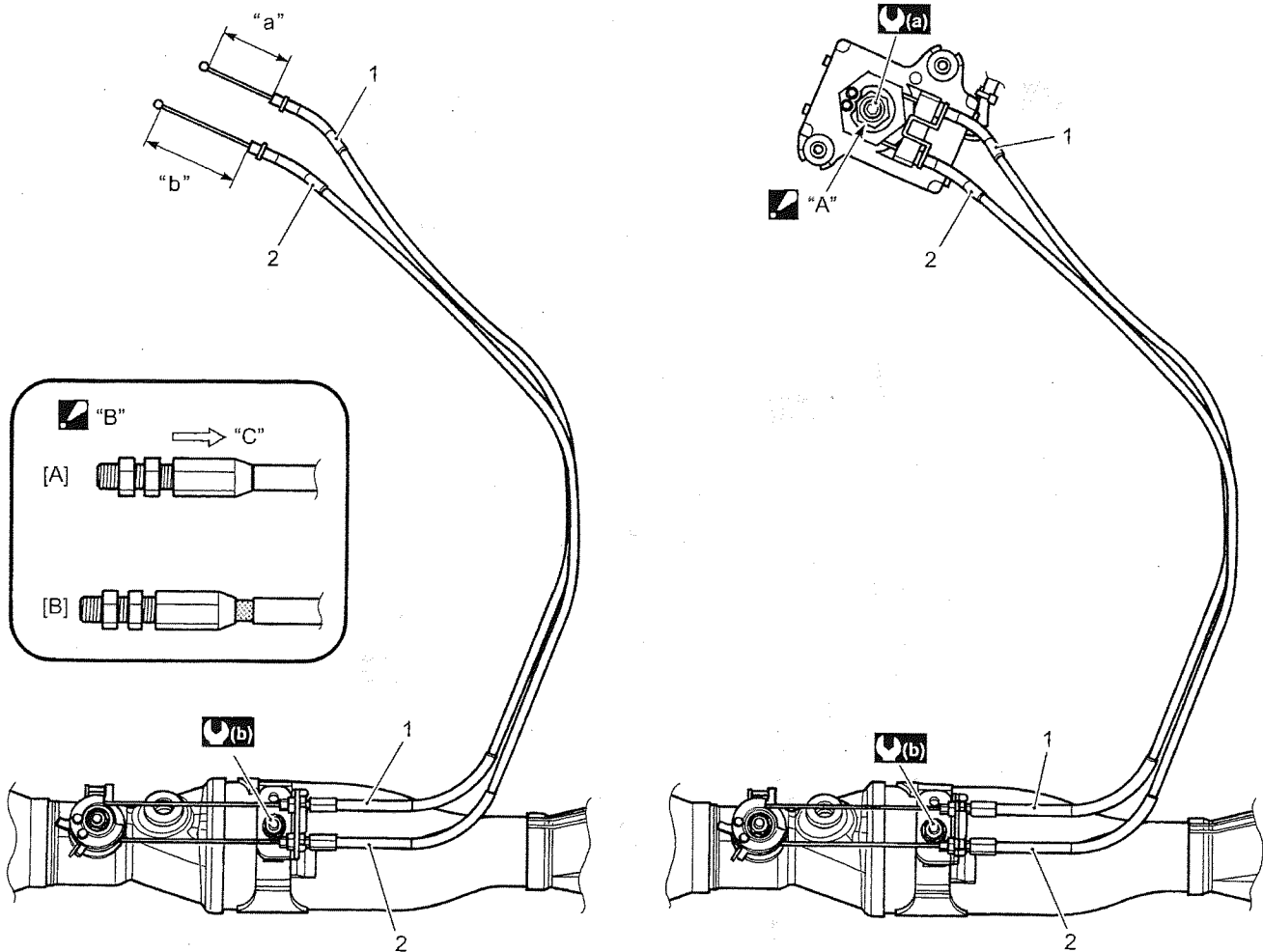
IB14J11B0042-01

1. EXCV cable No. 1	3. Radiator inlet hose	☑ "B": Do not intersect two cables more than the one revolution.
2. EXCV cable No. 2	☑ "A": Contact the EXCV cables to the hose protector.	

Repair Instructions

Exhaust Control System Construction

BENB15J21B06001

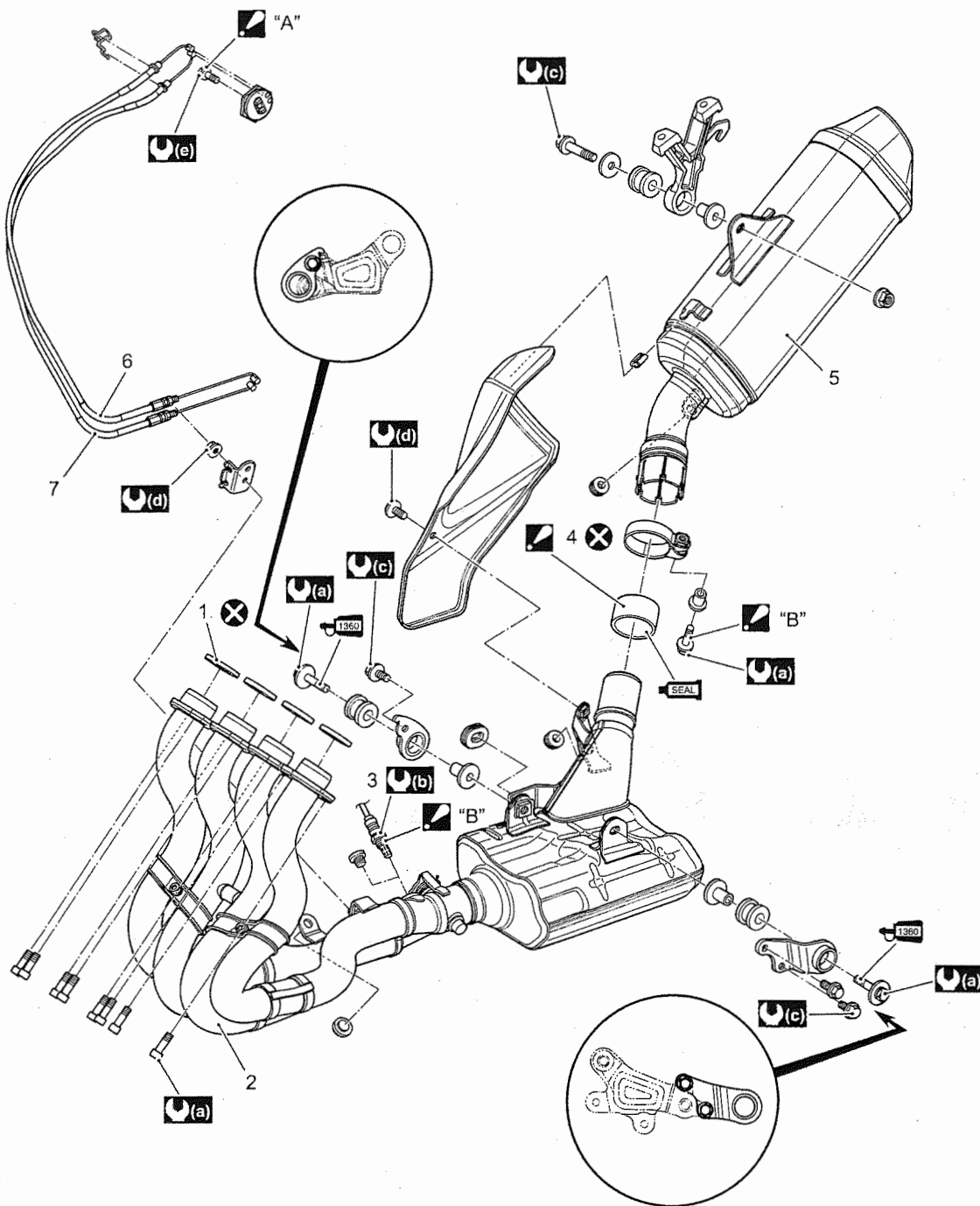


IB14J11B0043-03

1. EXCV cable No. 1	(a) : 5 N·m (0.5 kgf-m, 3.5 lbf-ft)	[A]: OK
2. EXCV cable No. 2	(b) : 11 N·m (1.1 kgf-m, 8.0 lbf-ft)	[B]: NG
"A": When loosening or tightening the pulley mounting bolt, be sure to fix the pulley with a box end wrench, or EXCVA may get damaged.	"a": 45 – 46 mm (1.77 – 1.81 in)	
"B": When adjusting the EXCV cables, push adjuster to arrow direction "C" until it stops.	"b": 48 – 49 mm (1.89 – 1.93 in)	

Exhaust System Components

BENB15J21B06002



IB14J11B0044-03

1. Exhaust pipe gasket	7. EXCV cable No. 2	(d) : 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
2. Exhaust pipe assembly	"A": When loosening or tightening the pulley bolt, be sure to fix the pulley with a box end wrench, or EXCV may get damaged.	(e) : 5 N·m (0.5 kgf-m, 3.5 lbf-ft)
3. HO2 sensor	"B": Apply anti-seize compound to the thread part.	1360 : Apply thread lock to the thread part.
4. Muffler connector : Install the connector so that the chamfer side faces the muffler body.	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	SEAL : Apply muffler seal.
5. Muffler	(b) : 25 N·m (2.5 kgf-m, 18.0 lbf-ft)	X : Do not reuse.
6. EXCV cable No. 1	(c) : 26 N·m (2.6 kgf-m, 19.0 lbf-ft)	

EXCVA / EXCV Cable Removal and Installation

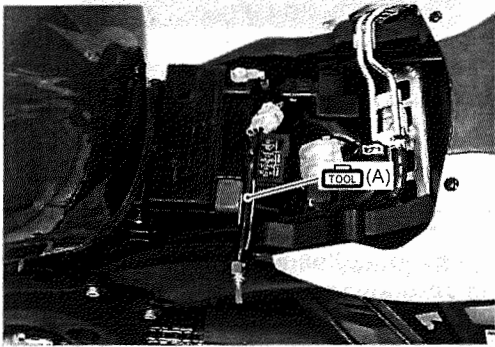
BENB15J21B06003

Removal

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 4) Connect the special tool (Mode selection switch) to the mode selection coupler. Refer to "Self-Diagnostic Procedures" in Section 1A (Page 1A-12).
- 5) After turning the mode selection switch ON, turn the ignition switch ON.

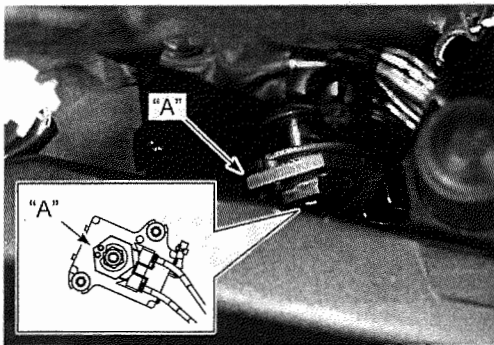
Special tool

 (A): 09930-82720 (Mode selection switch)



IB14J11B0001-01

- 6) Check that the cable slots of the EXCVA pulley comes to the middle (Adjustment position) "A".
- 7) Turn the ignition switch OFF.



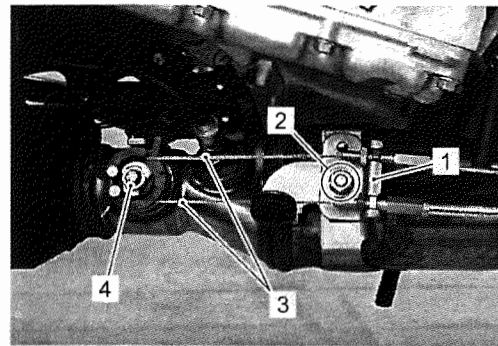
IB14J11B0002-01

- 8) Remove the EXCV cable bracket (1) by removing the nut (2).

NOTE

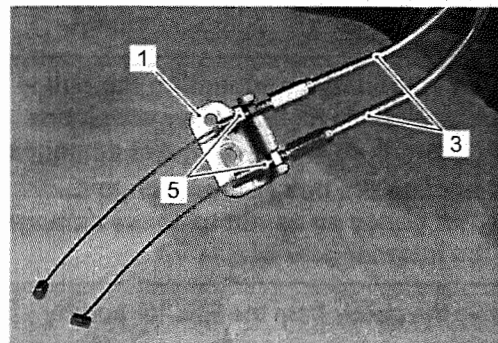
Before removing the EXCV cables, be sure to set the EXCVA pulley to the adjustment position.

- 9) Disconnect the EXCV cables (3) from the EXCV pulley (4).



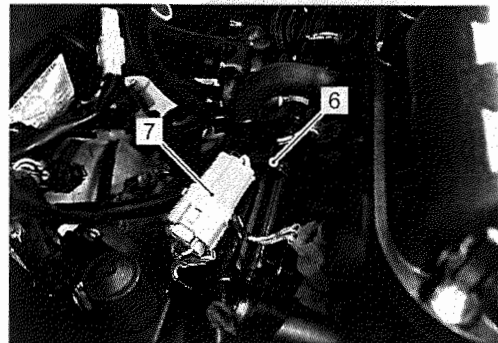
IB14J11B0003-01

- 10) Loosen the lock-nuts (5).
- 11) Disconnect the EXCV cables (3) from its bracket (1).



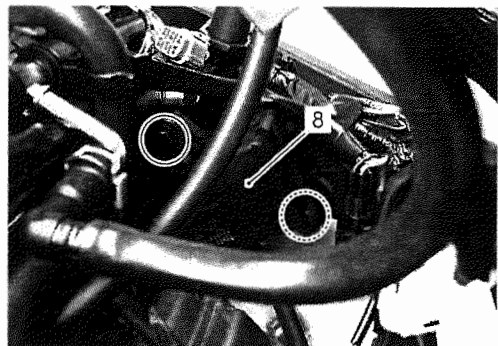
IB14J11B0004-02

- 12) Remove the clamp (6) and disconnect the EXCVA coupler (7).



IB14J11B0005-02

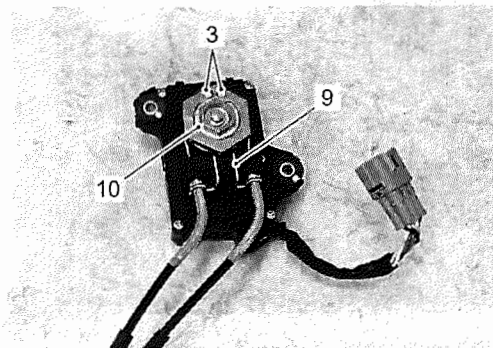
- 13) Remove the EXCVA (8) along with EXCV cables.



IB14J11B0006-02

1K-8 Exhaust System:

- 14) Remove the guide (9).
- 15) Disconnect the EXCV cables (3) from the EXCVA pulley (10).



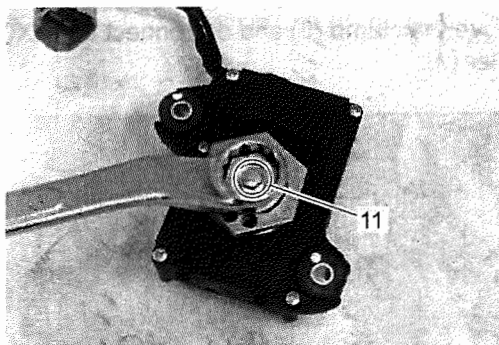
IB14J11B0007-02

- 16) Hold the pulley with a box end wrench, and remove the pulley mounting bolt (11).

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.

- 17) Remove the pulley from the EXCVA body.



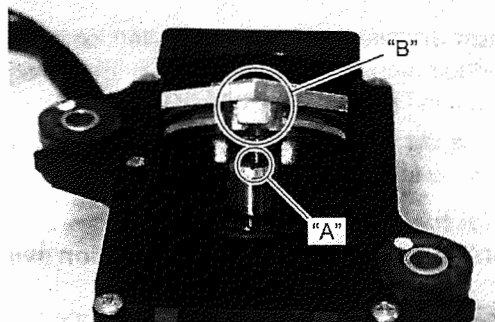
IB14J11B0008-02

Installation

- 1) Set the EXCVA to the adjustment position. Refer to "EXCVA Adjustment" (Page 1K-10).
- 2) Install the EXCVA pulley to the shaft.

NOTE

Align the shaft's line "A" and cable slots "B".



IB14J11B0009-01

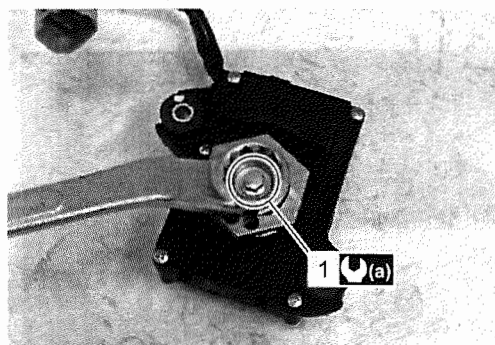
- 3) Hold the pulley with a box end wrench, and then tighten the pulley mounting bolt (1) to the specified torque.

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, 3.5 lbf-ft)



IB14J11B0010-01

- 4) Temporarily connect the EXCV cable No. 1 (14J0CL) (2) and No. 2 (14J0OP) (3) to the EXCV cable bracket (4) and install them to the exhaust pipe.

NOTE

The EXCV cables are identified by the letters.

No. 1 cable (2): 14J0CL

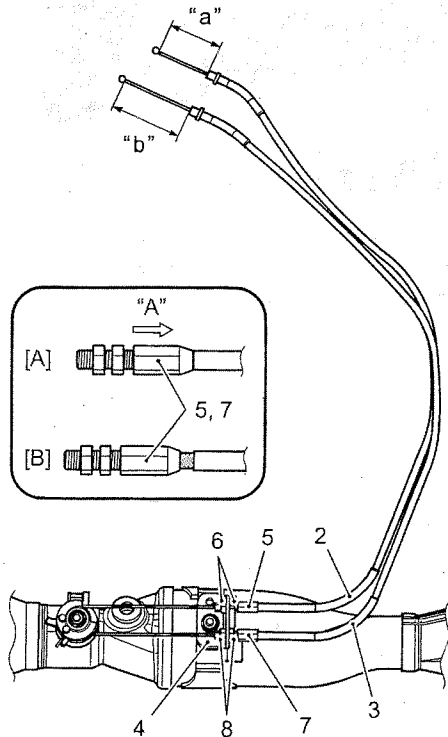
No. 2 cable (3): 14J0OP

- 5) Connect the EXCV cable No. 1 (2) and No. 2 (3) to the EXCV pulley.
- 6) Adjust the EXCV cables as follows.

NOTE

When adjusting the EXCV cables, push adjuster to arrow direction "A" until it stops.

- a) Adjust the inner cable length "a" of No. 1 cable (2) in 45 – 46 mm (1.77 – 1.81 in) by turning the adjuster (5), then tighten the lock-nuts (6).
- b) Adjust the inner cable length "b" of No. 2 cable (3) in 48 – 49 mm (1.89 – 1.93 in) by turning the adjuster (7), then tighten the lock-nuts (8).



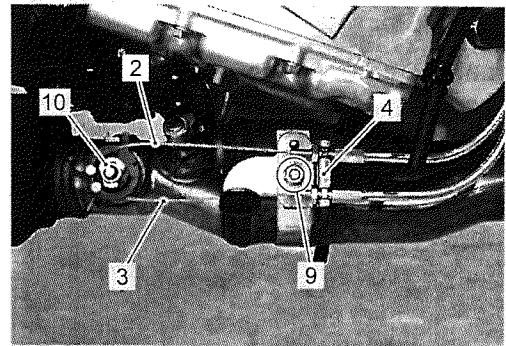
IB14J11B0011-03

[A]: OK

[B]: NG

- 7) Remove the EXCV cable bracket (4) by removing the nut (9).

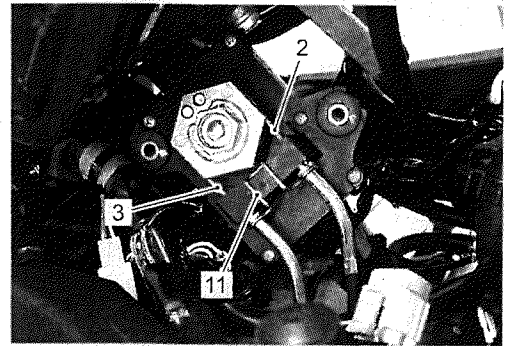
- 8) Disconnect the EXCV cable No. 1 (2) and No. 2 (3) from the EXCV pulley (10).



IB14J11B0036-01

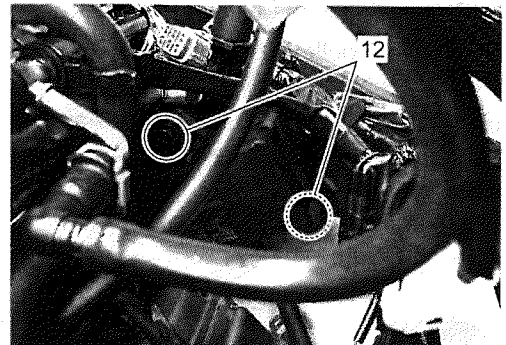
- 9) Connect the EXCV cable No. 1 (2) and No. 2 (3) to the EXCVA pulley.

- 10) Install the guide (11).



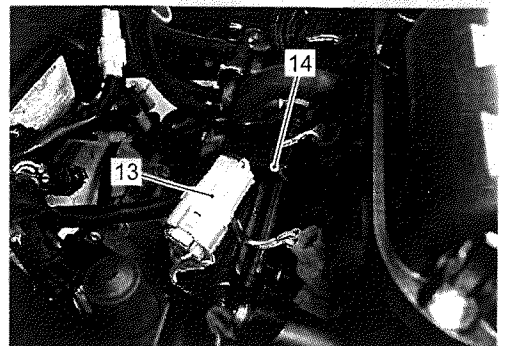
IB14J11B0012-01

- 11) Tighten the EXCVA mounting bolts (12).



IB14J11B0013-01

- 12) Connect the EXCVA coupler (13) and install the clamp (14). Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).



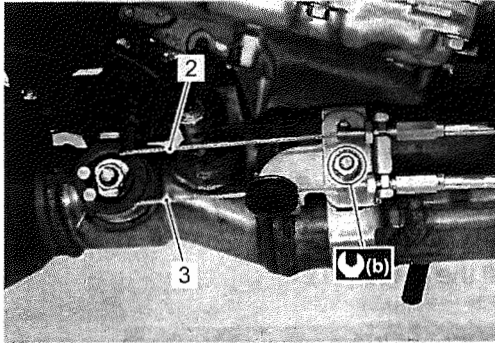
IB14J11B0037-01

1K-10 Exhaust System:

- 13) Connect the EXCV cable No. 1 (2) and No. 2 (3) to the EXCV pulley.
- 14) Install the EXCV cable bracket and tighten the nut to the specified torque.

Tightening torque

EXCV cable bracket mounting nut (b): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)



IB14J11B0038-01

- 15) Install the removed parts.
- 16) Inspect the EXCVA position sensor output voltage. Refer to "EXCVA Adjustment" (Page 1K-10).

EXCVA Inspection

BENB15J21B06004

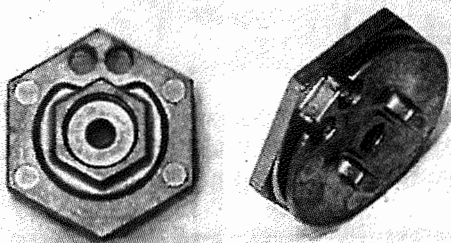
Refer to "DTC "C46" (P1657-H/L or P1658): EXCV Actuator Circuit Malfunction" in Section 1A (Page 1A-82).

EXCVA Pulley Inspection

BENB15J21B06005

Inspect the EXCVA pulley in the following procedures:

- 1) Remove the EXCVA pulley. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-7).
- 2) Visually inspect the EXCVA pulley for wear and damage. If there is anything unusual, replace the pulley with a new one.



IB14J11B0014-02

- 3) Install the pulley and EXCVA. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-7).

EXCVA Adjustment

BENB15J21B06006

Adjustment

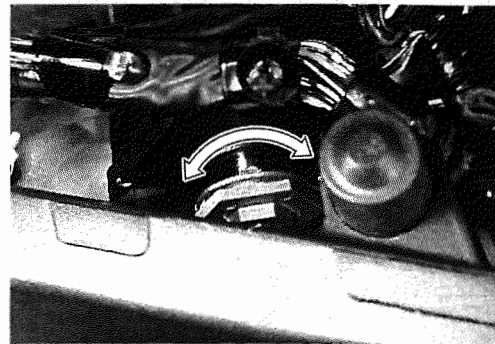
Inspect the EXCVA operation and adjust it if necessary in the following steps:

Step 1

- 1) Set the EXCVA to the adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-7).

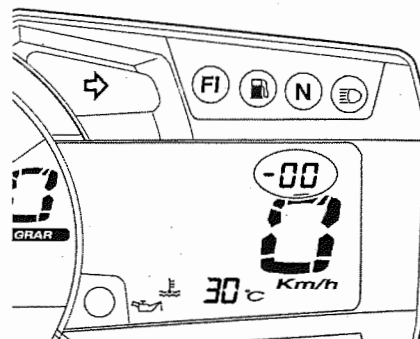
Step 2

- 1) Turn the ignition switch OFF.
- 2) Turn the mode selection switch OFF.
- 3) Turn the ignition switch ON and check the operation of EXCVA.
(EXCVA operation order: Full close → Full open → Approx. 35% open)



IB14J11B0015-01

- 4) Turn the mode selection switch ON. If DTC "C46" is not indicated on the LCD display, the adjustment is correctly completed. If "C46" is indicated, repeat the procedures from Step 3 to Step 4.

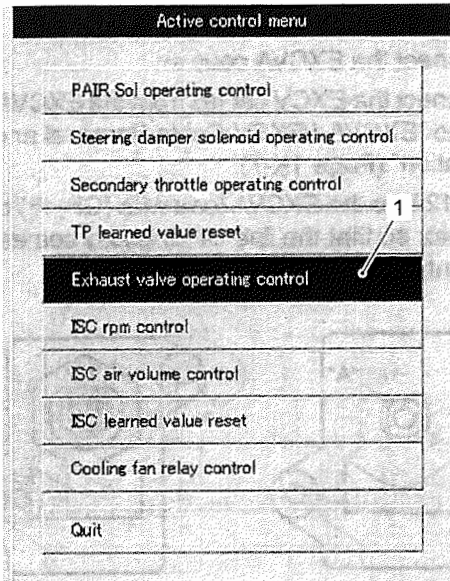


IB14J1110139-01

Step 3

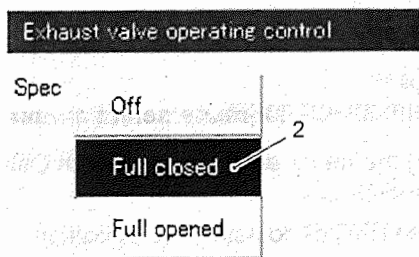
- 1) Turn the ignition switch OFF.
- 2) Set up the SDS tool. Refer to "Self-Diagnostic Procedures" in Section 1A (Page 1A-12).
- 3) Turn the ignition switch ON.

- 4) Click "Exhaust valve operating control" (1).



IB14J11B0045-01

- 5) Click "Full closed" (2).



I947H11B0020-02

- 6) Insert the needle-point probes to the EXCVA coupler (3). ((+) Y - (-) W)
- 7) Measure the EXCVA position sensor output voltage at EXCV fully closed position.

Special tool

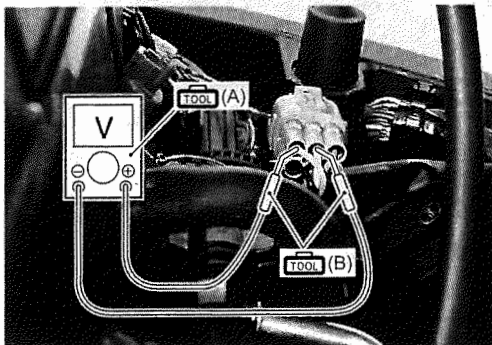
- (A): 09900-25008 (Multi circuit tester set)
- (B): 09900-25009 (Needle-point probe set)

Tester knob indication

Voltage (---)

EXCVA position sensor output voltage

EXCV is fully closed: 0.45 - 1.4 V ((+) Y - (-) W)



IB14J11B0017-01

- 8) If the measured voltage is less than specification, adjust the No. 1 cable adjuster (4) as follows:

- a) Set the EXCVA to the adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-7).

NOTICE

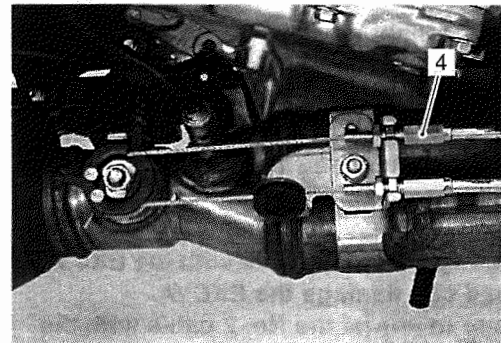
Adjusting the No. 1 cable with the EXCV fully closed can damage the EXCVA.

Be sure to adjust the No. 1 cable with the EXCV set in the adjustment position.

- b) Turn the No. 1 cable adjuster (4) in or out to set the output voltage within the specified value.

NOTE

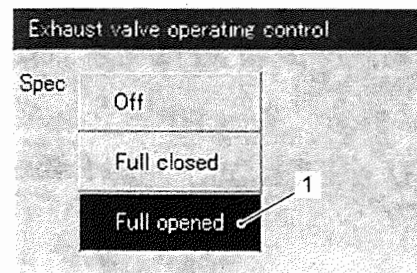
If C46 code is indicated after adjusting the voltage, increase the voltage to 0.9 V.



IB14J11B0018-01

Step 4

- 1) Click "Full opened" (1).





I947H11B0023-02

1K-12 Exhaust System:

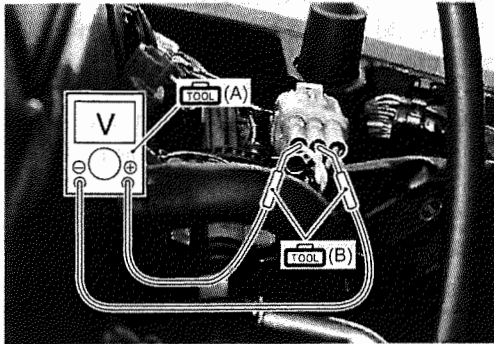
- 2) Measure the EXCVA position sensor output voltage at EXCV fully opened position.

Special tool

-  (A): 09900-25008 (Multi circuit tester set)
 (B): 09900-25009 (Needle-point probe set)

EXCVA position sensor output voltage

EXCV is fully opened: 3.6 – 4.55 V ((+) Y – (–) W)



IB14J11B0019-01

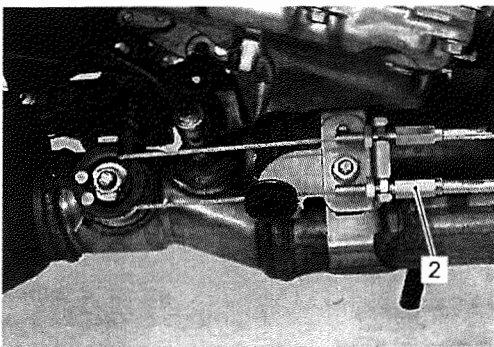
- 3) If the measured voltage is more than specification, adjust the No. 2 cable adjuster (2) as follows:
 - a) Set the EXCVA to the adjustment position. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-7).

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 (2) in or out to set the output voltage within the specified value.

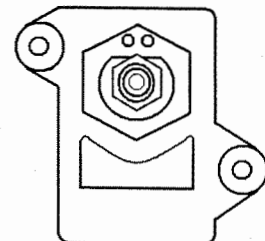
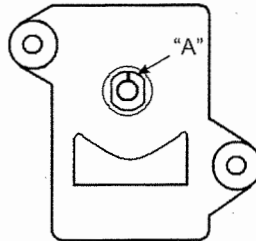


IB14J11B0020-01

- 4) After adjusting the EXCV cables, perform Step 2 to confirm DTC "46" is not indicated.

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.
- 3) Disconnect the EXCV cables from the EXCVA pulley. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-7).
- 4) Apply 12 V to the EXCVA lead wire (Gr – P) to rotate the motor so that the line "A" or pulley comes to the adjacent position as shown.



IB14J11B0021-01

- 5) Connect the EXCVA coupler.
- 6) Connect the special tool (Mode selection switch) to the mode selection coupler.

Special tool

 : 09930-82720 (Mode selection switch)

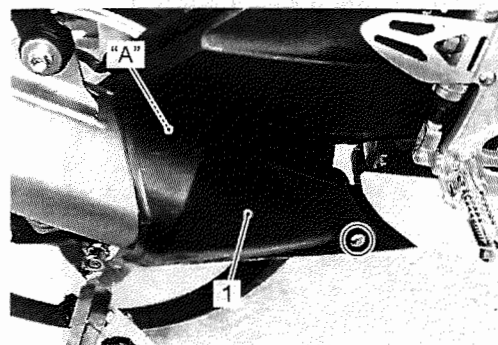
- 7) After turning the mode selection switch ON, turn the ignition switch ON.
- 8) Check the EXCVA to adjustment position.
- 9) Turn the ignition switch OFF.
- 10) Connect the EXCV cables and install the EXCVA. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-7).
- 11) Inspect the EXCVA position sensor output voltage. Refer to "Adjustment" (Page 1K-10).

Exhaust Pipe / Muffler Removal and Installation

BENB15J21B06007

Removal

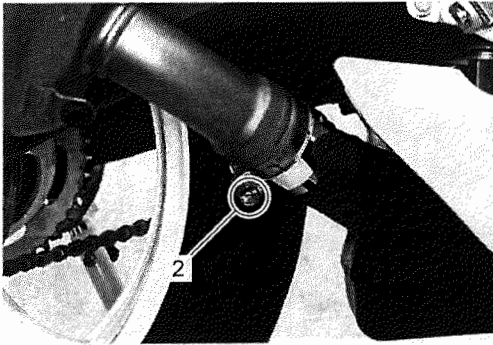
- 1) Remove the muffler cover (1).



IB14J11B0022-01

"A": Hooked point

- 2) Loosen the muffler connecting bolt (2).

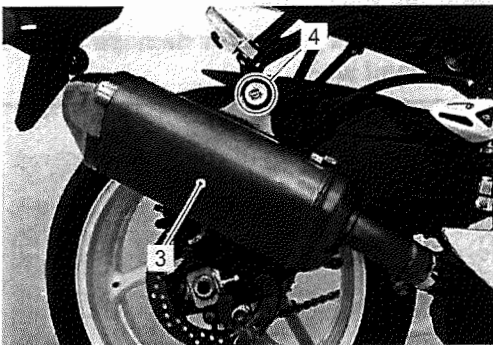


IB14J11B0023-01

- 3) Remove the muffler (3) by removing the support bolt and nut (4).

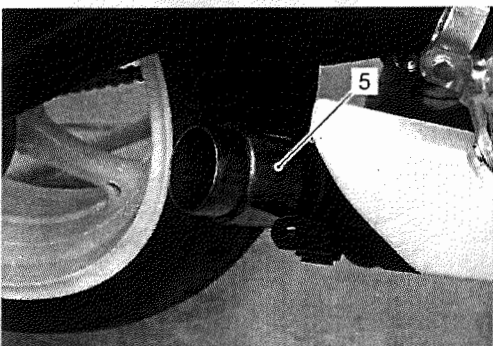
NOTE

Support the muffler to prevent it from falling.



IB14J11B0024-01

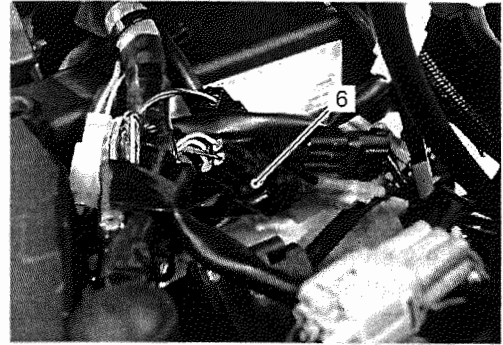
- 4) Remove the muffler connector (5).



IB14J11B0025-01

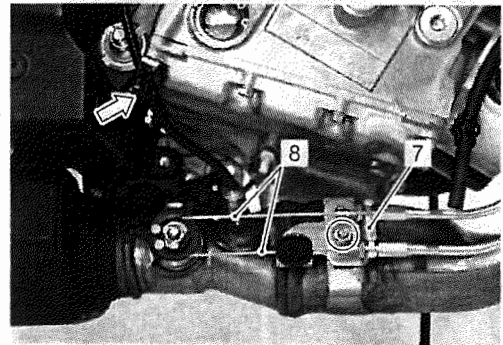
- 5) Remove the cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 6) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).

- 7) Disconnect the HO2 sensor coupler (6).



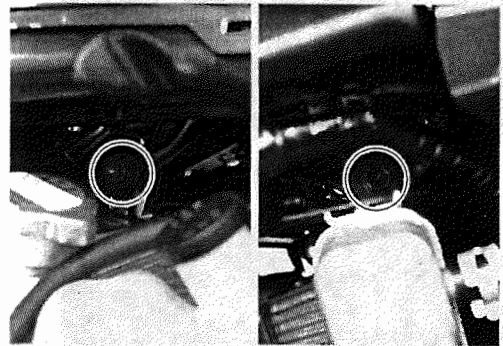
IB14J11B0026-01

- 8) Release the HO2 sensor lead wire from the clamp.
- 9) Remove the EXCV cable bracket (7).
- 10) Disconnect the EXCV cables (8) from the EXCV pulley.

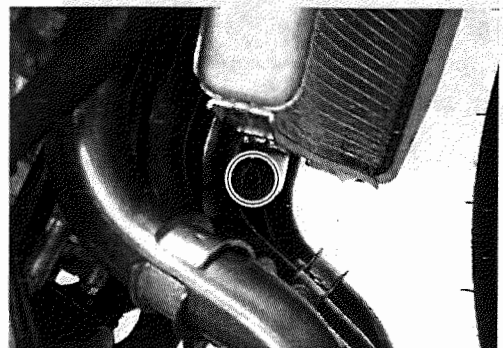


IB14J11B0027-01

- 11) Remove the radiator mounting bolts.



IB14J11B0028-01



IB14J11B0029-01

1K-14 Exhaust System:

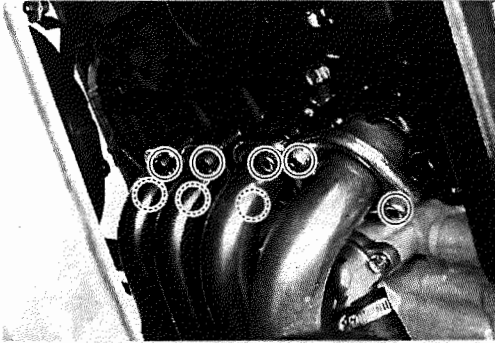
- 12) Move the radiator forward.
- 13) Remove the exhaust pipe assembly by removing the exhaust pipe bolts and exhaust chamber support bracket bolts.

NOTICE

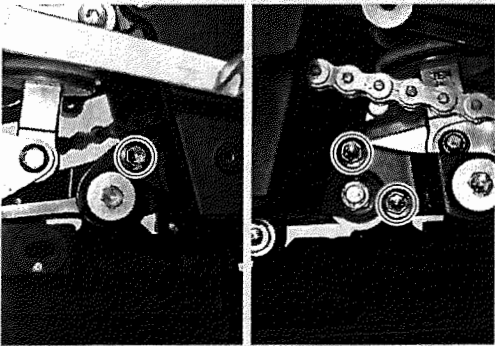
Take care not to bend the radiator fins.

NOTE

Support the exhaust pipe assembly to prevent it from falling.

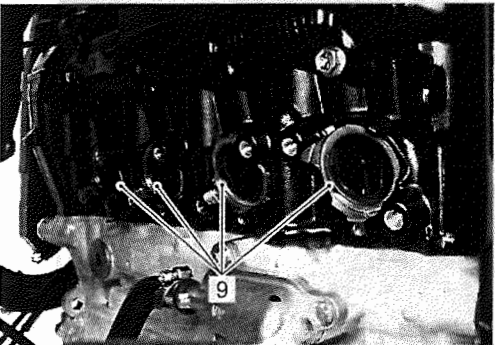


IB14J11B0030-01



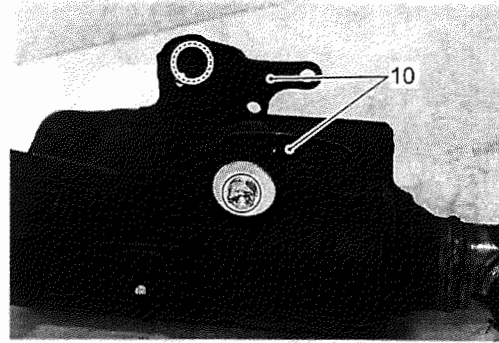
IB14J11B0031-01

- 14) Remove the exhaust pipe gaskets (9).



IB14J11B0032-01

- 15) Remove the exhaust chamber support brackets (10).

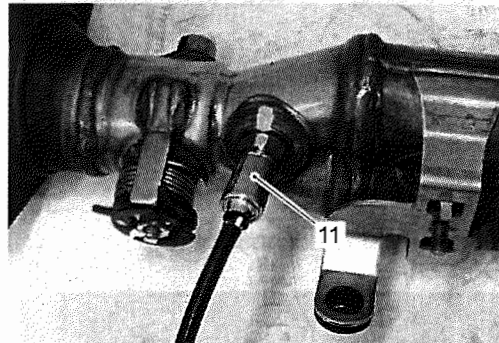


IB14J11B0033-01

- 16) Remove the HO2 sensor (11) from the exhaust pipe.

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.



IB14J11B0034-01

Installation

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

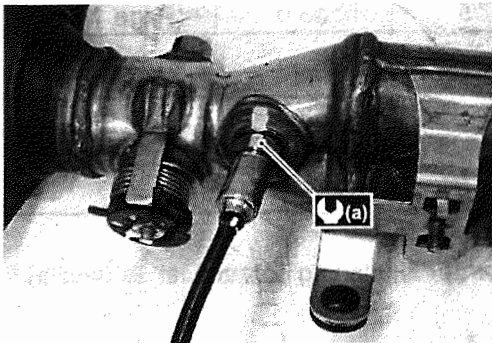
- Apply anti-seize compound to the thread part and tighten the HO2 sensor to the specified torque.

Tightening torque

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

NOTICE

- Be careful not to expose the HO2 sensor to an excessive shock.
- Do not use an impact wrench when installing the HO2 sensor.
- Be careful not to twist or damage the HO2 sensor lead wires.
- Do not apply oil or other materials to the sensor air holes.



IB14J11B0035-01

- Install new exhaust pipe gaskets and muffler connector and tighten each bolt to the specified torque. Refer to "Exhaust System Components" (Page 1K-6).

NOTE

When installing a new muffler connector, remove all of the old sealer. Apply the exhaust gas sealer to both the inside and outside of the new muffler connector.

SEAL : Muffler seal (MUFFLER SEAL LOCTITE 5920 (commercially available) or equivalent)

- Install the EXCV cables. Refer to "EXCVA / EXCV Cable Removal and Installation" (Page 1K-7).

Exhaust System Inspection

BENB15J21B06008

Inspect the exhaust pipe connection and muffler connection for exhaust gas leakage and mounting condition. If any defect is found, replace the exhaust pipe assembly or muffler with a new one.

Check the exhaust pipe bolts, muffler connecting bolt, exhaust chamber support bolt, exhaust chamber support bracket bolt and muffler support bolt are tightened to their specified torque. Refer to "Exhaust System Components" (Page 1K-6).

Specifications

Service Data

BENB15J21B07001

FI Sensors

Item	Standard/Specification		Note
HO2 sensor output voltage	0.4 V and less at idle speed		
	0.6 V and more at 5 000 r/min		
EXCVA position sensor input voltage	4.5 – 5.5 V		
EXCVA position sensor output voltage	Closed	0.45 – 1.4 V	
	Opened	3.6 – 4.55 V	
EXCVA position sensor resistance	Approx. 3.1 kΩ		At adjustment position

Tightening Torque Specifications

BENB15J21B07002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
EXCVA pulley mounting bolt	5	0.5	3.5	☞ (Page 1K-8)
EXCV cable bracket mounting nut	11	1.1	8.0	☞ (Page 1K-10)
HO2 sensor	25	2.5	18.0	☞ (Page 1K-15)

NOTE

The tightening torque(s) also specified in:

“Exhaust Control System Construction” (Page 1K-5)

“Exhaust System Components” (Page 1K-6)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J21B08001

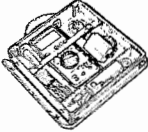
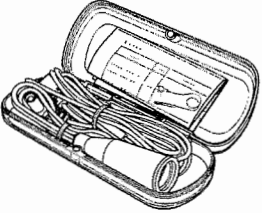

Material	SUZUKI recommended product or Specification	Note
Muffler seal	MUFFLER SEAL LOCTITE 5920 (commercially available) or equivalent	☞ (Page 1K-15)

NOTE

Required service material(s) also described in:
 “Exhaust System Components” (Page 1K-6)

Special Tool

BENB15J21B08002

09900-25008 Multi circuit tester set ☞ (Page 1K-11) / ☞ (Page 1K-12)		09900-25009 Needle-point probe set ☞ (Page 1K-11) / ☞ (Page 1K-12)	
09930-82720 Mode selection switch ☞ (Page 1K-7) / ☞ (Page 1K-12)			

Section 2

Suspension

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Precautions

Precautions

Precautions for Suspension

BENB15J22000001

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

▲ WARNING

All suspensions, bolts and nuts are an important part in that it could affect the performance of vital parts. They must be tightened to the specified torque periodically and if the suspension effect is lost, replace it with a new one.

NOTICE

Never attempt to heat, quench or straighten any suspension part. Replace it with a new one, or damage to the part may result.

Suspension General Diagnosis

Diagnostic Information and Procedures

Suspension and Wheel Symptom Diagnosis

BENB15J22104001

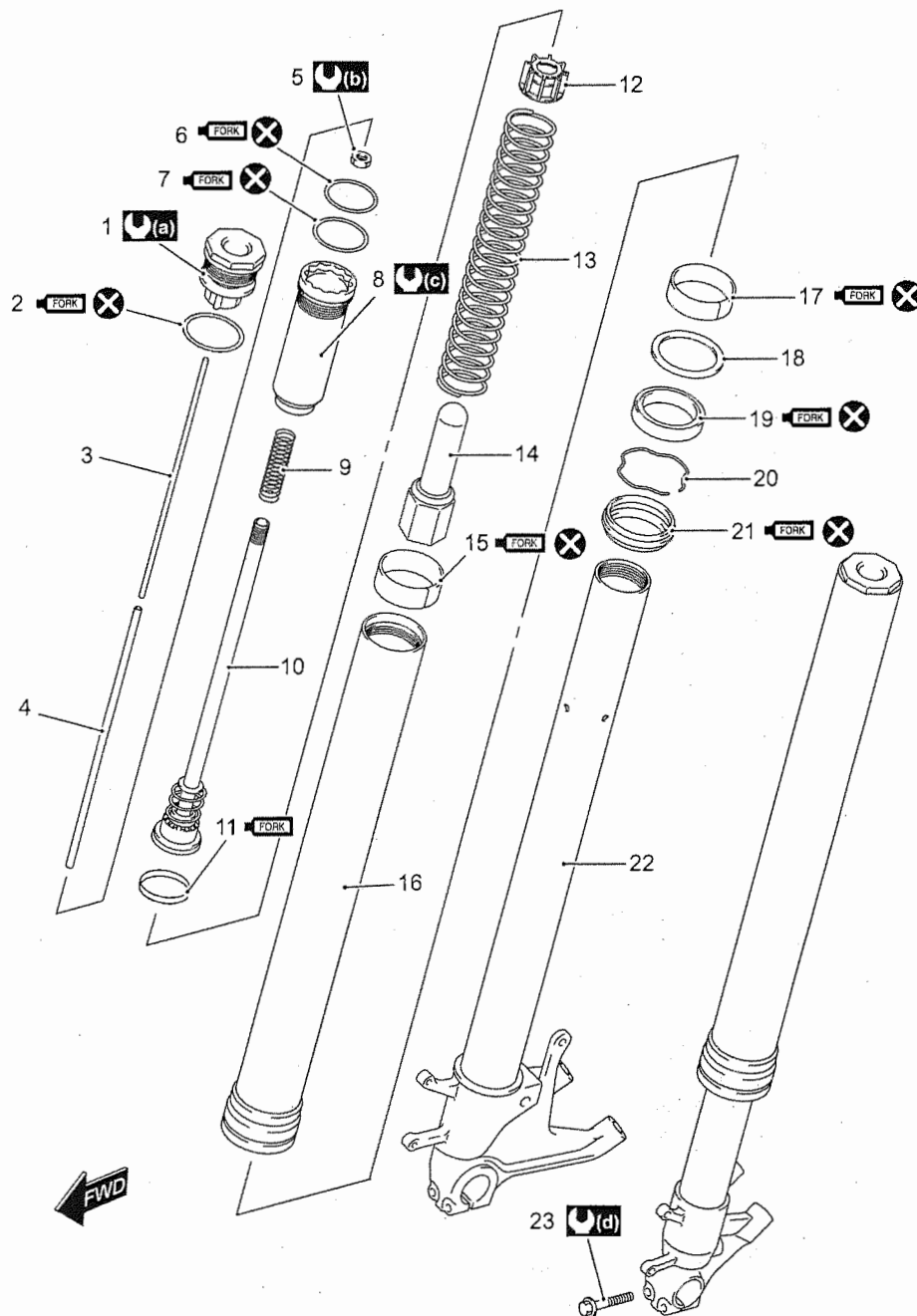
Condition	Possible cause	Correction / Reference Item
Wobbly front wheel	Distorted wheel rim.	Replace.
	Worn front wheel bearings.	Replace.
	Defective or incorrect tire.	Replace.
	Loose front axle nut.	Tighten.
	Loose front axle pinch bolts.	Tighten.
	Incorrect fork oil level.	Adjust.
	Incorrect front wheel weight balance.	Adjust.
Front suspension too soft	Weak spring.	Replace.
	Insufficient fork oil.	Check level and add.
	wrong weight fork oil.	Replace.
	Improperly set front fork spring adjuster.	Adjust.
	Improperly set front fork damping force adjuster.	Adjust.
Front suspension too stiff	Excessively viscous fork oil.	Replace.
	Excessive fork oil.	Check level and drain.
	Bent front axle.	Replace.
Front suspension too noisy	Insufficient fork oil.	Check level and add.
	Loose front suspension fastener.	Tighten.
Wobbly rear wheel	Distorted wheel rim.	Replace.
	Worn rear wheel bearings.	Replace.
	Defective or incorrect tire.	Replace.
	Worn swingarm bearings.	Replace.
	Worn rear suspension bearings.	Replace.
	Loose rear suspension fastener.	Tighten.
	Incorrect rear wheel weight balance.	Adjust.
Rear suspension too soft	Weak rear shock absorber spring.	Replace.
	Rear shock absorber leaks oil.	Replace.
	Improperly set rear spring pre-load adjuster.	Adjust.
	Improperly set damping force adjuster.	Adjust.
Rear suspension too stiff	Bent rear shock absorber shaft.	Replace.
	Bent swingarm pivot shaft.	Replace.
	Worn swingarm bearings.	Replace.
	Worn rear suspension bearings.	Replace.
	Improperly set rear spring pre-load adjuster.	Adjust.
	Improperly set damping force adjuster.	Adjust.
Rear suspension too noisy	Loose rear suspension bolt/nut.	Tighten.
	Worn rear suspension bearings.	Replace.
	Worn swingarm bearings.	Replace.

Front Suspension

Repair Instructions

Front Fork Components

BENB15J22206001



IB14J1220043-02

1. Front fork cap	9. Spring	17. Guide bushing	(b) : 28 N-m (2.8 kgf-m, 20.0 lbf-ft)
2. O-ring	10. Piston rod	18. Oil seal spacer	(c) : 90 N-m (9.0 kgf-m, 65.0 lbf-ft)
3. Rebound damping force adjuster rod	11. Piston ring A	19. Oil seal	(d) : 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
4. Compression damping force adjuster rod	12. Spring collar B	20. Stopper ring	FORK : Apply fork oil.
5. Piston rod nut	13. Spring	21. Dust seal	X : Do not reuse.
6. O-ring	14. Spring collar A	22. Inner tube	
7. Piston ring B	15. Slide bushing	23. Front axle pinch bolt	
8. Rod guide case	16. Outer tube	(a) : 35 N-m (3.5 kgf-m, 25.5 lbf-ft)	

Front Fork Removal and Installation

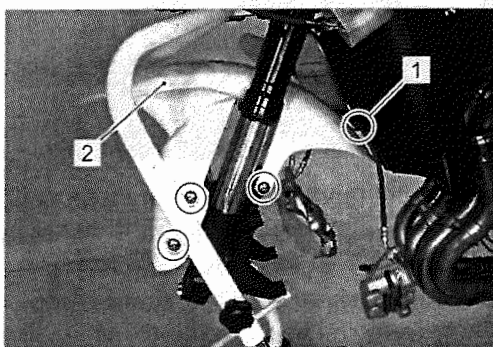
BENB15J22206002

NOTE

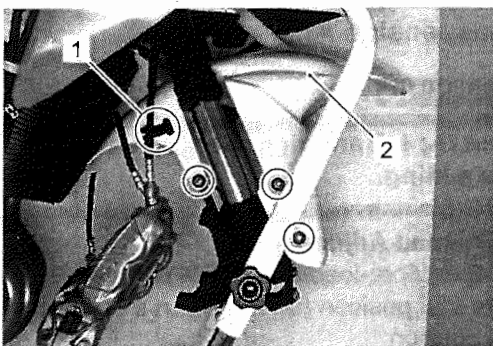
The right and left front forks are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

- 1) Remove the front wheel. Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-4).
- 2) Disconnect the brake hoses from the clamps (1) on the front fender.
- 3) Remove the front fender (2) by removing the bolts.



IB14J1220001-01



IB14J1220002-01

- 4) Loosen the front fork upper clamp bolt (3).

NOTE

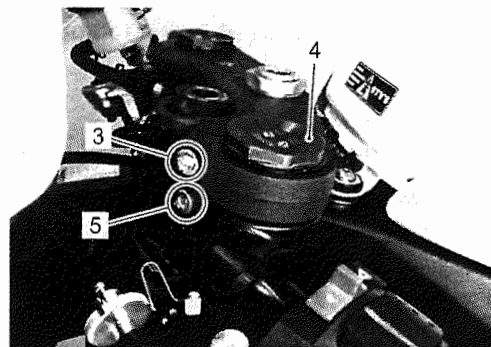
Slightly loosen the front fork cap (4) to facilitate later disassembly.

Special tool

TOOL : 09941-53670 (Front fork cap socket wrench (45 mm))

- 5) Place a rag under each handlebar to prevent scratching the cowling.

- 6) Loosen the handlebar clamp bolt (5).

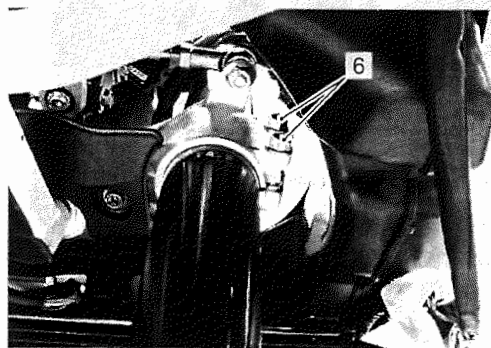


IB14J1220003-01

- 7) Loosen the front fork lower clamp bolts (6) and remove the front fork.

NOTE

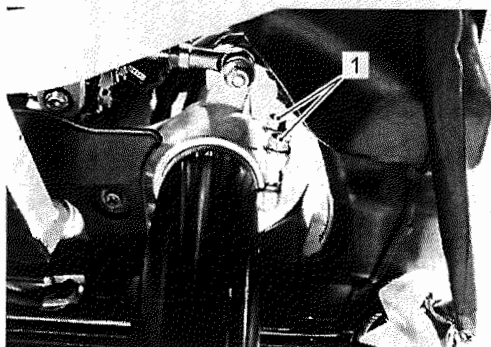
Hold the front fork by hand to prevent it sliding out of the steering stem.



IB14J1220004-01

Installation

- 1) Set the front fork to the handlebars steering stem lower bracket temporarily by tightening the lower clamp bolts (1).



IB14J1220005-01

2B-3 Front Suspension:

- 2) Tighten the front fork cap (2) to the specified torque.

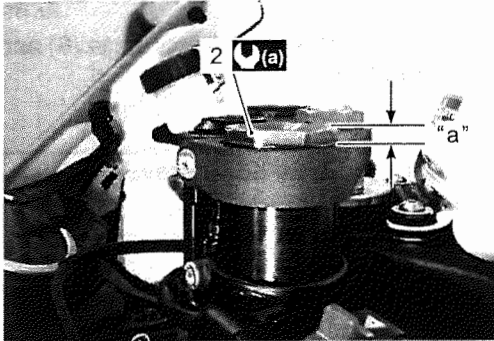
Special tool

Tool : 09941-53670 (Front fork cap socket wrench (45 mm))

Tightening torque

Front fork cap (a): 35 N·m (3.5 kgf-m, 25.5 lbf-ft)

- 3) Loosen the lower clamp bolts.
- 4) Set the front fork with the upper surface of the front fork cap positioned 6.5 mm (0.26 in) "a" from the upper surface of the upper bracket.



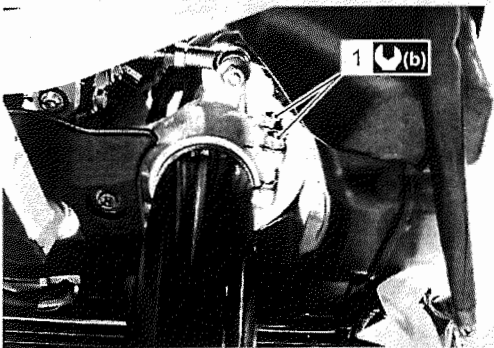
IB14J1220006-01

"a": 6.5 mm (0.26 in)

- 5) Tighten the front fork lower clamp bolts (1).

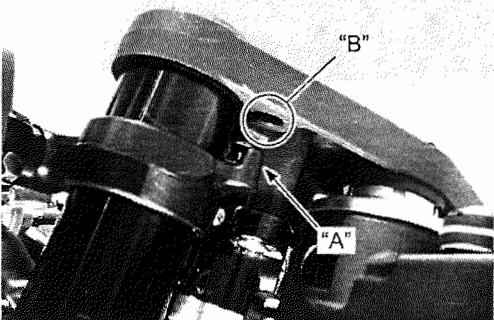
Tightening torque

Front fork lower clamp bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1220007-01

- 6) Insert the protrusion "A" of the handlebar into the hole "B" of the steering stem upper bracket.



IB14J1220008-01

- 7) Tighten the front fork upper clamp bolt (3).

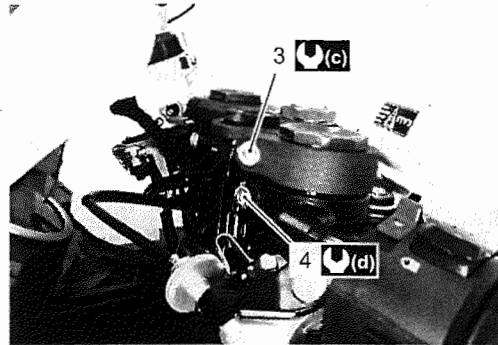
Tightening torque

Front fork upper clamp bolt (c): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

- 8) Tighten the handlebar clamp bolt (4).

Tightening torque

Handlebar clamp bolt (d): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1220009-01

- 9) Install the front fender as shown in the front brake hose routing diagram. Refer to "Front Brake Hose Routing Diagram" in Section 4A (Page 4A-1).
- 10) Install the front wheel. Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-4).

Front Suspension Adjustment

BENB15J22206003

⚠ WARNING

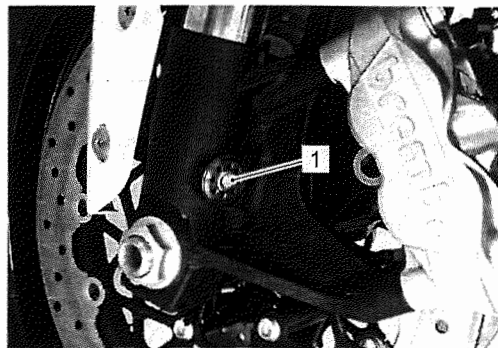
Adjust the left and right front forks to the same setting.

Spring Pre-load Adjustment

Turn the spring pre-load adjuster (1) counterclockwise fully. From that position (softest), turn it clockwise to the specified position.

STD position

4 turns in from softest position



IB14J1220011-01

Damping Force Adjustment**Rebound damping force**

Fully turn the rebound damping force adjuster (1) clockwise. From full hard position, turn it out to standard setting position.

STD position

4 turns out from full hard position



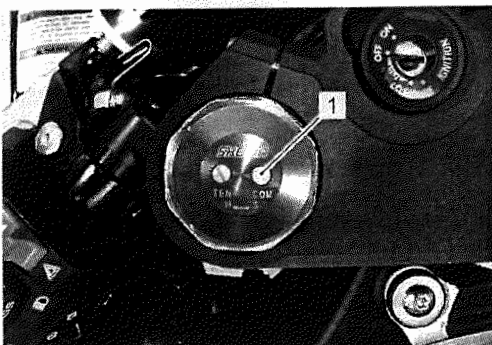
IB14J1220042-01

Compression damping force

Fully turn the compression damping force adjuster (1) clockwise. From full hard position, turn it out to standard setting position.

STD position

5 turns out from full hard position



IB14J1220012-02

Front Fork Disassembly and Assembly

BENB15J22206004

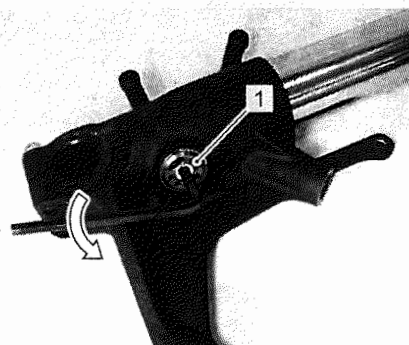
Refer to "Front Fork Removal and Installation" (Page 2B-2).

NOTE

The right and left front forks are installed symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.

Disassembly

- 1) Turn the spring pre-load adjuster (1) to the softest position.



IB14J1220014-01

- 2) Clamp the outer tube with a vise. Protect the outer tube with a rag when using a vise.

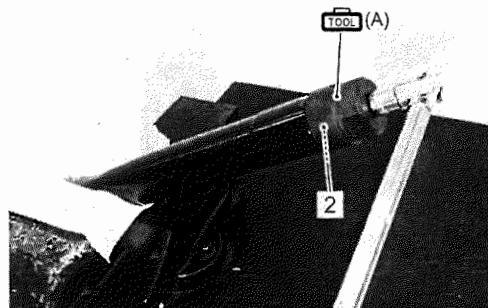
NOTICE

Do not clamp the outer tube too tight.

- 3) Loosen and remove the front fork cap bolt (2) from the outer tube and slowly slide down the outer tube.

Special tool

TOOL (A): 09941-53670 (Front fork cap socket wrench (45 mm))




IB14J1220015-01

- 4) Clamp the axle holder with a vise. Protect the axle holder with a rag when using a vise.

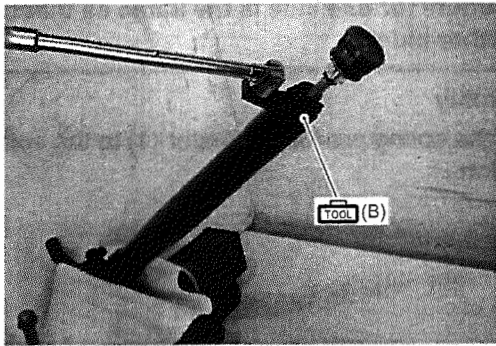
2B-5 Front Suspension:

- 5) Loosen the rod guide case installed in the inner tube using the special tool.

Special tool

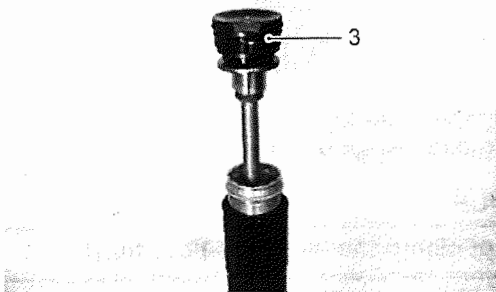
 (B): 09940-84711 (Rod guide case wrench)

- 6) Hold the front fork cap when removing the rod guide case.



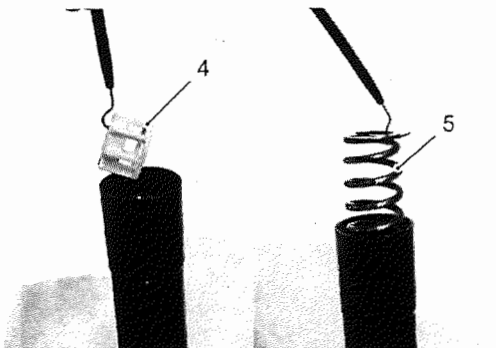
IB14J1220016-03

- 7) Remove the piston rod assembly (3).



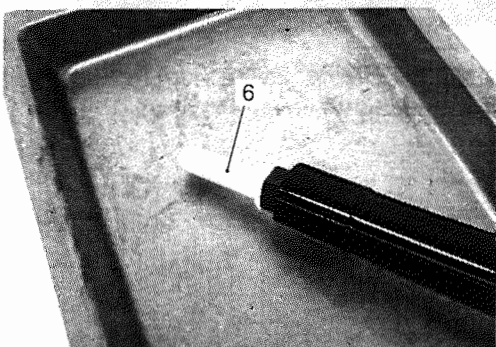
IB14J1220017-01

- 8) Remove the spring collar B (4) and spring (5).



IB14J1220018-01

- 9) Drain fork oil and remove the spring collar A (6).



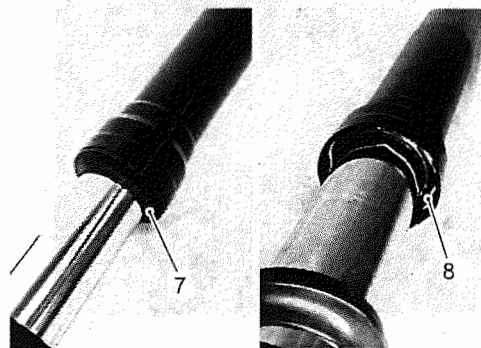
IB14J1220019-01

- 10) Remove the dust seal (7).

- 11) Remove the oil seal stopper ring (8).

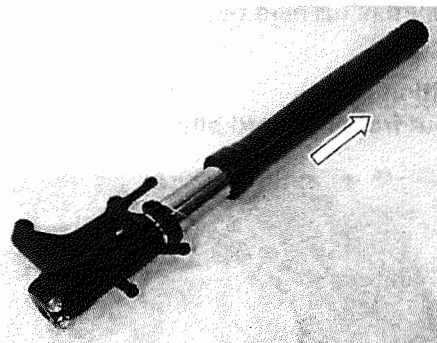
NOTICE

- Scratches on the inner tube could cause oil leaks.
- Avoid scratching when removing.



IB14J1220020-01

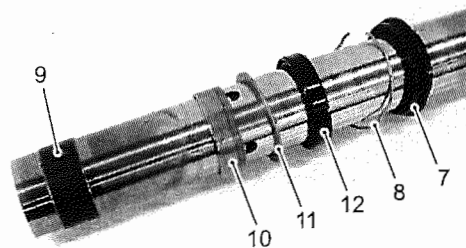
- 12) Remove the oil seal by pulling out the inner tube.



IB14J1220021-01

- 13) Remove the following parts from the inner tube.

- Slide bushing (9)
- Guide bushing (10)
- Oil seal spacer (11)
- Oil seal (12)
- Oil seal stopper ring (8)
- Dust seal (7)



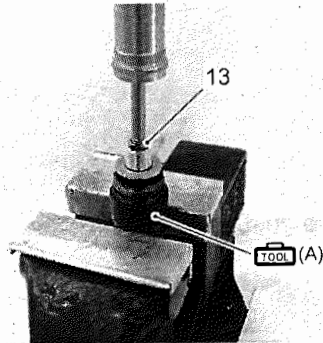
IB14J1220022-01

- 14) Hold the piston rod assembly with the special tool and vise.

Special tool

TOOL (A): 09941-53670 (Front fork cap socket wrench (45 mm))

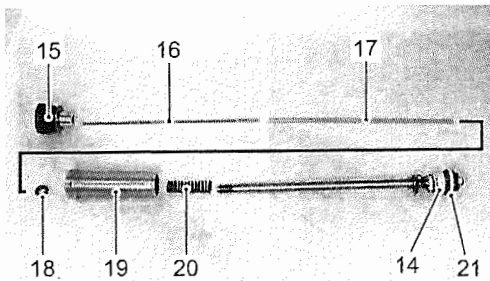
- 15) Loosen the piston rod nut (13).



IB14J1220023-02

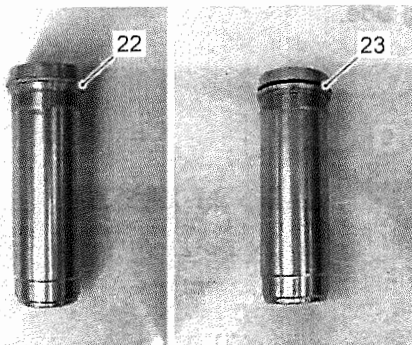
- 16) Remove the following parts from the piston rod (14).

- Front fork cap (15)
- Rebound damping force adjuster rod (16)
- Compression damping force adjuster rod (17)
- Piston rod nut (18)
- Rod guide case (19)
- Spring (20)
- Piston ring A (21)



IB14J1220024-02

- 17) Remove the piston ring B (22) and O-ring (23) from the rod guide case.



IB14J1220025-02

Assembly

NOTICE

- Clean all fork parts before reassembling.
- Apply specified front fork oil when installing the O-rings, slide bushing and guide bushing.

- 1) Cover the inner tube with a plastic film.

NOTICE

Scratches on the oil seal lip may cause oil leakage. When installing the seals, place a plastic film over the slide bushing groove and edges of the inner tube to avoid damaging the seals' lip.

- 2) Install the following parts to the inner tube.

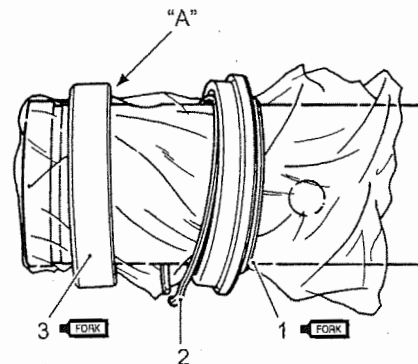
- a) New dust seal (1)
- b) Stopper ring (2)
- c) New oil seal (3)

NOTE

Face the stamp mark side "A" of the oil seal to the dust seal side.

- 3) Apply fork oil to the dust seal lip and oil seal lip.

FORK : Fork Oil (FORK OIL SS-47 or equivalent)



"A": Stamp mark

I947H1220024-01

2B-7 Front Suspension:

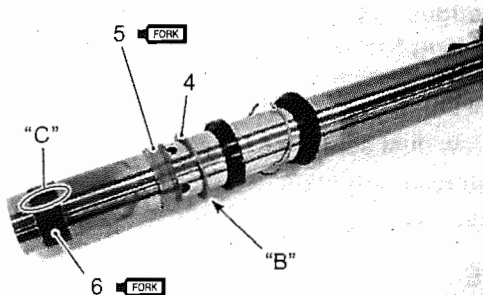
- 4) Remove the plastic film and install the oil seal spacer (4), guide bushing (5) and slide bushing (6) keep them free from dust.

NOTICE

- Face the chamfer side "B" of the oil seal spacer (4) to the guide bushing (5) side.
- Position the slit "C" of slide bushing 90° against the traveling direction.

- 5) Apply fork oil to the guide bushing and slide bushing.

FORK : Fork Oil (FORK OIL SS-47 or equivalent)

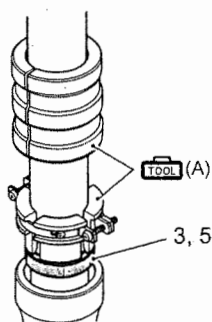


IB14J1220041-01

- 6) Insert the inner tube into the outer tube.
7) Press fit the new guide bushing (5) using the special tools.
8) Press fit the new oil seal (3) using the special tools until the stopper ring groove on the outer tube can be seen.

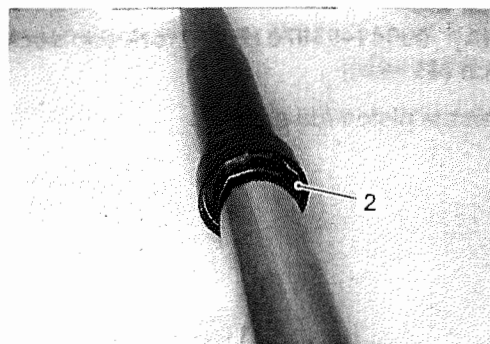
Special tool

TOOL (A): 09940-52861 (Front fork oil seal installer set)



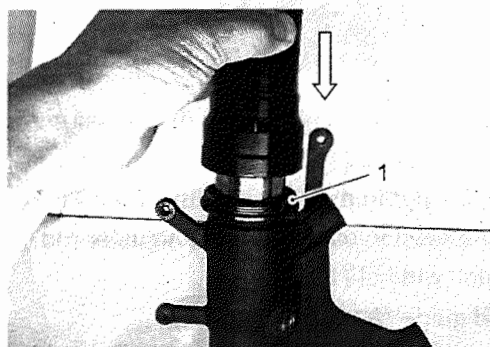
IB14J1220045-01

- 9) When installing the stopper ring (2), make sure that the stopper ring is fitted securely into the groove.



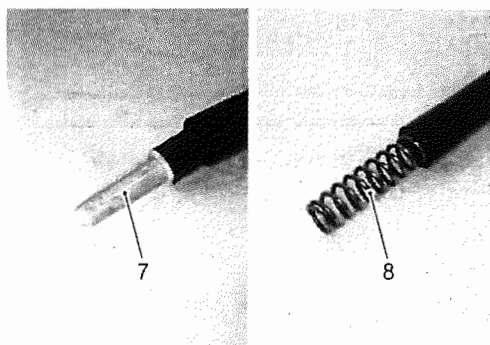
IB14J1220026-01

- 10) Press fit the dust seal (1).



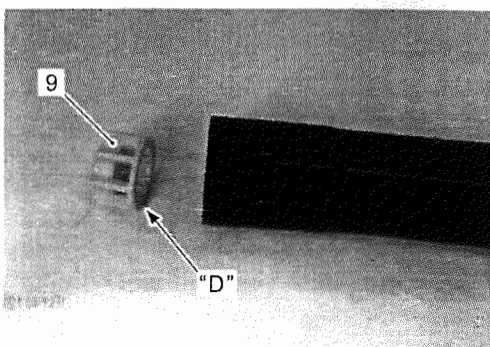
IB14J1220027-01

- 11) Insert the spring collar A (7) and spring (8) into the inner tube.



IB14J1220028-01

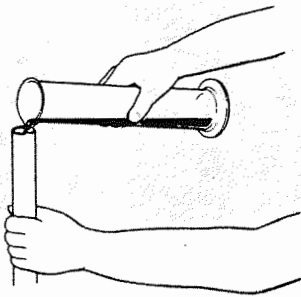
- 12) When inserting the spring collar B (9) into the inner tube, face the flange "D" of the spring collar B to the spring side.



IB14J1220029-01

- 13) Pour specified fork oil until its surface passes the side holes of inner tube.

FORK : Fork Oil (FORK OIL SS-47 or equivalent)

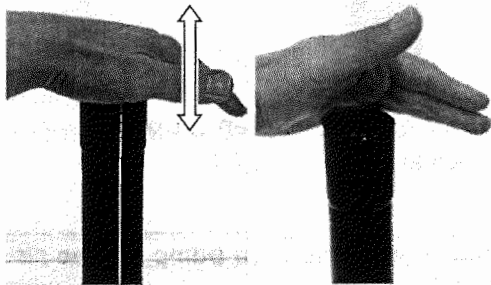


1649G1220026-02

- 14) Slowly stroke the outer tube more than ten times to pump out air.

NOTE

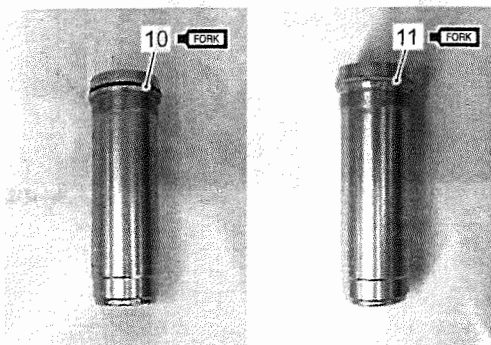
Take extreme attention to pump out air completely.



1B14J1220032-01

- 15) Apply fork oil to the new oil seal (10) and new piston ring B (11).
16) When installing the new oil seal (10) and new piston ring B (11) to the rod guide case, apply fork oil.

FORK : Fork Oil (FORK OIL SS-47 or equivalent)

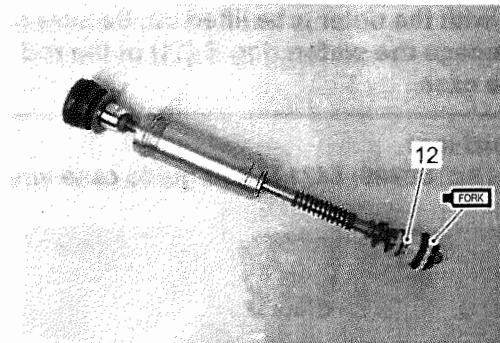


1B14J1220030-01

- 17) Install the piston rod parts to the piston rod (12) in the reverse order of removal.

- 18) Apply fork oil to the piston ring A.

FORK : Fork Oil (FORK OIL SS-47 or equivalent)



1B14J1220031-02

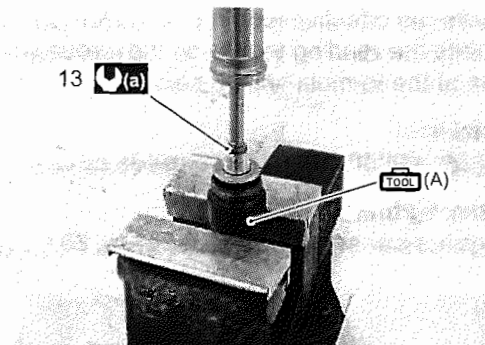
- 19) Tighten the piston rod nut (13) with the special tool and vise.

Special tool

TOOL (A): 09941-53670 (Front fork cap socket wrench (45 mm))

Tightening torque

Piston rod nut (a): 28 N·m (2.8 kgf-m, 20.0 lbf-ft)



1B14J1220033-01

2B-9 Front Suspension:

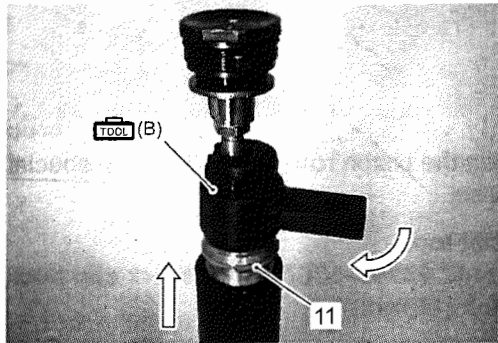
- 20) Insert the piston rod assembly into the inner tube with the outer tube lifted up and temporarily tighten the rod guide case by hand.

NOTICE

Insert the piston rod assembly into the inner tube with the outer tube lifted up. Be sure not to damage the piston ring B (11) of the rod guide case.

Special tool

TOOL (B): 09940-84711 (Rod guide case wrench)



IB14J1220034-02

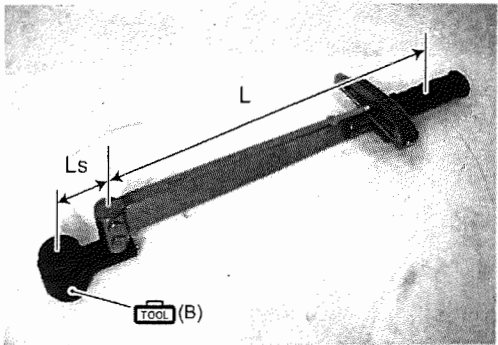
- 21) Tighten the rod guide case in the following procedures:
Measure the effective length L of the torque wrench.
Calculate the reading torque on the torque wrench by use of the formula shown below.

Special tool

TOOL (B): 09940-84711 (Rod guide case wrench)

Tightening torque

Rod guide case: 90 N·m (9.0 kgf·m, 65.0 lbf·ft)

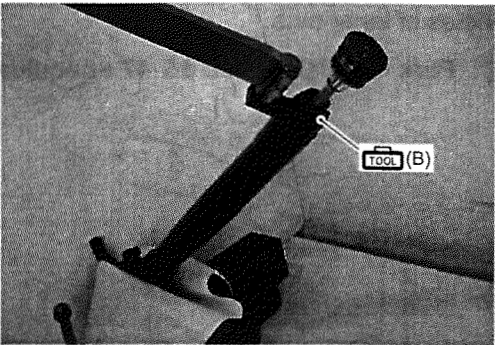


IB14J1220044-02

$$T = \frac{L \times Ts}{L + Ls}$$

I933H1310046-01

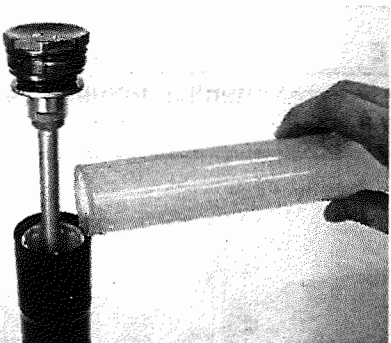
T: Reading torque on the torque wrench
Ts: Specified torque 90 N·m
Ls: 0.05 m (1.97 in)
L: Effective length of the torque wrench



IB14J1220035-02

- 22) Pour specified fork oil up to the top of the rod guide case.

FORK : Fork Oil (FORK OIL SS-47 or equivalent)

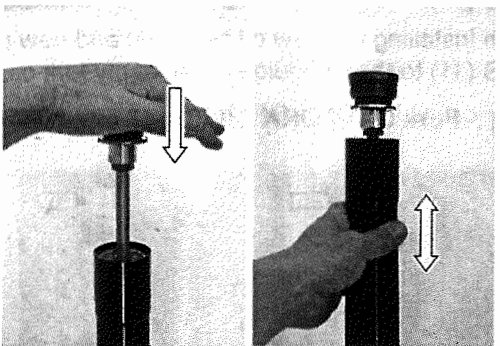


IB14J1220036-01

- 23) Push the front fork cap, then stroke the outer tube several times to pump out air.

NOTE

Take extreme attention to pump out the air completely.



IB14J1220037-01

- 24) Hold the front fork vertically and adjust the oil level using the special tool.

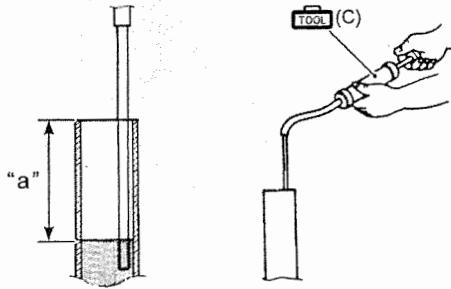
Special tool

TOOL (C): 09943-74111 (Front fork oil level gauge)

Fork oil level "a"

90 mm (3.5 in)

80 mm (3.1 in) 10 min. after adjustment

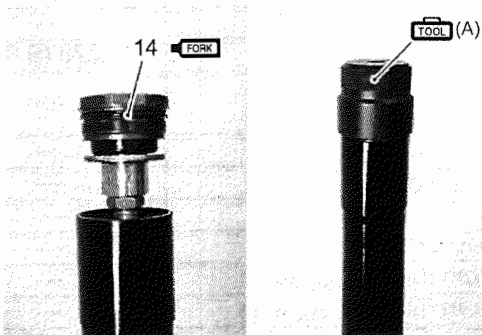


I947H1220038-01

- 25) Apply fork oil to the new O-ring (14).
26) Temporarily tighten the front fork cap.

Special tool

TOOL (A): 09941-53670 (Front fork cap socket wrench (45 mm))



IB14J1220038-02

- 27) After installing the front fork, adjust the spring preload. Refer to "Front Suspension Adjustment" (Page 2B-3).

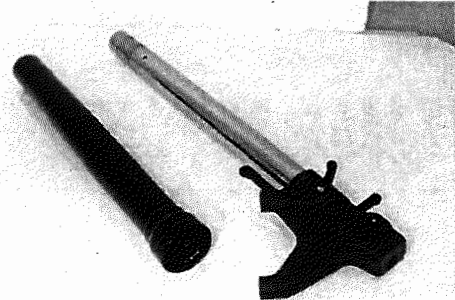
Front Fork Parts Inspection

BENB15J22206005

Refer to "Front Fork Disassembly and Assembly" (Page 2B-4).

Inner and Outer Tubes

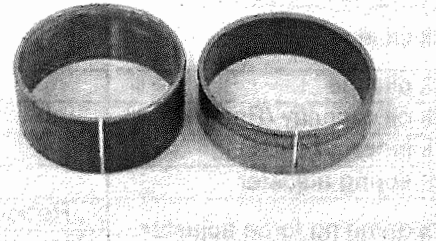
Inspect the inner tube and outer tube for scratches.



IB14J1220039-01

Slide Bushing / Guide Bushing

Inspect the slide bushing and guide bushing for wear or damage. If they are worn or damaged, replace them with new ones. If they are not clean, clean them with a nylon brush and fork oil.



I947H1220041-01

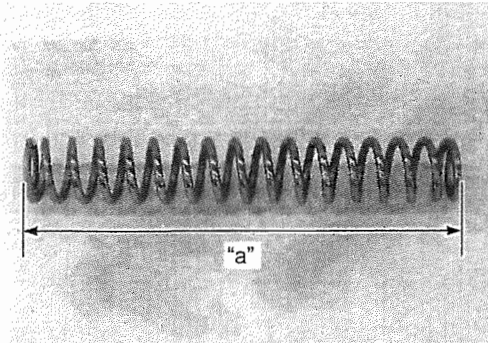
2B-11 Front Suspension:

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 "a"

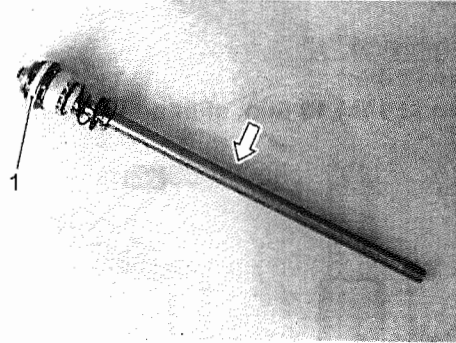
Service limit: 238 mm (9.0 in)



1947H1220042-02

Piston Rod / Piston Ring

Inspect the piston rod and piston ring A (1) for wear or damage. If any defects are found, replace the piston rod or piston ring A with a new one.



IB14J1220040-02

Specifications

Service Data

BENB15J22207001

Suspension

Unit: mm (in)

Item	Standard	Limit
Front fork stroke	120 (4.7)	—
Front fork spring free length	233.4 (9.19)	228 (9.0)
Front fork oil level	90 (3.5)	—
	80 (3.1) 10 min. after adjustment	—
Front fork oil type	FORK OIL SS-47 or an equivalent fork oil	—
Front fork oil capacity (Each leg)	420 ml (14.2/14.8 US/Imp oz)	—
Front fork inner tube O.D	41 (1.6)	—
Front fork spring adjuster	4 turns in from softest position	—
Front fork damping force adjuster	Rebound	4 turns out from full hard position
	Compression	5 turns out from full hard position

Tightening Torque Specifications

BENB15J22207002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Front fork cap	35	3.5	25.5	☞ (Page 2B-3)
Front fork lower clamp bolt	23	2.3	16.5	☞ (Page 2B-3)
Front fork upper clamp bolt	23	2.3	16.5	☞ (Page 2B-3)
Handlebar clamp bolt	23	2.3	16.5	☞ (Page 2B-3)
Piston rod nut	28	2.8	20.0	☞ (Page 2B-8)
Rod guide case	90	9.0	65.0	☞ (Page 2B-9)

NOTE

The tightening torque(s) also specified in:
"Front Fork Components" (Page 2B-1)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J22208001

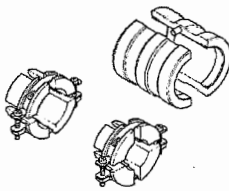
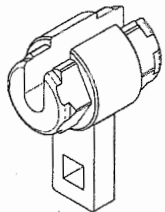
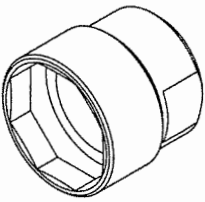
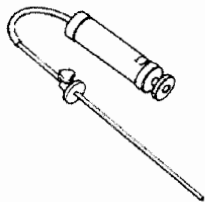
Material	SUZUKI recommended product or Specification	Note
Fork Oil	FORK OIL SS-47 or equivalent	☞ (Page 2B-6) / ☞ (Page 2B-7) / ☞ (Page 2B-8) / ☞ (Page 2B-8) / ☞ (Page 2B-9)

NOTE

Required service material(s) also described in:
 “Front Fork Components” (Page 2B-1)

Special Tool

BENB15J22208002

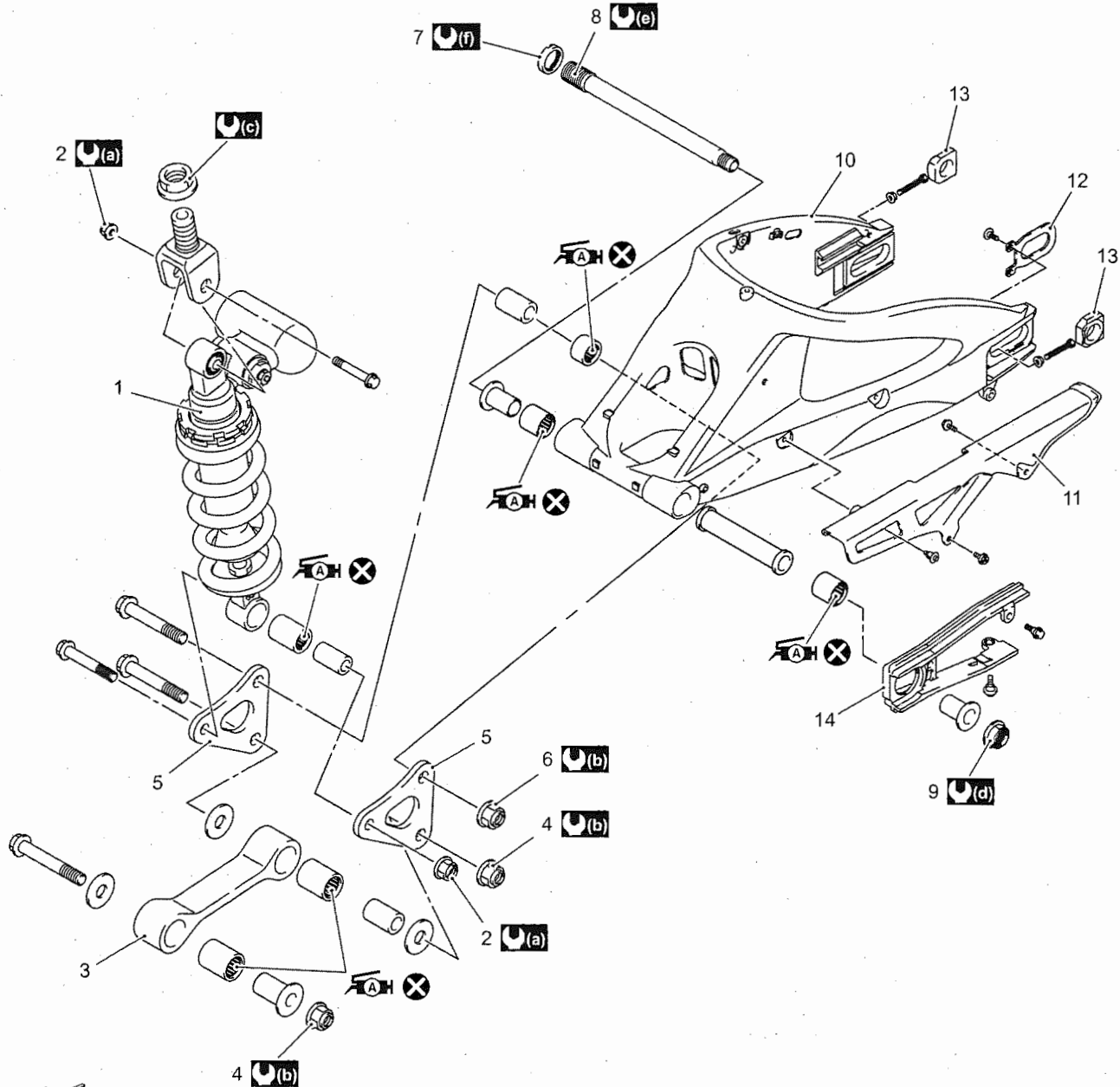
09940-52861 Front fork oil seal installer set ☞ (Page 2B-7) 	09940-84711 Rod guide case wrench ☞ (Page 2B-5) / ☞ (Page 2B-9) / ☞ (Page 2B-9) 
09941-53670 Front fork cap socket wrench (45 mm) ☞ (Page 2B-2) / ☞ (Page 2B-3) / ☞ (Page 2B-4) / ☞ (Page 2B-6) / ☞ (Page 2B-8) / ☞ (Page 2B-10) 	09943-74111 Front fork oil level gauge ☞ (Page 2B-10) 

Rear Suspension

Repair Instructions

Rear Suspension Components

BENB15J22306001



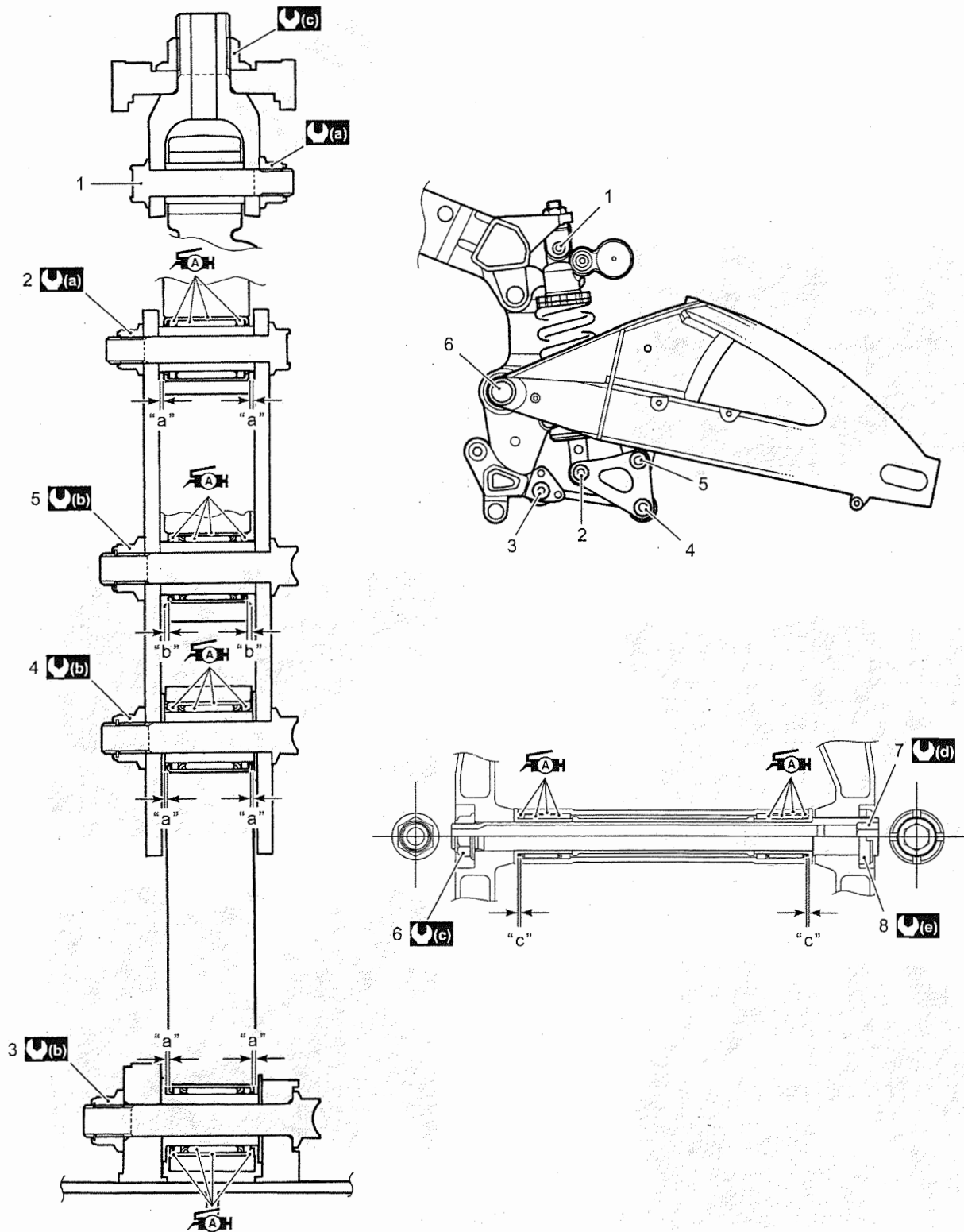
IB14J1230001-01

1. Rear shock absorber	9. Swingarm pivot nut	U(c) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
2. Rear shock absorber mounting nut	10. Swingarm	U(d) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
3. Cushion rod	11. Chain case	U(e) : 15 N·m (1.5 kgf-m, 11.0 lbf-ft)
4. Cushion rod mounting nut	12. Plate	U(f) : 90 N·m (9.0 kgf-m, 65.0 lbf-ft)
5. Cushion lever	13. Chain adjuster	AH : Apply grease to the bearing.
6. Cushion lever mounting nut	14. Chain buffer	X : Do not reuse.
7. Swingarm pivot lock-nut	U(a) : 50 N·m (5.0 kgf-m, 36.0 lbf-ft)	
8. Swingarm pivot shaft	U(b) : 98 N·m (9.8 kgf-m, 71.0 lbf-ft)	



Rear Suspension Assembly Construction

BENB15J22306002



IB14J1230037-03

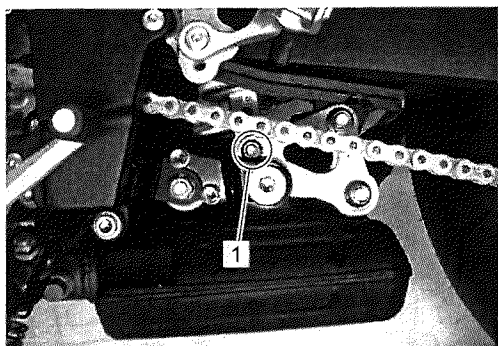
1. Rear shock absorber upper mounting bolt	7. Swingarm pivot shaft	⌚(b) : 98 N·m (9.8 kgf-m, 71.0 lbf-ft)
2. Rear shock absorber lower mounting nut	8. Swingarm pivot lock nut	⌚(c) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
3. Cushion rod front mounting nut	"a": 0.5 mm (0.02 in)	⌚(d) : 15 N·m (1.5 kgf-m, 11.0 lbf-ft)
4. Cushion rod rear mounting nut	"b": 1.5 mm (0.06 in)	⌚(e) : 90 N·m (9.0 kgf-m, 65.0 lbf-ft)
5. Cushion lever mounting nut	"c": 0 - 0.5 mm (0 - 0.02 in)	⌚(f) : Apply grease to the bearing.
6. Swingarm pivot nut	⌚(a) : 50 N·m (5.0 kgf-m, 36.0 lbf-ft)	

Rear Shock Absorber Removal and Installation

BENB15J22306003

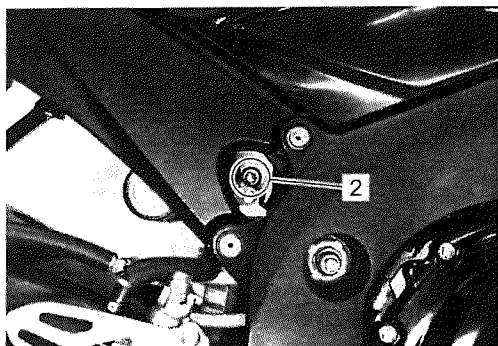
Removal

- 1) Remove the right cowl. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Support the motorcycle with a jack to relieve load on the rear shock absorber.
- 3) Remove the rear shock absorber lower mounting bolt and nut (1).



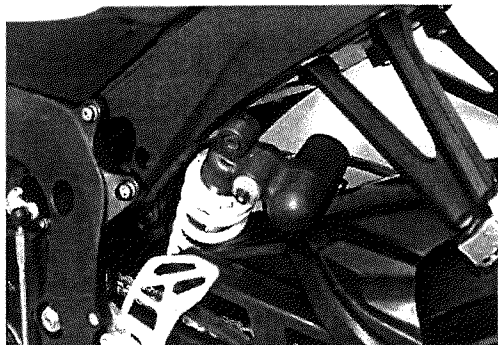
IB14J1230038-01

- 4) Remove the rear shock absorber upper mounting bolt and nut (2).



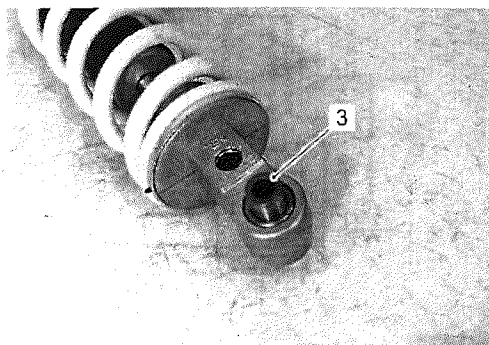
IB14J1230039-01

- 5) Remove the rear shock absorber upward.



IB14J1230040-01

- 6) Remove the spacer (3) from the rear shock absorber.



IB14J1230002-01

Installation

Install the rear shock absorber in the reverse order of removal. Pay attention to the following points:

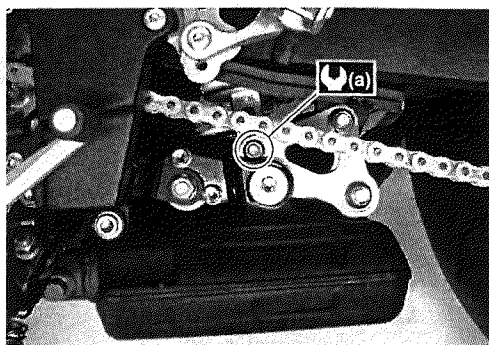
- Tighten the rear shock absorber upper/lower mounting bolts and nuts.

Tightening torque

Rear shock absorber mounting nut (a): 50 N·m (5.0 kgf-m, 36.0 lbf-ft)



IB14J1230041-01



IB14J1230042-01

Rear Suspension Inspection

BENB15J22306004

Refer to "Rear Suspension Inspection" in Section 0B (Page 0B-20).

Rear Shock Absorber Inspection

BENB15J22306005

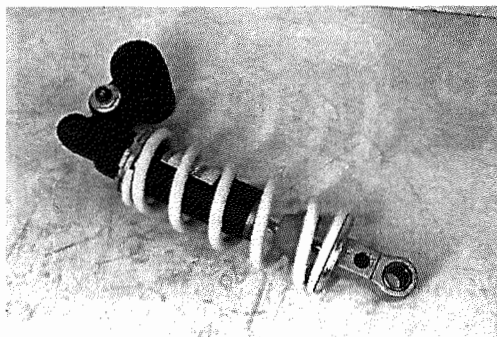
Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-3).

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

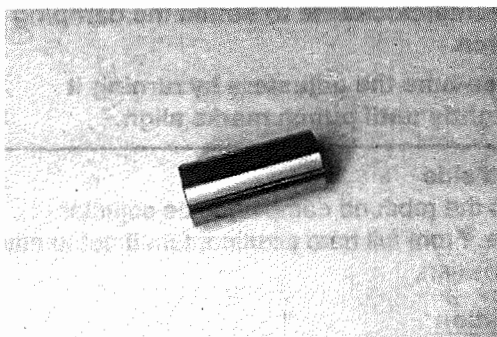
Do not attempt to disassemble the rear shock absorber. It is unserviceable.



IB14J1230003-01

Spacer

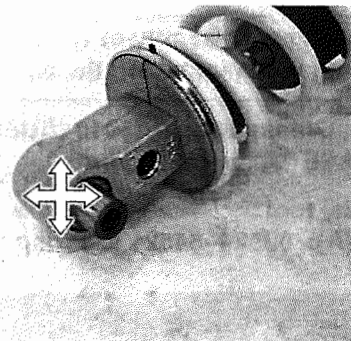
Inspect the spacer for any flaws or other damage. If any defect is found, replace the spacer with a new one.



IB14J1230043-01

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. Refer to "Rear Shock Absorber Bearing Removal and Installation" (Page 2C-4).



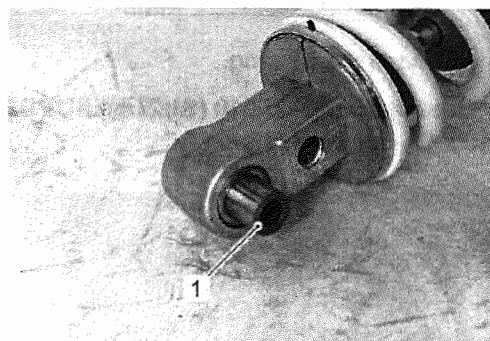
IB14J1230004-01

Rear Shock Absorber Bearing Removal and Installation

BENB15J22306006

Removal

- 1) Remove the spacer (1) from the rear shock absorber. Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-3).

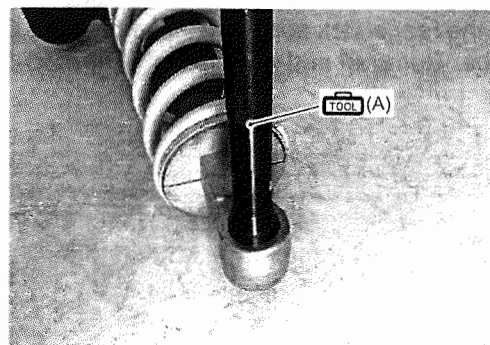


IB14J1230005-01

- 2) Remove the rear shock absorber bearing with the special tool.

Special tool

TOOL (A): 09943-88211 (Pinion bearing installer)



IB14J1230006-01

Installation

- 1) Press the new bearing into the rear shock absorber at 0.5 mm (0.02 in) depth "a" from the rear shock absorber side surface with the special tool and suitable size socket wrench. Refer to "Rear Suspension Assembly Construction" (Page 2C-2).

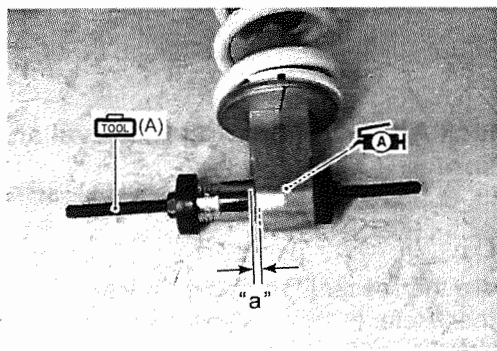
NOTE

Apply a small quantity of the grease to housing when installing the bearing.

FAH: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

Special tool

TOOL (A): 09924-84521 (Bearing installer set)

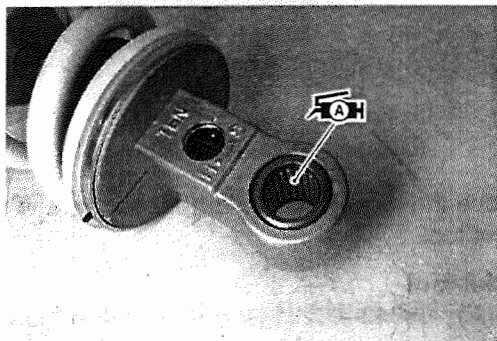


IB14J1230007-02

"a": 0.5 mm (0.02 in)

- 2) Apply grease to the bearing.

FAH: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



IB14J1230008-01

- 3) Install the rear shock absorber. Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-3).

Rear Shock Absorber Adjustment

BENB15J22306007

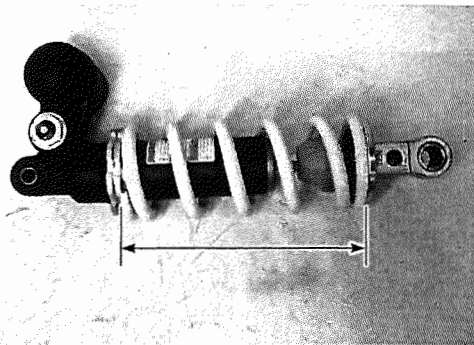
After installing the rear suspension, adjust the spring pre-load and damping force as follows:

Spring Pre-load Adjustment

- The set length 176 mm (6.93 in) provides the maximum spring pre-load.
- The set length 186 mm (7.32 in) provides the minimum spring pre-load.

STD position

181 mm (7.1 in)



IB14J1230009-01

Damping Force Adjustment

NOTE

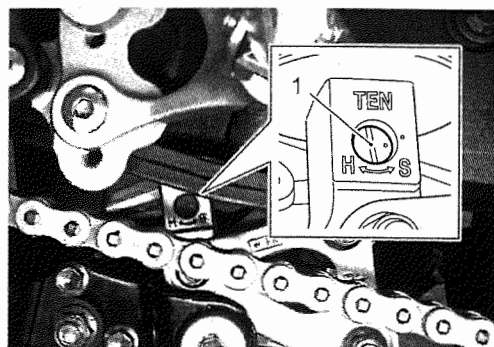
- Turn the adjuster clockwise to stiffen the damping force and turn it counterclockwise to soften the damping force.
- Fine-tune the adjusters by turning it slightly until punch marks align.

Rebound side

Fully turn the rebound damping force adjuster (1) clockwise. From full hard position, turn it out to standard setting position.

STD position

2 turns out from full hard position



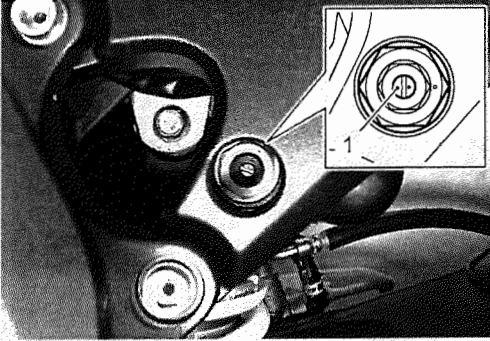
IB14J1230044-02

Compression side (Low speed)

Fully turn the compression damping force (Low speed) adjuster (1) clockwise. From full hard position, turn it out to standard setting position.

STD position

2-1/4 turns out of from full hard position



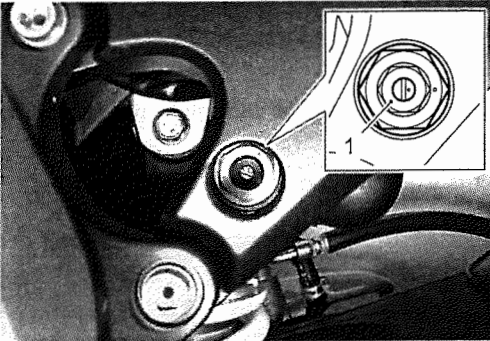
IB14J1230045-01

Compression side (High speed)

Fully turn the compression damping force (High speed) adjuster (1) clockwise. From full hard position, turn it out to standard setting position.

STD position

3 turns out of from full hard position



IB14J1230046-01

Rear Shock Absorber Disposal

BENB15J22306008

Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-3).

The rear shock absorber unit contains high-pressure nitrogen gas.

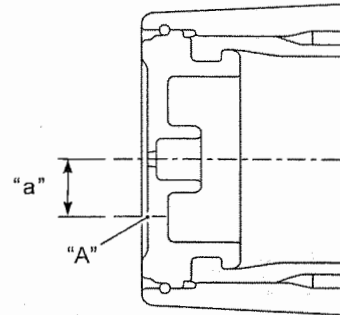
⚠ WARNING

- Mishandling the rear shock absorber can cause explosion.
- Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.
- Never apply heat or disassemble the damper unit since it can explode or oil can splash hazardously.
- Release gas pressure before disposing.

Gas Pressure Release

When discarding the rear shock absorber, be sure to release gas pressure from the unit following the procedures:

- 1) Mark the drill center at the location "A" using a center punch.



IB14J1230010-01

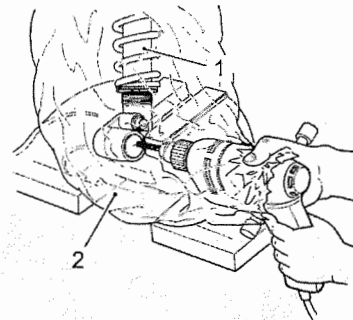
"a": 9 mm (0.35 in)

"A": Mark the drill hole

- 2) Wrap rear shock absorber (1) with a plastic bag (2) and fix it on a vise as shown in the figure.
- 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.



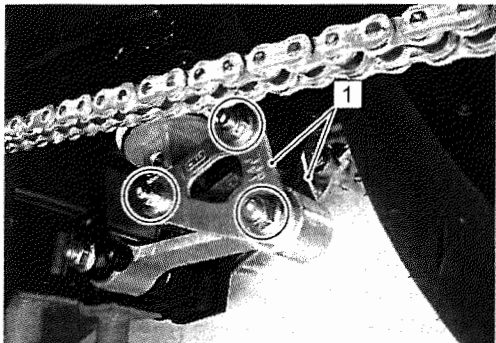
IB23H1230010-01

Cushion Lever Removal and Installation

BENB15J22306009

Removal

- 1) Remove the left and right cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the exhaust pipe. Refer to "Exhaust Pipe / Muffler Removal and Installation" in Section 1K (Page 1K-12).
- 3) Support the motorcycle with a jack to relieve load on the cushion levers.
- 4) Remove the cushion levers (1) and washers.



IB14J1230047-01

Installation

Install the cushion levers in the reverse order of removal. Pay attention to the following points:

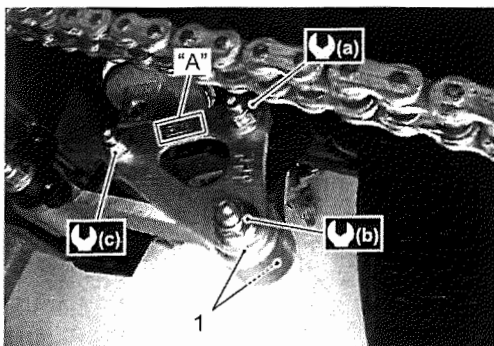
- Set the cushion levers so that the arrow mark "A" points forward.
- Install the washers (1) between the cushion rod and cushion levers.
- Tighten each nut to the specified torque.

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, 36.0 lbf-ft)



IB14J1230048-01

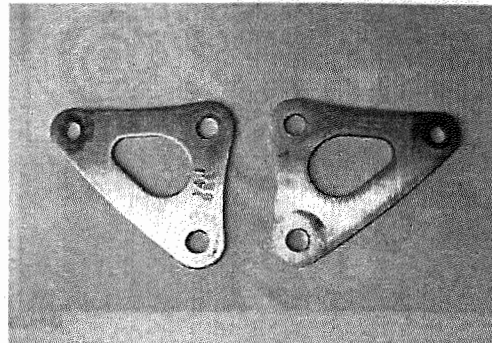
Cushion Lever Inspection

BENB15J22306010

Refer to "Cushion Lever Removal and Installation" (Page 2C-7).

Cushion Lever

Inspect the cushion levers for damage. If any defects are found, replace the cushion levers with new ones.



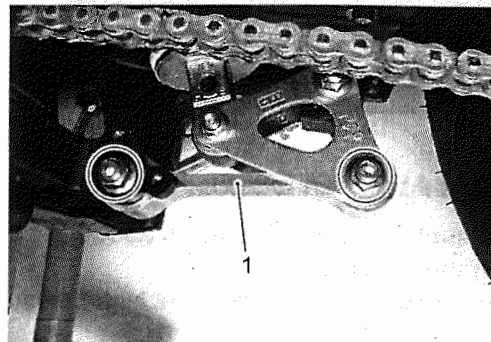
IB14J1230049-01

Cushion Rod Removal and Installation

BENB15J22306011

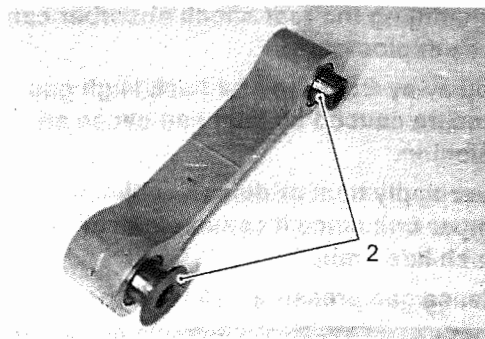
Removal

- 1) Remove the left and right cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the exhaust pipe. Refer to "Exhaust Pipe / Muffler Removal and Installation" in Section 1K (Page 1K-12).
- 3) Support the motorcycle with a jack to relieve load on the cushion rod.
- 4) Remove the cushion rod (1) and washers.



IB14J1230050-01

- 5) Remove the spacers (2).

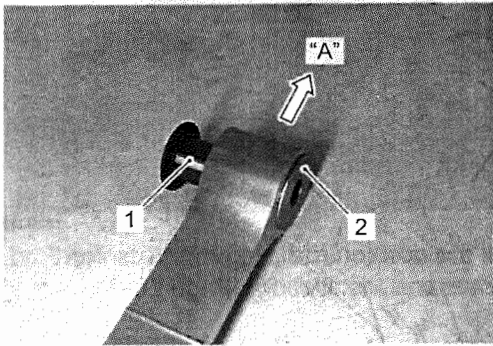


IB14J1230051-01

Installation

Install the cushion rod in the reverse order of removal. Pay attention to the following points:

- Before installing the cushion rod to the frame, insert the spacer (1) into the bearing from the left side.
- Install the washer (2) between the cushion rod right side and frame.



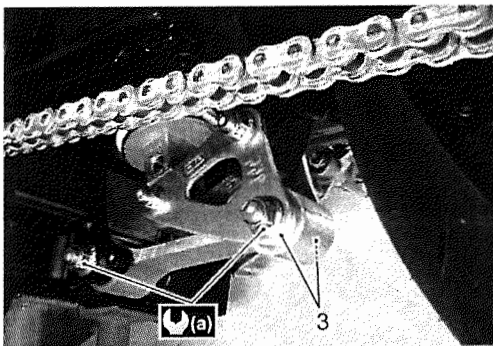
IB14J1230052-01

"A": Forward

- Install the washers (3) between cushion rod and cushion levers.
- Tighten cushion rod mounting nuts to the specified torque.

Tightening torque

Cushion rod mounting nut (a): 98 N·m (9.8 kgf-m, 71.0 lbf-ft)



IB14J1230053-02

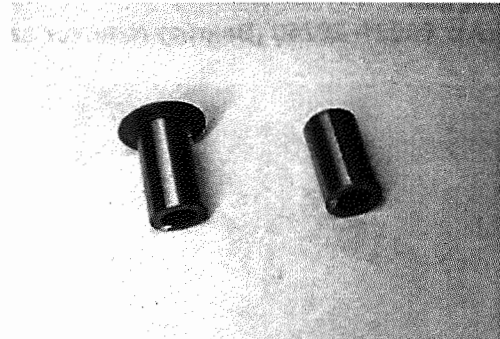
Cushion Rod Inspection

BENB15J22306012

Refer to "Cushion Rod Removal and Installation" (Page 2C-7).

Spacer

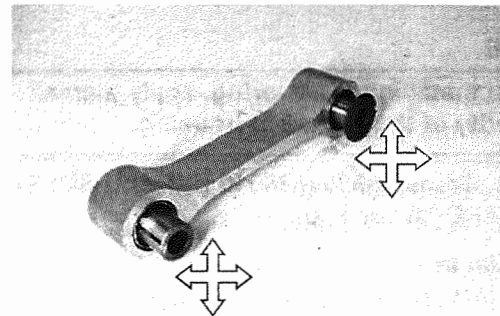
- 1) Inspect the spacers for any flaws or other damage. If any defects are found, replace it with a new one.



IB14J1230054-01

Cushion Rod Bearing

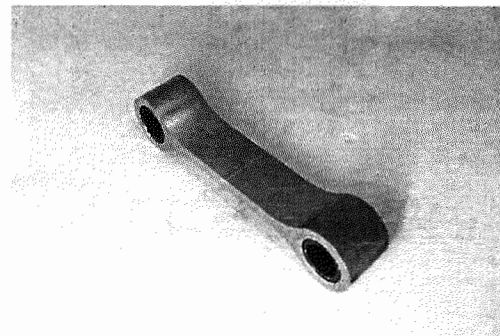
- 1) Insert the spacers into bearings.
- 2) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one. Refer to "Cushion Rod Bearing Removal and Installation" (Page 2C-9).



IB14J1230055-01

Cushion Rod

Inspect the cushion rod for damage. If any defects are found, replace the cushion rod with a new one.



IB14J1230056-01


Cushion Rod Bearing Removal and Installation

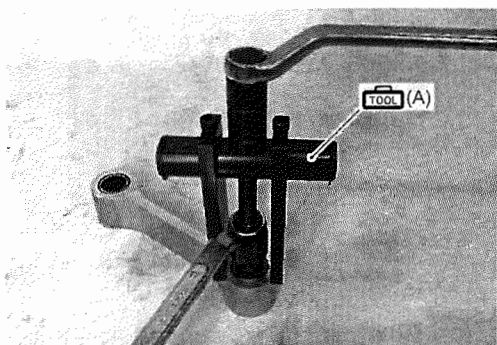
BENB15J22306013

Removal

- 1) Remove the cushion rod. Refer to "Cushion Rod Removal and Installation" (Page 2C-7).
- 2) Remove the cushion rod bearings with the special tool.

Special tool

 (A): 09921-20240 (Bearing remover set)




IB14J1230057-01

Installation


- 1) Press the new bearings into the cushion rod at 0.5 mm (0.02 in) depth "a" from the cushion rod side surface with the special tool and suitable size socket wrench.

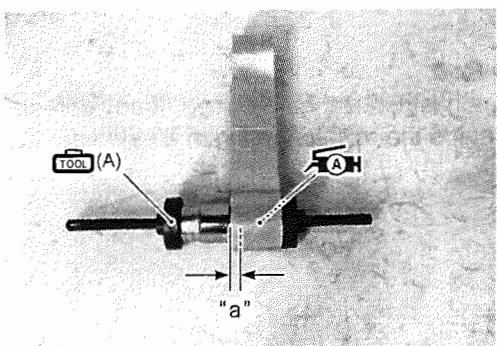
NOTE

When installing the bearing, apply a small quantity of the grease to housing.

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

Special tool


 (A): 09924-84521 (Bearing installer set)

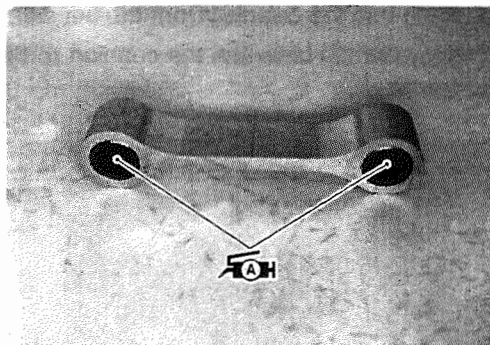


IB14J1230058-02

"a": 0.5 mm (0.02 in)

- 2) Apply grease to the bearings.

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



IB14J1230059-01

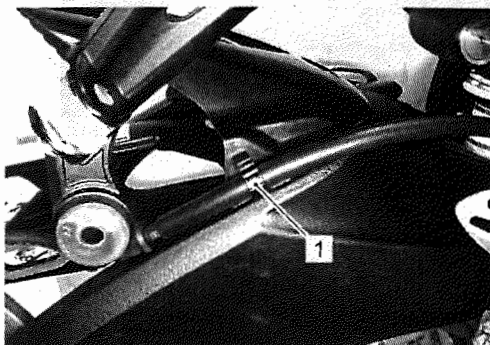
- 3) Install the cushion rod. Refer to "Cushion Rod Removal and Installation" (Page 2C-7).

Swingarm Removal and Installation

BENB15J22306014

Removal

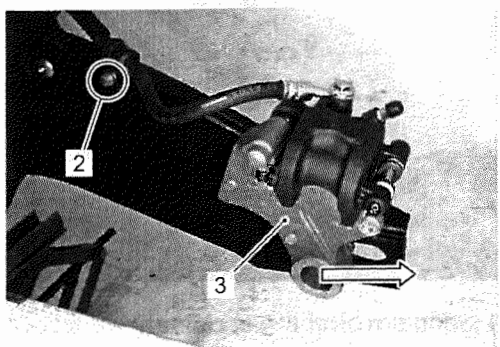
- 1) Cut the drive chain. Refer to "Drive Chain Replacement" in Section 3A (Page 3A-7).
- 2) Remove the left and right cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Remove the exhaust pipe. Refer to "Exhaust Pipe / Muffler Removal and Installation" in Section 1K (Page 1K-12).
- 4) Remove the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- 5) Disconnect the brake hose from the brake hose clamp (1).



IB14J1230011-01

- 6) Remove the brake hose clamp bolt (2).

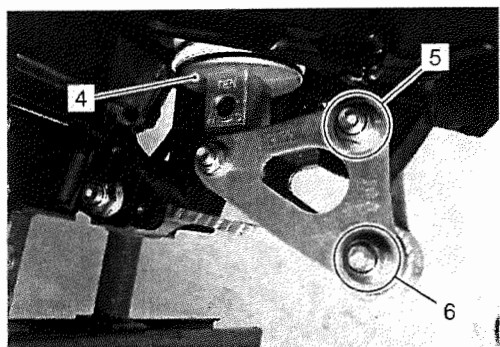
- 7) Remove the rear brake caliper assembly (3) from the swingarm.



IB14J1230012-01

- 8) Remove the rear shock absorber (4) and cushion lever mounting bolt and nut (5). Refer to "Rear Shock Absorber Removal and Installation" (Page 2C-3).


- 9) Loosen the cushion rod rear mounting nut (6).

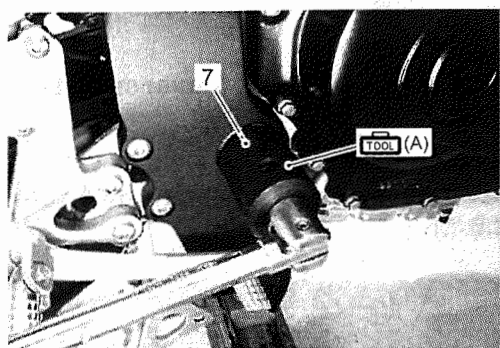


IB14J1230013-01

- 10) Remove the swingarm pivot shaft lock-nut (7) with the special tool.

Special tool


 (A): 09940-14940 (Swingarm pivot thrust adjuster wrench)

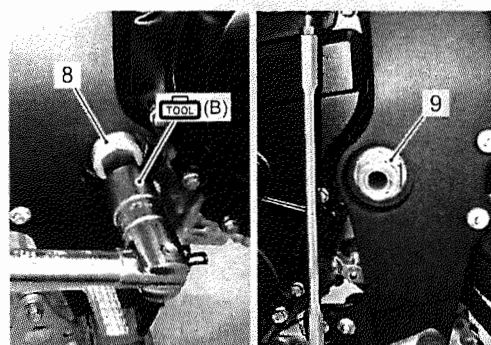


IB14J1230014-02

- 11) Hold the swingarm pivot shaft (8) with the special tool and remove the swingarm pivot nut (9).

Special tool


 (B): 09944-28321 (Hexagon socket (19 mm))

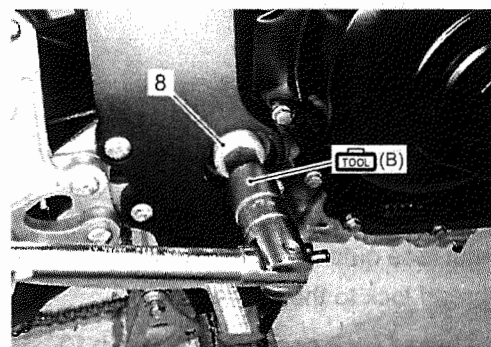


IB14J1230015-01

- 12) Remove the swingarm assembly by removing the swingarm pivot shaft (8) with the special tool.

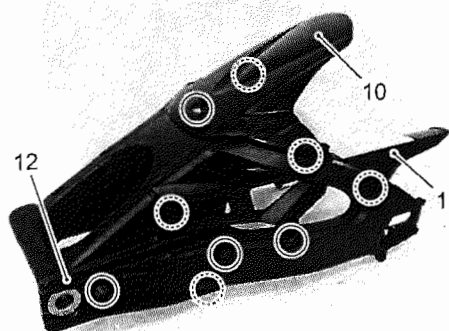
Special tool

 (B): 09944-28321 (Hexagon socket (19 mm))



IB14J1230016-01

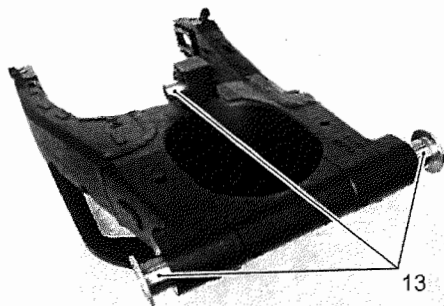
- 13) Remove the rear fender (Lower) (10), chain case (11) and chain buffer (12) from the swingarm.



IB14J1230017-01

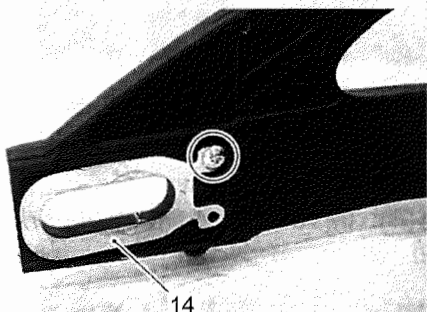
2C-11 Rear Suspension:

- 14) Remove the spacers (13) from the swingarm.



IB14J1230018-01

- 15) Remove the plate (14).



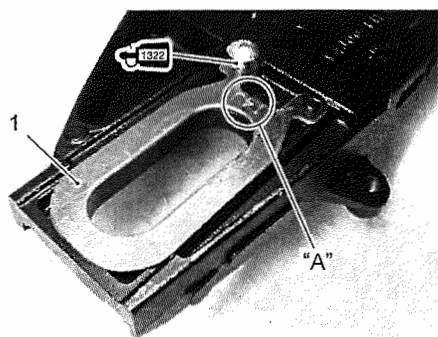
IB14J1230019-01

Installation

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

- When installing the plate (1), stamped mark "A" on the plate must face outside.
- Apply thread lock to the screw.

 **1322** : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)



IB14J1230020-01

- Apply thread lock to the rear fender (Lower) mounting bolts (2) and tighten them to the specified torque.

 **1322** : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Rear fender (Lower) mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)




IB14J1230060-02

- Adjust swingarm pivot thrust clearance in the following procedures:

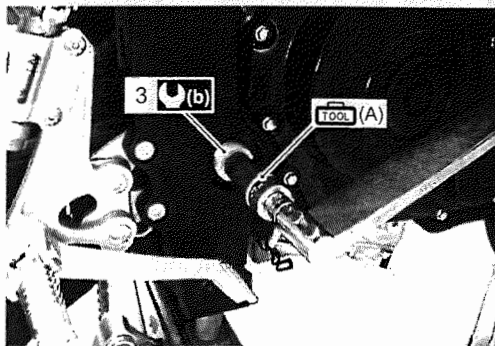
- a. Insert the swingarm pivot shaft (3) and tighten it to the specified torque.

Special tool

 **TOOL (A)**: 09944-28321 (Hexagon socket (19 mm))

Tightening torque


Swingarm pivot shaft (b): 15 N·m (1.5 kgf-m, 11.0 lbf-ft)



IB14J1230021-02

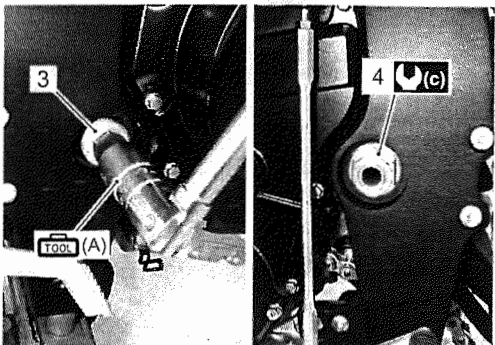
- b. Hold the swingarm pivot shaft (3) with the special tool and tighten the swingarm pivot nut (4) to the specified torque.

Special tool

 **TOOL (A)**: 09944-28321 (Hexagon socket (19 mm))

Tightening torque


Swingarm pivot nut (c): 100 N·m (10.0 kgf-m, 72.5 lbf-ft)



IB14J1230022-02

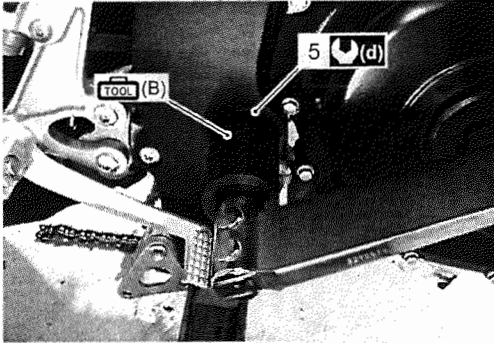
- c. Tighten the swingarm pivot lock-nut (5) to the specified torque with the special tool.

Special tool

 (B): 09940-14940 (Swingarm pivot thrust adjuster wrench)

Tightening torque

Swingarm pivot lock-nut (d): 90 N·m (9.0 kgf-m, 65.0 lbf-ft)



IB14J1230023-02

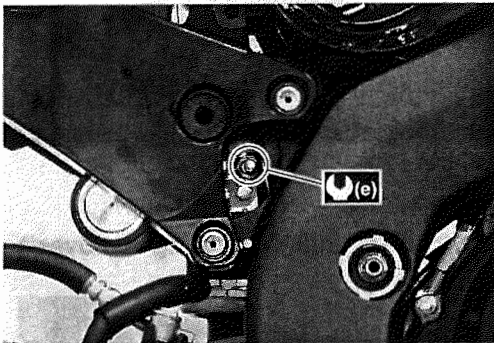
- Tighten the cushion lever, cushion rod and rear shock absorber mounting bolts and nuts to the specified torque.

Tightening torque

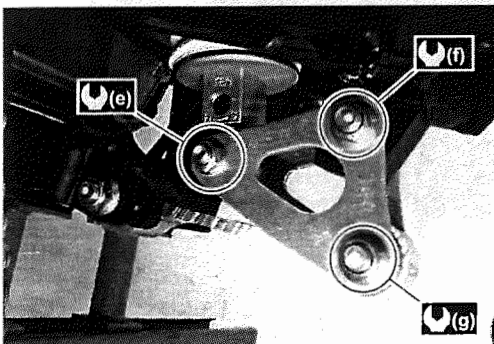
Rear shock absorber mounting nut (e): 50 N·m (5.0 kgf-m, 36.0 lbf-ft)

Cushion lever mounting nut (f): 98 N·m (9.8 kgf-m, 71.0 lbf-ft)

Cushion rod mounting nut (g): 98 N·m (9.8 kgf-m, 71.0 lbf-ft)



IB14J1230061-01



IB14J1230024-03

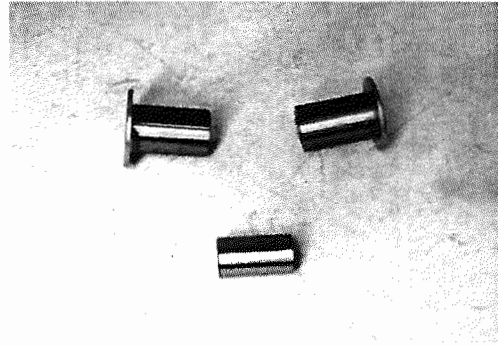
Swingarm Related Parts Inspection

BENB15J22306015

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.



IB14J1230025-01

Chain Buffer

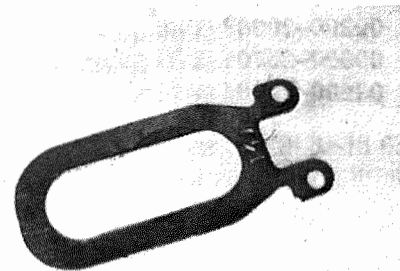
Inspect the chain buffer for wear and damage. If any defect is found, replace the chain buffer with a new one.



IB14J1230026-01

Plate

Inspect the plate for damage and excessive bend. If any defect is found, replace the plate with a new one.

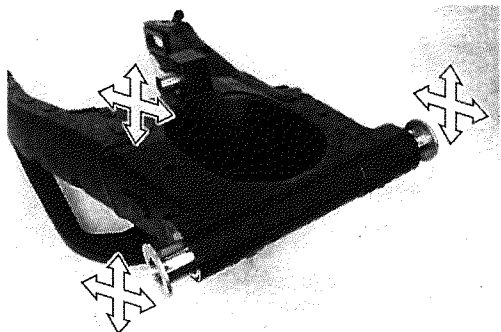


IB14J1230027-01

2C-13 Rear Suspension:

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. Refer to "Swingarm Bearing Removal and Installation" (Page 2C-13).



IB14J1230028-01

Swingarm

Inspect the swingarm for damage. If any defect is found, replace the swingarm with a new one.






IB14J1230029-01

Swingarm Pivot Shaft

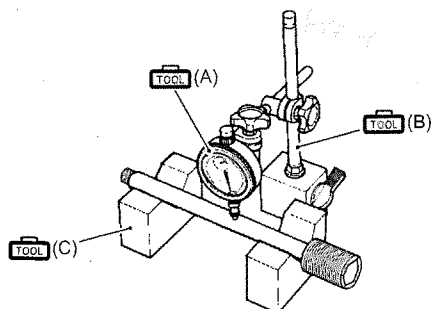
Measure the swingarm pivot shaft runout using the dial gauge. If the runout exceeds the service limit, replace the pivot shaft.

Special tool

-  (A): 09900-20607 (Dial gauge)
-  (B): 09900-20701 (Dial gauge chuck)
-  (C): 09900-21304 (V blocks)

Swingarm pivot shaft runout

Service limit: 0.3 mm (0.01 in)



IB14J1230030-03


Swingarm Bearing Removal and Installation

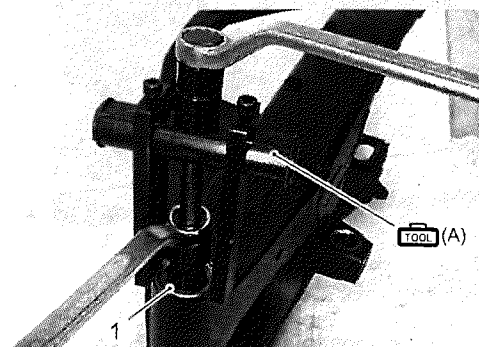
BENB15J22306016

Removal

- 1) Remove the swingarm. Refer to "Swingarm Removal and Installation" (Page 2C-9).
- 2) Remove the swingarm pivot bearings (1) on both sides using the special tool.

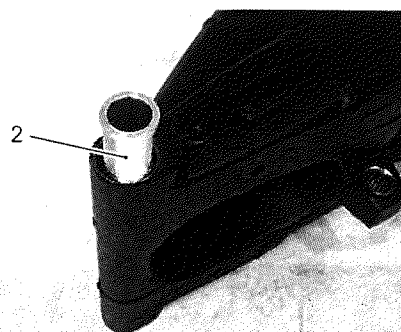
Special tool

 (A): 09921-20240 (Bearing remover set)



IB14J1230031-01


- 3) Remove the center spacer (2).

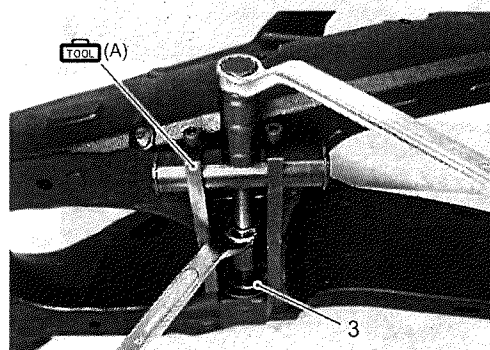


IB14J1230032-01

- 4) Remove the cushion lever bearing (3) using the special tool.

Special tool

 (A): 09921-20240 (Bearing remover set)



IB14J1230033-01

Installation


- 1) 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. Refer to "Rear Suspension Assembly Construction" (Page 2C-2).

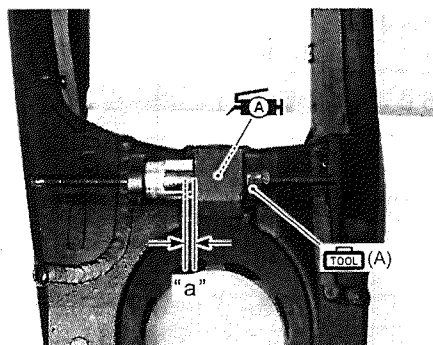
NOTE

Apply a small quantity of the grease to housing and stamped mark on the bearing must face outside.

 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

Special tool

 **(A): 09924-84521 (Bearing installer set)**



IB14J1230034-02

"a": 1.5 mm (0.06 in)

- 2) Install the center spacer.

- 3) Press the pivot bearings into the swingarm pivot to the depth "b" of 0 – 0.5 mm (0 – 0.02 in) from the edge with the special tool and suitable size socket wrench. Refer to "Rear Suspension Assembly Construction" (Page 2C-2).

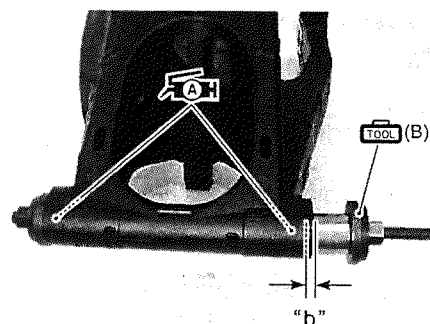
NOTE

When installing the bearing, apply a small quantity of the grease to housing and stamped mark on the bearing must face outside.

 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

Special tool

 **(B): 09941-34513 (Bearing installer)**

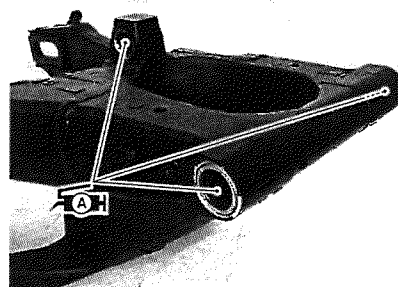


IB14J1230035-01

"b": 0 – 0.5 mm (0 – 0.02 in)

- 4) Apply grease to the bearings.

 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**



IB14J1230036-01

- 5) Install the swingarm. Refer to "Swingarm Removal and Installation" (Page 2C-9).

Specifications

Service Data

BENB15J22307001

Suspension

Unit: mm (in)

Item	Standard		Limit
Rear shock absorber spring pre-set length	181 (7.1)		—
Rear shock absorber damping force adjuster	Rebound	2 turns out from full hard position	—
	Compression	Lo: 2-1/4 turns out from full hard position Hi: 3 turns out from full hard position	—
Rear wheel travel	130 (5.1)		—
Swingarm pivot shaft runout	—		0.3 (0.01)

Tightening Torque Specifications

BENB15J22307002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Rear shock absorber mounting nut	50	5.0	36.0	☞(Page 2C-3) / ☞(Page 2C-12)
Cushion lever mounting nut	98	9.8	71.0	☞(Page 2C-7) / ☞(Page 2C-12)
Cushion rod mounting nut	98	9.8	71.0	☞(Page 2C-7) / ☞(Page 2C-8) / ☞(Page 2C-12)
Rear shock absorber lower mounting nut	50	5.0	36.0	☞(Page 2C-7)
Rear fender (Lower) mounting bolt	10	1.0	7.0	☞(Page 2C-11)
Swingarm pivot shaft	15	1.5	11.0	☞(Page 2C-11)
Swingarm pivot nut	100	10.0	72.5	☞(Page 2C-11)
Swingarm pivot lock-nut	90	9.0	65.0	☞(Page 2C-12)

NOTE

The tightening torque(s) also specified in:

“Rear Suspension Components” (Page 2C-1)

“Rear Suspension Assembly Construction” (Page 2C-2)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J22308001

Material	SUZUKI recommended product or Specification	Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010 ☞(Page 2C-5) / ☞(Page 2C-5) / ☞(Page 2C-9) / ☞(Page 2C-9) / ☞(Page 2C-14) / ☞(Page 2C-14) / ☞(Page 2C-14)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110 ☞(Page 2C-11) / ☞(Page 2C-11)

NOTE

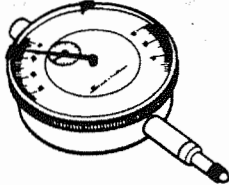
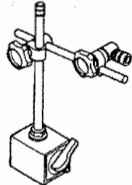
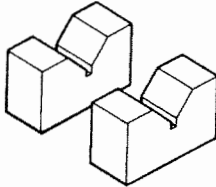
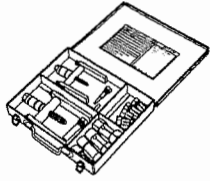
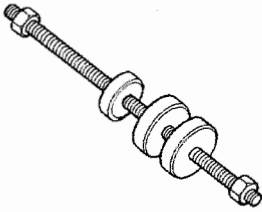
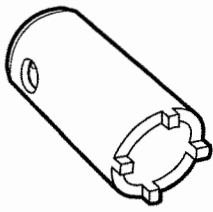

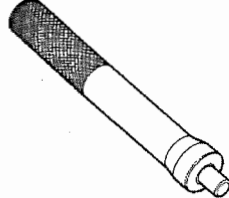
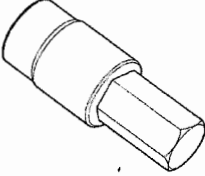
Required service material(s) also described in:

"Rear Suspension Components" (Page 2C-1)

"Rear Suspension Assembly Construction" (Page 2C-2)

Special Tool

BENB15J22308002

09900-20607 Dial gauge ☞(Page 2C-13)		09900-20701 Dial gauge chuck ☞(Page 2C-13)	
09900-21304 V blocks ☞(Page 2C-13)		09921-20240 Bearing remover set ☞(Page 2C-9) / ☞(Page 2C-13) / ☞(Page 2C-13)	
09924-84521 Bearing installer set ☞(Page 2C-5) / ☞(Page 2C-9) / ☞(Page 2C-14)		09940-14940 Swingarm pivot thrust adjuster wrench ☞(Page 2C-10) / ☞(Page 2C-12)	
09941-34513 Bearing installer ☞(Page 2C-14)		09943-88211 Pinion bearing installer ☞(Page 2C-4)	
09944-28321 Hexagon socket (19 mm) ☞(Page 2C-10) / ☞(Page 2C-10) / ☞(Page 2C-11) / ☞(Page 2C-11)			

Wheels and Tires

Precautions

Precautions for Wheel and Tire

BENB15J22400001

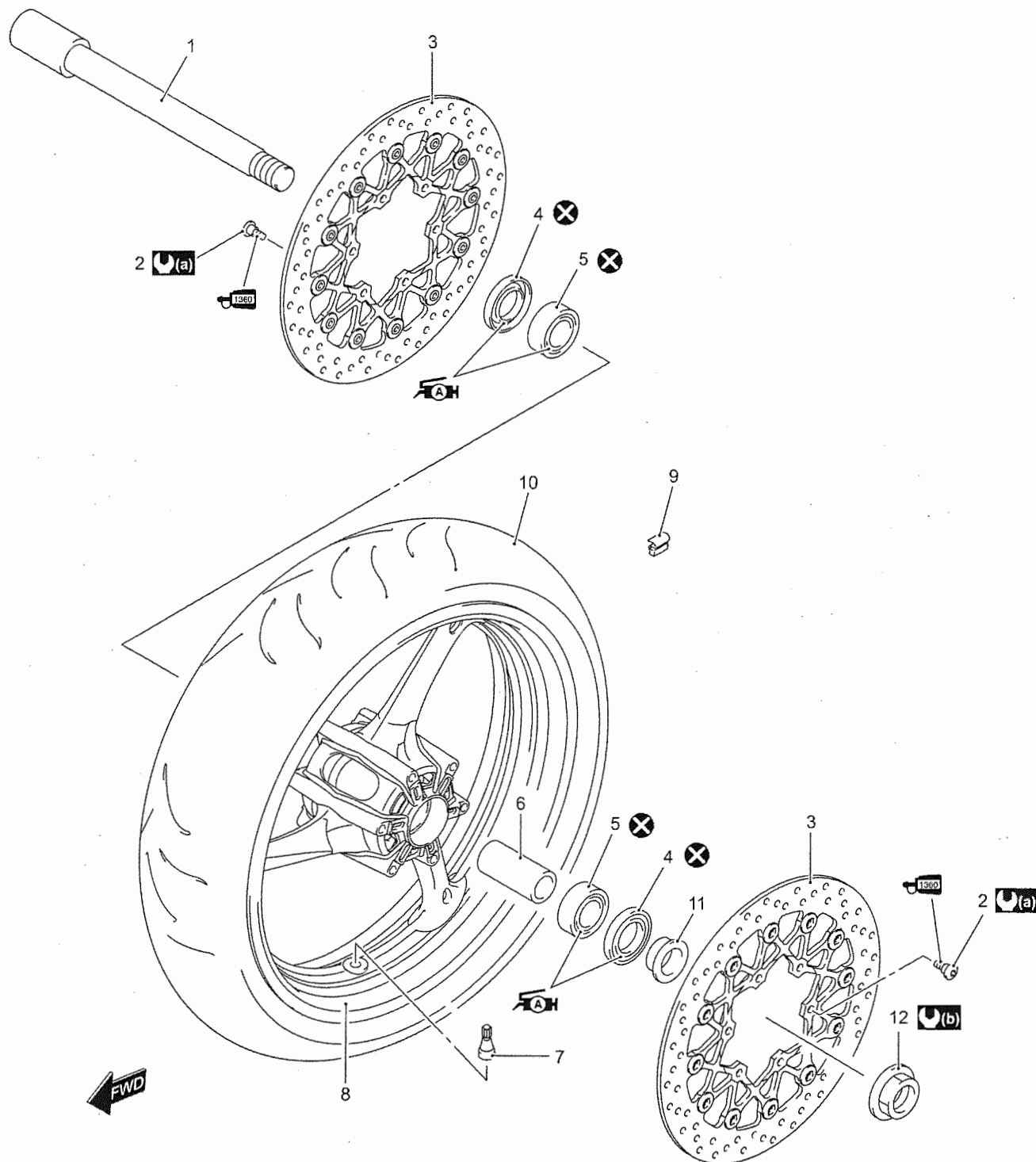
▲ WARNING

- Proper tire pressure and proper tire loading are important factors. Over loading tire can lead to tire failure and loss of motorcycle control.
 - Under-inflated tires make smooth cornering difficult, and can result in rapid tire wear.
 - Over-inflated tires have a smaller amount of tire in contact with the load, which can contribute to skidding and loss of control.
 - Replace the wheel when wheel runout exceed the service limit or if find damage such as distortion, crack, nick or scratch.
 - When tire replacement is necessary, the original equipment type tire should be used.
 - Do not mix different types of tires on the same vehicle such as radial and bias-belted tires except in emergencies, because handling may be seriously affected and may result in loss of control.
 - Replacement wheel must be equivalent to the original equivalent wheel.
-

Repair Instructions

Front Wheel Components

BENB15J22406001

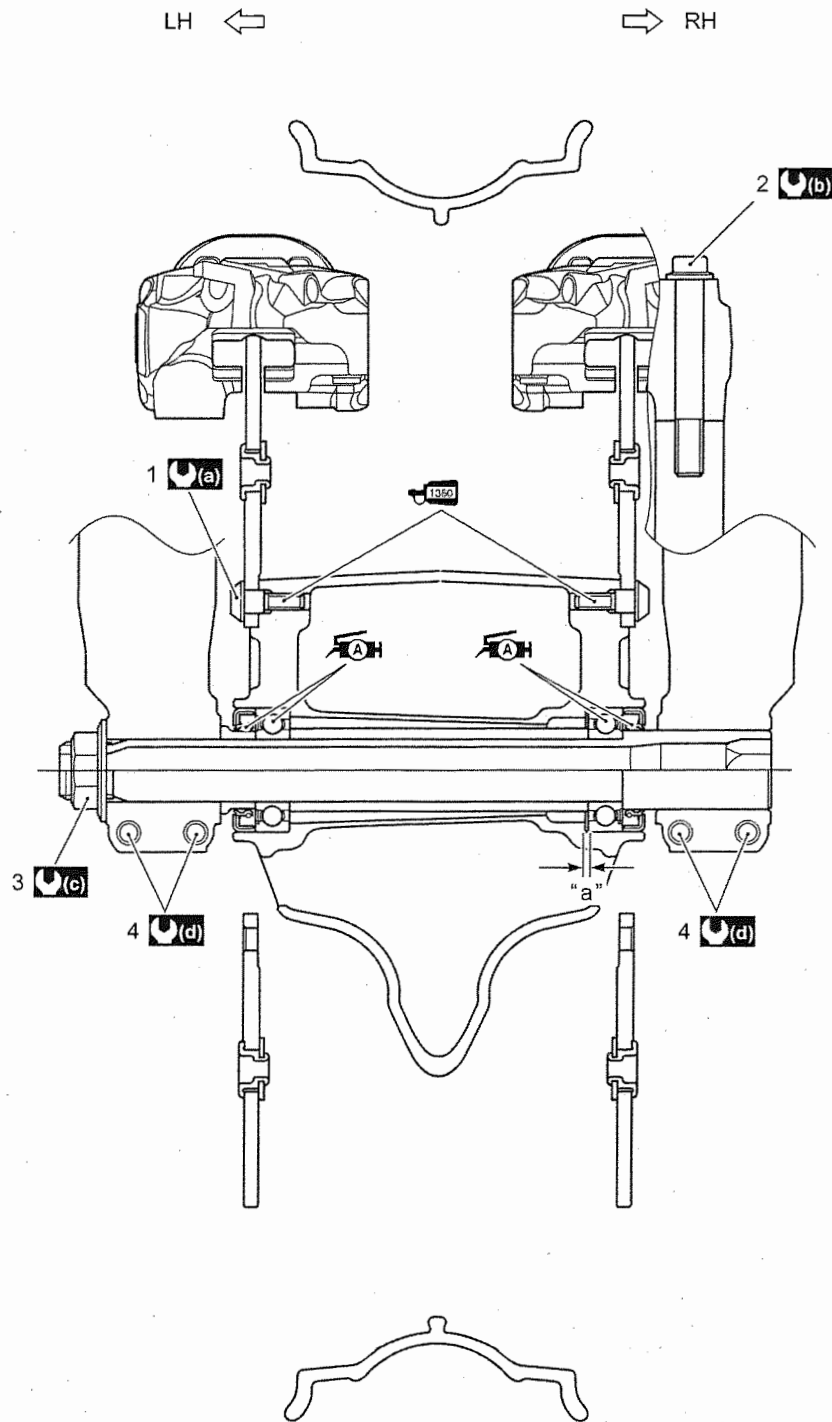


IB14J1240038-02

1. Front axle	6. Spacer	11. Collar	1360 : Apply thread lock to the thread part.
2. Brake disc bolt	7. Air valve	12. Front axle nut	X : Do not reuse.
3. Brake disc	8. Front wheel	(a) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)	
4. Dust seal	9. Wheel balancer	(b) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)	
5. Bearing	10. Tire	AH : Apply grease.	

Front Wheel Assembly Construction

BENB15J22406002



IB14J1240036-03

1. Brake disc bolt	"a": Clearance	(d) : 23 N·m (2.3 kgf·m, 16.5 lbf·ft)
2. Brake caliper mounting bolt	(a) : 18 N·m (1.8 kgf·m, 13.0 lbf·ft)	AH : Apply grease.
3. Front axle nut	(b) : 39 N·m (3.9 kgf·m, 28.0 lbf·ft)	1350 : Apply thread lock to the thread part.
4. Front axle pinch bolt	(c) : 100 N·m (10.0 kgf·m, 72.5 lbf·ft)	

Front Wheel Assembly Removal and Installation

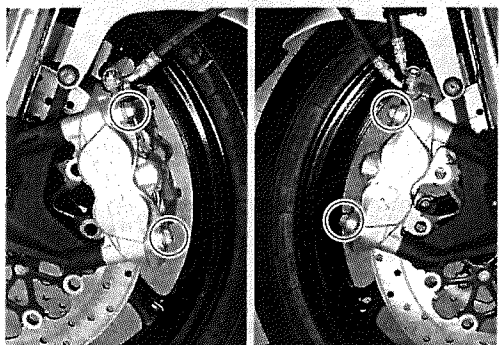
BENB15J22406003

Removal

- 1) Remove the cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the brake calipers, left and right.

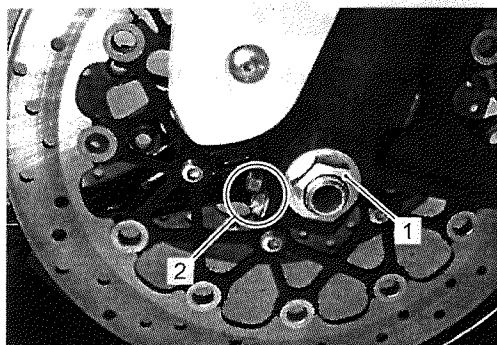
NOTE

Do not operate the brake lever with the caliper removed.



IB14J1240001-01

- 3) Remove the front axle nut (1).
- 4) Loosen two axle pinch bolts (2) on the left front fork leg.



IB14J1240002-03

- 5) Raise the front wheel off the ground and support the motorcycle with a jack or a wooden block.

NOTICE

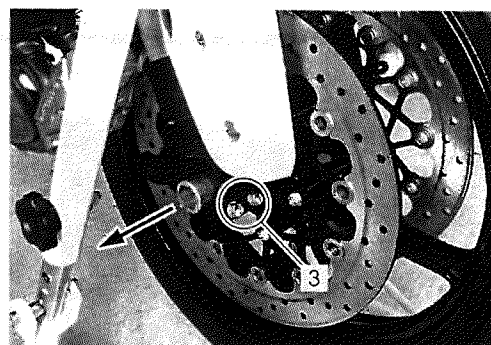
Do not carry out the work with the motorcycle resting on the side-stand. Do not support the motorcycle with the exhaust pipes. Make sure that the motorcycle is supported securely.

- 6) Loosen two axle pinch bolts (3) on the right front fork leg.

- 7) Draw out the front axle and remove the front wheel.

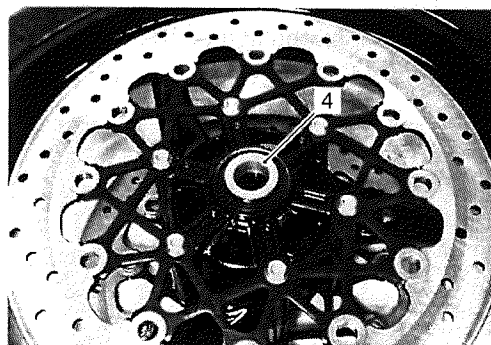
NOTE

After removing the front wheel, fit the calipers temporarily to the original positions.



IB14J1240003-01

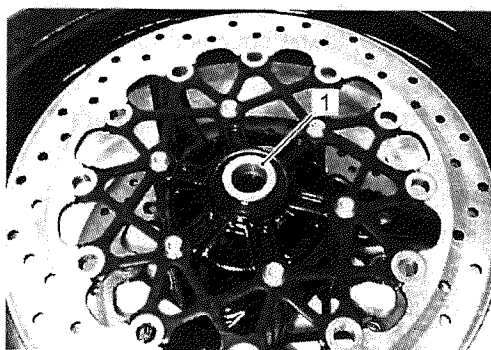
- 8) Remove the collar (4) (LH only).



IB14J1240004-01

Installation

- 1) Install the collar (1) to the left side of the wheel.



IB14J1240005-01

2D-5 Wheels and Tires:

- 2) Install the front wheel with the front axle and tighten the front axle nut temporarily.

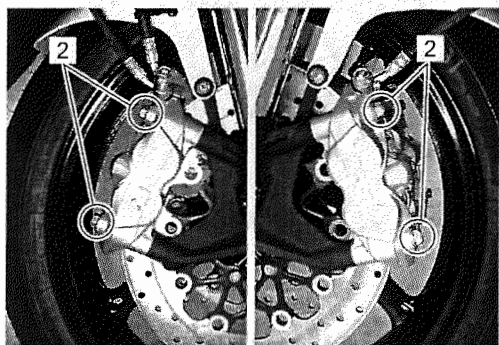
▲ WARNING

The directional arrow on the tire should point to the wheel rotation, when remounting the wheel.



IB14J1240006-01

- 3) Install the brake caliper and tighten the brake caliper mounting bolts (2) temporarily.



IB14J1240039-01

- 4) Hold the front axle with the special tool and tighten the front axle nut (3) to the specified torque.

Special tool

TOOL (A): 09940-30230 (Hexagon socket (17 mm))

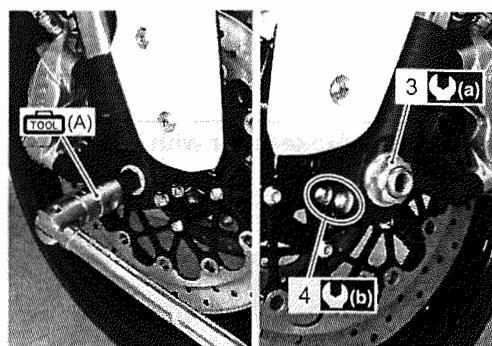
Tightening torque

Front axle nut (a): 100 N·m (10.0 kgf-m, 72.5 lbf-ft)

- 5) Tighten two axle pinch bolts (4) on the left front fork leg to the specified torque.

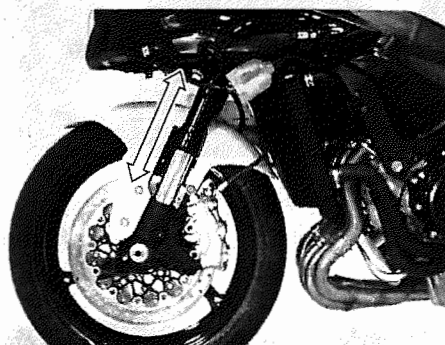
Tightening torque

Front axle pinch bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1240008-03

- 6) Move the front fork up and down 4 or 5 times.

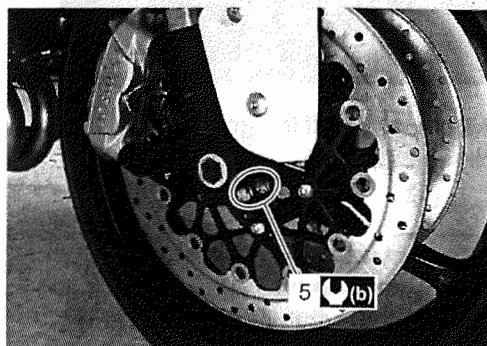


IB14J1240009-01

- 7) Tighten two axle pinch bolts (5) on the right front fork leg to the specified torque.

Tightening torque

Front axle pinch bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1240010-05

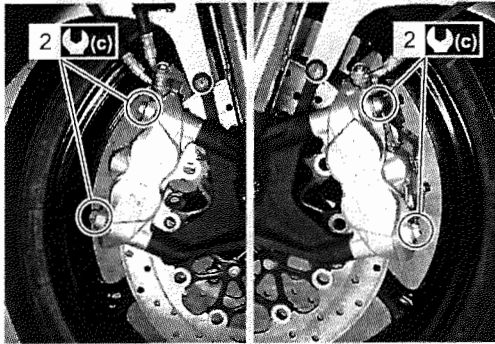
- 8) Tighten the brake caliper mounting bolts (2) to the specified torque.

Tightening torque

Front brake caliper mounting bolt (c): 39 N·m (3.9 kgf-m, 28.0 lbf-ft)

⚠ WARNING

After remounting the brake calipers, pump the brake lever until the pistons push the pads correctly.



IB14J1240007-02

- 9) Install the cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

Front Wheel Related Parts Inspection

BENB15J22406004

Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4).

Tire

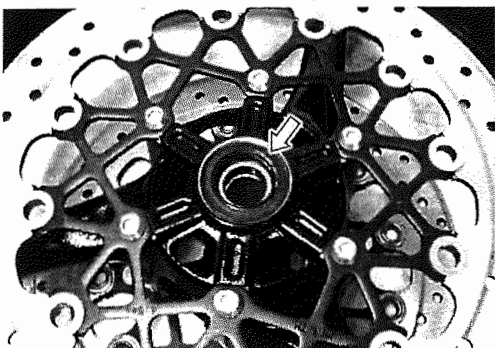
Refer to "Tire Inspection" in Section 0B (Page 0B-19).

Front Brake Disc

Refer to "Front Brake Disc Inspection" in Section 4B (Page 4B-6).

Dust Seal

Inspect the dust seal lips for wear or damage. If any defects are found, replace the dust seal with a new ones. Refer to "Front Wheel Dust Seal / Bearing Removal and Installation" (Page 2D-7).



IB14J1240011-01

Wheel Axle

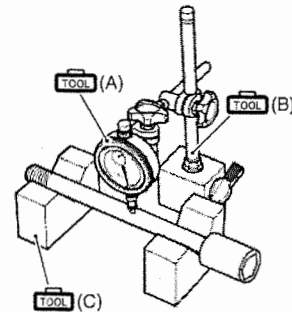
Using a dial gauge, check the wheel axle for runout. If the runout exceeds the limit, replace the axle shaft.

Special tool

- TOOL (A):** 09900-20607 (Dial gauge)
TOOL (B): 09900-20701 (Dial gauge chuck)
TOOL (C): 09900-21304 (V blocks)

Wheel axle runout

Service limit: 0.25 mm (0.010 in)



I649G1240054-02

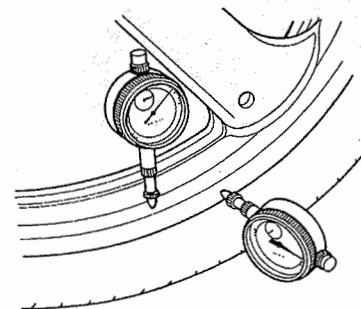
Wheel

Inspect the wheel in the following procedures:

- 1) Remove the front brake pads. Refer to "Front Brake Pad Replacement" in Section 4B (Page 4B-2).
- 2) Make sure that the wheel runout checked as shown in the figure does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel.

Wheel rim runout

Service limit (Axial and Radial): 2.0 mm (0.08 in)

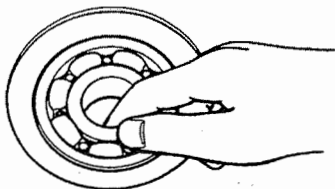


I649G1240014-02

- 3) Install the front brake pads. Refer to "Front Brake Pad Replacement" in Section 4B (Page 4B-2).

Wheel Bearing

Inspect the play of the wheel bearings by finger while they are in the wheel. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to "Front Wheel Dust Seal / Bearing Removal and Installation" (Page 2D-7).



I649G1240015-02

Front Wheel Dust Seal / Bearing Removal and Installation

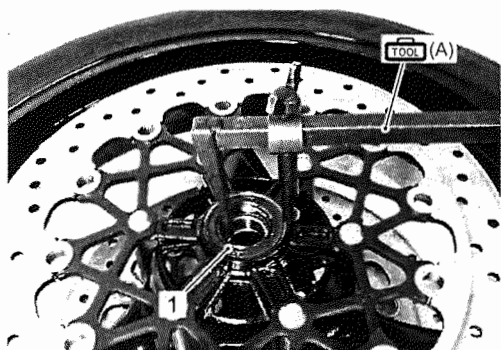
BENB15J22406005

Removal

- 1) Remove the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4).
- 2) Remove the dust seals (1) on both sides using the special tool.

Special tool

TOOL (A): 09913-50121 (Oil seal remover)

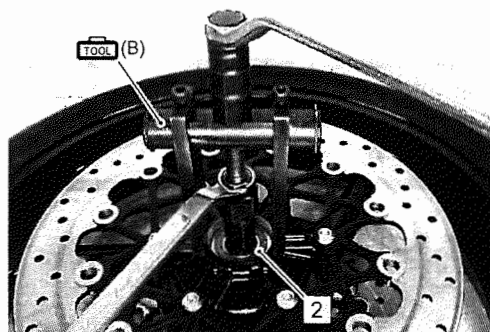


IB14J1240012-01

- 3) Remove the bearings (2) on both sides using the special tool.

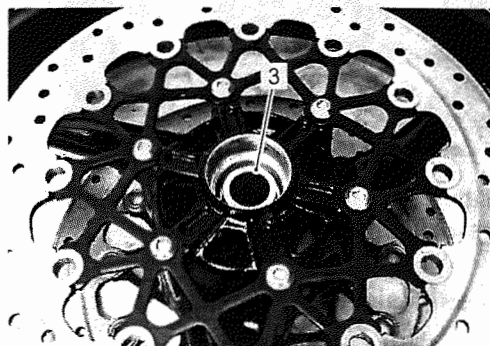
Special tool

TOOL (B): 09921-20240 (Bearing remover set)



IB14J1240013-01

- 4) Remove the spacer (3).



IB14J1240014-01

Installation

- 1) Apply grease to the new wheel bearings.

AX: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

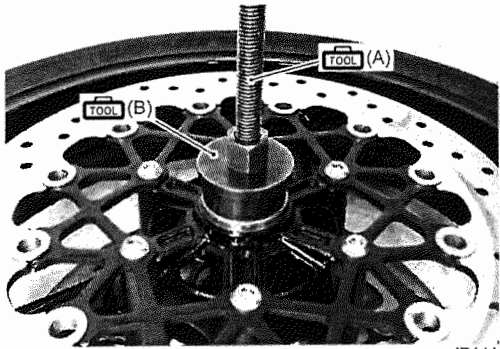


I649G1240019-02

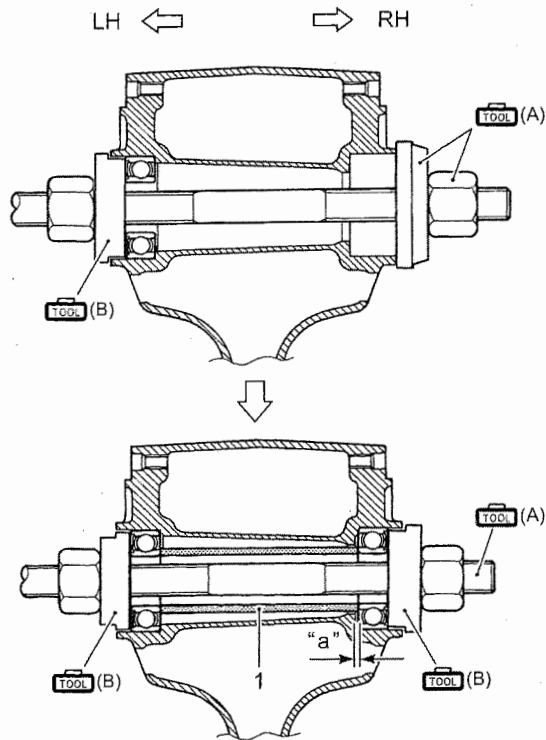
- 2) Face the sealed cover of the wheel bearings outside.
- 3) First install the left wheel bearing, then install the spacer (1) and right wheel bearing with the special tool.

Special tool

- TOOL (A): 09941-34513 (Bearing installer)**
TOOL (B): 09913-70210 (Bearing installing set (10 - 75 Φ))



IB14J1240015-01



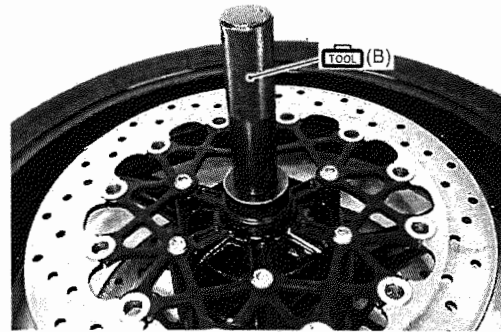
IB14J1240016-05

1. Spacer	"a": Clearance
-----------	----------------

- 4) Install the new dust seals with the special tool.

Special tool

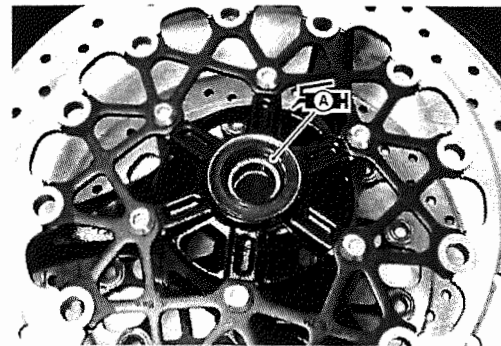
- TOOL (B): 09913-70210 (Bearing installing set (10 - 75 Φ))**



IB14J1240017-02

- 5) Apply grease to the lip of dust seals.

FAH: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

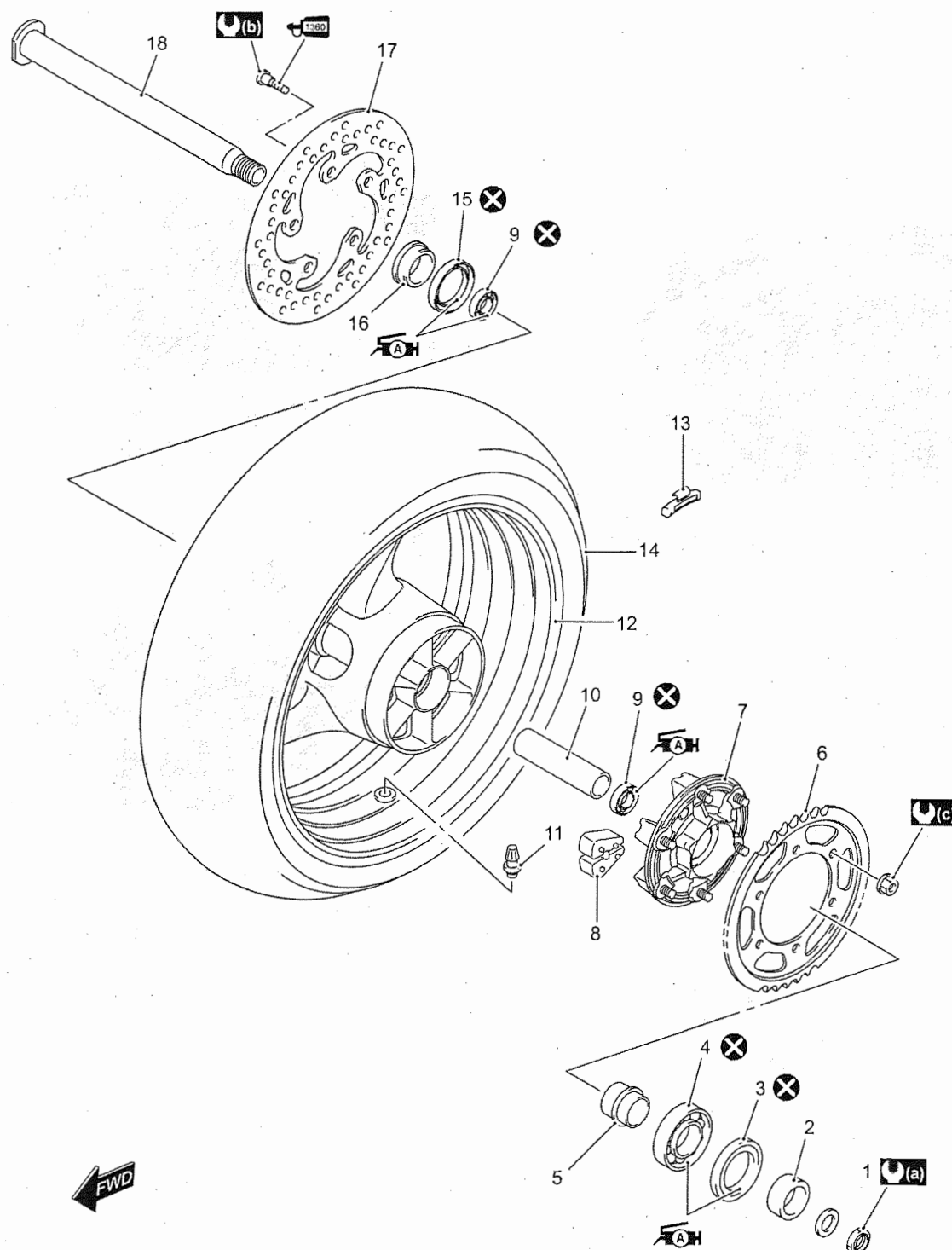


IB14J1240018-01

- 6) Install the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4).

Rear Wheel Components

BENB15J22406006

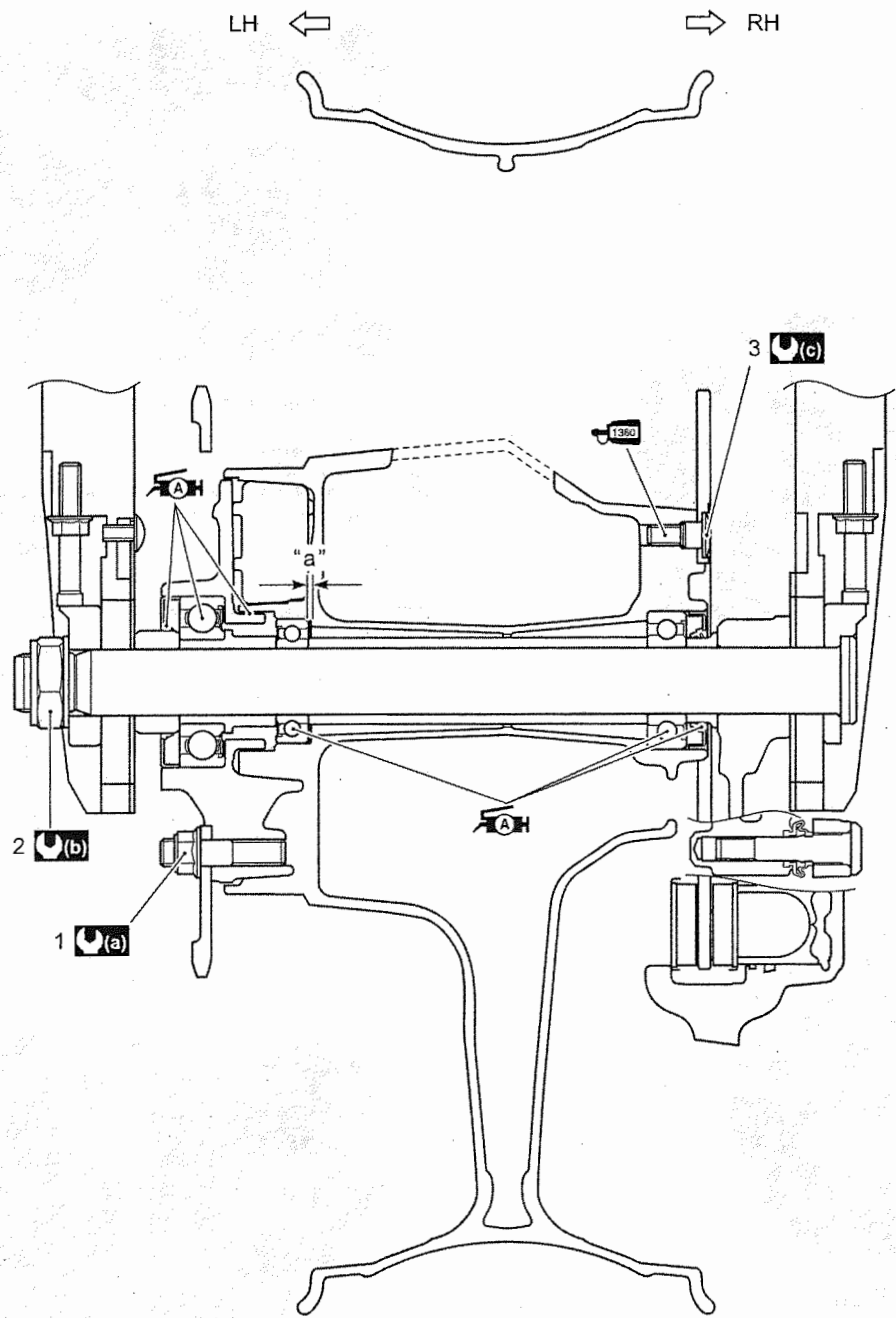


IB14J1240019-02

1. Rear axel nut	9. Bearing	17. Rear brake disc
2. Spacer	10. Spacer	18. Rear axle
3. Dust seal	11. Air valve	(a) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
4. Bearing	12. Rear wheel	(b) : 35 N·m (3.5 kgf-m, 25.5 lbf-ft)
5. Retainer	13. Wheel balancer	(c) : 60 N·m (6.0 kgf-m, 43.0 lbf-ft)
6. Rear sprocket	14. Rear tire	AH : Apply grease.
7. Sprocket mounting drum	15. Dust seal	1360 : Apply thread lock to the thread part.
8. Wheel damper	16. Spacer	X : Do not reuse.

Rear Wheel Assembly Construction

BENB15J22406007



IB14J1240037-02

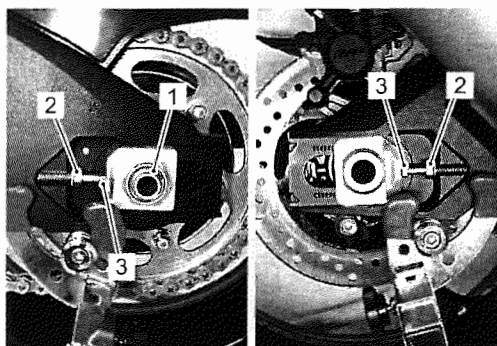
1. Rear sprocket nut	"a": Clearance	(c) : 35 N·m (3.5 kgf-m, 25.5 lbf-ft)
2. Rear axle nut	(a) : 60 N·m (6.0 kgf-m, 43.0 lbf-ft)	A : Apply grease.
3. Brake disc bolt	(b) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)	1360 : Apply thread lock to the thread part.

Rear Wheel Assembly Removal and Installation

BENB15J22406008

Removal

- 1) Loosen the axle nut (1).
- 2) Raise the rear wheel off the ground and support the motorcycle with a jack or wooden block.
- 3) Remove the axle nut (1).
- 4) Loosen the left and right lock-nuts (2) and turn in the adjuster bolts (3).

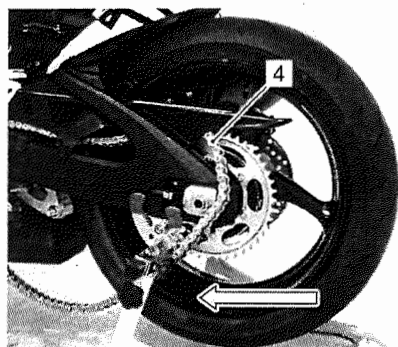


IB14J1240020-01

- 5) Disengage the drive chain (4) from the rear sprocket.
- 6) Draw out the rear axle and remove the rear wheel.

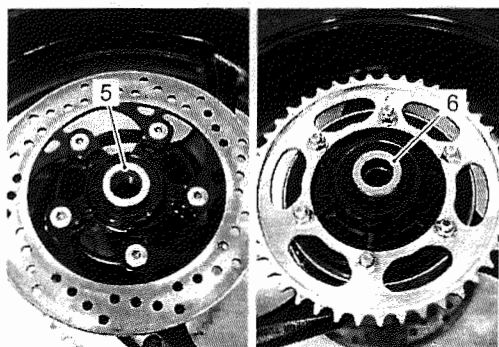
NOTE

Do not operate the rear brake pedal with the rear wheel removed.



IB14J1240021-01

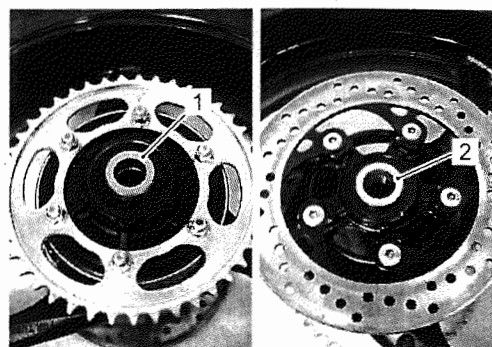
- 7) Remove the spacers (5) and (6).



IB14J1240022-01

Installation

- 1) Install the spacers (1) and (2).



IB14J1240023-01

- 2) Remount the rear wheel and rear axle (3).

⚠ WARNING

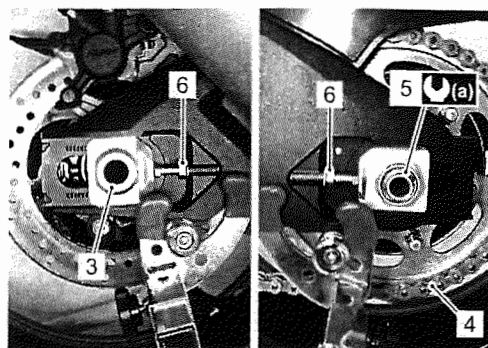
The directional arrow on the tire should point to the wheel rotation, when remounting the wheel.

- 3) Engage the drive chain (4) to the rear sprocket and tighten the rear axle nut (5) temporarily.
- 4) Adjust the chain slack after installing the rear wheel. Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-15).
- 5) Tighten the rear axle nut (5) to the specified torque.

Tightening torque

Rear axle nut (a): 100 N·m (10.0 kgf-m, 72.5 lbf-ft)

- 6) Tighten both chain adjuster lock-nut (6) securely.



IB14J1240024-01

⚠ WARNING

After remounting the rear wheel, pump the brake pedal several times to check for proper brake operation.

Rear Wheel Related Parts Inspection

BENB15J22406009

Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).

Tire

Refer to "Tire Inspection" in Section 0B (Page 0B-19).

Rear Brake Disc

Refer to "Rear Brake Disc Inspection" in Section 4C (Page 4C-7).

Wheel Damper

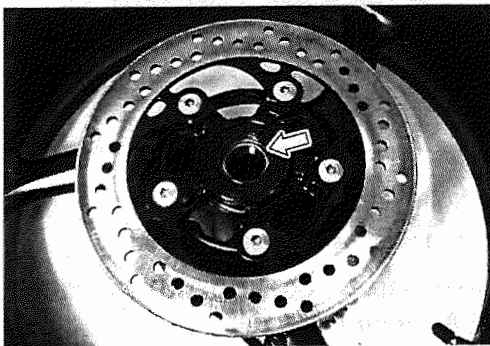
Refer to "Drive Chain Related Parts Inspection" in Section 3A (Page 3A-5).

Sprocket

Refer to "Drive Chain Related Components" in Section 3A (Page 3A-1).

Dust Seal

Inspect the dust seal lip for wear or damage. If any defect is found, replace the dust seal with a new one. Refer to "Rear Wheel Dust Seal / Bearing Removal and Installation" (Page 2D-13).



IB14J1240025-01




Wheel Axle

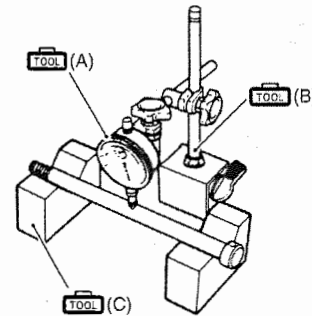
Using a dial gauge, check the wheel axle for runout. If the runout exceeds the limit, replace the axle shaft.

Wheel axle runout

Service limit: 0.25 mm (0.010 in)

Special tool

-  (A): 09900-20607 (Dial gauge)
-  (B): 09900-20701 (Dial gauge chuck)
-  (C): 09900-21304 (V blocks)



I649G1230034-03

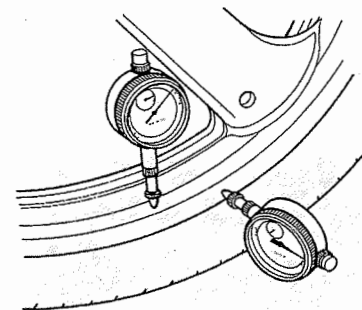
Wheel

Inspect the wheel in the following procedures:

- 1) Remove the rear brake pads. Refer to "Rear Brake Pad Replacement" in Section 4C (Page 4C-2).
- 2) Make sure that the wheel runout checked as shown in the figure does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel.

Wheel rim runout

Service limit (Axial and Radial): 2.0 mm (0.08 in)

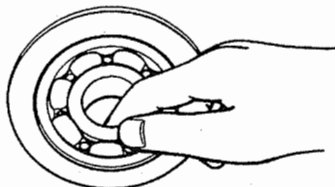


I649G1240014-02

- 3) Install the rear brake pads. Refer to "Rear Brake Pad Replacement" in Section 4C (Page 4C-2).

Bearing

Inspect the play of the wheel bearings by hand while they are in the wheel. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to "Rear Wheel Dust Seal / Bearing Removal and Installation" (Page 2D-13).



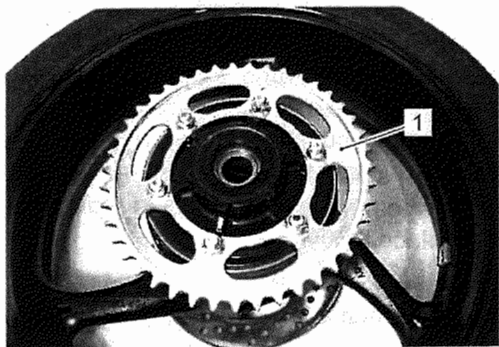
I649G1240015-02

Rear Wheel Dust Seal / Bearing Removal and Installation

BENB15J22406010

Removal

- 1) Remove the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).
- 2) Remove the rear sprocket mounting drum assembly (1) from the rear wheel.

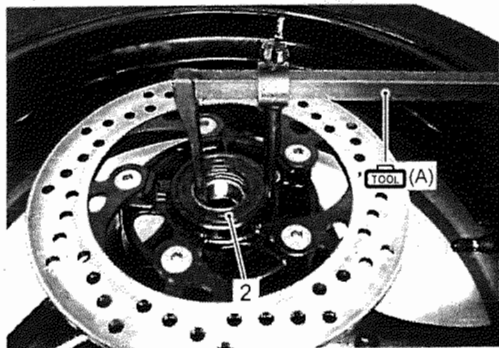


IB14J1240026-01

- 3) Remove the dust seal (2).

Special tool

TOOL (A): 09913-50121 (Oil seal remover)

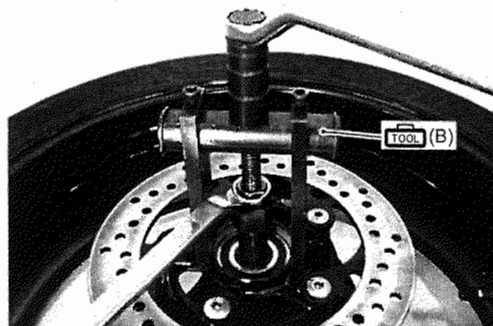


IB14J1240027-01

- 4) Remove the bearings on both sides using the special tool.

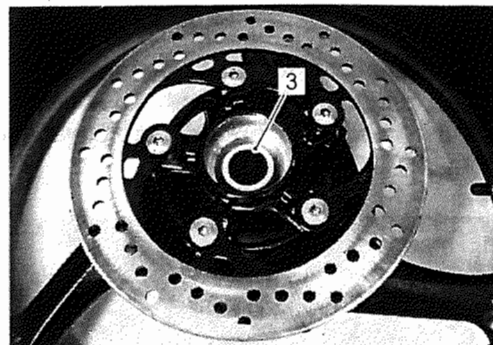
Special tool

TOOL (B): 09921-20240 (Bearing remover set)



IB14J1240028-01

- 5) Remove the spacer (3).



IB14J1240029-01

Installation

- 1) Apply grease to the new wheel bearings.

FAH: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



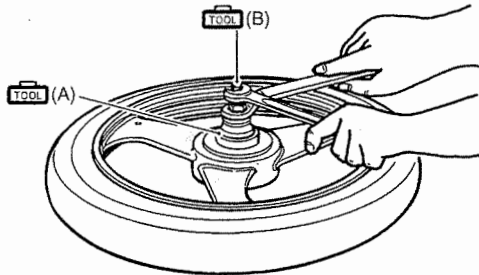
I649G1240019-02

- 2) Face the sealed cover of the bearings outside.
- 3) First install the right wheel bearing, then install the spacer (1) and left wheel bearing with the special tools.

Special tool

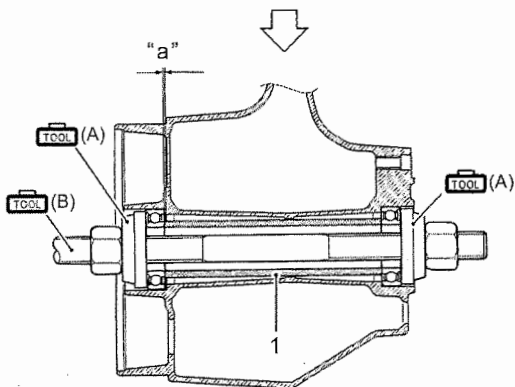
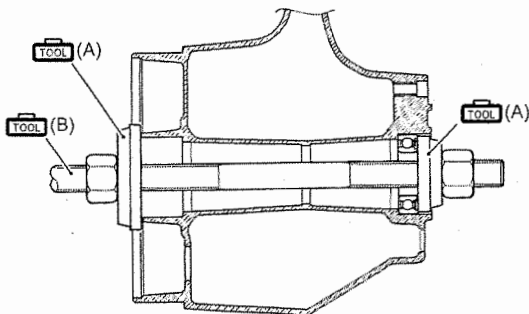
TOOL (A): 09924-84510 (Bearing installer set)

TOOL (B): 09941-34513 (Bearing installer)



IB14J1240030-01

LH ← → RH



IB14J1240031-02

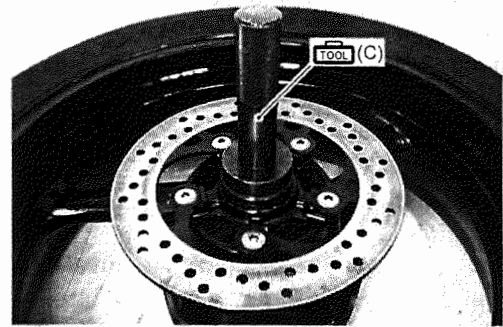
1. Spacer

"a": Clearance

- 4) Install a new dust seal with the special tool.

Special tool

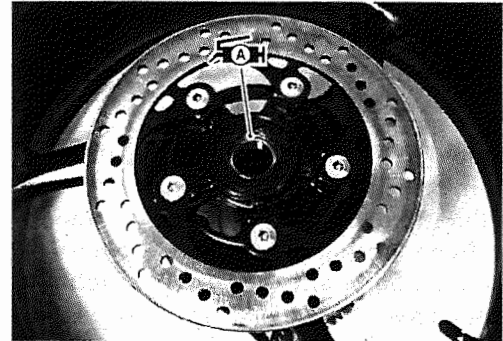
TOOL (C): 09913-70210 (Bearing installing set (10 - 75 Φ))



IB14J1240032-01

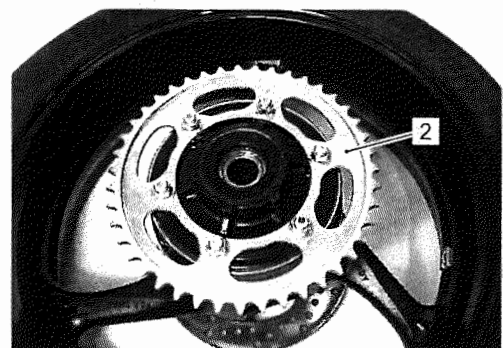
- 5) Apply grease to the lip of dust seal.

FAH : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



IB14J1240033-01

- 6) Install the rear sprocket mounting drum assembly (2).



IB14J1240034-01

- 7) Install the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).

Tire Removal and Installation

BENB15J22406011

Removal

The most critical factor of a tubeless tire is the seal between the wheel rim and the tire bead. For this reason, it is recommended to use a tire changer that can satisfy this sealing requirement and can make the operation efficient as well as functional.

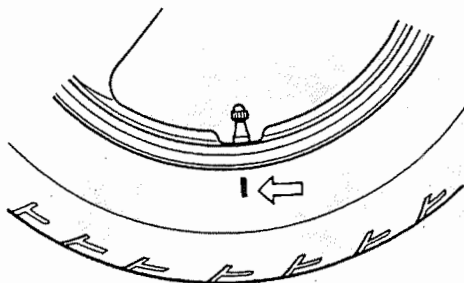
- 1) Removal the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4) and "Rear Wheel Assembly Removal and Installation" (Page 2D-11).
- 2) Remove the mounting drum from the rear wheel. (For rear wheel)
Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).
- 3) Remove the valve core.
- 4) Remove the tire using the tire changer.

NOTICE

For operating procedures, refer to the instructions supplied by the tire changer manufacturer.

NOTE

When removing the tire in case of repair or inspection, mark the tire with a chalk to indicate the tire position relative to the valve position. Even though the tire is refitted to the original position after repairing puncture, the tire may have to be balanced again since such a repair can cause imbalance.



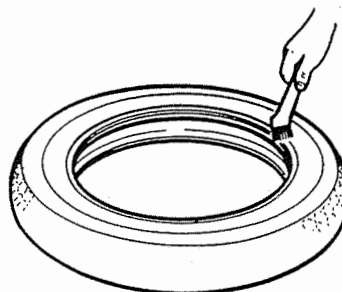
I649G1240037-02

Installation

- 1) Apply tire lubricant to the tire bead.

NOTICE

Never use oil, grease or gasoline on the tire bead in place of tire lubricant.



I649G1240038-02

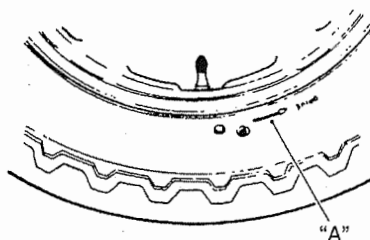
- 2) Install the tire onto the wheel.

NOTICE

For installation procedure of tire onto the wheel, follow the instructions given by the tire changer manufacturer.

NOTE

- When installing the tire, the arrow "A" on the side wall should point to the direction of wheel rotation.
- Align the chalk mark put on the tire at the time of removal with the valve position.



I649G1240039-02

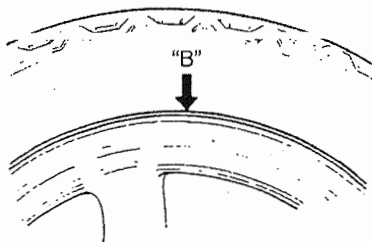
- 3) Bounce the tire several times while rotating. This makes the tire bead expand outward to contact the wheel, thereby facilitating air inflation.

- 4) Install the new valve core and inflate the tire.

▲ WARNING

- Do not inflate the tire to more than 400 kPa (4.0 kgf/cm², 57 psi). If inflated beyond this limit, the tire can burst and possibly cause injury.
- Do not stand directly over the tire while inflating.
- In the case of preset pressure air inflator, pay special care for the set pressure adjustment.

- 5) In this condition, check the "rim line" "B" cast on the tire side walls. The line must be equidistant from the wheel rim all around.
- 6) If the distance between the rim line and wheel rim varies, this indicates that the bead is not properly seated. If this is the case, deflate the tire completely and unseat the bead for both sides. Coat the bead with lubricant and fit the tire again.



I649G1240040-02

- 7) When the bead has been fitted properly, adjust the pressure to specification.

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)

- 8) As necessary, adjust the tire balance. Refer to "Wheel Balance Check and Adjustment" (Page 2D-17).
- 9) Install the mounting drum to the rear wheel.
(For rear wheel)
Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).
- 10) Install the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4) and "Rear Wheel Assembly Removal and Installation" (Page 2D-11).

Wheel / Tire / Air Valve Inspection and Cleaning

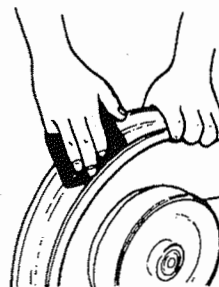
BENB15J22406012

Refer to "Tire Removal and Installation" (Page 2D-15).

Wheel

Wipe the wheel clean and check for the following points:

- Distortion and crack
- Any flaws and scratches at the bead seating area
- Wheel rim runout (Refer to "Front Wheel Related Parts Inspection" (Page 2D-6) and "Rear Wheel Related Parts Inspection" (Page 2D-12).)

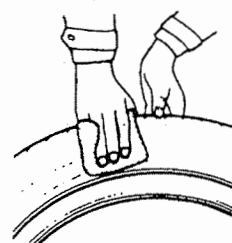


I649G1240041-02

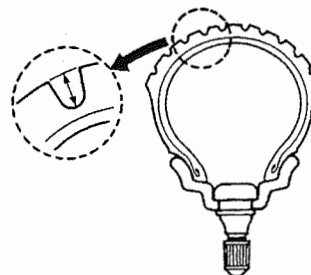
Tire

Tire must be checked for the following points:

- Nick and rupture on side wall
- Tire tread depth (Refer to "Tire Inspection" in Section 0B (Page 0B-19).)
- Tread separation
- Abnormal, uneven wear on tread
- Surface damage on bead
- Localized tread wear due to skidding (Flat spot)
- Abnormal condition of inner liner



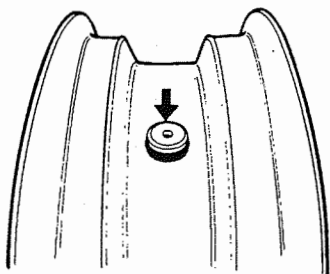
I649G1240042-02



I649G1240043-02

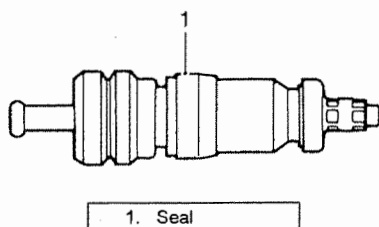
Air Valve

Inspect the air valve for peeling and damage. If any defect is found, replace the air valve with a new one. Refer to "Air Valve Removal and Installation" (Page 2D-17).



I649G1240044-02

Inspect the valve core seal (1) for wear and damage. If any defect is found, replace the valve core with a new one. Refer to "Air Valve Removal and Installation" (Page 2D-17).



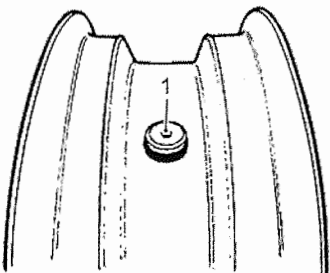
I649G1240045-02

Air Valve Removal and Installation

BENB15J22406013

Removal

- 1) Remove the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4) and "Rear Wheel Assembly Removal and Installation" (Page 2D-11).
- 2) Remove the tire. Refer to "Tire Removal and Installation" (Page 2D-15).
- 3) Remove the air valve (1) from the wheel.

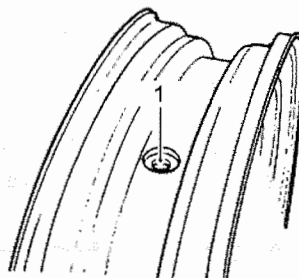


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Installation

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

- Any dust or rust around the valve hole (1) must be cleaned off.



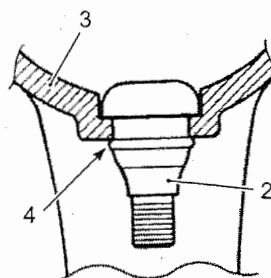
I837H1240032-01

- Install the new air valve (2) in the wheel (3).

NOTICE

Be careful not to damage the valve lip (4).

- To properly install the valve (2) into the valve hole, apply a special tire lubricant or neutral soapy liquid to the valve (2).



I837H1240033-01

2. Valve	3. Wheel	4. Valve lip
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Wheel Balance Check and Adjustment

BENB15J22406014

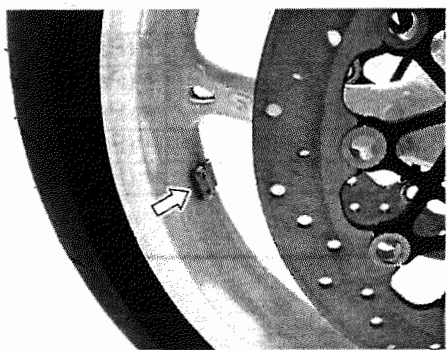
Check and adjust the wheel balance in the following procedures:

- 1) Remove the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4) and "Rear Wheel Assembly Removal and Installation" (Page 2D-11).
- 2) Remove the mounting drum from the rear wheel. (For rear wheel)
Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).
- 3) 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.

- 4) When installing the balancer weight to the wheel, set the balancer weight on center rib of the wheel.



IB14J1240035-01

- 5) Recheck the wheel balance.
- 6) Install the mounting drum to the rear wheel. (For rear wheel)
Refer to "Rear Wheel Assembly Removal and Installation" (Page 2D-11).
- 7) Install the wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" (Page 2D-4) and "Rear Wheel Assembly Removal and Installation" (Page 2D-11).

Specifications

Service Data

BENB15J22407001

Wheel

Unit: mm (in)

Item	Standard		Limit
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	
Wheel rim size	Front	17 M/C x MT 3.50	—
	Rear	17 M/C x MT 5.50	—
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	

Tire

Item	Standard		Limit
Cold inflation tire pressure (Solo riding)	Front	250 kPa (2.50 kgf/cm ² , 36 psi)	—
	Rear	290 kPa (2.90 kgf/cm ² , 42 psi)	—
Cold inflation tire pressure (Dual riding)	Front	250 kPa (2.50 kgf/cm ² , 36 psi)	—
	Rear	290 kPa (2.90 kgf/cm ² , 42 psi)	—
Tire size	Front	120/70 ZR17M/C (58 W)	—
	Rear	180/55 ZR17M/C (73 W)	—
Tire type	Front	BRIDGESTONE BATT LAX BT016F G	—
	Rear	BRIDGESTONE BATT LAX BT016R G	—
Tire tread depth (Recommended depth)	Front	—	1.6 mm (0.06 in)
	Rear	—	2.0 mm (0.08 in)

Tightening Torque Specifications

BENB15J22407002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Front axle nut	100	10.0	72.5	☞ (Page 2D-5)
Front axle pinch bolt	23	2.3	16.5	☞ (Page 2D-5) / ☞ (Page 2D-5)
Front brake caliper mounting bolt	39	3.9	28.0	☞ (Page 2D-6)
Rear axle nut	100	10.0	72.5	☞ (Page 2D-11)

NOTE

The tightening torque(s) also specified in:

“Front Wheel Components” (Page 2D-2)

“Front Wheel Assembly Construction” (Page 2D-3)

“Rear Wheel Components” (Page 2D-9)

“Rear Wheel Assembly Construction” (Page 2D-10)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J22408001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000-25010	☞ (Page 2D-7) / ☞ (Page 2D-8) / ☞ (Page 2D-13) / ☞ (Page 2D-14)

NOTE

Required service material(s) also described in:

“Front Wheel Components” (Page 2D-2)

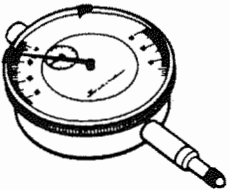
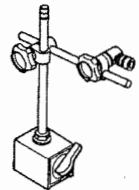
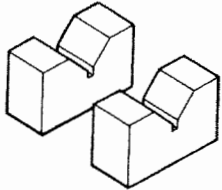
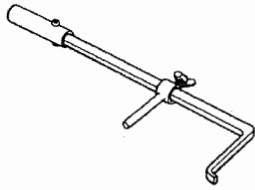
“Front Wheel Assembly Construction” (Page 2D-3)

“Rear Wheel Components” (Page 2D-9)

“Rear Wheel Assembly Construction” (Page 2D-10)

Special Tool

BENB15J22408002

09900-20607 Dial gauge ☞ (Page 2D-6) / ☞ (Page 2D-12)		09900-20701 Dial gauge chuck ☞ (Page 2D-6) / ☞ (Page 2D-12)	
09900-21304 V blocks ☞ (Page 2D-6) / ☞ (Page 2D-12)		09913-50121 Oil seal remover ☞ (Page 2D-7) / ☞ (Page 2D-13)	

<p>09913-70210 Bearing installing set (10 – 75 Φ) ☞ (Page 2D-8) / ☞ (Page 2D-8) / ☞ (Page 2D-14)</p>	<p>09921-20240 Bearing remover set ☞ (Page 2D-7) / ☞ (Page 2D-13)</p>
<p>09924-84510 Bearing installer set ☞ (Page 2D-14)</p>	<p>09940-30230 Hexagon socket (17 mm) ☞ (Page 2D-5)</p>
<p>09941-34513 Bearing installer ☞ (Page 2D-8) / ☞ (Page 2D-14)</p>	

Section 3

Driveline / Axle

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Precautions

Precautions

Precautions for Driveline / Axle

BENB15J23000001

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 such similar solvent. These fluids will damage the O-rings of the drive chain.
 - Clean the drive chain with a spray-type chain cleaner and blow dry with compressed air. If the drive chain cannot be cleaned with a spray cleaner, it may be necessary to use a kerosine. Always follow the chemical manufacturer's instructions on proper use, handling and storage.
 - Lubricate the drive chain with a heavy weight motor oil. Wipe off any excess oil or chain lubricant. Do not use any oil sold commercially as "drive chain oil". Such oil can damage the O-rings.
-

NOTE

The standard drive chain is RK 525ROZ5Y. Suzuki recommends to use this standard drive chain as a replacement.

Drive Chain / Drive Train / Drive Shaft

Diagnostic Information and Procedures

Drive Chain and Sprocket Symptom Diagnosis

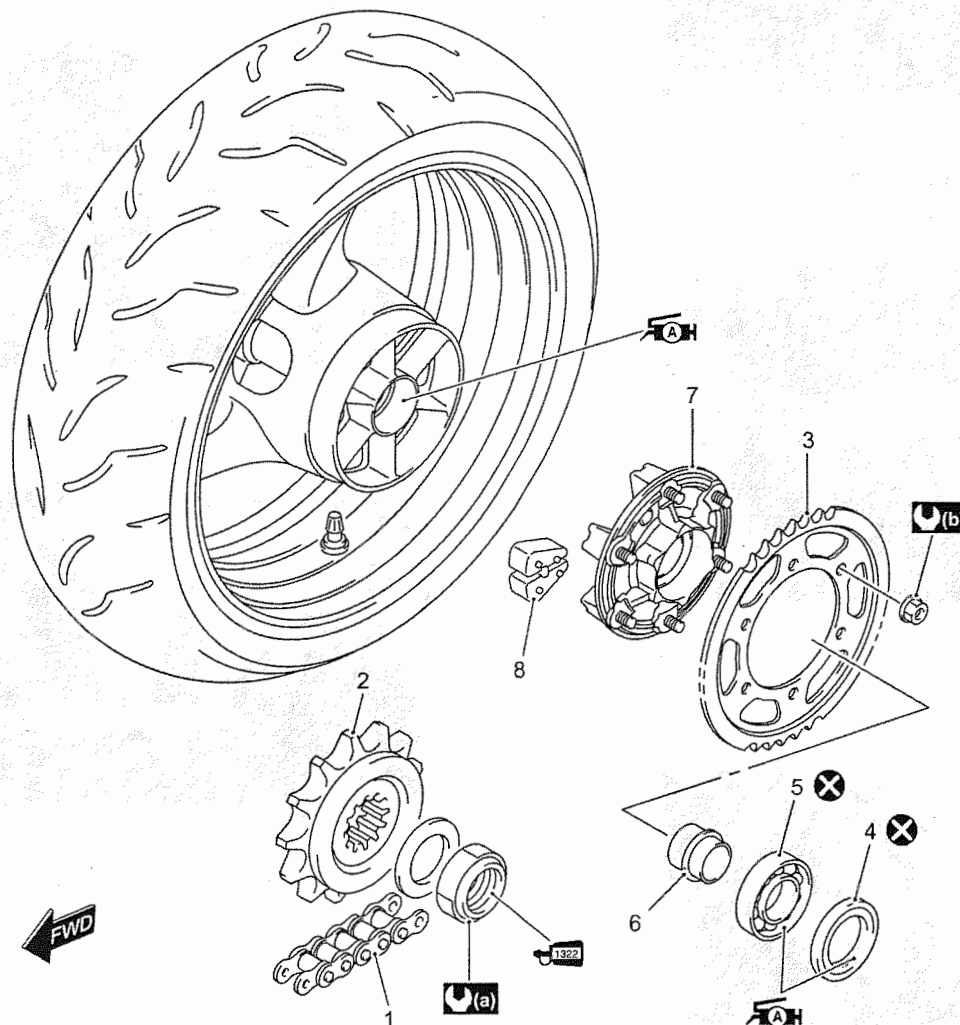
BENB15J23104001

Condition	Possible cause	Correction / Reference Item
Noisy Drive Chain	Worn sprocket.	Replace.
	Worn drive chain.	Replace.
	Stretched drive chain.	Replace.
	Too large drive chain slack.	Adjust.
	Drive chain out of adjustment.	Adjust.

Repair Instructions

Drive Chain Related Components

BENB15J23106001



IB14J1310001-03

1. Drive chain	6. Retainer	ⒶH : Apply grease.
2. Engine sprocket	7. Sprocket mounting drum	1322 : Apply thread lock to thread part.
3. Rear sprocket	8. Wheel damper	⊗ : Do not reuse.
4. Dust seal	Ⓐa : 115 N·m (11.5 kgf-m, 83.0 lbf-ft)	
5. Bearing	Ⓐb : 60 N·m (6.0 kgf-m, 43.0 lbf-ft)	

Engine Sprocket Removal and Installation

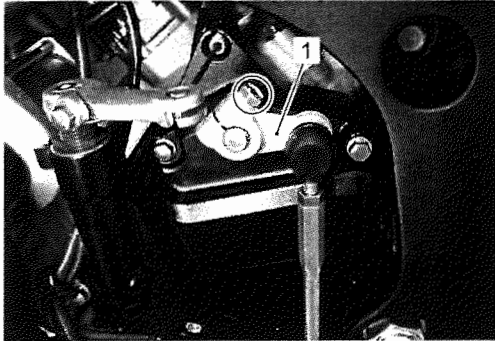
BENB15J23106002

Removal

- 1) Remove the gearshift link arm (1) by removing the bolt.

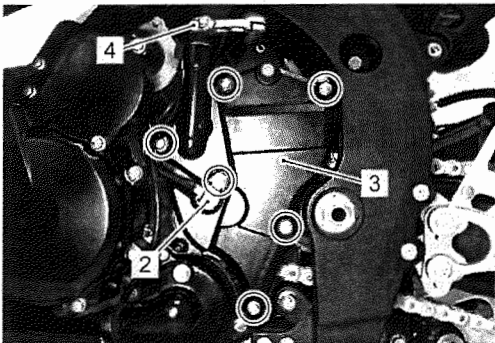
NOTE

Mark the gearshift shaft head at which the gearshift link arm slit set for correct reinstallation.



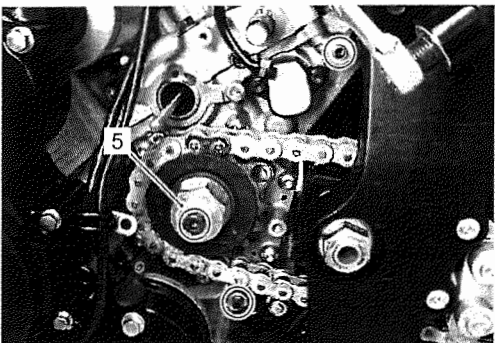
IB14J1310002-01

- 2) Remove the speed sensor (2).
- 3) Move the engine sprocket cover (3) along with the clutch release arm (4).



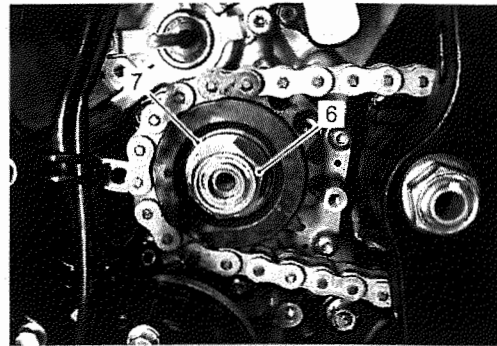
IB14J1310003-01

- 4) Remove the dowel pins.
- 5) Remove the speed sensor rotor (5) by removing its bolt while depressing the rear brake pedal.



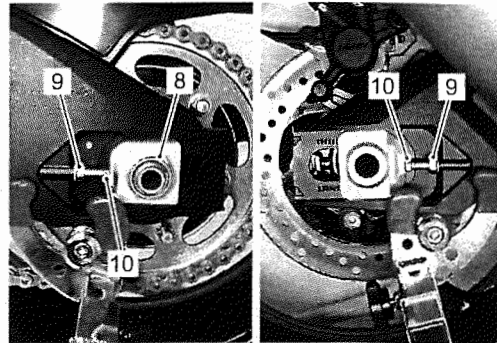
IB14J1310004-01

- 6) Remove the engine sprocket nut (6) while depressing the rear brake pedal.
- 7) Remove the washer (7).



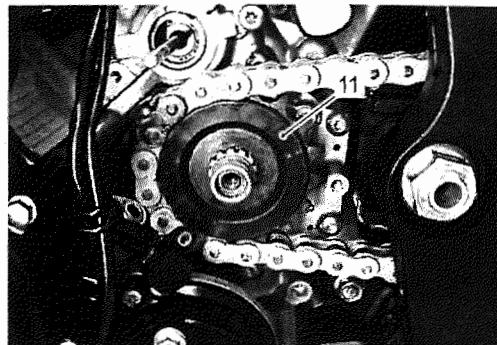
IB14J1310005-01

- 8) Support the motorcycle with a jack or wooden block.
- 9) Loosen the rear axle nut (8).
- 10) Loosen the left and right lock-nuts (9) and turn in the adjuster bolts (10) to provide additional chain slack.



IB14J1310006-01

- 11) Remove the engine sprocket (11).



IB14J1310007-01

Installation

Install the engine sprocket in the reverse order of removal. Pay attention to the following points:

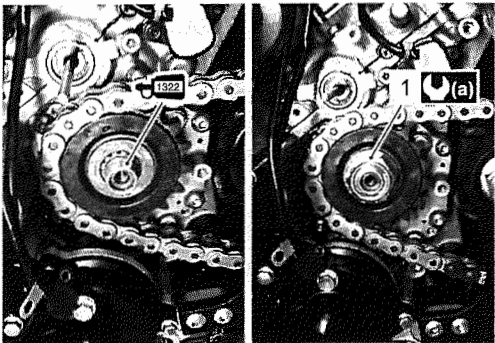
- Apply thread lock to the driveshaft.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

- Tighten the engine sprocket nut (1) to the specified torque.

Tightening torque

Engine sprocket nut (a): 115 N·m (11.5 kgf-m, 83.0 lbf-ft)




IB14J1310008-01

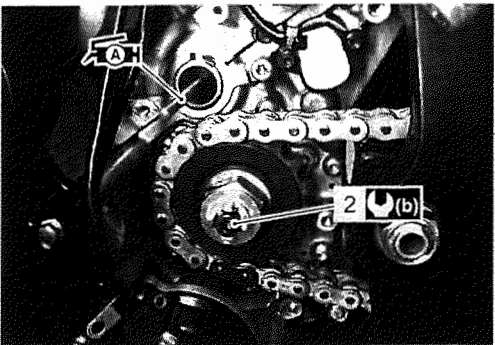
- Tighten the speed sensor rotor bolt (2) to the specified torque.

Tightening torque

Speed sensor rotor bolt (b): 28 N·m (2.8 kgf-m, 20.0 lbf-ft)

- Before installing the sprocket cover, apply a small quantity of grease to the clutch push rod.

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



IB14J1310009-02

- Install the engine sprocket cover (3).

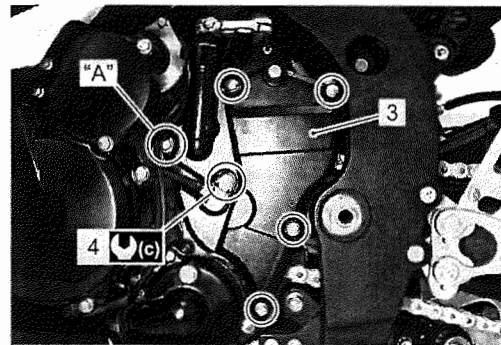
NOTE

Fit the clamp to the bolt "A".

- Tighten the speed sensor mounting bolt (4) to the specified torque.

Tightening torque

Speed sensor bolt (c): 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)

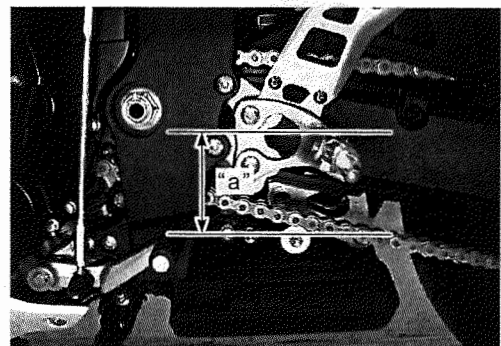


IB14J1310010-03

- Fit the gearshift link arm to the gearshift shaft so that the gearshift lever is located at height "a" above the footrest. Refer to "Gearshift Lever Height Inspection and Adjustment" in Section 5B (Page 5B-15).

Gearshift lever height "a"

Standard: 65 – 75 mm (2.6 – 3.0 in)



IB14J1310011-01

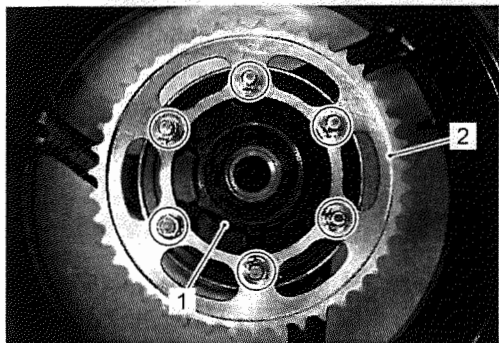
- Adjust the drive chain slack. Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-15).

Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation

BENB15J23106003

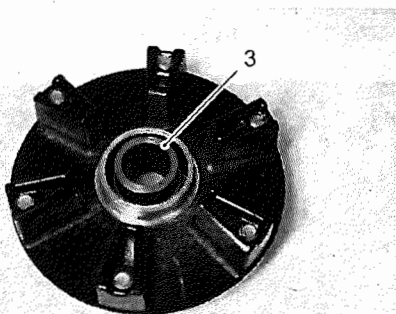
Removal

- 1) Remove the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- 2) Loosen the rear sprocket nuts.
- 3) Draw out the rear sprocket mounting drum (1) along with the rear sprocket (2) from the wheel hub.
- 4) Remove the rear sprocket nuts and separate the rear sprocket (2) from its mounting drum (1).



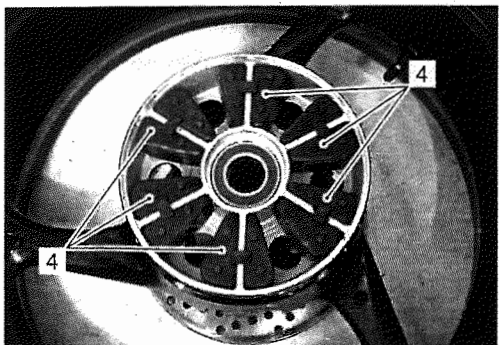
IB14J1310012-01

- 5) Remove the retainer (3).



IB14J1310013-01

- 6) Remove the wheel dampers (4).

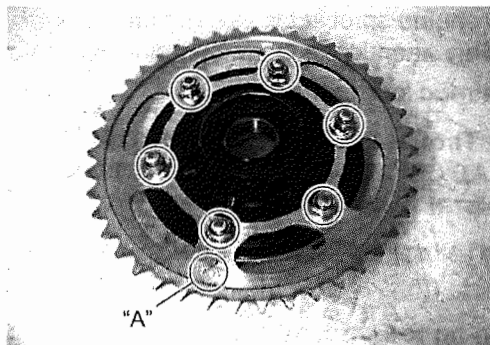


IB14J1310014-01

Installation

Install the rear sprocket and rear sprocket mounting drum in the reverse order of removal. Pay attention to the following points:

- Install the rear sprocket so that the letters "A" face outside and temporarily tighten the rear sprocket nuts.



IB14J1310015-01

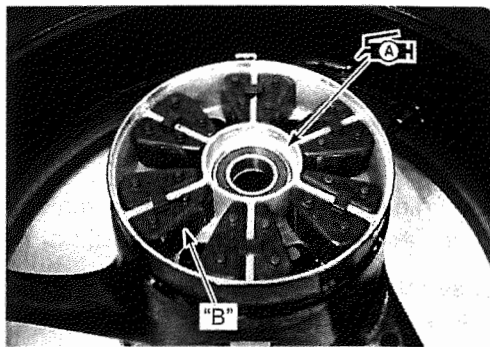
- Apply grease to the contacting surface between the rear wheel hub and rear sprocket mounting drum.

⚠ : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

- Apply special tire lubricant or neutral soapy liquid to the wheel damper surfaces "B".

NOTICE

Never use oil, grease or gasoline on the wheel damper in place of the tire lubricant or neutral soapy liquid.

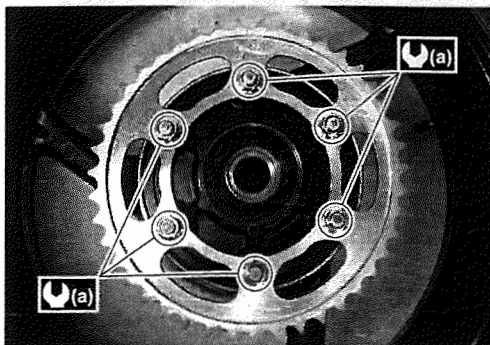


IB14J1310016-01

- Tighten the rear sprocket nuts to the specified torque.

Tightening torque

Rear sprocket nut (a): 60 N·m (6.0 kgf-m, 43.0 lbf-ft)



IB14J1310017-01

- Install the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).

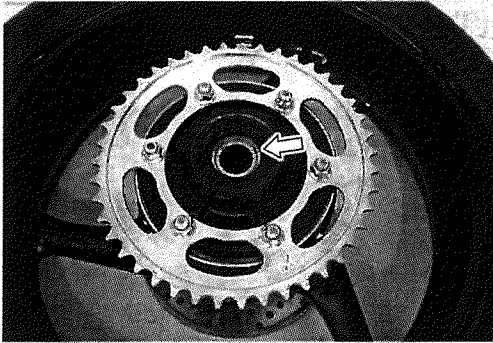
Drive Chain Related Parts Inspection

BENB15J23106004

Refer to "Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation" (Page 3A-4).

Dust Seal

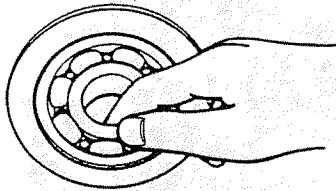
Inspect the dust seal for wear or damage. If any damage is found, replace the dust seal with a new one.



IB14J1310018-01

Bearing

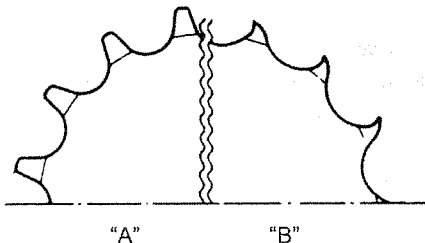
Inspect the play of the sprocket mounting drum bearing by hand while it is in the drum. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.



I649G1310015-02

Engine Sprocket and Rear Sprocket

Inspect the sprocket teeth for wear. If they are worn as shown, replace the engine sprocket, rear sprocket and drive chain as a set.



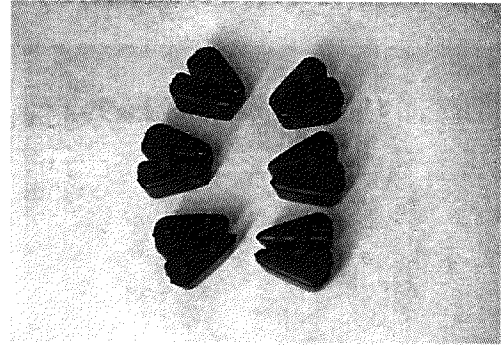
I947H1310010-01

"A": Normal wear

"B": Excessive wear

Wheel Damper

Inspect the dampers for wear and damage. Replace the dampers if there is anything unusual.



IB14J1310019-01

Drive Chain

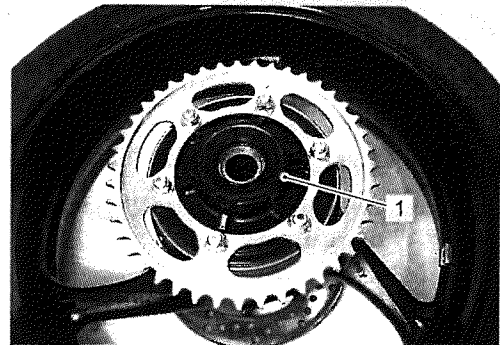
Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-15).

Sprocket Mounting Drum Dust Seal / Bearing Removal and Installation

BENB15J23106005

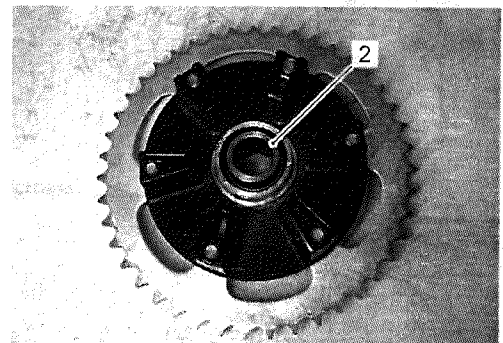
Removal

- 1) Remove the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- 2) Remove the rear sprocket mounting drum assembly (1) from the rear wheel.



IB14J1310020-02

- 3) Remove the retainer (2).



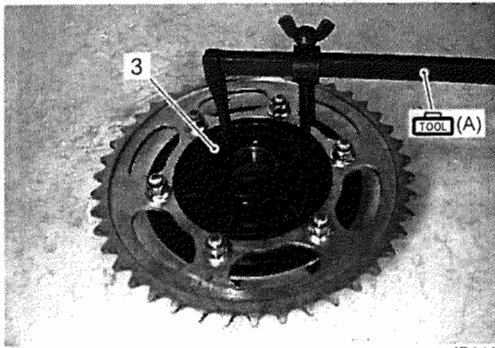
IB14J1310021-01

3A-6 Drive Chain / Drive Train / Drive Shaft:

- 4) Remove the sprocket mounting drum dust seal (3) with the special tool.

Special tool

TOOL (A): 09913-50121 (Oil seal remover)

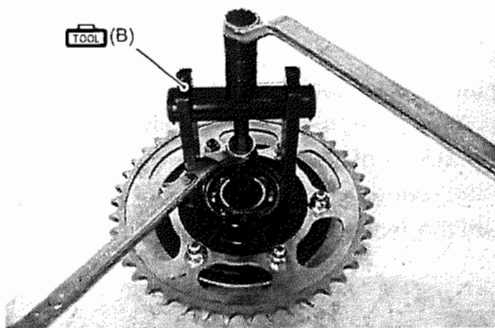


IB14J1310022-02

- 5) Remove the sprocket mounting drum bearing with the special tool.

Special tool

TOOL (B): 09921-20240 (Bearing remover set)



IB14J1310023-01

Installation

- 1) Apply grease to new bearing before installing.

FAH: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



I649G1310020-02

- 2) Install the bearing (1) and new dust seal (2) to the sprocket mounting drum with the special tools.

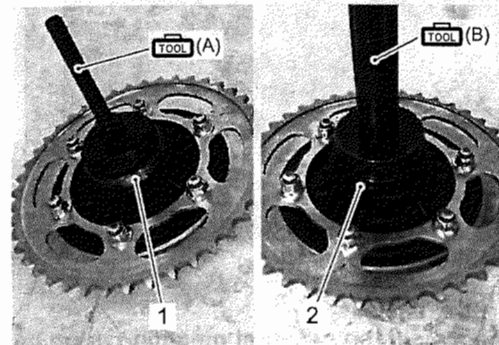
NOTE

The sealed cover of the bearing must face wheel hub side.

Special tool

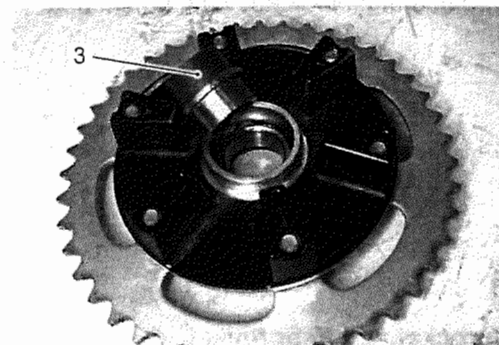
TOOL (A): 09924-84510 (Bearing installer set)

TOOL (B): 09913-70210 (Bearing installing set (10 - 75 Φ))



IB14J1310024-01

- 3) Install the retainer (3).



IB14J1310025-01

- 4) Install the rear sprocket mounting drum assembly to rear wheel hub. Refer to "Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation" (Page 3A-4).
- 5) Install the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).

Drive Chain Replacement

BENB15J23106006

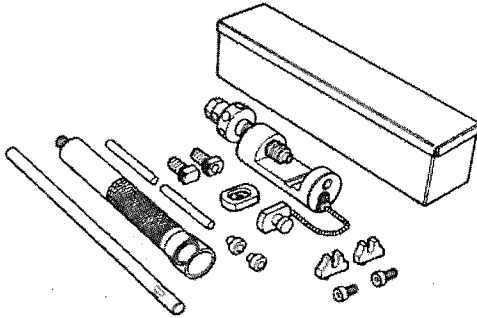
Use the special tool in the following procedures, to cut and rejoin the drive chain.

NOTE

When using the special tool, apply a small quantity of grease to the threaded parts of the special tool.

Special tool

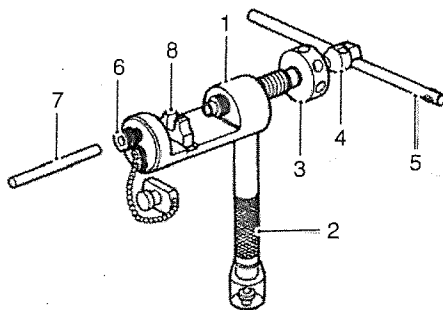
TOOL : 09922-22711 (Drive chain cutting and joint tool set)



I649G1310023-02

Drive Chain Cutting

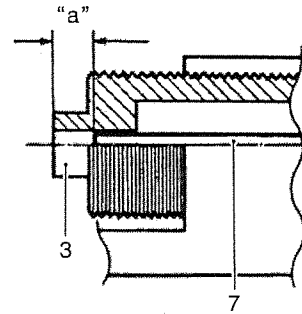
1) Set up the special tool as shown in the figure.



I649G1310024-02

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

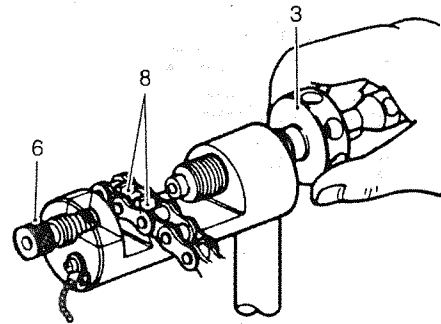
2) The tip of pin remover (7) should be positioned inside "a" approximately 5 mm (0.2 in) from the end face of pressure bolt [A] (3) as shown in the figure.



I837H1310026-02

"a": 5 mm (0.2 in)

- 3) Place the drive chain link being disjointed on the chain holder (8) of the tool.
- 4) Turn in both the adjuster bolt (6) and pressure bolt [A] (3) so that each of their end hole fits over the chain joint pin properly.
- 5) Tighten the pressure bolt [A] (3) with the bar.



I837H1310027-02

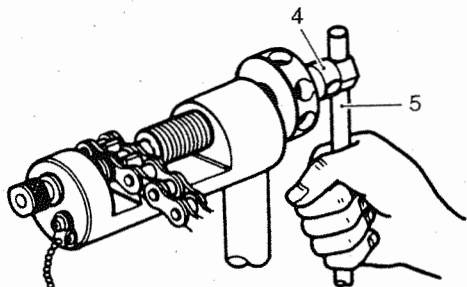
3A-8 Drive Chain / Drive Train / Drive Shaft:

- 6) Turn in the pressure bolt [B] (4) with the bar (5) and force out the drive chain joint pin (9).

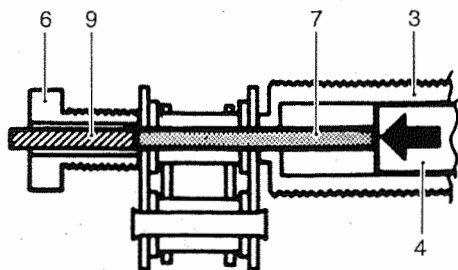
NOTE

Continue turning in the pressure bolt [B] (4) until the joint pin should be completely pushed out of the chain.

- 7) After the joint pin (9) is removed, loosen the pressure bolt [B] (4) and then pressure bolt [A] (3).



I649G1310027-02



I837H1310028-02

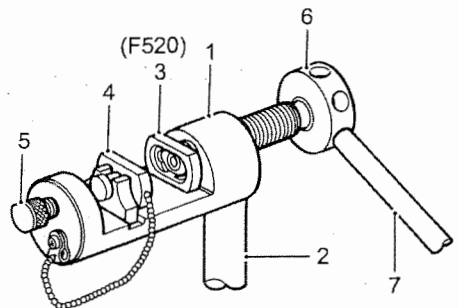
Drive Chain Connecting

⚠ WARNING

Do not use joint clip type of drive chain. The joint clip may have a chance to drop which may cause severe damage to motorcycle and severe injury.

Joint plate installation

- 1) Set up the special tool as shown in the figure.



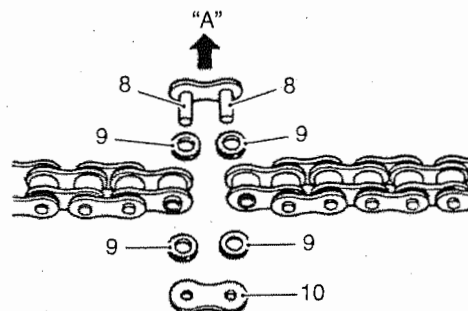
IB14J1310026-01

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 & wedge pin	

- 2) Apply grease to the new joint pins (8), new O-rings (9) and new plates (10).
- 3) Connect both ends of the drive chain with the joint pins (8) inserted from the wheel side "A" as installed on the motorcycle.

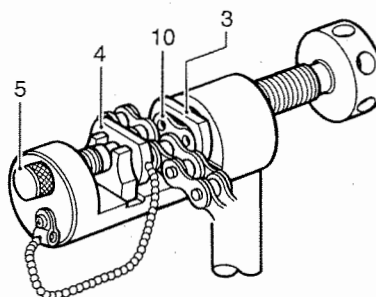
Joint set part number

RK: 27620 - 33E40



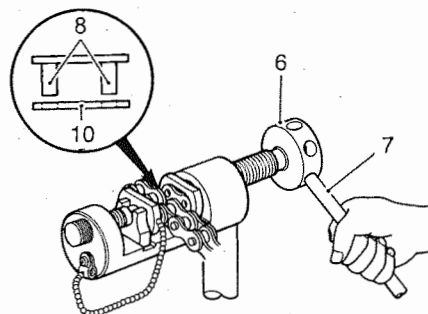
I837H1310029-01

- 4) Apply grease on the recessed portion of the joint plate holder (3). Then install the joint plate (10) on the tool, its stamp mark must face the joint plate holder (3) side.
- 5) Set the drive chain on the tool as illustrated and turn in the adjuster bolt (5) to secure the wedge holder and wedge pin (4).



I649G1310031-02

- 6) Turn in the pressure bolt [A] (6) and align two joint pins (8) properly with the respective holes of the joint plate (10).
- 7) Turn in the pressure bolt [A] (6) further using the bar (7) to press the joint plate over the joint pins.



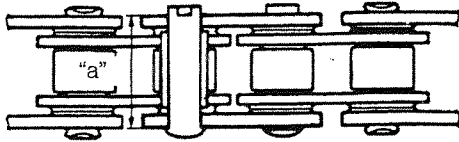
I837H1310030-01

- 8) Continue pressing the joint plate until the distance between the two joint plates comes to the specification.

Joint plate distance specification "a"
 20.1 – 20.4 mm (0.79 – 0.80 in)

NOTICE

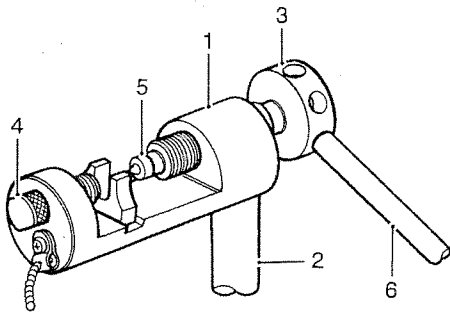
If pressing of the joint plate makes the dimension out of specification excessively, the work must be carried out again by using new joint parts.



I649G1310033-03

Joint pin staking

- 1) Set up the special tool as shown in the figure.



I649G1310034-02

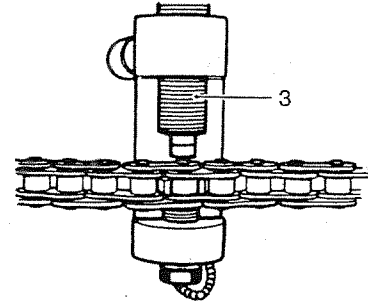
1. Tool body
2. Grip handle
3. Pressure bolt [A]
4. Adjuster bolt (Without hole)
5. Staking pin (Stowed inside grip handle behind rubber cap)
6. Bar

- 2) Apply grease to the staking pin (5).
- 3) Stake the joint pin by turning (approximately 7/8 turn) the pressure bolt [A] (3) with the bar until the pin end diameter becomes the specified dimension.
- 4) After joining of the chain has been completed, check to make sure that the link is smooth and no abnormal condition is found.

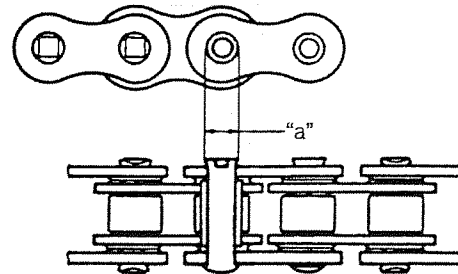
NOTE

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)



I649G1310035-02



I649G1310036-03

- 5) Adjust the drive chain slack, after connecting it. Refer to "Drive Chain Inspection and Adjustment" in Section 0B (Page 0B-15).

Specifications

Service Data

BENB15J23107001

Drive Train

Unit: mm (in)

Item	Standard		Limit
Final reduction ratio	2.647 (45/17)		—
Drive chain	Type	RK 525ROZ5Y	—
	Links	116 links	—
	20-pitch length	—	319.4 (12.57)
Drive chain slack (on side-stand)	20 – 30 (0.8 – 1.2)		—
Gearshift lever height	65 – 75 (2.6 – 3.0)		—

Tightening Torque Specifications

BENB15J23107002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Engine sprocket nut	115	11.5	83.0	☞ (Page 3A-3)
Speed sensor rotor bolt	28	2.8	20.0	☞ (Page 3A-3)
Speed sensor bolt	4.5	0.45	3.0	☞ (Page 3A-3)
Rear sprocket nut	60	6.0	43.0	☞ (Page 3A-4)

NOTE

The tightening torque(s) also specified in:
 “Drive Chain Related Components” (Page 3A-1)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J23108001

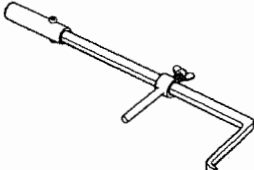
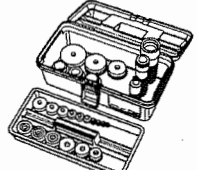
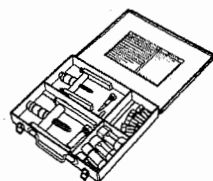

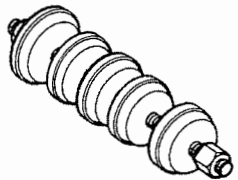
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010	☞ (Page 3A-3) / ☞ (Page 3A-4) / ☞ (Page 3A-6)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞ (Page 3A-3)

NOTE

Required service material(s) also described in:
 "Drive Chain Related Components" (Page 3A-1)

Special Tool

BENB15J23108002

09913-50121 Oil seal remover ☞ (Page 3A-6) 	09913-70210 Bearing installing set (10 – 75 Φ) ☞ (Page 3A-6) 
09921-20240 Bearing remover set ☞ (Page 3A-6) 	09922-22711 Drive chain cutting and joint tool set ☞ (Page 3A-7) 
09924-84510 Bearing installer set ☞ (Page 3A-6) 	

Section 4

Brake

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Precautions

Precautions

Precautions for Brake System

BENB15J24000001

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

Brake Pad and Brake Disc

▲ WARNING

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.

Brake Fluid Information

BENB15J24000002

▲ 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.
-

NOTICE

The brake fluid reacts chemically with paint, plastics and rubber materials, etc., and will damage them severely.

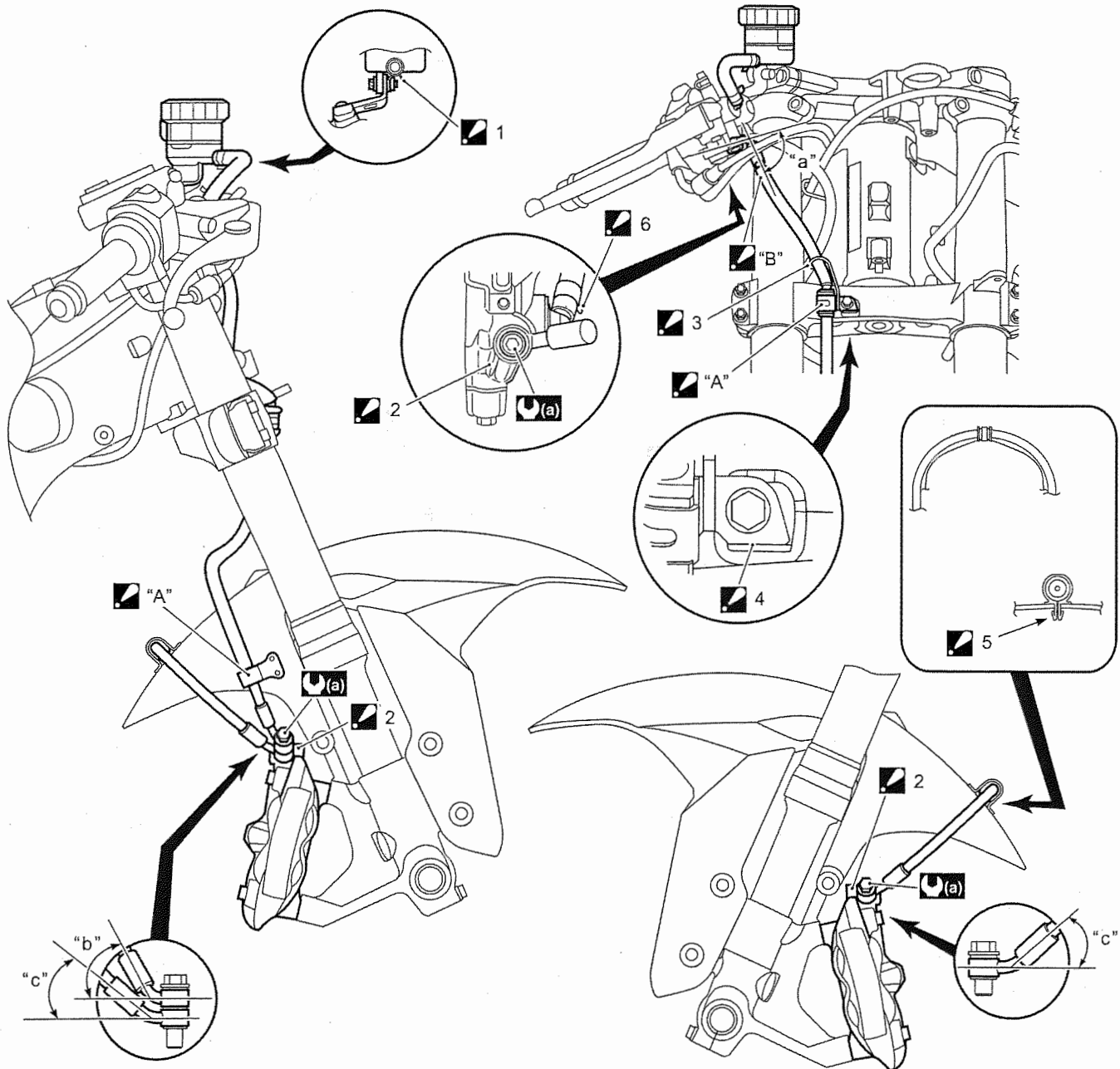
Immediately and completely wipe off any brake fluid contacting any part of the motorcycle.

Brake Control System and Diagnosis

Schematic and Routing Diagram

Front Brake Hose Routing Diagram

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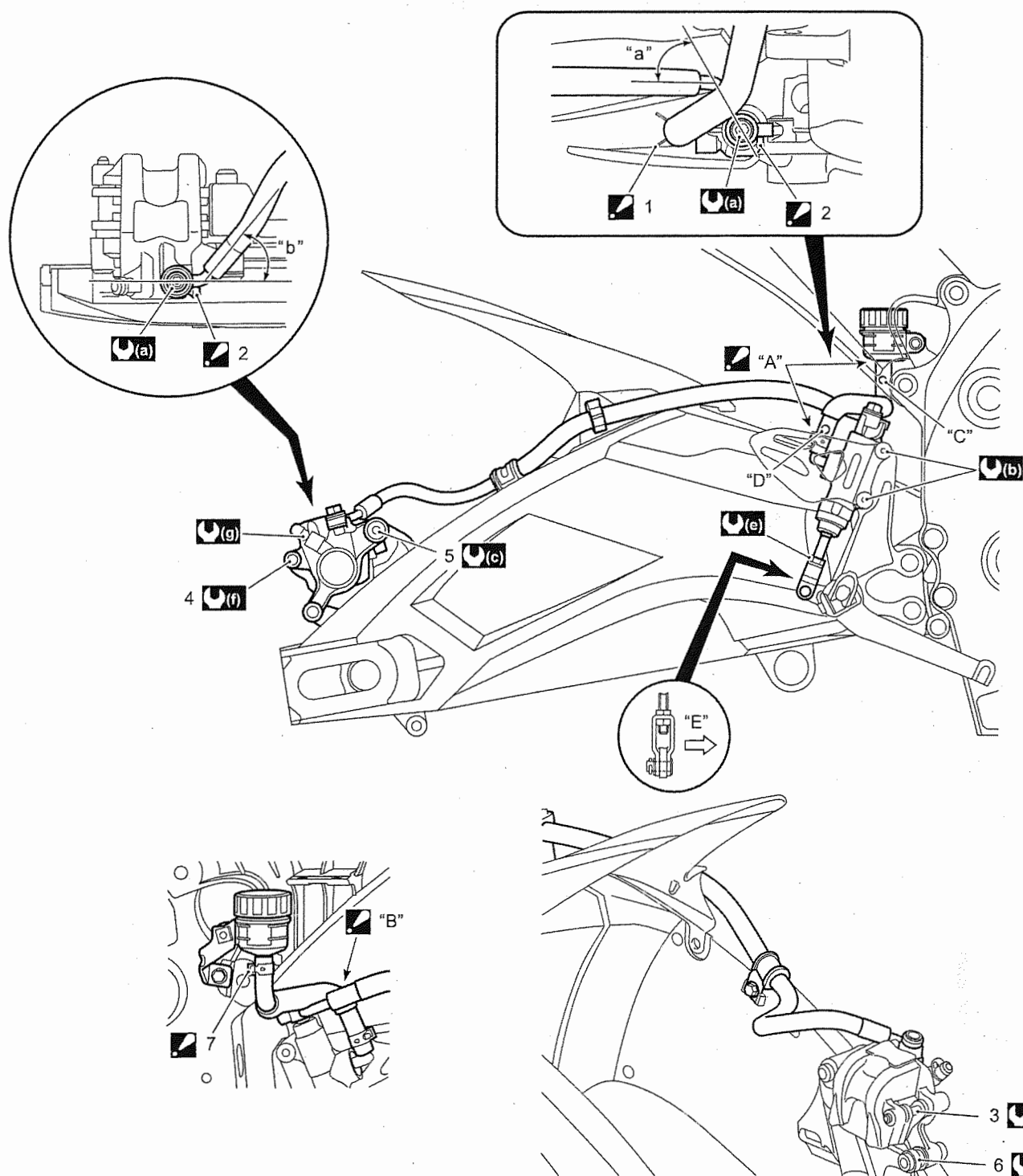


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1. Hose clamp : Clamp end should face downward.	"A": Clamp the brake hose firmly.
2. Stopper : After the brake hose union has contacted to the stopper, tighten the union bolt.	"B": Pass the brake hose behind throttle cables.
3. Hose guide : Pass the brake hose into the hose guide.	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
4. Stopper : After positioning the clamp with the stopper, tighten the clamp bolt.	"a": 79°
5. Hose clamp : Insert the clamp end into the hole on the front fender.	"b": 55°
6. Hose clamp : Clamp end should face backward.	"c": 40°

Rear Brake Hose Routing Diagram

BENB15J24102002



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1. Hose clamp : Face the clamp end backward.	"A": Insert the brake hose firmly.	(c) : 27 N·m (2.7 kgf-m, 19.5 lbf-ft)
2. Stopper : After the brake hose union has contacted to the stopper, tighten the union bolt.	"B": Pass the reservoir hose above the brake hose.	(d) : 13 N·m (1.3 kgf-m, 9.5 lbf-ft)
3. Brake pad pin	"C": White marking	(e) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
4. Brake pad pin plug	"D": Yellow marking	(f) : 2.5 N·m (0.25 kgf-m, 2.0 lbf-ft)
5. Caliper sliding pin A	"E": Outside	(g) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
6. Caliper sliding pin B	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	"a": 63°
7. Hose clamp : Face the clamp end forward.	(b) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	"b": 49°

Diagnostic Information and Procedures

Brake Symptom Diagnosis

BENB15J24104001

Condition	Possible cause	Correction / Reference Item
Insufficient brake power	Leakage of brake fluid from hydraulic system.	Repair or replace.
	Worn pads and disc.	Replace.
	Oil adhesion on friction surface of pads.	Clean disc and pads.
	Air in hydraulic system.	Bleed air.
	Not enough brake fluid in the reservoir.	Replenish.
Brake squeaking	Carbon adhesion on pad surface.	Repair surface with sandpaper.
	Tilted pad.	Correct pad fitting or replace.
	Damaged wheel bearing.	Replace.
	Loose front wheel axle or rear wheel axle.	Tighten to specified torque.
	Worn pads and disc.	Replace.
	Foreign material in brake fluid.	Replace brake fluid.
	Clogged return port of master cylinder.	Disassemble and clean master cylinder.
Excessive brake lever stroke	Air in hydraulic system.	Bleed air.
	Insufficient brake fluid.	Replenish fluid to specified level; bleed air.
	Improper quality of brake fluid.	Replace with correct fluid.
Leakage of brake fluid	Insufficient tightening of connection joints.	Tighten to specified torque.
	Cracked hose.	Replace.
	Worn piston and/or cup.	Replace piston and/or cup.
	Worn piston seals and dust seals.	Replace piston seals and dust seals.
Brake drags	Rusty part.	Clean and lubricate.
	Insufficient brake lever or brake pedal pivot lubrication.	Lubricate.

Repair Instructions

Brake Pedal Height Inspection and Adjustment

BENB15J24106001

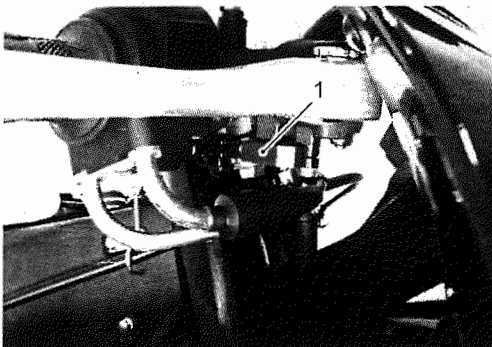
Refer to "Brake System Inspection" in Section 0B (Page 0B-17).

Front Brake Light Switch Inspection

BENB15J24106002

Inspect the front brake light switch in the following procedures:

- 1) Disconnect the front brake light switch coupler (1).



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- 2) Inspect the front brake light switch for continuity with the tester.

If any abnormality is found, replace the front brake light switch with a new one. Refer to "Front Brake Master Cylinder / Brake Lever Disassembly and Assembly" (Page 4A-11).

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity (•••)

Color Position	Terminal (B/R)	Terminal (B/BI)
OFF		
ON	○	○

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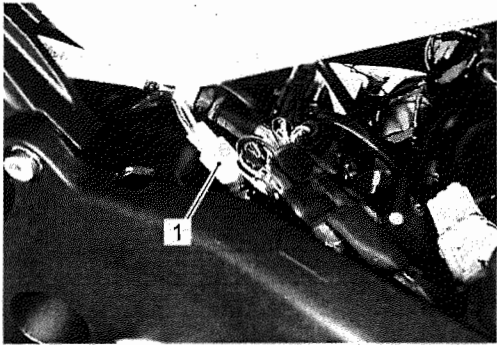
- 3) Connect the front brake light switch coupler (1).

4A-4 Brake Control System and Diagnosis:

Rear Brake Light Switch Inspection

Inspect the rear brake light switch in the following procedures:

- 1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Disconnect the rear brake light switch lead wire coupler (1).



- 3) Inspect the rear brake light switch for continuity with the tester.
If any abnormality is found, replace the rear brake light switch with a new one.

Special tool

: 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity (•))

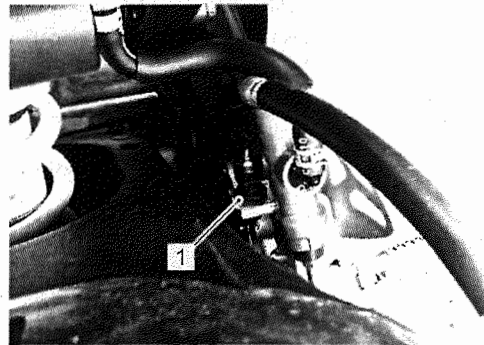
Rear brake light switch

Color Position	Terminal (O)	Terminal (W/B)
OFF		
ON		

- 4) Connect the rear brake light switch lead wire coupler (1).
- 5) Reinstall the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).

Rear Brake Light Switch Inspection and Adjustment

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.



Brake Fluid Level Check

Refer to "Brake System Inspection" in Section 0B (Page 0B-17).

Brake Hose Inspection

Refer to "Brake System Inspection" in Section 0B (Page 0B-17).

Air Bleeding from Brake Fluid Circuit

Air trapped in the brake fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by "sponginess" of the brake lever and also by lack of braking force. Considering the danger to which such trapped air exposes the machine and rider, it is essential that after remounting the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner:

NOTICE

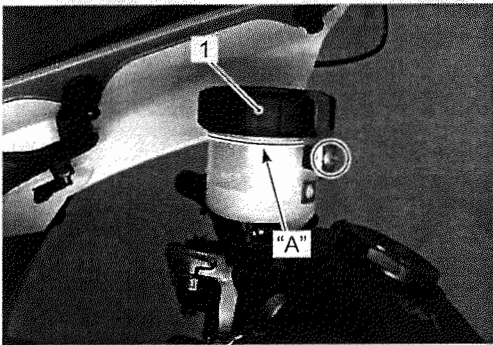
Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.

Front Brake

NOTE

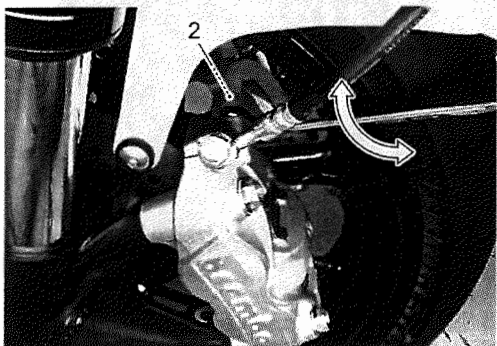
If air is trapped in the master cylinder, bleed air from the master cylinder first in the same manner as follows. Refer to "Air Bleeding from the Front Brake Master Cylinder" (Page 4A-11).

- 1) Place the motorcycle on a level surface and keep the handlebars straight.
- 2) Remove the reservoir cap and diaphragm (1).
- 3) Fill the reservoir with brake fluid to the upper line "A" of the reservoir. Place the reservoir cap to prevent dirt from entering.

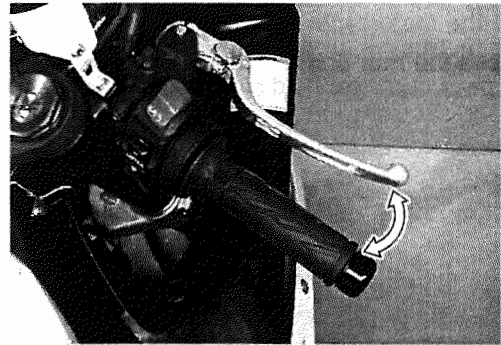


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- 4) Attach a hose to the air bleeder valve (2), and insert the free end of the hose into a receptacle.
- 5) Squeeze and release the brake lever several times in rapid succession and squeeze the lever fully without releasing it.
- 6) Loosen the air bleeder valve (2) by turning it a quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake lever causing it to touch the handlebar grip.



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- 7) Close the air bleeder valve (2), pump and squeeze the lever, and open the valve.
- 8) Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.

NOTE

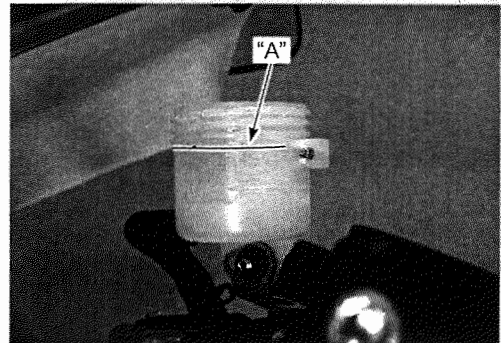
While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.

- 9) Close the air bleeder valve (2) and disconnect the hose.

Tightening torque

Air bleeder valve (Front caliper): 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)

- 10) Fill the reservoir with brake fluid to the upper line "A" of the reservoir.



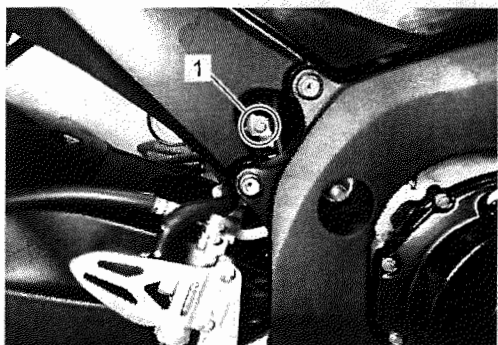
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- 11) Install the diaphragm and reservoir cap (1).

4A-6 Brake Control System and Diagnosis:

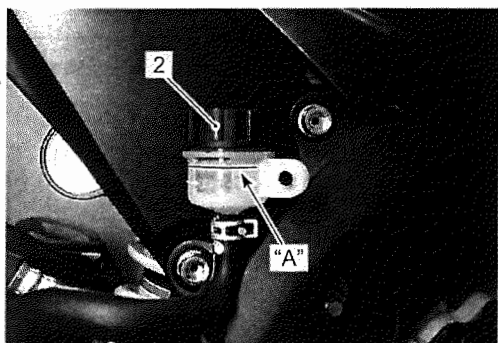
Rear Brake

- 1) Place the motorcycle on a level surface.
- 2) Remove the rear brake fluid reservoir mounting bolt (1).



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- 3) Remove the reservoir cap (2) and diaphragm.
- 4) Fill the reservoir with brake fluid to the upper line "A" of the reservoir. Place the reservoir cap to prevent dirt from entering.



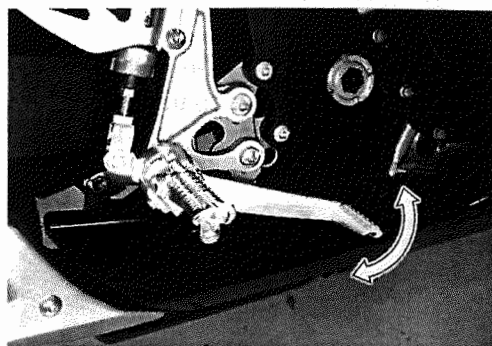
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NOTE

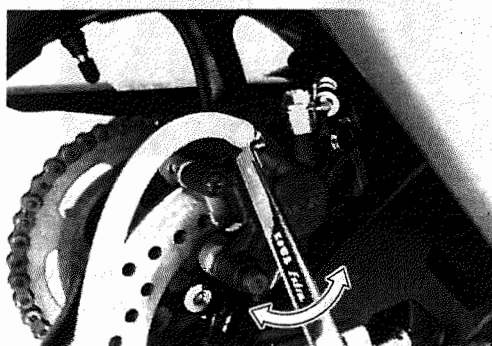
The difference of bleeding operation from the front brake is that the rear master cylinder is actuated by a pedal.

Tightening torque

Air bleeder valve (Rear caliper): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

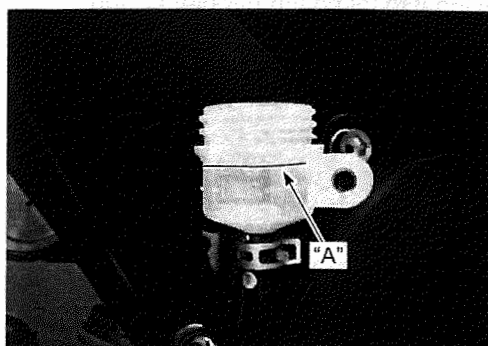


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- 5) Fill the reservoir with brake fluid to the upper line "A" of the reservoir.



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- 6) Install the diaphragm and reservoir cap.
- 7) Install the reservoir tank as shown in the rear brake hose routing diagram. Refer to "Rear Brake Hose Routing Diagram" (Page 4A-2).

Brake Fluid Replacement

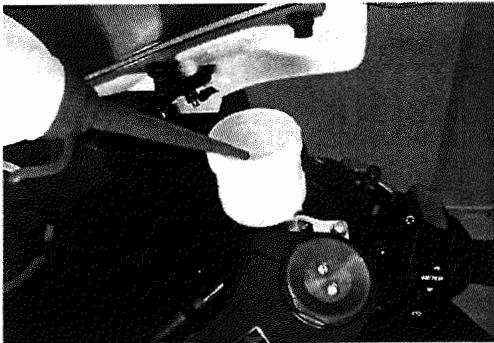
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NOTICE

Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.

Front Brake

- 1) Place the motorcycle on a level surface and keep the handlebars straight.
- 2) Remove the brake fluid reservoir cap and diaphragm.
- 3) Suck up the old brake fluid as much as possible.

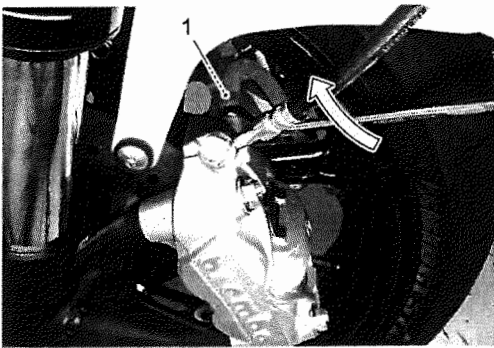


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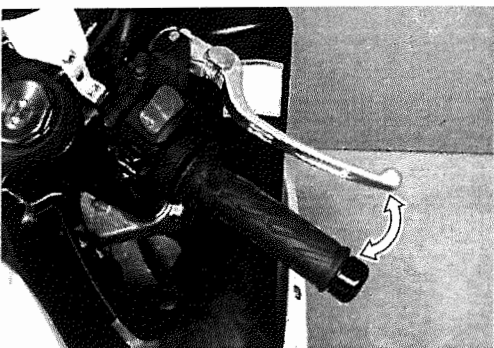
- 4) Fill the reservoir with new brake fluid.

BF: Brake fluid (DOT 4)

- 5) Connect a clear hose to the air bleeder valve (1) and insert the other end of the hose into a receptacle.
- 6) Loosen the air bleeder valve (1) and pump the brake lever until the old brake fluid flows out of the brake system.



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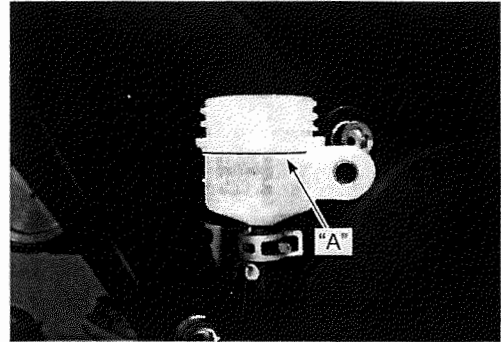
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- 7) Close the air bleeder valve (1) and disconnect the clear hose.

Tightening torque

Air bleeder valve (Front caliper): 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)

- 8) Fill the reservoir with brake fluid to the upper line "A" of the reservoir.

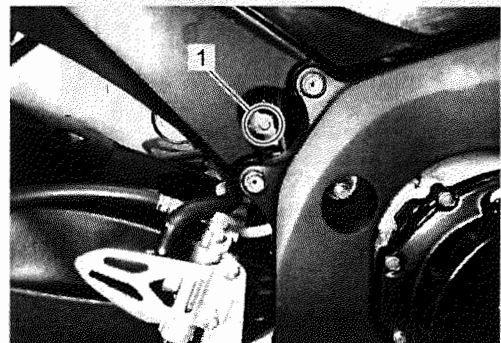


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- 9) Install the diaphragm and reservoir cap.

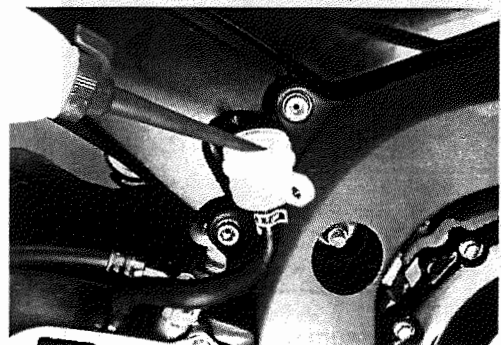
Rear Brake

- 1) Place the motorcycle on a level surface.
- 2) Remove the rear brake fluid reservoir mounting bolt (1).



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- 3) Remove the brake fluid reservoir cap and diaphragm.
- 4) Suck up the old brake fluid as much as possible.



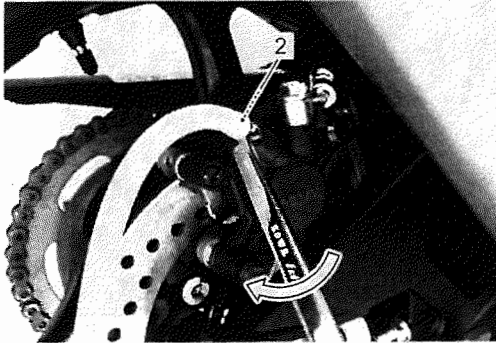
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4A-8 Brake Control System and Diagnosis:

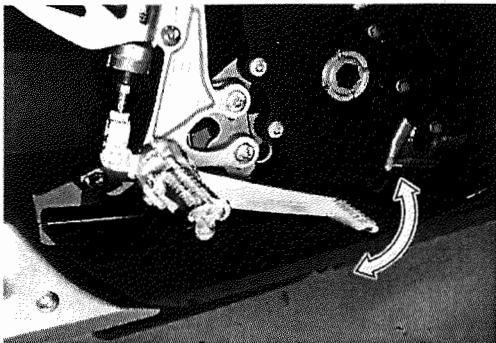
- 5) Fill the reservoir with new brake fluid.

BF: Brake fluid (DOT 4)

- 6) Connect a clear hose to the air bleeder valve (2) and insert the other end of the hose into a receptacle.
- 7) Loosen the air bleeder valve (2) and pump the brake pedal until the old brake fluid flows out of the brake system.



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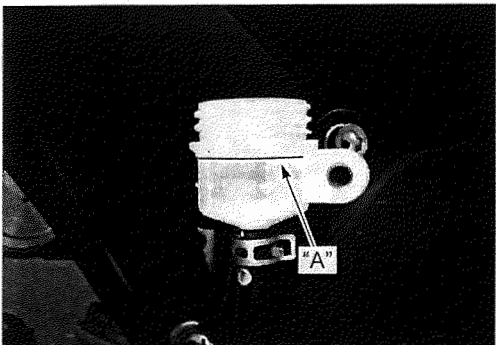
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- 8) Close the air bleeder valve and disconnect the clear hose.

Tightening torque

Air bleeder valve (Rear caliper): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

- 9) Fill the reservoir with brake fluid to the upper line "A" of the reservoir.



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- 10) Install the diaphragm and reservoir cap.
- 11) Install the reservoir tank as shown in the rear brake hose routing diagram. Refer to "Rear Brake Hose Routing Diagram" (Page 4A-2).

Front Brake Hose Removal and Installation

BENB15J24106009

Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" (Page 4A-7).
- 2) Remove the front brake hoses as shown in the front brake hose routing diagram. Refer to "Front Brake Hose Routing Diagram" (Page 4A-1).

Installation

- 1) Install the new seal washers then install the front brake hose as shown in the front brake hose routing diagram. Refer to "Front Brake Hose Routing Diagram" (Page 4A-1).
- 2) Bleed air from the front brake system. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-4).

Rear Brake Hose Removal and Installation

BENB15J24106010

Removal

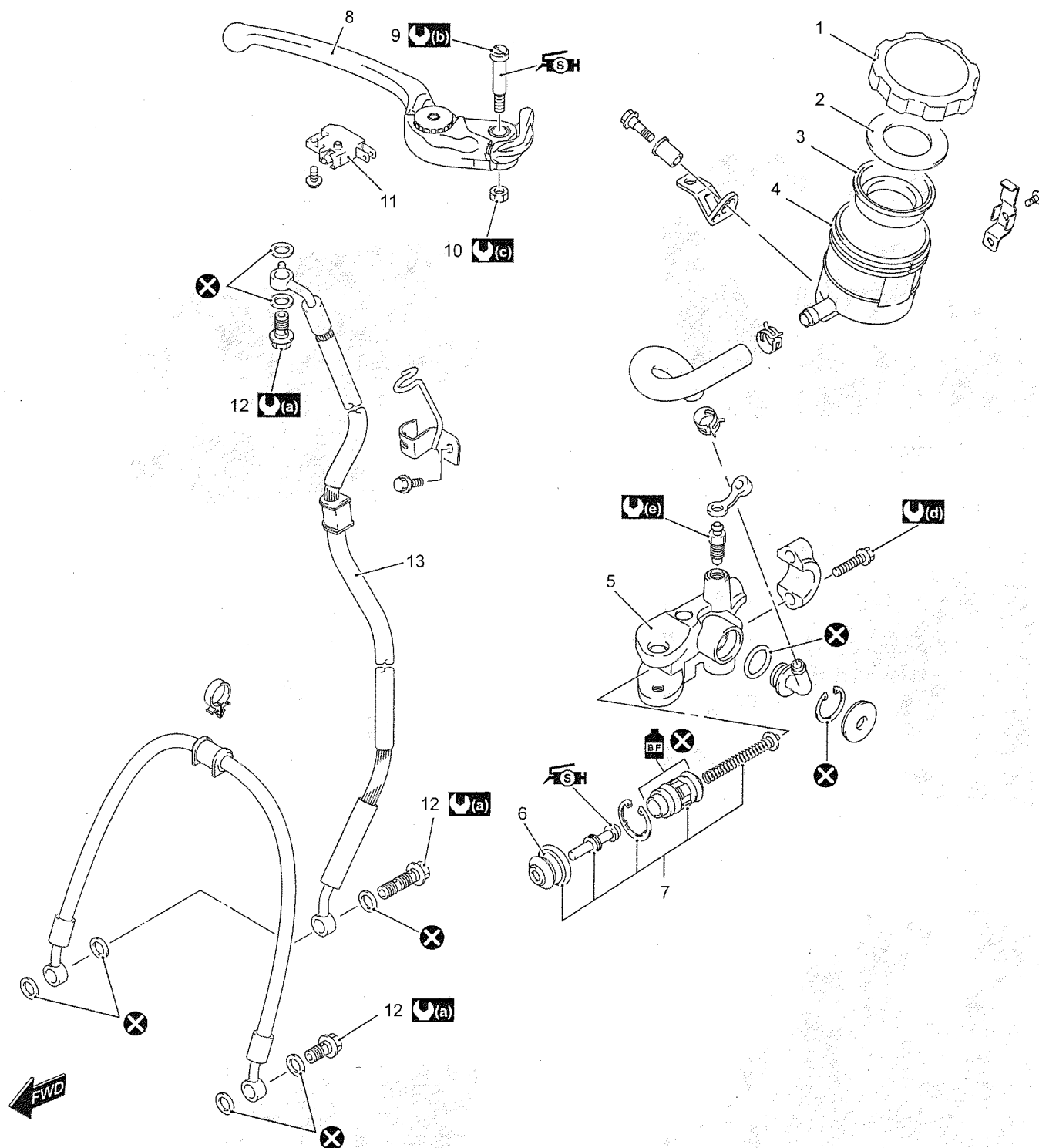
- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" (Page 4A-7).
- 2) Remove the rear brake hoses as shown in the rear brake hose routing diagram. Refer to "Rear Brake Hose Routing Diagram" (Page 4A-2).

Installation

- 1) Install the new seal washers then install the rear brake hose as shown in the rear brake hose routing diagram. Refer to "Rear Brake Hose Routing Diagram" (Page 4A-2).
- 2) Bleed air from the rear brake system. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-4).

Front Brake Master Cylinder Components

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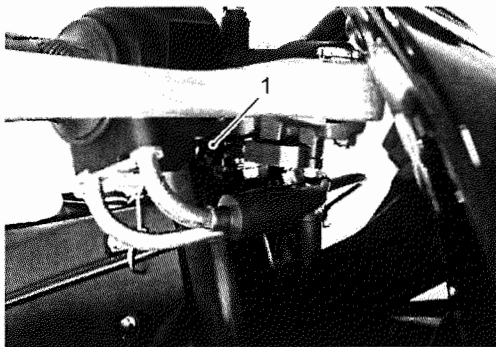
1. Reservoir cap	8. Brake lever	U(b) : 1 N·m (0.1 kgf-m, 0.5 lbf-ft)
2. Plate	9. Brake lever pivot bolt	U(c) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
3. Diaphragm	10. Brake lever pivot bolt lock-nut	U(d) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
4. Reservoir tank	11. Brake light switch	U(e) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
5. Master cylinder	12. Brake hose union bolt	BF : Apply brake fluid.
6. Dust boot	13. Brake hose	SH : Apply silicone grease.
7. Piston set	U(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	X : Do not reuse.

Front Brake Master Cylinder Assembly Removal and Installation

BENB15J24106012

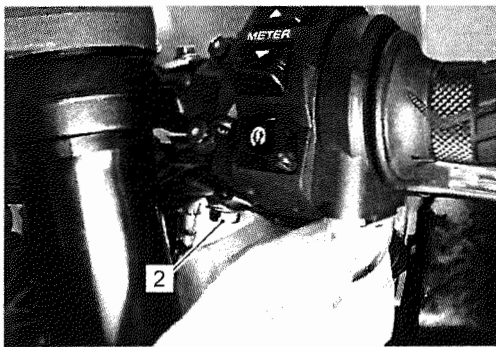
Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" (Page 4A-7).
- 2) Disconnect the front brake light switch coupler (1).



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- 3) Place a rag underneath the brake hose union bolt (2) on the master cylinder to catch any spilt brake fluid.
- 4) Remove the brake hose union bolt (2).



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- 5) Remove the reservoir tank bolt (3) and master cylinder assembly (4).



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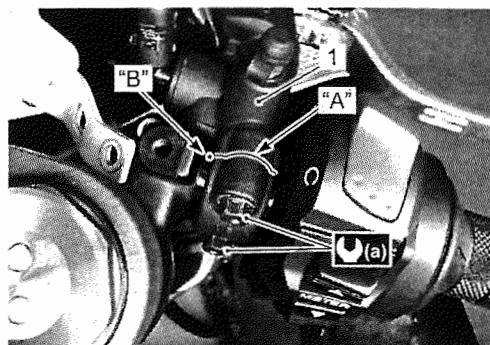
Installation

Install the front brake master cylinder in the reverse order of removal. Pay attention to the following points:

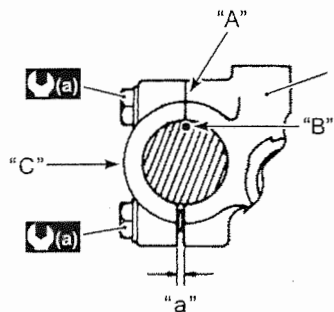
- When installing the master cylinder (1) onto the handlebar, align the master cylinder holder's mating surface "A" with the punch mark "B" on the handlebar and tighten the upper holder bolt first.

Tightening torque

Front brake master cylinder holder bolt (Upper and Lower) (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



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IB14J1410029-01

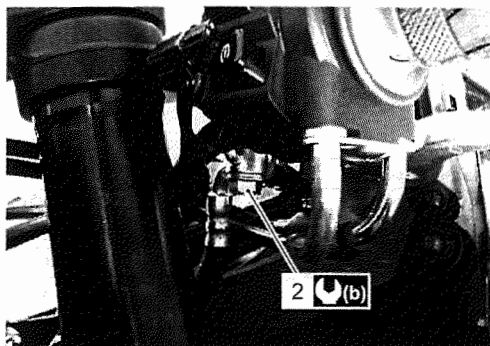
"C": Up mark

"a": Clearance

- Install the new seal washers.
- After setting the brake hose union to the stopper, tighten the union bolt (2) to the specified torque.

Tightening torque

Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



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- Bleed air from front brake system. Refer to "Air Bleeding from the Front Brake Master Cylinder" (Page 4A-11) and "Air Bleeding from Brake Fluid Circuit" (Page 4A-4).

Air Bleeding from the Front Brake Master Cylinder

BENB15J24106013

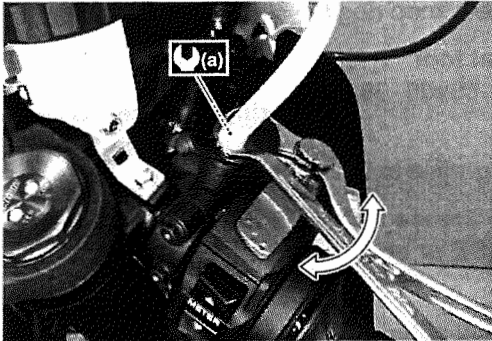
Bleed air from the master cylinder in the same manner as front brake caliper side. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-4).

NOTE

If air is trapped in the master cylinder, bleed air from the master cylinder first.

Tightening torque

Air bleeder valve (Master cylinder) (a): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



IB14J1410031-02

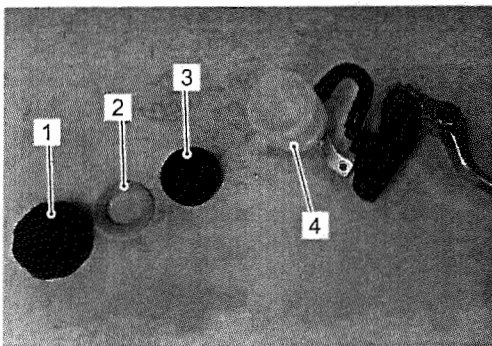
Front Brake Master Cylinder / Brake Lever Disassembly and Assembly

BENB15J24106014

Refer to "Front Brake Master Cylinder Assembly Removal and Installation" (Page 4A-10).

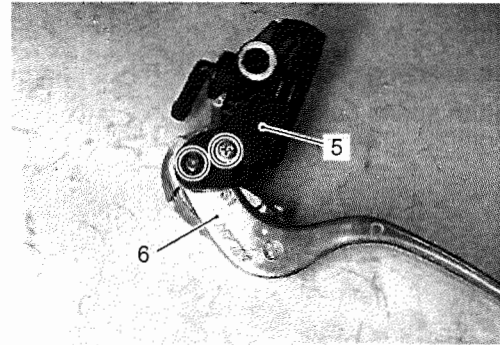
Disassembly

- 1) Remove the reservoir cap (1), plate (2), diaphragm (3) and reservoir tank (4).



IB14J1410032-01

- 2) Remove the brake light switch (5) and brake lever (6).

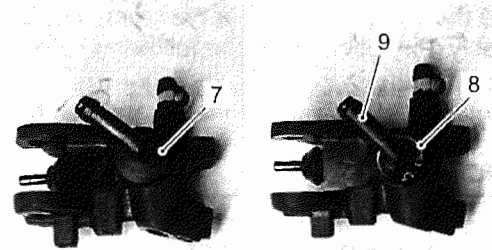


IB14J1410033-01

- 3) Remove the dust rubber (7), snap ring (8) and connector (9).

Special tool

 : 09900-06108 (Snap ring remover (Close type))

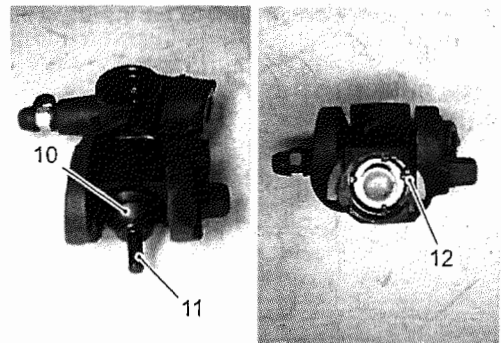


IB14J1410034-01

- 4) Pull out the dust boot (10) and push rod (11).
- 5) Remove the snap ring (12).

Special tool

 : 09900-06108 (Snap ring remover (Close type))

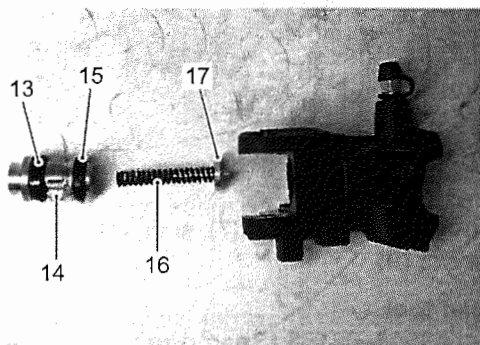


IB14J1410035-01

4A-12 Brake Control System and Diagnosis:

6) Remove the following parts from the master cylinder.

- Secondary cup (13)
- Piston (14)
- Primary cup (15)
- Return spring (16)
- Return spring guide (17)



IB14J1410036-01

Assembly

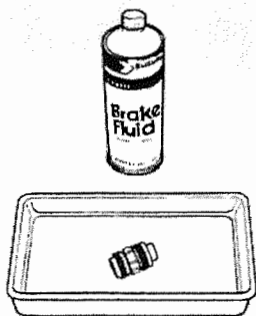
Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

- Wash the master cylinder components with new brake fluid before reassembly.

NOTICE

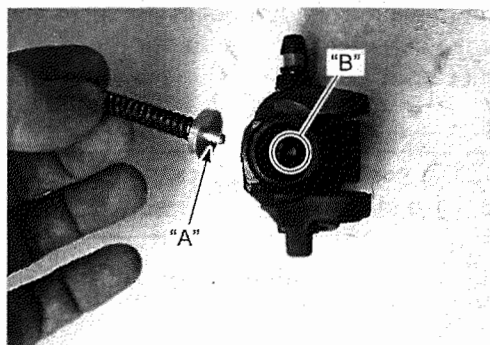
- Do not wipe the brake fluid off after washing the components.
 - When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.
 - Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.
-
- Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.

BF: Brake fluid (DOT 4)



IB37H1410034-01


- When installing the spring guide, fit the spring guide end "A" into the hole "B" of the master cylinder.




IB14J1410037-01

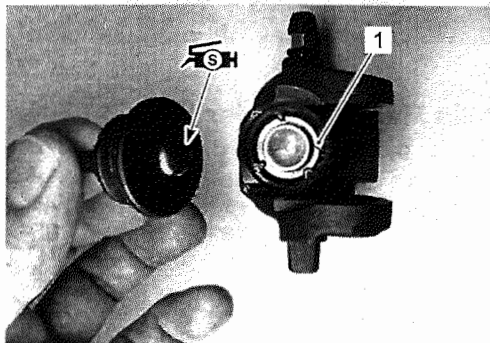
- Fit a new snap ring (1).

Special tool

 : 09900-06108 (Snap ring remover (Close type))

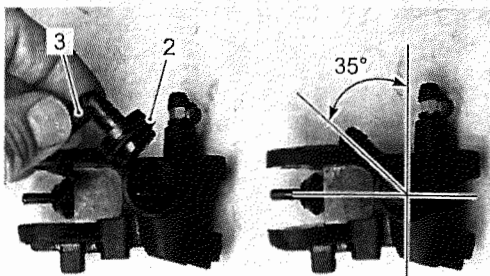
- Apply grease to the push rod end.

 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)



IB14J1410038-01

- Install a new O-ring (2).
- Install the connector (3) as shown in the figure.

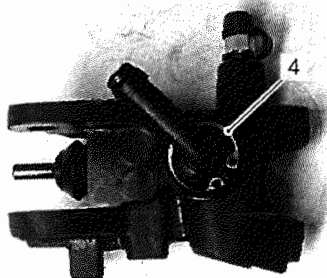


IB14J1410039-01

- Fit a new snap ring (4).


Special tool

 : 09900-06108 (Snap ring remover (Close type))



IB14J1410040-01

- When installing the brake lever (5), insert the push rod into the hole of the brake lever.
- Apply grease to the brake lever pivot bolt.

 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)



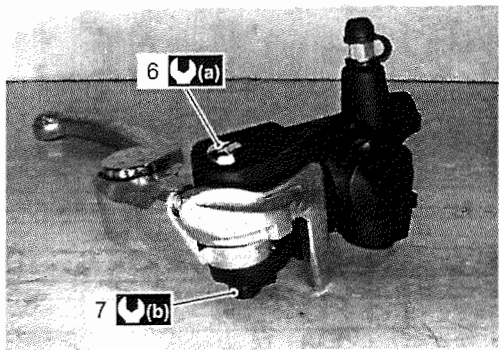
IB14J1410041-01

- Tighten the pivot bolt (6) and lock-nut (7) to the specified torque.

Tightening torque

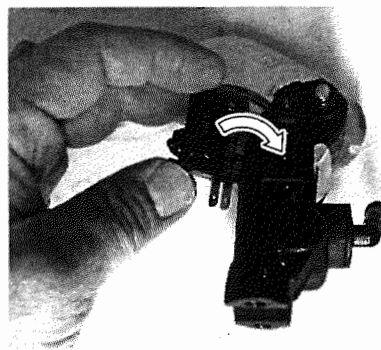
Brake lever pivot bolt (a): 1 N·m (0.1 kgf-m, 0.5 lbf-ft)

Brake lever pivot bolt lock-nut (b): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



IB14J1410042-01

- When installing the brake light switch, align the projection on the switch with the hole in the master cylinder.



IB14J1410043-01

- Install the reservoir tank and hose as shown in the front brake hose routing diagram. Refer to "Front Brake Hose Routing Diagram" (Page 4A-1).

Front Brake Master Cylinder Parts Inspection

BENB15J24106015

Refer to "Front Brake Master Cylinder / Brake Lever Disassembly and Assembly" (Page 4A-11).

Master Cylinder

Inspect the master cylinder bore for any scratches or other damage.

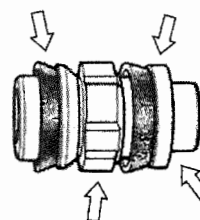


IB14J1410044-01

Piston / Rubber Parts

Inspect the piston surface for any scratches or other damage.

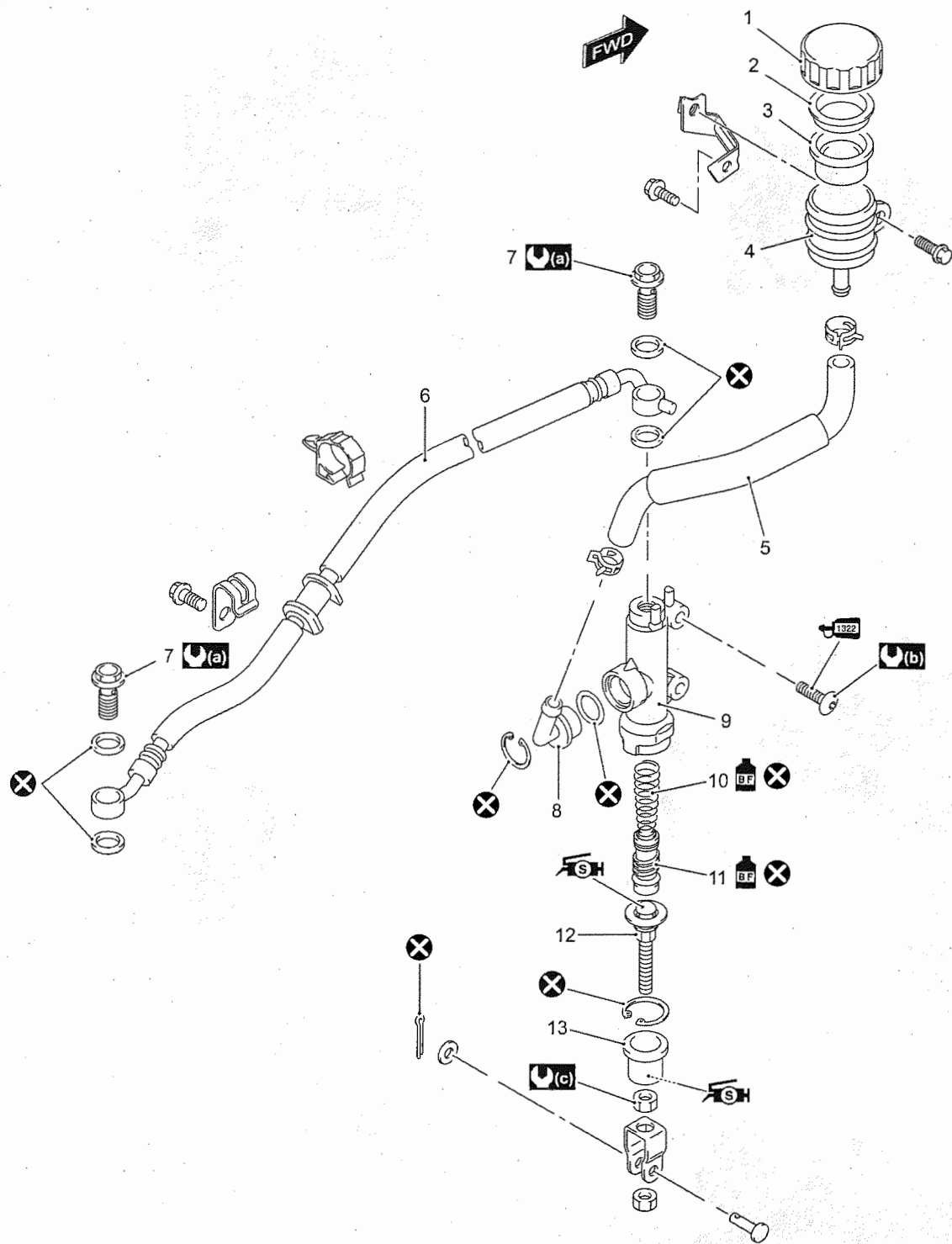
Inspect the primary cup, secondary cup and dust boot for wear or damage.



IB37H1410041-01

Rear Brake Master Cylinder Components

BENB15J24106016



IB14J1410063-02

1. Reservoir cap	6. Brake hose	11. Piston/Cup set	(c) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
2. Plate	7. Brake hose union bolt	12. Push rod	: Apply silicone grease.
3. Diaphragm	8. Brake hose connector	13. Dust boot	: Apply thread lock to the thread part.
4. Reservoir tank	9. Master cylinder	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	: Apply brake fluid.
5. Reservoir hose	10. Cup/Spring set	(b) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	: Do not reuse.

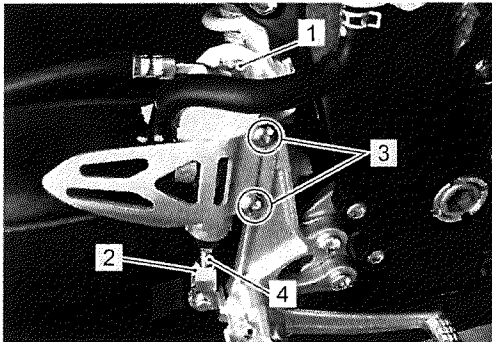
Rear Brake Master Cylinder Assembly Removal and Installation

BENB15J24106017

Refer to "Rear Brake Hose Routing Diagram" (Page 4A-2).

Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" (Page 4A-7).
- 2) Place a rag underneath the brake hose union bolt (1) on the master cylinder to catch any spilt brake fluid.
- 3) Remove the brake hose union bolt (1).
- 4) Loosen the lock-nut (2).
- 5) Remove the master cylinder mounting bolts (3).
- 6) Remove the master cylinder along with the reservoir by turning the push rod (4).




IB14J1410045-01

Installation

Install the rear brake master cylinder in the reverse order of removal. Pay attention to the following points:

- Apply thread lock to the master cylinder mounting bolts (1) and tighten them to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Rear brake master cylinder mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

- Tighten the lock-nut (2) to the specified torque.

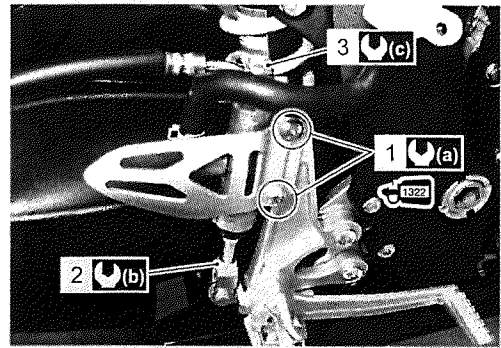
Tightening torque

Rear brake master cylinder rod lock-nut (b): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)

- Install the new seal washers.
- After setting the brake hose union to the stopper, tighten the union bolt (3) to the specified torque.

Tightening torque

Brake hose union bolt (c): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1410046-01

- Bleed air from the brake system after reassembling the master cylinder. Refer to "Air Bleeding from Brake Fluid Circuit" (Page 4A-4).
- Adjust the brake pedal height. Refer to "Brake Pedal Height Inspection and Adjustment" (Page 4A-3).

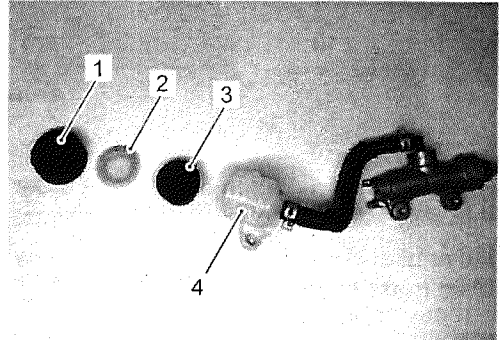
Rear Brake Master Cylinder Disassembly and Assembly

BENB15J24106018

Refer to "Rear Brake Master Cylinder Assembly Removal and Installation" (Page 4A-15).

Disassembly

- 1) Remove the reservoir cap (1), plate (2), diaphragm (3) and reservoir tank (4).

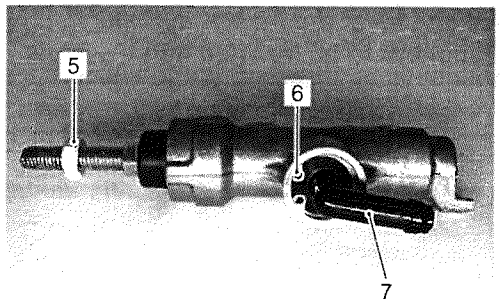


IB14J1410047-01

- 2) Remove the lock-nut (5).
- 3) Remove the snap ring (6) and brake hose connector (7).

Special tool

 : 09900-06108 (Snap ring remover (Close type))



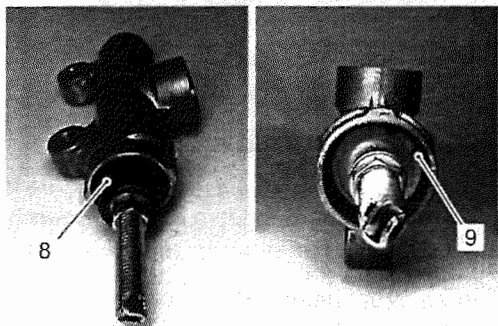
IB14J1410048-01

4A-16 Brake Control System and Diagnosis:

- 4) Pull out the dust boot (8) and remove the snap ring (9).

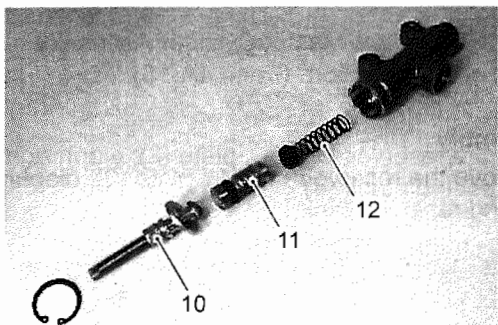
Special tool

TOOL : 09900-06108 (Snap ring remover (Close type))



IB14J1410049-01

- 5) Remove the push rod (10), piston/cup set (11) and cup/spring (12).



IB14J1410050-01

Assembly

Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

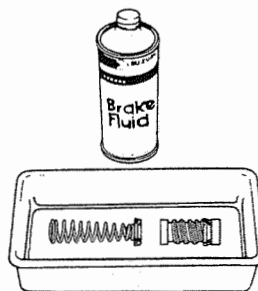
- Wash the master cylinder components with new brake fluid before reassembly.

NOTICE

- 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.

- Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.

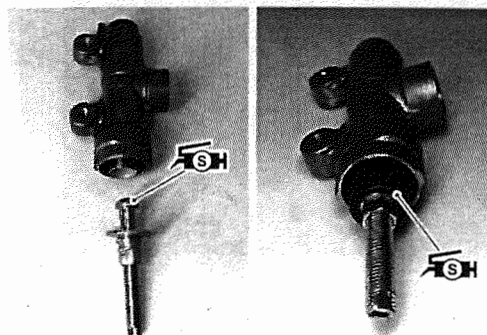
BF: Brake fluid (DOT 4)



IB14J1410051-02

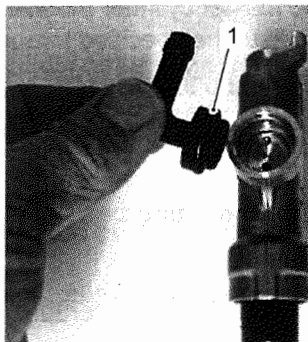
- Apply grease to the push rod end and dust boot lip.

SH : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)



IB14J1410052-02

- Install a new O-ring (1).



IB14J1410053-01

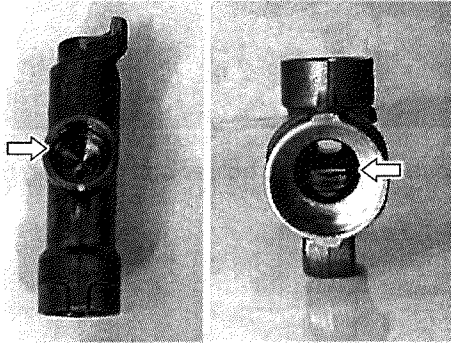
Rear Brake Master Cylinder Parts Inspection

BENB15J24106019

Refer to "Rear Brake Master Cylinder Disassembly and Assembly" (Page 4A-15).

Master Cylinder

Inspect the master cylinder bore for any scratches or other damage.

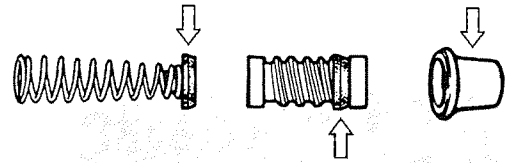


IB14J1410054-01

Piston / Rubber Parts

Inspect the piston surface for any scratches or other damage.

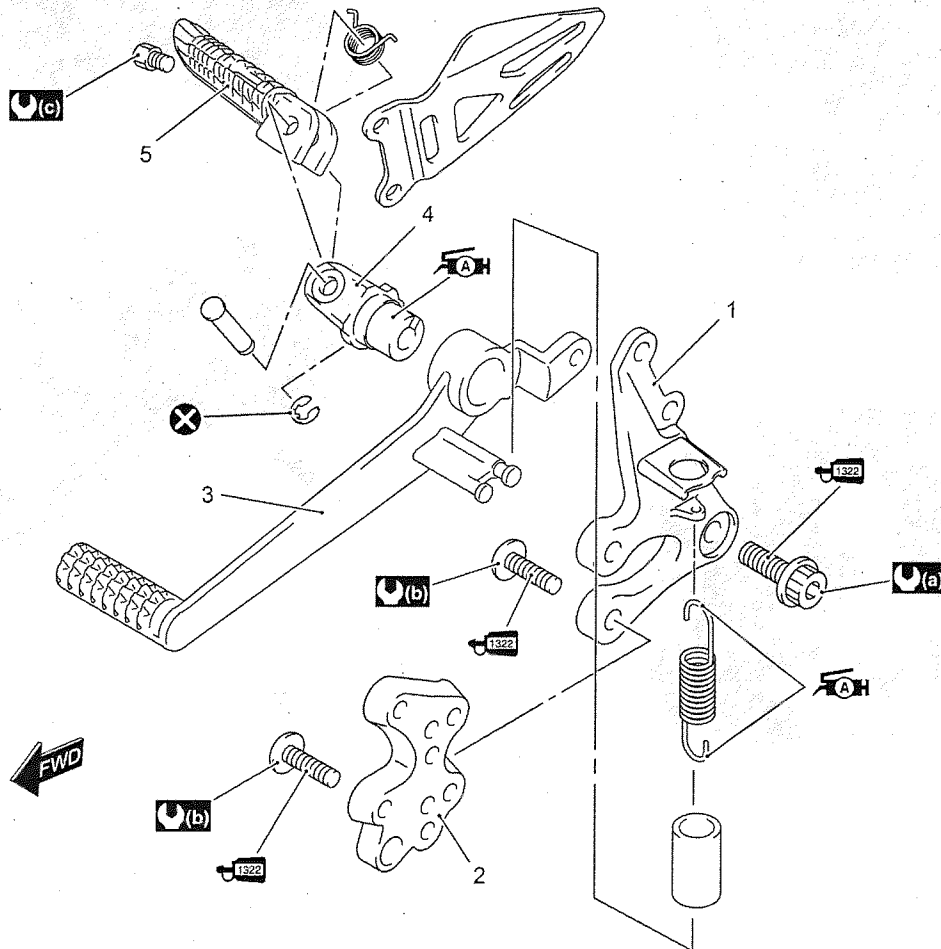
Inspect the primary cup, secondary cup and dust boot for wear or damage.



IB14J1410055-01

Rear Brake Pedal Construction

BENB15J24106020



IB14J1410056-01

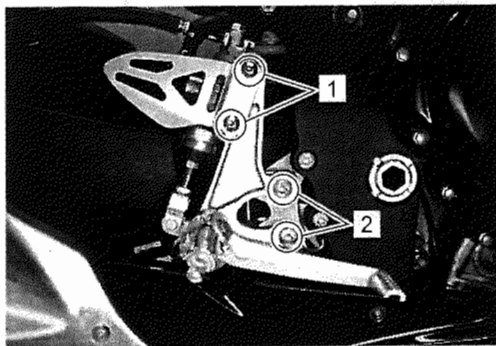
1. Footrest bracket No. 2	5. Footrest	: Apply grease.
2. Footrest bracket No. 1	: 35 N·m (3.5 kgf-m, 25.5 lbf-ft)	: Apply thread lock to the thread part.
3. Rear brake pedal	: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	: Do not reuse.
4. Footrest holder	: 18 N·m (1.8 kgf-m, 13.0 lbf-ft)	

Rear Brake Pedal Removal and Installation

BENB15J24106021

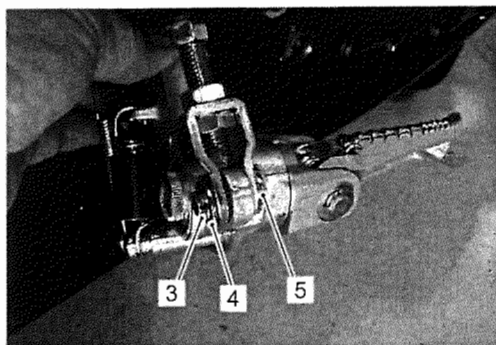
Removal

- 1) Remove the rear brake master cylinder mounting bolts (1) and right footrest bracket No. 2 mounting bolts (2).



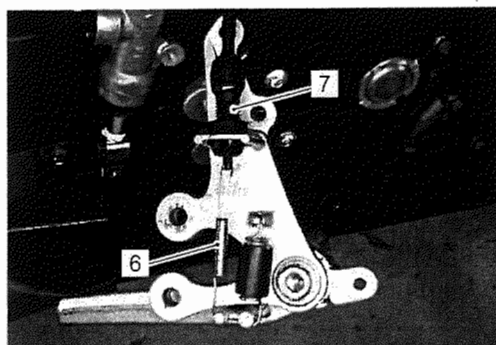
IB14J1410057-01

- 2) Remove the cotter pin (3), washer (4) and pin (5).



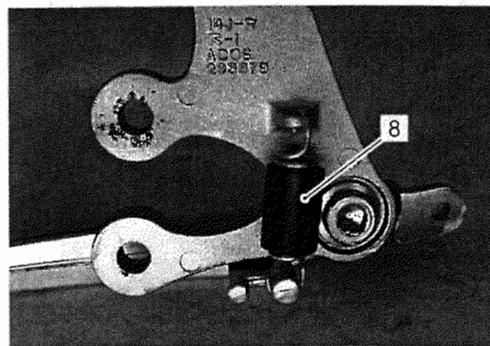
IB14J1410058-01

- 3) Remove the spring (6) and rear brake light switch (7).



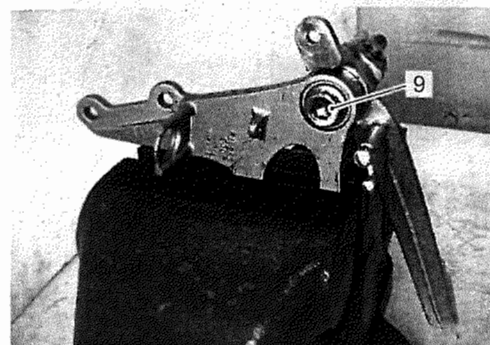
IB14J1410059-01

- 4) Remove the brake pedal spring (8).



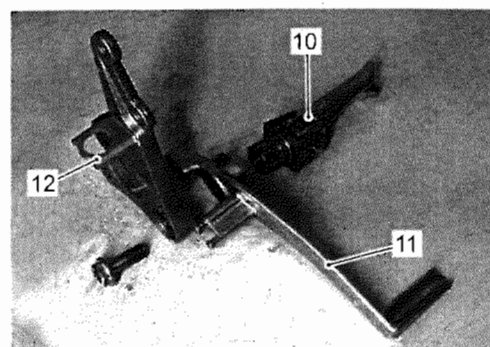
IB14J1410060-01

- 5) Remove the footrest holder bolt (9) using the vise.



IB14J1410061-01

- 6) Remove the front footrest (10), rear brake pedal (11) and right footrest bracket No. 2 (12).



IB14J1410062-01

Installation

- 1) Install the rear brake pedal as shown in the front footrest bracket construction. Refer to "Front Footrest Bracket Construction" in Section 9E (Page 9E-2).
- 2) After installing the rear brake pedal, check the following items.
 - Brake pedal height
Refer to "Brake System Inspection" in Section 0B (Page 0B-17).
 - Rear brake light
Refer to "Rear Brake Light Switch Inspection and Adjustment" (Page 4A-4).

Specifications

Service Data

BENB15J24107001

Brake

Unit: mm (in)

Item	Standard		Limit
Rear brake pedal height	65 – 75 (2.6 – 3.0)		—
Master cylinder bore and piston diam.	Front	Approx. 17.5 (0.69)	—
	Rear	Approx. 14.0 (0.55)	—
Brake fluid type	DOT 4		—

Tightening Torque Specifications

BENB15J24107002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Air bleeder valve (Front caliper)	7.5	0.75	5.5	☞ (Page 4A-5) / ☞ (Page 4A-7)
Air bleeder valve (Rear caliper)	6	0.6	4.5	☞ (Page 4A-6) / ☞ (Page 4A-8)
Front brake master cylinder holder bolt (Upper and Lower)	10	1.0	7.0	☞ (Page 4A-10)
Brake hose union bolt	23	2.3	16.5	☞ (Page 4A-10) / ☞ (Page 4A-15)
Air bleeder valve (Master cylinder)	6	0.6	4.5	☞ (Page 4A-11)
Brake lever pivot bolt	1	0.1	0.5	☞ (Page 4A-13)
Brake lever pivot bolt lock-nut	6	0.6	4.5	☞ (Page 4A-13)
Rear brake master cylinder mounting bolt	10	1.0	7.0	☞ (Page 4A-15)
Rear brake master cylinder rod lock-nut	18	1.8	13.0	☞ (Page 4A-15)

NOTE

The tightening torque(s) also specified in:

- “Front Brake Hose Routing Diagram” (Page 4A-1)
- “Rear Brake Hose Routing Diagram” (Page 4A-2)
- “Front Brake Master Cylinder Components” (Page 4A-9)
- “Rear Brake Master Cylinder Components” (Page 4A-14)
- “Rear Brake Pedal Construction” (Page 4A-17)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J24108001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page 4A-7) / ☞ (Page 4A-8) / ☞ (Page 4A-12) / ☞ (Page 4A-16)
Grease	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000-25100	☞ (Page 4A-12) / ☞ (Page 4A-13) / ☞ (Page 4A-16)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞ (Page 4A-15)

NOTE

Required service material(s) also described in:

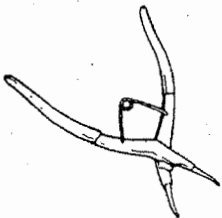
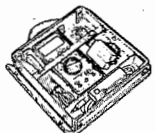
"Front Brake Master Cylinder Components" (Page 4A-9)

"Rear Brake Master Cylinder Components" (Page 4A-14)

"Rear Brake Pedal Construction" (Page 4A-17)

Special Tool

BENB15J24108002

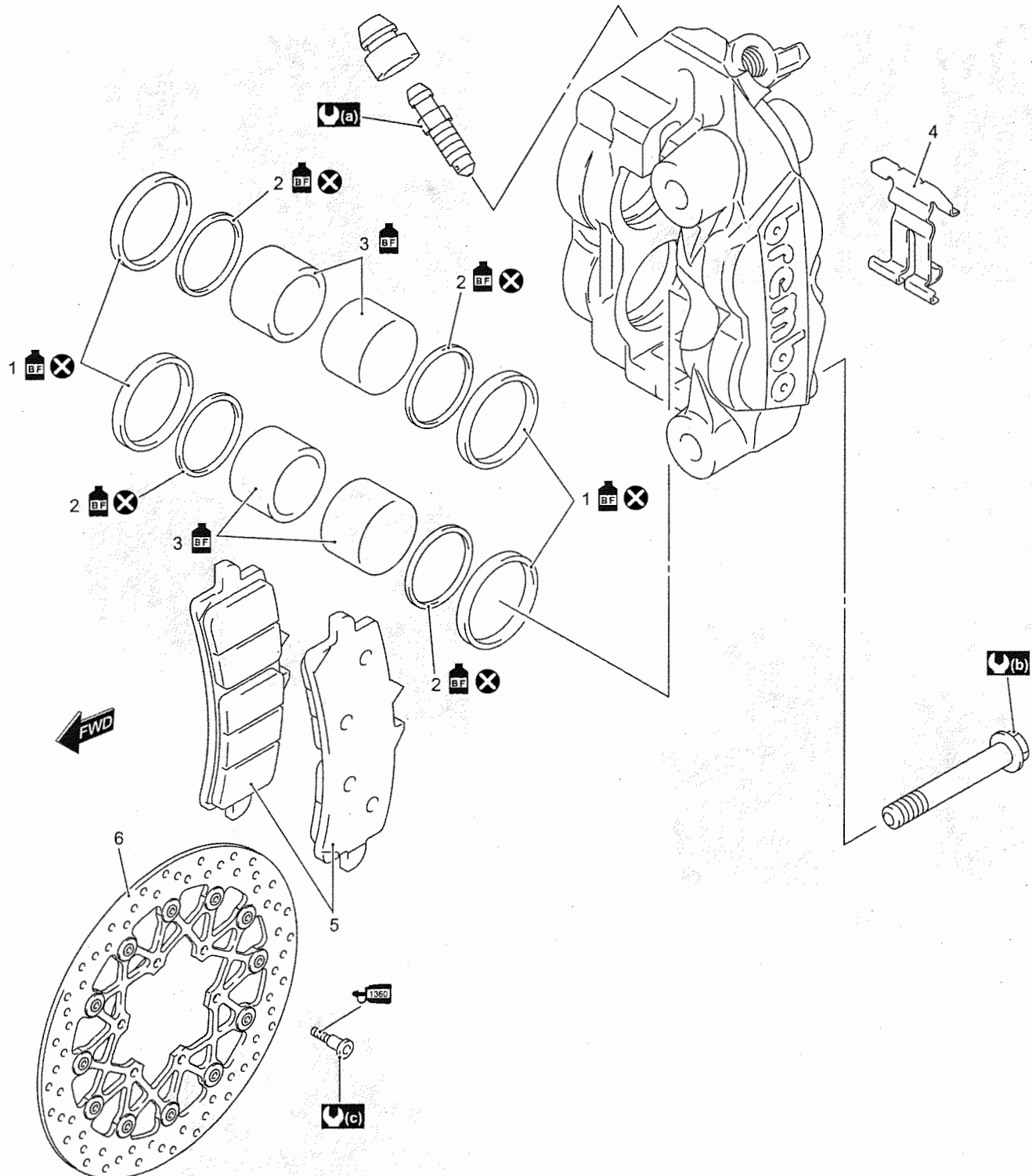
09900-06108 Snap ring remover (Close type) ☞ (Page 4A-11) / ☞ (Page 4A-11) / ☞ (Page 4A-12) / ☞ (Page 4A-13) / ☞ (Page 4A-15) / ☞ (Page 4A-16)		09900-25008 Multi circuit tester set ☞ (Page 4A-3) / ☞ (Page 4A-4)	
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Front Brakes

Repair Instructions

Front Brake Components

BENB15J24206001



IB14J1420021-01

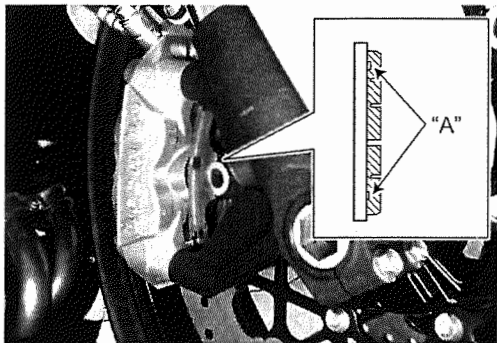
1. Piston seal	5. Brake pad	: 18 N-m (1.8 kgf-m, 13.0 lbf-ft)
2. Dust seal	6. Front brake disc	: Apply thread lock to the thread part.
3. Piston	: 7.5 N-m (0.75 kgf-m, 5.5 lbf-ft)	: Apply brake fluid.
4. Brake pad spring	: 39 N-m (3.9 kgf-m, 28.0 lbf-ft)	: Do not reuse.

4B-2 Front Brakes:

Front Brake Pad Inspection

BENB15J24206002

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



IB14J1420001-03

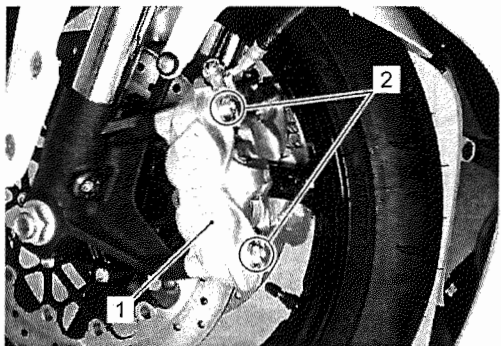
Front Brake Pad Replacement

BENB15J24206003

NOTE

The right and left caliper brake pads are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

- 1) Remove the brake caliper (1) by removing the caliper mounting bolts (2).



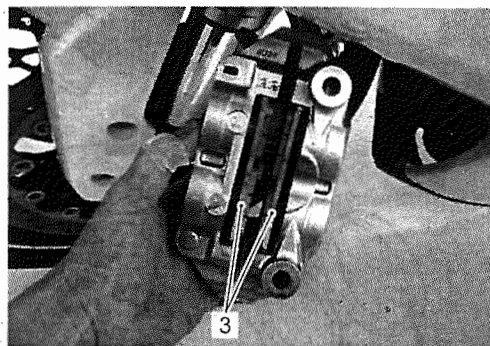
IB14J1420019-02

- 2) Remove the brake pads (3).

- 3) When removing the pads, push the pistons all the way into the brake caliper.

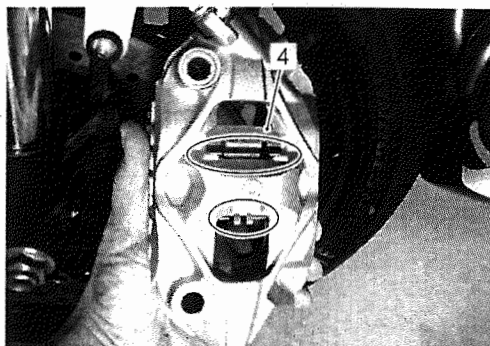
NOTE

Do not operate the brake lever while the pads are removed.



IB14J1420002-02

- 4) Clean up the caliper especially around the caliper pistons.
- 5) Replace the brake pad spring (4) if necessary, fit the brake pad spring claws to the groove of brake caliper.

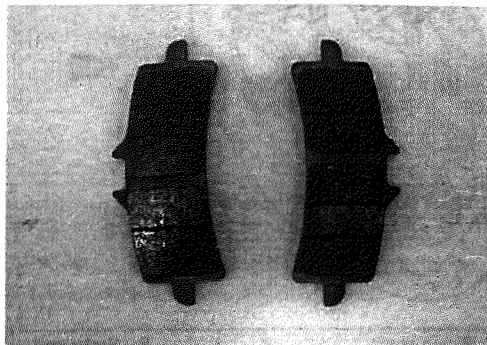


IB14J1420003-03

- 6) Install the new brake pads.

NOTE

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

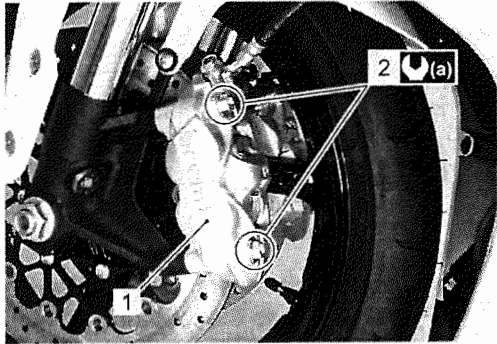


IB14J1420004-02

- 7) Install the brake caliper (1).
- 8) Tighten the front brake caliper mounting bolts (2) to the specified torque.

Tightening torque

Front brake caliper mounting bolt (a): 39 N·m (3.9 kgf-m, 28.0 lbf-ft)



IB14J1420005-01

- 9) After replacing the brake pads, pump the brake lever several times to check for proper brake operation and then check the brake fluid level.

Front Brake Caliper Removal and Installation

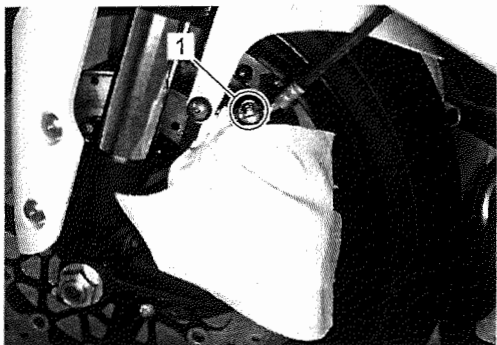
BENB15J24206004

NOTE

The right and left brake calipers are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

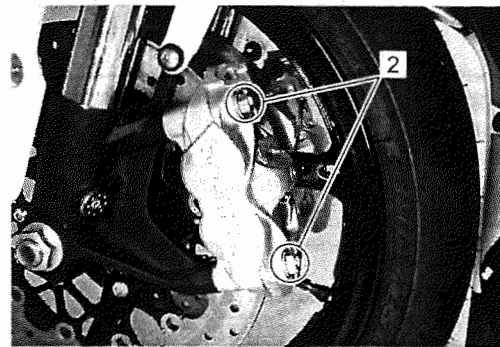
Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" in Section 4A (Page 4A-7).
- 2) Place a rag underneath the union bolt (1) on the brake caliper to catch any spilt brake fluid.
- 3) Remove the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.



IB14J1420006-01

- 4) Remove the brake caliper by removing its mounting bolts (2).



IB14J1420007-01

Installation

Install the brake caliper in the reverse order of removal. Pay attention to the following points:

- Tighten the brake caliper bolts (1) to the specified torque.

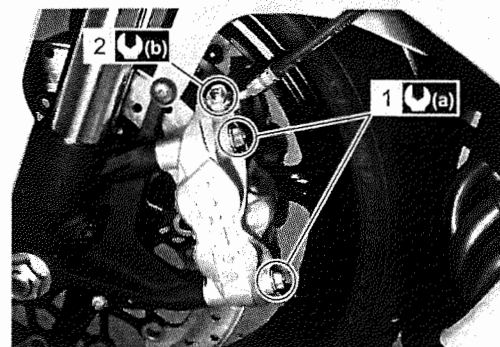
Tightening torque

Front brake caliper mounting bolt (a): 39 N·m (3.9 kgf-m, 28.0 lbf-ft)

- Install the brake hose with the union bolt and new seal washers.
- After setting the brake hose union to the stopper, tighten the union bolt (2) to the specified torque.

Tightening torque

Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1420008-01

- Bleed air from the front brake system after installing the brake caliper. Refer to "Air Bleeding from Brake Fluid Circuit" in Section 4A (Page 4A-4).
- Check the brake fluid leakage and brake operation.

⚠ WARNING

Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and fluid leakage.

4B-4 Front Brakes:

Front Brake Caliper Disassembly and Assembly

BENB15J24206005

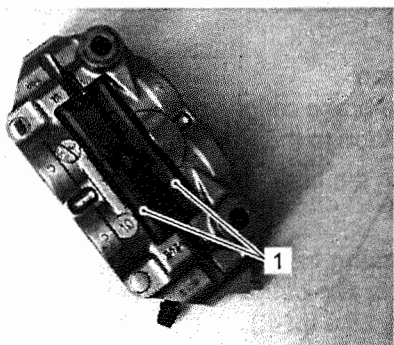
Refer to "Front Brake Caliper Removal and Installation" (Page 4B-3).

NOTE

The right and left calipers are installed symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.

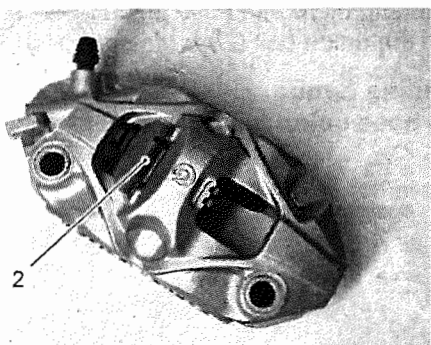
Disassembly

- 1) Remove the brake pads (1).



IB14J1420009-02

- 2) Remove the brake pad spring (2).

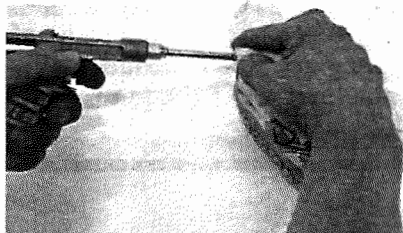


IB14J1420010-01

- 3) Place a rag over the pistons to prevent them from popping out and then force out the pistons using low-pressure air.

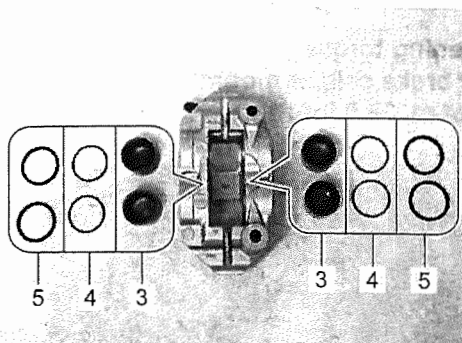
NOTICE

Do not use high pressure air to prevent piston damage.



IB14J1420011-01

- 4) Remove the pistons (3), dust seals (4) and piston seals (5) from both sides of the caliper.



IB14J1420012-03

Assembly

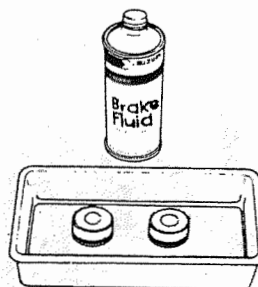
Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

- Wash the caliper bores and pistons with specified brake fluid. Particularly wash the dust seal grooves and piston seal grooves.

BF: Brake fluid (DOT 4)

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.

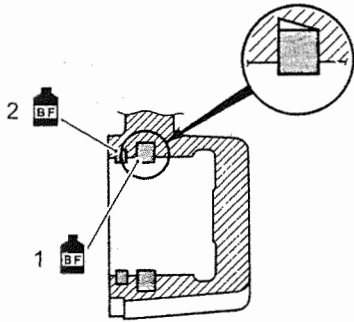


IB49G1420012-02

- Apply the brake fluid to new piston seals (1) and new dust seals (2).

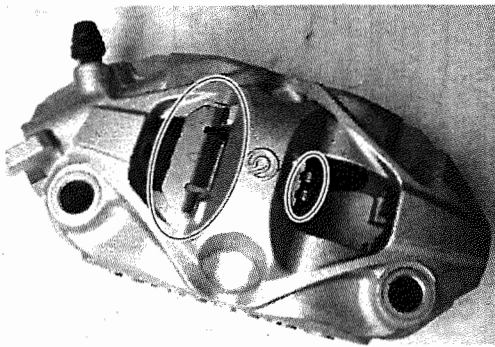
BF: Brake fluid (DOT 4)

- Install the piston seals as shown in the figure.



IB14J1420020-01

- When installing the brake pad spring, fit the brake pad spring claws to the grooves of the brake caliper.



IB14J1420013-01

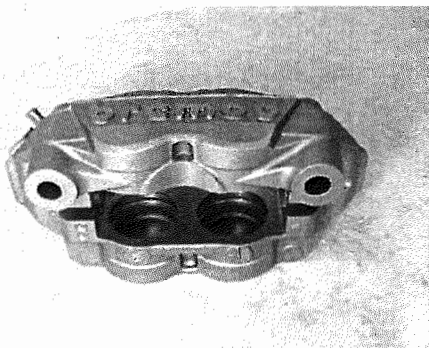
Front Brake Caliper Parts Inspection

BENB15J24206006

Refer to "Front Brake Caliper Disassembly and Assembly" (Page 4B-4).

Brake Caliper Cylinder

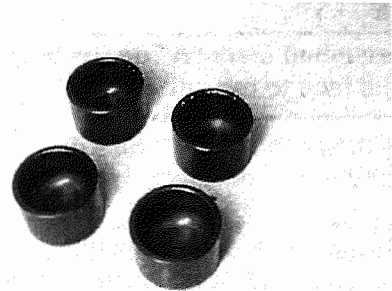
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damage is found, replace the caliper with a new one.



IB14J1420014-01

Brake Caliper Piston

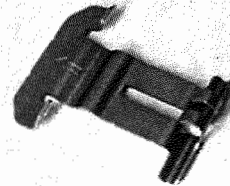
Inspect the surface of brake caliper pistons for any scratches or other damage. If any damage is found, replace the pistons with a new one.



IB14J1420015-01

Brake Pad Spring

Inspect the brake pad spring for damage and excessive bend. If any damage is found, replace it with a new one.



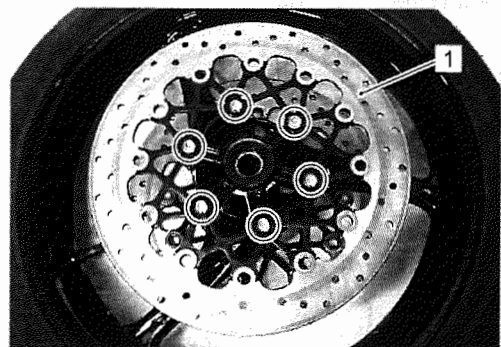
IB14J1420016-01

Front Brake Disc Removal and Installation

BENB15J24206007

Removal

- 1) Remove the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-4).
- 2) Remove the front brake disc (1).



IB14J1420017-01

4B-6 Front Brakes:

Installation

- 1) Make sure that the brake disc is clean and free of any grease.
- 2) Install the front brake disc.

NOTE

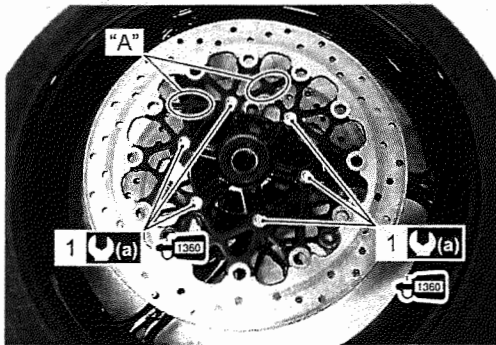
The stamped mark "A" on the brake disc should face to the outside.

- 3) Apply thread lock to the brake disc bolts (1) and tighten them to the specified torque.

 : Thread lock cement 99000-32130 (THREAD LOCK CEMENT SUPER "1360" or equivalent)

Tightening torque

Brake disc bolt (Front) (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)



IB14J1420018-01

- 4) Remount the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-4).

Front Brake Disc Inspection


BENB15J24206008

Brake Disc Thickness

Check the brake disc for damage or cracks and measure the thickness using the micrometer.

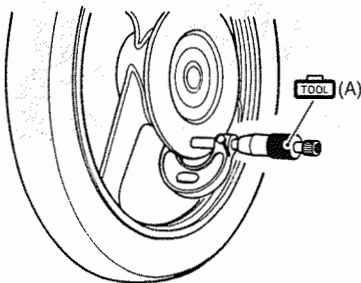
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Special tool

 (A): 09900-20205 (Micrometer (0 - 25 mm))

Brake disc thickness

Service limit (Front): 4.5 mm (0.18 in)





I649G1420019-03

Brake Disc Runout

- 1) Dismount the front brake caliper. Refer to "Front Brake Caliper Removal and Installation" (Page 4B-3).
- 2) Measure the runout using the dial gauge. Replace the disc if the runout exceeds the service limit.

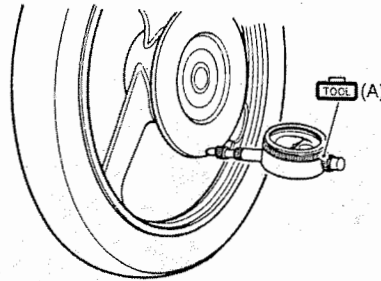
Special tool

 (A): 09900-20607 (Dial gauge)

 : 09900-20701 (Dial gauge chuck)

Brake disc runout

Service limit: 0.30 mm (0.012 in)



I649G1420020-03

- 3) Remount the front brake caliper. Refer to "Front Brake Caliper Removal and Installation" (Page 4B-3).

Specifications

Service Data

BENB15J24207001

Brake

Unit: mm (in)

Item	Standard			Limit
Brake disc thickness	Front	5.0 (0.20)		4.5 (0.18)
Brake disc runout	—			0.30 (0.012)
Brake caliper cylinder bore & piston diam.	Front	Leading	Approx. 32.0 (1.26)	—
		Trailing		—
Brake fluid type	DOT 4			—

Tightening Torque Specifications

BENB15J24207002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Front brake caliper mounting bolt	39	3.9	28.0	☞(Page 4B-3) / ☞(Page 4B-3)
Brake hose union bolt	23	2.3	16.5	☞(Page 4B-3)
Brake disc bolt (Front)	18	1.8	13.0	☞(Page 4B-6)

NOTE

The tightening torque(s) also specified in:
 “Front Brake Components” (Page 4B-1)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J24208001


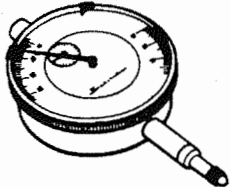
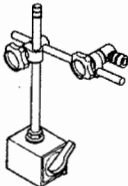
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page 4B-4) / ☞ (Page 4B-4)
Thread lock cement	THREAD LOCK CEMENT SUPER "1360" or equivalent	P/No.: 99000-32130	☞ (Page 4B-6)

NOTE

Required service material(s) also described in:
"Front Brake Components" (Page 4B-1)

Special Tool

BENB15J24208002

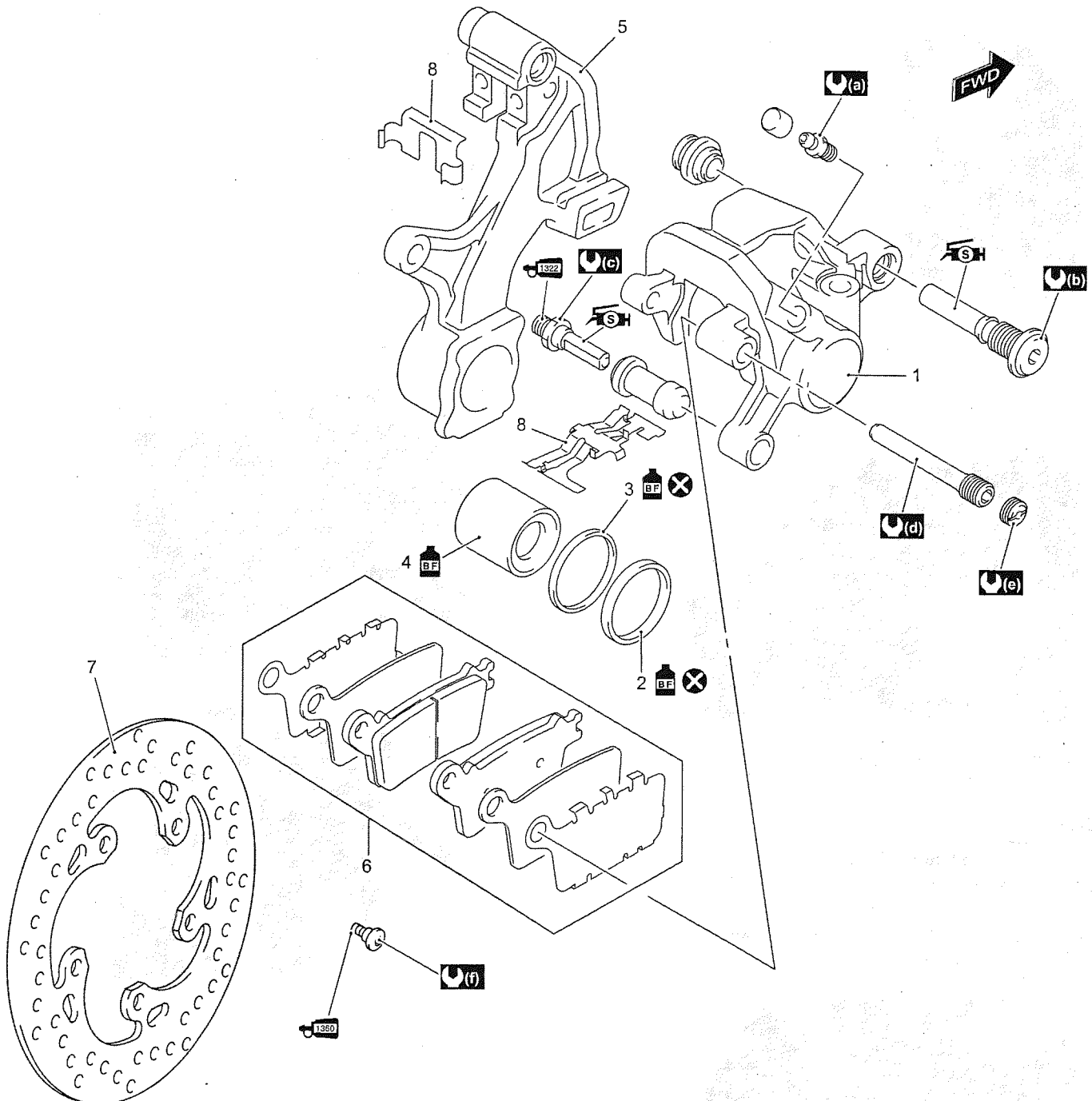
09900-20205 Micrometer (0 – 25 mm) ☞ (Page 4B-6) 	09900-20607 Dial gauge ☞ (Page 4B-6) 
09900-20701 Dial gauge chuck ☞ (Page 4B-6) 	

Rear Brakes

Repair Instructions

Rear Brake Components

BENB15J24306001



IB14J1430021-01

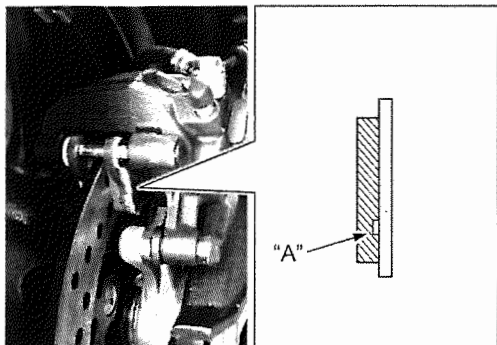
1. Rear brake caliper	8. Brake pad spring	: Apply silicone grease to sliding surface.
2. Piston seal	: 6 N·m (0.6 kgf-m, 4.5 lbf-ft)	: Apply thread lock to the thread part.
3. Dust seal	: 27 N·m (2.7 kgf-m, 19.5 lbf-ft)	: Apply thread lock to the thread part.
4. Piston	: 13 N·m (1.3 kgf-m, 9.5 lbf-ft)	: Apply brake fluid.
5. Rear caliper bracket	: 18 N·m (1.8 kgf-m, 13.0 lbf-ft)	: Do not reuse.
6. Rear brake pad set	: 2.5 N·m (0.25 kgf-m, 2.0 lbf-ft)	
7. Rear brake disc	: 35 N·m (3.5 kgf-m, 25.5 lbf-ft)	

4C-2 Rear Brakes:

Rear Brake Pad Inspection

BENB15J24306002

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

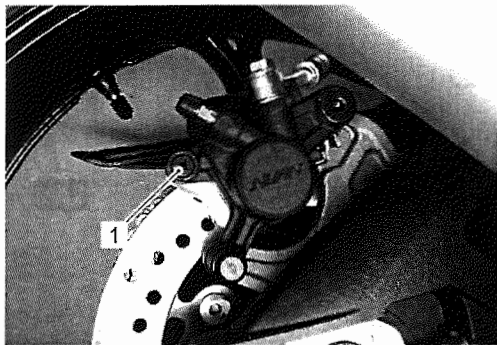


IB14J1430001-01

Rear Brake Pad Replacement

BENB15J24306003

- 1) Remove the plug (1).



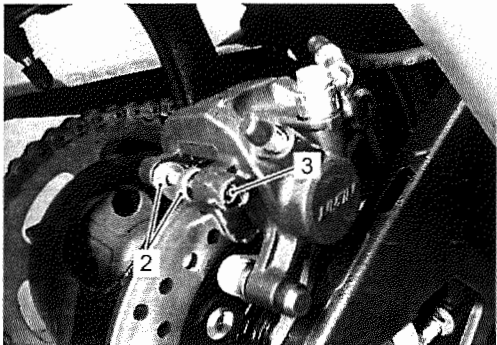
IB14J1430002-01

- 2) Remove the brake pads (2) by removing the brake pad mounting pin (3).

NOTE

Do not operate the brake pedal while the pads are removed.

- 3) When removing the pads, push the piston all the way into the brake caliper.



IB14J1430003-01

NOTE

If necessary, remove the brake pad springs from the rear brake caliper. Refer to "Rear Brake Caliper Removal and Installation" (Page 4C-3).

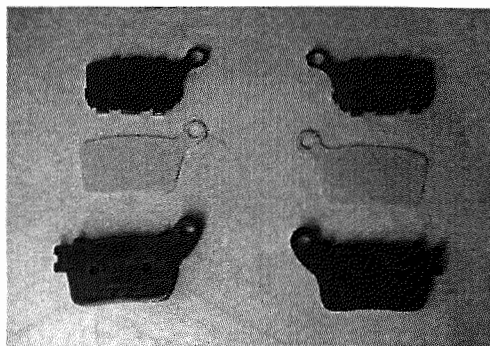
- 4) Clean up the caliper, especially around the caliper piston.
- 5) Install new brake pads.

NOTICE

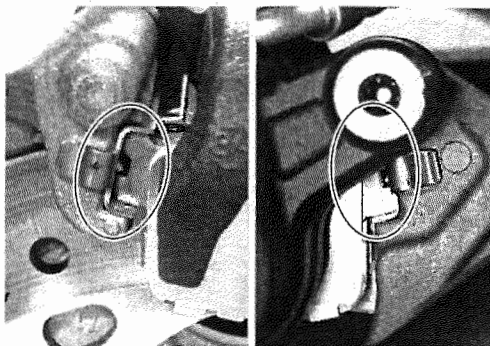
Replace the brake pads as a set, otherwise braking performance will be adversely affected.

NOTE

Make sure that the detent of the pads is seated onto the retainers on the caliper bracket.



IB14J1430004-01



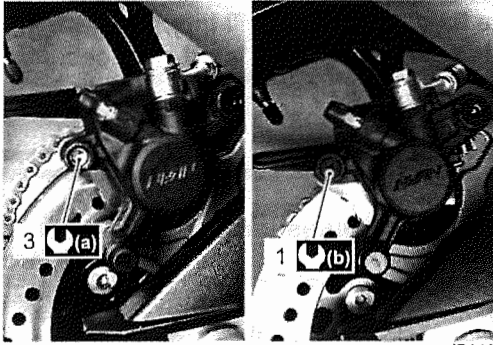
I947H1430003-01

- 6) Tighten the brake pad mounting pin (3) and plug (1) to the specified torque.

Tightening torque

Rear brake pad mounting pin (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)

Rear brake pad mounting pin plug (b): 2.5 N·m (0.25 kgf-m, 2.0 lbf-ft)



IB14J1430005-02

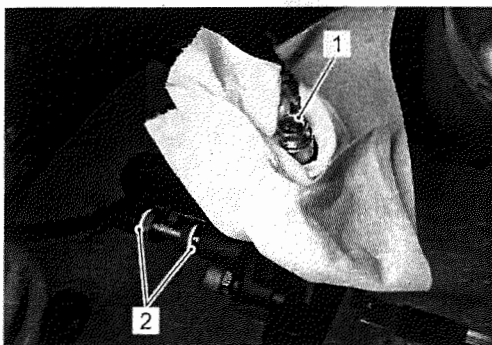
- 7) After replacing the brake pads, pump the brake pedal several times to check for proper brake operation and then check the brake fluid level.

Rear Brake Caliper Removal and Installation

BENB15J24306004

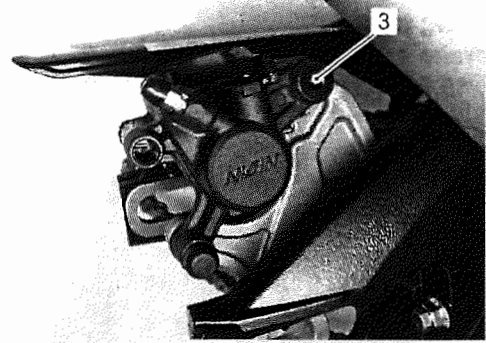
Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement" in Section 4A (Page 4A-7).
- 2) Remove the rear wheel. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- 3) Place a clean rag underneath the union bolt (1) on the brake caliper to catch any spilt brake fluid.
- 4) Remove the brake hose from the brake caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.
- 5) Remove the brake pads (2). Refer to "Rear Brake Pad Replacement" (Page 4C-2).



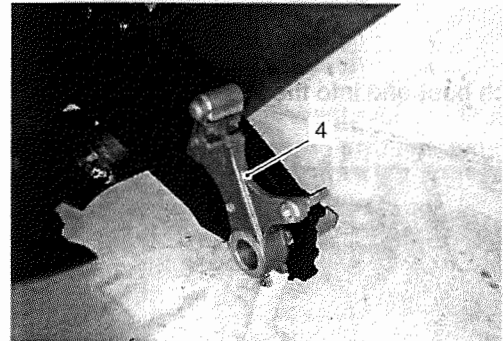
IB14J1430006-01

- 6) Remove the caliper by removing the sliding pin A (3).



IB14J1430007-01

- 7) Remove the caliper bracket (4) from the swingarm.



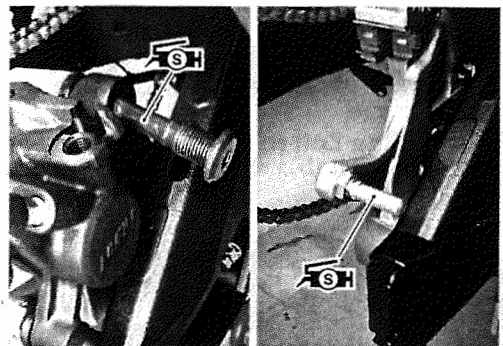
IB14J1430008-01

Installation

Install the brake caliper in the reverse order of removal. Pay attention to the following points:

- Apply grease to the sliding pins.

SH : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)



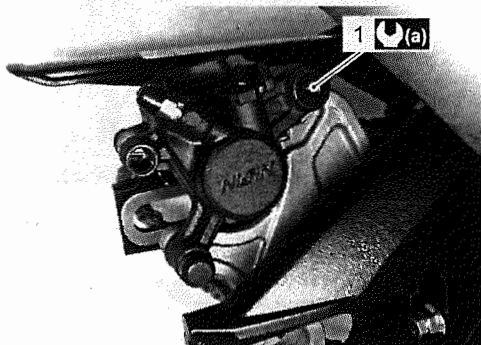
IB14J1430009-01

4C-4 Rear Brakes:

- Tighten the caliper sliding pin A (1) to the specified torque.

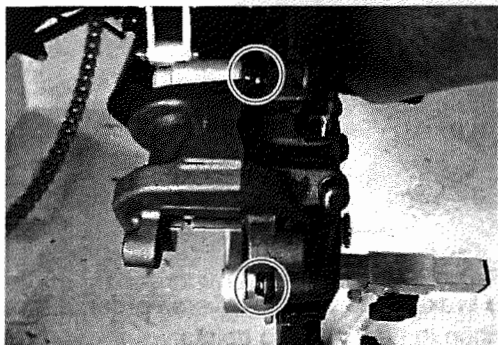
Tightening torque

Rear brake caliper sliding pin A (a): 27 N·m (2.7 kgf-m, 19.5 lbf-ft)



IB14J1430010-01

- Fit each boot end into the sliding pin groove.

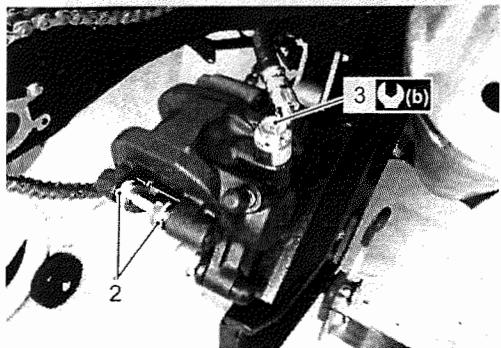


IB14J1430011-01

- Install the brake pads (2). Refer to "Rear Brake Pad Replacement" (Page 4C-2).
- Install the brake hose with the union bolt and new seal washers.
- After setting the brake hose union to the stopper, tighten the union bolt (3) to the specified torque.

Tightening torque

Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1430012-01

- Install the rear wheel. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- Bleed air from the brake system after installing the caliper. Refer to "Air Bleeding from Brake Fluid Circuit" in Section 4A (Page 4A-4).
- Check the brake fluid leakage and brake operation.

⚠ WARNING

Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and fluid leakage.

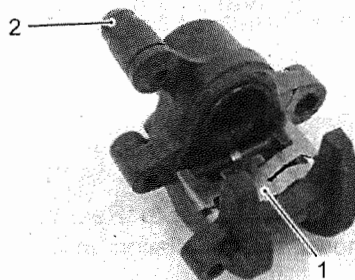
Rear Brake Caliper Disassembly and Assembly

BENB15J24306005

Refer to "Rear Brake Caliper Removal and Installation" (Page 4C-3).

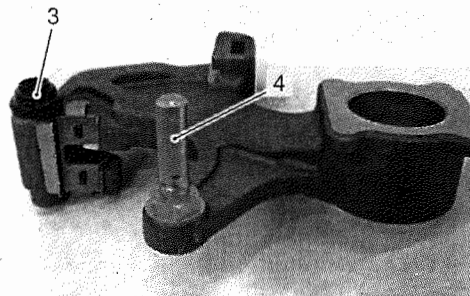
Disassembly

- 1) Remove the pad spring (1) and rubber boot (2) from the caliper.



IB947H1430013-02

- 2) Remove the rubber boot (3) and sliding pin B (4) from the caliper bracket.

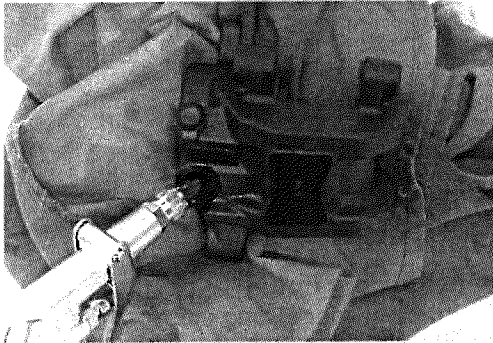


IB14J1430013-02

- 3) Place a rag over the piston to prevent it from popping out and then force out the piston using low pressure air.

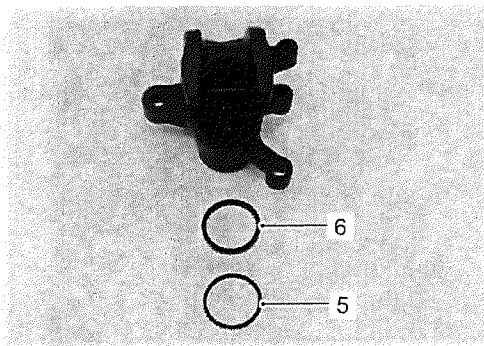
NOTICE

Do not use high pressure air to prevent piston damage.



I947H1430014-01

- 4) Remove the dust seal (5) and piston seal (6).



IB14J1430014-02

Assembly

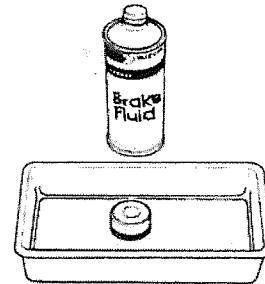
Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

- Wash the caliper bore and piston with specified brake fluid. Particularly wash the dust seal groove and piston seal groove.

BF: Brake fluid (DOT 4)

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, kerosene or the others.

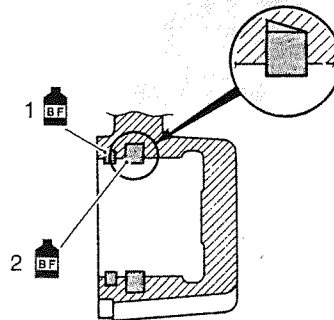


I649G1430018-02

- Apply the brake fluid to the new piston seal (2) and new dust seal (1).

BF: Brake fluid (DOT 4)

- Install the piston seal (2) as shown in the figure.



IB14J1430015-03

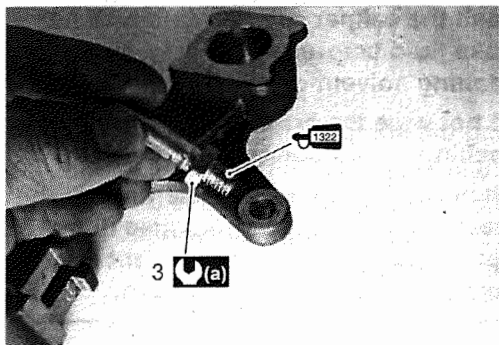
4C-6 Rear Brakes:

- Apply thread lock to the thread part and install the sliding pin B (3) to the bracket.

 : Thread lock cement 99000-32110
(THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Rear caliper sliding pin B (a): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)



IB14J1430016-01

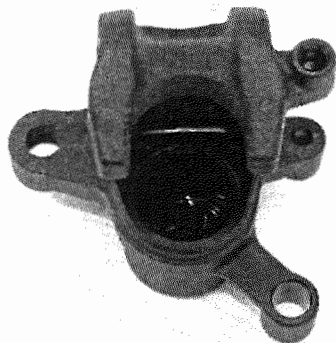
Rear Brake Caliper Parts Inspection

BENB15J24306006

Refer to "Rear Brake Caliper Disassembly and Assembly" (Page 4C-4).

Brake Caliper Cylinder

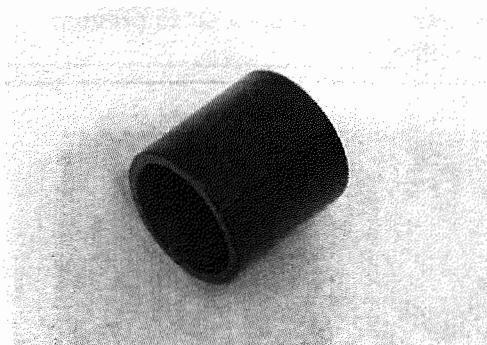
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damage is found, replace the caliper with a new one.



I947H1430019-01

Brake Caliper Piston

Inspect the brake caliper piston surface for any scratches or other damage. If any damage is found, replace the piston with a new one.



I947H1430020-01

Brake Caliper Sliding Pin

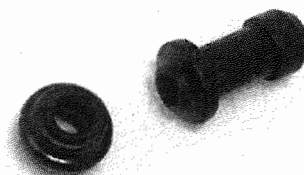
Inspect the brake caliper sliding pins for wear and other damage. If any damage is found, replace the sliding pin with a new one.



I947H1430021-01

Boot

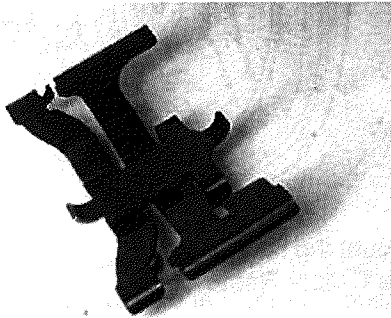
Inspect the boots for damage and wear. If any defects are found, replace it with a new one.



I947H1430022-01

Brake Pad Spring

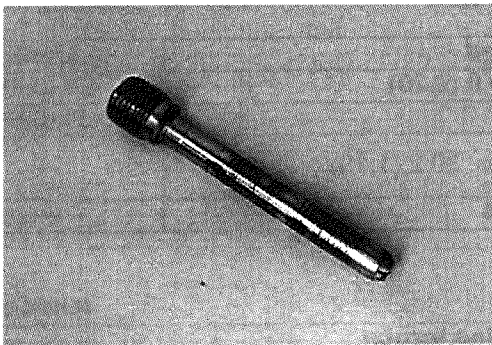
Inspect the brake pad spring for damage and excessive bend. If any defects are found, replace it with a new one.



IB14J1430017-02

Brake Pad Mounting Pin

Inspect the brake pad mounting pin for wear and other damage. If any damage is found, replace the pad mounting pin with a new one.



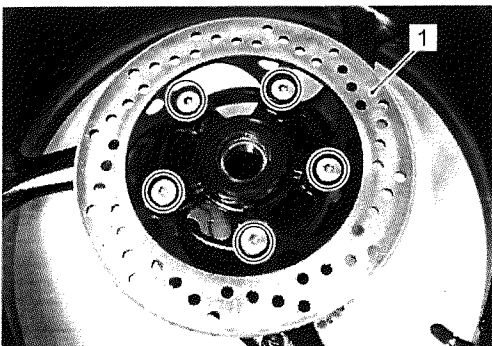
IB14J1430018-01

Rear Brake Disc Removal and Installation

BENB15J24306007

Removal

- 1) Remove the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).
- 2) Remove the rear brake disc (1).



IB14J1430019-01

Installation

- 1) Make sure that the brake disc is clean and free of any grease.
- 2) Install the rear brake disc.

NOTE

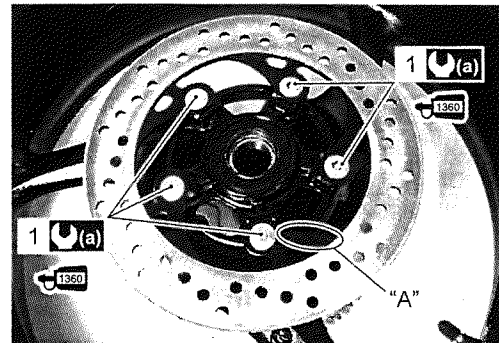
The stamped mark "A" on the brake disc should face to the outside.

- 3) Apply thread lock to the brake disc bolts (1) and tighten them to the specified torque.

 : Thread lock cement 99000-32130 (THREAD LOCK CEMENT SUPER "1360" or equivalent)

Tightening torque

Brake disc bolt (Rear) (a): 35 N·m (3.5 kgf-m, 25.5 lbf-ft)



IB14J1430020-01

- 4) Remount the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation" in Section 2D (Page 2D-11).

Rear Brake Disc Inspection


BENB15J24306008

Brake Disc Thickness

Check the brake disc for damage or cracks and measure the thickness using the micrometer.

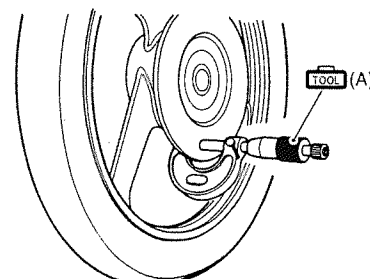
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Special tool

 (A): 09900-20205 (Micrometer (0 – 25 mm))

Brake disc thickness

Service limit (Rear): 4.5 mm (0.18 in)





I649G1430027-03

4C-8 Rear Brakes:

Brake Disc Runout

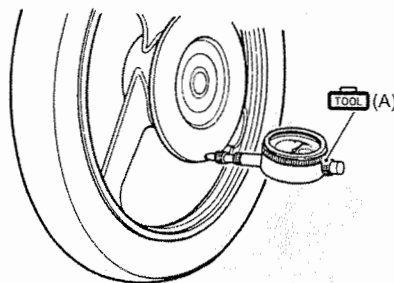
- 1) Dismount the rear brake caliper. Refer to "Rear Brake Caliper Removal and Installation" (Page 4C-3).
- 2) Measure the runout using the dial gauge.
Replace the disc if the runout exceeds the service limit.

Special tool

-  (A): 09900-20607 (Dial gauge)
 : 09900-20701 (Dial gauge chuck)

Brake disc runout

Service limit: 0.30 mm (0.012 in)



I649G1430028-03

- 3) Remount the rear brake caliper. Refer to "Rear Brake Caliper Removal and Installation" (Page 4C-3).

Specifications

Service Data

BENB15J24307001

Brake

Unit: mm (in)

Item	Standard		Limit
Brake disc thickness	Rear	5.0 (0.20)	4.5 (0.18)
Brake disc runout		—	0.30 (0.012)
Brake caliper cylinder bore & piston diam.	Rear	Approx. 30.2 (1.19)	—
Brake fluid type		DOT 4	—

Tightening Torque Specifications

BENB15J24307002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Rear brake pad mounting pin	18	1.8	13.0	☞ (Page 4C-3)
Rear brake pad mounting pin plug	2.5	0.25	2.0	☞ (Page 4C-3)
Rear brake caliper sliding pin A	27	2.7	19.5	☞ (Page 4C-4)
Brake hose union bolt	23	2.3	16.5	☞ (Page 4C-4)
Rear caliper sliding pin B	13	1.3	9.5	☞ (Page 4C-6)
Brake disc bolt (Rear)	35	3.5	25.5	☞ (Page 4C-7)

NOTE

The tightening torque(s) also specified in:
"Rear Brake Components" (Page 4C-1)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J24308001


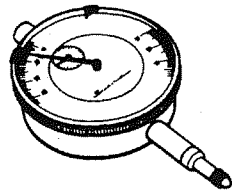
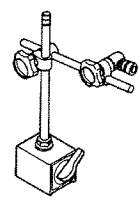
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page 4C-5) / ☞ (Page 4C-5)
Grease	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000-25100	☞ (Page 4C-3)
Thread lock cement	THREAD LOCK CEMENT SUPER "1322" or equivalent	P/No.: 99000-32110	☞ (Page 4C-6)
	THREAD LOCK CEMENT SUPER "1360" or equivalent	P/No.: 99000-32130	☞ (Page 4C-7)

NOTE

Required service material(s) also described in:
 "Rear Brake Components" (Page 4C-1)

Special Tool

BENB15J24308002

09900-20205 Micrometer (0 – 25 mm) ☞ (Page 4C-7) 	09900-20607 Dial gauge ☞ (Page 4C-8) 
09900-20701 Dial gauge chuck ☞ (Page 4C-8) 	

Section 5

Transmission / Transaxle

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Precautions

Precautions

Precautions for Transmission / Transaxle

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

BENB15J25000001

Manual Transmission

Diagnostic Information and Procedures

Manual Transmission Symptom Diagnosis

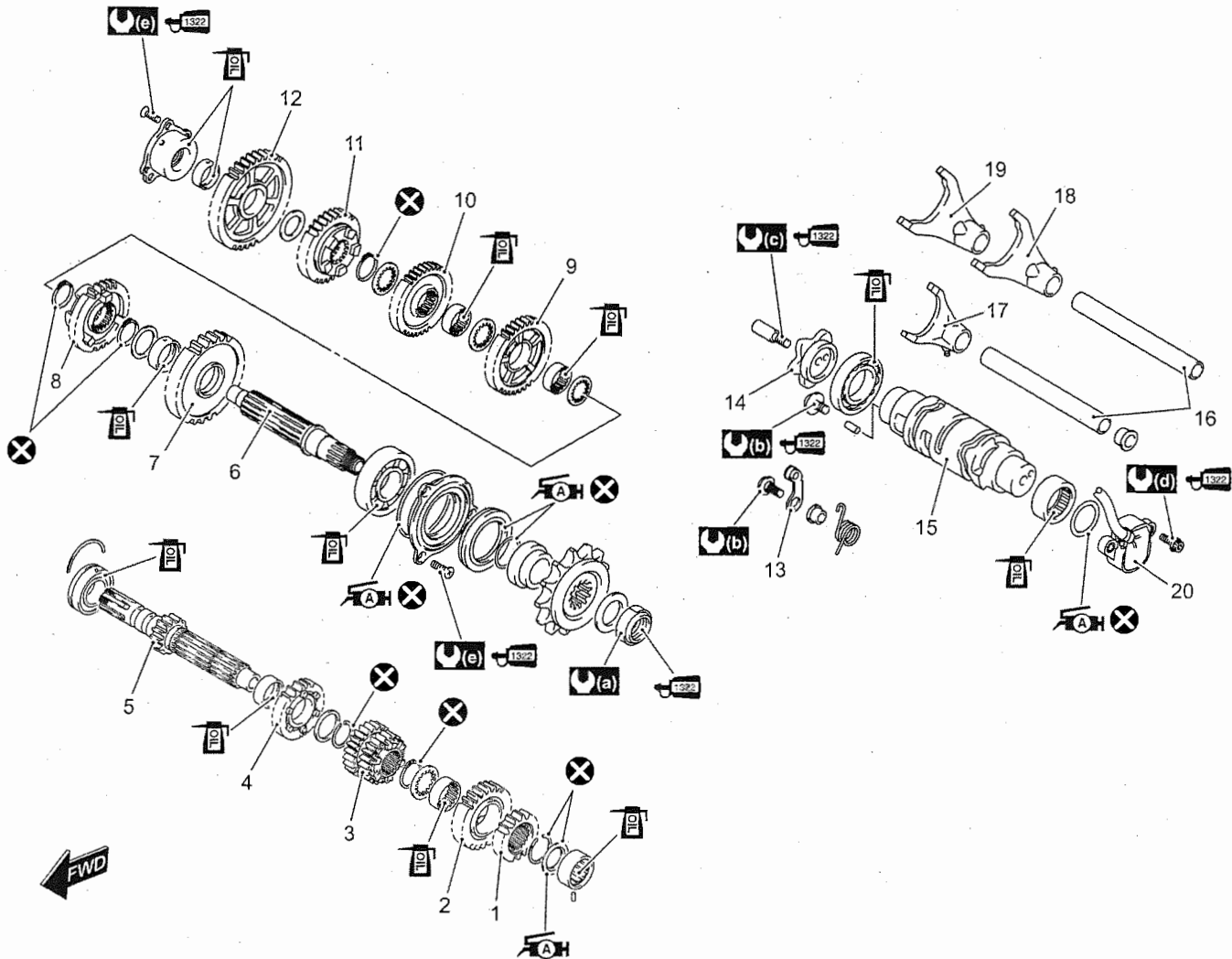
BENB15J25204001

Condition	Possible cause	Correction / Reference Item
Engine is noisy (Noise seems to come from the transmission)	Worn or rubbing gear.	<i>Replace.</i>
	Worn countershaft spline.	<i>Replace countershaft.</i>
	Worn driveshaft spline.	<i>Replace driveshaft.</i>
	Worn or rubbing primary gear.	<i>Replace.</i>
	Worn bearing.	<i>Replace.</i>
Transmission will not shift	Broken gearshift cam.	<i>Replace.</i>
	Distorted gearshift fork.	<i>Replace.</i>
	Worn gearshift pawl.	<i>Replace.</i>
Transmission will not shift back	Broken return spring on shift shaft.	<i>Replace.</i>
	Rubbing or stuck gearshift shaft.	<i>Repair or replace.</i>
	Worn or distorted gearshift fork.	<i>Replace.</i>
Transmission jumps out of gear	Worn shifting gears on driveshaft or countershaft.	<i>Replace.</i>
	Worn or distorted gearshift fork.	<i>Replace.</i>
	Weakened gearshift stopper spring.	<i>Replace.</i>
	Worn gearshift cam plate.	<i>Replace.</i>

Repair Instructions

Transmission Components

BENB15J25206001



IB14J1520029-02

1. 2nd drive gear	11. 5th driven gear	(a) : 115 N·m (11.5 kgf-m, 83.0 lbf-ft)
2. 6th drive gear	12. 1st driven gear	(b) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
3. 3rd/4th drive gear	13. Gearshift cam stopper	(c) : 13 N·m (1.3 kgf-m, 9.5 lbf-ft)
4. 5th drive gear	14. Gearshift cam plate	(d) : 6.5 N·m (0.65 kgf-m, 4.5 lbf-ft)
5. Countershaft/1st drive gear	15. Gearshift cam	(e) : 12 N·m (1.2 kgf-m, 8.5 lbf-ft)
6. Driveshaft	16. Gearshift fork shaft	Ⓐ: Apply grease to the oil seal lip.
7. 2nd driven gear	17. Gearshift fork (For 3rd/4th drive gear)	1322: Apply thread lock to the thread part.
8. 6th driven gear	18. Gearshift fork (For 6th driven gear)	Ⓜ: Apply engine oil.
9. 3rd driven gear	19. Gearshift fork (For 5th driven gear)	ⓧ: Do not reuse.
10. 4th driven gear	20. GP switch	

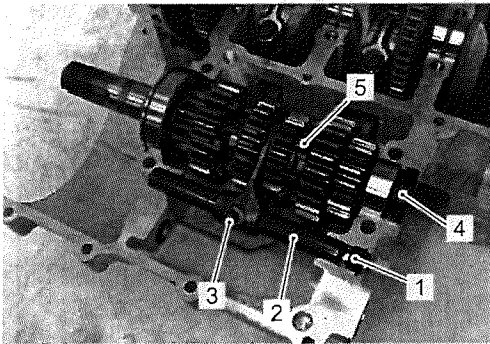
Transmission Removal

BENB15J25206002

- 1) Remove the engine assembly from the frame. Refer to "Engine Assembly Removal" in Section 1D (Page 1D-21).
- 2) Remove the engine top side. Refer to "Engine Top Side Disassembly" in Section 1D (Page 1D-27).
- 3) Separate the upper and lower crankcases. Refer to "Engine Bottom Side Disassembly" in Section 1D (Page 1D-49).

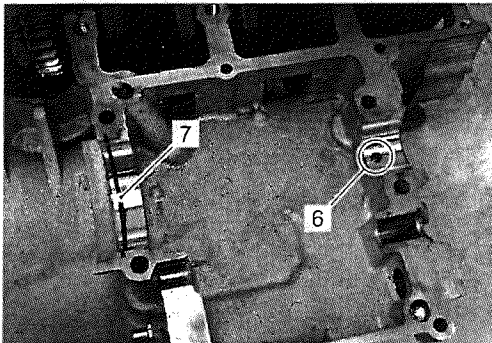
Countershaft Assembly

- 1) Remove the gearshift shaft plug (1), gearshift fork shaft (2) and gearshift fork (3).
- 2) Remove the clutch push rod oil seal (4) and countershaft assembly (5).



IB15J1520001-01

- 3) Remove the bearing pin (6) and C-ring (7).

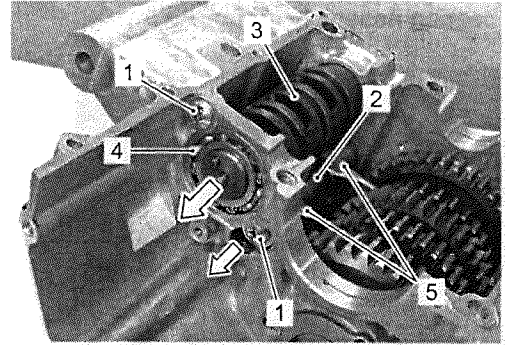


IB14J1520002-01

Gearshift Fork / Gearshift Cam

- 1) Remove the gearshift cam retainer screws (1).
- 2) Remove the gearshift fork shaft (2).
- 3) Remove the gearshift cam (3) along with its bearing (4).

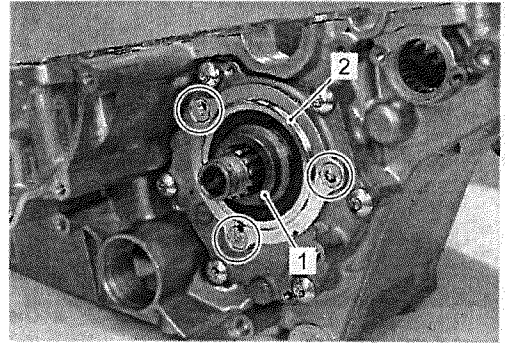
- 4) Remove the gearshift forks (5).



I837H1520003-01

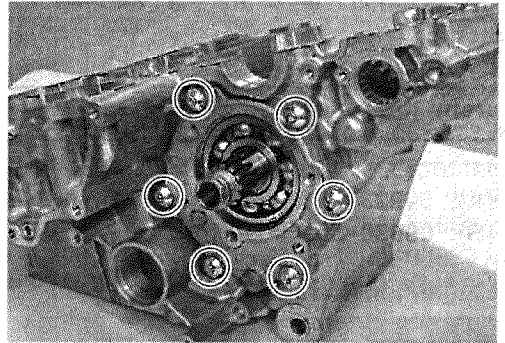
Driveshaft Assembly

- 1) Remove the spacer (1).
- 2) Remove the driveshaft oil seal retainer (2).



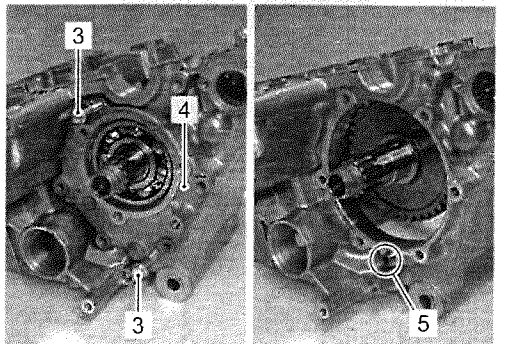
I837H1520004-01

- 3) Remove the driveshaft left bearing case bolts.



I837H1520005-01

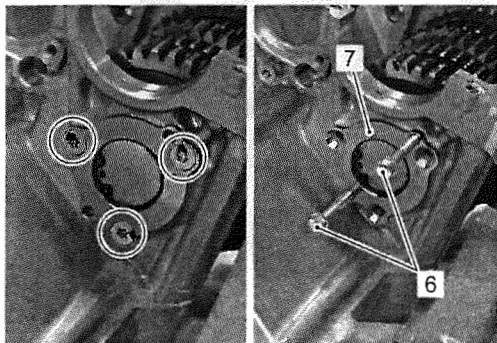
- 4) Using suitable size bolts (3), remove the driveshaft left bearing case (4).
- 5) Remove the dowel pin (5).



I837H1520006-01

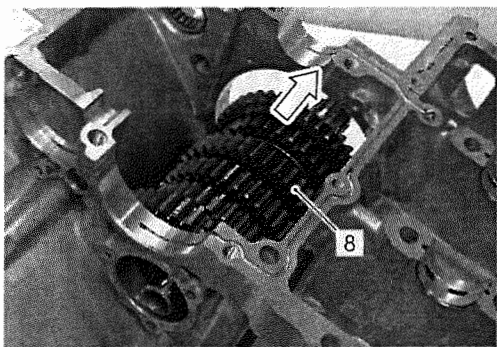
5B-4 Manual Transmission:

- 6) Remove the driveshaft right bearing case bolts.
- 7) Using suitable size bolts (6), remove the driveshaft right bearing assembly (7).



IB14J1520003-01

- 8) Remove the driveshaft assembly (8).



IB14J1520004-01

Bearing / Oil Seal

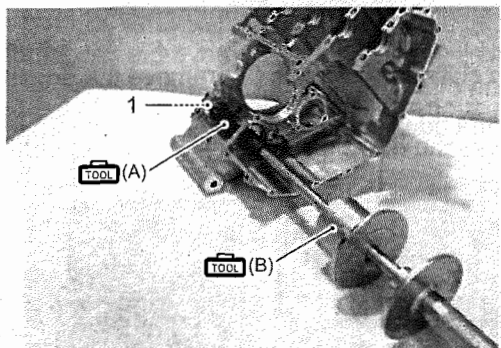
- 1) Remove the gearshift cam bearing (1) with the special tools.

NOTE

Be careful not to lean the bearing remover.

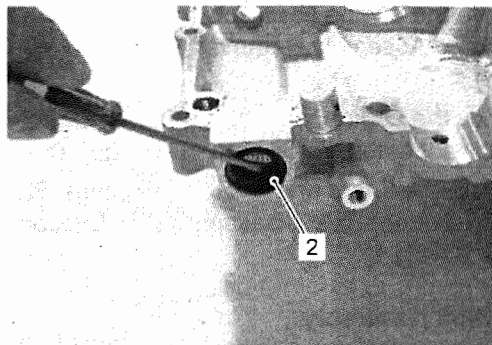
Special tool

- TOOL (A): 09923-74511 (Bearing remover)**
TOOL (B): 09930-30104 (Rotor remover sliding shaft)



IB37H1520009-02

- 2) Remove the gearshift shaft oil seal (2). (LH only)

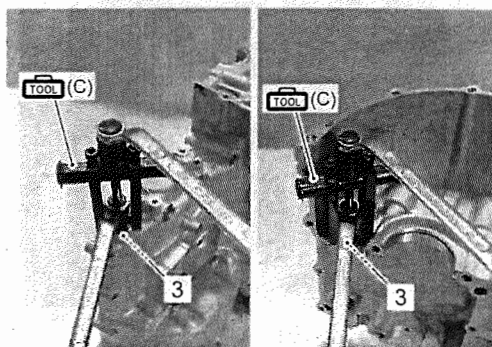


IB37H1520010-01

- 3) Remove the gearshift shaft bearings (3) with the special tool.

Special tool

- TOOL (C): 09921-20240 (Bearing remover set)**

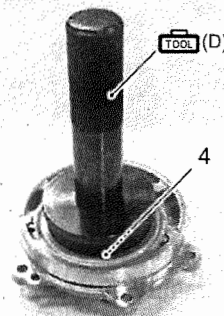


IB37H1520011-01

- 4) Remove the driveshaft left bearing (4) with the special tool.

Special tool

- TOOL (D): 09913-70210 (Bearing installing set (10 - 75 Φ))**

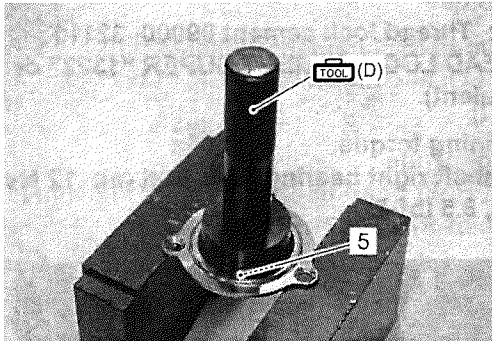


IB37H1520012-01

- 5) Remove the driveshaft left bearing oil seal (5) from the retainer using the special tool.

Special tool

TOOL (D): 09913-70210 (Bearing installing set (10 - 75 Φ))



I837H1520013-01

Transmission Installation

BENB15J25206003

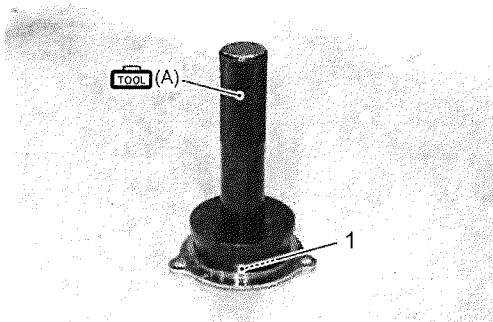
Install the transmission in the reverse order of removal. Pay attention to the following points:

Bearing / Oil Seal

- Install the new driveshaft left bearing oil seal (1) with the special tool.

Special tool

TOOL (A): 09913-70210 (Bearing installing set (10 - 75 Φ))



I837H1520014-01

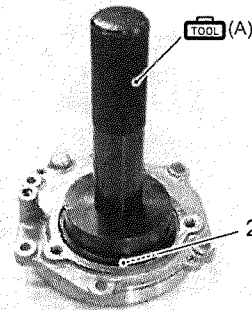
- Install the new driveshaft left bearing (2) with the special tool.

NOTE

The stamped mark side of the driveshaft left bearing faces outside.

Special tool

TOOL (A): 09913-70210 (Bearing installing set (10 - 75 Φ))



I837H1520015-01

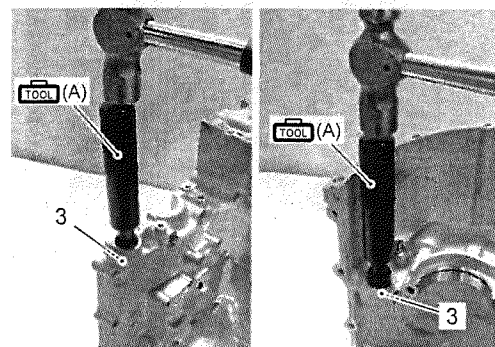
- Install the new gearshift shaft bearings (3) with the special tool.

NOTE

The stamped mark side of the gearshift shaft bearing faces outside.

Special tool

TOOL (A): 09913-70210 (Bearing installing set (10 - 75 Φ))




I837H1520016-01


5B-6 Manual Transmission:

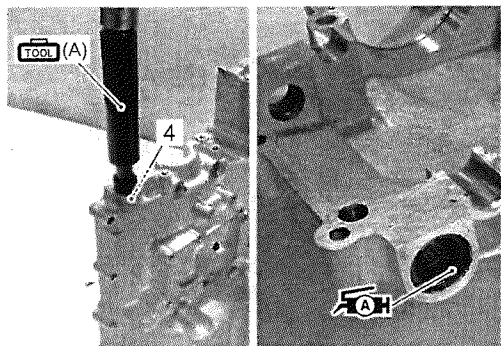
- Install the new gearshift shaft oil seal (4) with the special tool.

Special tool

 (A): 09913-70210 (Bearing installing set (10 - 75 Φ))

- Apply grease to the oil seal lip.


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

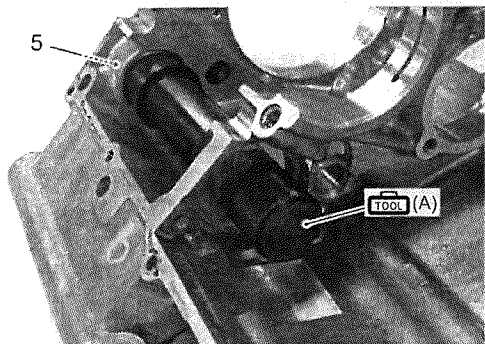


I837H1520017-02

- Install the new gearshift cam bearing (5) with the special tool.

Special tool

 (A): 09913-70210 (Bearing installing set (10 - 75 Φ))



I837H1520018-01

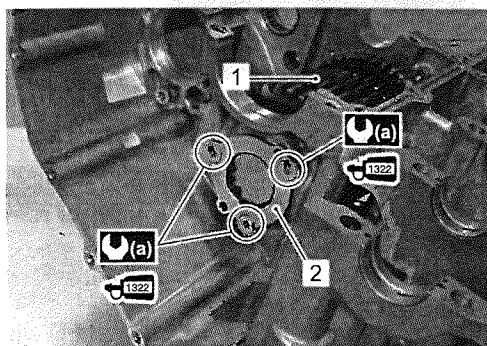
Driveshaft Assembly

- Put the driveshaft assembly (1) into the lower crankcase.
- Install the driveshaft right bearing assembly (2).
- Apply thread lock to the bolts and tighten them to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)


Tightening torque

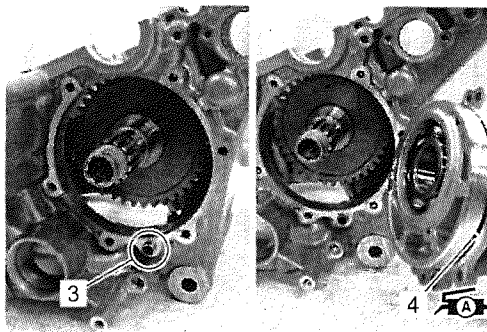
Driveshaft right bearing case bolt (a): 12 N·m (1.2 kgf-m, 8.5 lbf-ft)



I837H1520019-03

- Install the dowel pin (3).
- Apply grease to the new O-ring (4) and install it.

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



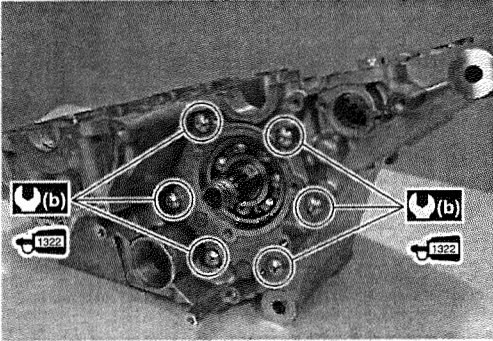
I837H1520020-02

- Apply thread lock to the bolts and tighten them to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)


Tightening torque

Driveshaft left bearing case bolt (b): 12 N·m (1.2 kgf-m, 8.5 lbf-ft)




I837H1520021-03

- Apply grease to the new oil seal lip and new O-ring (5).

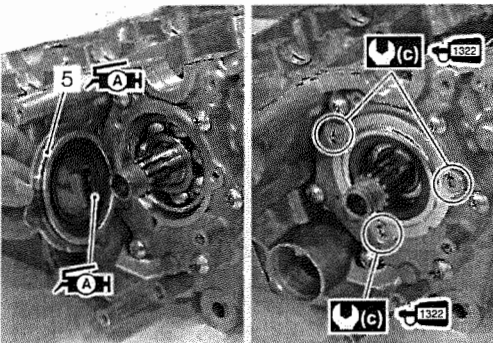
 : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

- Apply thread lock to the bolts and tighten them to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)


Tightening torque

Driveshaft retainer bolt (c): 12 N·m (1.2 kgf-m, 8.5 lbf-ft)

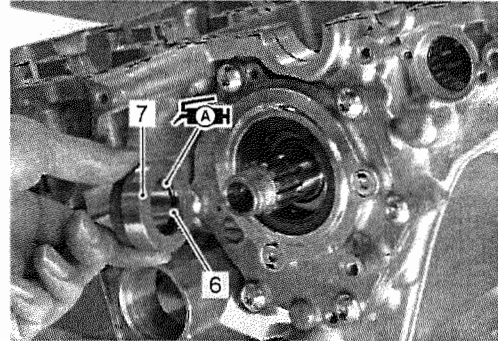


IB14J1520005-01

- Apply grease to the new O-ring (6) and install it.

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

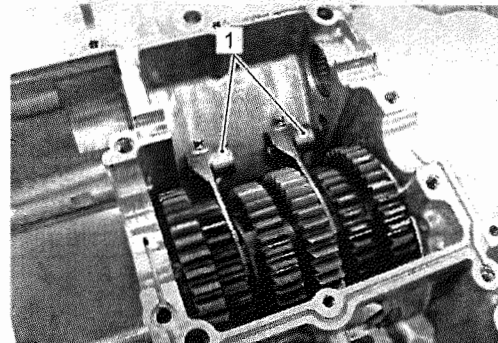
- Install the spacer (7).



I837H1520023-03

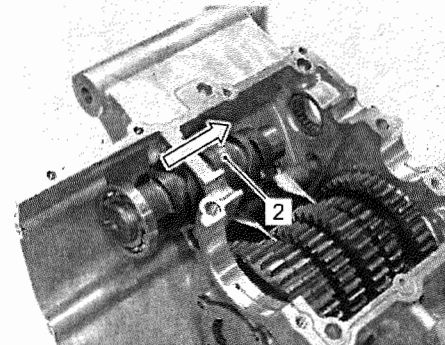
Gearshift Cam / Gearshift Fork

- Install the gearshift forks (1) as shown.



I837H1520024-01


- Install the gearshift cam (2) with the bearing fitted.



I837H1520025-01

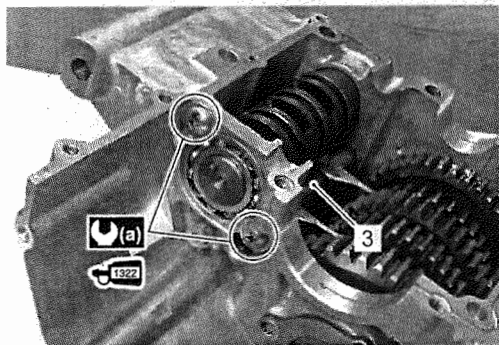
5B-8 Manual Transmission:

- With engaging each fork end to the cam groove, insert the fork shaft (3).
- Apply thread lock to the screws and tighten them to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

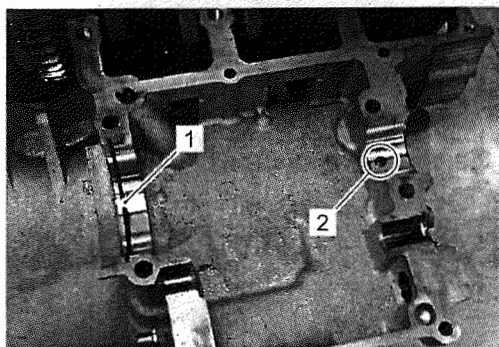
Gearshift cam bearing retainer screw (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB37H1520026-02

Countershaft

- Install the C-ring (1) and bearing pin (2) to the upper crankcase.

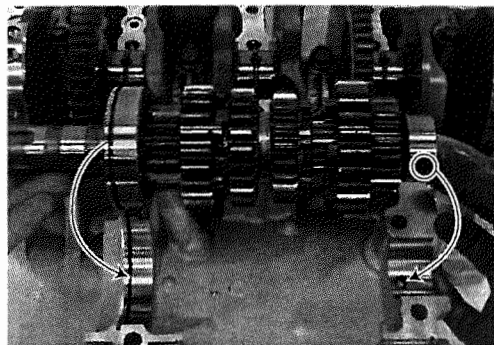


IB14J1520006-01

- Install the countershaft assembly to the upper crankcase.

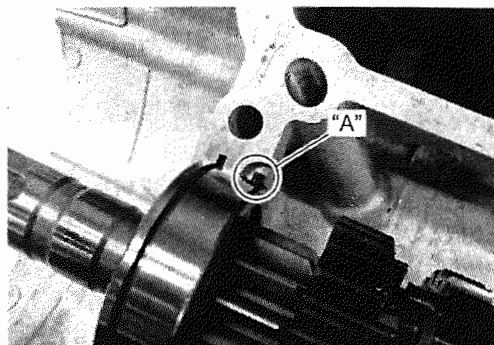
NOTE

Align the C-ring with the groove of bearing and the bearing pin with the indent on the bearing.



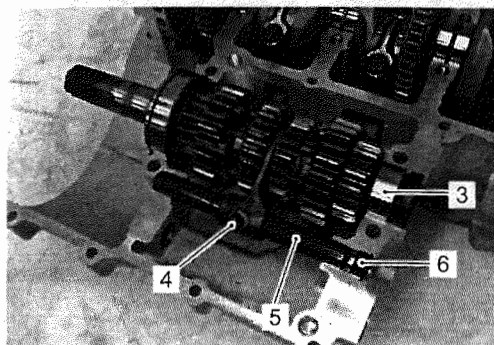
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- Turn the bearing to fit the bearing dowel pin in the position "A".



IB37H1520029-01

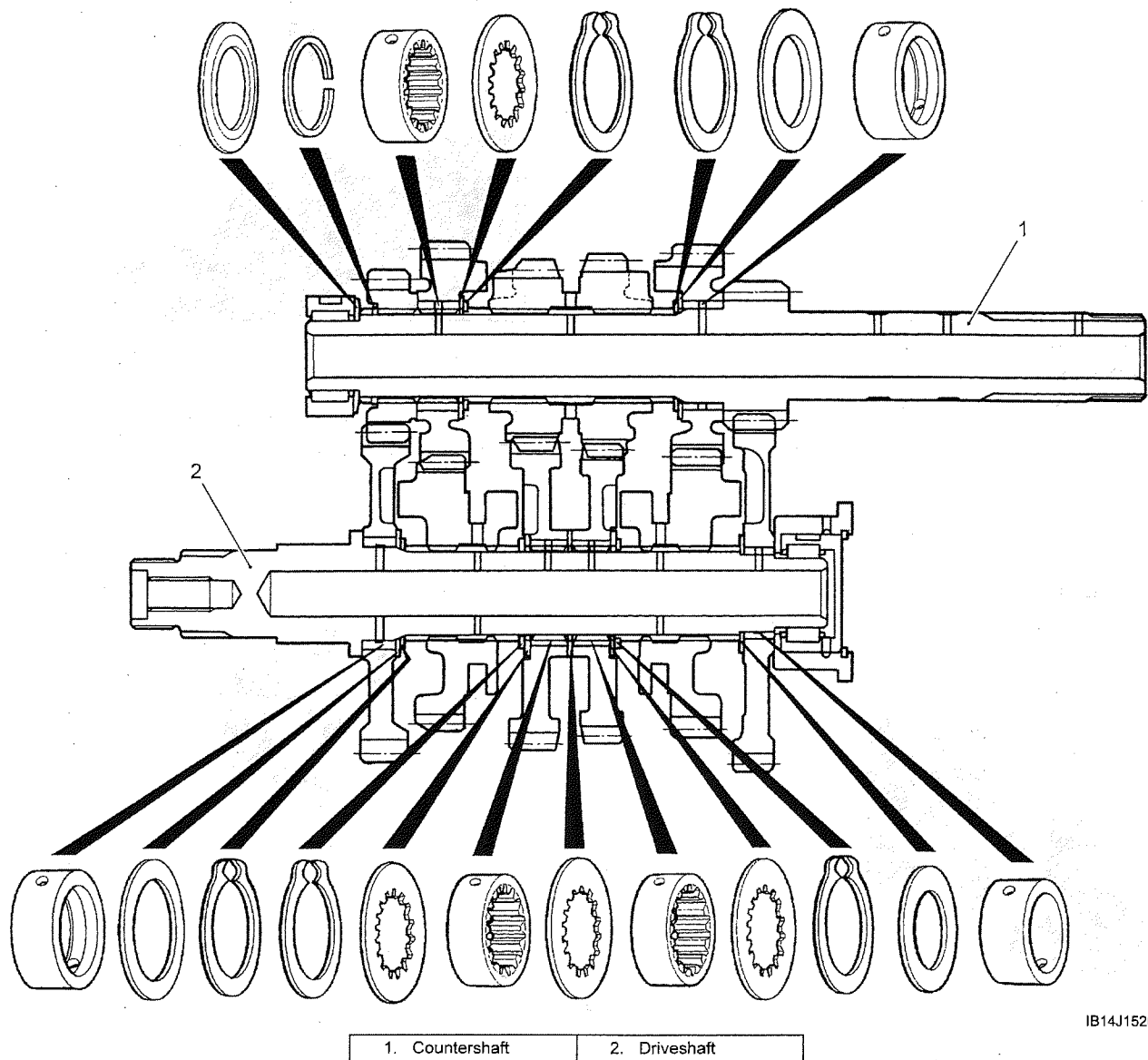
- Install the clutch push rod oil seal (3).
- Install the gearshift fork (4), gearshift shaft (5) and gearshift shaft plug (6) as shown.



IB15J1520003-01

Transmission Construction

BENB15J25206004



IB14J1520008-02

Countershaft Gear / Driveshaft Gear Disassembly and Assembly

BENB15J25206005

Refer to "Transmission Removal" (Page 5B-3) and
"Transmission Installation" (Page 5B-5).

Disassembly

Disassemble the countershaft and driveshaft as shown
in the transmission construction. Refer to "Transmission
Construction" (Page 5B-9).

Pay attention to the following points:

NOTE

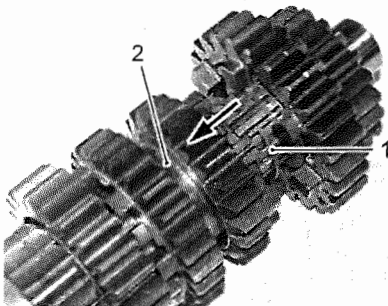
**Identify the position of each removed part.
Organize the parts in their respective groups
(i.e., drive or driven) so that they can be
reinstalled in their original positions.**

Countershaft

- Remove the 6th drive gear snap ring (1) from its
groove and slide it towards the 3rd/4th drive gears (2).

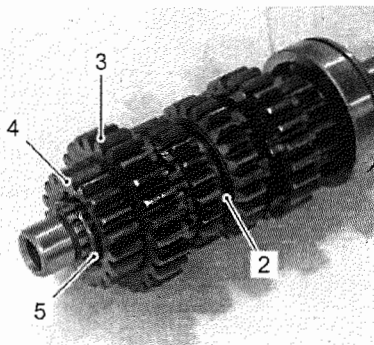
Special tool

TOOL : 09900-06104 (Snap ring remover (Open
type))



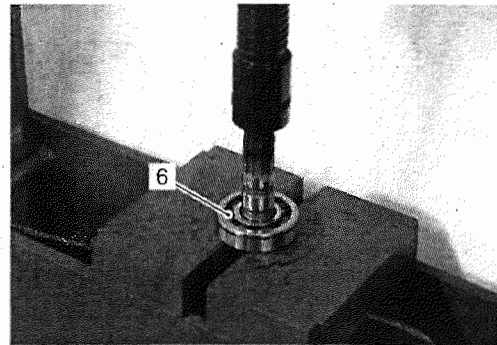
IB14J1520009-01

- Slide the 6th (3) and 2nd (4) drive gears toward the
3rd/4th drive gears (2), then remove the 2nd drive
gear circlip (5).
- Remove the 2nd drive gear (4) and 6th drive gear (3).



IB37H1520032-01

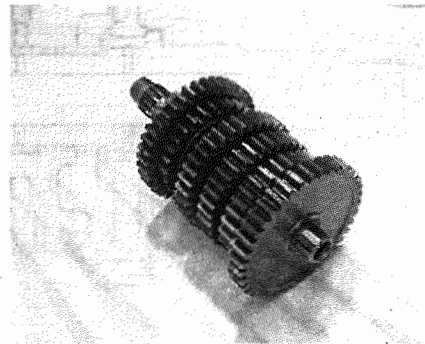
- Remove the countershaft bearing (6) using a
hydraulic press.



IB37H1520033-01

Driveshaft

- Disassembly the driveshaft as shown in the
transmission construction. Refer to "Transmission
Construction" (Page 5B-9).



IB37H1520034-01

Assembly

Assemble the countershaft and driveshaft as shown in
the transmission construction. Refer to "Transmission
Construction" (Page 5B-9).

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-9).**

- Rotate the bearing by hand to inspect if there is any
abnormal noise and for smooth rotation. Replace the
bearing if there is anything unusual.
- Before installing the gears, apply engine oil to the
driveshaft and countershaft.

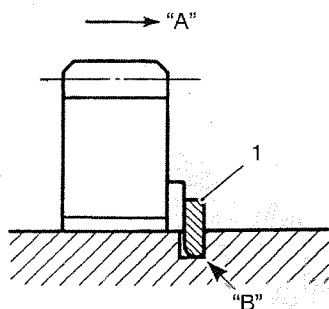
- Before installing the oil seal, apply grease to the oil seal lip.

⚠️ Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

- When installing a new snap ring (1), pay attention to its direction. Fit it to the side where the thrust is as shown in the figure.

NOTE

- Never reuse a snap ring. After a snap ring has been removed from the shaft, it should be discarded and a new snap ring must be installed.**
- When installing a new snap ring, do not expand the end gap larger than required to slip the snap ring over the shaft.**
- After installing a snap ring, make sure that it is completely seated in the groove and securely fitted.**

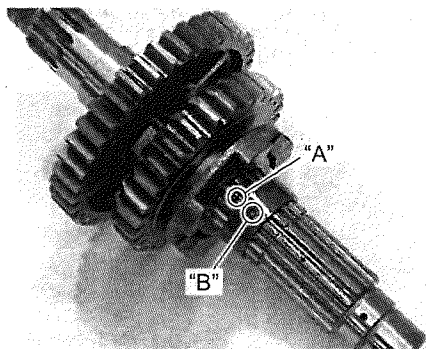


I649G1520049-02

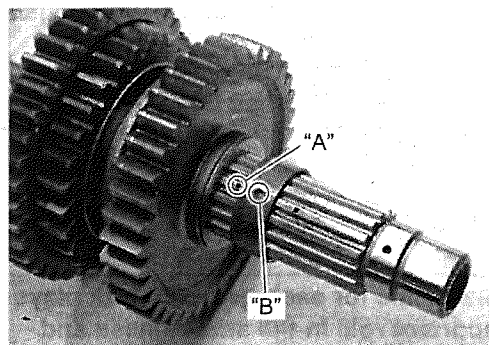
"A": Thrust	"B": Sharp edge
-------------	-----------------

Driveshaft

- When installing the gear bushings onto the driveshaft, align the shaft oil holes "A" with the bushing oil hole "B".



I837H1520035-01



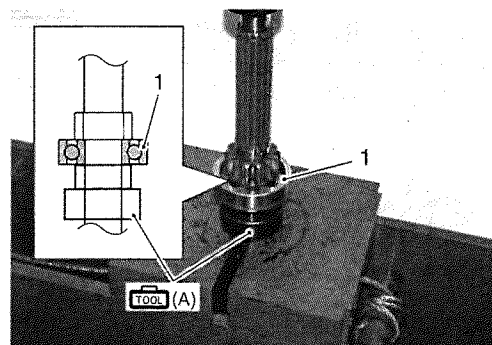
I837H1520036-01

Countershaft

- Install the new countershaft bearing (1) using a hydraulic press and special tool.

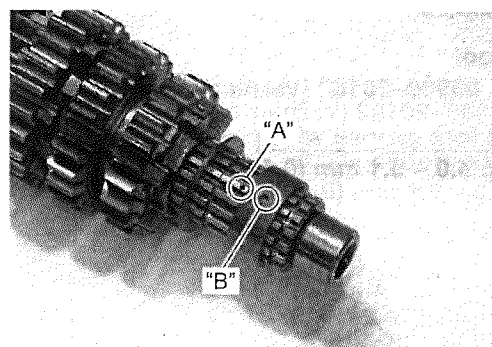
Special tool

TOOL (A): 09913-70210 (Bearing installing set (10 - 75 Φ))



I837H1520037-01

- When installing the gear bushing onto the countershaft, align the shaft oil hole "A" with the bushing oil hole "B".



I837H1520038-01

Transmission Related Parts Inspection

BENB15J25206006

Refer to "Transmission Removal" (Page 5B-3),
"Transmission Installation" (Page 5B-5) and
"Countershaft Gear / Driveshaft Gear Disassembly and
Assembly" (Page 5B-10).

Gearshift Fork to Groove Clearance

NOTE

The clearance for each gearshift fork plays
an important role in the smoothness and
positiveness of the shifting action.

Using the thickness gauge, check the gearshift fork
clearance in the groove of its gear.
If the clearance checked is noted to exceed the limit
specified, replace the fork or its gear, or both.

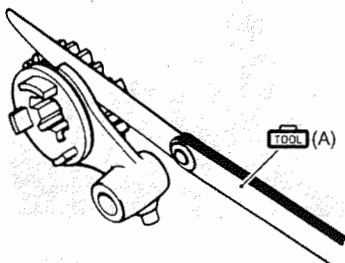
Special tool

TOOL (A): 09900-20803 (Thickness gauge)

Gearshift fork to gearshift fork groove clearance

Standard: 0.1 – 0.3 mm (0.004 – 0.012 in)

Service limit: 0.5 mm (0.02 in)



I649G1520056-03

Gearshift Fork Groove Width

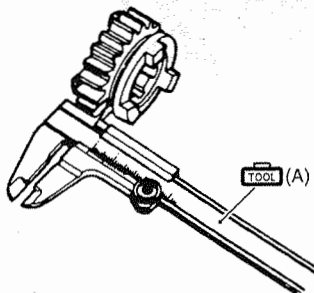
Measure the gearshift fork groove width using the
vernier calipers.

Special tool

TOOL (A): 09900-20102 (Vernier calipers (200 mm))

Gearshift fork groove width

Standard: 5.0 – 5.1 mm (0.197 – 0.201 in)



I649G1520057-03

Gearshift Fork Thickness

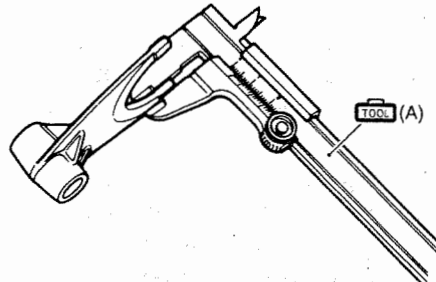
Measure the gearshift fork thickness using the vernier
calipers.

Special tool

TOOL (A): 09900-20102 (Vernier calipers (200 mm))

Gearshift fork thickness

Standard: 4.8 – 4.9 mm (0.189 – 0.193 in)



I649G1520058-03

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.

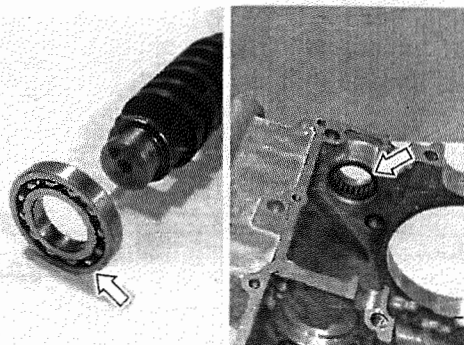


IB14J1520010-01

Gearshift Cam Bearing

Inspect the gearshift cam bearings, left and right for
abnormal noise and smooth rotation.

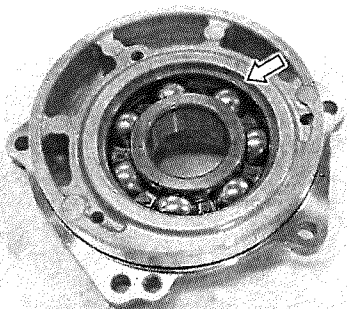
Replace the bearing if there is anything unusual. Refer
to "Transmission Removal" (Page 5B-3) and
"Transmission Installation" (Page 5B-5).



I837H1520039-02

Driveshaft Bearing**Left side**

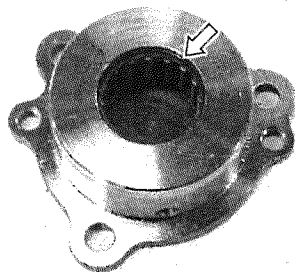
Inspect the driveshaft left bearing for abnormal noise and smooth rotation while it is in the case. Replace the bearing if there is anything unusual. Refer to "Transmission Removal" (Page 5B-3) and "Transmission Installation" (Page 5B-5).



I837H1520040-01

Right side

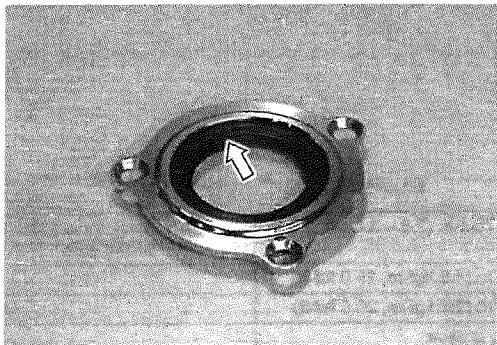
Inspect the driveshaft right bearing for abnormal noise and smooth rotation. If there is anything unusual, replace the bearing assembly. Refer to "Transmission Removal" (Page 5B-3) and "Transmission Installation" (Page 5B-5).



I837H1520041-01

Driveshaft Oil Seal

Inspect the driveshaft left bearing oil seal for wear and damage. Replace the oil seal if there is anything unusual. Refer to "Transmission Removal" (Page 5B-3) and "Transmission Installation" (Page 5B-5).



I837H1520042-01

Gear Position (GP) Switch Inspection

BENB15J25206007

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

Gear Position (GP) Switch Removal and Installation

BENB15J25206008

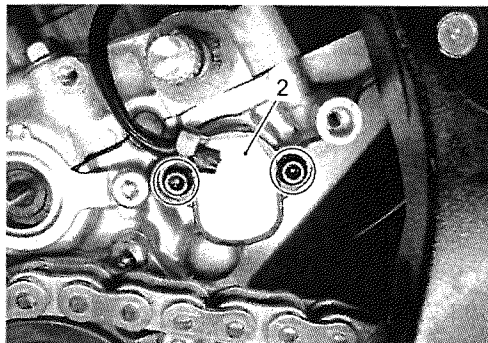
Removal

- 1) Turn the ignition switch OFF.
- 2) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 3) Disconnect the gear position switch coupler (1).



IB14J1110076-01

- 4) Remove the engine sprocket cover. Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" in Section 5C (Page 5C-4).
- 5) Remove the gear position switch (2).



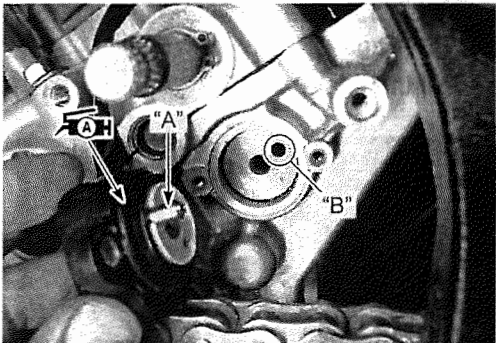
I837H1520043-01

Installation

Install the gear position switch in the reverse order of removal. Pay attention to the following points:

- Apply grease to the new O-ring.
- When installing the gear position switch, align the gear position switch pin "A" with the gearshift cam hole "B".

⚙️: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)

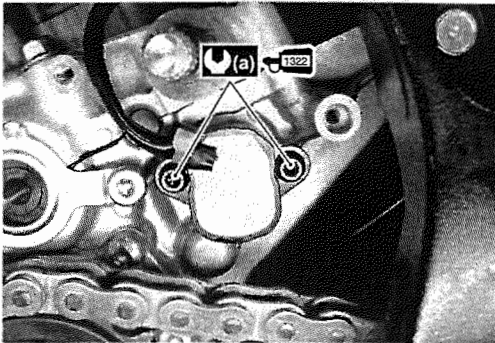


IB37H1520044-02

- Apply thread lock to the gear position switch bolts and tighten them to the specified torque.

⚙️1322 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque
 GP switch mounting bolt (a): 6.5 N·m (0.65 kgf-m, 4.5 lbf-ft)

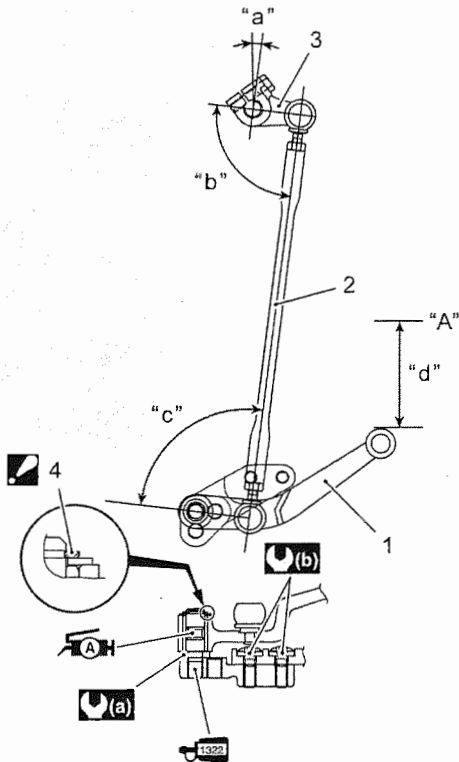


IB37H1520045-01

- Route the gear position switch lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

Gearshift Lever Construction

BENB15J25206009



IB14J1520012-02

1. Gearshift lever	"A": Footrest top surface	"d": 65 – 75 mm (2.6 – 3.0 in)	⚙️1322 : Apply thread lock to the thread part.
2. Gearshift link rod	"a": Approx. 7° 50'	⚙️(a) : 40 N·m (4.0 kgf-m, 29.0 lbf-ft)	
3. Gearshift link arm	"b": 91° 2'	⚙️(b) : 28 N·m (2.8 kgf-m, 20.0 lbf-ft)	
4. Circlip : Face the sharp edge outside.	"c": 90°	⚙️: Apply grease.	

Gearshift Lever Removal and Installation

BENB15J25206010

Removal

Remove the gearshift lever as shown in the gearshift lever construction. Refer to "Gearshift Lever Construction" (Page 5B-14).

Installation

- 1) Install the gearshift lever as shown in the gearshift lever construction. Refer to "Gearshift Lever Construction" (Page 5B-14).
- 2) After installing the gearshift lever, check the gearshift lever height. Refer to "Gearshift Lever Height Inspection and Adjustment" (Page 5B-15).

Gearshift Lever Height Inspection and Adjustment

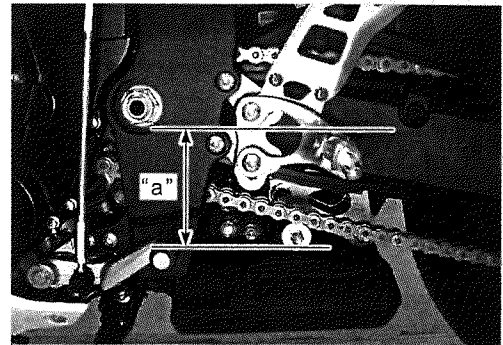
BENB15J25206011

Inspect and adjust the gearshift lever height in the following procedures:

- 1) Inspect the gearshift lever height "a" between the lever top and footrest.
Adjust the gearshift lever height if necessary.

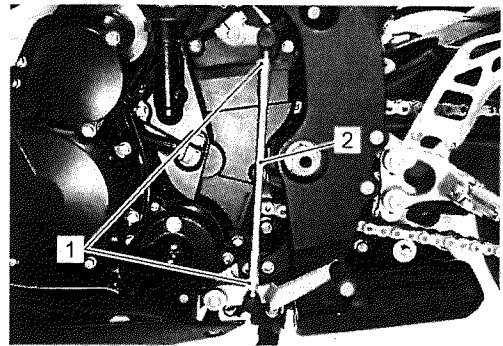
Gearshift lever height "a"

Standard: 65 – 75 mm (2.6 – 3.0 in)



IB14J1520013-01

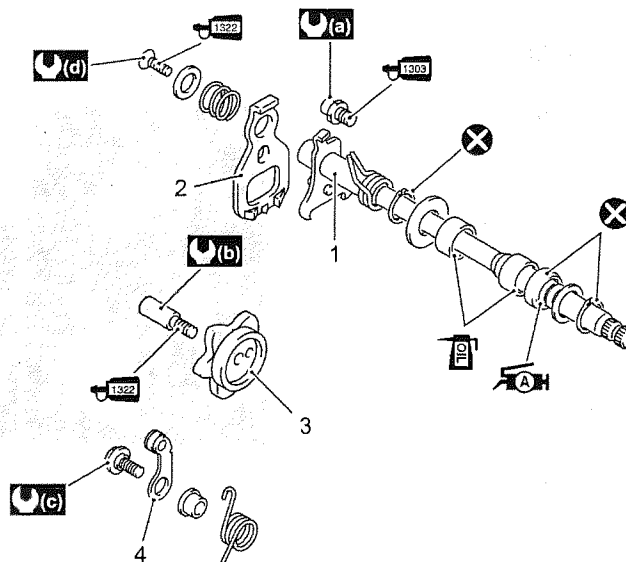
- 2) Loosen the lock-nuts (1).
- 3) Turn the gearshift link rod (2) until the gearshift lever is 65 – 75 mm (2.6 – 3.0 in) below the top of the footrest.
- 4) Tighten the lock-nuts securely.



IB14J1520014-01

Gearshift Shaft / Gearshift Cam Plate Components

BENB15J25206012

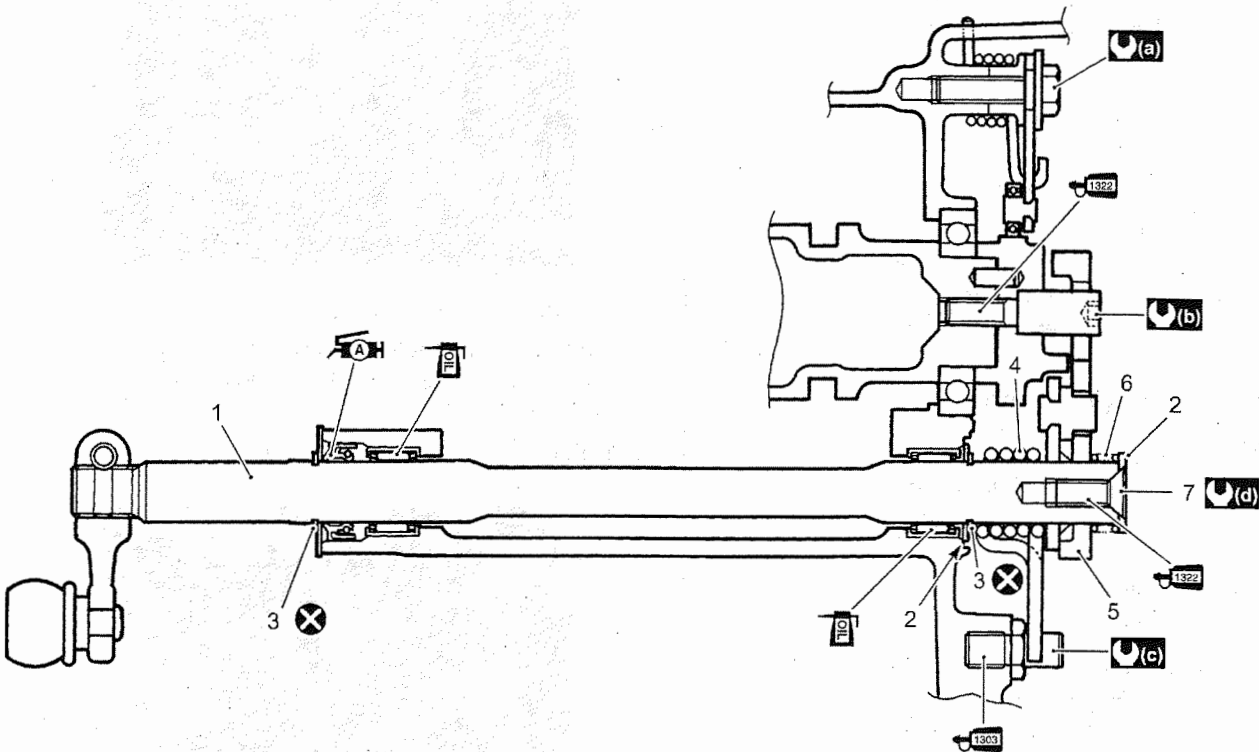


IB14J1520015-02

1. Gearshift shaft	(b) : 13 N·m (1.3 kgf-m, 9.5 lbf-ft)	1322 : Apply thread lock to the thread part.
2. Gearshift cam drive plate	(c) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	: Apply engine oil to bearing.
3. Gearshift cam plate	(d) : 8.5 N·m (0.85 kgf-m, 6.1 lbf-ft)	: Do not reuse.
4. Gearshift cam stopper	: Apply grease to oil seal lip.	
(a) : 19 N·m (1.9 kgf-m, 13.5 lbf-ft)	1303 : Apply thread lock to the thread part.	

Gearshift Shaft Construction

BENB15J25206013



IB14J1520016-01

1. Gearshift shaft	7. Gearshift shaft end screw	1303 : Apply thread lock to the thread part.
2. Washer	(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	1322 : Apply thread lock to the thread part.
3. Snap ring	(b) : 13 N·m (1.3 kgf-m, 9.5 lbf-ft)	1303 : Apply engine oil to bearing.
4. Gearshift shaft return spring	(c) : 19 N·m (1.9 kgf-m, 13.5 lbf-ft)	(X) : Do not reuse.
5. Gearshift cam drive plate	(d) : 8.5 N·m (0.85 kgf-m, 6.1 lbf-ft)	
6. Gearshift plate return spring	1303 : Apply grease.	

Gearshift Shaft / Gearshift Cam Plate Removal and Installation

BENB15J25206014

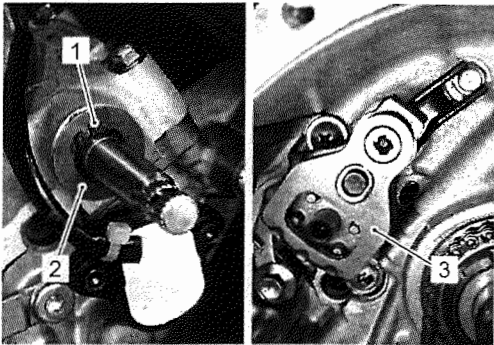
Removal

- 1) Remove the engine sprocket cover. Refer to "Engine Sprocket Removal and Installation" in Section 3A (Page 3A-2).
- 2) Remove the clutch component parts. Refer to "Clutch Removal" in Section 5C (Page 5C-8).
- 3) Remove the snap ring (1) and washer (2) from the gearshift shaft.

Special tool

TOOL : 09900-06107 (Snap ring remover (Open type))

- 4) Remove the gearshift shaft assembly (3).

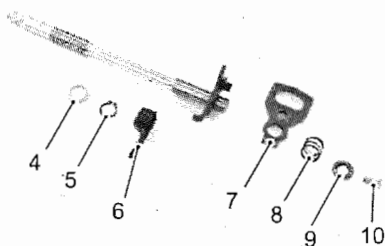


IB14J1520017-01

5) Remove the following parts from the gearshift shaft.

Special tool

1000 : 09900-06107 (Snap ring remover (Open type))



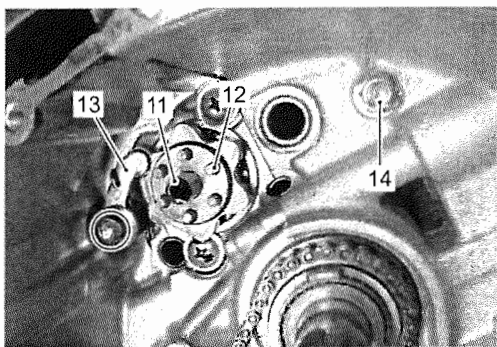
I837H1520050-01

4.	Washer
5.	Snap ring
6.	Gearshift shaft return spring
7.	Gearshift cam drive plate
8.	Gearshift plate return spring
9.	Washer
10.	Gearshift shaft end screw

6) Remove the gearshift cam plate bolt (11) and gearshift cam plate (12).

7) Remove the gearshift cam stopper (13).

8) Remove the gearshift arm stopper (14).



I837H1520051-01

Installation

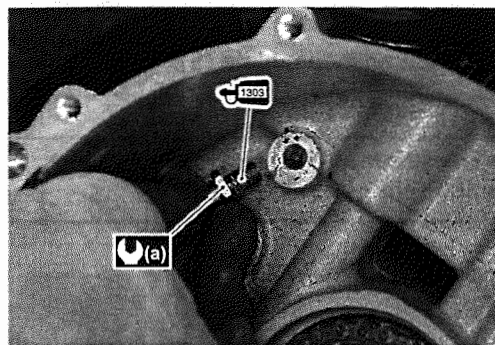
Install the gearshift shaft and gearshift cam plate in the reverse order of removal. Pay attention to the following points:

- Apply a small quantity of thread lock to the gearshift arm stopper and tighten it to the specified torque.

1303 : Thread lock cement 99000-32030 (THREAD LOCK CEMENT SUPER "1303" or equivalent)

Tightening torque

Gearshift arm stopper (a): 19 N·m (1.9 kgf-m, 13.5 lbf-ft)



IB14J1520018-01

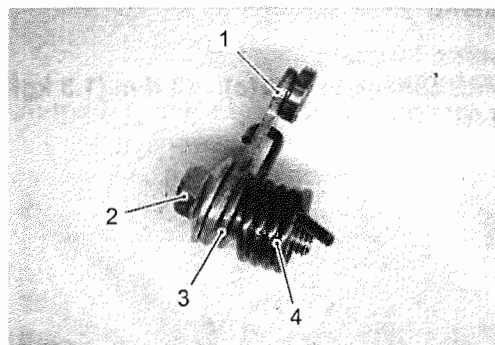
- Assemble the gearshift cam stopper (1), bolt (2), spacer (3) and return spring (4).
- Tighten the gearshift cam stopper bolt (2) to the specified torque.

NOTE

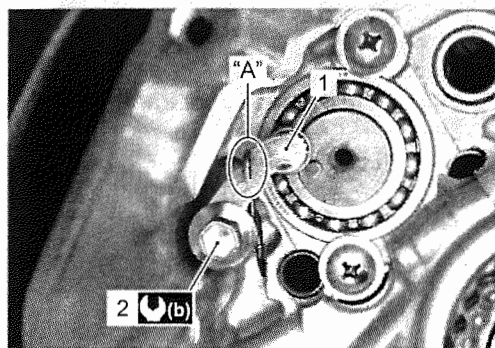
Hook the return spring end "A" to the stopper (1).

Tightening torque

Gearshift cam stopper bolt (b): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I837H1520053-01



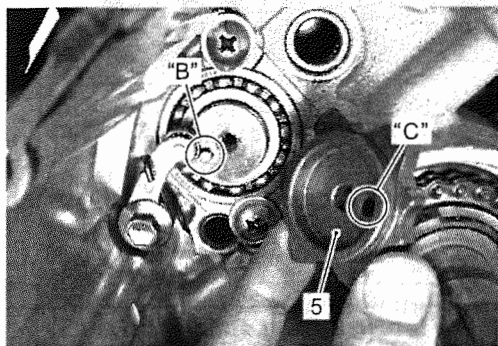
I837H1520054-01

5B-18 Manual Transmission:

- Check the gearshift cam stopper moves smoothly.
- Locate the gearshift cam in the neutral position.
- Install the gearshift cam plate (5).

NOTE

Align the gearshift cam pin "B" with the gearshift cam plate hole "C".



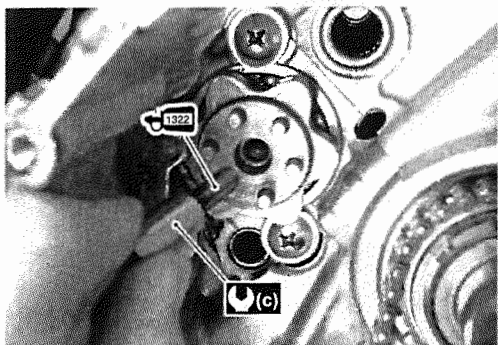
IB37H1520055-01

- Apply a small quantity of thread lock to the gearshift cam plate bolt and tighten it to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Gearshift cam plate bolt (c): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)



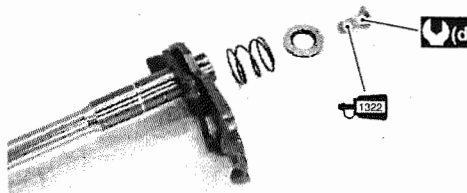
IB37H1520056-01

- Apply a small quantity of thread lock to the gearshift shaft end screw and tighten it to the specified torque.

 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

Gearshift shaft end screw (d): 8.5 N·m (0.85 kgf-m, 6.1 lbf-ft)

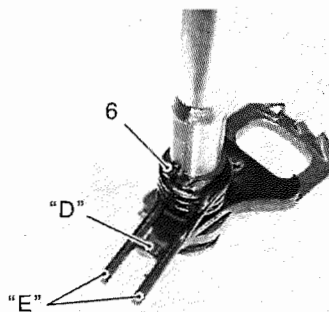


IB14J1520019-01

- When installing the gearshift shaft return spring, position the stopper "D" of gearshift arm between the shaft return spring ends "E".
- Install a new snap ring (6).

Special tool

 : 09900-06107 (Snap ring remover (Open type))

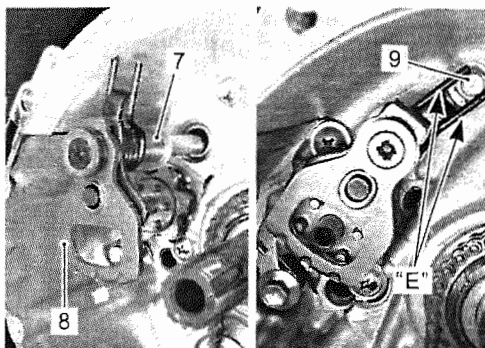


IB14J1520030-01

- Install the washer (7) and gearshift shaft assembly (8).

NOTE

Pinch the gearshift arm stopper (9) with return spring ends "E".

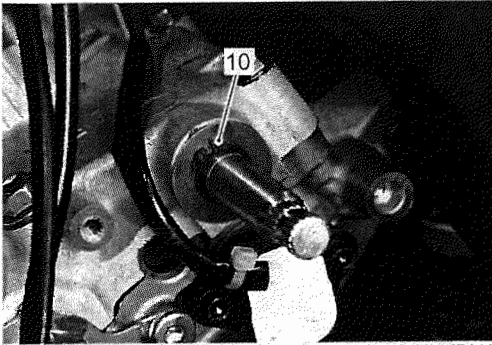


IB14J1520020-03

- Install a new snap ring (10).

Special tool

TOOL : 09900-06107 (Snap ring remover (Open type))



IB14J1520021-02

- After installing the gearshift lever, check the gearshift lever height. Refer to "Gearshift Lever Height Inspection and Adjustment" (Page 5B-15).

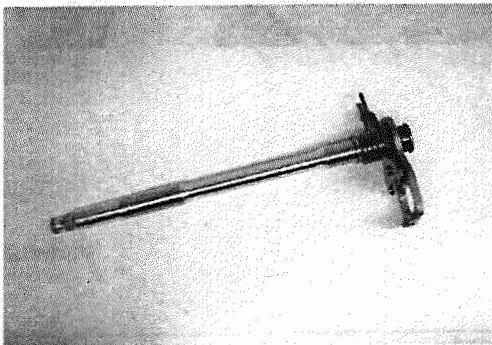
Gearshift Linkage Inspection

BENB15J25206015

Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" (Page 5B-16).

Gearshift Shaft

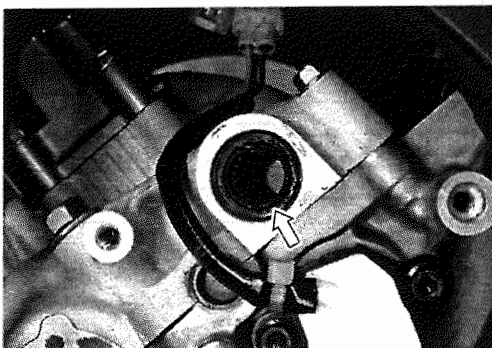
Check the gearshift shaft for bend or wear. Check the return spring for damage or fatigue. If any defects are found, replace the defective part(-s).



IB37H1520061-01

Gearshift Shaft Oil Seal

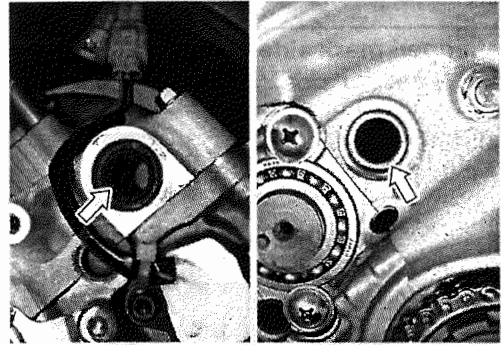
Inspect the gearshift shaft oil seal lip for damage or wear. If any defect is found, replace the oil seal with a new one.



IB14J1520022-01

Gearshift Shaft Bearing

Inspect the gearshift shaft bearing for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.



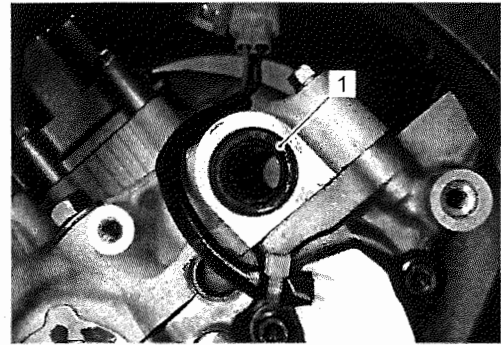
IB14J1520023-01

Gearshift Shaft Oil Seal / Bearing Removal and Installation

BENB15J25206016

Removal

- 1) Remove the gearshift shaft. Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation" (Page 5B-16).
- 2) Remove the gearshift shaft oil seal (1).



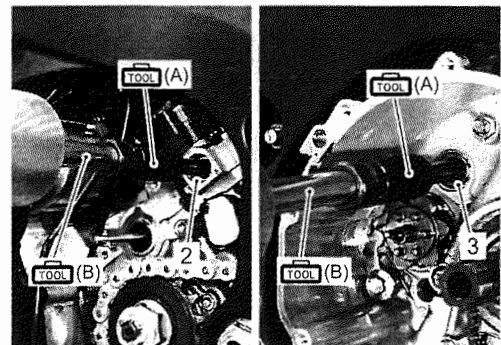
IB14J1520024-01

- 3) Remove the bearings (2) and (3) with the special tools.

Special tool

TOOL (A): 09921-20210 (Bearing remover (12 mm))

TOOL (B): 09930-30104 (Rotor remover sliding shaft)



IB14J1520025-01

Installation

Install the oil seal and bearing in the reverse order of removal. Pay attention to the following points:

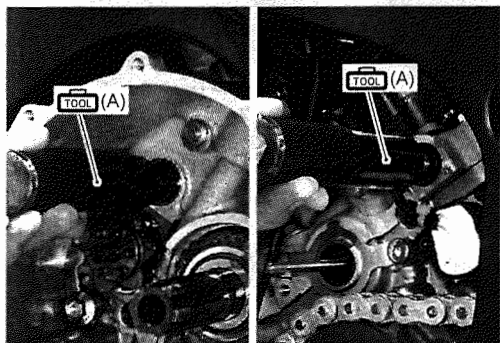
- Install the new bearings with the special tool.

NOTE

The stamped mark side of gearshift shaft bearing faces outside.

Special tool

TOOL (A): 09913-70210 (Bearing installing set (10 – 75 Φ))

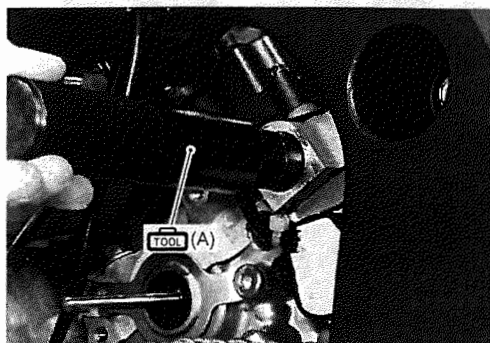


IB14J1520026-01

- Install the new oil seal with the special tool.

Special tool

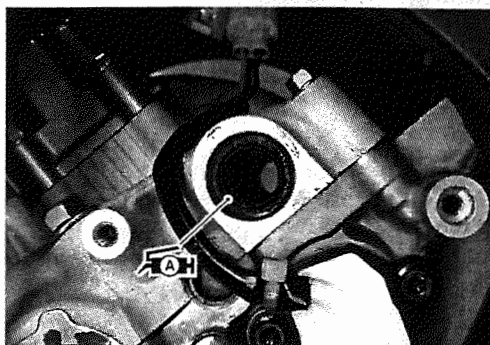
TOOL (A): 09913-70210 (Bearing installing set (10 – 75 Φ))



IB14J1520027-01

- Apply grease to the oil seal lip.

FAH : Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



IB14J1520028-01

Specifications

Service Data

Drive Train

Unit: mm (in) Except ratio

BENB15J25207001

Item		Standard	Limit
Primary reduction ratio		1.761 (74/42)	—
Final reduction ratio		2.647 (45/17)	—
Gear ratios	Low	2.785 (39/14)	—
	2nd	2.052 (39/19)	—
	3rd	1.714 (36/21)	—
	4th	1.500 (36/24)	—
	5th	1.347 (31/23)	—
	Top	1.208 (29/24)	—
Gearshift fork to groove clearance		0.1 – 0.3 (0.004 – 0.012)	0.5 (0.02)
Gearshift fork groove width		5.0 – 5.1 (0.197 – 0.201)	—
Gearshift fork thickness		4.8 – 4.9 (0.189 – 0.193)	—
Gearshift lever height		65 – 75 (2.6 – 3.0)	—

Tightening Torque Specifications

BENB15J25207002

Fastening part	Tightening torque			Note
	N-m	kgf-m	lbf-ft	
Driveshaft right bearing case bolt	12	1.2	8.5	☞(Page 5B-6)
Driveshaft left bearing case bolt	12	1.2	8.5	☞(Page 5B-7)
Driveshaft retainer bolt	12	1.2	8.5	☞(Page 5B-7)
Gearshift cam bearing retainer screw	10	1.0	7.0	☞(Page 5B-8)
GP switch mounting bolt	6.5	0.65	4.5	☞(Page 5B-14)
Gearshift arm stopper	19	1.9	13.5	☞(Page 5B-17)
Gearshift cam stopper bolt	10	1.0	7.0	☞(Page 5B-17)
Gearshift cam plate bolt	13	1.3	9.5	☞(Page 5B-18)
Gearshift shaft end screw	8.5	0.85	6.1	☞(Page 5B-18)

NOTE

The tightening torque(s) also specified in:

“Transmission Components” (Page 5B-2)

“Gearshift Lever Construction” (Page 5B-14)

“Gearshift Shaft / Gearshift Cam Plate Components” (Page 5B-15)

“Gearshift Shaft Construction” (Page 5B-16)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J25208001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000-25010	☞(Page 5B-6) / ☞(Page 5B-6) / ☞(Page 5B-7) / ☞(Page 5B-7) / ☞(Page 5B-11) / ☞(Page 5B-14) / ☞(Page 5B-20)
Thread lock cement	THREAD LOCK CEMENT SUPER “1303” or equivalent	P/No.: 99000-32030	☞(Page 5B-17)
	THREAD LOCK CEMENT SUPER “1322” or equivalent	P/No.: 99000-32110	☞(Page 5B-6) / ☞(Page 5B-7) / ☞(Page 5B-7) / ☞(Page 5B-8) / ☞(Page 5B-14) / ☞(Page 5B-18) / ☞(Page 5B-18)

NOTE

Required service material(s) also described in:

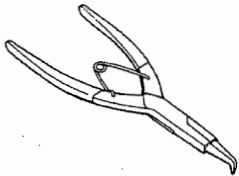
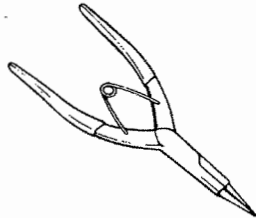
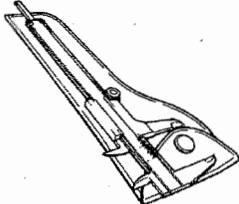
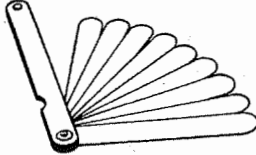
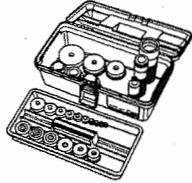
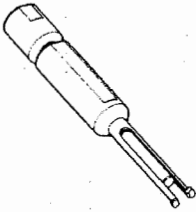
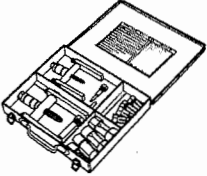
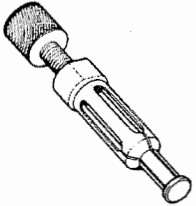
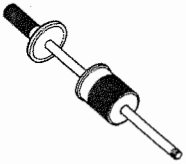
“Transmission Components” (Page 5B-2)

“Gearshift Lever Construction” (Page 5B-14)

“Gearshift Shaft / Gearshift Cam Plate Components” (Page 5B-15)

“Gearshift Shaft Construction” (Page 5B-16)

Special Tool

09900-06104 Snap ring remover (Open type) (Page 5B-10)		09900-06107 Snap ring remover (Open type) (Page 5B-16) / (Page 5B-17) / (Page 5B-18) / (Page 5B-19)	
09900-20102 Vernier calipers (200 mm) (Page 5B-12) / (Page 5B-12)		09900-20803 Thickness gauge (Page 5B-12)	
09913-70210 Bearing installing set (10 – 75 Φ) (Page 5B-4) / (Page 5B-5) / (Page 5B-5) / (Page 5B-5) / (Page 5B-5) / (Page 5B-6) / (Page 5B-6) / (Page 5B-11) / (Page 5B-20) / (Page 5B-20)		09921-20210 Bearing remover (12 mm) (Page 5B-19)	
09921-20240 Bearing remover set (Page 5B-4)		09923-74511 Bearing remover (Page 5B-4)	
09930-30104 Rotor remover sliding shaft (Page 5B-4) / (Page 5B-19)			

Clutch

Precautions

Precautions for Clutch System

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

BENB15J25300001

Schematic and Routing Diagram

Clutch Cable Routing Diagram

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

BENB15J25302001

Diagnostic Information and Procedures

Clutch System Symptom Diagnosis

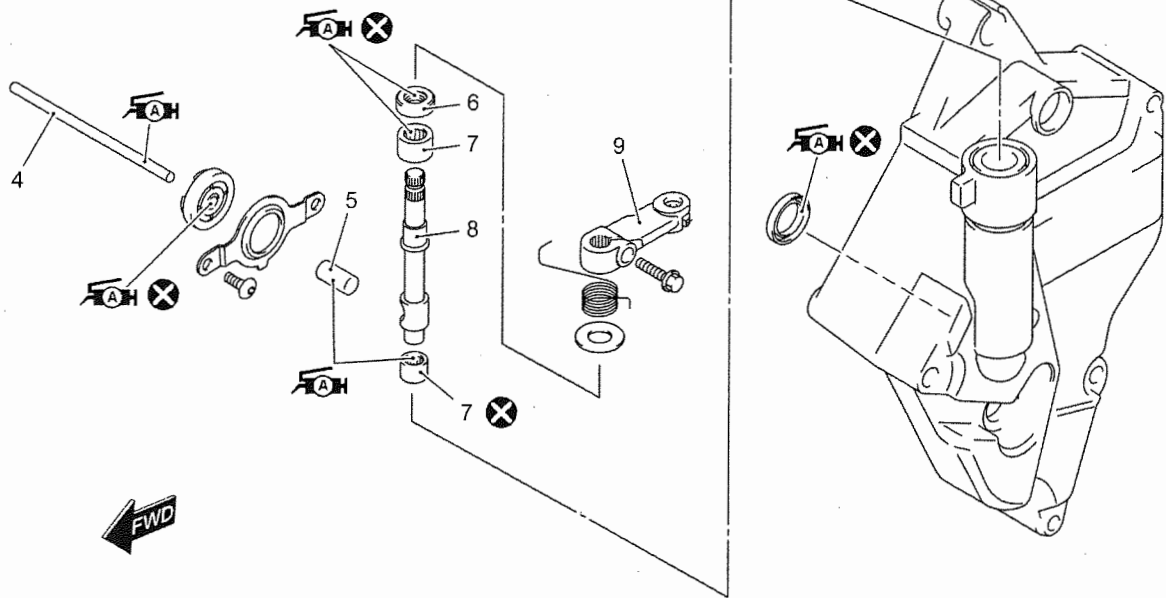
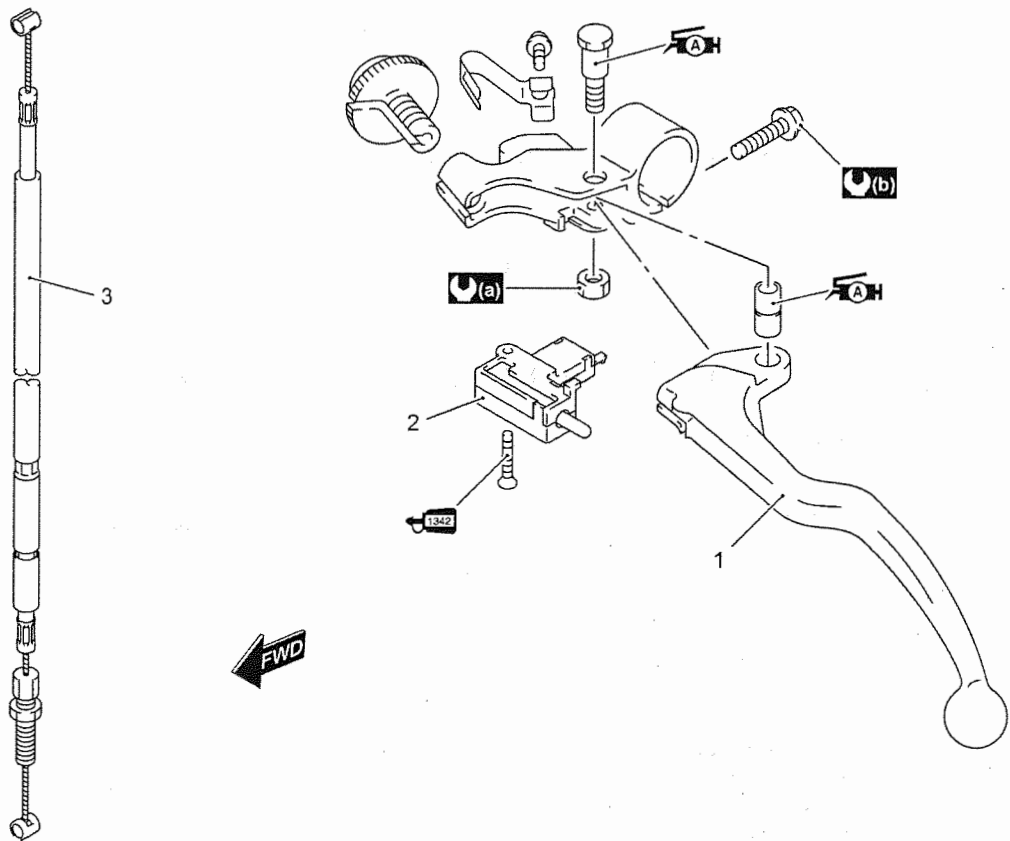
BENB15J25304001

Condition	Possible cause	Correction / Reference Item
Engine is noisy (Noise seems to come from the clutch)	Worn countershaft spline.	<i>Replace countershaft.</i>
	Worn clutch hub spline.	<i>Replace clutch hub.</i>
	Worn clutch plate teeth.	<i>Replace clutch plate.</i>
	Distorted clutch plate.	<i>Replace.</i>
	Worn clutch release bearing.	<i>Replace.</i>
	Weakened clutch damper.	<i>Replace primary driven gear.</i>
Clutch slips	Weakened clutch spring.	<i>Replace.</i>
	Worn or distorted clutch pressure plate.	<i>Replace.</i>
	Distorted clutch plate.	<i>Replace.</i>

Repair Instructions

Clutch Control System Components

BENB15J25306001



IB14J1530001-06

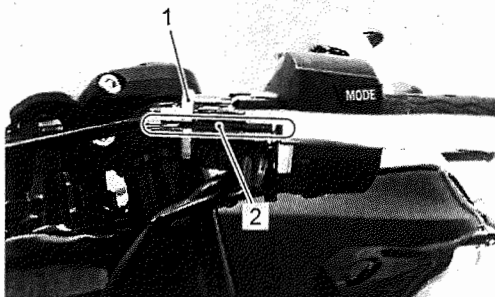
1. Clutch lever	6. Oil seal	(b) : 10 N·m (1.0 kgf-m, 0.7 lbf-ft)
2. Clutch lever position switch	7. Bearing	1342 : Apply thread lock to thread part.
3. Clutch cable	8. Clutch release camshaft	AH : Apply grease.
4. Clutch push rod (Left)	9. Clutch release arm	X : Do not reuse.
5. Clutch push rod cap	(a) : 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)	

Clutch Cable Removal and Installation

BENB15J25306002

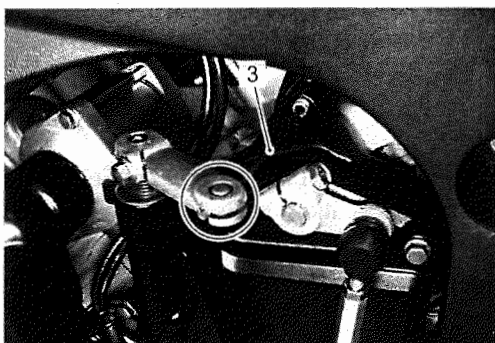
Removal

- 1) Loosen the cable adjuster nut (1).
- 2) Align the clutch lever and cable adjuster nut (1) with the cutaway.
- 3) Disconnect the clutch cable (2) from the clutch lever side.



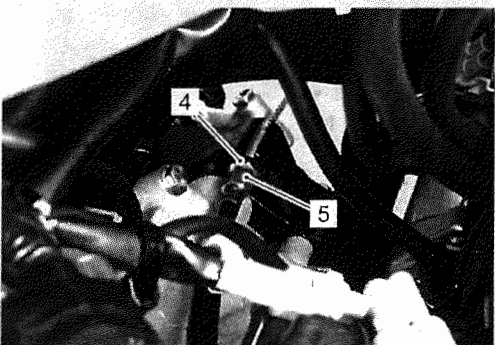
IB14J1530002-01

- 4) Disconnect the clutch cable (3) from the engine side.



IB14J1530003-01

- 5) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 6) Loosen the clutch cable lock-nut (4).
- 7) Remove the clutch cable adjuster (5) from the engine sprocket cover.



IB14J1530004-01

- 8) Remove the right cowling side cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 9) Remove the clutch cable as shown in the throttle cable routing diagram. Refer to "Throttle Cable Routing Diagram" in Section 1D (Page 1D-2).

Installation

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

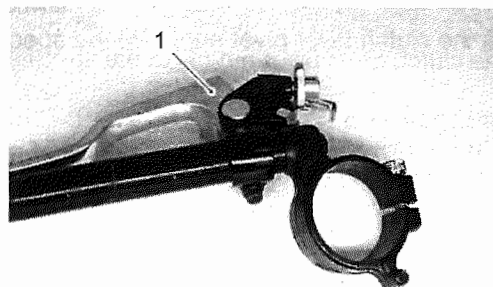
- Install the clutch cable as shown in the throttle cable routing diagram. Refer to "Throttle Cable Routing Diagram" in Section 1D (Page 1D-2).
- After install the removed parts, adjust the clutch cable play. Refer to "Clutch Cable Play Inspection and Adjustment" in Section 0B (Page 0B-14).

Clutch Lever Removal and Installation

BENB15J25306003

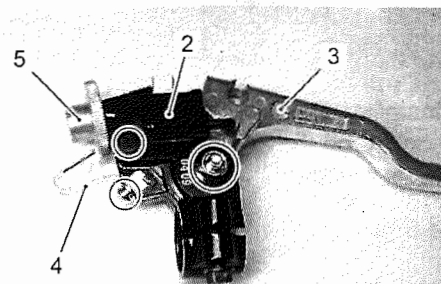
Removal

- 1) Remove the clutch lever assembly (1) from the left handlebar. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).



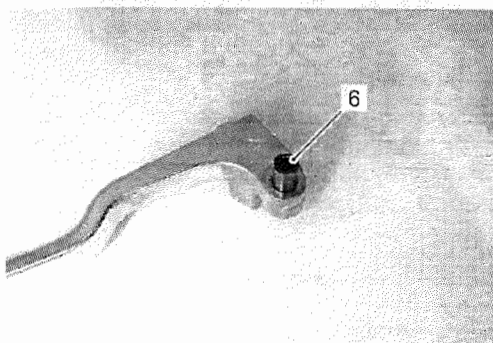
IB14J1530005-01

- 2) Remove the clutch lever position switch (2) and clutch lever (3).
- 3) Remove the spring (4) and cable adjuster nut (5).



IB14J1530006-01

- 4) Remove the collar (6) from the clutch lever.




IB14J1530007-01

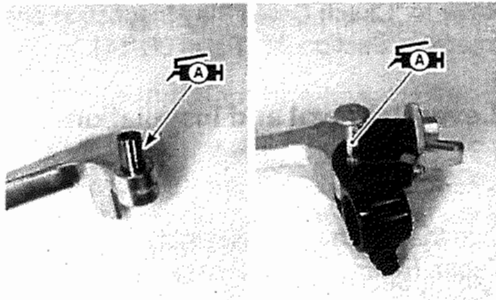
5C-4 Clutch:

Installation

Install the clutch lever in the reverse order of removal. Pay attention to the following points:

- Apply grease to the collar and clutch lever pivot bolt.

 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**

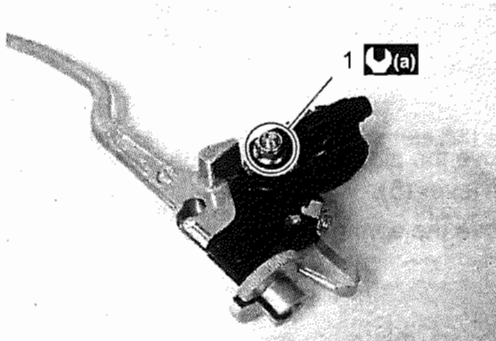


IB14J1530008-01

- Tighten the clutch lever pivot nut (1) to the specified torque.

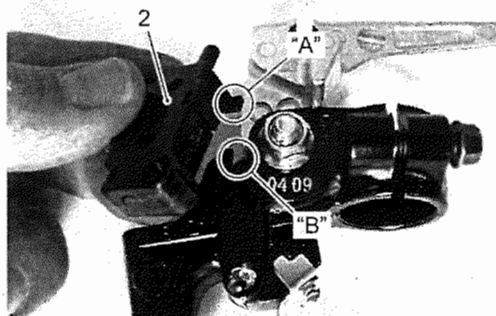
Tightening torque

Brake lever pivot nut (a): 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)



IB14J1530009-01

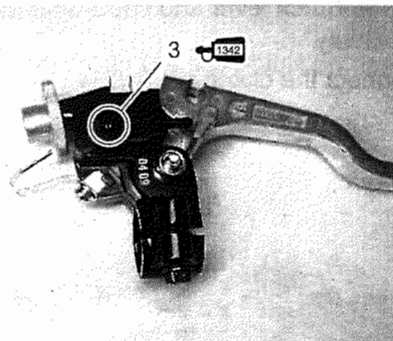
- When installing the brake light switch (2), align the projection "A" on the switch with the groove "B" in the clutch lever holder.



IB14J1530010-01

- Apply thread lock to the brake light switch screw (3).

 **Thread lock cement 99000-32050 (THREAD LOCK CEMENT "1342" or equivalent)**



IB14J1530011-02

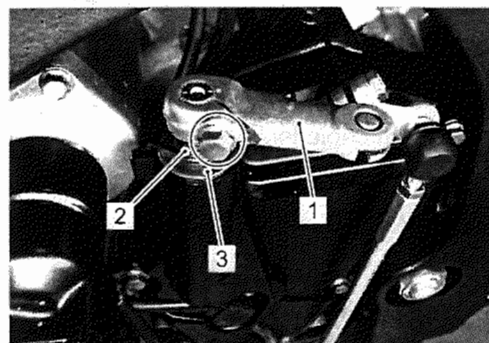
- Install the clutch lever assembly. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).
- After install the removed parts, adjust the clutch cable play. Refer to "Clutch Cable Play Inspection and Adjustment" in Section 0B (Page 0B-14).

Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation

BENB15J25306004

Removal

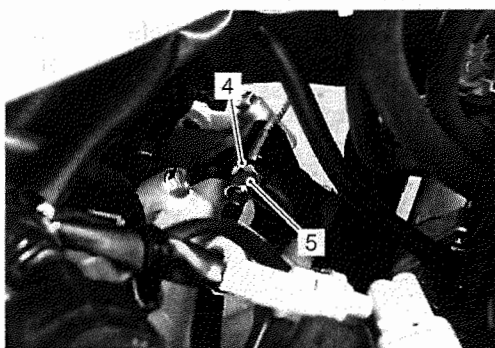
- 1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Remove the clutch release arm (1), spring (2) and washer (3).



IB14J1530012-02

- 3) Loosen the clutch lock-nut (4).

- 4) Remove the clutch cable adjuster (5) from the engine sprocket cover.

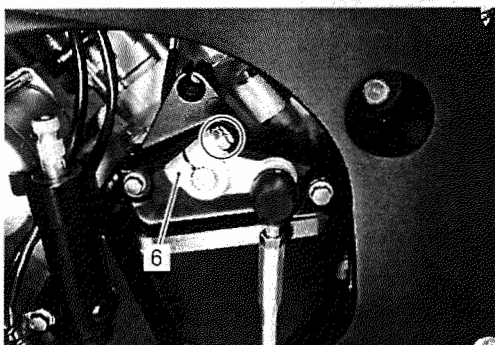


IB14J1530013-01

- 5) Remove the gearshift link arm (6) by removing the bolt.

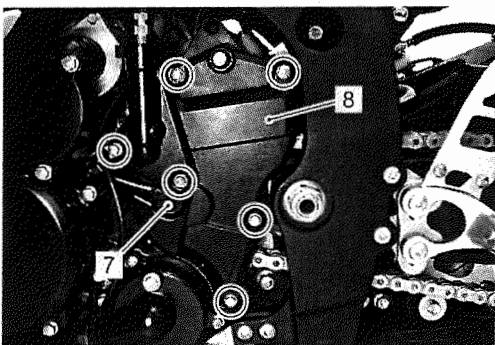
NOTE

Mark the gearshift shaft head at which the gearshift link arm slit set for correct reinstallation.



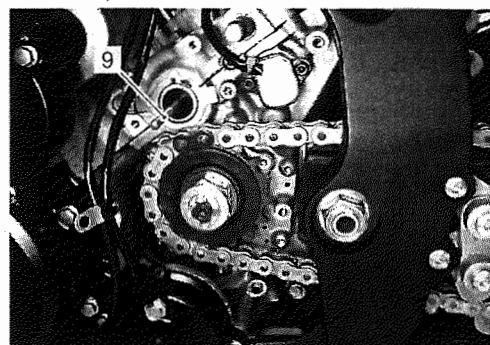
IB14J1530014-01

- 6) Remove the speed sensor (7).
7) Remove the engine sprocket cover (8).



IB14J1530015-01

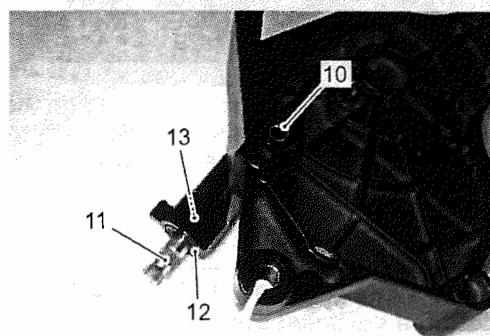
- 8) Remove the clutch push rod (Left) (9).



IB14J1530016-01

- 9) Remove the clutch push rod cap (10).

- 10) Remove the clutch release camshaft (11) along with the oil seal (12) and bearing (13).



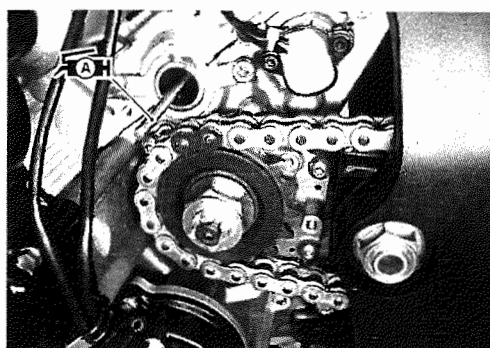
IB14J1530017-01

Installation

Install the clutch push rod (left) / clutch release camshaft in the reverse order of removal. Pay attention to the following points:

- Install the new bearing, new oil seal, clutch release camshaft and clutch push rod cap as shown in the clutch control system components. Refer to "Clutch Control System Components" (Page 5C-2).
- Apply a small quantity of grease to the clutch push rod.

ⒶH: Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



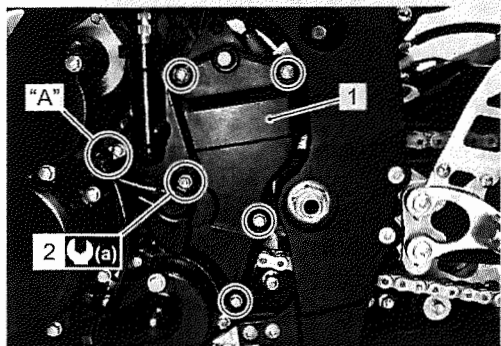
IB14J1530018-01

5C-6 Clutch:

- Install the engine sprocket cover (1).
- Fit the clamp to the bolt "A".
- Tighten the speed sensor mounting bolt (2) to the specified torque.

Tightening torque

Speed sensor bolt (a): 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)

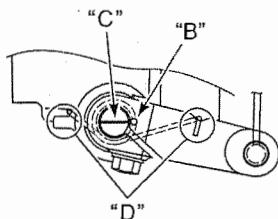


IB14J1530019-02

- When installing the clutch release arm, align the punch mark "B" of clutch release arm with slit "C" of clutch release camshaft.

NOTE

Hook the spring end "D" to the clutch release arm and engine sprocket cover.



IB14J1530020-01

- After installing, adjust the clutch cable play and check the gearshift lever height. Refer to "Clutch Cable Play Inspection and Adjustment" in Section 0B (Page 0B-14) and "Gearshift Lever Height Inspection and Adjustment" in Section 5B (Page 5B-15).

Clutch Push Rod (Left) Inspection

BENB15J25306005

Inspect the push rod in the following procedures:

- 1) Remove the clutch push rod (left). Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" (Page 5C-4).
- 2) Inspect the push rod for wear or bend. If any defects are found, replace it with a new one.

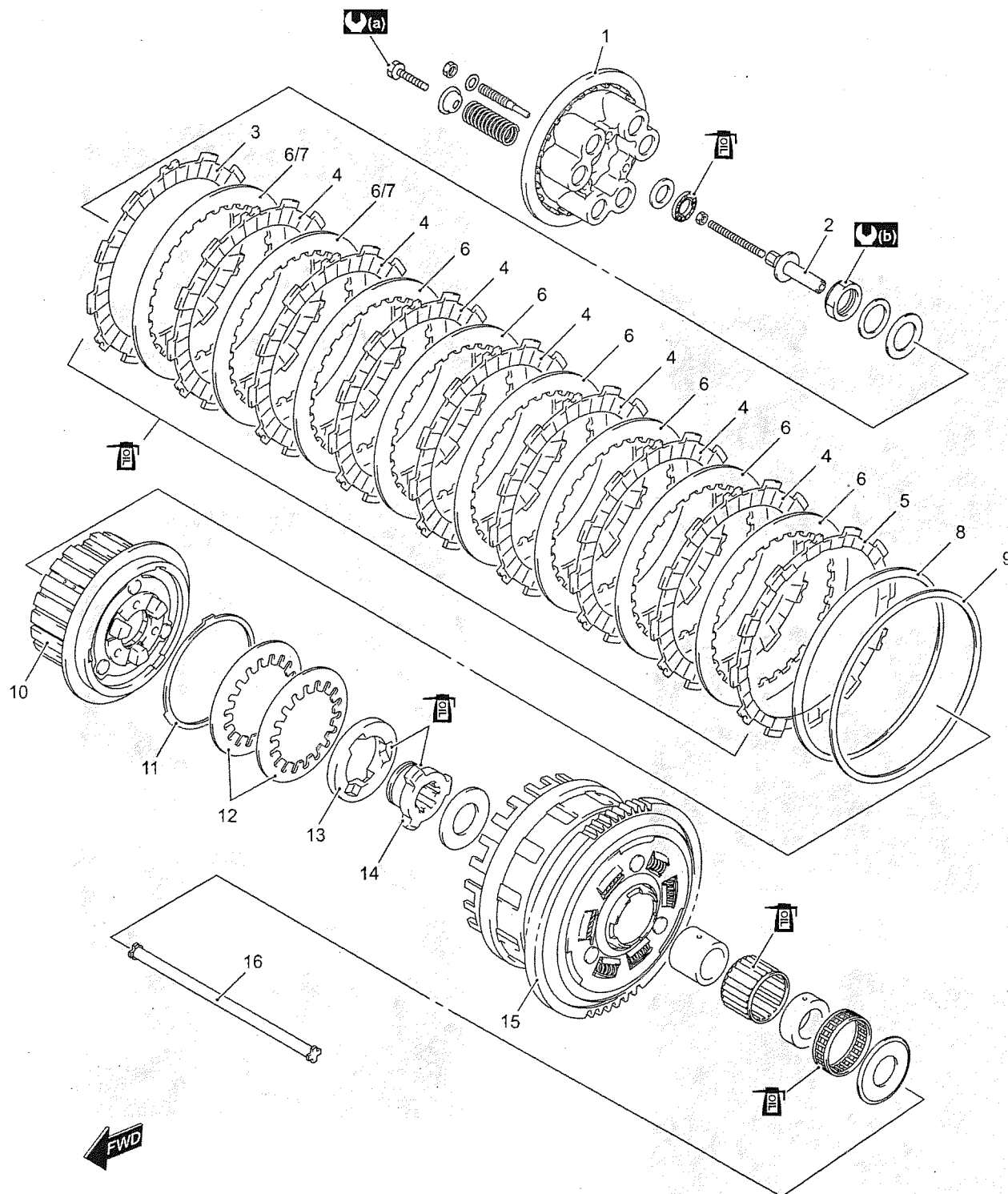


IB14J1530021-01

- 3) Reinstall the removed parts. Refer to "Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation" (Page 5C-4).

Clutch Components

BENB15J25306006



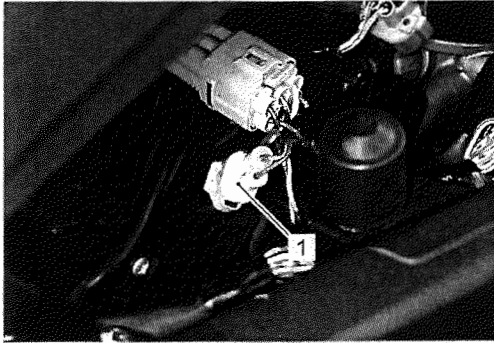
IB15J1530001-01

1. Clutch pressure plate	8. Spring washer	15. Primary driven gear assembly
2. Clutch push piece	9. Spring washer seat	16. Push rod
3. No. 2 drive plate (1 pcs.)	10. Clutch sleeve hub	(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
4. No. 1 drive plate (7 pcs.)	11. Seat washer	(b) : 95 N·m (9.5 kgf-m, 68.5 lbf-ft)
5. No. 3 drive plate (1 pc.)	12. Wave spring washer	⌚ : Apply engine oil.
6. No. 1 driven plate (6 – 8 pcs.)	13. Clutch lifter driven cam	
7. No. 2 driven plate (0 – 2 pcs.)	14. Clutch lifter drive cam	

Clutch Removal

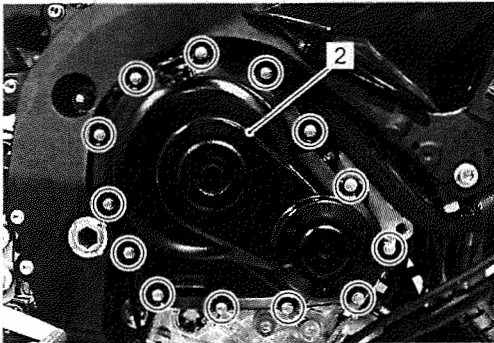
BENB15J25306007

- 1) Drain engine oil. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).
- 2) Remove the right cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 3) Lift and support the fuel tank with the prop stay. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 4) Disconnect the CKP sensor coupler (1).



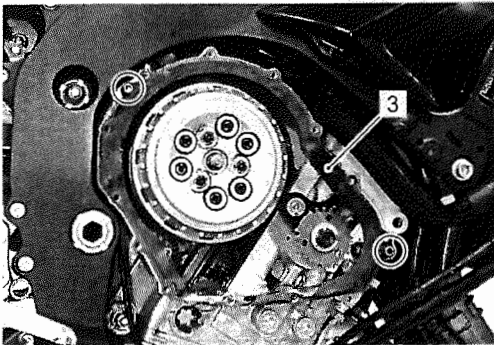
IB14J1110024-01

- 5) Remove the clutch cover (2).



IB14J1530023-01

- 6) Remove the gasket (3) and dowel pins.

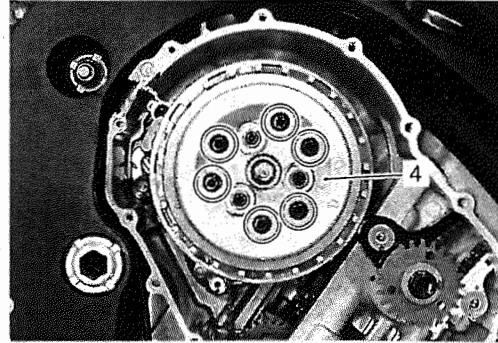


IB14J1530024-01

- 7) Remove the clutch springs and pressure plate (4).

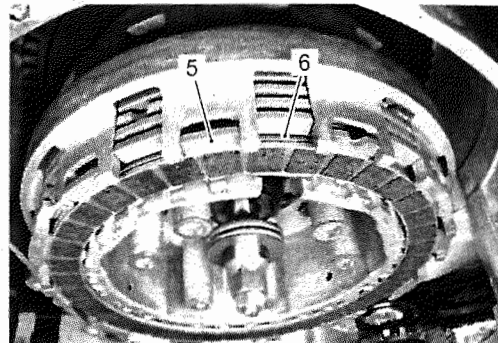
NOTE

Loosen the clutch spring set bolts little by little and diagonally.



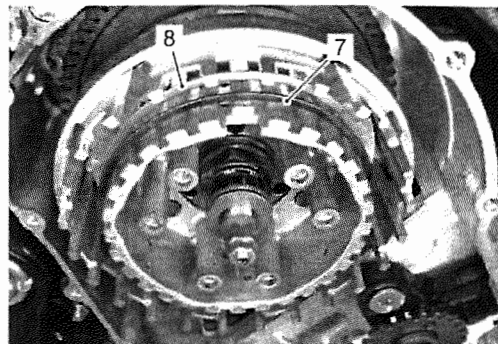
IB14J1530025-02

- 8) Remove the clutch drive plates (5) and driven plates (6).



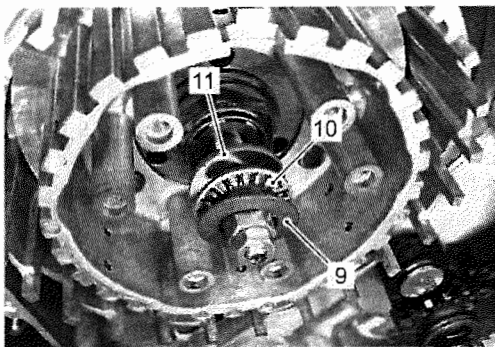
IB15J1530002-01

- 9) Remove the spring washer (7) and its seat (8).



IB37H1530006-01

- 10) Remove the thrust washer (9), bearing (10) and clutch push piece (11).

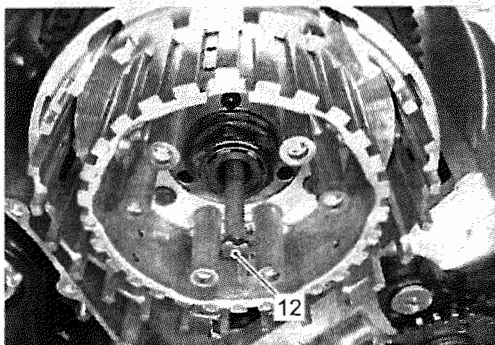


I837H1530007-01

- 11) Remove the clutch push rod (12).

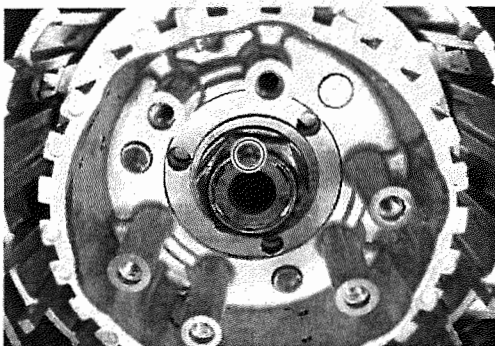
NOTE

If it is difficult to pull out the push rod (12), use a magnetic hand or wire.



I837H1530008-01


- 12) Unlock the clutch sleeve hub nut.




I837H1530009-01

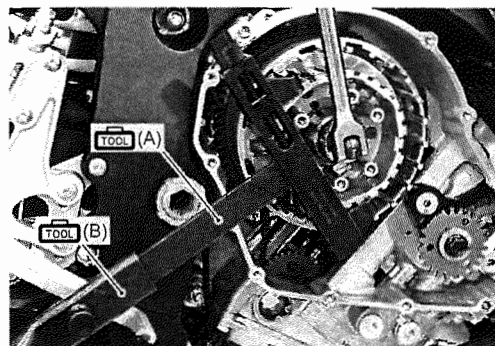
- 13) Hold the clutch sleeve hub with the special tools.

Special tool

 (A): 09920-53740 (Clutch sleeve hub holder)

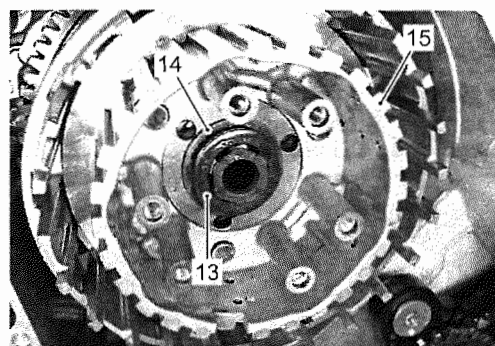
 (B): 09920-31020 (Extension handle)

- 14) Remove the clutch sleeve hub nut.



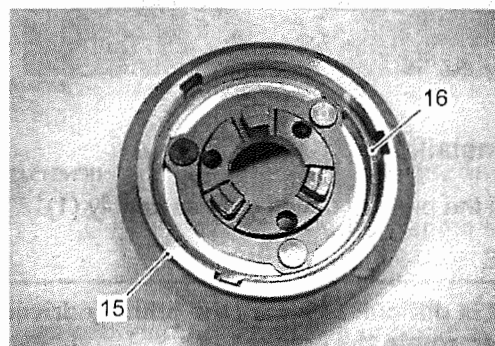
IB14J1530026-01

- 15) Remove the conical spring washer (13), washer (14) and clutch sleeve hub (15).



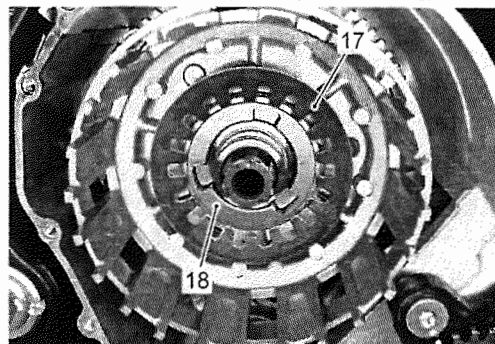
I837H1530011-03

- 16) Remove the seat washer (16) from the clutch sleeve hub (15).



IB14J1530027-01

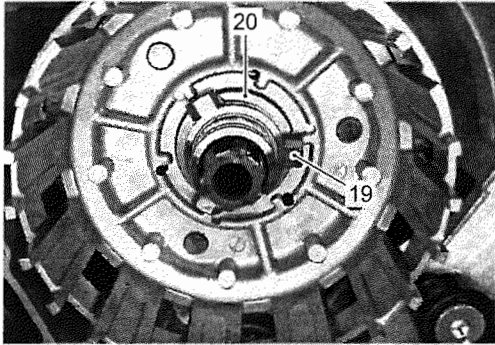
- 17) Remove the wave spring washers (17) and clutch lifter driven cam (18).



I837H1530013-03

5C-10 Clutch:

- 18) Remove the clutch lifter drive cam (19) and thrust washer (20).

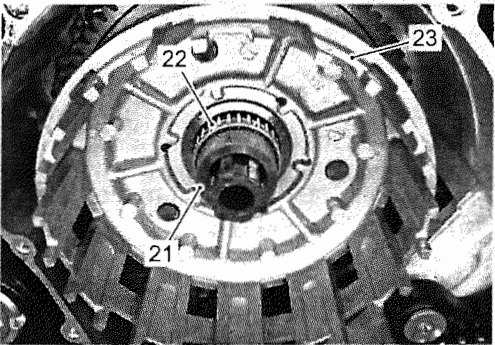


IB37H1530014-01

- 19) Remove the spacer (21) and bearing (22).
20) Remove the primary driven gear assembly (23).

NOTE

If it is difficult to remove the primary driven gear, rotate the crankshaft.



IB37H1530015-01

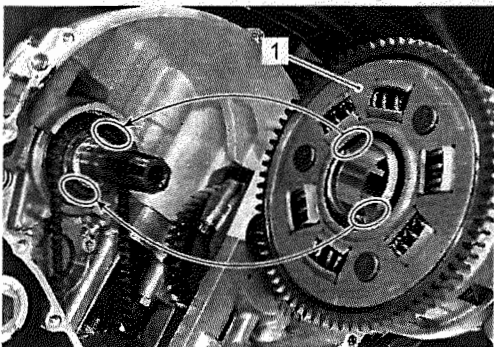
Clutch Installation

BENB15J25306008

- 1) Install the primary driven gear assembly (1).

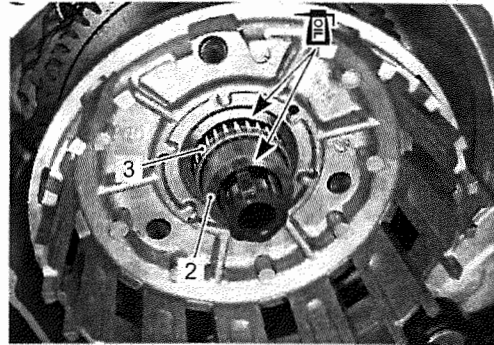
NOTE

- If it is difficult to install the primary driven gear, rotate the crankshaft.
- Be sure to engage the oil pump drive sprocket with the primary driven gear.



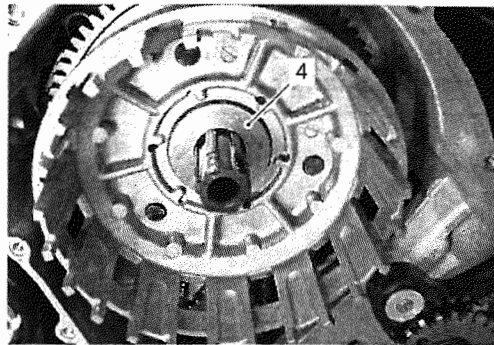
IB14J1530028-01

- 2) Install the spacer (2) and bearing (3), and apply engine oil to them.



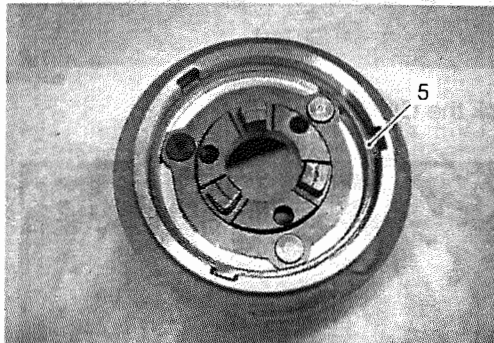
IB37H1530018-02

- 3) Install the thrust washer (4).



IB37H1530017-02

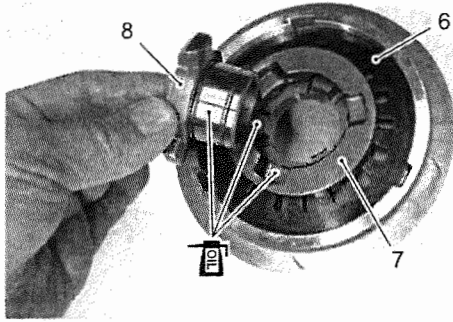
- 4) Install the seat washer (5) to the clutch sleeve hub.



IB37H1530019-01

- 5) Install the wave spring washers (6) and clutch lifter driven cam (7).
6) Apply engine oil to the contacting surfaces of the clutch sleeve hub, clutch lifter drive cam and clutch lifter driven cam.

- 7) Install the clutch lifter drive cam (8).

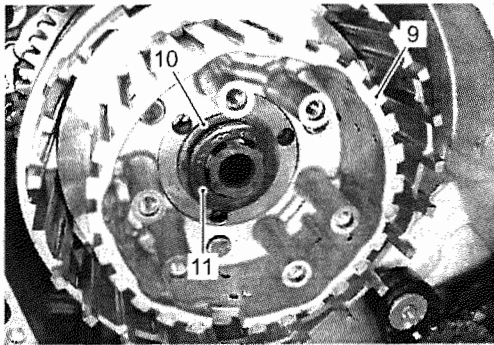


IB14J1530029-01

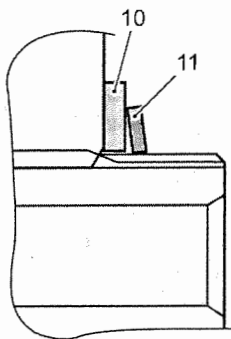
- 8) Install the clutch sleeve hub (9), washer (10) and spring washer (11).

NOTE

The conical curve side of spring washer (11) faces outside.



I837H1530021-01



I837H1530024-02

- 9) Hold the clutch sleeve hub with the special tool.

Special tool

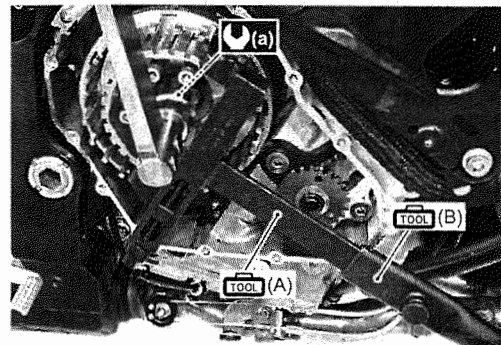
(A): 09920-53740 (Clutch sleeve hub holder)

(B): 09920-31020 (Extension handle)

- 10) Tighten the clutch sleeve hub nut to the specified torque.

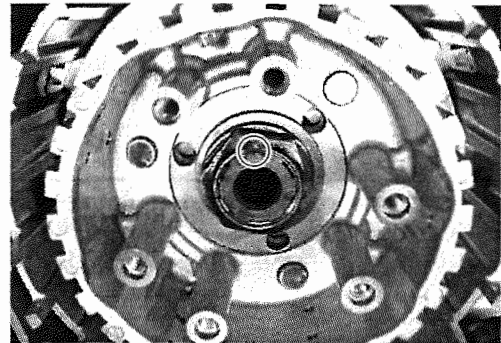
Tightening torque

Clutch sleeve hub nut (a): 95 N·m (9.5 kgf-m, 68.5 lbf-ft)



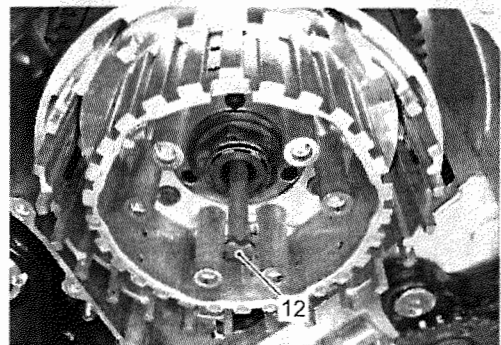
IB14J1530030-01

- 11) Lock the clutch sleeve hub nut with a center punch.



I837H1530023-01

- 12) Install the clutch push rod (12) into the countershaft.

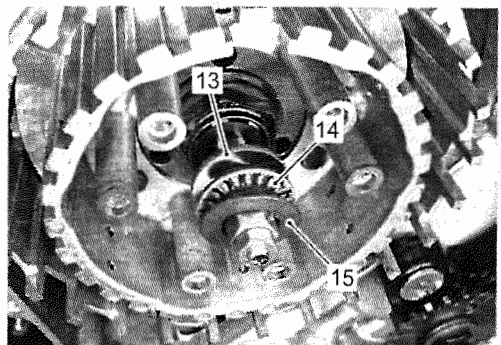


I837H1530025-01

- 13) Install the clutch push piece (13), bearing (14) and thrust washer (15) to the countershaft.

NOTE

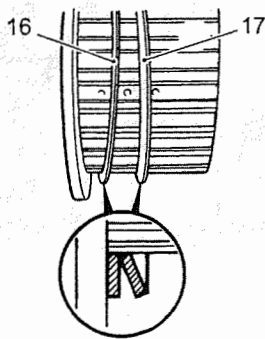
Thrust washer (15) is located between the pressure plate and bearing (14).



I837H1530026-01

5C-12 Clutch:

- 14) Install the spring washer seat (16) and spring washer (17) onto the clutch sleeve hub correctly.

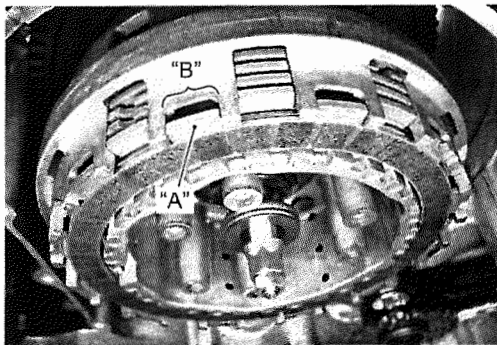


IB37H1530028-01

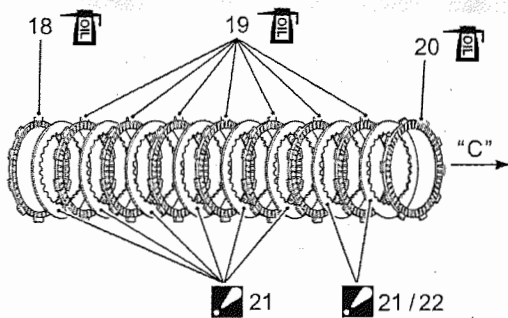
- 15) Apply engine oil to the clutch drive plates.
16) Insert the clutch drive plates and driven plates one by one into the clutch sleeve hub in the prescribed order.

NOTE



Insert the outermost No. 1 drive plate claws "A" to the other slits "B" of clutch housing as shown.



IB15J1530003-01

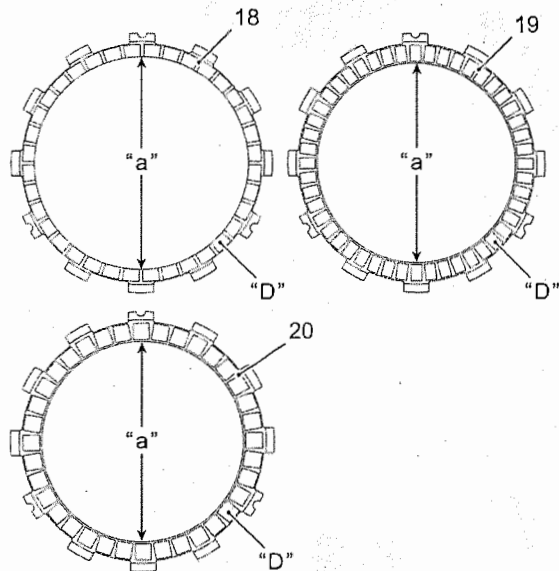


IB15J1530004-01

18.	No. 3 drive plate (1 pc.)
19.	No. 1 drive plate (7 pcs.)
20.	No. 2 drive plate (1 pcs.)
	21. No. 1 driven plate (6 – 8 pcs.) : The No. 1 and No. 2 driven plates are 8 in total.
	22. No. 2 driven plate (0 – 2 pcs.) : The No. 1 and No. 2 driven plates are 8 in total.
"C": Direction of outside	

NOTE

For drive plate
Three kinds of the drive plate (No. 1, No. 2 and No. 3) are equipped in the clutch system, they can be distinguished by the inside diameter "a" and clutch facing "D".



IB15J1530005-01

Drive plate	I.D. "a"	Clutch facing "D"
18. No. 3 drive plate	118 mm (4.6 in)	36 pcs.
19. No. 1 drive plate	111 mm (4.4 in)	48 pcs.
20. No. 2 drive plate	111 mm (4.4 in)	36 pcs.

NOTE

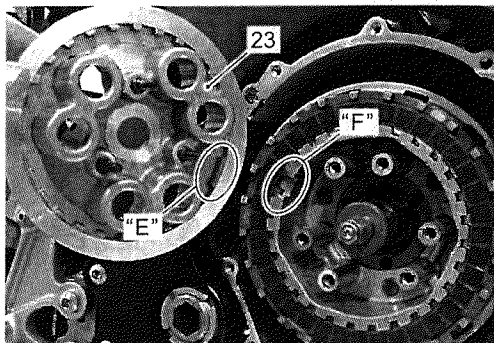
For driven plate
Basically in this motorcycle, 8 pcs of the driven plate No. 1 are installed. Instead of 1 or 2 pcs of the No. 1, however, sometimes same pcs of the driven plate No. 2 may have been installed at the factory for the purpose of fine adjusting the overall thickness of clutch plates. The driven plate No. 2 should be installed in the pressure plate side. When replacing the driven plate in the aftermarket, always use the driven plate No. 1.

Drive plate	Thickness
21. No. 1 driven plate	2.0 mm (0.08 in)
22. No. 2 driven plate	1.6 mm (0.06 in)

- 17) Install the pressure plate (23).

NOTE

When install the pressure plate, fit the convex part "E" of the pressure plate onto the concave part "F" of the clutch sleeve hub.



IB15J1530006-01

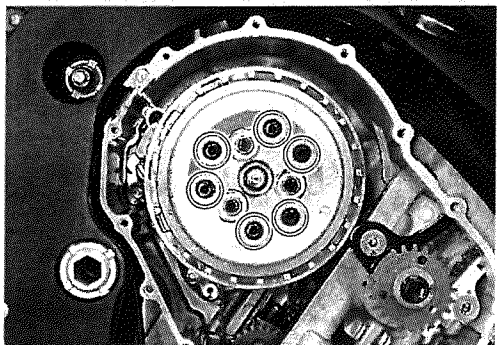
- 18) Install the clutch springs and set bolts.
19) Tighten the clutch spring set bolts to the specified torque.

NOTE

Tighten the clutch spring set bolt little by little and diagonally.

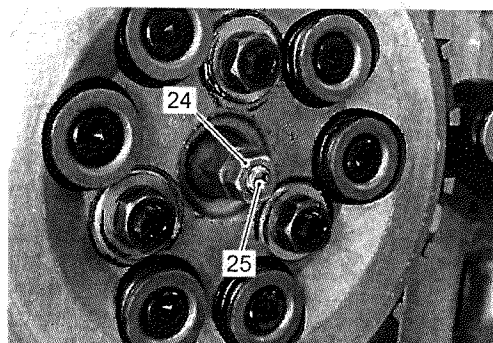
Tightening torque

Clutch spring set bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1530034-01

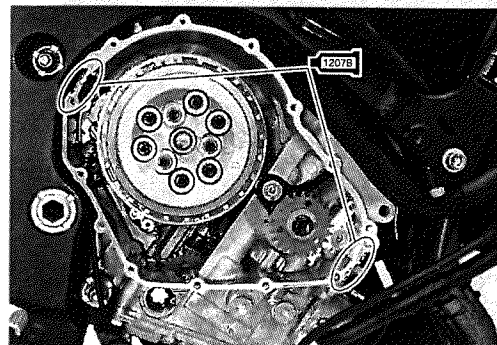
- 20) Loosen the lock-nut (24) and turn in the clutch release adjusting screw (25) until resistance is felt.
21) From that position, turn out the clutch release adjusting screw (25) 1 turn and tighten the lock-nut (24) while holding the screw (25).



IB15J1530007-01

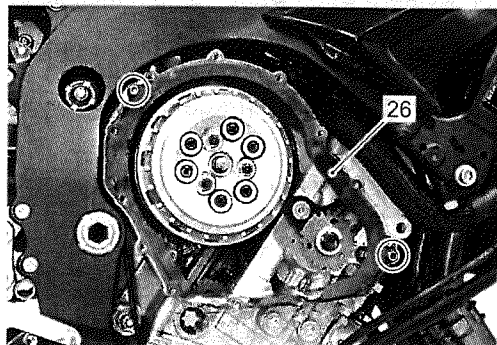
- 22) Apply bond lightly to the mating surfaces at the parting line between the upper and lower crankcases as shown.

1207B : Sealant 99000-31140 (SUZUKI BOND No.1207B or equivalent)



IB14J1530036-01

- 23) Install the dowel pins and new gasket (26).

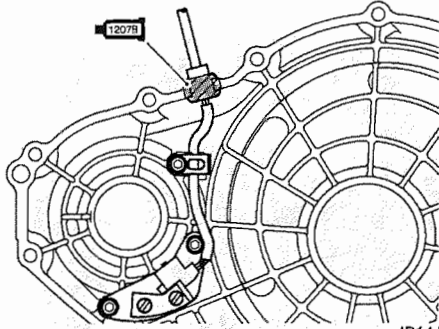


IB15J1530008-01

5C-14 Clutch:

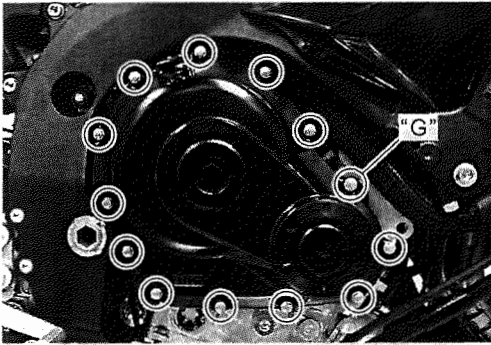
24) Apply bond lightly to the CKP sensor grommet.

1207B : Sealant 99000-31140 (SUZUKI BOND No.1207B or equivalent)



25) Fit the new gasket washer to the bolt "G".

26) Install the clutch cover and tighten the clutch cover bolts.



27) Route the CKP sensor lead wire properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

28) Install the fuel tank and right cowling. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9) and "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

29) Pour engine oil. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).

Clutch Parts Inspection

BENB15J25306009

Refer to "Clutch Removal" (Page 5C-8) and "Clutch Installation" (Page 5C-10).

Clutch Drive and Driven Plate

NOTE

Wipe off the engine oil from the drive and driven plates with a clean rag.

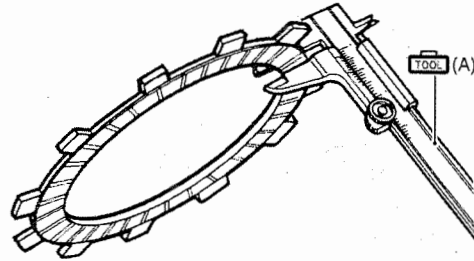
Measure the thickness of drive plates with a vernier calipers. If the drive plate thickness is found to have reached the limit, replace it with a new one.

Special tool

TOOL (A): 09900-20102 (Vernier calipers (200 mm))

Clutch drive plate thickness

Service limit (No. 1, No. 2 and No. 3 drive plates):
2.42 mm (0.095 in)



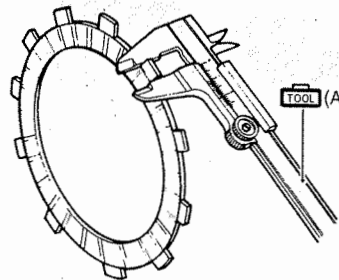
Measure the claw width of drive plates with a vernier calipers. Replace the drive plates found to have worn down to the limit.

Special tool

TOOL (A): 09900-20102 (Vernier calipers (200 mm))

Clutch drive plate claw width

Service limit (No. 1, No. 2 and No. 3 drive plates):
13.05 mm (0.514 in)



Measure each driven plate for distortion with a thickness gauge and surface plate.

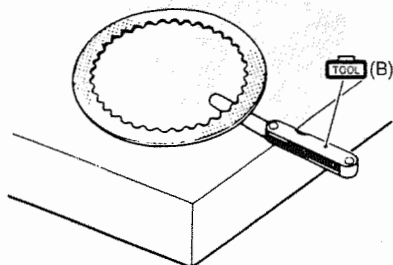
Replace driven plates which exceed the limit.

Special tool

TOOL (B): 09900-20803 (Thickness gauge)

Clutch driven plate distortion

Service limit (No. 1 and No. 2 driven plates): 0.10 mm (0.004 in)



I649G1530058-03

Clutch Spring

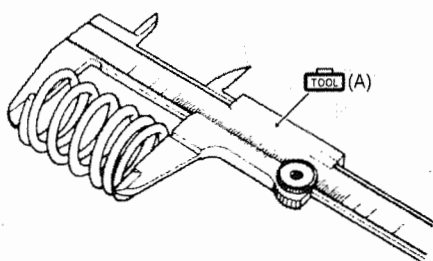
Measure the free length of each coil spring with a vernier calipers, and compare the length with the specified limit. Replace all the springs if any spring is not within the limit.

Special tool

TOOL (A): 09900-20102 (Vernier calipers (200 mm))

Clutch spring free length

Service limit: 63.2 mm (2.49 in)

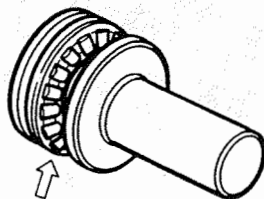


I718H1530062-01

Clutch Release Bearing

Inspect the clutch release bearing for any abnormality, especially cracks. When removing the bearing from the clutch, decide whether it can be reused or if it should be replaced.

Smooth engagement and disengagement of the clutch depends on the condition of this bearing.

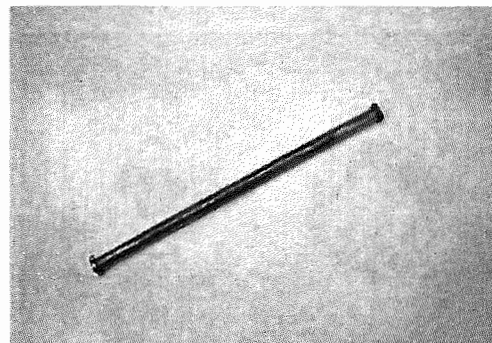


I649G1530059-02

Push Rod (Right)

Inspect the push rod for wear and damage.

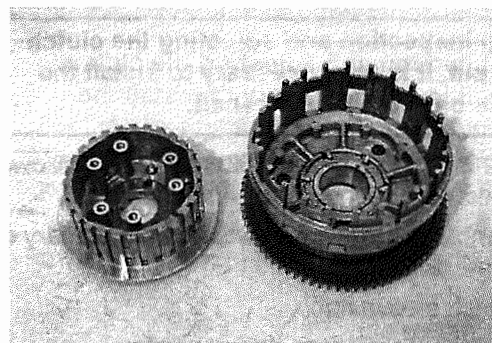
If any defects are found, replace the push rod with a new one.



I837H1530037-01

Clutch Sleeve Hub and Primary Driven Gear Assembly

Inspect the slot of the clutch sleeve hub and primary driven gear assembly for damage or wear caused by the clutch plates. If necessary, replace it with a new one.



IB14J1530040-01

Wave Spring Washer

Measure the free height "a" of each wave spring washer with a vernier calipers.

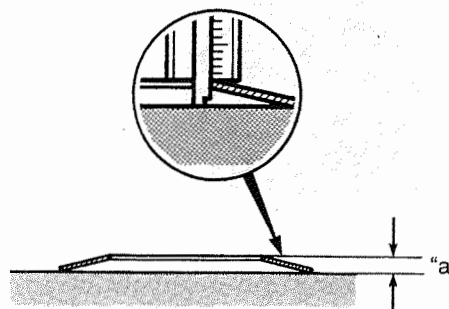
If each wave spring washer height "a" is not within the specified limit, replace it with a new one.

Special tool

TOOL : 09900-20102 (Vernier calipers (200 mm))

Wave spring washer height "a"

Service limit: 4.30 mm (0.169 in)

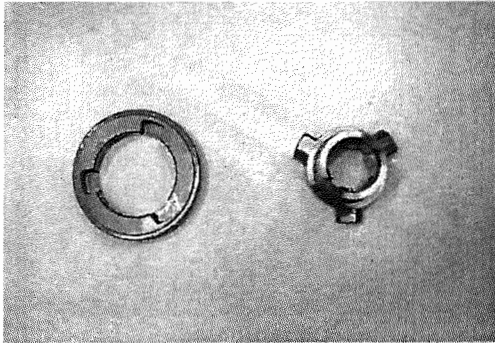


IB14J1530041-01

5C-16 Clutch:

Clutch Lifter Drive Cam and Clutch Lifter Driven Cam

Inspect the clutch lifter drive cam and clutch lifter driven cam for wear and damage. If any defects are found, replace the clutch lifter drive cam or clutch lifter driven cam.



IB37H1530039-01

Clutch Lifter Pin Inspection and Adjustment

BENB15J25306010

Refer to "Clutch Removal" (Page 5C-8) and "Clutch Installation" (Page 5C-10).

NOTE

When inspection and adjusting the clutch lifter pin, it is not necessary to install the clutch onto the countershaft.

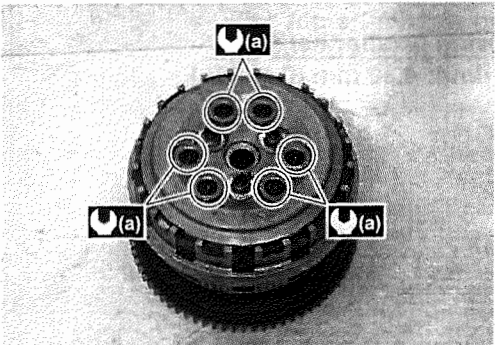
Inspect and adjust the clutch lifter pin in the following procedures:

- 1) Assemble the following parts into the primary driven gear assembly.

- Clutch sleeve hub
- Spring washer seat, spring washer
- Clutch drive plates, clutch driven plates
- Pressure plate
- Clutch springs, clutch springs set bolts

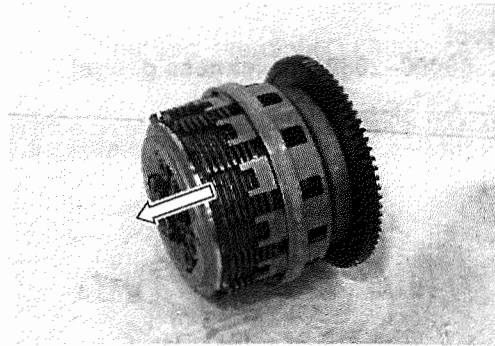
Tightening torque

Clutch spring set bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1530042-02

- 2) Remove the clutch assembly from the primary driven gear assembly.



IB14J1530043-01

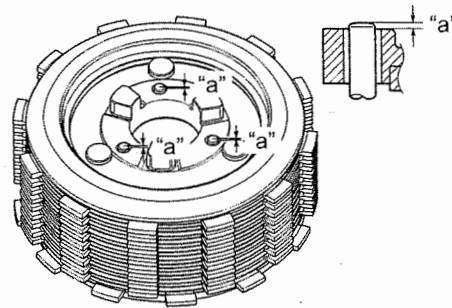
- 3) Inspect the height "a" of clutch lifter pin at three positions using the thickness gauge. If the measurement is out of the specification, adjust the height "a" as shown in the figure.

Special tool

Tool : 09900-20803 (Thickness gauge)

Clutch lifter pin height "a"

Standard: 0.2 – 0.4 mm (0.008 – 0.016 in)

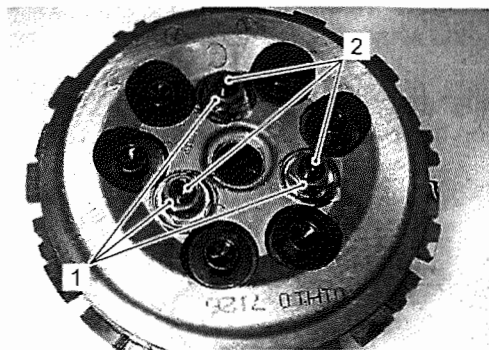


IB14J1530044-01

- 4) Loosen the lock-nut (1) and turn out the clutch lifter pin (2).

NOTE

Each clutch lifter pin height should be as closely as possible.



IB14J1530045-01

5) Set the thickness gauge to 0.3 mm (0.012 in).

Special tool

TOOL (A): 09900-20803 (Thickness gauge)

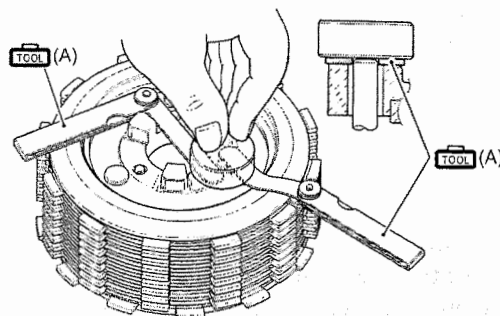
6) Place a proper flat plate on the thickness gauges and hold them by hand.

7) Slowly turn in the clutch lifter pin (2) until resistance is felt.

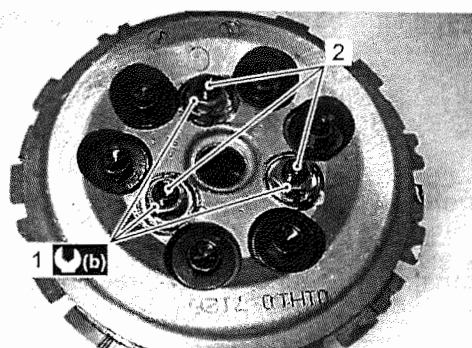
8) Tighten the lock-nut (1) to the specified torque.

Tightening torque

Clutch lifter pin lock-nut (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB37H1530046-02



IB15J1530010-01

Specifications

Service Data

Clutch

Unit: mm (in)

BENB15J25307001

Item	Standard		Limit
Clutch drive plate thickness	No. 1, 2 & 3	2.72 – 2.88 (0.107 – 0.113)	2.42 (0.095)
Clutch drive plate claw width	No. 1, 2 & 3	13.85 – 13.96 (0.545 – 0.550)	13.05 (0.514)
Clutch driven plate distortion	—		0.10 (0.004)
Clutch spring free length	66.47 (2.617)		63.2 (2.49)
Clutch lifter pin height	0.2 – 0.4 (0.008 – 0.016)		—
Wave spring washer height	—		4.30 (0.169)
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1 turn back		—

Tightening Torque Specifications

BENB15J25307002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Brake lever pivot nut	6.5	0.65	4.7	☞(Page 5C-4)
Speed sensor bolt	4.5	0.45	3.0	☞(Page 5C-6)
Clutch sleeve hub nut	95	9.5	68.5	☞(Page 5C-11)
Clutch spring set bolt	10	1.0	7.0	☞(Page 5C-13) / ☞(Page 5C-16)
Clutch lifter pin lock-nut	23	2.3	16.5	☞(Page 5C-17)

NOTE

The tightening torque(s) also specified in:

“Clutch Control System Components” (Page 5C-2)

“Clutch Components” (Page 5C-7)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J25308001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE “A” or equivalent	P/No.: 99000–25010	☞(Page 5C-4) / ☞(Page 5C-5)
Sealant	SUZUKI BOND No.1207B or equivalent	P/No.: 99000–31140	☞(Page 5C-13) / ☞(Page 5C-14)
Thread lock cement	THREAD LOCK CEMENT “1342” or equivalent	P/No.: 99000–32050	☞(Page 5C-4)

NOTE

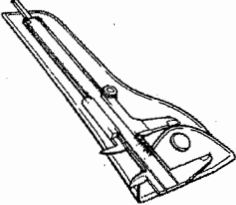
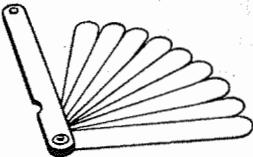
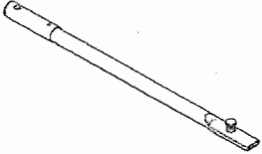
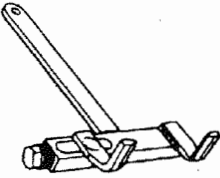
Required service material(s) also described in:

“Clutch Control System Components” (Page 5C-2)

“Clutch Components” (Page 5C-7)

Special Tool

BENB15J25308002

09900–20102 Vernier calipers (200 mm) ☞(Page 5C-14) / ☞(Page 5C-14) / ☞(Page 5C-15) / ☞(Page 5C-15)		09900–20803 Thickness gauge ☞(Page 5C-15) / ☞(Page 5C-16) / ☞(Page 5C-17)	
09920–31020 Extension handle ☞(Page 5C-9) / ☞(Page 5C-11)		09920–53740 Clutch sleeve hub holder ☞(Page 5C-9) / ☞(Page 5C-11)	

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		Special Tool	6B-15

Precautions

Precautions

Precautions for Steering

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

BENB15J26000001

Steering General Diagnosis

Diagnostic Information and Procedures

Steering Symptom Diagnosis

BENB15J26104001

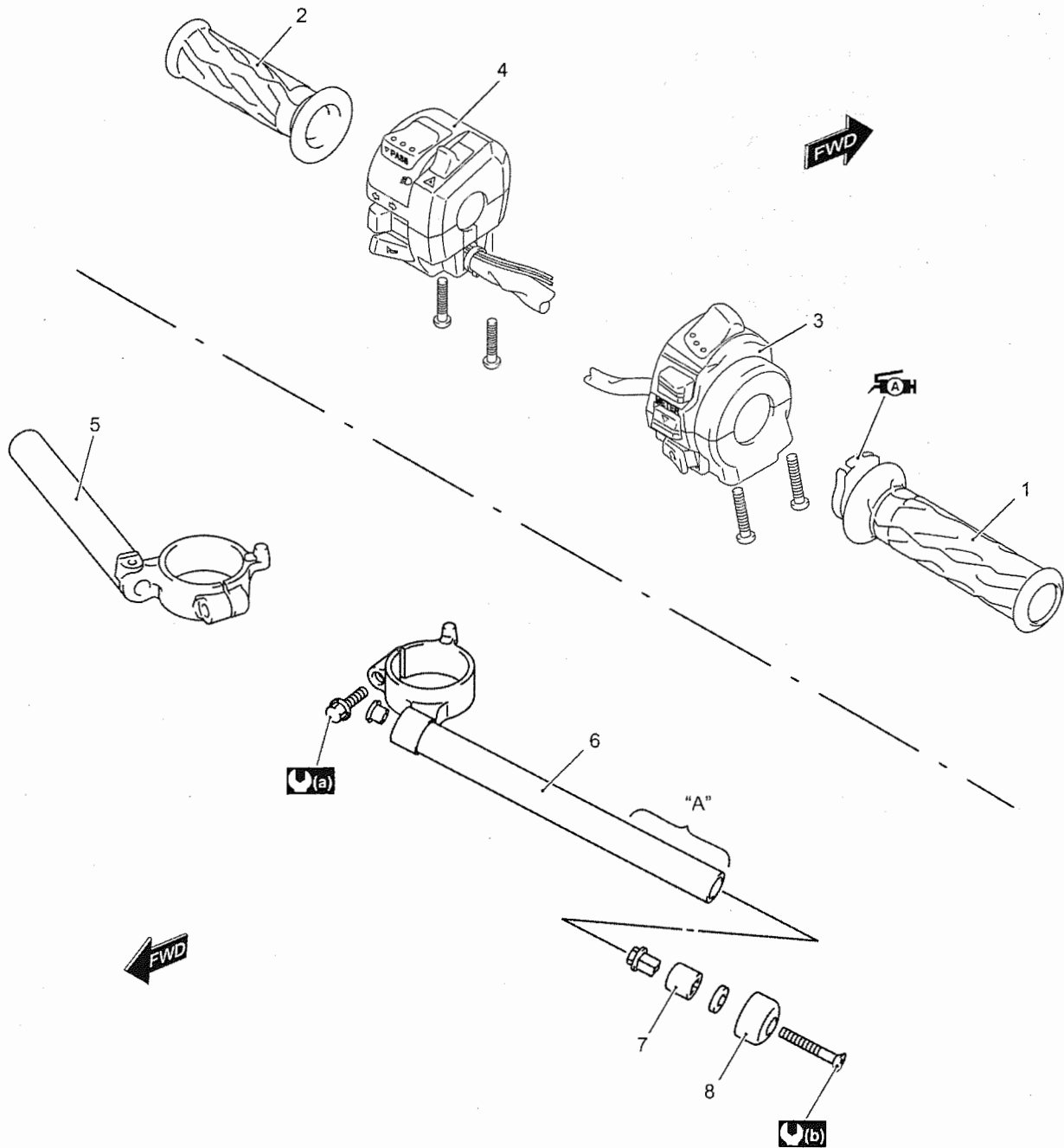
Condition	Possible cause	Correction / Reference Item
Heavy steering	Over tightened steering stem nut.	<i>Adjust.</i>
	Broken bearing in steering stem.	<i>Replace.</i>
	Distorted steering stem.	<i>Replace.</i>
	Not enough pressure in tires.	<i>Adjust.</i>
	Defective steering damper unit.	<i>Replace.</i>
Wobbly handlebars	Loss of balance between right and left front forks.	<i>Replace fork, adjust fork oil level or replace spring.</i>
	Distorted front fork.	<i>Repair or replace.</i>
	Distorted front axle or crooked tire.	<i>Replace.</i>
	Loose steering stem nut.	<i>Adjust.</i>
	Worn or incorrect tire or wrong tire pressure.	<i>Adjust or replace.</i>
	Worn bearing/race in steering stem.	<i>Replace.</i>

Steering / Handlebar

Repair Instructions

Handlebars Components

BENB15J26206001

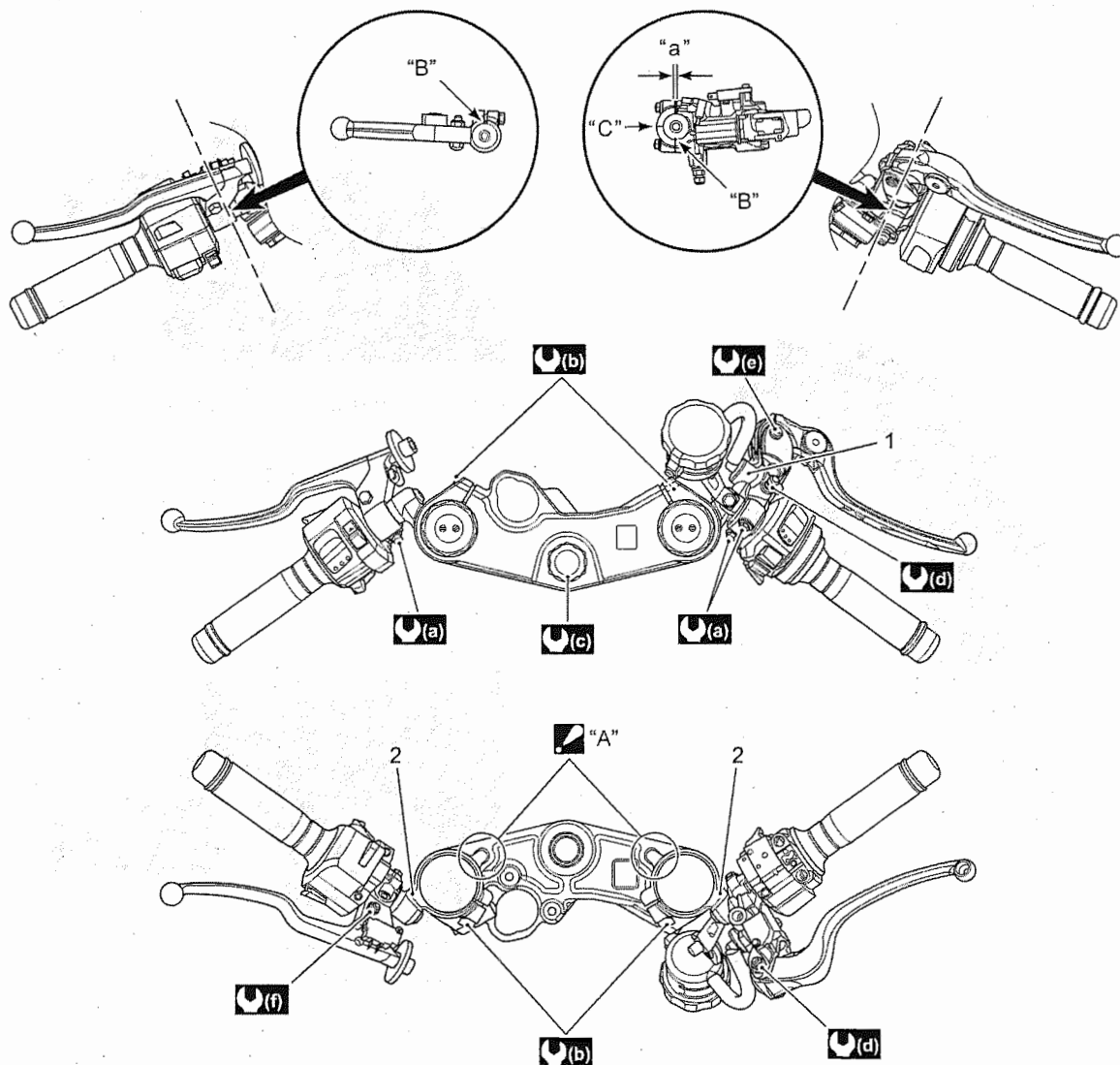


IB14J1620046-01

1. Throttle grip	5. Right handlebar	"A": Apply handle grip bond.
2. Grip rubber	6. Left handlebar	(a) : 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
3. Right handlebar switch box	7. Handlebar expander	(b) : 5.5 N-m (0.55 kgf-m, 4.0 lbf-ft)
4. Left handlebar switch box	8. Handlebar balancer	: Apply grease.

Handlebars Construction

BENB15J26206002



IB14J1620001-03

1. Front brake master cylinder	⌚(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
2. Handlebar holder	⌚(b) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
☑ "A": Set the boss of handlebar into the hole of steering stem upper bracket.	⌚(c) : 90 N·m (9.0 kgf-m, 65.0 lbf-ft)
"B": Punch mark	⌚(d) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
"C": UP mark	⌚(e) : 1 N·m (0.1 kgf-m, 0.7 lbf-ft)
"a": Clearance	⌚(f) : 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)

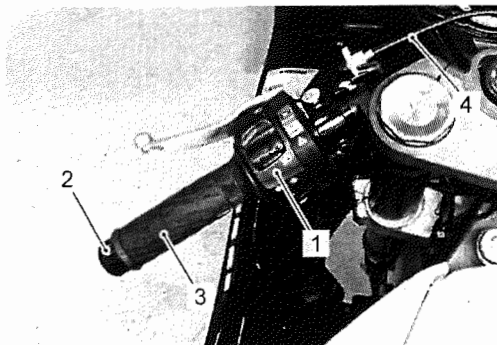
Handlebars Removal and Installation

BENB15J26206003

Removal

1) Remove the following parts from the left handlebar.

- Left handlebar switch box (1)
- Handlebar balancer (2)
- Grip rubber (3)
- Disconnect the clutch cable (4) from the clutch lever side. Refer to "Clutch Cable Removal and Installation" in Section 5C (Page 5C-3).



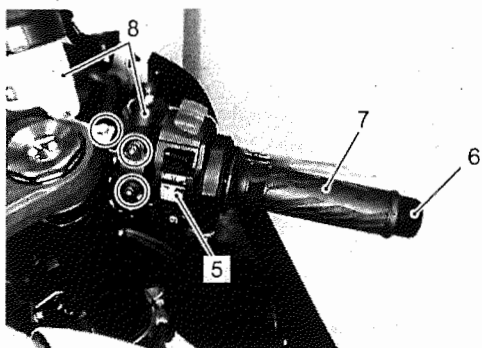
IB14J1620002-01

2) Remove the following parts from the right handlebar.

- Right handlebar switch box (5)
- Handlebar balancer (6)
- Throttle grip (7)
- Front brake master cylinder/Front brake lever (8)

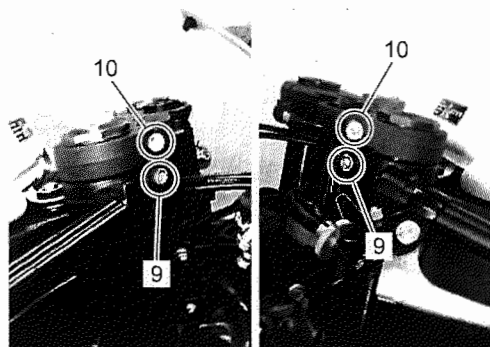
NOTICE

Do not turn the front brake master cylinder upside down.



IB14J1620003-02

3) Loosen the handlebar clamp bolts (9) and front fork upper clamp bolts (10).

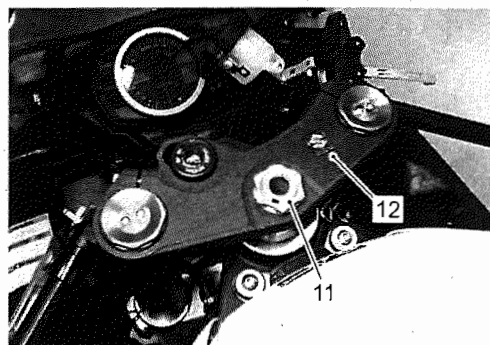


IB14J1620004-01

4) Remove the steering stem head nut (11) and washer.

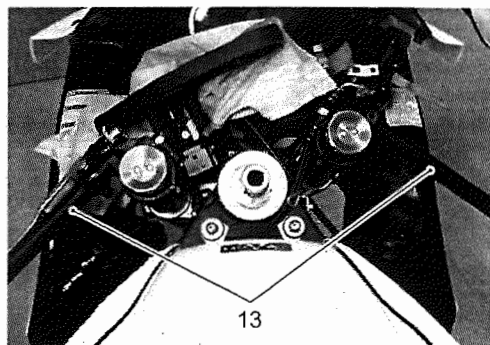
5) Place a rag under the steering stem upper bracket to prevent scratching the combination meter and other parts.

6) Remove the steering stem upper bracket assembly (12).



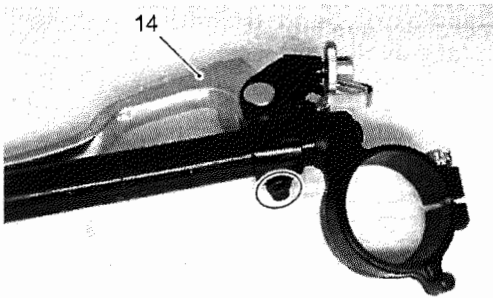
IB14J1620005-01

7) Remove the handlebars (13) upward.



IB14J1620006-01

- 8) Remove the clutch lever assembly (14) from the left handlebar.



IB14J1620007-01

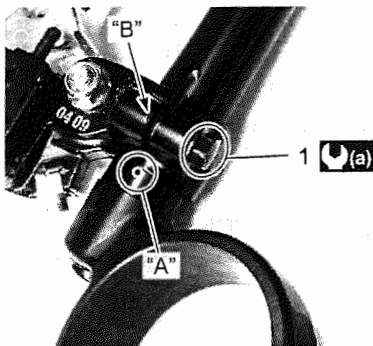
Installation

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

- When installing the clutch lever assembly to the left handlebar, align the slit "B" of clutch lever holder with the punch mark "A".
- Tighten the clutch lever holder bolt (1) to the specified torque.

Tightening torque

Clutch lever holder bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



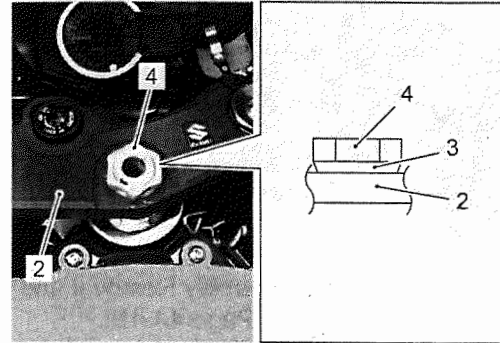
IB14J1620008-01

- Install the handlebars temporarily to the front forks.

- Install the upper bracket (2), washer (3) and steering stem head nut (4) temporarily.

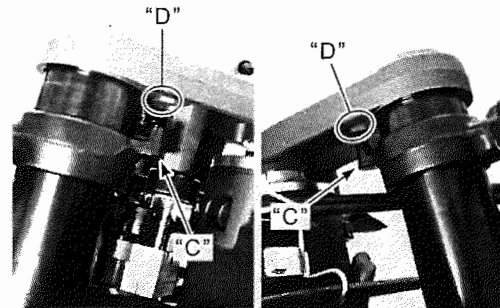
NOTE

- Raise the motorcycle with a jack, so that make easy to install the upper bracket.
- Face the chamfer side of the washer (3) downward.



IB14J1620009-01

- Insert the protrusion "C" of the handlebar into the hole "D" of the steering stem upper bracket.



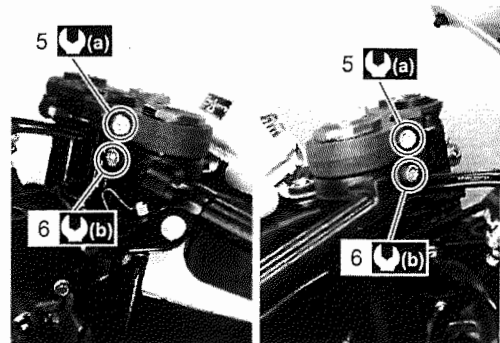
IB14J1620010-01

- Remove the jack.
- Tighten the front fork upper clamp bolts (5) and handlebar clamp bolts (6) to the specified torque.

Tightening torque

Front fork upper clamp bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

Handlebar clamp bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



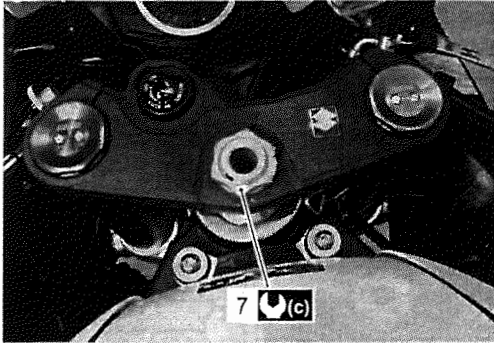
IB14J1620011-02

6B-5 Steering / Handlebar:

- Tighten the steering stem head nut (7) to the specified torque.


Tightening torque

Steering stem head nut (c): 90 N·m (9.0 kgf-m, 65.0 lbf-ft)

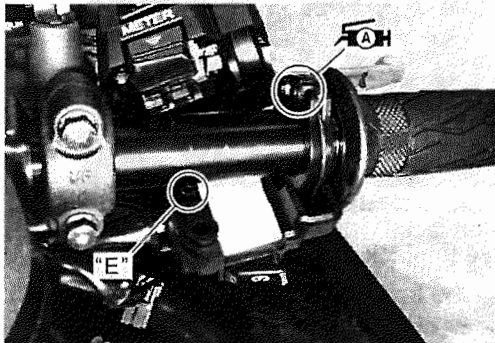


IB14J1620012-02

- Install the front brake master cylinder. Refer to "Front Brake Master Cylinder Assembly Removal and Installation" in Section 4A (Page 4A-10).
- Apply grease to the end of the throttle cables and cable pulley.

 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**


- Insert the projection "E" of the right handlebar switch box into the hole of the handlebars.

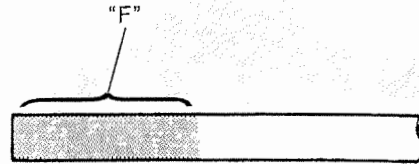


IB14J1620013-01

- Install the clutch cable (clutch lever side).

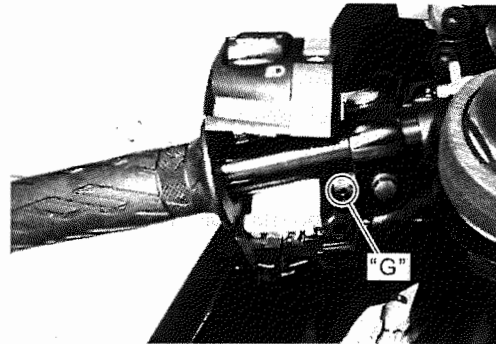
- Apply a handle grip bond "F" onto the left handlebar before installing the handlebar grip.

 **Handle grip bond (Handle Grip Bond (commercially available))**



IB14J1620014-01

- Insert the projection "G" of the left handlebar switch box into the hole of the handlebars.



IB14J1620015-01

- After installing the steering, the following adjustments are required before driving.
 - Throttle cable routing (Refer to "Throttle Cable Routing Diagram" in Section 1D (Page 1D-2))
 - Throttle cable play (Refer to "Throttle Cable Play Inspection and Adjustment" in Section 0B (Page 0B-12))
 - Clutch cable play (Refer to "Clutch Cable Play Inspection and Adjustment" in Section 0B (Page 0B-14))

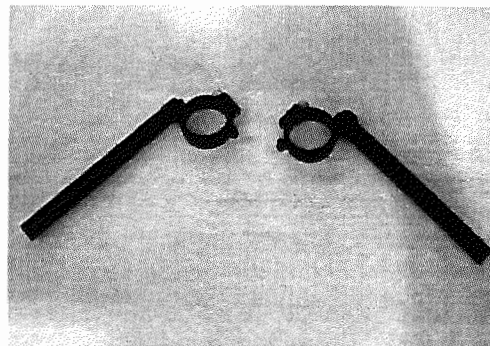
Handlebars Inspection

BENB15J26206004

Refer to "Handlebars Removal and Installation" (Page 6B-3).

Inspect the handlebars for distortion and damage.

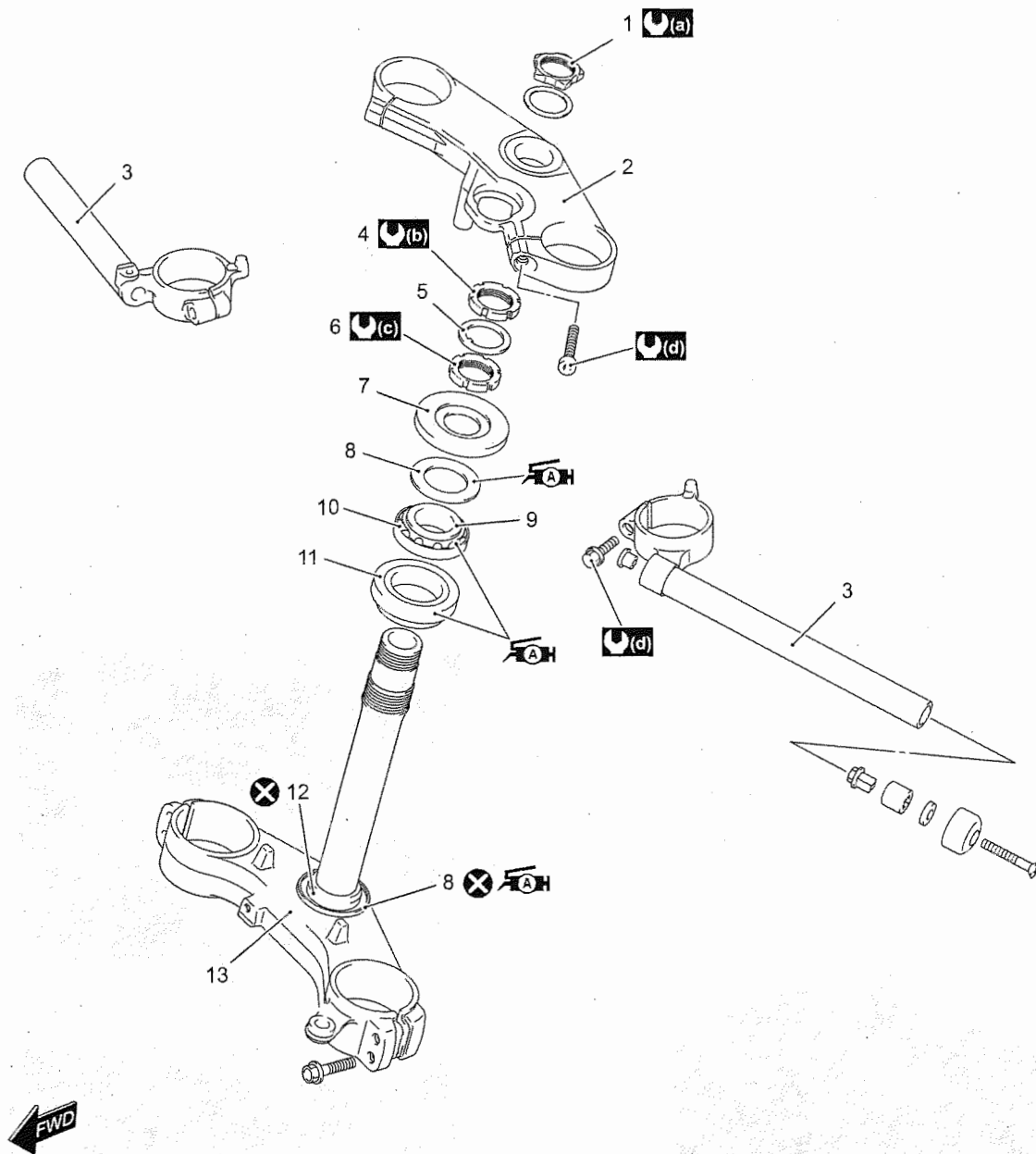
If any defect is found, replace the handlebars with a new one.



IB14J1620016-01

Steering Components

BENB15J26206005

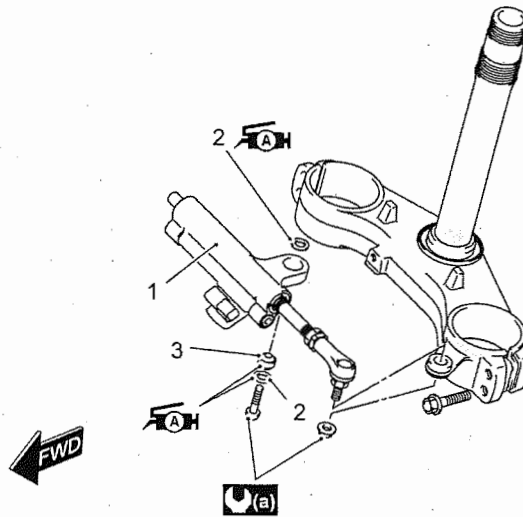


IB14J1620017-02

1. Steering stem head nut	8. Dust seal	Ⓐ(b) : 80 N-m (8.0 kgf-m, 58.0 lbf-ft)
2. Steering stem upper bracket	9. Upper bearing inner race	Ⓐ(c) : 45 N-m (4.5 kgf-m, 32.5 lbf-ft) then turn back 1/2 – 1/4
3. Handlebars	10. Steering stem upper bearing	Ⓐ(d) : 23 N-m (2.3 kgf-m, 16.5 lbf-ft)
4. Steering stem lock-nut	11. Steering stem lower bearing	ⒶH : Apply grease.
5. Washer	12. Lower bearing inner race	⊗ : Do not reuse.
6. Steering stem nut	13. Steering stem lower bracket	
7. Dust seal cover	Ⓐ(a) : 90 N-m (9.0 kgf-m, 65.0 lbf-ft)	

Steering Damper Construction

BENB15J26206006



IB37H1620040-01

1. Steering damper	2. Dust seal	3. Bearing	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	AH : Apply grease.
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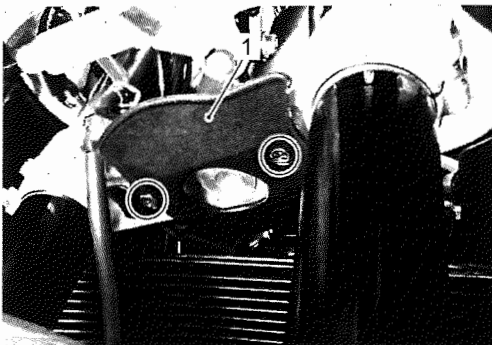
Steering / Steering Damper Removal and Installation

BENB15J26206007

Removal

Steering damper

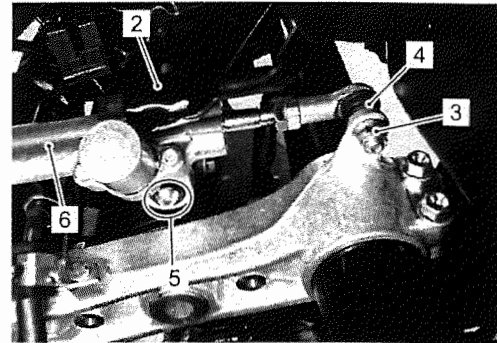
- 1) Remove the body cowling cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the lower bracket cover (1).



IB14J1620018-01

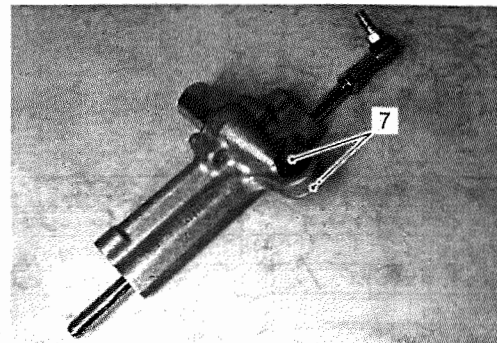
- 3) Disconnect the steering damper lead wire coupler (2).
- 4) Remove the steering damper mounting nut (3) by holding the lock-nut (4).
- 5) Remove the steering damper mounting bolt (5).

- 6) Remove the steering damper (6).



IB14J1620019-02

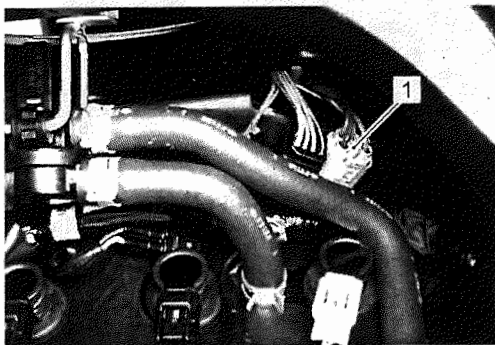
- 7) Remove the dust seal (7).



IB14J1620020-01

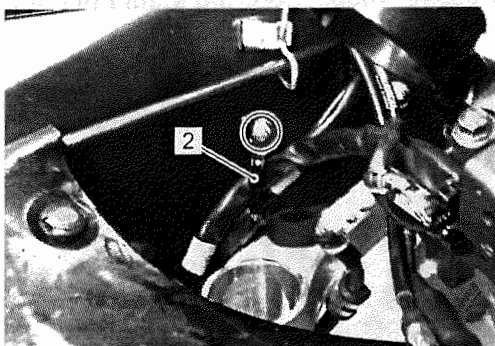
Steering

- 1) Remove the cowlings. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Support the motorcycle with a jack or wooden block.
- 3) Remove the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation" in Section 2D (Page 2D-4).
- 4) Remove the front forks. Refer to "Front Fork Removal and Installation" in Section 2B (Page 2B-2).
- 5) Remove the steering damper. Refer to "Steering damper" (Page 6B-7).
- 6) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 7) Disconnect the ignition switch lead wire coupler (1) (white) and immobilizer antenna lead wire coupler (For E-21, 24).



IB14J1620021-03

- 8) Remove the harness clamp (2).



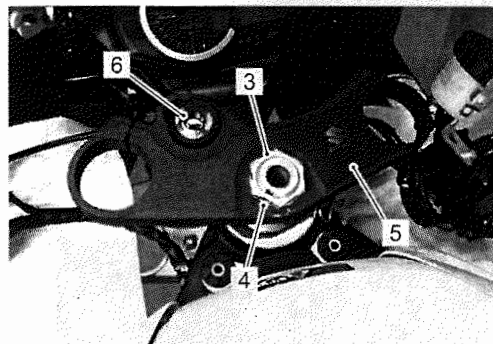
IB14J1620022-02

- 9) Remove the steering stem head nut (3) and washer (4).

- 10) Remove the steering stem upper bracket assembly (5).

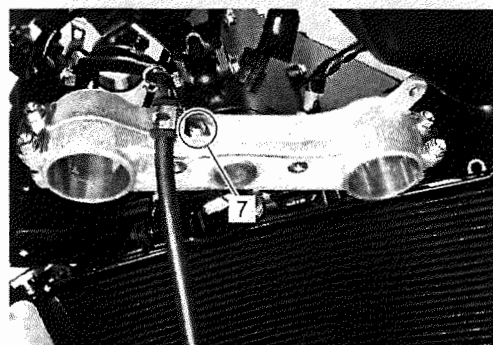
NOTE

If necessary, remove the ignition switch (6) from the upper bracket. Refer to "Ignition Switch Removal and Installation (E-21 Only)" in Section 1H (Page 1H-11).



IB14J1620023-03

- 11) Remove the brake hose clamp bolt (7).



IB14J1620024-03

- 12) Remove the steering stem lock-nut (8), washer and steering stem nut (9) with the special tools.

NOTE

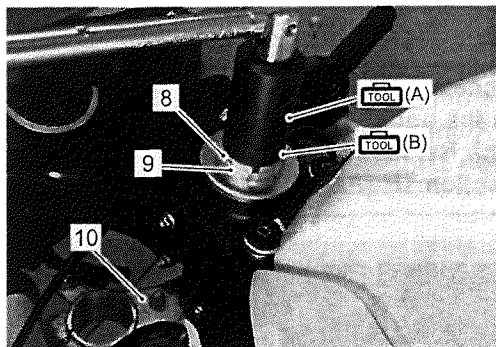
When loosening the stem nuts, hold the steering stem lower bracket to prevent it from falling.

Special tool

TOOL (A): 09940-14911 (Steering stem nut socket wrench)

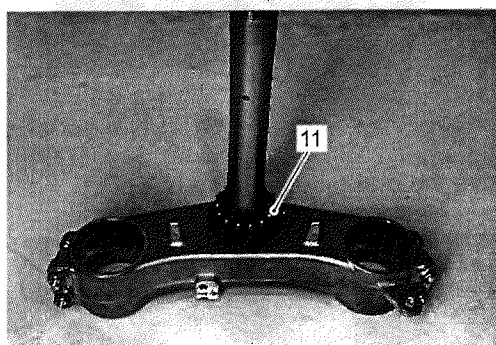
TOOL (B): 09940-14960 (Steering stem nut socket wrench)

- 13) Remove the steering stem lower bracket (10).



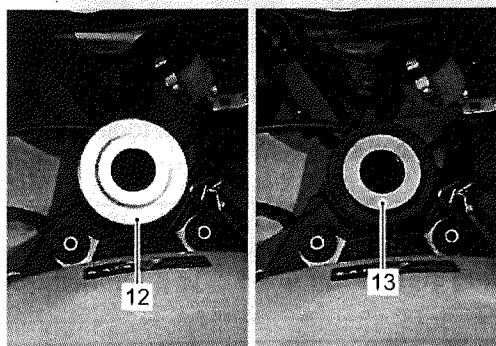
IB14J1620026-04

- 14) Remove the lower bearing (11) from the steering stem lower bracket.

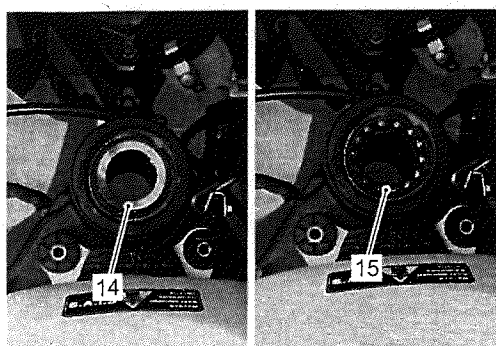


IB14J1620027-04

- 15) Remove the dust seal cover (12), dust seal (13), upper bearing inner race (14) and upper bearing (15).



IB14J1620028-04



IB14J1620029-04

Installation


Install the steering/steering damper in the reverse order of removal.

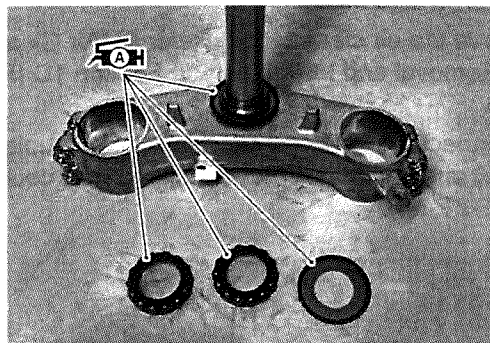
Pay attention to the following points:

Steering

Bearing

- Apply grease to the bearings and dust seal lips before remounting the steering stem.

 **Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)**





IB14J1620030-01

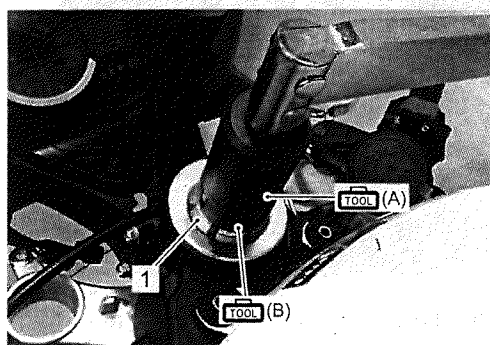
Steering stem nut

- Tighten the steering stem nut (1) to the specified torque with the special tools. [45 N·m (4.5 kgf-m, 32.5 lbf-ft)]

Special tool

 **(A): 09940-14911 (Steering stem nut socket wrench)**

 **(B): 09940-14960 (Steering stem nut socket wrench)**



IB14J1620031-01

- Turn the steering stem lower bracket about five or six times to the left and right so that the angular ball bearings seat properly.

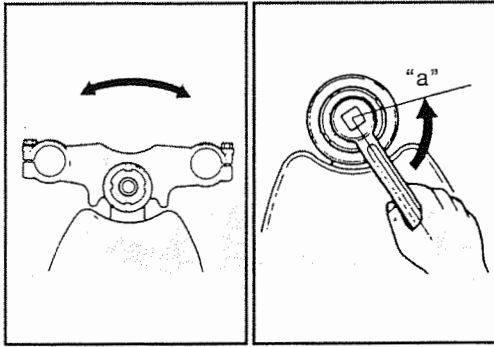
- Loosen the steering stem nut $1/4 - 1/2$ turn "a".

Tightening torque

Steering stem nut: 45 N·m (4.5 kgf-m, 32.5 lbf-ft)
then turn back $1/2 - 1/4$

NOTE

This adjustment will vary from motorcycle to motorcycle.



IB49G1620026-02

- When installing the washer (2), align the lug of the washer to the groove of the steering stem.



IB14J1620032-01

- Tighten the steering stem lock-nut (3) to the specified torque with the special tools.

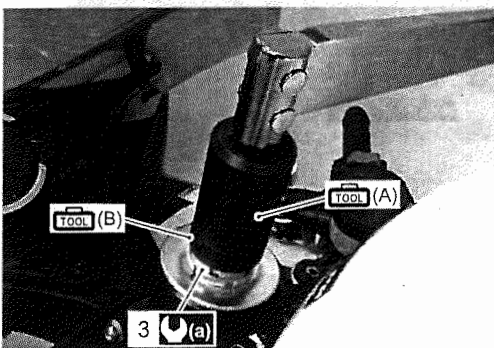
Special tool

TOOL (A): 09940-14911 (Steering stem nut socket wrench)

TOOL (B): 09940-14960 (Steering stem nut socket wrench)

Tightening torque

Steering stem lock-nut (a): 80 N·m (8.0 kgf-m, 58.0 lbf-ft)



IB14J1620033-02

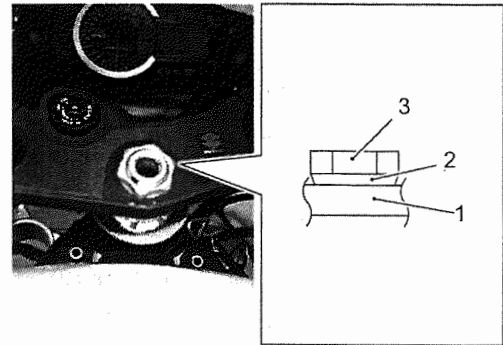
Steering stem upper bracket

Install the front forks and steering stem upper bracket in the following steps:

- Temporarily install the upper bracket (1), washer (2) and steering stem head nut (3).

NOTE

Face the chamfer side of the washer downward.

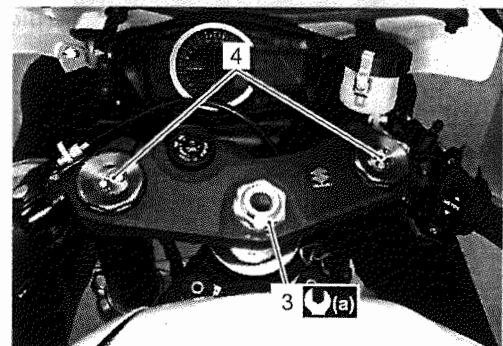


IB14J1620034-02

- Route the ignition switch lead wire properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).
- Temporarily install the front forks (4) to the handlebars and steering stem.
- Tighten the steering stem head nut (3) to the specified torque, then install the front fork (4) again. Refer to "Front Fork Removal and Installation" in Section 2B (Page 2B-2).

Tightening torque

Steering stem head nut (a): 90 N·m (9.0 kgf-m, 65.0 lbf-ft)




IB14J1620035-01

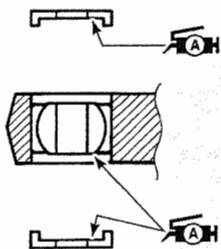
Inspection after installation

Check the steering tension. Refer to "Steering Tension Adjustment" (Page 6B-13).

Steering damper

- Apply grease to the bearing and dust seals.

 Grease 99000-25010 (SUZUKI SUPER GREASE "A" or equivalent)



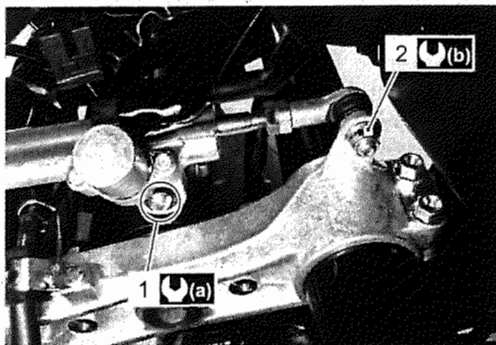
IB23H1620019-02

- Tighten the steering damper bolt (1) and nut (2).

Tightening torque

Steering damper bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

Steering damper nut (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



IB14J1620036-01

Steering / Steering Damper Related Parts Inspection

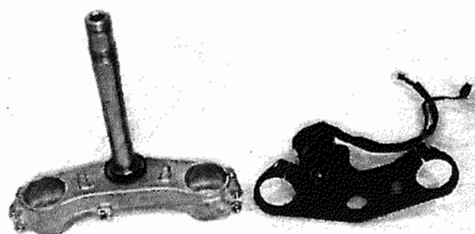
BENB15J26206008

Refer to "Steering / Steering Damper Removal and Installation" (Page 6B-7).

Inspect the removed parts for the following abnormalities:

Steering Stem

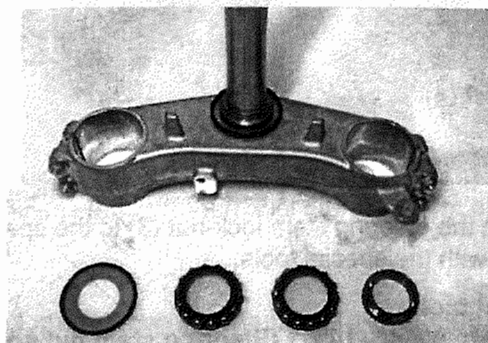
- Distortion of the steering stem



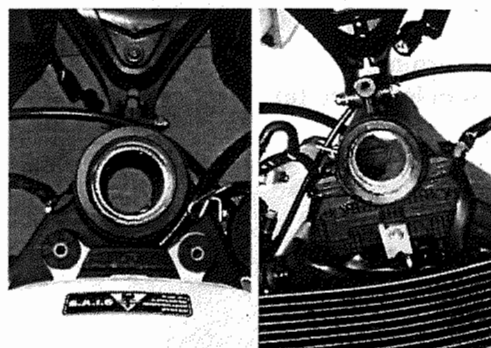
IB14J1620037-01

Bearing

- Bearing wear or damage
- Abnormal bearing noise
- Race wear or damage
- Dust seal wear or damage



IB14J1620038-01



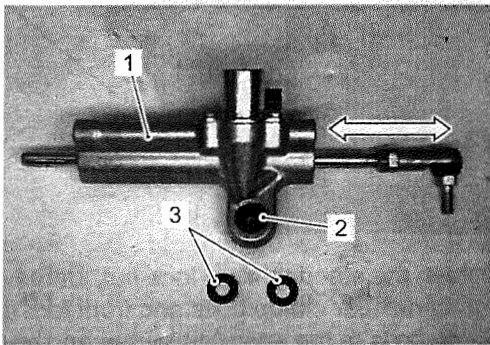
IB14J1620039-01

Steering Damper

NOTE

The steering damper operation can be checked without removing it. Refer to "DTC 'C93' (P1769-H/L): Steering Damper Solenoid Valve Circuit Malfunction" in Section 1A (Page 1A-102).

- Inspect the steering damper body (1), bearing (2) and oil seal (3) for damage and oil leaking.
- Move the steering damper rod by hand to inspect for a smooth movement.
- If any defects are found, replace the steering damper with a new one.



IB14J1620040-01

Steering System Inspection

BENB15J26206009

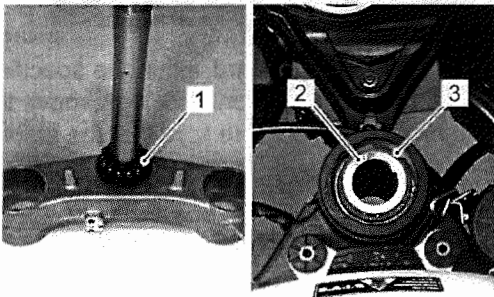
Refer to "Steering System Inspection" in Section 0B (Page 0B-19).

Steering Stem Bearing Removal and Installation

BENB15J26206010

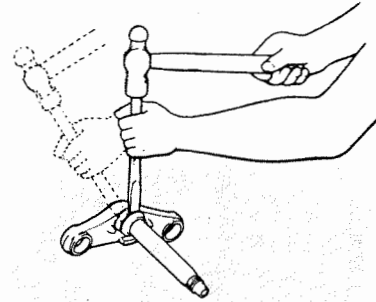
Removal

- 1) Remove the steering stem lower bearing (1), steering stem upper bearing inner race (2) and upper bearing (3). Refer to "Steering / Steering Damper Removal and Installation" (Page 6B-7).



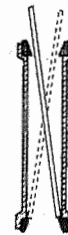
IB14J1620041-01

- 2) Remove the inner race using a chisel.



I649G1620033-02

- 3) Remove the steering stem upper and lower bearing outer races using the steel rod.



I837H1620033-01

Installation

Install the steering stem bearings in the reverse order of removal. Pay attention to the following points:

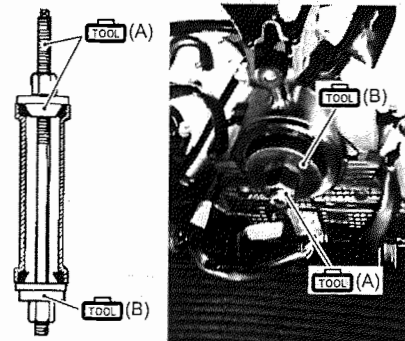
Outer race

- Press in the new upper and lower outer races using the special tools.

Special tool

TOOL (A): 09941-34513 (Bearing installer)

TOOL (B): 09913-70210 (Bearing installing set (10 - 75 Φ))




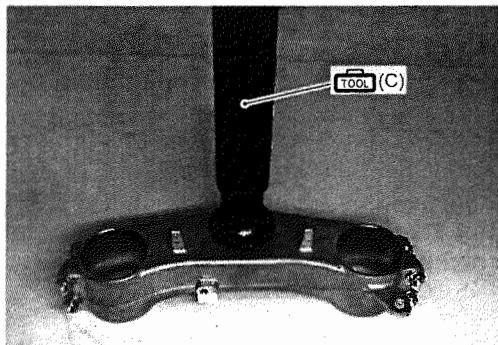
IB14J1620042-01

Inner race

- Press in the new lower bearing inner race using the special tool.

Special tool

 (C): 09925-18011 (Bearing installer)



IB14J1620043-02

- Install the steering. Refer to "Steering / Steering Damper Removal and Installation" (Page 6B-7).

Steering Tension Adjustment

BENB15J26206011


Check the steering movement in the following procedures:

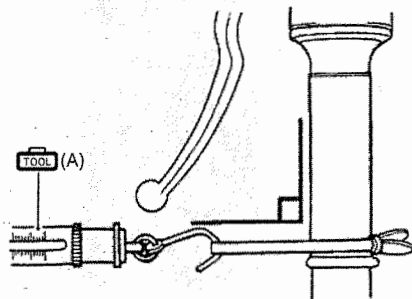
- 1) By supporting the motorcycle with a jack, lift the front wheel unit is off the floor 20 – 30 mm (0.8 – 1.2 in).
- 2) Remove the steering damper. Refer to "Steering Damper Construction" (Page 6B-7).
- 3) Check to make sure that the cables and wire harnesses are properly routed.
- 4) With the front wheel in the straight ahead state, hitch the spring scale (special tool) on one handlebar grip end as shown in the figure and read the graduation when the handlebar starts moving.

Initial force

200 – 500 grams

Special tool

 (A): 09940-92720 (Spring scale)




I649G1620040-02

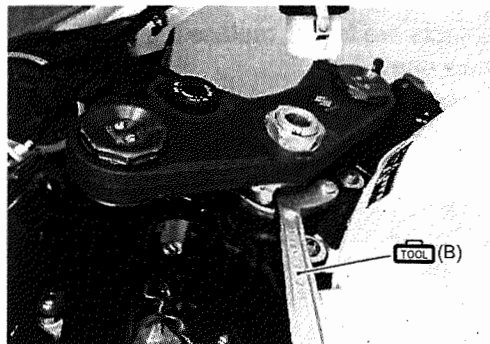
- 5) Do the same on the other grip end.

- 6) If the initial force read on the scale when the handlebar starts turning is either too heavy or too light, adjust it till it satisfies the specification.

- a) First, loosen the front fork upper clamp bolts, handlebar clamp bolts, steering stem head nut and steering stem lock-nut, and then adjust the steering stem nut by loosening or tightening it.

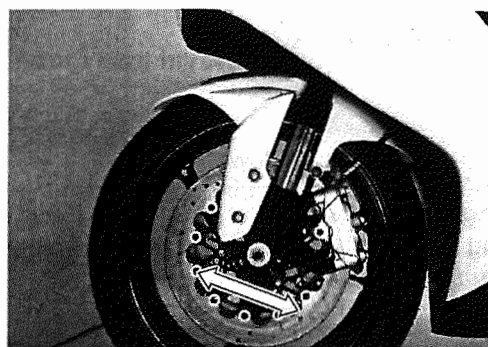
Special tool

 (B): 09910-60611 (Universal clamp wrench)



IB14J1620044-01

- b) Tighten the steering stem lock-nut, stem head nut, handlebar clamp bolts and front fork upper clamp bolts to the specified torque and re-check the initial force with the spring scale according to the previously described procedure. Refer to "Steering / Steering Damper Removal and Installation" (Page 6B-7).



IB14J1620045-01

- c) If the initial force is found within the specified range, then hold the front fork legs, move them back and forth and make sure that the steering is not loose.

Specifications

Tightening Torque Specifications

BENB15J26207001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Clutch lever holder bolt	10	1.0	7.0	☞ (Page 6B-4)
Front fork upper clamp bolt	23	2.3	16.5	☞ (Page 6B-4)
Handlebar clamp bolt	23	2.3	16.5	☞ (Page 6B-4)
Steering stem head nut	90	9.0	65.0	☞ (Page 6B-5) / ☞ (Page 6B-10)
Steering stem nut	45 N·m (4.5 kgf·m, 32.5 lbf·ft) then turn back 1/2 – 1/4			☞ (Page 6B-10)
Steering stem lock-nut	80	8.0	58.0	☞ (Page 6B-10)
Steering damper bolt	23	2.3	16.5	☞ (Page 6B-11)
Steering damper nut	23	2.3	16.5	☞ (Page 6B-11)

NOTE

The tightening torque(s) also specified in:

“Handlebars Components” (Page 6B-1)

“Handlebars Construction” (Page 6B-2)

“Steering Components” (Page 6B-6)

“Steering Damper Construction” (Page 6B-7)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J26208001

Material	SUZUKI recommended product or Specification	Note
Grease	SUZUKI SUPER GREASE "A" or equivalent	P/No.: 99000-25010 ☞ (Page 6B-5) / ☞ (Page 6B-9) / ☞ (Page 6B-11)
Handle grip bond	Handle Grip Bond (commercially available)	☞ (Page 6B-5)

NOTE

Required service material(s) also described in:

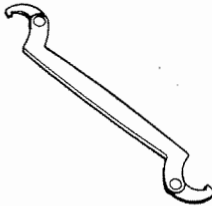
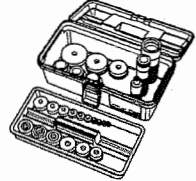

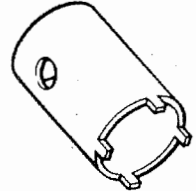
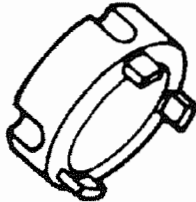

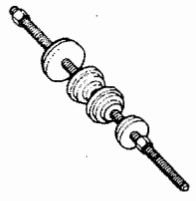
"Handlebars Components" (Page 6B-1)

"Steering Components" (Page 6B-6)

"Steering Damper Construction" (Page 6B-7)

Special Tool

BENB15J26208002

09910-60611 Universal clamp wrench ☞ (Page 6B-13)		09913-70210 Bearing installing set (10 – 75 Φ) ☞ (Page 6B-12)	
09925-18011 Bearing installer ☞ (Page 6B-13)		09940-14911 Steering stem nut socket wrench ☞ (Page 6B-8) / ☞ (Page 6B-9) / ☞ (Page 6B-10)	
09940-14960 Steering stem nut socket wrench ☞ (Page 6B-8) / ☞ (Page 6B-9) / ☞ (Page 6B-10)		09940-92720 Spring scale ☞ (Page 6B-13)	
09941-34513 Bearing installer ☞ (Page 6B-12)			

Section 9

Body and Accessories

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Precautions

Precautions

Precautions for Electrical System

BENB15J29000001

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

BENB15J29003001

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

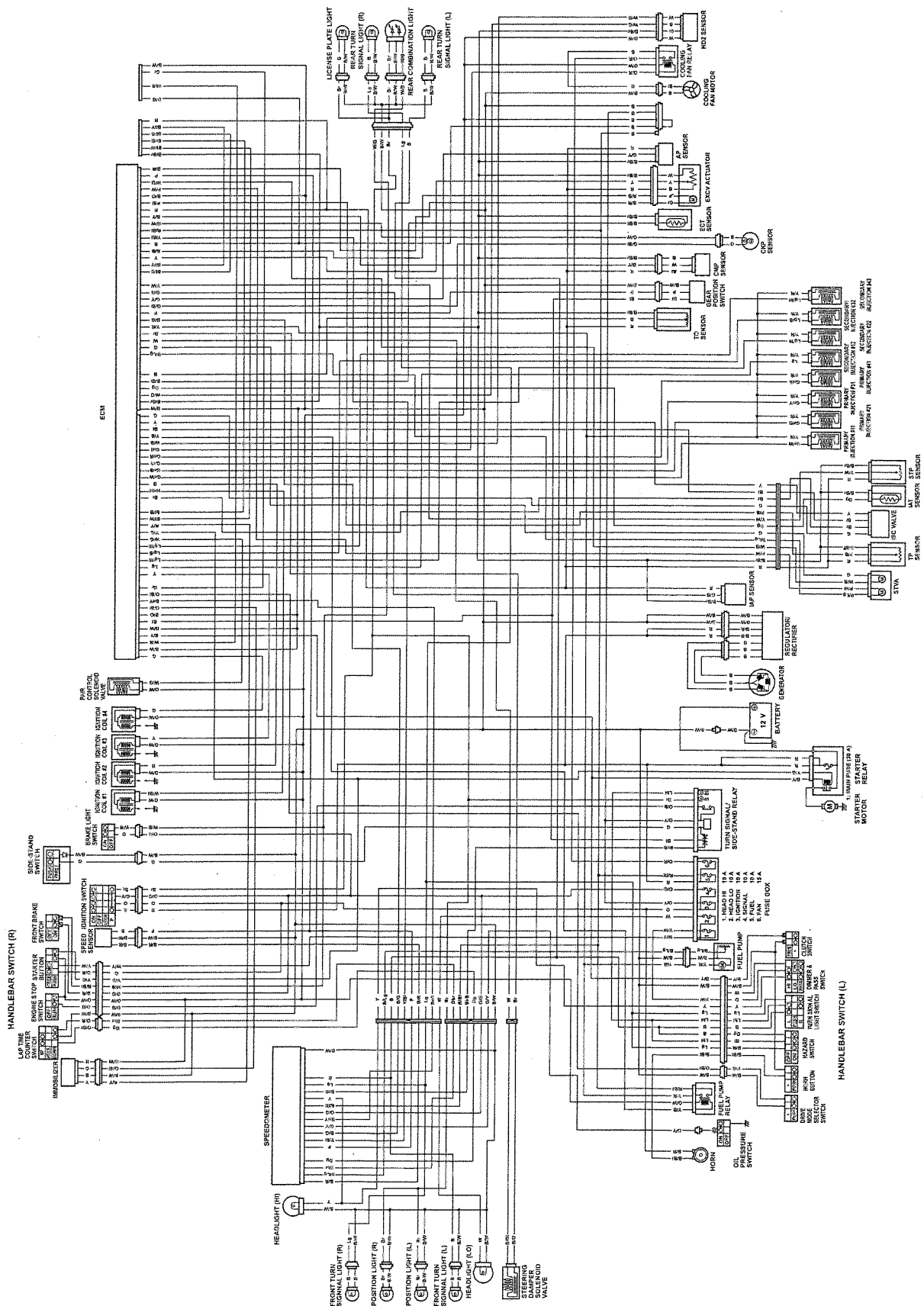
Wiring Systems

Schematic and Routing Diagram

Wiring Diagram

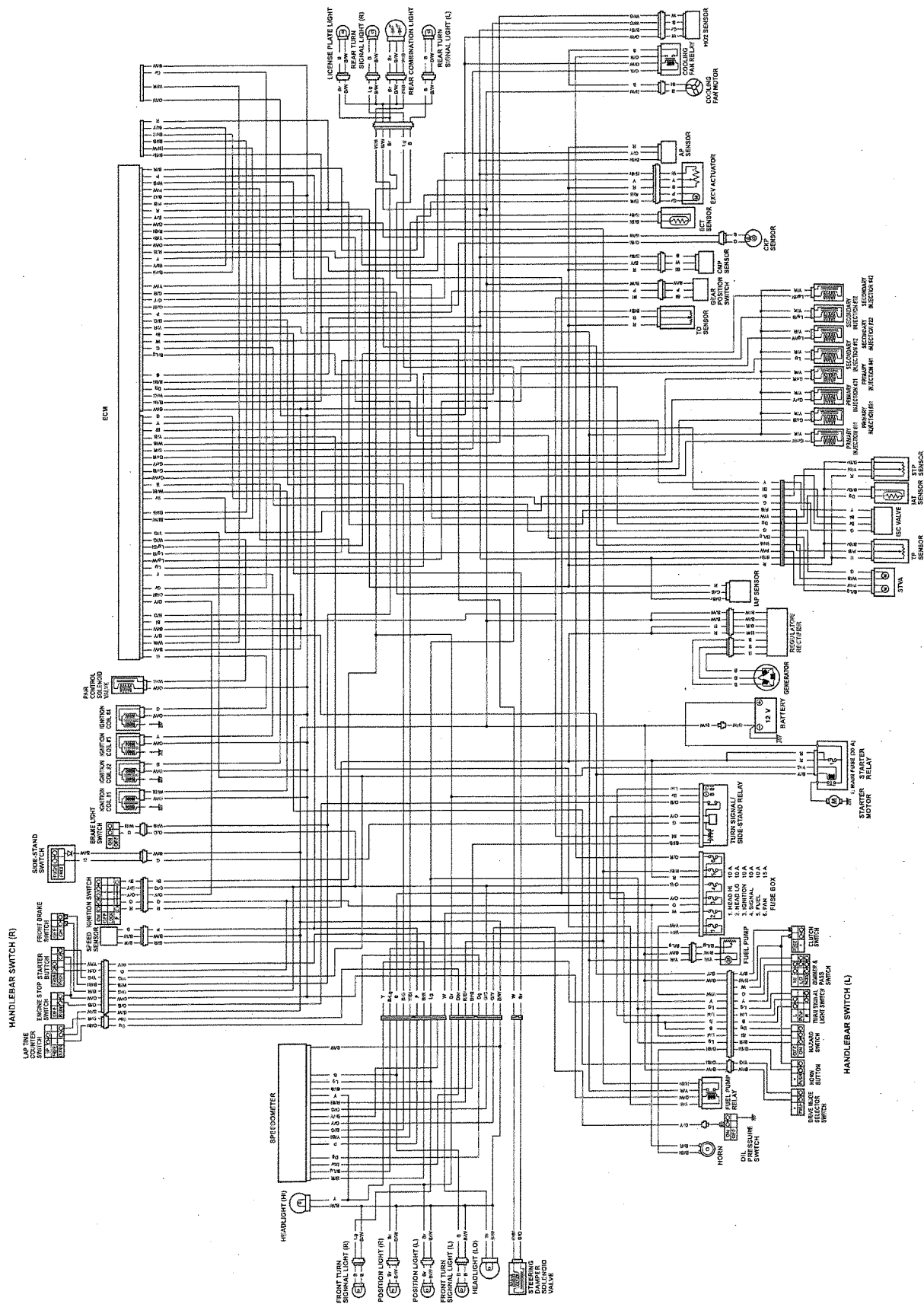
Refer to "Wire Color Symbols" in Section 0A (Page 0A-6).

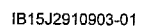
For E-21, 24



9A-3 Wiring Systems:

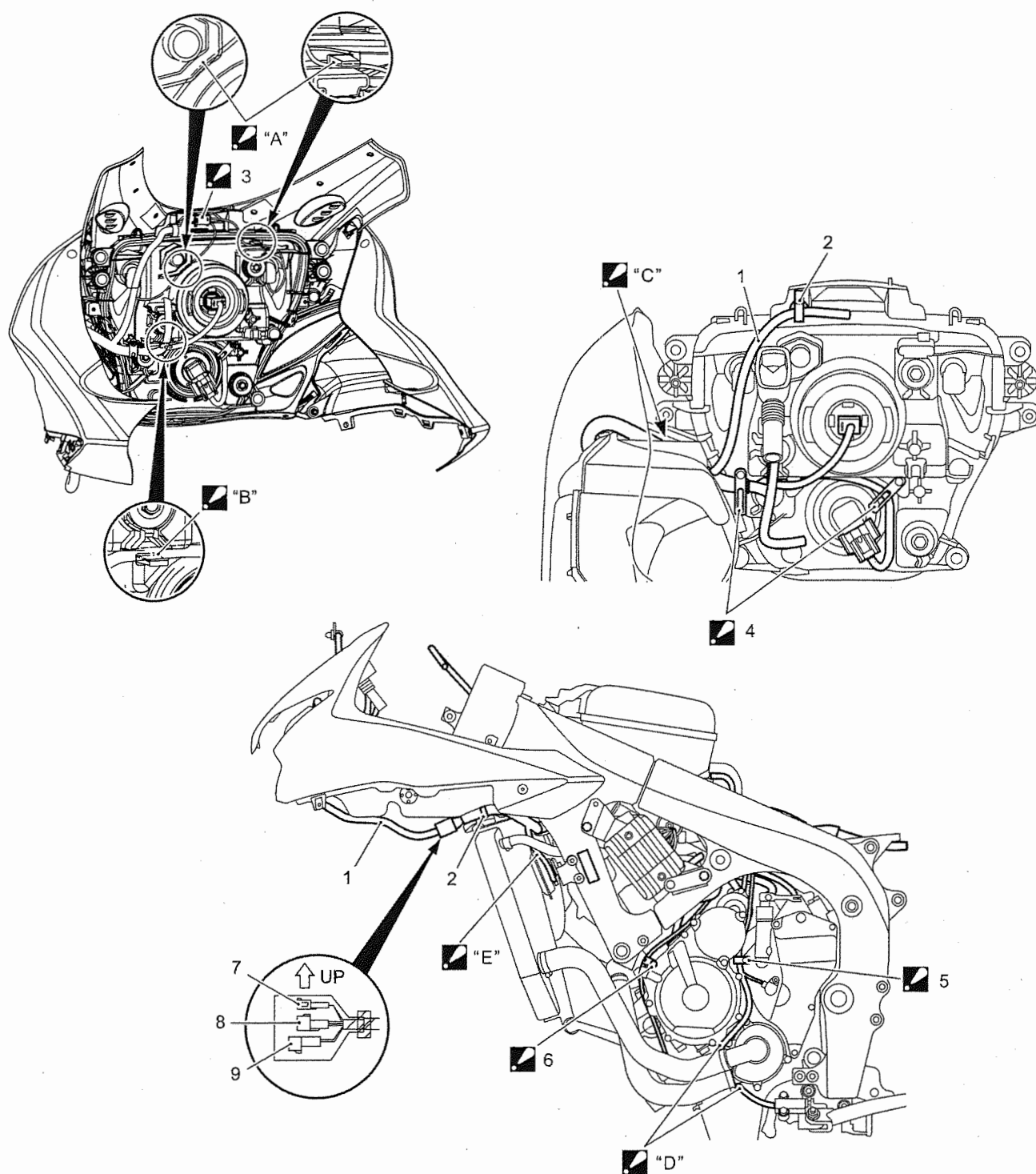
For E-03, 28





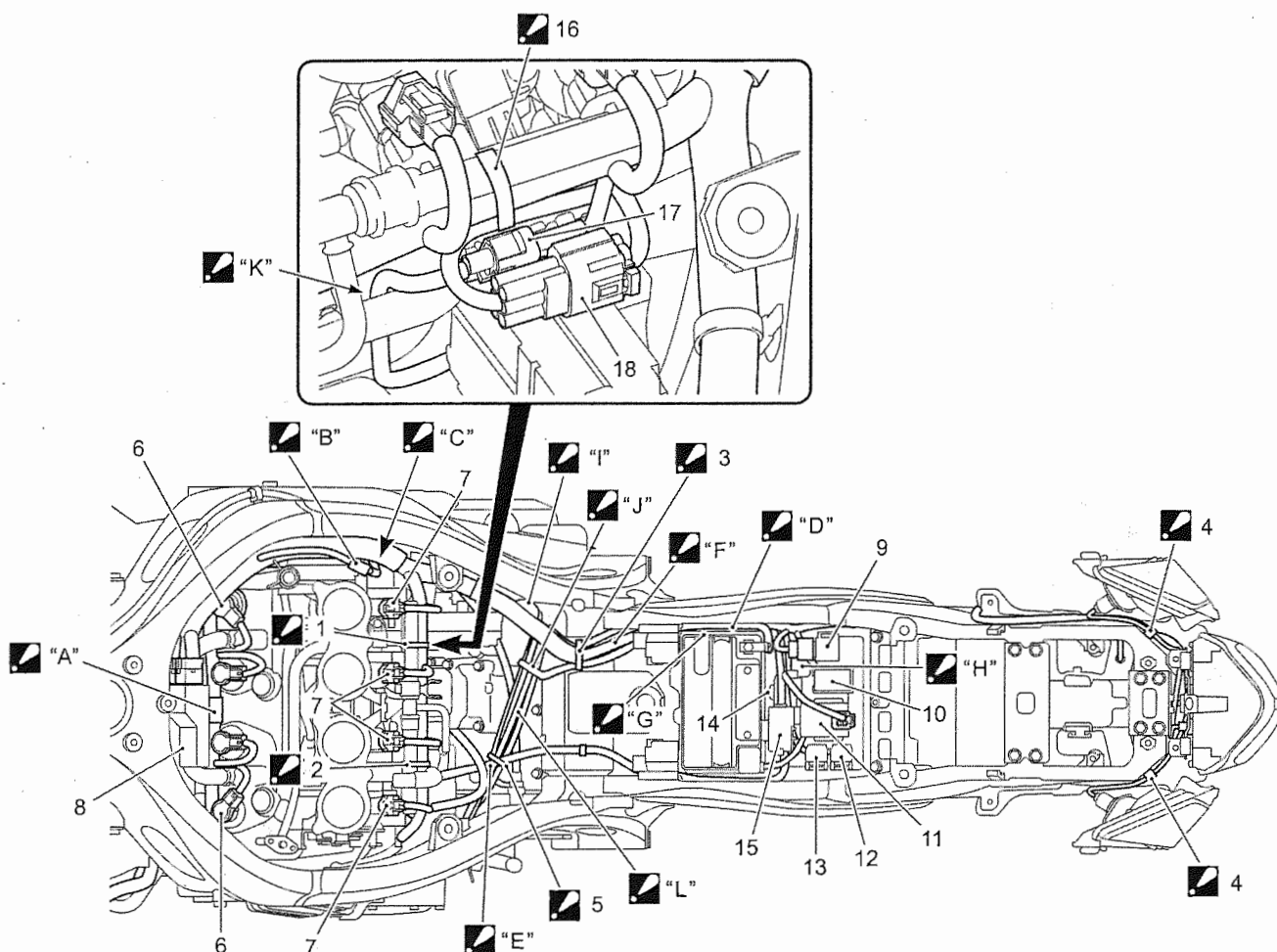
Wiring Harness Routing Diagram

BENB15J29102002



IB14J1910905-04

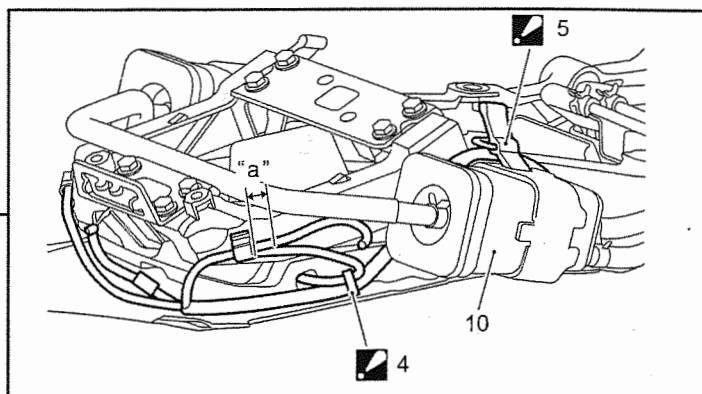
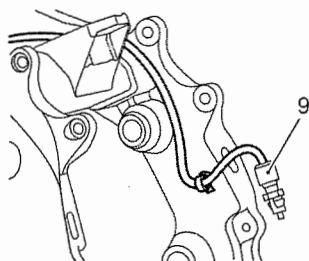
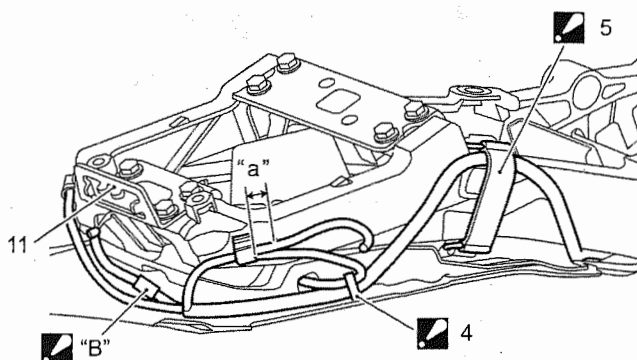
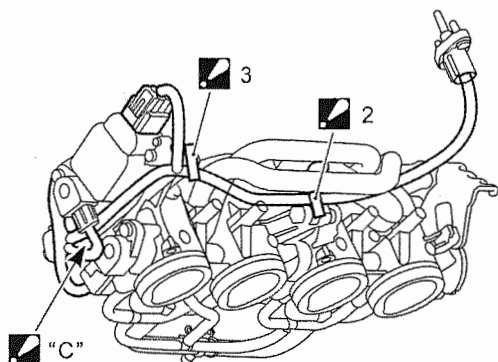
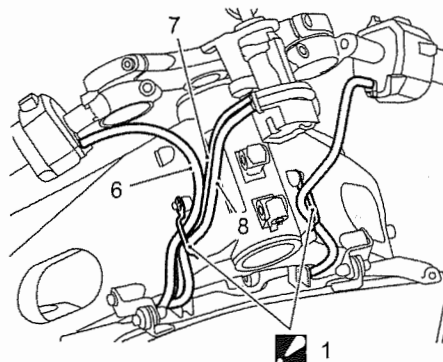
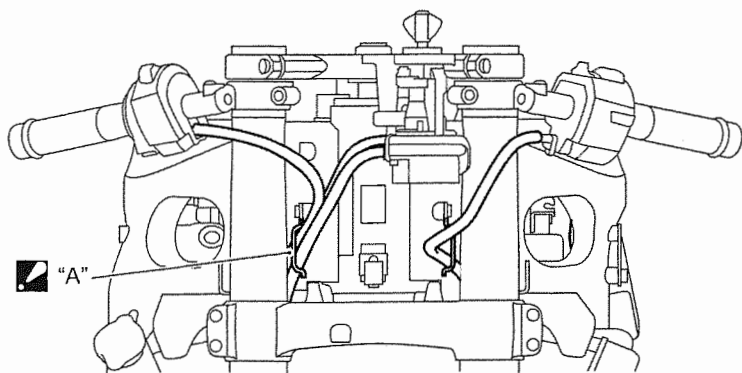
1. Wiring harness No. 2	6. Clamp: Clamp the oil pressure switch lead wire.	"B": Pass the headlamp lead wire above the claws.
2. Tapping clamp	7. Two terminal	"C": Pass the wiring harness No. 2 in front of the air intake pipe mounting fastener.
3. Position light coupler : Put the position light coupler.	8. Eight terminal	"D": Pass the side-stand switch lead wire to inside of the radiator outlet hose and cylinder inlet hoses.
4. Steel clamp : Clamp the wiring harness at the gray tape point. Bend the steel clamps to the front side.	9. Ten terminal	"E": Pass the horn lead wire to inside of the water bypass hose.
5. Clamp: Clamp the speed sensor lead wire and side-stand switch lead wire.	"A": Pass the position light lead wire under the claws.	



IB14J1910906-06

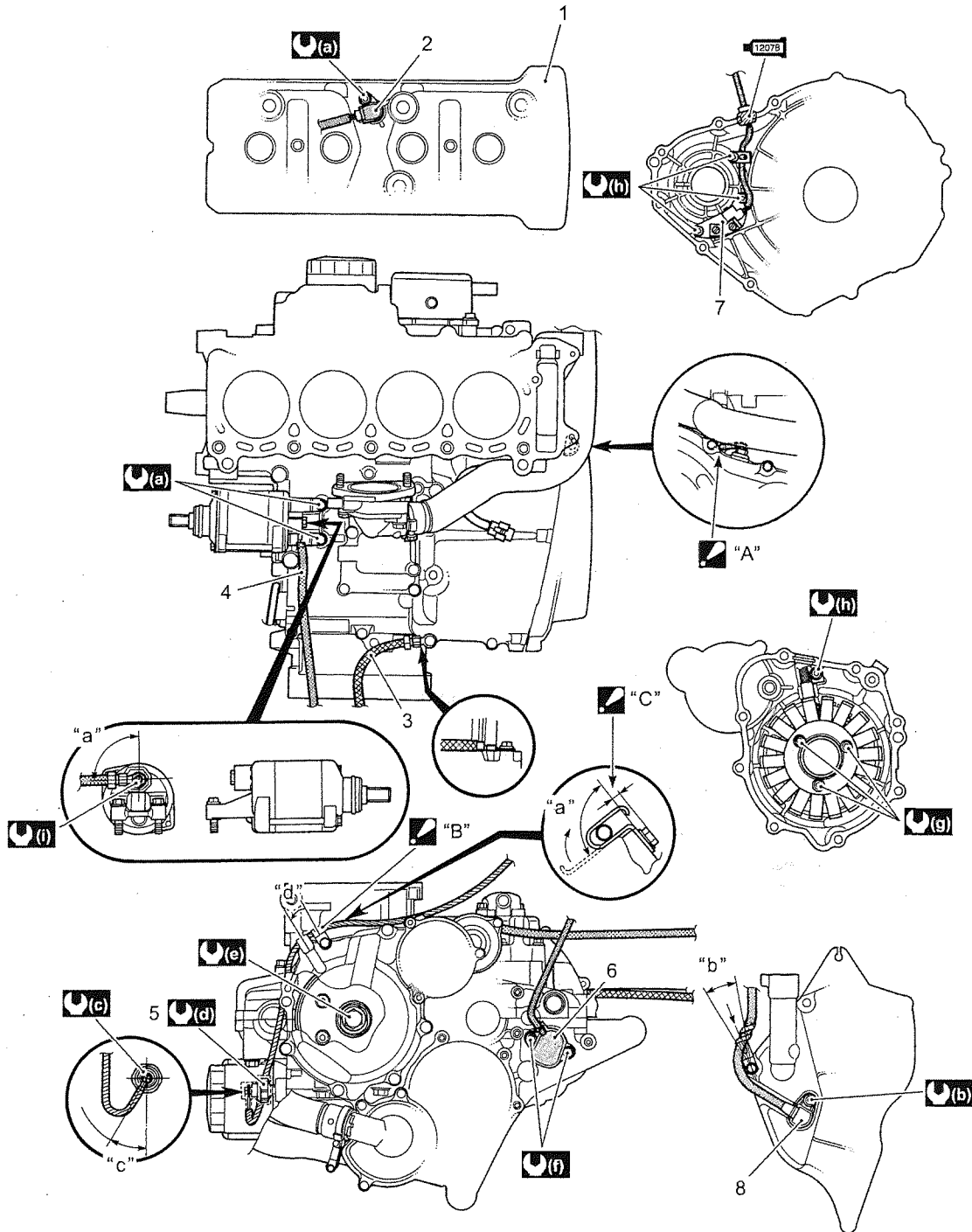
<p>1. Clamp : Clamp the wiring harness, regulator/rectifier lead wire and EXCVA lead wire with the fuel delivery pipe and face the clamp end upward.</p>	<p>16. Clamp : Clamp the EXCVA lead wire at the tube point.</p>
<p>2. Clamp : Clamp the wiring harness, regulator/rectifier lead wire and generator lead wire with the fuel delivery pipe and face the clamp end upward.</p>	<p>17. CKP sensor coupler</p>
<p>3. Clamp : Clamp the wiring harness, battery negative lead wire and rear brake light switch lead wire at the gray tape point and cut off the excess tip of the clamp. Be sure not to slacken the rear brake light switch lead wire.</p>	<p>18. EXCVA coupler</p>
<p>4. Clamp : Clamp the turn signal lead wire at the gray tape point.</p>	<p>"A": Pass the CMP sensor lead wire in front of the wiring harness. Set the CMP sensor lead wire coupler between the ignition coil #2 and #3.</p>
<p>5. Clamp : Clamp the starter motor lead wire, oil pressure switch lead wire, side-stand switch lead wire, speed sensor lead wire and GP switch lead wire at gray tape point. The end of the clamp should face left side.</p>	<p>"B": Set the wiring harness No. 3 between the wiring harness and air cleaner box.</p>
<p>6. White coupler (for ignition coil #1 and #4)</p>	<p>"C": Pass the wiring harness No. 3 behind STVA.</p>
<p>7. Gray coupler (secondary fuel injector)</p>	<p>"D": Pass the battery negative lead wire above the wiring harness.</p>
<p>8. ECM</p>	<p>"E": Pass the lead wires under the starter motor lead wire.</p>
<p>9. AP sensor</p>	<p>"F": Do not twist the wiring harness.</p>
<p>10. Turn signal/Side-stand relay</p>	<p>"G": Put the wiring harness between the seat rail and battery box of the rear front fender.</p>
<p>11. Starter relay/Main fuse</p>	<p>"H": Set the mode selection coupler under the AP sensor.</p>
<p>12. Cooling fan relay</p>	<p>"I": After connecting the rear brake light switch lead wire, set the rear brake light switch lead wire coupler inside the frame. Pass the battery negative lead wire to downward of the wiring harness.</p>
<p>13. Fuel pump relay</p>	<p>"J": Pass the oil pressure switch lead wire, side-stand switch lead wire, speed sensor lead wire and GP switch lead wire between the battery negative lead wire and frame.</p>
<p>14. TO sensor</p>	<p>"K": Pass the CKP sensor lead wire to forward of the PCV hose.</p>
<p>15. Fuse box</p>	<p>"L": Pass the each lead wires above the clutch cable.</p>

9A-7 Wiring Systems:



IB14J1910907-04

<p>1. Guide : Clamp the lead wire at the center part of the gray tape.</p>	9. Rear brake light switch
<p>2. Clamp : Clamp the wiring harness No. 3 and throttle body at blue tape point and face the clamp end forward. Cut off the excess tip of the clamp.</p>	10. EVAP canister
<p>3. Clamp : Clamp the wiring harness No. 3 and throttle body at blue tape point. Cut off the excess tip of the clamp.</p>	11. Seat rail bridge
<p>4. Clamp : Clamp the license lamp lead wire tube point and rear combination light lead wire gray tape point and face the clamp end upward. Cut off the excess tip off the clamp.</p>	<p>"A": Pass the right handlebar switch lead wire above the ignition switch lead wire.</p>
<p>5. Band : Clamp the rear combination light lead wire at the gray tape point.</p>	<p>"B": Set the rear combination light lead wire coupler under the rear combination bracket. (Be sure not to pinch the rear combination light lead wire coupler between rear combination light and seat rail bridge.)</p>
6. Right handlebar switch lead wire	"C": Pass the wiring harness No. 3 between the STP sensor lead wire and throttle body.
7. Immobilizer lead wire (For E-21, 24)	"a": 10 – 14 mm
8. Ignition switch lead wire	[A]: For E-33 only



IB14J1910908-04

1. Cylinder head cover	"B": Clamp the oil pressure switch lead wire at the gray tape point.	(d) : 14 N·m (1.4 kgf-m, 10.0 lbf-ft)
2. CMP sensor	"C": Bend it so that the end of the clamp may enter the area.	(e) : 120 N·m (12.0 kgf-m, 87.0 lbf-ft)
3. Battery negative lead wire	"a": 90°	(f) : 6.5 N·m (0.65 kgf-m, 4.5 lbf-ft)
4. Starter motor lead wire	"b": 20°	(g) : 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
5. Oil pressure switch	"c": 30°	(h) : 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)
6. GP switch	"d": ±5°	(i) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
7. CKP sensor	(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	1207B : Apply bond.
8. Speed sensor	(b) : 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)	
"A": Pass the generator lead wire under the water hose.	(c) : 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)	

Specifications

Service Data

BENB15J2910S001

Electrical

Item			Specification	Note
Fuse size	Headlight	HI	10 A	
		LO	10 A	
	Ignition		10 A	
	Signal		10 A	
	Fuel		10 A	
	Fan		15 A	
	Main		30 A	

Tightening Torque Specifications

BENB15J2910S002

NOTE

The tightening torque(s) also specified in:
 "Wiring Harness Routing Diagram" (Page 9A-5)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J2910T001

NOTE

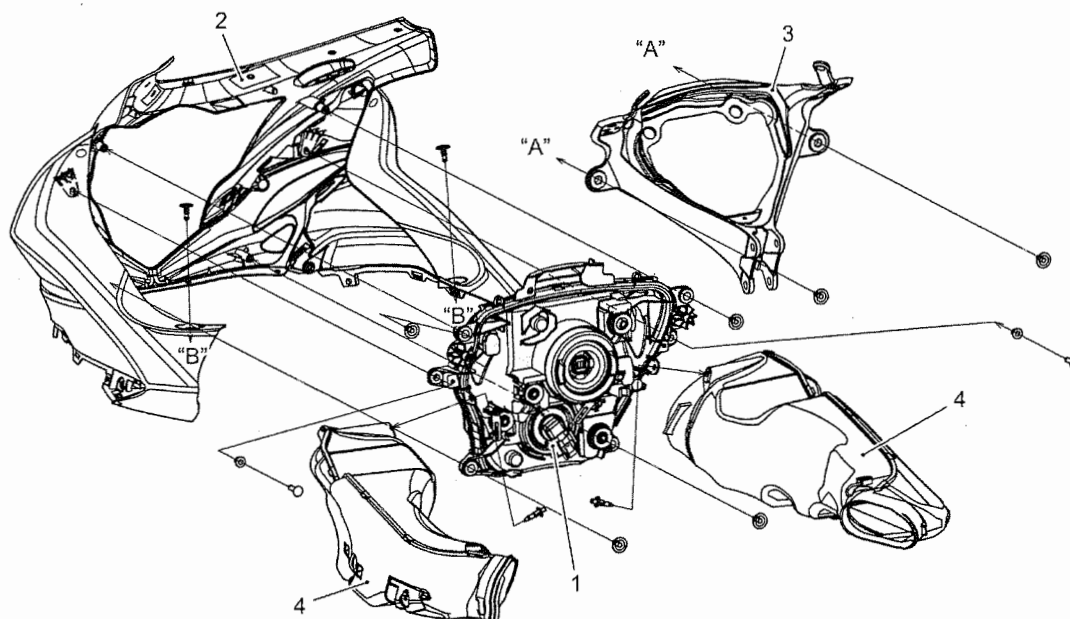
Required service material(s) also described in:
 "Wiring Harness Routing Diagram" (Page 9A-5)

Lighting Systems

Repair Instructions

Headlight Construction

BENB15J29206001

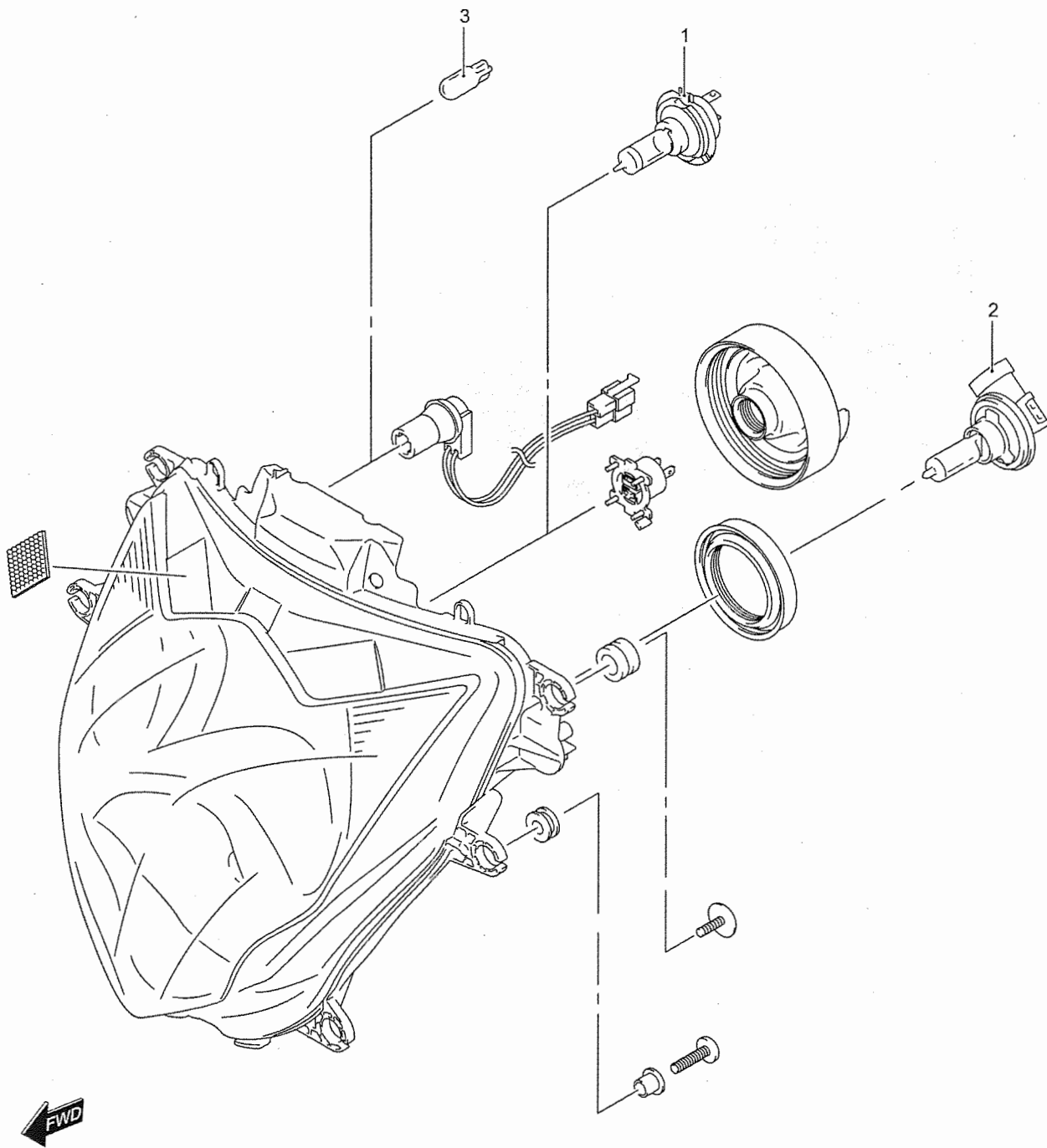


IB14J1920001-02

1. Headlight	2. Body cowling	3. Cowling brace	4. Intake pipe	"A": To headlight	"B": To intake pipe
--------------	-----------------	------------------	----------------	-------------------	---------------------

Headlight Components

BENB15J29206002



IB14J1920039-01

1. Headlight low beam bulb (12 V 55 W, H7)

2. Headlight high beam bulb (12 V 65 W, H9)

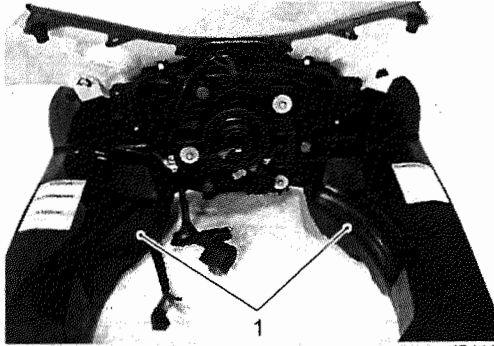
3. Position light bulb (12 V 5 W) x 2

Headlight Removal and Installation

BENB15J29206003

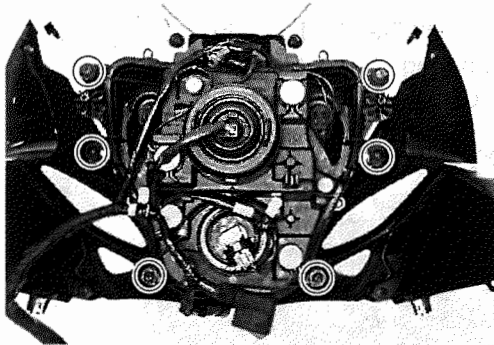
Removal

- 1) Remove the body cowl assembly and intake pipes (1). Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

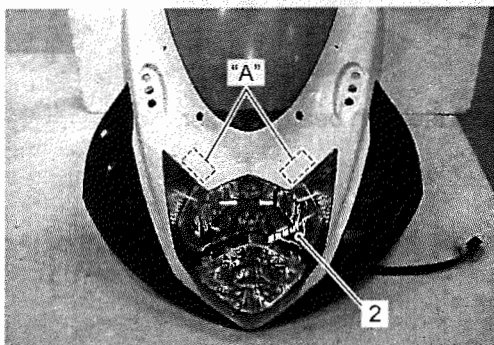


IB14J1920002-01

- 2) Remove the headlight (2).



IB14J1920003-01



IB14J1920004-01

"A": Velcro fastening

Installation

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

- Route the wiring harness properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).
- After installing, be sure to inspect the headlight beam. Refer to "Headlight Beam Adjustment" (Page 9B-5).

Position Light Removal and Installation

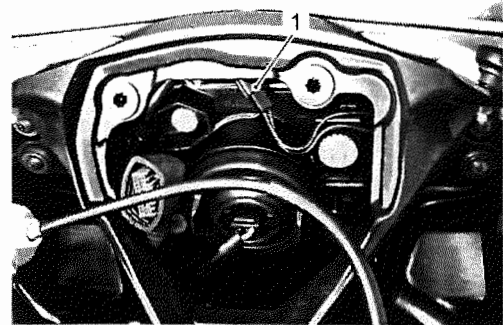
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NOTE

The right and left position lights are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

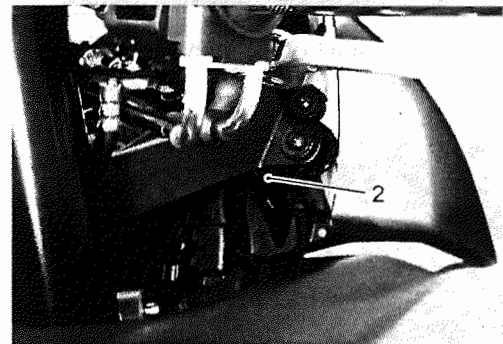
Removal

- 1) Remove the combination meter. Refer to "Combination Meter Removal and Installation" in Section 9C (Page 9C-2).
- 2) Disconnect the position light coupler (1). (RH: Black LH: Gray)



IB14J1920005-01

- 3) Remove the position light socket (2).



IB14J1920006-01

Installation

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

- Route the wiring harness properly. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

Headlight Bulb and Position Light Bulb Replacement

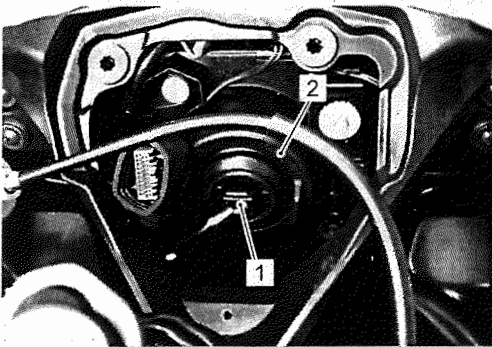
BENB15J29206005

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.

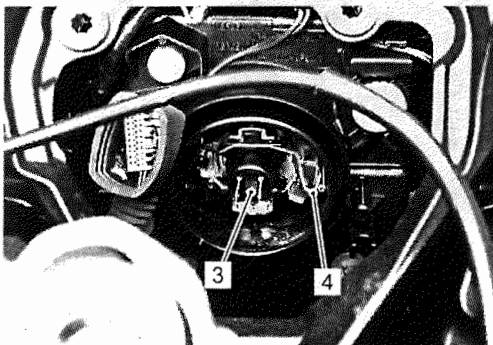
Low Beam Bulb

- 1) Remove the combination meter. Refer to "Combination Meter Removal and Installation" in Section 9C (Page 9C-2).
- 2) Push the lock on the low beam coupler (1) and pull off the low beam coupler (1).
- 3) Remove the bulb socket rubber cap (2).



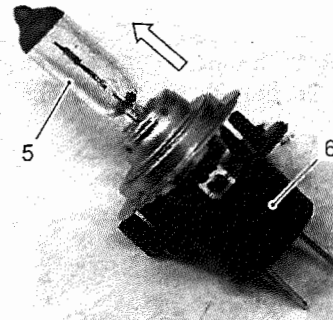
IB14J1920007-01

- 4) Remove the low beam bulb socket (3) by unhooking the bulb holder spring (4).



IB14J1920008-01

- 5) Pull off the low beam bulb (5) from the socket (6) and replace the low beam bulb (5).



IB14J1920035-02

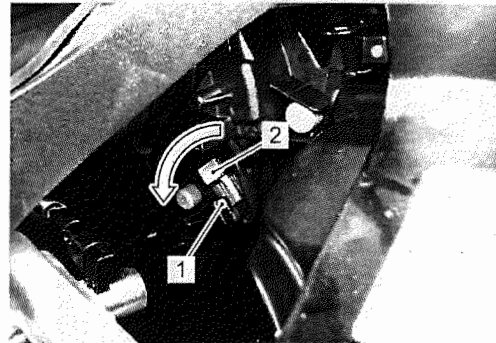
- 6) Reinstall the removed parts.

NOTE

Properly fit the bulb socket rubber cap (2).

High Beam Bulb

- 1) Disconnect the high beam coupler (1).
- 2) Replace the high beam bulb (2) by turning it counterclockwise.



IB14J1920009-01

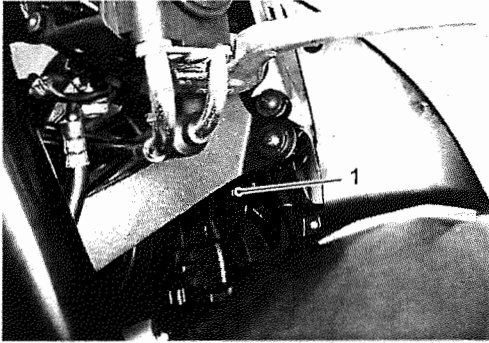
- 3) Connect the high beam coupler.

Position Light Bulb

NOTE

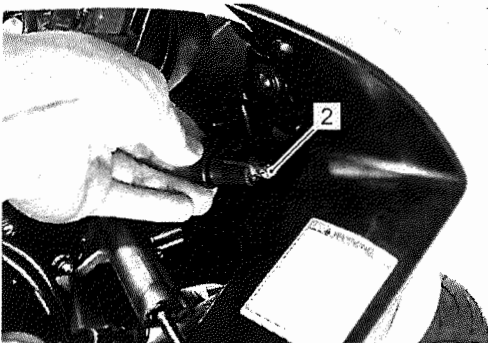
The right and left position light bulbs are installed symmetrically and therefore the replacement procedure for one side is the same as that for the other side.

- 1) Remove the position light socket (1).



IB14J1920010-01

- 2) Replace the position light bulb (2) with a new one.



IB14J1920011-01

- 3) Reinstall the position light socket (1).

NOTE

Properly fit the position light socket (1).

Headlight Beam Adjustment

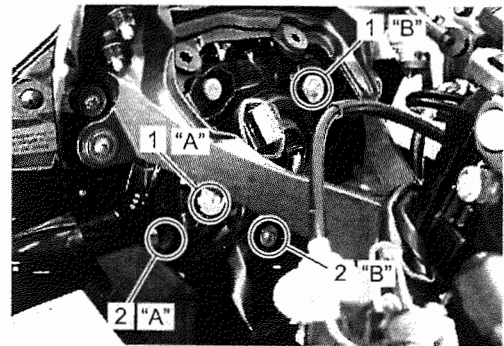
BENB15J29206006

Adjust the headlight beam in the following procedures:

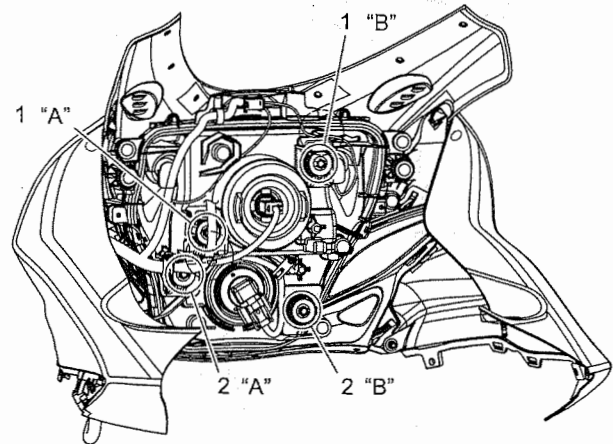
- 1) Remove the combination meter. Refer to "Combination Meter Removal and Installation" in Section 9C (Page 9C-2).

NOTE

To adjust the headlight beam, adjust the beam horizontally first, then vertically.



IB14J1920012-02



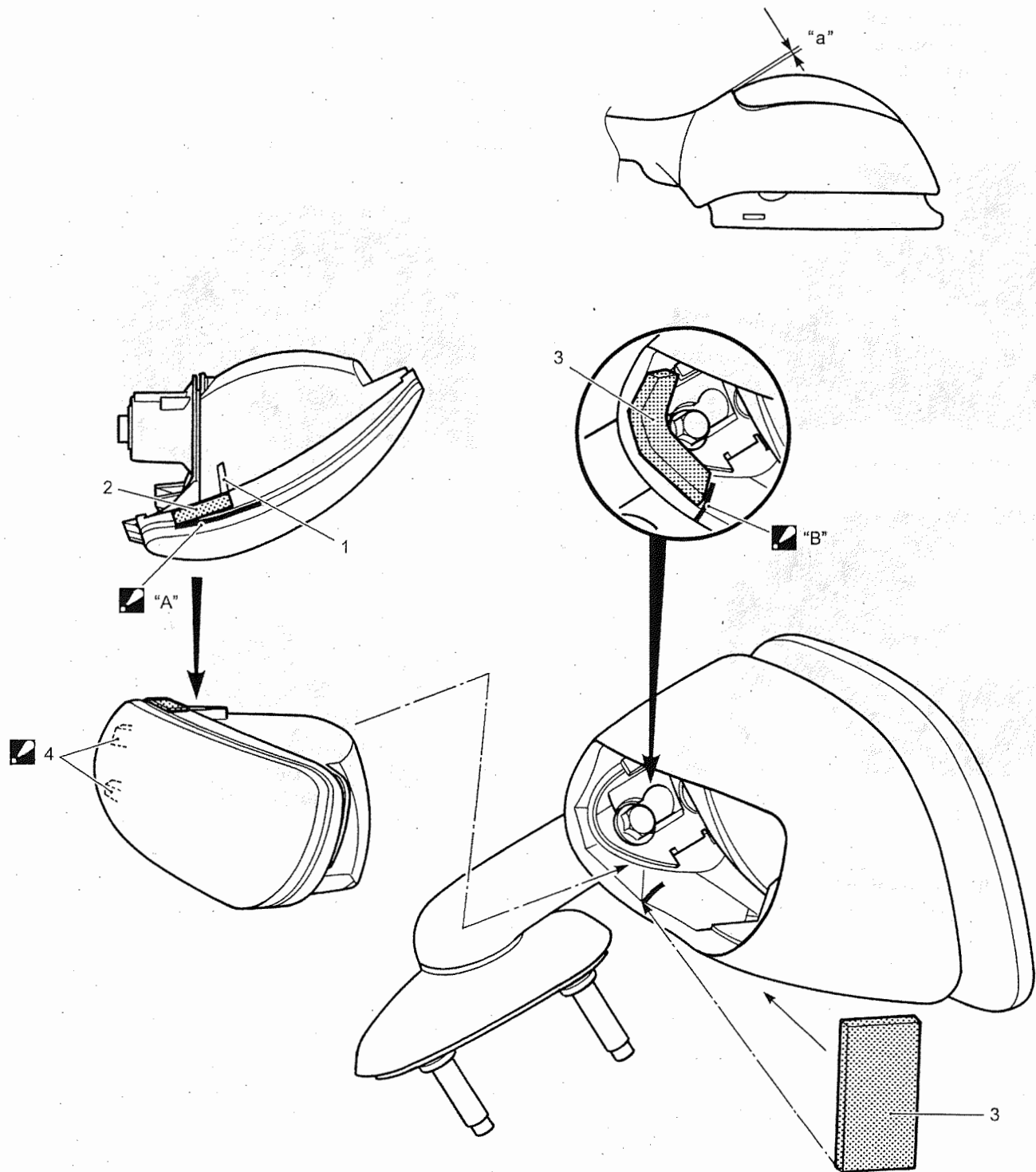
IB14J1920037-02

1. Low beam	"A": Horizontal adjuster
2. High beam	"B": Vertical adjuster

- 2) Reinstall the removed parts.

Front Turn Signal Cushion Attachment

BENB15J29206007

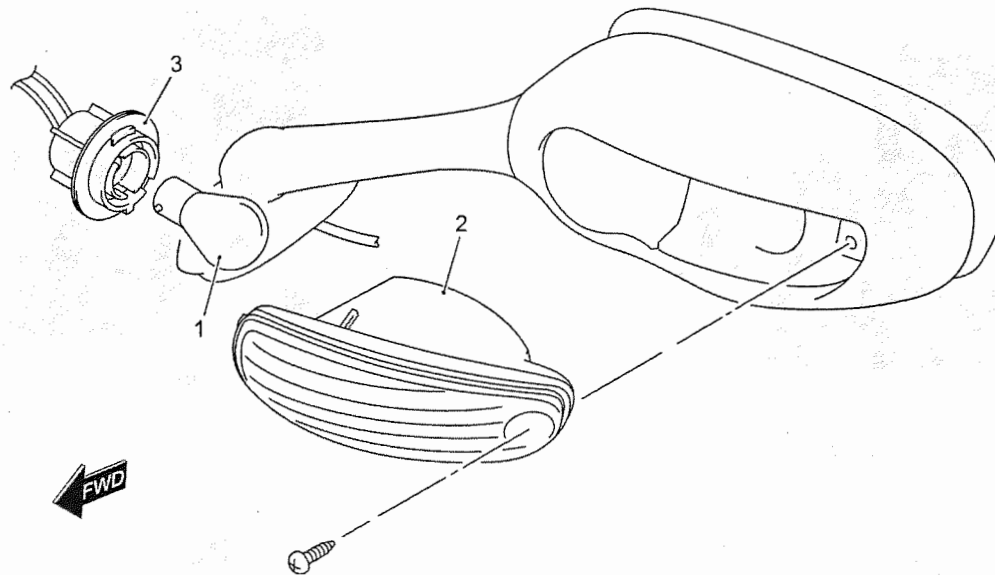


IB14J1920038-02

1. Tape affix mark rib	☑ "A": Tape should not run over the indicated line.
2. Tape	☑ "B": Align the cushion corner to the indicated point.
3. Cushion	"a": Max. 1.5 mm (0.06 in)
☑ 4. Protrusion : Protrusion should contact to the cushion when assembled.	

Front Turn Signal Light Components

BENB15J29206008



I947H1920012-01

1. Turn signal light bulb (12 V 21 W)

2. Front turn signal light

3. Socket

Front Turn Signal Light Removal and Installation

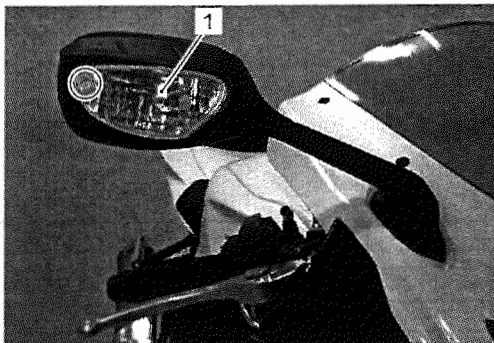
BENB15J29206009

NOTE

The right and left front turn signal lights are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

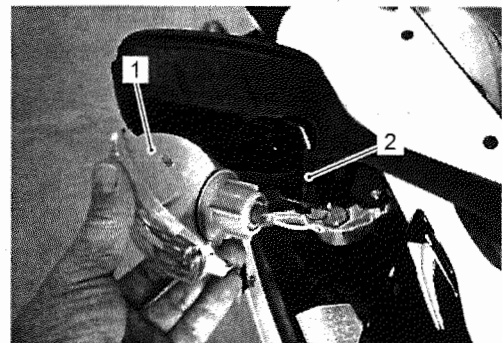
- 1) Remove the screw and pull the front turn signal light (1).



IB14J1920013-03

- 2) Disconnect the front turn signal coupler (2).

- 3) Remove the turn signal light (1).



IB14J1920014-01

Installation

Install the front turn signal light in the reverse order of removal.

Front Turn Signal Light Bulb Replacement

BENB15J29206010

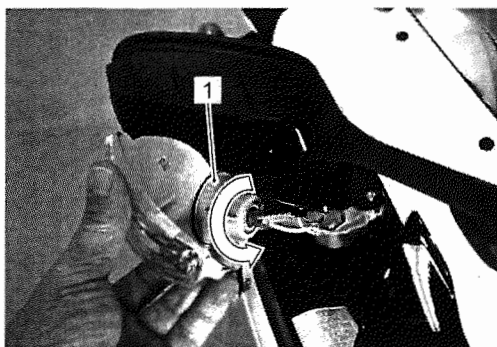
NOTICE

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.

- 1) Pull the turn signal light. Refer to "Front Turn Signal Light Removal and Installation" (Page 9B-7).

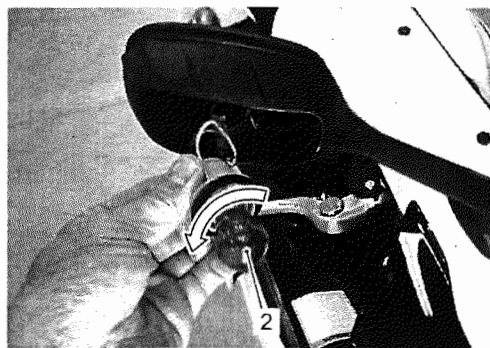
9B-8 Lighting Systems:

- 2) Remove the socket (1) by turning it counterclockwise.



IB14J1920015-01

- 3) Replace the front turn signal light bulb (2).

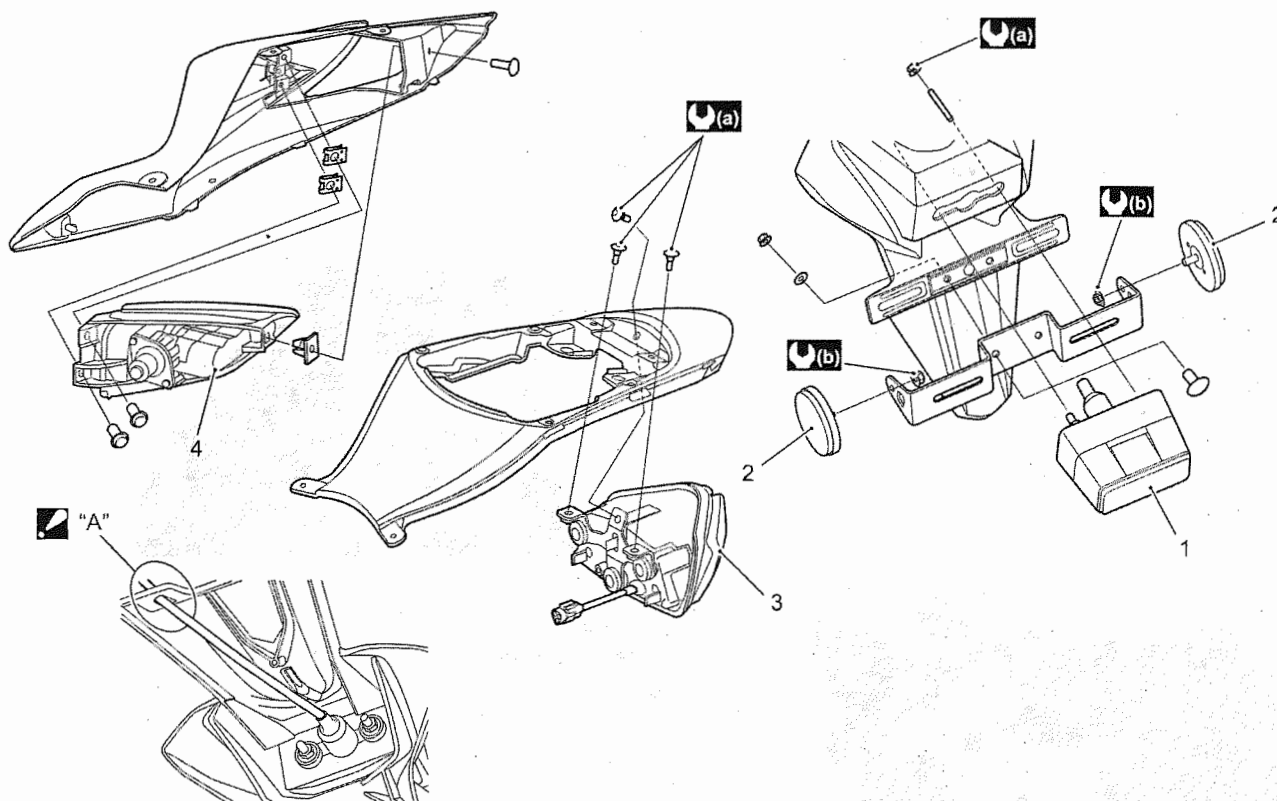


IB14J1920016-01

- 4) Reinstall the removed parts.

Rear Lighting System Construction

BENB15J29206011



IB14J1920036-05

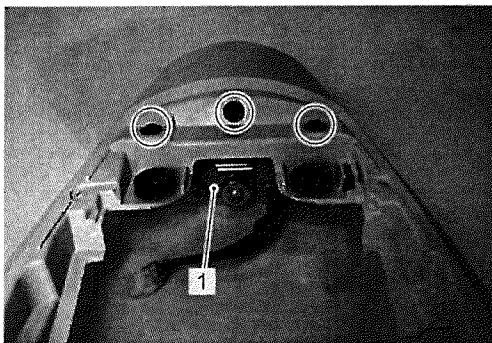
1. License plate light	4. Rear turn signal light	(b) : 1.8 N·m (0.18 kgf-m, 1.3 lbf-ft)
2. Reflex reflector (E-03, 28, 33 only)	A : Pass the wiring harness into the hole provided of the rear fender.	
3. Rear combination light	(a) : 5 N·m (0.5 kgf-m, 3.5 lbf-ft)	

Rear Combination Light Removal and Installation

BENB15J29206012

Removal

- 1) Remove the center frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the rear combination light (1).



IB14J1920017-01

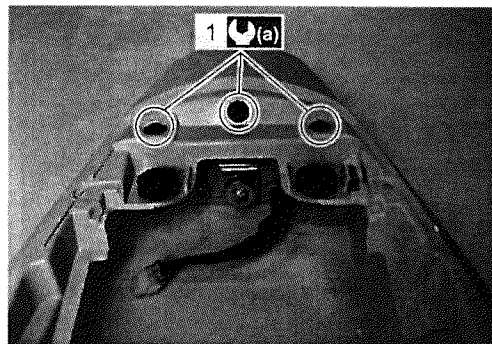
Installation

Install the rear combination light in the reverse order of removal. Pay attention to the following point:

- Tighten the rear combination light mounting bolts (1) to the specified torque.

Tightening torque

Rear combination light mounting bolt (a): 5 N·m (0.5 kgf-m, 3.5 lbf-ft)



IB14J1920041-01

Rear Combination Light Replacement

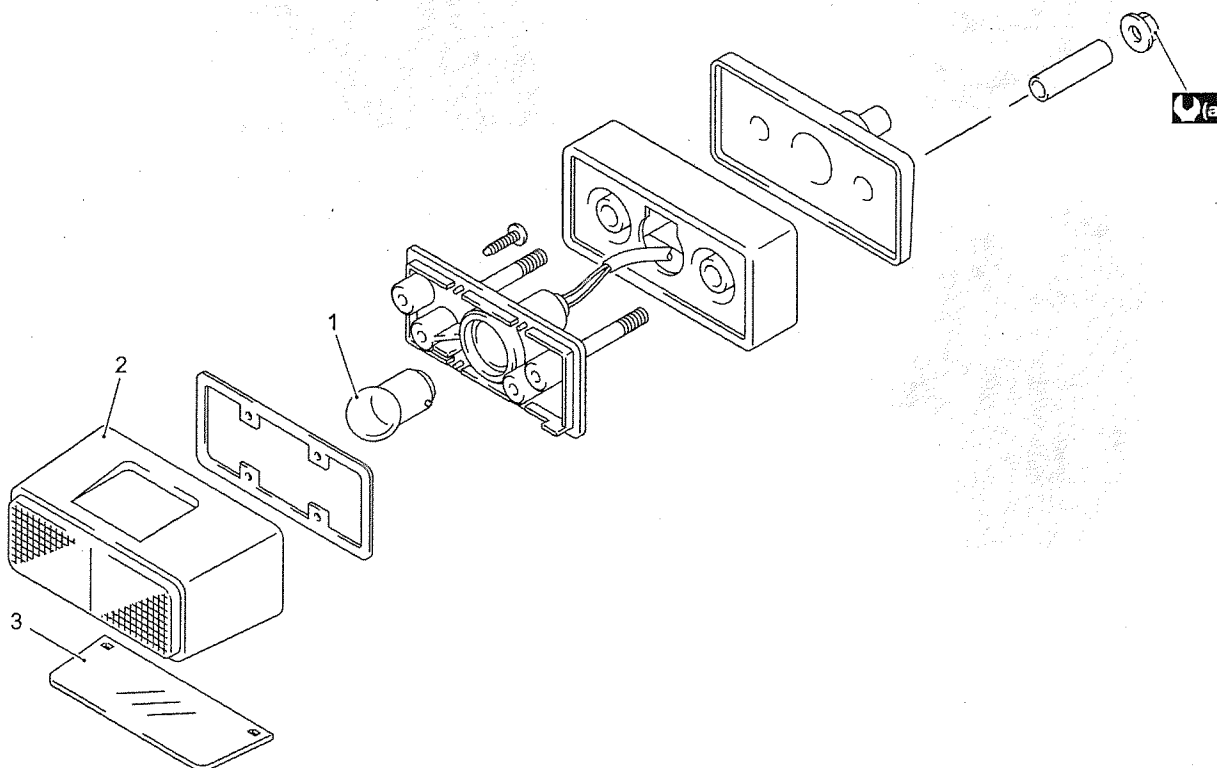
BENB15J29206013

NOTE

If LED operation is abnormal, replace the rear combination light with a new one.

License Plate Light Components

BENB15J29206014



1. License plate light bulb (12 V 5 W)	3. Lens
2. Lens cover	(a) : 5 N·m (0.5 kgf-m, 3.5 lbf-ft)

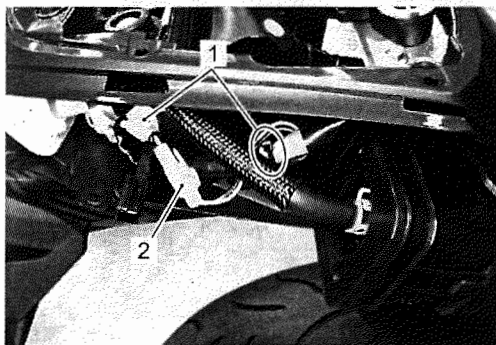
I947H1920021-01

License Plate Light Removal and Installation

BENB15J29206015

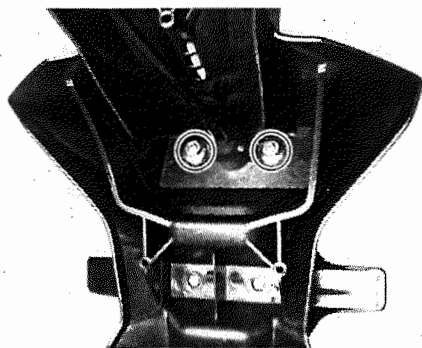
Removal

- 1) Remove the right frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Disconnect the clamps (1) license plate light coupler (2).



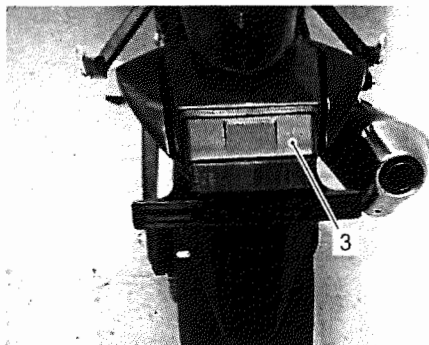
IB14J1920018-02

- 3) Remove the license plate light mounting nuts.



IB14J1920019-01

- 4) Remove the license plate light assembly (3).



IB14J1920020-02

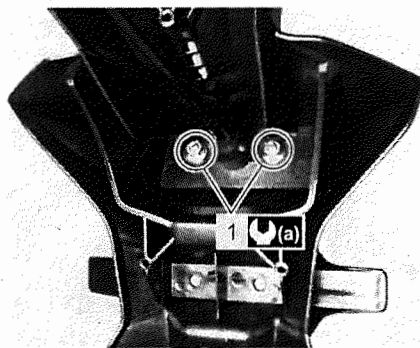
Installation

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, 3.5 lbf-ft)



IB14J1920021-03

- Pass the license plate light lead wire into the rear front fender.



IB14J1920022-02

- Clamp the license plate light lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

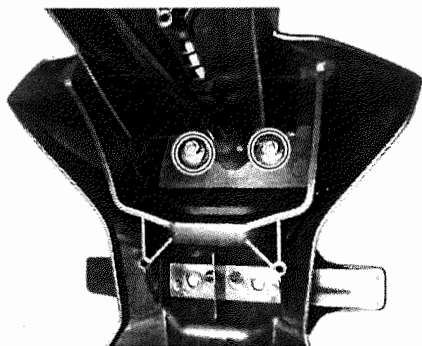
License Plate Light Bulb Replacement

BENB15J29206016

NOTICE

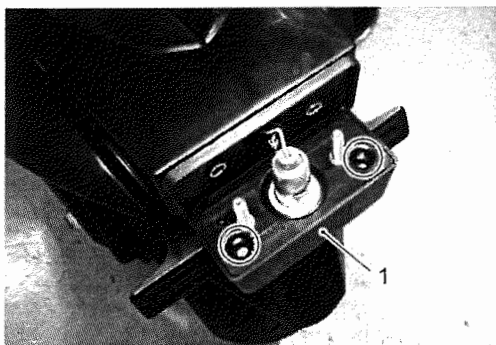
When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soap water to prevent premature bulb failure.

- 1) Remove the license plate light mounting nuts.



IB14J1920023-01

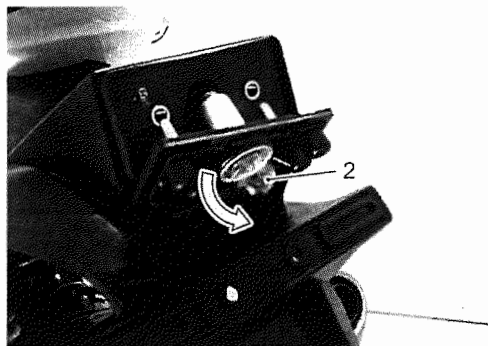
- 2) Remove the lens cover (1) by removing the screws.



IB14J1920024-01

- 3) Push in on the license plate light bulb (2), turn it counter clockwise, and pull in out.

- 4) Replace the license plate light bulb (2).



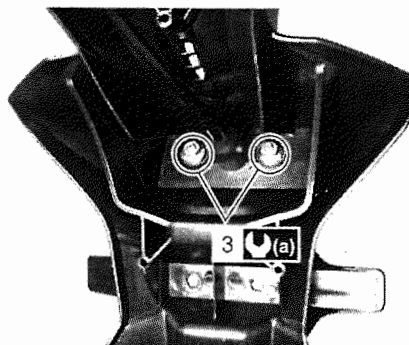
IB14J1920025-01

- 5) Reinstall the removed parts.

- 6) Tighten the license plate light mounting nuts (3) to the specified torque.

Tightening torque

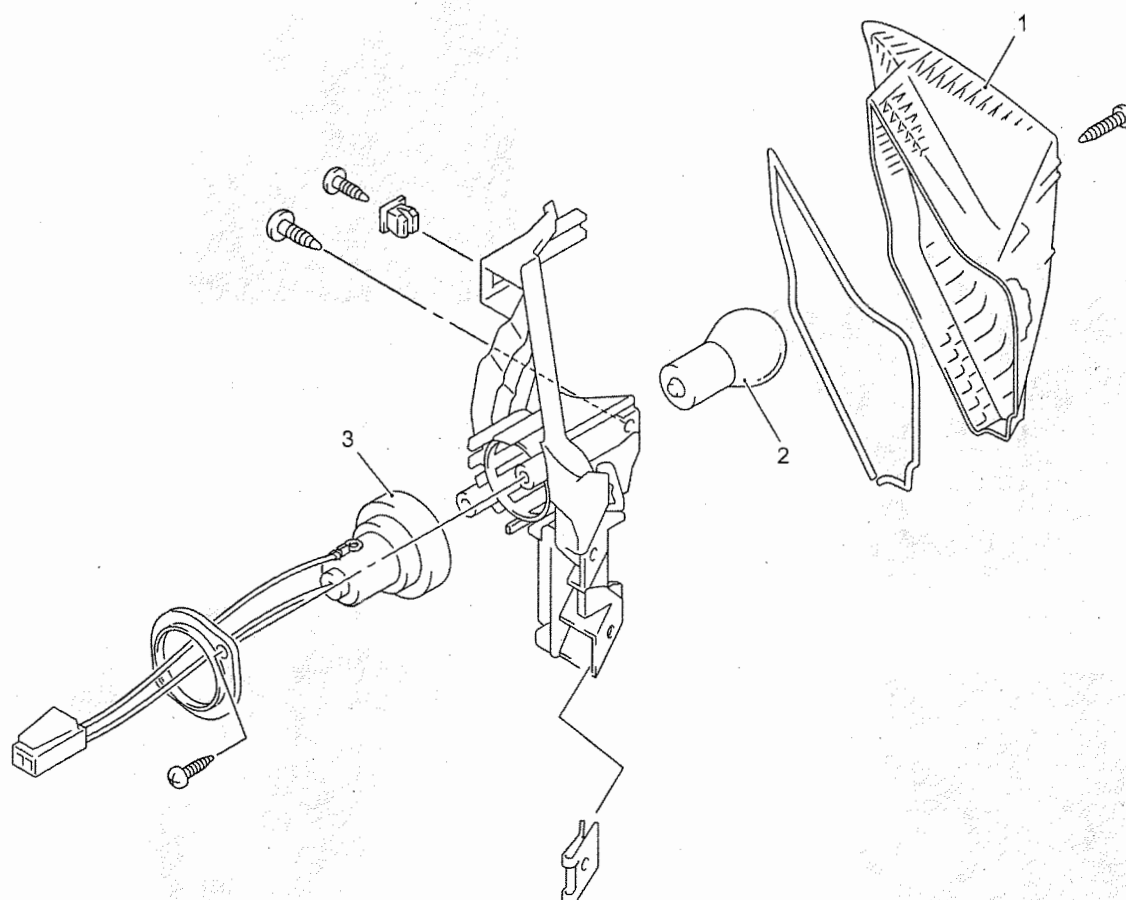
License plate light mounting nut (a): 5 N·m (0.5 kgf-m, 3.5 lbf-ft)



IB14J1920026-03

Rear Turn Signal Light Components

BENB15J29206017



IB14J1920040-01

1. Rear turn signal light lens

2. Rear turn signal light bulb (12 V 21 W)

3. Socket

Rear Turn Signal Light Removal and Installation

BENB15J29206018

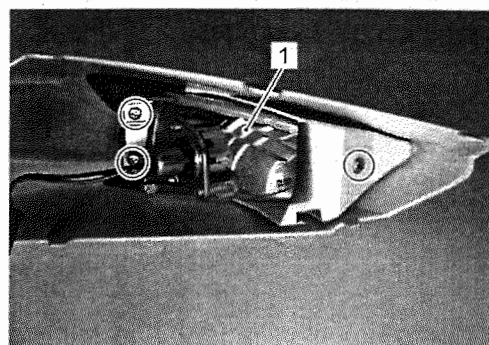
NOTE

The right and left rear turn signal lights are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

- 1) Remove the frame cover. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).

- 2) Remove the rear turn signal light (1).



IB14J1920027-01

Installation

Install the rear turn signal light in the reverse order of removal.

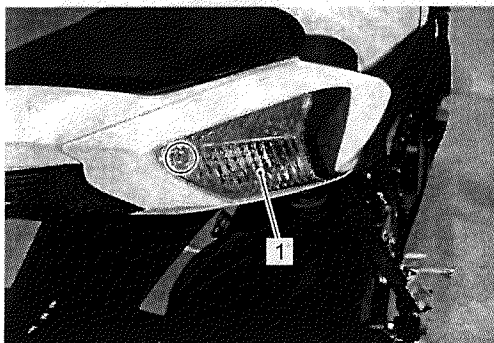
Rear Turn Signal Light Bulb Replacement

BENB15J29206019

NOTICE

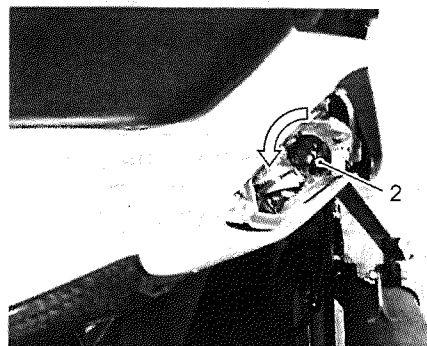
When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soap water to prevent premature bulb failure.

- 1) Remove the rear turn signal light lens (1).



IB14J1920028-01

- 2) Replace the bulb (2).

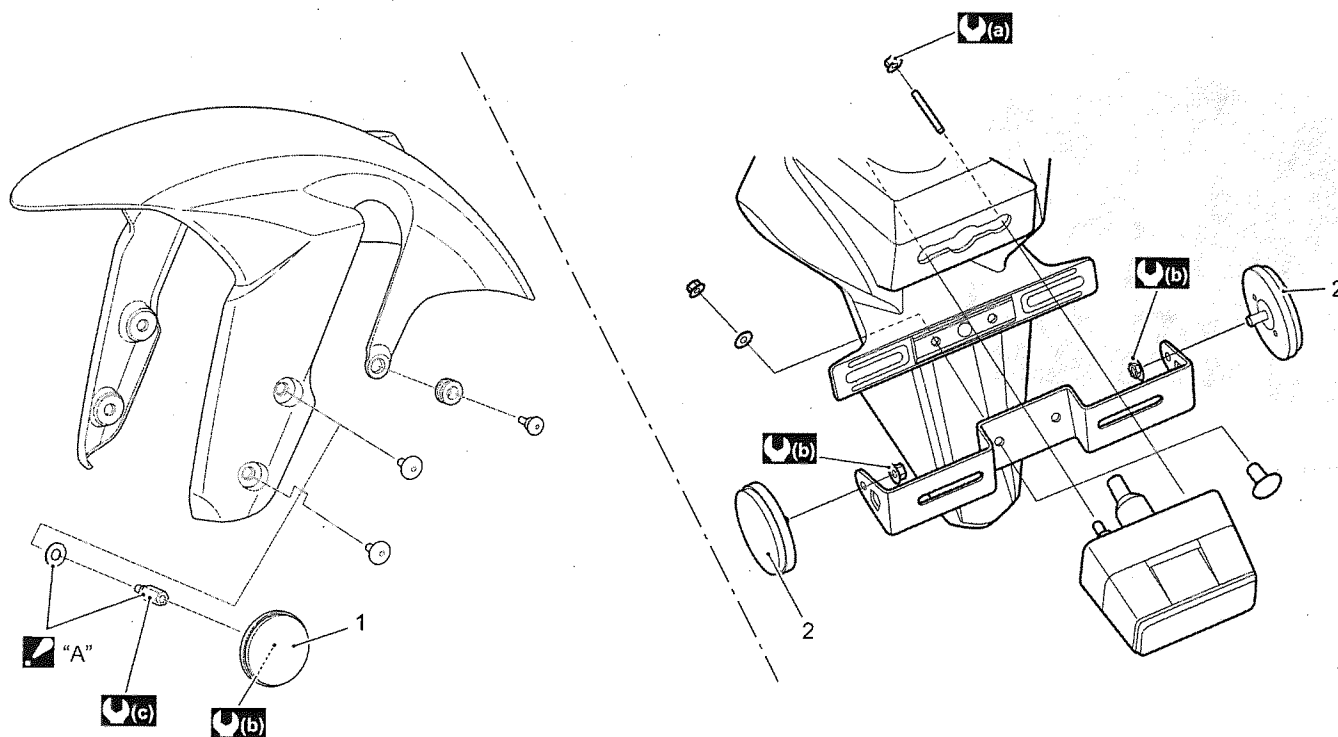


IB14J1920029-01

- 3) Reinstall the rear turn signal lens.

Reflex Reflector Construction (For E-03, 24, 28, 33)

BENB15J29206020



IB14J1920042-01

1. Front reflex reflector x 2 pcs. (For E-03, 24, 28, 33)	(a) : 5 N·m (0.5 kgf-m, 3.5 lbf-ft)
2. Rear reflex reflector x 2 pcs. (For E-03, 28, 33)	(b) : 1.8 N·m (0.18 kgf-m, 1.3 lbf-ft)
"A": Fix washer with double side tape.	(c) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

Turn Signal / Side-Stand Relay Inspection

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

NOTE

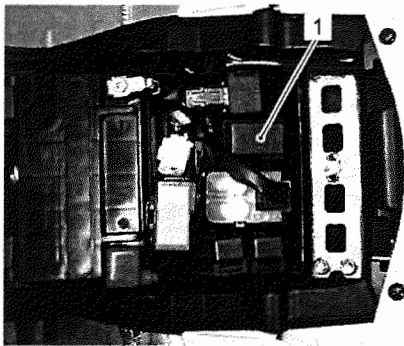
Make sure that the battery is fully charged.

Before removing the turn signal/side-stand relay, check the operation of the turn signal light.
If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connections.
If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal/side-stand relay with a new one.
Refer to "Turn Signal / Side-Stand Relay Removal and Installation" (Page 9B-14).

Turn Signal / Side-Stand Relay Removal and Installation

Removal

- 1) Remove the front seat. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the turn signal/side-stand relay (1).



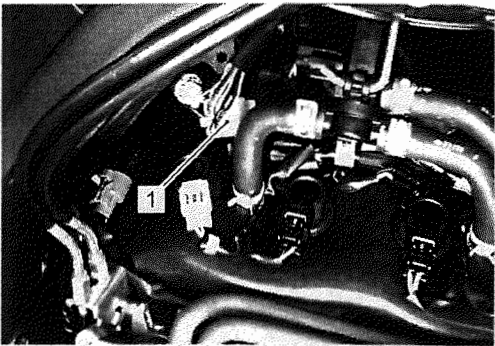
Installation

Install the turn signal/side-stand relay in the reverse order of removal.

Hazard Switch Inspection

Inspect the hazard switch in the following procedures:

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 2) Disconnect the left handlebar switch coupler (1). (Yellow)



- 3) Inspect the hazard switch for continuity with the tester.
If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).

Special tool

09900 : 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity (•))

Color Position	B/R	Bl	Dg
OFF			
ON	○	○	○

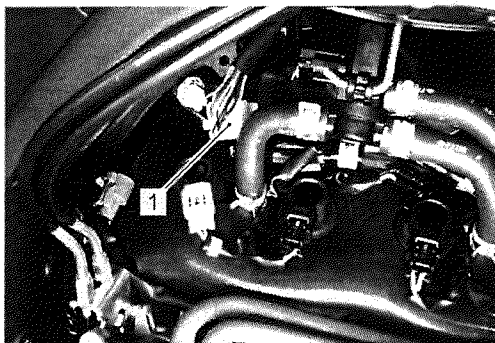
- 4) After finishing the hazard switch inspection, reinstall the removed parts.

Turn Signal Switch Inspection

BENB15J29206024

Inspect the turn signal switch in the following procedures:

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 2) Disconnect the left handlebar switch coupler (1). (Yellow)



IB14J1920033-02

- 3) Inspect the turn signal switch for continuity with the tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).

Special tool

: 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity (•))

Color Position	B	Lbl	Lg
L	○	○	
PUSH			
R		○	○

I947H1920041-01

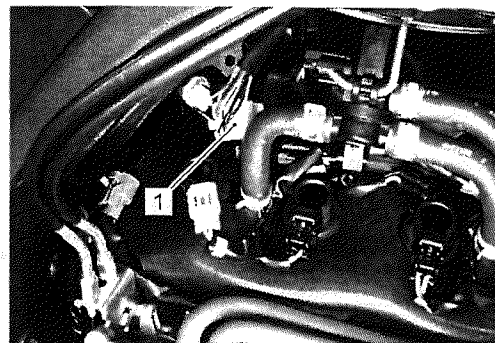
- 4) After finishing the turn signal switch inspection, reinstall the removed parts.

Dimmer / Passing Light Switch Inspection

BENB15J29206025

Inspect the dimmer/passing light switch in the following procedures:

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 2) Disconnect the left handlebar switch coupler (1). (Yellow)



IB14J1920034-02

- 3) Inspect the dimmer/passing light switch for continuity with the tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).

Special tool

: 09900-25008 (Multi circuit tester set)

Tester knob indication

Continuity (•))

Color Position	Y	O	W
HI	○	○	
LO		○	○
PASS	○	○	○

I947H1920043-01

- 4) After finishing the dimmer/passing light switch inspection, reinstall the removed parts.

Specifications

Service Data

BENB15J29207001

Wattage

Unit: W

Item		Specification
Headlight	HI	65
	LO	55
Position light		5 x 2
Brake/Tail light		LED
Turn signal light		21 x 4
License plate light		5

Tightening Torque Specifications

BENB15J29207002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Rear combination light mounting bolt	5	0.5	3.5	☞ (Page 9B-9)
License plate light mounting nut	5	0.5	3.5	☞ (Page 9B-10) / ☞ (Page 9B-11)

NOTE

The tightening torque(s) also specified in:

“Rear Lighting System Construction” (Page 9B-8)

“License Plate Light Components” (Page 9B-9)

“Reflex Reflector Construction (For E-03, 24, 28, 33)” (Page 9B-13)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Special Tool

BENB15J29208001

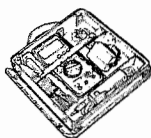
09900-25008

Multi circuit tester set

☞ (Page 9B-14) /

☞ (Page 9B-15) /

☞ (Page 9B-15)



Combination Meter / Fuel Meter / Horn

General Description

Combination Meter System Description

BENB15J29301001

This combination meter mainly consists of a stepping motor, LCD (Liquid Crystal Display) and LEDs (Light Emitting Diode).

The tachometer pointer is driven by the stepping motor.

The LCDs indicate followings:

Speed, Odo / Trip 1 / Trip 2 / Fuel reserve trip / Clock / FI (DTC) / Lap time counter / Panel light brightness, Gear position, Engine RPM indicator, Oil pressure indicator, Engine coolant temperature and Drive mode position.

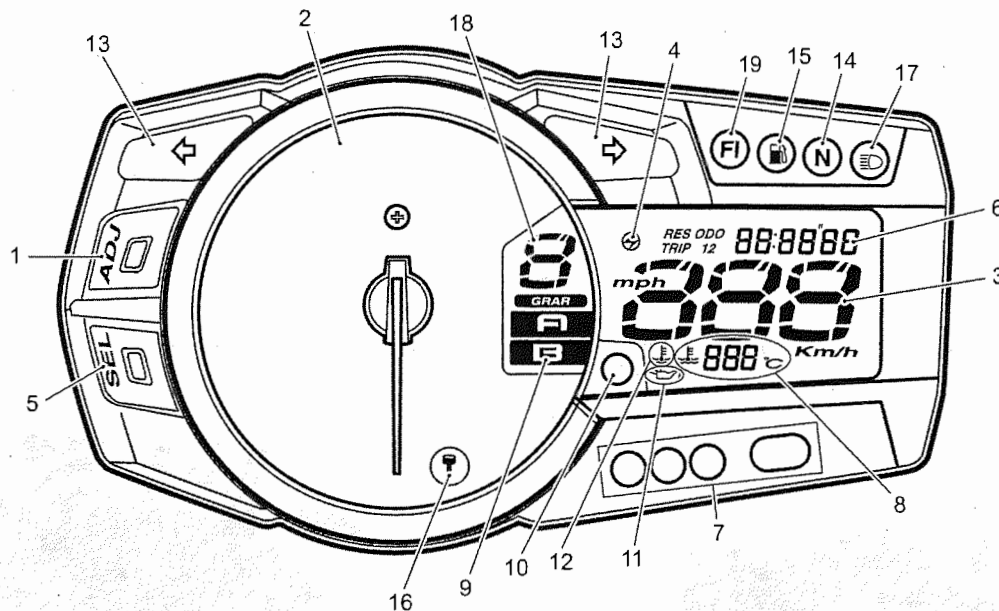
LED (Light Emitting Diode)

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.

Engine RPM Indicator Light

This speedometer is equipped the engine revolution indicator light. The engine revolution indicator light is adjustable from 7 000 – 14 250 r/min. (from 7 000 r/min to 10 000 r/min, every 250 r/min and 10 000 r/min to 14 250 r/min, every 50 r/min: Initial setting: 13 000 r/min)



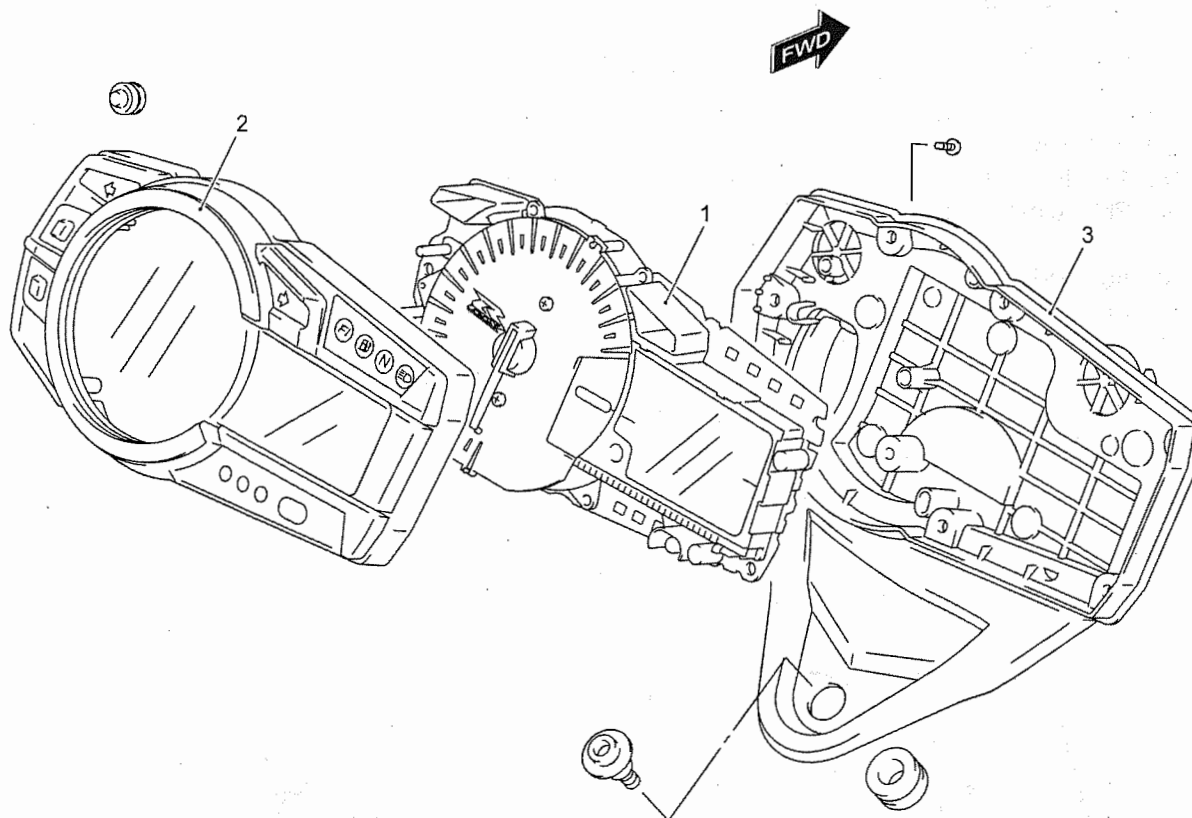
IB14J1930001-02

1. ADJ button	11. LCD (Oil pressure indicator)
2. Tachometer	12. LCD (Engine coolant temperature indicator)
3. LCD (Speedometer)	13. LED (Turn signal indicator light)
4. LCD (Engine RPM indicator)	14. LED (Neutral indicator light)
5. SEL button	15. LED (Fuel indicator light)
6. LCD (Odo / Trip 1 / Trip 2 / Fuel reserve trip / Clock / FI (DTC) / Sd / Lap time counter / Panel light brightness)	16. LED (Immobilizer indicator light) (For E-21, 24)
7. LED (Engine RPM indicator light)	17. LED (High-beam indicator light)
8. LCD (Engine coolant temperature)	18. LCD (Gear position indicator)
9. LCD (Drive mode indicator)	19. LED (FI / Sd)
10. LED (Oil pressure indicator light / Engine coolant temperature indicator light)	

Repair Instructions

Combination Meter Components

BENB15J29306001



1. Combination meter unit	2. Combination meter case	3. Combination meter cover
---------------------------	---------------------------	----------------------------

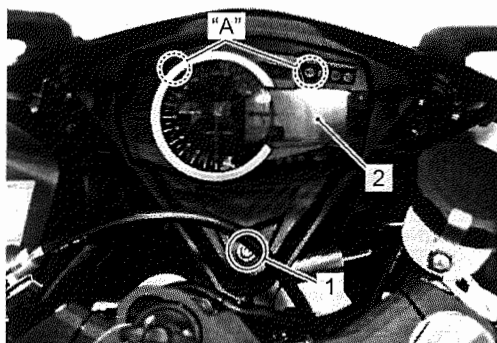
IB14J1930026-02

Combination Meter Removal and Installation

BENB15J29306002

Removal

- 1) Remove the bolt (1) and pull out the combination meter (2) from the cowling brace.

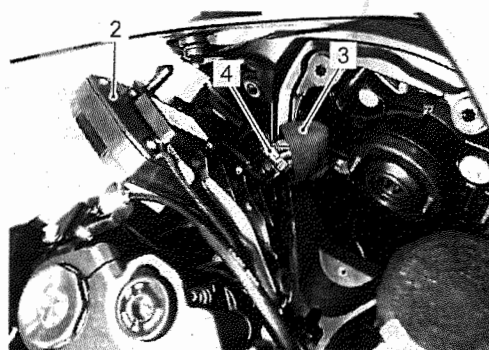


IB15J1930001-01

"A": Hooked point

- 2) Disconnect the boot (3).

- 3) Disconnect the coupler (4) and remove the combination meter (2).



IB14J1930003-01

Installation

Install the combination meter in the reverse order of removal.

NOTE

Fix the boot of the combination meter coupler firmly.

Combination Meter Disassembly and Assembly

BENB15J29306003

Refer to "Combination Meter Removal and Installation" (Page 9C-2).

Disassembly

Disassemble the combination meter as shown in the combination meter components. Refer to "Combination Meter Components" (Page 9C-2).

Assembly

Assemble the combination meter as shown in the combination meter components. Refer to "Combination Meter Components" (Page 9C-2).

Combination Meter Inspection

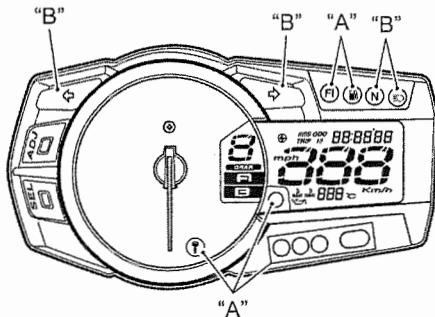
BENB15J29306004

LED Inspection

Check that the LEDs "A" (FI, fuel, engine RPM, oil pressure/engine coolant, immobilizer (E-21, 24) and meter panel illumination) immediately light up when the ignition switch is turned ON.

Check that the other LEDs "B" (neutral, high-beam and turn signal indicator lights) light up/go off by operating each switch.

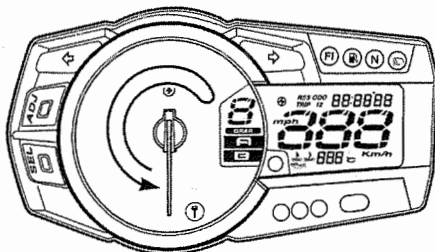
If abnormal condition is found, replace the combination meter assembly with a new one after checking its wire harness/coupler. Refer to "Combination Meter Removal and Installation" (Page 9C-2).



IB14J1930004-01

Stepping Motor Inspection and Adjustment

- 1) Check that the pointers calibrate immediately after turning the ignition switch ON and stop at zero point. If abnormal condition is found, replace the combination meter assembly with a new one after checking its wire harness/coupler.

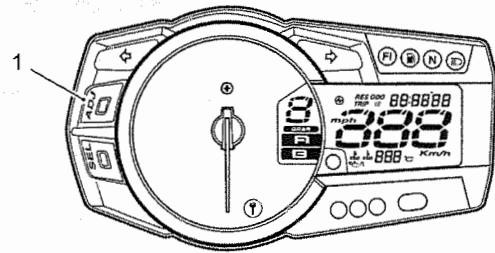


IB14J1930005-01

NOTE

- The pointers may not return to the proper position even turning the ignition switch on under low temperature condition. In that case, you can reset the pointers to the proper position by the following instruction.
- Complete the operation within 10 seconds after the ignition switch has been turned on.

- 2) With the ADJ button (1) pressed, turn the ignition switch ON.
- 3) Keep pushing the ADJ button for more than 3 to 5 sec.



IB14J1930006-01

- 4) Release the ADJ button, then tap it twice. (within 1 second) → Reset

Time	Ignition switch	Adjuster button (1)
	OFF	PUSH
0	ON	
•		
•		
3 sec.		
•		
5 sec.		Release
•		
•		Push
•		Push→Reset
10 sec.		

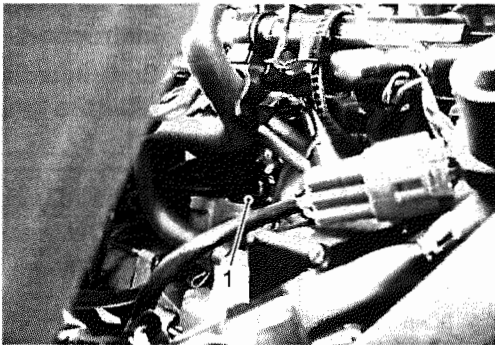
IB37H1930023-01

- 5) Pointers will return to the proper position right after the completion of the operation. In the case of the pointers not returning to the proper position after doing above, replace the combination meter unit. Refer to "Combination Meter Removal and Installation" (Page 9C-2).
- 6) Turn the ignition switch OFF.

Engine Coolant Temperature Indicator Light Inspection

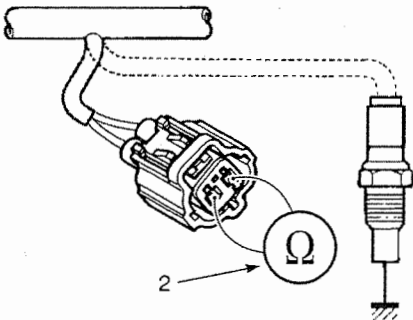
Inspect the engine coolant temperature meter (LCD) and indicator light (LED) in the following procedures:

- 1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Disconnect the ECT sensor coupler (1).



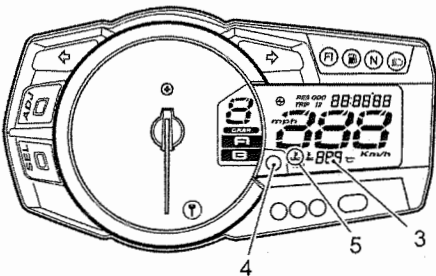
IB14J1930007-02

- 3) Leave the oil pressure switch lead wire open. Refer to "Oil Pressure Indicator Inspection" (Page 9C-7).
- 4) Connect a variable resistor (2) between the terminals.



I718H1930009-05

- 5) Turn the ignition switch ON.
 - 6) Check the engine coolant temperature meter (LCD) (3) and indicator light (LED) (4) 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. Refer to "Combination Meter Removal and Installation" (Page 9C-2).



IB14J1930008-02

Resistance (2)	LCD (3)		LED (4)	LCD (5)	Engine coolant temperature
	°C	°F			
2.45 kΩ and more	"--"	"--"	OFF	—	19 °C (67 °F) and below
Approx. 0.318 kΩ	"80"	"177"	OFF	—	Approx. 80 °C (177 °F)
0.1108 kΩ and less	"120" – "139" flicker	"248" – "282" flicker	ON	Flicker	120 – 139 °C (248 – 282 °F)
0 Ω (Jumper wire)	"HI" flicker	"HI" flicker	ON	Flicker	140 °C (283 °F) and over

- 7) Connect the ECT sensor coupler.
- 8) Install the removed parts.

ECT Sensor Removal and Installation

BENB15J29306006

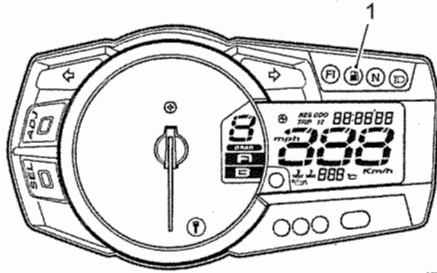
Refer to "ECT Sensor Removal and Installation" in Section 1C (Page 1C-4).

Fuel Level Indicator Inspection

BENB15J29306007

If the fuel level indicator light (1) does not function properly, check the fuel level gauge and its lead wire/ coupler.

If the fuel level gauge and its lead wire/coupler are functioning properly, replace the combination meter with a new one.



IB14J1930009-01

Fuel Level Gauge Inspection

BENB15J29306008

Inspect the fuel level gauge in the following procedures:

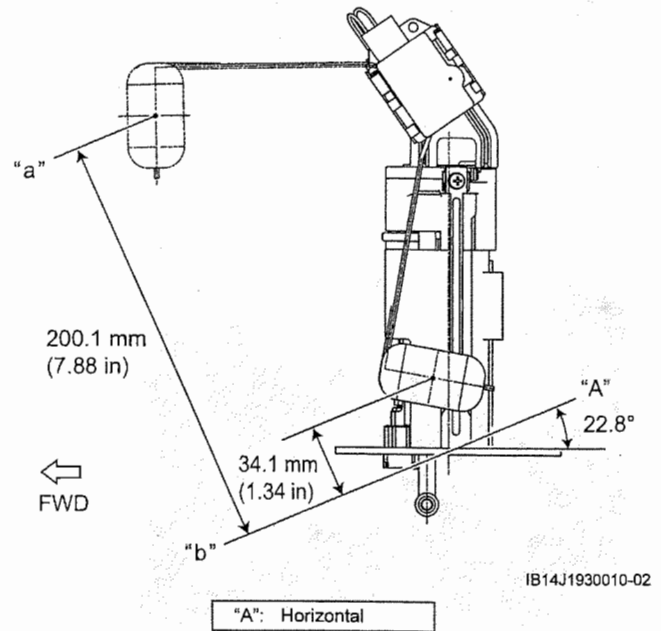
- 1) Remove the fuel pump. Refer to "Fuel Pump Disassembly and Assembly" in Section 1G (Page 1G-12).
- 2) Measure the resistance at each fuel level gauge in float position. If the resistance is incorrect, replace fuel level gauge with a new one.

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication**Resistance (Ω)**

Float position	Resistance
Full "a"	2 – 4 Ω
Empty "b"	119 – 121 Ω



- 3) Install the fuel pump. Refer to "Fuel Pump Disassembly and Assembly" in Section 1G (Page 1G-12).

Speedometer Inspection

BENB15J29306009

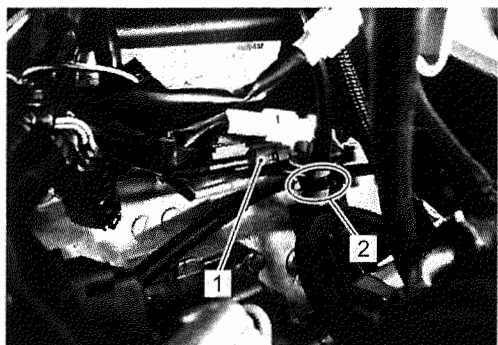
If the speedometer, odometer or tripmeter does not function properly, inspect the speed sensor and the coupler connections. If the speed sensor and coupler connections are OK, replace the combination meter unit with a new one. Refer to "Combination Meter Removal and Installation" (Page 9C-2).

Speed Sensor Removal and Installation

BENB15J29306010

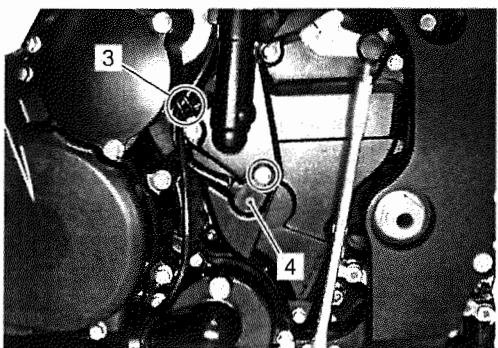
Removal

- 1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation" in Section 1G (Page 1G-9).
- 2) Disconnect the speed sensor lead wire coupler (1) and clamp (2).



IB14J1930011-02

- 3) Open the clamp (3).
- 4) Remove the speed sensor (4).



IB14J1930012-01

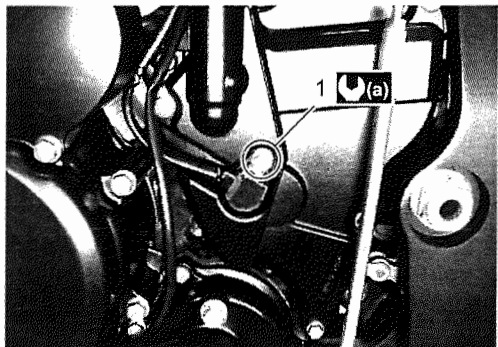
Installation

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

- Tighten the speed sensor bolt (1) to the specified torque.

Tightening torque

Speed sensor bolt (a): 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)



IB14J1930013-01

- Route the speed sensor lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).


Speed Sensor Inspection

BENB15J29306011

Inspect the speed sensor in the following procedures:

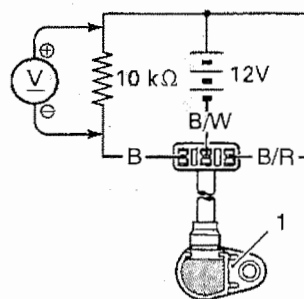
- 1) Remove the speed sensor. Refer to "Speed Sensor Removal and Installation" (Page 9C-6).
- 2) Connect a 12 V battery (between B and B/W), 10 kΩ resistor (between B/R and B) and multi circuit tester (tester (+) probe to B and tester (-) probe to B/R) as shown in the figure.

Special tool

 : 09900-25008 (Multi circuit tester set)

Tester knob indication

Voltage (---)



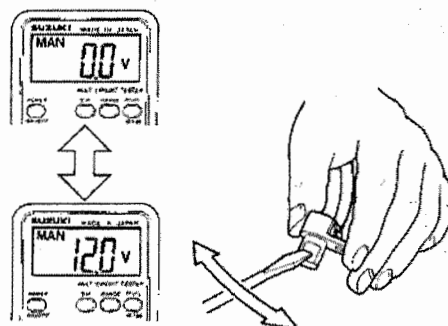
I649G1930016-02

1. Speed sensor

- 3) Move a screwdriver back and forth across the pick-up surface of the speed sensor. The voltage readings should cycle as follows (0 V → 12 V or 12 V → 0 V). If the voltage reading does not change, replace the speed sensor with a new one.

NOTE

While testing, the highest voltage reading should be the same as the battery voltage (12 V).



I649G1930017-02

- 4) Install the speed sensor. Refer to "Speed Sensor Removal and Installation" (Page 9C-6).

Oil Pressure Indicator Inspection

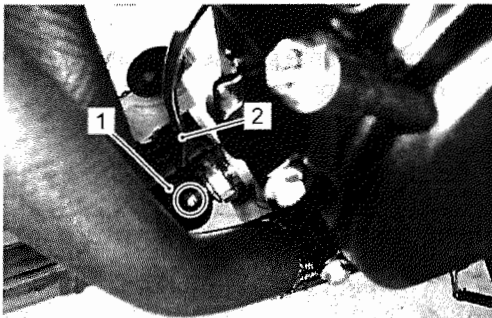
BENB15J29306012

Inspect the oil pressure indicator in the following procedures:

NOTE

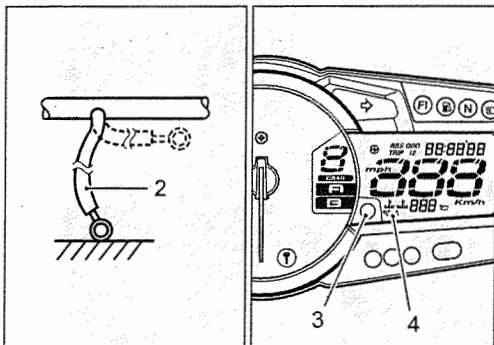
Before inspecting the oil pressure switch, check if the engine oil level is correct. Refer to "Engine Oil and Filter Replacement" in Section 0B (Page 0B-10).

- 1) Remove the left cowling. Refer to "Exterior Parts Removal and Installation" in Section 9D (Page 9D-7).
- 2) Remove the boot (1) and oil pressure switch lead wire (2) from the oil pressure switch.



IB14J1930014-02

- 3) Turn the ignition switch ON.
- 4) Check if the oil pressure indicator (LED) (3) and (LCD) (4) will light up grounding the lead wire (2). If the oil pressure indicator does not light up, replace the combination meter unit with a new one after checking the connection of coupler.



IB14J1930015-02

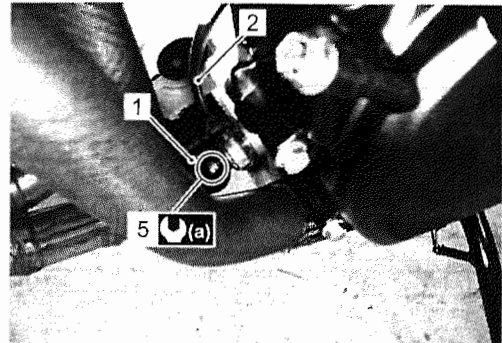
- 5) Turn the ignition switch OFF.

- 6) Install the oil pressure switch lead wire (2) and tighten it screw (5). Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

Tightening torque

Oil pressure switch lead wire screw (a): 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)

- 7) Install the boot (1) firmly.



IB14J1930016-02

- 8) Install the left cowling.

Oil Pressure Switch Removal and Installation

BENB15J29306013

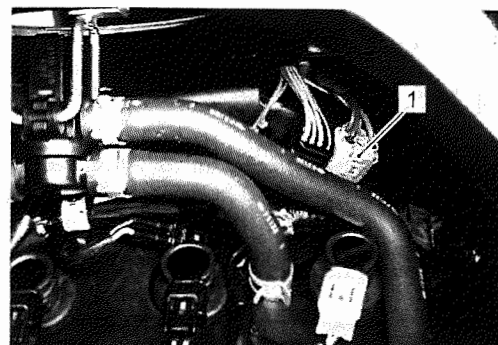
Refer to "Oil Pressure Switch Removal and Installation" in Section 1E (Page 1E-9).

Ignition Switch Inspection

BENB15J29306014


Inspect the ignition switch in the following procedures:

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 2) Disconnect the ignition switch lead wire coupler (1). (White)









IB14J1930017-02

3) Inspect the ignition switch for continuity with a tester. If any abnormality is found, replace the ignition switch with a new one.

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








Tester knob indication
Continuity (●))

E-21, 24

Color Position	R	O	Gr	Br
ON				
OFF				
LOCK				
P				

IB14J1930018-01

E-03, 28, 33

Color Position	R	O	O/Y	Gr	Br
ON					
OFF					
LOCK					
P					

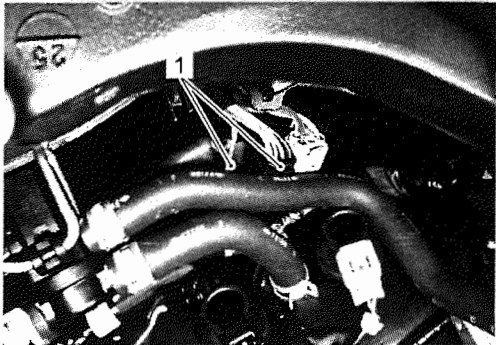
IB14J1930019-01

4) After finishing the ignition switch inspection, reinstall the removed parts.

Ignition Switch Removal and Installation
BENB15J29306015
Refer to "Ignition Switch Removal and Installation (E-21 Only)" in Section 1H (Page 1H-11).


Lap Time Counter Switch Inspection
BENB15J29306016
Inspect the lap time counter switch in the following procedures:

- 1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
- 2) Disconnect the right handlebar switch couplers (1).







IB14J1930020-02

3) Inspect the lap time counter switch for continuity with the tester. If any abnormality is found, replace the right handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).

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

Tester knob indication
Continuity (●))

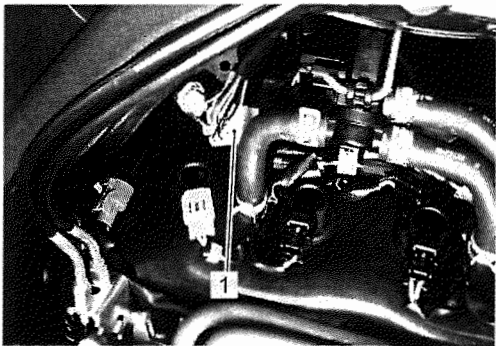
Color Position	O/Bl	B/W	O/R
UP			
FREE			
DOWN			

IB14J1930021-01

4) After finishing the lap time counter switch inspection, reinstall the removed parts.

Horn Inspection
BENB15J29306017
NOTE
If the horn sound condition is normal, it is not necessary to inspect the horn button continuity.

Horn Button Inspection
1) Remove the air cleaner box. Refer to "Air Cleaner Box Removal and Installation" in Section 1D (Page 1D-7).
2) Disconnect the left handlebar switch lead wire coupler (1). (Yellow)



IB14J1930022-02

- 3) Inspect the horn button for continuity with a tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation" in Section 6B (Page 6B-3).

Special tool

TOOL : 09900-25008 (Multi circuit tester set)

Tester knob indication

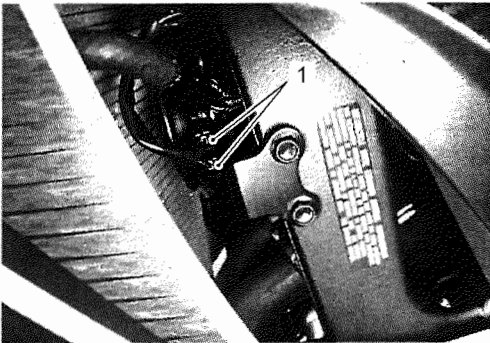
Continuity (•••••)

Color Position	B/Bl	B/W
•		
PUSH	○ — ○	○ — ○

I718H1930028-03

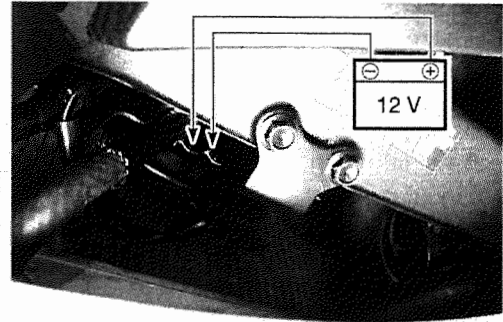
Horn Inspection

- 1) Disconnect the horn couplers (1).



IB14J1930023-03

- 2) Connect a 12 V battery to the horn terminals. If the sound is not heard from the horn, replace the horn with a new one.



IB14J1930024-03

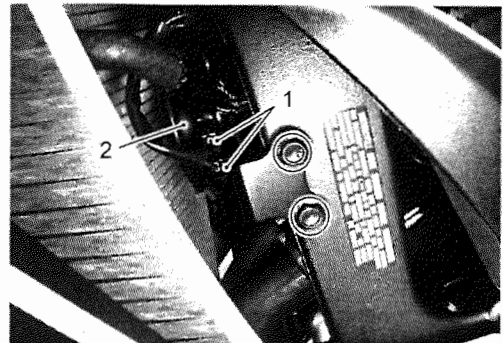
- 3) Connect the horn couplers.

Horn Removal and Installation

BENB15J29306018

Removal

- 1) Disconnect the horn couplers (1).
- 2) Remove the horn (2) by removing the mounting bolts.



IB14J1930025-02

Installation

Install the horn in the reverse order of removal.

Specifications

Service Data

BENB15J29307001

Wattage

Unit: W

Item	Specification	
	E-21, 24	E-03, 28, 33
Combination meter light	LED	←
Turn signal indicator light	LED	←
High beam indicator light	LED	←
Neutral position indicator light	LED	←
Oil pressure indicator light/Engine coolant temperature indicator light	LED	←
FI indicator light/Sd indicator light	LED	←
Fuel level indicator light	LED	←
Engine RPM indicator light	LED	←
Immobilizer indicator light	LED	—

Tightening Torque Specifications

BENB15J29307002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Speed sensor bolt	4.5	0.45	3.0	☞ (Page 9C-6)
Oil pressure switch lead wire screw	1.5	0.15	1.0	☞ (Page 9C-7)

Reference:

For the tightening torques of fasteners not specified in this section, refer to "Tightening Torque List" in Section 0C (Page 0C-7).

Special Tools and Equipment

Special Tool

BENB15J29308001

09900-25008

Multi circuit tester set

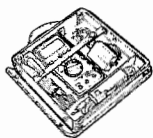
☞ (Page 9C-5) /

☞ (Page 9C-6) /

☞ (Page 9C-8) /

☞ (Page 9C-8) /

☞ (Page 9C-9)

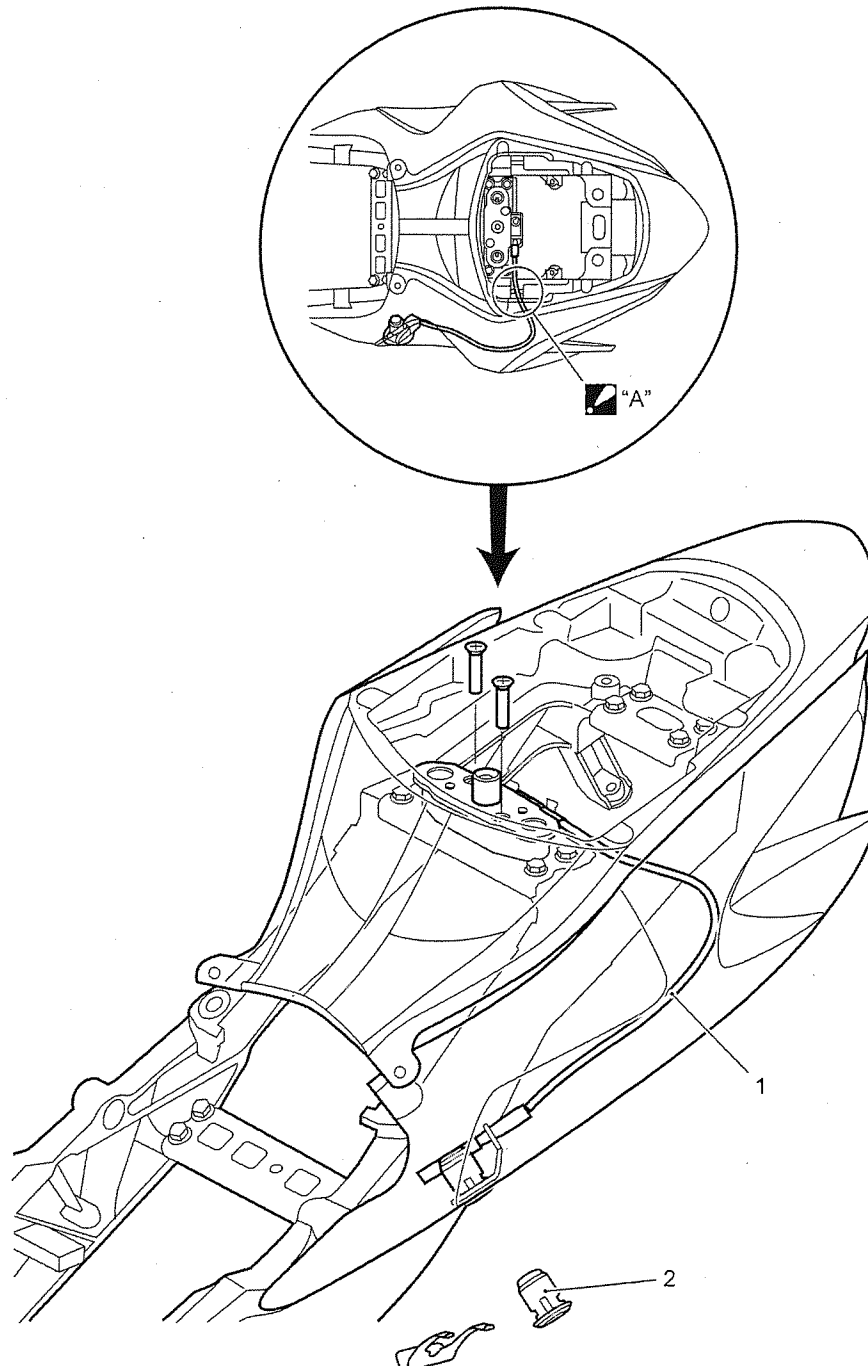


Exterior Parts

Schematic and Routing Diagram

Seat Lock Cable Routing Diagram

BENB15J29402001



1. Seat lock cable	■ "A": Pass the seat lock cable into the concave part of the rear front fender.
2. Seat lock	

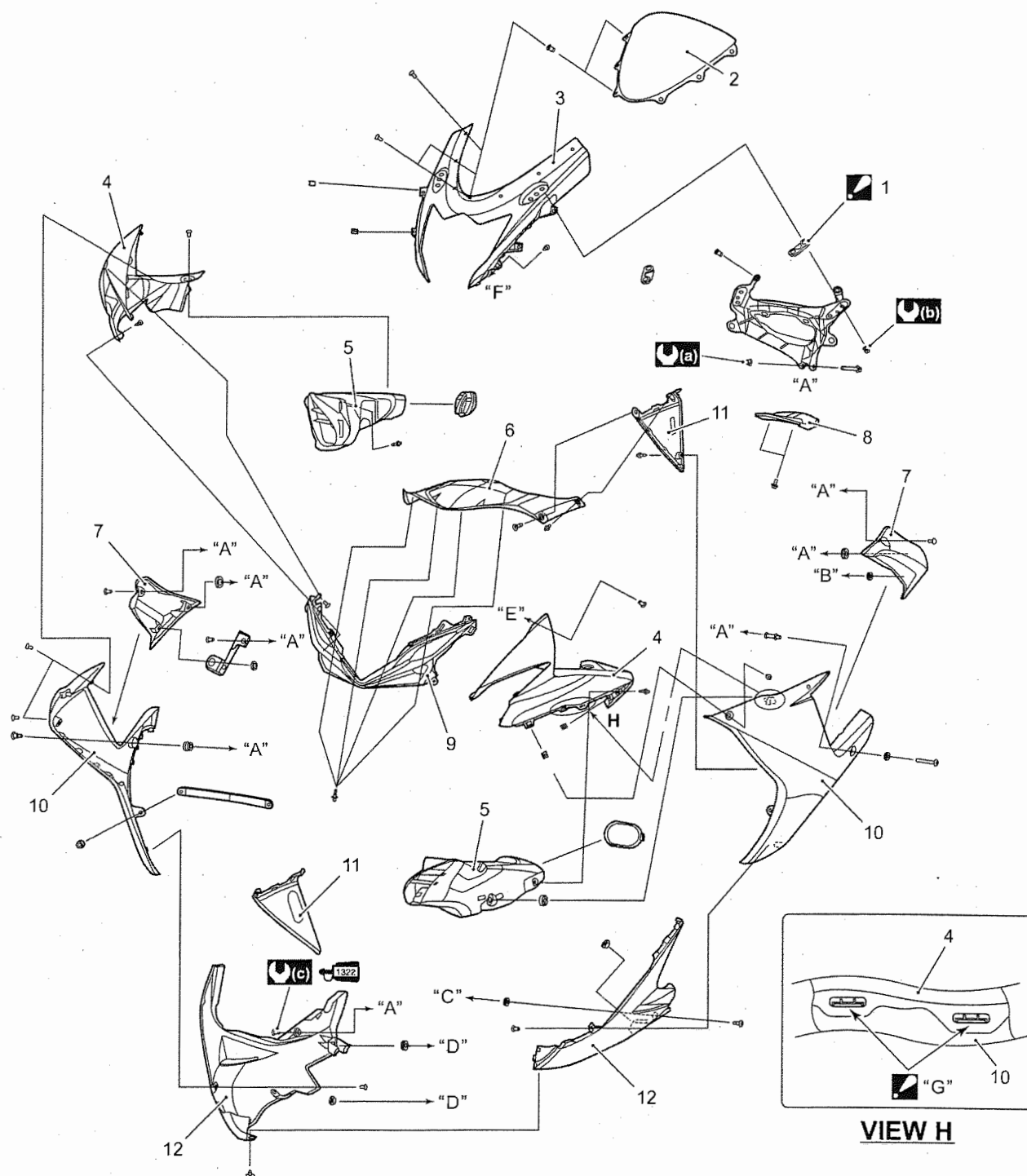
IB14J1940047-03

Repair Instructions

Exterior Parts Construction

Cowling

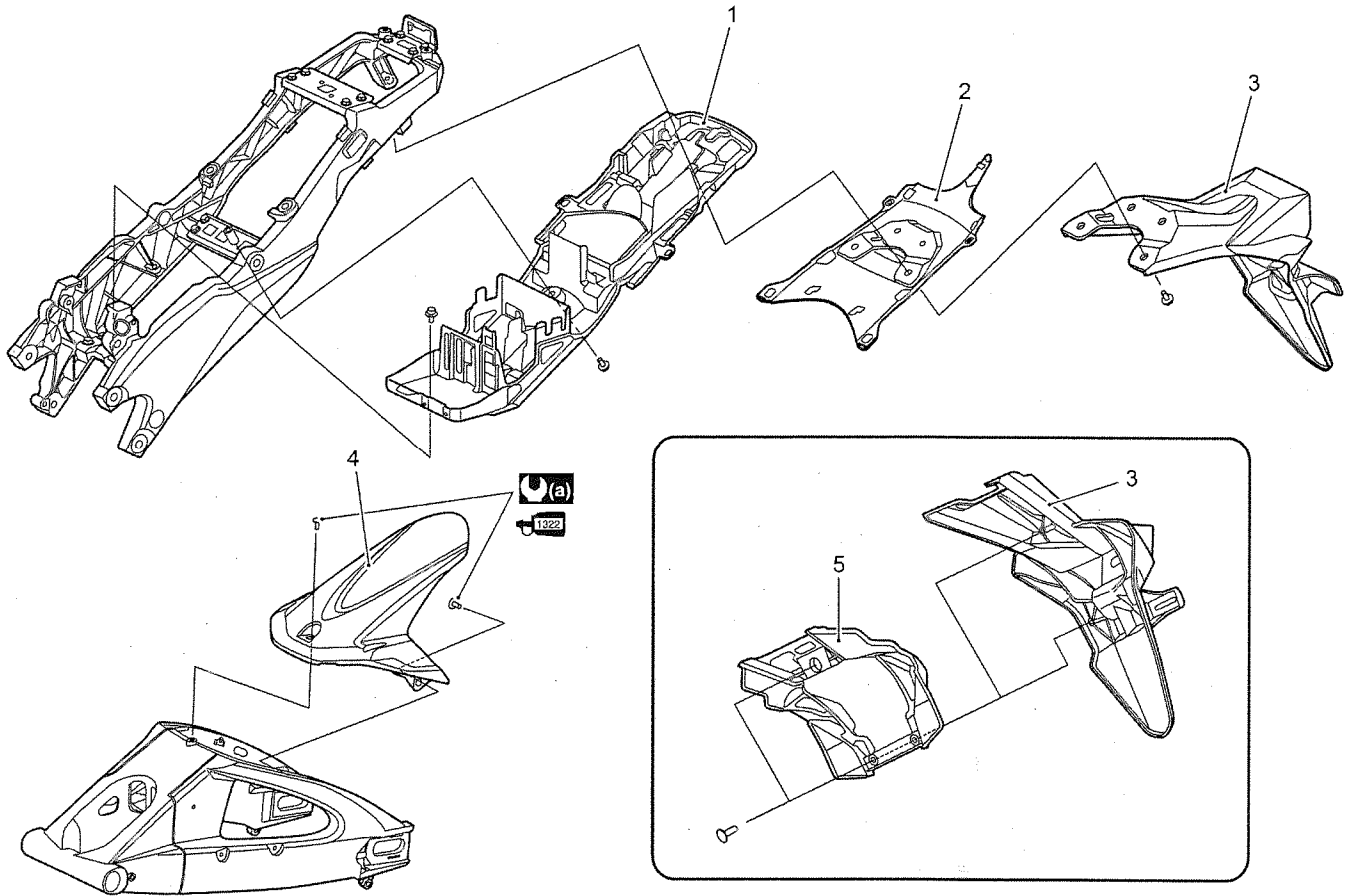
BENB15J29406001





IB14J1940048-08

1. Rear view mirror cushion : Set the dent side to inside.	9. Center intake cover	"E": To body cowling
2. Windscreen	10. Cowling side	"F": To center intake cover
3. Body cowling	11. Inner under cowling	G: Insert the cowling side claws to the hole of the intake cover firmly.
4. Intake cover	12. Under cowling	(a) : 38 N·m (3.8 kgf-m, 27.5 lbf-ft)
5. Intake pipe	"A": To frame	(b) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
6. Body cowling cover	"B": To regulator/rectifier	(c) : 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)
7. Cowling side cover	"C": To side-stand bracket	1322 : Apply thread lock to the thread part.
8. Lower bracket cover	"D": Exhaust pipe	

Rear Fender

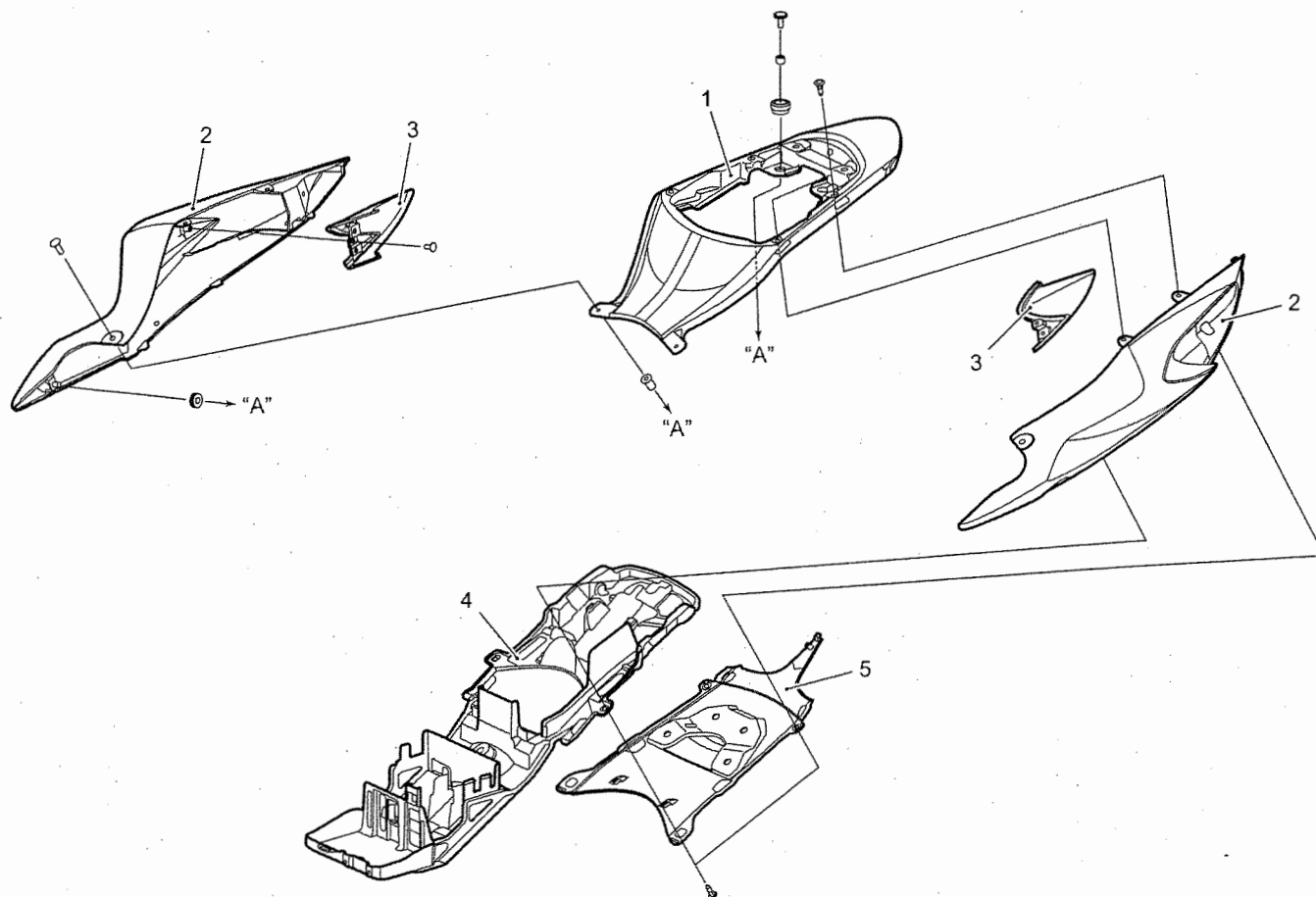


IB14J1940049-03

1. Rear fender (Front)	4. Rear fender (Lower)	 : Apply thread lock to the thread part.
2. Rear fender cover (Front)	5. Rear fender guard (E-24 only)	
3. Rear fender (Rear)	 : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	

9D-4 Exterior Parts:

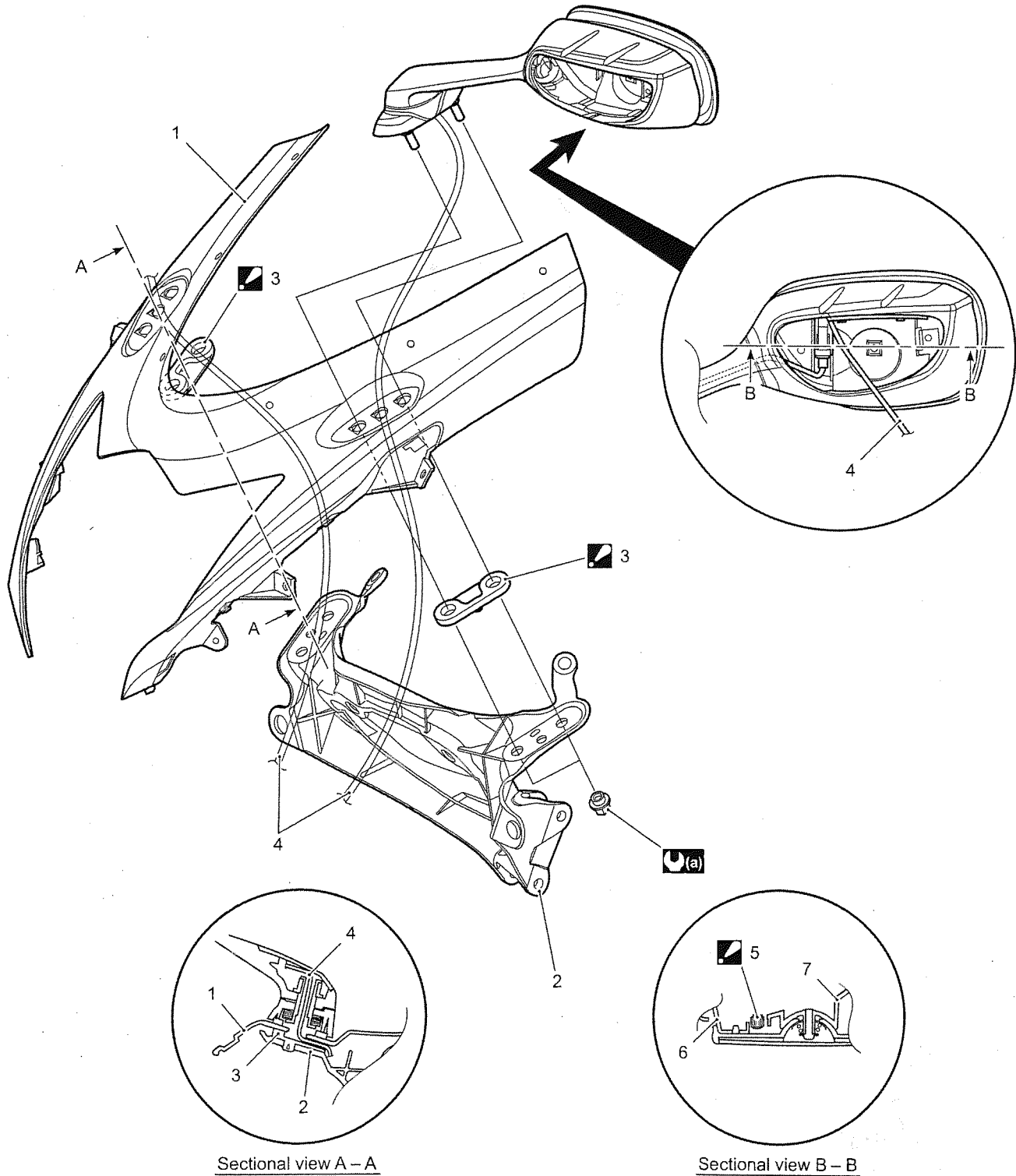
Frame Cover



IB14J1940050-04

1. Center frame cover	3. Rear frame cover	5. Rear fender cover (Front)
2. Frame cover	4. Rear fender (Front)	"A": To seat rail

Rear View Mirror Construction



Sectional view A – A

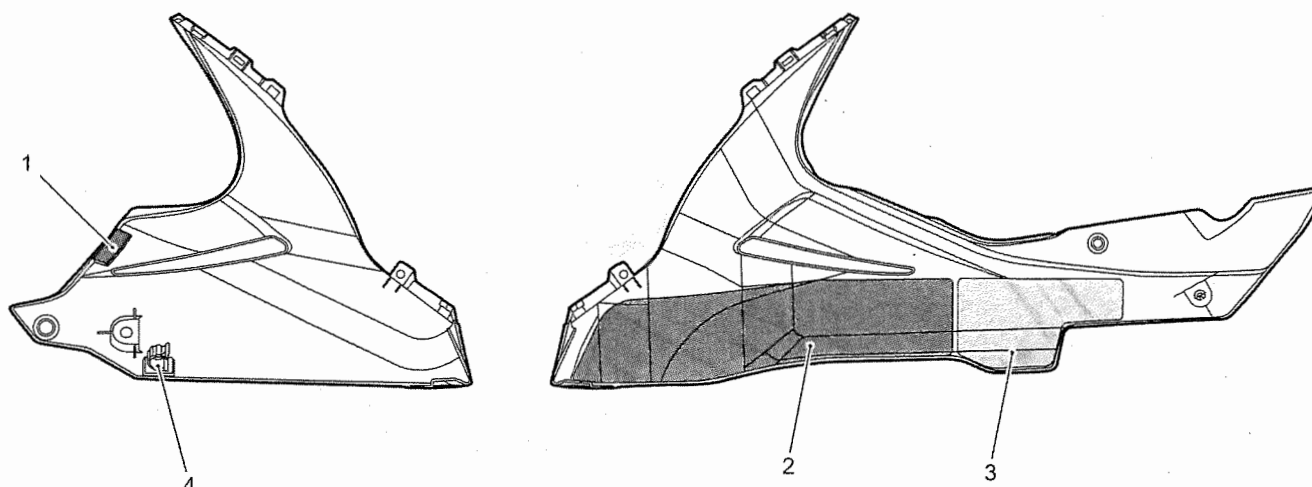
Sectional view B – B

IB14J1940051-01

1. Body cowling	4. Turn signal lead wire	7. Mirror body
2. Cowling brace	5. Turn signal lead wire coupler : Locate the turn signal led wire coupler (5) between the mirror cover (6) and mirror body (7).	(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
3. Cushion : Set the dent side to inside.	6. Mirror cover	

Under Cowling Heat Shield and Cushion Attachment

BENB15J29406003



IB14J1940052-01

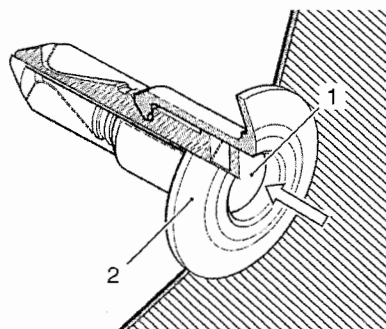
1. Cushion	2. Heat shield No. 1	3. Heat shield No. 2	4. Clamp
------------	----------------------	----------------------	----------

Fastener Removal and Installation

BENB15J29406004

Type A Removal

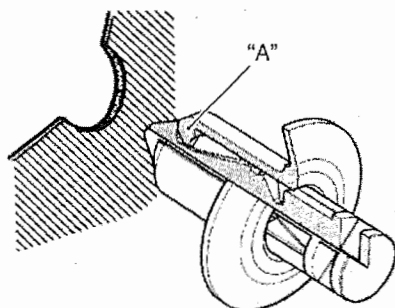
- 1) Depress the head of fastener center piece (1).
- 2) Pull out the fastener (2).



I649G1940005-02

Installation

- 1) Let the center piece stick out toward the head so that the pawls "A" closes.



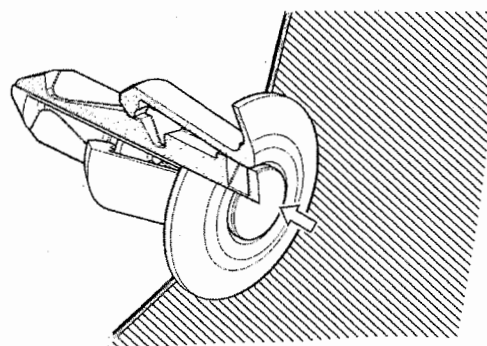
I649G1940006-02

- 2) Insert the fastener into the installation hole.

NOTE

To prevent the pawl "A" from damage, insert the fastener all the way into the installation hole.

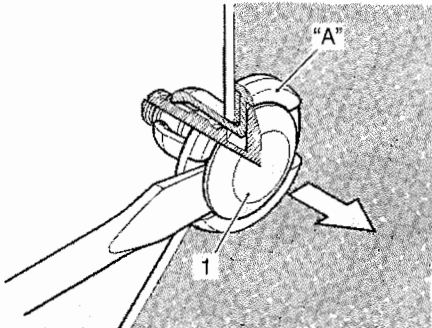
- 3) Push in the head of center piece until it becomes flush with the fastener outside face.



I649G1940007-02

Type B Removal

- 1) Pry up the head of fastener center piece (1) with a screw driver.
- 2) Pull out the fastener "A".



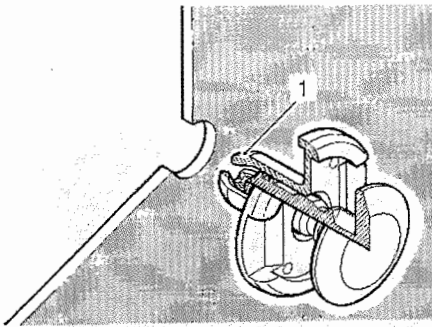
I823H1940001-01

Installation

- 1) Insert the fastener into the installation hole.

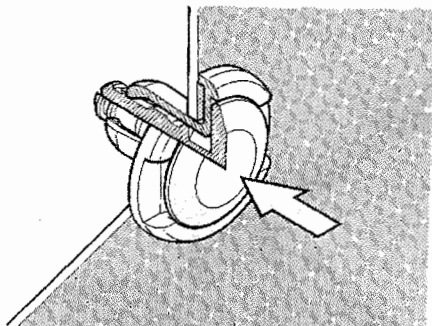
NOTE

To prevent the pawl (1) from damage, insert the fastener all the way into the installation hole.



I947H1940005-01

- 2) Push in the head of center piece.



I823H1940003-01

Exterior Parts Removal and Installation

BENB15J29406005

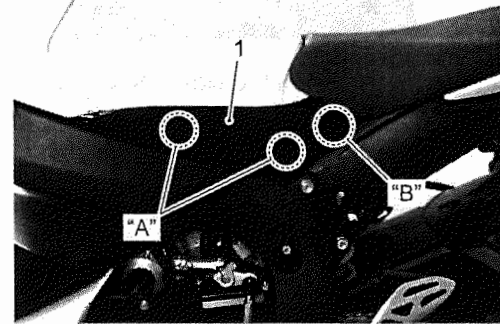
Side Frame Cover

NOTE

The left and right side frame covers are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Removal

- 1) Remove the side frame cover (1).



IB14J1940001-02

"A": Velcro fastening

"B": Hooked point

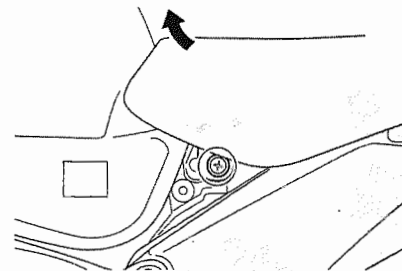
Installation

Installation is in the reverse order of removal.

Front Seat

Removal

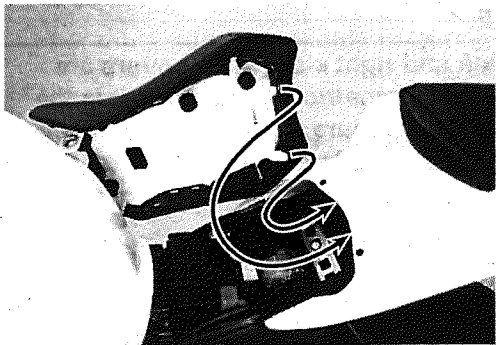
- 1) Remove the side frame covers. Refer to "Side Frame Cover" (Page 9D-7).
- 2) Remove the front seat by removing the left and right screws.



IB14J1940054-01

Installation

- 1) Slide the front seat hooks into the seat hook retainers.



IB14J1940045-01

- 2) Tighten the bolts and install the side frame covers.

Rear Seat

Removal

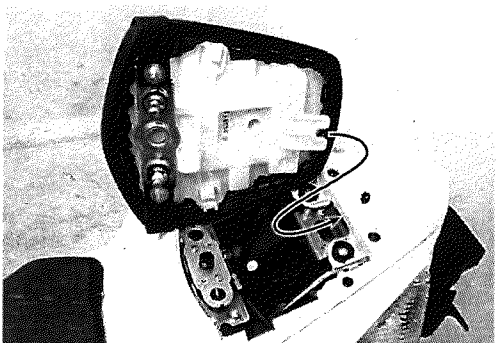
Remove the rear seat with the ignition key.



IB14J1940003-02

Installation

Slide the rear seat hook into the seat hook retainer and push the rear seat down firmly until the rear seat snaps into the locked position.



IB14J1940004-01

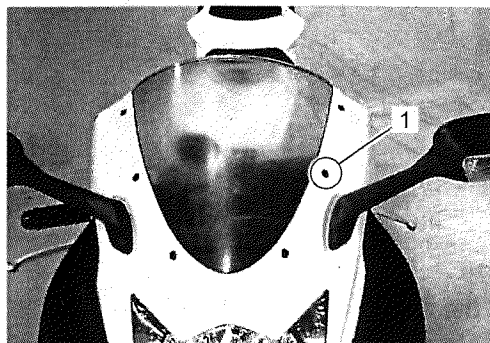
Rear View Mirror

NOTE

The right and left rear view mirrors are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

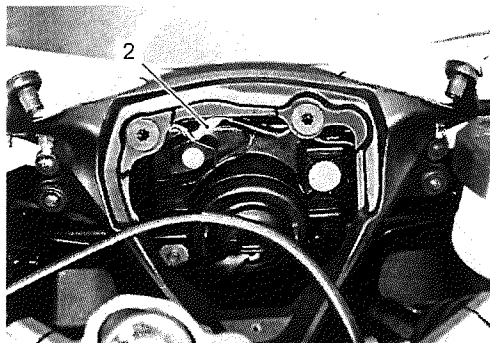
Removal

- 1) Remove the windscreen screw (1).



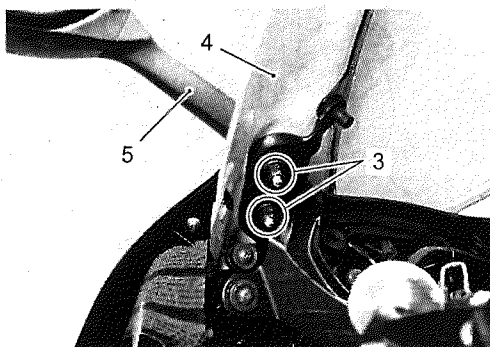
IB14J1940005-01

- 2) Remove the combination meter. Refer to "Combination Meter Removal and Installation" in Section 9C (Page 9C-2).
- 3) Disconnect the turn signal lead wire coupler (2). (RH: Black, LH: Gray)



IB14J1940006-01

- 4) Remove the rear view mirror mounting bolts (3).
- 5) Lift the body cowling (4) and rear view mirror (5).



IB14J1940007-01

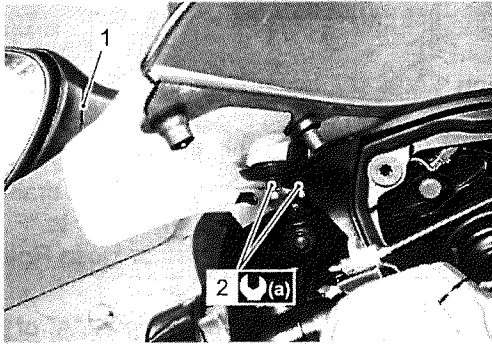
Installation

Install the rear view mirror in the reverse order of removal. Pay attention to the following point:

- Route the rear view mirror lead wire properly, install the rear view mirror (1). Refer to "Rear View Mirror Construction" (Page 9D-5).
- Tighten the rear view mirror mounting nuts (2) to the specified torque.

Tightening torque

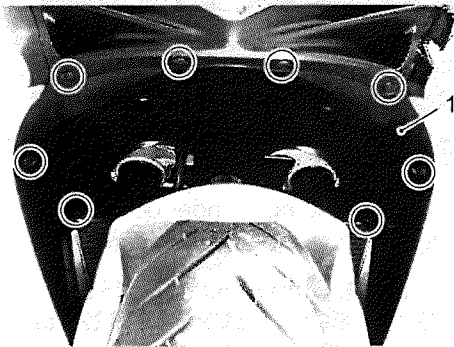
Rear view mirror mounting nut (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



IB14J1940008-02

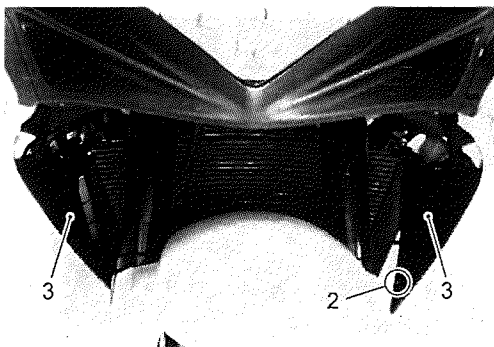
Body Cowling Cover and Inner Under Cowling Removal

- 1) Remove the fasteners (8 pcs.). Refer to "Fastener Removal and Installation" (Page 9D-6).
- 2) Remove the body cowling cover (1).



IB14J1940009-01

- 3) Remove the fastener (2) (LH only). Refer to "Fastener Removal and Installation" (Page 9D-6).
- 4) Remove the inner under cowlings (3).

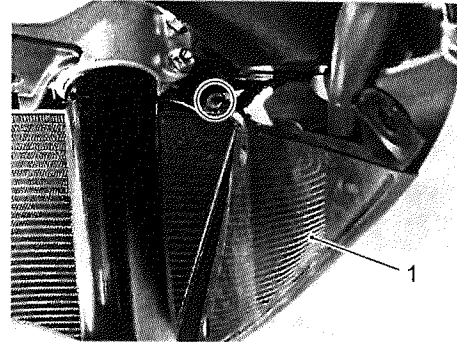


IB14J1940010-01

Installation

Install the body cowling cover and inner under cowlings in the reverse order of removal. Pay attention to the following point:

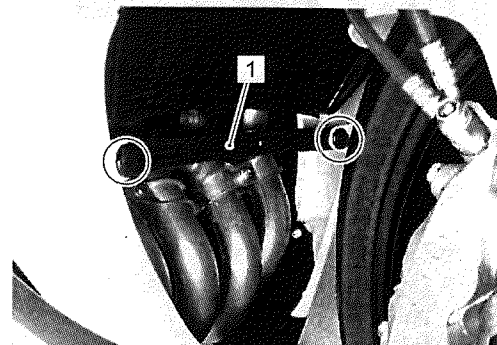
- Insert the convex part of the inner under cowlings (1) to the hole of the radiator heat shield.



IB14J1940011-01

Cowling Removal

- 1) Remove the body cowling cover and inner under cowlings. Refer to "Body Cowling Cover and Inner Under Cowling" (Page 9D-9).
- 2) Remove the fasteners and cowling bracket (1). Refer to "Fastener Removal and Installation" (Page 9D-6).



IB14J1940012-01

- 3) Remove the fastener (2). Refer to "Fastener Removal and Installation" (Page 9D-6).

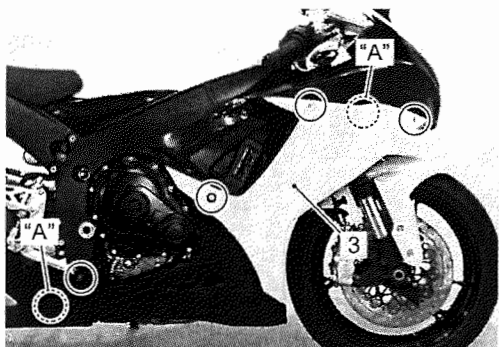


IB14J1940013-01

9D-10 Exterior Parts:

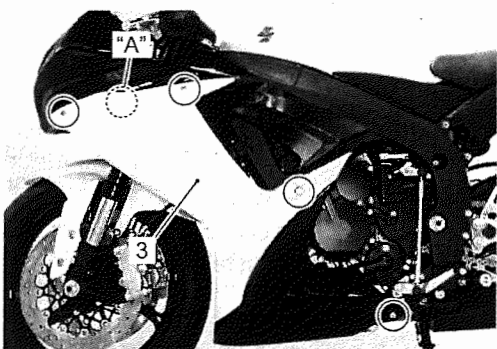
- 4) Remove the bolts.
- 5) Remove the cowling (3).

Right side



IB14J1940014-01

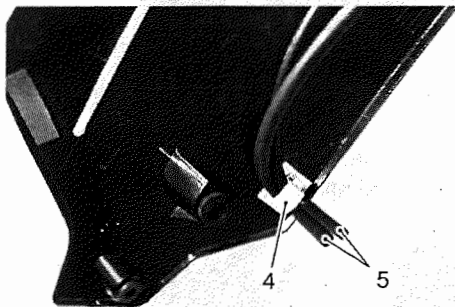
Left side



IB14J1940015-02

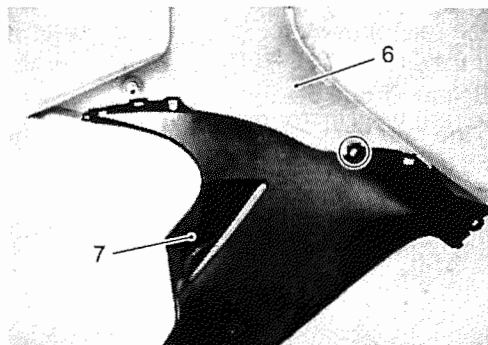
"A": Hooked point

- 6) Open the clamp (4) and remove the hoses (5) from the under cowling (LH).



IB14J1940016-02

- 7) Remove the cowling side (6) from the under cowling (7).



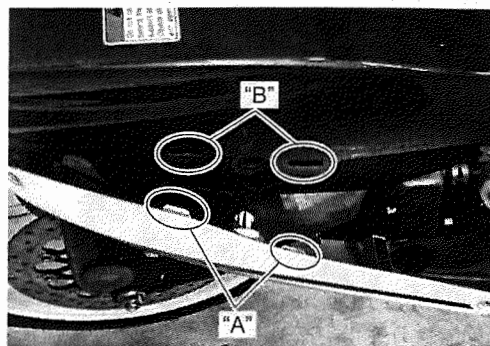
IB14J1940046-02

Installation

Install cowling in the reverse order of removal.

Pay attention to the following point:

- Clamp the hoses as shown in the fuel tank drain hose and breather hose routing diagram. Refer to "Fuel Tank Water Drain Hose and Breather Hose Routing Diagram" in Section 1G (Page 1G-3).
- When installing the cowling, fit the claws "A" of the cowling side into the hole "B" of the intake cover.



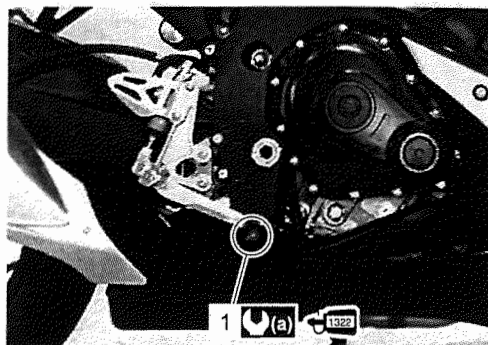
IB14J1940053-01

- Apply thread lock to the right under cowling mounting bolt (1) and tighten it to the specified torque.

1322 : Thread lock cement 99000-32110
(THREAD LOCK CEMENT SUPER "1322" or equivalent)

Tightening torque

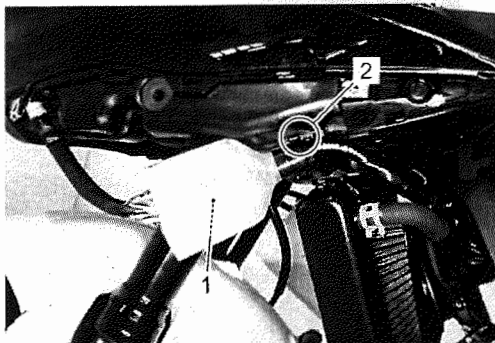
Right under cowling mounting bolt (a): 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)



IB14J1940055-01

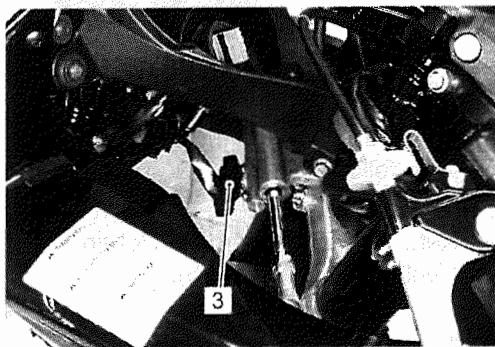
Body Cowling and Windscreen Removal**Removal**

- 1) Remove the rear view mirror. Refer to "Rear View Mirror" (Page 9D-8)
- 2) Remove the left and right cowlings. Refer to "Cowling" (Page 9D-9).
- 3) Disconnect the lead wire couplers (1).
- 4) Remove the clamp (2) from the intake pipe.



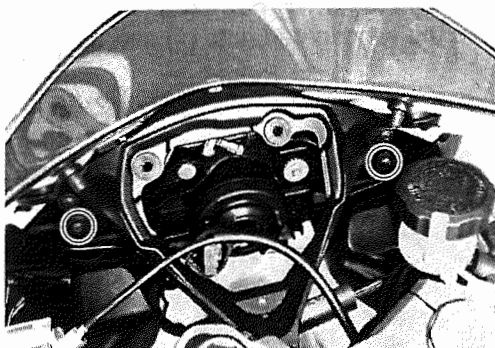
IB14J1940017-02

- 5) Disconnect the steering damper lead wire coupler (3).



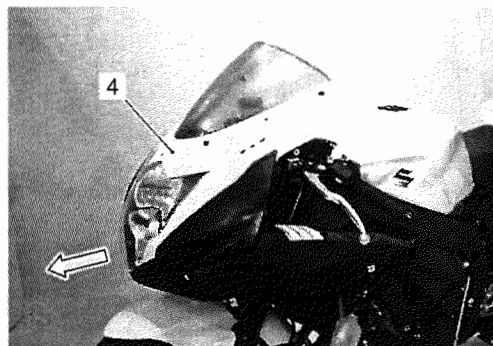
IB14J1940018-01

- 6) Remove the screws.



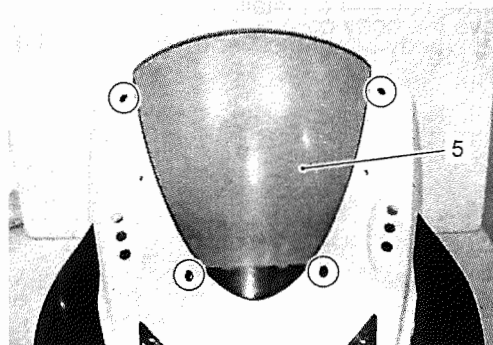
IB14J1940019-01

- 7) Remove the body cowling assembly (4) forward.



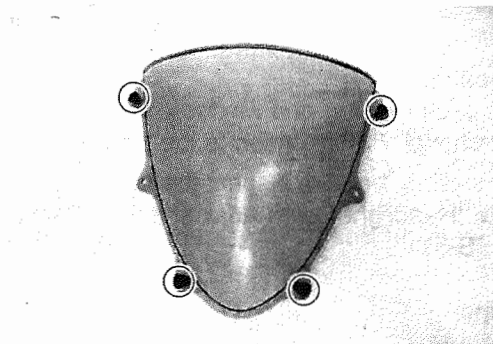
IB14J1940020-01

- 8) Remove the windscreen (5).



IB14J1940021-01

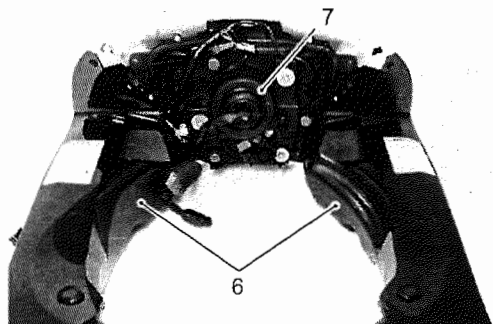
- 9) Remove the nuts.



IB14J1940022-01

- 10) Remove the left and right intake pipes (6). Refer to "Intake Pipe" (Page 9D-12).

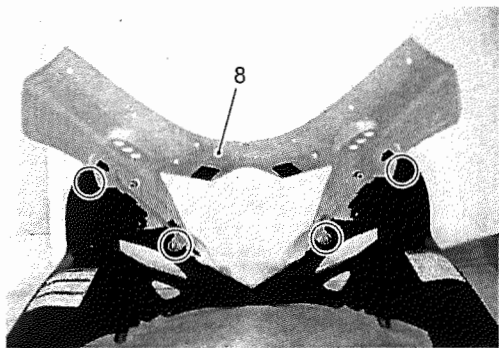
- 11) Remove the headlight (7). Refer to "Headlight Removal and Installation" in Section 9B (Page 9B-3).



IB14J1940023-02

9D-12 Exterior Parts:

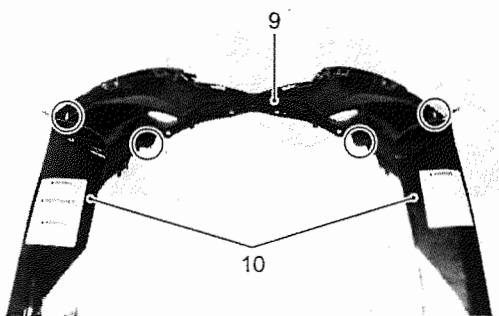
12) Remove the body cowling (8).



IB14J1940024-03

13) Remove the fasteners and screws. Refer to "Fastener Removal and Installation" (Page 9D-6).

14) Remove the body cowling cover (9) from the intake covers (10).



IB14J1940025-02

Installation

Install the body cowling and windscreen in the reverse order of removal. Pay attention to the following point:

- After installing, be sure inspect the headlight beam. Refer to "Headlight Beam Adjustment" in Section 9B (Page 9B-5).

Intake Pipe

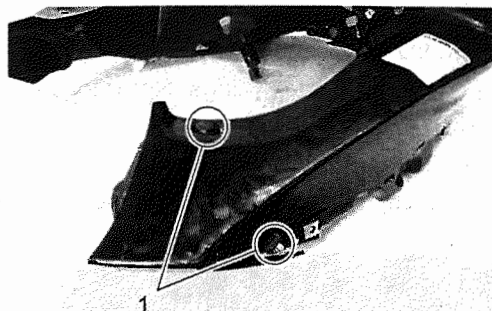
NOTE

The right and left intake pipes are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

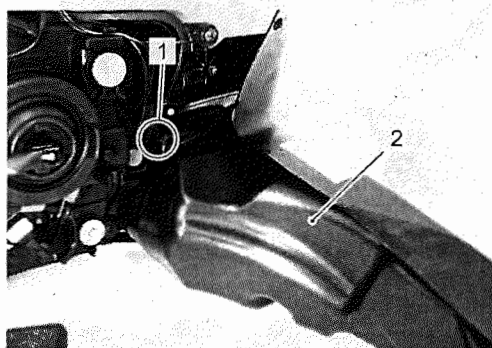
Removal

- 1) Remove the body cowling assembly. Refer to "Body Cowling and Windscreen" (Page 9D-11).
- 2) Remove the fasteners (1). Refer to "Fastener Removal and Installation" (Page 9D-6).

3) Remove the intake pipe (2).



IB14J1940026-01



IB14J1940027-01

Installation

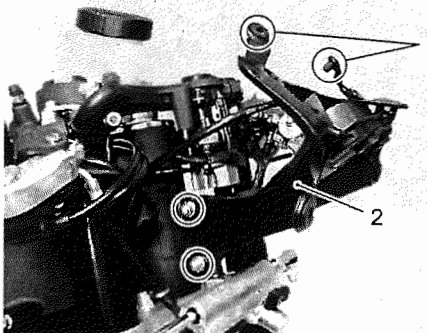
Install the intake pipe in the reverse order of removal. Pay attention to the following point:

- Route the wiring harness properly, install the left intake pipe. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

Cowling Brace

Removal

- 1) Remove the body cowling assembly. Refer to "Body Cowling and Windscreen" (Page 9D-11).
- 2) Remove the windscreen nuts (1) and cowling brace (2).



IB14J1940028-01

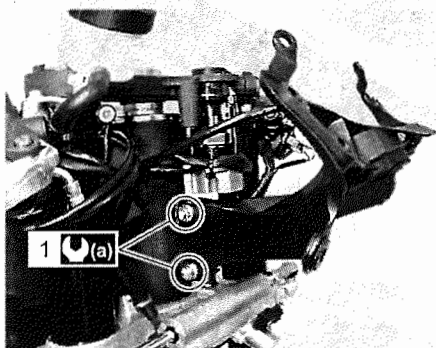
Installation

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

- Tighten the cowling brace mounting nuts (1) to the specified torque.

Tightening torque

Cowling brace mounting nut (a): 38 N·m (3.8 kgf-m, 27.5 lbf-ft)

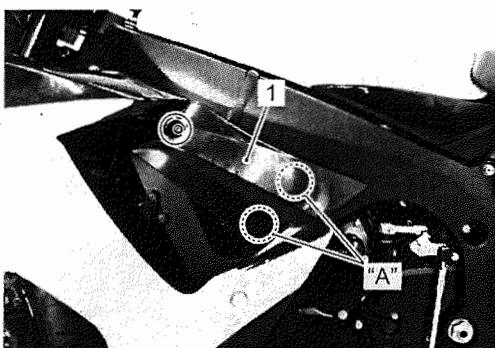


IB14J1940029-01

Cowling Side Cover Removal**NOTE**

The left and right cowling side covers are installed symmetrically and therefore the removal/installation procedure for one side is the same as that for the other side.

- 1) Remove the cowling side cover (1).



IB14J1940030-02

"A": Hooked point

Installation

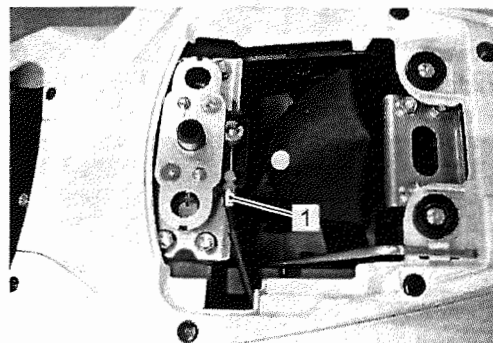
Install the cowling side in the reverse order of removal.

Frame Cover**NOTE**

The left and right frame covers are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

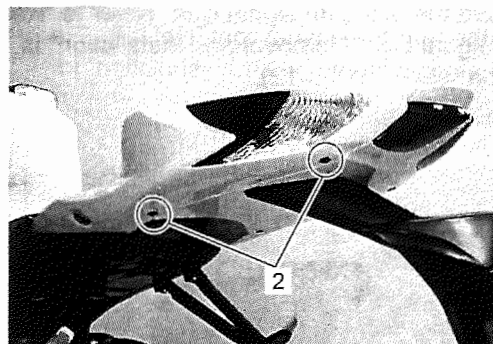
Removal

- 1) Remove the front and rear seats. Refer to "Front Seat" (Page 9D-7) and "Rear Seat" (Page 9D-8).
- 2) Disconnect the seat lock cable (1).

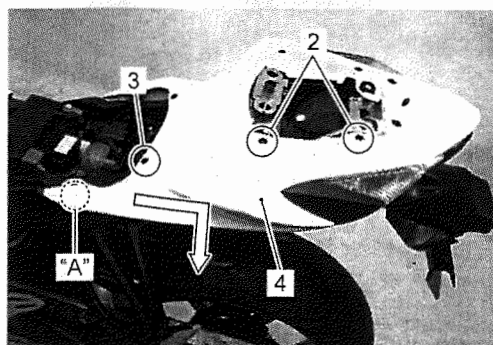


IB14J1940031-01

- 3) Remove the fasteners (2) and screw (3). Refer to "Fastener Removal and Installation" (Page 9D-6).
- 4) Pull the frame cover (4).



IB14J1940032-01

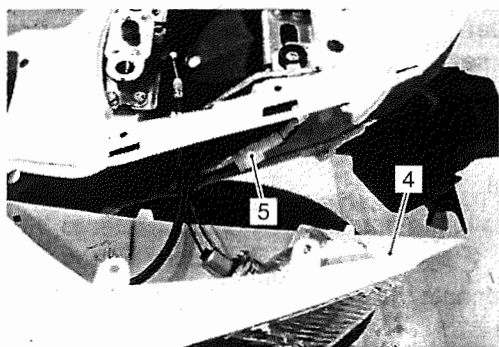


IB14J1940033-01

"A": Hooked point

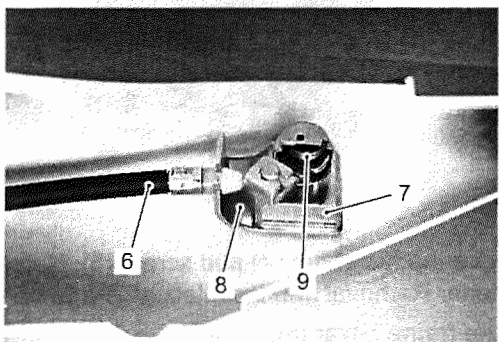
9D-14 Exterior Parts:

- 5) Disconnect the rear turn signal light coupler (5) and remove the frame cover (4).



IB14J1940034-01

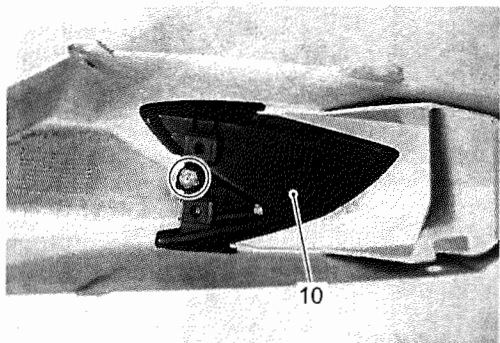
- 6) Disconnect the seat lock cable (6), seat lock plate (7), guide (8) and seat lock (9). (LH only)



IB14J1940035-01

- 7) Remove the rear turn signal light. Refer to "Rear Turn Signal Light Removal and Installation" in Section 9B (Page 9B-12).

- 8) Remove the rear frame cover (10).

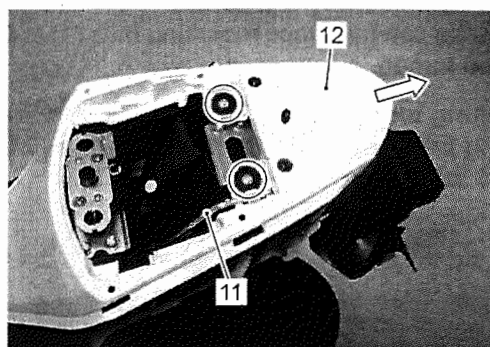


IB14J1940036-01

- 9) Remove the frame cover in the same manner as the other side removal.

- 10) Remove the fuel tank stay (11).

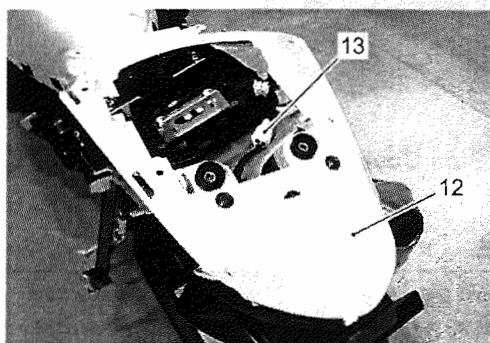
- 11) Remove the bolts and pull the center frame cover (12) backward.



IB14J1940037-01

- 12) Disconnect the rear combination light coupler (13).

- 13) Remove the center frame cover (12).



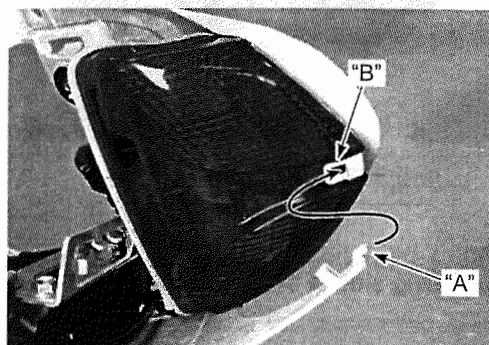
IB14J1940038-01

- 14) Remove the rear combination light. Refer to "Rear Combination Light Removal and Installation" in Section 9B (Page 9B-9).

Installation

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

- Insert the convex part "A" of the rear fender cover (front) to the hole "B" of the center frame cover.

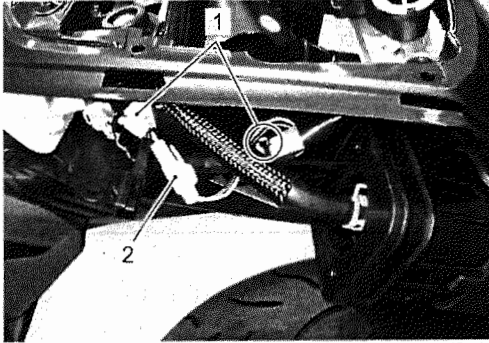


IB14J1940039-01

- Route the wiring harness and seat lock cable. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5) and "Seat Lock Cable Routing Diagram" (Page 9D-1).

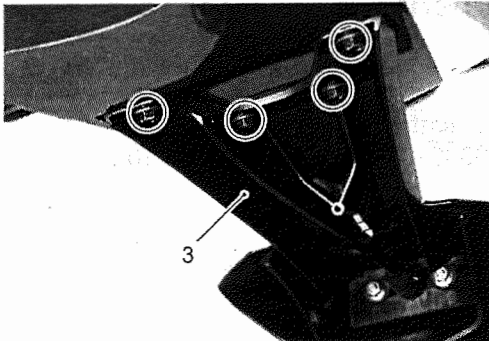
Rear Fender**Removal**

- 1) Remove the right frame cover. Refer to "Frame Cover" (Page 9D-13).
- 2) Disconnect the clamps (1) and licence plate light coupler (2).



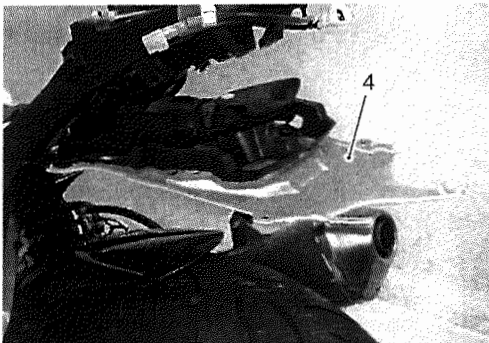
IB14J1940040-02

- 3) Remove the rear fender (rear) (3).



IB14J1940041-02

- 4) Remove the licence plate light. Refer to "License Plate Light Removal and Installation" in Section 9B (Page 9B-10).
- 5) Remove the center frame cover. Refer to "Frame Cover" (Page 9D-13).
- 6) Remove the rear fender cover (front) (4).

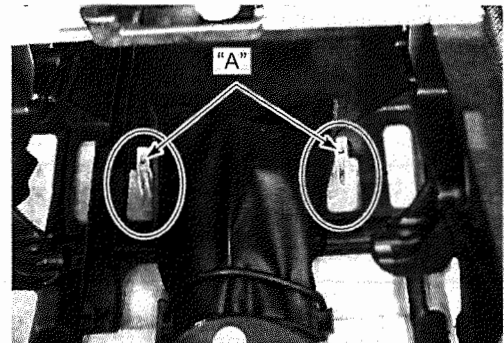


IB14J1940042-01

Installation

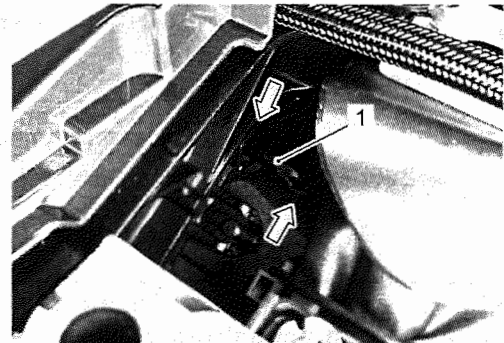
Install the rear fender in the reverse order of removal. Pay attention to the following points:

- Insert the convex parts "A" of the rear fender cover (front) to the hole of the rear fender (front).



IB14J1940043-01

- Pass the license plate light lead wire (1) into the rear fender (front).



IB14J1940044-02

- Clamp the license plate light lead wire. Refer to "Wiring Harness Routing Diagram" in Section 9A (Page 9A-5).

Front Fender**Removal**

Refer to "Front Fork Removal and Installation" in Section 2B (Page 2B-2).

Installation

Refer to "Front Fork Removal and Installation" in Section 2B (Page 2B-2).

Specifications

Tightening Torque Specifications

BENB15J29407001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lbf·ft	
Rear view mirror mounting nut	10	1.0	7.0	☞ (Page 9D-9)
Right under cowling mounting bolt	6.5	0.65	4.7	☞ (Page 9D-10)
Cowling brace mounting nut	38	3.8	27.5	☞ (Page 9D-13)

NOTE

The tightening torque(s) also specified in:
 “Exterior Parts Construction” (Page 9D-2)
 “Rear View Mirror Construction” (Page 9D-5)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J29408001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT SUPER “1322” or equivalent	P/No.: 99000-32110	☞ (Page 9D-10)

NOTE

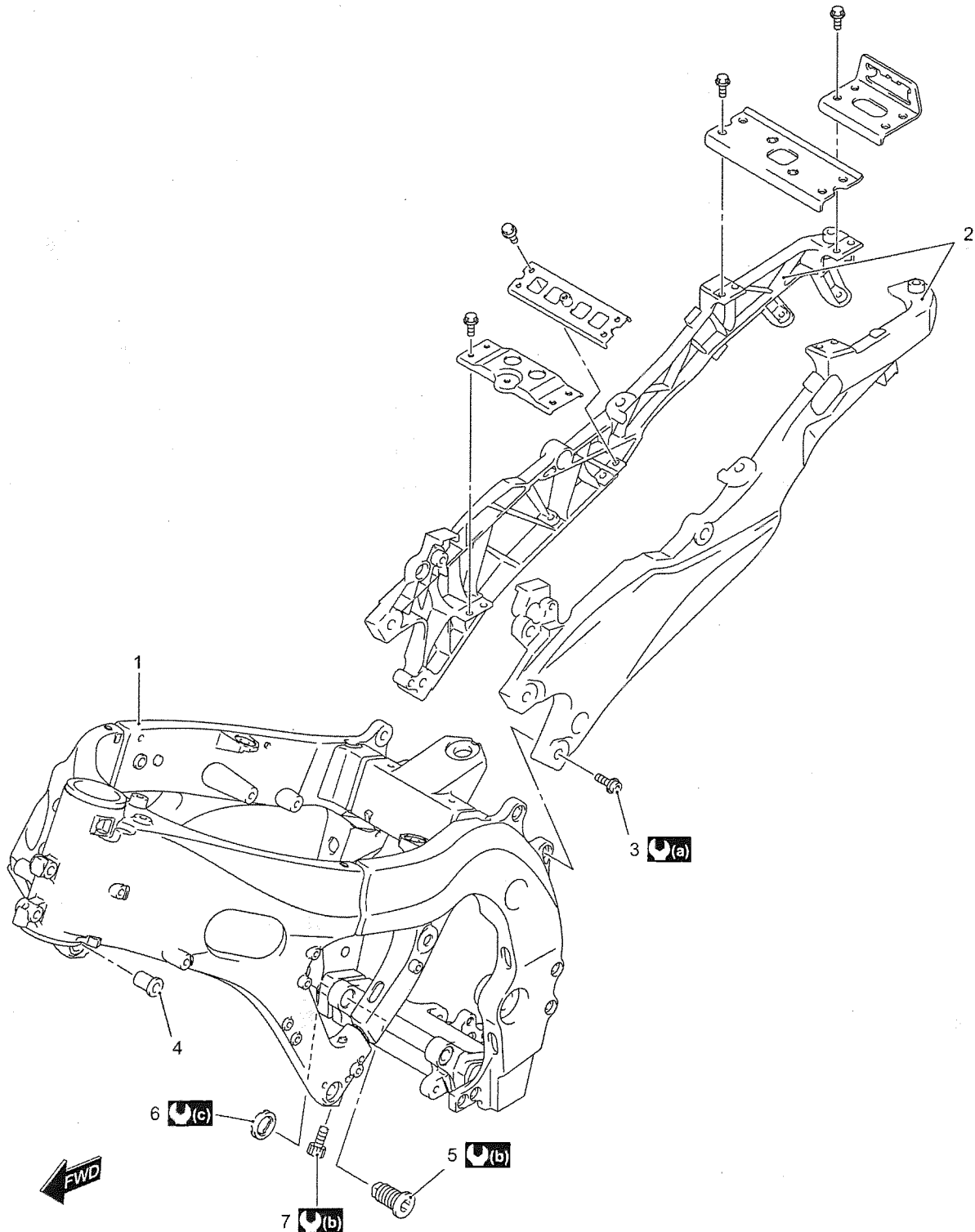
Required service material(s) also described in:
 “Exterior Parts Construction” (Page 9D-2)

Body Structure

Repair Instructions

Body Frame Construction

BENB15J29506001

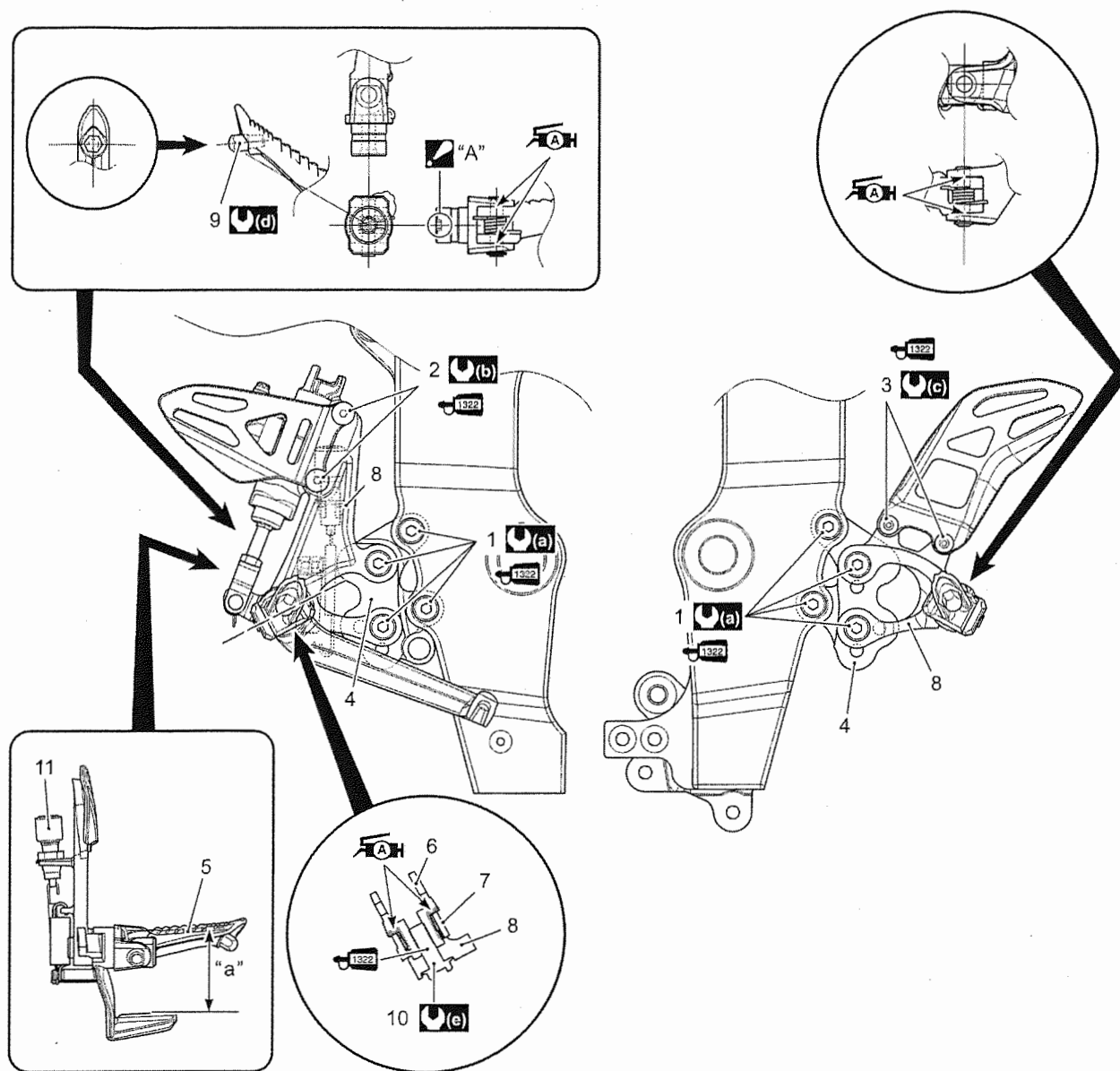


IB14J1950001-01

1. Frame	5. Engine mounting thrust adjuster	: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
2. Seat rail	6. Engine mounting thrust adjuster lock-nut	: 45 N·m (4.5 kgf-m, 32.5 lbf-ft)
3. Seat rail mounting bolt	7. Engine mounting pinch bolt	
4. Collar	: 50 N·m (5.0 kgf-m, 36.0 lbf-ft)	

Front Footrest Bracket Construction

BENB15J29506002



IB14J1950002-06

1. Footrest bracket bolt	8. Footrest bracket No. 2	: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
2. Rear brake master cylinder mounting bolt	9. Bank sensor bolt	: 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)
3. Footrest guard screw	10. Footrest holder bolt	: 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
4. Footrest bracket No. 1	11. Rear brake light switch	: 35 N·m (3.5 kgf-m, 25.5 lbf-ft)
5. Footrest	"A": Align the cutaway when installing.	"AH": Apply grease to the sliding surface.
6. Footrest holder	"a": 65 – 75 mm (2.6 – 3.0 in)	"1322": Apply thread lock to the thread part.
7. Rear brake pedal	: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	

Front Footrest Bracket Removal and Installation

BENB15J29506003

Removal**Footrest bracket No. 1**

Remove the footrest bracket No. 2 bolt and footrest bracket No. 1 bolt as shown in the front footrest bracket construction. Refer to "Front Footrest Bracket Construction" (Page 9E-2).

Footrest bracket No. 2**Right side**

Remove the right footrest bracket No. 2. Refer to "Rear Brake Pedal Removal and Installation" in Section 4A (Page 4A-18).

Left side

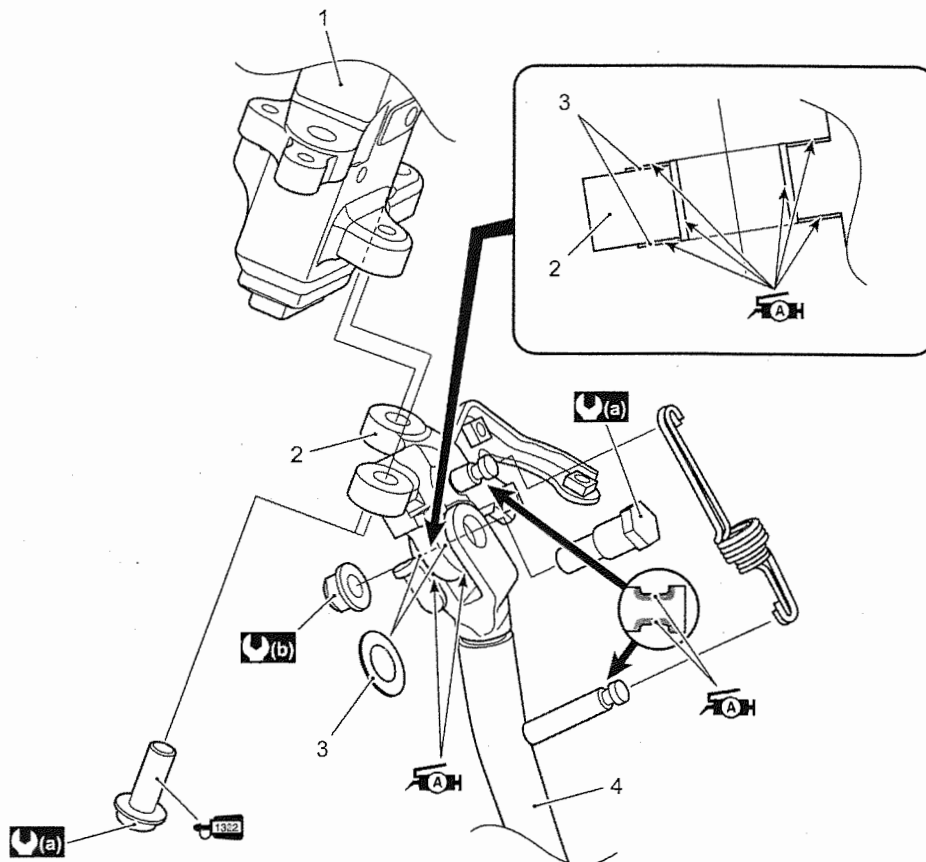
Remove the left footrest bracket No. 2 by removing the bolts as shown in the front footrest bracket construction. Refer to "Front Footrest Bracket Construction" (Page 9E-2).

Installation

Install the front footrest bracket No. 1 and No. 2 in the reverse order of removal as shown in the front footrest bracket construction. Refer to "Front Footrest Bracket Construction" (Page 9E-2).

Side-stand Construction

BENB15J29506004



IB14J1950003-05

1. Frame	3. Washer	Ⓐ : 50 N·m (5.0 kgf-m, 36.0 lbf-ft)	ⒶH : Apply grease to sliding surface.
2. Side-stand bracket	4. Side-stand	Ⓑ : 40 N·m (4.0 kgf-m, 29.0 lbf-ft)	1322 : Apply thread lock to the thread part.

Side-stand Removal and Installation

BENB15J29506005

Removal

- 1) Support the motorcycle with a jack or wooden block.

NOTICE

- Do not support the motorcycle with the exhaust pipes.
- Make sure that the motorcycle is supported securely.

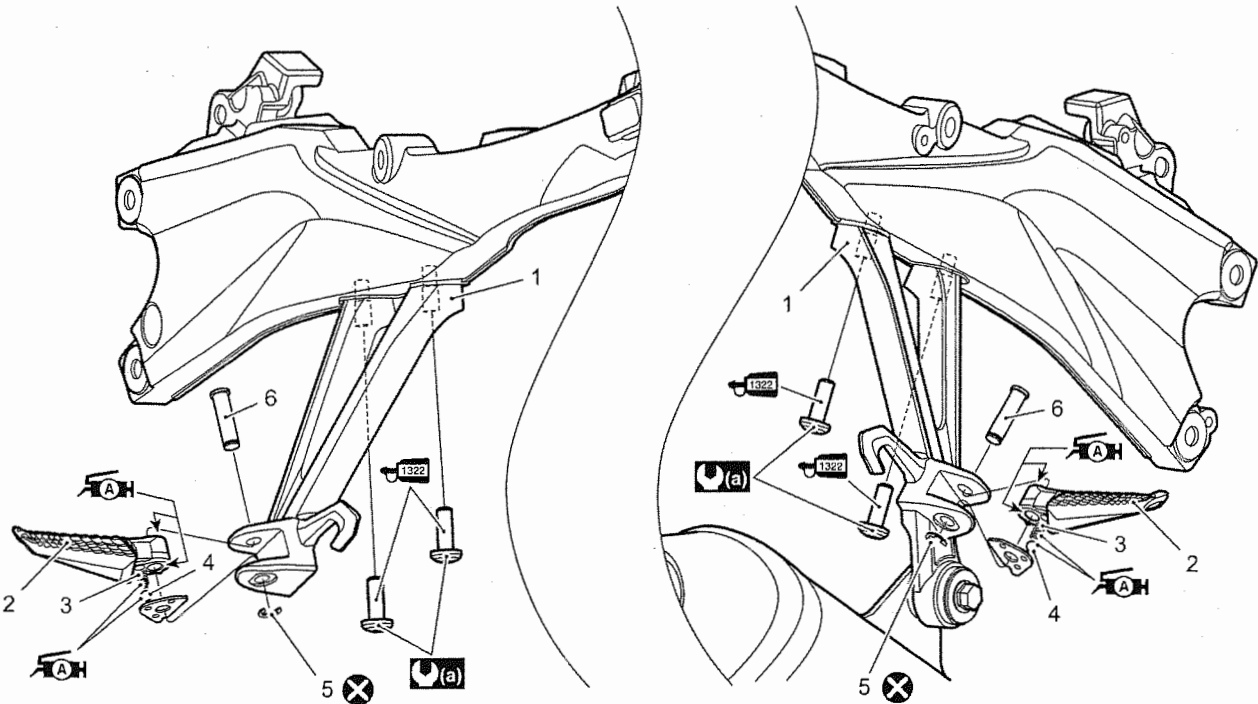
- 2) Remove the side-stand as shown in the side-stand construction. Refer to "Side-stand Construction" (Page 9E-3).

Installation

Install the side-stand as shown in the side-stand construction. Refer to "Side-stand Construction" (Page 9E-3).

Pillion Footrest Construction

BENB15J29506006



IB14J1950004-02

1. Pillion footrest bracket	4. Ball	U(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	⊗ : Do not reuse.
2. Pillion footrest	5. E-ring	AH : Apply grease.	
3. Spring	6. Footrest pin	1322 : Apply thread lock to the thread part.	

Pillion Footrest Removal and Installation

BENB15J29506007

Removal

Remove the pillion footrest as shown in the pillion footrest construction. Refer to "Pillion Footrest Construction" (Page 9E-4).

Installation

Install the pillion footrest as shown in the pillion footrest construction. Refer to "Pillion Footrest Construction" (Page 9E-4).

Specifications

Tightening Torque Specifications

BENB15J29507001

NOTE

The tightening torque(s) also specified in:

“Body Frame Construction” (Page 9E-1)

“Front Footrest Bracket Construction” (Page 9E-2)

“Side-stand Construction” (Page 9E-3)

“Pillion Footrest Construction” (Page 9E-4)

Reference:

For the tightening torques of fasteners not specified in this section, refer to “Tightening Torque List” in Section 0C (Page 0C-7).

Special Tools and Equipment

Recommended Service Material

BENB15J29508001

NOTE

Required service material(s) also described in:

“Front Footrest Bracket Construction” (Page 9E-2)

“Side-stand Construction” (Page 9E-3)

“Pillion Footrest Construction” (Page 9E-4)

○

GSX-R750L2 ('12 MODEL)

10

When you service the above model, please refer to the information contained in this chapter in addition to the base L1 ('11 model) service manual.

CONTENTS

	PAGE
Service Data	10-2
Front Fork Components	10-3
Pillion Footrest Construction	10-4

Service Data

NOTE

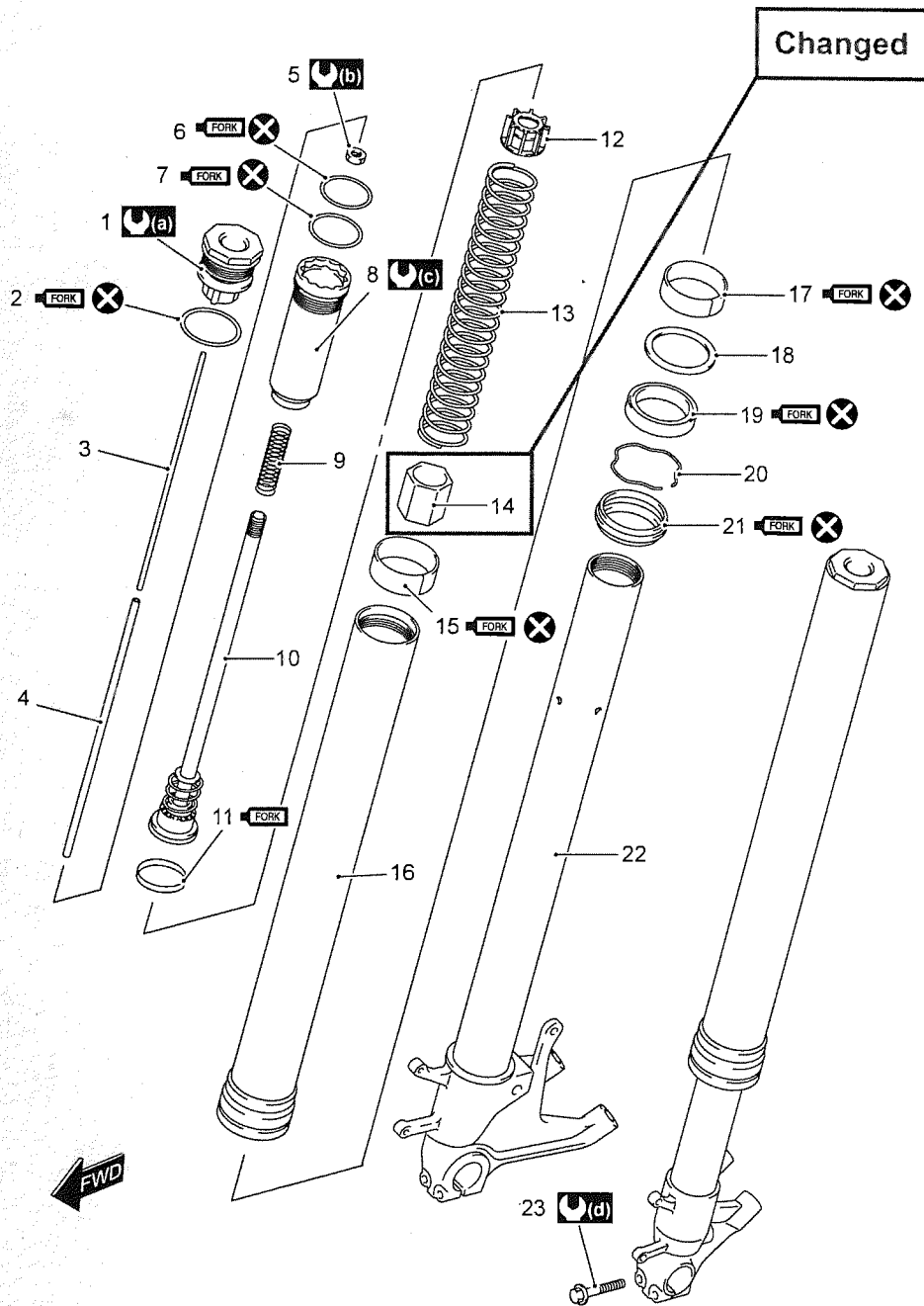
Any differences between the GSX-R750L1 ('11 model) and GSX-R750L2 ('12 model) in service data are indicated with an asterisk mark (*) and highlighting (halftone screen).

Suspension

Unit: mm (in)

Item	Standard		Limit
Front fork stroke	120 (4.7)		—
Front fork spring free length	* 238.4 (9.39)		* 233 (9.2)
Front fork oil level	90 (3.5) 80 (3.1) 10 min. after adjustment		—
Front fork oil type	FORK OIL SS-47 or an equivalent fork oil		—
Front fork oil capacity (Each leg)	* 487 ml (16.5/17.1 US/Imp oz)		—
Front fork inner tube O.D	41 (1.6)		—
Front fork spring adjuster	4 turns in from full soft position		—
Front fork damping force adjuster	Rebound	4 turns out from full hard position	—
	Compression	5 turns out from full hard position	—
Rear shock absorber spring pre-set length	181 (7.1)		—
Rear shock absorber damping force adjuster	Rebound	2 turns out from full hard position	—
	Compression	Lo: 2-1/4 turns out from full hard position Hi: 3 turns out from full hard position	—
Rear wheel travel	130 (5.1)		—
Swingarm pivot shaft runout	—		0.3 (0.01)

Front Fork Components



1. Front fork cap	9. Spring	17. Guide bushing	28 N·m (2.8 kgf-m, 20.0 lbf-ft)
2. O-ring	10. Piston rod	18. Oil seal spacer	90 N·m (9.0 kgf-m, 65.0 lbf-ft)
3. Rebound damping force adjuster rod	11. Piston ring A	19. Oil seal	23 N·m (2.3 kgf-m, 16.5 lbf-ft)
4. Compression damping force adjuster rod	12. Spring collar B	20. Stopper ring	Apply fork oil.
5. Piston rod nut	13. Spring	21. Dust seal	Do not reuse.
6. O-ring	14. Spring collar A	22. Inner tube	
7. Piston ring B	15. Slide bushing	23. Front axle pinch bolt	
8. Rod guide case	16. Outer tube	35 N·m (3.5 kgf-m, 25.5 lbf-ft)	

GSX-R750L3 ('13 MODEL)

11

The service data and specifications for the above model GSX-R750L3 ('13-Model) are the same as the GSX-R750L2 ('12-Model).

1. The first part of the document is a list of names and addresses of the members of the committee.

2. The second part of the document is a list of names and addresses of the members of the committee.

3. The third part of the document is a list of names and addresses of the members of the committee.

GSX-R750L4 ('14 MODEL)

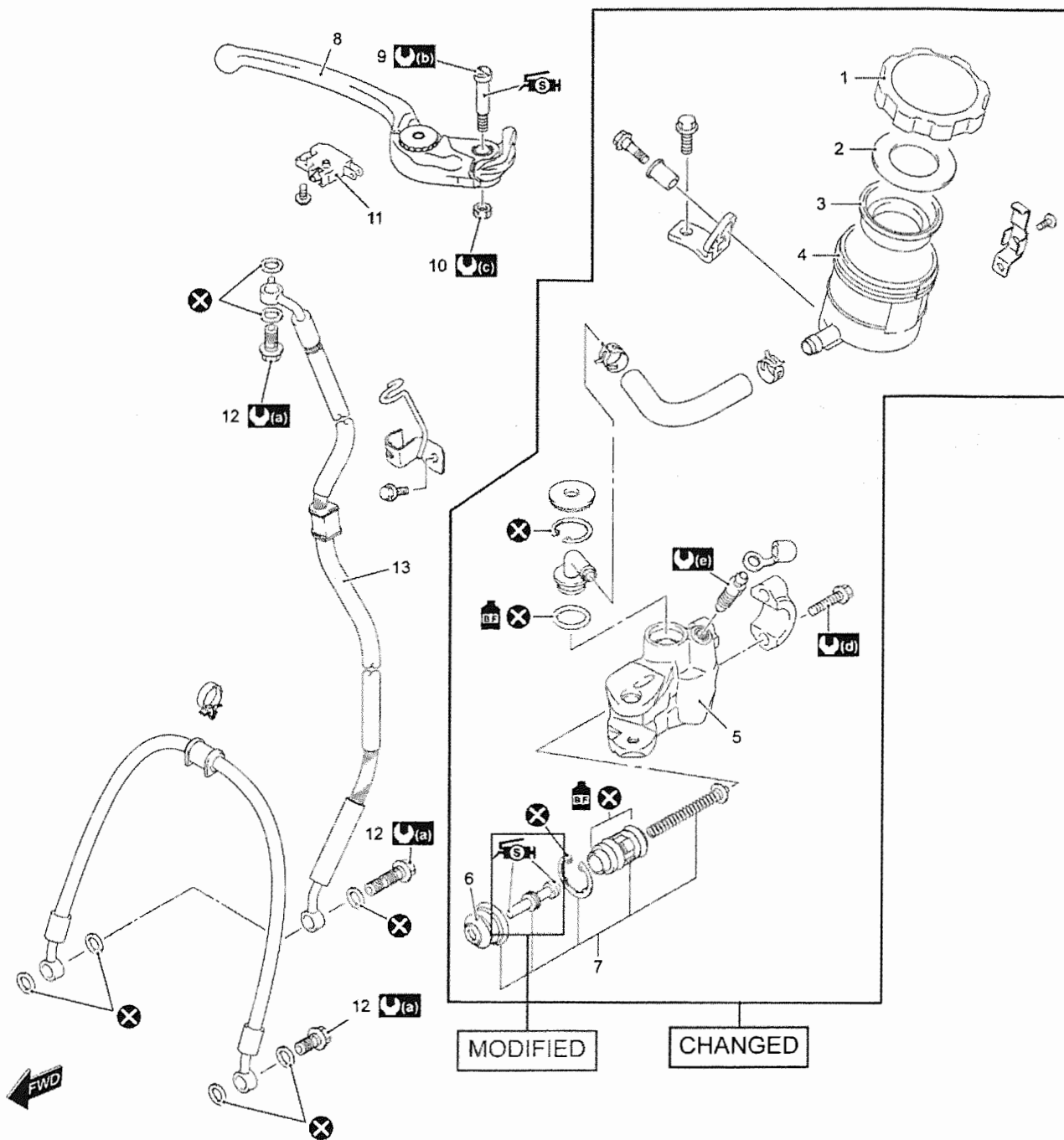
12

When you service the above model, please refer to the information contained in this chapter in addition to the previous chapters and the base L1 ('11 model) service manual.

CONTENTS

Front Brake Master Cylinder Components	12-2
Front Brake Master Cylinder / Brake Lever Disassembly and Assembly	12-3

Front Brake Master Cylinder Components



IB14J1410024-03

1. Reservoir cap	8. Brake lever	: 1 N·m (0.1 kgf-m, 0.5 lbf-ft)
2. Plate	9. Brake lever pivot bolt	: 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
3. Diaphragm	10. Brake lever pivot bolt lock-nut	: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
4. Reservoir tank	11. Brake light switch	: 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
5. Master cylinder	12. Brake hose union bolt	: Apply brake fluid.
6. Dust boot	13. Brake hose	: Apply silicone grease.
7. Piston set	: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	: Do not reuse.

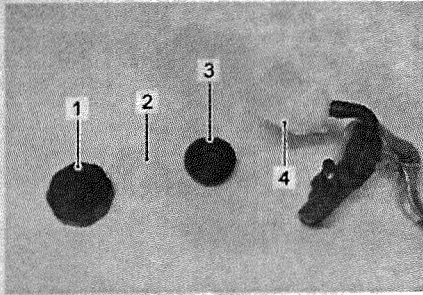
Front Brake Master Cylinder / Brake Lever Disassembly and Assembly

BENB14J14106013

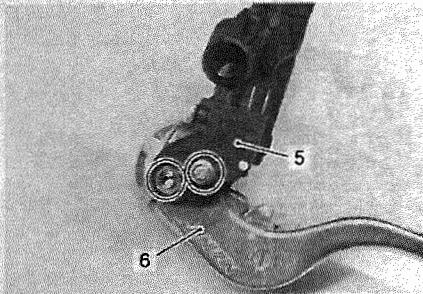
Refer to "Front Brake Master Cylinder Assembly
Removal and Installation" (Page 4A-10).

Disassembly

- 1) Remove the reservoir cap (1), plate (2), diaphragm (3) and reservoir tank (4).




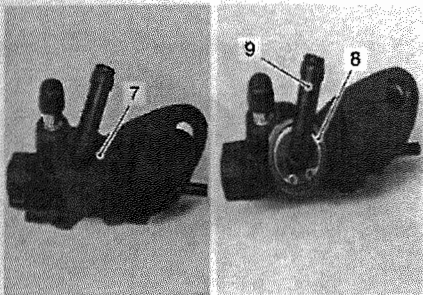
- 2) Remove the brake light switch (5) and brake lever (6).



- 3) Remove the dust rubber (7), snap ring (8) and connector (9).

Special tool


 : 09900-06108 (Snap ring remover (Close type))

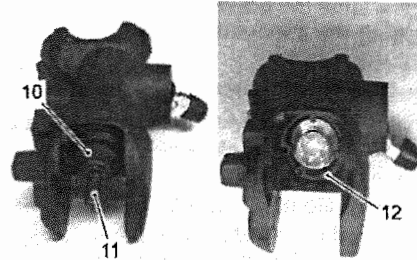


- 4) Pull out the dust boot (10) and push rod (11).

- 5) Remove the snap ring (12).

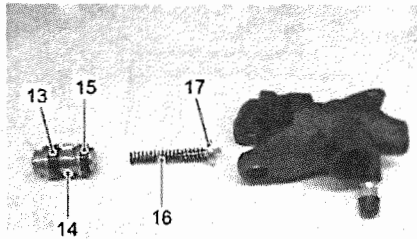
Special tool

 : 09900-06108 (Snap ring remover (Close type))



- 6) Remove the following parts from the master cylinder.

- Secondary cup (13)
- Piston (14)
- Primary cup (15)
- Return spring (16)
- Return spring guide (17)



Assembly

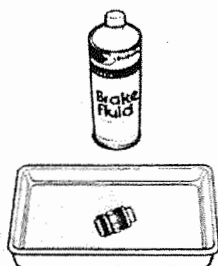
Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

- Wash the master cylinder components with new brake fluid before reassembly.

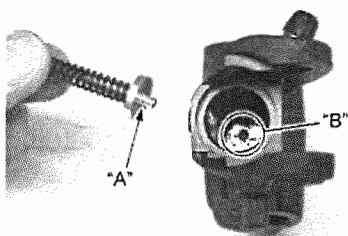
NOTICE

- 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.
-
- Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.

BF: Brake fluid (DOT 4)




- When installing the spring guide, fit the spring guide end "A" into the hole "B" of the master cylinder.




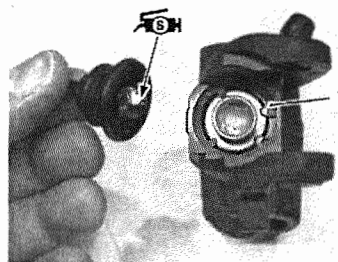
- Fit a new snap ring (1).

Special tool

 : 09900-06108 (Snap ring remover (Close type))

- Apply grease to the push rod end.

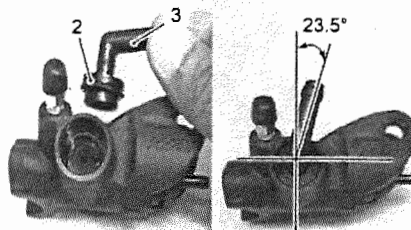
 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)



- Apply brake fluid to the new O-ring and install it.


BF: Brake fluid (DOT 4)

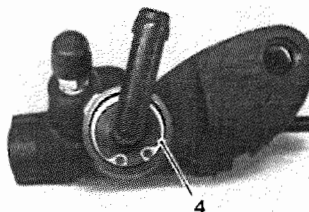
- Install the connector (3) as shown in the figure.



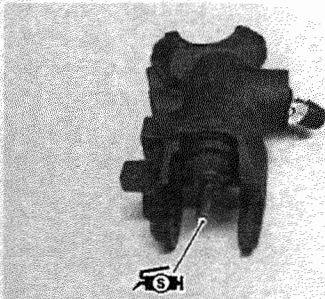
- Fit a new snap ring (4).

Special tool


 : 09900-06108 (Snap ring remover (Close type))

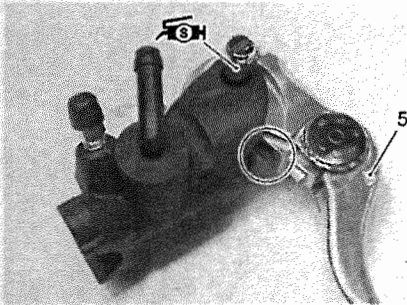


- Apply grease to the push rod end.



- When installing the brake lever (5), insert the push rod into the hole of the brake lever.
- Apply grease to the brake lever pivot bolt.

 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)

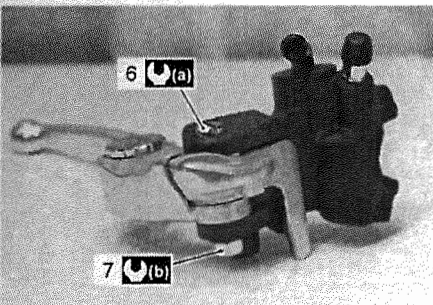


- Tighten the pivot bolt (6) and lock-nut (7) to the specified torque.

Tightening torque

Brake lever pivot bolt (a): 1 N·m (0.1 kgf-m, 0.5 lbf-ft)

Brake lever pivot bolt lock-nut (b): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



MODIFIED

- When installing the brake light switch, align the projection on the switch with the hole in the master cylinder.



- Install the reservoir tank and hose as shown in the front brake hose routing diagram. Refer to "Front Brake Hose Routing Diagram" (Page 4A-1).

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GSX-R750L5 ('15 MODEL)

13

The service data and specifications for the above model GSX-R750L5 ('15-Model) are the same as the GSX-R750L4 ('14-Model).

