SUZUKI

SFV650

SERVICE MANUAL

99500-36190-01E

FOREWORD

This manual contains an introductory description on the SUZUKI SFV650 and procedures for its inspection/service and overhaul of its main components.
Other information considered as generally known is not included.
Read the GENERAL INFORMATION section to familiarize yourself with the motorcycle and its maintenance. Use this section as well as other sections to use as a guide for proper inspection and service.
This manual will help you know the motorcycle better so that you can assure your customers of fast and reliable service.

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

⚠ WARNING

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

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Section 00

Precautions

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Precautions

Precautions

Warning / Caution / Note

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

⚠ WARNING

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

⚠ CAUTION

Indicates a potential hazard that could result in motorcycle damage.

NOTE

Indicates special information to make maintenance easier or instructions clearer.

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

General Precautions

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⚠ WARNING

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

⚠ CAUTION

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

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

Precautions for Electrical Circuit Service

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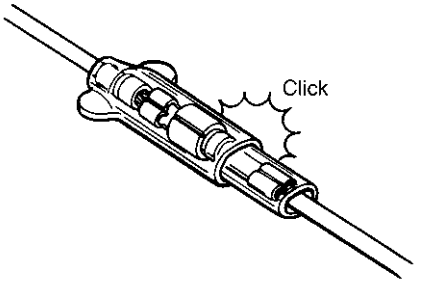
When handling the electrical parts or servicing the FI system, observe the following points for the safety of the system.

Electrical Parts

Connector / Coupler

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



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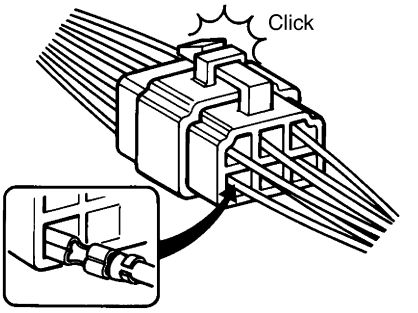
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- 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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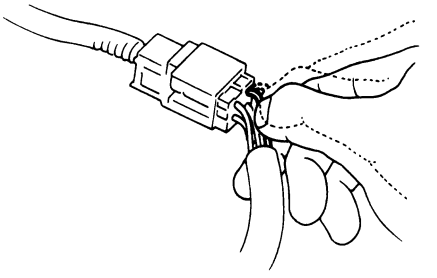
- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



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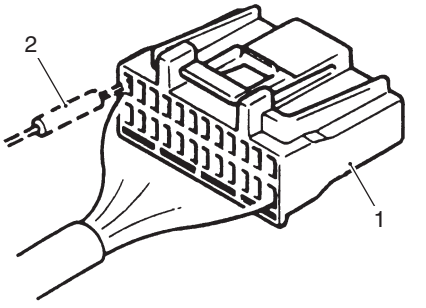
- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (rear) of the connector/coupler.



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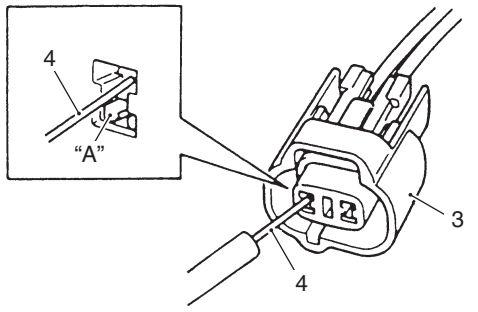
1. Coupler	2. Probe

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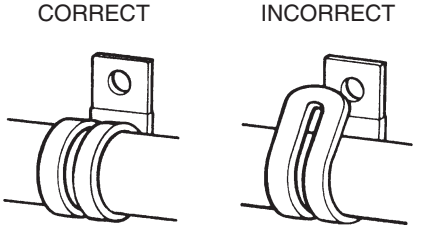
3. Coupler	4. Probe	"A": Where male terminal fits

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

Clamp

- Clamp the wire harness at such positions as indicated in "Wiring Harness Routing Diagram in Section 9A (Page 9A-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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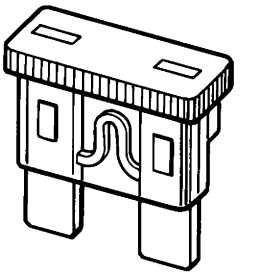
Fuse

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



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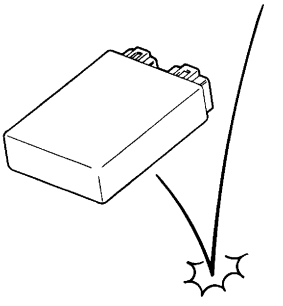
Switch

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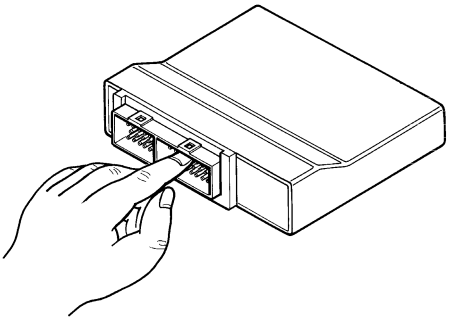
- Be careful not to touch the electrical terminals of the electronic parts (ECM, etc.). The static electricity from your body may damage them.



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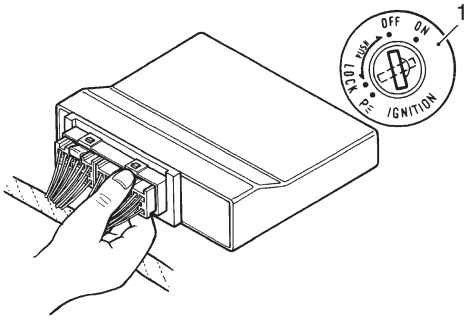
- When disconnecting and connecting the coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



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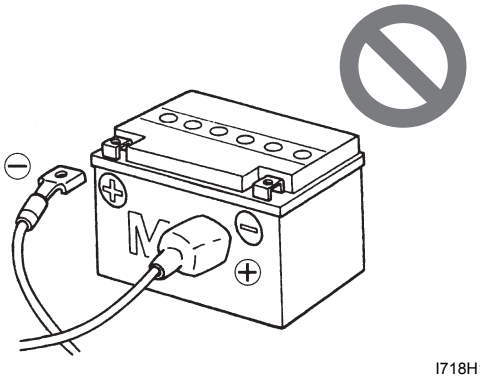
1. Ignition switch

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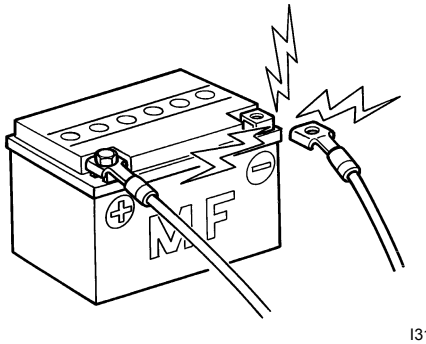
- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the electronic unit which may result in serious damage.



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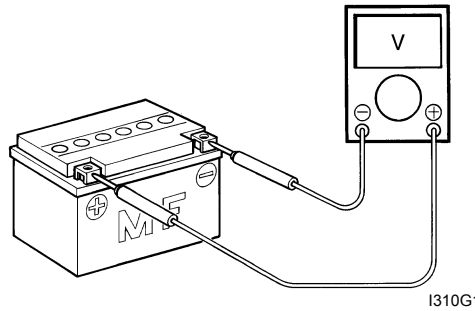
- Before measuring voltage at each terminal, check to make sure that battery voltage is 11 V or higher. Terminal voltage check with a low battery voltage will lead to erroneous diagnosis.



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- Never connect any tester (voltmeter, ohmmeter, or whatever) to the electronic unit when its coupler is disconnected. Otherwise, damage to electronic unit may result.
- Never connect an ohmmeter to the electronic unit with its coupler connected. If attempted, damage to ECM 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.

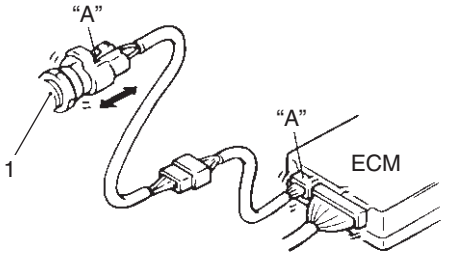
Open circuit check

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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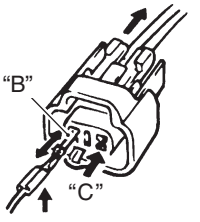
1. Sensor	"A": Check for loose connection

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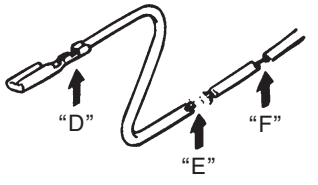
"B": Check contact tension by inserting and removing.
"C": Check each terminal for bend and proper alignment.

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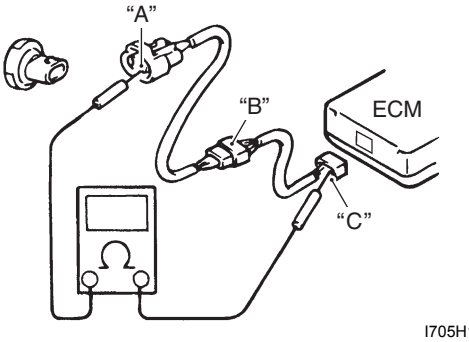
"D": Looseness of crimping
"E": Open
"F": Thin wire (A few strands left)

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".



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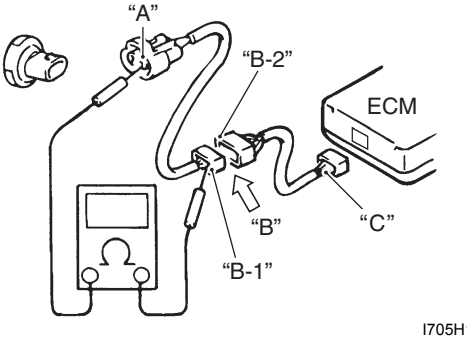
2) Disconnect the coupler "B" and measure resistance between couplers "A" and "B-1".
If no continuity is indicated, the circuit is open between couplers "A" and "B-1". If continuity is indicated, there is an open circuit between couplers "B-2" and "C" or an abnormality in coupler "B-2" or coupler "C".



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Voltage check

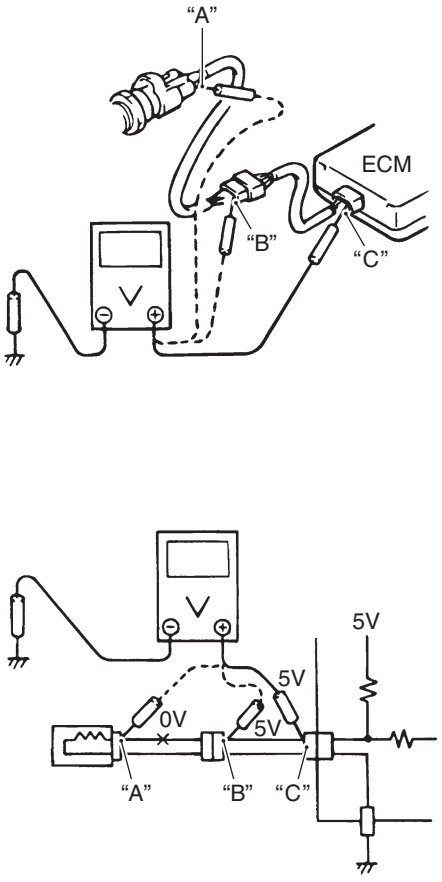
If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

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 are as 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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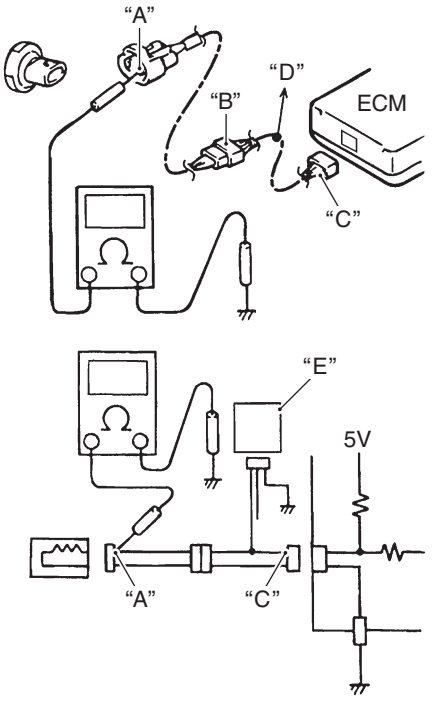
Short circuit check (Wire harness to ground)

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 as shown, disconnect all connectors/ couplers of those parts. Otherwise, diagnosis will be misled.

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



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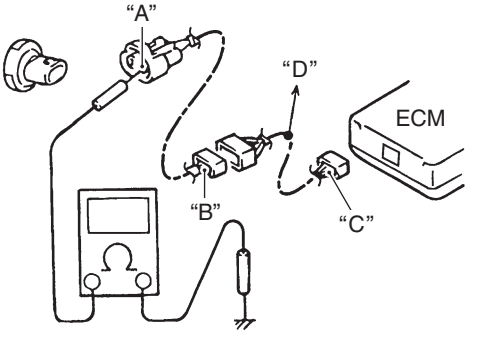
“D”: To other parts	“E”: Other parts

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



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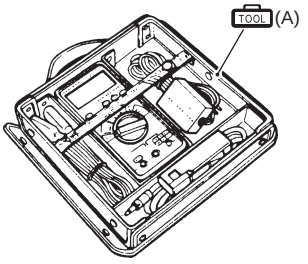
“D”: To other parts

Using The Multi-Circuit Testers

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

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



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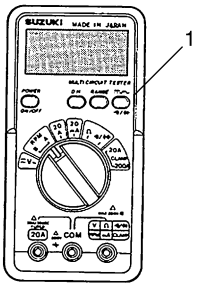
Using the testers

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

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



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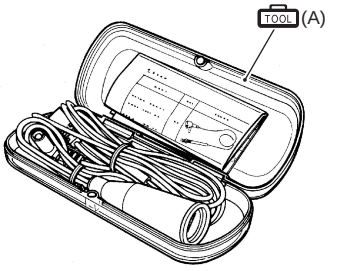
NOTE

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

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



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Section 0

General Information

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General Information

General Description

Symbols

B944H10101001

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

Abbreviations

B944H10101002

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

Vehicle Side View

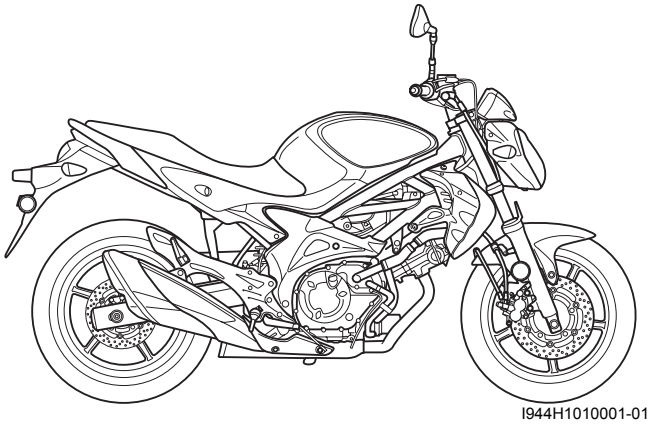
B944H10101003

NOTE

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

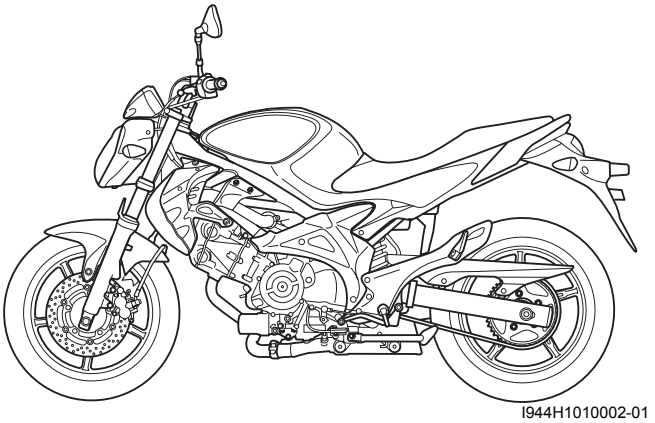
SUZUKI SFV650 (2009-model)

Right Side



I944H1010001-01

Left Side

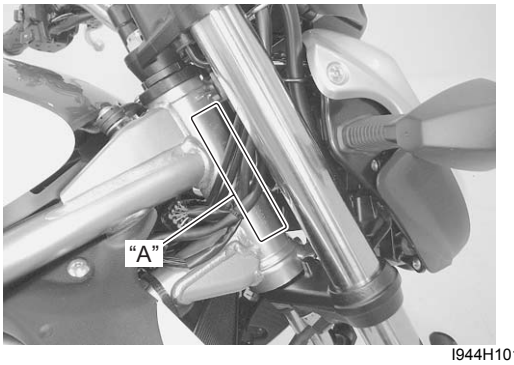


I944H1010002-01

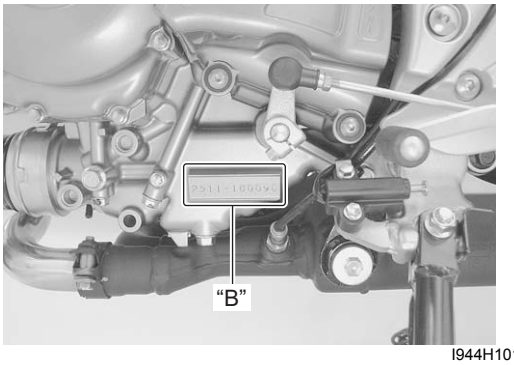
Vehicle Identification Number

B944H10101004

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



I944H1010003-01



I944H1010004-01

Fuel and Oil Recommendation

B944H10101005

Fuel (For USA and Canada)

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

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

Fuel (For Other Countries)

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

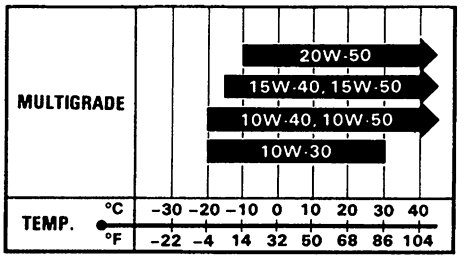
Engine Oil (For USA)

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

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

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

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



I310G1010005-01

Brake Fluid
Specification and classification: DOT 4

⚠ WARNING

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

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

Engine Coolant Recommendation

B944H10101006

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)
1 850 ml (2.0/1.6 US/Imp qt)

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

⚠ CAUTION

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

BREAK-IN Procedures

B944H10101007

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:

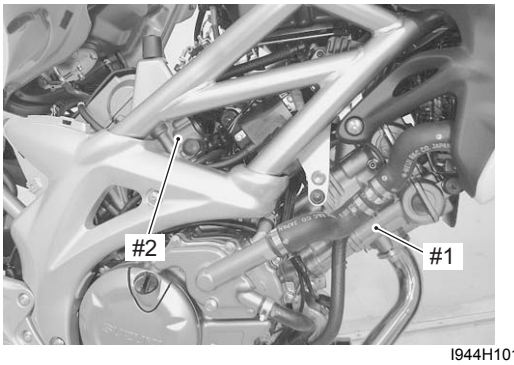
   Speed limits
   Initial 800 km (500 miles): Below 5 250 r/min
   Up to 1 600 km (1 000 miles): Below 7 500 r/min
   Over 1 600 km (1 000 miles): Below 10 500 r/min

2) Upon reaching an odometer reading of 1 600 km (1 000 miles) you can subject the motorcycle to full throttle operation. However, do not exceed 10 500 r/min at any time.

Cylinder Identification

B944H10101008

The two cylinders of this engine are identified as # 1 and # 2 cylinder, as counted from front to rear (as viewed by the rider on the seat).



I944H1010005-02

Country and Area Codes

B944H10101009

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

Code	Country or Area	Effective Frame No.
SFV650 K9 (E-02)	U.K.	JS1CX111100100001 –
SFV650 K9 (E-03)	U.S.A (Except for California)	JS1VP55A 92100001 –
SFV650 K9 (E-19)	E.U.	JS1CX111100100001 –
SFV650 K9 (E-24)	Australia	JS1CX111200100001 –
SFV650 K9 (E-28)	Canada	JS1VP55A 92100001 –
SFV650 K9 (E-33)	California (U.S.A)	JS1VP55A 92100001 –
SFV650UK9 (E-19)	E.U.	JS1CX211100100001 –
SFV650UK9 (E-24)	Australia	JS1CX211200100001 –

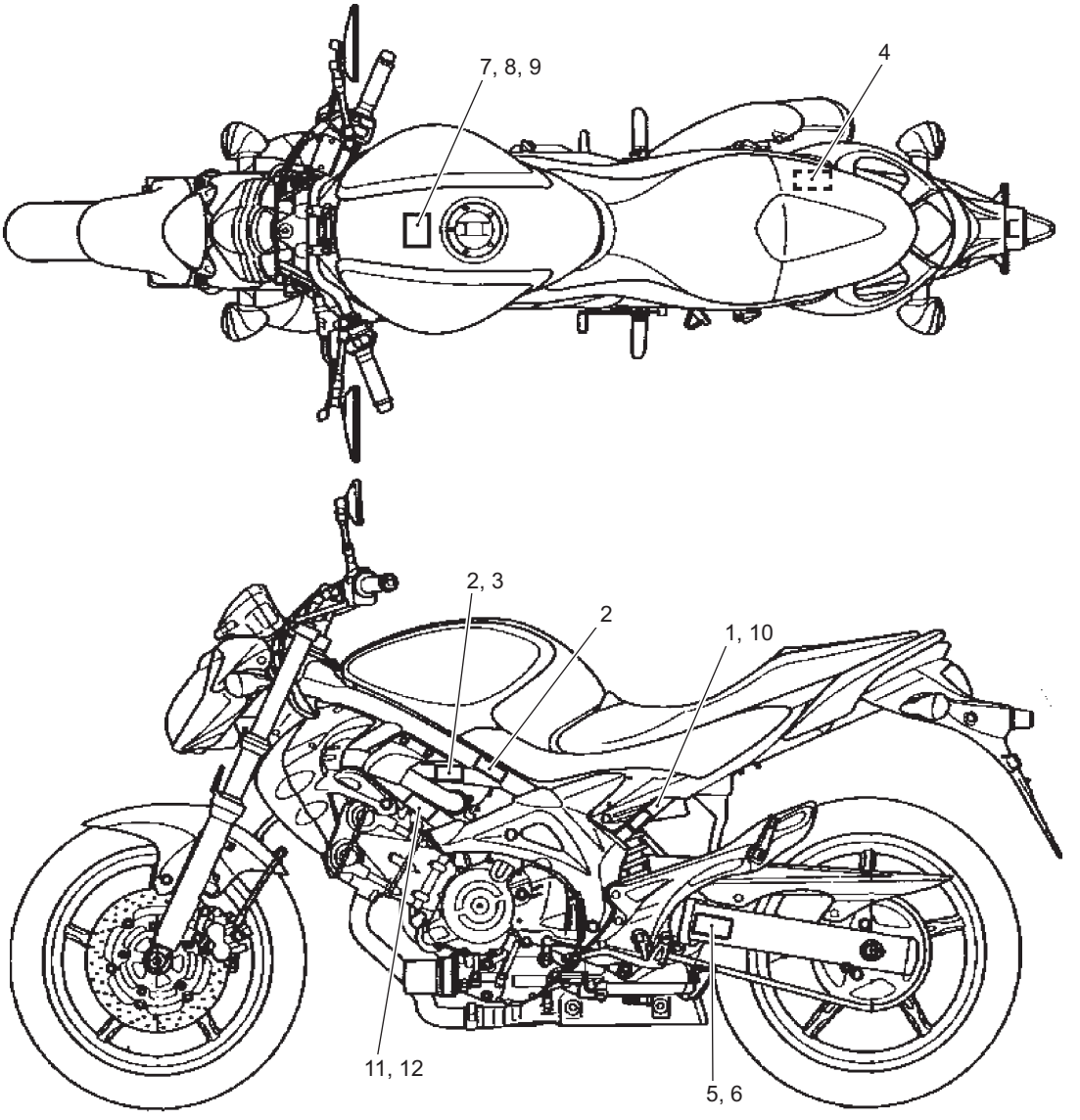
Wire Color Symbols

B944H10101010

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

Warning, Caution and Information Labels Location

B944H10101011



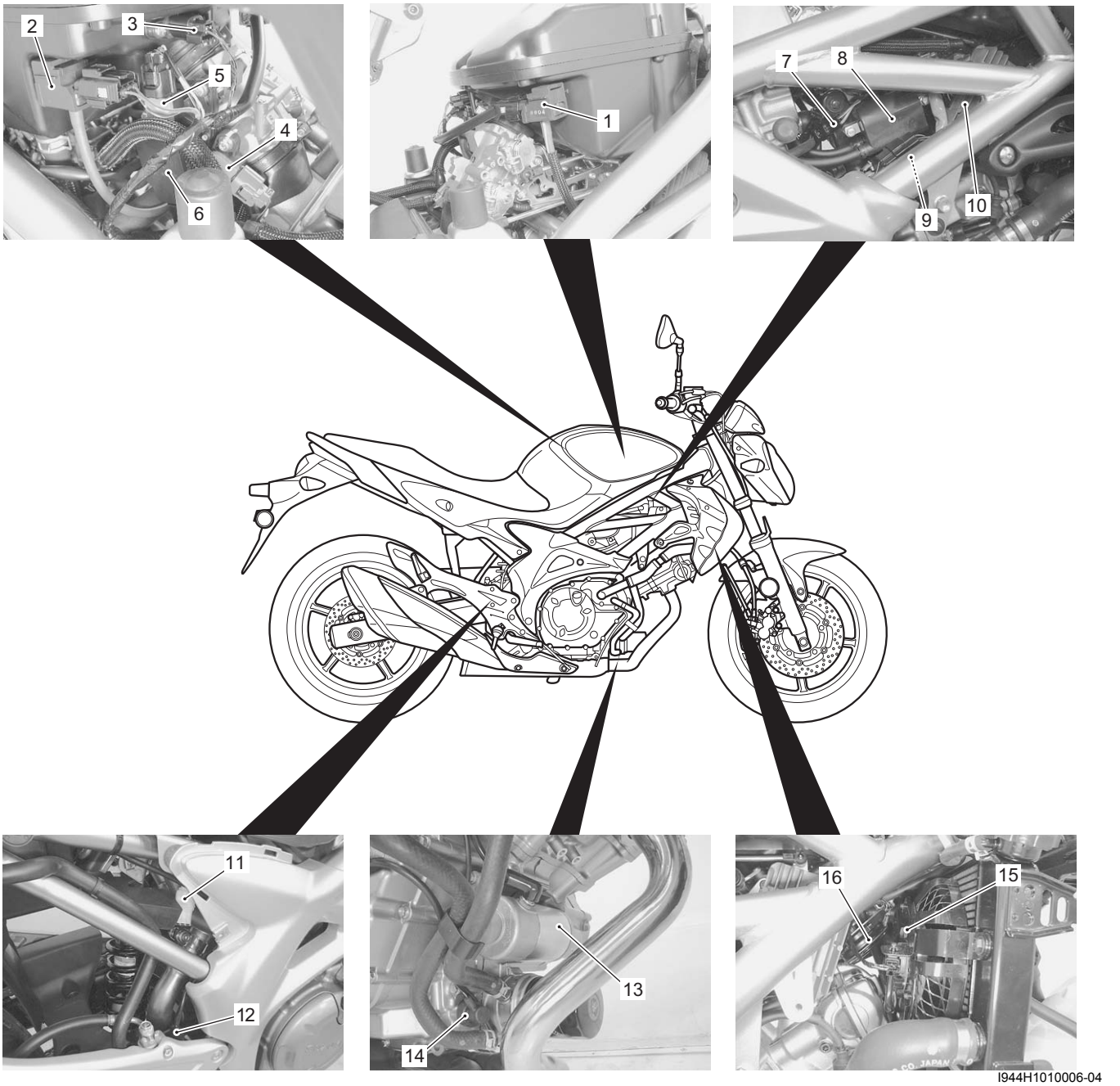
I944H1010008-02

	SFV650	SFV650U
1. Noise label	For E-03, 24, 33	For E-24
2. Information label	For E-03, 28, 33	—
3. Vacuum hose routing label	For E-33	—
4. Manual notice label	For E-03, 33	—
5. Tire information label (English)	For E-03, 33	—
6. Tire information label (French/German/English)	For E-02, 19, 24, 28	For E-19, 24
7. General warning label (English)	For E-02, 03, 24, 33	For E-24
8. General warning label (English/French)	For E-28	—
9. General warning label (French/German/Italian/Swedish)	For E-19	For E-19
10. ICES Canada label	For E-28	—
11. I.D. plate	For E-02, 19, 24	For-E-19, 24
12. Safety plate	For E-03, 28, 33	—

Component Location

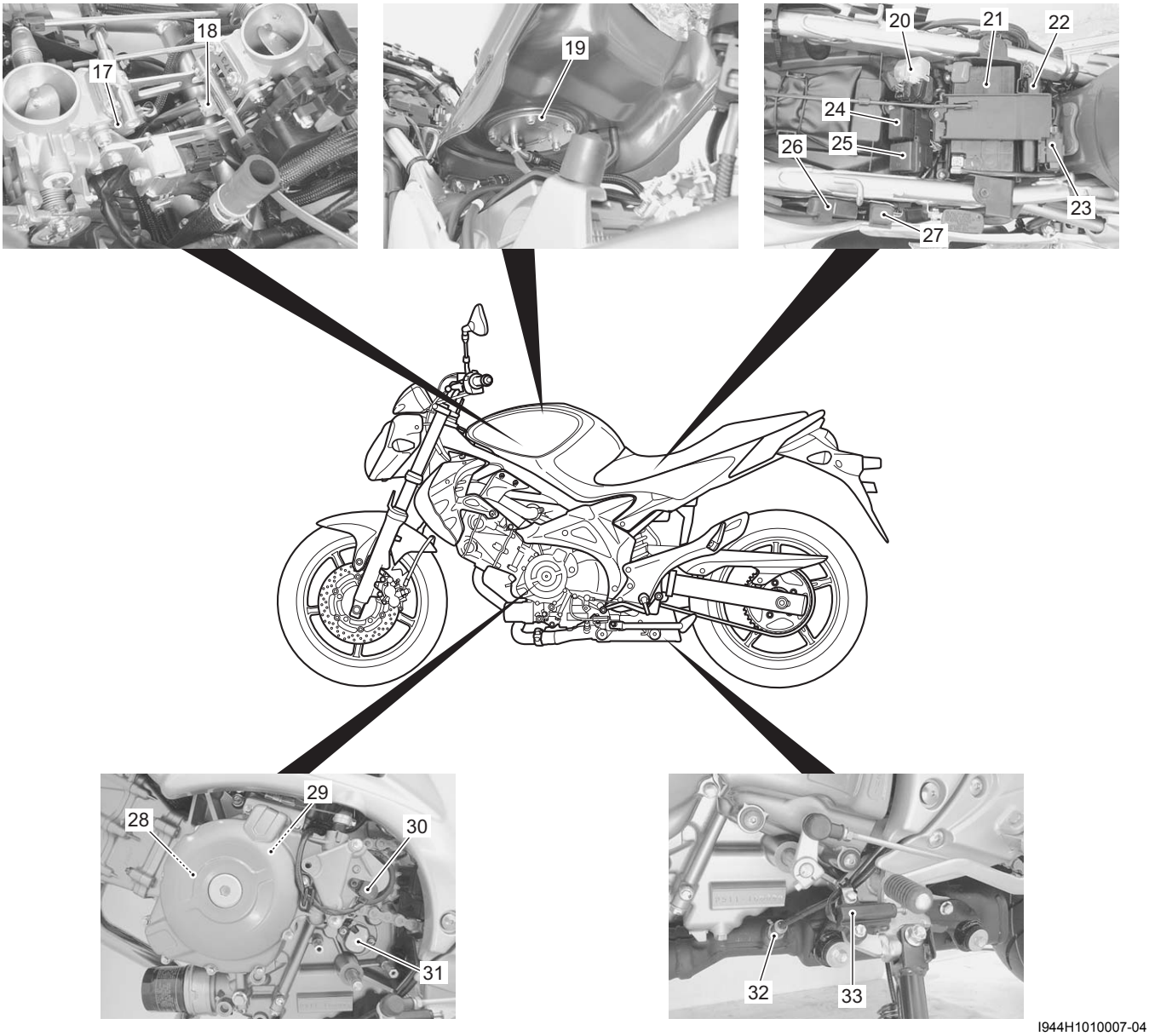
Electrical Components Location

B944H10103001



I944H1010006-04

1. IAP sensor (#1)	7. ECT sensor	13. Starter motor
2. IAP sensor (#2)	8. Ignition coil (#2)	14. Oil pressure switch
3. IAT sensor	9. Ignition coil (#1)	15. Cooling fan
4. TP sensor	10. Regulator/rectifier	16. Horn
5. STP sensor	11. Mode selection switch coupler	
6. STV/ISC actuator	12. Rear brake switch	



I944H1010007-04

17. Fuel injector (#1)	23. TO sensor	29. CKP sensor
18. Fuel injector (#2)	24. Turn signal/Side-stand relay	30. Speed sensor
19. Fuel pump/Fuel level gauge	25. Fuse box	31. GP switch
20. Starter relay/main fuse	26. Cooling fan relay	32. HO2 sensor
21. Battery	27. Fuel pump relay	33. Side-stand switch
22. ECM	28. Generator	

Specifications

Specifications

B944H10107001

NOTE

These specifications are subject to change without notice.

Dimensions and curb mass

Item	Specification	Remark
Overall length	2 130 mm (83.9 in)	
Overall width	760 mm (29.9 in)	
Overall height	1 090 mm (42.9 in)	
Wheelbase	1 445 mm (56.9 in)	
Ground clearance	135 mm (5.3 in)	
Seat height	785 mm (30.9 in)	
Curb mass	202 kg (445 lbs)	
	203 kg (448 lbs)	E-33

Engine

Item	Specification	Remark
Type	4-stroke, liquid-cooled, DOHC, 90° V-twin	
Number of cylinders	2	
Bore	81.0 mm (3.189 in)	
Stroke	62.6 mm (2.465 in)	
Displacement	645 cm^3 (39.4 cu. in)	
Compression ratio	11.5 : 1	
Fuel system	Fuel injection	
Air cleaner	Non-woven fabric element	
Starter system	Electric	
Lubrication system	Wet sump	
Idle speed	1 300 $\pm$ 100 r/min	

Drive train

Item		Specification	Remark
Clutch		Wet multi-plate type	
Transmission		6-speed constant mesh	
Gearshift pattern		1-down, 5-up	
Primary reduction ratio		2.088 (71/34)	
Gear ratios	Low	2.461 (32/13)	
	2nd	1.777 (32/18)	
	3rd	1.380 (29/21)	
	4th	1.125 (27/24)	
	5th	0.961 (25/26)	
	Top	0.851 (23/27)	
Final reduction ratio		3.066 (46/15)	
Drive chain		DID520VM2, 112 links	

Chassis

Item	Specification	Remark
Front suspension	Telescopic, coil spring, oil damped	
Rear suspension	Link type, coil spring, oil damped	
Front suspension stroke	125 mm (4.9 in)	
Rear wheel travel	130 mm (5.1 in)	
Caster	25°	
Trail	106 mm (4.17 in)	
Steering angle	33° (right & left)	
Turning radius	3.0 m (9.8 ft)	
Front brake	Disc brake, twin	
Rear brake	Disc brake	
Front tire size	120/70ZR17M/C (58 W), tubeless	
Rear tire size	160/60ZR17M/C (69 W), tubeless	

Electrical

Item	Specification	Remark
Ignition type	Electronic ignition (Transistorized)	
Ignition timing	8° B.T.D.C. at 1 300 r/min	
Spark plug	NGK CR8EIA-9 or DENSO IU24D	
Battery	12 V 36.0 kC (10 Ah)/10 HR	
Generator	Three-phase A.C. generator	
Main fuse	30 A	
Fuse	10/10/15/15/10/10 A	
Headlight	12 V 60/55 W (H4)	
Position light	12 V 5 W	
Brake light/Taillight	12 V 21/5 W	
Turn signal light	12 V 21 W	E-03, 28, 33
	12 V 10 W	E-02, 19, 24
License plate light	12 V 5 W	
Speedometer light	LED	
Tachometer light	LED	
Neutral indicator light	LED	
High beam indicator light	LED	
Turn signal indicator light	LED	
Oil pressure indicator light	LED	
Coolant temperature indicator light	LED	
Fuel injection indicator light	LED	

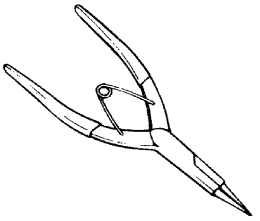
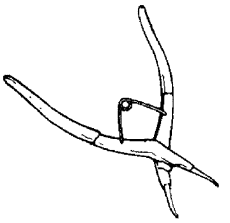
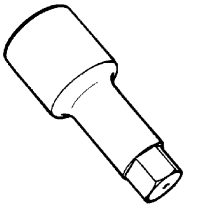
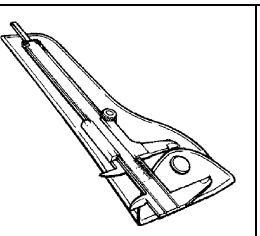
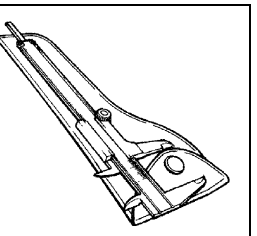
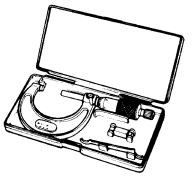
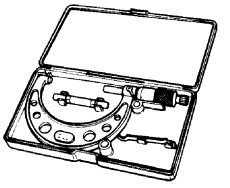
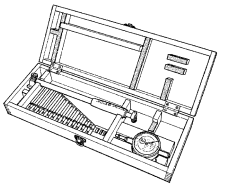
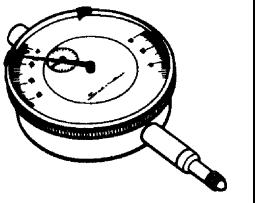
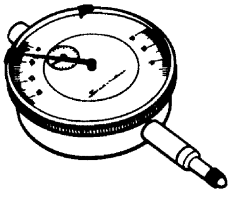
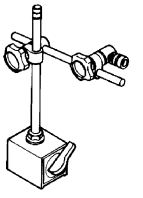
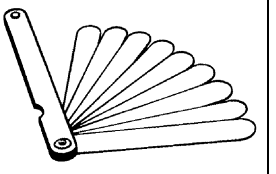
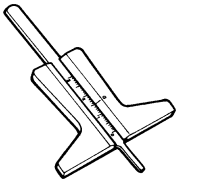
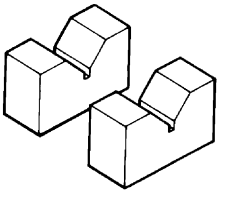
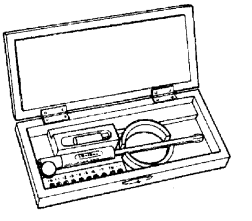
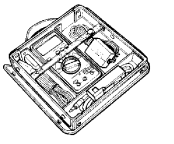
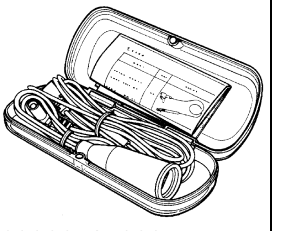
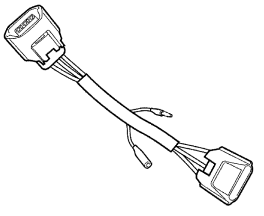
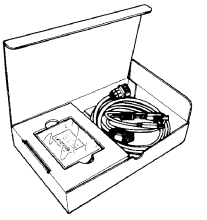
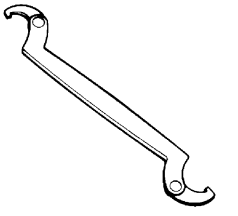
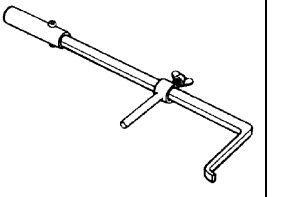
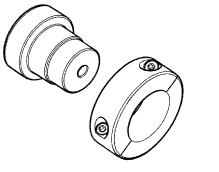
Capacities

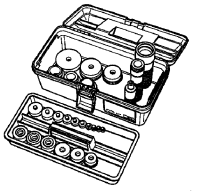
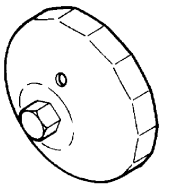
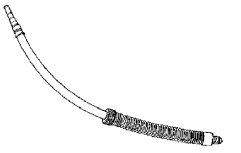
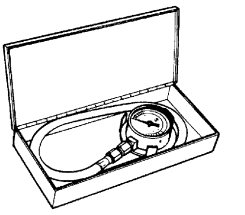
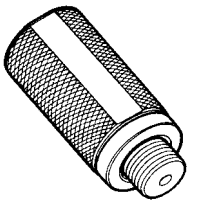
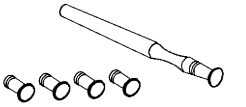
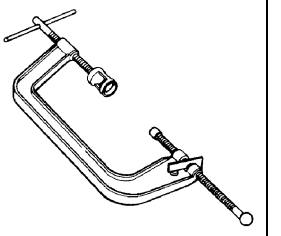
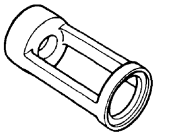
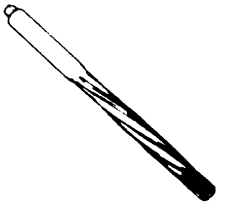
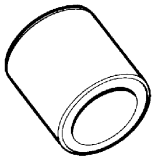
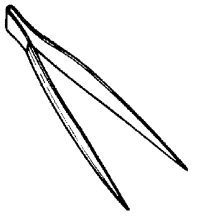
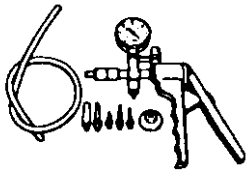
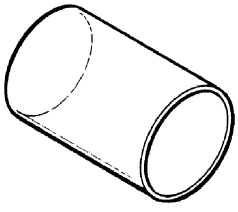
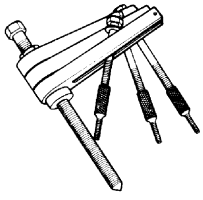
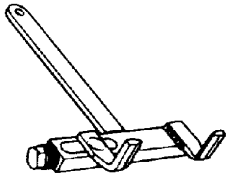
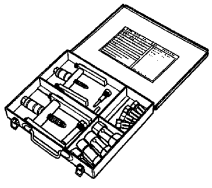
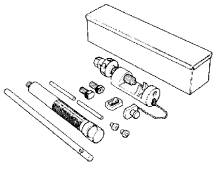
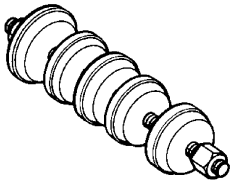
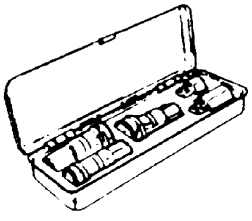
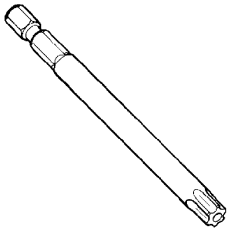
Item		Specification	Remark
Fuel tank		13.5 L (3.6/3.0 US/Imp gal)	E-33
		14.5 L (3.8/3.2 US/Imp gal)	Others
Engine oil	Oil change	2 400 ml (2.5/2.1 US/Imp qt)	
	With filter change	2 750 ml (2.9/2.4 US/Imp qt)	
	Overhaul	3 000 ml (3.2/2.6 US/Imp qt)	
Coolant		1 850 ml (2.0/1.6 US/Imp gal)	

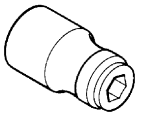
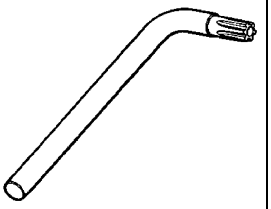
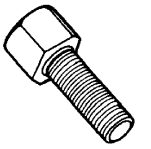
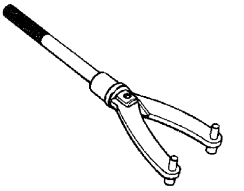
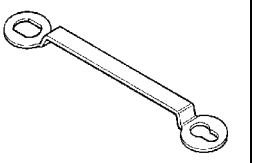
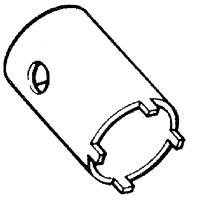
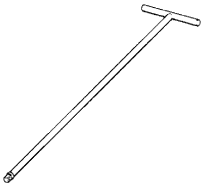
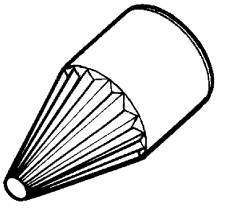
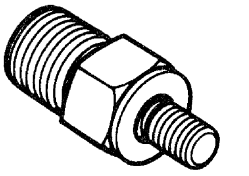
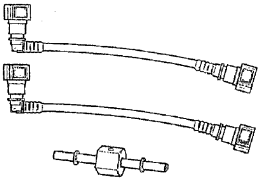
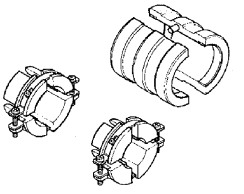
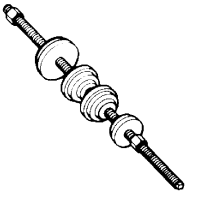
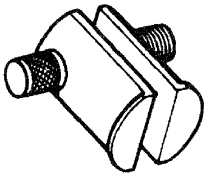
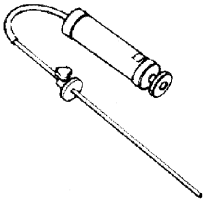
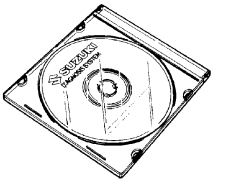
Special Tools and Equipment

Special Tool

B944H10108002

 **09900–06107** Snap ring remover (Open type)	 **09900–06108** Snap ring remover (Close type)	 **09900–18710** Hexagon socket (12 mm)	 **09900–20101** Vernier calipers (150 mm)	 **09900–20102** Vernier calipers (200 mm)
 **09900–20202** Micrometer (25 – 50 mm)	 **09900–20204** Micrometer (75 – 100 mm)	**09900–20205** Micrometer (0 – 25 mm)	 **09900–20530** Cylinder gauge set	 **09900–20602** Dial gauge
 **09900–20607** Dial gauge	 **09900–20701** Dial gauge chuck	 **09900–20803** Thickness gauge	 **09900–20805** Tire depth gauge	 **09900–21304** V blocks
09900–22301 Plastigauge	**09900–22302** Plastigauge	 **09900–22403** Small bore gauge (18 – 35 mm)	 **09900–25008** Multi circuit tester set	 **09900–25009** Needle pointed probe set
 **09900–28630** TP Sensor test lead	 **09904–41010** SUZUKI Diagnostic system set	 **09910–60611** Universal clamp wrench	 **09913–50121** Oil seal remover	 **09913–60221** Journal bearing installer & holder

 **09913–70210** Bearing installer set (10 – 75)	 **09915–40620** Oil filter wrench	 **09915–63311** Compression gauge attachment	 **09915–64512** Compression gauge	 **09915–70610** Oil pressure gauge attachment
09915–74521 Adapter hose	**09915–77331** Oil pressure gauge (1000 kPa)	 **09916–10911** Valve lapper set	 **09916–14510** Valve lifter	 **09916–14522** Valve lifter attachment
09916–33210 Valve guide reamer (4.5 mm)	**09916–34542** Reamer handle	 **09916–34580** Valve guide reamer (10.8 mm)	**09916–43211** Valve guide installer & remover	 **09916–53330** Valve guide installer attachment
 **09916–84511** Tweezer	 **09917–47011** Vacuum pump gauge set	 **09919–28620** Sleeve protector	 **09920–13120** Crankshaft remover	 **09920–53740** Clutch sleeve hub holder
 **09921–20240** Bearing remover set	 **09922–22711** Drive chain cutting and joint tool set	 **09924–84510** Bearing installer set	 **09930–10121** Spark plug wrench set	 **09930–11920** Torx bit (JT40H)

 **09930–11940** Torx bit holder	 **09930–11950** Torx wrench (5 mm)	 **09930–30450** Rotor remover bolt	 **09930–40113** Flywheel rotor holder	 **09930–44530** Rotor holder
09930–82720 Mode selection switch	 **09940–14911** Steering stem nut socket wrench	 **09940–34520** T type handle	 **09940–34531** Front fork assembling attachment (A)	 **09940–40211** Fuel pressure gauge adapter
 **09940–40220** Fuel pressure gauge attachment	 **09940–52861** Front fork oil seal installer set	**09940–92720** Spring scale	 **09941–34513** Bearing installer	 **09941–54911** Bearing outer race remover
09941–74911 Steering race installer	 **09943–74111** Front fork oil level gauge	 **99565–01010–019** CD-ROM Ver.19		

Maintenance and Lubrication

Precautions

Precautions for Maintenance

B944H10200001

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

NOTE

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

General Description

Recommended Fluids and Lubricants

B944H10201001

Refer to “Fuel and Oil Recommendation in Section 0A (Page 0A-3)” and “Engine Coolant Recommendation in Section 0A (Page 0A-4)”.

Scheduled Maintenance

Periodic Maintenance Schedule Chart

B944H10205001

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
Valve clearance		—	—	—	—	I
Spark plugs		—	I	R	I	R
Fuel line		—	I	I	I	I
Evaporative emission control system (E-33 only)		—	—	I	—	I
Engine oil		R	R	R	R	R
Engine oil filter		R	—	—	R	—
Throttle cable play		I	I	I	I	I
Throttle valve synchronization		I (E-33 only)	—	I	—	I
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
Brake fluid		—	I	I	I	I
		Replace every 2 years.				
Brake hose		—	I	I	I	I
		Replace every 4 years.				
Tires		—	I	I	I	I
Steering		I	—	I	—	I
Front forks		—	—	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
Rear suspension		—	—	I	—	I
Chassis bolts and nuts		T	T	T	T	T

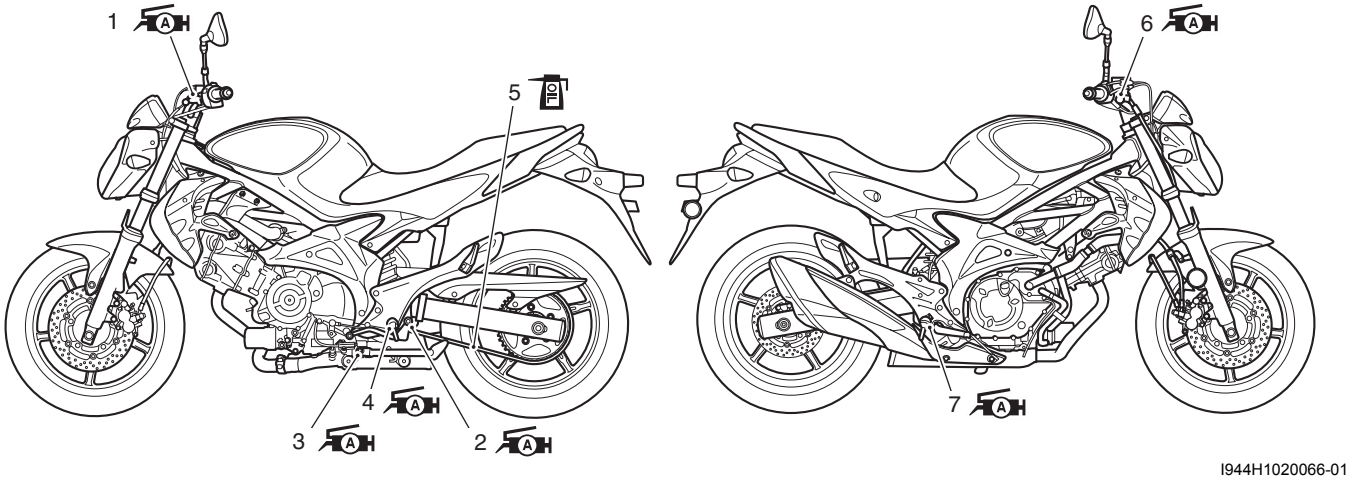
Lubrication Points

B944H10205002

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.**



I944H1020066-01

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

Repair Instructions

Air Cleaner Element Replacement

B944H10206001

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

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

Air Cleaner Element Inspection and Cleaning

B944H10206002

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

Inspection

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

⚠ CAUTION

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

I944H1020002-01

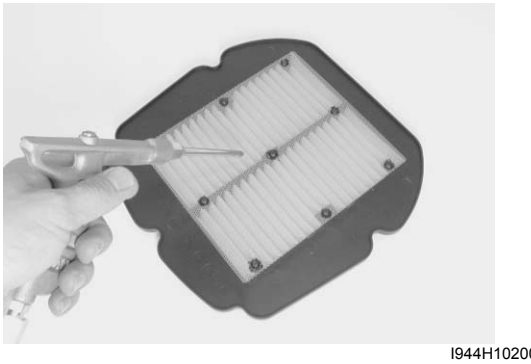
3) After finishing the air cleaner element inspection, reinstall the removed parts.

Cleaning

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

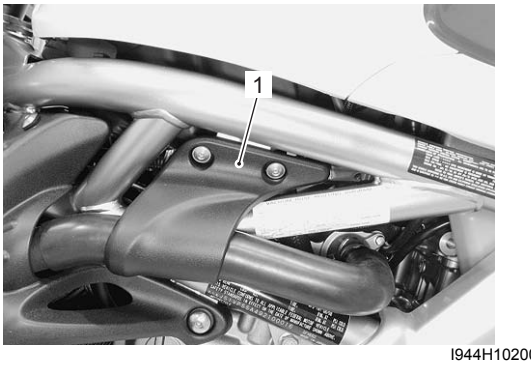
⚠ CAUTION

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



I944H1020003-01

3) After cleaning the air cleaner element, reinstall the removed parts.
4) Remove the rear frame body cover (1).



I944H1020004-01

5) Drain water from the air cleaner by removing the drain plug (2).

I944H1020005-01

6) Reinstall the drain plug (2) and rear frame body cover (1).

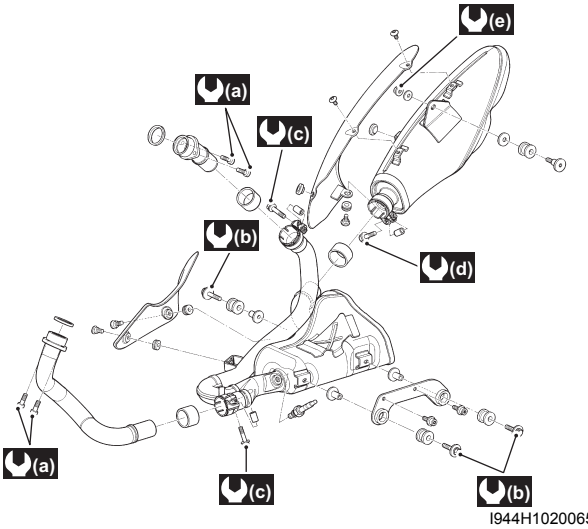
Exhaust Pipe Bolts and Muffler Bolts Inspection

B944H10206003

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

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

Tightening torque
Exhaust pipe bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
Exhaust mounting bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
Exhaust pipe connecting bolt (c): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
Muffler connecting bolt (d): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
Muffler mounting nut (e): 25 N·m (2.5 kgf-m, 18.0 lbf-ft)



I944H1020065-01

Valve Clearance Inspection and Adjustment

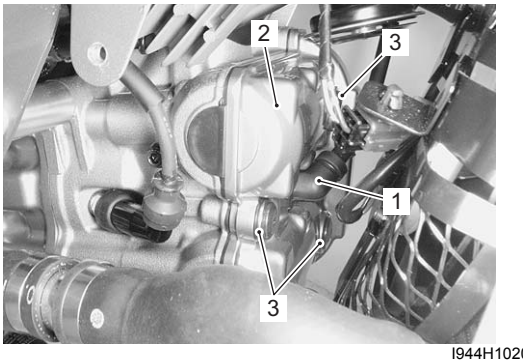
B944H10206006

Inspect valve clearance
Every 24 000 km (14 500 miles, 48 months) thereafter

Inspection
Tappet 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.

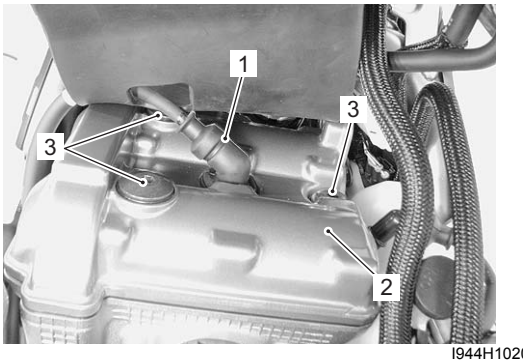
1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Remove the spark plug caps (1). Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-5)”.
3) Remove the cylinder head covers (2) by removing the bolts (3).

Front



I944H1020007-01

Rear



I944H1020008-01

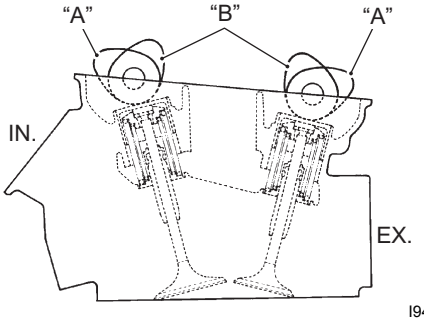
NOTE

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

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

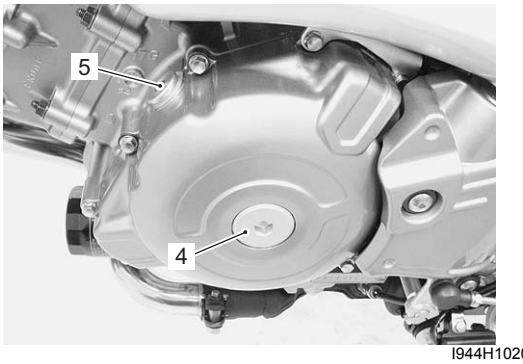
NOTE

- **The tappet clearance should be taken when each cylinder is at Top Dead Center (TDC) of compression stroke.**
- **The cams (IN. & EX.) on the front cylinder at position "A" show the front cylinder at TDC of compression stroke.**
- **The cams (IN. & EX.) on the front cylinder at position "B" show the rear cylinder at TDC of compression stroke.**
- **The clearance specification is for COLD state.**
- **To turn the crankshaft for clearance checking, be sure to use a wrench, and rotate in the normal running direction. All spark plugs should be removed.**



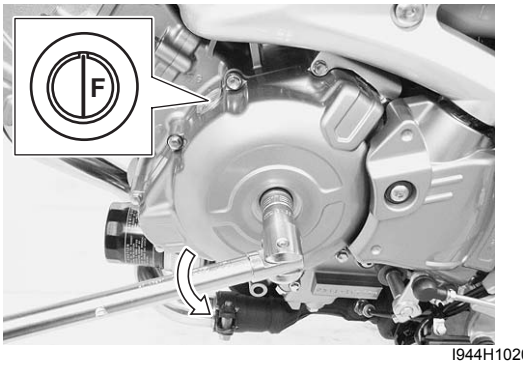
I944H1020009-03

4) Remove the generator cover plug (4) and timing inspection plug (5).

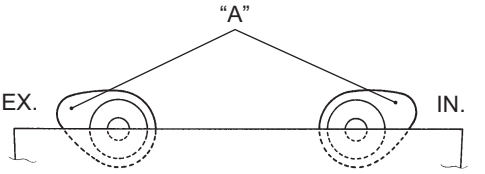


I944H1020010-01

5) Turn the crankshaft to set the #1 (Front) cylinder at TDC of compression stroke. (Align the "| F" line on the generator rotor to the center of timing inspection hole and also bring the camshafts to the position "A" as shown in the figure.



I944H1020011-01



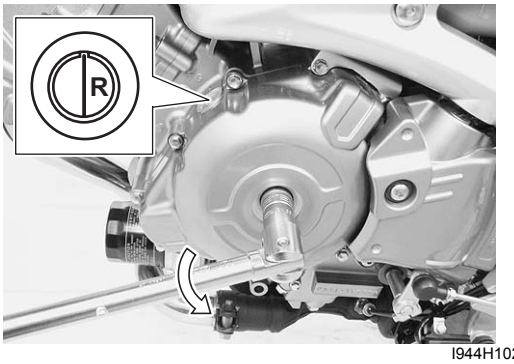
I822H1020023-01

6) To inspect the #1 (Front) cylinder tappet clearance, use a thickness gauge between the tappet and the cam. If the clearance is out of specification, adjust it into the specified range.

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

I944H1020013-01

7) Turn the crankshaft 270 degrees (3/4 turns) to set the #2 (Rear) cylinder at TDC of compression stroke. (Align the "| R" line on the generator rotor to the center of timing inspection hole and also bring the camshafts to the position "B" as shown in the figure.



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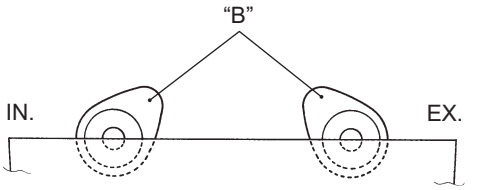
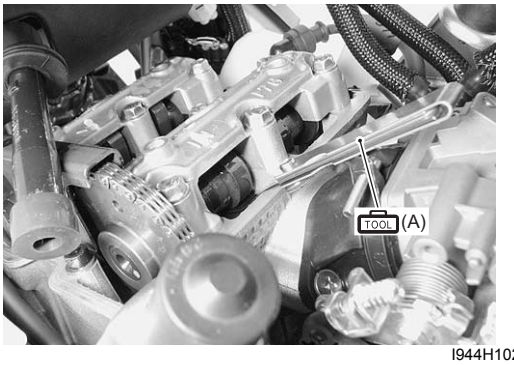


I822H1020022-01

8) Inspect the #2 (Rear) cylinder tappet clearance as the same manner of #1 (Front) cylinder and adjust the clearance if necessary.

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



I944H1020015-01

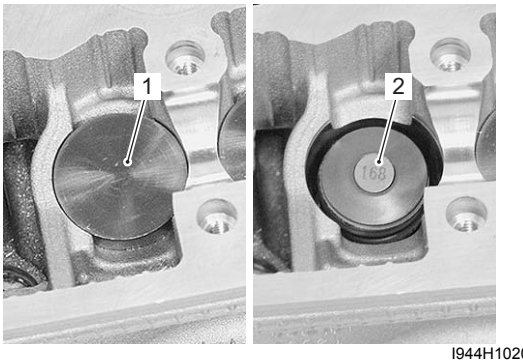
9) After finishing the tappet clearance inspection, reinstall the removed parts. Refer to "Engine Top Side Assembly in Section 1D (Page 1D-31)" and "Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-5)".

Adjustment

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

1) Remove the intake or exhaust camshafts. Refer to "Engine Top Side Disassembly in Section 1D (Page 1D-25)".

2) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



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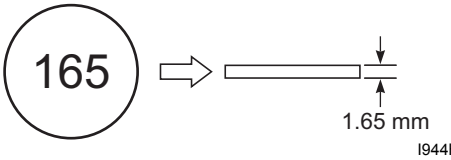
3) Check the figures printed on the shim. These figures indicate the thickness of the shim, as illustrated.



I944H1020017-01

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

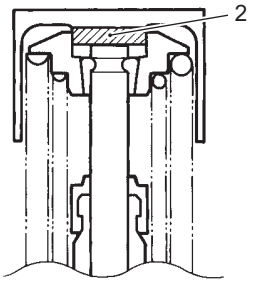
⚠ CAUTION

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

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

NOTE

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



I944H1020018-01

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

TAPPET SHIM SET (12800-05820)

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

HOW TO USE THIS CHART:

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

EXAMPLE

Tappet clearance is	0.23 mm
Present shim size	1.65 mm
Shim size to be used	1.75 mm

I944H1020019-01

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

TAPPET SHIM SET (12800-05820)

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

HOW TO USE THIS CHART:

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

EXAMPLE

Tappet clearance is	0.33 mm
Present shim size	1.65 mm
Shim size to be used	1.75 mm

I944H1020020-01

6) Install the intake or exhaust cam chain tension adjuster. Refer to “Engine Top Side Assembly in Section 1D (Page 1D-31)”.
7) Rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement, then check the clearance again to confirm that it is within the specified range.
8) After finishing the tappet clearance adjustment, reinstall the removed parts. Refer to “Engine Top Side Assembly in Section 1D (Page 1D-31)”.

Spark Plug Replacement

B944H10206004

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

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

Spark Plug Inspection and Cleaning

B944H10206005

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

Heat Range

1) Remove the spark plugs. Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-5)”.
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

	Standard	Cold type	Hot type
NGK	CR8EIA-9	CR9EIA-9	CR7EIA-9
DENSO	IU24D	IU27D	IU22D

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

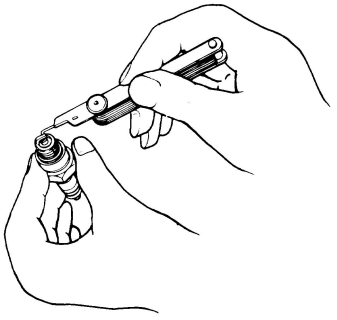
Spark Plug Gap

1) Remove the spark plugs. Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-5)”.
2) Measure the spark plug gap using a wire gauge. If it is not within the specification, replace the spark plug.

⚠ CAUTION

- **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)



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

Electrodes Condition

1) Remove the spark plugs. Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-5)”.
2) Check to see the worn or burnt condition of the electrodes.
If it is extremely worn or burnt, replace the plug. And also replace the plug if it has a broken insulator, or damaged thread.

⚠ CAUTION

Check the thread size and reach when replacing the spark plug. If the reach is too short, carbon will be deposited on the screw portion of the spark plug hole and engine damage may result.

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

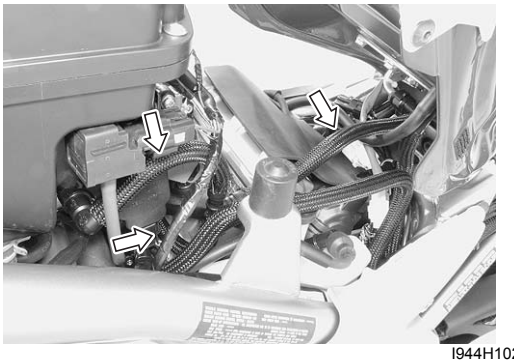
Fuel Line Inspection

B944H10206007

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-7)”.
2) Inspect the fuel feed hoses for damage and fuel leakage. If any defects are found, the fuel feed hoses must be replaced.



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3) After finishing the Fuel feed hoses Inspection, reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.

Engine Oil and Filter Replacement

B944H10206008

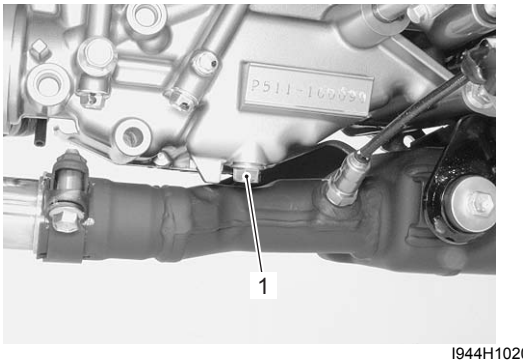
Replace engine oil
Initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter

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

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

Engine Oil Replacement

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



I944H1020022-01

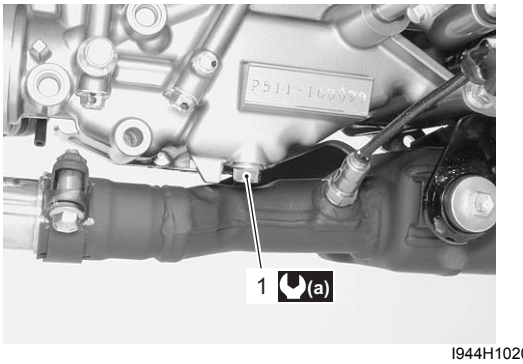
I944H1020023-01

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

⚠ CAUTION

Replace the gasket washer with a new one.

Tightening torque
Oil drain plug (a): 21 N·m (2.1 kgf-m, 15.0 lbf-ft)



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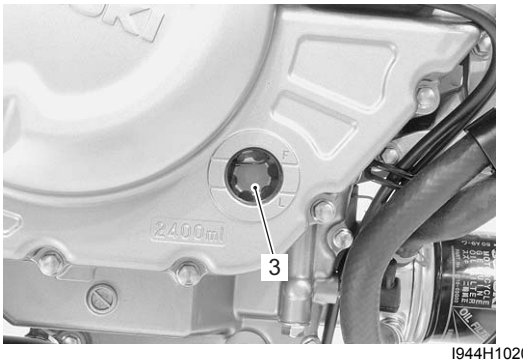
4) Pour new oil through the oil filler. When performing an oil change (without oil filter replacement), the engine will hold about 2.4 L (2.5/2.1 US/Imp qt) of oil. Use of SF/SG or SH/SJ in API with MA in JASO.
5) Start up the engine and allow it to run for few minutes at idling speed.

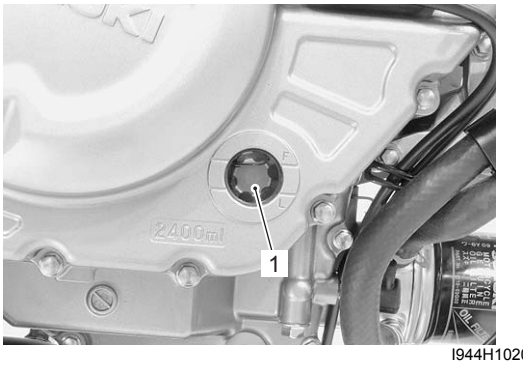
6) Turn off the engine and wait about three minutes, then check the oil level through the inspection window (3). If the oil level is below the “L” mark, add oil to the “F” mark. If the level is above the “F” mark, drain the oil until the level reaches the “F” mark.



I944H1020025-01

Oil Level Inspection

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

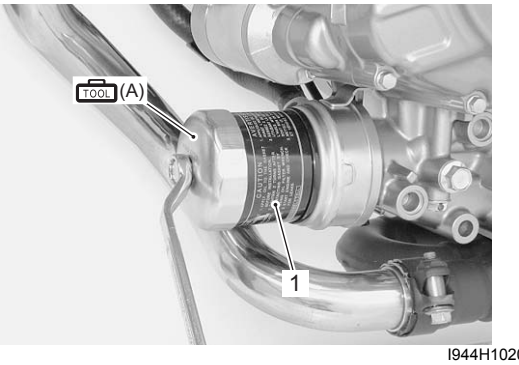


I944H1020026-01

Oil Filter Replacement

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

Special tool
TOOL (A): 09915–40620 (Oil filter wrench)



I944H1020027-01

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

⚠ CAUTION

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

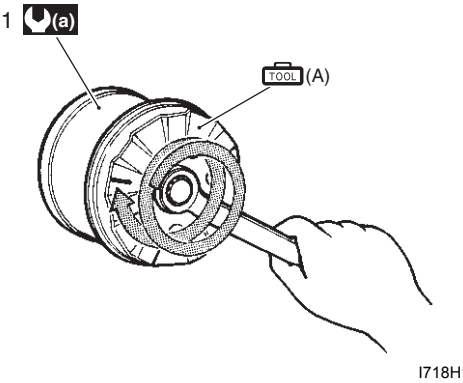
4) Install a new oil filter. Turn it by hand until you feel that the oil filter O-ring contacts the oil filter mounting surface. Then, tighten the oil filter two full turns (or to specified torque) using the special tool.

NOTE

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

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

Necessary amount of engine oil
Oil change: 2 400 ml (2.5/2.1 US/Imp qt)
Oil and filter change: 2 750 ml (2.9/2.4 US/Imp qt)
Engine overhaul: 3 000 ml (3.2/2.6 US/Imp qt)

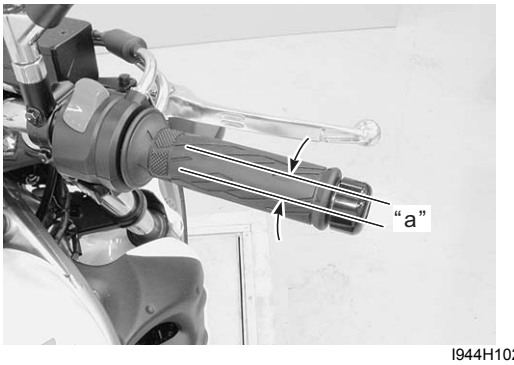
Throttle Cable Play Inspection and Adjustment

B944H10206009

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

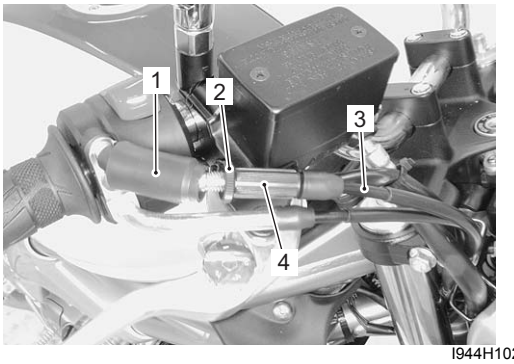
Inspect and adjust the throttle cable play “a” as follows.

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



I944H1020028-01

1) Remove 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).



I944H1020029-05

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.

Throttle Valve Synchronization

B944H10206010

Inspect throttle valve synchronization
Initially 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-15)”.

Cooling System Inspection

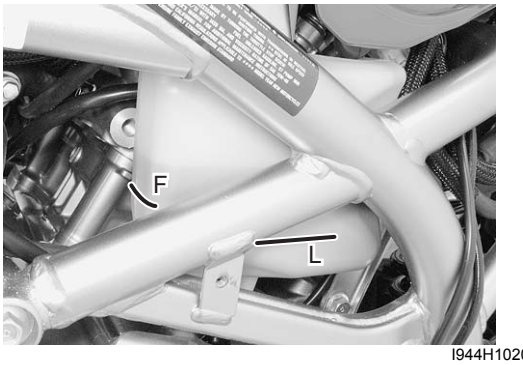
B944H10206012

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

Replace engine coolant
Every 2 years

Engine Coolant Level Inspection

1) Keep the motorcycle upright.
2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Check the engine coolant level by observing the full and lower lines on the engine coolant reservoir tank. If the level is below the lower line, add engine coolant to the full line from the engine coolant reservoir tank filler cap.



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4) After finishing the engine coolant level inspection, reinstall the fuel tank and left frame cover. Refer “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)” and “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.

Engine Coolant Change

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

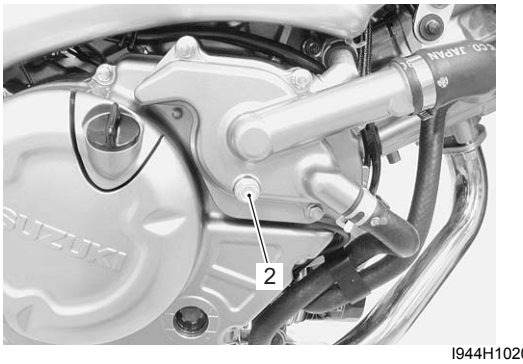
⚠ WARNING

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 frame body cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
2) Remove the radiator cap (1).

I944H1160002-01

3) Drain engine coolant by removing the drain bolt (2).



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4) Flush the radiator with fresh water if necessary.
5) Tighten the drain plug (2) to the specified torque.

⚠ CAUTION

Replace the gasket with a new one.

Tightening torque
Engine coolant drain bolt (a): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)

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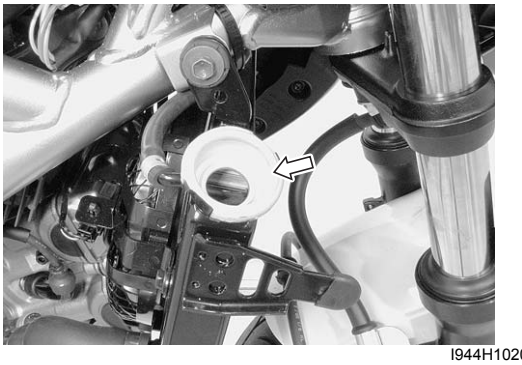
6) Pour the specified engine coolant up to the radiator inlet.

Engine coolant capacity (excluding reservoir)
1 600 ml (1.7/1.4 US/Imp qt)



I944H1020034-01

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

Air Bleeding From the Cooling Circuit

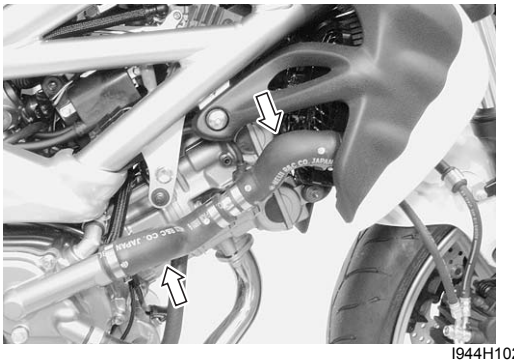
1) Support the motorcycle upright.
2) Remove the radiator cap and pour engine coolant up to the radiator inlet. Refer to "Cooling System Inspection (Page 0B-12)".
3) Slowly swing the motorcycle, right and left, to bleed the air trapped in the cooling circuit.
4) Add engine coolant up to the radiator inlet.
5) Start up the engine and bleed air from the radiator inlet completely.
6) Add engine coolant up to the radiator inlet.
7) Repeat the 4), 5) procedures until no air bleeds from the thermostat connector inlet.
8) Close the radiator cap securely.
9) After warming up and cooling down the engine several times, add the engine coolant up to the full level of the reservoir tank. Refer to "Cooling System Inspection (Page 0B-12)".

⚠ CAUTION

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

10) Reinstall the removed parts.

Radiator Hose Inspection
Check the radiator hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with new ones.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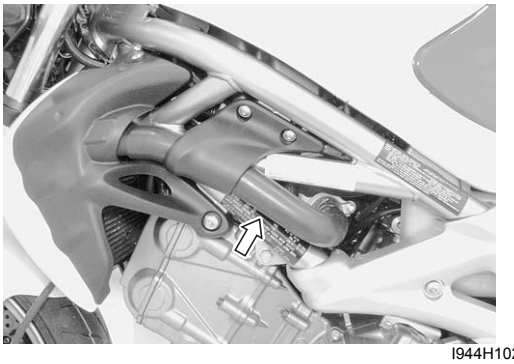

I944H1020036-01

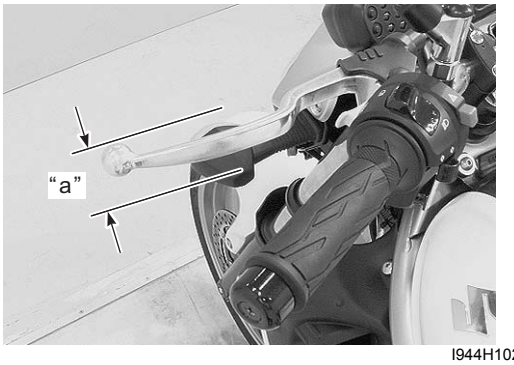
Clutch System Inspection

B944H10206013

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

Inspect and adjust the clutch lever play “a” as follows.

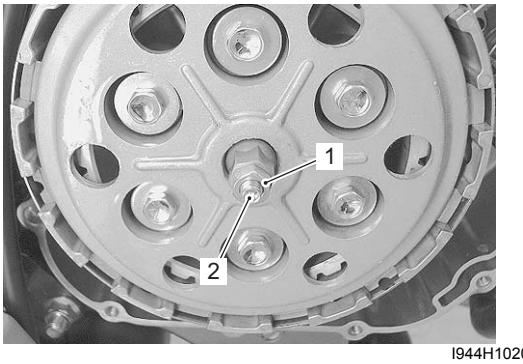
Clutch cable play “a”
10 – 15 mm (0.4 – 0.6)



I944H1020037-01

1) Remove the clutch cover. Refer to “Clutch Removal in Section 5C (Page 5C-7)”.
2) Loosen the lock-nut (1) and turn in the release screw (2) to feel resistance.
3) From that position, turn out the release screw (2) 1 turn and tighten the lock-nut (1) securely by holding the release screw (2).

Clutch release screw
1 turn back



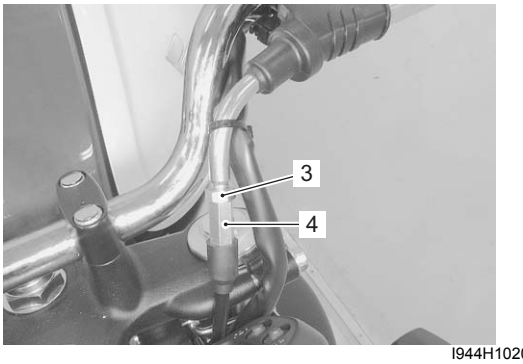
I944H1020038-01

4) Install the clutch cover. Refer to “Clutch Removal in Section 5C (Page 5C-7)”.
5) Loosen the lock-nut (3).

NOTE

The adjustment of clutch cable play should be made on the adjuster on which the clutch cable cap is installed with 3 – 5 mm of threads left on the clutch lever adjuster.

6) Turn the adjuster (4) in or out until the clutch lever play “a” is between 10 – 15 mm (0.4 – 0.6 in).
7) Tighten the lock-nut (3) while holding the adjuster (4).



I944H1020039-01

8) Pour engine oil and coolant. Refer to “Engine Oil and Filter Replacement (Page 0B-10)” and “Cooling System Inspection (Page 0B-12)”.

Drive Chain Inspection and Adjustment

B944H10206016

Inspect drive chain

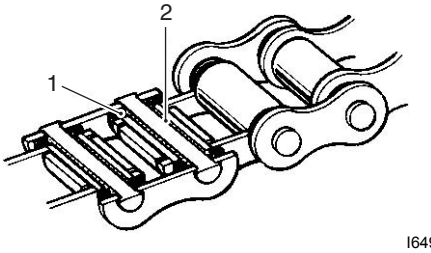
Initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter

Drive Chain Visual Check

1) With the transmission in neutral, support the motorcycle 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.

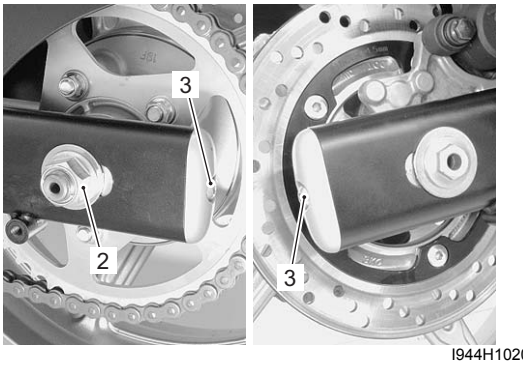


I649G1020032-02

1. O-ring seal	2. Grease

Drive Chain Length Inspection

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

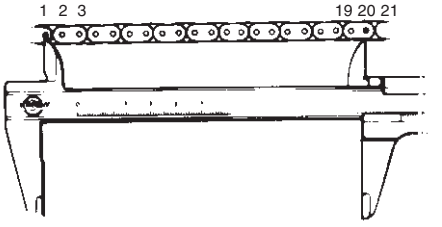


I944H1020040-01

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

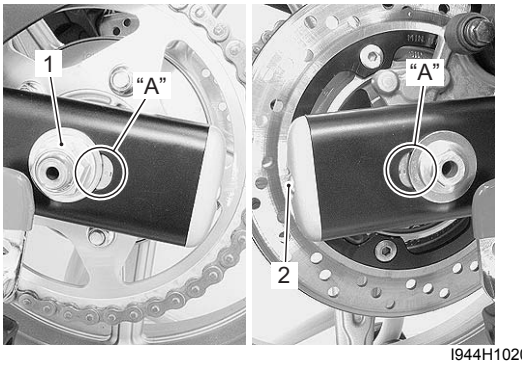
1) Support the motorcycle with a jack.
2) Loosen the axle nut (1).
3) Loosen or tighten both chain adjuster bolts (2) until there is 20 – 30 mm (0.8 – 1.2 in) “a” of slack at the middle of the chain between the engine and rear sprockets as shown in the figure.

⚠ CAUTION

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

Drive chain slack “a”

Standard 20 – 30 mm (0.8 – 1.2 in)



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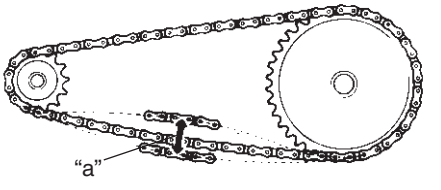


I649G1020036-02

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

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

5) Recheck the drive chain slack after tightening the axle nut (1).

Drive Chain Cleaning and Lubricating

B944H10206017

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

Clean and lubricate the drive chain in the following procedures:

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

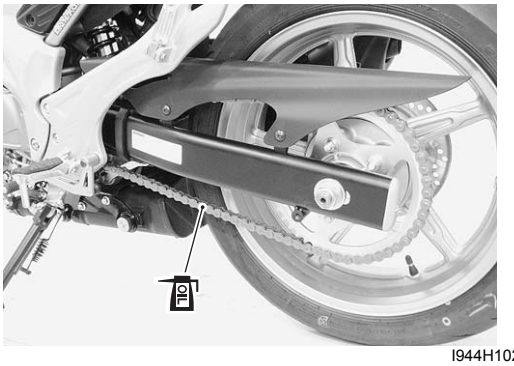
⚠ CAUTION

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

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

⚠ CAUTION

- **Do not use any oil sold commercially as "drive chain oil". Such oil can damage the O-rings.**
- **The standard drive chain is a DID520VM2. SUZUKI recommends to use this standard drive chain as a replacement.**



I944H1020042-01

Brake System Inspection

B944H10206018

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

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

⚠ WARNING

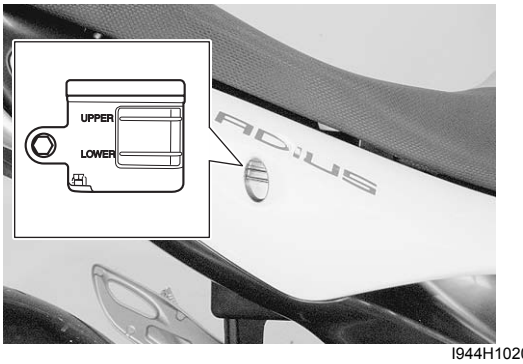
- **The brake system of this motorcycle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based fluids. Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing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

Brake Fluid Level Check

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

BF: Brake fluid (DOT 4)

I944H1020043-01



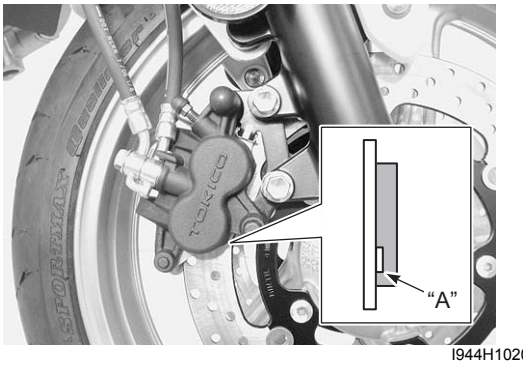
I944H1020044-01

Brake Pads Check

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

⚠ CAUTION

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



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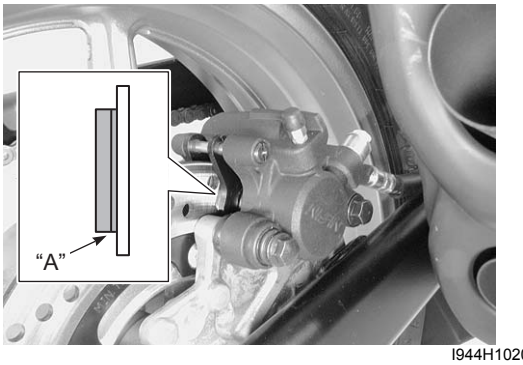


I944H1020046-01

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 “Brake Hose Removal and Installation in Section 4A (Page 4A-8)” and “Brake Hose Removal and Installation in Section 4A (Page 4A-8)”.

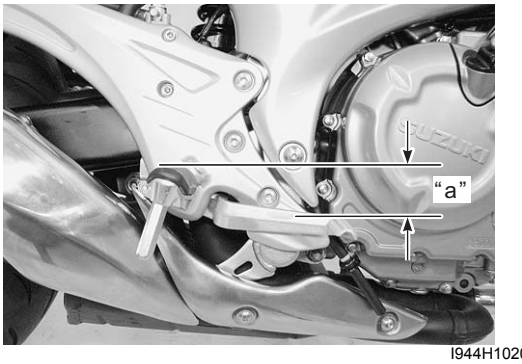
I944H1020047-01

I944H1020048-01

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.

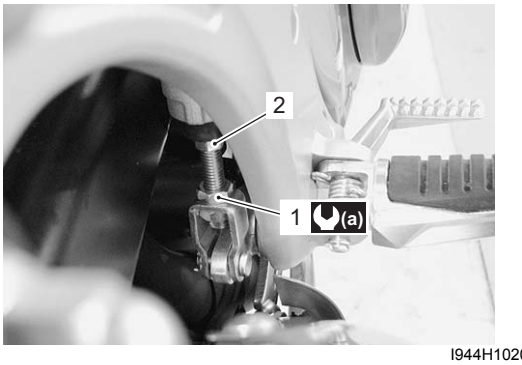
   Brake pedal height “a”
   Standard: 45 – 55 mm (1.8 – 2.2 in)



I944H1020049-01

2) Loosen the lock-nut (1).
3) Turn the push rod (2) until the brake pedal becomes 45 – 55 mm (1.8 – 2.2 in) “a” below the top of the footrest.
4) Tighten the lock-nut (1) securely.

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



I944H1020050-01

5) After finishing the brake pedal height inspection and adjustment, check the rear brake light switch. Refer to “Rear Brake Light Switch Inspection and Adjustment in Section 4A (Page 4A-4)”.

Brake Fluid Replacement

Replace brake fluid
Every 2 years

Refer to “Brake Fluid Replacement in Section 4A (Page 4A-6)”.

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

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

Brake Hose Replacement

Replace brake hose
Every 4 years

Refer to “Brake Hose Removal and Installation in Section 4A (Page 4A-8)”.

Tire Inspection

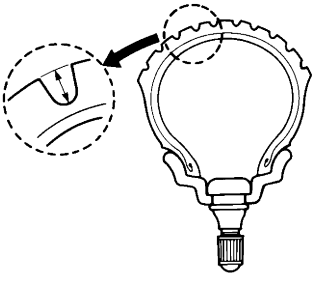
B944H10206019

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)

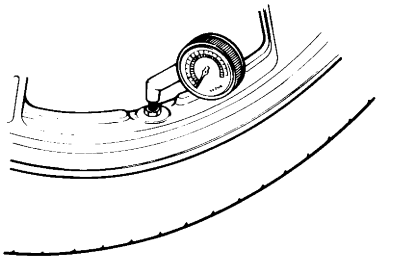


I310G1020068-02

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	225	2.25	33	225	2.25	33
Rear	250	2.50	36	250	2.50	36



I310G1020069-02

⚠ CAUTION

The standard tire fitted on this motorcycle is 120/70 ZR17 M/C (58W) for front and 160/60 ZR17 M/C (69W) for rear. The use of tires other than those specified may cause instability. It is highly recommended to use the specified tires.

Tire type
DUNLOP

- **Front: Qualifier J**
- **Rear: Qualifier J**

Steering System Inspection

B944H10206020

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-9)".

I944H1020051-01

Front Fork Inspection

B944H10206021

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)".

I944H1020052-01

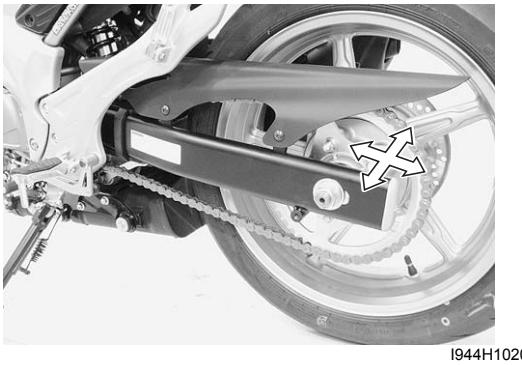
Rear Suspension Inspection

B944H10206022

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

Inspect the rear shock absorbers for oil leakage and check that there is no play in the swingarm.
Replace any defective parts, if necessary. Refer to "Rear Shock Absorber Removal and Installation in Section 2C (Page 2C-3)", "Cushion Lever / Cushion Rod Removal and Installation in Section 2C (Page 2C-5)" and "Swingarm Removal and Installation in Section 2C (Page 2C-8)".

I944H1020053-01



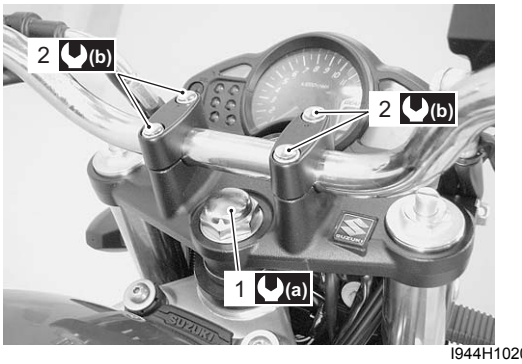
I944H1020054-01

Chassis Bolt and Nut Inspection

B944H10206023

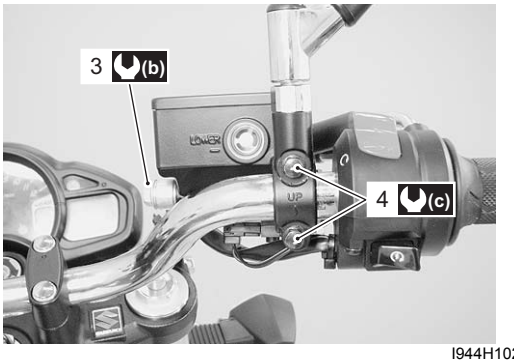
Tighten chassis bolt and nut
Initially at 1 000 km (600 miles, 2 months) and every 6 000 km (4 000 miles, 12 months) thereafter

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



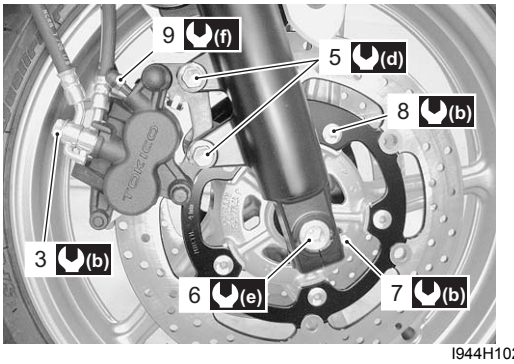
I944H1020055-01

1	(a)	Steering stem head nut 90 N·m (9.0 kgf-m, 65.0 lbf-ft)
2	(b)	Handlebar holder bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



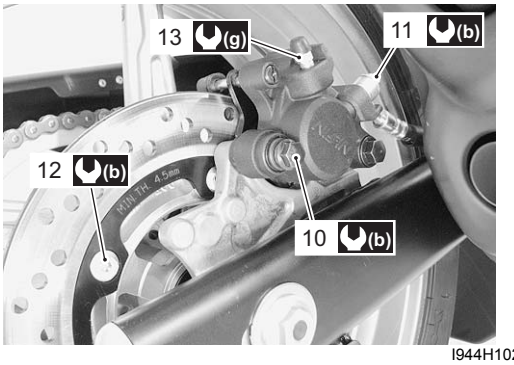
I944H1020056-01

3	(b)	Front brake hose union bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
4	(c)	Front brake master cylinder mounting bolt 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



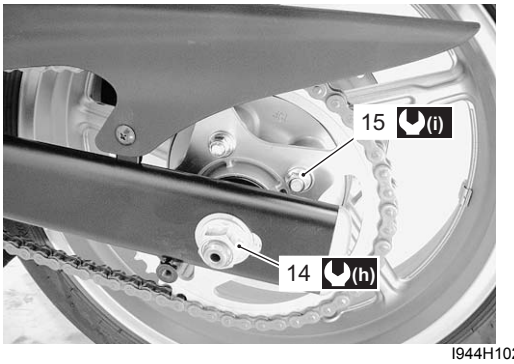
I944H1020057-01

3	(b)	Front brake hose union bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
5	(d)	Front brake caliper mounting bolt 39 N·m (3.9 kgf-m, 28.0 lbf-ft)
6	(e)	Front axle 65 N·m (6.5 kgf-m, 47.0 lbf-ft)
7	(b)	Front axle pinch bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
8	(b)	Front brake disc bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
9	(f)	Front brake air bleeder valve 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)



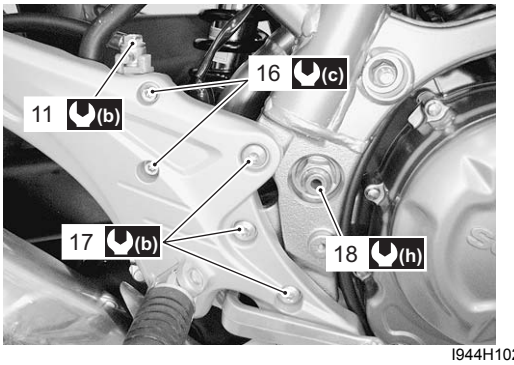
I944H1020058-02

10	(b)	Rear brake caliper mounting bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
11	(b)	Rear brake hose union bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
12	(b)	Rear brake disc bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
13	(g)	Rear brake air bleeder valve 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



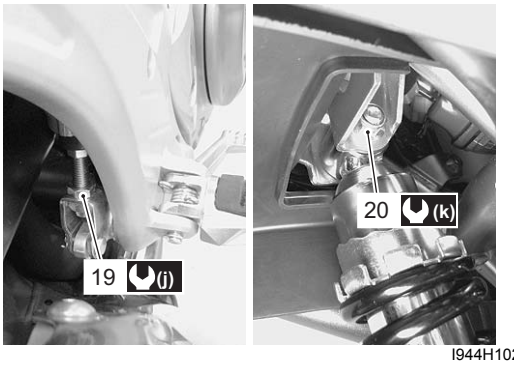
I944H1020059-02

14	(h)	Rear axle nut 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
15	(i)	Rear sprocket nut 60 N·m (6.0 kgf-m, 43.5 lbf-ft)



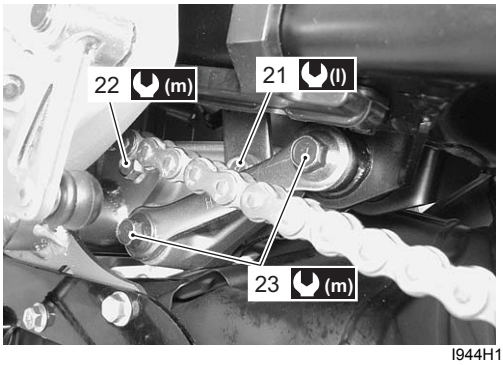
I944H1020060-01

11	(b)	Rear brake hose union bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
16	(c)	Rear brake master cylinder mounting bolt 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
17	(b)	Front footrest bracket bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
18	(h)	Swingarm pivot nut 100 N·m (10.0 kgf-m, 72.5 lbf-ft)



I944H1020061-02

19	(j)	Rear brake master cylinder rod lock-nut 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
20	(k)	Rear shock absorber mounting nut (Upper) 50 N·m (5.0 kgf-m, 36.0 lbf-ft)



I944H1020062-02

21	(l)	Rear shock absorber mounting bolt (Lower) 50 N·m (5.0 kgf-m, 36.0 lbf-ft)
22	(m)	Cushion lever mounting nut 78 N·m (7.8 kgf-m, 56.5 lbf-ft)
23	(m)	Cushion rod mounting nut 78 N·m (7.8 kgf-m, 56.5 lbf-ft)

I944H1020063-01

24	(b)	Front fork upper clamp bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
25	(b)	Front fork lower clamp bolt 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

Compression Pressure Check

B944H10206024

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

Oil Pressure Check

B944H10206025

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

SDS Check

B944H10206026

Refer to “SDS Check in Section 1A (Page 1A-18)”.

Specifications

Tightening Torque Specifications

B944H10207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Exhaust pipe bolt	23	2.3	16.5	☞(Page 0B-4)
Exhaust mounting bolt	23	2.3	16.5	☞(Page 0B-4)
Exhaust pipe connecting bolt	23	2.3	16.5	☞(Page 0B-4)
Muffler connecting bolt	23	2.3	16.5	☞(Page 0B-4)
Muffler mounting nut	25	2.5	18.0	☞(Page 0B-4)
Oil drain plug	21	2.1	15.0	☞(Page 0B-10)
Oil filter	20	2.0	14.5	☞(Page 0B-11)
Engine coolant drain bolt	13	1.3	9.5	☞(Page 0B-13)
Rear axle nut	100	10.0	72.5	☞(Page 0B-16)
Rear brake master cylinder rod lock-nut	18	1.8	13.0	☞(Page 0B-17)

NOTE

The specified tightening torque is described in the following.
“Chassis Bolt and Nut Inspection (Page 0B-19)”

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

Special Tools and Equipment

Recommended Service Material

B944H10208001

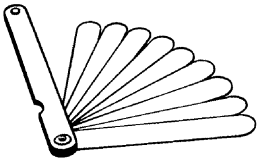
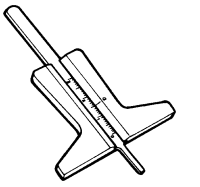
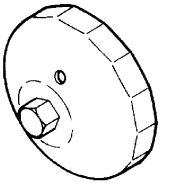
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 0B-16)

NOTE

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

Special Tool

B944H10208002

09900–20803 Thickness gauge ☞(Page 0B-5) / ☞(Page 0B-6) 	09900–20805 Tire depth gauge ☞(Page 0B-18) 
09915–40620 Oil filter wrench ☞(Page 0B-11) / ☞(Page 0B-11) 	

Service Data

Specifications

Service Data

B944H10307001

Valve + Guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	31 (1.22)	—
	EX.	25.5 (1.00)	—
Valve clearance (when cold)	IN.	0.10 – 0.20 (0.004 – 0.008)	—
	EX.	0.20 – 0.30 (0.008 – 0.012)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve 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.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	IN. & EX.	—	37.1 (1.46)
Valve spring tension	IN. & EX.	127 – 147 N (13.0 – 15.0 kgf, 28.5 – 33.0 lbs) at length 33.4 mm (1.31 in)	—

Camshaft + Cylinder Head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	36.380 – 36.425 (1.4323 – 1.4341)	36.08 (1.4205)
	EX.	35.680 – 35.725 (1.4047 – 1.4065)	35.38 (1.3929)
Camshaft journal oil clearance	IN. & EX.	0.027 – 0.069 (0.0011 – 0.0027)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.007 – 22.028 (0.8664 – 0.8672)	—
Camshaft journal O.D.	IN. & EX.	21.959 – 21.980 (0.8645 – 0.8654)	—
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cam chain pin (at arrow “3”)	16th pin		—
Cylinder head distortion	—		0.05 (0.002)

Cylinder + Piston + Piston Ring

Unit: mm (in)

Item	Standard			Limit
Compression pressure	1 300 – 1 700 kPa (13.0 – 17.0 kgf/cm^2, 185 – 242 psi)			1 100 kPa (11.0 kgf/cm^2, 156 psi)
Compression pressure difference	—			200 kPa (2.0 kgf/cm^2, 28 psi)
Piston-to-cylinder clearance	0.025 – 0.035 (0.0010 – 0.0014)			0.120 (0.0047)
Cylinder bore	81.000 – 81.015 (3.1890 – 3.1896)			Nicks or Scratches
Piston diam.	80.970 – 80.985 (3.1878 – 3.1884) Measure 20 mm (0.8 in) from the skirt end.			80.880 (3.1842)
Cylinder distortion	—			0.05 (0.002)
Piston ring free end gap	1st	—	Approx. 6.5 (0.26)	5.2 (0.20)
	2nd	2T	Approx. 9.0 (0.35)	7.2 (0.28)
Piston ring end gap	1st	—	0.06 – 0.18 (0.002 – 0.007)	0.5 (0.020)
	2nd	2T	0.06 – 0.18 (0.002 – 0.007)	0.5 (0.020)
Piston ring-to-groove clearance	1st		—	0.180 (0.0071)
	2nd		—	0.150 (0.0059)
Piston ring groove width	1st		0.83 – 0.85 (0.0327 – 0.0335) 1.30 – 1.32 (0.0512 – 0.0520)	—
	2nd		1.01 – 1.03 (0.0398 – 0.0406)	—
	Oil		2.01 – 2.03 (0.0791 – 0.0799)	—
Piston ring thickness	1st		0.76 – 0.81 (0.0299 – 0.0319) 1.08 – 1.10 (0.0425 – 0.0433)	—
	2nd		0.97 – 0.99 (0.0382 – 0.0390)	—
Piston pin bore I.D.	20.002 – 20.008 (0.7875 – 0.7877)			20.030 (0.7886)
Piston pin O.D.	19.996 – 20.000 (0.7872 – 0.7874)			19.980 (0.7866)

Conrod + Crankshaft

Unit: mm (in)

Item	Standard	Limit
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.170 – 0.320 (0.0067 – 0.0126)	0.5 (0.02)
Conrod big end width	20.95 – 21.00 (0.825 – 0.827)	—
Crank pin width	42.17 – 42.22 (1.660 – 1.662)	—
Conrod big end oil clearance	0.032 – 0.056 (0.0013 – 0.0022)	0.080 (0.0031)
Crank pin O.D.	37.976 – 38.000 (1.4951 – 1.4961)	—
Crankshaft journal O.D.	41.985 – 42.000 (1.6529 – 1.6535)	—
Crankshaft runout	—	0.05 (0.002)

Oil Pump

Item	Standard	Limit
Oil pressure (at 60 °C, 140 °F)	200 – 600 kPa (2.0 – 6.0 kgf/cm^2, 28 – 85 psi) at 3 000 r/min.	—

Clutch

Unit: mm (in)

Item	Standard		Limit
Clutch cable play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1 turn back		—
Clutch drive plate thickness	No. 1, 2	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
Clutch drive plate claw width	No. 1, 2	13.7 – 13.8 (0.539 – 0.543)	12.9 (0.508)
Clutch driven plate distortion	—		0.10 (0.004)
Clutch spring free length	53.1 (2.09)		50.4 (1.98)

Transmission + Drive Chain

Unit: mm (in) Except ratio

Item		Standard		Limit
Primary reduction ratio		2.088 (71/34)		—
Final reduction ratio		3.066 (46/15)		—
Gear ratios	1st	2.461 (32/13)		—
	2nd	1.777 (32/18)		—
	3rd	1.380 (29/21)		—
	4th	1.125 (27/24)		—
	5th	0.961 (25/26)		—
	Top	0.851 (23/27)		—
Shift fork to groove clearance		No. 1, 2, 3	0.1 – 0.3 (0.004 – 0.012)	0.5 (0.02)
Shift fork groove width		No. 1, 2, 3	5.5 – 5.6 (0.217 – 0.220)	—
Shift fork thickness		No. 1, 2, 3	5.3 – 5.4 (0.209 – 0.213)	—
Drive chain		Type	DID520VM2	—
		Links	112 links	—
		20-pitch length	—	319.4 (12.57)
Drive chain slack (on side-stand)		20 – 30 (0.8 – 1.2)		—
Gearshift lever height		45 – 55 (1.8 – 2.2)		—

Thermostat + Radiator + Fan + Coolant

Item	Standard/Specification		Note
Thermostat valve opening temperature	Approx. 76.5 °C (170 °F)		—
Thermostat valve lift	8 mm (0.31 in) and over at 100°C (212 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	50 °C (122 °F)	Approx. 0.811 kΩ	—
	80 °C (176 °F)	Approx. 0.318 kΩ	—
	110 °C (230 °F)	Approx. 0.142 kΩ	—
Radiator cap valve opening pressure	93 – 123 kPa (0.93 – 1.23 kgf/cm^2, 13.2 – 17.5 psi)		—
Cooling fan operating temperature	OFF→ON	Approx. 98 °C (208 °F)	—
	ON→OFF	Approx. 92 °C (198 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant	Reservoir tank side	Approx. 250 ml (0.3/0.2 US/Imp qt)	—
	Engine side	Approx. 1 600 ml (1.7/1.4 US/Imp qt)	—

Injector + Fuel Pump + Fuel Pressure Regulator

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

FI Sensors + Secondary Throttle Valve Actuator

Item	Standard/Specification		Note
CKP sensor resistance	160 – 240 Ω		
CKP sensor peak voltage	4.6 V and more		When cranking
IAP sensor (#1 & #2) input voltage	4.5 – 5.5 V		
IAP sensor (#1 & #2) output voltage	Approx. 2.5 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.5 kΩ at 20 °C (68 °F)		
TO sensor resistance	16.5 – 22.3 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	150 V and more		When cranking
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 4.5 V	
STV actuator resistance	Approx. 7 Ω		
HO2 sensor heater resistance	Approx. 8 Ω at 23 °C (73 °F)		
HO2 sensor output voltage	Approx. 0.45 V and less at idle speed		
	0.6 V and more at 6 000 r/min.		
EVAP system purge control solenoid valve resistance	Approx. 32 Ω at 20 °C (68 °F)		E-33 only

Throttle Body

Item	Specification
Bore size	39 mm
I.D. No.	44H1 (E-33), 44H0 (Others)
Idle r/min.	1 300 ± 100 r/min.
Fast idle r/min.	Approx. 2 000 r/min. (When cold engine)
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)

Electrical

Unit: mm (in)

Item			Specification		Note
Firing order			1 · 2		
Spark plug			Type	NGK: CR8EIA-9 DENSO: IU24D	
			Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance			Over 8 (0.3) at 1 atm.		
CKP sensor resistance			160 – 240 Ω		
CKP sensor peak voltage			4.6 V and more		When cranking
Ignition coil resistance			Primary	1 – 3 Ω	Terminal – Terminal
			Secondary	25 – 40 kΩ	Plug cap – Plug cap
Ignition coil primary peak voltage			150 V and more		When cranking
Generator coil resistance			0.3 – 1.2 Ω		
Generator maximum output			Approx. 375 W at 5 000 r/min.		
Generator no-load voltage (When engine is cold)			60 V (AC) and more at 5 000 r/min.		
Regulated voltage			14.0 – 15.5 V at 5 000 r/min.		
Starter motor brush length			Standard	10 (0.39)	
			Limit	6.5 (0.26)	
Starter relay resistance			3 – 6 Ω		
Battery	Type designation		YT12A-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		
	Fuel		10 A		
	Ignition		15 A		
	Signal		10 A		
	Fan		15 A		
	Main		30 A		

Wattage

Unit: W

Item		Specification	
		E-03, 28, 33	E-02, 19, 24
Headlight	HI	60	←
	LO	55	←
Position/Parking light		5	←
Brake light/Taillight		21/5	←
Turn signal light		21 x 4	10 x 4
License plate light		5	←
Speedometer light		LCD	←
Tachometer light		LED	←
Turn signal indicator light		LED	←
High beam indicator light		LED	←
Neutral position indicator light		LED	←
Oil pressure/Engine coolant temp indicator light		LED	←
FI indicator light		LED	←
Fuel indicator light		LED	←

Brake + Wheel

Unit: mm (in)

Item		Standard	Limit
Rear brake pedal height		45 – 55 (1.8 – 2.2)	—
Brake disc thickness	Front	4.3 – 4.7 (0.17 – 0.19)	4.0 (0.16)
	Rear	4.8 – 5.2 (0.19 – 0.20)	4.5 (0.18)
Brake disc runout		—	0.30 (0.012)
Master cylinder bore	Front	14.000 – 14.043 (0.5512 – 0.5529)	—
	Rear	14.000 – 14.043 (0.5512 – 0.5529)	—
Master cylinder piston diam.	Front	13.957 – 13.984 (0.5495 – 0.5506)	—
	Rear	13.957 – 13.984 (0.5495 – 0.5506)	—
Brake caliper cylinder bore	Front	27.000 – 27.076 (1.0630 – 1.0660)	—
	Rear	38.180 – 38.230 (1.5031 – 1.5051)	—
Brake caliper piston diam.	Front	26.920 – 26.970 (1.0598 – 1.0618)	—
	Rear	38.080 – 38.130 (1.4992 – 1.5012)	—
Brake fluid type		DOT 4	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	17 M/C x MT 3.50	—
	Rear	17 M/C x MT 5.00	—

Tire

Item		Standard	Limit
Cold inflation tire pressure (Solo riding)	Front	225 kPa (2.25 kgf/cm^2, 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm^2, 36 psi)	—
Cold inflation tire pressure (Dual riding)	Front	225 kPa (2.25 kgf/cm^2, 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm^2, 36 psi)	—
Tire size	Front	120/70 ZR17 M/C (58 W)	—
	Rear	160/60 ZR17 M/C (69 W)	—
Tire type	Front	DUNLOP: Qualifier J	—
	Rear	DUNLOP: Qualifier J	—
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	125 (4.9)	—
Front fork inner tube O.D.	41 (1.61)	—
Front fork spring free length	446.5 (17.58)	437 (17.2)
Front fork oil level (Without spring, outer tube fully compressed)	96 (3.78)	—
Front fork oil type	SUZUKI FORK OIL SS-08 or an equivalent fork oil	—
Front fork oil capacity (Each leg)	517 ml (17.5/18.2 US/Imp oz)	—
Front fork spring adjuster	3th groove from top	—
Rear shock absorber spring pre-set position	3/7	—
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 87 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 91 octane (Research Method) or higher. Unleaded gasoline is recommended.		E-02, 19, 24
Fuel tank capacity	Including reserve	13.5 L (3.6/3.0 US/Imp gal)	E-33
		14.5 L (3.8/3.2 US/Imp gal)	Others
	Fuel level indicator light flickers	Approx. 3.5 L (0.9/0.8 US/Imp gal)	
Engine oil type	SAE 10 W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	2 400 ml (2.5/2.1 US/Imp qt)	
	Filter change	2 750 ml (2.9/2.4 US/Imp qt)	
	Overhaul	3 000 ml (3.2/2.6 US/Imp qt)	

Tightening Torque List

B944H10307002

Engine

Item			N·m	kgf-m	lbf-ft
Exhaust pipe bolt			23	2.3	16.5
Exhaust pipe connecting bolt			23	2.3	16.5
Exhaust mounting bolt			23	2.3	16.5
Chamber support bracket bolt			25	2.5	18.0
Muffler connecting bolt			23	2.3	16.5
Muffler mounting nut			25	2.5	18.0
Muffler cover bolt			5.5	0.55	4.0
Exhaust cover bolt			5.5	0.55	4.0
Speed sensor rotor bolt			25	2.5	18.0
Speed sensor mounting bolt			5	0.5	3.5
Engine sprocket nut			145	14.5	105.0
Engine mounting nut	Front upper		93	9.3	67.5
	Rear upper		55	5.5	40.0
	Rear lower		55	5.5	40.0
Engine mounting bracket bolt			23	2.3	16.5
Cylinder head cover bolt			14	1.4	10.0
Spark plug			11	1.1	8.0
Camshaft journal holder bolt			10	1.0	7.0
Oil pipe mounting bolt			10	1.0	7.0
Cam chain tensioner adjuster cap bolt			23	2.3	16.6
Cam chain tensioner adjuster mounting bolt			10	1.0	7.0
Cylinder head bolt	[M10]	Initial	25	2.5	18.0
		Final	42	4.2	30.5
Cylinder head bolt	[M6]		10	1.0	7.0
Cylinder nut [M6]			10	1.0	7.0
Clutch sleeve hub nut			50	5.0	36.0
Clutch spring set bolt			10	10	7.0
Primary drive gear bolt			70	7.0	50.5
Starter clutch bolt			25	2.5	18.0
Generator rotor bolt			140	14.0	101.5
Generator stator set bolt			11	1.1	8.0
Generator cover bolt			10	1.0	7.0
Gearshift cam stopper bolt			10	1.0	7.0
Gearshift cam stopper plate bolt			13	1.3	9.5
Gearshift arm stopper			19	1.9	13.5
Gearshift lever bolt			40	4.0	29.0
Gearshift shaft link arm bolt			10	1.0	7.0
Clutch release arm bolt			9	0.9	6.5

Item		N·m	kgf-m	lbf-ft
Gear position switch mounting bolt		6.5	0.65	4.7
Oil pressure switch		14	1.4	10.0
Oil pressure switch lead wire bolt		1.5	0.15	1.1
Crankcase bolt	[M6]	11	1.1	8.0
	[M8]	26	2.6	19.0
Oil gallery plug	(Cylinder head) [M6]	10	1.0	7.0
	[M6]	10	1.0	7.0
	[M8]	18	1.8	13.0
	[M12]	21	2.1	15.0
	[M16]	35	3.5	25.5
Oil drain plug		21	2.1	15.0
Piston cooling oil jet bolt		10	1.0	7.0
Conrod cap bolt	Initial	21	2.1	15.0
	Final	90° (1/4 turn)		
Oil cooler union bolt		70	7.0	50.5
Starter motor lead wire mounting bolt		6	0.6	4.5
Starter motor mounting bolt		10	1.0	7.0
Starter motor brush holder mounting bolt		7	0.7	5.0
Starter motor housing bolt		3.5	0.35	2.5
EVAP canister bracket bolt (E-33 only)		7.5	0.75	5.5

FI System and Intake Air System

Item	N·m	kgf-m	lbf-ft
CKP sensor mounting bolt	6.5	0.65	4.7
Fuel delivery pipe mounting screw	5	0.5	3.5
Fuel pump mounting 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
ECT sensor	18	1.8	13.0
GP switch mounting bolt	6.5	0.65	4.7
HO2 sensor	25	2.5	18.0
EVAP system purge control solenoid valve mounting nut (E-33 only)	7	0.7	5.0

Cooling System

Item	N·m	kgf-m	lbf-ft
Water pump cover screw	4.5	0.45	32.5
Engine coolant drain bolt	13	1.3	9.5
Water hose clamp bolt	1.5	0.15	1.0
Thermostat connector cap bolt	10	1.0	7.0
Cooling fan assembly mounting bolt	6.5	0.65	4.5

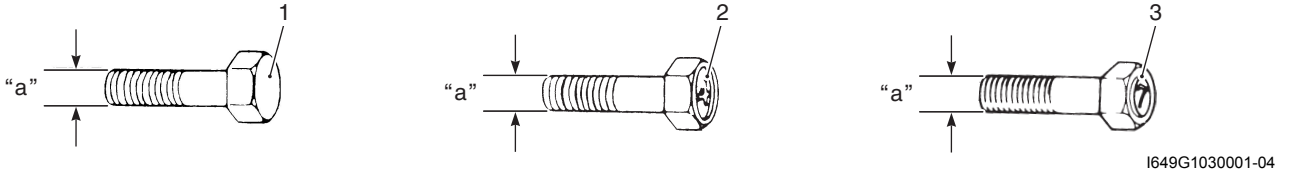
Chassis

Item	N·m	kgf-m	lbf-ft
Steering stem head nut	90	9.0	65.0
Steering stem nut	Tighten 45 N·m (4.5 kgf-m, 32.5 lbf-ft) then turn back 1/2 – 1/4.		
Front fork upper clamp bolt	23	2.3	16.5
Front fork lower clamp bolt	23	2.3	16.5
Front fork cap bolt	23	2.3	16.5
Front fork cylinder bolt	20	2.0	14.5
Front axle	65	6.5	47.0
Front axle pinch bolt	23	2.3	16.5
Front footrest bracket mounting bolt	23	2.3	16.5
Handlebar holder bolt	23	2.3	16.5
Front brake master cylinder mounting bolt	10	1.0	7.0
Front brake caliper mounting bolt	39	3.9	28.0
Brake hose union bolt	23	2.3	16.5
Brake disc bolt (Front and Rear)	23	2.3	16.5
Air bleeder valve (Front brake caliper)	7.5	0.75	5.5
Air bleeder valve (Rear brake caliper)	6	0.6	4.5
Rear brake caliper mounting bolt	23	2.3	16.5
Rear brake caliper sliding pin	27	2.7	19.5
Rear brake pad mounting pin	17	1.7	12.5
Pad pin plug	2.5	0.25	1.8
Rear brake master cylinder mounting bolt	10	1.0	7.0
Rear brake master cylinder rod lock-nut	18	1.8	13.0
Rear axle nut	100	10.0	72.5
Rear sprocket nut	60	6.0	43.5
Side-stand bolt	10	1.0	7.0
Side-stand nut	40	4.0	29.0
Side-stand switch mounting bolt	14	1.4	10.0
Swingarm pivot nut	100	10.0	72.5
Rear shock absorber mounting upper nut	50	5.0	36.0
Rear shock absorber mounting bolt	50	5.0	36.0
Cushion lever mounting nut	78	7.8	56.5
Cushion rod mounting nut	78	7.8	56.5
Brake lever pivot bolt	6	0.6	4.5
Brake lever pivot bolt lock-nut	6	0.6	4.5
Clutch lever pivot bolt	5	0.5	3.8
Clutch lever pivot bolt lock-nut	5	0.5	3.8
Rear combination light mounting bolt	1.8	0.18	1.5
Turn signal light mounting nut (Front and Rear)	1.3	0.13	1.0
Bank sensor bolt	18	1.8	13.0

Tightening Torque Chart

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

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



I649G1030001-04

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

Section 1

Engine

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Precautions

Precautions

Precautions for Engine

B944H11000001

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

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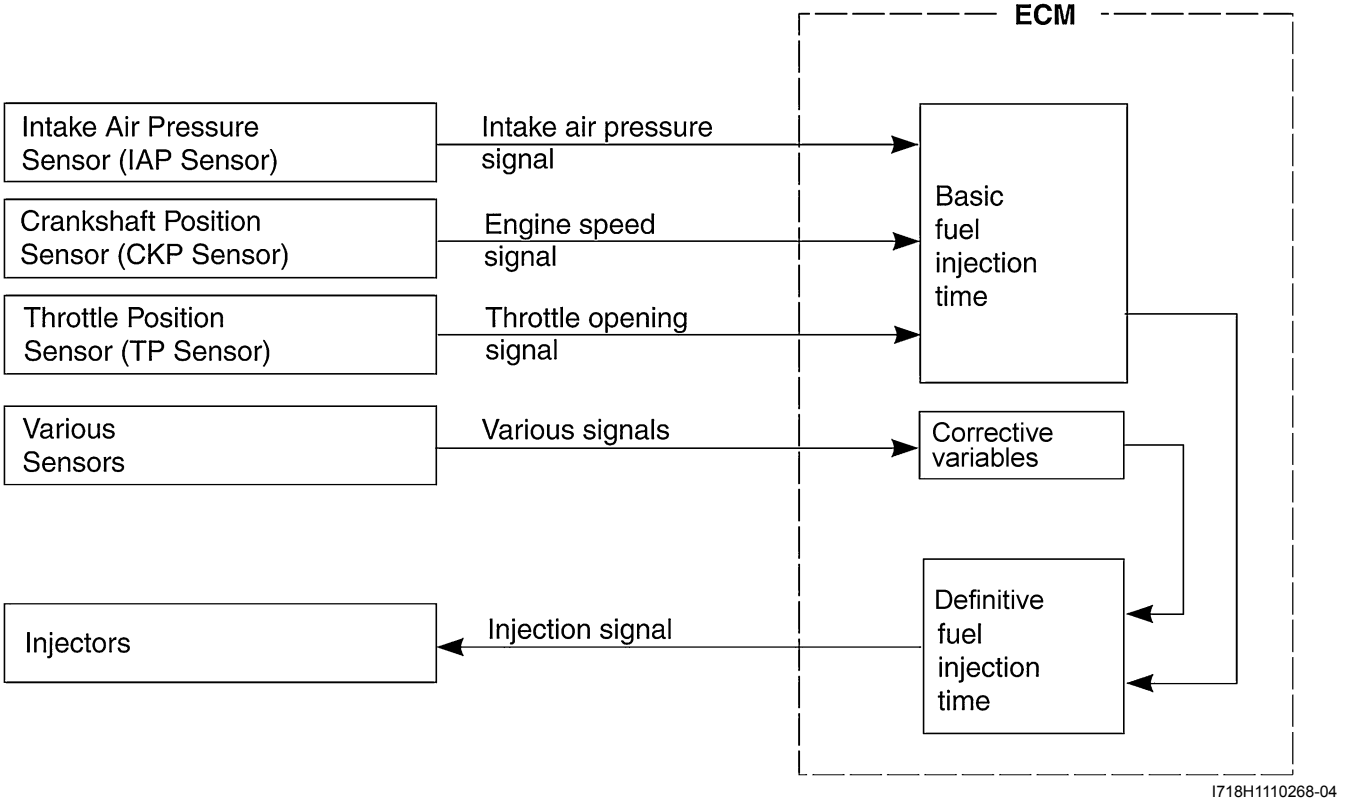
Injection Time (Injection Volume)

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



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

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

Injection Stop Control

Signal	Descriptions
TIP-OVER SENSOR SIGNAL (FUEL SHUT-OFF)	When the motorcycle tips over, the tip-over sensor sends a signal to the ECM. Then, this signal cuts OFF current supplied to the fuel pump, fuel injectors and ignition coils.
OVER-REV. LIMITER SIGNAL	The fuel injector stops operation when engine rpm reaches rev. limit rpm. The fuel cut-off circuit is incorporated in this ECM in order to prevent over-running of engine. When engine speed reaches 10 200 r/min, this circuit cuts off fuel at the fuel injector. But under no load, the clutch lever is pulled or the gear position is neutral, this circuit cuts off fuel when engine speed reaches 10 200 r/min. **⚠ CAUTION** **Under no load, the engine can run over 11 000 r/min though the fuel cut-off circuit is effective, which may possibly cause engine damage. Do not run the engine without load over 11 000 r/min at anytime.**

Self-Diagnosis Function

B944H11101002

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

User Mode

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

***1**

Current letter displayed any one of the odometer, tripmeter 1 or tripmeter 2.

***2**

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

***3**

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

“CHEC”:

The LCD panel indicates “CHEC” when no communication signal from the ECM is received for 3 seconds and more.

For Example:

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

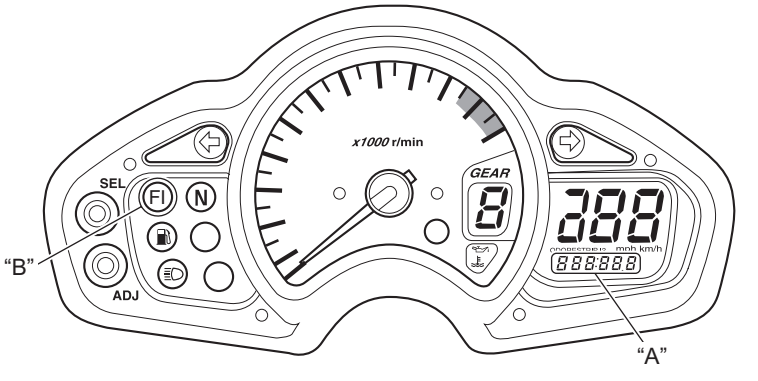
If CHEC is indicated, the LCD does not indicate the trouble code. It is necessary to check the wiring harness between ECM and speedometer couplers.

The possible cause of this indication is as follows:

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

NOTE

The FI indicator light “B” turns ON about 3 seconds after turning the ignition switch ON.



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Dealer Mode

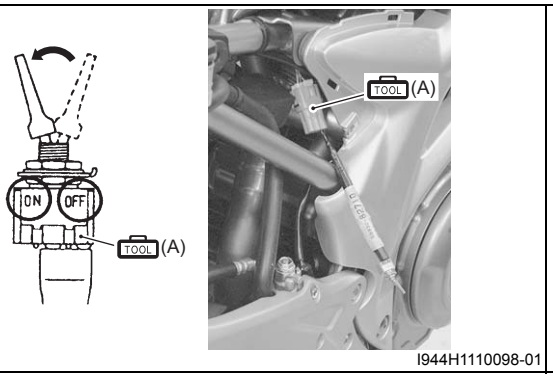
The defective function is memorized in the computer. Use the special tool's coupler to connect to the mode select switch. The memorized malfunction code is displayed on LCD (DISPLAY) panel. Malfunction means that the ECM does not receive signal from the devices. These affected devices are indicated in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

⚠ CAUTION

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

Special tool

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



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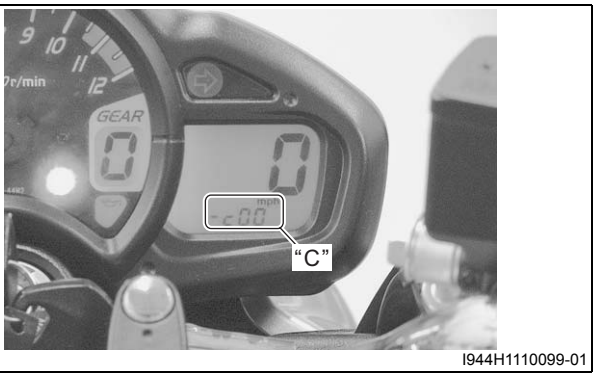

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Malfunction	LCD (display) indication	FI indicator light indication	Indication mode
"NO"	C00 "C"	FI indicator light turns OFF.	—
"YES"	C** code is indicated from small numeral to large one.		For each 2 sec., code is indicated.

Schematic and Routing Diagram

FI System Wiring Diagram

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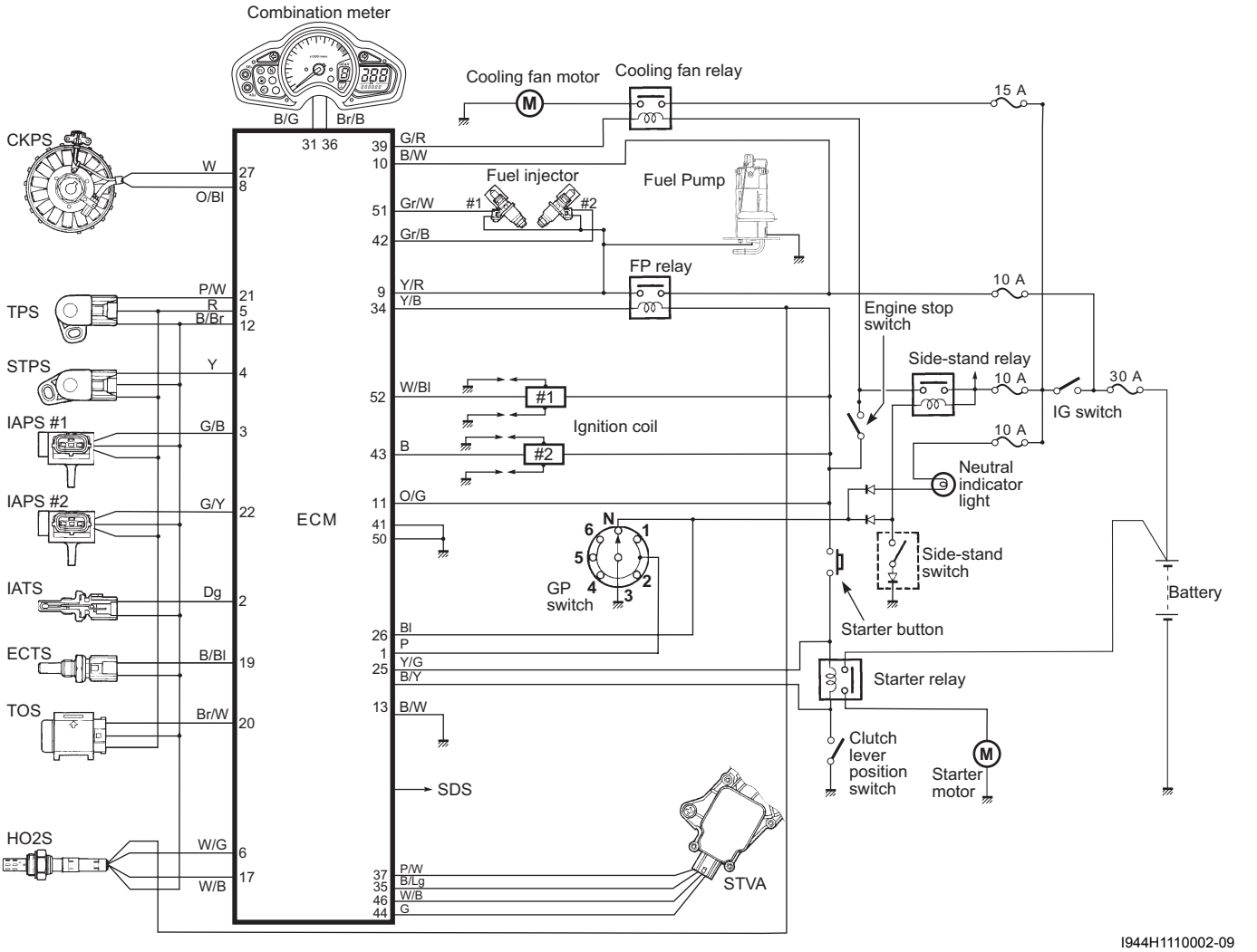

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Terminal Alignment of ECM Coupler

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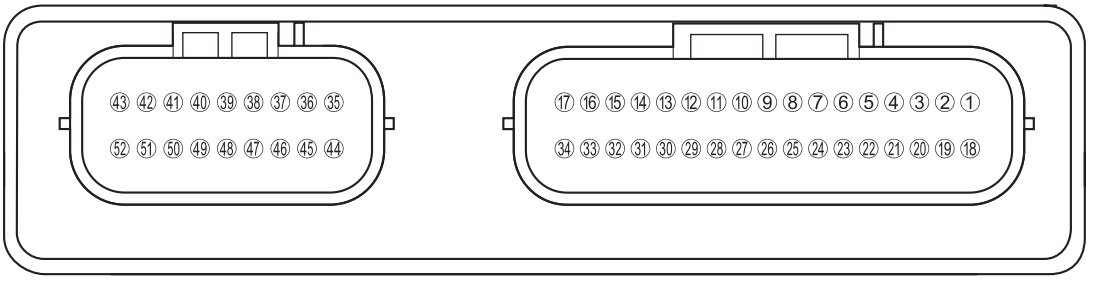

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TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
1	GP switch signal (GP)	27	CKP sensor signal (CKP+)
2	IAT sensor signal (IAT)	28	—
3	IAP sensor signal #1 (IAP.F)	29	—
4	STP sensor signal (STP)	30	—
5	Power source for sensors (VCC)	31	Serial data for speedometer (TECH)
6	HO2 sensor signal	32	Serial data for self-diagnosis
7	Clutch lever position switch (CLT)	33	—
8	CKP sensor signal (CKP–)	34	Fuel pump relay (FP Relay)
9	Power source for fuel injector (VM)	35	STVA signal (STVA. 1B)
10	Power source for back-up	36	Tachometer
11	Power source	37	STVA signal (STVA. 1A)
12	Sensor ground (E2)	38	—
13	ECM ground (E1)	39	Cooling fan relay
14	—	40	—
15	—	41	Ground
16	—	42	Fuel injector #2 (R)
17	HO2 sensor heater (HO2.H)	43	Ignition coil #2
18	—	44	STVA signal (STVA. 2B)
19	ECT sensor signal (ECT)	45	—
20	TO sensor signal (TOS)	46	STVA signal (STVA. 2A)
21	TP sensor signal (TP)	47	—
22	IAP sensor signal #2 (IAP.R)	48	—
23	—	49	—
24	—	50	Ground
25	Starter switch signal	51	Fuel injector #1 (F)
26	Neutral switch signal	52	Ignition coil #1

Component Location

FI System Parts Location

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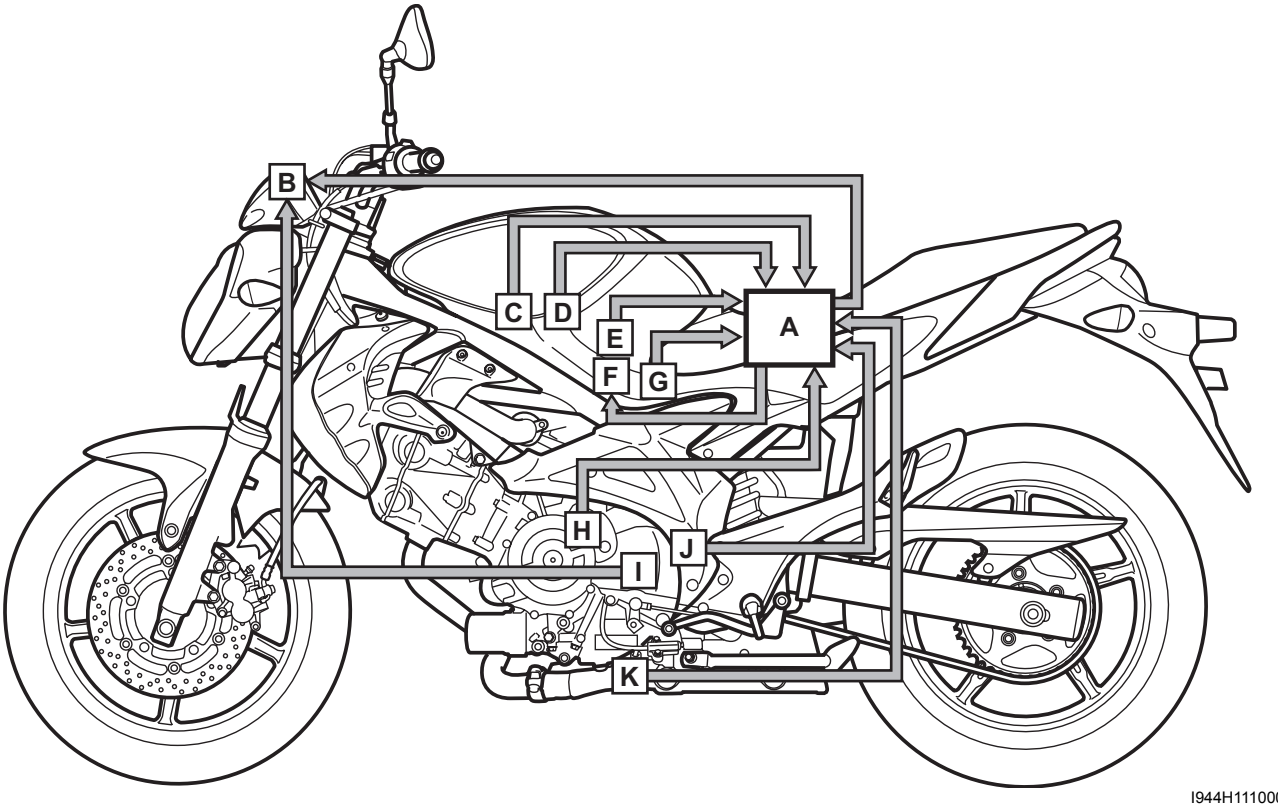

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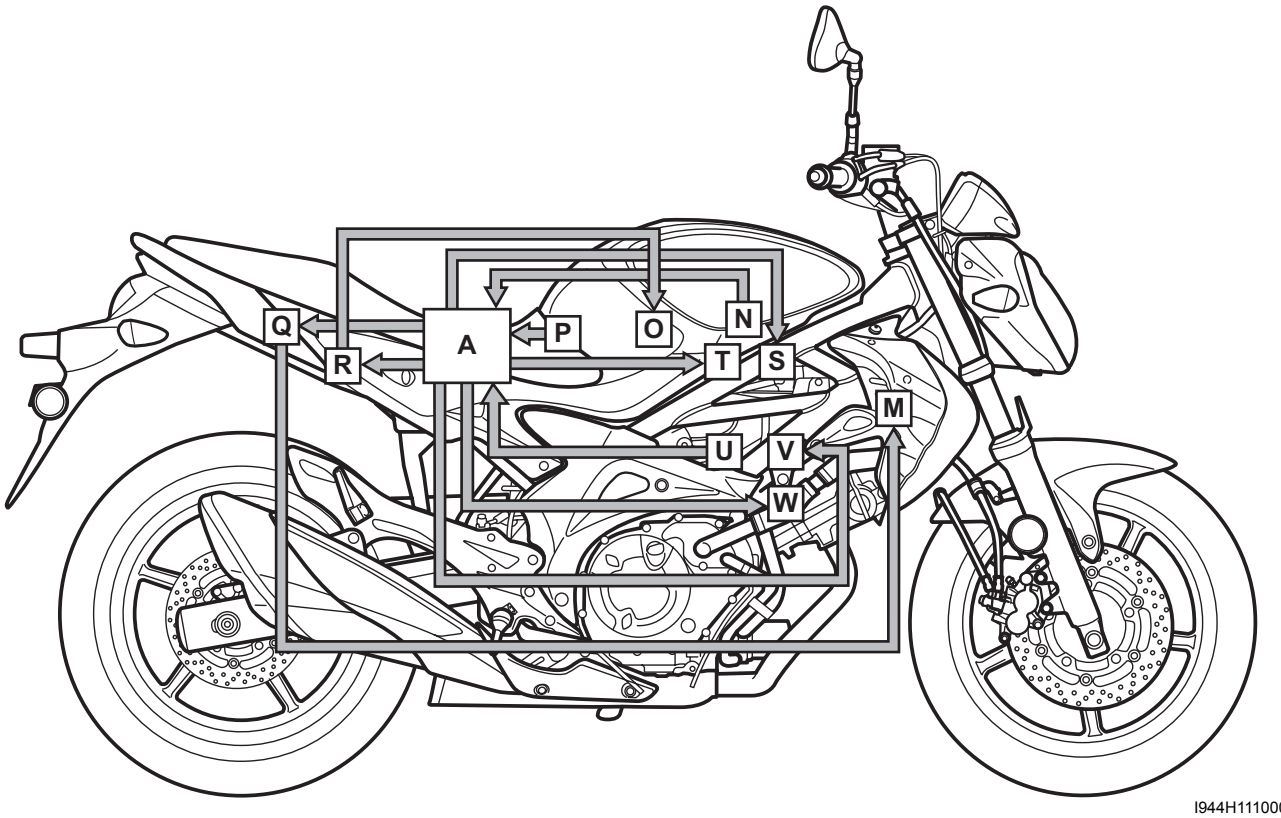
“A”: ECM	“G”: Throttle position sensor (TPS)
“B”: Speedometer	“H”: Crank shaft position sensor (CKPS)
“C”: Intake air pressure sensor #2 (IAPS)	“I”: Speedometer sensor
“D”: Intake air temperature sensor (IATS)	“J”: Gear position switch (GP switch)
“E”: Secondary throttle position sensor (STPS)	“K”: Heated oxygen sensor (HO2S)
“F”: Secondary throttle valve actuator (STVA)	



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“A”: ECM	“R”: Fuel pump relay (FP relay)
“M”: Cooling fan	“S”: Fuel injector (Front)
“N”: Intake air pressure sensor #1 (IAPS)	“T”: Fuel injector (Rear)
“O”: Fuel pump	“U”: Engine coolant temperature sensor (ECTS)
“P”: Tip-over sensor (TOS)	“V”: Ignition coil (Rear)
“Q”: Cooling fan relay	“W”: Ignition coil (Front)

Diagnostic Information and Procedures

Engine Symptom Diagnosis

B944H11104001

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 rings.	*Replace.*
	Worn-down cylinder bores.	*Replace.*
	Too slow starter motor cranking.	*Refer to "Starting System Diagram in Section 1I (Page 1I-1)".*
	Poor seating of spark plugs.	*Retighten.*
	Defective cylinder head gasket.	*Replace.*
Engine will not start or is hard to start (Plug not sparking)	Fouled spark plugs.	*Clean.*
	Wet spark plugs.	*Clean and dry.*
	Defective ignition coil.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Open-circuited wiring connection.	*Repair or replace.*
	Open or short in high-tension cords.	*Replace.*
Engine will not start or is hard to start (No fuel reaching the intake manifold)	Clogged fuel filter or fuel hose.	*Clean or replace.*
	Defective fuel pump.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Defective fuel injectors.	*Replace.*
	Defective fuel pump relay.	*Replace.*
	Defective ECM.	*Replace.*
	Open-circuited wiring 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 sensors.	*Replace.*
	Defective ECM.	*Replace.*
	Defective ECT sensor.	*Replace.*
	Defective IAT sensor.	*Replace.*
	Clogged ISC valve air passage way.	*Repair or replace.*
Engine idles poorly	Valve clearance out of adjustment.	*Adjust.*
	Poor seating of valves.	*Replace or repair.*
	Defective valve guides.	*Replace.*
	Worn down camshafts.	*Replace.*
	Too wide spark plug gaps.	*Adjust or replace.*
	Defective ignition coil.	*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 leaning.	*Reset learned value.*
	Dirty throttle body.	*Clean.*
	Sucking air from throttle valve or intake pipe.	*Retighten or replace.*

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

Condition	Possible cause	Correction / Reference Item
Engine runs poorly in high speed range (Defective engine internal/ electrical parts)	Weakened valve spring.	*Replace.*
	Worn camshafts.	*Replace.*
	Valve timing out of adjustment.	*Adjust.*
	Too narrow spark plug gaps.	*Adjust.*
	Ignition not advanced sufficiently due to poorly working timing advance circuit.	*Replace ECM.*
	Defective ignition coils.	*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.*
	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 CKP sensor.	*Replace.*
	Defective GP sensor.	*Replace.*
	Defective IAP sensors.	*Replace.*
	Defective ECM.	*Replace.*
	TP sensor out of adjustment.	*Adjust.*
	Defective STP sensor and/or STVA.	*Replace.*
Engine lacks power (Defective engine internal/ electrical parts)	Loss of valve clearance.	*Adjust.*
	Weakened valve springs.	*Replace.*
	Valve timing out of adjustment.	*Adjust.*
	Worn piston rings or cylinders.	*Replace.*
	Poor seating of valves.	*Repair.*
	Fouled spark plugs.	*Clean or replace.*
	Incorrect spark plugs.	*Adjust or replace.*
	Clogged fuel injectors.	*Replace.*
	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 coils.	*Replace.*
	Defective STP sensor or STVA.	*Replace.*
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	*Repair or replace.*
	Defective TP sensor.	*Replace.*
	Defective IAT sensor.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective GP sensor.	*Replace.*
	Defective IAP sensors.	*Replace.*
	TP sensor out of adjustment.	*Adjust.*
	Defective STP sensor and/or STVA.	*Replace.*

Condition	Possible cause	Correction / Reference Item
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 pipes.	*Retighten or replace.*
	Use of incorrect engine oil.	*Change.*
	Defective cooling system.	*See radiator section.*
Engine overheats (Lean fuel/air mixture)	Short-circuited IAP sensors/lead wires.	*Repair or replace.*
	Short-circuited IAT sensor/lead wire.	*Repair or replace.*
	Sucking air from intake pipe joint.	*Repair or replace.*
	Defective fuel injectors.	*Replace.*
	Defective ECT sensor.	*Replace.*
Engine overheats (Other factors)	Ignition timing is too advanced due to defective timing advance system (ECT sensor, GP sensor, CKP sensor or ECM).	*Replace.*
	ISC valve incorrect learning.	*Reset learned value.*
Dirty or heavy exhaust smoke	Too much engine oil.	*Check with inspection window, drain out excess oil.*
	Worn piston rings or cylinders.	*Replace.*
	Worn valve guides.	*Replace.*
	Scored or scuffed cylinder walls.	*Replace.*
	Worn valve stems.	*Replace.*
	Defective stem seal.	*Replace.*
	Worn oil ring side rails.	*Replace.*

Self-Diagnostic Procedures

B944H11104002

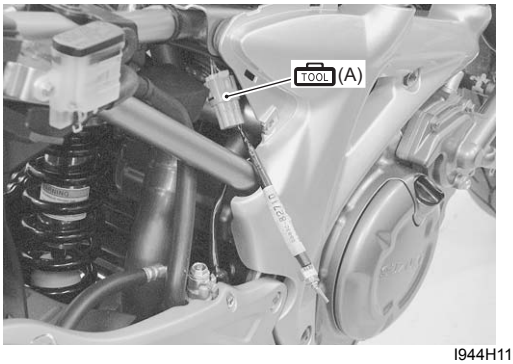
Use of Mode Select Switch

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 right frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
2) Connect the special tool to the mode select switch coupler at the wiring harness.

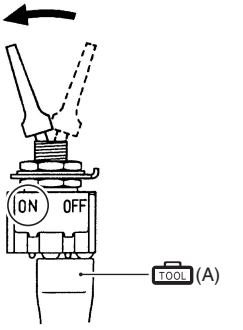
Special tool
TOOL (A): 09930–82720 (Mode select switch)



I944H1110100-01

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 "A" to determine the malfunction part. Refer to "DTC Table (Page 1A-22)".

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



I718H1110006-04

I944H1110101-01

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-15)".**

7) Turn the ignition switch OFF and disconnect the special tool from the mode select switch coupler.
8) Reinstall the removed parts.

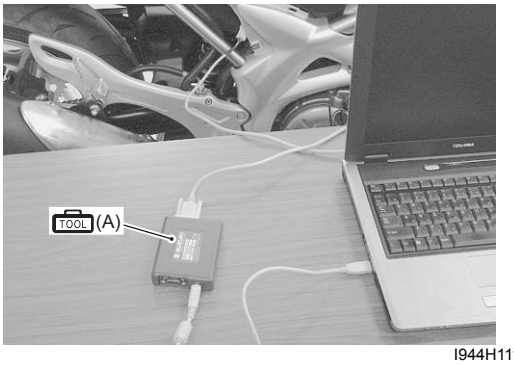
Use of SDS

NOTE

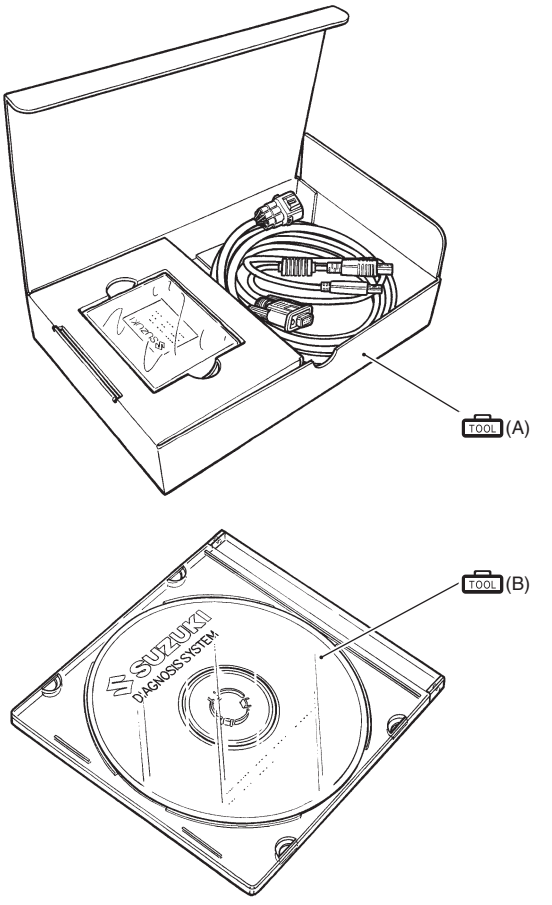
- **Do not disconnect the coupler from ECM, battery cable from battery, ECM ground wire from the engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection may erase the memorized information in ECM memory.**
- **DTC stored in ECM memory can be checked by 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 right frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
2) Set up the SDS tools. (Refer to the SDS operation manual for further details.)

Special tool
TOOL (A): 09904–41010 (SDS Set)
TOOL (B): 99565–01010–019 (CD-ROM Ver.19)

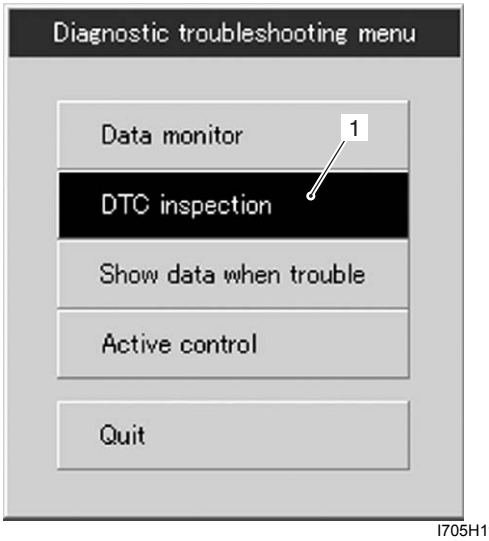


I944H1110102-01



I705H1110116-03

3) Click the DTC inspection button (1).



I705H1110003-01

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

NOTE

- **Read the DTC (Diagnostic Trouble Code) and show data when trouble (displaying data at the time of DTC) according to instructions displayed on SDS.**
- **Not only SDS is used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger. (Refer to “Show Data When Trouble (Displaying Data at the Time of DTC) (Page 1A-16)”.)**
- **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-15)”.
7) Close the SDS tool and turn the ignition switch OFF.
8) Disconnect the SDS tool.

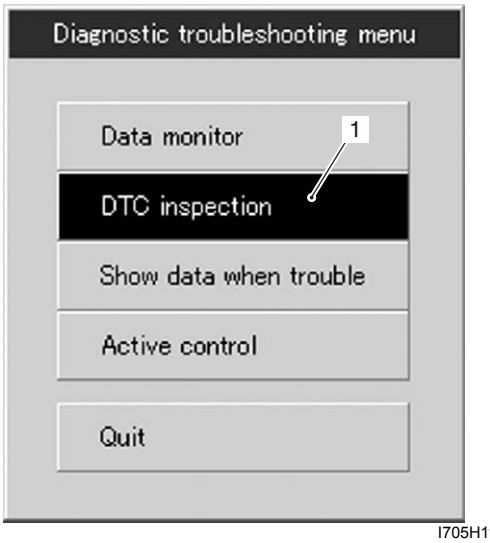
Use of SDS Diagnosis Reset Procedures

B944H11104003

NOTE

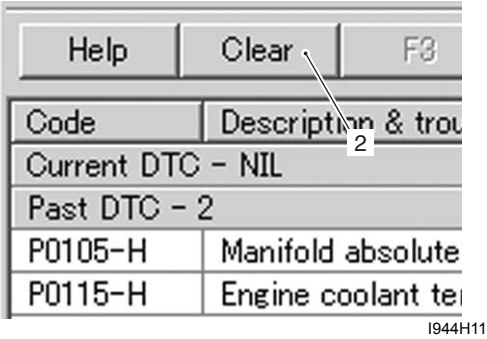
The malfunction code is memorized in the ECM also when the lead wire coupler of any sensor is disconnected. Therefore, when a lead wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Set up the SDS tools. (Refer to the SDS operation manual for further details.)
3) After repairing the trouble, turn OFF the ignition switch and turn ON again.
4) Click the DTC inspection button (1).



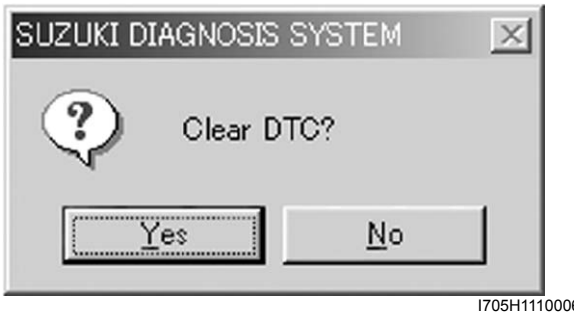
I705H1110003-01

5) Check the DTC.
6) 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.
7) Click “Clear” (2) to delete history code (Past DTC).

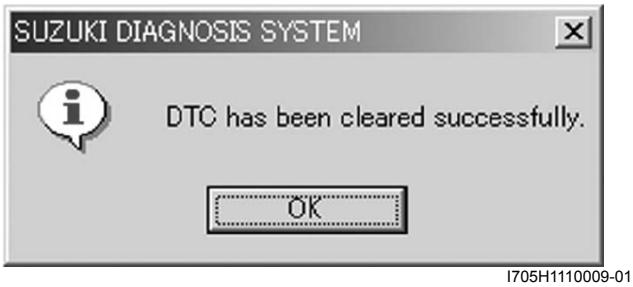


I944H1110006-01

8) Follow the displayed instructions.

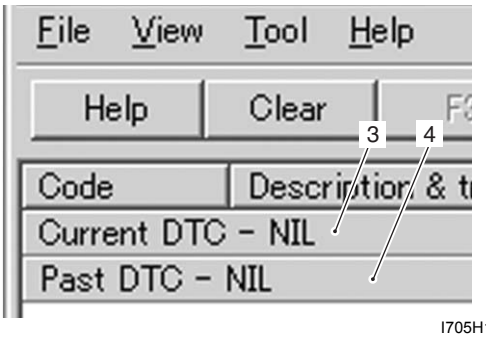


I705H1110006-01



I705H1110009-01

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



I705H1110008-01

10) Close the SDS tool and turn the ignition switch OFF.
11) Disconnect the SDS tool.
12) Reinstall the removed parts.

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

B944H11104004

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.

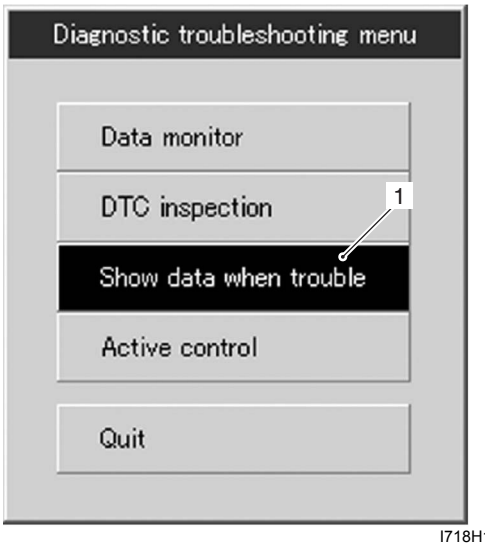
Failure #1

P0105 Manifold absolute pressure circuit malfunction 1

Item	Pre-detect	Detect poi...	Post-dete...
Engine speed	0	0	0
Throttle position	27.0	27.0	27.0
Manifold absolute pressure 1	126.4	126.4	126.4
Engine coolant / oil temperature	18.0	18.0	18.0
Gear position	Neutral pos	Neutral pos	Neutral pos
Secondary throttle actuator position sensor	38.4	38.4	38.4
Manifold absolute pressure 2	101.6	101.6	101.6

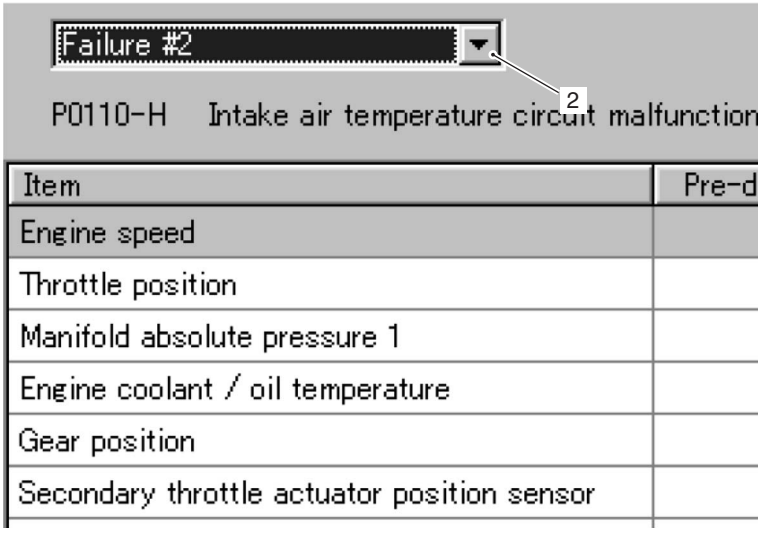
I944H1110106-01

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



I718H1110269-02

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



I718H1110270-01

SDS Check

B944H11104005

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

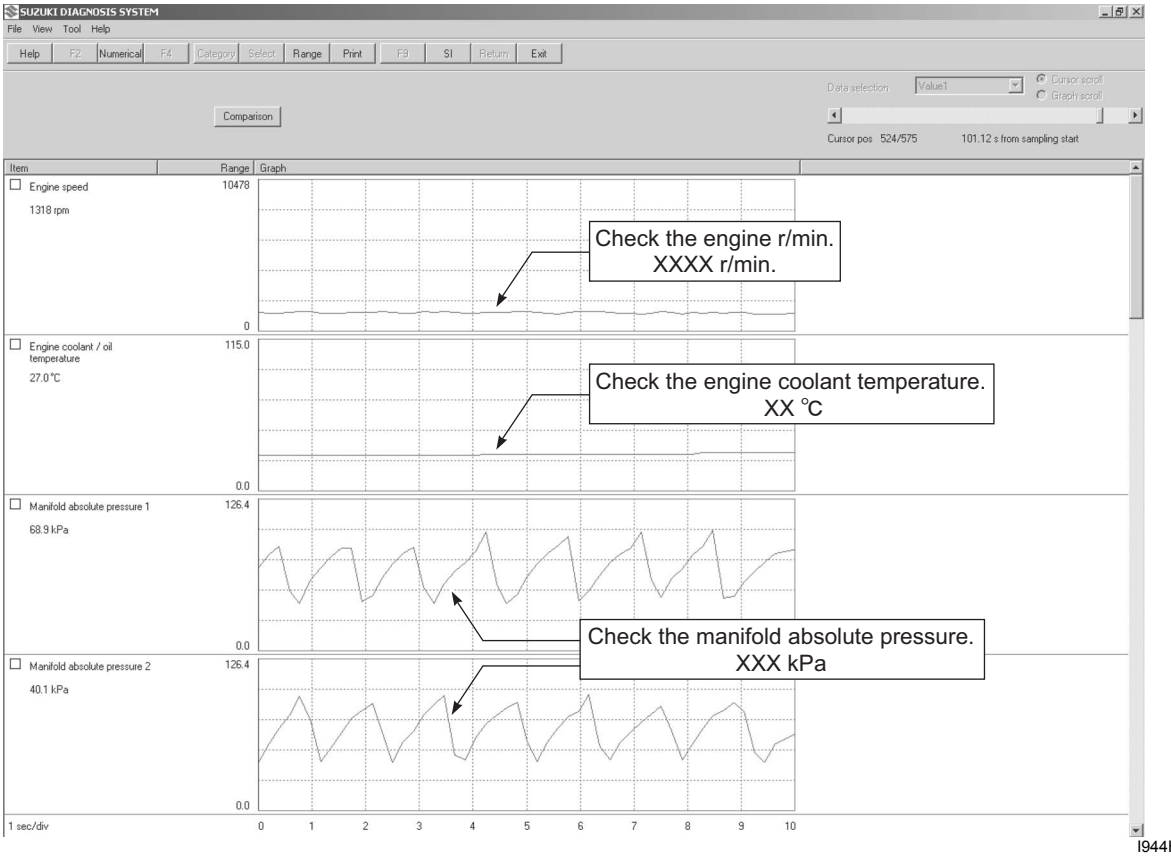
1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)

Special tool
(TOOL) : 09904–41010 (SDS set)
(TOOL) : 99565–01010–019 (CD-ROM Ver.19)

NOTE

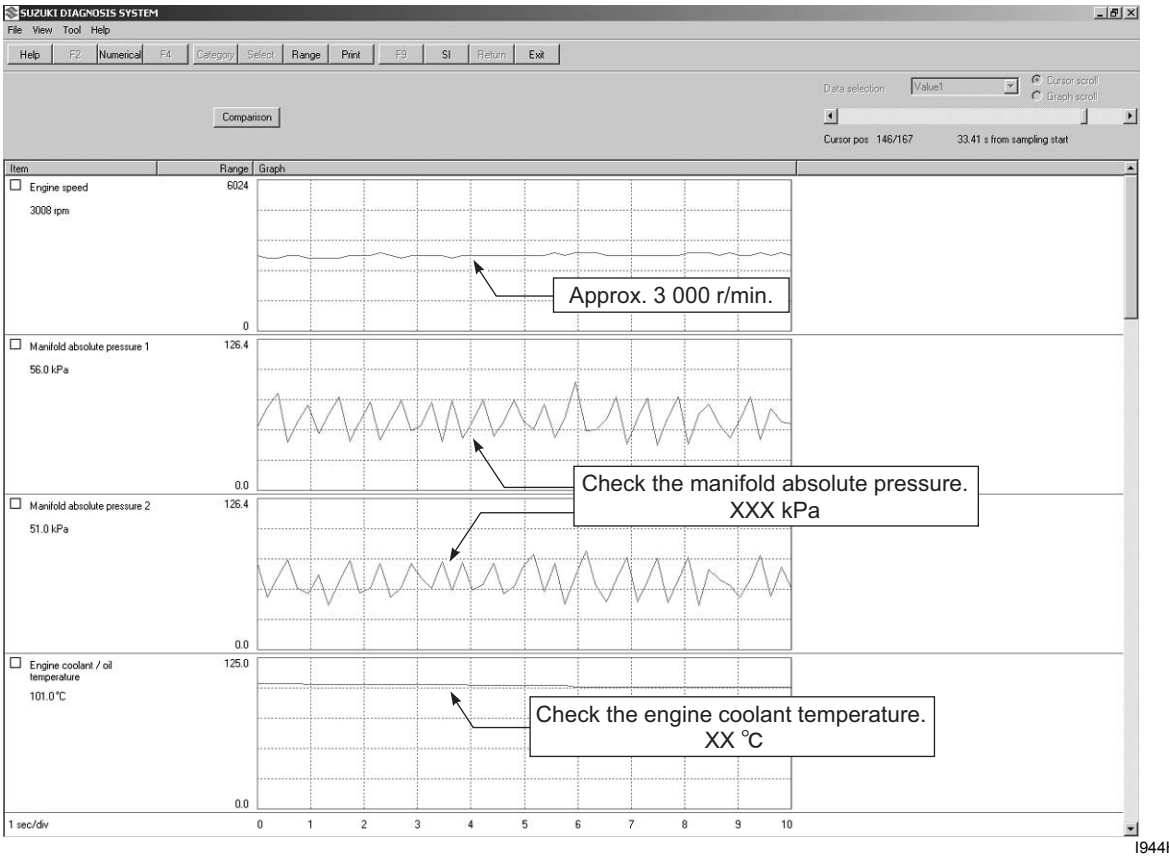
- **Before taking the sample of data, check and clear the Past DTC.**
- **A number of different data under a fixed condition as shown should be saved or filed as sample.**

Sample
Data sampled from cold starting through warm-up



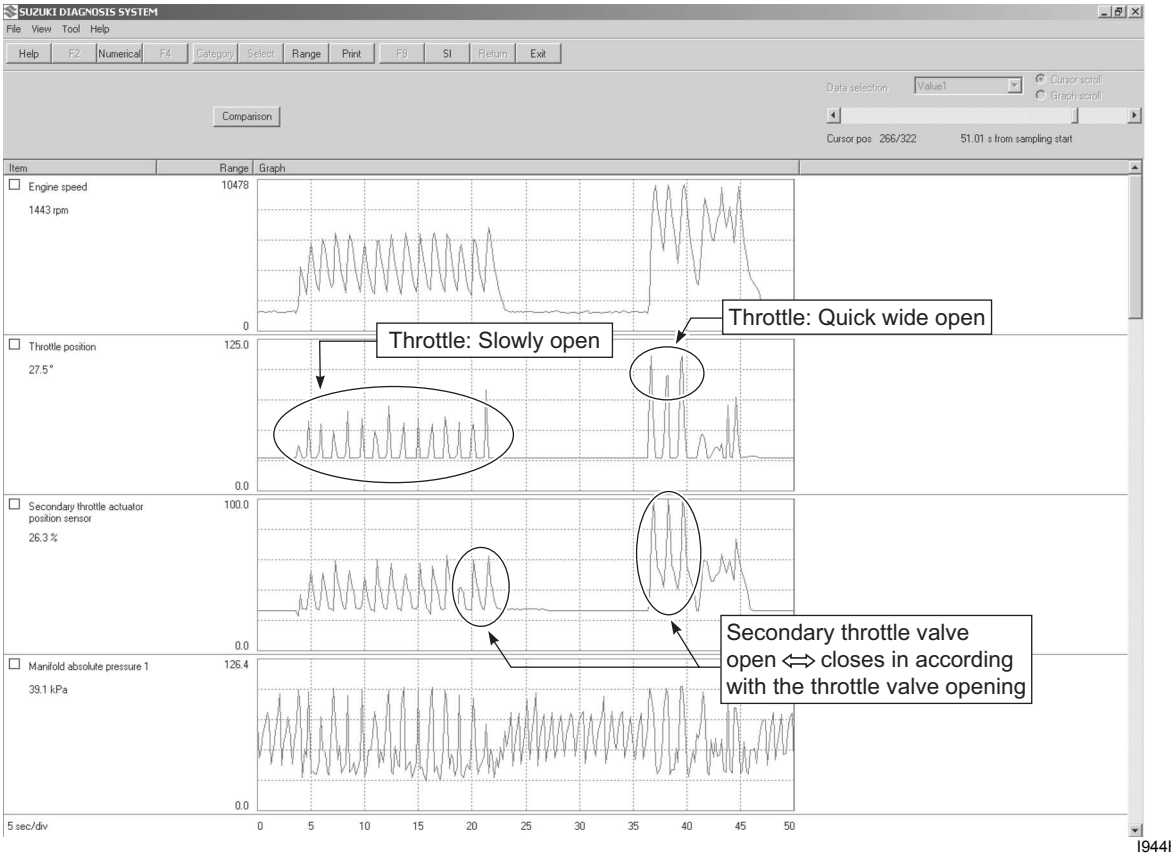
I944H1110107-01

Data at 3 000 r/min under no load



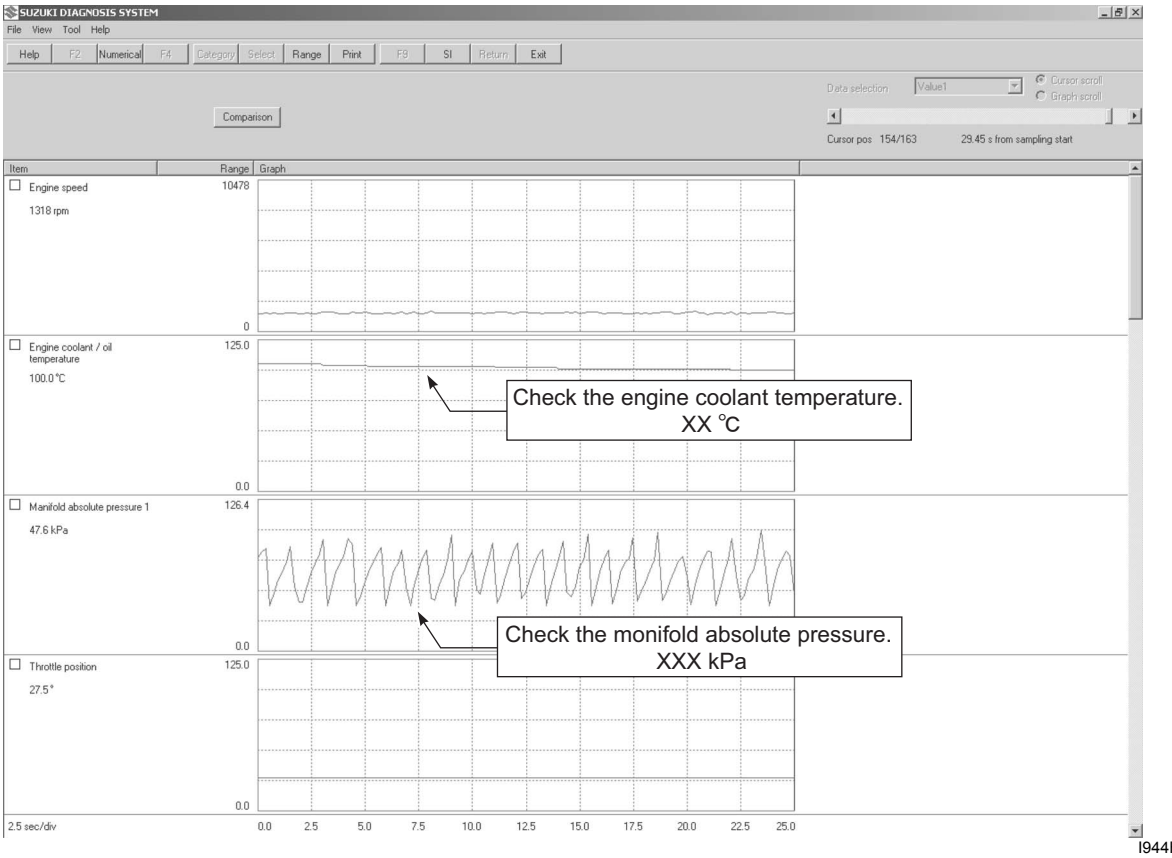
I944H1110108-02

Data at the time of racing



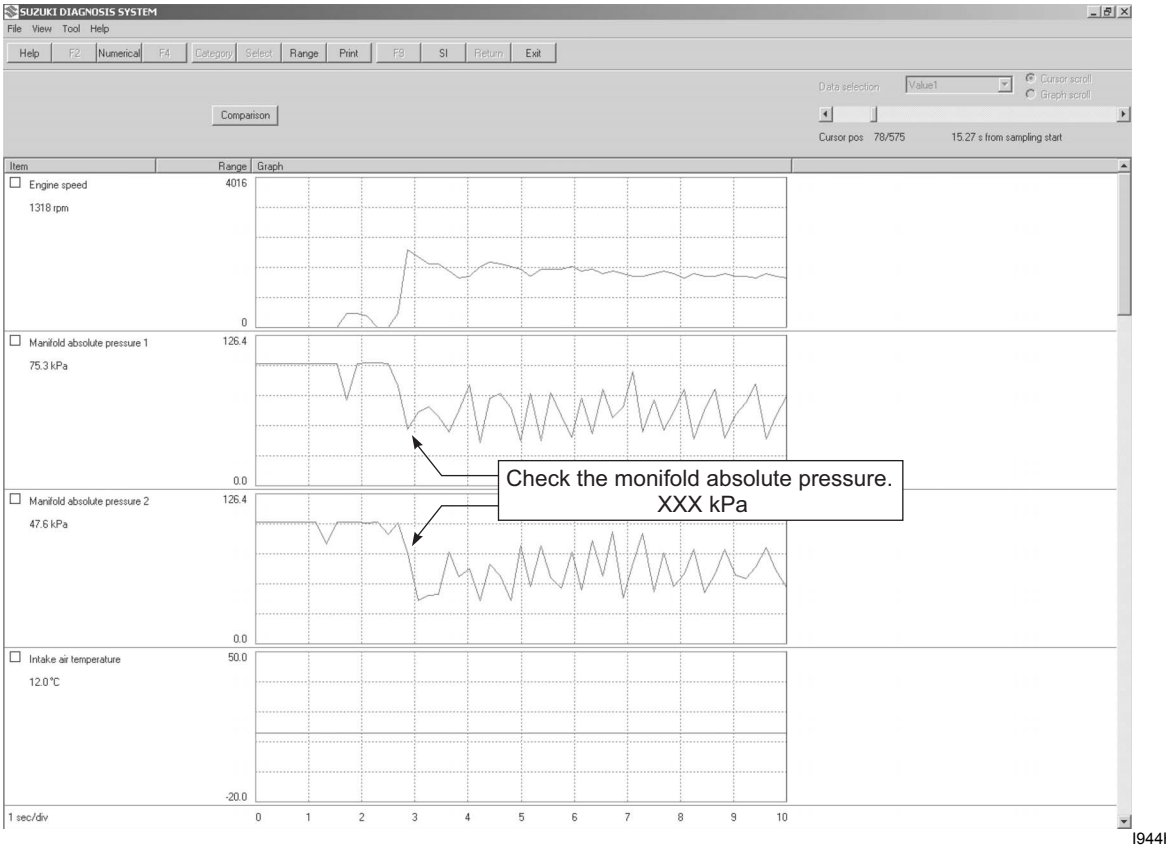
I944H1110109-01

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



I944H1110110-01

Data of manifold absolute pressure operation at the time of starting



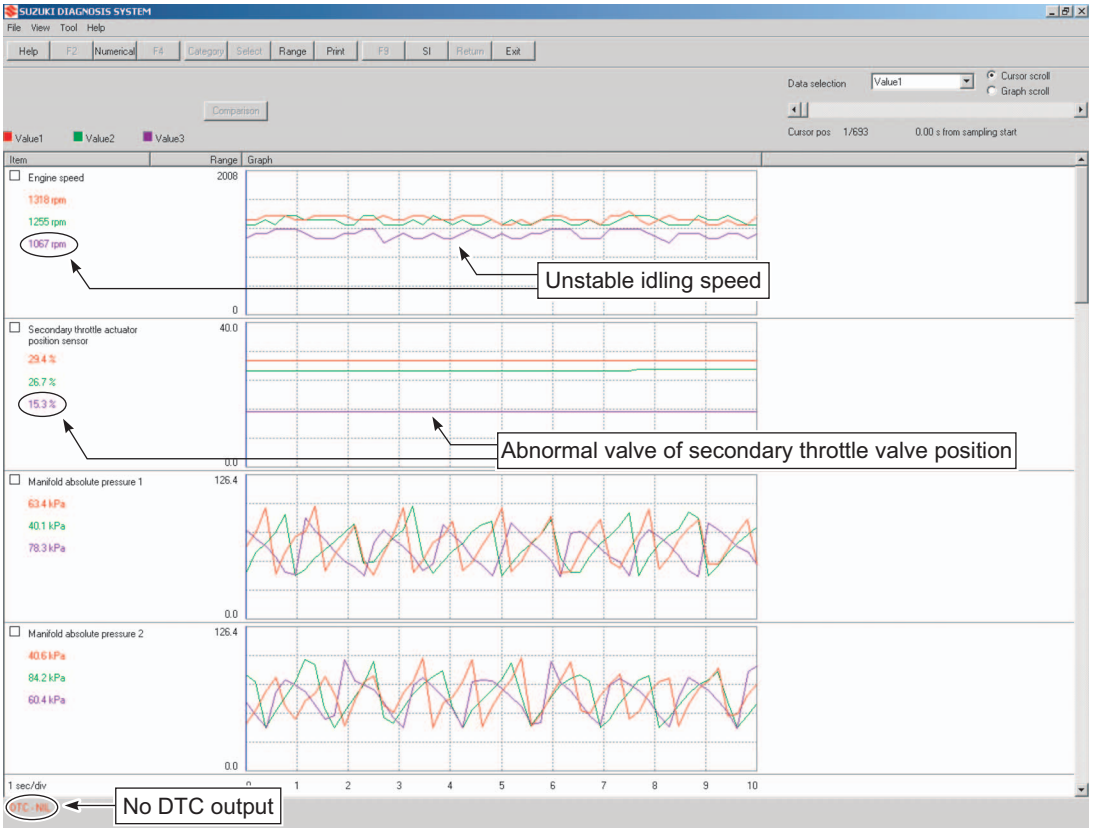
I944H1110111-01

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 secondary throttle actuator 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 bypass passage clogged, secondary throttle valve stuck, etc.



I944H1110112-01

DTC Table

B944H11104006

Code	Malfunction Part	Remarks
C00	None	No defective part
C12 (P0335) ☞(Page 1A-27)	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
C13 (P1750) ☞(Page 1A-30)	Intake air pressure sensor #2 (IAPS)	For #2 cylinder
C14 (P0120-H/L) ☞(Page 1A-36)	Throttle position sensor (TPS)	*1
C15 (P0115-H/L) ☞(Page 1A-47)	Engine coolant temperature sensor (ECTS)	
C17 (P0105) ☞(Page 1A-30)	Intake air pressure sensor #1 (IAPS)	For #1 cylinder
C21 (P0110-H/L) ☞(Page 1A-53)	Intake air temperature sensor (IATS)	
C23 (P1651-H/L) ☞(Page 1A-59)	Tip-over sensor (TOS)	
C24 (P0351) ☞(Page 1A-67)	Ignition signal #1 (IG coil #1)	For #1 cylinder
C25 (P0352) ☞(Page 1A-67)	Ignition signal #2 (IG coil #2)	For #2 cylinder
C28 (P1655) ☞(Page 1A-67)	Secondary throttle valve actuator (STVA)	
C29 (P1654-H/L) ☞(Page 1A-73)	Secondary throttle position sensor (STPS)	
C31 (P0705) ☞(Page 1A-84)	Gear position signal (GP switch)	
C32 (P0201) ☞(Page 1A-88)	Injector signal #1	For #1 cylinder
C33 (P0202) ☞(Page 1A-88)	Injector signal #2	For #2 cylinder
C40 (P0505/P0506/ P0507) ☞(Page 1A-91)	Idle speed control valve (ISC valve)	
C41 (P0230) ☞(Page 1A-93)	Fuel pump control system (FP control system)	Fuel pump, fuel pump relay
C42 (P1650) ☞(Page 1A-97)	Ignition switch signal	Anti-theft
C44 (P0130/P0135) ☞(Page 1A-97)	Heated oxygen sensor (HO2S)	
C60 (P0480) ☞(Page 1A-104)	Cooling fan control system	Cooling fan relay

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 900 r/min, slightly turn the throttle position sensor and bring the line to the middle.

Fail-Safe Function Table

B944H11104007

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

Item	Fail-Safe Mode	Starting Ability	Running Ability
IAP sensor	Intake air pressure value is fixed to 101 kPa (760 mmHg).	“YES”	“YES”
TP sensor	The throttle opening is fixed to full open position. Ignition timing is also fixed.	“YES”	“YES”
ECT sensor	Engine coolant temperature value is fixed to 70 °C (176 °F). Cooling fan is fixed on position.	“YES”	“YES”
IAT sensor	Intake air temperature value is fixed to 25 °C (104 °F).	“YES”	“YES”
Ignition signal	#1 fuel-cut	“YES”	“YES”
		#2 cylinder can run.	
	#2 fuel-cut	“YES”	“YES”
		#1 cylinder can run.	
Injection signal	#1 fuel-cut	“YES”	“YES”
		#2 cylinder can run.	
	#2 fuel-cut	“YES”	“YES”
		#1 cylinder can run.	
STV actuator	Secondary throttle valve is fixed to full close position. When motor disconnection or lock occurs, power from ECM is shut off.	“YES”	“YES”
STP sensor	Secondary throttle valve is fixed to full close position.	“YES”	“YES”
Gear position signal	Gear position signal is fixed to 6th gear.	“YES”	“YES”
HO2 sensor	Feedback compensation is inhibited. (Air/fuel ratio is fixed to normal.)	“YES”	“YES”
ISC valve	When motor disconnection or lock occurs, power from ECM is shut off.	“YES”	“YES”

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

FI System Troubleshooting

B944H11104008

Customer Complaint Analysis

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

NOTE

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

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

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

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

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

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

Visual Inspection

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

- Engine oil level and leakage. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
- Engine coolant level and leakage. Refer to “Cooling Circuit Inspection in Section 1F (Page 1F-4)”.
- Fuel level and leakage. Refer to “Fuel Line Inspection in Section 0B (Page 0B-10)”.
- Clogged air cleaner element. Refer to “Air Cleaner Element Inspection and Cleaning in Section 0B (Page 0B-3)”.
- Battery condition.
- Throttle cable play. Refer to “Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-12)”.
- Vacuum hose looseness, bend and disconnection.
- Broken fuse.
- FI 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)”.
- Speedometer operation. Refer to “Speedometer Inspection in Section 9C (Page 9C-5)”.
- Exhaust gas leakage and noise. Refer to “Exhaust System Construction in Section 1K (Page 1K-2)”.
- Each coupler disconnection.
- Clogged radiator fins. Refer to “Radiator Inspection and Cleaning in Section 1F (Page 1F-5)”.

Malfunction Code and Defective Condition Table

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Malfunction Code		Detected Item	Detected Failure Condition	Check For
C00		NO FAULT	—	—
C12		CKP sensor	The signal does not reach ECM for 2 seconds or more, after receiving the starter signal.	CKP sensor wiring and mechanical parts CKP sensor, lead wire/coupler connection
P0335				
C13/C17		IAP sensor	The sensor should produce following voltage. 0.1 V ≤ Sensor voltage < 4.8 V In other than the above range, C13 (P0170) or C17 (P0105) is indicated.	IAP sensor, lead wire/coupler connection
P1750/P0105				
C14		TP sensor	The sensor should produce following voltage. 0.1 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
C15		ECT sensor	The sensor voltage should be the following. 0.1 V ≤ Sensor voltage < 4.85 V In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection
P0115	H		Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground
C21		IAT sensor	The sensor voltage should be the following. 0.1 V ≤ Sensor voltage < 4.6 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

Malfunction Code		Detected Item	Detected Failure Condition	Check For
C23		TO sensor	The sensor voltage should be the following. 0.2 V ≤ Sensor voltage < 4.8 V In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection
P1651	H		Sensor voltage is higher than specified value.	TO sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	TO sensor circuit open or shorted to ground or VCC circuit open
C24/C25 P0351/P0352		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) or C25 (P0352) is indicated.	Ignition coil, wiring/coupler connection, power supply from the battery
C28 P1655		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.	STVA motor, STVA lead wire/ coupler connection
C29		STP sensor	The sensor should produce following voltage. 0.1 V < Sensor voltage < 4.8 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
C31 P0705		Gear position signal	Gear position signal voltage should be higher than the following. Gear position sensor voltage ≥ 0.2 V If lower than the above value for 3 seconds and more, C31 (P0705) is indicated.	GP switch, wiring/coupler connection, gearshift cam, etc.
C32/C33 P0201/P0202		Fuel injector	CKP sensor (pickup coil) signal is produced, but fuel injector signal is interrupted 8 times or more continuously. In this case, the code C32 (P0201), C33 (P0202) is indicated.	Fuel injector, wiring/coupler connection, power supply to the injector
C40 P0505		ISC valve	ISC valve circuit malfunction.	Secondary throttle valve is fixed in opening position.
C40 P0506			Idle speed is lower than the desired idle speed.	Defective ECM
C40 P0507			Idle speed is higher than the desired idle speed.	
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
C42 P1650		Ignition switch	Ignition switch signal is not input to the ECM.	Ignition switch, lead wire/ coupler

Malfunction Code	Detected Item	Detected Failure Condition	Check For
C44 P0130	HO2 sensor	After engine is started few minutes. (Sensor output voltage ≥ 2.5 V) Engine is cold and stopped. (Sensor output voltage < 0.1 V) In other than the above value, C44 (P0130) is indicated.	HO2 sensor is circuit open or shorted to ground
C44 P0135		The heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit, C44 (P0135) is indicated.	HO2 sensor lead wire/coupler connection Battery voltage supply to the HO2 sensor
C60 P0480	Cooling fan relay	Cooling fan relay signal is not input to ECM.	Cooling fan relay, lead wire/ coupler connection

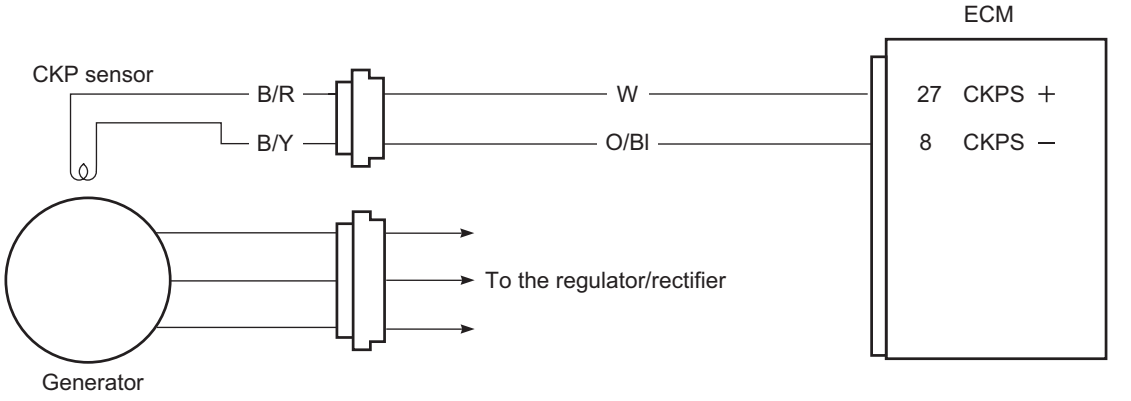
DTC “C12” (P0335): CKP Sensor Circuit Malfunction

B944H11104010

Detected Condition and Possible Cause

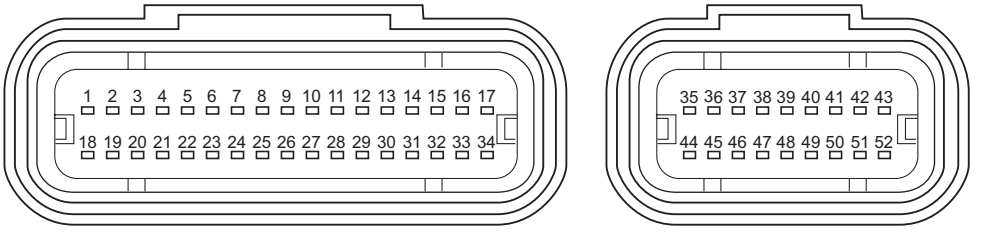
Detected Condition	Possible Cause
The signal does not reach ECM for 3 seconds. or more, after receiving the starter signal.	• Metal particles or foreign material being stuck on the CKP sensor and rotor tip. • CKP sensor circuit open or short. • CKP sensor malfunction. • ECM malfunction.

Wiring Diagram



I944H1110007-02

ECM coupler (Harness side)



I944H1110008-01

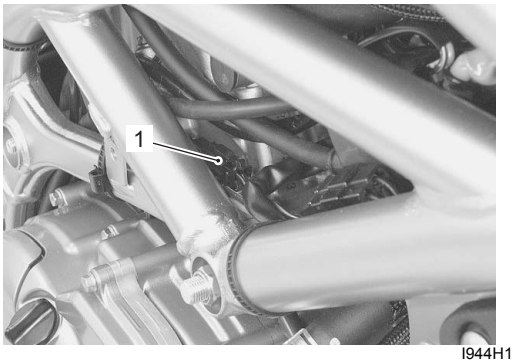
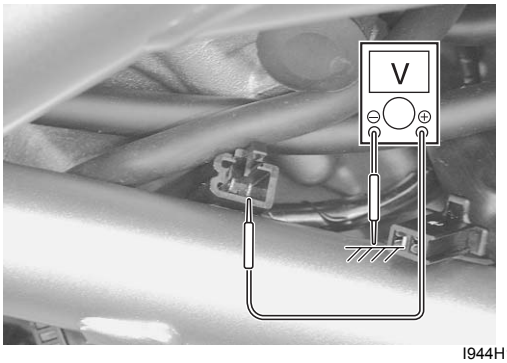
Troubleshooting

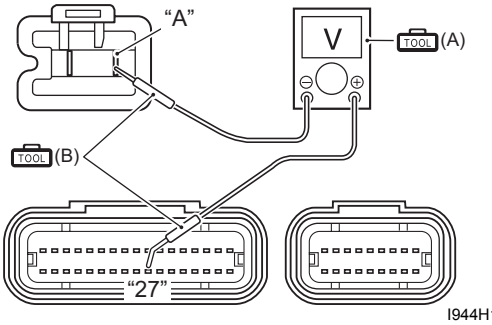
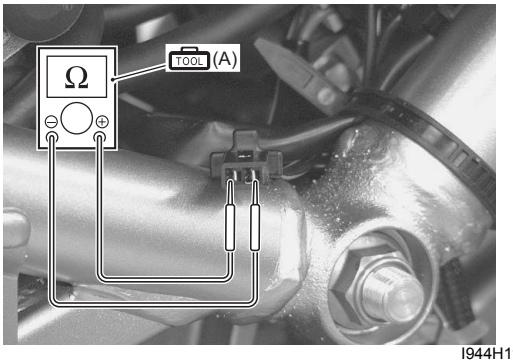
⚠ CAUTION

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

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures (Page 1A-15)".

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the right frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)". 3) Disconnect the CKP sensor coupler (1).  I944H1110009-02 4) Turn the ignition switch ON, and measure the voltage between the W wire and ground. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **CKP sensor input voltage** **0.5 V and more** **((+) terminal: W – (–) terminal: Ground)**  I944H1110113-03 *Is the voltage OK?*	Go to Step 2.	Open circuit in the W wire.

Step	Action	Yes	No
2	1) Turn the ignition switch OFF. 2) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 3) Insert the needle pointed probes to the lead wire coupler. 4) Check there is continuity between the W wire “A” and ECM terminal “27”. Also, there is no continuity among the W wire “A” and ECM terminals. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•))))**  I944H1110164-01 *Is the continuity OK?*	Go to Step 3.	Short circuit in the W wire.
3	1) Measure the CKP sensor resistance. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Resistance (Ω)** **CKP sensor resistance** **160 – 240 Ω (B/R – B/Y)**  I944H1110010-01 *Is the resistance OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	• Inspect that metal particles or foreign material stuck on the CKP sensor and rotor tip. • If there are no metal particles and foreign material, then replace the CKP sensor with a new one. Refer to “CKP Sensor Removal and Installation in Section 1C (Page 1C-2)”.

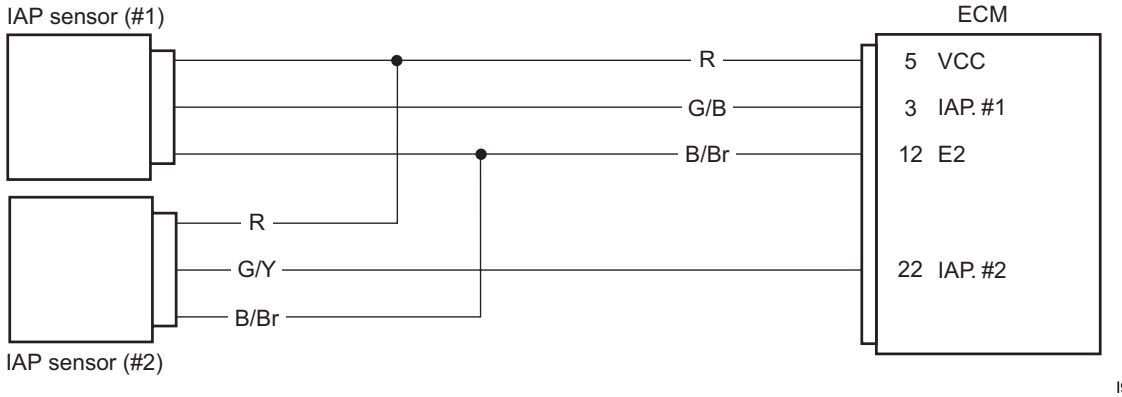
DTC “C13” (P1750) or “C17” (P0105): IAP Sensor Circuit Malfunction

B944H11104011

Detected Condition and Possible Cause

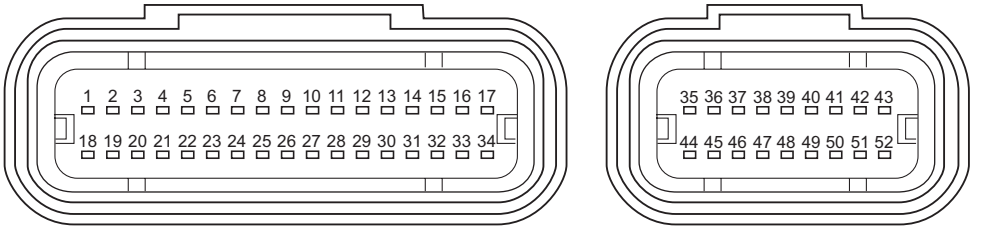
	Detected Condition	Possible Cause
C13/C17	IAP sensor voltage is not within the following range. 0.1 V ≤ Sensor voltage < 4.8 V **NOTE** **Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.**	• Clogged vacuum passage between throttle body and IAP sensor. • 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.

Wiring Diagram



I944H1110013-04

ECM coupler (Harness side)



I944H1110014-01

Troubleshooting

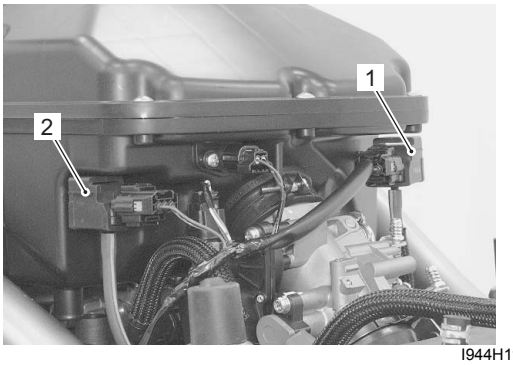
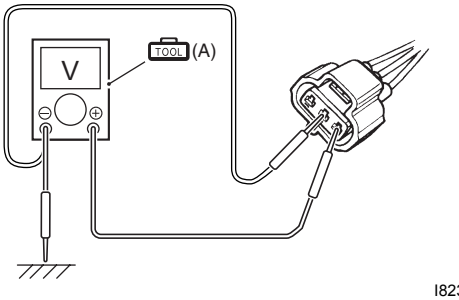
⚠ CAUTION

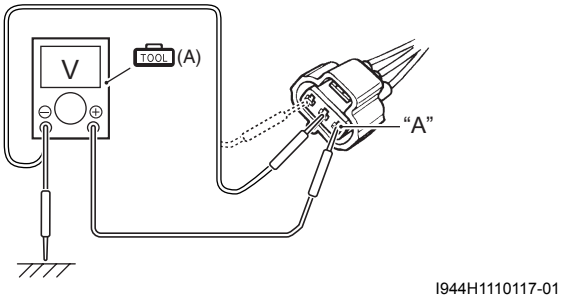
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

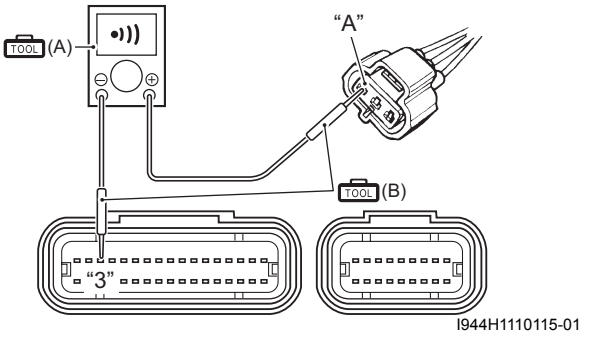
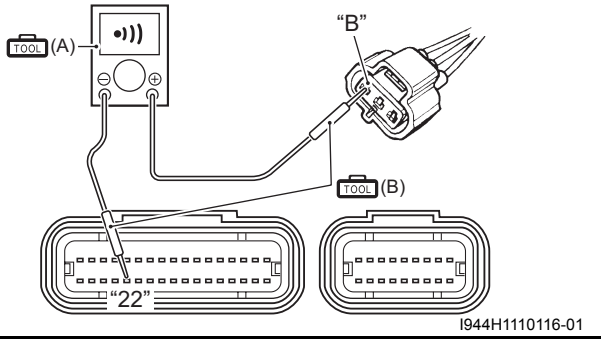
NOTE

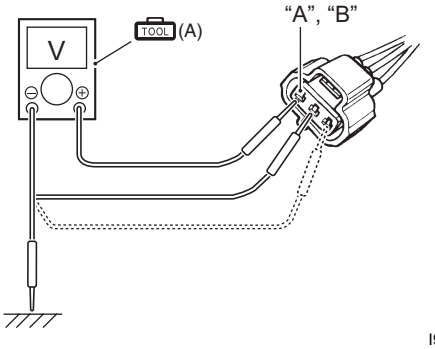
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

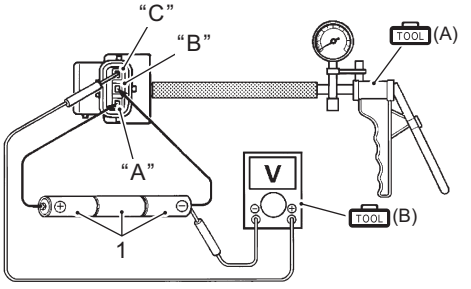
When indicating C13 for IAP sensor (#2) / When indicating C17 for IAP sensor (#1) (Use of mode select switch)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 3) Check the IAP sensor couplers (#1 cylinder (1) or #2 cylinder (2)) for loose or poor contacts. If OK, then measure the IAP sensor input voltage.  I944H1110015-01 4) Disconnect the IAP sensor couplers. 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 (⎓)** **IAP sensor input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I823H1110016-05 *Is the voltage OK?*	Go to Step 2.	Open circuit in the R or B/Br wire.

Step	Action	Yes	No
2	1) Turn the ignition switch OFF. 2) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 3) Insert the needle pointed probes to the lead wire coupler. 4) Check there is no continuity between the R wire “A” and ground. Also the R wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))**  I944H1110117-01 *Is there continuity?*	Go to Step 3.	Short circuit in the R wire.

Step	Action	Yes	No
3	1) Insert the needle pointed probes to the lead wire coupler. 2) Check there is continuity between the G/B wire “A” and ECM terminal “3” (#1). Also the G/Y wire “B” and ECM terminal “22” (#2). **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•))))** **#1 Cylinder**  I944H1110115-01 **#2 Cylinder**  I944H1110116-01	Go to Step 4.	• Open or short circuit in the G/B wire (#1 cylinder). • Open or short circuit in the G/Y wire (#2 cylinder).

Step	Action	Yes	No
3	3) If there is continuity, check there is no continuity between the G/B wire “A” and ground, G/Y wire “B” and ground. Also the G/B wire “A” and another wire, G/Y wire “B” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))**  I944H1110118-01 *Is the continuity OK?*	Go to Step 4.	• Open or short circuit in the G/B wire (#1 cylinder). • Open or short circuit in the G/Y wire (#2 cylinder).

Step	Action	Yes	No
4	1) Remove the IAP sensor. Refer to “IAP Sensor Removal and Installation in Section 1C (Page 1C-2)”. 2) Connect the vacuum pump gauge to the vacuum port of the IAP sensor. 3) Arrange 3 new 1.5 V batteries in series (1) (check that total - voltage is 4.5 – 5.0 V) and connect (–) terminal to ground - terminal “A” and (+) terminal to the VCC terminal “B”. 4) Check the voltage between Vout terminal “C” and ground. Also, check if voltage reduces when vacuum is applied up to 400 mmHg 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 (⎓)**  I944H1110018-01 ALTITUDE (Reference) / ATOMOSPHERIC PRESSURE / OUTPUT VOLTAGE m | ft | kPa | mmHg | V 0 – 610 | 0 – 2 000 | 100 – 95 | 760 – 708 | 3.4 – 4.0 611 – 1 524 | 2 001 – 5 000 | 94 – 86 | 707 – 635 | 3.0 – 3.7 1 525 – 2 438 | 5 001 – 8 000 | 85 – 77 | 634 – 568 | 2.6 – 3.4 2 439 – 3 048 | 8 001 – 10 000 | 76 – 70 | 567 – 526 | 2.4 – 3.1 I822H1110025-01 *Is the voltage OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	If check result is not satisfactory, replace the IAP sensor with a new one.

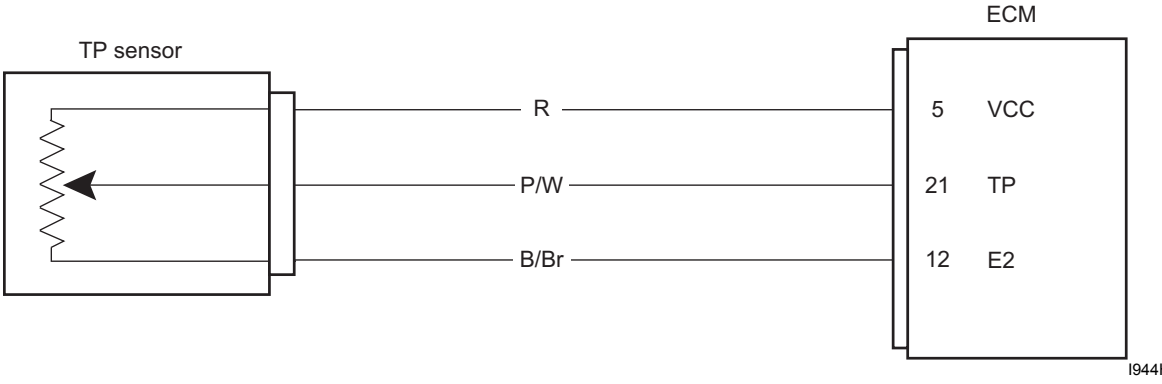
DTC “C14” (P0120-H/L): TP Sensor Circuit Malfunction

B944H11104012

Detected Condition and Possible Cause

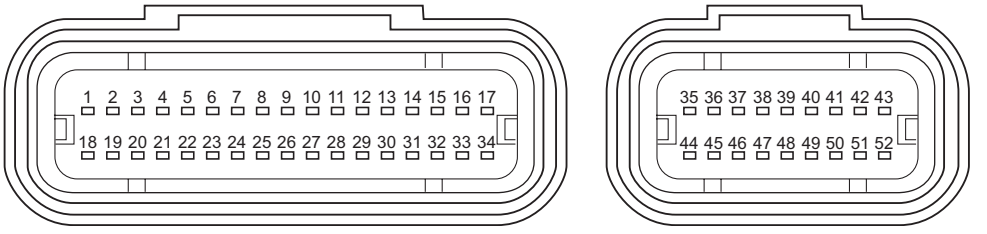
Detected Condition			Possible Cause
C14		Output voltage is not within the following range. 0.1 V ≤ Sensor voltage < 4.8 V	• TP sensor maladjusted. • TP sensor circuit open or short. • TP sensor malfunction. • ECM malfunction.
P0120	H	Sensor voltage is higher than specified value.	• TP sensor circuit is shorted to VCC or ground circuit is open.
	L	Sensor voltage is lower than specified value.	• TP sensor circuit is open or shorted to ground or VCC circuit is open.

Wiring Diagram



I944H1110019-04

ECM coupler (Harness side)



I944H1110020-01

Troubleshooting

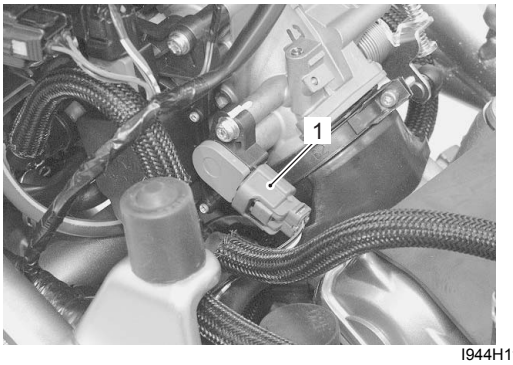
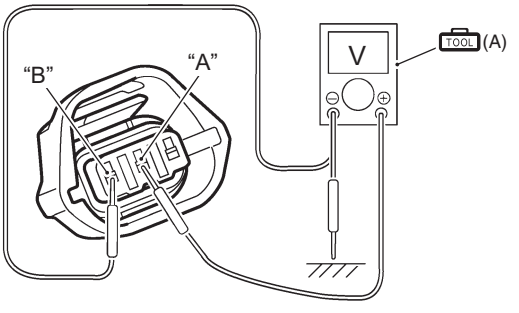
⚠ CAUTION

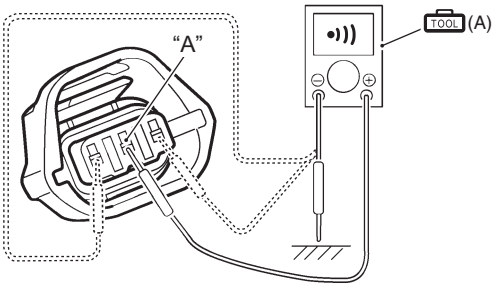
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

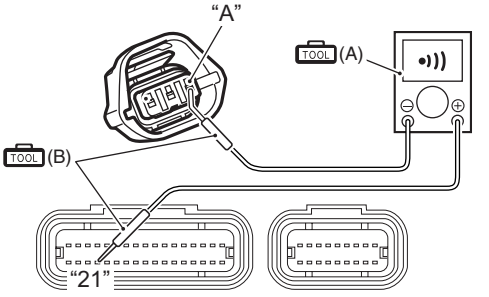
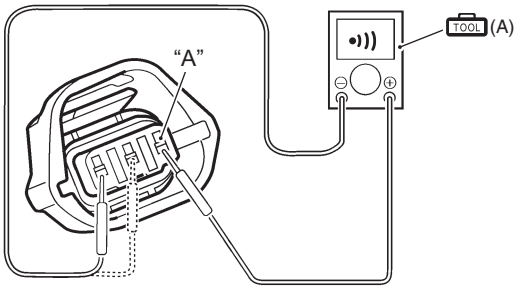
NOTE

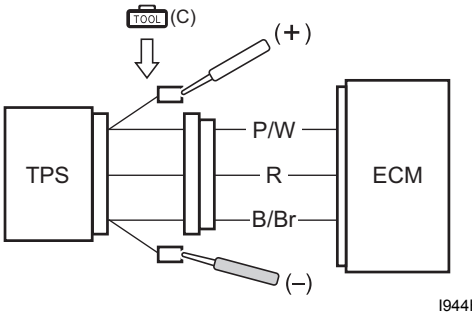
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

C14 (Use of mode select switch)

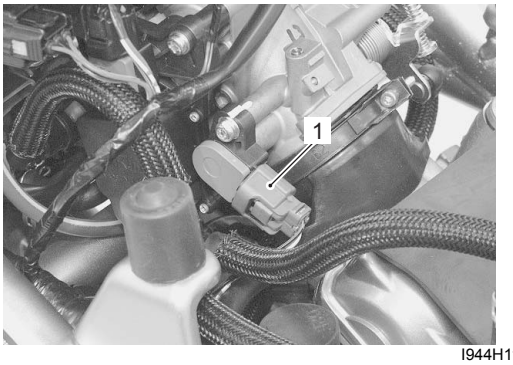
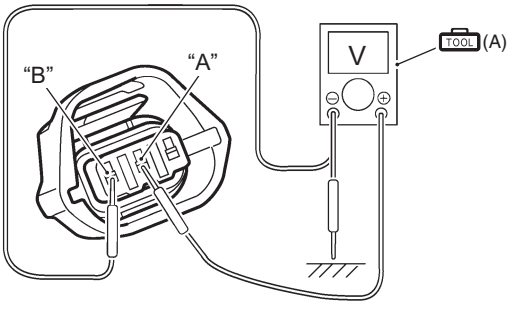
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 3) Check the TP sensor coupler (1) for loose or poor contacts. If OK, then measure the TP sensor input voltage.  I944H1110021-01 4) Disconnect the TP sensor coupler. 5) Turn the ignition switch ON. 6) Measure the input voltage between the R wire “A” and ground. If OK, then measure the input voltage between the R wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **TP sensor input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I944H1110119-01 *Is the voltage OK?*	Go to Step 2.	Open circuit in the R or B/Br wire.

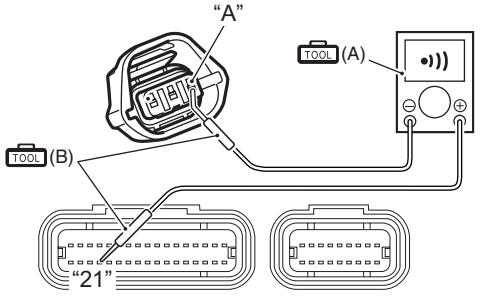
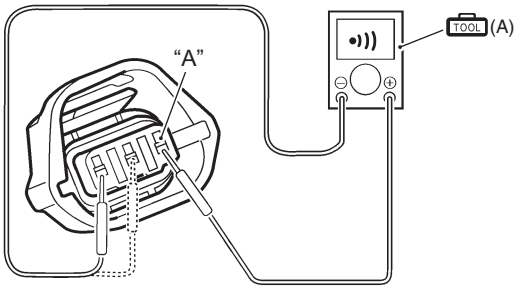
Step	Action	Yes	No
2	1) Turn the ignition switch OFF. 2) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 3) Check there is no continuity between the R wire “A” and ground. Also, the R wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110120-01 *Is there no continuity?*	Go to Step 3.	Short circuit in the R wire.

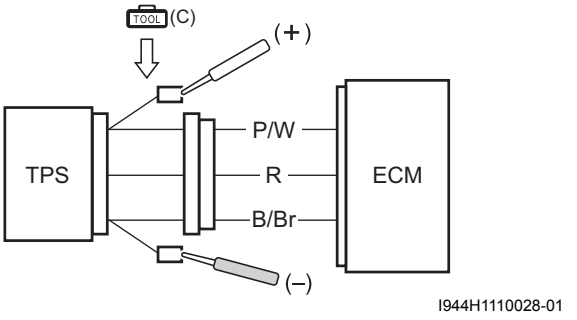
Step	Action	Yes	No
3	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Check the continuity between the P/W wire “A” and terminal “21”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•))))** **ECM coupler (Harness side)**  I944H1110123-01 3) If the sound is head from the tester, then check there is no continuity among the P/W wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110124-01 *Is the continuity OK?*	Go to Step 4.	Short circuit in the P/W wire.

Step	Action	Yes	No
4	1) Turn the ignition switch OFF. 2) Connect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 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/W wire terminal (+) and B/Br wire terminal (–) with turning the throttle grip open and close. **Special tool** **TOOL (C): 09900–28630 (TPS test wire harness)** **TOOL : 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **TP sensor output voltage** **Throttle valve is closed: Approx. 1.1 V** **Throttle valve is opened: Approx. 4.3 V** **((+) terminal: P/W – (–) terminal: B/Br)**  I944H1110028-01 *Is the voltage OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	If check result is not satisfactory, replace TP sensor with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-11)”.

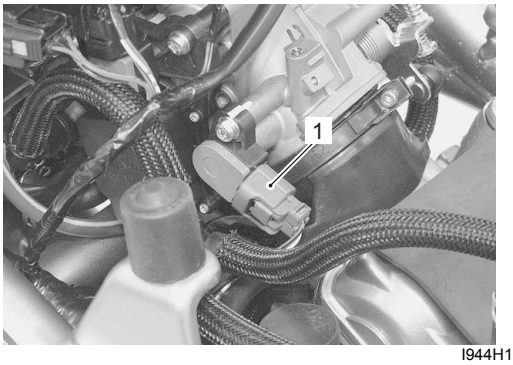
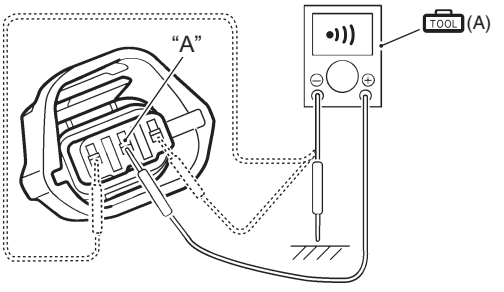
P0120-H (Use of SDS)

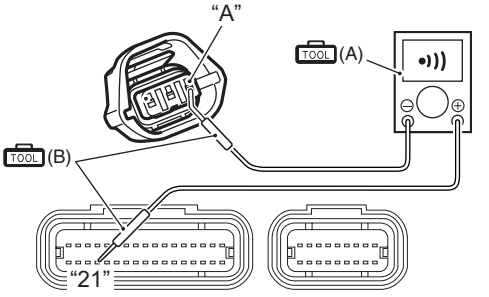
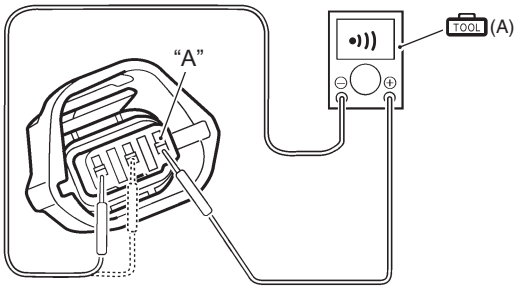
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 3) Check the TP sensor coupler (1) for loose or poor contacts. If OK, then check the TP sensor lead wire continuity.  I944H1110021-01 4) Disconnect the TP sensor coupler. 5) Turn the ignition switch ON. 6) Measure the input voltage between the R wire “A” and B/Br wire “B”. If OK, then measure the input voltage between the R wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **TP sensor input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I944H1110121-01 *Is the voltage OK?*	Go to Step 2.	Open circuit in the R wire.

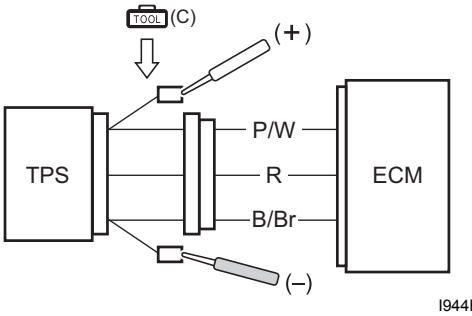
Step	Action	Yes	No
2	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Check the continuity between the P/W wire “A” and terminal “21”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))** **ECM coupler (Harness side)**  I944H1110123-01 3) If the sound is head from the tester, then check there is no continuity among the P/W wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110124-01 *Is the continuity OK?*	Go to Step 3.	Short circuit in the P/W wire.

Step	Action	Yes	No
3	1) Turn the ignition switch OFF. 2) Connect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 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/W wire terminal (+) and B/Br wire terminal (–) with turning the throttle grip open and close. **Special tool** **TOOL (C): 09900–28630 (TPS test wire harness)** **TOOL : 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **TP sensor output voltage** **Throttle valve is closed: Approx. 1.1 V** **Throttle valve is opened: Approx. 4.3 V** **((+) terminal: P/W – (–) terminal: B/Br)**  I944H1110028-01 *Is the voltage OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	If check result is not satisfactory, replace TP sensor with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-11)”.

P0120-L (Use of SDS)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 3) Check the TP sensor coupler (1) for loose or poor contacts. If OK, then check the TP sensor lead wire continuity.  I944H1110024-01 4) Disconnect the TP sensor coupler and ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 5) Check there is no continuity between the R wire “A” and ground. Also the R wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110122-01 *Is there no continuity?*	Go to Step 2.	Short circuit in the R wire.

Step	Action	Yes	No
2	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Check the continuity between the P/W wire “A” and terminal “21”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•))))** **ECM coupler (Harness side)**  I944H1110123-01 3) If the sound is head from the tester, then check there is no continuity among the P/W wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110124-01 *Is the continuity OK?*	Go to Step 3.	Short circuit in the P/W wire.

Step	Action	Yes	No
3	1) Turn the ignition switch OFF. 2) Connect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 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/W wire terminal (+) and B/Br wire terminal (–) with turning the throttle grip open and close. **Special tool** **TOOL (C): 09900–28630 (TPS test wire harness)** **TOOL : 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **TP sensor output voltage** **Throttle valve is closed: Approx. 1.1 V** **Throttle valve is opened: Approx. 4.3 V** **((+) terminal: P/W – (–) terminal: B/Br)**  I944H1110028-01 *Is the voltage OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	If check result is not satisfactory, replace TP sensor with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-11)”.

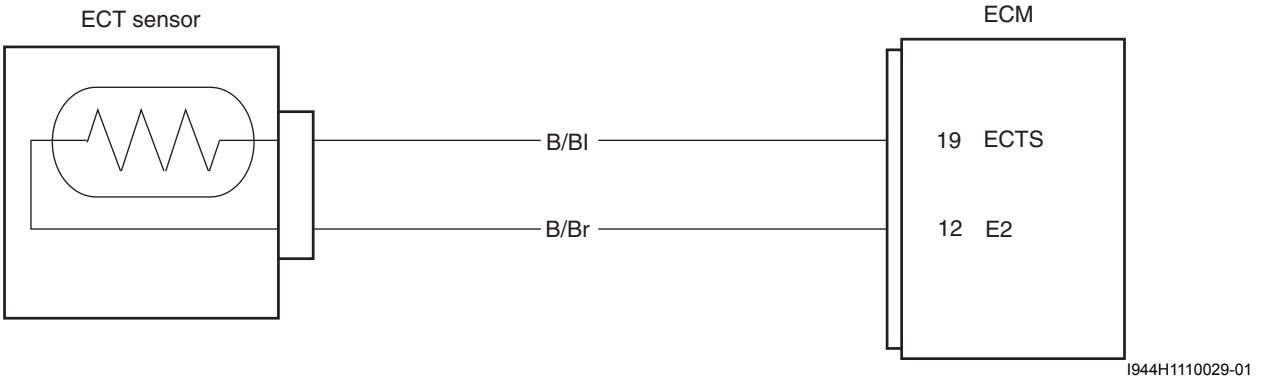
DTC “C15” (P0115-H/L): ECT Sensor Circuit Malfunction

B944H11104013

Detected Condition and Possible Cause

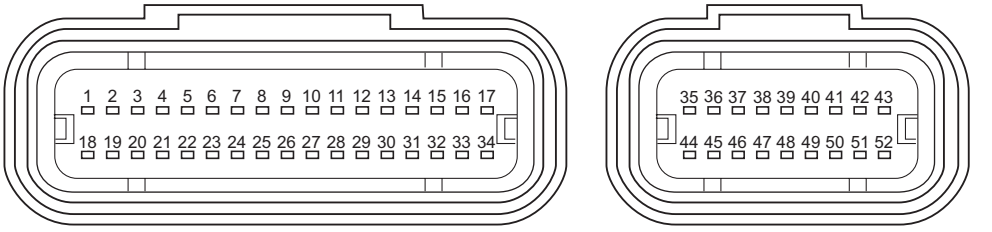
Detected Condition			Possible Cause
C15		Output voltage is not with in the following range. 0.1 V ≤ Sensor voltage < 4.85 V	• ECT sensor circuit open or short. • ECT sensor malfunction. • ECM malfunction.
P0115	H	Sensor voltage is higher than specified value.	• ECT sensor circuit is open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• ECT sensor circuit shorted to ground.

Wiring Diagram



I944H1110029-01

ECM coupler (Harness side)



I944H1110030-01

Troubleshooting

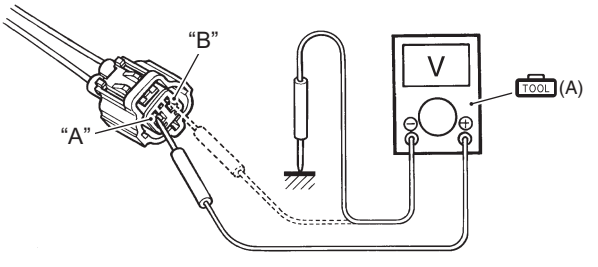
⚠ CAUTION

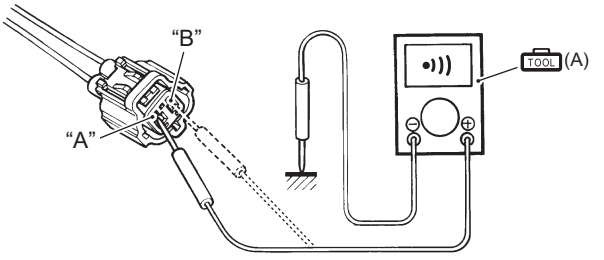
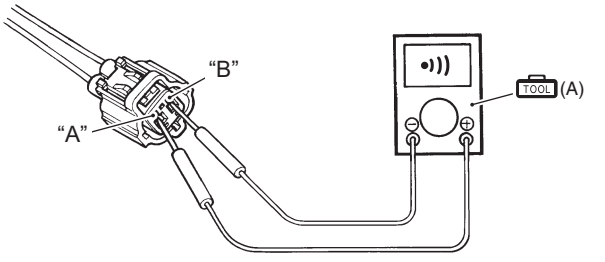
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

NOTE

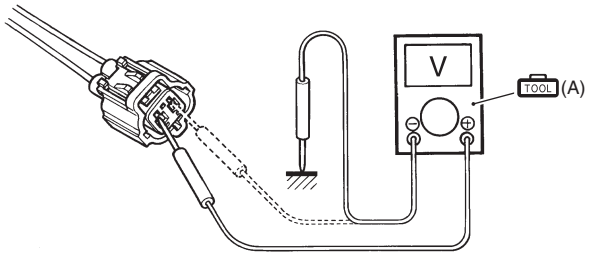
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

C15 (Use of mode select switch)

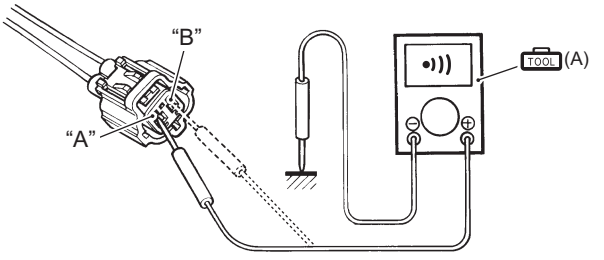
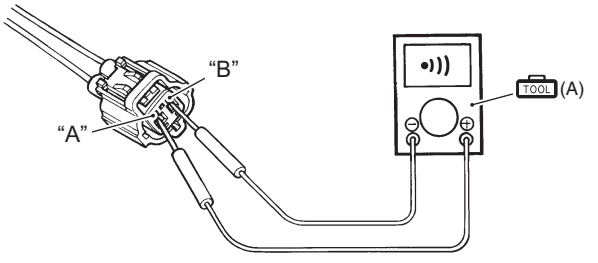
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the throttle body. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”. 3) Check the ECT sensor coupler (1) for loose or poor contacts. If OK, then measure the ECT sensor input voltage. I944H1110031-01 4) Disconnect the ECT sensor coupler and turn the ignition switch ON. 5) Measure the input voltage between the B/Bl wire “A” and ground. Also the B/Bl wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **ECT sensor input voltage** **4.5 – 5.5 V** **((+) terminal: B/Bl – (–) terminal: Ground, (+) terminal: B/Bl – (–) terminal: B/Br)**  I944H1110172-01	Go to Step 2.	Short circuit in the B/Bl wire or B/Br wire.

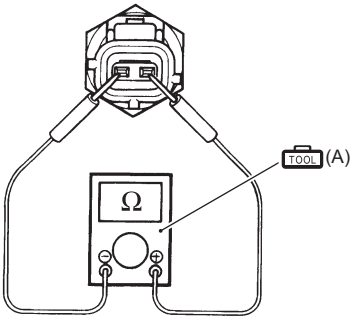
Step	Action	Yes	No
1	6) If OK, then check there is ECT sensor lead wire no continuity. 7) Turn the ignition switch OFF. 8) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 9) Check there is no continuity between the B/Bl wire “A” and ground, B/Br wire “B” and ground, B/Bl wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110125-01  I944H1110126-01 *Is there no continuity?*	Go to Step 2.	Short circuit in the B/Bl wire or B/Br wire.

P0115-H (Use of SDS)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the throttle body. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”. 3) Check the ECT sensor coupler (1) for loose or poor contacts. If OK, then check the ECT sensor lead wire continuity. I944H1110032-01 4) Disconnect the ECT sensor coupler and turn the ignition switch ON. 5) Measure the input voltage between the B/Bl wire and ground. If OK, then measure the input voltage between the B/Bl 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/Bl – (–) terminal: Ground, (+) terminal: B/Bl – (–) terminal: B/Br)**  I718H1110048-03 *Is the voltage OK?*	Go to Step 2.	Open circuit in the B/Bl or B/Br wire.

P0115-L (Use of SDS)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the throttle body. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”. 3) Check the ECT sensor coupler (1) for loose or poor contacts. If OK, then check the ECT sensor lead wire continuity. I944H1110034-01 4) Disconnect the ECT sensor coupler and ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 5) Check there is no continuity between the B/Bl wire “A” and ground, B/Br wire “B” and ground, B/Bl wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110127-01  I944H1110128-01 *Is there no continuity?*	Go to Step 2.	Short circuit in the B/Bl or B/Br wire.

Step	Action	Yes	No
2	1) Turn the ignition switch OFF. 2) Disconnect the ECT sensor coupler. 3) Measure the ECT sensor resistance. **Special 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-4)" for details.** *Is the resistance OK?*	Replace the ECM with a new one. Refer to "ECM Removal and Installation in Section 1C (Page 1C-1)".	Replace the ECT sensor with a new one. Refer to "ECT Sensor Inspection in Section 1C (Page 1C-4)".

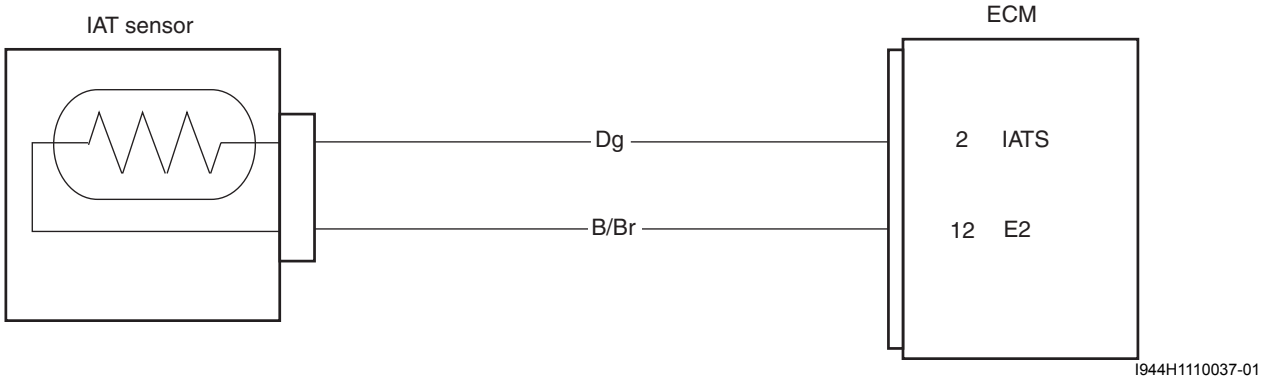
DTC “C21” (P0110-H/L): IAT Sensor Circuit Malfunction

B944H11104015

Detected Condition and Possible Cause

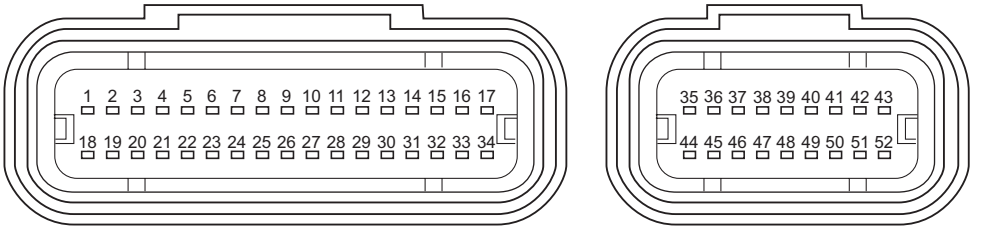
Detected Condition			Possible Cause
C21		Output voltage is not with in the following range. 0.1 V ≤ Sensor voltage < 4.6 V	• IAT sensor circuit open or short. • IAT sensor malfunction. • ECM malfunction.
P0110	H	Sensor voltage is higher than specified value.	• IAT sensor circuit open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• IAT sensor circuit shorted to ground.

Wiring Diagram



I944H1110037-01

ECM coupler (Harness side)



I944H1110038-01

Troubleshooting

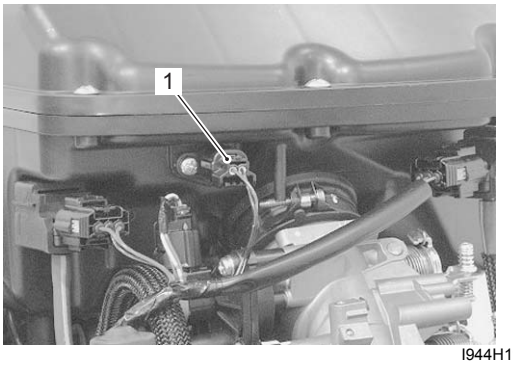
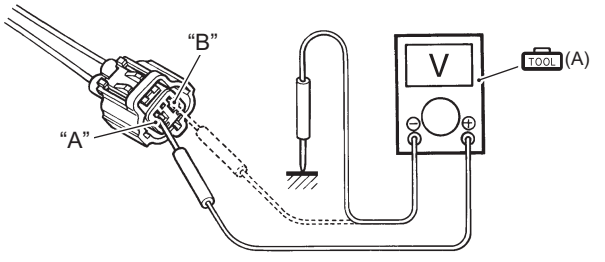
⚠ CAUTION

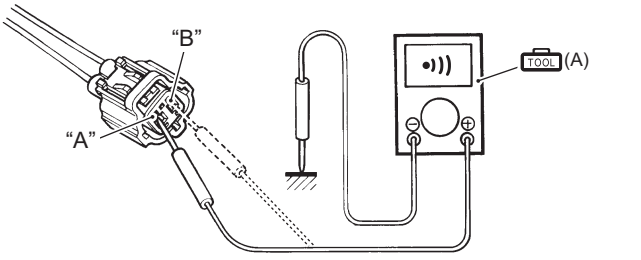
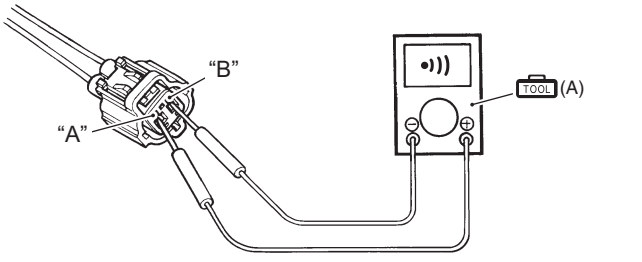
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

NOTE

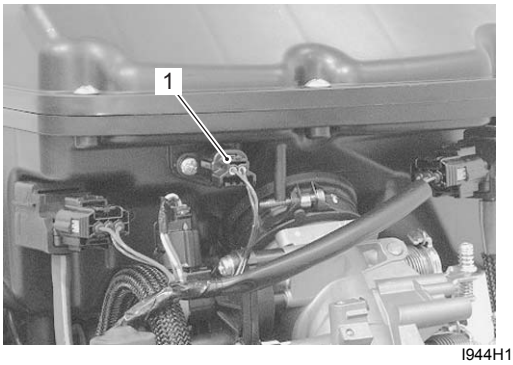
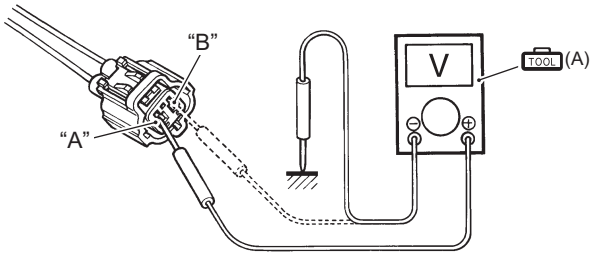
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

C21 (Use of mode select switch)

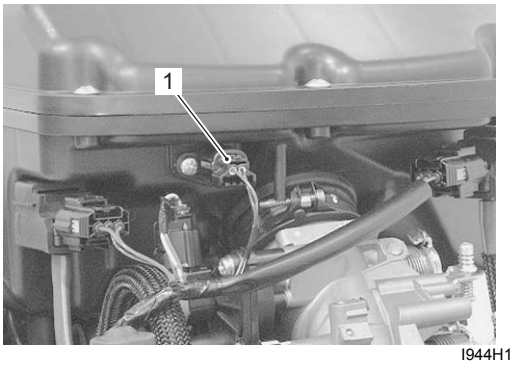
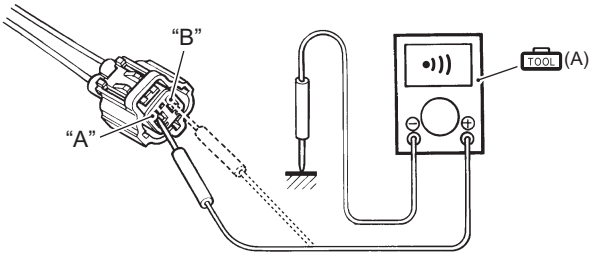
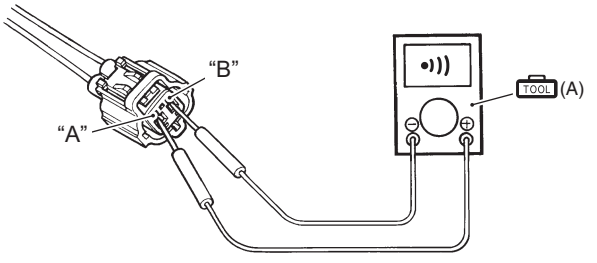
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 3) Check the IAT sensor coupler (1) for loose or poor contacts. If OK, then measure the IAT sensor input voltage.  I944H1110039-01 4) Disconnect the IAT sensor coupler and turn the ignition switch ON. 5) Measure the input voltage between the Dg wire “A” and ground. If OK, then measure the input voltage between the Dg wire “A” and B/Br wire “B”. **Special tool** **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)**  I944H1110173-01 6) If OK, then check there is IAT sensor lead wire no continuity. 7) Turn the ignition switch OFF.	Go to Step 2.	Short circuit in the Dg wire or B/Br wire.

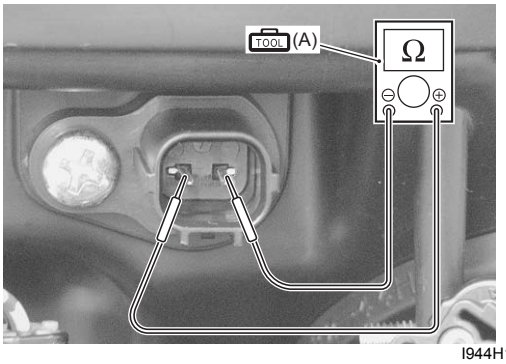
Step	Action	Yes	No
1	8) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 9) Check there is no continuity between the Dg wire “A” and ground, B/Br wire “B” and ground, Dg wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110129-01  I944H1110130-01 *Is there no continuity?*	Go to Step 2.	Short circuit in the Dg wire or B/Br wire.

P0110-H (Use of SDS)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 3) Check the IAT sensor coupler (1) for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.  I944H1110040-01 4) Disconnect the IAT sensor coupler and turn the ignition switch ON. 5) Measure the input voltage between the Dg wire “A” and ground. If OK, then measure the input voltage between the Dg wire “A” and B/Br wire “B”. **Special tool** **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)**  I944H1110174-01 *Is the voltage OK?*	Go to Step 2.	Open circuit in the Dg or B/Br wire.

P0110-L (Use of SDS)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 3) Check the IAT sensor coupler (1) for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.  I944H1110042-01 4) Disconnect the IAT sensor coupler and ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 5) Check there is no continuity between the Dg wire “A” and ground, B/Br wire “B” and ground, Dg wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110132-01  I944H1110133-01 *Is there no continuity?*	Go to Step 2.	Short circuit in the Dg or B/Br wire.

Step	Action	Yes	No
2	1) Turn the ignition switch OFF. 2) Disconnect the IAT sensor coupler. 3) Measure the IAT sensor resistance. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **IAT sensor resistance** **Approx. 2.56 kΩ at 20 °C (68 °F)** **(Terminal – Terminal)**  I944H1110044-02 **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-4)".** *Is the resistance OK?*	Replace the ECM with a new one. Refer to "ECM Removal and Installation in Section 1C (Page 1C-1)".	Replace the IAT sensor with a new one. Refer to "IAP Sensor Removal and Installation in Section 1C (Page 1C-2)".

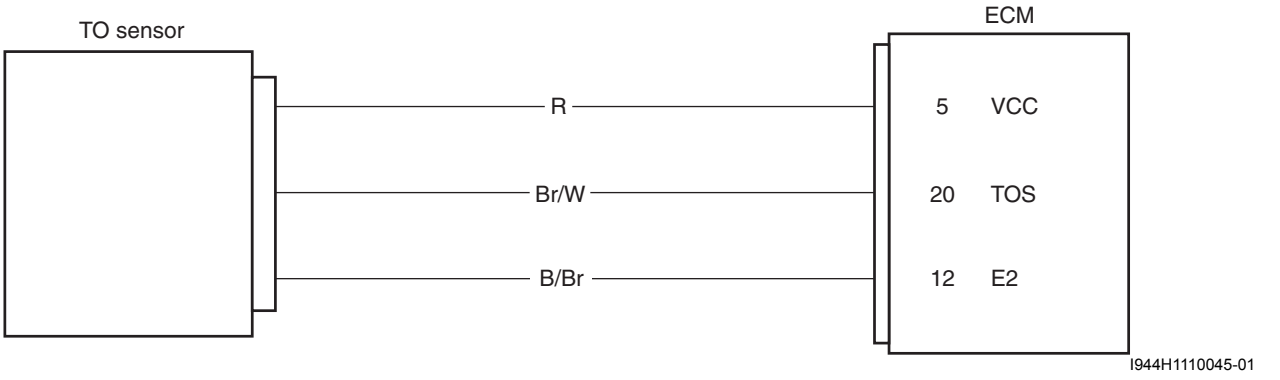
DTC “C23” (P1651-H/L): TO Sensor Circuit Malfunction

B944H11104016

Detected Condition and Possible Cause

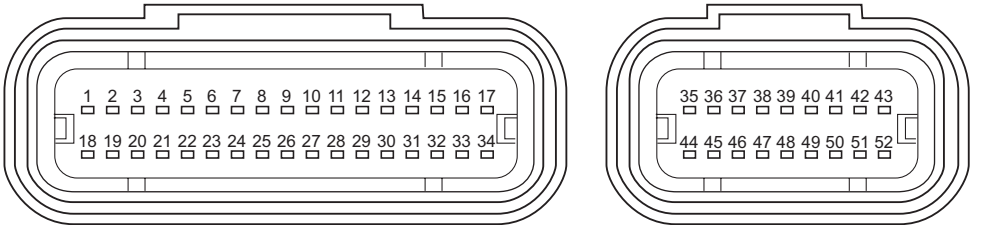
Detected Condition			Possible Cause
C23		The sensor voltage should be the following. 0.2 V ≤ Sensor voltage < 4.6 V	• TO sensor circuit open or short. • TO sensor malfunction. • ECM malfunction.
P1651	H	Sensor voltage is higher than specified value.	• TO sensor circuit is open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• TO sensor circuit is open or shorted to ground or VCC circuit open.

Wiring Diagram



I944H1110045-01

ECM coupler (Harness side)



I944H1110046-01

Troubleshooting

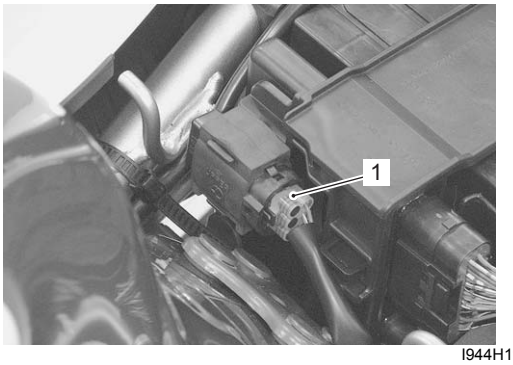
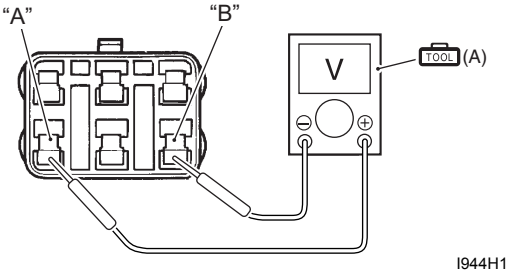
⚠ CAUTION

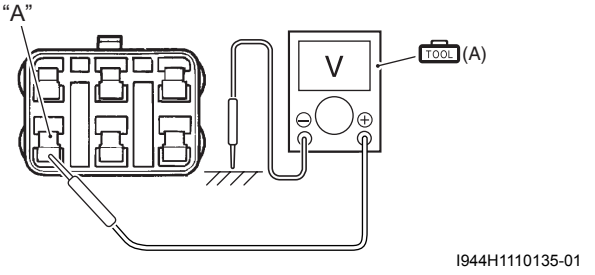
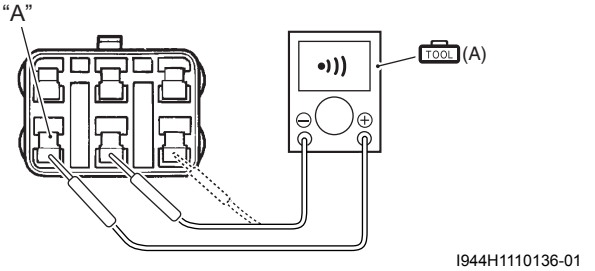
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

NOTE

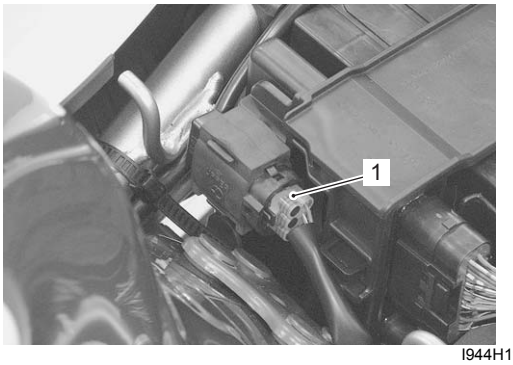
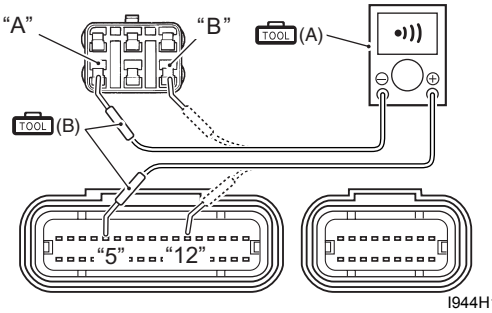
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

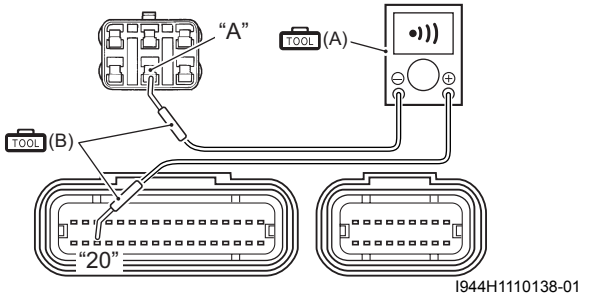
C23 (Use of mode select switch)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”. 3) Check the TO sensor coupler (1) for loose or poor contacts. If OK, then measure the TO sensor voltage.  I944H1110047-01 4) Disconnect the TO sensor coupler. 5) Turn the ignition switch ON. 6) Measure the TO sensor input voltage between the R wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **TO sensor input voltage** **4.5 – 5.5 V** **((+) Terminal: R – (–) terminal: B/Br)**  I944H1110134-01	Go to Step 2.	Open circuit in the R wire or B/Br wire.

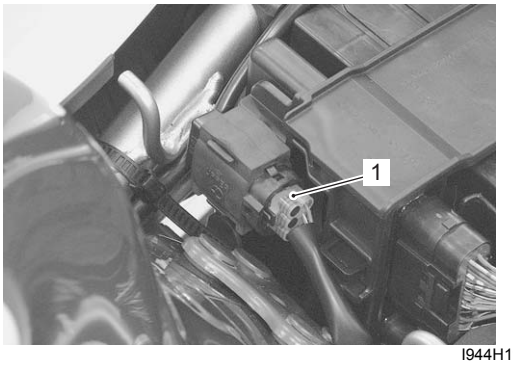
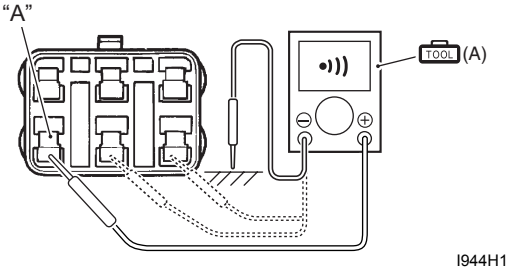
Step	Action	Yes	No
1	7) If OK, then measure the voltage between the R wire "A" and ground. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Voltage (⎓)**  I944H1110135-01 *Is the voltage OK?*	Go to Step 2.	Open circuit in the R wire or B/Br wire.
2	1) Turn the ignition switch OFF. 2) Disconnect the ECM coupler. Refer to "ECM Removal and Installation in Section 1C (Page 1C-1)". 3) Check there is no continuity among the R wire "A" and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110136-01 *Is there no continuity?*	Go to Step 3.	Short circuit in the R wire.

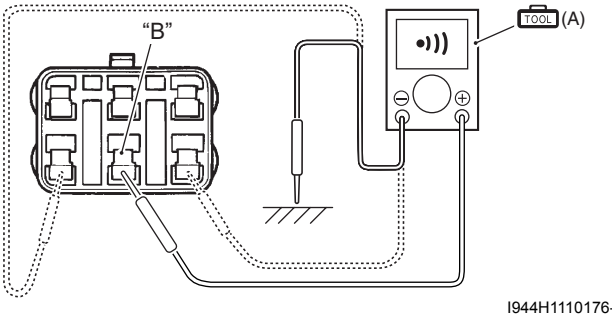
P1651-H (Use of SDS)

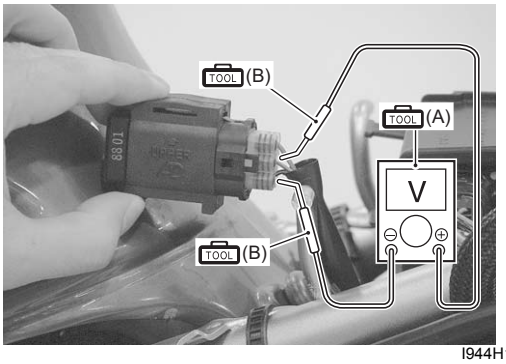
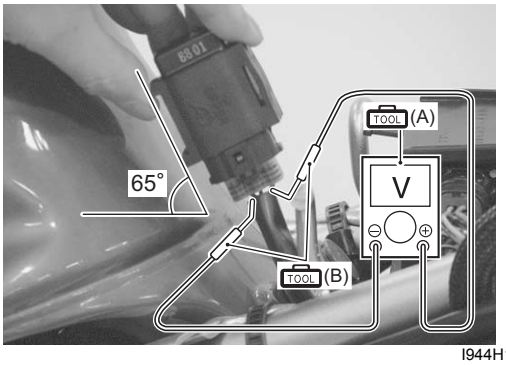
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”. 3) Check the TO sensor coupler (1) for loose or poor contacts. If OK, then check the TO sensor lead wire continuity.  I944H1110049-01 4) Disconnect the TO sensor coupler and ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 5) Insert the needle pointed probes to the lead wire coupler. 6) Check the continuity between the R wire “A” and terminal “5”. Also, check the continuity between the B/Br wire “B” and terminal “12”. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **(B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))** **ECM coupler (Harness side)**  I944H1110137-01 *Is the continuity OK?*	Go to Step 2.	Open circuit in the R wire or B/Br wire.

Step	Action	Yes	No
2	1) Insert the needle pointed probes to the lead wire coupler. 2) Check the continuity between the B/W wire “A” and terminal “20”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))** **ECM coupler (Harness side)**  I944H1110138-01 *Is the continuity?*	Go to Step 3.	Open circuit in the Br/W wire.

P1651-L (Use of SDS)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”. 3) Check the TO sensor coupler (1) for loose or poor contacts. If OK, then check the TO sensor lead wire continuity.  I944H1110051-01 4) Disconnect the TO sensor coupler and ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 5) Check there is no continuity between the R wire “A” and ground. Also the R wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110175-01 *Is there no continuity?*	Go to Step 2.	Short circuit in the R wire.

Step	Action	Yes	No
2	1) Check there is no continuity between the Br/W wire “B” and ground. Also the Br/W wire “B” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110176-01 *Is there no continuity?*	Go to Stop 3.	Short circuit in the Br/W wire.

Step	Action	Yes	No
3	1) Connect the ECM coupler and TO sensor coupler. 2) Remove the TO sensor. Refer to “TO Sensor Removal and Installation in Section 1C (Page 1C-5)”. 3) Insert the needle pointed probes to the lead wire coupler. 4) Turn the ignition switch ON. 5) Measure the voltage at the wire side coupler between Br/W wire and B/Br wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **TO sensor voltage (Normal)** **0.4 – 1.4 V** **((+) terminal: Br/W – (–) terminal: B/Br)**  I944H1110053-01 6) Measure the voltage when it is leaned 65° and more to left and right, from the horizontal level. **TO sensor voltage (Leaning)** **3.7 – 4.4 V** **((+) terminal: Br/W – (–) terminal: B/Br)**  I944H1110054-01 *Is the voltage OK?*	• Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	• Replace the TO sensor with a new one. Refer to “TO Sensor Removal and Installation in Section 1C (Page 1C-5)”.

DTC “C24” (P0351) or “C25” (P0352): Ignition System Malfunction

B944H11104017

NOTE

- **Refer to “No Spark or Poor Spark in Section 1H (Page 1H-3)” for details.**
- **When indicating “C24” (P0351) for #1 front cylinder side.**
- **When indicating “C25” (P0352) for #2 rear cylinder side.**

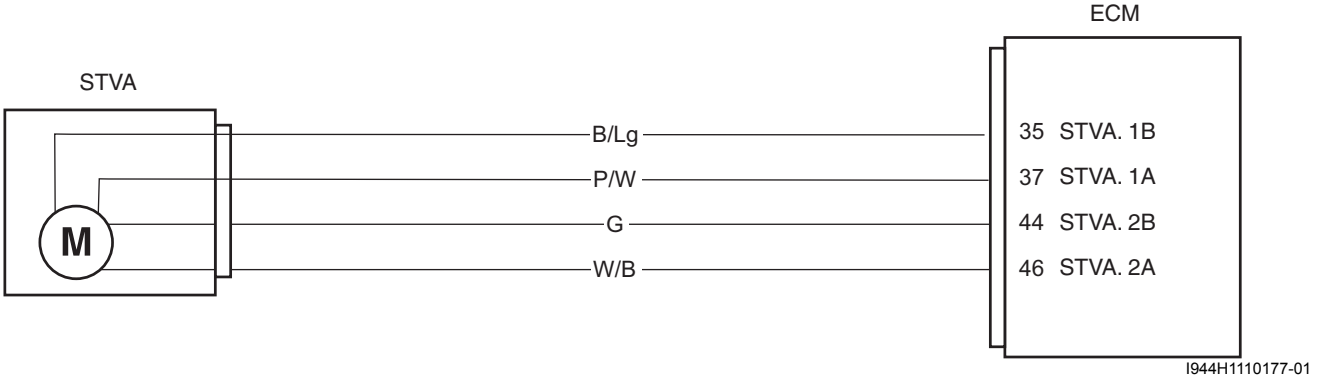
DTC “C28” (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction

B944H11104018

Detected Condition and Possible Cause

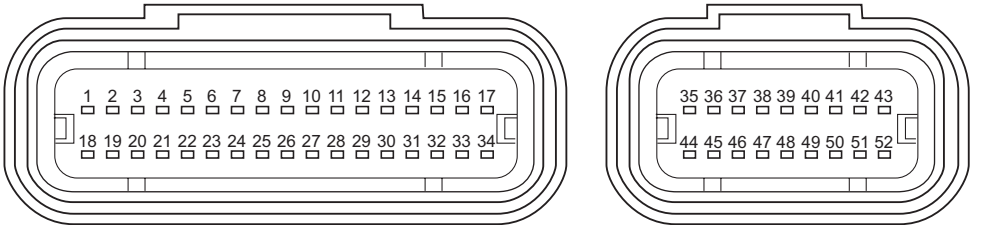
Detected Condition	Possible Cause
The operation voltage does not reach the STVA. ECM does not receive communication signal from the STVA. STVA can not operate properly.	• STVA malfunction. • STVA circuit open or short. • STVA motor malfunction.

Wiring Diagram



I944H1110177-01

ECM coupler (Harness side)



I944H1110056-01

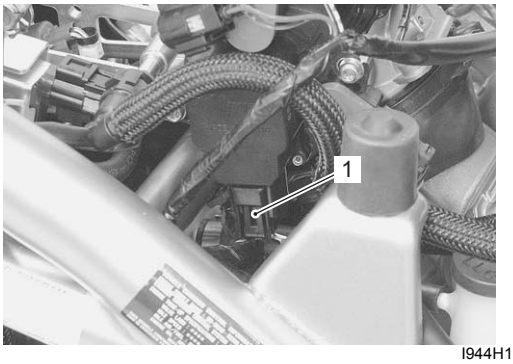
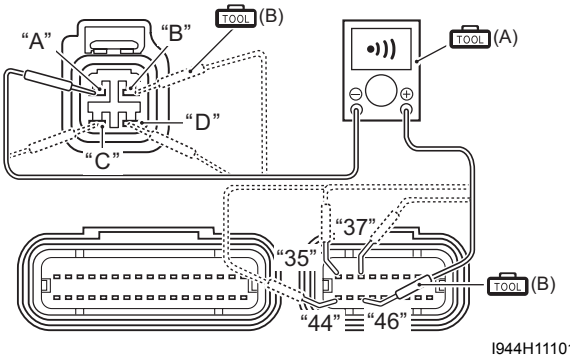
Troubleshooting

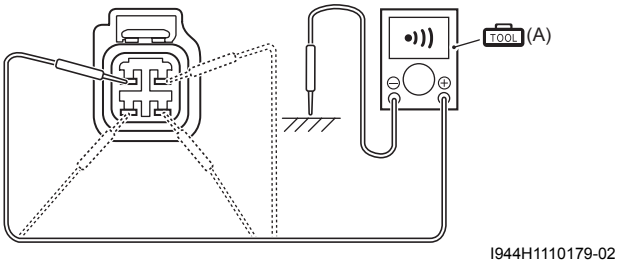
⚠ CAUTION

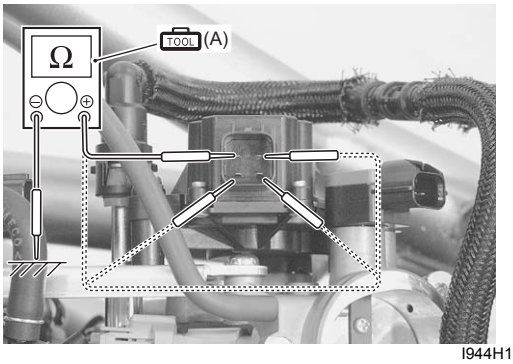
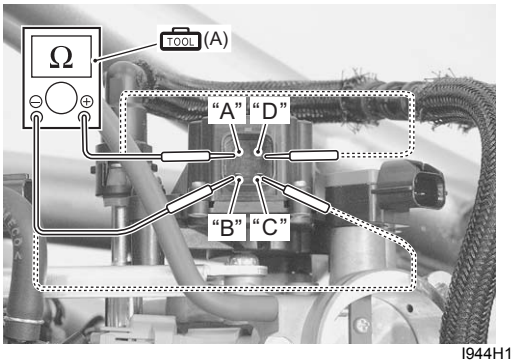
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

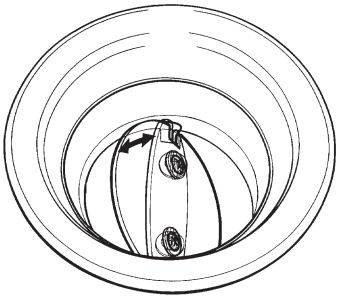
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

Step	Action	Yes	No
1	1) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation in Section 1D (Page 1D-6)”. 2) Check the STVA lead wire coupler (1) for loose or poor contacts.  I944H1110057-01 3) Turn the ignition switch OFF. 4) Disconnect the STVA lead wire coupler and ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 5) Insert the needle pointed probes to the lead wire coupler. 6) Check the continuity between the W/B wire “A” and ECM terminal “46”, B/Lg wire “B” and ECM terminal “35”, G wire “C” and ECM terminal “44” and P/W wire “D” and ECM terminal “37”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))**  I944H1110178-02	Go to Step 2.	Open or short circuit in the W/B, B/Lg, G or P/W wire.

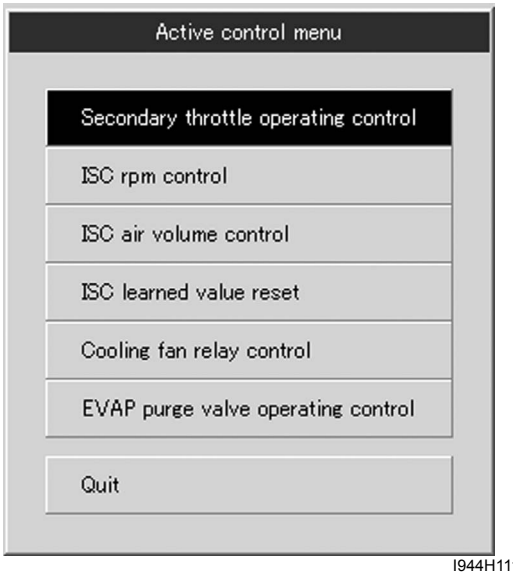
Step	Action	Yes	No
1	7) If the sound is heard from the tester, then check there is no continuity among the STVA lead wire coupler each terminal and ground. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110179-02 *Are there continuity and no continuity?*	Go to Step 2.	Open or short circuit in the W/B, B/Lg, G or P/W wire.

Step	Action	Yes	No
2	1) Remove the throttle body assembly. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”. 2) Check the continuity between each terminal and ground. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **STVA continuity** **∞ Ω (Infinity)** **(Terminal – Ground)**  I944H1110058-01 3) If OK, then measure the STVA resistance (between the B/Lg wire “A” and P/W wire “B”) and (between the G wire “C” and W/B wire “D”). **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **STVA resistance** **Approx. 7 Ω** **(Terminal “A” – Terminal “B”, Terminal “C” – Terminal “D”)**  I944H1110059-01 *Is the resistance OK?*	Go to Step 3.	Replace the throttle body assembly with a new one. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”.

Step	Action	Yes	No
3	1) Install the throttle body assembly. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”. 2) Connect the STVA lead wire coupler and ECM coupler. 3) Start the engine to check the STV operation. (STVA operating order: Open → Approx. 38% open)  I705H1110063-01 *Is the operation OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the throttle body assembly with a new one. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”.

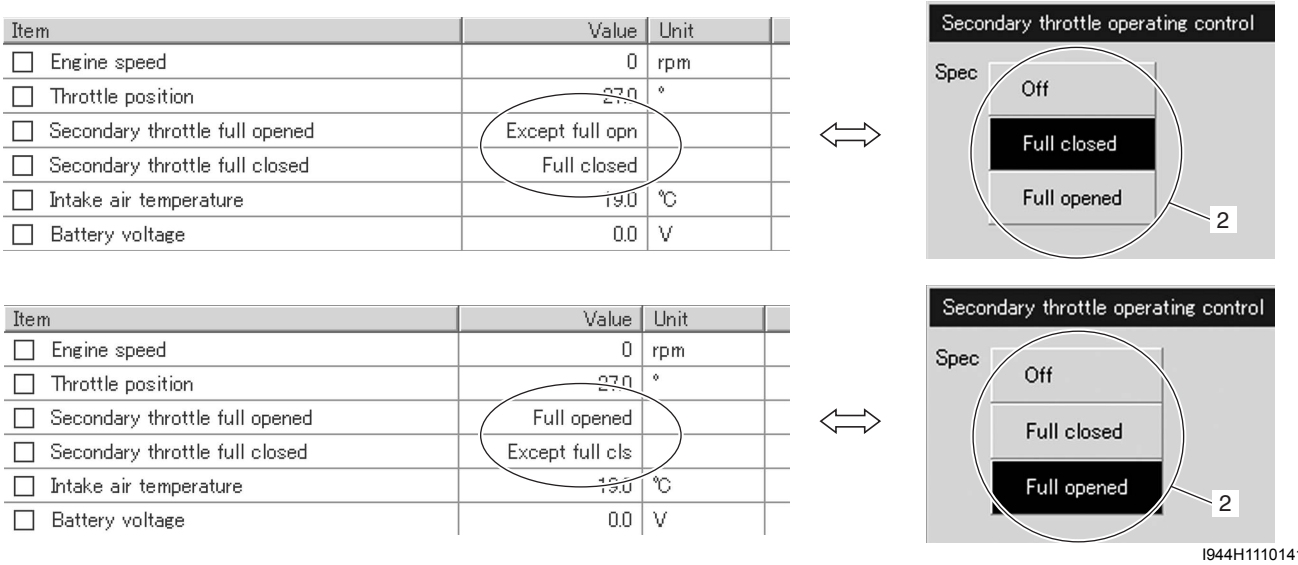
Active Control Inspection

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



I944H1110140-02

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



I944H1110141-01

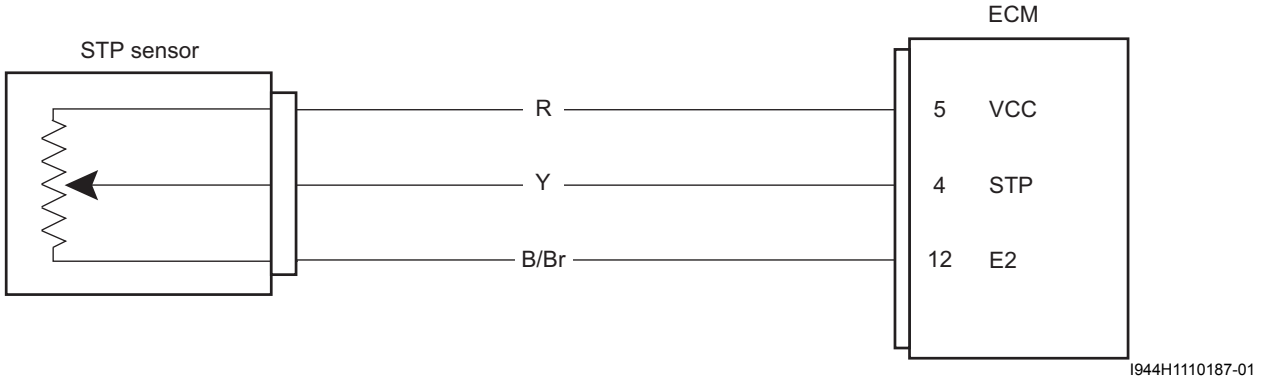
DTC “C29” (P1654-H/L): Secondary Throttle Position Sensor (STPS) Circuit Malfunction

B944H11104019

Detected Condition and Possible Cause

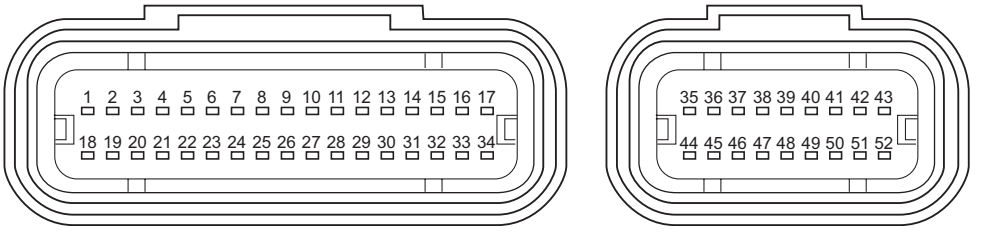
Detected Condition			Possible Cause
C29		Output voltage is not within the following range. 0.1 V ≤ Sensor voltage < 4.8 V	• STP sensor maladjusted. • STP sensor circuit open or short. • STP sensor malfunction. • ECM malfunction.
P1654	H	Sensor voltage is higher than specified value.	• STP sensor circuit shorted to VCC or ground circuit open.
	L	Sensor voltage is lower than specified value.	• STP sensor circuit open or shorted to ground or VCC circuit open.

Wiring Diagram



I944H1110187-01

ECM coupler (Harness side)



I944H1110061-01

Troubleshooting

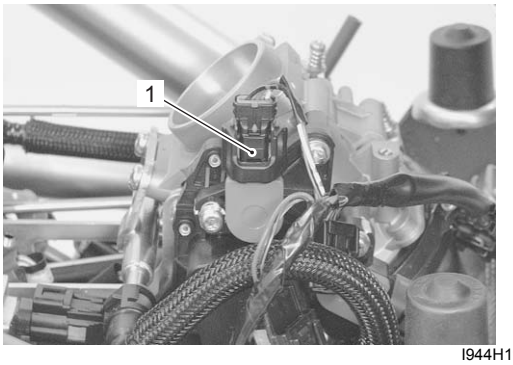
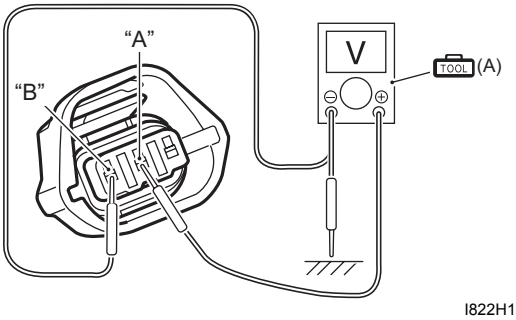
⚠ CAUTION

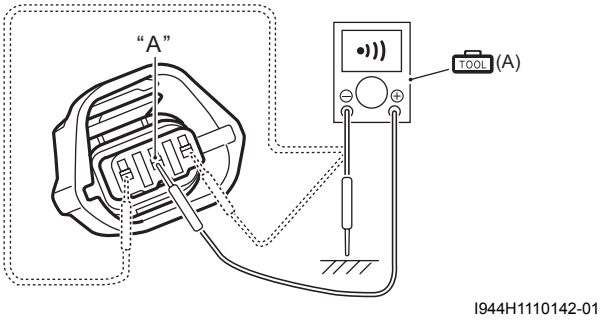
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

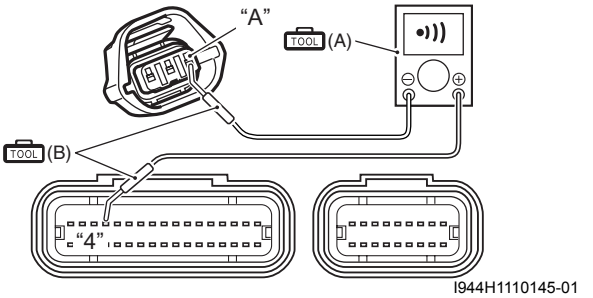
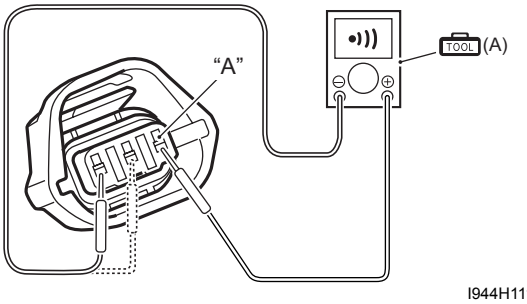
NOTE

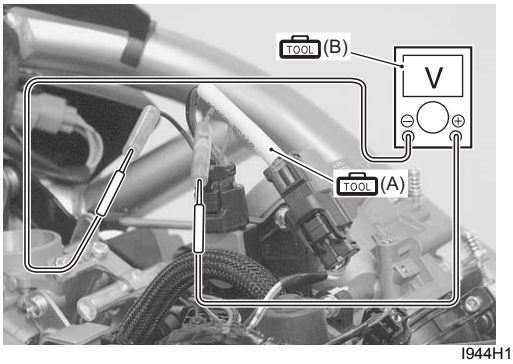
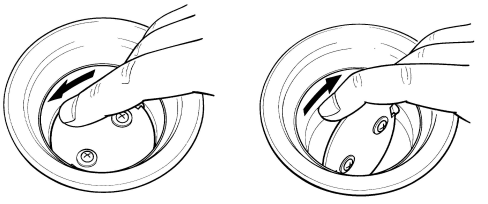
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

C29 (Use of mode select switch)

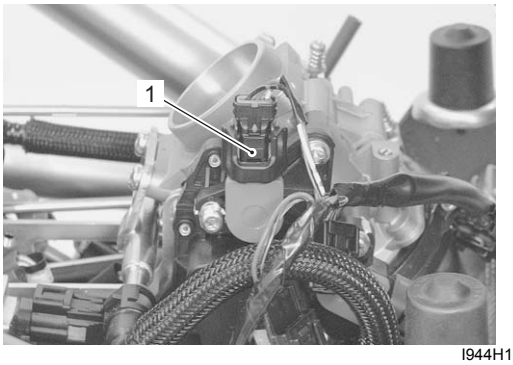
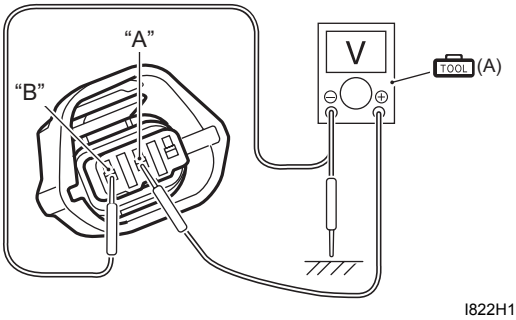
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation in Section 1D (Page 1D-6)”. 3) Check the STP sensor coupler (1) for loose or poor contacts. If OK, then measure the STP sensor input voltage.  I944H1110062-02 4) Disconnect the STP sensor coupler. 5) Turn the ignition switch ON. 6) Measure the input voltage between the R wire “A” and ground. Also, measure the voltage between the R wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **STP sensor input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I822H1110064-01 *Is the voltage OK?*	Go to Step 2.	Open circuit in the R wire or B/Br wire.

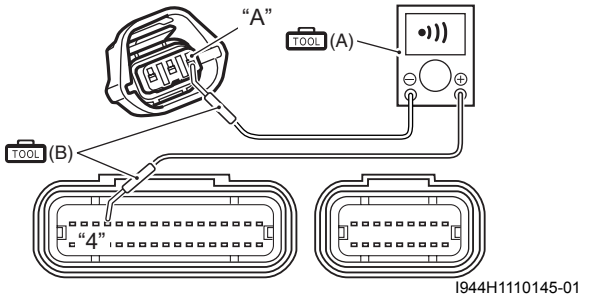
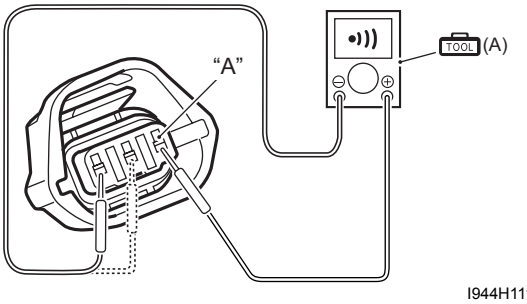
Step	Action	Yes	No
2	1) Turn the ignition switch OFF. 2) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 3) Check there is no continuity between the R wire “A” and ground. Also the R wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110142-01 *Is there no continuity?*	Go to Step 3.	Short circuit in the R wire.

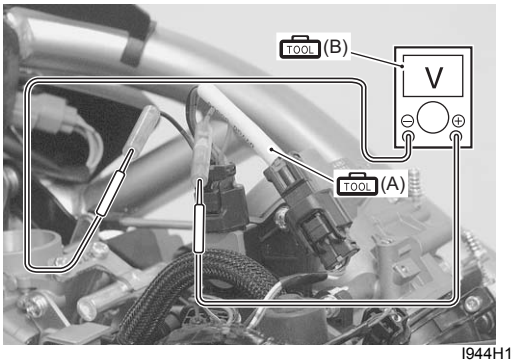
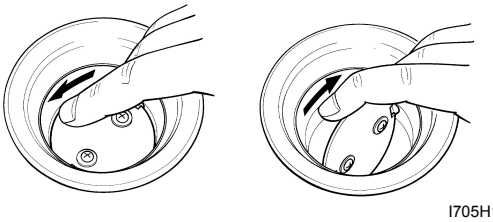
Step	Action	Yes	No
3	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Check the continuity between the Y wire “A” and terminal “4”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))** **ECM couplers (Harness side)**  I944H1110145-01 3) If the sound is head from the tester, then check there is no continuity among the Y wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110146-01 *Is the continuity OK?*	Go to Step 4.	Short circuit in the Y wire.

Step	Action	Yes	No
4	1) Turn the ignition switch OFF. 2) Connect the ECM coupler. 3) Connect the special tool between the STP sensor and its coupler. **Special tool** **TOOL (A): 09900–28630 (TP Sensor test lead)** 4) Disconnect the STVA lead wire coupler. Refer to “DTC “C28” (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction (Page 1A-67)”. 5) Turn the ignition switch ON. 6) Measure the STP sensor output voltage at the coupler (between the R wire (+) and B wire (–)) by turning the secondary throttle valve (close and open) with your finger. **Special tool** **TOOL (B): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Voltage (⎓)** **STP sensor output voltage** **Secondary throttle valve is closed: Approx. 0.6 V** **Secondary throttle valve is opened: Approx. 4.5 V** **((+) terminal: R – (–) terminal: B)**  I944H1110067-01  I705H1110071-01 *Is the voltage OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the STP sensor with a new one. Refer to “STP Sensor Removal and Installation in Section 1C (Page 1C-6)”.

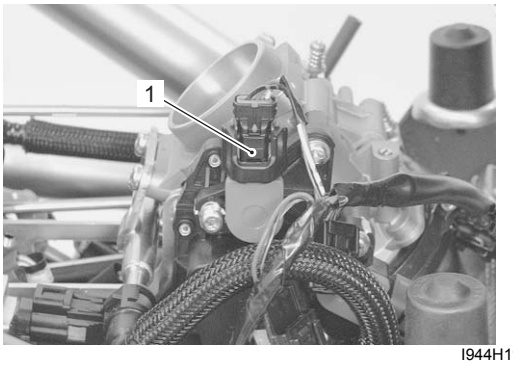
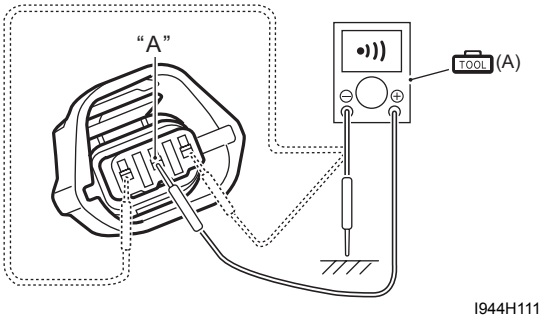
P1654-H (Use of SDS)

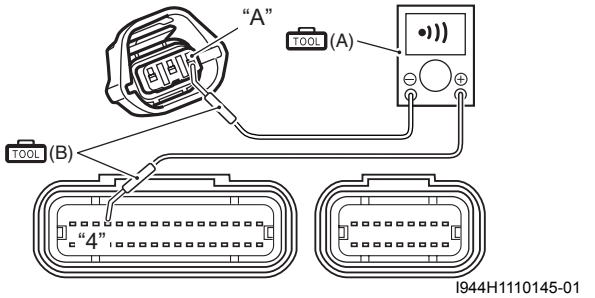
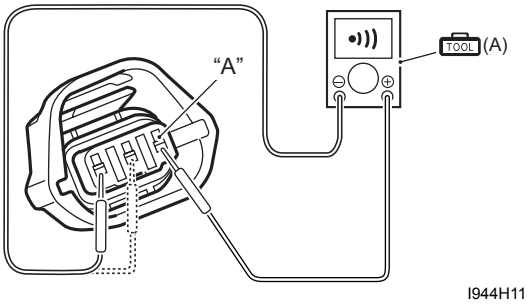
Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation in Section 1D (Page 1D-6)”. 3) Check the STP sensor coupler (1) for loose or poor contacts. If OK, then check the STP sensor lead wire continuity.  I944H1110063-01 4) Disconnect the STP sensor coupler. 5) Turn the ignition switch ON. 6) Measure the input voltage between the R wire “A” and ground. Also, measure the voltage between the R wire “A” and B/Br wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **STP sensor input voltage** **4.5 – 5.5 V** **((+) terminal: R – (–) terminal: Ground, (+) terminal: R – (–) terminal: B/Br)**  I822H1110064-01 *Is the voltage OK?*	Go to Step 2.	Open circuit in the R wire.

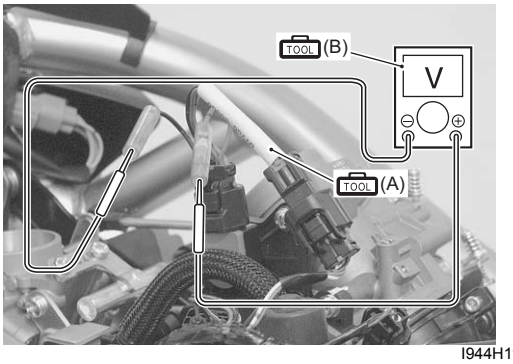
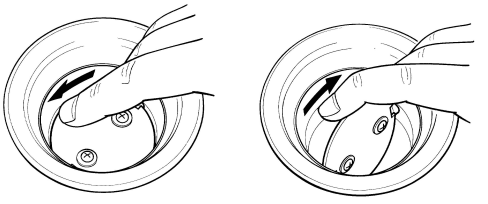
Step	Action	Yes	No
2	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Check the continuity between the Y wire “A” and terminal “4”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•))))** **ECM couplers (Harness side)**  I944H1110145-01 3) If the sound is head from the tester, then check there is no continuity among the Y wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110146-01 *Is the continuity OK?*	Go to Step 3.	Short circuit in the Y wire.

Step	Action	Yes	No
3	1) Turn the ignition switch OFF. 2) Connect the ECM coupler. 3) Connect the special tool between the STP sensor and its coupler. **Special tool** **TOOL (A): 09900–28630 (TP Sensor test lead)** 4) Disconnect the STVA lead wire coupler. Refer to “DTC “C28” (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction (Page 1A-67)”. 5) Turn the ignition switch ON. 6) Measure the STP sensor output voltage at the coupler (between the R wire (+) and B wire (–)) by turning the secondary throttle valve (close and open) with your finger. **Special tool** **TOOL (B): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Voltage (⎓)** **STP sensor output voltage** **Secondary throttle valve is closed: Approx. 0.6 V** **Secondary throttle valve is opened: Approx. 4.5 V** **((+) terminal: R – (–) terminal: B)**  I944H1110067-01  I705H1110071-01 *Is the voltage OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the STP sensor with a new one. Refer to “STP Sensor Removal and Installation in Section 1C (Page 1C-6)”.

P1654-L (Use of SDS)

Step	Action	Yes	No
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-6)”. 3) Check the STP sensor coupler (1) for loose or poor contacts. If OK, then check the STP sensor lead wire continuity.  I944H1110065-01 4) Disconnect the STP sensor coupler and ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 5) Check there is no continuity between the R wire “A” and ground. Also the R wire “A” and another wire. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110143-01 *Is there no continuity?*	Go to Step 2.	Short circuit in the R wire.

Step	Action	Yes	No
2	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Check the continuity between the Y wire “A” and terminal “4”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))** **ECM couplers (Harness side)**  I944H1110145-01 3) If the sound is head from the tester, then check there is no continuity among the Y wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110146-01 *Is the continuity OK?*	Go to Step 3.	Short circuit in the Y wire.

Step	Action	Yes	No
3	1) Turn the ignition switch OFF. 2) Connect the ECM coupler. 3) Connect the special tool between the STP sensor and its coupler. **Special tool** **TOOL (A): 09900–28630 (TP Sensor test lead)** 4) Disconnect the STVA lead wire coupler. Refer to “DTC “C28” (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction (Page 1A-67)”. 5) Turn the ignition switch ON. 6) Measure the STP sensor output voltage at the coupler (between the R wire (+) and B wire (–)) by turning the secondary throttle valve (close and open) with your finger. **Special tool** **TOOL (B): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Voltage (⎓)** **STP sensor output voltage** **Secondary throttle valve is closed: Approx. 0.6 V** **Secondary throttle valve is opened: Approx. 4.5 V** **((+) terminal: R – (–) terminal: B)**  I944H1110067-01  I705H1110071-01 *Is the voltage OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the STP sensor with a new one. Refer to “STP Sensor Removal and Installation in Section 1C (Page 1C-6)”.

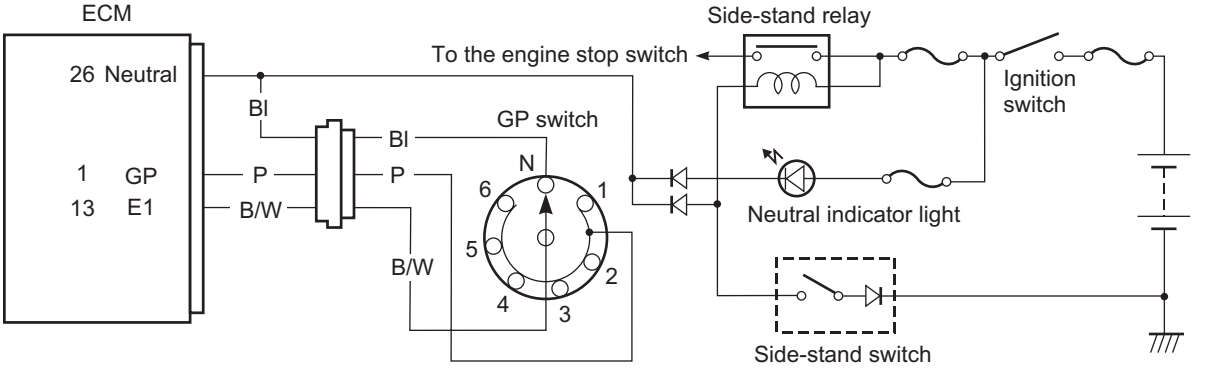
DTC “C31” (P0705): GP Switch Circuit Malfunction

B944H11104020

Detected Condition and Possible Cause

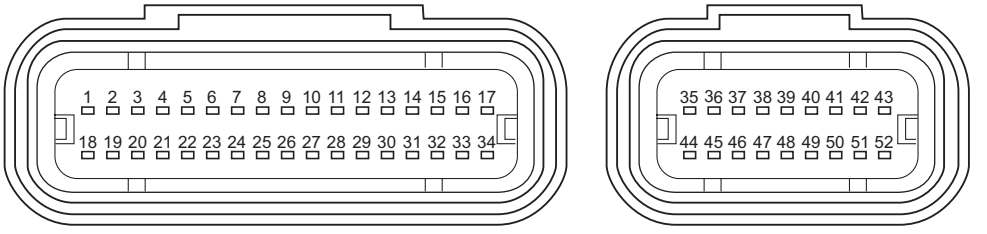
Detected Condition	Possible Cause
Gear position signal voltage should be higher than the following. Gear position sensor voltage ≥ 0.2 V If lower than the above value for 3 seconds and more.	• GP switch circuit open or short. • GP switch malfunction. • ECM malfunction.

Wiring Diagram



I944H1110068-02

ECM coupler (Harness side)



I944H1110069-01

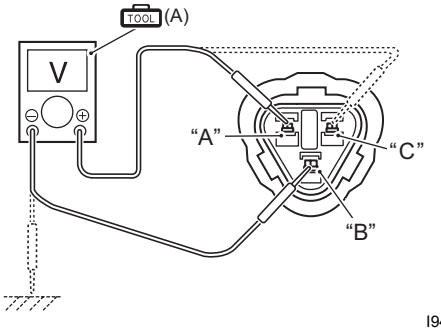
Troubleshooting

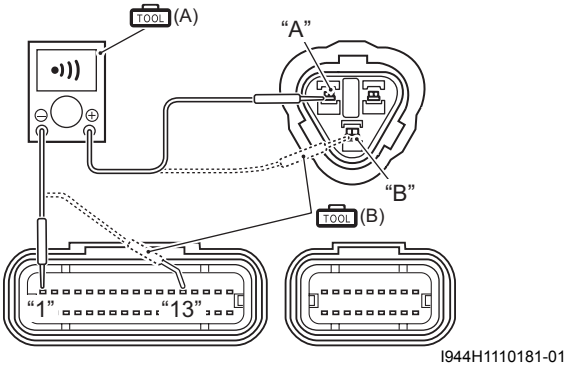
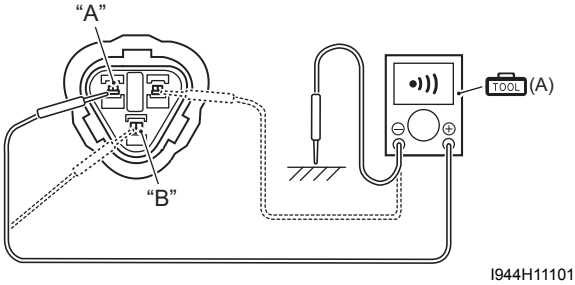
⚠ CAUTION

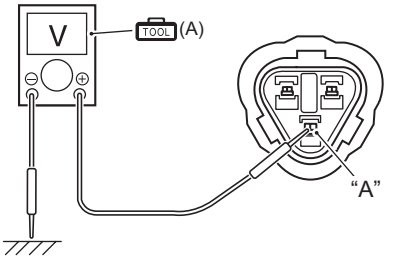
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 3) Check the GP switch coupler (1) for loose or poor contacts. If OK, then measure the GP switch voltage. I944H1110070-01 4) Support the motorcycle with a jack. 5) Fold the side-stand to up position. 6) Disconnect the GP switch coupler. 7) Turn the ignition switch ON. 8) Measure the voltage between the P wire “A” and B/W wire “B”, P wire “A” and ground, Bl wire “C” and B/W wire “B”, Bl wire “C” and ground. When shifting the gearshift lever from 1st to Top. **Special tool** **(A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **GP switch voltage** **0.6 V and more** **((+) terminal: P – (–) terminal: B/W, (+) terminal: P – (–) terminal: Ground,** **(+) terminal: Bl –(–) terminal: B/W, (+) terminal: Bl – (–) terminal: Ground)**  I944H1110180-01 *Is the voltage OK?*	Go to Step 2.	Open circuit in the P, Bl or B/W wire.

Step	Action	Yes	No
2	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Insert the needle pointed probes to the lead wire coupler. 3) Check there is continuity between the P wire “A” and ECM terminal “1”. Also the B/W wire “B” and ECM terminal “13”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))**  I944H1110181-01 4) If the sound is head from the tester, then check there is no continuity among the P wire “A” and ground, B/W wire “B” and ground, P wire “A” and another wire, B/W wire and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110182-02 *Is continuity OK?*	Go to Step 3.	Short circuit in the P wire or B/W wire.

Step	Action	Yes	No
3	1) Connect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Turn the ignition switch ON. 3) Measure the voltage between the BI wire “A” and ground. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Voltage (⎓)** **((+) terminal: BI – (–) terminal: Ground)**  I944H1110183-02 *Is the battery voltage?*	Go to Step 4.	Short circuit in the BI wire.
4	1) Check the GP switch. Refer to “Side-stand / Ignition Interlock System Parts Inspection in Section 1I (Page 1I-8)”. *Is it in good condition?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the GP switch with a new one. Refer to “GP Switch Removal and Installation in Section 1C (Page 1C-8)”.

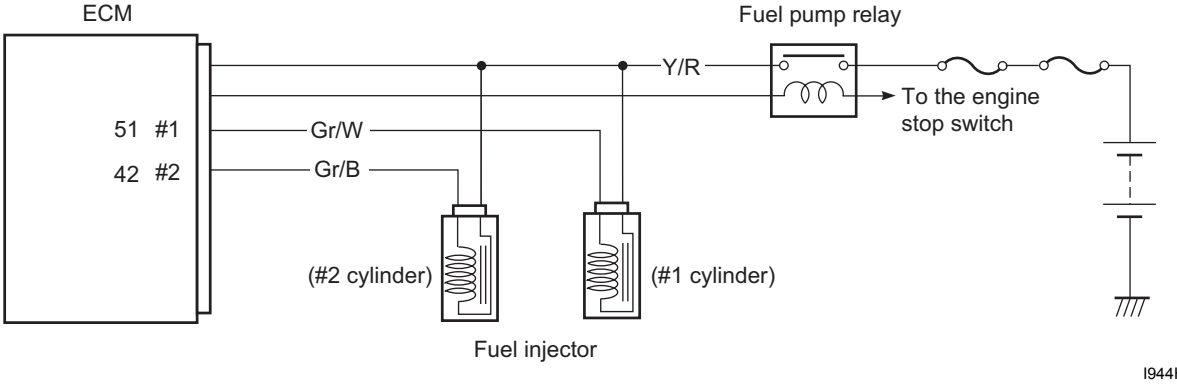
DTC “C32” (P0201), “C33” (P0202): Fuel Injector Circuit Malfunction

B944H11104021

Detected Condition and Possible Cause

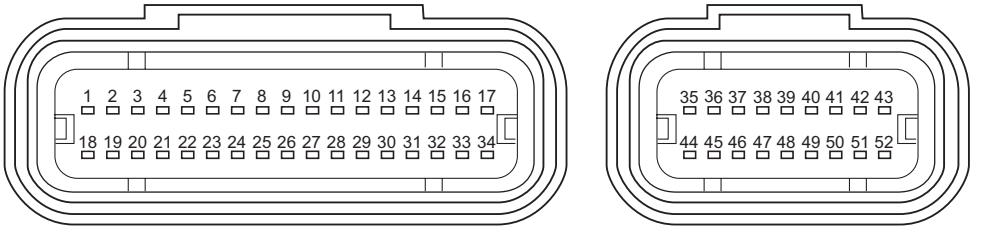
Detected Condition	Possible Cause
CKP signal is produced but fuel injector signal is interrupted by 8 times or more continuity.	• Injector circuit open or short. • Injector malfunction. • ECM malfunction.

Wiring Diagram



I944H1110072-02

ECM coupler (Harness side)



I944H1110073-01

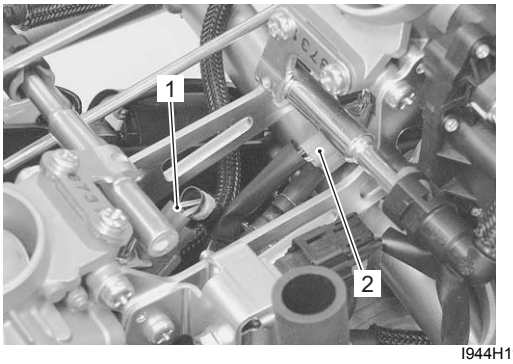
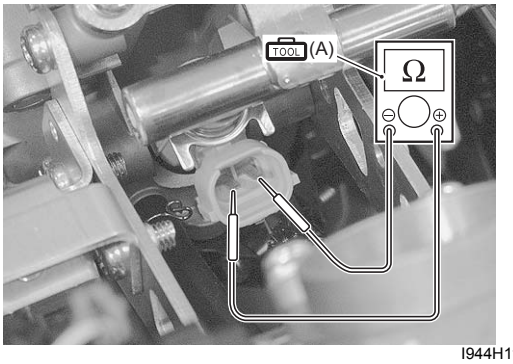
Troubleshooting

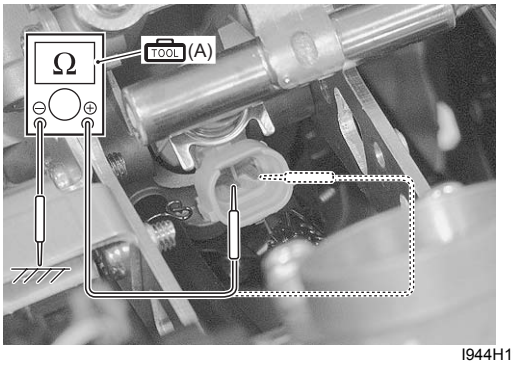
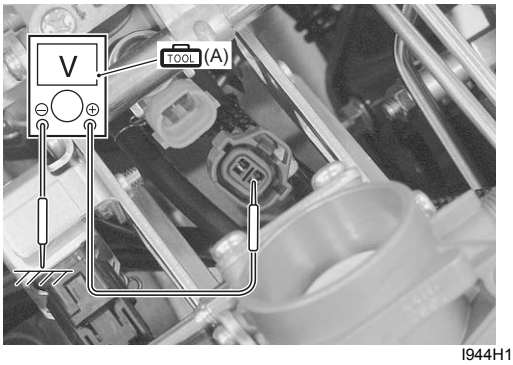
⚠ CAUTION

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

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

Step	Action	Yes	No
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-6)”. 3) Check the injector coupler (#1 (1) or #2 (2)) for loose or poor contacts. If OK, then measure the injector resistance.  I944H1110074-01 4) Disconnect the injector coupler and measure the resistance between terminals. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **Injector resistance** **11 – 13 Ω at 23 °C (73 °F)** **(Terminal – Terminal)**  I944H1110075-01	Go to Step 2.	Replace the injector with a new one. Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-11)”.

Step	Action	Yes	No
1	5) If OK, then check the continuity between each terminal and ground. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Injector continuity** **∞ Ω (Infinity)**  I944H1110076-01 *Are the resistance and continuity OK?*	Go to Step 2.	Replace the injector with a new one. Refer to "Throttle Body Disassembly and Assembly in Section 1D (Page 1D-11)".
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)**  I944H1110077-02 *Is the voltage OK?*	Replace the ECM with a new one. Refer to "ECM Removal and Installation in Section 1C (Page 1C-1)".	Open circuit in the Y/R wire.

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

B944H11104022

Detected Condition and Possible Cause

Detected Condition		Possible Cause
C40/P0505	ISC valve circuit malfunction.	• Secondary throttle valve is fixed in opening position. • Defective ECM.
C40/P0506	Idle speed is lower than the desired idle speed.	
C40/P0507	Idle speed is higher than the desired idle speed.	

Troubleshooting

⚠ CAUTION

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

NOTE

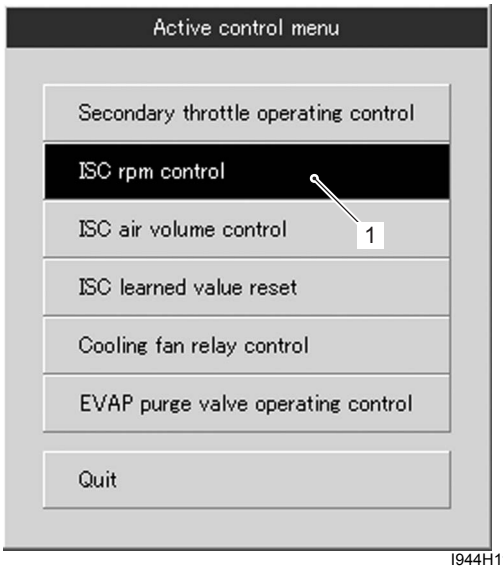
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

Step	Action	Yes	No
1	1) Start the engine. 2) Check the engine idling speed. **NOTE** **Make sure there is no crack or disconnection in the IAP sensor hoses and intake pipe.** *Is engine idling speed normal?*	Go to Step 3.	Go to Step 2.
2	1) Stop the engine. 2) Replace the ECM with a known good one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 3) Start the engine. 4) Check the engine idling speed again. *Is engine idling speed normal?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Go to Step 3.
3	1) Stop the engine. 2) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation in Section 1D (Page 1D-6)”. 3) Confirm the throttle valve closed position. 4) Turn the ignition switch ON. 5) Check the secondary throttle valve operation. *Is the operation OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the throttle body assembly with a new one. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”.

Active Control Inspection (ISC RPM Control)

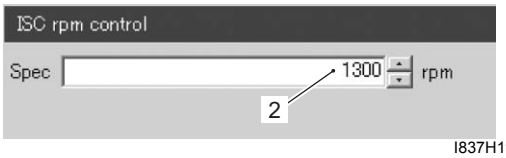
Check 1

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



I944H1110166-02

5) Check that the “Spec” (2) is idle speed 1 300 ± 100 rpm.
6) Check that the “Desired idle speed” (3) is within the specified idle rpm.



I837H1110141-01

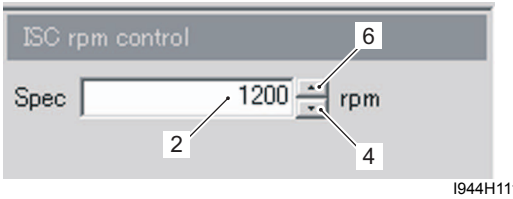
Item	Value	Unit
Engine speed	1318	rpm
Desired idle speed	1305	rpm
Secondary throttle actuator position sensor	23.1	%
Manifold absolute pressure 1	55.0	kPa

3

I944H1110167-01

Check 2

1) Click the button (4) and decrease the “Spec” (2) to 1 200 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 percent (5) in the secondary throttle actuator position sensor 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 percent (5) in the secondary throttle actuator position sensor increases.



I944H1110168-01

Item	Value	Unit
Engine speed	1192	rpm
Desired idle speed	1205	rpm
Secondary throttle actuator position sensor	20.4	%
Manifold absolute pressure 1	68.4	kPa

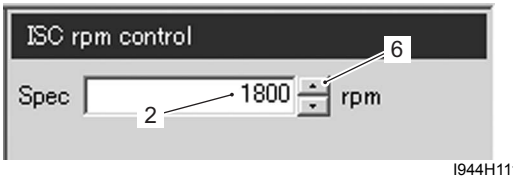
3

5

I944H1110169-01

Check 3

1) Click the button (6) and increase the “Spec” (2) to 1 800 rpm slowly.
2) Check that the “Desired idle speed” (3) is nearly equal to the “Spec” (2). Also, check that the number of percent (5) in the secondary throttle actuator position sensor increases.



I944H1110170-01

Item	Value	Unit
Engine speed	1820	rpm
Desired idle speed	1807	rpm
Secondary throttle actuator position sensor	38.8	%
Manifold absolute pressure 1	47.1	kPa

3

5

I944H1110171-01

NOTE

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

If the secondary throttle valve actuator does not function properly, inspect the ISC or replace the throttle body assembly. Refer to “DTC “C40” (P0505 / P0506 / P0507): ISC Valve Circuit Malfunction (Page 1A-91)” or “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”.

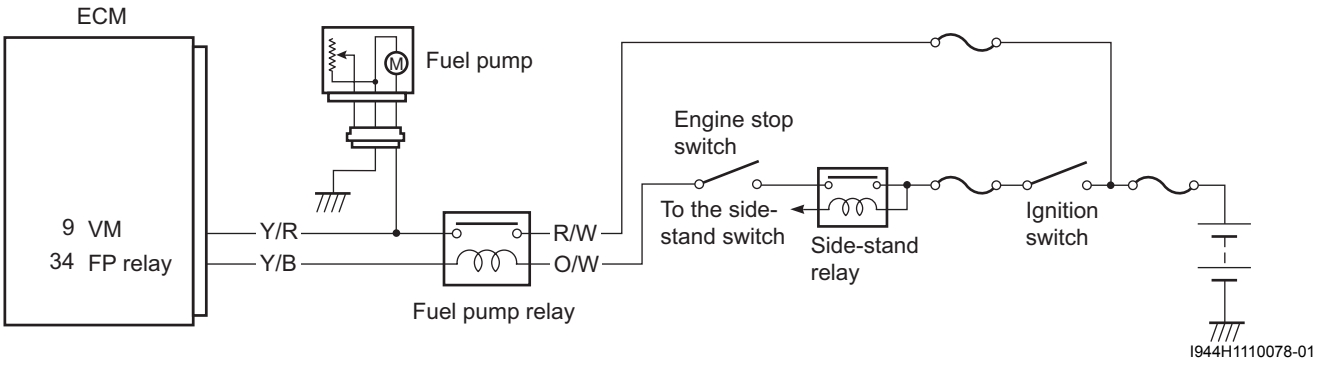
DTC “C41” (P0230-H/L): FP Relay Circuit Malfunction

B944H11104023

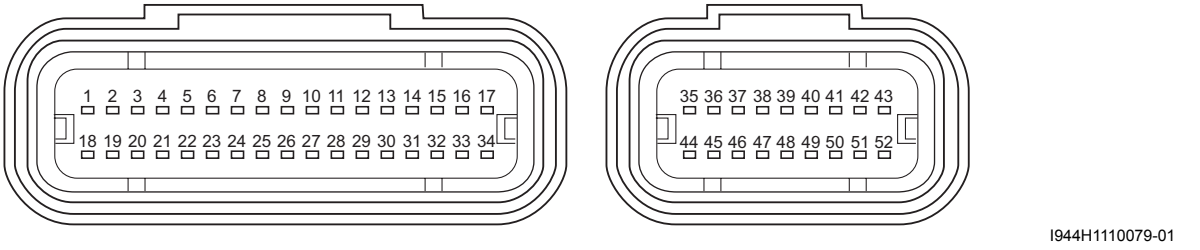
Detected Condition and Possible Cause

Detected Condition	Possible Cause
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.

Wiring Diagram



ECM coupler (Harness side)



Troubleshooting

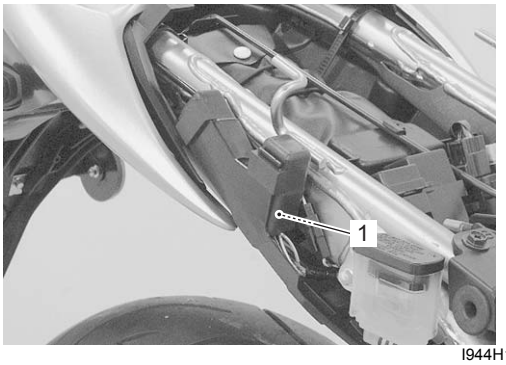
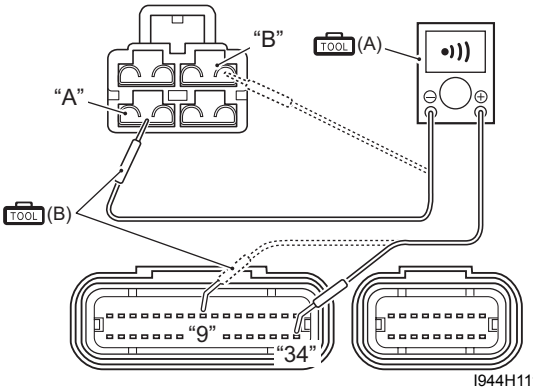
⚠ CAUTION

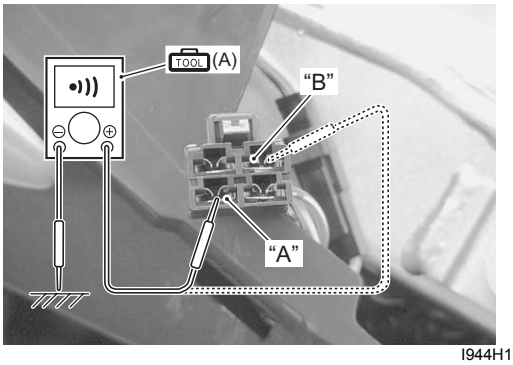
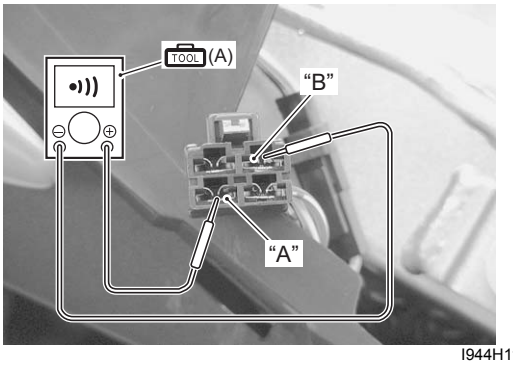
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

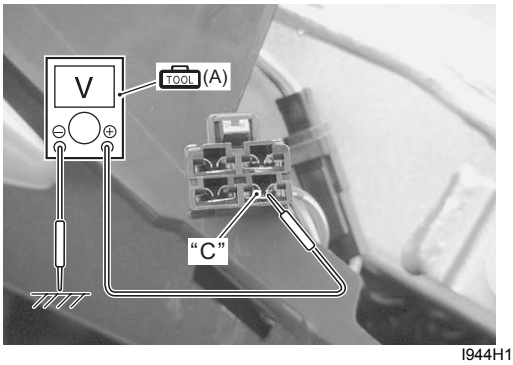
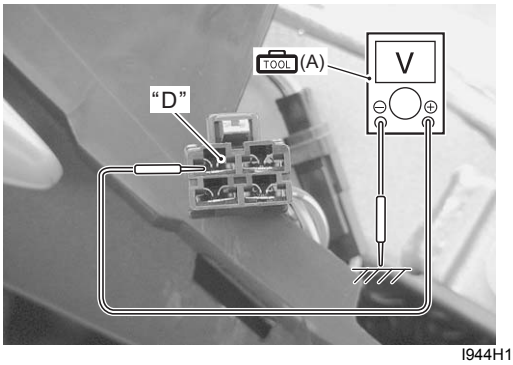
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

C41 (Use of mode select switch)

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the right rear frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”. 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-6)”.  I944H1110080-01 *Is the FP relay OK?*	Go to Step 2.	Replace the FP relay with a new one.
2	1) Disconnect the ECM coupler and fuel pump lead wire coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)” and “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 2) Insert the needle pointed probes to the lead wire coupler. 3) Check there is continuity between the Y/B wire “A” and ECM terminal “34”. Also the Y/R wire “B” and ECM terminal “9”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))**  I944H1110184-01	Go to Step 3.	Open or short circuit in the Y/B or Y/R wire.

Step	Action	Yes	No
2	4) If the sound is heard from the tester, then check there is no continuity between the Y/B wire “A” and ground, Y/R wire “B” and ground, Y/B wire “A” and Y/R wire “B”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Continuity (•)))**  I944H1110148-01  I944H1110149-02 *Is the continuity OK?*	Go to Step 3.	Open or short circuit in the Y/B or Y/R wire.

Step	Action	Yes	No
3	1) Measure the fuel pump relay switch side voltage between the R/W wire “C” and ground. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Fuel pump relay switch side voltage** **Battery voltage** **((+) terminal: R/W – (–) terminal: Ground)**  I944H1110150-02 2) If OK, then measure the fuel pump relay coil side voltage between the O/W wire “D” and ground. 3) Turn the ignition switch ON, engine stop switch is in ON position, side-stand to upright position and measure the voltage. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Fuel pump relay coil side voltage** **Battery voltage** **((+) terminal: O/W – (–) terminal: Ground)**  I944H1110151-02 *Is the voltage OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Open circuit in the R/W wire or O/W wire.

DTC “C42” (P1650): IG Switch Circuit Malfunction

B944H11104025

Detected Condition and Possible Cause

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

Troubleshooting

NOTE

- **Refer to “Ignition Switch Inspection in Section 1H (Page 1H-9)” for details.**
- **After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.**

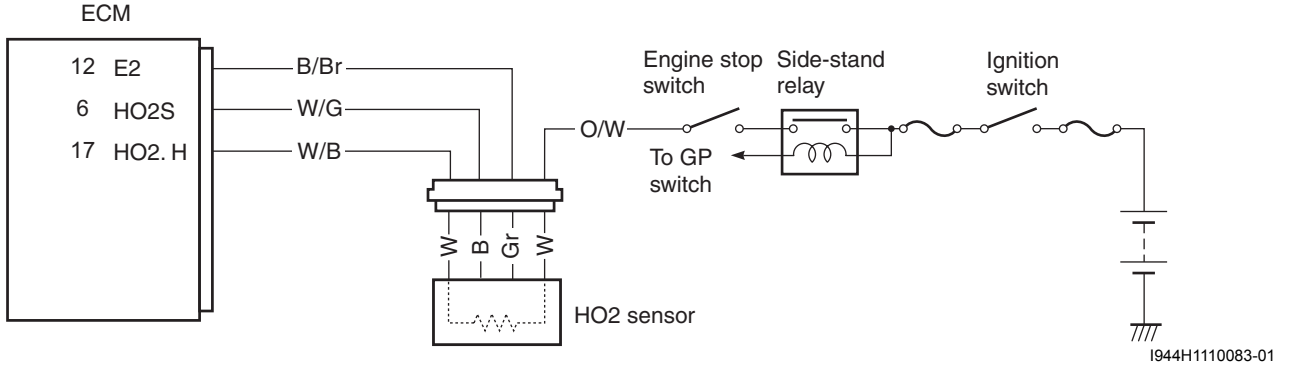
DTC “C44” (P0130 / P0135): HO2 Sensor (HO2S) Circuit Malfunction

B944H11104026

Detected Condition and Possible Cause

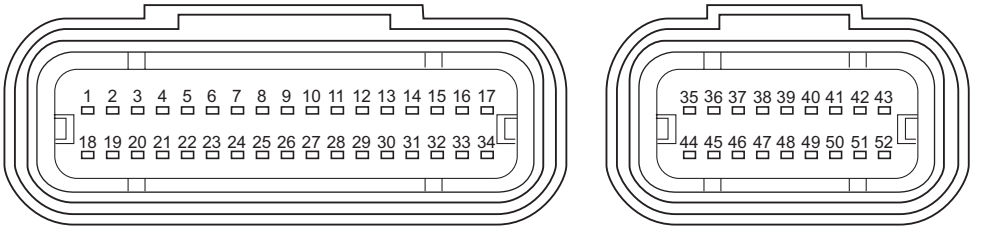
Detected Condition		Possible Cause
C44/P0130	After engine is started few minutes. (Sensor voltage ≥ 2.5 V) Engine is cold and stopped. (Sensor output voltage < 0.1 V) In other than the above value, C44 (P0130) is indicated.	• HO2 sensor circuit open or shorted to ground. • Fuel system malfunction. • ECM malfunction.
C44/P0135	The heater can not operate so that heater operation voltage is not supply to the oxygen heater circuit.	• Battery voltage supply to the HO2 sensor.

Wiring Diagram



I944H1110083-01

ECM coupler (Harness side)

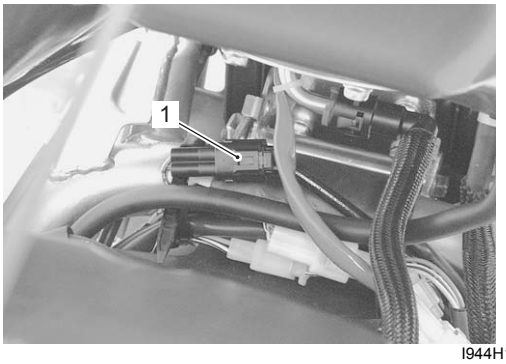
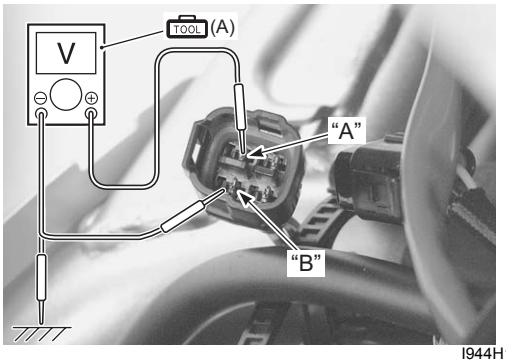


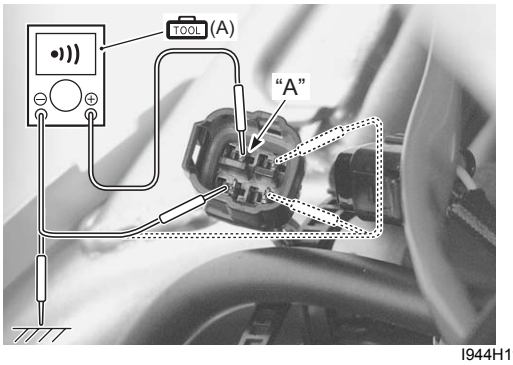
I944H1110084-01

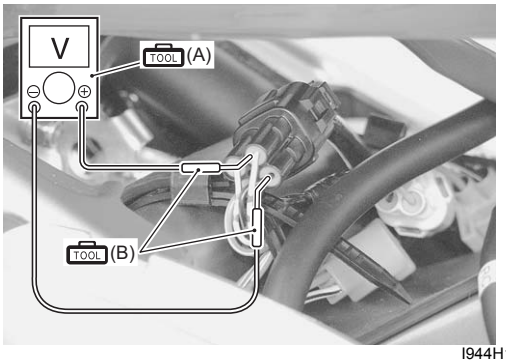
Troubleshooting (When Indicating C44 / P0130:)

⚠ CAUTION

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

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”. 3) Check the HO2 sensor coupler (1) for loose or poor contacts. If OK, then check the HO2 sensor lead wire continuity.  I944H1110085-01 4) Disconnect the HO2 sensor coupler. 5) Turn the ignition switch ON. 6) Check the voltage between the W/G wire “A” and ground. Also, check the voltage between W/G wire “A” and B/Br wire “B”. If the sound is not hard from the tester, the circuit condition is OK. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Voltage (⎓)** **HO2 sensor output voltage** **Approx. 5.0 V** **((+) terminal: W/G – (–) terminal: Ground, (+) terminal: W/G – (–) terminal: B/Br)**  I944H1110086-02 *Is the voltage OK?*	Go to Step 2.	Open circuit in the W/G wire or B/Br wire.

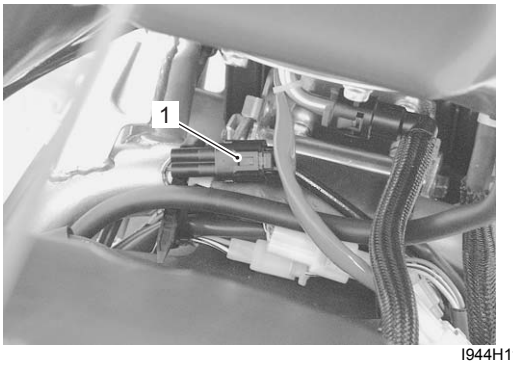
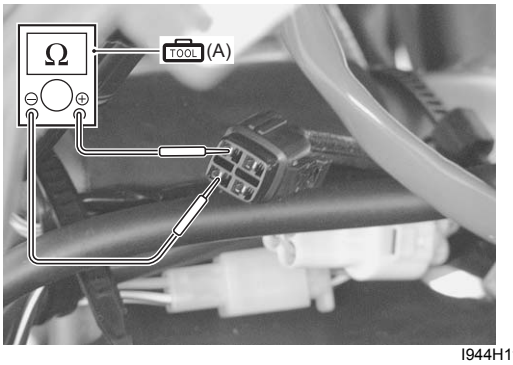
Step	Action	Yes	No
2	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Check there is no continuity between the W/G wire “A” and ground. Also the W/G wire “A” and another wire. **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Continuity (•))))**  I944H1110152-01 *Is the no continuity?*	Go to Step 3.	Short circuit in the W/G wire.

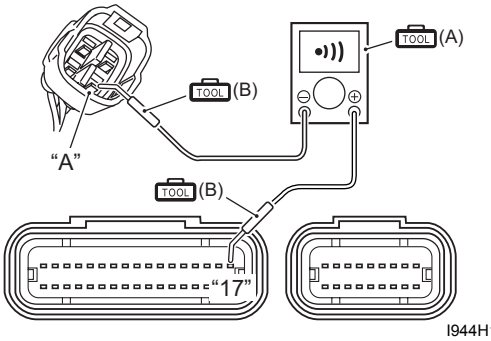
Step	Action	Yes	No
3	1) Connect the ECM coupler and HO2 sensor coupler. 2) Warm up the engine enough. 3) Insert the needle pointed probes to the lead wire coupler. 4) Measure the HO2 sensor output voltage between the W/G wire and B/Br wire, in idling condition. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **HO2 sensor output voltage at idle speed** **0.45 V and less** **((+) terminal: W/G – (–) terminal: B/Br)**  I944H1110088-01 5) Measure the HO2 sensor output voltage while holding the engine speed at 3 000 r/min. **HO2 sensor output voltage at 6 000 r/min** **0.6 V and more** **((+) terminal: W/G – (–) terminal: B/Br)** *Is the voltage OK?*	• W/G or B/Br wire open or shorted to the power source, or poor “6” or “12” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspection it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Replace the HO2 sensor with a new one. Refer to “Heated Oxygen Sensor (HO2S) Removal and Installation in Section 1B (Page 1B-3)”.

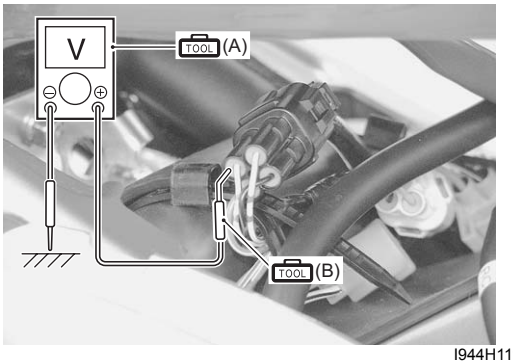
Troubleshooting (When Indicating C44 / P0135:)

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to "Use of SDS Diagnosis Reset Procedures (Page 1A-15)".

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-7)". 3) Check the HO2 sensor coupler (1) for loose or poor contacts. If OK, then measure the HO2 sensor resistance.  I944H1110089-01 4) Disconnect the HO2 sensor coupler and measure the resistance between terminals. **⚠ CAUTION** **• Temperature of the sensor affects resistance value largely.** **• Make sure that the sensor heater is in atmospheric temperature.** **Special tool** **TOOL (A): 09900–25008 (Multi-circuit tester set)** **Tester knob indication** **Resistance (Ω)** **HO2 sensor heater resistance** **Approx. 8 Ω at 23 °C (73 °F)** **(W – W)**  I944H1110090-01 *Is the resistance OK?*	Go to Step 2.	Replace the HO2 sensor with a new one. Refer to "HO2 Sensor Removal and Installation in Section 1C (Page 1C-8)".

Step	Action	Yes	No
2	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Insert the needle pointed probes to the lead wire coupler. 3) Check there is continuity between the W/B wire “A” and ECM terminal “17”. **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 pointed probe set)** **Tester knob indication** **Continuity (•)))**  I944H1110153-01 *Is there continuity?*	Go to Step 3.	Open circuit in the W/B wire.

Step	Action	Yes	No
3	1) Connect the HO2 sensor coupler and ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Insert the needle pointed probes to the lead wire coupler. 3) Turn the ignition switch ON and measure the heater voltage between the W/B wire and ground. If the tester voltage indicates the battery voltage, it is good condition. **NOTE** **Battery voltage can be detected only before starting the engine.** **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Voltage (⎓)** **Heater voltage** **((+) terminal: W/B – (–) terminal: Ground)**  I944H1110091-02 *Is the voltage OK?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Open circuit in the O/W wire.

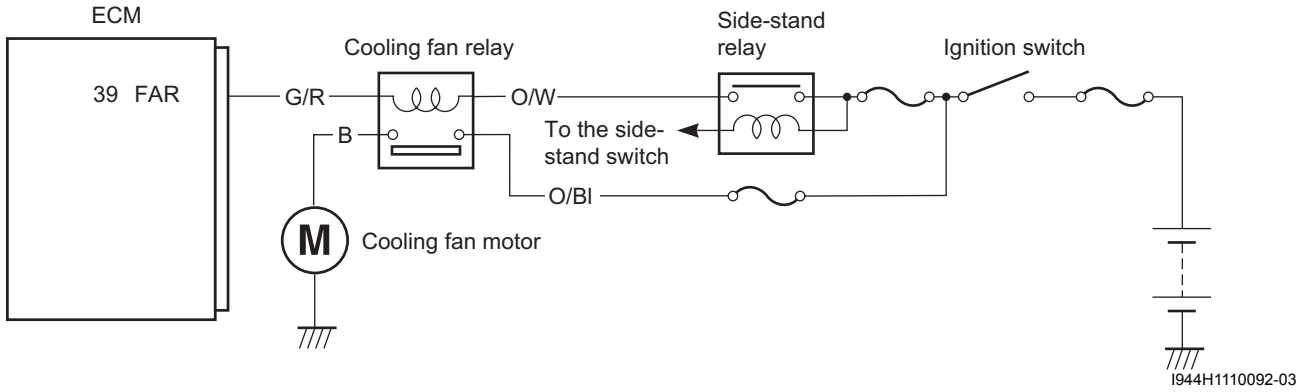
DTC “C60” (P0480): Cooling Fan Relay Circuit Malfunction

B944H11104028

Detected Condition and Possible Cause

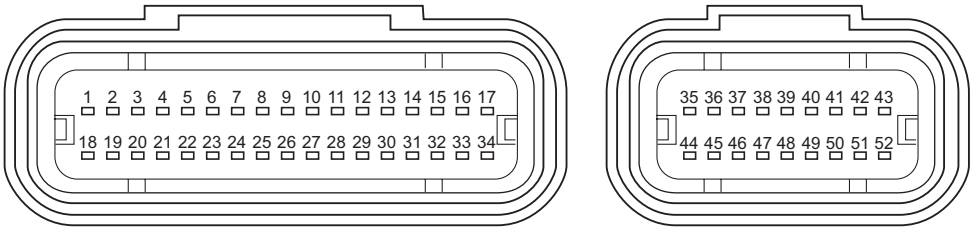
Detected Condition	Possible Cause
Cooling fan relay signal is not input to ECM.	• Cooling fan relay circuit open or short. • ECM malfunction.

Wiring Diagram



I944H1110092-03

ECM coupler (Harness side)



I944H1110093-01

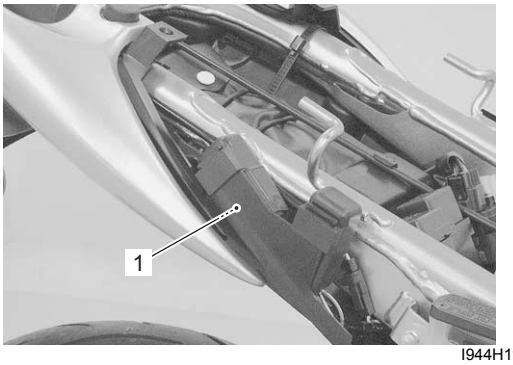
Troubleshooting

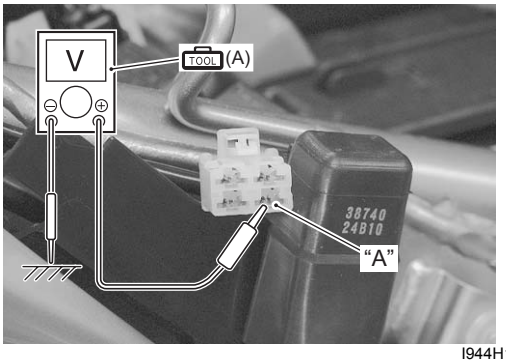
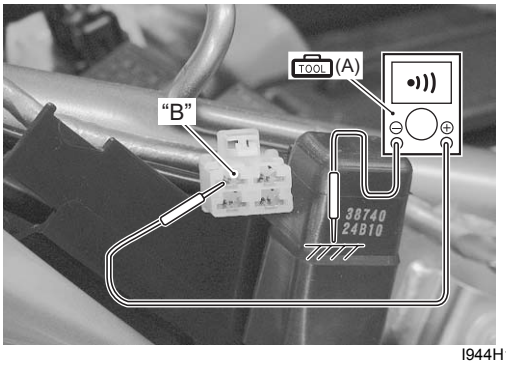
⚠ CAUTION

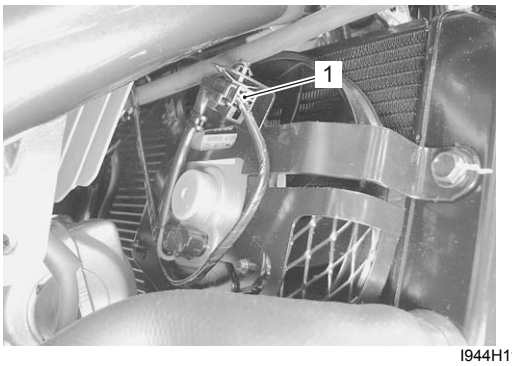
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent terminal damage.

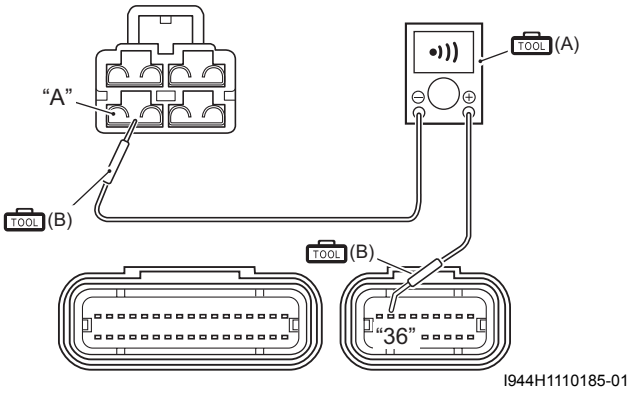
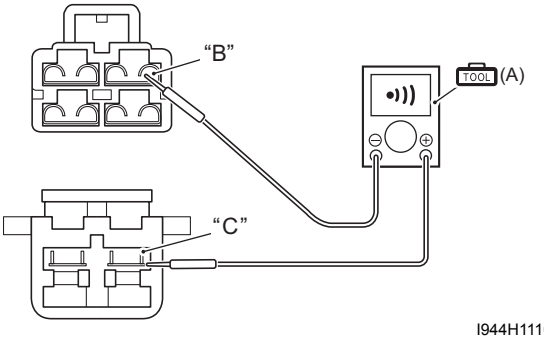
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-15)”.

Step	Action	Yes	No
1	1) Turn the ignition switch OFF. 2) Remove the right rear frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”. 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 Relay Inspection in Section 1F (Page 1F-9)”.  I944H1110094-01 *Is the cooling fan relay OK?*	Go to Step 2.	Replace the cooling fan relay with a new one.

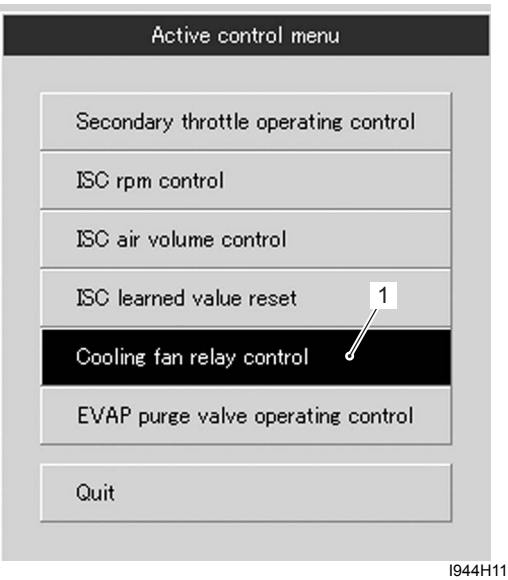
Step	Action	Yes	No
2	1) Turn the ignition switch ON. 2) Measure the cooling fan relay switch side voltage between the O/Bl wire “A” and ground. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Cooling fan relay switch side voltage** **Battery voltage** **((+) terminal: O/Bl – (–) terminal: Ground)**  I944H1110154-01 3) If OK, then measure the cooling fan relay coil side voltage between the O/W wire “B” and ground. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **Tester knob indication** **Voltage (⎓)** **Cooling fan relay coil side voltage** **Battery voltage** **((+) terminal: O/W – (–) terminal: Ground)**  I944H1110155-02 *Is the voltage OK?*	Go to Step 3.	Open circuit in the O/Bl wire or O/W wire.

Step	Action	Yes	No
3	1) Remove the right frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”. 2) Disconnect the cooling fan motor coupler (1).  I944H1160015-01 3) Apply 12 V to the terminals and check the operation of cooling fan motor. ((+) terminal: Bl – (–) terminal: B) I944H1110156-01 *Is the operation OK?*	Go to Step 4.	Replace the cooling fan motor with a new one. Refer to “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)”.

Step	Action	Yes	No
4	1) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”. 2) Insert the needle pointed probes to the lead wire coupler. 3) Check there is continuity between the G/R wire “A” and ECM terminal “39”. Also the B wire “B” and cooling fan motor B wire “C”. **Special tool** **TOOL (A): 09900–25008 (Multi circuit tester set)** **TOOL (B): 09900–25009 (Needle pointed probe set)** **Tester knob indication** **Continuity (•)))**  I944H1110185-01  I944H1110186-01 *Is there continuity?*	Replace the ECM with a new one. Refer to “ECM Removal and Installation in Section 1C (Page 1C-1)”.	Open circuit in the G/W wire or B wire.

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).

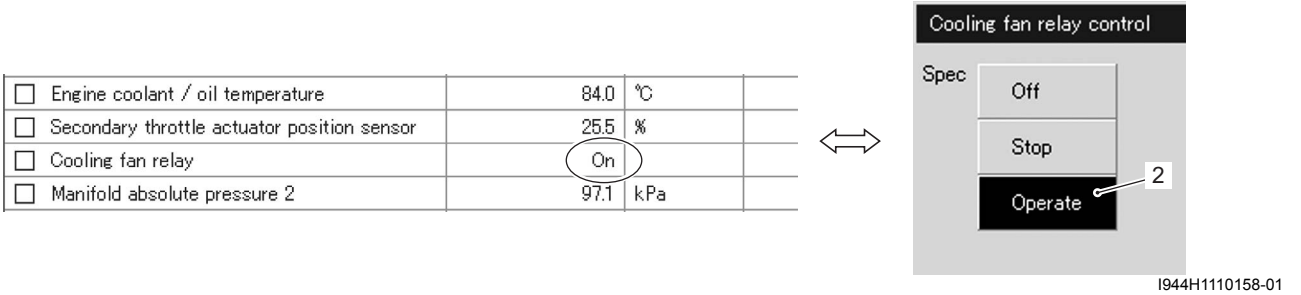


I944H1110157-02

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.

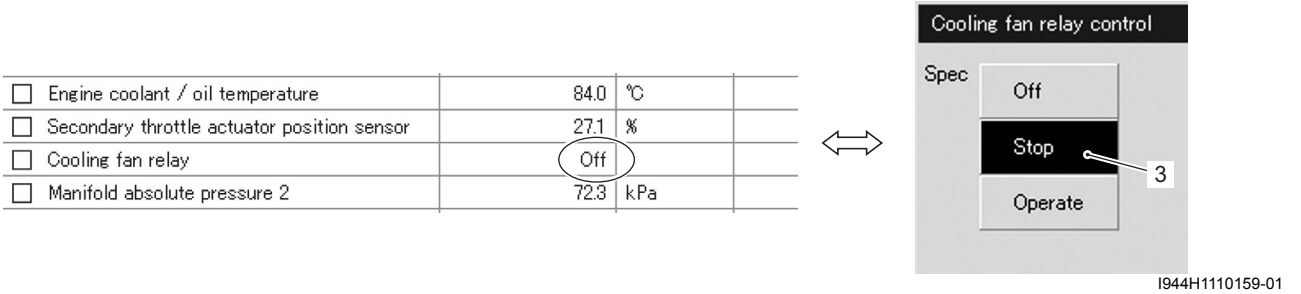
NOTE

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



I944H1110158-01

5) Click the “Stop” (3) to check the operation properly.



I944H1110159-01

Specifications

Service Data

B944H11107001

Injector

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

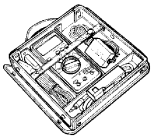
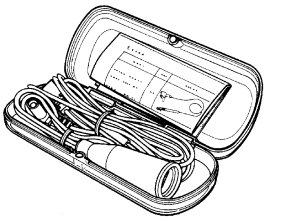
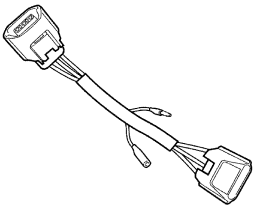
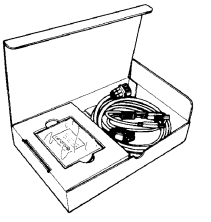
FI Sensors

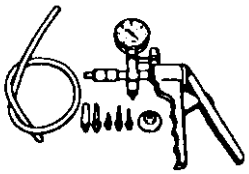
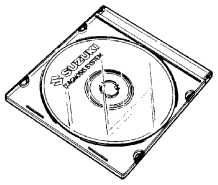
Item	Specification		Note
CKP sensor resistance	160 – 240 Ω		
CKP sensor peak voltage	4.6 V and more		When cranking
IAP sensor (#1) input voltage	4.5 – 5.5 V		
IAP sensor (#1) output voltage	Approx. 2.5 V at idle speed		
IAP sensor (#2) input voltage	4.5 – 5.5 V		
IAP sensor (#2) output voltage	Approx. 2.5 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.5 kΩ at 20 °C (68 °F)		
TO sensor resistance	16.5 – 22.3 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	150 V and more		When cranking
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 4.5 V	
STV actuator resistance	Approx. 7 Ω		
HO2 sensor heater resistance	Approx. 8 Ω at 23 °C (73 °F)		
HO2 sensor output voltage	Approx. 0.45 V and less at idle speed		
	0.6 V and more at 6 000 r/min.		

Special Tools and Equipment

Special Tool

B944H11108001

09900–25008 Multi circuit tester set ☞(Page 1A-28) / ☞(Page 1A-29) / ☞(Page 1A-100) / ☞(Page 1A-101) / ☞(Page 1A-102) / ☞(Page 1A-103) / ☞(Page 1A-106) / ☞(Page 1A-106) / ☞(Page 1A-108) / ☞(Page 1A-29) / ☞(Page 1A-31) / ☞(Page 1A-32) / ☞(Page 1A-33) / ☞(Page 1A-34) / ☞(Page 1A-35) / ☞(Page 1A-37) / ☞(Page 1A-38) / ☞(Page 1A-39) / ☞(Page 1A-39) / ☞(Page 1A-40) / ☞(Page 1A-41) / ☞(Page 1A-42) / ☞(Page 1A-42) / ☞(Page 1A-43) / ☞(Page 1A-44) / ☞(Page 1A-45) / ☞(Page 1A-45) / ☞(Page 1A-46) / ☞(Page 1A-48) / ☞(Page 1A-49) / ☞(Page 1A-50) / ☞(Page 1A-51) / ☞(Page 1A-52) / ☞(Page 1A-54) / ☞(Page 1A-55) / ☞(Page 1A-56) / ☞(Page 1A-57) / ☞(Page 1A-58) / ☞(Page 1A-60) / ☞(Page 1A-61) / ☞(Page 1A-61)  ☞(Page 1A-62) / ☞(Page 1A-63) / ☞(Page 1A-64) / ☞(Page 1A-65) / ☞(Page 1A-66) / ☞(Page 1A-68) / ☞(Page 1A-69) / ☞(Page 1A-70) / ☞(Page 1A-70) / ☞(Page 1A-74) / ☞(Page 1A-75) / ☞(Page 1A-76) / ☞(Page 1A-76) / ☞(Page 1A-77) / ☞(Page 1A-78) / ☞(Page 1A-79) / ☞(Page 1A-79) / ☞(Page 1A-80) / ☞(Page 1A-81) / ☞(Page 1A-82) / ☞(Page 1A-82) / ☞(Page 1A-83) / ☞(Page 1A-85) / ☞(Page 1A-86) / ☞(Page 1A-86) / ☞(Page 1A-87) / ☞(Page 1A-89) / ☞(Page 1A-90) / ☞(Page 1A-90) / ☞(Page 1A-94) / ☞(Page 1A-95) / ☞(Page 1A-96) / ☞(Page 1A-96) / ☞(Page 1A-98) / ☞(Page 1A-99)	09900–25009 Needle pointed probe set ☞(Page 1A-29) / ☞(Page 1A-100) / ☞(Page 1A-102) / ☞(Page 1A-103) / ☞(Page 1A-108) / ☞(Page 1A-32) / ☞(Page 1A-33) / ☞(Page 1A-34) / ☞(Page 1A-39) / ☞(Page 1A-42) / ☞(Page 1A-45) / ☞(Page 1A-62) / ☞(Page 1A-63) / ☞(Page 1A-66) / ☞(Page 1A-68) / ☞(Page 1A-76) / ☞(Page 1A-79) / ☞(Page 1A-82) / ☞(Page 1A-86) / ☞(Page 1A-94) 
09900–28630 TP Sensor test lead ☞(Page 1A-40) / ☞(Page 1A-43) / ☞(Page 1A-46) / ☞(Page 1A-77) / ☞(Page 1A-80) / ☞(Page 1A-83) 	09904–41010 SUZUKI Diagnostic system set ☞(Page 1A-14) / ☞(Page 1A-18) 

09917–47011 Vacuum pump gauge set ☞(Page 1A-35) 	09930–82720 Mode selection switch ☞(Page 1A-4) / ☞(Page 1A-13) / ☞(Page 1A-13)
99565–01010–019 CD-ROM Ver.19 ☞(Page 1A-14) / ☞(Page 1A-18) 	

Emission Control Devices

Precautions

Precautions for Emission Control Devices

B944H11200001

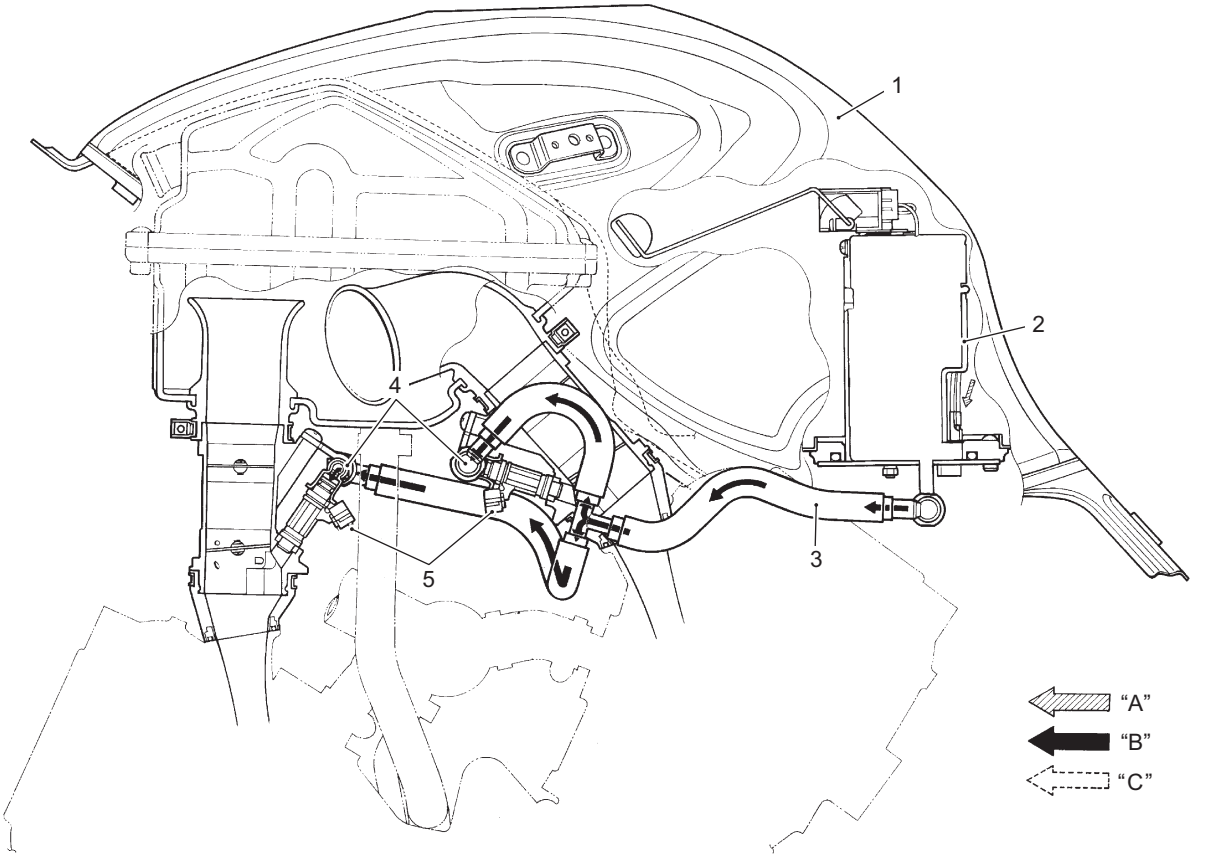
Refer to “General Precautions in Section 00 (Page 00-1)”.

General Description

Fuel Injection System Description

B944H11201001

SFV650 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.



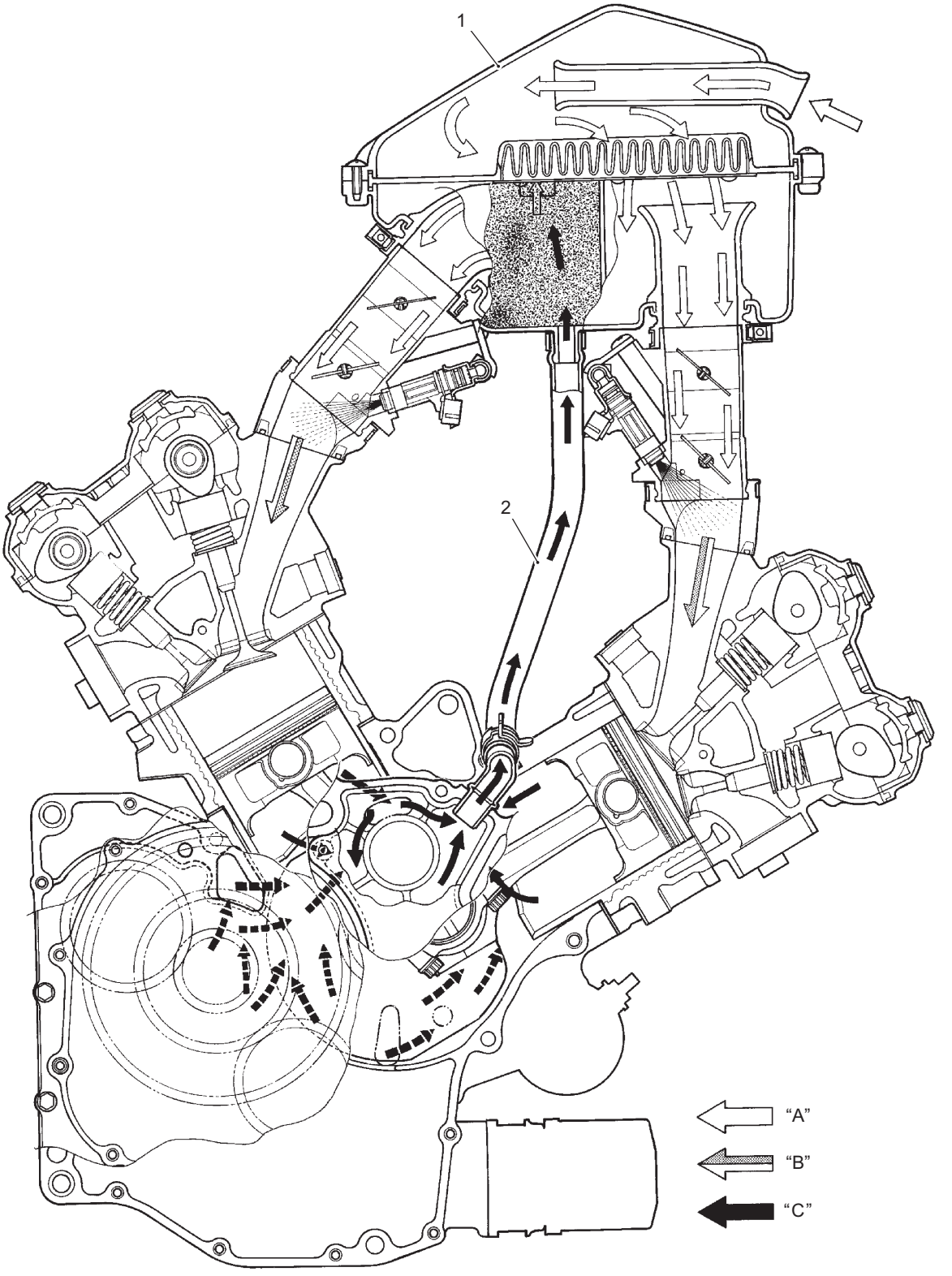
I944H1120015-05

1. Fuel tank	4. Fuel delivery pipe	“B”: Pressurized fuel
2. Fuel pump	5. Fuel injector	“C”: Relieved fuel
3. Fuel feed hose	“A”: Before-pressurized fuel	

Crankcase Emission Control System Description

B944H11201002

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.



I944H1120017-01

1. Air cleaner box	"A": Fresh air	"C": Blow-by gas
2. PCV (breather) hose	"B": Fuel/Air mixture	

Noise Emission Control System Description

B944H11201004

TAMPERING WITH THE NOISE CONTROL SYSTEM PROHIBITED: Local 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.

Repair Instructions

Heated Oxygen Sensor (HO2S) Removal and Installation

B944H11206001

Removal

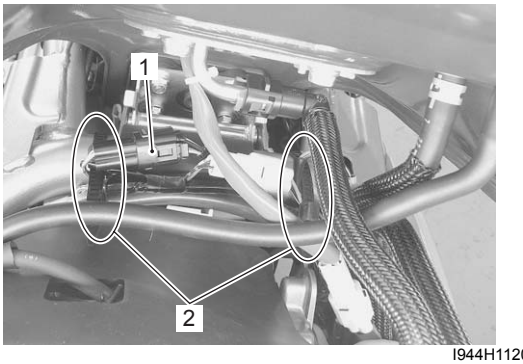
⚠ WARNING

Do not remove the HO2 sensor while it is hot.

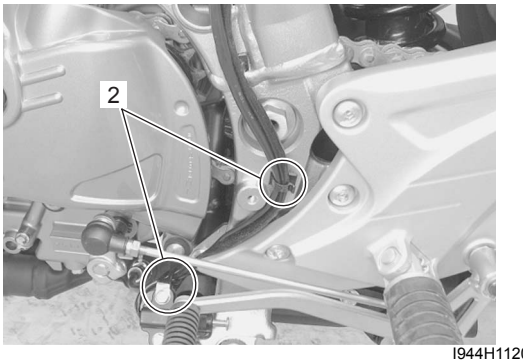
⚠ CAUTION

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

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Disconnect the HO2 sensor coupler (1) and clamps (2).

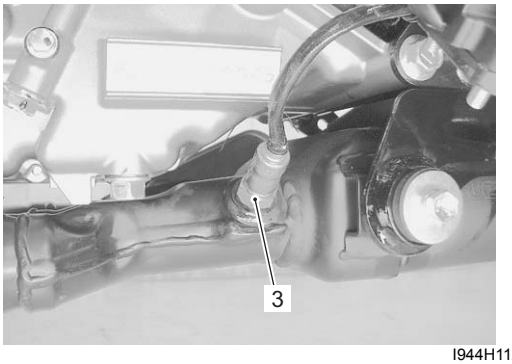


I944H1120002-03



I944H1120003-05

4) Remove the HO2 sensor (3).



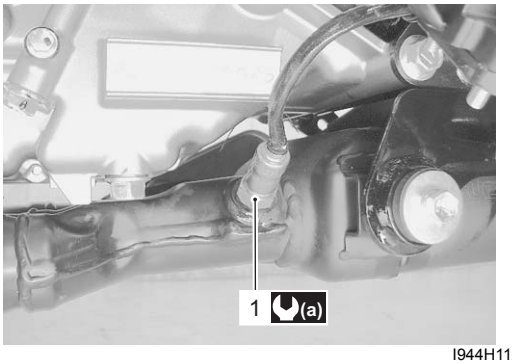
I944H1120004-02

Installation

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

- Apply anti seize compound (Never-seez purenickel special) to the HO2 sensor.
- 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)



I944H1120005-02

- Route the HO2 sensor lead wire properly. Refer to "Throttle Body Construction in Section 1D (Page 1D-8)" and "Wiring Harness Routing Diagram in Section 9A (Page 9A-5)".

Heated Oxygen Sensor (HO2S) Inspection

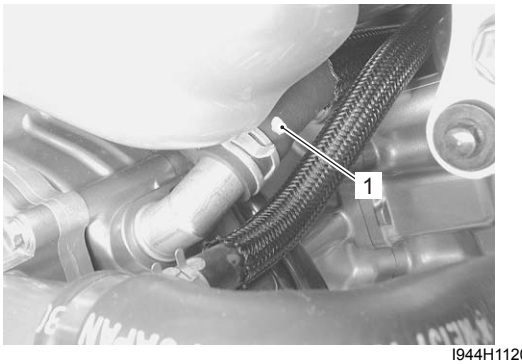
B944H11206002

Refer to "DTC "C44" (P0130 / P0135): HO2 Sensor (HO2S) Circuit Malfunction in Section 1A (Page 1A-97)".

Crankcase Breather (PCV) Hose Inspection

B944H11206006

Inspect the PCV hose (1) for wear and damage.
If it is worn or damaged, replace the PCV hose with a new one. Refer to "Crankcase Breather (PCV) Hose Removal and Installation (Page 1B-4)".



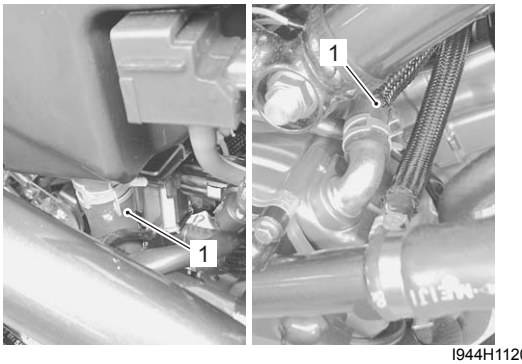
I944H1120006-02

Crankcase Breather (PCV) Hose Removal and Installation

B944H11206007

Removal

1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-7)".
2) Remove the right frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
3) Remove the crankcase breather (PCV) hose (1).



I944H1120007-01

Installation

1) Install the crankcase breather (PCV) hose as shown in the intake system construction. Refer to "Throttle Body Construction in Section 1D (Page 1D-8)".
2) Reinstall the removed parts.

Specifications

Service Data

B944H11207001

FI Sensors

Item	Specification	Note
HO2 sensor heater resistance	Approx. 8 Ω at 23 °C (73 F°)	
HO2 sensor output voltage	Approx. 0.45 V and less at idle speed	
	0.6 V and more at 6 000 r/min	

Tightening Torque Specifications

B944H11207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
HO2 sensor	25	2.5	18.0	☞(Page 1B-4)

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

Engine Electrical Devices

Precautions

Precautions for Engine Electrical Device

B944H11300001

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

Component Location

Engine Electrical Components Location

B944H11303001

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

Diagnostic Information and Procedures

Engine Symptom Diagnosis

B944H11304001

Refer to “Engine Symptom Diagnosis in Section 1A (Page 1A-9)”.

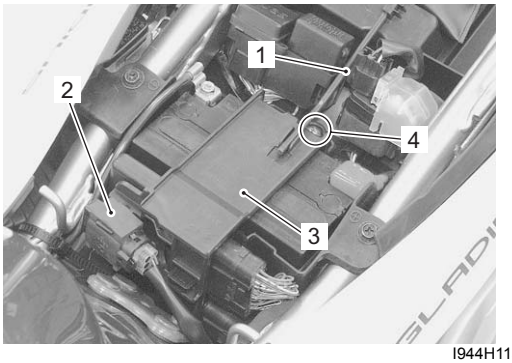
Repair Instructions

ECM Removal and Installation

B944H11306001

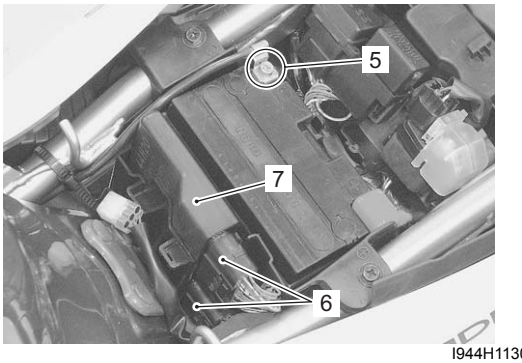
Removal

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Remove the prop stay (1).
3) Remove the TO sensor (2).
4) Remove the battery holder lid (3) by removing the screw (4).



I944H1130001-01

5) Remove the battery (–) lead wire (5).
6) Disconnect the ECM couplers (6) and remove the ECM (7).



I944H1130002-01

Installation

Install the ECM in the reverse order of removal.

CKP Sensor Inspection

B944H11306002

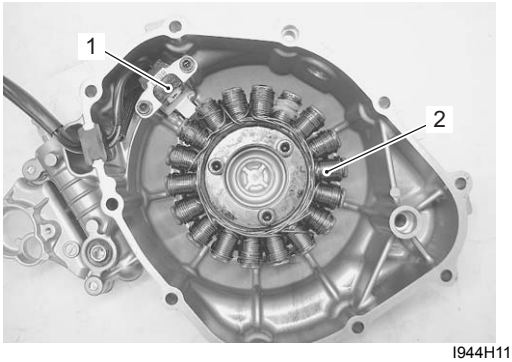
Refer to “CKP Sensor Inspection in Section 1H (Page 1H-8)”.

CKP Sensor Removal and Installation

B944H11306003

Removal

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



I944H1130003-02

Installation

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

IAP Sensor Inspection

B944H11306004

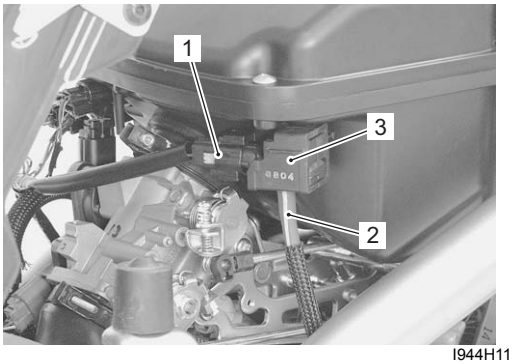
Refer to “DTC “C13” (P1750) or “C17” (P0105): IAP Sensor Circuit Malfunction in Section 1A (Page 1A-30)”.

IAP Sensor Removal and Installation

B944H11306005

Removal

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Disconnect the IAP sensor (#1 and #2) couplers (1) and vacuum hoses (2).
3) Remove the IAP sensor (3) (#1 and #2).



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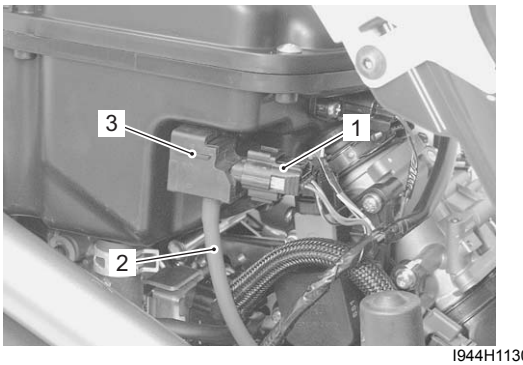


I944H1130005-01

Installation

Install the IAP sensors in the reverse order of removal.

TP Sensor Inspection

B944H11306006

Refer to “DTC “C14” (P0120-H/L): TP Sensor Circuit Malfunction in Section 1A (Page 1A-36)”.

TP Sensor Removal and Installation

B944H11306007

Refer to “Throttle Body Disassembly and Assembly in Section 1D (Page 1D-11)”.

TP Sensor Adjustment

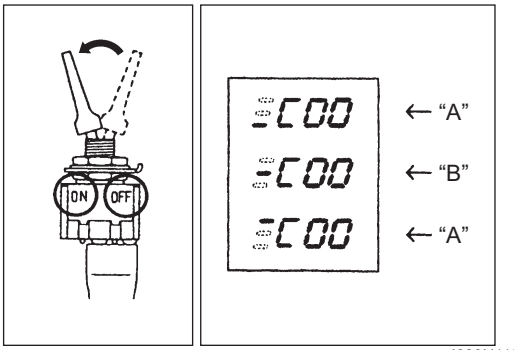
B944H11306025

Inspect the TP sensor setting position and adjust it if necessary in the following procedures:

1) Connect the special tool (Mode select switch) to the dealer mode coupler. Refer to “Self-Diagnostic Procedures in Section 1A (Page 1A-13)”.

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

2) Warn up the engine and keep it running in idling speed.
3) Turn the mode select switch ON.
4) Check the position of the bar in the left of C code displayed on the LCD panel.



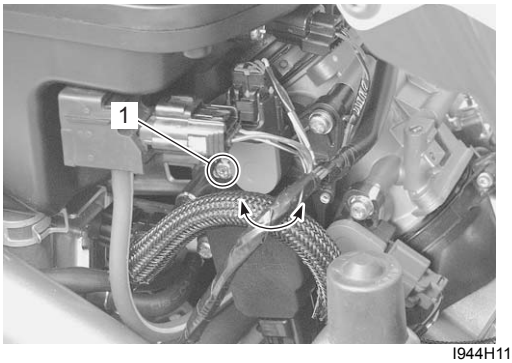
I823H1130022-01

“A”: Incorrect position	“B”: Correct position

5) If the TP sensor adjustment is necessary, lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.

6) Loosen the TP sensor mounting screw (1) using the special tool and turn the TP sensor to bring the bar to the correct position.

Special tool
TOOL : 09930–11950 (Torx wrench)



I944H1130006-01

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 install the removed parts.

IAT Sensor Removal and Installation

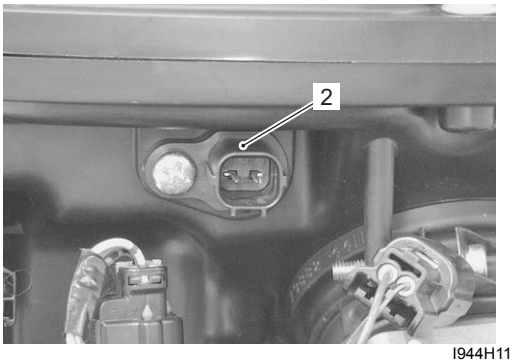
B944H11306024

Removal

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Disconnect the IAT sensor coupler (1).

I944H1130007-01

3) Remove the IAT sensor (2).



I944H1130008-01

Installation

Install the IAT sensor in the reverse order of removal.

IAT Sensor Inspection

B944H11306026

Refer to “DTC “C21” (P0110-H/L): IAT Sensor Circuit Malfunction in Section 1A (Page 1A-53)”.

NOTE

IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to “ECT Sensor Inspection (Page 1C-4)”.

⚠ CAUTION

- **The IAT sensor operative temperature range is –30 – 120 °C (–22 – 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. 2.56 kΩ
50 °C (122 °F)	Approx. 1.20 kΩ
80 °C (176 °F)	Approx. 0.61 kΩ
100 °C (212 °F)	Approx. 0.33 kΩ

ECT Sensor Removal and Installation

B944H11306008

Removal

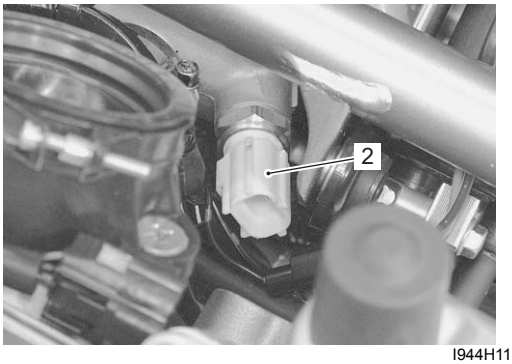
1) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
2) Remove the throttle body. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”.
3) Disconnect the ECT sensor lead wire coupler (1).

I944H1130009-01

4) Remove the ECT sensor (2).

⚠ CAUTION

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



I944H1130010-01

Installation

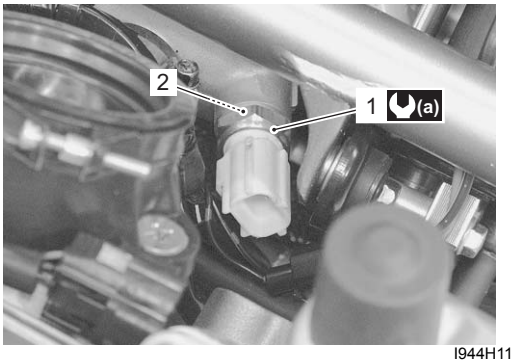
Install the ECT sensor in the reverse order of removal. Pay attention to the following points:

- Tighten the ECT sensor (1) to the specified torque.

⚠ CAUTION

Use the new gasket washer (2) to prevent engine coolant leakage.

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



I944H1130011-01

ECT Sensor Inspection

B944H11306009

Refer to "DTC "C15" (P0115-H/L): ECT Sensor Circuit Malfunction in Section 1A (Page 1A-47)".
Inspect the ECT sensor in the following procedures:

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

⚠ CAUTION

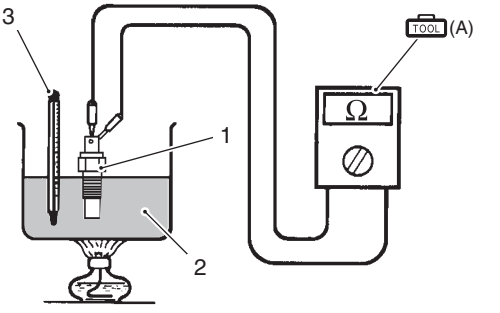
- **Take special care when handling the ECT sensor. It may cause damage if it gets an excessive sharp impact.**
- **Do not contact the ECT sensor and the column thermometer with a pan.**

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

Tester knob indication
Resistance (Ω)

Temperature sensor specification

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



I718H1130014-01

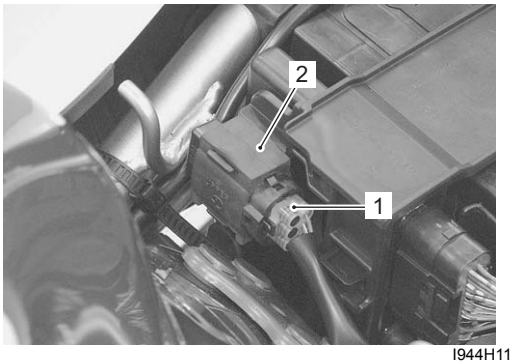
4) Install the ECT sensor. Refer to "ECT Sensor Removal and Installation (Page 1C-3)".

TO Sensor Removal and Installation

B944H11306010

Removal

1) Remove seat (1). Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the coupler (1) and remove the TO sensor (2).

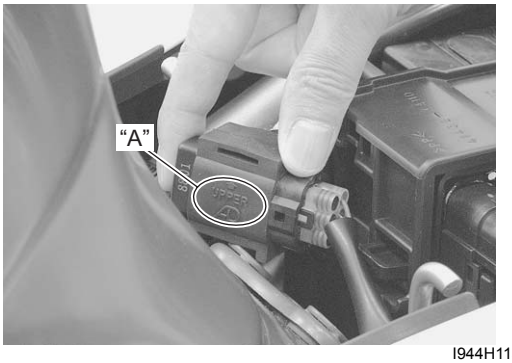


I944H1130012-01

Installation

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

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



I944H1130013-01

TO Sensor Inspection

B944H11306011

Refer to “DTC “C23” (P1651-H/L): TO Sensor Circuit Malfunction in Section 1A (Page 1A-59)”.

STP Sensor Inspection

B944H11306012

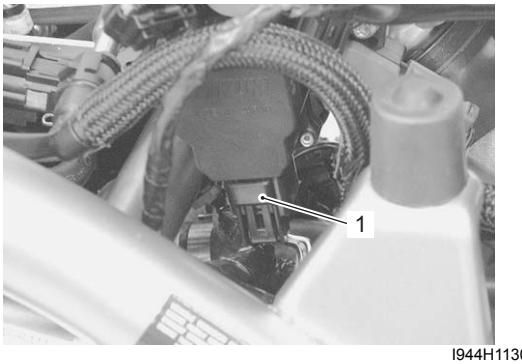
Refer to “DTC “C29” (P1654-H/L): Secondary Throttle Position Sensor (STPS) Circuit Malfunction in Section 1A (Page 1A-73)”.

STP Sensor Adjustment

B944H11306013

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-6)”.
2) Disconnect the STVA lead wire coupler (1).



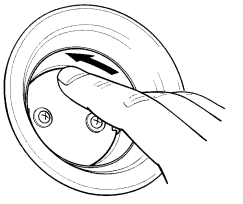
I944H1130014-01

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

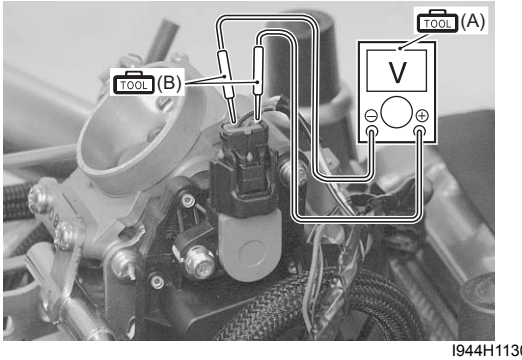
Special tool
TOOL (A): 09900–25008 (Multi-circuit tester set)
TOOL (B): 09900–25009 (Needle pointed probe set)

Tester knob indication
Voltage (⎓)

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



I718H1130017-01

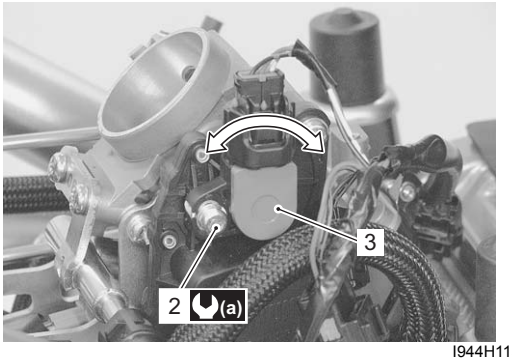


I944H1130015-01

6) Loosen the STP sensor mounting screw (2) adjust the STP sensor (3) until the output voltage comes within the specified value and tighten the STP sensor mounting screw.

Special tool
(TOOL) : 09930–11950 (Torx wrench)

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



I944H1130016-01

7) Reinstall the removed parts.

STP Sensor Removal and Installation

B944H11306014

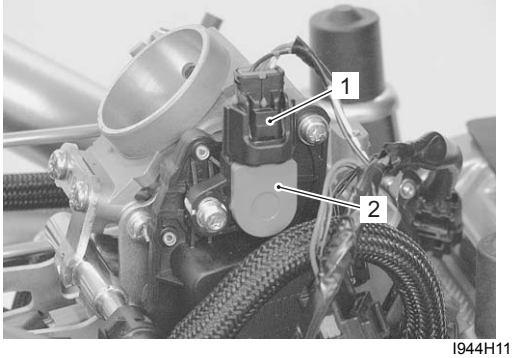
Removal

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-6)”.
3) Disconnect the coupler (1) and remove the STP sensor (2) with the special tool.

NOTE

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

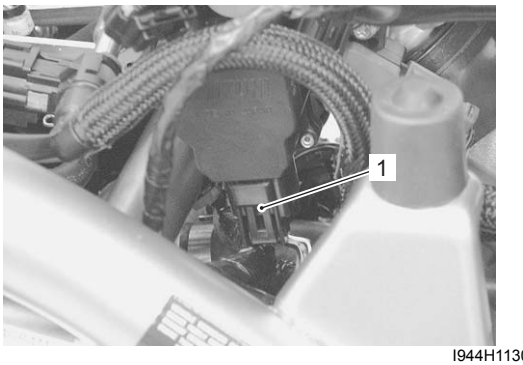
Special tool
(TOOL) : 09930–11950 (Torx wrench)



I944H1130017-01

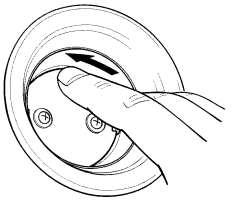
Installation

1) Disconnect the STVA lead wire coupler (1).



I944H1130018-01

2) Close the secondary throttle valve by finger.



I718H1130017-01

3) With the STV fully closed, install the STP sensor (2) and tighten the STP sensor mounting screw to the specified torque.

⚠ CAUTION

Replace the O-ring (3) with a new one.

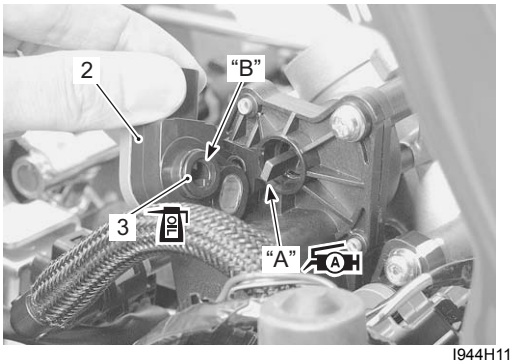
NOTE

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

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

Special tool
(TOOL) : 09930–11950 (Torx wrench)

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



I944H1130020-01

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

STV Actuator Inspection

B944H11306015

Refer to "DTC "C28" (P1655): Secondary Throttle Valve Actuator (STVA) Malfunction in Section 1A (Page 1A-67)".

STV Actuator Removal and Installation

B944H11306016

Refer to "Throttle Body Disassembly and Assembly in Section 1D (Page 1D-11)".

⚠ CAUTION

- **Never remove the STVA from the throttle body.**
- **The STVA and throttle body are available only as an assembly.**

ISC Valve Inspection

B944H11306017

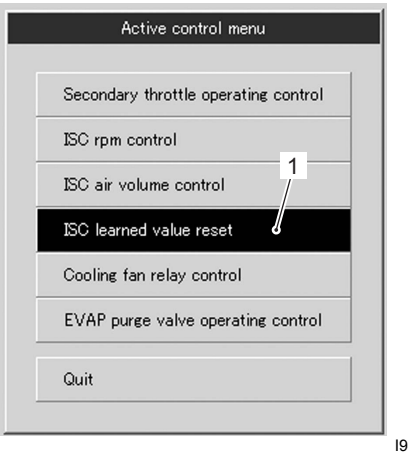
Refer to "DTC "C40" (P0505 / P0506 / P0507): ISC Valve Circuit Malfunction in Section 1A (Page 1A-91)".

ISC Learned Value Reset and Opening Initialization

B944H11306019

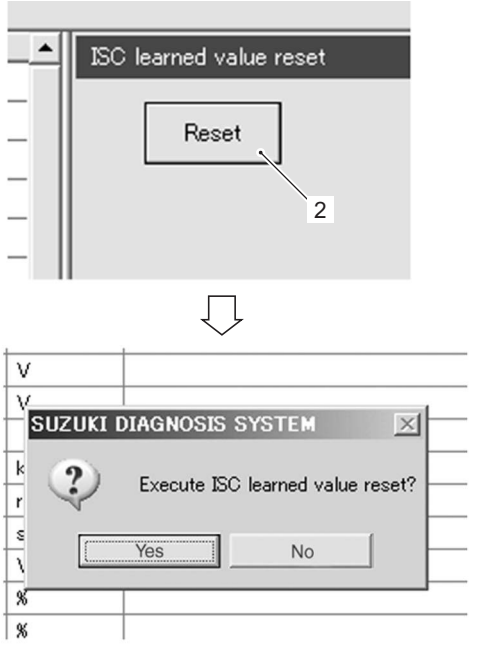
When removing or replacing the throttle body assembly, set the ISC valve to the following procedures:

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



I944H1130021-01

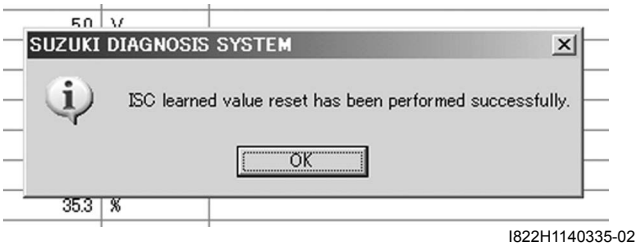
5) Click the "Reset" button to clear the ISC leaned valve.



I944H1130022-01

NOTE

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



I822H1140335-02

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

B944H11306020

Refer to "DTC "C44" (P0130 / P0135): HO2 Sensor (HO2S) Circuit Malfunction in Section 1A (Page 1A-97)".

HO2 Sensor Removal and Installation

B944H11306021

Refer to "Heated Oxygen Sensor (HO2S) Removal and Installation in Section 1B (Page 1B-3)".

GP Switch Inspection

B944H11306022

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

GP Switch Removal and Installation

B944H11306023

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

Specifications

Service Data

B944H11307001

FI Sensors

Item	Standard/Specification		Note
CKP sensor resistance	160 – 240 Ω		
CKP sensor peak voltage	4.6 V and more		When cranking
IAP sensor (#1 & #2) input voltage	4.5 – 5.5 V		
IAP sensor (#1 & #2) output voltage	Approx. 2.5 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor output voltage	Closed	Approx. 1.1 V	
	Opened	Approx. 4.3 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 2.5 kΩ at 20 °C (68 °F)		
TO sensor resistance	16.5 – 22.3 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.6 V and more		From 1st to Top
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	150 V and more		When cranking
STP sensor input voltage	4.5 – 5.5 V		
STP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 4.5 V	
STV actuator resistance	Approx. 7 Ω		
HO2 sensor heater resistance	Approx. 8 Ω at 23 °C (73 °F)		
HO2 sensor output voltage	Approx. 0.45 V and less at idle speed		
	0.6 V and more at 6 000 r/min.		
EVAP system purge control solenoid valve resistance	Approx. 32 Ω at 20 °C (68 °F)		

Tightening Torque Specifications

B944H11307002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
TP sensor mounting screw	3.5	0.35	2.5	☞(Page 1C-3)
ECT sensor	18	1.8	13.0	☞(Page 1C-4)
STP sensor mounting screw	3.5	0.35	2.5	☞(Page 1C-6) / ☞(Page 1C-6)

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

Special Tools and Equipment

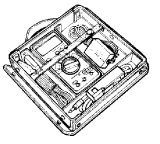
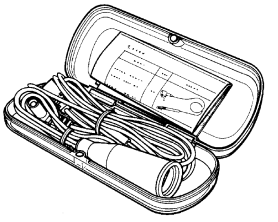
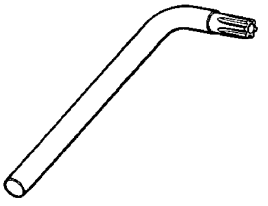
Recommended Service Material

B944H11308001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1C-6)

Special Tool

B944H11308002

09900–25008 Multi circuit tester set ☞(Page 1C-4) / ☞(Page 1C-5)	
09900–25009 Needle pointed probe set ☞(Page 1C-5)	
09930–11950 Torx wrench (5 mm) ☞(Page 1C-3) / ☞(Page 1C-6) / ☞(Page 1C-6) / ☞(Page 1C-6)	
09930–82720 Mode selection switch ☞(Page 1C-2)	

Engine Mechanical

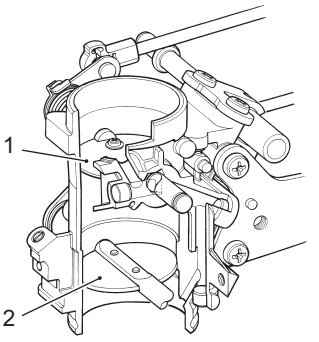
General Description

ISC Valve System Description

B944H11401001

SFV650 motorcycles are equipped with a ISC valve system of secondary throttle valve interlinked. In the throttle body is provided a bypass through which air volume is varied when the cutaway on the secondary throttle shaft is moved, causing the engine idle speed to be adjusted.

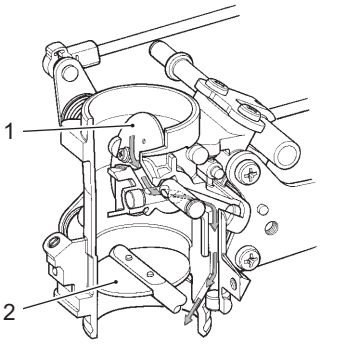
ISC Valve is Closed Position



I944H1140337-02

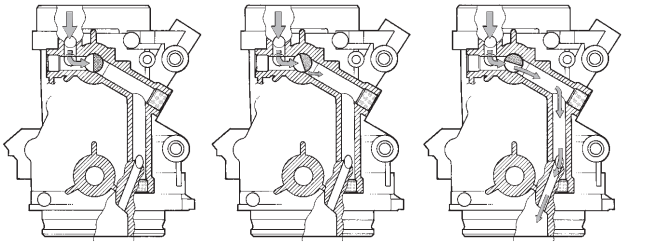
1. Secondary throttle valve	2. Throttle valve

ISC Valve is Opened Position



I944H1140338-02

1. Secondary throttle valve	2. Throttle valve



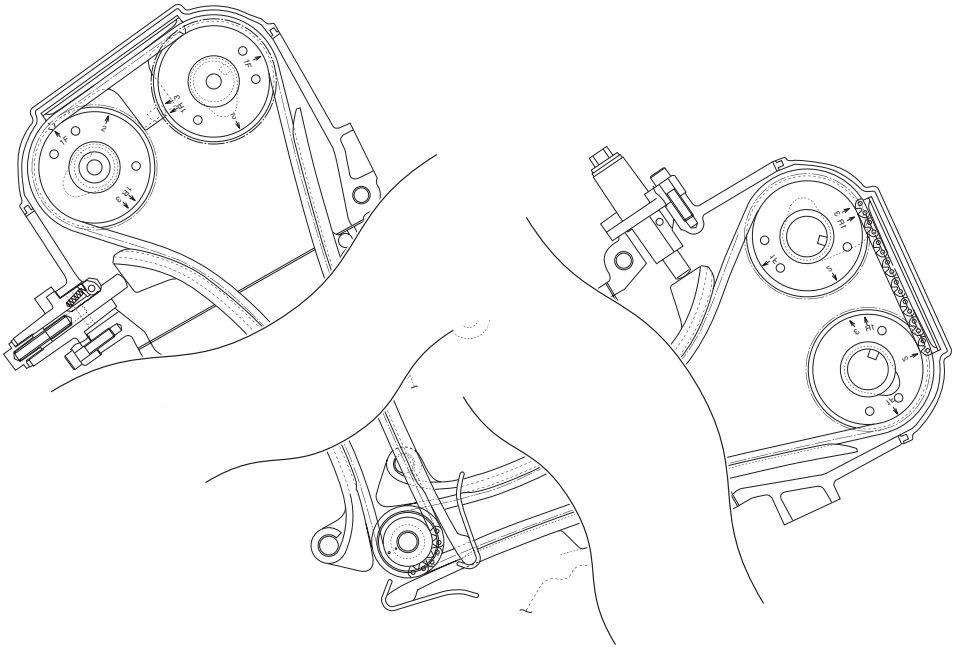
Fully closed Opening at 20% Opening at 80% and more

I944H1140340-02

Schematic and Routing Diagram

Camshaft and Sprocket Assembly Diagram

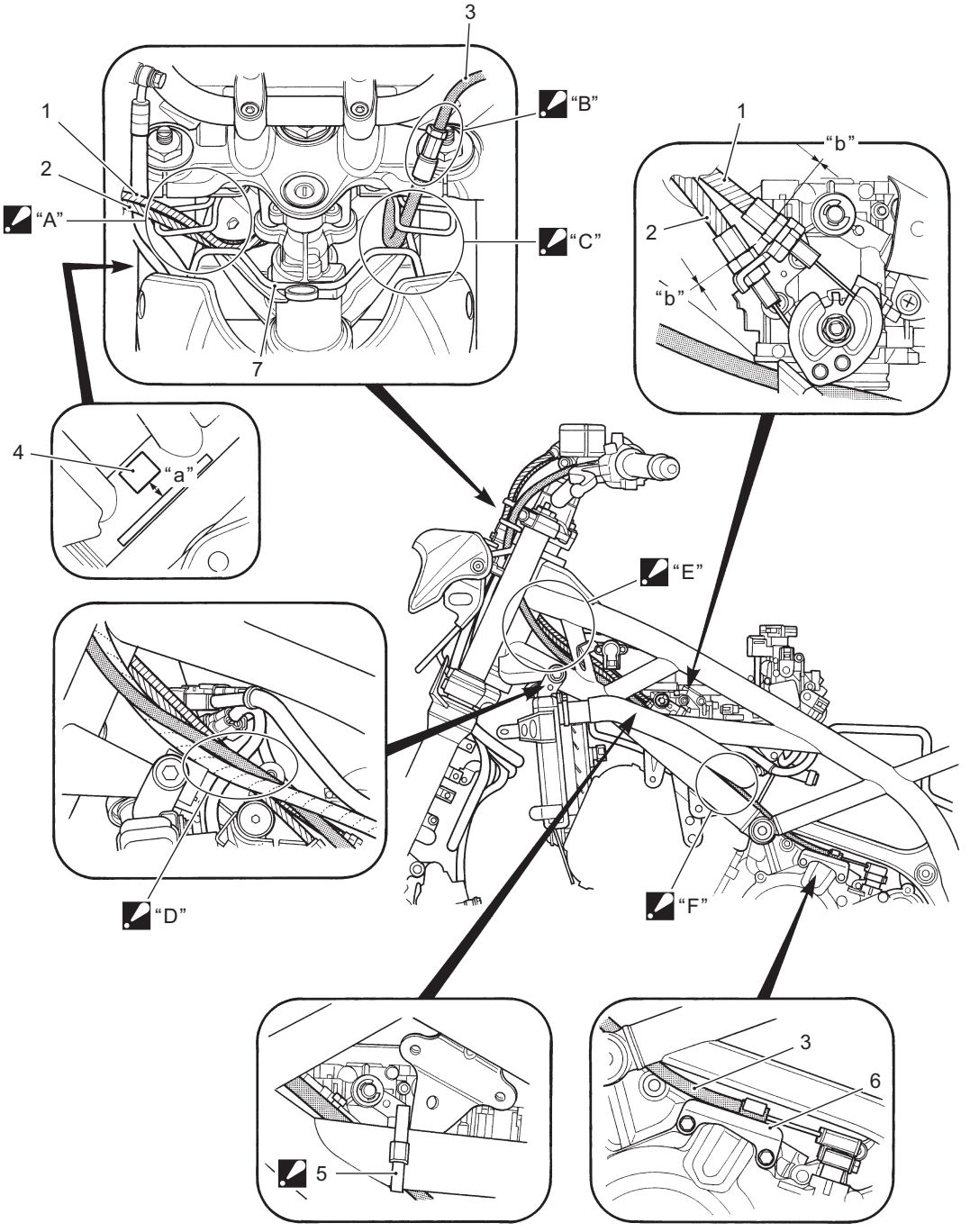
B944H11402001



I944H1140350-01

Throttle Cable Routing Diagram

B944H11402002



I944H1140330-02

1. Throttle cable No. 1	"B": The adjustment of clutch cable play should be made on the adjuster on which the clutch cable cap is installed with 3-5 mm of threads left on the clutch lever adjuster.
2. Throttle cable No. 2	"C": Pass the clutch cable inside of the clutch cable guide and behind the headlight housing brace.
3. Clutch cable	"D": Pass the clutch cable over the wiring harness.
4. Frame head pipe tape	"E": Pass the clutch cable left side of frame head pipe. Pass the throttle cables right side of frame head pipe.
5. Clamp : Bind the clutch cable to frame bridge with the clamp. Set the locked part facing outside.	"F": Pass the clutch cable under the radiator inlet hose.
6. Clutch cable stopper	"a": 15 – 20 mm (0.6 – 0.8 in)
7. Headlight housing brace	"b": 0 – 1 mm (0 – 0.04 in)
"A": Pass the throttle cables inside of the throttle cable guide and behind the headlight housing brace.	

Diagnostic Information and Procedures

Engine Mechanical Symptom Diagnosis

B944H11404002

Refer to “Engine Symptom Diagnosis in Section 1A (Page 1A-9)”.

Compression Pressure Check

B944H11404001

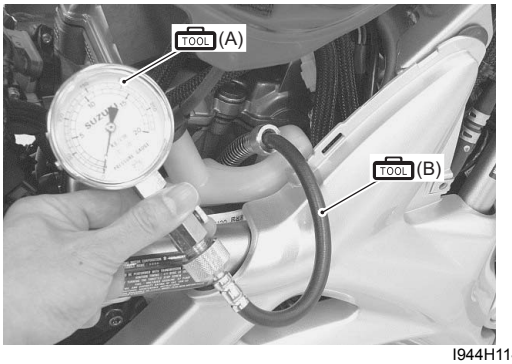
The compression pressure reading of a cylinder is a good indicator of its internal condition.
The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance service.

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.**

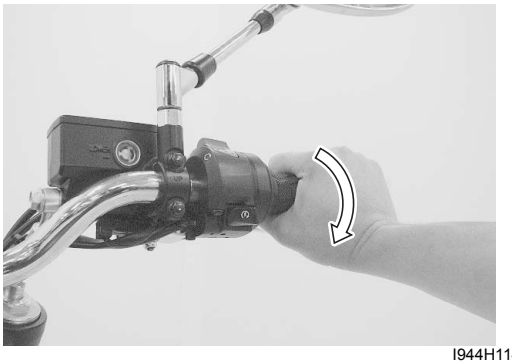
1) Warm up the engine.
2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
3) Remove the outside spark plugs (Front side and Rear side). Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-5)”.
4) Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.

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



I944H1140252-01

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



I944H1140253-01

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

Compression pressure specification

Standard	Limit	Difference
1 300 – 1 700 kPa (13.0 – 17.0 kgf/cm², 185 – 242 psi)	1 100 kPa (11.0 kgf/cm², 156 psi)	200 kPa (2.0 kgf/cm², 28 psi)

Low compression pressure can indicate any of the following conditions:

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

Overhaul the engine in the following cases:

- Compression pressure in one of the cylinders is 1 100 kPa (11.0 kgf/cm², 156 psi) and less.
- The difference in compression pressure between any two cylinders is 200 kPa (2.0 kgf/cm², 28 psi) and more.
- All compression pressure readings are below 1 300 kPa (13.0 kgf/cm², 185 psi) even when they measure 1 100 kPa (11.0 kgf/cm², 156 psi) and more.

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

Repair Instructions

Engine Components Removable with the Engine in Place

B944H11406001

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

Center of Engine

Item	Removal	Inspection	Installation
Air cleaner element	Refer to “Air Cleaner Element Removal and Installation (Page 1D-6)”.	Refer to “Air Cleaner Element Inspection and Cleaning in Section 0B (Page 0B-3)”.	Refer to “Air Cleaner Element Removal and Installation (Page 1D-6)”.
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 strainer/Oil pressure regulator	Refer to “Oil Strainer / Oil Pressure Regulator Removal and Installation in Section 1E (Page 1E-6)”.	Refer to “Oil Pressure Regulator Inspection in Section 1E (Page 1E-7)”.	Refer to “Oil Strainer / Oil Pressure Regulator Removal and Installation in Section 1E (Page 1E-6)”.
Throttle body	Refer to “Throttle Body Removal and Installation (Page 1D-10)”.	Refer to “Throttle Body Inspection and Cleaning (Page 1D-15)”.	Refer to “Throttle Body Removal and Installation (Page 1D-10)”.
Cam chain tension adjuster	Refer to “Engine Top Side Disassembly (Page 1D-25)”.	Refer to “Cam Chain Tension Adjuster Inspection (Page 1D-45)”.	Refer to “Engine Top Side Assembly (Page 1D-31)”.
Cylinder head cover	Refer to “Engine Top Side Disassembly (Page 1D-25)”.	—	Refer to “Engine Top Side Assembly (Page 1D-31)”.
Camshafts	Refer to “Engine Top Side Disassembly (Page 1D-25)”.	Refer to “Camshaft Inspection (Page 1D-44)”.	Refer to “Engine Top Side Assembly (Page 1D-31)”.
Cylinder head	Refer to “Engine Top Side Disassembly (Page 1D-25)”.	Refer to “Cylinder Head Related Parts Inspection (Page 1D-49)”.	Refer to “Engine Top Side Assembly (Page 1D-31)”.
Cylinder	Refer to “Engine Top Side Disassembly (Page 1D-25)”.	Refer to “Cylinder Inspection (Page 1D-54)”.	Refer to “Engine Top Side Assembly (Page 1D-31)”.
Pistons	Refer to “Engine Top Side Disassembly (Page 1D-25)”.	Refer to “Piston and Piston Ring Inspection (Page 1D-56)”.	Refer to “Engine Top Side Assembly (Page 1D-31)”.
Starter motor	Refer to “Starter Motor Removal and Installation in Section 1I (Page 1I-4)”.	Refer to “Starter Motor Related Parts Inspection in Section 1I (Page 1I-6)”.	Refer to “Starter Motor Removal and Installation in Section 1I (Page 1I-4)”.
Oil pressure switch	Refer to “Oil Pressure Switch Removal and Installation in Section 1E (Page 1E-8)”.	Refer to “Oil Pressure Indicator Inspection in Section 9C (Page 9C-6)”.	Refer to “Oil Pressure Switch Removal and Installation in Section 1E (Page 1E-8)”.

Engine Right Side

Item	Removal	Inspection	Installation
Exhaust pipe/Muffler	Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.	Refer to “Exhaust System Construction in Section 1K (Page 1K-2)”.	Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.
Clutch cover	Refer to “Clutch Installation in Section 5C (Page 5C-9)”.	—	Refer to “Clutch Installation in Section 5C (Page 5C-9)”.
Clutch plates	Refer to “Clutch Removal in Section 5C (Page 5C-7)”.	Refer to “Clutch Parts Inspection in Section 5C (Page 5C-13)”.	Refer to “Clutch Removal in Section 5C (Page 5C-7)”.
Clutch sleeve hub	Refer to “Clutch Removal in Section 5C (Page 5C-7)”.	Refer to “Clutch Parts Inspection in Section 5C (Page 5C-13)”.	Refer to “Clutch Installation in Section 5C (Page 5C-9)”.
Primary driven gear	Refer to “Clutch Removal in Section 5C (Page 5C-7)”.	Refer to “Clutch Parts Inspection in Section 5C (Page 5C-13)”.	Refer to “Clutch Installation in Section 5C (Page 5C-9)”.
Oil pump drive gear	Refer to “Oil Pump Removal and Installation in Section 1E (Page 1E-12)”.	—	Refer to “Oil Pump Removal and Installation in Section 1E (Page 1E-12)”.
Oil pump	Refer to “Oil Pump Removal and Installation in Section 1E (Page 1E-12)”.	Refer to “Oil Pump Inspection in Section 1E (Page 1E-13)”.	Refer to “Oil Pump Removal and Installation in Section 1E (Page 1E-12)”.
Water pump	Refer to “Water Pump Removal and Installation in Section 1F (Page 1F-12)”.	Refer to “Water Pump Related Parts Inspection in Section 1F (Page 1F-16)”.	Refer to “Water Pump Removal and Installation in Section 1F (Page 1F-12)”.
Gearshift shaft	Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation in Section 5B (Page 5B-14)”.	Refer to “Gearshift Linkage Inspection in Section 5B (Page 5B-17)”.	Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation in Section 5B (Page 5B-14)”.

Engine Left Side

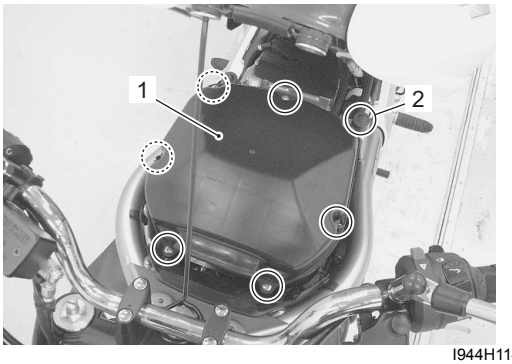
Item	Removal	Inspection	Installation
Generator	Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.	Refer to “Generator Inspection in Section 1J (Page 1J-4)”.	Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.
Engine sprocket	Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.	Refer to “Drive Chain Related Parts Inspection in Section 3A (Page 3A-5)”.	Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
Driven chain	Refer to “Drive Chain Replacement in Section 3A (Page 3A-7)”.	Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.	Refer to “Drive Chain Replacement in Section 3A (Page 3A-7)”.
Starter idle gear	Refer to “Starter Clutch Inspection in Section 1I (Page 1I-12)”.	—	Refer to “Starter Clutch Inspection in Section 1I (Page 1I-12)”.
Starter clutch	Refer to “Starter Clutch Removal and Installation in Section 1I (Page 1I-10)”.	Refer to “Starter Clutch Inspection in Section 1I (Page 1I-12)”.	Refer to “Starter Clutch Removal and Installation in Section 1I (Page 1I-10)”.
CKP sensor	Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.	Refer to “CKP Sensor Inspection in Section 1H (Page 1H-8)”.	Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.
Gear position switch	Refer to “Gear Position Switch Removal and Installation in Section 5B (Page 5B-12)”.	Refer to “Gear Position Switch Inspection in Section 5B (Page 5B-12)”.	Refer to “Gear Position Switch Removal and Installation in Section 5B (Page 5B-12)”.

Air Cleaner Element Removal and Installation

B944H11406034

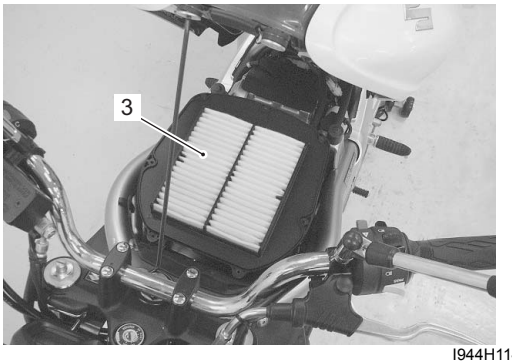
Removal

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Remove the air cleaner box cap (1) by removing its screws (2).



I944H1140254-02

3) Remove the air cleaner element (3).



I944H1140255-02

Installation

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

Air Cleaner Element Inspection and Cleaning

B944H11406035

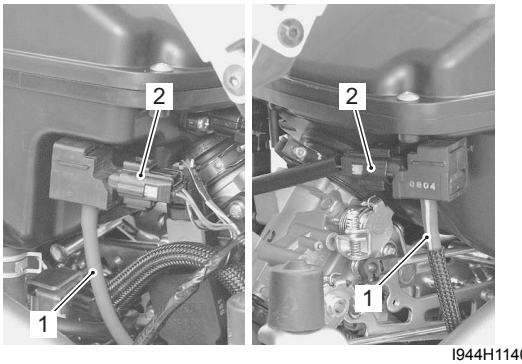
Refer to “Air Cleaner Element Inspection and Cleaning in Section 0B (Page 0B-3)”.

Air Cleaner Box Removal and Installation

B944H11406036

Removal

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Disconnect the IAP sensor vacuum hoses (1) and IAP sensor couplers (2).

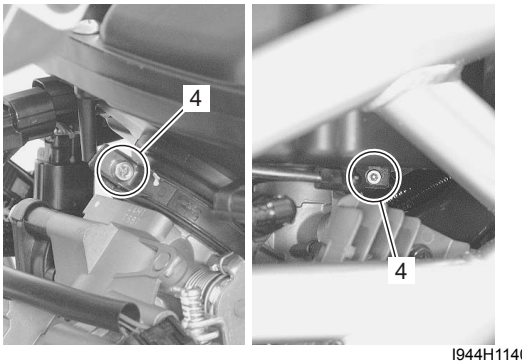


I944H1140256-01

3) Disconnect the IAP sensor coupler (3).

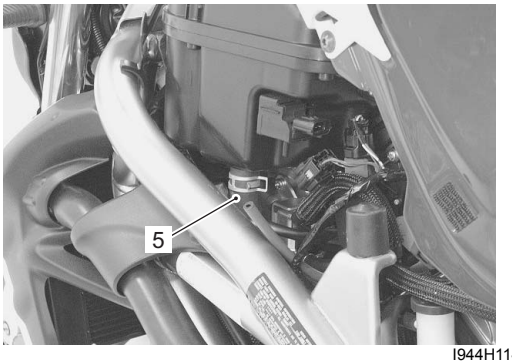
I944H1140257-01

4) Loosen the air cleaner outlet tube clamp screws (4).



I944H1140258-01

5) Disconnect the crankcase breather hose (5).



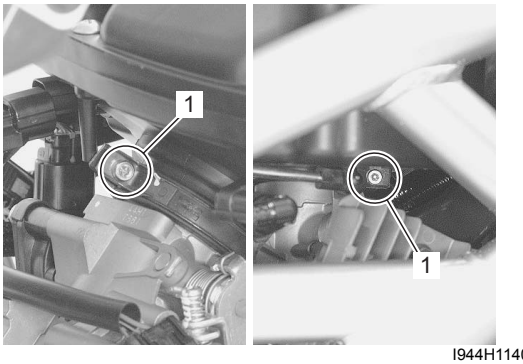
I944H1140259-01

6) Remove the air cleaner box.

Installation

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

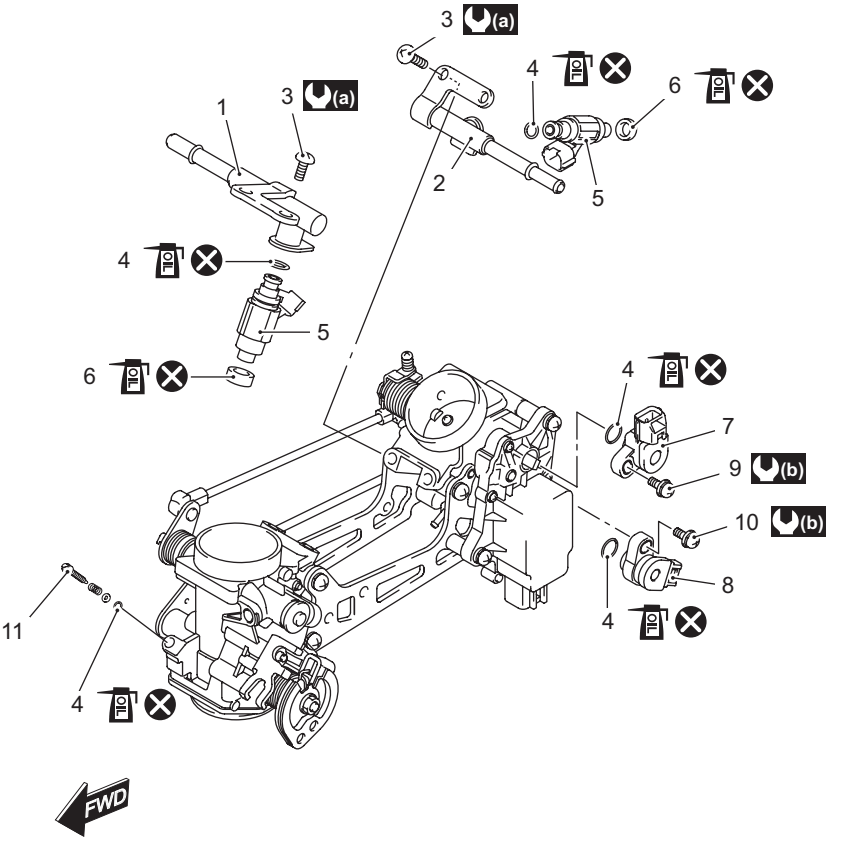
- Fit the air cleaner outlet tube clamps properly. Refer to “Throttle Body Construction (Page 1D-8)”.
- Route the hoses properly. Refer to “Throttle Body Construction (Page 1D-8)”.
- Tighten the air cleaner outlet tube clamp screws (1).



I944H1140260-01

Throttle Body Components

B944H11406040

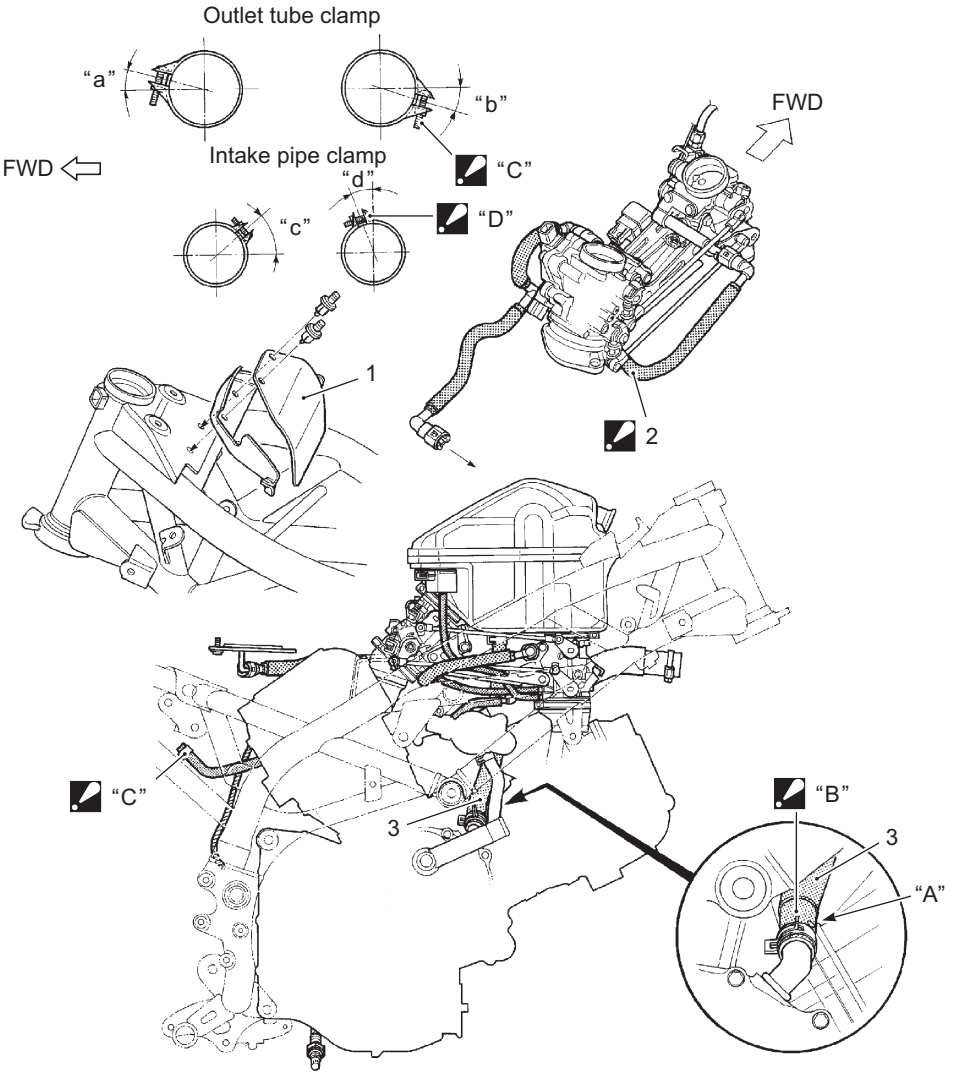


I944H1140341-04

1. Fuel delivery pipe #1	5. Fuel injector	9. STP sensor mounting screw	(b) : 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)
2. Fuel delivery pipe #2	6. Cushion seal	10. TP sensor mounting screw	: Apply engine oil.
3. Fuel delivery pipe mounting screw	7. STP sensor	11. Air screw	: Do not reuse.
4. O-ring	8. TP sensor	(a) : 5 N·m (0.5 kgf-m, 3.5 lbf-ft)	

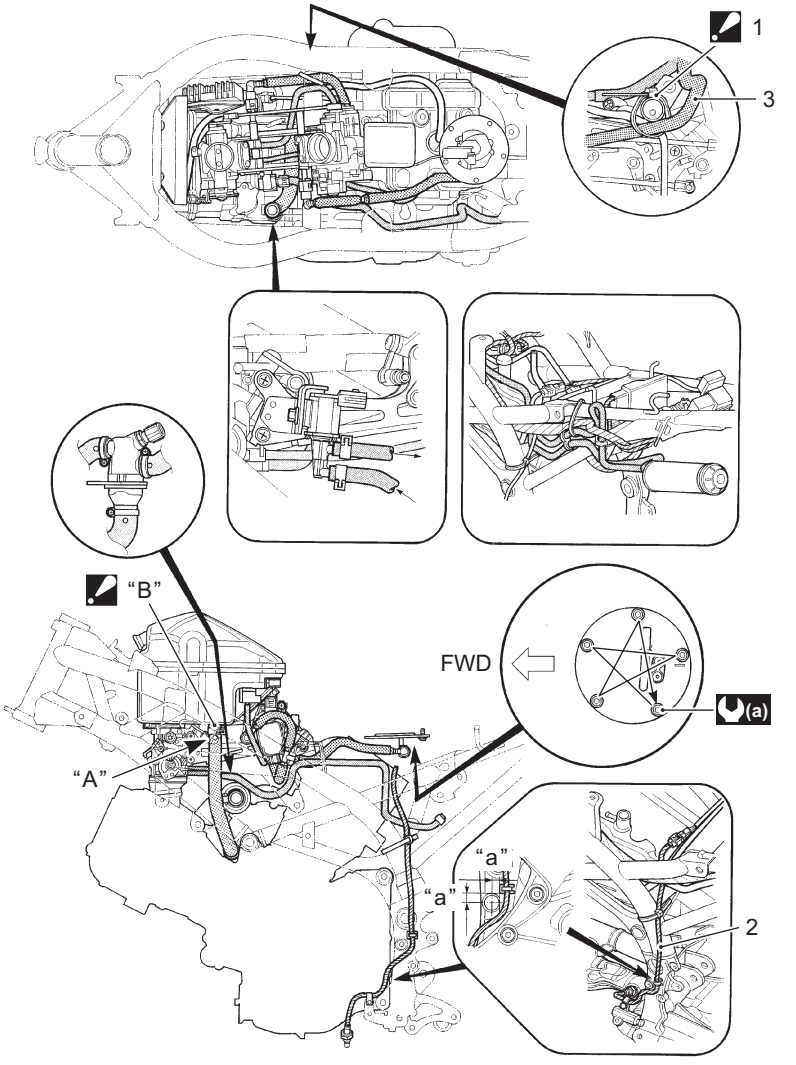
Throttle Body Construction

B944H11406041



I944H1140342-02

1. Clean inlet sheet	"B": Face the tip of the front side clamp to upper.	"b": 15 – 25°
2. Fuel hose : Pass the fuel hose under the throttle body.	"C": Face the tip of the clamp to inside.	"c": 35 – 45°
3. Breather hose	"D": Make sure that the intake pipe clamp is not contacted to the throttle body.	"d": 0 – 10°
"A": White mark	"a": 15°	



I944H1140343-03

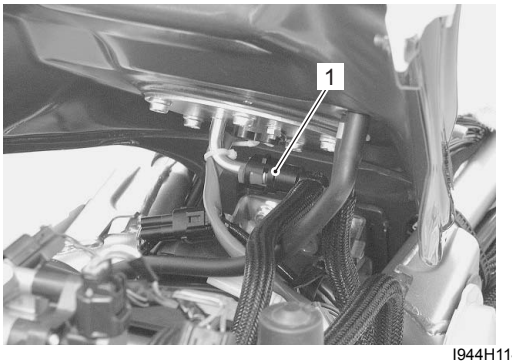
1. Clamp : The end of clamp should face forward.	"A": Yellow mark	(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
2. HO2 sensor lead wire	"B": The end clamp should face backward.	
3. Fuel feed hose	"a": 10 – 15 mm (0.4 – 0.6 in)	

Throttle Body Removal and Installation

B944H11406042

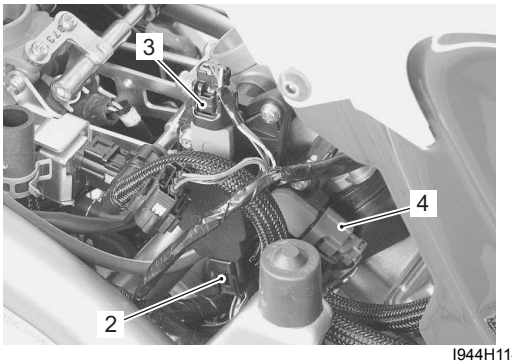
Removal

1) Disconnect the battery (–) lead wire. Refer to “Battery Removal and Installation in Section 1J (Page 1J-12)”.
2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
3) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation (Page 1D-6)”.
4) Place a clean rag under the fuel feed hose (1) and disconnect the fuel feed hose from the fuel pump.



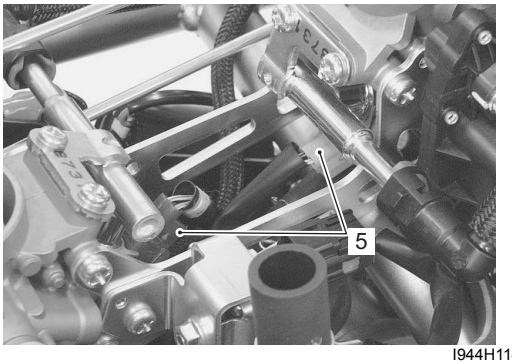
I944H1140261-01

5) Disconnect the STVA lead wire coupler (2), STP sensor lead wire coupler (3) and TP sensor lead wire coupler (4).



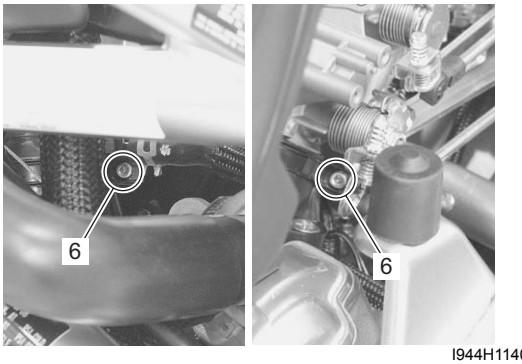
I944H1140262-01

6) Disconnect the fuel injector couplers (5).



I944H1140329-02

7) Loosen the throttle body clamp screws (6).

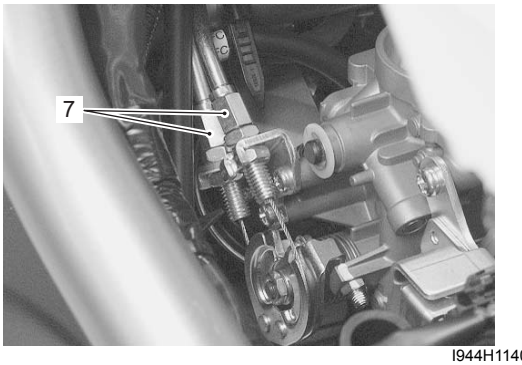


I944H1140263-03

8) Disconnect the throttle cables (7) from the throttle body and move the throttle body assembly upward.

⚠ CAUTION

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



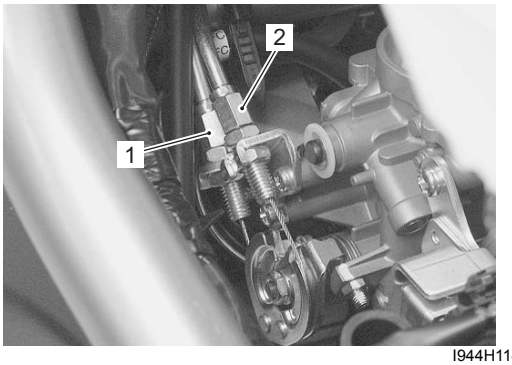
I944H1140264-02

9) Remove the throttle body assembly.

Installation

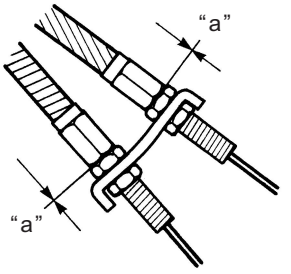
Install the throttle body in the reverse order of removal. Pay attention to the following points:

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



I944H1140266-01

- Tighten the throttle body clamp screws. Refer to “Throttle Body Construction (Page 1D-8)”.
- Loosen each throttle cable lock-nut.
- Turn in each throttle cable adjuster fully and locate each outer cable so that the clearance “a” is 1 mm (0.04 in).



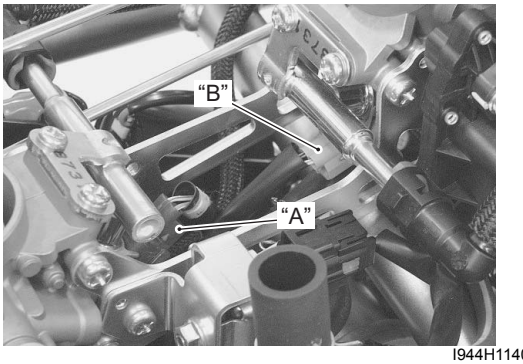
I822H1140016-01

“a”: 1 mm (0.04 in)

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

NOTE

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



I944H1140267-01

	Coupler color
Front [A]	Brown
Rear [B]	Gray

Throttle Body Disassembly and Assembly

B944H11406043

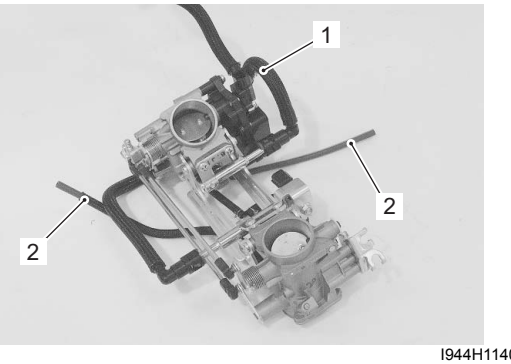
Refer to “Throttle Body Removal and Installation (Page 1D-10)”.

Disassembly

⚠ CAUTION

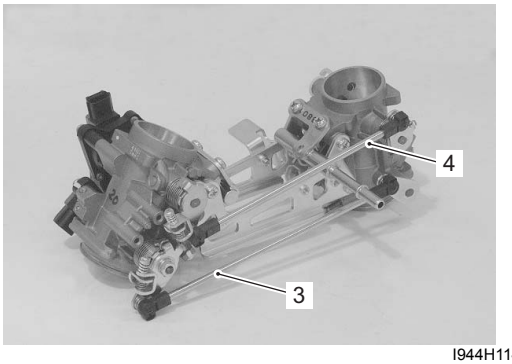
Identify the position of each removed part. Organize the parts in their respective groups so that they can be reinstalled in their original positions.

1) Remove the fuel feed hose (1) and IAP sensor vacuum hoses (2).



I944H1140268-01

2) Remove the throttle link rod (3) and secondary throttle link rod (4).

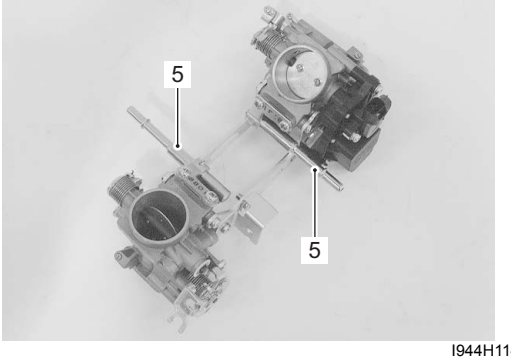


I944H1140270-02

3) Remove the fuel delivery pipe assemblies (5).

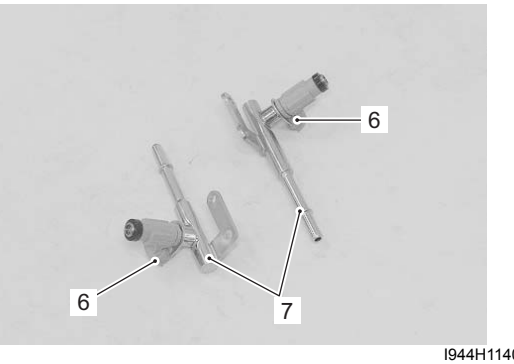
⚠ CAUTION

Be careful not to twist the fuel delivery pipe, when disconnecting the fuel feed hose or removing the fuel delivery pipe.



I944H1140271-02

4) Remove the fuel injectors (6) from the fuel delivery pipes (7).



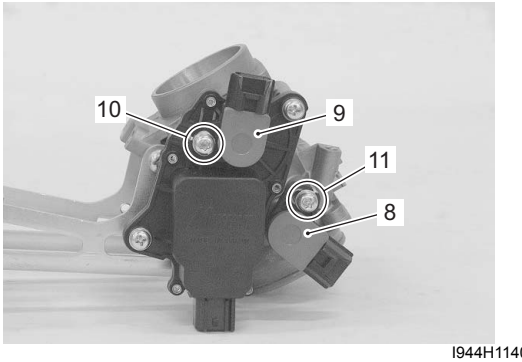
I944H1140272-02

5) Remove the TP sensor (8) and STP sensor (9) by removing each screw (10) and (11).

NOTE

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

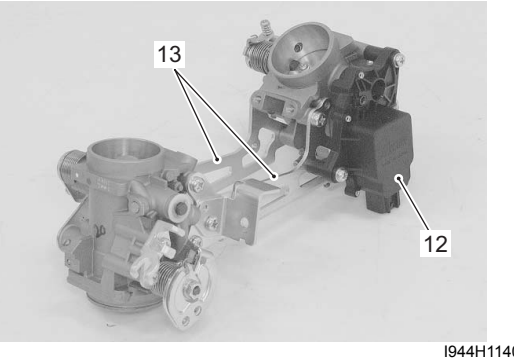
Special tool
TOOL : 09930–11950 (Torx wrench)



I944H1140273-04

⚠ CAUTION

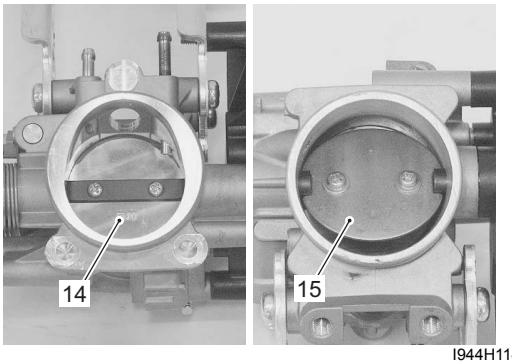
Never remove the STVA (12) and link plates (13) from the throttle body.



I944H1140274-03

⚠ CAUTION

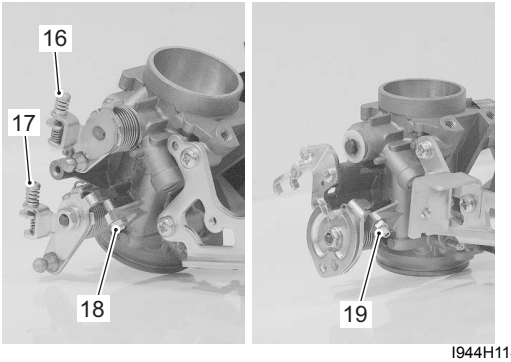
Never remove the throttle valve (14) and secondary throttle valve (15).



I944H1140275-04

⚠ CAUTION

These adjusting screws (16), (17), (18) and (19) are factory-adjusted at the time of delivery and therefore avoid removing or turning it unless otherwise necessary.



I944H1140276-03

Assembly

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

- Apply thin coat of the engine oil to the O-ring.

⚠ CAUTION

Replace the O-ring with a new one.

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

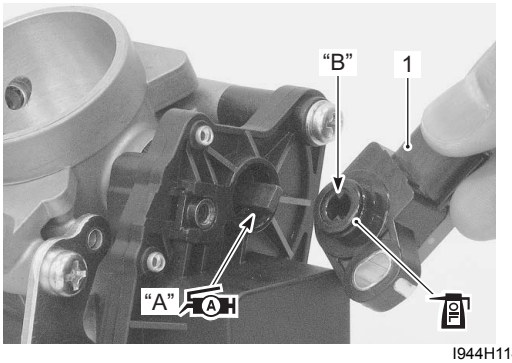
NOTE

- **Align the secondary throttle shaft end "A" with the groove "B" of 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)

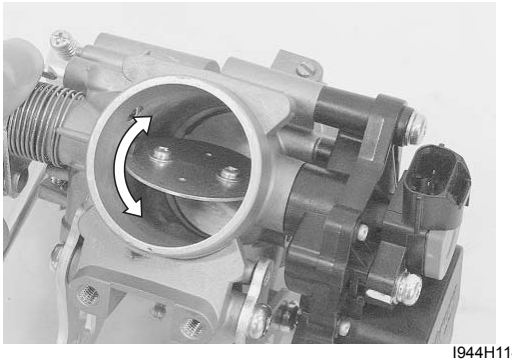
Tightening torque
STP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



I944H1140277-01

NOTE

Make sure the STP valve open or close smoothly. If the STP sensor adjustment is necessary, refer to "STP Sensor Adjustment in Section 1C (Page 1C-5)".



I944H1140278-01

- Apply thin coat of the engine oil to the O-ring.

⚠ CAUTION

Replace the O-ring with a new one.

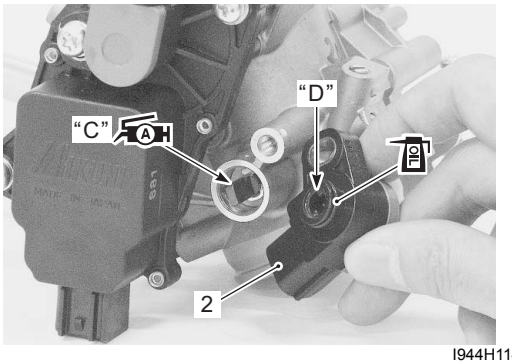
- With the throttle valve fully closed, install the TP sensor (2) and tighten the TP sensor mounting screw to the specified torque.

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.**

Special tool
TOOL : 09930–11950 (Torx wrench)

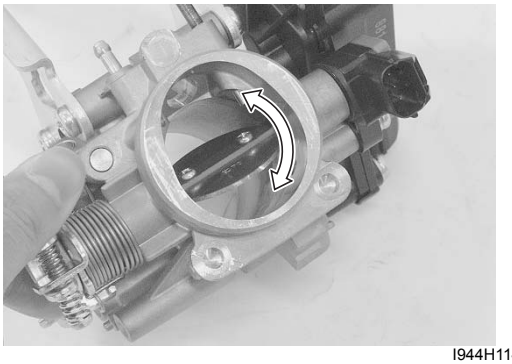
Tightening torque
TP sensor mounting screw: 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



I944H1140279-01

NOTE

Make sure the throttle valve open or close smoothly. If the TP sensor adjustment is necessary, refer to "TP Sensor Adjustment in Section 1C (Page 1C-2)".

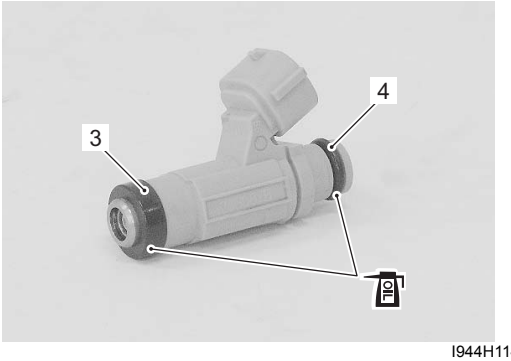


I944H1140280-01

- Apply a small quantity thin coat of the engine oil to the new cushion seal (3) and O-ring (4).

⚠ CAUTION

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



I944H1140281-01

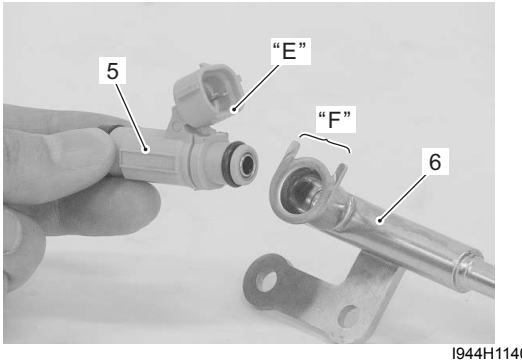
- Wipe off the mounting surface on the delivery pipe (6) where the fuel injector (5) will be seated with a clean rag.
- Install the fuel injector (5) by pushing it straight to the delivery pipe (6).

⚠ CAUTION

Never turn the injector while pushing it.

NOTE

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

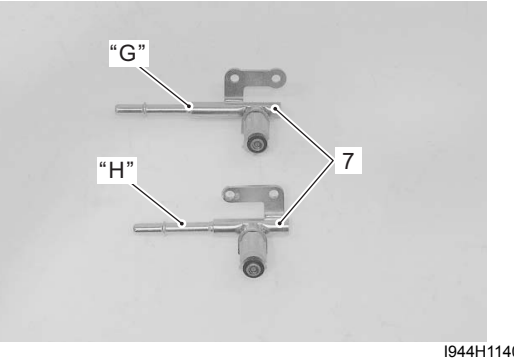


I944H1140282-01

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

⚠ CAUTION

- **When installing the fuel delivery pipes to the throttle body, pay attention to the difference of the fuel delivery pips.**
- **Never turn the fuel injectors while installing them.**

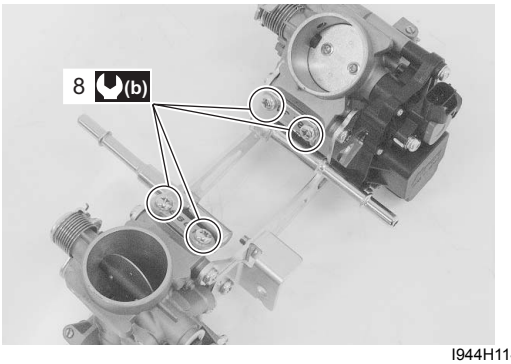


I944H1140283-01

"G": Front side	"H": Rear side

- Tighten the fuel delivery pipe mounting screws (8) to the specified torque.

  Tightening torque
  Fuel delivery pipe mounting screw (b): 5 N·m (0.5 kgf-m, 3.5 lbf-ft)

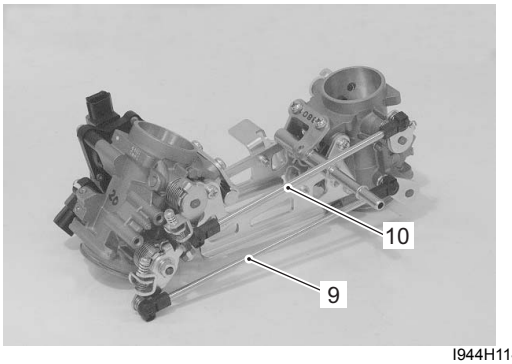


I944H1140284-01

- Install the throttle link rod (9) and secondary throttle link rod (10).

NOTE

The throttle link rod (9) is longer than the secondary throttle link rod (10).



I944H1140285-01

Throttle Body Inspection and Cleaning

B944H11406044

Refer to “Throttle Body Disassembly and Assembly (Page 1D-11)”.

Cleaning

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

⚠ CAUTION

- **Never clean the main bore of throttle body to prevent come off molybdenum from the throttle valve.**
- **Do not use wire to clean passageways. Wire can damage passageways. Always follow the chemical manufacturer’s instructions for proper use and cleaning of the throttle body components. Do not apply carburetor cleaning chemicals to the rubber and plastic materials.**

Inspection

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

- O-ring
- Throttle valve
- Secondary throttle valve
- Vacuum hose
- STVA lead wire

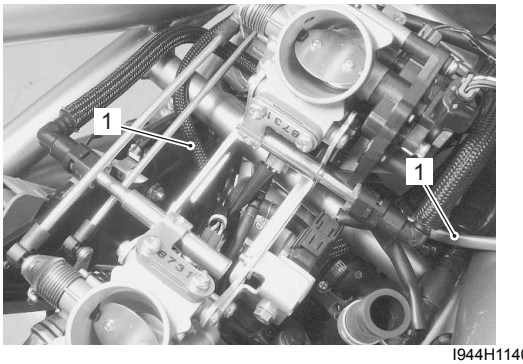
Throttle Valve Synchronization

B944H11406045

Use of SDS Tool

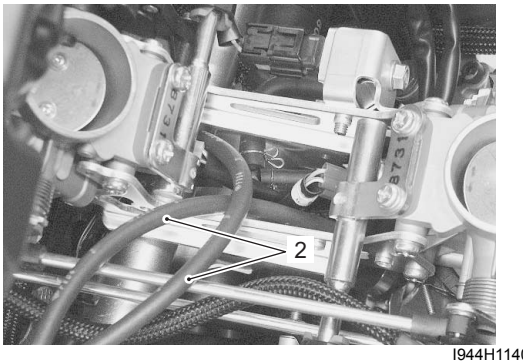
Check and adjust the throttle valve synchronization between two cylinders.

1) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation (Page 1D-6)”.
2) Disconnect the IAP sensor vacuum hoses (1) at the throttle body side.



I944H1140332-01

3) Connect the respective vacuum tester hoses (2) to the vacuum nipples.



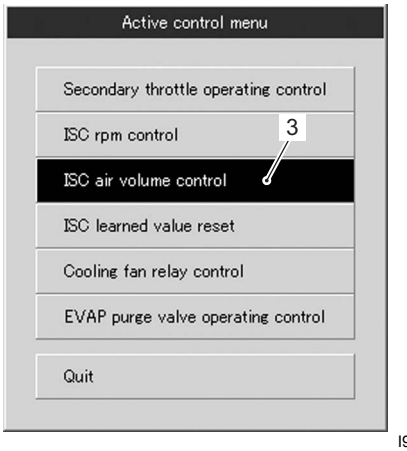
I944H1140333-01

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

☐ Engine speed	1318	rpm	
☐ Throttle position	27.0	°	
☐ Engine coolant / oil temperature “A”	89.0	°C	
☐ Manifold absolute pressure 1	63.4	kPa	
☐ Intake air temperature	33.0	°C	

I944H1140344-02

8) Click “Active control”.
9) Click “ISC air volume control” (3).

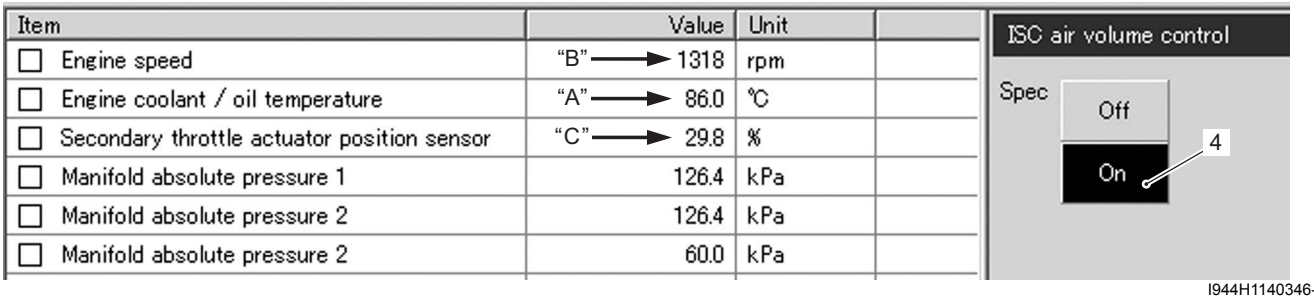


I944H1140345-02

10) Click “ON” button (4) to fix the ISC air volume between 2 cylinders.

NOTE

When making this synchronization, be sure that the water temperature is within 80 – 105 °C (176 – 221 °F) “A”.



I944H1140346-02

“B”: Engine speed: Approx. 1300 rpm	“C”: ISC valve position: Approx. 30%

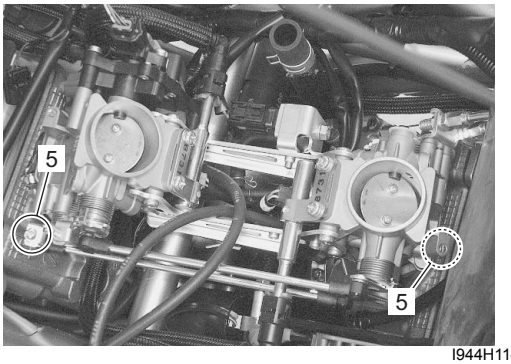
11) Check for the synchronization of vacuum from #1 and #2 cylinders.

I944H1140334-01

12) Equalize the vacuum of the cylinders by turning each airscrew (5) and keep it turning at idling speed.

NOTE

Always set the engine rpm at idle rpm.



I944H1140335-01

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

NOTE

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

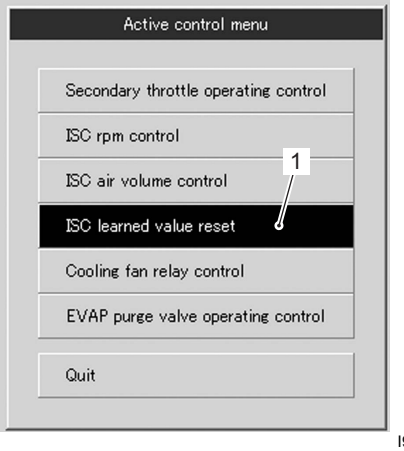
14) Repeat the procedures of 4) to 12).
15) Close the SDS tool and turn the ignition switch to OFF position.
16) Disconnect the vacuum tester and reinstall the removed parts.
17) After completing the throttle valve synchronization, clear the DTC and reset the ISC learned valve using SDS tool. Refer to “ISC Learned Value Reset and Opening Initialization in Section 1C (Page 1C-7)”.

ISC Learned Value Reset

B944H11406047

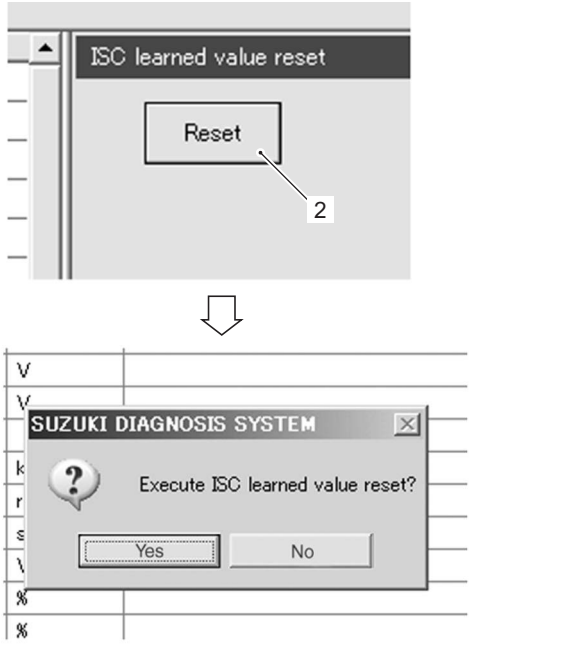
When removing or replacing the throttle body assembly, reset the ISC valve learned value in the following procedures:

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”
2) Set up the SDS tools. (Refer to the SDS operation manual for further details.)
3) Turn the ignition switch ON position.
4) Click “Active control”.
5) Click “ISC learned value reset” (1).



I944H1140347-01

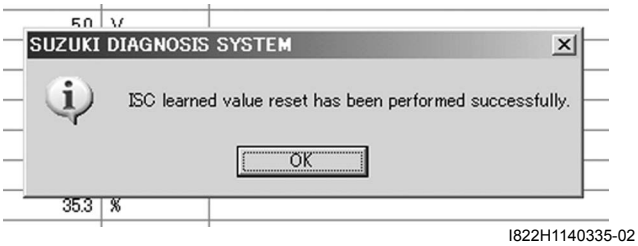
6) Click “Reset” button (2) to clear the ISC learned value.



I944H1140348-01

NOTE

The ISC learned value is set at preset position.



I822H1140335-02

7) Close the SDS tool.
8) Turn the ignition switch OFF position.

NOTE

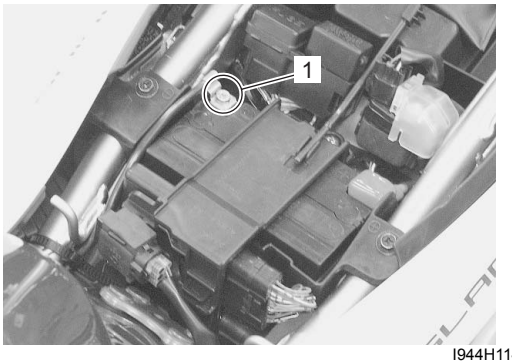
The ISC valve opening initialization is automatically started after the ignition switch is turned OFF.

Engine Assembly Removal

B944H11406059

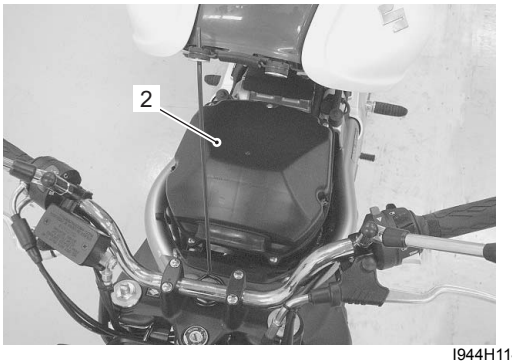
Before taking the engine out of the frame, wash the engine using a stream cleaner. Engine removal is sequentially explained in the following steps:

1) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
3) Remove the frame covers and frame cover bodies. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
4) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
5) Disconnect the battery (–) lead wire (1).



I944H1140286-01

6) Remove the air cleaner box (2). Refer to “Air Cleaner Box Removal and Installation (Page 1D-6)”.

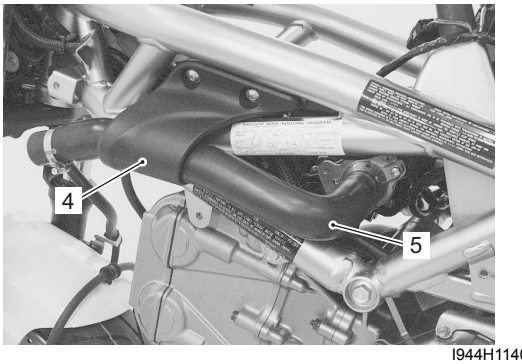


I944H1140287-01

7) Remove the radiator assembly (3). Refer to “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)”.

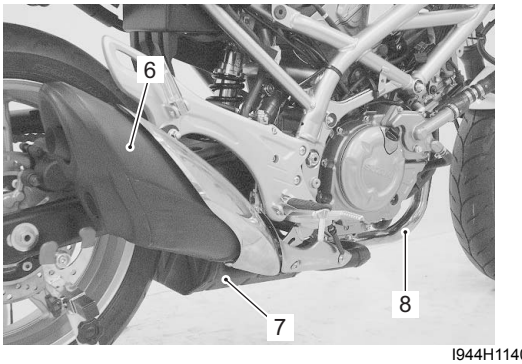
I944H1140288-01

8) Remove the rear frame body cover (4) and radiator inlet hose (5).



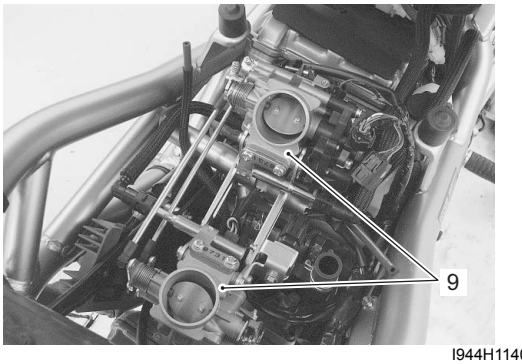
I944H1140289-01

9) Remove the muffler (6), exhaust assembly (7) and front exhaust pipe (8). Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.



I944H1140290-01

10) Remove the throttle body assembly (9). Refer to “Throttle Body Removal and Installation (Page 1D-10)”.

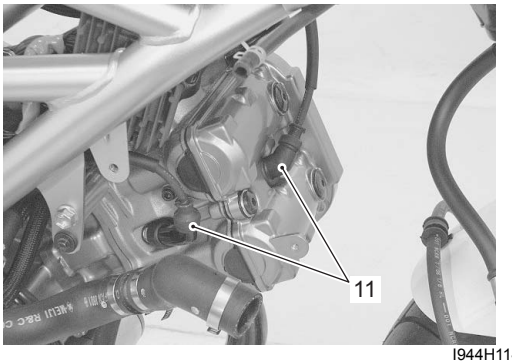


I944H1140291-01

11) Disconnect the ECT sensor coupler (10).

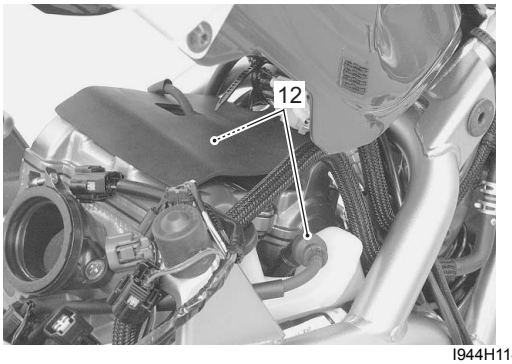
I944H1140292-01

12) Remove the front spark plug caps (11).



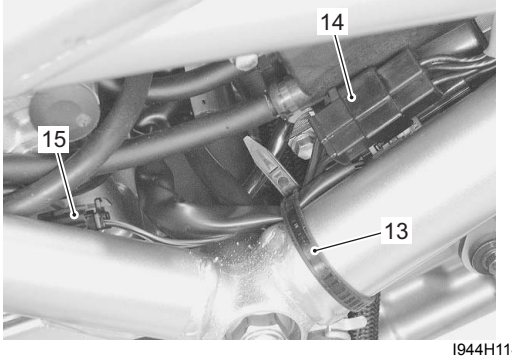
I944H1140293-01

13) Remove the rear spark plug caps (12).



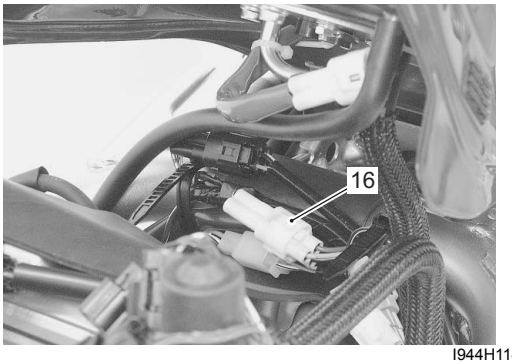
I944H1140294-01

14) Disconnect the clamp (13).
15) Disconnect the generator lead wire coupler (14).
16) Disconnect the CKP sensor lead wire coupler (15).



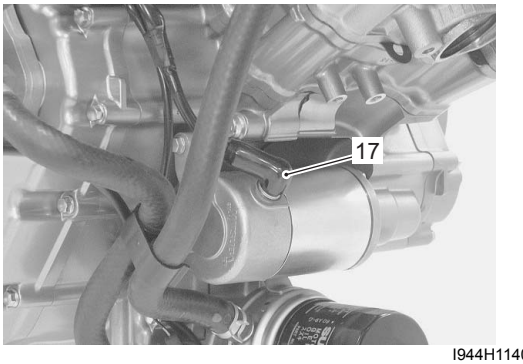
I944H1140295-02

17) Disconnect the GP sensor lead wire coupler (16).



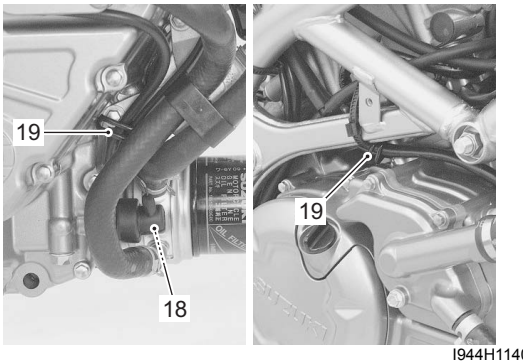
I944H1140296-01

18) Disconnect the starter motor lead wire (17).



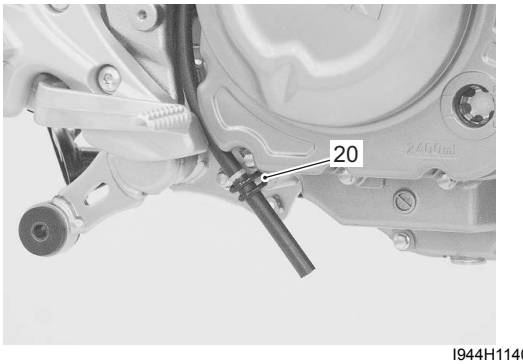
I944H1140297-01

19) Disconnect the oil pressure switch lead wire (18) and clamps (19).



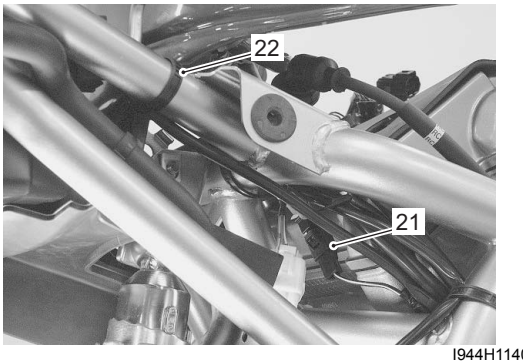
I944H1140298-01

20) Disconnect the water drain hose clamp (20).



I944H1140299-01

21) Disconnect the ground lead wire coupler (21) and clamp (22).

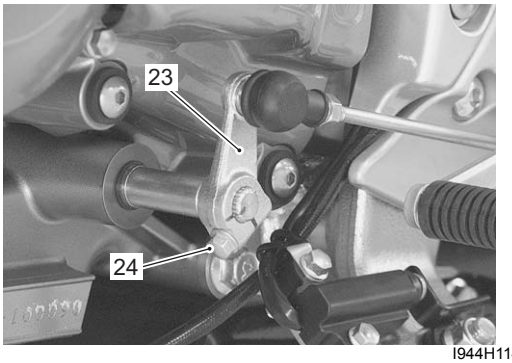


I944H1140300-02

22) Disengage the gearshift link arm (23) by removing the bolt (24).

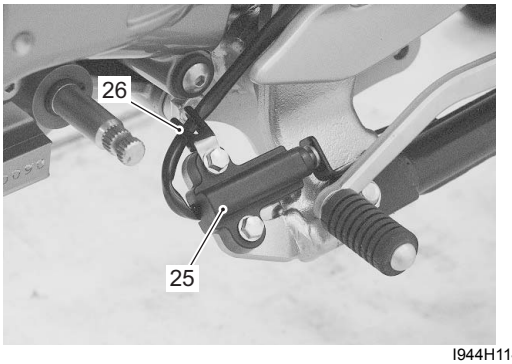
NOTE

Mark the gearshift shaft head at which the gearshift link arm slit is set for correct reinstallation.



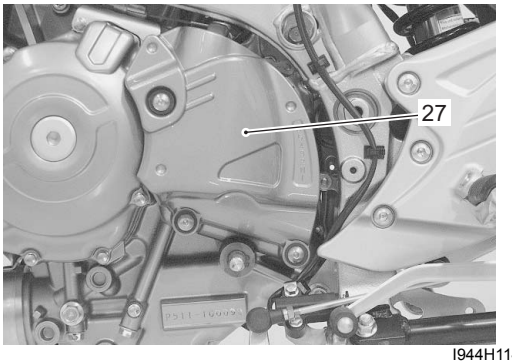
I944H1140301-02

23) Remove the side-stand switch (25) and clamp (26).



I944H1140302-02

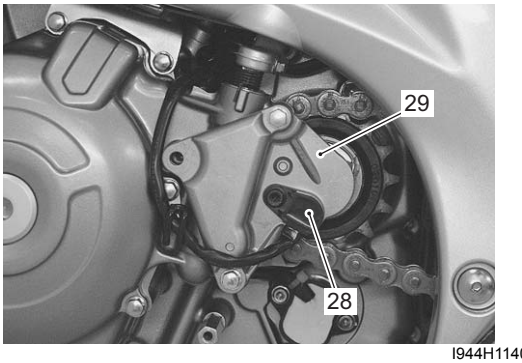
24) Remove the engine sprocket outer cover (27).



I944H1140303-02

25) Remove the speed sensor (28).

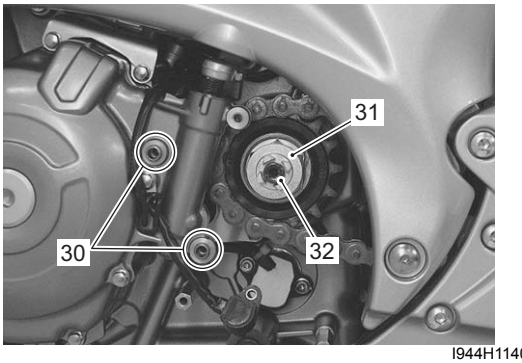
26) Remove the engine sprocket inner cover (29).



I944H1140304-04

27) Remove the dowel pins (30).

28) Remove the speed sensor rotor (31) by removing its bolt (32) while depressing the rear brake pedal.

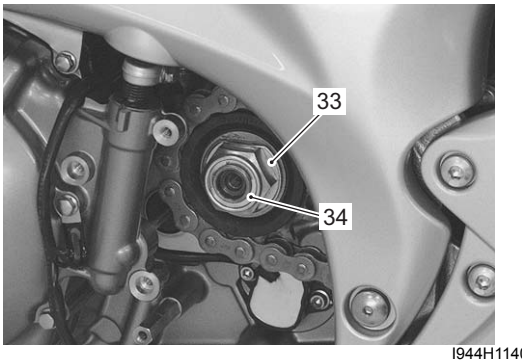


I944H1140305-03

29) Flatten the lock washer (33).

30) Remove the engine sprocket nut (34) while depressing the rear brake pedal.

31) Remove the lock washer (33).



I944H1140306-02

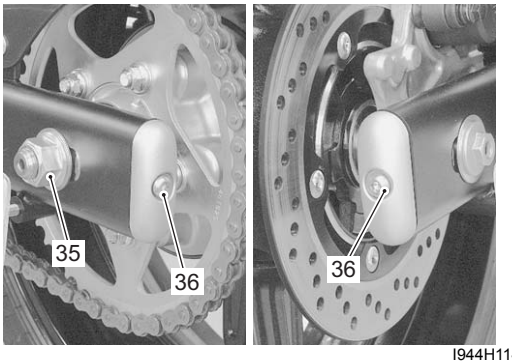
32) Loosen the rear axle nut (35).

33) Support the motorcycle with a jock or wooden block.

⚠ CAUTION

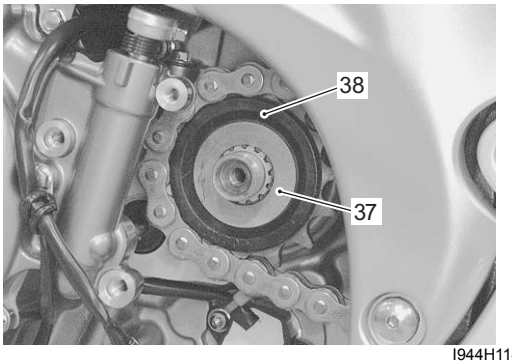
Make sure that the motorcycle is supported securely.

34) Loosen the chain adjuster bolts (36) to provide additional chain slack, left and right.



I944H1140307-02

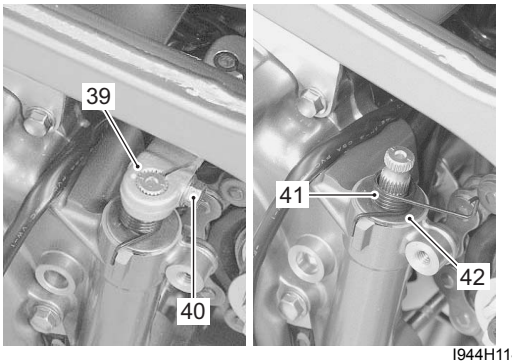
35) Remove the washer (37) and engine sprocket (38).



I944H1140308-02

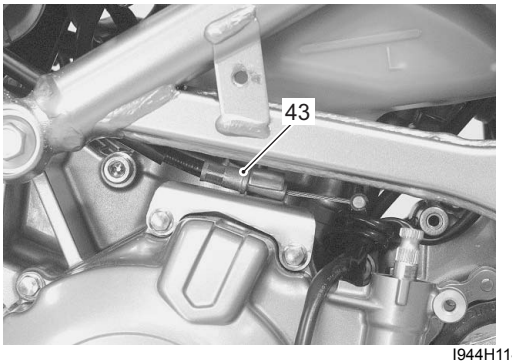
36) Remove the clutch release arm (39) by removing the clutch release arm bolt (40). Refer to “Clutch Cable Removal and Installation in Section 5C (Page 5C-2)”.

37) Remove the return spring (41) and washer (42).



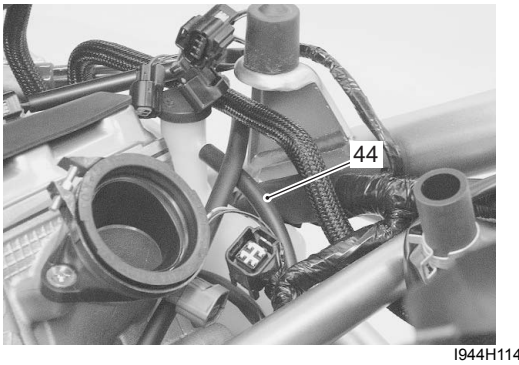
I944H1140309-03

38) Disconnect the clutch cable (43).



I944H1140310-02

39) Disconnect the reservoir tank over flow hose (44).

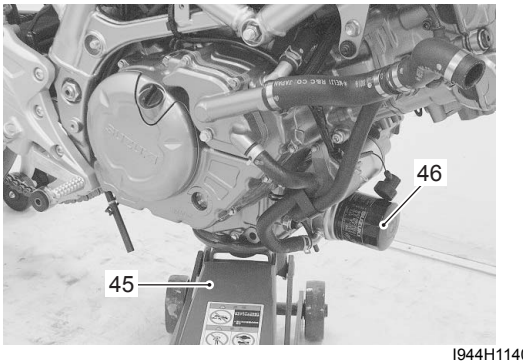


I944H1140311-02

40) Support the engine with a proper jack (45).

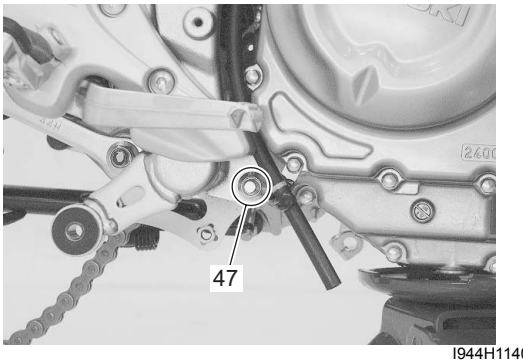
⚠ CAUTION

Do not support at the oil filter (46).

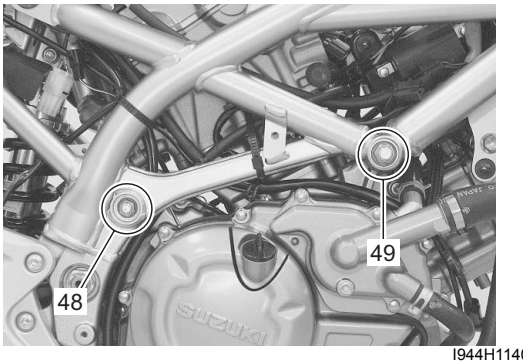


I944H1140312-02

41) Remove the engine mounting nuts (47), (48) and (49).

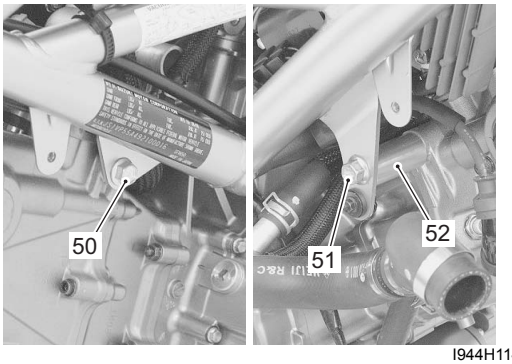


I944H1140313-03



I944H1140314-03

42) Remove the front left engine mounting bolt (50).
43) Remove the front right engine mounting bolt (51) and spacer (52).

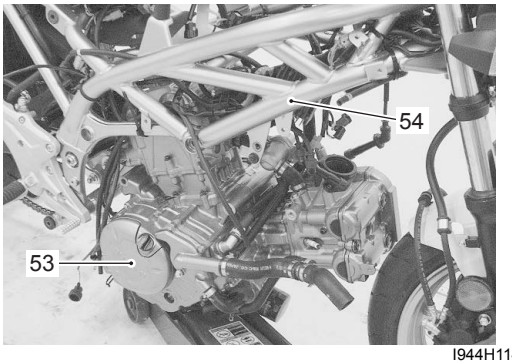


I944H1140315-03

44) Remove the engine mounting bolts and gradually lower the engine. Then, take off the drive chain from the driveshaft.
45) Remove the engine assembly (53).

⚠ CAUTION

Be careful not to contact the rear exhaust pipe with the frame (54) and swingarm.



I944H1140316-02

Engine Assembly Installation

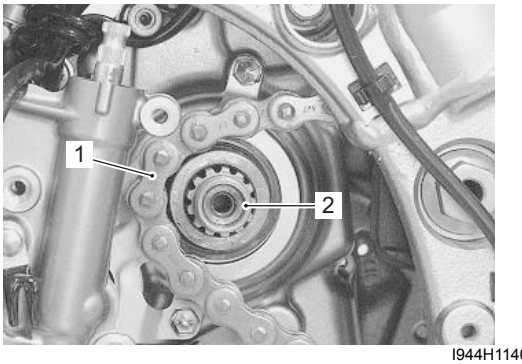
B944H11406061

Reinstall the engine in the reverse order of engine removal. Pay attention to the following points:
Install the engine in the reverse order of engine removal. Pay attention to the following points:

- Gradually raise the engine assembly, and then put the drive chain (1) on the driveshaft (2).

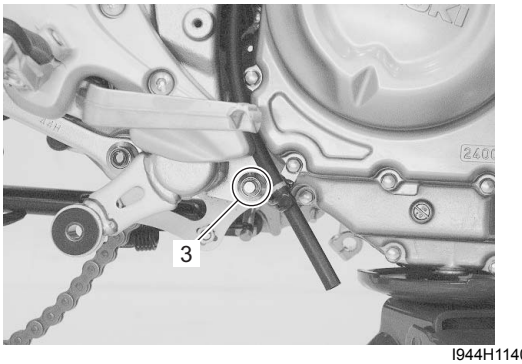
⚠ CAUTION

Be careful not to catch the wiring harness between the frame and the engine.

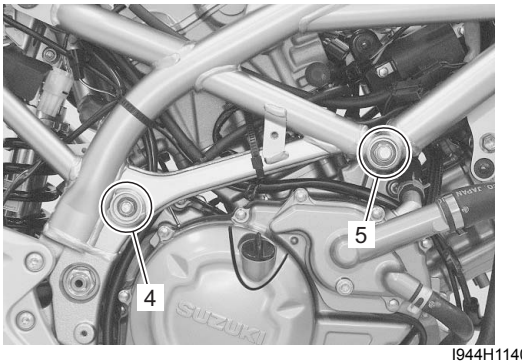


I944H1140317-02

- Install the three mounting bolts (3), (4) and (5) from left side, and tighten their nuts.



I944H1140318-02



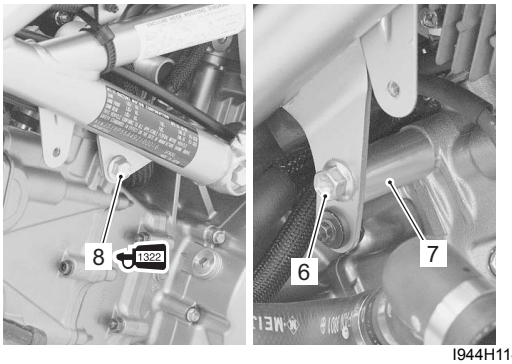
I944H1140319-02

NOTE

The engine mounting nuts are self-locking. Once the nuts have been removed, they are no longer of any use.

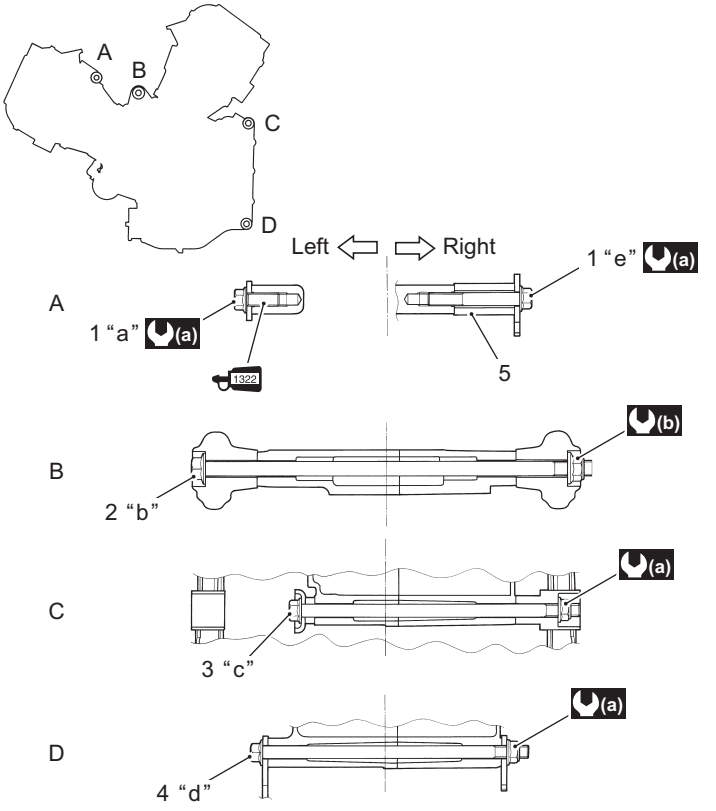
- Install the front right engine mounting bolt (6) and spacer (7) temporarily.
- Apply thread lock to the front left engine mounting bolt (8) and tighten it.

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



I944H1140320-02

- Tighten all engine mounting bolts and nuts to the specified torque, as shown in the following illustration.

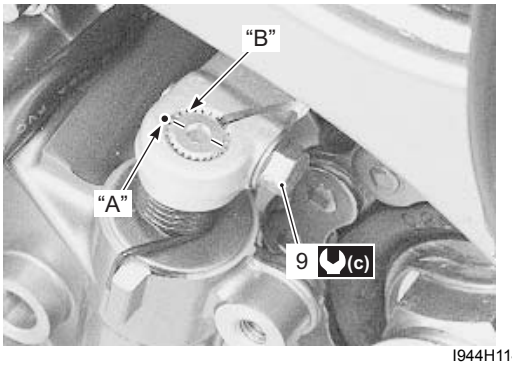


I944H1140321-02

1. Engine mounting bolt (Cylinder head)	"c": 215 mm (8.5 in)
2. Engine mounting bolt (Front upper)	"d": 205 mm (8.1 in)
3. Engine mounting bolt (Rear upper)	"e": 70 mm (2.8 in)
4. Engine mounting bolt (Rear lower)	(a) : 55 N·m (5.5 kgf-m, 40.0 lbf-ft)
5. Spacer	(b) : 93 N·m (9.3 kgf-m, 67.5 lbf-ft)
"a": 25 mm (1.0 in)	1322 : Apply thread lock to thread part.
"b": 300 mm (11.8 in)	

- When installing the clutch release arm, align the punch mark “A” of clutch release arm with slit “B” of camshaft.
- Tighten the clutch release arm bolt (9) to the specified torque.

Tightening torque
Clutch release arm bolt (c): 9 N·m (0.9 kgf-m, 6.5 lbf-ft)



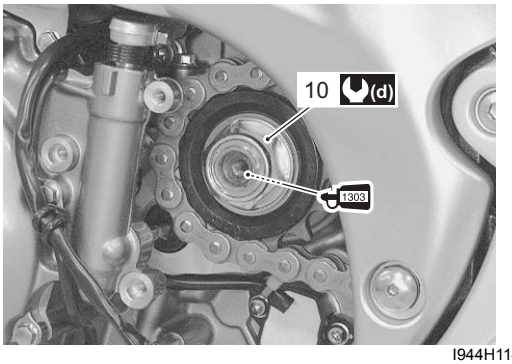
I944H1140322-04

- Apply thread lock super to the driveshaft.

1303 : Thread lock cement 99000–32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)

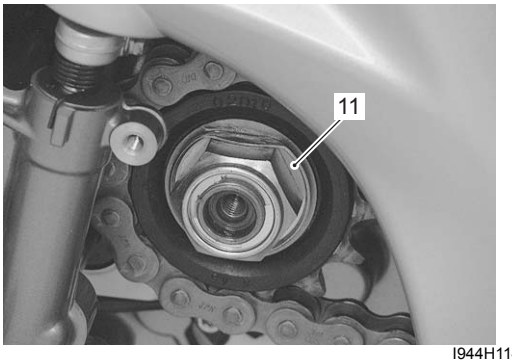
- Tighten the engine sprocket nut (10) to the specified torque.

Tightening torque
Engine sprocket nut (d): 145 N·m (14.5 kgf-m, 105.0 lbf-ft)



I944H1140323-03

- Bend the lock washer (11).

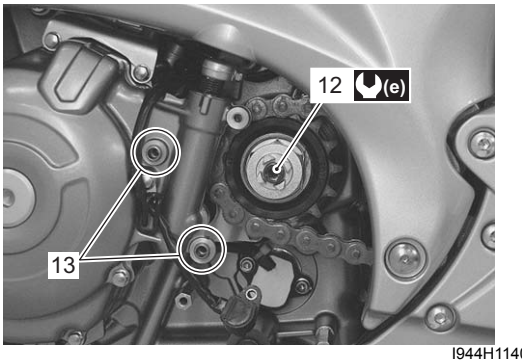


I944H1140324-02

- Tighten the speed sensor rotor bolt (12) to the specified torque.

Tightening torque
Speed sensor rotor bolt (e): 25 N·m (2.5 kgf-m, 18.0 lbf-ft)

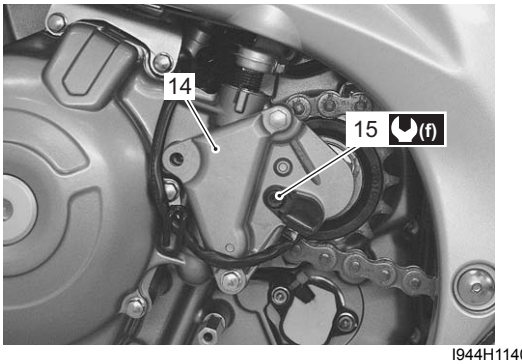
- Install the dowel pins (13).



I944H1140325-03

- Install the engine sprocket inner cover (14).
- Tighten the speed sensor mounting bolt (15) to the special torque.

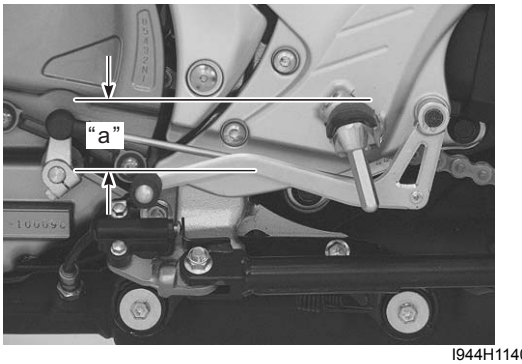
Tightening torque
Speed sensor mounting bolt (f): 5 N·m (0.5 kgf-m, 3.5 lbf-ft)



I944H1140326-03

- Install the gearshift lever to the gearshift shaft in the correct position.

Gearshift lever height “a”
Standard: 45 – 55 mm (1.8 – 2.2 in)



I944H1140327-01

- Adjust the drive chain slack. Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.
- After remounting the engine, route the wiring harness properly. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-5)”.
- Connect the clutch cable. Refer to “Clutch Cable Removal and Installation in Section 5C (Page 5C-2)”.
- Install the throttle body. Refer to “Throttle Body Removal and Installation (Page 1D-10)”.
- Install the front exhaust pipe, exhaust assembly and muffler. Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.
- Install the radiator. Refer to “Radiator / Cooling Fan Motor Removal and Installation in Section 1F (Page 1F-5)”.
- Install the air cleaner box. Refer to “Air Cleaner Box Removal and Installation (Page 1D-6)”.
- 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 in Section 0B (Page 0B-12)”.
  - Engine oil and coolant leakage
    Refer to “Cooling Circuit Inspection in Section 1F (Page 1F-4)”.
  - Clutch cable play
    Refer to “Clutch System Inspection in Section 0B (Page 0B-14)”.

Engine Top Side Disassembly

B944H11406006

It is unnecessary to remove the engine assembly from the frame when servicing the engine top side.

NOTE

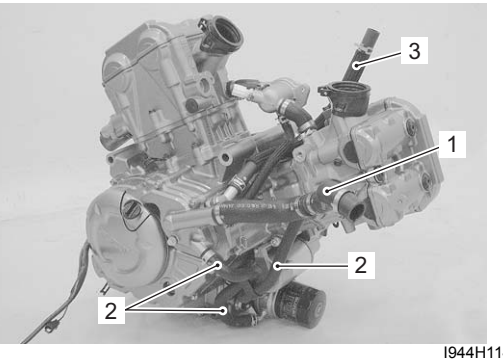
Before servicing the engine top side with engine in place, remove the air cleaner box, throttle body, fuel tank, exhaust pipe, muffler and etc. Refer to “Engine Assembly Removal (Page 1D-18)”.

⚠ CAUTION

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

Radiator Hose / Breather Hose

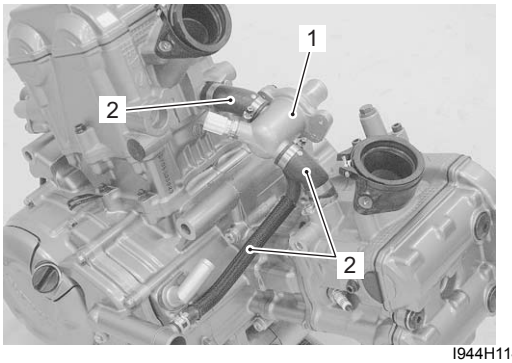
1) Remove the radiator hose (1), oil cooler hoses (2) and breather hose (3).



I944H1140134-01

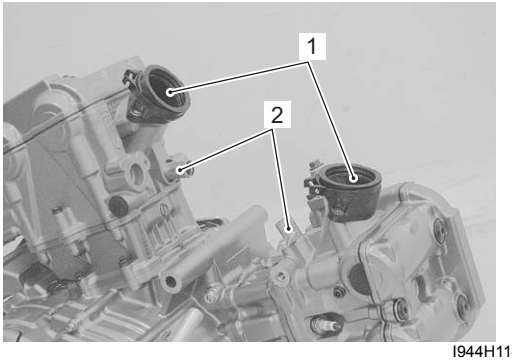
Thermostat

Remove the thermostat assembly (1) and water hoses (2).



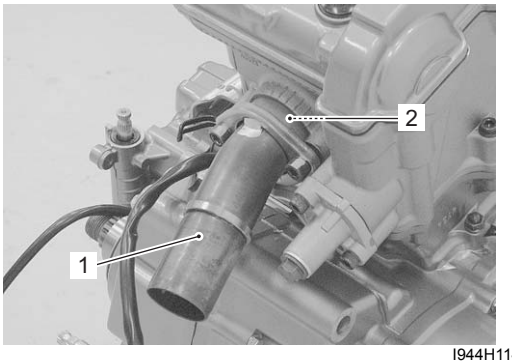
I944H1140135-01

Intake Pipe / Water Union
Remove the intake pipe (1) and water unions (2).



I944H1140136-01

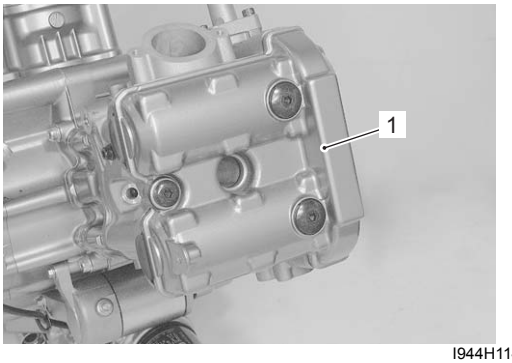
Exhaust Pipe
Remove the rear exhaust pipe (1) and gasket (2).



I944H1140137-01

Front Cylinder Head Cover

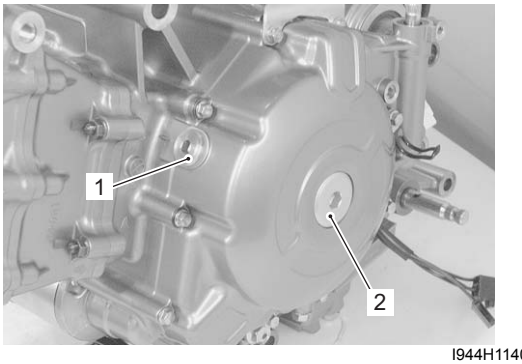
1) Remove the front cylinder spark plugs. Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-5)”.
2) Remove the front cylinder head cover (1) and its gasket.



I944H1140138-01

Front Camshaft

1) Remove the valve timing inspection plug (1) and generator cover plug (2).

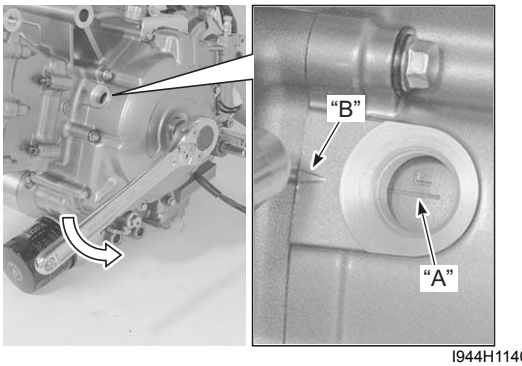


I944H1140139-01

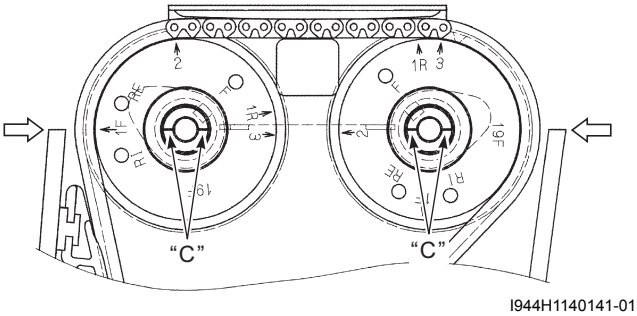
2) Turn the crankshaft to bring the “I F” line “A” on generator rotor to the index mark “B” of the valve inspection hole and also to bring the cams to the position as shown.

NOTE

At the above condition, the front cylinder is at TDC on compression stroke and also the engraved lines “C” on the camshafts are parallel with the mating surface of the cylinder head.



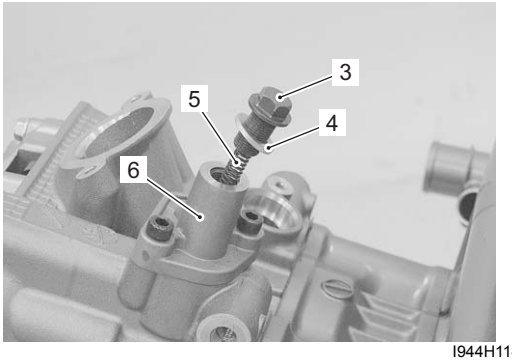
I944H1140140-01



I944H1140141-01

3) Remove the cam chain tension adjuster cap bolt (3), washer (4) and spring (5).

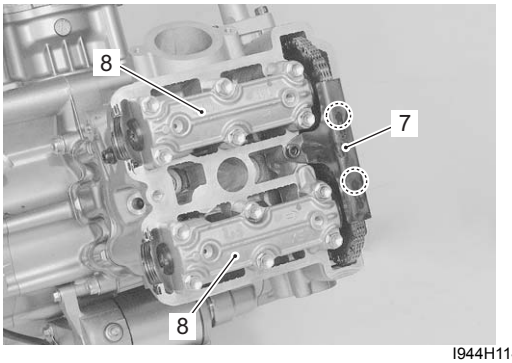
4) Remove the front cam chain tension adjuster (6) and gasket.



I944H1140142-01

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

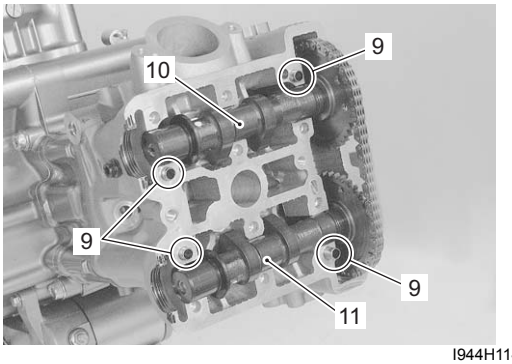
6) Remove the camshaft journal holders (8).



I944H1140143-01

7) Remove the dowel pins (9).

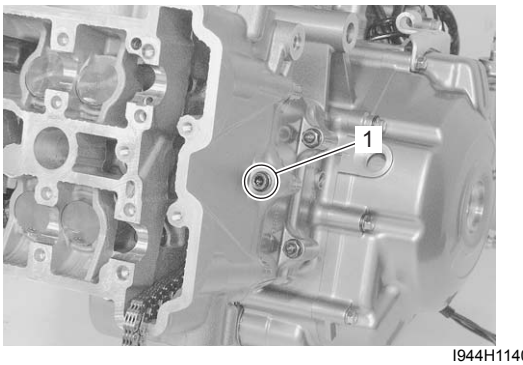
8) Remove the intake camshaft (10) and exhaust camshaft (11).



I944H1140144-01

Front Cylinder Head

1) Remove the front cylinder head bolt (M6) (L40) (1).

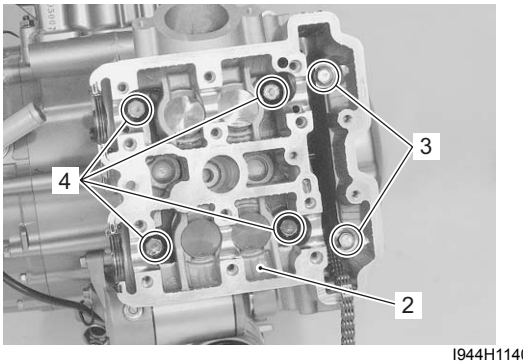


I944H1140145-01

2) Remove the front cylinder head (2) by removing the cylinder head bolts (M6) (L70) (3) and (M10) (4).

NOTE

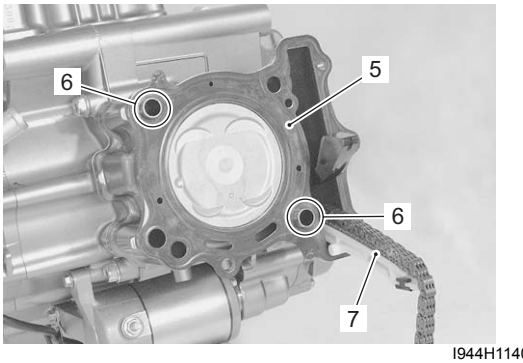
Loosen the cylinder head bolts little by little diagonally with the smaller sizes first.



I944H1140146-01

3) Remove the front cylinder head gasket (5) and dowel pins (6).

4) Remove the front cam chain guide (7).



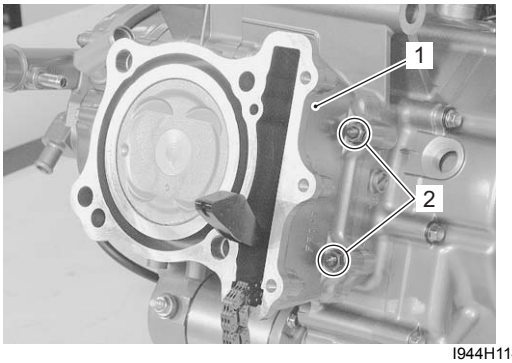
I944H1140147-01

Front Cylinder

1) Remove the front cylinder (1) by removing the cylinder nuts (2).

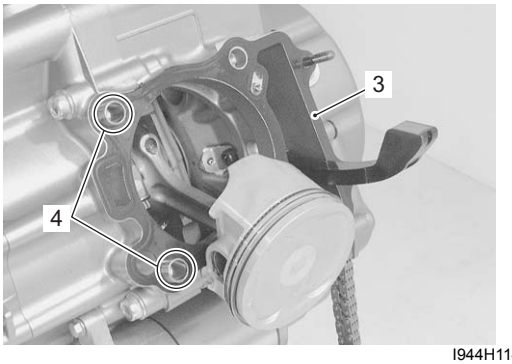
NOTE

Firmly grip the cylinder at both ends, and lift it straight up. If the cylinder does not come off, lightly tap it with a plastic hammer.



I944H1140148-01

2) Remove the front cylinder gasket (3) and dowel pins (4).



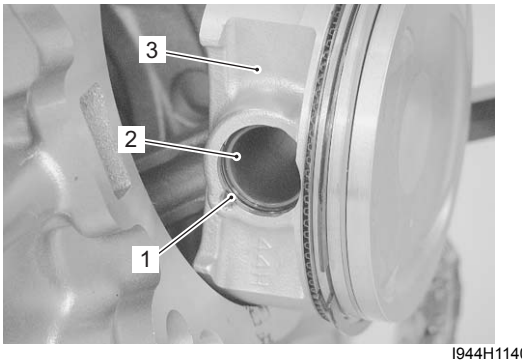
I944H1140149-01

Front Piston

1) Place a clean rag over the cylinder base so as not to drop the piston pin circlips into the crankcase.
2) Remove the piston pin circlip (1).
3) Draw out the piston pin (2) and remove the piston (3).

NOTE

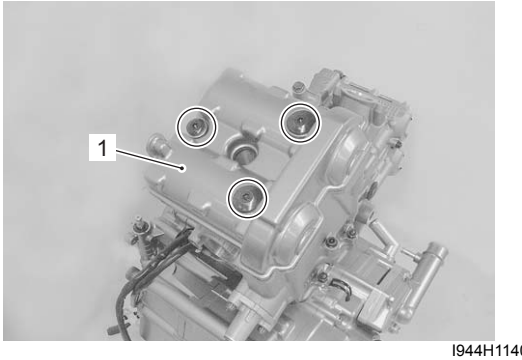
Scribe the cylinder number on the piston head.



I944H1140150-01

Rear Cylinder Head Cover

1) Remove the rear cylinder spark plugs. Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-5)”.
2) Remove the rear cylinder head cover (1) and its gasket.



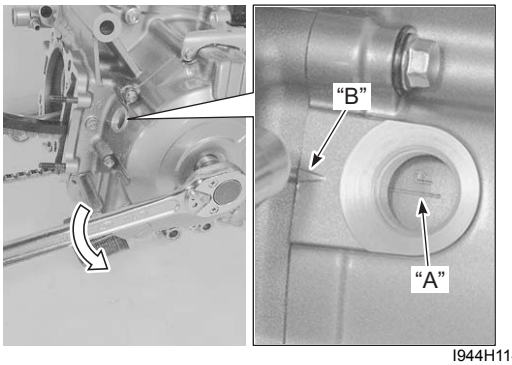
I944H1140151-01

Rear Camshaft

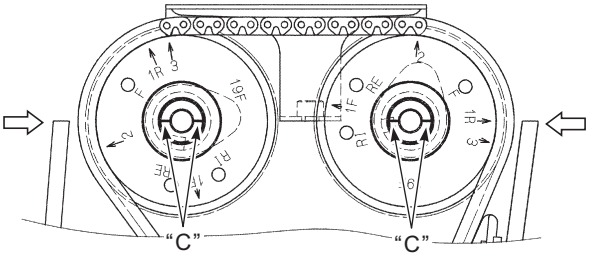
1) Rotate the generator 360 degrees (1 turn) counterclockwise and align the “I F” line “A” on the generator rotor with the index mark “B” of the valve timing inspection hole.

NOTE

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

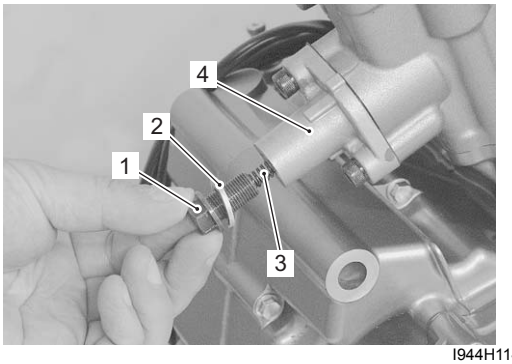


I944H1140152-01



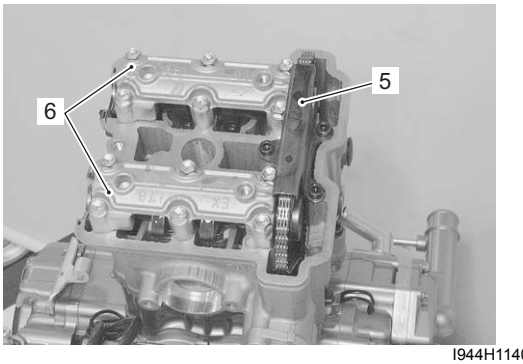
I944H1140153-01

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



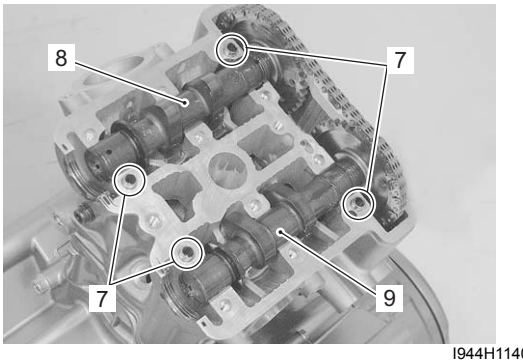
I944H1140154-01

4) Remove the cam chain guide No. 2 (5).
5) Remove the camshaft journal holder (6).



I944H1140155-01

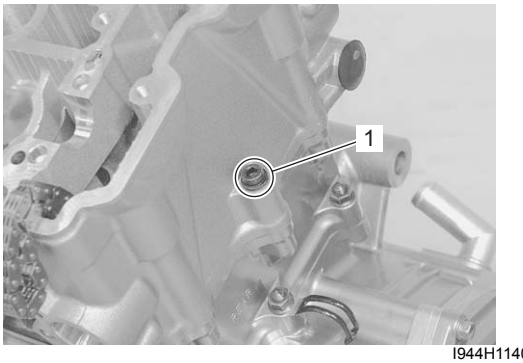
6) Remove the dowel pins (7).
7) Remove the intake camshaft (8) and exhaust camshaft (9).



I944H1140156-01

Rear Cylinder Head

1) Remove the rear cylinder head bolt (M6) (L40) (1).

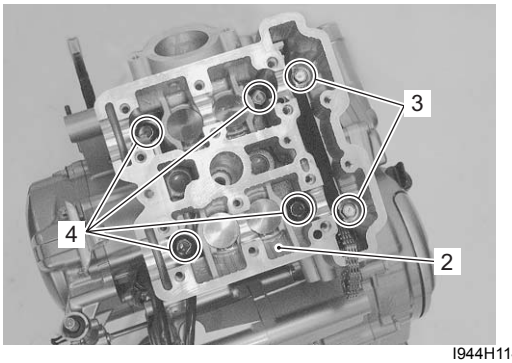


I944H1140157-01

2) Remove the rear cylinder head (2) by the removing cylinder head bolts (M6) (L70) (3) and (M10) (4).

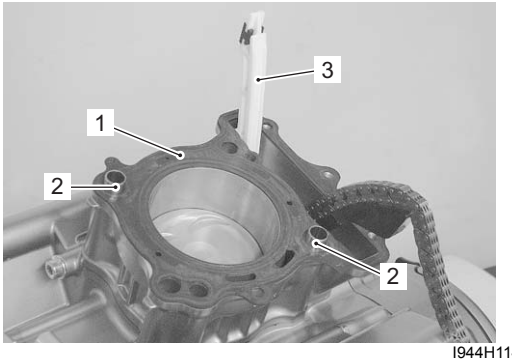
NOTE

Loosen the cylinder head bolts little by little diagonally with the smaller sizes first.



I944H1140158-01

3) Remove the rear cylinder gasket (1) and dowel pins (2).
4) Remove the rear cam chain guide (3).



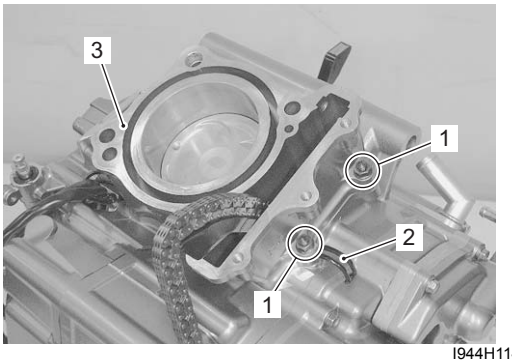
I944H1140159-01

Rear Cylinder

1) Remove the cylinder nuts (1) and clamp (2).
2) Remove the rear cylinder (3).

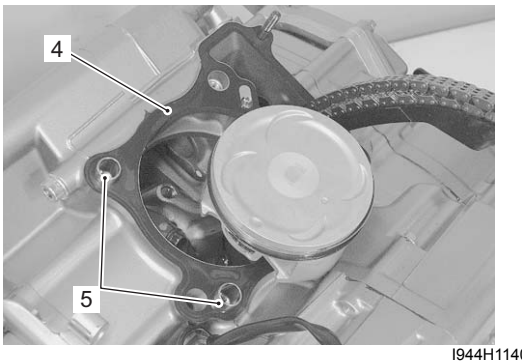
NOTE

Firmly grip the cylinder at both ends, and lift it straight up. If the cylinder does not come off, lightly tap it with a plastic hammer.



I944H1140160-01

3) Remove the rear cylinder gasket (4) and dowel pins (5).



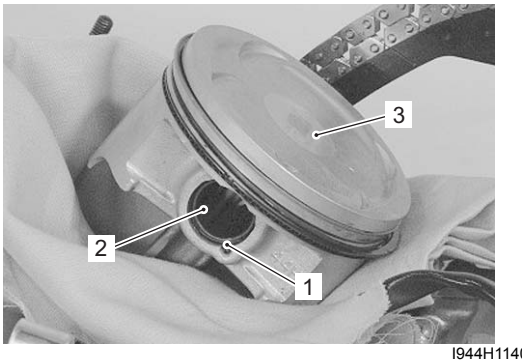
I944H1140161-01

Rear Piston

1) Place a clean rag over the cylinder base so as not to drop the piston pin circlips into the crankcase.
2) Remove the piston pin circlip (1).
3) Draw out the piston pin (2) and remove the piston (3).

NOTE

Scribe the cylinder number on the piston head.



I944H1140162-01

Engine Top Side Assembly

B944H11406007

Assemble the engine top side in the reverse order of disassembly. Pay attention to the following points:

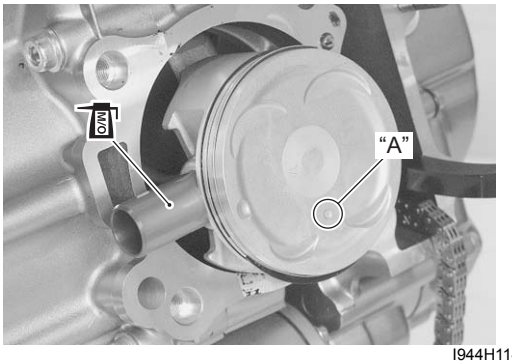
Piston

- When installing the piston pins, apply molybdenum oil solution onto each piston pins.

  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

  NOTE

  When installing the pistons, the indent "A" on the piston head must be faced to each exhaust side.



I944H1140163-01

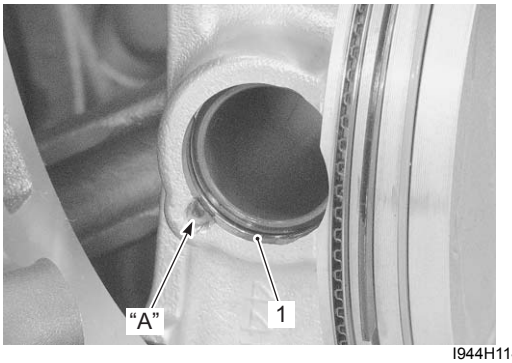
- Place a clean rag over the cylinder base so as not to drop the piston pin circlips (1) into the crankcase.
- Install the piston pin circlips (1).

  ⚠ CAUTION

  Replace the piston pin circlips (1) with new ones.

  NOTE

  End gap of the circlip (1) should not be aligned with the cutaway "A" in the piston pin bore.

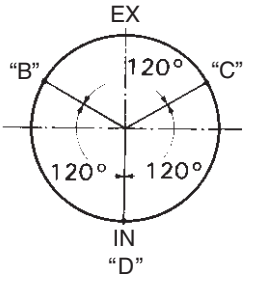


I944H1140164-02

- Apply molybdenum oil solution to the position rings.

  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

- Position the piston ring gaps as shown in the figure. Before inserting each piston into the cylinder, check that the gaps are properly positioned.



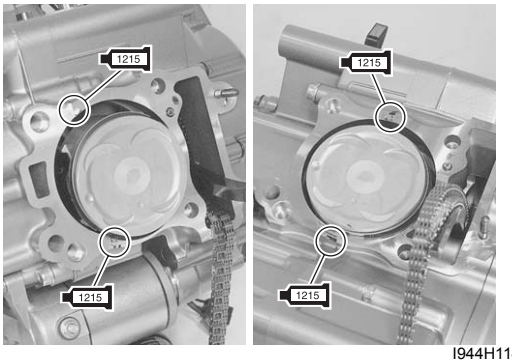
I718H1140051-01

"B":	2nd ring and lower side rail
"C":	Upper side rail
"D":	1st ring and spacer

Cylinder

- Thoroughly wipe off oil from the fitting surface of the crankcase.
- Coat bond lightly to the mating surfaces at the parting line between the right and left crankcases as shown.

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

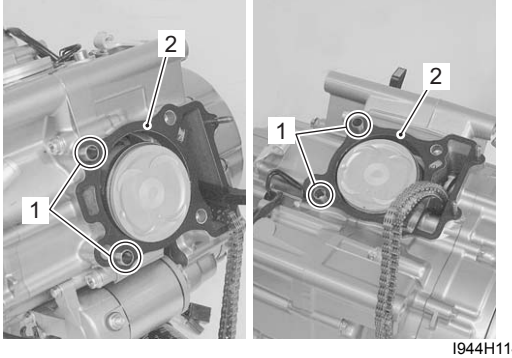


I944H1140165-01

- Install the dowel pins (1) and new gaskets (2), front and rear.

  ⚠ CAUTION

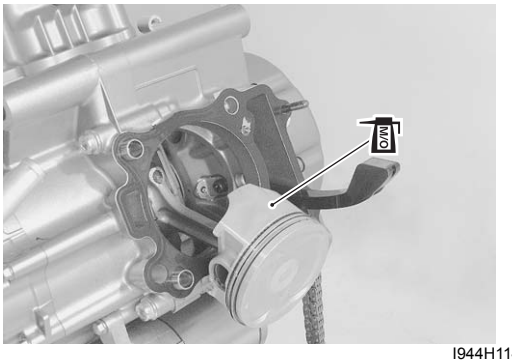
  Use a new gaskets (1) to prevent oil leakage.



I944H1140166-01

- Apply molybdenum oil solution to the sliding surface of the pistons and cylinder walls.

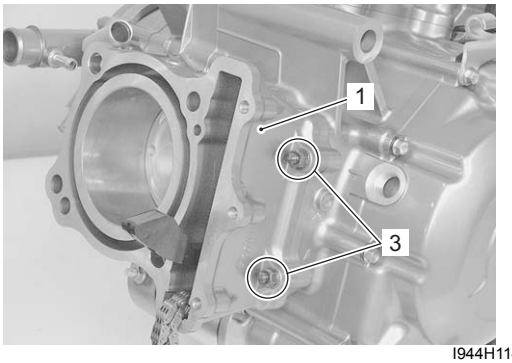
  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



I944H1140167-01

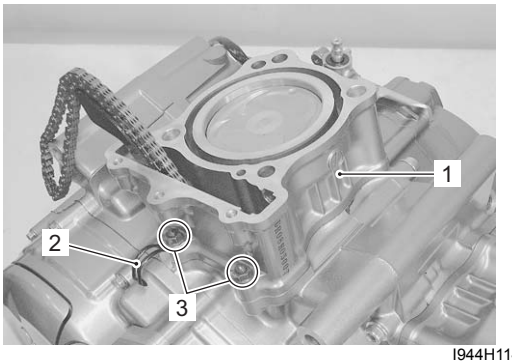
- Hold the piston rings in proper positions, and insert each of the pistons into the respective cylinders (1).
- Install the clamp (2) to the rear cylinder.
- Tighten the cylinder nuts (3) temporarily.

Front



I944H1140169-01

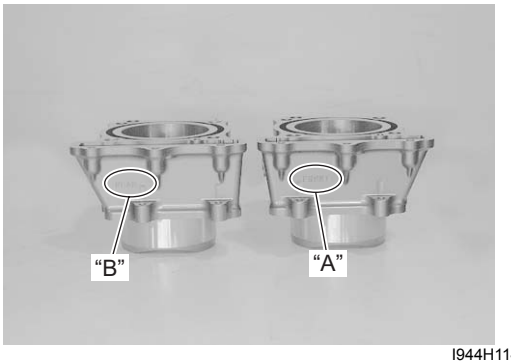
Rear



I944H1140170-01

NOTE

- **The cylinders can be distinguished by the embossed-letters, "FRONT" and "REAR".**
- **When installing the cylinders, keep the cam chains taut.**
- **The cam chain must not be caught between cam drive sprocket and crankcase when turning the crankshaft.**



I944H1140168-01

"A": FRONT	"B": REAR

Cylinder Head

NOTE

Install the front and rear cylinder heads in same manner.

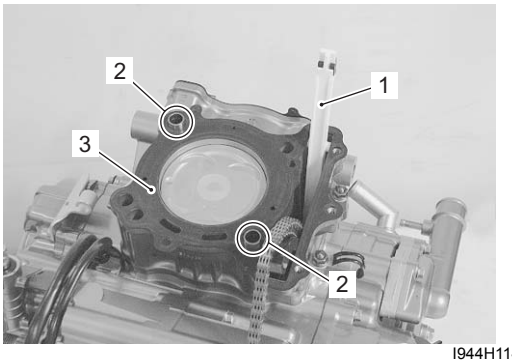
- Pull the cam chains out of the cylinders and install the cam chain guides (1).
- Fit the dowel pins (2) and a new cylinder head gaskets (3) to the cylinders.

⚠ CAUTION

- **There is the guide holder for the bottom end of each cam chain guides (1) cast in the crankcase.**
- **Be sure that the cam chain guides (1) is installed properly.**
- **Use a new gasket (3) to prevent gas leakage.**

NOTE

The front and rear cam chain guides are the same.

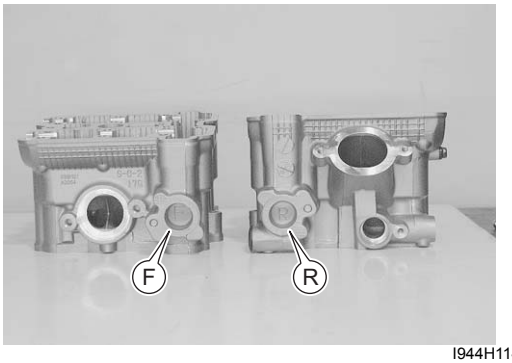


I944H1140171-01

- Place the cylinder heads on the cylinders.

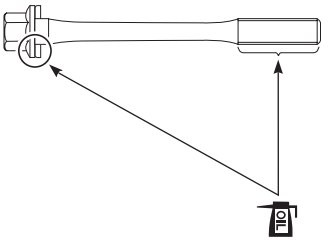
NOTE

- **The cylinder heads can be distinguished by the embossed-letters, “F” and “R”.**
- **When installing the cylinder head, keep the cam chain taut.**

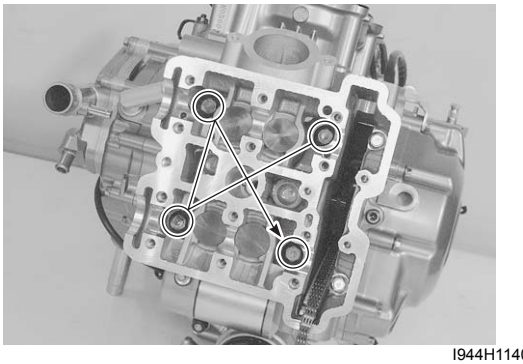


I944H1140172-01

- Apply engine oil to the both side of the washers and thread portion of the bolts before installing the cylinder head bolts.



I944H1140173-01



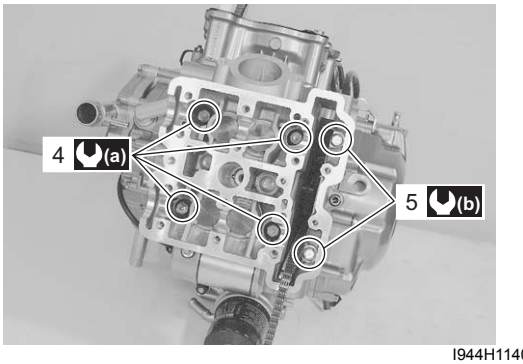
I944H1140328-01

- Tighten the cylinder head bolts (M10) (4) to the specified two-step torque with a torque wrench sequentially and diagonally.

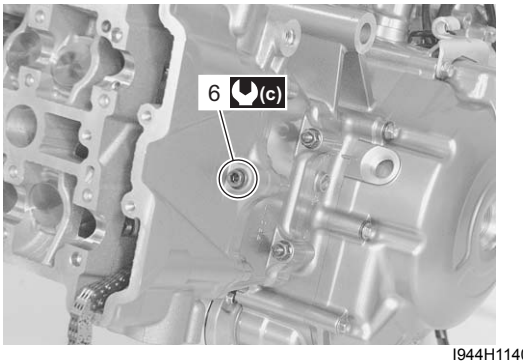
Tightening torque
Cylinder head bolt (M10) (Initial) (a): 25 N·m (2.5 kgf-m, 18.0 lbf-ft)
Cylinder head bolt (M10) (Final) (a): 42 N·m (4.2 kgf-m, 30.5 lbf-ft)

- Tighten the other bolts (M6) (L70) (5) and (L40) (6) to the specified torque.

Tightening torque
Cylinder head bolt (M6) (L70) (b): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
Cylinder head bolt (M6) (L40) (c): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



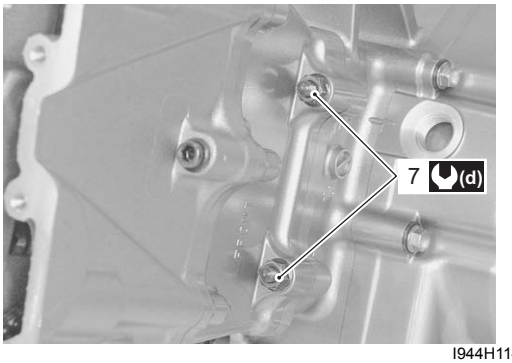
I944H1140174-01



I944H1140175-01

- Tighten the cylinder nuts (7) to the specified torque.

  Tightening torque
  Cylinder nut (M6) (d): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



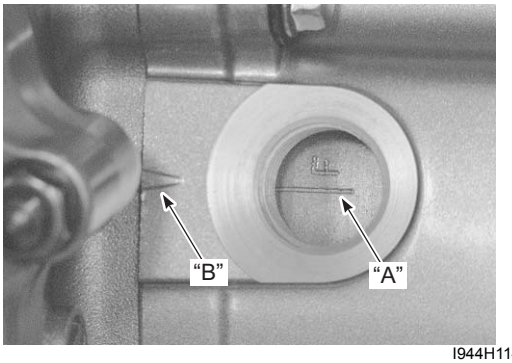
I944H1140176-01

Front Camshaft

- Turn the crankshaft clockwise and align "I F" line "A" on the generator rotor with the index mark "B" of the valve timing inspection hole while keeping the cam chains pulled upward.

  ⚠ CAUTION

  - **Pull the cam chain upward, or the chain will be caught between crankcase and cam drive sprocket.**
  - **To adjust the camshaft timing correctly, be sure to align "I F" line "A" with the index mark "B" and hold this position when installing the camshafts.**



I944H1140177-01

- The camshafts are identified by the embossed letters.

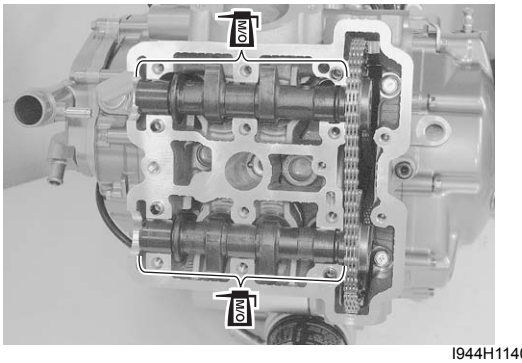
	letter mark
Intake	INF
Exhaust	EXF

- Before replacing the camshafts on cylinder head, apply molybdenum oil solution to their journals and cam faces.
- Apply molybdenum oil solution to the camshaft journal holders.

  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

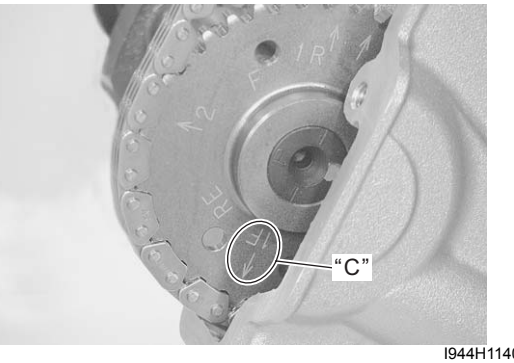
  NOTE

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



I944H1140178-01

- Pull the cam chain lightly.
- The exhaust camshaft sprocket has an arrow mark "1F" "C". Install the exhaust camshaft so that the arrow "C" is aligned with the mating surface of the cylinder head.
- Engage the cam chain with the intake camshaft sprocket.



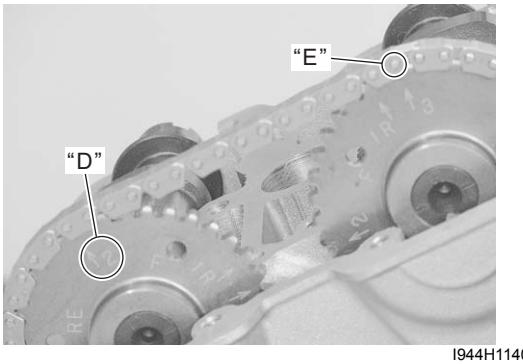
I944H1140179-01

- The other arrow marked "2" "D" should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked "2" "D", count out 16th roller pins (from the exhaust camshaft side going towards the intake camshaft side).

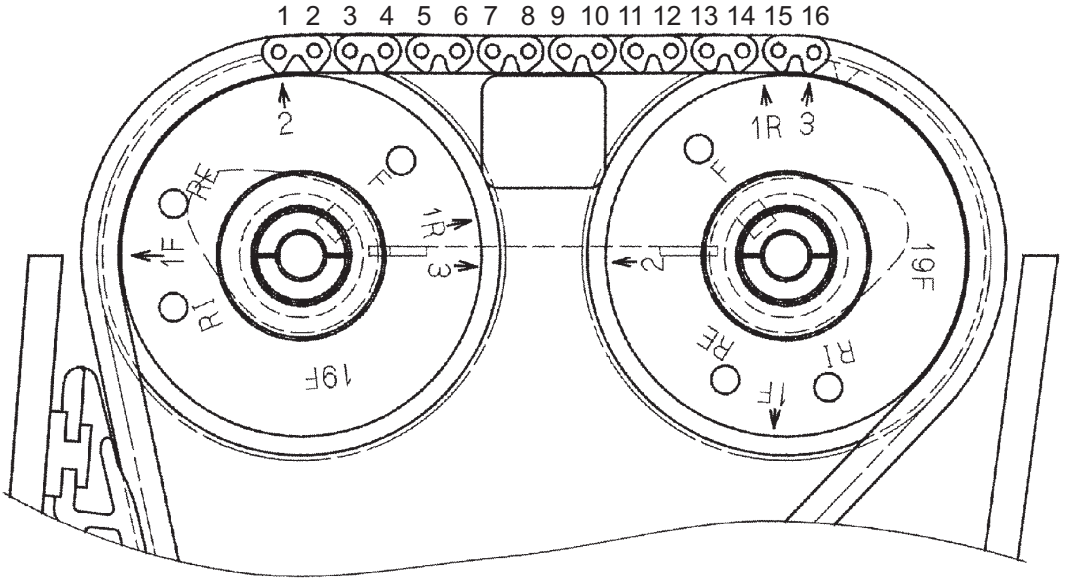
- Engage the 16th roller pin “E” on the cam chain with the arrow marked “3” on the intake sprocket.

NOTE

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

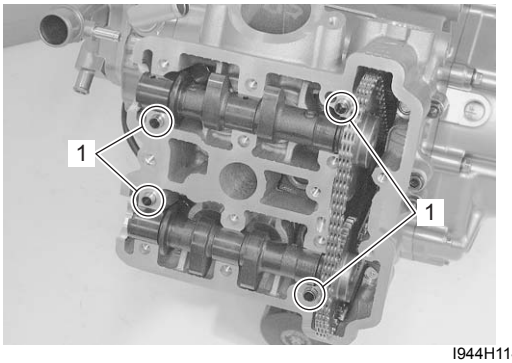


I944H1140180-01



I944H1140181-01

- Install the dowel pins (1).



I944H1140182-01

- Apply molybdenum oil to the camshaft journal holders.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

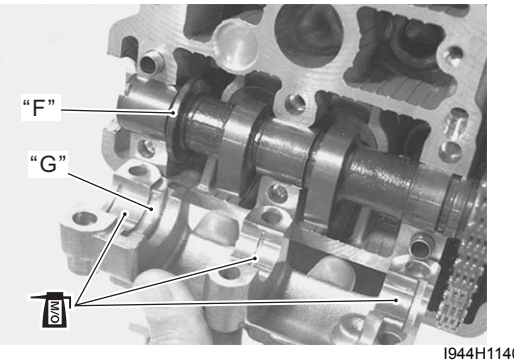
- Install the camshaft journal holders, intake and exhaust.

⚠ CAUTION

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

NOTE

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



I944H1140183-02

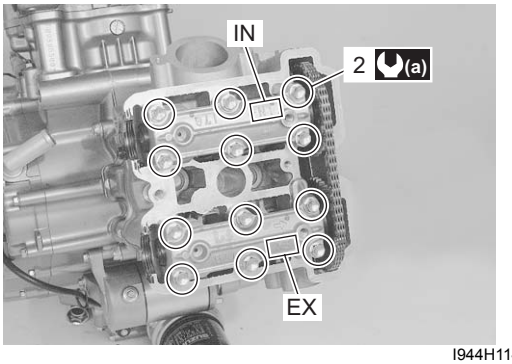
- Fasten the camshaft journal holders evenly by tightening the crankshaft journal holder bolts sequentially and diagonally.

⚠ CAUTION

The camshaft journal holder bolts are made of a special material and much superior in strength, compared with other types of high strength bolts.
Take special care not to use other types of bolts.

- Tighten the camshaft journal holder bolts (2) to the specified torque.

Tightening torque
Camshaft journal holder bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

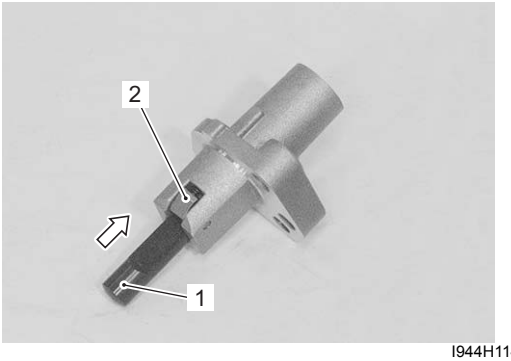


I944H1140184-02

- Recheck the front camshaft positions, intake and exhaust.

Front Cam Chain Tension Adjuster

- Retract the push rod (1) by pushing the stopper (2).



I944H1140185-01

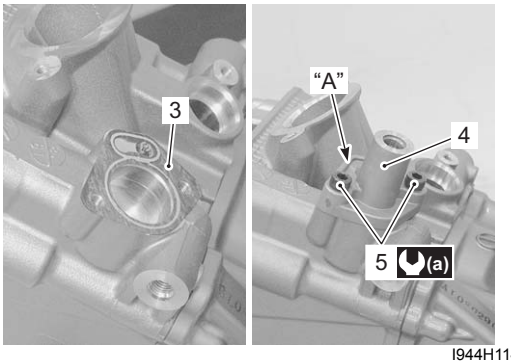
- Install a new gasket (3).

⚠ CAUTION

Use a new gasket to prevent oil leakage.

- Install the cam chain tension adjuster (4) with “F-UP” mark “A” faced to the top of cylinder head.
- Tighten the cam chain tension adjuster bolts (5) to the specified torque.

Tightening torque
Cam chain tension adjuster bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140186-01

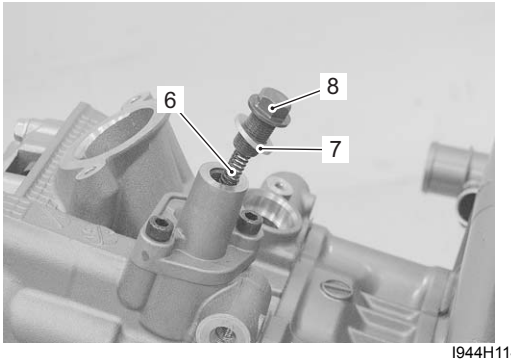
- Install the spring (6), washer (7) and cam chain tension adjuster cap bolt (8).

⚠ CAUTION

Use a new washer to prevent oil leakage.

NOTE

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



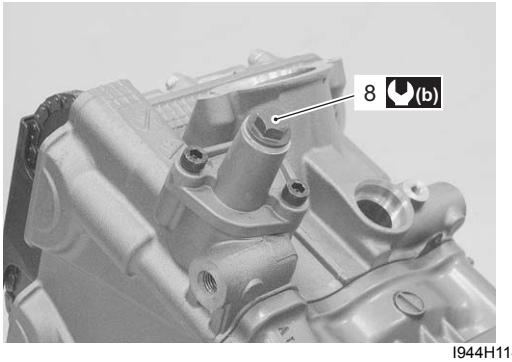
I944H1140187-01

- Tighten the cam chain tension adjuster cap bolt (8) to the specified torque.

Tightening torque
Cam chain tension adjuster cap bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

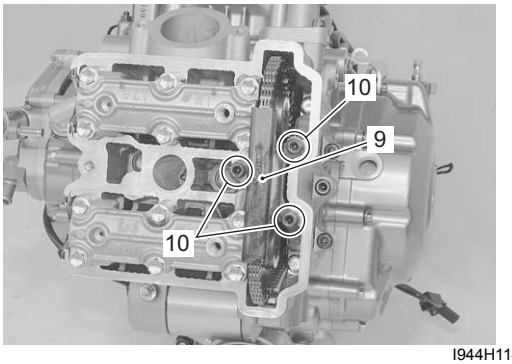
⚠ CAUTION

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

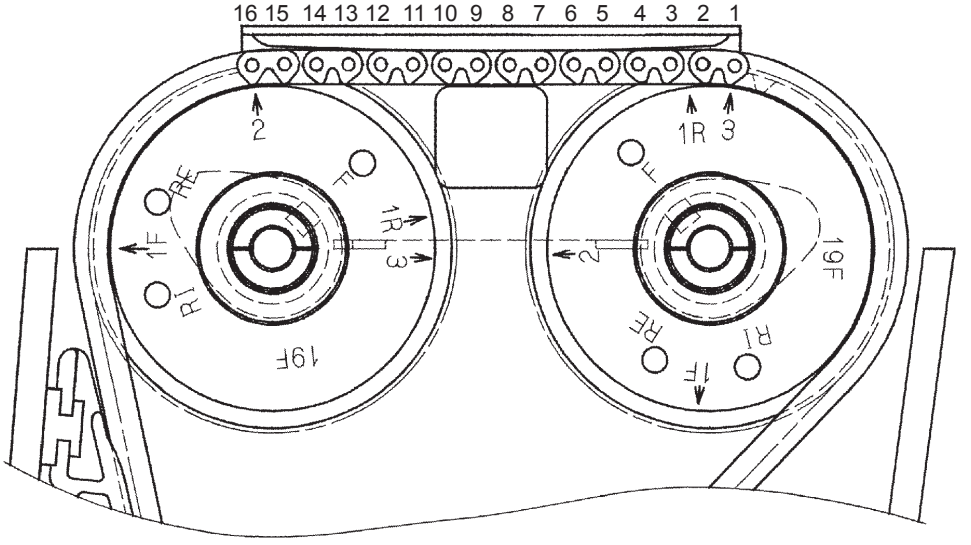


I944H1140188-01

- Install the cam chain guide (9) by tightening its bolts (10).



I944H1140189-02



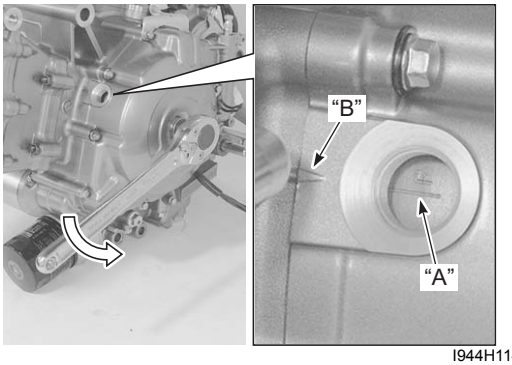
I944H1140190-02

Rear Camshaft

- From the position where the front camshafts have now been installed, rotate the generator rotor 360 degrees (1 turn) counterclockwise and align the “I F” line “A” on the generator rotor with the index mark “B” of the valve timing inspection hole.

⚠ CAUTION

- **Pull the cam chains upward, or the chain will be caught between crankcase and cam drive sprocket.**
- **To adjust the camshaft timing correctly, be sure to align “F I T” line “A” with the index mark “B” and hold this position when installing the camshafts.**



I944H1140140-01

- The camshafts are identified by the embossed letters.

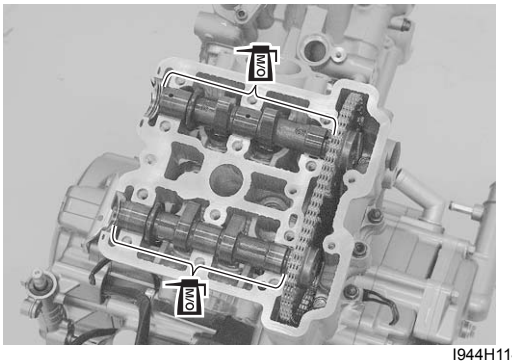
	letter mark
Intake	INR
Exhaust	EXR

- Before replacing the camshafts on cylinder head, apply molybdenum oil solution to their journals and cam faces.
- Apply molybdenum oil solution to the camshaft journal holders.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

NOTE

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

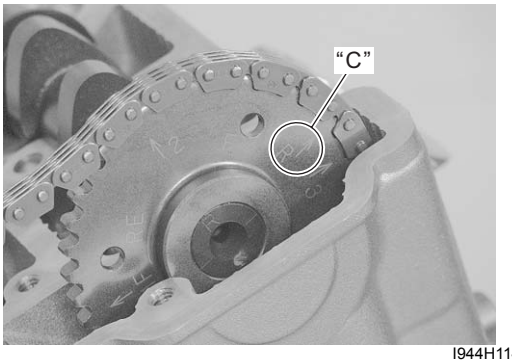


I944H1140191-01

- Pull the cam chain lightly.
- The No. 2 intake camshaft sprocket has an arrow mark “1R” “C”. Install the intake camshaft so that the arrow “C” is aligned with the mating surface of the cylinder head.
- Engage the cam chain with the intake camshaft sprocket.

NOTE

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

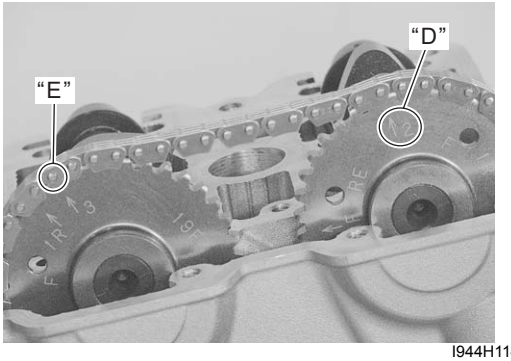


I944H1140192-01

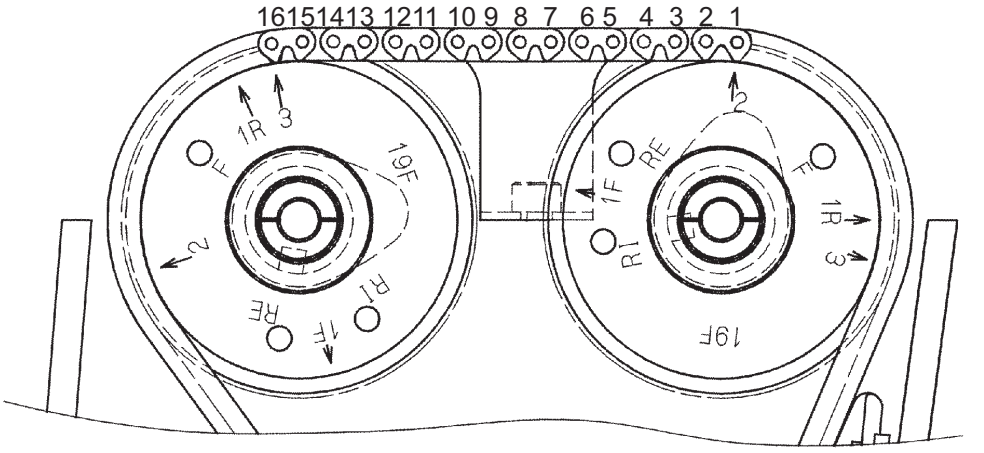
- The other arrow marked “2” “D” should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked “2” “D”, count out 16 roller pins (from the intake camshaft side going towards the exhaust camshaft side).
- Engage the 16th roller pin “E” on the cam chain with the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

NOTE

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

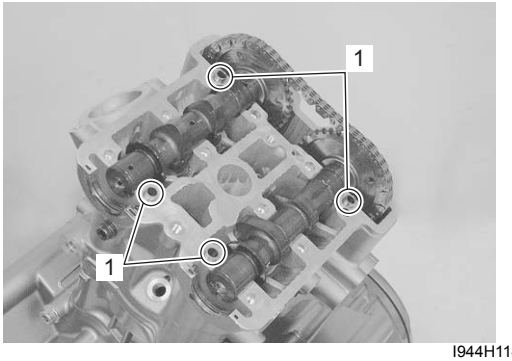


I944H1140193-01



I944H1140194-01

- Install the dowel pins (1).



I944H1140195-01

- Apply molybdenum oil to the camshaft journal holders.

  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

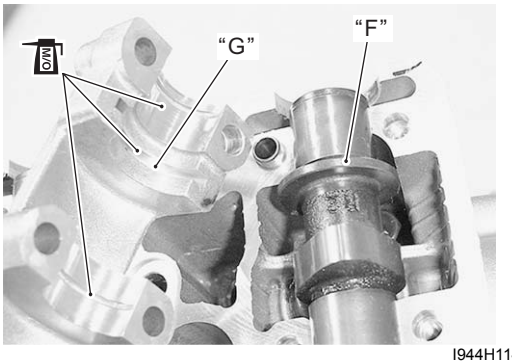
- Install the camshaft journal holders, intake and exhaust.

⚠ CAUTION

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

NOTE

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



I944H1140196-01

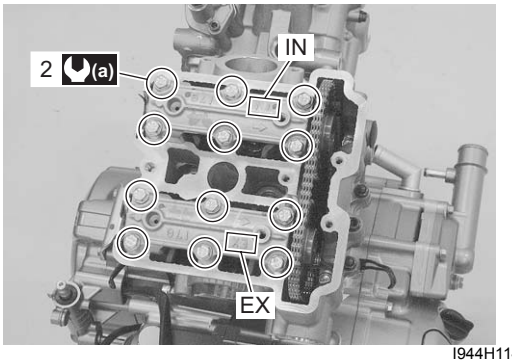
- Fasten the camshaft journal holders evenly by tightening the camshaft journal holder bolts sequentially and diagonally.

⚠ CAUTION

The camshaft journal holder bolts are made of a special material and much superior in strength, compared with other types of high strength bolts.
Take special care not to use other types of bolts.

- Tighten the camshaft journal holder bolts (2) to the specified torque.

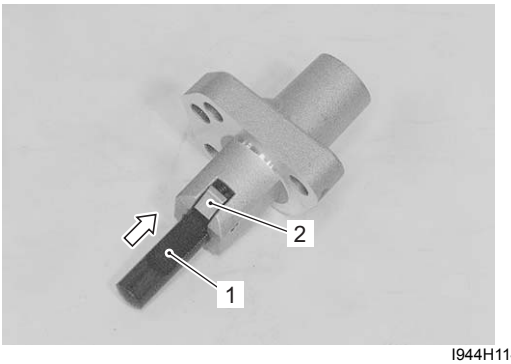
  Tightening torque
  Camshaft journal holder bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140197-02

Rear Cam Chain Tension Adjuster

- The rear cam chain tension adjuster are identified by the embossed letters “R-UP”.
- Retract the push rod (1) by pushing the stopper (2).



I944H1140198-01

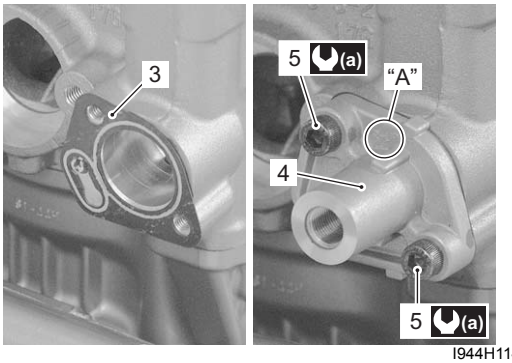
- Install a new gasket (3).

⚠ CAUTION

Use a new gasket to prevent oil leakage.

- Install the cam chain tension adjuster (4) with “R-UP” mark “A” faced to the top of cylinder head.
- Tighten the cam chain tension adjuster bolts (5) to the specified torque.

Tightening torque
Cam chain tension adjuster bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140199-02

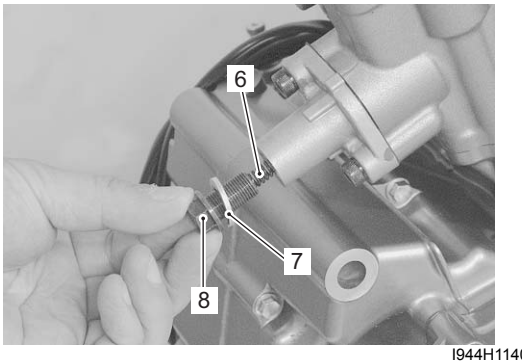
- Install the spring (6), washer (7) and cam chain tension adjuster cap bolt (8).

⚠ CAUTION

Use a new washer to prevent oil leakage.

NOTE

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



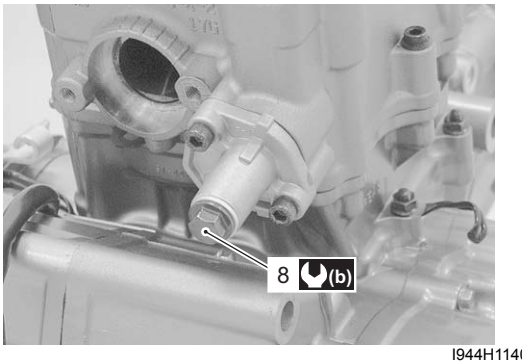
I944H1140200-01

- Tighten the cam chain tension adjuster cap bolt (8) to the specified torque.

Tightening torque
Cam chain tension adjuster cap bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

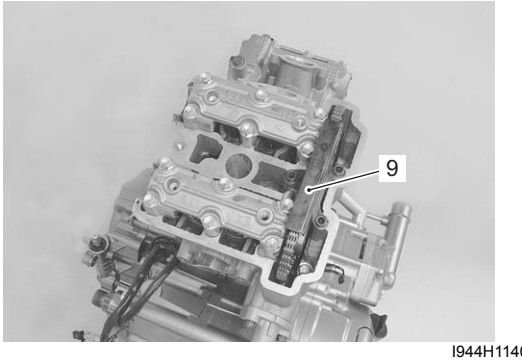
⚠ CAUTION

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



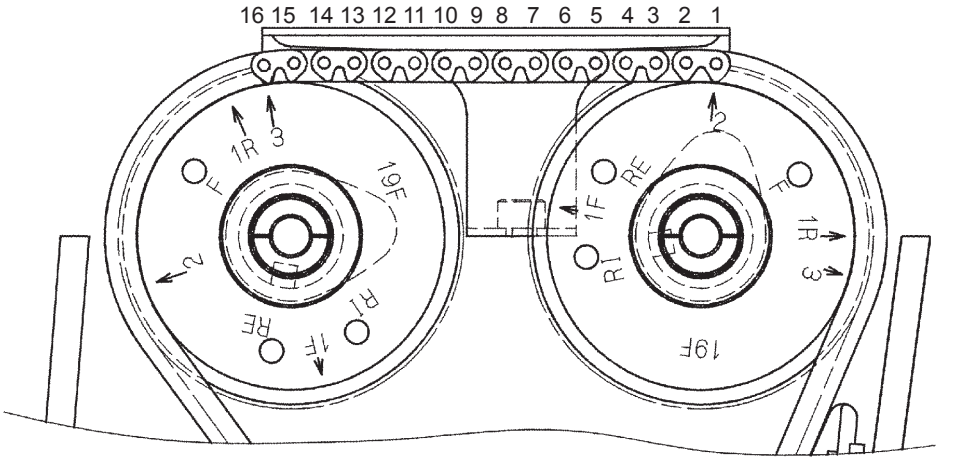
I944H1140201-01

- Install the cam guide (9).



I944H1140202-01

- After installing the cam chain tension adjuster, rotate the crankshaft (some turns), and recheck the positions of the camshafts.



I944H1140203-02

- Be sure to check and adjust the valve clearance. Refer to “Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-4)”.
- Apply engine oil to the new O-ring.

⚠ CAUTION

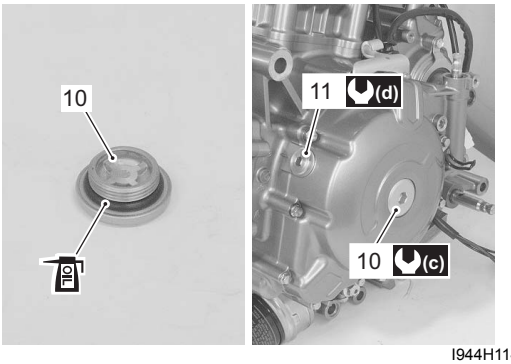
Use a new O-ring to prevent oil leakage.

- Tighten the generator cover plug (10) and valve timing inspection plug (11) to the specified torque.

⚠ CAUTION

Use the new gasket washer to prevent oil leakage.

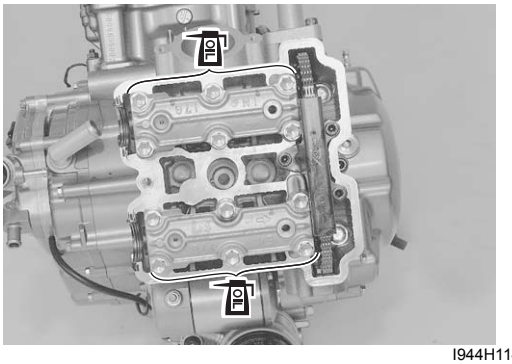
Tightening torque
Generator cover plug (c): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
Valve timing inspection plug (d): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



I944H1140336-02

Cylinder Head Cover

- Pour engine oil in each oil pocket in the cylinder heads.



I944H1140204-01

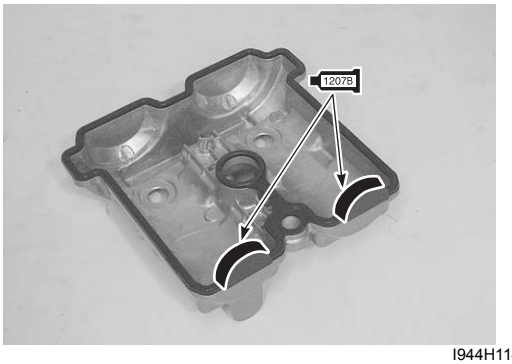
- Install a new gaskets to the cylinder head covers.

⚠ CAUTION

Use new gaskets to prevent oil leakage.

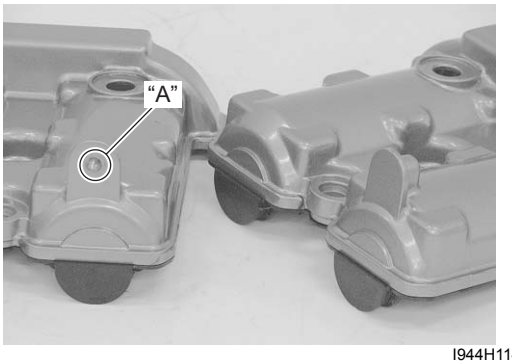
- Apply bond to the cam end caps of the gaskets as shown in the figure.

1207B : Sealant 99000–31140 (SUZUKI BOND No.1207B or equivalent)



I944H1140205-01

- The cylinder head covers can be distinguished by radiator mounting hole “A”.



I944H1140206-01

“A”: Front cylinder only

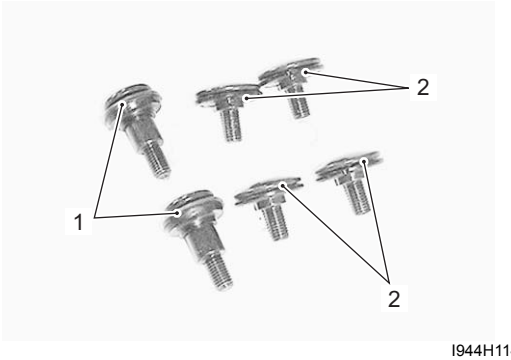
- Place the cylinder head covers on the cylinder heads.
- Fit new gaskets (1) and (2) to each head cover bolts.

⚠ CAUTION

Use the new gaskets to prevent oil leakage.

NOTE

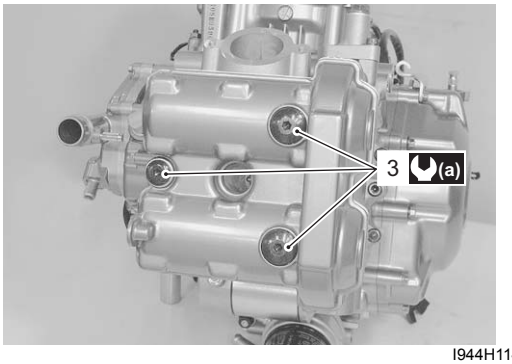
The metal side of the gasket (1) must face to the bolt flange.



I944H1140207-01

- Tighten the cylinder head cover bolts (3) in ascending order of numbers to the specified torque.

Tightening torque
Cylinder head cover bolt (a): 14 N·m (1.4 kgf-m, 10.0 lbf-ft)



I944H1140208-01

Spark Plug
Install the spark plugs. Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-5)”.

Exhaust Pipe

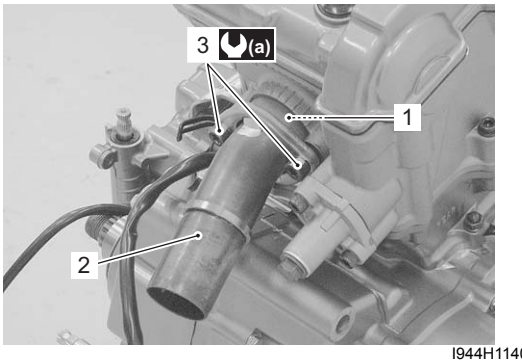
- Install the gasket (1) and rear exhaust pipe (2).

⚠ CAUTION

Use the new gasket to prevent exhaust gas leakage.

- Tighten the exhaust pipe bolts (3) to the specified torque.

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



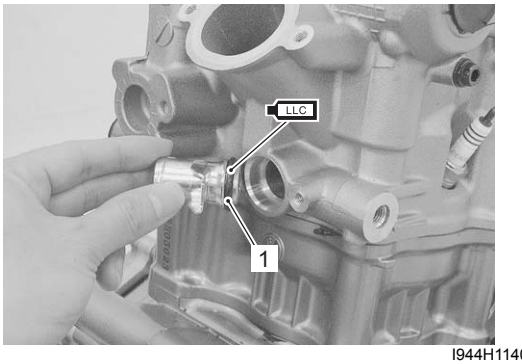
I944H1140209-01

Water Union

- Apply engine coolant to the O-ring (1).

⚠ CAUTION

Use a new O-ring (1) to prevent engine coolant leakage.



I944H1140210-01

Intake Pipe

- Apply grease to the O-ring.

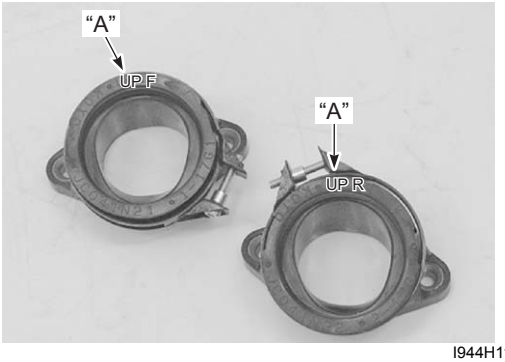
⚠ CAUTION

Use a new O-ring to prevent mixture air from soaking through the joint.

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

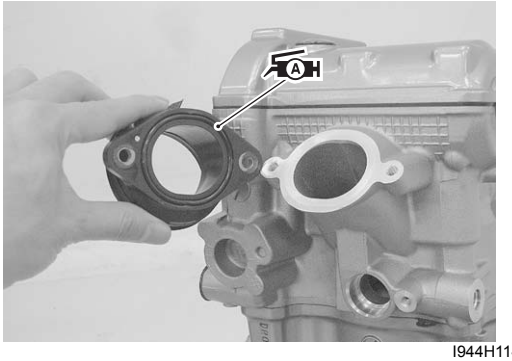
NOTE

- **Face the "UP" mark "A" on the intake pipe to upper.**
- **The intake pipe can be identified by the marks, "F" and "R".**



I944H1140211-05

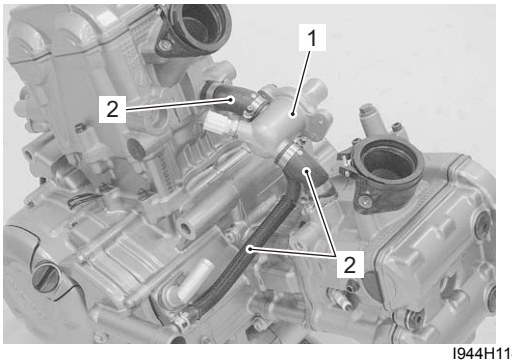
"F":	Front cylinder head intake pipe
"R":	Rear cylinder head intake pipe



I944H1140212-01

Thermostat

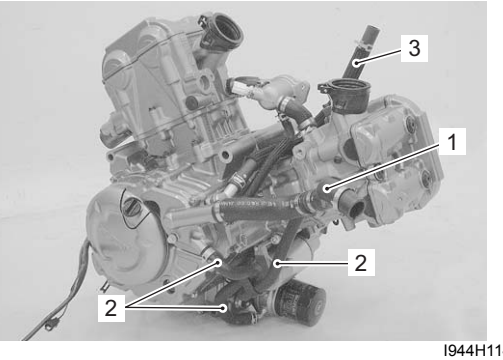
Install the thermostat assembly (1) and water hoses (2). Refer to "Water Hose Routing Diagram in Section 1F (Page 1F-3)".



I944H1140135-01

Radiator Hose / Breather Hose

Install the radiator hose (1), oil cooler hoses (2) and breather hose (3).
Refer to "Water Hose Routing Diagram in Section 1F (Page 1F-3)" and "Throttle Body Construction (Page 1D-8)".



I944H1140134-01

Valve Clearance Inspection and Adjustment

B944H11406008

Refer to "Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-4)".

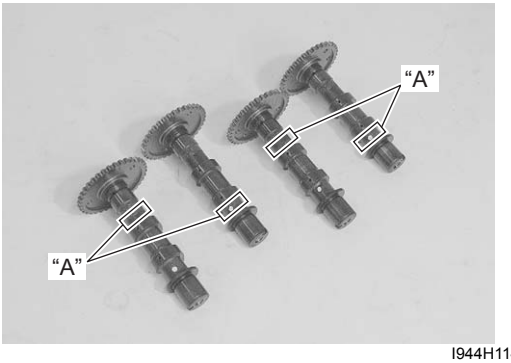
Camshaft Inspection

B944H11406009

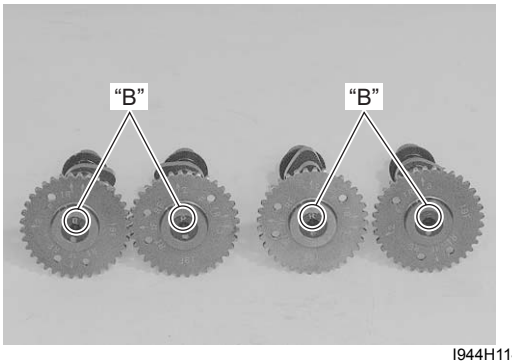
Refer to “Engine Top Side Disassembly (Page 1D-25)”.
Refer to “Engine Top Side Assembly (Page 1D-31)”.

Camshaft Identification

The camshafts can be identified by the engraved letter “A” and cords “B” stamped on the camshaft ends.



I944H1140213-01



I944H1140214-01

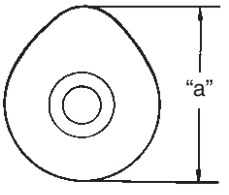
	Letter “A”	Cord “B”
Front intake camshaft	INF	O
Front exhaust camshaft	EXF	P
Rear intake camshaft	INR	R
Rear exhaust camshaft	EXR	S

Cam Wear

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

Special tool
TOOL : 09900–20202 (Micrometer (1/100 mm, 25 – 50 mm))

Cam height “a”
Service limit: (IN.) 36.08 mm (1.4205 in)
Service limit: (EX.) 35.38 mm (1.3929 in)



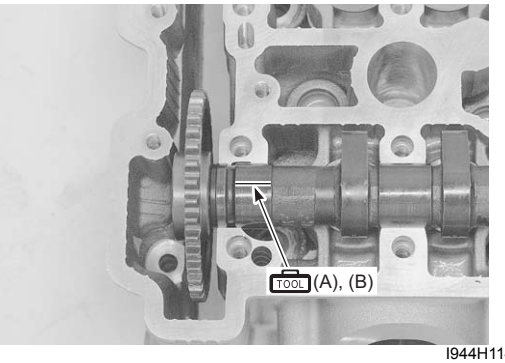
I649G1140199-02

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 plastigauge to read the clearance at the widest portion, which is specified as follows:

Special tool
TOOL (A): 09900–22301 (Plastigauge (0.025 – 0.076 mm))
TOOL (B): 09900–22302 (Plastigauge (0.051 – 0.152 mm))



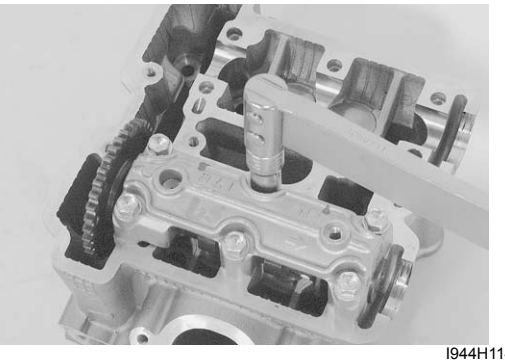
I944H1140216-01

3) Install camshaft journal holder and tighten the camshaft journal holder bolts in ascending order of numbers to the specified torque. Refer to “Engine Top Side Assembly (Page 1D-31)”.

NOTE

Do not rotate the camshafts with the plastigauge in place.

Tightening torque
Camshaft journal holder bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

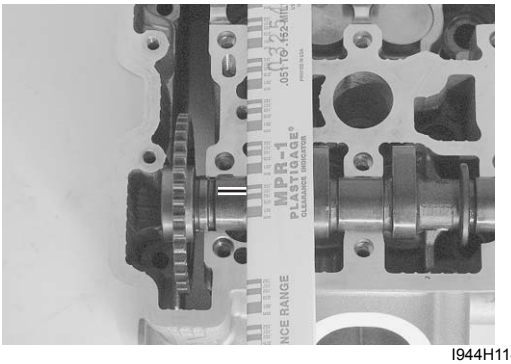


I944H1140217-01

4) Remove the camshaft journal holder and measure the width of the compressed plastigauge using the envelope scale.

5) This measurement should be taken at the widest part of the compressed plastigauge.

Camshaft journal oil clearance (IN. & EX.)
Service limit: 0.150 mm (0.0059 in)



I944H1140218-01

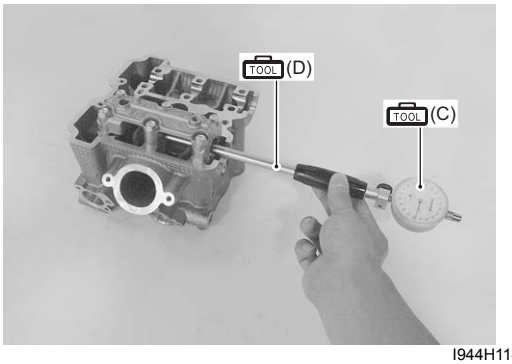
6) If the camshaft journal oil clearance exceeds the limit, measure the inside diameter of the camshaft journal holder and the outside diameter of the camshaft journal. Replace the camshaft or the cylinder head depending upon which one exceeds the specification.

Special tool
TOOL (C): 09900–20602 (Dial gauge (1/1000 mm, 1 mm))
TOOL (D): 09900–22403 (Small bore gauge (18 – 35 mm))

Camshaft journal holder I.D. (IN. & EX.)
Standard: 22.007 – 22.028 mm (0.8664 – 0.8672 in)

Special tool
TOOL (E): 09900–20205 (Micrometer (0 – 25 mm))

Camshaft journal O.D. (IN. & EX.)
Standard: 21.959 – 21.980 mm (0.8645 – 0.8654 in)



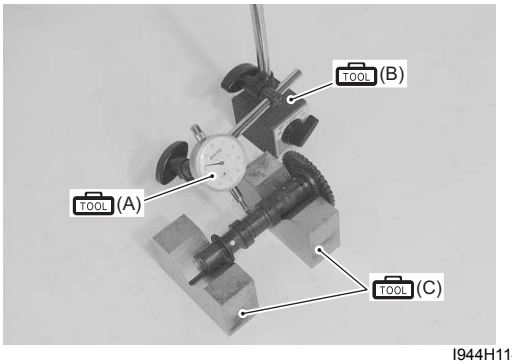
I944H1140219-01

I944H1140220-01

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

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL (B): 09900–20701 (Magnetic stand)
TOOL (C): 09900–21304 (V-block (100 mm))

Camshaft runout (IN. & EX.)
Service limit: 0.10 mm (0.004 in)



I944H1140221-02

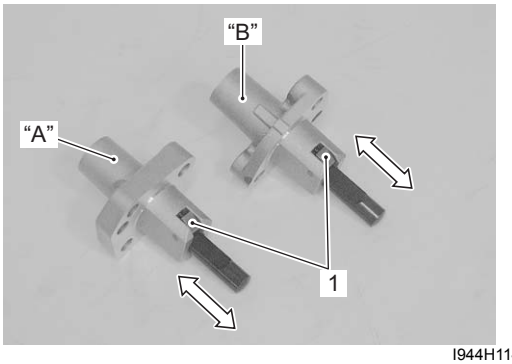
Cam Chain Tension Adjuster Inspection

B944H11406012

The cam chain tension adjusters are maintained at the proper cam chain tension automatically.

1) Remove the cam chain tension adjusters, front and rear adjuster. Refer to “Engine Top Side Disassembly (Page 1D-25)”.

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



I944H1140222-01

"A":	Front cam chain tension adjuster
"B":	Rear cam chain tension adjuster

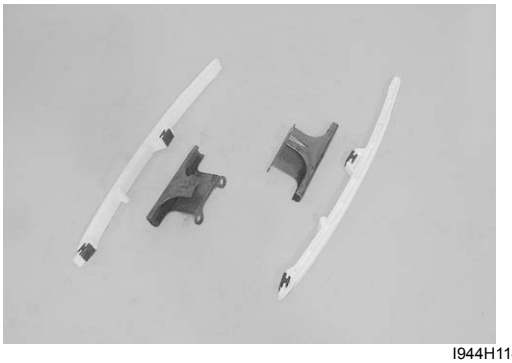
3) Install the cam chain tension adjusters. Refer to "Engine Top Side Assembly (Page 1D-31)".

Cam Chain Guide Inspection

B944H11406014

Inspect the cam chain guides in the following procedures:

1) Remove the cam chain guides No. 1 and No. 2. Refer to "Engine Top Side Disassembly (Page 1D-25)".
2) Check the contacting surface of the cam chain guides. If it is worn or damaged, replace it with a new one.



I944H1140223-01

3) Install the cam chain guides No. 1 and No. 2. Refer to "Engine Bottom Side Assembly (Page 1D-65)" and "Engine Top Side Assembly (Page 1D-31)".

Cam Chain Tensioner Inspection

B944H11406015

Inspect the cam chain tensioner in the following procedures:

1) Remove the cam chain tensioner No. 1, front and rear. Refer to "Engine Bottom Side Disassembly (Page 1D-58)".
2) Check the contacting surface of the cam chain tensioner. If it is worn or damaged, replace it with a new one.

I944H1140224-01

3) Install the cam chain tensioner, front and rear. Refer to "Engine Bottom Side Assembly (Page 1D-65)".

Cylinder Head Disassembly and Assembly

B944H11406016

Refer to "Engine Top Side Disassembly (Page 1D-25)".
Refer to "Engine Top Side Assembly (Page 1D-31)".

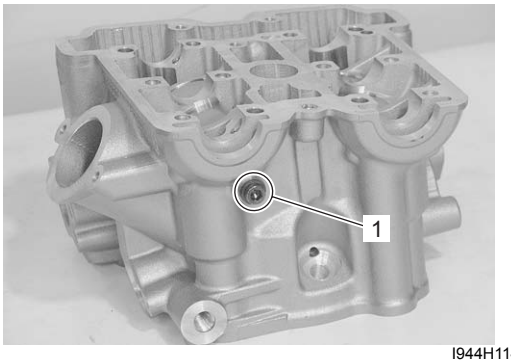
⚠ CAUTION

Identify the position of each removed part. Organize the parts in their respective groups (i.e., intake, exhaust, No. 1 or No. 2) so that they can be installed in their original locations.

Disassembly

Oil gallery plug (Cylinder head)

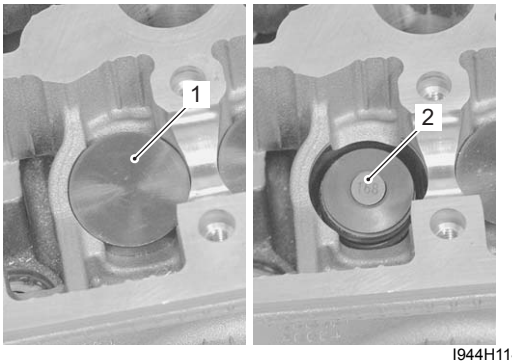
Remove the oil gallery plugs (1) (for front and rear cylinder).



I944H1140225-01

Valve / Valve spring

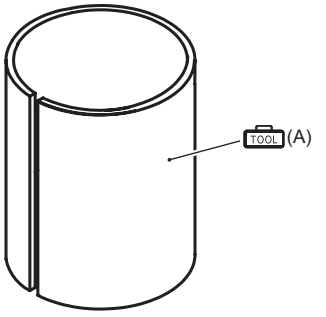
1) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



I944H1140226-01

2) When compressing the valve spring use a sleeve protector.
Cut the sleeve protector as shown in the illustration.

Special tool
TOOL (A): 09919–28620 (Sleeve protector)



I944H1140227-01

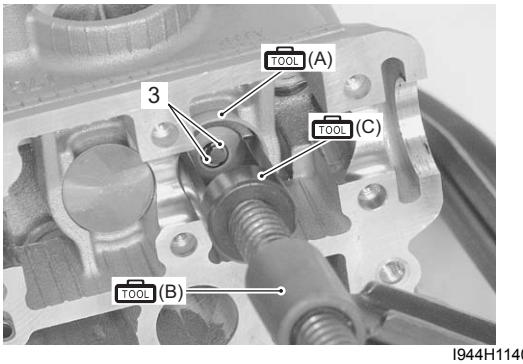
3) Install the sleeve protector between the valve spring and cylinder head.

⚠ CAUTION

To prevent damage of the tappet sliding surface with the valve lifter attachment, use a protector.

4) Using the special tools, compress the valve spring and remove the two cotter halves (3) from the valve stem.

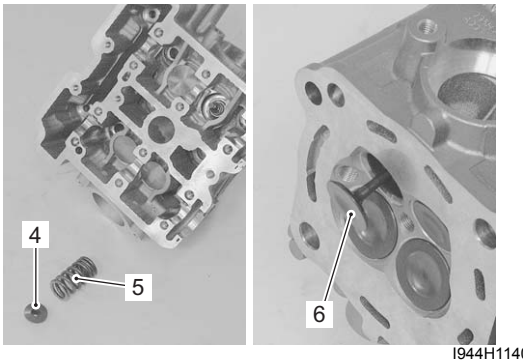
Special tool
TOOL (A): 09919–28620 (Sleeve protector)
TOOL (B): 09916–14510 (Valve spring compressor)
TOOL (C): 09916–14522 (Valve spring compressor attachment)
TOOL : 09916–84511 (Tweezers)



I944H1140228-01

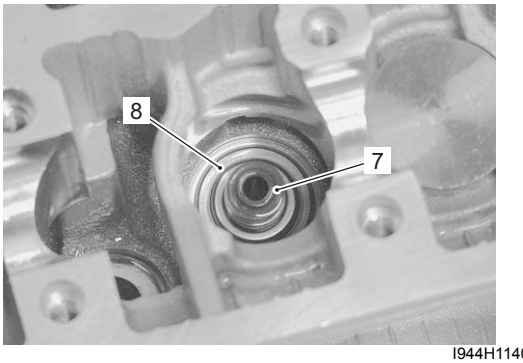
5) Remove the valve spring retainer (4) and valve spring (5).

6) Pull out the valve (6) from the combustion chamber side.



I944H1140229-01

7) Remove the oil seal (7) and spring seat (8).



I944H1140230-01

Assembly
Assembly is in the reverse order of disassembly. Pay attention to the following points:

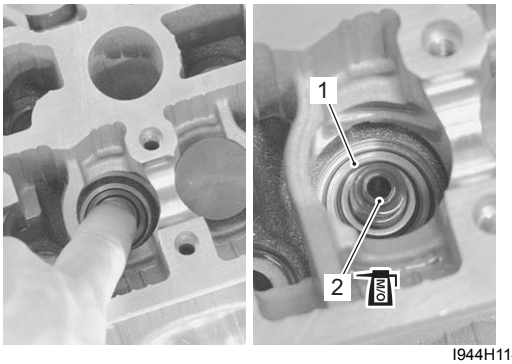
Valve / Valve spring

- Install the valve spring seat (1).
- Apply molybdenum oil solution to the oil seal (2), and press-fit it into position.

⚠ CAUTION

Use a new oil seal to prevent oil leakage.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



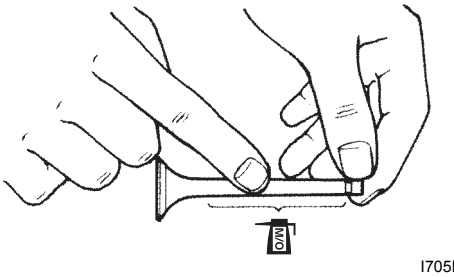
I944H1140231-01

- Insert the valve, with its stem coated with molybdenum oil solution all around and along the full stem length without any break.

⚠ CAUTION

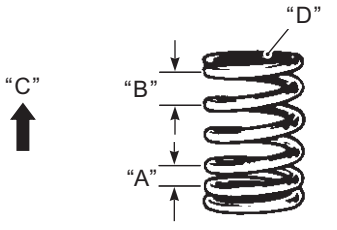
When inserting the valve, take care not to damage the lip of the oil seal.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



I705H1140165-01

- Install the valve spring with the small-pitch portion “A” facing cylinder head.



I822H1140347-01

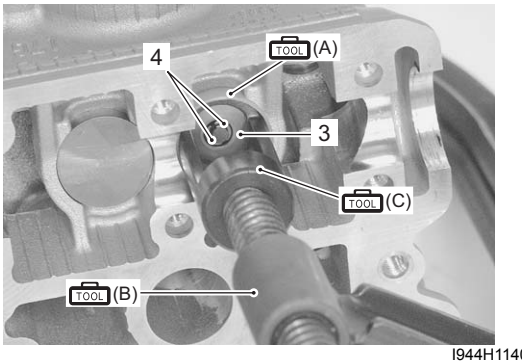
“A”: Small-pitch portion	“C”: Upward
“B”: Large-pitch portion	“D”: Paint

- 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 (4) halves to wedge in between retainer and stem.

⚠ CAUTION

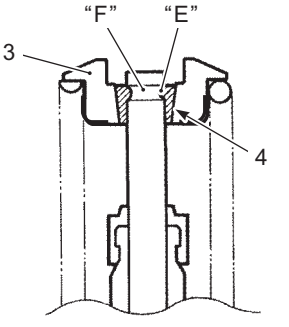
- **Be sure to restore each spring and valve to their original positions.**
- **Be careful not to damage the valve and valve stem when handling it.**
- **To prevent damage of the tappet sliding surface with the valve lifter attachment, use a protector.**

Special tool
TOOL (A): 09919–28620 (Sleeve protector)
TOOL (B): 09916–14510 (Valve spring compressor)
TOOL (C): 09916–14522 (Valve spring compressor attachment)
TOOL : 09916–84511 (Tweezers)



I944H1140232-01

- Be sure that the rounded lip “E” of the cotter fits snugly into the groove “F” in the stem end.



I944H1140233-01

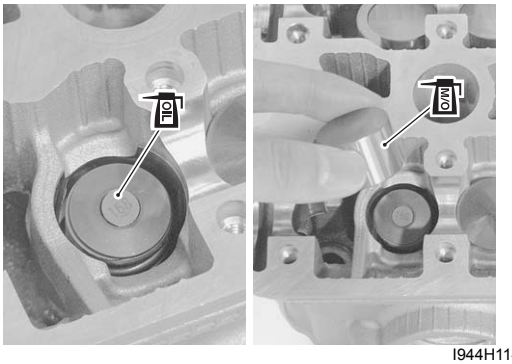
3. Valve spring retainer	4. Cotter

- Install the tappet shims and the tappets to their original positions.

NOTE

- **Apply engine oil to the stem.**
- **Apply molybdenum oil solution to the tappet.**
- **When seating the tappet shim, be sure the figure printed surface faces the tappet.**

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



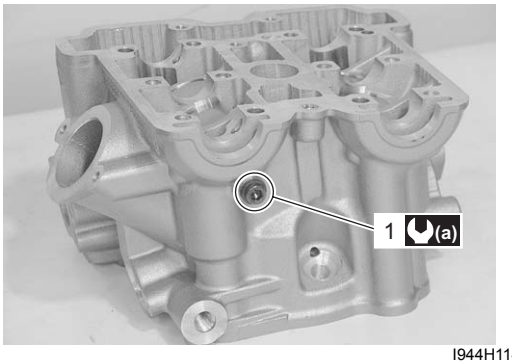
I944H1140234-01

Oil gallery plug (Cylinder head)
Tighten the oil gallery plugs (1) to the specified torque.

⚠ CAUTION

Replace the gasket with new ones.

Tightening torque
Oil gallery plug (Cylinder head) (M6) (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140235-01

Cylinder Head Related Parts Inspection

B944H11406050

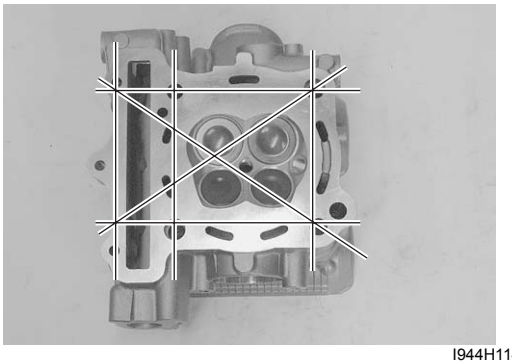
Refer to "Cylinder Head Disassembly and Assembly (Page 1D-46)".

Cylinder Head Distortion

1) Decarbonize the combustion chambers.
2) Check the gasketed surface of the cylinder head for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder head.

Special tool
TOOL : 09900–20803 (Thickness gauge)

Cylinder head distortion
Service limit: 0.05 mm (0.002 in)

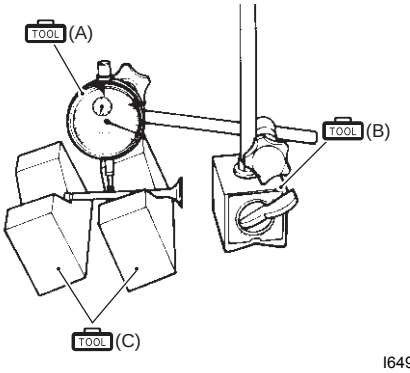


I944H1140236-01

Valve Stem Runout
Support the valve using V-blocks, and check its runout using the dial gauge as shown in the figure. If the runout exceeds the service limit, replace the valve.

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL (B): 09900–20701 (Magnetic stand)
TOOL (C): 09900–21304 (V-block (100 mm))

Valve stem runout (IN. & EX.)
Service limit: 0.05 mm (0.002 in)

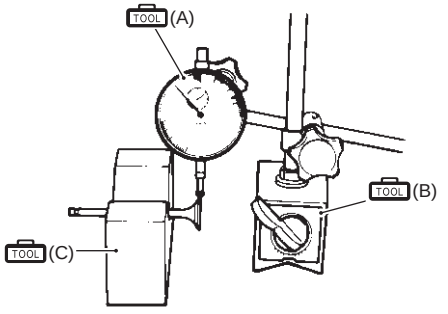


I649G1140231-03

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
(A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
(B): 09900–20701 (Magnetic stand)
(C): 09900–21304 (V-block (100 mm))

Valve head radial runout (IN. & EX.)
Service limit: 0.03 mm (0.001 in)

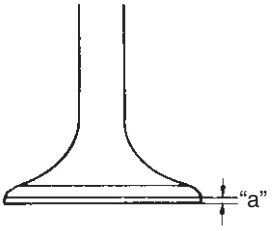


I649G1140232-03

Valve Face Wear
Visually inspect each valve face for wear. Replace any valve with an abnormally worn face. The thickness of the valve face decreases as the face wears. Measure the valve head “a”. If it is out of specification replace the valve with a new one.

Special tool
: 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

Valve head thickness “a” (IN. & EX.)
Service limit: 0.5 mm (0.02 in)

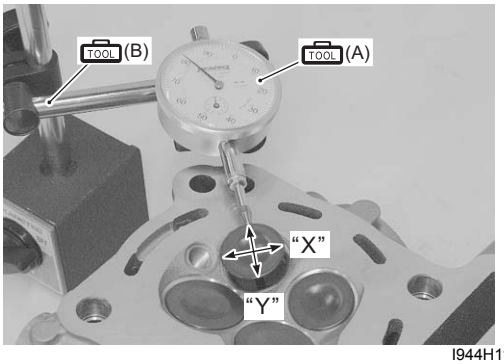


I649G1140233-02

Valve stem deflection
Lift the valve about 10 mm (0.39 in) from the valve seat. Measure the valve stem deflection in two directions, “X” and “Y”, perpendicular to each other, positioning the dial gauge as shown in the figure. If the deflection measured exceeds the service limit, then determine whether the valve or the guide should be replaced with a new one.

Special tool
(A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
(B): 09900–20701 (Magnetic stand)

Valve stem deflection (IN. & EX.)
Service limit: 0.35 mm (0.014 in)



I944H1140237-01

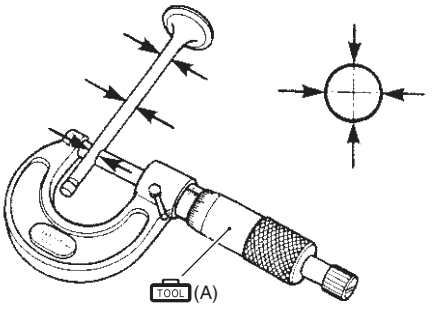
Valve Stem Wear
Measure the valve stem O.D. using the micrometer.
If the valve stem is worn down to the limit, as measured with a micrometer, replace the valve.
If the stem is within the limit, then replace the guide.
After replacing valve or guide, be sure to recheck the deflection.

Special tool
(A): 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-52)".

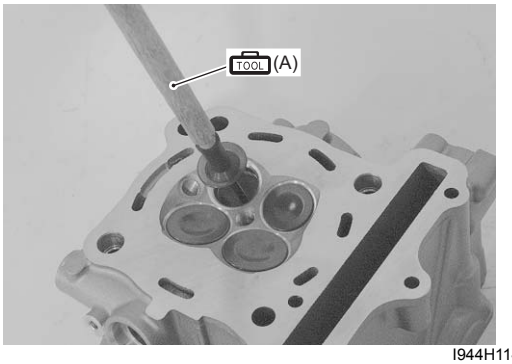


I718H1140122-01

Valve Seat Width

1) Visually check for valve seat width on each valve face. If the valve face has worn abnormally, replace the valve.
2) Coat the valve seat with a red lead (Prussian Blue) and set the valve in place.
3) Rotate the valve with light pressure.

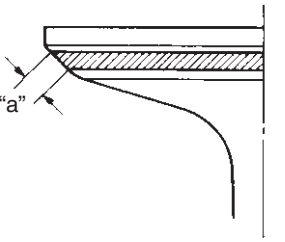
Special tool
TOOL (A): 09916–10911 (Valve lapper set)



I944H1140238-01

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-53)".

Valve seat width "a" (IN. & EX.)
Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)



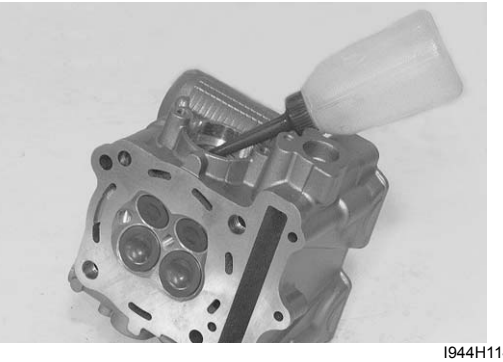
I649G1140246-02

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-53)".

⚠ WARNING

Always use extreme caution when handling gasoline.



I944H1140239-02

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

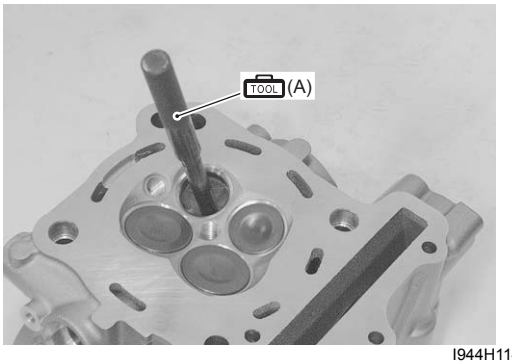
B944H11406052

1) Remove the cylinder head. Refer to “Engine Top Side Disassembly (Page 1D-25)”.
2) Remove the valves and springs. Refer to “Cylinder Head Disassembly and Assembly (Page 1D-46)”.
3) Using the valve guide remover, drive the valve guide out toward the intake or exhaust camshaft side.

Special tool
TOOL (A): 09916–43211 (Valve guide remover/ installer)

NOTE

- **Discard the removed valve guide sub assemblies.**
- **Only oversized valve guides are available as replacement parts. (Part No. 11115-18D72)**



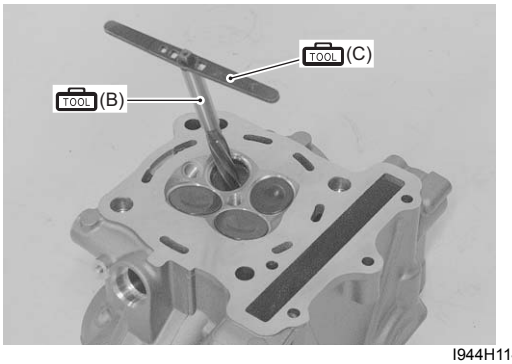
I944H1140240-01

4) Refinish the valve guide holes in the cylinder head using the reamer and handle.

⚠ CAUTION

When refinishing or removing the reamer from the valve guide hole, always turn it clockwise.

Special tool
TOOL (B): 09916–34580 (Valve guide reamer (10.8 mm))
TOOL (C): 09916–34542 (Reamer handle)



I944H1140241-01

5) Cool down the new valve guides in a freezer for about one hour and heat the cylinder head to 100 – 150 °C (212 – 302 °F) with a hot plate.

⚠ CAUTION

Do not use a burner to heat the valve guide hole to prevent cylinder head distortion.

6) Apply engine oil to each valve guide and valve guide hole.
7) Drive the guide into the guide hole using the valve guide installer and attachment.

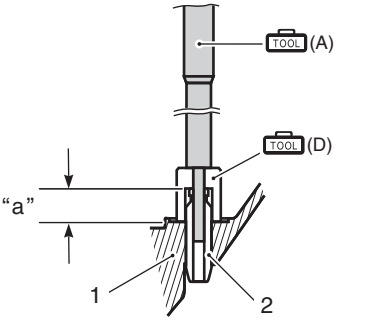
NOTE

Install the valve guide until the attachment contacts the cylinder head.

⚠ CAUTION

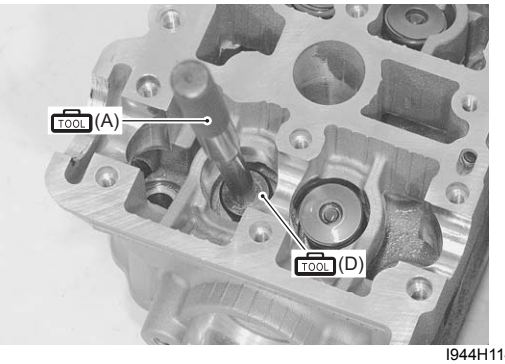
Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.

Special tool
TOOL (A): 09916–43211 (Valve guide remover/ installer)
TOOL (D): 09916–53330 (Attachment)



I717H1140113-01

1. Cylinder head	“a”: 13.5 mm (0.53 in)
2. Valve guide	



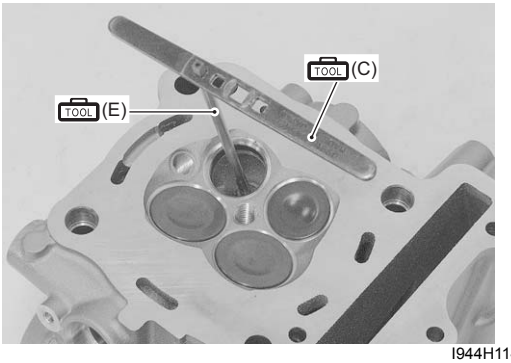
I944H1140242-01

8) After installing the valve guides, refinish their guiding bores using the reamer. Be sure to clean and oil the guides after reaming.

Special tool
(C): 09916–34542 (Reamer handle)
(E): 09916–33210 (Valve guide reamer (4.5 mm))

NOTE

- **Be sure to cool down the cylinder head to ambient air temperature.**
- **Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.**



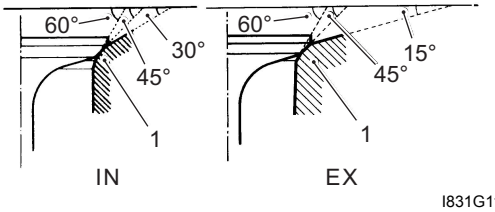
I944H1140243-01

9) Install the valves and springs. Refer to “Cylinder Head Disassembly and Assembly (Page 1D-46)”.
10) Install the cylinder head. Refer to “Engine Top Side Assembly (Page 1D-31)”.

Valve Seat Repair

B944H11406053

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°.



I831G1140170-02

	Intake	Exhaust
Seat angle	30°/45°/60°	15°/45°/60°
Seat width	0.9 – 1.1 mm (0.035 – 0.043 in)	←
Valve diameter	31 mm (1.22 in)	25.5 mm (1.00 in)
Valve guide I.D.	4.500 – 4.512 mm (0.1772 – 0.1776 in)	←

⚠ CAUTION

- **The valve seat contact area must be inspected after each cut.**
- **Do not use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish but not a highly polished or shiny finish. This will provide a soft surface for the final seating of the valve which will occur during the first few seconds of engine operation.**

NOTE

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. Refer to “Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-4)”.

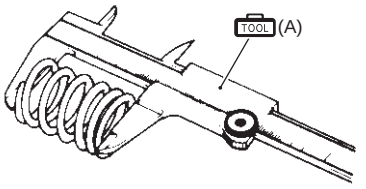
Valve Spring

The force of the coil spring keeps the valve seat tight. Weakened spring results in reduced engine power output and often accounts for the chattering noise coming from the valve mechanism.
Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the spring does not fall within the specified range, replace the valve spring.

Special tool
(A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

Valve spring free length (IN. & EX.)
Service limit: 37.1 mm (1.46 in)

Valve spring tension (IN. & EX.)
Standard: 127 – 147 N (13.0 – 15.0 kgf, 28.5 – 33.0 lbs)/33.4 mm (1.31 in)



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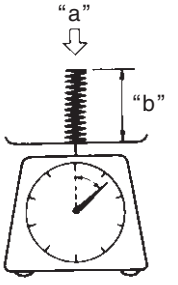

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Tension “a”	Length “b”
127 – 147 N (13.0 – 15.0 kgf, 28.5 – 33.0 lbs)	33.4 mm (1.31 in)

Cylinder Inspection

B944H11406020

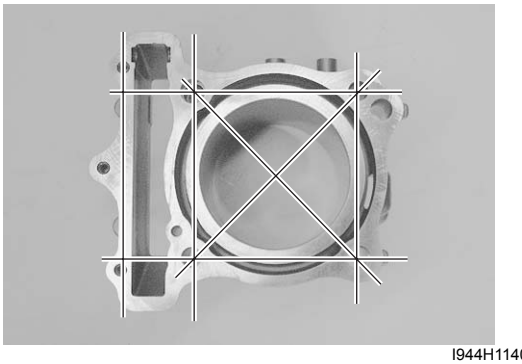
Refer to “Engine Top Side Disassembly (Page 1D-25)”.
Refer to “Engine Top Side Assembly (Page 1D-31)”.

Cylinder Distortion

Check the gasketed surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.

Special tool
: 09900–20803 (Thickness gauge)

Cylinder distortion
Service limit: 0.05 mm (0.002 in)



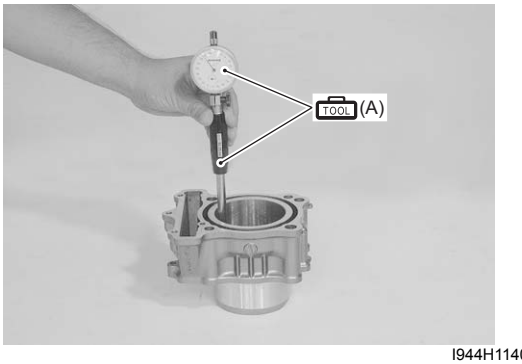
I944H1140244-01

Cylinder Bore

Inspect the cylinder wall for any scratches, nicks or other damage. Measure the cylinder bore diameter at six places.

Special tool
(A): 09900–20530 (Cylinder gauge set)

Cylinder bore
Standard: 81.000 – 81.015 mm (3.1890 – 3.1896 in)



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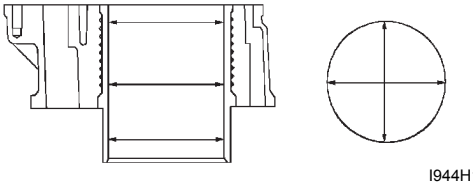


I944H1140245-01

Piston Ring Removal and Installation

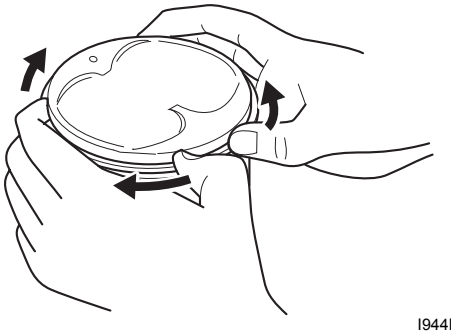
B944H11406022

Removal

1) Draw out the piston pin and remove the piston. Refer to “Engine Top Side Disassembly (Page 1D-25)”.
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.



I944H1140247-01

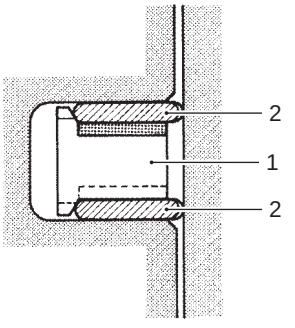
3) Remove the 2nd ring and oil ring in the same procedure.

Installation

NOTE

- **When installing the piston ring, be careful not to damage the piston.**
- **Do not expand the piston ring excessively since it is apt to be broken down.**

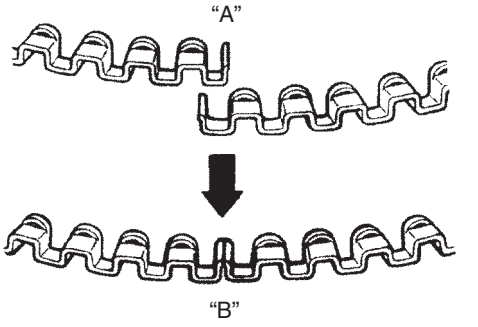
1) Install the piston rings in the order of the oil ring, 2nd ring and 1st ring.
   a) The first member to go into the of the oil ring groove is a spacer (1).
   After placing the spacer, fit the two side rails (2).



I718H1140143-02

⚠ CAUTION

When installing the spacer, be careful not to allow its two ends to overlap in the groove.



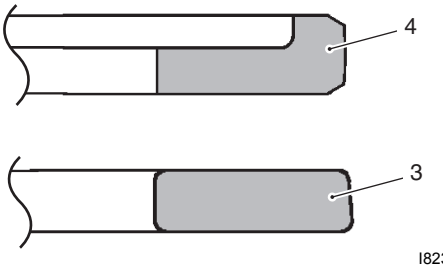
I705H1140170-02

“A”: INCORRECT	“B”: CORRECT

b) Install the 2nd ring (3) and 1st ring (4) to piston.

NOTE

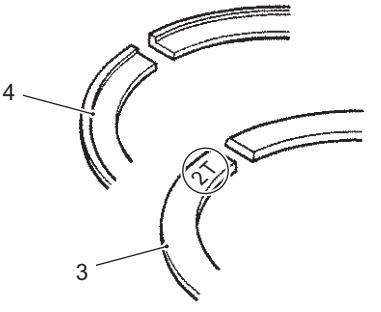
1st ring (4) and 2nd ring (3) differ in shape.



I823H1140147-01

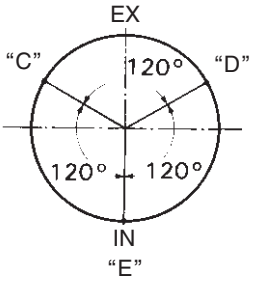
NOTE

- **2nd ring has letters “2T” marked on the side. Be sure to bring the marked side to the top when fitting it to the piston.**
- **Be sure to bring the concave side of 1st ring to the top when fitting it to the piston.**



I944H1140248-01

2) Position the gaps of the three rings and side rails as shown. Before inserting piston into the cylinder, check that the gaps are so located.



I944H1140351-01

"C":	2nd ring and lower side rail
"D":	Upper side rail
"E":	1st ring and spacer

3) Install the piston and piston pin. Refer to "Engine Top Side Assembly (Page 1D-31)".

Piston and Piston Ring Inspection

B944H11406023

Refer to "Piston Ring Removal and Installation (Page 1D-55)".

Piston Diameter

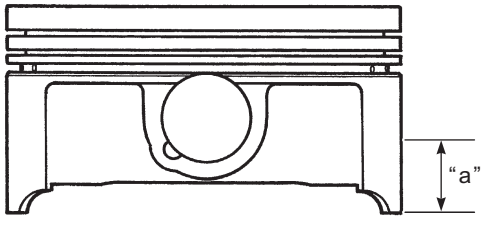
Measure the piston diameter using the micrometer at 20 mm (0.8 in) "a" from the skirt end. If the piston diameter is less than the service limit, replace the piston.

Special tool

TOOL (A): 09900–20204 (Micrometer (75 – 100 mm))

Piston diameter

Service limit: 80.880 mm (3.1842 in)



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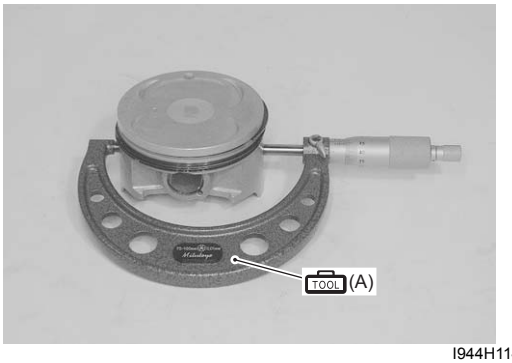


I944H1140250-01

Piston-to-cylinder Clearance

Subtract the piston diameter from the cylinder bore diameter. If the piston-to-cylinder clearance exceeds the service limit, replace both the cylinder and the piston.

Piston-to-cylinder clearance

Service limit: 0.120 mm (0.0047 in)

Piston Ring-to-groove Clearance

Measure the side clearances of the 1st and 2nd piston rings using the thickness gauge. If any of the clearances exceed the limit, replace both the piston and piston rings.

Special tool

TOOL (A): 09900–20803 (Thickness gauge)
TOOL (B): 09900–20205 (Micrometer (0 – 25 mm))

Piston ring-to-groove clearance

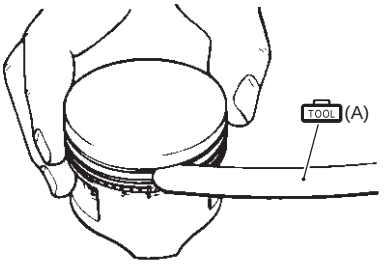
Service limit: (1st): 0.180 mm (0.0071 in)
Service limit: (2nd): 0.150 mm (0.0059 in)

Piston ring groove width

"a": Standard: (1st): 0.83 – 0.85 mm (0.0327 – 0.0335 in)
"b": Standard: (1st): 1.30 – 1.32 mm (0.0512 – 0.0520 in)
"c": Standard: (2nd): 1.01 – 1.03 mm (0.0398 – 0.0406 in)
"d": Standard: (Oil): 2.01 – 2.03 mm (0.0791 – 0.0799 in)

Piston ring thickness

Standard: (1st): 0.76 – 0.81 mm (0.0299 – 0.0319 in)
Standard: (1st): 1.08 – 1.10 mm (0.0425 – 0.0433 in)
Standard: (2nd): 0.97 – 0.99 mm (0.0382 – 0.0390 in)



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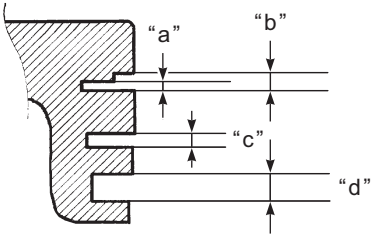

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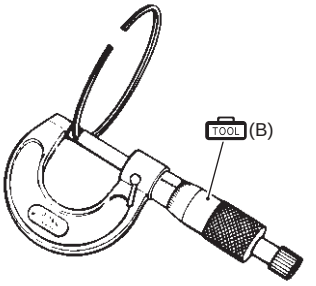


I649G1140264-03

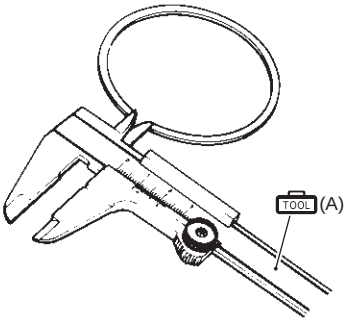
Piston Ring Free End Gap and Piston Ring End Gap
Measure the piston ring free end gap using vernier calipers. Next, fit the piston ring squarely into the cylinder and measure the piston ring end gap using the thickness gauge. If any of the measurements exceed the service limit, replace the piston ring with a new one.

Special tool
TOOL (A): 09900–20101 (Vernier calipers (1/15 mm, 150 mm))

Piston ring free end gap
Service limit: (1st): 5.2 mm (0.20 in)
Service limit: (2nd): 7.2 mm (0.28 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)



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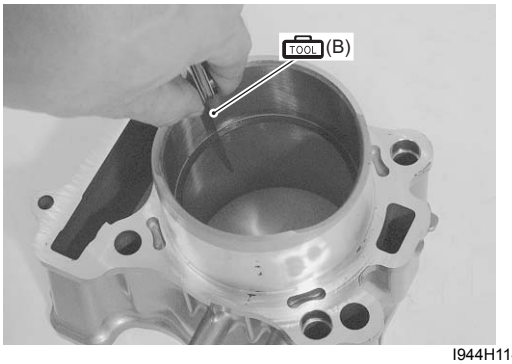
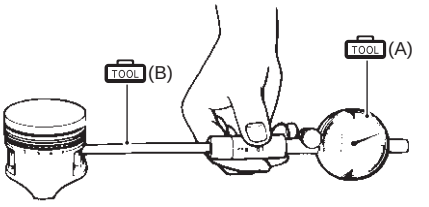


I944H1140251-01

Piston Pin / Pin Bore
Measure the piston pin bore inside diameter using the small bore gauge. If measurement is out of specification, replace the piston.

Special tool
TOOL (A): 09900–20602 (Dial gauge (1/1000 mm, 1 mm))
TOOL (B): 09900–22403 (Small bore gauge (18 – 35 mm))

Piston pin bore I.D.
Service limit: 20.030 mm (0.7886 in)

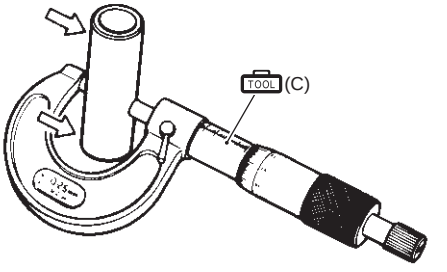


I649G1140267-03

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: 19.980 mm (0.7866 in)



I649G1140268-03

Engine Bottom Side Disassembly

B944H11406024

Refer to “Engine Assembly Removal (Page 1D-18)”.
Refer to “Engine Top Side Disassembly (Page 1D-25)”.

⚠ CAUTION

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

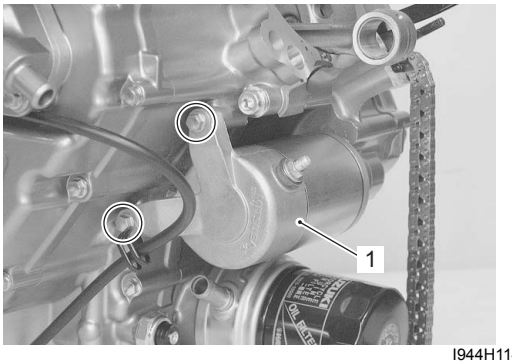
NOTE

The crankcase must be separated to service the crankshaft, oil pump.

1) Remove the engine assembly. Refer to “Engine Assembly Removal (Page 1D-18)”.
2) Remove the cylinder head, cylinder and piston. Refer to “Engine Top Side Disassembly (Page 1D-25)”.

Starter Motor

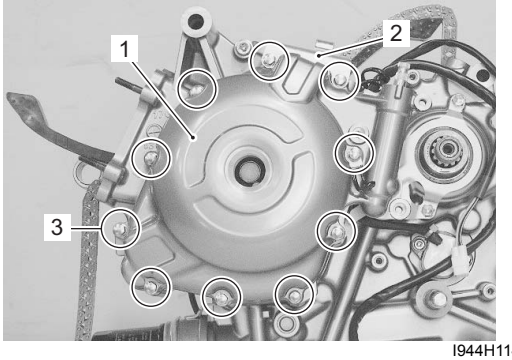
Remove the starter motor (1).



I944H1140001-01

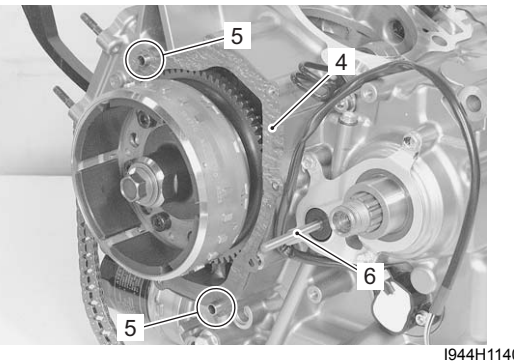
Generator Cover

1) Remove the generator cover (1) and clutch cable stopper (2) by removing the generator cover bolts (3).



I944H1140002-02

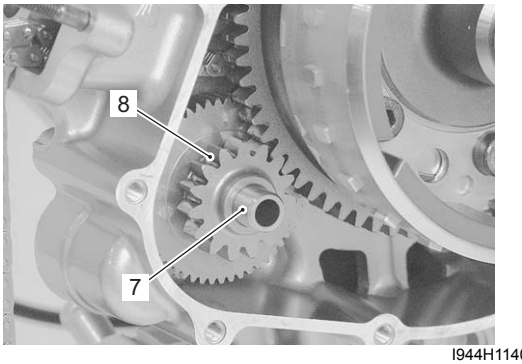
2) Remove the gasket (4), dowel pins (5) and clutch push rod (6).



I944H1140003-03

Starter Idle Gear

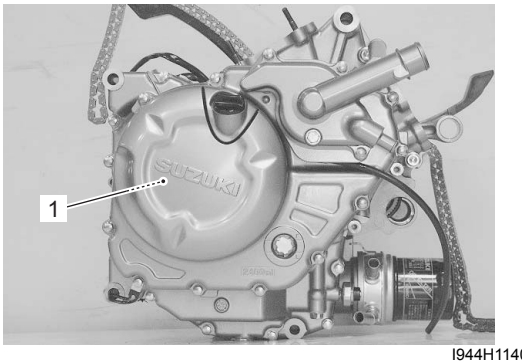
Remove the idle gear shaft (7) and starter idle gear (8).



I944H1140004-02

Clutch

Remove the clutch component parts (1). Refer to “Clutch Removal in Section 5C (Page 5C-7)”.



I944H1140005-02

Oil Pump

1) Remove the snap ring (1).

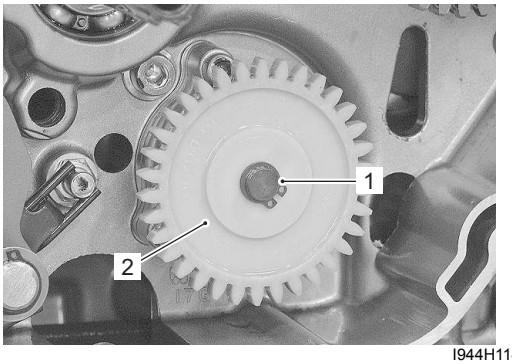
NOTE

Do not drop the snap ring (1) into the crankcase.

Special tool

TOOL : 09900–06107 (Snap ring pliers)

2) Remove the oil pump driven gear (2).



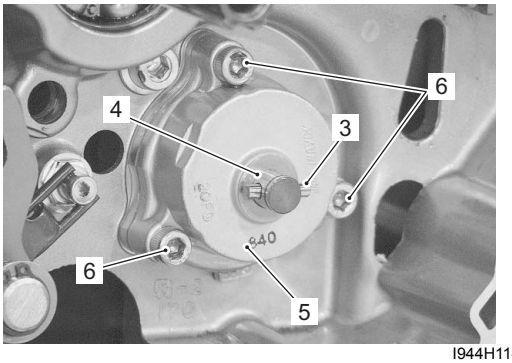
I944H1140006-01

3) Remove the pin (3) and washer (4).

NOTE

Do not drop the pin (3) and washer (4) into the crankcase.

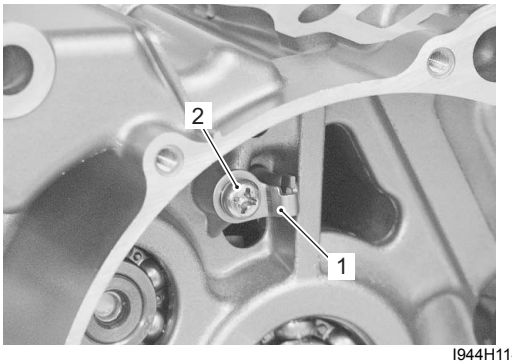
4) Remove the oil pump (5) by removing the its bolts (6).



I944H1140007-02

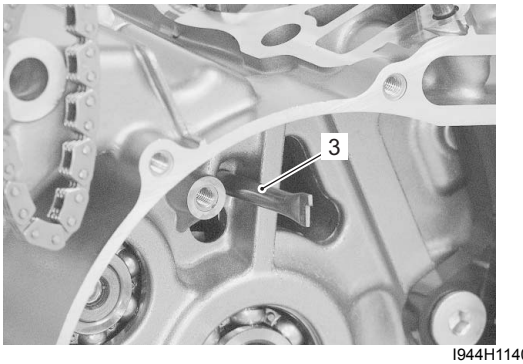
Oil Pipe

1) Remove the oil pipe stopper (1) by removing the its screw (2).



I944H1140008-02

2) Remove the oil pipe (3).



I944H1140009-02

Gearshift System

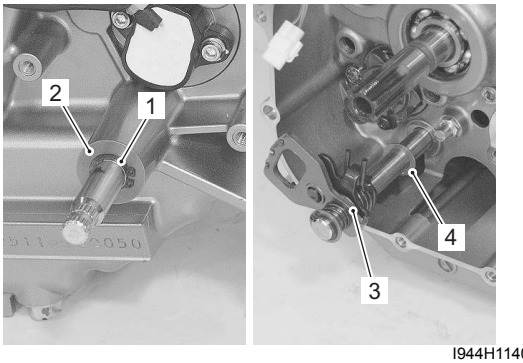
NOTE

Do not drop the each parts into the crankcase.

1) Remove the snap ring (1) and washer (2) from the gearshift shaft.

Special tool
(TOOL) : 09900–06107 (Snap ring pliers)

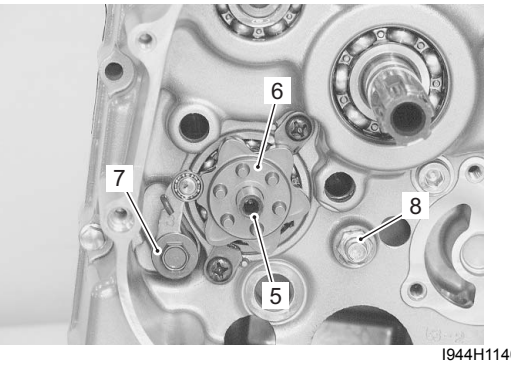
2) Remove the gearshift shaft assembly (3) and washer (4).



I944H1140010-01

3) Remove the gearshift cam plate bolt (5) and gearshift cam plate (6).

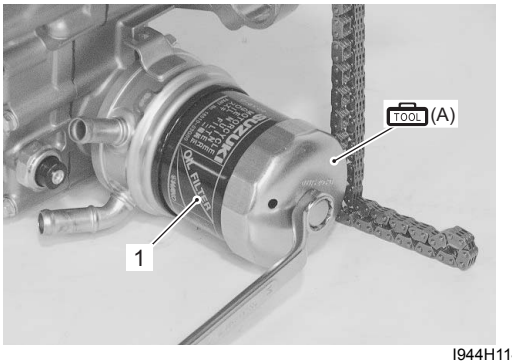
4) Remove the gearshift cam stopper bolt (7) and gearshift arm stopper (8).



I944H1140011-02

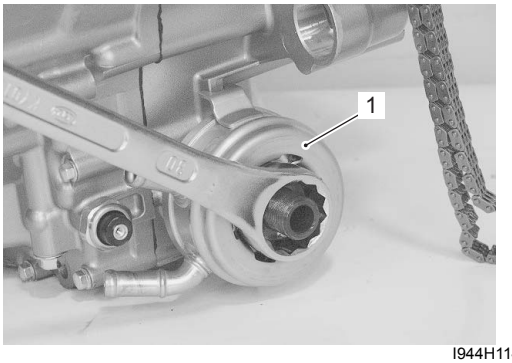
Oil Filter
Remove the oil filter (1) with the special tool.

Special tool
(A): 09915–40620 (Oil filter wrench)



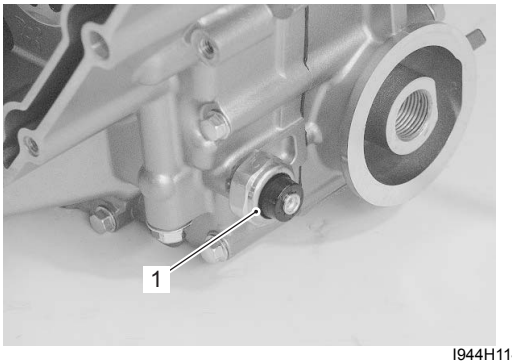
I944H1140012-01

Oil Cooler
1) Remove the oil cooler (1).



I944H1140013-01

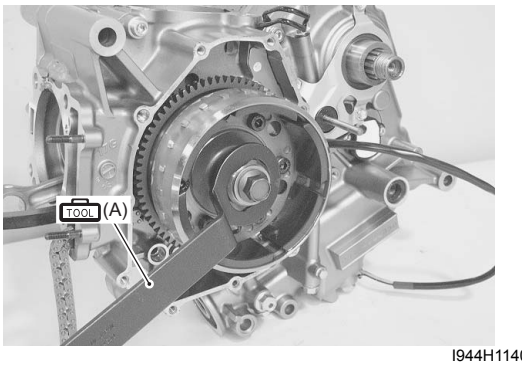
Oil Pressure Switch
Remove the oil pressure switch (1).



I944H1140014-01

Primary Drive Gear
1) Hold the generator rotor with the special tool.

Special tool
(A): 09930–44530 (Rotor holder)

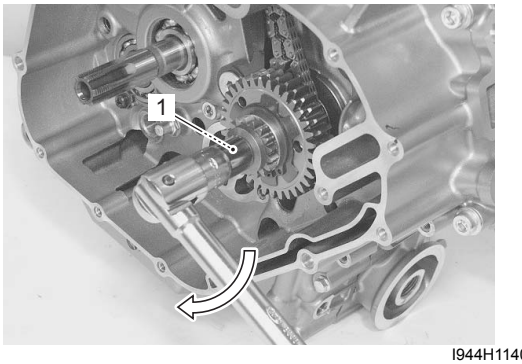


I944H1140015-01

2) Remove the primary drive gear bolt (1).

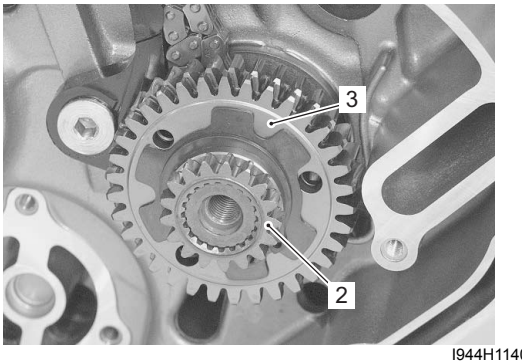
⚠ CAUTION

This bolt has left-hand thread. Turning it counterclockwise may cause damage.



I944H1140016-01

3) Remove the water pump drive gear (2) and primary drive gear (3).



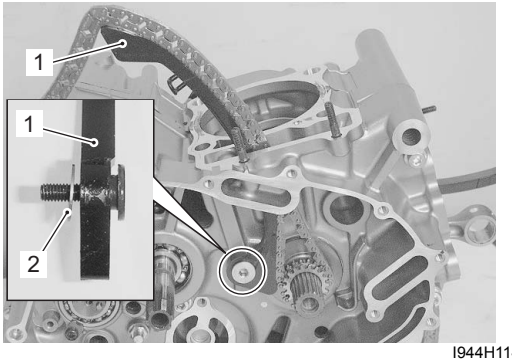
I944H1140017-01

Rear Cam Chain

1) Remove the cam chain tensioner (1).

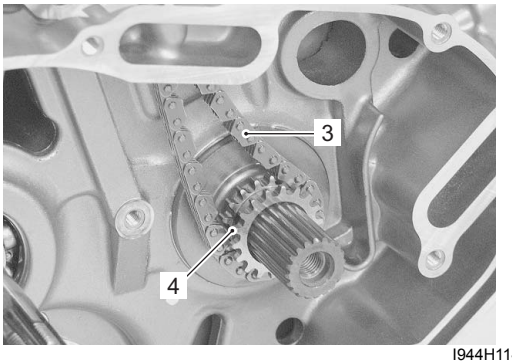
NOTE

Do not drop the washer (2) into the crankcase.



I944H1140018-01

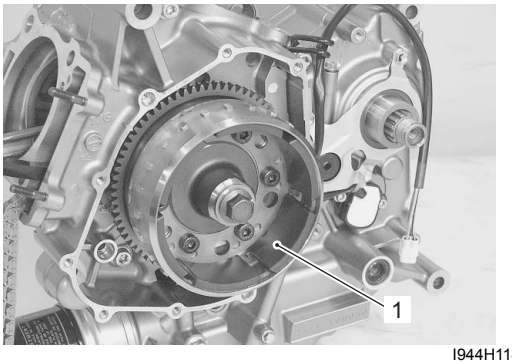
2) Remove the rear cam chain (3) and cam chain drive sprocket (4).



I944H1140019-01

Generator Rotor

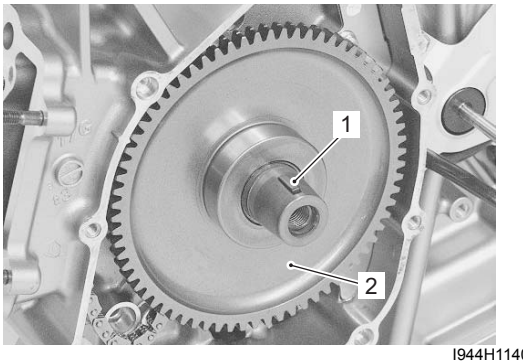
Remove the generator rotor (1). Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.



I944H1140020-01

Starter Driven Gear

Remove the key (1) and starter driven gear (2).



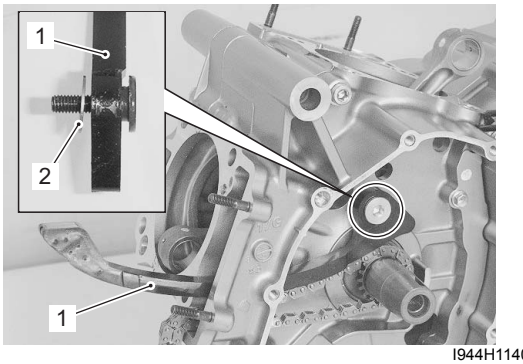
I944H1140021-01

Front Cam Chain

1) Remove the cam chain tensioner (1).

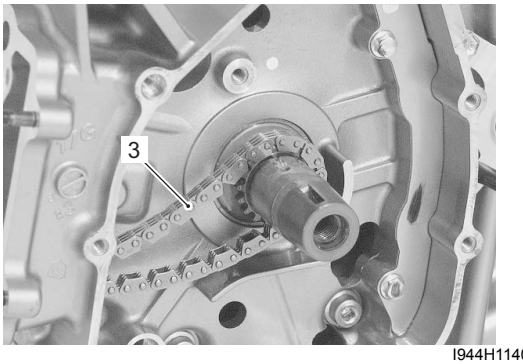
NOTE

Do not drop the washer (2) into the crankcase.



I944H1140022-02

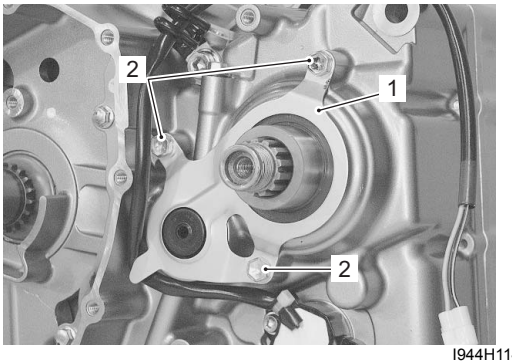
2) Remove the front cam chain (3).



I944H1140023-01

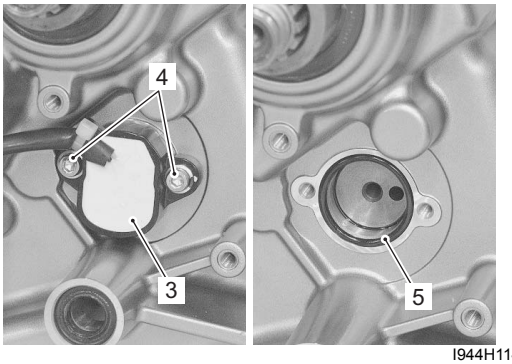
Gear Position Switch

1) Remove the driveshaft oil seal retainer (1) by removing its bolts (2).



I944H1140024-02

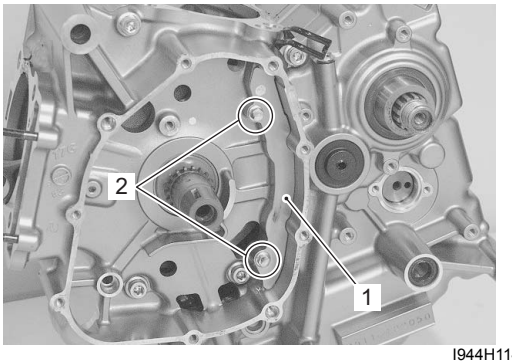
2) Remove the gear position switch (3) by removing its bolts (4).
3) Remove the O-ring (5).



I944H1140025-02

Crankcase

1) Remove the oil plate (1) by removing the its bolts (2).

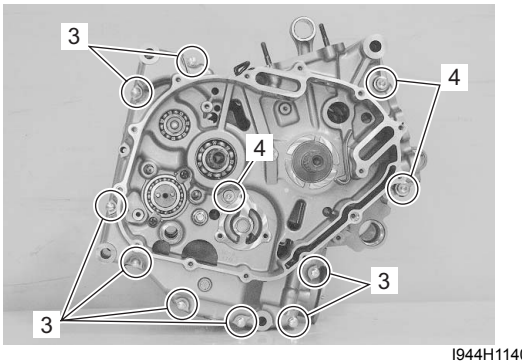


I944H1140026-02

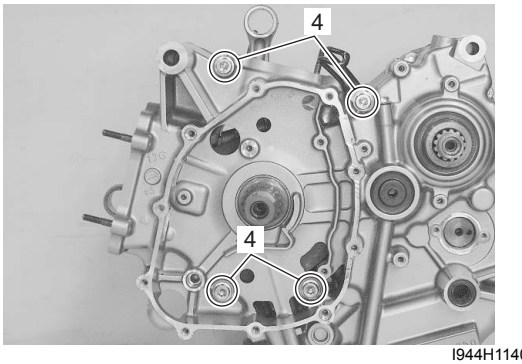
2) Remove the crankcase bolts (M6) (3).
3) Remove the crankcase bolts (M8) (4).

NOTE

Loosen the crankcase bolts diagonally and smaller sizes first.



I944H1140027-02



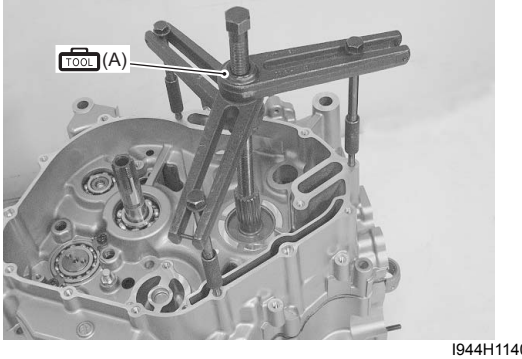
I944H1140028-02

4) Separate the crankcase into two parts, right and left with the special tool.

NOTE

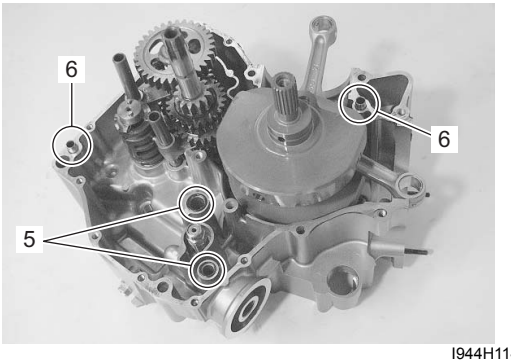
- **Fit the crankcase separating tool, so that the tool arms are in parallel with the side of crankcase.**
- **The crankshaft and transmission components should remain in the left crankcase half.**

Special tool
TOOL (A): 09920–13120 (Crankcase separating tool)



I944H1140029-02

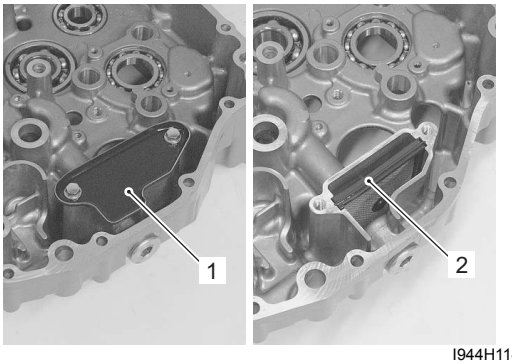
5) Remove the O-rings (5) and dowel pins (6).



I944H1140030-02

Oil Strainer

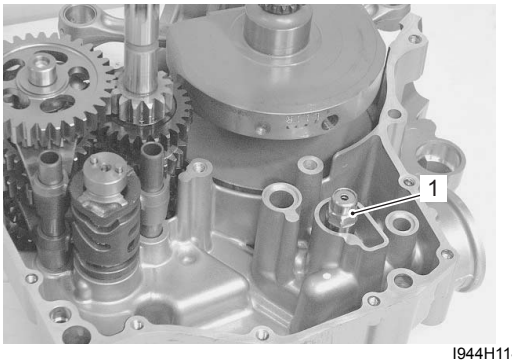
1) Remove the oil strainer plate (1).
2) Remove the oil strainer (2).



I944H1140031-02

Oil Pressure Regulator

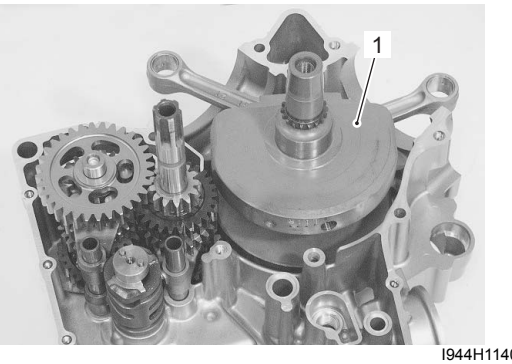
Remove the oil pressure regulator (1).



I944H1140032-01

Crankshaft

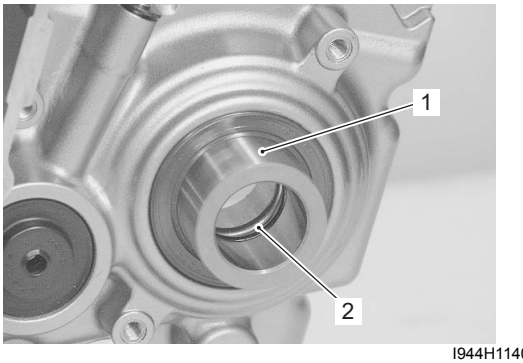
Remove the crankshaft (1).



I944H1140033-01

Transmission / Gearshift

1) Remove the transmission component. Refer to “Transmission Removal and Installation in Section 5B (Page 5B-3)”.
2) Remove the engine sprocket spacer (1) and O-ring (2).

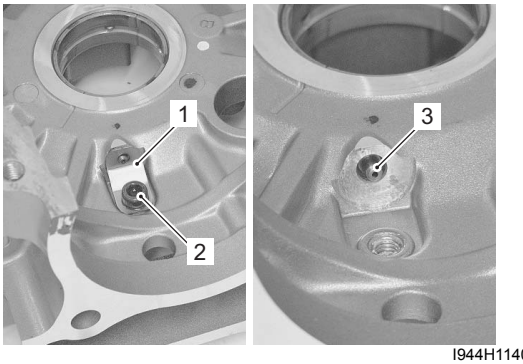


I944H1140035-01

Oil Jet

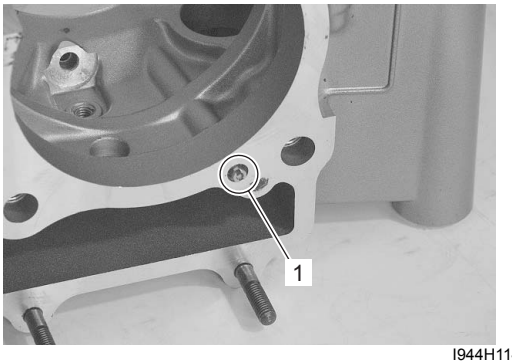
Piston Cooling Oil Jet

1) Remove the plates (1) by removing the its bolts (2).
2) Remove the piston cooling oil jets (3) from left and right crankcase halves.



I944H1140036-02

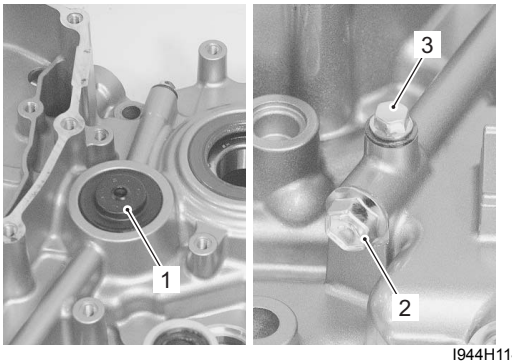
Oil Gallery Jet (for Cylinder)
Remove the oil gallery jets (1) (for cylinder) from left and right crankcase halves.



I944H1140037-02

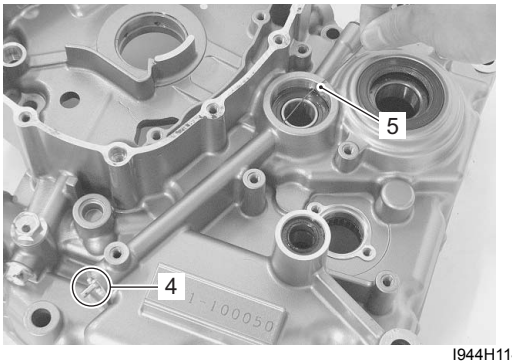
Oil Gallery Jet (for Transmission)

1) Remove the clutch push rod oil seal (1).
2) Remove the oil gallery plug (M8) (2).
3) Remove the oil gallery plug (M6) (3) if necessary.



I944H1140038-01

4) Remove the oil gallery jet (for transmission) (4) with a suitable bar (5).



I944H1140039-02

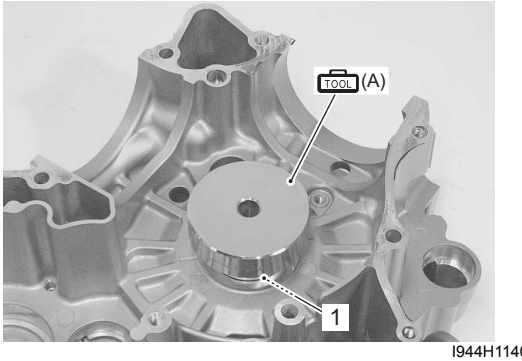
Crankshaft Journal Bearing

1) Set the special tool as shown to remove the crankshaft journal bearings (1) with the special tool.

NOTE

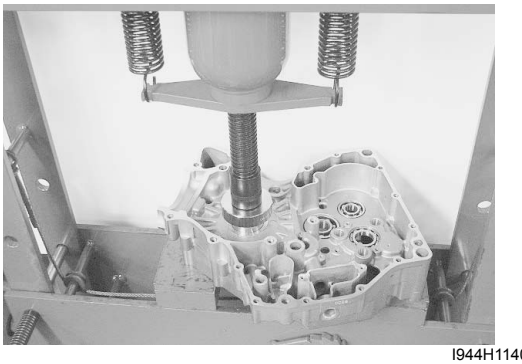
Remove the crankshaft journal bearings in only one direction, from inside to outside of each crankcase half.

Special tool
TOOL (A): 09913–60221 (Journal bearing installer and holder)

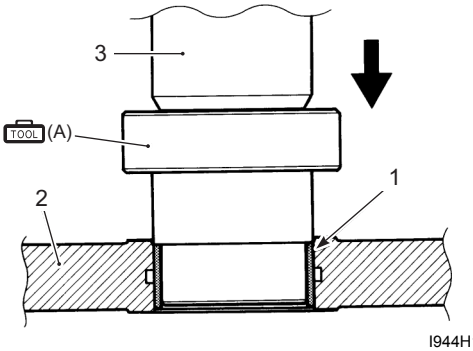


I944H1140040-01

2) Gradually press out the journal bearings with the special tool by using the hydraulic-press.



I944H1140041-01

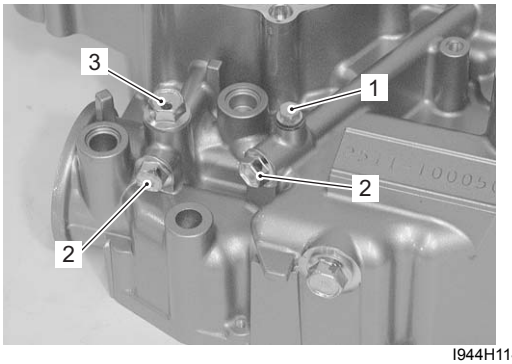


I944H1140042-01

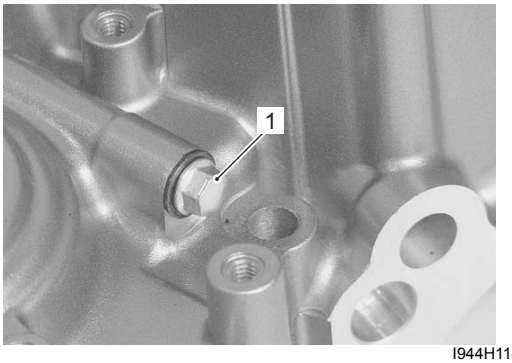
1. Journal bearing	3. hydraulic press
2. Crankcase	

Oil Gallery Plug

1) Remove the oil gallery plugs (M6) (1), (M8) (2) and (M12) (3) from the left crankcase.

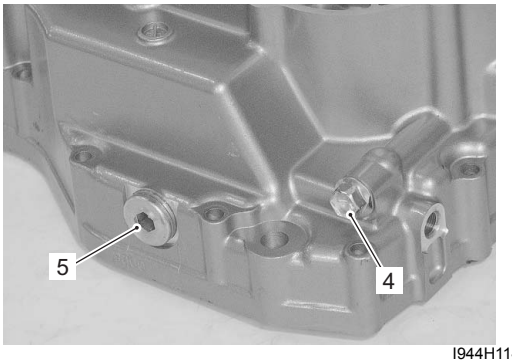


I944H1140043-01



I944H1140044-01

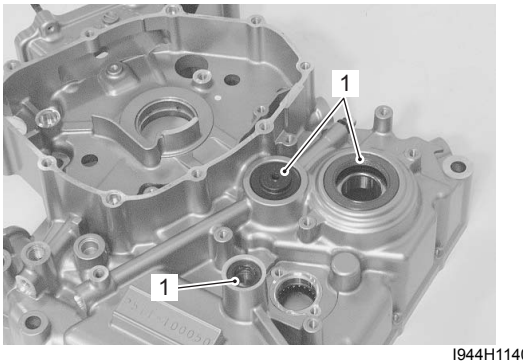
2) Remove the oil gallery plugs (M8) (4) and (M16) (5) from the right crankcase.



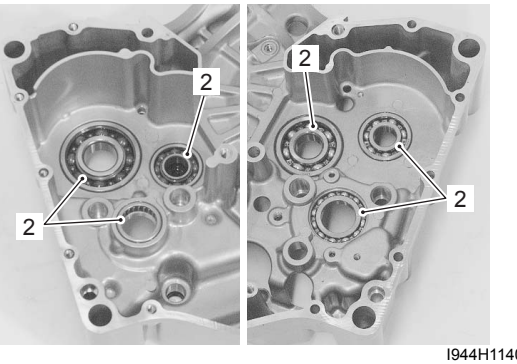
I944H1140045-01

Transmission Oil Seal / Bearing

Remove the transmission oil seals (1) and bearings (2) if necessary. Refer to “Transmission Removal and Installation in Section 5B (Page 5B-3)” and “Gearshift Shaft Oil Seal Removal and Installation in Section 5B (Page 5B-17)”.



I944H1140046-02



I944H1140047-02

Engine Bottom Side Assembly

B944H11406025

Assembly 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.

Transmission Oil Seal / Bearing

- Install the transmission oil seals and bearings. Refer to “Transmission Oil Seal / Bearing Removal and Installation in Section 5B (Page 5B-10)” and “Gearshift Shaft Oil Seal Removal and Installation in Section 5B (Page 5B-17)”.

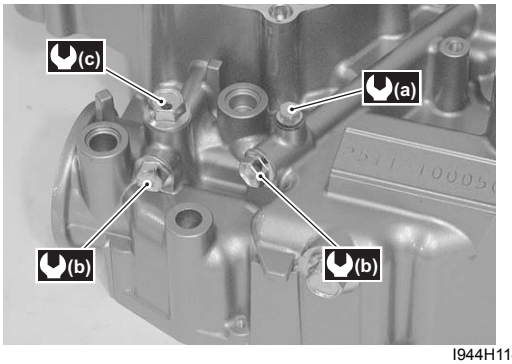
Oil Gallery Plug

- Tighten each plug to the specified torque.

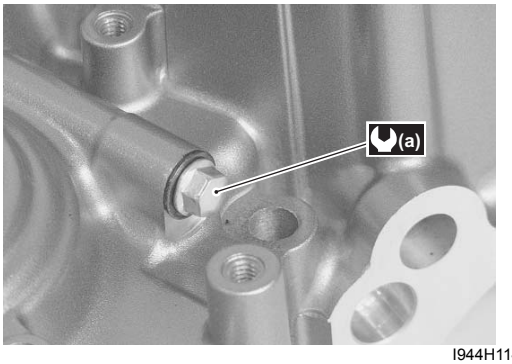
⚠ CAUTION

Use each new gasket.

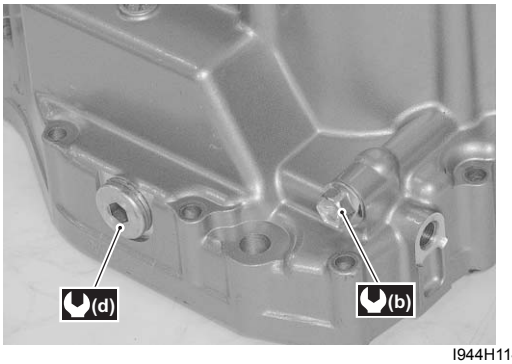
Tightening torque
Oil gallery plug (M6) (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
Oil gallery plug (M8) (b): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
Oil gallery plug (M12) (c): 21 N·m (2.1 kgf-m, 15.0 lbf-ft)
Oil gallery plug (M16) (d): 35 N·m (3.5 kgf-m, 25.5 lbf-ft)



I944H1140048-01



I944H1140049-01



I944H1140050-01

Crankcase Journal Bearing

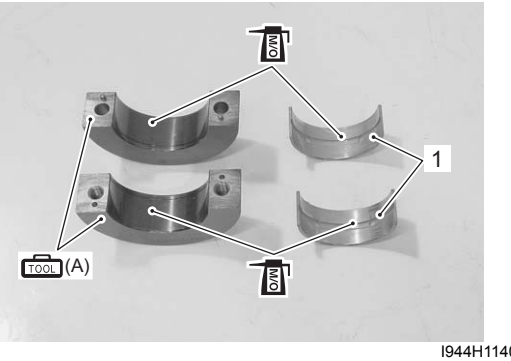
- Set the specified crankshaft journal bearings (1) to the special tool.

⚠ CAUTION

Before setting the bearing, apply molybdenum oil solution to the special tool and bearings.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

Special tool
TOOL (A): 09913–60221 (Journal bearing installer and holder)

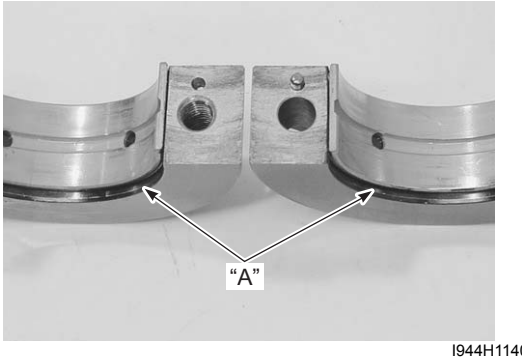


I944H1140051-01

- When setting the bearing, align the bearing side with the engraved line “A” and also the bearing end with the mating surface of the special tool.

NOTE

The upper and lower bearings are same.

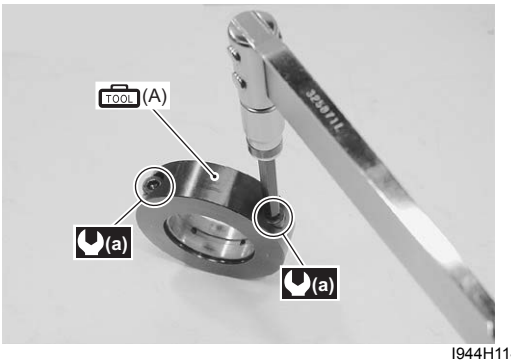


I944H1140052-01

- Tighten the special tool bolts to the specified torque.

  Special tool
  (A): 09913–60221 (Journal bearing installer and holder)

  Tightening torque
  Special tool bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



I944H1140053-01

- Set the bearings installed in the special tool to the crankcase half as shown.

  ⚠ CAUTION

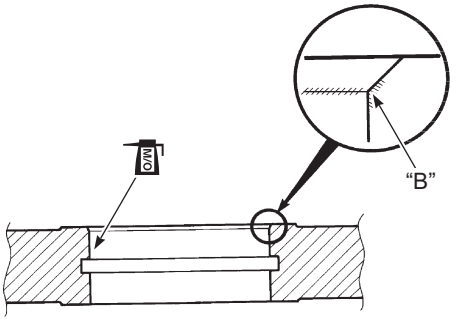
  - **Before installing the bearings, lightly shave off the sharp edge part "B" of the crankcase chamfer by using an oilstone and wash the crankcase bore with enough molybdenum oil solution.**
  - **Be sure the bearing protruded side "C" faces the crankcase bore.**
  - **Align the bearing/special tool mating surface with the line "D" on the crankcase.**

  NOTE

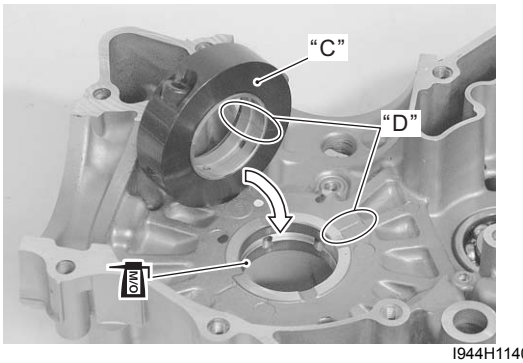
  Install the bearing from inside to outside of each crankcase halves.

  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

- The color code of the bearing must face crankshaft side.



I944H1140054-01



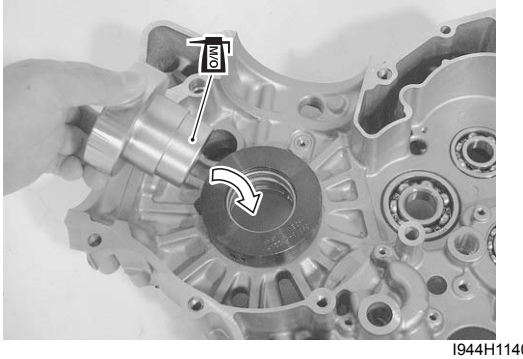
I944H1140055-01

- Apply enough molybdenum oil solution to the special tool and the bearings and then set the special tool carefully.

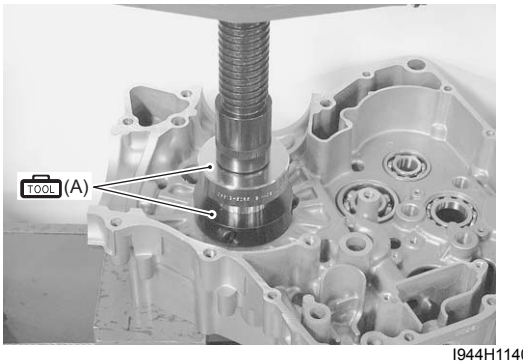
  Special tool
  (A): 09913–60221 (Journal bearing installer and holder)

  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

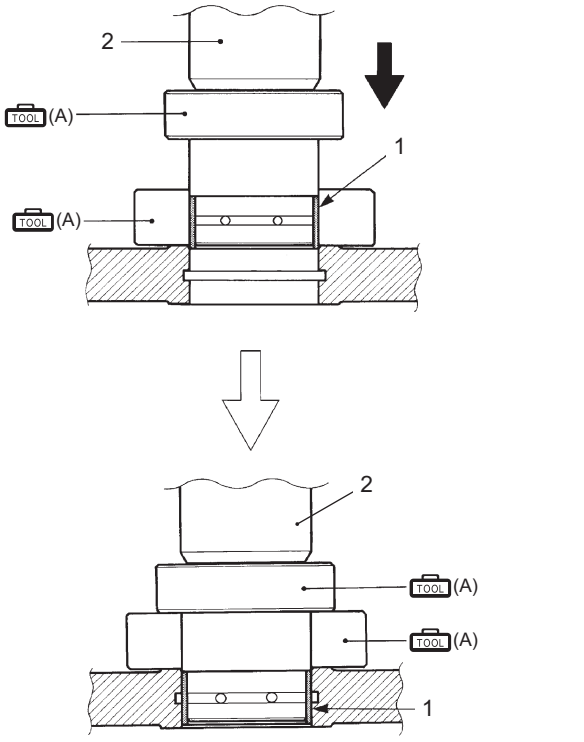
- Gradually press in the bearing into the main journal bore by using the hydraulic press until the special tool (1) contacts the special tool (2).



I944H1140056-01



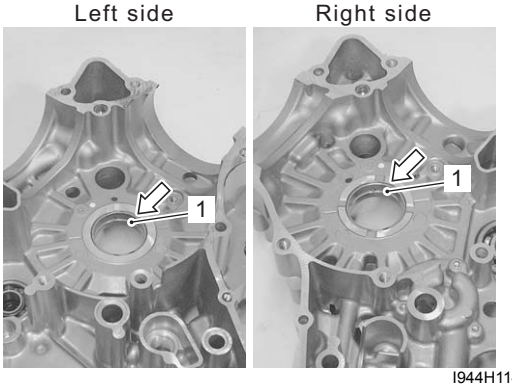
I944H1140057-01



I944H1140058-02

1. Journal bearing	2. hydraulic press

- After installing the bearings (1), check the bearing surface for any scratch or damage.



I944H1140059-03

Oil Jet

- Fit the new O-rings to each oil jets.

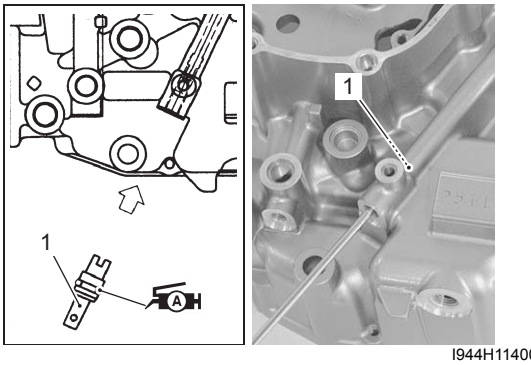
⚠ CAUTION

Use the new O-rings to prevent oil leakage.

- Apply grease to new O-ring.

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

- Install the oil gallery jet (for transmission) (1) with a suitable bar.



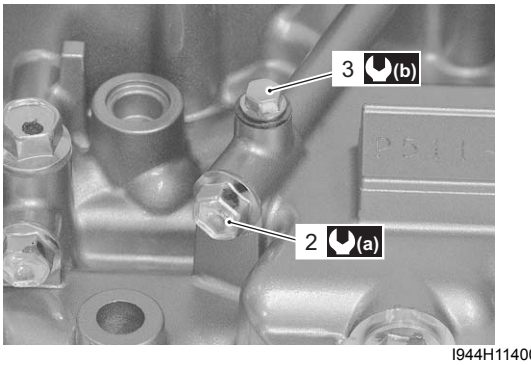
I944H1140060-01

- Tighten the oil gallery plug (M8) (2) and (M6) (3) to the specified torque.

⚠ CAUTION

Replace the gaskets with new ones.

Tightening torque
Oil gallery plug (M8) (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
Oil gallery plug (M6) (b): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140061-01

- Install the clutch push rod oil seal (4) with the special tool.

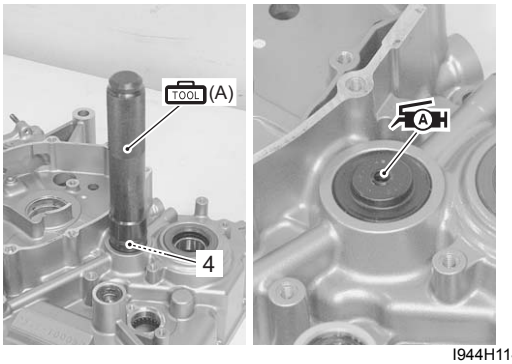
⚠ CAUTION

Replace the clutch push rod oil seal with a new one.

Special tool
TOOL (A): 09913–70210 (Bearing installer set)

- Apply grease to the lip of oil seal.

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



I944H1140062-01

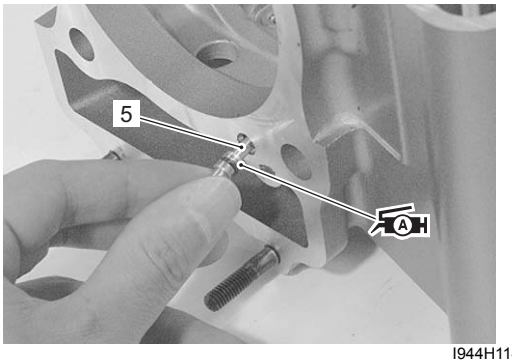
- Apply grease to new O-rings.

  ⚠ CAUTION

  Use the new O-rings to prevent oil leakage.

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

- Install the oil gallery jets (5) (for cylinder) to the left and right crankcase halves.



I944H1140063-02

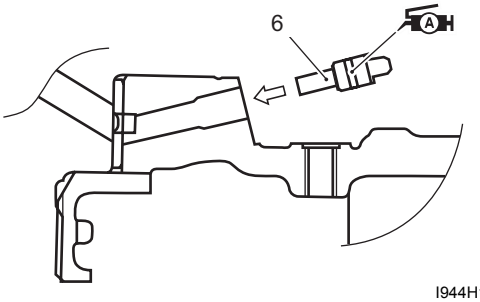
- Apply grease to new O-rings.

  ⚠ CAUTION

  Use the new O-rings to prevent oil leakage.

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

- Install the piston cooling oil jets (6) to the left and right crankcase halves.

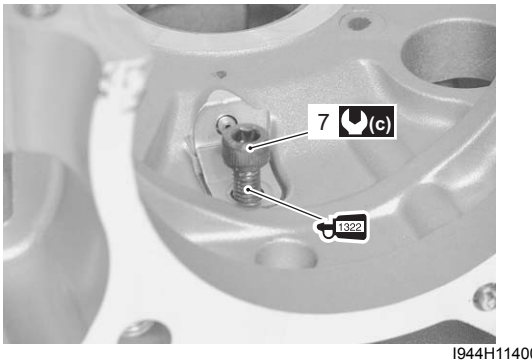


I944H1140064-02

- Apply a small quantity of thread lock to the bolts (7) 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 (c): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140065-02

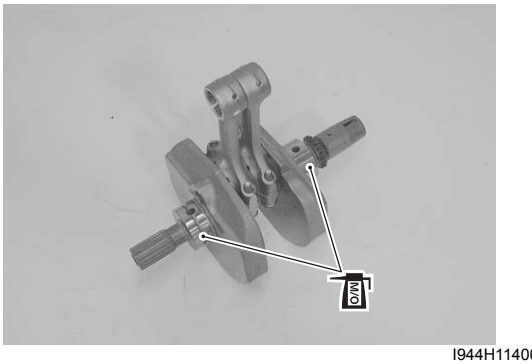
Transmission / Gearshift

Install the transmission component. Refer to "Transmission Removal and Installation in Section 5B (Page 5B-3)".

Crankshaft

- Coat lightly molybdenum oil solution to the crankshaft journal bearings.

  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



I944H1140066-01

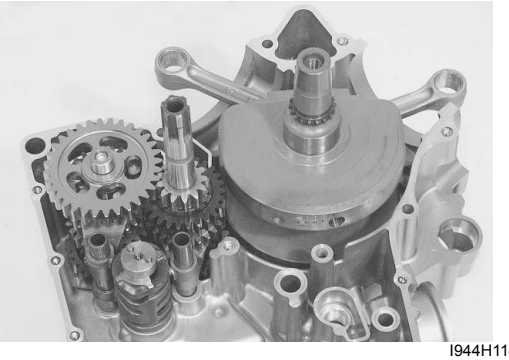
- Install the crankshaft assembly into the left crankcase.

⚠ CAUTION

Never strike the crankshaft with a plastic hammer when inserting it into the crankcase.

NOTE

- **Be sure to set the crankshaft in the proper direction.**
- **Of the two conrods, the one with the embossed letter marked should be brought to the rear cylinder.**

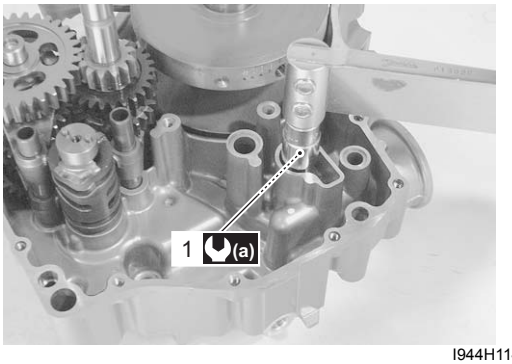


I944H1140071-01

Oil Pressure Regulator

- Tighten the oil pressure regulator (1) to the specified torque.

Tightening torque
Oil pressure regulator (a): 27 N·m (2.7 kgf-m, 19.5 lbf-ft)



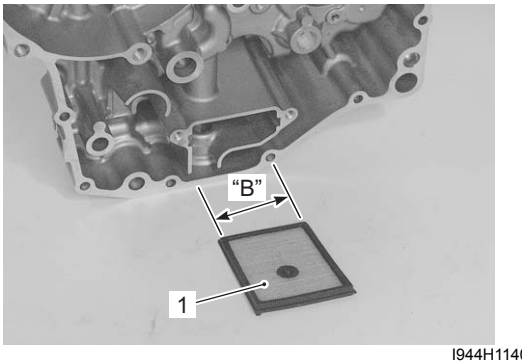
I944H1140067-01

Oil Strainer

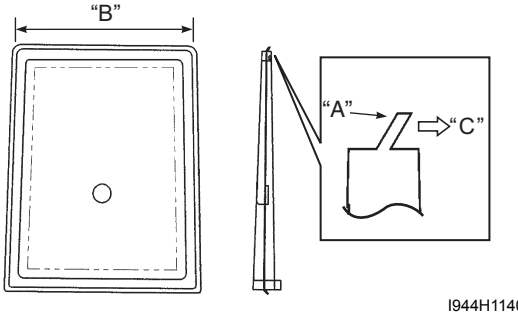
- Install the oil strainer (1).

⚠ CAUTION

- **The lip "A" of the oil strainer should be positioned downward.**
- **The shorter side "B" of the oil strainer should be positioned inside.**



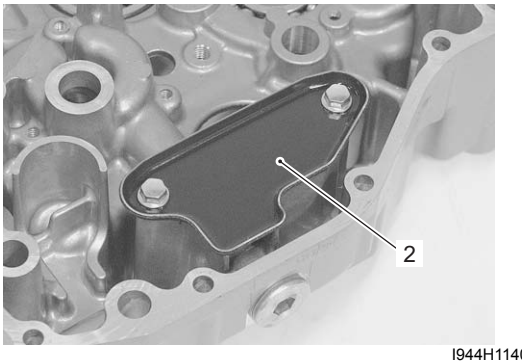
I944H1140068-01



I944H1140069-01

"A": Lip	"C": Lower side
"B": Shorter side	

- Install the oil strainer plate (2).



I944H1140070-02

Crankcase

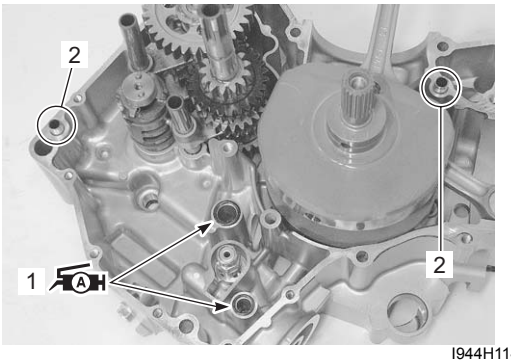
- Clean the mating surface of the left and right crankcase halves.
- Apply grease to the O-rings (1).

⚠ CAUTION

Replace the O-rings with new ones.

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

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



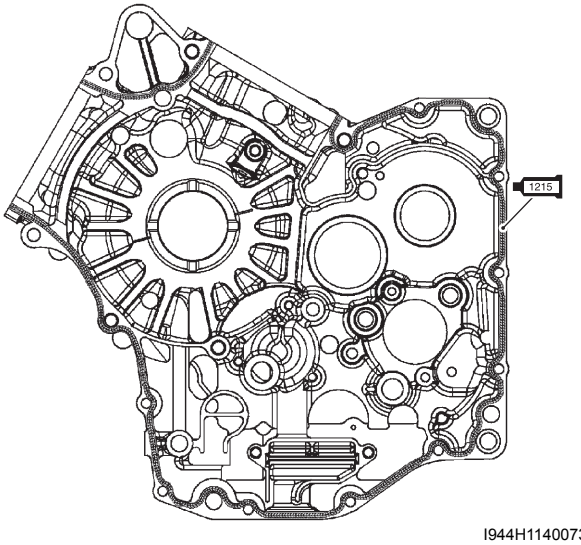
I944H1140072-02

- Apply bond to the mating surface of the right crankcase.

NOTE

- **Make surfaces free from moisture, oil, dust and other foreign materials.**
- **Spread on surfaces thinly to form an even layer, and assemble the crankcases within few minutes.**
- **Take extreme care not to apply any bond to the oil hole, oil groove and bearing.**
- **Apply to distorted surfaces as it forms a comparatively thick film.**

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



I944H1140073-02

- Tighten the crankcase bolts a little at a time to equalize the pressure.

⚠ CAUTION

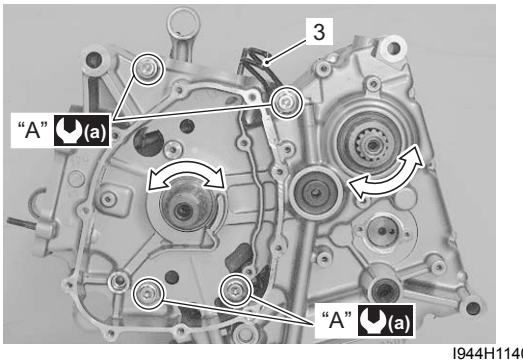
Do not drop the O-ring into the crankcase when assembling the right and left crankcase halves.

NOTE

Fit the clamp (3) to the bolt as shown.

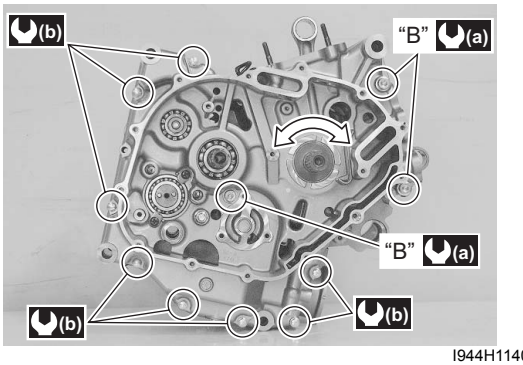
Tightening torque
Crankcase bolt (M8) (a): 26 N·m (2.6 kgf-m, 19.0 lbf-ft)
Crankcase bolt (M6) (b): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)

- After the crankcase bolts have been tightened, check if the crankshaft, the driveshaft and the countershaft rotate smoothly.



I944H1140074-02

"A": Crankcase bolt (M8) (L80)



I944H1140075-02

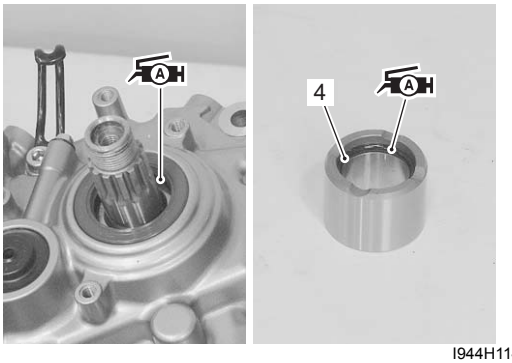
"B": Crankcase bolt (M8) (L55)

- Apply grease to the oil seal lip and O-ring (4).

⚠ CAUTION

Use the new O-ring to prevent oil leakage.

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

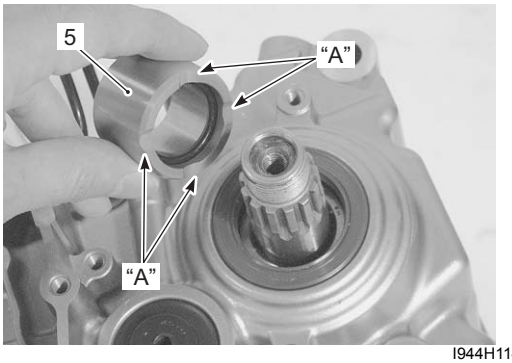


I944H1140076-01

- Install the engine sprocket spacer (5).

NOTE

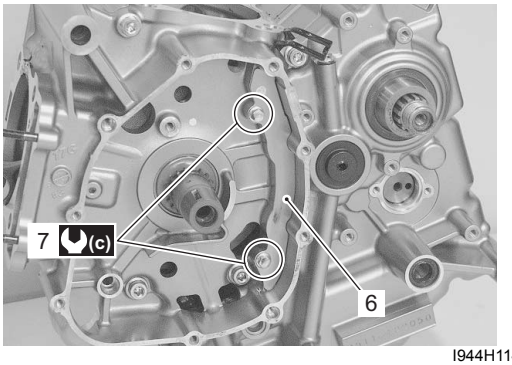
The grooved "A" side of the engine sprocket spacer (5) must face crankcase side.



I944H1140077-01

- Install the oil plate (6).
- Tighten the oil plate bolts (7) to the specified torque.

Tightening torque
Oil plate bolt (c): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140078-02

Gear Position Switch

- Apply grease to the O-ring.

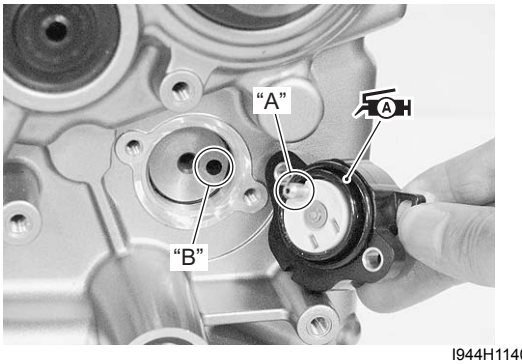
⚠ CAUTION

Replace the O-ring with a new one.

NOTE

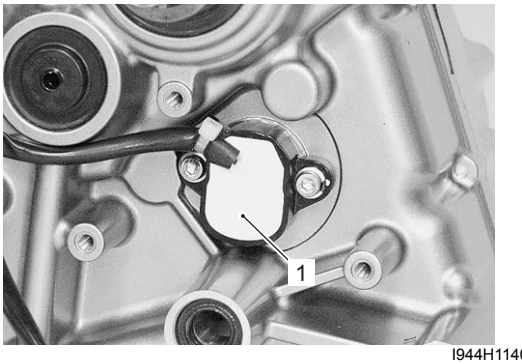
Align the gear position switch pin "A" with the gearshift cam hole "B".

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



I944H1140079-01

- Install the gear position switch (1).

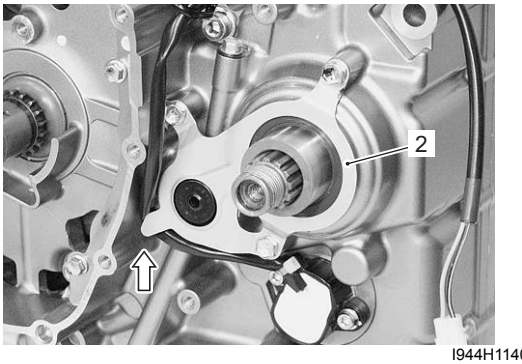


I944H1140080-02

- Install the drive shaft oil seal retainer (2).

NOTE

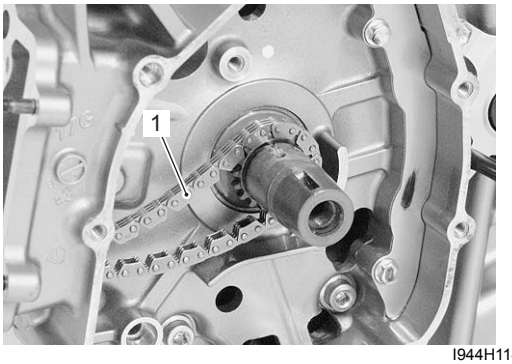
Pass the gear position switch lead wire under the driveshaft oil seal retainer.



I944H1140081-02

Front Cam Chain

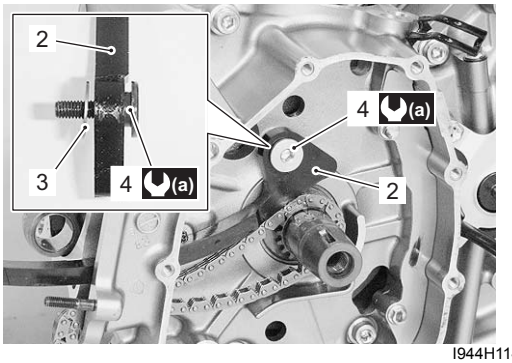
- Install the front cam chain (1).



I944H1140082-01

- Install the cam chain tensioner (2), washer (3) and cam chain tensioner bolt (4).
- Tighten the cam chain tensioner bolt (4) to the specified torque.

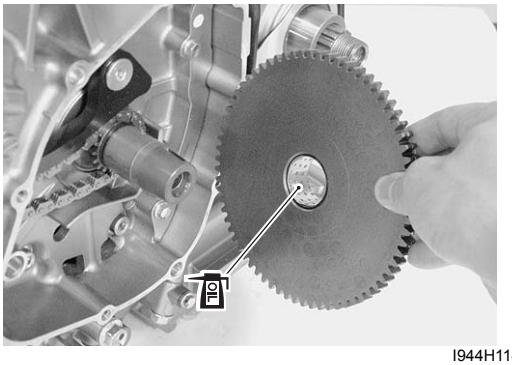
Tightening torque
Cam chain tensioner bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140083-01

Starter Driven Gear

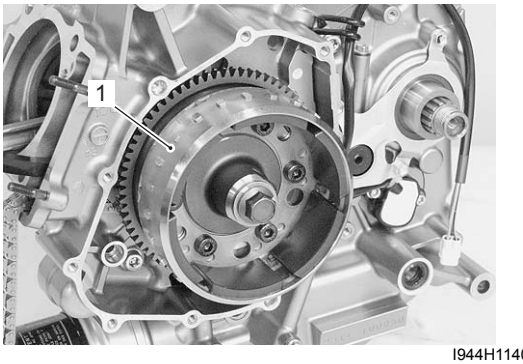
- Apply engine oil to the bushing of the starter driven gear.



I944H1140084-02

Generator Rotor

- Install the generator rotor (1). Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.



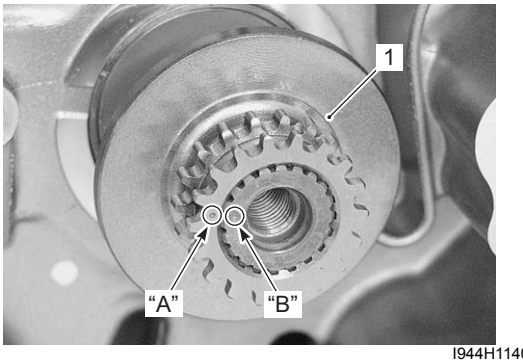
I944H1140085-01

Rear Cam Chain

- Install the cam chain drive sprocket (1).

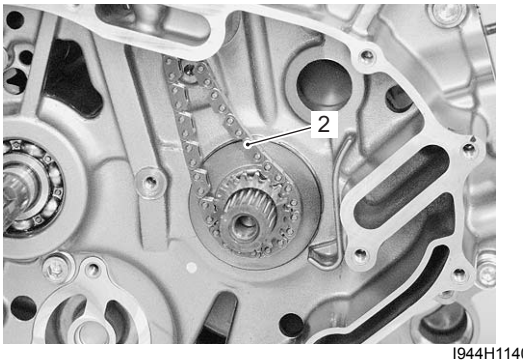
NOTE

Align the punched mark “A” on the cam chain drive sprocket with the punched mark “B” on the crankshaft.



I944H1140086-02

- Install the rear cam chain (2).

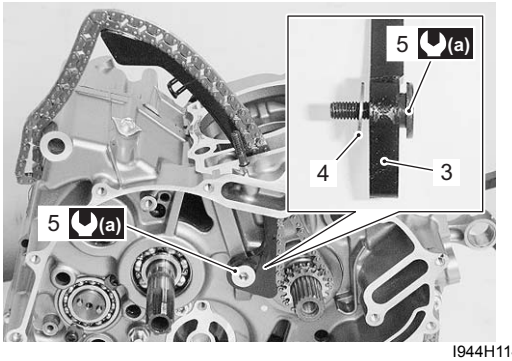


I944H1140087-01

- Install the cam chain tensioner (3), washer (4) and cam chain tensioner bolt (5).

- Tighten the cam chain tensioner bolt (5) to the specified torque.

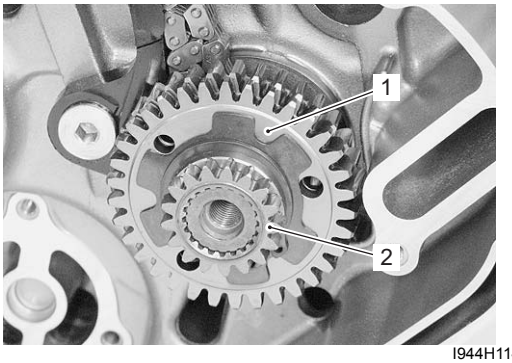
Tightening torque
Cam chain tensioner bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140088-01

Primary Drive Gear

- Install the primary drive gear (1) and water pump drive gear (2).



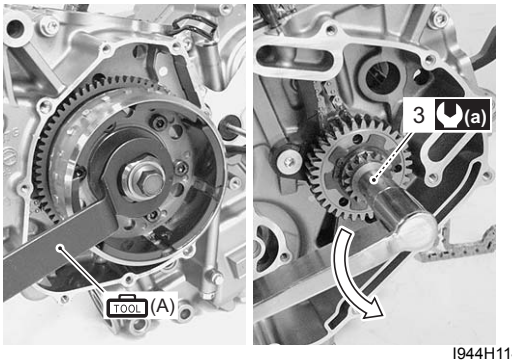
I944H1140089-01

- Hold the generator rotor with the special tool.

Special tool
TOOL (A): 09930–44530 (Rotor holder)

- Tighten the primary drive gear bolt (3) to the specified torque.

Tightening torque
Primary drive gear bolt (a): 70 N·m (7.0 kgf-m, 50.5 lbf-ft)



I944H1140090-03

Oil Pressure Switch

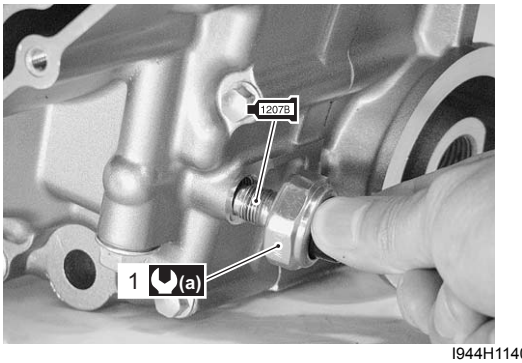
- Apply bond to the thread part of the oil pressure switch (1) and tighten the oil pressure switch (1) to the specified torque.

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 (a): 14 N·m (1.4 kgf-m, 10.0 lbf-ft)



I944H1140091-01

Oil Cooler

- Apply grease to the O-ring.

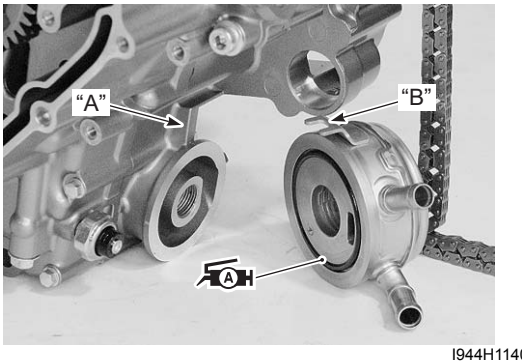
⚠ CAUTION

Use a new O-ring to prevent oil leakage.

NOTE

When install the oil cooler, fit the convex part "A" of the left crankcase onto the concave part "B" of the oil cooler.

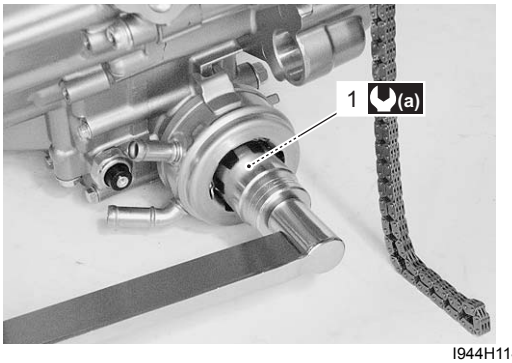
A : Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)



I944H1140092-01

- Tighten the union bolt (1) to the specified torque.

Tightening torque
Oil cooler union bolt (a): 70 N·m (7.0 kgf-m, 50.5 lbf-ft)

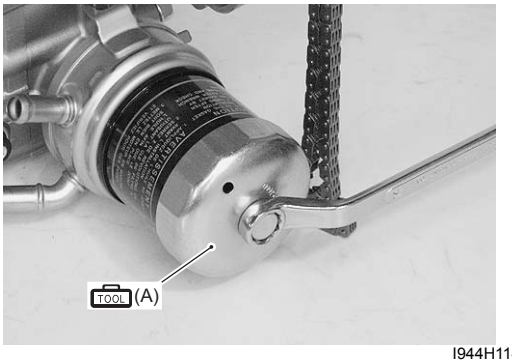


I944H1140093-01

Oil Filter

- Install the oil filter with the special tool. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".

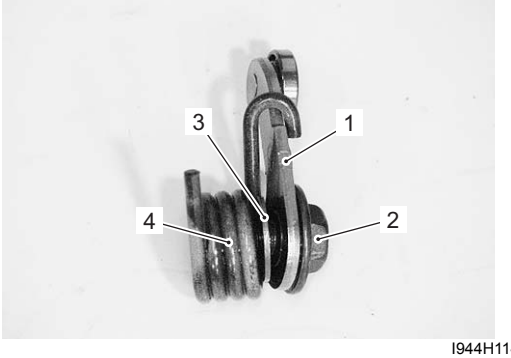
Special tool
TOOL (A): 09915–40620 (Oil filter wrench)



I944H1140094-01

Gearshift System

- Install the gearshift cam stopper (1), bolt (2), washer (3) and return spring (4).



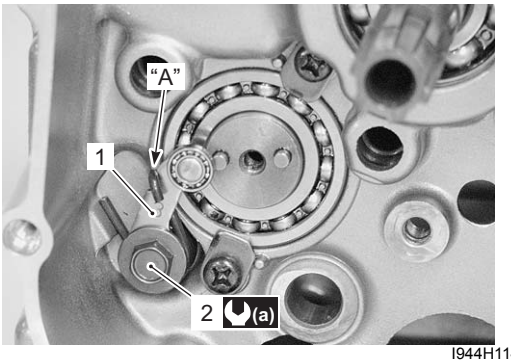
I944H1140095-01

- 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 (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

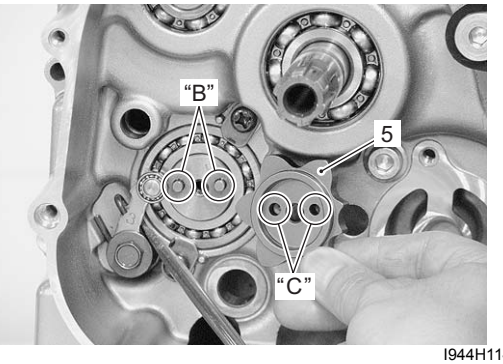


I944H1140096-01

- Check the gearshift cam stopper moves smoothly.
- Locate the gearshift cam in the neutral position.
- Install the gearshift cam stopper plate (5).

NOTE

Align the gearshift cam pins "B" with the gearshift cam stopper plate holes "C".

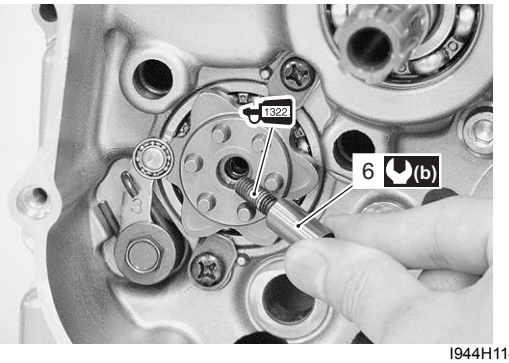


I944H1140097-01

- Apply thread lock to the gearshift cam stopper plate bolt (6) and tighten it to the specified torque.

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

  Tightening torque
  Gearshift cam stopper plate bolt (b): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)

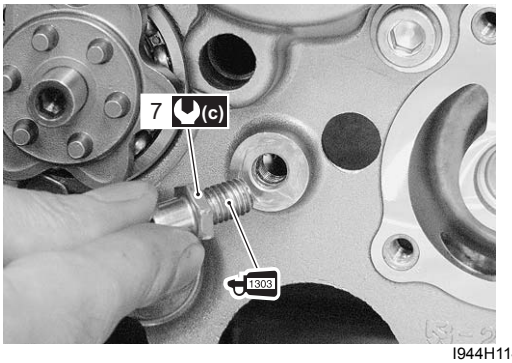


I944H1140098-02

- Apply thread lock to the gearshift arm stopper (7) and tighten it to the specified torque.

  1303 : Thread lock cement 99000–32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)

  Tightening torque
  Gearshift arm stopper (c): 19 N·m (1.9 kgf-m, 13.5 lbf-ft)

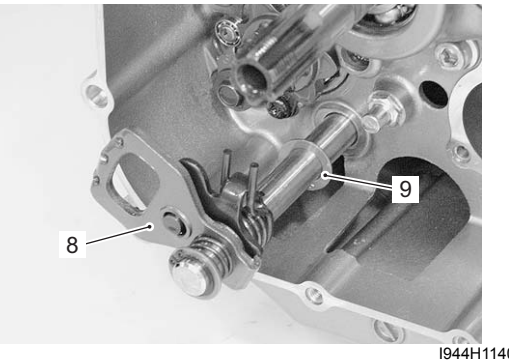


I944H1140100-01

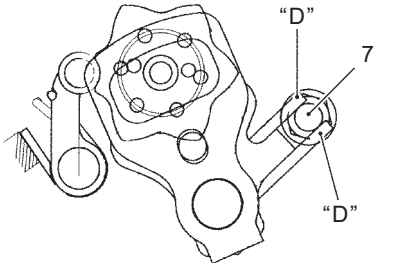
- Install the gearshift shaft assembly (8) and washers (9) as shown in the figure.

  NOTE

  Pinch the gearshift arm stopper (7) with return spring ends "D".



I944H1140101-01



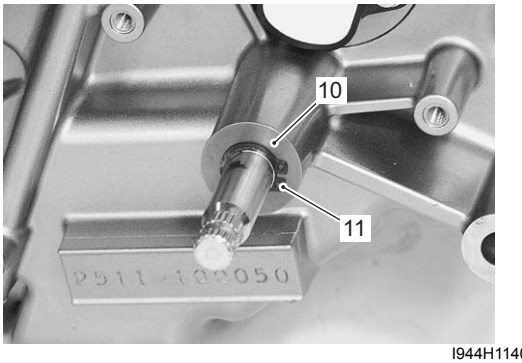
I944H1140102-01

- Install the washer (10) and snap ring (11).

  ⚠ CAUTION

  Replace the snap ring with a new one.

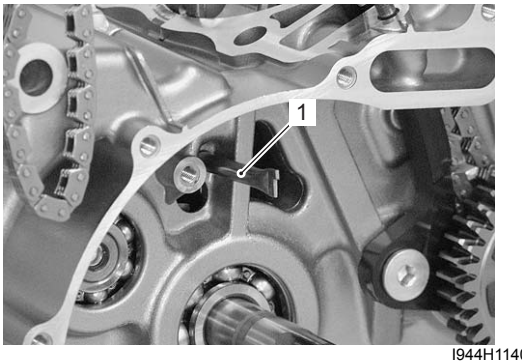
  Special tool
  TOOL : 09900–06107 (Snap ring remover (Open type))



I944H1140103-01

Oil Pipe

- Install the oil pipe (1).



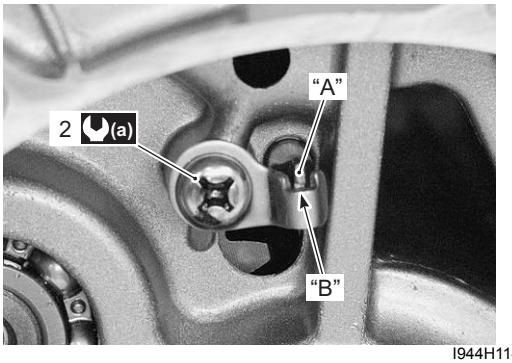
I944H1140104-01

- Tighten the oil pipe stopper screw (2) to the specified torque.

NOTE

Align the projection “A” of the oil pipe with the groove “B” of its stopper.

Tightening torque
Oil pipe stopper screw (a): 8 N·m (0.8 kgf-m, 6.0 lbf-ft)



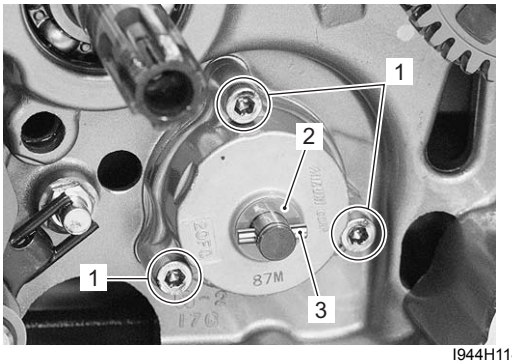
I944H1140105-01

Oil Pump

- Tighten the oil pump mounting bolts (1).
- Install the washer (2) and pin (3).

NOTE

Be careful not to drop the washer (2) and pin (3) into the crankcase.



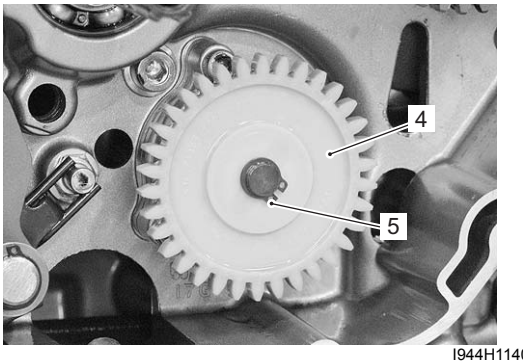
I944H1140106-02

- Install the oil pimp driven gear (4) and snap ring (5).

⚠ CAUTION

Replace the snap ring with a new one.

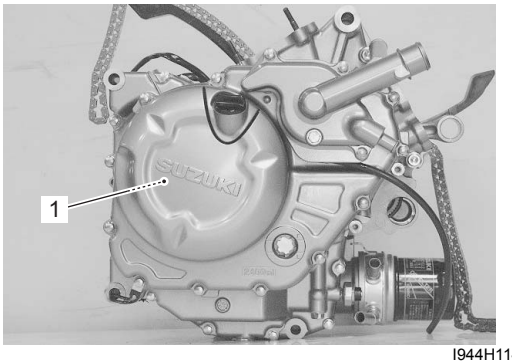
Special tool
TOOL : 09900–06107 (Snap ring pliers)



I944H1140107-02

Clutch

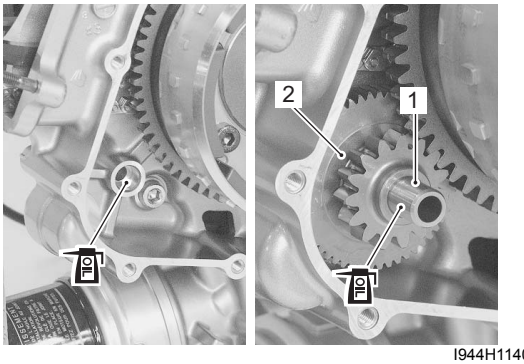
Install the clutch component parts (1). Refer to “Clutch Installation in Section 5C (Page 5C-9)”.



I944H1140108-01

Starter Idle Gear

- Apply engine oil to both ends of the shaft (1).
- Install the starter idle gear (2) and shaft (1).



I944H1140109-02

Generator Cover

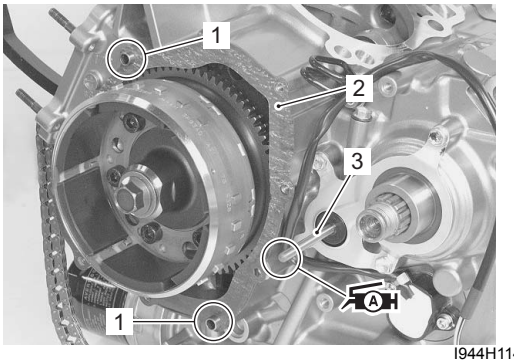
- Install the dowel pins (1), gasket (2) and clutch push rod (3).

⚠ CAUTION

Use the new gasket to prevent oil leakage.

- Apply a small quantity of grease to the push rod (3).

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



I944H1140110-01

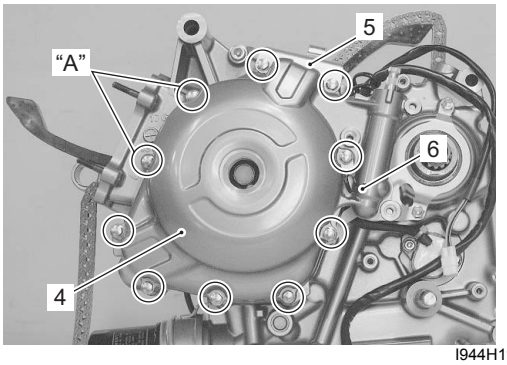
- Install the generator cover (4), clutch cable stopper (5) and clamp (6).
- Fit the gasket washer to the generator cover mounting bolts “A” correctly as shown.

⚠ CAUTION

Use the new gasket washer to prevent oil leakage.

- Tighten the generator cover mounting bolts to the specified torque.

Tightening torque
Generator cover mounting bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140111-02

Starter Motor

- Apply grease to the O-ring.

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

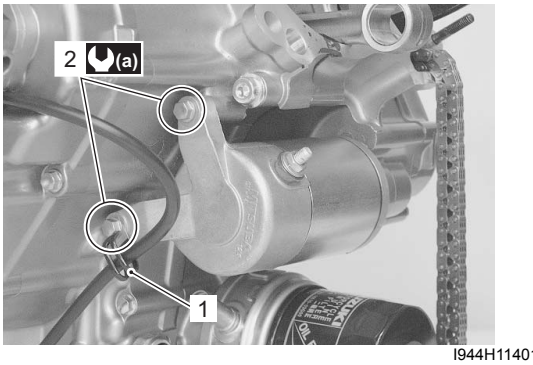
⚠ CAUTION

Replace the O-ring with a new one.

I944H1140112-01

- Fit the clamp (1) to the starter motor mounting bolt “A” as shown.
- Tighten the starter motor mounting bolts (2) to the specified torque.

Tightening torque
Starter motor mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1140113-02

Engine Top Side

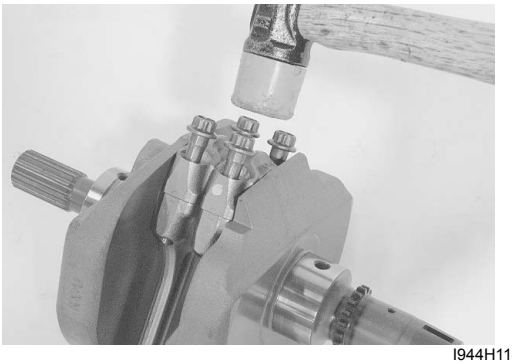
- Assembly the engine top side. Refer to “Engine Top Side Assembly (Page 1D-31)”.

Conrod Removal and Installation

B944H11406054

Removal

1) Remove the crankshaft assembly from the crankcase. Refer to “Engine Bottom Side Disassembly (Page 1D-58)”.
2) Loosen the conrod cap bolts, and tap the conrod cap bolts lightly with plastic hammer to remove the conrod cap.
3) Remove the conrods and mark them to identify their respective cylinders.



I944H1140114-01

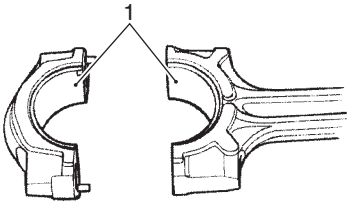
4) Remove the bearings (1).

NOTE

- **Do not remove the bearings (1) unless absolutely necessary.**
- **Make a note of where the bearings are removed from so that they can be reinstalled in their original positions.**

⚠ CAUTION

When removing the bearings, be careful not to scratch the conrods and the bearings.



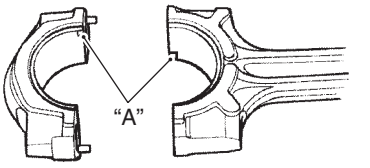
I718H1140269-01

Installation

1) When installing the bearings into the conrod cap and conrod, be sure to fix the stopper part “A” first, and then press in the opposite side of the bearing.

NOTE

Inspect and select the conrod crank pin bearing if necessary. Refer to “Conrod Crank Pin Bearing Inspection and Selection (Page 1D-81)”.



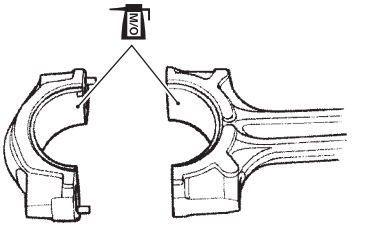
I717H1140221-02

2) Apply molybdenum oil solution to the crank pin and bearing surface.

⚠ CAUTION

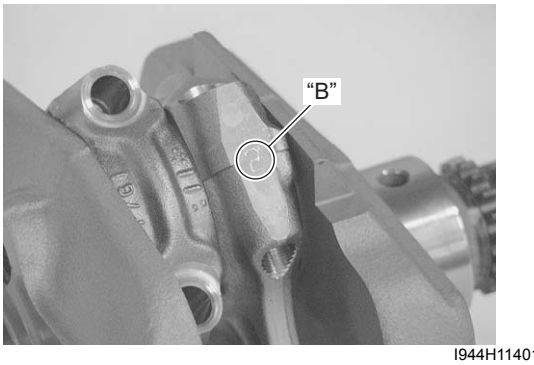
Be sure to clean the conrod big end.

M/O: Molybdenum oil (Molybdenum oil solution)

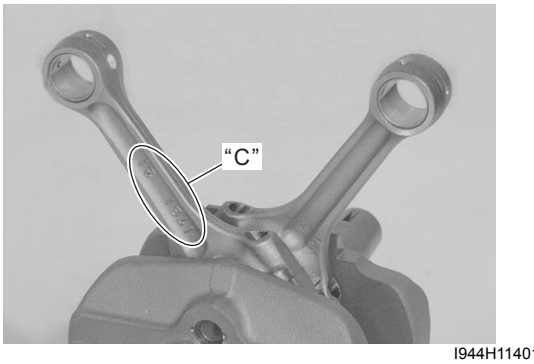


I718H1140273-01

3) When fitting the conrod cap, make sure that I.D. code “B” on each conrod faces intake side and that embossed lettering “C” on each conrod faces outside.

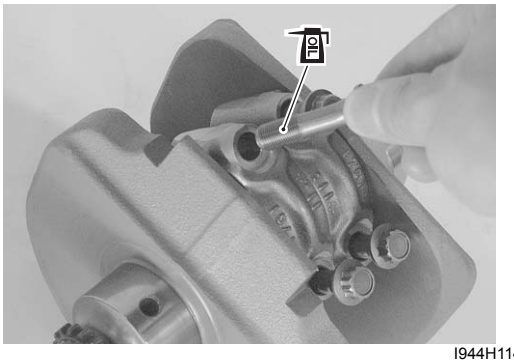


I944H1140115-01



I944H1140116-01

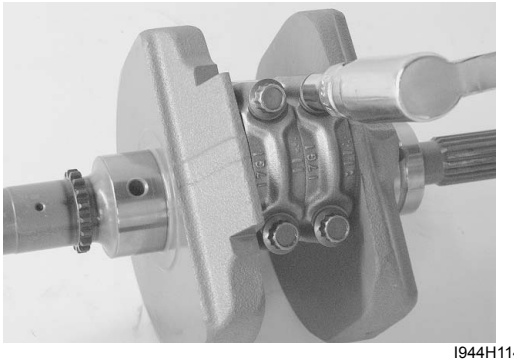
4) Apply engine oil to the conrod cap bolts.



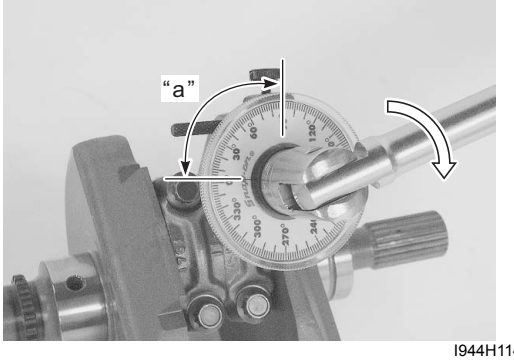
I944H1140117-02

5) Tighten the conrod cap bolts as following two steps.

Tightening torque
Conrod cap bolt: 21 N·m (2.1 kgf-m, 15.0 lbf-ft) then turn in 1/4 (90°) turn



I944H1140118-01



I944H1140119-01

"a": 90°

6) Apply molybdenum oil solution to the conrod big end side surfaces.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

7) Check that the conrod moves smoothly.
8) Install the crankshaft assembly to the crankcase. Refer to "Engine Bottom Side Assembly (Page 1D-65)".

Conrod / Crankshaft Inspection

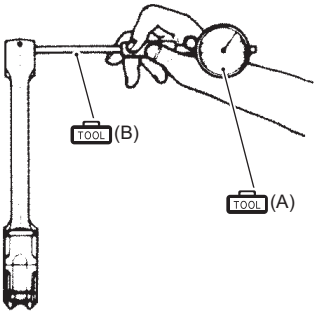
B944H11406055

Refer to "Conrod Removal and Installation (Page 1D-79)".

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 (1/1000 mm, 1 mm))
TOOL (B): 09900–22403 (Small bore gauge (18 – 35 mm))

Conrod small end I.D.
Service limit: 20.040 mm (0.7890 in)



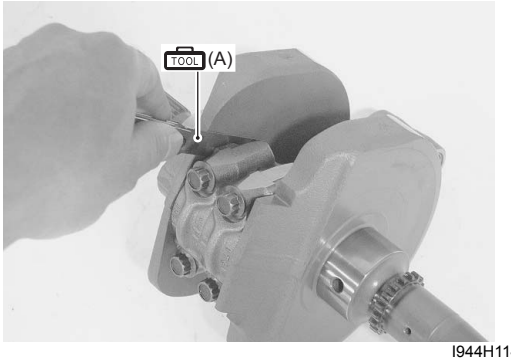
I944H1140099-01

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: 0.50 mm (0.020 in)



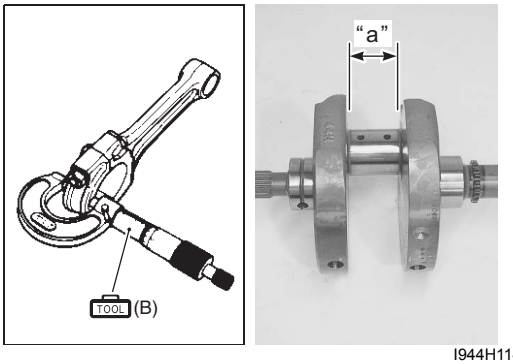
I944H1140120-01

2) If the clearance exceeds the limit, remove the conrod and measure the conrod big end width and crank pin width. Refer to "Conrod Removal and Installation (Page 1D-79)". If the width exceed the limit, replace the conrod or crankshaft.

Special tool
TOOL (B): 09900–20205 (Micrometer (0 – 25 mm))
TOOL : 09900–20101 (Vernier calipers (1/15 mm, 150 mm))

Conrod big end width
Standard: 20.95 – 21.00 mm (0.825 – 0.827 in)

Crank pin width "a"
Standard: 42.17 – 42.22 mm (1.660 – 1.662 in)



I944H1140121-01

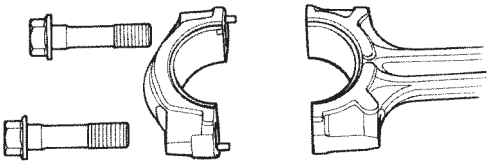
Conrod Crank Pin Bearing Inspection and Selection

B944H11406028

Refer to "Conrod Removal and Installation (Page 1D-79)".

Inspection

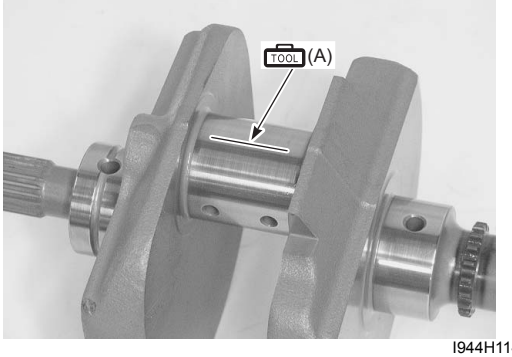
1) Inspect the bearing surfaces for any signs of fusion, pitting, burn or flaws. If any, replace them with a specified set of bearings.



I718H1140285-01

2) Place the plastigauge axially along the crank pin, avoiding the oil hole, as shown.

Special tool
TOOL (A): 09900–22301 (Plastigauge (0.025 – 0.076 mm))



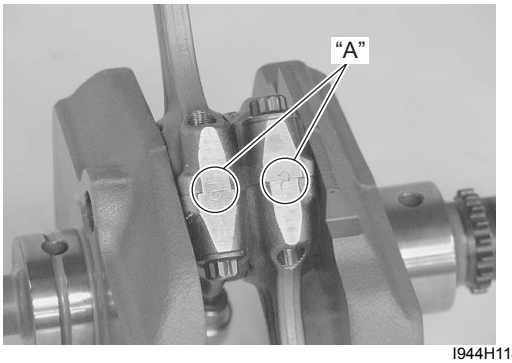
I944H1140122-01

3) Tighten the conrod cap bolts to the specified torque, in two stages. Refer to "Conrod Removal and Installation (Page 1D-79)".

NOTE

- **When installing the conrod cap to the crank pin, make sure that I.D code "A" on the conrod faces towards the intake side.**
- **Never rotate the crankshaft or conrod when a piece of plastigauge is installed.**

Tightening torque
Conrod cap bolt: 21 N·m (2.1 kgf-m, 15.0 lbf-ft) then turn in 1/4 (90°) turn

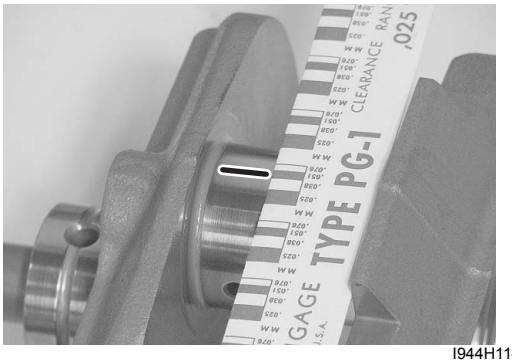


I944H1140123-01

4) Remove the conrod caps and measure the width of the compressed plastigauge using the envelope scale. This measurement should be taken at the widest part of the compressed plastigauge.
If the oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.

Conrod big end oil clearance
Standard: 0.032 – 0.056 mm (0.0013 – 0.0022 in)

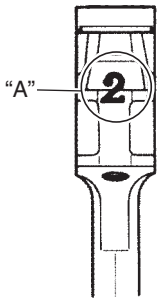
Conrod big end oil clearance
Service limit: 0.080 mm (0.0031 in)



I944H1140124-02

Selection

1) Check the corresponding conrod I.D. code numbers ([1] or [2]) “A”.

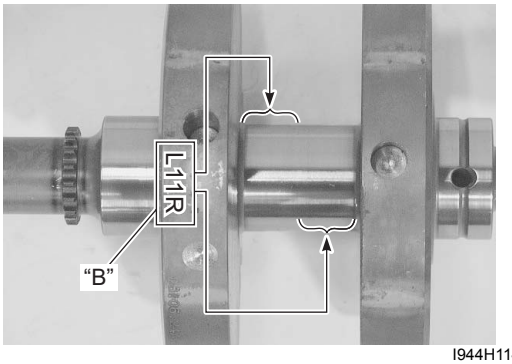


I822H1140296-01

Conrod I.D. specification

Code “A”	I.D. specification
1	41.000 – 41.008 mm (1.6142 – 1.6145 in)
2	41.008 – 41.016 mm (1.6145 – 1.6148 in)

2) Check the corresponding crank pin O.D. code numbers ([1], [2] or [3]) “B”.



I944H1140125-02

3) Measure the conrod crank pin O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

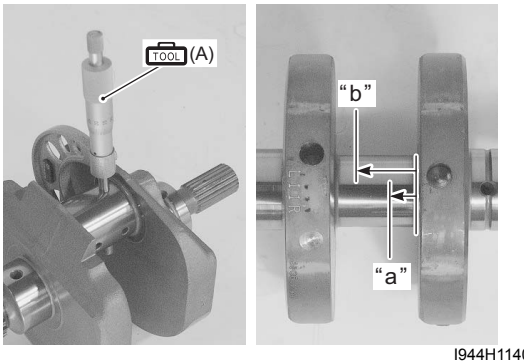
NOTE

The crank pin O.D. measurement should be taken at 10.5 mm and 31.5 mm positions from the crank pin end.

Crank pin O.D. specification

Code “B”	O.D. specification
1	37.992 – 38.000 mm (1.4957 – 1.4961 in)
2	37.984 – 37.992 mm (1.4954 – 1.4957 in)
3	37.976 – 37.984 mm (1.4951 – 1.4954 in)

Special tool
TOOL (A): 09900–20202 (Micrometer (1/100 mm, 25 – 50 mm))



I944H1140126-01

“a”: 10.5 mm (0.413 in)	“b”: 31.5 mm (1.240 in)

4) Select the specified bearings from the bearing selection table.

⚠ CAUTION

The bearings should be replaced as a set.

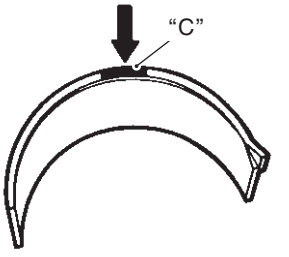
Bearing selection table

		Crank pin O.D. “B”		
	Code	1	2	3
Conrod I.D. “A”	1	Green	Black	Brown
	2	Black	Brown	Yellow

I718H1140293-01

Bearing thickness specification

Color “C” (Part No.)	Thickness
Green	1.480 – 1.484 mm (0.0583 – 0.0584 in)
Black	1.484 – 1.488 mm (0.0584 – 0.0586 in)
Brown	1.488 – 1.492 mm (0.0586 – 0.0587 in)
Yellow	1.492 – 1.496 mm (0.0587 – 0.0589 in)



I649G1140336-02

“C”: Color code

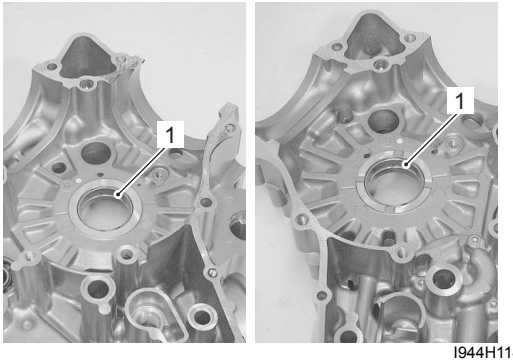
Crankshaft Journal Bearing Inspection and Selection

B944H11406029

Refer to “Engine Bottom Side Disassembly (Page 1D-58)”.
Refer to “Engine Bottom Side Assembly (Page 1D-65)”.

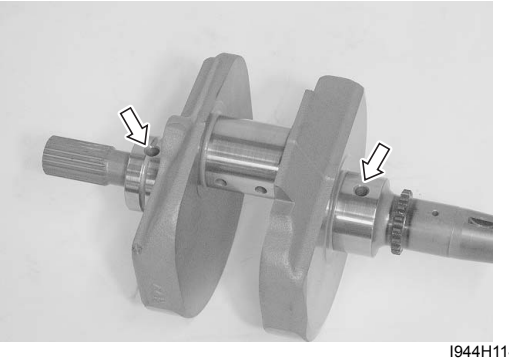
Inspection

1) Inspect each upper and lower crankcase bearings (1) for any damage.



I944H1140127-01

2) Inspect the crankshaft journal for any damage.

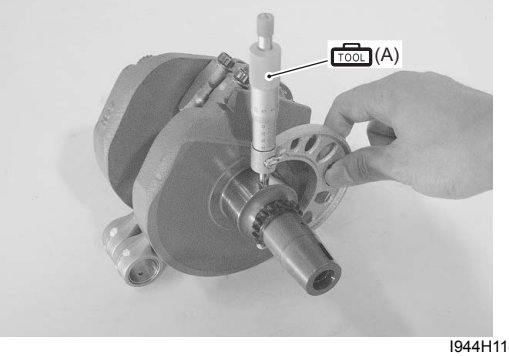


I944H1140128-01

3) Measure the crankshaft O.D. with the special tool. If any of the measurements are out of specification, replace the crankshaft.

Special tool
TOOL (A): 09900–20202 (Micrometer (1/100 mm, 25 – 50 mm))

Crankshaft journal O.D.
Standard: 41.985 – 42.000 mm (1.6529 – 1.6535 in)



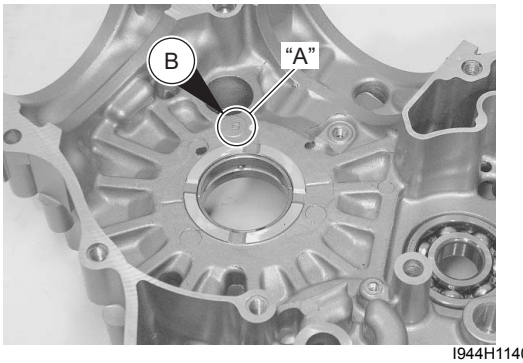
I944H1140129-01

Selection

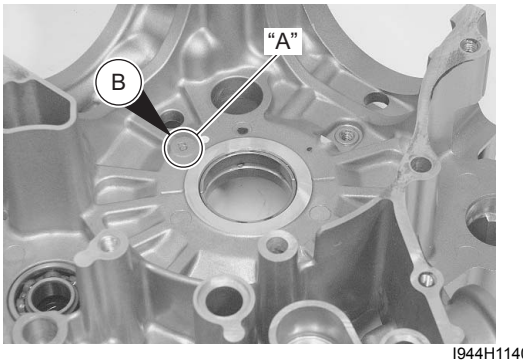
1) Select the specified bearings from the crankcase journal I.D. codes. The crankcase journal I.D. codes ((A), (B) or (C)) “A”, is stamped on the inside of each crankcase half.

⚠ CAUTION

The bearings should be replaced as a set.



I944H1140131-01



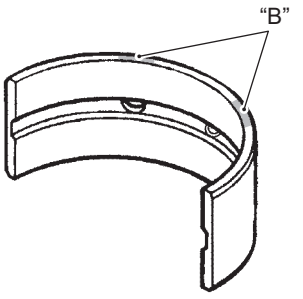
I944H1140132-01

Crankcase journal I.D. specification

Code “A”	I.D. specification	Bearing color
A	46.000 – 46.006 mm (1.8110 – 1.8113 in)	Green
B	46.006 – 46.012 mm (1.8113 – 1.8115 in)	Black
C	46.012 – 46.018 mm (1.8115 – 1.8117 in)	Brown

Bearing thickness specification

Color “B” (Part No.)	Thickness
Green	1.999 – 2.002 mm (0.0787 – 0.0788 in)
Black	2.002 – 2.005 mm (0.0788 – 0.0789 in)
Brown	2.005 – 2.008 mm (0.0789 – 0.0791 in)



I944H1140133-01

Specifications

Service Data

B944H11407001

Valve + Guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	31 (1.22)	—
	EX.	25.5 (1.00)	—
Valve clearance (when cold)	IN.	0.10 – 0.20 (0.004 – 0.008)	—
	EX.	0.20 – 0.30 (0.008 – 0.012)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve 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.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	IN. & EX.	—	37.1 (1.46)
Valve spring tension	IN. & EX.	127 – 147 N (13.0 – 15.0 kgf, 28.5 – 33.0 lbs) at length 33.4 mm (1.31 in)	—

Camshaft + Cylinder Head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	36.380 – 36.425 (1.4323 – 1.4341)	36.08 (1.4205)
	EX.	35.680 – 35.725 (1.4047 – 1.4065)	35.38 (1.3929)
Camshaft journal oil clearance	IN. & EX.	0.027 – 0.069 (0.0011 – 0.0027)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.007 – 22.028 (0.8664 – 0.8672)	—
Camshaft journal O.D.	IN. & EX.	21.959 – 21.980 (0.8645 – 0.8654)	—
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cam chain pin (at arrow "3")	16th pin		—
Cylinder head distortion	—		0.05 (0.002)

Cylinder + Piston + Piston Ring

Unit: mm (in)

Item	Standard			Limit
Compression pressure	1 300 – 1 700 kPa (13.0 – 17.0 kgf/cm^2, 185 – 242 psi)			1 100 kPa (11.0 kgf/cm^2, 156 psi)
Compression pressure difference	—			200 kPa (2.0 kgf/cm^2, 28 psi)
Piston-to-cylinder clearance	0.025 – 0.035 (0.0010 – 0.0014)			0.120 (0.0047)
Cylinder bore	81.000 – 81.015 (3.1890 – 3.1896)			Nicks or Scratches
Piston diam.	80.970 – 80.985 (3.1878 – 3.1884) Measure 20 mm (0.8 in) from the skirt end.			80.880 (3.1842)
Cylinder distortion	—			0.05 (0.002)
Piston ring free end gap	1st	—	Approx. 6.5 (0.26)	5.2 (0.20)
	2nd	2T	Approx. 9.0 (0.35)	7.2 (0.28)
Piston ring end gap	1st	—	0.06 – 0.18 (0.002 – 0.007)	0.5 (0.020)
	2nd	2T	0.06 – 0.18 (0.002 – 0.007)	0.5 (0.020)
Piston ring-to-groove clearance	1st		—	0.180 (0.0071)
	2nd		—	0.150 (0.0059)
Piston ring groove width	1st		0.83 – 0.85 (0.0327 – 0.0335) 1.30 – 1.32 (0.0512 – 0.0520)	—
	2nd		1.01 – 1.03 (0.0398 – 0.0406)	—
	Oil		2.01 – 2.03 (0.0791 – 0.0799)	—
Piston ring thickness	1st		0.76 – 0.81 (0.0299 – 0.0319) 1.08 – 1.10 (0.0425 – 0.0433)	—
	2nd		0.97 – 0.99 (0.0382 – 0.0390)	—
Piston pin bore I.D.	20.002 – 20.008 (0.7875 – 0.7877)			20.030 (0.7886)
Piston pin O.D.	19.996 – 20.000 (0.7872 – 0.7874)			19.980 (0.7866)

Conrod + Crankshaft

Unit: mm (in)

Item	Standard	Limit
Conrod small end I.D.	20.010 – 20.018 (0.7878 – 0.7881)	20.040 (0.7890)
Conrod big end side clearance	0.170 – 0.320 (0.0067 – 0.0126)	0.5 (0.02)
Conrod big end width	20.95 – 21.00 (0.825 – 0.827)	—
Crank pin width	42.17 – 42.22 (1.660 – 1.662)	—
Conrod big end oil clearance	0.032 – 0.056 (0.0013 – 0.0022)	0.080 (0.0031)
Crank pin O.D.	37.976 – 38.000 (1.4951 – 1.4961)	—
Crankshaft journal O.D.	41.985 – 42.000 (1.6529 – 1.6535)	—
Crankshaft runout	—	0.05 (0.002)

Tightening Torque Specifications

B944H11407002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
STP sensor mounting screw	3.5	0.35	2.5	☞(Page 1D-13)
TP sensor mounting screw	3.5	0.35	2.5	☞(Page 1D-14)
Fuel delivery pipe mounting screw	5	0.5	3.5	☞(Page 1D-15)
Clutch release arm bolt	9	0.9	6.5	☞(Page 1D-24)
Engine sprocket nut	145	14.5	105.0	☞(Page 1D-24)
Speed sensor rotor bolt	25	2.5	18.0	☞(Page 1D-24)
Speed sensor mounting bolt	5	0.5	3.5	☞(Page 1D-24)
Cylinder head bolt (M10) (Initial)	25	2.5	18.0	☞(Page 1D-33)
Cylinder head bolt (M10) (Final)	42	4.2	30.5	☞(Page 1D-33)
Cylinder head bolt (M6) (L70)	10	1.0	7.0	☞(Page 1D-33)
Cylinder head bolt (M6) (L40)	10	1.0	7.0	☞(Page 1D-33)
Cylinder nut (M6)	10	1.0	7.0	☞(Page 1D-34)
Camshaft journal holder bolt	10	1.0	7.0	☞(Page 1D-36) / ☞(Page 1D-39) / ☞(Page 1D-44)
Cam chain tension adjuster bolt	10	1.0	7.0	☞(Page 1D-36) / ☞(Page 1D-40)
Cam chain tension adjuster cap bolt	23	2.3	16.5	☞(Page 1D-36) / ☞(Page 1D-40)
Generator cover plug	11	1.1	8.0	☞(Page 1D-41)
Valve timing inspection plug	23	2.3	16.5	☞(Page 1D-41)
Cylinder head cover bolt	14	1.4	10.0	☞(Page 1D-42)
Exhaust pipe bolt	23	2.3	16.5	☞(Page 1D-42)
Oil gallery plug (Cylinder head) (M6)	10	1.0	7.0	☞(Page 1D-49)
Oil gallery plug (M6)	10	1.0	7.0	☞(Page 1D-66) / ☞(Page 1D-68)
Oil gallery plug (M8)	18	1.8	13.0	☞(Page 1D-66) / ☞(Page 1D-68)
Oil gallery plug (M12)	21	2.1	15.0	☞(Page 1D-66)
Oil gallery plug (M16)	35	3.5	25.5	☞(Page 1D-66)
Special tool bolt	23	2.3	16.5	☞(Page 1D-67)
Piston cooling oil jet bolt	10	1.0	7.0	☞(Page 1D-69)
Oil pressure regulator	27	2.7	19.5	☞(Page 1D-70)
Crankcase bolt (M8)	26	2.6	19.0	☞(Page 1D-71)
Crankcase bolt (M6)	11	1.1	8.0	☞(Page 1D-71)
Oil plate bolt	10	1.0	7.0	☞(Page 1D-72)
Cam chain tensioner bolt	10	1.0	7.0	☞(Page 1D-73) / ☞(Page 1D-74)
Primary drive gear bolt	70	7.0	50.5	☞(Page 1D-74)
Oil pressure switch	14	1.4	10.0	☞(Page 1D-74)
Oil cooler union bolt	70	7.0	50.5	☞(Page 1D-75)
Gearshift cam stopper bolt	10	1.0	7.0	☞(Page 1D-75)
Gearshift cam stopper plate bolt	13	1.3	9.5	☞(Page 1D-76)
Gearshift arm stopper	19	1.9	13.5	☞(Page 1D-76)
Oil pipe stopper screw	8	0.8	6.0	☞(Page 1D-77)
Generator cover mounting bolt	10	1.0	7.0	☞(Page 1D-78)
Starter motor mounting bolt	10	1.0	7.0	☞(Page 1D-78)
Conrod cap bolt	21 N·m (2.1 kgf-m, 15.0 lbf-ft) then turn in 1/4 (90°) turn			☞(Page 1D-80) / ☞(Page 1D-81)

NOTE

The specified tightening torque is described in the following.
“Throttle Body Components (Page 1D-7)”
“Throttle Body Construction (Page 1D-8)”
“Engine Assembly Installation (Page 1D-22)”

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

Special Tools and Equipment

Recommended Service Material

B944H11408001

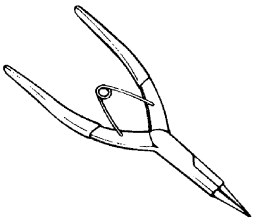
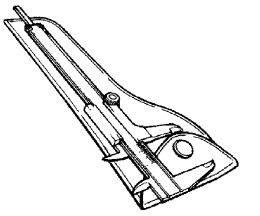
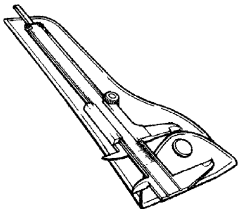
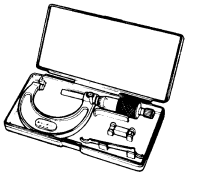
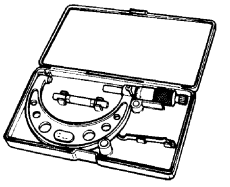
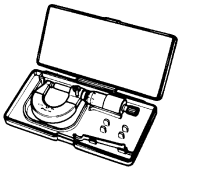
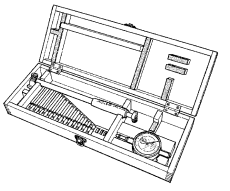
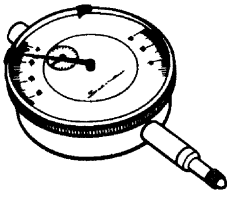
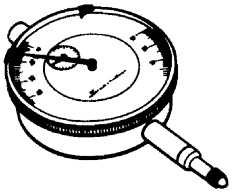
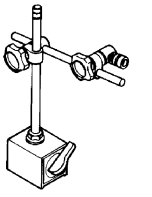
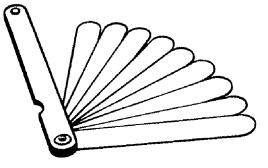
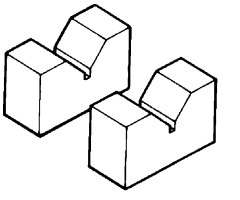
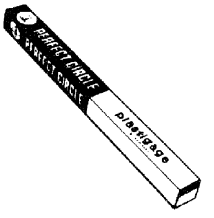
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1D-13) / ☞(Page 1D-43) / ☞(Page 1D-68) / ☞(Page 1D-69) / ☞(Page 1D-69) / ☞(Page 1D-69) / ☞(Page 1D-71) / ☞(Page 1D-72) / ☞(Page 1D-72) / ☞(Page 1D-74) / ☞(Page 1D-78) / ☞(Page 1D-78)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞(Page 1D-31) / ☞(Page 1D-31) / ☞(Page 1D-32) / ☞(Page 1D-34) / ☞(Page 1D-35) / ☞(Page 1D-38) / ☞(Page 1D-39) / ☞(Page 1D-48) / ☞(Page 1D-48) / ☞(Page 1D-49) / ☞(Page 1D-66) / ☞(Page 1D-67) / ☞(Page 1D-67) / ☞(Page 1D-69) / ☞(Page 1D-79) / ☞(Page 1D-80)
Sealant	SUZUKI BOND No.1215 or equivalent	P/No.: 99000–31110	☞(Page 1D-31) / ☞(Page 1D-71)
	SUZUKI BOND No.1207B or equivalent	P/No.: 99000–31140	☞(Page 1D-41) / ☞(Page 1D-74)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000–32030	☞(Page 1D-24) / ☞(Page 1D-76)
	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 1D-23) / ☞(Page 1D-69) / ☞(Page 1D-76)

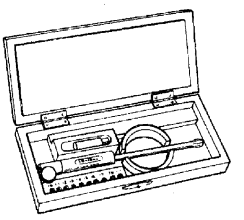
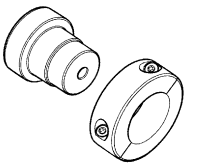
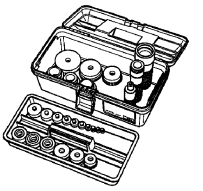
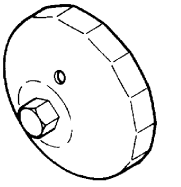
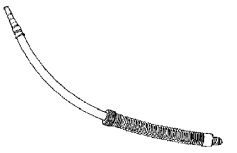
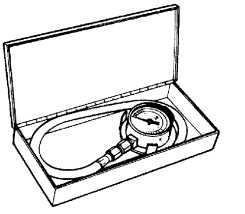
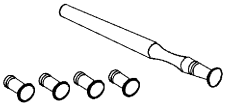
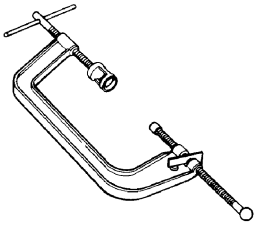
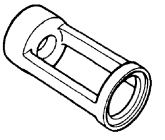
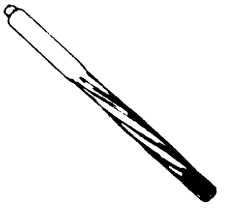
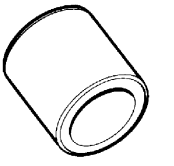
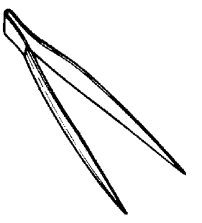
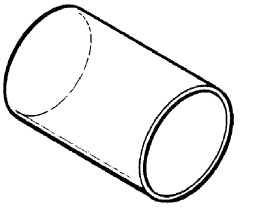
NOTE

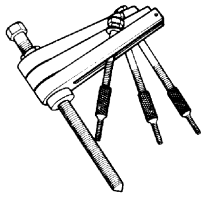
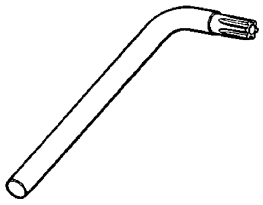
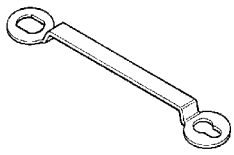
Required service material is also described in the following.
“Throttle Body Components (Page 1D-7)”
“Engine Assembly Installation (Page 1D-22)”

Special Tool

B944H11408002

09900–06107 Snap ring remover (Open type) ☞(Page 1D-58) / ☞(Page 1D-59) / ☞(Page 1D-76) / ☞(Page 1D-77)	
09900–20101 Vernier calipers (150 mm) ☞(Page 1D-57) / ☞(Page 1D-80)	
09900–20102 Vernier calipers (200 mm) ☞(Page 1D-50) / ☞(Page 1D-54)	
09900–20202 Micrometer (25 – 50 mm) ☞(Page 1D-44) / ☞(Page 1D-82) / ☞(Page 1D-83)	
09900–20204 Micrometer (75 – 100 mm) ☞(Page 1D-56)	
09900–20205 Micrometer (0 – 25 mm) ☞(Page 1D-45) / ☞(Page 1D-50) / ☞(Page 1D-56) / ☞(Page 1D-57) / ☞(Page 1D-80)	
09900–20530 Cylinder gauge set ☞(Page 1D-54)	
09900–20602 Dial gauge ☞(Page 1D-45) / ☞(Page 1D-57) / ☞(Page 1D-80)	
09900–20607 Dial gauge ☞(Page 1D-45) / ☞(Page 1D-49) / ☞(Page 1D-50) / ☞(Page 1D-50)	
09900–20701 Dial gauge chuck ☞(Page 1D-45) / ☞(Page 1D-49) / ☞(Page 1D-50) / ☞(Page 1D-50)	
09900–20803 Thickness gauge ☞(Page 1D-49) / ☞(Page 1D-54) / ☞(Page 1D-56) / ☞(Page 1D-57) / ☞(Page 1D-80)	
09900–21304 V blocks ☞(Page 1D-45) / ☞(Page 1D-49) / ☞(Page 1D-50)	
09900–22301 Plastigauge ☞(Page 1D-44) / ☞(Page 1D-81)	
09900–22302 Plastigauge ☞(Page 1D-44)	

09900–22403 Small bore gauge (18 – 35 mm) ☞(Page 1D-45) / ☞(Page 1D-57) / ☞(Page 1D-80) 	09913–60221 Journal bearing installer & holder ☞(Page 1D-64) / ☞(Page 1D-66) / ☞(Page 1D-67) / ☞(Page 1D-67) 
09913–70210 Bearing installer set (10 – 75) ☞(Page 1D-68) 	09915–40620 Oil filter wrench ☞(Page 1D-60) / ☞(Page 1D-75) 
09915–63311 Compression gauge attachment ☞(Page 1D-3) 	09915–64512 Compression gauge ☞(Page 1D-3) 
09916–10911 Valve lapper set ☞(Page 1D-51) 	09916–14510 Valve lifter ☞(Page 1D-47) / ☞(Page 1D-48) 
09916–14522 Valve lifter attachment ☞(Page 1D-47) / ☞(Page 1D-48) 	09916–33210 Valve guide reamer (4.5 mm) ☞(Page 1D-53)
09916–34542 Reamer handle ☞(Page 1D-52) / ☞(Page 1D-53) 	09916–34580 Valve guide reamer (10.8 mm) ☞(Page 1D-52) 
09916–43211 Valve guide installer & remover ☞(Page 1D-52) / ☞(Page 1D-52) 	09916–53330 Valve guide installer attachment ☞(Page 1D-52) 
09916–84511 Tweezer ☞(Page 1D-47) / ☞(Page 1D-48) 	09919–28620 Sleeve protector ☞(Page 1D-47) / ☞(Page 1D-47) / ☞(Page 1D-48) 

09920–13120 Crankshaft remover ☞(Page 1D-62) 	09930–11950 Torx wrench (5 mm) ☞(Page 1D-12) / ☞(Page 1D-13) / ☞(Page 1D-14) 
09930–44530 Rotor holder ☞(Page 1D-60) / ☞(Page 1D-74) 	

Engine Lubrication System

Precautions

Precautions for Engine Oil

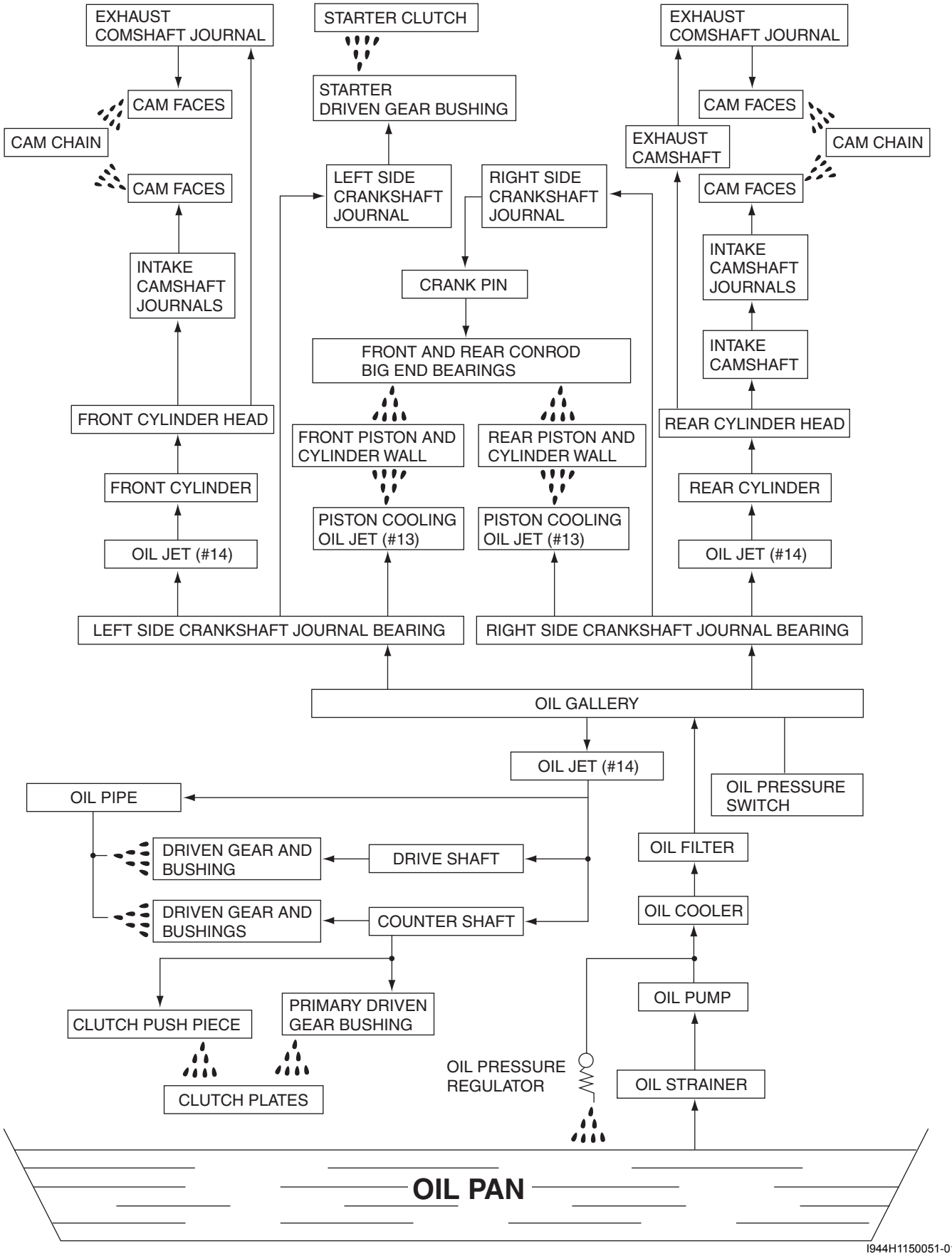
B944H11500001

Refer to “Fuel and Oil Recommendation in Section 0A (Page 0A-3)”.

Schematic and Routing Diagram

Engine Lubrication System Chart Diagram

B944H11502001

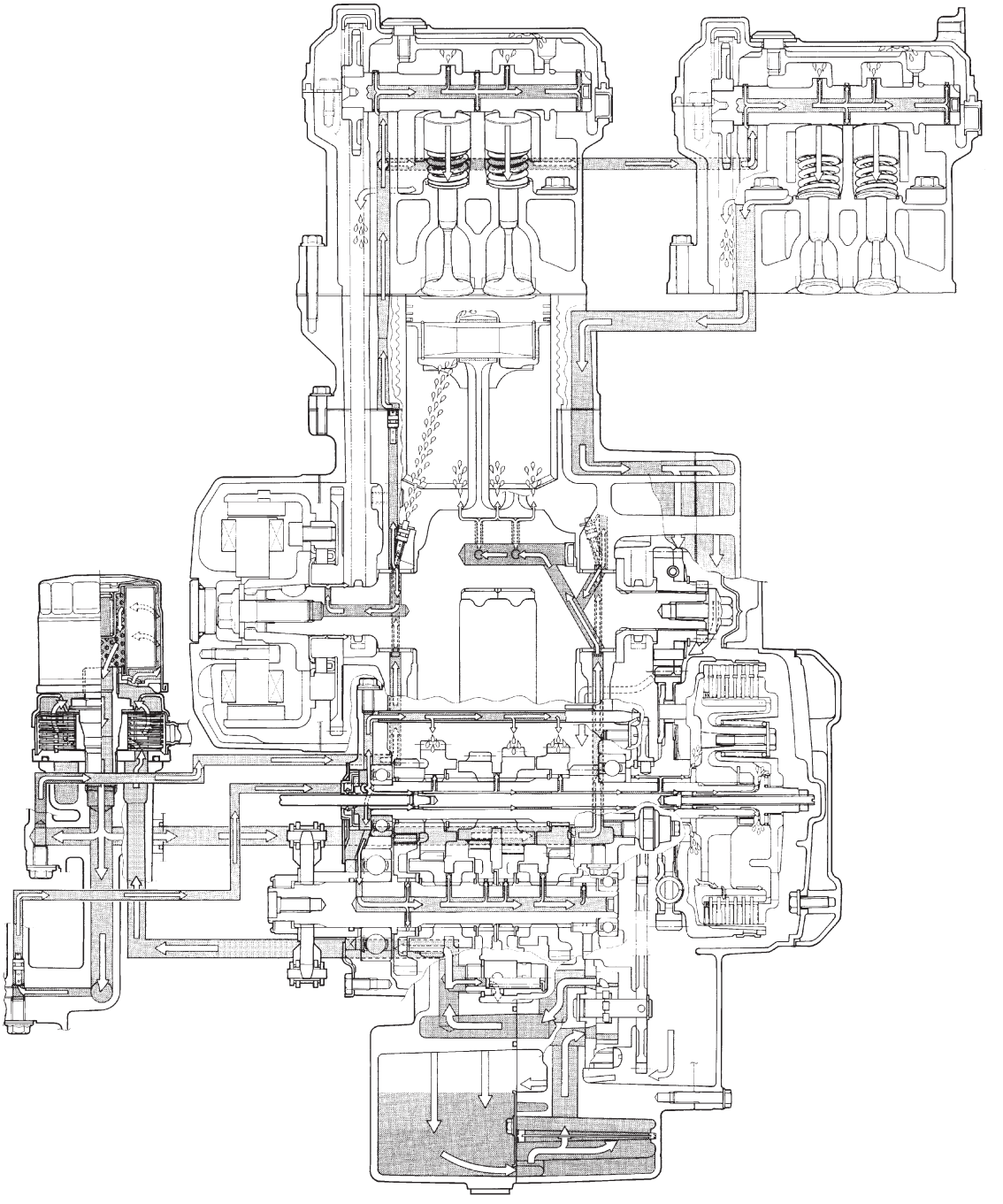


I944H1150051-01

Engine Lubrication Circuit Diagram

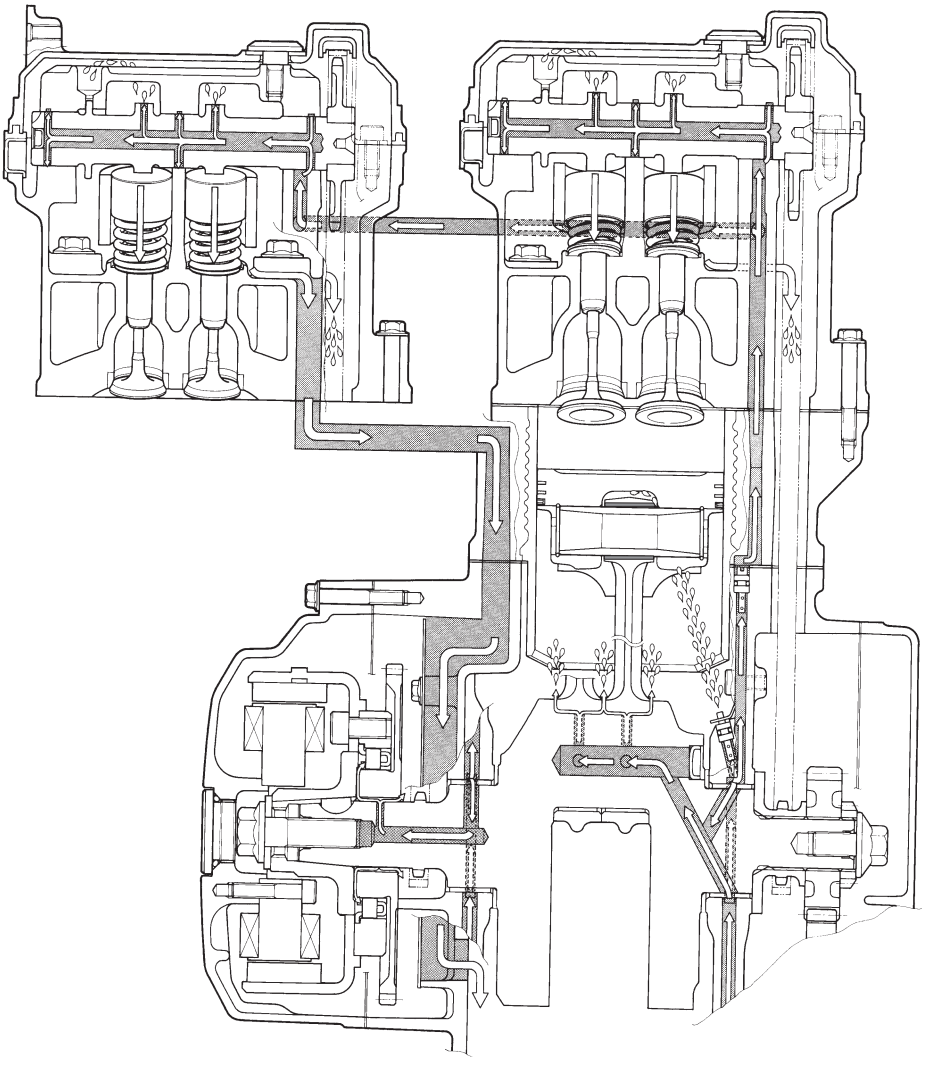
B944H11502002

FRONT CYLINDER



I944H1150042-03

REAR CYLINDER



I944H1150043-02

Diagnostic Information and Procedures

Engine Lubrication Symptom Diagnosis

B944H11504001

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

B944H11504002

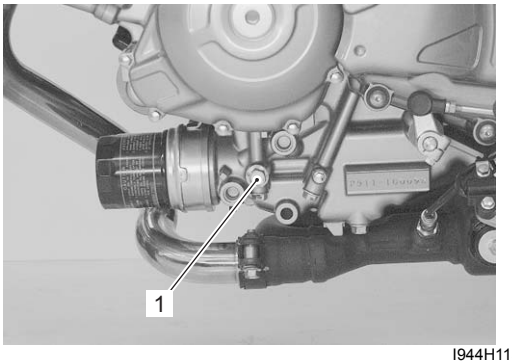
Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

NOTE

Before checking the oil pressure, check the following:

- **Oil level (Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)")**
- **Oil leaks (If leak is found, repair it.)**
- **Oil quality (If oil is discolored or deteriorated, replace it.)**

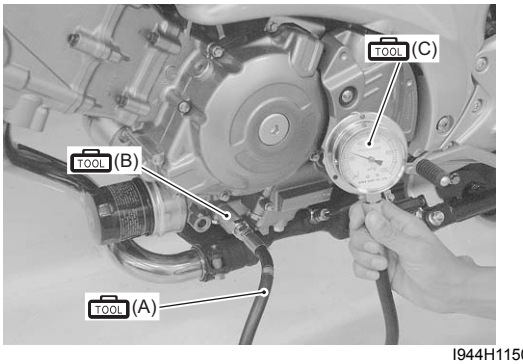
1) Start the engine and check if the oil pressure indicator light is turned on. If the light stays on, check the oil pressure indicator light circuit. If the circuit is OK, check the oil pressure in the following manner.
2) Remove the main oil gallery plug (1).



I944H1150044-01

3) Install the oil pressure gauge and adaptor into the main oil gallery.

Special tool
TOOL (A): 09915–74521 (Oil pressure gauge hose)
TOOL (B): 09915–70610 (Oil pressure gauge attachment)
TOOL (C): 09915–77331 (Meter (for high pressure))



I944H1150045-02

4) Warm up the engine as follows:
Summer: 10 min. at 2 000 r/min.
Winter: 20 min. at 2 000 r/min.
5) After warm up, increase the engine speed to 3 000 r/min (Observe the tachometer), and read the oil pressure gauge.
If the oil pressure is lower or higher than the specification, the following causes may be considered.

Oil pressure specification
200 – 600 kPa (2.0 – 6.0 kgf/cm^2, 28 – 85 psi) at 3 000 r/min, Oil temp. at 60 °C (140 °F)

High oil pressure	Low oil pressure
• Engine oil viscosity is too high • Clogged oil passage • Combination of the above items	• Clogged oil filter • Oil leakage from the oil passage • Damaged O-ring • Defective oil pump • Combination of the above items

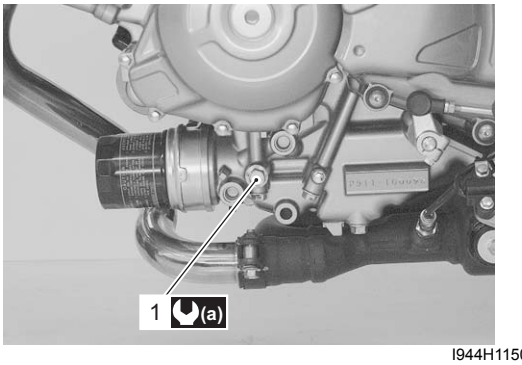
6) Stop the engine and remove the oil pressure gauge and attachment.

7) Reinstall the main oil gallery plug (1) and tighten it to the specified torque.

⚠ CAUTION

Use a new gasket to oil leakage.

Tightening torque
Main Oil gallery plug (M12) (a): 21 N·m (2.1 kgf-m, 15.0 lbf-ft)



I944H1150046-01

8) Check the engine oil level. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

Repair Instructions

Engine Oil and Filter Replacement

B944H11506001

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

Engine Oil Level Inspection

B944H11506002

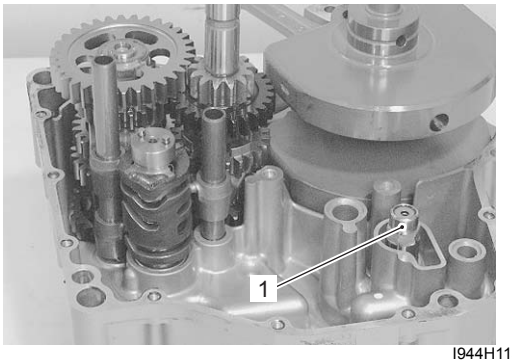
Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

Oil Strainer / Oil Pressure Regulator Removal and Installation

B944H11506003

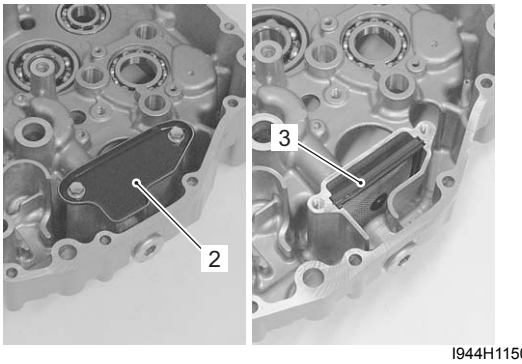
Removal

1) Remove the engine assembly from the frame. Refer to “Engine Assembly Removal in Section 1D (Page 1D-18)”.
2) Disassemble the engine top side. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-25)”.
3) Separate the left and right crankcase. Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-58)”.
4) Remove the oil pressure regulator (1).



I944H1150004-01

5) Remove the oil strainer plate (2).
6) Remove the oil strainer (3).



I944H1150005-02

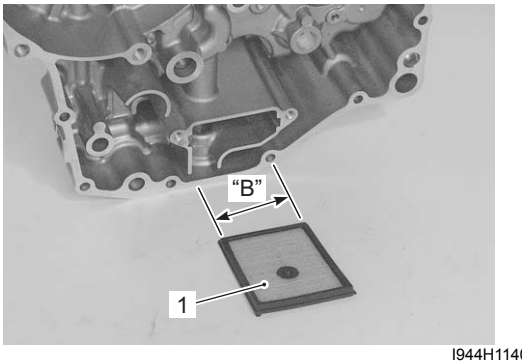
Installation

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

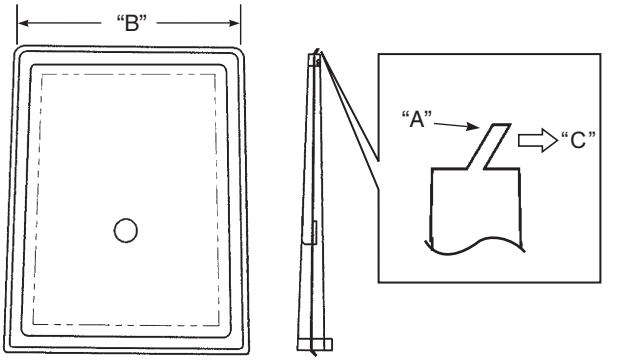
- Install the oil strainer (1).

⚠ CAUTION

- **The lip “A” of the oil strainer should be positioned downward.**
- **The shorter side “B” of the oil strainer should be positioned inside.**



I944H1140068-01

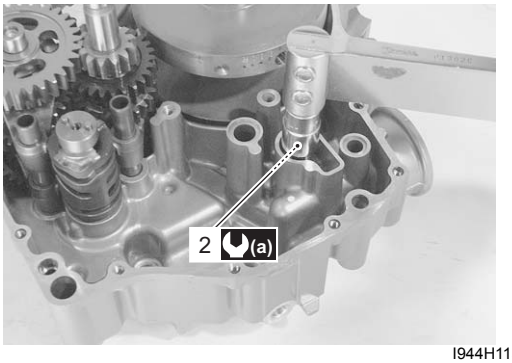


I944H1150007-01

"A" Lip	"C" Lower side
"B" Shorter side	

- Tighten the oil pressure regulator (2) to the specified torque.

Tightening torque
Oil pressure regulator (a): 27 N·m (2.7 kgf-m, 19.5 lbf-ft)



I944H1150008-02

- Assemble the engine. Refer to "Engine Bottom Side Assembly in Section 1D (Page 1D-65)" and "Engine Top Side Assembly in Section 1D (Page 1D-31)".
- Remount the engine assembly. Refer to "Engine Assembly Installation in Section 1D (Page 1D-22)".

Oil Strainer Inspection and Cleaning

B944H11506013

Inspect the oil strainer in the following procedures:

1) Remove the oil strainer. Refer to "Oil Strainer / Oil Pressure Regulator Removal and Installation (Page 1E-6)".
2) If the oil strainer is clogged with sediment or rust, clean the oil strainer using compressed air.

NOTE

When the strainer is dirtied excessively, replace the oil strainer with a new one.

I944H1150009-01

3) Install the oil strainer. Refer to "Oil Strainer / Oil Pressure Regulator Removal and Installation (Page 1E-6)".

Oil Pressure Regulator Inspection

B944H11506004

1) Remove the oil pressure regulator. Refer to"Oil Strainer / Oil Pressure Regulator Removal and Installation (Page 1E-6)".
2) Inspect the operation of the oil pressure regulator by pushing on the piston with a proper bar.
3) If the piston does not operate, replace the oil pressure regulator with a new one.

I944H1150010-01

4) Install the oil pressure regulator. Refer to "Oil Strainer / Oil Pressure Regulator Removal and Installation (Page 1E-6)".

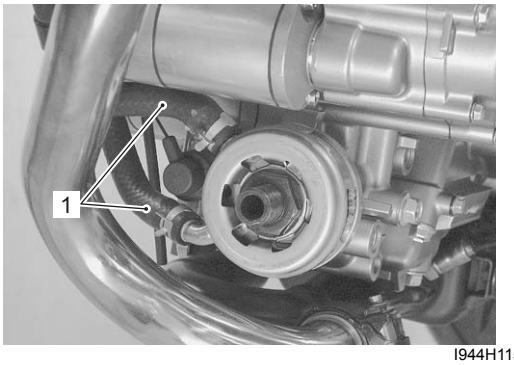
Oil Cooler Removal and Installation

B944H11506005

Removal

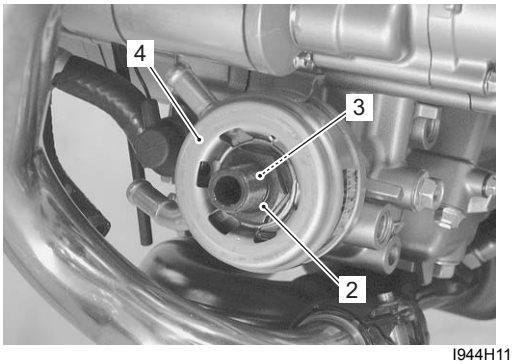
1) Drain engine oil and engine coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".
2) Remove the Oil filter. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".

3) Disconnect the oil cooler hoses (1).



I944H1150011-01

4) Remove the washer (3) and oil cooler (4) by removing the union bolt (2).



I944H1150012-01

Installation

Install the oil cooler in the reverse order of removal. Pay attention to the following points:

- Apply grease to the O-ring.

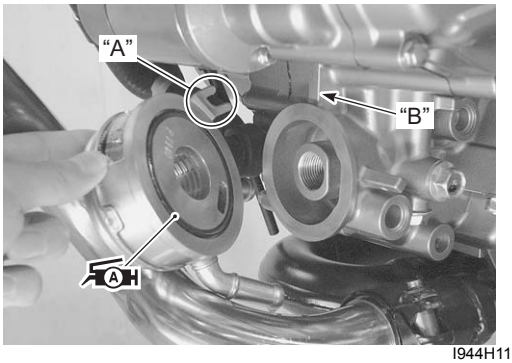
⚠ CAUTION

Use a new O-ring to prevent oil leakage.

NOTE

When installing the oil cooler, fit the concave part "A" of the oil cooler onto the convex part "B" of the crankcase.

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



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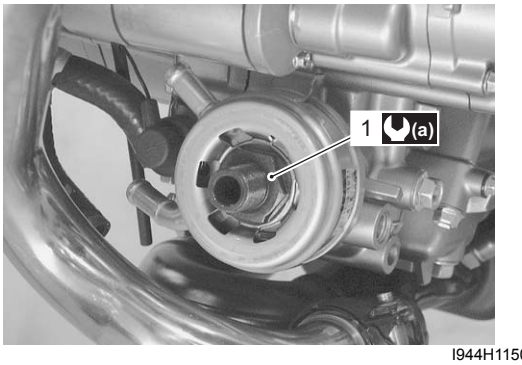
- Tighten the union bolt (1) to the specified torque.

Tightening torque
Oil cooler union bolt (a): 70 N·m (7.0 kgf-m, 50.5 lbf-ft)



I944H1150014-02

Oil Pressure Switch Removal and Installation

B944H11506006

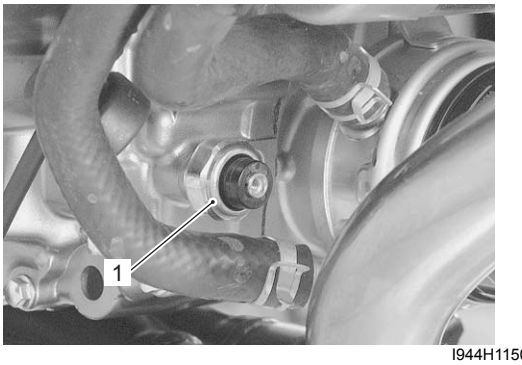
Refer to "Electrical Components Location in Section 0A (Page 0A-7)".

Removal

1) Turn the ignition switch OFF.
2) Drain engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".
3) Disconnect the oil pressure switch lead wire.

I944H1150015-01

4) Remove the oil pressure switch (1).



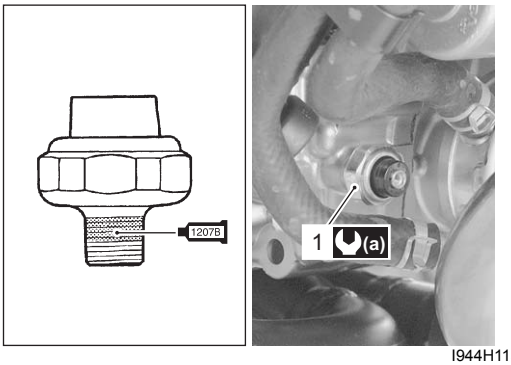
I944H1150016-01

Installation

1) Install the oil pressure switch (1), apply the bond to its thread part and tighten it to the specified torque.

1207B : Sealant 99000–31140 (SUZUKI BOND No.1207B or equivalent)

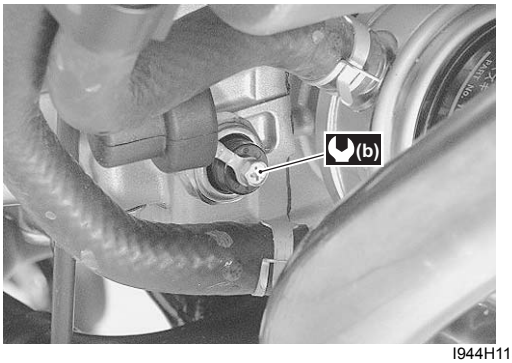
Tightening torque
Oil pressure switch (a): 14 N·m (1.4 kgf-m, 10.0 lbf-ft)



I944H1150017-01

2) Connect the oil pressure switch lead wire securely. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-5)”.

Tightening torque
Oil pressure switch lead wire bolt (b): 1.5 N·m (0.15 kgf-m, 1.0 lbf-ft)



I944H1150018-01

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

Oil Pressure Switch Inspection

B944H11506007

Refer to “Oil Pressure Indicator Inspection in Section 9C (Page 9C-6)”.

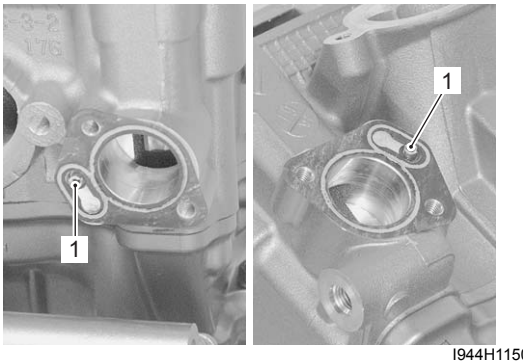
Oil Jet Removal and Installation

B944H11506008

Oil Jet (For Cam Chain Tension Adjuster)
Removal

1) Remove the each cam chain tension adjuster. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-25)”.

2) Remove the oil jets (1).



I944H1150047-01

Installation

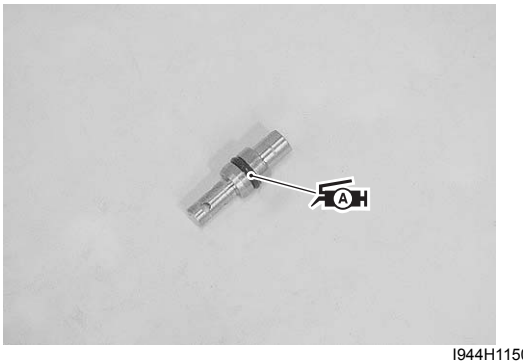
Installation is in the reverse order of removal. Pay attention to the following points:

- Apply grease to the O-ring.

⚠ CAUTION

Use a new O-ring to prevent oil leakage.

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



I944H1150019-01

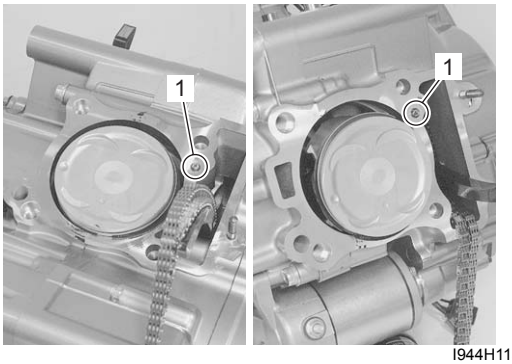
Oil Jet (For Cylinder Head and Piston Cooling)
Removal

NOTE

Do not drop the each parts into the crankcase.

1) Remove the cylinder. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-25)”.

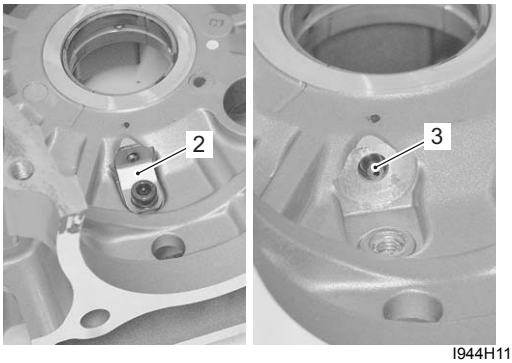
2) Remove the oil gallery jets (1) (for cylinder).



I944H1150048-01

3) Remove the plates (2).

4) Remove the piston cooling oil jets (3).



I944H1150049-01

Installation

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

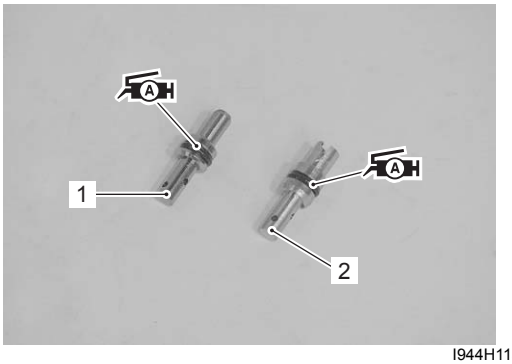
- Fit new O-rings to piston cooling oil jets (1) and oil gallery jets (2) (for cylinder) as shown.

⚠ CAUTION

Use new O-rings to prevent oil pressure leakage.

- Apply grease to O-rings.

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

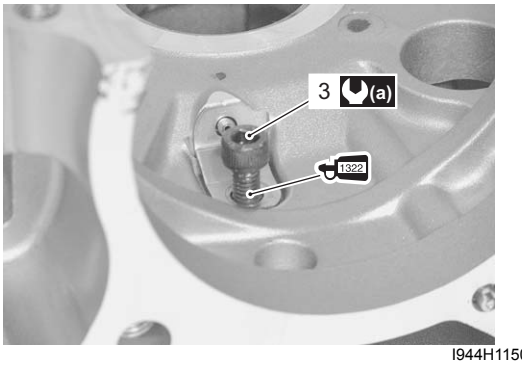


I944H1150022-02

- Apply a small quantity of thread lock to the bolts (3) 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)



I944H1150050-01

Oil Jet (For Transmission)

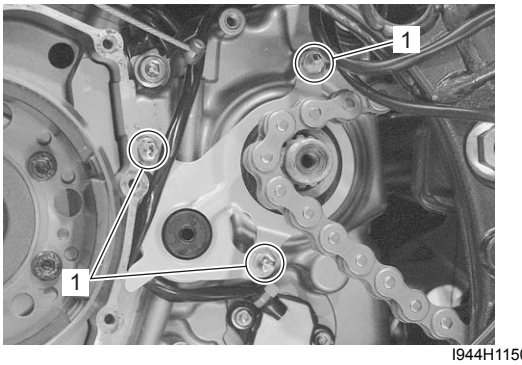
Removal

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

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

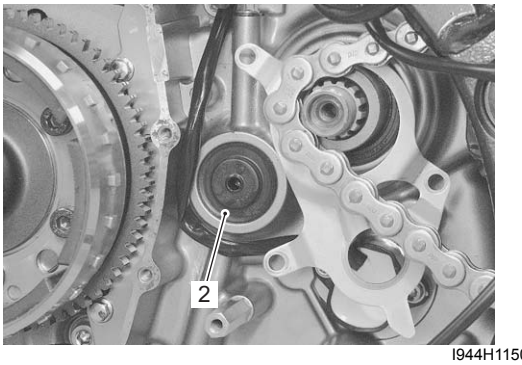
3) Remove the engine sprocket. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.

4) Remove the oil seal retainer mounting bolts (1).



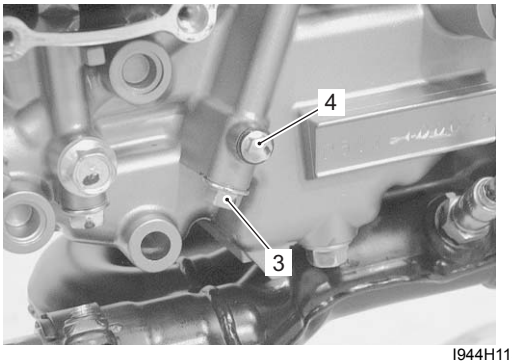
I944H1150023-02

5) Remove the clutch push rod oil seal (2).



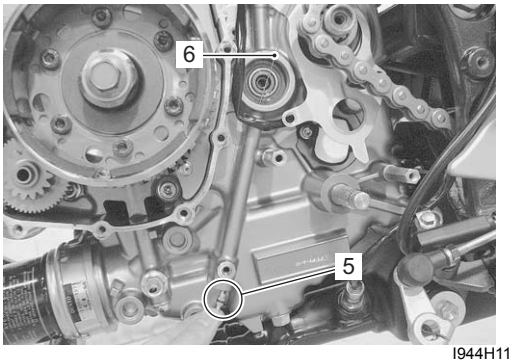
I944H1150024-01

6) Remove the oil gallery plug (M8) (3).
7) Remove the oil gallery plug (M6) (4) if necessary.



I944H1150025-01

8) Remove the oil gallery jet (for transmission) (5) with a suitable bar (6).



I944H1150026-02

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

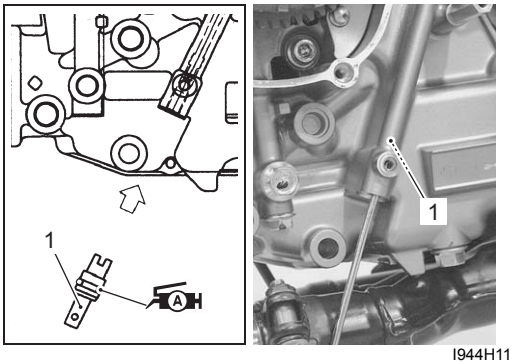
- Apply grease to the O-ring.

⚠ CAUTION

Use a new O-ring to prevent oil leakage.

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

- Install the oil gallery jet (for transmission) (1) with a suitable bar.



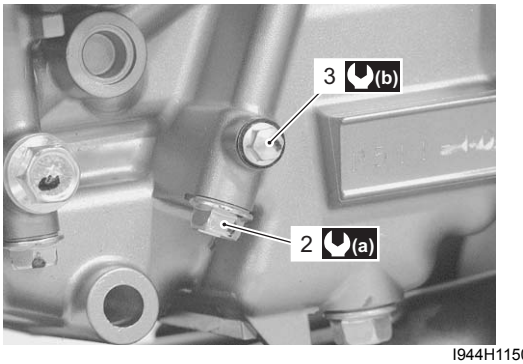
I944H1150027-02

- Tighten the oil gallery plug (M8) (2) and (M6) (3) to the specified torque.

⚠ CAUTION

Use new gaskets to prevent oil leakage.

Tightening torque
Oil gallery plug (M8) (a): 18 N·m (1.8 kgf-m, 13.0 lbf-ft)
Oil gallery plug (M6) (b): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1150028-01

- Install the clutch push rod oil seal (4) with the special tool.

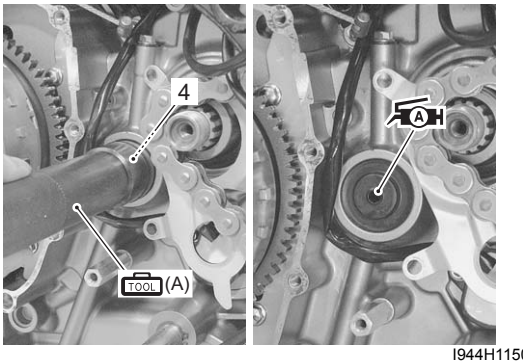
⚠ CAUTION

Use a new oil seal to prevent oil leakage.

Special tool
TOOL (A): 09913–70210 (Bearing installer set)

- Apply grease to lip of clutch push rod oil seal.

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



I944H1150029-02

- Reinstall the engine sprocket. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
- Reinstall the generator cover. Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.

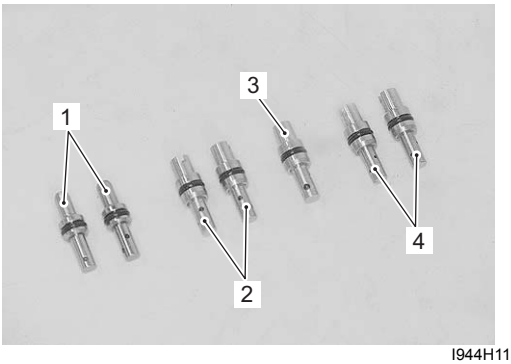
Oil Jet / Oil Gallery Jet Inspection

B944H11506010

Refer to “Oil 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.



I944H1150030-01

1.	Piston cooling oil jet
2.	Oil gallery jet (for cylinder)
3.	Oil gallery jet (for transmission)
4.	Oil jet (for tensioner adjuster)

Oil Pump Removal and Installation

B944H11506011

NOTE

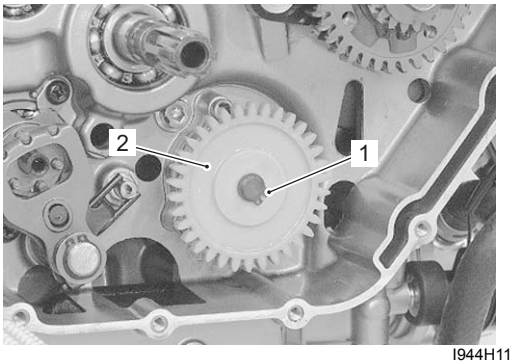
Do not drop the each parts into the crankcase.

Removal

1) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
2) Remove the clutch. Refer to “Clutch Removal in Section 5C (Page 5C-7)”.
3) Remove the snap ring (1) and oil pump driven gear (2).

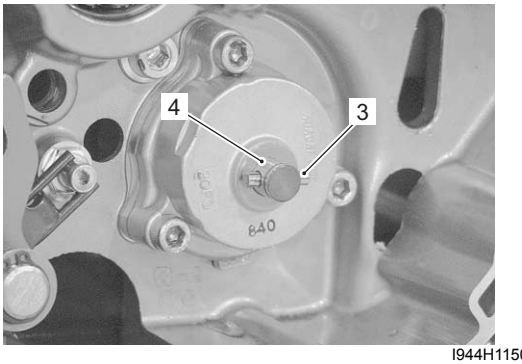
Special tool

TOOL : 09900–06107 (Snap ring pliers)



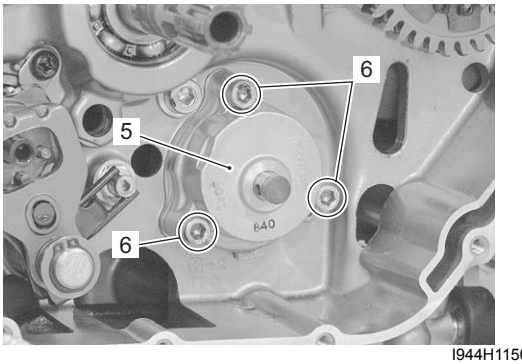
I944H1150031-01

4) Remove the pin (3) and washer (4).



I944H1150032-02

5) Remove the oil pump (5) by removing the oil pump mounting bolts (6).



I944H1150033-02

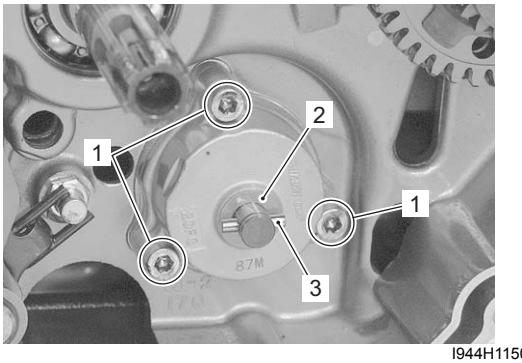
Installation

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

- Tighten the oil pump mounting bolts (1).
- Install the washer (2) and pin (3).

NOTE

Be careful not to drop the washer (1) and pin (2) into the crankcase.



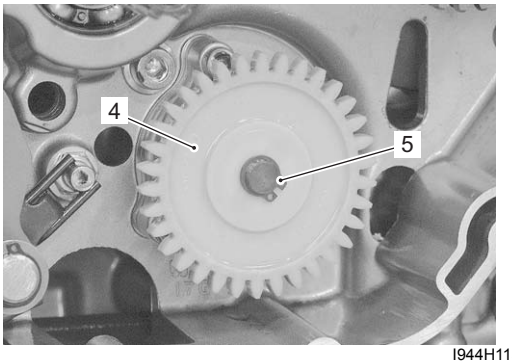
I944H1150034-02

- Install the oil pump driven gear (4) and snap ring (5).

⚠ CAUTION

Never reuse a snap ring.

Special tool
TOOL : 09900–06107 (Snap ring pliers)



I944H1150035-02

- Reinstall the clutch. Refer to “Clutch Installation in Section 5C (Page 5C-9)”.

Oil Pump Inspection

B944H11506012

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.

⚠ CAUTION

Do not attempt to disassemble the oil pump assembly.
The oil pump is available only as an assembly.

I944H1150036-01

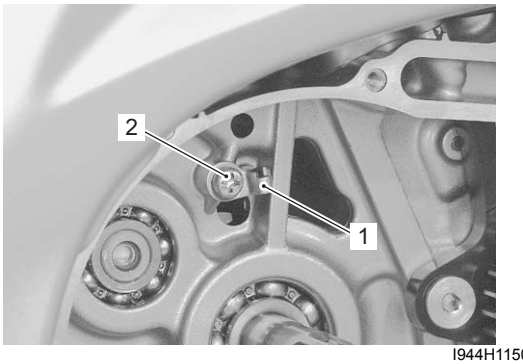
3) Install the oil pump. Refer to “Oil Pump Removal and Installation (Page 1E-12)”.

Oil Pipe Removal and Installation

B944H11506014

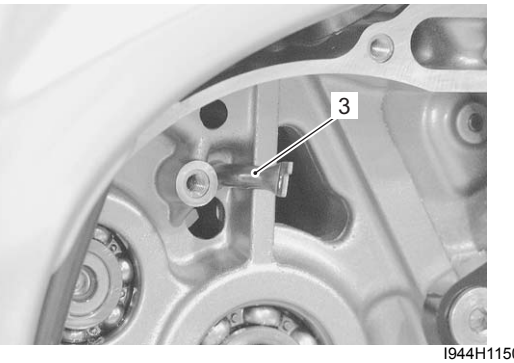
Removal

1) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.
2) Remove the clutch. Refer to “Clutch Removal in Section 5C (Page 5C-7)”.
3) Remove the oil pipe stopper (1) by removing its screw (2).



I944H1150037-02

4) Remove the oil pipe (3).

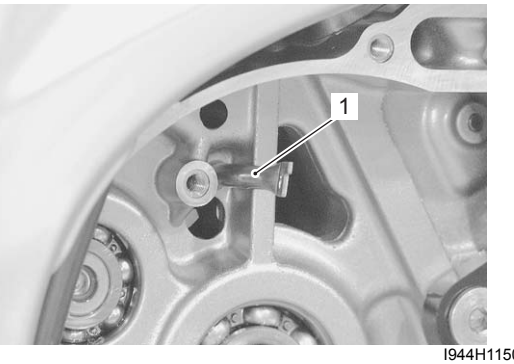


I944H1150038-02

Installation

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

- Install the oil pipe (1).



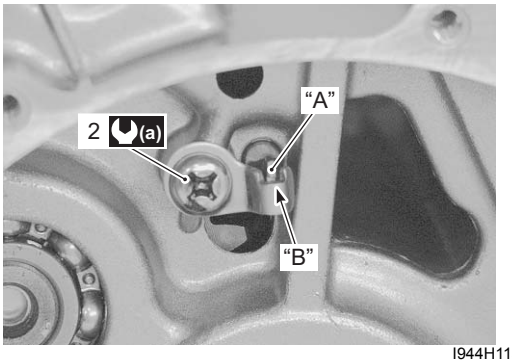
I944H1150039-01

- Tighten the oil pipe stopper screw (2) to the specified torque.

NOTE

Align the projection "A" of the oil pipe with the groove "B" of its stopper.

Tightening torque
Oil pipe stopper screw (a): 8 N·m (0.8 kgf-m, 6.0 lbf-ft)



I944H1150040-01

- Reinstall the clutch. Refer to "Clutch Installation in Section 5C (Page 5C-9)".

Oil Pipe Inspection

B944H11506015

Inspect the oil pipe the following procedures:

1) Remove the oil pipe. Refer to "Oil Pipe Removal and Installation (Page 1E-13)".
2) Inspect the oil pipe for clogging. Clean the oil pipe if necessary.

I944H1150041-01

3) Install the oil pipe. Refer to "Oil Pipe Removal and Installation (Page 1E-13)".

Specifications

Service Data

B944H11507001

Oil Pump

Item	Standard	Limit
Oil pressure (at 60 °C, 140 °F)	200 – 600 kPa (2.0 – 6.0 kgf/cm^2, 28 – 85 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	2 400 ml (2.5/2.1 US/Imp qt)	
	Filter change	2 750 ml (2.9/2.4 US/Imp qt)	
	Overhaul	3 000 ml (3.2/2.6 US/Imp qt)	

Tightening Torque Specifications

B944H11507002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Main Oil gallery plug (M12)	21	2.1	15.0	☞(Page 1E-6)
Oil pressure regulator	27	2.7	19.5	☞(Page 1E-7)
Oil cooler union bolt	70	7.0	50.5	☞(Page 1E-8)
Oil pressure switch	14	1.4	10.0	☞(Page 1E-9)
Oil pressure switch lead wire bolt	1.5	0.15	1.0	☞(Page 1E-9)
Piston cooling oil jet bolt	10	1.0	7.0	☞(Page 1E-10)
Oil gallery plug (M8)	18	1.8	13.0	☞(Page 1E-11)
Oil gallery plug (M6)	10	1.0	7.0	☞(Page 1E-11)
Oil pipe stopper screw	8	0.8	6.0	☞(Page 1E-14)

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

Special Tools and Equipment

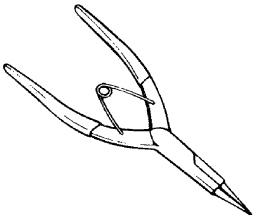
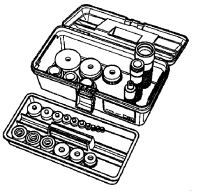
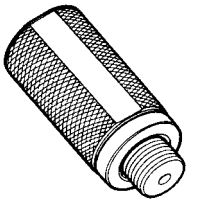
Recommended Service Material

B944H11508001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1E-8) / ☞(Page 1E-9) / ☞(Page 1E-10) / ☞(Page 1E-11) / ☞(Page 1E-11)
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-10)

Special Tool

B944H11508002

09900–06107 Snap ring remover (Open type) ☞(Page 1E-12) / ☞(Page 1E-13)		09913–70210 Bearing installer set (10 – 75) ☞(Page 1E-11)	
09915–70610 Oil pressure gauge attachment ☞(Page 1E-5)		09915–74521 Adapter hose ☞(Page 1E-5)	
09915–77331 Oil pressure gauge (1000 kPa) ☞(Page 1E-5)			

Engine Cooling System

Precautions

Precautions for Engine Cooling System

B944H11600001

⚠ 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

B944H11600002

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

General Description

Engine Coolant Description

B944H11601001

⚠ CAUTION

- **Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.**
- **Do not put in more than 60% anti-freeze or less than 50%. (Refer to Fig. 1 and 2.)**

At the time of manufacture, the cooling system is filled with a 50:50 mixture of distilled water and ethylene glycol anti-freeze. This 50:50 mixture will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above –31 °C (–24 °F).
If the vehicle is to be exposed to temperatures below –31 °C (–24 °F), this mixing ratio should be increased up to 55% or 60% according to the figure.

Anti-freeze Proportioning Chart

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

Fig.1: Engine coolant density-freezing point curve

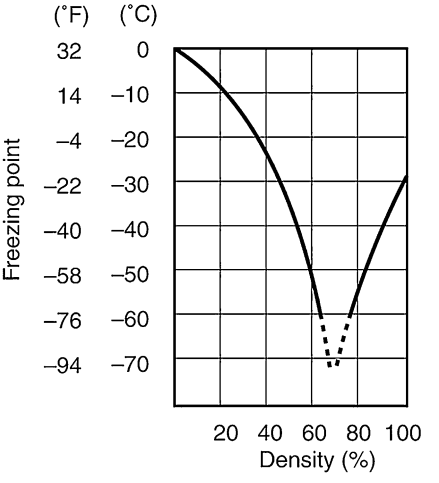


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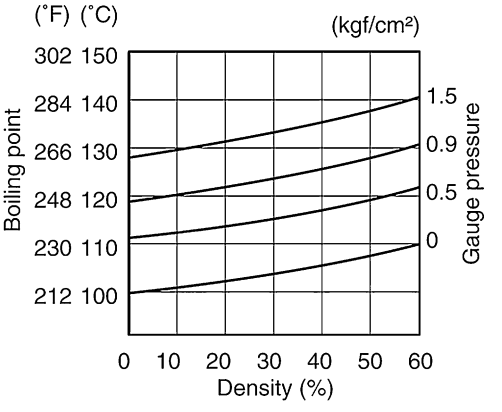
Fig.2: Engine coolant density-boiling point curve



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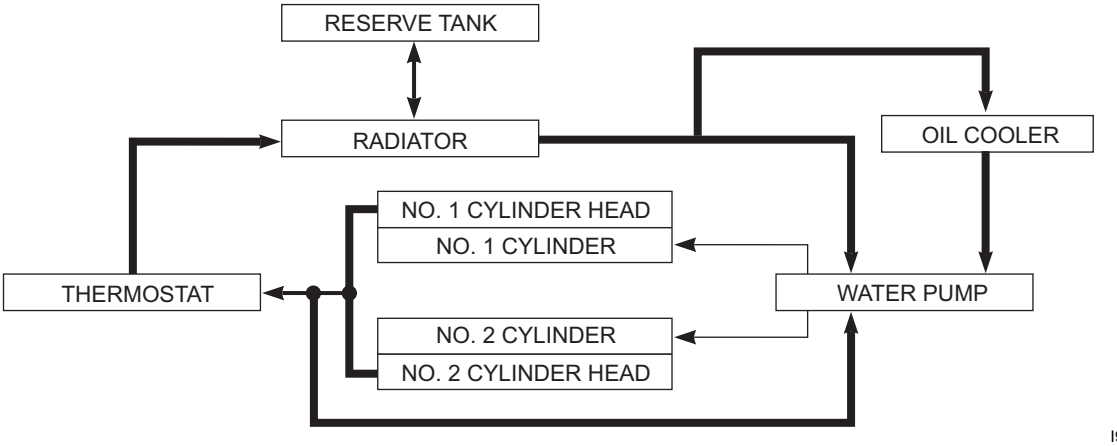
Schematic and Routing Diagram

Cooling Circuit Diagram

B944H11602001



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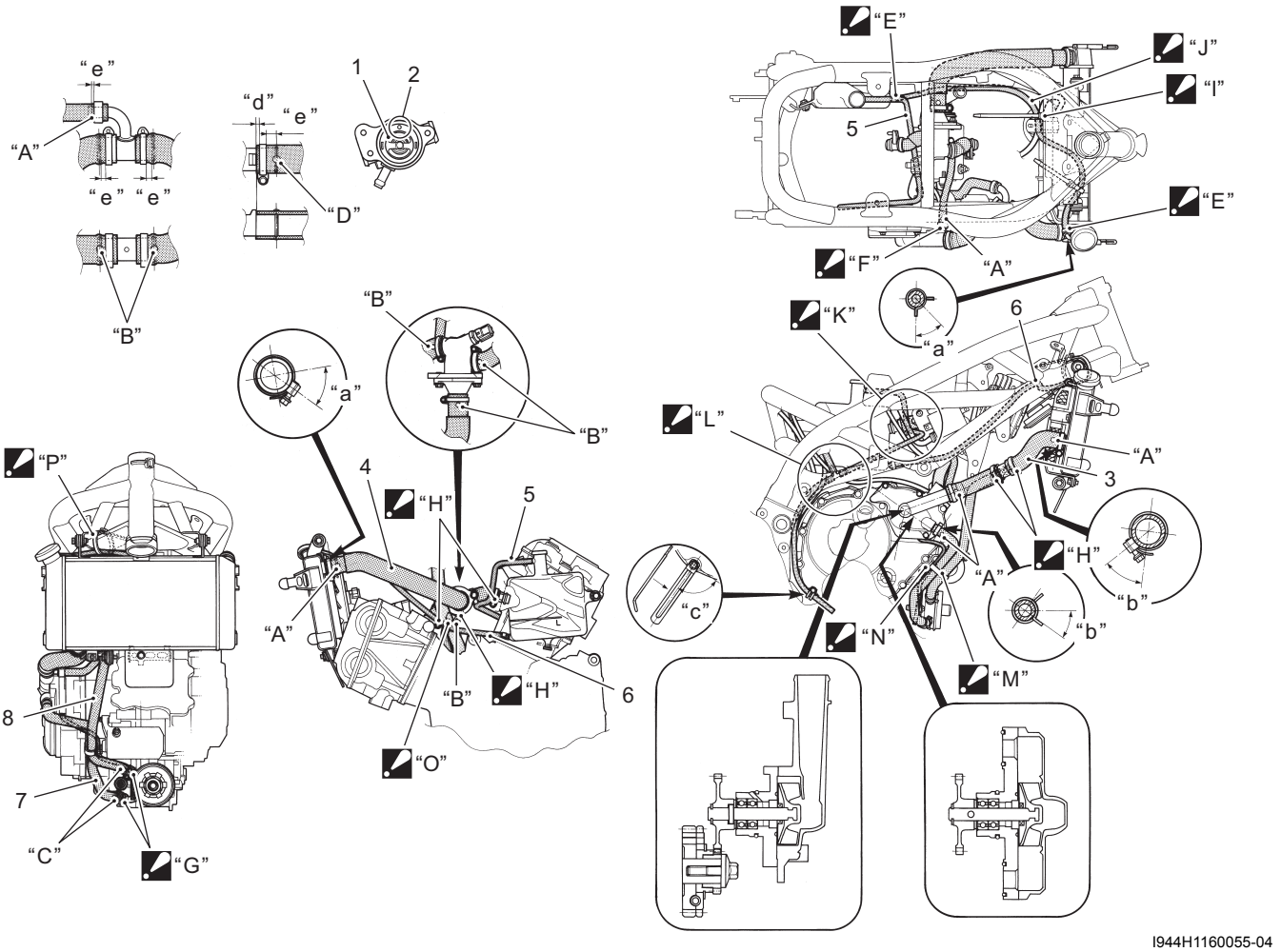
Water Hose Routing Diagram

B944H11602002



I944H1160055-04

1. Thermostat	"H": Clamp screw head should face left downside.
2. Jiggle valve	"I": Clamp the reservoir tank inlet hose and high-tension cord with the clamp.
3. Radiator outlet hose	"J": Pass the reservoir tank inlet hose forward horn lead wire.
4. Radiator inlet hose	"K": Pass the reservoir tank overflow hose above the high-tension cord and outside the regulator/rectifier lead wires and below the water hose.
5. Reservoir tank overflow hose	"L": Connect the thinner end of 3-way joint with the reservoir tank overflow hose.
6. Reservoir tank inlet hose	"M": Clamp the oil cooler hoses at the white marking point.
7. Oil cooler outlet hose	"N": Clamp the water pump drain hose and oil pressure switch lead wire.
8. Oil cooler inlet hose	"O": Pass the reservoir tank inlet hose outside of the crankcase breather hose.
"A": Yellow marking	"P": Clamp the reservoir tank inlet hose at white marking point.
"B": White marking	"a": 45°
"C": Red marking	"b": 0 – 45°
"D": Marking	"c": 90°
"E": Clamp ends should face downside.	"d": 2 – 8 mm (0.08 – 0.3 in)
"F": Clamp ends should face upside.	"e": Keep clearance
"G": Clamp ends should face forward.	

Diagnostic Information and Procedures

Engine Cooling Symptom Diagnosis

B944H11604001

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 engine coolant 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.*
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

B944H11606001

⚠ 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.**

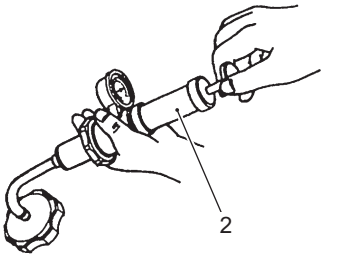
Inspect the cooling circuit in the following procedures:

1) Remove the right frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Remove the radiator cap (1) and connect the radiator tester (2) to the filler.
3) Pressurize the cooling system with 120 kPa (1.2 kgf/cm, 17 psi) of pressure, and then check if it holds the pressure for 10 seconds.

⚠ CAUTION

Do not exceed the radiator cap release pressure, or the radiator cap and subsequently the radiator, can be damaged.

I944H1160002-01



I933H1160003-02

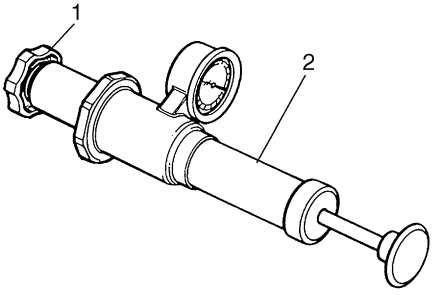
4) After finishing the cooling circuit inspection, reinstall the removed parts.

Radiator Cap Inspection

B944H11606002

Inspect the radiator cap in the following procedures:

1) Remove the radiator cap. Refer to “Cooling Circuit Inspection (Page 1F-4)”.
2) Attach the radiator cap (1) to the radiator tester (2) as shown in the figure.



I718H1160033-01

3) Slowly apply pressure to the radiator cap.
   If the radiator cap does not hold the pressure for at least 10 seconds, replace it with a new one.

   Radiator cap release pressure
   93 – 123 kPa (0.93 – 1.23 kgf/cm^2, 13.2 – 17.5 psi)

4) After finishing the radiator cap inspection, reinstall the removed parts.

Radiator Inspection and Cleaning

B944H11606003

Radiator Hose

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

Radiator

Inspect the radiator for engine coolant 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.

I944H1160003-01

Radiator Cleaning

Blow out any foreign matter that is stuck in the radiator fins using compressed air.

⚠ CAUTION

- **Make sure not to bend the fins when using compressed air.**
- **Always apply compressed air from the engine side. If compressed air is applied from the front side, dirt will be forced into the pores of radiator.**

I944H1160004-01

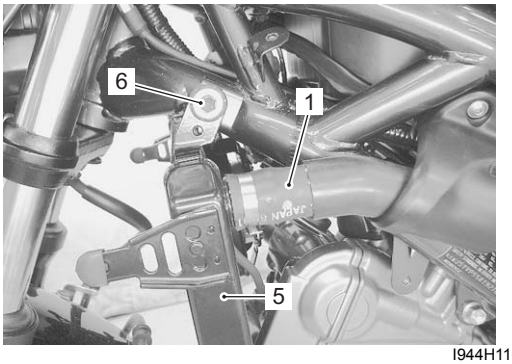
Radiator / Cooling Fan Motor Removal and Installation

B944H11606004

Removal

1) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
2) Remove the frame body covers, left and right. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Disconnect the radiator inlet hose (1), radiator outlet hose (2), reservoir tank inlet hose (3) and cooling fan motor lead wire coupler (4).

4) Remove the radiator assembly (5) by removing the bolts (6).



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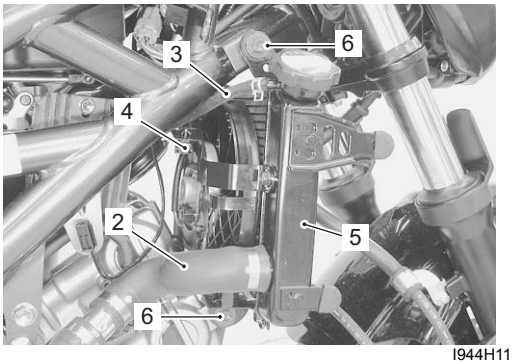

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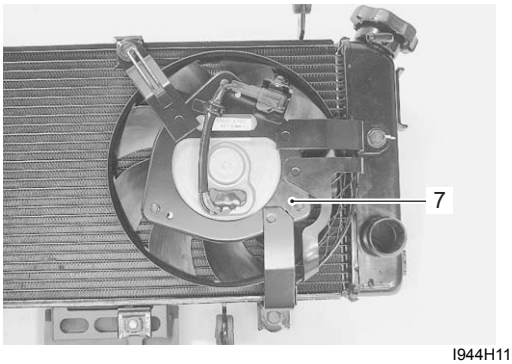
5) Remove the cooling fan assembly (7).

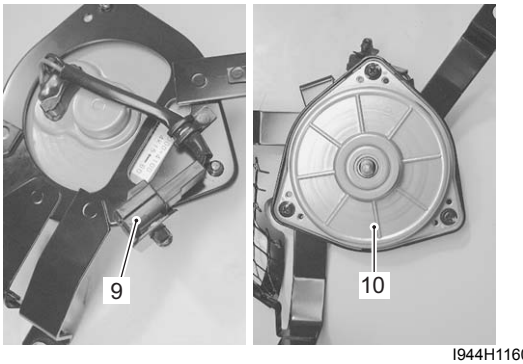


I944H1160007-02

6) Remove the cooling fan (8).

I944H1160008-02

7) Disconnect the coupler (9) and remove the cooling fan motor (10).



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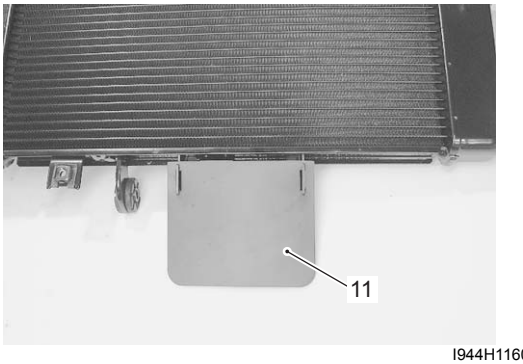
8) Remove the radiator under rubber (11).



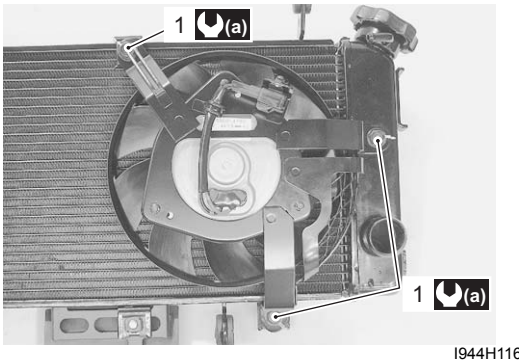
I944H1160010-02

Installation

Install the radiator/cooling fan motor in the reverse order of removal. Pay attention to the following points:

- Tighten the cooling fan assembly mounting bolts (1) to the specified torque.

  Tightening torque
  Cooling fan assembly mounting bolt (a): 6.5 N·m (0.65 kgf-m, 4.5 lbf-ft)



I944H1160011-03

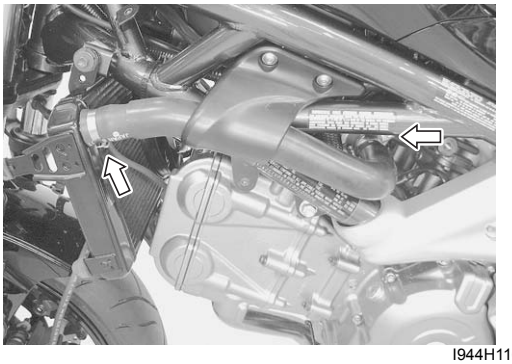
- Connect the radiator hoses securely. Refer to “Water Hose Routing Diagram (Page 1F-3)”.
- Pour engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
- Bleed air from the cooling circuit. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.

Water Hose Inspection

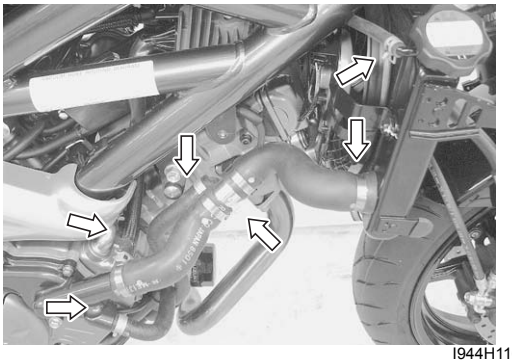
B944H11606005

Inspect the water hose in the following procedures:

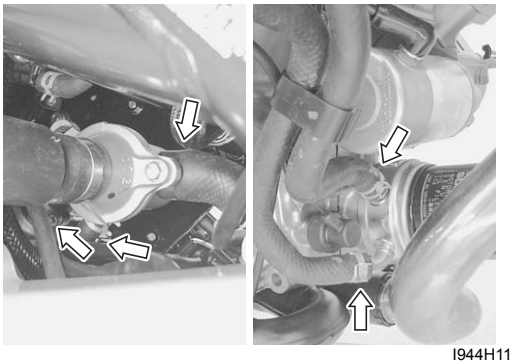
1) Remove the frame body covers, left and right. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Check the water hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.
3) Any leakage from the connecting section should be corrected by proper tightening. Refer to “Water Hose Routing Diagram (Page 1F-3)”.



I944H1160012-01



I944H1160013-01



I944H1160014-01

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

Water Hose Removal and Installation

B944H11606006

Removal

1) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
2) Remove the frame body covers, left and right. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Remove the water hose as shown in the water hose routing diagram. Refer to “Water Hose Routing Diagram (Page 1F-3)”.

Installation

1) Install the water hose as shown in the water hose routing diagram. Refer to “Water Hose Routing Diagram (Page 1F-3)”.
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

B944H11606007

Inspect the radiator reservoir tank in the following procedures:

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Inspect the radiator reservoir tank coolant leaks. If any defects are found, replace the radiator reservoir tank with a new one.

I944H1160050-02

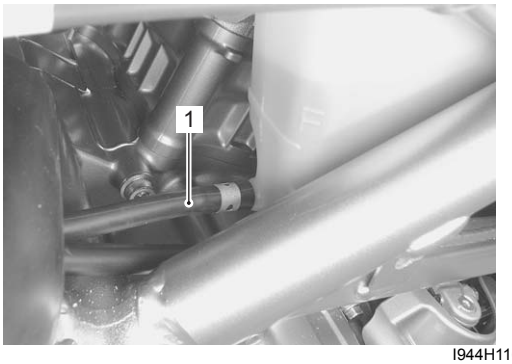
4) Reinstall the removed parts.

Radiator Reservoir Tank Removal and Installation

B944H11606008

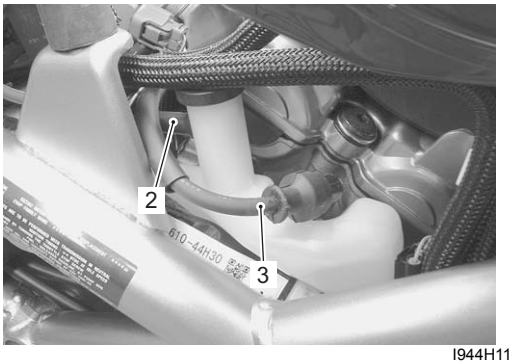
Removal

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Disconnect the reservoir tank inlet hose (1) and drain the engine coolant.



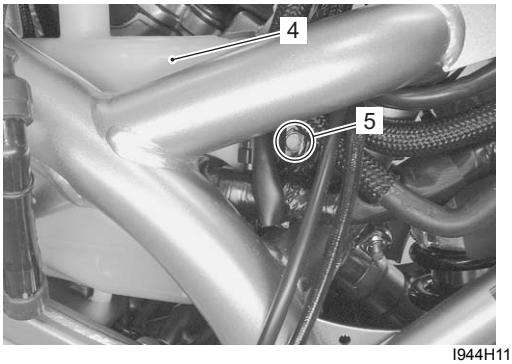
I944H1160051-02

4) Disconnect the reservoir tank overflow hose (2) and spark plug cap (3).



I944H1160052-02

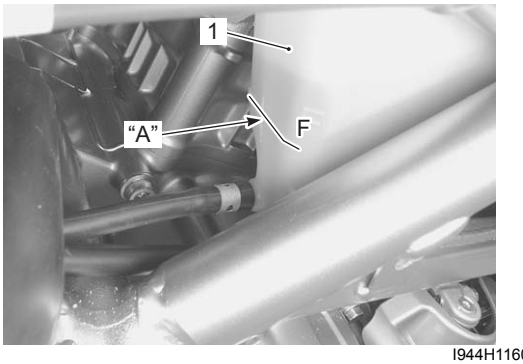
5) Remove the reservoir tank mounting (4) by removing the reservoir tank mounting bolt (5).



I944H1160053-02

Installation

1) Install the reservoir tank (1) as shown in the water hose routing diagram. Refer to “Water Hose Routing Diagram (Page 1F-3)”.
2) Fill the reservoir tank to the upper level “A”.



I944H1160054-02

3) Reinstall the removed parts.

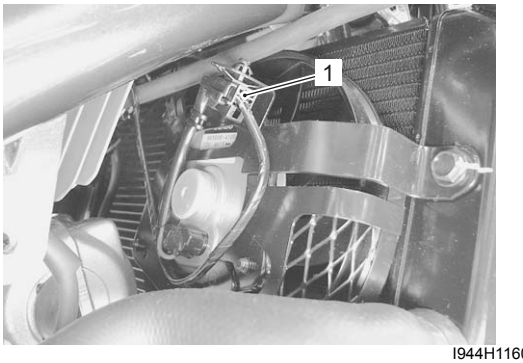
Cooling Fan Inspection

B944H11606009

Cooling fan operating temperature
Standard
(ON→OFF): Approx. 92 °C (198 °F)
(OFF→ON): Approx. 98 °C (208 °F)

Inspect the cooling fan in the following procedures:

1) Remove the right frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the cooling fan motor coupler (1).

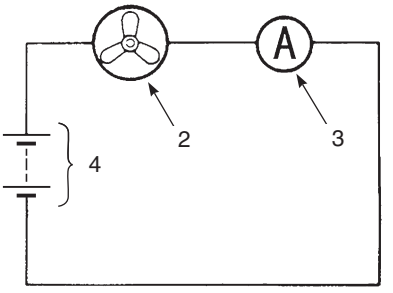


I944H1160015-01

3) 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 motor with a new one. Refer to “Radiator / Cooling Fan Motor Removal and Installation (Page 1F-5)”.

NOTE

- **When making this test, it is not necessary to remove the cooling fan.**
- **The voltmeter is for making sure that the battery applies 12 V to the motor. With the fan motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 A.**



I718H1160048-01

2. Fan motor	3. Ammeter	4. Battery

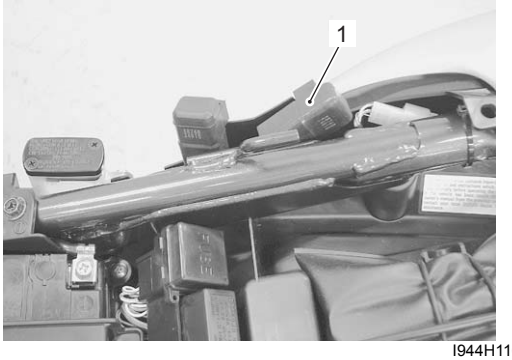
4) Connect the cooling fan motor coupler.
5) Reinstall the removed parts.

Cooling Fan Relay Inspection

B944H11606010

Refer to “Electrical Components Location in Section 0A (Page 0A-7)”.
Inspect the fan relay in the following procedures:

1) Remove the right rear frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the cooling fan relay coupler and remove the cooling fan relay (1).

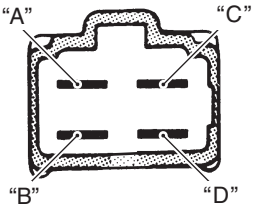


I944H1160016-01

3) First check the insulation between “A” and “B” terminals with tester. Then apply 12 V volts to “C” and “D” terminals, (+) to “C” and (–) to “D”, and check the continuity between “A” and “B”.
If there is no continuity, replace it with a new one.

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

Tester knob indication set
Continuity test (•))))



I718H1160006-03

4) Reinstall the removed parts.

ECT Sensor Removal and Installation

B944H11606011

Refer to “ECT Sensor Removal and Installation in Section 1C (Page 1C-3)”.

ECT Sensor Inspection

B944H11606012

Refer to “ECT Sensor Inspection in Section 1C (Page 1C-4)”.

Engine Coolant Temperature Indicator Inspection

B944H11606020

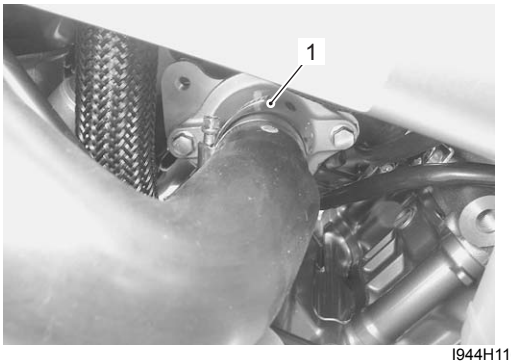
Refer to “Engine Coolant Temperature Indicator Light Inspection in Section 9C (Page 9C-4)”.

Thermostat Removal and Installation

B944H11606013

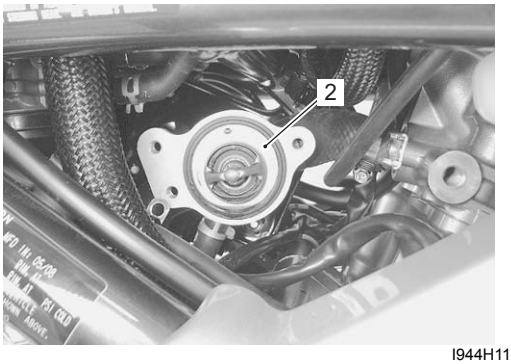
Removal

1) Drain a small amount of engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-12)”.
2) Place a clean rag under the thermostat case (1).
3) Remove the thermostat case (1).



I944H1160017-04

4) Remove the thermostat (2).



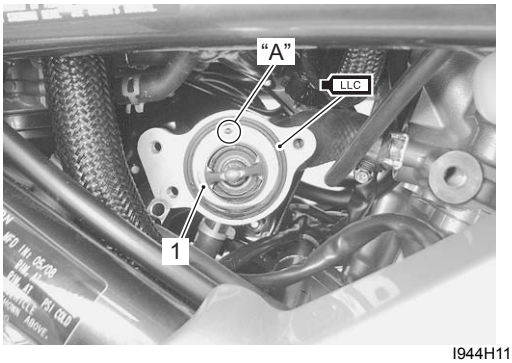
I944H1160018-01

Installation
Install the thermostat in the reverse order of removal, pay attention to the following points:

- Apply engine coolant to the rubber seal on the thermostat (1).
- Install the thermostat (1).

NOTE

The jiggle valve "A" of the thermostat faces upside.



I944H1160019-01

- Pour engine coolant and bleed air from the cooling circuit. Refer to "Cooling System Inspection in Section 0B (Page 0B-12)".

Thermostat Inspection

B944H11606014

Inspect the thermostat in the following procedures:

1) Remove the thermostat. Refer to "Thermostat Removal and Installation (Page 1F-9)".
2) Inspect the thermostat pellet for signs of cracking.

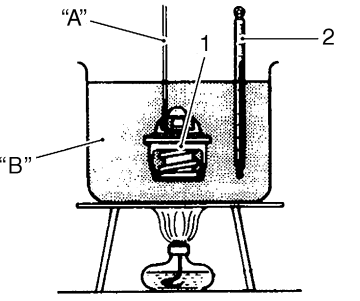
I944H1160021-01

3) Test the thermostat at the bench for control action.

⚠ CAUTION

- **Do not contact the thermostat (1) and the column thermometer (2) with a pan.**
- **As the thermostat operating response to water temperature change is gradual, do not raise water temperature too quickly.**
- **The thermostat with its valve open even slightly under normal temperature must be replaced.**

4) Immerse the thermostat (1) in the water contained in a beaker and note that the immersed thermostat is in suspension.
5) Heat the water by placing the beaker on a stove and observe the rising temperature on a thermometer (2).



I705H1160030-03

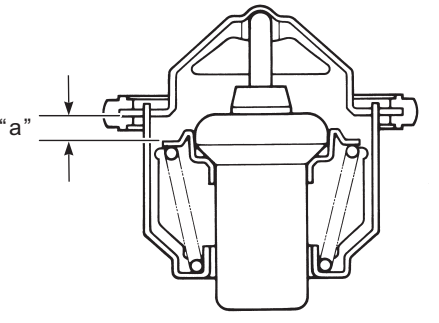
"A": String	"B": Water

6) Read the thermometer just when opening the thermostat. If this reading, which is the temperature level at which the thermostat valve begins to open, is out of the standard value, replace the thermostat with a new one.

Thermostat valve opening temperature
Standard: Approx. 76.5 °C (170 °F)

7) Keep on heating the water to raise its temperature.
8) Just when the water temperature reaches specified value, the thermostat valve should have been lifted by at least 8.0 mm (0.31 in). A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.

Thermostat valve lift "a"
Standard: 8.0 mm (0.31 in) and over at 100 °C (212 °F)

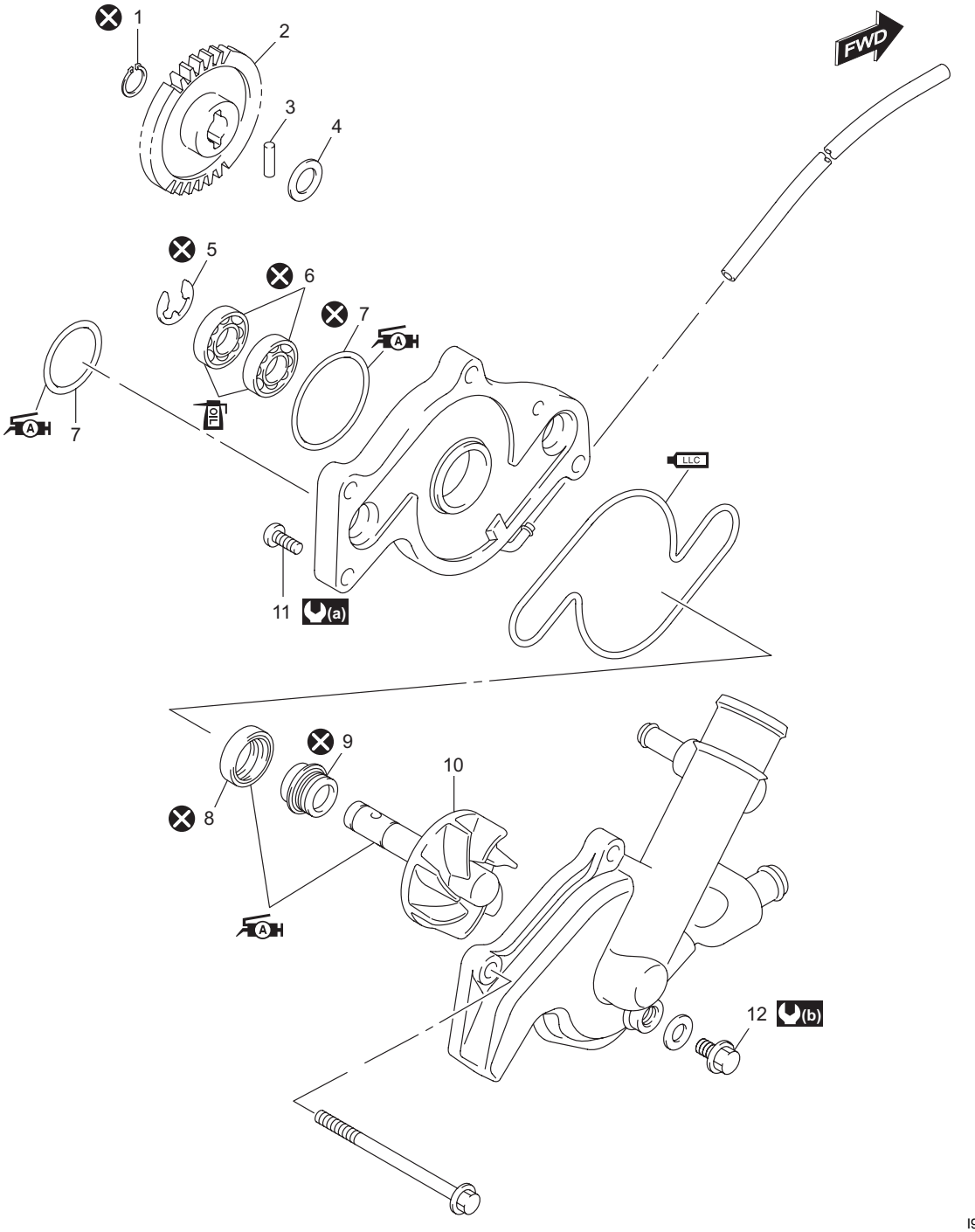


I944H1160022-01

9) Install the thermostat. Refer to "Thermostat Removal and Installation (Page 1F-9)".

Water Pump Components

B944H11606015



I944H1160056-01

1. Snap ring	6. Bearing	11. Water pump cover screw	LLC : Apply engine coolant.
2. Water pump driven gear	7. O-ring	12. Water drain bolt	OIL : Apply engine oil.
3. Pin	8. Oil seal	(a) : 4.5 N·m (0.45 kgf-m, 3.25 lbf-ft)	: Do not reuse.
4. Washer	9. Mechanical seal	(b) : 13 N·m (1.3 kgf-m, 9.5 lbf-ft)	
5. E-ring	10. Impeller	A : Apply grease.	

Water Pump Removal and Installation

B944H11606017

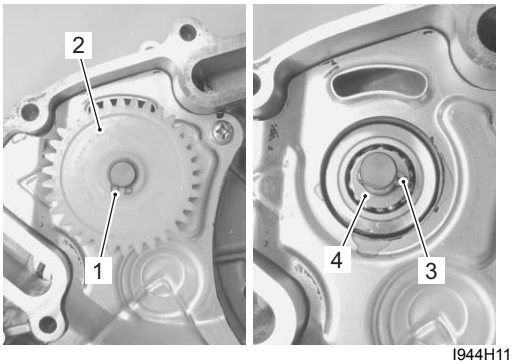
Removal

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 ring. Refer to "Water Pump Related Parts Inspection (Page 1F-16)".

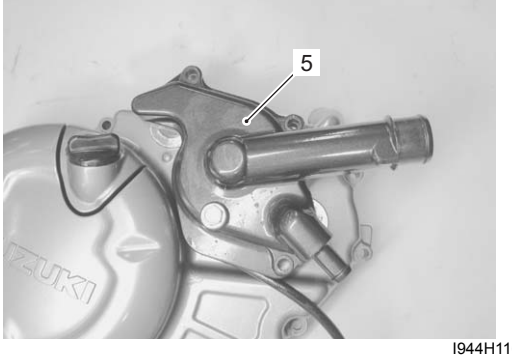
1) Drain engine oil and coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".
2) Remove the clutch cover. Refer to "Clutch Removal in Section 5C (Page 5C-7)".
3) Remove the snap ring (1), water pump driven gear (2), pin (3) and washer (4).

Special tool
TOOL : 09900–06107 (Snap ring pliers)



I944H1160024-01

4) Remove the water pump assembly (5) from the clutch cover.



I944H1160025-01

Installation

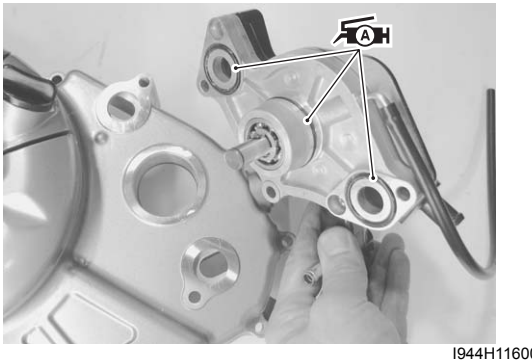
1) Apply grease to the O-rings.

⚠ CAUTION

Replace the O-rings with new ones.

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

2) Install the water pump assembly to the clutch cover.



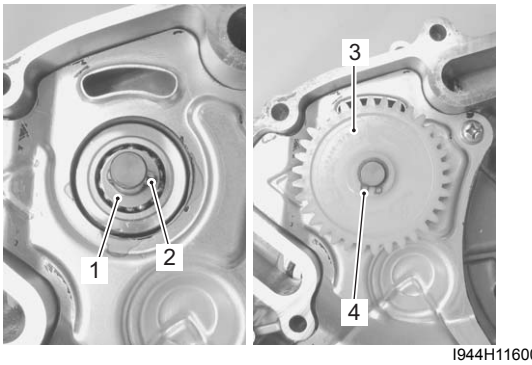
I944H1160026-01

3) Install the washer (1), pin (2), water pump driven gear (3) and snap ring (4).

⚠ CAUTION

The removed snap ring must be replaced with a new one.

Special tool
TOOL : 09900–06107 (Snap ring pliers)



I944H1160027-01

4) Install the clutch cover. Refer to "Clutch Installation in Section 5C (Page 5C-9)".
5) After installing the removed parts, pour engine oil and engine coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)" and "Cooling System Inspection in Section 0B (Page 0B-12)".

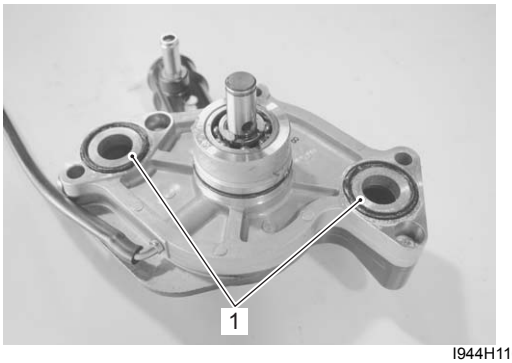
Water Pump Disassembly and Assembly

B944H11606018

Refer to “Water Pump Removal and Installation (Page 1F-12)”.

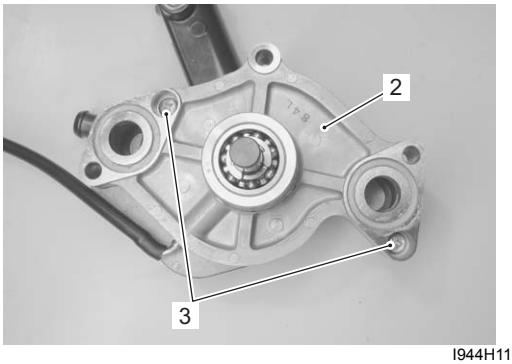
Disassembly

1) Remove the O-rings (1).



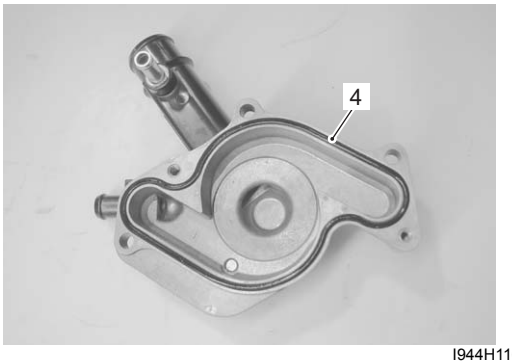
I944H1160028-01

2) Remove the water pump body (2) by removing the screws (3).



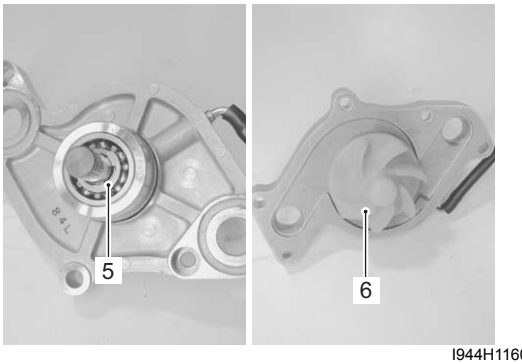
I944H1160029-02

3) Remove the O-ring (4).



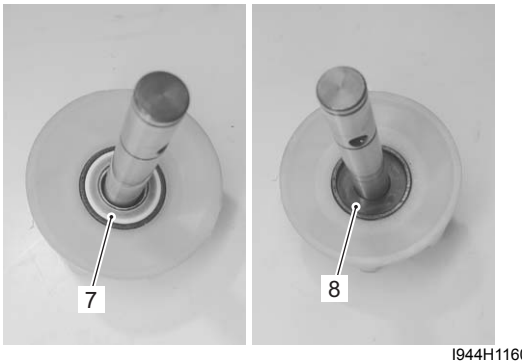
I944H1160030-02

4) Remove the E-ring (5) and impeller (6).



I944H1160031-02

5) Remove the mechanical seal ring (7) and rubber seal (8) from the impeller.



I944H1160032-02

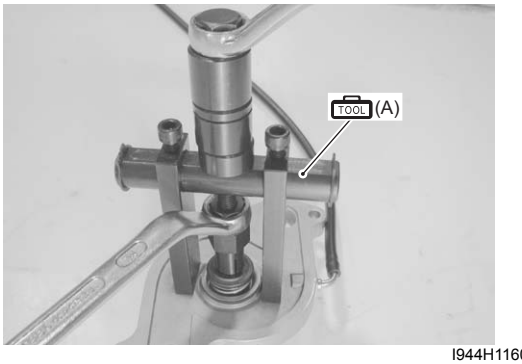
6) Remove the mechanical seal with the special tool.

NOTE

If there is no abnormal condition, the mechanical seal removal is not necessary.

Special tool

TOOL (A): 09921–20240 (Bearing remover set)

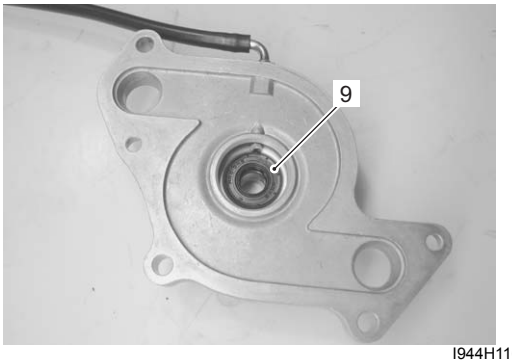


I944H1160033-01

7) Remove the oil seal (9).

NOTE

If there is no abnormal condition, the oil seal removal is not necessary.



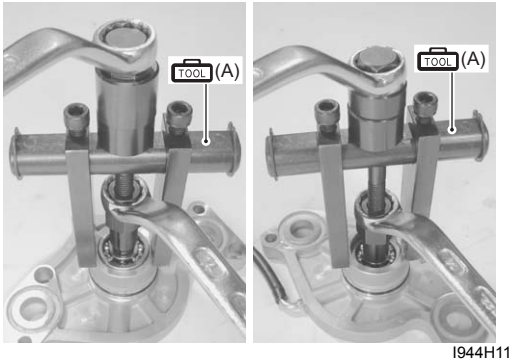
I944H1160034-02

8) Remove the bearings with the special tool.

NOTE

If there is no abnormal noise, bearings. removal is necessary.

Special tool
TOOL (A): 09921–20240 (Bearing remover set)



I944H1160035-01

Assembly

1) Apply engine oil to the bearings and install the bearings with the special tool.

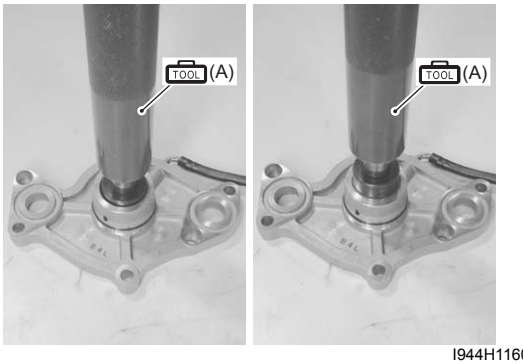
⚠ CAUTION

The removed bearings must be replaced with new ones.

NOTE

The stamped mark on the bearings face to the crankcase side.

Special tool
TOOL (A): 09913–70210 (Bearing installer set)



I944H1160036-01

2) Install the oil seal with the special tool.

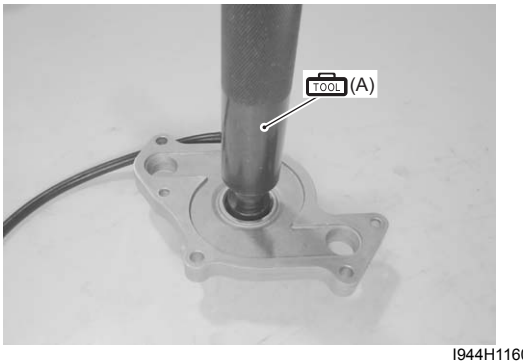
⚠ CAUTION

Replace the oil seal with a new one.

NOTE

The stamped mark on the oil seal should face mechanical seal side.

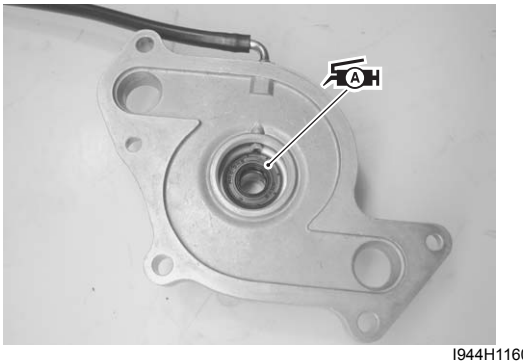
Special tool
TOOL (A): 09913–70210 (Bearing installer set)



I944H1160037-01

3) Apply a small quantity of the grease to the oil seal lip.

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



I944H1160038-01

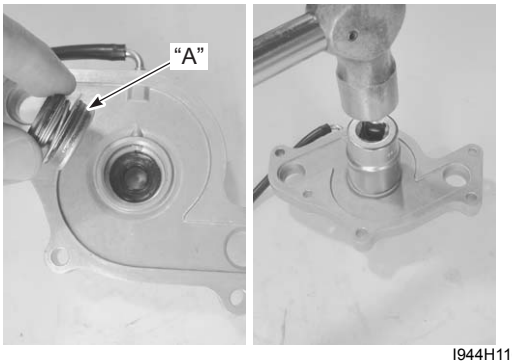
4) Install a new mechanical seal using a suitable size socket wrench.

⚠ CAUTION

The removed mechanical seal must be replaced with a new one.

NOTE

On the new mechanical seal, the sealer "A" has been applied.



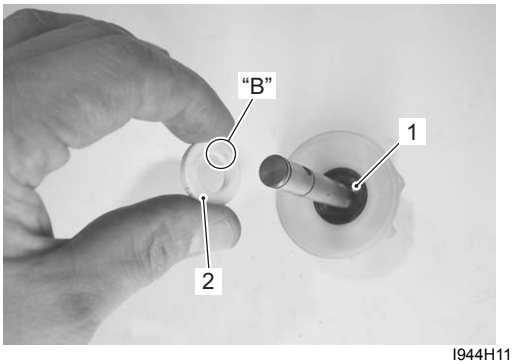
I944H1160039-01

5) Install the rubber seal (1) into the impeller.

6) After wiping off the oily or greasy matter from the mechanical seal ring (2), install it into the impeller.

NOTE

The paint marked side "B" of mechanical seal ring faces the impeller.

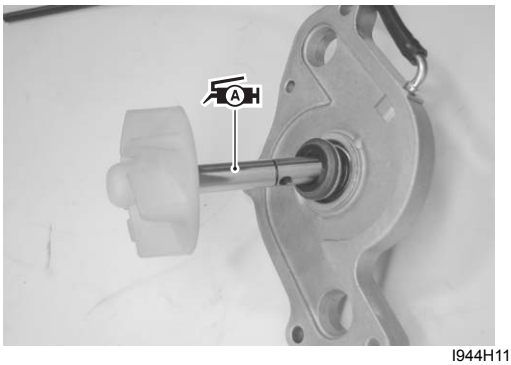


I944H1160040-02

7) Apply grease to the impeller shaft.

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

8) Install the impeller to the water pump body.

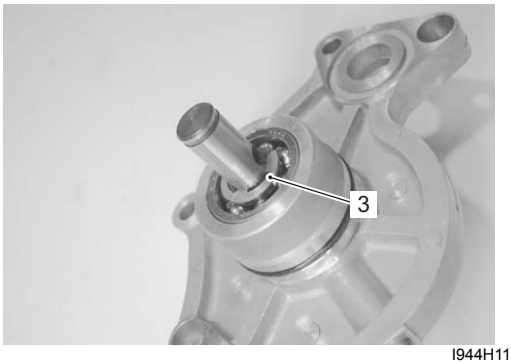


I944H1160041-01

9) Fix the impeller shaft with the E-ring (3).

⚠ CAUTION

The removed E-ring must be replaced with a new one.

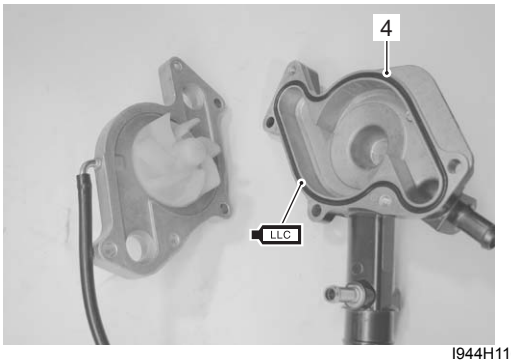


I944H1160042-01

10) Install a new O-ring (4) and apply engine coolant to it.

⚠ CAUTION

Use a new O-ring to prevent engine coolant leakage.



I944H1160043-02

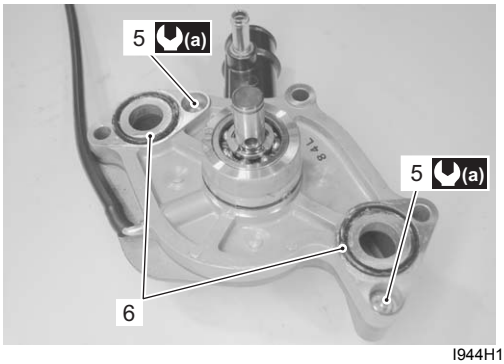
11) Fit the water pump cover and tighten the water pump cover screws (5) to the specified torque.

Tightening torque
Water pump cover screw (a): 4.5 N·m (0.45 kgf-m, 3.25 lbf-ft)

12) Install the new O-rings (6).

⚠ CAUTION

Use the new O-rings to prevent engine coolant leakage.



I944H1160044-04

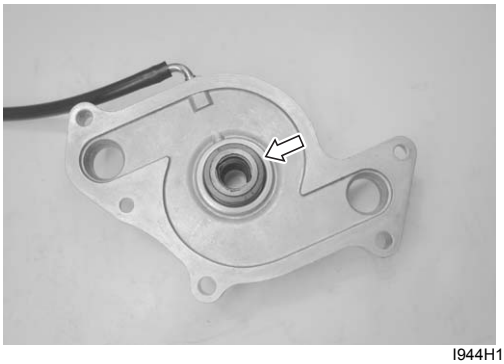
Water Pump Related Parts Inspection

B944H11606019

Refer to “Water Pump Disassembly and Assembly (Page 1F-13)”.

Mechanical Seal

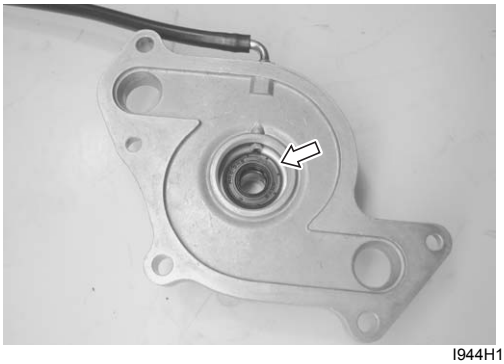
Visually inspect the mechanical seal for damage, with particular attention given to the sealing face.
Replace the mechanical seal that shows indications of leakage. Also replace the seal ring if necessary.



I944H1160045-01

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.



I944H1160046-01

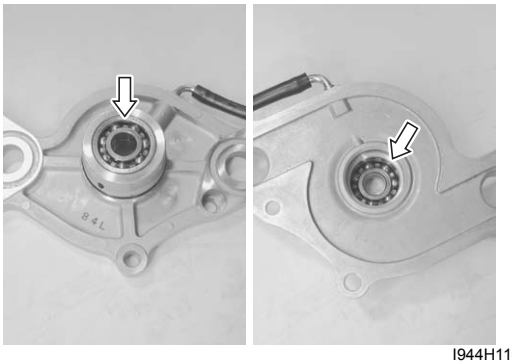
Impeller

Visually inspect the impeller and its shaft for damage.
Replace the impeller if necessary.

I944H1160047-01

Bearing

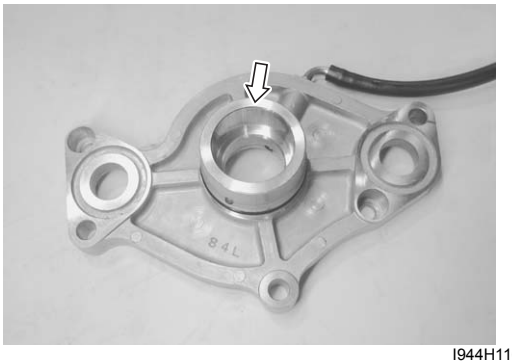
Inspect the play of the bearings by hand while it is in the water pump case. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.
Replace the bearings if there is anything unusual.



I944H1160048-01

Bearing case

Visually inspect the bearing case for damage or scratch.
Replace the water pump body if necessary.



I944H1160049-01

Specifications

Service Data

B944H11607001

Thermostat + Radiator + Fan + Coolant

Item	Standard		Note
Thermostat valve opening temperature	Approx. 76.5 °C (170 °F)		—
Thermostat valve lift	8 mm (0.31 in) and over at 100 °C (212 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	—
	50 °C (122 °F)	Approx. 0.811 kΩ	—
	80 °C (176 °F)	Approx. 0.318 kΩ	—
	110 °C (230 °F)	Approx. 0.142 kΩ	—
Radiator cap valve opening pressure	93 – 123 kPa (0.93 – 1.23 kgf/cm^2, 13.2 – 17.5 psi)		—
Cooling fan operating temperature	OFF → ON	Approx. 98 °C (198 °F)	—
	ON → OFF	Approx. 92 °C (208 °F)	—
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		—
Engine coolant	Reservoir tank side	Approx. 250 ml (0.3/0.2 US/Imp qt)	—
	Engine side	Approx. 1 600 ml (1.7/1.4 US/Imp qt)	—

Tightening Torque Specifications

B944H11607002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Cooling fan assembly mounting bolt	6.5	0.65	4.5	☞(Page 1F-6)
Water pump cover screw	4.5	0.45	3.25	☞(Page 1F-15)

NOTE

The specified tightening torque is described in the following.
“Water Pump Components (Page 1F-11)”

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

Special Tools and Equipment

Recommended Service Material

B944H11608001

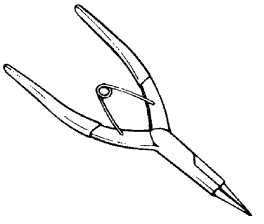
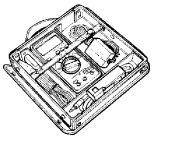
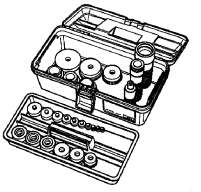
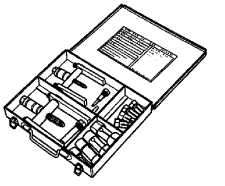
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1F-12) / ☞(Page 1F-14) / ☞(Page 1F-15)

NOTE

Required service material is also described in the following.
"Water Pump Components (Page 1F-11)"

Special Tool

B944H11608002

09900–06107 Snap ring remover (Open type) ☞(Page 1F-12) / ☞(Page 1F-12)		09900–25008 Multi circuit tester set ☞(Page 1F-9)	
09913–70210 Bearing installer set (10 – 75) ☞(Page 1F-14) / ☞(Page 1F-14)		09921–20240 Bearing remover set ☞(Page 1F-13) / ☞(Page 1F-14)	

Fuel System

Precautions

Precautions for Fuel System

B944H11700001

⚠ WARNING

- **Keep away from fire or spark.**
- **During disassembling, use care to minimize spillage of gasoline.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

⚠ CAUTION

- **To prevent the fuel system (fuel tank, fuel hose, etc.) from contamination with foreign particles, blind all openings.**
- **After removing the throttle body, tape the cylinder intake section to prevent foreign particles from entering.**

General Description

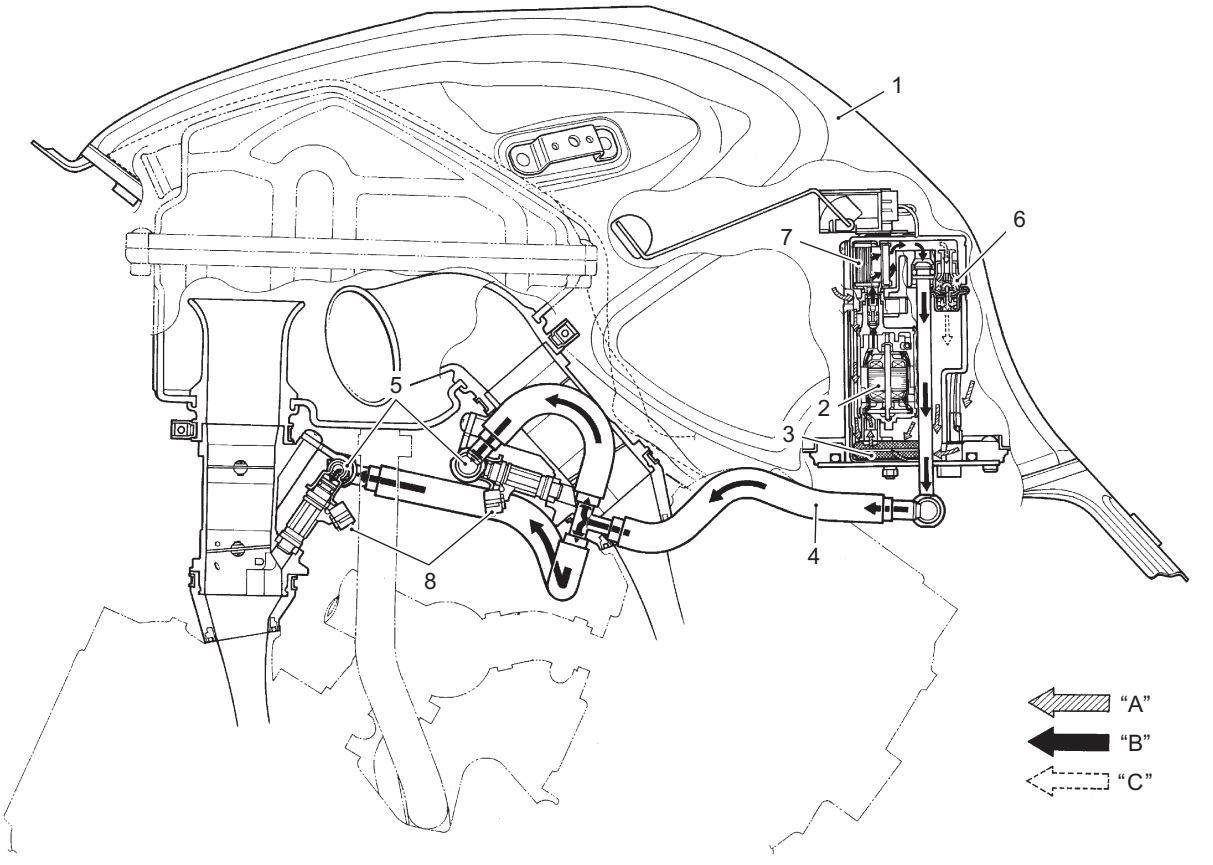
Fuel System Description

B944H11701001

Fuel System

The fuel delivery system consists of the fuel tank (1), fuel pump (2), fuel mesh filter (3), fuel feed hose (4), fuel delivery pipe (5), fuel injectors (8) and fuel pressure regulator (6). There is no fuel return hose. The fuel in the fuel tank (1) is pumped up by the fuel pump (2) and pressurized fuel flows into the injector (8) installed in the fuel delivery pipe (5). Fuel pressure is regulated by the fuel pressure regulator (6). As the fuel pressure applied to the fuel injector (8) (the fuel pressure in the fuel delivery pipe) is always kept at absolute fuel pressure of 300 kPa (3.0 kgf/cm^2, 43 psi), the fuel is injected into the throttle body in conic dispersion when the injector (8) opens according to the injection signal from the ECM.

The fuel relieved by the fuel pressure regulator (6) flows back to the fuel tank (1).



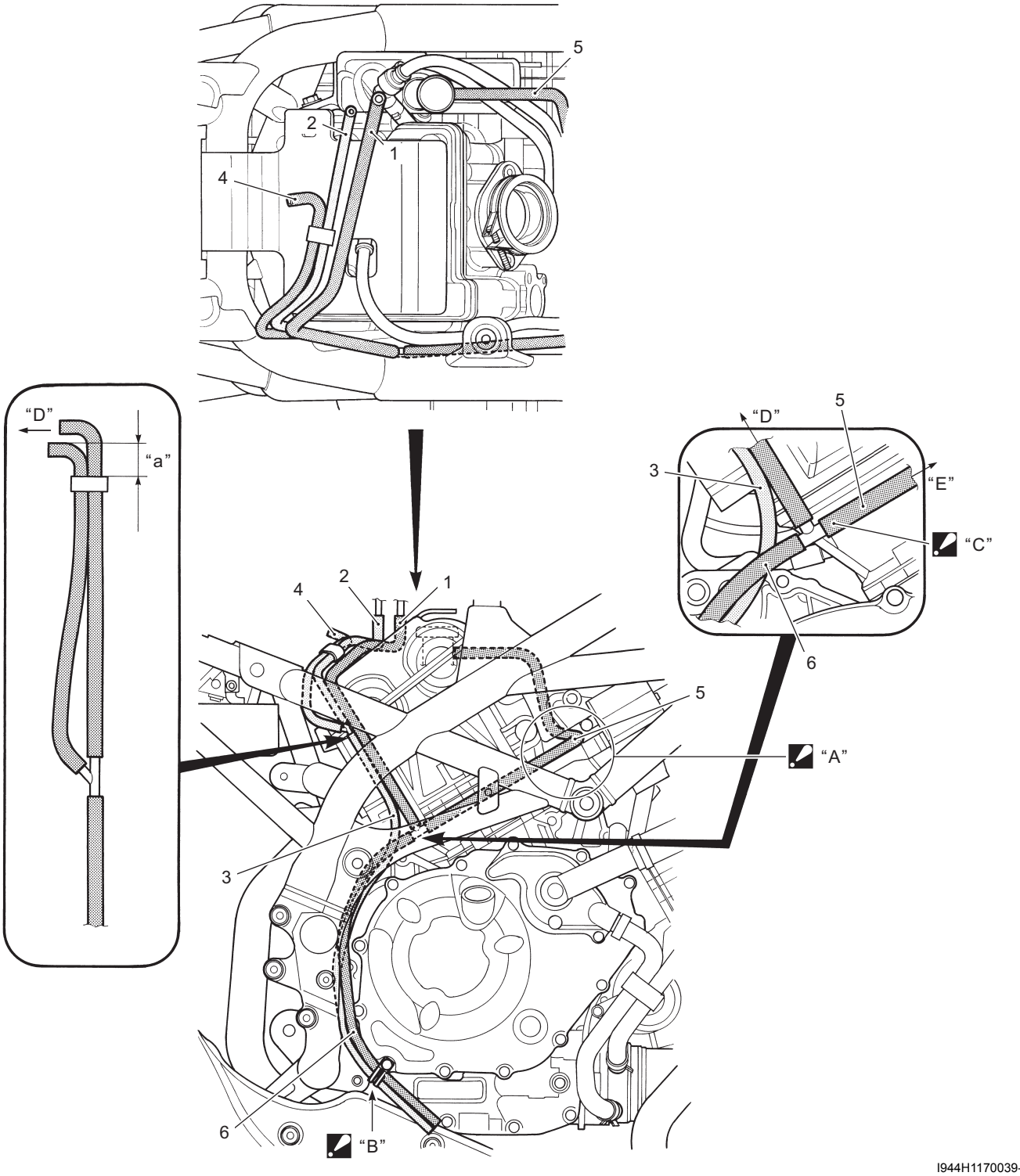
I944H1170040-02

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

Schematic and Routing Diagram

Fuel Tank Drain Hose and Breather Hose Routing Diagram

B944H11702001



I944H1170039-03

1. Fuel tank water drain hose	"A": Pass the reservoir tank overflow hose above the high-tension cord and below the water hose.
2. Fuel tank breather hose No. 1	"B": Align the white paint mark on the hoses with the clamp.
3. Fuel tank breather hose No. 2	"C": Connect the thinner end of 3-way joint with the reservoir tank overflow hose.
4. Fuel tank breather hose	"D": To the fuel tank
5. Reservoir tank overflow hose	"E": To the reservoir tank
6. Water drain hose	"a": 10 – 30 mm (0.4 – 1.2 in)

Diagnostic Information and Procedures

Fuel System Diagnosis

B944H11704001

Condition	Possible cause	Correction / Reference Item
Engine will not start or is hard to start (No fuel reaching the intake manifold)	Clogged fuel filter or fuel hose.	*Clean or replace.*
	Defective fuel pump.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Defective fuel injectors.	*Replace.*
	Defective fuel pump relay.	*Replace.*
	Defective ECM.	*Replace.*
	Open-circuited wiring connections.	*Check and repair.*
Engine will not start or is hard to start (Incorrect fuel/air mixture)	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.*
	Dirty throttle body.	*Clean.*
	Defective ISC valve.	*Replace the STVA.*
Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.	*Repair or replace.*
	Clogged fuel filter.	*Clean or replace.*
	Defective fuel pump.	*Replace.*
	Defective fuel pressure regulator.	*Replace.*
	Damaged or cracked vacuum hose.	*Replace.*
	Defective ECT sensor.	*Replace.*
	Defective thermostat.	*Replace.*
	Defective IAT sensor.	*Replace.*
	Defective ISC valve.	*Replace the STVA.*
Engine stalls often (Fuel injector improperly operating)	Defective fuel injectors.	*Replace.*
	No injection signal from ECM.	*Repair or replace.*
	Open or short circuited wiring connection.	*Repair or replace.*
	Defective battery or low battery voltage.	*Replace or recharge.*
Engine runs poorly in high speed range (Defective control circuit or sensor)	Low fuel pressure.	*Repair or replace.*
	Defective TP sensor.	*Replace.*
	Defective IAT sensor.	*Replace.*
	Defective IAP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Defective STP sensor or STVA.	*Replace.*
	Defective GP switch.	*Replace.*
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	*Repair or replace.*
	Defective TP sensor.	*Replace.*
	Defective IAT sensor.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective GP switch.	*Replace.*
	Defective IAP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Defective STP sensor or STVA.	*Replace.*
	Imbalanced throttle valve synchronization.	*Adjust.*
	TP sensor out of adjustment.	*Adjust.*

Repair Instructions

Fuel Pressure Inspection

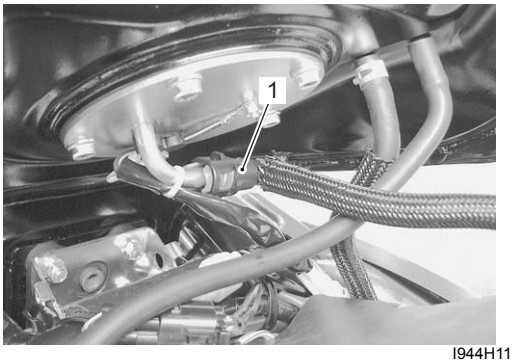
B944H11706001

⚠ WARNING

- **Keep away from fire or spark.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

Inspect the fuel pressure in the following procedures:

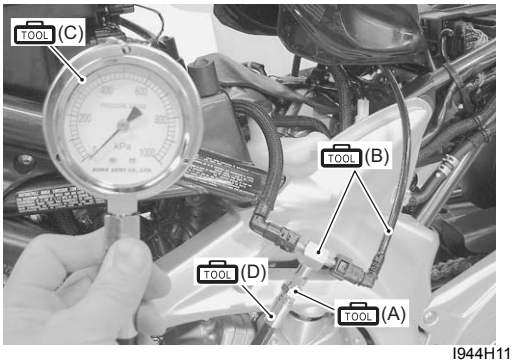
1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-7)”.
2) Place a clean rag under the fuel feed hose (1) and disconnect fuel feed hose (1) from the fuel pump.



I944H1170001-01

3) Install the special tools between the fuel pump and fuel feed hose.

Special tool
TOOL (A): 09940–40211 (Fuel pressure gauge adapter)
TOOL (B): 09940–40220 (Fuel pressure gauge hose attachment)
TOOL (C): 09915–77331 (Meter (for high pressure))
TOOL (D): 09915–74521 (Oil pressure gauge hose)



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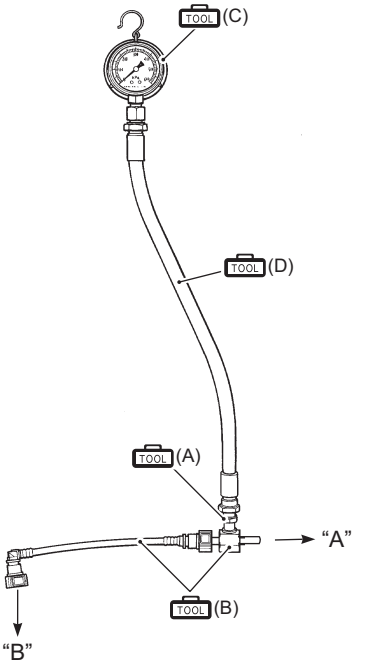


I944H1170003-01

“A”: To fuel feed hose	“B”: To fuel pump

4) Turn the ignition ON and check for fuel pressure.

Fuel pressure
Approx. 300 kPa (3.0 kgf/cm^2, 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 position and release the fuel pressure slowly.

NOTE

Connect the fuel feed hose to the fuel pump until it locks securely (a click is heard).

6) Reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-7)”.

Fuel Pump Inspection

B944H11706002

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-6)” and “TO Sensor Inspection in Section 1C (Page 1C-5)”.
If the fuel pump relay, TO sensor and fuel pump circuit connections are OK, the fuel pump may be faulty, replace the fuel pump with a new one. Refer to “Fuel Pump Assembly Removal and Installation (Page 1G-10)”.

Fuel Discharge Amount Inspection

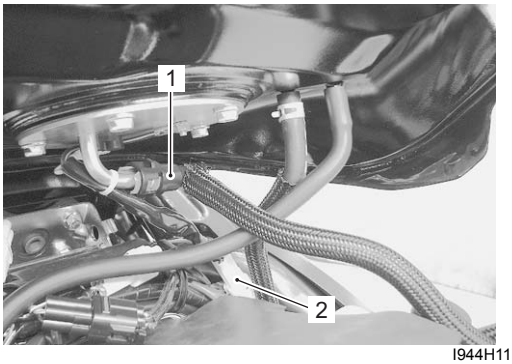
B944H11706003

⚠ WARNING

- **Keep away from fire or spark.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

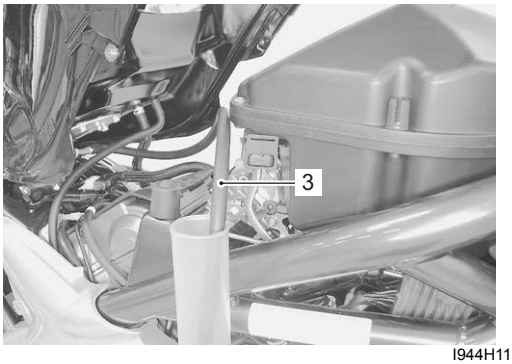
Inspect the fuel discharge amount in the following procedures:

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-7)”.
2) Place a clean rag under the fuel feed hose (1) and disconnect the fuel feed hose (1) from the fuel pump.
3) Disconnect the fuel pump lead wire coupler (2).



I944H1170004-01

4) Connect a proper fuel hose (3) to the fuel pump.
5) Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.



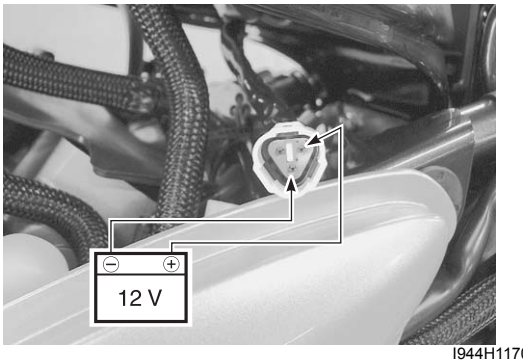
I944H1170005-01

6) Connect a proper lead wire into the fuel pump lead wire coupler (fuel pump side) and apply 12 V to the fuel pump (between (+) Y/R wire and (–) B/W wire) for 10 seconds and measure the amount of fuel discharged.
If the discharge amount is out of the specification, the probable cause may be failure of the fuel pump or clogged fuel filter.

NOTE

The battery must be in fully charged condition.

Fuel discharge amount
166 ml (5.6/5.8 US/Imp oz) and more/10 seconds



I944H1170006-02

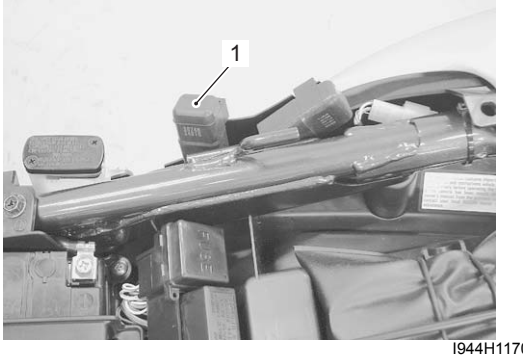
7) After finishing the fuel discharge inspection, reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-7)”.

Fuel Pump Relay Inspection

B944H11706004

Inspect the fuel pump relay in the following procedures:

1) Remove the right rear frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the fuel pump relay coupler and remove the fuel pump relay (1).

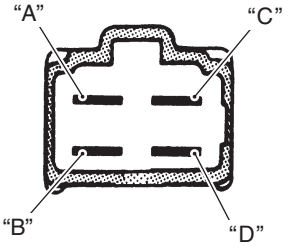


I944H1170007-01

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

4) Reinstall the removed parts.

Fuel Hose Inspection

B944H11706005

Refer to “Fuel Line Inspection in Section 0B (Page 0B-10)”.

Fuel Hose Removal and Installation

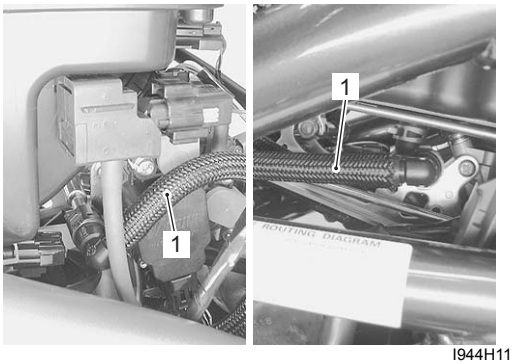
B944H11706017

⚠ WARNING

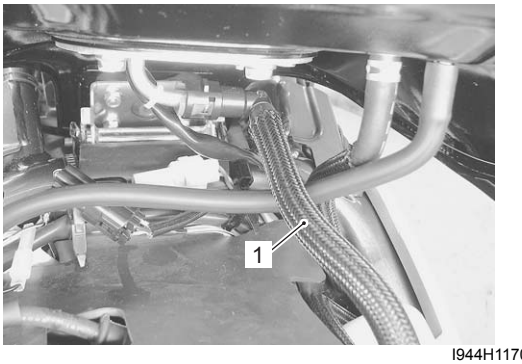
- **Keep away from fire or spark.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

Removal

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-7)”.
2) Place a clean rag under the fuel feed hoses (1).
3) Disconnect the fuel feed hoses (1) from the fuel delivery pipe and fuel pump.



I944H1170008-02



I944H1170009-02

4) Remove the fuel hose (1).

Installation

1) Install the fuel hose as shown in the intake system construction. Refer to “Throttle Body Construction in Section 1D (Page 1D-8)”.

NOTE

Connect the fuel feed hoses to the fuel pump and fuel delivery pipe until its locks securely (a click is heard).

2) Install the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-7)”.

Fuel Level Gauge Inspection

B944H11706007

Refer to “Fuel Level Gauge Inspection in Section 9C (Page 9C-5)”.

Fuel Tank Removal and Installation

B944H11706010

Removal

⚠ WARNING

- **Keep away from fire or spark.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

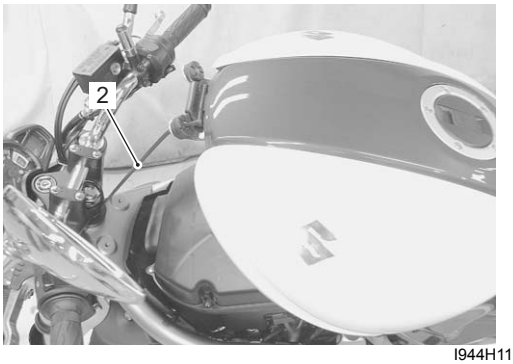
1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Remove the fuel tank mounting bolts (1).

I944H1170010-03

3) Lift and support the fuel tank with the fuel tank prop stay (2).

⚠ CAUTION

Lifting up the fuel tank by force can damage the hoses and wiring harness.



I944H1170011-03

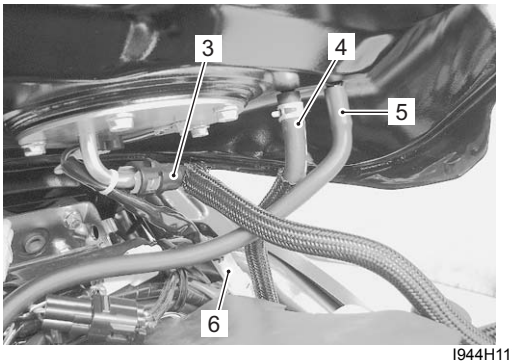
4) Place a clean rag under the fuel feed hose (3) and disconnect the fuel feed hose (3).

⚠ CAUTION

When removing the fuel tank, do not leave the fuel feed hose (3) on the fuel pump side.

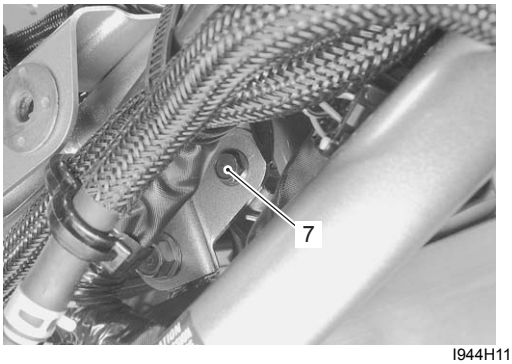
5) Disconnect the fuel tank breather hose (4) and water drain hose (5).

6) Disconnect the fuel pump lead wire coupler (6).



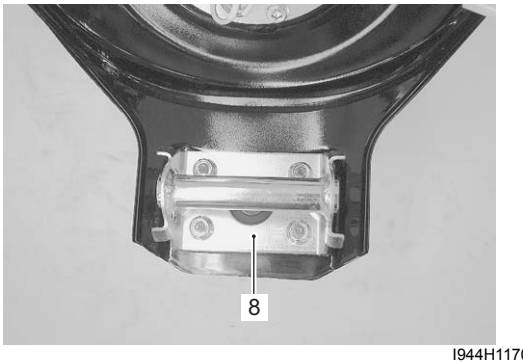
I944H1170012-02

7) Remove the fuel tank by removing the mounting bolt (7).



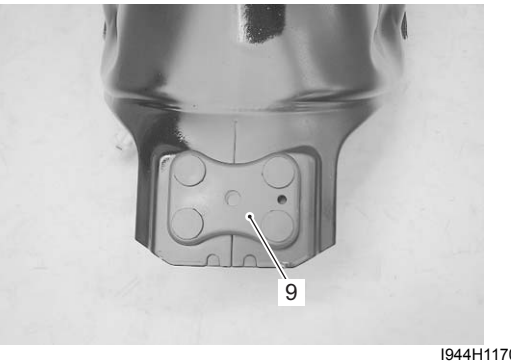
I944H1170013-04

8) Remove the fuel tank bracket (8).



I944H1170014-03

9) Remove the fuel tank stay and its rubber cushion (9).



I944H1170015-03

Installation

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

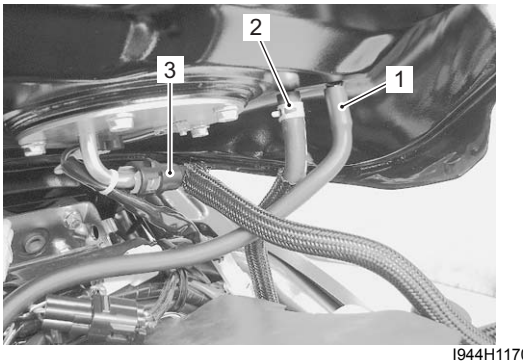
⚠ CAUTION

Be sure not to bend or twist the hoses when installing.

- Connect the water hose (1) and breather hose (2) as shown in the fuel tank drain hose and breather hose routing diagram. Refer to “Fuel Tank Drain Hose and Breather Hose Routing Diagram (Page 1G-3)”.

NOTE

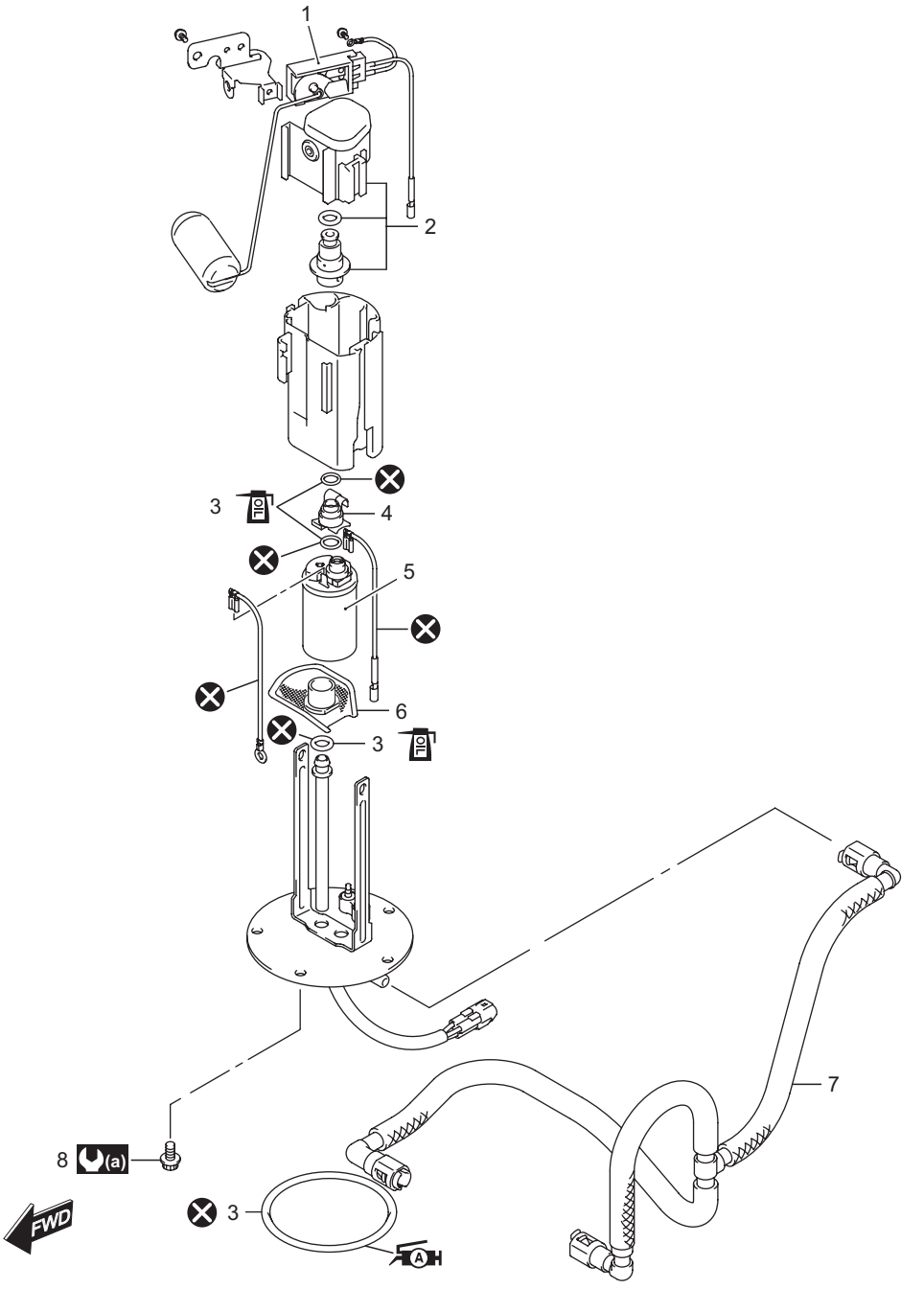
Connect the fuel feed hose (3) to the fuel pump until it locks securely (a click is heard).



I944H1170016-02

Fuel Pump Components

B944H11706011



I944H1170041-02

1. Fuel level gauge	5. Fuel pump	(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
2. Fuel pressure regulator assembly	6. Fuel mesh filter	: Apply engine oil.
3. O-ring	7. Fuel feed hose	: Apply grease.
4. Joint	8. Fuel pump mounting bolt	: Do not reuse.

Fuel Pump Assembly Removal and Installation

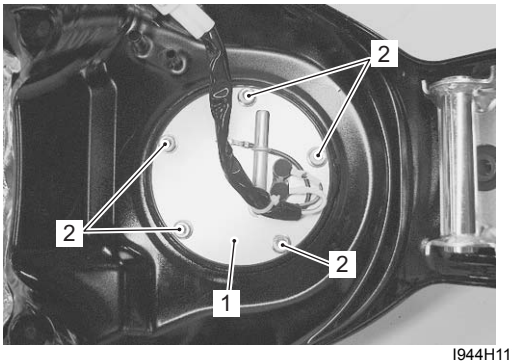
B944H11706012

Removal

⚠ WARNING

- **Spilled gasoline should be wiped off immediately.**
- **Keep away from fire or spark.**
- **Work in a well-ventilated area.**

1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-7)”.
2) Remove the fuel pump assembly (1) by removing its mounting bolts (2) diagonally.



I944H1170017-02

Installation

1) Install the new O-ring (1) and apply grease to it.

⚠ CAUTION

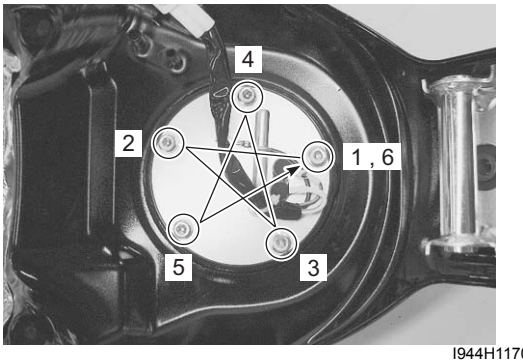
To O-ring must be replaced with a new one to prevent fuel leakage.

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

I944H1170018-01

2) 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 in the figure.

Tightening torque
Fuel pump mounting bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1170019-02

3) Reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-7)”.

Fuel Level Gauge Inspection

B944H11706018

Refer to “Fuel Level Gauge Inspection in Section 9C (Page 9C-5)”.

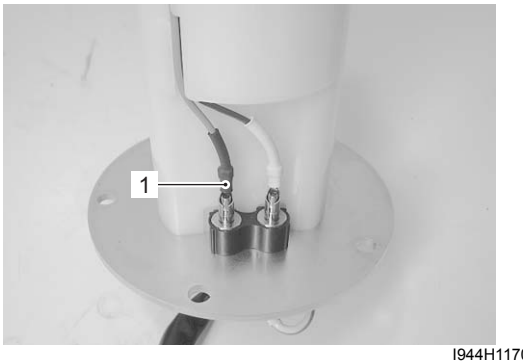
Fuel Pump Disassembly and Assembly

B944H11706013

Refer to “Fuel Pump Assembly Removal and Installation (Page 1G-10)”.

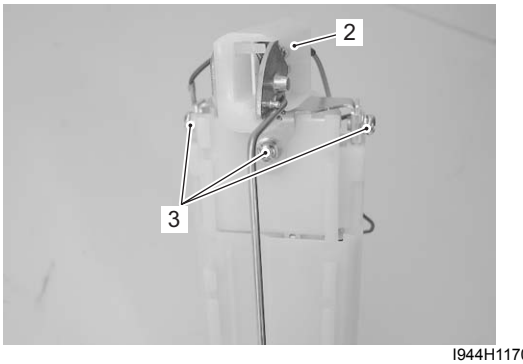
Disassembly

1) Disconnect the fuel level gauge (+) lead wire (1).



I944H1170020-01

2) Remove the fuel level gauge (2) by removing the screws (3).



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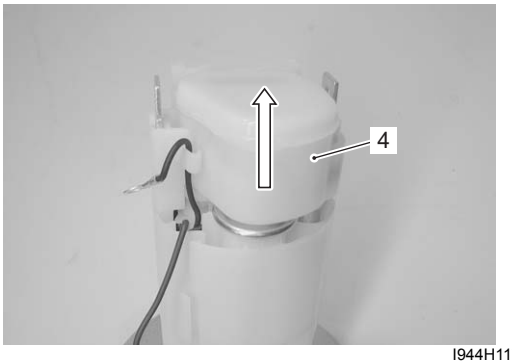
3) Remove the fuel pressure regulator assembly (4).



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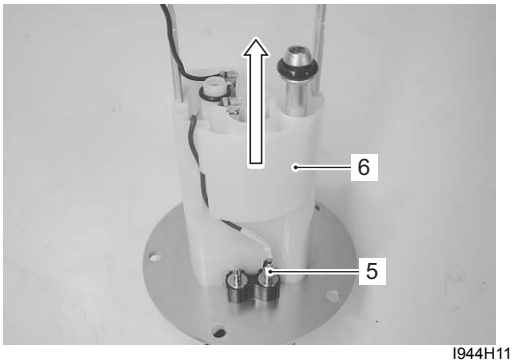
4) Disconnect the fuel pump (+) lead wire (5).

5) Remove the fuel pump assembly (6).



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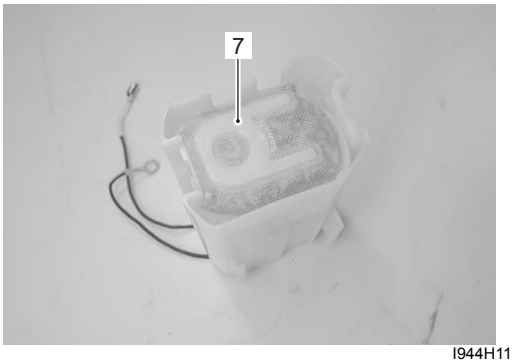
6) Remove the fuel mesh filter (7).



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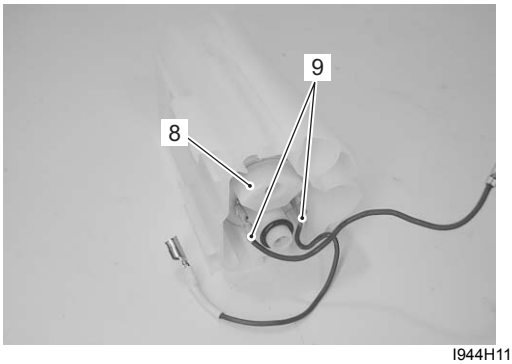
7) Remove the fuel pump (8).

8) Disconnect the lead wires (9).

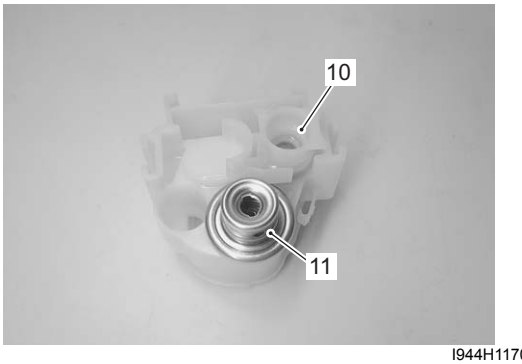


I944H1170025-02

9) Remove the joint (10).

⚠ CAUTION

Never remove the fuel pressure regulator (11) from the holder.



I944H1170026-02

Assembly

Refer to “Fuel Mesh Filter Inspection and Cleaning (Page 1G-12)”.

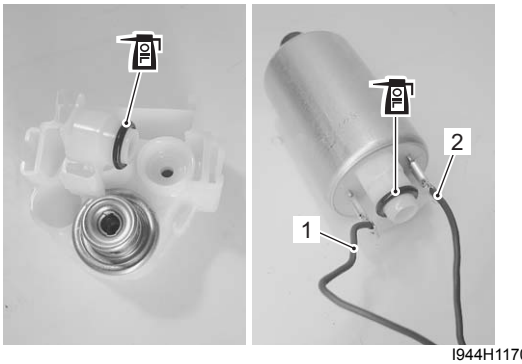
Assemble the fuel tank pump in the reverse order of the disassembly. Pay attention to the following points:

⚠ CAUTION

- **The removed fuel pump lead wire and fuel level gauge lead wire must be replaced with the new ones.**
- **To prevent fuel leakage, each O-rings must be replaced with new ones.**
- **Apply engine oil lightly to each of the O-rings.**

NOTE

Connect all lead wires securely so as not to cause contact failure.



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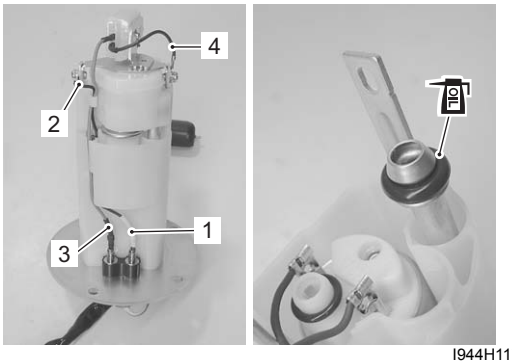


I944H1170028-01

1.	Fuel pump (+) lead wire (Bl)
2.	Fuel pump (–) lead wire (B)
3.	Fuel level gauge (+) lead wire (R)
4.	Fuel level gauge (–) lead wire (B)

Fuel Mesh Filter Inspection and Cleaning

B944H11706014

Inspect the fuel mesh filter in the following procedures:

1) Remove the fuel mesh filter. Refer to “Fuel Pump Disassembly and Assembly (Page 1G-10)”.
2) If the fuel mesh filter is clogged with foreign particles, it hinders smooth gasoline flow resulting in loss of engine power. Such a filter should be cleaned by blowing with compressed air.

NOTE

When the fuel mesh filter is dirtied excessively, replace the fuel filter cartridge with a new one.

I944H1170029-02

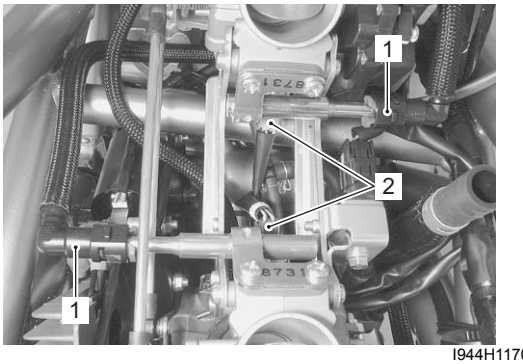
3) After finishing the fuel mesh filter inspection, reinstall the fuel mesh filter. Refer to “Fuel Pump Disassembly and Assembly (Page 1G-10)”.

Fuel Injector / Fuel Delivery Pipe Removal and Installation

B944H11706015

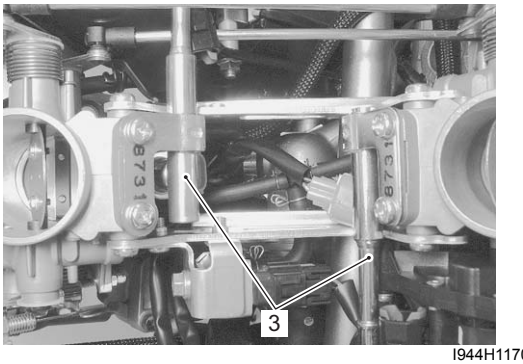
Removal

1) Remove the air cleaner box. Refer to “Air Cleaner Box Removal and Installation in Section 1D (Page 1D-6)”.
2) Place a rug under the fuel feed hoses (1) and disconnect the fuel feed hoses (1) from the fuel delivery pipes.
3) Disconnect the injector couplers (2).



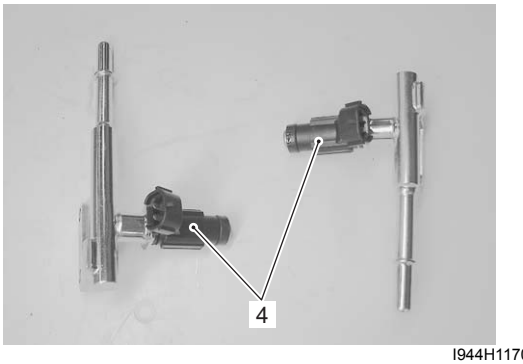
I944H1170030-02

4) Remove the fuel delivery pipes (3) along with the fuel injectors.



I944H1170031-03

5) Remove the fuel injectors (4) from the fuel delivery pipe.



I944H1170032-01

Installation
Install the fuel injector / fuel delivery pipe in the reverse order of removal.
Pay attention to the following points:

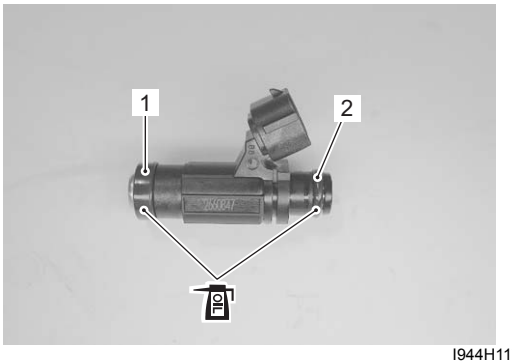
NOTE

Wipe off the mounting surface on the delivery pipe and throttle body where the fuel injector will be seated with a clean rag.

- Apply a thin coat of engine oil to the new cushion seal (1) and O-ring (2).

⚠ CAUTION

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



I944H1170033-01

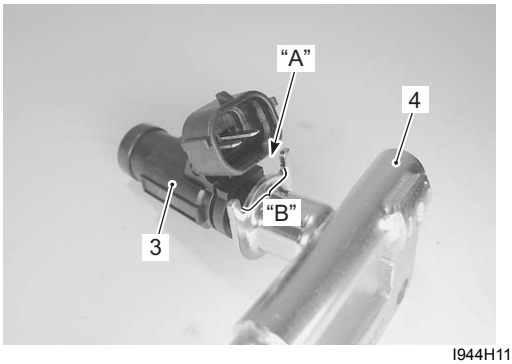
- Install the fuel injector (3) by pushing it straight to the delivery pipe (4).

⚠ CAUTION

Never turn the injector while pushing it.

NOTE

Align the coupler "A" of injector with boss "B" of the delivery pipe.

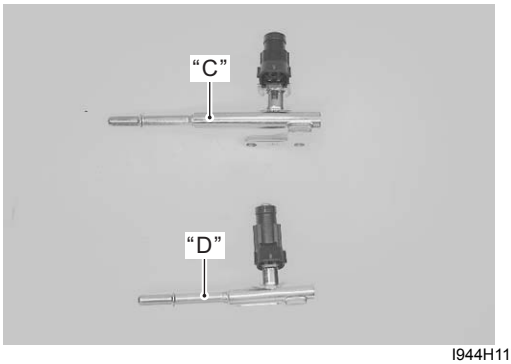


I944H1170037-01

- Install the fuel delivery pipes along with the fuel injectors to the throttle body assembly.

⚠ CAUTION

- **When installing the fuel delivery pipes to the throttle body, pay attention to the difference of the fuel delivery pips.**
- **Never turn the fuel injectors while installing it.**



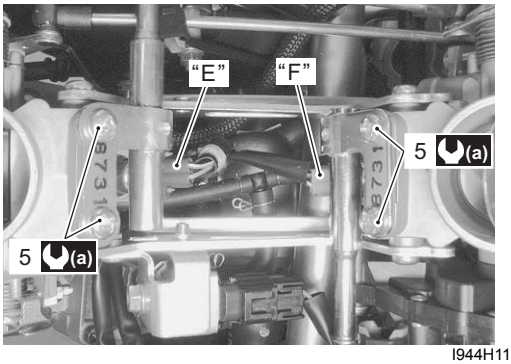
I944H1170034-02

"C": Front side	"D": Rear side

- Tighten the fuel delivery pipe mounting screws (5) to the specified torque.

Tightening torque
Fuel delivery pipe mounting screw (a): 5 N·m (0.5 kgf-m, 3.5 lbf-ft)

- Connect the fuel injector couplers to the 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.



I944H1170035-03

Coupler	Wire color
Front injector "E"	Y/R and Gr/B
Rear injector "F"	Y/R and Gr/W

NOTE

Connect the fuel feed hoses to the fuel delivery pipes until its locks securely (a click is heard).

Fuel Injector Inspection and Cleaning

B944H11706016

Inspect the fuel injector in the following procedures:

1) Remove the fuel injector. Refer to “Fuel Injector / Fuel Delivery Pipe Removal and Installation (Page 1G-12)”.
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.

I944H1170036-01

3) Install the fuel injector. Refer to “Fuel Injector / Fuel Delivery Pipe Removal and Installation (Page 1G-12)”.

Specifications

Service Data

B944H11707001

Injector + Fuel Pump + Fuel Pressure Regulator

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

Fuel

Item	Specification	Note
Fuel type	Use only unleaded gasoline of at least 87 pump octane or 91 octane (R/2 + M/2) or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.	E-03, 28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline type is recommended.	E-02, 19, 24
Fuel tank capacity	13.5 L (3.6/3.0 US/Imp gal)	E-33
	14.5 L (3.8/3.2 US/Imp gal)	Others

Tightening Torque Specifications

B944H11707002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Fuel pump mounting bolt	10	1.0	7.0	☞(Page 1G-10)
Fuel delivery pipe mounting screw	5	0.5	3.5	☞(Page 1G-13)

NOTE

The specified tightening torque is described in the following.
“Fuel Pump Components (Page 1G-9)”

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

Special Tools and Equipment

Recommended Service Material

B944H11708001

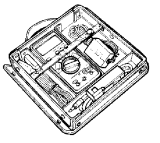
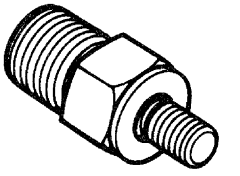
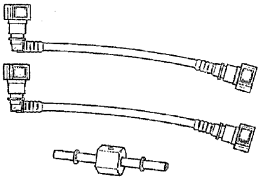
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1G-10)

NOTE

Required service material is also described in the following.
“Fuel Pump Components (Page 1G-9)”

Special Tool

B944H11708002

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) 	

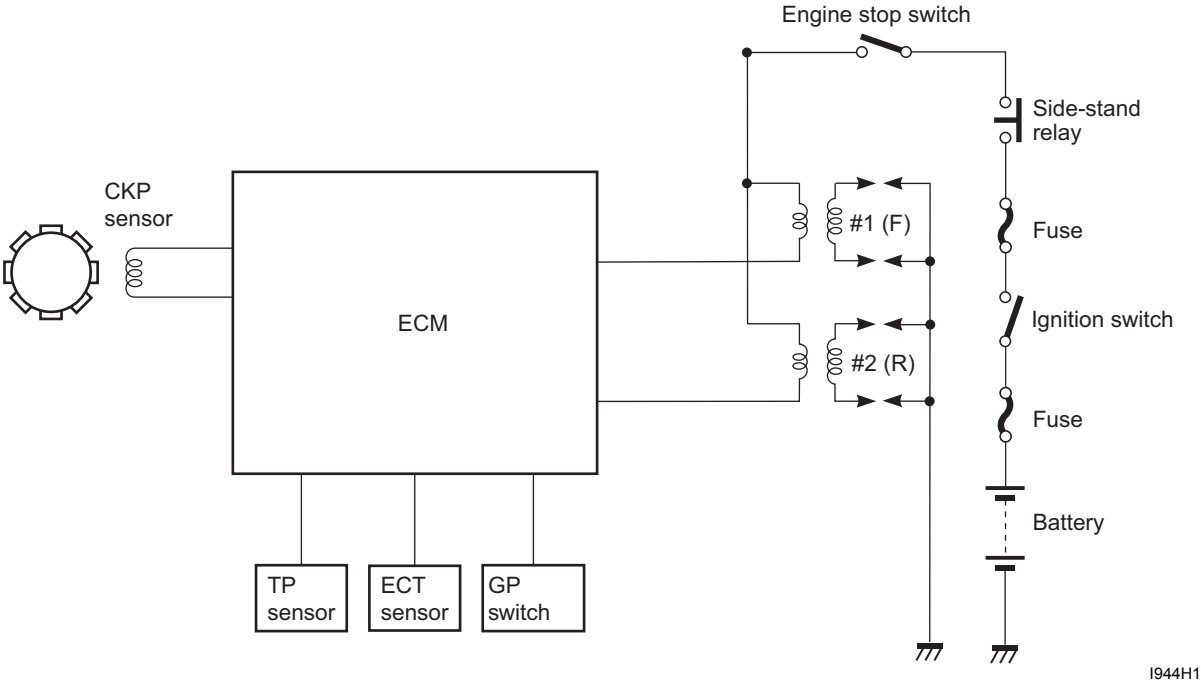
Ignition System

Schematic and Routing Diagram

Ignition System Diagram

B944H11802001

Refer to “Wire Color Symbols in Section 0A (Page 0A-5)”.



I944H1180001-05

Component Location

Ignition System Components Location

B944H11803003

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

Diagnostic Information and Procedures

Ignition System Symptom Diagnosis

B944H11804001

Condition	Possible cause	Correction / Reference Item
Spark plug not sparking	Damaged spark plugs.	*Replace.*
	Fouled spark plugs.	*Clean or replace.*
	Wet spark plugs.	*Clean and dry or replace.*
	Defective ignition coils or spark plug caps.	*Replace.*
	Defective CKP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Open-circuited wiring connections.	*Repair or replace.*
	Open or short in high-tension cord.	*Replace.*
Engine stalls easily (No spark)	Defective ignition coils.	*Replace.*
	Fouled spark plugs.	*Clean or replace.*
	Defective CKP sensor.	*Replace.*
	Defective ECM.	*Replace.*
	Open-circuited wiring connections.	*Repair or replace.*
Spark plug is wet or quickly becomes fouled with carbon	Excessively rich air/fuel mixture.	*Inspect FI system.*
	Excessively high idling speed.	*Inspect FI system.*
	Incorrect gasoline.	*Change.*
	Dirty air cleaner element.	*Clean or replace.*
	Incorrect spark plugs. (Cold type)	*Change to hot type spark plug.*
Spark plug quickly becomes fouled with oil or carbon	Worn piston rings.	*Replace.*
	Worn pistons or cylinders.	*Replace.*
	Worn cylinder.	*Replace.*
	Excessive valve-stem to valve-guide clearance.	*Replace.*
	Worn valve stem oil seals.	*Replace.*
Spark plug electrodes overheat or burn	Incorrect spark plugs. (Hot type)	*Change to cold type spark plug.*
	Overheated engine.	*Tune-up.*
	Loose spark plugs.	*Tighten.*
	Excessively lean air/fuel mixture.	*Inspect FI system.*

No Spark or Poor Spark

B944H11804002

Troubleshooting

NOTE

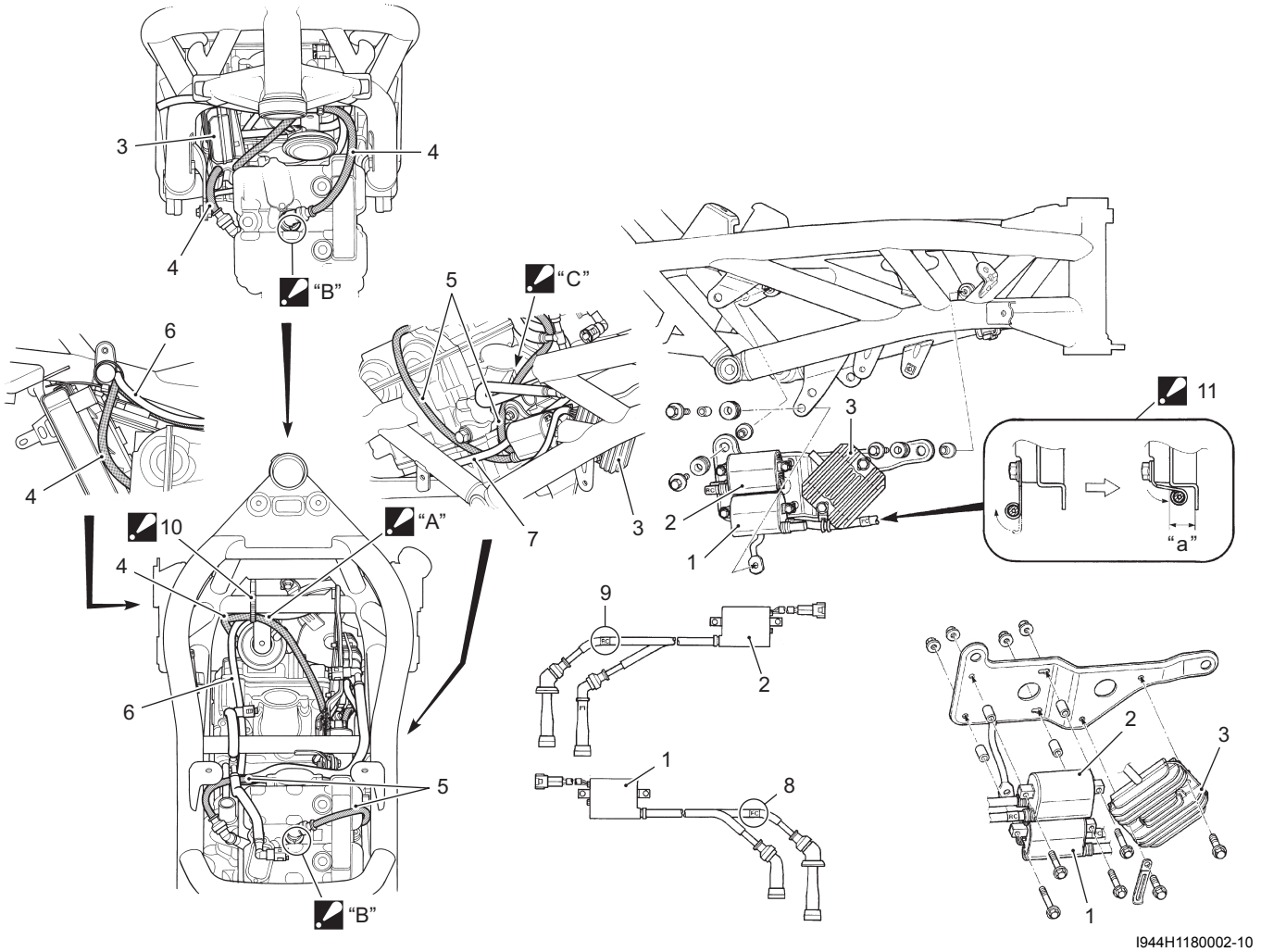
Check that the transmission is in neutral and the engine stop switch is in the "RUN" position. Grasp the clutch lever. Check that the fuse is not blown and the battery is fully-charged before diagnosing.

Step	Action	Yes	No
1	Check the ignition system couplers for poor connections. *Is there connection in the ignition system couplers?*	Go to Step 2.	Poor connection of couplers.
2	Measure the battery voltage between input lead wires (E-02, 19, 24: O/G and B/W, E-03, 28, 33: O/W and B/W) at the ECM with the ignition switch in the "ON" position. *Is the voltage OK?*	Go to Step 3.	• Faulty ignition switch. • Faulty turn signal / side-stand relay. • Faulty engine stop switch. • Broken wire harness or poor connection of related circuit couplers.
3	Measure the ignition coil primary peak voltage. Refer to "Ignition Coil and Plug Cap Inspection (Page 1H-6)". **NOTE** **This inspection method is applicable only with the multi-circuit tester and the peak volt adaptor.** *Is the peak voltage OK?*	Go to Step 4.	Go to Step 5.
4	Inspect the spark plugs. Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page 0B-9)". *Is the spark plug OK?*	Go to Step 5.	Faulty spark plugs.
5	Inspect the ignition coils. Refer to "Ignition Coil and Plug Cap Inspection (Page 1H-6)". *Is the ignition coil OK?*	Go to Step 6.	Faulty ignition coil.
6	Measure the CKP sensor peak voltage and its resistance. Refer to "CKP Sensor Inspection (Page 1H-8)". **NOTE** **The CKP sensor peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor.** *Are the peak voltage and resistance OK?*	• Faulty ECM. • Open or short circuit in wire harness. • Poor connection of ignition wire harness.	• Faulty CKP sensor. • Metal particles or foreign material being stuck on the CKP sensor and rotor tip.

Repair Instructions

Ignition Coil Construction

B944H11806011



I944H1180002-10

1. Ignition coil #1	8. FC mark
2. Ignition coil #2	9. RC mark
3. Regulator/rectifier	10. Clamp: Contact the clamp with the horn bracket on its left side and clamp down the high-tension cord at the marked position.
4. High-tension cord #1	11. Clamp: With the high-tension cord clamped and bent inward, check that it is positioned within area "a".
5. High-tension cord #2	"A": Pass the high-tension cord above the horn and reservoir tank inlet hose. Do not contact the high-tension cord to the horn and radiator.
6. Reservoir tank inlet hose	"B": Press firmly on the spark plug cap to fit it securely with mark "△" on the plug cap facing exhaust side.
7. Reservoir tank outlet hose	"C": Route the high-tension cord on the cylinder head side relative to the position of wiring harness or piping.

Spark Plug Cap and Spark Plug Removal and Installation

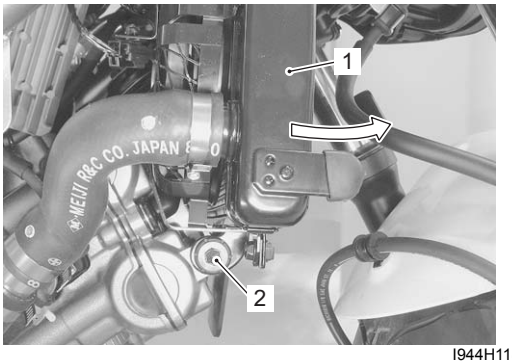
B944H11806012

⚠ WARNING

The hot engine can burn you.
Wait until the engine is cool enough to touch.

Removal
#1 (Front):

1) Turn the ignition switch OFF position.
2) Move the radiator assembly (1) by removing the bolt (2).



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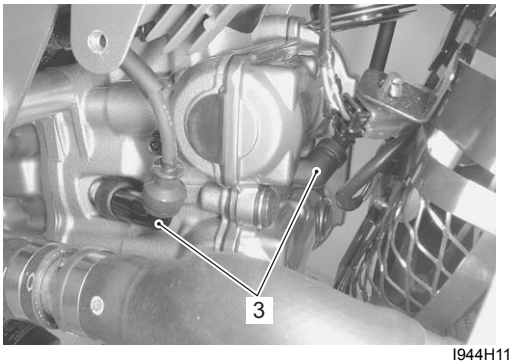
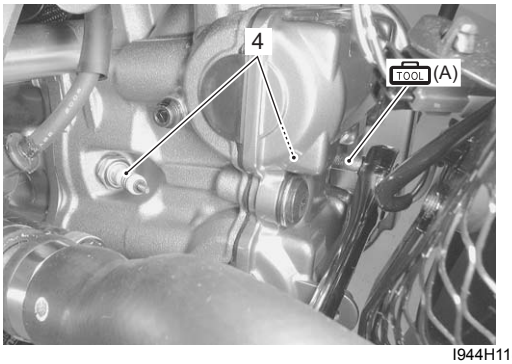
3) Disconnect the spark plug caps (3).



I944H1180004-02

4) Remove the spark plugs (4) with a spark plug wrench.

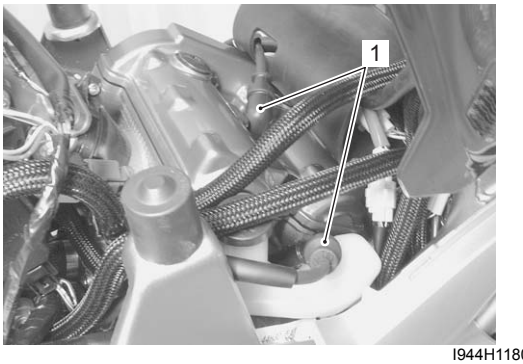
Special tool
TOOL (A): 09930–10121 (Spark plug wrench set)



I944H1180005-02

#2 (Rear):

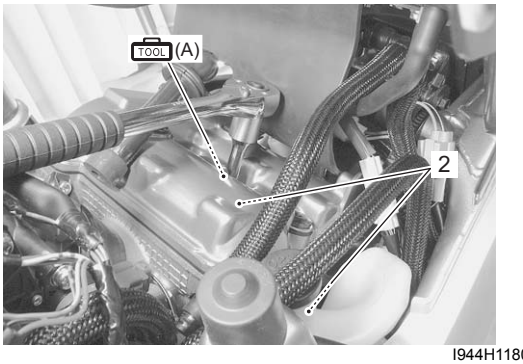
1) Turn the ignition switch OFF position.
2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
3) Disconnect the spark plug caps (1).



I944H1180006-01

4) Remove the spark plugs (2) with a spark plug wrench.

Special tool
TOOL (A): 09930–10121 (Spark plug wrench set)



I944H1180007-01

Installation
Install the spark plug caps and spark plugs in the reverse order of removal. Pay attention to the following points:

- Screw the spark plugs into the cylinder head with fingers, and then tighten them to the specified torque.

⚠ CAUTION

Do not cross thread or over tighten the spark plug, or such an operation will damage the aluminum threads of the cylinder hear.

Special tool
TOOL : 09930–10121 (Spark plug wrench set)

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

- Connect the spark plug caps. Refer to “Ignition Coil Construction (Page 1H-4)”.

NOTE

Fit the spark plug caps into the spark plug holes positively so that is no space.

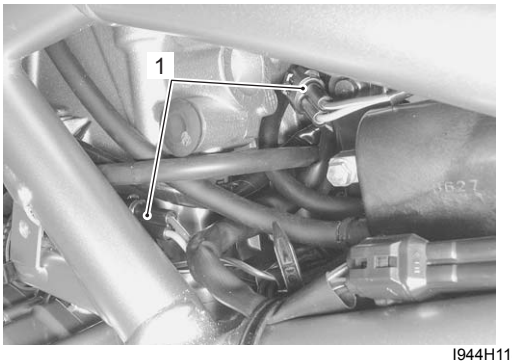
Ignition Coil Removal and Installation

B944H11806009

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

Removal

1) Remove the throttle body assembly. Refer to “Throttle Body Removal and Installation in Section 1D (Page 1D-10)”.
2) Disconnect the spark plug caps. Refer to “Spark Plug Cap and Spark Plug Removal and Installation (Page 1H-5)”.
3) Disconnect the ignition coil lead wire couplers (1).



I944H1180008-01

4) Remove the ignition coils as shown in the ignition coil construction. Refer to “Ignition Coil Construction (Page 1H-4)”.

Installation

Install the ignition coils in the reverse order of removal. Pay attention to the following points:

- Install the ignition coils as shown in the ignition coil construction. Refer to “Ignition Coil Construction (Page 1H-4)”.

Spark Plug Inspection and Cleaning

B944H11806002

Refer to “Spark Plug Inspection and Cleaning in Section 0B (Page 0B-9)”.

Ignition Coil and Plug Cap Inspection

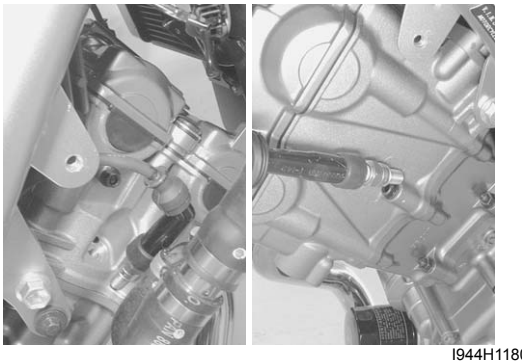
B944H11806003

Ignition Coil Primary Peak Voltage

1) Disconnect the all spark plug caps. Refer to “Spark Plug Cap and Spark Plug Removal and Installation (Page 1H-5)”.
2) Connect the new spark plugs to each spark plug caps and ground them to the cylinder heads.

NOTE

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



I944H1180009-01

3) Insert the needle pointed probe to the lead wire coupler.

NOTE

Use the special tool, to prevent the rubber of the water proof coupler from damage.

4) Connect the multi-circuit tester with the peak voltage adaptor as follows:

⚠ CAUTION

Before using the multi-circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.

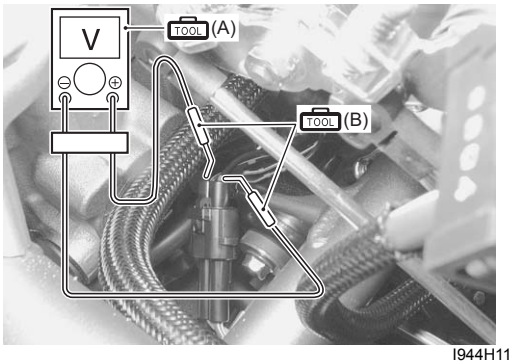
NOTE

Do not disconnect the ignition coil lead wire coupler.

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

Tester knob indication: Voltage (⎓)

	((+) Probe)	((–) Probe)
Ignition coil #1	O/W lead wire	W/Bl lead wire
Ignition coil #2	B/O lead wire	Black lead wire or Ground



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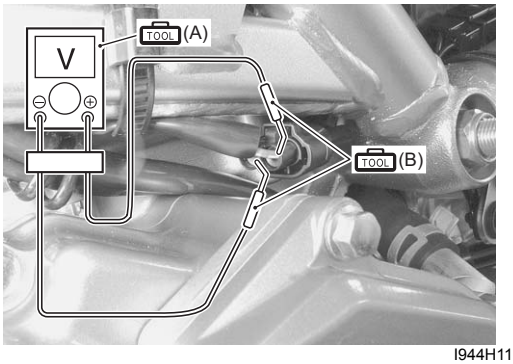

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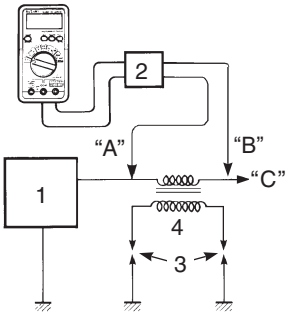


I944H1180012-02

1. ECM	"A": (–) probe
2. Peak voltage adaptor	"B": (+) probe
3. New spark plug	"C": For engine stop switch
4. Ignition coil	

5) Measure the ignition coils primary peak voltage in the following procedures:

⚠ WARNING

Do not touch the tester probes and spark plug to prevent an electric shock while testing.

a) Shift the transmission to the 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.

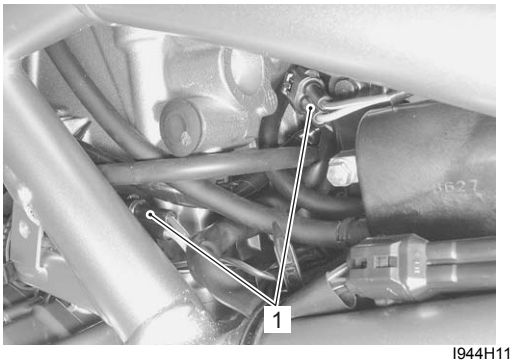
6) Repeat the b) procedure few times and measure the highest peak voltage.
If the voltage is lower than standard range, inspect the ignition coil and the CKP sensor.

Ignition coil primary peak voltage
150 V and more

7) After measuring the ignition coil primary peak voltage, reinstall the removed parts.

Ignition Coil Resistance

1) Disconnect the spark plug caps. Refer to "Spark Plug Cap and Spark Plug Removal and Installation (Page 1H-5)".
2) Disconnect the ignition coil lead wire couplers (1).



I944H1180013-01

3) Measure the ignition coil resistance in both the primary and secondary windings. If the resistance is not within the standard range, replace the ignition coil with a new one.

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

Tester knob indication
Resistance (Ω)

Ignition coil resistance
Primary: 1 – 3 Ω ((+) B/W – (–) Brown)
Secondary: 25 – 40 kΩ (Spark plug cap – spark plug cap)

4) After measuring the ignition coil resistance, reinstall the removed parts.

CKP Sensor Inspection

B944H11806004

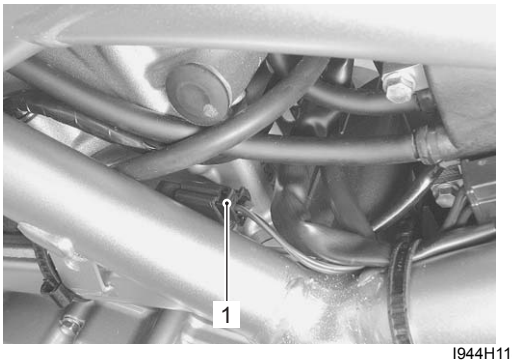
Refer to “Electrical Components Location in Section 0A (Page 0A-7)”.

CKP Sensor Peak Voltage

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the CKP sensor coupler (1).

NOTE

Be sure that all of the couplers are connected properly and the battery is fully-charged.



I944H1180014-01

3) Connect the multi-circuit tester with the peak volt adaptor as follows:

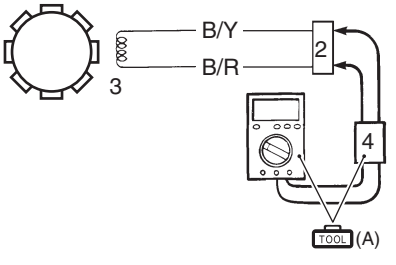
⚠ CAUTION

Before using the multi-circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.

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

Tester knob indication: Voltage (⎓)

CKP sensor	(+) Probe	(–) Probe
	B/R	B/Y



I944H1180015-03

2. CKP sensor coupler	4. Peak voltage adaptor
3. CKP sensor	

4) Measure the CKP sensor peak voltage in the following procedures:
   a) Shift the transmission to the 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.
5) Repeat the b) procedure a few times and measure the highest CKP sensor peak voltage.

CKP sensor peak voltage
4.6 V and more (Blue – Green)

6) If the peak voltage is within the specification, check the continuity between the CKP sensor coupler and ECM coupler.

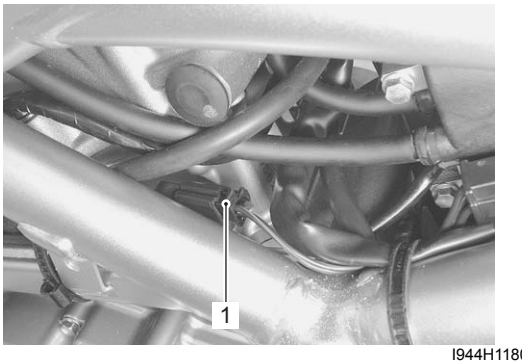
⚠ CAUTION

Normally, use the needle pointed probe to the backside of the lead wire coupler to prevent the terminal bend and terminal alignment.

7) After measuring the CKP sensor peak voltage, reinstall the removed parts.

CKP Sensor Resistance

1) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the CKP sensor coupler (1).

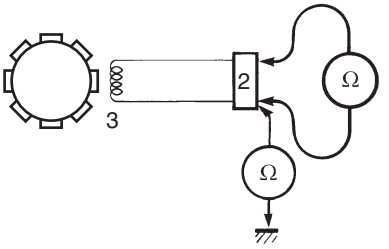


I944H1180014-01

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-9)”.

Tester knob indication
Resistance (Ω)

CKP sensor resistance
160 – 240 Ω (B/R – B/Y)
∞ Ω (B/R – Ground)



I718H1180008-02

2. CKP sensor coupler	3. CKP sensor

4) After measuring the CKP sensor resistance, connect the CKP sensor coupler (1).

CKP Sensor Removal and Installation

B944H11806005

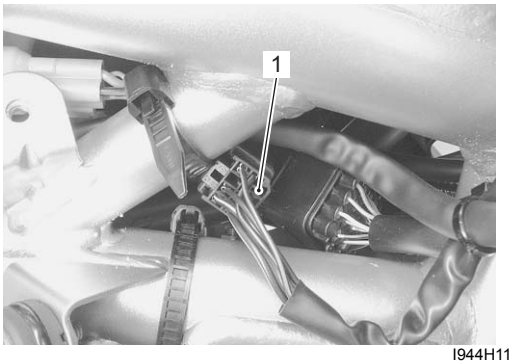
Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.

Engine Stop Switch Inspection

B944H11806006

Inspect the engine stop switch in the following procedures:

1) Remove the right frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the right handlebar switch coupler (1).



I944H1180017-01

3) 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 / Position	B/Bl	B/R
RUN	○	○
OFF		

I944H1180018-01

4) After finishing the engine stop switch inspection, reinstall the removed parts.

Ignition Switch Inspection

B944H11806007

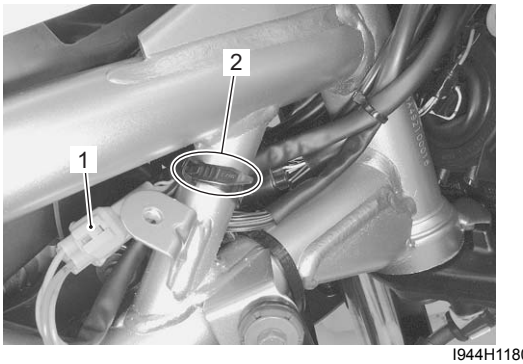
Refer to “Ignition Switch Inspection in Section 9C (Page 9C-7)”.

Ignition Switch Removal and Installation

B944H11806008

Removal

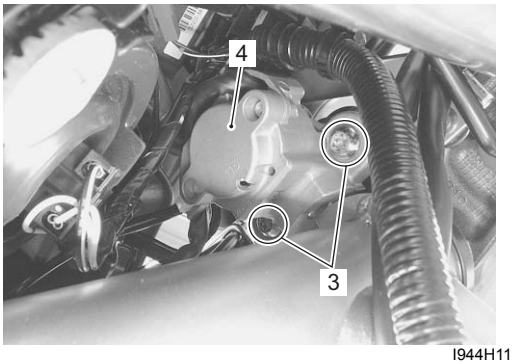
1) Remove the right frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the ignition switch coupler (1) and clamp (2).



I944H1180019-02

3) Remove the ignition switch mounting bolts (3) with the special tools and remove the ignition switch (4).

Special tool
: 09930–11920 (Torx bit (JT40H))
: 09930–11940 (Bit holder)



I944H1180020-02

Installation
Install the ignition switch in the reverse order of removal. Pay attention to the following point:

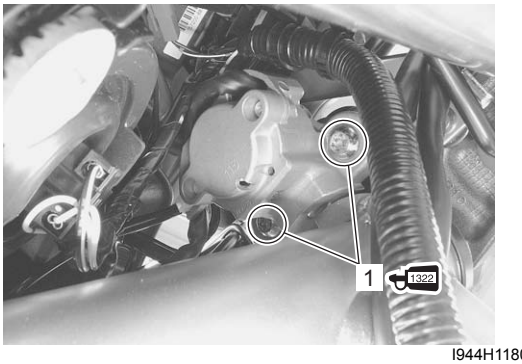
- Apply thread lock to the ignition switch mounting bolts (1).

⚠ CAUTION

When reusing the ignition switch mounting bolts, clean threaded part and apply the thread lock to them.

Special tool
: 09930–11920 (Torx bit (JT40H))
: 09930–11940 (Bit holder)

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



I944H1180021-02

Specifications

Service Data

B944H11807001

Electrical
Unit: mm (in)

Item	Specification		Note
Spark plug	Type	NGK: CR8EIA-9 DENSO: IU24D	
	Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance	Over 8 (0.3) at 1 atm.		
CKP sensor resistance	160 – 240 Ω		
CKP sensor peak voltage	4.6 V and more		When cranking
Ignition coil resistance	Primary	1 – 3 Ω	Terminal – Terminal
	Secondary	25 – 40 Ω	Plug cap – Plug cap
Ignition coil primary peak voltage	150 V and more		When cranking

Tightening Torque Specifications

B944H11807002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Spark plug	11	1.1	8.0	☞(Page 1H-5)

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

Special Tools and Equipment

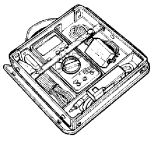
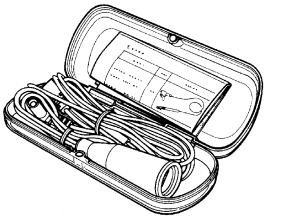
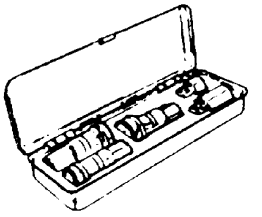
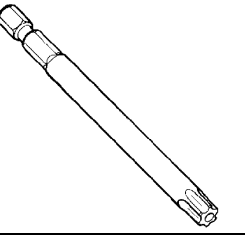
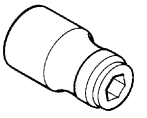
Recommended Service Material

B944H11808001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 1H-10)

Special Tool

B944H11808002

09900–25008 Multi circuit tester set ☞(Page 1H-6) / ☞(Page 1H-7) / ☞(Page 1H-8) / ☞(Page 1H-9) 	09900–25009 Needle pointed probe set ☞(Page 1H-6) 
09930–10121 Spark plug wrench set ☞(Page 1H-5) / ☞(Page 1H-5) / ☞(Page 1H-5) 	09930–11920 Torx bit (JT40H) ☞(Page 1H-10) / ☞(Page 1H-10) 
09930–11940 Torx bit holder ☞(Page 1H-10) / ☞(Page 1H-10) 	

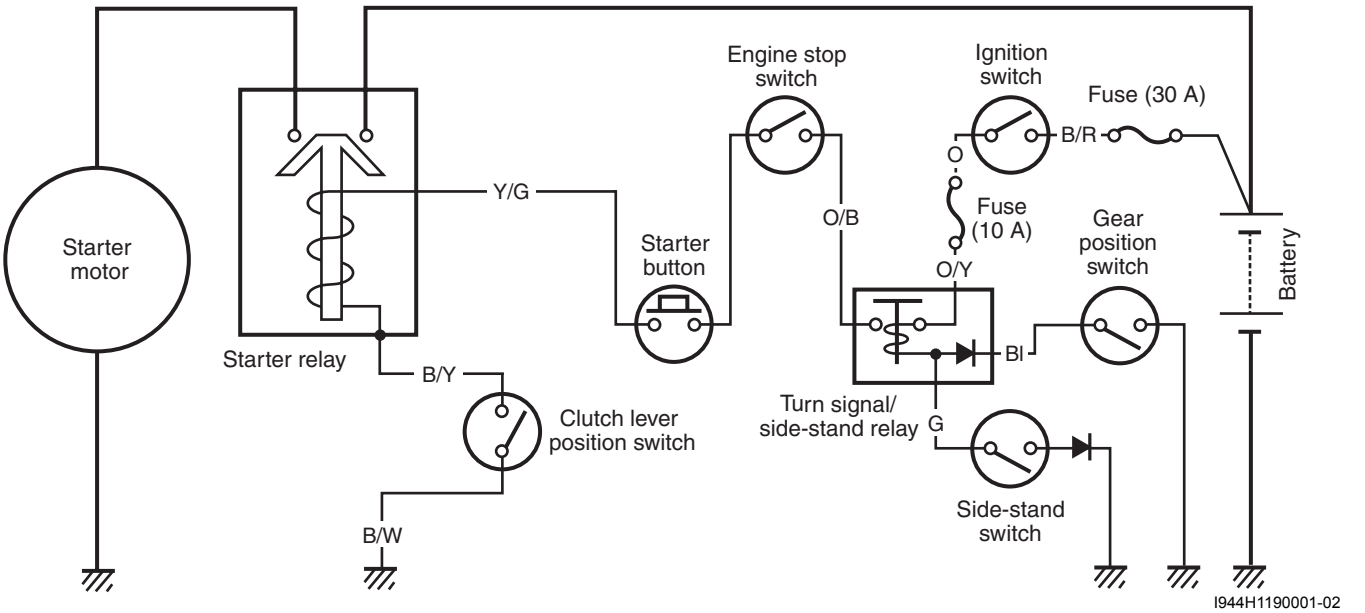
Starting System

Schematic and Routing Diagram

Starting System Diagram

B944H11902001

Refer to “Wire Color Symbols in Section 0A (Page 0A-5)”.



Component Location

Starting System Components Location

B944H11903001

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

Diagnostic Information and Procedures

Starting System Symptom Diagnosis

B944H11904001

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

B944H11904002

NOTE

Make sure the fuses are not blown and the battery is fully-charged before diagnosing.

Troubleshooting

Step	Action	Yes	No
1	1) Shift the transmission into neutral. 2) Grasp the clutch lever, turn on the ignition switch with the engine stop switch in the “RUN” position and listen for a click from the starter relay when the starter button is pushed. *Is a click sound heard?*	Go to Step 2.	Go to Step 3.
2	Check if the starter motor runs when its terminal is connected to the battery (+) terminal. (Do not use thin “wire” because a large amount of current flows.) *Does the starter motor run?*	• Faulty starter relay. • Loose or disconnected starter motor lead wire. • Loose or disconnected between starter relay and battery (+) terminal.	Faulty starter motor.
3	Measure the starter relay voltage at the starter relay connectors (between B/Y (+) and Y/G (–)) when the starter button is pushed. *Is the voltage OK?*	Go to Step 4.	• Faulty ignition switch. • Faulty engine stop switch. • Faulty clutch lever position switch. • Faulty gear position switch. • Faulty turn signal/ side-stand relay. • Faulty starter button. • Faulty side-stand switch. • Poor contact of connector. • Open circuit in wire harness.
4	Check the starter relay. Refer to “Starter Relay Inspection (Page 1I-7)”. *Is the starter relay OK?*	Poor contact of the starter relay.	Faulty starter relay.

Starter Motor Runs but Does not Crank the Engine

B944H11904003

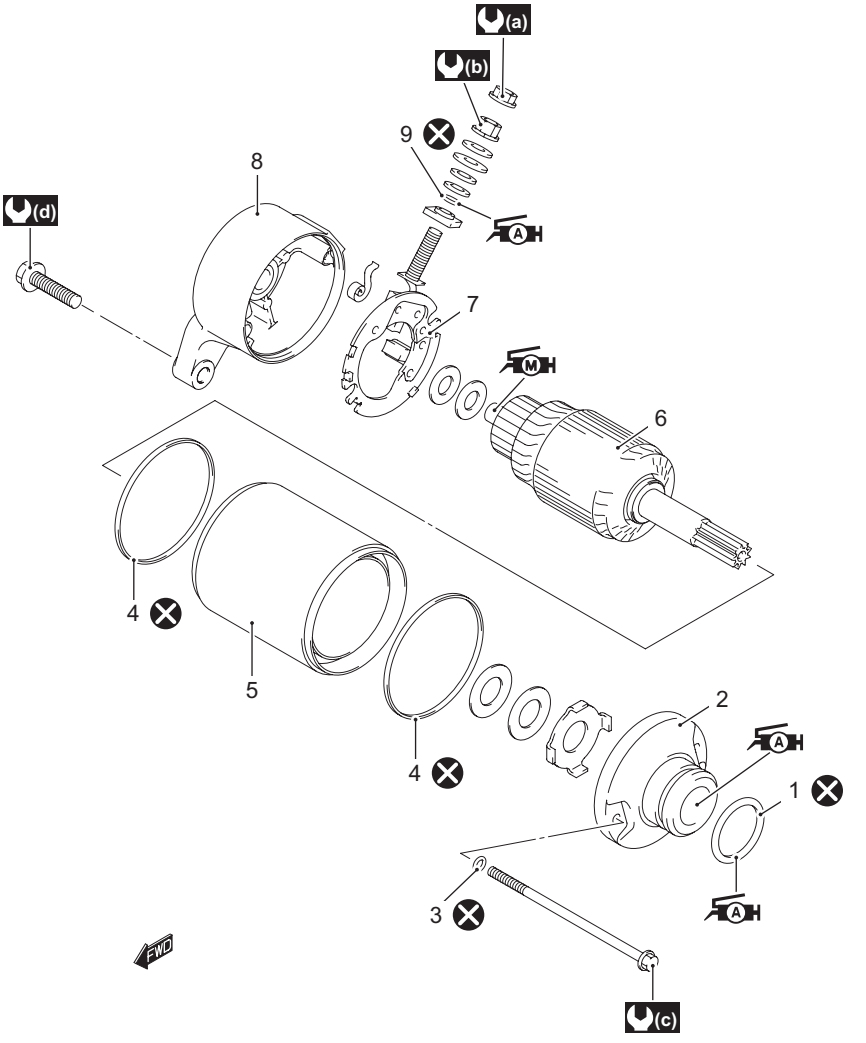
The starter motor runs when the transmission is in neutral with the side-stand up or down, but does not run when the transmission is in any position other than neutral, with the side-stand up.

Step	Action	Yes	No
1	Check the side-stand switch. Refer to “Side-stand / Ignition Interlock System Parts Inspection (Page 1I-8)”. *Is the side-stand switch OK?*	Go to Step 2.	Faulty side-stand switch.
2	Check the starter clutch. Refer to “Starter Clutch Inspection (Page 1I-12)”. *Is the starter clutch OK?*	• Open circuit in wire harness. • Poor contact of connector.	Faulty starter clutch.

Repair Instructions

Starter Motor Components

B944H11906001



I944H1190002-02

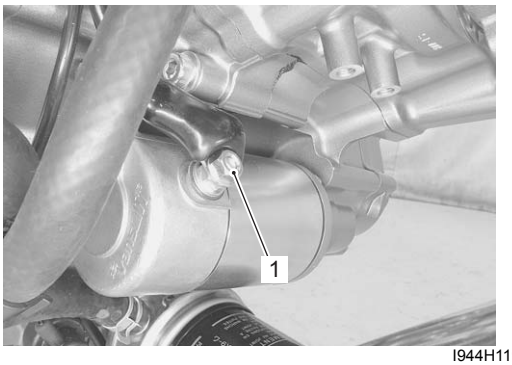
1. O-ring	7. Brush holder	(d) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
2. Housing end (Inside)	8. Housing end assembly (Outside)	A : Apply grease to sliding surface.
3. O-ring	9. O-ring	M : Apply moly past to sliding surface.
4. Square-ring	(a) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)	⊗ : Do not reuse.
5. Starter motor case	(b) : 7 N·m (0.7 kgf-m, 5.0 lbf-ft)	
6. Armature	(c) : 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)	

Starter Motor Removal and Installation

B944H11906002

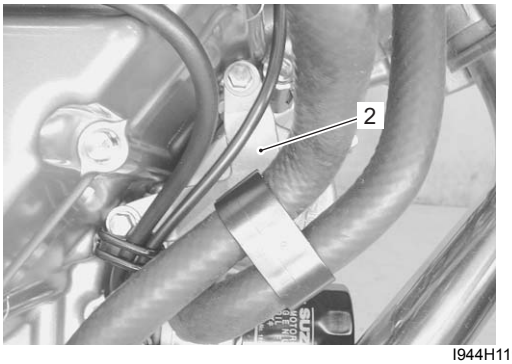
Removal

1) Turn the ignition switch OFF and disconnect the battery (–) lead wire. Refer to “Battery Removal and Installation in Section 1J (Page 1J-12)”.
2) Remove the starter motor lead wire (1).



I944H1190003-01

3) Remove the starter motor (2).



I944H1190004-02

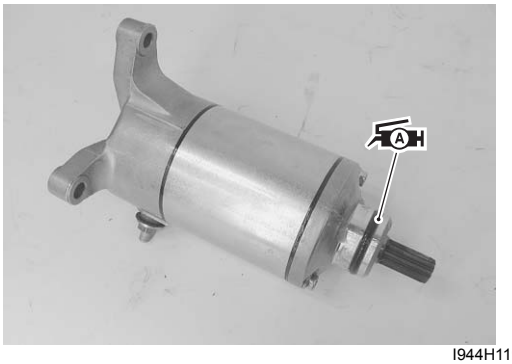
Installation

1) Apply grease to the starter motor O-ring.

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

⚠ CAUTION

Replace the O-ring with a new one.



I944H1190005-01

2) Install the starter motor.
3) Tighten the starter motor mounting bolts (1) to the specified torque. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-5)”.

NOTE

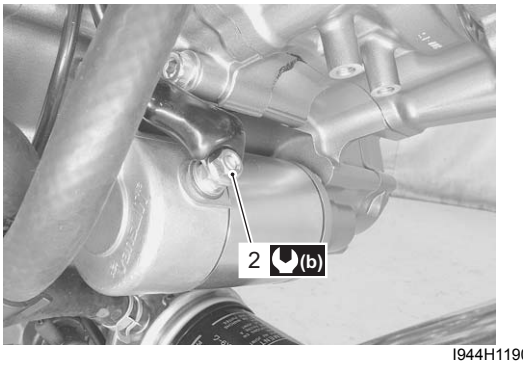
Fit the clamp to the bolt “A”.

Tightening torque
Starter motor mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

I944H1190006-01

4) Tighten the starter motor lead wire mounting nut (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)



I944H1190007-01

Starter Motor Disassembly and Assembly

B944H11906003

Refer to “Starter Motor Removal and Installation (Page 1I-4)”.

Disassembly

Disassemble the starter motor as shown in the starter motor components diagram. Refer to “Starter Motor Components (Page 1I-3)”.

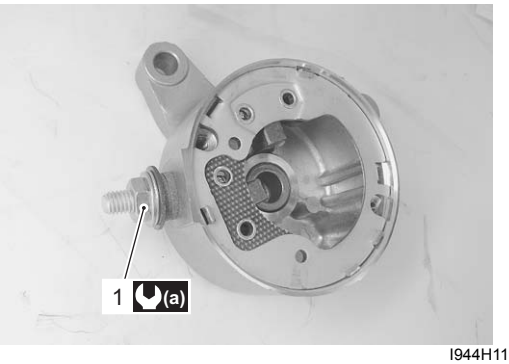
Assembly
Reassemble the starter motor in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

Replace the O-ring and square-ring with new ones to prevent oil leakage and moisture.

- Tighten the brush holder mounting nut (1) to the specified torque.

  Tightening torque
  Starter motor brush holder mounting nut (a): 7 N·m (0.7 kgf-m, 5.0 lbf-ft)



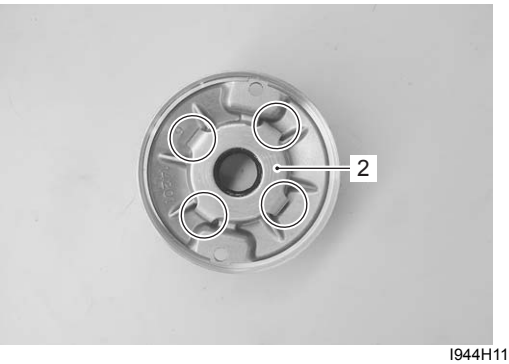
I944H1190008-01

- Apply grease to the lip of the dust seal and bearing.

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

I944H1190009-01

- Fit the washer (2) to the housing end correctly as shown in the figure.



I944H1190010-02

- Apply a small quantity of moly paste to the armature shaft.

  : Moly paste 99000–25140 (SUZUKI MOLY PASTE or equivalent)

I944H1190011-01

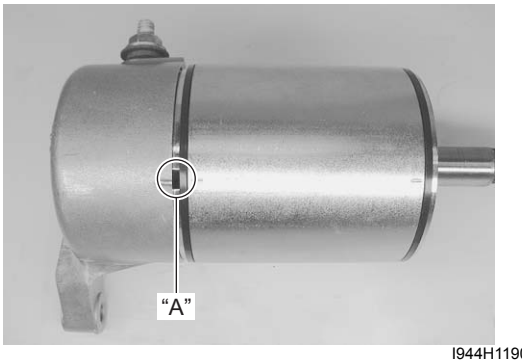
- Align the match mark on the starter motor case with the match mark on the housing end.

  NOTE

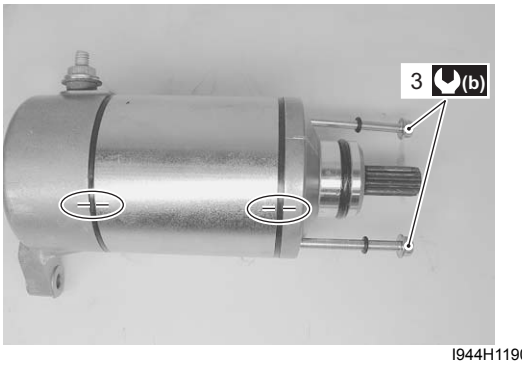
  The groove side "A" of starter motor case the housing end.

- Tighten the starter motor housing bolts (3) to the specified torque.

  Tightening torque
  Starter motor housing bolt (b): 3.5 N·m (0.35 kgf-m, 2.5 lbf-ft)



I944H1190012-01



I944H1190013-02

Starter Motor Related Parts Inspection

B944H11906004

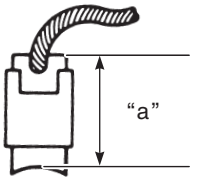
Refer to “Starter Motor Disassembly and Assembly (Page 1I-4)”.

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 housing end assembly with a new one.

Brush length “a”
Service limit: 6.5 mm (0.26 in)

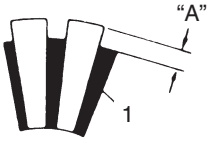
Special tool
TOOL : 09900–20102 (Vernier calipers (1/20 mm, 200 mm))



I831G1190065-01

Commutator

Inspect the commutator for discoloration, abnormal wear or undercut “A”.
If the commutator is abnormally worn, replace the armature.
If the commutator surface is discolored, polish it with #400 sandpaper and wipe it using a clean, dry cloth.
If there is no undercut, scrape out the insulator (1) with a saw blade.



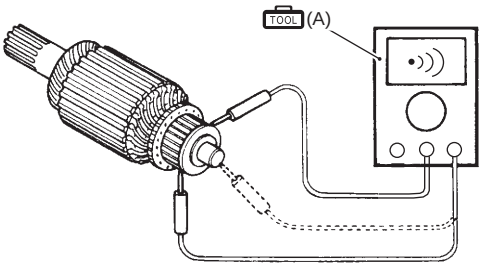
I649G1190016-02

Armature coil

Measure for continuity between each segment. Measure for continuity between each segment and the armature shaft.
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

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

Tester knob indication
Continuity set (•)))



I649G1190017-03

Dust seal and bearing

Check the seal lip for damage. If any damage is found, replace the housing end (Inside).
Check the bearing of housing end for damage.
If any damage is found, replace the housing end.

I944H1190014-01

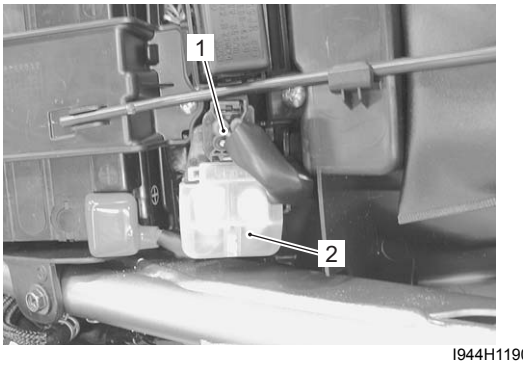
Starter Relay Removal and Installation

B944H11906005

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

Removal

1) Turn the ignition switch OFF position.
2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Disconnect the battery (–) lead wire from the battery.
4) Disconnect the starter relay coupler (1) and remove the starter relay cover (2).



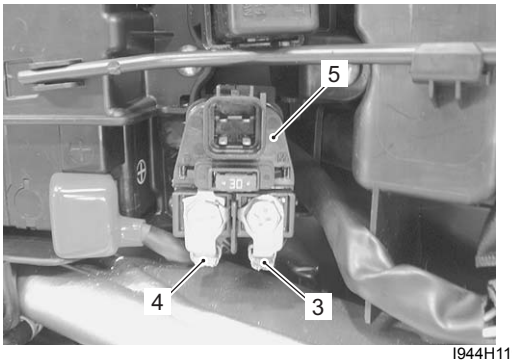
I944H1190015-01

5) Disconnect the starter motor lead wire (3) and battery (+) lead wire (4).

NOTE

Be sure to disconnect the starter motor lead wire (3) first, then disconnect the battery (+) lead wire (4).

6) Remove the starter relay (5).



I944H1190016-02

Installation
Install the starter relay in the reverse order of removal.

Starter Relay Inspection

B944H11906006

Inspect the starter relay in the following procedures:

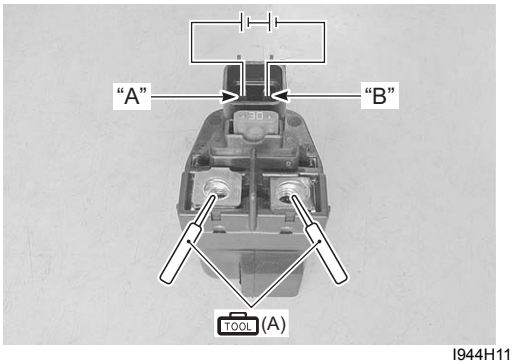
1) Remove the starter relay. Refer to “Starter Relay Removal and Installation (Page 1I-6)”.
2) Apply 12 V to “A” and “B” terminals and check for continuity between the positive and negative terminals using the multi-circuit tester. If the starter relay clicks and continuity is found, the relay is ok.

⚠ CAUTION

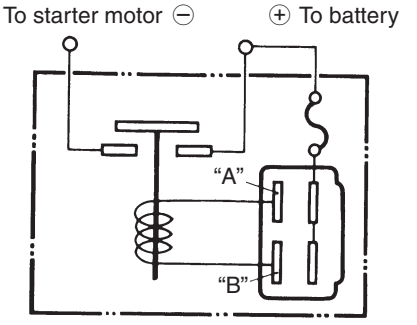
Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.

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

Tester knob indication
Continuity test (•))))



I944H1190017-02



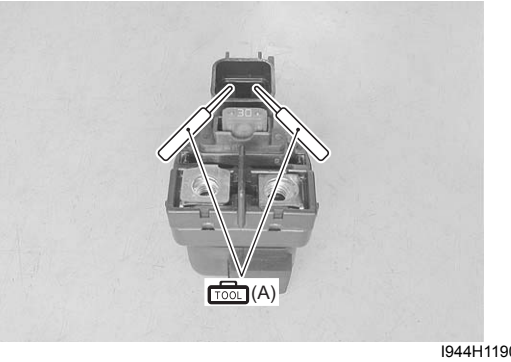
I649G1190022-02

3) Measure the relay coil resistance between the terminals “A” to “B” 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)

Tester knob indication
Resistance (Ω)

Starter relay resistance
3 – 6 Ω



I944H1190018-01

4) Install the starter relay. Refer to “Starter Relay Removal and Installation (Page 1I-6)”.

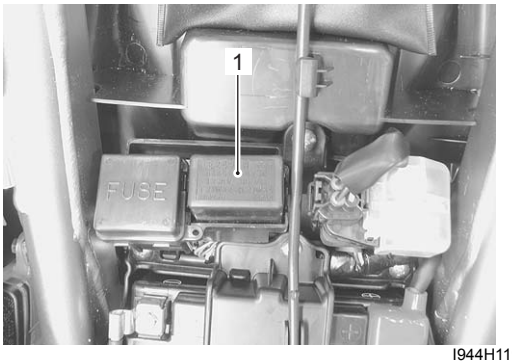
Turn Signal / Side-stand Relay Removal and Installation

B944H11906007

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

Removal

1) Turn the ignition switch OFF position.
2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Remove the turn signal/side-stand relay (1).



I944H1190019-01

Installation

Install the turn signal/side-stand relay in the reverse order of removal.

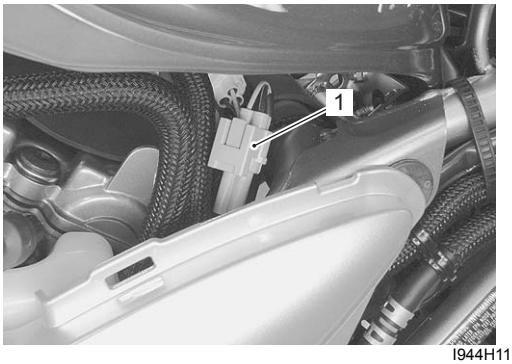
Side-stand / Ignition Interlock System Parts Inspection

B944H11906008

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 position.
2) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
3) Disconnect the side-stand switch coupler (1).



I944H1190020-01

4) Measure the voltage between Green and Black/White lead wires.

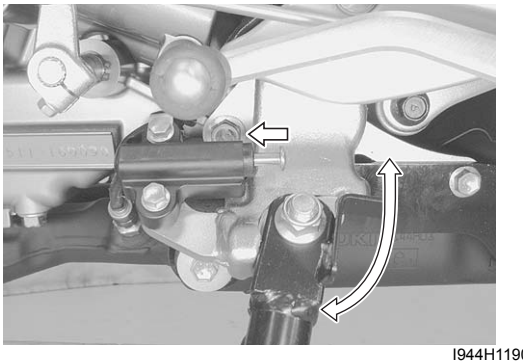
Special tool
TOOL : 09900–25008 (Multi-circuit tester set)

Tester knob indication
Diode test (⊣◀)

	G ((+) probe)	B/W ((–) probe)
ON (Side-stand up)	0.4 – 0.6 V	
OFF (Side-stand down)	1.4 V and more (Tester’s battery voltage)	

NOTE

If the tester reads 1.4 V and below when the tester probes are not connected, replace tester battery.

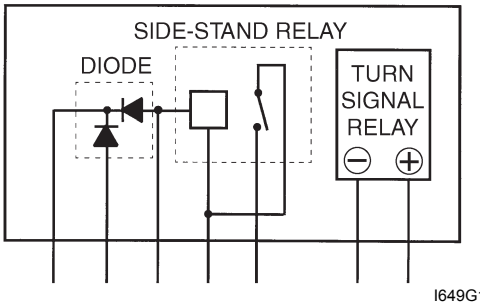


I944H1190021-01

5) Connect the side-stand switch coupler.
6) Reinstall 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.



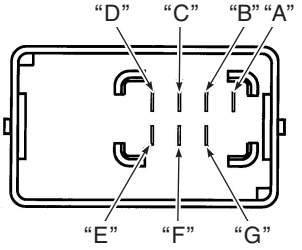
I649G1190027-02

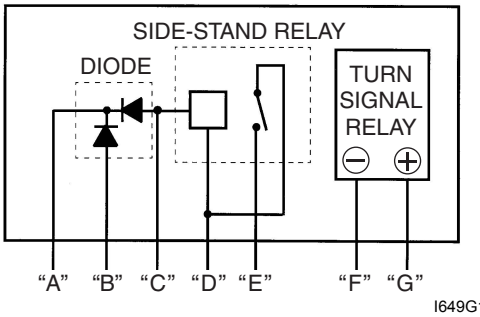
Side-stand relay

1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page 1I-8)".
2) Check the insulation between "D" and "E" terminals using the multi-circuit tester.
3) Apply 12 V to terminals "D" and "C" ((+) to "D" and (–) to "C") and check the continuity between "D" and "E". If there is no continuity, replace the turn signal/side-stand relay with a new one. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page 1I-8)".

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

Tester knob indication
Continuity test (•)))





I649G1190028-02

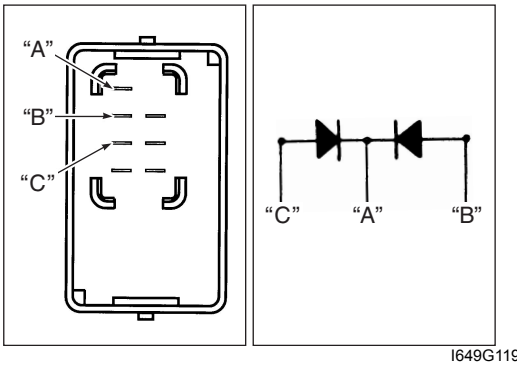
4) Install the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page 1I-8)".

Diode inspection

1) Remove the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page 1I-8)".
2) Measure the voltage between the "A", "B" and "C" terminals using the multi-circuit tester.

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

Tester knob indication
Diode test (⊣◀)



I649G1190029-02

	⊕ Probe of tester to:		
⊖ Probe of tester to:		"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 tester battery.

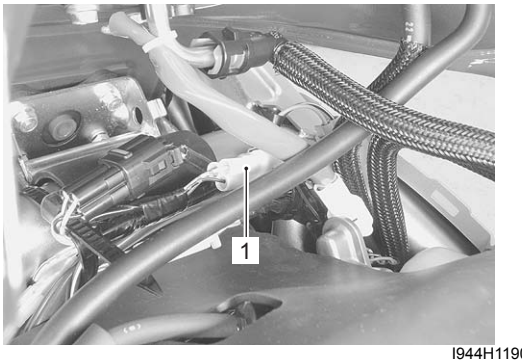
3) Install the turn signal/side-stand relay. Refer to "Turn Signal / Side-stand Relay Removal and Installation (Page 1I-8)".

Gear Position Switch

1) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-7)".
2) Disconnect the gear position switch coupler (1).

⚠ CAUTION

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



I944H1190022-01

3) Check the continuity between Blue and Black/White lead wires with the transmission in “NEUTRAL”.

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

Tester knob indication
Continuity test (•))))

	BI	B/W
ON (Neutral)	○	○
OFF (Except neutral)		

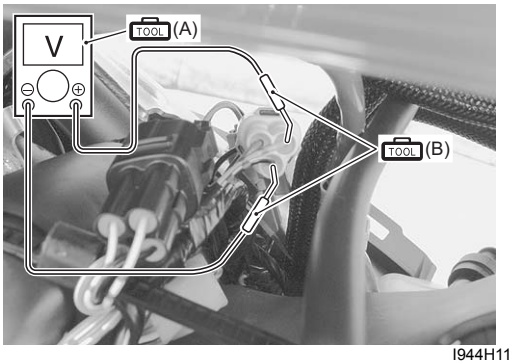
I649G1190045-03

4) Connect the gear position switch coupler to the wiring harness.
5) Insert the needle pointed probes to the lead wire coupler.
6) Turn the ignition switch ON and side-stand to upright position.
7) Measure the voltage between Pink and Black/White lead wires using the multi-circuit tester when shifting the gearshift lever from low to top.

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

Tester knob indication
Voltage (⎓)

Gear position switch voltage (Except neutral position)
0.6 V and more ((+) P – (–) B/W)



I944H1190023-01

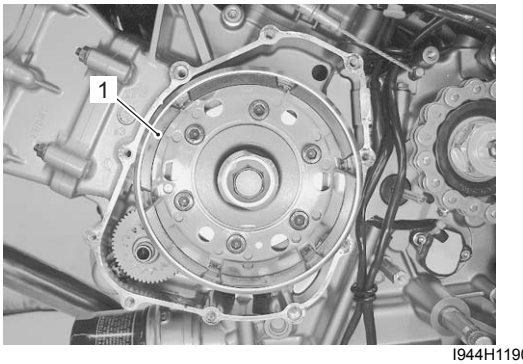
8) Turn the ignition switch OFF.
9) Reinstall the removed parts.

Starter Clutch Removal and Installation

B944H11906009

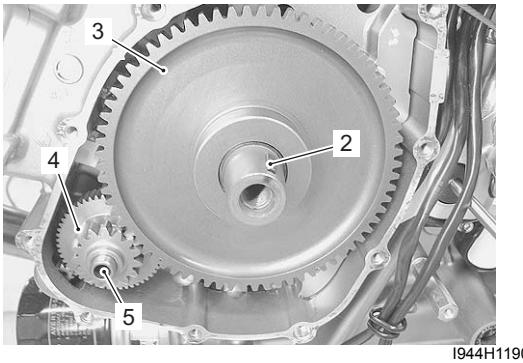
Removal

1) Drain engine oil.
2) Remove the generator rotor (1). Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.



I944H1190024-01

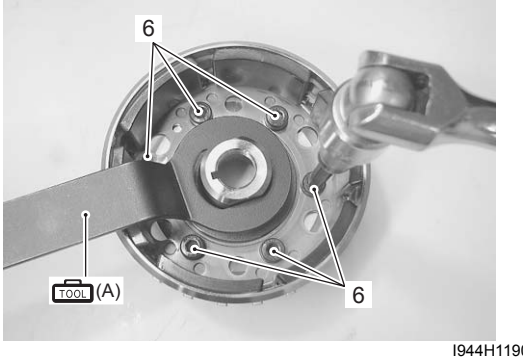
3) Remove the key (2) and starter driven gear (3).
4) Remove the starter idle gear (4) and its shaft (5).



I944H1190025-02

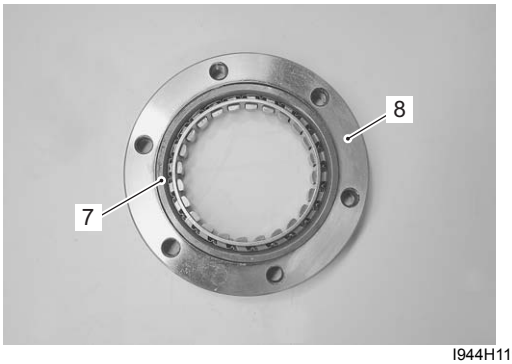
5) Hold the generator rotor with the special tool and remove the starter clutch bolts (6).

Special tool
TOOL (A): 09930–44530 (Rotor holder)



I944H1190026-03

6) Remove the one way clutch (7) from the guide (8).



I944H1190027-02

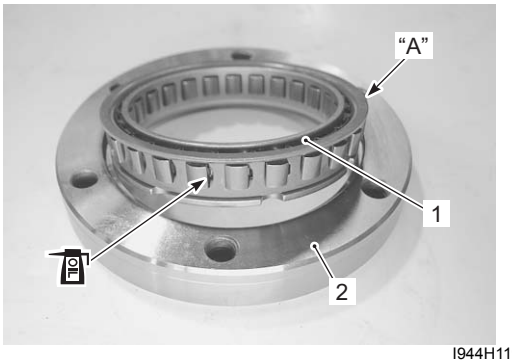
Installation

Install the starter clutch in the reverse order of removal. Pay attention to the following points:

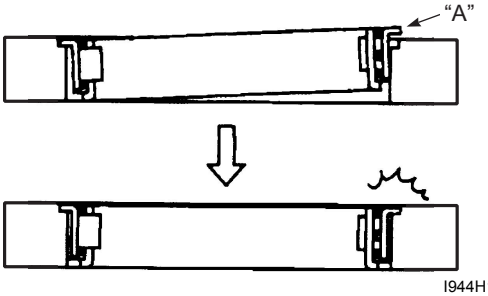
- Apply engine oil to the one way clutch (1).
- When inserting the one way clutch (1) into the guide (2), fit the flange “A” in the step of the guide (2).

NOTE

Be sure to seat the flange “A” of the one way clutch (1) to the guide (2).

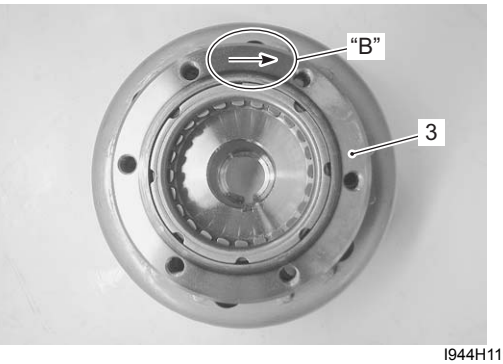


I944H1190028-01



I944H1190029-01

- Install the guide (3) to the generator rotor with the arrow mark “B” faced upward.



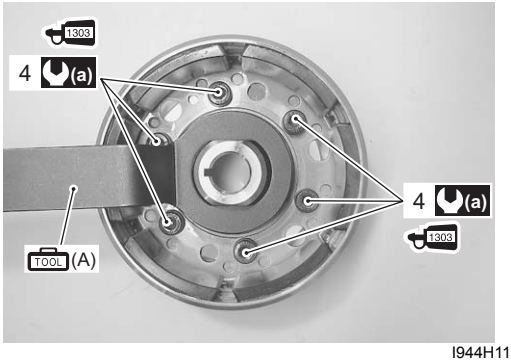
I944H1190030-03

- Apply THREAD LOCK to the bolts (4), and then tighten them to the specified torque with the special tool.

1303 : Thread lock cement 99000–32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)

Special tool
TOOL (A): 09930–44530 (Rotor holder)

Tightening torque
Starter clutch bolt (a): 25 N·m (2.5 kgf-m, 18.0 lbf-ft)

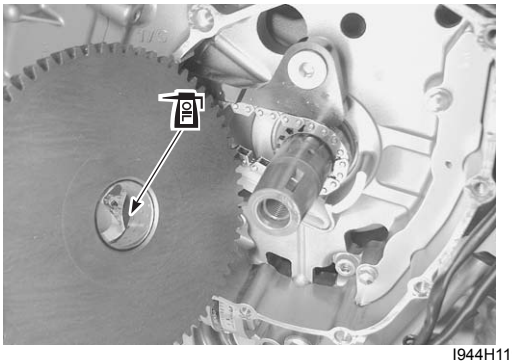


I944H1190031-03

- Apply engine oil to the starter idle gear shaft hole.

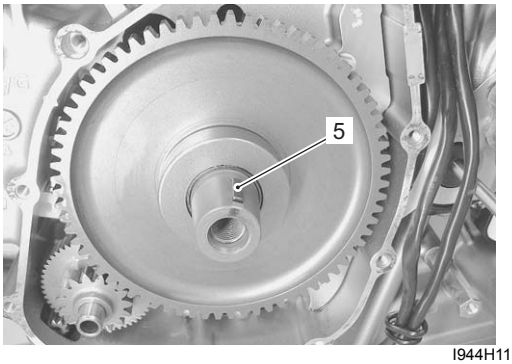
I944H1190032-02

- Apply engine oil to the bushing of the starter driven gear.



I944H1190033-02

- Fit the key (5) in the key slot on the crankshaft.



I944H1190034-03

- Install the generator rotor onto crankshaft. Refer to "Generator Removal and Installation in Section 1J (Page 1J-4)".

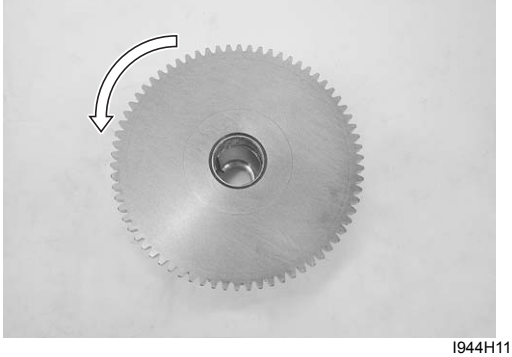
Starter Clutch Inspection

B944H11906010

Refer to "Starter Clutch Removal and Installation (Page 1I-10)".

Starter Clutch

1) Install the starter driven gear onto the starter clutch.
2) Turn the starter driven gear by hand to inspect the starter clutch for a smooth movement. The gear turns in one direction only. If a large resistance is felt for rotation, inspect the starter clutch or the starter clutch contacting surface on the starter driven gear for wear or damage.
   If they are found to be damaged, replace them with new ones.



I944H1190035-01

Starter Driven Gear Bushing

Inspect the starter driven gear bushing for wear or damage.
If necessary, replace it with a new one.

I944H1190036-01

Starter Idle Gear

Inspect the starter idle gear for wear or damage. If any damage is found, replace it with a new one.

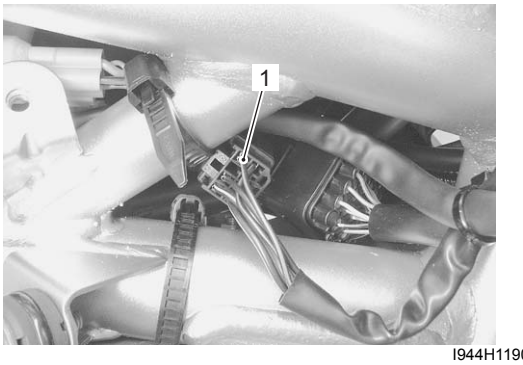
I944H1190037-01

Starter Button Inspection

B944H11906011

Inspect the starter button in the following procedures:

1) Remove the right frame body cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
2) Disconnect the right handlebar switch coupler (1).



I944H1190038-01

3) Inspect the starter button for continuity with a tester. If any abnormality is found, replace the right handle switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page 6B-3)".

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

Tester knob indication
Continuity (•)))

Position \ Color	B/R	Bl/B	B/O	G/B
•			○——	——○
PUSH	○——	——○		

I944H1190039-01

4) After finishing the starter button inspection, reinstall the right frame body cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".

Specifications

Service Data

B944H11907001

Electrical
Unit: mm (in)

Item	Specification		Note
Starter motor brush length	Standard	10 (0.39)	
	Limit	6.5 (0.26)	
Starter relay resistance	3 – 6 Ω		

Tightening Torque Specifications

B944H11907002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Starter motor mounting bolt	10	1.0	7.0	☞(Page 1I-4)
Starter motor lead wire mounting nut	6	0.6	4.5	☞(Page 1I-4)
Starter motor brush holder mounting nut	7	0.7	5.0	☞(Page 1I-5)
Starter motor housing bolt	3.5	0.35	2.5	☞(Page 1I-5)
Starter clutch bolt	25	2.5	18.0	☞(Page 1I-11)

NOTE

The specified tightening torque is described in the following.
"Starter Motor Components (Page 1I-3)"

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

Special Tools and Equipment

Recommended Service Material

B944H11908001

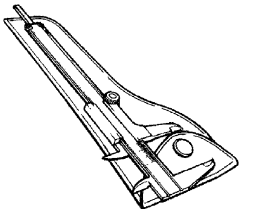
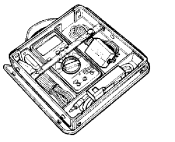
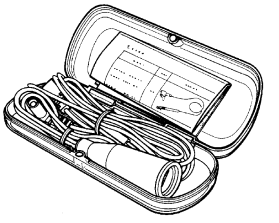
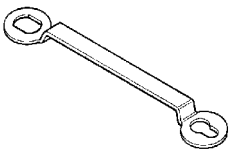
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 1I-4) / ☞(Page 1I-5)
Moly paste	SUZUKI MOLY PASTE or equivalent	P/No.: 99000–25140	☞(Page 1I-5)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000–32030	☞(Page 1I-11)

NOTE

Required service material is also described in the following.
"Starter Motor Components (Page 1I-3)"

Special Tool

B944H11908002

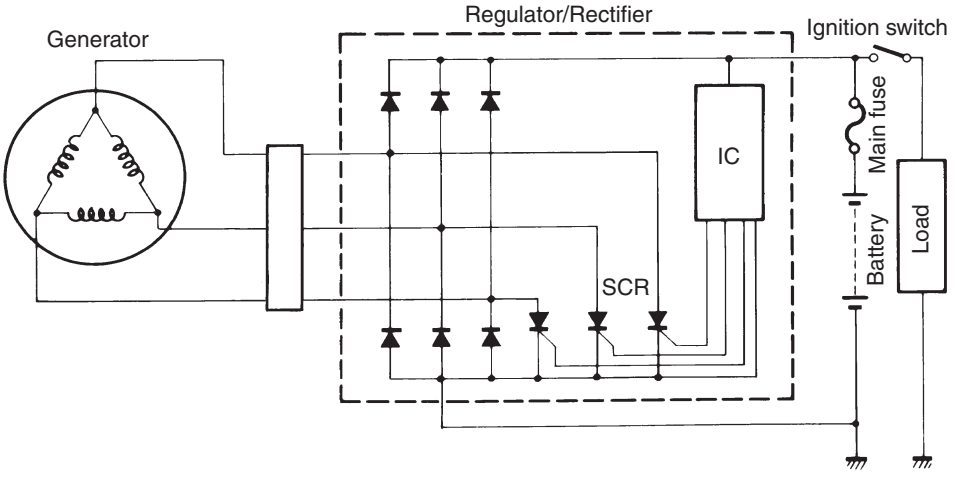
09900–20102 Vernier calipers (200 mm) ☞(Page 1I-6) 	09900–25008 Multi circuit tester set ☞(Page 1I-6) / ☞(Page 1I-7) / ☞(Page 1I-7) / ☞(Page 1I-8) / ☞(Page 1I-9) / ☞(Page 1I-9) / ☞(Page 1I-10) / ☞(Page 1I-10) / ☞(Page 1I-13) 
09900–25009 Needle pointed probe set ☞(Page 1I-10) 	09930–44530 Rotor holder ☞(Page 1I-10) / ☞(Page 1I-11) 

Charging System

Schematic and Routing Diagram

Charging System Diagram

B944H11A02001



I944H11A0001-01

Component Location

Charging System Components Location

B944H11A03001

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

Diagnostic Information and Procedures

Charging System Symptom Diagnosis

B944H11A04001

Condition	Possible cause	Correction / Reference Item
Generator does not charge	Open- or short-circuited lead wires, or loose lead connections.	*Repair, replace or connect properly.*
	Short-circuited, grounded or open generator coil.	*Replace.*
	Short-circuited or punctured regulator/ rectifier.	*Replace.*
Generator does charge, but charging rate is below the specification	Lead wires tend to get short- or open-circuited or loosely connected at terminals.	*Repair or retighten.*
	Grounded or open-circuited generator coil.	*Replace.*
	Defective regulator/rectifier.	*Replace.*
	Defective cell plates in the battery.	*Replace the battery.*
Generator overcharges	Internal short-circuit in the battery.	*Replace the battery.*
	Damaged or defective resistor element in the regulator/rectifier.	*Replace.*
	Poorly grounded regulator/rectifier.	*Clean and tighten ground connection.*
Unstable charging	Lead wire insulation frayed due to vibration, resulting in intermittent short-circuiting.	*Repair or replace.*
	Internally short-circuited generator.	*Replace.*
	Defective regulator/rectifier.	*Replace.*

Condition	Possible cause	Correction / Reference Item
Battery overcharges	Faulty regulator/rectifier.	*Replace.*
	Faulty battery.	*Replace.*
	Poor contact of generator lead wire coupler.	*Repair.*
"Sulfation", acidic white powdery substance or spots on surface of cell plates	Cracked battery case.	*Replace the battery.*
	Battery has been left in a run-down condition for a long time.	*Replace the battery.*
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

B944H11A04002

Troubleshooting

Step	Action	Yes	No
1	Check accessories which use excessive amounts of electricity. *Are accessories being installed?*	Remove accessories.	Go to Step 2.
2	Check the battery for current leakage. Refer to "Battery Current Leakage Inspection (Page 1J-3)". *Is the battery for current leakage OK?*	Go to Step 3.	• Short circuit of wire harness. • Faulty electrical equipment.
3	Measure the regulated voltage between the battery terminals. Refer to "Regulated Voltage Inspection (Page 1J-3)". *Is the regulated voltage OK?*	• Faulty battery. • Abnormal driving condition.	Go to Step 4.
4	Measure the resistance of the generator coil. Refer to "Generator Inspection (Page 1J-4)". *Is the resistance of generator coil OK?*	Go to Step 5.	• Faulty generator coil. • Disconnected lead wires.
5	Measure the generator no-load performance. Refer to "Generator Inspection (Page 1J-4)". *Is the generator no-load performance OK?*	Go to Step 6.	Faulty generator.
6	Inspect the regulator/rectifier. Refer to "Regulator / Rectifier Inspection (Page 1J-8)". *Is the regulator/rectifier OK?*	Go to Step 7.	Faulty regulator/rectifier.
7	Inspect wiring harness. *Is the wiring harness OK?*	Faulty battery.	• Short circuit of wire harness. • Poor contact of couplers.

Repair Instructions

Battery Current Leakage Inspection

B944H11A06001

Inspect the battery current leakage in the following procedures:

1) Turn the ignition switch OFF.
2) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Disconnect the battery (–) lead wire.
4) Measure the current between (–) battery terminal and the (–) battery lead wire using the multi-circuit tester. If the reading exceeds the specified value, leakage is evident.

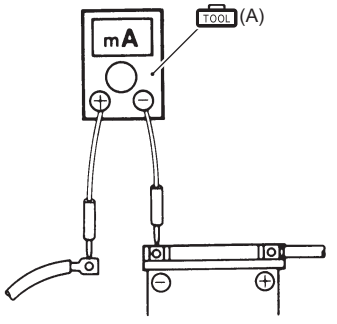
⚠ CAUTION

- **In case of a large current leak, turn the tester to high range first to avoid tester damage.**
- **Do not turn the ignition switch ON when measuring current.**

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

Tester knob indication
Current (⎓ , 20 mA)

Battery current (Leak)
Under 3 mA



I837H11A0025-01

5) Connect the (–) battery terminal and install the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.

Regulated Voltage Inspection

B944H11A06002

Inspect the regulated voltage in the following procedures:

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Start the engine and keep it running at 5 000 r/min with the dimmer switch turned HI position.
3) Measure the DC voltage between the (+) and (–) battery terminals using the multi-circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier. Refer to “Generator Inspection (Page 1J-4)” and “Regulator / Rectifier Inspection (Page 1J-8)”.

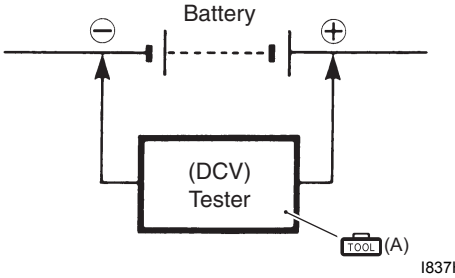
NOTE

When making this test, be sure that the battery is in fully charged condition.

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

Tester knob indication
Voltage (⎓)

Regulated voltage (Charging output)
Standard: 14.0 – 15.5 V at 5 000 r/min



I837H11A0026-01

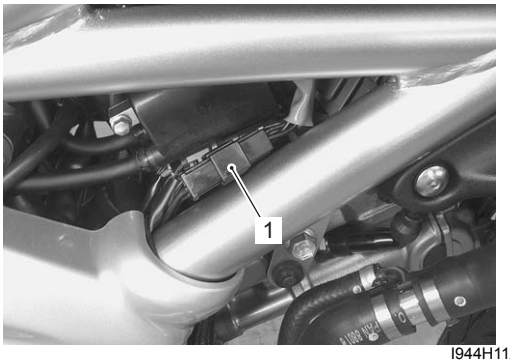
4) Install the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.

Generator Inspection

B944H11A06003

Generator Coil Resistance

1) Disconnect the generator coupler (1).



I944H11A0002-01

2) Measure the resistance between the three lead wires.
If the resistance is out of specified value, replace the stator with a new one. Also, check that the generator core is insulated properly.

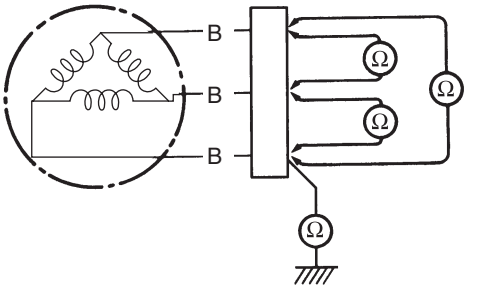
NOTE

When making this test, be sure that the battery is in fully charged condition.

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

Tester knob indication
Resistance (Ω)

Generator coil resistance
0.3 – 1.2 Ω (B – B)
∞ Ω (B – Ground)

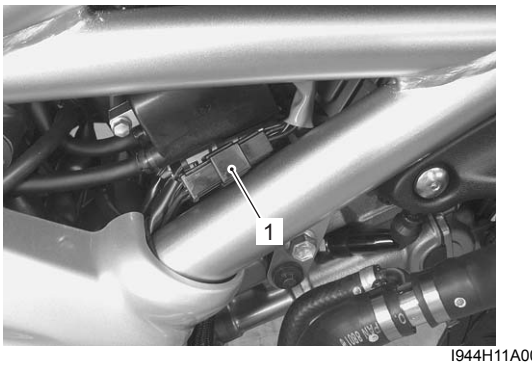


I718H11A0005-02

3) Connect the generator coupler.

No-load Performance

1) Disconnect the generator coupler (1).



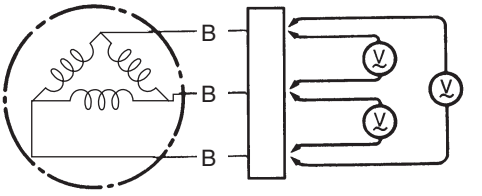
I944H11A0003-01

2) Start the engine and keep it running at 5 000 r/min.
3) Using the multi-circuit tester, measure the voltage between three lead wires.
If the tester reads under the specified value, replace the generator with a new one.

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

Tester knob indication
Voltage (⎓)

Generator no-load performance (When engine is cold)
60 V (AC) and more at 5 000 r/min



I718H11A0006-02

Generator Removal and Installation

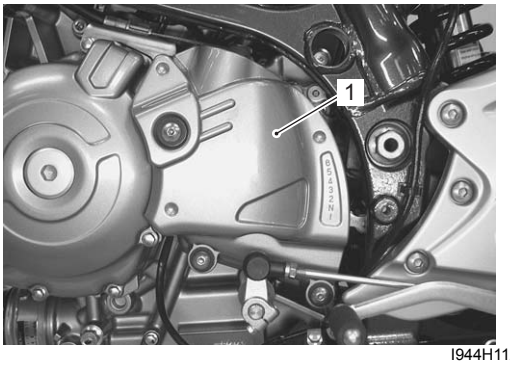
B944H11A06004

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

Removal

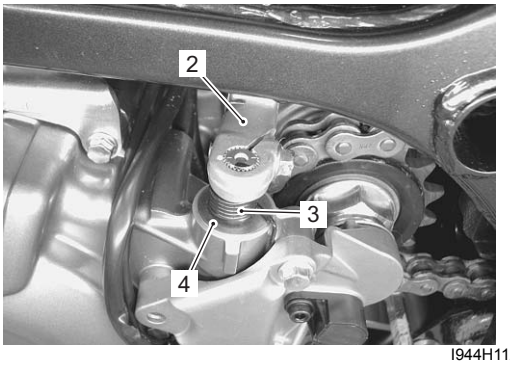
1) Drain engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)”.

2) Remove the engine sprocket cover (1). Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.



I944H11A0004-01

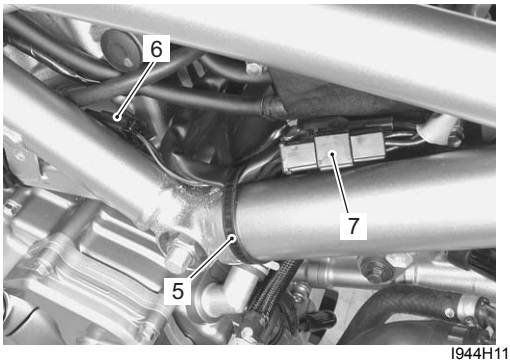
3) Remove the clutch release arm (2), spring (3) and washer (4).



I944H11A0005-02

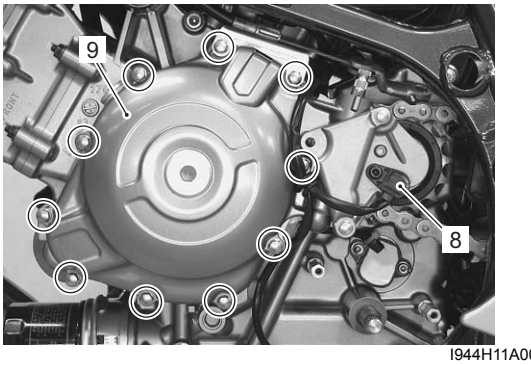
4) Remove the right frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.

5) Disconnect the clamp (5), CKP sensor coupler (6) and generator coupler (7).



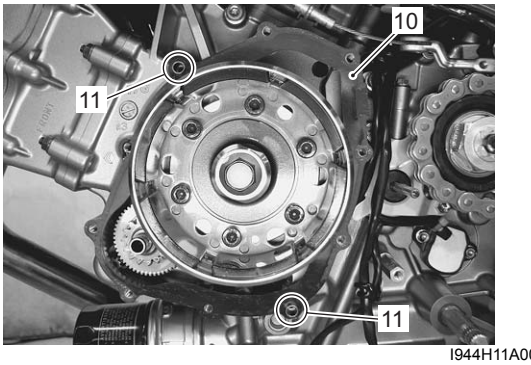
I944H11A0006-03

6) Remove the speed sensor (8) and generator cover (9).



I944H11A0007-02

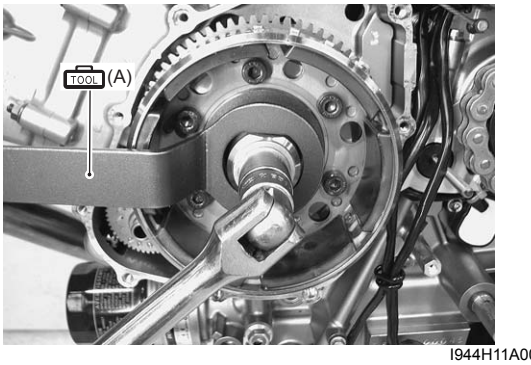
7) Remove the gasket (10) and dowel pins (11).



I944H11A0008-02

8) Hold the generator rotor with the special tool and remove the generator rotor bolt.

Special tool
TOOL (A): 09930–44530 (Rotor holder)



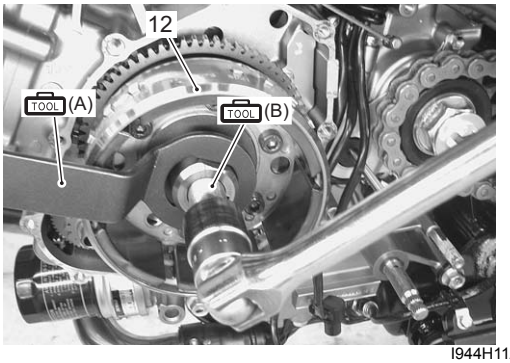
I944H11A0009-01

9) Remove the generator rotor (12) with the special tool.

NOTE

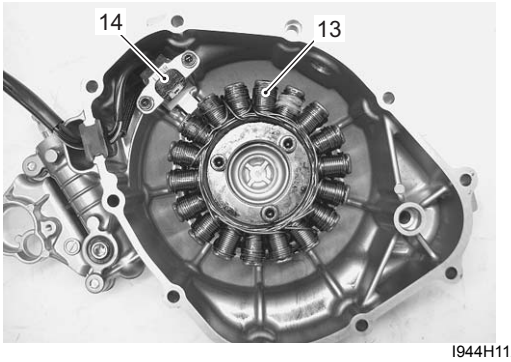
Remove the starter clutch if necessary. Refer to "Starter Clutch Removal and Installation in Section 1I (Page 1I-10)".

Special tool
(A): 09930–44530 (Rotor holder)
(B): 09930–30450 (Rotor remover bolt)



I944H11A0010-02

10) Remove the generator stator (13) along with the CKP sensor (14).



I944H11A0011-02

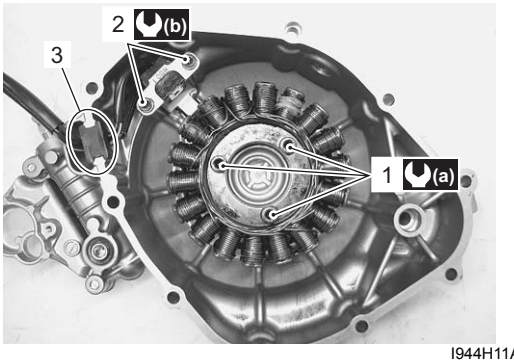
Installation
Install the generator in the reverse order of removal. Pay attention to the following points:

- Tighten the generator stator set bolts (1) and CKP sensor mounting bolts (2) to the specified torque.

NOTE

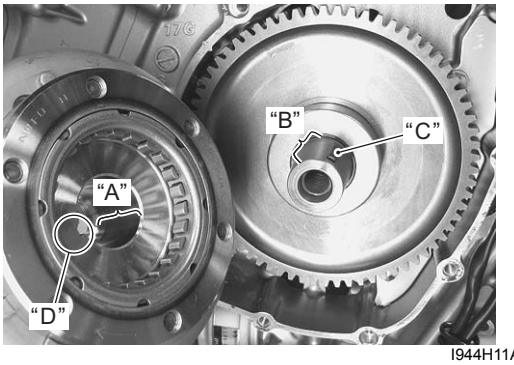
Be sure to install the grommet (3) to the generator cover.

Tightening torque
Generator stator set bolt (a): 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
CKP sensor mounting bolt (b): 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)



I944H11A0012-02

- 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.
- When installing the generator rotor onto crankshaft, align the key "C" and slot "D".

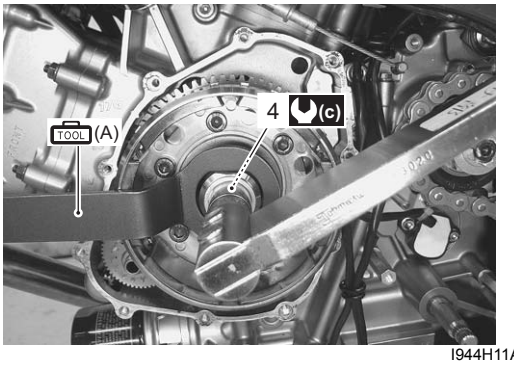


I944H11A0013-03

- While holding the generator rotor with the special tool, tighten generator rotor bolt (4) to the specified torque.

Special tool
(A): 09930–44530 (Rotor holder)

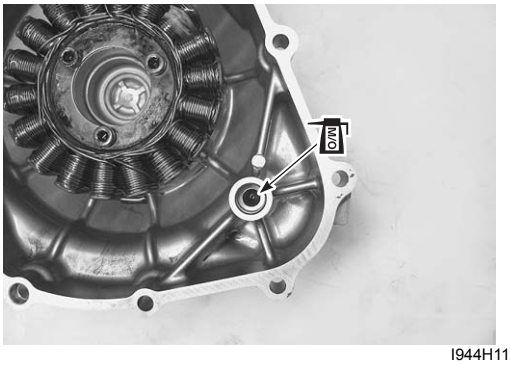
Tightening torque
Generator rotor bolt (c): 140 N·m (14.0 kgf-m, 101.5 lbf-ft)



I944H11A0014-03

- Apply molybdenum oil solution to the starter idle gear shaft hole.

  M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

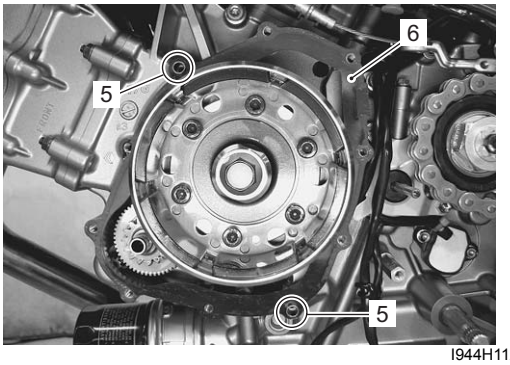


I944H11A0015-01

- Install the dowel pins (5) and new gasket (6).

  ⚠ CAUTION

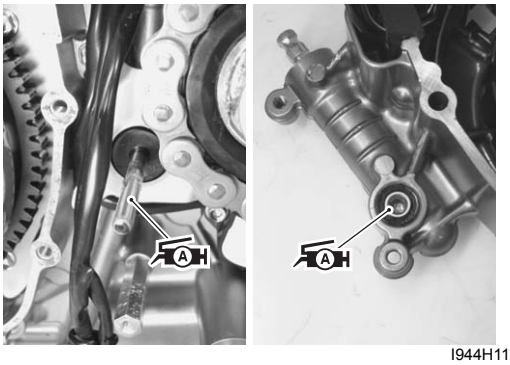
  Use a new gasket to prevent oil leakage.



I944H11A0016-02

- Apply a small quantity of grease to the clutch push rod cap and clutch push rod.

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



I944H11A0017-01

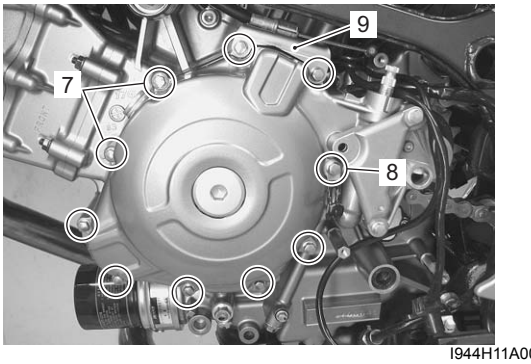
- Install the generator cover and tighten the generator cover bolts.

  ⚠ WARNING

  Be careful not to pinch the finger between the generator cover and the crankcase.

  ⚠ CAUTION

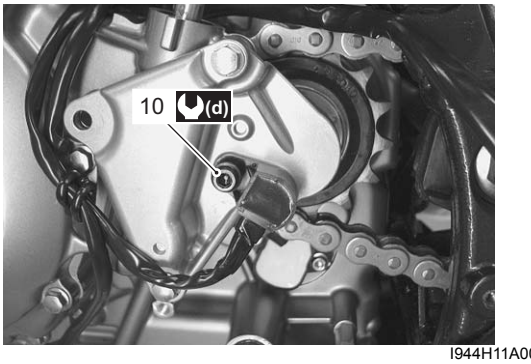
  - **Fit the new gasket washer to the bolts (7).**
  - **Fit the clamp to the bolt (8).**
  - **Fit the clutch cable stopper (9) to the bolts.**



I944H11A0018-02

- Tighten the speed sensor bolt (10) to the specified torque.

  Tightening torque
  Speed sensor bolt (d): 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)

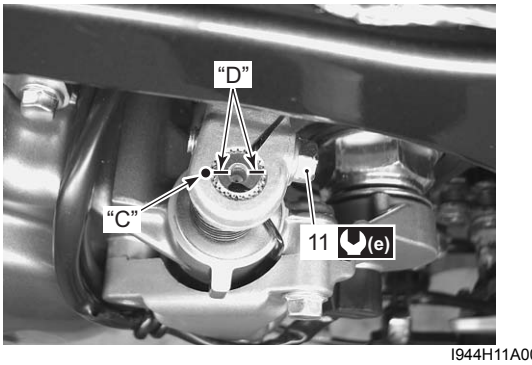


I944H11A0019-03

- Route the wiring harness. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-5)”.
- When installing the clutch release arm, align the punch mark “C” of clutch release arm with slit “D” of camshaft.

- Tighten the clutch release arm bolt (11) to the specified torque.

  Tightening torque
  Clutch release arm bolt (e): 9 N·m (0.9 kgf-m, 6.5 lbf-ft)

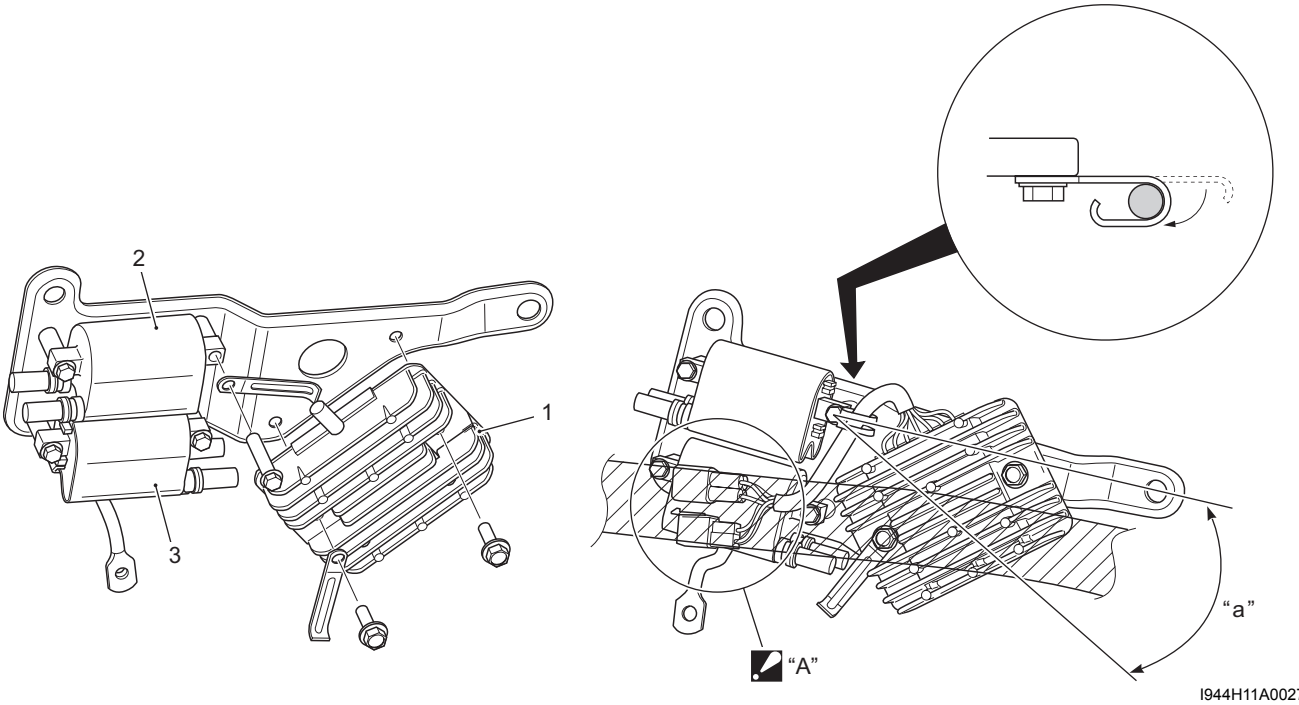


I944H11A0020-03

- Check the clutch cable play. Refer to "Clutch System Inspection in Section 0B (Page 0B-14)".
- After installing the removed parts, pour engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-10)".

Regulator / Rectifier Construction

B944H11A06012



I944H11A0027-01

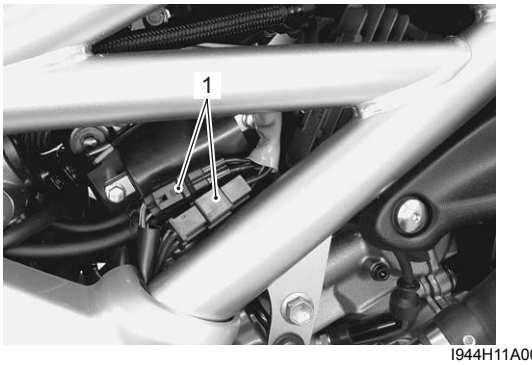
1. Regulator/rectifier	3. Ignition coil #2	"a": 30°
2. Ignition coil #1	"A": Set the regulator/rectifier couplers in the inside of the frame	

Regulator / Rectifier Inspection

B944H11A06006

Inspect the regulator/rectifier in the following procedures:

1) Turn the ignition switch OFF.
2) Disconnect the regulator/rectifier couplers (1).



I944H11A0021-01

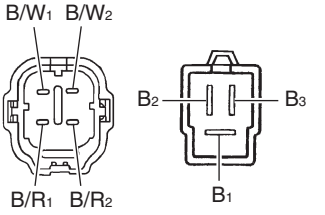
3) Measure the voltage between the terminals using the multi-circuit tester as indicated in the following table. If the voltage is not within the specified value, replace the regulator/rectifier with a new one.

NOTE

If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

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

Tester knob indication
Diode test (⊣◀)



I944H11A0022-02

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	0.1 – 0.8	0.1 – 0.8	0.1 – 0.8	0.3 – 1.0	0.3 – 1.0
	B/R_2	0	—	0.1 – 0.8	0.1 – 0.8	0.1 – 0.8	0.3 – 1.0	0.3 – 1.0
	B_1	*	*	—	*	*	0.1 – 0.8	0.1 – 0.8
	B_2	*	*	*	—	*	0.1 – 0.8	0.1 – 0.8
	B_3	*	*	*	*	—	0.1 – 0.8	0.1 – 0.8
	B/W_1	*	*	*	*	*	—	0
	B/W_2	*	*	*	*	*	0	—
*1.4 V and more (tester's battery voltage)								

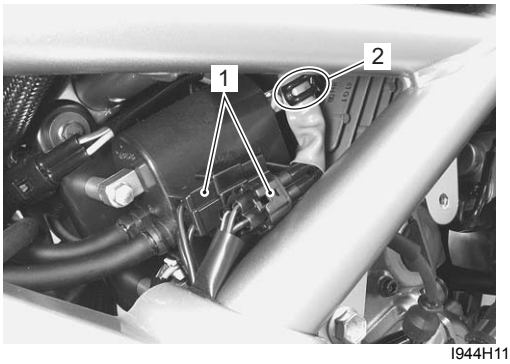
4) Connect the regulator/rectifier couplers (1).

Regulator / Rectifier Removal and Installation

B944H11A06011

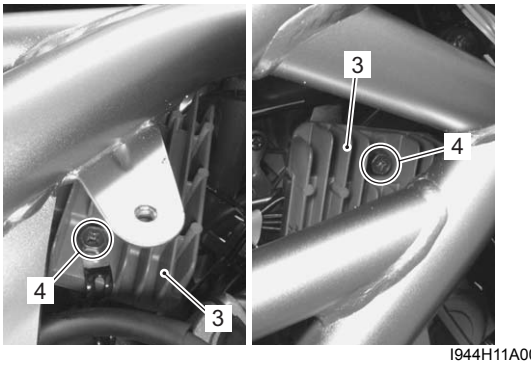
Removal

1) Remove the right frame body cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
2) Disconnect the regulator/rectifier couplers (1) and clamp (2).



I944H11A0023-02

3) Remove the regulator/rectifier (3) by removing the regulator/rectifier bolt (4).



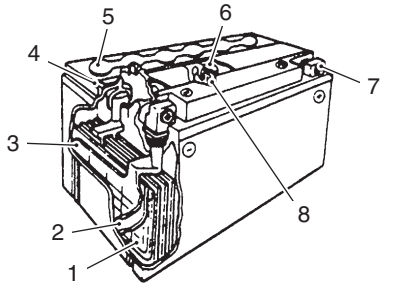
I944H11A0024-02

Installation

1) Install the regulator/rectifier as shown in the regulator/rectifier construction. Refer to "Regulator / Rectifier Construction (Page 1J-8)".
2) Install the right frame body cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".

Battery Components

B944H11A06007



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

B944H11A06008

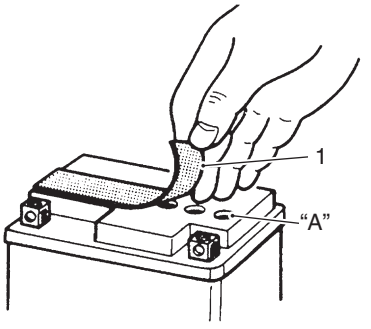
Initial Charging

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”.

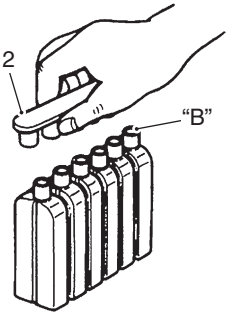


I649G11A0039-03

2) Remove the caps (2) from the electrolyte container.

NOTE

- **Do not remove or pierce the sealed areas “B” of the electrolyte container.**
- **After filling the electrolyte completely, use the removed cap (2) as sealing caps of battery-filler holes.**



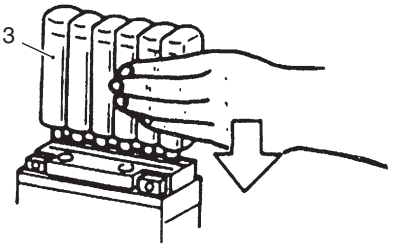
I649G11A0040-03

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.

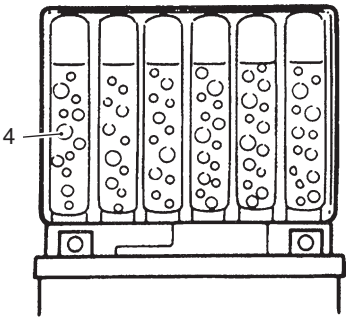
NOTE

Do not allow any of the electrolyte to spill.



I649G11A0041-03

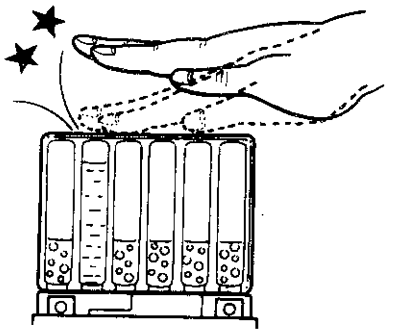
5) Make sure that air bubbles (4) rise to the top of each electrolyte container, and leave in this position for about more than 20 minutes.



I649G11A0042-03

NOTE

If no air bubbles are coming up from a filler port, tap the bottom of the electrolyte container two or three times.
Never remove the container from the battery.

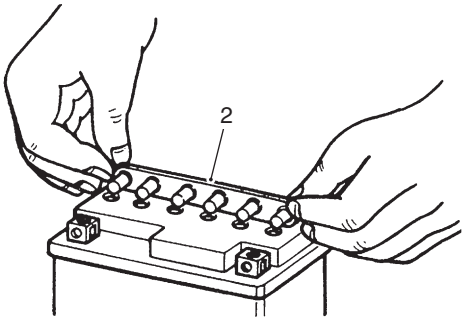


I310G11A0024-01

6) After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery.
7) Wait for about 20 minutes.
8) Insert the caps (2) into the filler holes, pressing in firmly so that the top of the caps do not protrude above the upper surface of the battery's top cover.

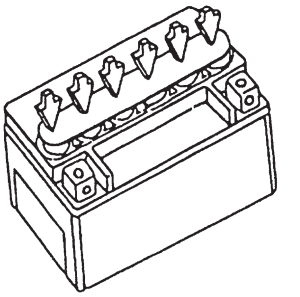
⚠ CAUTION

- **Once install the caps to the battery, do not remove the caps.**
- **Do not tap the caps with a hammer when installing them.**

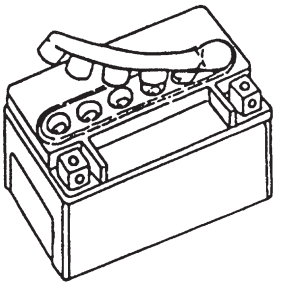


I718H11A0027-01

Correct



Incorrect



I649G11A0047-02

Charging

For initial charging, use the charger specially designed for MF battery.

⚠ CAUTION

- **For charging the battery, make sure to use the charger specially designed for MF battery. Otherwise, the battery may be overcharged resulting in shortened service life.**
- **Do not remove the cap during charging.**
- **Position the battery with the cap facing upward during charging.**

Battery Recharging

⚠ CAUTION

Do not remove the caps on the battery top while recharging.

NOTE

When the motorcycle is not used for a long period, check the battery every 1 month to prevent the battery discharge.

1) Remove the battery from the motorcycle. Refer to "Battery Removal and Installation (Page 1J-12)".

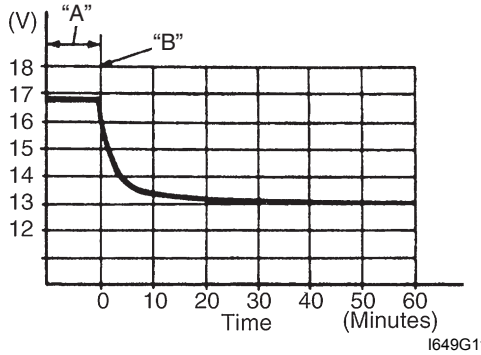
2) Measure the battery voltage using the multi-circuit tester.
If the voltage reading is less than the 12 V (DC), recharge the battery with a battery charger.

Recharging time
1.2 A for 5 to 10 hours or 5 A for 1 hour

⚠ CAUTION

Be careful not to permit the charging current to exceed 5 A at any time.

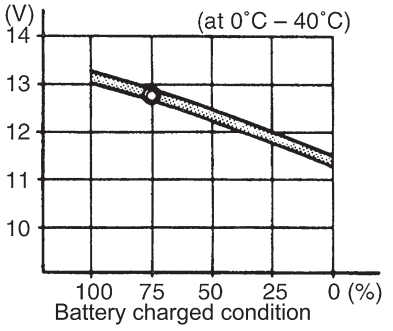
3) After recharging, wait at least 30 minutes and then measure the battery voltage using the multi-circuit tester.
If the battery voltage is less than 12.5 V, recharge the battery again.
If the battery voltage is still less than 12.5 V after recharging, replace the battery with a new one.



I649G11A0045-02

"A": Charging period	"B": Stop charging

4) Install the battery to the motorcycle. Refer to "Battery Removal and Installation (Page 1J-12)".



I944H11A0029-01

Battery Removal and Installation

B944H11A06009

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

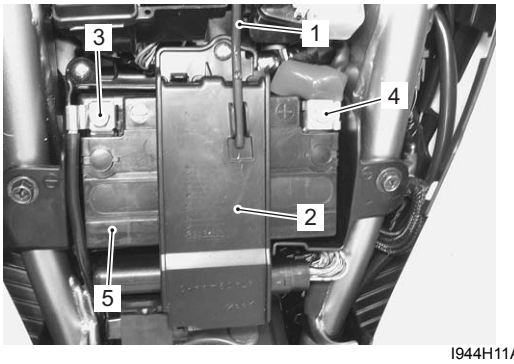
Removal

1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
2) Remove the stay (1) and battery holder lid (2).
3) Disconnect the battery (–) lead wire (3).
4) Disconnect the battery (+) lead wire (4).

NOTE

Be sure to disconnect the battery (–) lead wire (3) first, then disconnect the battery (+) lead wire (4).

5) Remove the battery (5) from the motorcycle.



I944H11A0025-03

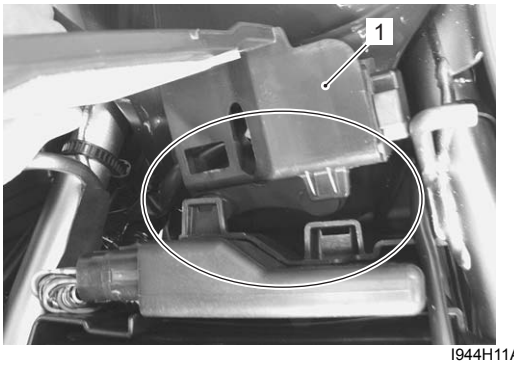
Installation

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

⚠ CAUTION

Never use anything except the specified battery.

- Tighten the battery lead wire mounting bolts securely.
- Fix the battery holder lid (1) to the groove of battery holder.



I944H11A0026-01

Battery Visual Inspection

B944H11A06010

Inspect the battery in the following procedures:

1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Visually inspect the surface of the battery container.
   If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one.
   If the battery terminals are found to be coated with rust or an acidic white powdery substance, clean the battery terminals with sandpaper.
3) Install the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.

Specifications

Service Data

B944H11A07001

Electrical

Unit: mm (in)

Item		Specification	Note
Generator coil resistance		0.3 – 1.2 Ω	
Generator maximum output		375 W at 5 000 r/min	
Generator no-load voltage (When engine is cold)		60 V (AC) and more at 5 000 r/min	
Regulated voltage		14.0 – 15.5 V at 5 000 r/min	
Battery	Type designation	YT12A-BS	
	Capacity	12 V 36.0 kC (10 Ah)/10 HR	
	Standard electrolyte S.G.	1.320 at 20 °C (68 °F)	

⚠ CAUTION

Never use anything except the specified battery.

Tightening Torque Specifications

B944H11A07002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Generator stator set bolt	11	1.1	8.0	☞(Page 1J-6)
CKP sensor mounting bolt	6.5	0.65	4.7	☞(Page 1J-6)
Generator rotor bolt	140	14.0	101.5	☞(Page 1J-6)
Speed sensor bolt	4.5	0.45	3.0	☞(Page 1J-7)
Clutch release arm bolt	9	0.9	6.5	☞(Page 1J-8)

Reference:

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

Special Tools and Equipment

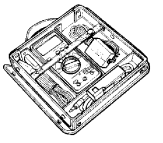
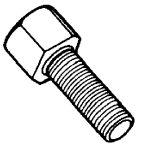
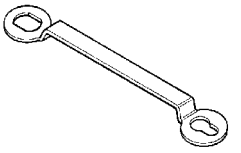
Recommended Service Material

B944H11A08001

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)

Special Tool

B944H11A08002

09900–25008 Multi circuit tester set ☞(Page 1J-3) / ☞(Page 1J-3) / ☞(Page 1J-4) / ☞(Page 1J-4) / ☞(Page 1J-9) 	09930–30450 Rotor remover bolt ☞(Page 1J-6) 
09930–44530 Rotor holder ☞(Page 1J-5) / ☞(Page 1J-6) / ☞(Page 1J-6) 	

Exhaust System

Precautions

Precautions for Exhaust System

B944H11B00001

⚠ WARNING

To avoid the danger of being burned, do not touch the exhaust system when the system is hot. Any service on the exhaust system should be performed when the system is cool.

⚠ CAUTION

Make sure that the exhaust pipe and muffler have enough clearance from the rubber parts and plastic parts to avoid melting.

Diagnostic Information and Procedures

Engine Symptom Diagnosis

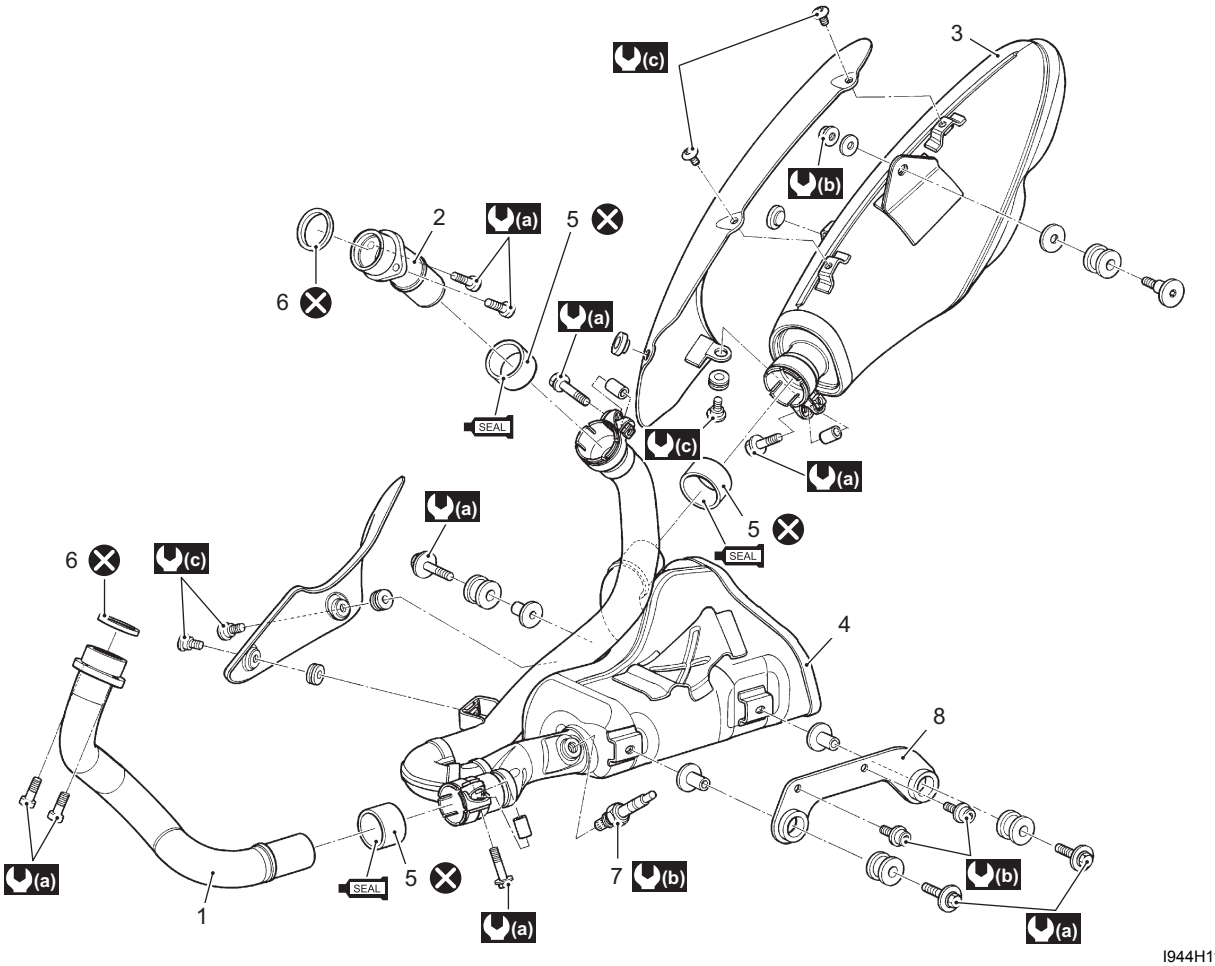
B944H11B04001

Refer to “Engine Symptom Diagnosis in Section 1A (Page 1A-9)”.

Repair Instructions

Exhaust System Construction

B944H11B06003



I944H11B0030-05

1. Front exhaust pipe	6. Gasket	(c) : 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)
2. Rear exhaust pipe	7. HO2 sensor	SEAL : Apply muffler seal.
3. Muffler	8. Chamber support bracket	⊗ : Do not reuse.
4. Exhaust assembly	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	
5. Connector	(b) : 25 N·m (2.5 kgf-m, 18.0 lbf-ft)	

Exhaust Pipe / Muffler Removal and Installation

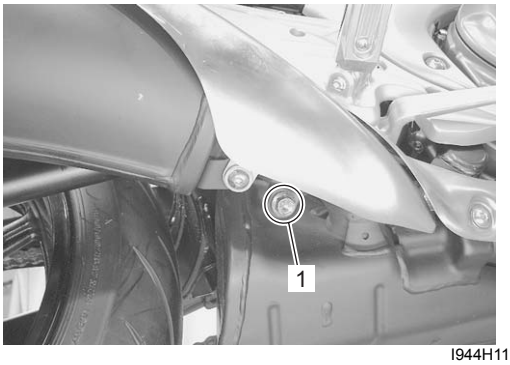
B944H11B06004

Removal

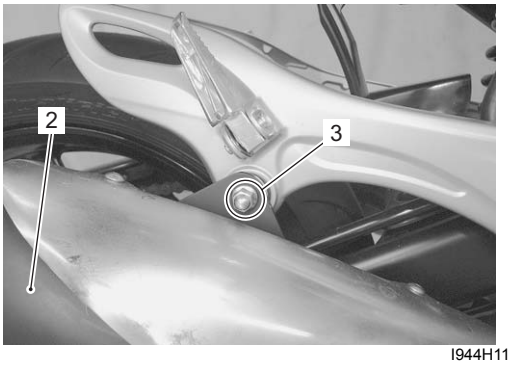
1) Loosen the muffler connecting bolt (1).
2) Remove the muffler (2) by removing the mounting bolt and nut (3).

NOTE

Support the muffler to prevent it from falling.

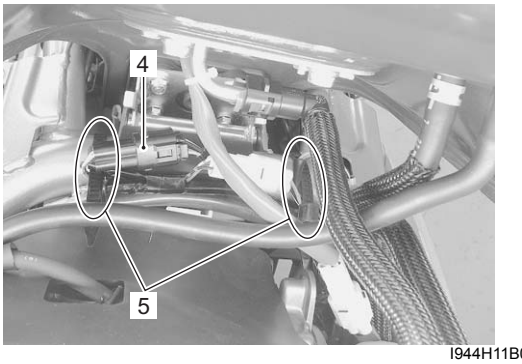


I944H11B0001-01

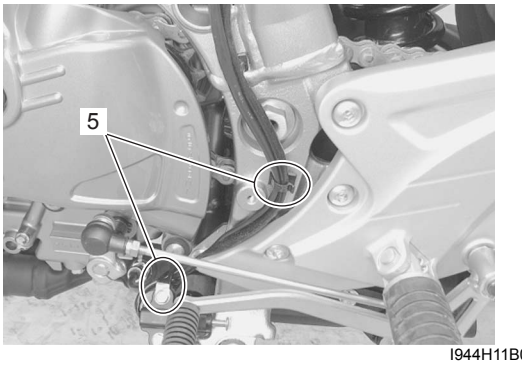


I944H11B0002-03

3) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
4) Remove the frame covers, left and right.
Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
5) Disconnect the HO2 sensor coupler (4) and clamps (5).

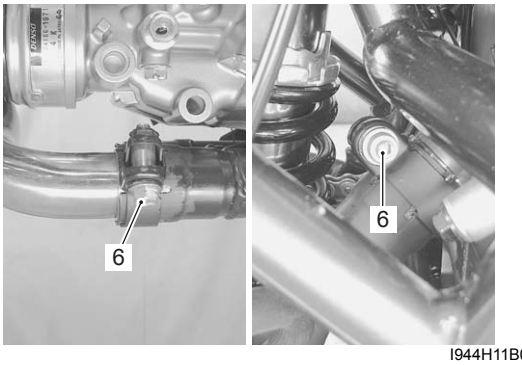


I944H11B0003-03



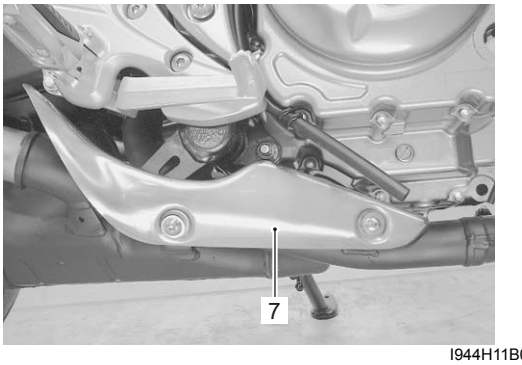
I944H11B0004-05

6) Loosen the exhaust pipe connecting bolts (6), front and rear.



I944H11B0005-02

7) Remove the exhaust cover (7).

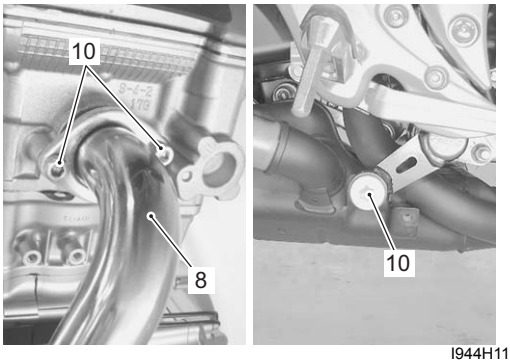


I944H11B0006-02

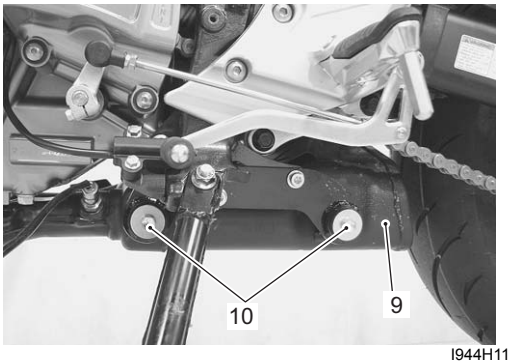
8) Remove the front exhaust pipe (8) with the exhaust assembly (9) by removing the bolts (10).

NOTE

Support the exhaust assembly to prevent it from falling.

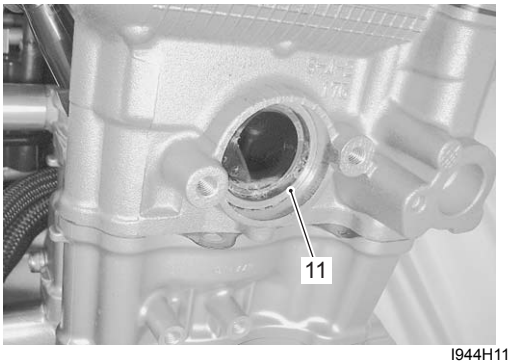


I944H11B0008-03



I944H11B0007-03

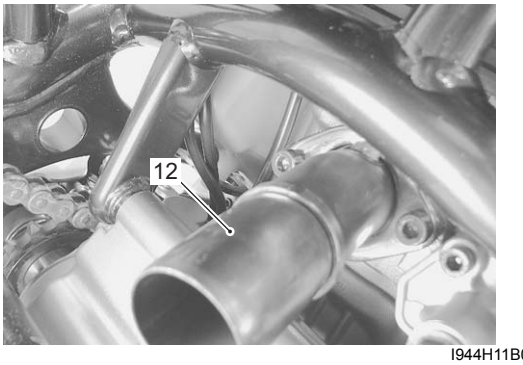
9) Remove the gasket (11).



I944H11B0009-02

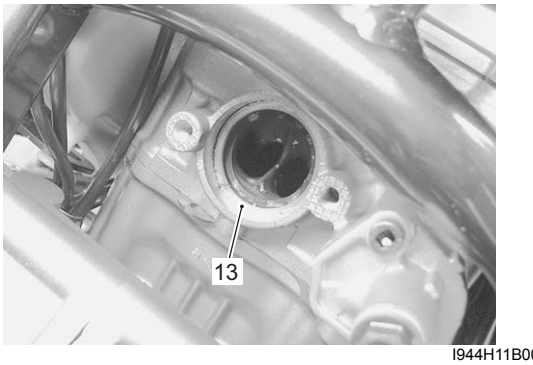
10) Remove the rear shock absorber. Refer to “Rear Shock Absorber Removal and Installation in Section 2C (Page 2C-3)”.

11) Remove the rear exhaust pipe (12).



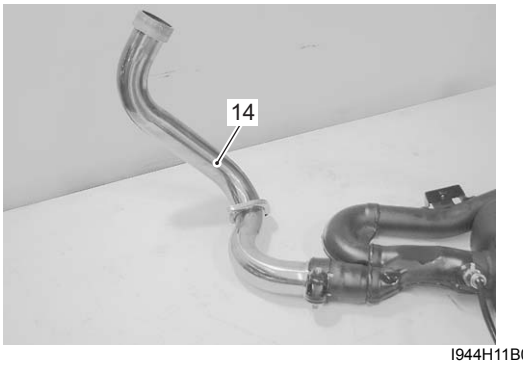
I944H11B0010-02

12) Remove the gasket (13).



I944H11B0011-02

13) Remove the front exhaust pipe (14).

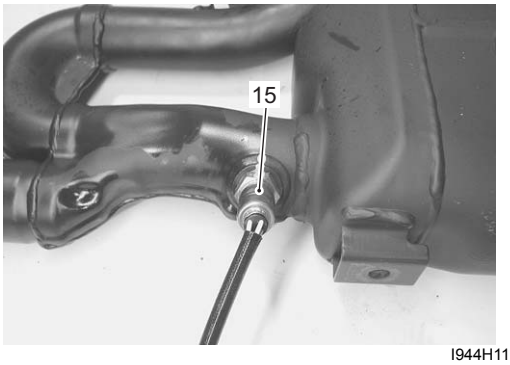


I944H11B0012-02

14) Remove the HO2 sensor (15).

⚠ CAUTION

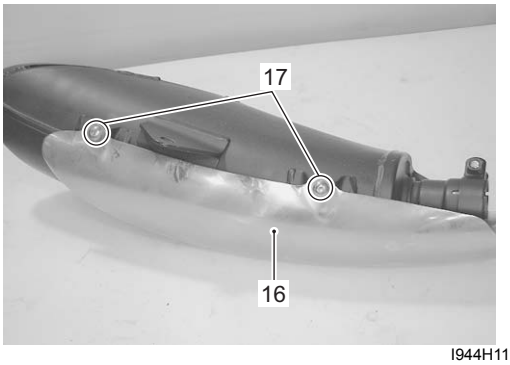
- **Be careful not to expose the HO2 sensor to an excessive shock.**
- **Be careful not to twist or damage the HO2 sensor lead wire.**



I944H11B0013-03

15) Remove the muffler cover (16) by removing the bolts (17).

I944H11B0014-04



I944H11B0015-04

Installation

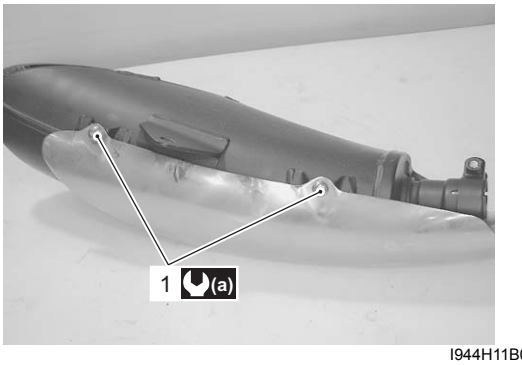
Installation is in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

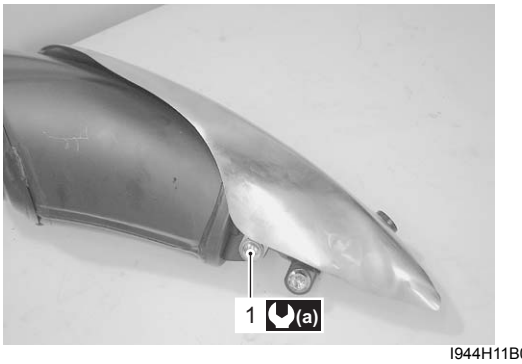
Replace the exhaust pipe gaskets and exhaust connectors with new ones.

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

Tightening torque
Muffler cover bolt (a): 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)



I944H11B0016-02



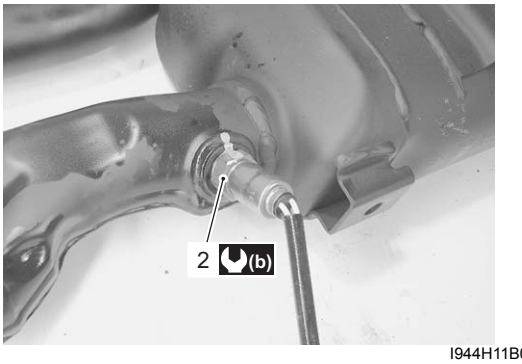
I944H11B0017-02

- Tighten the HO2 sensor (2) to the specified torque.

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

⚠ CAUTION

- **Apply anti seize compound (Never-seez purenickel special) to the HO2 sensor.**
- **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 wire.**



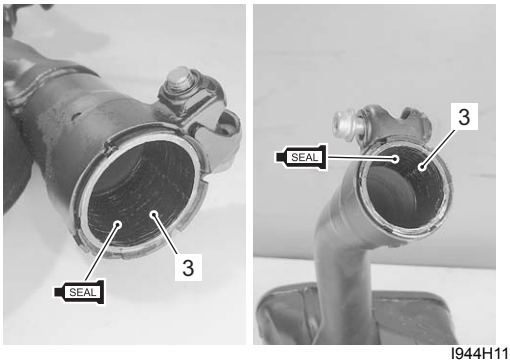
I944H11B0018-02

- Install the new exhaust connectors (3).

NOTE

When installing new exhaust connectors, remove the old sealer from the exhaust pipe and exhaust.
Apply the exhaust gas sealer to both the inside and outside of the new exhaust connector.

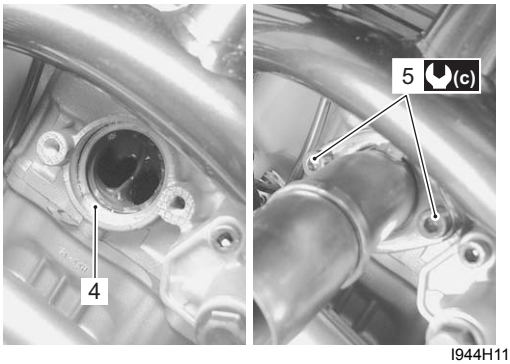
SEAL : Muffler seal (MUFFLER SEAL LOCTITE 5920 (commercially available) or equivalent)



I944H11B0020-03

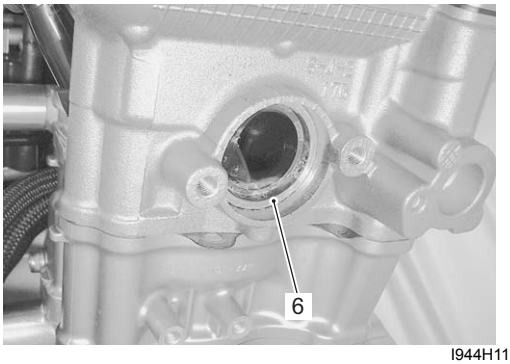
- Install the new gasket (4).
- Tighten the rear exhaust pipe bolts (5) to the specified torque.

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



I944H11B0021-03

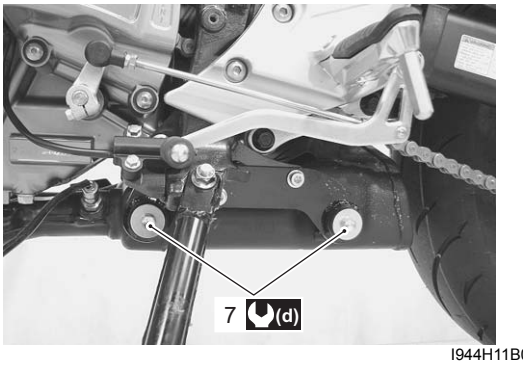
- Install the new gasket (6).



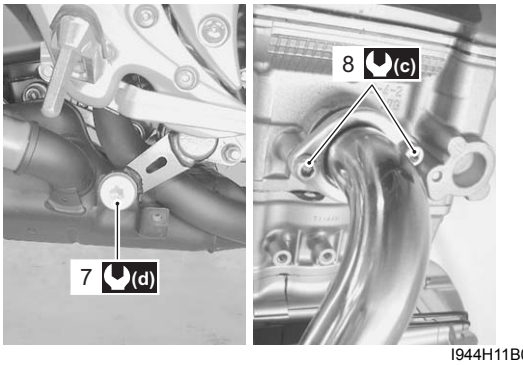
I944H11B0022-03

- Tighten the exhaust mounting bolts (7) and front exhaust pipe bolts (8) to the specified torque.

Tightening torque
Exhaust pipe bolt (c): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
Exhaust mounting bolt (d): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



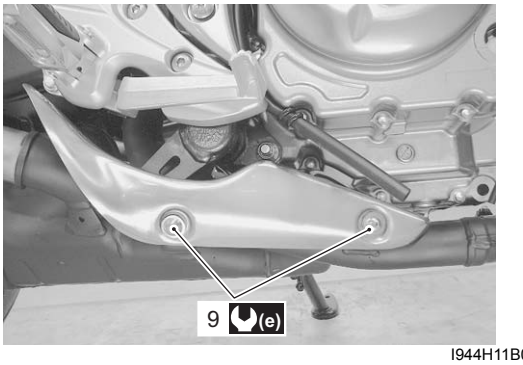
I944H11B0024-03



I944H11B0023-03

- Tighten the exhaust cover bolts (9) and exhaust pipe connecting bolts (10) to the specified torque.

Tightening torque
Exhaust cover bolt (e): 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)
Exhaust pipe connecting bolt (f): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



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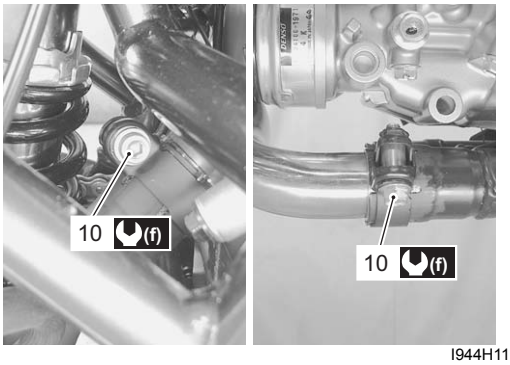


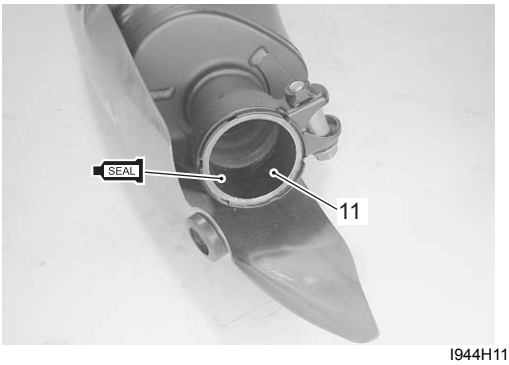
I944H11B0026-03

- Route the HO2 sensor lead wire properly.
  Refer to “Throttle Body Construction in Section 1D (Page 1D-8)” and “Wiring Harness Routing Diagram in Section 9A (Page 9A-5)”.
- Install the new muffler connector (11).

NOTE

- **When installing new muffler connector, remove the old sealer from the exhaust and muffler.**
- **Apply the exhaust gas sealer to both the inside and outside of the new connector.**

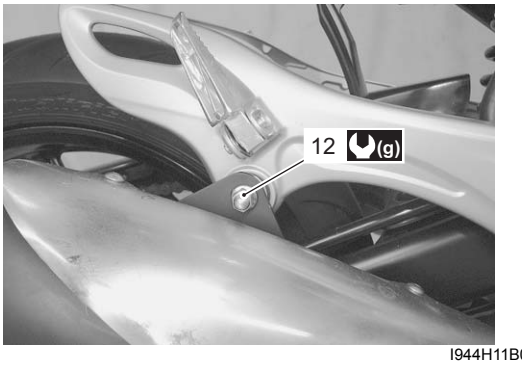
SEAL : Muffler seal (MUFFLER SEAL LOCTITE 5920 (commercially available) or equivalent)



I944H11B0027-03

- Tighten the muffler mounting nut (12) and muffler connecting bolt (13) to the specified torque.

Tightening torque
Muffler mounting nut (g): 25 N·m (2.5 kgf-m, 18.0 lbf-ft)
Muffler connecting bolt (h): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



I944H11B0028-03

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Exhaust System Inspection

B944H11B06005

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, connecting bolts and muffler mounting bolts are tightened to their specified torque. Refer to “Exhaust Pipe Bolts and Muffler Bolts Inspection in Section 0B (Page 0B-4)”.

Tightening torque
Exhaust pipe bolt: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
Exhaust pipe connecting bolt: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
Muffler connecting bolt: 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
Muffler mounting nut: 25 N·m (2.5 kgf-m, 18.0 lbf-ft)

Specifications

Tightening Torque Specifications

B944H11B07001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Muffler cover bolt	5.5	0.55	4.0	☞(Page 1K-5)
HO2 sensor	25	2.5	18.0	☞(Page 1K-5)
Exhaust pipe bolt	23	2.3	16.5	☞(Page 1K-6) / ☞(Page 1K-6) / ☞(Page 1K-7)
Exhaust mounting bolt	23	2.3	16.5	☞(Page 1K-6)
Exhaust cover bolt	5.5	0.55	4.0	☞(Page 1K-6)
Exhaust pipe connecting bolt	23	2.3	16.5	☞(Page 1K-6) / ☞(Page 1K-7)
Muffler mounting nut	25	2.5	18.0	☞(Page 1K-7) / ☞(Page 1K-7)
Muffler connecting bolt	23	2.3	16.5	☞(Page 1K-7) / ☞(Page 1K-7)

NOTE

The specified tightening torque is described in the following.
“Exhaust System Construction (Page 1K-2)”

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

Special Tools and Equipment

Recommended Service Material

B944H11B08001

Material	SUZUKI recommended product or Specification		Note
Muffler seal	MUFFLER SEAL LOCTITE 5920 (commercially available) or equivalent	—	☞(Page 1K-6) / ☞(Page 1K-7)

NOTE

Required service material is also described in the following.
“Exhaust System Construction (Page 1K-2)”

Section 2

Suspension

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Precautions

Precautions

Precautions for Suspension

B944H12000001

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

⚠ WARNING

All suspensions, bolts and nuts are an important part in that it could affect the performance of vital parts. They must be tightened to the specified torque periodically and if the suspension effect is lost, replace it with a new one.

⚠ CAUTION

Never attempt to heat, quench or straighten any suspension part. Replace it with a new one, or damage to the part may result.

Suspension General Diagnosis

Diagnostic Information and Procedures

Suspension and Wheel Symptom Diagnosis

B944H12104001

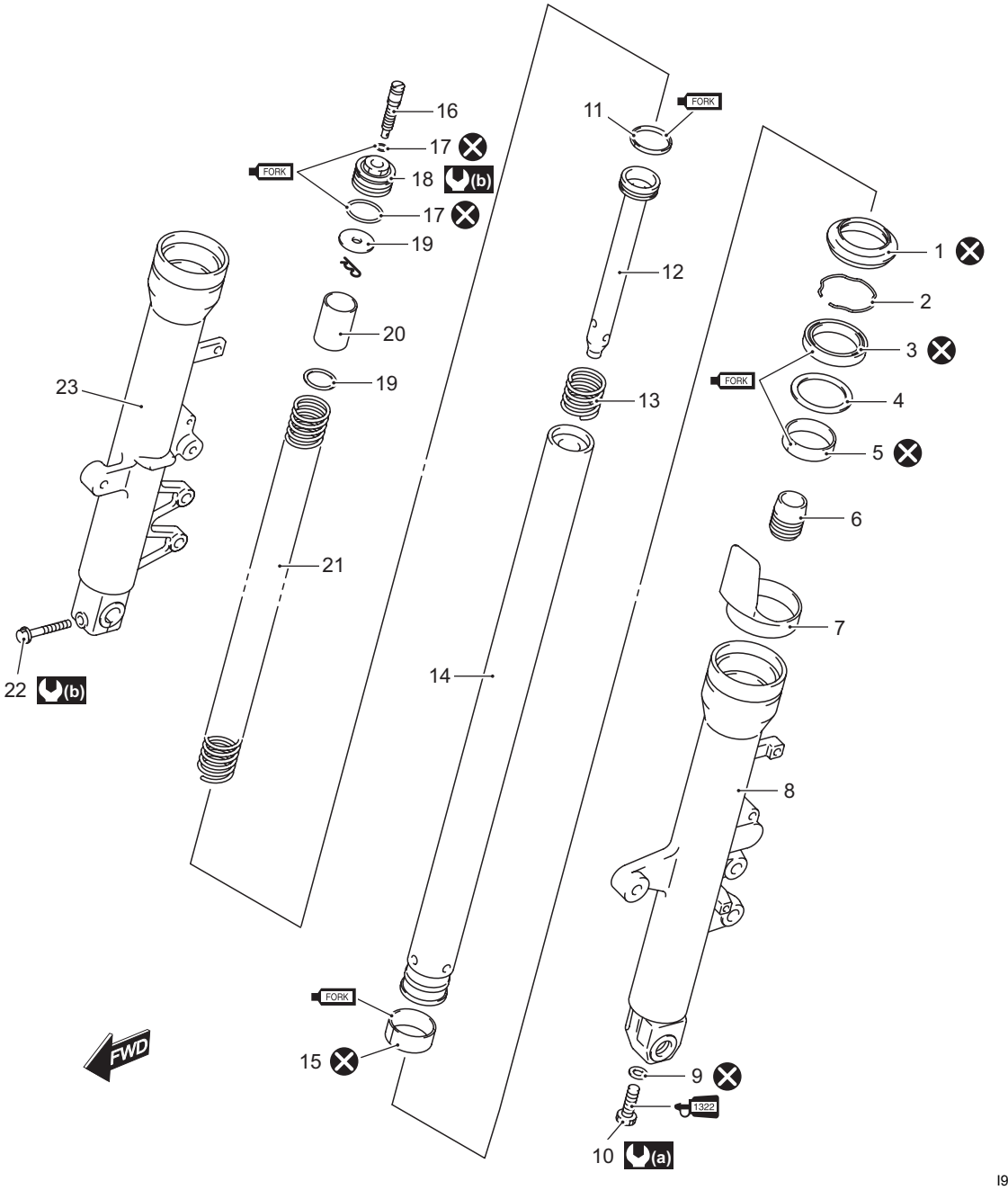
Condition	Possible cause	Correction / Reference Item
Wobbly front wheel	Distorted wheel rim.	*Replace.*
	Worn front wheel bearings.	*Replace.*
	Defective or incorrect tire.	*Replace.*
	Loose front axle or axle pinch bolt.	*Tighten.*
	Incorrect fork oil level.	*Adjust.*
	Incorrect front wheel weight balance.	*Adjust.*
Front suspension too soft	Weak spring.	*Replace.*
	Insufficient fork oil.	*Check level and add.*
	wrong weight fork oil.	*Replace.*
Front suspension too stiff	Excessively viscous fork oil.	*Replace.*
	Excessive fork oil.	*Check level and drain.*
	Bent front axle.	*Replace.*
Front suspension too noisy	Insufficient fork oil.	*Check level and add.*
	Loose front suspension fastener.	*Tighten.*
Wobbly rear wheel	Distorted wheel rim.	*Replace.*
	Worn rear wheel bearing.	*Replace.*
	Defective or incorrect tire.	*Replace.*
	Worn swingarm bearing.	*Replace.*
	Worn rear suspension bushing.	*Replace.*
	Loose rear suspension fastener.	*Tighten.*
Rear suspension too soft	Weak rear shock absorber spring.	*Replace.*
	Rear shock absorber leaks oil.	*Replace.*
	Improperly suspension setting.	*Adjust.*
Rear suspension too stiff	Improper suspension setting.	*Adjust.*
	Bent rear shock absorber shaft.	*Replace.*
	Bent swingarm.	*Replace.*
	Worn swingarm and rear suspension related bearings.	*Replace.*
Rear suspension too noisy	Loose rear suspension fastener.	*Tighten.*
	Worn rear suspension bushing.	*Replace.*
	Worn swingarm bearing.	*Replace.*

Front Suspension

Repair Instructions

Front Fork Components

B944H12206001



I944H1220031-01

1. Dust seal	11. Ring	21. Spring
2. Oil seal stopper ring	12. Cylinder	22. Front axle pinch bolt
3. Oil seal	13. Rebound spring	23. Outer tube (right)
4. Oil seal retainer	14. Inner tube	(a) : 20 N·m (2.0 kgf-m, 14.5 lbf-ft)
5. Outer tube slide metal	15. Inner tube slide metal	(b) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
6. Oil lock piece	16. Spring adjuster	1322 : Apply thread lock to thread part.
7. Front fork protector	17. O-ring	FORK : Apply fork oil.
8. Outer tube (left)	18. Front fork cap bolt	⊗ : Do not reuse.
9. Gasket	19. Washer	
10. Cylinder bolt	20. Spacer	

Front Fork Removal and Installation

B944H12206002

NOTE

The right and left front forks are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

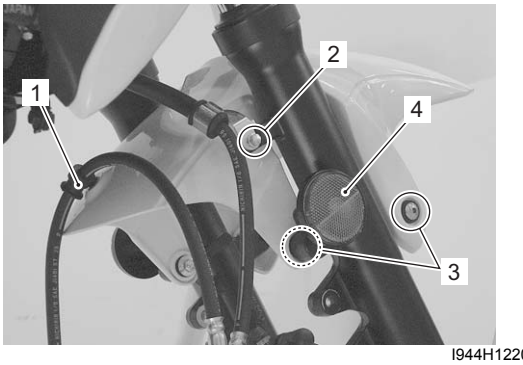
Removal

1) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-4)”.

⚠ CAUTION

- **Make sure that the motorcycle is supported securely.**
- **Do not operate the front brake lever with the front wheel removed.**

2) Disconnect the brake hose clamp (1) from the front fender.
3) Remove the brake hose clamp bolt (2).
4) Remove the front fender by removing the bolts (3), left and right.
5) Remove the reflex reflector (4) for E-24, 28.

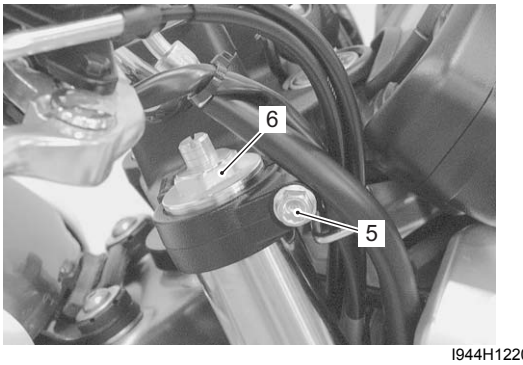


I944H1220028-02

6) Loose the front fork upper clamp bolt (5).

NOTE

Slightly loosen the front fork cap bolt (6) to facilitate later disassembly.

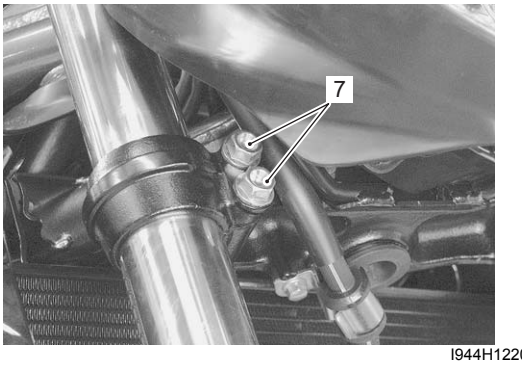


I944H1220001-02

7) Loosen the front fork lower clamp bolts (7) and remove the front fork.

NOTE

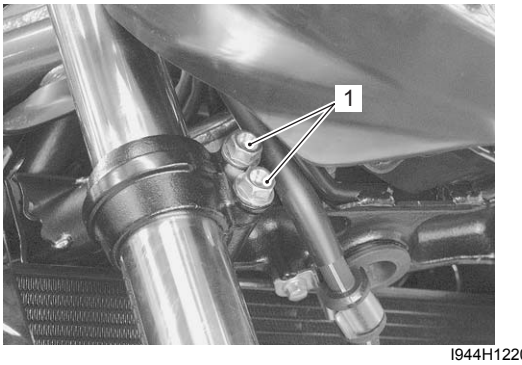
Hold the front fork by the hand to prevent sliding out of the steering stem.



I944H1220002-02

Installation

1) Set the front fork to the front fork lower bracket temporarily by tightening the lower clamp bolts (1).

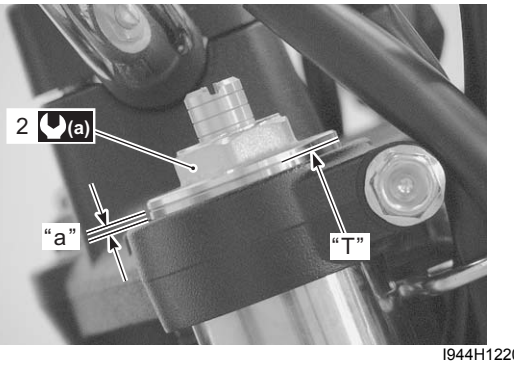


I944H1220003-01

2) Tighten the front fork cap bolt (2) to the specified torque.

Tightening torque
Front fork cap bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

3) Loosen the lower clamp bolts (1).
4) Set the front fork with the upper surface “T” of the inner tube positioned 1.5 mm (0.06 in) “a” from the upper surface of the upper bracket.

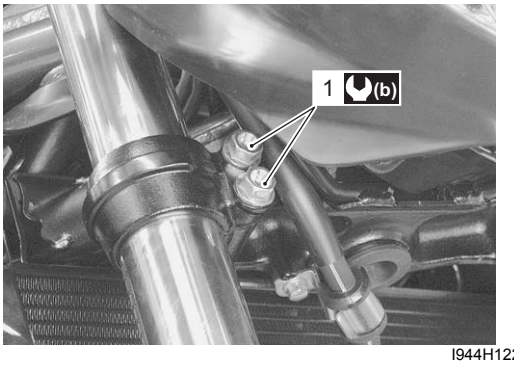


I944H1220004-03

“a” 1.5 mm (0.06 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)



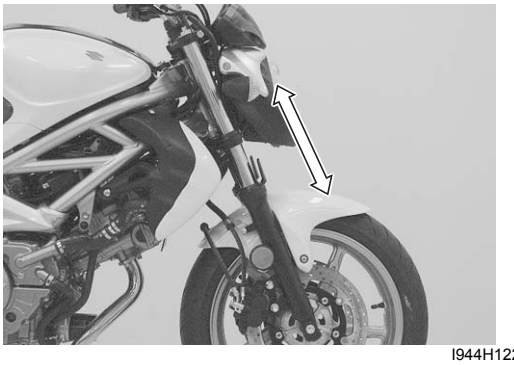
I944H1220005-01

6) 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)

I944H1220006-02

7) Install the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-4)”.



I944H1220029-01

⚠ WARNING

After remounting the brake caliper, pump the brake lever until the pistons push the pads correctly.

NOTE

Before tightening the front axle and front axle pinch bolt, move the front fork up and down four or five times.

Front Fork Inspection

B944H12206006

Refer to “Front Fork Inspection (Page 2B-3)”.

Front Fork Adjustment

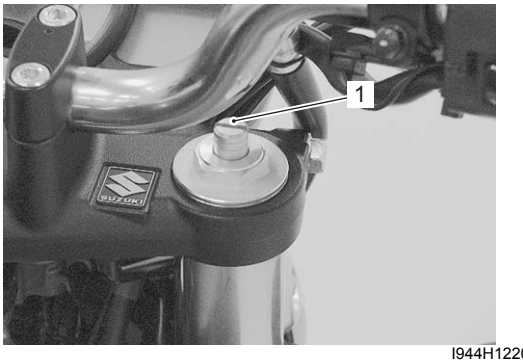
B944H12206007

Turn the adjustment (1) to the desired position.

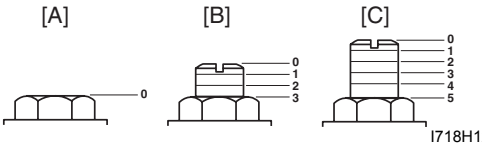
⚠ CAUTION

Adjust the left and right front forks to the same setting.

STD position
3rd groove from top



I944H1220030-01



I718H1220015-01

[A]: Position 0 (maximum)	[C]: Position 5 (minimum)
[B]: Position 3 (STD)	

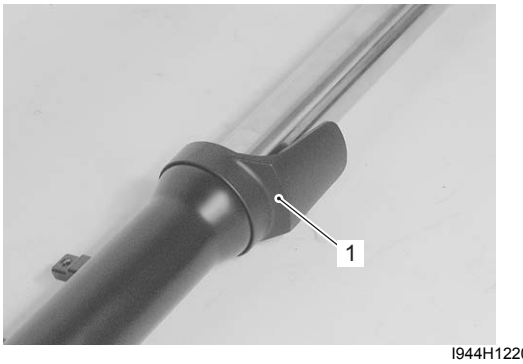
Front Fork Disassembly and Assembly

B944H12206003

Refer to “Front Fork Removal and Installation (Page 2B-2)”.

Disassembly

1) Remove the front fork protector (1).



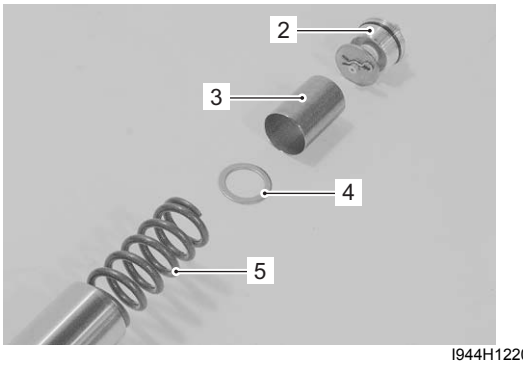
I944H1220007-01

2) Remove the front fork cap bolt (2).

⚠ CAUTION

Hold the front fork cap bolt when removing it, or it will jump out due to the spring pressure.

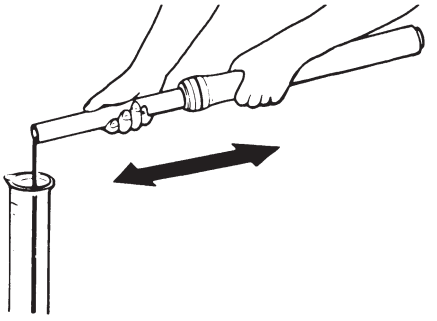
3) Remove the spacer (3), washer (4) and spring (5).



I944H1220008-01

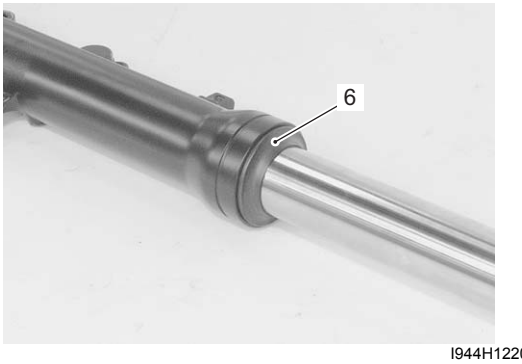
4) Invert the fork and stroke it several times to drain out fork oil.

5) Hold the fork inverted for a few minutes to drain oil.



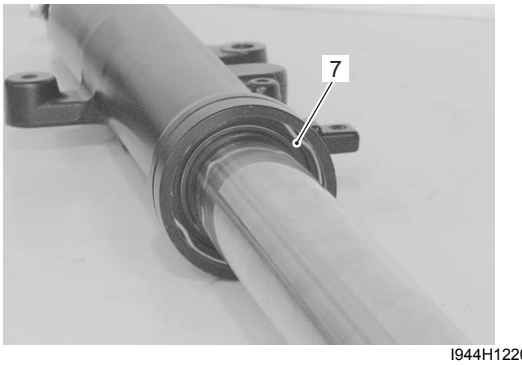
I649G1220012-02

6) Remove the dust seal (6).



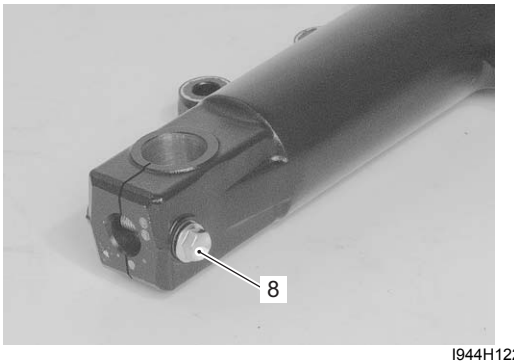
I944H1220009-01

7) Remove the oil seal stopper ring (7).



I944H1220010-01

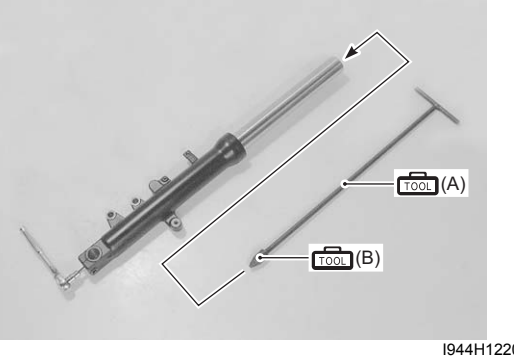
8) Remove the front axle pinch bolt (8).



I944H1220011-01

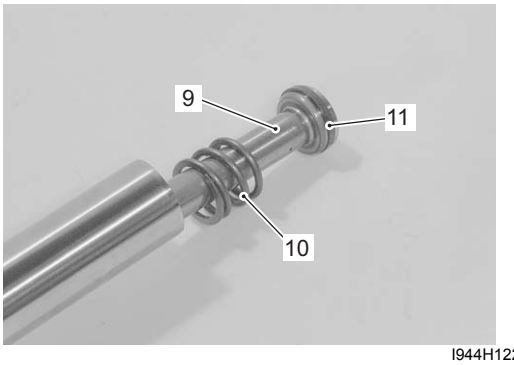
9) Remove the cylinder bolt using the special tools.

Special tool
TOOL (A): 09940–34520 (T handle)
TOOL (B): 09940–34531 (Attachment A)



I944H1220012-01

10) Remove the cylinder (9), rebound spring (10) and ring (11).

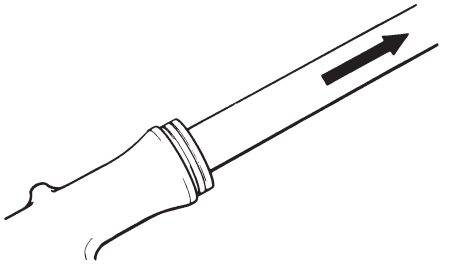


I944H1220013-02

11) Remove the oil seal by slowly pulling out the inner tube.

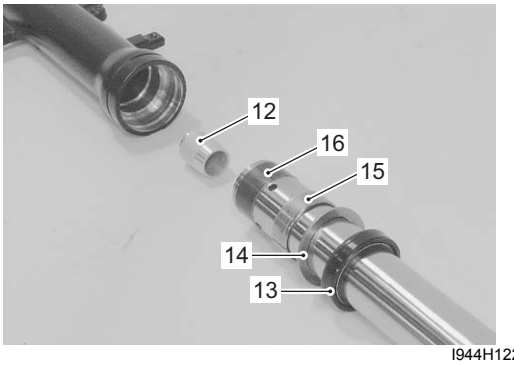
NOTE

Be careful not to damage the inner tube.



I717H1220017-01

12) Remove the following parts.
- Oil lock piece (12)
- Oil seal (13)
- Oil seal retainer (14)
- Outer tube slide metal (15)
- Inner tube slide metal (16)



I944H1220014-02

Assembly

Assemble the front fork in the reverse order of disassembly. Pay attention to the following points:

⚠ CAUTION

- **Thoroughly wash all the component parts being assembled.**
  Insufficient washing can result in oil leakage or premature wear of the parts.
- **When reassembling the front fork, use new fork oil.**
- **Use the specified fork oil for the front fork.**
- **When reassembling, replace the outer and inner tube's slide metal, oil seal, dust seal and cylinder bolt gasket with the new ones.**
- **Use care not to cause damage to the slide metal surfaces since the surfaces are teflon coated.**

Inner tube

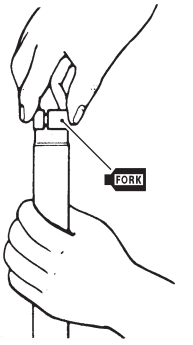
- Hold the inner tube vertically, clean the metal groove and install the inner tube slide metal by hand.

⚠ CAUTION

Do not damage the Teflon coated surface of the inner tube's slide metal when mounting it.

- Apply fork oil to the inner tube slide metal.

FORK : Fork Oil 99000–99001–SS8 (SUZUKI FORK OIL SS-08 or equivalent)



I649G1220021-02

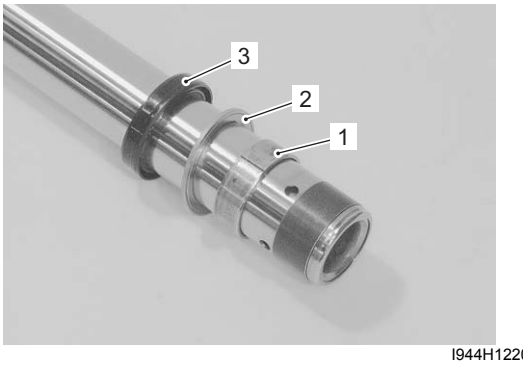
- Install the following parts onto the inner tube.
  – Outer tube slide metal (1)
  – Oil seal retainer (2)
  – Oil seal (3)

⚠ CAUTION

When installing the oil seal to inner tube, be careful not to damage the oil seal lip.

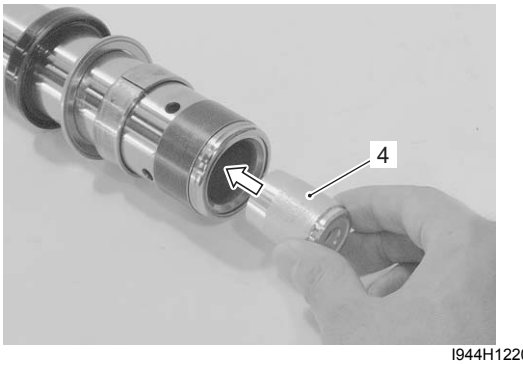
- Apply fork oil to the outer slide metal and oil seal lip.

  FORK : Fork Oil 99000–99001–SS8 (SUZUKI FORK OIL SS-08 or equivalent)



I944H1220015-01

- Install the oil lock piece (4) into the inner tube.



I944H1220016-01

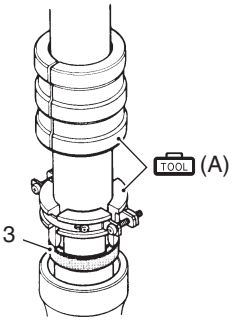
- Install the inner tube into the outer tube with care not to drop the oil lock piece out.

  NOTE

  After installing the inner tube into the outer tube, keep the oil lock piece into the inner tube by compressing the front fork fully.

- Install the oil seal (3) into the outer tube using the special tool.

  Special tool
  TOOL (A): 09940–52861 (Front fork oil seal installer)



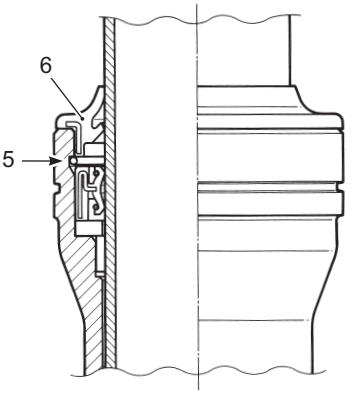
I717H1220024-01

- Install the oil seal stopper ring (5).

  ⚠ CAUTION

  Make sure that the oil seal stopper ring is fitted securely.

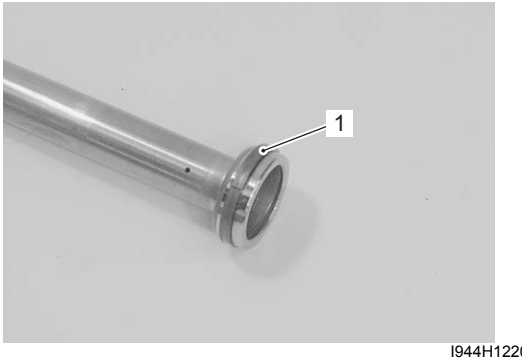
- Install the dust seal (6).



I944H1220017-01

Cylinder bolt

- Install the ring (1) to the cylinder.

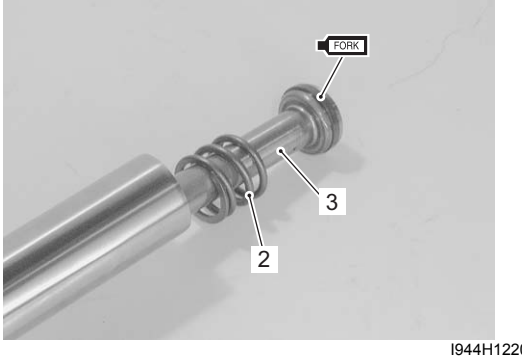


I944H1220018-01

- Install the rebound spring (2) to the cylinder (3).
- Apply fork oil to the cylinder ring.

  FORK : Fork Oil 99000–99001–SS8 (SUZUKI FORK OIL SS-08 or equivalent)

- Insert the cylinder (3) into the inner tube.



I944H1220019-01

- Apply thread lock to the cylinder bolt (4) and tighten it to the specified torque with a 6-mm hexagon wrench and special tools.

⚠ CAUTION

Use a new cylinder bolt gasket (5) to prevent oil leakage.

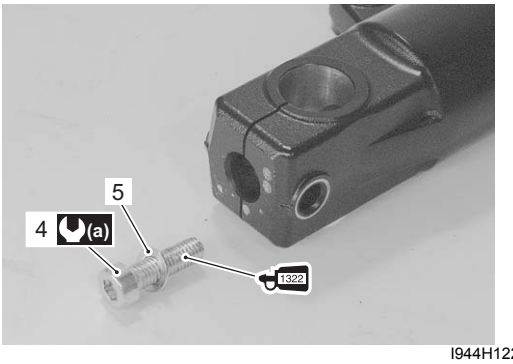
NOTE

Check the front fork for smoothness by stroking it after installing the cylinder.

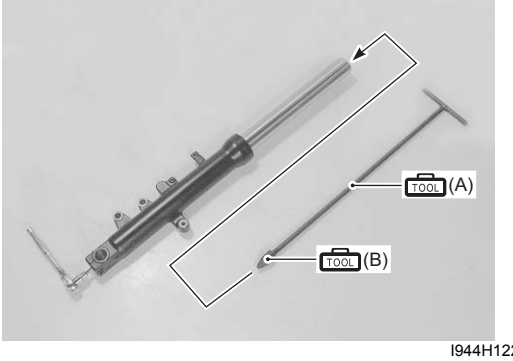
Special tool
TOOL (A): 09940–34520 (T handle)
TOOL (B): 09940–34531 (Attachment A)

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

Tightening torque
Front fork cylinder bolt (a): 20 N·m (2.0 kgf-m, 14.5 lbf-ft)



I944H1220020-02



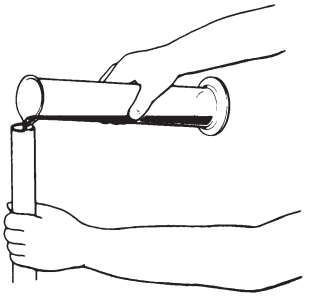
I944H1220021-01

Fork oil

- Place the front fork vertically without spring.
- Compress it fully.
- Pour specified front fork oil up to the top level of the inner tube.

FORK : Fork Oil 99000–99001–SS8 (SUZUKI FORK OIL SS-08 or equivalent)

Capacity (Each leg)
517 ml (17.5/18.2 US/Imp oz)

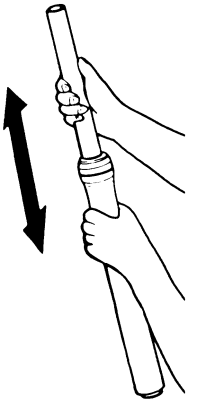


I649G1220026-02

- Move the inner tube up and down several strokes until bubbles do not come out from the oil.
- Keep the front fork vertically and wait 5 – 6 minutes.

NOTE

Take extreme attention to pump out air completely.



I717H1220029-01

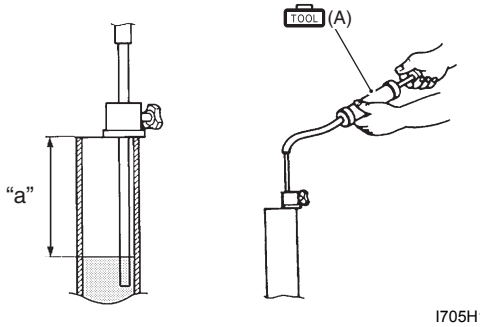
- Hold the front fork vertically and adjust fork oil level with the special tool.

NOTE

When adjusting the fork oil level, remove the fork spring and compress the inner tube fully.

Special tool
TOOL (A): 09943–74111 (Fork oil level gauge)

Fork oil level “a”
96 mm (3.78 in)



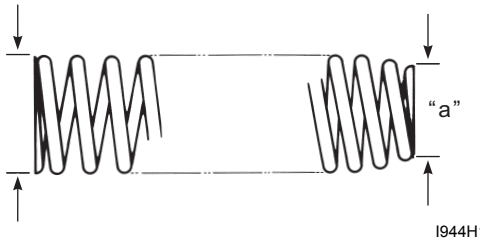
I705H1220021-01

Fork spring

- Install the fork spring as shown.

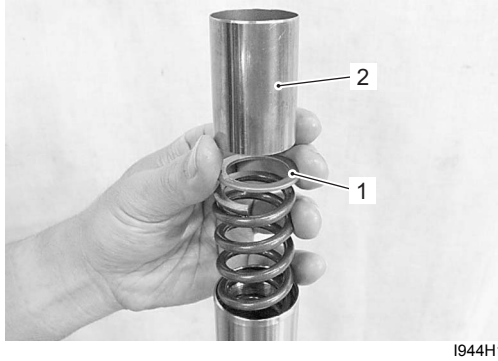
NOTE

The smaller diameter “a” should face to the bottom side of the front fork.



I944H1220022-01

- Install the washer (1) and spacer (2).



I944H1220023-01

Front fork cap bolt

- Apply fork oil lightly to the O-ring (1).

⚠ CAUTION

Use a new O-ring (1) to prevent oil leakage.

FORK : Fork Oil 99000–99044–10G (SUZUKI FORK OIL G-10 or equivalent)

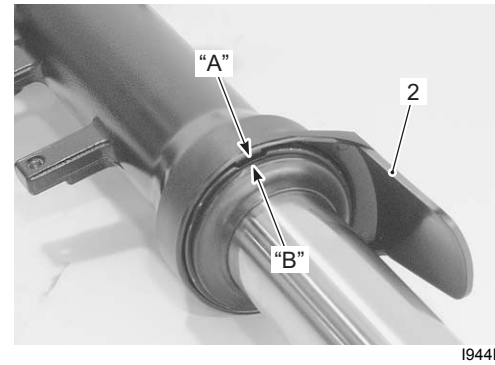
- Install the front fork cap bolt to the inner tube temporarily.

I944H1220024-02

- Install the front fork protector (2).

NOTE

Fit the projection “A” of the front fork protector to the depression “B” of the front fork outer tube.



I944H1220025-02

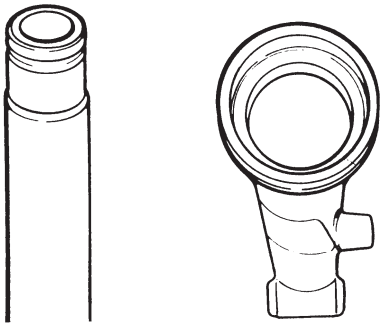
Front Fork Parts Inspection

B944H12206005

Refer to “Front Fork Disassembly and Assembly (Page 2B-4)”.

Inner and Outer Tubes

Inspect the inner tube sliding surface and outer tube sliding surface for scuffing.

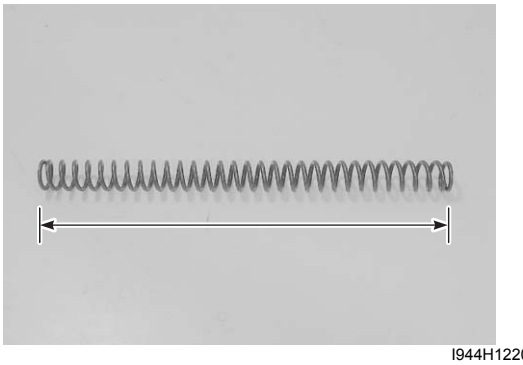


I649G1220035-03

Fork Spring

Measure the fork spring free length. If it is shorter than the service limit, replace it with a new one.

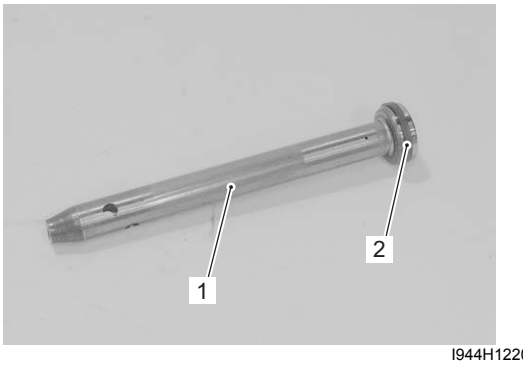
Front fork spring free length
Service limit: 437 mm (17.2 in)



I944H1220026-01

Cylinder / Cylinder Ring

Inspect the cylinder (1) and cylinder ring (2) for wear or damage. If any defects are found, replace the cylinder or cylinder ring with a new one.



I944H1220027-01

Specifications

Service Data

B944H12207001

Front Fork

Unit: mm (in)

Item	Standard	Limit
Front fork stroke	125 (4.9)	—
Front fork inner tube O.D.	41 (1.61)	—
Front fork spring free length	446.5 (17.58)	437 (17.2)
Front fork oil level (without spring, outer tube fully compressed)	96 (3.78)	—
Front fork spring adjuster	3th groove from top	—

Oil

Item	Specification	Note
Front fork oil type	SUZUKI TORK OIL SS-08 or equivalent fork oil	
Front fork oil capacity (Each leg)	517 ml (17.5/18.2 US/Imp oz)	

Tightening Torque Specifications

B944H12207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Front fork cap bolt	23	2.3	16.5	☞(Page 2B-2)
Front fork lower clamp bolt	23	2.3	16.5	☞(Page 2B-3)
Front fork upper clamp bolt	23	2.3	16.5	☞(Page 2B-3)
Front fork cylinder bolt	20	2.0	14.5	☞(Page 2B-7)

NOTE

The specified tightening torque is described in the following.
"Front Fork Components (Page 2B-1)"

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

Special Tools and Equipment

Recommended Service Material

B944H12208001

Material	SUZUKI recommended product or Specification		Note
Fork Oil	SUZUKI FORK OIL SS-08 or equivalent	P/No.: 99000–99001–SS8	☞(Page 2B-5) / ☞(Page 2B-6) / ☞(Page 2B-6) / ☞(Page 2B-7)
	SUZUKI FORK OIL G-10 or equivalent	P/No.: 99000–99044–10G	☞(Page 2B-8)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 2B-7)

NOTE

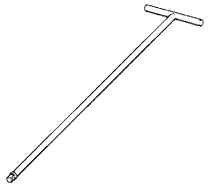
Required service material is also described in the following.
"Front Fork Components (Page 2B-1)"

Special Tool

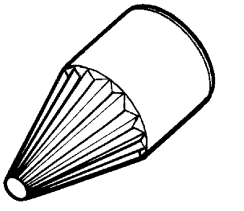
B944H12208002

09940–34520
T type handle

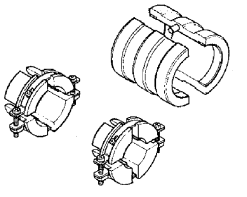
☞(Page 2B-4) / ☞(Page 2B-7)



09940–34531
Front fork assembling attachment (A)
☞(Page 2B-4) / ☞(Page 2B-7)

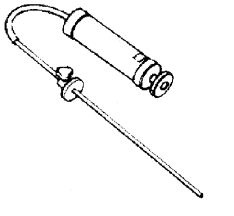


09940–52861
Front fork oil seal installer set
☞(Page 2B-6)



09943–74111
Front fork oil level gauge

☞(Page 2B-8)

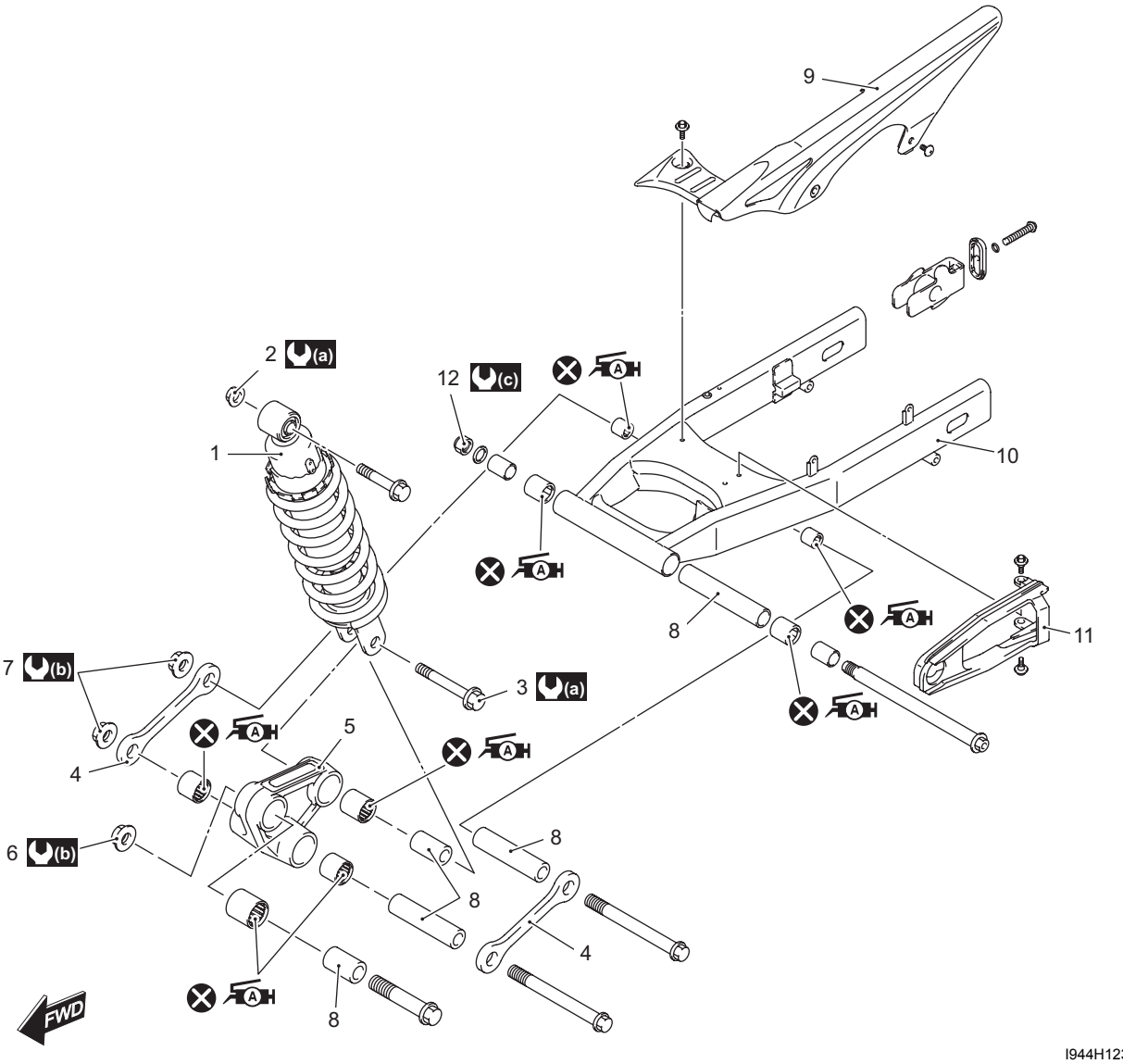


Rear Suspension

Repair Instructions

Rear Suspension Components

B944H12306001

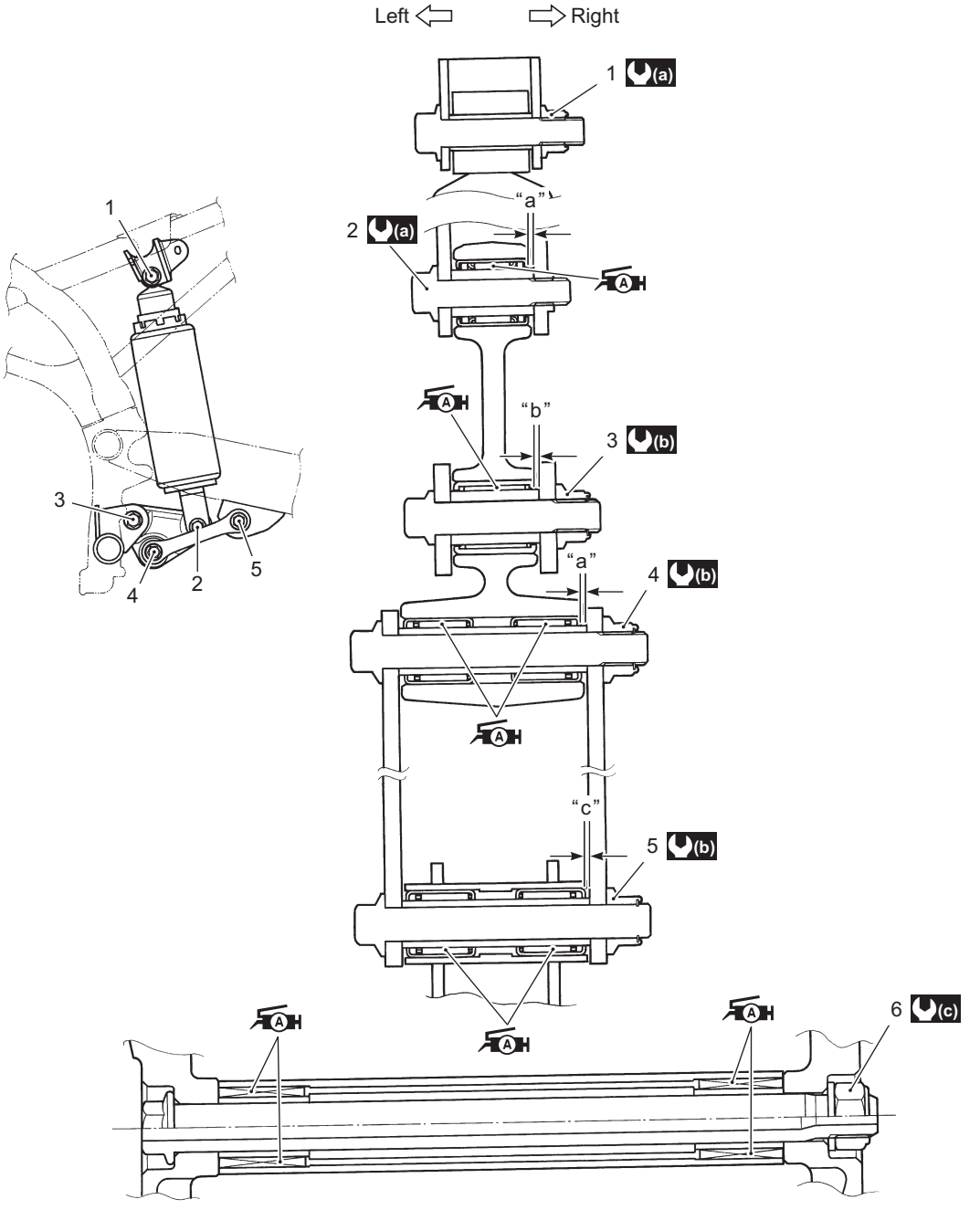


I944H1230046-01

1. Rear shock absorber	7. Cushion rod mounting nut	(a) : 50 N·m (5.0 kgf-m, 36.0 lbf-ft)
2. Rear shock absorber mounting nut	8. Spacer	(b) : 78 N·m (7.8 kgf-m, 56.5 lbf-ft)
3. Rear shock absorber mounting bolt (Lower)	9. Chain case	(c) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
4. Cushion rod	10. Swingarm	A : Apply grease to the bearing.
5. Cushion lever	11. Chain buffer	: Do not reuse.
6. Cushion lever mounting nut	12. Swingarm pivot nut	

Rear Suspension Assembly Construction

B944H12306002



I944H1230001-01

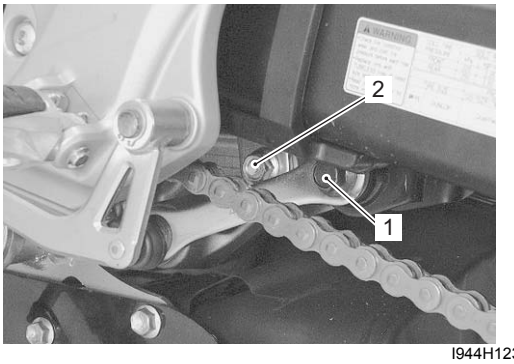
1. Rear shock absorber mounting nut (Upper)	6. Swingarm pivot nut	"a": 1.0 mm (0.04 in)
2. Rear shock absorber mounting bolt (Lower)	(a): 50 N·m (5.0 kgf-m 36.0 lbf-ft)	"b": 0.25 mm (0.01 in)
3. Cushion lever mounting nut	(b): 78 N·m (7.8 kgf-m 56.5 lbf-ft)	"c": 0.5 mm (0.02 in)
4. Cushion rod mounting nut (Lower)	(c): 100 N·m (10.0 kgf-m 72.5 lbf-ft)	
5. Cushion rod mounting nut (Upper)	A H: Apply grease to the bearing.	

Rear Shock Absorber Removal and Installation

B944H12306003

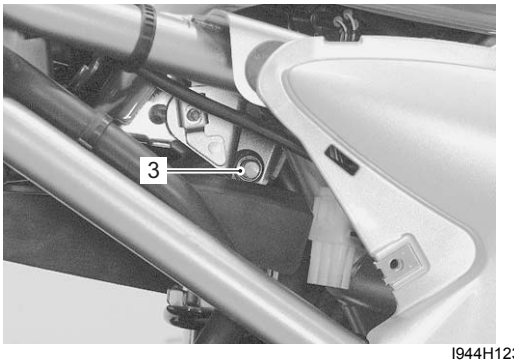
Removal

1) Support the motorcycle with a jack to be no load for the rear shock absorber.
2) Remove the right and left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Remove the cushion rod upper mounting bolt (1) and nut.
4) Remove the shock absorber lower mounting bolt (2).



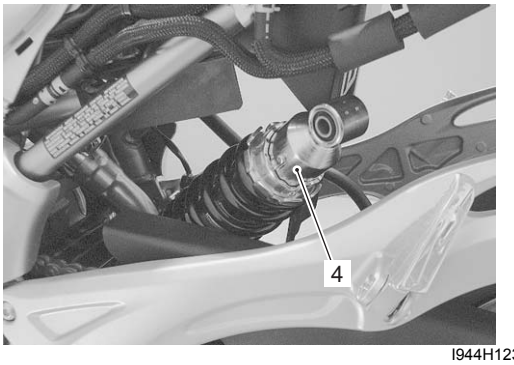
I944H1230002-01

5) Remove the shock absorber upper mounting bolt and nut (3).



I944H1230003-01

6) Remove the shock absorber (4).



I944H1230004-01

Installation

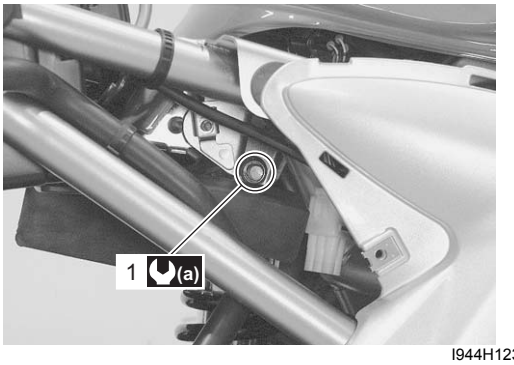
Install the rear shock absorber in the reverse order of removal. Pay attention to the following points:

- Temporary install the rear shock absorber and cushion rod.
- Tighten the rear shock absorber upper mounting nut (1) and lower mounting bolt (2).

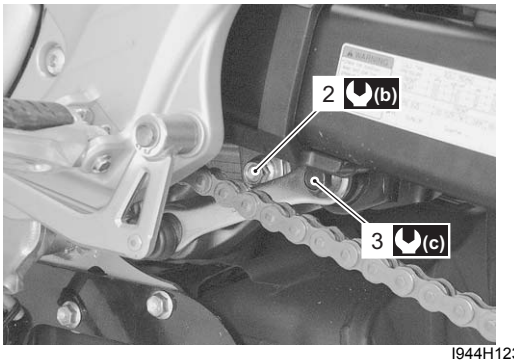
  Tightening torque
  Rear shock absorber upper mounting nut (a): 50 N·m (5.0 kgf-m, 36.0 lbf-ft)
  Rear shock absorber lower mounting bolt (b): 50 N·m (5.0 kgf-m, 36.0 lbf-ft)

- Tighten the cushion rod upper mounting bolt (3) and nut.

  Tightening torque
  Cushion rod upper mounting bolt (c): 78 N·m (7.8 kgf-m, 56.5 lbf-ft)



I944H1230005-02



I944H1230006-01

Rear Suspension Inspection

B944H12306004

Refer to “Rear Suspension Inspection in Section 0B (Page 0B-19)”.

Rear Shock Absorber Inspection

B944H12306005

Inspect the rear shock absorber in the following procedures:

1) Remove the rear shock absorber. Refer to “Rear Shock Absorber Removal and Installation (Page 2C-3)”.

2) Inspect the rear shock absorber for damage and oil leakage, and absorber bushing for wear and damage. If any defect is found, replace the rear shock absorber with a new one.

⚠ CAUTION

Do not attempt to disassemble the rear shock absorber. It is unserviceable.

I944H1230007-01

3) Install the rear shock absorber. Refer to “Rear Shock Absorber Removal and Installation (Page 2C-3)”.

Rear Suspension Adjustment

B944H12306006

After installing the rear suspension, adjust the spring pre-load and damping force as follows.

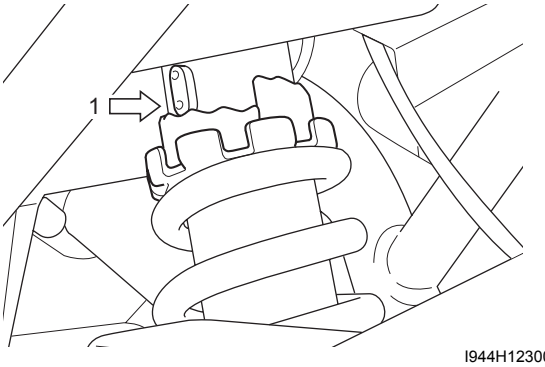
Spring Pre-load Adjustment

Turn the spring Pre-load adjuster (1) to the desired position.

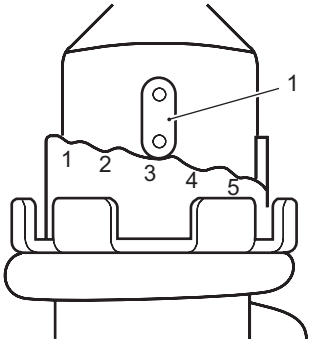
NOTE

Position 1 provides the softest spring tension and position 7 provides the stiffest.

STD position
3rd position



I944H1230008-02



I944H1230009-02

Rear Shock Absorber Disposal

B944H12306007

Refer to “Rear Shock Absorber Removal and Installation (Page 2C-3)”.

The rear shock absorber unit contains high-pressure nitrogen gas.

⚠ WARNING

- **Mishandling can cause explosion.**
- **Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.**
- **Release gas pressure before disposing.**

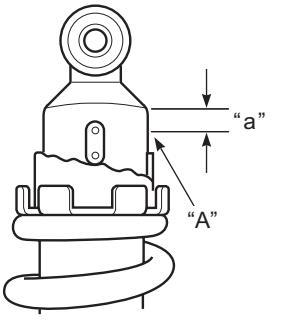
Gas Pressure Release

Make sure to observe the following precautions.

⚠ WARNING

- **Never apply heat or disassemble the damper unit since it can explode or oil can splash hazardously.**
- **When discarding the rear cushion unit, be sure to release gas pressure from the unit following the procedures.**

1) Mark the drill center at the location “A” using a center punch.



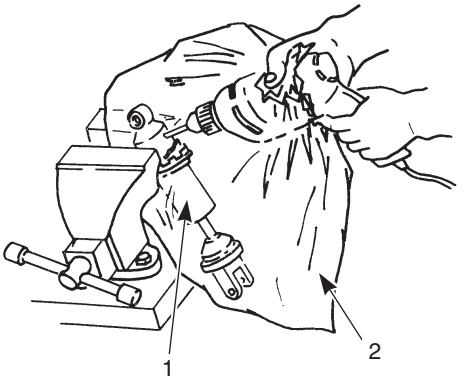
I944H1230010-01

“a”: 7 mm (0.28 in)	“A”: Mark the drill hole

2) Wrap rear shock absorber (1) with a vinyl bag (2) and fix it on a vise as shown.
3) Drill a 2 – 3 mm (0.08 – 0.12 in) hole at the marked drill center using a drilling machine and let out gas while taking care not to get the vinyl bag entangled with the drill bit.

⚠ WARNING

- **Be sure to wear protective glasses since drilling chips and oil may fly off with blowing gas when the drill bit has penetrated through the body.**
- **Make sure to drill at the specified position. Otherwise, pressurized oil many spout out forcefully.**



I649G1230009-03

Cushion Lever / Cushion Rod Removal and Installation

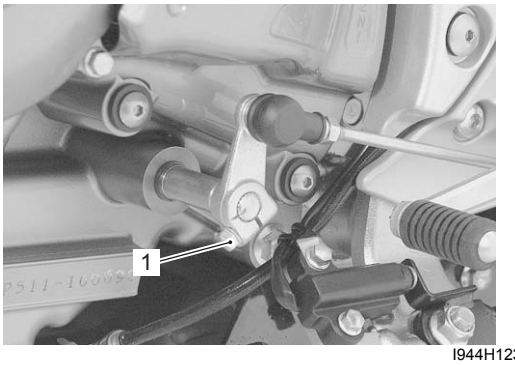
B944H12306008

Removal

1) Support the motorcycle with a jack to be no load for the cushion lever.
2) Remove the gearshift link arm mounting bolt (1).

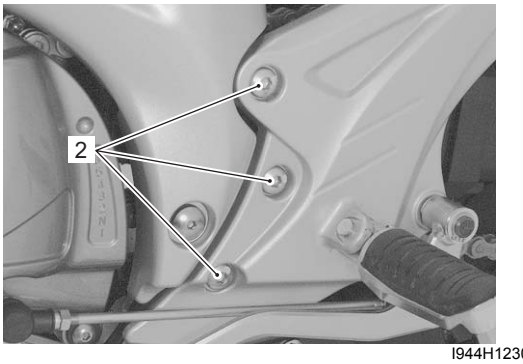
NOTE

Mark the marking to the matching surface of gearshift link arm before removing.



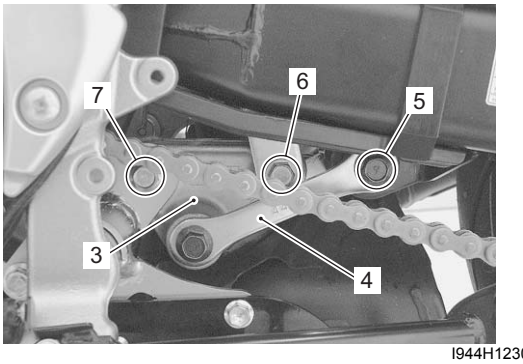
I944H1230011-01

3) Remove the front footrest bracket mounting bolts (2).



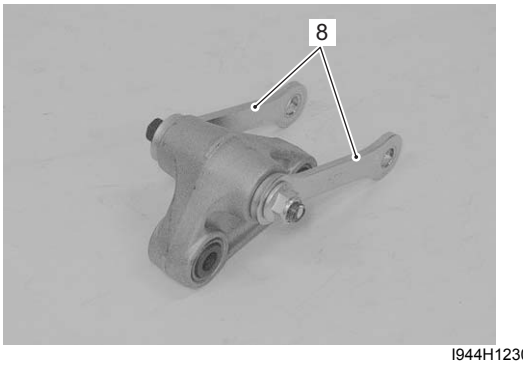
I944H1230012-02

4) Remove the cushion lever (3) and cushion rod (4) by removing the cushion rod upper mounting bolt (5), shock absorber lower mounting bolt (6) and cushion lever mounting bolt (7).



I944H1230013-01

5) Remove the cushion rods (8).



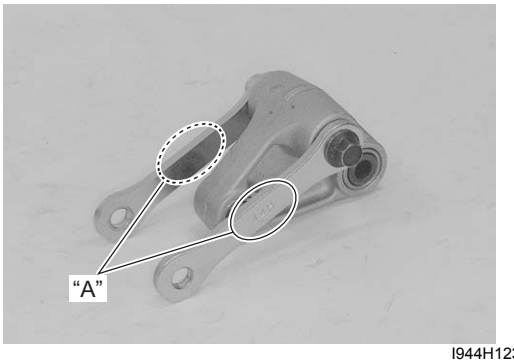
I944H1230014-01

Installation
Install the cushion lever in the reverse order of removal. Pay attention to the following point:

- Temporarily the cushion rod mounting nut.

NOTE

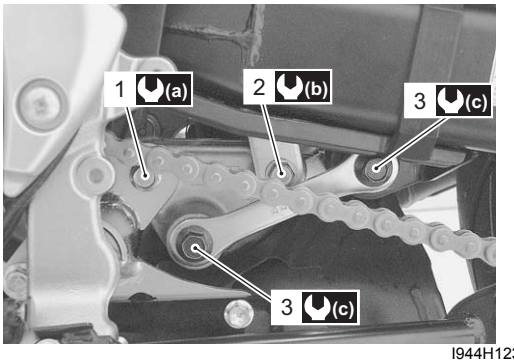
The stamped marks "A" on the cushion rod should be face out side.



I944H1230015-01

- Tighten the cushion lever mounting bolt (1), shock absorber lower mounting bolt (2), cushion rod mounting bolts (3) to the specified torque.

Tightening torque
Cushion lever mounting nut (a): 78 N·m (7.8 kgf-m, 56.5 lbf-ft)
Rear shock absorber lower mounting bolt (b): 50 N·m (5.0 kgf-m, 36.0 lbf-ft)
Cushion rod mounting bolt (c): 78 N·m (7.8 kgf-m, 56.5 lbf-ft)

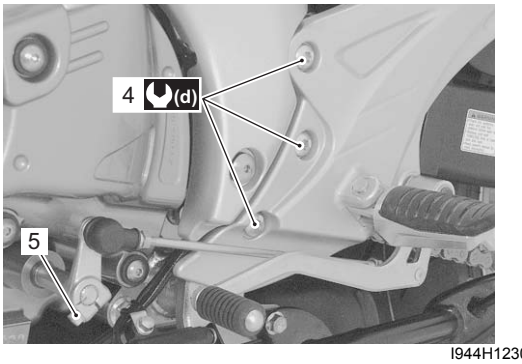


I944H1230016-01

- Apply thread lock to the front footrest bracket mounting bolts (4) and tighten it to the specified torque.

Tightening torque
Front footrest bracket mounting bolts (d): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)

- Tighten the gearshift link arm mounting bolt.



I944H1230017-01

Cushion Lever Inspection

B944H12306009

Refer to "Cushion Lever / Cushion Rod Removal and Installation (Page 2C-5)".

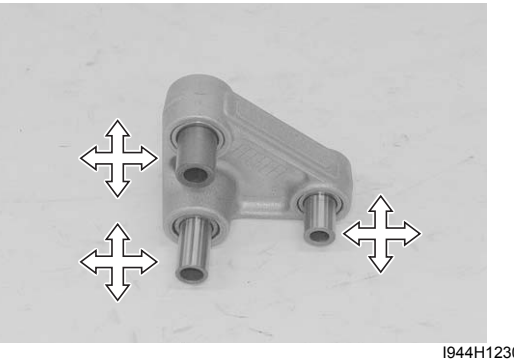
Spacer

1) Remove the spacers from the cushion lever.
2) Inspect the spacers for any flaws or other damage. If any defects are found, replace the spacers with new ones.

I944H1230045-01

Cushion Lever Bearing

1) Insert the spacers into bearings.
2) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one. Refer to "Cushion Lever Bearing Removal and Installation (Page 2C-7)".



I944H1230018-01

Cushion Lever
Inspect the cushion lever for damage. If any defect is found, replace the cushion lever with a new one.

I944H1230019-01

Cushion Rod
Inspect the cushion rods for damage and bend. If any defects are found, replace the cushion rods with new ones.

I944H1230020-01

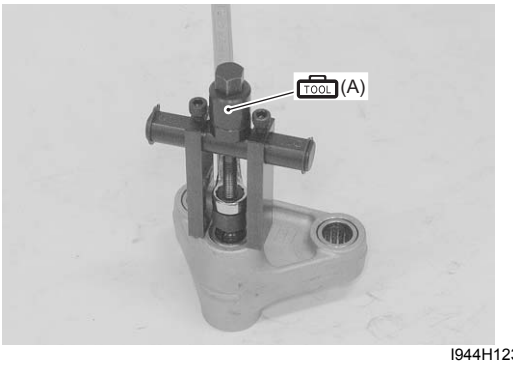
Cushion Lever Bearing Removal and Installation

B944H12306010

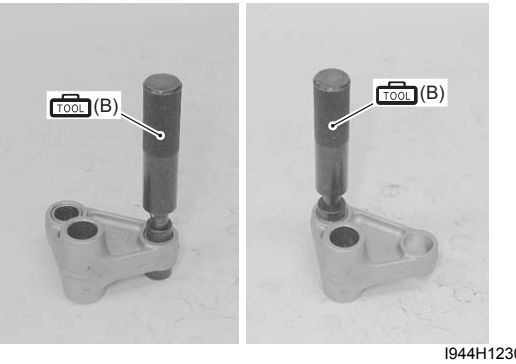
Removal

1) Remove the cushion lever. Refer to “Cushion Lever / Cushion Rod Removal and Installation (Page 2C-5)”.
2) Remove the cushion lever bearings using the special tools.

Special tool
TOOL (A): 09921–20240 (Bearing remover set)
TOOL (B): 09913–70210 (Bearing installer set)



I944H1230021-01



I944H1230022-01

Installation

⚠ CAUTION

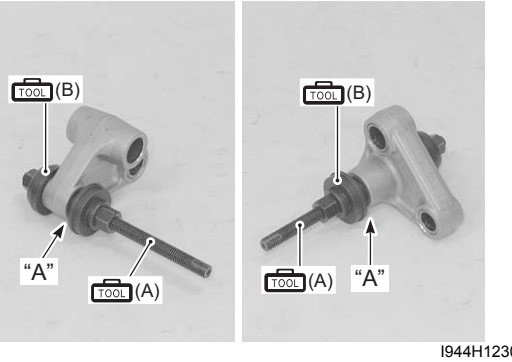
The removed bearings must be replaced with new ones.

1) Press the bearings into the cushion lever at 1 mm (0.04 in) depth “A” and 0.25 mm (0.01 in) depth “B” from the cushion laver surface with the special tool.

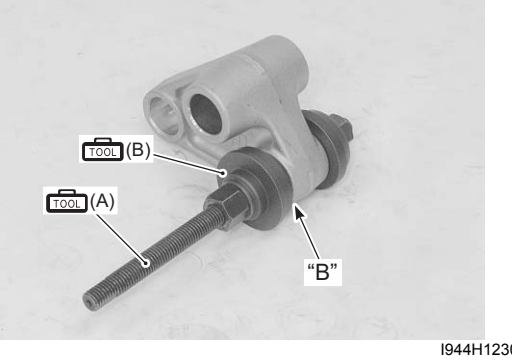
NOTE

When installing the bearing, stamped mark on the bearing must face outside.

Special tool
TOOL (A): 09924–84510 (Bearing installer set)
TOOL (B): 09941–34513 (Steering race installer)



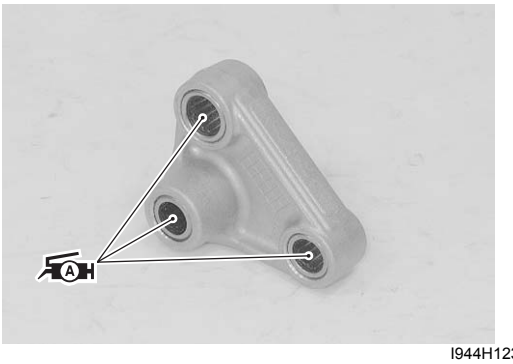
I944H1230023-01



I944H1230024-01

2) Apply grease to the bearings.

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



I944H1230025-01

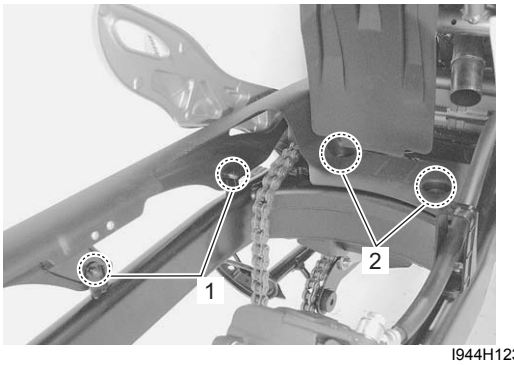
3) Install the cushion lever. Refer to “Rear Shock Absorber Removal and Installation (Page 2C-3)”.

Swingarm Removal and Installation

B944H12306011

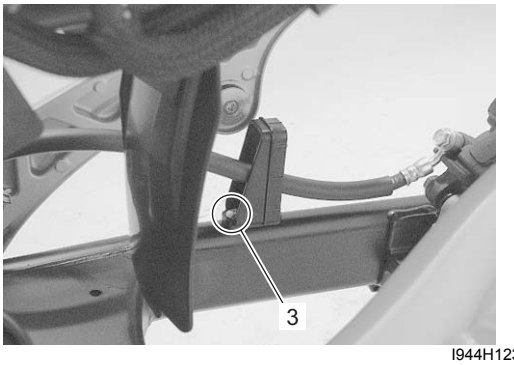
Removal

1) Remove the muffler and exhaust assembly. Refer to “Exhaust Pipe / Muffler Removal and Installation in Section 1K (Page 1K-3)”.
2) Remove the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-11)”.
3) Remove the drive chain cover mounting screws (1) and bolts (2).



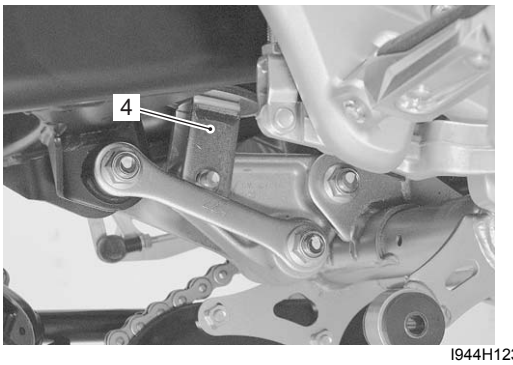
I944H1230026-01

4) Remove the brake hose clamp screw (3).



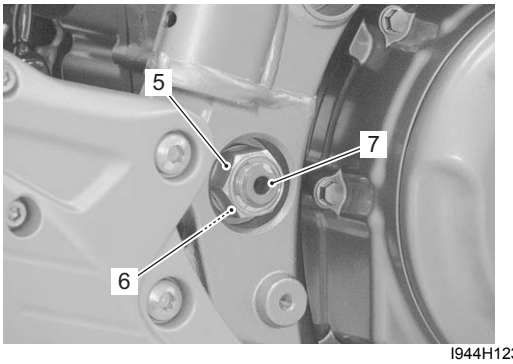
I944H1230027-01

5) Remove the rear shock absorber (4). Refer to “Rear Shock Absorber Removal and Installation (Page 2C-3)”.



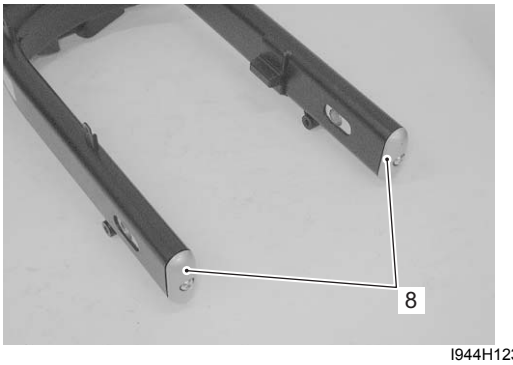
I944H1230028-01

6) Remove the swingarm by removing the swingarm pivot nut (5), washer (6) and swingarm pivot shaft (7).



I944H1230029-01

7) Remove the chain adjusters (8).



I944H1230030-02

8) Remove the chain buffer (9).

I944H1230031-02

Installation

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

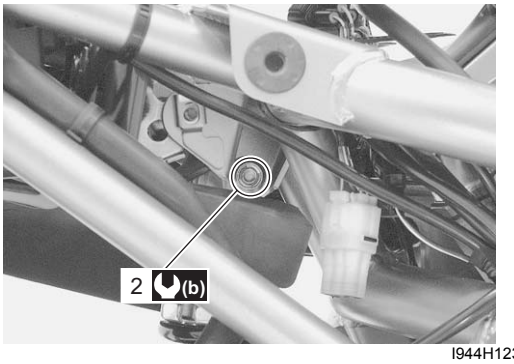
- Install the washer and swingarm pivot nut (1).
- Tighten the swingarm pivot nut to the specified torque.

Tightening torque
Swingarm pivot nut (a): 100 N·m (10.0 kgf-m, 72.5 lbf-ft)

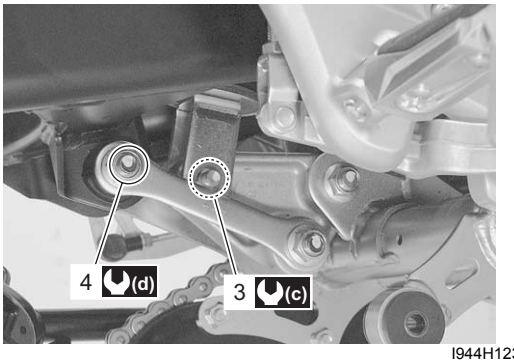
I944H1230032-01

- Tighten the rear shock absorber upper mounting nut (2), rear shock absorber lower mounting bolt (3) and cushion rod upper mounting nut (4) to the specified torque.

Tightening torque
Rear shock absorber upper mounting nut (b): 50 N·m (5.0 kgf-m, 36.0 lbf-ft)
Rear shock absorber lower mounting bolt (c): 50 N·m (5.0 kgf-m, 36.0 lbf-ft)
Cushion rod upper mounting nut (d): 78 N·m (7.8 kgf-m, 56.5 lbf-ft)



I944H1230033-02



I944H1230034-02

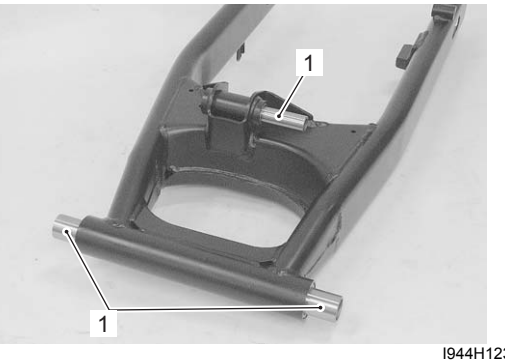
Swingarm Related Parts Inspection

B944H12306012

Refer to “Swingarm Removal and Installation (Page 2C-8)”.

Spacers

1) Remove the spacers (1) from the swingarm.
2) Inspect the spacers for wear and damage. If any defects are found, replace the spacers with new ones.



I944H1230035-01

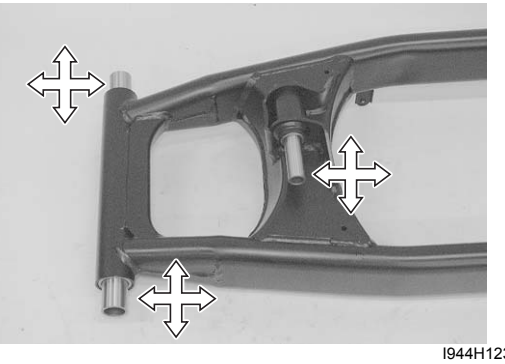
Chain Buffer

Inspect the chain buffer for wear and damage. If any defect is found, replace the chain buffer with a new one.

I944H1230036-01

Swingarm Bearing and Cushion Rod Bearing

1) Insert the spacers into bearings.
2) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one. Refer to “Swingarm Bearing Removal and Installation (Page 2C-10)”.



I944H1230037-01

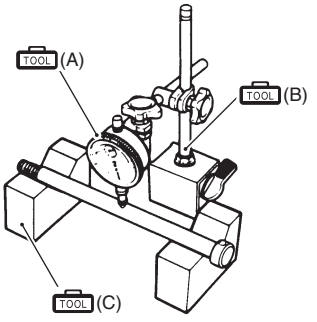
Swingarm
Inspect the swingarm for damage. If any defect is found, replace the swingarm with a new one.

I944H1230038-01

Swingarm Pivot Shaft
Measure the swingarm pivot shaft runout using the dial gauge. If the runout exceeds the service limit, replace the pivot shaft.

Special tool
(A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
(B): 09900–20701 (Magnetic stand)
(C): 09900–21304 (V-block (100 mm))

Swingarm pivot shaft runout
Service limit: 0.3 mm (0.01 in)



I649G1230034-03

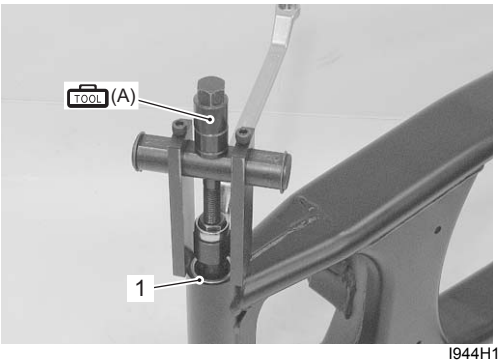
Swingarm Bearing Removal and Installation

B944H12306013

Removal

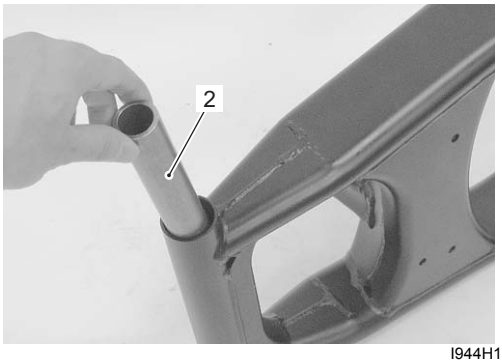
1) Remove the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-11)”.
2) Remove the swingarm. Refer to “Swingarm Removal and Installation (Page 2C-8)”.
3) Draw out the swingarm pivot bearings (1) using the special tool.

Special tool
(A): 09921–20240 (Bearing remover set)



I944H1230039-01

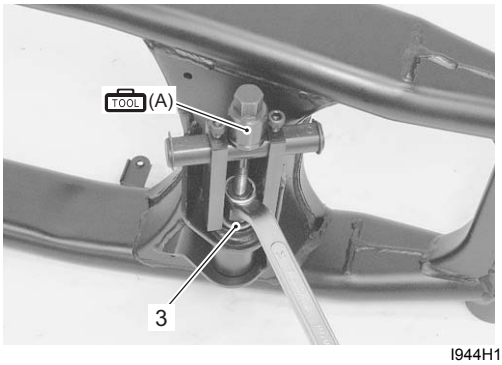
4) Remove the center spacer (2).



I944H1230040-01

5) Remove the swingarm cushion rod bearings (3) using the special tools.

Special tool
(A): 09921–20240 (Bearing remover set)



I944H1230041-02

Installation

⚠ CAUTION

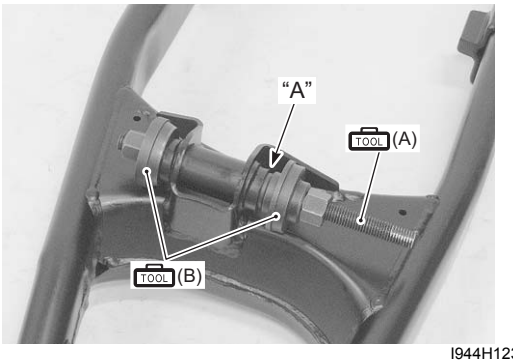
The removed bearings must be replaced with new ones.

1) Press the bearings into the swingarm cushion rod at 0.5 mm (0.02 in) depth “A” from the swingarm cushion rod surface with the special tool.

NOTE

When installing the bearing, stamped mark on the bearing must face outside.

Special tool
TOOL (A): 09924–84510 (Bearing installer set)
TOOL (B): 09941–34513 (Steering race installer)



I944H1230042-01

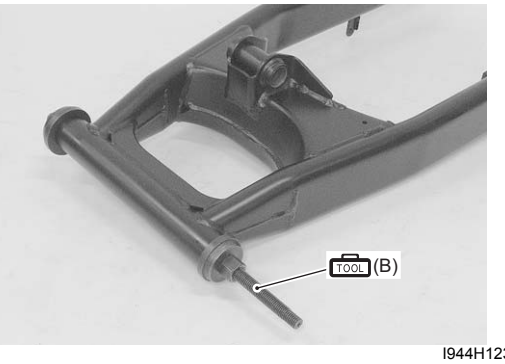
2) Install the bearing and center spacer.

3) Press the bearings into the swingarm pivot with the special tool.

NOTE

When installing the bearing, stamped mark on the bearing must face outside.

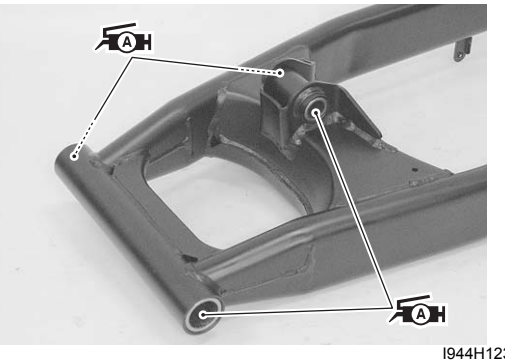
Special tool
TOOL (B): 09941–34513 (Steering race installer)



I944H1230043-01

4) Apply grease to the bearings.

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



I944H1230044-01

5) Install the swingarm. Refer to “Swingarm Removal and Installation (Page 2C-8)”.

6) Install the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-11)”.

Specifications

Service Data

B944H12307001

Suspension

Unit: mm (in)

Item	Standard	Limit
Rear shock absorber spring adjuster	3rd position	—
Rear wheel travel	130 (5.1)	—
Swingarm pivot shaft runout	—	0.3 (0.01)

Tightening Torque Specifications

B944H12307002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Rear shock absorber upper mounting nut	50	5.0	36.0	☞(Page 2C-3) / ☞(Page 2C-9)
Rear shock absorber lower mounting bolt	50	5.0	36.0	☞(Page 2C-3) / ☞(Page 2C-6) / ☞(Page 2C-9)
Cushion rod upper mounting bolt	78	7.8	56.5	☞(Page 2C-3)
Cushion lever mounting nut	78	7.8	56.5	☞(Page 2C-6)
Cushion rod mounting bolt	78	7.8	56.5	☞(Page 2C-6)
Front footrest bracket mounting bolts	23	2.3	16.5	☞(Page 2C-6)
Swingarm pivot nut	100	10.0	72.5	☞(Page 2C-9)
Cushion rod upper mounting nut	78	7.8	56.5	☞(Page 2C-9)

NOTE

The specified tightening torque is described in the following.
“Rear Suspension Components (Page 2C-1)”
“Rear Suspension Assembly Construction (Page 2C-2)”

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

Special Tools and Equipment

Recommended Service Material

B944H12308001

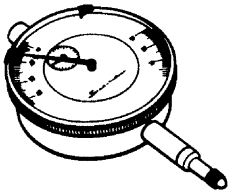
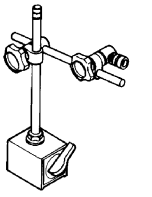
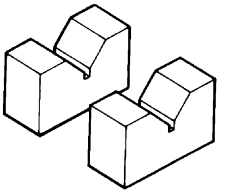
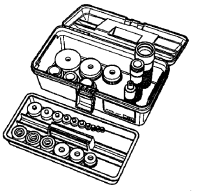
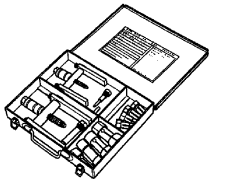
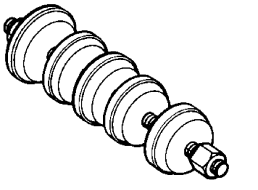
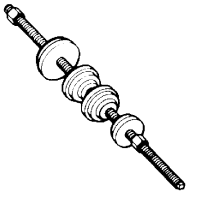
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 2C-8) / ☞(Page 2C-11)

NOTE

Required service material is also described in the following.
“Rear Suspension Components (Page 2C-1)”
“Rear Suspension Assembly Construction (Page 2C-2)”

Special Tool

B944H12308002

09900–20607 Dial gauge ☞(Page 2C-10)		09900–20701 Dial gauge chuck ☞(Page 2C-10)	
09900–21304 V blocks ☞(Page 2C-10)		09913–70210 Bearing installer set (10 – 75) ☞(Page 2C-7)	
09921–20240 Bearing remover set ☞(Page 2C-7) / ☞(Page 2C-10) / ☞(Page 2C-10)		09924–84510 Bearing installer set ☞(Page 2C-7) / ☞(Page 2C-11)	
09941–34513 Bearing installer ☞(Page 2C-7) / ☞(Page 2C-11) / ☞(Page 2C-11)			

Wheels and Tires

Precautions

Precautions for Wheel and Tire

B944H12400001

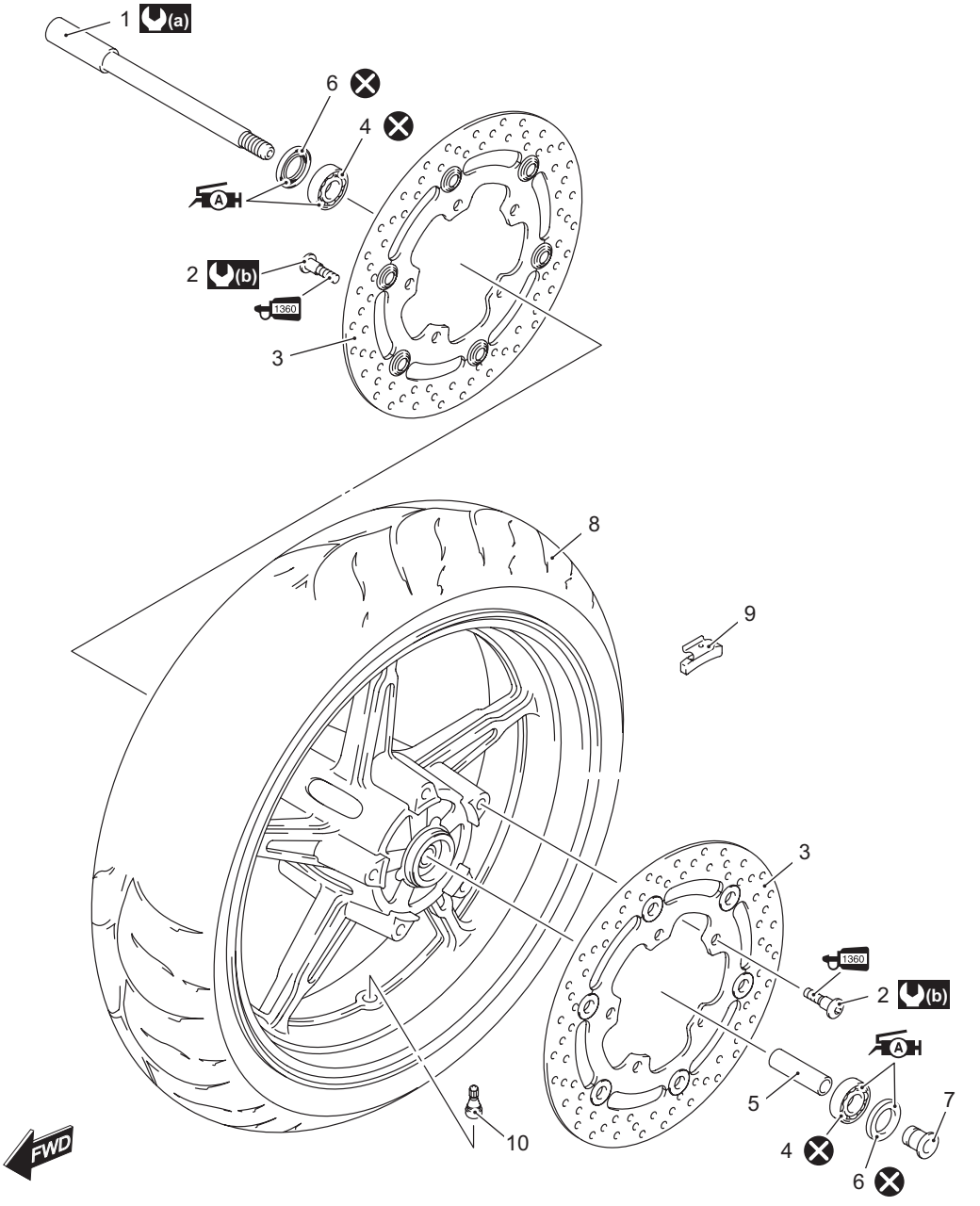
⚠ WARNING

- **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.**
- **Do not interchange tires between wheels on the same vehicle.**
  Do not use tires of sizes and types different from the originally installed tires.
  Rotation of tires or use of such different tires may adversely affect handling of the vehicle and can result in 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

B944H12406001

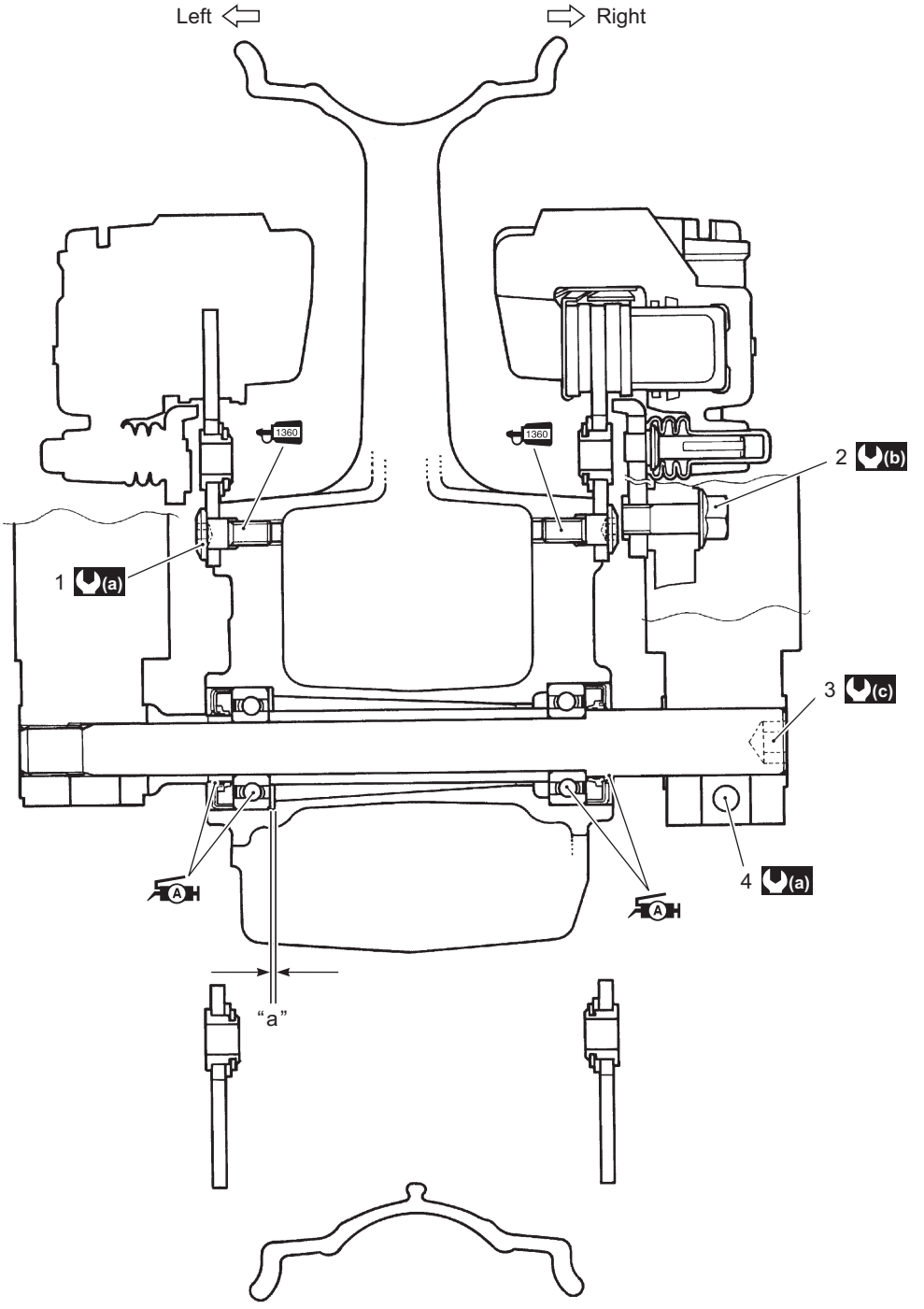


I944H1240052-02

1. Front axle	6. Dust seal	(a) : 65 N·m (6.5 kgf-m, 47.0 lbf-ft)
2. Brake disc bolt	7. Collar	(b) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
3. Brake disc	8. Tire	A : Apply grease.
4. Bearing	9. Wheel balancer	1360 : Apply thread lock to thread part.
5. Spacer	10. Air valve	: Do not reuse.

Front Wheel Assembly Construction

B944H12406002



I944H1240042-03

1. Brake disc bolt	"a": Clearance	A : Apply grease.
2. Brake caliper mounting bolt	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	1360 : Apply thread lock to thread part.
3. Front axle	(b) : 39 N·m (3.9 kgf-m, 28.0 lbf-ft)	
4. Front axle pinch bolt	(c) : 65 N·m (6.5 kgf-m, 47.0 lbf-ft)	

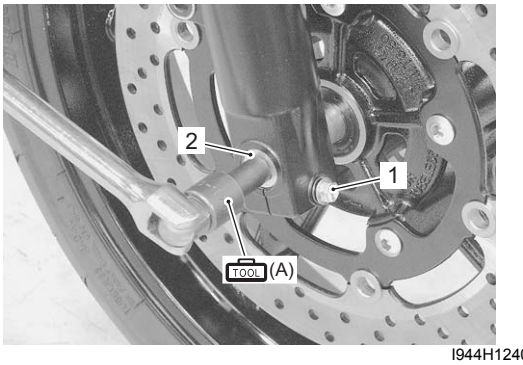
Front Wheel Assembly Removal and Installation

B944H12406003

Removal

1) Remove the brake calipers. Refer to “Front Brake Caliper Removal and Installation in Section 4B (Page 4B-3)”.
2) Loosen axle pinch bolt (1) on the right front fork leg.
3) Loosen the front axle (2) by using the special tool.

Special tool
TOOL (A): 09900–18710 (Hexagon socket (12 mm))



I944H1240006-01

4) Raise the front wheel off the ground and support the motorcycle with a jack or a wooden block.

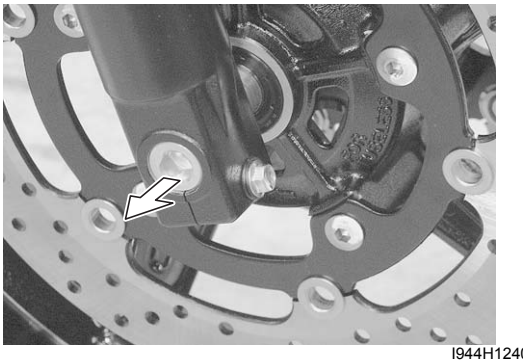
⚠ CAUTION

Do not carry out the work with the motorcycle resting on the side-stand. Do not support the motorcycle with the exhaust pipe. Make sure that the motorcycle is supported securely.

5) Draw out the front axle and remove the front wheel.

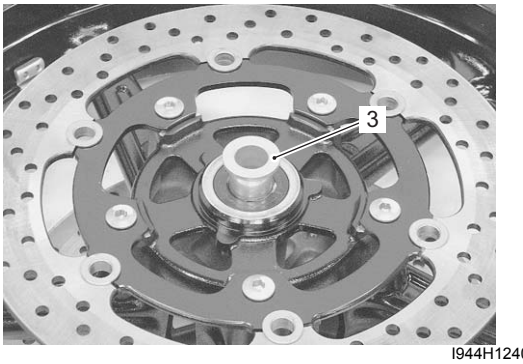
NOTE

After removing the front wheel, fit the calipers temporarily to the original positions.



I944H1240007-02

6) Remove the collar (3).



I944H1240008-02

Installation

1) Install the collar (1) into the left side of the wheel.

I944H1240009-02

2) Install the front wheel with the front axle and tighten the front axle temporarily.

⚠ WARNING

The directional arrow on the tire should point to the wheel rotation, when remounting the wheel.

I944H1240043-01

3) Tighten the brake caliper mounting bolts (2) to the specified torque.

⚠ WARNING

After remounting the brake calipers, pump the brake lever until the pistons push the pad correctly.

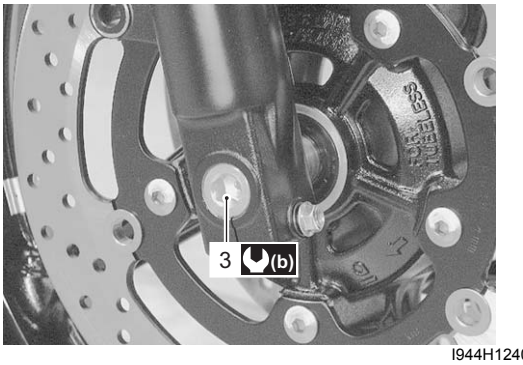
Tightening torque
Front brake caliper mounting bolt (a): 39 N·m (3.9 kgf-m, 28.0 lbf-ft)

I944H1240011-02

4) Tighten the front axle (3) to the specified torque.

Special tool
TOOL : 09900–18710 (Hexagon socket (12 mm))

Tightening torque
Front axle (b): 65 N·m (6.5 kgf-m, 47.0 lbf-ft)



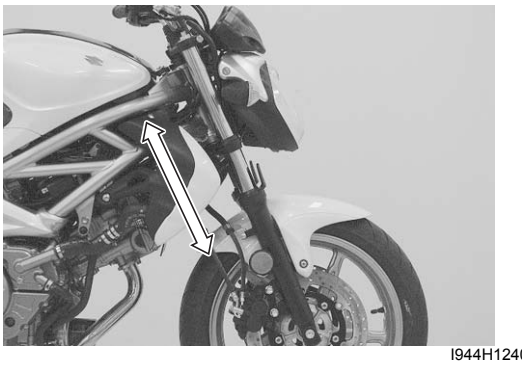
I944H1240013-02

5) Tighten axle pinch bolt (4) to the specified torque.

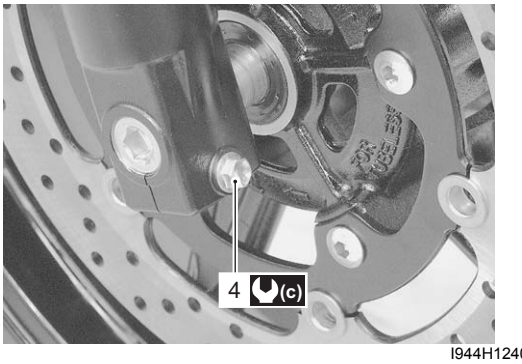
NOTE

Before toughening the front axle pinch bolt, move the front fork up and down four or five times.

Tightening torque
Front axle pinch bolt (c): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



I944H1240044-01



I944H1240015-03

Front Wheel Related Parts Inspection

B944H12406004

Refer to “Front Wheel Assembly Removal and Installation (Page 2D-4)”

Tire

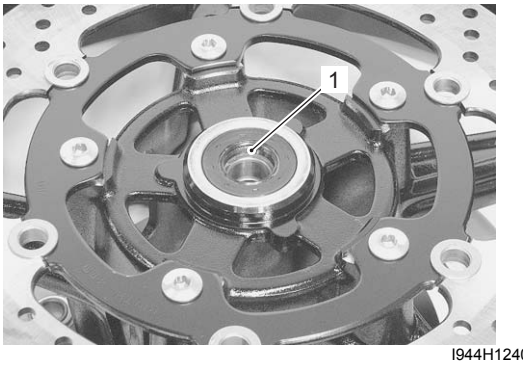
Refer to “Tire Inspection in Section 0B (Page 0B-18)”.

Front Brake Disc

Refer to “Front Brake Disc Inspection in Section 4B (Page 4B-7)”.

Dust Seal

Inspect the dust seal lips (1) for wear or damage. If any defects are found, replace the dust seal with the new ones. Refer to “Front Wheel Dust Seal / Bearing Removal and Installation (Page 2D-7)”.



I944H1240016-02

Wheel Axle

Using a dial gauge, check the wheel axle for runout. If the runout exceeds the limit, replace the axle shaft.

Special tool

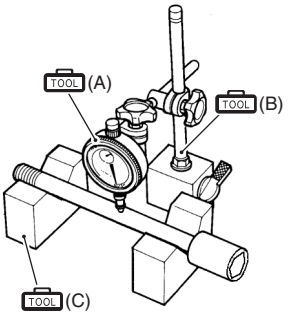
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))

TOOL (B): 09900–20701 (Magnetic stand)

TOOL (C): 09900–21304 (V-block (100 mm))

Wheel axle runout

Service limit: 0.25 mm (0.010 in)



I649G1240054-02

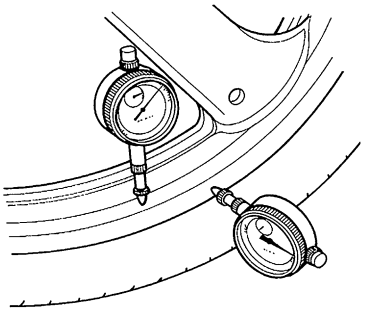
Wheel

Inspect the wheel in the following procedures:

1) Remove the brake pads. Refer to “Front Brake Pad Replacement in Section 4B (Page 4B-2)”.
2) Make sure that the wheel rim runout checked as shown does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel.
3) Install the brake pads. Refer to “Front Brake Pad Replacement in Section 4B (Page 4B-2)”.

Wheel rim runout

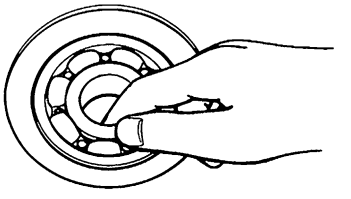
Service limit (Axial and Radial): 2.0 mm (0.08 in)



I649G1240014-02

Wheel Bearing

Inspect the play of the wheel bearings by finger while they are in the wheel. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation. Replace the bearing in the following procedure if there is anything unusual. Refer to “Front Wheel Dust Seal / Bearing Removal and Installation (Page 2D-7)”.



I649G1240015-02

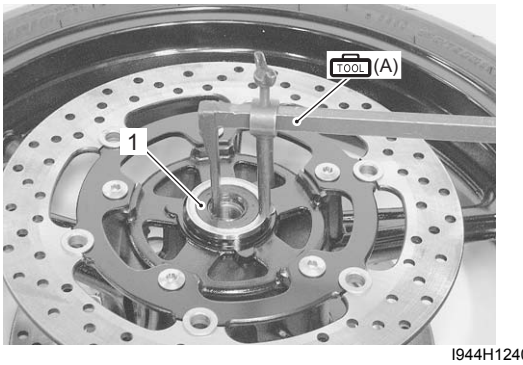
Front Wheel Dust Seal / Bearing Removal and Installation

B944H12406005

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.

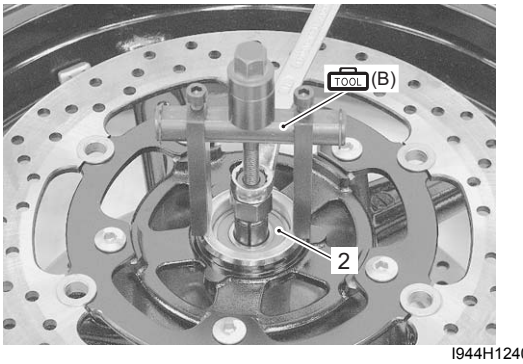
Special tool
TOOL (A): 09913–50121 (Oil seal remover)



I944H1240017-01

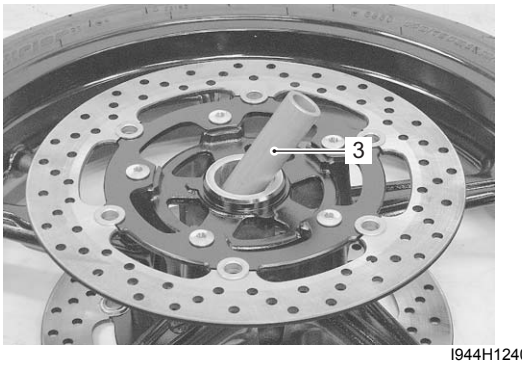
3) Remove the bearings (2) on both sides using the special tool.

Special tool
TOOL (B): 09921–20240 (Bearing remover set)



I944H1240018-01

4) Remove the spacer (3).



I944H1240019-01

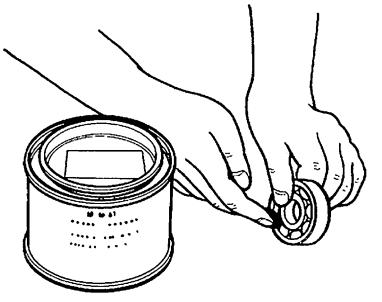
Installation

⚠ CAUTION

The removed dust seals and bearings must be replaced with new ones.

1) Apply grease to the wheel bearings.

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



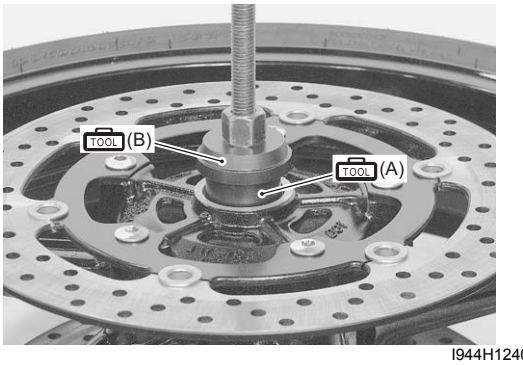
I649G1240019-02

2) First install the right wheel bearing, then install the spacer (1) and left wheel bearing with the special tool.

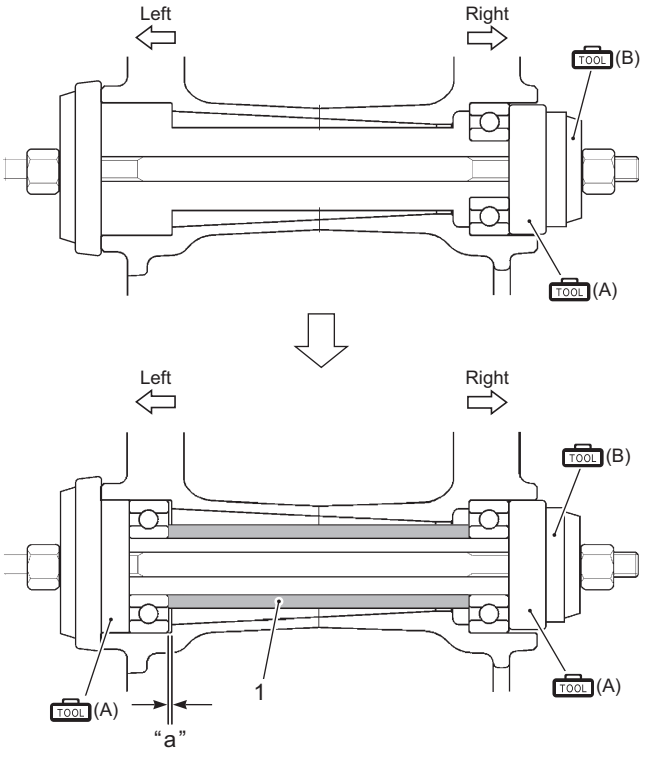
Special tool
TOOL (A): 09913–70210 (Bearing installer set)
TOOL (B): 09941–34513 (Steering race installer)

⚠ CAUTION

The sealed cover of the bearing must face outside.



I944H1240020-01

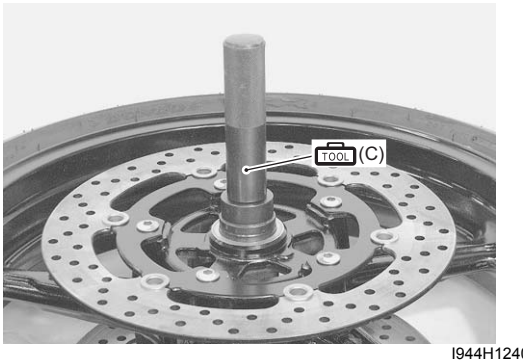


I944H1240047-03

1. Spacer	"a": Clearance

3) Install the dust seals with the special tool.

Special tool
TOOL (C): 09913–70210 (Bearing installer set)



I944H1240022-01

4) Apply grease to the lip of dust seals.

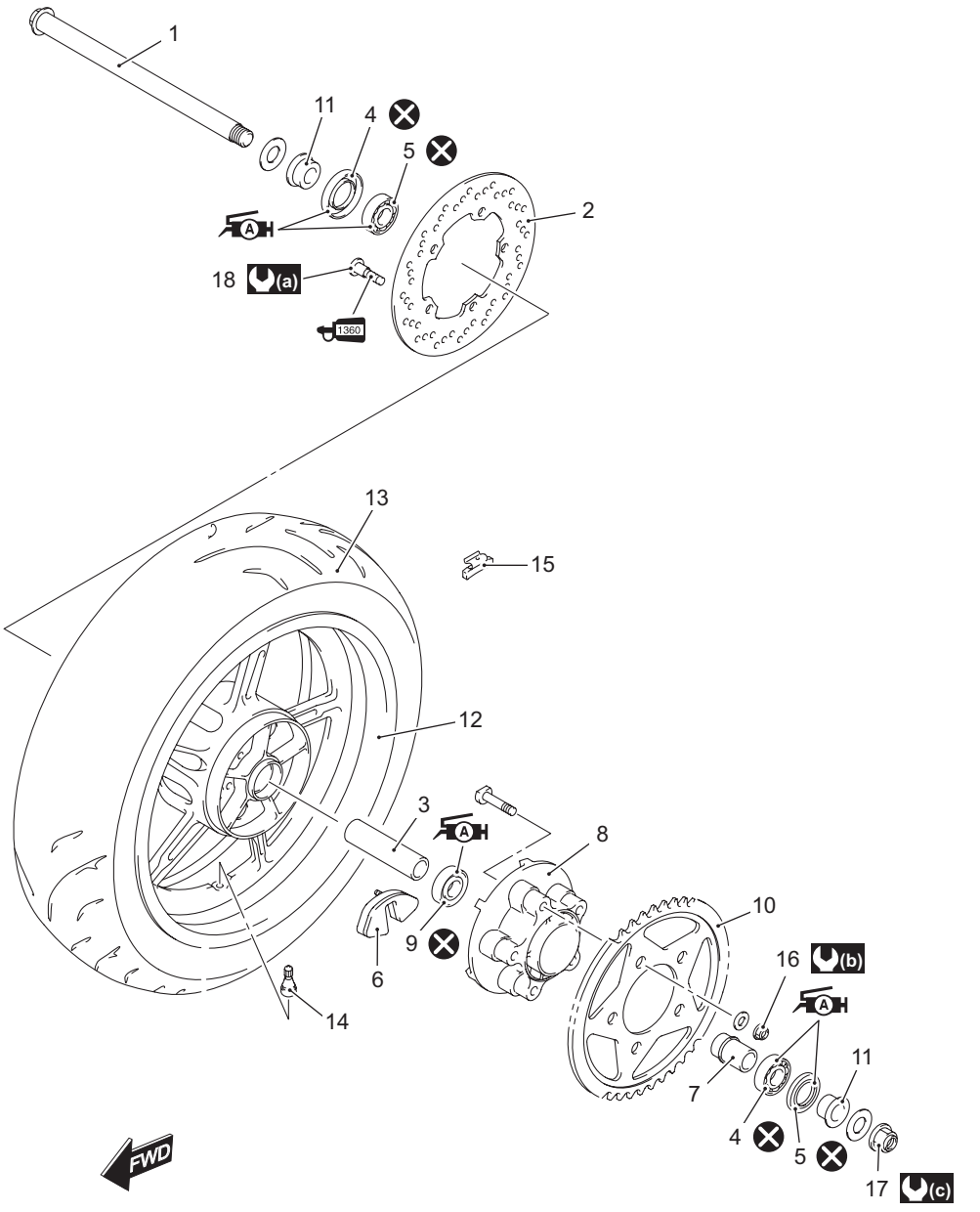
: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

I944H1240023-01

5) Install the front wheel assembly. Refer to "Front Wheel Assembly Removal and Installation (Page 2D-4)".

Rear Wheel Components

B944H12406006

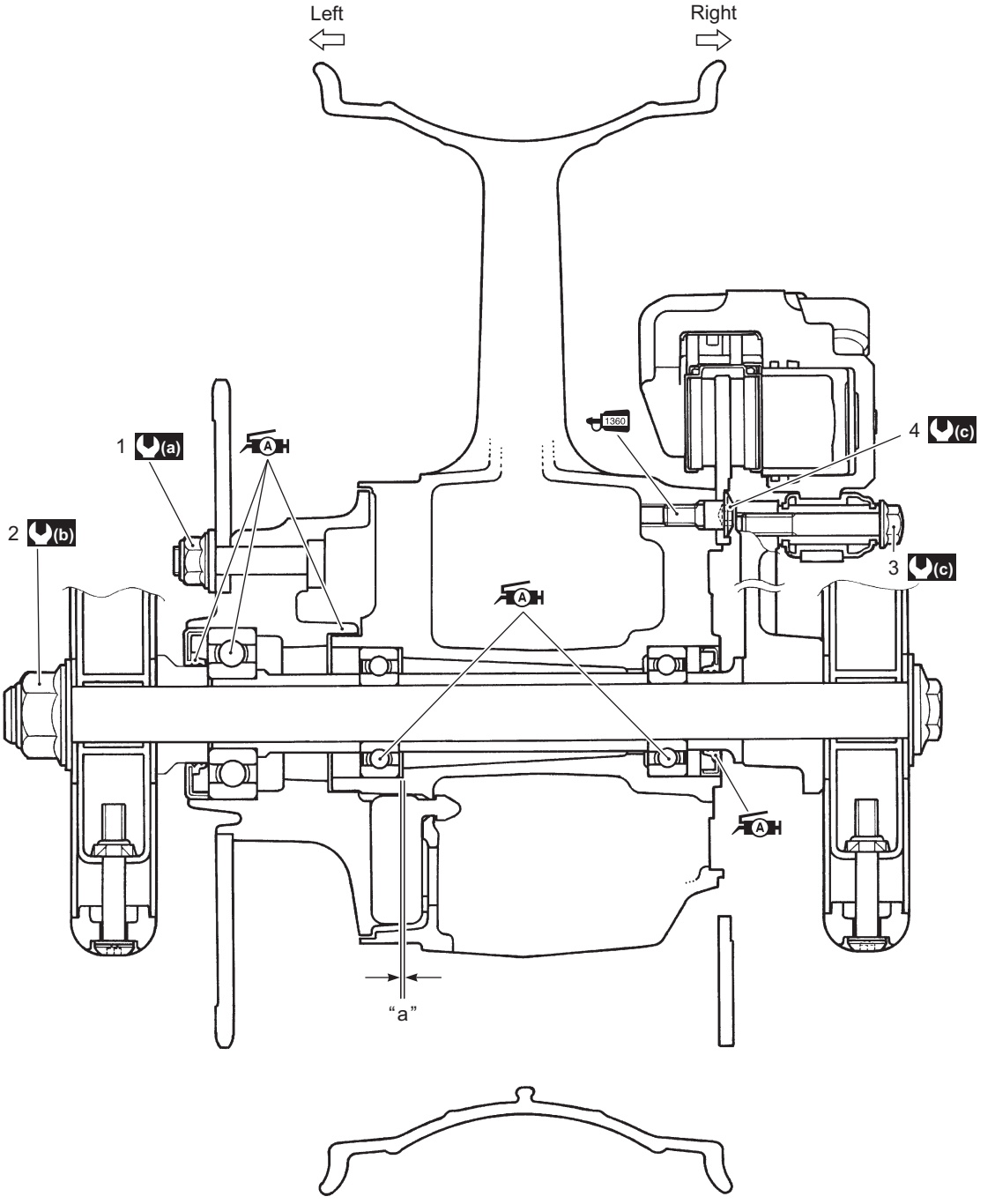


I944H1240054-01

1. Rear axle	9. Bearing	17. Rear axle nut
2. Brake disc	10. Sprocket	18. Brake disc bolt
3. Spacer	11. Collar	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
4. Dust seal	12. Rear wheel	(b) : 60 N·m (6.0 kgf-m, 43.5 lbf-ft)
5. Bearing	13. Tire	(c) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)
6. Wheel damper	14. Air valve	A : Apply grease.
7. Retainer	15. Wheel balancer	1360 : Apply thread lock to thread part.
8. Sprocket mounting drum	16. Rear sprocket nut	: Do not reuse.

Rear Wheel Assembly Construction

B944H12406007



I944H1240046-03

1. Rear sprocket nut	"a": Clearance	A : Apply grease.
2. Rear axle nut	(a) : 60 N·m (0.6 kgf-m, 16.5 lbf-ft)	1360 : Apply thread lock to thread part.
3. Brake caliper mounting bolt	(b) : 100 N·m (10.0 kgf-m, 72.5 lbf-ft)	
4. Brake disc bolt	(c) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	

Rear Wheel Assembly Removal and Installation

B944H12406008

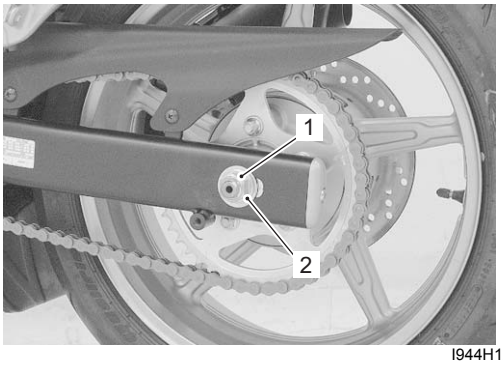
Removal

1) Loosen the rear axle nut (1).
2) Raise the rear wheel off the ground and support the motorcycle with a jack or wooden block.

⚠ CAUTION

Make sure that the motorcycle is supported securely.

3) Remove the rear axle nut (1), washer (2) and draw out the rear axle.



I944H1240048-01

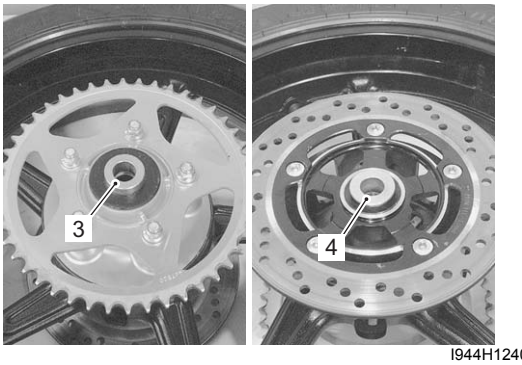
4) Remove the rear axle and disengage the drive chain from the rear sprocket.
5) Remove the rear wheel assembly.

⚠ CAUTION

Do not operate the rear brake pedal with the rear wheel removed.

I944H1240049-01

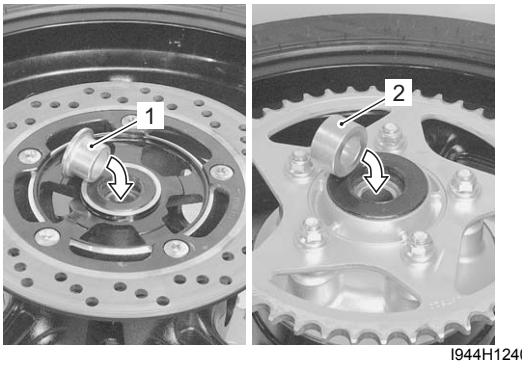
6) Remove the spacer (3) and collar (4).



I944H1240028-02

Installation

1) Install the collar (1) and spacer (2).



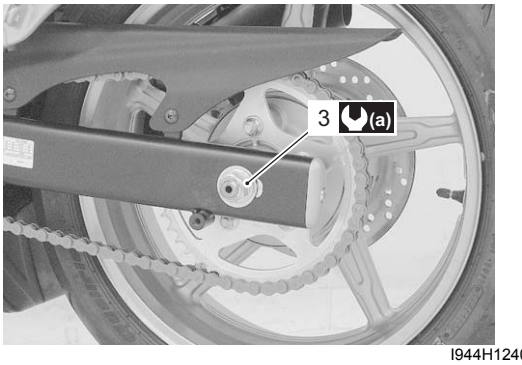
I944H1240029-01

2) Install the rear wheel with the rear axle and tighten the rear axle nut temporarily.
3) Adjust the drive chain slack after installing the rear wheel. Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.
4) Tighten the rear axle nut (3) to the specified torque.

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

⚠ WARNING

After remounting the rear wheel, pump the brake pedal a few times to check for proper brake operation.



I944H1240050-01

Rear Wheel Related Parts Inspection

B944H12406009

Refer to “Rear Wheel Assembly Removal and Installation (Page 2D-11)”.

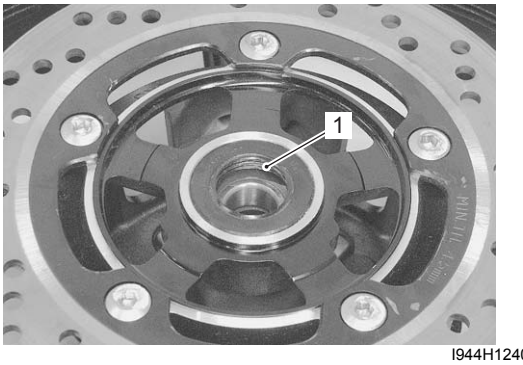
Tire
Refer to “Tire Inspection in Section 0B (Page 0B-18)”.

Rear Brake Disc
Refer to “Rear Brake Disc Inspection in Section 4C (Page 4C-7)”.

Wheel Damper
Refer to “Drive Chain Related Parts Inspection in Section 3A (Page 3A-5)”.

Sprocket
Refer to “Drive Chain Related Parts Inspection in Section 3A (Page 3A-5)”.

Dust Seal
Inspect the dust seal lip (1) for wear or damage. If any defects is found, replace the dust seal with a new one. Refer to “Rear Wheel Dust Seal / Bearing Removal and Installation (Page 2D-13)”.

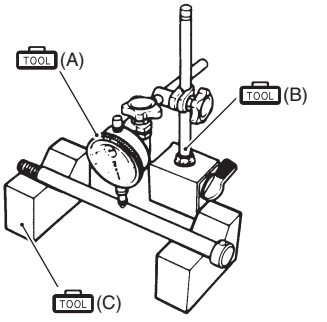


I944H1240031-02

Wheel Axle
Using a dial gauge, check the wheel axle for runout, If the runout exceeds the limit, replace the axle shaft.

Wheel axle runout
Service limit: 0.25 mm (0.010 in)

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL (B): 09900–20701 (Magnetic stand)
TOOL (C): 09900–21304 (V-block (100 mm))

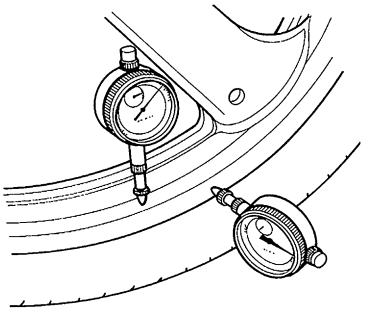


I649G1230034-03

Wheel
Inspect the wheel in the following procedures:

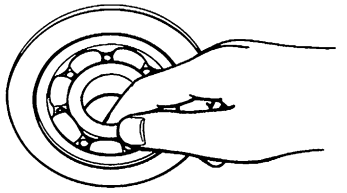
1) Remove the brake pads. Refer to “Rear Brake Pad Replacement in Section 4C (Page 4C-2)”.
2) Make sure that the wheel rim runout checked as shown does not exceed the service limit. An excessive runout is usually due to worn or loosened wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel.
3) Install the brake pads. Refer to “Rear Brake Pad Replacement in Section 4C (Page 4C-2)”.

Wheel rim runout
Service limit (Axial and Radial): 2.0 mm (0.08 in)



I649G1240014-02

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)”.



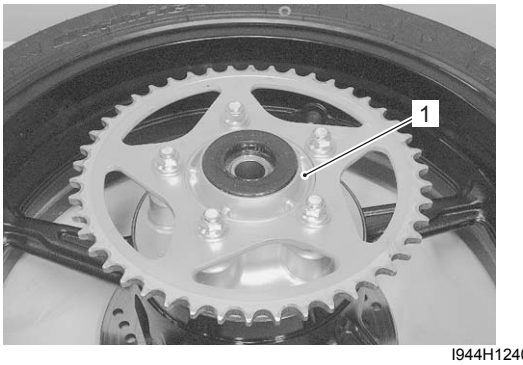
I649G1240015-02

Rear Wheel Dust Seal / Bearing Removal and Installation

B944H12406010

Removal

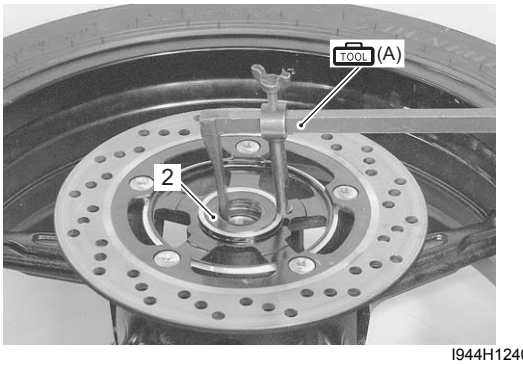
1) Remove the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation (Page 2D-11)”.
2) Remove the rear sprocket mounting drum assembly (1) from the rear wheel.



I944H1240032-02

3) Remove the dust seal (2).

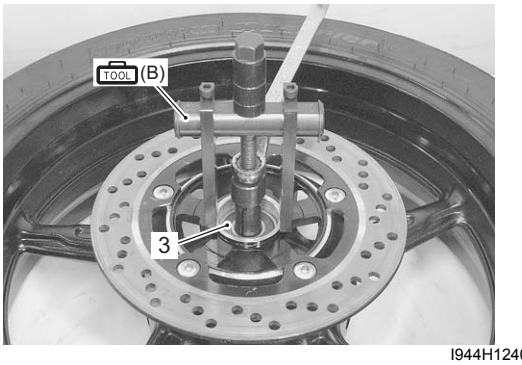
Special tool
(A): 09913–50121 (Oil seal remover)



I944H1240033-01

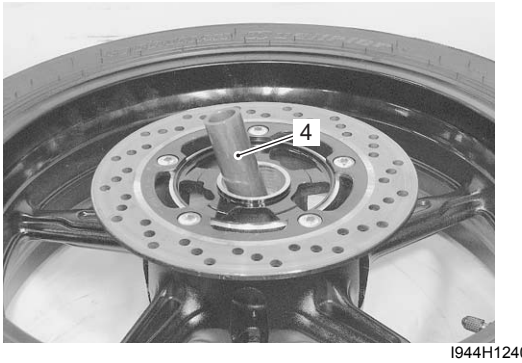
4) Remove the bearings (3) on both sides using the special tool.

Special tool
(B): 09921–20240 (Bearing remover set)



I944H1240034-01

5) Remove the spacer (4).



I944H1240035-01

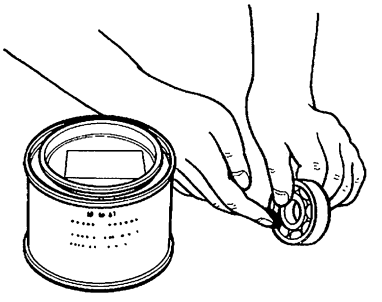
Installation

⚠ CAUTION

The removed dust seals and bearings must be replaced with new ones.

1) Apply grease to the wheel bearings.

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



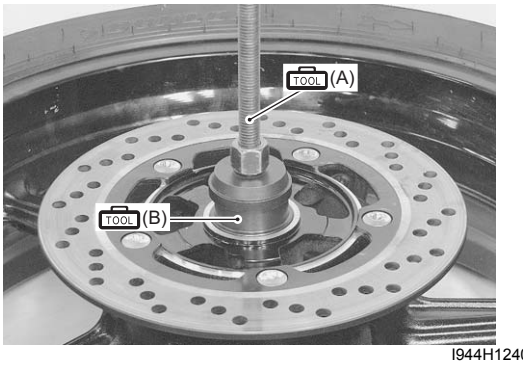
I649G1240019-02

2) First install the right wheel bearing, then install the spacer (1) and left wheel bearing with the special tools.

Special tool
TOOL (A): 09941–34513 (Steering race installer)
TOOL (B): 09913–70210 (Bearing installer set)

⚠ CAUTION

The sealed cover of the bearing must face outside.



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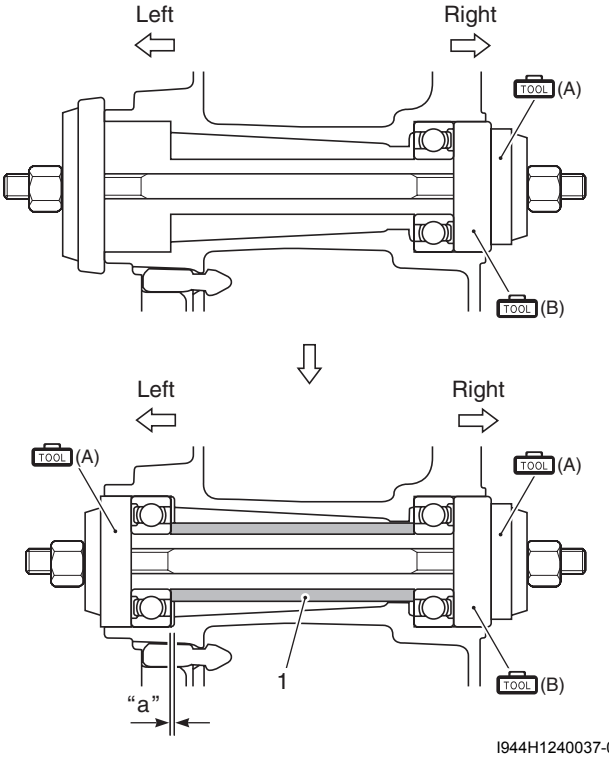
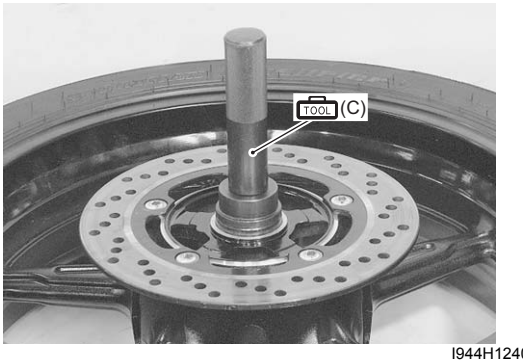


I944H1240037-01

1. Spacer	"a": Clearance

3) Install a new dust seal with the special tool.

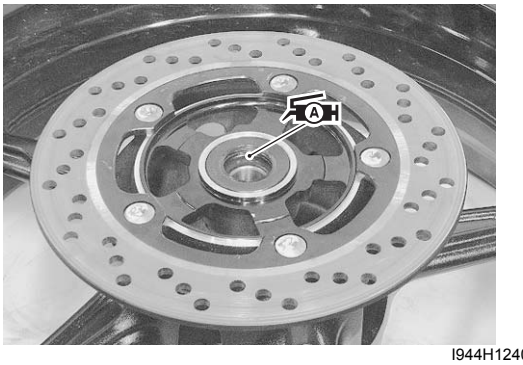
Special tool
TOOL (C): 09913–70210 (Bearing installer set)



I944H1240038-01

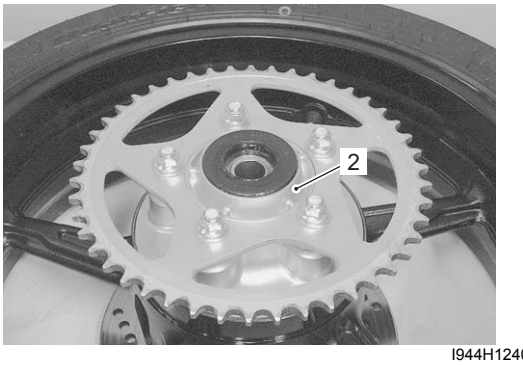
4) Apply grease to the dust seal lip.

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



I944H1240039-01

5) Install the rear sprocket mounting drum assembly (2).



I944H1240040-01

6) Install the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation (Page 2D-11)".

Tire Removal and Installation

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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.

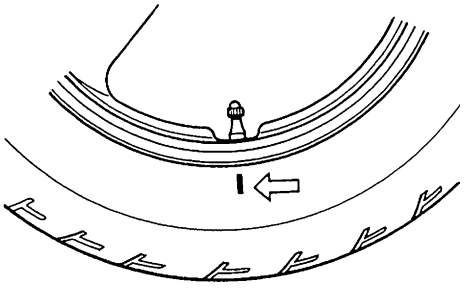
1) Removal the wheel assembly. Refer to “Front Wheel Assembly Removal and Installation (Page 2D-4)” and “Rear Wheel Assembly Removal and Installation (Page 2D-11)”.
2) Remove the mounting drum from the rear wheel. Refer to “Rear Wheel Dust Seal / Bearing Removal and Installation (Page 2D-13)”.
3) Remove the valve core.
4) Remove the tire using the tire changer.

⚠ CAUTION

For operating procedures, refer to the instructions supplied by the tire changer manufacturer.

NOTE

When removing the tire in case of repair or inspection, mark the tire with a chalk to indicate the tire position relative to the valve position. Even though the tire is refitted to the original position after repairing puncture, the tire may have to be balanced again since such a repair can cause imbalance.



I649G1240037-02

Installation

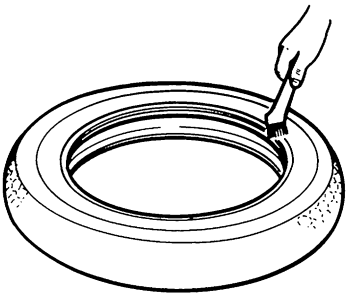
⚠ CAUTION

Do not reuse the valve which has been once removed.

1) Apply tire lubricant to the tire bead.

⚠ CAUTION

Never use oil, grease or gasoline on the tire bead in place of tire lubricant.



I649G1240038-02

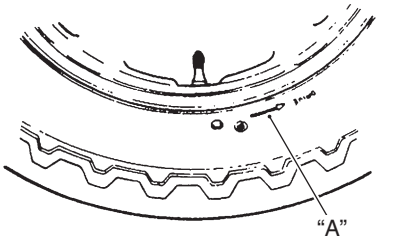
2) Install the tire onto the wheel.

⚠ CAUTION

For installation procedure of tire onto the wheel, follow the instructions given by the tire changer manufacturer.

NOTE

- **When installing the tire, the arrow “A” on the side wall should point to the direction of wheel rotation.**
- **Align the chalk mark put on the tire at the time of removal with the valve position.**



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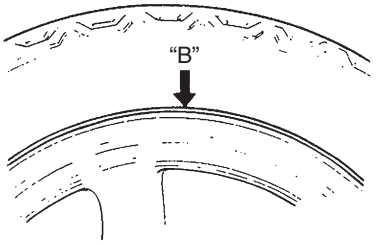
3) Bounce the tire several times while rotating. This makes the tire bead expand outward to contact the wheel, thereby facilitating air inflation.
4) Install the valve core and inflate the tire.

⚠ WARNING

- **Do not inflate the tire to more than 400 kPa (4.0 kgf/cm^2). 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.
8) As necessary, adjust the tire balance. Refer to "Wheel Balance Check and Adjustment (Page 2D-17)".

Cold inflation tire pressure

	Front	Rear
Solo riding	**225 kPa (2.25 kgf/cm²)**	**225 kPa (2.25 kgf/cm²)**
Dual riding	**250 kPa (2.50 kgf/cm²)**	**250 kPa (2.50 kgf/cm²)**

9) Install the mounting drum to the rear wheel. (For rear wheel) Refer to "Rear Wheel Dust Seal / Bearing Removal and Installation (Page 2D-13)".
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

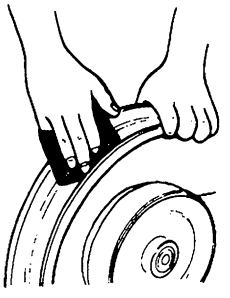
B944H12406012

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 Assembly Removal and Installation (Page 2D-4)" and "Rear Wheel Assembly Removal and Installation (Page 2D-11)".



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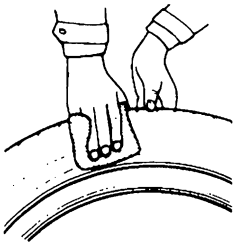
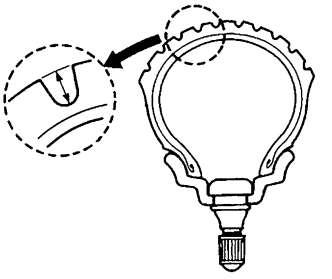
Tire

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-18)".)
- Tread separation
- Abnormal, uneven wear on tread
- Surface damage on bead
- Localized tread wear due to skidding (Flat spot)
- Abnormal condition of inner liner



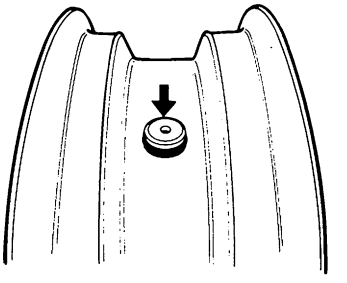
I649G1240042-02



I649G1240043-02

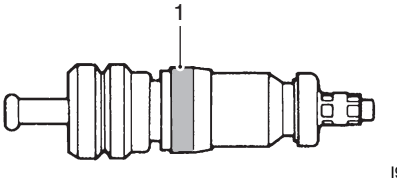
Air Valve

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)".



I944H1240041-01

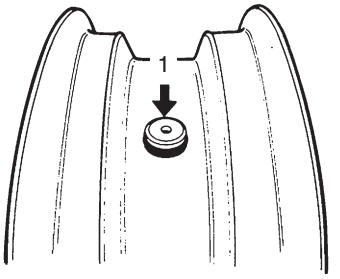
1. Seal

Air Valve Removal and Installation

B944H12406013

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.

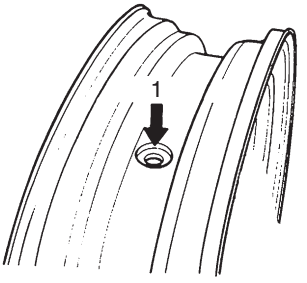


I649G1240046-02

Installation

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

- Any dust or rust around the valve hole (1) must be cleaned off.



I718H1240054-01

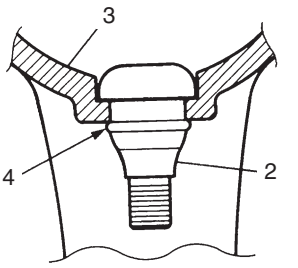
- Install the air valve (2) in the wheel (3).

⚠ CAUTION

- **Be careful not to damage the lip (4) of valve.**
- **Replace the air valve with a new one.**

NOTE

To properly install the valve into the valve hole, apply a special tire lubricant or neutral soapy liquid to the valve.



I718H1240055-01

2. Valve	3. Wheel	4. Valve lip

Wheel Balance Check and Adjustment

B944H12406014

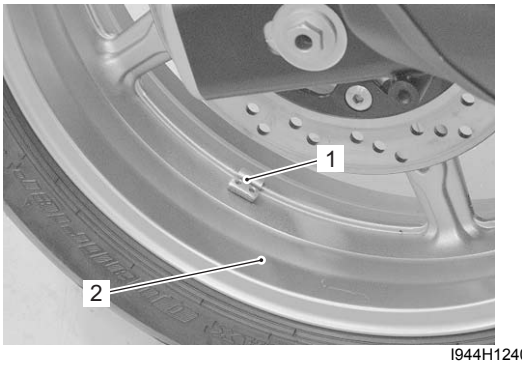
Check and adjust the wheel balance in the following procedures:

1) Removal the wheel assembly. Refer to “Front Wheel Assembly Removal and Installation (Page 2D-4)” and “Rear Wheel Assembly Removal and Installation (Page 2D-11)”.
2) Remove the mounting drum from the rear wheel. Refer to “Rear Wheel Dust Seal / Bearing Removal and Installation (Page 2D-13)”.
3) Check the wheel balance using the balancer and adjust the wheel balance if necessary.

⚠ CAUTION

For operating procedures, refer to the instructions supplied by the wheel balancer manufacturer.

4) When installing the balancer weight (1) to the wheel (2), set the balancer weight on center rib of the wheel.



I944H1240051-01

5) Recheck the wheel balance.
6) Install the mounting drum to the rear wheel. (For rear wheel)
Refer to “Rear Wheel Dust Seal / Bearing Removal and Installation (Page 2D-13)”.
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

B944H12407001

Wheel

Unit: mm (in)

Item	Standard		Limit
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	17 M/C x MT3.50	—
	Rear	17 M/C x MT5.00	—

Tire

Item	Standard		Limit
Cold inflation tire pressure (Solo riding)	Front	225 kPa (2.25 kgf/cm^2, 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm^2, 36 psi)	—
Cold inflation tire pressure (Dual riding)	Front	225 kPa (2.25 kgf/cm^2, 33 psi)	—
	Rear	250 kPa (2.50 kgf/cm^2, 36 psi)	—
Tire size	Front	120/70 ZR17M/C (58 W)	—
	Rear	160/60 ZR17M/C (69 W)	—
Tire type	Front	DUNLOP: Qualifier J	—
	Rear	DUNLOP: Qualifier J	—
Tire tread depth (Recommended depth)	Front	—	1.6 mm (0.06 in)
	Rear	—	2.0 mm (0.08 in)

Tightening Torque Specifications

B944H12407002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Front brake caliper mounting bolt	39	3.9	28.0	☞(Page 2D-5)
Front axle	65	6.5	47.0	☞(Page 2D-5)
Front axle pinch bolt	23	2.3	16.5	☞(Page 2D-5)
Rear axle nut	100	10.0	72.5	☞(Page 2D-11)

NOTE

The specified tightening torque is described in the following.
“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 torque of fastener not specified in this section, refer to “Tightening Torque List in Section 0C (Page 0C-7)”.

Special Tools and Equipment

Recommended Service Material

B944H12408001

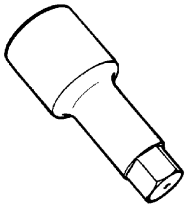
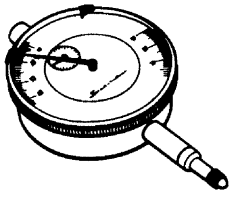
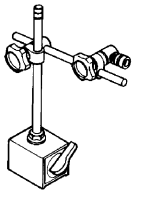
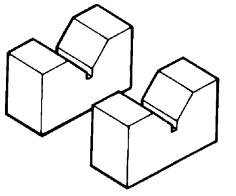
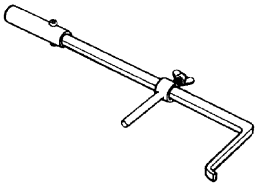
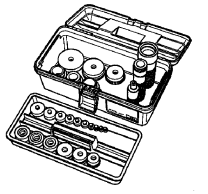
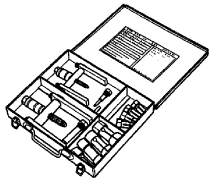
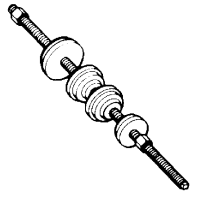
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 2D-7) / ☞(Page 2D-8) / ☞(Page 2D-13) / ☞(Page 2D-14)

NOTE

Required service material is also described in the following.
“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

B944H12408002

09900–18710 Hexagon socket (12 mm) ☞(Page 2D-4) / ☞(Page 2D-5)		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)		09913–70210 Bearing installer set (10 – 75) ☞(Page 2D-8) / ☞(Page 2D-8) / ☞(Page 2D-14) / ☞(Page 2D-14)	
09921–20240 Bearing remover set ☞(Page 2D-7) / ☞(Page 2D-13)		09941–34513 Bearing installer ☞(Page 2D-8) / ☞(Page 2D-14)	

Section 3

Driveline / Axle

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Precautions

Precautions

Precautions for Driveline / Axle

B944H13000001

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

⚠ WARNING

Never inspect or adjust the drive chain while the engine is running.

⚠ CAUTION

- **Do not use trichloroethylene, gasoline or any similar solvent. These fluids will damage the O-rings of the drive chain.**
- **Clean the drive chain with a spray-type chain cleaner and blow dry with compressed air. If the drive chain cannot be cleaned with a spray cleaner, it may be necessary to use a kerosine. Always follow the chemical manufacturer’s instructions on proper use, handling and storage.**
- **Lubricate the drive chain with a heavy weight motor oil. Wipe off any excess oil or chain lubricant. Do not use any oil sold commercially as “drive chain oil”. Such oil can damage the O-rings.**
- **The standard drive chain is DID520VM2. 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

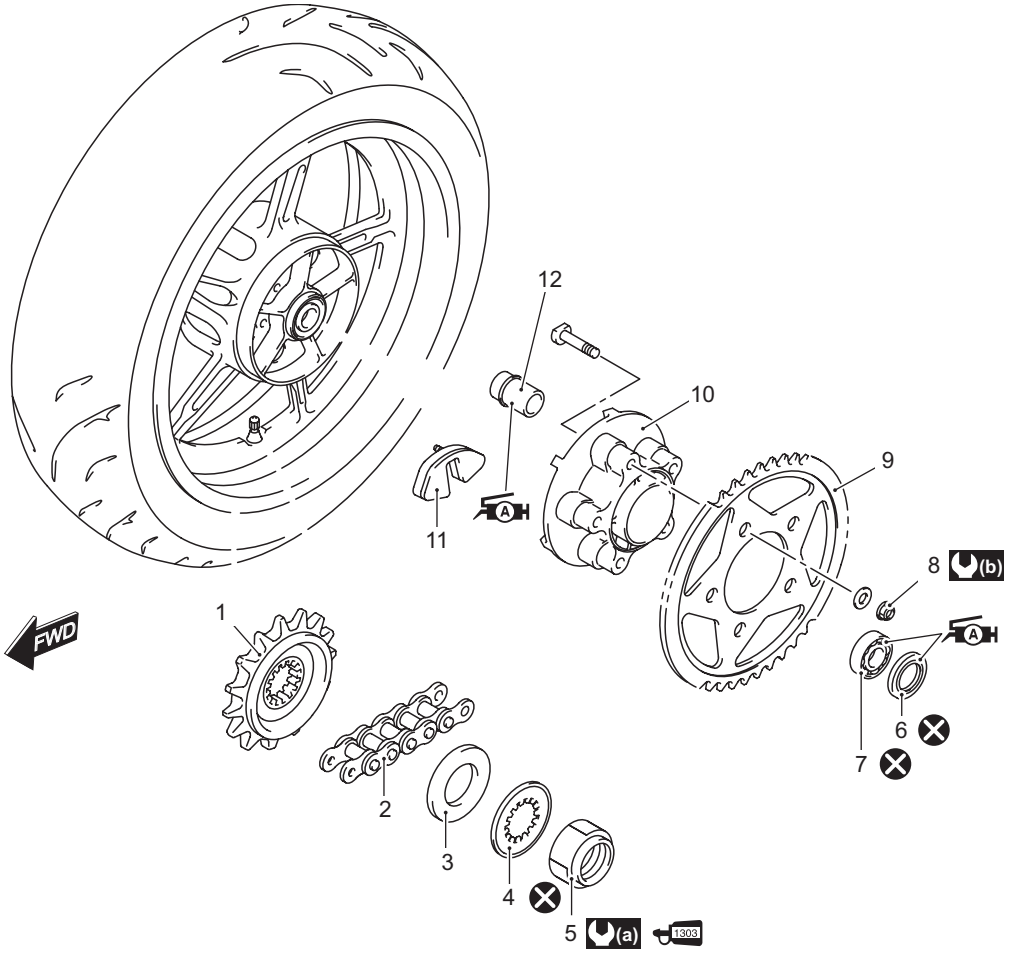
B944H13104001

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

B944H13106001



I944H1310033-01

1. Engine sprocket	7. Bearing	(a) : 145 N·m (14.5 kgf-m, 105.0 lbf-ft)
2. Drive chain	8. Rear sprocket nut	(b) : 60 N·m (6.0 kgf-m, 43.5 lbf-ft)
3. Washer	9. Rear sprocket	A : Apply grease.
4. Lock washer	10. Sprocket mounting drum	1303 : Apply thread lock to thread part.
5. Engine sprocket nut	11. Wheel damper	
6. Dust seal	12. Retainer	

Engine Sprocket Removal and Installation

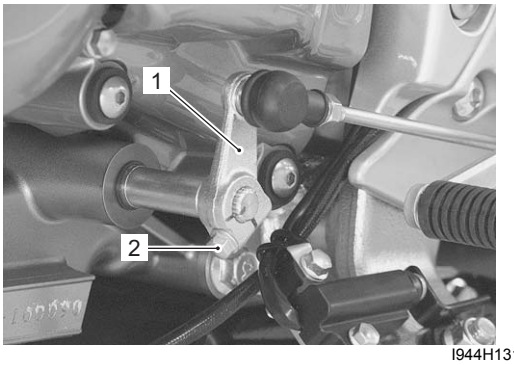
B944H13106002

Removal

1) Remove the gearshift link arm (1) by removing its bolt (2).

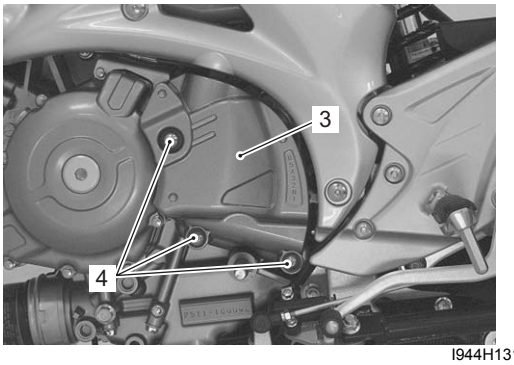
NOTE

Mark the marking to the matching surface of gearshift link arm before removing.



I944H1310001-03

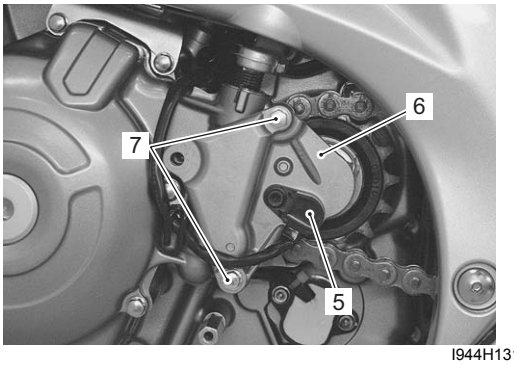
2) Remove the engine sprocket outer cover (3) by removing its screws (4).



I944H1310002-03

3) Remove the speed sensor (5).

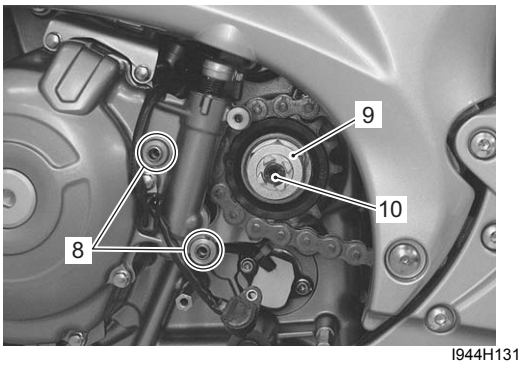
4) Remove the engine sprocket inner cover (6) by removing its bolts (7).



I944H1310003-03

5) Remove the dowel pins (8).

6) Remove the speed sensor rotor (9) by removing its bolt (10) while depressing the rear brake pedal.

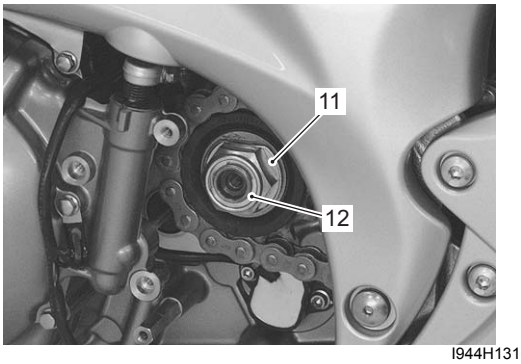


I944H1310004-05

7) Flatten the lock washer (11).

8) Remove the engine sprocket nut (12) while depressing the rear brake pedal.

9) Remove the lock washer (11).



I944H1310030-02

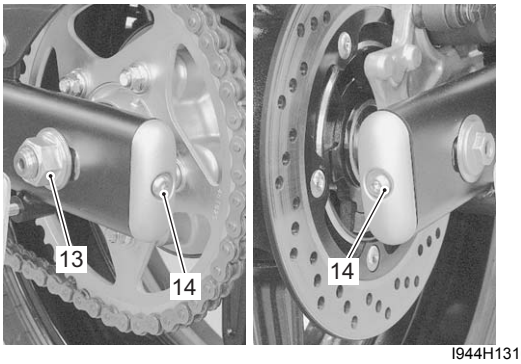
10) Loosen the rear axle nut (13).

11) Support the motorcycle with a jack or wooden block.

⚠ CAUTION

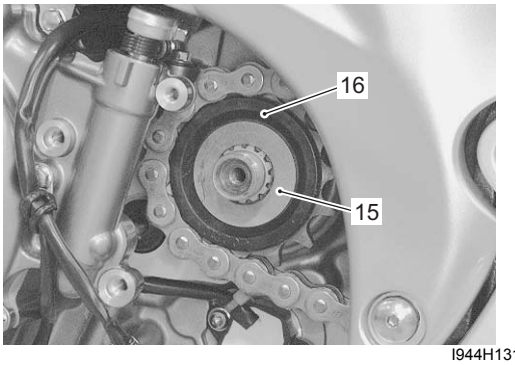
Make sure that the motorcycle is supported securely.

12) Loosen the chain adjuster bolts (14) to provide additional chain slack, left and right.



I944H1310005-02

13) Remove the washer (15) and engine sprocket (16).



I944H1310006-02

Installation

Install the engine sprocket in the reverse order of removal. Pay attention to the following points:

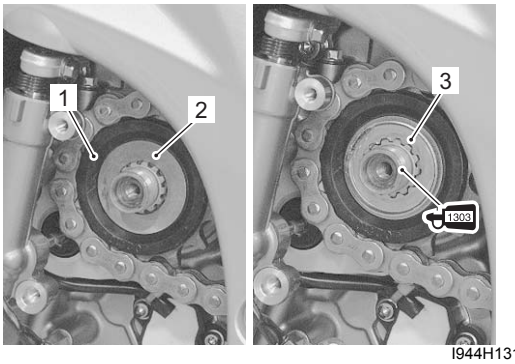
- Put the drive chain on the engine sprocket.
- Install the engine sprocket (1) and washer (2).
- Install the lock washer (3).

⚠ CAUTION

The removed lock washer must be replaced with a new one.

- Apply Thread lock super to the driveshaft.

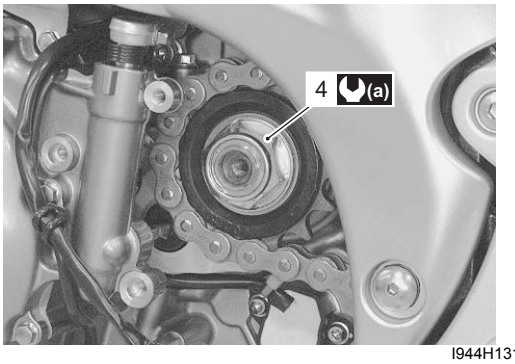
1303 : Thread lock cement 99000–32030 (Thread Lock Cement Super 1303 or equivalent)



I944H1310007-02

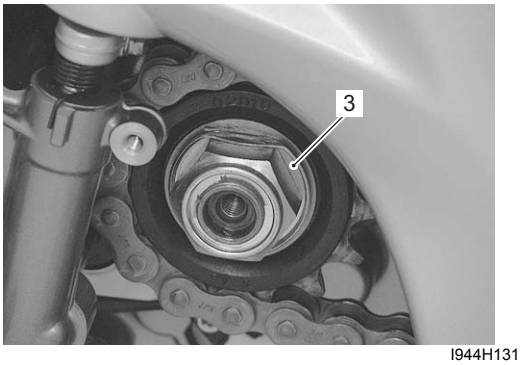
- Tighten the engine sprocket nut (4) to the specified torque.

Tightening torque
Engine sprocket nut (a): 145 N·m (14.5 kgf-m, 105.0 lbf-ft)



I944H1310008-02

- Bend the lock washer (3).

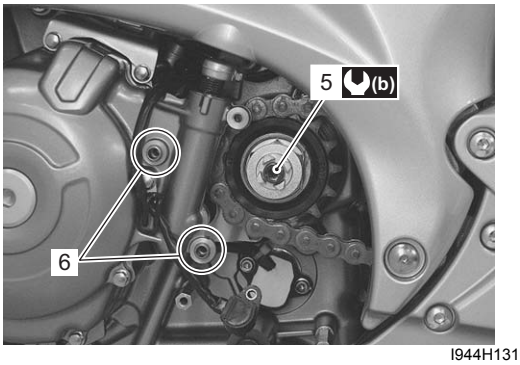


I944H1310031-01

- Tighten the speed sensor rotor bolt (5) to the specified torque.

Tightening torque
Speed sensor rotor bolt (b): 25 N·m (2.5 kgf-m, 18.0 lbf-ft)

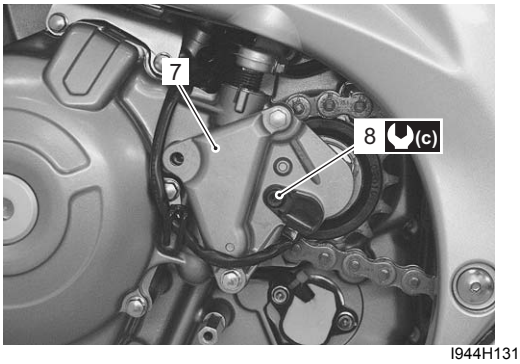
- Install the dowel pins (6).



I944H1310009-05

- Install the engine sprocket inner cover (7).
- Tighten the speed sensor mounting bolt (8) to the special torque.

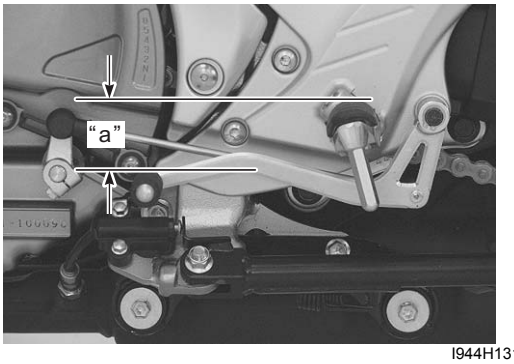
Tightening torque
Speed sensor mounting bolt (c): 5 N·m (0.5 kgf-m, 3.5 lbf-ft)



I944H1310010-03

- Install the gearshift lever to the gearshift shaft in the correct position.

  Gearshift lever height “a”
  Standard: 45 – 55 mm (1.8 – 2.2 in)



I944H1310032-02

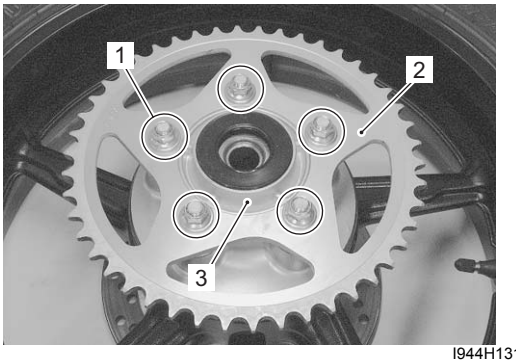
- Adjust the drive chain slack. Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.

Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation

B944H13106003

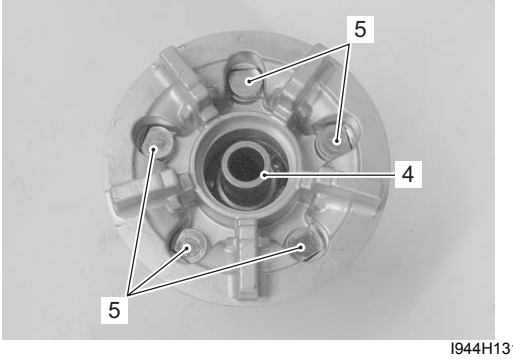
Removal

1) Remove the rear wheel assembly by disengaging the drive chain. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-11)”.
2) Remove the rear sprocket nuts (1) and separate the rear sprocket (2) from its mounting drum (3).
3) Draw out the mounting drum (3) from the wheel hub.



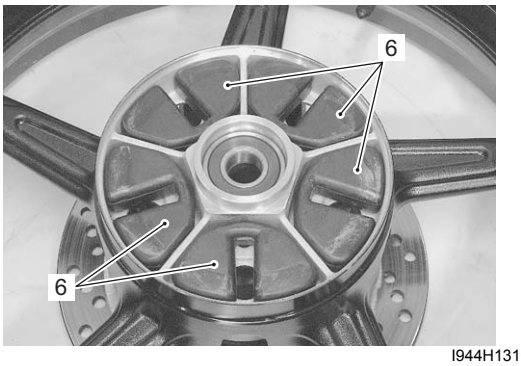
I944H1310011-02

4) Remove the retainer (4) and rear sprocket bolts (5).



I944H1310012-02

5) Remove the wheel dampers (6).



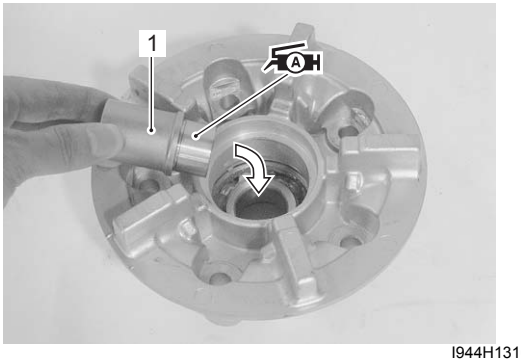
I944H1310013-02

Installation

Install the rear sprocket and rear sprocket mounting drum in the reverse order of removal. Pay attention to the following points:

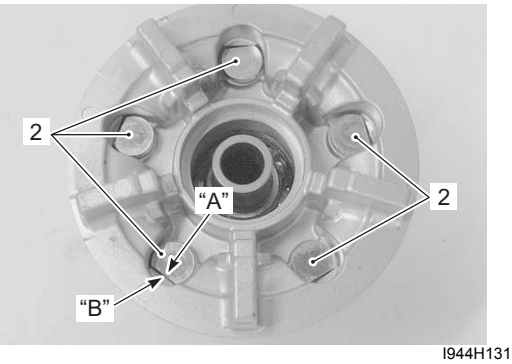
- Apply grease to the retainer (1).

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



I944H1310014-01

- Install the rear sprocket bolts (2), engage two flats “A” on the end of rear sprocket bolts face with the same shaped hole “B” on the rear sprocket mounting drum.

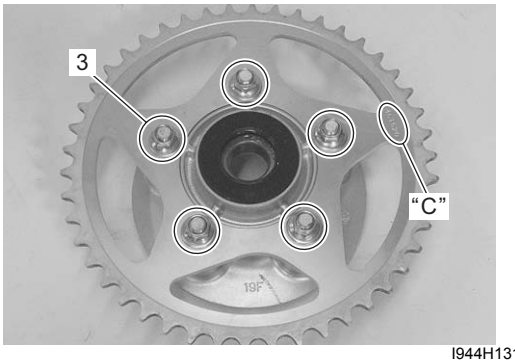


I944H1310015-01

- Temporarily tighten the rear sprocket nuts (3).

NOTE

The stamped mark "C" on the sprocket should face outside.



I944H1310016-03

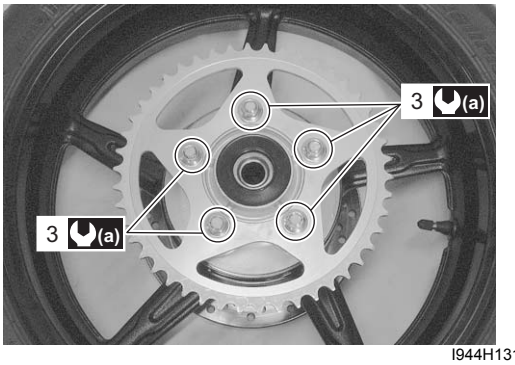
- Apply grease to the contacting surface between the rear wheel hub and the mounting drum.

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

I944H1310017-01

- Tighten the rear sprocket nuts (3) to the specified torque.

Tightening torque
Rear sprocket nut (a): 60 N·m (6.0 kgf-m, 43.5 lbf-ft)



I944H1310029-02

- Install the rear wheel assembly. Refer to "Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-11)".

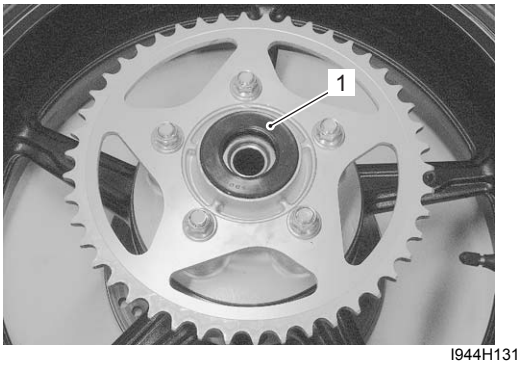
Drive Chain Related Parts Inspection

B944H13106004

Refer to "Rear Sprocket / Rear Sprocket Mounting Drum Removal and Installation (Page 3A-4)".

Dust Seal

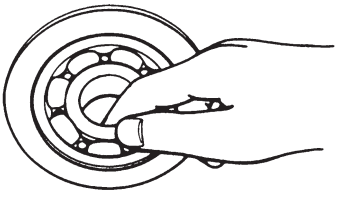
Inspect the sprocket mounting drum dust seal (1) for wear or damage. If any damage is found, replace the dust seal with a new one.



I944H1310018-02

Bearing

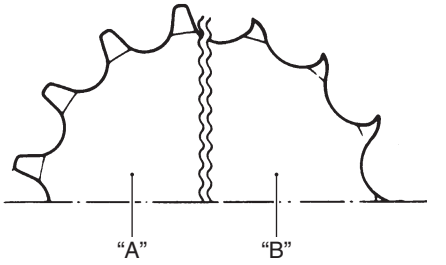
Inspect the play of the sprocket mounting drum bearings by hand while they are in the wheel and drum. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.



I649G1310015-02

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.



I649G1310016-02

"A": Normal wear	"B": Excessive wear

Wheel Damper
Inspect the dampers for wear and damage. Replace the damper if there is anything unusual.

I944H1310019-01

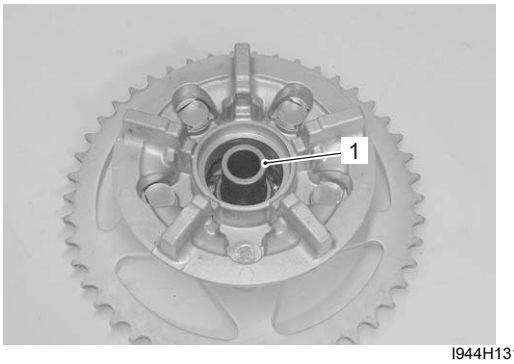
Drive Chain
Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.

Sprocket Mounting Drum Dust Seal / Bearing Removal and Installation

B944H13106005

Removal

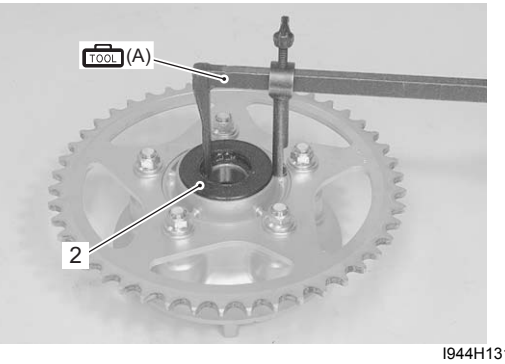
1) Remove the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-11)”.
2) Remove the rear sprocket mounting drum assembly from the rear wheel. Refer to “Rear Wheel Dust Seal / Bearing Removal and Installation in Section 2D (Page 2D-13)”.
3) Remove the retainer (1).



I944H1310020-01

4) Remove the sprocket mounting drum dust seal (2) using the special tool.

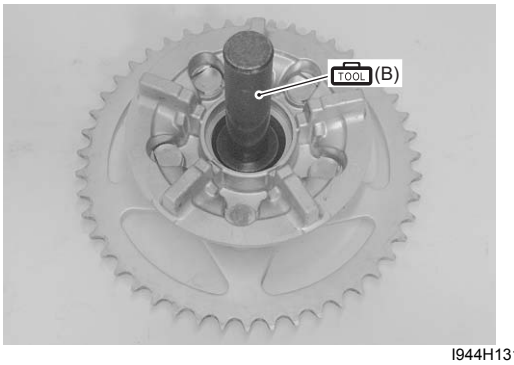
Special tool
(A): 09913–50121 (Oil seal remover)



I944H1310021-01

5) Remove the sprocket mounting drum bearing using the special tool.

Special tool
(B): 09913–70210 (Bearing installer set)



I944H1310022-01

Installation

⚠ CAUTION

The removed dust seal and bearing must be replaced with new ones.

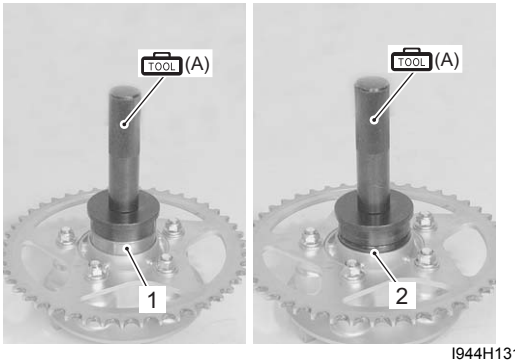
1) Apply grease to the bearing before installing.

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

I649G1310020-02

2) Install the bearing (1) and dust seal (2) to the sprocket mounting drum using the special tool.

Special tool
(A): 09913–70210 (Bearing installer set)



I944H1310023-02

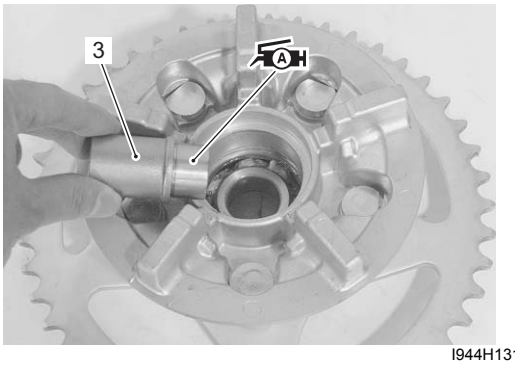
3) Apply grease to the dust seal lip.

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

I944H1310024-02

4) Apply grease to the retainer (3) before installing the rear sprocket mounting drum.

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



I944H1310025-01

5) Install the rear sprocket mounting drum assembly to rear wheel. Refer to “Front Wheel Dust Seal / Bearing Removal and Installation in Section 2D (Page 2D-7)”.

6) Install the rear wheel assembly. Refer to “Rear Wheel Assembly Removal and Installation in Section 2D (Page 2D-11)”.

Drive Chain Replacement

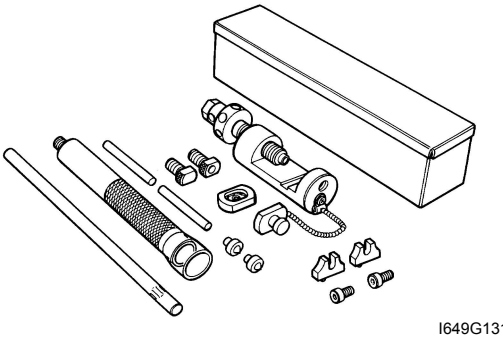
B944H13106006

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.

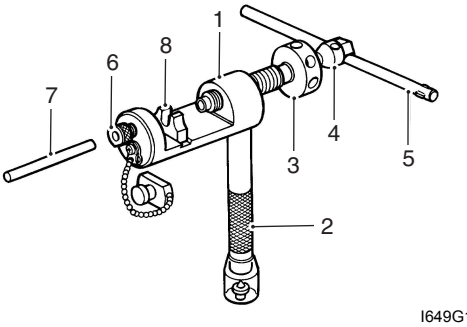
Special tool
: 09922–22711 (Drive chain cutting and joining tool)



I649G1310023-02

Drive Chain Cutting

1) Set up the special tool as shown in the illustration.

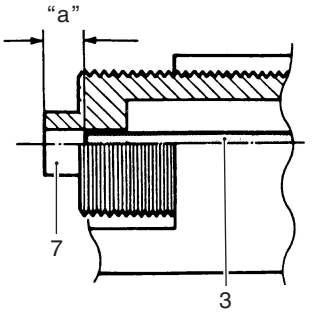


I649G1310024-02

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

NOTE

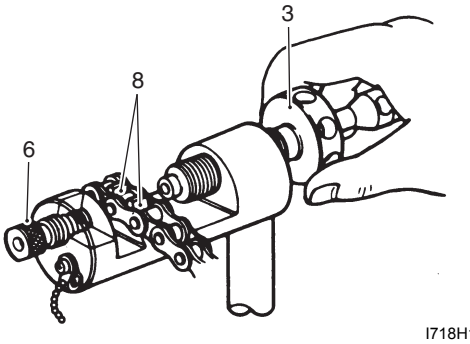
The tip of pin remover (7) should be positioned inside "a" approximately 5 mm (0.2 in) from the end face of pressure bolt [A] (3) as shown in the illustration.



I944H1310026-01

"a": 5 mm (0.2 in)

2) Place the drive chain link being disjointed on the holder part (8) of the tool.
3) Turn in both the adjuster bolt (6) and pressure bolt [A] (3) so that each of their end hole fits over the chain joint pin properly.
4) Tighten the pressure bolt [A] (3) with the bar.



I718H1310032-01

5) Turn in the pressure bolt [B] (4) with the bar (5) and force out the drive chain joint pin (9).

⚠ CAUTION

Continue turning in the pressure bolt [B] (4) until the joint pin has been completely pushed out of the chain.

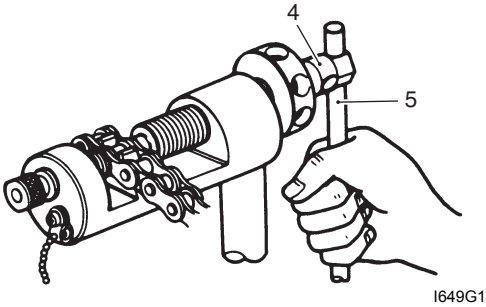
NOTE

After the joint pin (9) is removed, loosen the pressure bolt [B] (4) and then pressure bolt [A] (3).

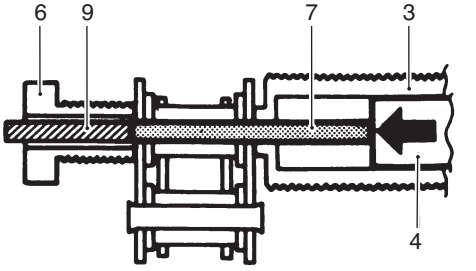
6) Remove the joint pin (9) of the other side of joint plate.

⚠ CAUTION

Never reuse joint pins, O-rings and plates.



I649G1310027-02



I649G1310028-02

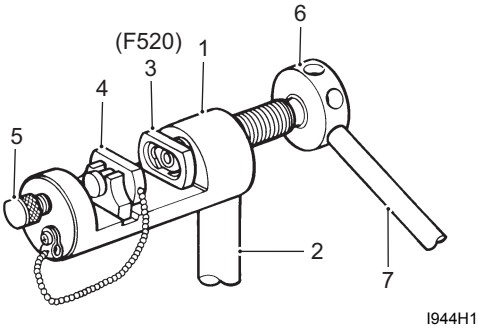
Drive Chain Connecting

⚠ 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 illustration.



I944H1310027-02

1.	Tool body
2.	Grip handle
3.	Joint plate holder (Engraved mark "F520")
4.	Wedge holder and wedge pin
5.	Adjuster bolt (Without hole)
6.	Pressure bolt [A]
7.	Bar

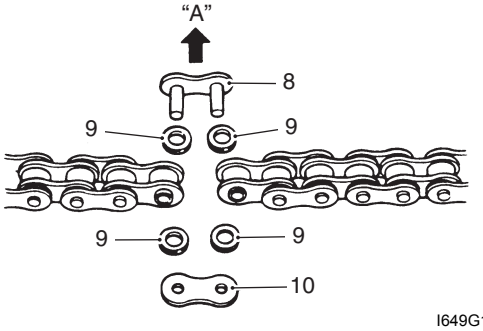
2) Apply grease to the joint pins (8), O-rings (9) and plates (10).

⚠ CAUTION

Replace the joint pins (8), O-rings (9) and plates (10) with new ones.

3) Connect both ends of the drive chain with the joint pin (8) inserted from the wheel side “A” as installed on the motorcycle.

Joint set part number
RK: 27620 – 44H00



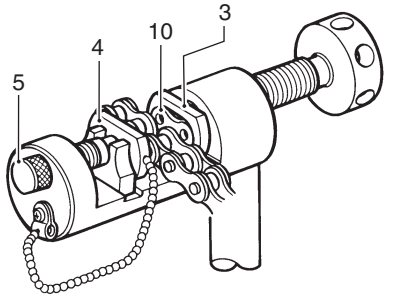
I649G1310030-02

4) Apply grease on the recessed portion of the joint plate holder (3) and set the joint plate (10).

NOTE

When positioning the joint plate (10) on the tool, its stamp mark must face the joint plate holder (3) side.

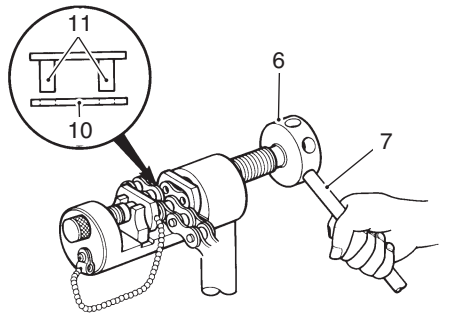
5) Set the drive chain on the tool as illustrated and turn in the adjuster bolt (5) to secure the wedge holder and wedge pin (4).



I649G1310031-02

6) Turn in the pressure bolt [A] (6) and align two joint pins (11) properly with the respective holes of the joint plate (10).

7) Turn in the pressure bolt [A] (6) further using the bar (7) to press the joint plate over the joint pins.



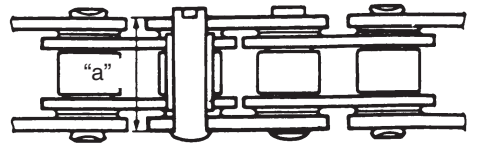
I649G1310032-02

8) Continue pressing the joint plate until the distance between the two joint plates come to the specification.

Joint plate distance specification “a”
17.10 – 17.30 mm (0.673 – 0.681 in)

⚠ CAUTION

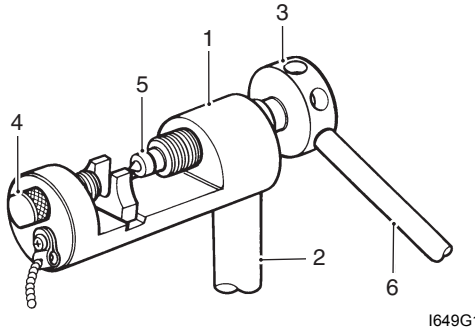
Should pressing of the joint plate be made excessively beyond the specified dimension, the work should be redone using the new joint parts.



I649G1310033-03

Joint pin staking

1) Set up the special tool as shown in the illustration.



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

NOTE

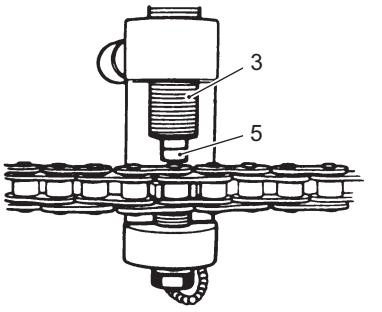
Before staking the joint pin, apply a small quantity of grease to the staking pin (5).

2) Stake the joint pin by turning (approximately 7/8 turn) the pressure bolt [A] (3) with the bar (6) until the pin end diameter becomes the specified dimension.

⚠ CAUTION

- **After joining of the chain has been completed, check to make sure that the link is smooth and no abnormal condition is found.**
- **Should any abnormal condition be found, reassemble the chain link using the new joint parts.**

Pin end diameter specification "a"
DID: 5.50 – 5.80 mm (0.217 – 0.228 in)



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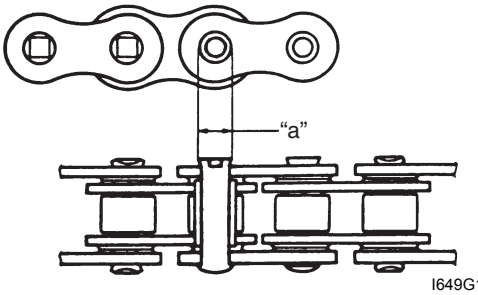


I649G1310036-03

3) Adjust the drive chain slack, after connecting it. Refer to "Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)".

Specifications

Service Data

B944H13107001

Drive Chain
Unit: mm (in)

Item	Standard		Limit
Final reduction ratio	3.066 (46/15)		—
Drive chain	Type	DID 520VM2	—
	Links	112 links	—
	20-pitch length	—	319.4 (12.57)
Drive chain slack	20 – 30 (0.8 – 1.2)		—

Tightening Torque Specifications

B944H13107002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Engine sprocket nut	145	14.5	105.0	☞(Page 3A-3)
Speed sensor rotor bolt	25	2.5	18.0	☞(Page 3A-3)
Speed sensor mounting bolt	5	0.5	3.5	☞(Page 3A-3)
Rear sprocket nut	60	6.0	43.5	☞(Page 3A-5)

NOTE

The specified tightening torque is described in the following.
"Drive Chain Related Components (Page 3A-1)"

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

Special Tools and Equipment

Recommended Service Material

B944H13108001

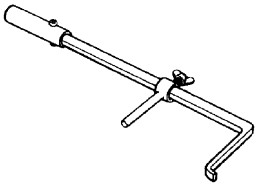
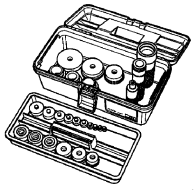
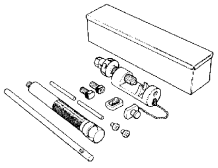
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 3A-4) / ☞(Page 3A-5) / ☞(Page 3A-6) / ☞(Page 3A-7) / ☞(Page 3A-7)
Thread lock cement	Thread Lock Cement Super 1303 or equivalent	P/No.: 99000–32030	☞(Page 3A-3)

NOTE

Required service material is also described in the following.
"Drive Chain Related Components (Page 3A-1)"

Special Tool

B944H13108002

09913–50121 Oil seal remover ☞(Page 3A-6) 	09913–70210 Bearing installer set (10 – 75) ☞(Page 3A-6) / ☞(Page 3A-7) 
09922–22711 Drive chain cutting and joint tool set ☞(Page 3A-7) 	

Section 4

Brake

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Precautions

Precautions

Precautions for Brake System

B944H14000001

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

Brake Fluid Information

B944H14000002

⚠ 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 long periods of time.**
- **When storing brake fluid, seal the container completely and keep it away from children.**
- **When replenishing brake fluid, take care not to get dust into the fluid.**
- **When washing brake components, use new brake fluid. Never use cleaning solvent.**
- **A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the disc with high quality brake cleaner or neutral detergent.**

⚠ CAUTION

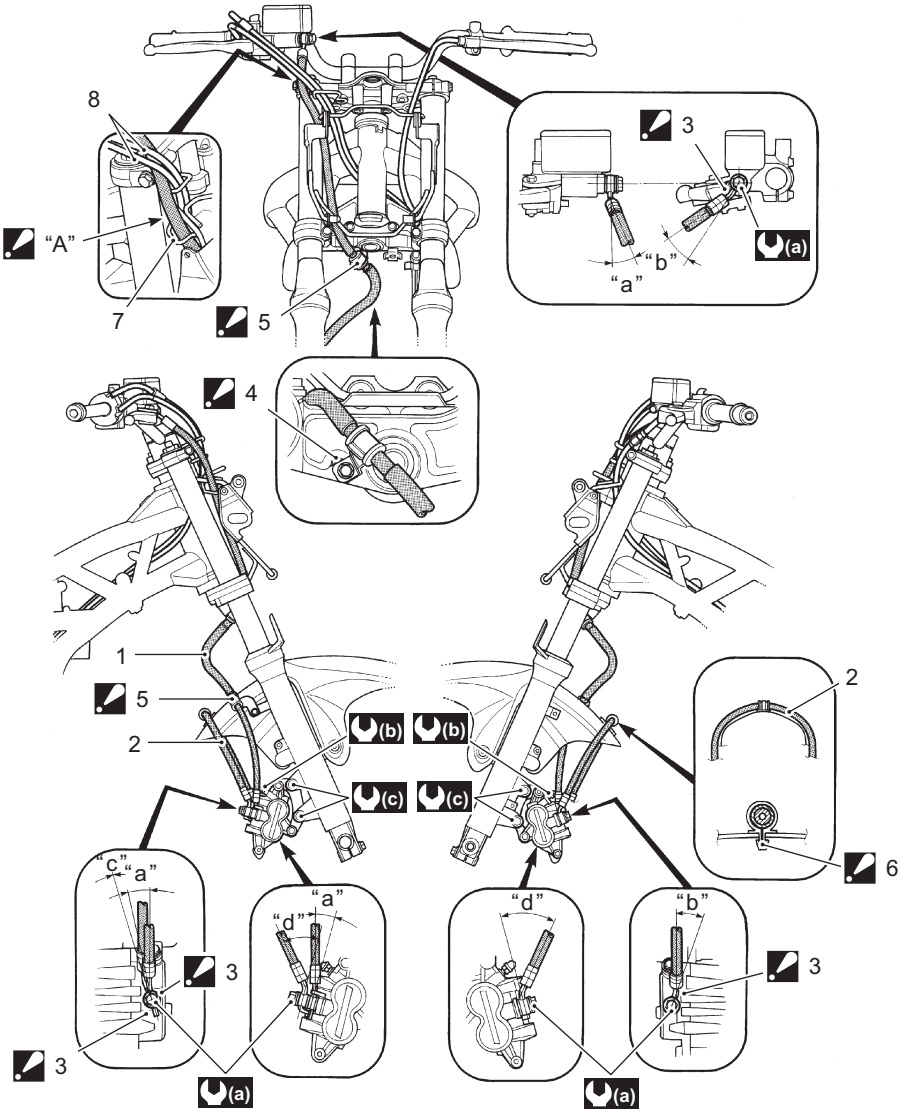
Immediately and completely wipe off any brake fluid contacting any part of the motorcycle. The brake fluid reacts chemically with paint, plastics and rubber materials, etc., and will damage them severely.

Brake Control System and Diagnosis

Schematic and Routing Diagram

Front Brake Hose Routing Diagram

B944H14102001

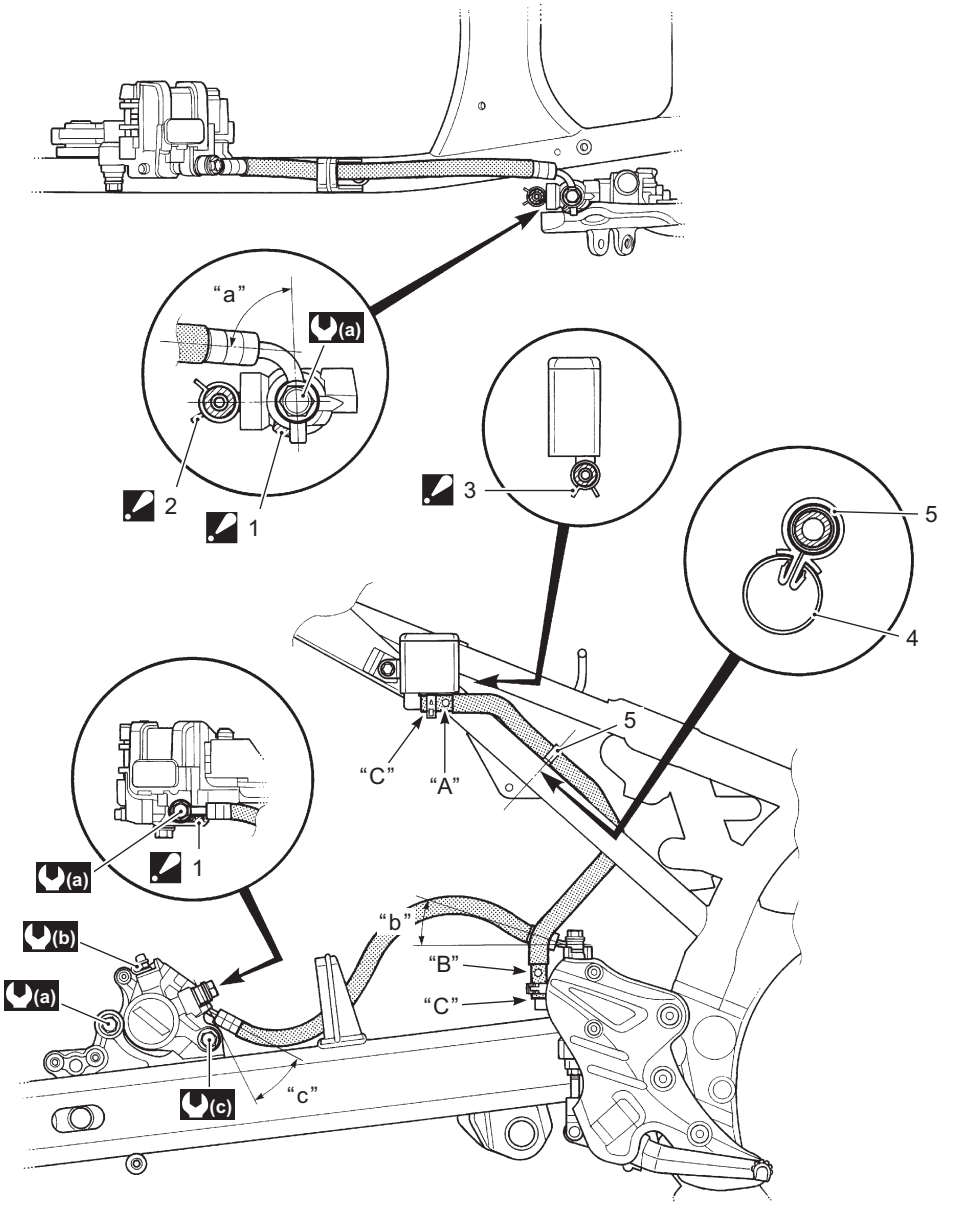


I944H1410044-03

1. Front brake hose No. 1	"A": Pass the front brake hose No. 1 inside of the headlight housing brace and under the throttle cables.
2. Front brake hose No. 2	"a": 14°
3. Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.	"b": 21°
4. Stopper : After positioning the clamp with the stopper, tighten the clamp bolt.	"c": 0°
5. Clamp : Clamp the brake hose firmly.	"d": 42°
6. Clamp : Insert the clamp to the hole of the front fender fully.	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
7. Headlight housing brace	(b) : 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)
8. Throttle cable	(c) : 39 N·m (3.9 kgf-m, 28.0 lbf-ft)

Rear Brake Hose Routing Diagram

B944H14102003



I944H1410042-01

1. Stopper : After the brake hose union has contacted the stopper, tighten the union bolt.	"C": Insert the reservoir hose firmly.
2. Brake hose clamp : Brake hose clamp ends should face backward.	"a": 84°
3. Brake hose clamp : Brake hose clamp ends should face downward.	"b": 14°
4. Frame	"c": 35°
5. Reservoir hose clamp	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
"A": White paint	(b) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
"B": Yellow paint	(c) : 27 N·m (2.7 kgf-m, 19.5 lbf-ft)

Diagnostic Information and Procedures

Brake Symptom Diagnosis

B944H14104001

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 cup.	*Replace piston and cup.*
	Worn piston seal and dust seal.	*Replace piston seal and dust seal.*
Brake drags	Rusty part.	*Clean and lubricate.*
	Insufficient brake lever or brake pedal pivot lubrication.	*Lubricate.*

Repair Instructions

Brake Pedal Height Inspection and Adjustment

B944H14106001

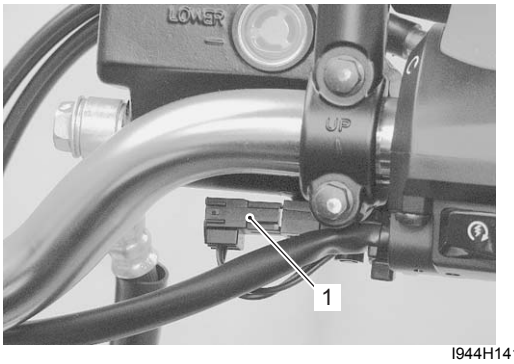
Refer to “Brake System Inspection in Section 0B (Page 0B-16)”.

Front Brake Light Switch Inspection

B944H14106002

Inspect the front brake light switch in the following procedures:

1) Disconnect the front brake light switch lead coupler (1).



I944H1410001-01

2) Inspect the switch for continuity with a tester.
If any abnormality is found, replace the front brake light switch with a new one. Refer to “Front Brake Master Cylinder / Brake Lever Disassembly and Assembly (Page 4A-11)”.

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

Tester knob indication
Continuity (•))))

Color / Position	Terminal (B/G)	Terminal (B)
OFF		
ON	○——	——○

I649G1410004-03

3) Connect the front brake light switch lead coupler.

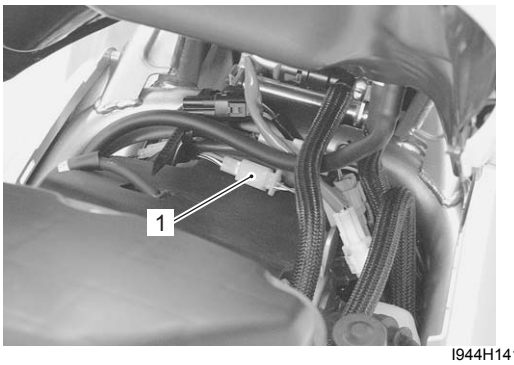
Rear Brake Light Switch Inspection

B944H14106003

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-7)”.

2) Disconnect the rear brake light switch lead coupler (1).



I944H1410035-01

3) Inspect the switch for continuity with a tester.
If any abnormality is found, replace the rear brake light switch with a new one.

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

Tester knob indication
Continuity (•))))

Rear brake light switch

Color / Position	Terminal (O)	Terminal (W/B)
ON	○——	——○
OFF		

I944H1410002-01

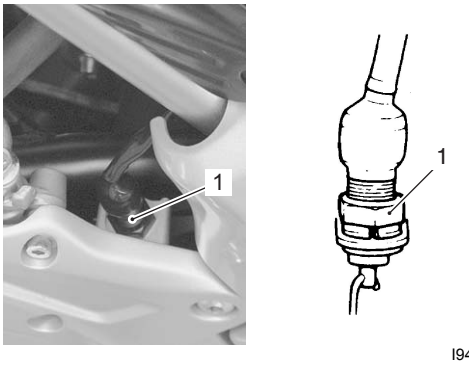
4) Connect the rear brake light switch lead coupler.

5) Reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.

Rear Brake Light Switch Inspection and Adjustment

B944H14106004

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.



I944H1410036-02

Brake Fluid Level Check

B944H14106005

Refer to “Brake System Inspection in Section 0B (Page 0B-16)”.

Brake Hose Inspection

B944H14106006

Refer to “Brake System Inspection in Section 0B (Page 0B-16)”.

Air Bleeding from Brake Fluid Circuit

B944H14106007

Air trapped in the brake fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by “sponginess” of the brake lever and also by lack of braking force. Considering the danger to which such trapped air exposes the machine and rider, it is essential that after remounting the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner:

⚠ CAUTION

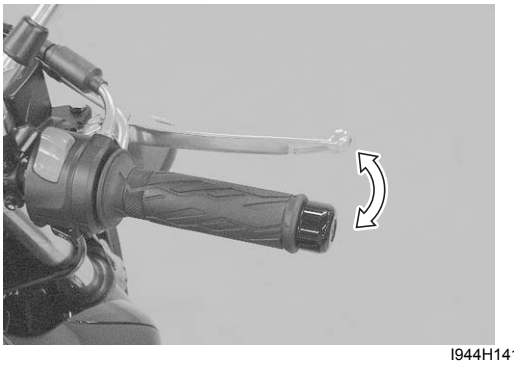
Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.

Front Brake

1) Fill the master cylinder reservoir to the top of the inspection window. Place the reservoir cap to prevent dirt from entering.

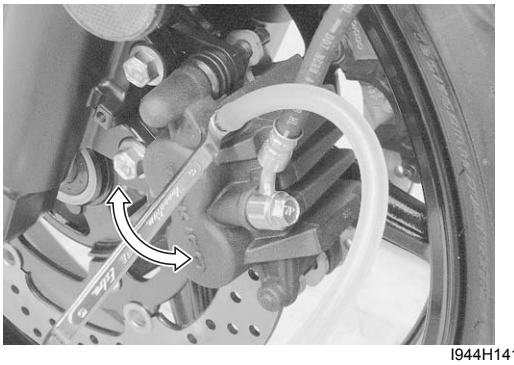
I944H1410003-01

2) Attach a hose to the air bleeder valve, and insert the free end of the hose into a receptacle.
3) Squeeze and release the brake lever several times in rapid succession and squeeze the lever fully without releasing it.



I944H1410004-01

4) Loosen the air bleeder valve by turning it a quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake lever causing it to touch the handlebar grip.



I944H1410005-01

5) Close the air bleeder valve, pump and squeeze the lever, and open the valve.
6) Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.

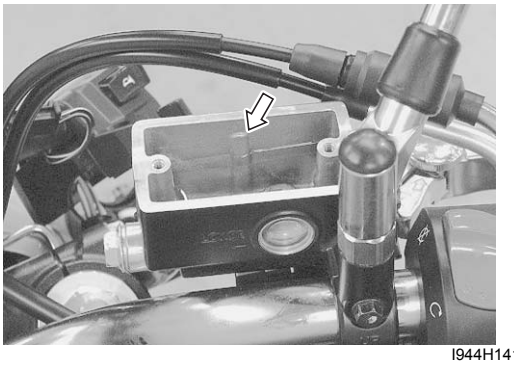
NOTE

While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.

7) Close the air bleeder valve and disconnect the hose.

Tightening torque
Air bleeder valve (Front brake): 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)

8) Fill the reservoir with brake fluid to the upper line of the reservoir.



I944H1410006-01

9) Install the reservoir cap.

Rear Brake

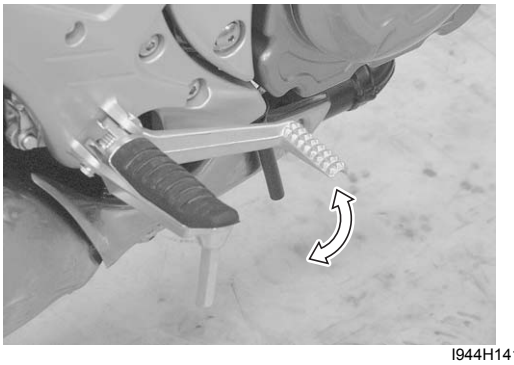
Bleed air from the rear brake system as the same manner of front brake. Pay attention to following points:

- Remove the right rear frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.

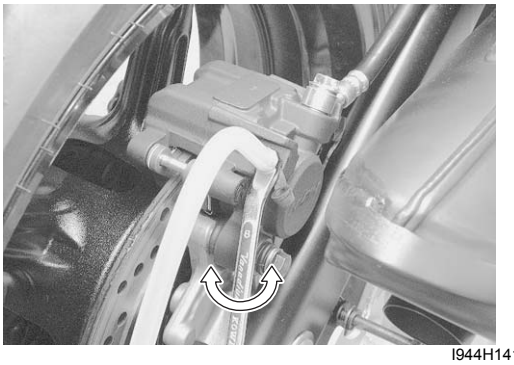
NOTE

The only difference of bleeding operation from the front brake is that the rear master cylinder is actuated by a pedal.

Tightening torque
Air bleeder valve (Rear brake): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)

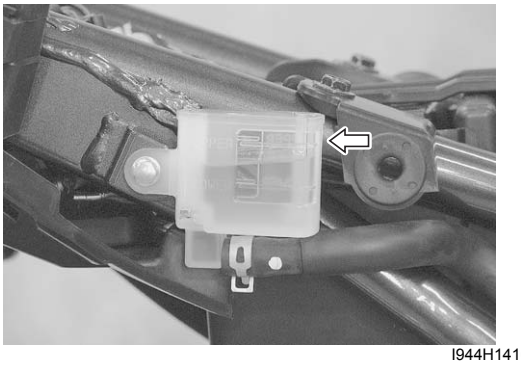


I944H1410007-01



I944H1410008-01

- Fill the reservoir with brake fluid to the upper mark of the reservoir.



I944H1410009-01

- Install the right rear frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.

Brake Fluid Replacement

B944H14106008

⚠ CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.

Front Brake

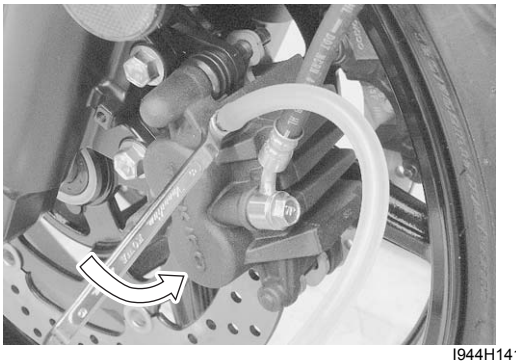
1) Place the motorcycle on a level surface and keep the handlebars straight.
2) Remove the brake fluid reservoir cap and diaphragm.
3) Suck up the old brake fluid as much as possible.

I944H1410010-01

4) Fill the reservoir with new brake fluid.

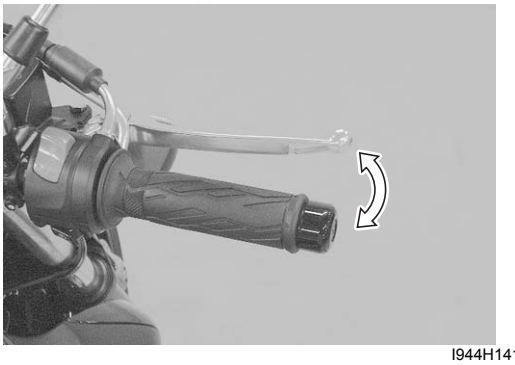
BF: Brake fluid (DOT 4)

5) Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.



I944H1410011-01

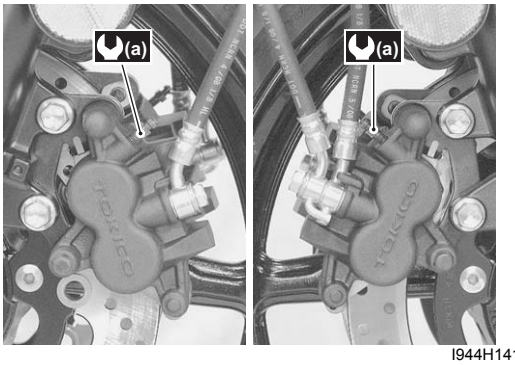
6) Loosen the air bleeder valve and pump the brake lever until the old brake fluid flows out of the brake system.



I944H1410012-01

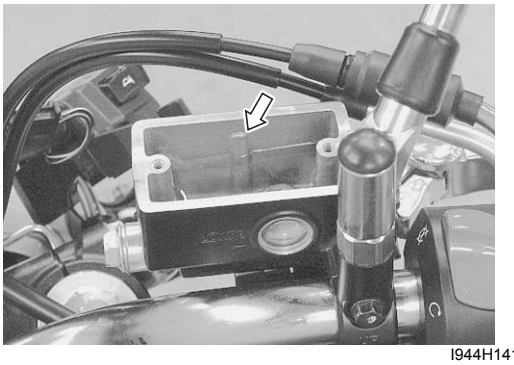
7) Close the air bleeder valve and disconnect the clear hose.

Tightening torque
Air bleeder valve (Front brake) (a): 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)



I944H1410013-01

8) Fill the reservoir with brake fluid to the upper line reservoir.



I944H1410014-01

9) Install the reservoir cap.

Rear Brake

Replace the brake fluid from the rear brake system as the same manner of front brake.

1) Place the motorcycle on a level surface.
2) Remove the right rear frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Remove the brake fluid reservoir cap and diaphragm.
4) Suck up the old brake fluid as much as possible.

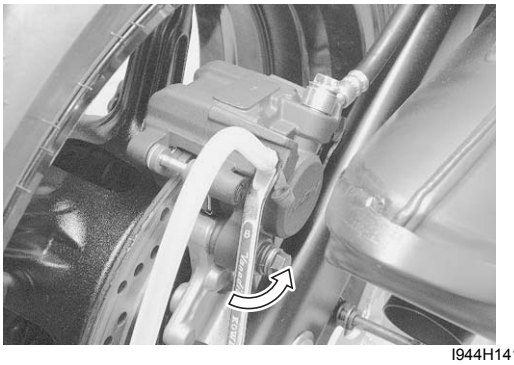
I944H1410015-01

5) Fill the reservoir with new brake fluid.

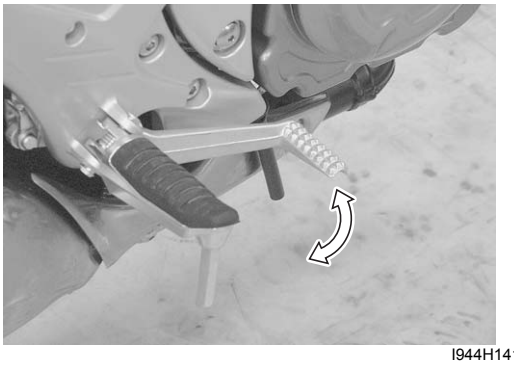
BF: Brake fluid (DOT 4)

6) Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.

7) Loosen the air bleeder valve and pump the brake pedal until the old brake fluid flows out of the brake system.



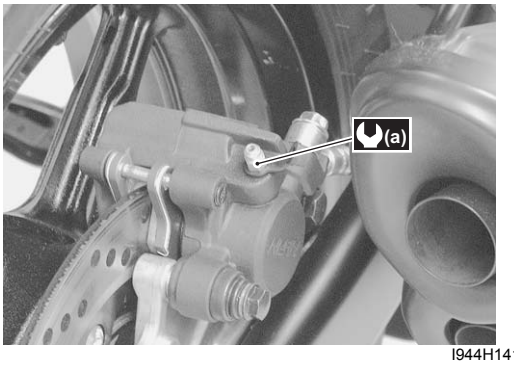
I944H1410016-01



I944H1410017-01

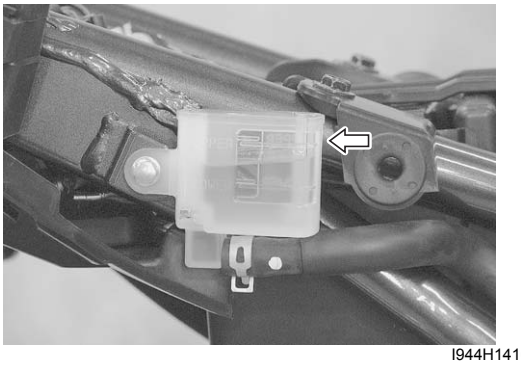
8) Close the air bleeder valve and disconnect the clear hose.

Tightening torque
Air bleeder valve (Rear brake) (a): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



I944H1410018-01

9) Fill the reservoir with brake fluid to the upper mark reservoir.



I944H1410019-01

10) Install the reservoir cap.

Brake Hose Removal and Installation

B944H14106009

Removal

1) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-6)”.
2) Remove the front and rear brake hoses as shown in the front and rear brake hose routing diagram. Refer to “Front Brake Hose Routing Diagram (Page 4A-1)” and “Rear Brake Hose Routing Diagram (Page 4A-2)”.

Installation

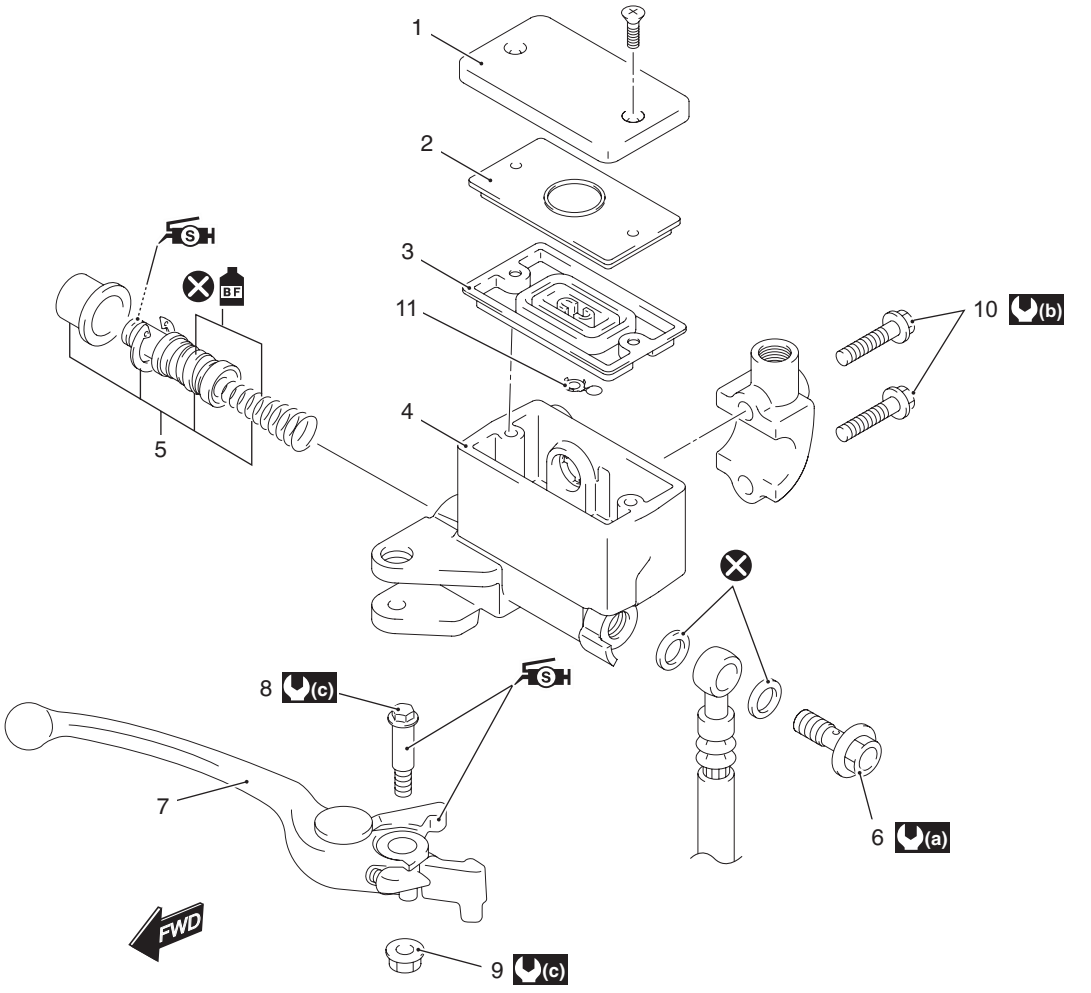
⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

1) Install the front and rear brake hoses as shown in the front and rear brake hose routing diagram. Refer to “Front Brake Hose Routing Diagram (Page 4A-1)” and “Rear Brake Hose Routing Diagram (Page 4A-2)”.
2) Bleed air from the front and rear brake system. Refer to “Air Bleeding from Brake Fluid Circuit (Page 4A-5)”.

Front Brake Master Cylinder Components

B944H14106010



I944H1410043-02

1. Reservoir cap	7. Brake lever	(b) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
2. Plate	8. Brake lever pivot bolt	(c) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
3. Diaphragm	9. Brake lever pivot bolt lock-nut	BF : Apply brake fluid.
4. Master cylinder	10. Master cylinder holder bolt	SH : Apply silicone grease.
5. Piston / Cup set	11. Protector	⊗ : Do not reuse.
6. Brake hose union bolt	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	

Front Brake Master Cylinder Assembly Removal and Installation

B944H14106011

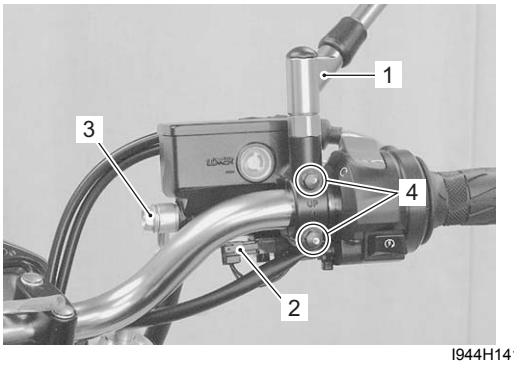
Removal

1) Remove the right rear view mirror (1).
2) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-6)”.
3) Disconnect the front brake light switch lead coupler (2).
4) Place a clean rag underneath the brake hose union bolt (3) on the master cylinder to catch any spilt brake fluid.

⚠ CAUTION

The brake fluid reacts chemically with paint, plastics, rubber materials, etc., and will damage them severely.

5) Remove the brake hose union bolt (3) and disconnect the brake hose.
6) Remove the master cylinder holder bolts (4).



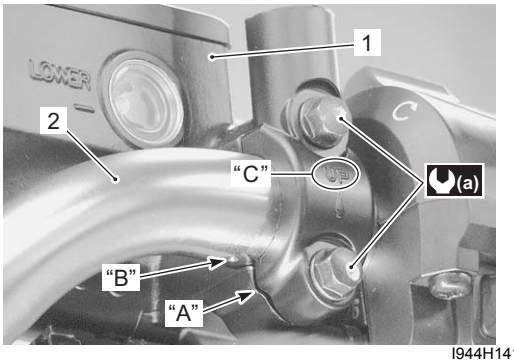
I944H1410020-02

Installation

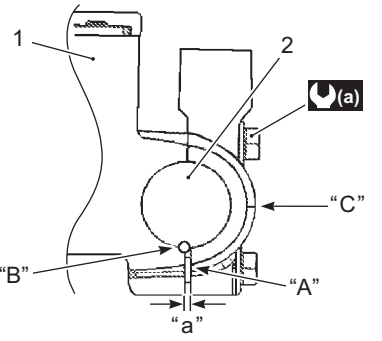
Install the front brake master cylinder in the reverse order of removal. Pay attention to the following points:

- When installing the master cylinder (1) onto the handlebars (2), align the master cylinder holder’s mating surface “A” with the punch mark “B” on the handlebars (2) and tighten the upper holder bolt first.

Tightening torque
Master cylinder holder bolt (Upper and Lower)
(a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1410021-01



I944H1410037-01

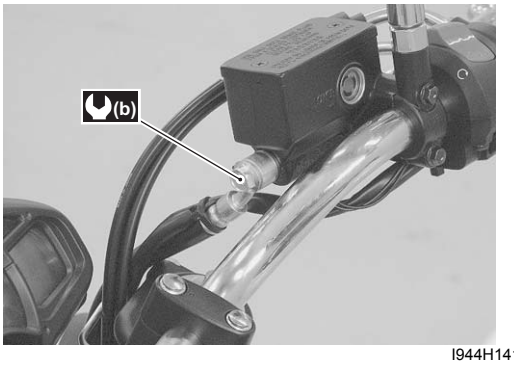
“C”: Up mark	“a”: Clearance

- After setting the brake hose union to the stopper, tighten the union bolt to the specified torque.

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

Tightening torque
Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



I944H1410038-01

- Bleed air from the brake system. Refer to “Air Bleeding from Brake Fluid Circuit (Page 4A-5)”.

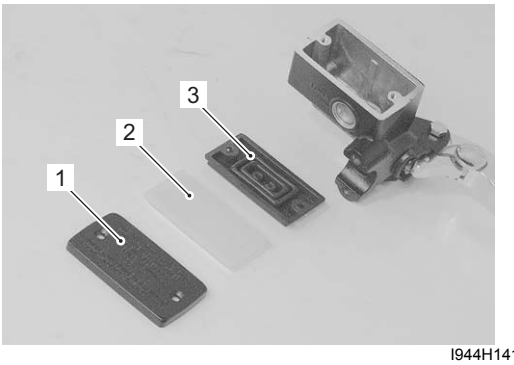
Front Brake Master Cylinder / Brake Lever Disassembly and Assembly

B944H14106020

Refer to “Front Brake Master Cylinder Assembly Removal and Installation (Page 4A-10)”.

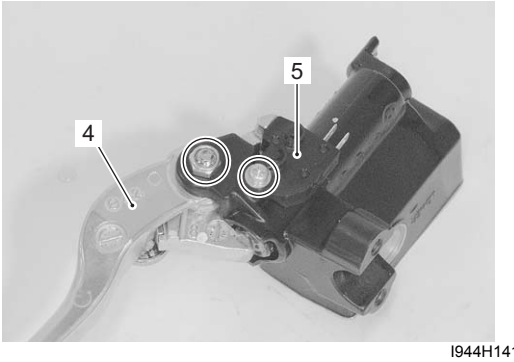
Disassembly

1) Remove the reservoir cap (1), plate (2) and diaphragm (3).



I944H1410022-01

2) Remove the brake lever (4) and brake light switch (5).

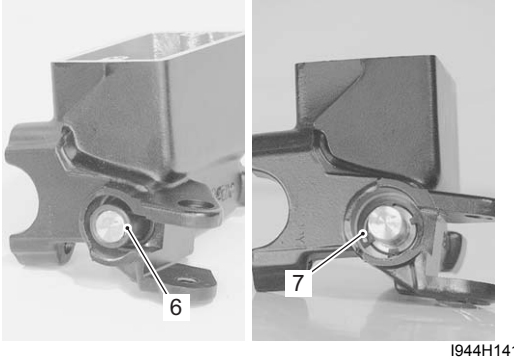


I944H1410023-01

3) Pull out the dust boot (6) and remove the snap ring (7).

Special tool

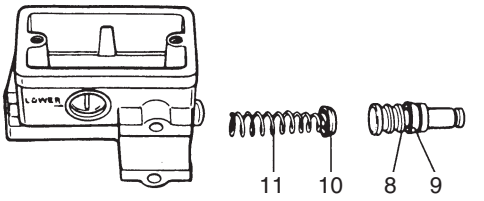
TOOL : 09900–06108 (Snap ring pliers)



I944H1410024-01

4) Remove the following parts from the master cylinder.

- Piston (8)
- Secondary cup (9)
- Primary cup (10)
- Spring (11)



I649G1410023-02

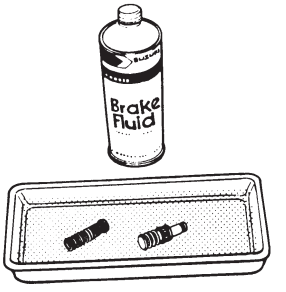
Assembly

Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

⚠ CAUTION

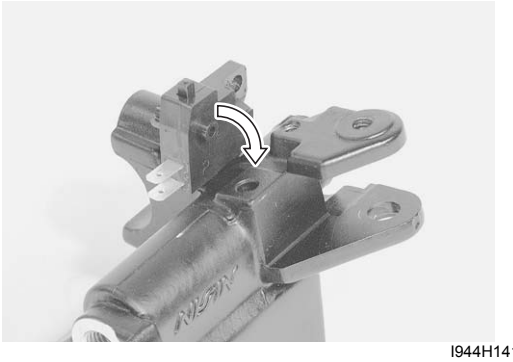
- **Wash the master cylinder components with new brake fluid before reassembly.**
- **Do not wipe the brake fluid off after washing the components.**
- **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.**
- **Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.**

BF: Brake fluid (DOT 4)



I649G1410024-02

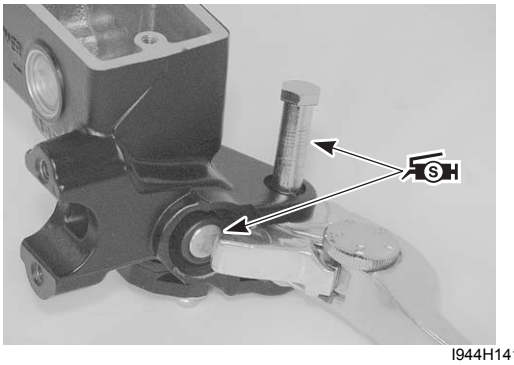
- When installing the brake light switch, align the projection on the switch with the hole in the master cylinder.



I944H1410025-01

- Apply grease to the brake lever pivot bolt.
- Apply grease to the contact point between piston and brake lever.

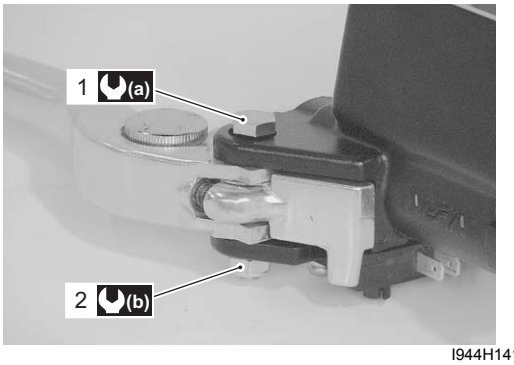
: Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)



I944H1410026-01

- Tighten the pivot bolt (1) and lock-nut (2) to the specified torque.

Tightening torque
Brake lever pivot bolt (a): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)
Brake lever pivot bolt lock-nut (b): 6 N·m (0.6 kgf-m, 4.5 lbf-ft)



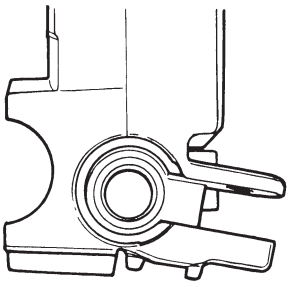
I944H1410027-01

Front Brake Master Cylinder Parts Inspection

B944H14106013

Refer to “Front Brake Master Cylinder / Brake Lever Disassembly and Assembly (Page 4A-11)”.

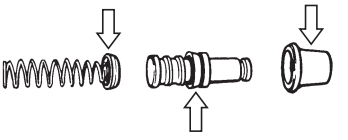
Master Cylinder
Inspect the master cylinder bore for any scratches or other damage.



I649G1410027-02

Piston
Inspect the piston surface for any scratches or other damage.

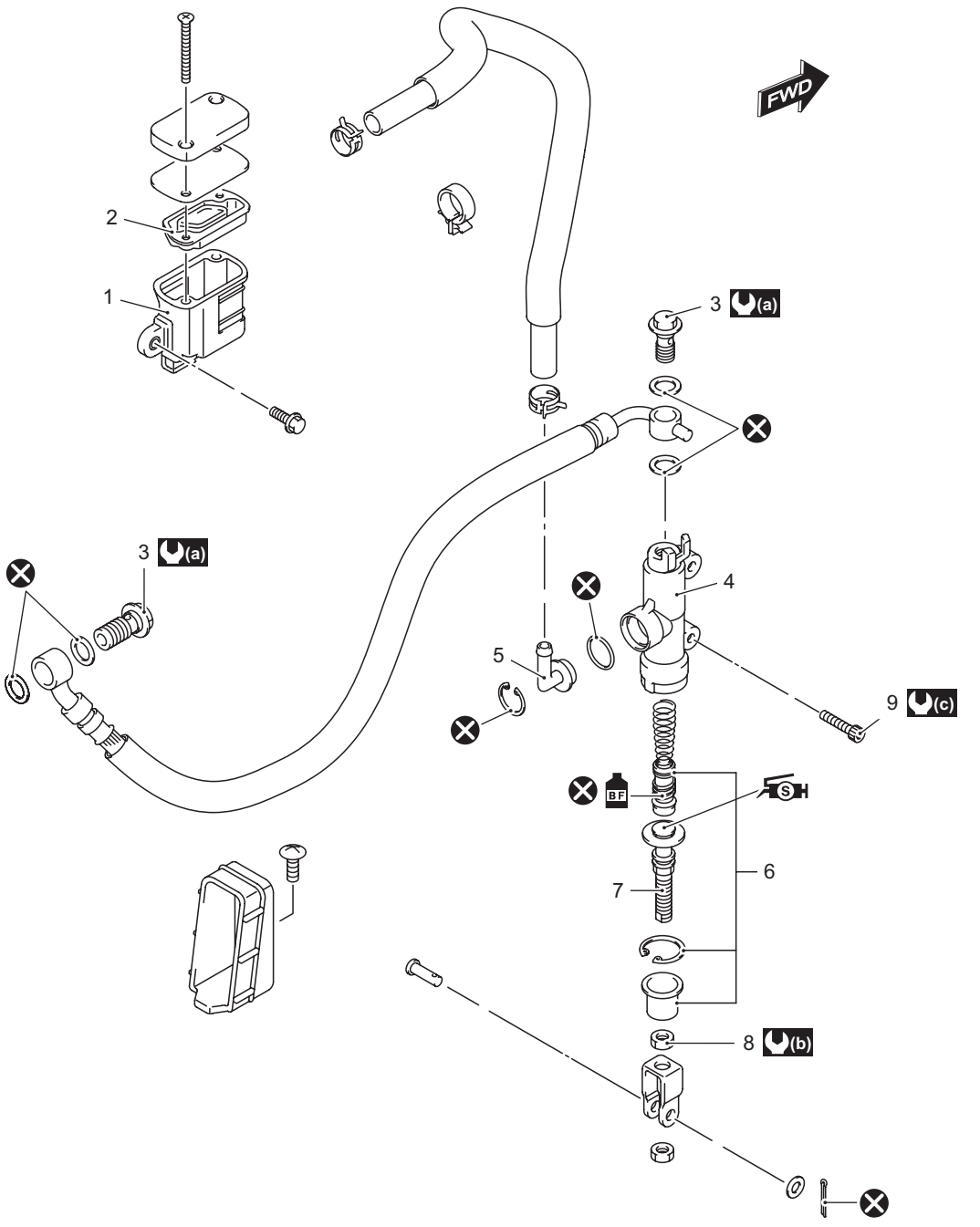
Rubber Parts
Inspect the primary cup, secondary cup and dust boot for wear or damage.



I944H1410028-01

Rear Brake Master Cylinder Components

B944H14106014



I944H1410045-01

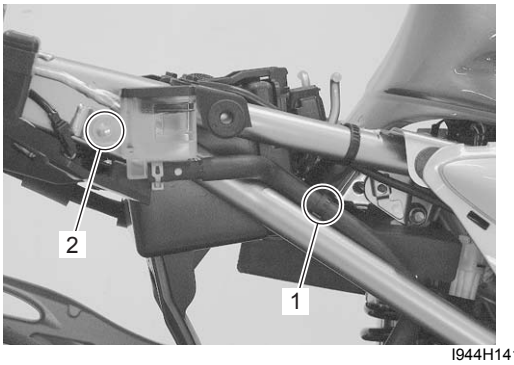
1. Reservoir tank	5. Brake hose connector	9. Rear brake master cylinder mounting bolt	: Apply silicone grease.
2. Diaphragm	6. Piston/Cup set	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)	BF : Apply brake fluid.
3. Brake hose union bolt	7. Push rod	(b) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)	: Do not reuse.
4. Master cylinder	8. Rear brake master cylinder rod lock-nut	(c) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	

Rear Brake Master Cylinder Assembly Removal and Installation

B944H14106019

Removal

1) Remove the right rear frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-6)”.
3) Disconnect the reservoir hose clamp (1).
4) Remove the reservoir mounting bolt (2).



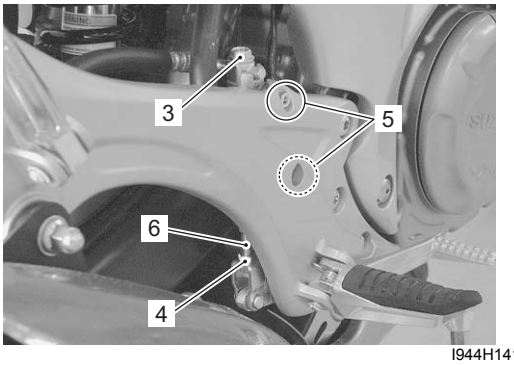
I944H1410029-02

5) Place a clean rag underneath the brake hose union bolt (3) on the master cylinder to catch any spilt brake fluid.

⚠ CAUTION

The brake fluid reacts chemically with paint, plastics, rubber materials, etc., and will damage them severely.

6) Remove the brake hose union bolt (3) and disconnect the brake hose.
7) Loosen the lock-nut (4).
8) Remove the master cylinder mounting bolts (5).
9) Remove the master cylinder along with the reservoir by turning the push rod (6).



I944H1410039-01

Installation

Install the rear brake master cylinder in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

- Tighten the master cylinder mounting bolts (1) to the specified torque.

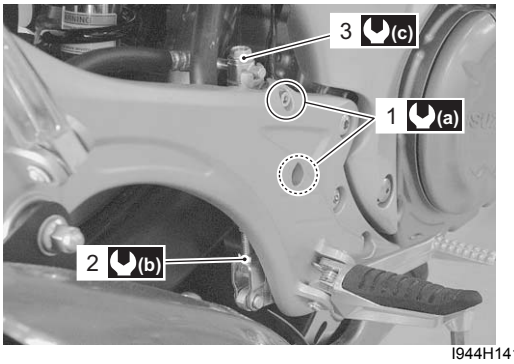
  Tightening torque
  Rear brake master cylinder mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)

- 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)

- 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)



I944H1410040-01

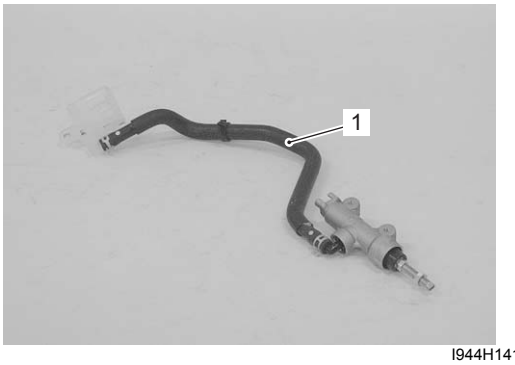
- Bleed air from the system after reassembling the master cylinder. Refer to “Brake System Inspection in Section 0B (Page 0B-16)”.
- Adjust the brake pedal height. Refer to “Brake System Inspection in Section 0B (Page 0B-16)”.

Rear Brake Master Cylinder Disassembly and Assembly

B944H14106016

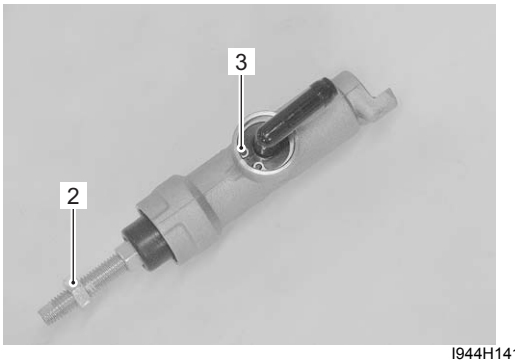
Disassembly

1) Disconnect the reservoir hose (1).



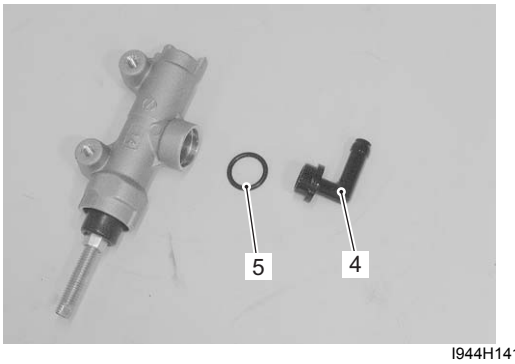
I944H1410041-01

2) Remove the lock-nut (2).
3) Remove the snap ring (3).



I944H1410031-02

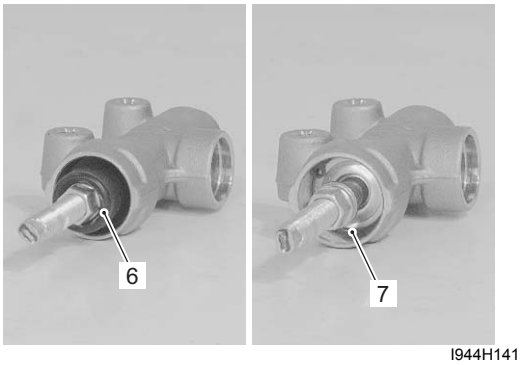
4) Remove the brake hose connector (4) and O-ring (5).



I944H1410030-02

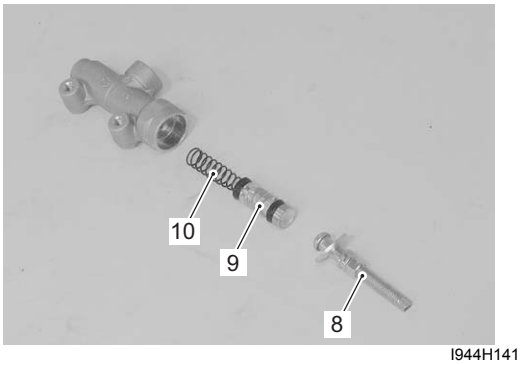
5) Pull out the dust boot (6) and remove the snap ring (7).

Special tool
TOOL : 09900–06108 (Snap ring pliers)



I944H1410032-02

6) Remove the push rod (8), piston/cup set (9) and spring (10).



I944H1410033-04

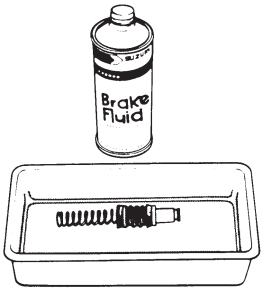
Assembly

Assemble the master cylinder in the reverse order of disassembly. Pay attention to the following points:

⚠ CAUTION

- **Wash the master cylinder components with new brake fluid before reassembly.**
- **Do not wipe the brake fluid off after washing the components.**
- **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.**
- **Apply brake fluid to the master cylinder bore and all of the master cylinder component to be inserted into the bore.**

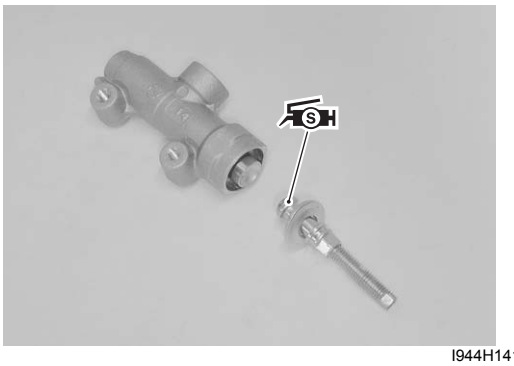
BF: Brake fluid (DOT 4)



I649G1410036-02

- Apply grease to the push rod end.

  : Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)

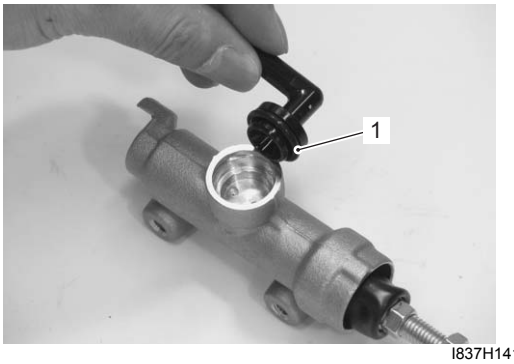


I944H1410034-01

- Install the O-ring (1).

  ⚠ CAUTION

  Replace the O-ring (1) with a new one.



I837H1410049-01

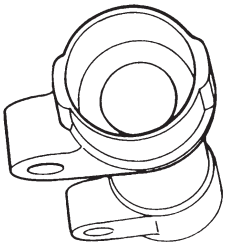
Rear Brake Master Cylinder Parts Inspection

B944H14106017

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.



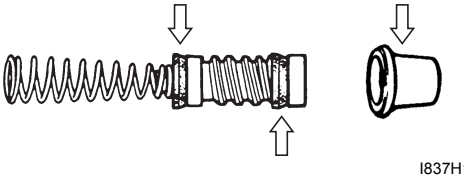
I649G1410038-02

Piston

Inspect the piston surface for any scratches or other damage.

Rubber Parts

Inspect the primary cup, secondary cup and dust boot for wear or damage.



I837H1410050-01

Specifications

Service Data

B944H14107001

Brake

Unit: mm (in)

Item	Standard		Limit
Rear brake pedal height	45 – 55 (1.8 – 2.2)		—
Master cylinder bore	Front	14.000 – 14.043 (0.5512 – 0.5529)	—
	Rear		—
Master cylinder piston diameter	Front	13.957 – 13.984 (0.5495 – 0.5506)	—
	Rear		—

Oil

Item	Specification	Note
Brake fluid type	DOT 4	

Tightening Torque Specifications

B944H14107002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Air bleeder valve (Front brake)	7.5	0.75	5.5	☞(Page 4A-5) / ☞(Page 4A-7)
Air bleeder valve (Rear brake)	6	0.6	4.5	☞(Page 4A-6) / ☞(Page 4A-8)
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-14)
Brake lever pivot bolt	6	0.6	4.5	☞(Page 4A-12)
Brake lever pivot bolt lock-nut	6	0.6	4.5	☞(Page 4A-12)
Rear brake master cylinder mounting bolt	10	1.0	7.0	☞(Page 4A-14)
Rear brake master cylinder rod lock-nut	18	1.8	13.0	☞(Page 4A-14)

NOTE

The specified tightening torque is described in the following.
"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-13)"

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

Special Tools and Equipment

Recommended Service Material

B944H14108001

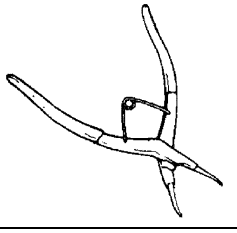
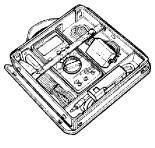
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4A-6) / ☞(Page 4A-7) / ☞(Page 4A-11) / ☞(Page 4A-15)
Grease	SUZUKI Silicone Grease or equivalent	P/No.: 99000–25100	☞(Page 4A-12) / ☞(Page 4A-16)

NOTE

Required service material is also described in the following.
"Front Brake Master Cylinder Components (Page 4A-9)"
"Rear Brake Master Cylinder Components (Page 4A-13)"

Special Tool

B944H14108002

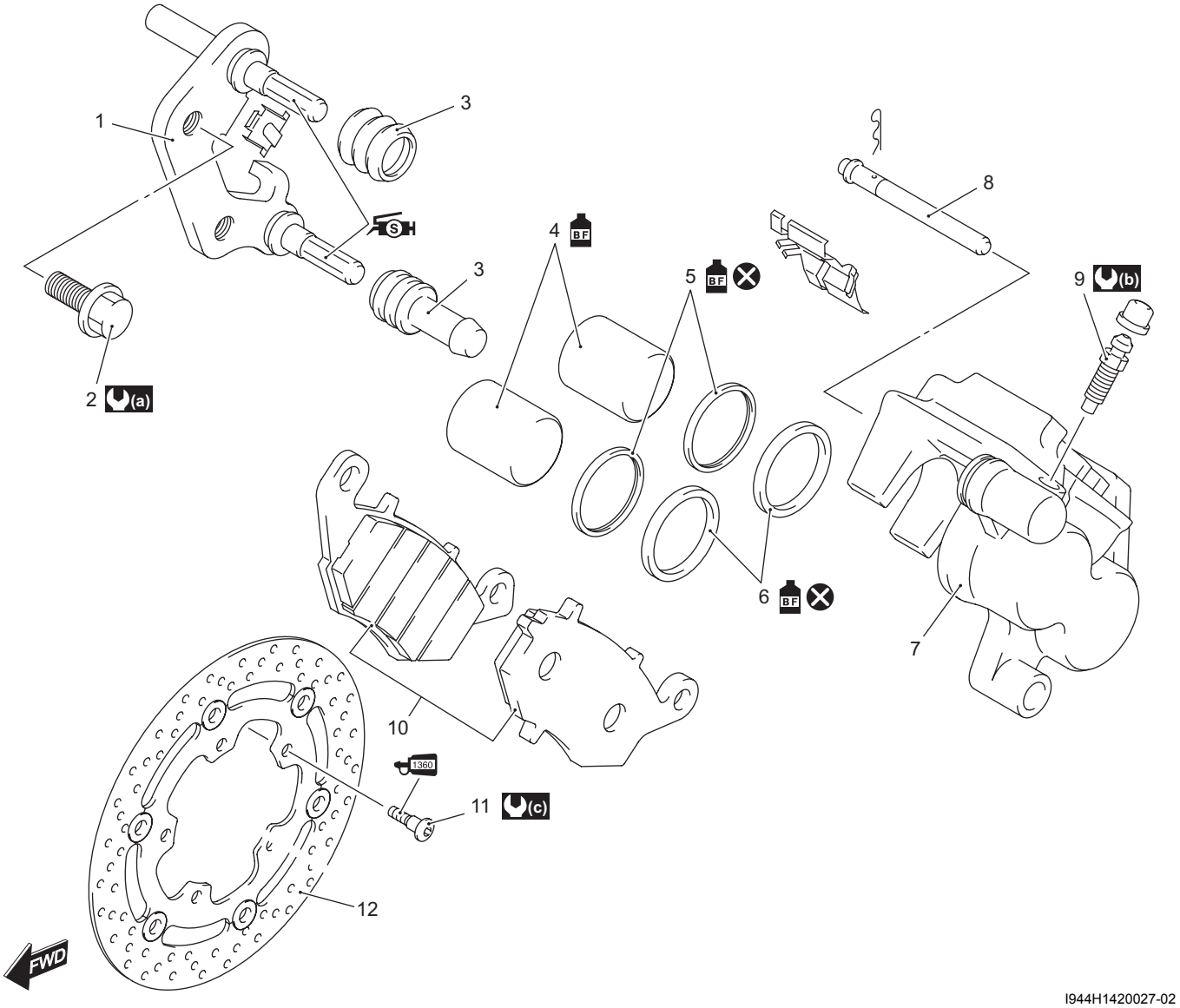
09900–06108 Snap ring remover (Close type) ☞(Page 4A-11) / ☞(Page 4A-15)		09900–25008 Multi circuit tester set ☞(Page 4A-4) / ☞(Page 4A-4)	

Front Brakes

Repair Instructions

Front Brake Components

B944H14206001



I944H1420027-02

1. Caliper holder	8. Pad mounting pin	(c) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
2. Front brake caliper mounting bolt	9. Air bleeder bolt	A H : Apply silicone grease to sliding surface.
3. Rubber boots	10. Pad set	1360 : Apply thread lock to thread part.
4. Piston	11. Brake disc bolt	BF : Apply brake fluid.
5. Piston seal	12. Front brake disc	: Do not reuse.
6. Dust seal	(a) : 39 N·m (3.9 kgf-m, 28.0 lbf-ft)	
7. Caliper	(b) : 7.5 N·m (0.75 kgf-m, 5.5 lbf-ft)	

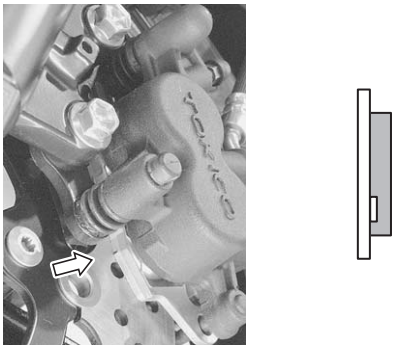
Front Brake Pad Inspection

B944H14206002

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

⚠ CAUTION

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



I944H1420026-04

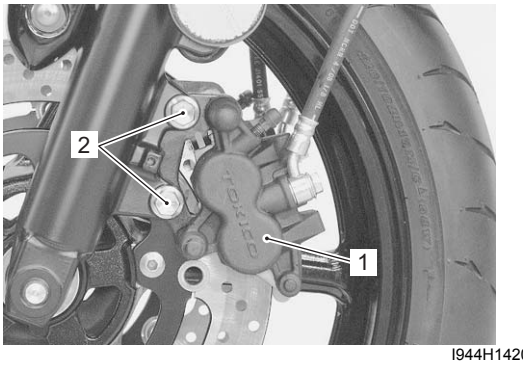
Front Brake Pad Replacement

B944H14206003

1) Remove the caliper (1) by removing its bolts (2).

⚠ CAUTION

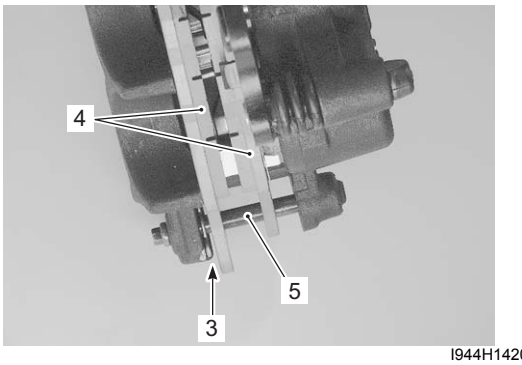
Do not operate the brake lever while dismounting the pads.



I944H1420001-03

2) Remove the clip (3).

3) Remove the brake pads (4) by removing the pad mounting pin (5).



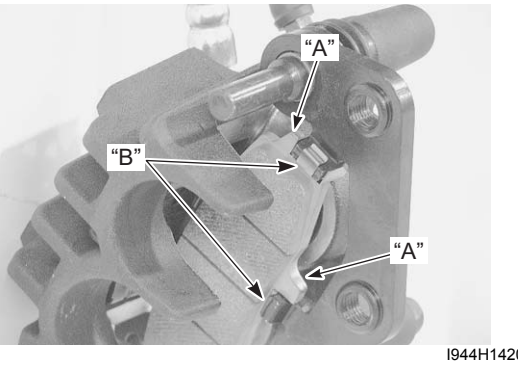
I944H1420002-03

4) Clean up the caliper especially around the caliper pistons.

5) Install the outer pad with the detentes “A” of pad fitted to the detentes “B” on the caliper holder.

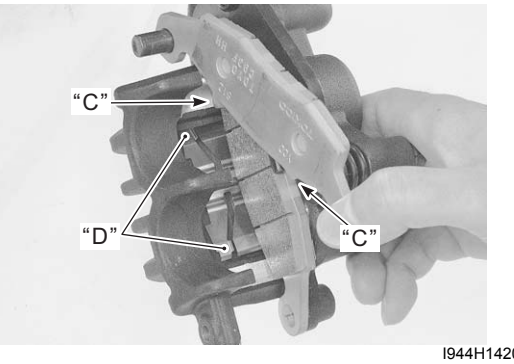
⚠ CAUTION

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



I944H1420003-01

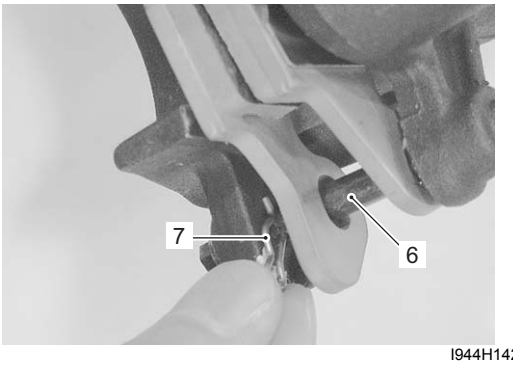
6) Install the inner pad by aligning the projection “C” of the inner pad with plate “D” of the pad spring.



I944H1420004-03

7) Install the pad mounting pin (6).

8) Install the clip (7) securely.



I944H1420005-03

9) Remount the caliper.
10) Tighten the caliper mounting bolts (8) to the specified torque.

Tightening torque
Front brake caliper mounting bolt (a): 39 N·m (3.9 kgf-m, 28.0 lbf-ft)

I944H1420007-03

NOTE

After replacing the brake pads, pump the brake lever several times to check for proper brake operation and then check the brake fluid level.

Front Brake Caliper Removal and Installation

B944H14206004

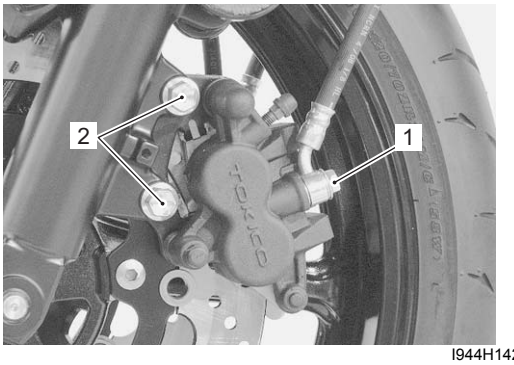
Removal

1) Drain brake fluid. Refer to “Brake Fluid Replacement in Section 4A (Page 4A-6)”.
2) Remove the brake hoses from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.

NOTE

Place a clean rag underneath the union bolt on the brake caliper to catch any spilt brake fluid.

3) Remove the brake caliper by removing the caliper mounting bolts (2).



I944H1420008-01

Installation

Install the brake caliper in the reverse order of removal. Pay attention to the following points:

- Tighten each bolt to the specified torque.

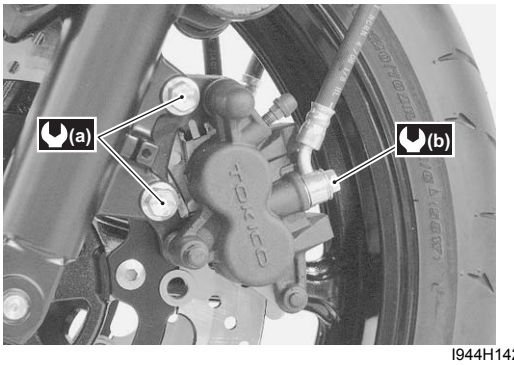
Tightening torque
Front brake caliper mounting bolt (a): 39 N·m (3.9 kgf-m, 28.0 lbf-ft)

- After setting the brake hose union to the stopper, tighten the union bolt to the specified torque.

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

Tightening torque
Front brake hose union bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



I944H1420009-01

- Bleed air from the brake system after installing the caliper. Refer to “Brake System Inspection in Section 0B (Page 0B-16)”.
- Check the brake fluid leakage and brake operation.

⚠ WARNING

Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and fluid leakage.

Front Brake Caliper Disassembly and Assembly

B944H14206005

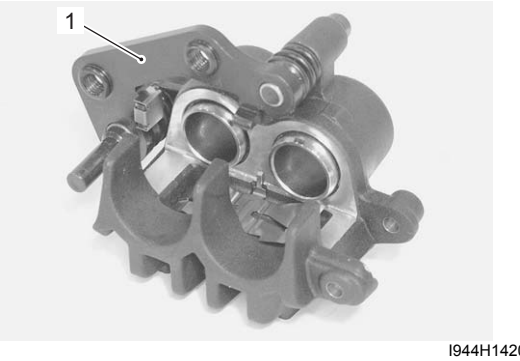
Refer to “Front Brake Caliper Removal and Installation (Page 4B-3)”.

NOTE

The right and left calipers are installed symmetrically and therefore the disassembly procedure for one side is the same as that for the other side.

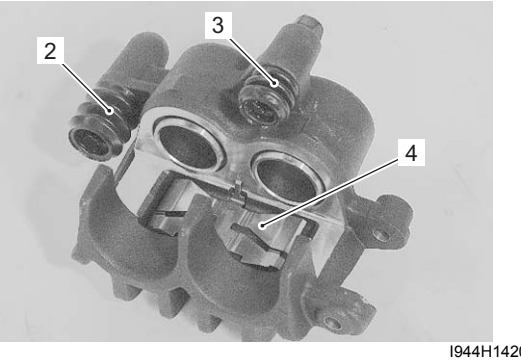
Disassembly

1) Remove the brake pads. Refer to “Front Brake Pad Replacement (Page 4B-2)”.
2) Remove the caliper holder (1).



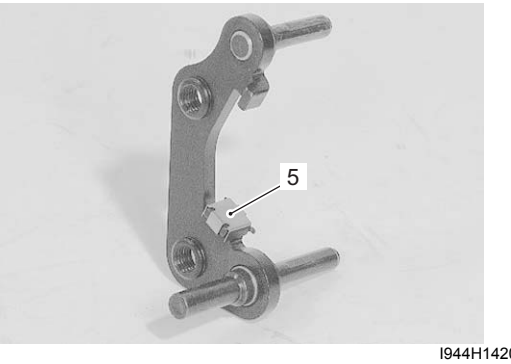
I944H1420010-01

3) Remove the rubber boots (2) and (3).
4) Remove the pad spring (4).



I944H1420011-01

5) Remove the pad guide (5).

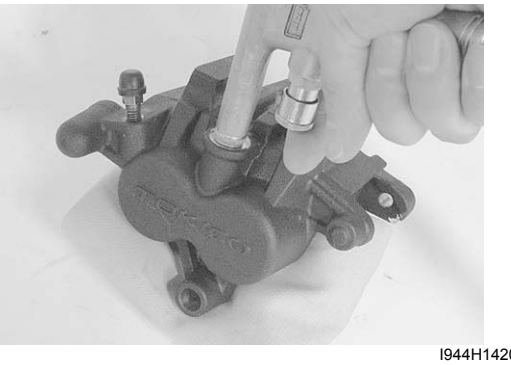


I944H1420012-01

6) Place a clean rag over the pistons to prevent it from popping out and then force out the pistons using compressed air.

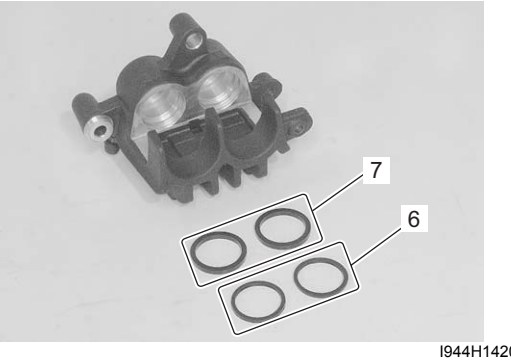
⚠ CAUTION

Do not use high pressure air to prevent piston damage.



I944H1420013-01

7) Remove the dust seals (6) and piston seals (7).



I944H1420014-02

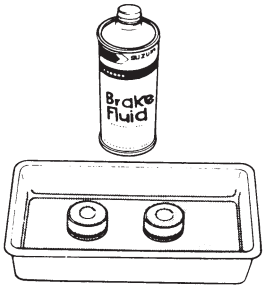
Assembly
Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

- Wash the caliper bores and pistons with specified brake fluid. Particularly wash the dust seal grooves and piston seal grooves.

  BF: Brake fluid (DOT 4)

  ⚠ CAUTION

  - **Wash the caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
  - **Do not wipe the brake fluid off after washing the components.**
  - **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvent such as gasoline, kerosine or the others.**



I649G1420012-02

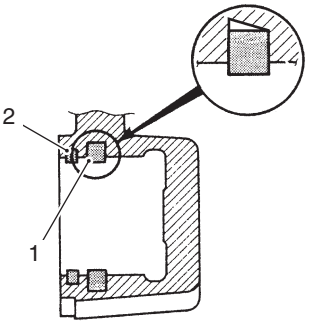
- Apply the brake fluid to piston seals (1) and dust seals (2).

  ⚠ CAUTION

  Replace the piston seals (1) and dust seals (2) with new ones.

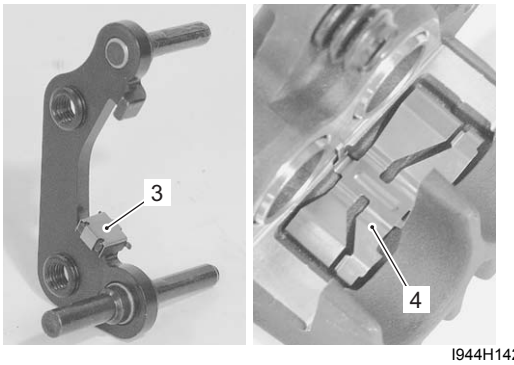
  BF: Brake fluid (DOT 4)

- Install the piston seals as shown.



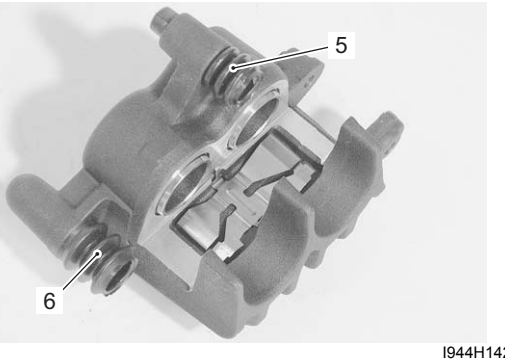
I649G1420013-02

- Install the pad guide (3) and pad spring (4).



I944H1420015-01

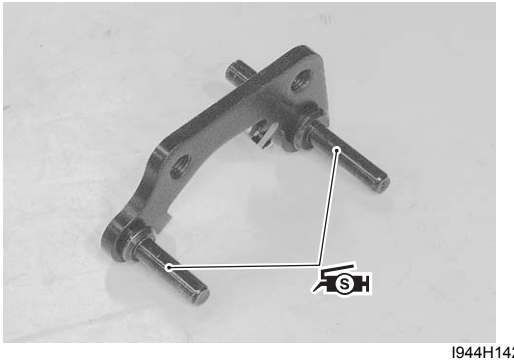
- Install the rubber boots (5) and (6).



I944H1420016-01

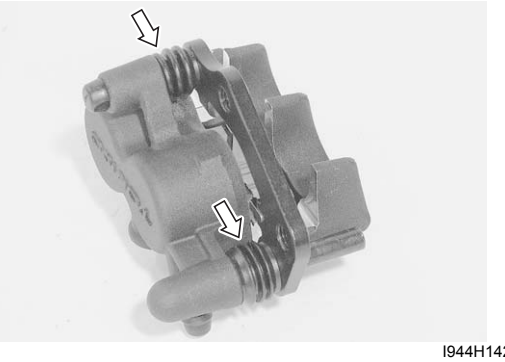
- Apply grease to the caliper holder sliding pins.

  : Grease 99000–25100 (SUZUKI SILICONE GREASE or equivalent)



I944H1420017-01

- Set the boots onto the sliding pins securely.



I944H1420018-01

Front Brake Caliper Parts Inspection

B944H14206006

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.

I944H1420019-01

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.

I944H1420020-01

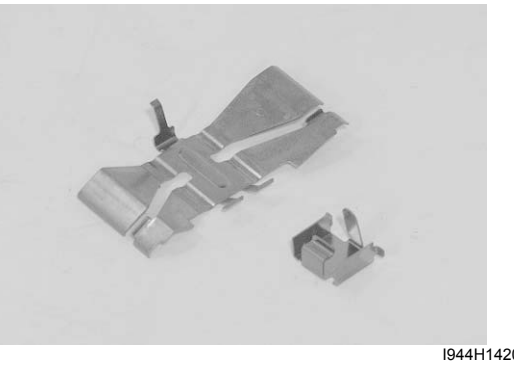
Brake Caliper Holder Sliding Pin

Inspect the brake caliper holder sliding pins for wear and other damage. If any damage is found, replace the brake caliper holder with a new one.

I944H1420021-01

Brake Pad Spring and Pad Guide

Inspect the brake pad spring and pad guide for damage and excessive bend. If any defects are found, replace them with new ones.



I944H1420022-01

Rubber Boot

Inspect the rubber boots for damage. If any damages are found, replace them with the new ones.

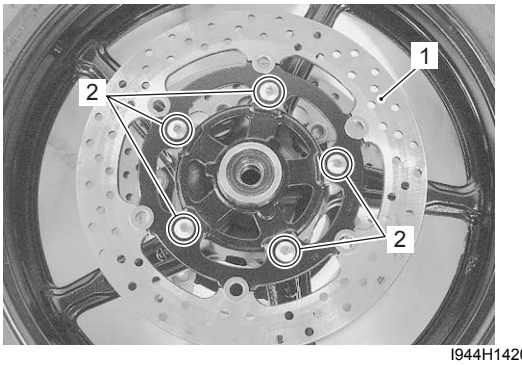
I944H1420023-01

Front Brake Disc Removal and Installation

B944H14206007

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) by removing its bolts (2).



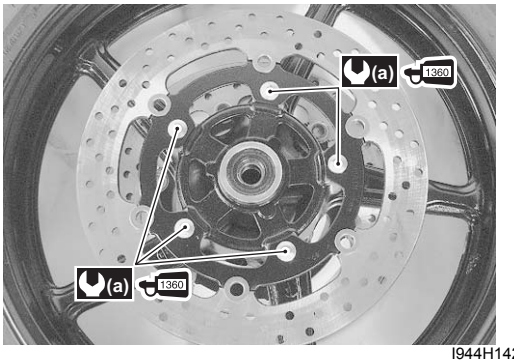
I944H1420024-03

Installation
Install the front brake disc in the reverse order of removal. Pay attention to the following points:

- Make sure that the brake discs are clean and free of any grease.
- Apply thread lock to the brake disc bolts and tighten them to the specified torque.

1360 : Thread lock cement 99000–32130 (Thread Lock Cement Super 1360 or equivalent)

Tightening torque
Brake disc bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



I944H1420025-01

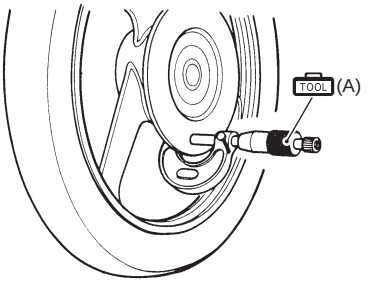
Front Brake Disc Inspection

B944H14206008

Brake Disc Thickness
Check the brake disc for damage or cracks and measure the thickness using the micrometer.
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Special tool
TOOL (A): 09900–20205 (Micrometer (0 – 25 mm))

Brake disc thickness
Service limit (Front): 4.0 mm (0.16 in)



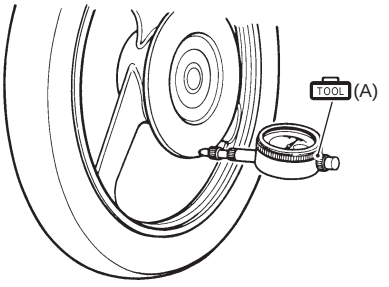
I649G1420019-03

Brake Disc Runout

1) Remove the front brake caliper. Refer to “Front Brake Caliper Removal and Installation (Page 4B-3)”.
2) Measure the runout using the dial gauge.
Replace the disc if the runout exceeds the service limit.

Special tool
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL : 09900–20701 (Magnetic stand)

Brake disc runout
Service limit: 0.30 mm (0.012 in)



I649G1420020-03

3) Install the front brake caliper. Refer to “Front Brake Caliper Removal and Installation (Page 4B-3)”.

Specifications

Service Data

B944H14207001

Brake

Unit: mm (in)

Item	Standard		Limit
Brake disc thickness	Front	4.3 – 4.7 (0.17 – 0.19)	4.0 (0.16)
Brake disc runout	—		0.30 (0.012)
Brake caliper cylinder bore	Front	27.000 – 27.076 (1.0630 – 1.0660)	—
Brake caliper piston diam.	Front	26.920 – 26.970 (1.0598 – 1.0618)	—

Oil

Item	Specification	Note
Brake fluid type	DOT 4	

Tightening Torque Specifications

B944H14207002

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)
Front brake hose union bolt	23	2.3	16.5	☞(Page 4B-3)
Brake disc bolt	23	2.3	16.5	☞(Page 4B-7)

NOTE

The specified tightening torque is described in the following.
“Front Brake Components (Page 4B-1)”

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

Special Tools and Equipment

Recommended Service Material

B944H14208001

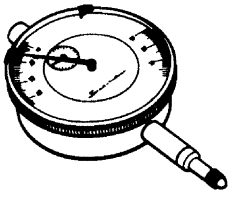
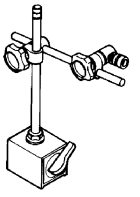
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4B-5) / ☞(Page 4B-5)
Grease	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000–25100	☞(Page 4B-5)
Thread lock cement	Thread Lock Cement Super 1360 or equivalent	P/No.: 99000–32130	☞(Page 4B-7)

NOTE

Required service material is also described in the following.
“Front Brake Components (Page 4B-1)”

Special Tool

B944H14208002

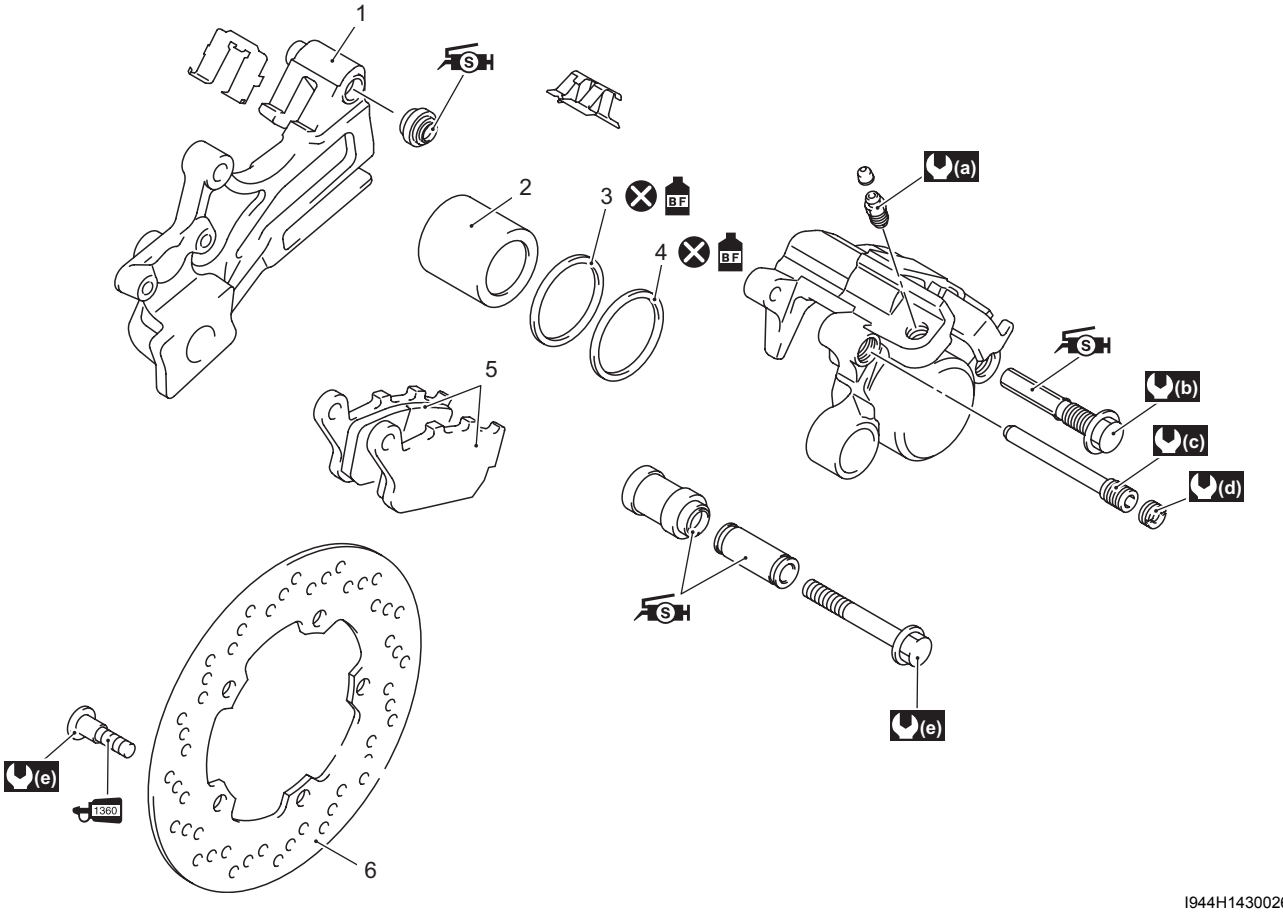
09900–20205 Micrometer (0 – 25 mm) ☞(Page 4B-7) 	09900–20607 Dial gauge ☞(Page 4B-7) 
09900–20701 Dial gauge chuck ☞(Page 4B-7) 	

Rear Brakes

Repair Instructions

Rear Brake Components

B944H14306001



I944H1430026-01

1. Rear caliper bracket	6. Rear brake disc	(e) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
2. Piston	(a) : 6 N·m (0.6 kgf-m, 4.5 lbf-ft)	S : Apply silicone grease to sliding surface.
3. Piston seal	(b) : 27 N·m (2.7 kgf-m, 19.5 lbf-ft)	1360 : Apply thread lock to thread part.
4. Dust seal	(c) : 17 N·m (1.7 kgf-m, 12.5 lbf-ft)	BF : Apply brake fluid.
5. Rear brake pad set	(d) : 2.5 N·m (0.25 kgf-m, 1.8 lbf-ft)	: Do not reuse.

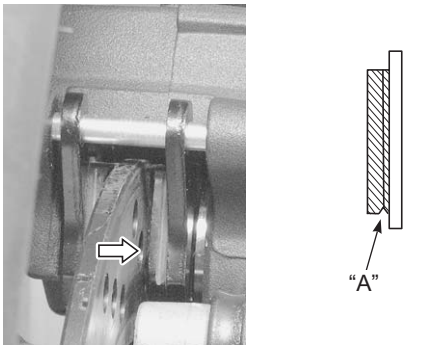
Rear Brake Pad Inspection

B944H14306002

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

⚠ CAUTION

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

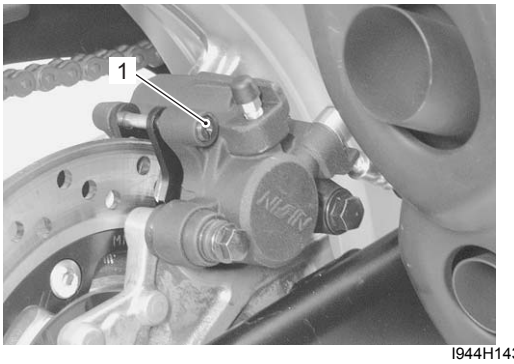


I944H1430001-02

Rear Brake Pad Replacement

B944H14306003

1) Remove the plug (1).

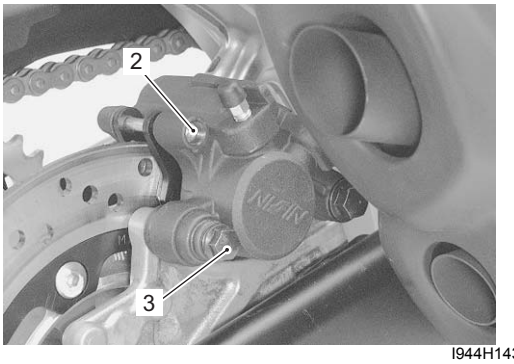


I944H1430002-02

2) Remove the pad mounting pin (2).
3) Remove the caliper mounting bolt (3).

⚠ CAUTION

Do not operate the brake pedal while dismounting the pads.



I944H1430003-02

4) Remove the brake pads with the rear caliper pivoted up.

NOTE

When removing the pads, push the piston all the way into brake caliper.

I944H1430004-02

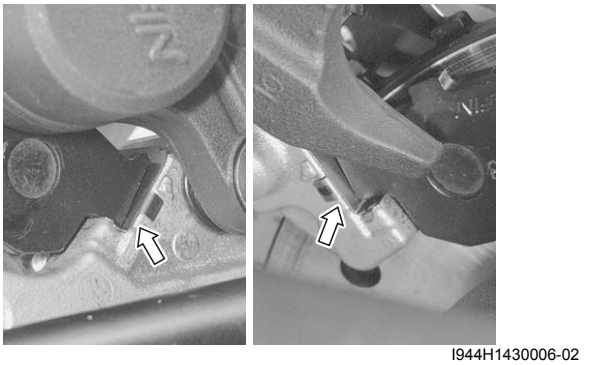
5) Clean up the caliper especially around the caliper piston.
6) Install the new brake pads.

⚠ CAUTION

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

NOTE

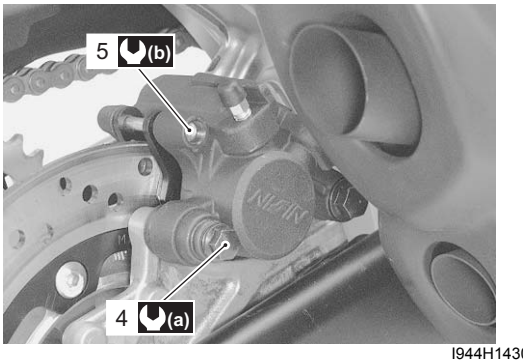
Make sure that the detente of the pad is seated onto the retainer on the caliper bracket.



I944H1430006-02

7) Tighten the caliper mounting bolt (4) and pad mounting pin (5) to the specified torque.

Tightening torque
Rear brake caliper mounting bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
Rear brake pad mounting pin (b): 17 N·m (1.7 kgf-m, 12.5 lbf-ft)



I944H1430007-02

8) Install the plug (6) to the specified torque.

Tightening torque
Pad pin plug (c): 2.5 N·m (0.25 kgf-m, 1.8 lbf-ft)

NOTE

After replacing the brake pads, pump the brake pedal few times to check for proper brake operation and then check the brake fluid level.

I944H1430008-02

Rear Brake Caliper Removal and Installation

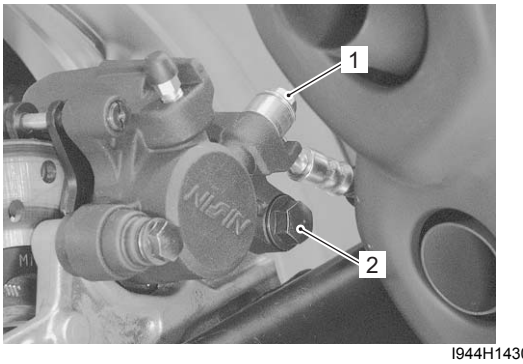
B944H14306004

Removal

1) Drain brake fluid. Refer to “Brake Fluid Replacement in Section 4A (Page 4A-6)”.
2) Remove the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.

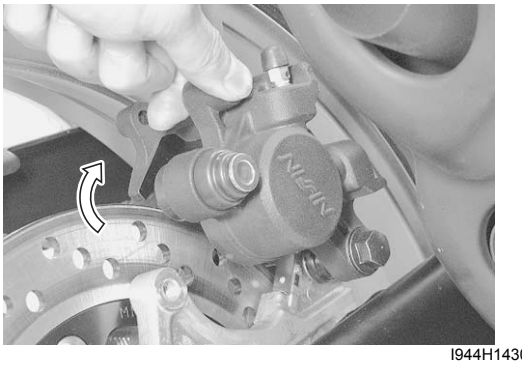
NOTE

- **Place a clean rag underneath the union bolt on the brake caliper to catch any spilt brake fluid.**
- **Slightly loosen the sliding pin (2) to facilitate later disassembly, if necessary.**



I944H1430009-02

3) Remove the brake pads. Refer to “Rear Brake Pad Replacement (Page 4C-2)”.
4) Pivot the caliper up and remove the caliper from the caliper bracket.



I944H1430010-02

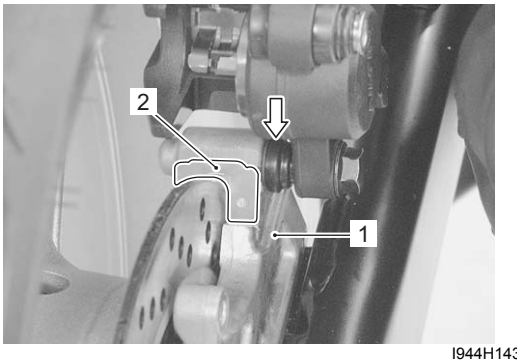
Installation

Install the brake caliper in the reverse order of removal. Pay attention to the following points:

- Install the caliper to the caliper bracket (1).
- Set the boot onto the sliding pin securely.
- Install the brake pads. Refer to “Rear Brake Pad Replacement (Page 4C-2)”.

⚠ CAUTION

Confirm that there is a brake pad spring (2) when installing the brake pads.



I944H1430011-03

- Tighten the sliding pin (3) to the specified torque.

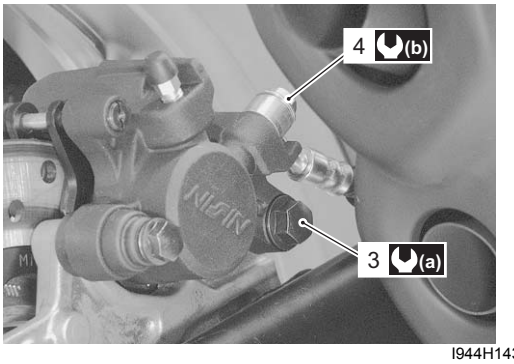
Tightening torque
Rear brake caliper sliding pin (a): 27 N·m (2.7 kgf-m, 19.5 lbf-ft)

- After setting the brake hose union to the stopper, tighten the union bolt (4) to the specified torque.

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

Tightening torque
Brake hose union bolt (b): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



I944H1430012-02

- Bleed air from the brake system after installing the caliper. Refer to “Brake System Inspection in Section 0B (Page 0B-16)”.
- 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.

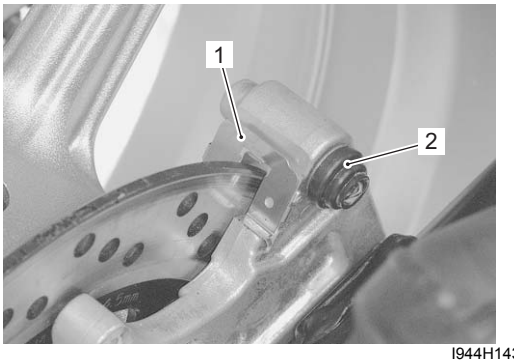
Rear Brake Caliper Disassembly and Assembly

B944H14306005

Refer to “Rear Brake Caliper Removal and Installation (Page 4C-3)”.

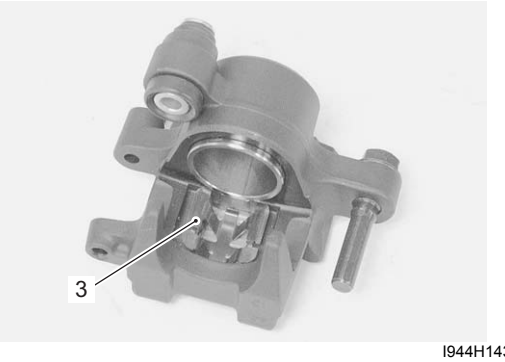
Disassembly

1) Remove the pad spring (1) and rubber boot (2).



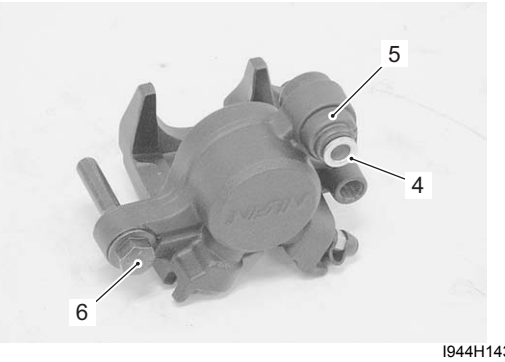
I944H1430013-02

2) Remove the pad spring (3).



I944H1430014-01

3) Remove the spacer (4) and rubber boot (5) from the caliper.
4) Remove the slide pin (6).



I944H1430015-01

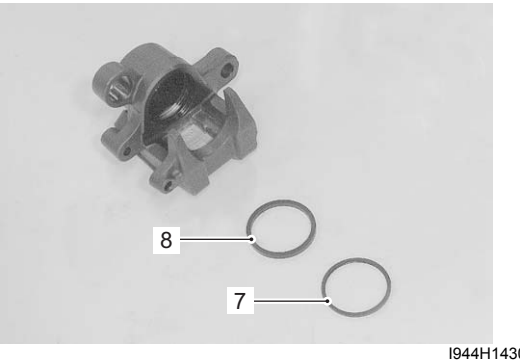
5) Place a clean rag over the piston to prevent it from popping out and then force out the piston using compressed air.

⚠ CAUTION

Do not use high pressure air to prevent piston damage.

I944H1430016-01

6) Remove the dust seal (7) and piston seal (8).



I944H1430017-01

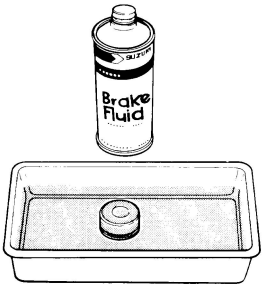
Assembly
Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

- Wash the caliper bore and piston with specified brake fluid. Particularly wash the dust seal groove and piston seal groove.

  BF: Brake fluid (DOT 4)

  ⚠ CAUTION

  - **Wash the caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
  - **Do not wipe the brake fluid off after washing the components.**
  - **When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvent such as gasoline, kerosine or the others.**



I649G1430018-02

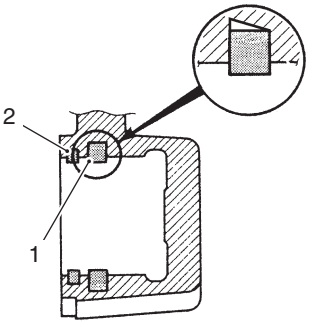
- Apply the brake fluid to piston seal (1) and dust seal (2).

  ⚠ CAUTION

  Replace the piston seal (1) and dust seal (2) with new ones.

  BF: Brake fluid (DOT 4)

- Install the piston seals as shown.



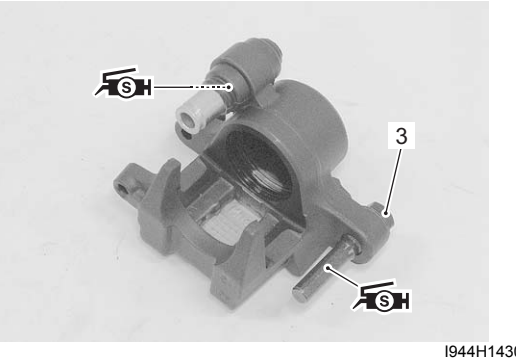
I649G1420013-02

- Apply grease to the inside of the boot.

  : Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)

- Temporarily tighten the sliding pin (3) and apply grease to the sliding pin.

  : Grease 99000–25100 (SUZUKI Silicone Grease or equivalent)



I944H1430018-01

Rear Brake Caliper Parts Inspection

B944H14306006

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.

I944H1430019-01

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.

I944H1430020-01

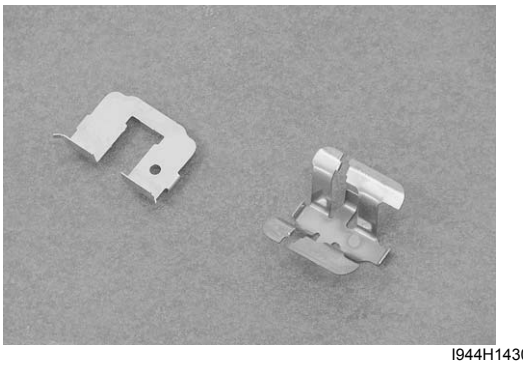
Brake Caliper Sliding Pin
Inspect the brake caliper sliding pin for wear and other damage. If any damage is found, replace the sliding pin with a new one.

I944H1430021-01

Boot and Spacer
Inspect the boots and spacer for damage and wear. If any defects are found, replace them with new ones.

I944H1430022-01

Brake Pad Spring
Inspect the brake pad springs for damage and excessive bend. If any defects are found, replace them with new ones.



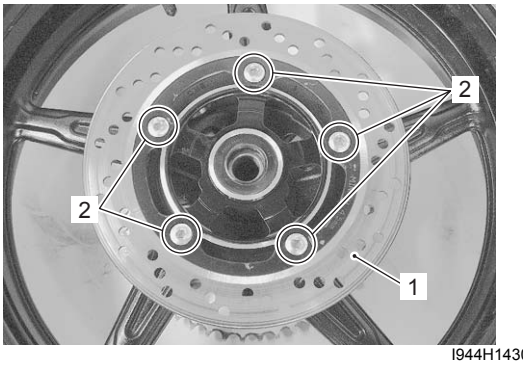
I944H1430023-02

Rear Brake Disc Removal and Installation

B944H14306007

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) by removing its bolts (2).



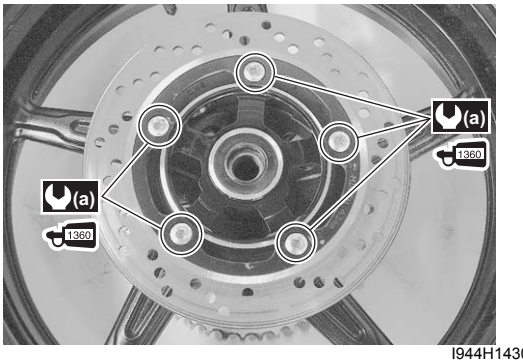
I944H1430024-02

Installation
Install the rear brake disc in the reverse order of removal. Pay attention to the following points:

- Make sure that the brake discs are clean and free of any grease.
- Apply thread lock to the brake disc bolts and tighten them to the specified torque.

1360 : Thread lock cement 99000–32130 (Thread Lock Cement Super 1360 or equivalent)

Tightening torque
Brake disc bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



I944H1430025-01

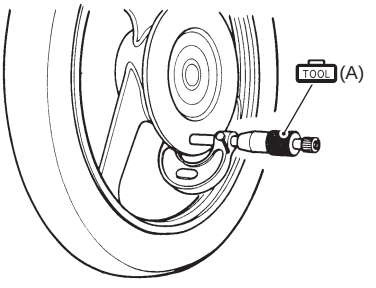
Rear Brake Disc Inspection

B944H14306008

Brake Disc Thickness
Check the brake disc for damage or cracks and measure the thickness using the micrometer.
Replace the brake disc if the thickness is less than the service limit or if defect is found.

Special tool
TOOL (A): 09900–20205 (Micrometer (0 – 25 mm))

Brake disc thickness
Service limit (Rear): 4.5 mm (0.18 in)



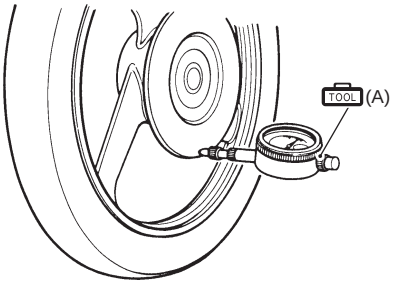
I649G1430027-03

Brake Disc Runout

1) Remove 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
TOOL (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))
TOOL : 09900–20701 (Magnetic stand)

Brake disc runout
Service limit: 0.30 mm (0.012 in)



I649G1430028-03

3) Install the rear brake caliper. Refer to “Rear Brake Caliper Removal and Installation (Page 4C-3)”.

Specifications

Service Data

B944H14307001

Brake

Unit: mm (in)

Item	Standard		Limit
Brake disc thickness	Rear	4.8 – 5.2 (0.19 – 0.20)	4.5 (0.18)
Brake disc runout	—		0.30 (0.012)
Brake caliper cylinder bore	Rear	38.180 – 38.230 (1.5031 – 1.5051)	—
Brake caliper piston diameter	Rear	38.080 – 38.130 (1.4992 – 1.5012)	—

Oil

Item	Specification	Note
Brake fluid type	DOT 4	

Tightening Torque Specifications

B944H14307002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Rear brake caliper mounting bolt	23	2.3	16.5	☞(Page 4C-2)
Rear brake pad mounting pin	17	1.7	12.5	☞(Page 4C-2)
Pad pin plug	2.5	0.25	1.8	☞(Page 4C-3)
Rear brake caliper sliding pin	27	2.7	19.5	☞(Page 4C-3)
Brake hose union bolt	23	2.3	16.5	☞(Page 4C-4)
Brake disc bolt	23	2.3	16.5	☞(Page 4C-7)

NOTE

The specified tightening torque is described in the following.
“Rear Brake Components (Page 4C-1)”

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

Special Tools and Equipment

Recommended Service Material

B944H14308001

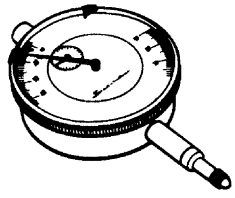
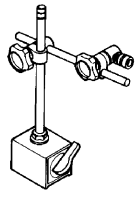
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞(Page 4C-5) / ☞(Page 4C-5)
Grease	SUZUKI Silicone Grease or equivalent	P/No.: 99000–25100	☞(Page 4C-5) / ☞(Page 4C-5)
Thread lock cement	Thread Lock Cement Super 1360 or equivalent	P/No.: 99000–32130	☞(Page 4C-7)

NOTE

Required service material is also described in the following.
"Rear Brake Components (Page 4C-1)"

Special Tool

B944H14308002

09900–20205 Micrometer (0 – 25 mm) ☞(Page 4C-7) 	09900–20607 Dial gauge ☞(Page 4C-7) 
09900–20701 Dial gauge chuck ☞(Page 4C-7) 	

Section 5

Transmission / Transaxle

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Precautions

Precautions

Precautions for Transmission / Transaxle

B944H15000001

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

Manual Transmission

Diagnostic Information and Procedures

Manual Transmission Symptom Diagnosis

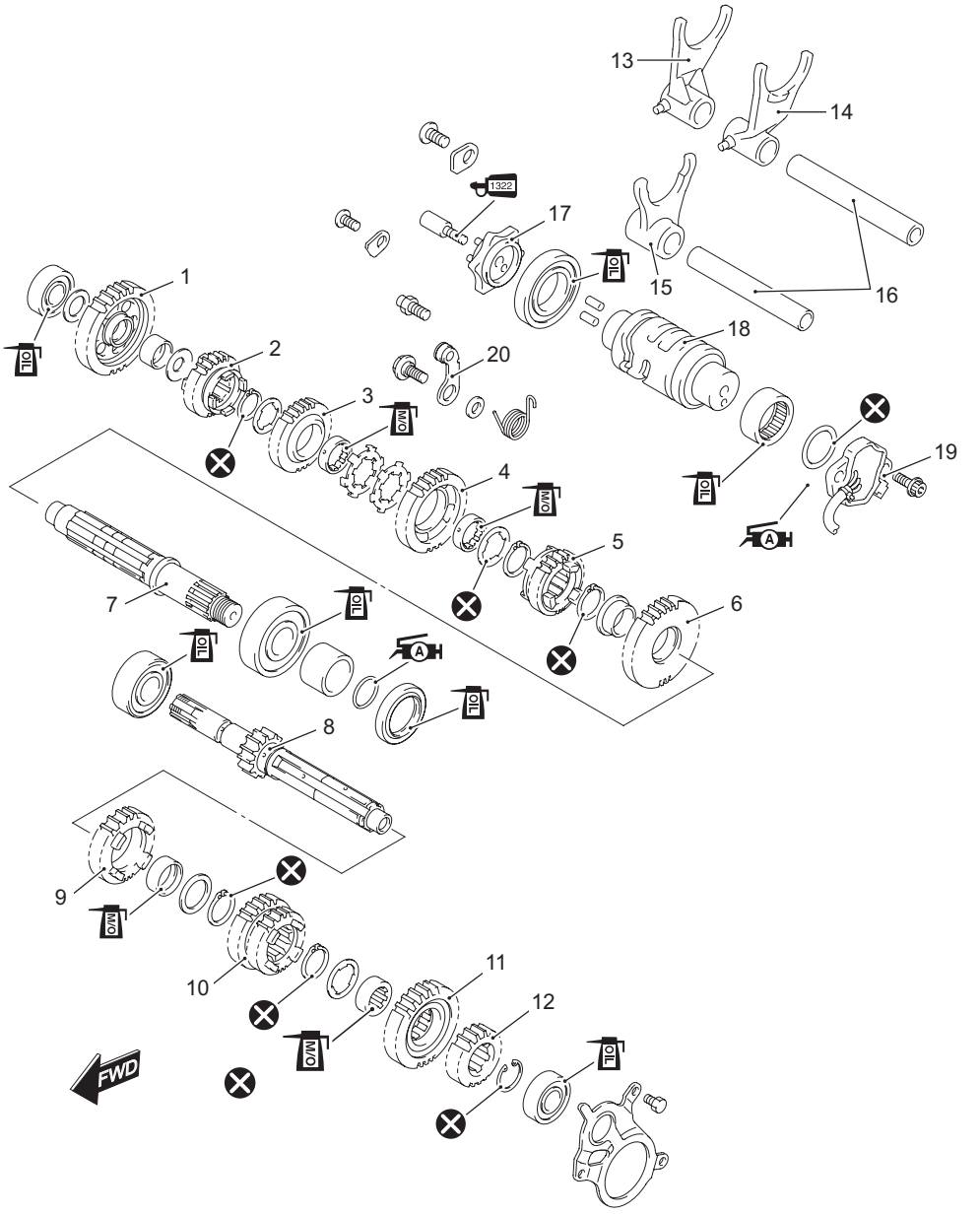
B944H15204001

Condition	Possible cause	Correction / Reference Item
Engine is noisy (Noise seems to come from the transmission).	Worn or rubbing gear.	*Replace.*
	Worn countershaft spline.	*Replace countershaft.*
	Worn driveshaft spline.	*Replace driveshaft.*
	Worn or rubbing primary gear.	*Replace.*
	Worn bearing.	*Replace.*
Transmission will not shift.	Broken gearshift cam.	*Replace.*
	Distorted gearshift fork.	*Replace.*
	Worn gearshift pawl.	*Replace.*
Transmission will not shift back.	Broken gearshift shaft return spring.	*Replace.*
	Rubbing or stuck gearshift shaft.	*Repair or replace.*
	Worn or distorted gearshift fork.	*Replace.*
Transmission jumps out of gear.	Worn shifting gears on driveshaft or countershaft.	*Replace.*
	Worn or distorted gearshift fork.	*Replace.*
	Weakened gearshift stopper spring.	*Replace.*
	Worn gearshift cam plate.	*Replace.*

Repair Instructions

Transmission Components

B944H15206001



I944H1520071-03

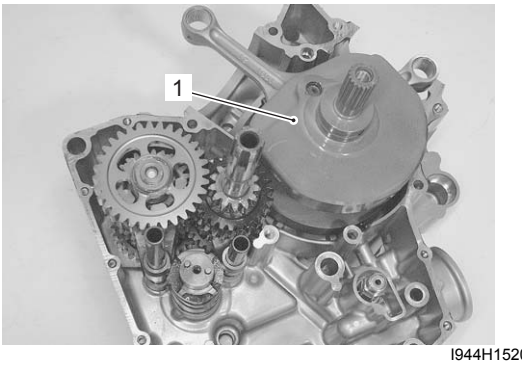
1. 1st driven gear	10. 3rd/4th drive gear	19. Gear position switch
2. 5th driven gear	11. 6th drive gear	20. Gearshift cam stopper plate
3. 4th driven gear	12. 2nd drive gear	OIL : Apply oil.
4. 3rd driven gear	13. Gearshift fork No. 1	MO : Apply molybdenum oil solution.
5. 6th driven gear	14. Gearshift fork No. 2	A : Apply grease to oil seal lip.
6. 2nd driven gear	15. Gearshift fork No. 3	1322 : Apply thread lock to thread part.
7. Driveshaft	16. Gearshift fork	: Do not reuse.
8. Countershaft/1st drive gear	17. Gearshift cam plate	
9. 5th drive gear	18. Gearshift cam	

Transmission Removal and Installation

B944H15206002

Removal

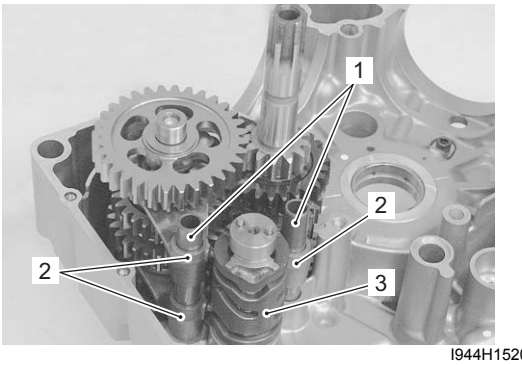
1) Remove the engine assembly from the frame. Refer to “Engine Assembly Removal in Section 1D (Page 1D-18)”.
2) Disassemble the engine top side. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-25)”.
3) Separate the right and left crankcases. Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-58)”.
4) Remove the crankshaft (1).



I944H1520001-01

Gearshift cam / Gearshift fork

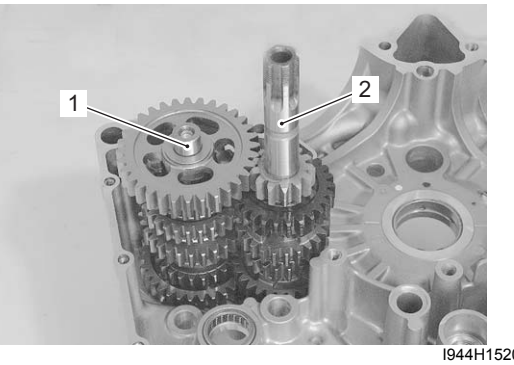
Remove the gearshift fork shafts (1), gearshift forks (2) and gearshift cam (3).



I944H1520002-01

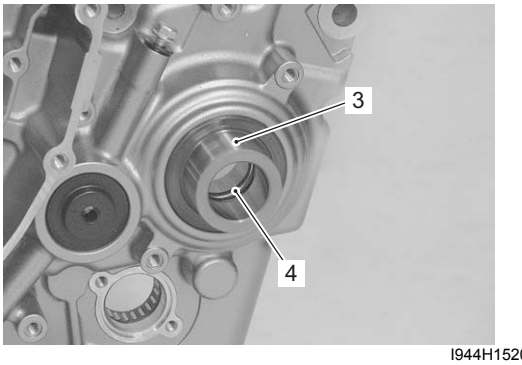
Driveshaft Assembly / Countershaft Assembly

1) Remove the driveshaft assembly (1) and countershaft assembly (2).



I944H1520003-01

2) Remove the engine sprocket spacer (3) and O-ring (4).



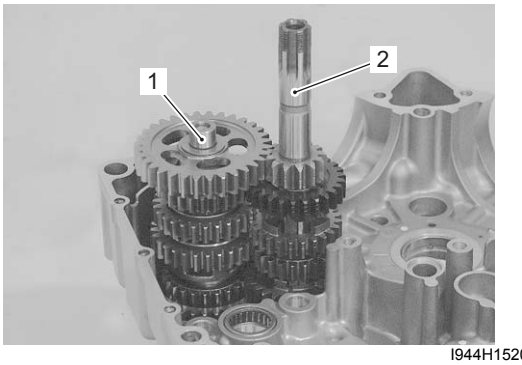
I944H1520004-01

Installation

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

Driveshaft Assembly / Countershaft Assembly

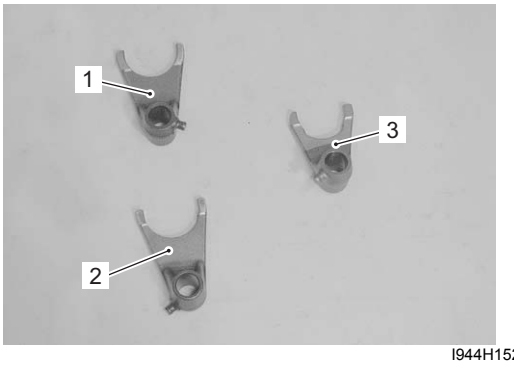
- Install the driveshaft assembly (1) and countershaft assembly (2).



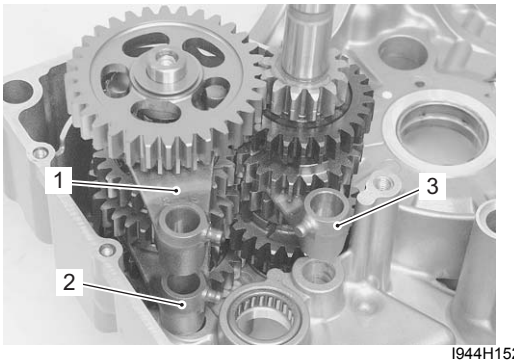
I944H1520005-01

Gearshift cam / Gearshift fork

- Install the gearshift forks into the gearshifting grooves in the correct position and direction.



I944H1520006-01



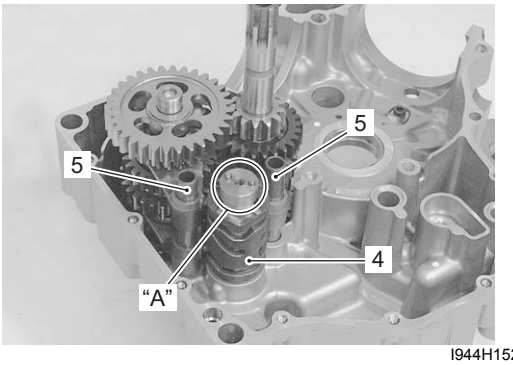
I944H1520007-01

1.	Gearshift fork No. 1
2.	Gearshift fork No. 2
3.	Gearshift fork No. 3

- Install the gearshift cam (4) so that the pins “A” face upward (right crankcase side).
- Install the gearshift fork shaft (5).

NOTE

- **After the gearshift fork shaft and gearshift forks have been fitted, make sure that the gears engage normally.**
- **Set the transmission gears to the neutral position.**

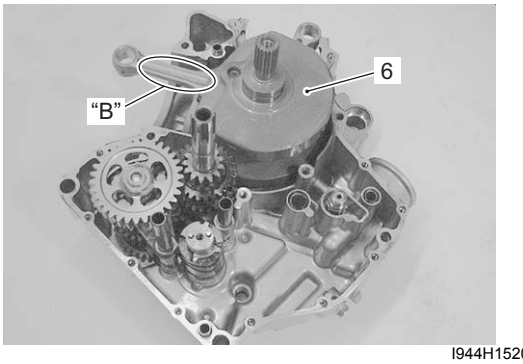


I944H1520008-01

- Install the crankshaft (6).

NOTE

- **Be sure to set the crankshaft in the proper direction.**
- **Of the two conrods, the one with the embossed letter marked should be brought to the rear cylinder.**



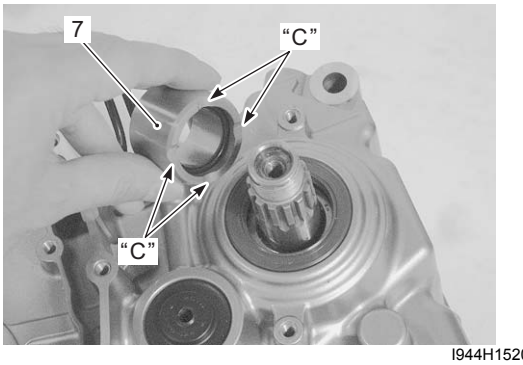
I944H1520009-01

“B”: Embossed letter

- Install the right crankcase. Refer to “Engine Bottom Side Assembly in Section 1D (Page 1D-65)”.
- Install the engine sprocket spacer (7).

NOTE

The grooved “C” side of the engine sprocket spacer (7) must face crankcase side.

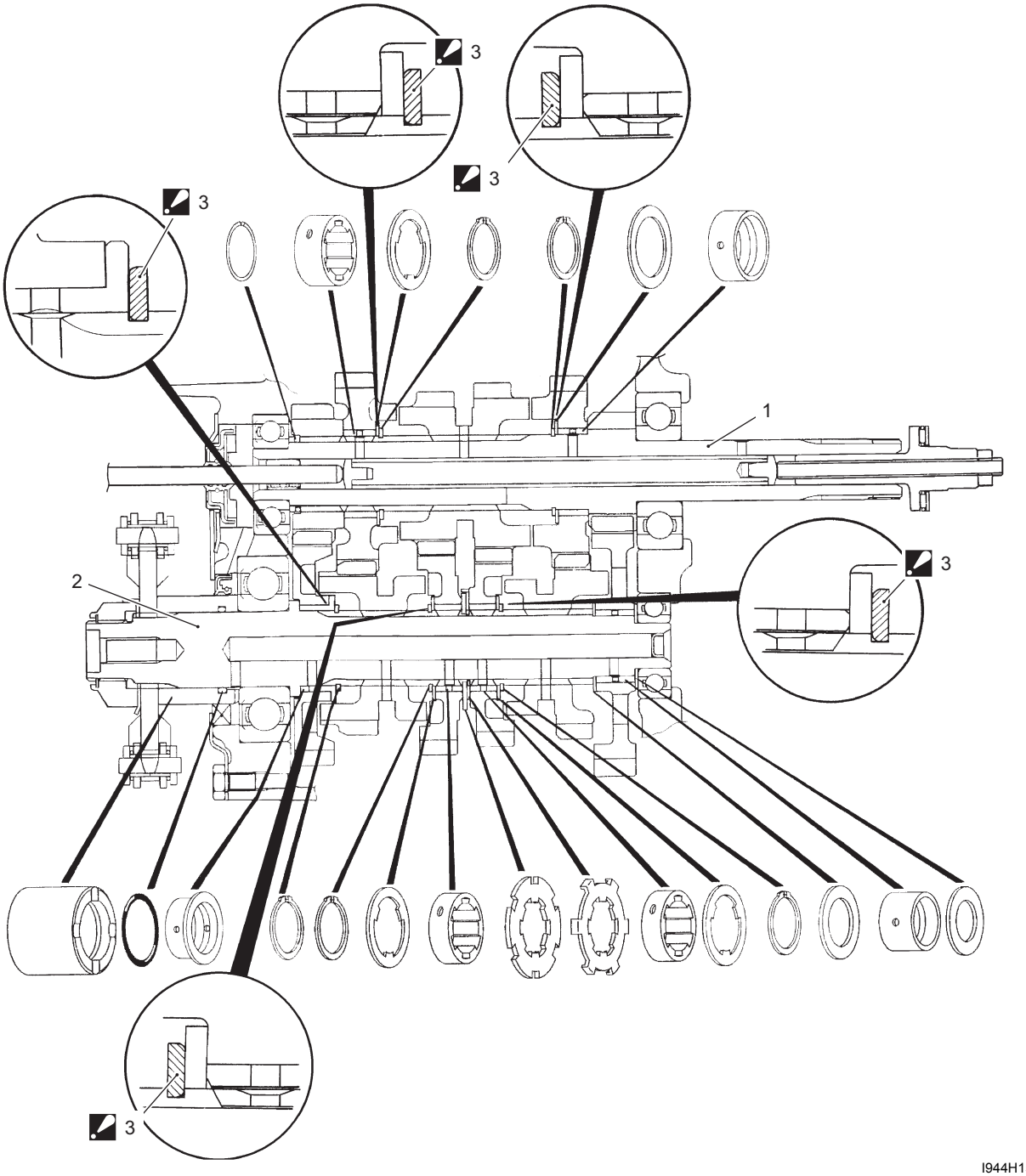


I944H1520010-01

- Assemble the engine. Refer to “Engine Bottom Side Assembly in Section 1D (Page 1D-65)” and “Engine Top Side Assembly in Section 1D (Page 1D-31)”.
- Remount the engine assembly. Refer to “Engine Assembly Installation in Section 1D (Page 1D-22)”.

Transmission Construction

B944H15206004



I944H1520011-04

1. Counter shaft	2. Drive shaft	3. Snap ring : Assemble snap ring with sharp edge side out.

Countershaft Gear / Driveshaft Gear Disassembly and Assembly

B944H15206005

Refer to “Transmission Removal and Installation (Page 5B-3)”.

Disassembly

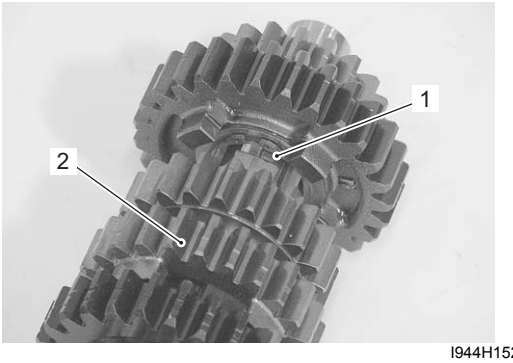
⚠ CAUTION

Identify the position of each removed part. Organize the parts in their respective groups (i.e., drive or driven) so that they can be reinstalled in their original positions.

Disassemble the countershaft and driveshaft as shown in the transmission construction. Refer to “Transmission Construction (Page 5B-5)”.
Pay attention to the following points:

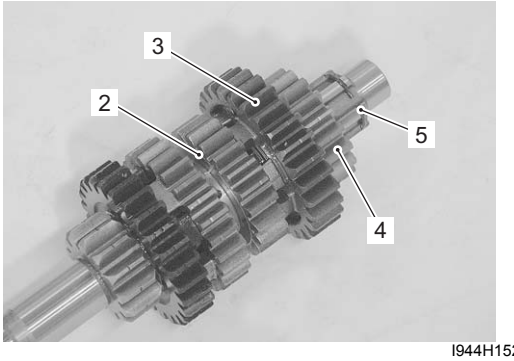
Countershaft

- Remove the 6th drive gear snap ring (1) from its groove and slide it towards the 3rd/4th drive gears (2).



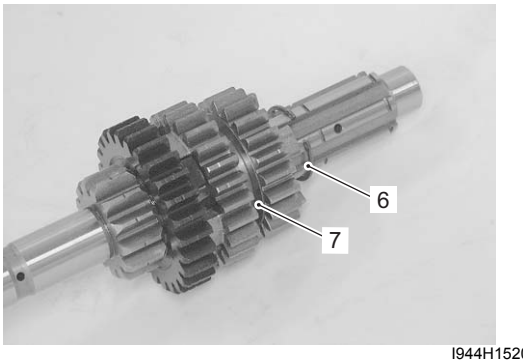
I944H1520012-01

- 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), 6th drive gear (3), bushing and washer.



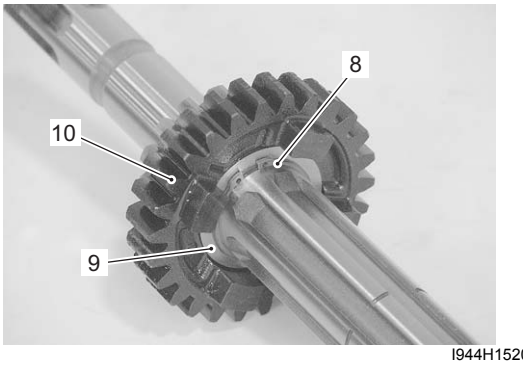
I944H1520013-01

- Remove the snap ring (6) and 3rd/4th drive gears (7).



I944H1520014-01

- Remove the snap ring (8), washer (9) and 5th drive gear (10).



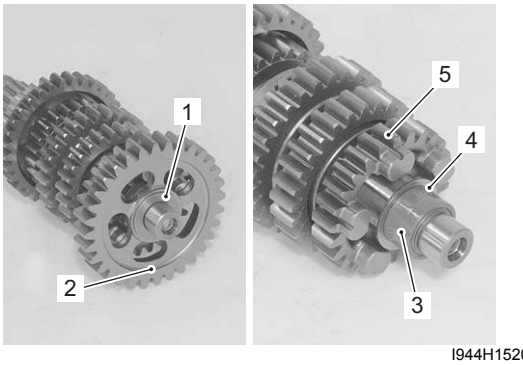
I944H1520015-01

- Remove the 5th drive gear bushing (11).

I944H1520016-01

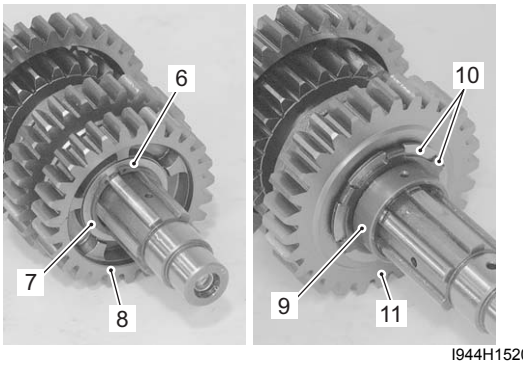
Driveshaft

- Remove the washer (1) and 1st driven gear (2).
- Remove the 1st driven gear bushing (3), washer (4) and 5th driven gear (5).



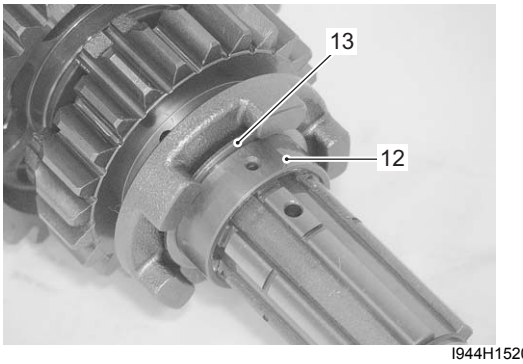
I944H1520017-01

- Remove the snap ring (6), washer (7) and 4th driven gear (8).
- Remove the 4th driven gear bushing (9), lock washers (10) and 3rd driven gear (11).



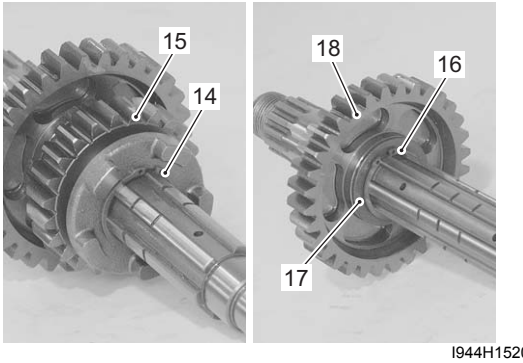
I944H1520018-01

- Remove the 3rd driven gear bushing (12) and washer (13).



I944H1520019-01

- Remove the snap ring (14) and 6th driven gear (15).
- Remove the snap ring (16) and 2nd driven gear bushing (17).
- Remove the 2nd driven gear (18).



I944H1520020-01

Assembly

NOTE

When reassembling the transmission gears, attention must be given to the locations and positions of washers and snap rings. The cross sectional view shows the correct position of the gears, bushings, washers and snap rings. Refer to "Transmission Construction (Page 5B-5)".

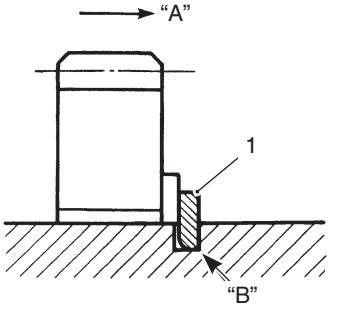
⚠ CAUTION

- **Never reuse a snap rings. After a snap rings has been removed from a shaft, it should be discarded and a new snap rings must be installed.**
- **When installing a new snap rings, do not expand the end gap larger than required to slip the snap rings over the shaft.**
- **After installing a snap rings, make sure that it is completely seated in its groove and securely fitted.**

NOTE

- **Rotate the bearing by hand to inspect for abnormal noises and smooth rotation. Replace the bearing if there is anything unusual.**
- **Before installing the gears, apply engine oil to the driveshaft and countershaft.**

- When installing a new snap ring (1), pay attention to its direction. Fit it to the side where the thrust is as shown in the illustration.

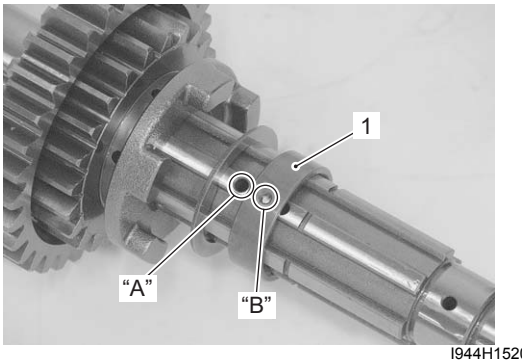


I649G1520049-02

1. Snap ring	"A": Thrust	"B": Sharp edge

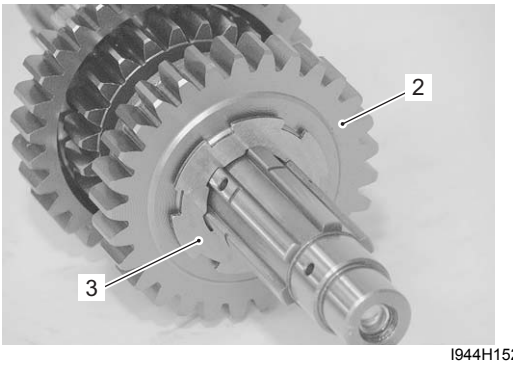
Driveshaft

- When install the 3rd driven gear bushing (1) onto the driveshaft, align the shaft oil hole "A" with the bushing oil hole "B".



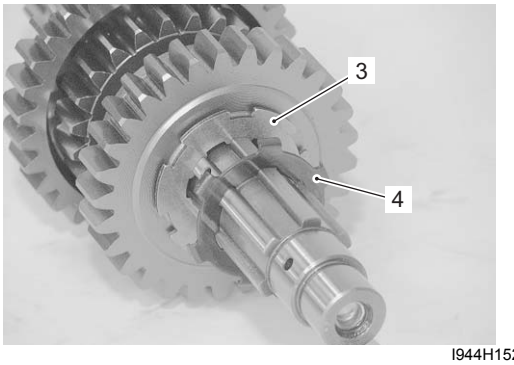
I944H1520021-01

- After installing the 3rd driven gear (2) onto the driveshaft, install lock washer No. 2 (3) onto the driveshaft, and position it so it fits into the groove.



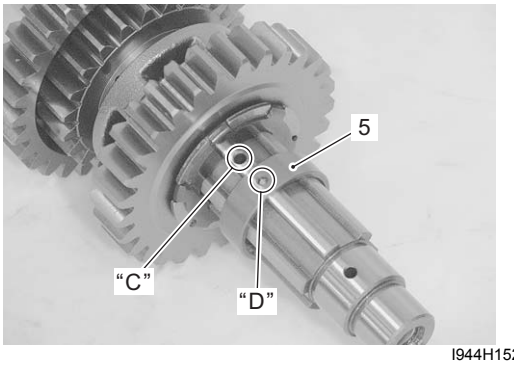
I944H1520022-01

- Then, fit lock washer No. 1 (4) into lock washer No. 2 (3).



I944H1520023-01

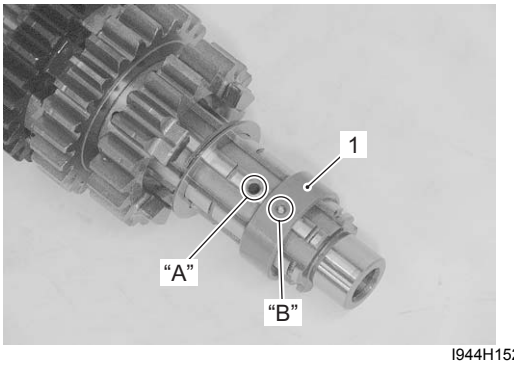
- When install the 4th driven gear bushing (5) onto the driveshaft, align the shaft oil hole “C” with the bushing oil hole “D”.



I944H1520024-01

Countershaft

- When installing the 6th drive gear bushing (1) onto the countershaft, align the shaft oil hole “A” with the bushing hole “B”.



I944H1520025-01

Transmission Related Parts Inspection

B944H15206006

Refer to “Transmission Removal and Installation (Page 5B-3)” and “Countershaft Gear / Driveshaft Gear Disassembly and Assembly (Page 5B-6)”.

Gearshift Fork to Groove Clearance

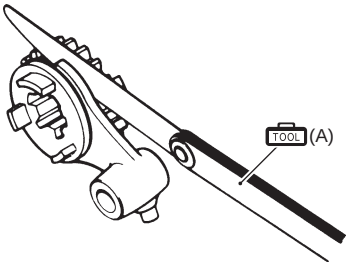
NOTE

The clearance for each gearshift fork plays an important role in the smoothness and positiveness of the shifting action.

Using a thickness gauge, check the gearshift fork clearance in the groove of its gear.
If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

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

Gearshift fork to gearshift fork groove clearance
Standard: 0.1 – 0.3 mm (0.004 – 0.012 in)
Service limit: 0.5 mm (0.02 in)

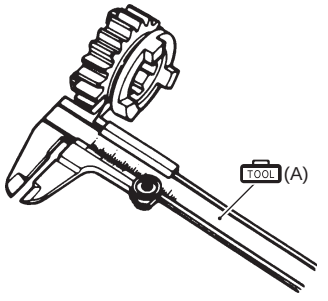


I649G1520056-03

Gearshift Fork Groove Width
Measure the gearshift fork groove width using the vernier calipers.

Special tool
TOOL (A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

Gearshift fork groove width
Standard (No. 1, No. 2 & No. 3): 5.5 – 5.6 mm (0.217 – 0.220 in)

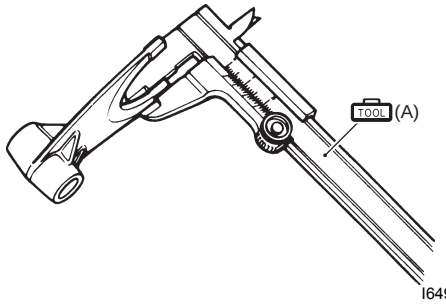


I649G1520057-03

Gearshift Fork Thickness
Measure the gearshift fork thickness using the vernier calipers.

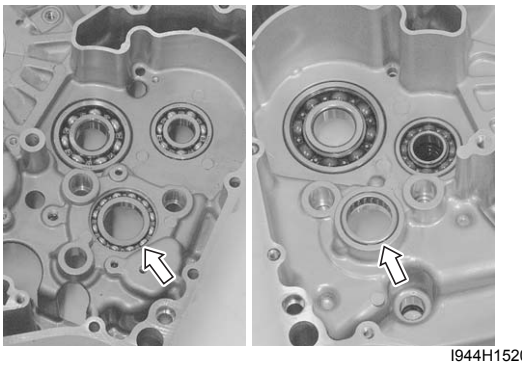
Special tool
TOOL (A): 09900–20102 (Vernier calipers (1/20 mm, 200 mm))

Gearshift fork thickness
Standard (No. 1, No. 2 & No. 3): 5.3 – 5.4 mm (0.209 – 0.213 in)



I649G1520058-03

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 Oil Seal / Bearing Removal and Installation (Page 5B-10)”.

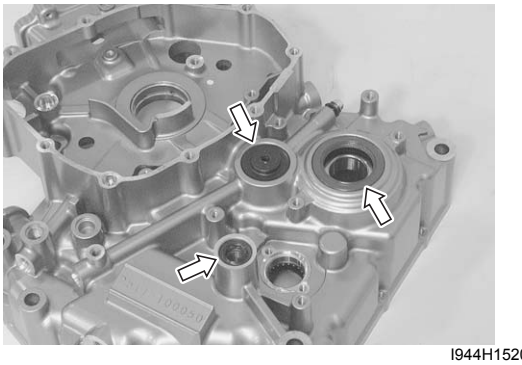

I944H1520026-01

Gearshift Cam
Inspect the gearshift cam groove for abnormal wear and damage. If any defects are found, replace the gearshift cam with a new one.

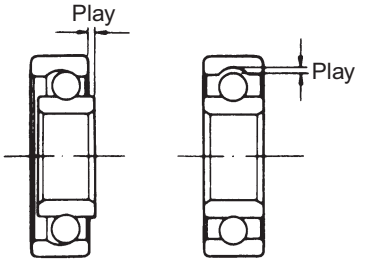
I944H1520027-01

Transmission Oil Seal / Bearing Inspection
B944H15206018
Refer to “Transmission Removal and Installation (Page 5B-3)”.

Oil seal
Inspect the oil seal lips for wear or damage. If any defects are found, replace the oil seal with new ones. Refer to “Transmission Oil Seal / Bearing Removal and Installation (Page 5B-10)”.


I944H1520067-01

Bearing
Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase.
Replace the bearing if there is anything unusual. Refer to “Transmission Oil Seal / Bearing Removal and Installation (Page 5B-10)”.



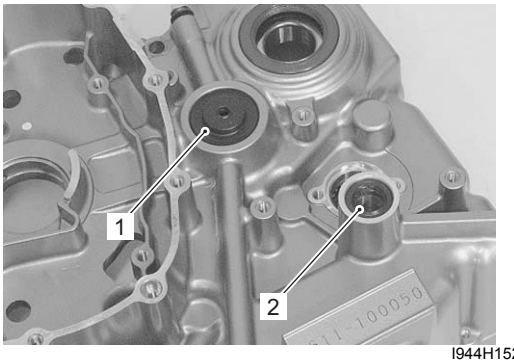
I933H1520033-01

Transmission Oil Seal / Bearing Removal and Installation

B944H15206017

Removal

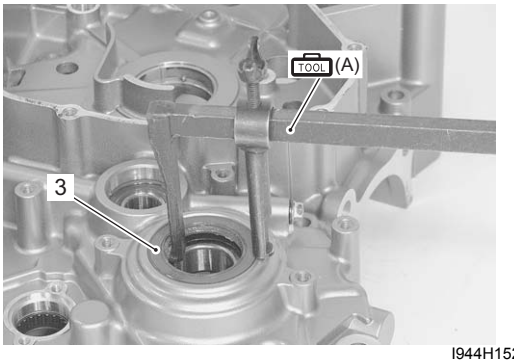
1) Remove the transmission assembly. Refer to “Transmission Removal and Installation (Page 5B-3)”.
2) Remove the clutch push rod oil seal (1) and shift shaft oil seal (2).



I944H1520031-01

3) Remove the driveshaft oil seal (3) with the special tool.

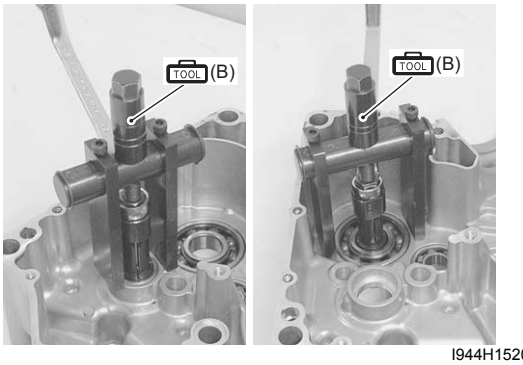
Special tool
TOOL (A): 09913–50121 (Oil seal remover)



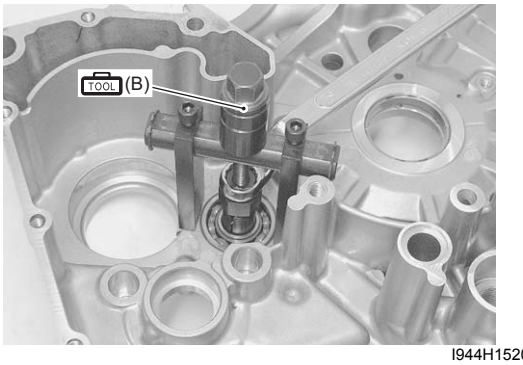
I944H1520032-01

4) Remove the bearings from the left crankcase with the special tool.

Special tool
TOOL (B): 09921–20240 (Bearing remover set)

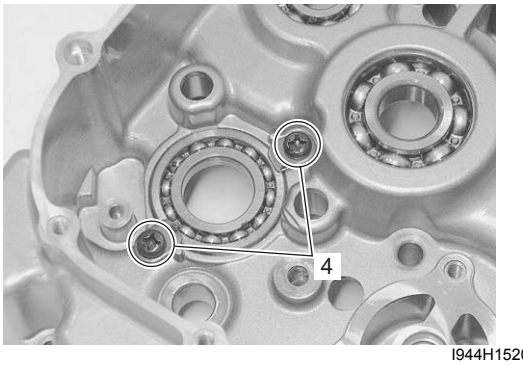


I944H1520034-01



I944H1520033-01

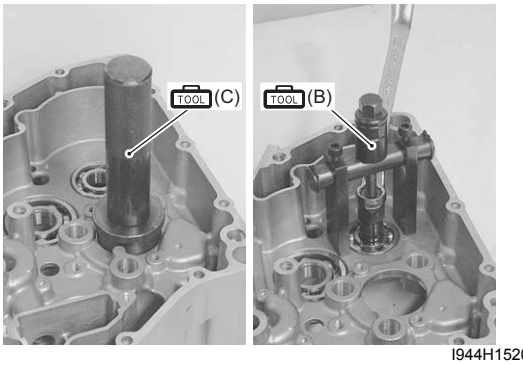
5) Remove the bearing retainers (4) from right crankcase.



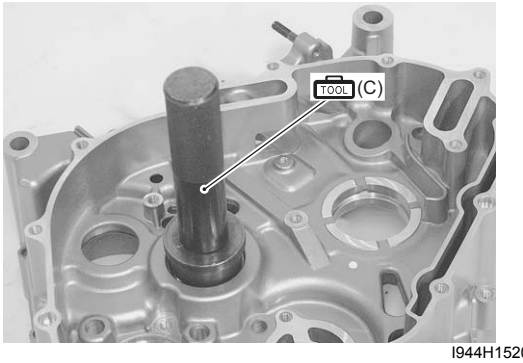
I944H1520035-01

6) Remove the bearings from right crankcase with the special tool.

Special tool
TOOL (B): 09921–20240 (Bearing remover set)
TOOL (C): 09913–70210 (Bearing installer set)



I944H1520036-01



I944H1520037-01

Installation

⚠ CAUTION

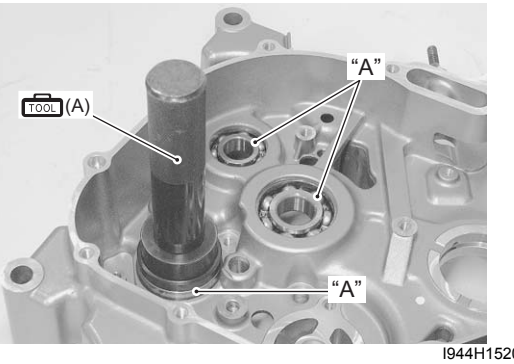
The removed oil seals and bearings must be replaced with new ones.

1) Install the bearings with the special tool.

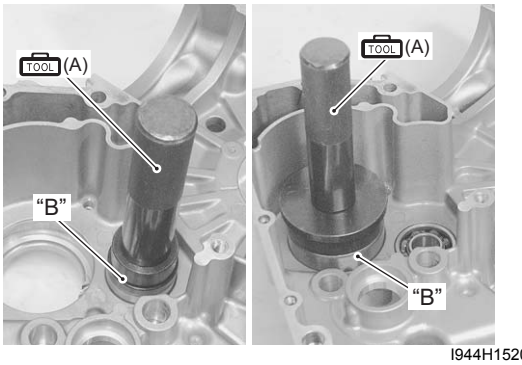
Special tool
TOOL (A): 09913–70210 (Bearing installer set)

⚠ CAUTION

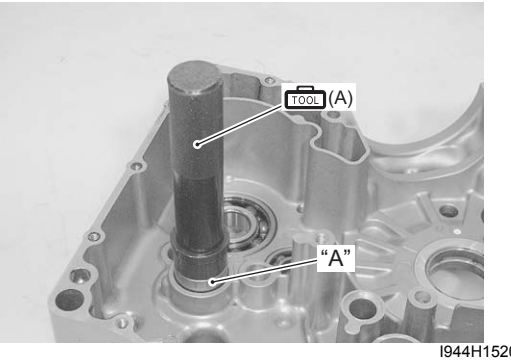
- **The stamped mark side of bearing "A" faces inside.**
- **The sealed side of the bearing "B" faces outside.**



I944H1520038-01

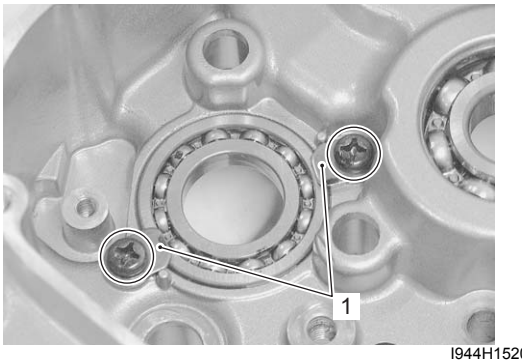


I944H1520039-01



I944H1520040-01

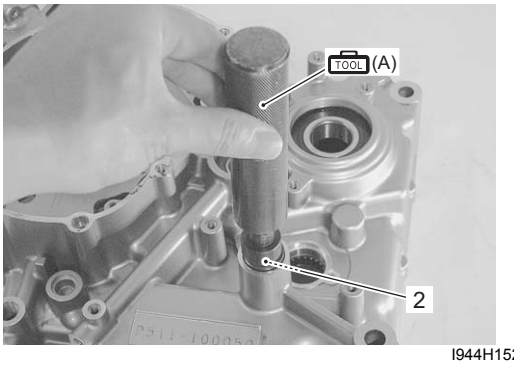
2) Install the bearing retainers (1).



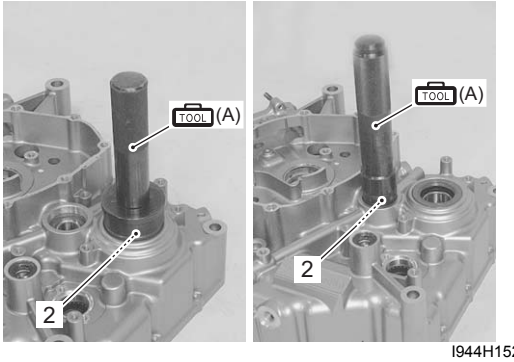
I944H1520041-01

3) Install the oil seals (2) using the special tool.

Special tool
(A): 09913–70210 (Bearing installer set)



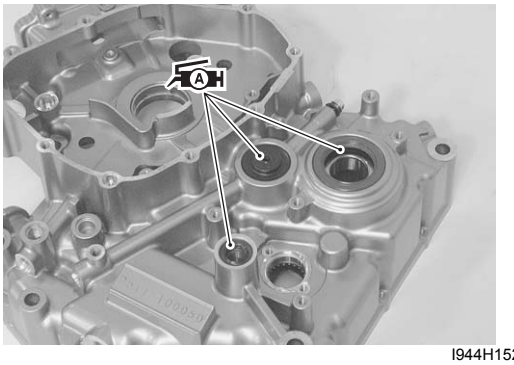
I944H1520042-01



I944H1520043-01

4) Apply grease to the oil seal lips.

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



I944H1520044-01

5) Install the transmission assembly. Refer to "Transmission Removal and Installation (Page 5B-3)".

Gear Position Switch Inspection

B944H15206007

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

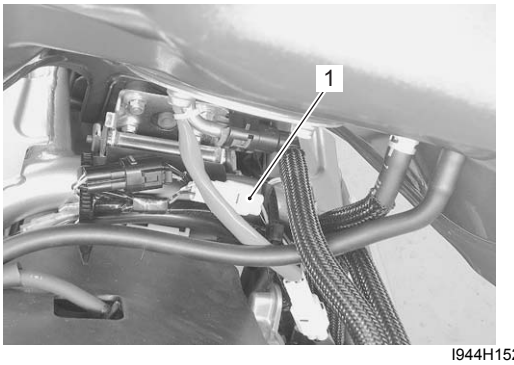
Gear Position Switch Removal and Installation

B944H15206008

Refer to "Electrical Components Location in Section 0A (Page 0A-7)".
Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-5)".

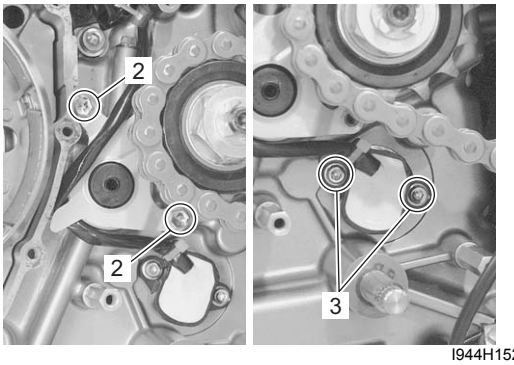
Removal

1) Turn the ignition switch OFF.
2) Lift and support the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-7)".
3) Disconnect the gear position switch coupler (1).



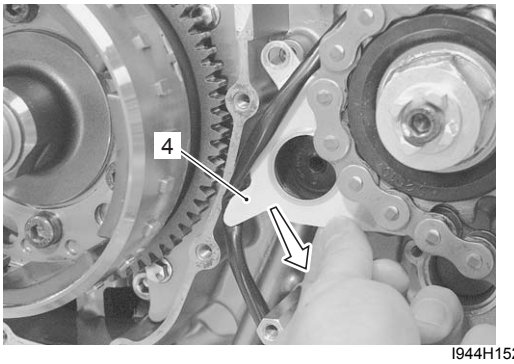
I944H1520068-01

4) Remove the generator cover. Refer to "Generator Removal and Installation in Section 1J (Page 1J-4)".
5) Remove the oil seal retainer mounting bolts (2).
6) Remove the gear position switch mounting bolts (3).



I944H1520028-02

7) Move the oil seal retainer (4) as shown.



I944H1520029-02

8) Remove the gear position switch.

Installation
Install the gear position switch in the reverse order of removal. Pay attention to the following points:

- Apply grease to the O-ring.

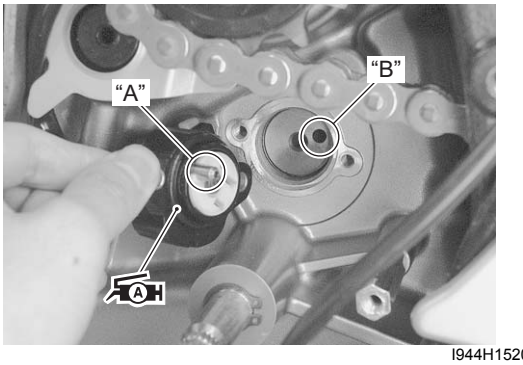
⚠ CAUTION

Replace the O-ring with a new one.

NOTE

Align the gear position switch pin "A" with the gearshift cam hole "B".

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

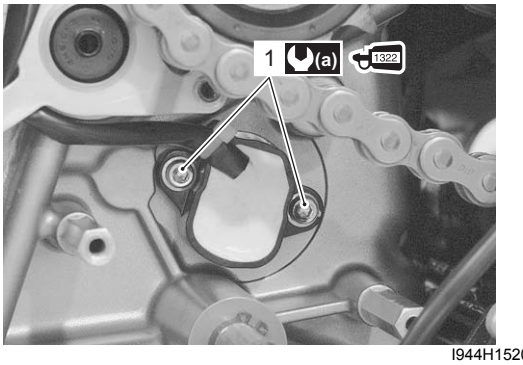


I944H1520030-01

- Apply thread lock to the gear position switch bolts (1) and tighten them to the specified torque.

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

Tightening torque
GP switch mounting bolt (a): 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)

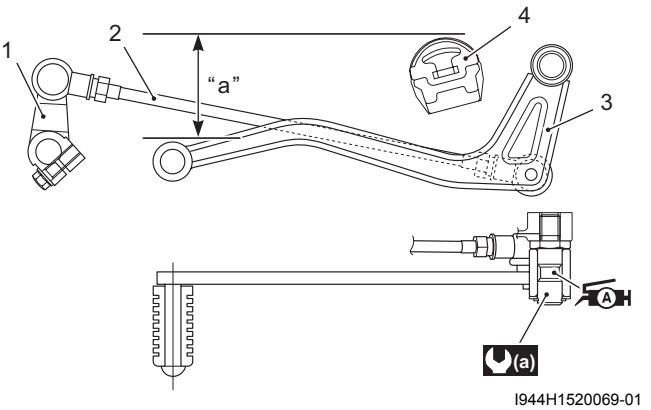


I944H1520045-03

- Route the gear position switch lead wire. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-5)".

Gearshift Lever Construction

B944H15206009



I944H1520069-01

1. Gearshift link arm	"a": 45 – 55 mm (1.8 – 2.2 in)
2. Gearshift link rod	(a): 40 N·m (4.0 kgf-m, 29.0 lbf-ft)
3. Gearshift lever	: Apply grease.
4. Footrest	

Gearshift Lever Removal and Installation

B944H15206010

Removal

1) Place the motorcycle on the center stand.
2) Remove the gearshift lever as shown in the gearshift lever construction. Refer to "Gearshift Lever Construction (Page 5B-13)".

Installation
Refer to "Gearshift Lever Construction (Page 5B-13)". Install the gearshift lever in the reverse order of removal. Pay attention to the following points:

- After installing the gearshift lever, check the gearshift lever height. Refer to "Gearshift Lever Height Inspection and Adjustment (Page 5B-13)".

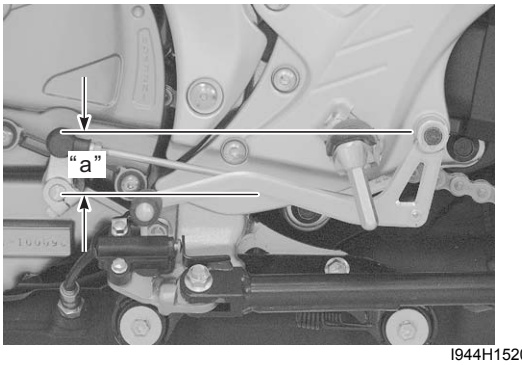
Gearshift Lever Height Inspection and Adjustment

B944H15206011

Inspect and adjust the gearshift lever height in the following procedures:

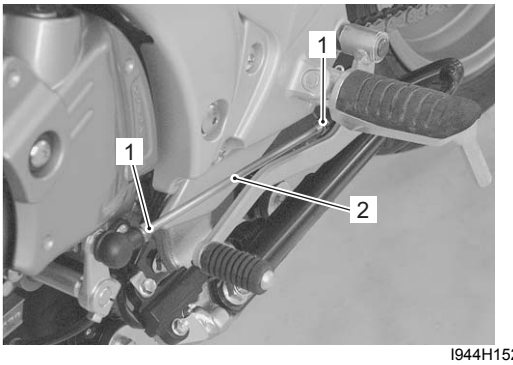
1) Inspect the gearshift lever height "a" between the pedal top face and footrest.
   Adjust the gearshift lever height if necessary.

Gearshift lever height "a"
Standard: 45 – 55 mm (1.8 – 2.2 in)



I944H1520046-01

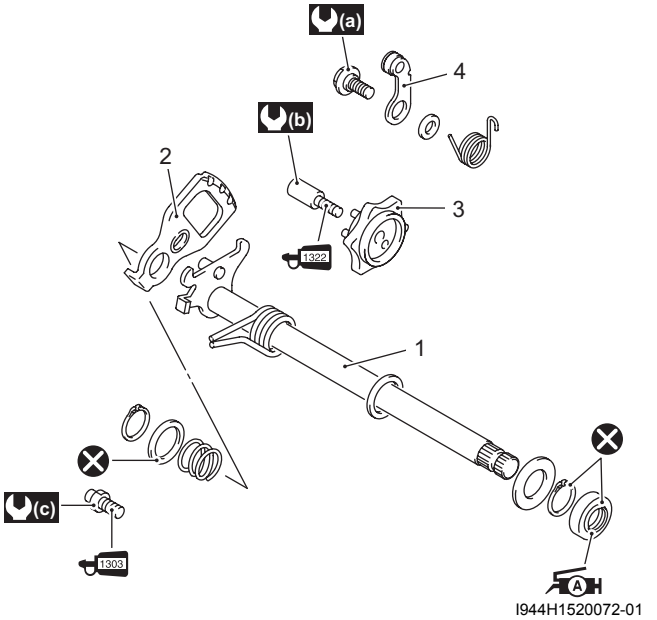
2) Loosen the lock-nuts (1).
3) Turn the gearshift link rod (2) until the gearshift lever is 45 – 55 mm (1.8 – 2.2 in) below the top of the footrest.
4) Tighten the lock-nuts securely.



I944H1520047-01

Gearshift Shaft / Gearshift Cam Plate Components

B944H15206012

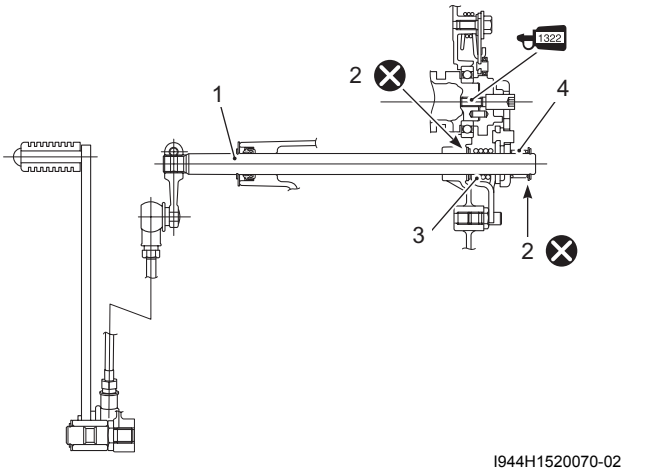


I944H1520072-01

1.	Gearshift shaft
2.	Gearshift cam drive plate
3.	Gearshift cam plate
4.	Gearshift cam stopper
(a) :	10 N·m (1.0 kgf-m, 7.0 lbf-ft)
(b) :	13 N·m (1.3 kgf-m, 9.5 lbf-ft)
(c) :	19 N·m (1.9 kgf-m, 13.5 lbf-ft)
1303 :	Apply thread lock to thread part.
1322 :	Apply thread lock to thread part.
A H :	Apply grease to oil seal lip.
:	Do not reuse.

Gearshift Construction

B944H15206013



I944H1520070-02

1.	Gearshift shaft
2.	Snap ring
3.	Gearshift shaft return spring
4.	Gearshift plate return spring
1322 :	Apply thread lock to thread part.
:	Do not reuse.

Gearshift Shaft / Gearshift Cam Plate Removal and Installation

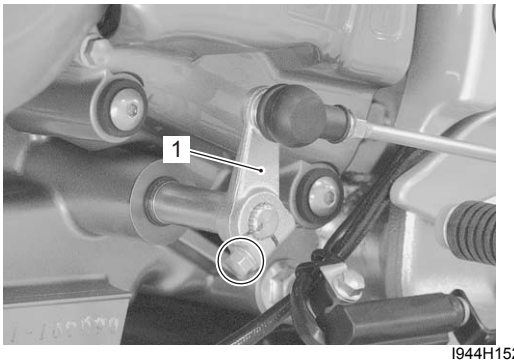
B944H15206014

Removal

1) Disengage the gearshift lever link arm (1) by removing the bolt.

NOTE

Mark the gearshift shaft head at which the gearshift link arm slit set for correct reinstallation.

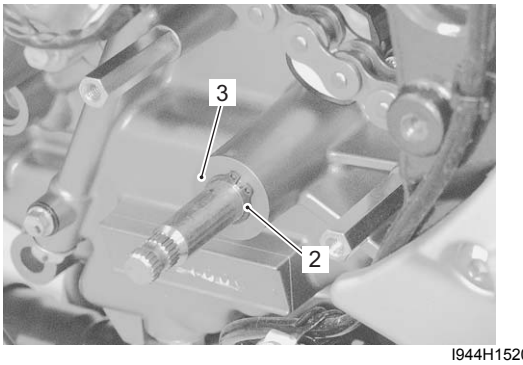


I944H1520048-01

2) Remove the engine sprocket outer cover. Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.
3) Remove the clutch components. Refer to “Clutch Removal in Section 5C (Page 5C-7)”.

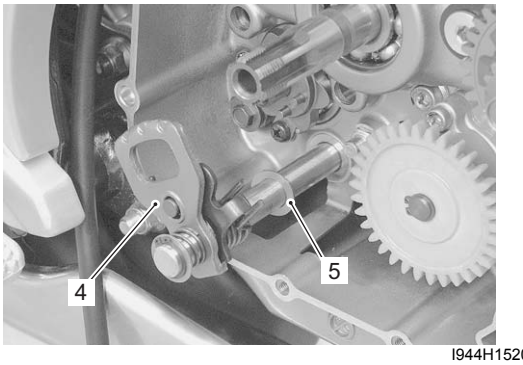
4) Remove the snap ring (2) and washer (3) from the gearshift shaft.

Special tool
TOOL : 09900–06107 (Snap ring pliers)



I944H1520049-02

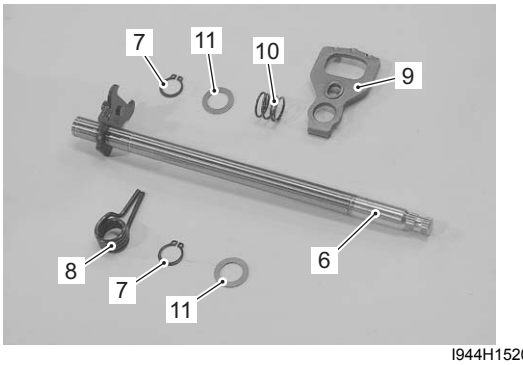
5) Remove the gearshift shaft assembly (4) and washer (5).



I944H1520050-02

6) Remove the following parts from the gearshift shaft (6).
- Snap ring (7)
- Gearshift return spring (8)
- Gearshift cam drive plate (9)
- Plate return spring (10)
- Washer (11)

Special tool
TOOL : 09900–06107 (Snap ring pliers)

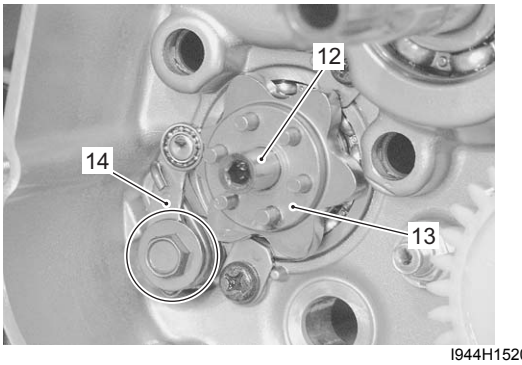


I944H1520051-01

7) Remove the gearshift cam plate bolt (12) and gearshift cam plate (13).
8) Remove the gearshift cam stopper (14).

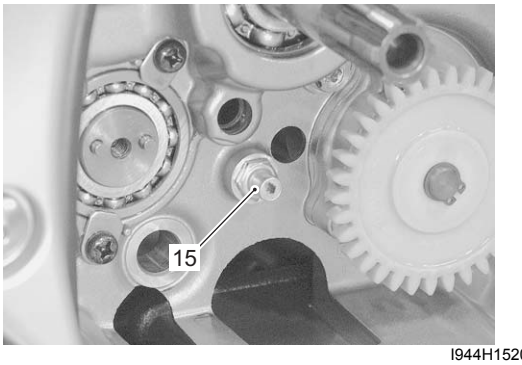
NOTE

Do not drop the each parts into the crankcase.



I944H1520052-01

9) Remove the gearshift arm stopper (15).



I944H1520053-01

Installation
Install the gearshift shaft and gearshift cam plate in the reverse order of removal. Pay attention to the following points:

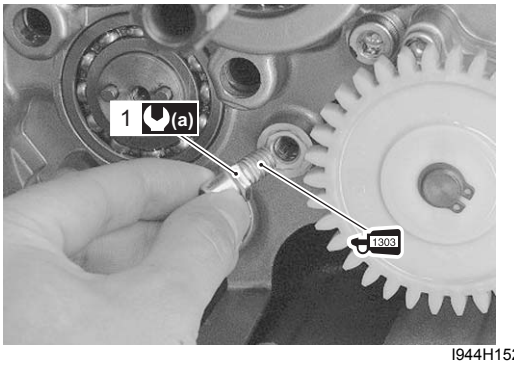
⚠ CAUTION

The removed snap rings must be replaced with new ones.

- Apply a small quantity of thread lock to the gearshift arm stopper (1) 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)



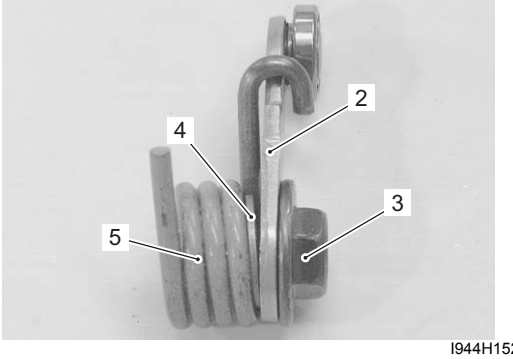
I944H1520054-02

- Install the gearshift cam stopper (2), bolt (3), washer (4) and return spring (5).
- Tighten the gearshift cam stopper bolt (3) to the specified torque.

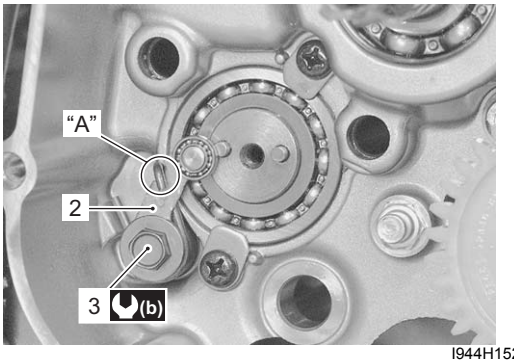
NOTE

Hook the return spring end “A” to the stopper (2).

Tightening torque
Gearshift cam stopper bolt (b): 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1520055-01

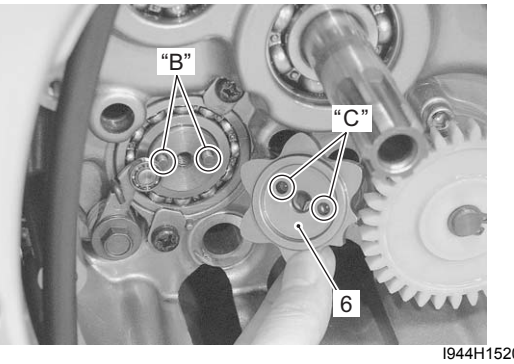


I944H1520056-02

- Check the gearshift cam stopper moves smoothly.
- Locate the gearshift cam in the neutral position.
- Install the gearshift cam stopper plate (6).

NOTE

Align the gearshift cam pins “B” with the gearshift cam stopper plate holes “C”.

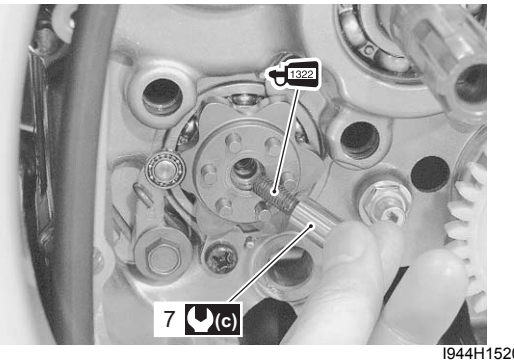


I944H1520057-01

- Apply a small quantity of thread lock to the gearshift cam stopper plate bolt (7) and tighten it to the specified torque.

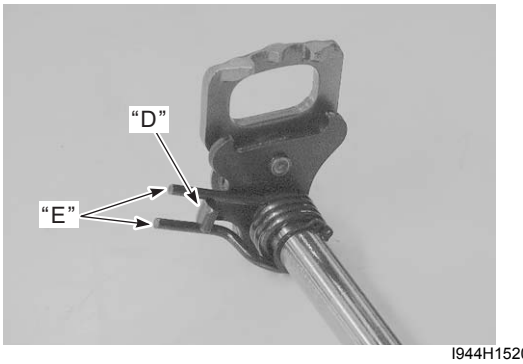
1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque
Gearshift cam stopper plate bolt (c): 13 N·m (1.3 kgf-m, 9.5 lbf-ft)



I944H1520058-01

- When installing the gearshift shaft return spring, position the stopper “D” of gearshift arm between the shaft return spring ends “E”.

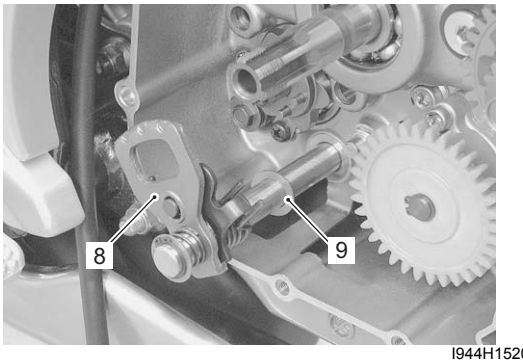


I944H1520059-01

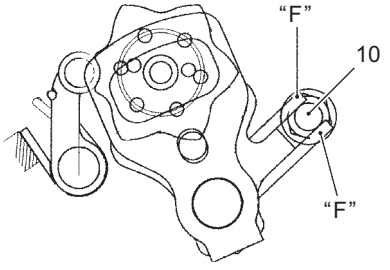
- Install the gearshift shaft assembly (8) and washer (9) as shown.

NOTE

Pinch the gearshift arm stopper (10) with return spring ends “F”.



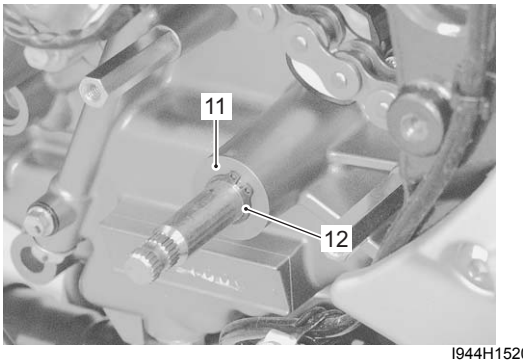
I944H1520060-01



I944H1520061-01

- Install the washer (11) and snap ring (12).

Special tool
TOOL : 09900–06107 (Snap ring pliers)



I944H1520062-01

- After installing the gearshift lever, check the gearshift lever height. Refer to “Gearshift Lever Height Inspection and Adjustment (Page 5B-13)”.

Gearshift Linkage Inspection

B944H15206015

Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation (Page 5B-14)”.

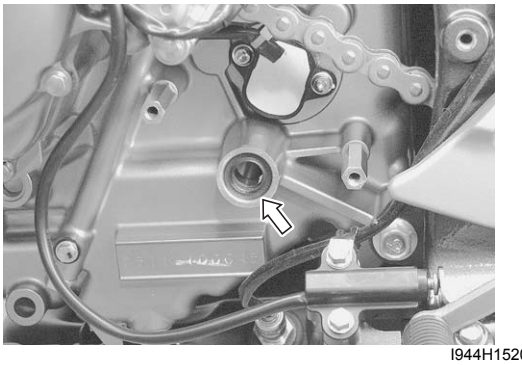
Gearshift Shaft

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).

I944H1520063-01

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.



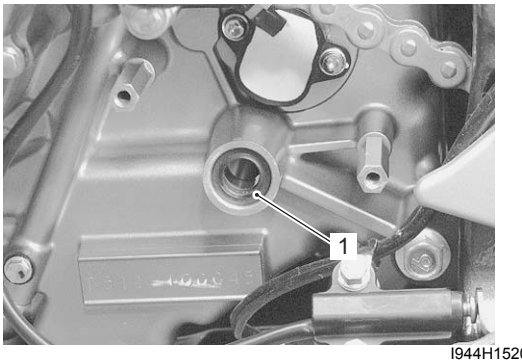
I944H1520064-01

Gearshift Shaft Oil Seal Removal and Installation

B944H15206016

Removal

1) Remove the gearshift shaft. Refer to “Gearshift Shaft / Gearshift Cam Plate Removal and Installation (Page 5B-14)”.
2) Remove the gearshift shaft oil seal (1).



I944H1520065-01

Installation
Install the oil seal in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

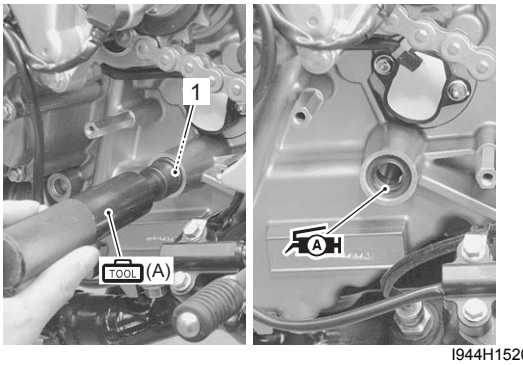
The removed oil seal must be replaced with new ones.

- Install the oil seal (1) with the special tool.

Special tool
TOOL (A): 09913–70210 (Bearing installer set)

- Apply grease to the oil seal lip.

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



I944H1520066-01

Specifications

Service Data

B944H15207001

Transmission + Drive Chain
Unit: mm (in) Except ratio

Item		Standard		Limit
Primary reduction ratio		2.088 (71/34)		—
Final reduction ratio		3.066 (46/15)		—
Gear ratios	Low	2.461 (32/13)		—
	2nd	1.777 (32/18)		—
	3rd	1.380 (29/21)		—
	4th	1.125 (27/24)		—
	5th	0.961 (25/26)		—
	Top	0.851 (23/27)		—
Gearshift-fork to gearshift-fork groove clearance		No. 1, No. 2 & No. 3	0.1 – 0.3 (0.004 – 0.012)	0.50 (0.020)
Gearshift fork groove width		No. 1, No. 2 & No. 3	5.5 – 5.6 (0.217 – 0.220)	—
Gearshift fork thickness		No. 1, No. 2 & No. 3	5.3 – 5.4 (0.209 – 0.213)	—
Gearshift lever height		45 – 55 (1.8 – 2.2)		—

Tightening Torque Specifications

B944H15207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
GP switch mounting bolt	6.5	0.65	4.7	☞(Page 5B-13)
Gearshift arm stopper	19	1.9	13.5	☞(Page 5B-16)
Gearshift cam stopper bolt	10	1.0	7.0	☞(Page 5B-16)
Gearshift cam stopper plate bolt	13	1.3	9.5	☞(Page 5B-16)

NOTE

The specified tightening torque is described in the following.
“Gearshift Lever Construction (Page 5B-13)”
“Gearshift Shaft / Gearshift Cam Plate Components (Page 5B-14)”

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

Special Tools and Equipment

Recommended Service Material

B944H15208001

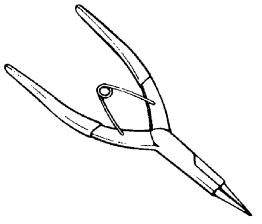
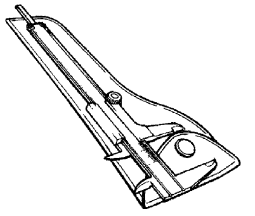
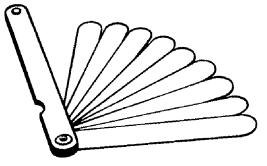
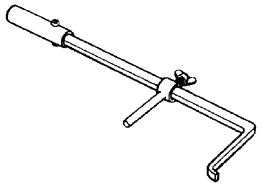
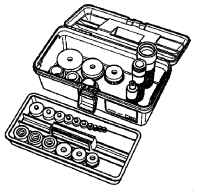
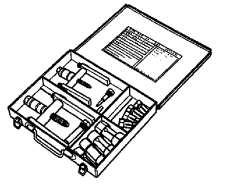
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 5B-12) / ☞(Page 5B-13) / ☞(Page 5B-18)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000–32030	☞(Page 5B-16)
	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞(Page 5B-13) / ☞(Page 5B-16)

NOTE

Required service material is also described in the following.
“Transmission Components (Page 5B-2)”
“Gearshift Lever Construction (Page 5B-13)”
“Gearshift Shaft / Gearshift Cam Plate Components (Page 5B-14)”
“Gearshift Construction (Page 5B-14)”

Special Tool

B944H15208002

09900–06107 Snap ring remover (Open type) ☞(Page 5B-15) / ☞(Page 5B-15) / ☞(Page 5B-17)		09900–20102 Vernier calipers (200 mm) ☞(Page 5B-9) / ☞(Page 5B-9)	
09900–20803 Thickness gauge ☞(Page 5B-8)		09913–50121 Oil seal remover ☞(Page 5B-10)	
09913–70210 Bearing installer set (10 – 75) ☞(Page 5B-11) / ☞(Page 5B-11) / ☞(Page 5B-12) / ☞(Page 5B-18)		09921–20240 Bearing remover set ☞(Page 5B-10) / ☞(Page 5B-11)	

Clutch

Precautions

Precautions for Clutch System

B944H15300001

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

Diagnostic Information and Procedures

Clutch System Symptom Diagnosis

B944H15304001

Condition	Possible cause	Correction / Reference Item
Engine is noisy (Noise seems to come from the clutch)	Worn countershaft spline.	*Replace countershaft.*
	Worn clutch hub spline.	*Replace clutch hub.*
	Worn clutch plate teeth.	*Replace clutch plate.*
	Distorted clutch plate, driven and drive.	*Replace.*
	Worn clutch release bearing.	*Replace.*
	Weakened clutch dampers.	*Replace primary driven gear.*
Clutch slips	Weakened clutch springs.	*Replace.*
	Worn or distorted clutch pressure plate.	*Replace.*
	Distorted clutch plates.	*Replace.*
	Clutch cable play out of adjustment.	*Adjust.*
Clutch drags	Clutch cable play out of adjustment.	*Adjust.*
	Some clutch springs are weak, while others are not.	*Replace.*
	Worn or distorted clutch pressure plates.	*Replace.*
	Distorted clutch plates.	*Replace.*

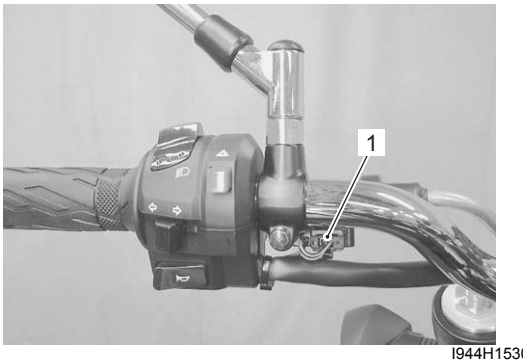
Repair Instructions

Clutch Lever Position Switch Inspection

B944H15306001

Inspect the clutch lever position switch in the following procedures:

1) Disconnect the clutch lever switch coupler (1).



I944H1530001-01

2) Inspect the clutch lever position switch for continuity with the tester.
If any abnormality is found, replace the switch with a new one.

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

Tester knob indication
Continuity (•))))

Color / Position	B/W	B/Y
OFF		
ON	○	○

I944H1530002-01

3) Connect the clutch lever position switch lead wire.

Clutch Cable Inspection and Adjustment

B944H15306024

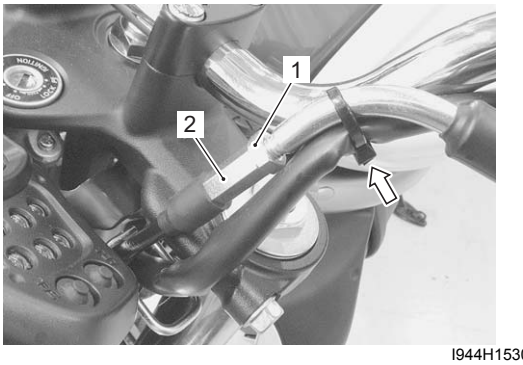
Refer to “Clutch System Inspection in Section 0B (Page 0B-14)”.

Clutch Cable Removal and Installation

B944H15306030

Removal

1) Full loosen the cable adjuster lock-nut (1) and adjuster (2).
2) Disconnect the clamp.



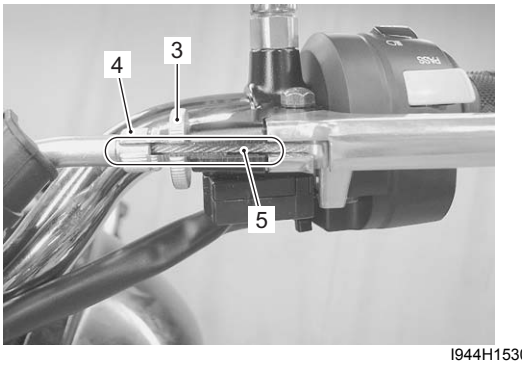
I944H1530003-02

3) Loosen the cable lock-nut (3) and adjuster (4).

NOTE

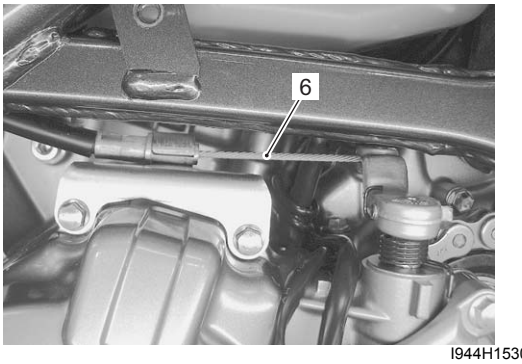
Align the clutch lever, cable lock-nut (3) and adjuster (4) with the cutaway.

4) Disconnect the clutch cable (5). (clutch lever side)



I944H1530004-01

5) Disconnect the clutch cable (6). (engine side)



I944H1530005-01

6) Remove the left frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
7) Remove the clutch cable as shown in the cable routing diagram. Refer to “Throttle Cable Routing Diagram in Section 1D (Page 1D-2)”.

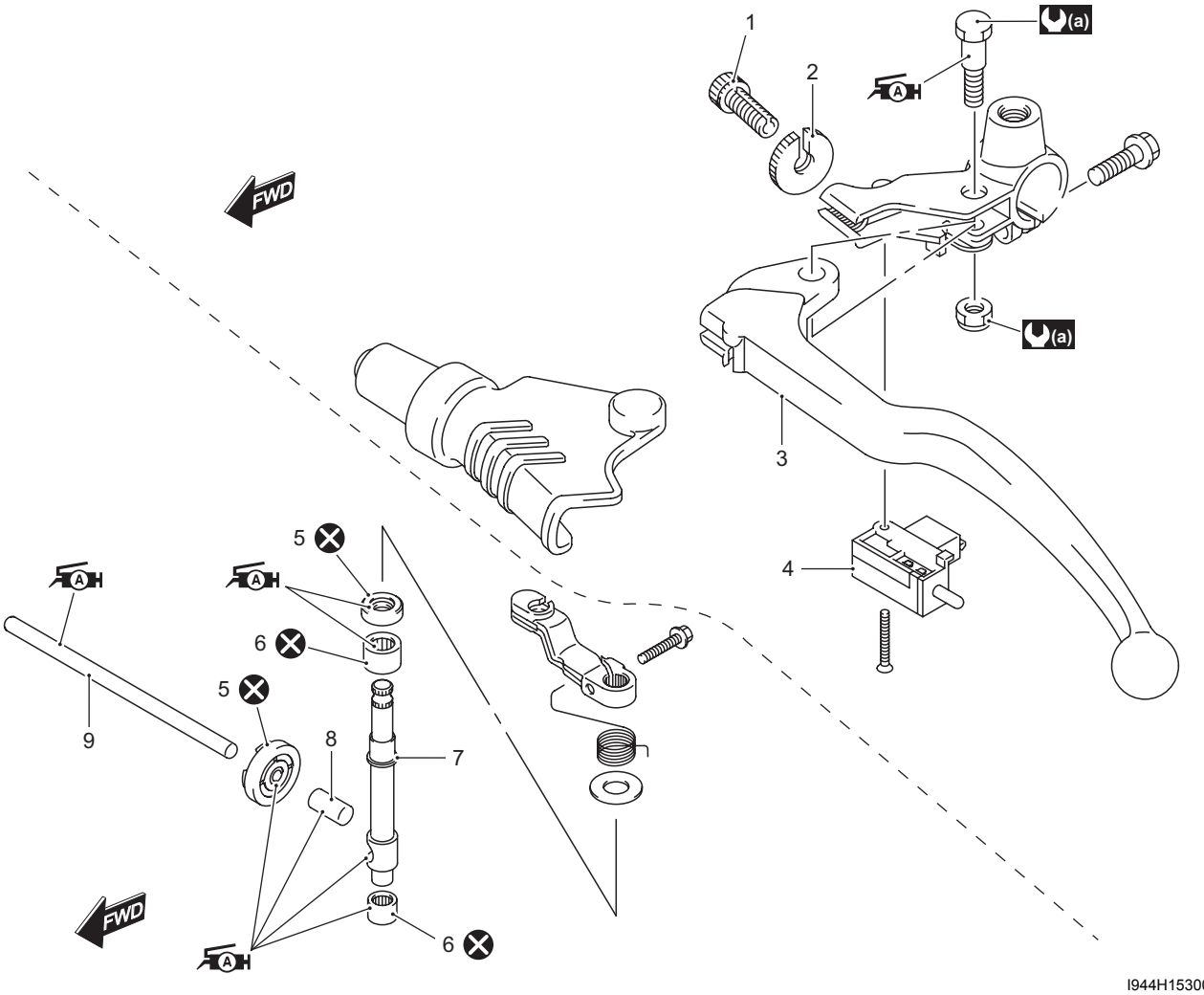
Installation

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

- Install the clutch cable as shown in the 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 System Inspection in Section 0B (Page 0B-14)”.

Clutch Lever Components

B944H15306025



I944H1530067-04

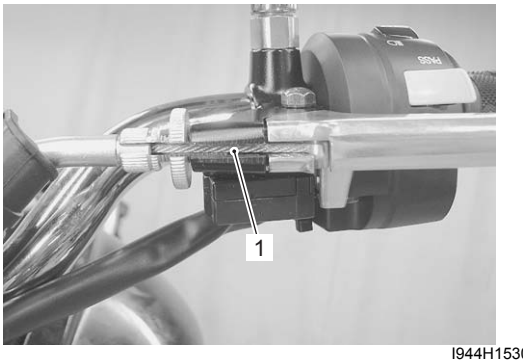
1. Adjuster	5. Oil seal	9. Clutch push rod (left)
2. Lock-nut	6. Bearing	(a) : 5 N·m (0.5 kgf-m, 3.8 lbf-ft)
3. Clutch lever	7. Clutch release camshaft	A : Apply grease.
4. Clutch lever position switch	8. Clutch push rod cap	⊗ : Do not reuse.

Clutch Lever Removal and Installation

B944H15306026

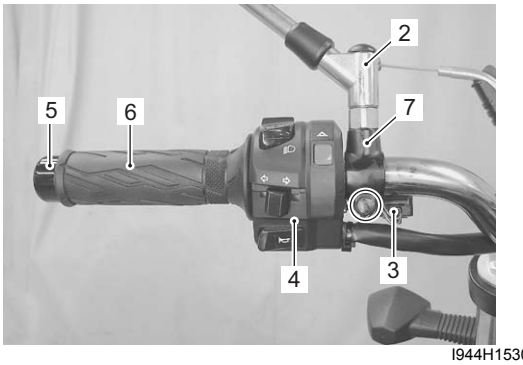
Removal

1) Disconnect the clutch cable (1) (Clutch lever side). Refer to “Clutch Cable Removal and Installation (Page 5C-2)”.



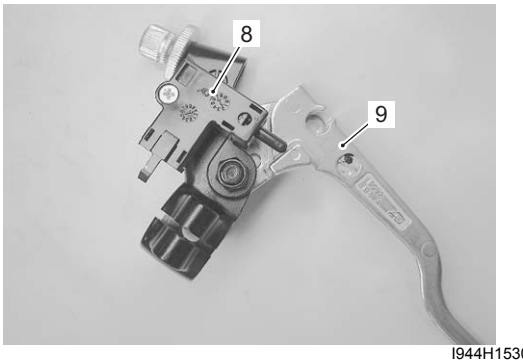
I944H1530006-01

2) Remove the following parts from the left handle bar.
   a) Rear view minor (2)
   b) Clutch lever position switch coupler (3)
   c) Left handlebar switch box (4)
   d) Handlebar balancer (5)
   e) Grip rubber (6)
   f) Clutch lever assembly (7)



I944H1530007-02

3) Remove the clutch lever position switch (8) and clutch lever (9).



I944H1530008-03

Installation

Install the clutch lever in the reverse order of removal. Pay attention to the following points:

- Apply grease to the clutch lever pivot bolt.

  : Grease 99000–25100 (SUZUKI SILICONE GREASE or equivalent)

I944H1530009-01

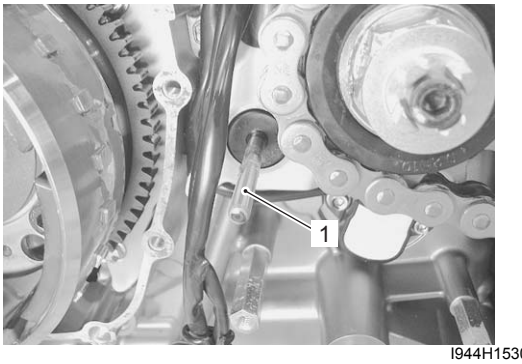
- Install the left handlebar components. Refer to “Handlebars Removal and Installation in Section 6B (Page 6B-3)”.
- After install the removed parts, adjust the clutch cable play. Refer to “Clutch System Inspection in Section 0B (Page 0B-14)”.

Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation

B944H15306027

Removal

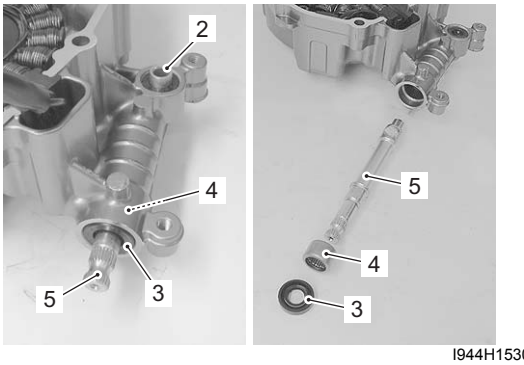
1) Remove the generator cover. Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.
2) Remove the clutch push rod (1).



I944H1530010-01

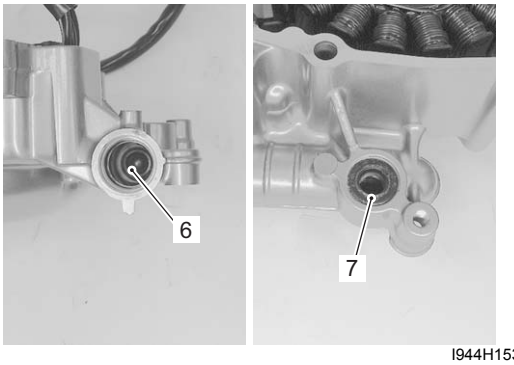
3) Remove the clutch push rod cap (2).

4) Pull out the oil seal (3), bearing (4) with the clutch release camshaft (5).



I944H1530011-01

5) Remove the bearing (6) and oil seal (7).



I944H1530012-01

Installation

Install the clutch push rod (left) / clutch release camshaft in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

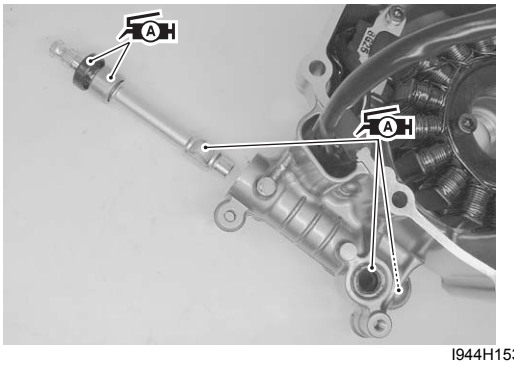
The removed bearings and oil seals must be replaced with new ones.

- Apply grease to the bearings, oil seals, release camshaft and clutch push rod cap.

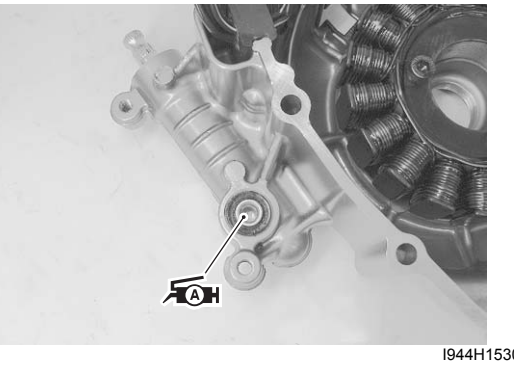
: Grease 99000–25010 (SUZUKI SUPER GREASE A or equivalent)

NOTE

The stamped mark side of the bearing face upside.



I944H1530013-01



I944H1530014-01

- Apply a small quantity of grease to the clutch push rod.

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

I944H1530015-01

- Install the generator cover. Refer to “Generator Removal and Installation in Section 1J (Page 1J-4)”.

Clutch Push Rod (Left) Inspection

B944H15306019

Inspect the push rod in the following procedures:

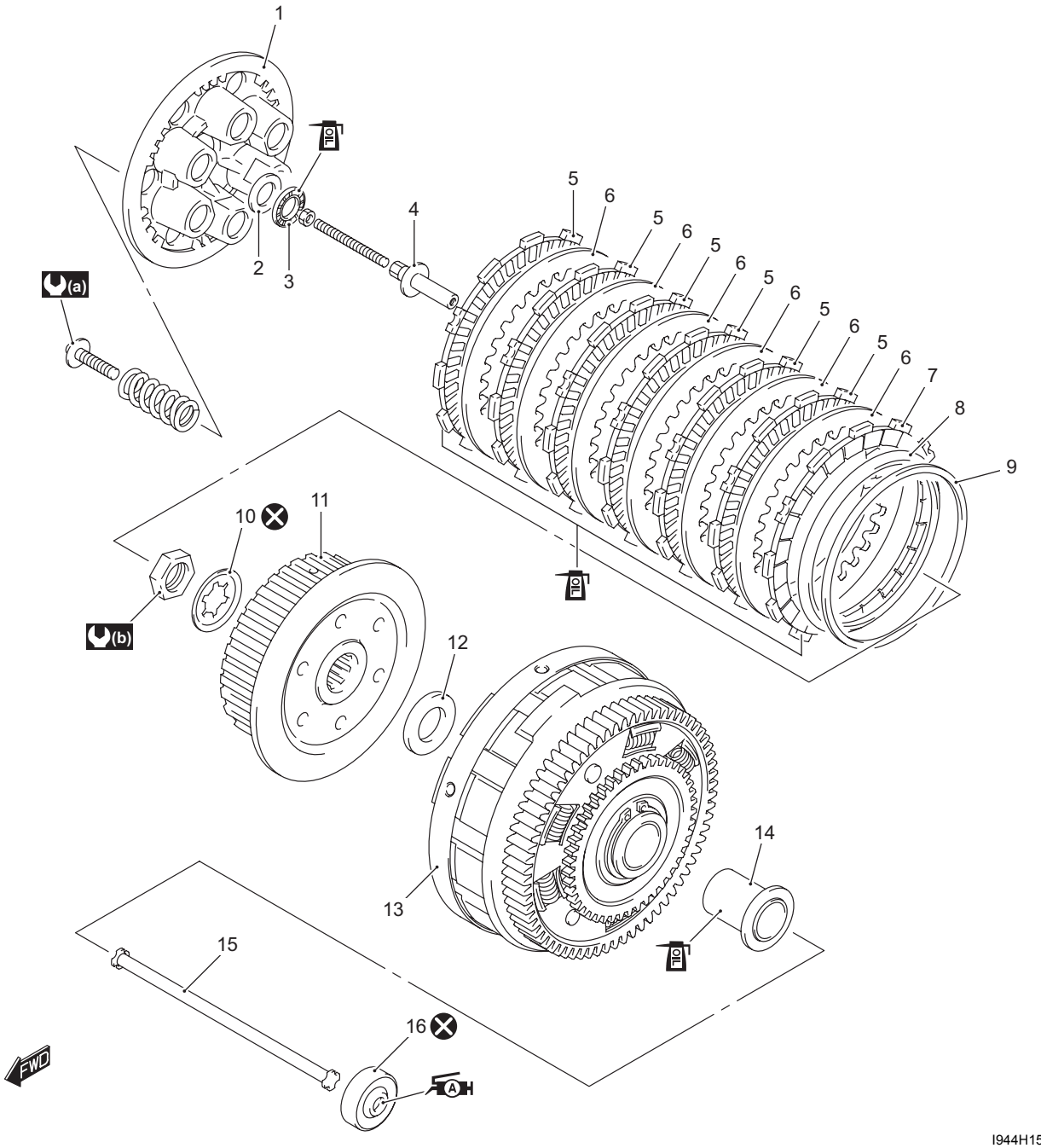
1) Remove the clutch push rod. Refer to “Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation (Page 5C-4)”.
2) Inspect the push rod for wear or bend. If any defects are found, replace it with a new one.

I944H1530016-01

3) Reinstall the removed parts. Refer to “Clutch Push Rod (Left) / Clutch Release Camshaft Removal and Installation (Page 5C-4)”.

Clutch Components

B944H15306028



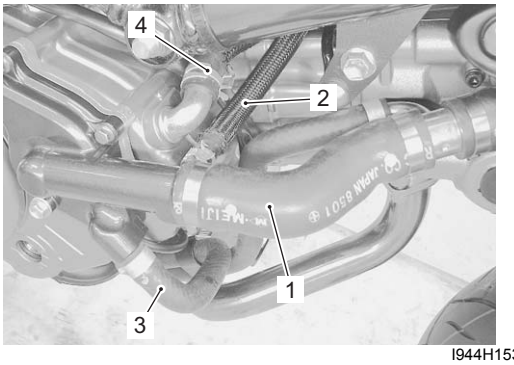
I944H1530069-03

1. Clutch pressure plate	8. Spring washer	15. Clutch push rod (right)
2. Thrust washer	9. Spring washer seat	16. Oil seal
3. Bearing	10. Clutch sleeve hub nut lock washer	(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
4. Clutch push piece	11. Clutch sleeve hub	(b) : 50 N·m (5.0 kgf-m, 36.0 lbf-ft)
5. No. 1 drive plate	12. Thrust washer	OIL : Apply engine oil.
6. No. 2 drive plate	13. Primary driven gear assembly	A : Apply grease.
7. Driven plate	14. Spacer	: Do not reuse.

Clutch Removal

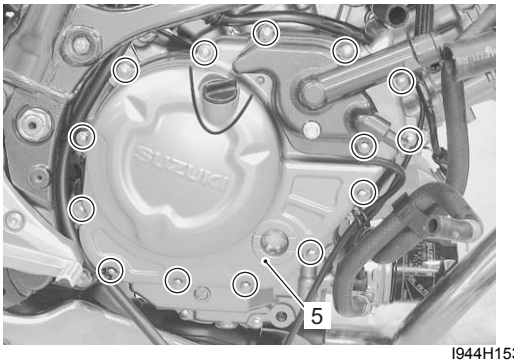
B944H15306029

1) Drain engine oil and coolant. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-10)” and “Cooling System Inspection in Section 0B (Page 0B-12)”.
2) Remove the left frame cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
3) Disconnect the radiator outlet hose (1), water bypass hose (2), oil cooler hose (3) and crankcase breather (PCV) hose (4).



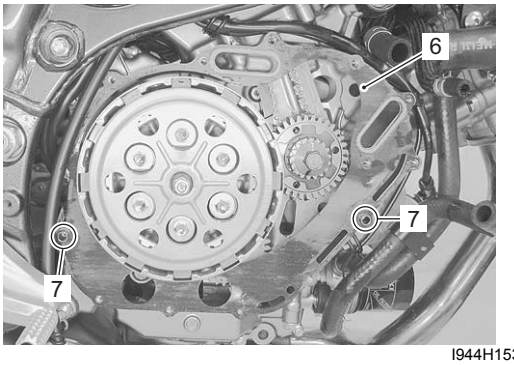
I944H1530017-01

4) Remove the clutch cover (5) by removing the bolts.



I944H1530018-01

5) Remove the gasket (6) and dowel pins (7).

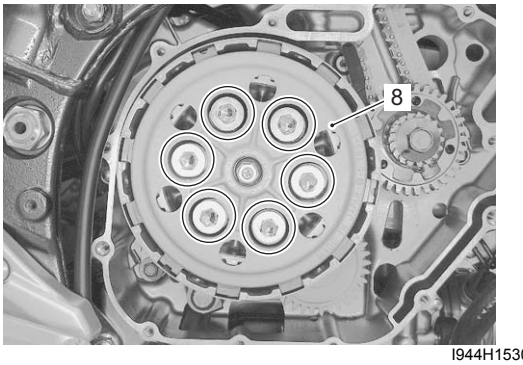


I944H1530019-02

6) Remove the clutch springs and clutch pressure plate (8).

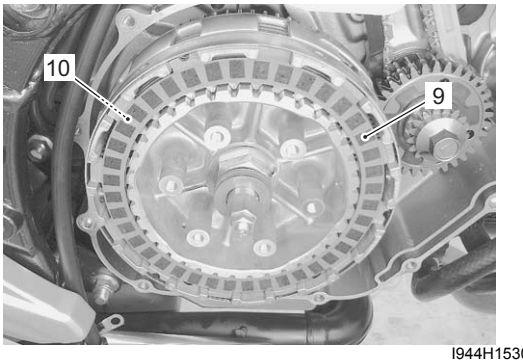
NOTE

Loosen the clutch spring set bolts little by little and diagonally.



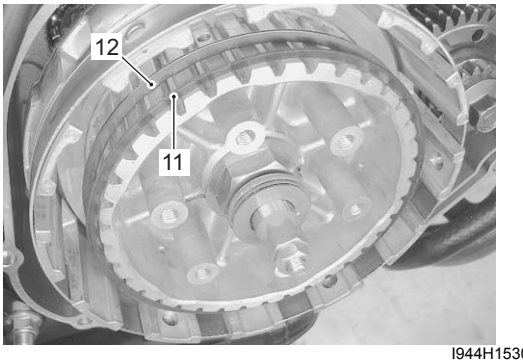
I944H1530020-02

7) Remove the clutch drive plates (9) and driven plates (10).



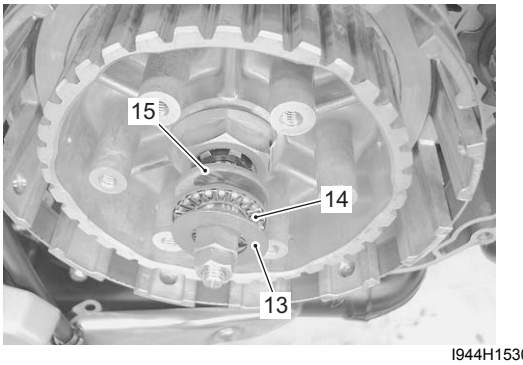
I944H1530021-02

8) Remove the spring washer (11) and spring washer seat (12).



I944H1530022-02

9) Remove the thrust washer (13), bearing (14) and clutch push piece (15).

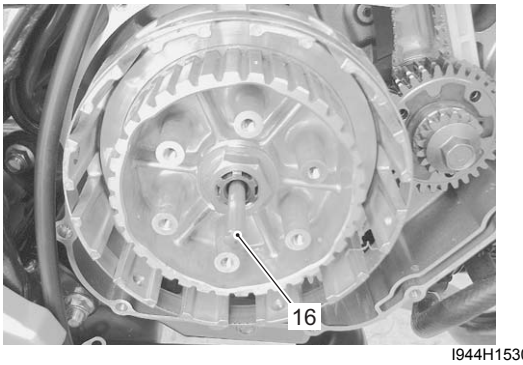


I944H1530023-02

10) Remove the clutch push rod (16).

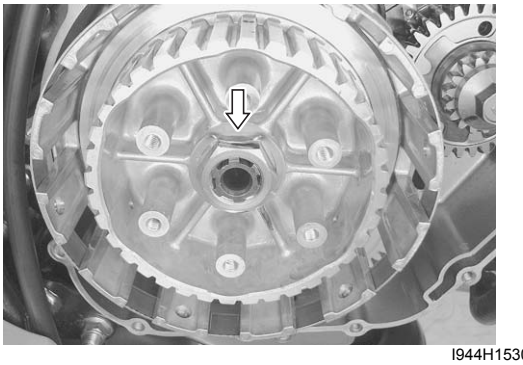
NOTE

If it is difficult to pull out the push rod (16), use a magnetic hand or a wire.



I944H1530024-02

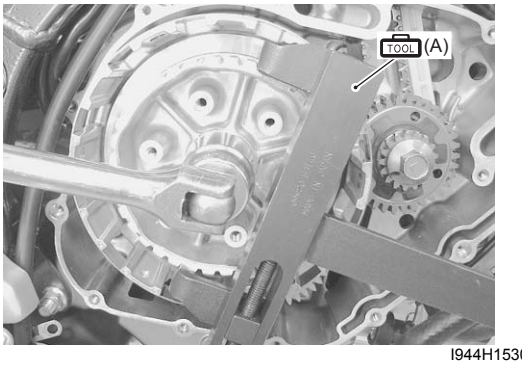
11) Flatten the clutch sleeve hub nut lock washer.



I944H1530025-01

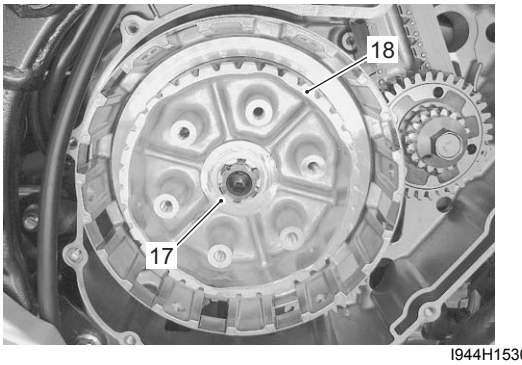
12) Hold the clutch sleeve hub with the special tool and remove the clutch sleeve hub nut.

Special tool
TOOL (A): 09920–53740 (Clutch sleeve hub holder)



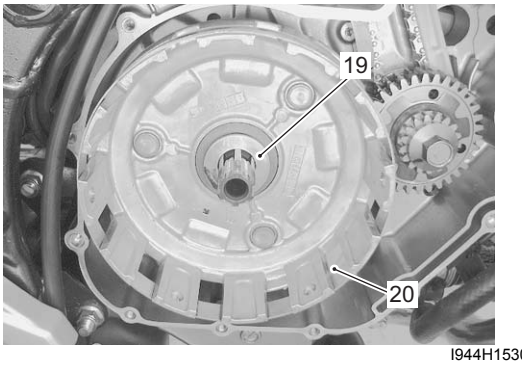
I944H1530026-01

13) Remove the lock washer (17) and clutch sleeve hub (18).



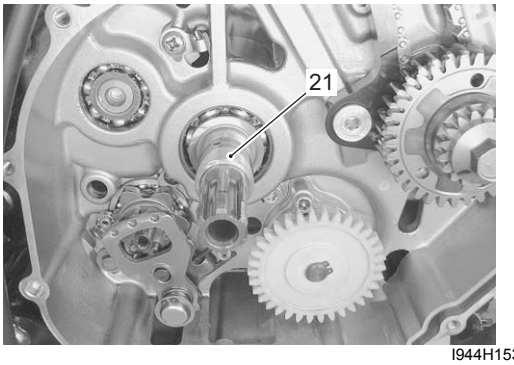
I944H1530027-02

14) Remove the thrust washer (19) and primary driven gear assembly (20).



I944H1530028-02

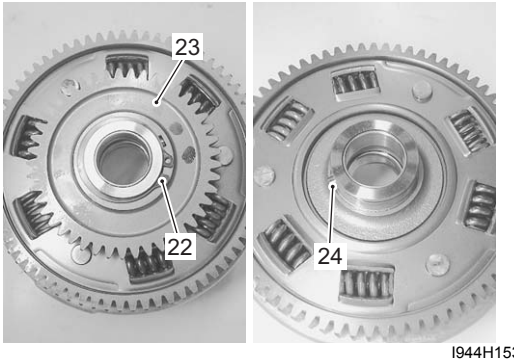
15) Remove the spacer (21).



I944H1530029-02

16) Remove the snap ring (22), oil pump drive gear (23) and pin (24).

Special tool
TOOL : 09900–06107 (Snap ring pliers)

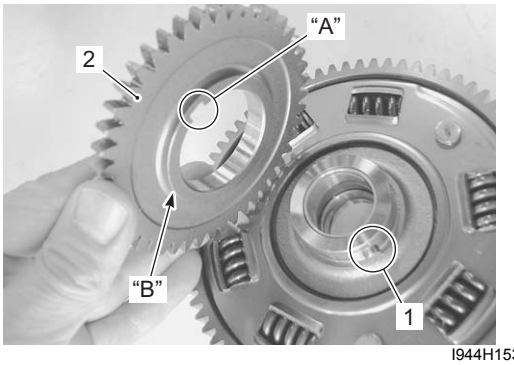


I944H1530030-02

Clutch Installation

B944H15306020

1) Install the pin (1).
2) When installing the oil pump drive gear (2), align the pin (1) with the slot “A” with the flange side “B” of the oil pump drive gear facing the primary drive gear.



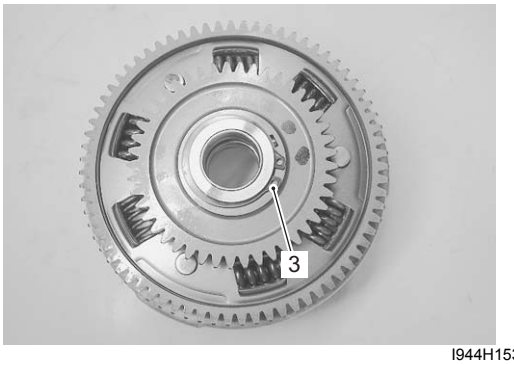
I944H1530031-02

3) Install the snap ring (3).

⚠ CAUTION

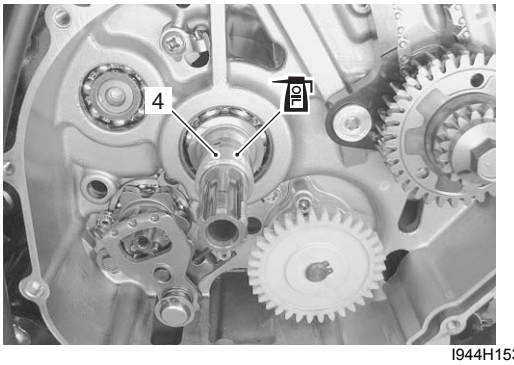
The removed snap ring (3) must be replaced with a new one.

Special tool
TOOL : 09900–06107 (Snap ring pliers)



I944H1530032-01

4) Install the spacer (4) and apply engine oil to it.

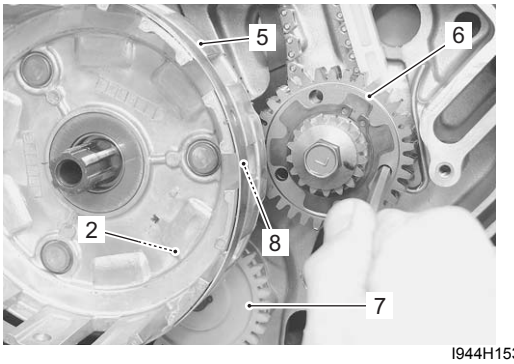


I944H1530033-01

5) Install the primary driven gear assembly (5) onto the countershaft.

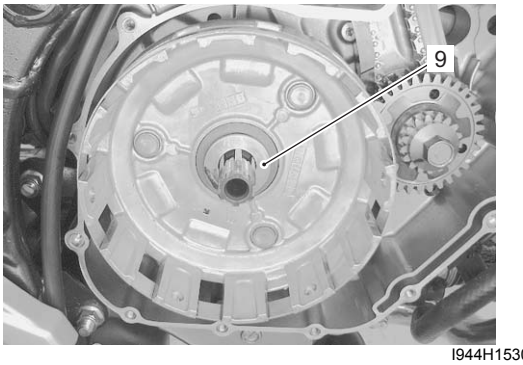
NOTE

When installing the primary driven gear assembly (5), align the teeth of the primary drive gears (6) by inserting a suitable bar to the holes of them.
Be sure to engage the oil pump driven (7) and oil pump drive gears (2), primary drive (6) and driven gears (8).



I944H1530034-02

6) Install the thrust washer (9).



I944H1530035-02

7) Install the clutch sleeve hub (10) and new lock washer (11).

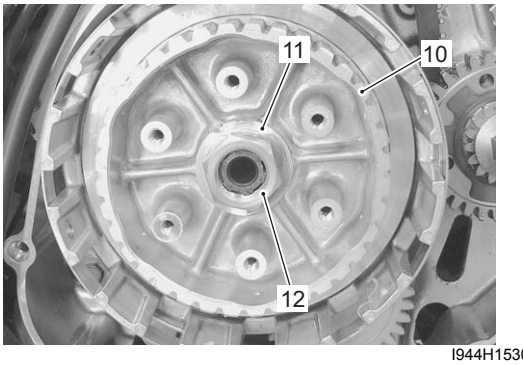
NOTE

The removed lock washer (11) must be replaced with a new one.

8) Install the clutch sleeve hub nut (12).

NOTE

The chamfer side of clutch sleeve hub nut (12) faces outward.

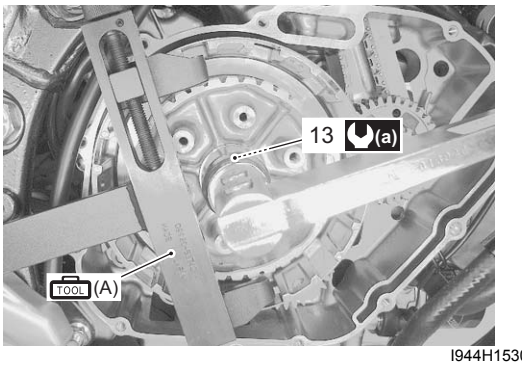


I944H1530036-02

9) Hold the clutch sleeve hub with the special tool and tighten the clutch sleeve hub nut (13) to the specified torque.

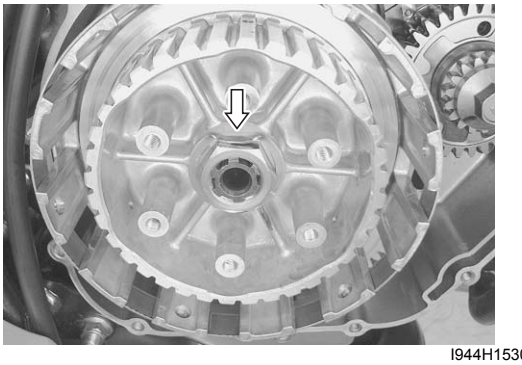
Special tool
TOOL (A): 09920–53740 (Clutch sleeve hub holder)

Tightening torque
Clutch sleeve hub nut (a): 50 N·m (5.0 kgf-m, 36.0 lbf-ft)



I944H1530037-02

10) Bend the lock washer to lock nut securely.

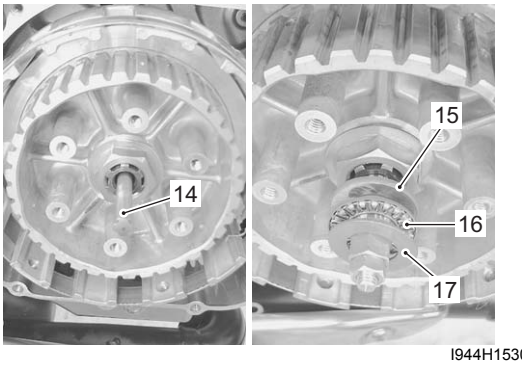


I944H1530038-01

11) Install the clutch push rod (14) into the countershaft.
12) Install the clutch push piece (15), the bearing (16) and thrust washer (17) to the countershaft.

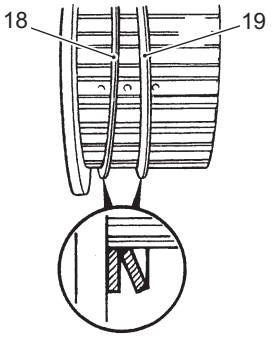
NOTE

Thrust washer is located between the pressure plate and bearing (16).



I944H1530040-02

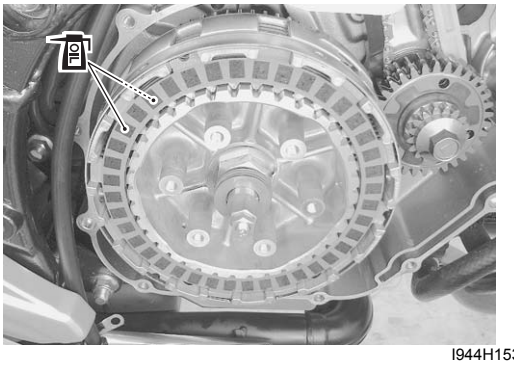
13) Install the spring washer seat (18) and spring washer (19) onto the clutch sleeve hub correctly.



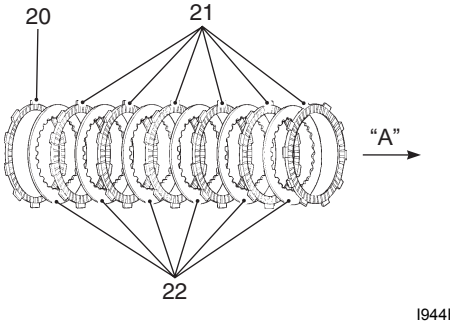
I944H1530041-03

14) Apply engine oil to the clutch drive plates and driven plates.

15) Insert the clutch drive plates and driven plates one by one into the clutch sleeve hub in the prescribed order.



I944H1530070-01

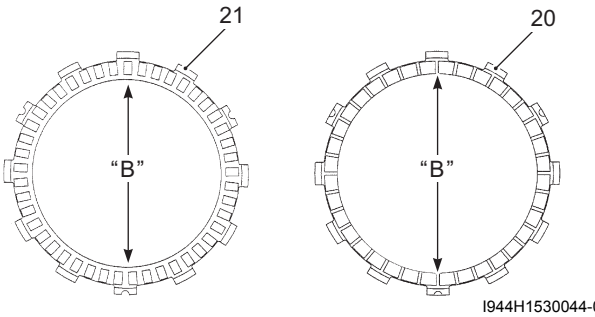


I944H1530043-02

20. No. 2 drive plate	22. Driven plate
21. No. 1 drive plate	"A": Direction of outside

NOTE

Two kinds of the drive plate (No. 1 and No. 2) are equipped in the clutch system, they can be distinguished by the inside diameter "B".



I944H1530044-02

Drive plate	I.D. "B"
No. 1 (21)	116 mm (4.5 in)
No. 2 (20)	122.5 mm (4.82 in)

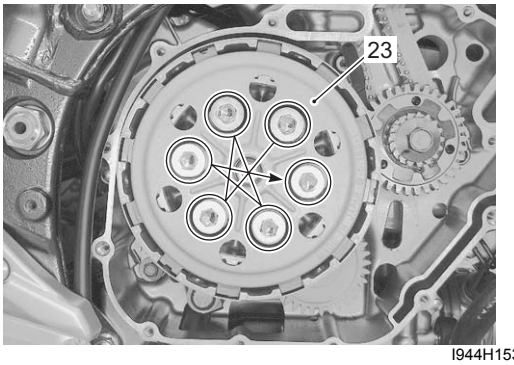
16) Install the clutch pressure plate (23) and clutch springs.

17) Tighten the clutch spring set bolts to the specified torque.

NOTE

Tighten the clutch spring set bolts diagonally.

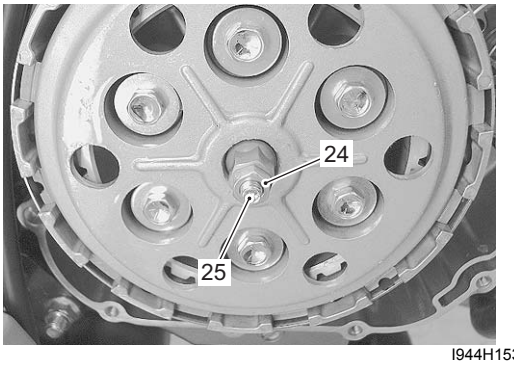
Tightening torque
Clutch spring set bolt: 10 N·m (1.0 kgf-m, 7.0 lbf-ft)



I944H1530065-02

18) Loosen the lock nut (24) and turn in the release screw (25) to feel resistance.

19) From that position, turn out the release screw (25) 1 turn and tighten the lock nut (24) securely by holding the release screw (25).



I944H1530045-02

20) Install the gasket (26) and the dowel pins (27).

⚠ CAUTION

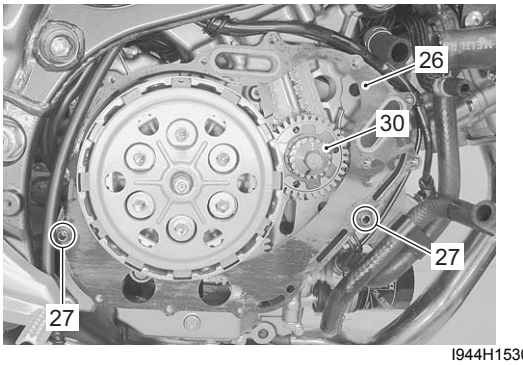
Use the new gasket to prevent oil leakage.

21) Remove the bolt (28).

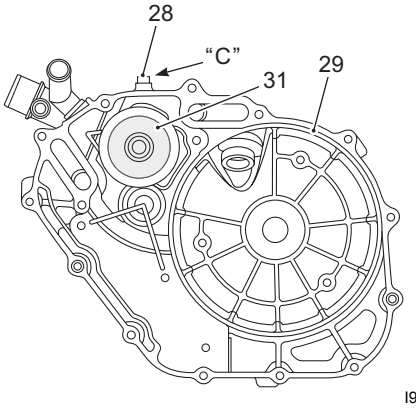
22) Install the clutch cover (29).

NOTE

When installing the clutch cover (29), align the teeth of water pump drive (30) with the water pump driven gear (31) by inserting a suitable bar to the hole "C".



I944H1530046-02

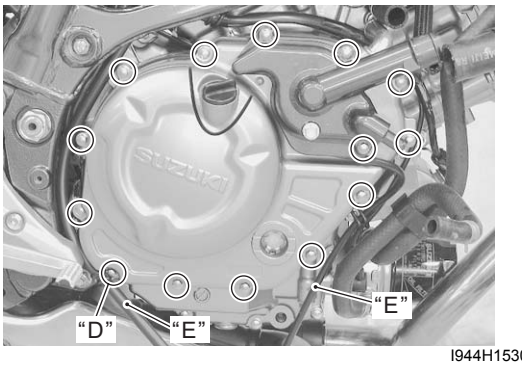


I944H1530066-01

23) Tighten the clutch cover bolts.

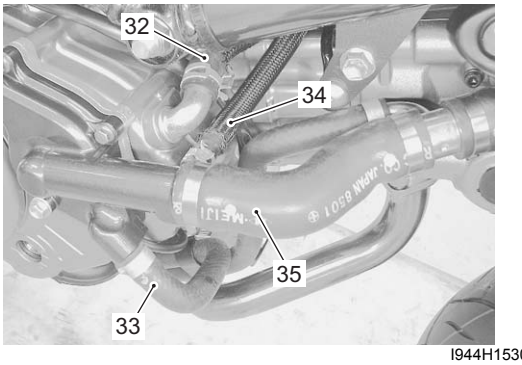
NOTE

- **Fit the clamp to the bolt "D".**
- **Route the drain hoses "E". Refer to "Water Hose Routing Diagram in Section 1F (Page 1F-3)" and "Fuel Tank Drain Hose and Breather Hose Routing Diagram in Section 1G (Page 1G-3)".**



I944H1530047-04

24) Connect the crankcase breather (PCV) hose (32), oil cooler hose (33), water bypass hose (34) and radiator outlet hose (35) securely. Refer to "Throttle Body Construction in Section 1D (Page 1D-8)" and "Water Hose Routing Diagram in Section 1F (Page 1F-3)".



I944H1530048-02

25) 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)".

26) Install the left frame cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".

Clutch Parts Inspection

B944H15306018

Refer to “Clutch Removal (Page 5C-7)” and “Clutch Installation (Page 5C-9)”.

Clutch Drive and Driven Plate

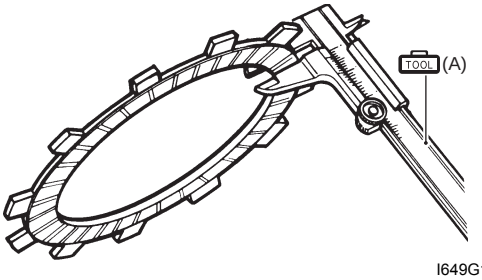
NOTE

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 (1/20 mm, 200 mm))

Clutch drive plate thickness
Service limit (No. 1 and No. 2): 2.62 mm (0.103 in)

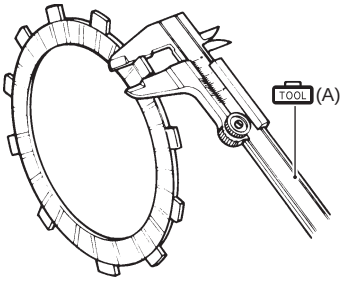


I649G1530056-03

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 (1/20 mm, 200 mm))

Clutch drive plate claw width
Service limit (No. 1 and No. 2): 12.9 mm (0.508 in)

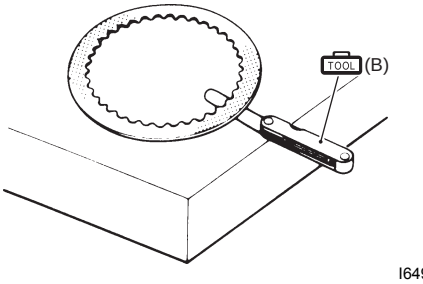


I649G1530057-03

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: 0.10 mm (0.004 in)



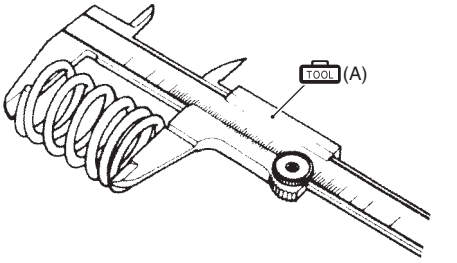
I649G1530058-03

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 (1/20 mm, 200 mm))

Clutch spring free length
Service limit: 50.4 mm (1.98 in)



I718H1530062-01

Clutch Release Bearing

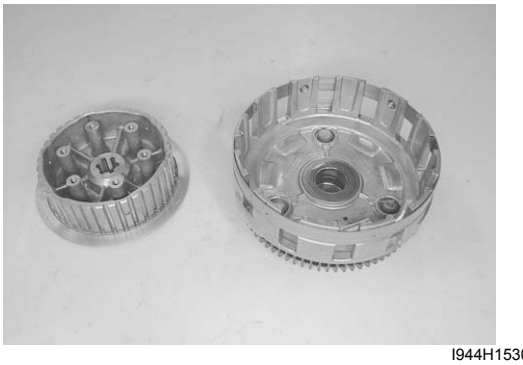
Inspect the clutch release bearing for any abnormality, especially cracks. When removing the bearing from the clutch, decide whether it can be reused or if it should be replaced.
Smooth engagement and disengagement of the clutch depends on the condition of this bearing.

I944H1530049-01

Push Rod (Right)
Inspect the push rod for bend and damage.
If any defects are found, replace the push rod with a new one.

I944H1530050-01

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.
Inspect the primary driven gear bushing for any damage.
Inspect the spring of primary driven gear for any damages. If necessary, replace it with a new one.



I944H1530051-01

I944H1530052-01

Primary Drive Gear Removal and Installation

B944H15306021

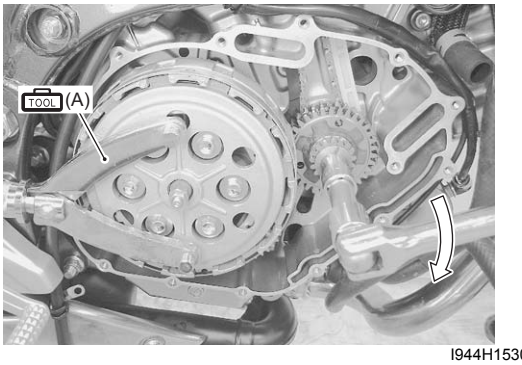
Removal

1) Remove the clutch cover. Refer to “Clutch Removal (Page 5C-7)”.
2) Hold the clutch pressure plate with the special tool and loosen the primary drive gear bolt.

Special tool
(A): 09930–40113 (Rotor holder)

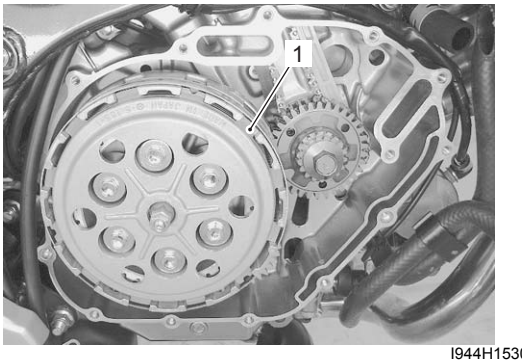
⚠ CAUTION

This bolt has left-hand Thread.



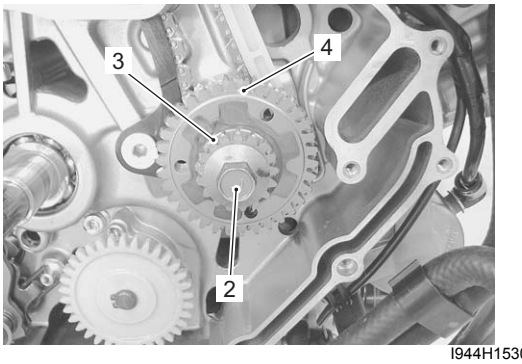
I944H1530053-01

3) Remove the clutch components (1).
Refer to “Clutch Removal (Page 5C-7)”.



I944H1530055-01

4) Remove the primary drive gear bolt (2), water pump drive gear (3) and primary drive gear assembly (4).



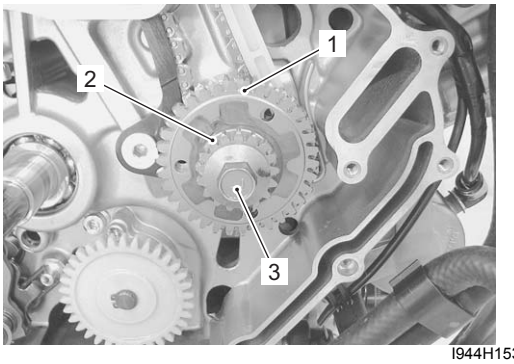
I944H1530056-03

Installation

⚠ CAUTION

This primary drive gear bolt has left-hand thread.

1) Install the primary drive gear assembly (1) and water pump drive gear (2).
2) Temporarily tighten the primary drive gear bolt (3).

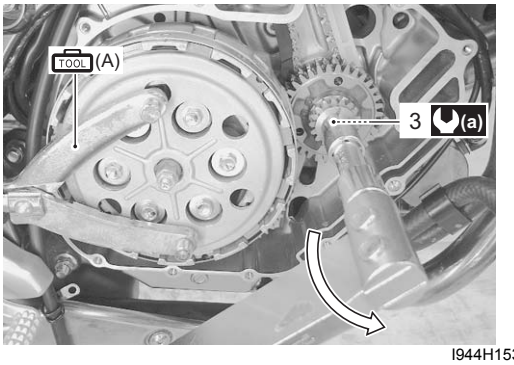


I944H1530057-03

3) Install the clutch components. Refer to “Clutch Installation (Page 5C-9)”.
4) While holding the clutch pressure plate with the special tool, tighten the primary drive gear bolt (3) to the specified torque.

Special tool
TOOL (A): 09930–40113 (Rotor holder)

Tightening torque
Primary drive gear bolt (a): 70 N·m (7.0 kgf-m, 50.5 lbf-ft)



I944H1530058-02

5) Install the clutch cover. Refer to “Clutch Installation (Page 5C-9)”.

Primary Drive Gear Inspection

B944H15306022

Inspect the primary drive gear in the following procedures:

1) Remove the primary drive gear assembly. Refer to “Primary Drive Gear Removal and Installation (Page 5C-14)”.
2) Visually inspect the gear teeth for wear and damage. If they are worn, replace the gear with a new one. Refer to “Primary Drive Gear Disassembly and Assembly (Page 5C-15)”.

I944H1530059-01

3) Install the primary drive gear assembly. Refer to “Primary Drive Gear Removal and Installation (Page 5C-14)”.

Primary Drive Gear Disassembly and Assembly

B944H15306023

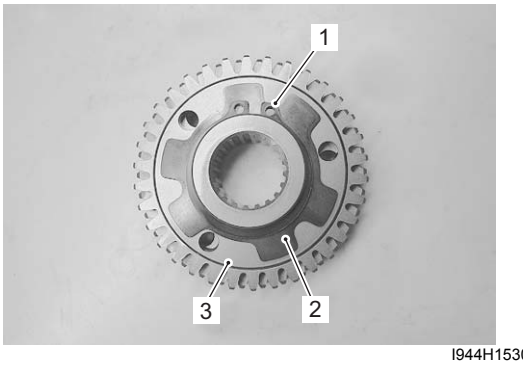
Refer to “Primary Drive Gear Removal and Installation (Page 5C-14)”.

Disassembly

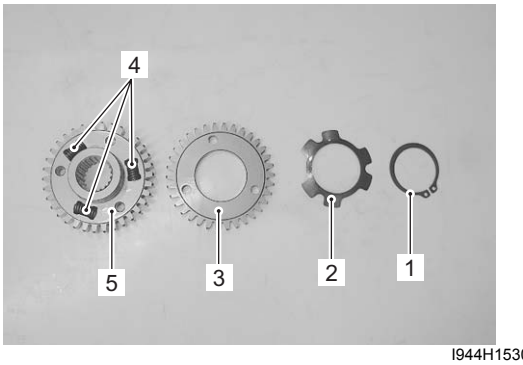
Remove the following parts from the primary drive gear.

- Snap ring (1)
- Spring washer (2)
- Scissors gear (3)
- Springs (4)
- Primary drive gear (5)

Special tool
TOOL : 09900–06107 (Snap ring pliers)



I944H1530060-01



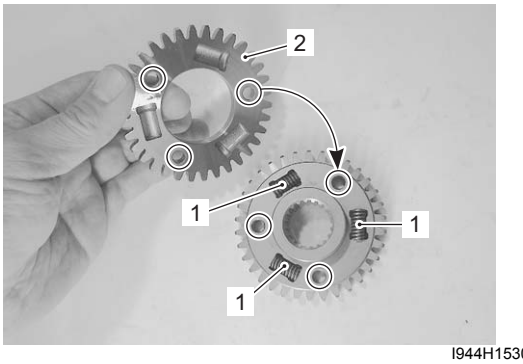
I944H1530061-01

Reassembly

1) Set the springs (1) into the grooves.
2) Install the scissors gear (2).

NOTE

Align the hole of the primary drive gear with the hole of the scissors gear.

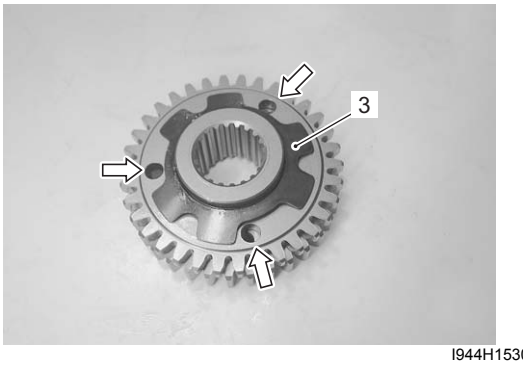


I944H1530062-01

3) Install the spring washer (3) not to cover the holes of the gears.

NOTE

The convex side of the spring washer (3) faces upward.



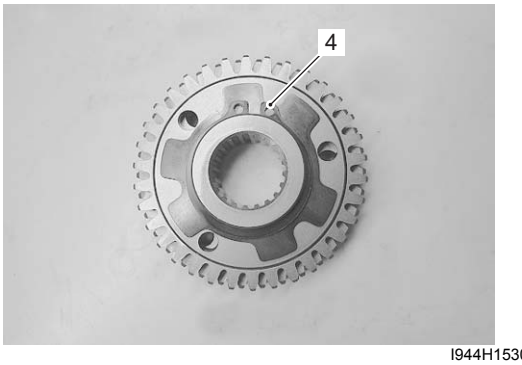
I944H1530063-01

4) Install the new snap ring (4).

Special tool
TOOL : 09900–06107 (Snap ring pliers)

⚠ CAUTION

The removed snap ring (4) must be replaced with a new one.
After installing a snap ring, always insure that it is completely seated in its groove and securely fitted.



I944H1530064-01

Specifications

Service Data

B944H15307001

Clutch

Unit: mm (in)

Item	Standard		Limit
Clutch cable play	10 – 15 (0.4 – 0.6)		—
Clutch release screw	1 turn back		—
Clutch drive plate thickness	No. 1, 2	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
Clutch drive plate claw width	No. 1, 2	13.7 – 13.8 (0.539 – 0.543)	12.9 (0.508)
Clutch driven plate distortion	—		0.10 (0.004)
Clutch spring free length	53.1 (2.09)		50.4 (1.98)

Tightening Torque Specifications

B944H15307002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Clutch sleeve hub nut	50	5.0	36.0	☞(Page 5C-10)
Clutch spring set bolt	10	1.0	7.0	☞(Page 5C-11)
Primary drive gear bolt	70	7.0	50.5	☞(Page 5C-15)

NOTE

The specified tightening torque is described in the following.
"Clutch Lever Components (Page 5C-3)"
"Clutch Components (Page 5C-6)"

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

Special Tools and Equipment

Recommended Service Material

B944H15308001

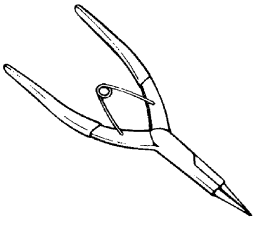
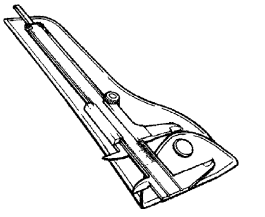
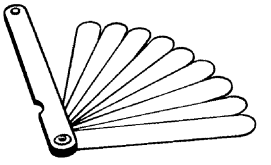
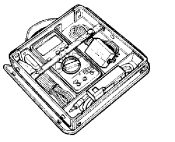
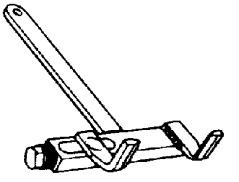
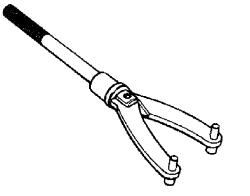
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 5C-5) / ☞(Page 5C-5)
	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000–25100	☞(Page 5C-4)

NOTE

Required service material is also described in the following.
"Clutch Lever Components (Page 5C-3)"
"Clutch Components (Page 5C-6)"

Special Tool

B944H15308002

09900–06107 Snap ring remover (Open type) ☞(Page 5C-9) / ☞(Page 5C-9) / ☞(Page 5C-15) / ☞(Page 5C-16) 	09900–20102 Vernier calipers (200 mm) ☞(Page 5C-13) / ☞(Page 5C-13) / ☞(Page 5C-13) 
09900–20803 Thickness gauge ☞(Page 5C-13) 	09900–25008 Multi circuit tester set ☞(Page 5C-2) 
09920–53740 Clutch sleeve hub holder ☞(Page 5C-8) / ☞(Page 5C-10) 	09930–40113 Flywheel rotor holder ☞(Page 5C-14) / ☞(Page 5C-15) 

Section 6

Steering

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Precautions

Precautions

Precautions for Steering

B944H16000001

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

Steering General Diagnosis

Diagnostic Information and Procedures

Steering Symptom Diagnosis

B944H16104001

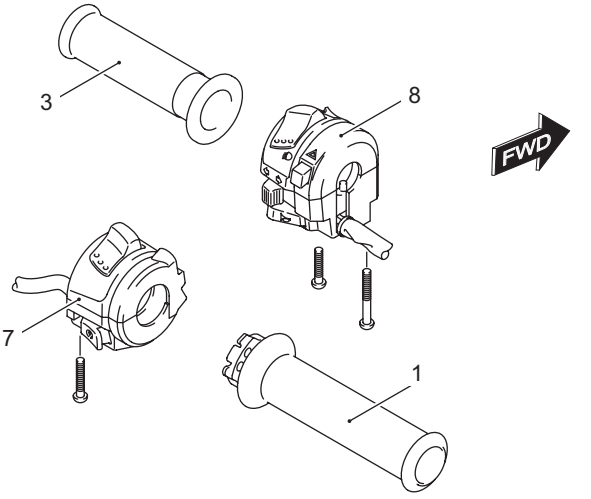
Condition	Possible cause	Correction / Reference Item
Heavy Steering	Over tightened steering stem nut.	*Adjust.*
	Broken bearing in steering stem.	*Replace.*
	Distorted steering stem.	*Replace.*
	Not enough pressure in tires.	*Adjust.*
Wobbly Handlebars	Loss of balance between right and left front forks.	*Replace fork or adjust fork oil level or replace spring.*
	Distorted front fork.	*Repair or replace.*
	Distorted front axle or crooked tire.	*Replace.*
	Loose steering stem nut.	*Adjust.*
	Worn or incorrect tire or wrong tire pressure.	*Adjust or replace.*
	Worn bearing/race in steering stem.	*Replace.*

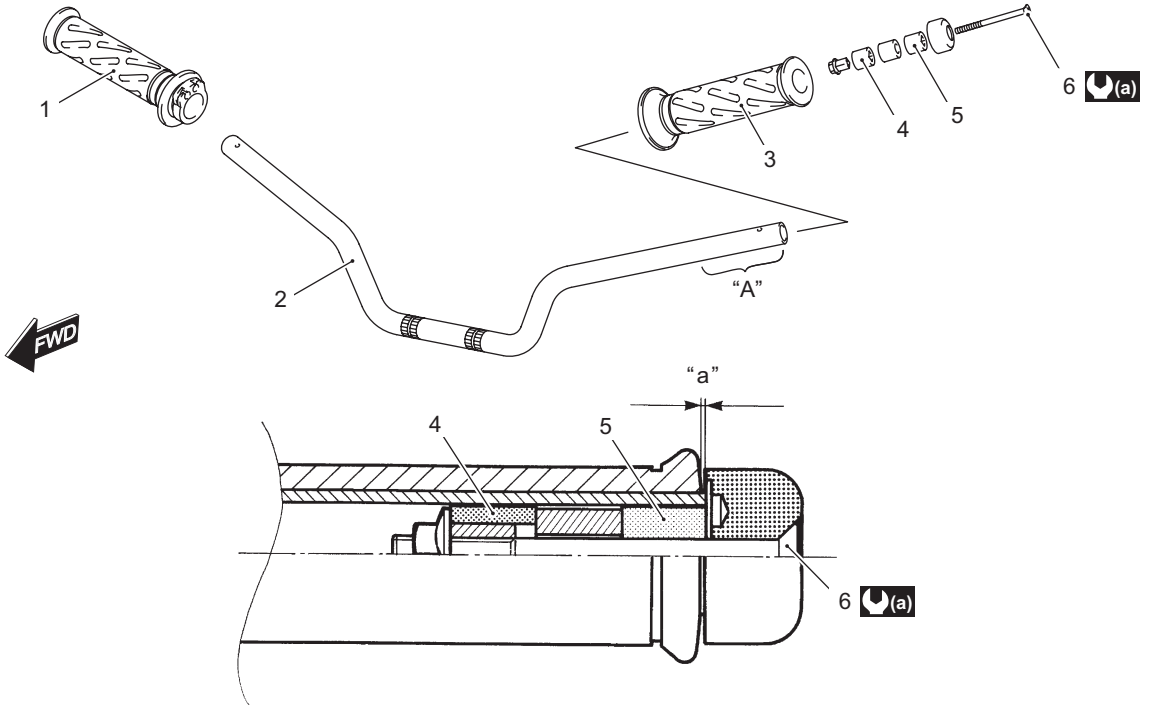
Steering / Handlebar

Repair Instructions

Handlebars Components

B944H16206001



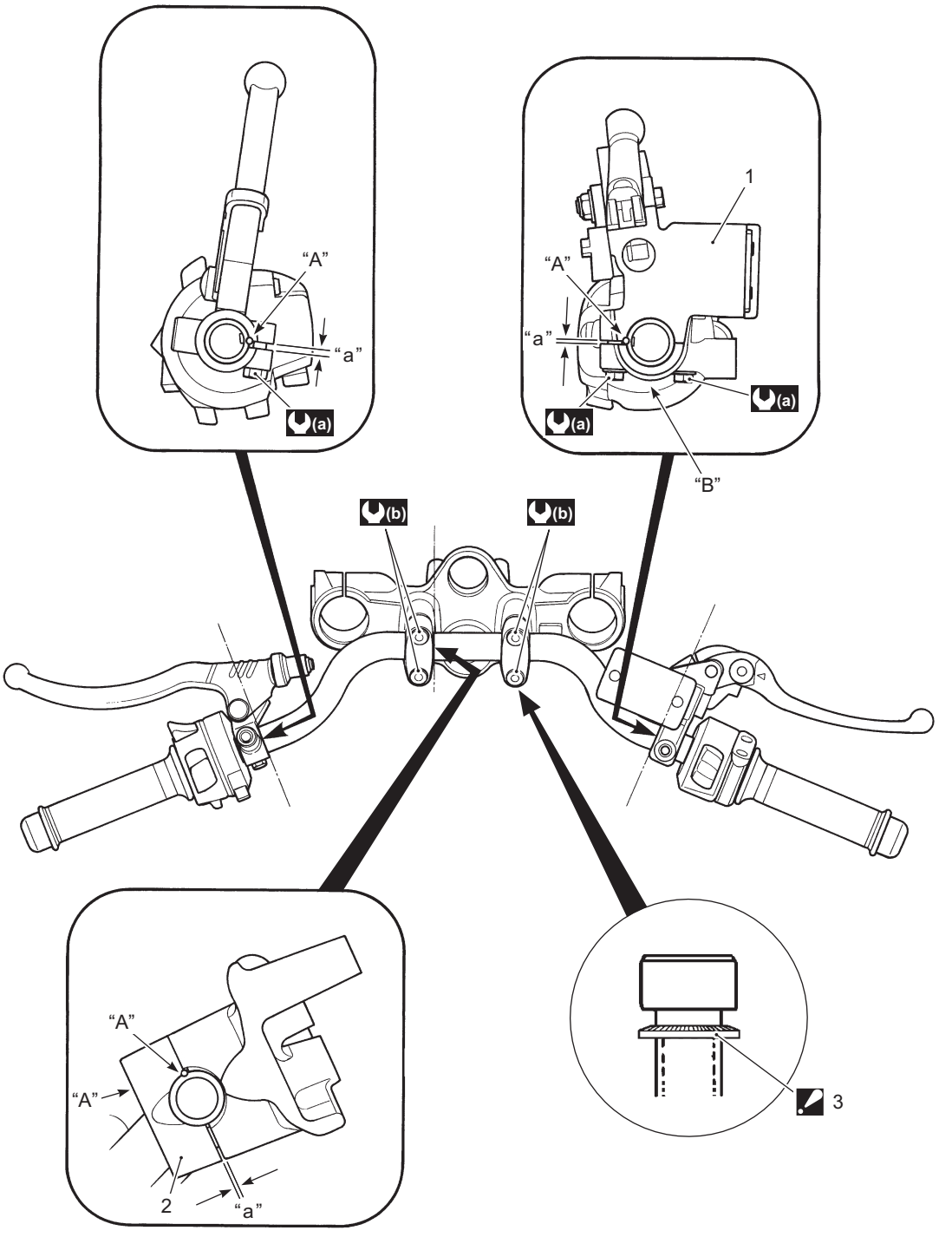


I944H1620023-02

1. Throttle grip	5. Handle balancer expander	"A": Apply handle grip bond.
2. Handlebars	6. Handle balancer screw	"a": 0.5 – 1.5 mm (0.02 – 0.06 in) (Throttle grip)
3. Grip rubber	7. Right handlebar switch box	(a) : 5.5 N·m (0.55 kgf-m, 4.0 lbf-ft)
4. Handle expander	8. Left handlebar switch box	

Handlebar Construction

B944H16206002



I944H1620001-03

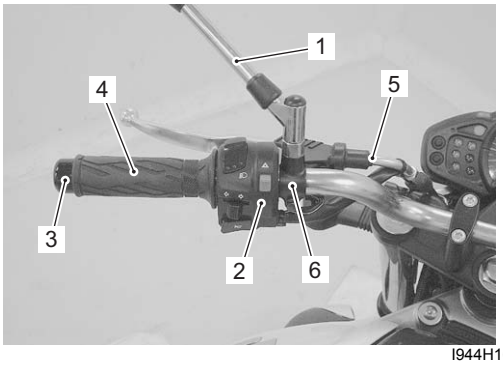
1. Front brake master cylinder	"A": Punch mark	(a) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)
2. Handlebar holder	"B": UP mark	(b) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
3. Washer : The conical side of washer faces outside.	"a": Clearance	

Handlebars Removal and Installation

B944H16206003

Removal

1) Remove the following parts from the left handlebar.
   a) Rear view mirror (1)
   b) Left handlebar switch box (2)
   c) Handlebar balancer (3)
   d) Grip rubber (4)
   e) Disconnect the clutch cable (5)
   f) Clutch lever (6)

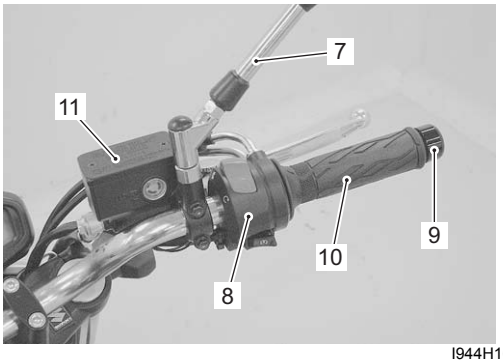


I944H1620002-01

2) Remove the following parts from the right handlebar.
   a) Rear view mirror (7)
   b) Right handlebar switch box (8)
   c) Handlebar balancer (9)
   d) Throttle grip (10)
   e) Front brake master cylinder/Front brake lever (11)

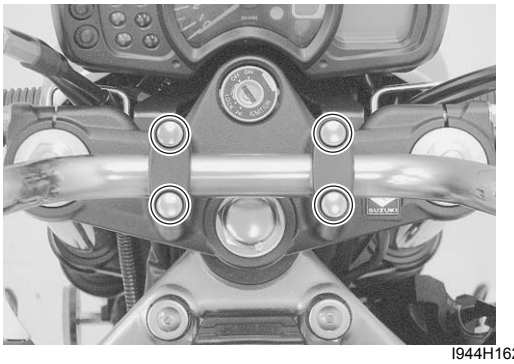
⚠ CAUTION

Do not turn the front brake master cylinder upside down.



I944H1620003-01

3) Remove the caps and handlebar holder bolts.

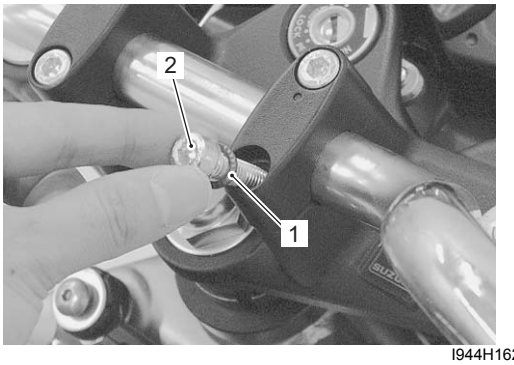


I944H1620004-01

Installation

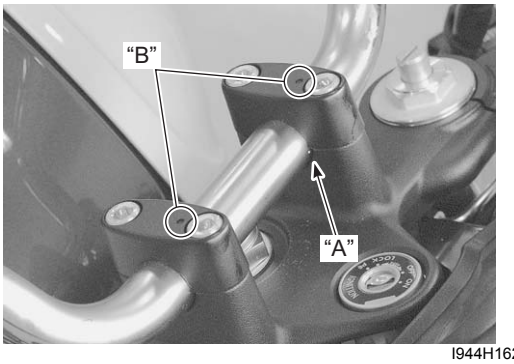
Install the handlebars in the reverse order of removal. Pay attention to the following points:

- Install the washers (1) and bolts (2) as shown in the handlebar construction. Refer to “Handlebar Construction (Page 6B-2)”.



I944H1620005-01

- Set the handlebars so that its punch mark “A” aligns with the mating surface of the left handlebar holder.
- Set the handlebar holders with their punch marks “B” forward.



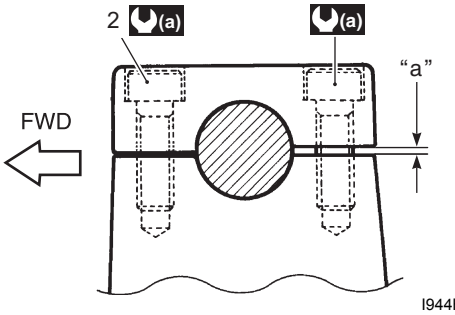
I944H1620006-01

- Tighten the handlebar holder bolts.

NOTE

First tighten the handlebar holder bolts (2) (front ones) to the specified torque.

Tightening torque
Handlebar holder bolt (a): 23 N·m (2.3 kgf-m, 16.5 lbf-ft)



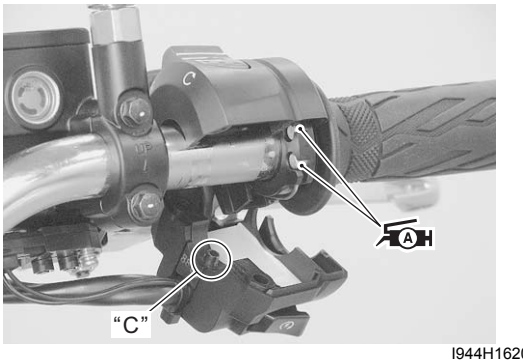
I944H1620007-01

"a": Clearance

- 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)

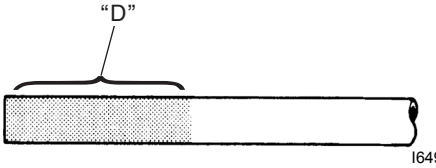
- Insert the projection "C" of the right handlebar switch box into the hole of the handlebars.



I944H1620008-01

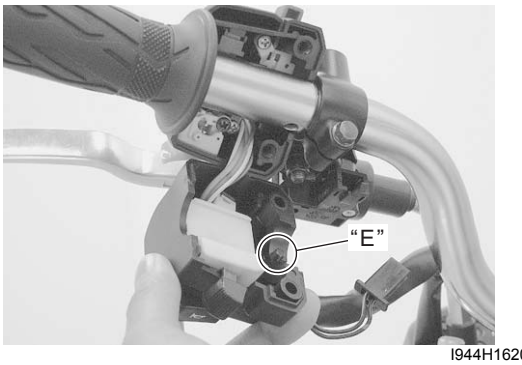
- Install the clutch lever assembly. Refer to "Clutch Lever Removal and Installation in Section 5C (Page 5C-4)".
- Apply a handle grip bond "D" onto the left handlebar before installing the handlebar grip.

: Handle grip bond (Handle Grip Bond (commercially available))



I649G1620008-03

- Insert the projection "E" of the left handlebar switch box into the hole of the handlebars.



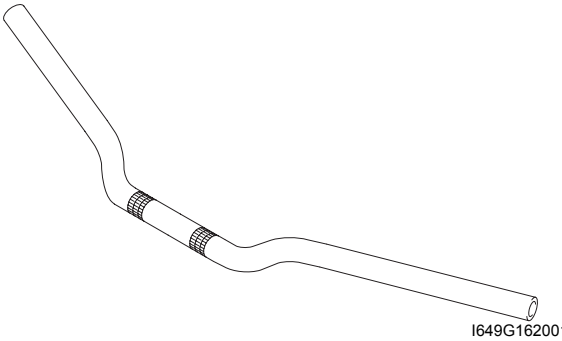
I944H1620009-01

- Rout the wiring harness and cable routing. Refer to "Throttle Cable Routing Diagram in Section 1D (Page 1D-2)" and "Wiring Harness Routing Diagram in Section 9A (Page 9A-5)".
- After installing the steering, the following adjustments are required before driving.
  - Throttle cable play (Refer to "Throttle Cable Routing Diagram in Section 1D (Page 1D-2)")
  - Clutch cable play (Refer to "Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-12)")
  - Throttle cable play (Refer to "Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-12)")

Handlebars Inspection

B944H16206004

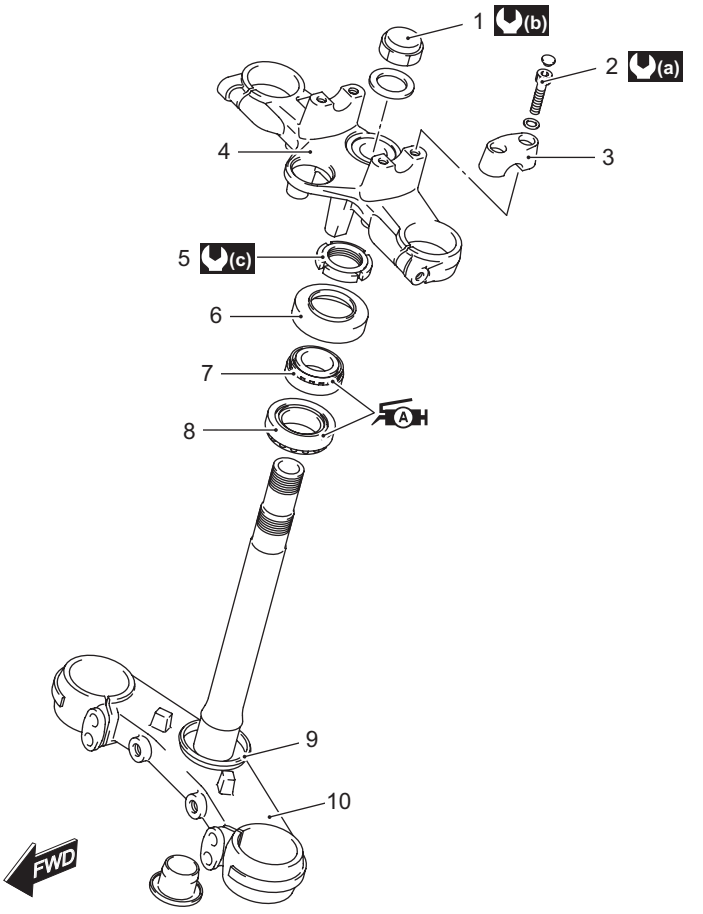
Refer to "Handlebars Removal and Installation (Page 6B-3)".
Inspect the handlebars for distortion and damage.
If any defect is found, replace the handlebars with a new one.



I649G1620010-03

Steering Components

B944H16206006



I944H1620024-01

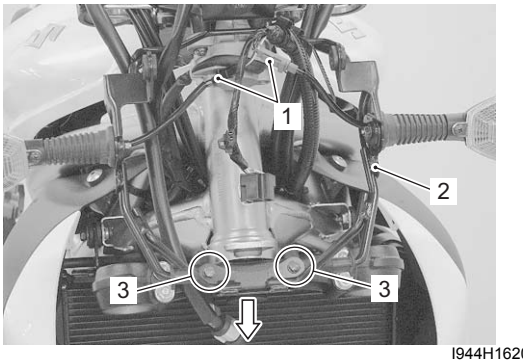
1. Steering stem head nut	6. Dust seal	(a) : 23 N·m (2.3 kgf-m, 16.5 lbf-ft)
2. Handlebar holder bolt	7. Steering stem upper bearing	(b) : 90 N·m (9.0 kgf-m, 65.0 lbf-ft)
3. Handlebar holder	8. Steering stem lower bearing	(c) : 45 N·m (4.5 kgf-m, 32.5 lbf-ft) then turn back 1/2 – 1/4
4. Steering stem upper bracket	9. Lower seal	A H : Apply grease to bearing.
5. Steering stem nut	10. Steering stem lower bracket	

Steering Removal and Installation

B944H16206007

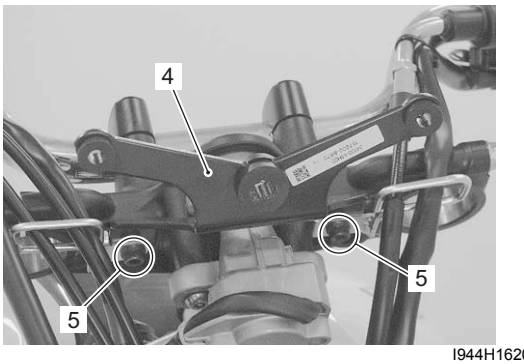
Removal

1) Remove the front wheel assembly. Refer to “Front Wheel Assembly Removal and Installation in Section 2D (Page 2D-4)”.
2) Remove the front forks. Refer to “Front Fork Removal and Installation in Section 2B (Page 2B-2)”.
3) Remove the headlight. Refer to “Headlight Removal and Installation in Section 9B (Page 9B-4)”.
4) Remove the combination meter unit. Refer to “Combination Meter Removal and Installation in Section 9C (Page 9C-2)”.
5) Disconnect the turn signal light lead wire couplers (1).
6) Demount the headlight bracket (2) downward by removing the bracket mounting bolts (3).



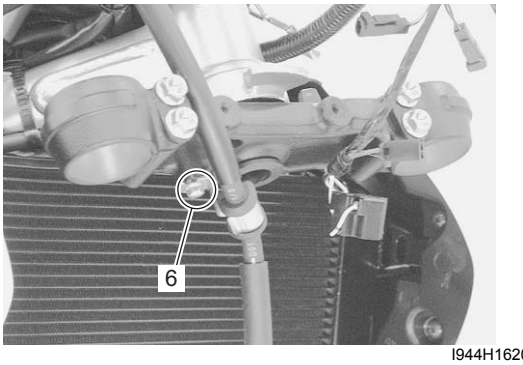
I944H1620010-02

7) Remove the combination meter bracket (4) by removing the bracket mounting bolts (5).



I944H1620011-02

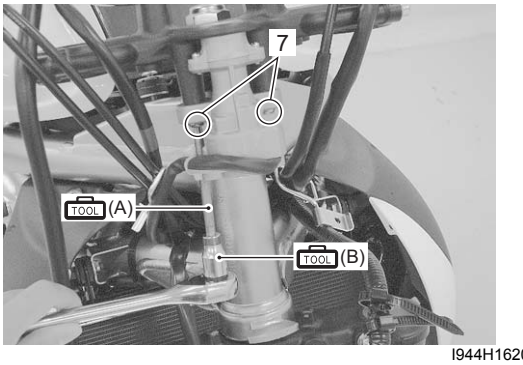
8) Remove the brake hose clamp (6).



I944H1620012-02

9) Remove the ignition switch mounting bolts (7) with the special tools.

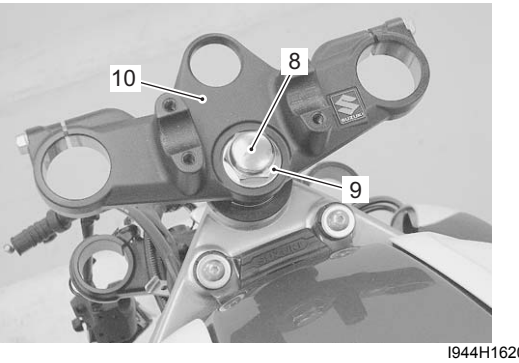
Special tool
TOOL (A): 09930–11920 (Torx bit (JT40H))
TOOL (B): 09930–11940 (Bit holder)



I944H1620013-02

10) Remove the handlebars. Refer to “Handlebars Removal and Installation (Page 6B-3)”.

11) Remove the steering stem head nut (8) and washer (9).
Remove the steering stem upper bracket (10).



I944H1620014-02

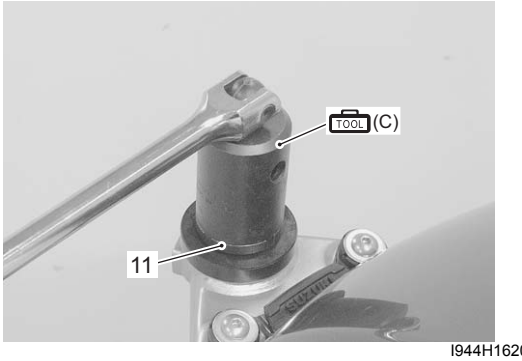
12) Remove the steering stem nut (11) with the special tool.

NOTE

When loosening the stem nuts, hold the steering stem lower bracket to prevent it from falling.

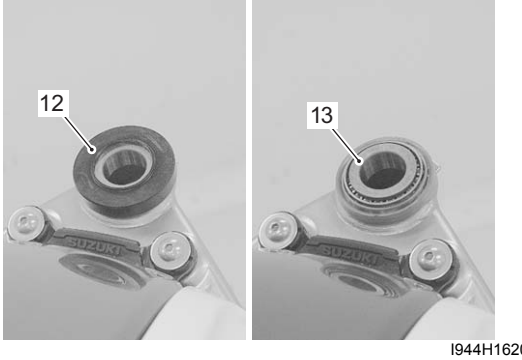
Special tool
TOOL (C): 09940–14911 (Steering stem nut wrench)

13) Remove the steering stem lower bracket.



I944H1620015-02

14) Remove the dust seal (12) and steering stem upper bearing (13).



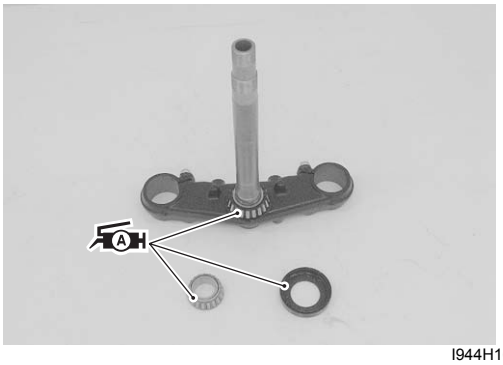
I944H1620016-02

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

Bearing

- Apply grease to the bearings, races and dust seals before remounting the steering stem.

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



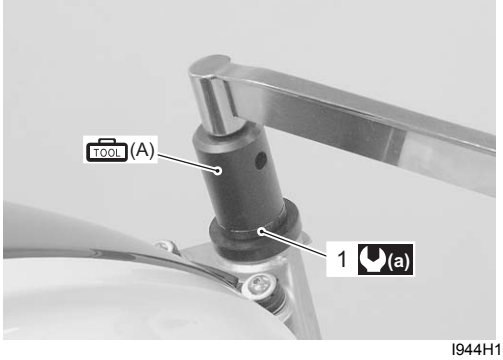
I944H1620017-01

Steering stem nut

- Tighten the steering stem nut (1) to the specified torque using the special tool.

  Special tool
  TOOL (A): 09940–14911 (Steering stem nut wrench)

  Tightening torque
  Steering stem nut (a): 45 N·m (4.5 kgf-m, 32.5 lbf-ft) then turn back 1/2 – 1/4

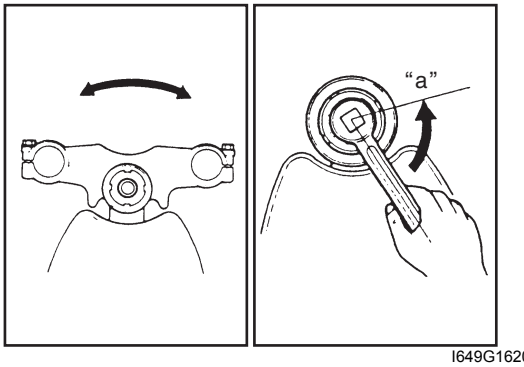


I944H1620018-01

- Turn the steering stem lower bracket about five or six times to the left and right so that the angular ball bearings seat properly.
- Loosen the steering stem nut 1/4 – 1/2 turn “a”.

  NOTE

  This adjustment will vary from motorcycle to motorcycle.



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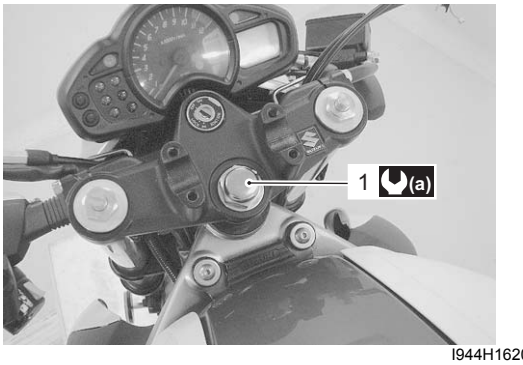
Steering stem upper bracket
Install the front forks and steering stem upper bracket in the following steps:

1) Temporarily install the upper bracket, washer and steering stem head nut (1).
2) Temporarily install the front forks.
3) Tighten the steering stem head nut (1).

   Tightening torque
   Steering stem head nut (a): 90 N·m (9.0 kgf-m, 65.0 lbf-ft)



I944H1620019-01

4) Tighten the front fork upper and lower clamp bolts. Refer to “Front Fork Removal and Installation in Section 2B (Page 2B-2)”.

Inspection After Installation

- Check the steering tension. Refer to “Steering Tension Adjustment (Page 6B-9)”.

Steering Related Parts Inspection

B944H16206008

Refer to “Steering Removal and Installation (Page 6B-5)”.

Inspect the removed parts for the following abnormalities.

- Distortion of the steering stem
- Bearing wear or damage
- Abnormal bearing noise
- Race wear or damage
- Bearing lower seal damage
- Rubber dust seal wear or damage

If any abnormal points are found, replace defective parts with new ones. Refer to “Ignition Switch Removal and Installation in Section 1H (Page 1H-9)”.

I944H1620020-01

I944H1620021-01

Steering System Inspection

B944H16206009

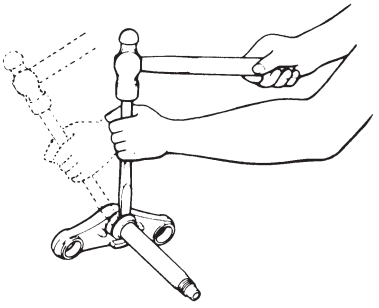
Refer to “Steering System Inspection in Section 0B (Page 0B-18)”.

Steering Stem Bearing Removal and Installation

B944H16206010

Removal

1) Remove the dust seal and steering stem upper bearing. Refer to “Steering Removal and Installation (Page 6B-5)”.
2) Remove the steering stem lower bearing and inner race using a chisel.



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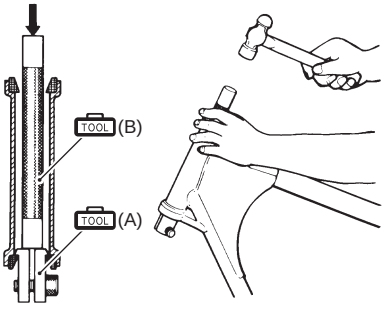
3) Remove the steering stem upper and lower bearing races using the special tools.

Special tool
(A): 09941–54911 (Bearing outer race remover)
(B): 09941–74911 (Steering bearing installer)



I649G1620034-03

Installation

Install the steering stem bearings in the reverse order of removal. Pay attention to the following points:

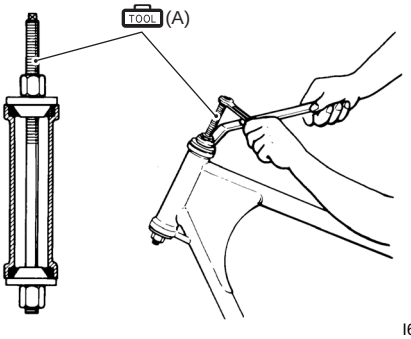
⚠ CAUTION

The removed bearings and races should be replaced with new ones.

Outer race

- Press in the upper and lower outer races using the special tool.

Special tool
(A): 09941–34513 (Steering race installer)



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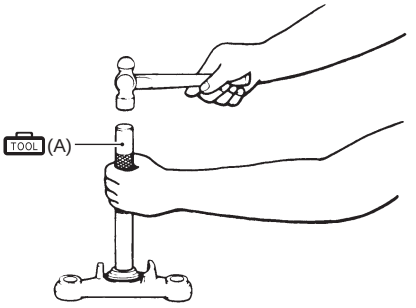
Inner race

- Press in the lower inner race and bearing using the special tool.

Special tool
TOOL (A): 09941–74911 (Steering bearing installer)



I649G1620036-03

- Install the steering. Refer to “Steering Removal and Installation (Page 6B-5)”.

Steering Tension Adjustment

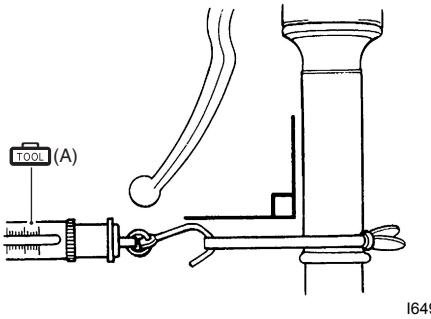
B944H16206011

Check the steering movement in the following procedures:

1) By supporting the motorcycle with a jack, lift the front wheel unit is off the floor 20 – 30 mm (0.8 – 1.2 in).
2) Check to make sure that the cables and wire harnesses are properly routed.
3) With the front wheel in the straight ahead state, hitch the spring scale (special tool) on one handlebar grip end as shown in the figure and read the graduation when the handlebar starts moving.

Initial force
200 – 500 grams

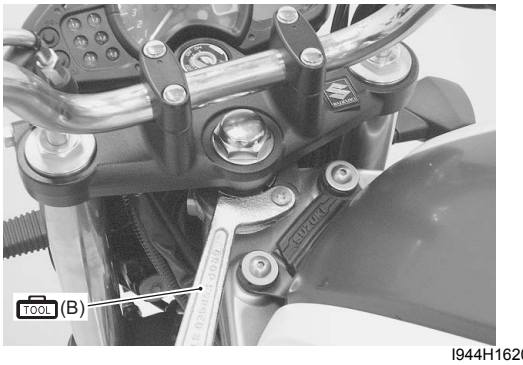
Special tool
TOOL (A): 09940–92720 (Spring scale)



I649G1620040-02

4) Do the same on the other grip end.
5) If the initial force read on the scale when the handlebar starts turning is either to heavy or too light, adjust it till it satisfies the specification.
   a) First, loosen the front fork upper and lower clamp bolts, steering stem head nut and steering stem nut, and then adjust the steering stem nut by loosening or tightening it.

Special tool
TOOL (B): 09910–60611 (Universal clamp wrench)



I944H1620022-01

   b) Tighten the steering stem nut, stem head nut and front fork upper and lower clamp bolts to the specified torque and recheck the initial force with the spring scale according to the previously described procedure.
   c) If the initial force is found within the specified range, adjustment has been completed.

NOTE

Hold the front fork legs, move them back and forth and make sure that the steering is not loose.

Specifications

Tightening Torque Specifications

B944H16207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Handlebar holder bolt	23	2.3	16.5	☞(Page 6B-4)
Steering stem nut	45 N·m (4.5 kgf-m, 32.5 lbf-ft) then turn back 1/2 – 1/4			☞(Page 6B-7)
Steering stem head nut	90	9.0	65.0	☞(Page 6B-7)

NOTE

The specified tightening torque is described in the following.
“Handlebars Components (Page 6B-1)”
“Handlebar Construction (Page 6B-2)”
“Steering Components (Page 6B-5)”

Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0B (Page 0B-21)”.

Special Tools and Equipment

Recommended Service Material

B944H16208001

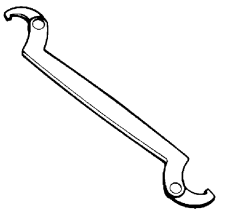
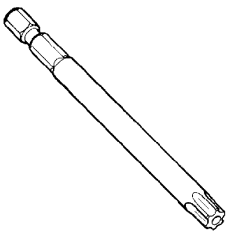
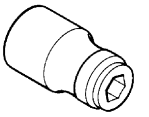
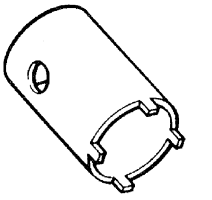
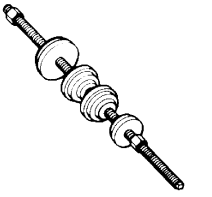
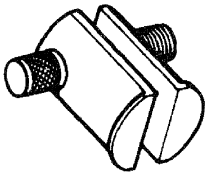
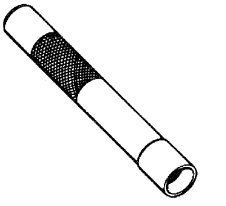
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000–25010	☞(Page 6B-4) / ☞(Page 6B-7)
Handle grip bond	Handle Grip Bond (commercially available)	—	☞(Page 6B-4)

NOTE

Required service material is also described in the following.
“Steering Components (Page 6B-5)”

Special Tool

B944H16208002

09910–60611 Universal clamp wrench ☞(Page 6B-9) 	09930–11920 Torx bit (JT40H) ☞(Page 6B-6) 
09930–11940 Torx bit holder ☞(Page 6B-6) 	09940–14911 Steering stem nut socket wrench ☞(Page 6B-6) / ☞(Page 6B-7) 
09940–92720 Spring scale ☞(Page 6B-9)	09941–34513 Bearing installer ☞(Page 6B-8) 
09941–54911 Bearing outer race remover ☞(Page 6B-8) 	09941–74911 Steering race installer ☞(Page 6B-8) / ☞(Page 6B-9) 

Section 9

Body and Accessories

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Precautions

Precautions

Precautions for Electrical System

B944H19000001

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

B944H19003001

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

Wiring Systems

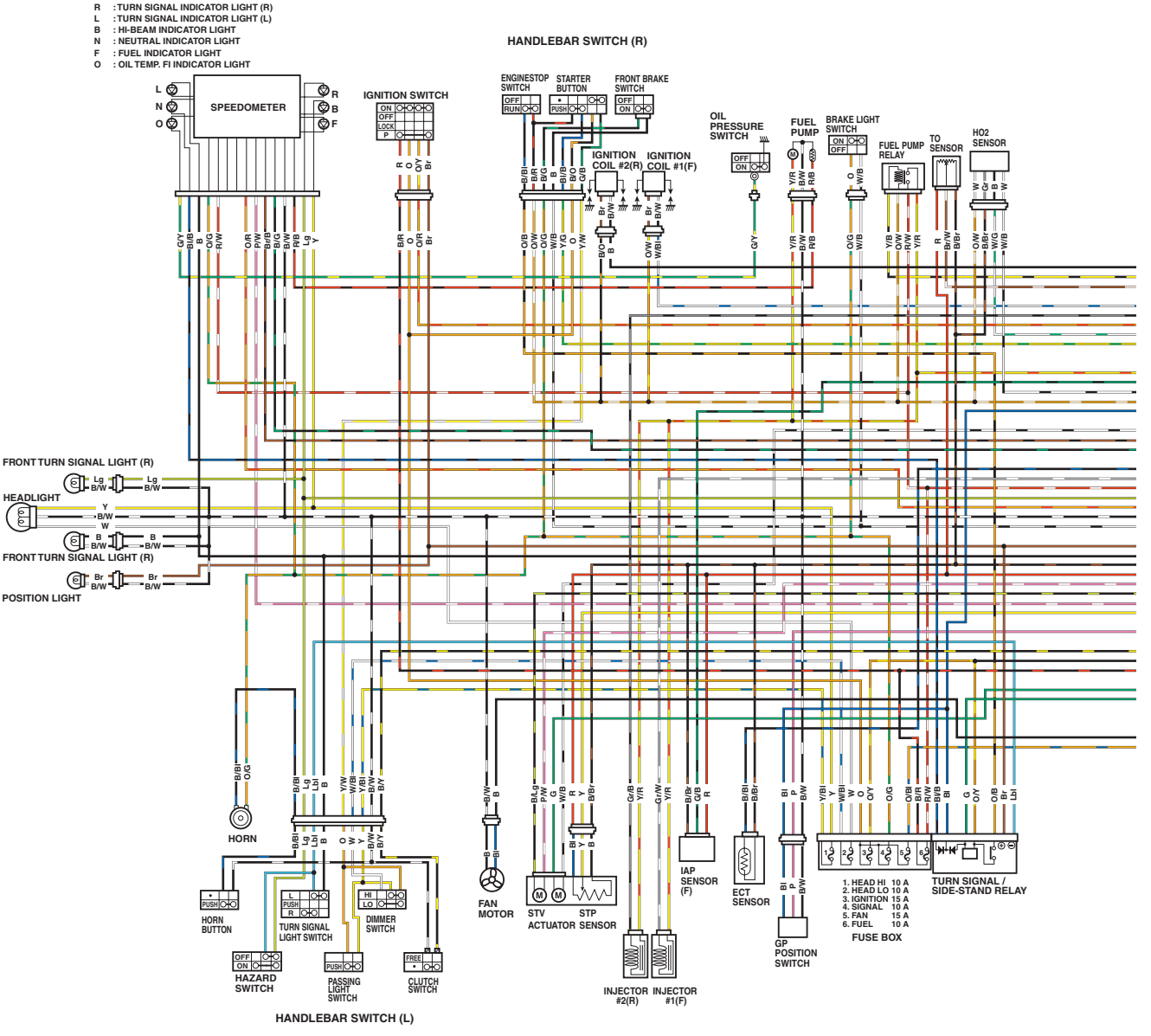
Schematic and Routing Diagram

Wiring Diagram

B944H19102001

Refer to “Wire Color Symbols in Section 0A (Page 0A-5)”.

For E-02, 19, 24



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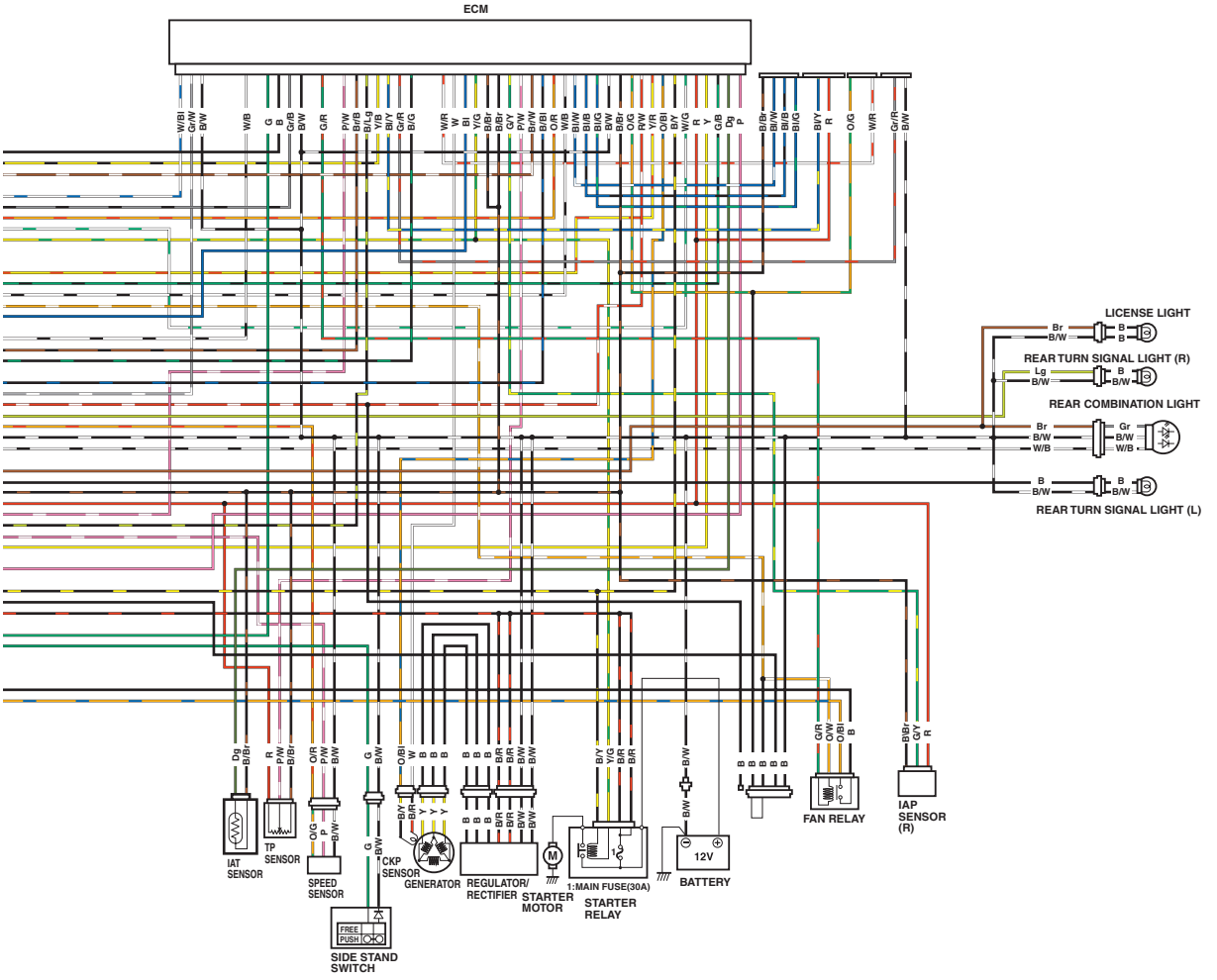
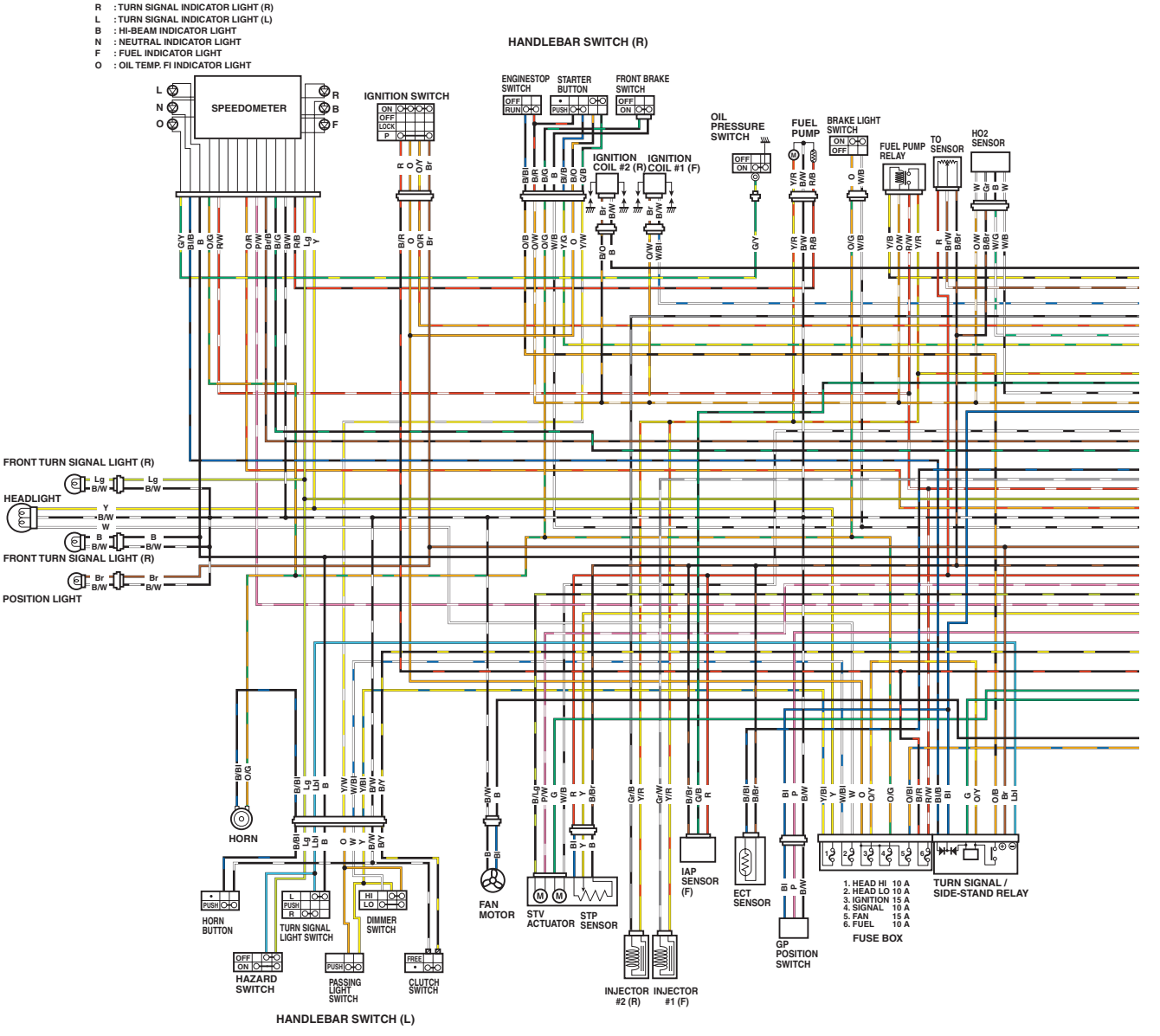
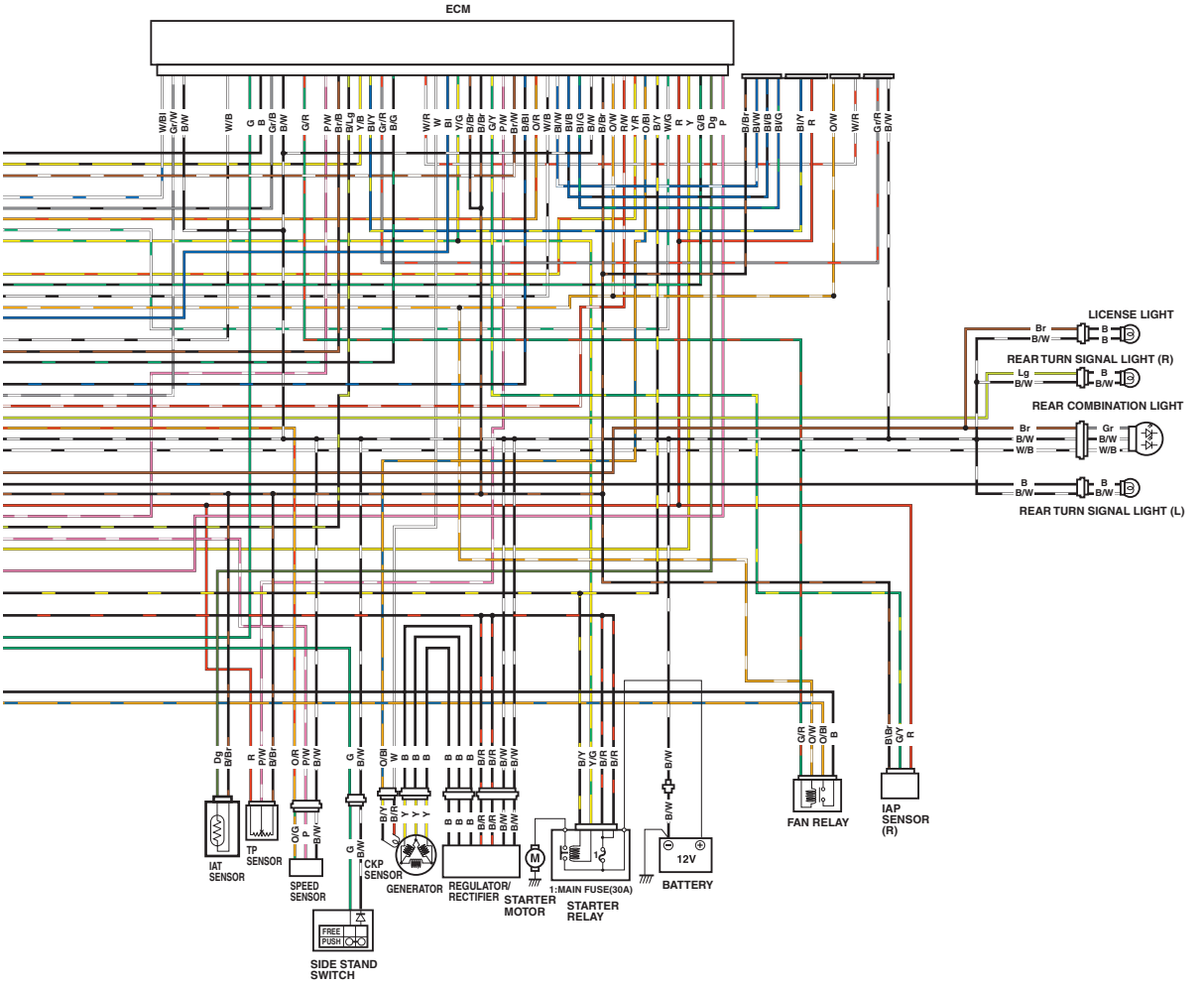

ECM
LICENSE LIGHT
REAR TURN SIGNAL LIGHT (R)
REAR COMBINATION LIGHT
REAR TURN SIGNAL LIGHT (L)
IAT SENSOR
TP SENSOR
SPEED SENSOR
CKP SENSOR
GENERATOR
REGULATOR/ RECTIFIER
STARTER MOTOR
1:MAIN FUSE(30A)
STARTER RELAY
12V
BATTERY
FAN RELAY
IAP SENSOR (R)
SIDE STAND SWITCH
FREE
PUSH

For E-28

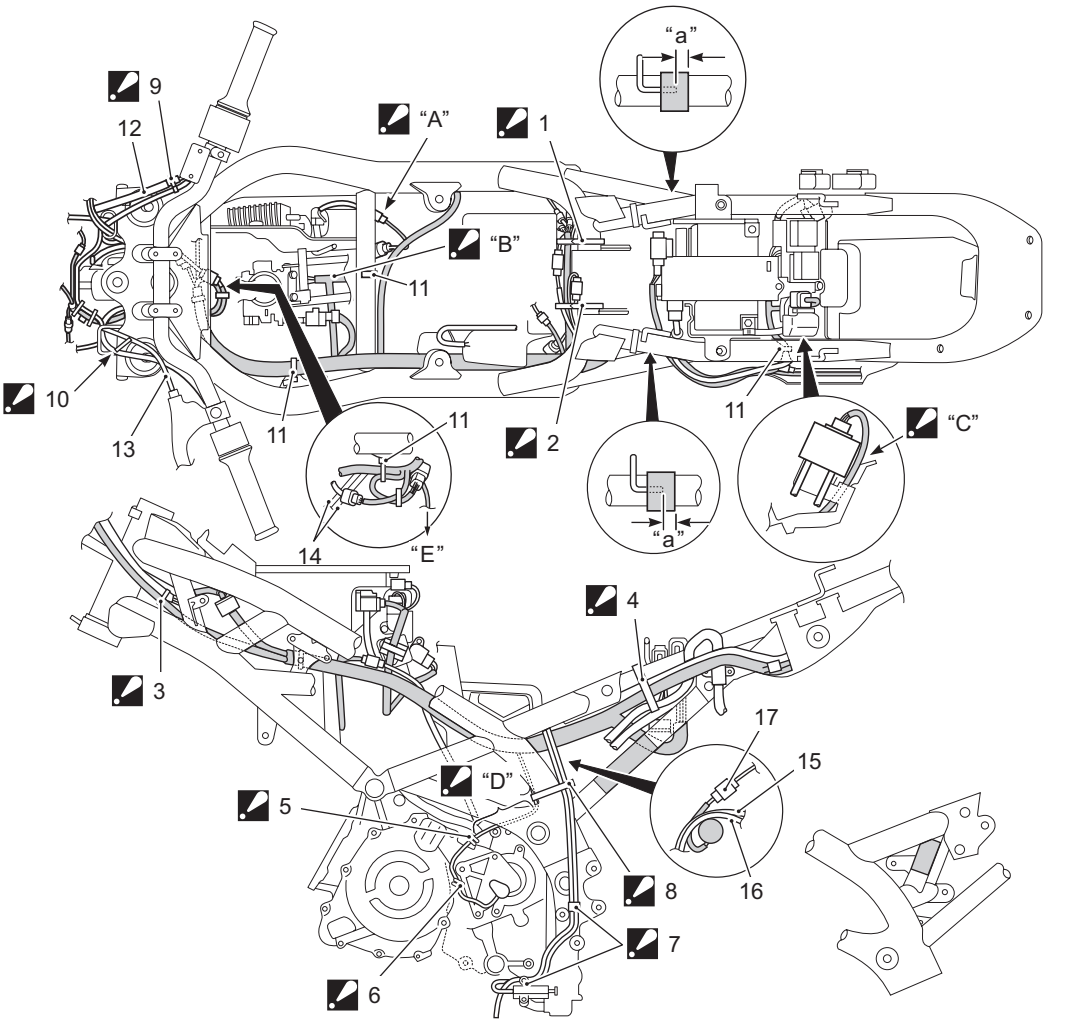


I944H1910909-03


ECM
LICENSE LIGHT
REAR TURN SIGNAL LIGHT (R)
REAR COMBINATION LIGHT
REAR TURN SIGNAL LIGHT (L)
IAT SENSOR
TP SENSOR
SPEED SENSOR
CKP SENSOR
GENERATOR
REGULATOR/ RECTIFIER
STARTER MOTOR
1:MAIN FUSE(30A)
STARTER RELAY
12V
BATTERY
FAN RELAY
IAP SENSOR (R)
SIDE STAND SWITCH
FREE
PUSH

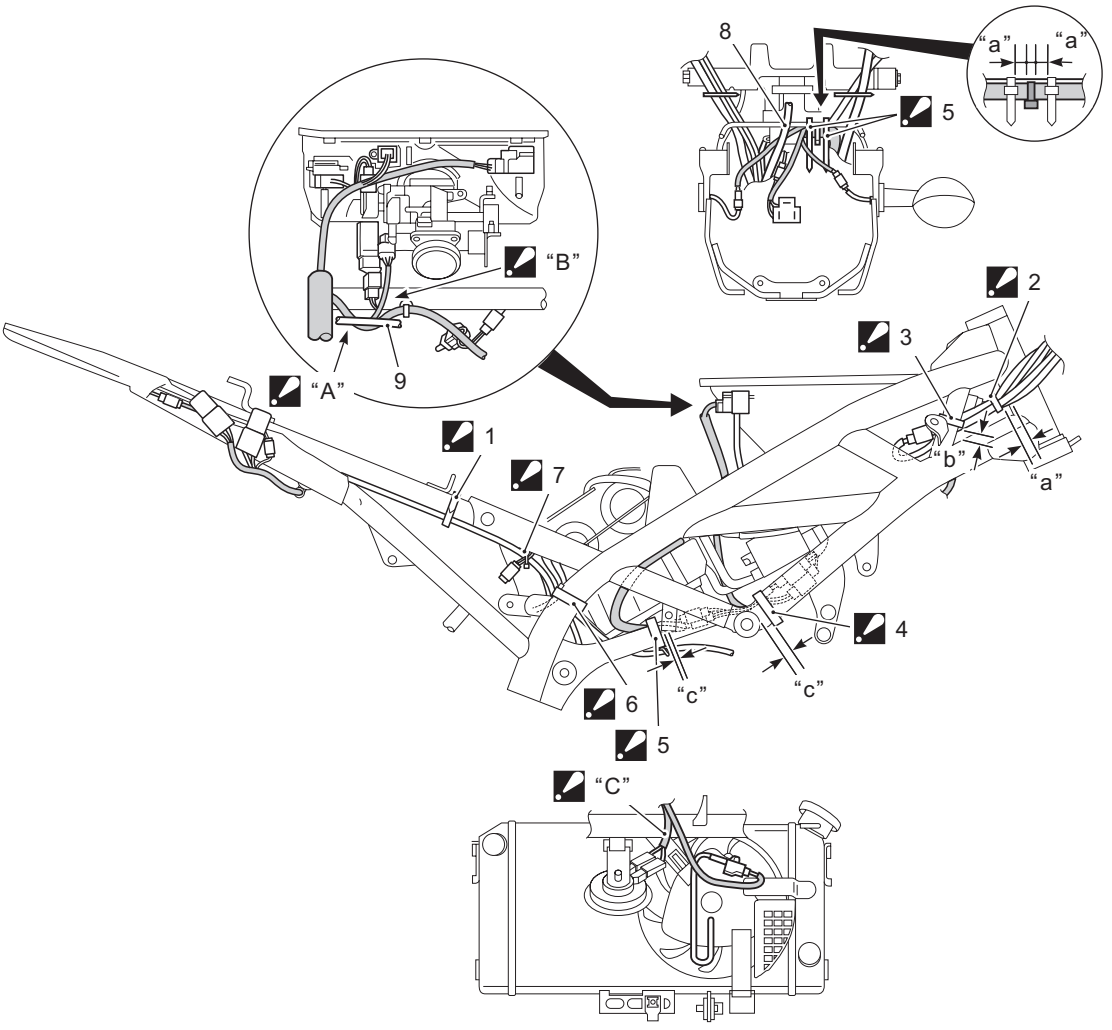
Wiring Harness Routing Diagram

B944H19102005



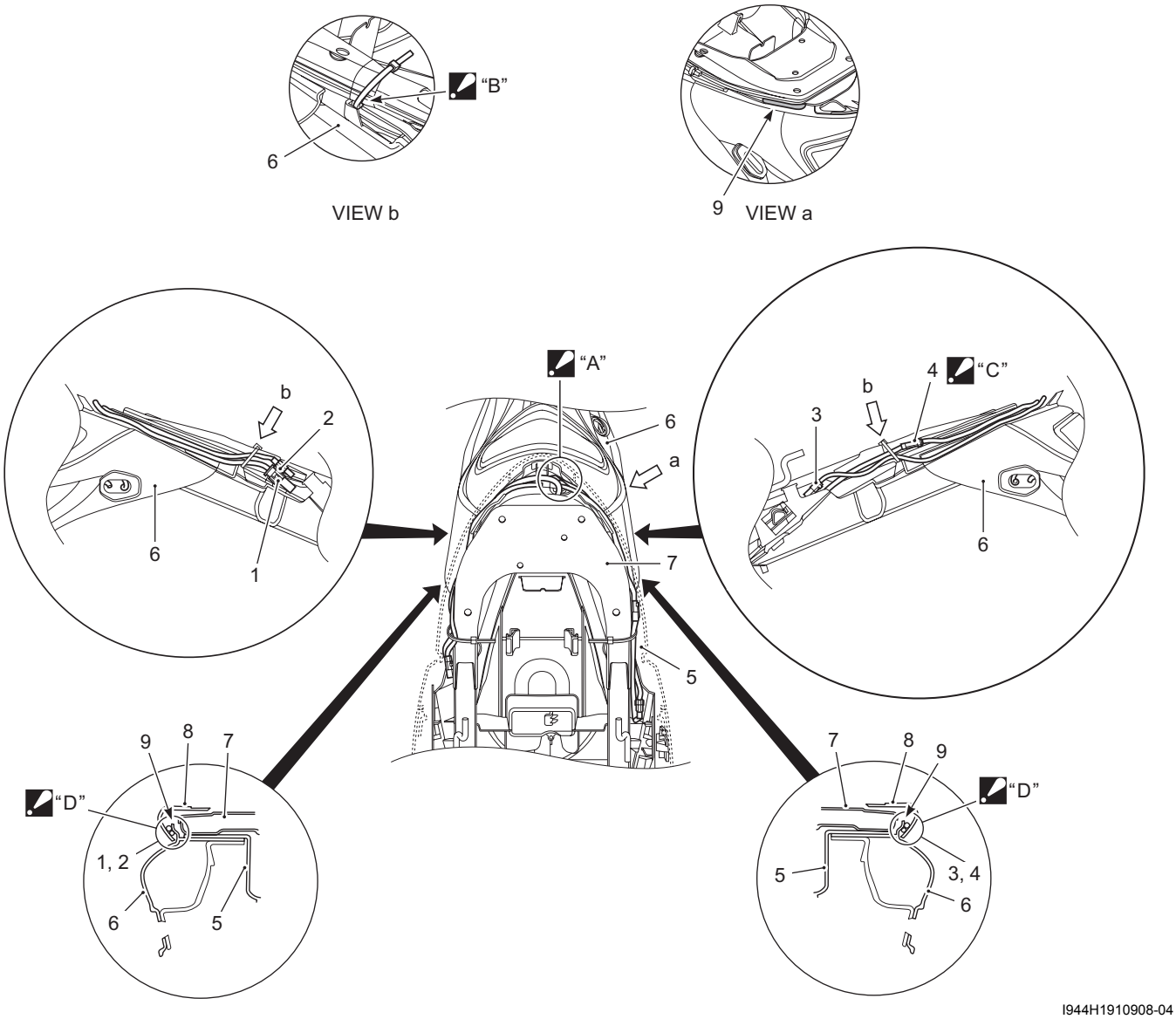
I944H1910910-02

1. Clamp : Bind the wiring harness, rear brake light switch lead wire and starter motor lead wire with the clamp.	13. Clutch cable
2. Clamp : Bind the wiring harness, HO2 sensor lead wire, starter motor lead wire and side-stand switch lead wire with the clamp.	14. Throttle cables
3. Clamp : Bind the wiring harness and left handlebar switch harness with the clamp. Make sure the wiring harness not to be pinched between the front fork and frame when the handlebars steered to the left.	15. HO2 sensor lead wire
4. Clamp : Bind the wiring harness and starter motor lead wire with the clamp.	16. Side-stand switch lead wire
5. Clamp : Bind the generator lead wire, neutral switch lead wire and speed sensor lead wire with the clamp.	17. Fuel pump lead wire coupler
6. Clamp : Bind the speed sensor lead wire with the clamp.	"A": Pass the ignition coil lead wire upper the regulator/rectifier.
7. Clamp : Bind the HO2 sensor lead wire and side-stand switch lead wire with the clamp.	"B": Pass the fuel injector lead wire between the IAP sensor vacuum hose and purge hose.
8. Clamp : Bind the HO2 sensor lead wire, side-stand switch lead wire and speed sensor lead wire with the clamp.	"C": Pass the wiring harness under the starter relay.
9. Clamp : Bind the right handlebar switch harness with the clamp.	"D": No loose in this section.
10. Clamp : Bind the left handlebar switch harness with the clamp.	"E": To the horn and cooling fan
11. Fixed clamp	"a": 10 – 20 mm (0.4 – 0.8 in)
12. Front brake hose	



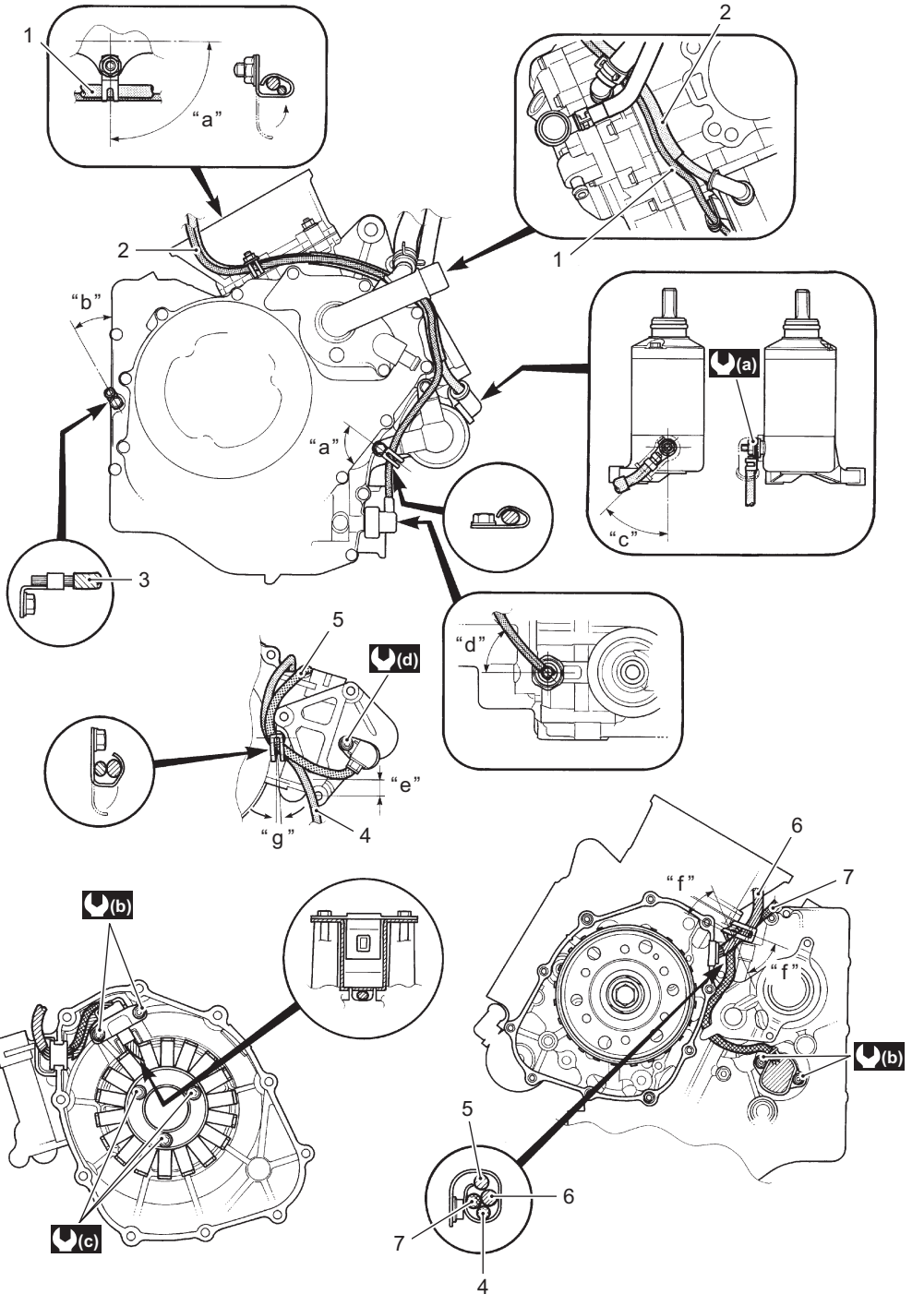
I944H1910907-07

1. Clamp : Bind the battery (–) lead wire.	9. Fuel hose
2. Clamp : Bind the right handlebar switch harnesses speedometer and ignition switch lead wire with the clamp.	"A": Pass the wiring harness under the fuel hose.
3. Clamp : Bind the wiring harness and ignition switch lead wire with the clamp.	"B": Pass the TP sensor lead wire between the high-tension cord and cylinder head.
4. Clamp : Bind the wiring harness, generator lead wire and front ignition coil with the clamp.	"C": Pass the horn lead wire under the radiator inlet hose.
5. Clamp : Bind the wiring harness.	"a": 0 – 5 mm (0 – 0.2 in)
6. Clamp : Bind the rear brake light switch lead wire.	"b": 0 – 30 mm (0 – 1.2 in)
7. Clamp : Bind the battery (–) lead wire and wiring harness.	"c": 0 – 10 mm (0 – 0.4 in)
8. Speedometer lead wire	



I944H1910908-04

1. Rear combination light lead wire coupler	8. Rear frame cover
2. Right rear turn signal light lead wire coupler	9. Frange
3. Left rear turn signal light lead wire coupler	"A": Pass the wiring harness through the hole provided on the upper part of rear fender.
4. License plate light lead wire coupler	"B": Pass the clamp between the rear fender and the bulge-and-recess section of frame.
5. Rear front fender	"C": Fasten the clamp after the license plate right lead wire coupler has been connected.
6. Rear fender	"D": To prevent the wiring harness from pinched between the rear frame cover and the rear fender, route the harness inside the flange located on the upper part of rear fender.
7. Frame	



I944H1910905-03

1. Starter motor lead wire	(c) : 11 N·m (1.1 kgf-m, 8.0 lbf-ft)
2. Oil pressure switch lead wire	(d) : 4.5 N·m (0.45 kgf-m, 3.0 lbf-ft)
3. Battery (–) lead wire	"a": 90°
4. Side-stand switch lead wire	"b": Max. 45°
5. Speed sensor lead wire	"c": Within 45°
6. Generator lead wire	"d": 45°
7. Gear position switch lead wire	"e": 15 – 25 mm (0.6 – 1.0 in)
(a) : 6 N·m (0.6 kgf-m, 4.3lbf-ft)	"f": 40°
(b) : 6.5 N·m (0.65 kgf-m, 4.7 lbf-ft)	"g": 3°

Specifications

Service Data

B944H1910S002

Electrical

Item			Specification	Note
Fuse size	Headlight	HI	10 A	
		LO	10 A	
	Ignition		15 A	
	Signal		10 A	
	Fan		15 A	
	Fuel		10 A	
	Main		30 A	

Tightening Torque Specifications

B944H1910S003

NOTE

The specified tightening torque is described in the following.
“Wiring Harness Routing Diagram (Page 9A-5)”

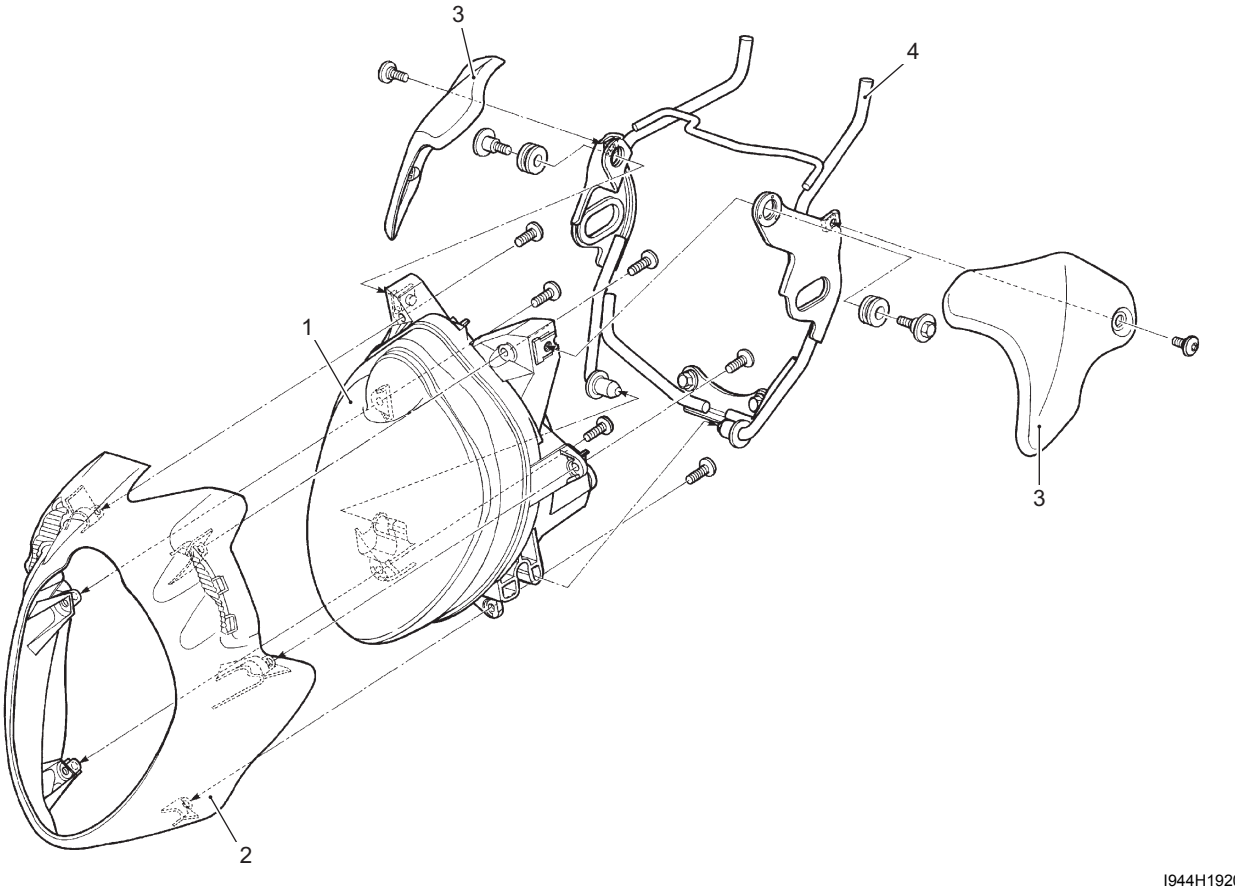
Reference:
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque List in Section 0C (Page 0C-7)”.

Lighting Systems

Repair Instructions

Headlight Construction

B944H19206029

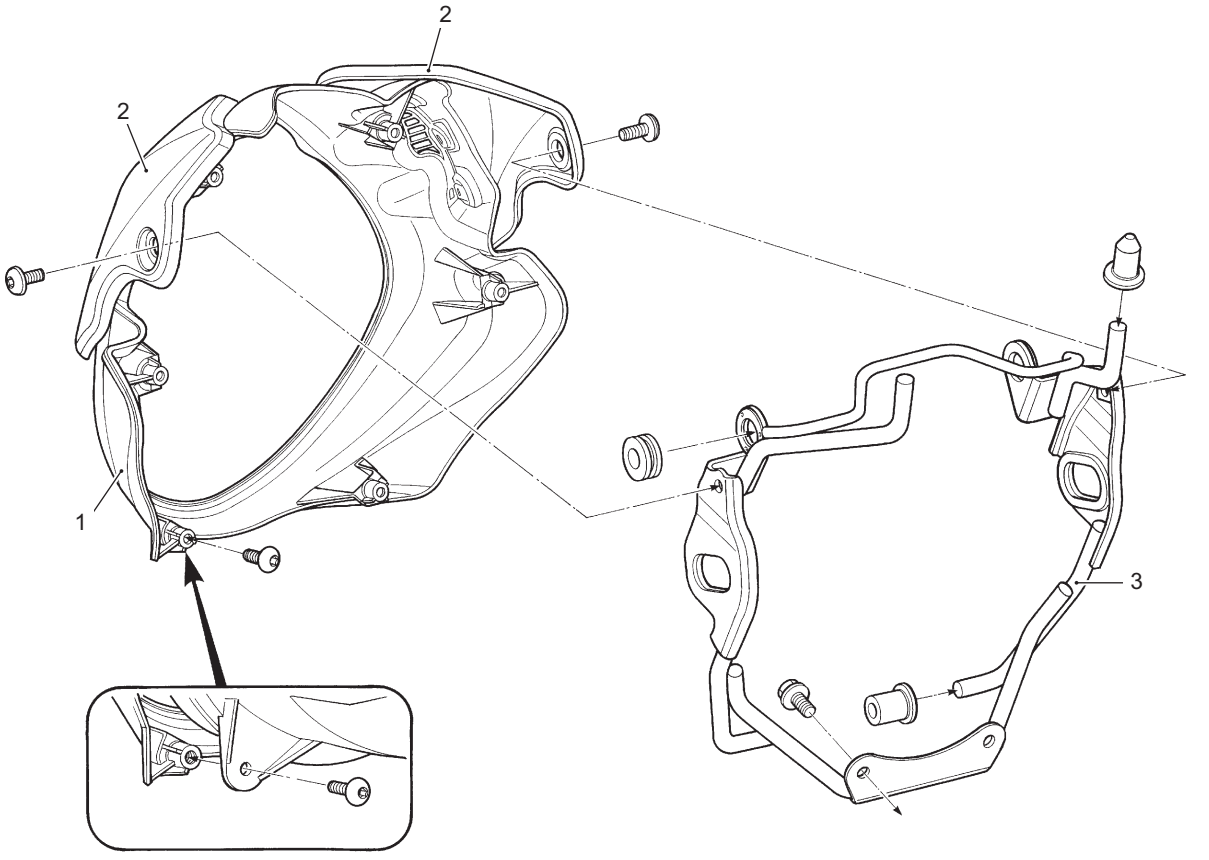


I944H1920001-02

1. Headlight	3. Headlight side cover
2. Headlight cover	4. Headlight brace

Headlight Cover Construction

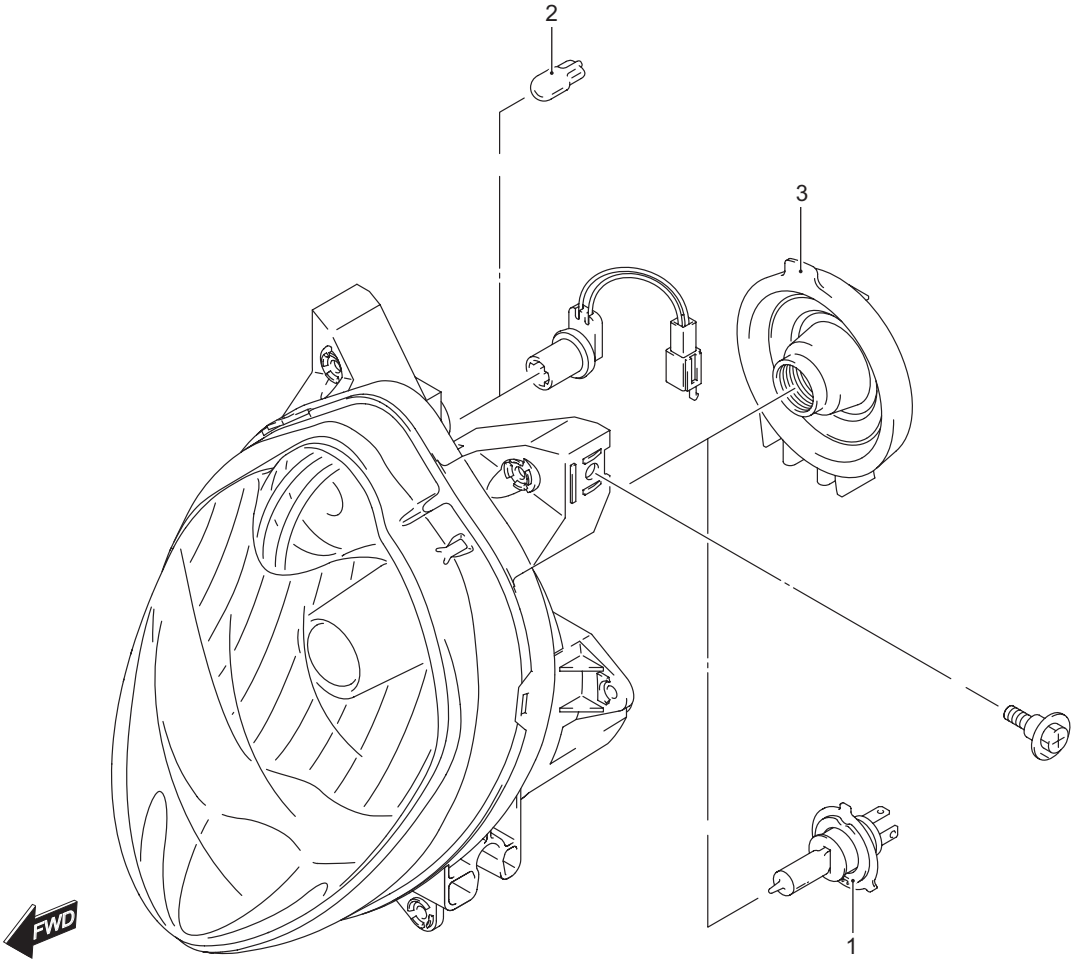
B944H19206030



I944H1920002-02

1. Headlight cover	2. Headlight side cover	3. Headlight brace

Headlight Components



I944H1920044-02

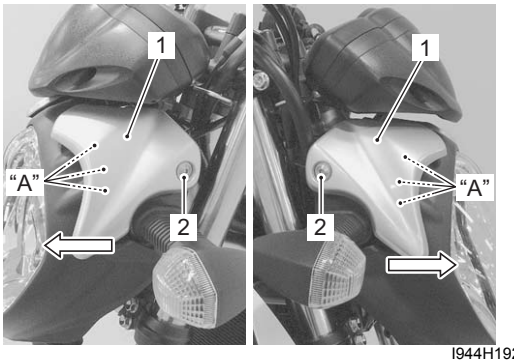
1. Headlight bulb (12 V 60/55 W, H4)	3. Bulb socket rubber cap
2. Position light bulb (12 V 5 W)	

Headlight Removal and Installation

B944H19206003

Removal

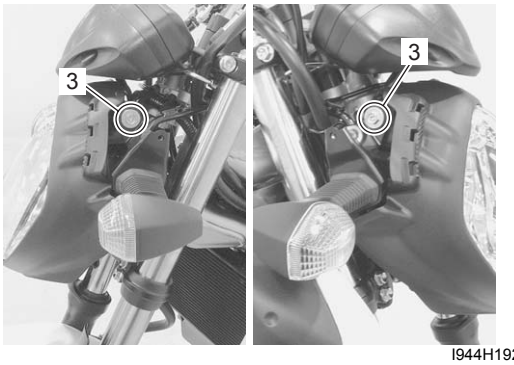
1) Removal the headlight side covers (1) by removing the bolts (2).



I944H1920004-05

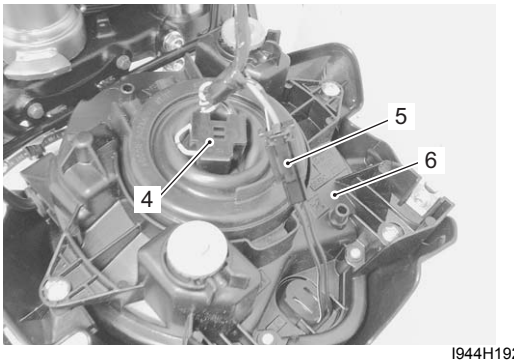
"A": Guide

2) Remove the headlight mounting bolts (3).



I944H1920005-03

3) Disconnect the headlight coupler (4) and position light coupler (5).
4) Remove the headlight assembly (6).



I944H1920006-03

Installation

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

- After installing, be sure to inspect the headlight beam. Refer to "Headlight Beam Adjustment (Page 9B-5)".

Headlight Bulb and Position Light Bulb Replacement

B944H19206004

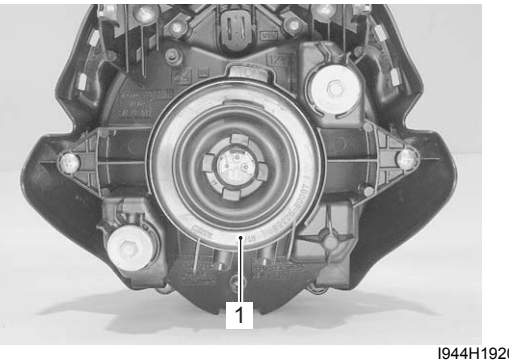
⚠ CAUTION

- **When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.**
- **Do not use bulb other than those with predetermined wattage.**
- **Remove the bulb when it gets cool, since it may be heated to an extremely high temperature when the headlight is turned ON.**

Headlight Bulb

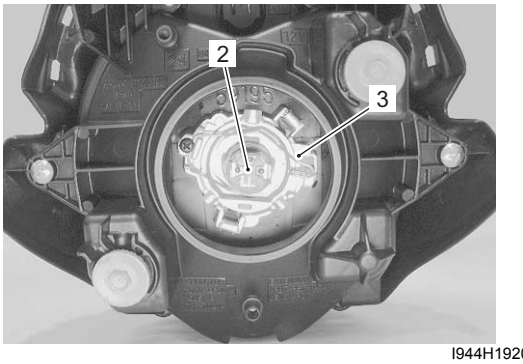
Replace the headlight bulb in the following procedures:

1) Remove the headlight assembly. Refer to "Headlight Removal and Installation (Page 9B-4)".
2) Remove the bulb socket rubber cap (1).



I944H1920007-01

3) Replace the headlight bulb (2) by unhooking the bulb holder spring (3).



I944H1920008-01

4) Reinstall the removed parts.

NOTE

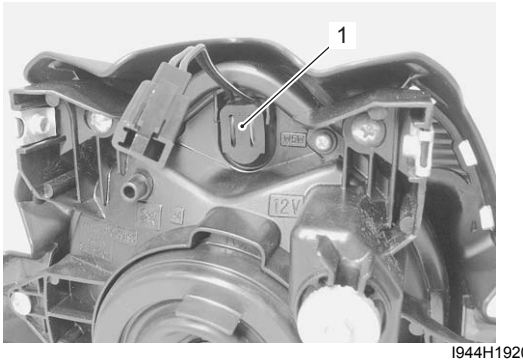
Properly fit the bulb socket rubber cap (1).

5) After installing be sure to inspect the headlight beam. Refer to “Headlight Beam Adjustment (Page 9B-5)”.

Position Light Bulb

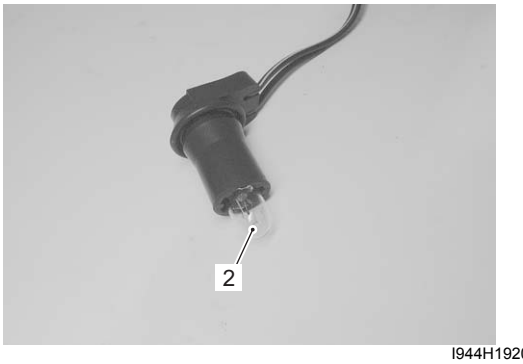
Replace the position light bulb in the following procedures:

1) Remove the headlight assembly. Refer to “Headlight Removal and Installation (Page 9B-4)”.
2) Remove the position light socket (1).



I944H1920009-01

3) Replace the position light bulb (2).



I944H1920010-01

4) Reinstall the removed parts.

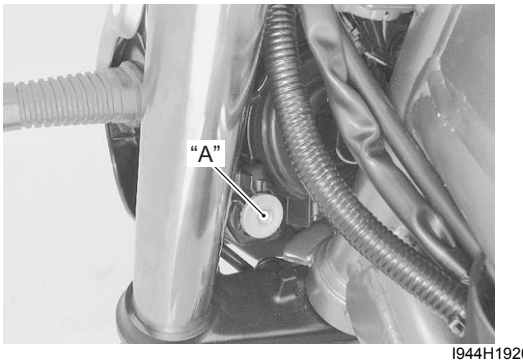
Headlight Beam Adjustment

B944H19206005

Adjust the headlight beam in the following procedures: Insert a plus screw driver along the guide as shown and adjust the headlight beam horizontally.

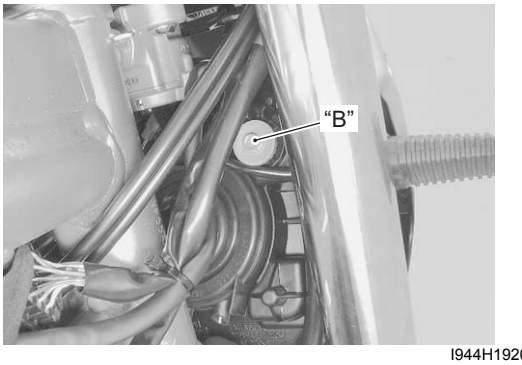
NOTE

Adjust the beam horizontally first, then vertically.



I944H1920011-01

“A”: Horizontal adjuster

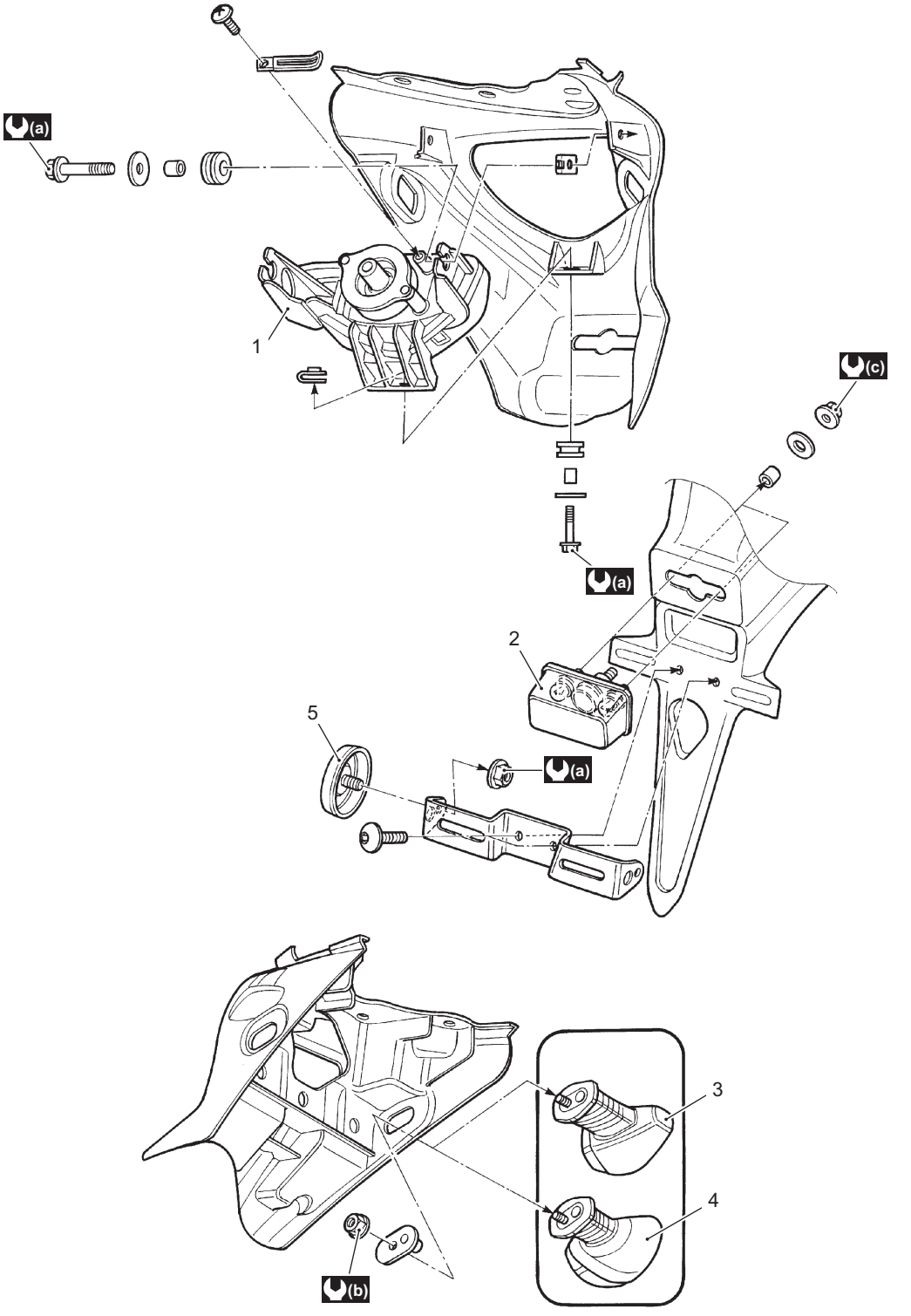


I944H1920012-01

“B”: Vertical adjuster

Rear Lighting System Construction

B944H19206007

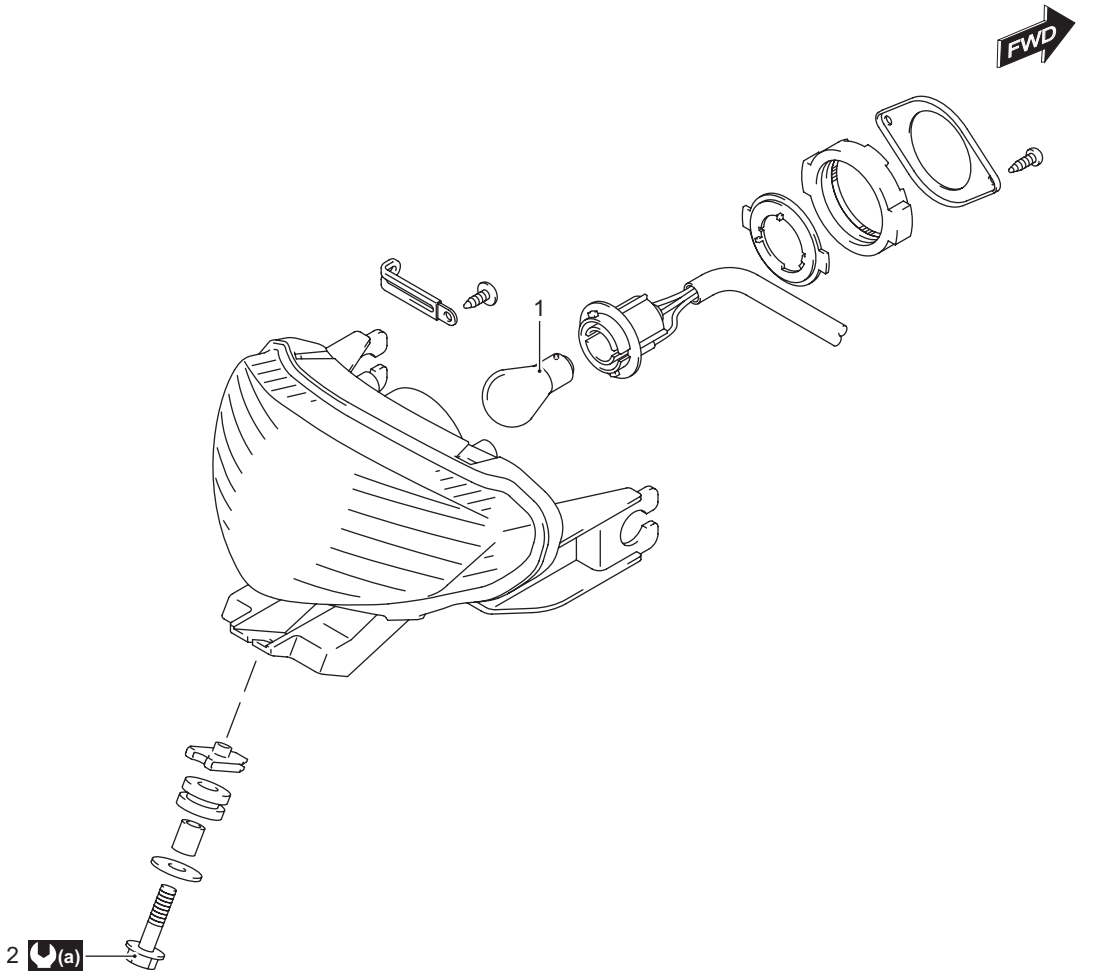


I944H1920003-02

1. Rear combination light	5. Reflex refractor (For E-03, 28, 33)
2. License plate light	(a) : 1.8 N·m (0.18 kgf-m, 1.5 lbf-ft)
3. Rear turn signal light (For E-03, 28, 33)	(b) : 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)
4. Rear turn signal light (For E-02, 19, 24)	(c) : 5.0 N·m (0.5 kgf-m, 3.5 lbf-ft)

Rear Combination Light Components

B944H19206006



I944H1920045-02

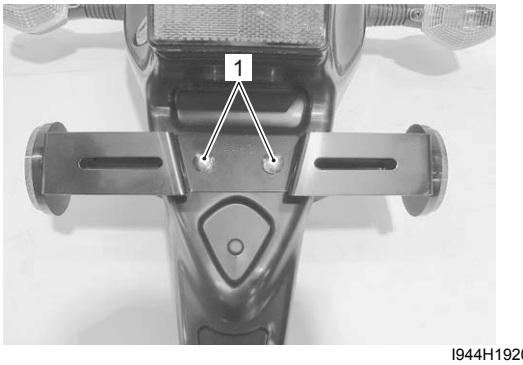
1. Brake light/Taillight bulb (12 V 21/5 W)	(a) : 1.8 N·m (0.18 kgf-m, 1.5 lbf-ft)
2. Rear combination light mounting bolt	

Rear Combination Light Removal and Installation

B944H19206008

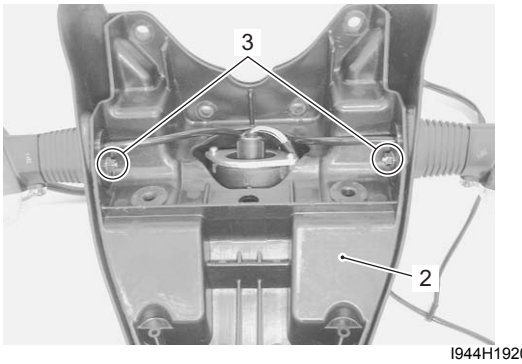
Removal

1) Remove the rear fender assembly. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Remove the screws (1).



I944H1920013-01

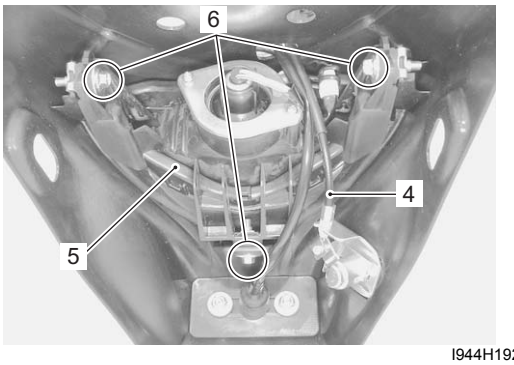
3) Remove the rear fender bracket (2) by removing the rear turn signal light mounting nuts (3).



I944H1920014-03

4) Disconnect the seat lock cable (4).

5) Remove the rear combination light (5) by removing the rear combination light bolts (6).



I944H1920015-02

Installation

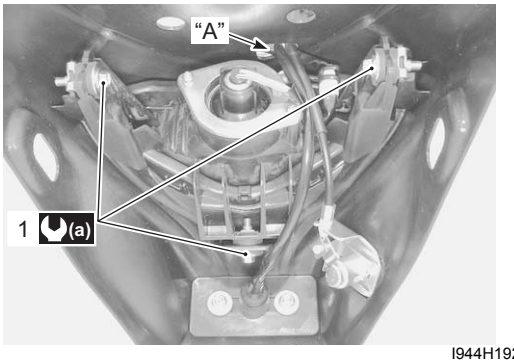
Install the rear combination right in the reverse order of removal. Pay attention to the following point:

NOTE

Pass the wiring harness and seat lock cable into the rear fender hole "A".

- Tighten the rear combination light mounting bolts (1) to the specified torque.

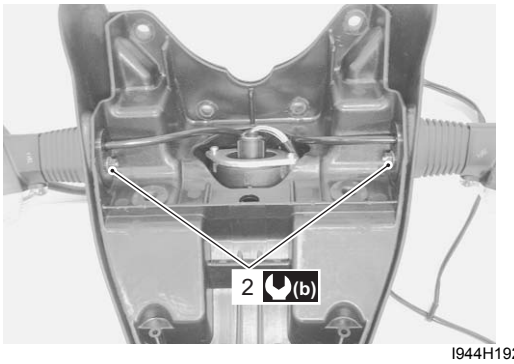
Tightening torque
Rear combination light mounting bolt (a): 1.8 N·m (0.18 kgf-m, 1.5 lbf-ft)



I944H1920016-01

- Tighten the rear turn signal light mounting nuts (2) to the specified torque.

Tightening torque
Rear turn signal light mounting nut (b): 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)



I944H1920017-01

Rear Combination Light Bulb Replacement

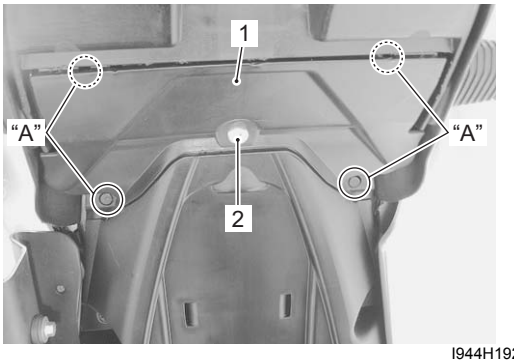
B944H19206009

⚠ CAUTION

- **When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.**
- **Do not use bulb other than those with predetermined wattage.**

Replace the rear combination light bulb in the following procedures:

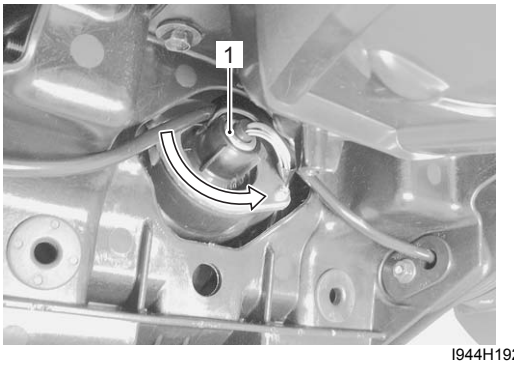
1) Remove the rear fender cover (1) by removing the screw (2).



I944H1920018-01

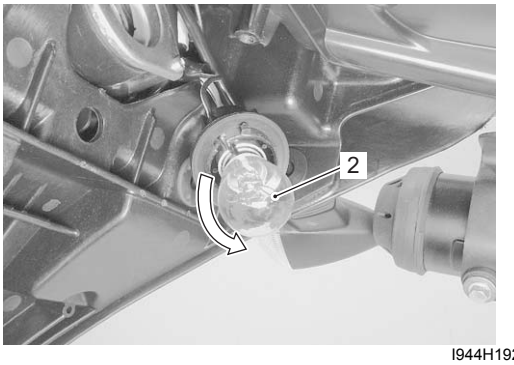
"A": Hooked point

2) Remove the bulb socket (1) by turning it counterclockwise.



I944H1920019-01

3) Push in on the bulb (2), turn it counterclockwise, and pull it out.

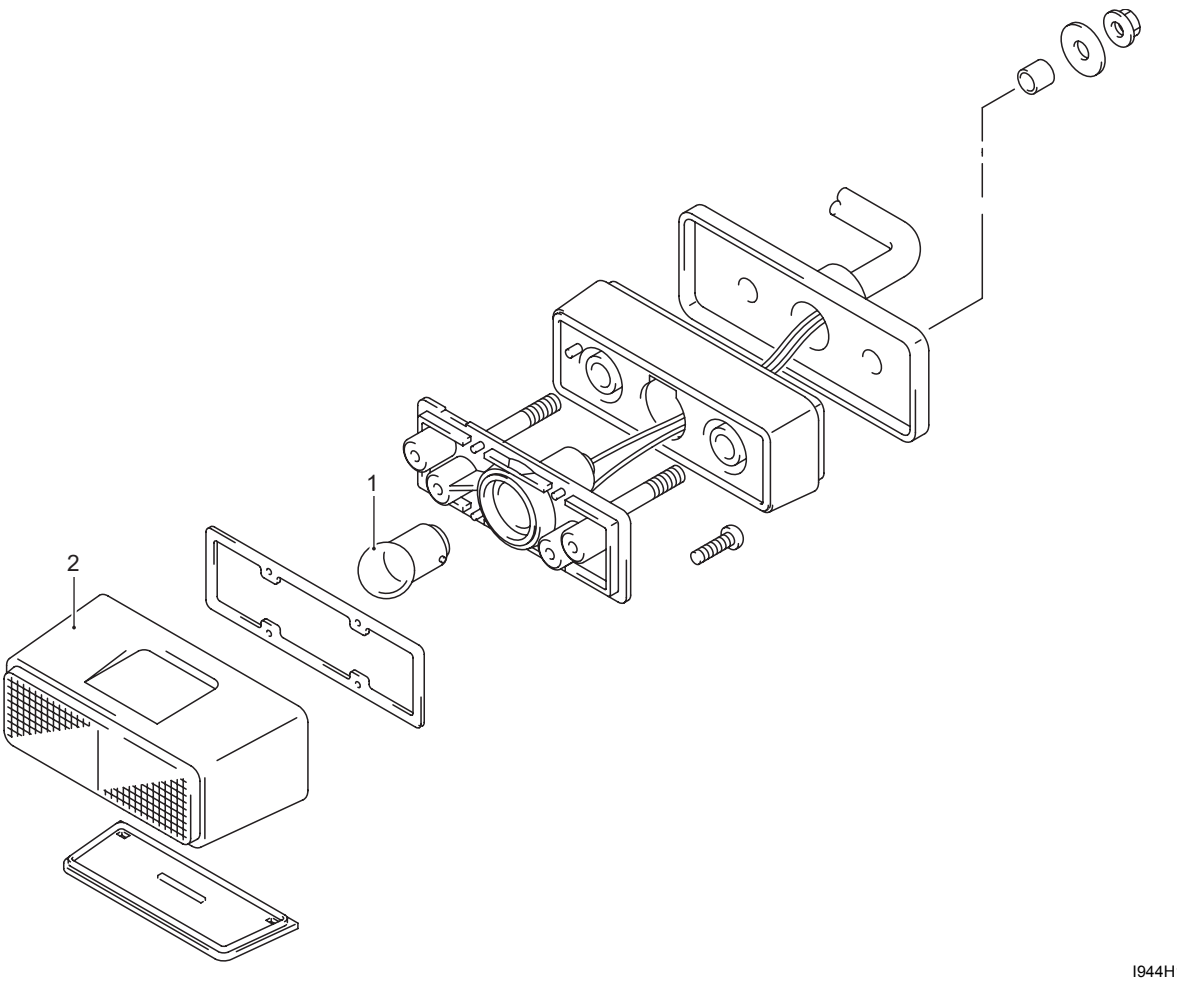


I944H1920020-01

4) Reinstall the removed parts.

License Plate Light Components

B944H19206010



I944H1920046-02

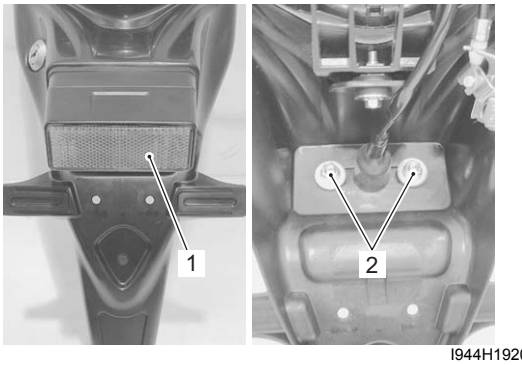
1. License plate light bulb (12 V 5 W)	2. Lens

License Plate Light Removal and Installation

B944H19206011

Removal

1) Remove the rear fender assembly. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Remove the rear fender bracket. Refer to “Rear Combination Light Removal and Installation (Page 9B-7)”.
3) Remove the license plate light assembly (1) by removing the nuts (2).



I944H1920021-01

Installation

Install the license plate light in the reverse order of removal.

License Plate Light Bulb Replacement

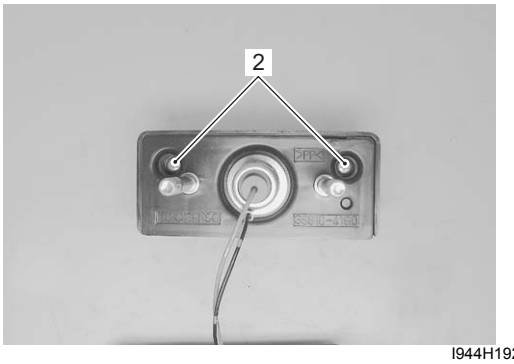
B944H19206012

Replace the license plate light bulb in the following procedures:

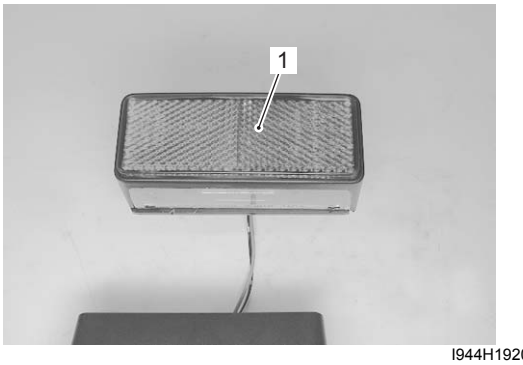
⚠ CAUTION

- **When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.**
- **Do not use bulb other than those with predetermined wattage.**

1) Remove the license plate light assembly. Refer to “License Plate Light Removal and Installation (Page 9B-9)”.
2) Remove the lens (1) by removing the screws (2).

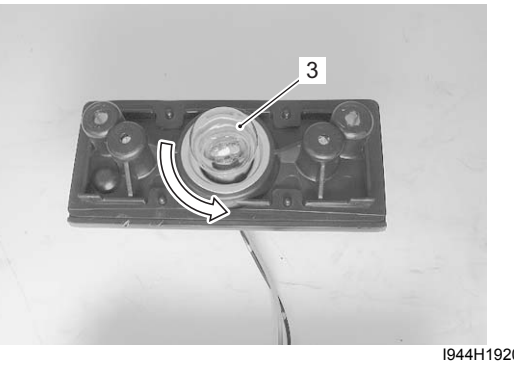


I944H1920022-01



I944H1920023-01

3) Push in on the bulb (3), turn it counterclockwise, and pull it out.

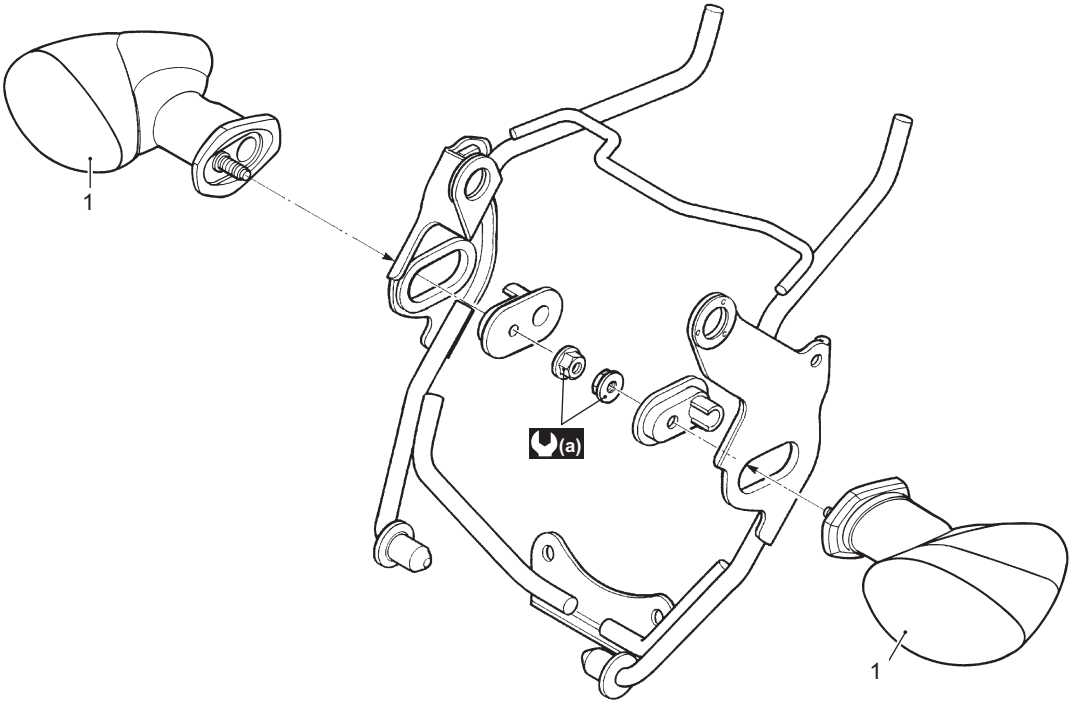


I944H1920024-01

4) Reinstall the removed parts.

Front Turn Signal Light Construction

B944H19206031

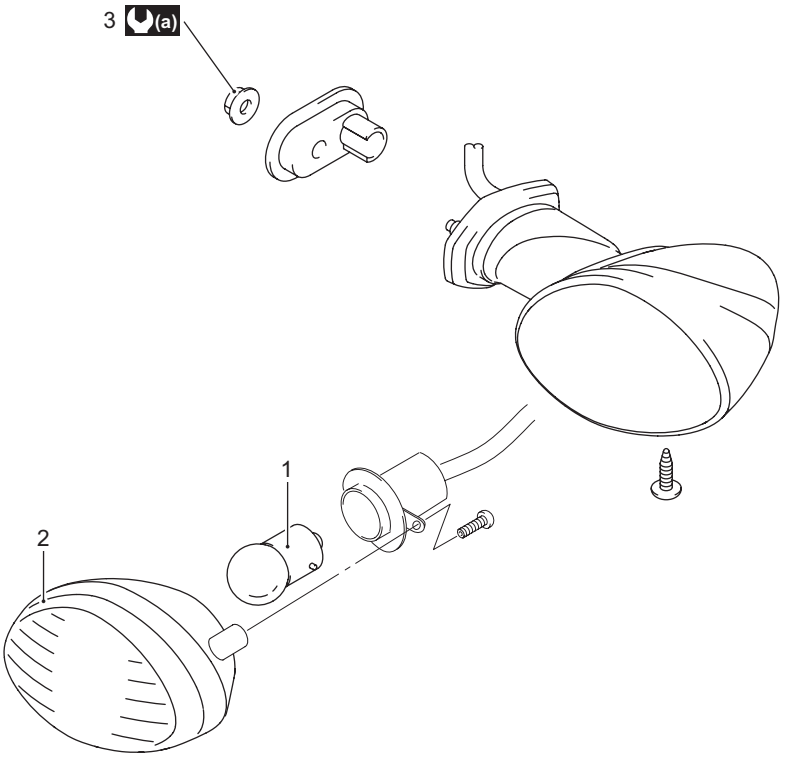


I944H1920025-05

1. Front turn signal light	(a) : 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)

Turn Signal Light Components

B944H19206032



I944H1920047-05

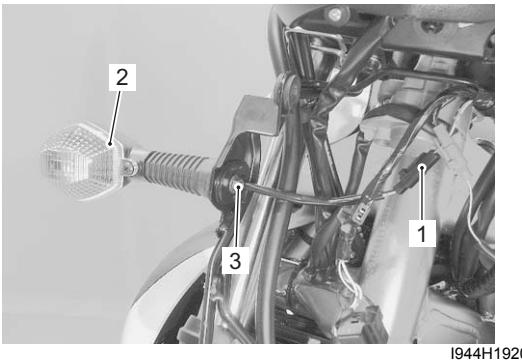
1. Turn signal light bulb (12 V 10 W x 4)	3. Turn signal light mounting nut
2. Lens	(a) : 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)

Front Turn Signal Light Removal and Installation

B944H19206014

Removal

1) Remove the headlight assembly. Refer to “Headlight Removal and Installation (Page 9B-4)”.
2) Disconnect the front turn signal light coupler (1).
3) Remove the front turn signal light (2) by removing the nut (3).



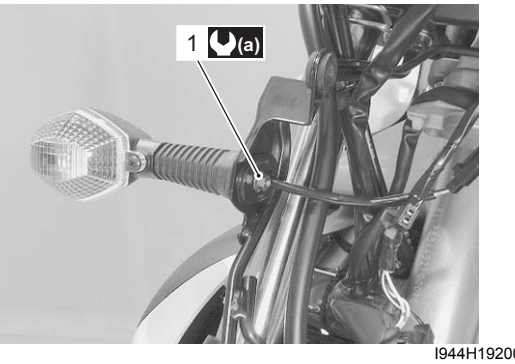
I944H1920026-01

Installation

Install the front turn signal light in the reverse order of removal. Pay attention to the following point:

- Tighten the front turn signal light mounting nut (1) to the specified torque.

Tightening torque
Front turn signal light mounting nut (a): 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)



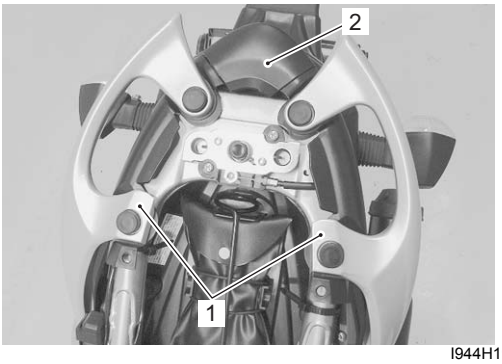
I944H1920027-01

Rear Turn Signal Light Removal and Installation

B944H19206015

Removal

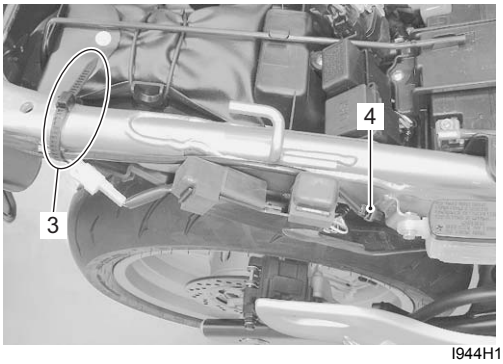
1) Remove the pillion rider handles (1) and rear frame cover (2). Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.



I944H1920028-01

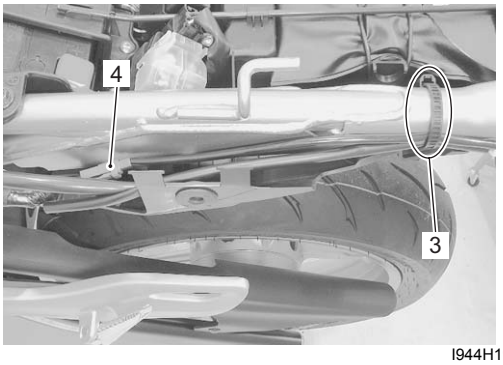
2) Disconnect the clamp (3) and rear turn signal light coupler (4).

Right side



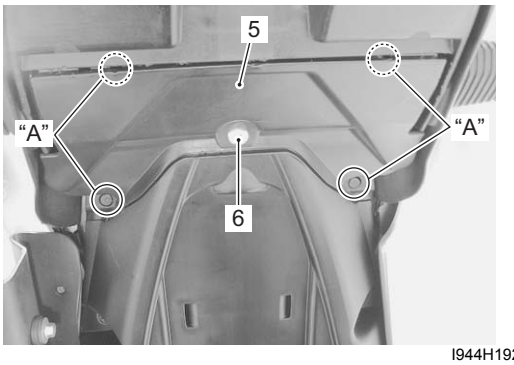
I944H1920029-02

Left side



I944H1920030-02

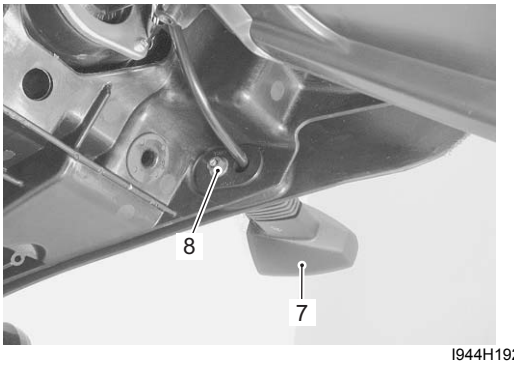
3) Remove the rear fender cover (5) by removing the screw (6).



I944H1920031-02

“A”: Hooked point

4) Remove the rear turn signal light (7) by removing the nut (8).



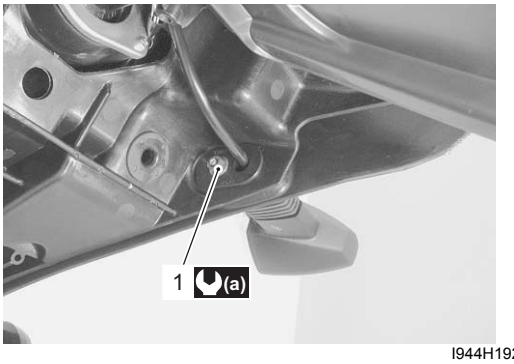
I944H1920032-02

Installation

Install the rear turn signal light in the reverse order of removal. Pay attention to the following point:

- Tighten the rear turn signal light mounting nut (1) to the specified torque.

  Tightening torque
  Rear turn signal light mounting nut (a): 1.3 N·m (0.13 kgf-m, 1.0 lbf-ft)



I944H1920033-01

- Rout the turn signal light lead wire. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-5)”.

Turn Signal Light Bulb Replacement

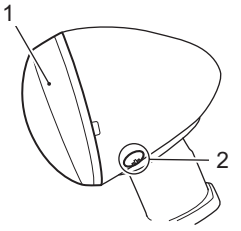
B944H19206016

⚠ CAUTION

- **When you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.**
- **Do not use bulb other than those with predetermined wattage.**

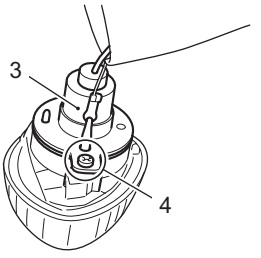
Replace the turn signal light bulb in the following procedures:

1) Remove the lens assembly (1) by removing the screw (2).



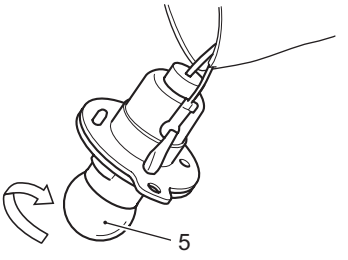
I944H1920048-01

2) Remove the socket (3) by removing the screw (4).



I944H1920050-01

3) Push in on the bulb (5), turn it counterclockwise, and pull it out.
4) Replace the bulb (5).



I944H1920049-01

5) Reinstall the lens and socket.

Turn Signal / Side-stand Relay Inspection

B944H19206018

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

NOTE

Make sure that the battery is fully charged.

Before removing the turn signal/side-stand relay, check the operation of the turn signal light.
If the turn signal light does not illuminate, inspect the bulb, turn signal switch and circuit connection.
If the bulb, turn signal switch and circuit connection are OK, the turn signal relay may be faulty; therefore, replace the turn signal/side-stand relay with a new one. Refer to “Turn Signal / Side-stand Relay Removal and Installation (Page 9B-13)”.

Turn Signal / Side-stand Relay Removal and Installation

B944H19206019

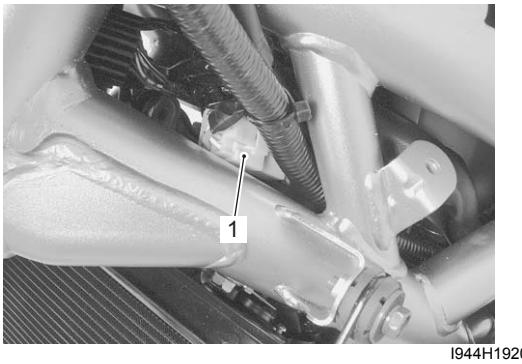
Refer to “Turn Signal / Side-stand Relay Removal and Installation in Section 1I (Page 1I-8)”.

Hazard Switch Inspection

B944H19206020

Inspect the hazard switch in the following procedures:

1) Remove the left frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the left handlebar switch coupler (1).



I944H1920036-03

3) Inspect the hazard switch for continuity with a tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to “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	Lbl	Lg/G
OFF		○	○
ON	○		○

I944H1920037-01

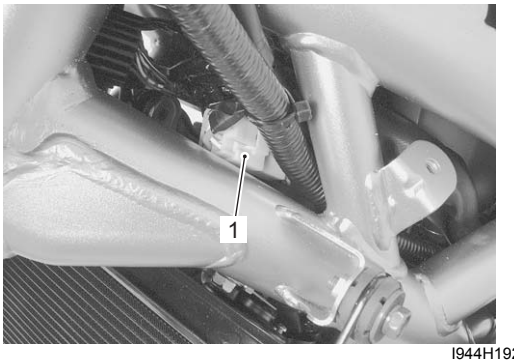
4) After finishing the hazard switch inspection, reinstall the removed parts.

Turn Signal Switch Inspection

B944H19206021

Inspect the turn signal switch in the following procedures:

1) Remove the left frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the left handlebar switch coupler (1).



I944H1920036-03

3) Inspect the turn signal switch for continuity with a tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to “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	Lg	Lbl	B
L		○——	——○
PUSH			
R	○——	——○	

I944H1920039-01

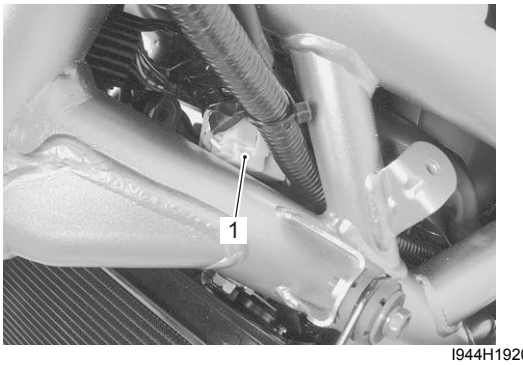
4) After finishing the turn signal switch inspection, reinstall the removed parts.

Passing Light Switch Inspection

B944H19206022

Inspect the passing light switch in the following procedures:

1) Remove the left frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the left handlebar switch coupler (1).



I944H1920036-03

3) Inspect the passing light switch for continuity with a tester.
If any abnormality is found, replace the left handlebar switch assembly with a new one.
Refer to “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	O	Y
•		
PUSH	○——	——○

I944H1920041-01

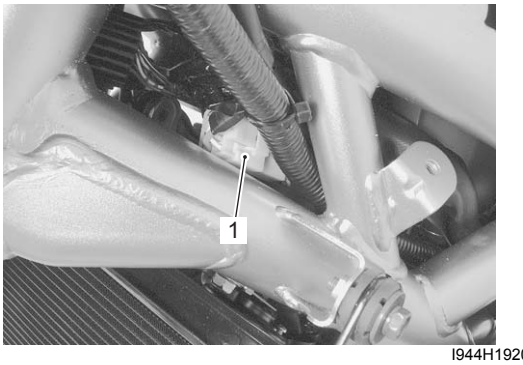
4) After finishing the passing light switch inspection, reinstall the removed parts.

Dimmer Switch Inspection

B944H19206023

Inspect the dimmer switch in the following procedures:

1) Remove the left frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the left handlebar switch coupler (1).



I944H1920036-03

3) Inspect the dimmer switch for continuity with a tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to “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	W	Y	O
HI		○——	——○
LO	○——	——	——○

I944H1920043-01

4) After finishing the dimmer switch inspection, reinstall the removed parts.

Specifications

Service Data

B944H19207001

Wattage
Unit: W

Item		Specification	
		E-03, 28, 33	E-02, 19, 24
Headlight	HI	60	←
	LO	55	←
Position/Parking light		5	←
Brake light/Taillight		21/5	←
Turn signal light		21 x 4	10 x 4
License plate light		5	←
Speedometer light		LCD	←
Tachometer light		LED	←
Turn signal indicator light		LED	←

Tightening Torque Specifications

B944H19207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Rear combination light mounting bolt	1.8	0.18	1.5	☞(Page 9B-8)
Rear turn signal light mounting nut	1.3	0.13	1.0	☞(Page 9B-8) / ☞(Page 9B-12)
Front turn signal light mounting nut	1.3	0.13	1.0	☞(Page 9B-11)

NOTE

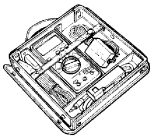
The specified tightening torque is described in the following.
“Rear Lighting System Construction (Page 9B-6)”
“Rear Combination Light Components (Page 9B-7)”
“Front Turn Signal Light Construction (Page 9B-10)”
“Turn Signal Light Components (Page 9B-11)”

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

Special Tools and Equipment

Special Tool

B944H19208001

09900–25008 Multi circuit tester set ☞(Page 9B-13) / ☞(Page 9B-14) / ☞(Page 9B-14) / ☞(Page 9B-15)		

Combination Meter / Fuel Meter / Horn

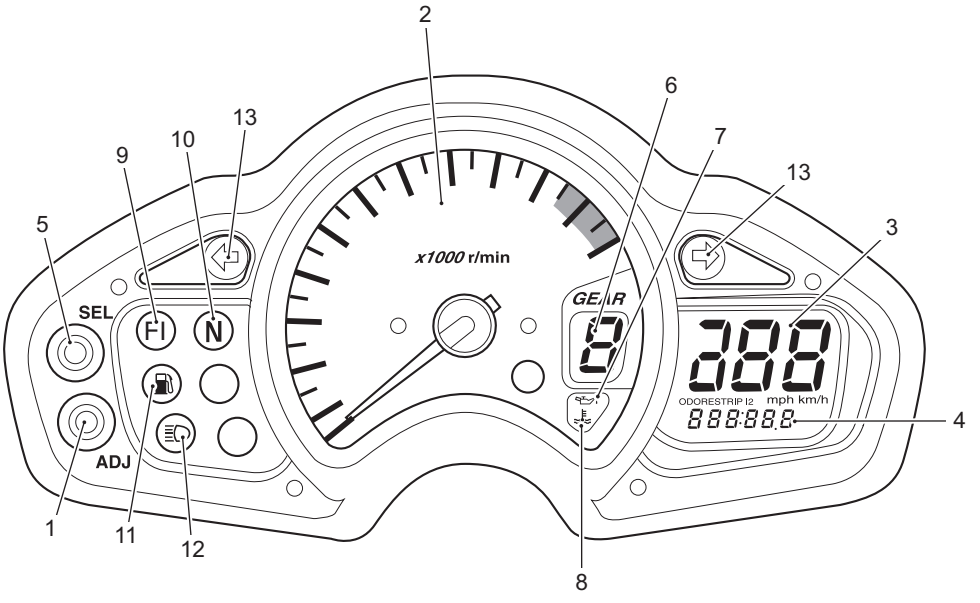
General Description

Combination Meter System Description

B944H19301001

This combination meter mainly consists of the stepping motor, LCD (Liquid Crystal Display) and LED (Light Emitting Diode).
The rpm pointer is driven by the stepping motor.
The LCDs indicate Speed, Odo / Trip 1 / Trip 2 / Fuel reserve's trip / Clock / FI (DTC), Gear position, Engine coolant temperature and Oil pressure indicator respectively.

LED (Light Emitting Diode)
LED is used for the illumination light and each indicator light.
LED is maintenance free. LED is less electric-power consuming and stronger to vibration resistance compared to the bulb.



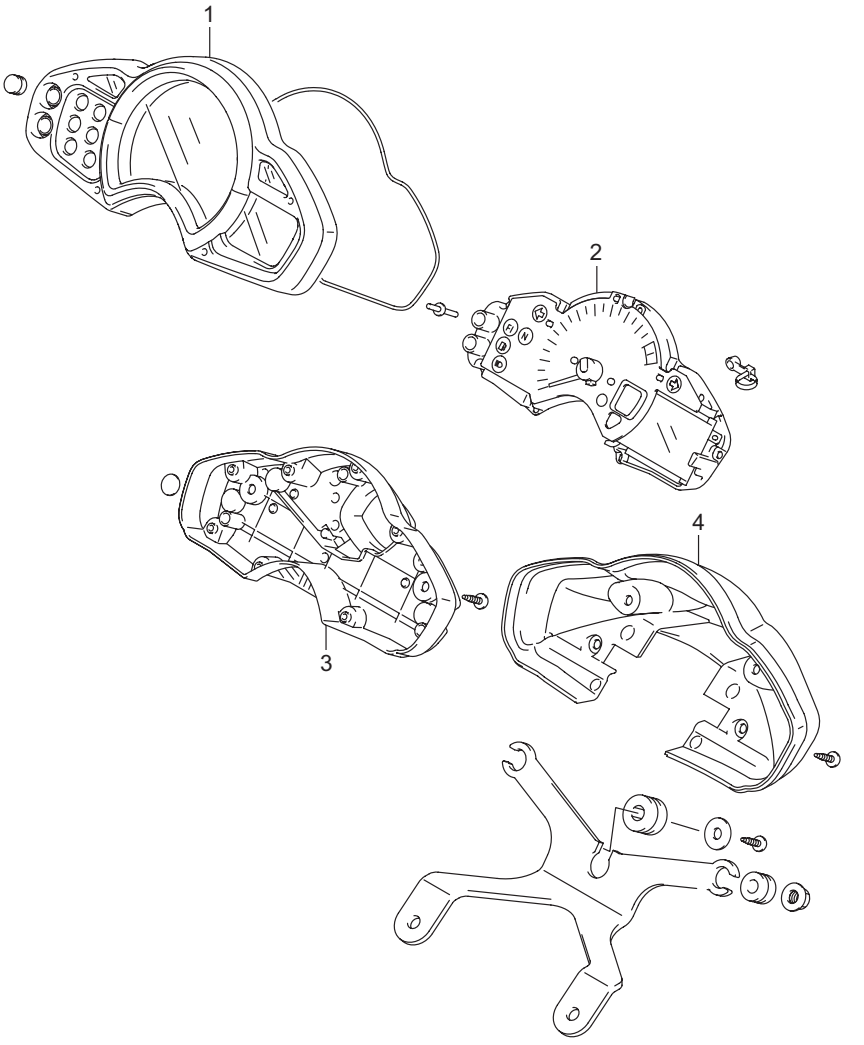
I944H1930001-01

1. Adjust switch (Trip / Clock)	8. LCD (Engine coolant temperature indicator light)
2. LED (Tachometer)	9. LED (FI indicator light)
3. LCD (Speedometer)	10. LED (Neutral indicator light)
4. LCD (Odo / Trip 1/ Trip 2 / Fuel reserve's trip / clock / FI (DTC))	11. LED (Fuel level indicator light)
5. Select switch (Odo / Trip 1 / Trip 2 / Fuel reserve's trip / Clock)	12. LED (High-beam indicator light)
6. LCD (Gear position)	13. LED (Turn signal indicator light)
7. LCD (Oil pressure indicator light)	

Repair Instructions

Combination Meter Components

B944H19306001



I944H1930025-03

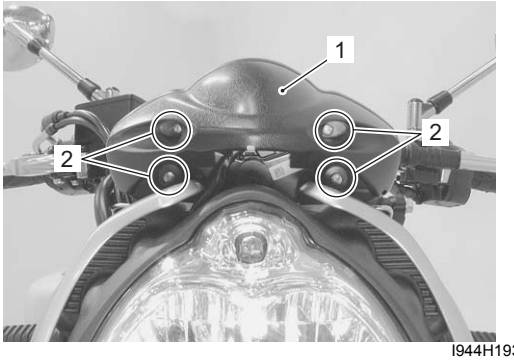
1. Combination meter upper case	3. Combination meter lower case
2. Combination meter unit	4. Combination meter cover

Combination Meter Removal and Installation

B944H19306002

Removal

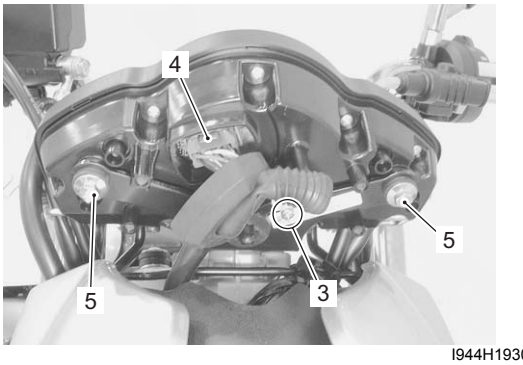
1) Remove the combination meter cover (1) by removing the screws (2).



I944H1930002-02

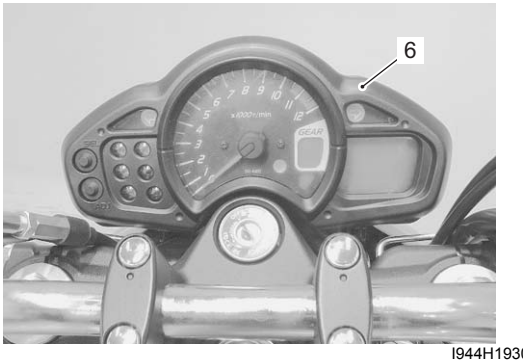
2) Remove the screws (3) and disconnect the combination meter coupler (4).

3) Remove the combination meter mounting nut (5).



I944H1930003-04

4) Remove the combination meter assembly (6).

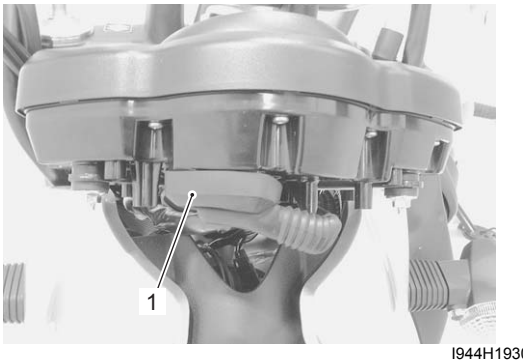


I944H1930004-03

Installation
Install the combination meter in the reverse order of removal.

NOTE

Fix the boot (1) of the combination meter coupler properly.



I944H1930005-02

Combination Meter Disassembly and Assembly

B944H19306003

Refer to “Combination Meter Removal and Installation (Page 9C-2)”.

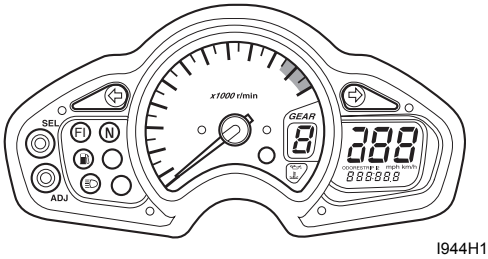
Disassembly
Disassemble the combination meter as shown in the combination meter components. Refer to “Combination Meter Components (Page 9C-2)”.

Assembly
Assemble the combination meter as shown in the combination meter components. Refer to “Combination Meter Components (Page 9C-2)”.

Combination Meter Inspection

B944H19306004

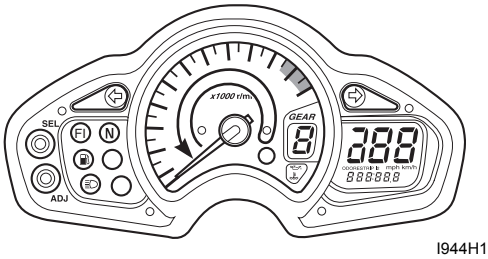
LED Inspection
Check that the LEDs (FI indicator light, oil pressure/ Engine coolant temperature indicator light, Fuel level indicator light and Meter panel illumination) immediately light up when the ignition switch is turned to ON.
Check that other LEDs (Neutral indicator light, High-beam indicator light and Turn signal indicator lights) light up/go off by operating each switch.
If abnormal condition is found, replace the combination meter unit with a new one after checking its wire harness/coupler. Refer to “Combination Meter Removal and Installation (Page 9C-2)”.



I944H1930006-02

Stepping Motor Inspection and Adjustment

1) Check that the pointer calibrates itself immediately after turning the ignition switch on and stops at zero point.
   If abnormal condition is found, replace the combination meter unit with a new one after checking its wire harness/coupler.



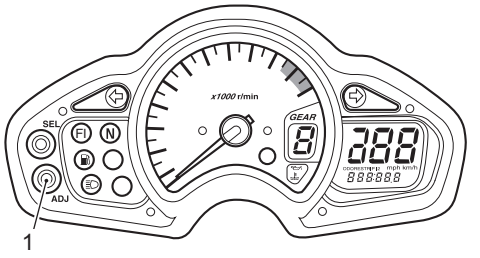
I944H1930007-04

NOTE

- **The pointer may not return to the proper position even turning the ignition switch on under low temperature condition. In that case, you can reset the pointer to the proper position by following the instruction.**
- **Complete the operation within 10 seconds after the ignition switch has been turned on.**

2) With the adjuster switch (1) pressed, turn the ignition switch ON.

3) Keep pushing the adjuster switch (1) for more than 4 sec.
→ Reset



I944H1930008-01

Time	Ignition switch	Adjuster switch (1)
	OFF	PUSH
0	ON	
•		
•		
•		
4 sec.		
•		
•		
•		
•		Reset
•		
•		
10 sec.		

I944H1930009-02

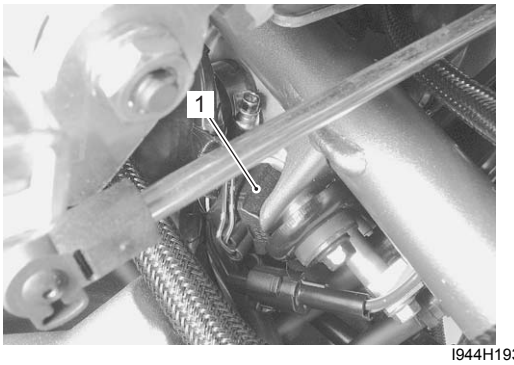
4) Pointer will return to the starting point right after the completion of the operation. In the case of the pointer not returning to the proper position after doing above, replace the combination meter unit. Refer to “Combination Meter Removal and Installation (Page 9C-2)”.
5) Turn the ignition switch OFF.

Engine Coolant Temperature Indicator Light Inspection

B944H19306005

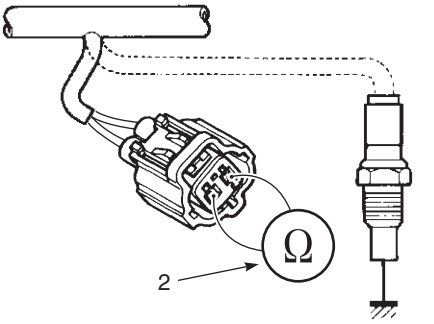
Refer to “Electrical Components Location in Section 0A (Page 0A-7)”.
Inspect the engine coolant temperature indicator light in the following procedures:

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Disconnect the ECT sensor coupler (1).



I944H1930010-01

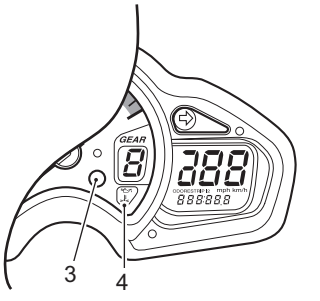
3) Connect the variable resistor (2) between the terminals.



I718H1930009-05

4) Turn the ignition switch ON.
5) Check the LED (3) and LCD (4) operations when the resistance is adjusted to the specified values.
If either one or all indications are abnormal, replace the combination meter with a new one. Refer to “Combination Meter Removal and Installation (Page 9C-2)”.

Resistance	LED (3)	LCD (4)	Water temperature
2.45 kΩ and over	OFF	–	19 °C (67 °F) and below
Approx. 0.811 kΩ	OFF	–	Approx. 50 °C (122 °F)
Approx. 0.11 kΩ	ON	ON	120 – 139 °C (248 – 282 °F)
0 Ω (Jumper wire)	ON	ON	140 °C (283 °F) and over



I944H1930011-01

6) Connect the ECT sensor coupler and install the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.

Engine Coolant Temperature Removal and Installation

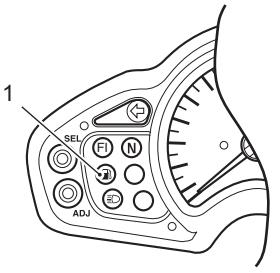
B944H19306006

Refer to “ECT Sensor Removal and Installation in Section 1C (Page 1C-3)”.

Fuel Level Indicator Light Inspection

B944H19306008

If the fuel level indicator light (1) does not function properly, check the fuel level gauge and its lead wire/coupler. Refer to “Fuel Level Gauge Inspection (Page 9C-5)”.
If the fuel level gauge and its lead wire/coupler are functioning properly, replace the combination meter with a new one. Refer to “Combination Meter Removal and Installation (Page 9C-2)”.



I944H1930012-01

Fuel Level Gauge Inspection

B944H19306009

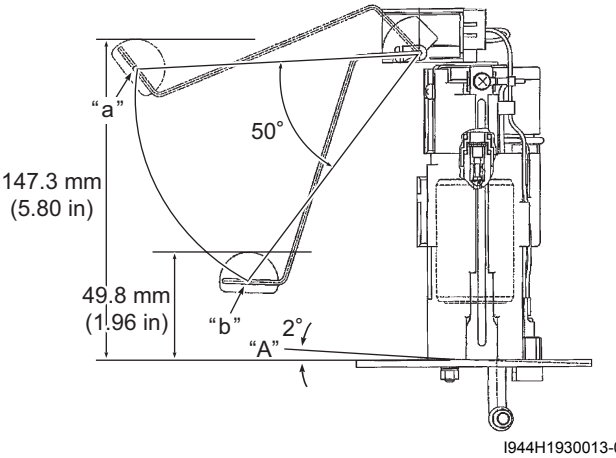
Inspect the fuel level gauge in the following procedures:

1) Remove the fuel pump assembly. Refer to “Fuel Pump Disassembly and Assembly in Section 1G (Page 1G-10)”.
2) Measure the resistance at each fuel level gauge 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”	10 – 20 Ω
Empty “b”	84 – 90 Ω



I944H1930013-01

“A”: Horizontal

3) Install the fuel pump assembly. Refer to “Fuel Pump Disassembly and Assembly in Section 1G (Page 1G-10)”.

Speedometer Inspection

B944H19306010

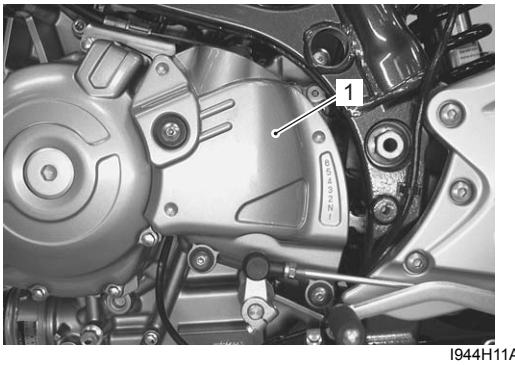
If the speedometer, odometer or tripmeter does not function properly, inspect the speed sensor and the coupler connections. If the speed sensor and coupler connections are OK, replace the combination meter unit with a new one. Refer to “Combination Meter Removal and Installation (Page 9C-2)”.

Speed Sensor Removal and Installation

B944H19306011

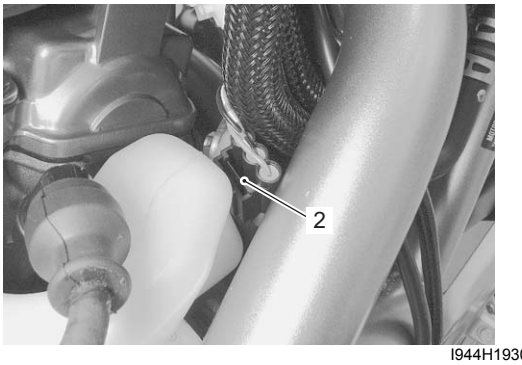
Removal

1) Lift and support the fuel tank. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-7)”.
2) Remove the engine sprocket cover (1). Refer to “Engine Sprocket Removal and Installation in Section 3A (Page 3A-2)”.



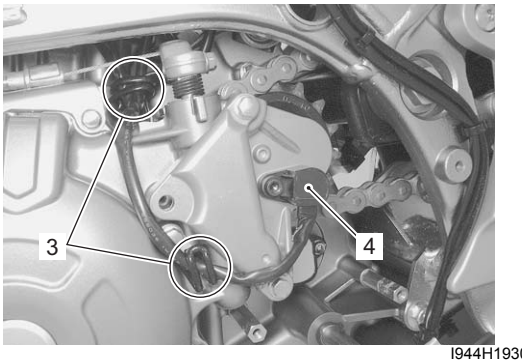
I944H11A0004-01

3) Disconnect the speed sensor coupler (2).



I944H1930015-01

4) Disconnect the speed sensor lead wire from the clamps (3).
5) Remove the speed sensor (4).

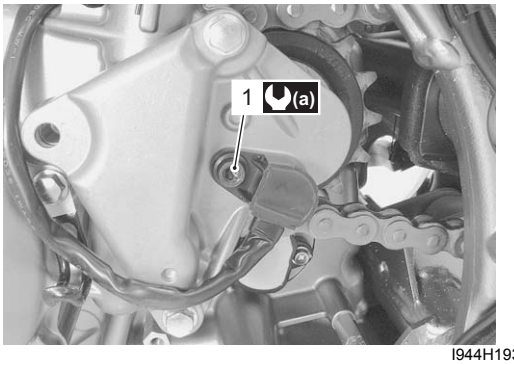


I944H1930016-02

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

- Tighten the speed sensor mounting bolt (1) to the specified torque.

  Tightening torque
  Speed sensor mounting bolt (a): 5 N·m (0.5 kgf-m, 3.5 lbf-ft)



I944H1930017-02

- Route the speed sensor lead wire. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-5)".

Speed Sensor Inspection

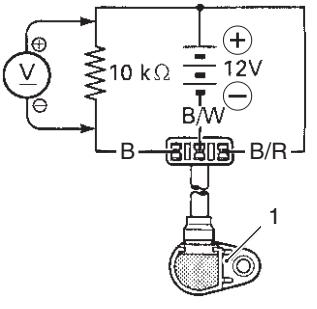
B944H19306012

Inspect the speed sensor in the following procedures:

1) Remove the speed sensor. Refer to "Speed Sensor Removal and Installation (Page 9C-5)".
2) Connect a 12 V battery (between B and B/W), 10 kΩ resistor (between B/R and B) and multi-circuit tester (tester (+) probe to B and tester (–) probe to B/R) as shown.

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

   Tester knob indication
   Voltage (⎓)



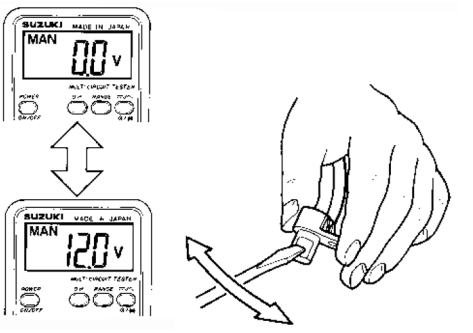
I717H1930018-01

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-5)".

Oil Pressure Indicator Inspection

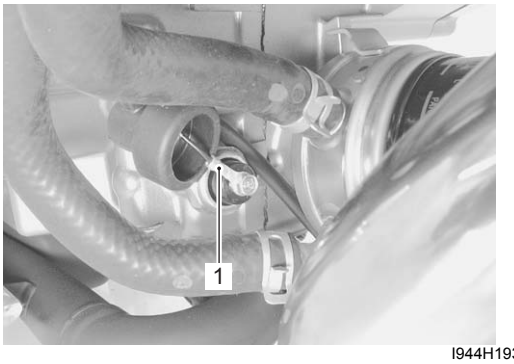
B944H19306024

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)".

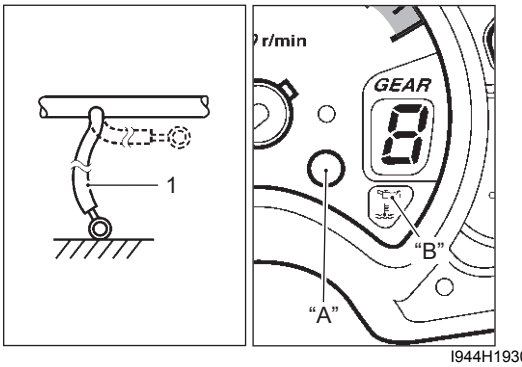
1) Remove the oil pressure switch lead wire (1) from the oil pressure switch.



I944H1930018-02

2) Turn the ignition switch to ON.

3) Check if the oil pressure indicator (LED) “A” and (LCD) “B” will light up when grounding the lead wire (1).
If the oil pressure indicator does not light up, replace the combination meter unit with a new one after checking connection of couplers.



I944H1930019-02

4) Install the oil pressure switch lead wire (1). Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-5)”.

Oil Pressure Switch Removal and Installation

B944H19306014

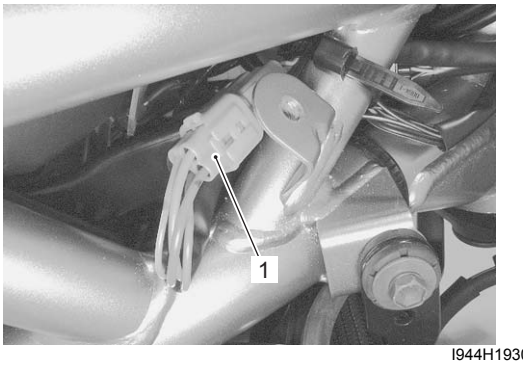
Refer to “Oil Pressure Switch Removal and Installation in Section 1E (Page 1E-8)”.

Ignition Switch Inspection

B944H19306015

Inspect the ignition switch in the following procedures:

1) Remove the right frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the ignition switch coupler (1).



I944H1930020-01

3) Inspect the ignition switch for continuity with a tester. If any abnormality is found, replace the ignition switch with a new one.

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

Tester knob indication
Continuity (•)))

Position \ Color	R	O	O/Y	Br
ON	○	○	○	○
OFF				
LOCK				
P	○			○

I944H1930021-02

4) After finishing the ignition switch inspection, reinstall the removed parts.

Ignition Switch Removal and Installation

B944H19306016

Refer to “Ignition Switch Removal and Installation in Section 1H (Page 1H-9)”.

Horn Inspection

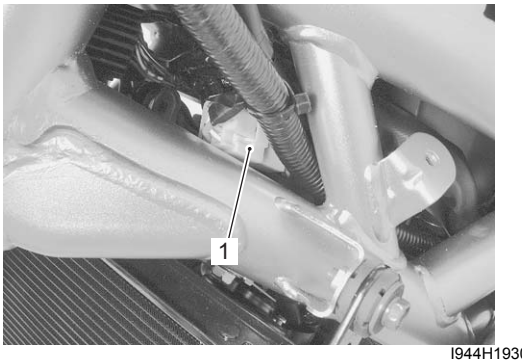
B944H19306017

NOTE

If the horn sound condition is normal, it is not necessary to inspect the horn button continuity.

Horn Button Inspection

1) Remove the left frame cover body. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the left handlebar switch coupler (1).



I944H1930022-01

3) Inspect the horn button for continuity with a tester. If any abnormality is found, replace the left handlebar switch assembly with a new one. Refer to “Handlebars Removal and Installation in Section 6B (Page 6B-3)”.

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

Tester knob indication
Continuity (•)))

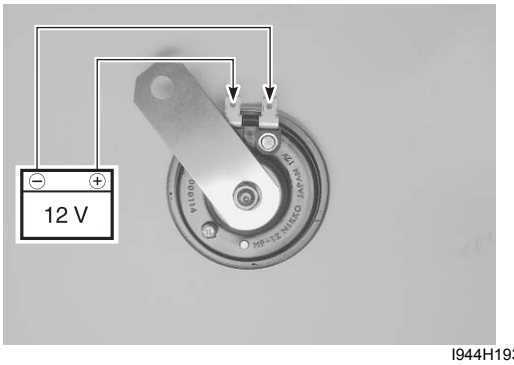
Color / Position	B/BI	B/W
•		
PUSH	○	○

I718H1930028-03

4) After finishing the horn button inspection, reinstall the removed parts.

Horn Inspection

1) Remove the horn. Refer to “Horn Removal and Installation (Page 9C-8)”.
2) Connect a 12 V battery to terminal “A” and terminal “B”. If the sound is not heard from the horn, replace the horn with a new one.



I944H1930023-01

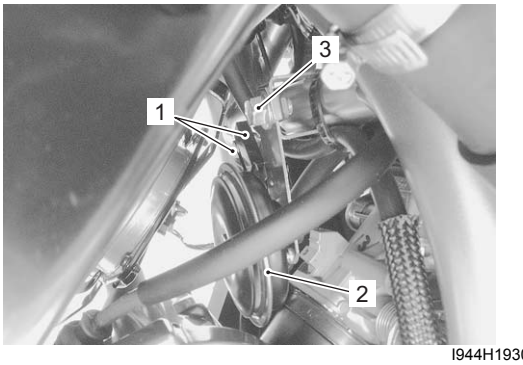
3) Install the horn.

Horn Removal and Installation

B944H19306026

Removal

1) Remove the left frame body cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
2) Disconnect the horn couplers (1).
3) Remove the horn (2) by removing the mounting bolt (3).



I944H1930024-01

Installation

Install the horn in the reverse order of removal.

Specifications

Service Data

B944H19307001

Wattage

Unit: W

Item		Specification	
		E-03, 28, 33	E-02, 19, 24
Headlight	HI	60	←
	LO	55	←
Position/Parking light		5	←
Brake light/Taillight		21/5	←
Turn signal light		21 x 4	10 x 4
License plate light		5	←
Speedometer light		LCD	←
Tachometer light		LED	←
Turn signal indicator light		LED	←
High beam indicator light		LED	←
Neutral position indicator light		LED	←
Oil pressure/Engine coolant temperature indicator light		LED	←
FI indicator light		LED	←
Fuel indicator light		LED	←

Tightening Torque Specifications

B944H19307002

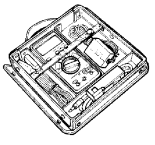
Fastening part	Tightening torque			Note
	N·m	kgf-m	lbf-ft	
Speed sensor mounting bolt	5	0.5	3.5	☞(Page 9C-6)

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

Special Tools and Equipment

Special Tool

B944H19308001

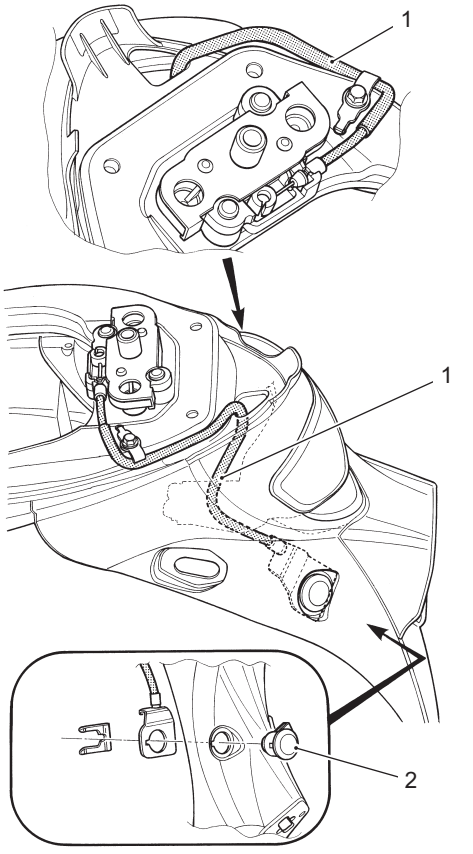
09900–25008 Multi circuit tester set ☞(Page 9C-5) / ☞(Page 9C-6) / ☞(Page 9C-7) / ☞(Page 9C-8)		

Exterior Parts

Schematic and Routing Diagram

Seat Lock Cable Routing Diagram

B944H19402001



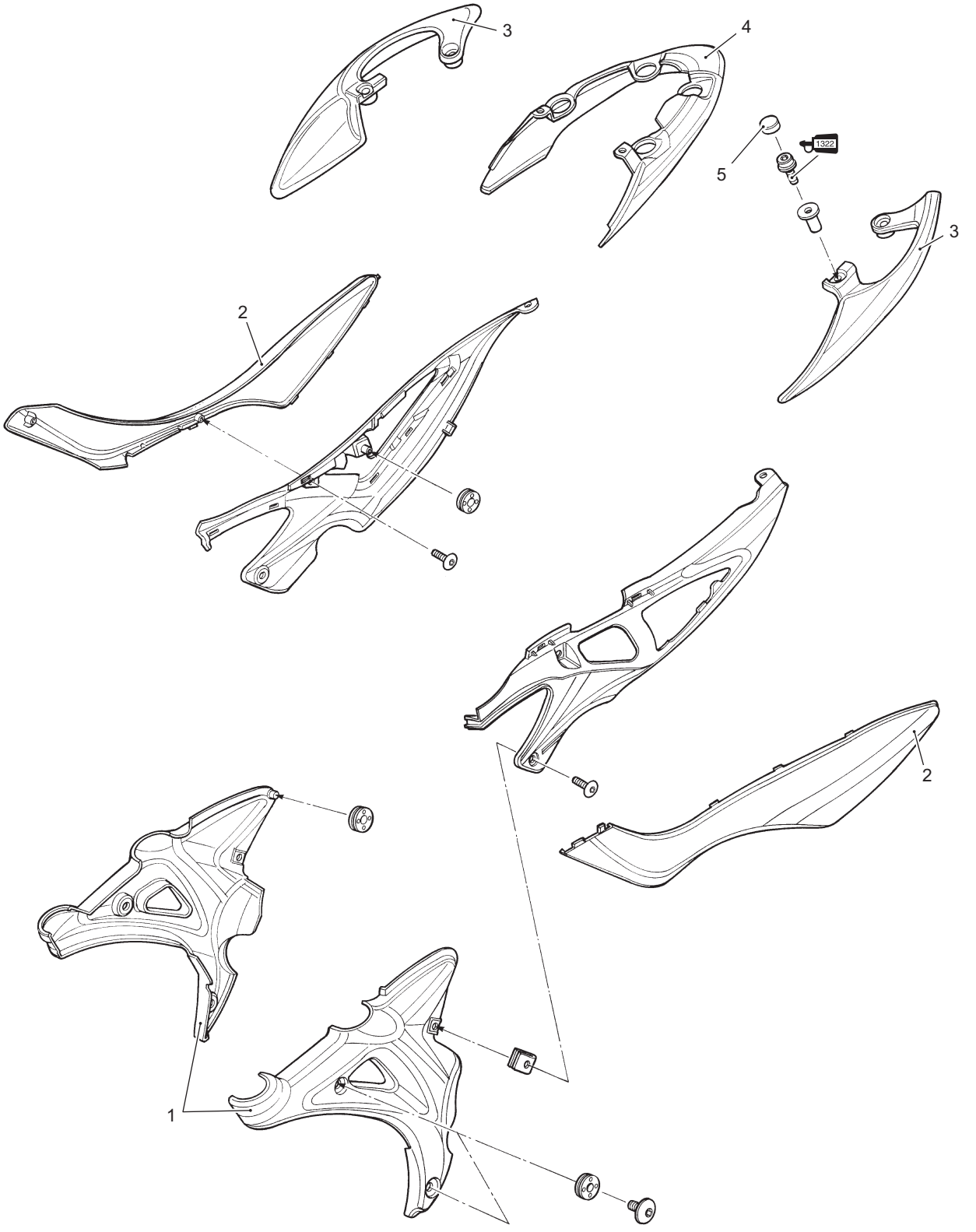
I944H1940021-01

1. Seat lock cable	2. Seat lock

Repair Instructions

Frame Cover Construction

B944H19406001

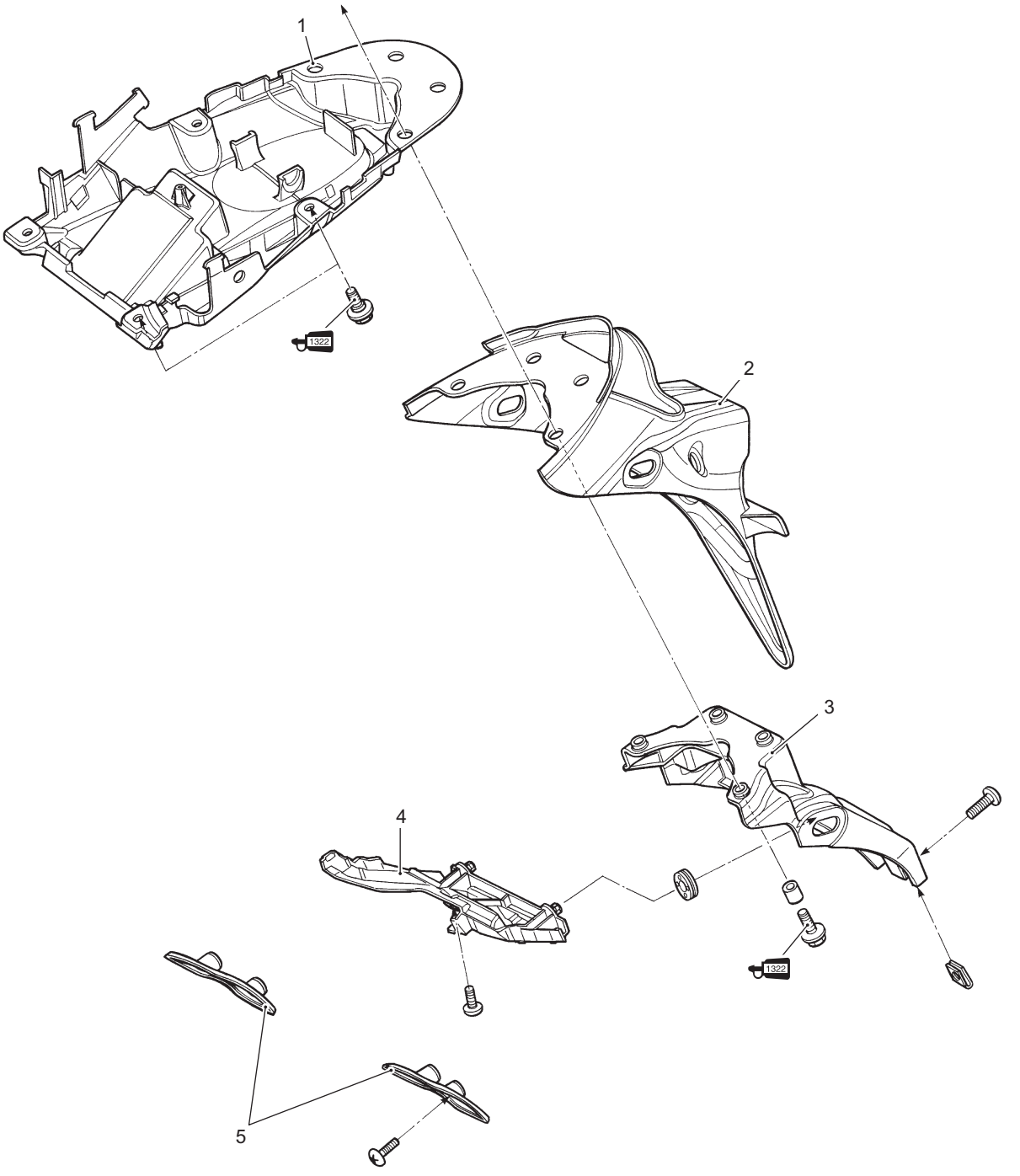


I944H1940001-03

1. Frame lower cover	4. Rear frame cover
2. Frame cover	5. Cap
3. Pillion rider handle	1322 : Apply thread lock to thread part.

Rear Fender Construction

B944H19406003



I944H1940003-02

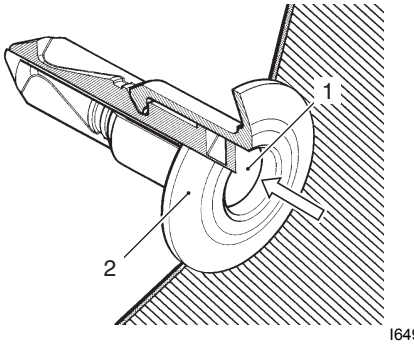
1. Rear front fender	4. Rear fender cover
2. Rear fender	5. Rear fender guard (For E-24)
3. Rear fender bracket	1322 : Apply thread lock to the thread part.

Fastener Removal and Installation

B944H19406006

Removal

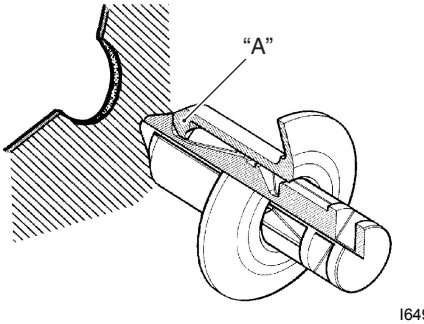
1) Depress the head of fastener center piece (1).
2) Pull out the fastener (2).



I649G1940005-02

Installation

1) Let the center piece stick out toward the head so that the pawls “A” close.



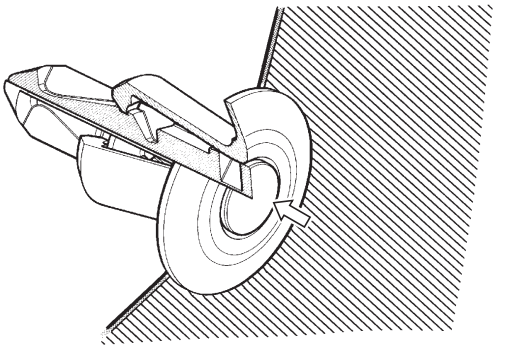
I649G1940006-02

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

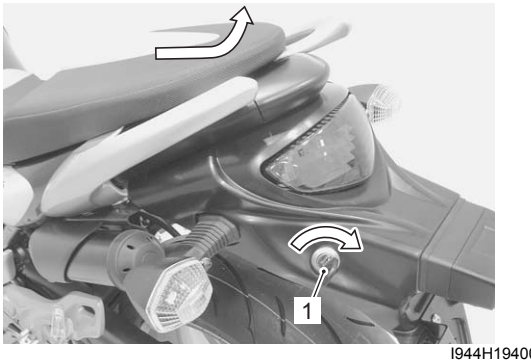
Exterior Parts Removal and Installation

B944H19406007

Seat

Removal

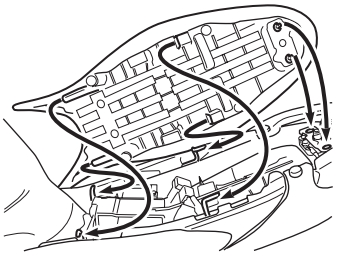
1) Unlock the seat with the ignition key (1).
2) Remove the seat.



I944H1940004-01

Installation

Slide the seat hooks into the seat hook retainers and push down firmly until the seat snaps into the locked position.

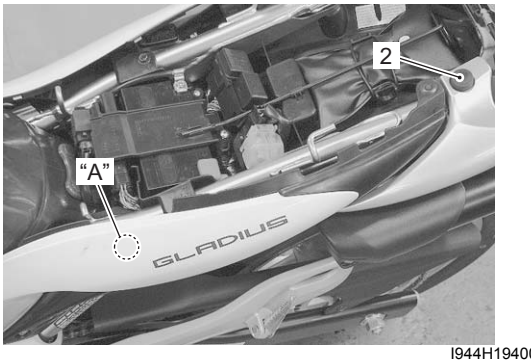


I944H1940020-01

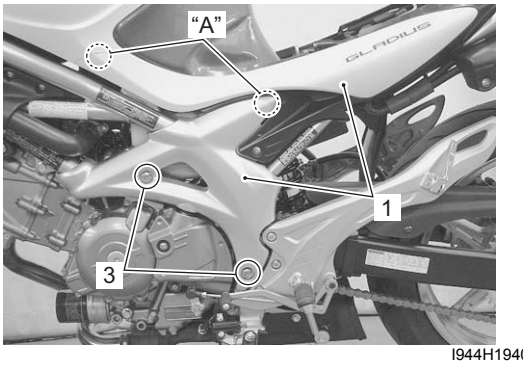
Frame Cover

Removal

1) Remove the seat.
2) Remove the frame cover(-s) assembly (1), left and right by removing the fastener (2) and bolts (3).



I944H1940005-02



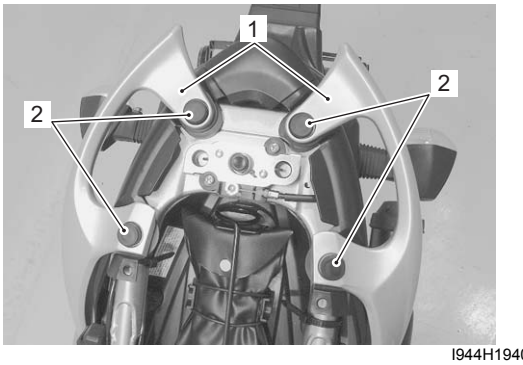
I944H1940006-03

"A": Hooked point

Installation
Install the frame covers in the reverse order of removal.

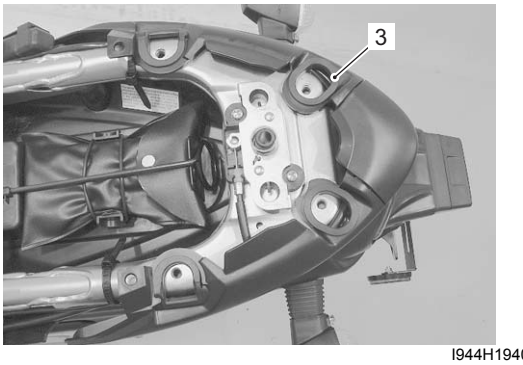
Pillion Rider Handle and Rear Fender
Removal

1) Remove the seat.
2) Remove the frame cover(-s), left and right.
3) Remove the pillion rider handles (1) by removing the caps and bolts (2).



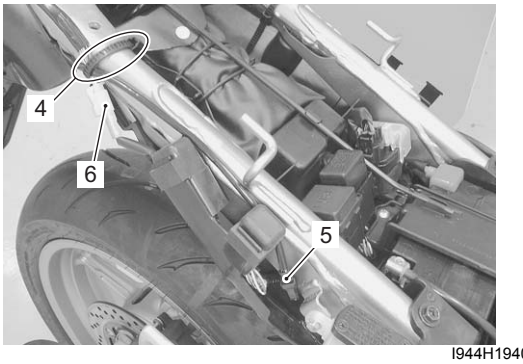
I944H1940007-02

4) Remove the rear frame cover (3).

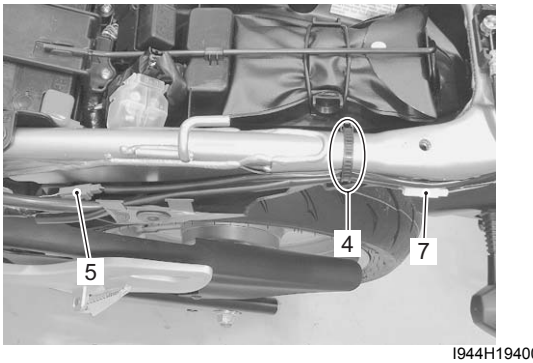


I944H1940009-03

5) Disconnect the clamps (4).
6) Disconnect the rear turn signal light lead wire couplers (5), rear combination lead wire coupler (6) and license plate light lead wire coupler (7).

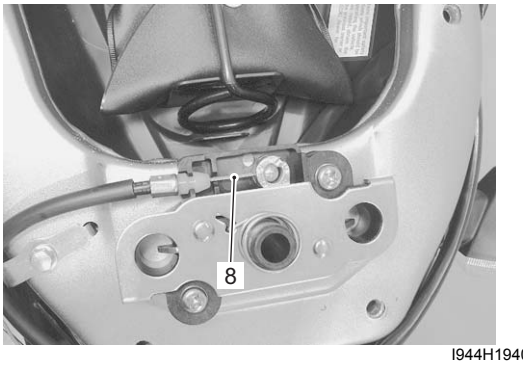


I944H1940010-03



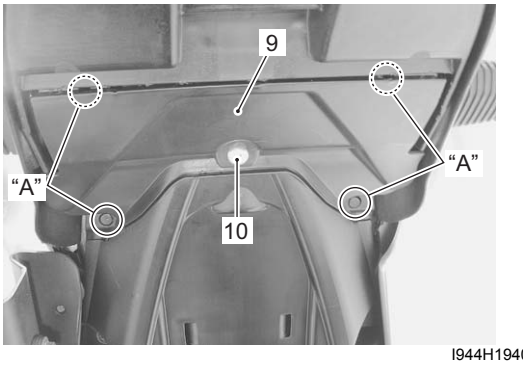
I944H1940011-03

7) Disconnect the seat lock cable (8).



I944H1940012-03

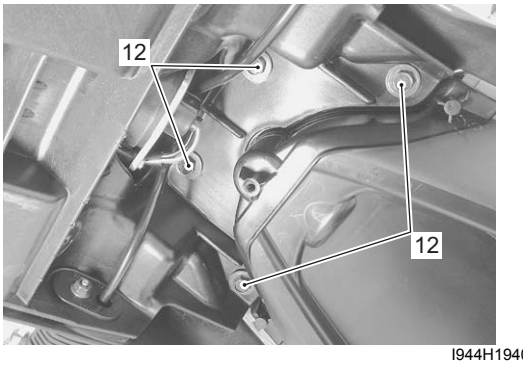
8) Remove the rear fender cover (9) by removing the screw (10).



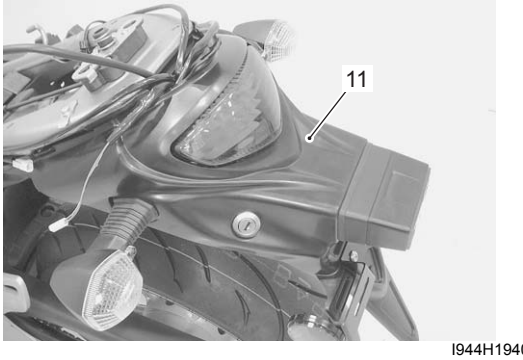
I944H1940013-04

"A": Hooked point

9) Remove the rear fender assembly (11) by removing the bolts (12).



I944H1940014-03



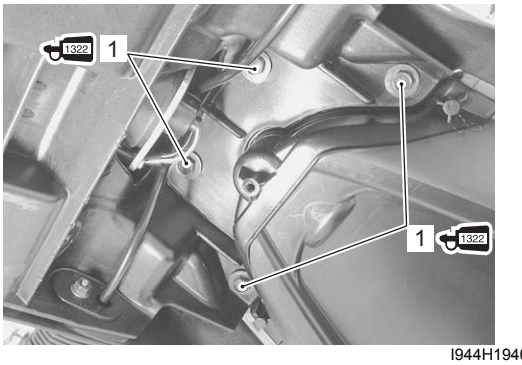
I944H1940015-03

Installation

Install the pillion rider handle and rear fender in the reverse order of removal. Pay attention to the following point:

- Apply thread lock to the rear fender mounting bolts (1).

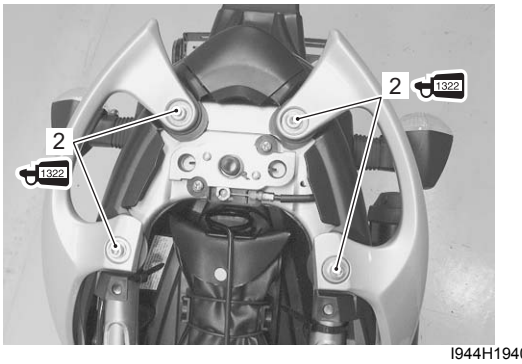
1322 : Thread lock cement 99000–32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)



I944H1940016-01

- Rout the wiring harness. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-5)".
- Apply thread lock to the pillion rider handle mounting bolts (2).

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

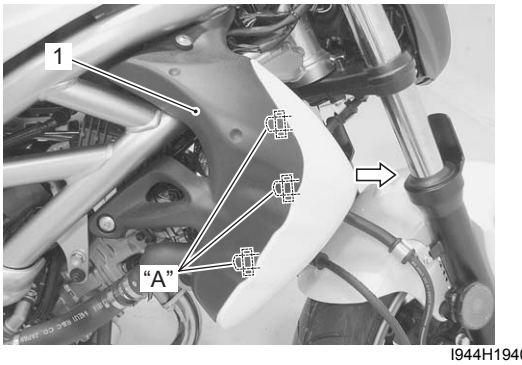


I944H1940017-01

Frame Body Cover

Removal

Remove the frame body cover(-s), (1) left and right.



I944H1940019-01

"A": Guide

Installation

Install the frame body cover(-s) in the reverse order of removal.

Special Tools and Equipment

Recommended Service Material

B944H19408001

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

NOTE

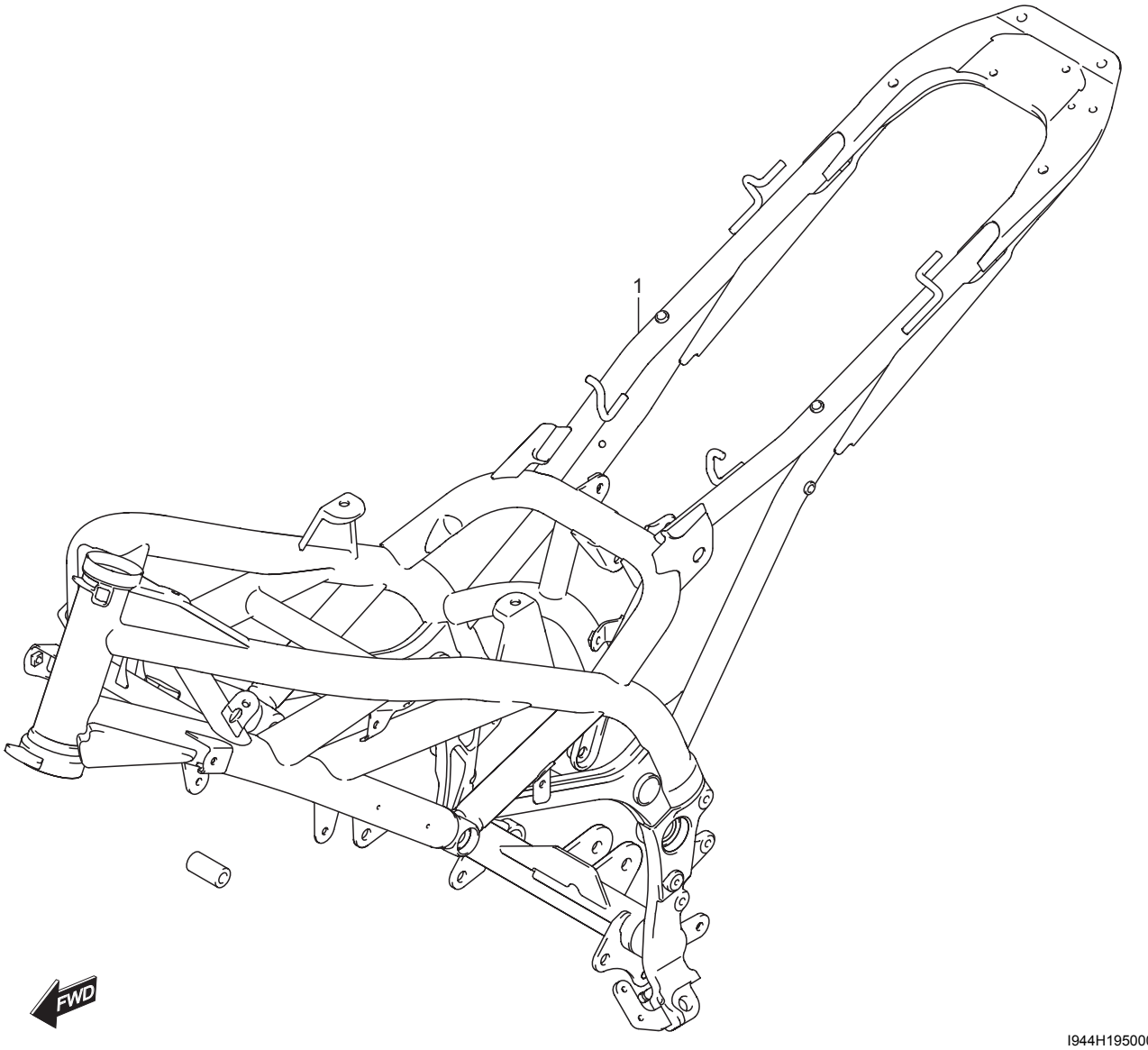
Required service material is also described in the following.
“Frame Cover Construction (Page 9D-2)”
“Rear Fender Construction (Page 9D-3)”

Body Structure

Repair Instructions

Body Frame Construction

B944H19506001

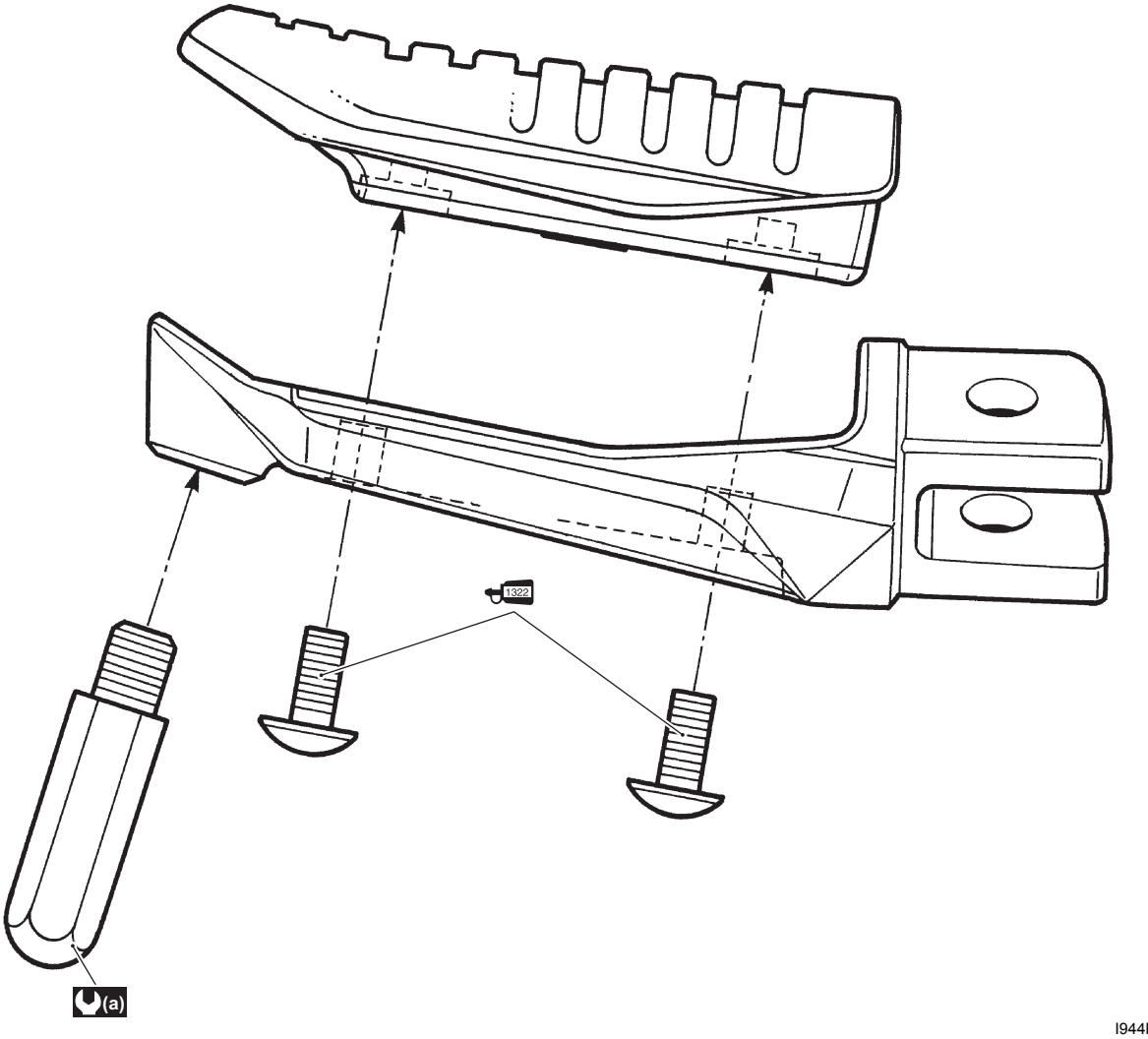


I944H1950003-01

1. Frame

Front Footrest Construction

B944H19506004

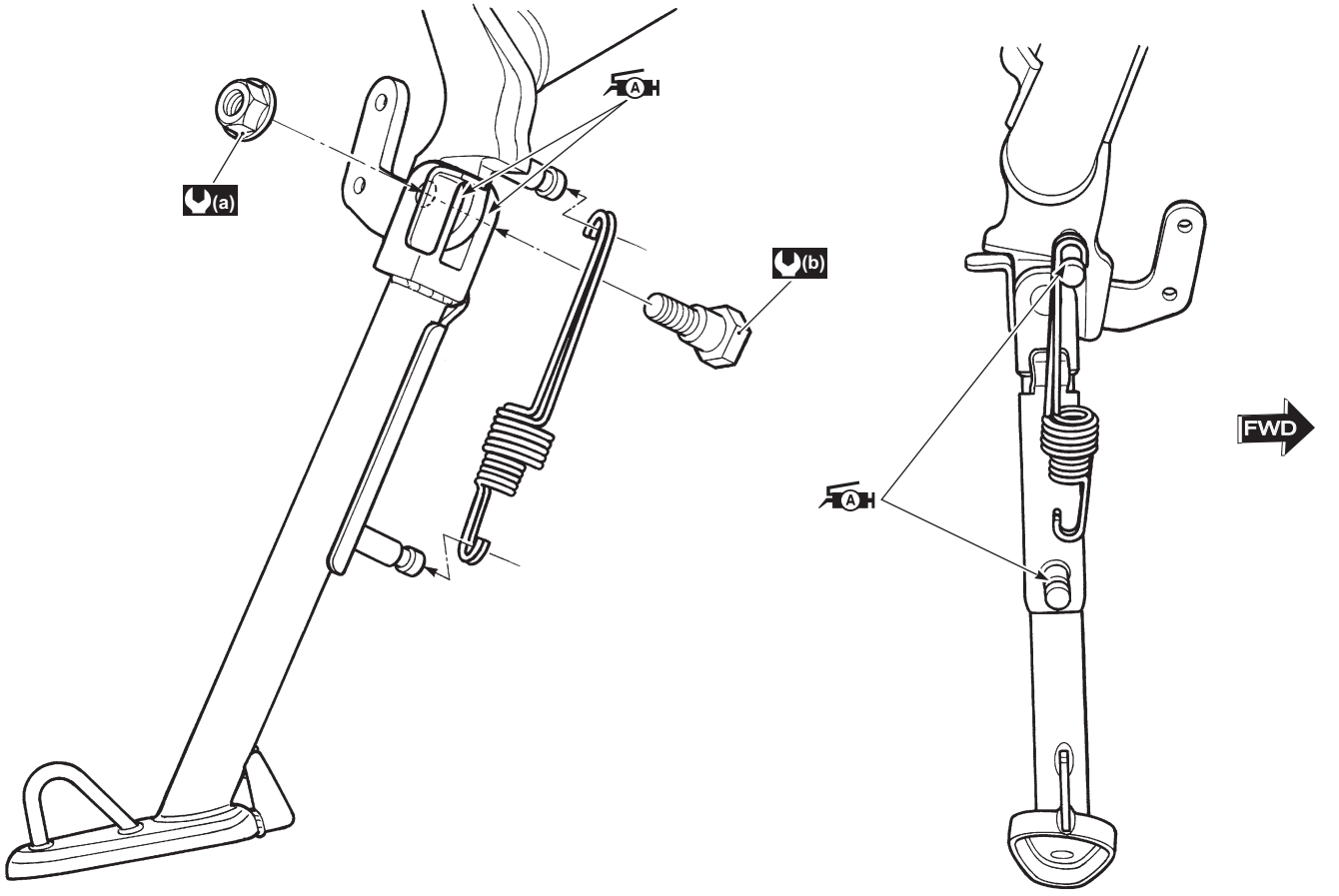


I944H1950001-01

(a) : 18 N·m (1.8 kgf-m, 13.0 lbf-ft)	1322 : Apply thread lock to thread part.

Side-stand Construction

B944H19506005



I944H1950002-01

(a) : 40 N·m (4.0 kgf-m, 29.0 lbf-ft)	A : Apply grease to sliding surface.
(b) : 10 N·m (1.0 kgf-m, 7.0 lbf-ft)	

Specifications

Tightening Torque Specifications

B944H19507001

NOTE

The specified tightening torque is described in the following.
“Front Footrest Construction (Page 9E-2)”
“Side-stand Construction (Page 9E-3)”

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

Special Tools and Equipment

Recommended Service Material

B944H19508001

NOTE

Required service material is also described in the following.
“Front Footrest Construction (Page 9E-2)”
“Side-stand Construction (Page 9E-3)”

Prepared by
SUZUKI MOTOR CORPORATION

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