

FOREWORD

This manual contains an introductory description on the SUZUKI LT-Z400 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 vehicle 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 vehicle 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 vehicle.*

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

** This manual is written for persons who have enough knowledge, skills and tools, including special tools, for servicing SUZUKI vehicles. 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 vehicle unsafe for the rider.

SUZUKI MOTOR CORPORATION

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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 vehicle 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 vehicle. 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 vehicle.
- 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 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 vehicle and parts.

Precautions for Electrical Circuit Service

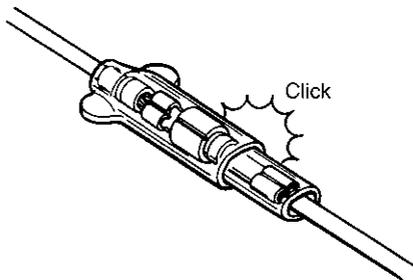
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When handling the electrical parts or servicing the FI systems, observe the following points for the safety of the systems.

Electrical parts

Connector / Coupler

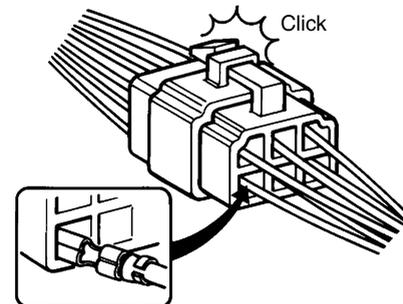
- Faulty FI system is often related to poor electrical contact of connector/coupler. Before servicing individual electronic part, check electrical contact of the connector/coupler.
- When connecting a connector, be sure to push it in until a click is felt.



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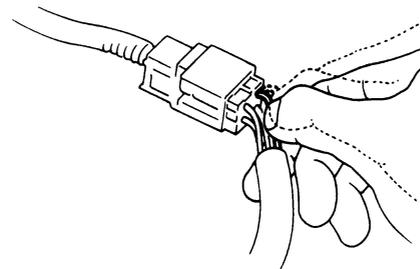
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- Push in the coupler straightly. An angled or skewed insertion may cause the terminal to be deformed, possibly resulting in poor electrical contact.
- Inspect each terminal for corrosion and contamination. The terminals must be clean and free of any foreign material which could impede proper terminal contact.

- Before refitting the sealed coupler, make sure its seal rubber is positioned properly. The seal rubber may possibly come off the position during disconnecting work and if the coupler is refitted with the seal rubber improperly positioned, it may result in poor water sealing.



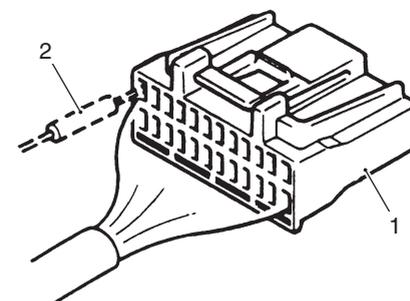
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- Inspect each lead wire circuit for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



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

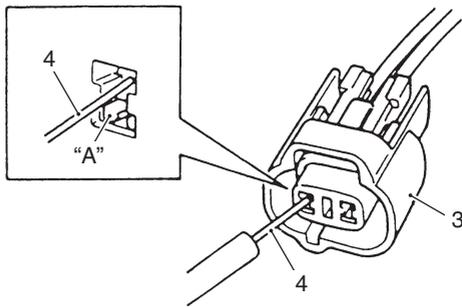


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1. Coupler	2. Probe
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00-3 Precautions:

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



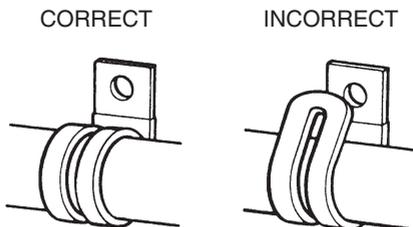
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3. Coupler	4. Probe	"A": Where male terminal fits
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- Avoid applying grease or other similar material to connector/coupler terminals to prevent electric trouble.

Clamp

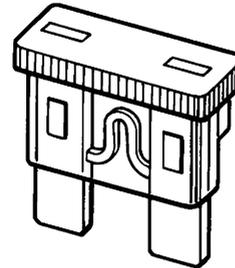
- Clamp the wire harness at such positions as indicated in "Wiring Harness Routing Diagram in Section 9A (Page 9A-3)".
- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute for the band type clamp.



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Fuse

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



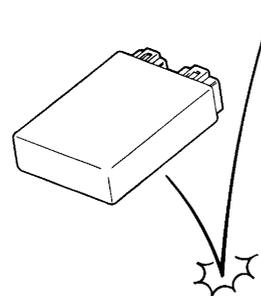
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Switch

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

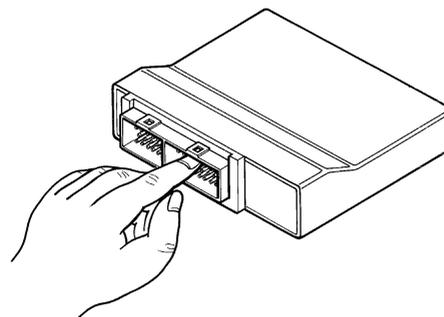
ECM / Various sensors

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



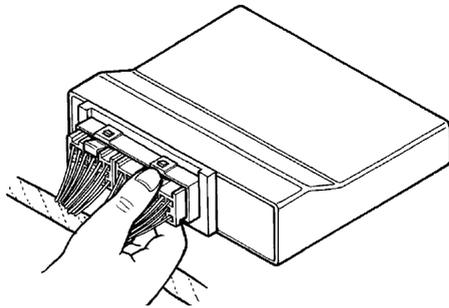
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- Be careful not to touch the electrical terminals of the electronic parts (ECM, etc.). The static electricity from your body may damage them.



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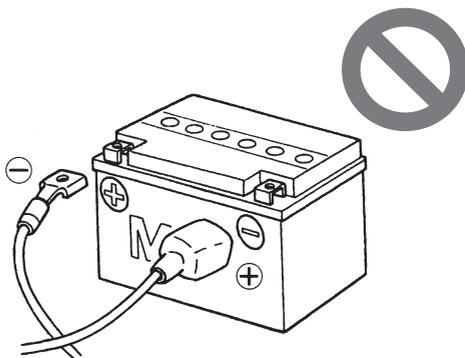
- When disconnecting and connecting the coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



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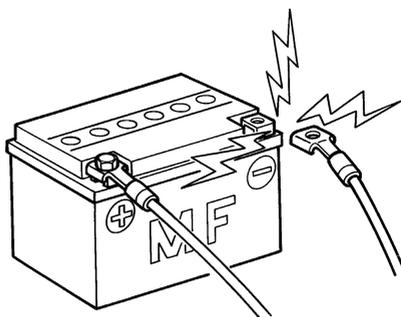
Battery

- 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.



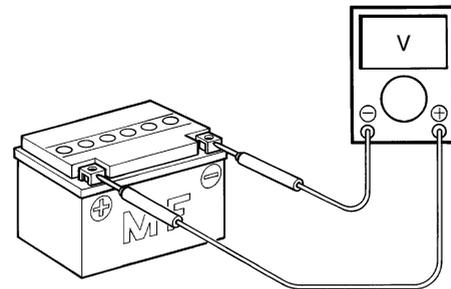
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- Removing any battery terminal of a running engine is strictly prohibited. The moment such removal is made, damaging counter electromotive force will be applied to the electronic unit which may result in serious damage.



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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

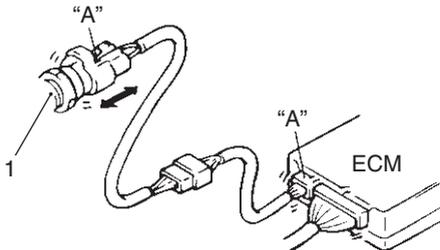
Possible causes for the open circuit are as follows. As the cause can exist in the connector/coupler or terminal, they need to be checked carefully.

- 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.

00-5 Precautions:

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

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



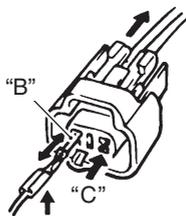
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1. Sensor	"A": Check for loose connection
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- 3) Using a test male terminal, check the female terminals of the circuit being checked for contact tension.

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.

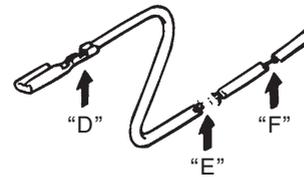
If contact tension is not enough, rectify the contact to increase tension or replace. The terminals must be clean and free of any foreign material which could impede proper terminal contact.



I649G1000027-02

"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.



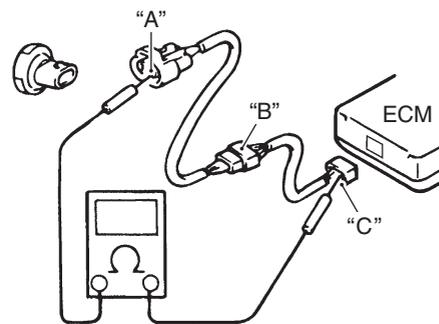
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"D": Looseness of crimping
"E": Open
"F": Thin wire (A few strands left)

Continuity check

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

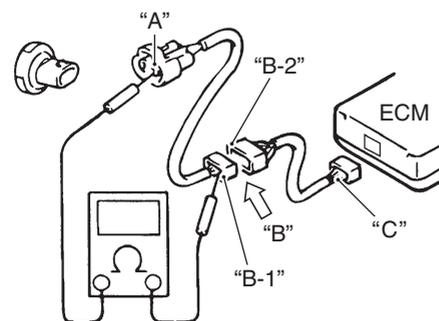
If no continuity is indicated (infinity or over limit), the circuit is open between terminals "A" and "C".



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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 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

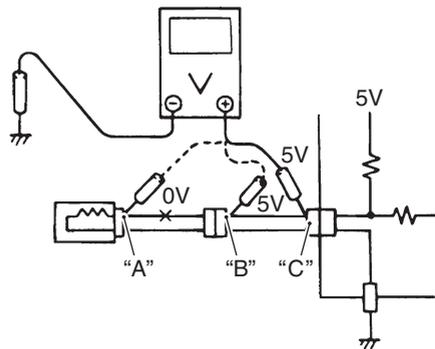
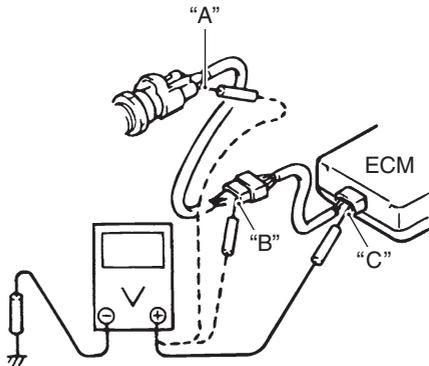
- 3) Also, if measured values are as listed following, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals "A" and "B".

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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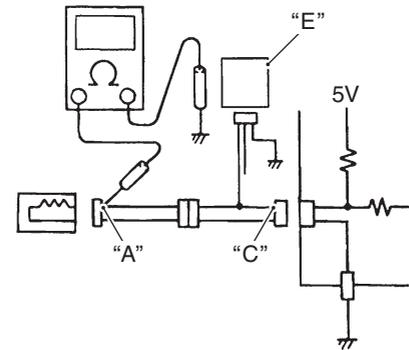
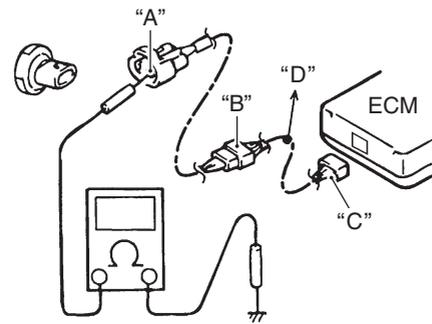
Short circuit check (Wire harness to ground)

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

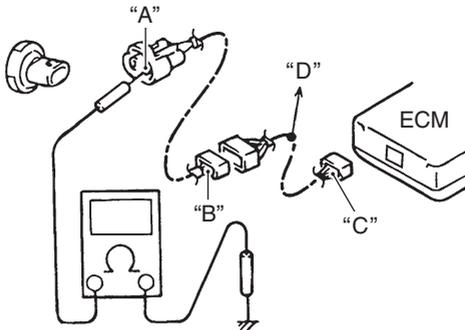


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"D": To other parts	"E": Other parts
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00-7 Precautions:

- 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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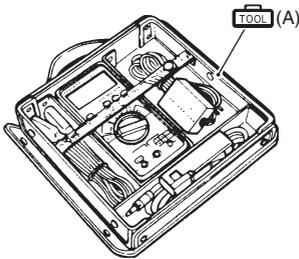
"D": To other parts

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)



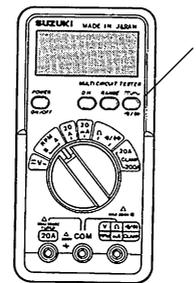
I649G1000024-03

Using the testers

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

Special tool

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



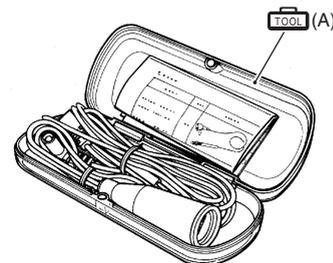
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NOTE

- 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.

Special tool

TOOL (A): 09900-25009 (Needle pointed probe set)



I649G1000025-03

Section 0

General Information

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General Information

General Description

Symbols

B933H20101001

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

Symbol	Definition
	Torque control required. Data beside it indicate specified torque.
	Apply oil. Use engine oil unless otherwise specified.
	Apply molybdenum oil solution. (Mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1 : 1)
	Apply SUZUKI SUPER GREASE "A" or equivalent. 99000-25010
	Apply SUZUKI MOLY PASTE or equivalent. 99000-25140
	Apply WATER RESISTANCE GREASE or equivalent. 99000-25160
	Apply SUZUKI SILICONE GREASE or equivalent. 99000-25100
	Apply SUZUKI BOND "1215" or equivalent. 99000-31110
	Apply SUZUKI BOND "1207B" or equivalent. 99000-31140
	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
	Apply or use brake fluid.
	Use special tool.
	Do not reuse.
	Note on reassembly.

Abbreviations

B933H20101002

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
I:
IAP Sensor: Intake Air Pressure Sensor (IAPS)
IAT Sensor: Intake Air Temperature Sensor (IATS)
IG: Ignition
IAS: Idle Air Screw
J:
JASO: Japanese Automobile Standards Organization
L:
LH: Left Hand
M:
MAL-CODE: Malfunction Code (Diagnostic Code)
Max: Maximum
MIL: Malfunction Indicator Lamp
Min: Minimum
N:
NOx: Nitrogen Oxides

O:
OHC: Over Head Camshaft
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
T:
TO Sensor: Tip-over Sensor (TOS)
TP Sensor: Throttle Position Sensor (TPS)

SAE-to-Former SUZUKI Term

B933H20101003

This list shows SAE (Society of Automotive Engineers) J1930 terms and abbreviations which may be used in this manual in compliance with SAE recommendations, as well as their former SUZUKI names.

Ex. SAE term (Abbreviation): Former SUZUKI term

A:
Air Cleaner (ACL): Air Cleaner, Air Cleaner Box
B:
Battery Positive Voltage (B+): Battery Voltage, +B
C:
Crankshaft Position Sensor (CKP Sensor): Crankshaft Position Sensor (CKPS), Crank Angle
D:
Data Link Connector (DLC): Dealer Mode Coupler
Diagnostic Test Mode (DTM): —
Diagnostic Trouble Code (DTC): Diagnostic Code, Malfunction Code
E:
Electronic Ignition (EI): —
Engine Control Module (ECM): Engine Control Module (ECM), FI Control Unit, Engine Control Unit (ECU)
Engine Coolant Level (ECL): Coolant Level
Engine Coolant Temperature (ECT): Coolant Temperature, Engine Coolant Temperature, Water Temperature
Engine Speed (RPM): Engine Speed (RPM)
F:
Fan Control (FC): —
Fuel Level Sensor: Fuel Level Sensor, Fuel Level Gauge
Fuel Pump (FP): Fuel Pump (FP)
G:
Generator (GEN): Generator
Ground (GND): Ground (GND, GRD)
I:
Ignition Control (IC): Electronic Spark Advance (ESA)
Ignition Control Module (ICM): —
Intake Air Temperature (IAT): Intake Air Temperature (IAT), Air Temperature
M:
Malfunction Indicator Lamp (MIL): Malfunction Indicator Lamp (MIL)

0A-3 General Information:

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

O:

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

P:

Programmable Read Only Memory (PROM): —

R:

Random Access Memory (RAM): —

Read Only Memory (ROM): ROM

T:

Throttle Body (TB): Throttle Body (TB)

Throttle Body Fuel Injection (TBI): Throttle Body Fuel Injection (TBI)

Throttle Position Sensor (TP Sensor): TP Sensor (TPS)

V:

Voltage Regulator (VR): Voltage Regulator

Vehicle Side View

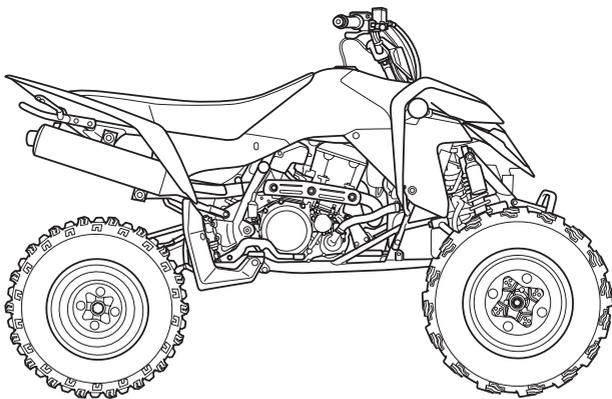
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NOTE

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

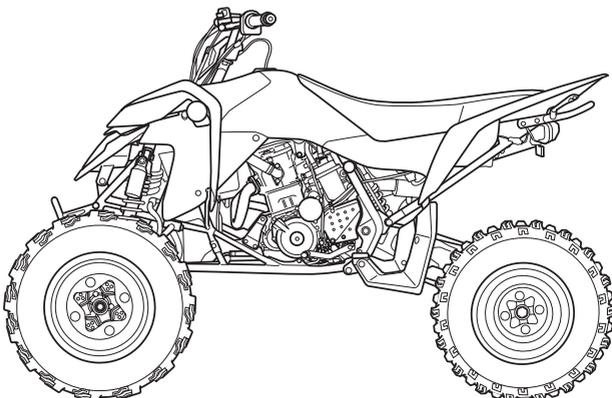
SUZUKI LT-Z400 (2009-model)

Right side



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Left side

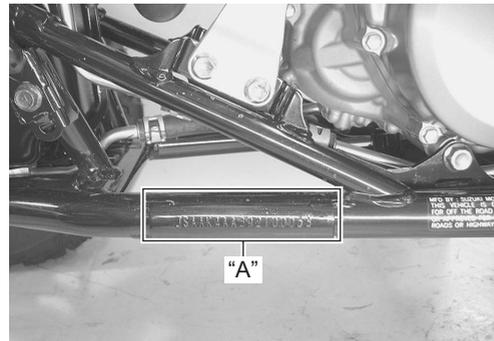


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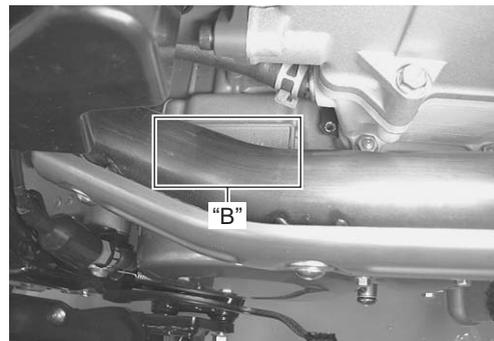
Vehicle Identification Number

B933H20101005

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



I933H1010003-07



I933H1010004-01

Fuel and Oil Recommendation

B933H20101006

Fuel (for USA and Canada)

Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) method 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.

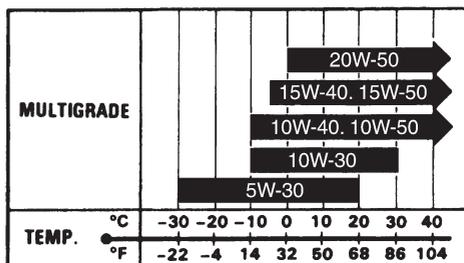
Suzuki recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL or an equivalent engine oil. Use of SF/SG or SH/SJ in API with MA in JASO.

Suzuki recommends the use of SAE 10W-40 engine oil. If SAE 10W-40 engine oil is not available, select an 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.



I831G1010008-01

Brake fluid

Specification and classification: DOT 4

⚠ WARNING

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

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

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

Engine Coolant Recommendation

B933H20101007

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)**

1 150 ml (1.2/1.0 US/Imp qt)

For engine coolant mixture information, refer to "Engine Coolant Description in Section 1F (Page 1F-2)".

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

BREAK-IN Procedures

B933H20101008

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 10 hours: Less than 1/2 throttle

2) After the engine has been operated for 10 hours the engine to full throttle operation, for short periods of time.

0A-5 General Information:**Country and Area Codes**

B933H20101009

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

Code	Country or area	Effective frame No.
LT-Z400K9 (E-19)	E.U.	JSAAK4AA92 100001-
LT-Z400K9 (E-28)	Canada	
LT-Z400K9 (E-33)	U.S.A.	

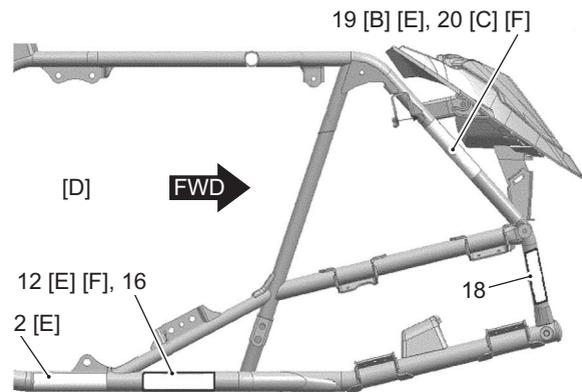
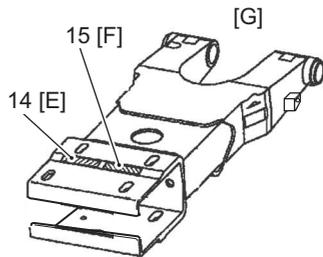
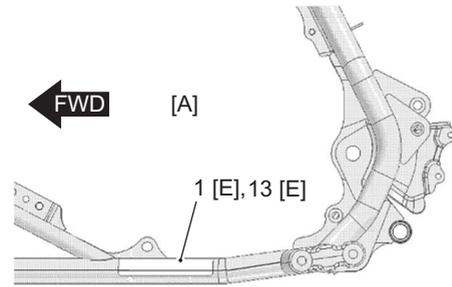
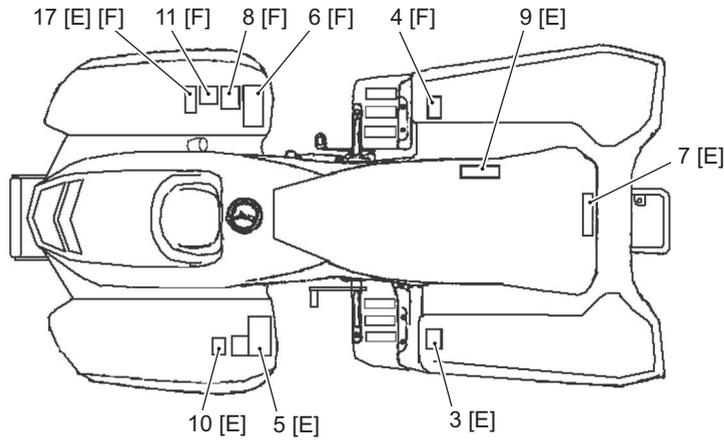
Wire Color Symbols

B933H20101010

Symbol	Wire color	Symbol	Wire color
B	Black	B/Y	Black with Yellow tracer
Bl	Blue	Bl/B	Blue with Black tracer
Br	Brown	Bl/R	Blue with Red tracer
Dg	Dark green	Br/W	Brown with White tracer
G	Green	G/B	Green with Black tracer
Gr	Gray	G/W	Green with White tracer
O	Orange	G/R	Green with Red tracer
P	Pink	Gr/W	Gray with White tracer
R	Red	O/G	Orange with Green tracer
W	White	O/W	Orange with White tracer
Y	Yellow	O/Y	Orange with Yellow tracer
B/Bl	Black with Blue tracer	O/B	Orange with Black tracer
B/Br	Black with Brown tracer	R/Y	Red with Yellow tracer
B/O	Black with Orange tracer	W/B	White with Black tracer
B/R	Black with Red tracer	W/R	White with Red tracer
B/W	Black with White tracer	Y/B	Yellow with Black tracer

Warning, Caution and Information Labels Location

B933H20101011



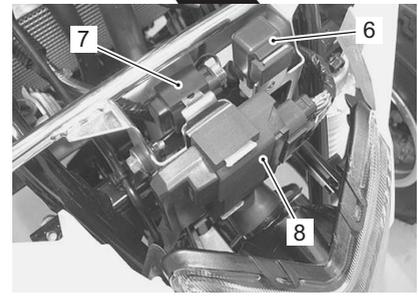
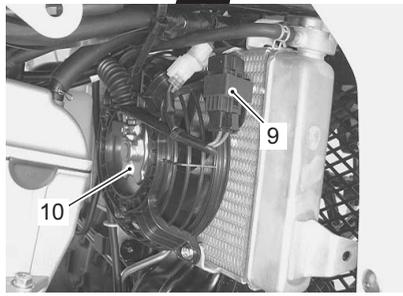
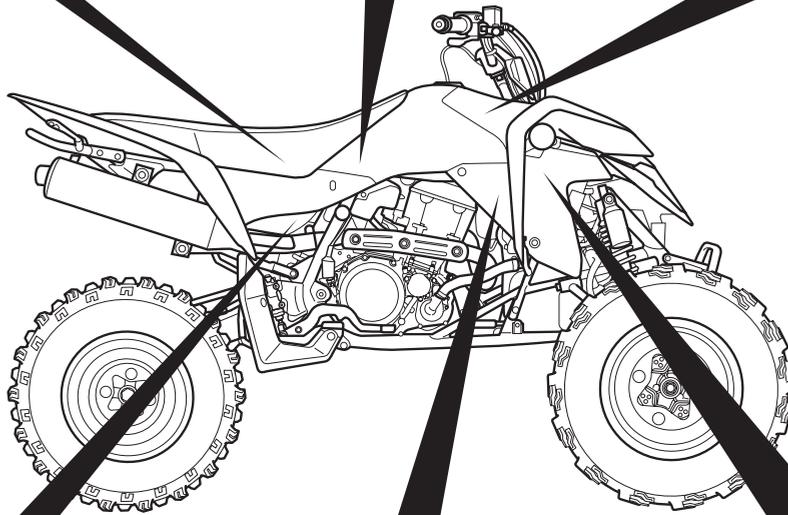
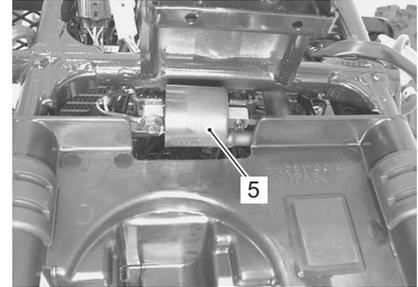
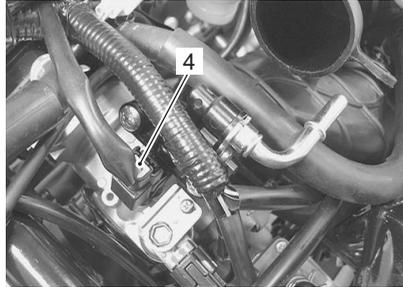
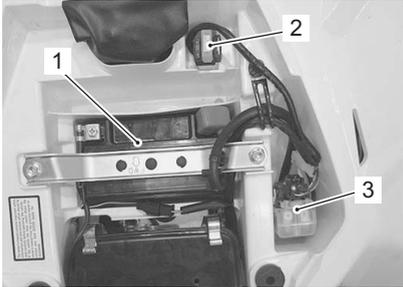
I933H1010007-06

1. Certification plate	For E-19, 33
2. Information label [EPA & CARB]	For E-33
3. Tire air pressure label	For E-19, 28, 33
4. Tire air pressure label and warning no-passenger label	For E-28
5. General warning & AGE, 16 label	For E-19, 28, 33
6. General warning label	For E-28
7. Warning no-passenger label	For E-19, 28, 33
8. AGE, 16 label	For E-28
9. Manual notice label	For E-33
10. Gearshift label	For E-19, 28, 33
11. Gearshift label	For E-28
12. ICES Canada label	For E-28
13. Compliance label	For E-28
14. Chain adjustment label	For E-19, 28, 33
15. Chain adjustment label	For E-28
16. EC approval mark	For E-19
17. Compliance label	For E-28
18. ANSI certification label	For E-33
19. Information label [EPA]	For E-28
20. Information label [EPA]	For E-28
[A]: Left side of frame	
[B]: Right side of pipe	
[C]: Left side of pipe	
[D]: Right side of frame	
[E]: English	
[F]: French	
[G]: Swingarm	

Component Location

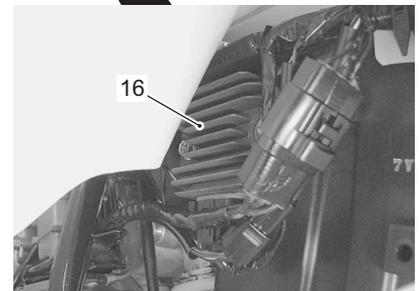
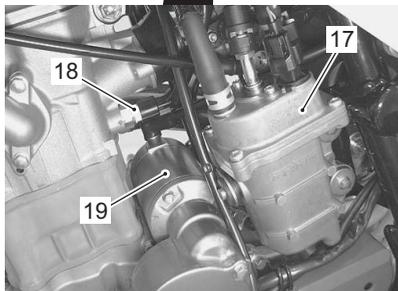
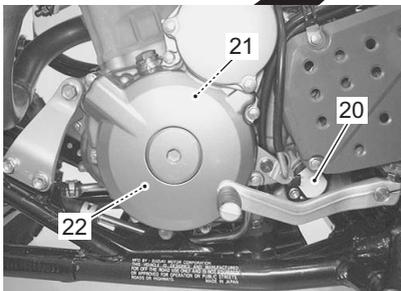
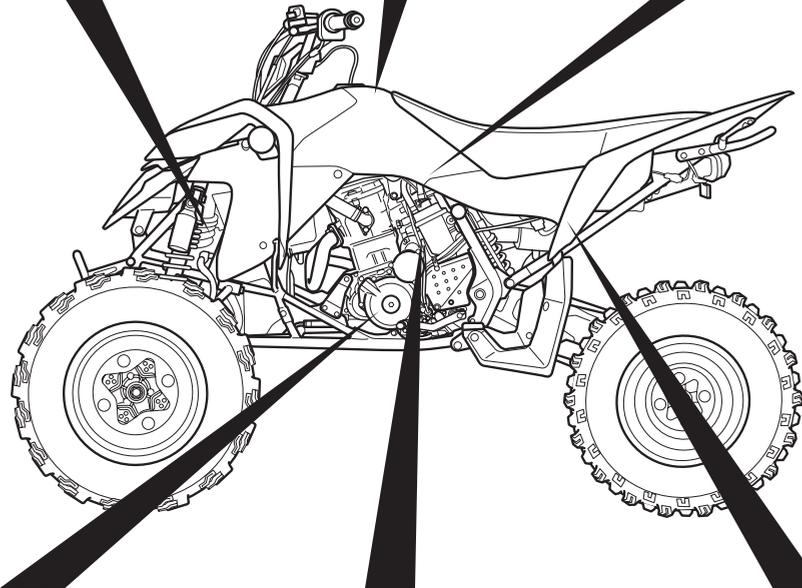
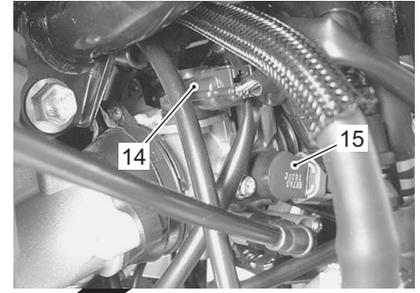
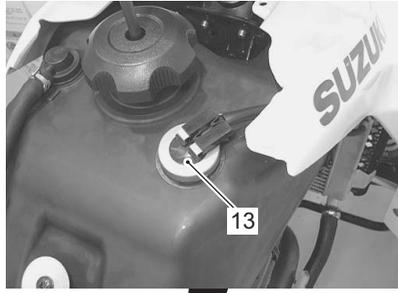
Electrical Components Location

B933H20103001



I933H1010005-02

1. Battery	5. Ignition coil	9. Cooling fan fuse
2. Ignition fuse	6. Cooling fan relay	10. Cooling fan
3. Starter relay/Main fuse	7. TO sensor	11. IAT sensor
4. Fuel injector	8. ECM	



I933H1010006-02

12. Mode select switch coupler	16. Regulator/Rectifier	20. GP switch
13. Fuel level gauge (Thermistor)	17. Fuel pump	21. CKP sensor
14. IAP sensor	18. ECT sensor	22. Generator
15. TP sensor	19. Starter motor	

Specifications

Specifications

B933H20107001

NOTE

These specifications are subject to change without notice.

Dimensions and dry mass

Item	Specification
Overall length	1 830 mm (72.0 in)
Overall width	1 190mm (46.9 in)
Overall height	1 145 mm (45.1 in)
Wheelbase	1 245 mm (49.0 in)
Front track	960 mm (37.8 in)
Rear track	910 mm (35.8 in)
Ground clearance	265 mm (10.4 in)
Seat height	810 mm (31.9 in)
Curb mass	193 kg (425 lbs)

Engine

Item	Specification
Type	4-stroke, liquid-cooled, DOHC
Number of cylinders	1
Bore	90.0 mm (3.543 in)
Stroke	62.6 mm (2.465 in)
Displacement	398 cm ³ (24.3 cu.in)
Compression ratio	11.3 : 1
Fuel system	Fuel injection
Air cleaner	Polyurethane foam element
Starter system	Electric
Lubrication system	Dry sump
Idle speed	1 600 ± 100 r/min

Drive train

Item	Specification	
Clutch	Wet multi-plate type	
Transmission	5-forward and 1-reverse	
Gearshift pattern	Forward	1 down 4 up, foot operated
	Reverse	Foot/hand operated
Primary reduction ratio	2.960 (74/25)	
Gear ratios	Low	2.538 (33/13)
	2nd	1.666 (30/18)
	3rd	1.238 (26/21)
	4th	1.000 (23/23)
	Top	0.846 (22/26)
	Reverse	2.153 (28/13)
Final reduction ratio	2.857 (40/14)	
Drive chain	RK 520SMOZ10S, 96 links	

Chassis

Item	Specification
Front suspension	Independent, double wishbone, coil spring, oil damped
Rear suspension	Swingarm type, coil spring, oil damped
Front wheel travel	215 mm (8.5 in)
Rear wheel travel	230 mm (9.1 in)
Caster	6.3°
Trail	28.6 mm (1.13 in)
Toe-out	6 mm (0.24 in)
Camber	-2.4°
Steering angle	41° (right & left)
Turning radius	3.3 m (10.8 ft)
Front brake	Disc brake, twin
Rear brake	Disc brake
Front tire size	AT22 x 7R10☆☆, tubeless
Rear tire size	AT20 x 10R9☆☆, tubeless

Electrical

Item	Specification
Ignition type	Electronic ignition (CDI)
Ignition timing	5° B.T.D.C. at 1 600 r/min
Spark plug	NGK CR7E or DENSO U22ESR-N
Battery	12 V 28.8 kC (8 Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	20 A
Ignition fuse	10 A
Cooling Fan fuse	10 A
Headlight	12 V 40/40 W
Brake light/Taillight	12 V 21/5 W
Neutral indicator light	12 V 1.7 W
Reverse indicator light	12 V 1.7 W
FI/Engine coolant temperature indicator light	12 V 1.7 W
Fuel indicator light	12 V 3.4 W

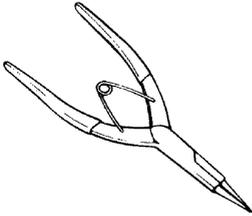
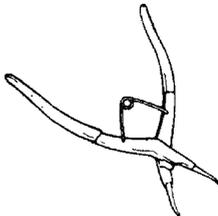
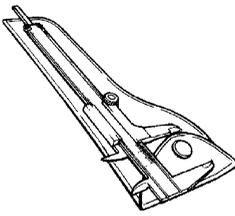
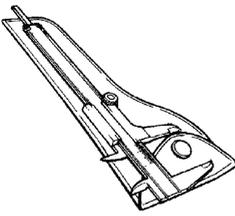
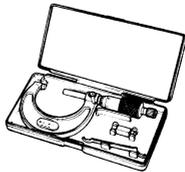
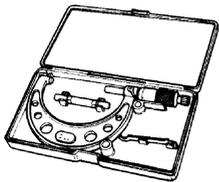
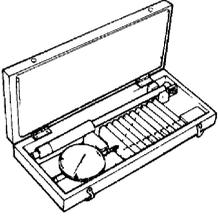
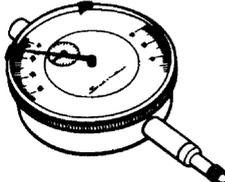
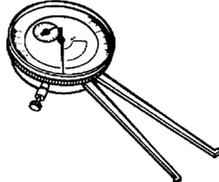
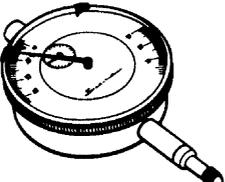
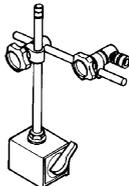
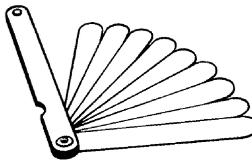
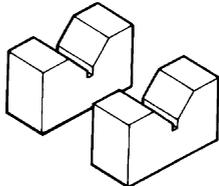
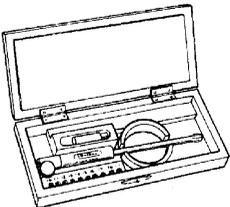
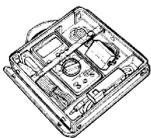
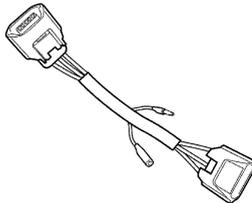
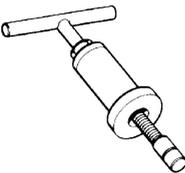
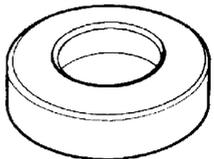
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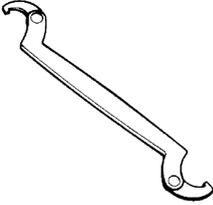
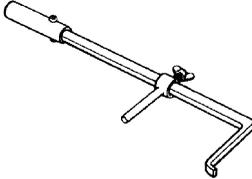
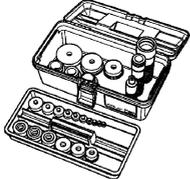
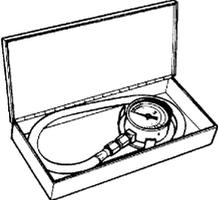
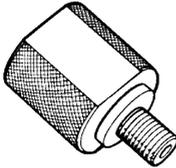
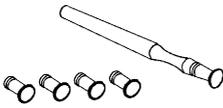
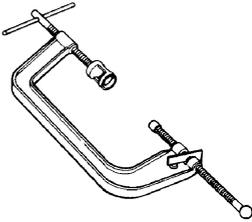
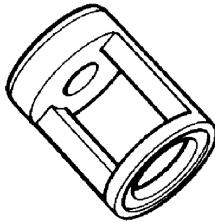
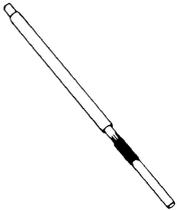
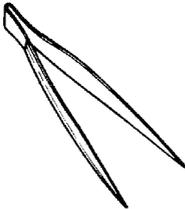
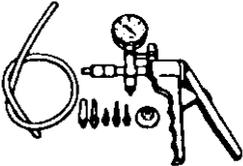
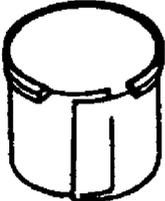
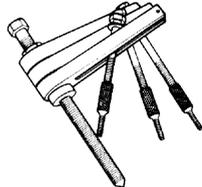
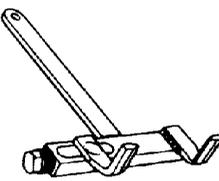
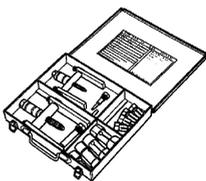
Item	Specification	
Fuel tank	9.5 L (2.5/2.1 US/lmp gal)	
Engine oil	Oil change	2 000 ml (2.1/1.8 US/lmp qt)
	With filter change	2 100 ml (2.2/1.8 US/lmp qt)
	Overhaul	2 200 ml (2.3/1.9 US/lmp qt)
Coolant	1 150 ml (1.2/1.0 US/lmp qt)	

Special Tools and Equipment

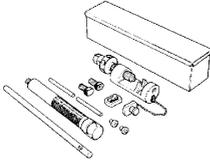
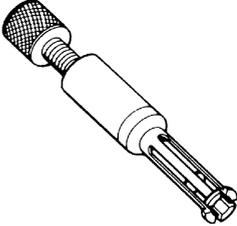
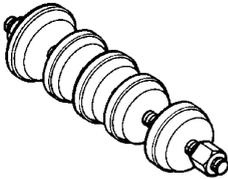
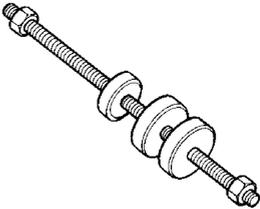
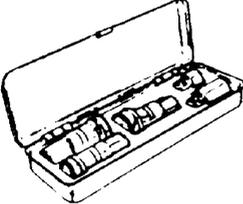
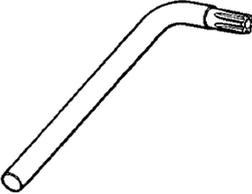
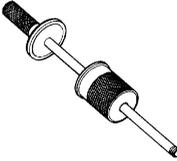
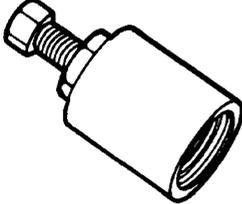
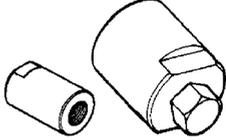
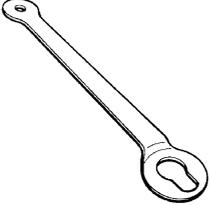
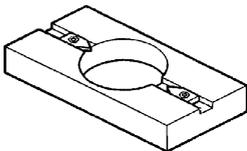
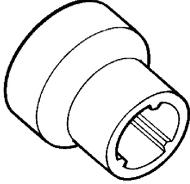
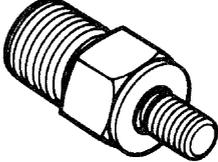
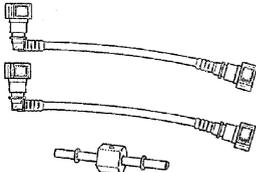
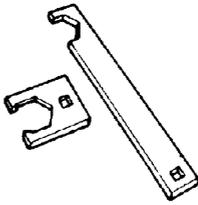
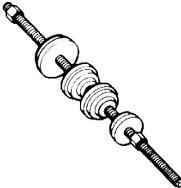
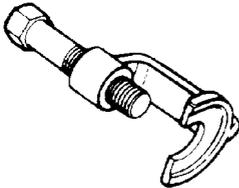
Special Tool

B933H20108001

 <p>09900-06107 Snap ring pliers</p>	 <p>09900-06108 Snap ring pliers</p>	 <p>09900-20101 Vernier calipers (1/15 mm, 150 mm)</p>	 <p>09900-20102 Vernier calipers (1/20 mm, 200 mm)</p>	 <p>09900-20202 Micrometer (1/100 mm, 25 - 50 mm)</p>
 <p>09900-20204 Micrometer (75 - 100 mm)</p>	 <p>09900-20205 Micrometer (0 - 25 mm)</p>	 <p>09900-20508 Cylinder gauge set</p>	 <p>09900-20602 Dial gauge (1/1000 mm, 1 mm)</p>	 <p>09900-20605 Dial calipers (1/100 mm, 10 - 34 mm)</p>
 <p>09900-20607 Dial gauge (1/100 mm, 10 mm)</p>	 <p>09900-20701 Magnetic stand</p>	 <p>09900-20803 Thickness gauge</p>	 <p>09900-20805 Tire depth gauge</p>	 <p>09900-21304 V-block (100 mm)</p>
 <p>09900-22301 Plastigauge (0.025 - 0.076 mm)</p>	 <p>09900-22302 Plastigauge (0.051 - 0.152 mm)</p>	 <p>09900-22403 Small bore gauge (18 - 35 mm)</p>	 <p>09900-25008 Multi-circuit tester set</p>	 <p>09900-25009 Needle pointed probe set</p>
 <p>09900-26006 Engine tachometer (solar cell type)</p>	 <p>09900-28630 TPS test wire harness</p>	 <p>09904-41010 SDS set</p>	 <p>09910-32812 Crankshaft installer</p>	 <p>09910-32820 Spacer</p>

 <p>09910-60611 Universal clamp wrench</p>	 <p>09911-11310 Crankshaft installer attachment</p>	 <p>09913-50121 Oil seal remover</p>	 <p>09913-70210 Bearing installer set</p>	 <p>09915-63311 Compression gauge attachment</p>
 <p>09915-64512 Compression gauge</p>	 <p>09915-74511 Oil pressure gauge set</p>	 <p>09915-74521 Oil pressure gauge hose</p>	 <p>09915-74533 Oil pressure gauge attachment</p>	 <p>09915-77331 Meter (for high pressure)</p>
 <p>09916-10911 Valve lapper set</p>	 <p>09916-14510 Valve spring compressor</p>	 <p>09916-14910 Valve spring compressor attachment</p>	 <p>09916-34542 Reamer handle</p>	 <p>09916-34570 Valve guide reamer (5.0 mm)</p>
 <p>09916-34580 Valve guide reamer (10.8 mm)</p>	 <p>09916-44310 Valve guide remover/installer</p>	 <p>09916-53360 Attachment</p>	 <p>09916-84511 Tweezers</p>	 <p>09917-47011 Vacuum pump gauge</p>
 <p>09919-28610 Sleeve protector</p>	 <p>09920-13120 Crankcase separating tool</p>	 <p>09920-53740 Clutch sleeve hub holder</p>	 <p>09921-20210 Bearing remover</p>	 <p>09921-20240 Bearing remover set</p>

0A-13 General Information:

 <p>09922-22711 Drive chain cutting and joining tool</p>	 <p>09923-73210 Bearing remover</p>	 <p>09923-74511 Bearing remover</p>	 <p>09924-84510 Bearing installer set</p>	 <p>09924-84521 Bearing installer set</p>
 <p>09930-10121 Spark plug wrench set</p>	 <p>09930-11950 Torx wrench</p>	 <p>09930-30104 Rotor remover slide shaft</p>	 <p>09930-30721 Rotor remover</p>	 <p>09930-31921 Rotor remover</p>
 <p>09930-44520 Rotor holder</p>	 <p>09930-73170 Starter torque limiter holder</p>	 <p>09930-73180 Starter torque limiter socket</p>	 <p>09930-82720 Mode select switch</p>	 <p>09940-40211 Fuel pressure gauge adapter</p>
 <p>09940-40220 Fuel pressure gauge hose attachment</p>	 <p>09940-92460 Rear axle nut wrench set</p>	 <p>09941-34513 Steering race installer</p>	 <p>09942-72410 Tie-rod end remover</p>	 <p>99565-01010-016 CD-ROM Ver.16</p>

Maintenance and Lubrication

Precautions

Precautions for Maintenance

B933H2020001

The “Periodic Maintenance Schedule Chart” lists the recommended intervals for all the required periodic service work necessary to keep the vehicle 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 vehicle that are used under severe conditions.

General Description

Recommended Fluids and Lubricants

B933H20201001

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

B933H20205001

NOTE

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

R = Replace.

T = Tighten.

C = Clean.

L = Lubricate.

Item	Interval		
	Initial 1 month	Every 3 months	Every 6 months
Air cleaner element	—	C	C
Exhaust pipe nuts and muffler bolt	T	T	T
Valve clearance	I	—	I
Spark plug	—	—	I
	Replace every 18 months.		
Spark arrester	—	—	C
Idle speed	I	I	I
Throttle body	—	I	I
Throttle cable play	I	I	I
Fuel line	—	I	I
	Replace every 4 years.		
Engine oil and oil filter	R	—	R
Engine oil hoses	I	I	I
Clutch	I	—	I
Engine coolant	Replace every 2 years.		
Radiator hose	—	—	I
	Replace every 4 years.		
Drive chain	Inspect every time before riding.		
Brakes	I	I	I
Brake fluid	—	I	I
	Replace every 2 years.		
Brake hose	—	—	I
	Replace every 4 years.		
Tires	—	I	I
Front and rear wheel set nuts	Tighten each time the vehicle is ridden.		
Rear axle nut and lock-nut	T	T	T
Suspension	—	—	I
Steering	I	I	I
Chassis bolts and nuts	T	T	T
General lubrications	L	L	L

Lubrication Points

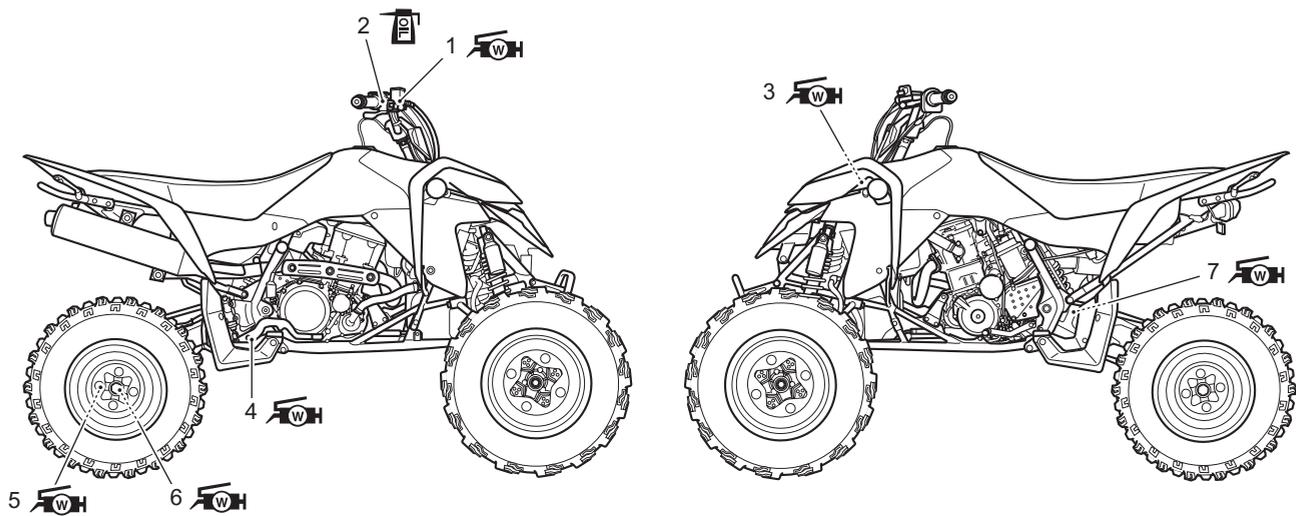
Lubricate exposed parts

Initially at 1 month and every 3 months thereafter

Proper lubrication is important for smooth operation and long life of each working part of the vehicle. 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 especially whenever the vehicle has been operated under wet or rainy conditions.



I933H1020001-02

1. Brake lever holder	4. Brake pedal and rod link	7. Rear suspension grease nipple.
2. Throttle lever	5. Brake cam	 : Apply water resistance grease.
3. Steering shaft holder	6. Axle shaft joint spline	 : Apply oil.

Repair Instructions

Air Cleaner Element Cleaning

B933H20206001

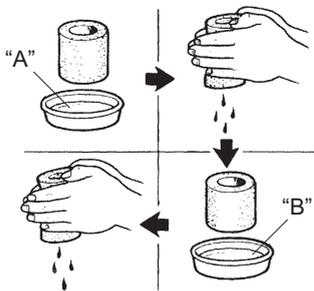
Air cleaner element cleaning Every 3 months

Inspect and clean the air cleaner element in the following procedures:

- 1) Remove the air cleaner element. Refer to "Air Cleaner Element Removal and Installation in Section 1D (Page 1D-4)".
- 2) Inspect the air cleaner element for clogging. If it is clogged with dirt, clean or 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.**
 - **Inspect the air cleaner element for tears. A torn element must be replaced.**
- 3) Fill a wash pan of a proper size with a non-flammable cleaning solvent. Immerse the air cleaner element in the cleaning solvent and wash it.
 - 4) Press the air cleaner element between the palms of both hands to remove the excess solvent: do not twist or wring the element or it will tear.
 - 5) Immerse the element in motor oil, and then squeeze out the excess oil leaving the element slightly wet.



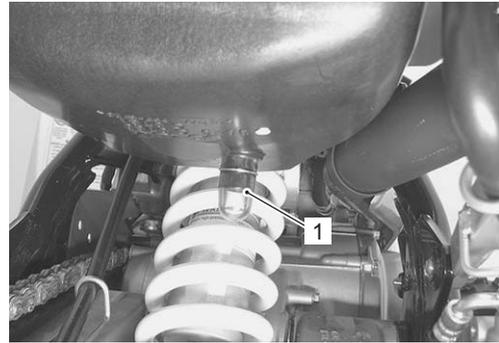
I827H1020035-01

"A": Non-flammable cleaning solvent

"B": Motor oil SAE #30 or SAE 10W-40

- 6) After cleaning the air cleaner element, reinstall the removed parts.

- 7) Remove the drain plug (1) of the air cleaner box to allow any water to drain out.



I933H1020002-01

- 8) Reinstall the drain plug (1).

Exhaust Pipe Nuts and Muffler Bolt Inspection

B933H20206002

Tighten exhaust pipe nuts and muffler bolts Initially at 1 month and every 3 months and thereafter

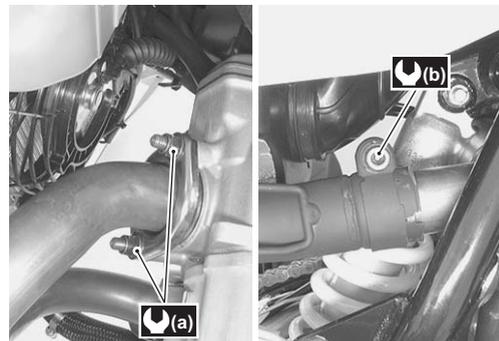
Check the exhaust pipe nuts and muffler bolts to the specified torque. Refer to "Muffler / Exhaust Pipe Removal and Installation in Section 1K (Page 1K-3)".

Tightening torque

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

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

Muffler mounting bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H1020078-01



I933H1020079-01

Valve Clearance Inspection and Adjustment

B933H20206003

Inspect valve clearance

Initially at 1 month and every 6 months thereafter

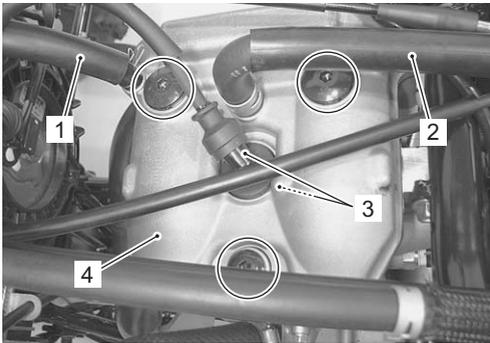
Inspection

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.

NOTE

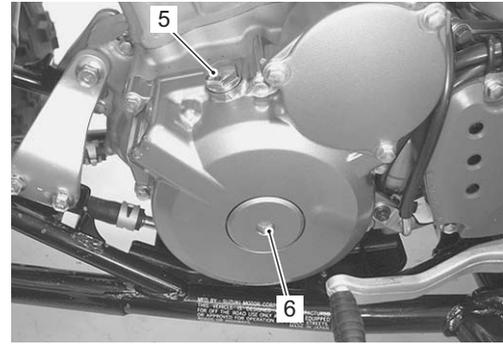
The tappet clearance should only be checked when the engine is cold.

- 1) Remove the fuel tank cover and front fender. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the fuel tank and fuel tank lower cover. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 3) Disconnect the oil tank overflow hose (1) and breather hose (2).
- 4) Disconnect the spark plug cap and spark plug (3). Refer to "Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)".
- 5) Remove the cylinder head cover (4). Refer to "Engine Top Side Disassembly in Section 1D (Page 1D-17)".



I933H1020003-01

- 6) Remove the valve timing inspection plug (5) and generator cover cap (6).

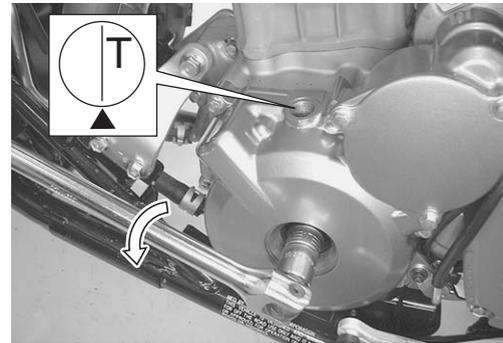


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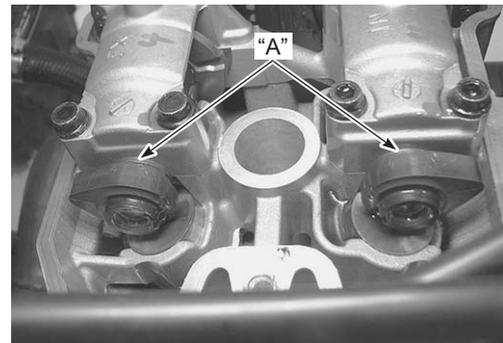
- 7) Turn the crankshaft counterclockwise and align the "T" line on the generator rotor is aligned with the triangle mark on the generator cover.

NOTE

- The piston must be at top dead center (TDC) on the compression stroke in order to check or adjust the tappet clearance.
- The cam must be at position "A", when checking and adjusting the tappet clearance. Clearance readings should not be taken with the cam in any other position than this position.



I933H1020005-01



I933H1020006-01

0B-6 Maintenance and Lubrication:

- 8) Insert the thickness gauge between the tappet and the cam. If the clearance is out of specification, adjust it to the specified range.

NOTE

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

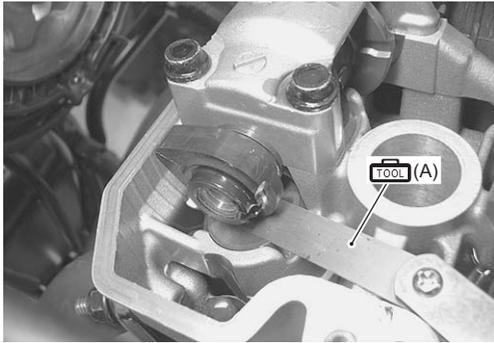
Special tool

 (A): 09900-20803 (Thickness gauge)

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)

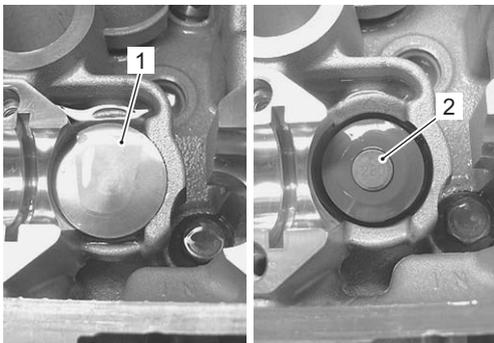


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Adjustment

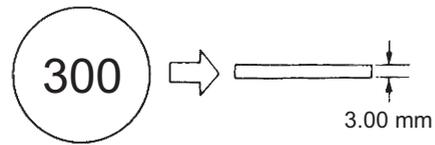
The clearance is adjusted by replacing the existing tappet shim with a thicker or thinner shim.

- 1) Remove the intake or exhaust camshafts. Refer to "Engine Top Side Disassembly in Section 1D (Page 1D-17)".
- 2) Remove the tappet (1) and shim (2) by fingers or magnetic hand.



I933H1020008-01

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



I831G1020091-01

- 4) Select a replacement shim that will provide a clearance within the specified range. For the purpose of this adjustment, a total of 25 sizes of tappet shim are available ranging from 2.30 to 3.50 mm in steps of 0.05 mm.

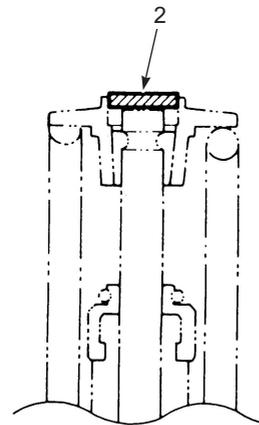
CAUTION

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.



I933H1020009-01

(INTAKE SIDE)

TAPPET SHIM SELECTION TABLE (INTAKE)
TAPPET SHIM NO. (12892-41C00-XXX)

TAPPET SHIM SET NO.(12800-41810)

MEASURED TAPPET CLEARANCE (mm)	SUFFIX NO.	TAPPET SHIM NO. (12892-41C00-XXX)																								
		230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350
0.00-0.04		2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.05-0.09		2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.10-0.20		2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50
0.21-0.25		2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50
0.26-0.30		2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50
0.31-0.35		2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50
0.36-0.40		2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.41-0.45		2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.46-0.50		2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.51-0.55		2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.56-0.60		2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.61-0.65		2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.66-0.70		2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.71-0.75		2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.76-0.80		3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.81-0.85		3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.86-0.90		3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.91-0.95		3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.96-1.00		3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.01-1.05		3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.06-1.10		3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.11-1.15		3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.16-1.20		3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.21-1.25		3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.26-1.30		3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.31-1.35		3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.36-1.40		3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED

How to use this chart:
 I. Measure tappet clearance when the 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 2.70 mm
 Shim size to be used 2.80 mm

(EXHAUST SIDE)

TAPPET SHIM SELECTION TABLE (EXHAUST)
TAPPET SHIM NO. (12892-41C00-XXX)

TAPPET SHIM SET NO.(12800-41810)

MEASURED TAPPET CLEARANCE (mm)	SUFFIX NO.	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																							
		230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345
0.00-0.04	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.05-0.09	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.10-0.14	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.15-0.19	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50
0.20-0.30	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50
0.31-0.35	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50
0.36-0.40	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50
0.41-0.45	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50
0.46-0.50	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.51-0.55	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.56-0.60	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.61-0.65	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.66-0.70	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.71-0.75	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.76-0.80	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.81-0.85	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.86-0.90	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.91-0.95	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
0.96-1.00	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.01-1.05	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.06-1.10	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.11-1.15	3.25	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.16-1.20	3.30	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.21-1.25	3.35	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.26-1.30	3.40	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.31-1.35	3.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.36-1.40	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.41-1.45	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1.46-1.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

How to use this chart:
 I. Measure tappet clearance when the 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 0.38 mm
 Present shim size 2.90 mm
 Shim size to be used 3.05 mm

- 6) Install the intake or exhaust camshafts. Refer to "Engine Top Side Assembly in Section 1D (Page 1D-20)".
- 7) Rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement, then check the clearance again to confirm that it is within the specified range.
- 8) After finishing the tappet clearance adjustment, reinstall the removed parts. Refer to "Engine Top Side Assembly in Section 1D (Page 1D-20)".

Spark Plug Replacement

B933H20206004

Replace spark plug Every 18 months

Refer to "Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)".

Spark Plug Inspection and Cleaning

B933H20206005

Inspect spark plug Every 6 months

Heat range

- 1) Remove the spark plug. Refer to "Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)".
- 2) Check spark plug heat range by observing electrode color. If the electrode of the spark plug is wet appearing or dark color, replace the spark plug with hotter type one. If it is white or glazed appearing, replace the spark plug with colder type one.

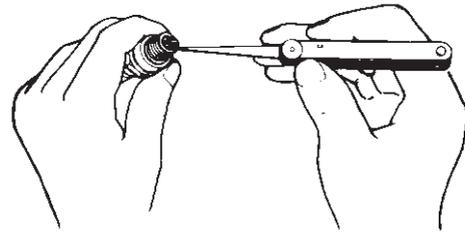
Heat range

	Hot type	Standard	Cold type
NGK	CR6E	CR7E	CR8E
DENSO	U20ESR-N	U22ESR-N	U24ESR-N

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

Carbon deposits

- 1) Remove the spark plug. Refer to "Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)".
- 2) Check carbon deposits on the spark plug. If carbon is deposited, remove it using a spark plug cleaner machine or carefully use a tool with a pointed end.



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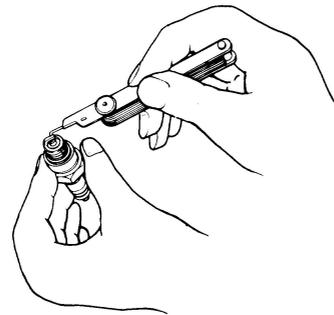
- 3) After finishing the spark plug inspection, reinstall the removed parts.

Spark plug gap

- 1) Remove the spark plug. Refer to "Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)".
- 2) Measure the spark plug gap using a wire gauge. Adjust the spark plug gap if necessary.

Spark plug gap

0.7 – 0.8 mm (0.028 – 0.031 in)



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

Electrodes condition

- 1) Remove the spark plug. Refer to "Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)".
- 2) Check the worn or burnt condition of the electrodes. If it is extremely worn or burnt, replace the spark plug. And also replace the spark plug if it has a broken insulator, or damaged thread.

⚠ 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.

0B-10 Maintenance and Lubrication:

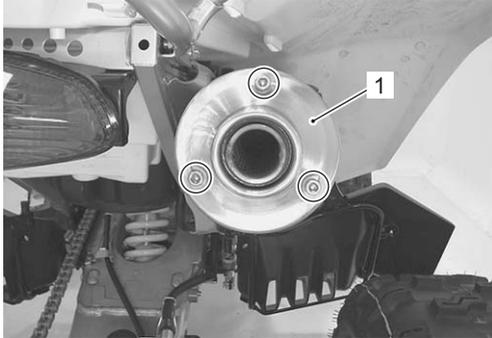
Spark Arrester Cleaning

B933H20206006

Spark arrester cleaning Every 6 months

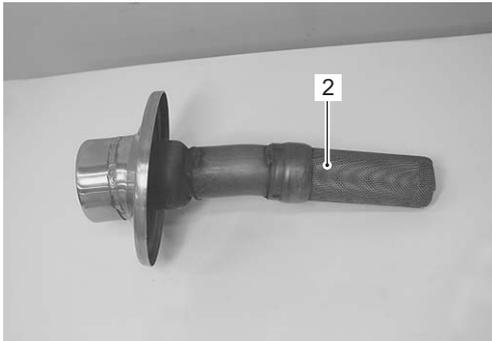
Clean the spark arrester in the following procedures:

- 1) Remove the spark arrester (1).



I933H1020012-01

- 2) Clean the spark arrester (2) with a brush.



I933H1020013-02

- 3) Install the spark arrester and tighten its bolts to the specified torque.

Tightening torque

Spark arrester mounting bolt: 13 N·m (1.3 kgf-m, 9.5 lb-ft)

Engine Idle Speed Inspection and Adjustment

B933H20206007

Inspect engine idle speed

Initially at 1 month and every 3 months thereafter

Inspect and adjust the engine idle speed in the following procedures:

- 1) Warm up the engine.
- 2) Connect the tachometer to the high-tension cord.

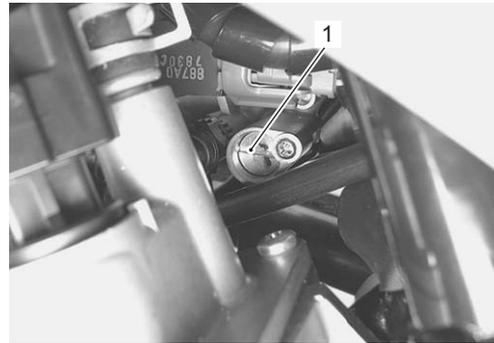
Special tool

Ⓜ : 09900-26006 (Engine tachometer (solar cell type))

- 3) Set the engine idle speed between 1 500 and 1 700 r/min by turning the idle air screw (1).

Engine idle speed

1 600 ± 100 r/min



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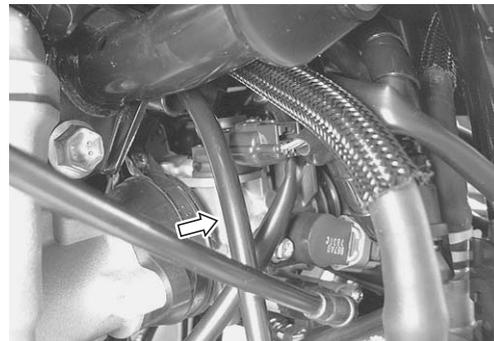
Throttle Body Inspection

B933H20206008

Inspect throttle body

Every 3 months

Inspect the throttle body periodically for dirt or mud. If any dirt or mud is found, clean it. Refer to "Throttle Body Removal and Installation in Section 1D (Page 1D-9)".



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Throttle Cable Play Inspection and Adjustment

B933H20206009

Inspect throttle cable play

Initially at 1 month and every 3 months thereafter

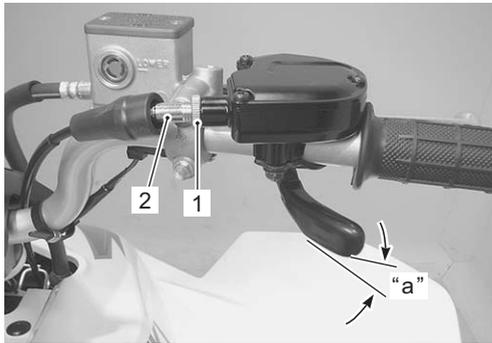
Inspect and adjust the throttle cable play "a" as follows.

Throttle cable play "a"

3 – 5 mm (0.12 – 0.20 in)

- 1) Loosen the lock-nut (1) of the throttle cable.
- 2) Turn the adjuster (2) in or out until the throttle cable play "a" (at the throttle lever) is between 3 – 5 mm (0.12 – 0.20 in).

- 3) Tighten the lock-nut (1) while holding the adjuster (2).
- 4) Install the boot correctly.



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⚠ WARNING

After the adjustment is completed, check that handlebar movement does not raise the engine idle speed and that the throttle lever returns smoothly and automatically.

Fuel Line Replacement

B933H20206010

Replace fuel line
Every 4 years

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

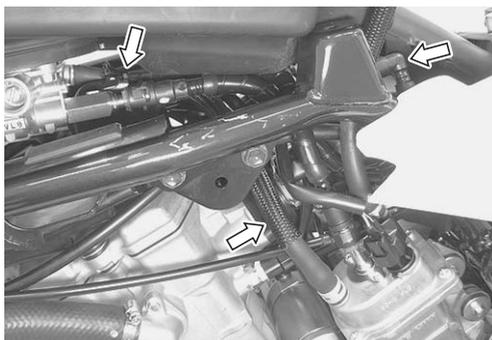
Fuel Line Inspection

B933H20206011

Inspect fuel line
Every 3 months

Inspect the fuel line in the following procedures:

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



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- 3) After finishing the fuel feed hoses and fuel hose inspection or replacement, reinstall the removed parts.

Engine Oil and Filter Replacement

B933H20206012

Replace engine oil

Initially at 1 month and every 6 months thereafter

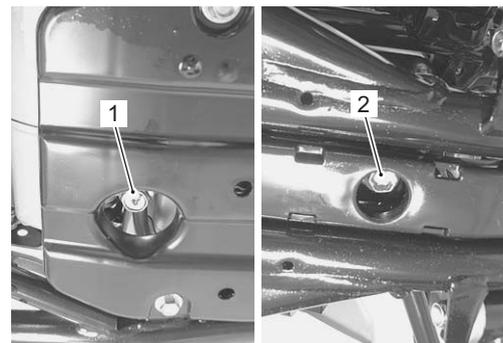
Replace oil filter

Initially at 1 month and every 6 months thereafter

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

Engine oil replacement

- 1) Place the vehicle on a level ground.
- 2) Place an oil pan under the drain plug (1) on the crankcase and drain plug (2) on the oil tank. Then drain out the engine oil by removing the engine oil drain plug (1), (2) and engine oil level gauge (3).



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I933H1020019-01

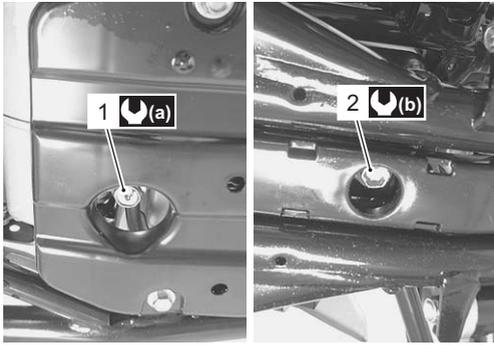
- 3) Tighten the oil drain plug (1) and (2) to the specified torque.

⚠ CAUTION

Replace the gasket washer with a new one.

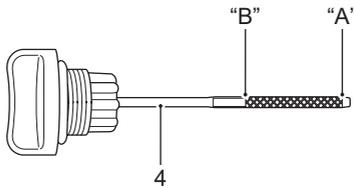
Tightening torque

- Oil drain plug (a): 21 N·m (2.1 kgf-m, 15.0 lb-ft)
- Oil drain plug (b): 12 N·m (1.2 kgf-m, 8.5 lb-ft)



I933H1020020-01

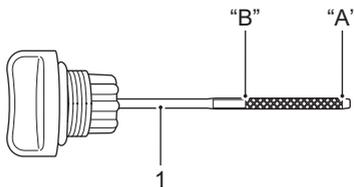
- 4) Pour new oil through the oil filler hole. When performing an oil change (without oil filter replacement), the engine will hold about 2.0 L (2.1/ 1.8 US/Imp qt) of oil. Use of SF/SG or SH/SJ in API with MA in JASO.
- 5) Start up the engine and allow it to run for few minutes at idling speed after tightening the oil level gauge (3).
- 6) Turn off the engine and wait about three minutes, and then check the oil level on the dipstick (4). The oil level should be between the low level line "A" and full level line "B". If the oil level is lower than the low level line "A", add oil to the full level line "B".



I933H1020021-01

Oil level inspection

- 1) Place the vehicle on a level ground.
- 2) Start up the engine and allow it to run for few minutes at idling speed.
- 3) Turn off the engine and wait about three minutes, then check the oil level on the dipstick (1). If the level is below low level line "A", add oil to full level line "B". If the level is above full level line "B", drain oil to full level line "B".



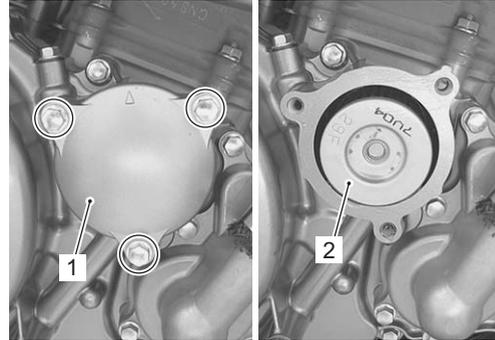
I933H1020022-01

Oil filter replacement

⚠ CAUTION

When reassembling the oil filter, make sure that the oil filter is installed as properly. If the filter is installed improperly, serious engine damage may result.

- 1) Drain engine oil as described in the engine oil replacement procedure.
- 2) Remove the oil filter cap (1) and oil filter (2).



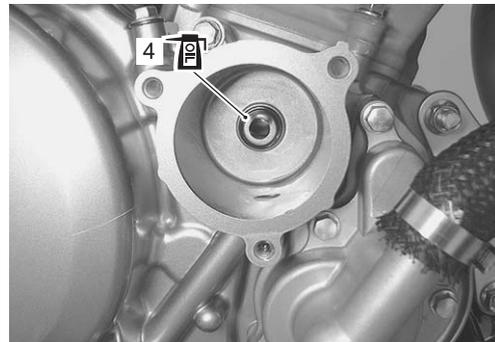
I933H1020023-01

- 3) Install the spring (3) correctly.
- 4) Apply engine oil to the new O-rings (4) and (5).

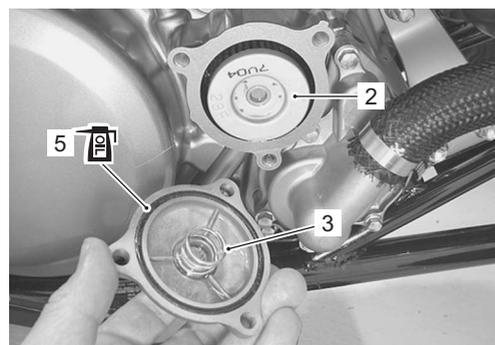
⚠ CAUTION

Replace the new O-rings with new ones.

- 5) Replace the oil filter (2) with a new one.



I933H1020024-01

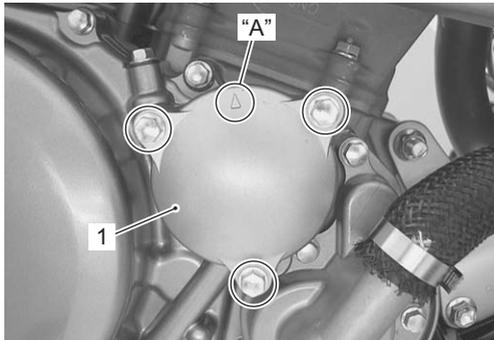


I933H1020025-03

- 6) Install the oil filter cap (1) and tighten the bolts securely.

NOTE

Face the triangle mark "A" on the cap upward.



I933H1020026-01

- 7) 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: 2 000 ml (2.1/1.8 US/lmp qt)

Oil and filter change: 2 100 ml (2.2/1.8 US/lmp qt)

Engine overhaul: 2 200 ml (2.3/1.9 US/lmp qt)

Engine Oil Hoses Inspection

B933H20206013

Inspect engine oil hoses

Initially at 1 month and every 3 months thereafter

Inspect the engine oil hoses for damage and oil leakage. If any defects are found, replace the engine oil hoses with new ones. Refer to "Engine Oil Pipe Removal and Installation in Section 1E (Page 1E-8)".



I933H1020027-02

Clutch Inspection and Adjustment

B933H20206014

Inspect clutch lever play

Initially at 1 month and every 6 months thereafter

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

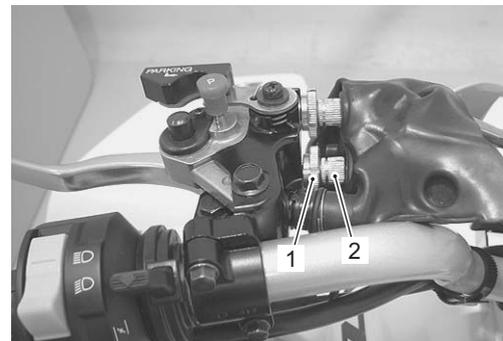
Clutch lever play "a"

5 – 10 mm (0.2 – 0.4 in)



I933H1020028-01

- 1) Loosen the lock-nut (1).
- 2) Turn the adjuster (2) in or out until the clutch lever play "a" is between 5 – 10 mm (0.2 – 0.4 in).
- 3) Tighten the lock-nut (1) while holding the adjuster (2).



I933H1020029-01

Cooling System Inspection

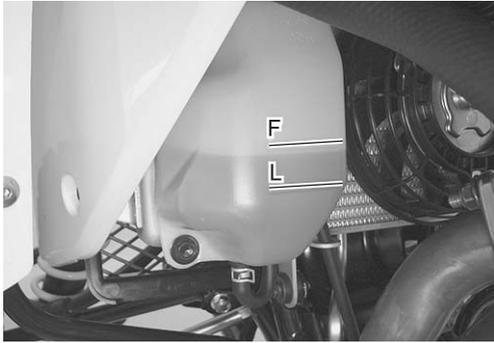
B933H20206015

Replace engine coolant

Every 2 years

Engine coolant level inspection

- 1) Place the vehicle on a level ground.
- 2) 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.



I933H1020030-01

Engine coolant change

Refer to “Engine Coolant Description in Section 1F (Page 1F-2)”.

⚠ WARNING

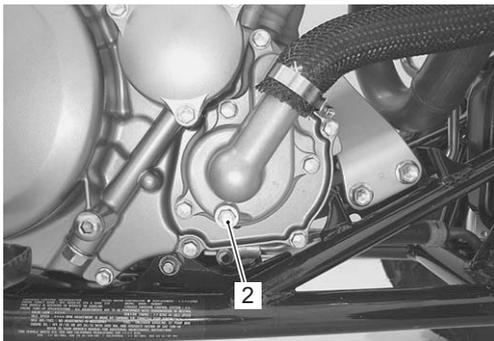
Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor. Engine coolant may be harmful if swallowed or if it comes in contact with skin or eyes. If engine coolant gets into the eyes or in contact with the skin, flush thoroughly with plenty of water.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

- 1) Remove the right side cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Remove the radiator cap (1).



I933H1020031-01

- 3) Place a pan below the water pump, and then drain the engine coolant by removing the drain plug (2).



I933H1020032-01

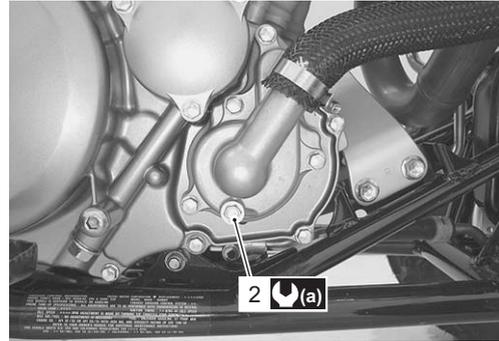
- 4) Flush the radiator with fresh water if necessary.
- 5) Tighten the drain plug (2) to the specified torque.

⚠ CAUTION

Replace the gasket with a new one.

Tightening torque

Engine coolant drain plug (a): 6 N·m (0.6 kgf-m, 4.5 lb-ft)

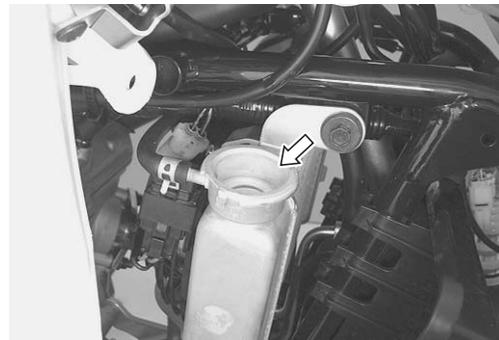


I933H1020033-01

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

Engine coolant capacity

Reservoir side: 250 ml (0.3/0.2 US/Imp qt)
Engine side: 900 ml (1.0/0.8 US/Imp qt)



I933H1020034-01

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

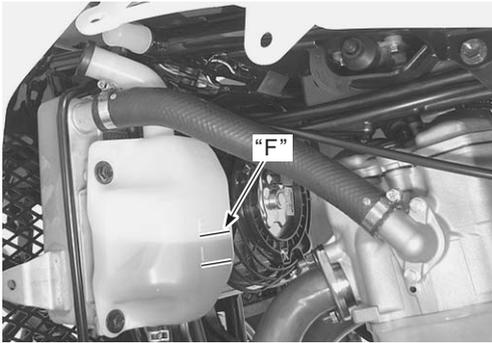
Air bleeding from the cooling circuit

- 1) Place the vehicle on a level ground.
- 2) Pour engine coolant up to the radiator inlet.
- 3) Slowly swing the vehicle, 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 6), 7) procedures until no air bleeds from the radiator 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.

⚠ CAUTION

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



I933H1020035-04

- 10) Reinstall the removed parts.

Radiator hoses inspection

Inspect radiator hoses
Every 6 months

- 1) Remove the left side cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Inspect the radiator hoses for damage and engine coolant leakage. If any defects are found, replace them with new ones.



I933H1020036-01



I933H1020037-01

- 3) After finishing the radiator hose inspection, reinstall the left side cover.

Radiator Hoses Replacement

Replace radiator hoses

Every 4 years

Refer to “Water Hose Removal and Installation in Section 1F (Page 1F-8)”.

Drive Chain Inspection and Adjustment

B933H20206016

Clean, lubricate and inspect each time the vehicle is ridden

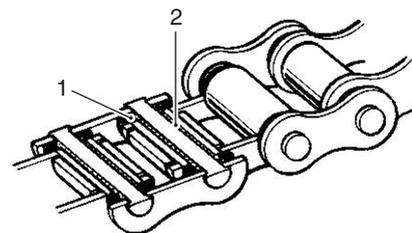
Every time before riding

Drive chain visual check

- 1) Support the vehicle by a jack and a wooden block, turn the rear wheel slowly by hand with the transmission shifted to Neutral.
 - 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-8)”.
- Loose pins
 - Damaged rollers
 - Dry or rusted links
 - Kinked or binding links
 - Excessive wear
 - Improper chain adjustment
 - Missing O-ring seals

NOTE

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



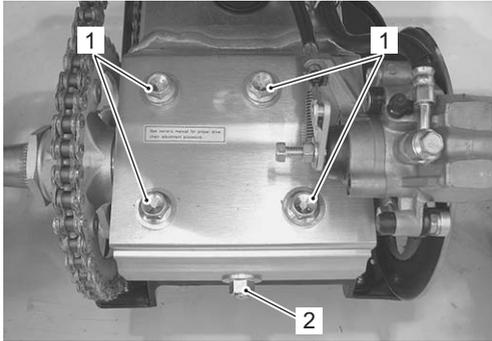
I649G1020032-02

1. O-ring seal	2. Grease
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OB-16 Maintenance and Lubrication:

Drive chain length inspection

- 1) Place the vehicle on level ground.
- 2) Loosen the rear axle housing bolts (1).
- 3) Tense the drive chain fully by turning chain adjuster nut (2).

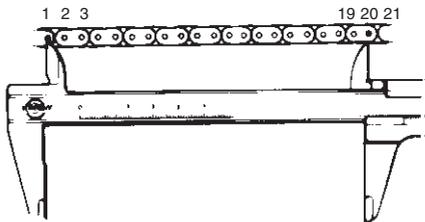


I933H1020038-02

- 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.

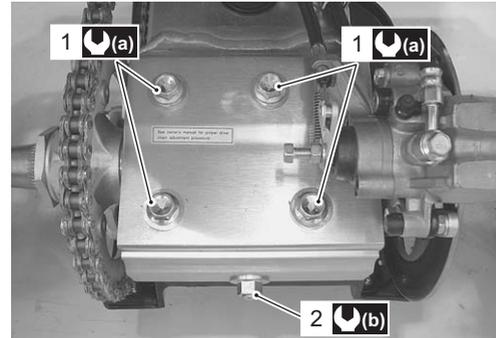
Drive chain slack adjustment

- 1) Place the vehicle on level ground.
- 2) Loosen the rear axle housing bolts (1).

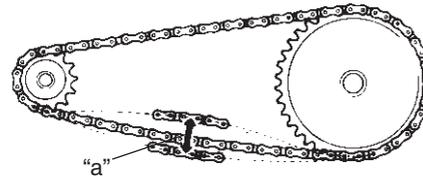
- 3) Loosen or tighten the chain adjuster nut (2) until there is 30 – 40 mm (1.2 – 1.6 in) "a" of slack at the middle of the chain between the engine and rear sprockets as shown in the figure.

Drive chain slack "a"

Standard 30 – 40 mm (1.2 – 1.6 in)



I933H1020039-01



I649G1020036-02

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

Tightening torque

Rear axle housing bolt (a): 100 N·m (10.0 kgf-m, 72.5 lb-ft)

- 5) Tighten the chain adjuster nut (2) to the specified torque.

Tightening torque

Chain adjuster nut (b): 30 N·m (3.0 kgf-m, 21.5 lb-ft)

Drive chain cleaning and lubricating

Clean and lubricate drive chain

Every time before riding

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

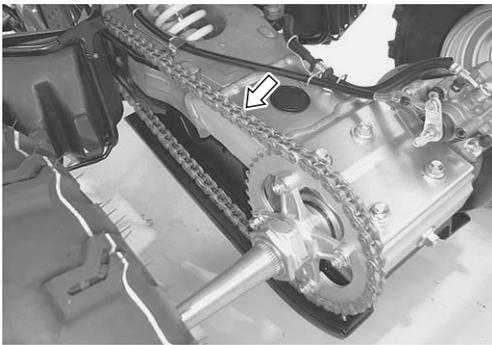
Do not use trichloroethylene, gasoline or any similar solvent.

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 RK520 SMOZ10S. SUZUKI recommends to use this standard drive chain as a replacement.



I933H1020040-01

Brake System Inspection

B933H20206017

Inspect brake system

Initially at 1 months and every 3 months thereafter

⚠ WARNING

- The brake system of this vehicle 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.

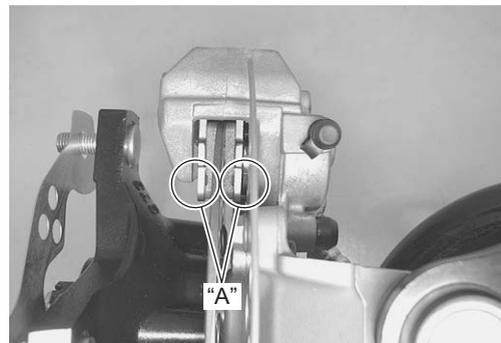
Brake pads check

- 1) Remove the front wheel. Refer to “Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)”.
- 2) The extent of brake pad wear can be checked by observing the grooved limit line “A” on the side of brake 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

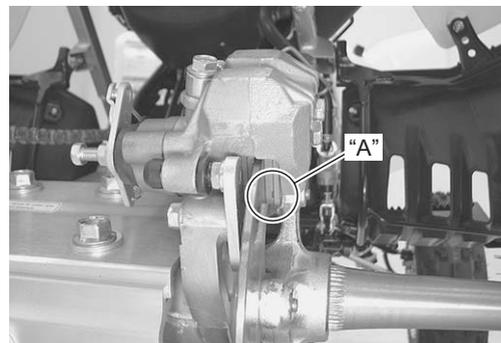
Replace the brake pad as a set, otherwise braking performance will be adversely affected.

Front



I933H1020041-01

Rear



I933H1020042-01

- 3) Install the front wheel. Refer to “Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)”.

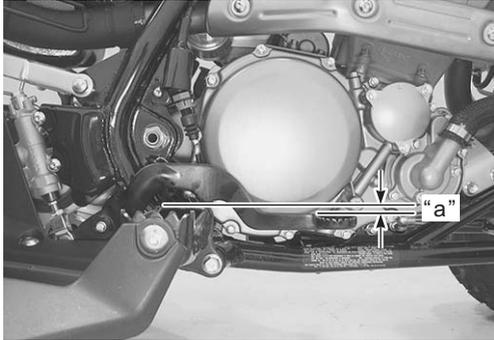
0B-18 Maintenance and Lubrication:

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: 0 – 10 mm (0 – 0.4 in)

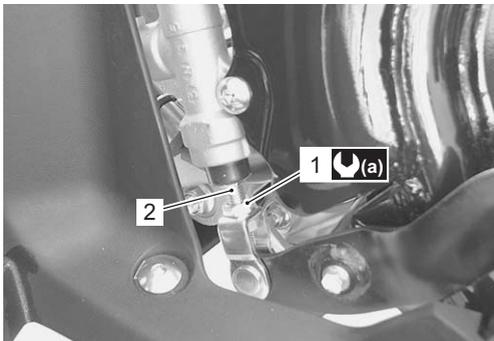


I933H1020043-02

- 2) Loosen the lock-nut (1).
- 3) Turn the push rod (2) until the brake pedal becomes 0 – 10 mm (0 – 0.4 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 lb-ft)



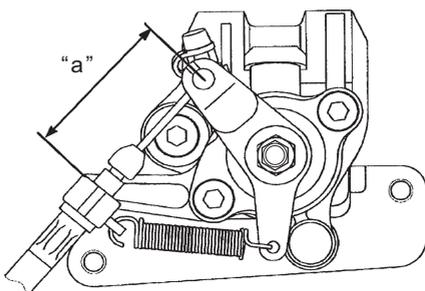
I933H1020044-01

Parking brake inspection and adjustment

Inspect and adjust the parking brake cable length "a" as follows.

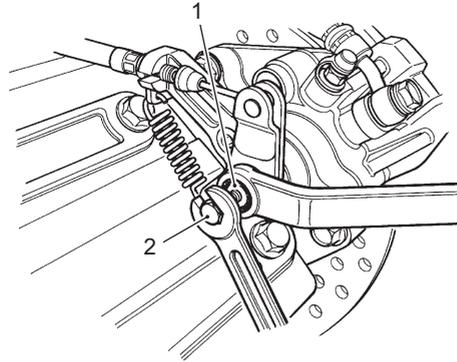
Parking brake cable length "a"

47 – 51 mm (1.9 – 2.0 in)



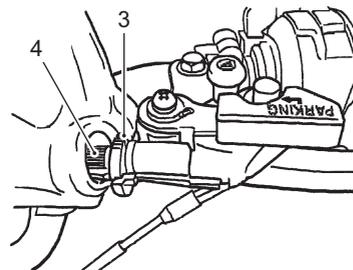
I933H1020045-01

- 1) Loosen the parking brake adjuster lock-nut (1) while holding the adjuster (2) with a wrench.
- 2) Loosen the adjuster (2).



I933H1020046-01

- 3) Loosen the parking brake cable adjuster lock-nut (3).
- 4) Turn the cable adjuster (4) so that the cable length "a" is 47 – 51 mm (1.9 – 2.0 in).
- 5) Tighten the adjuster lock-nut (3).

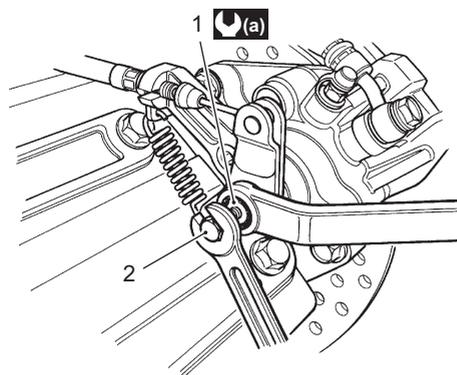


I933H1020047-01

- 6) Turn the adjuster (2) clockwise until stops.
- 7) Then turn the adjuster (2) 1/8 – 1/4 back.
- 8) Tighten the adjuster lock-nut (1) while holding the adjuster (2) in position with a wrench.

Tightening torque

Parking brake adjuster lock-nut (a): 18 N·m (1.8 kgf-m, 13.0 lb-ft)



I933H1020048-02

⚠ CAUTION

After adjusting the parking brake, check that there is no dragging when turning the rear wheel with the wheel off the ground.

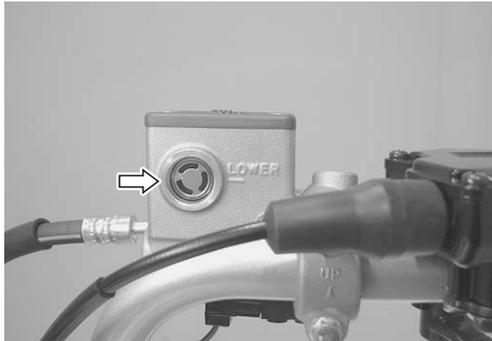
Brake fluid level check

Inspect brake fluid level

Every 3 months

- 1) Place the vehicle on a level ground and place the handlebars straight.
- 2) Check the brake fluid level by observing the lower limit lines on the brake fluid reservoir. 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)



I933H1020049-01



I933H1020050-01

Brake fluid replacement

Replace brake fluid

Every 2 years

Refer to "Brake Fluid Replacement in Section 4A (Page 4A-8)".

Air bleeding from brake fluid circuit

Refer to "Air Bleeding from Brake Fluid Circuit in Section 4A (Page 4A-6)".

Rear brake light switch adjustment

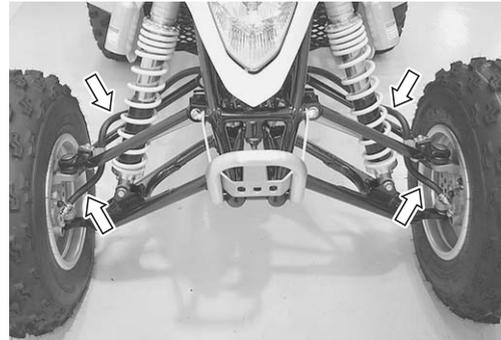
Refer to "Rear Brake Light Switch Inspection in Section 4A (Page 4A-6)".

Front and rear brake hose inspection

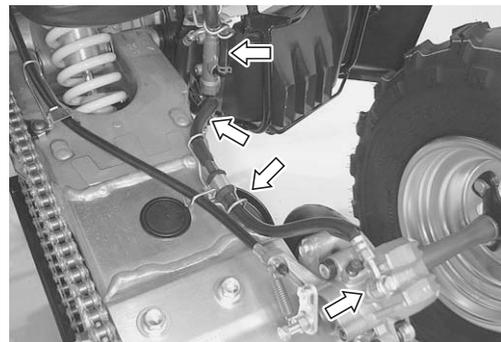
Inspect brake hose

Every 6 months

Inspect the brake hoses and hose joints for crack, damage or brake oil leakage. If any defects are found, replace the front and rear brake hoses with new ones. Refer to "Brake Hose Removal and Installation in Section 4A (Page 4A-9)".



I933H1020051-01



I933H1020052-01

Front and rear brake hose replacement

Replace brake hose

Every 4 years

Refer to "Brake Hose Removal and Installation in Section 4A (Page 4A-9)".

Tire Inspection

B933H20206018

Inspect tire

Every 3 months

Tire tread condition

Operating the vehicle 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.

OB-20 Maintenance and Lubrication:

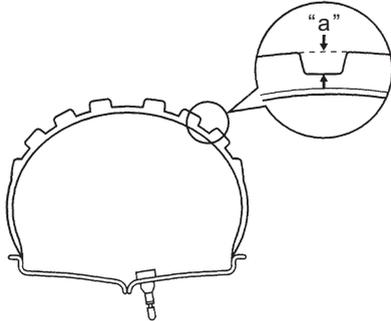
Special tool

 : 09900–20805 (Tire depth gauge)

Tire tread depth “a” (Service limit)

Front: 4.0 mm (0.16 in)

Rear: 4.0 mm (0.16 in)



I831G1020084-01

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 longer tire life will result. Cold inflation tire pressure is as follows.

Cold inflation tire pressure

	kPa	kgf/cm ²	psi
Front	30	0.30	4.4
Rear	30	0.30	4.4

Vehicle load capacity limit

110 kg (243 lbs)

CAUTION

To minimize the possibility of tire damage from over-inflation, we strongly recommend that a manual type air pump be used rather than a high pressure air compressor as found in service stations. When filling air into the tires, never exceed 70 kPa (0.7 kgf/cm², 10 psi).

CAUTION

The standard tire fitted on this vehicle is an AT22 x 7R10☆☆ for the front and a AT20 x 10R9☆☆ for the 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: KT331
- Rear: KT335

Front and Rear Wheel Set Nuts Inspection

B933H20206019

Tighten front and rear wheel set nuts

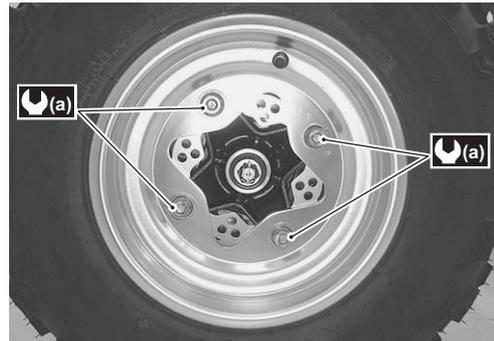
Each time the vehicle is ridden

Tighten the front and rear wheel set nuts to the specified torque.

Tightening torque

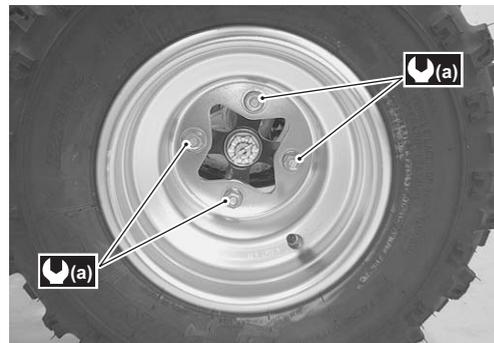
Wheel set nut (Front and Rear) (a): 66 N·m (6.6 kgf-m, 47.5 lb-ft)

Front



I933H1020053-02

Rear



I933H1020054-01

Rear Axle Nut and Lock-nut Inspection

B933H20206020

Tighten rear axle nut and lock-nut

Initially at 1 month and every 3 months thereafter

NOTE

When tightening the axle nut with the special tool, the reading torque on the torque wrench is smaller than actual torque that is applied to the axle nut. Therefore convert the tightening torque. Refer to “Rear Axle Nut and Lock-Nut Tightening Torque in Section 3A (Page 3A-7)”.

Check that the rear axle nut is tightened to its specified torque.

If the specified torque is lower than specification, tighten the rear axle nut and lock-nut as follows.

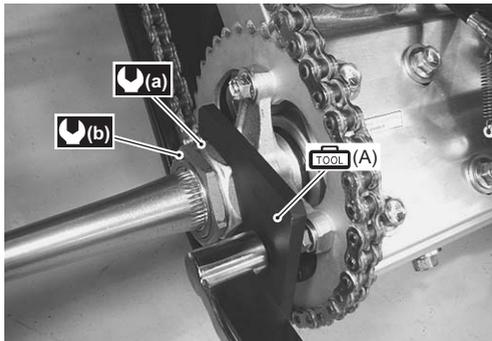
Special tool

TOOL (A): 09940-92460 (Rear axle nut wrench set)

Tightening torque

Rear axle nut (a): 240 N·m (24.0 kgf-m, 173.5 lb-ft)

Rear axle lock-nut (b): 240 N·m (24.0 kgf-m, 173.5 lb-ft)



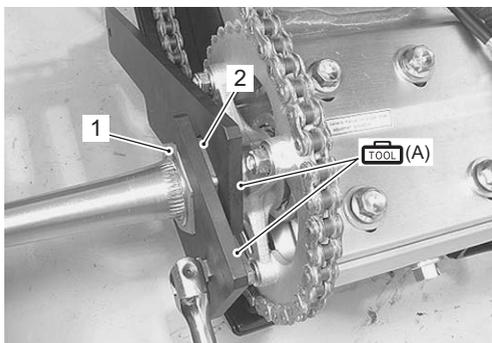
I933H1020055-02

- 1) Loosen the rear axle lock-nut (1) and rear axle nut (2) with the special tool by applying the rear brake.

Special tool

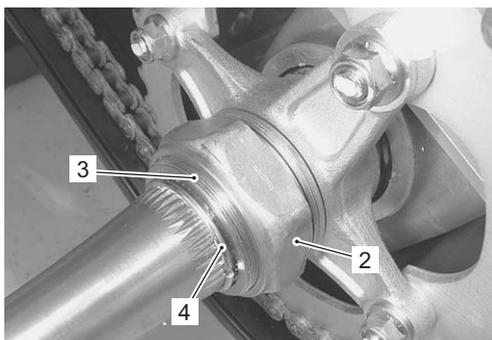
TOOL (A): 09940-92460 (Rear axle nut wrench set)

- 2) Remove the rear axle lock-nut (1).



I933H1310009-01

- 3) Push the rear axle nut bolt (3).
- 4) Move the stopper ring (4) and tighten the rear axle nut (2).



I933H1020056-03

- 5) Apply thread lock to the rear axle nut bolt (3).

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

- 6) Loosen the rear axle nut (2).

- 7) Fit the stopper ring (4).

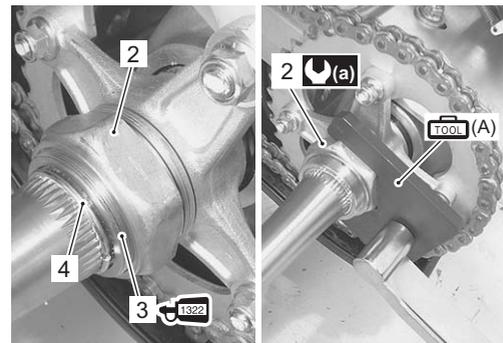
- 8) Tighten the rear axle nut (2) to the specified torque with the special tool. Refer to "Rear Axle Nut and Lock-Nut Tightening Torque in Section 3A (Page 3A-7)".

Special tool

TOOL (A): 09940-92460 (Rear axle nut wrench set)

Tightening torque

Rear axle nut (a): 240 N·m (24.0 kgf-m, 173.5 lb-ft)



I933H1020057-02

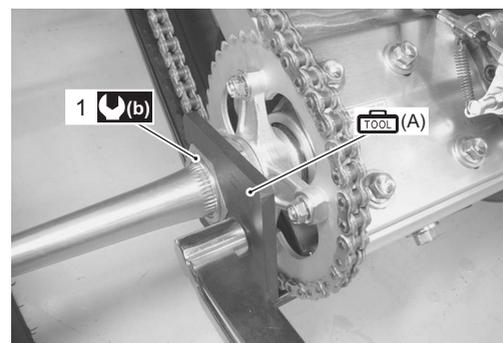
- 9) Tighten the rear axle lock-nut (1) to the specified torque with the special tool. Refer to "Rear Axle Nut and Lock-Nut Tightening Torque in Section 3A (Page 3A-7)".

Special tool

TOOL (A): 09940-92460 (Rear axle nut wrench set)

Tightening torque

Rear axle lock-nut (b): 240 N·m (24.0 kgf-m, 173.5 lb-ft)



I933H1020058-03

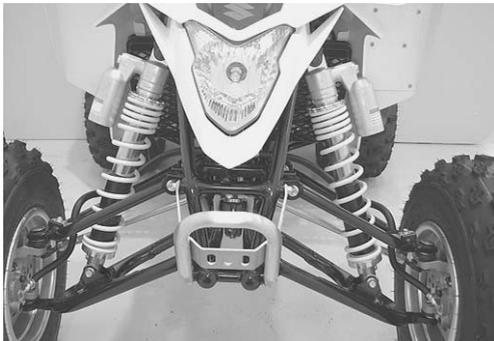
Suspensions Inspection

B933H20206021

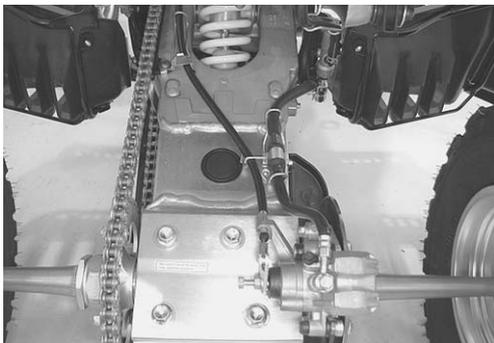
Inspect suspensions Every 6 months

Inspect the suspensions in the following procedures:

- 1) Inspect the front suspension arm bearing for scratches, wear or damage. If any damages are found, replace the suspension arm, bearing or bushing with a new one. Refer to "Front Suspension Wishbone Arm Dust Seal / Bearing Removal and Installation in Section 2B (Page 2B-13)".
- 2) Inspect the swinging arm, rear axle and bearing for scratches, wear or damage. If any damages are found, replace them with a new one. Refer to "Swingarm Dust Seal / Bearing Removal and Installation in Section 2C (Page 2C-14)" and "Rear Axle Dust Seal / Bearing Removal and Installation in Section 3A (Page 3A-14)".
- 3) Inspect the front and rear shock absorbers for oil leakage or damage. If any damages are found, replace them with a new one. Refer to "Front Shock Absorber Removal and Installation in Section 2B (Page 2B-3)" and "Rear Shock Absorber Removal and Installation in Section 2C (Page 2C-3)".



I933H1020059-01



I933H1020060-01

Steering System Inspection

B933H20206022

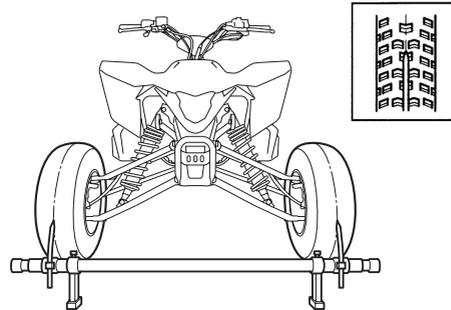
Inspect steering system Initially at 1 month and every 3 months thereafter

Steering should be adjusted properly for smooth turning of handlebars and safe running.

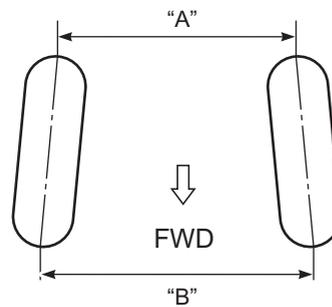
- 1) Place the vehicle on level ground.
- 2) Make sure the tire pressure for right and left tires in the same and set to the proper specification.
- 3) Set the front wheels in the straight position.
- 4) Place a load of 75 kg (165 lbs) on the seat.
- 5) Measure the distance "A" and "B" of the front wheels with a toe-out gauge as shown and calculate the difference between "A" and "B".

Toe-out ("B" - "A")

Standard: 6 ± 4 mm (0.24 ± 0.16 in)



I933H1020061-01



I831G1020059-04

- 6) If the toe-out is out of specification, bring it into the specified range. Refer to "Toe-out Adjustment in Section 6B (Page 6B-11)".

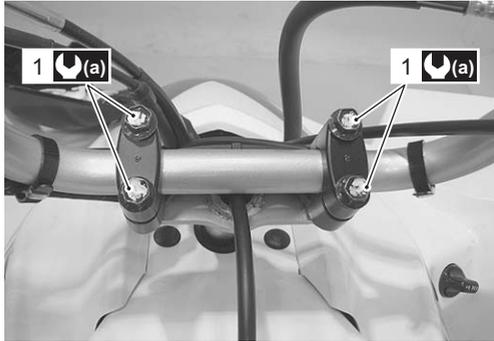
Chassis Bolts and Nuts Inspection

B933H20206023

Tighten chassis bolts and nuts

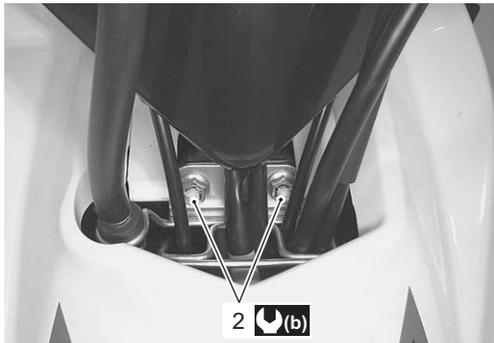
Initially at 1 month and 3 months thereafter

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



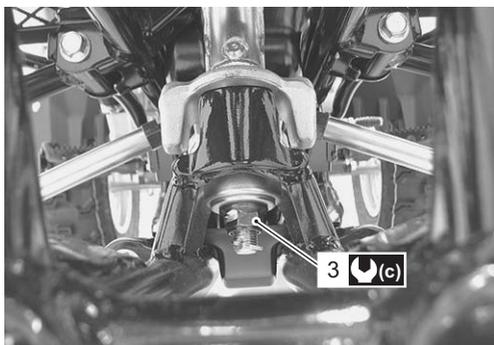
I933H1020063-01

1 (a) Handlebar clamp bolt 26N·m (2.6 kgf·m, 19.0 lb-ft)



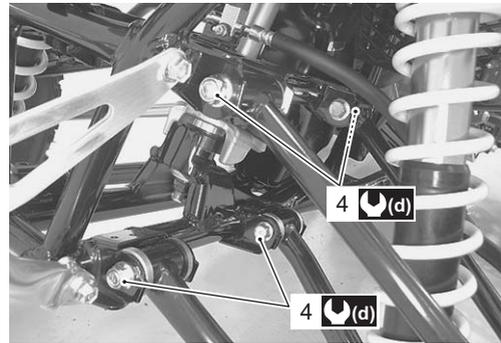
I933H1020064-01

2 (b) Steering shaft holder bolt 23 N·m (2.3 kgf·m, 16.5 lb-ft)



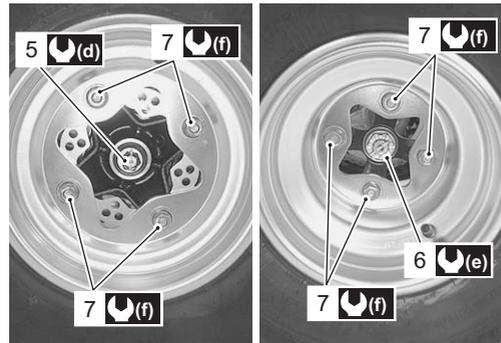
I933H1020065-01

3 (c) Steering shaft nut 49 N·m (4.9 kgf·m, 35.5 lb-ft)



I933H1020066-01

4 (d) Wishbone arm pivot nut (Upper & Lower) 65 N·m (6.5 kgf·m, 47.0 lb-ft)

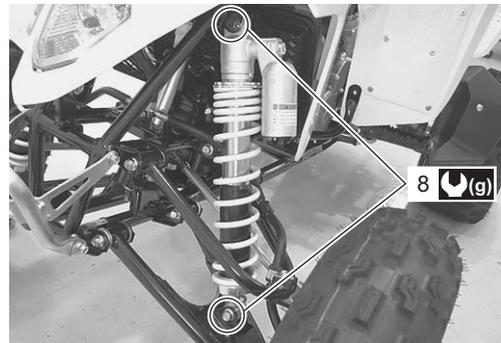


I933H1020067-01

5 (d) Front hub nut 65 N·m (6.5 kgf·m, 47.0 lb-ft)

6 (e) Rear hub nut 121 N·m (12.1 kgf·m, 87.5 lb-ft)

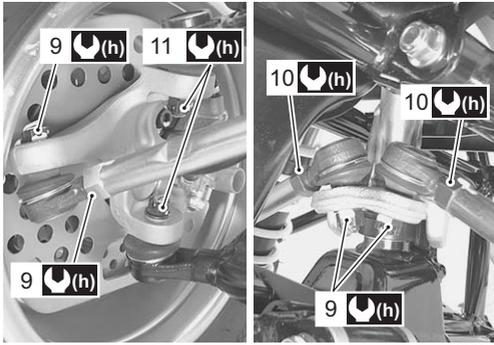
7 (f) Wheel set nut (Front & Rear) 66 N·m (6.6 kgf·m, 47.5 lb-ft)



I933H1020068-01

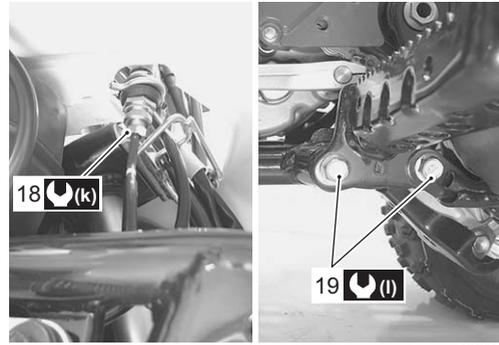
8 (g) Front shock absorber mounting nut (Upper & Lower) 60 N·m (6.0 kgf·m, 43.5 lb-ft)

0B-24 Maintenance and Lubrication:



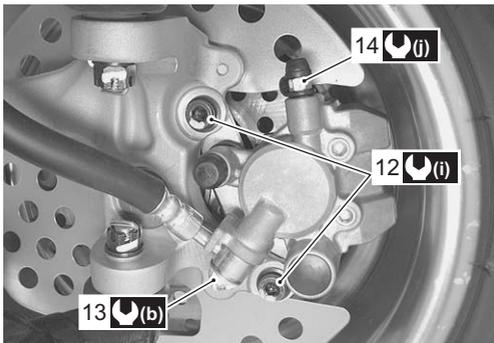
I933H1020069-02

9		Tie-rod end nut 29 N·m (2.9 kgf·m, 21.0 lb·ft)
10		Tie-rod end lock-nut 29 N·m (2.9 kgf·m, 21.0 lb·ft)
11		Knuckle end nut 29 N·m (2.9 kgf·m, 21.0 lb·ft)



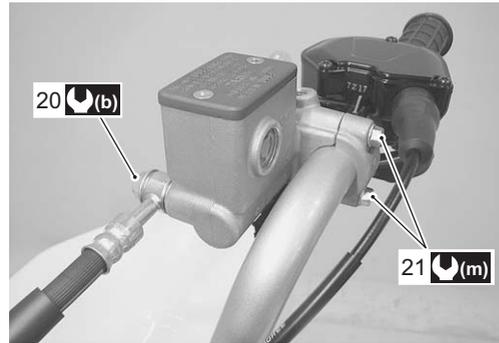
I933H1020072-02

18		Front brake pipe nut (Upper) 16 N·m (1.6 kgf·m, 11.5 lb·ft)
19		Footrest mounting bolt 55 N·m (5.5 kgf·m, 40.0 lb·ft)



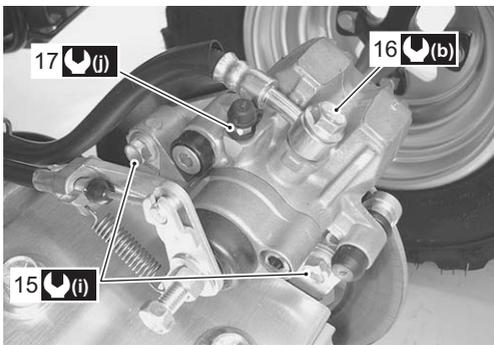
I933H1020070-02

12		Front brake caliper mounting bolt 26 N·m (2.6 kgf·m, 19.0 lb·ft)
13		Front brake hose union bolt 23 N·m (2.3 kgf·m, 16.5 lb·ft)
14		Front brake air bleeder valve 6 N·m (0.6 kgf·m, 4.5 lb·ft)



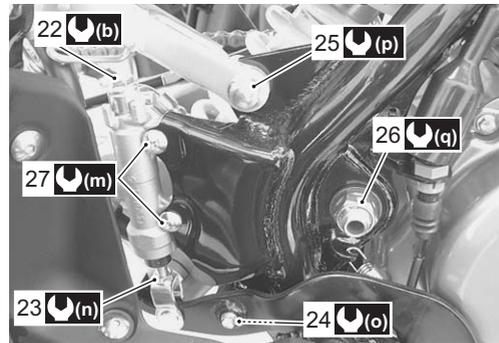
I933H1020073-02

20		Front brake hose union bolt 23 N·m (2.3 kgf·m, 16.5 lb·ft)
21		Front brake master cylinder mounting bolt 10 N·m (1.0 kgf·m, 7.0 lb·ft)



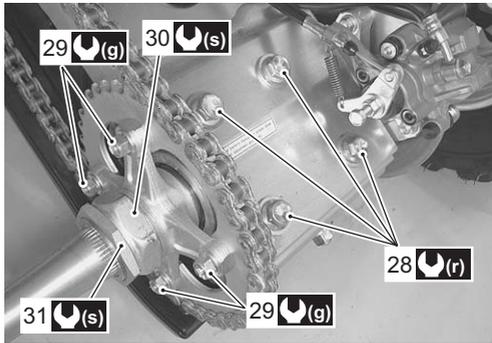
I933H1020071-02

15		Rear brake caliper mounting bolt 26 N·m (2.6 kgf·m, 19.0 lb·ft)
16		Rear brake hose union bolt 23 N·m (2.3 kgf·m, 16.5 lb·ft)
17		Rear brake air bleeder valve 6 N·m (0.6 kgf·m, 4.5 lb·ft)



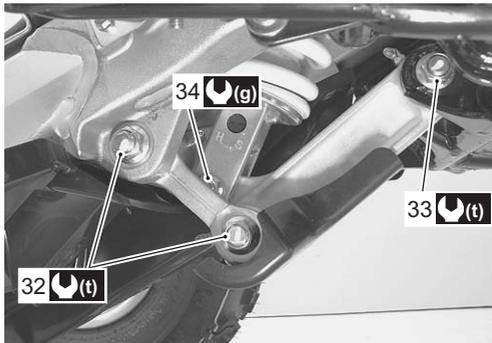
I933H1020074-05

22		Rear brake hose union bolt 23 N·m (2.3 kgf·m, 16.5 lb·ft)
23		Rear brake master cylinder rod lock-nut 18 N·m (1.8 kgf·m, 13.0 lb·ft)
24		Rear brake pedal nut 11 N·m (1.1 kgf·m, 8.0 lb·ft)
25		Seat rail mounting bolt (Upper) 66 N·m (6.6 kgf·m, 47.5 lb·ft)
26		Swingarm pivot nut 95 N·m (9.5 kgf·m, 68.5 lb·ft)
27		Rear brake master cylinder mounting bolt 10 N·m (1.0 kgf·m, 7.0 lb·ft)



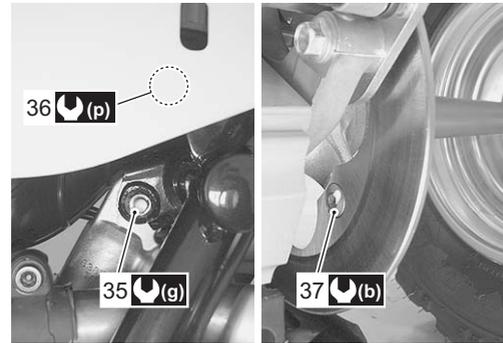
I933H1020075-02

28		Rear axle housing bolt 100 N-m (10.0 kgf-m, 72.5 lb-ft)
29		Rear sprocket mounting nut 60 N-m (6.0 kgf-m, 43.5 lb-ft)
30		Rear axle nut 240 N-m (24.0 kgf-m, 173.5 lb-ft)
31		Rear axle lock-nut 240 N-m (24.0 kgf-m, 173.5 lb-ft)



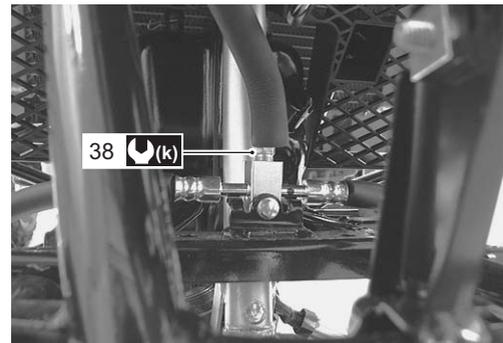
I933H1020076-02

32		Cushion rod nut 78 N-m (7.8 kgf-m, 56.5 lb-ft)
33		Cushion lever nut 78 N-m (7.8 kgf-m, 56.5 lb-ft)
34		Rear shock absorber mounting nut (Lower) 60 N-m (6.0 kgf-m, 43.5 lb-ft)



I933H1020077-04

35		Rear shock absorber mounting nut (Upper) 60 N-m (6.0 kgf-m, 43.5 lb-ft)
36		Seat rail mounting bolt (Lower) 66 N-m (6.6 kgf-m, 47.5 lb-ft)
37		Rear brake disc bolt 23 N-m (2.3 kgf-m, 16.5 lb-ft)



I933H1020080-02

38		Front brake pipe nut (Lower) 16 N-m (1.6 kgf-m, 11.5 lb-ft)
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Compression Pressure Check

B933H20206024

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

Oil Pressure Check

B933H20206025

Refer to "Oil Pressure Check in Section 1E (Page 1E-3)".

SDS Check

B933H20206026

Refer to "SDS Check in Section 1A (Page 1A-15)".

Specifications

Tightening Torque Specifications

B933H20207001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Exhaust pipe nut	23	2.3	16.5	☞ (Page 0B-4)
Muffler connecting bolt	23	2.3	16.5	☞ (Page 0B-4)
Muffler mounting bolt	23	2.3	16.5	☞ (Page 0B-4)
Spark arrester mounting bolt	13	1.3	9.5	☞ (Page 0B-10)
Oil drain plug	21	2.1	15.0	☞ (Page 0B-11)
Oil drain plug	12	1.2	8.5	☞ (Page 0B-11)
Engine coolant drain plug	6	0.6	4.5	☞ (Page 0B-14)
Rear axle housing bolt	100	10.0	72.5	☞ (Page 0B-16)
Chain adjuster nut	30	3.0	21.5	☞ (Page 0B-16)
Rear brake master cylinder rod lock-nut	18	1.8	13.0	☞ (Page 0B-18)
Parking brake adjuster lock-nut	18	1.8	13.0	☞ (Page 0B-18)
Wheel set nut (Front and Rear)	66	6.6	47.5	☞ (Page 0B-20)
Rear axle nut	240	24.0	173.5	☞ (Page 0B-21) / ☞ (Page 0B-21)
Rear axle lock-nut	240	24.0	173.5	☞ (Page 0B-21) / ☞ (Page 0B-21)

NOTE

The specified tightening torque is also described in the following.
“Chassis Bolts and Nuts Inspection (Page 0B-23)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H20208001

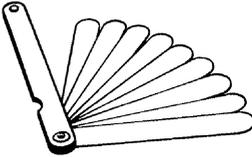
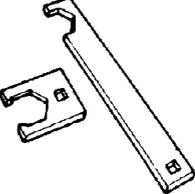
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page 0B-19)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞ (Page 0B-21)

NOTE

Required service material is also described in the following.
 “Lubrication Points (Page 0B-3)”

Special Tool

B933H20208002

09900-20803 Thickness gauge ☞ (Page 0B-6)		09900-20805 Tire depth gauge ☞ (Page 0B-20)	
09900-26006 Engine tachometer (solar cell type) ☞ (Page 0B-10)		09940-92460 Rear axle nut wrench set ☞ (Page 0B-21) / ☞ (Page 0B-21) / ☞ (Page 0B-21) / ☞ (Page 0B-21)	

Service Data

Specifications

Service Data

B933H20307001

Valve + Valve guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	36.0 (1.42)	—
	EX.	29.0 (1.14)	—
Tappet 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 stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	5.000 – 5.012 (0.1969 – 0.1973)	—
Valve stem O.D.	IN.	4.975 – 4.990 (0.1959 – 0.1965)	—
	EX.	4.955 – 4.970 (0.1951 – 0.1957)	—
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.	—	38.8 (1.53)
Valve spring tension	IN. & EX.	182 – 210 N (18.6 – 21.4 kgf, 41.0 – 47.2 lbs) at length 31.5 mm (1.24 in)	—

Camshaft + Cylinder head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	36.190 – 36.240 (1.4248 – 1.4268)	35.890 (1.4130)
	EX.	34.920 – 34.970 (1.3748 – 1.3768)	34.620 (1.3630)
Camshaft journal oil clearance	IN. & EX.	0.019 – 0.053 (0.0007 – 0.0021)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8666 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.972 – 21.993 (0.8650 – 0.8659)	—
Camshaft runout	—		0.10 (0.004)
Cam chain pin (at arrow "3")	15th pin		—
Cylinder head distortion	—		0.05 (0.002)

Cylinder + Piston + Piston ring

Unit: mm (in)

Item	Standard		Limit
Compression pressure (Automatic decomp. actuated)	Approx. 1 100 kPa (11.0 kgf/cm ² , 156 psi)		—
Piston-to-cylinder clearance	0.030 – 0.040 (0.0012 – 0.0016)		0.120 (0.0047)
Cylinder bore	90.000 – 90.015 (3.5433 – 3.5439)		Nicks or Scratches
Piston diam.	89.965 – 89.980 (3.5419 – 3.5425) Measure at 15 mm (0.6 in) from the skirt end.		89.880 (3.5386)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st	R	Approx. 6.9 (0.27)
	2nd	R	Approx. 11.5 (0.45)
Piston ring end gap	1st	R	0.08 – 0.20 (0.003 – 0.008)
	2nd	R	0.08 – 0.20 (0.003 – 0.008)
Piston ring-to-groove clearance	1st	—	0.180 (0.0071)
	2nd	—	0.150 (0.0059)

Item	Standard		Limit
Piston ring groove width	1st	0.78 – 0.80 (0.0307 – 0.0315)	—
		1.30 – 1.32 (0.0512 – 0.0520)	—
	2nd	0.81 – 0.83 (0.0319 – 0.0327)	—
	Oil	2.01 – 2.03 (0.0791 – 0.0799)	—
Piston ring thickness	1st	0.71 – 0.76 (0.0280 – 0.0299)	—
		1.08 – 1.10 (0.0425 – 0.0433)	—
	2nd	0.77 – 0.79 (0.0303 – 0.0311)	—
Piston pin bore	20.002 – 20.008 (0.7875 – 0.7877)		20.030 (0.7886)
Piston pin O.D.	19.995 – 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 deflection	—	3.0 (0.12)
Conrod big end side clearance	0.30 – 0.65 (0.012 – 0.026)	1.0 (0.04)
Conrod big end width	21.75 – 21.80 (0.856 – 0.858)	—
Crank web to web width	61.9 – 62.1 (2.43 – 2.44)	—
Crankshaft runout	—	0.08 (0.003)

Oil pump

Item	Standard	Limit
Oil pressure (at 60 °C, 140 °F)	20 – 60 kPa (0.2 – 0.6 kgf/cm ² , 2.8 – 8.5 psi) at 3 000 r/min	—

Clutch

Unit: mm (in)

Item	Standard	Limit
Clutch cable play	5 – 10 (0.2 – 0.4)	—
Drive plate thickness	(No. 1, No. 2 & No. 3) 2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
Drive plate claw width	(No. 1, No. 2 & No. 3) 13.7 – 13.8 (0.539 – 0.543)	13.2 (0.520)
Driven plate distortion	—	0.10 (0.004)
Clutch spring free length	52.5 (2.07)	49.9 (1.96)

Drive train + Drive chain

Unit: mm (in) Except ratio

Item	Standard	Limit	
Primary reduction ratio	2.960 (74/25)	—	
Final reduction ratio	2.857 (40/14)	—	
Gear ratios	Low	2.538 (33/13)	—
	2nd	1.666 (30/18)	—
	3rd	1.238 (26/21)	—
	4th	1.000 (23/23)	—
	Top	0.846 (22/26)	—
	Reverse	2.153 (28/13)	—
Gear shift fork to groove clearance	0.1 – 0.3 (0.004 – 0.012)	0.5 (0.020)	
Gear shift fork groove width	5.0 – 5.1 (0.197 – 0.201)	—	
Gear shift fork thickness	4.8 – 4.9 (0.189 – 0.193)	—	
Drive chain	Type	RK520SMOZ10S	—
	Links	96	—
	20-pitch length	—	319.4 (12.57)
Drive chain slack	30 – 40 (1.2 – 1.6)		—

0C-3 Service Data:**Thermostat + Radiator + Fan + Coolant**

Item	Standard		Note
Thermostat valve opening temperature	Approx. 76.5 °C (170 °F)		—
Thermostat valve lift	Over 4.5 mm (0.18 in) and at 90 °C (194 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.57 kΩ	—
	50 °C (122 °F)	Approx. 0.77 kΩ	—
	80 °C (176 °F)	Approx. 0.27 kΩ	—
	110 °C (230 °F)	Approx. 0.11 kΩ	—
Radiator cap valve opening pressure	108 – 137 kPa (1.08 – 1.37 kgf/cm ² , 15.4 – 19.5 psi)		—
Cooling fan operating temperature	OFF → ON	Approx. 98 °C (208 °F)	—
	ON → OFF	Approx. 93 °C (199 °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 including reserve	Reserve tank side	250 ml (0.3/0.2 US/Imp qt)	—
	Engine side	900 ml (1.0/0.8 US/Imp qt)	—

Injector + Fuel pump + Fuel pressure regulator

Item	Specification	Note
Injector resistance	9 – 17 Ω at 20 °C (68 °F)	
Fuel pump discharge amount	84 ml (2.8/3.0 US/Imp qt) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 294 kPa (2.94 kgf/cm ² , 42 psi)	

FI sensors

Item	Specification		Note
CKP sensor resistance	400 – 600 Ω		
CKP sensor peak voltage	1.0 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 1.7 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Closed	Approx. 0.6 kΩ	
	Opened	Approx. 3.8 kΩ	
TP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 3.8 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor output voltage	0.2 – 4.9 V		
ECT sensor resistance	Approx. 2.6 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	0.2 – 4.9 V		
IAT sensor resistance	Approx. 2.6 kΩ at 20 °C (68 °F)		
TO sensor resistance	15.0 – 25.0 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°
GP switch voltage	0.9 V and more		From 1st to Top
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	150 V and more		When cranking
FP relay input voltage	Battery voltage		

Throttle body

Item	Specification
Bore size	36 mm (1.42 in)
I.D. No.	33H0
Idle r/min	1 600 ± 100 r/min
Idle air screw	1-5/8 turns back
Throttle cable play	3 – 5 mm (0.12 – 0.20 in)

Electrical

Unit: mm (in)

Item	Specification		Note
Spark plug	Type	NGK: CR7E DENSO: U22ESR-N	
	Gap	0.7 – 0.8 (0.028 – 0.031)	
Spark performance	Over 8 (0.3) at 1 atm.		
CKP sensor resistance	400 – 600 Ω		
CKP sensor peak voltage	1.0 V and more		(+): BI, (-): G
Ignition coil resistance	Primary	0.1 – 1.0 Ω	Terminal – Terminal
	Secondary	12 – 20 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage	150 V and more		(+): B/W, (-): W/BI
Generator coil resistance	0.1 – 1.5 Ω		
Generator Max. output	200 W at 5 000 r/min		
Generator no-load voltage (When engine is cold)	55 V (AC) and more at 5 000 r/min		
Starter motor brush length	Standard	10 (0.39)	
	Limit	6.5 (0.26)	
Regulated voltage	13.5 – 15.0 V at 5 000 r/min		
Starter relay resistance	3 – 6 Ω		
Battery	Type designation	YTX9-BS	
	Capacity	12 V 28.8 kC (8 Ah)/10 HR	
Fuse size	Ignition	10 A	
	Cooling fan	10 A	
	Main	20 A	

Wattage

Unit: W

Item	Specification	
Headlight	HI	40
	LO	40
Brake light/Taillight	21/5	
Fuel indicator light	3.4	
Neutral indicator light	1.7	
Engine coolant temp. FI indicator light	1.7	
Reverse indicator light	1.7	

Brake + Wheel

Unit: mm (in)

Item	Standard	Limit
Rear brake pedal height	0 – 10 (0 – 0.4)	—
Brake caliper cylinder bore	Front	32.03 – 32.08 (1.2610 – 1.2630)
	Rear	33.96 – 34.01 (1.3370 – 1.3390)
Brake caliper piston diam.	Front	31.948 – 31.998 (1.2578 – 1.2598)
	Rear	33.878 – 33.928 (1.3338 – 1.3357)
Brake fluid type	DOT 4	—

0C-5 Service Data:

Item	Standard		Limit
Brake disc thickness	Front	2.8 – 3.2 (0.11 – 0.13)	2.5 (0.10)
	Rear	3.8 – 4.2 (0.15 – 0.17)	3.5 (0.14)
Brake disc runout	—		0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
	Rear	14.000 – 14.043 (0.5512 – 0.5529)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4994)	—
	Rear	13.957 – 13.984 (0.5495 – 0.5506)	—
Turning radius	3.3 m (10.8 ft)		—
Toe-out (with 75 kg, 165 lbs)	6 ± 4 (0.24 ± 0.16)		—
Camber	-2.4°		—
Caster	6.3°		—
Wheel rim size	Front	10 x 5.5 AT	—
	Rear	9 x 8.0 AT	—
Wheel axle runout	Rear	—	6.0 (0.24)

Tire

Unit: mm (in)

Item	Standard		Limit
Cold inflation tire pressure	Front	30 kPa (0.30 kgf/cm ² , 4.4 psi)	—
	Rear	30 kPa (0.30 kgf/cm ² , 4.4 psi)	—
Tire size	Front	AT22 x 7R10 ☆☆	—
	Rear	AT20 x 10R9 ☆☆	—
Tire type	Front	DUNLOP: KT331	—
	Rear	DUNLOP: KT335	—
Tire tread depth	Front	—	4.0 (0.16)
	Rear	—	4.0 (0.16)

Suspension

Unit: mm (in)

Item	Standard		Limit
Front shock absorber spring pre-load length	288.5 (11.36)		—
Front suspension damping force adjuster	Compression	1 and 1/4 turns out	—
Rear shock absorber spring pre-load length	234.8 (9.24)		—
Rear suspension damping force adjuster	Rebound	1 and 1/4 turns out	—
	Compression	2 turns out	—
Front wheel travel	215 (8.5)		—
Rear wheel travel	230 (9.1)		—
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) 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.	E-28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline type is recommended.	E-19
Fuel tank capacity	9.5 L (2.5/2.1 US/Imp qt)	
Engine oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA	
Engine oil capacity	Change	2 000 ml (2.1/1.8 US/Imp qt)
	Filter change	2 100 ml (2.2/1.8 US/Imp qt)
	Overhaul	2 200 ml (2.3/1.9 US/Imp qt)

Tightening Torque Specifications

B933H20307002

Engine

Item		N-m	kgf-m	lb-ft
Cylinder head cover bolt		14	1.4	10.0
Spark plug		11	1.1	8.0
Cylinder head bolt	(M10)	Initial	25	2.5
		Final	46	4.6
	(M6)	10	1.0	7.0
Cylinder base nut		10	1.0	7.0
Camshaft journal holder bolt		10	1.0	7.0
Balancer driven gear nut		50	5.0	36.0
Primary drive gear nut		140	14.0	101.5
Generator rotor nut		120	12.0	87.0
Clutch sleeve hub nut		70	7.0	50.5
Gearshift arm stopper		19	1.9	13.5
Gearshift cam stopper plate bolt		24	2.4	17.5
Cam chain tension adjuster bolt		10	1.0	7.0
Cam chain tensioner mounting bolt		10	1.0	7.0
Cam chain tension spring holder bolt		30	3.0	21.5
Engine oil drain plug (on the crankcase)		21	2.1	15.0
Engine oil drain plug (on the oil tank)		12	1.2	8.5
Crankcase bolt		11	1.1	8.0
Gear position switch mounting bolt		6.5	0.65	4.7
Oil hose union bolt (on the crankcase)		23	2.3	16.5
Starter motor lead wire nut		6	0.6	4.5
Starter motor mounting bolt		10	1.0	7.0
Starter motor brush holder mounting nut		7	0.7	5.0
Starter motor housing bolt		3	0.3	2.0
Valve timing inspection plug		23	2.3	16.5
Engine mounting nut and bolt		66	6.6	47.5
Engine mounting bracket bolt		26	2.6	19.0
Exhaust pipe nut		23	2.3	16.5
Muffler connection bolt		23	2.3	16.5
Muffler mounting bolt		23	2.3	16.5
Starter clutch bolt		10	1.0	7.0
Main oil gallery plug		18	1.8	13.0
Generator cover plug		15	1.5	11.0
Oil gallery plug [M6]		11	1.1	8.0
Oil gallery plug [M8]		13	1.3	9.5
Oil gallery plug [M12]		23	2.3	16.5
Oil gallery plug [Cylinder head]		10	1.0	7.0
Intake pipe mounting bolt		9	0.9	6.5
Generator startor set bolt		11	1.1	8.0
Generator lead wire bracket bolt		5.5	0.55	4.0
Air cleaner box mounting bolt		10	1.0	7.0
Oil pump mounting screw		8.5	0.85	6.0
Spark arrester mounting bolt		13	1.3	9.5
Gearshift pawl lifter screw		9	0.9	6.5

FI system and intake air system

Item	N-m	kgf-m	lb-ft
CKP sensor mounting bolt	5.5	0.55	4.0
Fuel pump mounting bolt	10	1.0	7.0
Fuel valve mounting bolt	10	1.0	7.0
IAT sensor mounting screw	2.5	0.25	2.0

0C-7 Service Data:**Cooling system**

Item	N·m	kgf·m	lb·ft
Water pump cover bolt	10	1.0	7.0
Engine coolant drain plug	6	0.6	4.5
ECT sensor	12	1.2	8.5

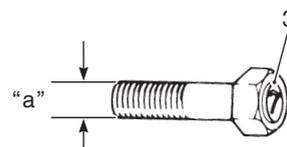
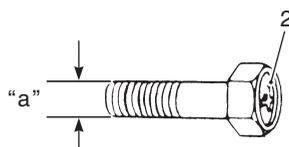
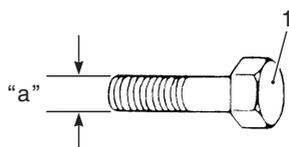
Chassis tightening torque

Item	N·m	kgf·m	lb·ft
Handlebar clamp bolt	26	2.6	19.0
Handlebar holder nut	60	6.0	43.5
Steering shaft holder bolt	23	2.3	16.5
Steering shaft nut	49	4.9	35.5
Steering knuckle end nut (Upper and Lower)	29	2.9	21.0
Tie-rod end nut	29	2.9	21.0
Tie-rod lock-nut	29	2.9	21.0
Front shock absorber mounting nut (Upper & Lower)	60	6.0	43.5
Wishbone arm pivot nut (Upper & Lower)	65	6.5	47.0
Front wheel hub nut	65	6.5	47.0
Rear wheel hub nut	121	12.1	87.5
Wheel set nut (Front & Rear)	66	6.6	47.5
Brake hose union bolt	23	2.3	16.5
Brake disc bolt (Front & Rear)	23	2.3	16.5
Brake air bleeder valve (Front & Rear)	6	0.6	4.5
Brake caliper mounting bolt (Front & Rear)	26	2.6	19.0
Brake master cylinder mounting bolt (Front & Rear)	10	1.0	7.0
Front brake caliper holder pin	18	1.8	13.0
Front brake caliper holder slide pin	23	2.3	16.5
Front brake pipe nut	16	1.6	11.5
Front brake pad mounting pin	18	1.8	13.0
Rear brake master cylinder rod lock-nut	18	1.8	13.0
Rear brake pedal nut	11	1.1	8.0
Rear brake pad mounting pin	18	1.8	13.0
Rear brake caliper holder pin	18	1.8	13.0
Rear brake caliper holder slide pin	23	2.3	16.5
Brake lever pivot bolt	6	0.6	4.5
Brake lever pivot bolt lock-nut	6	0.6	4.5
Parking brake bolt	23	2.3	16.5
Parking brake adjuster lock-nut	18	1.8	13.0
Footrest mounting bolt	55	5.5	40.0
Seat rail mounting bolt (Upper & Lower)	66	6.6	47.5
Rear sprocket mounting nut	60	6.0	43.5
Rear axle nut	240	24.0	173.5
Front fender mounting screw	12	1.2	8.5
Brake light/taillight mounting nut	5.5	0.55	4.0
Front shock absorber spring adjuster lock-nut	34	3.4	24.5
Rear shock absorber spring adjuster lock-nut	44	4.4	32.0
Rear axle lock-nut	240	24.0	173.5
Rear axle housing bolt	100	10.0	72.5
Swingarm pivot nut	95	9.5	68.5
Rear shock absorber mounting nut (Upper & Lower)	60	6.0	43.5
Cushion lever nut	78	7.8	56.5
Cushion rod nut	78	7.8	56.5
Cushion lever cover bolt	5.5	0.55	4.0
Drive chain roller mounting bolt	40	4.0	29.0
Chain adjuster nut	30	3.0	21.5

Tightening torque chart

For other nuts and bolts 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	lb-ft	N·m	kgf·m	lb-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



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

Section 1

Engine

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Special Tools and Equipment1K-5
Recommended Service Material 1K-5

Precautions

Precautions

Precautions for Engine

B933H21000001

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

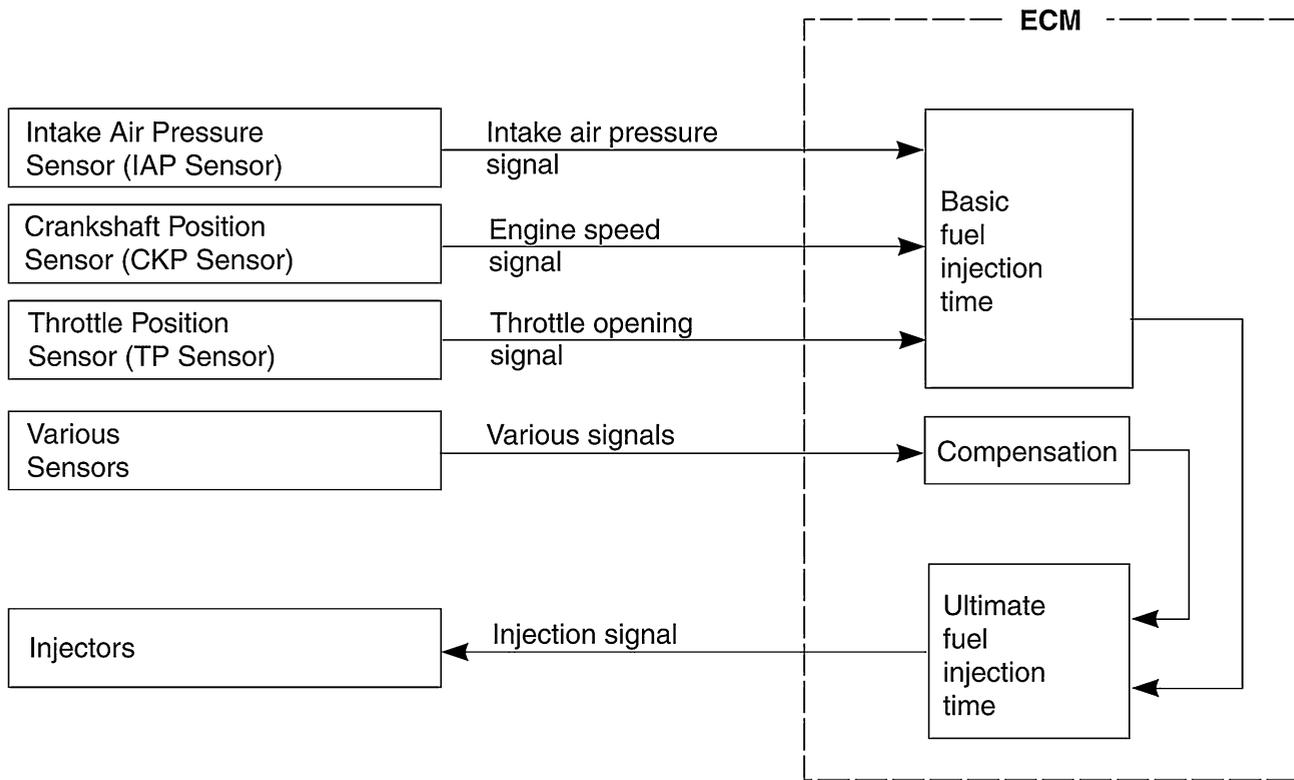
General Description

Injection Timing Description

B933H21101001

Injection time (Injection volume)

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



I718H1110268-03

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.
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.
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 vehicle tips over, the tip-over sensor sends a signal to the ECM. Then, this signal cuts OFF current supplied to the fuel pump, fuel injector and ignition coil.
OVER-REV. LIMITER SIGNAL	The fuel injector stops operation when engine rpm reaches rev. limit rpm. NOTE The fuel cut-off circuit is incorporated in this ECM in order to prevent over-running of engine. When engine speed reaches 9 300 r/min, this circuit cuts off fuel at the fuel injector.

Self-Diagnosis function

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

User mode

Malfunction		FI indicator light indication "A"
"NO"		—
"YES"	Engine can start	FI light turns ON. *1
	Engine can not start	FI light turns ON and blinks. *2

1A-3 Engine General Information and Diagnosis:

*1

When one of the signals is not received by ECM, the fail-safe circuit works and injection is not stopped. In this case, "FI" light is lighted in the indicator panel and vehicle can run.

*2

The injection signal is stopped, when the crankshaft position sensor signal, tip-over sensor signal, ignition signal, injector signal, fuel pump signal or ignition switch signal is not sent to ECM. In this case, "FI light" is lighted and blinked in the indicator panel. Vehicle can not run.

When ignition switch is turned ON, FI light is lit for 2 seconds and thereafter remains unlit.

The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the indicator panel does not receive any signal from ECM, and the indicator panel does not light "FI light".

If FI light is not lighted when turning the ignition switch to ON, the FI light does not indicate the trouble code.

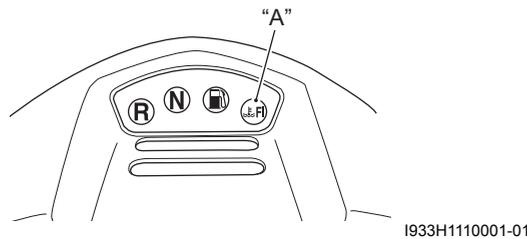
It is necessary to check the wiring harness between ECM and indicator panel couplers.

The possible cause of this indication is as follows;

Engine stop switch is in OFF position. Ignition fuse is burnt.

NOTE

The FI light blinks quickly two times a second when the engine coolant temperature becomes too high.



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 FI light. Malfunction means that the ECM does not receive signal from the devices. These affected devices are indicated in the code form.

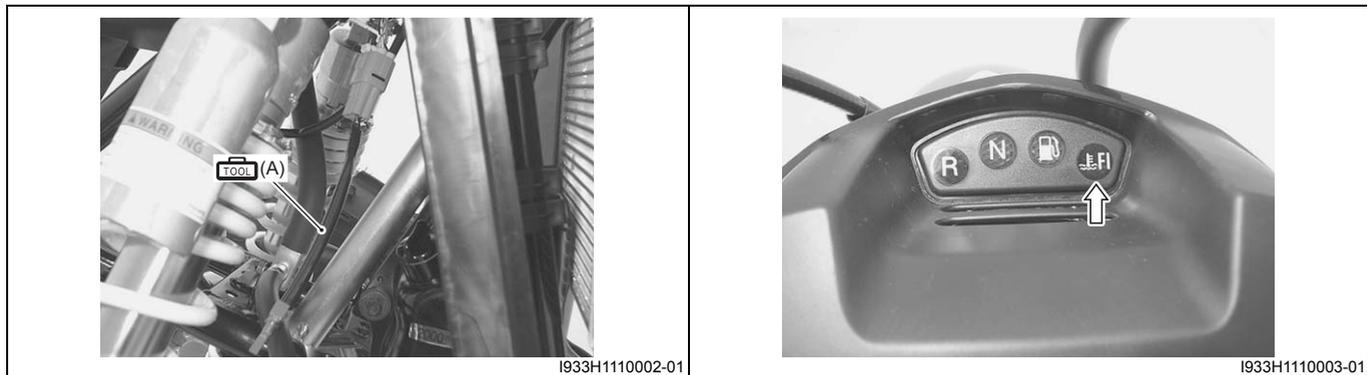
⚠ CAUTION

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

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

Special tool

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

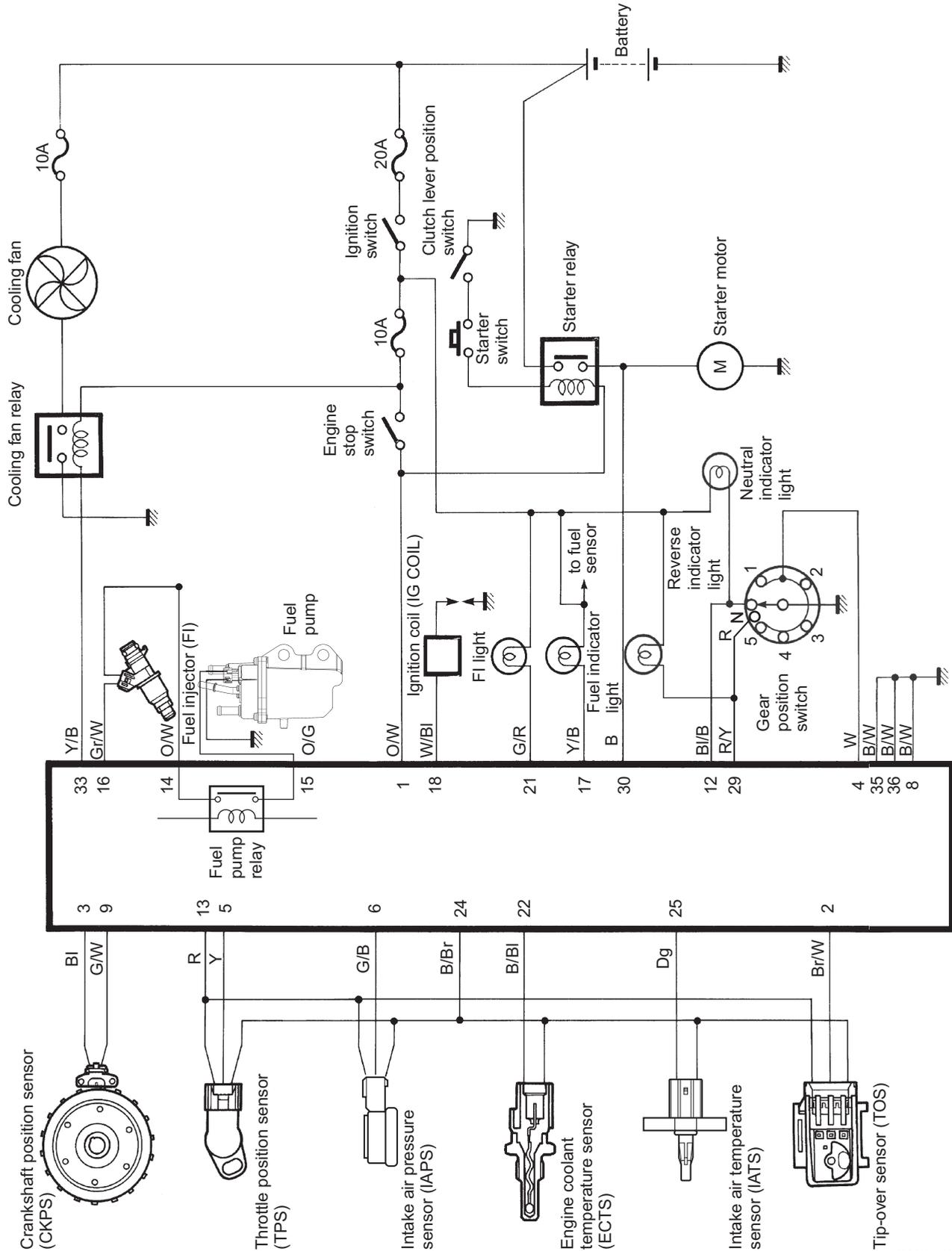


Malfunction	FI light indication	Indication mode
"NO"	FI light turns OFF.	—
"YES"	FI indicator light turns ON and blinks. (code is indicated from small numeral to large one.)	Refer to "DTC Table (Page 1A-18)".

Schematic and Routing Diagram

FI System Wiring Diagram

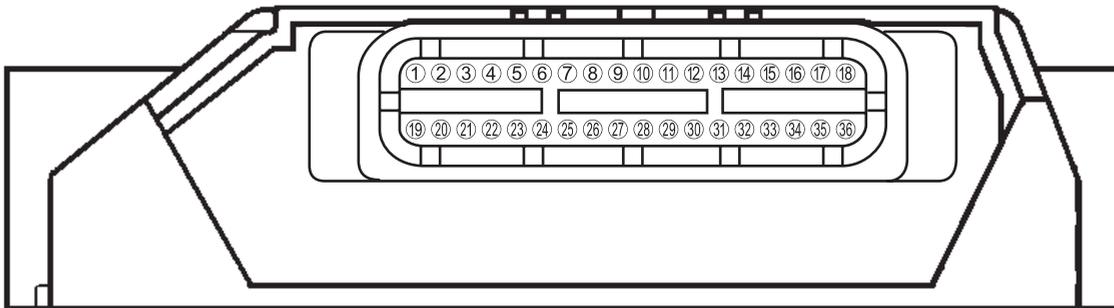
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Terminal Alignment of ECM Coupler

B933H21102002



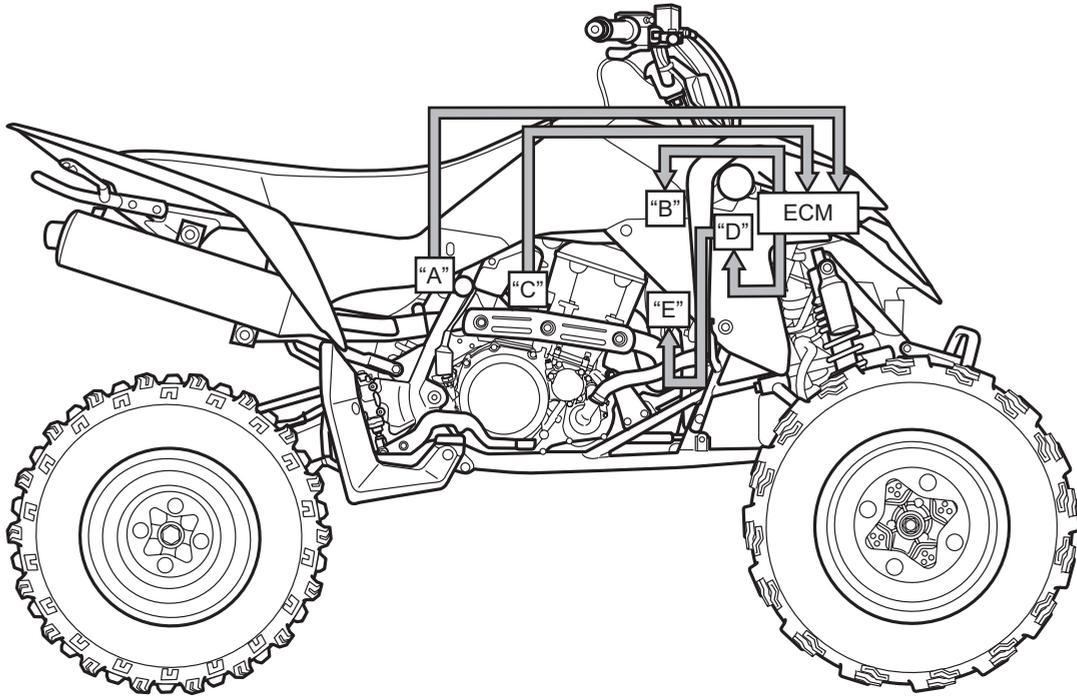
I933H1110005-01

Terminal No.	Circuit	Terminal No.	Circuit
1	Power source	19	—
2	TO sensor signal (TOS)	20	—
3	CKP sensor signal (CKP+)	21	FI/ECT indicator
4	GP switch signal (GP)	22	ECT sensor signal (ECT)
5	TP sensor signal (TP)	23	—
6	IAP sensor signal (IAP)	24	Sensors ground (E2)
7	—	25	IAT sensor signal (IAT)
8	ECM ground (E1)	26	—
9	CKP sensor signal (CKP-)	27	—
10	Serial data of self-diagnosis	28	—
11	—	29	Reverse switch signal (REV)
12	Neutral switch (NT)	30	Starter motor (STA)
13	Power source for sensors (VCC)	31	—
14	Fuel pump power source (FPP)	32	—
15	Fuel pump (FP)	33	Cooling fan relay (FAR)
16	Injector (#11)	34	Mode select switch
17	Fuel indicator	35	Ground (E01)
18	Ignition coil	36	Ground (E02)

Component Location

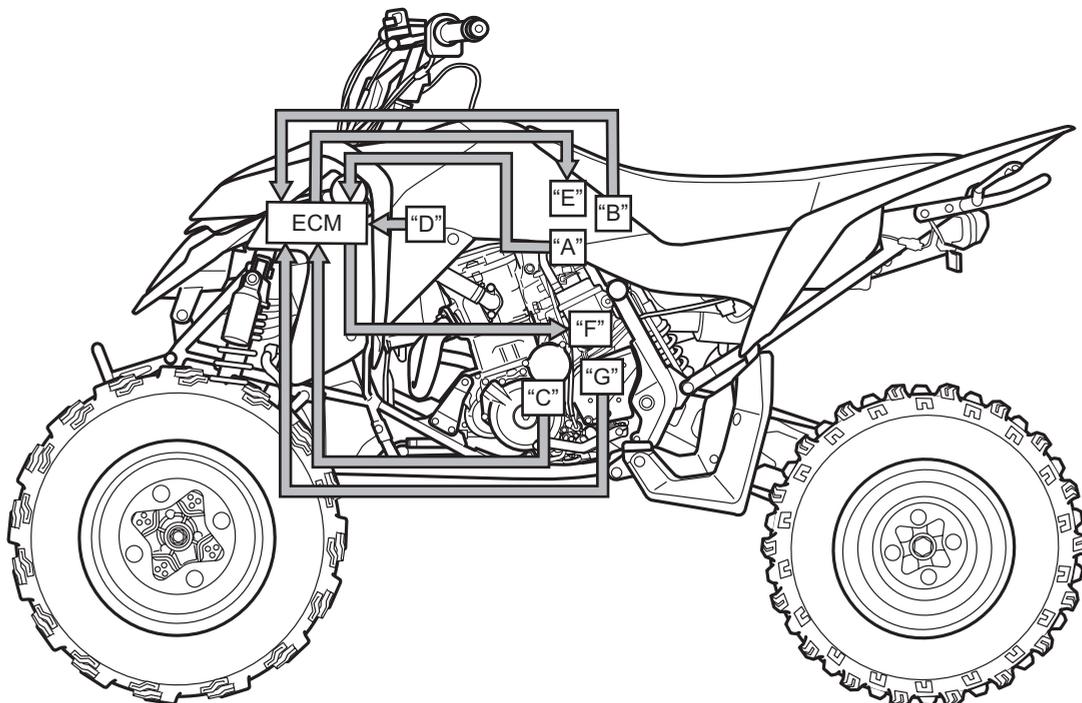
FI System Parts Location

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I933H1110006-01

"A": Intake air temperature sensor (IATS)	"C": Engine coolant temperature sensor (ECTS)	"E": Cooling fan
"B": Ignition coil (IG COIL)	"D": Cooling fan relay	



I933H1110007-02

"A": Intake air pressure sensor (IAPS)	"C": Crankshaft position sensor (CKPS)	"E": Fuel injector	"G": Gear position switch
"B": Throttle position sensor (TPS)	"D": Tip-over sensor (TOS)	"F": Fuel pump (FP)	

Diagnostic Information and Procedures

Engine Symptom Diagnosis

B933H21104001

Condition	Possible cause	Correction / Reference Item
Engine will not start or is hard to start (Compression too low)	Valve clearance out of adjustment.	<i>Adjust.</i>
	Worn valve guides or poor seating of valves.	<i>Repair or replace.</i>
	Mistimed valves.	<i>Adjust.</i>
	Excessively worn piston rings.	<i>Replace.</i>
	Worn-down cylinder bore.	<i>Replace.</i>
	Starter motor cranks too slowly.	<i>Refer to "Starting System Diagram in Section 11 (Page 11-1)".</i>
	Poor seating of spark plug.	<i>Retighten.</i>
Engine will not start or is hard to start (Plugs not speaking)	Fouled spark plug.	<i>Clean.</i>
	Wet spark plug.	<i>Clean and dry.</i>
	Defective ignition coil.	<i>Replace.</i>
	Open or short in high-tension cord.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Repair or replace.</i>
Engine will not start or is hard to start (No fuel reaching the intake manifold)	Clogged fuel filter or fuel hose.	<i>Clean or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel injector.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Check and repair.</i>
	Clogged or defective fuel valve.	<i>Clean or replace.</i>
Engine will not start or is hard to start (Incorrect fuel/air mixture)	TP sensor out of adjustment.	<i>Adjust.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
Engine idles poorly	Valve clearance out of adjustment.	<i>Adjust.</i>
	Poor seating of valves.	<i>Replace or repair.</i>
	Defective valve guides.	<i>Replace.</i>
	Worn down camshafts.	<i>Replace.</i>
	Too wide spark plug gaps.	<i>Adjust or replace.</i>
	Defective ignition coil.	<i>Replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Damaged or cracked vacuum hose.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.
Clogged fuel filter.		<i>Clean or replace.</i>
Defective fuel pump.		<i>Replace.</i>
Damaged or cracked vacuum hose.		<i>Replace.</i>
Defective ECT sensor.		<i>Replace.</i>
Defective thermostat.		<i>Replace.</i>
Engine stalls often (Fuel injector improperly operating)	Defective IAT sensor.	<i>Replace.</i>
	Defective fuel injector.	<i>Replace.</i>
	No injection signal from ECM.	<i>Repair or replace.</i>
	Open or short circuited wiring connection.	<i>Repair or replace.</i>
	Defective battery or low battery voltage.	<i>Replace or recharge.</i>

Condition	Possible cause	Correction / Reference Item
Engine stalls often (Control circuit or sensor improperly operating)	Defective ECM.	Replace.
	Defective fuel pump.	Replace.
	Defective TP sensor.	Replace.
	Defective IAT sensor.	Replace.
	Defective CKP sensor.	Replace.
	Defective ECT sensor.	Replace.
Engine stalls often (Engine parts improperly operating)	Fouled spark plug.	Clean.
	Defective CKP sensor or ECM.	Replace.
	Clogged fuel hose.	Clean.
	Out of adjustment tappet clearance.	Adjust.
Engine noisy (Excessive valve chatter)	Too large tappet clearance.	Adjust.
	Weakened or broken valve springs.	Replace.
	Worn tappet or cam surface.	Replace.
	Worn and burnt camshaft journal.	Replace.
Engine noisy (Noise seems to come from piston)	Worn down pistons or cylinder.	Replace.
	Combustion chambers fouled with carbon.	Clean.
	Worn piston pin or piston pin bore.	Replace.
	Worn piston rings or ring grooves.	Replace.
Engine noisy (Noise seems to come from timing chain)	Stretched chain.	Replace.
	Worn sprockets.	Replace.
	Tension adjuster not working.	Repair or replace.
Engine noisy (Noise seems to come from crankshaft)	Rattling bearings due to wear.	Replace.
	Worn and burnt journal bearings.	Replace.
	Worn and burnt crank pin bearing.	Replace.
Engine noisy (Noise seems to come from transmission)	Worn or rubbing gears.	Replace.
	Worn splines.	Replace.
	Worn or rubbing primary gears.	Replace.
	Worn bearings.	Replace.
Engine noisy (Noise seems to come from water pump)	Worn or damaged impeller shaft.	Replace.
	Worn or damaged mechanical seal.	Replace.
	Contact between pump case and impeller.	Replace.
Engine runs poorly in high speed range (Defective engine internal/electrical parts)	Weakened valve springs.	Replace.
	Worn camshaft.	Replace.
	Valve timing out of adjustment.	Adjust.
	Too narrow spark plug gap.	Adjust.
	Ignition not advanced sufficiently due to poorly working timing advance circuit.	Replace ECM.
	Defective ignition coil.	Replace.
	Defective CKP sensor.	Replace.
	Defective ECM.	Replace.
	Clogged air cleaner element.	Clean.
	Clogged fuel hose, resulting in inadequate fuel supply to injector.	Clean and prime.
	Defective fuel pump.	Replace.
	Defective TP sensor.	Replace.
Engine runs poorly in high speed range (Defective air flow system)	Clogged air cleaner element.	Clean or replace.
	Defective throttle valve.	Adjust or replace.
	Sucking air from throttle body joint.	Repair or replace.
	Defective ECM.	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 IAP sensor.	Replace.
	Defective CKP sensor.	Replace.
	Defective ECM.	Replace.
	Defective GP sensor.	Replace.
	TP sensor out of adjustment.	Adjust.

1A-9 Engine General Information and Diagnosis:

Condition	Possible cause	Correction / Reference Item
Engine lacks power (Defective engine internal/ electrical parts)	Loss of tappet clearance.	<i>Adjust.</i>
	Weakened valve springs.	<i>Replace.</i>
	Valve timing out of adjustment.	<i>Adjust.</i>
	Worn piston rings or cylinder.	<i>Replace.</i>
	Poor seating of valves.	<i>Repair.</i>
	Fouled spark plug.	<i>Clean or replace.</i>
	Incorrect spark plug.	<i>Adjust or replace.</i>
	Clogged fuel injector.	<i>Clean.</i>
	TP sensor out of adjustment.	<i>Adjust.</i>
	Clogged air cleaner element.	<i>Clean.</i>
	Sucking air from throttle valve or vacuum hose.	<i>Retighten or replace.</i>
	Too much engine oil.	<i>Drain out excess oil.</i>
	Defective fuel pump or ECM.	<i>Replace.</i>
	Defective CKP sensor and ignition coil.	<i>Replace.</i>
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	<i>Repair or replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective GP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	TP sensor out of adjustment.	<i>Adjust.</i>
Engine overheats (Defective engine internal parts)	Heavy carbon deposit on piston crown.	<i>Clean.</i>
	Not enough oil in the engine.	<i>Add oil.</i>
	Defective oil pump or clogged oil circuit.	<i>Replace or clean.</i>
	Use of incorrect engine oil.	<i>Change.</i>
	Sucking air from intake pipe.	<i>Retighten or replace.</i>
	Defective cooling system.	<i>Refer to "Engine Cooling Symptom Diagnosis in Section 1F (Page 1F-4)".</i>
Engine overheats (Lean fuel/air mixture)	Short-circuited IAP sensor/lead wire.	<i>Repair or replace.</i>
	Short-circuited IAT sensor/lead wire.	<i>Repair or replace.</i>
	Sucking air from intake pipe joint.	<i>Repair or replace.</i>
	Defective fuel injector.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
Engine overheats (The other factors)	Ignition timing too advanced due to defective timing advance system (ECT sensor, GP sensor, CKP sensor and ECM.)	<i>Replace.</i>
	Drive chain is too tight.	<i>Adjust.</i>
Dirty or heavy exhaust smoke	Worn piston rings or cylinders.	<i>Replace.</i>
	Too much engine oil in the engine.	<i>Check and drain excess oil.</i>
	Worn valve guides.	<i>Replace.</i>
	Scored or scuffed cylinder wall.	<i>Replace.</i>
	Worn valves stems.	<i>Replace.</i>
	Defective stem seals.	<i>Replace.</i>
	Worn oil ring side rails.	<i>Replace.</i>

Self-Diagnostic Procedures

B933H21104002

Use of mode select switch

NOTE

- Do not disconnect coupler from ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection will 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-Diagnostic Procedures (Page 1A-10)”.) 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 left side 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)

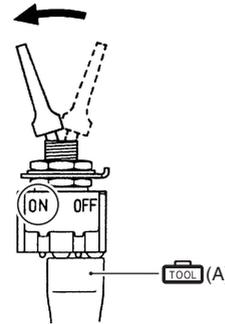


I933H1110008-01

- 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 to determine the malfunction part. Refer to “DTC Table (Page 1A-18)”.

Special tool

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



I718H1110006-04



I933H1110003-01

- 6) After repairing the trouble, turn OFF the ignition switch and turn ON again. If DTC does not indicate, the malfunction is cleared.

NOTE

- Even though DTC (FI light blinks) is not 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 wire coupler of any sensor is disconnected. Therefore, when a 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-12)”.

- 7) Turn the ignition switch OFF and disconnect the special tool from the mode select switch coupler.
- 8) Reinstall the left side cover.

1A-11 Engine General Information and Diagnosis:

Use of SDS

NOTE

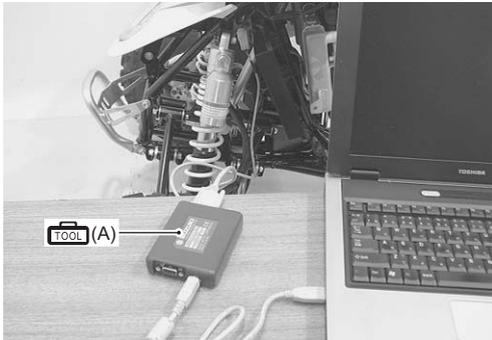
- Do not disconnect the coupler from ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming DTC (Diagnostic Trouble Code) stored in memory. Such disconnection will erase the memorized information in ECM memory.
- DTC stored in ECM memory can be checked by the 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 left side 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.)

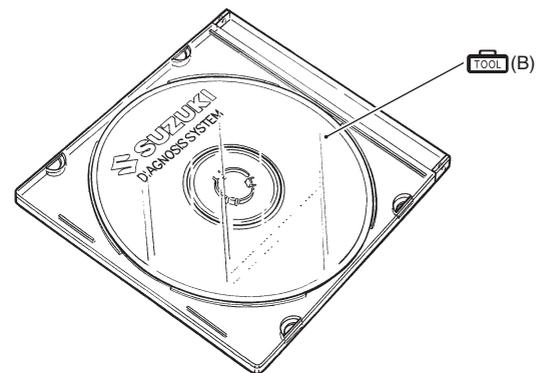
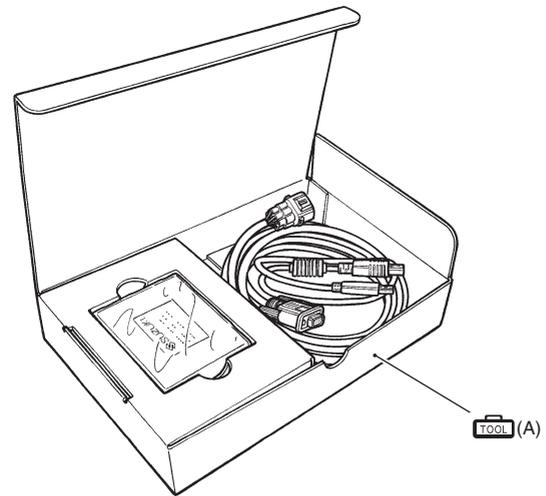
Special tool

 (A): 09904-41010 (SDS set)

 (B): 99565-01010-016 (CD-ROM Ver.16)

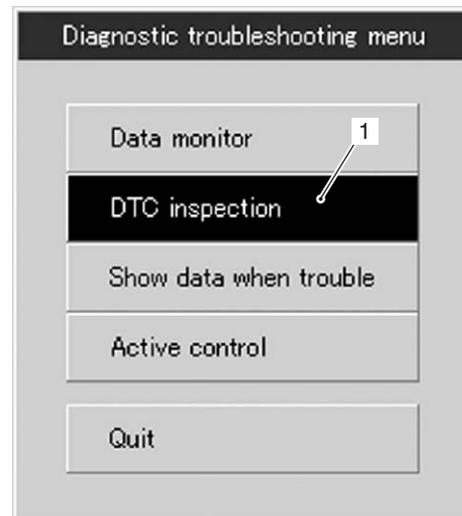


I933H1110009-01



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-18)".

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-13)".)
- 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-12)".
- 7) Close the SDS tool and turn the ignition switch OFF.
- 8) Disconnect the SDS tool and install the left side cover.

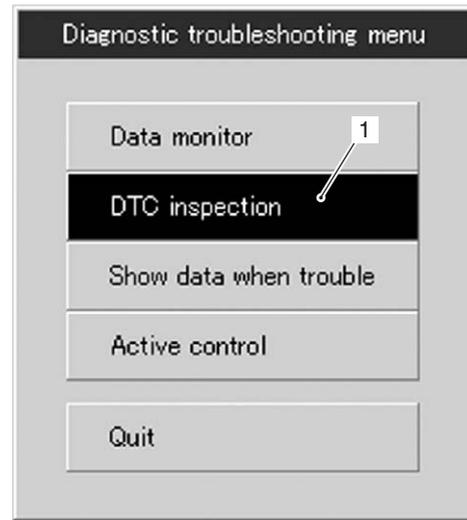
Use of SDS Diagnosis Reset Procedures

B933H21104003

NOTE

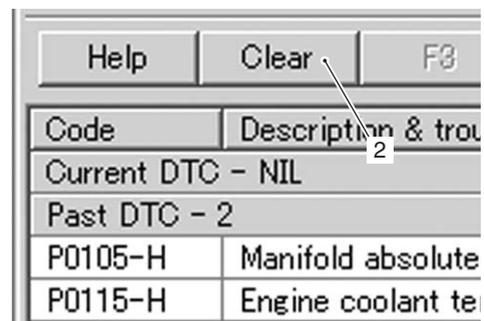
The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.

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



I705H1110003-01

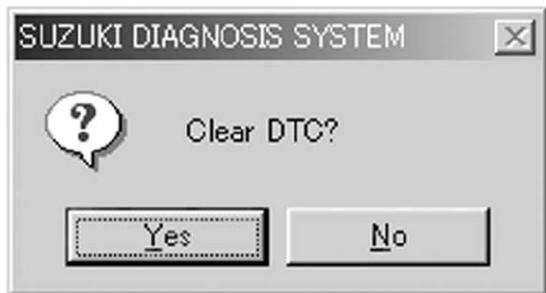
- 3) Check the DTC.
- 4) The previous malfunction history code (Past DTC) still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS tool.
- 5) Click "Clear" (2) to delete history code (Past DTC).



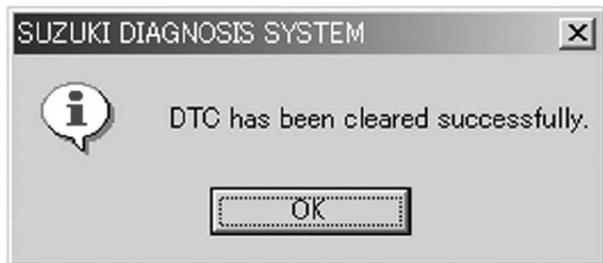
I705H1110005-01

1A-13 Engine General Information and Diagnosis:

6) Follow the displayed instructions.

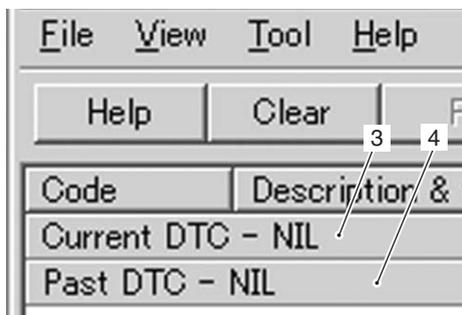


I705H1110006-01



I705H1110009-01

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



I705H1110008-01

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

9) Disconnect the SDS tool and install the left side cover.

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

B933H21104004

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 vehicle 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.

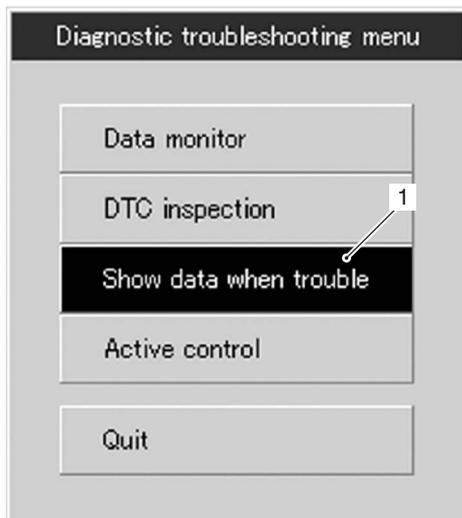
Failure #1

P0110-H Intake air temperature circuit malfunction

Item	Pre-detect	Detect poi...	Post-dete...
Engine speed	1082	1327	1175
Throttle position	32.4	32.4	32.4
Manifold absolute pressure 1	98.1	93.5	98.1
Engine coolant / oil temperature	37.8	37.8	37.8
Gear position	N	N	N

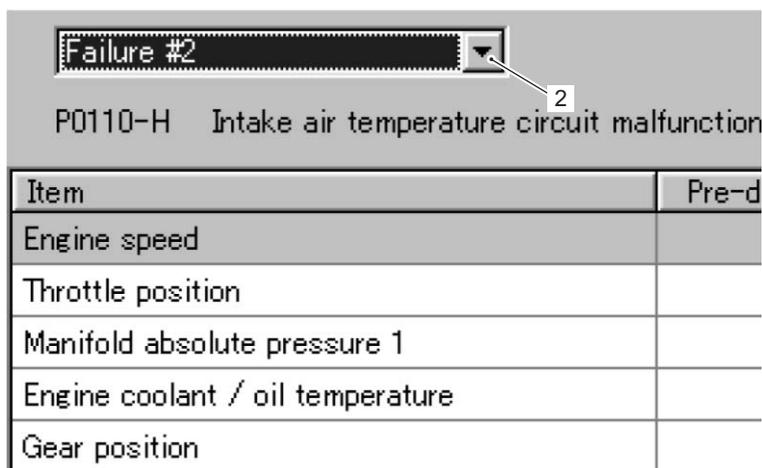
I831G1110016-02

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.



I831G1110017-01

1A-15 Engine General Information and Diagnosis:

SDS Check

B933H21104005

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 left side 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

 : 09904-41010 (SDS set)

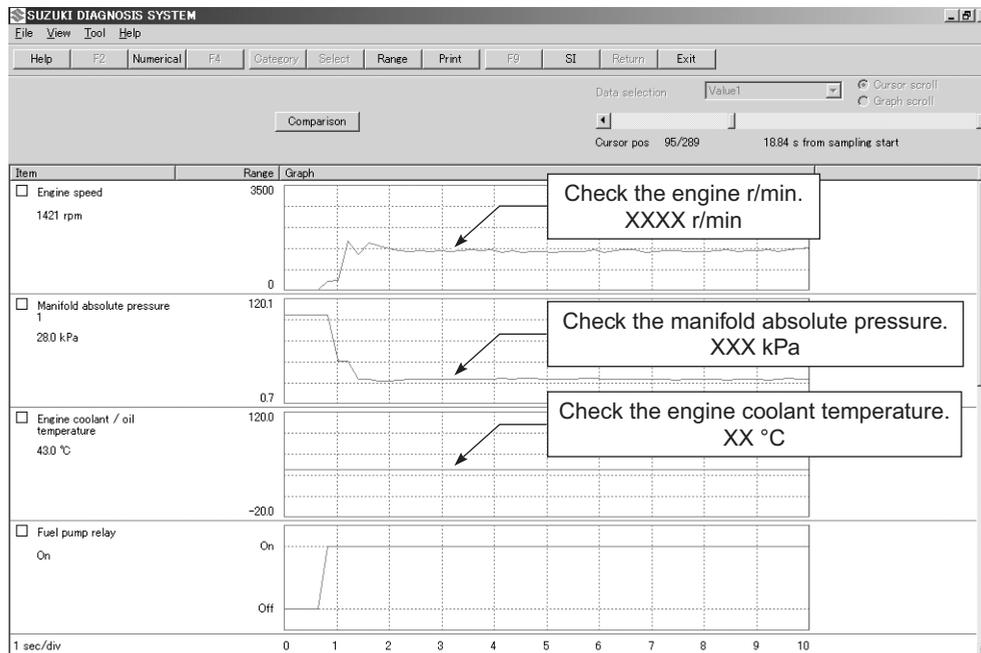
 : 99565-01010-016 (CD-ROM Ver.16)

NOTE

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

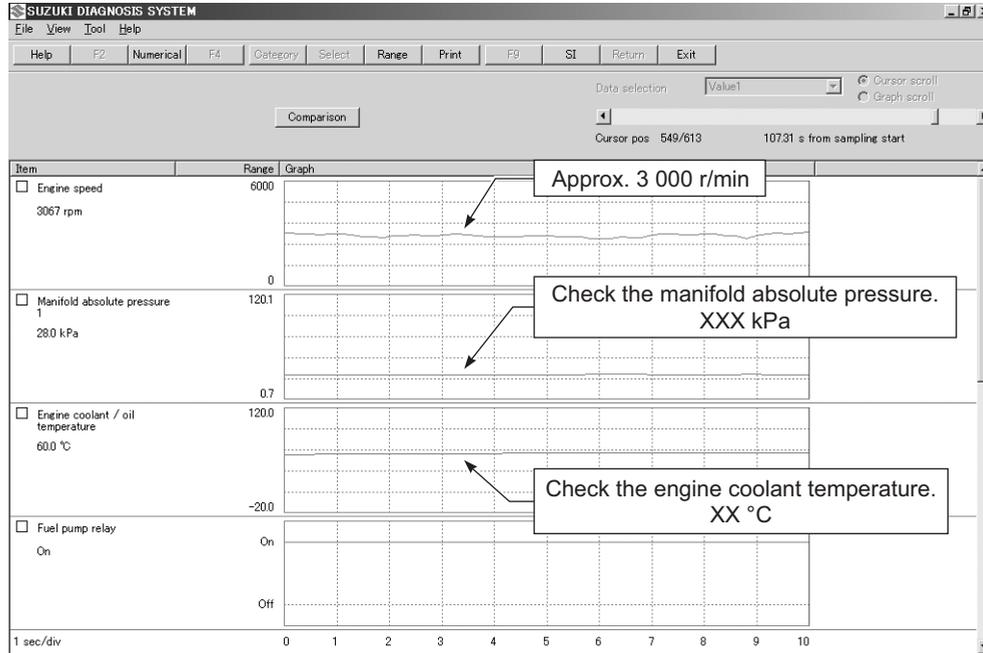
Sample

Data sampled from cold starting through warm-up



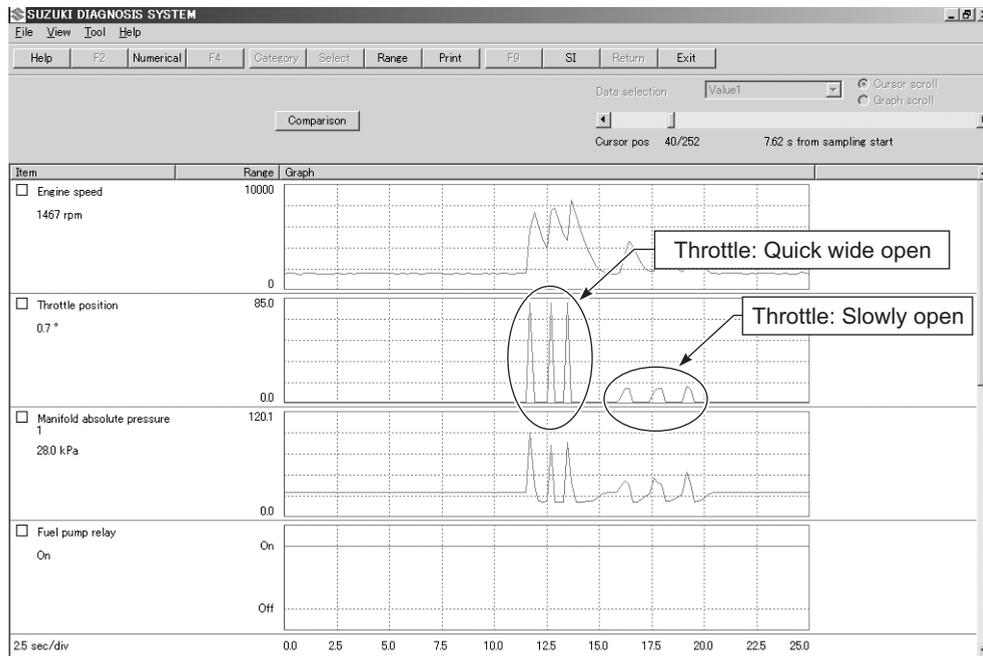
I933H1110074-01

Data at 3 000 r/min under no load



I933H1110075-01

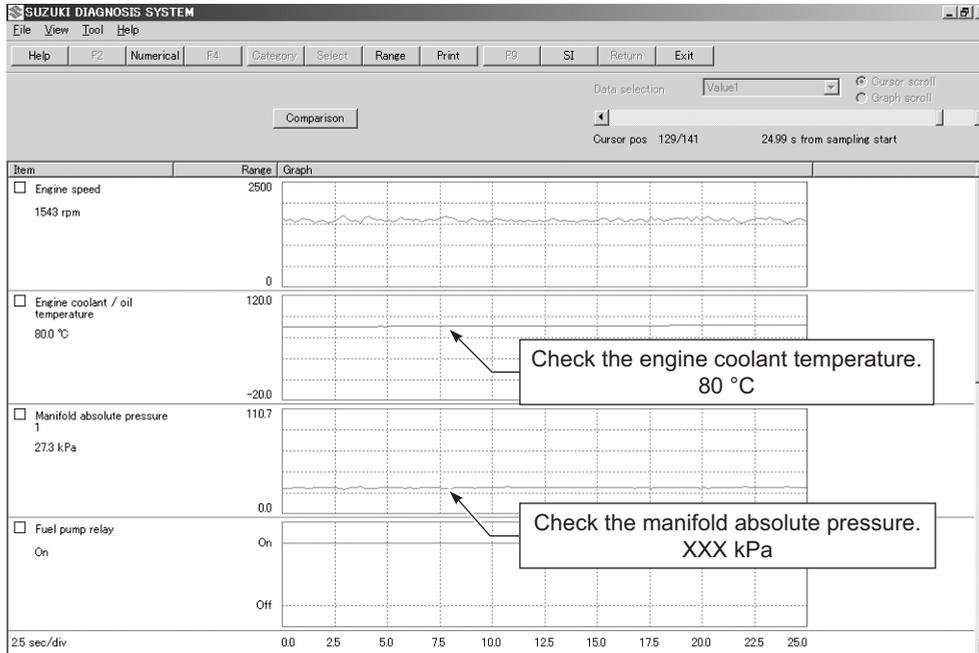
Data at the time of racing



I933H1110076-01

1A-17 Engine General Information and Diagnosis:

Data of intake negative pressure during idling (80 °C)



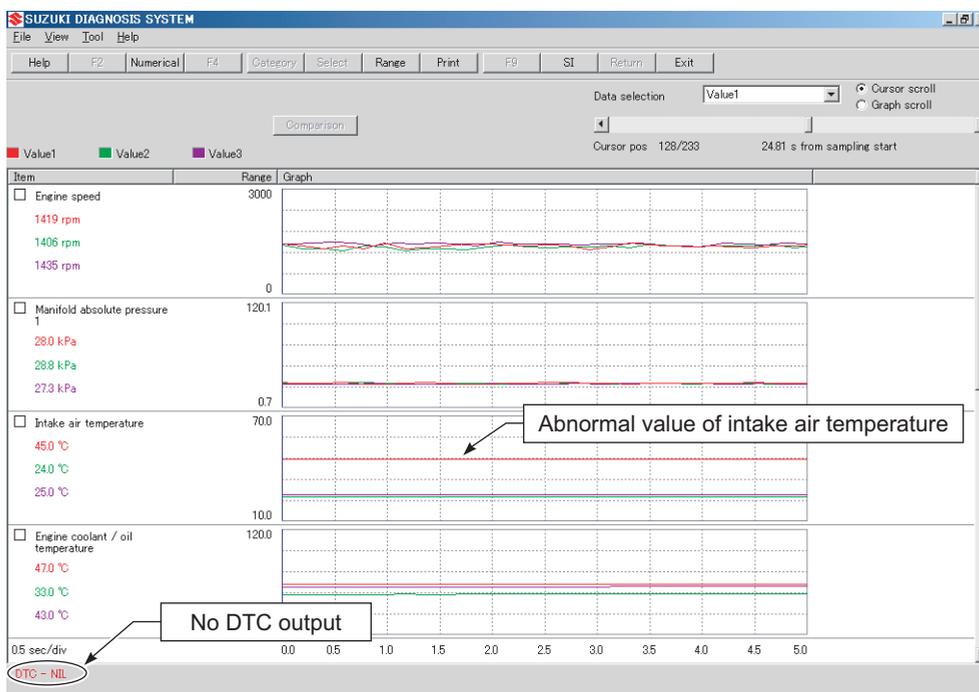
I933H1110077-01

Example of trouble

Three data; value 3 (current data 3), value 2 (past data 2) and value 1 (past data 1); 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.

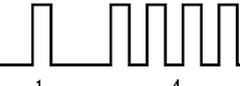
NOTE

With DTC not output, if the value of intake air temperature is found to be higher than the data saved previously, the possible cause may probably lie in a sensor circuit opened, ground circuit opened or influence of internal resistance value changes, etc.



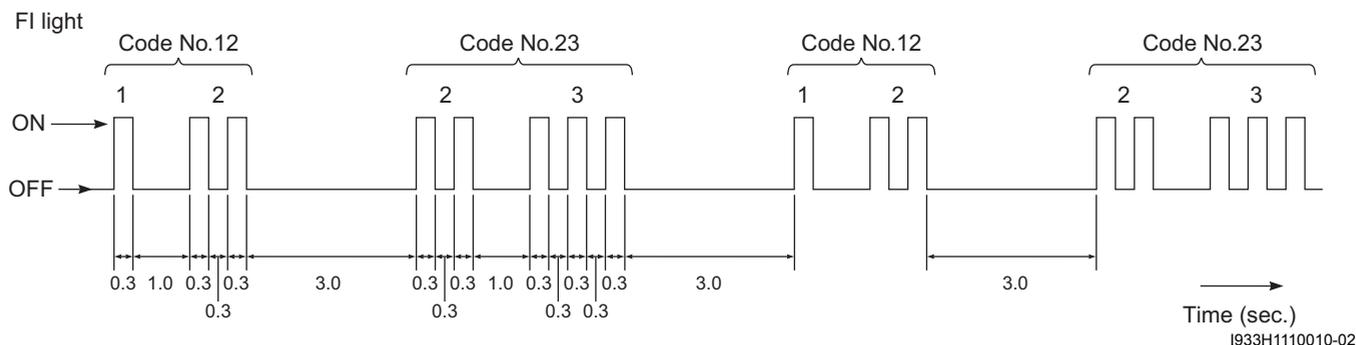
I933H1110078-02

DTC Table

Code	FI light flashing pattern	Malfunction part	Remarks
C00	 MCODE00C00-0-03	None	
C12 ☞(Page 1A-23)	 MCODE00C12-0-02	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
C14 ☞(Page 1A-26)	 MCODE00C14-0-02	Throttle position sensor (TPS)	
C15 ☞(Page 1A-34)	 MCODE00C15-0-02	Engine coolant temperature sensor (ECTS)	
C17 ☞(Page 1A-40)	 MCODE00C17-0-01	Intake air pressure sensor (IAPS)	
C21 ☞(Page 1A-47)	 MCODE00C21-0-03	Intake air temperature sensor (IATS)	
C23 ☞(Page 1A-52)	 MCODE00C23-0-02	Tip-over sensor (TOS)	
C24 ☞(Page 1A-58)	 MCODE00C24-0-01	Ignition signal (IG coil)	IG coil
C31 ☞(Page 1A-58)	 MCODE00C31-0-01	Gear position signal (GP switch)	GP switch
C32 ☞(Page 1A-60)	 MCODE00C32-0-02	Injector signal (FI)	Fuel injector
C41 ☞(Page 1A-63)	 MCODE00C41-0-01	Fuel pump control system (FP control system)	ECM
C60 ☞(Page 1A-65)	 MCODE00C60-0-01	Cooling fan control system	Cooling fan relay

1A-19 Engine General Information and Diagnosis:

EXAMPLE: When CKP sensor and TO sensor defective (DTC No.12 and 23)



In the FI light, the DTC is indicated from small code to large code.

Fail-Safe Function Table

B933H21104007

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

Item	Fail-Safe mode	Starting ability	Running ability
IAP sensor	Intake air pressure is fixed to 101 kPa (760 mmHg).	“YES”	“YES”
TP sensor	The throttle opening is fixed to full open position. Ignition timing is also fixed.	“YES”	“YES”
ECT sensor	Engine coolant temperature value is fixed to 80 °C (176 °F).	“YES”	“YES”
IAT sensor	Intake air temperature value is fixed to 40 °C (104 °F).	“YES”	“YES”
Gear position signal	Gear position signal is fixed to neutral gear.	“YES”	“YES”

The engine can start and can run even if the above signal 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 vehicle to the workshop for complete repair.

FI System Troubleshooting

Customer complaint analysis

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

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

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

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

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

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

NOTE

The above form is a standard sample. The form should be modified according to condition and characteristics of each market.

1A-21 Engine General Information and Diagnosis:

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-11)”.
- 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-11)”.
- Clogged air cleaner element. Refer to “Air Cleaner Element Cleaning in Section 0B (Page 0B-4)”.
- Battery condition.
- Throttle cable play. Refer to “Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-10)”.
- Vacuum hose looseness, bend and disconnection.
- Broken fuse.
- FI light operation. Refer to “Indicator Light Inspection in Section 9C (Page 9C-2)”.
- Each indicator light operation. Refer to “Indicator Light Inspection in Section 9C (Page 9C-2)”.
- Exhaust gas leakage and noise. Refer to “Exhaust System Inspection in Section 1K (Page 1K-4)”.
- Each coupler disconnection.
- Clogged radiator fins. Refer to “Radiator Inspection and Cleaning in Section 1F (Page 1F-5)”.

Malfunction Code and Defective Condition Table

B933H21104009

Malfunction code	Detected item		Detected failure condition	Check for	
C00	NO FAULT		—	—	
C12	CKP sensor		The signal does not reach ECM for 1 sec. or more, after receiving the IAP sensor input signal.	CKP sensor wiring and mechanical parts. CKP sensor, lead wire/coupler connection.	
P0335					
C14	TP sensor		The sensor should produce following voltage. $0.4\text{ V} \leq \text{sensor voltage} < 4.5\text{ V}$ 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 the ground or VCC circuit open.
C15	ECT sensor		The sensor voltage should be the following. $0.2\text{ V} \leq \text{sensor voltage} < 4.9\text{ V}$ In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection.	
P0115			H	Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open.
			L	Sensor voltage is lower than specified value.	ECT sensor circuit shorted to the ground.
C17	IAP sensor		The sensor should produce following voltage. $0.2\text{ V} \leq \text{sensor voltage} < 4.1\text{ V}$ In other than the above range, C17 (P1750) is indicated.	IAP sensor, lead wire/coupler connection.	
P0105			H	Sensor voltage is higher than specified value.	IAP sensor circuit shorted to VCC or ground circuit open.
			L	Sensor voltage is lower than specified value.	IAP sensor circuit open or shorted to ground or VCC circuit open.

Malfunction code	Detected item	Detected failure condition	Check for	
C21	IAT sensor	The sensor voltage should be the following. 0.2 V ≤ sensor voltage < 4.9 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 the ground.
C23	TO sensor	The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 V ≤ sensor voltage < 4.7 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 the ground or VCC circuit open.
C24	Ignition signal	CKP sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted 5 times or more continuously. In this case, the code C24 (P0351) is indicated.	Ignition coil, wiring/coupler connection, power supply from the battery.	
P0351				
C31	Gear position signal	Gear position signal voltage should be higher than the following for 3 seconds and more. Gear position sensor voltage ≥ 0.9 V. If lower than the above value, C31 (P0705) is indicated.	GP switch, wiring/coupler connection, gearshift cam, etc.	
P0705				
C32	Fuel injector	CKP sensor (pick-up coil) signal is produced, but fuel injector signal is interrupted 8 times or more continuously. In this case, the code C32 (P0201) is indicated.	Fuel injector, wiring/coupler connection, power supply to the injector.	
P0201				
C41	Fuel pump relay	No voltage is applied to the fuel pump, although fuel pump relay is turned ON. NOTE The FP relay is incorporated in the ECM.	Fuel pump relay, lead wire/coupler connection, power source to the fuel pump relay and fuel injectors.	
P0230				
C60	Cooling fan relay	Cooling fan relay signal is not input to ECM.	Cooling fan relay, lead wire/coupler connection.	
P0480				

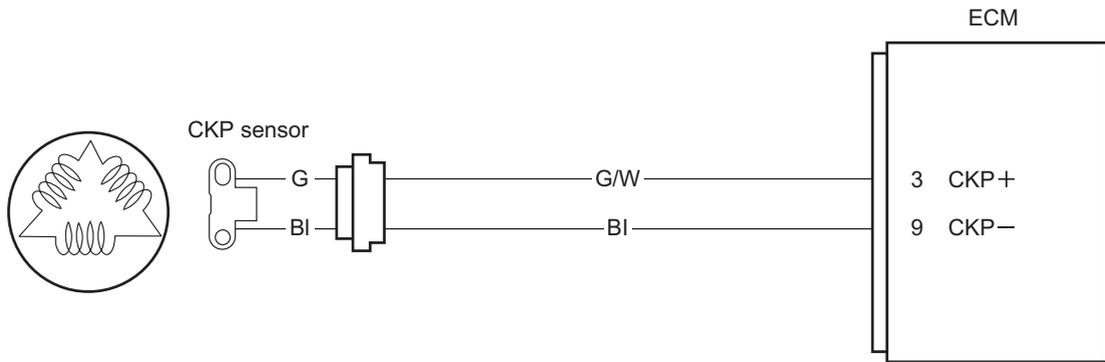
DTC “C12” (P0335): CKP Sensor Circuit Malfunction

B933H21104010

Detected condition and possible cause

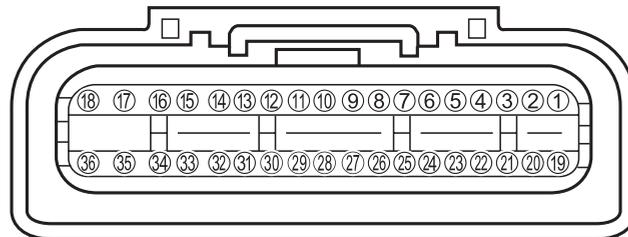
Detected condition	Possible cause
The signal does not reach ECM for 1 sec. or more, after receiving the IAP sensor input signal.	<ul style="list-style-type: none"> • Metal particles or foreign material being stuck on the CKP sensor and rotor tip. • CKP sensor circuit open or short. • CKP sensor malfunction. • ECM malfunction.

Wiring diagram



I933H1110011-03

ECM coupler (Harness side)

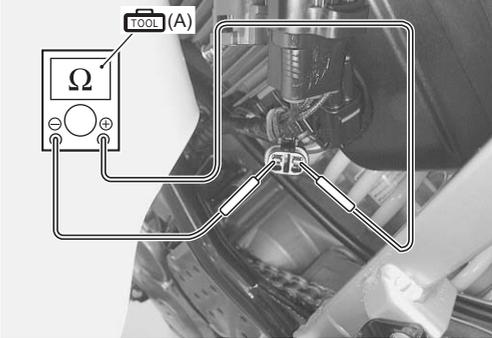
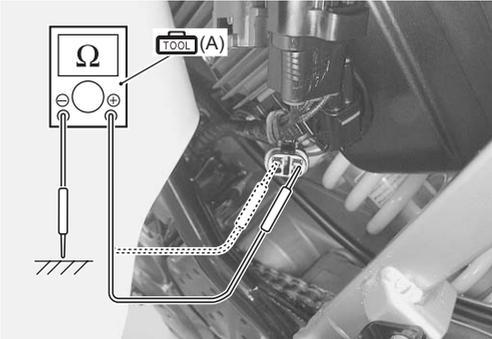


I933H1110012-02

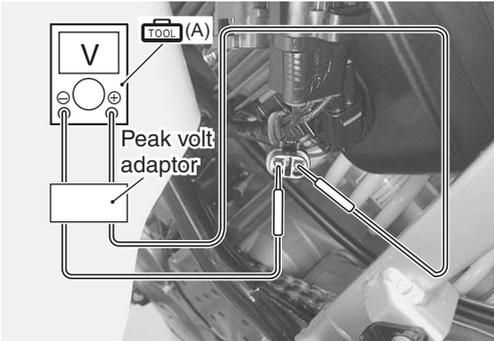
Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the CKP sensor coupler for loose or poor contacts. If OK, then measure the CKP sensor resistance.</p>  <p style="text-align: right; font-size: small;">I933H1110013-01</p> <p>3) Disconnect the CKP sensor coupler and measure the resistance.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set)</p> <p>Tester knob indication Resistance (Ω)</p> <p>CKP sensor resistance 400 – 600 Ω (BI – G)</p>  <p style="text-align: right; font-size: small;">I933H1110014-01</p> <p>4) If OK, then check the continuity between each terminal and ground.</p> <p>CKP sensor continuity $\infty \Omega$ (Infinity) (BI – Ground, G – Ground)</p>  <p style="text-align: right; font-size: small;">I933H1110015-01</p> <p><i>Are the resistance and continuity OK?</i></p>	Go to Step 2.	Replace the CKP sensor with a new one.

1A-25 Engine General Information and Diagnosis:

Step	Action	Yes	No
2	<p>1) Press the starter button and allow the engine to crank for a few seconds, and measure the CKP sensor peak voltage at the coupler.</p> <p>Special tool  (A): 09900–25008 (Multi-circuit tester set)</p> <p>Tester knob indication Voltage (---)</p> <p>CKP sensor peak voltage 1.0 V and more (+) terminal: BI – (-) terminal: G)</p>  <p style="text-align: right; font-size: small;">I933H1110016-01</p> <p>2) Repeat the 1) test procedures a few times and measure the highest peak voltage.</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> • BI or G/W wire open or shorted to the ground. • Loose or poor contacts on the CKP sensor coupler or ECM coupler (terminal “3” or “9”). • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-2)”. 	<ul style="list-style-type: none"> • 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)”.

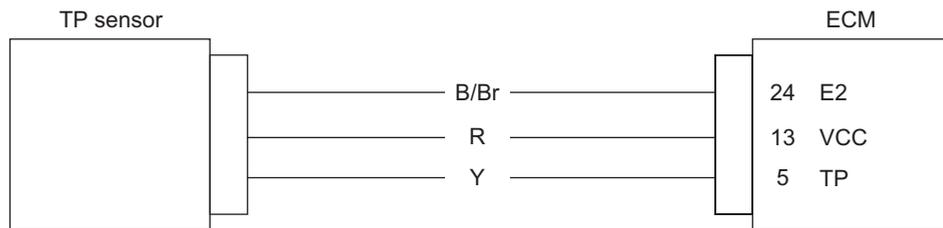
DTC “C14” (P0120-H/L): TP Sensor Circuit Malfunction

B933H21104011

Detected condition and possible cause

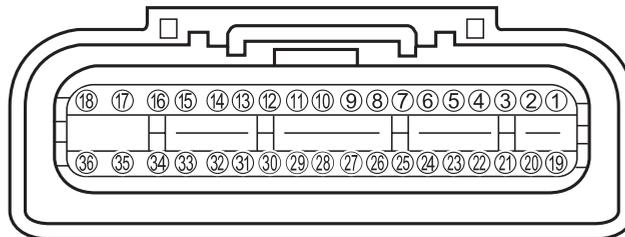
Detected condition		Possible cause
C14	Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. $0.4\text{ V} \leq \text{Sensor voltage} < 4.5\text{ V}$	<ul style="list-style-type: none"> TP sensor maladjusted. TP sensor circuit open or short. TP sensor malfunction. ECM malfunction.
P0120	H	<ul style="list-style-type: none"> TP sensor circuit is shorted to VCC or ground circuit is open. TP sensor circuit is open or shorted to ground or VCC circuit open.
	L	

Wiring diagram



I933H1110017-01

ECM coupler (Harness side)



I933H1110012-02

Troubleshooting

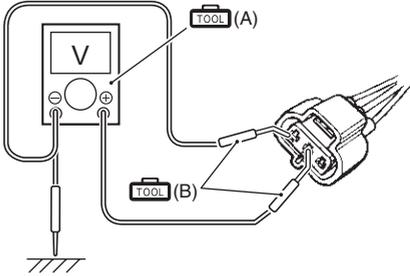
⚠ CAUTION

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

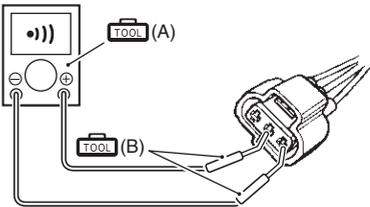
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.

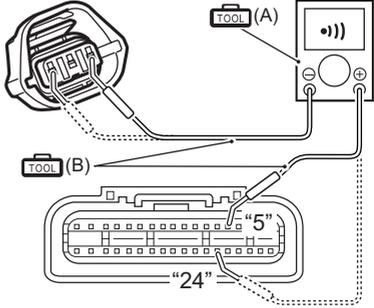
C14 (Use of mode select switch)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the fuel pump mounting bolts and move the fuel pump. Refer to "TP Sensor Removal and Installation in Section 1C (Page 1C-3)".</p> <p>3) Check the TP sensor coupler for loose or poor contacts. If OK, then check the TP sensor input voltage.</p>  <p style="text-align: right; font-size: small;">I933H1110018-01</p> <p>4) Disconnect the TP sensor coupler.</p> <p>5) Turn the ignition switch ON.</p> <p>6) Measure the input voltage at the R wire and ground. If OK, then measure the input voltage at the R wire and B/Br wire "C".</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)  (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>TP sensor input voltage 4.5 – 5.5 V ((+) terminal: R – (-) terminal: Ground, (+) terminal: R – (-) terminal: B/Br)</p>  <p style="text-align: right; font-size: small;">I933H1110019-01</p> <p><i>Is the continuity OK?</i></p>	<p>Go to Step 3.</p>	<ul style="list-style-type: none"> • Loose or poor contacts on the ECM coupler. • Open or short circuit in the R wire or B/Br wire.

P0120-H (Use of SDS)

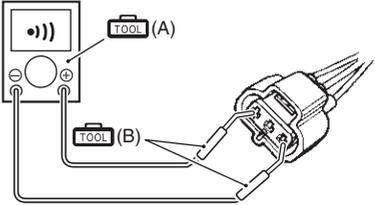
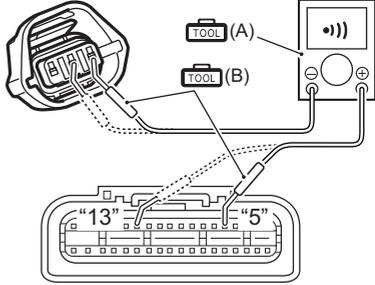
Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the fuel pump mounting bolts and move the fuel pump. Refer to "TP Sensor Removal and Installation in Section 1C (Page 1C-3)".</p> <p>3) Check the TP sensor coupler for loose or poor contacts. If OK, then check the TP sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110018-01</p> <p>4) Disconnect the TP sensor coupler.</p> <p>5) Check the continuity between Y wire and R wire. If sound is not heard from the tester, the circuit condition is OK.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set) TOOL (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Continuity (•)))</p>  <p style="text-align: right; font-size: small;">I933H1110020-01</p>	<p>Go to Step 2.</p>	<p>Y wire shorted to VCC or B/Br wire open.</p>

1A-29 Engine General Information and Diagnosis:

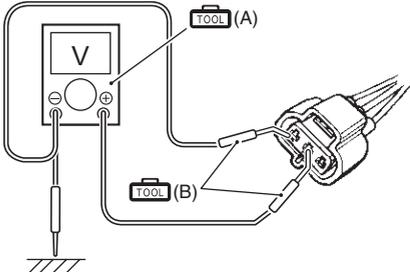
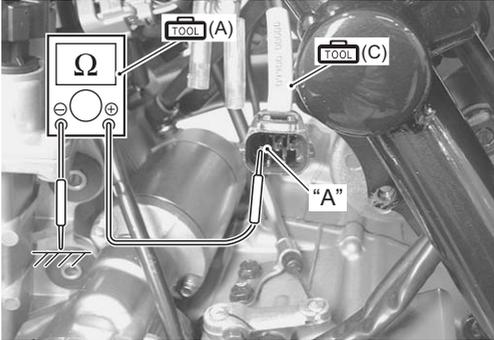
Step	Action	Yes	No
1	<p>6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-2)”.</p> <p>7) Check the continuity between Y wire and terminal “5”. Also, check the continuity between B/Br wire and terminal “24”.</p> <p>Tester knob indication Continuity (•)))</p> <p>ECM coupler (Harness side)</p>  <p style="text-align: right; font-size: small;">I933H1110021-01</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	Y wire shorted to VCC or B/Br wire open.

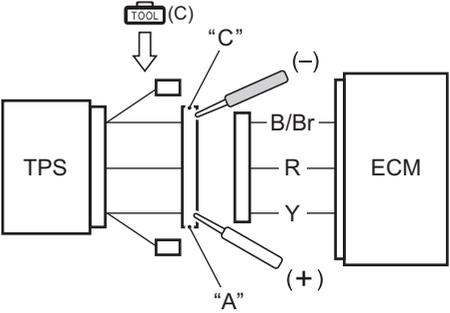
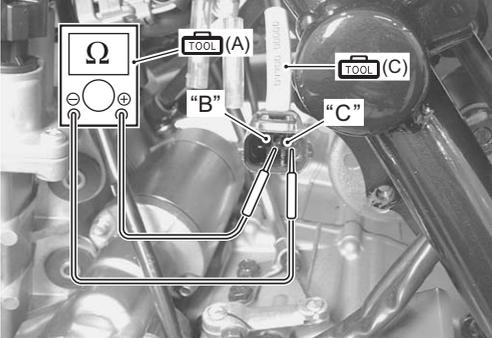
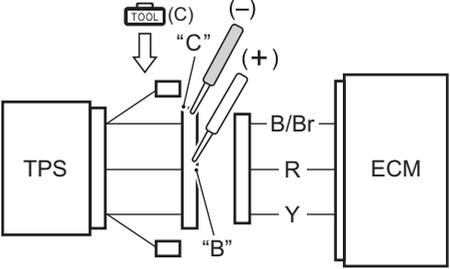
P0120-L (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the fuel pump mounting bolts and move the fuel pump. Refer to “TP Sensor Removal and Installation in Section 1C (Page 1C-3)”.</p> <p>3) Check the TP sensor coupler for loose or poor contacts. If OK, then check the TP sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110018-01</p>	Go to Step 2.	Y or R wire open, or Y wire shorted to ground.

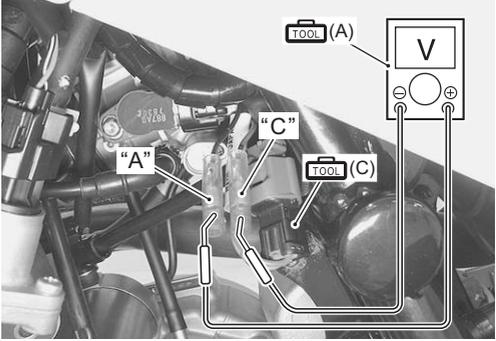
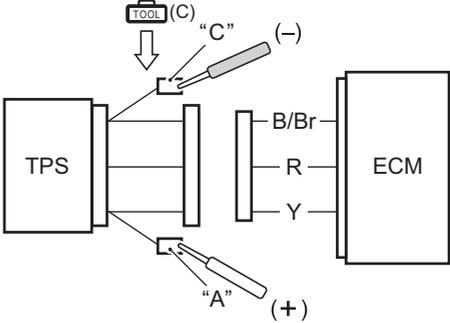
Step	Action	Yes	No
1	<p>4) Disconnect the TP sensor coupler.</p> <p>5) Check the continuity between Y wire and ground. Also, check the continuity between Y wire and B/Br wire. If sound is not heard from the tester, the circuit condition is OK.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set) TOOL (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Continuity test (•))</p>  <p style="text-align: right; font-size: small;">I933H1110031-01</p> <p>6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-2)”.</p> <p>7) Check the continuity between Y wire and terminal “5”. Also, check the continuity between R wire and terminal “13”.</p> <p>Tester knob indication Continuity test (•))</p> <p style="text-align: center;">ECM coupler (Harness side)</p>  <p style="text-align: right; font-size: small;">I933H1110032-01</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	Y or R wire open, or Y wire shorted to ground.

1A-31 Engine General Information and Diagnosis:

Step	Action	Yes	No
2	<p>1) Correct the ECM coupler.</p> <p>2) Turn the ignition switch ON.</p> <p>3) Measure the input voltage between the R wire and ground. If OK, the measure the input voltage between the R wire and B/Br wire.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)  (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>TP sensor input voltage 4.5 – 5.5 V ((+) terminal: R – (-) terminal: Ground, (+) terminal: R – (-) terminal: B/Br)</p>  <p style="text-align: right; font-size: small;">I933H1110019-01</p> <p><i>In the voltage OK?</i></p>	Go to Step 3.	Open or short circuit in the R wire or B/Br wire.
3	<p>1) Turn the ignition switch OFF.</p> <p>2) Connect the test harness the TP sensor.</p> <p>3) Check the continuity between terminal “A” (Y wire) and ground.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)  (C): 09900-28630 (TPS test wire harness)</p> <p>Tester knob indication Resistance (Ω)</p> <p>TP sensor resistance ∞ Ω (Infinity) ((+) terminal: “A” (Y) – (+) terminal: Ground)</p>  <p style="text-align: right; font-size: small;">I933H1110033-01</p>	Go to Step 4.	<ul style="list-style-type: none"> • Reset the TP sensor position correctly • Replace the TP sensor with a new one.

Step	Action	Yes	No
3	<p>4) If OK, then measure the TP sensor resistance at the test harness terminals (between terminal "A" (Y wire) and "C" (B/Br wire)).</p> <p>5) Push the throttle lever and measure the resistance.</p> <p>TP sensor resistance Throttle valve is closed: Approx. 0.6 kΩ Throttle valve is opened: Approx. 3.8 kΩ</p>  <p style="text-align: right; font-size: small;">I933H1110073-02</p>	<p>Go to Step 4.</p>	<ul style="list-style-type: none"> Reset the TP sensor position correctly. Replace the TP sensor with a new one.
	<p>6) If OK, then measure the TP sensor resistance at the test harness terminals (between terminal "B" (R wire) and terminal "C" (B/Br wire)).</p> <p>TP sensor resistance Approx. 5.0 kΩ (Terminal "B" (R wire) – Terminal "C" (B/Br wire))</p>  <p style="text-align: right; font-size: small;">I933H1110034-03</p>  <p style="text-align: right; font-size: small;">I933H1110035-01</p> <p><i>Are the continuity and resistance OK?</i></p>		

1A-33 Engine General Information and Diagnosis:

Step	Action	Yes	No
4	<p>1) Connect the test harness to TP sensor coupler.</p> <p>2) Turn the ignition switch ON.</p> <p>3) Measure the TP sensor output voltage at the coupler (between terminal "A" (Y wire) (+) and terminal "C" (B/Br wire) (-)) by opening the throttle lever.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set) TOOL (C): 09900-28630 (TPS test wire harness)</p> <p>Tester knob indication Voltage (---)</p> <p>TP sensor output voltage Throttle valve is closed: Approx. 0.6 V Throttle valve is opened: Approx. 3.8 V (+ terminal: Y - (-) terminal: B/Br)</p>   <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> • Y, R or B/Br wire open or shorted to ground, or poor "5", "13" or "24" connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation in Section 1C (Page 1C-2)". 	<p>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-10)".</p>

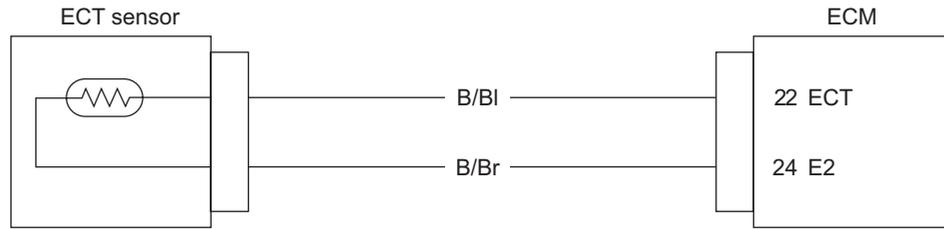
DTC “C15” (P0115-H/L): ECT Sensor Circuit Malfunction

B933H21104012

Detected condition and possible cause

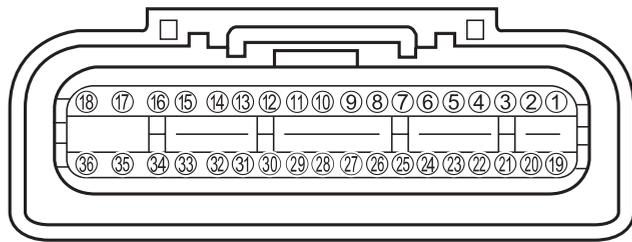
Detected condition		Possible cause
C15	Output voltage is not with in the following range. 0.2 V ≤ Sensor voltage < 4.9 V	<ul style="list-style-type: none"> ECT sensor circuit open or short. ECT sensor malfunction. ECM malfunction.
P0115	H Sensor voltage is higher than specified value.	<ul style="list-style-type: none"> ECT sensor circuit is open or ground circuit open.
	L Sensor voltage is lower than specified value.	<ul style="list-style-type: none"> ECT sensor circuit shorted to the ground.

Wiring diagram



I933H1110038-01

ECM coupler (Harness side)



I933H1110012-02

Troubleshooting

⚠ CAUTION

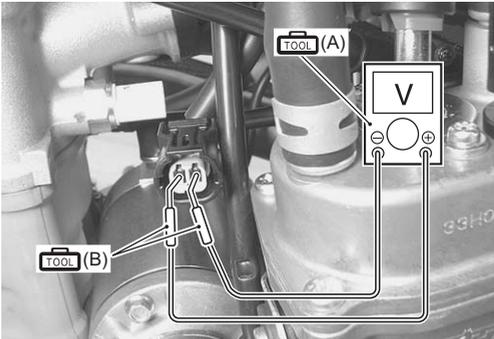
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

NOTE

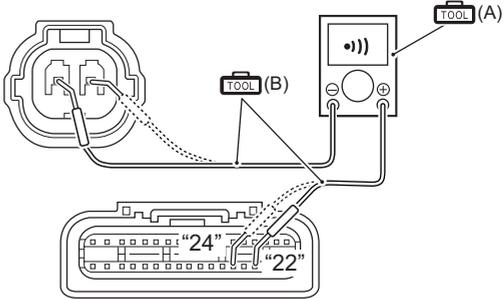
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.

1A-35 Engine General Information and Diagnosis:

C15 (Use of mode select switch)

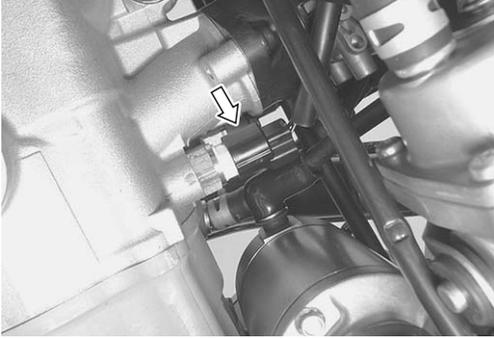
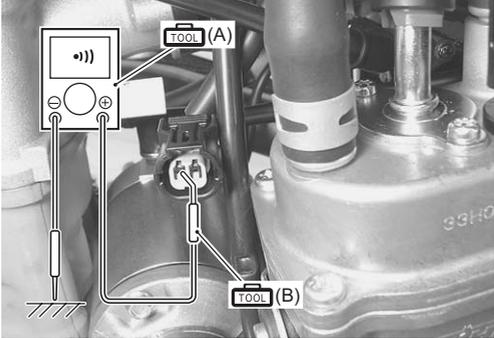
Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the ECT sensor coupler for loose or poor contacts. If OK, then measure the ECT sensor voltage at the wire side coupler.</p>  <p style="text-align: right; font-size: small;">I933H1110039-01</p> <p>3) Disconnect the coupler and turn the ignition switch ON.</p> <p>4) Measure the voltage between the B/BI wire terminal and ground. If OK, then measure the input voltage between B/BI wire terminal and B/Br wire terminal.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)  (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>ECT sensor voltage 4.5 – 5.5 V (+) terminal: B/BI – (-) terminal: Ground, (+) terminal: B/BI – (-) terminal: B/Br)</p>  <p style="text-align: right; font-size: small;">I933H1110040-01</p> <p><i>Is the voltage OK?</i></p>	Go to Step 2.	<ul style="list-style-type: none"> • Loose or poor contacts on the ECM coupler. • Open or short circuit in the B/BI or B/Br wire.

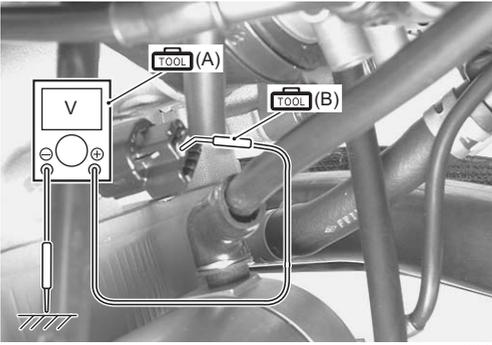
P0115-H (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the ECT sensor coupler for loose or poor contacts. If OK, then check the ECT sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110039-01</p> <p>3) Disconnect the ECT sensor coupler.</p> <p>4) Disconnect the ECM coupler. Refer to "ECM Removal and Installation in Section 1C (Page 1C-2)".</p> <p>5) Check the continuity between B/BI wire and terminal "22". Also, check the continuity between B/Br wire and terminal "24".</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set) TOOL (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Continuity test (•)))</p> <p style="text-align: center;">ECM coupler (Harness side)</p>  <p style="text-align: right; font-size: small;">I933H1110041-01</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	B/BI or B/Br wire open.

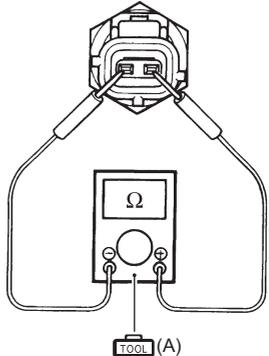
1A-37 Engine General Information and Diagnosis:

P0115-L (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the ECT sensor coupler for loose or poor contacts. If OK, then check the ECT sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110039-01</p> <p>3) Disconnect the ECT sensor coupler.</p> <p>4) Check the continuity between B/BI wire and ground. If sound is not heard from the tester, the circuit condition is OK.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)  (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Continuity test (•)))</p>  <p style="text-align: right; font-size: small;">I933H1110042-01</p> <p>5) Connect the ECT sensor coupler.</p> <p>6) Insert the needle pointed probes to the lead wire coupler.</p> <p>7) Turn the ignition switch ON.</p>	Go to Step 2.	<ul style="list-style-type: none"> • B/BI wire shorted to ground. • If wire is OK, go to Step 2.

Step	Action	Yes	No
1	<p>8) Measure the output voltage between B/BI wire and ground.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set) TOOL (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>ECT sensor output voltage 0.2 – 4.9 V (+) terminal: B/BI – (-) terminal: Ground)</p>  <p style="text-align: right; font-size: small;">I933H1110043-01</p> <p><i>Are the continuity and voltage OK?</i></p>	<p>Go to Step 2.</p>	<ul style="list-style-type: none"> • B/BI wire shorted to ground. • If wire is OK, go to Step 2.

1A-39 Engine General Information and Diagnosis:

Step	Action	Yes	No
2	<p>1) Turn the ignition switch OFF.</p> <p>2) Connect the ECM coupler and disconnect the ECT sensor coupler.</p> <p>3) Remove the fuel pump mounting bolts and move the fuel pump. Refer to "TP Sensor Removal and Installation in Section 1C (Page 1C-3)".</p> <p>4) Measure the ECT sensor resistance. Refer to "ECT Sensor Inspection in Section 1C (Page 1C-6)" for details.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)</p> <p>Tester knob indication Resistance (Ω)</p> <p>ECT sensor resistance Approx 2.6 kΩ at 20 °C (68 °F) (Terminal – Terminal)</p>  <p style="text-align: right;">I933H1110044-01</p> <p>NOTE Refer to "ECT Sensor Inspection in Section 1C (Page 1C-6)" for details.</p> <hr/> <p><i>Is the resistance OK?</i></p>	<ul style="list-style-type: none"> • B/BI or B/Br wire open or shorted to ground, or poor "22" or "24" connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation in Section 1C (Page 1C-2)". 	<p>Replace the ECT sensor with a new one. Refer to "ECT Sensor Removal and Installation in Section 1C (Page 1C-5)".</p>

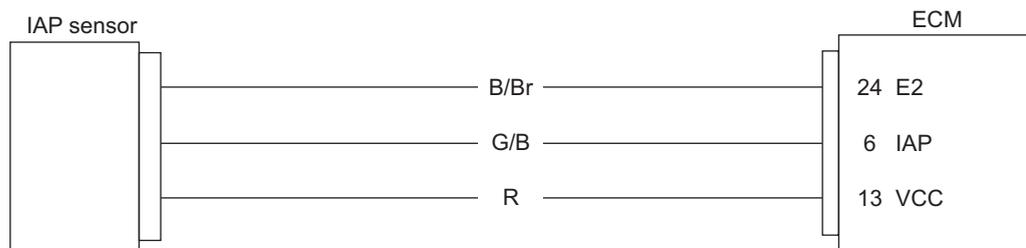
DTC “C17” (P1750-H/L): IAP Sensor Circuit Malfunction

B933H21104013

Detected condition and possible cause

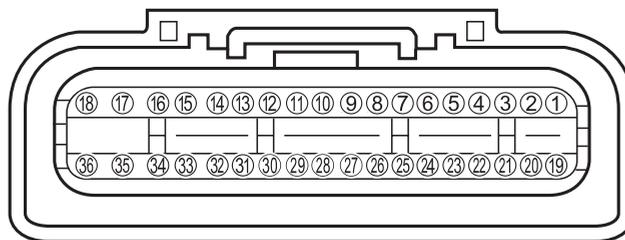
Detected condition		Possible cause
C17	IAP sensor voltage is not within the following range. 0.2 V ≤ Sensor voltage < 4.1 V	<ul style="list-style-type: none"> • Clogged vacuum passage between throttle body and IAP sensor. • Air being drawn from vacuum passage between throttle body and IAP sensor. • IAP sensor circuit open or shorted to the ground. • IAP sensor malfunction. • ECM malfunction.
	<p>NOTE</p> <p>Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.</p>	
P0105	H Sensor voltage is higher than specified value.	<ul style="list-style-type: none"> • IAP sensor circuit is open or shorted to VCC or ground circuit open. • IAP sensor circuit is shorted to the ground or VCC circuit open.
	L Sensor voltage is lower than specified value.	

Wiring diagram



I933H1110026-02

ECM coupler (Harness side)



I933H1110012-02

1A-41 Engine General Information and Diagnosis:

Troubleshooting

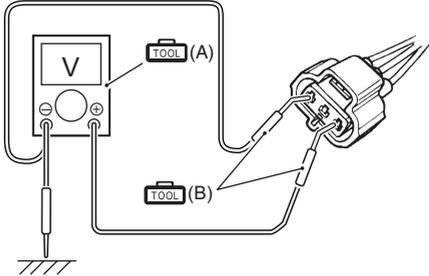
⚠ CAUTION

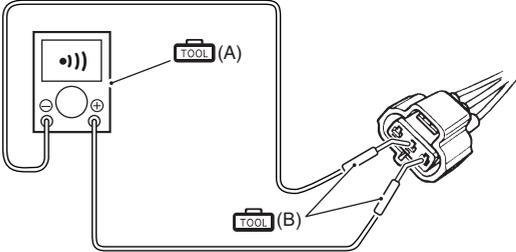
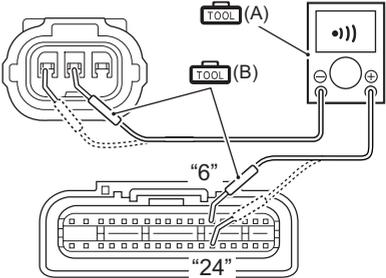
When using the multi-circuit tester, do not strongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.

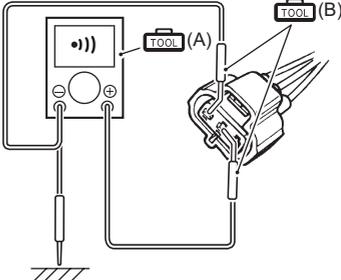
C17 (Use of mode select switch)

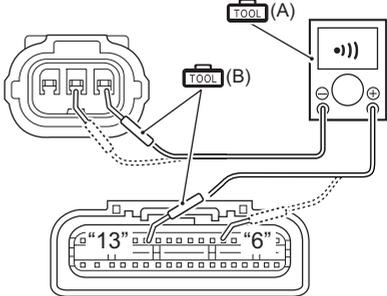
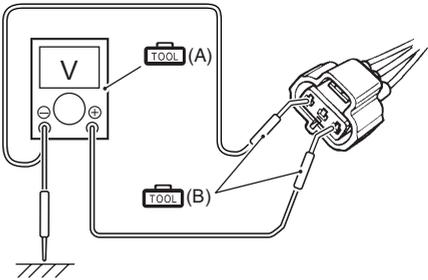
Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the IAP sensor coupler for loose or poor contacts. If OK, then measure the IAP sensor input voltage.</p>  <p style="text-align: right; font-size: small;">I933H1110027-01</p> <p>3) Disconnect the IAP sensor coupler.</p> <p>4) Turn the ignition switch ON.</p> <p>5) Measure the voltage at the R wire and ground. If OK, then measure the voltage at the R wire and B/Br wire.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)  (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>IAP sensor input voltage 4.5 – 5.5 V (+) terminal: R – (-) terminal: Ground, (+) terminal: R - (-) terminal: B/Br</p>  <p style="text-align: right; font-size: small;">I933H1110028-01</p> <p><i>Is the voltage OK?</i></p>	Go to Step 3.	<ul style="list-style-type: none"> • Loose or poor contacts on the ECM coupler. • Open or short circuit in the R wire or B/Br wire.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the IAP sensor coupler for loose or poor contacts. If OK, then check the IAP sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110027-01</p> <p>3) Disconnect the IAP sensor coupler.</p> <p>4) Check the continuity between the R wire and G/B wire. If the sound is not heard from the tester, the circuit condition is OK.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set) TOOL (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Continuity (•)))</p>  <p style="text-align: right; font-size: small;">I933H1110029-01</p> <p>5) Disconnect the ECM coupler. Refer to "ECM Removal and Installation in Section 1C (Page 1C-2)".</p> <p>6) Check the continuity between the G/B wire and terminal "16". If OK, then check the continuity between the B/Br wire and terminal "24".</p> <p>Tester knob indication Continuity test (•)))</p> <p style="text-align: center;">ECM coupler (Harness side)</p>  <p style="text-align: right; font-size: small;">I933H1110030-01</p> <p><i>Is the continuity OK?</i></p>	<p>Go to Step 3.</p>	<p>G/B wire shorted to VCC, or B/Br wire open.</p>

1A-43 Engine General Information and Diagnosis:

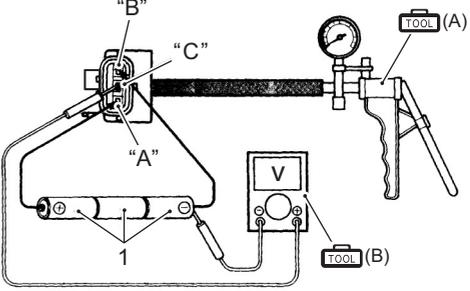
P0105-L for IAP sensor (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the IAP sensor coupler for loose or poor contacts. If OK, then check the IAP sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110027-01</p> <p>3) Disconnect the IAP sensor coupler.</p> <p>4) Check the continuity between the G/B wire and ground. Also, check the continuity between the G/B wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK.</p> <p>Special tool</p> <p> (A): 09900-25008 (Multi-circuit tester set)</p> <p> (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication</p> <p>Continuity (●)))</p>  <p style="text-align: right; font-size: small;">I933H1110022-02</p> <p>5) Disconnect the ECM coupler. Refer to "ECM Removal and Installation in Section 1C (Page 1C-2)".</p>	Go to Step 2.	R and G/B wire open, G/B wire shorted to the ground.

Step	Action	Yes	No
1	<p>6) Check the continuity between the R wire and terminal "13". Also, check the continuity between the G/B wire and terminal "6".</p> <p>Tester knob indication Continuity (•)))</p> <p>ECM coupler (Harness side)</p>  <p>I933H1110023-01</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	R and G/B wire open, G/B wire shorted to the ground.
2	<p>1) Connect the ECM coupler. 2) Turn the ignition switch ON. 3) Measure the input voltage at the R wire and ground. If OK, the measure the input voltage at the R wire and B/Br wire.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set) TOOL (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (- - -)</p> <p>IAP sensor input voltage 4.5 – 5.5 V ((+) terminal: R – (-) terminal: Ground, (+) terminal: R – (-) terminal: B/Br)</p>  <p>I933H1110028-01</p> <p><i>Is the voltage OK?</i></p>	Go to Step 3.	Open or short circuit in the B wire or B/Br wire.

1A-45 Engine General Information and Diagnosis:

Step	Action	Yes	No
3	<p>1) Turn the ignition switch OFF.</p> <p>2) Connect the ECM coupler and IAP sensor coupler.</p> <p>3) Insert the needle pointed probes to the lead wire coupler.</p> <p>4) Run the engine at idle speed and measure the IAP sensor output voltage at the wire side coupler between G/B wire and B/Br wire.</p> <p>Special tool</p> <p> (A): 09900-25008 (Multi-circuit tester set)</p> <p> (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication</p> <p>Voltage (---)</p> <p>IAP sensor output voltage</p> <p>Approx. 1.7 V at idle speed</p> <p>(+) terminal: G/B – (-) terminal: B/Br)</p> <div> </div> <p>I933H1110024-01</p> <p><i>Is the voltage OK?</i></p>	Go to Step 4.	<ul style="list-style-type: none"> • Check the vacuum hose for crack or damage. • Open or short circuit in the G/B wire. • If vacuum hose and wire is OK, replace the IAP sensor with a new one. Refer to "IAP Sensor Removal and Installation in Section 1C (Page 1C-2)".

Step	Action	Yes	No																														
4	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the IAP sensor. Refer to "IAP Sensor Removal and Installation in Section 1C (Page 1C-2)".</p> <p>3) Connect the vacuum pump gauge to the vacuum port of the IAP sensor. Arrange 3 new 1.5 V batteries in series (1) (check that total voltage is 4.5 – 5.5 V) and connect (–) terminal to the ground terminal "B" and (+) terminal to the VCC terminal "A".</p> <p>4) Check the voltage between Vout "C" and ground. Also, check if voltage reduces when vacuum is applied up to 400 mmHg by using vacuum pump gauge.</p> <p>Special tool TOOL (A): 09917-47011 (Vacuum pump gauge) TOOL (B): 09900-25008 (Multi-circuit tester set)</p> <p>Tester knob indication Voltage (---)</p>  <p style="text-align: right;">I933H1110025-01</p> <table border="1"> <thead> <tr> <th colspan="2">ALTITUDE (Reference)</th> <th colspan="2">ATMOSPHERIC PRESSURE</th> <th>OUTPUT VOLTAGE</th> </tr> <tr> <th>ft</th> <th>m</th> <th>mmHg</th> <th>kPa</th> <th>V</th> </tr> </thead> <tbody> <tr> <td>0 – 2 000</td> <td>0 – 610</td> <td>760 – 707</td> <td>100 – 94</td> <td>3.1 – 3.6</td> </tr> <tr> <td>2 001 – 5 000</td> <td>611 – 1 524</td> <td>707 – 634</td> <td>94 – 85</td> <td>2.8 – 3.4</td> </tr> <tr> <td>5 001 – 8 000</td> <td>1 525 – 2 438</td> <td>634 – 567</td> <td>85 – 76</td> <td>2.6 – 3.1</td> </tr> <tr> <td>8 001 – 10 000</td> <td>2 439 – 3 048</td> <td>567 – 526</td> <td>76 – 70</td> <td>2.4 – 2.9</td> </tr> </tbody> </table> <p style="text-align: right;">I831G1110033-01</p> <p><i>Is the voltage OK?</i></p>	ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE	ft	m	mmHg	kPa	V	0 – 2 000	0 – 610	760 – 707	100 – 94	3.1 – 3.6	2 001 – 5 000	611 – 1 524	707 – 634	94 – 85	2.8 – 3.4	5 001 – 8 000	1 525 – 2 438	634 – 567	85 – 76	2.6 – 3.1	8 001 – 10 000	2 439 – 3 048	567 – 526	76 – 70	2.4 – 2.9	<ul style="list-style-type: none"> • G/B, R or B/Br wire open or shorted to ground, or poor "6", "13" or "24" connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to "ECM Removal and Installation in Section 1C (Page 1C-2)". 	<p>If check result is not satisfactory, replace IAP sensor with a new one. Refer to "IAP Sensor Removal and Installation in Section 1C (Page 1C-2)".</p>
ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE																													
ft	m	mmHg	kPa	V																													
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5 001 – 8 000	1 525 – 2 438	634 – 567	85 – 76	2.6 – 3.1																													
8 001 – 10 000	2 439 – 3 048	567 – 526	76 – 70	2.4 – 2.9																													

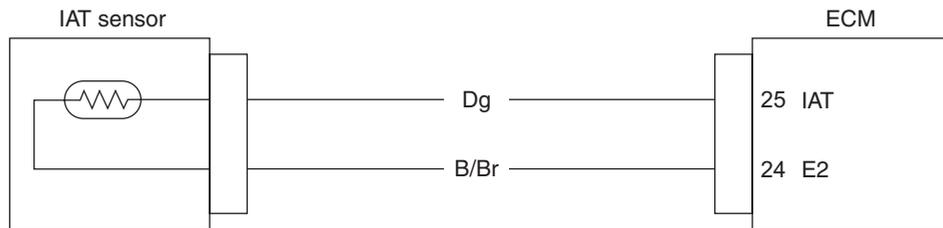
DTC “C21” (P0110-H/L): IAT Sensor Circuit Malfunction

B933H21104014

Detected condition and possible cause

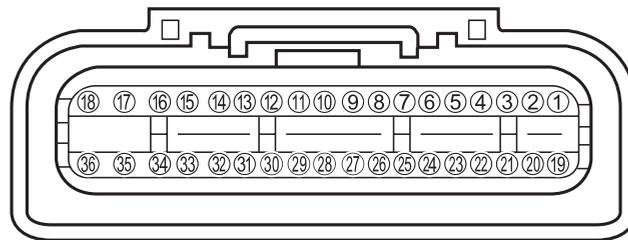
Detected condition		Possible cause
C21	Output voltage is not with in the following range. 0.2 V ≤ Sensor voltage < 4.9 V	<ul style="list-style-type: none"> • IAT sensor circuit open or short. • IAT sensor malfunction. • ECM malfunction. • IAT sensor circuit open or ground circuit open. • IAT sensor circuit shorted to the ground.
P0110	H Sensor voltage is higher than specified value.	
	L Sensor voltage is lower than specified value.	

Wiring diagram



I933H1110045-01

ECM coupler (Harness side)



I933H1110012-02

Troubleshooting

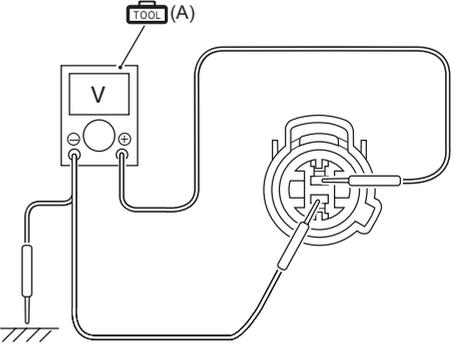
⚠ CAUTION

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

NOTE

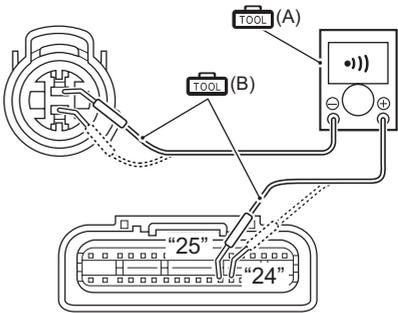
After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.

C21 (Use of mode select switch)

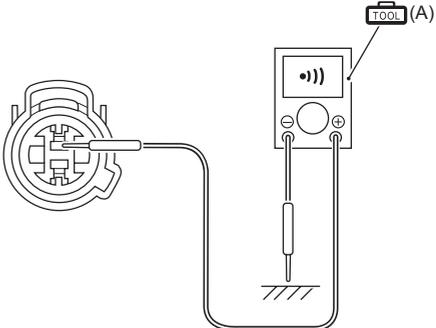
Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the IAT sensor coupler for loose or poor contacts. If OK, then measure the IAT sensor voltage at the wire side coupler.</p>  <p style="text-align: right; font-size: small;">I933H1110046-01</p> <p>3) Disconnect the IAT sensor coupler and turn the ignition switch ON.</p> <p>4) Measure the voltage between the Dg wire terminal and ground. If OK, then measure the input voltage between Dg wire terminal and B/Br wire terminal.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)</p> <p>Tester knob indication Voltage (---)</p> <p>IAT sensor input voltage 4.5 – 5.5 V ((+) terminal: Dg – (-) terminal: Ground, (+) terminal: Dg – (-) terminal: B/Br)</p>  <p style="text-align: right; font-size: small;">I933H1110047-01</p> <p><i>Is the voltage OK?</i></p>	<p>Go to Step 2.</p>	<ul style="list-style-type: none"> • Loose or poor contacts on the ECM coupler. • Open or short circuit in the Dg wire or B/Br wire.

1A-49 Engine General Information and Diagnosis:

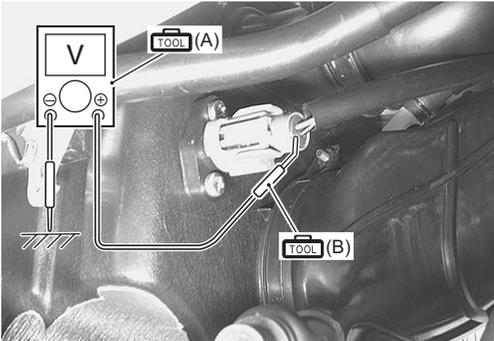
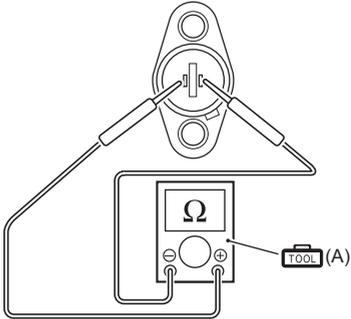
P0110-H (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the IAT sensor coupler for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110046-01</p> <p>3) Disconnect the IAT sensor coupler.</p> <p>4) Disconnect the ECM coupler. Refer to "ECM Removal and Installation in Section 1C (Page 1C-2)".</p> <p>5) Check the continuity between the Dg wire and terminal "25". Also, check the continuity between the B/Br wire and terminal "24".</p> <p>Special tool</p> <p> (A): 09900-25008 (Multi-circuit tester set)</p> <p> (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Continuity test (•))</p> <p style="text-align: center;">ECM coupler (Harness side)</p>  <p style="text-align: right; font-size: small;">I933H1110048-01</p> <p><i>Is the continuity OK?</i></p>	<p>Connect the ECM coupler and go to step 2.</p>	<p>Dg or B/Br wire open.</p>

P0110-L (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the IAT sensor coupler for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110046-01</p> <p>3) Disconnect the IAT sensor coupler.</p> <p>4) Check the continuity between the Dg wire and ground. If the sound is not heard from the tester, the circuit condition is OK.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set)</p> <p>Tester knob indication Continuity test (•)))</p>  <p style="text-align: right; font-size: small;">I933H1110049-01</p> <p>5) Connect the IAT sensor coupler.</p> <p>6) Turn the ignition switch ON.</p> <p>7) Insert the needle pointed probes to the lead wire coupler.</p>	<p>Go to Step 2.</p>	<ul style="list-style-type: none"> • Dg wire shorted to ground. • If wire is OK, go to Step 2.

1A-51 Engine General Information and Diagnosis:

Step	Action	Yes	No
1	<p>8) Measure the output voltage between the Dg wire and ground.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)  (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>IAT sensor output voltage 0.2 – 4.9 V (+) terminal: Dg – (–) terminal: Ground)</p>  <p style="text-align: right; font-size: small;">I933H1110050-01</p> <p><i>Are the continuity and voltage OK?</i></p>	<p>Go to Step 2.</p>	<ul style="list-style-type: none"> • Dg wire shorted to ground. • If wire is OK, go to Step 2.
2	<p>1) Turn the ignition switch OFF. 2) Disconnect the IAT sensor coupler. 3) Measure the IAT sensor resistance.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)</p> <p>Tester knob indication Resistance (Ω)</p> <p>IAT sensor resistance Approx. 2.6 kΩ at 20 °C (68 °F) (Terminal – Terminal)</p>  <p style="text-align: right; font-size: small;">I933H1110051-01</p> <p>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-6)”.</p> <p><i>Is the resistance OK?</i></p>	<ul style="list-style-type: none"> • B/Br or Dg wire open or shorted to ground, or poor “24” or “25” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-2)”. 	<p>Replace the IAT sensor with a new one. Refer to “IAT Sensor Removal and Installation in Section 1C (Page 1C-5)”.</p>

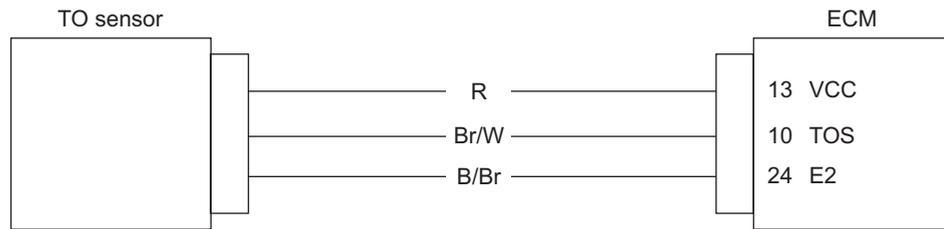
DTC “C23” (P1651-H/L): TO Sensor Circuit Malfunction

B933H21104015

Detected condition and possible cause

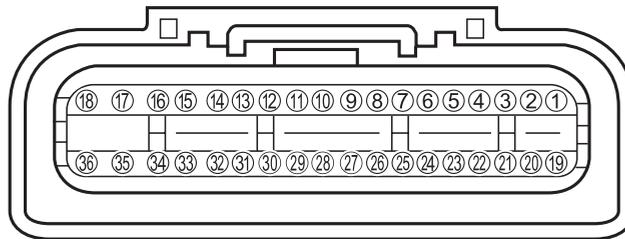
Detected condition		Possible cause
C23	The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 V ≤ Sensor voltage < 4.7 V	<ul style="list-style-type: none"> • TO sensor circuit open or short. • TO sensor malfunction. • ECM malfunction.
P1651	H Sensor voltage is higher than specified value.	<ul style="list-style-type: none"> • TO sensor circuit open or shorted to VCC or ground circuit open.
	L Sensor voltage is lower than specified value.	<ul style="list-style-type: none"> • TO sensor circuit shorted to ground or VCC circuit open.

Wiring diagram



I933H1110052-01

ECM coupler (Harness side)



I933H1110012-02

Troubleshooting

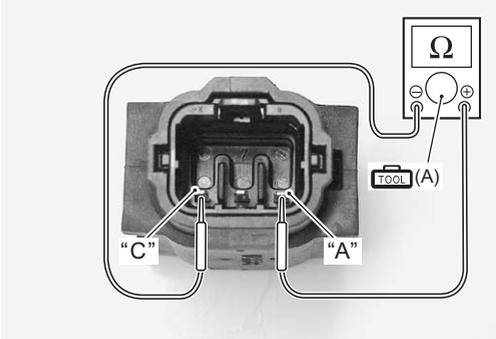
⚠ CAUTION

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

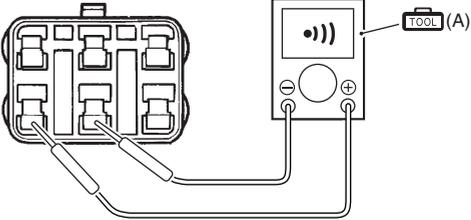
NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.

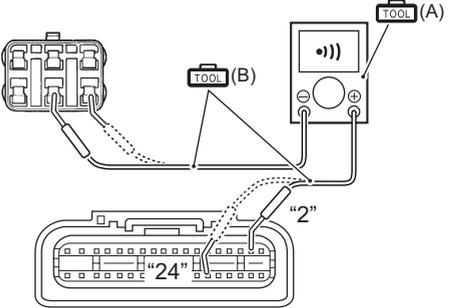
C23 (Use of mode select switch)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the left side cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".</p> <p>3) Check the TO sensor coupler for loose or poor contacts. If OK, then measure the TO sensor resistance.</p>  <p style="text-align: right; font-size: small;">I933H1110053-01</p> <p>4) Remove the TO sensor and disconnect the TO sensor coupler.</p> <p>5) Measure the resistance between terminal "A" and terminal "B".</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)</p> <p>Tester knob indication Resistance (Ω)</p> <p>TO sensor resistance 15.0 – 25.0 kΩ (Terminal "A" – Terminal "C")</p>  <p style="text-align: right; font-size: small;">I933H1110054-01</p> <p><i>Is the resistance OK?</i></p>	Go to Step 2.	Replace the TO sensor with a new one. Refer to "TO Sensor Removal and Installation in Section 1C (Page 1C-6)".

P1651-H (Use of SDS)

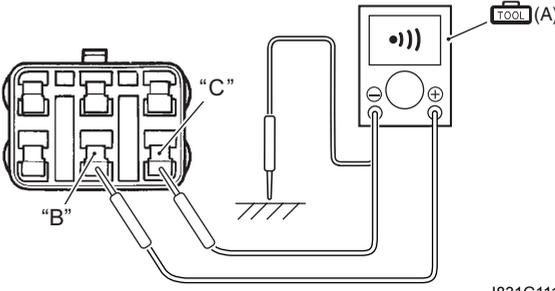
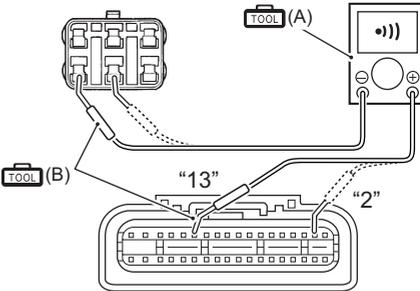
Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the left side cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.</p> <p>3) Check the TO sensor coupler for loose or poor contacts. If OK, then check the TO sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110053-01</p> <p>4) Dismount the TO sensor and disconnect the TO sensor coupler.</p> <p>5) Check the continuity between the R wire and B/Br wire. If the sound is not heard from the tester, the circuit condition is OK.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set)</p> <p>Tester knob indication Continuity test (•)))</p>  <p style="text-align: right; font-size: small;">I823H1110051-01</p> <p>6) Disconnect the ECM coupler. Refer to “ECM Removal and Installation in Section 1C (Page 1C-2)”.</p>	Go to Step 2.	Br/W wire shorted to VCC, or B/Br wire open.

1A-55 Engine General Information and Diagnosis:

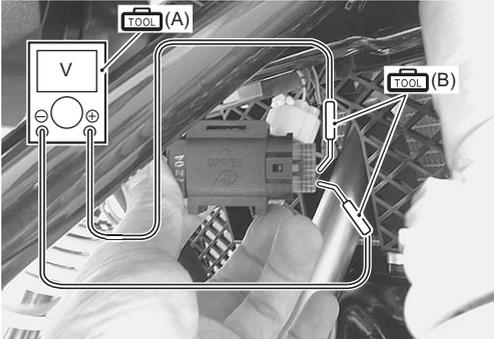
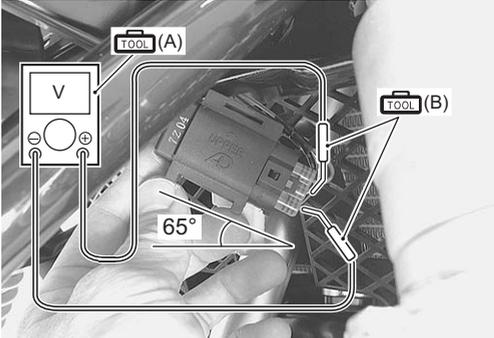
Step	Action	Yes	No
1	<p>7) Check the continuity between Br/W wire and terminal "2". Also, check the continuity between B/Br wire "C" and terminal "24".</p> <p>Special tool  (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Continuity test (•)))</p> <p>ECM coupler (Harness side)</p>  <p style="text-align: right; font-size: small;">I933H1110056-02</p> <p><i>Is the continuity OK?</i></p>	Go to Step 2.	Br/W wire shorted to VCC, or B/Br wire open.

P1651-L (Use of SDS)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the left side cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".</p> <p>3) Check the TO sensor coupler for loose or poor contacts. If OK, then check the TO sensor lead wire continuity.</p>  <p style="text-align: right; font-size: small;">I933H1110053-01</p> <p>4) Dismount the TO sensor and disconnect the TO sensor coupler.</p>	Go to Step 2.	R or B wire open, or Br/W wire shorted to the ground.

Step	Action	Yes	No
1	<p>5) Check the continuity between Br/W wire and ground. Also, check the continuity between Br/W wire and B/Br wire. If sound is not heard from the tester, the circuit condition is OK.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set)</p> <p>Tester knob indication Continuity test (•)))</p>  <p style="text-align: right; font-size: small;">I831G1110084-01</p> <p>6) Disconnect the ECM coupler. Refer to "ECM Removal and Installation in Section 1C (Page 1C-2)".</p> <p>7) Check the continuity between R wire and terminal "13". Also, then check the continuity between Br/W wire and terminal "2".</p> <p>Special tool TOOL (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Continuity test (•)))</p>  <p style="text-align: right; font-size: small;">I933H1110057-01</p> <p><i>Is the continuity OK?</i></p>	<p>Go to Step 2.</p>	<p>R or B wire open, or Br/W wire shorted to the ground.</p>

1A-57 Engine General Information and Diagnosis:

Step	Action	Yes	No
2	<p>1) Connect the ECM coupler and TO sensor coupler. 2) Insert the needle pointed probes to the lead wire coupler. 3) Turn the ignition switch ON. 4) Measure the voltage at the wire side coupler between Br/W and B/Br wires.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)  (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>TO sensor voltage (Normal) 0.4 – 1.4 V ((+) terminal: Br/W – (-) terminal: B/Br)</p>  <p style="text-align: right; font-size: small;">I933H1110058-01</p> <p>5) Measure the voltage when TO sensor is learned 65° and more, left and right, from the horizontal level.</p> <p>Tester knob indication Voltage (---)</p> <p>TO sensor voltage (Leaning) 3.7 – 4.4 V ((+) terminal: Br/W – (-) terminal: B/Br)</p>  <p style="text-align: right; font-size: small;">I933H1110059-01</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> • Br/W, R or B/Br wire open or shorted to ground, or poor “2”, “13” or “24” connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-2)”. 	<ul style="list-style-type: none"> • Loose or poor contacts on the ECM coupler. • Open or short circuit. • Replace the TO sensor with a new one. Refer to “TO Sensor Removal and Installation in Section 1C (Page 1C-6)”.

DTC “C24” (P0351): Ignition Coil Circuit Malfunction

B933H21104016

NOTE

Refer to “No Spark or Poor Spark in Section 1H (Page 1H-3)” for details.

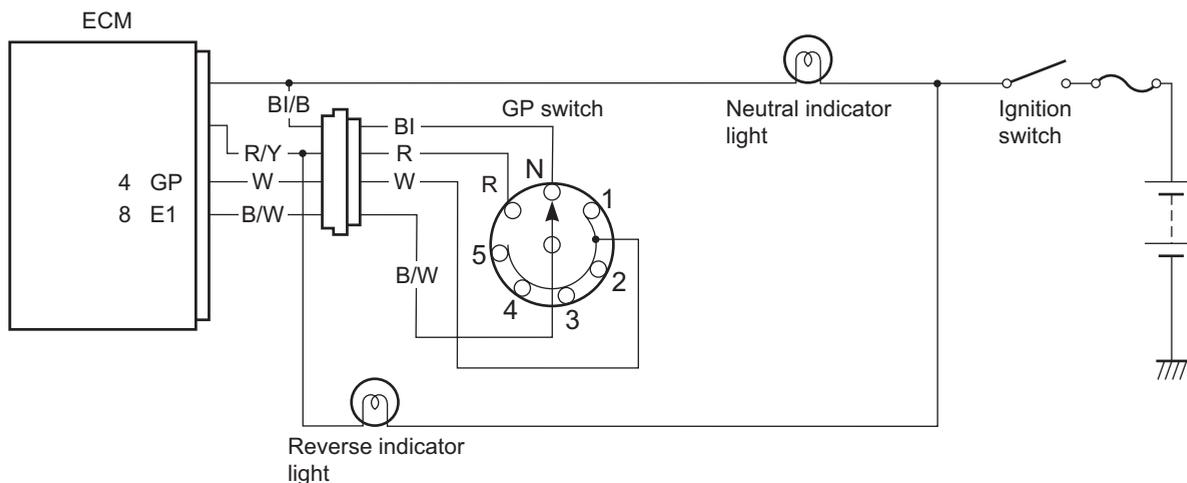
DTC “C31” (P0705): GP Switch Circuit Malfunction

B933H21104017

Detected condition and possible cause

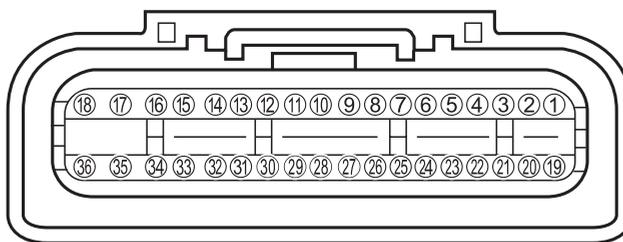
Detected condition	Possible cause
No gear position switch voltage. GP switch voltage is not within the following range. GP switch voltage > 0.9 V	<ul style="list-style-type: none"> • GP switch circuit open or short. • GP switch malfunction. • ECM malfunction.

Wiring diagram



I933H1110060-03

ECM coupler (Harness side)

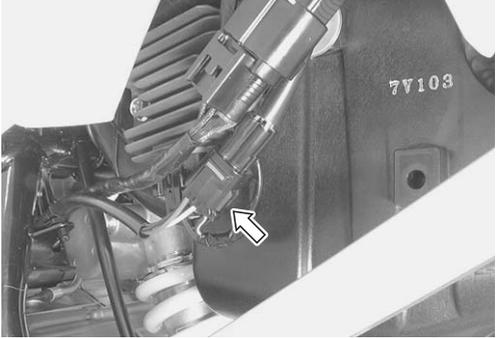
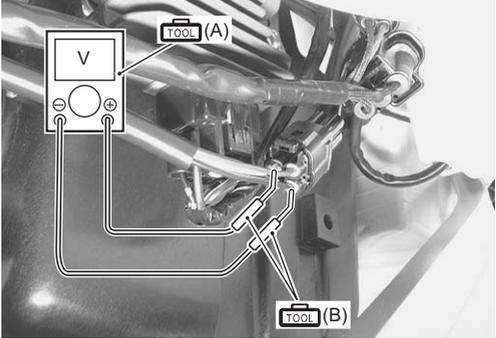


I933H1110012-02

Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Check the GP switch coupler for loose or poor contacts. If OK, then measure the GP switch voltage.</p>  <p style="text-align: right; font-size: small;">I933H1110061-01</p> <p>3) Make sure the engine stop switch is in the “RUN” position.</p> <p>4) Insert the needle pointed probe to the lead wire coupler.</p> <p>5) Turn the ignition switch ON.</p> <p>6) Measure the voltage at the wire side coupler between W and B/W wire, when shifting the gearshift lever from 1st to top.</p> <p>Special tool  (A): 09900-25008 (Multi-circuit tester set)  (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>GP switch voltage 0.9 V and more ((+) terminal: W – (-) terminal: B/W)</p>  <p style="text-align: right; font-size: small;">I933H1110062-01</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> • W wire open or shorted to ground. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-2)”. 	<ul style="list-style-type: none"> • W or B/W wire open, or P wire shorted to ground. • Loose or poor contacts on the ECM coupler. • If wire and connection are OK, replace the GP switch with a new one. Refer to “Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)”.

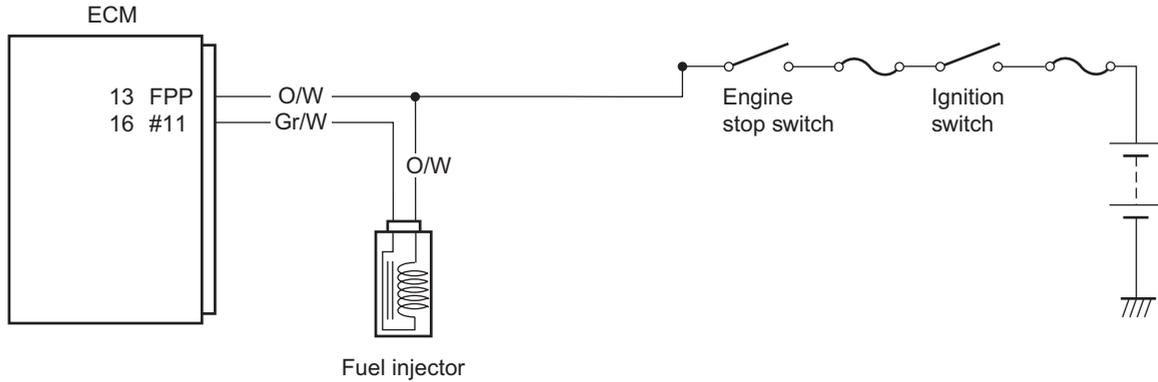
DTC "C32" (P0201): Fuel Injector Circuit Malfunction

B933H21104018

Detected condition and possible cause

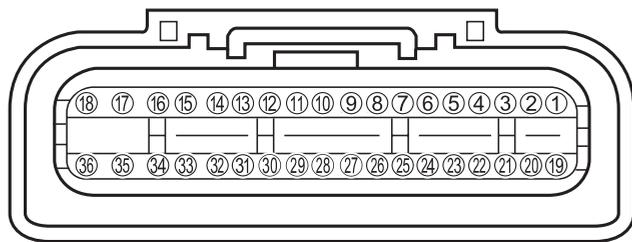
Detected condition	Possible cause
CKP signal is produced but fuel injector signal is interrupted by 8 times or more continuity.	<ul style="list-style-type: none"> • Injector circuit open or short. • Injector malfunction. • ECM malfunction.

Wiring diagram



I933H1110063-02

ECM coupler (Harness side)

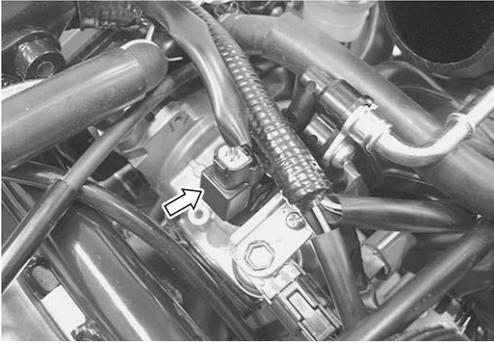
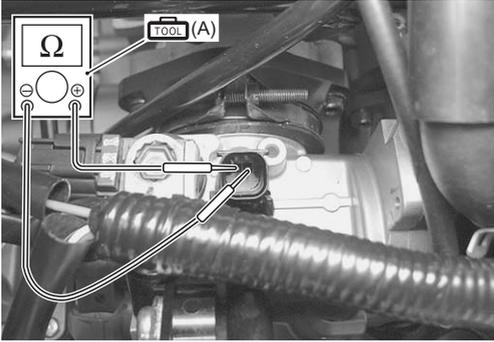


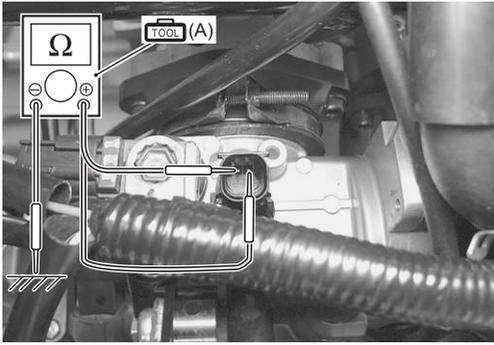
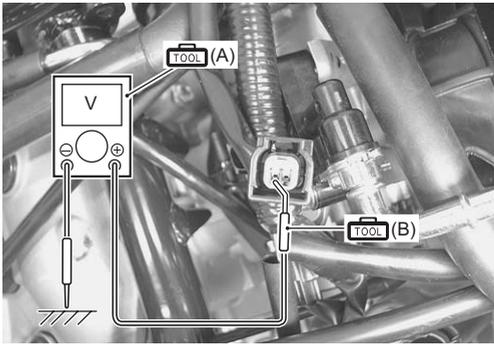
I933H1110012-02

Troubleshooting

NOTE

- After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.
- Injector voltage can be detected only for 2 seconds after ignition switch is turned ON.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the fuel tank lower cover. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.</p> <p>3) Check the injector coupler for loose or poor contacts. If OK, then measure the injector resistance.</p>  <p style="text-align: right; font-size: small;">I933H1110064-02</p> <p>4) Disconnect the injector coupler and measure the resistance between terminals.</p> <p>Special tool  (A): 09900–25008 (Multi-circuit tester set)</p> <p>Tester knob indication Resistance (Ω)</p> <p>Injector resistance 9 – 17 Ω at 20 °C (68 °F) (Terminal – Terminal)</p>  <p style="text-align: right; font-size: small;">I933H1110065-02</p>	Go to Step 2.	Replace the injector with a new one. Refer to “Fuel Injector / Fuel Delivery Pipe / L-joint Removal and Installation in Section 1G (Page 1G-11)”.

Step	Action	Yes	No
1	<p>5) If OK, then check the continuity between each terminal and ground.</p> <p>Tester knob indication Resistance (Ω)</p> <p>Injector continuity $\infty \Omega$ (Infinity)</p>  <p style="text-align: right; font-size: small;">I933H1110066-02</p> <p><i>Are the resistance and continuity OK?</i></p>	Go to Step 2.	Replace the injector with a new one. Refer to "Fuel Injector / Fuel Delivery Pipe / L-joint Removal and Installation in Section 1G (Page 1G-11)".
2	<p>1) Remove the ignition switch. Refer to "Ignition Switch Removal and Installation in Section 1H (Page 1H-7)".</p> <p>2) Connect the ignition switch coupler and turn the ignition switch ON.</p> <p>3) Measure the injector voltage between O/W wire and ground.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set) TOOL (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>Injector voltage Battery voltage ((+) terminal: O/W – (-) terminal: Ground)</p>  <p style="text-align: right; font-size: small;">I933H1110067-02</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> • Gr/W wire open or shorted to ground, or poor "16" connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and poor connection. • Replace the ECM with a known good one, and inspect it again. 	Open circuit in the O/W wire.

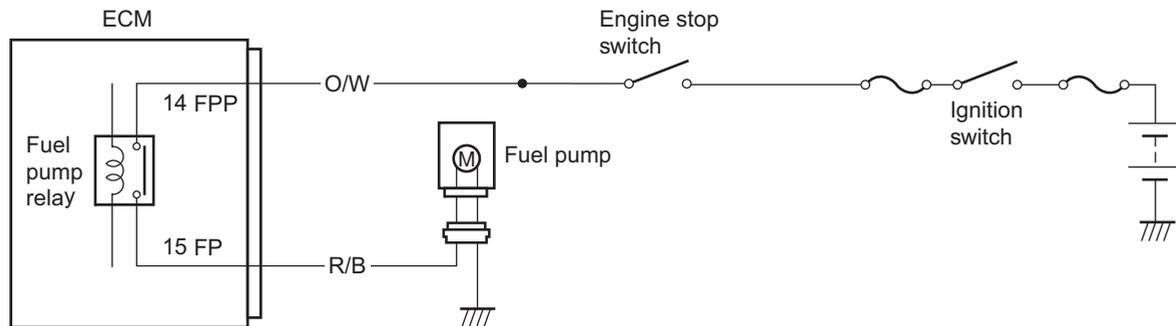
DTC “C41” (P0230): FP Relay Circuit Malfunction

B933H21104019

Detected condition and possible cause

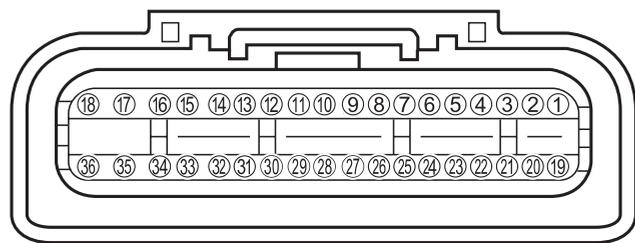
Detected condition	Possible cause
No voltage is applied to fuel pump although FP relay is turned ON.	<ul style="list-style-type: none"> • FP relay circuit open or short. • FP relay (ECM) malfunction.

Wiring diagram



I933H1110068-01

ECM coupler (Harness side)



I933H1110012-02

Troubleshooting

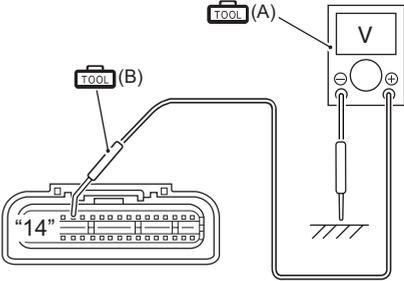
⚠ CAUTION

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

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.

C41 (Use of mode select switch)

Step	Action	Yes	No
1	<p>1) Turn the ignition switch to OFF.</p> <p>2) Remove the headlight. Refer to "Headlight Removal and Installation in Section 9B (Page 9B-2)".</p> <p>3) Check the ECM coupler for loose or poor contacts. If OK, then measure the FP relay input voltage.</p>  <p style="text-align: right; font-size: small;">I933H1110069-01</p> <p>4) Disconnect the ECM coupler.</p> <p>5) Insert the needle pointed probe to ECM coupler.</p> <p>6) Measure the voltage between terminal "14" and ground.</p> <p>Special tool TOOL (A): 09900-25008 (Multi-circuit tester set) TOOL (B): 09900-25009 (Needle pointed probe set)</p> <p>Tester knob indication Voltage (---)</p> <p>FP relay input voltage Battery voltage</p>  <p style="text-align: right; font-size: small;">I933H1110070-05</p> <p><i>Is the voltage OK?</i></p>	<ul style="list-style-type: none"> • FP relay (ECM) malfunction. • O/W or R/B wire open or shorted, or poor terminal "14" or "15" connection. • If the wire and connection are OK. intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. 	<p>Open or short circuit in the red wire.</p>

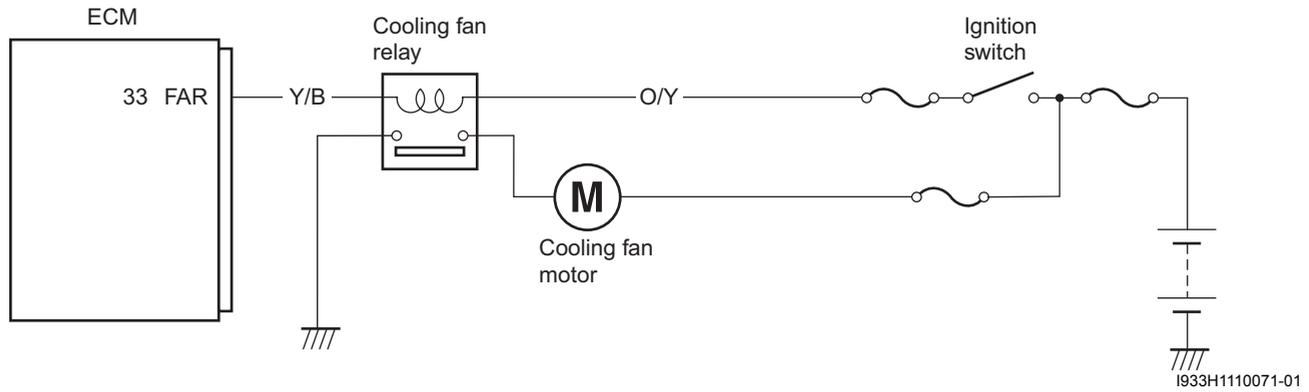
DTC "C60" (P0480): Cooling Fan Relay Circuit Malfunction

B933H21104020

Detected condition and possible cause

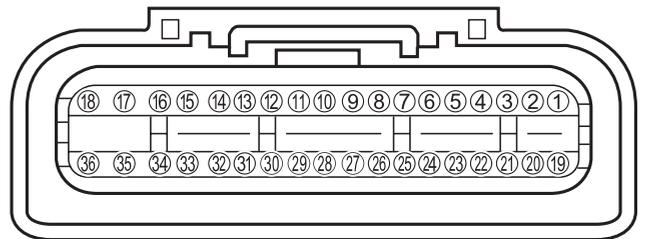
Detected condition	Possible cause
Cooling fan relay signal is not input to ECM.	<ul style="list-style-type: none"> • Cooling fan relay circuit open or short. • ECM malfunction.

Wiring diagram



I933H1110071-01

ECM coupler (Harness side)



I933H1110012-02

Troubleshooting

NOTE

After repairing the trouble, clear the DTC using SDS tool. Refer to “Use of SDS Diagnosis Reset Procedures (Page 1A-12)”.

Step	Action	Yes	No
1	<p>1) Turn the ignition switch OFF.</p> <p>2) Remove the front fender. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.</p> <p>3) Check the cooling fan relay coupler for loose or poor contacts.</p> <p>If OK, then inspection the cooling fan relay. Refer to “Cooling Fan Relay Inspection in Section 1F (Page 1F-10)”.</p>  <p>I933H1110072-01</p> <p><i>Is the cooling fan relay OK?</i></p>	<ul style="list-style-type: none"> • O/Y and Y/B wire open or shorted to ground, or poor “33” connection. • If wire and connection are OK. intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again. Refer to “ECM Removal and Installation in Section 1C (Page 1C-2)”. 	<p>Replace the cooling fan relay with a new one.</p>

Active control inspection

NOTE

Cooling fan relay and cooling fan motor operation can be checked until the engine coolant temperature is less than 90 °C (194 °F) after starting the engine.

- 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).

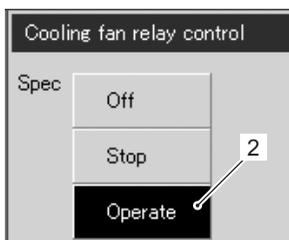


I933H1110079-02

1A-67 Engine General Information and Diagnosis:

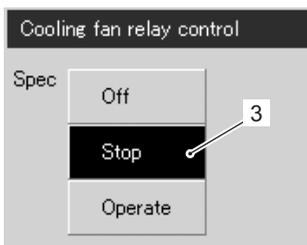
4) Click the “Operate” (2).

At this time, if an operation sound is heard from the cooling fan relay and cooling fan motors are operated, the function is normal.



I933H1110080-02

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



I933H1110081-02

Specifications

Service Data

B933H21107001

Injector

Item	Specification	Note
Injector resistance	9 – 17 Ω at 20 °C (68 °F)	—

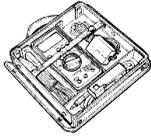
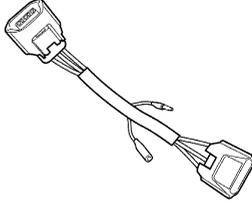
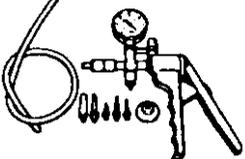
FI sensors

Item	Specification	Note
CKP sensor resistance	400 – 600 Ω	
CKP sensor peak voltage	1.0 V and more	When cranking
IAP sensor input voltage	4.5 – 5.5 V	
IAP sensor output voltage	Approx. 1.7 V at idle speed	
TP sensor input voltage	4.5 – 5.5 V	
TP sensor resistance	Closed	Approx. 0.6 k Ω
	Opened	Approx. 3.8 k Ω
TP sensor output voltage	Closed	Approx. 0.6 V
	Opened	Approx. 3.8 V
ECT sensor input voltage	4.5 – 5.5 V	
ECT sensor output voltage	0.2 – 4.9 V	
ECT sensor resistance	Approx. 2.6 k Ω at 20 °C (68 °F)	
IAT sensor input voltage	4.5 – 5.5 V	
IAT sensor output voltage	0.2 – 4.9 V	
IAT sensor resistance	Approx. 2.6 k Ω at 20 °C (68 °F)	
TO sensor resistance	15.0 – 25.0 k Ω	
TO sensor voltage	Normal	0.4 – 1.4 V
	Leaning	3.7 – 4.4 V
GP switch voltage	0.9 V and more	From 1st to Top
Injector voltage	Battery voltage	
Ignition coil primary peak voltage	150 V and more	When cranking
FP relay input voltage	Battery voltage	

Special Tools and Equipment

Special Tool

B933H21108001

<p>09900-25008 Multi-circuit tester set</p> <ul style="list-style-type: none"> ☞ (Page 1A-24) / ☞ (Page 1A-25) / ☞ (Page 1A-27) / ☞ (Page 1A-28) / ☞ (Page 1A-30) / ☞ (Page 1A-31) / ☞ (Page 1A-31) / ☞ (Page 1A-33) / ☞ (Page 1A-35) / ☞ (Page 1A-36) / ☞ (Page 1A-37) / ☞ (Page 1A-38) / ☞ (Page 1A-39) / ☞ (Page 1A-41) / ☞ (Page 1A-42) / ☞ (Page 1A-43) / ☞ (Page 1A-44) / ☞ (Page 1A-45) / ☞ (Page 1A-46) / ☞ (Page 1A-48) / ☞ (Page 1A-49) / ☞ (Page 1A-50) / ☞ (Page 1A-51) / ☞ (Page 1A-51) / ☞ (Page 1A-53) / ☞ (Page 1A-54) / ☞ (Page 1A-56) / ☞ (Page 1A-57) / ☞ (Page 1A-59) / ☞ (Page 1A-61) / ☞ (Page 1A-62) / ☞ (Page 1A-64) 	<p>09900-25009 Needle pointed probe set</p> <ul style="list-style-type: none"> ☞ (Page 1A-27) / ☞ (Page 1A-28) / ☞ (Page 1A-30) / ☞ (Page 1A-31) / ☞ (Page 1A-35) / ☞ (Page 1A-36) / ☞ (Page 1A-37) / ☞ (Page 1A-38) / ☞ (Page 1A-41) / ☞ (Page 1A-42) / ☞ (Page 1A-43) / ☞ (Page 1A-44) / ☞ (Page 1A-45) / ☞ (Page 1A-49) / ☞ (Page 1A-51) / ☞ (Page 1A-55) / ☞ (Page 1A-56) / ☞ (Page 1A-57) / ☞ (Page 1A-59) / ☞ (Page 1A-62) / ☞ (Page 1A-64) 
<p>09900-28630 TPS test wire harness</p> <ul style="list-style-type: none"> ☞ (Page 1A-31) / ☞ (Page 1A-33) 	<p>09904-41010 SDS set</p> <ul style="list-style-type: none"> ☞ (Page 1A-11) / ☞ (Page 1A-15) 
<p>09917-47011 Vacuum pump gauge</p> <ul style="list-style-type: none"> ☞ (Page 1A-46) 	<p>09930-82720 Mode select switch</p> <ul style="list-style-type: none"> ☞ (Page 1A-3) / ☞ (Page 1A-10) / ☞ (Page 1A-10) 
<p>99565-01010-016 CD-ROM Ver.16</p> <ul style="list-style-type: none"> ☞ (Page 1A-11) / ☞ (Page 1A-15) 	

Emission Control Devices

Precautions

Precautions for Emission Control Devices

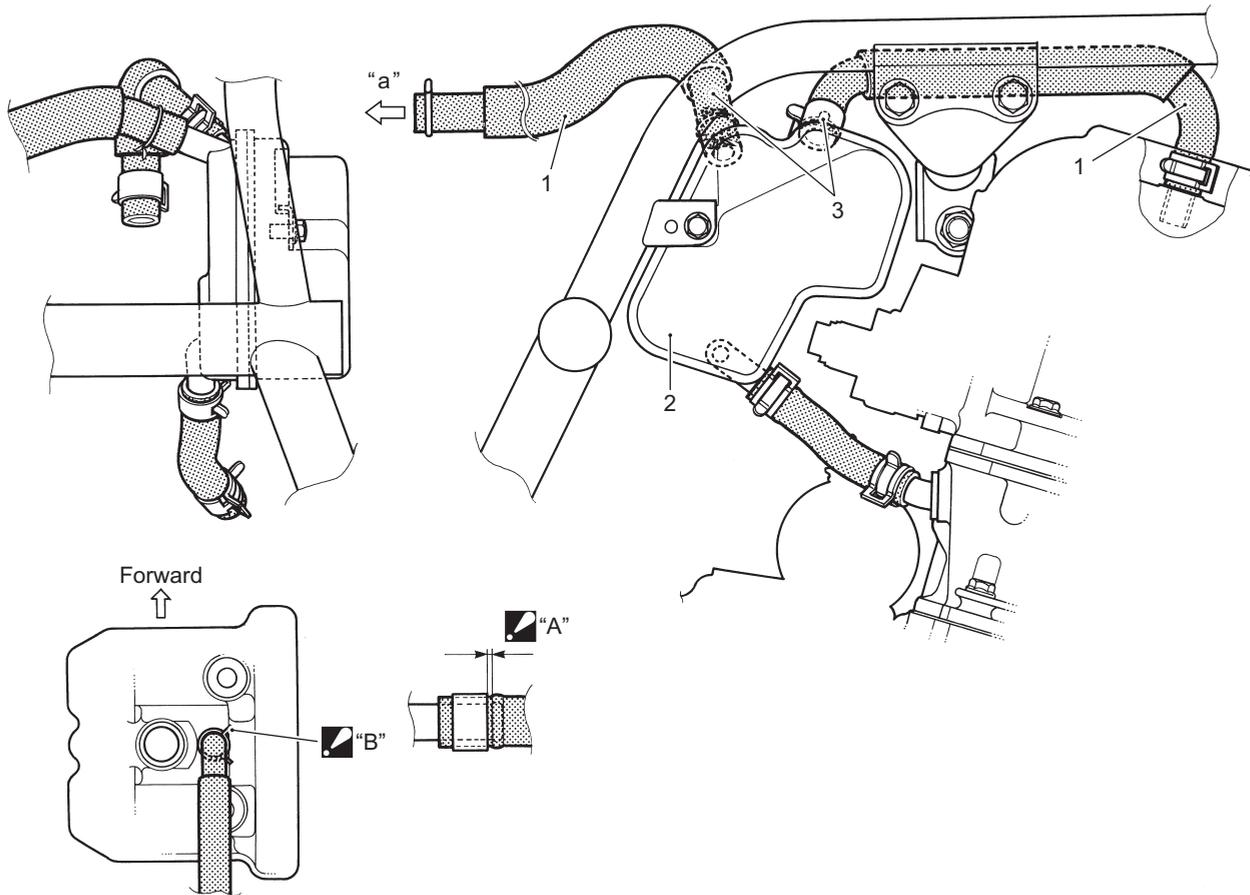
Refer to "General Precautions in Section 00 (Page 00-1)".

B933H21200001

Schematic and Routing Diagram

Oil Return Tank Hose Routing Diagram

B933H21202001



I933H1120006-08

1. Breather hose	▲ "A": Keep clearance between clip and ribbed of tank.
2. Engine oil return tank	▲ "B": Face the tip of clip to right.
3. White mark	"a": To air cleaner outlet tube.

Repair Instructions

Crankcase Breather (PCV) Hose Inspection

B933H21206001

Inspect the PCV hose in the following procedures:

- 1) Remove the fuel tank cover and front fender. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".

- 2) Remove the fuel tank lower cover. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".

- 3) Inspect the PCV hoses (1) for wear or damage. If it is worn or damaged, replace the PCV hoses with a new ones.
Check that the PCV hoses (1) is securely connected.



I933H1120001-03

- 4) Reinstall the removed parts.

Crankcase Breather (PCV) Hose Removal and Installation

B933H21206002

Removal

- 1) Remove the fuel tank cover and front fender. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the fuel tank lower cover. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 3) Disconnect the PCV hoses (1).



I933H1120001-03

Installation

- 1) Install the PCV hoses as shown in the fuel hose routing diagram. Refer to "Oil Return Tank Hose Routing Diagram (Page 1B-1)".
- 2) Reinstall the removed parts.

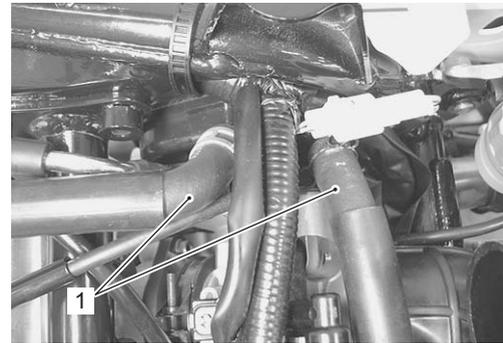
Oil Return Tank Removal and Installation

B933H21206003

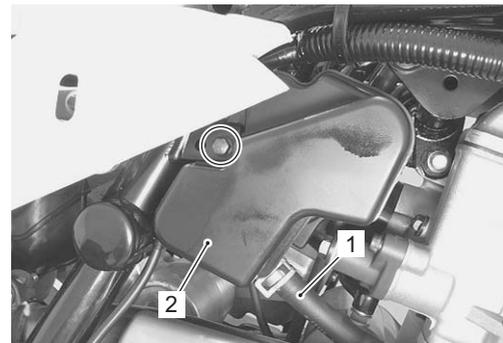
Removal

- 1) Remove the front fender and fuel tank cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".

- 3) Disconnect the breather hoses (1).
- 4) Remove the oil return tank (2).



I933H1120003-04



I933H1120004-01

Installation

- 1) Install the oil return tank and connect the breather hoses. Refer to "Engine Oil Hose and Pipe Routing Diagram in Section 1E (Page 1E-1)".
- 2) Install the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 3) Install the front fender and fuel tank cover.

Oil Return Tank Inspection

B933H21206004

Inspect the oil return tank in the following procedures:

- 1) Remove the oil return tank. Refer to "Oil Return Tank Removal and Installation (Page 1B-2)".
- 2) Inspect the oil return tank for damage. Clean the oil return tank.



I933H1120005-01

- 3) Reinstall the removed parts.

Engine Electrical Devices

Precautions

Precautions for Engine Electrical Device

B933H21300001

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

B933H21303001

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

Diagnostic Information and Procedures

Engine Symptom Diagnosis

B933H21304001

Refer to "Engine Symptom Diagnosis in Section 1A (Page 1A-7)".

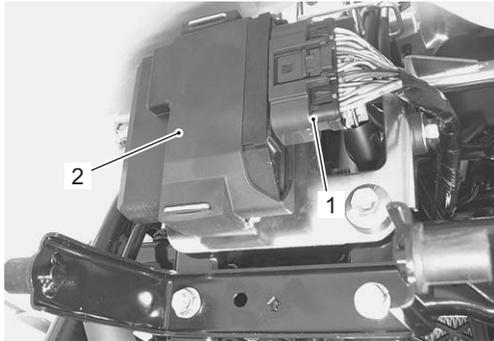
Repair Instructions

ECM Removal and Installation

B933H21306001

Removal

- 1) Remove the battery (-) lead wire. Refer to "Battery Removal and Installation in Section 1J (Page 1J-12)".
- 2) Remove the headlight assembly. Refer to "Headlight Removal and Installation in Section 9B (Page 9B-2)".
- 3) Disconnect the ECM coupler (1) and remove the ECM (2).



I933H1130001-01

Installation

Install the ECM in the reverse order of removal.

CKP Sensor Inspection

B933H21306002

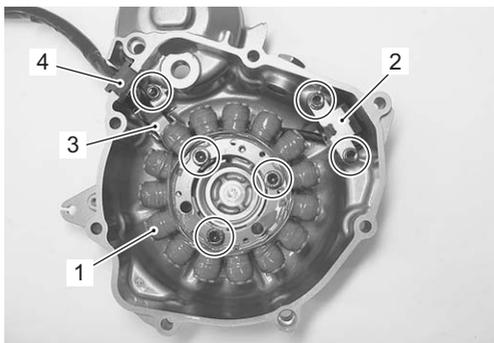
Refer to "DTC "C12" (P0335): CKP Sensor Circuit Malfunction in Section 1A (Page 1A-23)".

CKP Sensor Removal and Installation

B933H21306003

Removal

- 1) Remove the generator cover. Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".
- 2) Remove the generator starter (1), CKP sensor (2), bracket (3) and grommet (4) along with generator starter.



I933H1130019-02

Installation

Install the CKP sensor in the reverse order of removal. Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".

IAP Sensor Inspection

B933H21306004

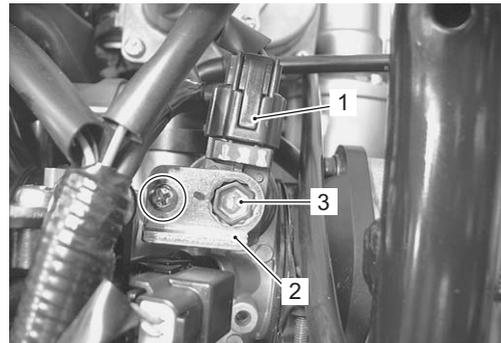
Refer to "DTC "C17" (P1750-H/L): IAP Sensor Circuit Malfunction in Section 1A (Page 1A-40)".

IAP Sensor Removal and Installation

B933H21306005

Removal

- 1) Remove the fuel tank cover and front fender. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the fuel tank lower cover. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 3) Disconnect the IAP sensor coupler (1).
- 4) Remove the plate (2) and IAP sensor (3).



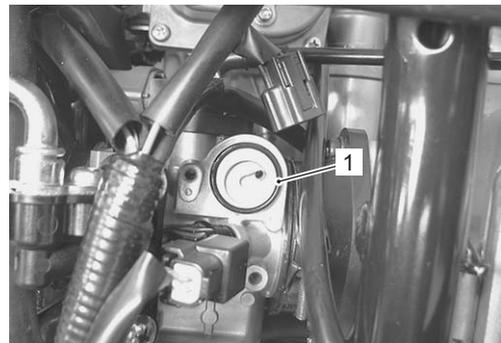
I933H1130002-05

Installation

Install the IAP sensor in the reverse order of removal. Pay attention to the following points:
Install the new O-ring (1).

⚠ CAUTION

Replace the O-ring with a new one.



I933H1130003-02

TP Sensor Inspection

B933H21306006

Refer to "DTC "C14" (P0120-H/L): TP Sensor Circuit Malfunction in Section 1A (Page 1A-26)".

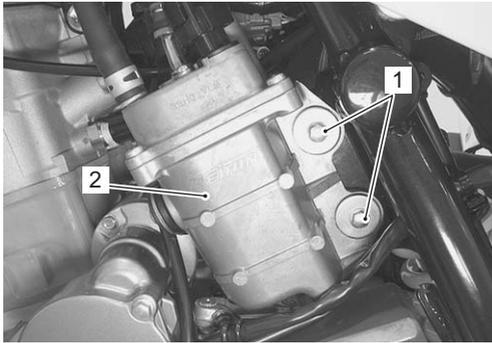
1C-3 Engine Electrical Devices:

TP Sensor Removal and Installation

B933H21306007

Removal

- 1) Remove the fuel pump mounting bolts (1) and move the fuel pump (2).



I933H1130004-01

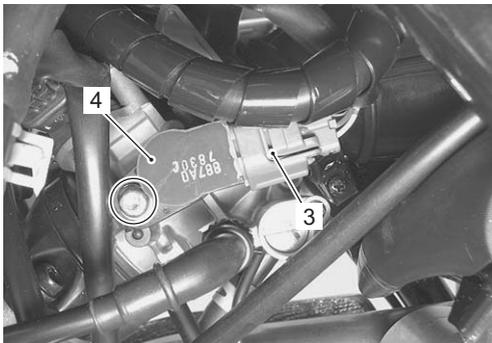
- 2) Disconnect the TP sensor coupler (3) and remove the TP sensor (4) with the special tool.

NOTE

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

Special tool

 : 09930-11950 (Torx wrench)



I933H1130005-01

Installation

- 1) Install the TP sensor (1) and tighten the TP sensor mounting screw.

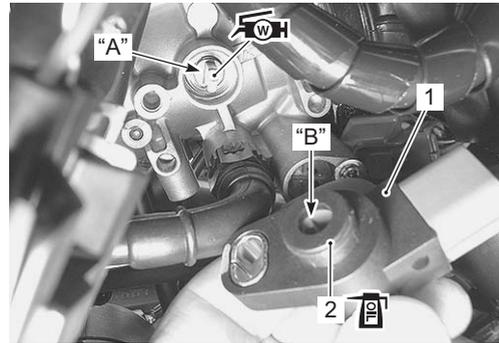
NOTE

- Apply thin coat of engine oil to the O-ring (2).
- Align the throttle shaft end "A" with the groove "B" of the TP sensor.
- Apply grease to the throttle shaft end "A" if necessary.

 : Grease 99000-25160 (Water resistance grease or equivalent)

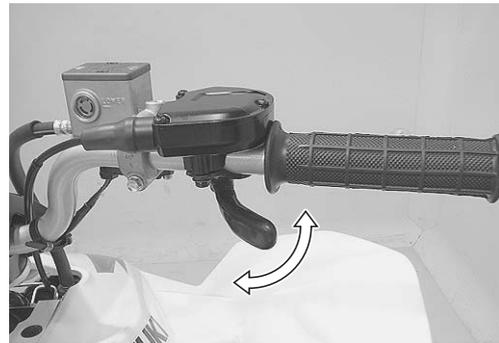
Special tool

 : 09930-11950 (Torx wrench)



I933H1130006-04

- 2) Make sure the throttle lever smoothly push and release.
- 3) For TP sensor setting procedure, refer to "TP Sensor Adjustment (Page 1C-4)".

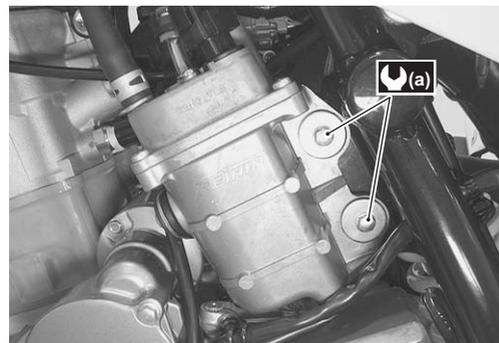


I933H1130007-01

- 4) Tighten the fuel pump mounting bolts to the specified torque.

Tightening torque

Fuel pump mounting bolt (a): 10 N·m (1.0 kgf·m, 7.0 lb-ft)



I933H1130008-01

TP Sensor Adjustment

B933H21306008

Adjust the TP sensor in the following procedures:

- 1) Warm up the engine and check the idling speed. Refer to "Engine Idle Speed Inspection and Adjustment in Section 0B (Page 0B-10)".
- 2) Turn the ignition switch OFF.
- 3) Disconnect the TP sensor coupler (1). Refer to "TP Sensor Removal and Installation (Page 1C-3)".



I933H1130009-01

- 4) Connect the test harness between the TP sensor and its coupler.
- 5) Turn the ignition switch ON.
- 6) Measure the TP sensor output voltage between the yellow wire terminal (+) and B/Br wire terminal (-).

Special tool

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

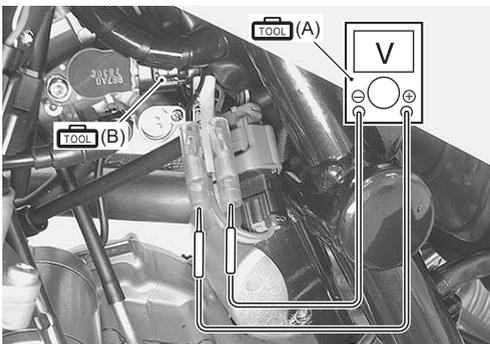
(B): 09900-28630 (TPS test wire harness)

Tester knob indication

Voltage (---)

TP sensor output voltage

0.6 – 3.8 V ((+) terminal: Y – (-) terminal: B/Br)



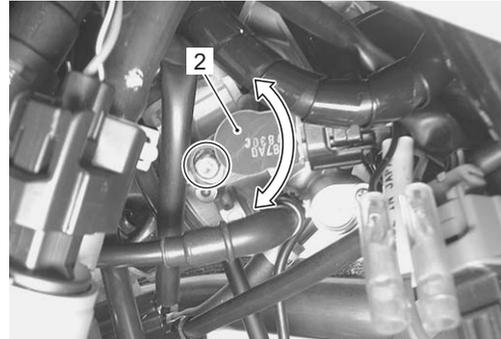
I933H1130010-01

- 7) If the TP sensor adjustment is necessary, loosen the TP sensor mounting screw with the special tool.

Special tool

: 09930-11950 (Torx wrench)

- 8) Turn the TP sensor (2) and adjust the TP sensor until the output voltage comes within to specified valve.



I933H1130011-01

- 9) Tighten the TP sensor mounting screw with the special tool.

Special tool

: 09930-11950 (Torx wrench)



I933H1130012-01

- 10) Turn OFF the ignition switch.
- 11) Disconnect the test harness and connect the TP sensor coupler (1).
- 12) Reinstall the removed parts.

IAT Sensor Inspection

B933H21306009

Refer to "DTC "C21" (P0110-H/L): IAT Sensor Circuit Malfunction in Section 1A (Page 1A-47)".

NOTE

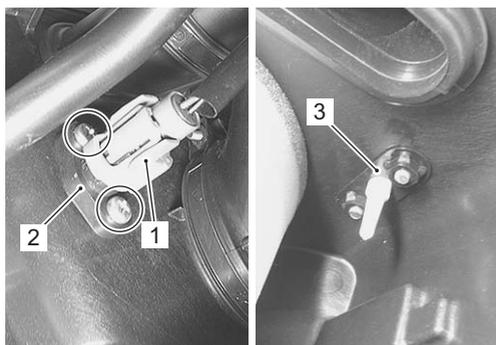
IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to "ECT Sensor Inspection (Page 1C-6)".

IAT Sensor Removal and Installation

B933H21306010

Removal

- 1) Remove the seat. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Remove the air cleaner box cover. Refer to “Air Cleaner Element Removal and Installation in Section 1D (Page 1D-4)”.
- 3) Disconnect the IAT sensor coupler (1).
- 4) Remove the IAT sensor (2) and nuts plate (3).



I933H1130013-01

Installation

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

- Tighten the IAT sensor mounting screws to the specified torque.

CAUTION

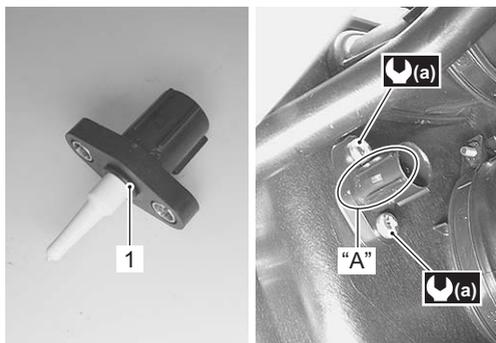
Replace the O-ring (1) with a new one.

NOTE

The claw “A” of IAT sensor faces right side.

Tightening torque

IAT sensor mounting screw (a): 2.5 N·m (0.25 kgf-m, 2.0 lb-ft)



I933H1130014-01

ECT Sensor Removal and Installation

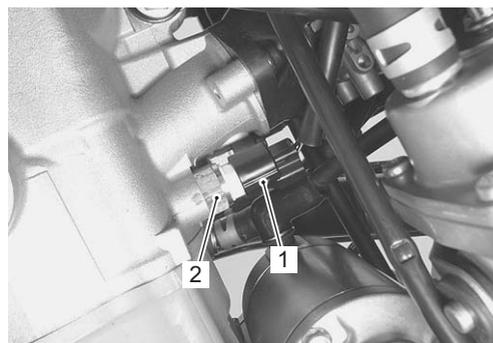
B933H21306011

Removal

- 1) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-13)”.
- 2) Disconnect the coupler (1) and remove the ECT sensor (2).

CAUTION

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



I933H1130015-01

Installation

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

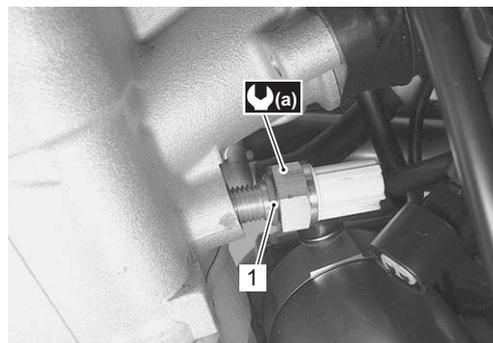
- Tighten the ECT sensor to the specified torque.

CAUTION

Use the new O-ring (1) to prevent engine coolant leakage.

Tightening torque

ECT sensor (a): 12 N·m (1.2 kgf-m, 8.5 lb-ft)



I933H1130016-01

- Pour engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-13)”.

ECT Sensor Inspection

B933H21306012

Refer to "DTC "C15" (P0115-H/L): ECT Sensor Circuit Malfunction in Section 1A (Page 1A-34)".

Inspect the ECT sensor in the following procedures:

- 1) Remove the ECT sensor. Refer to "ECT Sensor Removal and Installation (Page 1C-5)".
- 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

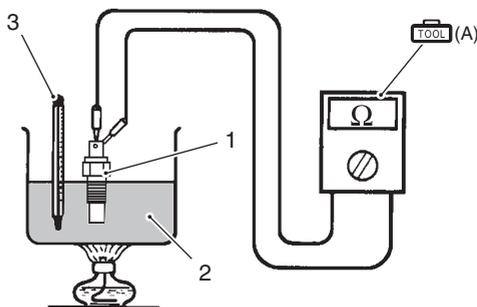
TOOL (A): 09900-25008 (Multi-circuit tester set)

Tester knob indication

Resistance (Ω)

Temperature sensor specification

Temperature	Standard resistance
20 °C (68 °F)	Approx. 2.57 k Ω
50 °C (122 °F)	Approx. 0.77 k Ω
80 °C (176 °F)	Approx. 0.27 k Ω
110 °C (230 °F)	Approx. 0.11 k Ω



I718H1130014-01

- 4) Install the ECT sensor. Refer to "ECT Sensor Removal and Installation (Page 1C-5)".

TO Sensor Inspection

B933H21306013

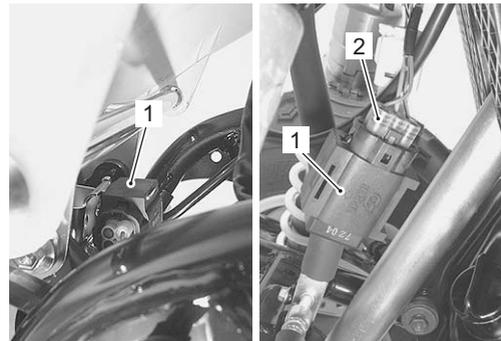
Refer to "DTC "C23" (P1651-H/L): TO Sensor Circuit Malfunction in Section 1A (Page 1A-52)".

TO Sensor Removal and Installation

B933H21306014

Removal

- 1) Remove the left side cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Dismounting the TO sensor (1).
- 3) Disconnect the coupler (2) and remove the TO sensor (1).

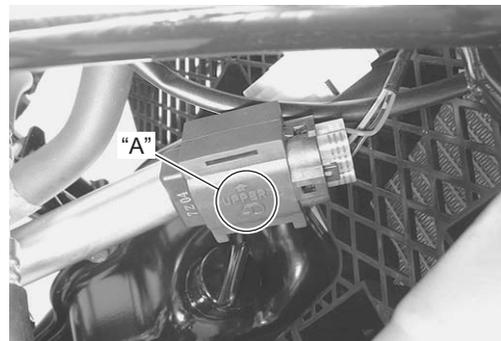


I933H1130017-01

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.



I933H1130018-01

Specifications

Service Data

B933H21307001

FI Sensors

Item	Specification		Note
CKP sensor resistance	400 – 600 Ω		
CKP sensor peak voltage	1.0 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 1.7 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Closed	Approx. 0.6 kΩ	
	Opened	Approx. 3.8 kΩ	
TP sensor output voltage	Closed	Approx. 0.6 V	
	Opened	Approx. 3.8 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor output voltage	0.2 – 4.9 V		
ECT sensor resistance	Approx. 2.6 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor output voltage	0.2 – 4.9 V		
IAT sensor resistance	Approx. 2.6 kΩ at 20 °C (68 °F)		
TO sensor resistance	15.0 – 25.0 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65°

Tightening Torque Specifications

B933H21307002

Fastening part	Tightening torque			Note
	N-m	kgf-m	lb-ft	
Fuel pump mounting bolt	10	1.0	7.0	☞ (Page 1C-3)
IAT sensor mounting screw	2.5	0.25	2.0	☞ (Page 1C-5)
ECT sensor	12	1.2	8.5	☞ (Page 1C-5)

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

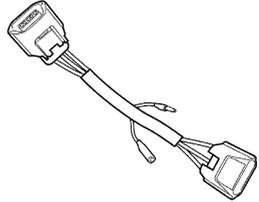
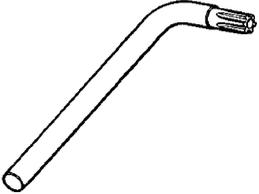
Recommended Service Material

B933H21308001

Material	SUZUKI recommended product or Specification		Note
Grease	Water resistance grease or equivalent	P/No.: 99000-25160	☞(Page 1C-3)

Special Tool

B933H21308002

<p>09900-25008 Multi-circuit tester set ☞(Page 1C-4) / ☞(Page 1C-6)</p>	<p>09900-28630 TPS test wire harness ☞(Page 1C-4)</p>
	
<p>09930-11950 Torx wrench ☞(Page 1C-3) / ☞(Page 1C-3) / ☞(Page 1C-4) / ☞(Page 1C-4)</p>	
	

Engine Mechanical

Diagnostic Information and Procedures

Engine Mechanical Symptom Diagnosis

B933H21404001

Refer to “Engine Symptom Diagnosis in Section 1A (Page 1A-7)”.

Compression Pressure Check

B933H21404002

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

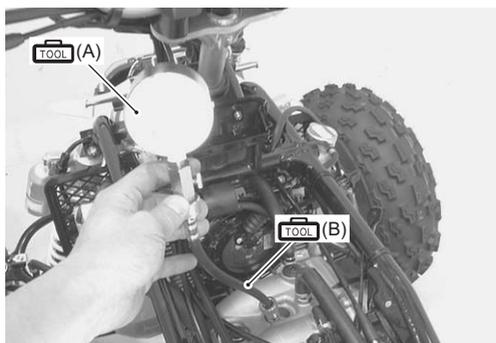
- Before checking the engine for compression pressure, make sure that the cylinder head nuts are tightened to the specified torque values and the valves are properly adjusted.
- Make sure that the battery is in fully-charged condition.

- 1) Warm up the engine.
- 2) Remove the fuel tank lower cover. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
- 3) Remove the spark plug. Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.
- 4) Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.

Special tool

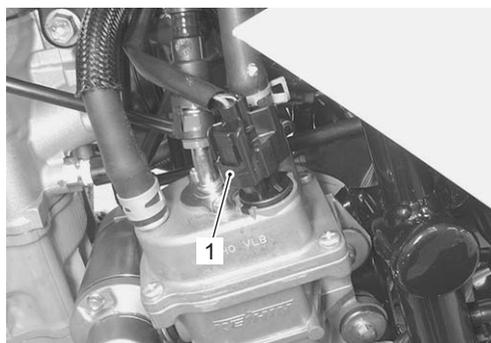
TOOL (A): 09915-64512 (Compression gauge)

TOOL (B): 09915-63311 (Compression gauge attachment)



I933H1140001-01

- 5) Disconnect the fuel pump lead wire coupler (1).



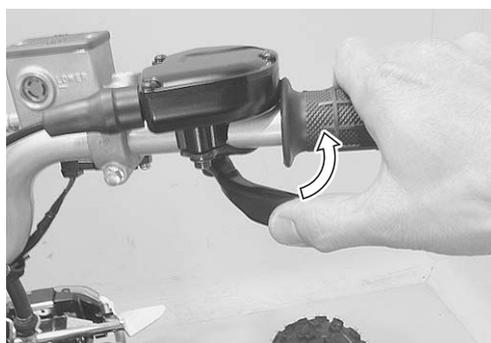
I933H1140002-02

- 6) Remove the ignition switch and connect the ignition switch coupler. Refer to “Ignition Switch Removal and Installation in Section 1H (Page 1H-7)”.
- 7) Shift the transmission to the neutral, turn the ignition switch ON and grasp the clutch lever.



I933H1140003-01

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



I933H1140004-01

9) Press the starter button and crank the engine for a few seconds. Record the maximum gauge reading as the cylinder compression.

Compression pressure specification

Standard
Approx. 1 100 kPa (11.0 kgf/cm², 156 psi) (Automatic decompression actuated)

Low compression pressure can indicate any of the following conditions:

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

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

Repair Instructions

Engine Components Removable with the Engine in Place

B933H21406001

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-4)".	Refer to "Air Cleaner Element Cleaning in Section 0B (Page 0B-4)".	Refer to "Air Cleaner Element Removal and Installation (Page 1D-4)".
Exhaust pipes/Muffler	Refer to "Muffler / Exhaust Pipe Removal and Installation in Section 1K (Page 1K-3)".	Refer to "Exhaust System Inspection in Section 1K (Page 1K-4)".	Refer to "Muffler / Exhaust Pipe Removal and Installation in Section 1K (Page 1K-3)".
Throttle body	Refer to "Throttle Body Removal and Installation (Page 1D-9)".	Refer to "Throttle Body Inspection and Cleaning (Page 1D-13)".	Refer to "Throttle Body Removal and Installation (Page 1D-9)".
Cam chain tension adjuster	Refer to "Engine Top Side Disassembly (Page 1D-17)".	Refer to "Cam Chain Tension Adjuster Inspection (Page 1D-28)".	Refer to "Engine Top Side Assembly (Page 1D-20)".
Cylinder head cover	Refer to "Engine Top Side Disassembly (Page 1D-17)".	—	Refer to "Engine Top Side Assembly (Page 1D-20)".
Cylinder head	Refer to "Engine Top Side Disassembly (Page 1D-17)".	Refer to "Cylinder Head Related Parts Inspection (Page 1D-33)".	Refer to "Engine Top Side Disassembly (Page 1D-17)".
Camshafts	Refer to "Engine Top Side Disassembly (Page 1D-17)".	Refer to "Camshaft Inspection (Page 1D-26)".	Refer to "Engine Top Side Disassembly (Page 1D-17)".
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-5)".	Refer to "Starter Motor Removal and Installation in Section 1I (Page 1I-4)".
Cylinder	Refer to "Engine Top Side Disassembly (Page 1D-17)".	Refer to "Cylinder Inspection (Page 1D-38)".	Refer to "Engine Top Side Disassembly (Page 1D-17)".
Piston	Refer to "Engine Top Side Disassembly (Page 1D-17)".	Refer to "Piston and Piston Ring Inspection (Page 1D-40)".	Refer to "Engine Top Side Disassembly (Page 1D-17)".
Cam chain	Refer to "Engine Top Side Disassembly (Page 1D-17)".	—	Refer to "Engine Top Side Disassembly (Page 1D-17)".
Cam chain guide	Refer to "Engine Top Side Disassembly (Page 1D-17)".	Refer to "Cam Chain Guide Inspection (Page 1D-28)".	Refer to "Engine Top Side Disassembly (Page 1D-17)".
Cam chain tensioner	Refer to "Engine Top Side Disassembly (Page 1D-17)".	Refer to "Cam Chain Tensioner Inspection (Page 1D-29)".	Refer to "Engine Top Side Disassembly (Page 1D-17)".

1D-3 Engine Mechanical:**Engine right side**

Item	Removal	Inspection	Installation
Clutch cover	Refer to "Clutch Removal in Section 5C (Page 5C-7)".	—	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-11)".	Refer to "Clutch Installation in Section 5C (Page 5C-9)".
Clutch sleeve hub	Refer to "Clutch Removal in Section 5C (Page 5C-7)".	—	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-11)".	Refer to "Clutch Installation in Section 5C (Page 5C-9)".
Oil pump idle gear and driven gear	Refer to "Oil Pump Removal and Installation in Section 1E (Page 1E-5)".	—	Refer to "Oil Pump Removal and Installation in Section 1E (Page 1E-5)".
Oil pump	Refer to "Oil Pump Removal and Installation in Section 1E (Page 1E-5)".	Refer to "Oil Pump Inspection in Section 1E (Page 1E-6)".	Refer to "Oil Pump Removal and Installation in Section 1E (Page 1E-5)".
Oil filter	Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)".	—	Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)".
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)".
Gearshift cam driven gear	Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation in Section 5B (Page 5B-14)".	—	Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation in Section 5B (Page 5B-14)".
Balancer drive/driven gear	Refer to "Engine Bottom Side Disassembly (Page 1D-41)".	—	Refer to "Engine Bottom Side Assembly (Page 1D-48)".
Water pump	Refer to "Water Pump Removal and Installation in Section 1F (Page 1F-13)".	Refer to "Water Pump Related Parts Inspection in Section 1F (Page 1F-16)".	Refer to "Water Pump Removal and Installation in Section 1F (Page 1F-13)".

Engine left side

Item	Removal	Inspection	Installation
Generator	Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".	Refer to "Generator Inspection in Section 1J (Page 1J-4)".	Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".
Engine sprocket	Refer to "Engine Sprocket Removal and Installation in Section 3A (Page 3A-4)".	Refer to "Drive Chain Related Parts Inspection in Section 3A (Page 3A-8)".	Refer to "Engine Sprocket Removal and Installation in Section 3A (Page 3A-4)".
Driven chain	Refer to "Drive Chain Replacement in Section 3A (Page 3A-8)".	Refer to "Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)".	Refer to "Drive Chain Replacement in Section 3A (Page 3A-8)".
Gear position switch	Refer to "Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)".	Refer to "Gear Position (GP) Switch Inspection in Section 5B (Page 5B-12)".	Refer to "Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)".
Starter idle gear/driven gear	Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation in Section 1I (Page 1I-8)".	Refer to "Starter Clutch Related Parts Inspection in Section 1I (Page 1I-11)".	Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation in Section 1I (Page 1I-8)".
Starter clutch	Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation in Section 1I (Page 1I-8)".	Refer to "Starter Clutch Related Parts Inspection in Section 1I (Page 1I-11)".	Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation in Section 1I (Page 1I-8)".

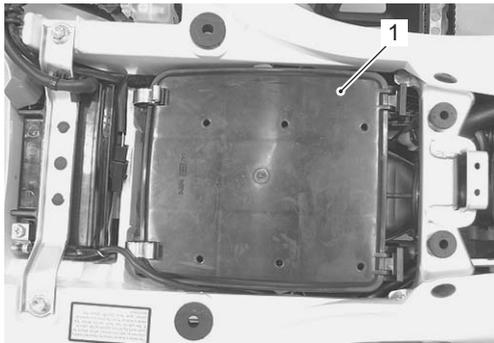
Item	Removal	Inspection	Installation
CKP sensor	Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".	Refer to "CKP Sensor Inspection in Section 1H (Page 1H-6)".	Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".
Starter torque limiter	Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation in Section 1I (Page 1I-8)".	Refer to "Starter Torque Limiter Inspection in Section 1I (Page 1I-11)".	Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation in Section 1I (Page 1I-8)".

Air Cleaner Element Removal and Installation

B933H21406002

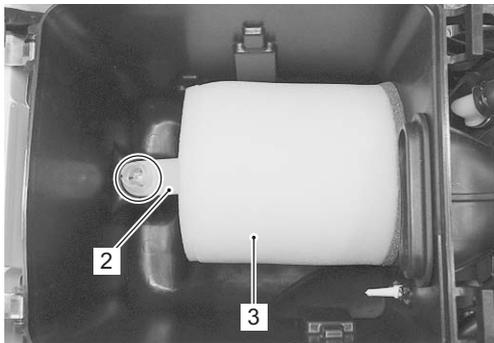
Removal

- 1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the air cleaner box cover (1).



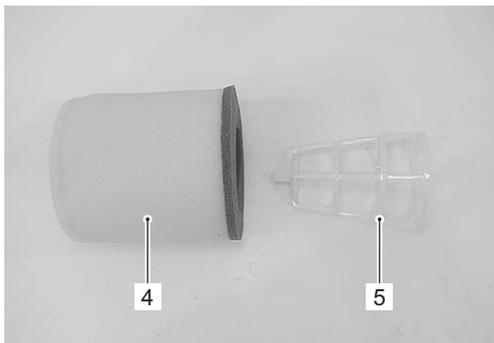
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- 3) Remove the holder (2) and air cleaner element (3).



I933H1140006-01

- 4) Separate the polyurethane foam element (4) from the element frame (5).



I933H1140007-01

Installation

Installation in the reverse order of removal.

Air Cleaner Element Cleaning

B933H21406003

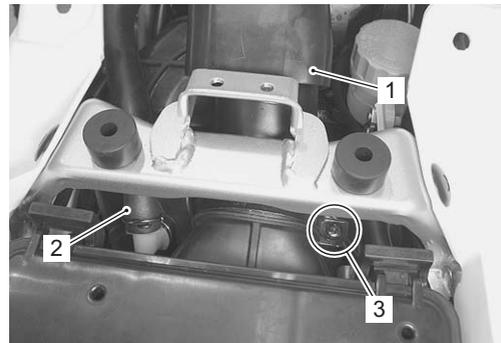
Refer to "Air Cleaner Element Cleaning in Section 0B (Page 0B-4)".

Air Cleaner Box Removal and Installation

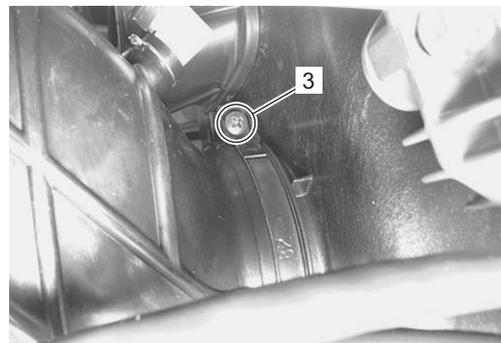
B933H21406004

Removal

- 1) Remove the seat and fuel tank cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the air cleaner duct (1) and disconnect the PCV (breather) hose (2).
- 3) Loosen the air cleaner box clamp screw (3).



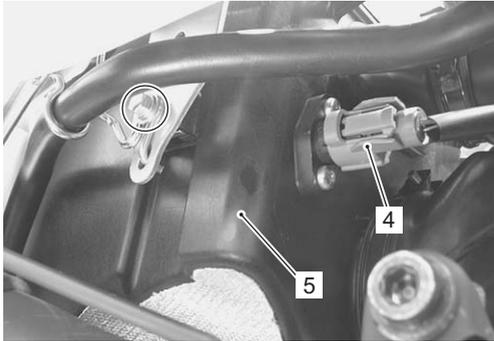
I933H1140008-02



I933H1140009-01

1D-5 Engine Mechanical:

- 4) Disconnect the IAT sensor coupler (4).
- 5) Remove the air cleaner box (5) by removing the air cleaner box mounting bolts.



I933H1140010-01



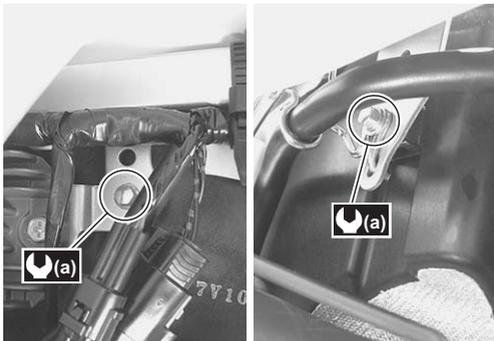
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Installation

Install the air cleaner box in the reverse order of removal. Pay attention to the following points:
Tighten the air cleaner box mounting bolts to the specified torque.

Tightening torque

Air cleaner box mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I933H1140012-01

Throttle Cable Removal and Installation

B933H21406005

Removal

- 1) Remove the fuel tank and fuel tank lower cover. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 2) Remove the throttle cable as shown in the cable routing diagram. Refer to "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".

Installation

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

- Install the throttle cable as shown in the cable routing diagram. Refer to "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".
- Check the throttle cable play and proper operation. Refer to "Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-10)".

Throttle Cable Inspection

B933H21406006

Check that the throttle lever move smoothly from full open to full close. If it does not move smoothly, lubricate the throttle cable.

Throttle Cable Play Inspection and Adjustment

B933H21406007

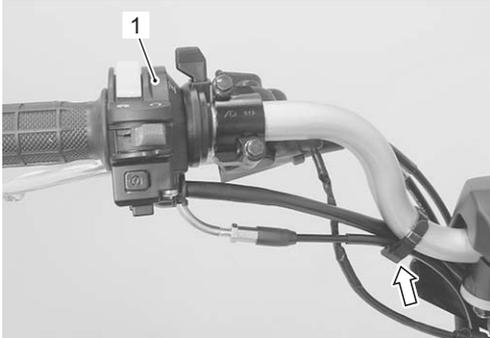
Refer to "Throttle Cable Play Inspection and Adjustment in Section 0B (Page 0B-10)".

Starter Cable Removal and Installation

B933H21406008

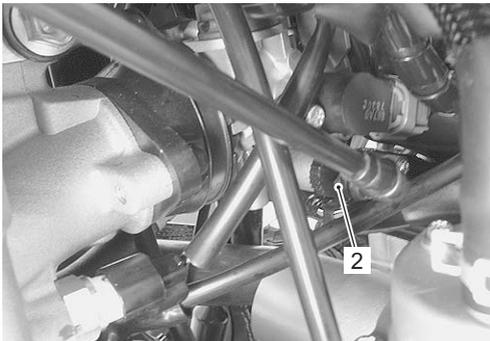
Removal

- 1) Remove the front fender. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Disconnect the clamp.
- 3) Remove the left handlebar switch box (1) and disconnect the starter cable.



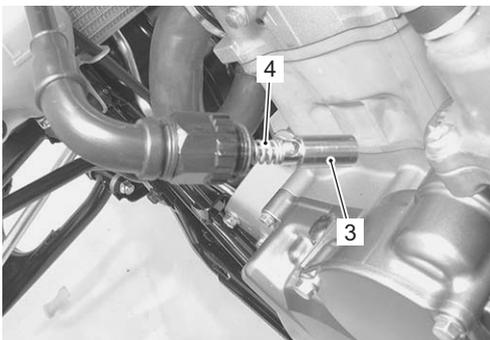
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- 4) Disconnect the starter cable (2) from the throttle body assembly.



I933H1140014-01

- 5) Remove the starter valve (3) and spring (4) from the starter cable.



I933H1140015-06

- 6) Remove the starter cable as shown in the cable routing diagram. Refer to "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".

Installation

Install the starter cable in the reverse order of removal. Pay attention to the following points:

- Install the starter cable as shown in the cable routing diagram. Refer to "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".
- Align the groove of starter valve with the starter cable end.

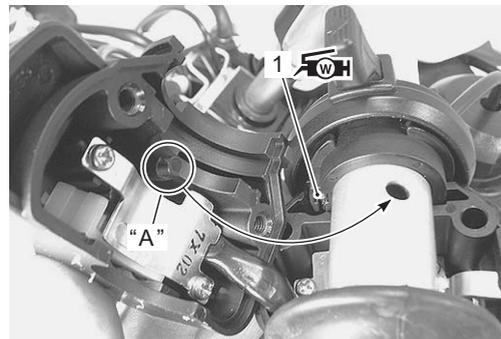


I933H1140016-01

- Connect the starter cable (1) to the starter lever.
- Apply grease to the end of starter cable (1).

 **Grease 99000-25160 (Water resistance grease or equivalent)**

- Insert the projection "A" of the left handlebar switch box into the hole of the handlebars.

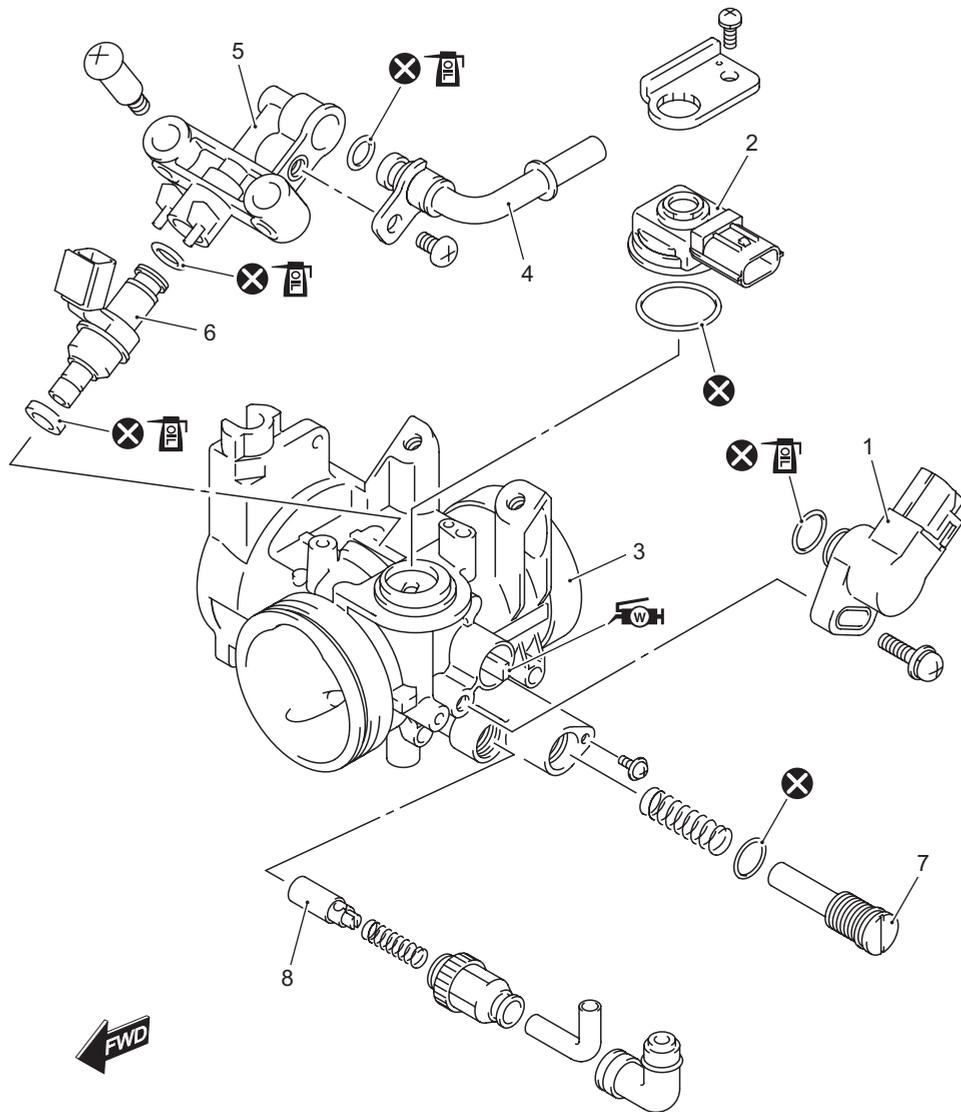


I933H1140017-02

- Check that the starter lever move smoothly from full open to full close.

Throttle Body Components

B933H21406009

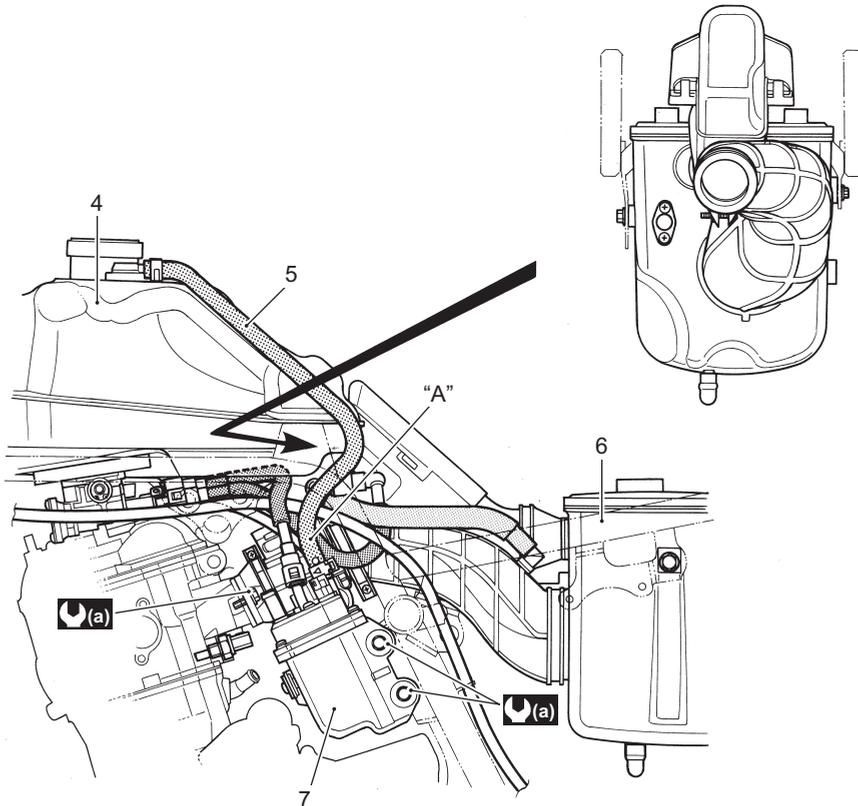
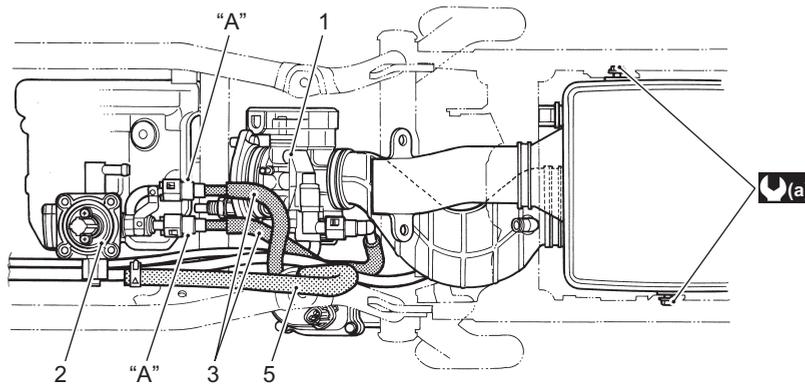
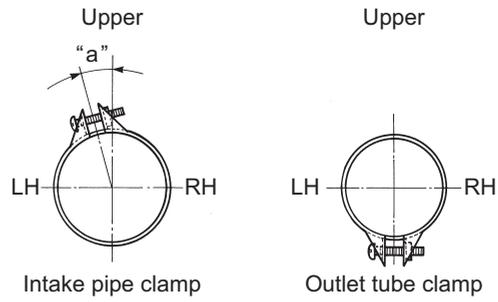


1933H1140018-07

1. TP sensor	4. L-joint	7. Idle air screw	: Apply engine oil.
2. IAP sensor	5. Fuel delivery pipe	8. Starter valve	: Do not reuse.
3. Throttle body	6. Fuel injector	: Apply water resistance grease.	

Throttle Body Construction

B933H21406010



I933H1140241-07

1. Throttle body	5. Fuel vapor return hose	"A": White mark
2. Fuel valve	6. Air cleaner box	"a": 10 – 30°
3. Fuel feed hose	7. Fuel pump	
4. Fuel tank	(a) : 10 N·m (1.0 kgf·m, 7.0 lb-ft)	

1D-9 Engine Mechanical:

Throttle Body Inspection

B933H21406011

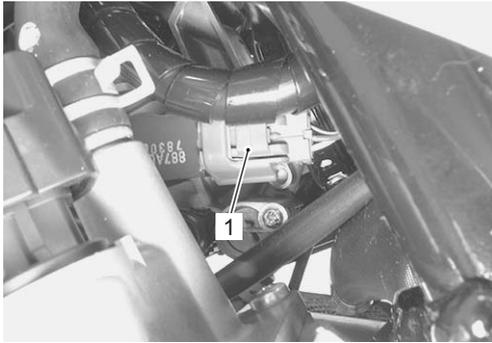
Refer to "Throttle Body Inspection in Section 0B (Page 0B-10)".

Throttle Body Removal and Installation

B933H21406012

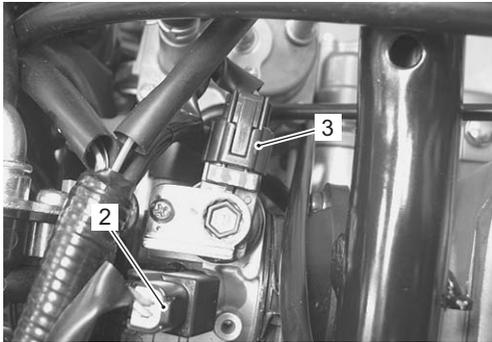
Removal

- 1) Remove the front fender. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the fuel tank lower cover. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 3) Remove the oil return tank. Refer to "Oil Return Tank Removal and Installation in Section 1B (Page 1B-2)".
- 4) Disconnect the TP sensor lead wire coupler (1).



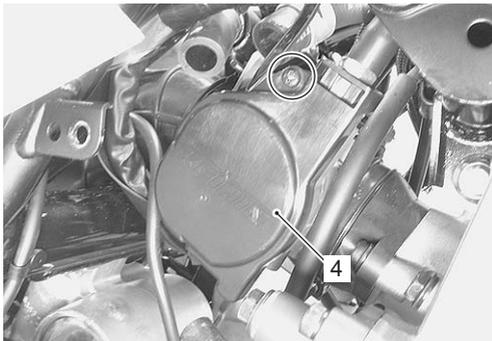
I933H1140019-01

- 5) Disconnect the fuel injector lead wire coupler (2) and IAP sensor lead wire coupler (3).



I933H1140020-01

- 6) Remove the throttle cable cover (4).



I933H1140021-01

- 7) Disconnect the throttle cable from drum.

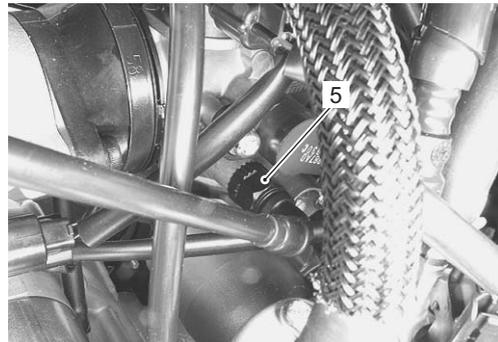
CAUTION

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



I933H1140022-01

- 8) Disconnect the starter cable (5) from the throttle body assembly.



I933H1140023-01

- 9) Loosen the throttle body clamp screws and remove the throttle body assembly.



I933H1140024-01

Installation

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

NOTE

When installing the throttle body, fit the concave part of the intake pipe onto the convex part of the throttle body.



I933H1140025-01

- Tighten the throttle body clamp screws. Refer to “Throttle Body Construction (Page 1D-8)”.
- Connect the starter cable. Refer to “Hose and Cable Routing Diagram in Section 4A (Page 4A-3)”.
- Adjuster the throttle cable play. Refer to “Throttle Cable Play Inspection and Adjustment (Page 1D-5)”.

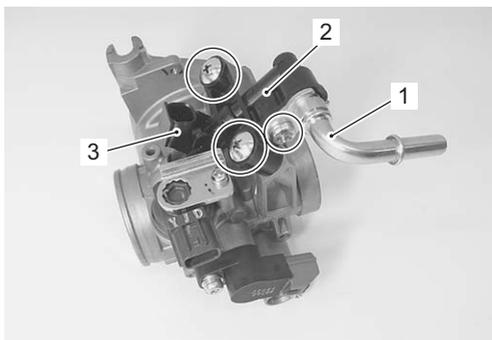
Throttle Body Disassembly and Assembly

B933H21406013

Refer to “Throttle Body Removal and Installation (Page 1D-9)”.

Disassembly

- 1) Remove the L-joint (1) from the fuel delivery pipe (2).
- 2) Remove the fuel delivery pipe (2) with the fuel injector (3).



I933H1140027-02

- 3) Remove the fuel injector (3) from the fuel delivery pipe (2).



I933H1140239-02

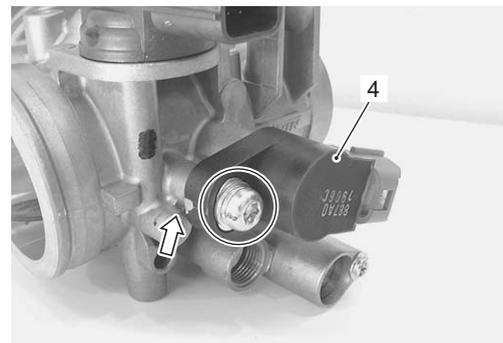
- 4) Remove the TP sensor (4) with the special tool.

Special tool

 : 09930-11950 (Torx wrench)

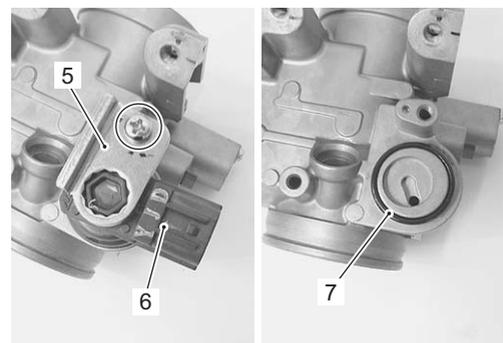
NOTE

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



I933H1140028-01

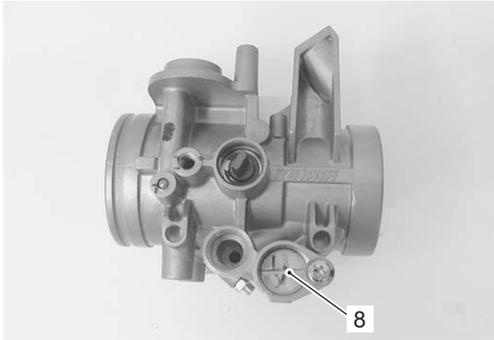
- 5) Remove the plate (5), IAP sensor (6) and O-ring (7).



I933H1140029-01

⚠ CAUTION

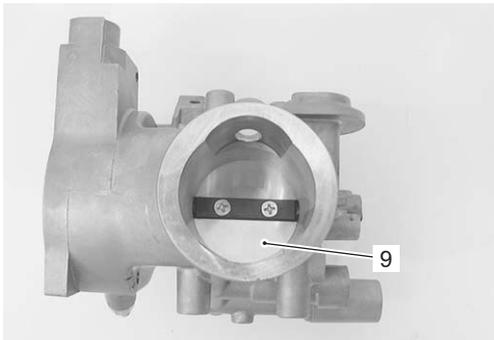
Avoid removing the idle air screw (8).



I933H1140030-01

⚠ CAUTION

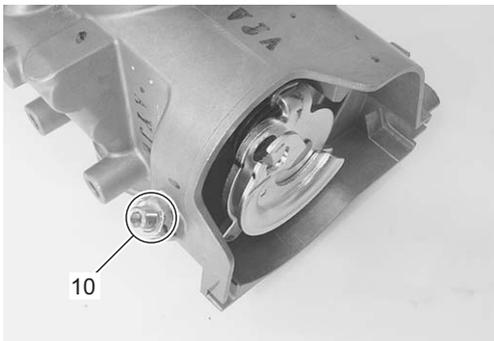
Never remove the throttle valve (9).



I933H1140031-01

⚠ CAUTION

Avoid removing the throttle lever stopper screw (10).



I933H1140032-01

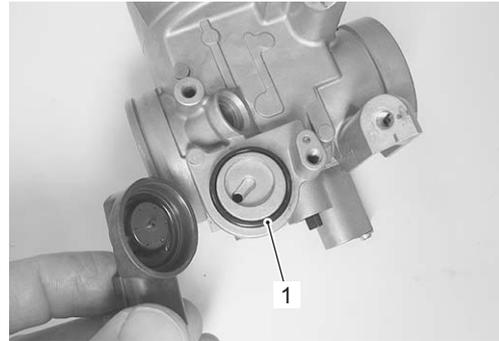
Assembly

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

- Install the new O-ring (1).

⚠ CAUTION

Replace the O-ring with a new one.



I933H1140033-01

- Apply thin coat of engine oil to the O-ring.
- With the throttle valve fully closed, install the TP sensor (1) and tighten the TP sensor mounting screw.

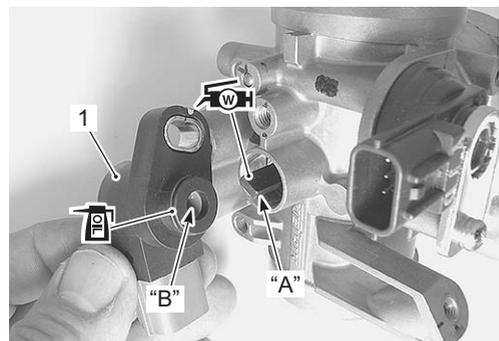
NOTE

- Align the throttle shaft end "A" with the groove "B" of TP sensor.
- Apply grease to the throttle shaft end "A" if necessary.

🛠 : Grease 99000-25160 (Water resistance grease or equivalent)

Special tool

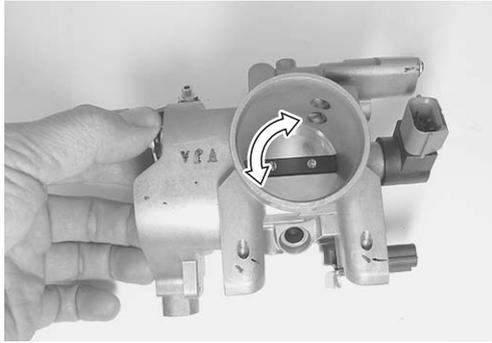
🛠 : 09930-11950 (Torx wrench)



I933H1140034-03

NOTE

- Make sure the throttle valve smoothly open and close.
- For TP sensor setting procedure, refer to "TP Sensor Adjustment in Section 1C (Page 1C-4)".

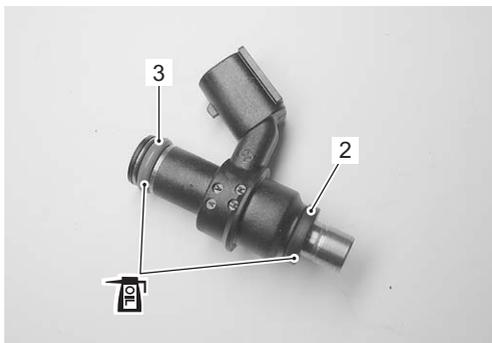


I933H1140035-01

- Apply thin coat of engine oil to the new cushion seal (2) and the O-ring (3).

⚠ CAUTION

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



I933H1140036-01

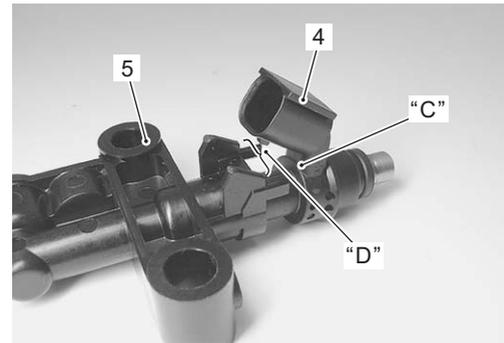
- Install the fuel injector (4) by pushing it straight to the delivery pipe (5).

⚠ CAUTION

Never turn the injector (4) while pushing it.

NOTE

Align the coupler "C" of injector with boss "D" of the delivery pipe.

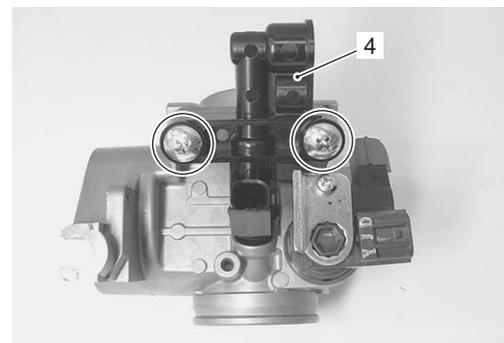


I933H1140037-01

- Install the fuel injector (4) by pushing it straight to throttle body.

⚠ CAUTION

Never turn the fuel injector (4) while pushing it.



I933H1140038-01

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

⚠ CAUTION

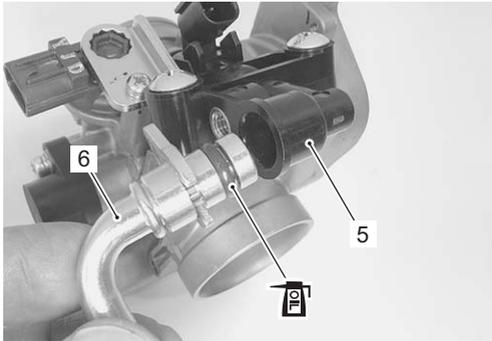
Replace the O-ring with a new one.

1D-13 Engine Mechanical:

- Install the L-joint (6) by pushing it straight to the delivery pipe (5).

⚠ CAUTION

Never turn the L-joint (6) while pushing it.



I933H1140039-01

Throttle Body Inspection and Cleaning

Refer to "Throttle Body Disassembly and Assembly (Page 1D-10)".

B933H21406014

Cleaning

⚠ WARNING

Some carburetor cleaning chemicals, especially dip-type soaking solutions, are very corrosive and must be handled carefully. Always follow the chemical manufacturer's instructions on proper use, handling and storage.

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

⚠ CAUTION

Do not use wire to clean passageways. Wire can damage passageways. If the components cannot be cleaned with a spray cleaner it may be necessary to use a dip-type cleaning solution and allow them to soak. Always follow the chemical manufacturer's instructions for proper use and cleaning of the throttle body components. Do not apply carburetor cleaning chemicals to the rubber and plastic materials.

Inspection

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

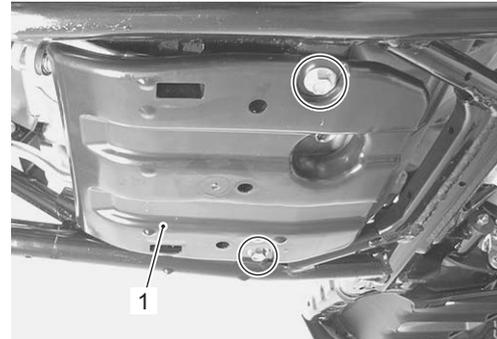
- O-ring
- Throttle valve
- Idle air screw

Engine Assembly Removal

B933H21406015

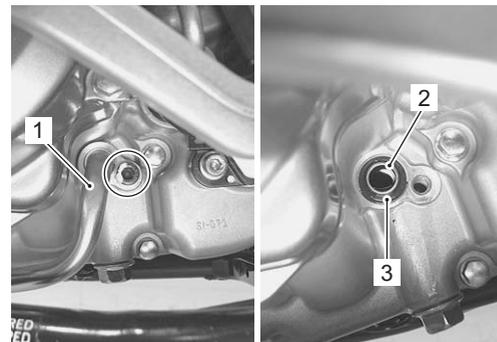
Before taking the engine out of the frame, wash the engine using a steam cleaner. Engine removal is sequentially explained in the following steps:

- 1) Remove the engine under cover (1).

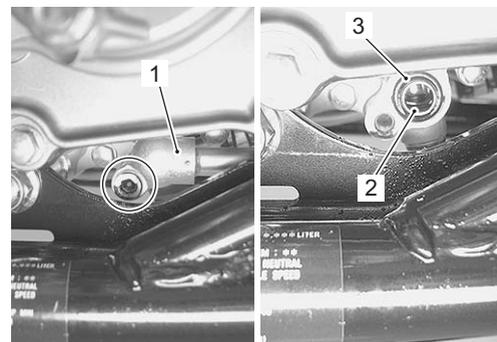


I933H1140040-03

- 2) Drain engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)".
- 3) Remove the oil tank hoses (1).
- 4) Remove the dowel pins (2) and O-rings (3).



I933H1140041-01



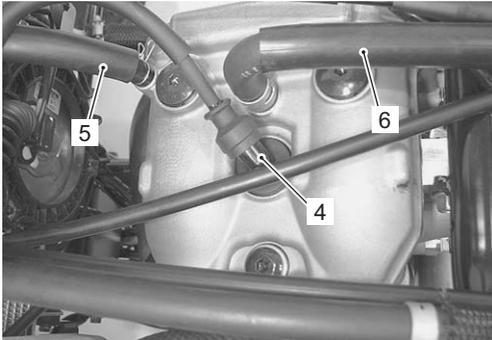
I933H1140042-01

- 5) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 6) Disconnect the battery (-) lead wire.



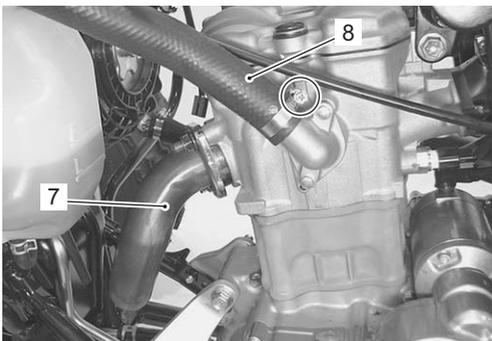
I933H1140043-01

- 7) Remove the fuel tank and fuel tank lower cover. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 8) Disconnect the spark plug cap (4), oil tank overflow hose (5) and breather hose (6).



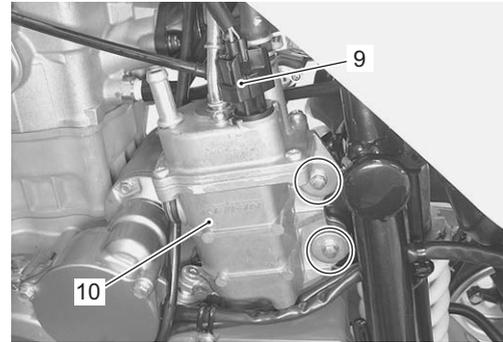
I933H1140044-01

- 9) Drain engine coolant. Refer to "Cooling System Inspection in Section 0B (Page 0B-13)".
- 10) Remove the exhaust pipe (7). Refer to "Muffler / Exhaust Pipe Removal and Installation in Section 1K (Page 1K-3)".
- 11) Disconnect the engine coolant outlet hose (8).



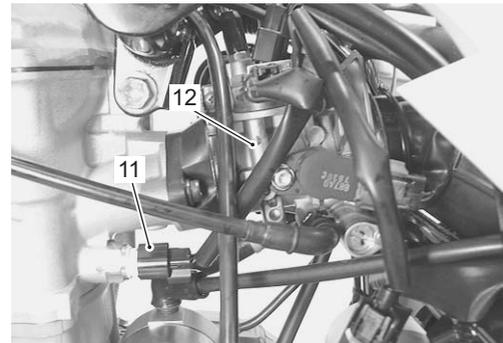
I933H1140045-01

- 12) Disconnect the fuel pump lead wire coupler (9) and remove the fuel pump (10).



I933H1140046-01

- 13) Disconnect the ECT sensor coupler (11).
- 14) Remove the throttle body (12). Refer to "Throttle Body Removal and Installation (Page 1D-9)".

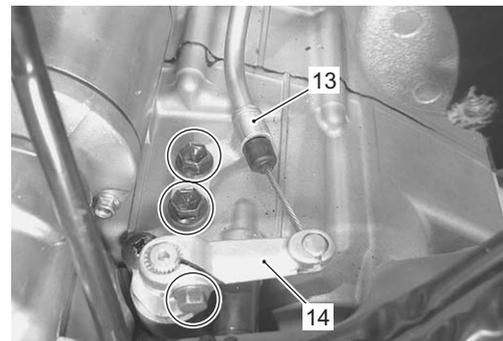


I933H1140047-01

- 15) Remove the clutch cable bracket (13).
- 16) Disconnect the clutch release arm (14) along with the clutch cable.

NOTE

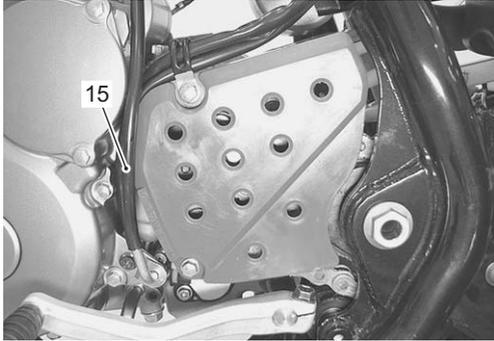
Mark the clutch release camshaft head at which the clutch release arm slit for correct reinstallation.



I933H1140048-01

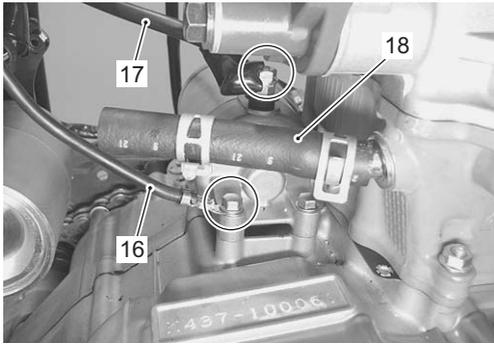
1D-15 Engine Mechanical:

- 17) Disconnect the reverse lock release cable (15). Refer to "Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)".



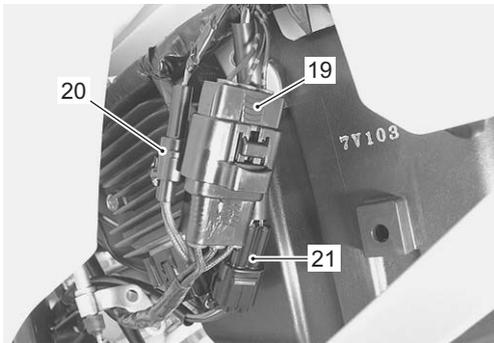
I933H1140049-05

- 18) Disconnect the engine ground wire coupler (16), starter motor lead wire (17) and breather hose (18).



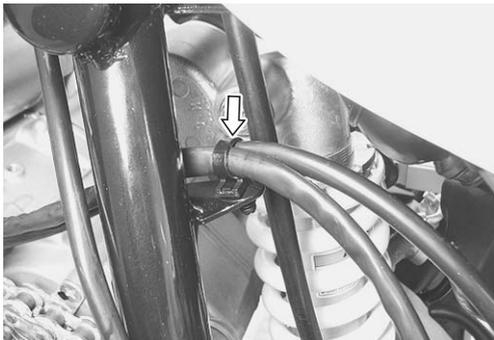
I933H1140050-01

- 19) Disconnect the generator coupler (19), CKP sensor coupler (20) and GP switch coupler (21).



I933H1140051-01

- 20) Disconnect the clamp.

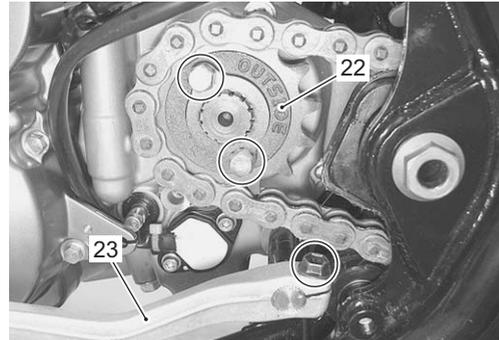


I933H1140052-01

- 21) Remove the engine sprocket (22) with drive chain.
22) Remove the gear shift lever (23) and spacers.

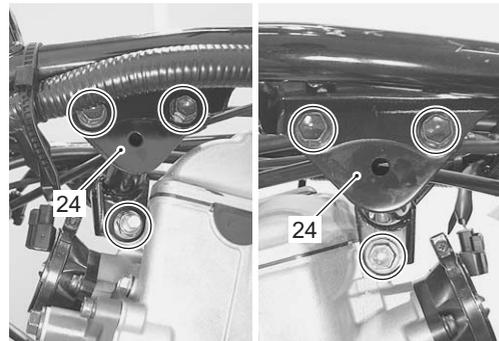
NOTE

Mark the gearshift shaft head at which the gearshift lever slit set for correct reinstallation.

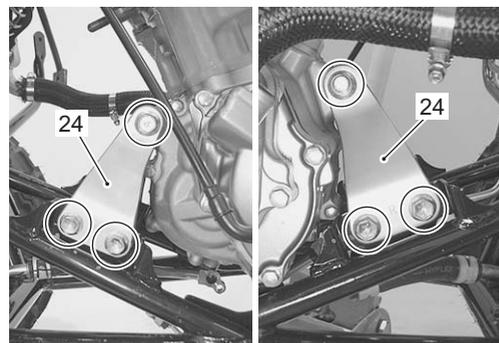


I933H1140053-01

- 23) Support the engine with a proper jack.
24) Remove the engine mounting brackets (24).

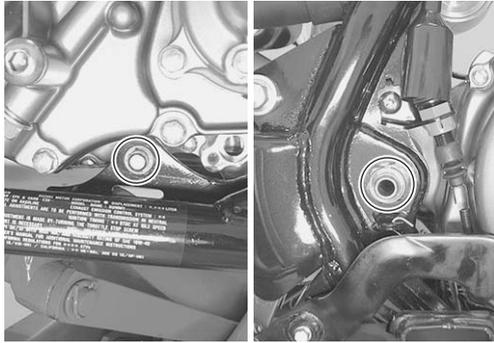


I933H1140054-01



I933H1140055-01

25) Remove the engine mounting bolts and nuts.



I933H1140056-01

26) Remove the engine from the left side.

Engine Assembly Installation

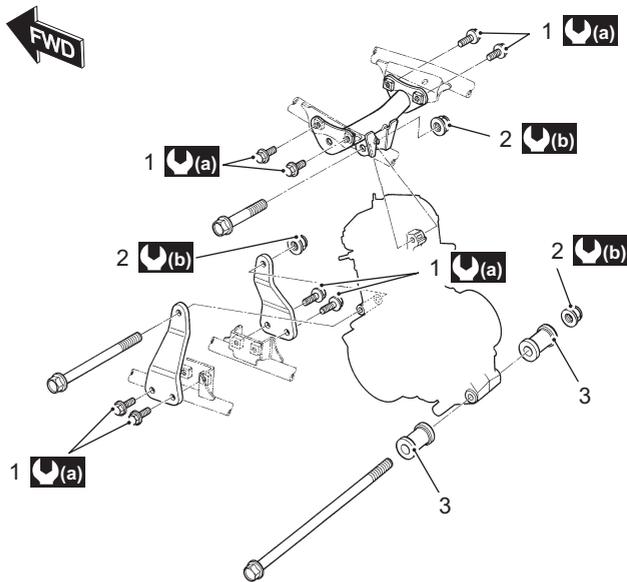
B933H21406016

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

- Tighten the engine mounting bracket bolts (1) and engine mounting nuts (2) to the specified torque as shown in the figure.

NOTE

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



I933H1140057-01

1. Engine mounting bracket bolt	(a) : 26 Nm (2.6 kgf-m, 19.0 lb-ft)
2. Engine mounting nut	(b) : 66 Nm (6.6 kgf-m, 47.5 lb-ft)
3. Collar	

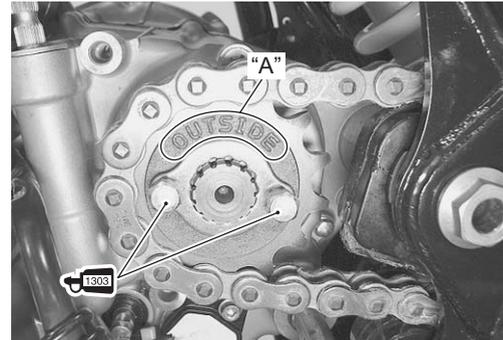
- Install the engine sprocket with drive chain after loosening the chain adjuster bolts.

NOTE

The letter "A" on the engine sprocket should face to the outside.

- Apply thread lock to the engine sprocket bolts and tighten them.

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



I933H1140058-01

- Install the throttle body. refer to "Throttle Body Removal and Installation (Page 1D-9)".
- Install the oil return tank. Refer to "Oil Return Tank Removal and Installation in Section 1B (Page 1B-2)".
- Install the fuel pump. Refer to "Fuel Pump Removal and Installation in Section 1G (Page 1G-13)".
- Install the exhaust pipe. Refer to "Muffler / Exhaust Pipe Removal and Installation in Section 1K (Page 1K-3)".
- Install the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- Install the oil tank hoses. Refer to "Engine Oil Pipe Removal and Installation in Section 1E (Page 1E-8)".
- After remounting the engine, route the wiring harness, cable and hoses properly. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-3)", "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)" and "Water Hose Routing Diagram in Section 1F (Page 1F-3)".
- Pour engine coolant and engine oil. Refer to "Cooling System Inspection in Section 0B (Page 0B-13)" and "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)".

1D-17 Engine Mechanical:

- 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-10)”.
 - Clutch cable play
Refer to “Clutch Inspection and Adjustment in Section 0B (Page 0B-13)”.
 - Reverse lock cable play
Refer to “Reverse Lock Cable Play Inspection and Adjustment in Section 5B (Page 5B-1)”.
 - Drive chain slack
Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.
 - Engine idle speed.
Refer to “Engine Idle Speed Inspection and Adjustment in Section 0B (Page 0B-10)”.
 - Engine oil and coolant leakage
Refer to “Cooling Circuit Inspection in Section 1F (Page 1F-4)”.

Engine Top Side Disassembly

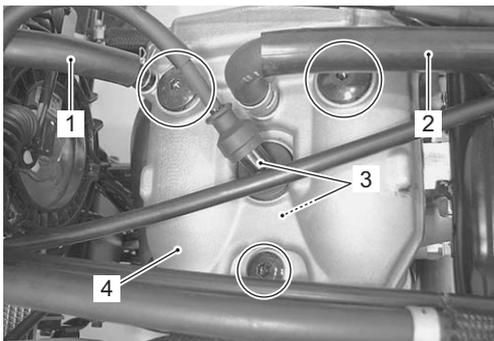
B933H21406017

⚠ 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.**

Cylinder head cover

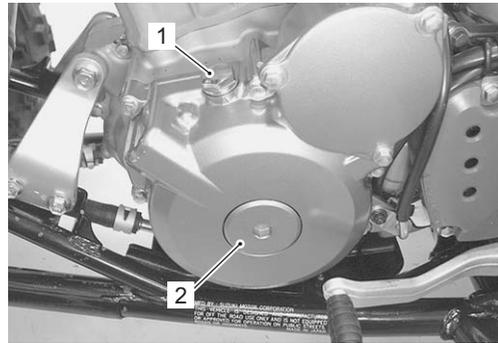
- 1) Remove the fuel tank cover and front fender. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Remove the fuel tank and fuel tank lower cover. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
- 3) Disconnect the oil tank overflow hose (1) and breather hose (2).
- 4) Disconnect the spark plug cap and spark plug (3). Refer to “Spark Plug Cap and Spark Plug Removal and Installation in Section 1H (Page 1H-4)”.
- 5) Remove the cylinder head cover (4) and its gasket.



I933H1140059-01

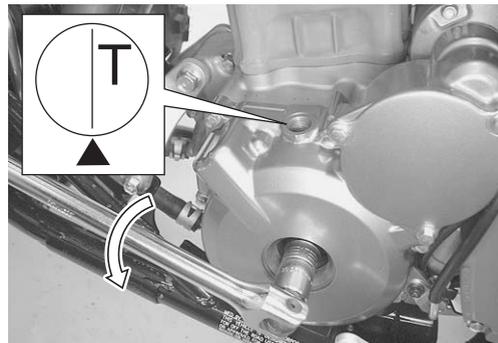
Camshaft

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

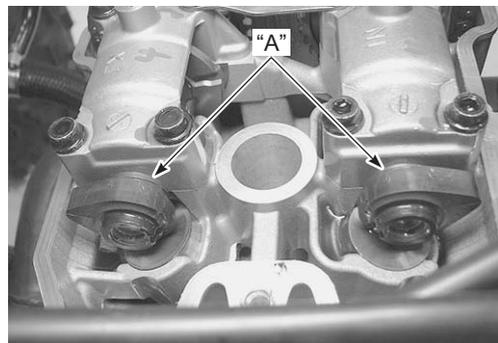


I933H1140060-01

- 2) Turn the crankshaft counterclockwise and align the “T” line on the generator rotor is aligned with the triangle mark on the generator cover and also bring the cams “A” to the position as shown in the figure.

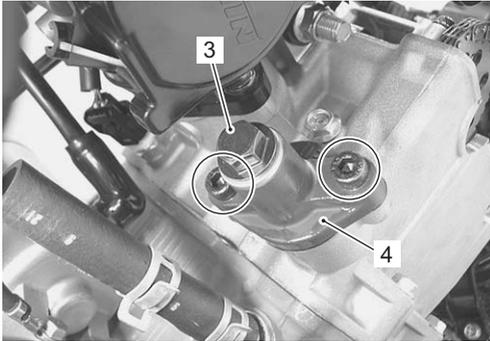


I933H1140061-02



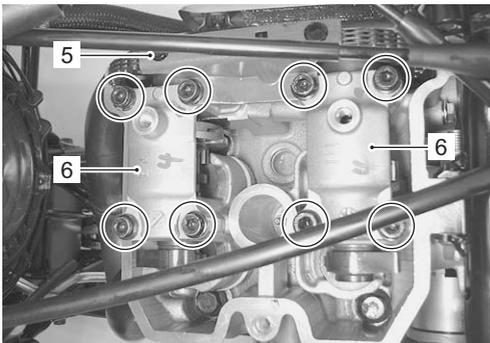
I933H1140062-01

- 3) Remove the oil return tank. Refer to "Oil Return Tank Removal and Installation in Section 1B (Page 1B-2)".
- 4) Remove the cam chain tension adjuster cap bolt (3), washer and spring.
- 5) Remove the cam chain tension adjuster (4) and its gasket.



I933H1140064-01

- 6) Remove the cam chain guide No. 2 (5) and camshaft journal holders (6).



I933H1140063-01

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

NOTE

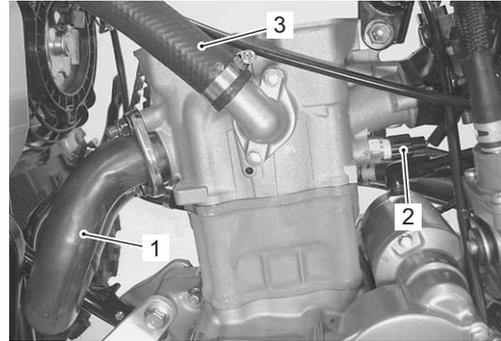
Do not drop the dowel pins and camshaft drive chain into the crankcase.



I933H1140065-01

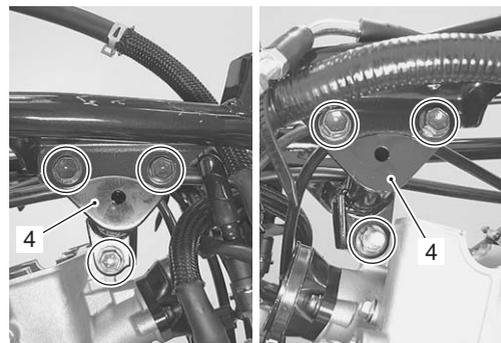
Cylinder head

- 1) Remove the exhaust pipe (1). Refer to "Muffler / Exhaust Pipe Removal and Installation in Section 1K (Page 1K-3)".
- 2) Disconnect the ECT sensor coupler (2) and radiator inlet hose (3).



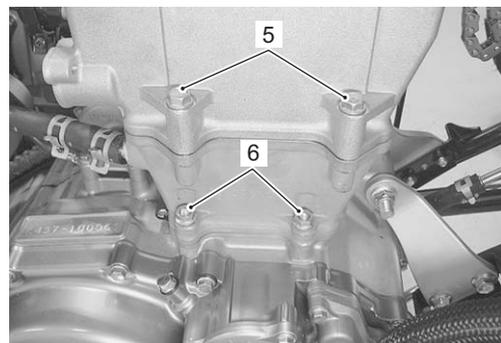
I933H1140066-01

- 3) Remove the throttle body. Refer to "Throttle Body Removal and Installation (Page 1D-9)".
- 4) Remove the engine mounting bracket (4).



I933H1140067-01

- 5) Remove the cylinder head bolts (5).
- 6) Loosen the cylinder base nuts (6).



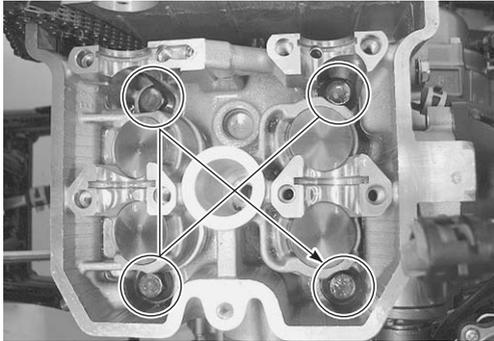
I933H1140068-01

1D-19 Engine Mechanical:

7) Remove the cylinder head.

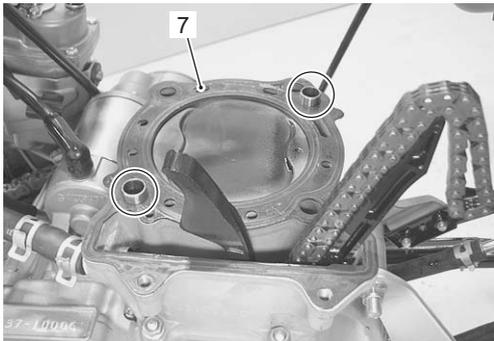
NOTE

- When loosening the cylinder head bolts, loosen each bolt little by little diagonally.
- If the cylinder head does not come off easily, lightly tap using a plastic hammer.



I933H1140069-01

8) Remove the cylinder head gasket (7) and dowel pins.



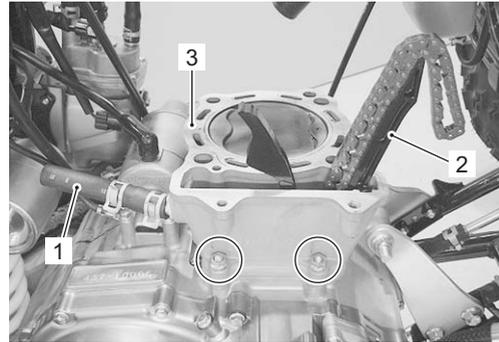
I933H1140070-01

Cylinder

- 1) Disconnect the breather hose (1).
- 2) Remove the cam chain guide No. 1 (2) and cylinder (3).

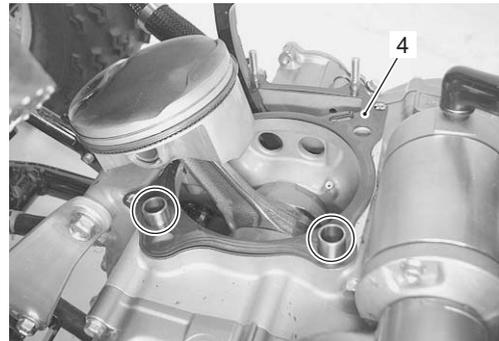
NOTE

If the cylinder does not come off easily, lightly tap using a plastic hammer.



I933H1140071-02

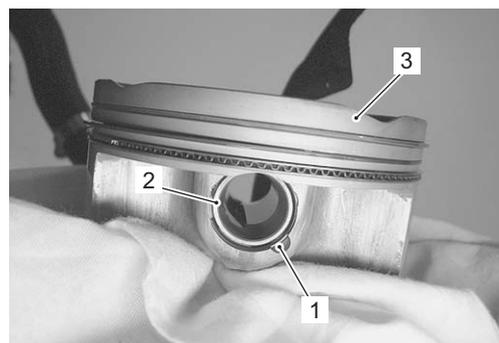
3) Remove the cylinder gasket (4) and dowel pins.



I933H1140072-01

Piston

- 1) Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into the crankcase.
- 2) Remove each piston pin circlip (1).
- 3) Draw out the piston pin (2) and remove the piston (3).



I933H1140073-01

Engine Top Side Assembly

B933H21406018

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

Piston

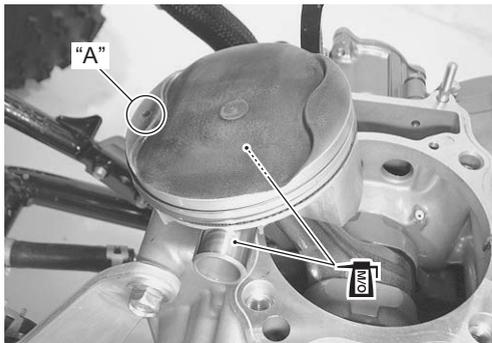
- Apply molybdenum oil solution onto piston pin and small end of conrod.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

- Install the piston and piston pin.

NOTE

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



I933H1140074-01

- Place a clean rag over the cylinder base to prevent the piston pin circlip (1) from dropping into the crankcase, and then fit the piston pin circlip (1) with long-nose pliers.

⚠ CAUTION

Use new piston pin circlip (1) to prevent circlip failure which will occur when it is bent.

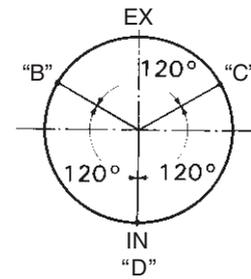
NOTE

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



I933H1140075-02

- Position the gaps of the three rings and side rails as shown in the figure. Before inserting piston into the cylinder, check that the gaps are so located.



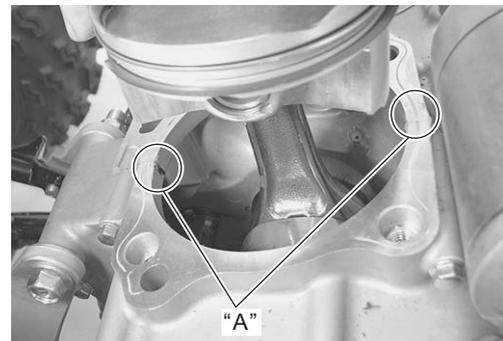
I718H1140051-01

"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.
- Apply bond to the crankcase "A" as shown in the figure.

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



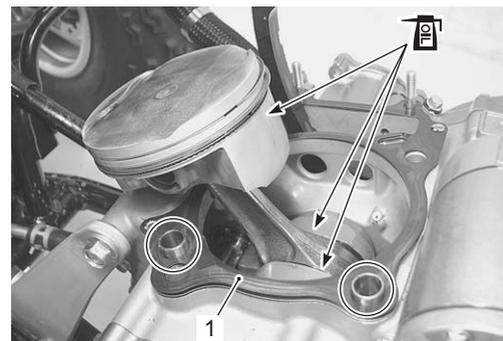
I933H1140076-03

- Install the dowel pins and cylinder gasket (1).

⚠ CAUTION

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

- Apply engine oil to the sliding surface of the piston and big end of the conrod.



I933H1140077-01

1D-21 Engine Mechanical:

- Hold each piston ring and put it into the cylinder. Make sure that the piston rings are caught by the cylinder skirt.

NOTE

When mounting the cylinder, keep the camshaft drive chain taut. The camshaft drive chain must not be caught between the cam drive chain sprocket and crankcase when the crankshaft is rotated.



I933H1140078-01

Cylinder head

- Install the cam chain guide No. 1 (1).

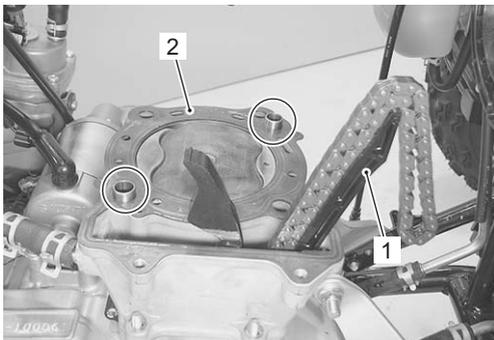
NOTE

Make sure that the cam chain guide No. 1 (1) is inserted properly or binding of the cam chain and guide may result.

- Install the dowel pins and cylinder head gasket (2).

CAUTION

Use a new gasket to prevent gas leakage.

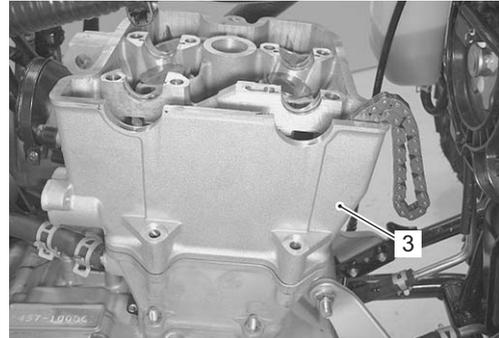


I933H1140079-01

- Place the cylinder head (3) on the cylinder.

NOTE

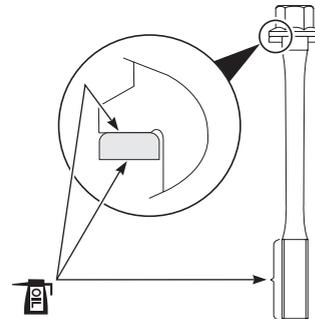
When installing the cylinder head (3), keep the cam chain taut.



I933H1140080-01

NOTE

- Apply engine oil to the threaded parts of the cylinder head bolts and both sides of the its washers.
- Be sure to install the washer with rounded side facing up.



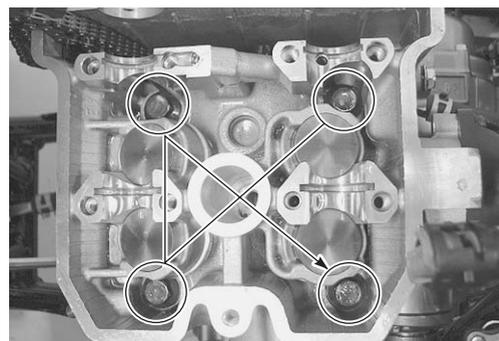
I933H1140081-01

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

Tightening torque

Cylinder head bolt (M10) (Initial): 25 N·m (2.5 kgf·m, 18.0 lb-ft)

Cylinder head bolt (M10) (Final): 46 N·m (4.6 kgf·m, 33.5 lb-ft)



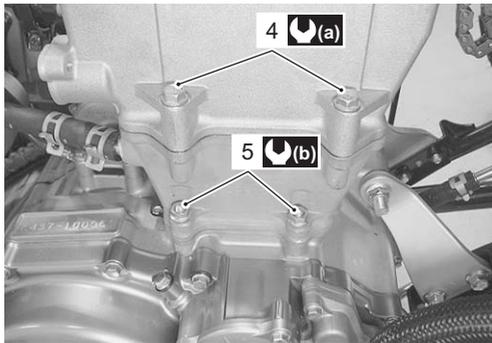
I933H1140069-01

- After tightening the cylinder head bolts to specification, tighten the cylinder head bolts (4) and cylinder base nuts (5) to the specified torque.

Tightening torque

Cylinder head bolt (M6) (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

Cylinder base nut (b): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I933H1140083-01

- Install the engine mounting bracket.
- Tighten the bolts and nuts to the specified torque.

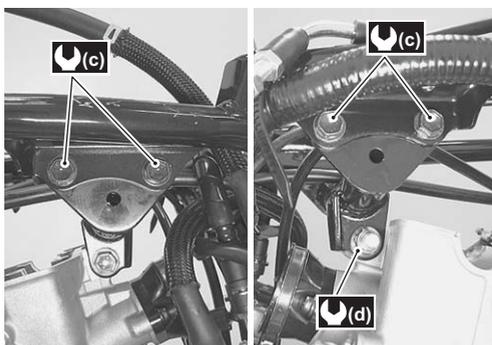
NOTE

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

Tightening torque

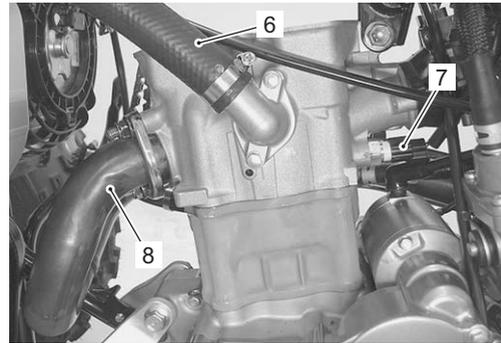
Engine mounting bracket bolt (c): 26 N·m (2.6 kgf-m, 19.0 lb-ft)

Engine mounting nut (d): 66 N·m (6.6 kgf-m, 47.5 lb-ft)



I933H1140084-03

- Install the throttle body. Refer to "Throttle Body Removal and Installation (Page 1D-9)".
- Connect the radiator inlet hose (6) and ECT sensor coupler (7).
- Install the exhaust pipe (8). Refer to "Muffler / Exhaust Pipe Removal and Installation in Section 1K (Page 1K-3)".



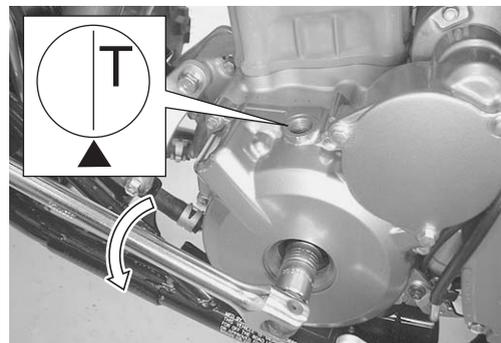
I933H1140085-01

Camshaft

- Turn the crankshaft counterclockwise and align the "T" line on the generator rotor is aligned with the triangle mark on the generator cover.

CAUTION

If the crankshaft is turned without drawing the cam chain upward, the cam chain will catch between crankcase and cam chain drive sprocket.



I933H1140061-02

1D-23 Engine Mechanical:

- Just before installing the camshaft into the cylinder head, apply engine oil to the camshaft journals, cam faces and camshaft journal holders.
- Apply molybdenum oil solution to the camshaft journals.

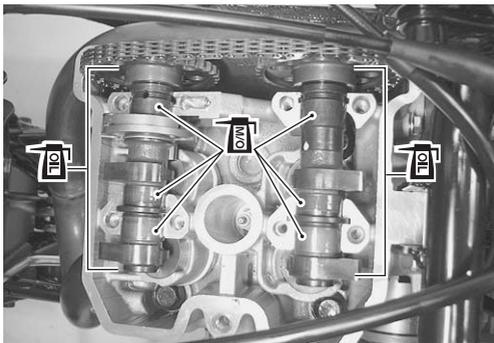
⚠ CAUTION

Do not apply molybdenum oil into the screw hole.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

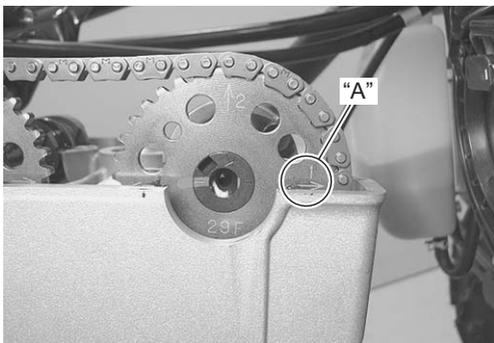
NOTE

Place each camshaft into the correct position.



I933H1140087-02

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

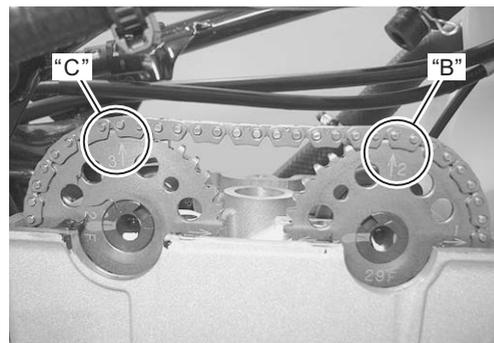


I933H1140088-01

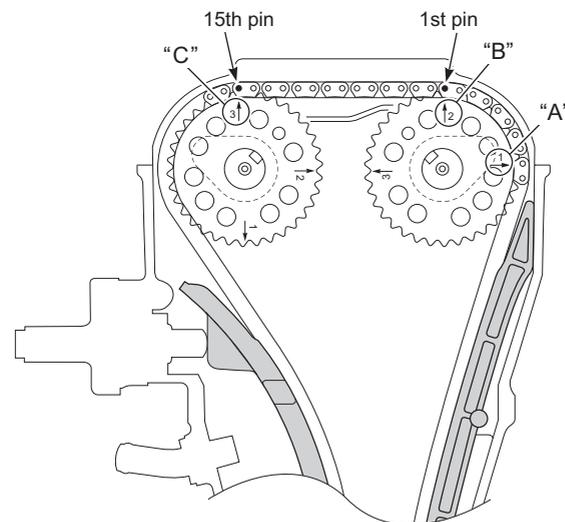
- The other arrow marked "2" "B" should now be pointing straight up. Starting from the roller pin that is directly above the arrow marked "2" "B", count out 15 roller pins (from the exhaust camshaft side going towards the intake camshaft side).
- Engage the 15th roller pin on the cam chain with the arrow marked "3" "C" 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.

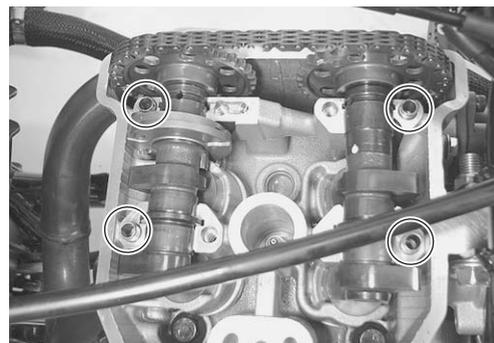


I933H1140089-01



I933H1140090-01

- Install the dowel pins.



I933H1140091-01

- Place each camshaft journal holders (1) and cam chain guide No. 2 (2) into the correct position.

NOTE

Camshaft journal holders marked "EX" "D" are for the exhaust side and those marked "IN" "E" are for the intake side.

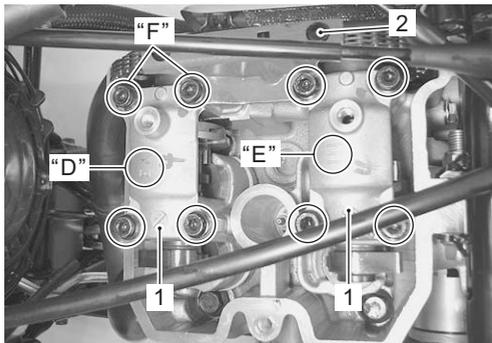
- Tighten the camshaft journal holder bolts ("F" (L45) and (L40)) to the specified torque.

NOTE

Tighten the camshaft journal holder bolts diagonally.

Tightening torque

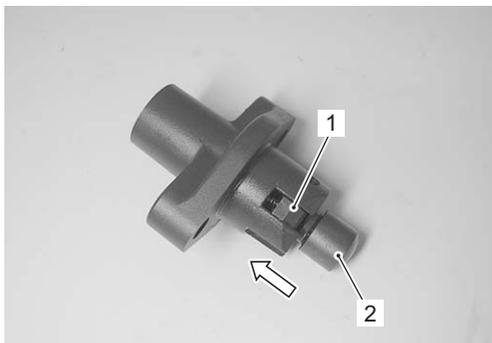
Camshaft journal holder bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I933H1140092-01

Cam chain tension adjuster

- Unlock the ratchet mechanism (1) and push the push rod (2) all the way.



I933H1140093-01

- Install the new gasket (3).

⚠ CAUTION

Use a new gasket to prevent oil leakage.

- Install the cam chain tension adjuster (4).

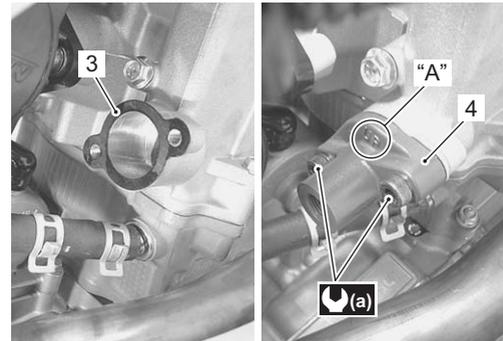
NOTE

Make sure that the "UP" mark "A" comes to the upper side.

- Tighten the cam chain tension adjuster mounting bolts to the specified torque.

Tightening torque

Cam chain tension adjuster mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I933H1140094-01

- Install the spring (5).
- Install the gasket (6) and cam chain tension spring holder bolt (7).

NOTE

Click sound is heard when the cam chain tension spring holder bolt is installed.

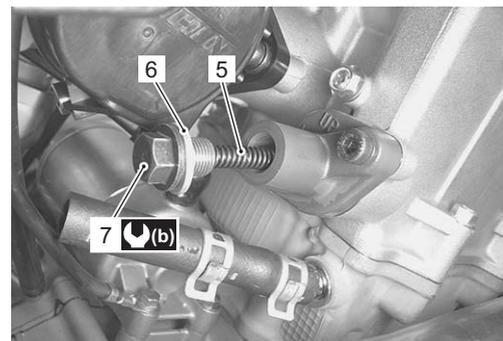
- Tighten the cam chain tension spring holder bolt (7) to the specified torque.

Tightening torque

Cam chain tension spring holder bolt (b): 30 N·m (3.0 kgf-m, 21.5 lb-ft)

⚠ CAUTION

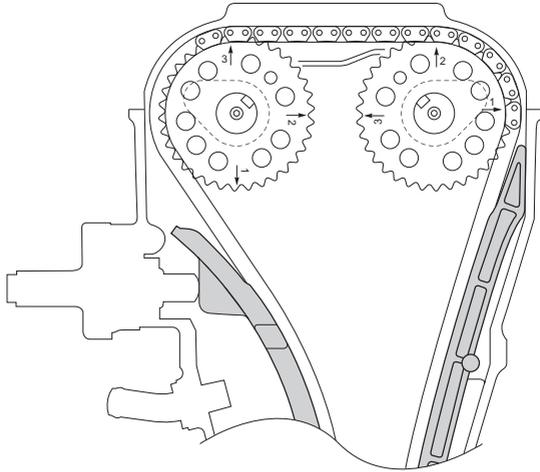
After installing the cam chain tension adjuster, check to be sure that the adjuster works properly by checking the slack of cam chain.



I933H1140095-01

1D-25 Engine Mechanical:

- After installing the cam chain tension adjuster, rotate the crankshaft (some turns), and recheck the positions of the camshafts.



I933H1140096-01

- Be sure to check and adjust the valve clearance. Refer to "Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-5)".
- Apply engine oil to the new O-ring and install the generator cover plug (8).

⚠ CAUTION

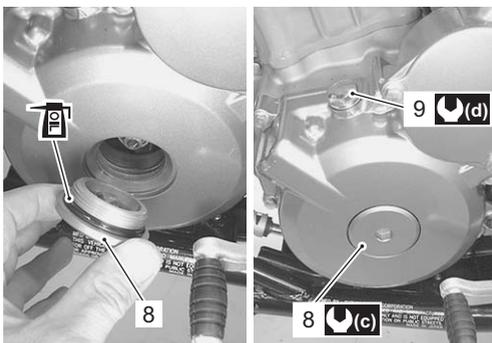
Use the new O-ring to prevent oil leakage.

- Tighten the generator cover plug (8) and valve timing inspection plug (9) to the specified torque.

Tightening torque

Generator cover plug (c): 15 N·m (1.5 kgf-m, 11.0 lb-ft)

Valve timing inspection plug (d): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H1140097-01

- Install the oil return tank. Refer to "Oil Return Tank Removal and Installation in Section 1B (Page 1B-2)".

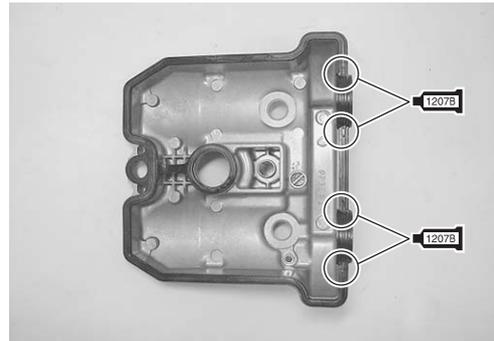
Cylinder head cover

- Thoroughly wipe off oil from the fitting surfaces of the cylinder head and cover.
- Apply bond to the end caps of the cylinder head cover gasket as shown in the figure.

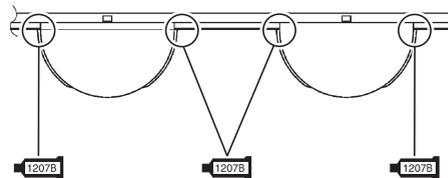
1207B : Sealant 99000-31140 (SUZUKI BOND No.1207B or equivalent)

⚠ CAUTION

Use a new gasket to prevent oil leakage.



I933H1140098-01



I933H1140099-01

- Apply engine oil to both sides of the washer and cushion.

⚠ CAUTION

Use new washers and cushion to prevent oil leakage.

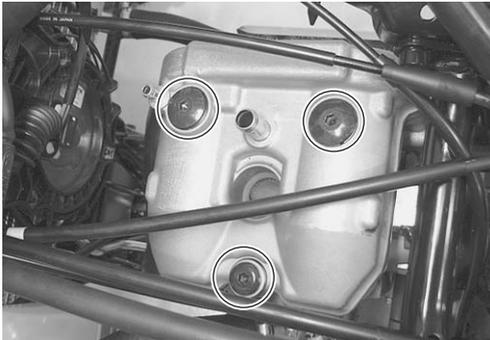


I933H1140100-01

- Tighten the cylinder head cover bolts in diagonal stages to the specified torque.

Tightening torque

Cylinder head cover bolt: 14 N·m (1.4 kgf·m, 10.0 lb-ft)



I933H1140101-01

Valve Clearance Inspection and Adjustment

B933H21406019

Refer to “Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-5)”.

Camshaft Inspection

B933H21406020

Refer to “Engine Top Side Disassembly (Page 1D-17)” and “Engine Top Side Assembly (Page 1D-20)”.

⚠ CAUTION

Do not attempt to disassemble the camshaft/automatic decompression assembly. It is not serviceable.

Camshaft sprocket

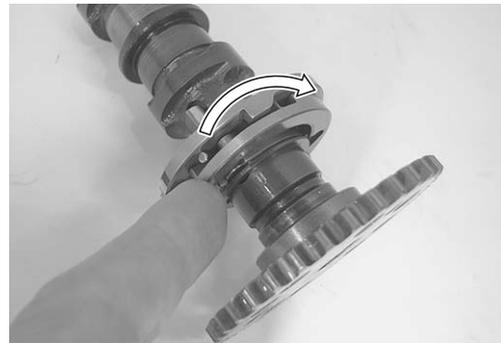
Inspect the teeth of each camshaft sprocket for wear or damage. If they are worn or damaged, replace the camshaft and cam chain as a set.



I933H1140102-01

Automatic decompression

Move the automatic decompression weight by hand to inspect if it is operating smoothly. If the automatic decompression weight does not operate smoothly, replace it with a new one.



I933H1140103-01

Cam wear

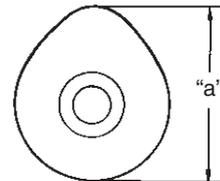
Check the camshaft for wear or damage. Measure the cam height “a” with a micrometer. Replace a camshaft if the cams are worn to the service limit.

Special tool

09900-20202 (Micrometer (1/100 mm, 25 – 50 mm))

Cam height “a”

Service limit (IN.): 35.890 mm (1.4130 in)
Service limit (EX.): 34.620 mm (1.3630 in)



I649G1140199-02

Camshaft journal wear

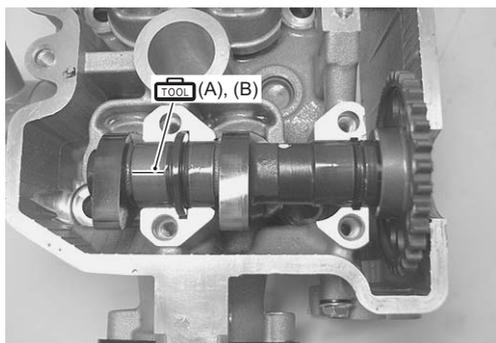
Inspect the camshaft journal wear in the following procedures:

- 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))



I933H1140104-01

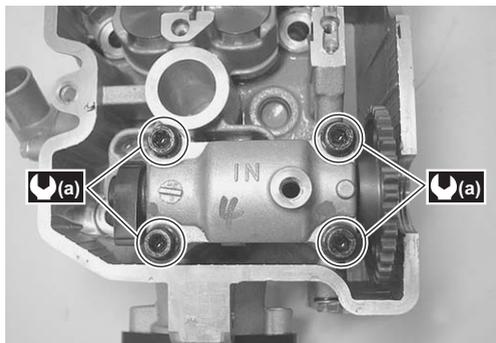
- 3) Install each camshaft journal holder to its original position. Refer to “Engine Top Side Assembly (Page 1D-20)”.
- 4) Tighten the camshaft journal holder bolts evenly and in diagonally to the specified torque. Refer to “Engine Top Side Assembly (Page 1D-20)”.

NOTE

Do not rotate the camshafts with the plastigauge in place.

Tightening torque

Camshaft journal holder bolt (a): 10 N·m (1.0 kgf·m, 7.0 lb·ft)

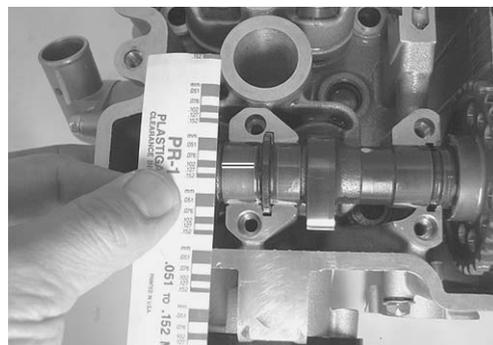


I933H1140105-01

- 5) Remove the camshaft journal holders and measure the width of the compressed plastigauge using the envelope scale.
- 6) 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)



I933H1140106-01

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

Special tool

TOOL (C): 09900-20602 (Dial gauge (1/1000 mm, 1 mm))

TOOL (D): 09900-22403 (Small bore gauge (18 – 35 mm))

Camshaft journal holder I.D. (IN. & EX.)

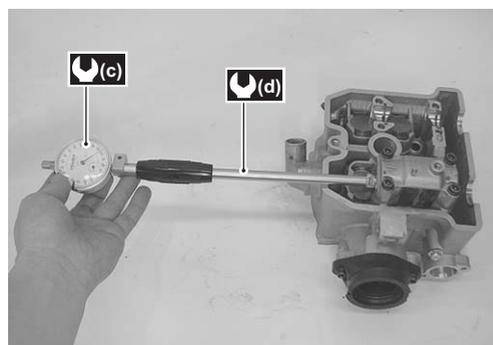
Standard: 22.012 – 22.025 mm (0.8666 – 0.8671 in)

Special tool

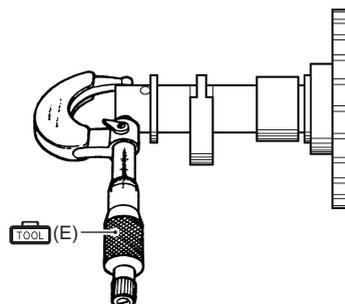
TOOL (E): 09900-20205 (Micrometer (0 – 25 mm))

Camshaft journal O.D. (IN. & EX.)

Standard: 21.972 – 21.993 mm (0.8650 – 0.8659 in)



I933H1140107-01



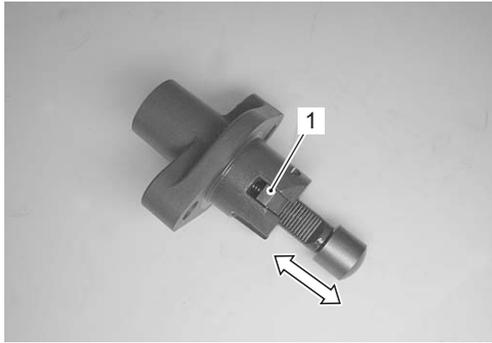
I933H1140108-01

Cam Chain Tension Adjuster Inspection

B933H21406021

The cam chain tension adjuster is maintained at the proper tension by an automatically adjusted.

- 1) Remove the cam chain tension adjuster. Refer to "Engine Top Side Disassembly (Page 1D-17)".
- 2) Check that the push rod slides smoothly when unlocking the ratchet mechanism (1). If it does not slide smoothly, replace the cam chain tension adjuster with a new one.



I933H1140109-01

- 3) Install the cam chain tension adjuster. Refer to "Engine Top Side Assembly (Page 1D-20)".

Cam Chain Guide Removal and Installation

B933H21406022

Removal

- 1) Remove the cylinder head. Refer to "Engine Top Side Disassembly (Page 1D-17)".
- 2) Remove the cam chain guide No. 1 (1).

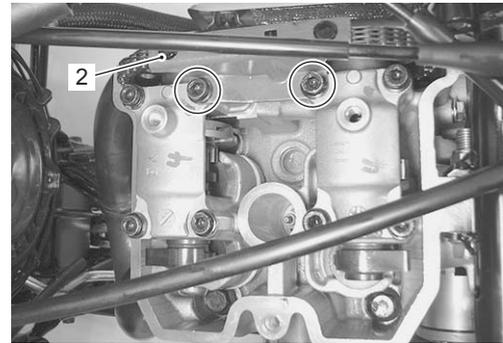
NOTE

Be careful not to drop the chain into the crankcase.



I933H1140110-01

- 3) Remove the cylinder head cover. Refer to "Engine Top Side Disassembly (Page 1D-17)".
- 4) Remove the cam chain guide No. 2 (2).



I933H1140111-01

Installation

Install the cam chain guide in the reverse order of removal.

Cam Chain Guide Inspection

B933H21406023

Inspect the cam chain No. 1 and No. 2 guides in the following procedures:

- Remove the cam chain guides. Refer to "Cam Chain Guide Removal and Installation (Page 1D-28)".
- Check the contacting surface of the cam chain guides. If it is worn or damaged, replace those with new ones.



I933H1140112-01

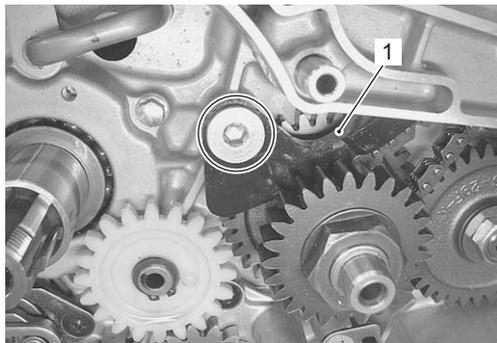
- Install the cam chain No. 1 and No. 2 guides. Refer to "Cam Chain Guide Removal and Installation (Page 1D-28)".

Cam Chain Tensioner Inspection

B933H21406024

Inspect the cam chain tensioner in the following procedures:

- 1) Remove the cylinder head. Refer to "Engine Top Side Disassembly (Page 1D-17)".
- 2) Remove the clutch components. Refer to "Clutch Removal in Section 5C (Page 5C-7)".
- 3) Remove the cam chain tensioner (1) and washer.



I933H1140113-01

- 4) Check the contacting surface of the cam chain tensioner. If it is worn or damaged, replace it with a new one.

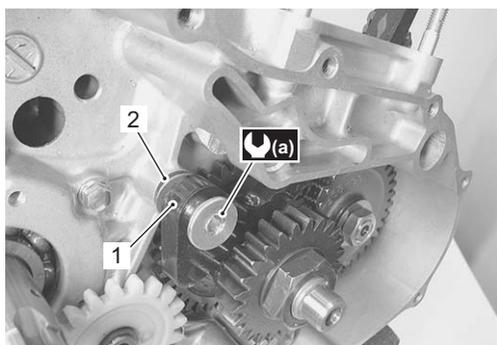


I933H1140114-01

- 5) Install the washer (2) and cam chain tensioner (1).
- 6) Tighten the cam chain tensioner mounting bolt to the specified torque.

Tightening torque

Cam chain tensioner mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I933H1140115-01

- 7) Reinstall the clutch components. Refer to "Clutch Installation in Section 5C (Page 5C-9)".
- 8) Reinstall the cylinder head. Refer to "Engine Top Side Assembly (Page 1D-20)".

Cylinder Head Disassembly and Assembly

B933H21406025

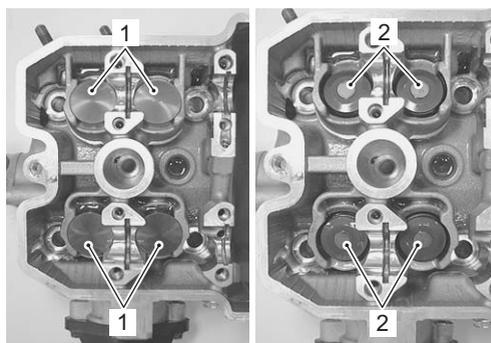
Refer to "Engine Top Side Disassembly (Page 1D-17)" and "Engine Top Side Assembly (Page 1D-20)".

⚠ CAUTION

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

Disassembly

- 1) Remove the tappets (1) and shims (2) by fingers or magnetic hand.

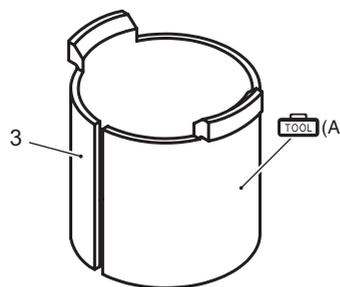


I933H1140116-01

- 2) When compressing the valve spring use a sleeve protector (3). Cut the sleeve protector (3) as shown in the illustration.

Special tool

 (A): 09919-28610 (Sleeve protector)



I933H1140117-01

- 3) Install the sleeve protector (3) between the valve spring and cylinder head.

- 4) Using the special tools, compress the valve spring and remove the two cotter halves (4) from the valve stem.

⚠ CAUTION

To prevent damage of the tappet sliding surface with the special tool, use the sleeve protector.

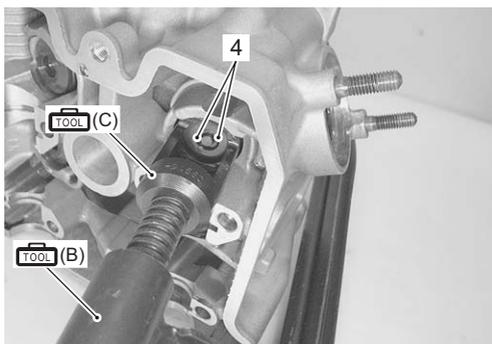
Special tool

TOOL (B): 09916-14510 (Valve spring compressor)

Special tool

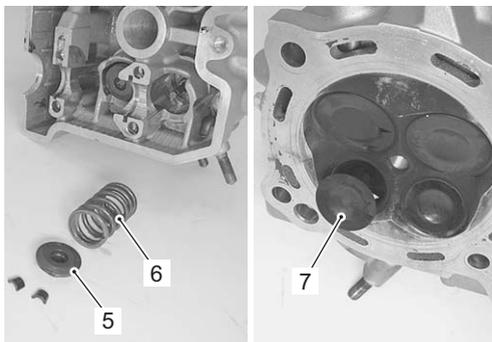
TOOL (C): 09916-14910 (Valve spring compressor attachment)

TOOL : 09916-84511 (Tweezers)



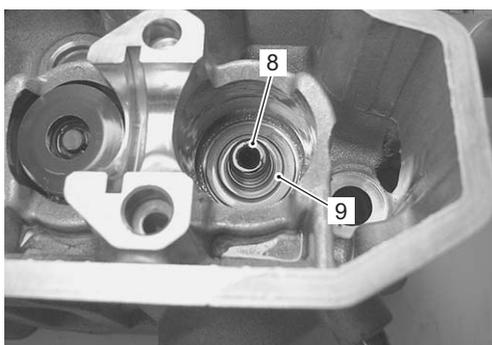
I933H1140118-01

- 5) Remove the valve spring retainer (5) and valve spring (6).
6) Pull out the valve (7) from the combustion chamber side.



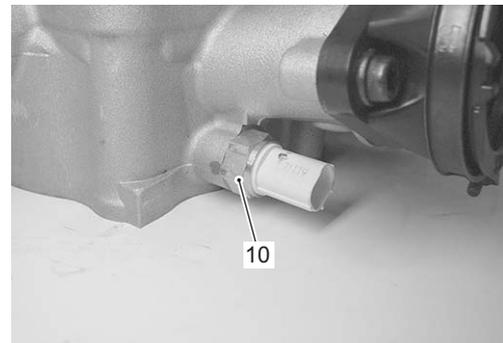
I933H1140119-02

- 7) Remove the oil seal (8) and spring seat (9).



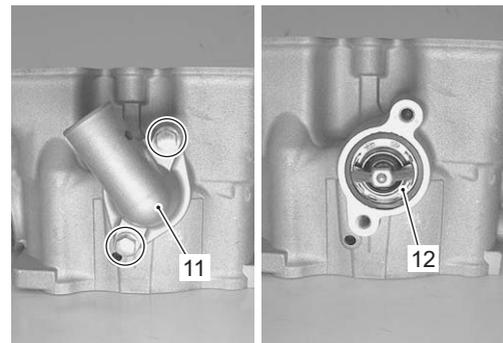
I933H1140120-01

- 8) Remove the other valves in the same manner as described previously.
9) Remove the ECT sensor (10).



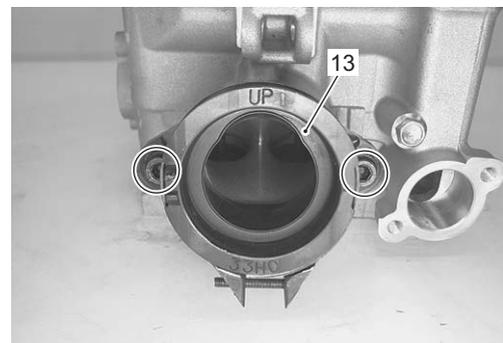
I933H1140121-01

- 10) Remove the thermostat case (11) and thermostat (12).



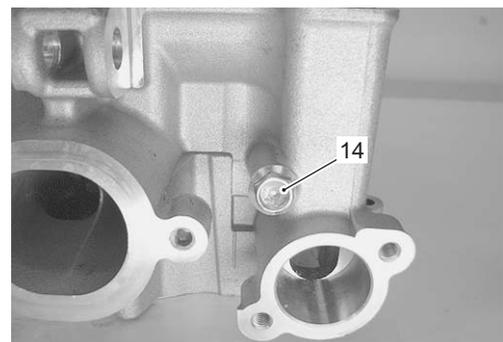
I933H1140122-01

- 11) Remove the intake pipe (13).



I933H1140123-01

- 12) Remove the oil gallery plug (cylinder head) (14).



I933H1140124-01

1D-31 Engine Mechanical:

Assembly

Assembly is in the reverse order of disassembly. Pay attention to the following points:

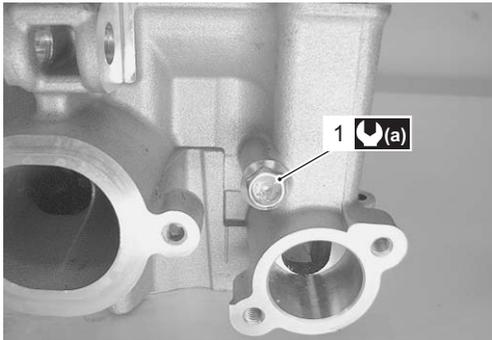
- Tighten the oil gallery plug (1) (cylinder head) to the specified torque.

Tightening torque

Oil gallery plug (Cylinder head) (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

⚠ CAUTION

Replace the gasket with a new one.



I933H1140125-01

- Apply grease to the O-ring of the intake pipe.

⚠ CAUTION

Replace the O-ring with new ones.

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



I933H1140126-01

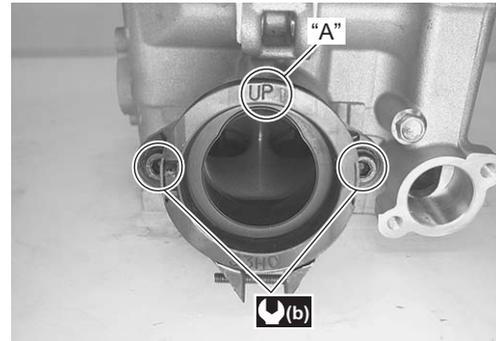
- Tighten the intake pipe mounting bolts to the specified torque.

NOTE

Make sure that the "UP" mark "A" faces up.

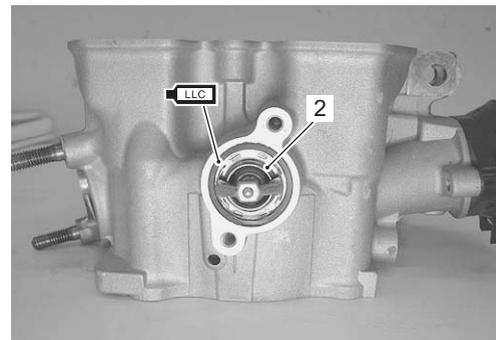
Tightening torque

Intake pipe bolt (a): 9 N·m (0.9 kgf-m, 6.5 lb-ft)



I933H1140127-01

- Apply engine coolant to the rubber seal on the thermostat (2).



I933H1140128-02

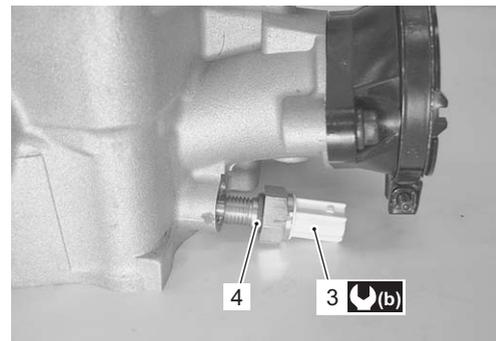
- Tighten the ECT sensor (3) to the specified torque.

⚠ CAUTION

Use the new O-ring (4) to prevent engine coolant leakage.

Tightening torque

ECT sensor (b): 12 N·m (1.2 kgf-m, 8.5 lb-ft)

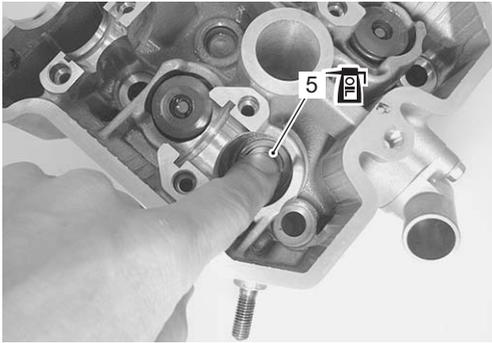


I933H1140129-01

- Install the valve spring seat.
- Apply engine oil to the oil seal (5), and press-fit it into position.

⚠ CAUTION

Do not reuse the removed oil seal.



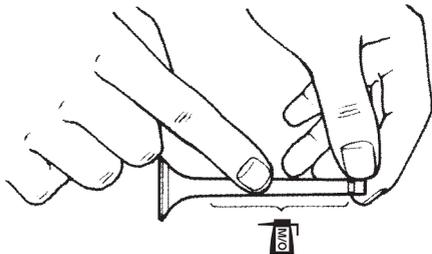
I933H1140130-01

- Insert the valve, with its stem coated with molybdenum oil all around and along the full stem length without any break.

⚠ CAUTION

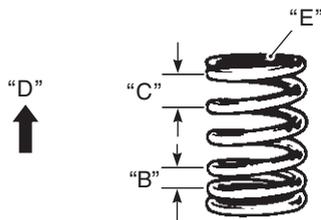
When inserting the valve, take care not to damage the lip of the oil seal.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



I705H1140165-01

- Install the valve spring with the small-pitch portion "B" facing cylinder head.



I718H1140004-01

"B": Small-pitch portion	"D": UPWARD
"C": Large-pitch portion	"E": Paint

- Put on the valve spring retainer (6), and using the special tools, press down the spring, fit the cotter halves (7) to the stem end, and release the lifter to allow the cotter halves (7) 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 them.
- To prevent damage of the tappet sliding surface with the special tool, use the sleeve protector.

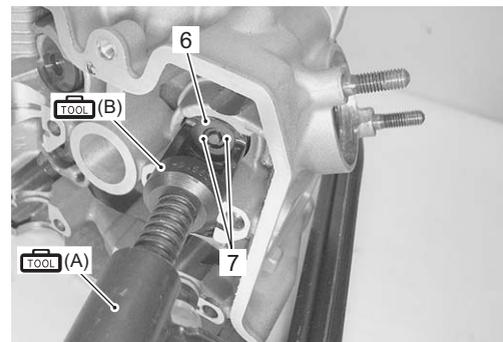
Special tool

TOOL (A): 09916-14510 (Valve spring compressor)

TOOL (B): 09916-14910 (Valve spring compressor attachment)

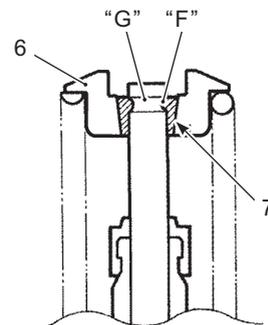
TOOL : 09916-84511 (Tweezers)

TOOL : 09919-28610 (Sleeve protector)



I933H1140131-01

- Be sure that the rounded lip "F" of the cotter fits snugly into the groove "G" in the stem end.



I933H1140132-01

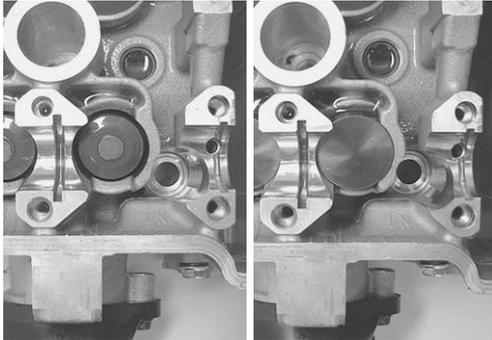
6. Valve spring retainer	7. Cotter
--------------------------	-----------

1D-33 Engine Mechanical:

- Install the other valves and springs in the same manner as described previously.
- Install the tappet shims and the tappets to their original positions.

NOTE

- Apply engine oil to the stem end, shim and tappet before fitting them.
- When seating the tappet shim, be sure the figure printed surface faces the tappet.



I933H1140133-01

Cylinder Head Related Parts Inspection

B933H21406026

Refer to "Cylinder Head Disassembly and Assembly (Page 1D-29)".

Cylinder head distortion

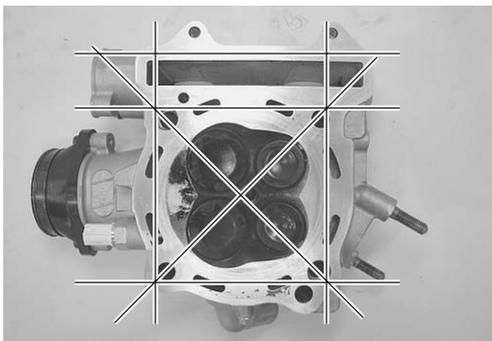
- 1) Decarbonize the combustion chambers.
- 2) Check the gasket surface of the cylinder head for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If readings exceed the service limit, replace the cylinder head.

Special tool

TOOL : 09900-20803 (Thickness gauge)

Cylinder head distortion

Service limit: 0.05 mm (0.002 in)



I933H1140134-01

Valve stem runout

Support the valve using V-blocks, as shown in the figure, and check its runout using the dial gauge. If the runout exceeds the service limit, replace the valve.

Special tool

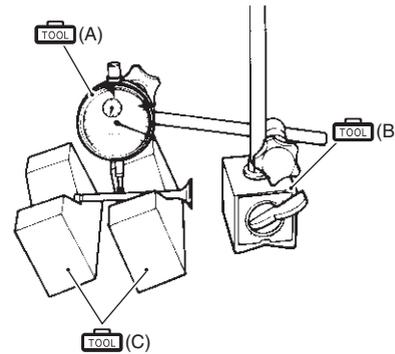
TOOL (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

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

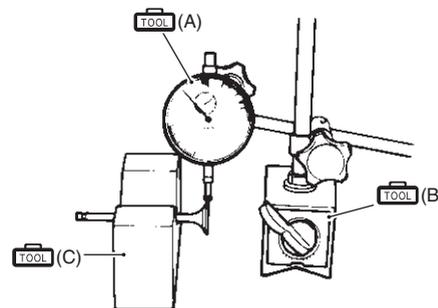
TOOL (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

TOOL (B): 09900-20701 (Magnetic stand)

TOOL (C): 09900-21304 (V-block (100 mm))

Valve head radial runout (IN. & EX.)

Service limit: 0.03 mm (0.001 in)



I649G1140232-03

Valve face wear

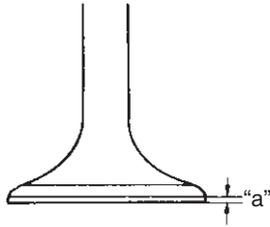
Visually inspect each valve face for wear. Replace any valve with an abnormally worn face. The thickness of the valve face decreases as the face wears. Measure the valve head "a". If it is out of specification replace the valve with a new one.

Special tool

TOOL (A): 09900-20101 (Vernier calipers (1/15 mm, 150 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. Position the dial gauge as shown. If the deflection exceeds the service limit, then determine whether the valve or the guide should be replaced with a new one.

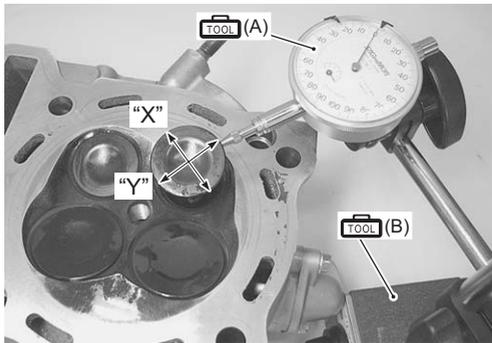
Special tool

TOOL (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

TOOL (B): 09900-20701 (Magnetic stand)

Valve stem deflection (IN. & EX.)

Service limit: 0.35 mm (0.014 in)



I933H1140135-02

Valve stem wear

Measure the valve stem O.D. using the micrometer. If it is out of specification, replace the valve with a new one. If the valve stem O.D. is within specification but the valve stem deflection is not, replace the valve guide. After replacing the valve or valve guide, recheck the deflection.

Special tool

TOOL (A): 09900-20205 (Micrometer (0 – 25 mm))

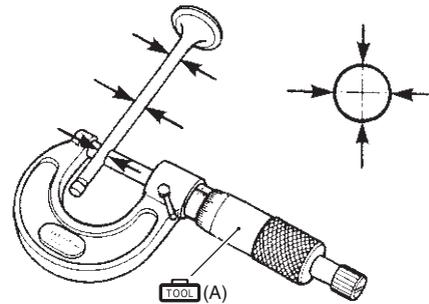
Valve stem O.D.

Standard (IN.): 4.975 – 4.990 mm (0.1959 – 0.1965 in)

Standard (EX.): 4.955 – 4.970 mm (0.1951 – 0.1957 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-36)".



I718H1140122-01

1D-35 Engine Mechanical:

Valve spring

The force of the coil spring keeps the valve seat tight. A weakened spring results in reduced engine power output and often accounts for the chattering noise coming from the valve mechanism.

Check the valve springs for proper strength by measuring their free length and also by the force required to compress them. If the spring length is less than the service limit or if the force required to compress the spring does not fall within the specified range, replace the valve spring.

Special tool

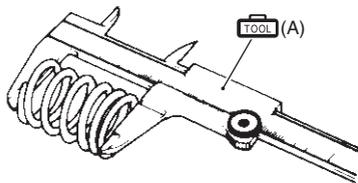
TOOL (A): 09900-20101 (Vernier calipers (1/15 mm, 150 mm))

Valve spring free length (IN. & EX.)

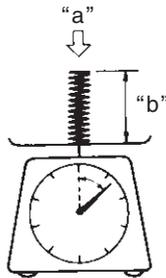
Service limit: 38.8 mm (1.53 in)

Valve spring tension (IN. & EX.)

Standard: 182 – 210 N (18.6 – 21.4 kgf, 41.0 – 47.2 lbs)/31.5 mm (1.24 in)



I649G1140237-03



I649G1140238-03

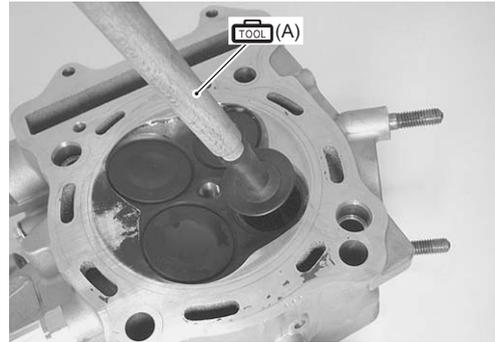
Tension "a"	Length "b"
182 – 210 N (18.6 – 21.4 kgf, 41.0 – 47.2 lbs)	31.5 mm (1.24 in)

Valve seat width

- 1) Visually check for valve seat width on each valve face. If the valve face has worn abnormally, replace the valve.
- 2) Coat the valve seat with a red lead (Prussian Blue) and set the valve in place.
- 3) Rotate the valve with light pressure.

Special tool

TOOL (A): 09916-10911 (Valve lapper set)

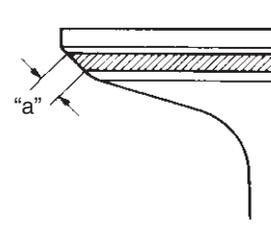


I933H1140136-01

- 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-37)".

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-37)".

▲ WARNING

Always use extreme caution when handling gasoline.



I933H1140137-01

NOTE

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. Refer to "Valve Clearance Inspection and Adjustment in Section 0B (Page 0B-5)".

Valve Guide Replacement

B933H21406027

- 1) Remove the cylinder head. Refer to "Engine Top Side Disassembly (Page 1D-17)".
- 2) Remove the valves. Refer to "Cylinder Head Disassembly and Assembly (Page 1D-29)".

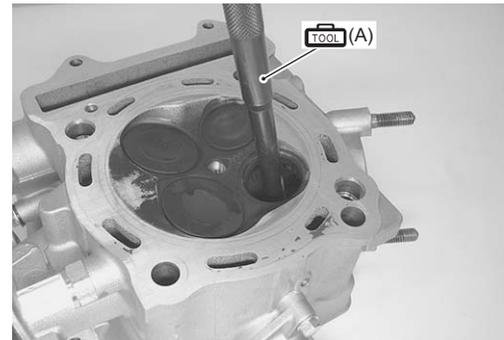
- 3) Using the valve guide remover, drive the valve guide out toward the intake or exhaust camshaft side.

Special tool

TOOL (A): 09916-44310 (Valve guide remover/installer)

NOTE

- Discard the removed valve guide sub-assemblies.
- Only oversized valve guides are available as replacement parts. (Part No. 11115-20E70)



I933H1140138-01

- 4) Refinish the valve guide holes in the cylinder head using the reamer and handle.

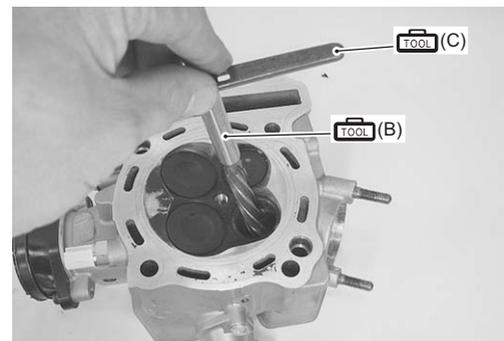
▲ CAUTION

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)



I933H1140139-01

1D-37 Engine Mechanical:

- 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.

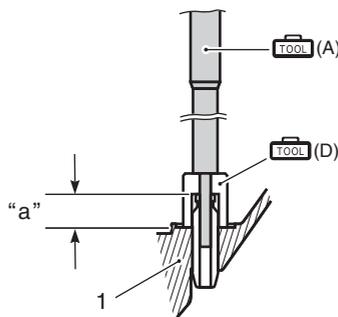
⚠ CAUTION

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): 09916-44310 (Valve guide remover/installer)

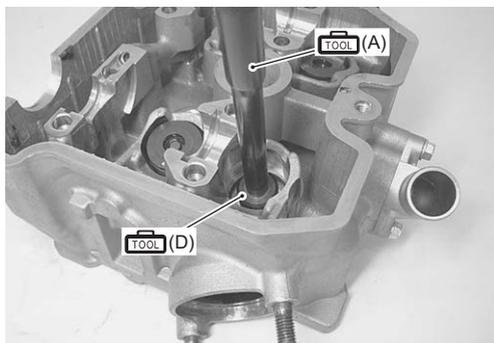
TOOL (D): 09916-53360 (Attachment)



I718H1140127-01

1. Cylinder head

"a": 12.2 mm (0.48 in)



I933H1140140-01

- 8) After installing the valve guides, refinish their guiding bores using the reamer. Be sure to clean and oil the guides after reaming.

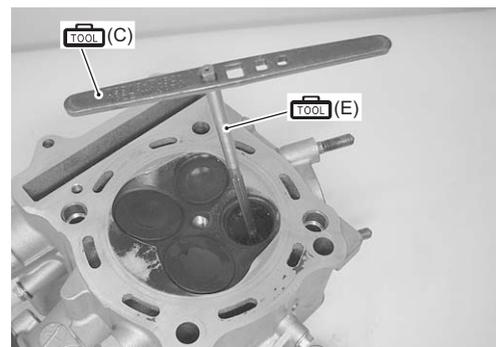
Special tool

TOOL (C): 09916-34542 (Reamer handle)

TOOL (E): 09916-34570 (Valve guide reamer (5.0 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.



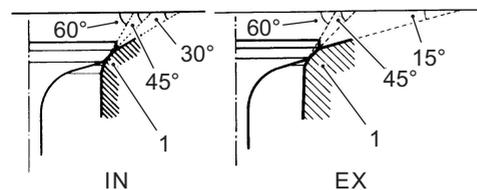
I933H1140141-01

- 9) Reassemble the cylinder head. Refer to "Cylinder Head Disassembly and Assembly (Page 1D-29)".
10) Install the cylinder head assembly. Refer to "Engine Top Side Assembly (Page 1D-20)".

Valve Seat Repair

B933H21406028

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	36 mm (1.42 in)	29 mm (1.14 in)
Valve guide I.D.	5.000 – 5.012 mm (0.1969 – 0.1973 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-5)”.

Cylinder Inspection

B933H21406029

Refer to “Engine Top Side Disassembly (Page 1D-17)” and “Engine Top Side Assembly (Page 1D-20)”.

Cylinder distortion

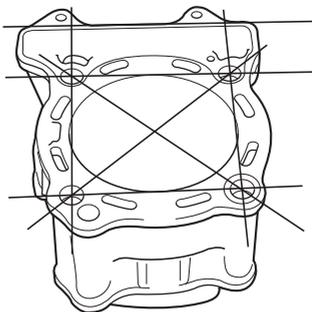
Check the gasket surface of the cylinder for distortion. Use a straightedge and thickness gauge. Take clearance readings at several places. If any reading exceeds the service limit, replace the cylinder.

Special tool

TOOL : 09900–20803 (Thickness gauge)

Cylinder distortion

Service limit: 0.05 mm (0.002 in)



I933H1140142-01

Cylinder bore

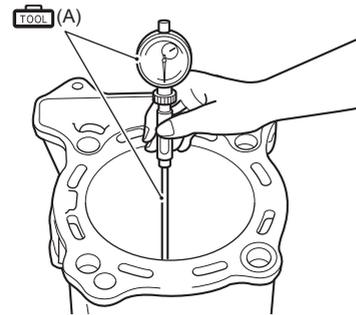
Inspect the cylinder wall for any scratches, nicks or other damage (Measure the cylinder bore diameter at six places). If any defects are found, replace the cylinder with a new one.

Special tool

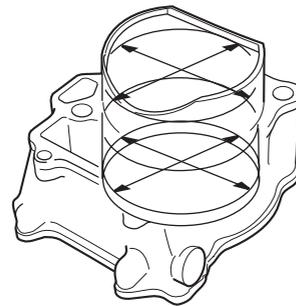
TOOL (A): 09900–20508 (Cylinder gauge set)

Cylinder bore

Standard: 90.000 – 90.015 mm (3.5433 – 3.5439 in)



I933H1140143-01



I933H1140144-01

Piston-to-cylinder clearance

Refer to “Piston and Piston Ring Inspection (Page 1D-40)”.

Piston Ring Removal and Installation

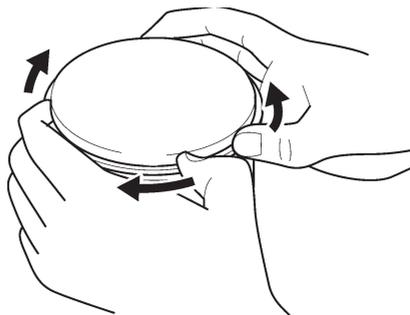
B933H21406030

Removal

- 1) Draw out the piston pin and remove the piston. Refer to "Engine Top Side Disassembly (Page 1D-17)".
- 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.



I831G1140178-01

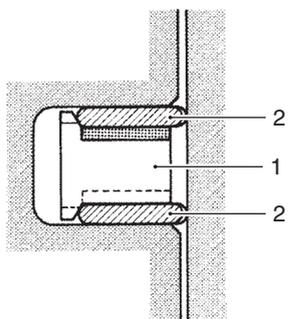
- 3) Remove the 2nd ring and oil ring in the same manner.

Installation

NOTE

- When installing the piston ring, be careful not to damage the piston.
- Do not expand the piston ring excessively since it is apt to be broken down.

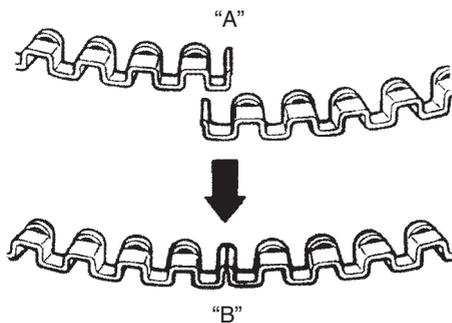
- 1) Install the piston rings in the order of the oil ring, second ring and top ring.
 - a) The first member to go into the oil ring groove is a spacer (1). After placing the spacer, fit the two side rails (2).



I718H1140143-02

⚠ CAUTION

When installing the spacer, be careful not to allow its two ends to overlap in the groove.



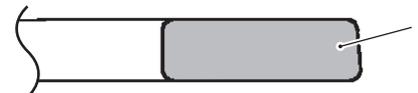
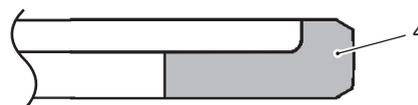
I705H1140170-02

"A": INCORRECT "B": CORRECT

- b) Install the 2nd ring (3) and 1st ring (4) to piston.

NOTE

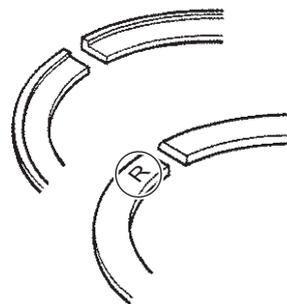
1st ring (4) and 2nd ring (3) differ in shape.



I823H1140147-01

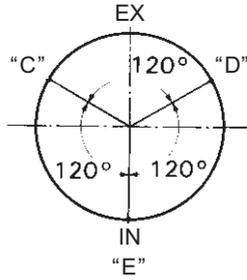
NOTE

Face the side with the stamped mark upward when assembling.



I933H1140145-01

- 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.



I933H1140146-01

"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-20)".

Piston and Piston Ring Inspection

B933H21406031

Refer to "Piston Ring Removal and Installation (Page 1D-39)".

Piston diameter

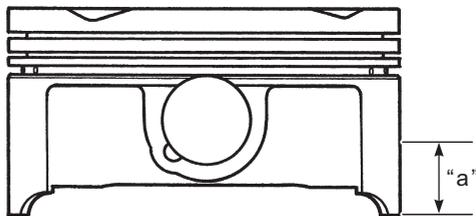
Measure the piston diameter using the micrometer at 15 mm (0.6 in) "a" from the skirt end. If the piston diameter is less than the service limit, replace the piston.

Special tool

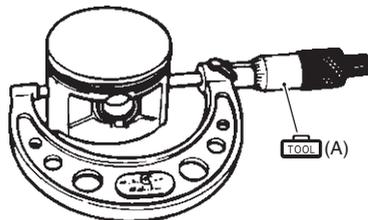
TOOL (A): 09900-20204 (Micrometer (75 – 100 mm))

Piston diameter

Service limit: 89.880 mm (3.5386 in)



I933H1140147-01



I831G1140337-01

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 (0.007 in)

Service limit: (2nd): 0.150 mm (0.006 in)

Piston ring groove width

"a": Standard: (1st): 0.78 – 0.80 mm (0.0307 – 0.0315 in)

"b": Standard: (1st): 1.30 – 1.32 mm (0.0512 – 0.0520 in)

Standard: (2nd): 0.81 – 0.83 mm (0.0319 – 0.0327 in)

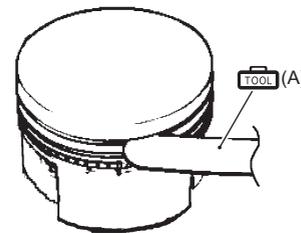
Standard: (Oil): 2.01 – 2.03 mm (0.0791 – 0.0799 in)

Piston ring thickness

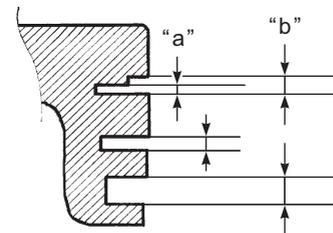
Standard: (1st): 0.71 – 0.76 mm (0.0280 – 0.0299)

Standard: (1st): 1.08 – 1.10 mm (0.0425 – 0.0433)

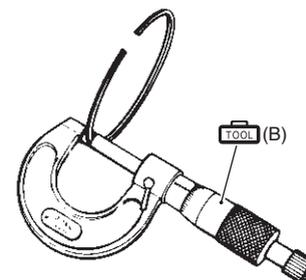
Standard: (2nd): 0.77 – 0.79 mm (0.0303 – 0.0311 in)



I831G1140183-03



I933H1140242-01



I649G1140264-03

1D-41 Engine Mechanical:

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): 5.5 mm (0.22 in)

Service limit: (2nd): 9.2 mm (0.36 in)

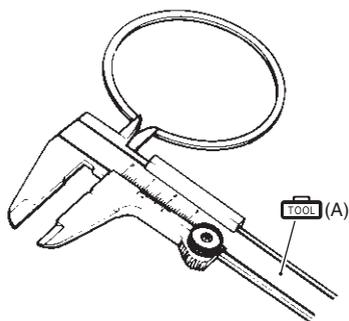
Special tool

TOOL (B): 09900-20803 (Thickness gauge)

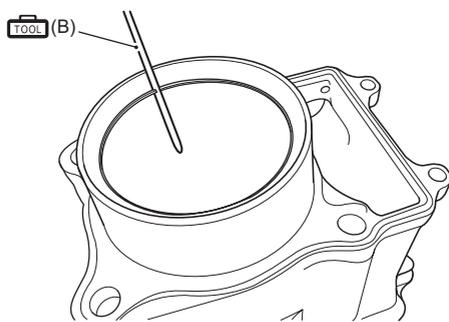
Piston ring end gap

Service limit: (1st): 0.50 mm (0.020 in)

Service limit: (2nd): 0.50 mm (0.020 in)



I649G1140265-03



I933H1140148-01

Piston pin and pin bore

Measure the piston pin bore inside diameter using the small bore gauge. If the measurement is out of specification, replace the piston.

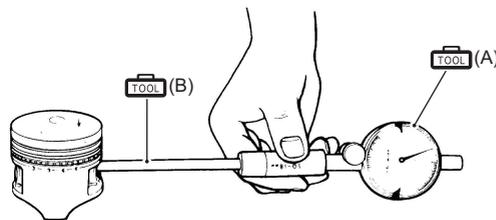
Special tool

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)



I933H1140149-01

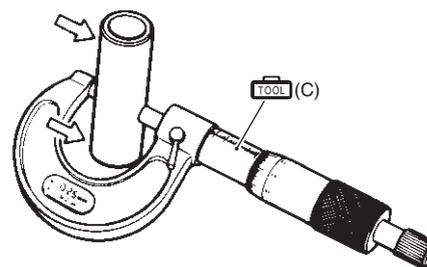
Measure the piston pin outside diameter at three positions using the micrometer. If any of the measurements are out of specification, replace the piston pin.

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

B933H21406032

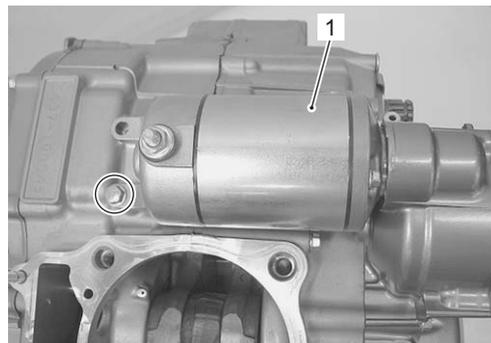
NOTE

The crankcase must be separated to service the crankshaft and conrod.

- 1) Remove the engine assembly from the frame. Refer to "Engine Assembly Removal (Page 1D-13)".
- 2) Remove the engine top side. Refer to "Engine Top Side Disassembly (Page 1D-17)".

Starter motor

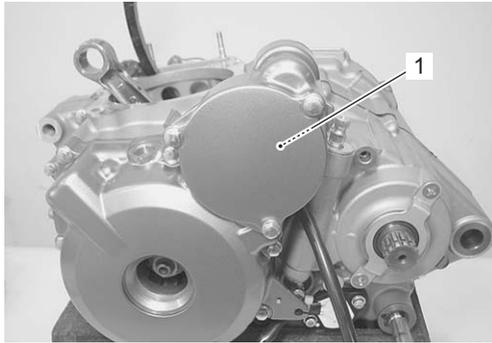
Remove the starter motor (1).



I933H1140026-01

Starter torque limiter

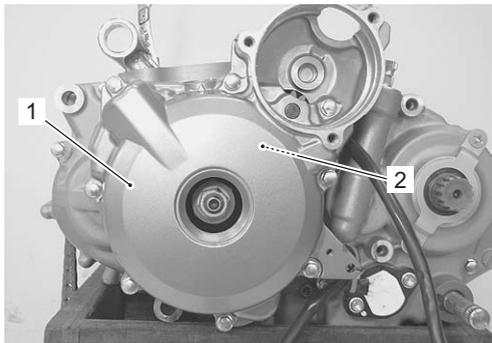
Remove the starter torque limiter (1). Refer to “Starter Torque Limiter / Starter Clutch Removal and Installation in Section 1I (Page 1I-8)”.



I933H1140150-01

Generator cover / Starter idle gear

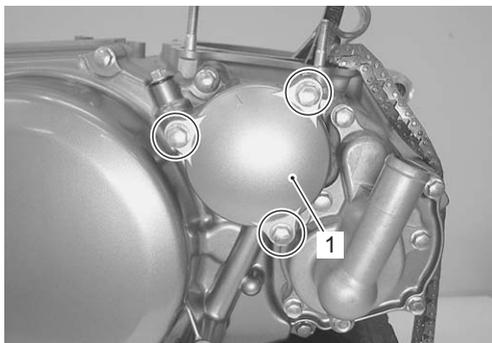
Remove the generator cover (1) and starter idle gear (2). Refer to “Generator Removal and Installation in Section 1J (Page 1J-5)”.



I933H1140151-01

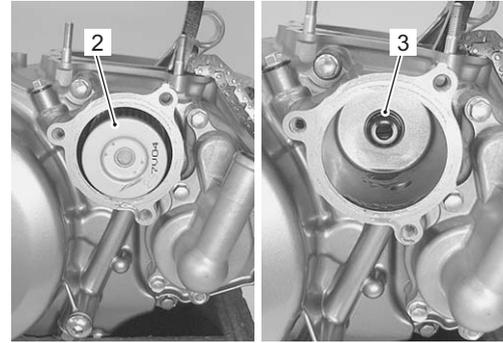
Oil filter

1) Remove the oil filter cap (1).



I933H1140152-01

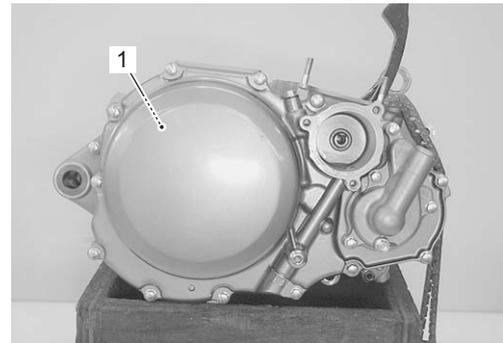
2) Remove the oil filter (2) and O-ring (3).



I933H1140153-01

Clutch

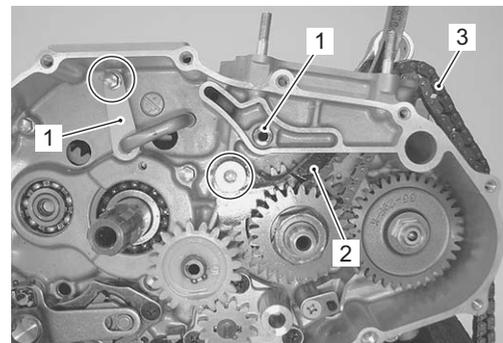
Remove the clutch component parts (1). Refer to “Clutch Removal in Section 5C (Page 5C-7)”.



I933H1140154-01

Cam chain tensioner / Cam chain / Oil pipe

1) Remove the oil pipes (1).
2) Remove the cam chain tensioner (2) and cam chain (3).



I933H1140155-01

Oil pump

- 1) Remove the snap rings (1).

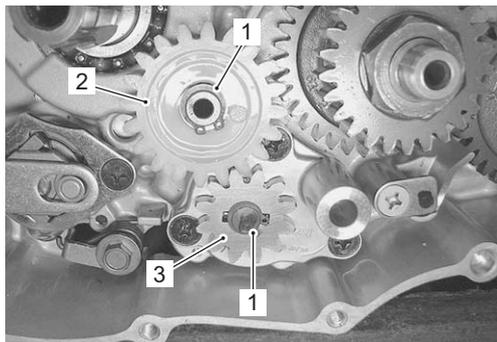
NOTE

Do not drop the snap ring (1) into the crankcase.

Special tool

TOOL : 09900-06107 (Snap ring pliers)

- 2) Remove the oil pump idle gear (2) and oil pump driven gear (3).



I933H1140156-01

- 3) Remove the pin (4) and washer (5).

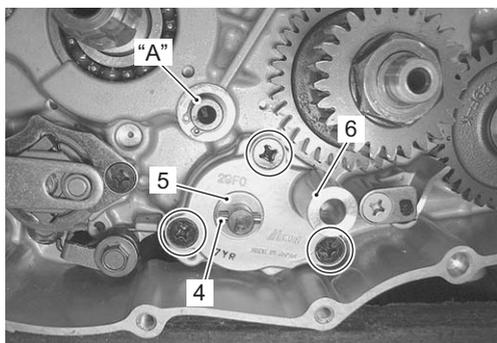
NOTE

Do not drop the pin (4) and washer (5) into the crankcase.

- 4) Remove the oil pump assembly (6).

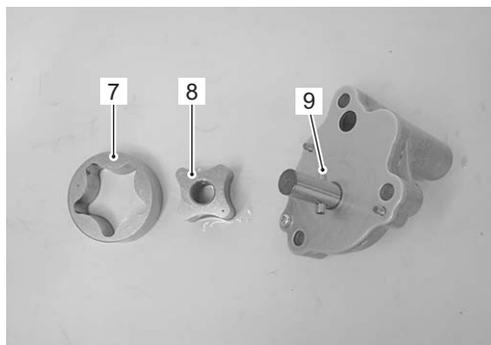
CAUTION

Do not remove the snap ring "A", before separating the crankcase to prevent the oil pump idle gear shaft from dropping into the crankcase.



I933H1140157-01

- 5) Remove the outer rotor (7), inner rotor (8) and pin (9).



I933H1140158-01

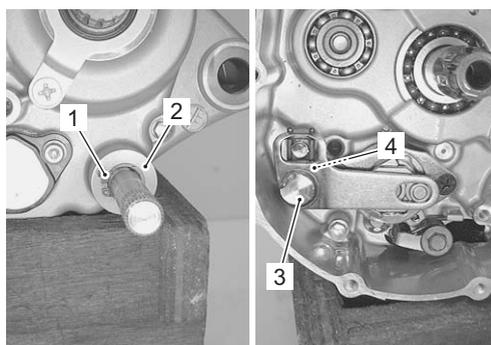
Gearshift shaft / Gearshift cam plate

- 1) Remove the snap ring (1) and washer (2).

Special tool

TOOL : 09900-06107 (Snap ring pliers)

- 2) Remove the gearshift shaft (3) and washer (4).

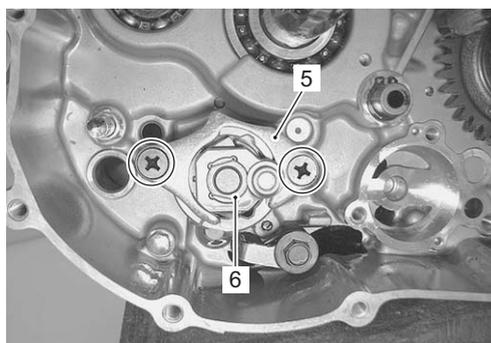


I933H1140159-01

- 3) Remove the gearshift pawl lifter (5) and gearshift cam driven gear (6).

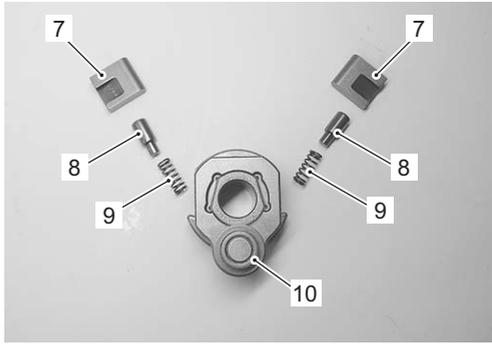
NOTE

Be careful not to drop the pins and springs when removing the gearshift cam driven gear.



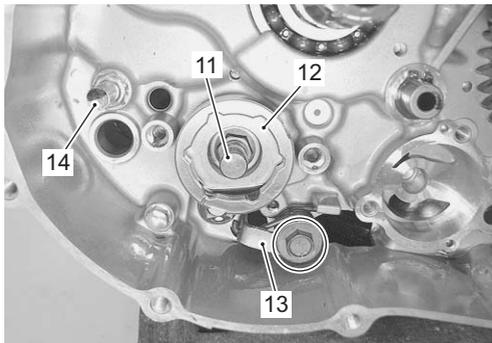
I933H1140160-01

- Remove the gearshift pawls (7), pins (8), springs (9) and roller (10).



I933H1140161-01

- Remove the gearshift cam stopper plate bolt (11) and gearshift cam stopper plate (12).
- Remove the gearshift cam stopper (13), washer and spring.
- Remove the gearshift arm stopper (14).



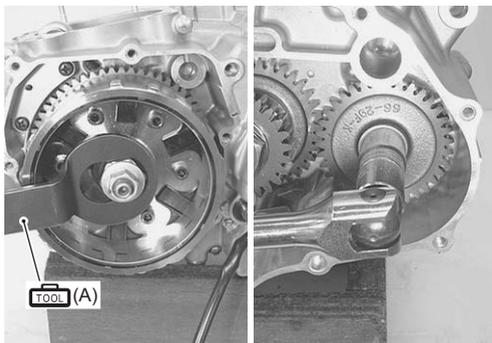
I933H1140162-01

Balancer driven gear

- Hold the generator rotor using the special tool, and then remove the balancer driven gear nut.

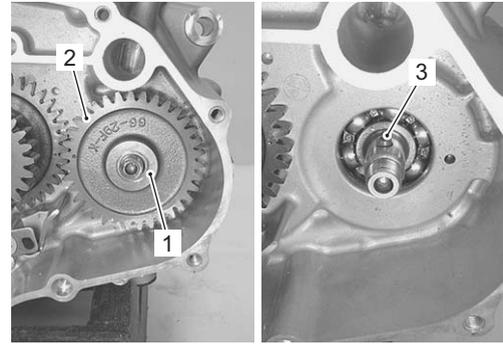
Special tool

(A): 09930-44520 (Rotor holder)



I933H1140163-01

- Remove the washer (1), balancer driven gear (2) and pin (3).



I933H1140164-01

Primary drive gear / Balancer drive gear

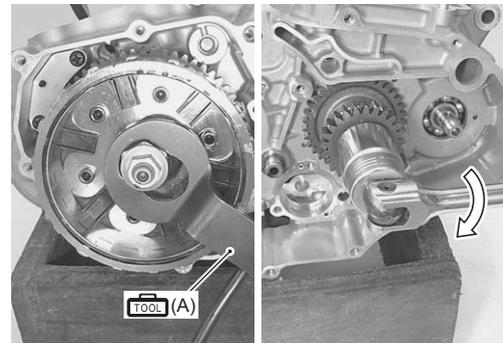
- Hold the generator rotor using the special tool, and then remove the primary drive gear nut.

⚠ CAUTION

The primary drive gear nut has left-hand threads.

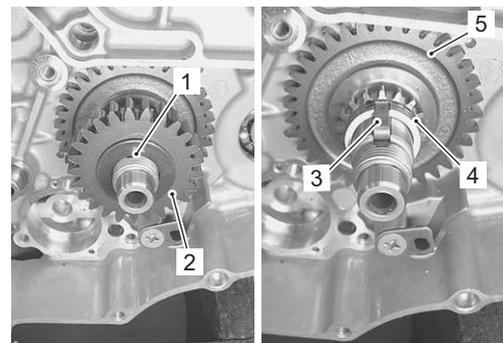
Special tool

(A): 09930-44520 (Rotor holder)



I933H1140165-01

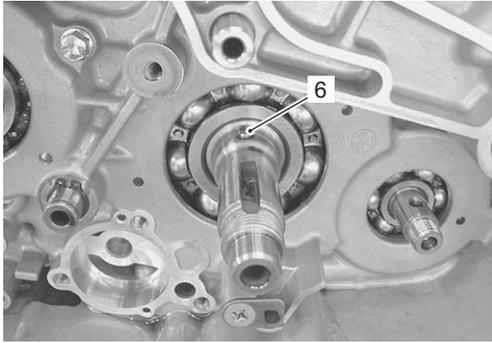
- Remove the washer (1) and primary drive gear (2).
- Remove the key (3), cam chain drive sprocket (4) and balancer drive gear (5).



I933H1140166-01

1D-45 Engine Mechanical:

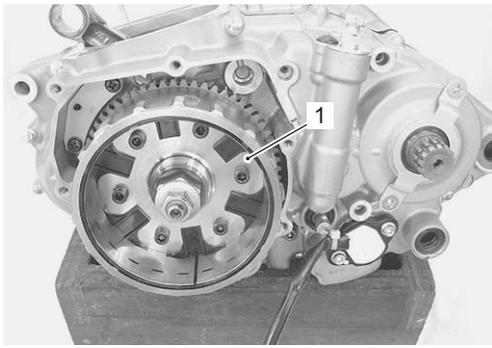
- 4) Remove the pin (6).



I933H1140167-01

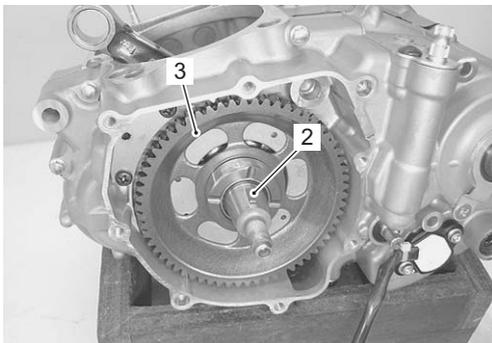
Generator / Starter driven gear

- 1) Remove the generator rotor (1). Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".



I933H1140168-01

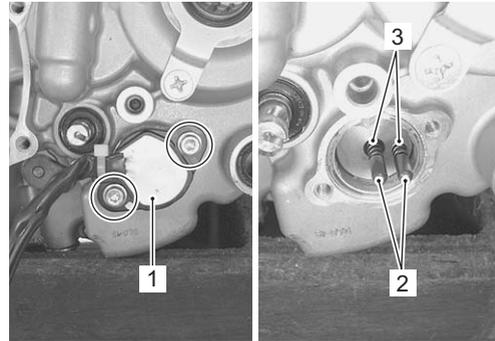
- 2) Remove the generator rotor key (2) and starter driven gear (3).



I933H1140169-02

Gear position switch

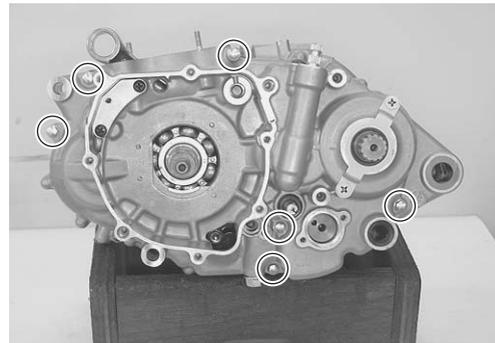
- 1) Remove the gear position switch (1).
- 2) Remove the switch contacts (2) and springs (3).



I933H1140170-01

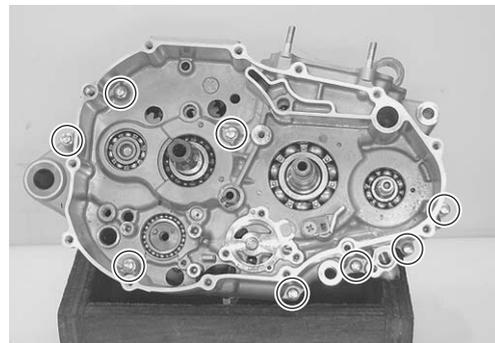
Crankcase

- 1) Remove the left crankcase securing bolts.



I933H1140171-01

- 2) Remove the right crankcase securing bolts.



I933H1140172-01

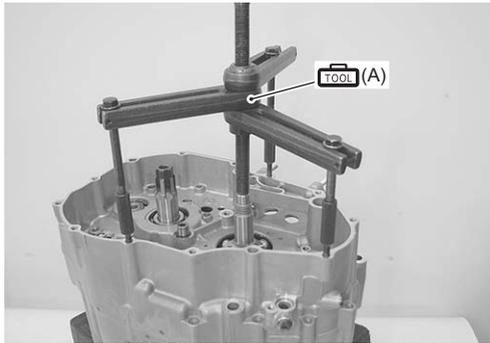
3) Separate the crankcase using the special tool.

Special tool

 (A): 09920-13120 (Crankcase separating tool)

NOTE

Fit the crankcase separating tool to the right crankcase, so that the tool plate is paralleled with the end face of the crankcase.



I933H1140173-01

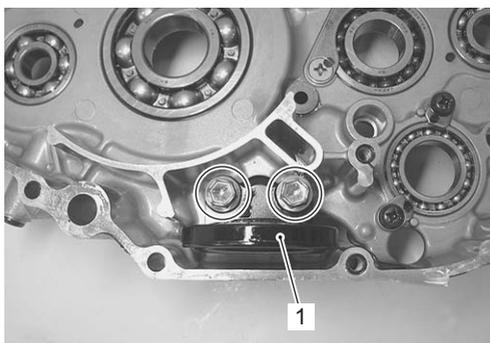
4) Remove the dowel pins.



I933H1140174-02

Oil sump filter

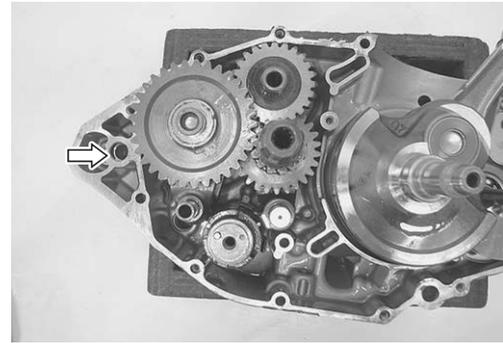
Remove the oil sump filter (1).



I933H1150005-01

Transmission / Gearshift

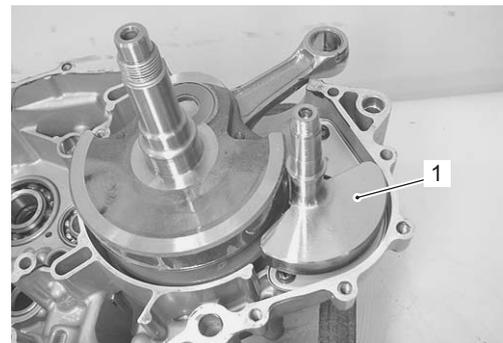
Remove the transmission component. Refer to "Transmission Removal and Installation in Section 5B (Page 5B-5)".



I933H1140175-01

Balancer shaft

Remove the balancer shaft (1).



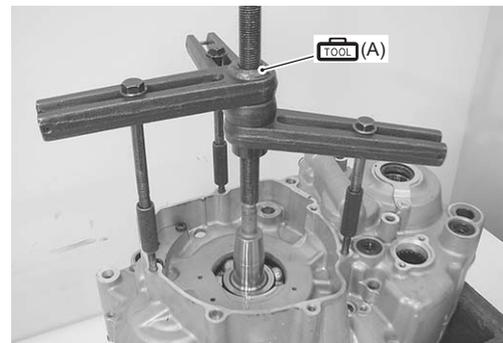
I933H1140176-01

Crankshaft

Remove the crankshaft from the crankcase using the special tool.

Special tool

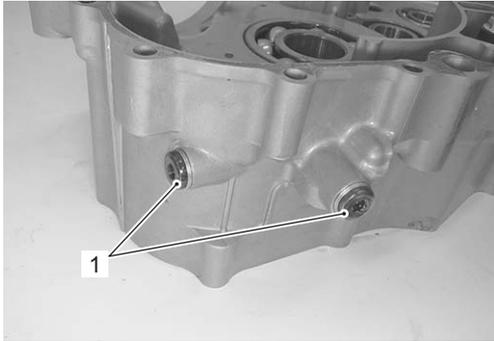
 (A): 09920-13120 (Crankcase separating tool)



I933H1140177-01

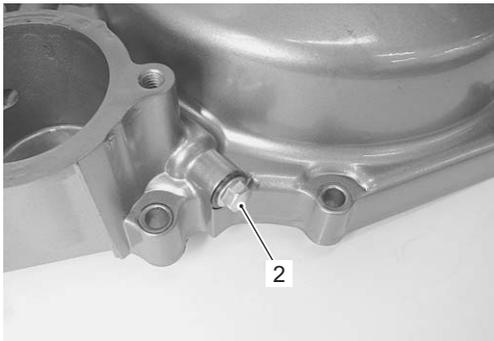
Oil gallery plug

- 1) Remove the oil gallery plugs (1) from the right crankcase.



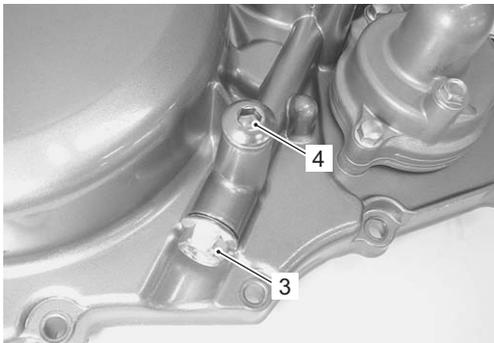
I933H1140178-01

- 2) Remove the oil gallery plug (2) from the generator cover.



I933H1140179-01

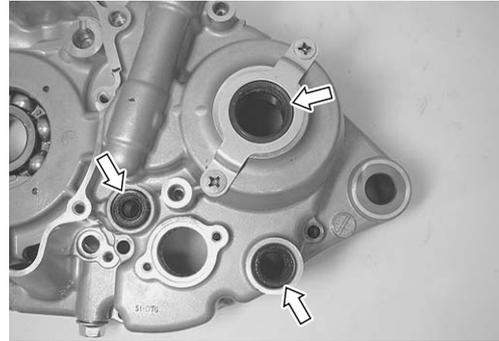
- 3) Remove the oil gallery plug (3) and main oil gallery plug (4) from the clutch cover.



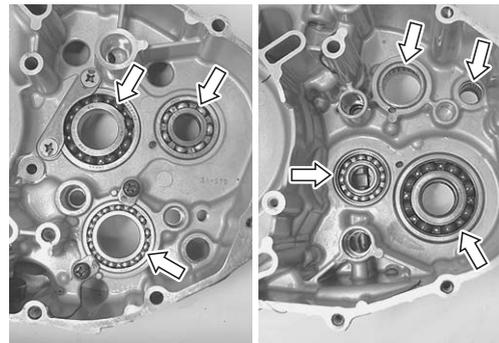
I933H1140180-01

Transmission oil seal / Bearing

Remove the transmission oil seals and bearings if necessary. Refer to "Transmission Oil Seal / Bearing Removal and Installation in Section 5B (Page 5B-10)" and "Gearshift Shaft Oil Seal / Bearing Removal and Installation in Section 5B (Page 5B-18)".



I933H1140181-01



I933H1140182-01

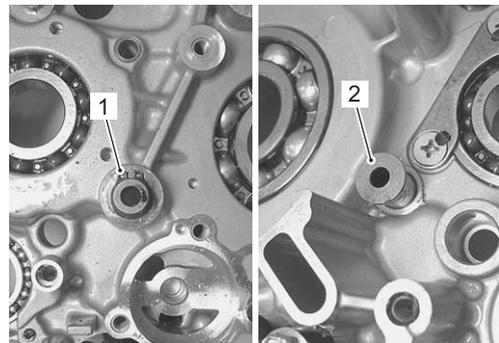
Oil pump idle gear shaft

- 1) Remove the snap ring (1).

Special tool

TOOL : 09900-06108 (Snap ring pliers)

- 2) Remove the oil pump idle gear shaft (2).



I933H1140183-01

Engine Bottom Side Assembly

B933H21406033

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

NOTE

Apply engine oil to each running and sliding part before reassembling.

Oil pump idle gear shaft

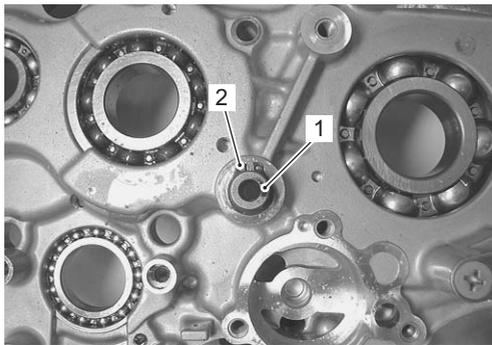
Install the oil pump idle gear shaft (1) and new snap ring (2).

⚠ CAUTION

The removed snap ring (2) must be replaced with a new one.

Special tool

TOOL : 09900-06108 (Snap ring pliers)



I933H1140184-01

Transmission oil seal / Bearing

Install the transmission bearings and oil seals. Refer to "Transmission Oil Seal / Bearing Removal and Installation in Section 5B (Page 5B-10)" and "Gearshift Shaft Oil Seal / Bearing Removal and Installation in Section 5B (Page 5B-18)".

Oil gallery plug

Tighten each plug to the specified torque.

⚠ CAUTION

Use each new gaskets.

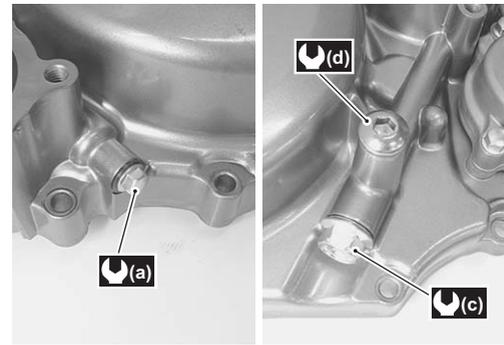
Tightening torque

Oil gallery plug (M6) (a): 11 N·m (1.1 kgf-m, 8.0 lb-ft)

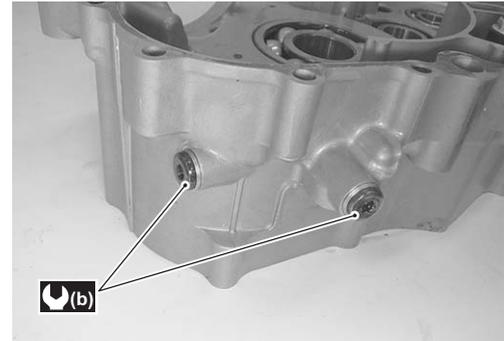
Oil gallery plug (M8) (b): 13 N·m (1.3 kgf-m, 9.5 lb-ft)

Oil gallery plug (M12) (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

Main oil gallery plug (d): 18 N·m (1.8 kgf-m, 13.0 lb-ft)



I933H1140185-01



I933H1140186-01

Crankshaft

- When mounting the crankshaft in the crankcase, it is necessary to pull its left end into the crankcase by using the special tools.

⚠ CAUTION

Never fit the crankshaft into the crankcase by striking it with a plastic mallet.

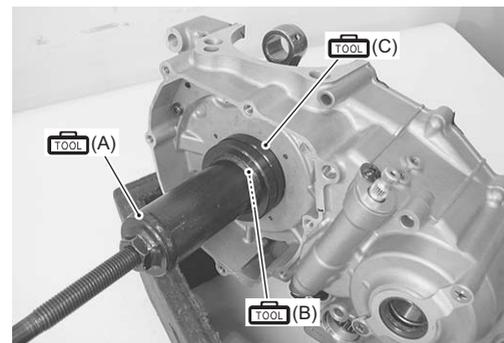
Always use the special tool, otherwise the accuracy of the crankshaft alignment will be affected.

Special tool

TOOL (A): 09910-32812 (Crankshaft installer)

TOOL (B): 09911-11310 (Crankshaft installer attachment)

TOOL (C): 09910-32820 (Spacer)

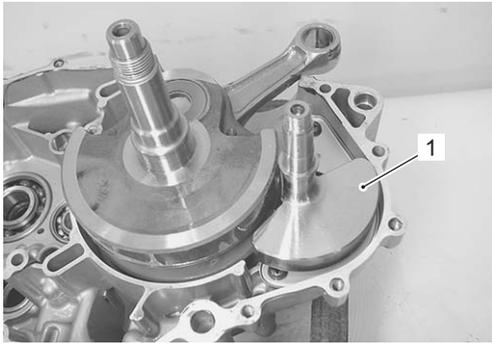


I933H1140187-01

1D-49 Engine Mechanical:

Balancer shaft

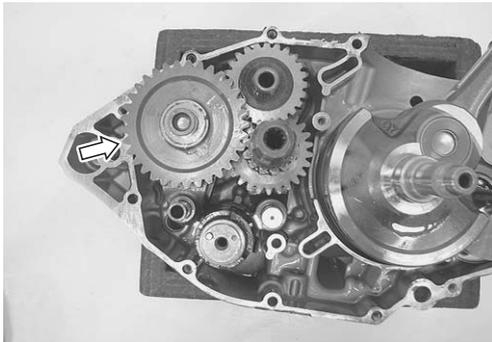
Install the balancer shaft (1).



I933H1140188-01

Transmission / Gear shift

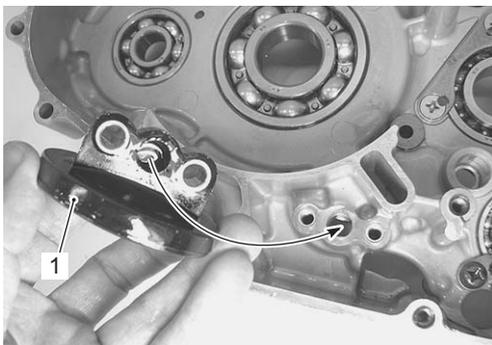
Install the transmission component. Refer to "Transmission Removal and Installation in Section 5B (Page 5B-5)".



I933H1140189-01

Oil sump filter

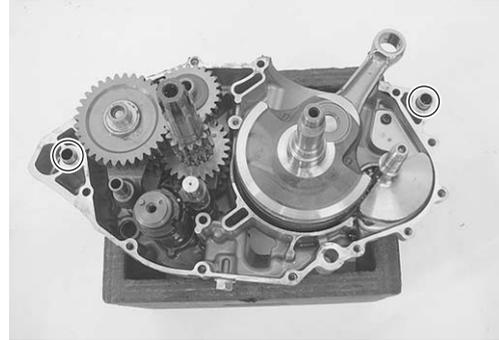
Align the oil passage holes when installing the oil sump filter (1).



I933H1150006-01

Crankcase

- Thoroughly remove the sealant and oil stains on the mating surface of the right and left crankcases.
- Install the dowel pins to the left crankcase.
- Apply engine oil to the conrod big end and to the transmission gears.



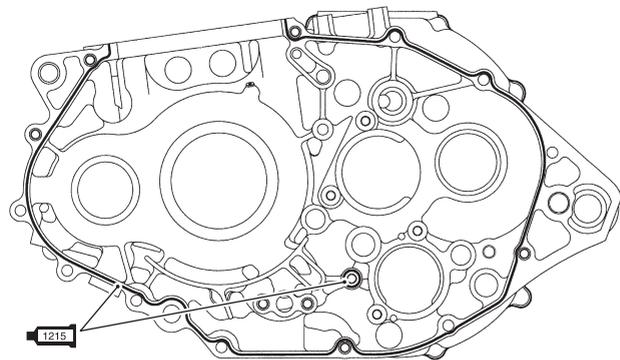
I933H1140190-01

- Apply bond to the mating surface of the right crankcase as follows.

NOTE

- Spread the sealant on surfaces thinly to form an even layer, and assemble the crankcases within a few minutes.
- Take extreme care not to apply 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)

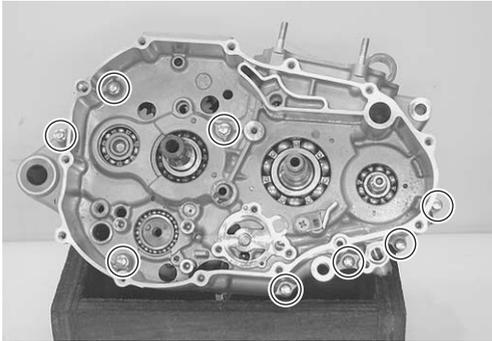


I933H1140191-02

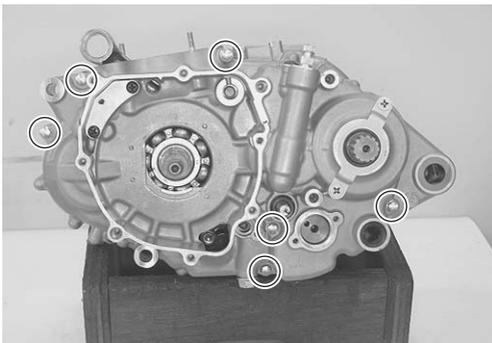
- Tighten the crankcase bolts to the specified torque.

Tightening torque

Crankcase bolt: 11 N·m (1.1 kgf-m, 8.0 lb-ft)

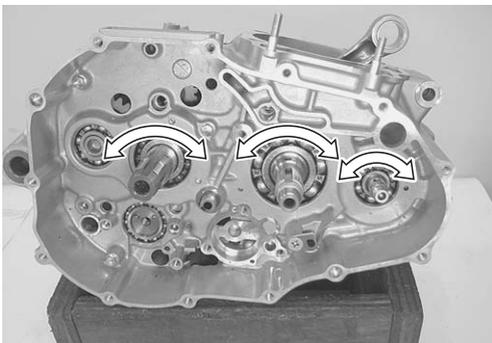


I933H1140192-01



I933H1140193-01

- After the crankcase bolts have been tightened, check if the crankshaft, countershaft, and driveshaft rotate smoothly. If a large resistance is felt to rotation, try to free the shafts by tapping them with a plastic mallet.



I933H1140194-01

Gear position switch

- Apply grease to the O-ring.

⚠ CAUTION

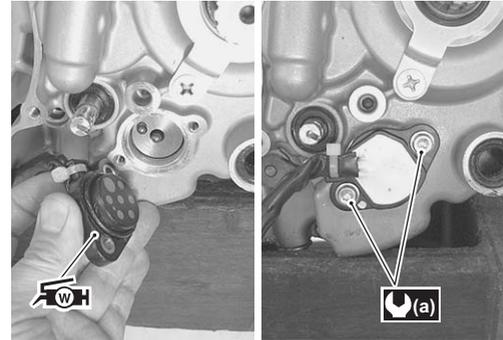
Replace the O-ring with a new one.

🔧: Grease 99000-25160 (Water resistance grease or equivalent)

- Tighten the gear position switch mounting bolts to the specified torque.

Tightening torque

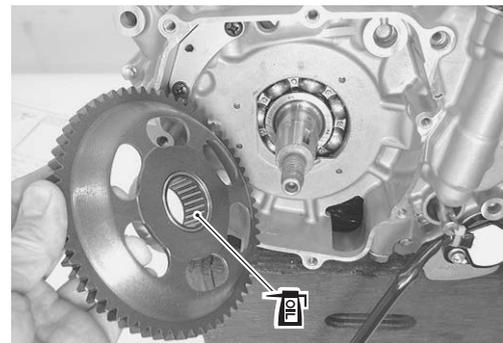
Gear position switch mounting bolt (a): 6.5 N·m (0.65 kgf-m, 4.7 lb-ft)



I933H1140195-02

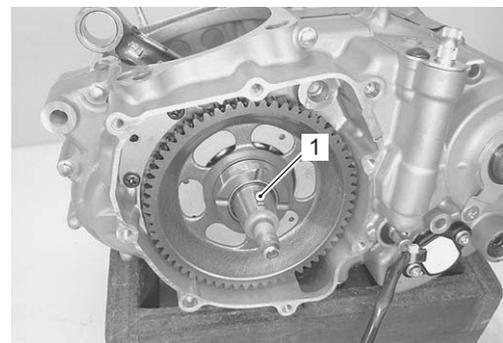
Generator / Starter driven gear

- Apply engine oil to the bearing of the starter driven gear.



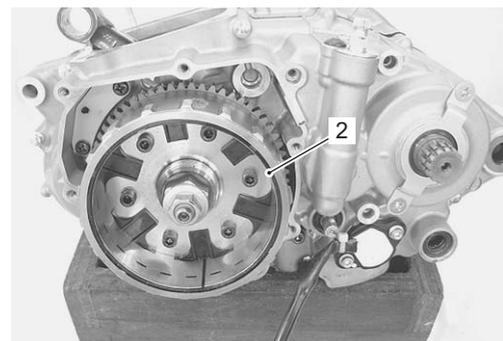
I933H1140196-01

- Install the key (1).



I933H1140197-01

- Install the generator rotor (2). Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".

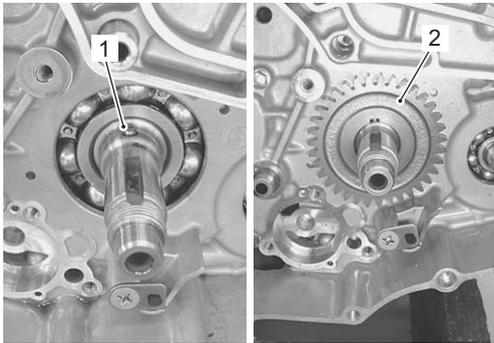


I933H1140240-03

1D-51 Engine Mechanical:

Primary drive gear / Balancer drive gear

- Install the pin (1) and balancer drive gear (2).

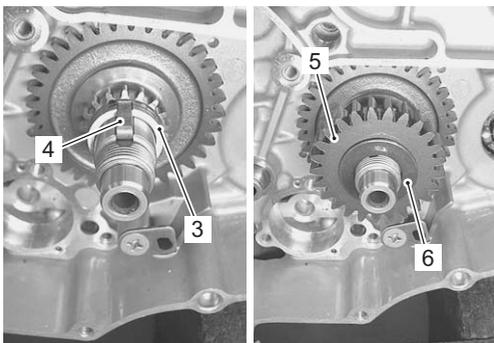


I933H1140198-01

- Install the cam chain drive sprocket (3) and key (4).
- Install the primary drive gear (5) and washer (6).

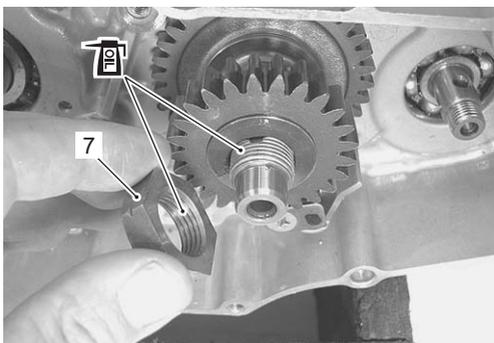
NOTE

The conical curve side of washer (6) face outside.



I933H1140199-03

- Apply engine oil to the thread and inside surface of the primary drive gear nut (7).



I933H1140200-01

- Hold the generator rotor using the special tool, and then tighten the primary drive gear nut (7) to the specified torque.

NOTE

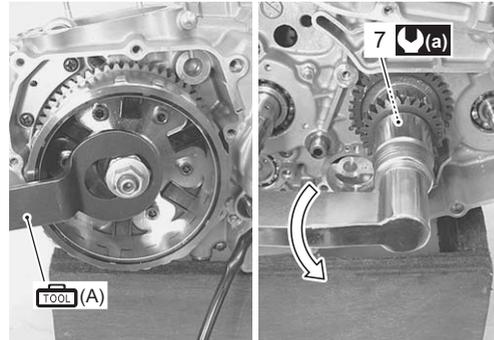
The primary drive gear nut (7) has left-hand thread.

Special tool

 (A): 09930-44520 (Rotor holder)

Tightening torque

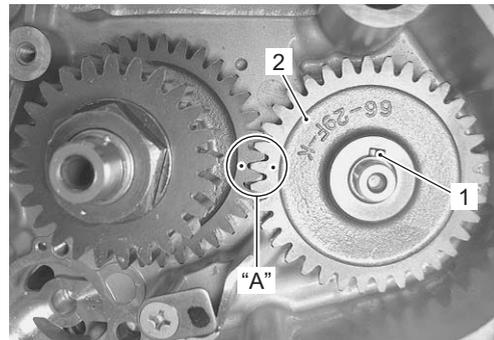
Primary drive gear nut (a): 140 N·m (14.0 kgf·m, 101.5 lb-ft)



I933H1140201-01

Balancer driven gear

- Install the pin (1).
- Install the balancer driven gear (2) by aligning the matching marks "A".



I933H1140202-01

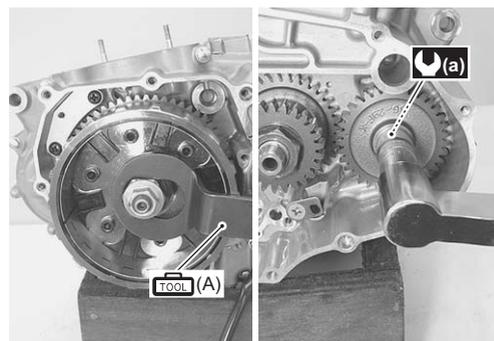
- Install the washer.
- Hold the generator rotor using the special tool, and then tighten the balancer driven gear nut to the specified torque.

Special tool

 (A): 09930-44520 (Rotor holder)

Tightening torque

Balancer driven gear nut (a): 50 N·m (5.0 kgf·m, 36.0 lb-ft)



I933H1140203-01

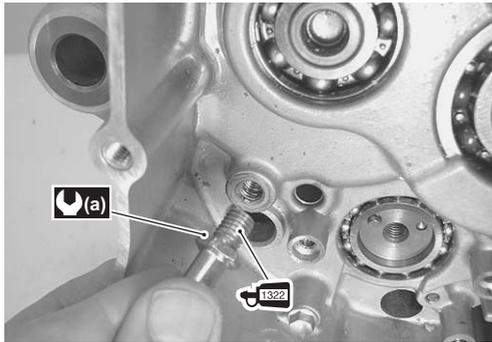
Gearshift / Gearshift cam plate

- Apply a small quantity of thread lock to the gearshift arm stopper and tighten it to the specified torque.

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

Tightening torque

Gearshift arm stopper (a): 19 N·m (1.9 kgf·m, 13.5 lb·ft)

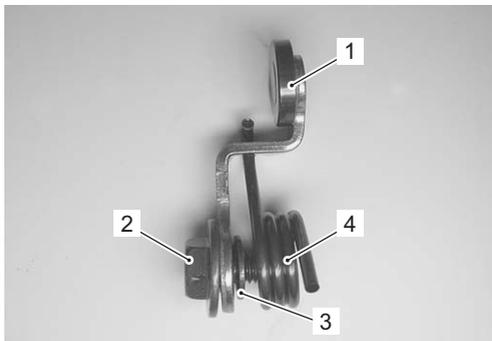


I933H1140204-01

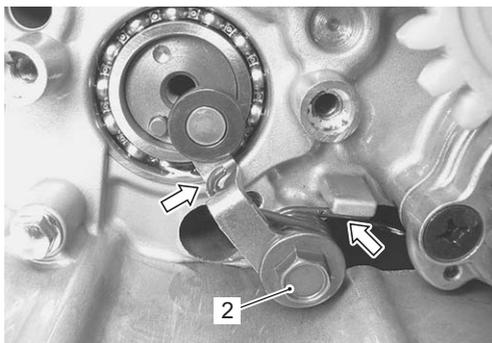
- Install the gearshift cam stopper (1), bolt (2), washer (3) and return spring (4).
- Tighten the gearshift cam stopper bolt (2).

NOTE

Hook the return spring end to the gearshift cam stopper (1) and crankcase.



I933H1140205-01

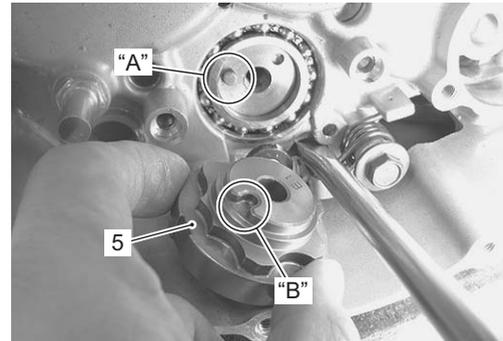


I933H1140206-02

- 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 pin "A" with the gearshift cam stopper plate "B".

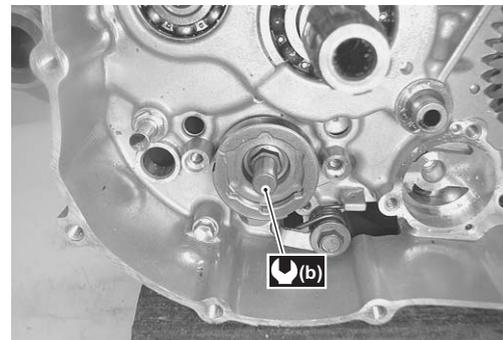


I933H1140207-01

- Tighten the gearshift cam stopper plate bolt to the specified torque.

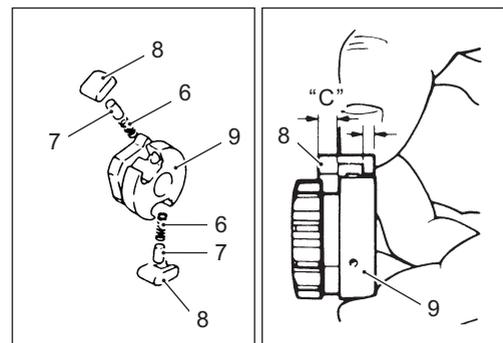
Tightening torque

Gearshift cam stopper plate bolt (b): 24 N·m (2.4 kgf·m, 17.5 lb·ft)

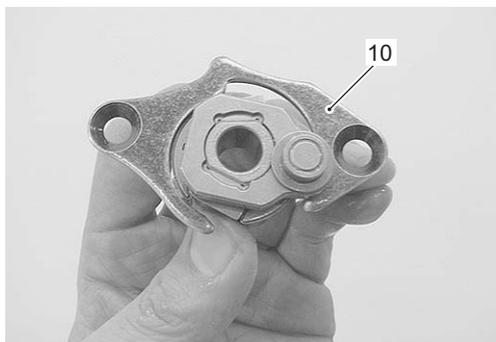


I933H1140208-01

- Install each spring (6), pins (7) and pawls (8) into the gearshift cam driven gear (9). The large shoulder "C" must face to the outside.
- With the pawls (8) held in pushed position, install the pawl lifter (10).



I933H1140209-01



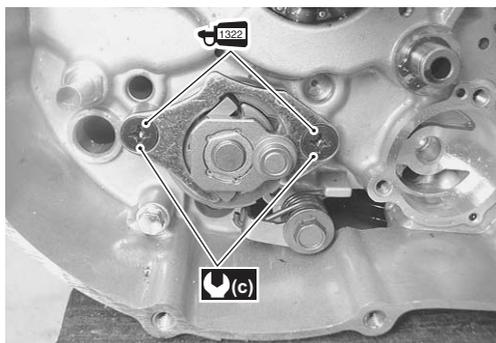
I933H1140210-01

- Apply a small quantity of thread lock to the gearshift pawl lifter screws, and then tighten the specified torque.

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

Tightening torque

Gearshift pawl lifter screw (c): 9 N·m (0.9 kgf-m, 6.5 lb-ft)

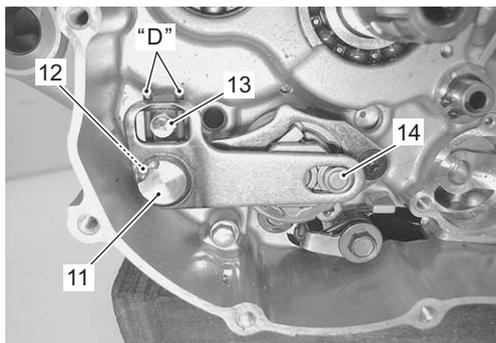


I933H1140211-02

- Install the gearshift shaft (11) with the washer (12).

NOTE

Set the gearshift shaft return spring ends "D" to the gearshift arm stopper (13) and gearshift cam roller (14) to the gearshift shaft (11).



I933H1140212-01

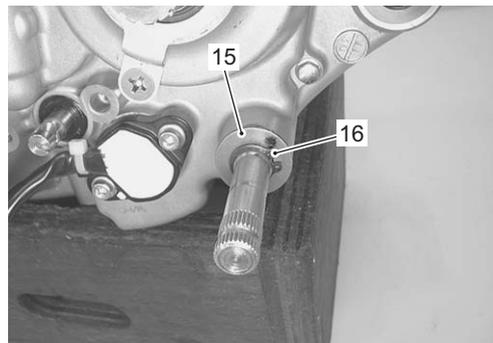
- Install the washer (15) and new snap ring (16).

CAUTION

The removed snap ring (16) must be replaced with a new one.

Special tool

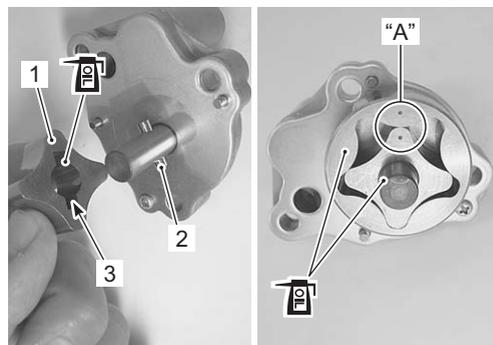
TOOL : 09900-06107 (Snap ring pliers)



I933H1140213-02

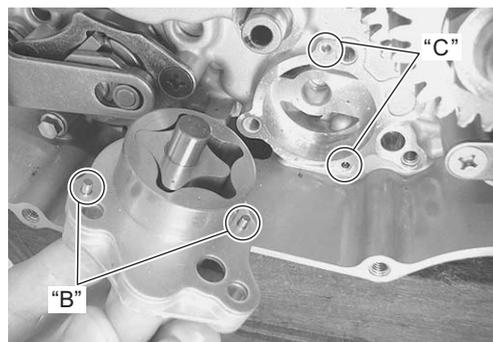
Oil pump

- Apply engine oil to the sliding surfaces of the oil pump inner rotor, outer rotor and shaft.
- When installing the inner rotor (1), align the pin (2) with the groove (3).
- When installing the inner rotor and outer rotor, face the punched marks "A" on the inner rotor and outer rotor to the outside.



I933H1150012-01

- When installing the oil pump assembly, align the pin "B" with the pinhole "C".



I933H1140214-01

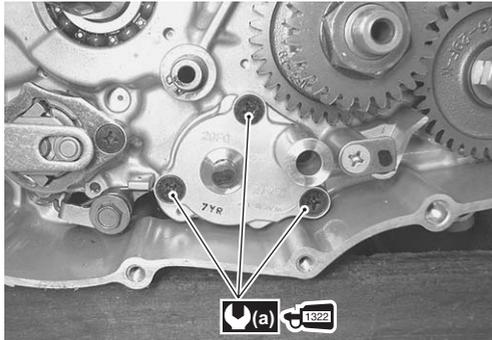
- Apply a small quantity of thread lock to the oil pump mounting screws.

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

Tighten the oil pump mounting screws to the specified torque.

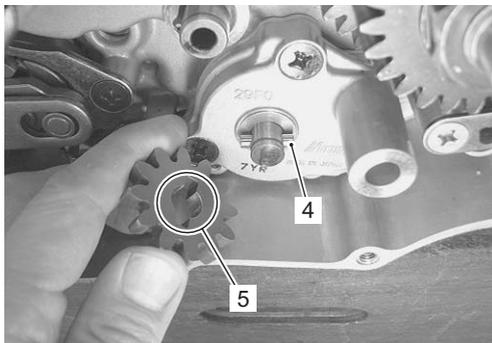
Tightening torque

Oil pump mounting screw (a): 8.5 N·m (0.85 kgf-m, 6.0 lb-ft)



I933H1140215-01

- When installing the oil pump driven gear, align the pin (4) with the groove (5).



I933H1140216-01

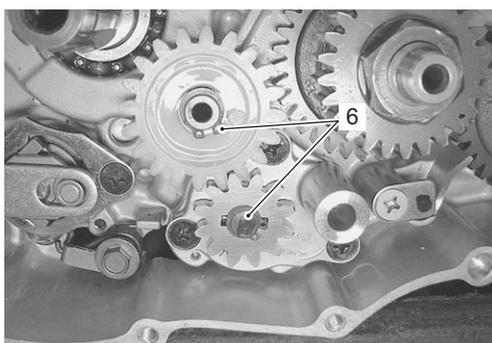
- Install the new snap rings (6).

CAUTION

The removed snap rings (6) must be replaced with a new one.

Special tool

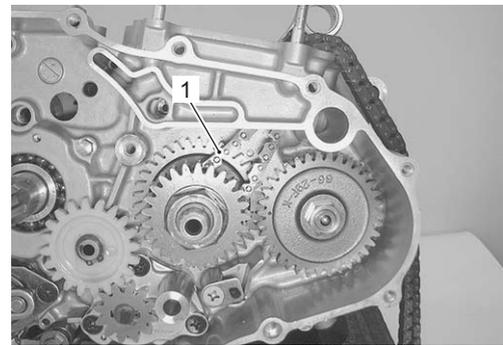
TOOL : 09900-06107 (Snap ring pliers)



I933H1140217-01

Cam chain tensioner / Cam chain

- Install the cam chain (1).

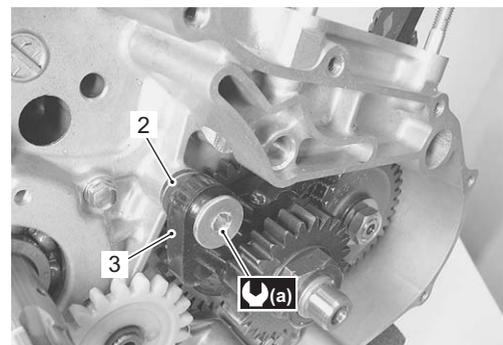


I933H1140218-01

- Install the washer (2) and cam chain tensioner (3).
- Tighten the cam chain tensioner mounting bolt to the specified torque.

Tightening torque

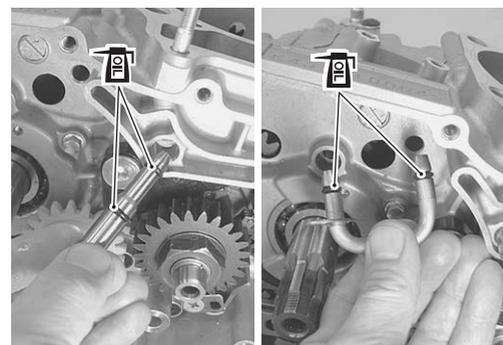
Cam chain tensioner mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I933H1140219-01

Oil pipe

- Apply engine oil to the O-rings.
- Tighten the oil pipe bolt securely.



I933H1140220-01

1D-55 Engine Mechanical:

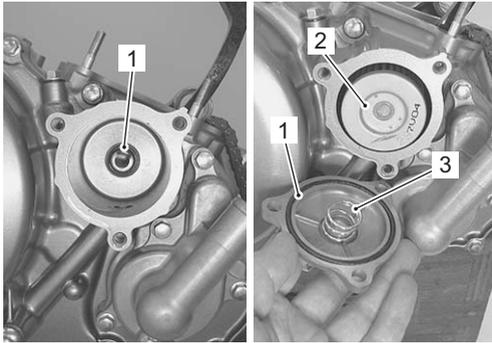
Oil filter

- Apply engine oil to the new O-rings (1).

⚠ CAUTION

Replace the new O-rings with new ones.

- Install the oil filter (2) and spring (3) correctly.

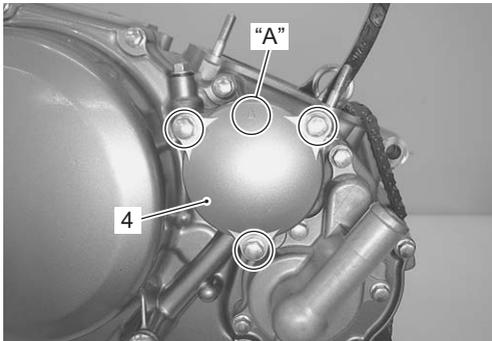


I933H1140221-02

- Install the oil filter cap (4) and tighten the bolts securely.

NOTE

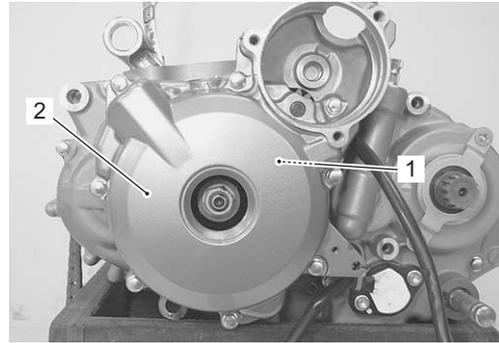
Face the triangle mark "A" on the oil filter cap (4) upward.



I933H1140222-02

Generator cover / Starter idle gear

Install the starter idle gear (1) and generator cover (2). Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".



I933H1140223-01

Starter torque limiter

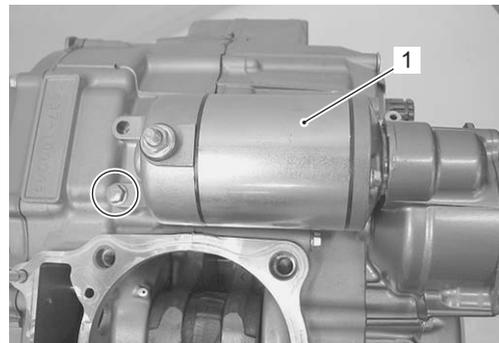
Install the starter torque limiter (1). Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation in Section 1I (Page 1I-8)".



I933H1140086-01

Starter motor

Install the starter motor (1). Refer to "Starter Motor Removal and Installation in Section 1I (Page 1I-4)".



I933H1140224-01

Engine top side / Engine assembly

Assembly the engine top side. Refer to "Engine Top Side Assembly (Page 1D-20)".

Remount the engine assembly. Refer to "Engine Assembly Installation (Page 1D-16)".

Oil Sump Filter Inspection

B933H21406034

Refer to "Oil Sump Filter Inspection and Cleaning in Section 1E (Page 1E-4)".

Oil Pump Inspection

B933H21406035

Refer to "Oil Pump Inspection in Section 1E (Page 1E-6)".

Gearshift Shaft Inspection

B933H21406036

Refer to "Gearshift Linkage Inspection in Section 5B (Page 5B-17)".

Conrod and Crankshaft Inspection

B933H21406037

Refer to "Engine Bottom Side Disassembly (Page 1D-41)" and "Engine Bottom Side Assembly (Page 1D-48)".

Conrod small end I.D.

Measure the conrod small end inside diameter with the dial calipers.

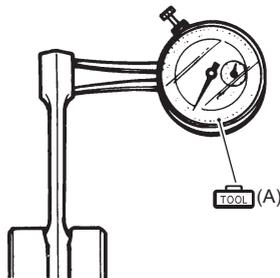
If conrod small end inside diameter exceeds the service limit, replace the conrod.

Special tool

TOOL (A): 09900-20605 (Dial calipers (1/100 mm, 10 – 34 mm))

Conrod small end I.D.

Service limit: 20.040 mm (0.7890 in)



I831G1140292-02

Conrod deflection

Wear On the big end of the conrod can be estimated by checking the movement of the small end of the rod. This method can also check the extent of wear on the parts of the conrod's big end.

Special tool

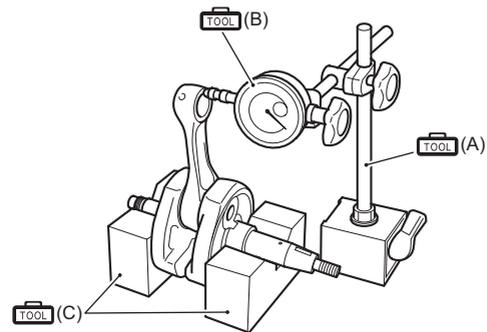
TOOL (A): 09900-20701 (Magnetic stand)

TOOL (B): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

TOOL (C): 09900-21304 (V-block (100 mm))

Conrod deflection

Service Limit: 3.0 mm (0.12 in)



I933H1140225-01

Conrod big end side clearance

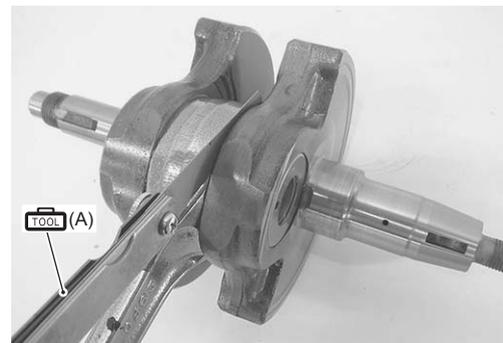
Push the big end of the conrod to one side and measure the side clearance using a thickness gauge. If the clearance exceeds the service limit, replace the crankshaft assembly with a new one or bring the deflection and the side clearance within the service limit by replacing the worn parts (conrod, big end bearing, crank pin, etc.) with new ones.

Special tool

TOOL (A): 09900-20803 (Thickness gauge)

Conrod big end side clearance

Service limit: 1.0 mm (0.04 in)



I933H1140226-01

1D-57 Engine Mechanical:

Crankshaft runout

Support the crankshaft using V-blocks and measure the crankshaft runout using the dial gauge, as shown. If the runout exceeds the service limit, replace the crankshaft with a new one.

NOTE

- Place the crankshaft onto the V-blocks so that it becomes horizontally.
- Measure the runout from the tips of the crankshaft.

Crankshaft runout

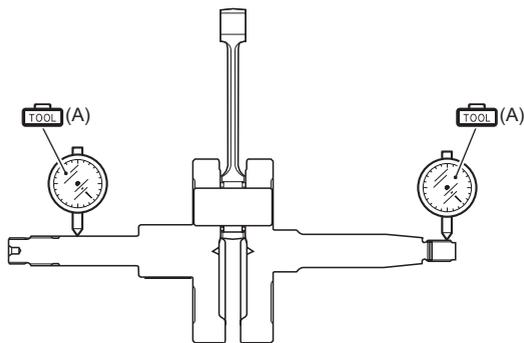
Service limit: 0.08 mm (0.003 in)

Special tool

TOOL (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

TOOL : 09900-20701 (Magnetic stand)

TOOL : 09900-21304 (V-block (100 mm))



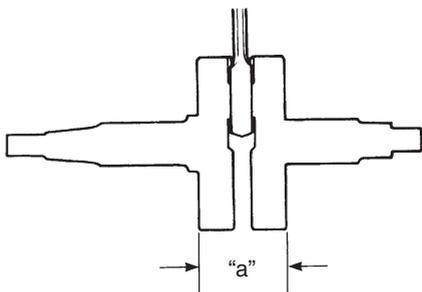
I933H1140227-01

Width between crankshaft webs

Measure the width between crankshaft webs "a".

Width between crankshaft webs "a"

Standard: 61.9 – 62.1 mm (2.43 – 2.44 in)



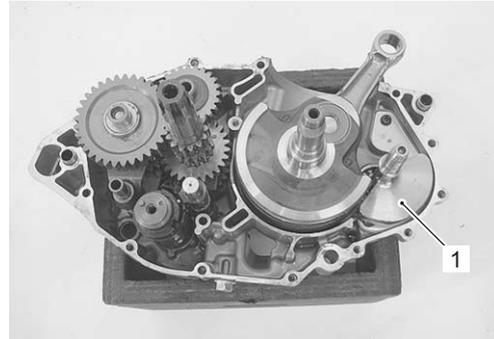
I705H1140149-04

Balancer Shaft Inspection

B933H21406038

Inspect the balancer shaft in the following procedures:

- 1) Separate the crankcase, left and right. Refer to "Engine Bottom Side Disassembly (Page 1D-41)".
- 2) Remove the balancer shaft (1).



I933H1140228-01

- 3) Inspect the balancer shaft for wear or damage. If any defects are found, replace the balancer shaft with a new one.



I933H1140229-01

- 4) Install the balancer shaft (1).

- 5) Reassemble the crankcase, left and right. Refer to "Engine Bottom Side Assembly (Page 1D-48)".

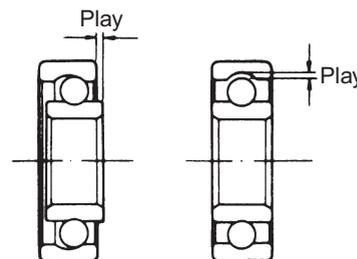
Crankshaft Bearing / Balancer Shaft Bearing Inspection

B933H21406039

Refer to "Engine Bottom Side Disassembly (Page 1D-41)" and "Engine Bottom Side Assembly (Page 1D-48)".

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 "Crankshaft Bearing / Balancer Shaft Bearing Removal and Installation (Page 1D-58)".



I933H1140230-01

Crankshaft Bearing / Balancer Shaft Bearing Removal and Installation

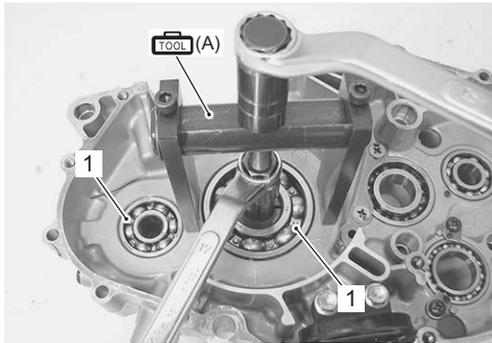
B933H21406040

Removal

- 1) Disassemble the engine bottom side. Refer to "Engine Bottom Side Disassembly (Page 1D-41)".
- 2) Remove the right crankcase bearings (1) using the special tool.

Special tool

TOOL (A): 09921-20240 (Bearing remover set)



I933H1140231-01

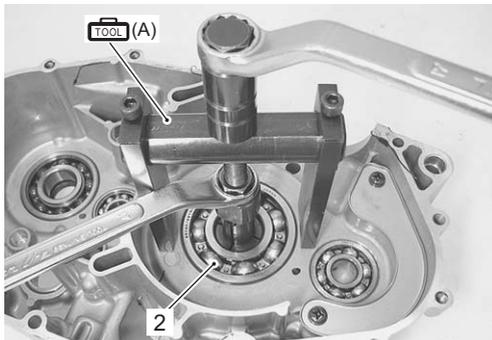
- 3) Remove the left crankcase bearings (2) using the special tools.

Special tool

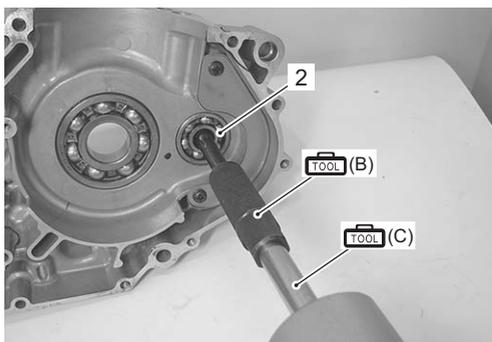
TOOL (A): 09921-20240 (Bearing remover set)

TOOL (B): 09921-20210 (Bearing remover)

TOOL (C): 09930-30104 (Rotor remover slide shaft)



I933H1140232-01



I933H1140233-01

Installation

⚠ CAUTION

The removed bearings must be replaced with new ones.

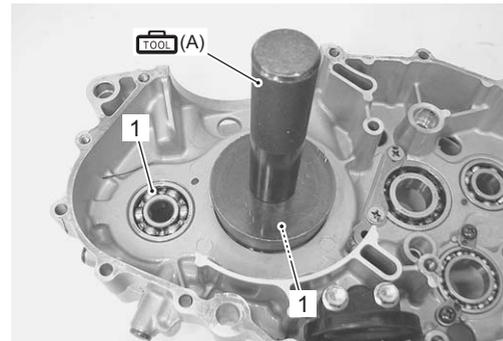
NOTE

The stamped mark side of the bearing faces inside.

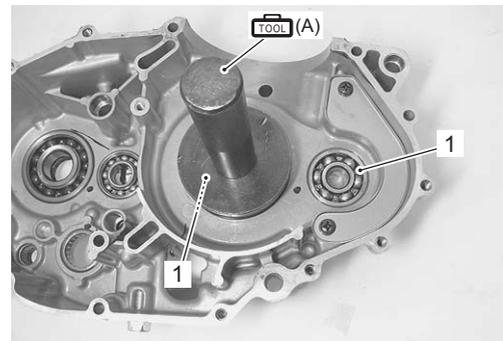
- 1) Install the bearings (1) using the special tool.

Special tool

TOOL (A): 09913-70210 (Bearing installer set)



I933H1140234-01



I933H1140235-01

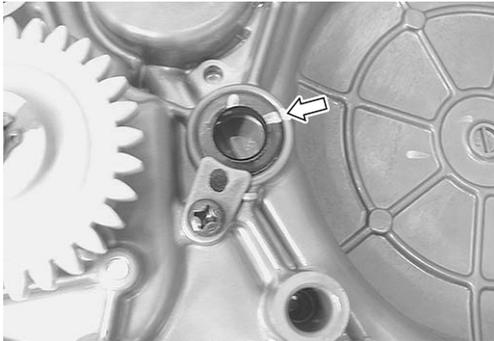
- 2) Assemble the engine bottom side. Refer to "Engine Bottom Side Assembly (Page 1D-48)".
- 3) Remount the engine assembly. Refer to "Engine Assembly Installation (Page 1D-16)".

Crankshaft Oil Seal Inspection

B933H21406041

Inspect the crankshaft oil seal in the following procedures:

- 1) Remove the clutch cover. Refer to "Clutch Removal in Section 5C (Page 5C-7)".
- 2) Inspect the crankshaft oil seal lip for damage or wear. If any defect is found, replace the oil seal with a new one.



I933H1140082-02

- 3) Install the clutch cover. Refer to "Clutch Installation in Section 5C (Page 5C-9)".

Crankshaft Oil Seal Removal and Installation

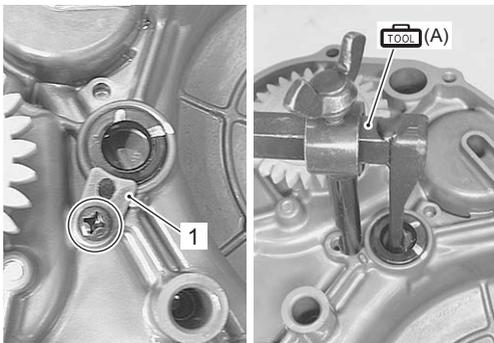
B933H21406042

Removal

- 1) Remove the clutch cover. Refer to "Clutch Removal in Section 5C (Page 5C-7)".
- 2) Remove the oil seal retainer (1).
- 3) Remove the oil seal using the special tool.

Special tool

 (A): 09913-50121 (Oil seal remover)



I933H1140236-01

Installation

- 1) Install the oil seal using the special tool.

CAUTION

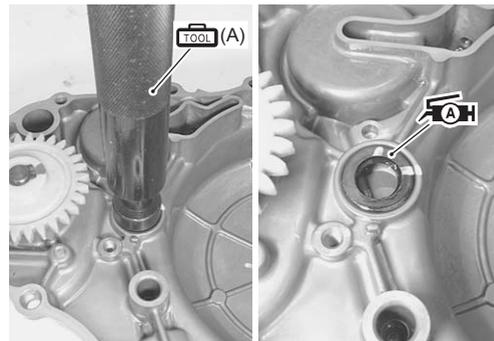
The removed oil seal must be replaced with a new one.

Special tool

 (A): 09913-70210 (Bearing installer set)

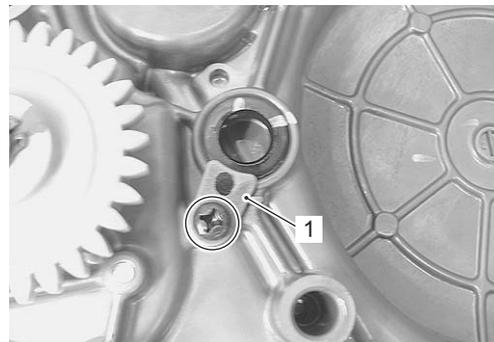
- 2) Apply grease to the oil seal lip.

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



I933H1140237-01

- 3) Install the oil seal retainer (1).



I933H1140238-01

- 4) Install the clutch cover. Refer to "Clutch Installation in Section 5C (Page 5C-9)".

Clutch Release Camshaft Removal and Installation

B933H21406043

Refer to "Clutch Release Camshaft Removal and Installation in Section 5C (Page 5C-5)".

Specifications

Service Data

B933H21407001

Valve + Valve guide

Unit: mm (in)

Item	Standard		Limit
Valve diam.	IN.	36.0 (1.42)	—
	EX.	29.0 (1.14)	—
Tappet 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 stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	5.000 – 5.012 (0.1969 – 0.1973)	—
Valve stem O.D.	IN.	4.975 – 4.990 (0.1959 – 0.1965)	—
	EX.	4.955 – 4.970 (0.1951 – 0.1957)	—
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.	—	38.8 (1.53)
Valve spring tension	IN. & EX.	182 – 210 N (18.6 – 21.4 kgf, 41.0 – 47.2 lbs) at length 31.5 mm (1.24 in)	—

Camshaft + Cylinder head

Unit: mm (in)

Item	Standard		Limit
Cam height	IN.	36.190 – 36.240 (1.4248 – 1.4268)	35.890 (1.4130)
	EX.	34.920 – 34.970 (1.3748 – 1.3768)	34.620 (1.3630)
Camshaft journal oil clearance	IN. & EX.	0.019 – 0.053 (0.007 – 0.0021)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8666 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.972 – 21.993 (0.8650 – 0.8659)	—
Camshaft runout	IN. & EX.	—	0.10 (0.004)
Cam chain pin (at arrow “3”)	15th pin		—
Cylinder head distortion	—		0.05 (0.002)

Cylinder + Piston + Piston ring

Unit: mm (in)

Item	Standard		Limit
Compression pressure (Automatic-decomp. actuated)	Approx. 1 100 kPa (11.0 kgf/cm ² , 156 psi)		—
Piston-to-cylinder clearance	0.030 – 0.040 (0.0012 – 0.0016)		0.120 (0.0047)
Cylinder bore	90.000 – 90.015 (3.5433 – 3.5439)		Nicks or Scratches
Piston diam.	89.965 – 89.980 (3.5419 – 3.5425) Measure at 15 mm (0.6 in) from the skirt end.		89.880 (3.5386)
Cylinder distortion	—		0.05 (0.102)
Piston ring free end gap	1st	R	Approx. 6.9 (0.27)
	2nd	R	Approx. 11.5 (0.45)
Piston ring end gap	1st	R	0.08 – 0.20 (0.003 – 0.008)
	2nd	R	0.08 – 0.20 (0.003 – 0.008)
Piston ring-to-groove clearance	1st	—	0.180 (0.0071)
	2nd	—	0.150 (0.0059)
Piston ring groove width	1st	—	0.78 – 0.80 (0.0307 – 0.0315)
		—	1.30 – 1.32 (0.0512 – 0.0520)
	2nd	—	0.81 – 0.83 (0.0319 – 0.0327)
		Oil	—
Piston ring thickness	1st	—	0.71 – 0.76 (0.0280 – 0.0299)
		—	1.08 – 1.10 (0.0425 – 0.0433)
	2nd	—	0.77 – 0.79 (0.0303 – 0.0311)

1D-61 Engine Mechanical:

Item	Standard	Limit
Piston pin bore I.D.	20.002 – 20.008 (0.7875 – 0.7877)	20.030 (0.7886)
Piston pin O.D.	19.995 – 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 deflection	—	3.0 (0.12)
Conrod big end side clearance	0.30 – 0.65 (0.012 – 0.026)	1.0 (0.04)
Conrod big end width	21.75 – 21.80 (0.856 – 0.858)	—
Crank web to web width	61.9 – 62.1 (2.43 – 2.44)	—
Crankshaft runout	—	0.08 (0.003)

Tightening Torque Specifications

B933H21407002

Fastening part	Tightening torque			Note
	N-m	kgf-m	lb-ft	
Air cleaner box mounting bolt	10	1.0	7.0	☞ (Page 1D-5)
Cylinder head bolt (M10) (Initial)	25	2.5	18.0	☞ (Page 1D-21)
Cylinder head bolt (M10) (Final)	46	4.6	33.5	☞ (Page 1D-21)
Cylinder head bolt (M6)	10	1.0	7.0	☞ (Page 1D-22)
Cylinder base nut	10	1.0	7.0	☞ (Page 1D-22)
Engine mounting bracket bolt	26	2.6	19.0	☞ (Page 1D-22)
Engine mounting nut	66	6.6	47.5	☞ (Page 1D-22)
Camshaft journal holder bolt	10	1.0	7.0	☞ (Page 1D-24) / ☞ (Page 1D-27)
Cam chain tension adjuster mounting bolt	10	1.0	7.0	☞ (Page 1D-24)
Cam chain tension spring holder bolt	30	3.0	21.5	☞ (Page 1D-24)
Generator cover plug	15	1.5	11.0	☞ (Page 1D-25)
Valve timing inspection plug	23	2.3	16.5	☞ (Page 1D-25)
Cylinder head cover bolt	14	1.4	10.0	☞ (Page 1D-26)
Cam chain tensioner mounting bolt	10	1.0	7.0	☞ (Page 1D-29) / ☞ (Page 1D-54)
Oil gallery plug (Cylinder head)	10	1.0	7.0	☞ (Page 1D-31)
Intake pipe bolt	9	0.9	6.5	☞ (Page 1D-31)
ECT sensor	12	1.2	8.5	☞ (Page 1D-31)
Oil gallery plug (M6)	11	1.1	8.0	☞ (Page 1D-48)
Oil gallery plug (M8)	13	1.3	9.5	☞ (Page 1D-48)
Oil gallery plug (M12)	23	2.3	16.5	☞ (Page 1D-48)
Main oil gallery plug	18	1.8	13.0	☞ (Page 1D-48)
Crankcase bolt	11	1.1	8.0	☞ (Page 1D-50)
Gear position switch mounting bolt	6.5	0.65	4.7	☞ (Page 1D-50)
Primary drive gear nut	140	14.0	101.5	☞ (Page 1D-51)
Balancer driven gear nut	50	5.0	36.0	☞ (Page 1D-51)
Gearshift arm stopper	19	1.9	13.5	☞ (Page 1D-52)
Gearshift cam stopper plate bolt	24	2.4	17.5	☞ (Page 1D-52)
Gearshift pawl lifter screw	9	0.9	6.5	☞ (Page 1D-53)
Oil pump mounting screw	8.5	0.85	6.0	☞ (Page 1D-54)

NOTE

The specified tightening torque is also described in the following.

“Throttle Body Construction (Page 1D-8)”

“Engine Assembly Installation (Page 1D-16)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H21408001

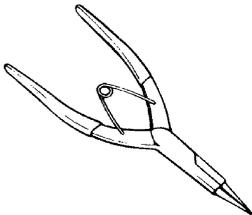
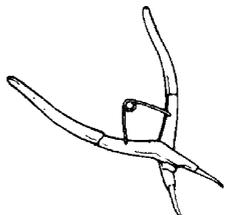
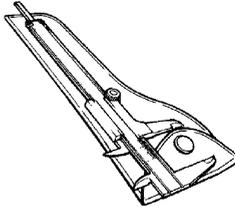
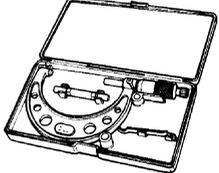
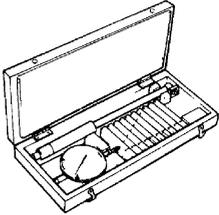
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞(Page 1D-31) / ☞(Page 1D-59)
	Water resistance grease or equivalent	P/No.: 99000-25160	☞(Page 1D-6) / ☞(Page 1D-11) / ☞(Page 1D-50)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞(Page 1D-20) / ☞(Page 1D-23) / ☞(Page 1D-32)
Sealant	SUZUKI BOND No.1215 or equivalent	P/No.: 99000-31110	☞(Page 1D-20) / ☞(Page 1D-49)
	SUZUKI BOND No.1207B or equivalent	P/No.: 99000-31140	☞(Page 1D-25)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000-32030	☞(Page 1D-16)
	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞(Page 1D-52) / ☞(Page 1D-53) / ☞(Page 1D-54)

NOTE

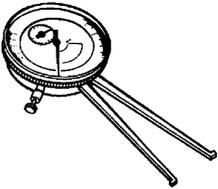
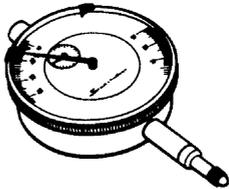
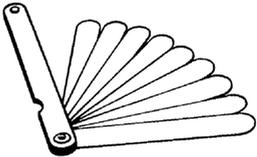
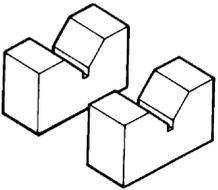
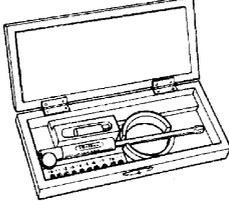
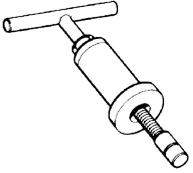
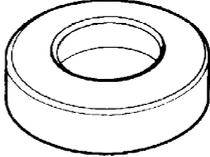
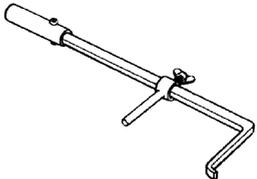
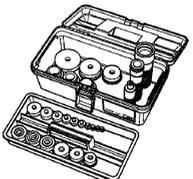
Required service material is also described in the following.
“Throttle Body Components (Page 1D-7)”

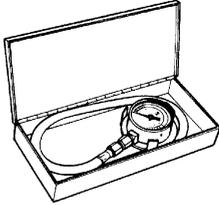
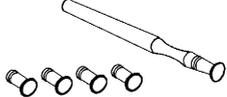
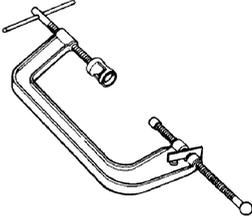
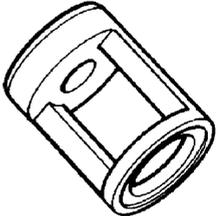
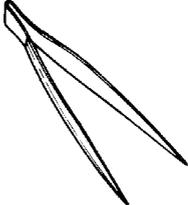
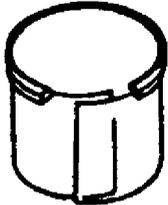
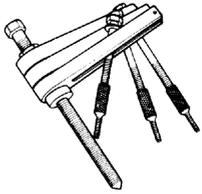
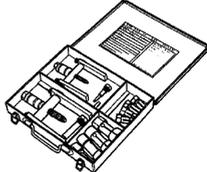
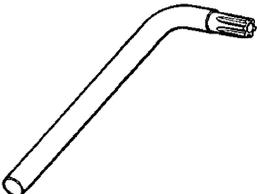
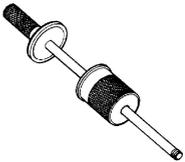
Special Tool

B933H21408002

09900-06107 Snap ring pliers ☞(Page 1D-43) / ☞(Page 1D-43) / ☞(Page 1D-53) / ☞(Page 1D-54)		09900-06108 Snap ring pliers ☞(Page 1D-47) / ☞(Page 1D-48)	
09900-20101 Vernier calipers (1/15 mm, 150 mm) ☞(Page 1D-34) / ☞(Page 1D-35) / ☞(Page 1D-41)		09900-20202 Micrometer (1/100 mm, 25 – 50 mm) ☞(Page 1D-26)	
09900-20204 Micrometer (75 – 100 mm) ☞(Page 1D-40)		09900-20205 Micrometer (0 – 25 mm) ☞(Page 1D-27) / ☞(Page 1D-34) / ☞(Page 1D-40) / ☞(Page 1D-41)	
09900-20508 Cylinder gauge set ☞(Page 1D-38)		09900-20602 Dial gauge (1/1000 mm, 1 mm) ☞(Page 1D-27) / ☞(Page 1D-41)	

1D-63 Engine Mechanical:

<p>09900-20605 Dial calipers (1/100 mm, 10 – 34 mm) ☞ (Page 1D-56)</p>		<p>09900-20607 Dial gauge (1/100 mm, 10 mm) ☞ (Page 1D-33) / ☞ (Page 1D-33) / ☞ (Page 1D-34) / ☞ (Page 1D-56) / ☞ (Page 1D-57)</p>	
<p>09900-20701 Magnetic stand ☞ (Page 1D-33) / ☞ (Page 1D-33) / ☞ (Page 1D-34) / ☞ (Page 1D-56) / ☞ (Page 1D-57)</p>		<p>09900-20803 Thickness gauge ☞ (Page 1D-33) / ☞ (Page 1D-38) / ☞ (Page 1D-40) / ☞ (Page 1D-41) / ☞ (Page 1D-56)</p>	
<p>09900-21304 V-block (100 mm) ☞ (Page 1D-33) / ☞ (Page 1D-33) / ☞ (Page 1D-56) / ☞ (Page 1D-57)</p>		<p>09900-22301 Plastigauge (0.025 – 0.076 mm) ☞ (Page 1D-27)</p>	
<p>09900-22302 Plastigauge (0.051 – 0.152 mm) ☞ (Page 1D-27)</p>		<p>09900-22403 Small bore gauge (18 – 35 mm) ☞ (Page 1D-27) / ☞ (Page 1D-41)</p>	
<p>09910-32812 Crankshaft installer ☞ (Page 1D-48)</p>		<p>09910-32820 Spacer ☞ (Page 1D-48)</p>	
<p>09911-11310 Crankshaft installer attachment ☞ (Page 1D-48)</p>		<p>09913-50121 Oil seal remover ☞ (Page 1D-59)</p>	
<p>09913-70210 Bearing installer set ☞ (Page 1D-58) / ☞ (Page 1D-59)</p>		<p>09915-63311 Compression gauge attachment ☞ (Page 1D-1)</p>	

<p>09915-64512 Compression gauge ☞ (Page 1D-1)</p> 	<p>09916-10911 Valve lapper set ☞ (Page 1D-35)</p> 
<p>09916-14510 Valve spring compressor ☞ (Page 1D-30) / ☞ (Page 1D-32)</p> 	<p>09916-14910 Valve spring compressor attachment ☞ (Page 1D-30) / ☞ (Page 1D-32)</p> 
<p>09916-34542 Reamer handle ☞ (Page 1D-36) / ☞ (Page 1D-37)</p> 	<p>09916-34570 Valve guide reamer (5.0 mm) ☞ (Page 1D-37)</p> 
<p>09916-34580 Valve guide reamer (10.8 mm) ☞ (Page 1D-36)</p> 	<p>09916-44310 Valve guide remover/ installer ☞ (Page 1D-36) / ☞ (Page 1D-37)</p> 
<p>09916-53360 Attachment ☞ (Page 1D-37)</p> 	<p>09916-84511 Tweezers ☞ (Page 1D-30) / ☞ (Page 1D-32)</p> 
<p>09919-28610 Sleeve protector ☞ (Page 1D-29) / ☞ (Page 1D-32)</p> 	<p>09920-13120 Crankcase separating tool ☞ (Page 1D-46) / ☞ (Page 1D-46)</p> 
<p>09921-20210 Bearing remover ☞ (Page 1D-58)</p> 	<p>09921-20240 Bearing remover set ☞ (Page 1D-58) / ☞ (Page 1D-58)</p> 
<p>09930-11950 Torx wrench ☞ (Page 1D-10) / ☞ (Page 1D-11)</p> 	<p>09930-30104 Rotor remover slide shaft ☞ (Page 1D-58)</p> 

1D-65 Engine Mechanical:

09930-44520

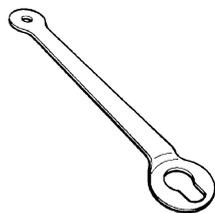
Rotor holder

☞ (Page 1D-44) /

☞ (Page 1D-44) /

☞ (Page 1D-51) /

☞ (Page 1D-51)



Engine Lubrication System

Precautions

Precautions for Engine Oil

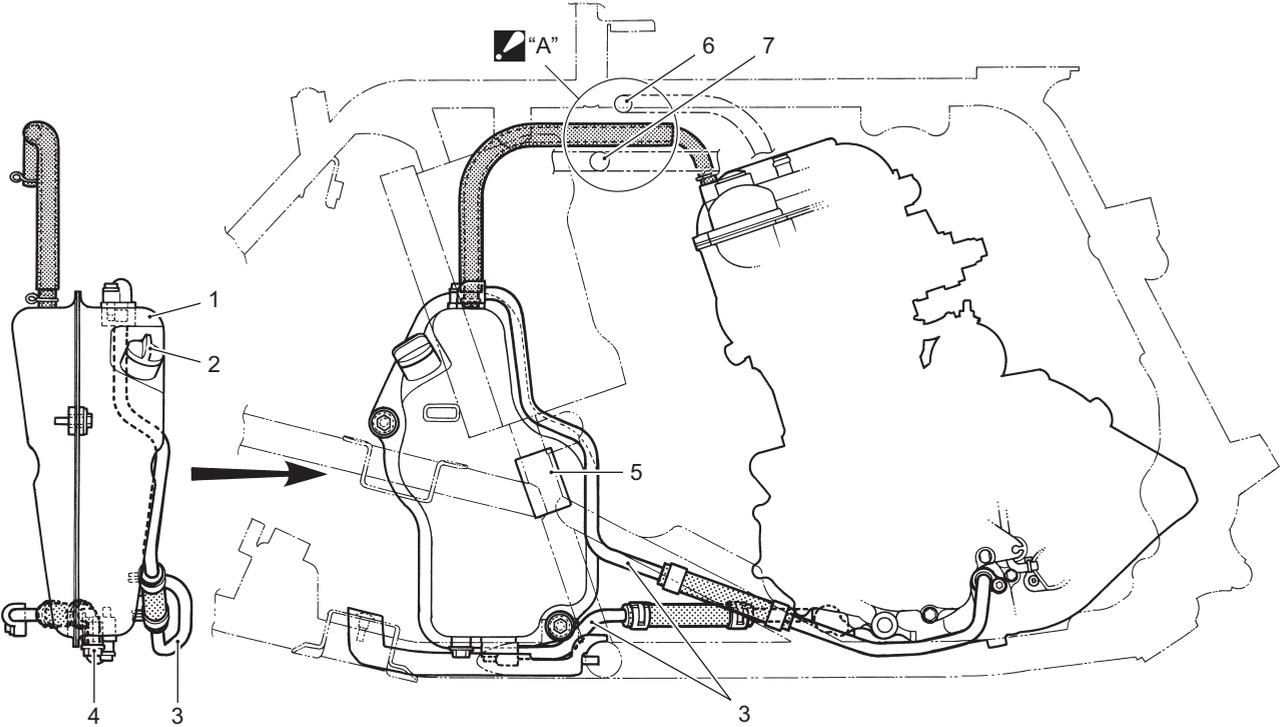
Refer to "Fuel and Oil Recommendation in Section 0A (Page 0A-3)".

B933H21500001

Schematic and Routing Diagram

Engine Oil Hose and Pipe Routing Diagram

B933H21502001



I933H1150035-03

1. Engine oil tank	5. Cushion
2. Engine oil level gauge	6. Wiring harness
3. Engine oil pipe	7. High tension code
4. Oil tank drain bolt	☑ "A": Pass the engine oil tank overflow hose between the high tension cord and wiring harness.

Diagnostic Information and Procedures

Engine Lubrication Symptom Diagnosis

B933H21504001

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.
	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

B933H21504002

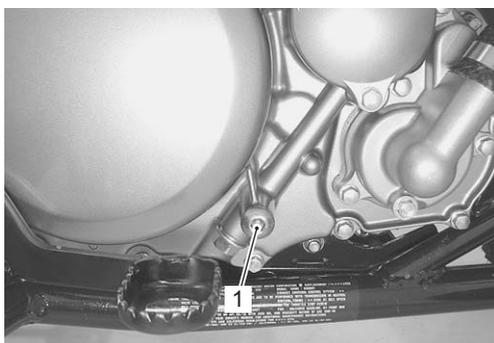
Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

NOTE

Before checking the oil pressure, check the following.

- Oil level (Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)”.)
- Oil leaks (If leak is found, repair it.)
- Oil quality (If oil is discolored or deteriorated, replace it.)

- 1) Remove the main oil gallery plug (1).

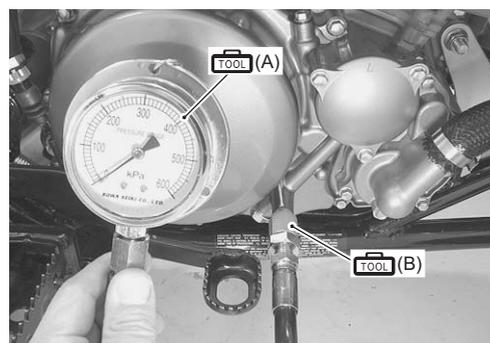


I933H1150002-01

- 2) Install the oil pressure gauge and attachment into the main oil gallery.
- 3) Connect the tachometer to the high-tension cord.

Special tool

- TOOL (A): 09915-74511 (Oil pressure gauge set)**
- TOOL (B): 09915-74533 (Oil pressure gauge attachment)**
- TOOL : 09900-26006 (Engine tachometer (solar cell type))**



I933H1150003-01

- 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

20 – 60 kPa (0.2 – 0.6 kgf/cm², 2.8 – 8.5 psi) at 3 000 r/min, Oil temp. at 60 °C (140 °F)

High oil pressure	Low oil pressure
<ul style="list-style-type: none"> • Engine oil viscosity is too high. • Clogged oil passage. • Combination of the above items. 	<ul style="list-style-type: none"> • Clogged oil filter. • Oil leakage from the oil passage. • Damaged O-ring. • Defective oil pump. • Combination of the above items.

1E-4 Engine Lubrication System:

- 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 prevent oil leakage.

Tightening torque

Main oil gallery plug (a): 18 N·m (1.8 kgf-m, 13.0 lb-ft)



I933H1150004-02

- 8) Check the engine oil level. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)”.

Repair Instructions

Engine Oil and Filter Replacement

B933H21506001

Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)”.

Engine Oil Level Inspection

B933H21506002

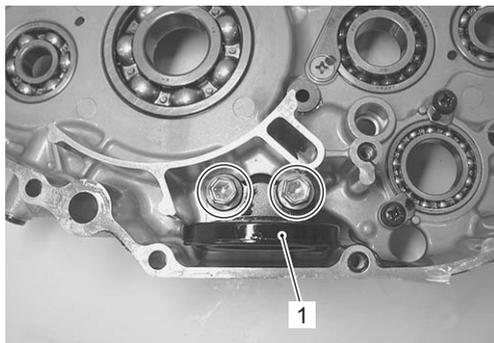
Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)”.

Oil Sump Filter Removal and Installation

B933H21506003

Removal

- 1) Remove the engine assembly from the frame. Refer to “Engine Assembly Removal in Section 1D (Page 1D-13)”.
- 2) Disassemble the engine top side. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-17)”.
- 3) Separate the left and right crankcase. Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-41)”.
- 4) Remove the oil sump filter (1).



I933H1150005-01

Installation

- 1) Align the oil passage holes when installing the oil sump filter (1).



I933H1150006-01

- 2) Assemble the engine. Refer to “Engine Bottom Side Assembly in Section 1D (Page 1D-48)” and “Engine Top Side Assembly in Section 1D (Page 1D-20)”.
- 3) Remount the engine assembly. Refer to “Engine Assembly Installation in Section 1D (Page 1D-16)”.

Oil Sump Filter Inspection and Cleaning

B933H21506004

Inspect the oil sump filter in the following procedures:

- 1) Remove the oil sump filter. Refer to “Oil Sump Filter Removal and Installation (Page 1E-4)”.
- 2) If the oil sump filter is clogged with sediment or rust, clean the oil sump filter using compressed air.

NOTE

When the filter is dirtied excessively, replace the oil sump filter with a new one.

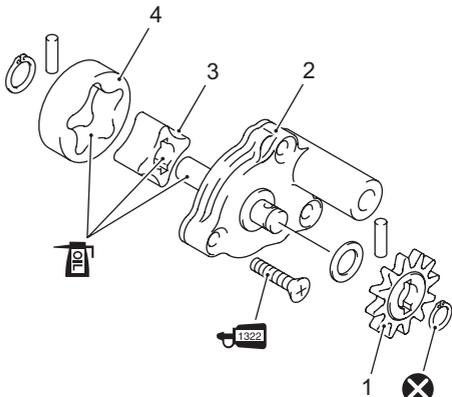


I933H1150007-01

3) Install the oil sump filter. Refer to “Oil Sump Filter Removal and Installation (Page 1E-4)”.

Oil Pump Components

B933H21506005



I933H1150008-01

1. Oil pump driven gear	: Apply engine oil.
2. Oil pump	: Apply thread lock to thread part.
3. Inner rotor	: Do not reuse.
4. Outer rotor	

Oil Pump Removal and Installation

B933H21506006

Removal

NOTE

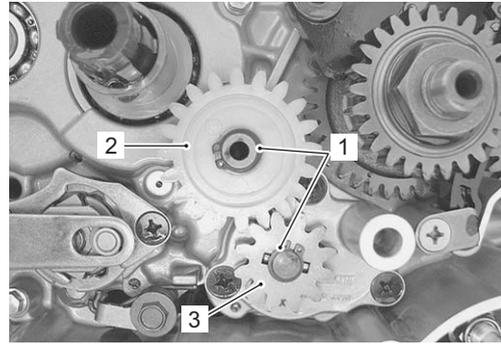
Do not drop the each parts into the crankcase.

- 1) Drain engine oil and coolant. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)” and “Cooling System Inspection in Section 0B (Page 0B-13)”.
- 2) Remove the clutch primary driven gear assembly. Refer to “Clutch Removal in Section 5C (Page 5C-7)”.
- 3) Remove the snap rings (1).

Special tool

: 09900-06107 (Snap ring pliers)

- 4) Remove the oil pump idle gear (2) and oil pump driven gear (3).

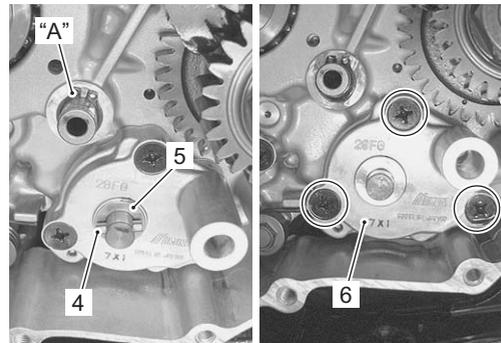


I933H1150009-02

- 5) Remove the pin (4) and washer (5).
- 6) Remove the oil pump assembly (6).

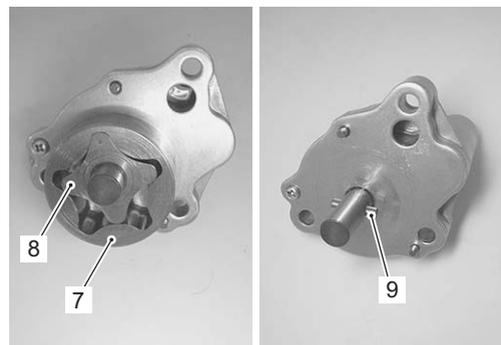
⚠ CAUTION

Do not remove the snap ring “A”, before separating the crankcase to prevent the oil pump idle gear shaft from dropping into the crankcase.



I933H1150010-01

- 7) Remove the outer rotor (7), inner rotor (8) and pin (9).



I933H1150011-02

Installation

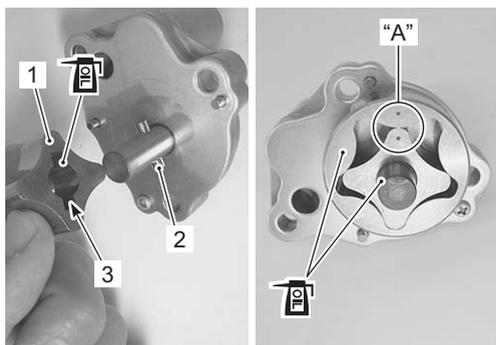
Install the oil pump in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

The removed snap rings must be replaced with new ones.

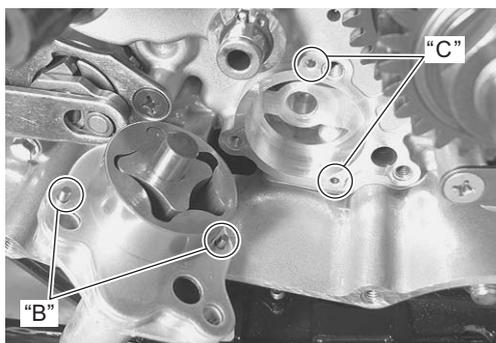
1E-6 Engine Lubrication System:

- Apply engine oil to the sliding surfaces of the oil pump inner rotor, outer rotor and shaft.
- When installing the inner rotor (1), align the pin (2) with the groove (3).
- When installing the inner rotor and outer rotor, face the punched marks "A" on the inner rotor and outer rotor to the outside.



I933H1150012-01

- When installing the oil pump assembly, align the pin "B" with the pinhole "C".



I933H1150013-01

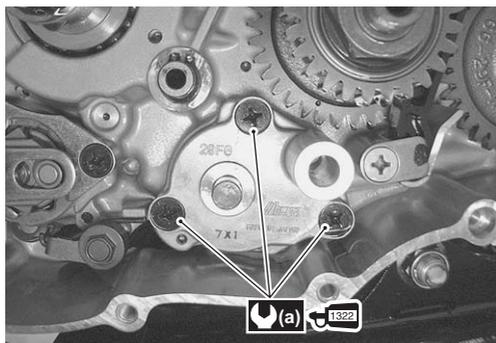
- Apply a small quantity of thread lock to the oil pump mounting screws.

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

Tighten the oil pump mounting screws to the specified torque.

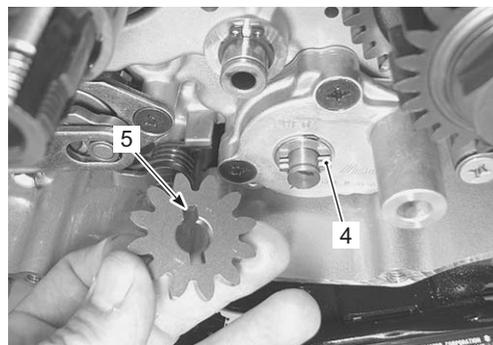
Tightening torque

Oil pump mounting screw (a): 8.5 N·m (0.85 kgf-m, 6.0 lb-ft)



I933H1150014-01

- When installing the oil pump driven gear, align the pin (4) with the groove (5).



I933H1150015-01

- Reinstall the clutch. Refer to "Clutch Installation in Section 5C (Page 5C-9)".

Oil Pump Inspection

B933H21506007

Inspect the oil pump in the following procedures:

- 1) Remove the oil pump. Refer to "Oil Pump Removal and Installation (Page 1E-5)".
- 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.

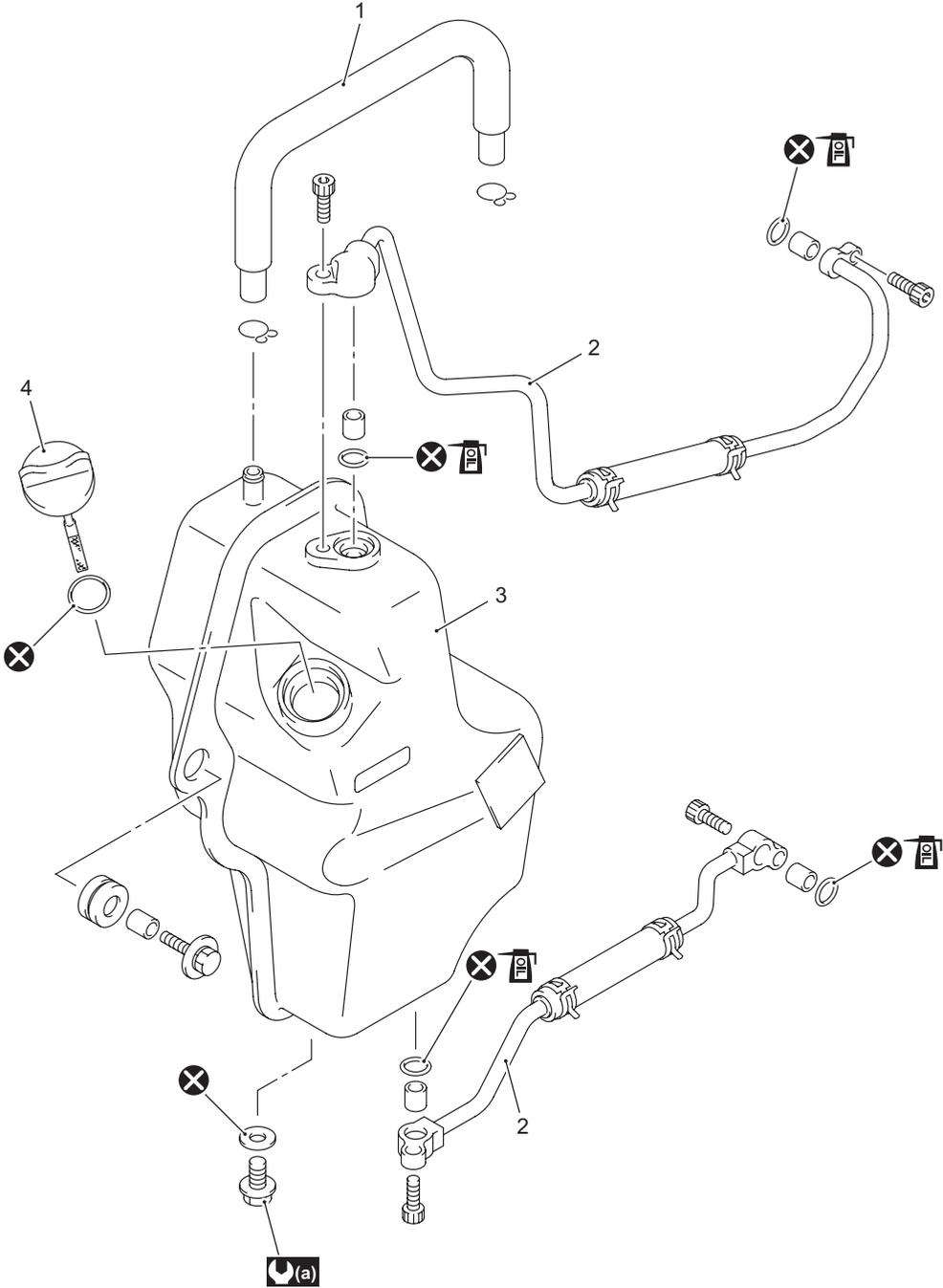


I933H1150016-01

- 3) Install the oil pump. Refer to "Oil Pump Removal and Installation (Page 1E-5)".

Engine Oil Hose and Pipe Construction

B933H21506008



1. Oil tank overflow hose	: 12 N·m (1.2 kgf·m, 8.5 lb·ft)
2. Engine oil pipe	: Apply engine oil.
3. Oil tank	: Do not reuse.
4. Engine oil level gauge	

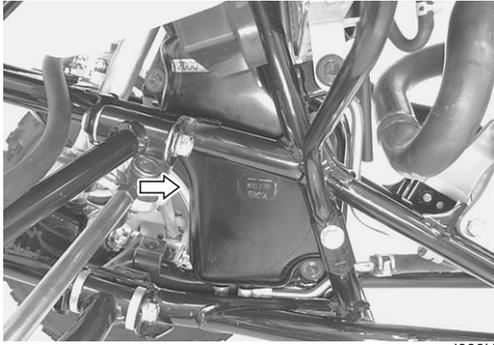
I933H1150036-03

1E-8 Engine Lubrication System:

Oil Tank Inspection

B933H21506009

Inspect the oil tank oil leaks. If any defects are found, replace the oil tank with a new one. Refer to "Oil Tank Removal and Installation (Page 1E-9)".



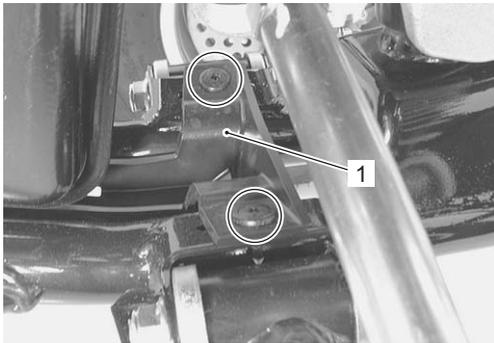
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Engine Oil Pipe Removal and Installation

B933H21506010

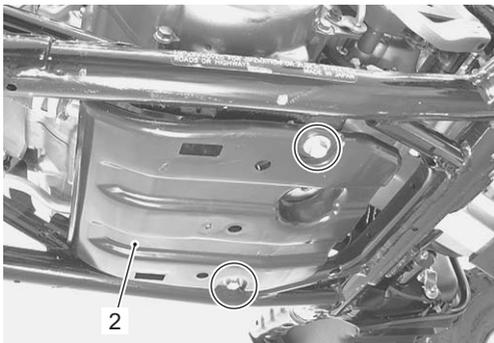
Removal

- 1) Drain engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)".
- 2) Remove the radiator cover. Refer to "Radiator Cover Removal and Installation in Section 1F (Page 1F-8)".
- 3) Remove the oil tank lower cover (1).



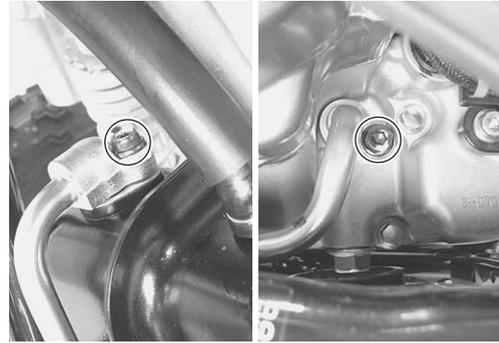
I933H1150018-01

- 4) Remove the engine under cover (2).

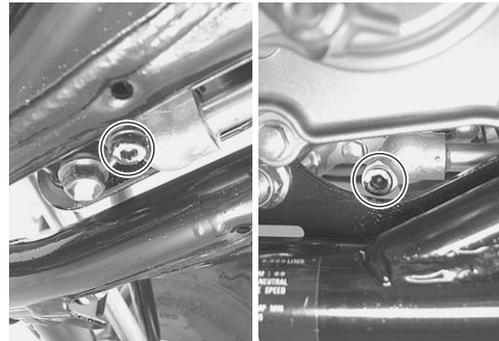


I933H1150019-01

- 5) Remove the engine oil pipes.

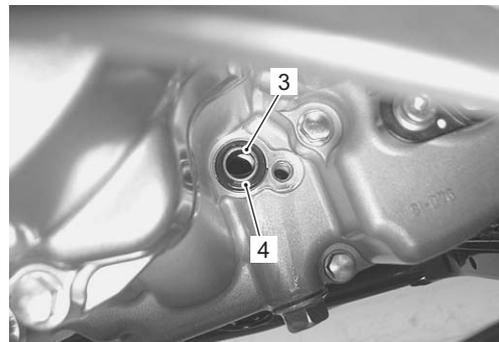


I933H1150020-01



I933H1150021-01

- 6) Remove the each dowel pins (3) and O-rings (4).



I933H1150022-01

Installation

Install the engine oil pipes in the reverse order of removal. Pay attention to the following points:
Apply engine oil to the O-rings.

⚠ CAUTION

Replace the O-rings with new ones to prevent oil leakage.



I933H1150023-01

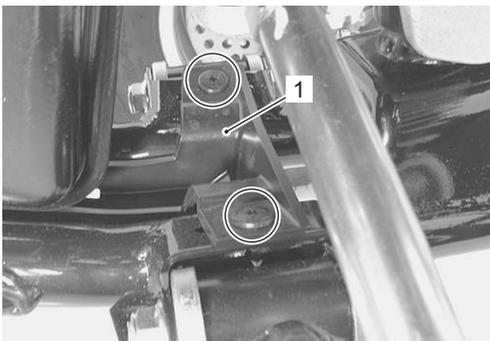
- Install the engine oil pipes as shown in the oil tank hose routing diagram. Refer to “Engine Oil Hose and Pipe Routing Diagram (Page 1E-1)”
- After installing the removed parts, pour engine oil. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)”.

Oil Tank Removal and Installation

B933H21506011

Removal

- 1) Drain engine oil and coolant. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)” and “Cooling System Inspection in Section 0B (Page 0B-13)”.
- 2) Remove the radiator cover. Refer to “Radiator Cover Removal and Installation in Section 1F (Page 1F-8)”.
- 3) Remove the radiator assembly. Refer to “Radiator Removal and Installation in Section 1F (Page 1F-5)”.
- 4) Remove the oil tank lower cover (1).

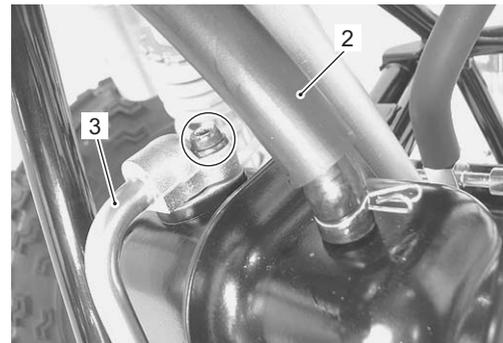


I933H1150024-01

- 5) Disconnect the overflow hose (2).
- 6) Remove the engine oil pipes (3).

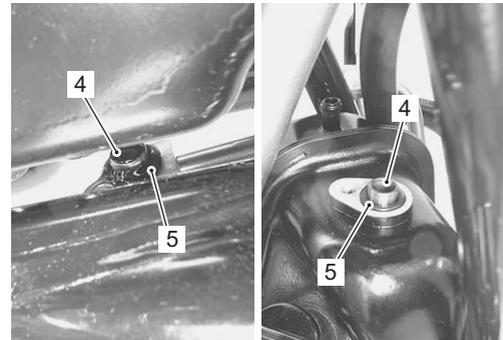


I933H1150025-01



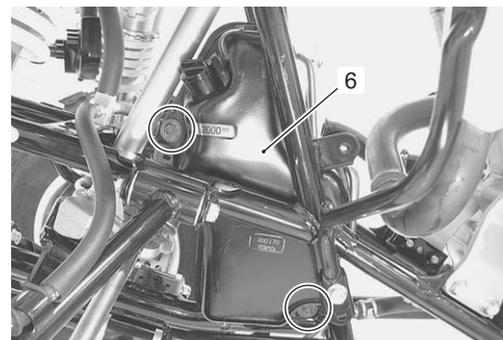
I933H1150026-05

- 7) Remove the dowel pins (4) and O-rings (5).



I933H1150027-01

- 8) Remove the oil tank (6).



I933H1150028-01

1E-10 Engine Lubrication System:

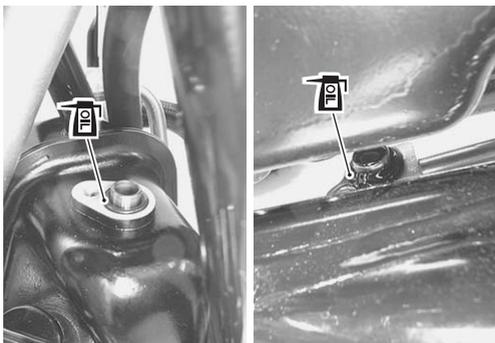
Installation

Install the oil tank in the reverse order of removal. Pay attention to the following points.

- Apply engine oil to the O-rings.

⚠ CAUTION

Use the new O-rings to prevent oil leakage.



I933H1150029-02

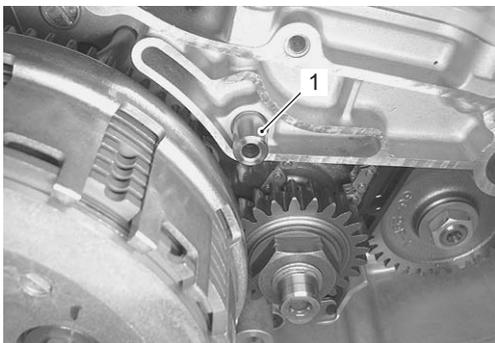
- After install the removed parts, pour engine oil and engine coolant. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)”.

Oil Pipe Removal and Installation

B933H21506012

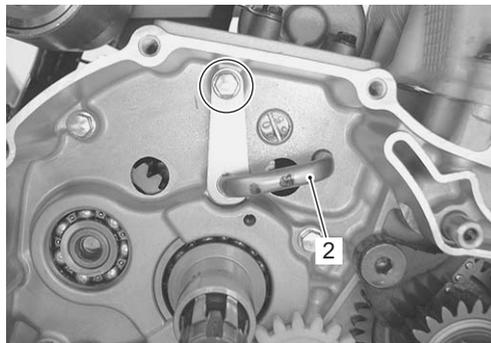
Removal

- 1) Remove the clutch cover. Refer to “Clutch Removal in Section 5C (Page 5C-7)”.
- 2) Remove the oil pipe No.1 (1).



I933H1150030-01

- 3) Remove the clutch primary driven gear assembly. Refer to “Clutch Removal in Section 5C (Page 5C-7)”.
- 4) Remove the oil pipe No.2 (2).



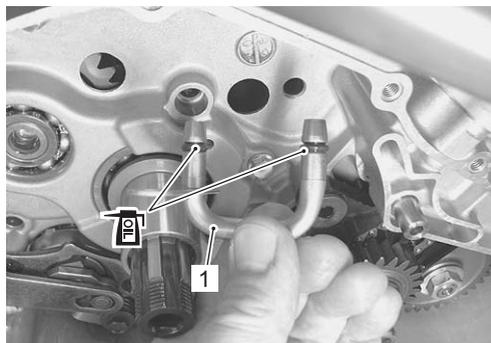
I933H1150031-01

Installation

⚠ CAUTION

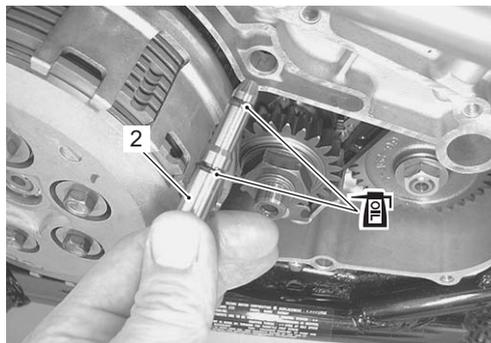
Use new O-rings to prevent oil leakage.

- 1) Apply engine oil to the O-rings and install the oil pipe No.2 (1).



I933H1150032-02

- 2) Install the clutch assembly. Refer to “Clutch Installation in Section 5C (Page 5C-9)”.
- 3) Apply engine oil to the O-rings and install the oil pipe No.1 (2).



I933H1150033-02

- 4) Install the clutch cover. Refer to “Clutch Installation in Section 5C (Page 5C-9)”.
- 5) After install the removed parts, pour engine oil and engine coolant. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)”.

Oil Pipe Inspection

B933H21506013

Refer to “Oil Pipe Removal and Installation (Page 1E-10)”.

Make sure that the oil pipes are not clogged. If it is clogged, clean the oil passage using a wire of the proper size and compressed air.



I933H1150034-01

Specifications

Service Data

B933H21507001

Oil pump

Item	Standard	Limit
Oil pressure (at 60 °C, 140 °F)	20 – 60 kPa (0.2 – 0.6 kgf/cm ² , 2.8 – 8.5 psi) at 3 000 r/min	—

Oil

Item	Specification	Note
Engine oil type	SAE 10 W-40, API SF/SG or SH/SJ with JASO MA	
Engine oil capacity	Change	2 000 ml (2.1/1.8 US/lmp qt)
	Filter change	2 100 ml (2.2/1.8 US/lmp qt)
	Overhaul	2 200 ml (2.3/1.9 US/lmp qt)

Tightening Torque Specifications

B933H21507002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Main oil gallery plug	18	1.8	13.0	☞ (Page 1E-4)
Oil pump mounting screw	8.5	0.85	6.0	☞ (Page 1E-6)

NOTE

The specified tightening torque is also described in the following.
“Engine Oil Hose and Pipe Construction (Page 1E-7)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H21508001

Material	SUZUKI recommended product or Specification	Note
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110 ☞ (Page 1E-6)

NOTE

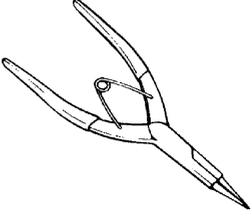
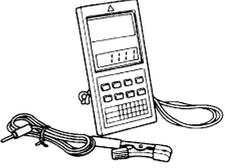
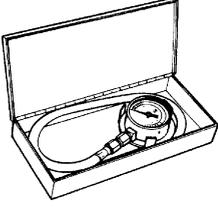
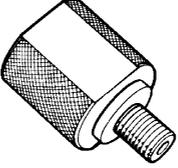
Required service material is also described in the following.

“Oil Pump Components (Page 1E-5)”

“Engine Oil Hose and Pipe Construction (Page 1E-7)”

Special Tool

B933H21508002

09900-06107 Snap ring pliers ☞ (Page 1E-5)		09900-26006 Engine tachometer (solar cell type) ☞ (Page 1E-3)	
09915-74511 Oil pressure gauge set ☞ (Page 1E-3)		09915-74533 Oil pressure gauge attachment ☞ (Page 1E-3)	

Engine Cooling System

Precautions

Precautions for Engine Cooling System

B933H21600001

⚠ 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

B933H21600002

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

General Description

Engine Coolant Description

B933H21601001

⚠ CAUTION

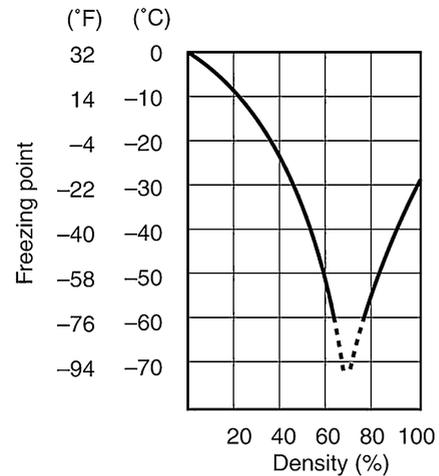
- Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix an alcohol base anti-freeze and different brands of anti-freeze.
- Do not put in more than 60% anti-freeze or less than 50%. (Refer to Fig. 1 and 2.)

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 $-31\text{ }^{\circ}\text{C}$ ($-24\text{ }^{\circ}\text{F}$). If the vehicle is to be exposed to temperatures below $-31\text{ }^{\circ}\text{C}$ ($-24\text{ }^{\circ}\text{F}$), this mixing ratio should be increased up to 55% or 60% according to the figure.

Anti-freeze Proportioning Chart

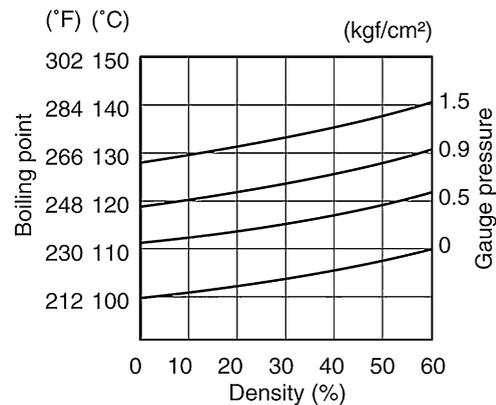
Anti-freeze density	Freezing point
50%	$-31\text{ }^{\circ}\text{C}$ ($-24\text{ }^{\circ}\text{F}$)
55%	$-40\text{ }^{\circ}\text{C}$ ($-40\text{ }^{\circ}\text{F}$)
60%	$-55\text{ }^{\circ}\text{C}$ ($-67\text{ }^{\circ}\text{F}$)

Fig.1: Engine coolant density-freezing point curve



I310G1160001-01

Fig.2: Engine coolant density-boiling point curve

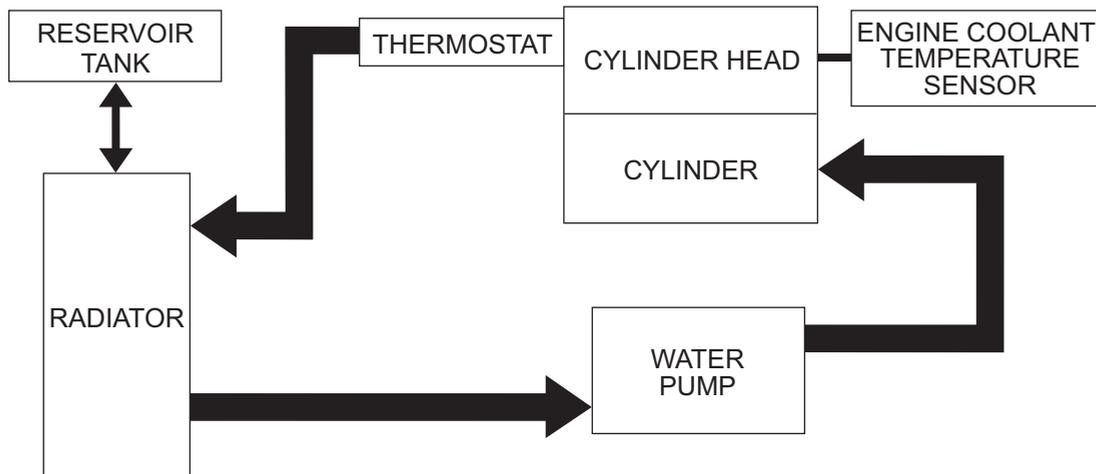


I310G1160002-01

Schematic and Routing Diagram

Cooling Circuit Diagram

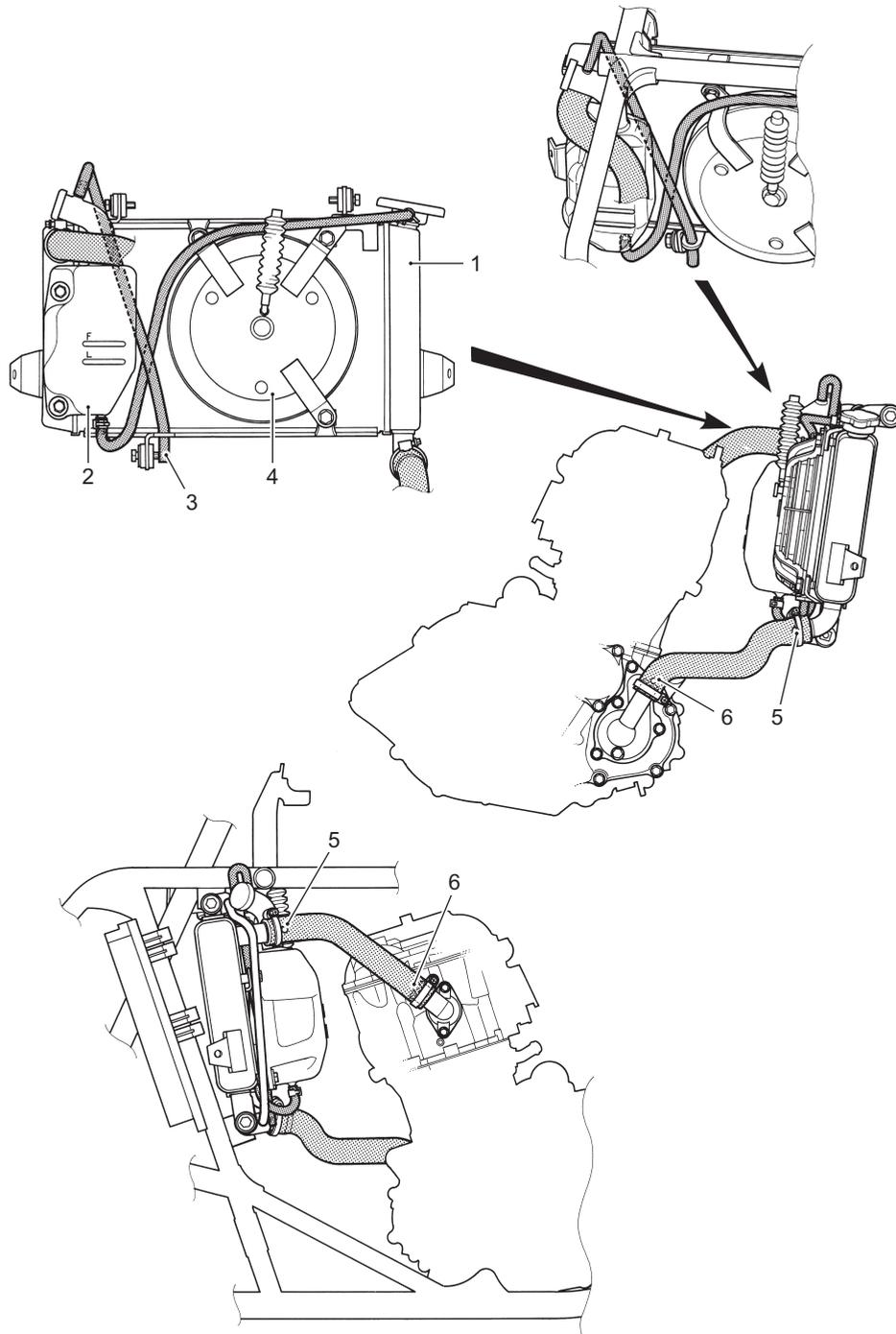
B933H21602001



I933H1160001-01

Water Hose Routing Diagram

B933H21602002



1. Radiator	4. Cooling fan
2. Reservoir	5. Yellow mark
3. Reservoir overflow hose	6. White mark

I933H1160054-10

Diagnostic Information and Procedures

Engine Cooling Symptom Diagnosis

B933H21604001

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

B933H21606001

⚠ 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:

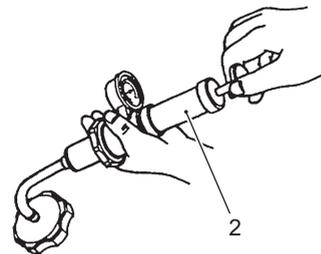
- 1) Remove the right side cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the radiator cap (1) and connect the radiator tester (2) to the filler.
- 3) Pressurize the cooling system with 120 kPa (1.2 kgf/cm, 17 psi) of pressure, and then check if it holds 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.



I933H1160002-02



I933H1160003-02

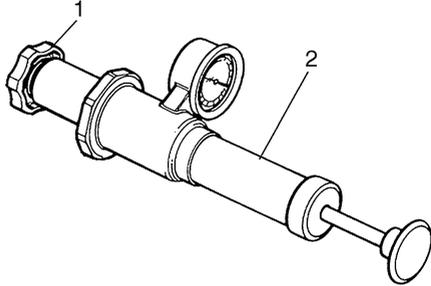
- 4) After finishing the cooling circuit inspection, reinstall the removed parts.

Radiator Cap Inspection

B933H21606002

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

108 – 137 kPa (1.08 – 1.37 kgf/cm², 15.4 – 19.5 psi)

- 4) After finishing the radiator cap inspection, reinstall the removed parts.

Radiator Inspection and Cleaning

B933H21606003

Radiator hose

Refer to "Cooling System Inspection in Section 0B (Page 0B-13)".

Radiator

- 1) Remove the side covers, left and right. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) 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.



I933H1160004-02

- 3) Reinstall the side covers, left and right.

Radiator cleaning

- 1) Remove the side covers, left and right. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) 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.



I933H1160005-02

- 3) Reinstall the side covers, left and right.

Radiator Removal and Installation

B933H21606004

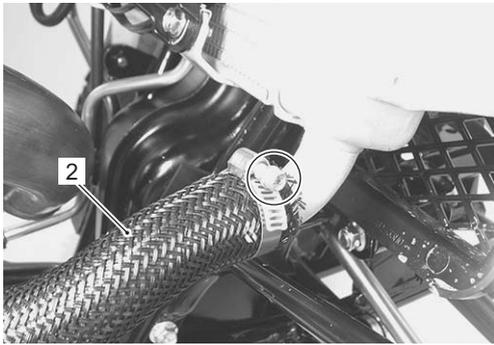
Removal

- 1) Drain engine coolant. Refer to "Cooling System Inspection in Section 0B (Page 0B-13)".
- 2) Remove the side covers, left and right. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 3) Disconnect the inlet hose (1) and outlet hose (2).



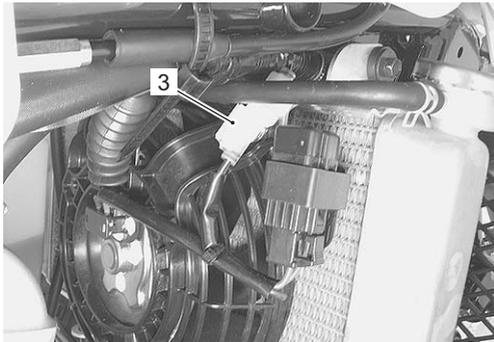
I933H1160006-02

1F-6 Engine Cooling System:



I933H1160007-03

- 4) Disconnect the cooling fan motor lead wire coupler (3).

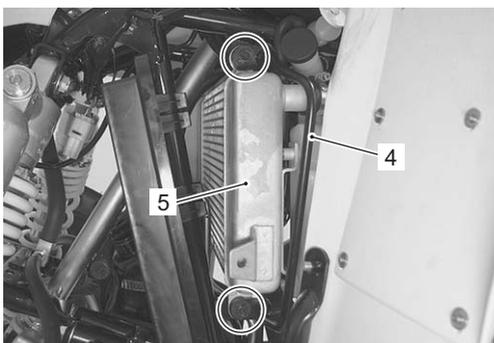


I933H1160008-02

- 5) Remove the radiator guard (4) and radiator assembly (5) by removing the bolts.

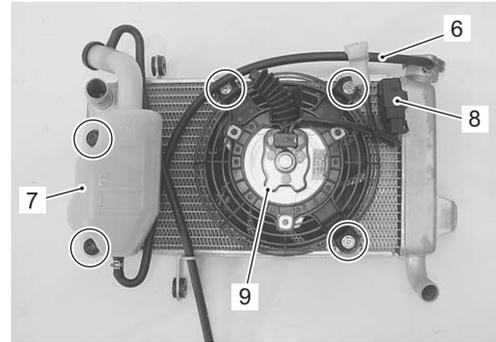


I933H1160009-02



I933H1160010-02

- 6) Disconnect the overflow hose (6) and reservoir tank (7).
- 7) Remove the cooling fan motor fuse box (8) and cooling fan assembly (9).



I933H1160011-02

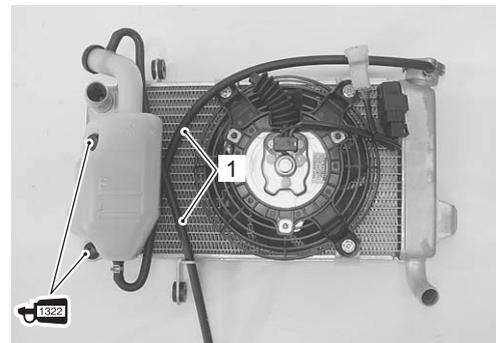
Installation

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

- Apply thread lock to the reservoir tank mounting bolts and tighten them.

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

- Rout the reservoir tank hoses (1) properly. Refer to "Water Hose Routing Diagram (Page 1F-3)".



I933H1160055-03

- Connect the radiator hoses as shown in the water hose routing diagram. Refer to "Water Hose Routing Diagram (Page 1F-3)".
- Pour engine coolant and bleed air from the cooling circuit. Refer to "Cooling System Inspection in Section 0B (Page 0B-13)".

Cooling Fan Motor Removal and Installation

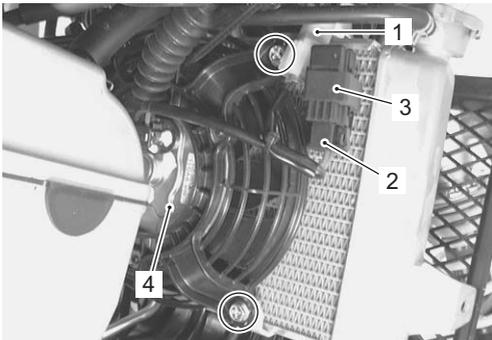
B933H21606005

Removal

- 1) Remove the side covers, left and right. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Disconnect the cooling fan motor lead wire coupler (1) and cooling fan motor fuse box coupler (2).
- 3) Remove the cooling fan motor fuse box (3) and cooling fan motor assembly (4).

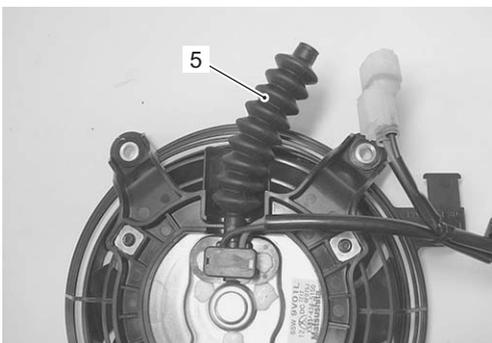


I933H1160012-02



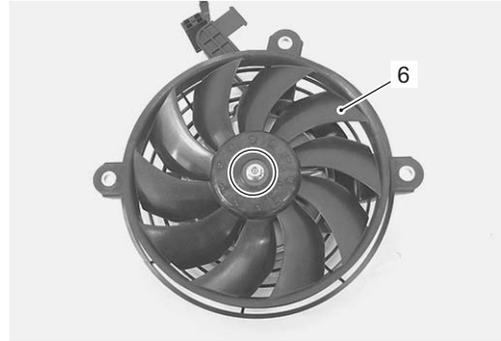
I933H1160013-02

- 4) Remove the boot (5).



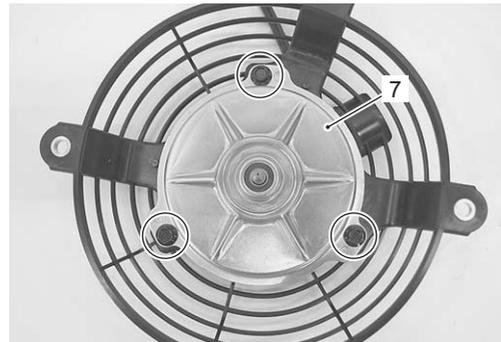
I933H1160014-02

- 5) Remove the cooling fan (6).



I933H1160015-02

- 6) Remove the cooling fan motor (7).



I933H1160016-01

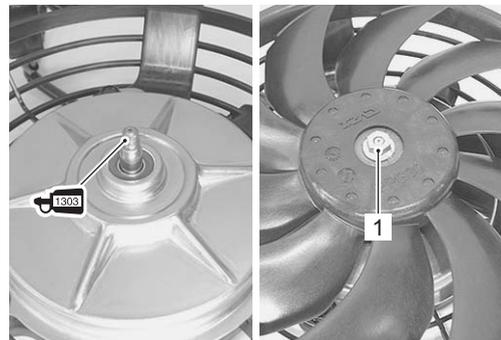
Installation

Install the cooling fan motor in the reverse order of removal. Pay attention to the following points:

- Apply thread lock to the cooling fan motor shaft.

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

- Tighten the cooling fan nut (1).



I933H1160017-01

1F-8 Engine Cooling System:

Water Hose Inspection

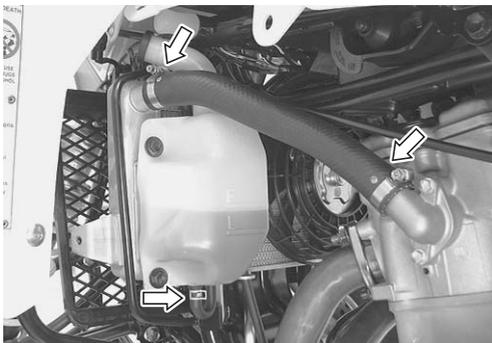
B933H21606006

Inspect the water hose in the following procedures:

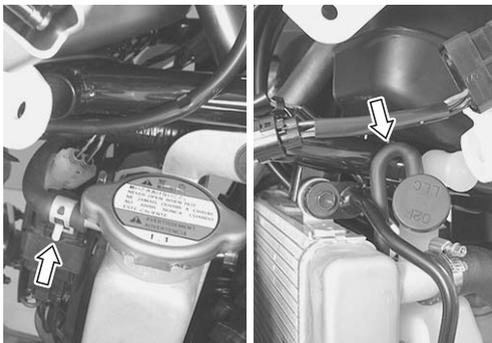
- 1) Remove the side covers, left and right. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Check the water hoses for crack, damage or engine coolant leakage. If any defect is found, replace the radiator hose with a new one.
- 3) Any leakage from the connecting section should be corrected by proper tightening. Refer to “Water Hose Routing Diagram (Page 1F-3)”.



I933H1160018-02



I933H1160019-02



I933H1160020-02

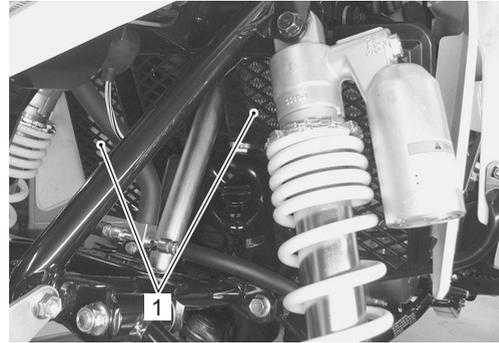
- 4) After finishing the water hose inspection, reinstall the removed parts.

Radiator Cover Removal and Installation

B933H21606007

Removal

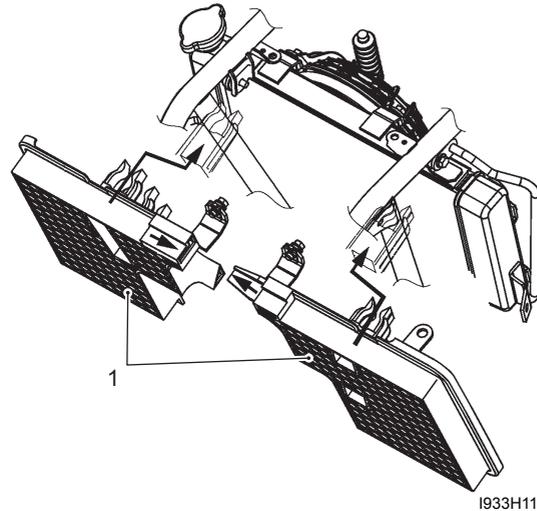
Remove the radiator covers, left and right (1).



I933H1160021-03

Installation

Install the radiator covers (1) as shown in the figure.



I933H1160053-01

Water Hose Removal and Installation

B933H21606008

Removal

- 1) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-13)”.
- 2) Remove the side 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

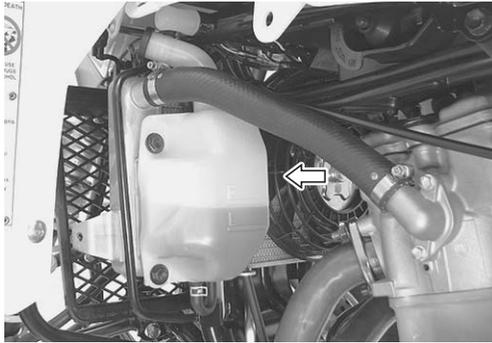
- 1) Install the water hose as shown in the water hose routing diagram. Refer to “Water Hose Routing Diagram (Page 1F-3)”.
- 2) Pour engine coolant and bleed air from the cooling circuit. Refer to “Cooling System Inspection in Section 0B (Page 0B-13)”.
- 3) Reinstall the side covers, left and right.

Radiator Reservoir Tank Inspection

B933H21606009

Inspect the radiator reservoir tank in the following procedures:

- 1) Remove the left side cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Inspect the radiator reservoir tank coolant leaks. If any defects are found, replace the radiator reservoir tank with a new one.



I933H1160022-02

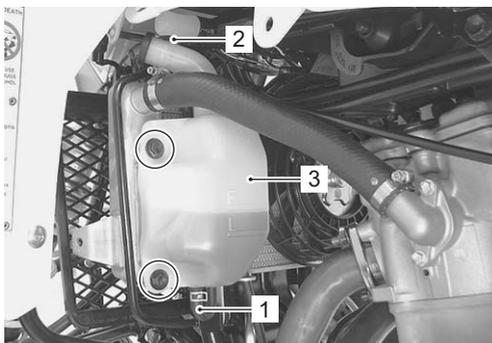
- 3) Install the side cover.

Radiator Reservoir Tank Removal and Installation

B933H21606010

Removal

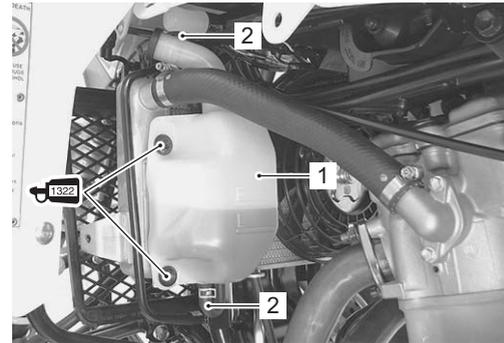
- 1) Remove the left side cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Disconnect the inlet hose (1) and drain the engine coolant.
- 3) Disconnect the outlet hose (2) and remove the reservoir tank (3).



I933H1160023-03

Installation

- 1) Install the reservoir tank (1).
- 2) Apply thread lock to the reservoir tank mounting bolts and tighten them.
1322 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)
- 3) Connect the hoses (2) as shown in the water hose routing diagram. Refer to “Water Hose Routing Diagram (Page 1F-3)”.



I933H1160056-04

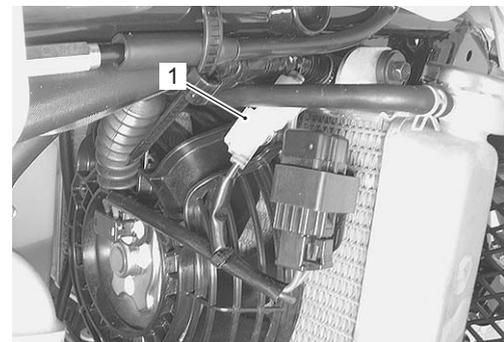
- 4) Install the left side cover.

Cooling Fan Inspection

B933H21606011

Inspect the cooling fan in the following procedures:

- 1) Remove the right side cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Disconnect the cooling fan motor coupler (1).



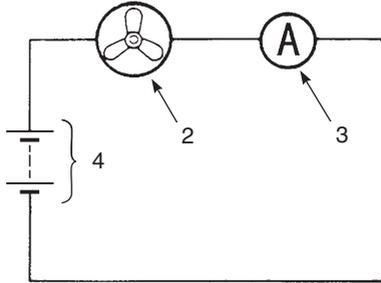
I933H1160024-02

- 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 assembly with a new one. Refer to “Cooling Fan Motor Removal and Installation (Page 1F-7)”.

1F-10 Engine Cooling System:

NOTE

- When making this test, it is not necessary to remove the cooling fan.
- Make sure that the battery has a capacity enough to supply the motor with 12 V. With the motor running at full speed, the ammeter should indicate not higher than 5 A.



I718H1160048-01

2. Fan motor	3. Ammeter	4. Battery
--------------	------------	------------

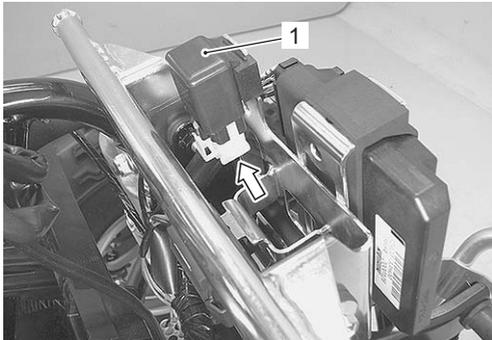
- 4) Connect the cooling fan motor coupler.
- 5) Install the right side cover.

Cooling Fan Relay Inspection

B933H21606012

Inspect the fan relay in the following procedures:

- 1) Remove the front fender. 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).



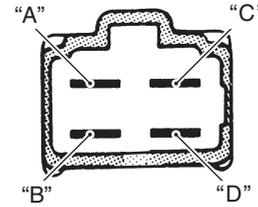
I933H1160025-02

- 3) First check the insulation between "A" and "B" terminals with tester. Then apply 12 volts to "C" and "D" terminals, (+) to "C" and (-) to "D", and check the continuity between "A" and "B". If there is no continuity, replace it with a new one.

Special tool

 : 09900-25008 (Multi-circuit tester set)

Tester knob indication set
Continuity test (•))



I718H1160006-03

- 4) Reinstall the removed parts.

ECT Sensor Removal and Installation

B933H21606013

Refer to "ECT Sensor Removal and Installation in Section 1C (Page 1C-5)".

ECT Sensor Inspection

B933H21606014

Refer to "ECT Sensor Inspection in Section 1C (Page 1C-6)".

Engine Coolant Temperature Indicator Inspection

B933H21606015

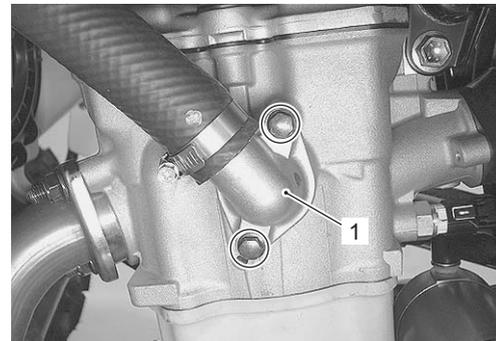
Refer to "Indicator Light Inspection in Section 9C (Page 9C-2)".

Thermostat Removal and Installation

B933H21606016

Removal

- 1) Drain a small amount of engine coolant. Refer to "Cooling System Inspection in Section 0B (Page 0B-13)".
- 2) Place a rag under the thermostat case (1).
- 3) Remove the thermostat case (1).



I933H1160026-01

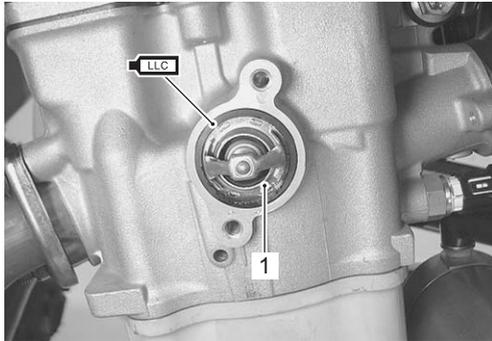
- 4) Remove the thermostat (2).



I933H1160027-01

Installation

- 1) Apply engine coolant to the rubber seal on the thermostat (1).
- 2) Install the thermostat (1).



I933H1160028-01

- 3) Install the thermostat case.
- 4) Pour engine coolant and bleed air from the cooling circuit. Refer to "Cooling System Inspection in Section 0B (Page 0B-13)".

Thermostat Inspection

B933H21606017

Inspect the thermostat in the following procedures:

- 1) Remove the thermostat. Refer to "Thermostat Removal and Installation (Page 1F-10)".
- 2) Inspect the thermostat pellet for signs of cracking.



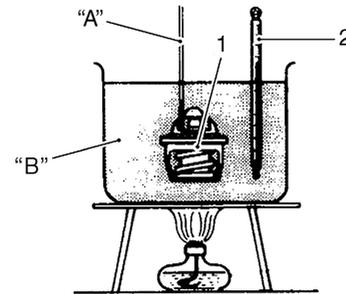
I933H1160029-01

- 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
-------------	------------

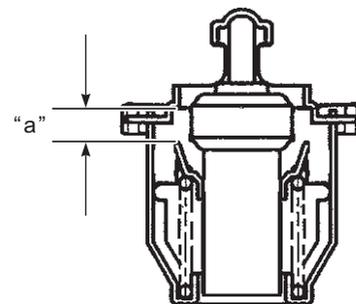
- 6) Read the thermometer just when opening the thermostat. If this reading, which is the temperature level at which the thermostat valve begins to open, is out of the standard value, replace the thermostat with a new one.

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 4.5 mm (0.18 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: 4.5 mm (0.18 in) and over at 90 °C (194 °F)



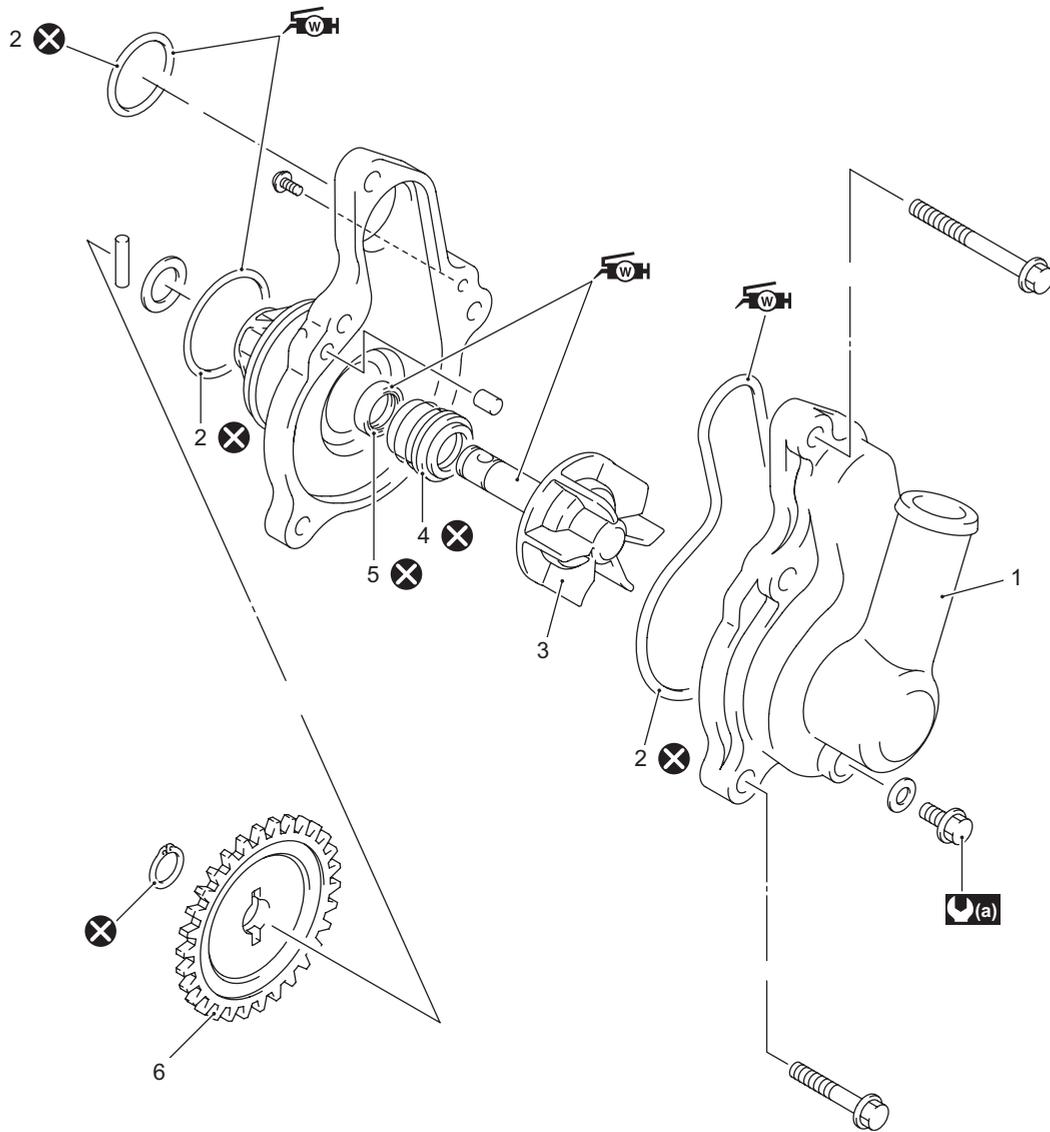
I933H1160030-05

- 9) Install the thermostat. Refer to "Thermostat Removal and Installation (Page 1F-10)".

1F-12 Engine Cooling System:

Water Pump Components

B933H21606018



I933H1160031-02

1. Water pump cover	4. Mechanical seal	(a) : 6 N·m (0.6 kgf·m, 4.5 lb-ft)	X : Do not reuse.
2. O-ring	5. Oil seal	WH : Apply water resistance grease.	
3. Impeller	6. Water pump driven gear	LLC : Apply engine coolant.	

Water Pump Removal and Installation

B933H21606019

Removal

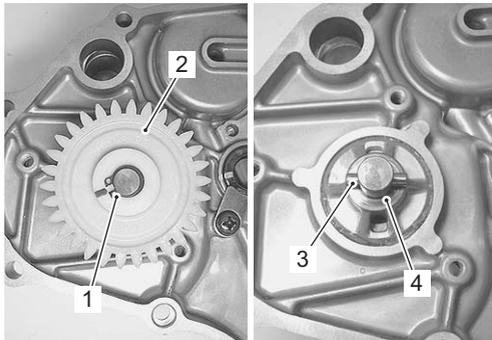
NOTE

Before draining engine oil and engine coolant, inspect engine oil and coolant leakage between the water pump and crankcase. If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the mechanical seal and seal washer. Refer to “Water Pump Related Parts Inspection (Page 1F-16)”.

- 1) Drain engine oil and coolant. Refer to “Engine Oil and Filter Replacement in Section 0B (Page 0B-11)” and “Cooling System Inspection in Section 0B (Page 0B-13)”.
- 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).

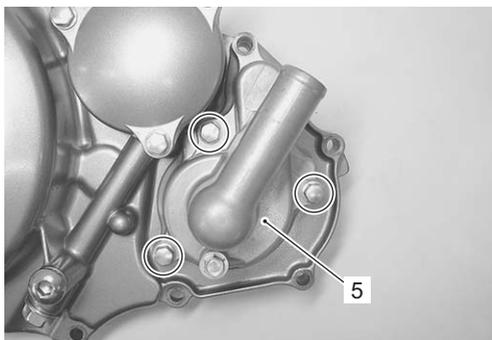
Special tool

 : 09900-06107 (Snap ring pliers)



I933H1160032-03

- 4) Remove the water pump assembly (5).



I933H1160033-01

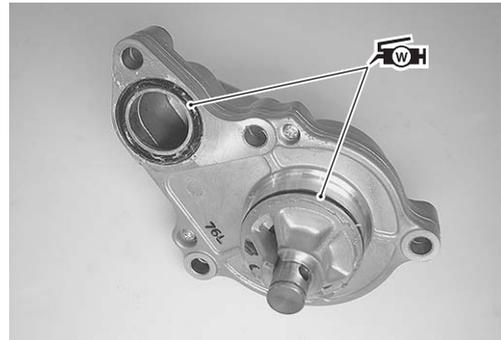
Installation

- 1) Apply grease to the O-rings.

⚠ CAUTION

Replace the O-rings with new ones.

 : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1160034-03

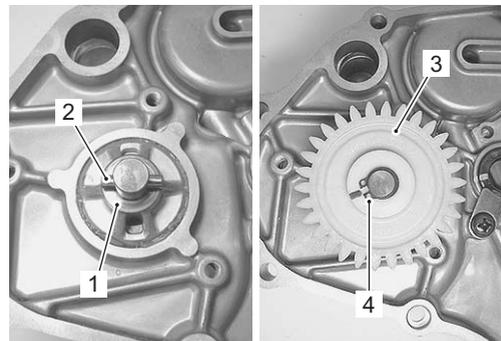
- 2) Install the water pump assembly to the clutch cover.
- 3) Install the washer (1), pin (2), water pump driven gear (3) and snap ring (4).

⚠ CAUTION

The removed snap ring must be replaced with a new one.

Special tool

 : 09900-06107 (Snap ring pliers)



I933H1160035-01

- 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-11)” and “Cooling System Inspection in Section 0B (Page 0B-13)”.

1F-14 Engine Cooling System:

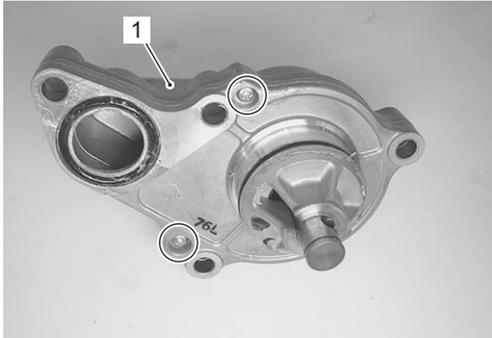
Water Pump Disassembly and Assembly

B933H21606020

Refer to "Water Pump Removal and Installation (Page 1F-13)".

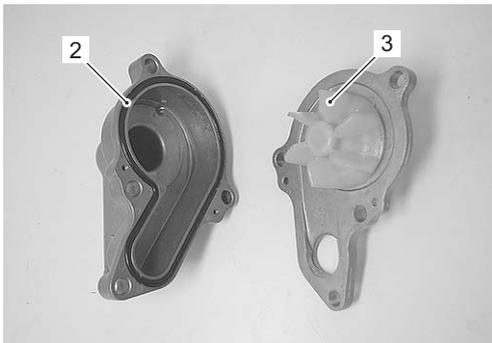
Disassembly

- 1) Remove the water pump cover (1).



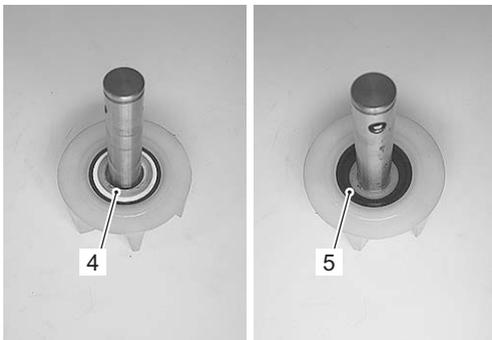
I933H1160036-01

- 2) Remove the O-ring (2) and impeller (3).



I933H1160037-01

- 3) Remove the mechanical seal ring (4) and rubber seal (5) from the impeller.



I933H1160038-01

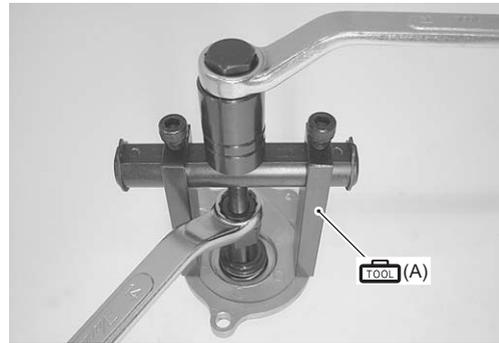
- 4) Remove the mechanical seal with the special tool.

NOTE

If there is no abnormal condition, the mechanical seal removal is not necessary.

Special tool

 (A): 09921-20240 (Bearing remover set)

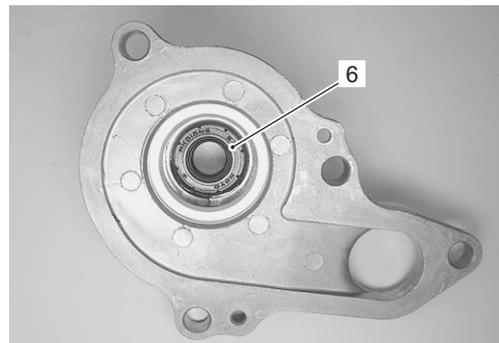


I933H1160039-01

- 5) Remove the oil seal (6).

NOTE

If there is no abnormal condition, the oil seal removal is not necessary.



I933H1160040-01

Assembly

- 1) 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

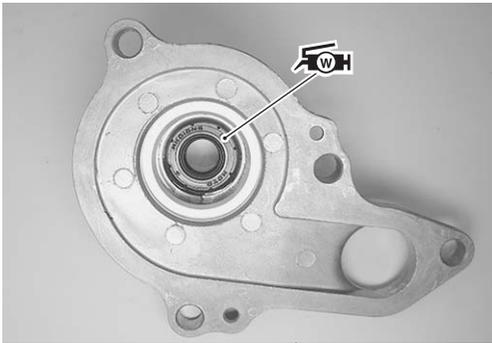
 (A): 09913-70210 (Bearing installer set)



I933H1160041-01

- 2) Apply a small quantity of the grease to the oil seal lip.

 **Grease 99000-25160 (Water resistance grease or equivalent)**



I933H1160042-02

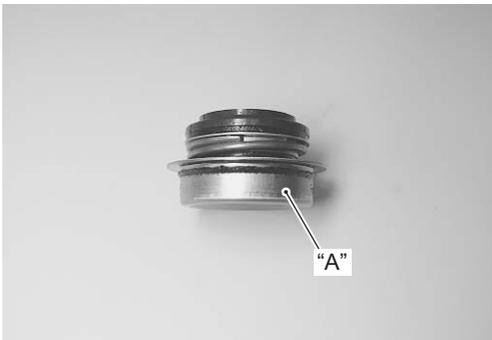
- 3) Install a new mechanical seal using a suitable size socket wrench.

CAUTION

Replace the mechanical seal with a new one.

NOTE

On the new mechanical seal, the sealer "A" has been applied.



I933H1160043-01

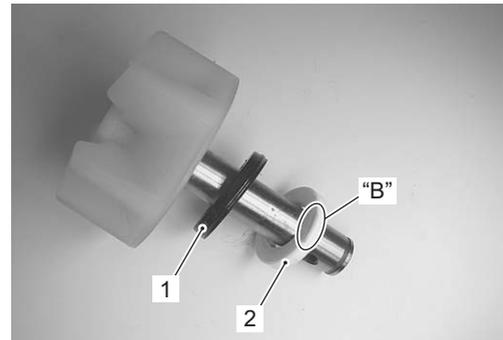


I933H1160044-01

- 4) Install the rubber seal (1) into the impeller.
- 5) 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.

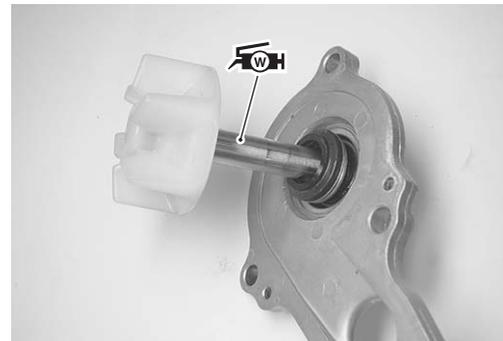


I933H1160045-01

- 6) Apply grease to the impeller shaft.

 **Grease 99000-25160 (Water resistance grease or equivalent)**

- 7) Install the impeller shaft to the mechanical sealing.

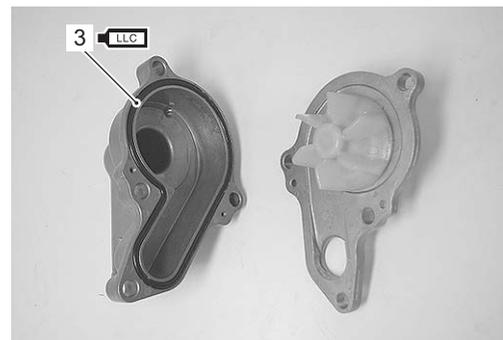


I933H1160046-03

- 8) Install a new O-ring (3) and apply engine coolant to it.

CAUTION

Use a new O-ring to prevent engine coolant leakage.



I933H1160047-01

1F-16 Engine Cooling System:

- 9) Fit the water pump cover and tighten the water pump cover screws.



I933H1160048-01

Water Pump Related Parts Inspection

B933H21606021

Refer to "Water Pump Disassembly and Assembly (Page 1F-14)".

Mechanical seal

Visually inspect the mechanical seal for damage, with particular attention given to the sealing face. Replace the mechanical seal that shows indications of leakage.

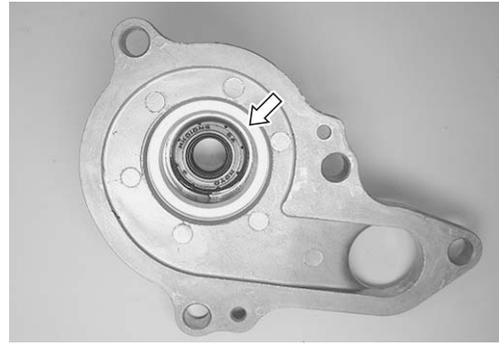


I933H1160049-01

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.



I933H1160050-01

Impeller

Visually inspect the impeller and its shaft for damage. Replace the impeller if necessary.



I933H1160051-01

Impeller shaft journal

Visually inspect the journal for damage or scratch. Replace the water pump body if necessary.



I933H1160052-01

Specifications

Service Data

B933H21607001

Thermostat + Radiator + Fan + Coolant

Item	Standard		Note
Thermostat valve opening temperature	Approx. 76.5 °C (170 °F)		—
Thermostat valve lift	4.5 mm (0.18 in) and over at 90 °C (194 °F)		—
ECT sensor resistance	20 °C (68 °F)	Approx. 2.57 kΩ	—
	50 °C (122 °F)	Approx. 0.77 kΩ	—
	80 °C (176 °F)	Approx. 0.27 kΩ	—
	110 °C (230 °F)	Approx. 0.11 kΩ	—
Radiator cap valve opening pressure	108 – 137 kPa (1.08 – 1.37 kgf/cm ² , 15.4 – 19.5 psi)		—
Cooling fan operating temperature	OFF → ON	Approx. 98 °C (208 °F)	—
	ON → OFF	Approx. 93 °C (199 °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	250 ml (0.3/0.2 US/Imp qt)	—
	Engine side	900 ml (1.0/0.8 US/Imp qt)	—

Tightening Torque Specifications

B933H21607002

NOTE

The specified tightening torque is also described in the following.
 “Water Pump Components (Page 1F-12)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H21608001

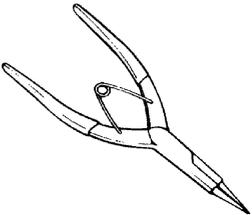
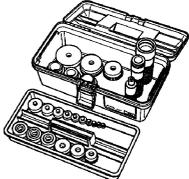
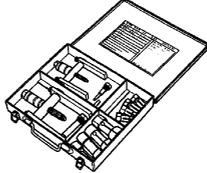
Material	SUZUKI recommended product or Specification		Note
Grease	Water resistance grease or equivalent	P/No.: 99000-25160	☞ (Page 1F-13) / ☞ (Page 1F-15) / ☞ (Page 1F-15)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000-32030	☞ (Page 1F-7)
	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞ (Page 1F-6) / ☞ (Page 1F-9)

NOTE

Required service material is also described in the following.
 “Water Pump Components (Page 1F-12)”

Special Tool

B933H21608002

09900-06107 Snap ring pliers ☞ (Page 1F-13) / ☞ (Page 1F-13)		09900-25008 Multi-circuit tester set ☞ (Page 1F-10)	
09913-70210 Bearing installer set ☞ (Page 1F-14)		09921-20240 Bearing remover set ☞ (Page 1F-14)	

Fuel System

Precautions

Precautions for Fuel System

B933H21700001

⚠ 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.
-

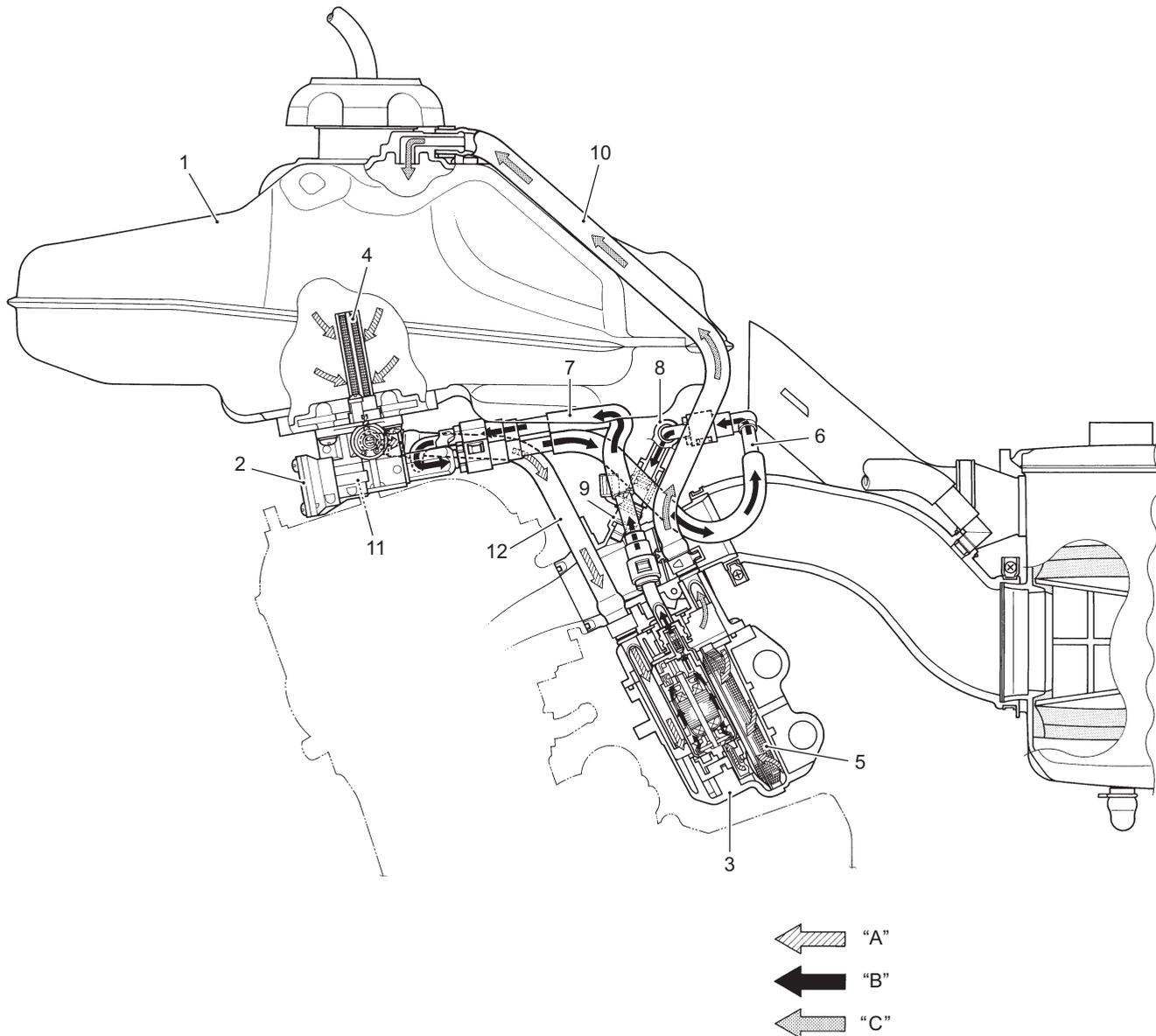
General Description

Fuel System Description

B933H21701001

Fuel system

The fuel delivery system consists of the fuel tank (1), fuel valve (2), fuel pump (3), fuel filter (4), fuel feed hoses (6) and (7), fuel delivery pipe (8), fuel injector (9), fuel pressure regulator (11). The fuel is pumped up by the fuel pump and pressurized fuel flows into the injector installed in the fuel delivery pipe. Fuel pressure is regulated by the fuel pressure regulator in the fuel valve. As the fuel pressure applied to the fuel injector (the fuel pressure in the fuel delivery pipe) is always kept at absolute fuel pressure of approx. 294 kPa (2.9 kgf/cm², 41 psi), the fuel is injected into the throttle body in conic dispersion when the injector opens according to the injection signal from the ECM. The fuel relieved by the fuel pressure regulator flows back to the fuel tank.



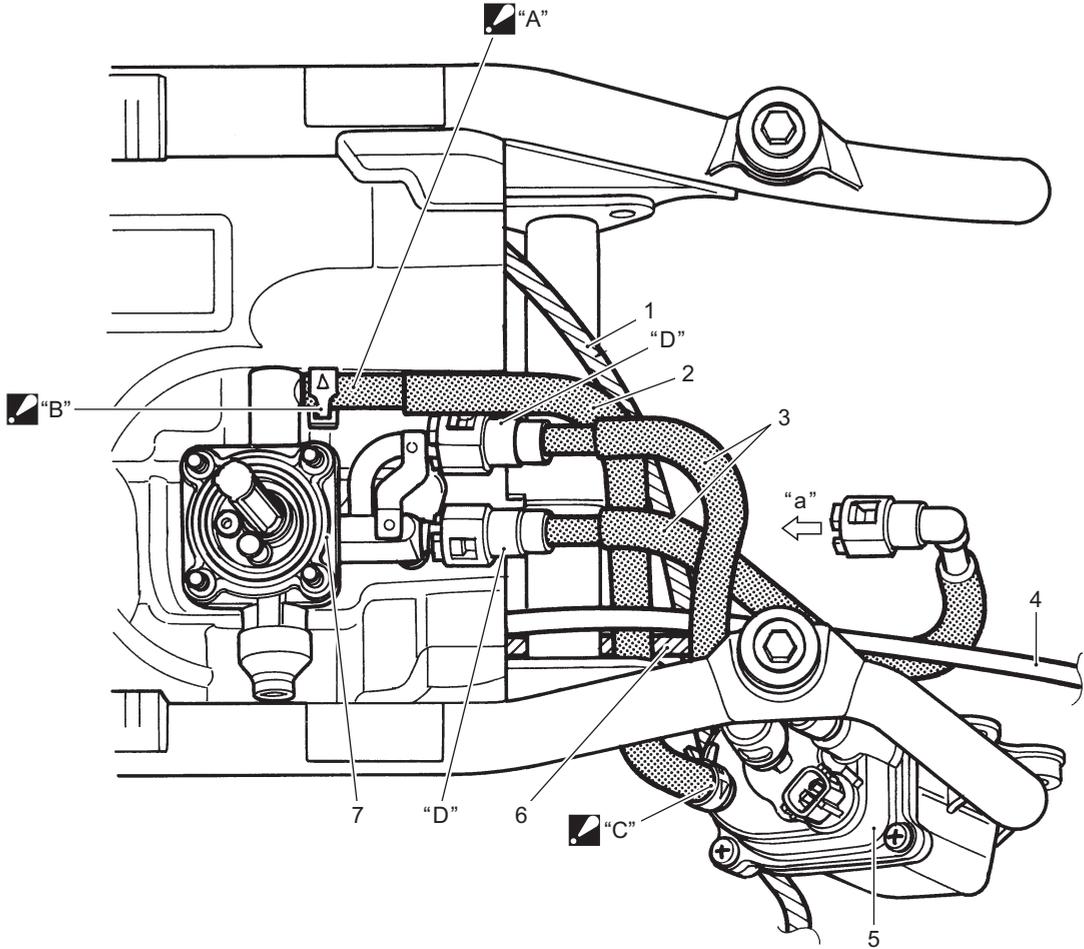
I933H1170039-02

1. Fuel tank	5. Fuel filter (For fuel pump)	9. Fuel injector	"A": Before-pressurized fuel
2. Fuel valve	6. Fuel feed hose (For fuel valve)	10. Fuel vapor return hose	"B": Pressurized fuel
3. Fuel pump	7. Fuel feed hose (For fuel pump)	11. Fuel pressure regulator	"C": Fuel vapor
4. Fuel filter (For fuel valve)	8. Fuel delivery pipe	12. Fuel hose	

Schematic and Routing Diagram

Fuel Hose Routing Diagram

B933H21702001



I933H1170037-03

1. Reverse gear cable	5. Fuel pump	▣ "B": Face the tip of clip to left.
2. Fuel hose	6. Starter cable	▣ "C": Face the tip of clip to right.
3. Fuel feed hose	7. Fuel valve	"D": White mark
4. Parking brake cable	▣ "A": Set the white mark on hose to down ward.	"a": To fuel injector

Diagnostic Information and Procedures

Fuel System Diagnosis

B933H21704001

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.	<i>Clean or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel valve.	<i>Replace.</i>
	Defective fuel injector.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Check and repair.</i>
Engine will not start or is hard to start (Incorrect fuel/air mixture)	TP sensor out of adjustment.	<i>Adjust</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel valve.	<i>Replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
Defective IAT sensor.	<i>Replace.</i>	
Engine stalls often (Incorrect fuel/air mixture)	Defective IAP sensor or circuit.	<i>Repair or replace.</i>
	Clogged fuel filter.	<i>Clean or replace.</i>
	Defective fuel pump.	<i>Replace.</i>
	Defective fuel valve.	<i>Replace.</i>
	Defective ECT sensor.	<i>Replace.</i>
	Defective thermostat.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
Damaged or cracked vacuum hose.	<i>Replace.</i>	
Engine stalls often (Fuel injector improperly operating)	Defective fuel injector.	<i>Replace.</i>
	No injection signal from ECM.	<i>Repair or replace.</i>
	Open or short circuited wiring connection.	<i>Repair or replace.</i>
	Defective battery or low battery voltage.	<i>Replace or recharge.</i>
Engine runs poorly in high speed range (Defective control circuit or sensor)	Low fuel pressure.	<i>Repair or replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective GP switch.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	TP sensor out of adjustment.	<i>Adjust or replace.</i>
Engine lacks power (Defective control circuit or sensor)	Low fuel pressure.	<i>Repair or replace.</i>
	Defective TP sensor.	<i>Replace.</i>
	Defective IAT sensor.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective GP switch.	<i>Replace.</i>
	Defective IAP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	TP sensor out of adjustment	<i>Adjust.</i>

Repair Instructions

Fuel Pressure Inspection

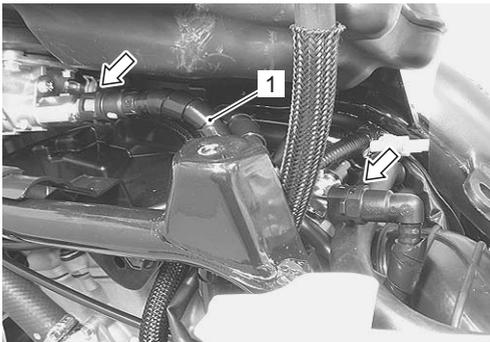
B933H21706001

▲ 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) Remove the fuel tank mounting bolts. Refer to "Fuel Tank Removal and Installation (Page 1G-9)".
- 2) Lift up the fuel tank and place a rag under the fuel feed hose (1) and disconnect the fuel feed hose.



I933H1170001-03

- 3) Install the special tools between the fuel valve and fuel delivery pipe.

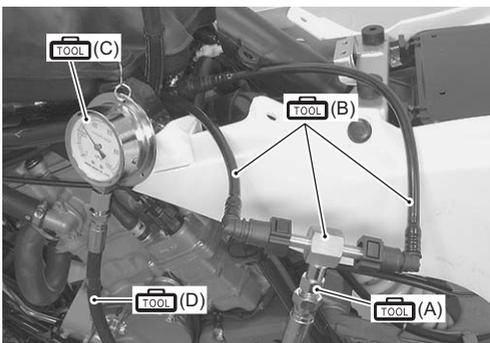
Special tool

TOOL (A): 09940-40211 (Fuel pressure gauge adapter)

TOOL (B): 09940-40220 (Fuel pressure gauge hose attachment)

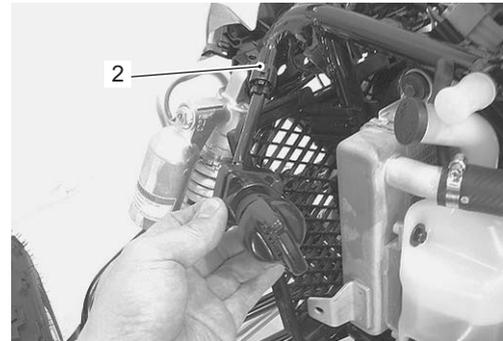
TOOL (C): 09915-77331 (Meter (for high pressure))

TOOL (D): 09915-74521 (Oil pressure gauge hose)



I933H1170002-01

- 4) Remove the ignition switch. Refer to "Ignition Switch Removal and Installation in Section 1H (Page 1H-7)".
- 5) Connect the ignition switch lead wire coupler (2).



I933H1170003-01

- 6) Turn the ignition ON and check for fuel pressure.

Fuel pressure

Approx. 294 kPa (2.94 kgf/cm², 42psi)

If the fuel pressure is lower than the specification, check for the followings:

- Fuel hose leakage
- Fuel valve
- Fuel pump

If the fuel pressure is higher than the specification, check for the followings:

- Fuel pump
- Fuel valve

- 7) Remove the special tools.

▲ WARNING

Before removing the special tools, turn the ignition switch OFF and release the fuel pressure slowly.

- 8) Reinstall the removed parts.

NOTE

Connect the fuel feed hose to the fuel valve and fuel delivery pipe until it locks securely (a click is heard). Refer to "Throttle Body Construction in Section 1D (Page 1D-8)".

1G-6 Fuel System:

Fuel Pump Inspection

B933H21706002

Turn the ignition switch ON and check that the fuel pump operates for a few seconds.

If the fuel pump motor does not make operating sound, inspect the fuel pump circuit connections or inspect the fuel pump relay and TO sensor. Refer to "Fuel Pump Relay Inspection (Page 1G-7)" and "DTC "C23" (P1651-H/L): TO Sensor Circuit Malfunction in Section 1A (Page 1A-52)".

If the 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 Removal and Installation (Page 1G-13)".

Fuel Discharge Amount Inspection

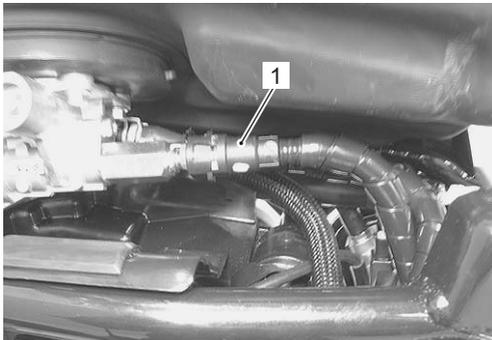
B933H21706003

▲ WARNING

- **Keep away from fire or spark.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

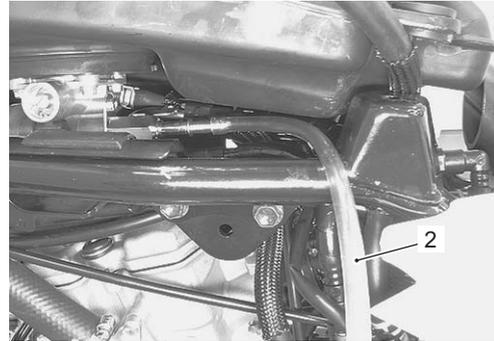
Inspect the fuel discharge amount in the following procedures:

- 1) Remove the fuel tank mounting bolts. Refer to "Fuel Tank Removal and Installation (Page 1G-9)".
- 2) Lift up the fuel tank and place a rag under the fuel feed hose (1) and disconnect fuel feed hose from the fuel valve.



I933H1170004-01

- 3) Connect a proper fuel hose (2) to the fuel valve.
- 4) Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.



I933H1170005-01

- 5) Disconnect the fuel pump lead wire coupler (3).
- 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 (+) O/G wire and (-) B/W wire) for 10 seconds and measure the amount of fuel discharged.

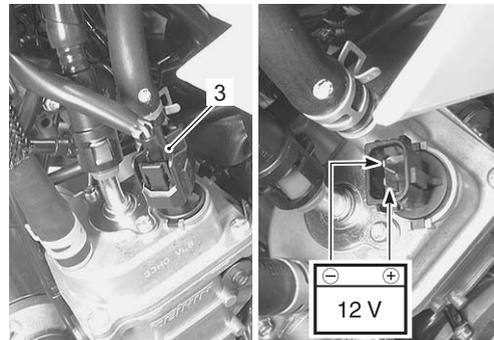
If the discharge amount is out of the specification, the probable cause may be failure of the fuel pump or clogged fuel filter.

NOTE

The battery must be in fully charged condition.

Fuel discharge amount

84 ml (2.8/3.0 US/lmp oz) and more/10 sec.



I933H1170006-01

- 7) After finishing the fuel discharge inspection, reinstall the removed parts.

NOTE

Connect the fuel feed hose to the fuel valve until it locks securely (a click is heard).

Fuel Pump Relay Inspection

B933H21706004

Refer to "DTC "C41" (P0230): FP Relay Circuit Malfunction in Section 1A (Page 1A-63)".

Fuel Hose Inspection

B933H21706005

Refer to "Fuel Line Inspection in Section 0B (Page 0B-11)".

Fuel Level Indicator Inspection

B933H21706006

Refer to "Indicator Light Inspection in Section 9C (Page 9C-2)".

Fuel Level Indicator Switch (Thermistor) Inspection

B933H21706007

Refer to "Fuel Level Indicator Switch (Thermistor) Inspection in Section 9C (Page 9C-2)".

Fuel Level Gauge Removal and Installation

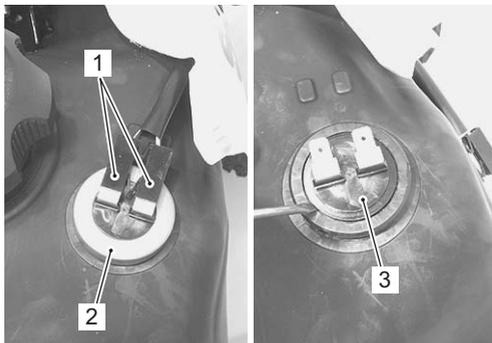
B933H21706008

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 cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Disconnect the fuel level gauge couplers (1).
- 3) Remove the fuel level gauge cap (2) and fuel level gauge assembly (3).



I933H1170008-01

- 4) Remove the fuel level indicator switch (thermistor) cover (4).



I933H1170009-01

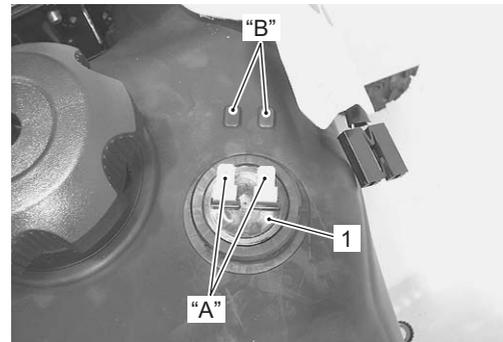
Installation

Install the fuel level gauge in the reverse order of removal. Pay attention to the following points:

- Install the fuel level gauge assembly (1).

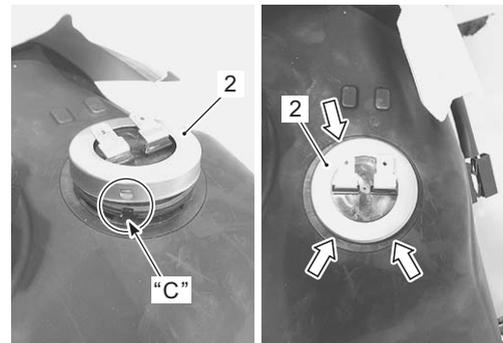
NOTE

When installing the fuel level gauge, align the fuel gauge terminals "A" with the embossed lines "B" on the fuel tank.



I933H1170010-02

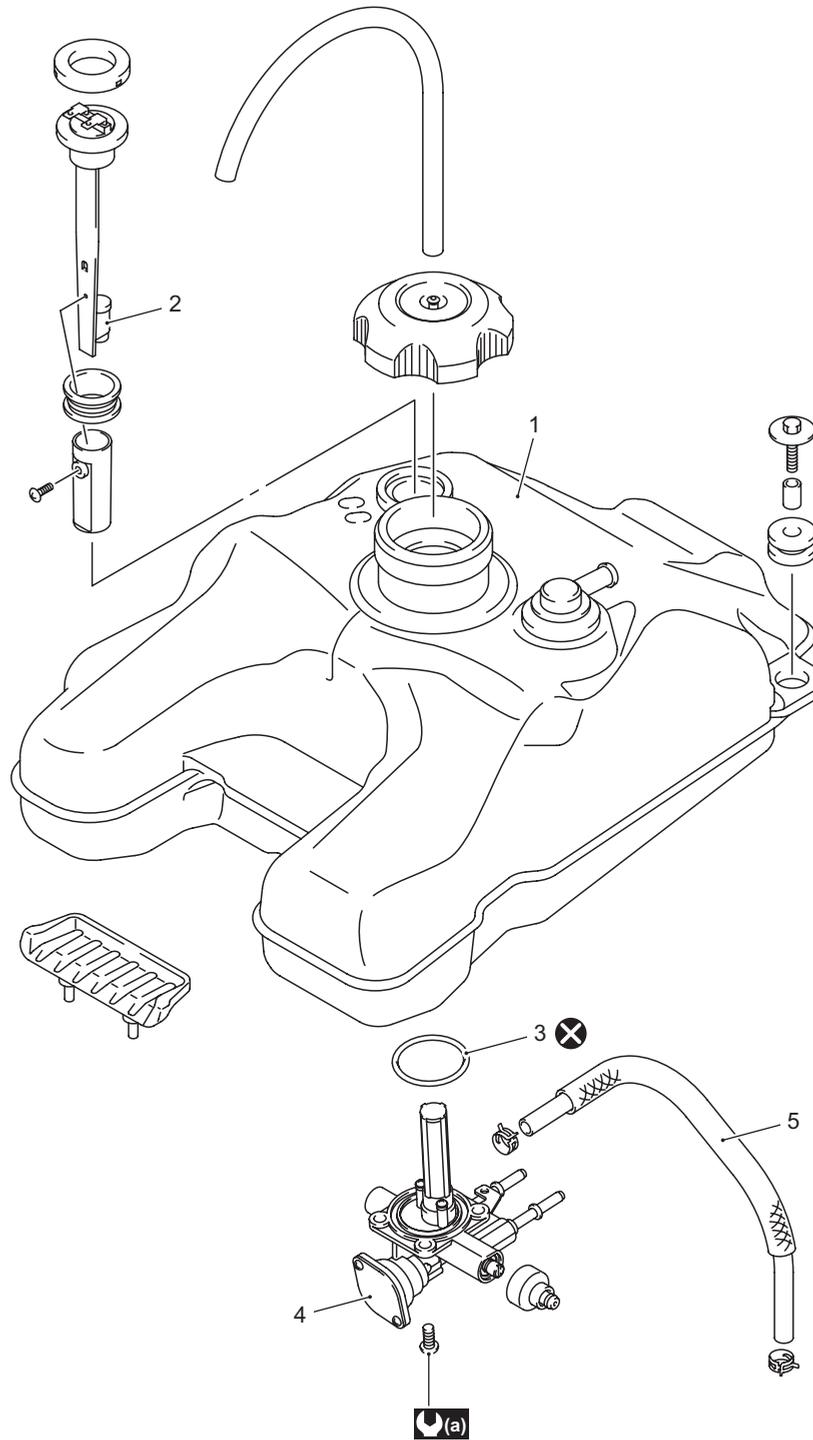
- Fix the fuel level gauge cap (2) to the groove "C" of fuel tank.



I933H1170011-02

Fuel Tank Construction

B933H21706009



1. Fuel tank	5. Fuel hose
2. Fuel level indicator switch (Thermistor)	(a) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)
3. O-ring	⊗ : Do not reuse.
4. Fuel valve	

I933H1170038-01

Fuel Tank Removal and Installation

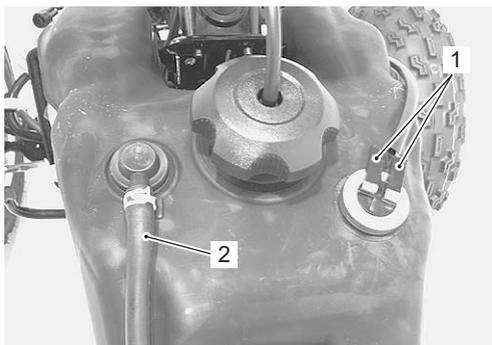
B933H21706010

Removal

▲ WARNING

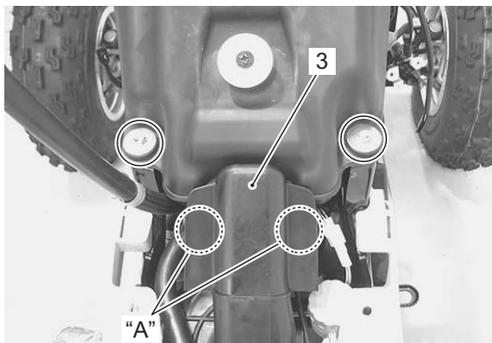
- Keep away from fire or spark.
- Spilled gasoline should be wiped off immediately.
- Work in a well-ventilated area.

- 1) Remove the fuel tank cover and front fender. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Disconnect the fuel level gauge couplers (1) and fuel vapor return hose (2) from the fuel tank.



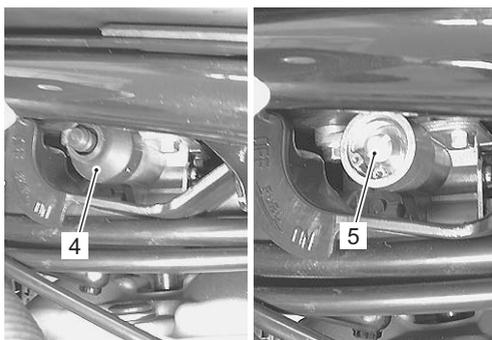
I933H1170012-01

- 3) Remove the air cleaner duct cover (3) by releasing stopper "A".
- 4) Remove the fuel tank mounting bolts.



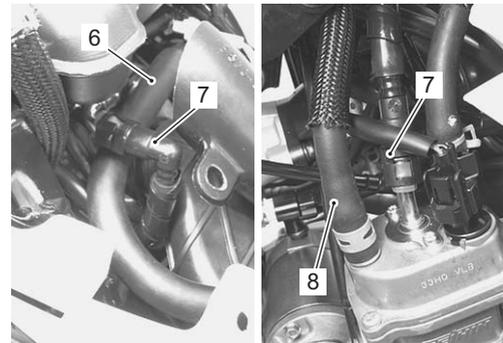
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- 5) Remove the fuel valve screw cap (4).
- 6) Full close the fuel valve screw (5) by turning the fuel valve screw clockwise.



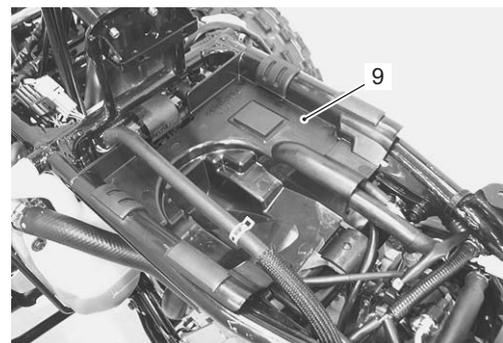
I933H1170034-02

- 7) Disconnect the breather hose (6).
- 8) Place a rag under the fuel feed hoses (7) and fuel hose (8).
- 9) Disconnect the fuel feed hoses (7) and fuel hose (8).
- 10) Remove the fuel tank.



I933H1170014-02

- 11) Remove the fuel tank lower cover (9).



I933H1170015-03

Installation

Install the fuel tank in the reverse order of removal. Pay attention to the following points:

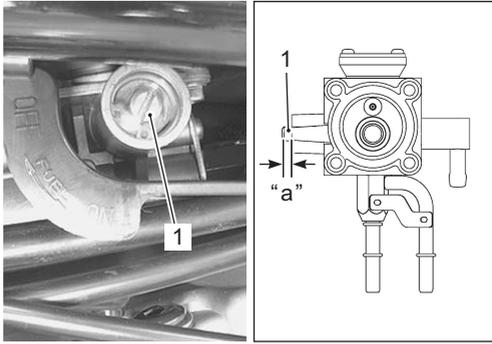
- Connect the fuel hose and fuel feed hoses as shown in the fuel hose routing diagram and throttle body construction. Refer to "Fuel Hose Routing Diagram (Page 1G-3)" and "Throttle Body Construction in Section 1D (Page 1D-8)".

NOTE

Connect the fuel feed hoses to the fuel pump and throttle body until it locks securely (a click is heard)

1G-10 Fuel System:

- Full open the fuel valve screw (1) by turning the fuel valve screw counter clockwise.



I933H1170016-03

"a": Full open: 5.5 mm (0.2 in)

- Connect the breather hose and fuel vapor return hose as shown in the oil return tank hose routing diagram and throttle body construction. Refer to "Oil Return Tank Hose Routing Diagram in Section 1B (Page 1B-1)" and "Throttle Body Construction in Section 1D (Page 1D-8)".

Fuel Valve Removal and Installation

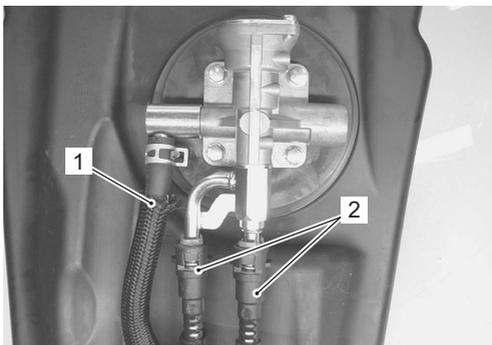
B933H21706011

Removal

⚠ WARNING

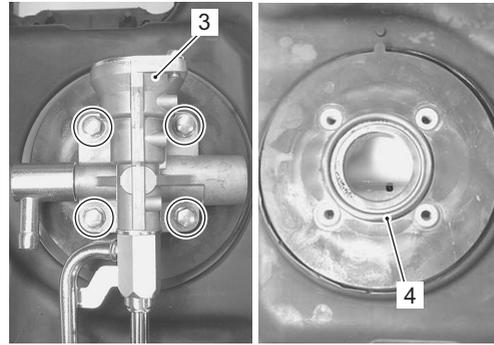
- **Keep away from fire or spark.**
- **Spilled gasoline should be wiped off immediately.**
- **Work in a well-ventilated area.**

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation (Page 1G-9)".
- 2) Disconnect the fuel hose (1) and fuel feed hoses (2).



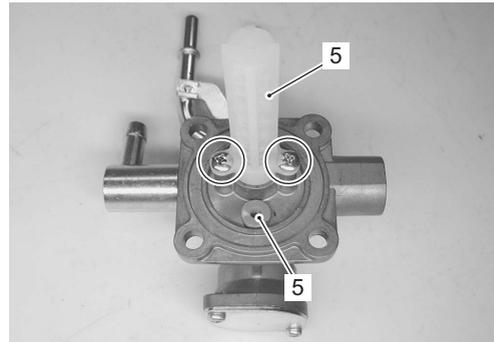
I933H1170035-04

- 3) Remove the fuel valve (3) and O-ring (4).



I933H1170017-08

- 4) Remove the fuel filters (5).



I933H1170040-01

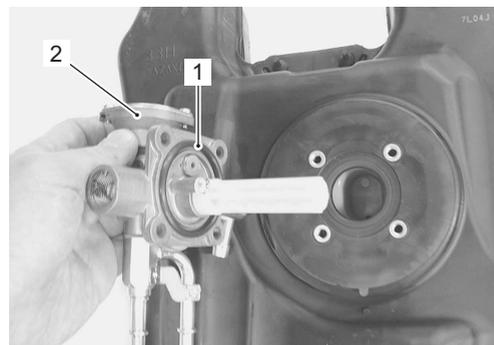
Installation

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

- Install the new O-ring (1) and fuel valve (2) from the fuel tank.

⚠ CAUTION

Replace the O-ring (1) with a new one.

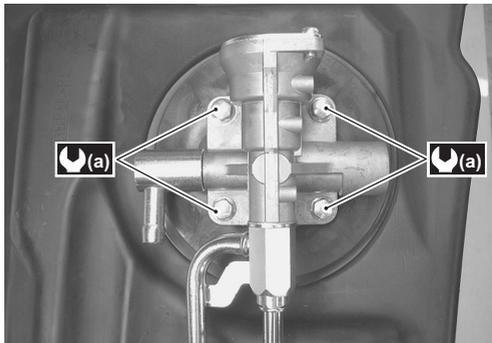


I933H1170018-02

- Tighten the fuel valve mounting bolts to specified torque.

Tightening torque

Fuel valve mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

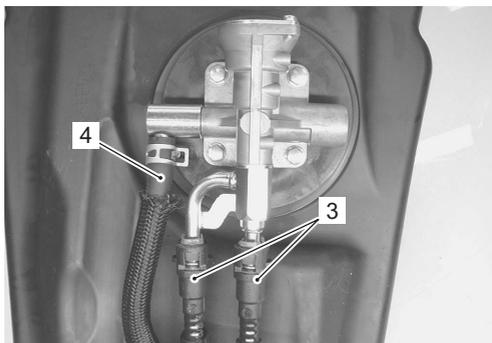


I933H1170019-02

- Connect the fuel feed hoses (3) and fuel hose (4). Refer to “Fuel Hose Routing Diagram (Page 1G-3)”.

NOTE

Connect the fuel feed hoses to the fuel valve until it locks securely (a click is heard)



I933H1170036-03

Fuel Filter Inspection and Cleaning

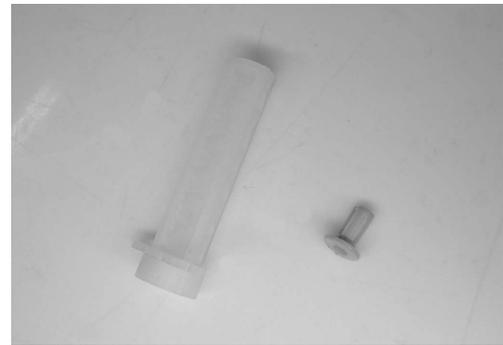
B933H21706012

Inspect and clean the fuel filter in the following procedures:

- 1) Remove the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-9)”.
- 2) Remove the fuel filters. Refer to “Fuel Valve Removal and Installation (Page 1G-10)”.
- 3) Inspect the fuel filters for sediment or rust. If the fuel filters is dirty with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Clean the fuel filters with compressed air.

NOTE

If the fuel filters is clogged with many sediment or rust, replace the fuel filters with new ones.



I933H1170020-02

- 4) Reinstall the fuel valve. Refer to “Fuel Valve Removal and Installation (Page 1G-10)”.
- 5) Reinstall the fuel tank. Refer to “Fuel Tank Removal and Installation (Page 1G-9)”.

Fuel Injector Inspection and Cleaning

B933H21706013

Inspect the fuel injector in the following procedures:

- 1) Remove the fuel injector. Refer to “Fuel Injector / Fuel Delivery Pipe / L-joint Removal and Installation (Page 1G-11)”.
- 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.



I933H1170021-01

- 3) Install the fuel injector. Refer to “Fuel Injector / Fuel Delivery Pipe / L-joint Removal and Installation (Page 1G-11)”.

Fuel Injector / Fuel Delivery Pipe / L-joint Removal and Installation

B933H21706014

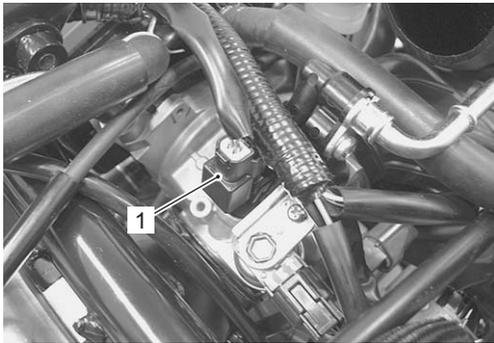
Removal

⚠ WARNING

- Spilled gasoline should be wiped off immediately.
- Keep away from fire or spark.
- Work in a well-ventilated area.

1G-12 Fuel System:

- 1) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation (Page 1G-9)".
- 2) Disconnect the injector coupler (1).

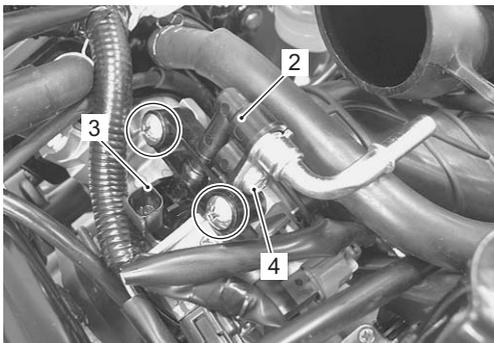


I933H1170022-02

- 3) Remove the fuel delivery pipe (2) with the injector (3).

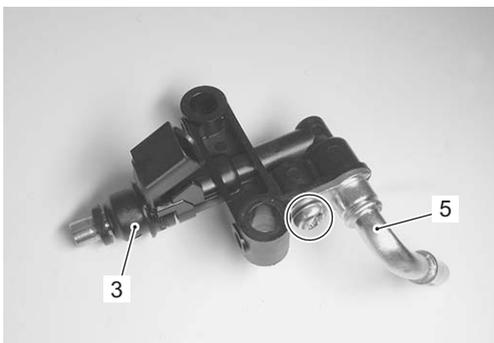
NOTE

Slightly loosen the L-joint mounting screw (4) to facilitate later disassembly, if necessary.



I933H1170023-02

- 4) Remove the fuel injector (3) and L-joint (5) from the fuel delivery pipe.



I933H1170024-02

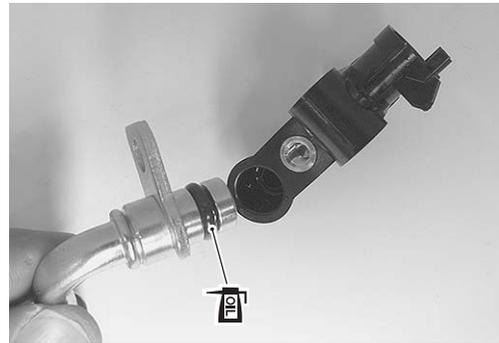
Installation

Install the fuel injector/fuel delivery pipe/L-joint in the reverse order of removal. Pay attention to the following points:

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

CAUTION

Replace the O-ring with a new one.

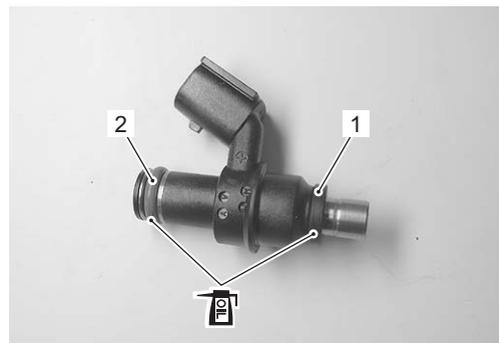


I933H1170025-06

- Apply 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.



I933H1170026-01

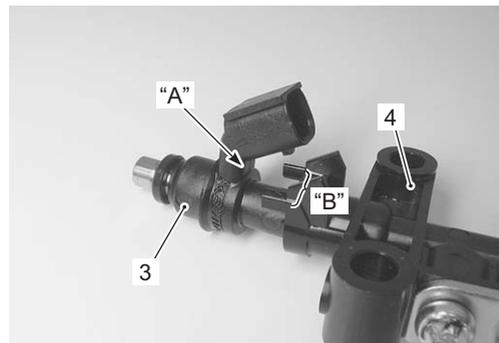
- Install the fuel injector (3) by pushing it straight to the delivery pipe (4).

CAUTION

Never turn the injector while pushing it.

NOTE

Align the coupler "A" of injector with boss "B" of the delivery pipe.



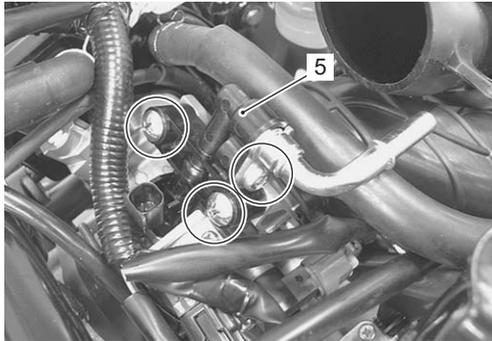
I933H1170027-02

- Install the fuel delivery pipe assembly (5) to the throttle body assembly.

⚠ CAUTION

Never turn the fuel injector while installing it.

- Tighten the fuel delivery pipe mounting screws and L-joint mounting screw.



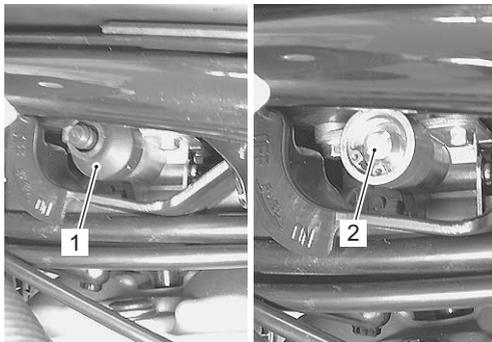
I933H1170028-03

Fuel Pump Removal and Installation

B933H21706015

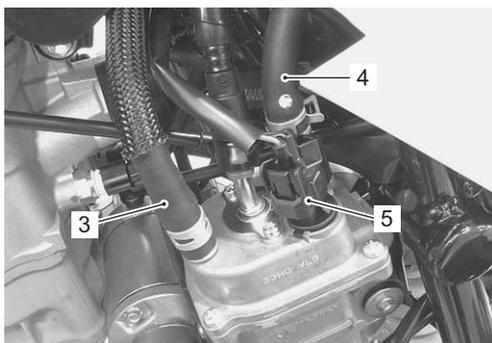
Removal

- 1) Remove the fuel tank cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Remove the fuel valve screw cap (1).
- 3) Full close the fuel valve screw (2) by turning the fuel valve screw (2) clockwise.



I933H1170029-01

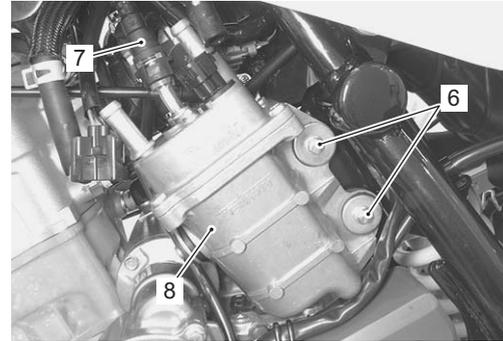
- 4) Place a rag under the fuel hose (3).
- 5) Disconnect the fuel hose (3), fuel vapor return hose (4) and fuel pump lead wire coupler (5).



I933H1170030-01

- 6) Remove the fuel pump mounting bolts (6).
- 7) Place a rag under the fuel feed hose (7) and disconnect the fuel feed hose (7).

- 8) Remove the fuel pump (8).



I933H1170031-01

Installation

- 1) Connect the fuel feed hose (1) to the fuel pump until it locks securely (a click is heard).
- 2) Tighten the fuel pump mounting bolts to the specified torque.

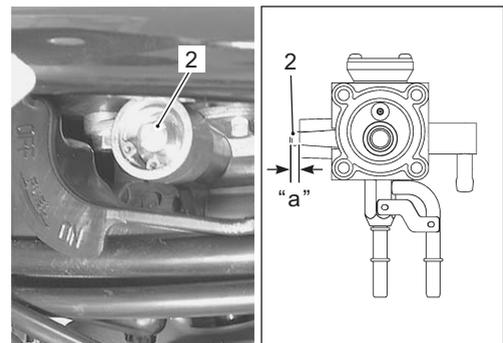
Tightening torque

Fuel pump mounting bolt (a): 10 N·m (1.0 kgf·m, 7.0 lb-ft)



I933H1170032-01

- 3) Connect the fuel vapor return hose and fuel hose as shown in the throttle body construction and fuel hose routing diagram. Refer to “Throttle Body Construction in Section 1D (Page 1D-8)” and “Fuel Hose Routing Diagram (Page 1G-3)”.
- 4) Full open the fuel valve screw (2) turning the fuel valve screw (2) counter clockwise.



I933H1170033-02

“a” Full open: 5.5 mm (0.2 in)

- 5) Install the fuel tank cover.

Specifications

Service Data

B933H21707001

Injector + Fuel Pump + Fuel Pressure Regulator

Item	Specification	Note
Injector resistance	9 – 17 Ω at 20 °C (68 °F)	—
Fuel pump discharge amount	84 ml (2.8/3.0 US/Imp oz) and more/10 sec.	—
Fuel pressure regulator operating set pressure	Approx. 294 kPa (2.9 kgf/cm ² , 42 psi)	—

Fuel

Item	Specification	Note
Fuel type	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.	E-28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline type is recommended.	E-19
Fuel tank capacity	9.5 L (2.5/2.1 US/Imp gal)	

Tightening Torque Specifications

B933H21707002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Fuel valve mounting bolt	10	1.0	7.0	☞ (Page 1G-11)
Fuel pump mounting bolt	10	1.0	7.0	☞ (Page 1G-13)

NOTE

The specified tightening torque is also described in the following.
 “Fuel Tank Construction (Page 1G-8)”

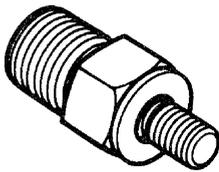
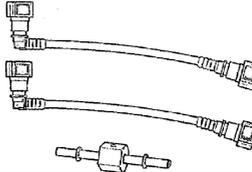
Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Special Tool

B933H21708001

09915-74521 Oil pressure gauge hose ☞ (Page 1G-5)		09915-77331 Meter (for high pressure) ☞ (Page 1G-5)	
09940-40211 Fuel pressure gauge adapter ☞ (Page 1G-5)		09940-40220 Fuel pressure gauge hose attachment ☞ (Page 1G-5)	

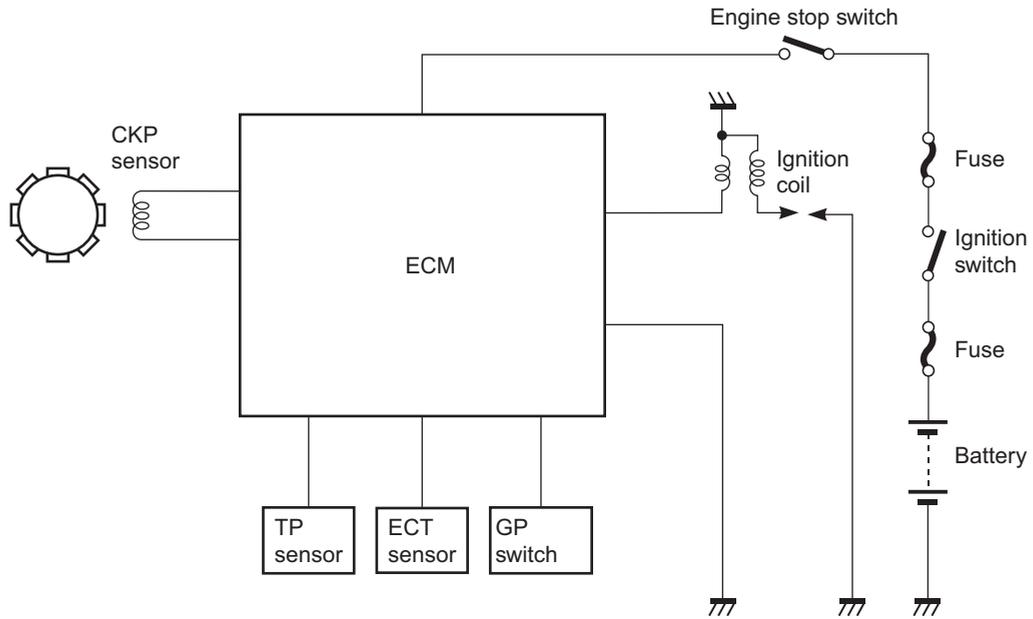
Ignition System

Schematic and Routing Diagram

Ignition System Diagram

Refer to "Wire Color Symbols in Section 0A (Page 0A-5)".

B933H21802001



I933H1180001-02

Ignition System Components Location

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

B933H21802002

Diagnostic Information and Procedures

Ignition System Symptom Diagnosis

B933H21804001

Condition	Possible cause	Correction / Reference Item
Spark plug not sparking	Damaged spark plug cap.	<i>Replace.</i>
	Damaged spark plug.	<i>Replace.</i>
	Fouled spark plug.	<i>Clean or replace.</i>
	Wet spark plug.	<i>Clean and dry or replace.</i>
	Defective ignition coil.	<i>Replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Repair or replace.</i>
	Open or short in high-tension cord.	<i>Replace.</i>
Engine stalls easily (No spark)	Defective ignition coil.	<i>Replace.</i>
	Fouled spark plug.	<i>Clean or replace.</i>
	Defective CKP sensor.	<i>Replace.</i>
	Defective ECM.	<i>Replace.</i>
	Open-circuited wiring connections.	<i>Repair or replace.</i>
Spark plug is wet or quickly becomes fouled with carbon	Excessively rich air/fuel mixture.	<i>Inspect FI system.</i>
	Excessively high idling speed.	<i>Inspect FI system.</i>
	Incorrect gasoline.	<i>Change.</i>
	Dirty air cleaner element.	<i>Clean or replace.</i>
	Incorrect spark plug. (Cold type)	<i>Change to standard spark plug.</i>
Spark plug quickly becomes fouled with oil or carbon	Worn piston rings.	<i>Replace.</i>
	Worn piston.	<i>Replace.</i>
	Worn cylinder.	<i>Replace.</i>
	Excessive valve-stem to valve-guide clearance.	<i>Replace.</i>
	Worn valve stem oil seals.	<i>Replace.</i>
Spark plug electrodes overheat or burn	Incorrect spark plug.	<i>Change to cold type spark plug.</i>
	Overheated engine.	<i>Tune-up.</i>
	Loose spark plug.	<i>Tighten.</i>
	Excessively lean air/fuel mixture.	<i>Inspect FI system.</i>

No Spark or Poor Spark

B933H21804002

Troubleshooting

NOTE

Check that the transmission is in neutral and the engine stop switch is in the "RUN" position. Check that the fuse is not blown and the battery is fully-charged before diagnosing.

Step	Action	Yes	No
1	Check the ignition system couplers for poor connections. <i>Is there connection in the ignition system couplers?</i>	Go to step 2.	Poor connection of couplers.
2	Measure the battery voltage between input lead wires (O/W and B/W) at the ECM with the ignition switch in the "ON" position. <i>Is the voltage OK?</i>	Go to Step 3.	<ul style="list-style-type: none"> Faulty ignition switch. 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-4)". NOTE This inspection method is applicable only with the multi-circuit tester and the peak volt adaptor. <i>Is the peak voltage OK?</i>	Go to step 4.	Go to step 5.
4	Inspect the spark plug. Refer to "Spark Plug Inspection and Cleaning in Section 0B (Page 0B-9)". <i>Is the spark plug OK?</i>	Go to Step 5.	Faulty spark plug.
5	Inspect the ignition coil. Refer to "Ignition Coil and Plug Cap Inspection (Page 1H-4)". <i>Is the ignition coil OK?</i>	Go to step 6.	Faulty ignition coil.
6	Measure the CKP sensor peak voltage and its resistance. Refer to "CKP Sensor Inspection (Page 1H-6)". NOTE The CKP sensor peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor. <i>Are the peak voltage and resistance OK?</i>	<ul style="list-style-type: none"> Faulty ECM. Open or short circuit in wire harness. Poor connection of ignition wire harness. 	<ul style="list-style-type: none"> Faulty CKP sensor. Metal particles or foreign material being stuck on the CKP sensor and rotor tip.

Repair Instructions

Spark Plug Cap and Spark Plug Removal and Installation

B933H21806001

Removal

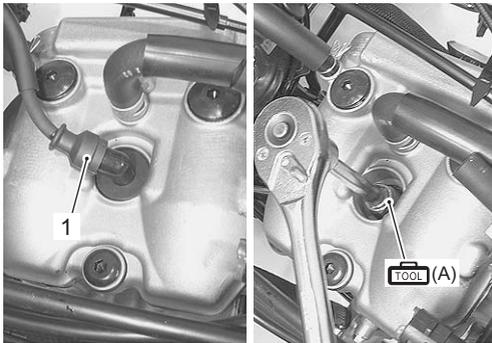
⚠ WARNING

**The hot engine can burn you.
Wait until the engine is cool enough to touch.**

- 1) Turn the ignition switch OFF.
- 2) Remove the front fender. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 3) Remove the fuel tank lower cover. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
- 4) Disconnect the spark plug cap (1).
- 5) Remove the spark plug with a spark plug wrench.

Special tool

TOOL (A): 09930-10121 (Spark plug wrench set)



I933H1180002-01

Installation

Install the spark plug cap and spark plug in the reverse order of removal. Pay attention to the following points:

- Screw the spark plug 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 head.

Special tool

TOOL : 09930-10121 (Spark plug wrench set)

Tightening torque

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

Spark Plug Inspection and Cleaning

B933H21806002

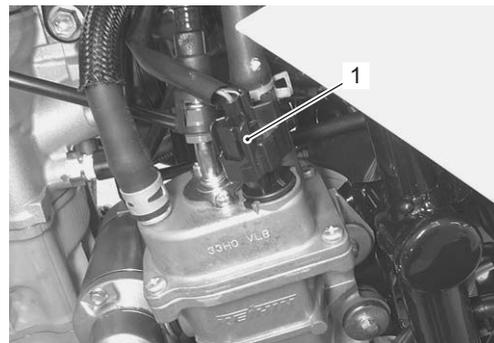
Refer to “Spark Plug Inspection and Cleaning in Section 0B (Page 0B-9)”.

Ignition Coil and Plug Cap Inspection

B933H21806003

Ignition Coil Primary Peak Voltage

- 1) Remove the front fender. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Remove the fuel tank lower cover. Refer to “Fuel Tank Removal and Installation in Section 1G (Page 1G-9)”.
- 3) Disconnect the fuel pump coupler (1).

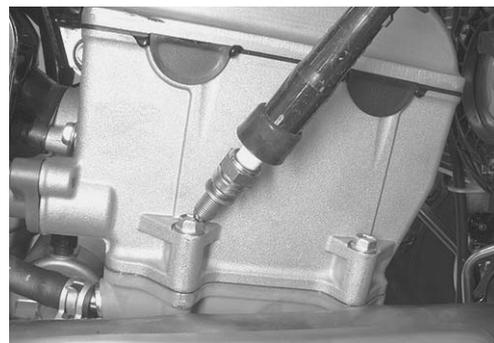


I933H1180012-01

- 4) Remove the ignition switch and connect the ignition switch coupler. Refer to “Ignition Switch Removal and Installation (Page 1H-7)”.
- 5) Disconnect the spark plug cap. Refer to “Spark Plug Cap and Spark Plug Removal and Installation (Page 1H-4)”.
- 6) Connect the new spark plug to spark plug cap and ground it to the cylinder head.

NOTE

Be sure that the spark plug is connected properly and the battery used is in fully-charged condition.



I933H1180003-01

7) 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

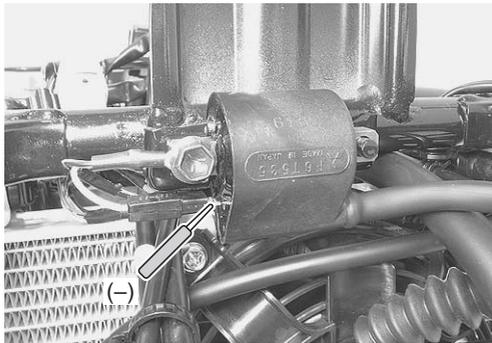
Do not disconnect the ignition coil lead wires.

Special tool

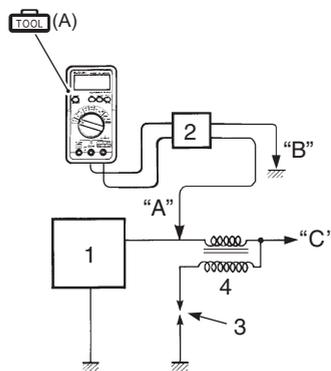
TOOL : 09900-25008 (Multi-circuit tester set)

Tester knob indication: Voltage (---)

	((+) Probe)	((-) Probe)
Ignition coil	B/W lead wire terminal	W/BI lead wire terminal or Ground



I933H1180004-03



I933H1180013-01

1. ECM	"A": (-) probe
2. Peak voltage adaptor	"B": (+) probe
3. New spark plug	"C": For engine stop switch
4. Ignition coil	

8) Measure the ignition coil 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.
- 9) 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

10) After measuring the ignition coil primary peak voltage, reinstall the removed parts.

Ignition Coil Resistance

- 1) Disconnect the spark plug cap. Refer to "Ignition Coil and Plug Cap Inspection (Page 1H-4)".
- 2) Disconnect the ignition coil lead wire.
- 3) Measure the ignition coil resistance in both the primary and secondary coils. 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)

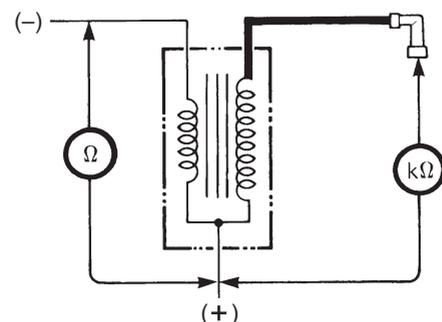
Tester knob indication

Resistance (Ω)

Ignition coil resistance

Primary: 0.1 – 1.0 Ω ((+) terminal – (-) Ground)

Secondary: 12 – 20 k Ω (Spark plug cap – (-) terminal)



I933H1180014-01

4) After measuring the ignition coil resistance, reinstall the removed parts.

1H-6 Ignition System:

CKP Sensor Inspection

B933H21806004

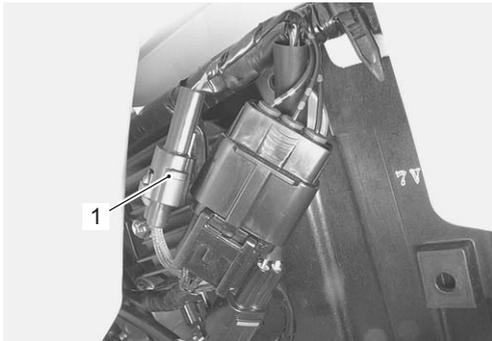
Refer to "Electrical Components Location in Section 0A (Page 0A-7)".

CKP Sensor Peak Voltage

- 1) Remove the ignition switch and connect the ignition switch coupler. Refer to "Ignition Switch Removal and Installation (Page 1H-7)".
- 2) Disconnect the CKP sensor coupler (1).

NOTE

Be sure that all of the couplers are connected properly and the battery is fully-charged.



I933H1180005-01

- 3) Connect the multi-circuit tester with the peak volt adaptor as follows:

CAUTION

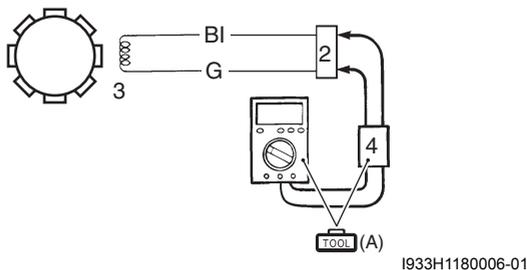
Before using the multi-circuit tester and peak voltage adaptor, refer to the appropriate instruction manual.

Special tool

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

Tester knob indication: Voltage (---)

CKP sensor	(+) Probe	(-) Probe
	BI	G



I933H1180006-01

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

1.0 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.

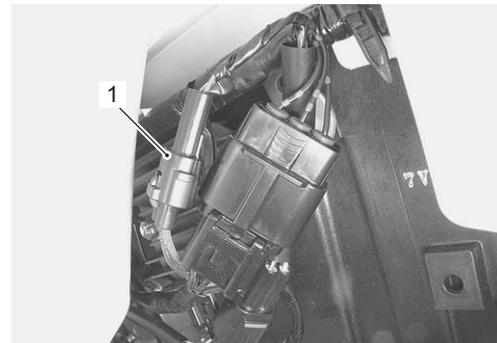
CAUTION

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) Disconnect the CKP sensor coupler (1).



I933H1180007-01

- 2) 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-7)".

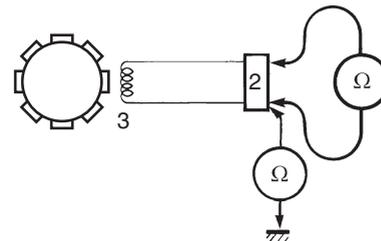
Tester knob indication

Resistance (Ω)

CKP sensor resistance

400 – 600 Ω (Blue – Green)

$\infty \Omega$ (Blue – Ground)



I718H1180008-02

2. CKP sensor coupler	3. CKP sensor
-----------------------	---------------

- 3) After measuring the CKP sensor resistance, connect the CKP sensor coupler (1).

CKP Sensor Removal and Installation

B933H21806005

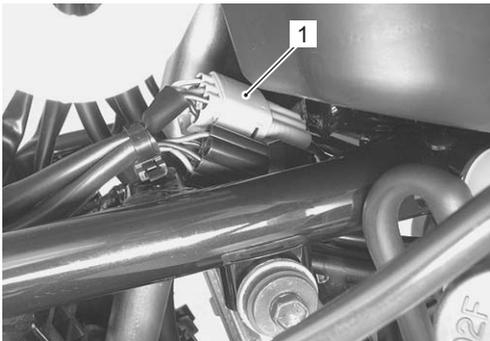
Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".

Engine Stop Switch Inspection

B933H21806006

Inspect the engine stop switch in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Remove the left side cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 3) Disconnect the handlebar switch coupler (1).



I933H1180008-01

- 4) Inspect the engine stop switch for continuity with a tester.
If any abnormality is found, replace the 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	O/W
RUN (⊙)	○	○
OFF (⊗)		

I831G1180009-01

- 5) After finishing the engine stop switch inspection, reinstall the removed parts.

Ignition Switch Inspection

B933H21806007

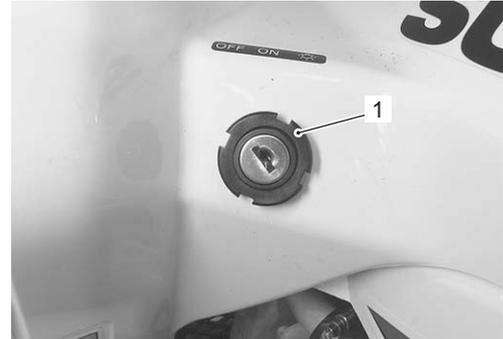
Refer to "Ignition Switch Inspection in Section 9C (Page 9C-4)".

Ignition Switch Removal and Installation

B933H21806008

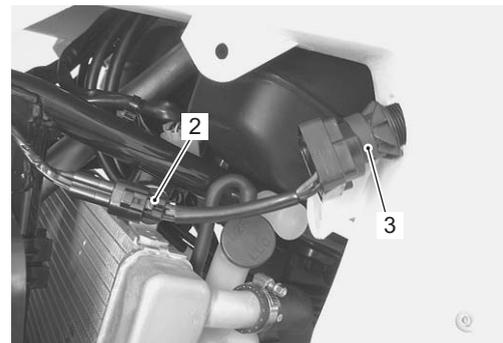
Removal

- 1) Remove the left side cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the ignition switch ring nut (1).



I933H1180009-02

- 3) Disconnect the ignition switch coupler (2) and remove the ignition switch (3).



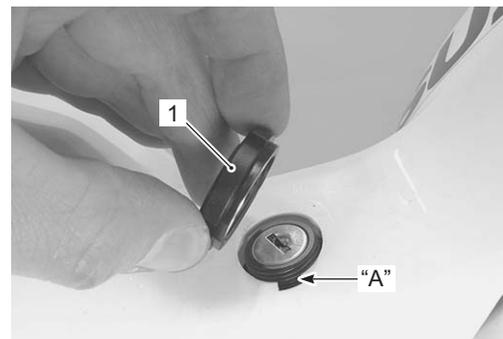
I933H1180010-03

Installation

Install the ignition switch in the reverse order of removal. Pay attention to the following point:
Install the ignition switch ring nut (1) as shown in the figure.

NOTE

The flange "A" of the ignition switch must face lower.



I933H1180011-02

Specifications

Service Data

B933H21807001

Electrical

Unit: mm (in)

Item	Specification		Note
Spark plug	Type	NGK: CR7E DENSO: U22ESR-N	
	Gap	0.7 – 0.8 (0.028 – 0.031)	
Spark performance	Over 8 (0.3) at 1 atm.		
CKP sensor resistance	400 – 600 Ω		
CKP sensor peak voltage	1.0 V and more		When cranking
Ignition coil resistance	Primary	0.1 – 1.0 Ω	Terminal – Ground
	Secondary	12 – 20 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage	150 V and more		(+): B/W, (-): W/Bl

Tightening Torque Specifications

B933H21807002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Spark plug	11	1.1	8.0	☞(Page 1H-4)

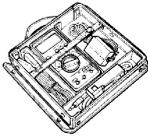
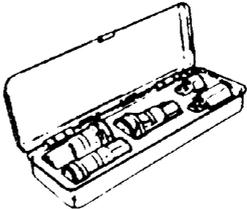
Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Special Tool

B933H21808001

<p>09900–25008 Multi-circuit tester set ☞(Page 1H-5) / ☞(Page 1H-5) / ☞(Page 1H-6) / ☞(Page 1H-7)</p> 	<p>09930–10121 Spark plug wrench set ☞(Page 1H-4) / ☞(Page 1H-4)</p> 
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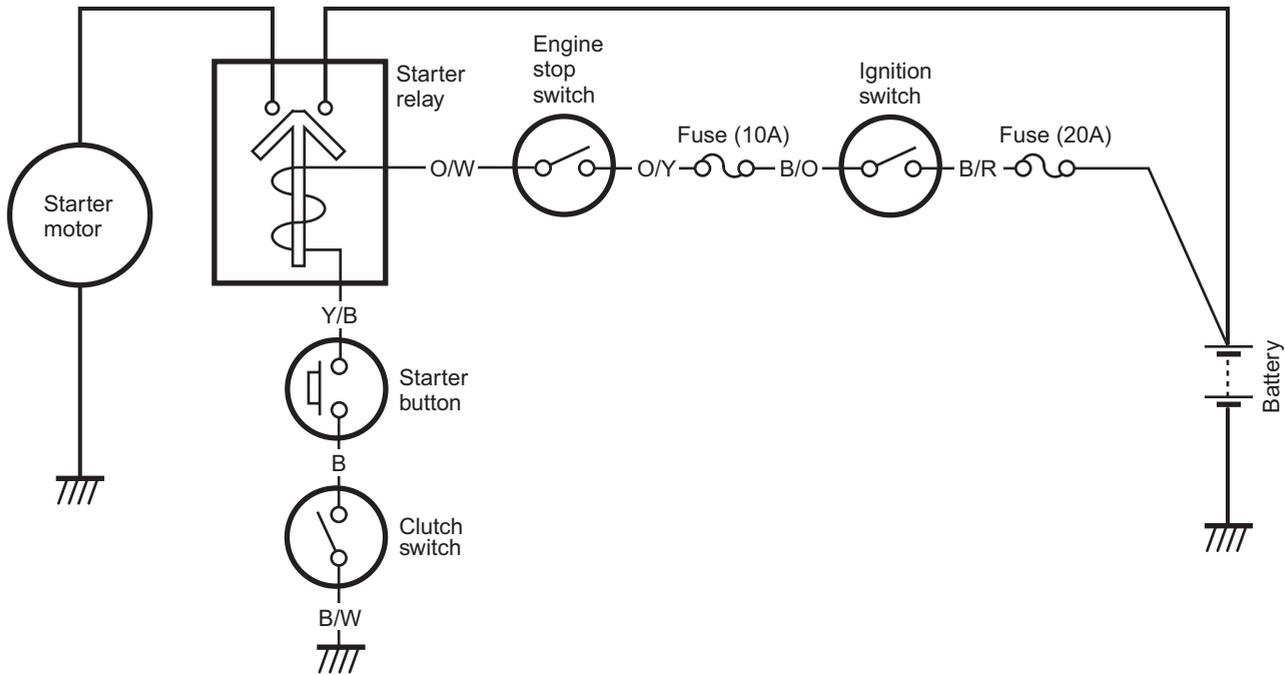
Starting System

Schematic and Routing Diagram

Starting System Diagram

B933H21902001

Refer to "Wire Color Symbols in Section 0A (Page 0A-5)".



I933H1190001-01

Component Location

Starting System Components Location

B933H21903001

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

Diagnostic Information and Procedures

Starting System Symptom Diagnosis

B933H21904001

Condition	Possible cause	Correction / Reference Item
Starter button is not effective	Run down battery.	<i>Repair or replace.</i>
	Defective switch contacts.	<i>Replace.</i>
	Brushes not seating properly on starter motor commutator.	<i>Repair or replace.</i>
	Defective starter relay.	<i>Replace.</i>
	Defective main fuse.	<i>Replace.</i>
	Defective clutch lever position switch	<i>Replace.</i>

11-2 Starting System:

Starter Motor will not Run

B933H21904002

NOTE

Make sure the fuses are not blown and the battery is fully-charged before diagnosing.

Troubleshooting

Step	Action	Yes	No
1	<p>1) Shift the transfer to neutral.</p> <p>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.</p> <p><i>Is a click sound heard?</i></p>	Go to step 2.	Go to step 3.
2	<p>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.)</p> <p><i>Does the starter motor run?</i></p>	<ul style="list-style-type: none"> Faulty starter relay. Loose or disconnected starter motor lead wire. Loose or disconnected between starter relay and battery (+) terminal. 	Faulty starter motor.
3	<p>Measure the starter relay voltage at the starter relay connectors (between Y/B (+) and O/W (-)) when the starter button is pushed.</p> <p><i>Is the voltage OK?</i></p>	Go to Step 4.	<ul style="list-style-type: none"> Faulty ignition switch. Faulty engine stop switch. Faulty clutch lever position switch. Faulty starter button. Poor contact of connector. Open circuit in wire harness.
4	<p>Check the starter relay. Refer to "Starter Relay Inspection (Page 11-7)".</p> <p><i>Is the starter relay OK?</i></p>	Poor contact of the starter relay.	Faulty starter relay.

Starter Motor Runs but Does not Crank the Engine

B933H21904003

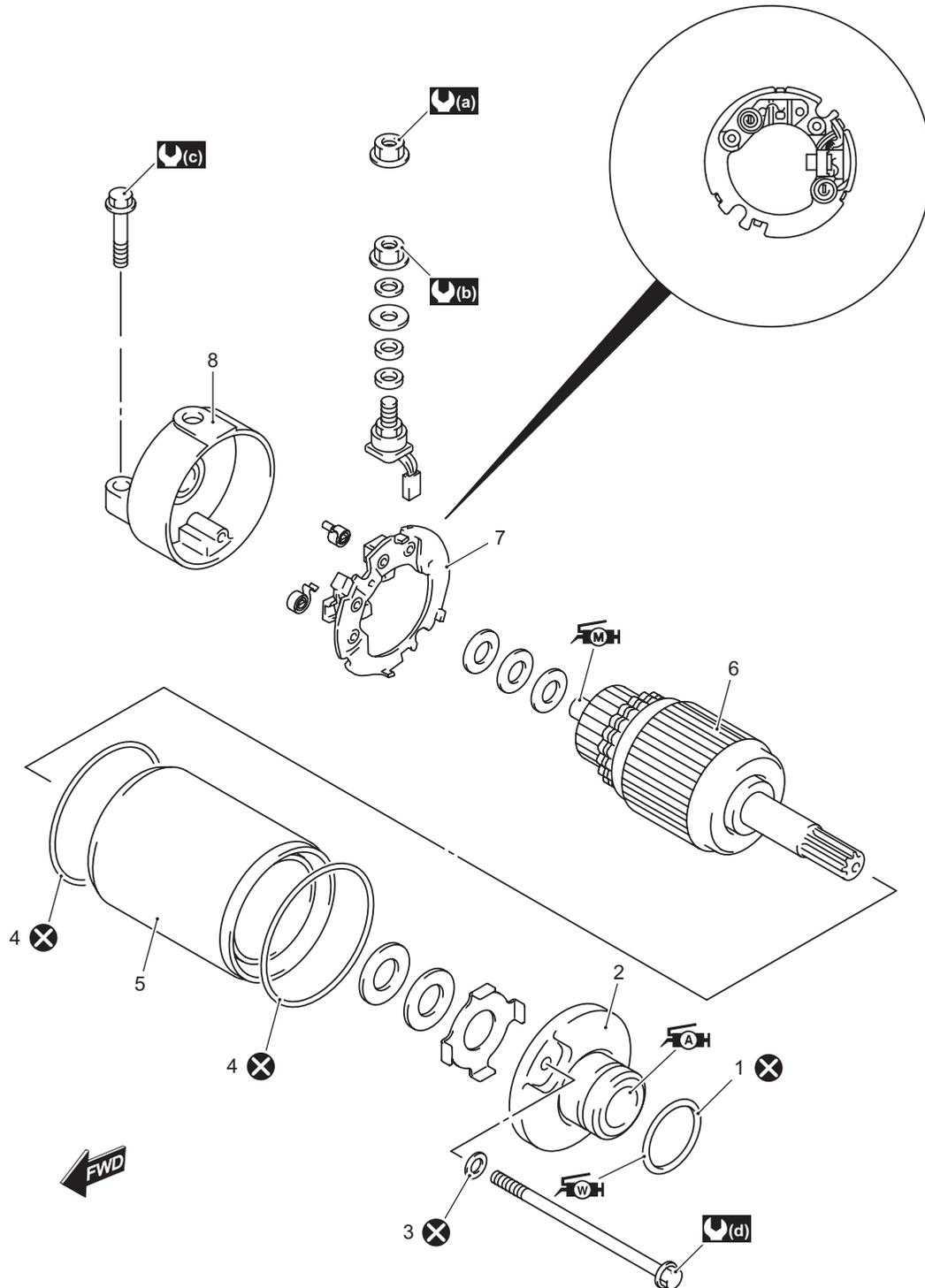
The starter motor runs when the transmission is in neutral, but does not run when the transfer is in any position other than neutral, with the parking lever grasped firmly.

Step	Action	Yes	No
1	<p>Check the starter clutch. Refer to "Starter Clutch Related Parts Inspection (Page 11-11)".</p> <p><i>Is the starter clutch OK?</i></p>	<ul style="list-style-type: none"> Open circuit in wire harness Poor contact of connector 	Faulty starter clutch.

Repair Instructions

Starter Motor Components

B933H21906001



I933H1190003-03

1. O-ring	7. Brush holder	: Apply grease.
2. Housing end (Inside)	8. Housing end (Outside)	: Apply water resistance grease.
3. O-ring	: 6 N-m (0.6 kgf-m, 4.5 lb-ft)	: Apply moly paste to sliding surface.
4. Square-ring	: 7 N-m (0.7 kgf-m, 5.0 lb-ft)	: Do not reuse.
5. Starter motor case	: 10 N-m (1.0 kgf-m, 7.0 lb-ft)	
6. Armature	: 3 N-m (0.3 kgf-m, 2.0 lb-ft)	

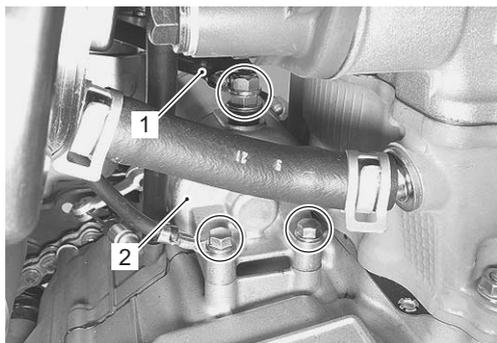
11-4 Starting System:

Starter Motor Removal and Installation

B933H21906002

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) Drain engine coolant. Refer to “Cooling System Inspection in Section 0B (Page 0B-13)”.
- 3) Remove the exhaust pipe. Refer to “Muffler / Exhaust Pipe Removal and Installation in Section 1K (Page 1K-3)”.
- 4) Remove the starter motor lead wire (1) and starter motor (2).



I933H1190004-01

Installation

Install the starter motor in the reverse order of removal. Pay attention to the following points:

- Apply grease to the starter motor O-ring.

 **Grease 99000–25160 (Water resistance grease or equivalent)**

CAUTION

Replace the O-ring with a new one.



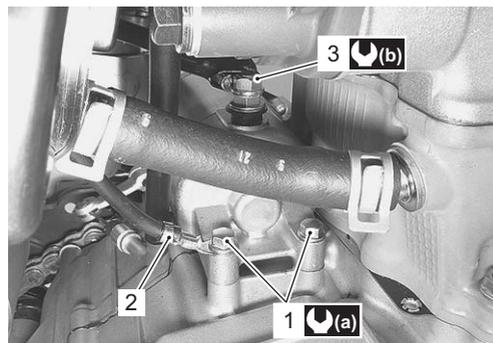
I933H1190005-02

- Tighten the starter motor mounting bolts (1) with the battery (–) lead wire (2) and starter motor lead wire mounting nut (3) to the specified torque. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-3)”.

Tightening torque

Starter motor mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

Starter motor lead wire mounting nut (b): 6 N·m (0.6 kgf-m, 4.5 lb-ft)



I933H1190006-01

Starter Motor Disassembly and Assembly

B933H21906003

Refer to “Starter Motor Removal and Installation (Page 11-4)”.

Disassembly

Disassemble the starter motor as shown in the starter motor components diagram. Refer to “Starter Motor Components (Page 11-3)”.

Assembly

Reassemble the starter motor in the reverse order of removal. Pay attention to the following points:

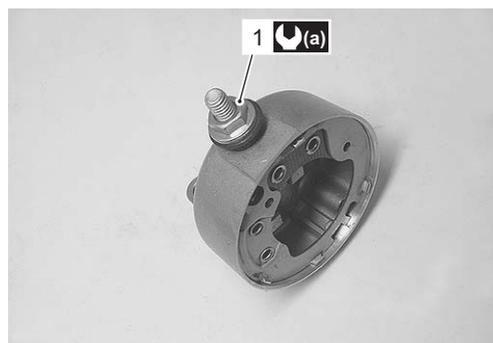
CAUTION

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 lb-ft)



I933H1190007-01

- Apply grease to the lip of the dust seal and bearing.

 **Grease 99000-25010 (SUZUKI SUPER GREASE A or equivalent)**



I933H1190008-04

- Fit the washer to the housing end correctly as shown in the figure.



I933H1190009-01

- Apply a small quantity of moly paste to the armature shaft.

 **Moly paste 99000-25140 (SUZUKI Moly paste or equivalent)**



I933H1190010-01

- Align the match mark on the starter motor case with the match mark on the housing end.

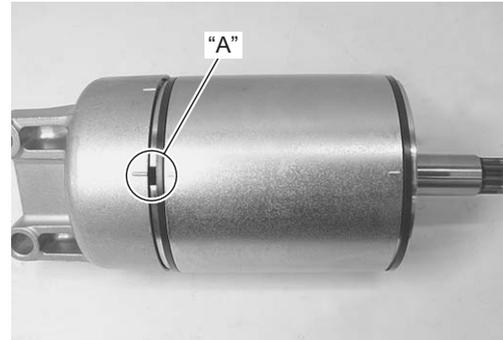
NOTE

The groove side "A" of brush holder the housing end.

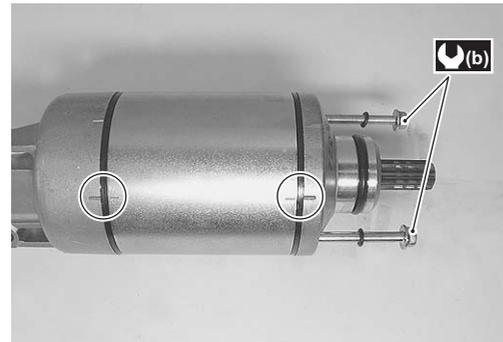
- Tighten the starter motor housing bolts to the specified torque.

Tightening torque

Starter motor housing bolt (b): 3 N·m (0.3 kgf-m, 2.0 lb-ft)



I933H1190011-01



I933H1190012-01

Starter Motor Related Parts Inspection

B933H21906004

Refer to "Starter Motor Disassembly and Assembly (Page 11-4)".

Carbon brush

Inspect the carbon brushes for abnormal wear, cracks or smoothness in the brush holder.

If either carbon brush is defective, replace the brush holder set with a new one.

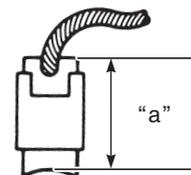
Measure the length "a" of the carbon brushes using a vernier calipers. If the measurement is less than the service limit, replace the housing end assembly with a new one.

Brush length "a"

Service limit: 6.5 mm (0.26 in)

Special tool

 : 09900-20102 (Vernier calipers (1/20 mm, 200 mm))



I831G1190065-01

11-6 Starting System:

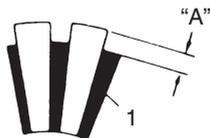
Commutator

Inspect the commutator for discoloration, abnormal wear or undercut "A".

If the commutator is abnormally worn, replace the armature.

If the commutator surface is discolored, polish it with #400 sandpaper and wipe it using a clean, dry cloth.

If there is no undercut, scrape 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.

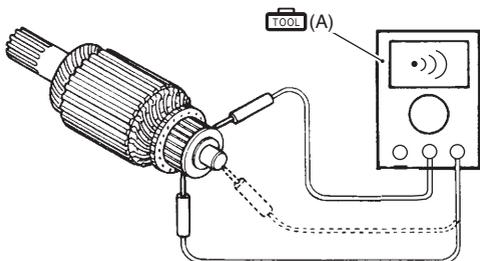
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

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.



I933H1190013-01

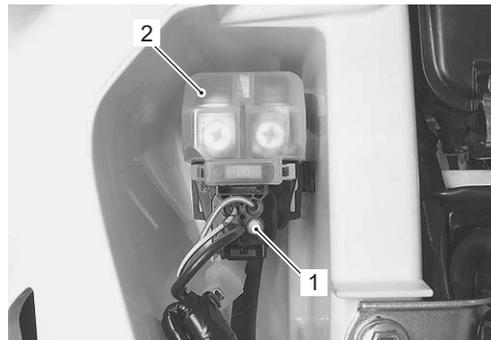
Starter Relay Removal and Installation

B933H21906005

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).



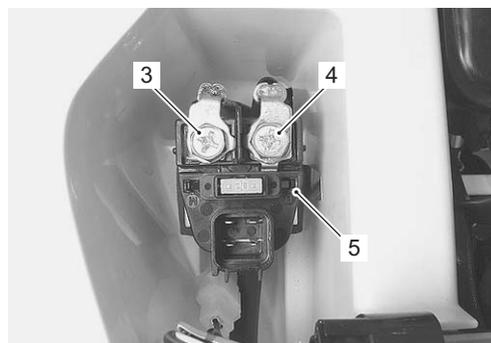
I933H1190014-01

- 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).



I933H1190015-02

Installation

Install the starter relay in the reverse order of removal.

Starter Relay Inspection

B933H21906006

Inspect the starter relay in the following procedures:

- 1) Remove the starter relay. Refer to “Starter Relay Removal and Installation (Page 11-6)”.
- 2) Apply 12 V to “A” and “B” terminals and check for continuity between the positive and negative terminals using the multi-circuit tester. If the starter relay clicks and continuity is found, the relay is OK.

⚠ CAUTION

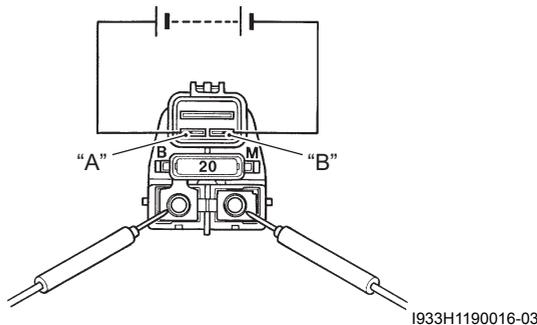
Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.

Special tool

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

Tester knob indication

Continuity test (•)))



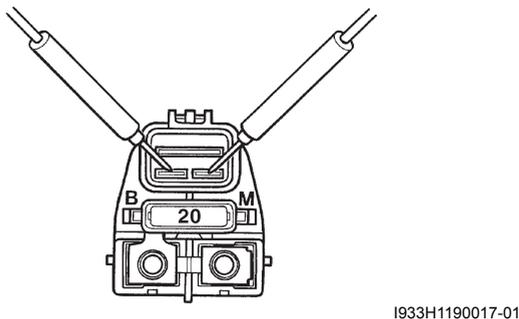
- 3) Measure the relay coil resistance between the terminals using the multi-circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

Special tool

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

Starter relay resistance

3 – 6 Ω



- 4) Install the starter relay.

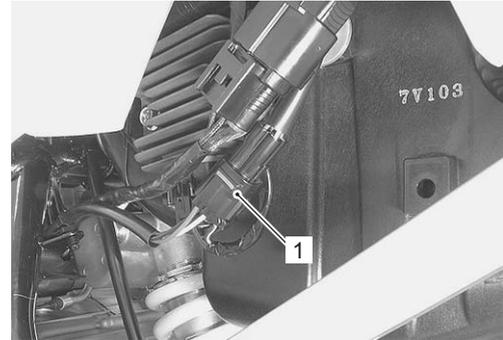
Gear Position (GP) Switch Inspection

B933H21906007

Refer to “DTC “C31” (P0705): GP Switch Circuit Malfunction in Section 1A (Page 1A-58)”.

Inspect the gear position switch in the following procedures:

- 1) Disconnect the gear position switch coupler (1).



I933H1190018-01

- 2) Inspect the gear position switch for continuity with a tester. If any abnormality is found, replace the gear position switch with a new one. Refer to “Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)”.

Special tool

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

Tester knob indication

Continuity (•)))

Position \ Color	R	Bl	W	B
R	○			○
N		○		○
F			○	○

I933H1190019-01

- 3) After finishing the gear position switch inspection, reinstall the removed parts.

11-8 Starting System:

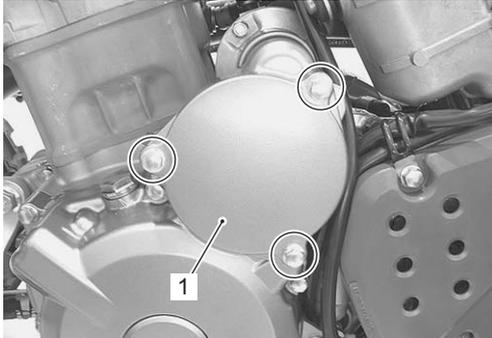
Starter Torque Limiter / Starter Clutch Removal and Installation

B933H21906008

Removal

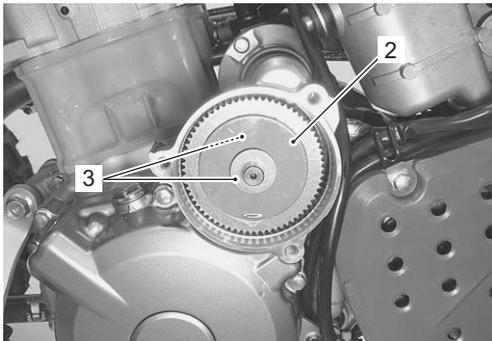
Starter torque limiter

- 1) Remove the starter torque limiter cover (1).



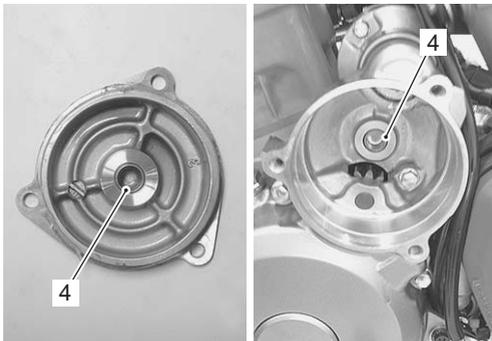
I933H1190020-01

- 2) Remove the starter torque limiter (2) with the washers (3).



I933H1190021-01

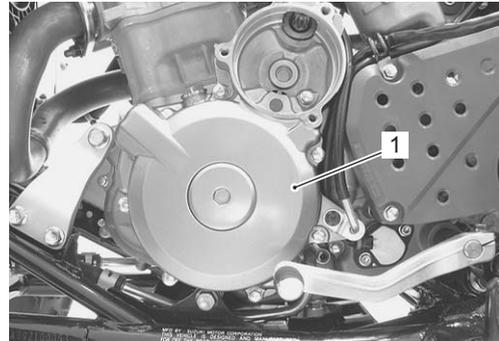
- 3) Remove the bushings (4) from the starter torque limiter cover and generator cover.



I933H1190022-01

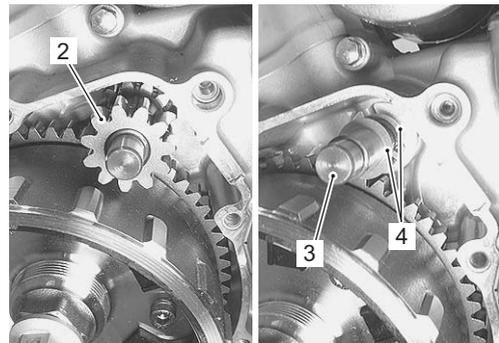
Starter clutch

- 1) Drain engine oil.
- 2) Remove the generator cover (1). Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".



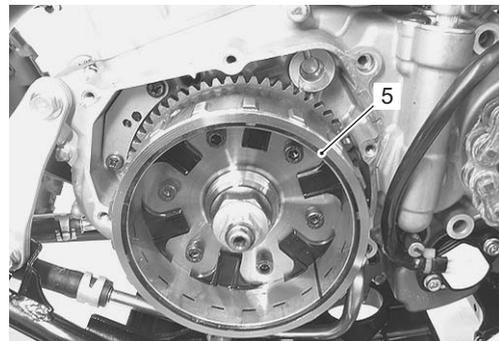
I933H1190023-01

- 3) Remove the starter idle gear (2) and starter idle gear shaft (3) with the washers (4).



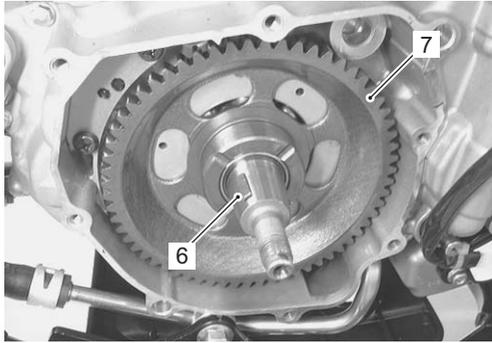
I933H1190024-05

- 4) Remove the generator rotor assembly (5). Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".



I933H1190025-01

5) Remove the key (6) and starter driven gear (7).

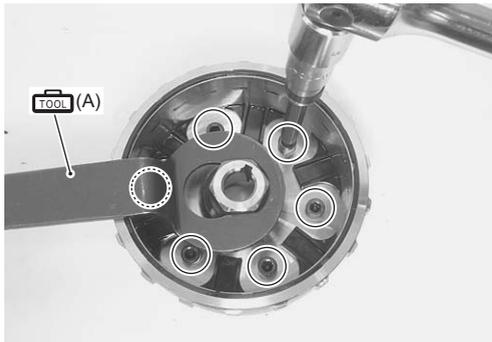


I933H1190026-01

6) Hold the generator rotor with the special tool and remove the starter clutch bolts.

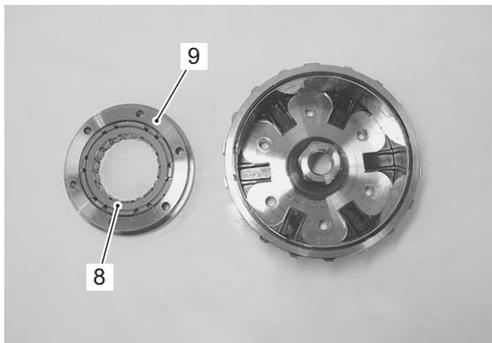
Special tool

TOOL (A): 09930-44520 (Rotor holder)



I933H1190027-01

7) Remove the one way clutch (8) from the guide (9).



I933H1190028-01

Installation

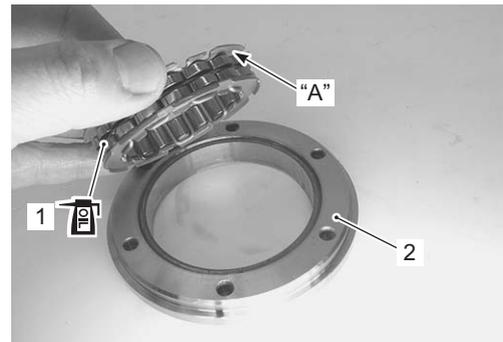
Install the starter clutch in the reverse order of removal. Pay attention to the following points:

Starter clutch

- 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).

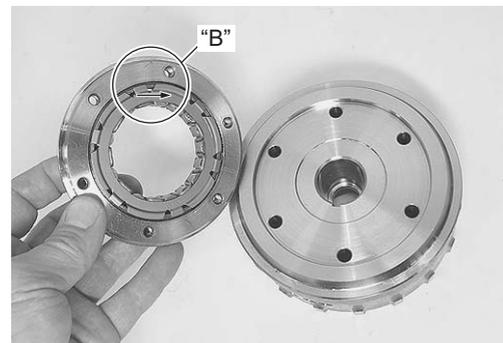


I933H1190029-01

- Install the guide to the generator rotor.

NOTE

The arrow mark "B" must face the generator rotor side.



I933H1190030-01

11-10 Starting System:

- Apply thread lock to the bolts, and then tighten them to the specified torque with the special tool.

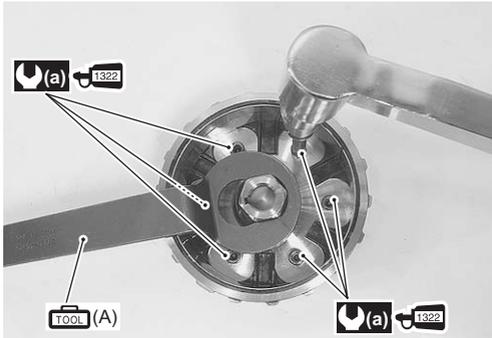
 **1303** : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Special tool

 **TOOL (A)**: 09930-44520 (Rotor holder)

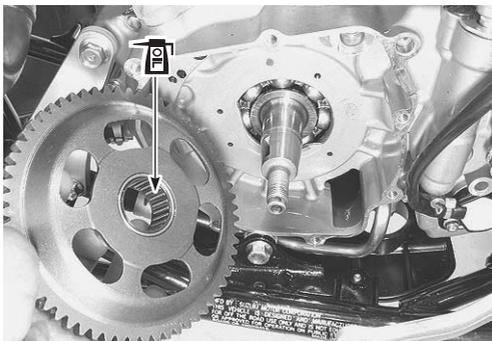
Tightening torque

Starter clutch bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I933H1190031-01

- Apply engine oil to the bearing of the starter driven gear.



I933H1190032-01

- Install the generator rotor assembly onto crankshaft. Refer to "Generator Removal and Installation in Section 1J (Page 1J-5)".
- Apply molybdenum oil solution to the idle gear shaft hole.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



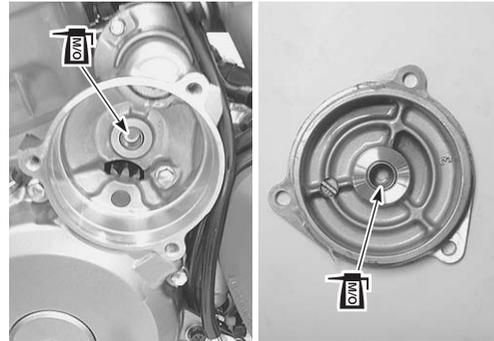
I933H1190033-01

- After installing the generator cover, pour engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)".

Starter torque limiter

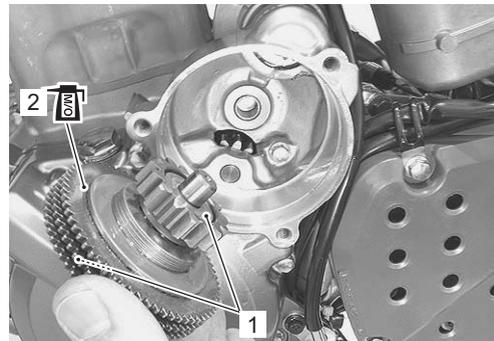
- Apply molybdenum oil solution to the inside of bushings.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



I933H1190034-01

- Fit the washers (1) onto the starter torque limiter (2).
- Apply engine oil to the starter torque limiter (2).
- Install the starter torque limiter (2) to the crankcase.



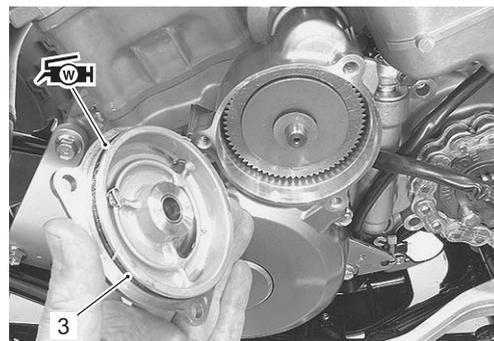
I933H1190035-01

- Apply grease to the O-ring (3).

CAUTION

Replace to the O-ring with a new one.

 **M/O: Grease 99000-25160 (Water resistance grease or equivalent)**



I933H1190036-02

Starter Torque Limiter Inspection

B933H21906009

Inspect the starter torque limiter in the following procedures:

⚠ CAUTION

- Do not attempt to disassemble the starter torque limiter.
- The starter torque limiter is available only as an assembly part.

- 1) Hold the starter torque limiter with the special tools and vise as shown in the figure.

Special tool

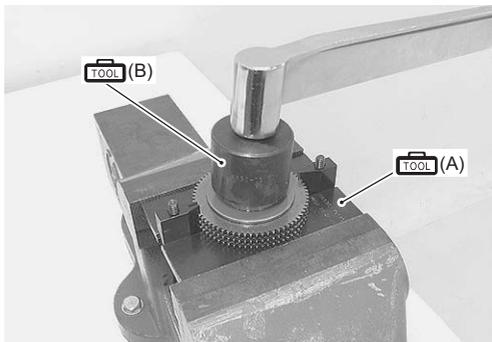
TOOL (A): 09930-73170 (Starter torque limiter holder)

TOOL (B): 09930-73180 (Starter torque limiter socket)

- 2) Turn the starter torque limiter with a torque wrench and check the slip torque. If the slip torque is not within the specification, replace the starter torque limiter with a new one.

Starter torque limiter slip torque

Standard: 30 – 55 N·m (3.0 – 5.5 kgf-m, 21.5 – 40.0 lb-ft)



I933H1190037-01

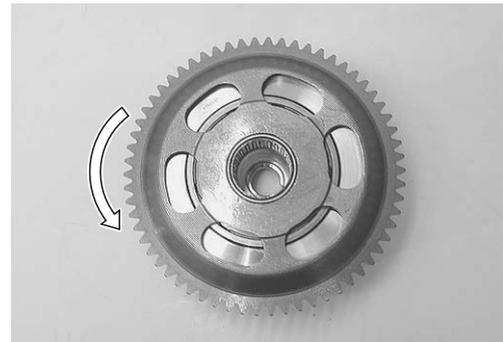
Starter Clutch Related Parts Inspection

B933H21906010

Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation (Page 11-8)".

Starter clutch

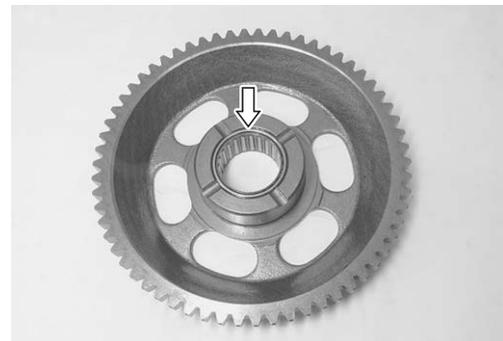
- 1) Install the starter driven gear onto the starter clutch.
- 2) Turn the starter driven gear by hand to inspect the starter clutch for smooth movement. The gear turns in one direction only. If a large resistance is felt for rotation, inspect the starter clutch or the starter clutch contacting surface on the starter driven gear for wear or damage. If they are found to be damaged, replace the one way clutch with a new one.



I933H1190038-01

Starter driven gear bearing

Inspect the starter driven gear bearing for wear or damage. If necessary, replace it with a new one.



I933H1190039-01

Starter idle gear

Inspect the starter idle gear for wear or damage. If any damage is found, replace it with a new one.



I933H1190040-01

11-12 Starting System:

Starter Driven Gear Bearing Removal and Installation

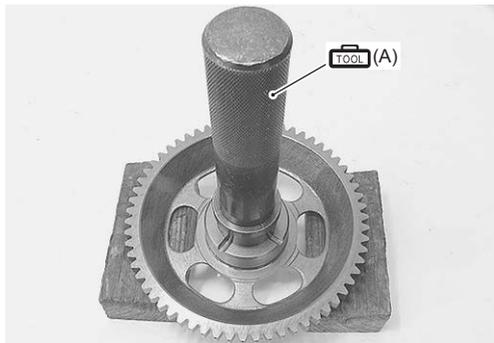
B933H21906011

Removal

- 1) Remove the starter driven gear. Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation (Page 11-8)".
- 2) Remove the bearing with the special tool.

Special tool

 (A): 09913-70210 (Bearing installer set)



I933H1190041-01

Installation

Install the starter driven gear bearing in the reverse order of removal. Pay attention to following point:

- Install the bearing with the special tool.

Special tool

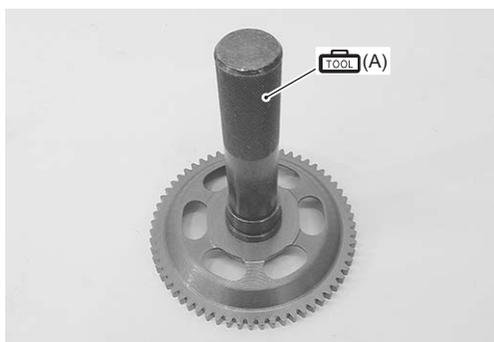
 (A): 09913-70210 (Bearing installer set)

CAUTION

The removed bearing must be replaced with a new one.

NOTE

The stamped mark on the bearing must face outside.



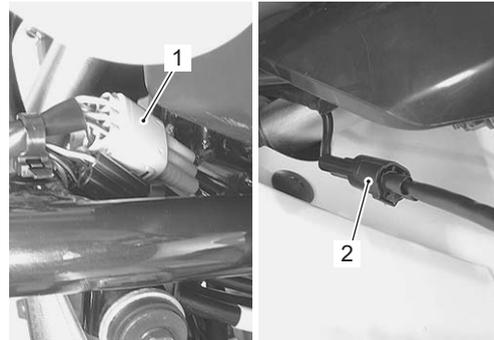
I933H1190042-01

Starter Button Inspection

B933H21906012

Inspect the starter button in the following procedures:

- 1) Remove the left side cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Disconnect the handlebar switch coupler (1) and clutch lever switch coupler (2).



I933H1190043-01

- 3) Inspect the starter button for continuity with a tester. If any abnormality is found, replace the handle switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page 6B-3)".

Special tool

 : 09900-25008 (Multi-circuit tester set)

Tester knob indication

Continuity ()

Color	Y/B	B
Position		
•		
PUSH		

I933H1190044-01

- 4) After finishing the starter button inspection, reinstall the removed parts.

Specifications

Service Data

B933H21907001

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

B933H21907002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb-ft	
Starter motor mounting bolt	10	1.0	7.0	☞ (Page 11-4)
Starter motor lead wire mounting nut	6	0.6	4.5	☞ (Page 11-4)
Starter motor brush holder mounting nut	7	0.7	5.0	☞ (Page 11-4)
Starter motor housing bolt	3	0.3	2.0	☞ (Page 11-5)
Starter clutch bolt	10	1.0	7.0	☞ (Page 11-10)

NOTE

The specified tightening torque is also described in the following.
 “Starter Motor Components (Page 11-3)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H21908001

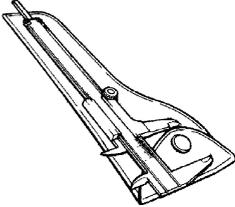
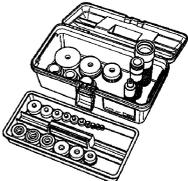
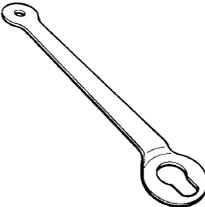
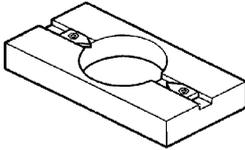
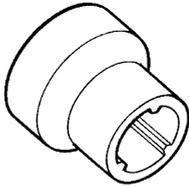
Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SUPER GREASE A or equivalent	P/No.: 99000-25010	☞ (Page 11-5)
	Water resistance grease or equivalent	P/No.: 99000-25160	☞ (Page 11-4) / ☞ (Page 11-10)
Moly paste	SUZUKI Moly paste or equivalent	P/No.: 99000-25140	☞ (Page 11-5)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞ (Page 11-10) / ☞ (Page 11-10)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞ (Page 11-10)

NOTE

Required service material is also described in the following.
 “Starter Motor Components (Page 11-3)”

Special Tool

B933H21908002

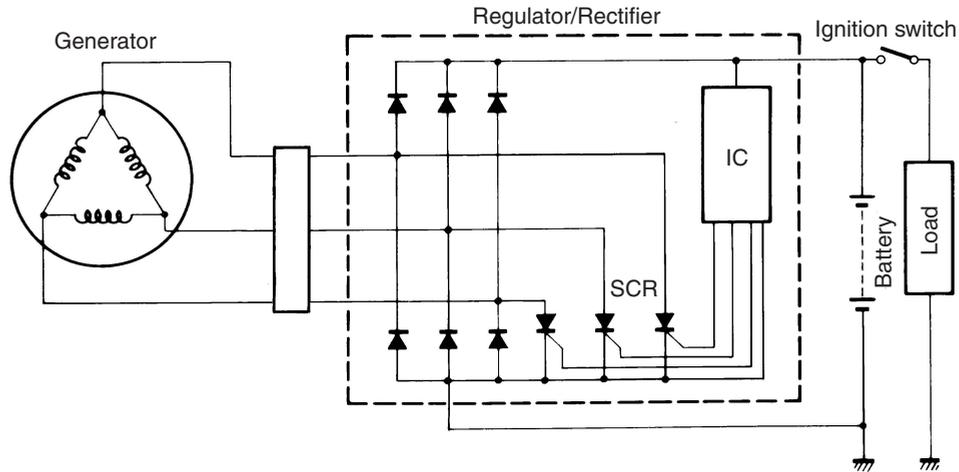
09900-20102 Vernier calipers (1/20 mm, 200 mm) ☞ (Page 11-5)		09900-25008 Multi-circuit tester set ☞ (Page 11-6) / ☞ (Page 11-7) / ☞ (Page 11-7) / ☞ (Page 11-7) / ☞ (Page 11-12)	
09913-70210 Bearing installer set ☞ (Page 11-12) / ☞ (Page 11-12)		09930-44520 Rotor holder ☞ (Page 11-9) / ☞ (Page 11-10)	
09930-73170 Starter torque limiter holder ☞ (Page 11-11)		09930-73180 Starter torque limiter socket ☞ (Page 11-11)	

Charging System

Schematic and Routing Diagram

Charging System Diagram

B933H21A02001



I718H11A0001-01

Component Location

Charging System Components Location

B933H21A03001

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

Diagnostic Information and Procedures

Charging System Symptom Diagnosis

B933H21A04001

Condition	Possible cause	Correction / Reference Item
Generator does not charge	Open- or short-circuited lead wires, or loose lead connections.	<i>Repair, replace or connect properly.</i>
	Short-circuited, grounded or open generator coil.	<i>Replace.</i>
	Short-circuited or punctured regulator/rectifier.	<i>Replace.</i>
Generator does charge, but charging rate is below the specification	Lead wires tend to get short- or open-circuited or loosely connected at terminals.	<i>Repair or retighten.</i>
	Grounded or open-circuited generator coil.	<i>Replace.</i>
	Defective regulator/rectifier.	<i>Replace.</i>
	Defective cell plates in the battery.	<i>Replace the battery.</i>
Generator overcharges	Internal short-circuit in the battery.	<i>Replace the battery.</i>
	Damaged or defective regulator/rectifier.	<i>Replace.</i>
	Poorly grounded regulator/rectifier.	<i>Clean and tighten ground connection.</i>
Unstable charging	Lead wire insulation frayed due to vibration, resulting in intermittent short-circuiting.	<i>Repair or replace.</i>
	Internally short-circuited generator.	<i>Replace.</i>
	Defective regulator/rectifier.	<i>Replace.</i>

1J-2 Charging System:

Condition	Possible cause	Correction / Reference Item
Battery overcharges	Faulty regulator/rectifier.	<i>Replace.</i>
	Faulty battery.	<i>Replace.</i>
	Poor contact of generator lead wire coupler.	<i>Repair.</i>
“Sulfation”, acidic white powdery substance or spots on surfaces of cell plates	Cracked battery case.	<i>Replace the battery.</i>
	Battery has been left in a run-down condition for a long time.	<i>Replace the battery.</i>
Battery runs down quickly	Trouble in charging system.	<i>Check the generator, regulator/rectifier and circuit connections and make necessary adjustments to obtain specified charging operation.</i>
	Cell plates have lost much of their active materials a result of overcharging.	<i>Replace the battery and correct the charging system.</i>
	Internal short-circuit in the battery.	<i>Replace the battery.</i>
	Too low battery voltage.	<i>Recharge the battery fully.</i>
	Too old battery.	<i>Replace the battery.</i>
Battery discharged too rapidly	Dirty container top and sides.	<i>Clean.</i>
	Old battery	<i>Replace.</i>
Battery “sulfation”	Incorrect charging rate. (When not in use battery should be checked at least once a month to avoid sulfation.)	<i>Replace the battery.</i>
	The battery was left unused in a cold climate for too long.	<i>Replace the battery if badly sulfated.</i>

Battery Runs Down Quickly

B933H21A04002

Troubleshooting

Step	Action	Yes	No
1	Check accessories which use excessive amounts of electricity. <i>Are accessories being installed?</i>	Remove accessories.	Go to Step 2.
2	Check the battery for current leakage. Refer to “Battery Current Leakage Inspection (Page 1J-3)”. <i>Is the battery for current leakage OK?</i>	Go to Step 3.	<ul style="list-style-type: none"> • 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)”. <i>Is the regulated voltage OK?</i>	<ul style="list-style-type: none"> • Faulty battery. • Abnormal driving condition. 	Go to Step 4.
4	Measure the resistance of the generator coil. Refer to “Generator Inspection (Page 1J-4)”. <i>Is the resistance of generator coil OK?</i>	Go to Step 5.	<ul style="list-style-type: none"> • Faulty generator coil. • Disconnected lead wires.
5	Measure the generator no-load performance. Refer to “Generator Inspection (Page 1J-4)”. <i>Is the generator no-load performance OK?</i>	Go to Step 6.	Faulty generator.
6	Inspect the regulator/rectifier. Refer to “Regulator / Rectifier Inspection (Page 1J-8)”. <i>Is the regulator/rectifier OK?</i>	Go to Step 7.	Faulty regulator/rectifier.
7	Inspect wirings. <i>Is the wirings OK?</i>	Faulty battery.	<ul style="list-style-type: none"> • Short circuit of wire harness. • Poor contact of couplers.

Repair Instructions

Battery Current Leakage Inspection

B933H21A06001

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

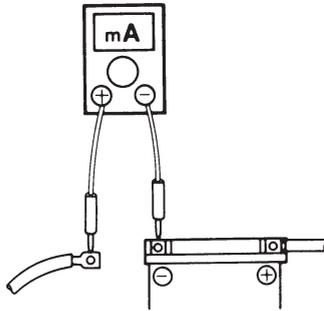
 : 09900-25008 (Multi-circuit tester set)

Tester knob indication

Current (---, 20 mA)

Battery current (Leak)

Under 1.0 mA



I649G11A0002-02

- 5) Connect the (-) battery terminal and install the seat.

Regulated Voltage Inspection

B933H21A06002

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) Connect the tachometer onto the spark plug high-tension cord.
- 3) Start the engine and keep it running at 5 000 r/min with the dimmer switch turned HI position.
- 4) 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 fully charged condition.

Special tool

 : 09900-25008 (Multi-circuit tester set)

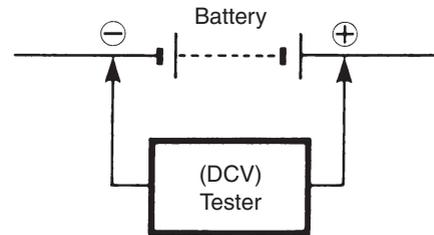
 : 09900-26006 (Engine tachometer (solar cell type))

Tester knob indication

Voltage (---)

Regulated voltage (Charging output)

Standard: 13.5 – 15.0 V at 5 000 r/min



I649G11A0003-02

- 5) Install the seat.

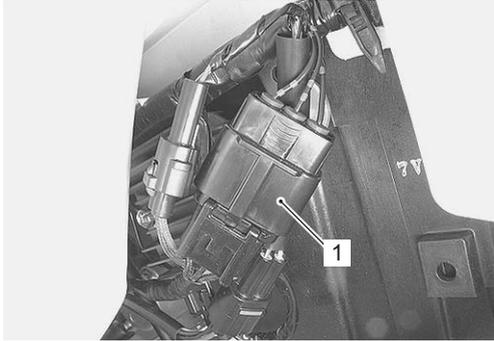
1J-4 Charging System:

Generator Inspection

B933H21A06003

Generator coil resistance

- 1) Disconnect the generator coupler (1).



I933H11A0001-01

- 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, it is not necessary to remove the generator.

Special tool

 : 09900-25008 (Multi-circuit tester set)

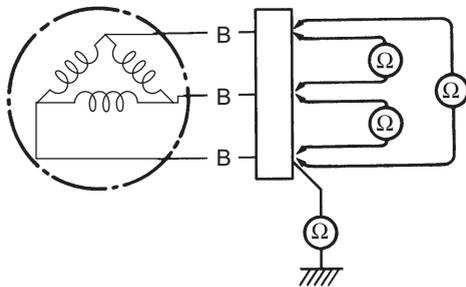
Tester knob indication

Resistance (Ω)

Generator coil resistance

0.1 – 1.5 Ω (B – B)

∞ Ω (B – Ground)

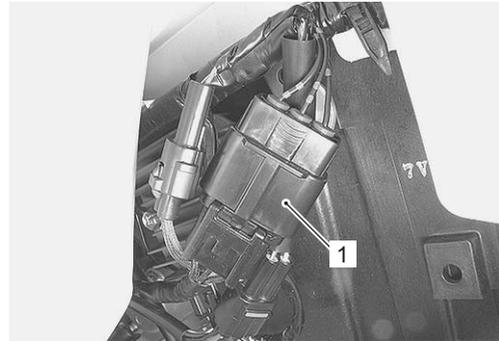


I933H11A0002-02

- 3) Connect the generator coupler (1).

No-load performance

- 1) Connect the tachometer onto the spark plug high-tension cord.
- 2) Disconnect the generator coupler (1).



I933H11A0001-01

- 3) Start the engine and keep it running at 5 000 r/min.
- 4) Using the multi-circuit tester, measure the voltage between three lead wires.
If the tester reads under the specified value, replace the generator with a new one.

Special tool

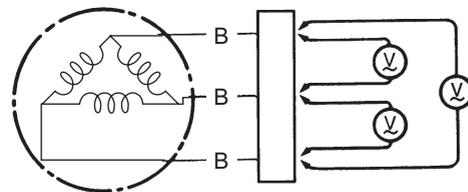
 : 09900-25008 (Multi-circuit tester set)

 : 09900-26006 (Engine tachometer (solar cell type))

Tester knob indication

Voltage (~)

**Generator no-load voltage (When engine is cold)
55 V (AC) and more at 5 000 r/min**



I933H11A0004-01

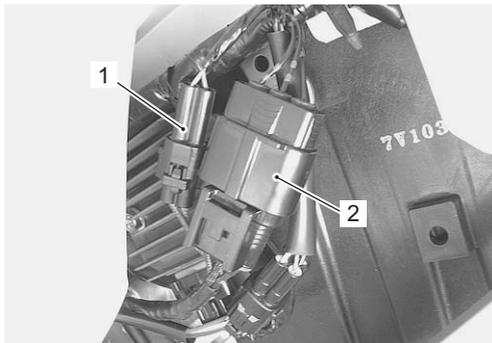
- 5) Connect the generator coupler (1).

Generator Removal and Installation

B933H21A06004

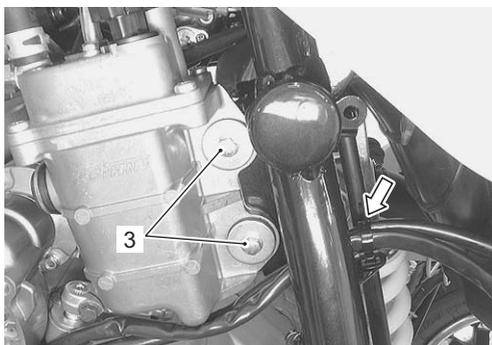
Removal

- 1) Drain engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)".
- 2) Disconnect the reverse lock release cable. (for transmission side) Refer to "Gear Position (GP) Switch Removal and Installation in Section 5B (Page 5B-12)".
- 3) Remove the starter torque limiter. Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation in Section 11 (Page 11-8)".
- 4) Disconnect the CKP sensor coupler (1) and generator coupler (2).



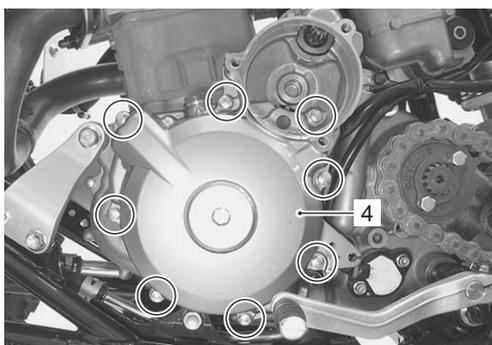
I933H11A0005-01

- 5) Remove the fuel pump mounting bolts (3).
- 6) Release the CKP sensor and generator lead wires from the clamp.



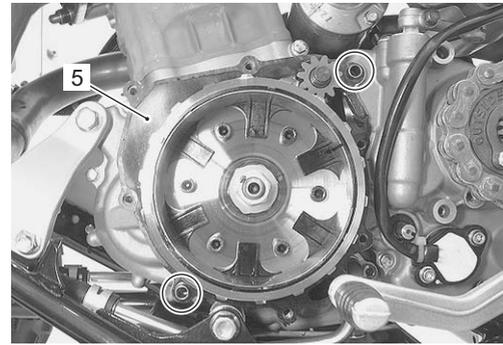
I933H11A0006-01

- 7) Remove the generator cover (4).



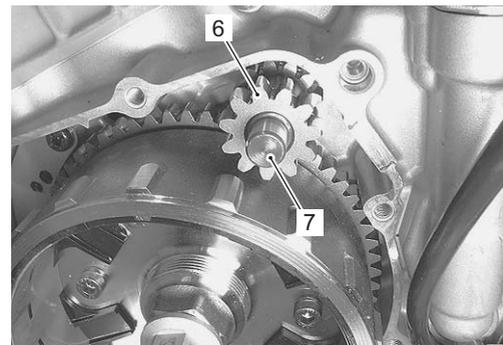
I933H11A0007-01

- 8) Remove the gasket (5) and dowel pin.



I933H11A0008-01

- 9) Remove the starter idle gear (6) and shaft (7) with the washers.



I933H11A0009-01

- 10) Hold the generator rotor with the special tool.

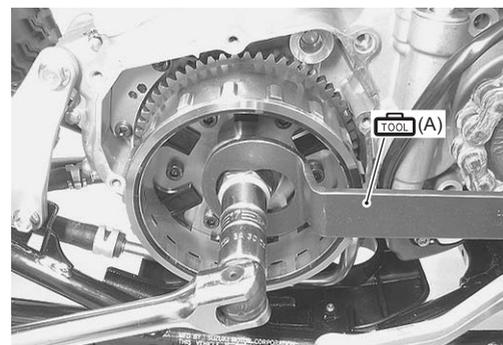
Special tool

 (A): 09930-44520 (Rotor holder)

- 11) Loosen the generator rotor nut.

NOTE

When loosening the generator rotor nut, do not remove it. The rotor nut is used in conjunction with the rotor remover when removing the rotor.



I933H11A0010-01

1J-6 Charging System:

- 12) Remove the generator rotor assembly (8) with the special tool.

Special tool

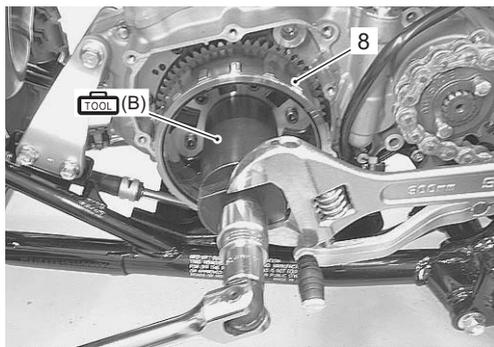
Tool (B): 09930-31921 (Rotor remover)

CAUTION

Do not hit the generator rotor with a hammer, otherwise the rotor may be damaged.

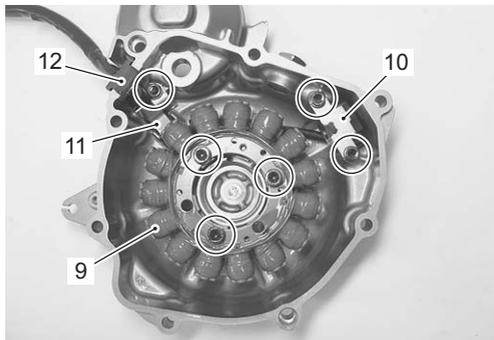
NOTE

Remove the starter clutch if necessary. Refer to "Starter Torque Limiter / Starter Clutch Removal and Installation in Section 11 (Page 11-8)".



I933H11A0011-02

- 13) Remove the generator stator (9) CKP sensor (10), bracket (11) and grommet (12).

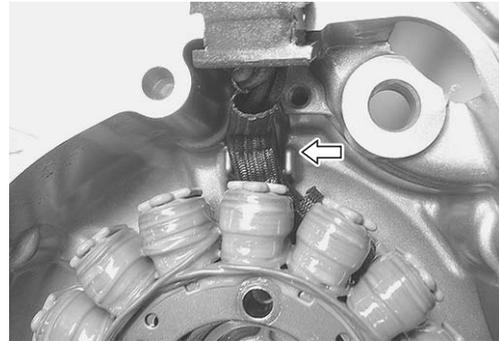


I933H11A0012-04

Installation

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

- When installing the generator stator or CKP sensor, route the wire properly.



I933H11A0013-01

- Tighten the generator stator set bolts, lead wire bracket bolt and CKP sensor mounting bolts to the specified torque. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-3)".

NOTE

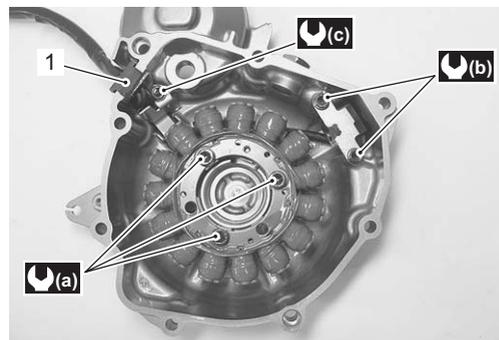
Be sure the grommet (1) is set to the generator cover.

Tightening torque

Generator stator set bolt (a): 11 N·m (1.1 kgf-m, 8.0 lb-ft)

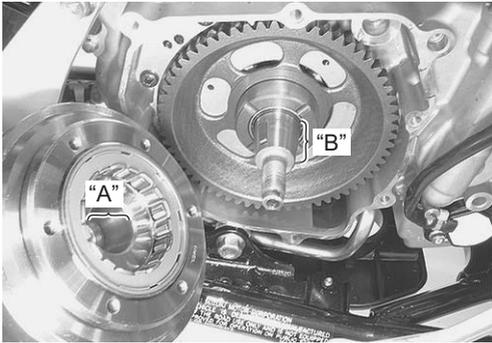
CKP sensor mounting bolt (b): 5.5 N·m (0.55 kgf-m, 4.0 lb-ft)

Generator lead wire bracket bolt (c): 5.5 N·m (0.55 kgf-m, 4.0 lb-ft)



I933H11A0014-03

- Degrease the tapered portion "A" of generator rotor assembly and also the crankshaft "B". Use nonflammable cleaning solvent to wipe off oily or greasy matter to make these surfaces completely dry.
- Install the generator rotor assembly onto crankshaft.



I933H11A0015-01

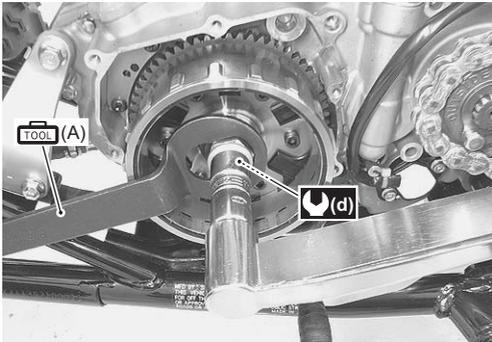
- Hold the generator rotor with the special tool and tighten the generator rotor nut to the specified torque.

Special tool

 (A): 09930-44520 (Rotor holder)

Tightening torque

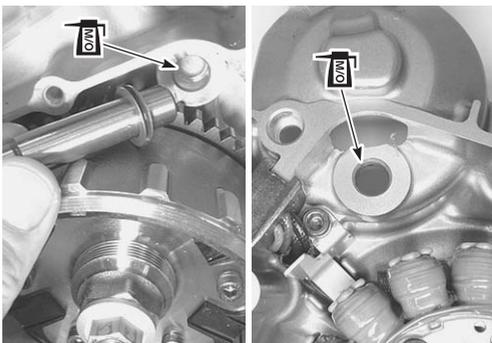
Generator rotor nut (d): 120 N·m (12.0 kgf·m, 87.0 lb-ft)



I933H11A0016-01

- Apply molybdenum oil solution to the idle gear shaft holes.

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)

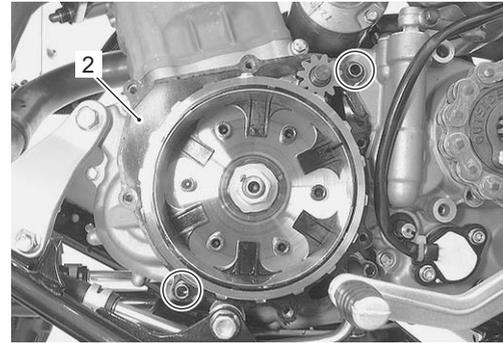


I933H11A0017-01

- Install the dowel pins and new gasket (2).

⚠ CAUTION

Use a new gasket to prevent oil leakage.



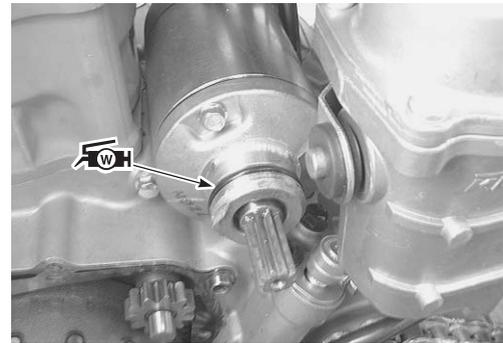
I933H11A0018-01

- Apply grease to the starter motor O-ring.

 : Grease 99000-25160 (Water resistance grease or equivalent)

⚠ CAUTION

Replace the O-ring with a new one.



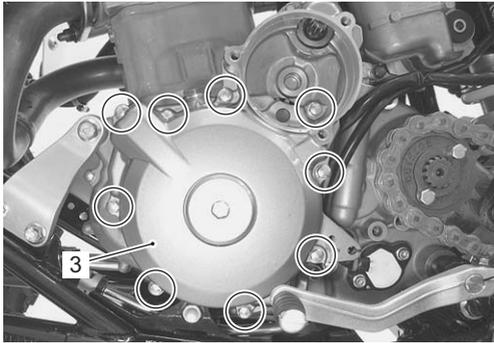
I933H11A0019-02

1J-8 Charging System:

- Install the generator cover (3) and tighten the generator cover bolts.

⚠ WARNING

Be careful not to pinch the finger between the generator cover and the crankcase.

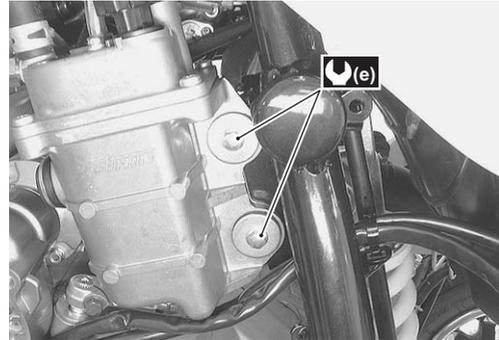


I933H11A0020-01

- Route the CKP sensor and generator lead wire. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-3)".
- Tighten the fuel pump mounting bolts to the specified torque.

Tightening torque

Fuel pump mounting bolt (e): 10 N·m (1.0 kgf-m, 7.0 lb-ft)



I933H11A0021-01

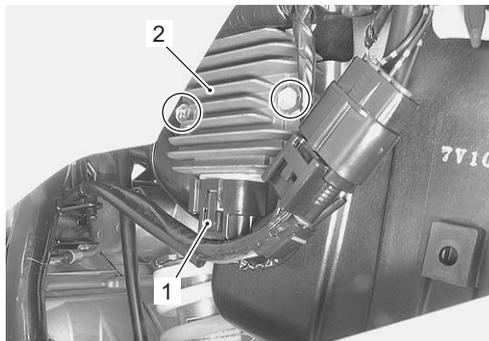
- Adjust the reverse lock cable play. Refer to "Reverse Lock Cable Play Inspection and Adjustment in Section 5B (Page 5B-1)".
- After installing the removed parts, pour engine oil. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)".

Regulator / Rectifier Inspection

Inspect the regulator/rectifier in the following procedures:

- 1) Turn the ignition switch OFF.
- 2) Disconnect the regulator/rectifier coupler (1) and remove the regulator/rectifier (2).

B933H21A06005



I933H11A0022-01

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

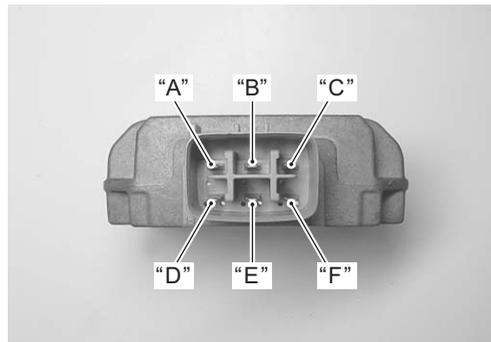
If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

Special tool

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

Tester knob indication

Diode test (←)



I933H11A0023-01

Unit: V

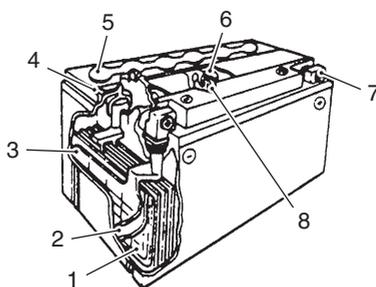
		"A"	"B"	"C"	"D"	"E"	"F"
(-) probe of tester to:	"A"	—	*	0.4 – 1.1	0.1 – 0.8	0.1 – 0.8	0.1 – 0.8
	"B"	*	—	*	*	*	*
	"C"	*	*	—	*	*	*
	"D"	*	*	0.1 – 0.8	—	*	*
	"E"	*	*	0.1 – 0.8	*	—	*
	"F"	*	*	0.1 – 0.8	*	*	—

*1.4 V and more (tester's battery voltage)

4) Connect the regulator/rectifier coupler and reinstall the removed parts.

Battery Components

B933H21A06006



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

B933H21A06007

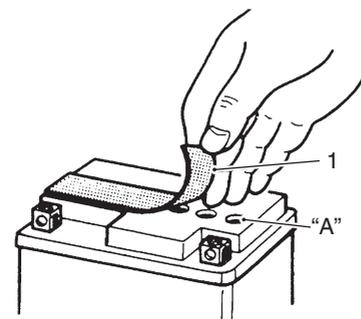
Initial charging

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".



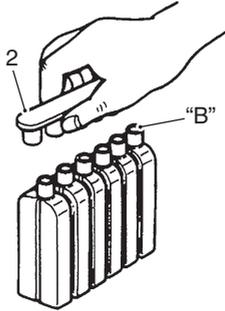
I649G11A0039-03

1J-10 Charging System:

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.



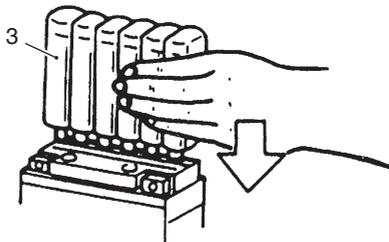
I649G11A0040-03

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.

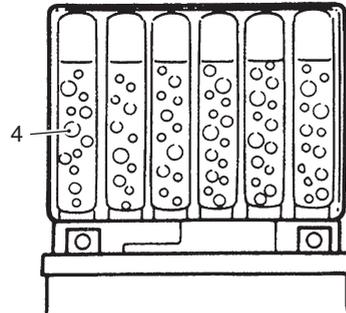
NOTE

Do not allow any of the electrolyte to spill.



I649G11A0041-03

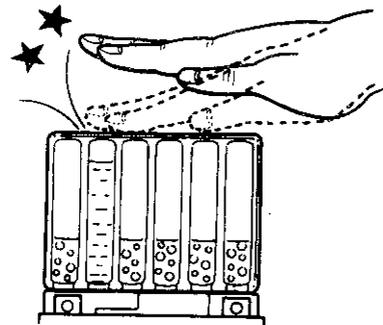
5) Make sure that air bubbles (4) rise to the top of each electrolyte container, and leave in this position for about more than 20 minutes.



I649G11A0042-03

NOTE

**If no air bubbles come out from a filler port, tap the bottom of the electrolyte container two or three times.
Never remove the container from the battery.**



I310G11A0024-01

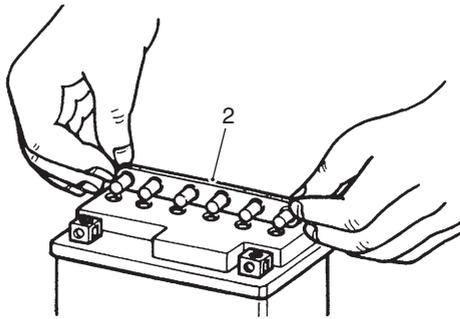
6) After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery.

7) Wait for about 20 minutes.

8) Insert the caps (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.

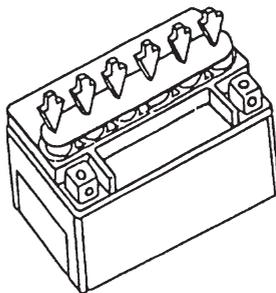
⚠ CAUTION

- Once the caps are installed to the battery, do not remove the caps.
- Do not tap the caps with a hammer when installing them.

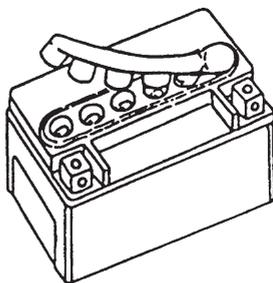


I718H11A0027-01

Correct



Incorrect



I649G11A0047-02

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 vehicle is not used for a long period, check the battery every 1 month to prevent the battery discharge.

- 1) Remove the battery from the vehicle. 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.

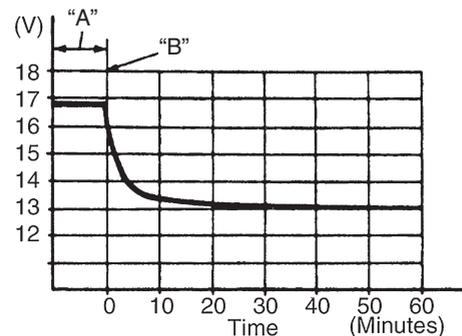
Recharging time

0.9 A for 5 to 10 hours or 4 A for 1 hour

⚠ CAUTION

Be careful not to permit the charging current to exceed 4 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.

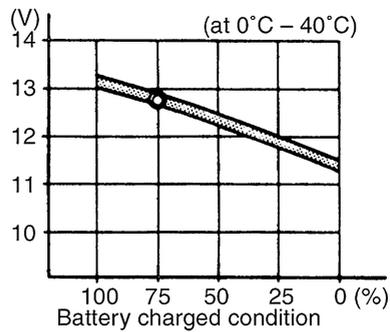


I649G11A0045-02

"A": Charging period	"B": Stop charging
----------------------	--------------------

1J-12 Charging System:

- 4) Install the battery to the vehicle. Refer to "Battery Removal and Installation (Page 1J-12)".



I705H11A0029-02

Battery Removal and Installation

B933H21A06008

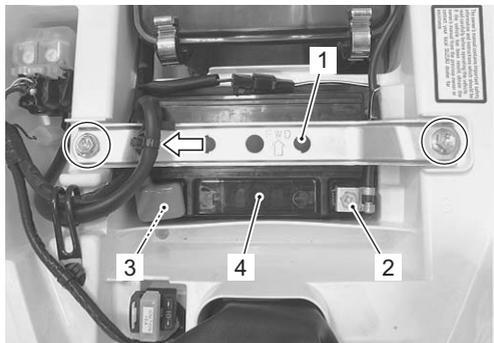
Removal

- 1) Remove the seat. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Disconnect the clamp and remove the battery plate (1).
- 3) Disconnect the battery (-) lead wire (2).
- 4) Disconnect the battery (+) lead wire (3).

NOTE

Be sure to disconnect the battery (-) lead wire (2) first, then disconnect the battery (+) lead wire (3).

- 5) Remove the battery (4).



I933H11A0024-02

Installation

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

⚠ CAUTION

Never use anything except the specified battery.

- Apply thread lock to the battery plate mounting bolts and tighten them.

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

- Route the battery lead wire harness properly. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-3)".



I933H11A0025-02

Battery Visual Inspection

B933H21A06009

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.

Specifications

Service Data

B933H21A07001

Electrical

Unit: mm

Item		Specification	Note
Generator coil resistance		0.1 – 1.5 Ω	
Generator maximum output		200 W at 5 000 r/min	
Generator no-load voltage (When engine is cold)		55 V (AC) and more at 5 000 r/min	
Regulated voltage		13.5 – 15.0 V at 5 000 r/min	
Battery	Type designation	YTX9-BS	
	Capacity	12 V 28.8 kC (8 Ah)/10 HR	

⚠ CAUTION

Never use anything except the specified battery.

Tightening Torque Specifications

B933H21A07002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Generator stator set bolt	11	1.1	8.0	☞ (Page 1J-6)
CKP sensor mounting bolt	5.5	0.55	4.0	☞ (Page 1J-6)
Generator lead wire bracket bolt	5.5	0.55	4.0	☞ (Page 1J-6)
Generator rotor nut	120	12.0	87.0	☞ (Page 1J-7)
Fuel pump mounting bolt	10	1.0	7.0	☞ (Page 1J-8)

Reference:

For the tightening torque of fastener not specified in this section, refer to "Tightening Torque Specifications in Section 0C (Page 0C-6)".

Special Tools and Equipment

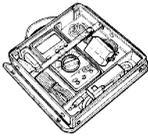
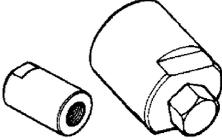
Recommended Service Material

B933H21A08001

Material	SUZUKI recommended product or Specification		Note
Grease	Water resistance grease or equivalent	P/No.: 99000-25160	☞ (Page 1J-7)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞ (Page 1J-7)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞ (Page 1J-12)

Special Tool

B933H21A08002

<p>09900-25008 Multi-circuit tester set</p> <p>☞ (Page 1J-3) / ☞ (Page 1J-3) / ☞ (Page 1J-4) / ☞ (Page 1J-4) / ☞ (Page 1J-9)</p> 	<p>09900-26006 Engine tachometer (solar cell type)</p> <p>☞ (Page 1J-3) / ☞ (Page 1J-4)</p> 
<p>09930-31921 Rotor remover</p> <p>☞ (Page 1J-6)</p> 	<p>09930-44520 Rotor holder</p> <p>☞ (Page 1J-5) / ☞ (Page 1J-7)</p> 

Exhaust System

Precautions

Precautions for Exhaust System

B933H21B00001

⚠ WARNING

To avoid the risk of being burned, do not touch the exhaust system when the system is hot. Any service on the exhaust system should be performed when the system is cool.

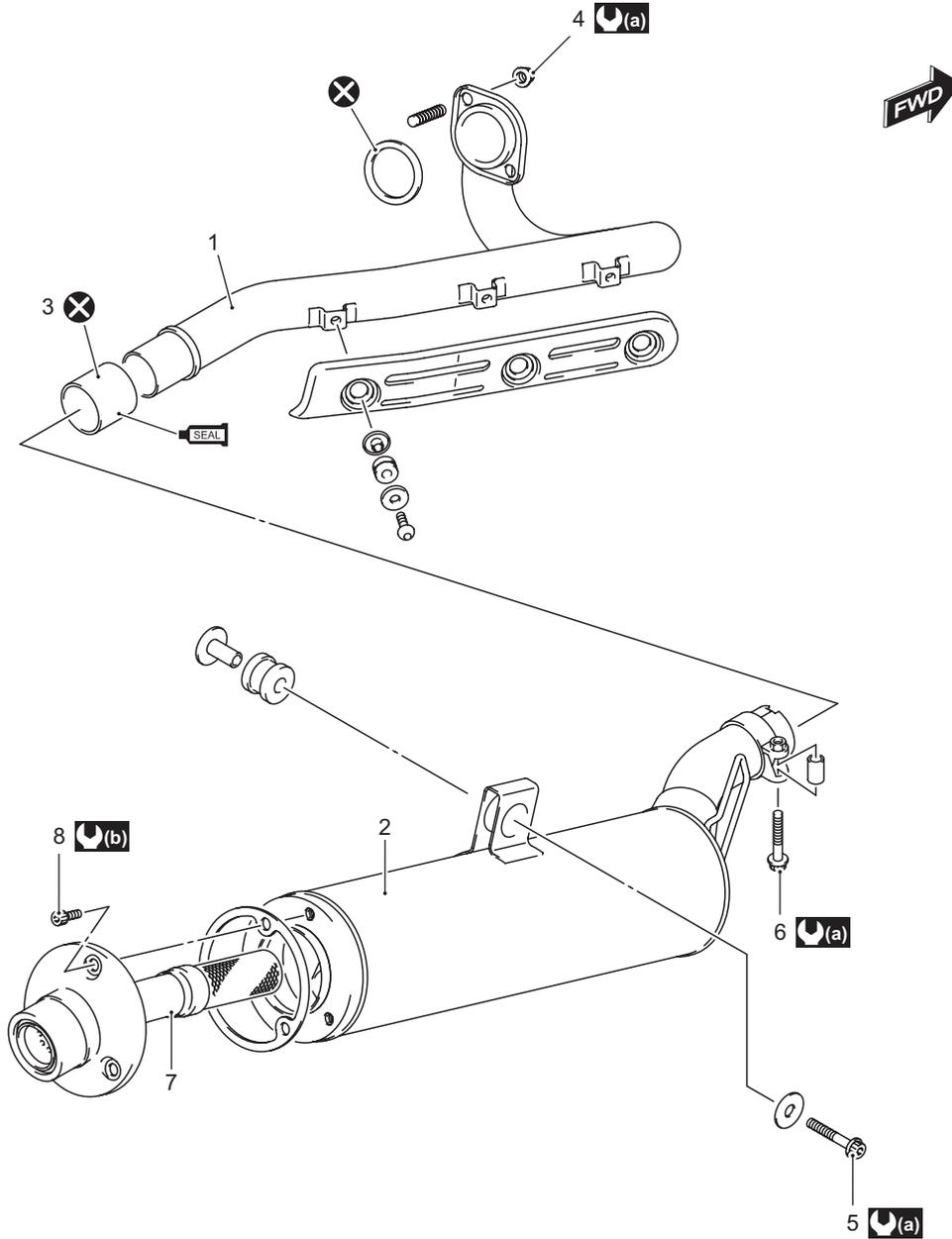
⚠ CAUTION

Make sure that the exhaust pipe and muffler have enough clearance from the rubber parts and plastic parts to avoid melting.

Repair Instructions

Exhaust System Construction

B933H21B06001



1. Exhaust pipe	5. Muffler mounting bolt	(a) : 23 N-m (2.3 kgf-m, 16.5 lb-ft)
2. Muffler	6. Muffler connecting bolt	(b) : 13 N-m (1.3 kgf-m, 9.5 lb-ft)
3. Connector	7. Spark arrester	SEAL : Apply muffler seal.
4. Exhaust pipe nut	8. Spark arrester mounting bolt.	X : Do not reuse.

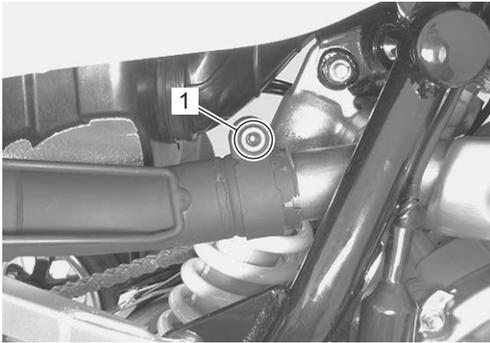
I933H11B0012-03

Muffler / Exhaust Pipe Removal and Installation

B933H21B06002

Removal

- 1) Loosen the muffler connecting bolt (1).



I933H11B0001-01

- 2) Remove the muffler (2) by removing the mounting bolts.

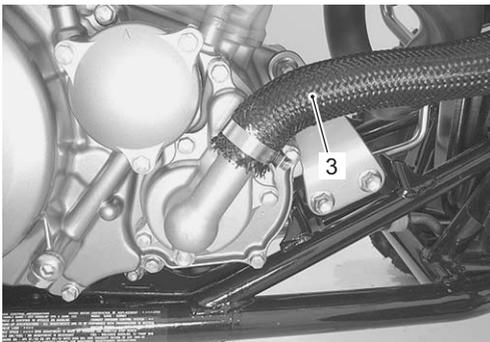
NOTE

Support the muffler to prevent it from falling.



I933H11B0002-01

- 3) Remove the side covers, left and right. 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-13)".
- 5) Disconnect the radiator outlet hose (3).

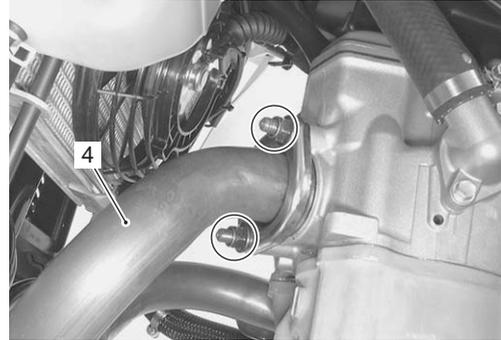


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- 6) Remove the exhaust pipe (4) by removing the exhaust pipe mounting nuts.

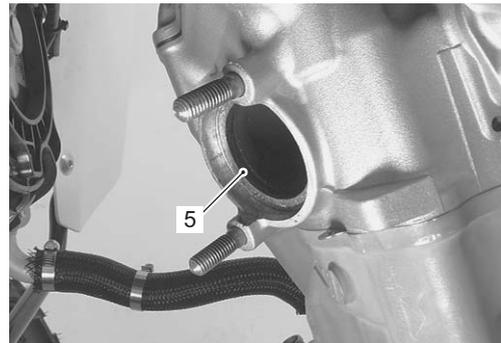
NOTE

Support the exhaust pipe to prevent it from falling.



I933H11B0004-07

- 7) Remove the exhaust pipe gasket (5).



I933H11B0005-02

Installation

Install the muffler/exhaust pipe in the reverse order of removal.

Pay attention to the following points:

⚠ CAUTION

Replace the gasket and connector with new ones.

- Install the new exhaust pipe gasket (1).
- Tighten the exhaust pipe mounting nuts to the specified torque.

Tightening torque

Exhaust pipe mounting nut (a): 23 N·m (2.3 kgf·m, 16.5 lb·ft)



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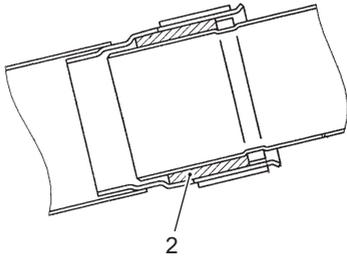
1K-4 Exhaust System:

- Install the new muffler connector (2).

NOTE

When installing new connector, remove the old sealer from the exhaust pipe 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)



I933H11B0007-01

- Tighten the muffler mounting pipe bolts (3) and muffler connecting bolt (4) to the specified torque.

Tightening torque

Muffler mounting bolt (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)

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



I933H11B0008-04



I933H11B0009-02

Exhaust System Inspection

B933H21B06003

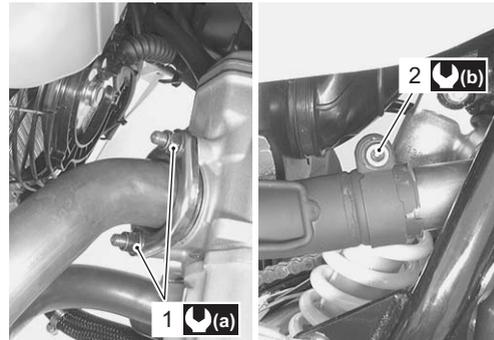
Inspect the exhaust pipe connection and muffler connection for exhaust gas leakage and mounting condition. If any defect are found, replace the exhaust pipe assembly or muffler with a new one. Check the exhaust pipe nuts (1), muffler connecting bolt (2) and muffler mounting bolts (3) are tightened to their specified torque.

Tightening torque

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

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

Muffler mounting bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H11B0010-01



I933H11B0011-01

Spark Arrester Inspection

B933H21B06004

Refer to "Spark Arrester Cleaning in Section 0B (Page 0B-10)".

Specifications

Tightening Torque Specifications

B933H21B07001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Exhaust pipe mounting nut	23	2.3	16.5	☞ (Page 1K-3)
Muffler mounting bolt	23	2.3	16.5	☞ (Page 1K-4) / ☞ (Page 1K-4)
Muffler connecting bolt	23	2.3	16.5	☞ (Page 1K-4) / ☞ (Page 1K-4)
Exhaust pipe nut	23	2.3	16.5	☞ (Page 1K-4)

NOTE

The specified tightening torque is also 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 Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H21B08001

Material	SUZUKI recommended product or Specification	Note
Muffler seal	MUFFLER SEAL LOCTITE 5920 (commercially available) or equivalent	☞ (Page 1K-4)

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

B933H2200001

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.

NOTE

The right and left suspension related parts (shock absorbers, suspension arms and knuckles) are installed symmetrically and therefore the removal procedure for one side is the same as that for the other side.

Suspension General Diagnosis

Diagnostic Information and Procedures

Suspension and Wheel Symptom Diagnosis

B933H22104001

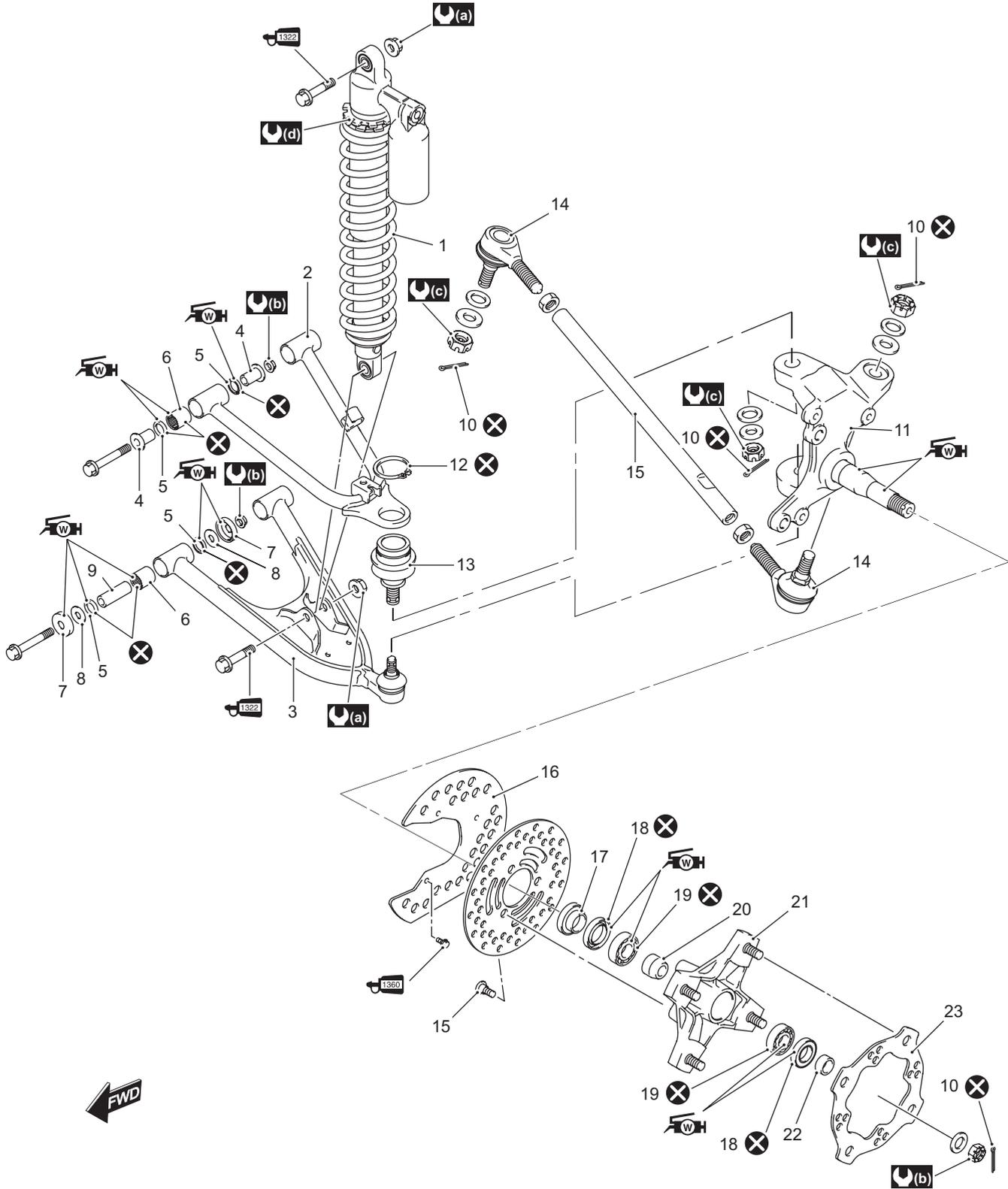
Condition	Possible cause	Correction / Reference Item
Tires rapidly or unevenly wear	Worn or loose front wheel hub bearings.	<i>Replace.</i>
	Improper front wheel alignment.	<i>Adjust.</i>
Wobbly front wheel	Distorted front wheel rims.	<i>Replace.</i>
	Damage or worn front wheel hub bearings.	<i>Replace.</i>
	Defective or incorrect tires.	<i>Replace.</i>
	Loose front wheel nuts.	<i>Tighten.</i>
	Damaged or worn wishbone arms and related bearings.	<i>Replace.</i>
	Loose chassis nuts and bolts.	<i>Tighten.</i>
	Front shock absorber leaks oil.	<i>Replace.</i>
Front suspension too soft	Weak front shock absorber spring.	<i>Replace.</i>
	Leakage oil or gas of shock absorber.	<i>Replace.</i>
	Improperly suspension setting.	<i>Adjust.</i>
Front suspension too stiff	Bent front shock absorber rod.	<i>Replace.</i>
	Worn upper or lower wishbone arms and related bearings.	<i>Tighten.</i>
	Improperly suspension setting.	<i>Adjust.</i>
Front suspension too noisy	Loose front suspension system bolts.	<i>Tighten.</i>
	Worn front wishbone arms and related bushings.	<i>Replace.</i>
	Worn swingarm and suspension bearings.	<i>Replace.</i>
Wobbly rear wheel	Distorted rear wheel rims.	<i>Replace.</i>
	Damage or worn rear axel housing bearings.	<i>Replace.</i>
	Defective or incorrect rear tires.	<i>Replace.</i>
	Loose rear wheel hub nuts.	<i>Tighten.</i>
	Worn rear suspension bushings.	<i>Replace.</i>
	Loose rear axle housing mounting bolts.	<i>Tighten.</i>
	Distorted rear axle.	<i>Replace.</i>
	Improper rear brake adjustment.	<i>Adjust.</i>
	Damaged or worn rear swingarm and related bearings.	<i>Replace.</i>
	Rear shock absorber leaks oil.	<i>Replace.</i>
	Loose rear swingarm nut.	<i>Tighten.</i>
Rear suspension too soft	Weak rear shock absorber spring.	<i>Replace.</i>
	Leakage oil or gas of shock absorber.	<i>Replace.</i>
	Improperly suspension setting.	<i>Adjust.</i>
Rear suspension too stiff	Bent rear shock absorber rod.	<i>Replace.</i>
	Bent swingarm pivot shaft.	<i>Replace.</i>
	Worn swingarm and rear suspension bearings.	<i>Replace.</i>
	Improperly suspension setting.	<i>Adjust.</i>
	Improper chain adjustment.	<i>Adjust.</i>
Rear suspension too noisy	Loose rear suspension fastener.	<i>Tighten.</i>
	Worn rear suspension related bushings.	<i>Replace.</i>

Front Suspension

Repair Instructions

Front Suspension Components

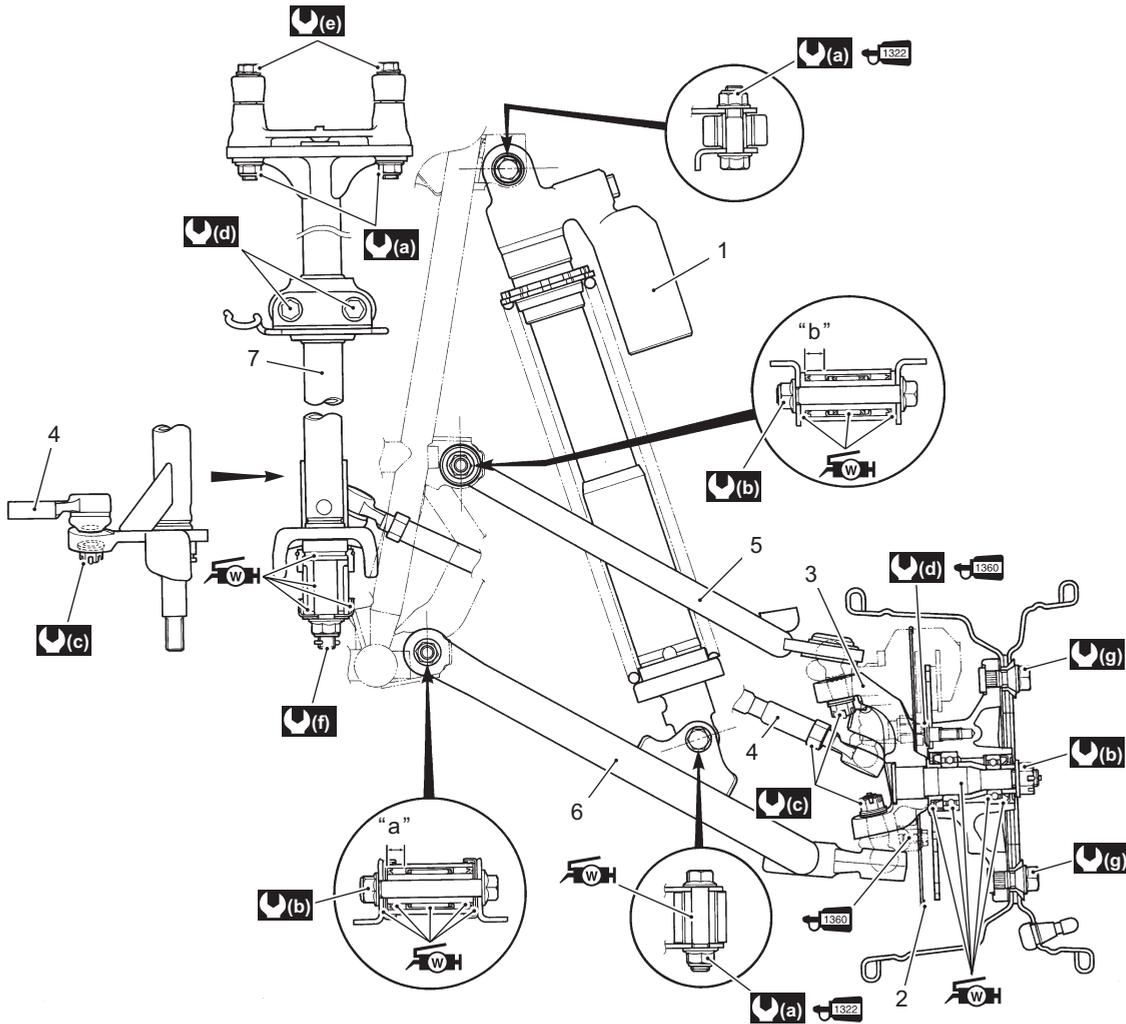
B933H22206001



1. Front shock absorber	12. Snap ring	23. Front hub plate
2. Upper wishbone arm	13. Knuckle end	ⓐ : 60 N·m (6.0 kgf-m, 43.5 lb-ft)
3. Lower wishbone arm	14. Tie-rod end	ⓑ : 65 N·m (6.5 kgf-m, 47.0 lb-ft)
4. Collar	15. Tie-rod	ⓒ : 29 N·m (2.9 kgf-m, 21.0 lb-ft)
5. Dust seal	16. Front disc brake cover	ⓓ : 34 N·m (3.4 kgf-m, 24.5 lb-ft)
6. Bearing	17. Collar	Ⓦ : Apply water resistance grease.
7. Dust cover	18. Dust seal	Ⓛ1322 : Apply thread lock to the thread part.
8. Washer	19. Bearing	Ⓛ1360 : Apply thread lock to the thread part.
9. Spacer	20. Spacer	ⓧ : Do not reuse.
10. Cotter pin	21. Front wheel hub	
11. Steering knuckle	22. Spacer	

Front Suspension / Steering Assembly Construction

B933H22206002



I933H1220066-03

1. Front shock absorber	ⓑ : 65 N·m (6.5 kgf-m, 47.0 lb-ft)
2. Front hub plate	ⓒ : 29 N·m (2.9 kgf-m, 21.0 lb-ft)
3. Steering knuckle	ⓓ : 23 N·m (2.3 kgf-m, 16.5 lb-ft)
4. Tie-rod end	ⓐ : 26 N·m (2.6 kgf-m, 19.0 lb-ft)
5. Upper wishbone arm	ⓕ : 49 N·m (4.9 kgf-m, 35.5 lb-ft)
6. Lower wishbone arm	ⓖ : 66 N·m (6.6 kgf-m, 47.5 lb-ft)
7. Steering shaft	Ⓦ : Apply water resistance grease.
"a": 11 mm (0.43 in)	Ⓛ1322 : Apply thread lock to the thread part.
"b": 11 – 12mm (0.43 – 0.47 in)	Ⓛ1360 : Apply thread lock to the thread part.
ⓐ : 60 N·m (6.0 kgf-m, 43.5 lb-ft)	

2B-3 Front Suspension:

Front Shock Absorber Removal and Installation

B933H22206003

⚠ CAUTION

Make sure that the vehicle is supported securely.

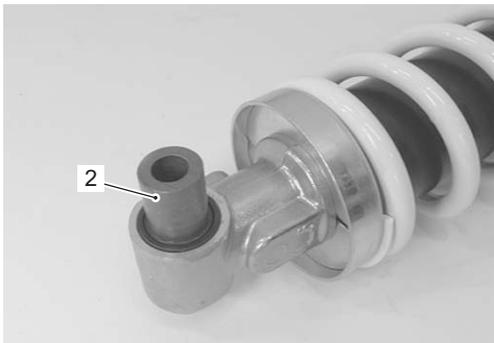
Removal

- 1) Remove the front shock absorber (1).



I933H1220002-03

- 2) Remove the spacer (2).



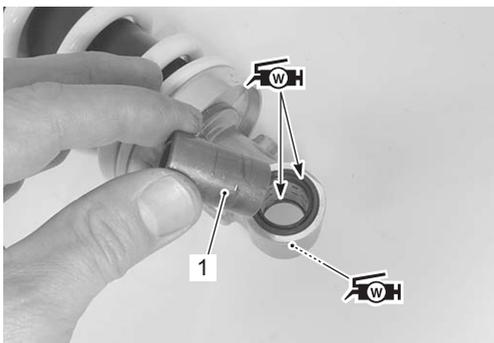
I933H1220003-01

Installation

- 1) Apply grease to the bushing and dust seals.

 : Grease 99000-25160 (Water resistance grease or equivalent)

- 2) Install the spacer (1).



I933H1220004-02

- 3) Apply thread lock to the front shock absorber mounting bolts and tighten the nuts to the specified torque.

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

Tightening torque

Front shock absorber mounting nut (a): 60 N·m (6.0 kgf-m, 43.5 lb-ft)



I933H1220005-02

Front Suspension Inspection

B933H22206004

Refer to "Suspensions Inspection in Section 0B (Page 0B-22)".

Front Shock Absorber Parts Inspection

B933H22206005

Refer to "Front Shock Absorber Removal and Installation (Page 2B-3)".

Front shock absorber

Inspect the front shock absorber for damage and oil leakage, and absorber bushing for wear or damage. If any defects are found, replace the front shock absorber with a new one.

⚠ CAUTION

Do not attempt to disassemble the front shock absorber. It is unserviceable.



I933H1220006-01

Bush / Dust seal

Inspect the bushing and dust seal for wear or damage. If any damages are found, replace the front shock absorber with a new one.



I933H1220007-02

Rubber bush

Inspect the rubber bushing for wear or damage. If any damages are found, replace the front shock absorber with a new one.



I933H1220008-02

Front Suspension Adjustment

B933H22206006

Spring pre-load inspection and adjustment

- 1) Remove the front shock absorber. Refer to "Front Shock Absorber Removal and Installation (Page 2B-3)".
- 2) Inspect the spring pre-load length "a". Adjust the spring pre-load length if necessary.

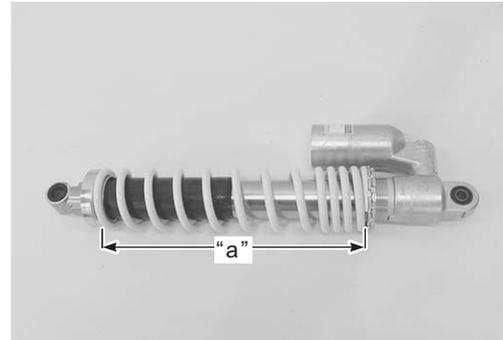
NOTE

The front suspension spring pre-load is adjustable. This adjustment is performed by changing spring set length.

CAUTION

Do not set the spring length out of the specified range.

	Standard	Maximum (Softest)	Minimum (Stiffest)
"a"	288.5 mm (11.36 in)	295.5 mm (11.63 in)	281.5 mm (11.08 in)



I933H1220009-01

- 3) Loosen the lock-nut (1) with the special tool.

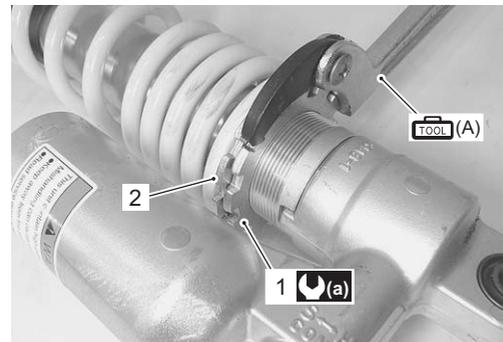
Special tool

 (A): 09910-60611 (Universal clamp wrench)

- 4) Adjust the spring pre-load length by turning the adjuster (2).
- 5) Tighten the lock-nut (1) to the specified torque.

Tightening torque

Front shock absorber lock-nut: 34 N·m (3.4 kgf-m, 24.5 lb-ft)



I933H1220010-02

WARNING

Be sure to adjust the spring pre-load on the both suspensions equally.

- 6) Install the front shock absorber. Refer to "Front Shock Absorber Removal and Installation (Page 2B-3)".

2B-5 Front Suspension:

Compression damping force adjustment

After installing the front suspension, adjust the spring pre-load and damping force as follows.

NOTE

- Turn the adjuster clockwise to stiffen the damping force and turn it counterclockwise to soften the damping force.
- Fine-tune the adjuster by turning it slightly until two punch marks align.

Turn the damping force adjuster (1) to the desired position.

STD position

1 and 1/4 turns out from stiffest position



I933H1220011-02

Front Shock Absorber Disposal

B933H22206007

Refer to "Front Shock Absorber Removal and Installation (Page 2B-3)".

The front 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.

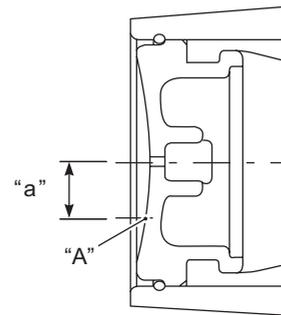
Gas pressure release

Make sure to observe the following precautions:

⚠ WARNING

- Never apply heat or disassemble the shock absorber unit since it can explode or oil can splash hazardously.
- When discarding the shock absorber unit, be sure to release gas pressure from the unit following the procedures.

- 1) Make the drill center at the location "A" using a center punch.



I823H1230009-01

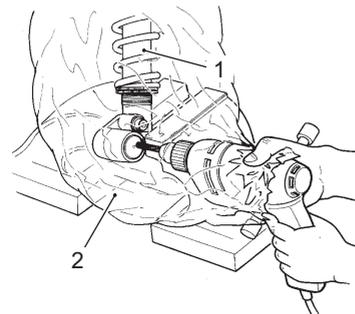
"a": 9 mm (0.35 in)

"A": Mark the drill hole

- 2) Wrap front shock absorber (1) with a plastic bag (2) and fix it on a vise as shown in the figure.
- 3) Drill a 2 – 3 mm (0.08 – 0.12 in) hole at the marked drill center using a drilling machine and let out gas while taking care not to get the plastic bag entangled with the drill bit.

⚠ WARNING

- Be sure to wear protective glasses since drilling chips and oil may fly off with blowing gas when the drill bit has penetrated through the body.
- Make sure to drill at the specified position. Otherwise, pressurized oil may spout out forcefully.



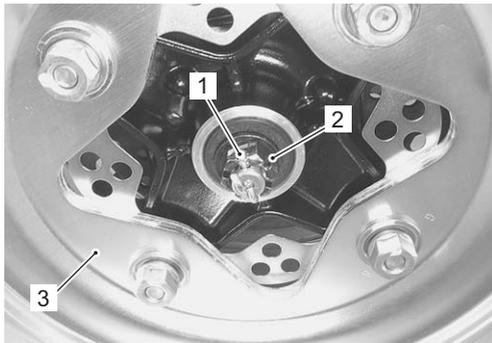
I823H1230010-01

Front Wheel Hub / Steering Knuckle Removal and Installation

B933H22206008

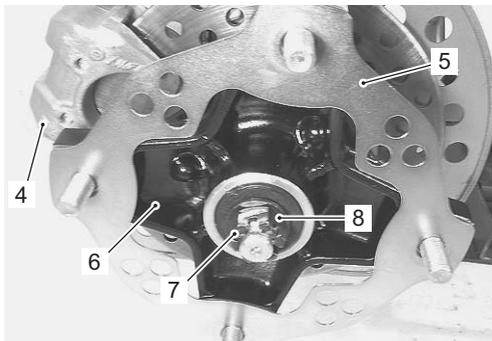
Removal

- 1) Remove the cotter pin (1) and loosen the hub nut (2).
- 2) Remove the front wheel assembly (3). Refer to "Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)".



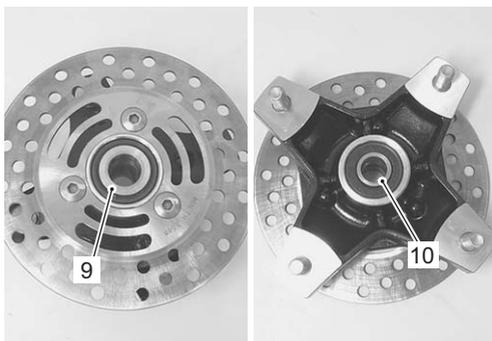
I933H1220013-01

- 3) Remove the front brake caliper (4). Refer to "Front Brake Caliper Removal and Installation in Section 4B (Page 4B-3)".
- 4) Remove the front hub plate (5).
- 5) Remove the front wheel hub (6) by removing wheel hub nut (7) and washer (8).



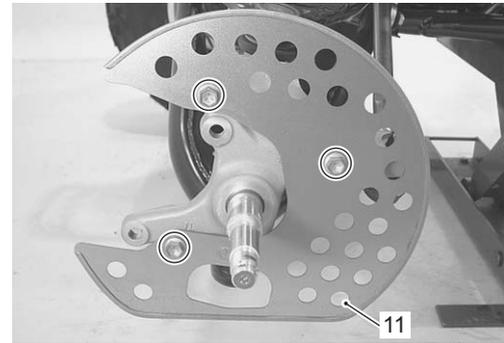
I933H1220015-01

- 6) Remove the collar (9) and spacer (10).



I933H1220014-01

- 7) Remove the front disc brake cover (11).

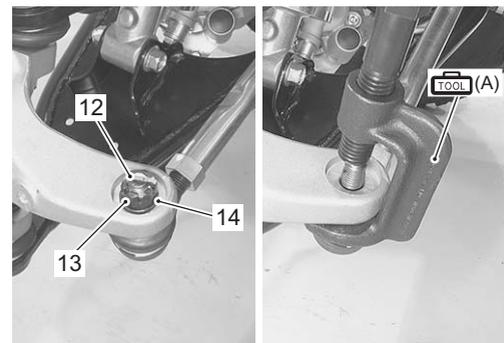


I933H1220016-01

- 8) Remove the cotter pin (12), tie-rod end nut (13) and spring washer (14).
- 9) Disconnect the tie-rod end with the special tool.

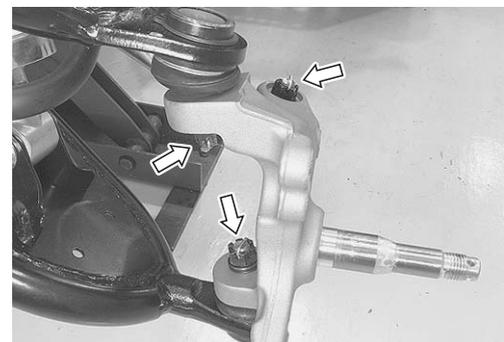
Special tool

 (A): 09942-72410 (Tie-rod end remover)



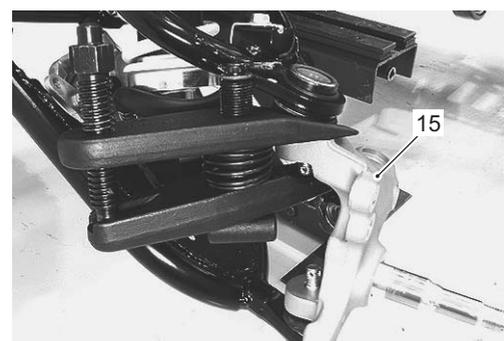
I933H1220017-01

- 10) Remove the cotter pins, knuckle end nuts, spring washers and washers.



I933H1220018-01

- 11) Remove the steering knuckle (15) with a commercially available bearing joint remover.



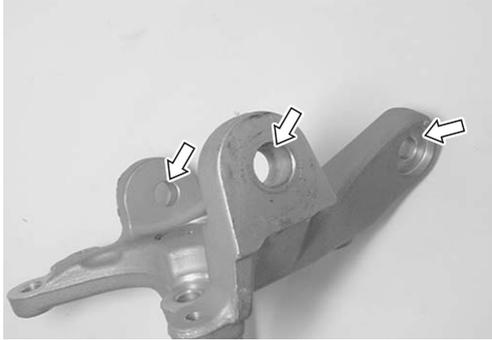
I933H1220019-01

2B-7 Front Suspension:

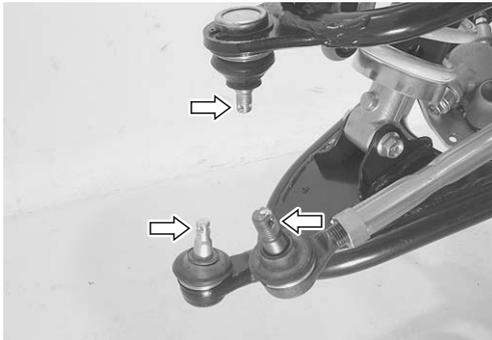
Installation

Install the front wheel hub and steering knuckle in the reverse order of removal. Pay attention to the following points:

- Degrease the tapered position of knuckle and also knuckle end and tie-rod end with nonflammable cleaning solvent.



I933H1220020-01



I933H1220021-01

- Install the washers (1) and spring washers (2) and tighten the knuckle end nuts (3) and tie-rod end nut (4) to the specified torque.

Tightening torque

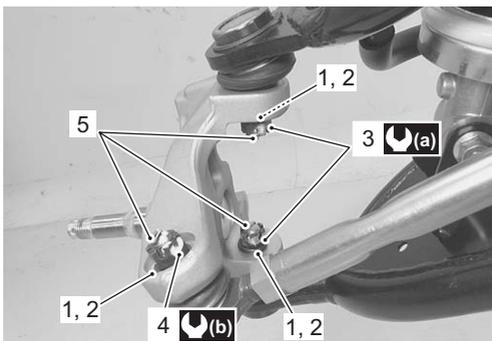
Steering knuckle end nut (a): 29 N·m (2.9 kgf·m, 21.0 lb-ft)

Tie-rod end nut (b): 29 N·m (2.9 kgf·m, 21.0 lb-ft)

- Install the cotter pins (5).

⚠ CAUTION

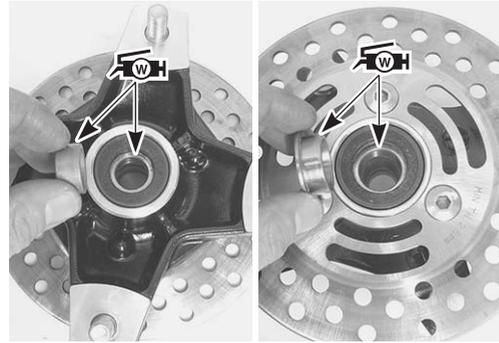
The removed cotter pins (5) must be replaced with new ones.



I933H1220022-02

- Apply grease to the dust seal lips, collar and spacer.

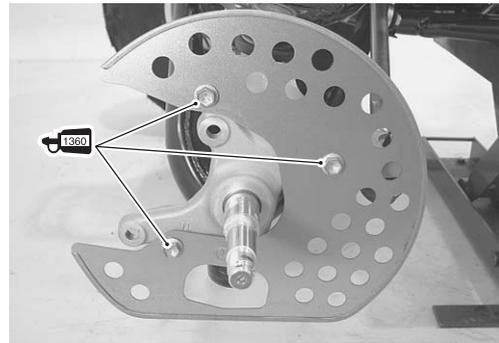
 : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1220023-02

- Apply thread lock to the brake disc cover mounting bolts.

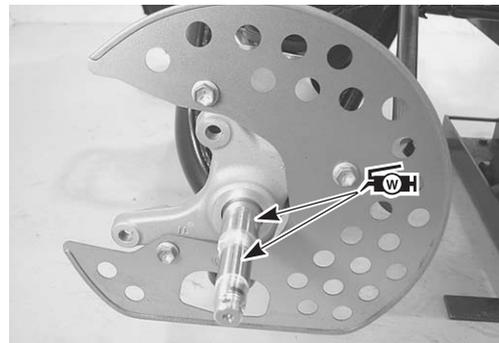
 : Thread lock cement 99000-32130 (THREAD LOCK CEMENT SUPER 1360 or equivalent)



I933H1220024-01

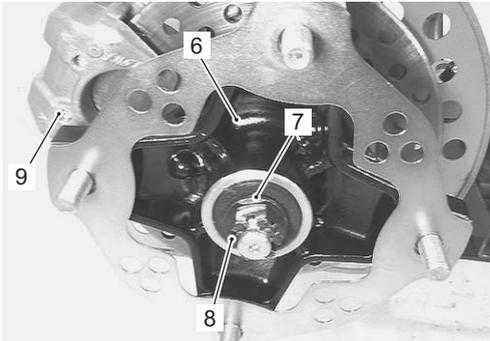
- Apply grease to the front axle.

 : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1220025-02

- Install the front wheel hub (6), washer (7) and front wheel hub nut (8).
- Install the brake caliper (9). Refer to “Front Brake Caliper Removal and Installation in Section 4B (Page 4B-3)”.



I933H1220026-01

- Install the front wheel assembly (10). Refer to “Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)”.
- Tighten the front hub nut (8) to the specified torque.

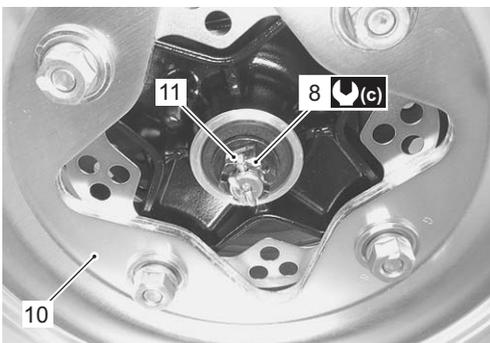
Tightening torque

Front wheel hub nut (c): 65 N·m (6.5 kgf-m, 47.0 lb-ft)

- Install the cotter pin (11).

⚠ CAUTION

The removed cotter pin (11) must be replaced with a new one.



I933H1220027-03

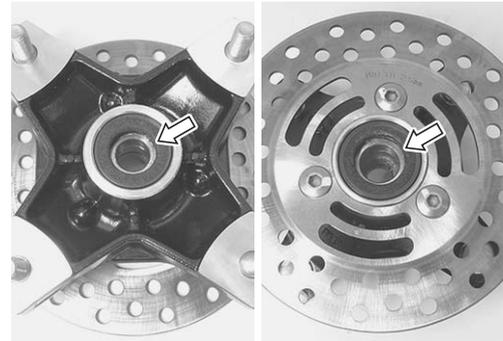
Front Wheel Hub Parts Inspection

B933H22206009

Refer to “Front Wheel Hub / Steering Knuckle Removal and Installation (Page 2B-6)”.

Dust seal

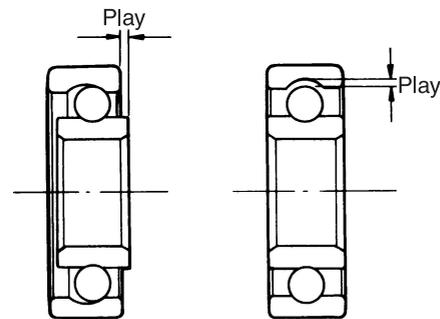
Inspect the dust seal lips for wear or damage. If any defects are found, replace the dust seal with a new one.



I933H1220028-01

Hub bearing

Inspect the inner race play of the hub bearing by hand while it is in the wheel hub. Rotate the inner races by hand to inspect for abnormal noise and smooth rotation. If there is anything unusual, replace the front hub bearing with a new one.



I933H1220029-01

Front hub plate

Inspect the front hub plate for damage. If any defects are found, replace the front hub plate with a new one.



I933H1220030-01

2B-9 Front Suspension:

Steering Knuckle Inspection

B933H22206010

Refer to "Front Wheel Hub / Steering Knuckle Removal and Installation (Page 2B-6)".

Inspect the steering knuckle for damage.

If any defects are found, replace the steering knuckle with a new one.



I933H1220031-01

Front Wheel Hub Dust Seal / Bearing Removal and Installation

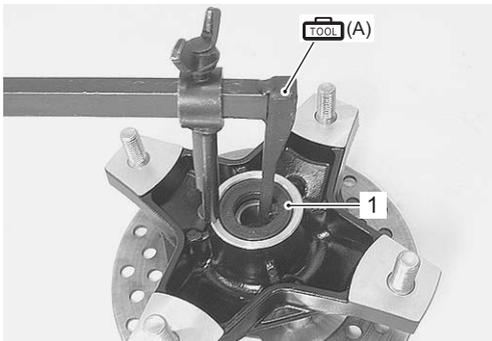
B933H22206011

Removal

- 1) Remove the front wheel hub.
Refer to "Front Wheel Hub / Steering Knuckle Removal and Installation (Page 2B-6)".
- 2) Remove the dust seals (1) with the special tool.

Special tool

TOOL (A): 09913-50121 (Oil seal remover)

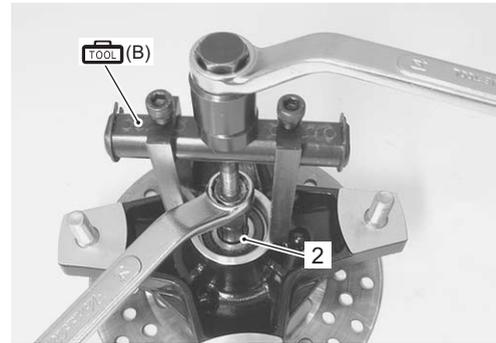


I933H1220032-01

- 3) Remove the hub bearings (2) with the special tool.

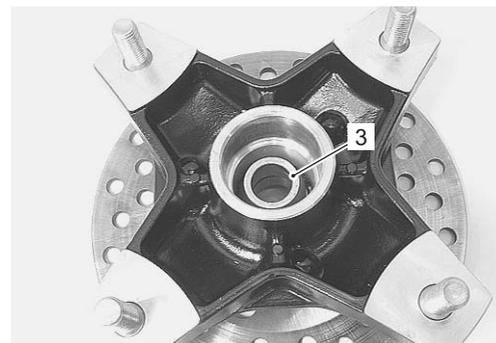
Special tool

TOOL (B): 09921-20240 (Bearing remover set)



I933H1220033-01

- 4) Remove the spacer (3).



I933H1220034-01

Installation

CAUTION

The removed dust seals and bearings must be replaced with new ones.

- 1) Apply grease to the hub bearings.

TOOL : Grease 99000-25160 (Water resistance grease or equivalent)



I649G1240019-02

- 2) First install the right hub bearing, then install the spacer (1) and left hub bearing with the special tool.

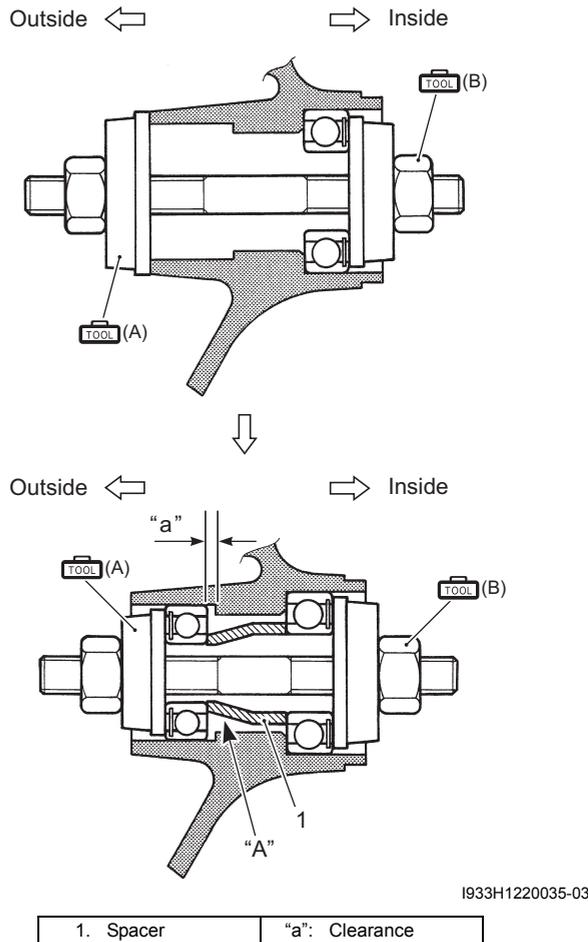
Special tool

TOOL (A): 09913-70210 (Bearing installer set)

TOOL (B): 09924-84510 (Bearing installer set)

⚠ CAUTION

The sealed cover of the bearing must face outside.
Insert the tapered end "A" of the spacer (1) into the front wheel hub.



- 3) Install the dust seals with the special tool.

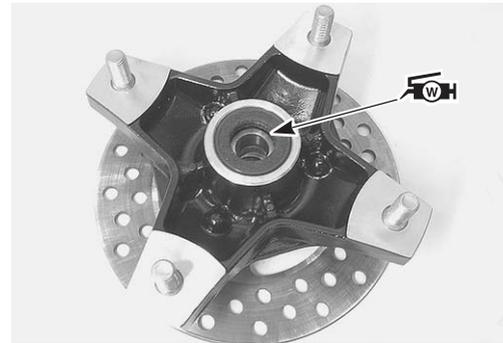
Special tool

TOOL (A): 09913-70210 (Bearing installer set)



- 4) Apply grease to the lip of dust seals.

⚠ WH: Grease 99000-25160 (Water resistance grease or equivalent)



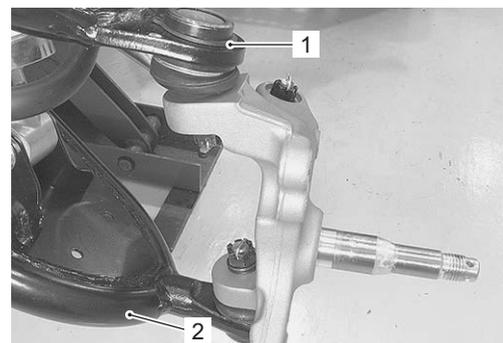
- 5) Install the front wheel hub.
Refer to "Front Wheel Hub / Steering Knuckle Removal and Installation (Page 2B-6)".

Front Suspension Upper / Lower Wishbone Arm Removal and Installation

B933H22206012

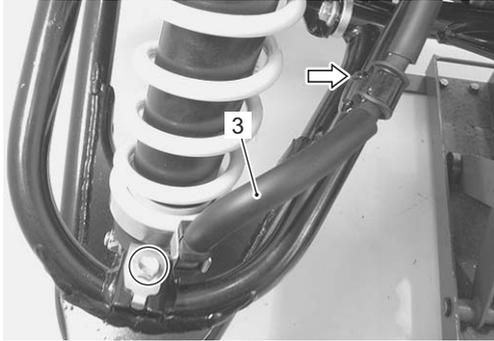
Removal

- 1) Remove the front wheel assembly. Refer to "Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)".
- 2) Remove the front brake caliper. Refer to "Front Brake Caliper Removal and Installation in Section 4B (Page 4B-3)".
- 3) Remove the front wheel hub. Refer to "Front Wheel Hub / Steering Knuckle Removal and Installation (Page 2B-6)".
- 4) Remove the upper wishbone arm (1) and lower wishbone arm (2) with a commercially available bearing joint remover. Refer to "Front Wheel Hub / Steering Knuckle Removal and Installation (Page 2B-6)".

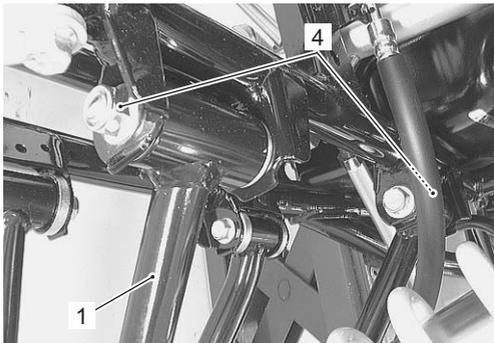


2B-11 Front Suspension:

- 5) Disconnect the front brake hose (3) and remove the upper wishbone arm (1) by removing the upper wishbone arm bolts and pivot nut (4).

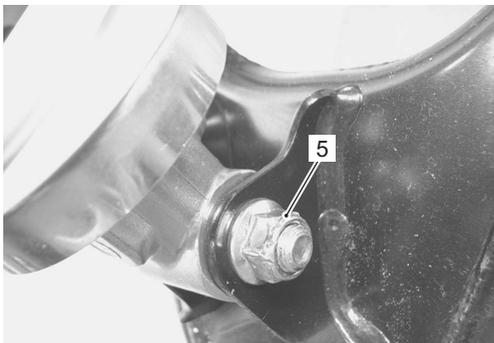


I933H1220039-02

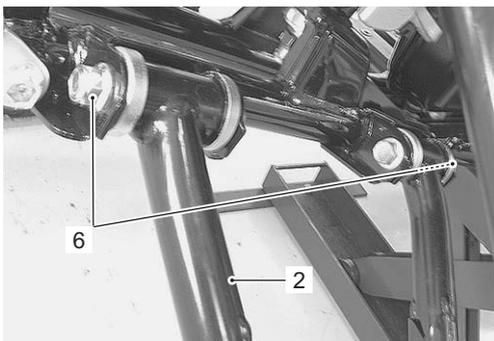


I933H1220040-03

- 6) Remove the front shock absorber lower mounting bolt and nut (5) and remove the lower wishbone arm (2) by removing the lower wishbone arm bolts and pivot nut (6).



I933H1220041-02



I933H1220042-03

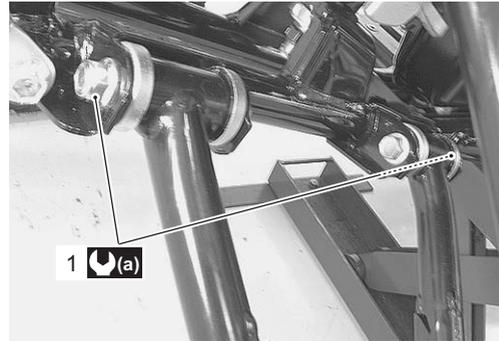
Installation

Install the front suspension upper/lower wishbone in the reverse order of removal. Pay attention to the following points.

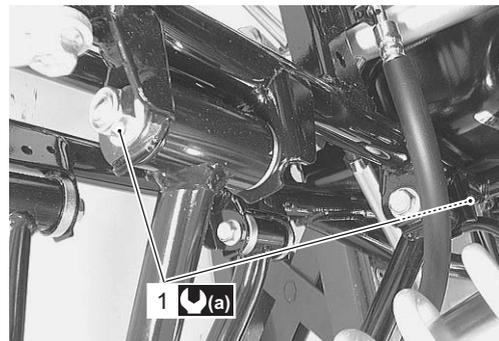
- Tighten the wishbone arm pivot nuts (1) to the specified torque.

Tightening torque

Wishbone arm pivot nut (a): 65 N·m (6.5 kgf·m, 47.0 lb·ft)



I933H1220043-01

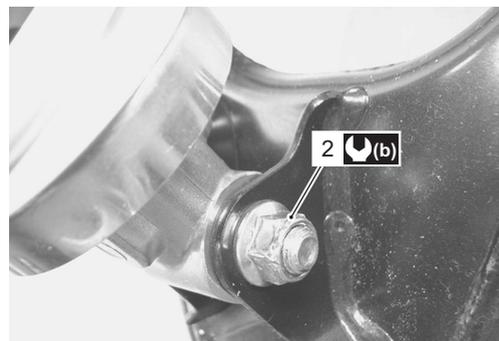


I933H1220044-02

- Tighten the front shock absorber lower mounting bolt and nut (2) to the specified torque.

Tightening torque

Front shock absorber mounting nut (b): 60 N·m (6.0 kgf·m, 43.5 lb·ft)



I933H1220045-02

- Install the brake hose. Refer to "Brake Hose Removal and Installation in Section 4A (Page 4A-9)".
- Install the wishbone arms to the steering knuckle. Refer to "Front Wheel Hub / Steering Knuckle Removal and Installation (Page 2B-6)".

- Install the front wheel hub. Refer to “Front Wheel Hub / Steering Knuckle Removal and Installation (Page 2B-6)”.
- Install the front wheel assembly. Refer to “Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)”.

Knuckle End Boot Inspection

B933H22206013

Refer to “Front Suspension Upper / Lower Wishbone Arm Removal and Installation (Page 2B-10)”.

Inspect the knuckle end boot for wear or damage. If any defects are found, replace the knuckle end or lower wishbone arm with a new one. Refer to “Knuckle End Removal and Installation (Page 2B-12)” or “Front Suspension Wishbone Arm Dust Seal / Bearing Removal and Installation (Page 2B-13)”.

Inspect the knuckle end for smooth movement. If there are any abnormalities, replace the knuckle end or lower wishbone arm with a new one. Refer to “Knuckle End Removal and Installation (Page 2B-12)” or “Front Suspension Wishbone Arm Dust Seal / Bearing Removal and Installation (Page 2B-13)”.



I933H1220046-01

Knuckle End Removal and Installation

B933H22206014

Removal

- 1) Remove the front suspension wishbone arm. Refer to “Front Suspension Upper / Lower Wishbone Arm Removal and Installation (Page 2B-10)”.
- 2) Remove the snap ring (1).

Special tool

TOOL : 09900-06107 (Snap ring pliers)

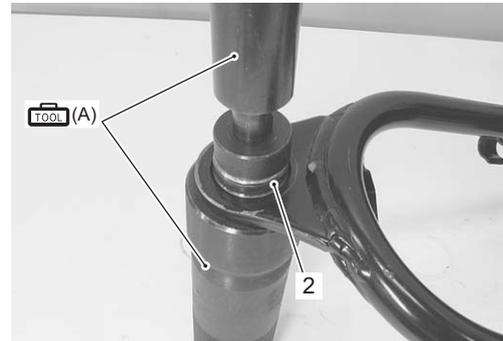


I933H1220047-02

- 3) Remove the knuckle end (2) with the special tool.

Special tool

TOOL (A): 09913-70210 (Bearing installer set)



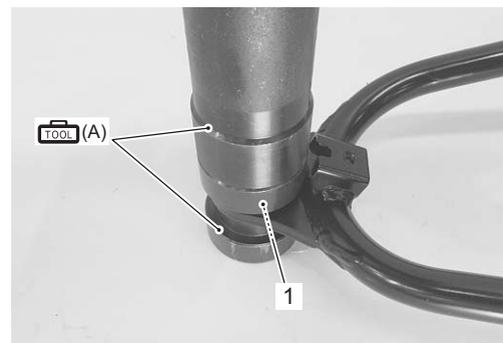
I933H1220048-02

Installation

- 1) Install the knuckle end (1) with the special tool.

Special tool

TOOL (A): 09913-70210 (Bearing installer set)



I933H1220049-02

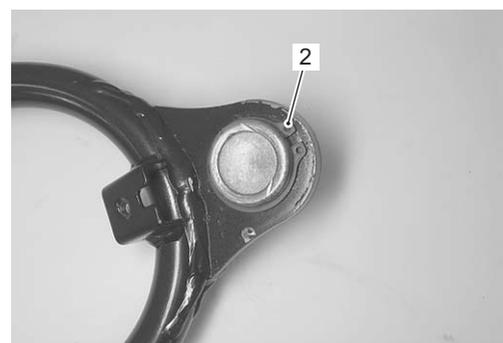
- 2) Install the snap ring (2).

⚠ CAUTION

Replace the snap ring (2) with a new one.

Special tool

TOOL : 09900-06107 (Snap ring pliers)



I933H1220050-01

- 3) Install the front suspension wishbone arm. Refer to “Front Suspension Upper / Lower Wishbone Arm Removal and Installation (Page 2B-10)”.

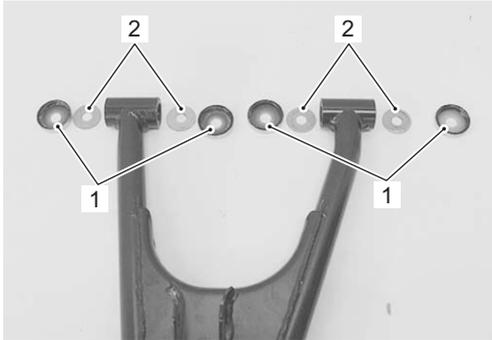
2B-13 Front Suspension:

Front Suspension Wishbone Arm Dust Seal / Bearing Removal and Installation

B933H22206015

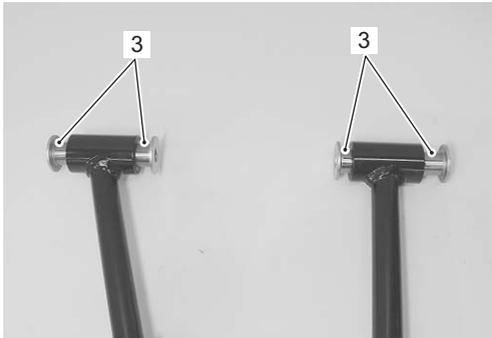
Removal

- 1) Remove the front suspension upper/lower wishbone arm. Refer to "Front Suspension Upper / Lower Wishbone Arm Removal and Installation (Page 2B-10)".
- 2) Remove the dust covers (1) and washers (2) (Lower wishbone).



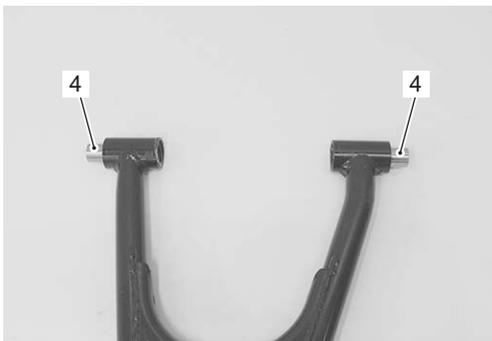
I933H1220051-01

- 3) Remove the collars (3) and spacer (4).
- Upper**



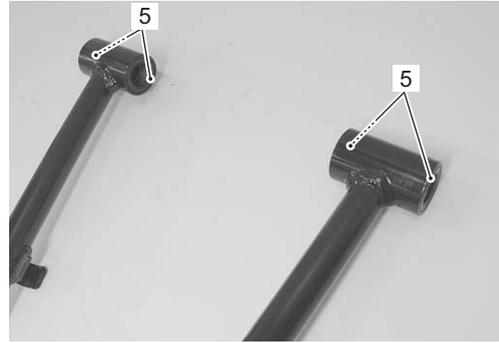
I933H1220052-01

Lower



I933H1220053-01

- 4) Remove the dust seals (5).



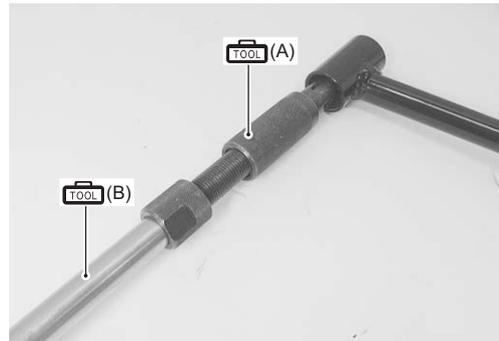
I933H1220054-02

- 5) Remove the bearings with the special tools.

Special tool

TOOL (A): 09923-73210 (Bearing remover)

TOOL (B): 09930-30104 (Rotor remover slide shaft)



I933H1220055-01

Installation

Install the front suspension wishbone dust seal/bearing in the reverse order of removal. Pay attention to the following points:

CAUTION

The removed dust seals and bearings must be replaced with new ones.

NOTE

Stamped marks on the dust seals and bearings must face outside.

- Install the bearings with the special tool and a suitable size socket wrench.

NOTE

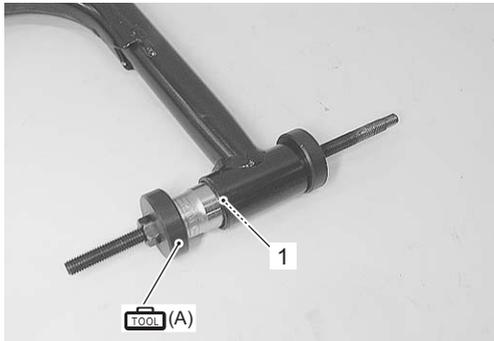
Position of the bearings (1) is shown in the figure.

Special tool

TOOL (A): 09924-84521 (Bearing installer set)

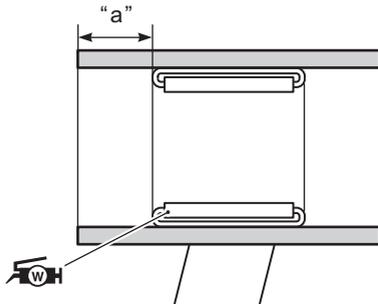
- Apply grease to the bearings.

W: Grease 99000-25160 (Water resistance grease or equivalent)



I933H1220056-01

Inside ← → Outside



I933H1220057-02

	Upper wishbone	Lower wishbone
"a"	11 - 12 mm (0.43 - 0.47 in)	11 mm (0.43 in)

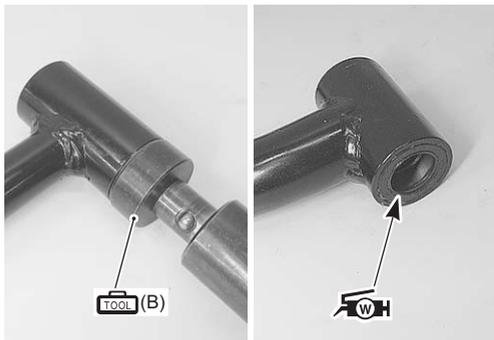
- Install the dust seals with the special tool.

Special tool

TOOL (B): 09913-70210 (Bearing installer set)

- Apply grease to the oil seal lip.

W: Grease 99000-25160 (Water resistance grease or equivalent)

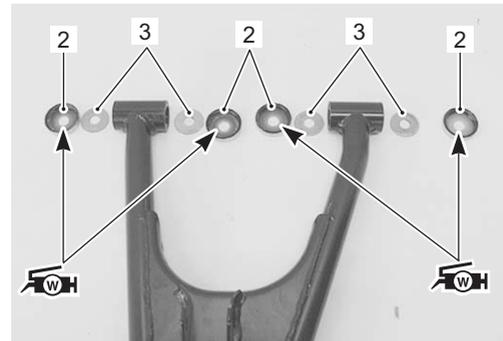


I933H1220058-02

- Apply grease to the dust covers (2).

W: Grease 99000-25160 (Water resistance grease or equivalent)

- Install the washers (3) and dust covers (2).



I933H1220059-03

Front Suspension Wishbone Arm Related Parts Inspection

B933H22206016

Refer to "Front Suspension Wishbone Arm Dust Seal / Bearing Removal and Installation (Page 2B-13)".

Upper wishbone arm

- 1) Remove the knuckle end boot. Refer to "Knuckle End Removal and Installation (Page 2B-12)".
- 2) Inspect the upper wishbone arm for wear or damage. If any defects are found, replace the upper wishbone arm with a new one.



I933H1220060-01

- 3) Install the knuckle end boot. Refer to "Knuckle End Removal and Installation (Page 2B-12)".

2B-15 Front Suspension:

Lower wishbone arm

Inspect the knuckle end boot and lower wishbone arm for wear or damage. If any defects are found, replace the lower wishbone arm with a new one.

Inspect the knuckle end smooth movement. If there are any abnormalities, replace the knuckle end with a new one.



I933H1220061-01

Spacer / Collar

Inspect the spacers and collars for wear and damage. If any defects are found, replace the spacers with the new ones.



I933H1220062-01

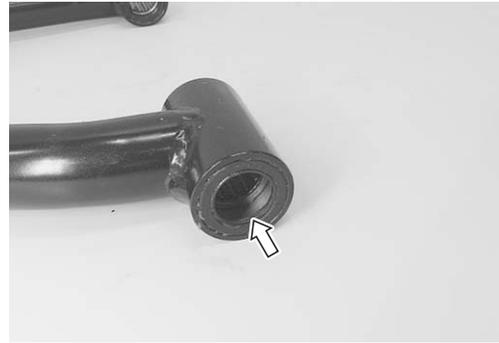


I933H1220063-01

Dust seal

Inspect the dust seal lips for wear or damage.

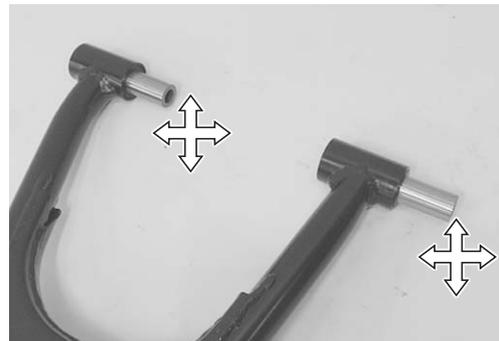
If any defects are found, replace the dust seal with the new ones.



I933H1220064-01

Bearing

Insert the spacer or collar into the bearing, and then check the play when moving the spacer up and down. If excessive is noted, replace the bearing with a new one.



I933H1220065-01

Specifications

Service Data

B933H22207001

Suspension

Unit: mm (in)

Item	Standard		Limit
Front shock absorber spring pre-load length	288.5 (11.36)		—
Front suspension damping force adjuster	Compression	1 and 1/4 turns out	—
Front wheel travel	215 (8.5)		—

Tightening Torque Specifications

B933H22207002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Front shock absorber mounting nut	60	6.0	43.5	☞ (Page 2B-3) / ☞ (Page 2B-11)
Front shock absorber lock-nut	34	3.4	24.5	☞ (Page 2B-4)
Steering knuckle end nut	29	2.9	21.0	☞ (Page 2B-7)
Tie-rod end nut	29	2.9	21.0	☞ (Page 2B-7)
Front wheel hub nut	65	6.5	47.0	☞ (Page 2B-8)
Wishbone arm pivot nut	65	6.5	47.0	☞ (Page 2B-11)

NOTE

The specified tightening torque is also described in the following.

“Front Suspension Components (Page 2B-1)”

“Front Suspension / Steering Assembly Construction (Page 2B-2)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H22208001

Material	SUZUKI recommended product or Specification		Note
Grease	Water resistance grease or equivalent	P/No.: 99000–25160	☞ (Page 2B-3) / ☞ (Page 2B-7) / ☞ (Page 2B-7) / ☞ (Page 2B-9) / ☞ (Page 2B-10) / ☞ (Page 2B-14) / ☞ (Page 2B-14) / ☞ (Page 2B-14)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000–32110	☞ (Page 2B-3)
	THREAD LOCK CEMENT SUPER 1360 or equivalent	P/No.: 99000–32130	☞ (Page 2B-7)

NOTE

Required service material is also described in the following.

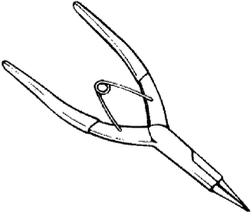
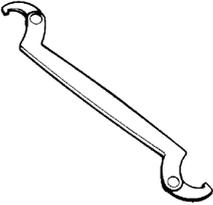
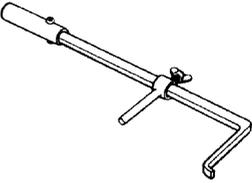
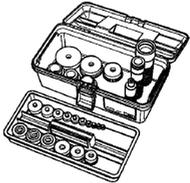
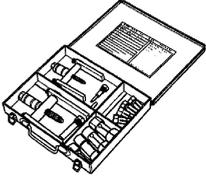
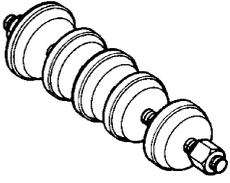
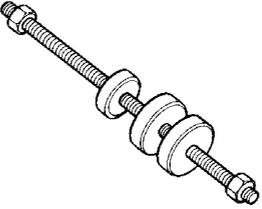
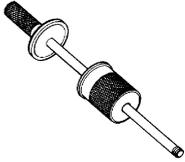
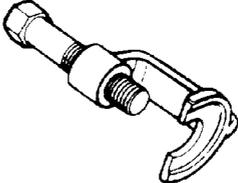
“Front Suspension Components (Page 2B-1)”

“Front Suspension / Steering Assembly Construction (Page 2B-2)”

2B-17 Front Suspension:

Special Tool

B933H22208002

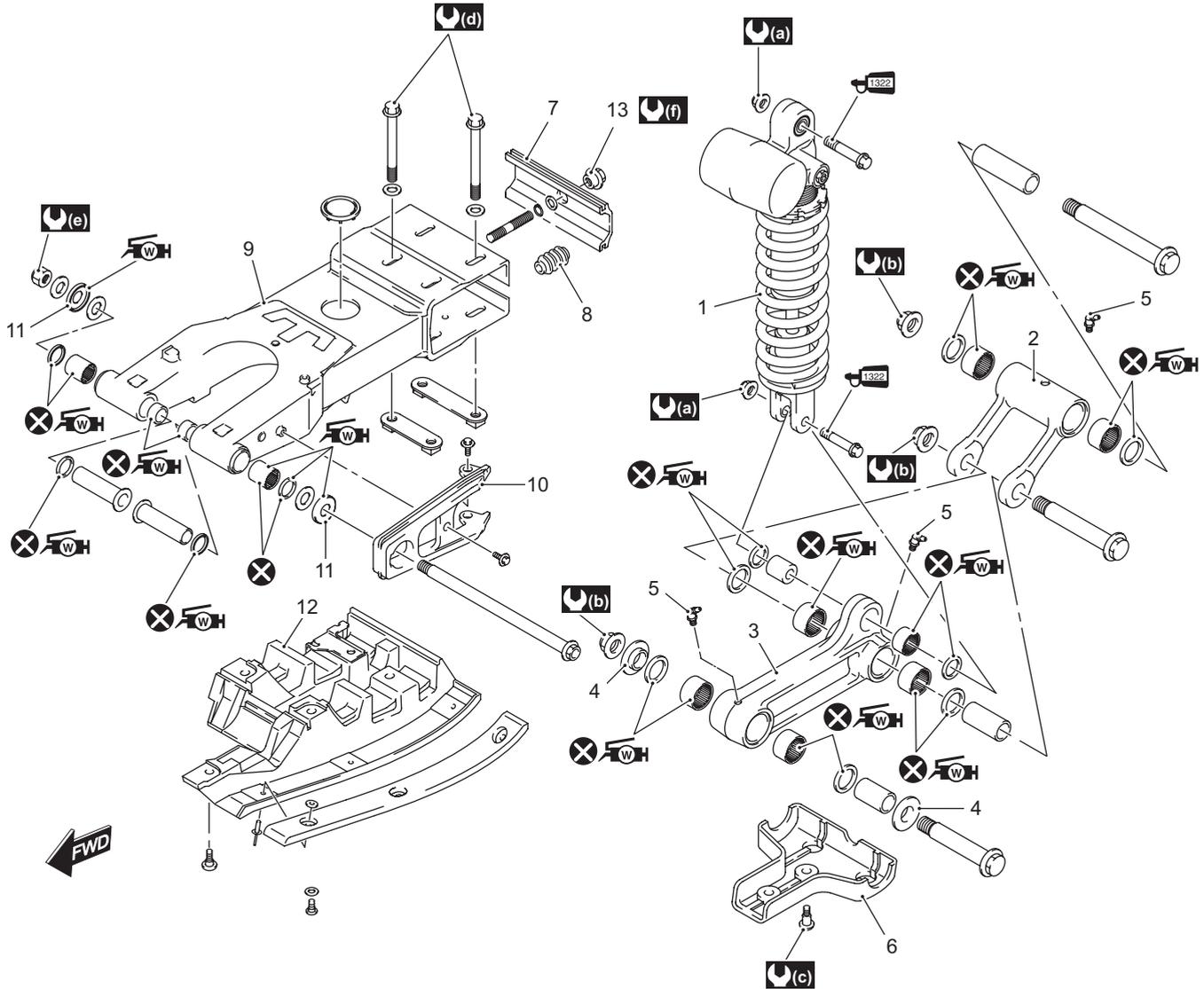
<p>09900-06107 Snap ring pliers ☞ (Page 2B-12) / ☞ (Page 2B-12)</p>		<p>09910-60611 Universal clamp wrench ☞ (Page 2B-4)</p>	
<p>09913-50121 Oil seal remover ☞ (Page 2B-9)</p>		<p>09913-70210 Bearing installer set ☞ (Page 2B-10) / ☞ (Page 2B-10) / ☞ (Page 2B-12) / ☞ (Page 2B-12) / ☞ (Page 2B-14)</p>	
<p>09921-20240 Bearing remover set ☞ (Page 2B-9)</p>		<p>09923-73210 Bearing remover ☞ (Page 2B-13)</p>	
<p>09924-84510 Bearing installer set ☞ (Page 2B-10)</p>		<p>09924-84521 Bearing installer set ☞ (Page 2B-13)</p>	
<p>09930-30104 Rotor remover slide shaft ☞ (Page 2B-13)</p>		<p>09942-72410 Tie-rod end remover ☞ (Page 2B-6)</p>	

Rear Suspension

Repair Instructions

Rear Suspension Components

B933H22306001

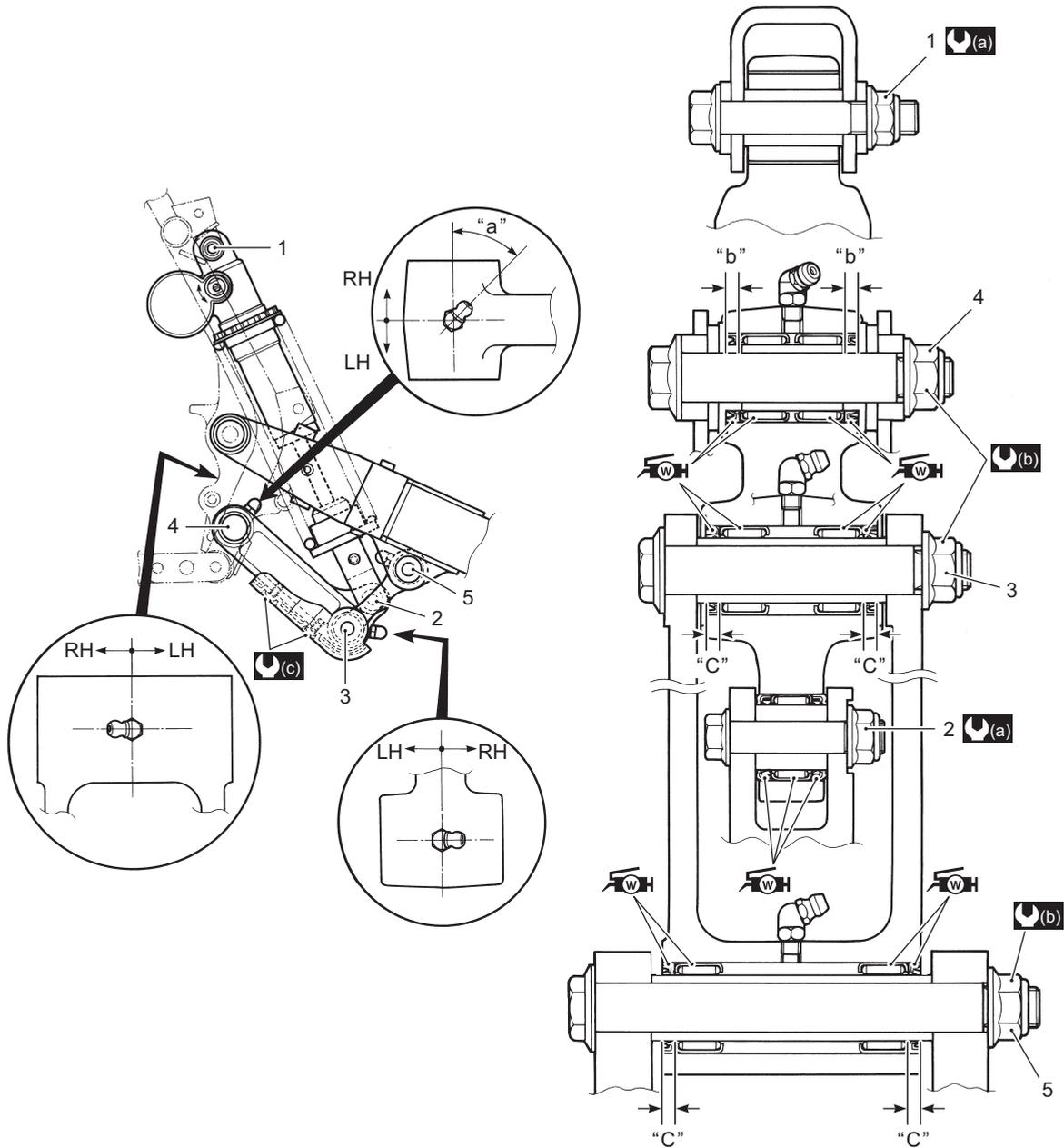


I933H1230001-07

1. Rear shock absorber	9. Swingarm	(d) : 100 N·m (10.0 kgf·m, 72.5 lb·ft)
2. Cushion rod	10. Chain buffer	(e) : 95 N·m (9.5 kgf·m, 68.5 lb·ft)
3. Cushion lever	11. Dust cover	(f) : 30 N·m (3.0 kgf·m, 21.5 lb·ft)
4. Collar	12. Swingarm under cover	WH : Apply water resistance grease.
5. Grease nipple	13. Chain adjuster nut	1322 : Apply thread lock to thread part.
6. Cushion lever cover		(a) : 60 N·m (6.0 kgf·m, 43.5 lb·ft)
7. Chain adjuster plate		(b) : 78 N·m (7.8 kgf·m, 56.5 lb·ft)
8. Boot		(c) : 5.5 N·m (0.55 kgf·m, 4.0 lb·ft)
		(X) : Do not reuse.

Rear Suspension Assembly Construction

B933H22306002



I933H1230067-05

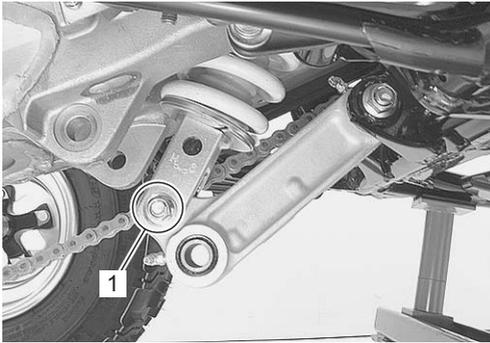
1. Rear shock absorber mounting nut (Upper)	5. Cushion rod nut (Upper)	: Apply water resistance grease.
2. Rear shock absorber mounting nut (Lower)	: 60 Nm (6.0 kgf-m, 43.5 lb-ft)	"a": 45°
3. Cushion rod nut (Lower)	: 78 Nm (7.8 kgf-m, 56.5 lb-ft)	"b": 4 mm (0.6 in)
4. Cushion lever nut	: 5.5 Nm (0.55 kgf-m, 4.0 lb-ft)	"c": 4.5 mm (0.18 in)

Rear Shock Absorber Removal and Installation

B933H22306003

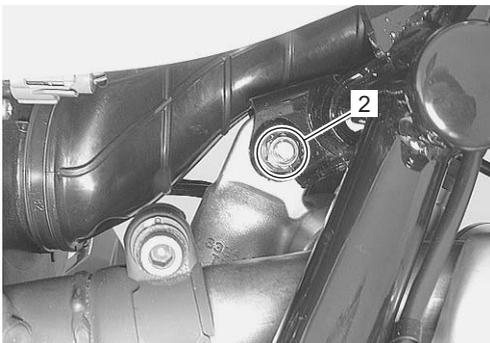
Removal

- 1) Remove the cushion rod and cushion lever. Refer to "Cushion Rod / Cushion Lever Removal and Installation (Page 2C-7)".
- 2) Remove the rear shock absorber lower mounting bolt and nut (1).



I933H1230002-01

- 3) Remove the rear shock absorber upper mounting bolt and nut (2).
- 4) Remove the rear shock absorber.



I933H1230003-01



I933H1230004-01

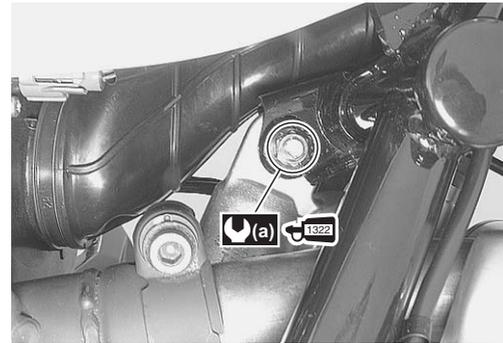
Installation

- 1) Apply thread lock to the rear shock absorber mounting bolts and tighten the nuts to the specified torque.

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

Tightening torque

Rear shock absorber mounting nut (a): 60 N·m (6.0 kgf-m, 43.5 lb-ft)



I933H1230005-01



I933H1230006-01

- 2) Install the cushion rod and cushion lever. Refer to "Cushion Rod / Cushion Lever Removal and Installation (Page 2C-7)".

2C-4 Rear Suspension:

Rear Suspension Inspection

B933H22306004

Refer to "Suspensions Inspection in Section 0B (Page 0B-22)".

Rear Shock Absorber Inspection

B933H22306005

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 or damage. If any defects are found, replace the rear shock absorber with a new one.

⚠ CAUTION

Do not attempt to disassemble the rear shock absorber. It is unserviceable.



I933H1230007-01

- 3) Install the rear shock absorber. Refer to "Rear Shock Absorber Removal and Installation (Page 2C-3)".

Rear Suspension Absorber Adjustment

B933H22306006

Spring pre-load inspection and adjust

- 1) Remove the rear shock absorber. Refer to "Rear Shock Absorber Removal and Installation (Page 2C-3)".
- 2) Inspect the spring pre-load length "a". Adjust the spring pre-load length if necessary.

NOTE

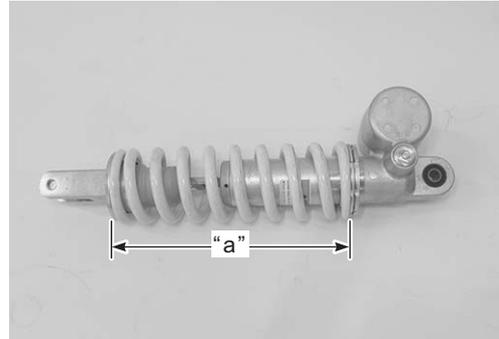
The rear suspension spring pre-load is adjustable. This adjustment is performed by changing spring set length.

⚠ CAUTION

Do not set the spring length out of the specified range.

Spring pre-load length

	Standard	Maximum (Softest)	Minimum (Stiffest)
a	234.8 mm (9.24 in)	238 mm (9.37 in)	227.5 mm (8.96 in)



I933H1230008-01

- 3) Loosen the lock-nut (1) with the special tool.

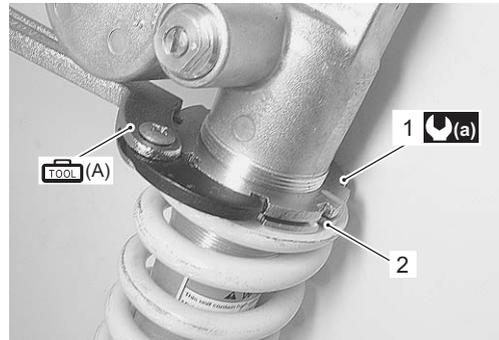
Special tool

Tool (A): 09910-60611 (Universal clamp wrench)

- 4) Adjust the spring pre-load length by turning the adjuster (2).
- 5) Tighten the lock-nut (1) to the specified torque.

Tightening torque

Rear shock absorber lock-nut (a): 44 N·m (4.4 kgf-m, 32.0 lb-ft)



I933H1230009-02

- 6) Install the rear shock absorber. Refer to "Rear Shock Absorber Removal and Installation (Page 2C-3)".

Damping force adjustment

After installing the rear suspension, adjust the damping force as follows.

NOTE

- Turn the adjuster clockwise to stiffen the damping force and turn it counterclockwise to soften the damping force.
- Fine-tune the adjusters by turning it slightly until two punch marks align.

Rebound side

Turn the damping force adjuster (1) to the desired position.

STD position

1 and 1/4 turns out from stiffest position



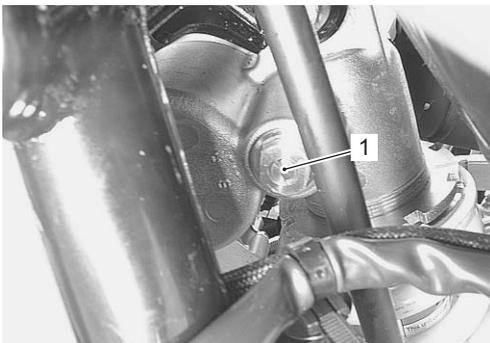
I933H1230010-01

Compression side

Turn the damping force adjuster (1) to the desired position.

STD position

2 turns out from stiffest position



I933H1230011-01

Rear Shock Absorber Disposal

B933H22306007

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.

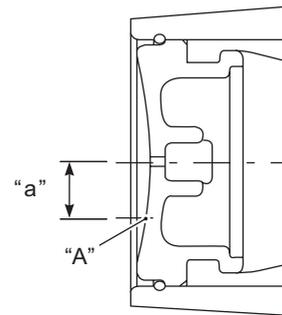
Gas pressure release

Make sure to observe the following precautions:

⚠ WARNING

- Never apply heat or disassemble the shock absorber unit since it can explode or oil can splash hazardously.
- When discarding the shock absorber unit, be sure to release gas pressure from the unit following the procedures.

- 1) Make the drill center at the location "A" using a center punch.



I823H1230009-01

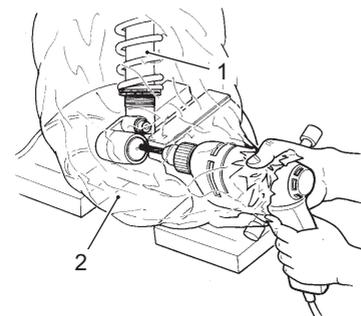
"a": 9 mm (0.35 in)

"A": Mark the drill hole

- 2) Wrap rear shock absorber (1) with a plastic bag (2) and fix it on a vise as shown in the figure.
- 3) Drill a 2 – 3 mm (0.08 – 0.12 in) hole at the marked drill center using a drilling machine and let out gas while taking care not to get the plastic bag entangled with the drill bit.

⚠ WARNING

- Be sure to wear protective glasses since drilling chips and oil may fly off with blowing gas when the drill bit has penetrated through the body.
- Make sure to drill at the specified position. Otherwise, pressurized oil may spout out forcefully.



I823H1230010-01

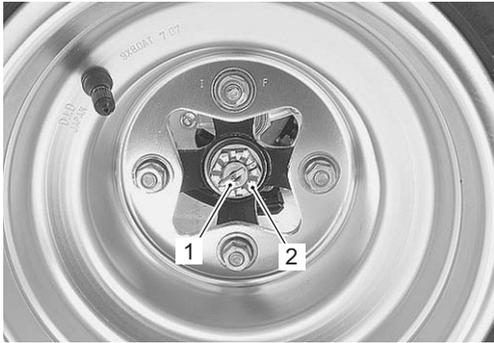
2C-6 Rear Suspension:

Rear Wheel Hub Removal and Installation

B933H22306008

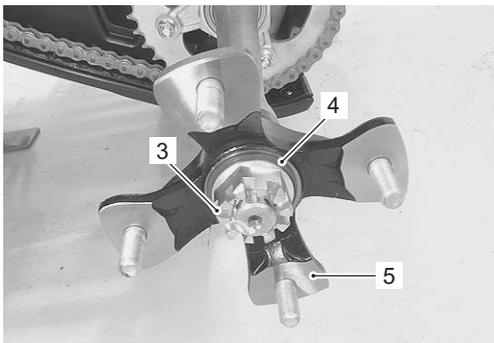
Removal

- 1) Remove the cotter pin (1) and loosen the hub nut (2).



I933H1230012-01

- 2) Remove the rear wheel assembly. Refer to "Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)".
- 3) Remove the hub nut (3), washer (4) and rear wheel hub (5).



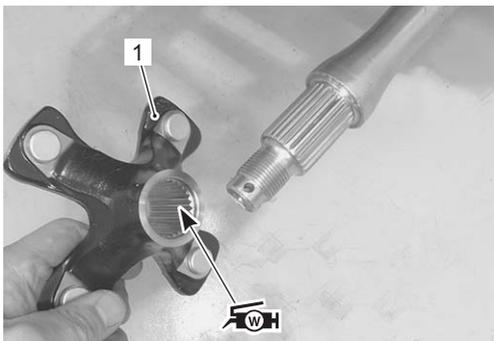
I933H1230013-01

Installation

- 1) Apply small amount grease to the wheel hub spline.

 **Grease 99000-25160 (Water resistance grease or equivalent)**

- 2) Install the rear wheel hub (1) to the rear axle shaft.

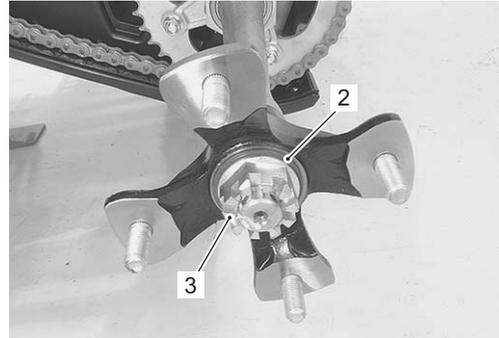


I933H1230014-02

- 3) Install the washer (2) and hub nut (3).

NOTE

The conical side of washer (2) faces outside. Refer to "Rear Suspension Assembly Construction (Page 2C-2)".



I933H1230015-01

- 4) Install the rear wheel assembly. Refer to "Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)".
- 5) Tighten the hub nut (4) to the specified torque.

Tightening torque

Rear wheel hub nut (a): 121 N·m (12.1 kgf-m, 87.5 lb-ft)

- 6) Install the cotter pin (5).

CAUTION

The removed cotter pin (5) must be replaced with a new one.



I933H1230016-02

Rear Wheel Hub Inspection

B933H22306009

Refer to "Rear Wheel Hub Removal and Installation (Page 2C-6)".

Inspect the rear wheel hub flange for damage and wear of spline. If any defects are found, replace the rear wheel hub with a new one.



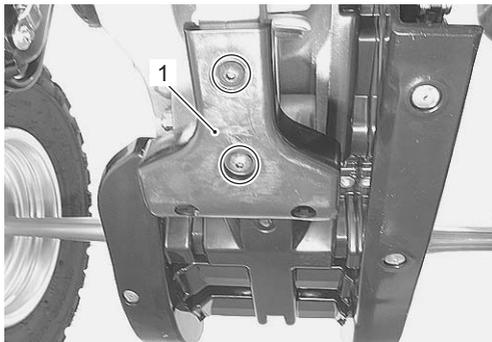
I933H1230017-01

Cushion Rod / Cushion Lever Removal and Installation

I933H22306010

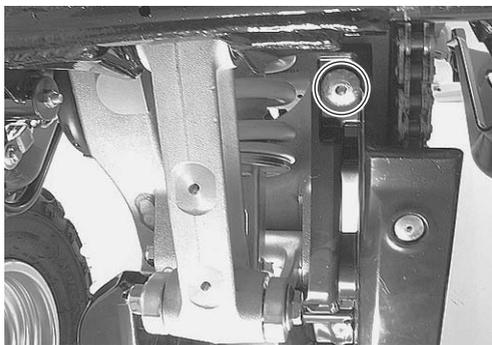
Removal

- 1) Remove the cushion lever cover (1).

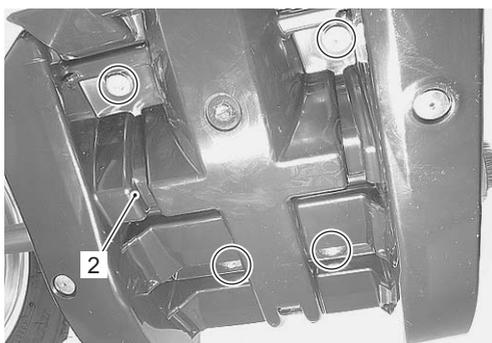


I933H1230018-01

- 2) Remove the swingarm under cover (2).

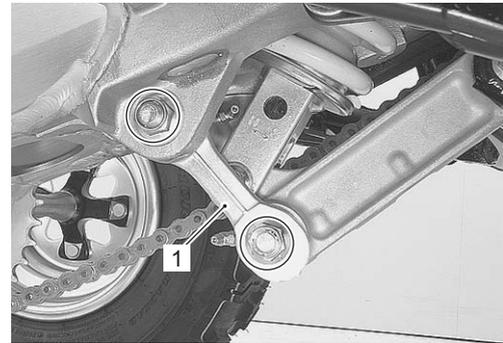


I933H1230019-01



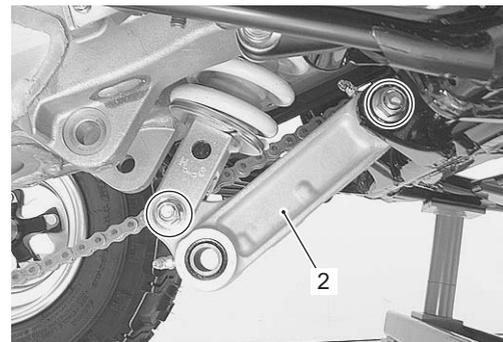
I933H1230020-01

- 3) Place the vehicle on the level ground and support the vehicle with a jack.
- 4) Remove the cushion rod (1).



I933H1230021-01

- 5) Remove the cushion lever (2).



I933H1230022-01

Installation

- 1) Apply thread lock to the rear shock absorber mounting bolt.

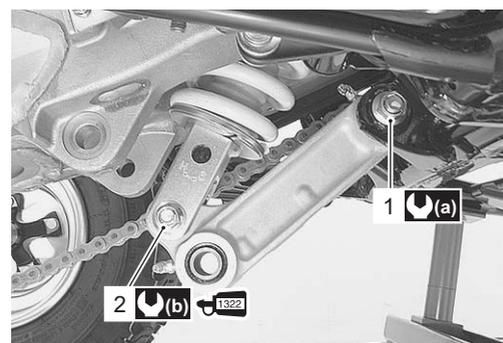
1322 : Thread lock cement 99000-32110
(THREAD LOCK CEMENT SUPER 1322 or equivalent)

- 2) Tighten the cushion lever nut (1) and rear shock absorber mounting nut (2) to the specified torque.

Tightening torque

Cushion lever nut (a): 78 N·m (7.8 kgf·m, 56.5 lb·ft)

Rear shock absorber mounting nut (b): 60 N·m (6.0 kgf·m, 43.5 lb·ft)



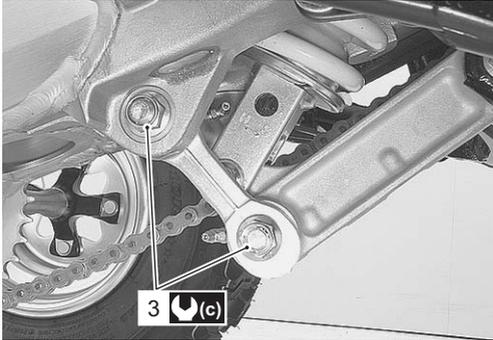
I933H1230023-01

2C-8 Rear Suspension:

- 3) Tighten the cushion rod nuts (3) to the specified torque.

Tightening torque

Cushion rod nut (c): 78 N·m (7.8 kgf-m, 56.5 lb-ft)

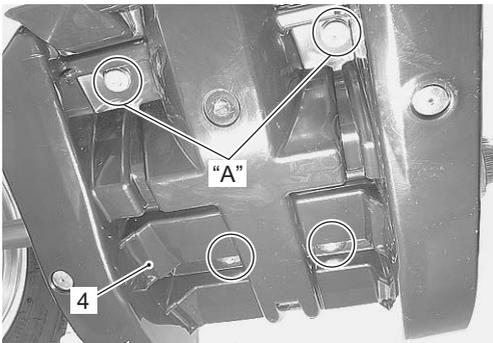


I933H1230024-03

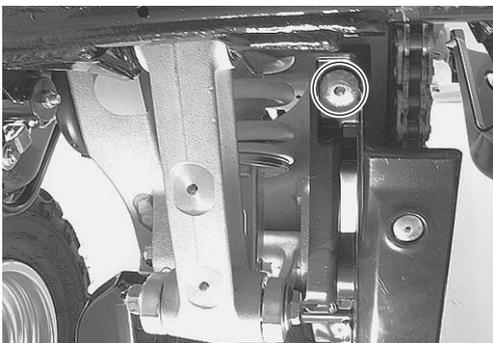
- 4) Install the swingarm under cover (4).

NOTE

Fit the washers to the bolts "A".



I933H1230025-01

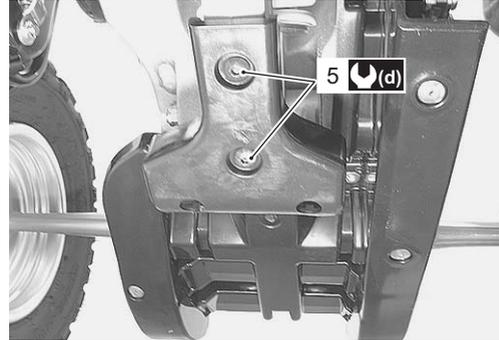


I933H1230026-01

- 5) Tighten the cushion lever cover bolts (5) to the specified torque.

Tightening torque

Cushion lever cover bolt (d): 5.5 N·m (0.55 kgf-m, 4.0 lb-ft)



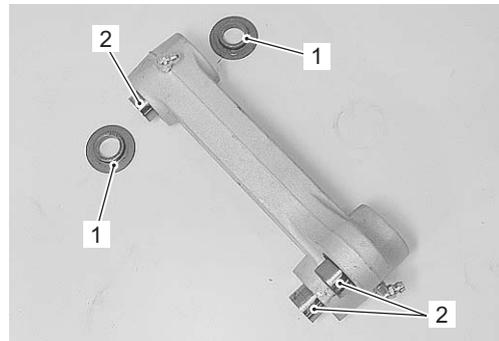
I933H1230028-01

Cushion Lever Dust Seal / Bearing Removal and Installation

B933H22306011

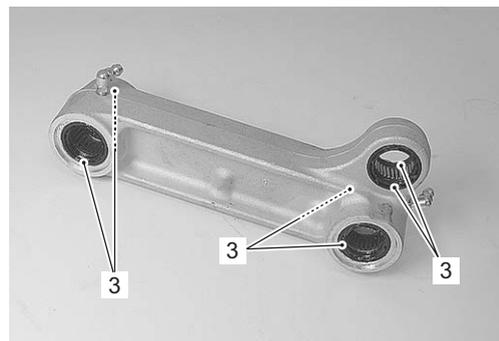
Removal

- 1) Remove the cushion lever. Refer to "Cushion Rod / Cushion Lever Removal and Installation (Page 2C-7)".
- 2) Remove the collars (1) and spacers (2).



I933H1230029-01

- 3) Remove the dust seals (3).

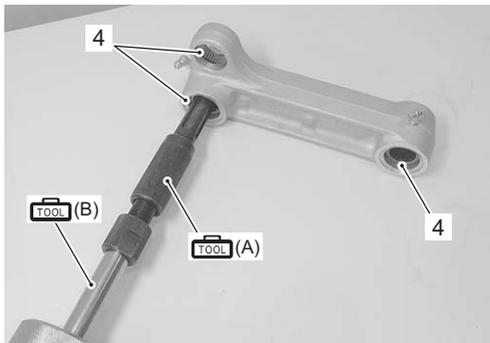


I933H1230030-01

4) Remove the bearings (4) with the special tools.

Special tool

- TOOL (A): 09923-73210 (Bearing remover)**
- TOOL (B): 09930-30104 (Rotor remover slide shaft)**



I933H1230031-01

Installation

⚠ CAUTION

The removed dust seals and bearings must be replaced with new ones.

NOTE

Stamped marks on the dust seals and bearings must face outside.

1) Install the bearings with the special tool and suitable size socket wrench.

Special tool

- TOOL (A): 09924-84521 (Bearing installer set)**

NOTE

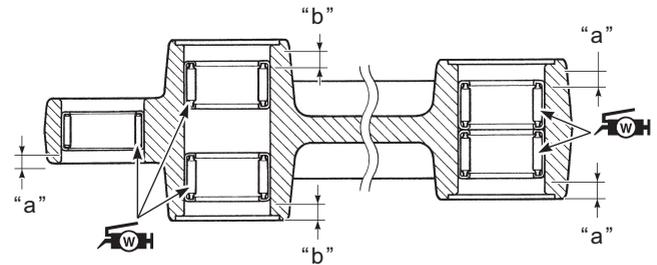
Position of the bearings is shown in the figure.

2) Apply grease to the bearings.

⚠ WH : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1230032-01



I933H1230033-02

"a": 4 mm (0.16 in)	"b": 4.5 mm (0.18 in)
---------------------	-----------------------

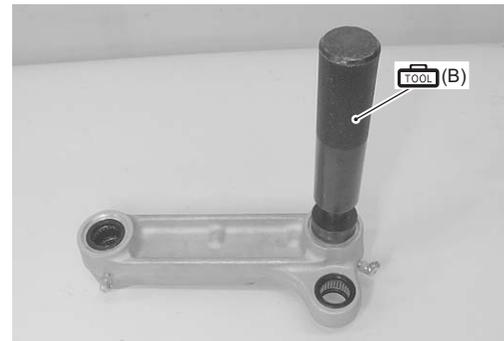
3) Install the dust seals with the special tool.

Special tool

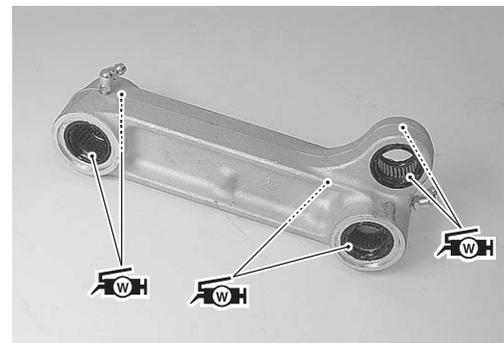
- TOOL (B): 09913-70210 (Bearing installer set)**

4) Apply grease to the oil seal lips.

⚠ WH : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1230034-01



I933H1230035-02

5) Install the spacers and collars into the cushion lever.

6) Install the cushion lever. Refer to "Cushion Rod / Cushion Lever Removal and Installation (Page 2C-7)".

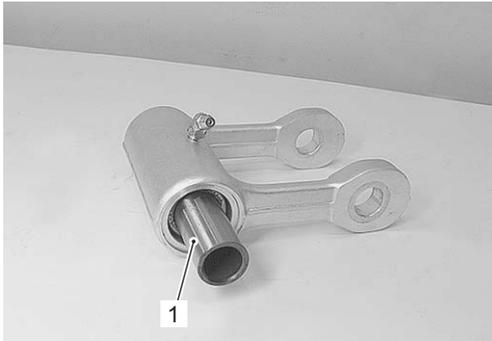
2C-10 Rear Suspension:

Cushion Rod Dust Seal / Bearing Removal and Installation

B933H22306012

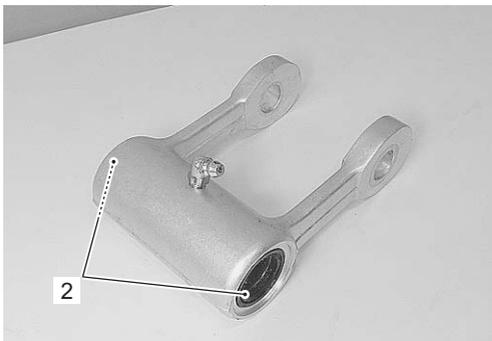
Removal

- 1) Remove the cushion rod. Refer to "Cushion Rod / Cushion Lever Removal and Installation (Page 2C-7)".
- 2) Remove the spacer (1).



I933H1230036-01

- 3) Remove the dust seals (2).

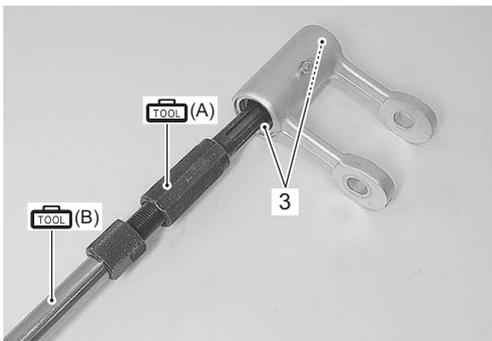


I933H1230037-01

- 4) Remove the bearings (3) with the special tools.

Special tool

-  (A): 09923-73210 (Bearing remover)
-  (B): 09930-30104 (Rotor remover slide shaft)



I933H1230038-01

Installation

CAUTION

The removed dust seals and bearings must be replaced with new ones.

NOTE

Stamped marks on the dust seals and bearings must face outside.

- 1) Install the bearings with the special tool and suitable size socket wrench.

Special tool

-  (A): 09924-84521 (Bearing installer set)

NOTE

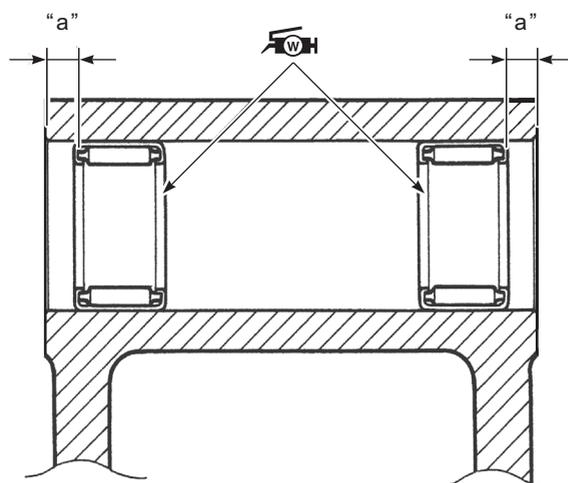
Position of the bearings is shown in the figure.

- 2) Apply grease to the bearings.

 : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1230039-01



I933H1230040-04

"a": 4.5 mm (0.8 in)

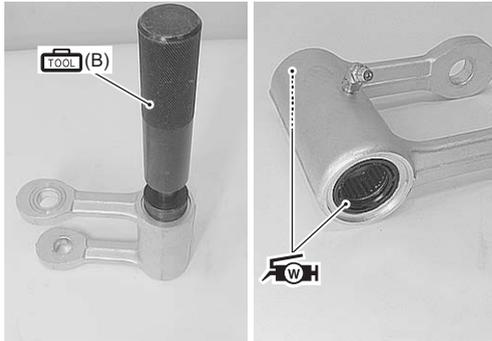
3) Install the dust seals with the special tool.

Special tool

TOOL (B): 09913-70210 (Bearing installer set)

4) Apply grease to the oil seal lip.

FWH : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1230041-02

5) Install the spacer.

6) Install the cushion rod. Refer to "Cushion Rod / Cushion Lever Removal and Installation (Page 2C-7)".

Cushion Lever / Cushion Rod Related Parts Inspection

B933H22306013

Refer to "Cushion Rod / Cushion Lever Removal and Installation (Page 2C-7)".

Spacer

1) Remove the collars and spacers. Refer to "Cushion Lever Dust Seal / Bearing Removal and Installation (Page 2C-8)" and "Cushion Rod Dust Seal / Bearing Removal and Installation (Page 2C-10)".

2) Inspect the spacers for any flaws or other damage. If any defects are found, replace the spacers with new ones.



I933H1230042-01



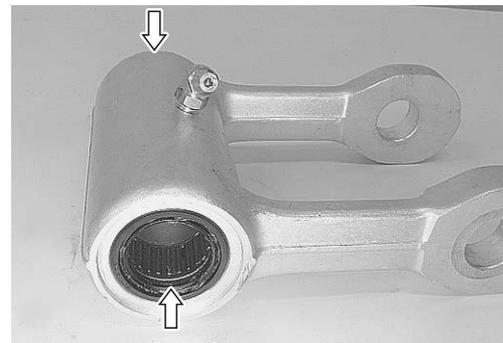
I933H1230043-01

3) Install the spacers and collars.

Dust seal

1) Remove the collars and spacers. Refer to "Cushion Lever Dust Seal / Bearing Removal and Installation (Page 2C-8)" and "Cushion Rod Dust Seal / Bearing Removal and Installation (Page 2C-10)".

2) Inspect the dust seal lips for wear or damage. If any defects are found, replace the dust seals with the new ones.



I933H1230044-01



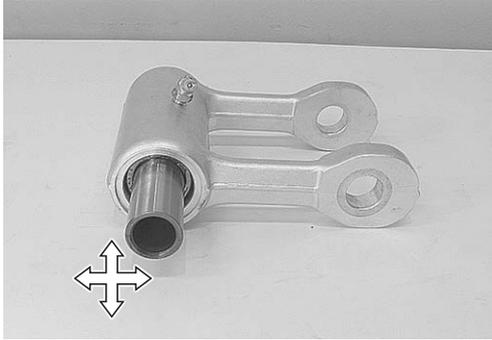
I933H1230045-01

3) Install the spacers and collars.

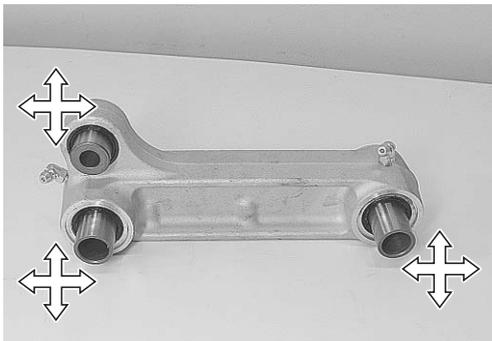
2C-12 Rear Suspension:

Bearing

- 1) Remove the dust seals. Refer to "Cushion Lever Dust Seal / Bearing Removal and Installation (Page 2C-8)" and "Cushion Rod Dust Seal / Bearing Removal and Installation (Page 2C-10)".
- 2) Insert the spacers into bearings.
- 3) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one.



I933H1230046-01



I933H1230047-01

- 4) Install the dust seals. Refer to "Cushion Lever Dust Seal / Bearing Removal and Installation (Page 2C-8)" and "Cushion Rod Dust Seal / Bearing Removal and Installation (Page 2C-10)".

Cushion rod / Cushion lever

Inspect the cushion rod / cushion lever for damage. If any defect is found, replace them with new ones.



I933H1230048-01



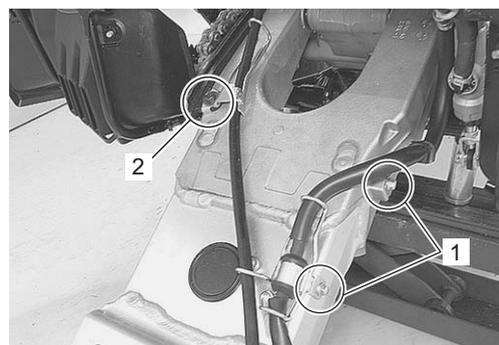
I933H1230049-01

Swingarm Removal and Installation

B933H22306014

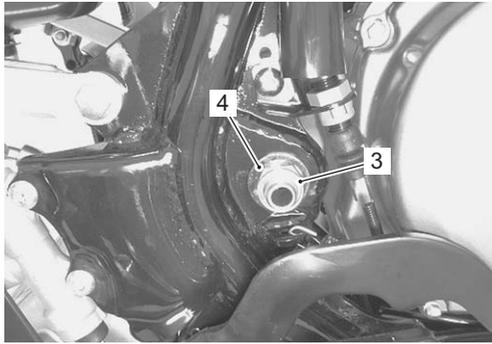
Removal

- 1) Remove the rear shock absorber. Refer to "Rear Shock Absorber Removal and Installation (Page 2C-3)".
- 2) Remove the rear axle housing. Refer to "Rear Axle Housing Removal and Installation in Section 3A (Page 3A-12)".
- 3) Remove the brake hose guide (1) and parking cable guide (2).



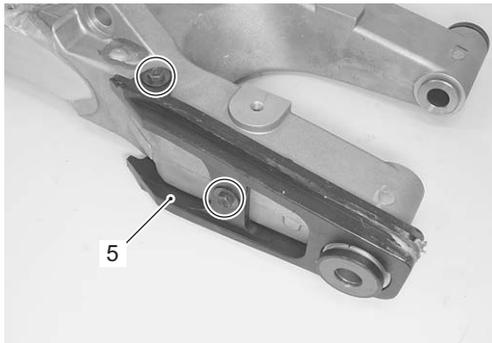
I933H1230050-02

- 4) Remove the swingarm by removing the pivot shaft and nut (3) and washer (4).



I933H1230052-01

- 5) Remove the chain buffer (5).



I933H1230051-01

- 6) Remove the dust covers (6) and washers (7).



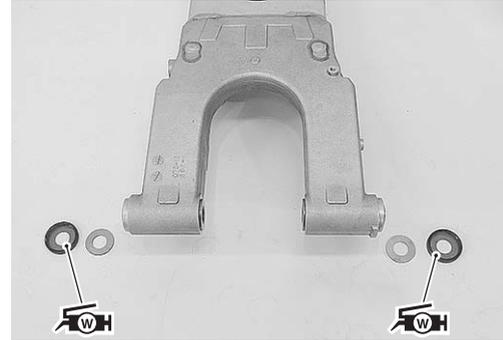
I933H1230053-01

Installation

Install the swingarm in the reverse order removal. Pay attention to the following points.

- Apply grease to the dust covers lip.

 : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1230054-02

- Tighten the swingarm pivot nut to the specified torque.

Tightening torque

Swingarm pivot nut (a): 95 N·m (9.5 kgf·m, 68.5 lb-ft)



I933H1230055-01

- Install the brake hose and parking brake cable. Refer to "Rear Brake Hose Routing Diagram in Section 4A (Page 4A-2)" and "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".

2C-14 Rear Suspension:

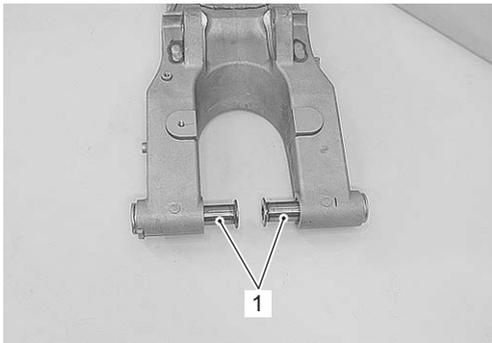
Swingarm Dust Seal / Bearing Removal and Installation

B933H22306015

Refer to "Rear Axle Assembly Construction in Section 3A (Page 3A-3)".

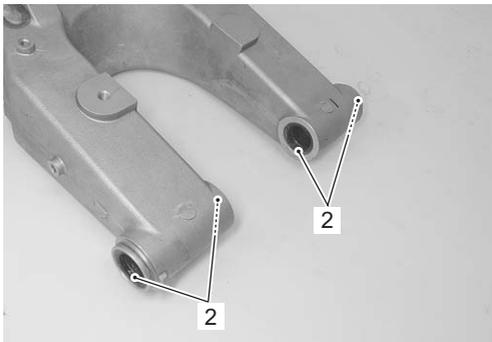
Removal

- 1) Remove the swingarm. Refer to "Swingarm Removal and Installation (Page 2C-12)".
- 2) Remove the spacers (1).



I933H1230056-01

- 3) Remove the dust seals (2).

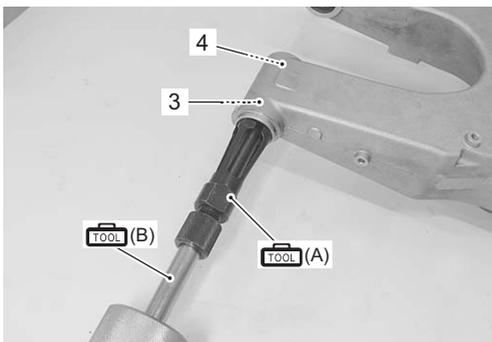


I933H1230057-01

- 4) Remove the bearings (3) and bushings (4) with the special tools.

Special tool

- TOOL (A): 09923-74511 (Bearing remover)**
- TOOL (B): 09930-30104 (Rotor remover slide shaft)**



I933H1230058-01

Installation

CAUTION

The removed dust seals, bushings and bearings must be replaced with new ones.

NOTE

Stamped marks on the dust seals and bearings must face outside.

- 1) Install the bushings and bearings with the special tool and suitable size socket wrench.

Special tool

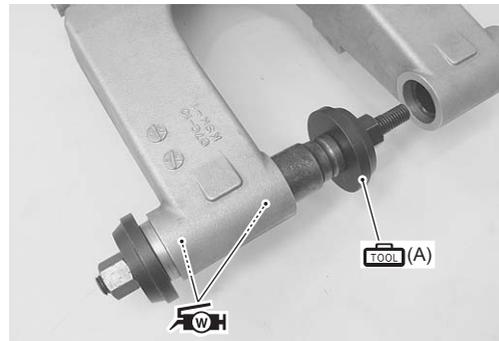
- TOOL (A): 09924-84510 (Bearing installer set)**

NOTE

Press the bushings at 6.0 mm (0.23 in) depth from swingarm edge and bearings at 5.0 mm (0.20 in) depth from swingarm edge. Refer to "Rear Axle Assembly Construction in Section 3A (Page 3A-3)".

- 2) Apply grease to the bushings and bearings.

W/H: Grease 99000-25160 (Water resistance grease or equivalent)



I933H1230059-02

- 3) Install the dust seals with the special tool.

Special tool

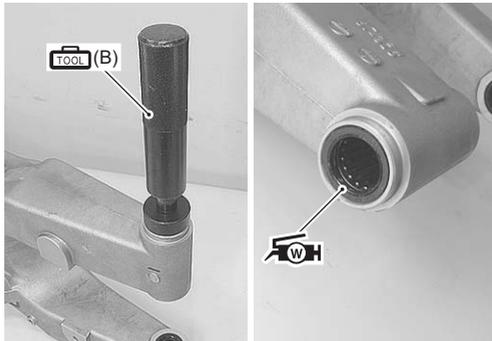
- TOOL (B): 09913-70210 (Bearing installer set)**

NOTE

Press the inside dust seals at 2.0 mm (0.08 in) depth from swingarm inside edge.

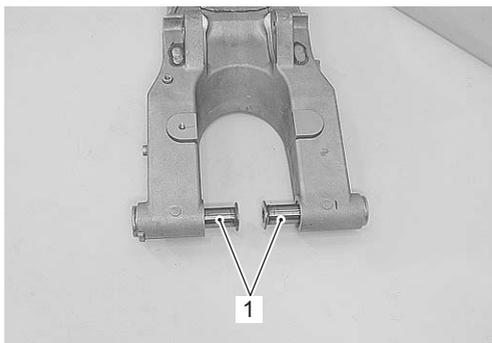
4) Apply grease to the dust seal lips.

 **Grease 99000-25160 (Water resistance grease or equivalent)**



I933H1230060-02

5) Install the spacers (1).



I933H1230061-01

6) Install the swingarm. Refer to "Swingarm Removal and Installation (Page 2C-12)".

Swingarm Related Parts Inspection

Refer to "Swingarm Removal and Installation (Page 2C-12)".

B933H22306016

Spacers

- 1) Remove the spacers from the swingarm. Refer to "Swingarm Dust Seal / Bearing Removal and Installation (Page 2C-14)".
- 2) Inspect the spacers for wear and damage. If any defects are found, replace the spacers with new ones.



I933H1230063-01

3) Install the spacers. Refer to "Swingarm Dust Seal / Bearing Removal and Installation (Page 2C-14)".

Chain buffer

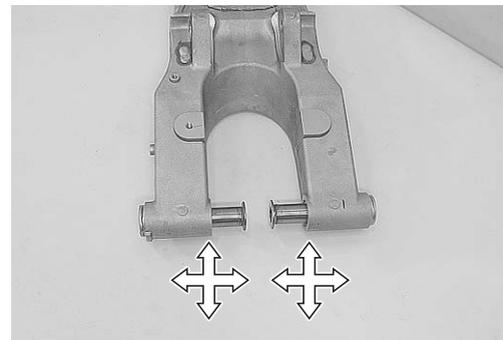
Inspect the chain buffer for wear and damage. If any defect is found, replace the chain buffer with a new one.



I933H1230062-01

Swingarm bearing and bushing

- 1) Remove the dust seals. Refer to "Swingarm Dust Seal / Bearing Removal and Installation (Page 2C-14)".
- 2) Insert the spacers into bearing and bushing.
- 3) Check the play by moving the spacers up and down. If excessive play is noted, replace the bearing with a new one.



I933H1230064-01

4) Install the dust seals. Refer to "Swingarm Dust Seal / Bearing Removal and Installation (Page 2C-14)".

Swingarm

Inspect the swingarm for damage. If any defect is found, replace the swingarm with a new one.

Refer to "Swingarm Dust Seal / Bearing Removal and Installation (Page 2C-14)".



I933H1230065-01

2C-16 Rear Suspension:

Cushion lever / Rod bolt

Inspect the cushion lever/rod bolts for damage and bend. If any defects are noted, replace them with new ones.



I933H1230066-01

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

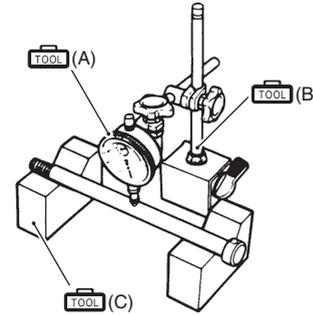
(A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

(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

Specifications

Service Data

B933H22307001

Suspension

Unit: mm (in)

Item	Standard		Limit
Rear shock absorber spring pre-load length	234.8 (9.24)		—
Rear shock absorber damping force adjuster	Rebound	1 and 1/4 turns out	—
	Compression	2 turns out	—
Rear wheel travel	230 (9.1)		—
Swingarm pivot shaft runout	—		0.3 (0.01)

Tightening Torque Specifications

B933H22307002

Fastening part	Tightening torque			Note
	N-m	kgf-m	lb-ft	
Rear shock absorber mounting nut	60	6.0	43.5	(Page 2C-3) / (Page 2C-7)
Rear shock absorber lock-nut	44	4.4	32.0	(Page 2C-4)
Rear wheel hub nut	121	12.1	87.5	(Page 2C-6)
Cushion lever nut	78	7.8	56.5	(Page 2C-7)
Cushion rod nut	78	7.8	56.5	(Page 2C-8)
Cushion lever cover bolt	5.5	0.55	4.0	(Page 2C-8)
Swingarm pivot nut	95	9.5	68.5	(Page 2C-13)

NOTE

The specified tightening torque is also 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 Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H22308001

Material	SUZUKI recommended product or Specification	Note
Grease	Water resistance grease or equivalent	P/No.: 99000-25160 ☞(Page 2C-6) / ☞(Page 2C-9) / ☞(Page 2C-9) / ☞(Page 2C-10) / ☞(Page 2C-11) / ☞(Page 2C-13) / ☞(Page 2C-14) / ☞(Page 2C-15)
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110 ☞(Page 2C-3) / ☞(Page 2C-7)

NOTE

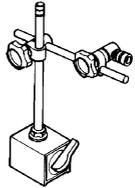
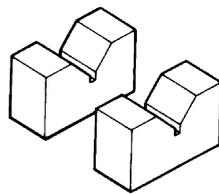
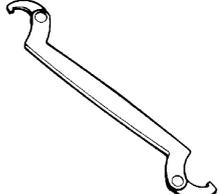
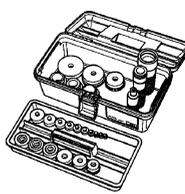
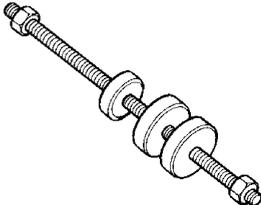
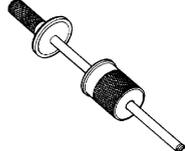
Required service material is also described in the following.

“Rear Suspension Components (Page 2C-1)”

“Rear Suspension Assembly Construction (Page 2C-2)”

Special Tool

B933H22308002

09900-20607 Dial gauge (1/100 mm, 10 mm) ☞(Page 2C-16)		09900-20701 Magnetic stand ☞(Page 2C-16)	
09900-21304 V-block (100 mm) ☞(Page 2C-16)		09910-60611 Universal clamp wrench ☞(Page 2C-4)	
09913-70210 Bearing installer set ☞(Page 2C-9) / ☞(Page 2C-11) / ☞(Page 2C-14)		09923-73210 Bearing remover ☞(Page 2C-9) / ☞(Page 2C-10)	
09923-74511 Bearing remover ☞(Page 2C-14)		09924-84510 Bearing installer set ☞(Page 2C-14)	
09924-84521 Bearing installer set ☞(Page 2C-9) / ☞(Page 2C-10)		09930-30104 Rotor remover slide shaft ☞(Page 2C-9) / ☞(Page 2C-10) / ☞(Page 2C-14)	

Wheels and Tires

Precautions

Precautions for Wheel and Tire

B933H2240001

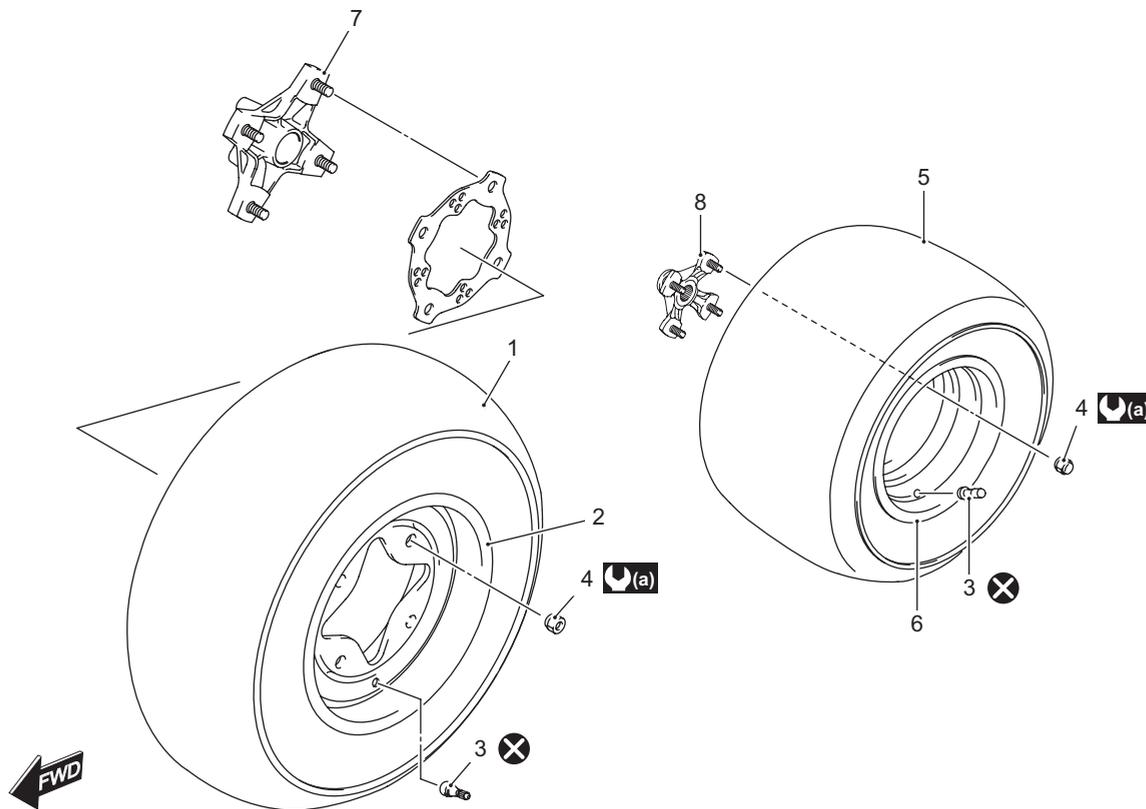
⚠ WARNING

- Proper tire inflation pressure and loading are important factors to ensure riding safety. Overloading can lead not only to tire damage but also to loss of control.
- Under-inflation makes it difficult to turn a corner smoothly and results in premature wear of tires.
- Over-inflation reduces tire's area of road contact and thus results in 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 if it is deformed or has cracks or scratches. Also replace the wheel if its runout exceeds the service limit.
- Replacement wheels must be equivalent to the originally installed wheels.

Repair Instructions

Front and Rear Wheel Components

B933H22406001



I933H1240001-02

1. Front tire	6. Rear wheel
2. Front wheel	7. Front wheel hub
3. Wheel air valve	8. Rear wheel hub
4. Wheel nut	: 66 N·m (6.6 kgf·m, 47.5 lb-ft)
5. Rear tire	: Do not reuse.

Front / Rear Wheel Removal and Installation

B933H22406002

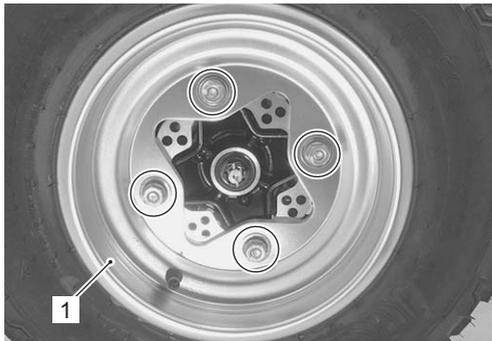
⚠ CAUTION

Make sure that the vehicle is supported securely.

Removal

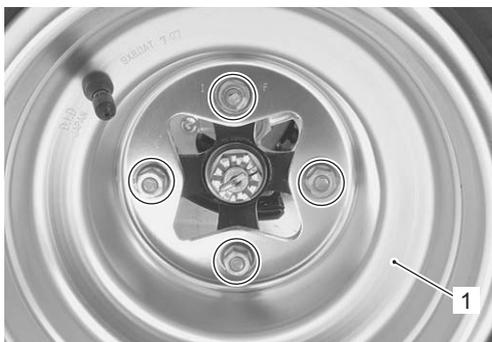
- 1) Place the vehicle on level ground.
- 2) Support the vehicle with a jack or wooden block.
- 3) Remove the wheel (1).

Front



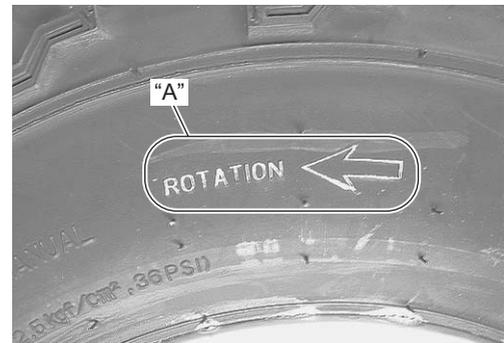
I933H1240002-02

Rear



I933H1240004-01

Front

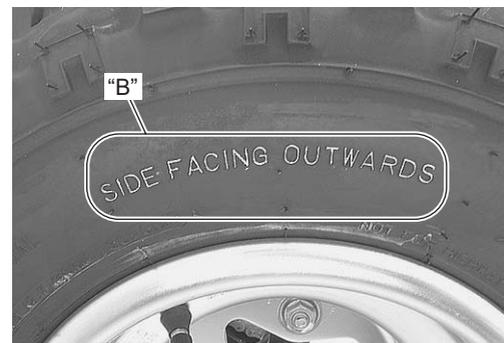


I933H1240005-03



I933H1240006-01

Rear



I933H1240007-01



I933H1240008-01

Installation

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

- Tighten the wheel set nuts to the specified torque.

⚠ WARNING

- When installing the front wheel, make sure that the arrow "A" on the tire points in the direction of rotation.
When installing the rear wheel, make sure that the instruction "SIDE FACING OUTWARDS" "B" on the rear tire faces outwards.
- Tighten the wheel set nuts diagonally.

Tightening torque

Wheel set nut (Front and Rear): 66 N·m (6.6 kgf·m, 47.5 lb·ft)

2D-3 Wheels and Tires:

Tire Removal and Installation

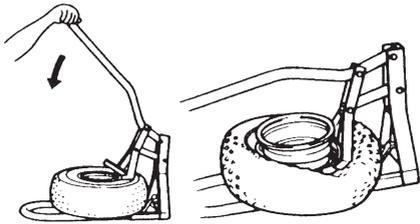
B933H22406003

- 1) Remove the wheel from vehicle. Refer to "Front / Rear Wheel Removal and Installation (Page 2D-2)".
- 2) After removing the air valve cap, release the tire pressure by depressing the valve.

NOTE

To properly remove the tire, if a pneumatic tire changer is not available, remove the tire as shown in the following procedures.

- 3) Dismount the bead from the rim completely as shown in the figure.

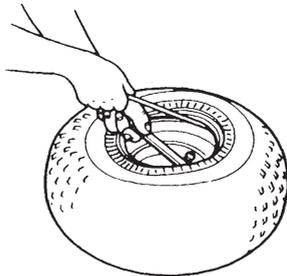


I831G1240005-01

- 4) Separate the tire from the rim using a set of tire levers and rim protectors.

CAUTION

When using the tire levers, do not scratch or hit the sealing portion (hump) of the wheel or it may cause air-leakage.



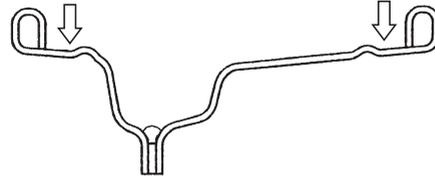
I831G1240006-01

Installation

CAUTION

Do not reuse the valve which has been once removed.

- 1) Clean up the sealing portion of the rim.

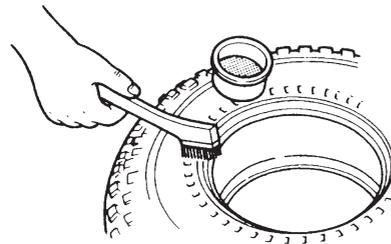


I933H1240009-01

- 2) Apply tire lubricant to the tire bead and the flange of the rim.

CAUTION

Never apply grease, oil or gasoline to the tire bead because they will deteriorate the tire.



I831G1240008-01

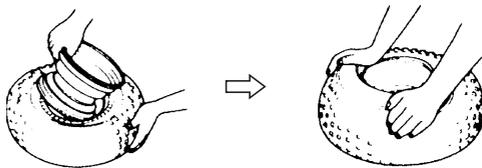
3) Mount the tire on the rim by hand or tire levers and rim protectors.

⚠ CAUTION

The standard tire fitted on this vehicle is AT22 x 7R10 ☆☆ for the front and AT20 x 10R9 ☆☆ for the rear. The use of tires other than the standard may cause instability. It is highly recommended to use the specified tire.

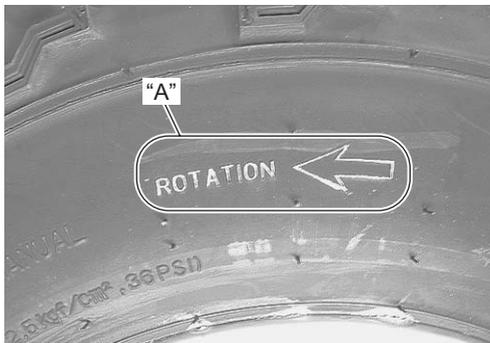
NOTE

- When installing the front tire, make sure that the arrow "A" on the side wall of the front tire points in the direction of rotation.
- When installing the rear tire, make sure that the instruction "SIDE FACING OUTWARDS" "B" on the rear tire faces outwards.



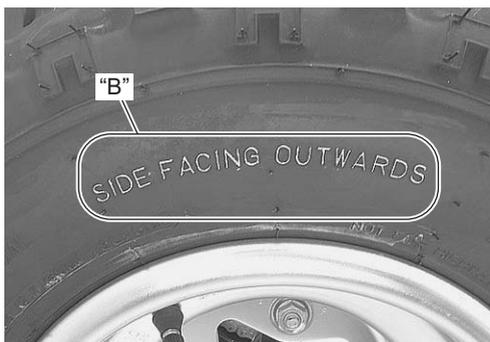
I831G1240009-02

Front



I933H1240005-03

Rear



I933H1240007-01

4) Inflate the tire to seat the tire bead.

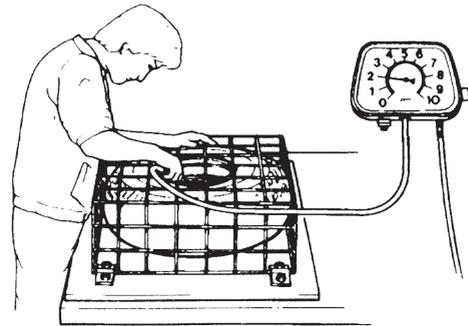
⚠ CAUTION

Place the tire under a protective tire cage or similar protective covering device before inflating the tire. To minimize the possibility of tire damage when seating the tire bead, never exceed the **MAXIMUM TIRE BEAD SEAT PRESSURE** rating shown on the tire.

Maximum tire bead seat pressure

Front: 250 kPa (2.5 kgf/cm², 36 psi)

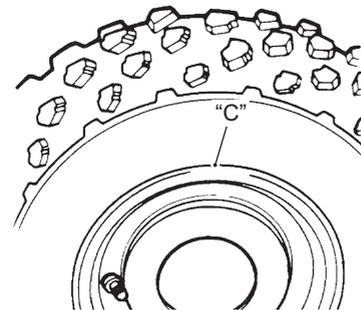
Rear: 250 kPa (2.5 kgf/cm², 36 psi)



I831G1240011-02

NOTE

Check the "rim line" "C" cast on the tire sidewalls. It must be equidistant from the wheel rim all the way around. If the distance between the rim line and the wheel rim varies, this indicates that the bead is not properly seated. If this is so, deflate the tire completely, and unseat the tire bead on both sides. Then, coat the bead with clean water, and re-seat the tire.



I933H1240012-02

2D-5 Wheels and Tires:

5) Adjust the tire pressure to the specified pressure.

⚠ CAUTION

Before inflating the tire, check the **MAXIMUM OPERATING PRESSURE** rating of the tire. This is indicated by a “☆” following the tire size shown on the sidewall. The number of “☆” on the tire indications the maximum operating pressure.

Cold inflation tire pressure

Front: 30 kPa (0.30 kgf/cm², 4.4 psi)

Rear: 30 kPa (0.30 kgf/cm², 4.4 psi)

Maximum operating pressure

☆☆: 35 kPa (0.35 kgf/cm², 5.1 psi)

6) Install the wheel assembly. Refer to “Front / Rear Wheel Removal and Installation (Page 2D-2)”.

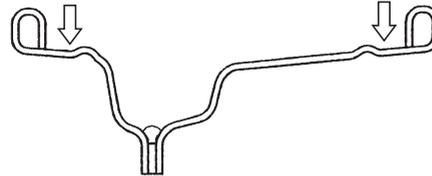
Wheel / Tire Inspection

B933H22406004

Refer to “Tire Removal and Installation (Page 2D-3)”.

Wheel

Inspect the sealing portion of the rim for contamination and distortion. If any damages are found, replace the wheel with a new one.



I933H1240009-01

Tire

Refer to “Tire Inspection in Section 0B (Page 0B-19)”.

Specifications

Service Data

B933H22407001

Wheel

Unit: mm (in)

Item	Standard		Limit
	Front	Rear	
Wheel rim size	10 x 5.5 AT	9 x 8.0 AT	—

Tire

Item	Standard		Limit
	Front	Rear	
Cold inflation tire pressure	30 kPa (0.30 kgf/cm ² , 4.4 psi)	30 kPa (0.30 kgf/cm ² , 4.4 psi)	—
Tire size	AT22 x 7R10 ☆☆	AT20 x 10R9 ☆☆	—
Tire type	DUNLOP: KT331	DUNLOP: KT335	—
Tire tread depth	—	—	4.0 (0.16)
			4.0 (0.16)

Tightening Torque Specifications

B933H22407002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Wheel set nut	66	6.6	47.5	☞ (Page 2D-2)

NOTE

The specified tightening torque is also described in the following.
“Front and Rear Wheel Components (Page 2D-1)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Section 3

Driveline / Axle

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Diagnostic Information and Procedures	3A-1	Drive Chain Roller Removal and Installation.....	3A-12
Drive Chain and Sprocket Symptom		Rear Axle Housing Removal and Installation....	3A-12
Diagnosis	3A-1	Rear Axle Related Parts Inspection	3A-13
Repair Instructions	3A-2	Rear Axle Dust Seal / Bearing Removal and	
Drive Chain / Rear Axle Related Components	3A-2	Installation	3A-14
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Engine Sprocket Removal and Installation	3A-4	Service Data.....	3A-16
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Rear Axle Nut and Lock-Nut Tightening		Special Tools and Equipment	3A-17
Torque.....	3A-7	Recommended Service Material	3A-17
		Special Tool	3A-17

Precautions

Precautions

Precautions for Driveline / Axle

B933H23000001

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 such similar solvent. These fluids will damage the O-rings of the drive chain.
 - Clean the drive chain with a spray-type chain cleaner and blow dry with compressed air. If the drive chain cannot be cleaned with a spray cleaner, it may be necessary to use a kerosine. Always follow the chemical manufacturer's instructions on proper use, handling and storage.
 - Lubricate the drive chain with a heavy weight motor oil. Wipe off any excess oil or chain lubricant. Do not use any oil sold commercially as "drive chain oil". Such oil can damage the O-rings.
 - The standard drive chain is RK 520SMOZ10S. 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

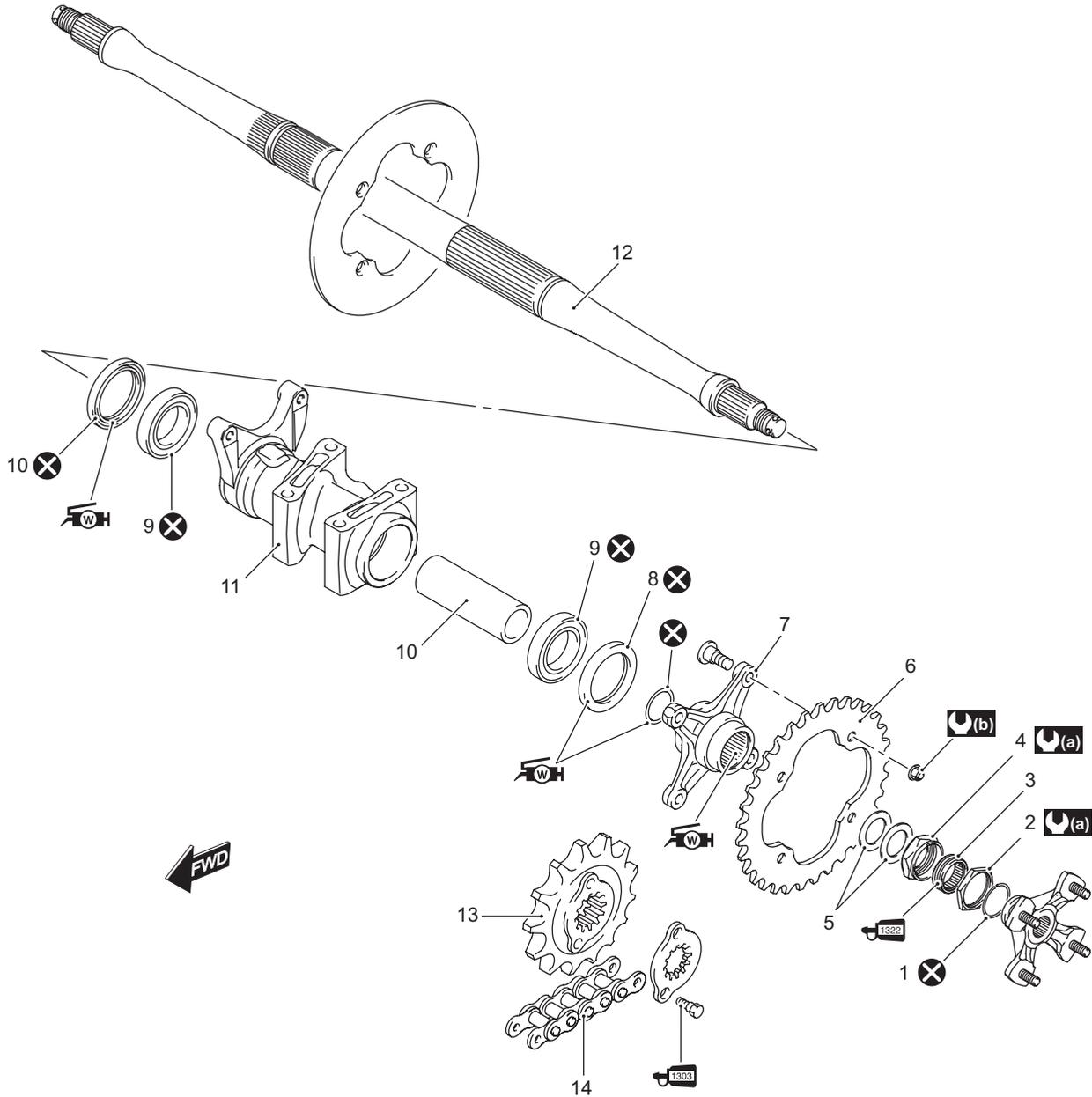
B933H23104001

Condition	Possible cause	Correction / Reference Item
Noisy Drive Chain	Worn sprocket.	<i>Replace.</i>
	Worn drive chain.	<i>Replace.</i>
	Stretched drive chain.	<i>Replace.</i>
	Too large drive chain slack.	<i>Adjust.</i>
	Drive chain out of adjustment.	<i>Adjust.</i>

Repair Instructions

Drive Chain / Rear Axle Related Components

B933H23106001

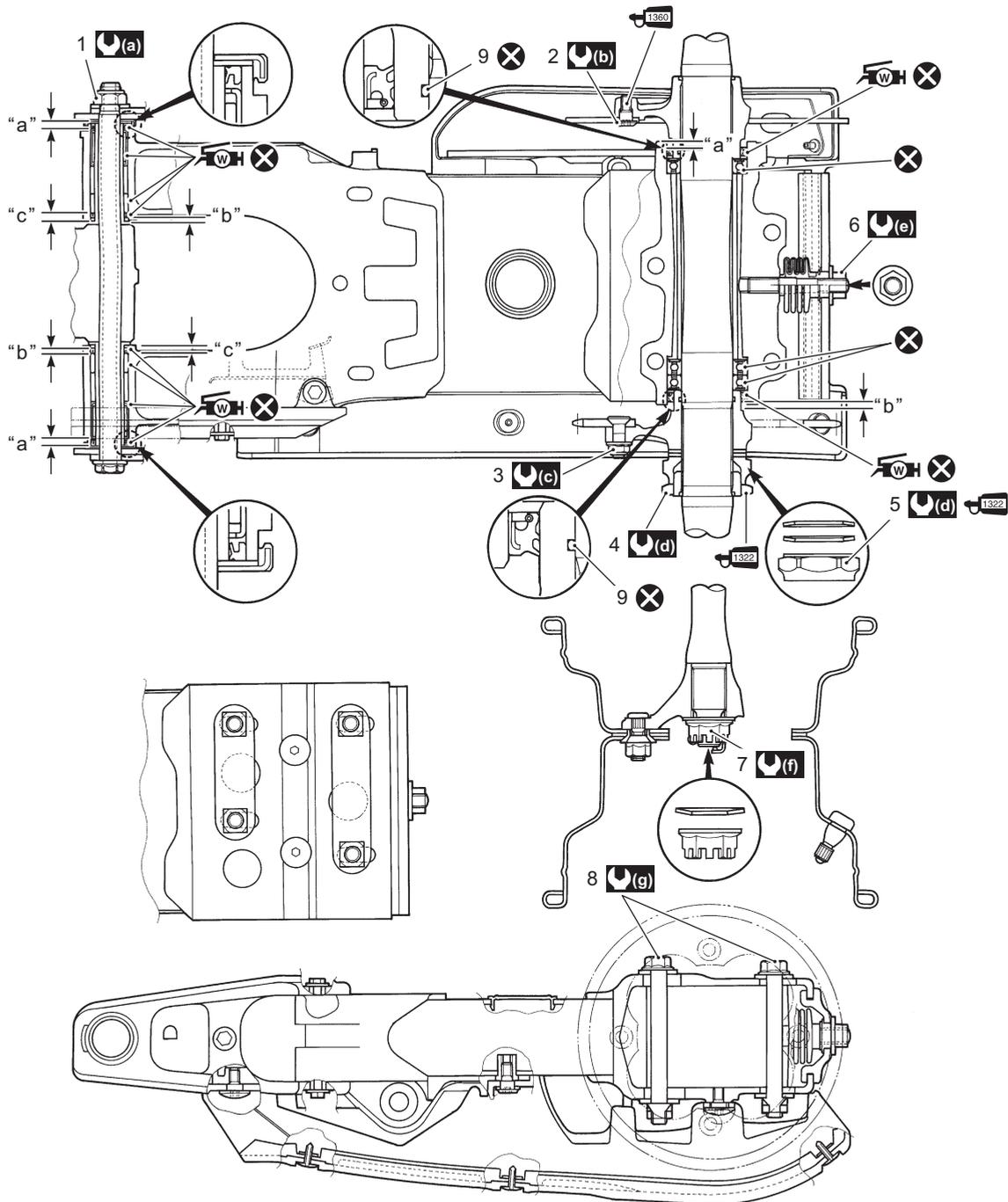


I933H1310044-03

1. Stopper ring	8. Dust seal	(a) : 240 N.m (24.0 kgf-m, 173.5 lb-ft)
2. Rear axle lock-nut	9. Bearing	(b) : 60 N.m (6.0 kgf-m, 43.5 lb-ft)
3. Rear axle nut bolt	10. Spacer	WH : Apply water resistance grease.
4. Rear axle nut	11. Rear axle housing	1303 : Apply thread lock to the thread part.
5. Concave washer	12. Rear axle	1322 : Apply thread lock to the thread part.
6. Rear sprocket	13. Engine sprocket	X : Do not reuse.
7. Sprocket flange	14. Drive chain	

Rear Axle Assembly Construction

B933H23106002



I933H1310045-04

1. Swingarm pivot nut	9. O-ring	1360 : Apply thread lock to the thread part.
2. Brake disc bolt	(a) : 95 N.m (9.5 kgf-m, 68.5 lb-ft)	: Apply water resistance grease.
3. Rear sprocket mounting nut	(b) : 23 N.m (2.3 kgf-m, 16.5 lb-ft)	: Do not reuse.
4. Rear axle lock-nut	(c) : 60 N.m (6.0 kgf-m, 43.5 lb-ft)	"a": 5.0 mm (0.20 in)
5. Rear axle nut	(d) : 240 N.m (24.0 kgf-m, 173.5 lb-ft)	"b": 2.0 mm (0.08 in)
6. Chain adjuster nut	(e) : 30 N.m (3.0 kgf-m, 21.5 lb-ft)	"c": 6.0 mm (0.23 in)
7. Rear wheel hub nut	(f) : 121 N.m (12.1 kgf-m, 87.5 lb-ft)	
8. Rear axle housing bolt	(g) : 100 N.m (10.0 kgf-m, 72.5 lb-ft)	

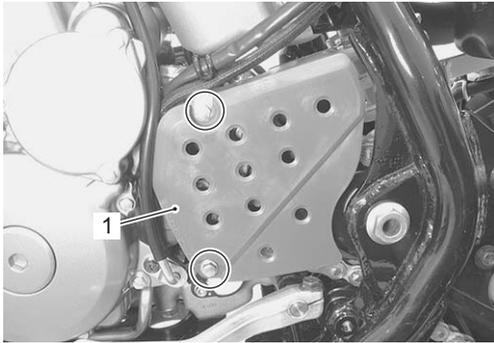
3A-4 Drive Chain / Drive Train / Drive Shaft:

Engine Sprocket Removal and Installation

B933H23106003

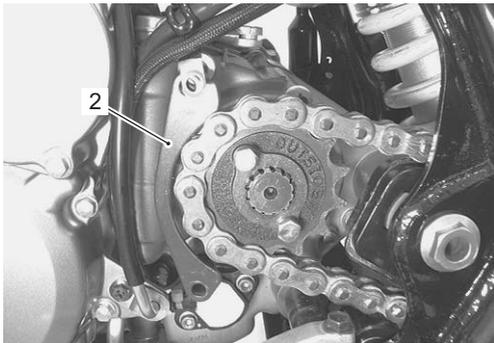
Removal

- 1) Remove the engine sprocket cover (1).



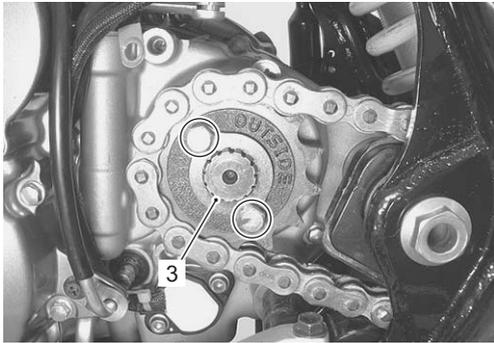
I933H1310001-01

- 2) Remove the bracket (2).



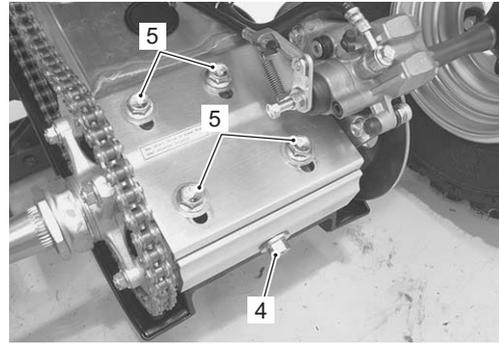
I933H1310002-01

- 3) Remove the engine sprocket washer (3).



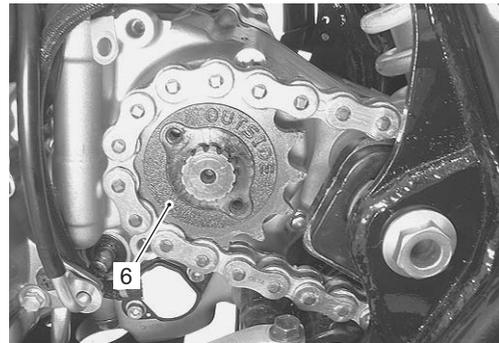
I933H1310003-02

- 4) Loosen the chain adjuster nut (4) and rear axle housing bolts (5) to provide additional chain slack.



I933H1310004-01

- 5) Remove the engine sprocket (6) with drive chain.



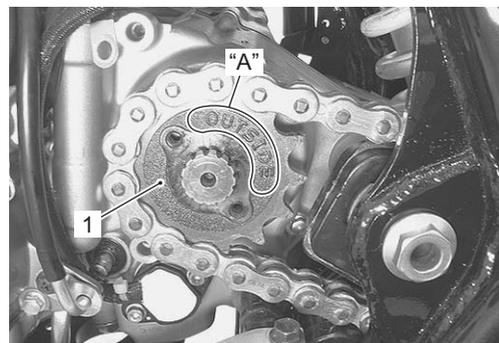
I933H1310005-01

Installation

- 1) Install the engine sprocket (1) with drive chain.

NOTE

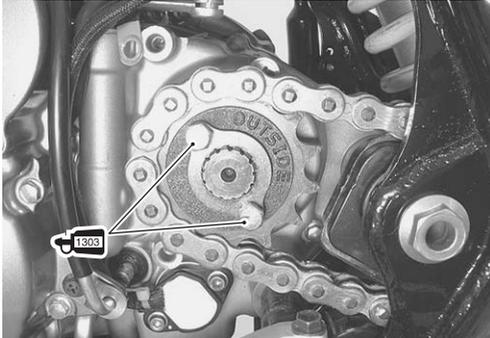
The letter "A" on the engine sprocket should face to the outside.



I933H1310006-01

- Apply thread lock to the sprocket bolts and tighten them.

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

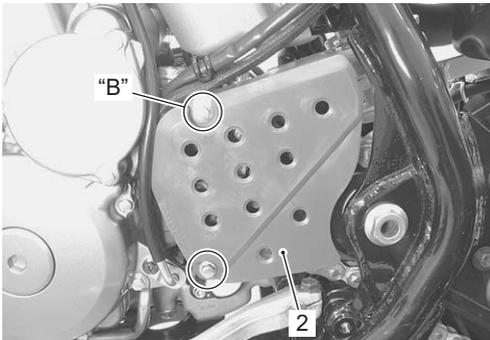


I933H1310007-01

- Install the bracket and engine sprocket cover (2).

NOTE

Fit the clamp to the bolt "B". Refer to "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".



I933H1310008-02

- Adjust the drive chain slack. Refer to "Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)".

Rear Sprocket Removal and Installation

B933H23106004

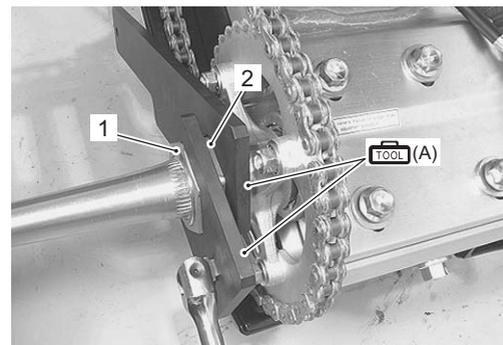
Removal

- Place the vehicle on the level ground and support the vehicle with a jack or wooden block.
- Remove the rear wheel hub. Refer to "Rear Wheel Hub Removal and Installation in Section 2C (Page 2C-6)".
- Loosen the rear axle lock-nut (1) and axle nut (2) with the special tool by applying the rear brake.

Special tool

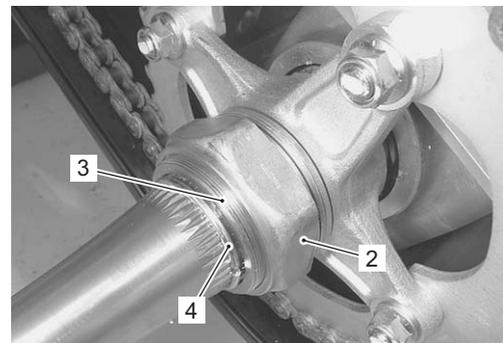
TOOL (A): 09940-92460 (Rear axle nut wrench set)

- Remove the rear axle lock-nut (1).



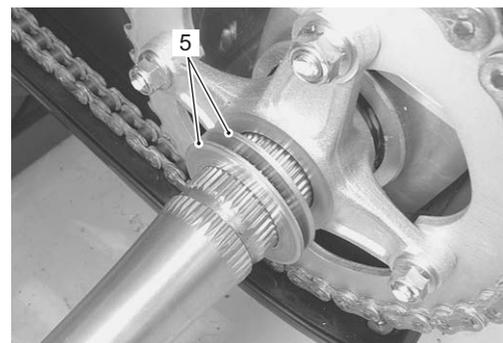
I933H1310009-01

- Loosen the rear axle nut (2).
- Push the rear axle nut bolt (3).
- Remove the stopper ring (4), rear axle nut (2) and rear axle nut bolt (3).



I933H1310010-05

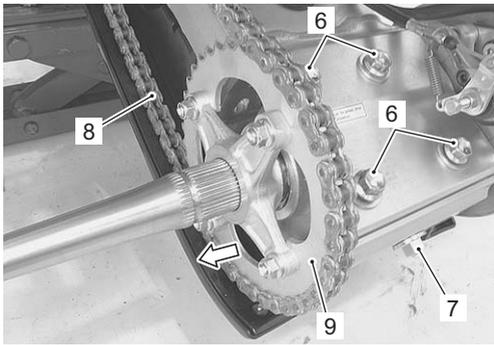
- Remove the concave washers (5).



I933H1310011-02

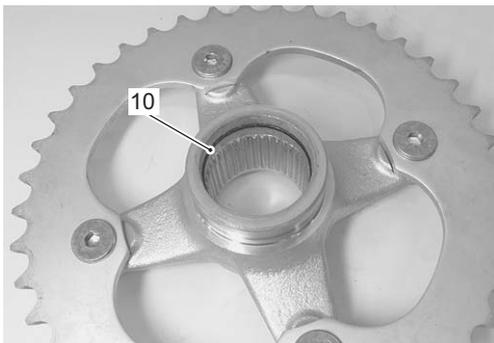
3A-6 Drive Chain / Drive Train / Drive Shaft:

- 9) Loosen the rear axle housing bolts (6) and chain adjuster nut (7).
- 10) Disengage the drive chain (8) from the rear sprocket.
- 11) Draw out the rear sprocket assembly (9).



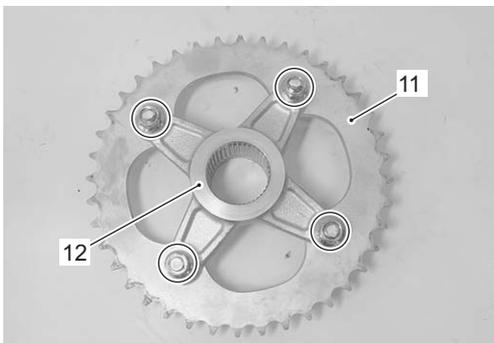
I933H1310012-03

- 12) Remove the O-ring (10).



I933H1310013-02

- 13) Remove the rear sprocket (11) from the sprocket flange (12).



I933H1310014-02

Installation

Install the rear sprocket in the reverse order of removal. Pay attention to the following point.

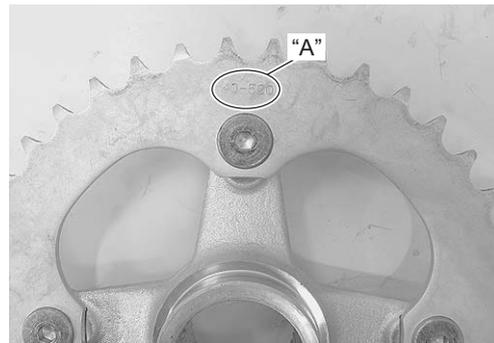
- Tighten the rear sprocket mounting nuts to the specified torque.

NOTE

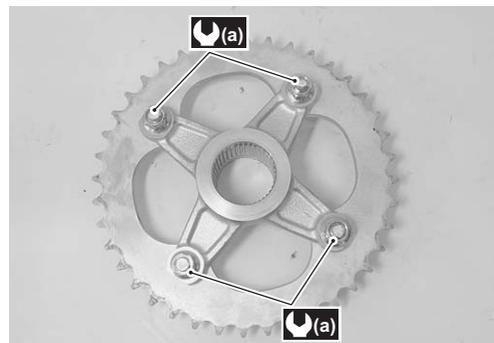
The stamped mark "A" must face right side of the vehicle.

Tightening torque

Rear sprocket mounting nut (a): 60 N·m (6.0 kgf·m, 43.5 lb-ft)



I933H1310015-01



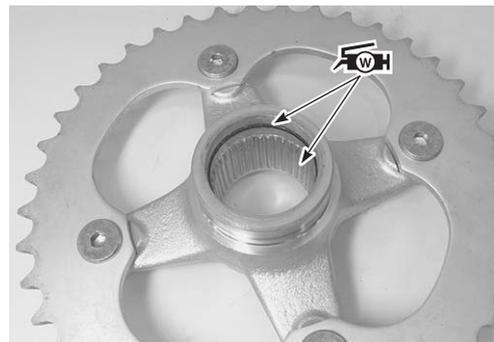
I933H1310016-01

- Apply grease to the O-ring and spline of sprocket flange.

CAUTION

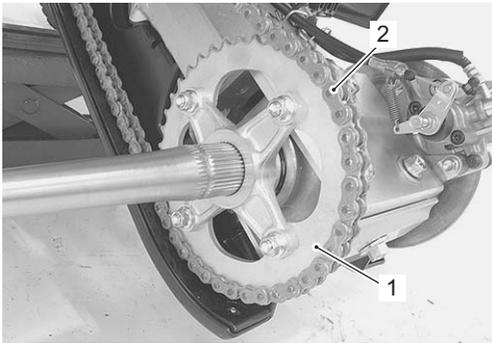
Replace the O-ring with a new one.

 : Grease 99000-25160 (Water resistance grease or equivalent)



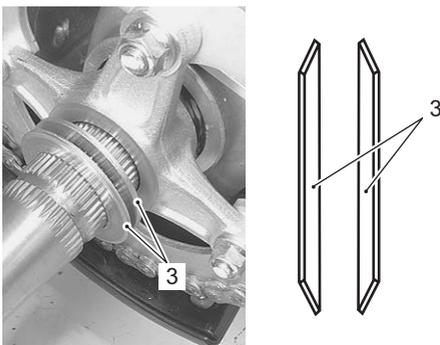
I933H1310017-02

- Install the rear sprocket assembly (1) to the axle shaft.
- Engage the drive chain (2) to the rear sprocket.



I933H1310018-01

- Install the concave washers (3) as shown in the figure.



I933H1310019-01

- Apply thread lock to the rear axle nut bolt.

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

- Install the stopper ring (4).

⚠ CAUTION

The removed stopper ring must be replaced with a new one.

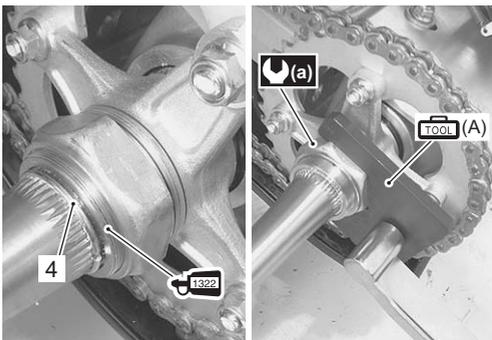
- Tighten the rear axle nut to the specified torque with the special tool. Refer to “Rear Axle Nut and Lock-Nut Tightening Torque (Page 3A-7)”.

Special tool

 (A): 09940-92460 (Rear axle nut wrench set)

Tightening torque

Rear axle nut (a): 240 N·m (24.0 kgf·m, 173.5 lb-ft)



I933H1310020-03

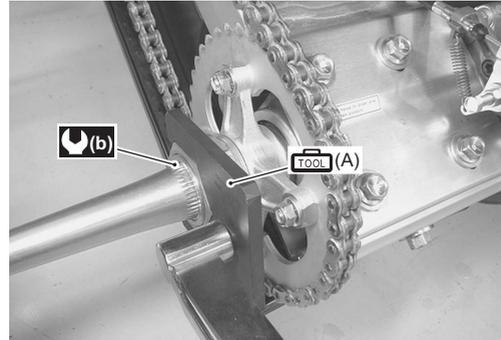
- Tighten the rear axle lock-nut to the specified torque with the special tool. Refer to “Rear Axle Nut and Lock-Nut Tightening Torque (Page 3A-7)”.

Special tool

 (A): 09940-92460 (Rear axle nut wrench set)

Tightening torque

Rear axle lock-nut (b): 240 N·m (24.0 kgf·m, 173.5 lb-ft)



I933H1310021-04

- Adjust the drive chain slack. Refer to “Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)”.

Rear Axle Nut and Lock-Nut Tightening Torque

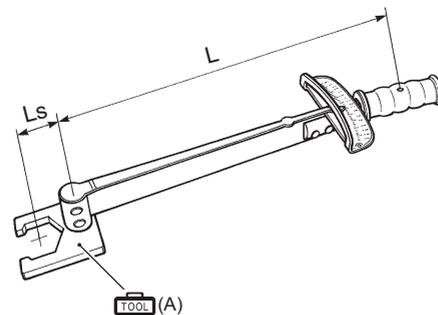
B933H23106005

Tighten the rear axle nut and lock-nut in the following procedures:

Measure the effective length L of the torque wrench. Calculate the reading torque on the torque wrench by use of the formula shown below.

Special tool

 : 09940-92460 (Rear axle nut wrench set)



I933H1310047-01

$$T = \frac{L \times Ts}{L + Ls}$$

I933H1310046-01

T:	Reading torque on the torque wrench
Ts:	Specified torque
Ls:	0.06 m (2.36 in)
L:	Effective length of the torque wrench

3A-8 Drive Chain / Drive Train / Drive Shaft:

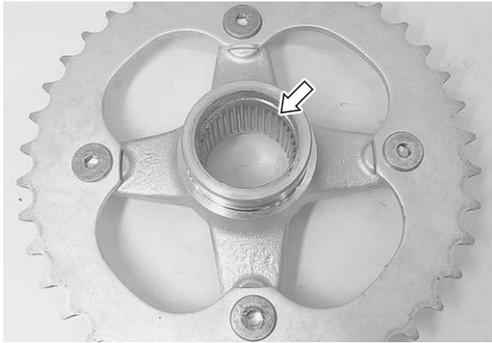
Drive Chain Related Parts Inspection

B933H23106006

Refer to "Engine Sprocket Removal and Installation (Page 3A-4)" and "Rear Sprocket Removal and Installation (Page 3A-5)".

Rear sprocket flange

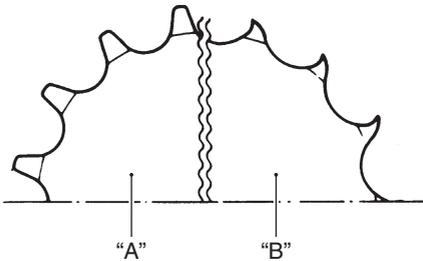
Inspect the rear sprocket flange for damage and wear of spline. If any defects are found, replace the rear sprocket flange with a new one.



I933H1310022-01

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
------------------	---------------------

Drive chain

Refer to "Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)".

Drive Chain Replacement

B933H23106007

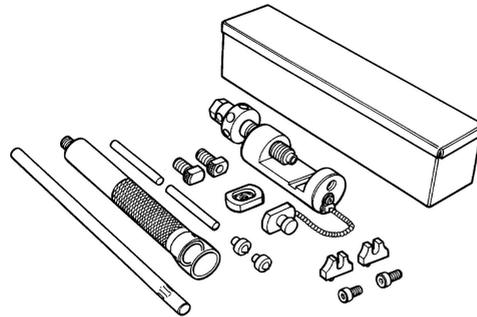
Use the special tool in the following procedures, to cut and rejoin the drive chain.

NOTE

When using the special tool, apply a small quantity of grease to the threaded parts of the special tool.

Special tool

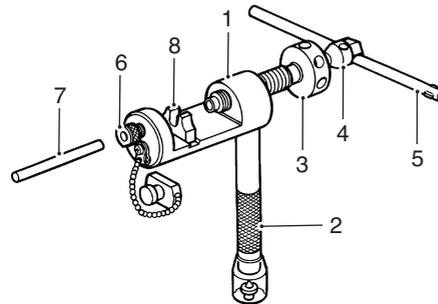
 : 09922-22711 (Drive chain cutting and joining tool)



I649G1310023-02

Drive chain cutting

1) Set up the special tool as shown in the figure.

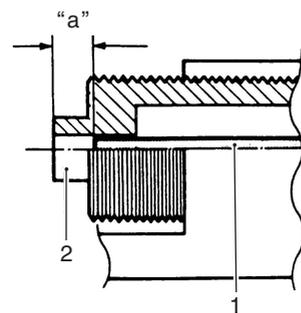


I649G1310024-02

1. Tool body
2. Grip handle
3. Pressure bolt [A]
4. Pressure bolt [B]
5. Bar
6. Adjuster bolt (With through hole)
7. Pin remover
8. Chain holder (Engraved mark 500) with reamer bolt M5 x 10

NOTE

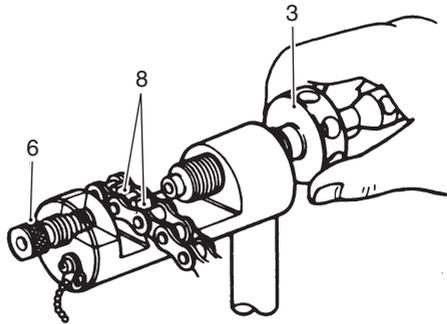
The tip of pin remover (1) should be positioned inside "a" approximately 5 mm (0.2 in) from the end face of pressure bolt [A] (2) as shown in the figure.



"a": 5 mm (0.2 in)

I649G1310025-02

- 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 should be completely pushed out of the chain.

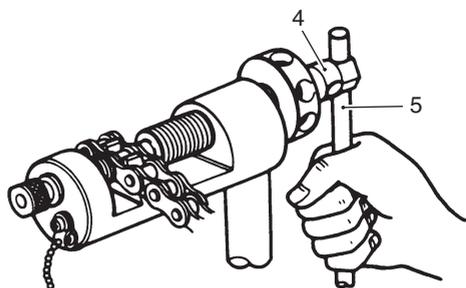
NOTE

After the joint pin (9) is removed, loosen the pressure bolt [B] (4) and then pressure bolt [A] (3).

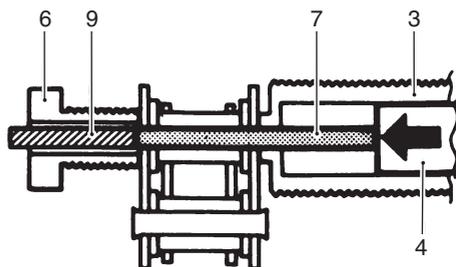
- 6) Remove the joint pin (9) of the other side of joint plate.

⚠ CAUTION

Never reuse joint pins, O-rings and plates.



I649G1310027-02



I649G1310028-02

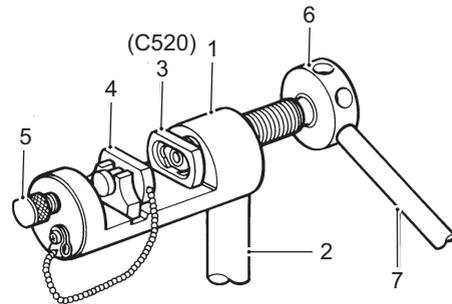
Drive chain connecting

⚠ 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 vehicle and severe injury.

Joint plate installation

- 1) Set up the special tool as shown in the figure.



I933H1310023-02

1.	Tool body
2.	Grip handle
3.	Joint plate holder (Engraved mark "C520")
4.	Wedge holder & 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).

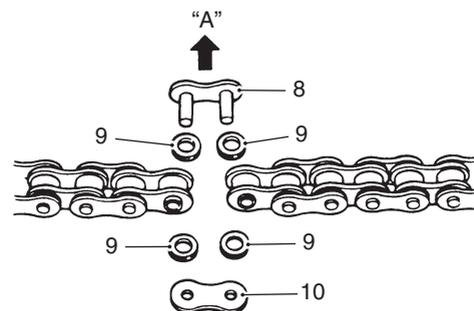
⚠ CAUTION

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 vehicle.

Joint set part number

RK: 27620 - 43B20



I649G1310030-02

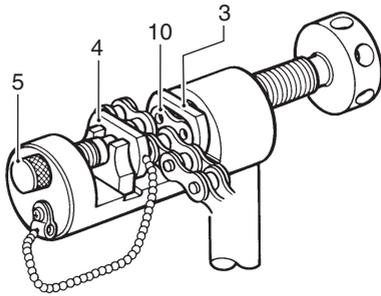
3A-10 Drive Chain / Drive Train / Drive Shaft:

- 4) Apply grease on the recessed portion of the joint plate holder (3) and set the joint plate (10).

NOTE

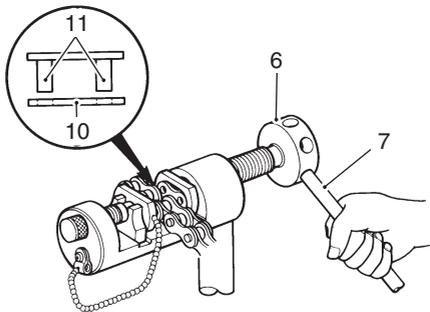
When positioning the joint plate (10) on the tool, its stamp mark must face the joint plate holder (3) side.

- 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.



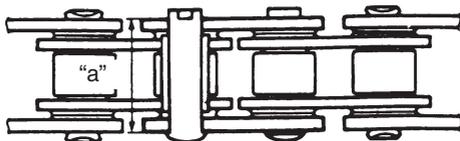
I649G1310032-02

- 8) Continue pressing the joint plate until the distance between the two joint plates comes to the specification.

Joint plate distance specification "a"
17.65 – 17.95 mm (0.695 – 0.707 in)

⚠ CAUTION

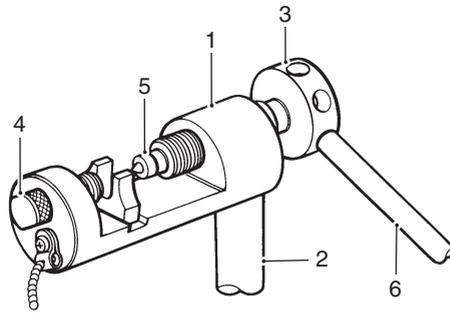
If pressing of the joint plate makes the dimension out of specification excessively, the work must be carried out again by using new joint parts.



I649G1310033-03

Joint pin staking

- 1) Set up the special tool as shown in the figure.



I649G1310034-02

1. Tool body
2. Grip handle
3. Pressure bolt [A]
4. Adjuster bolt (Without hole)
5. Staking pin (Stowed inside grip handle behind rubber cap)
6. Bar

NOTE

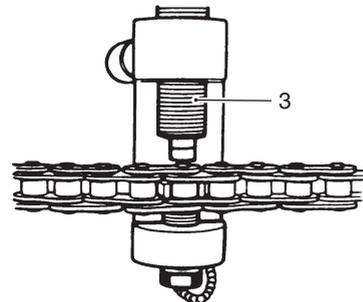
Before staking the joint pin, apply a small quantity of grease to the staking pin (5).

- 2) Stake the joint pin by turning (approximately 7/8 turn) the pressure bolt [A] (3) with the bar until the pin end diameter becomes the specified dimension.

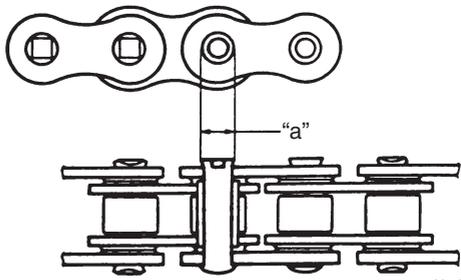
⚠ CAUTION

- 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"
RK: 5.4 – 5.8 mm (0.213 – 0.228 in)



I649G1310035-02

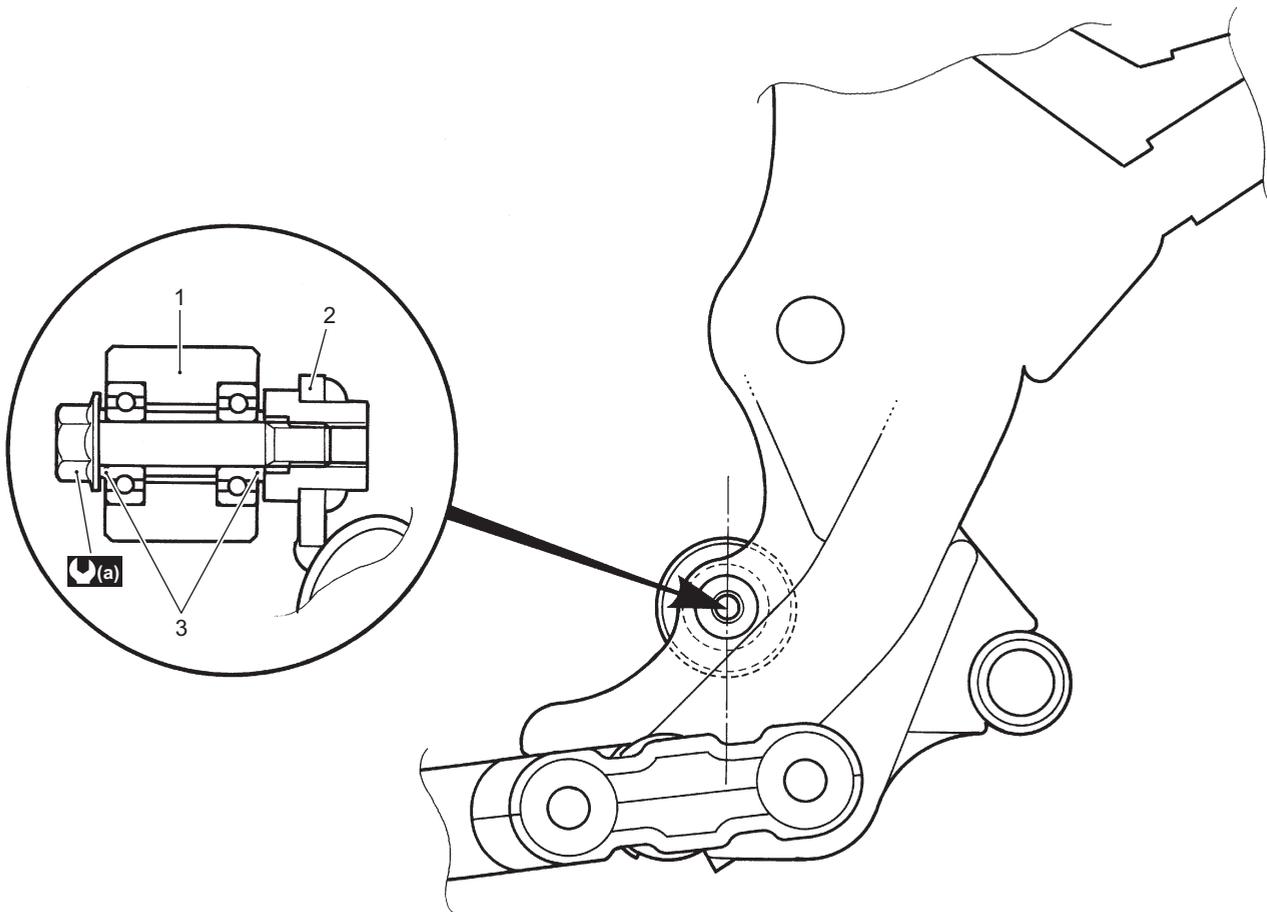


I649G1310036-03

3) Adjust the drive chain slack, after connecting it.
Refer to "Drive Chain Inspection and Adjustment in Section 0B (Page 0B-15)".

Drive Chain Roller Construction

B933H23106008



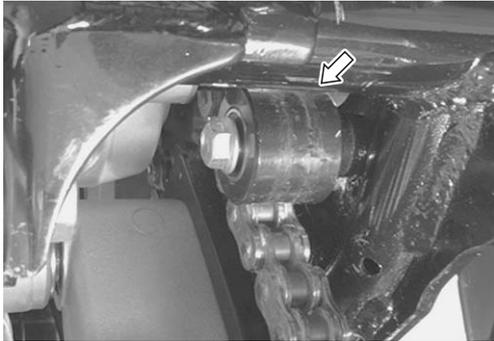
I933H1310048-02

1. Drive chain roller	3. Washer
2. Frame	: 40 N.m (4.0 kgf-m, 29.0 lb-ft)

Drive Chain Roller Inspection

B933H23106009

Inspect the drive chain roller bearings for abnormal noise and smooth rotation. Replace the drive chain control roller bearings if there is anything unusual. Refer to "Drive Chain Roller Removal and Installation (Page 3A-12)".



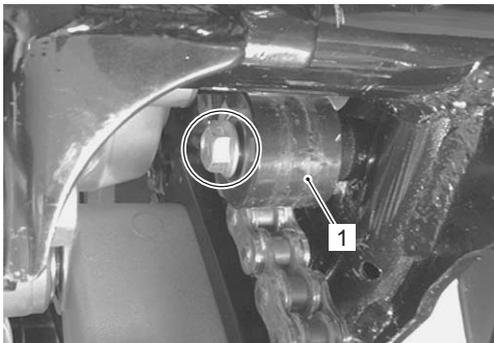
I933H1310024-01

Drive Chain Roller Removal and Installation

B933H23106010

Removal

Remove the drive chain roller (1).



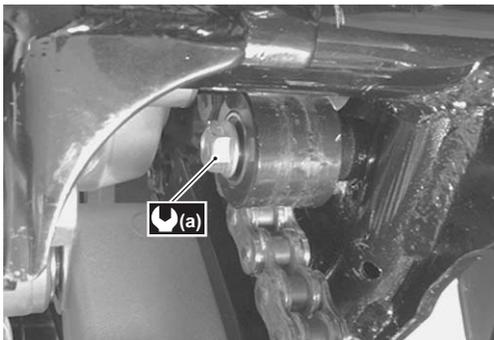
I933H1310025-01

Installation

Tighten the drive chain roller mounting bolt to the specified torque.

Tightening torque

Drive chain roller mounting bolt (a): 40 N·m (4.0 kgf·m, 29.0 lb-ft)



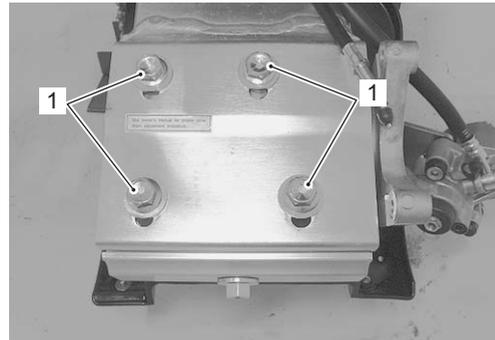
I933H1310026-01

Rear Axle Housing Removal and Installation

B933H23106011

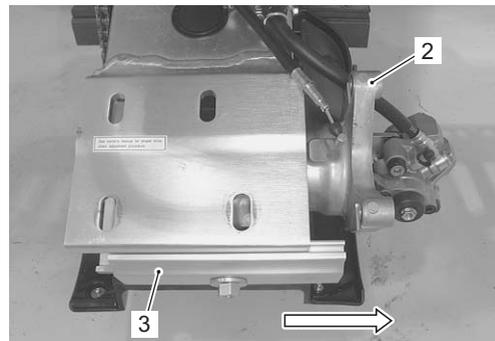
Removal

- 1) Remove the rear sprocket. Refer to "Rear Sprocket Removal and Installation (Page 3A-5)".
- 2) Draw out the rear axle. Refer to "Rear Brake Disc Removal and Installation in Section 4C (Page 4C-8)".
- 3) Remove the rear axle housing bolts (1) and nuts.



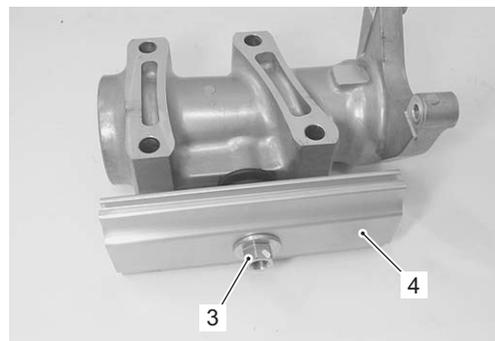
I933H1310027-01

- 4) Draw out the rear axle housing (2) with the plate (3).



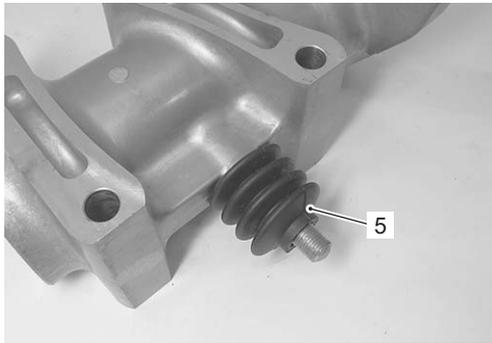
I933H1310028-01

- 5) Loosen the nut (3) and remove the plate (4).



I933H1310029-01

6) Remove the boot (5).

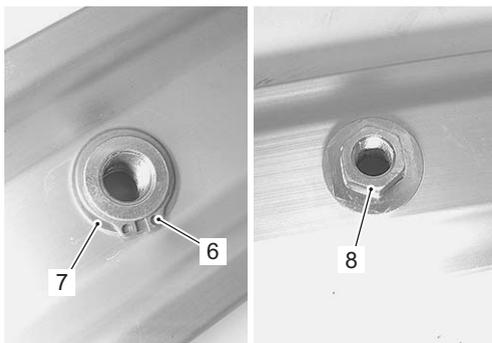


I933H1310030-01

7) Remove the snap ring (6), washer (7) and nut (8).

Special tool

TOOL : 09900-06107 (Snap ring pliers)

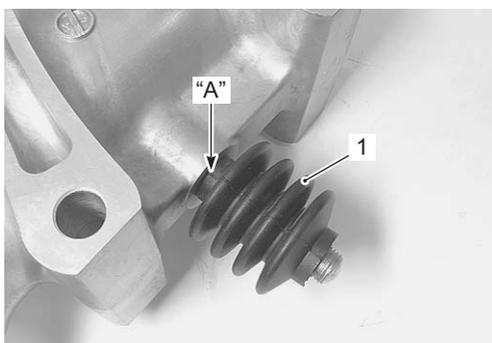


I933H1310031-01

Installation

Install the rear axle housing in the reverse order of removal. Pay attention to the following points:

- When installing the boot (1), insert the smaller diameter portion "A" of the boot must face to the rear axle housing.

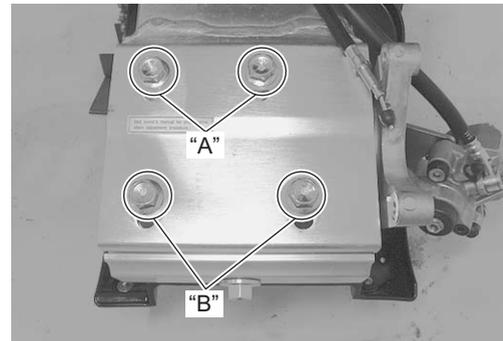


I933H1310032-03

- Temporarily tighten the rear axle housing bolts.

NOTE

The rear axle housing bolts are different length.



I933H1310033-04

"A": 121 mm (4.76 in)	"B": 112 mm (4.41 in)
-----------------------	-----------------------

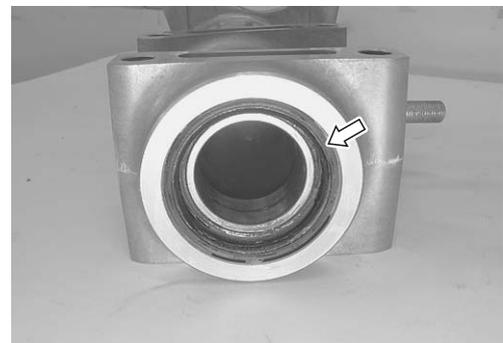
Rear Axle Related Parts Inspection

B933H23106012

Refer to "Rear Axle Housing Removal and Installation (Page 3A-12)".

Dust seal

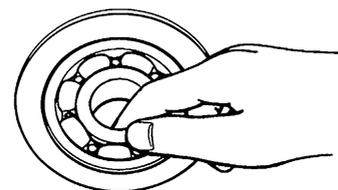
Inspect the dust seal lips for wear or damage. If any defects are found, replace the dust seal with the new ones. Refer to "Rear Axle Dust Seal / Bearing Removal and Installation (Page 3A-14)".



I933H1310034-03

Wheel bearing

Inspect the play of the axle bearings by finger while they are in the axle housing. Rotate the inner race by finger to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual. Refer to "Rear Axle Dust Seal / Bearing Removal and Installation (Page 3A-14)".



I649G1240015-02

3A-14 Drive Chain / Drive Train / Drive Shaft:

Boot

Inspect the boot for wear or damage. If any defects are found, replace the boot with a new one.



I933H1310035-03

Rear axle

- 1) Remove the rear brake disc plate housing from the rear axle. Refer to "Rear Brake Disc Removal and Installation in Section 4C (Page 4C-8)".
- 2) Using a dial gauge, check the rear axle for runout. If the runout exceeds the limit, replace the rear axle.

NOTE

When measuring the runout, support the rear axle at 35 mm (1.38 in) diameter of the rear axle as shown in the figure.

Measure the runout at 40 mm (1.57 in) diameter of the rear axle as shown in the figure.

Special tool

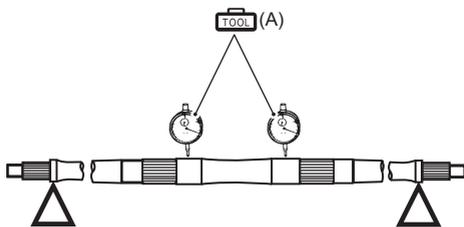
 (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

 : 09900-20701 (Magnetic stand)

 : 09900-21304 (V-block (100 mm))

Rear axle runout

Service limit: 6.0 mm (0.24 in)



I933H1310036-01

- 3) Reinstall the removed parts.

Rear Axle Dust Seal / Bearing Removal and Installation

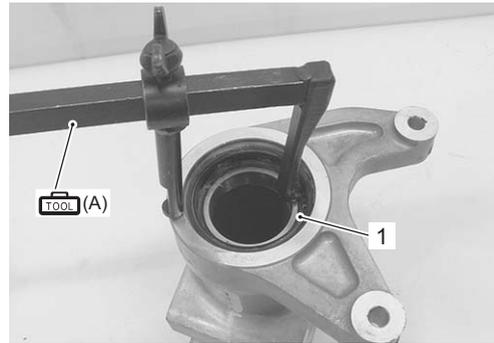
B933H23106013

Removal

- 1) Remove the rear axle housing. Refer to "Rear Axle Housing Removal and Installation (Page 3A-12)".
- 2) Remove the dust seals (1) with the special tool.

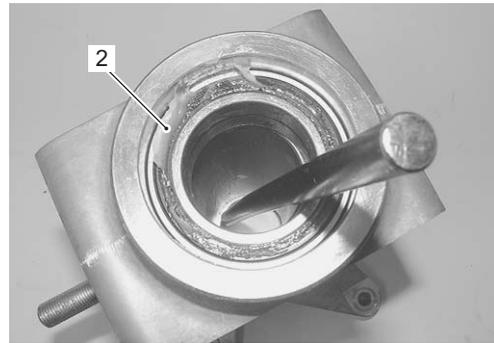
Special tool

 (A): 09913-50121 (Oil seal remover)



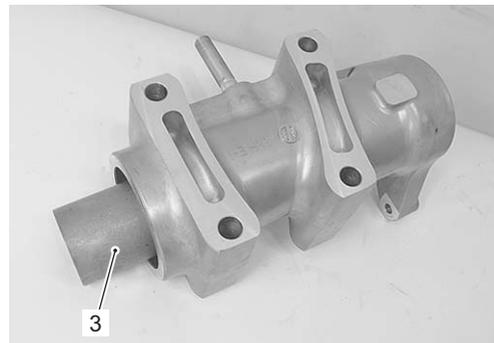
I933H1310037-01

- 3) Remove the bearings (2) with appropriate bar.



I933H1310038-01

- 4) Remove the spacer (3).



I933H1310039-06

Installation

CAUTION

The removed dust seals and bearings must be replaced with new ones.

Install the rear axle dust seal / bearing in the reverse order of removal. Pay attention to the following points.

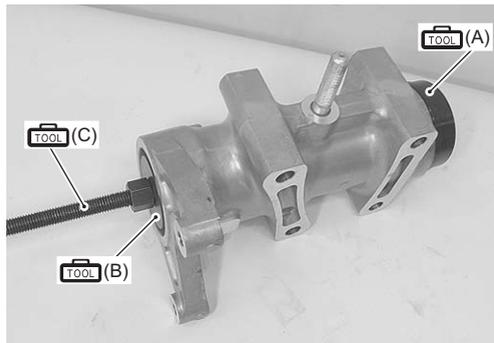
- First install the right bearing, then install the spacer (1) and left bearings with the special tools.

Special tool

- TOOL (A): 09913-70210 (Bearing installer set)**
- TOOL (B): 09924-84510 (Bearing installer set)**
- TOOL (C): 09941-34513 (Steering race installer)**

⚠ CAUTION

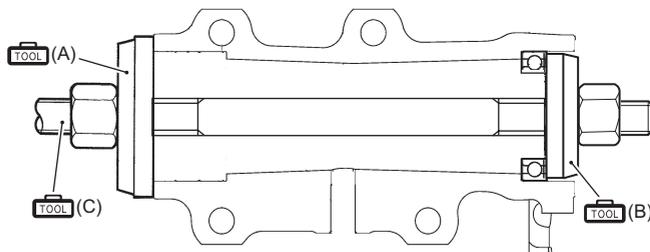
The sealed cover of inner bearing must face inside, and the sealed cover of outer bearings must face outside.



I933H1310040-03

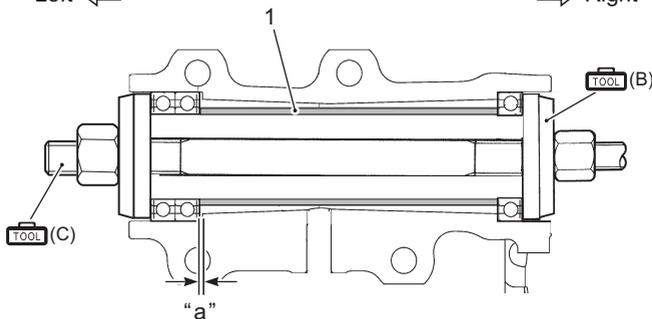
Left ←

⇒ Right



Left ←

⇒ Right



I933H1310043-04

1. Spacer	"a": Clearance
-----------	----------------

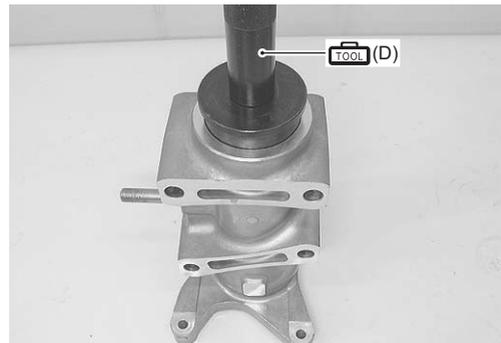
- Install the dust seals with the special tool.

NOTE

- The stamped mark on the dust seals must face outside.
- Press the left dust seal at 2.0 mm (0.08 in) depth from rear axle housing edge and right dust seal at 5.0 mm (0.20 in) depth from rear axle housing edge. Refer to "Rear Suspension Assembly Construction in Section 2C (Page 2C-2)".

Special tool

- TOOL (D): 09913-70210 (Bearing installer set)**



I933H1310041-01

- Apply grease to the lip of dust seals.

W: Grease 99000-25160 (Water resistance grease or equivalent)



I933H1310042-02

Specifications

Service Data

B933H23107001

Drive train

Unit: mm (in)

Item	Standard		Limit
Final reduction ratio	2.857 (40 / 14)		—
Drive chain	Type	RK520SMOZ10S	—
	Links	96	—
	20 pitch length	—	319.4 (12.57)
Drive chain slack (on center stand)	30 – 40 (1.2 – 1.6)		—

Wheel

Unit: mm (in)

Item	Standard		Limit
Wheel axle runout	Rear	—	6.0 (0.24)

Tightening Torque Specifications

B933H23107002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Rear sprocket mounting nut	60	6.0	43.5	☞ (Page 3A-6)
Rear axle nut	240	24.0	173.5	☞ (Page 3A-7)
Rear axle lock-nut	240	24.0	173.5	☞ (Page 3A-7)
Drive chain roller mounting bolt	40	4.0	29.0	☞ (Page 3A-12)

NOTE

The specified tightening torque is also described in the following.

“Drive Chain / Rear Axle Related Components (Page 3A-2)”

“Rear Axle Assembly Construction (Page 3A-3)”

“Drive Chain Roller Construction (Page 3A-11)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H23108001

Material	SUZUKI recommended product or Specification		Note
Grease	Water resistance grease or equivalent	P/No.: 99000-25160	☞(Page 3A-6) / ☞(Page 3A-15)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000-32030	☞(Page 3A-5)
	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞(Page 3A-7)

NOTE

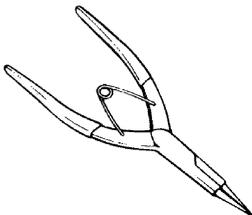
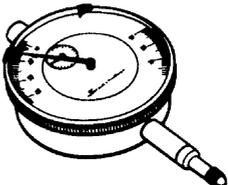
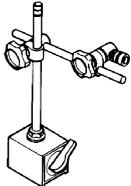
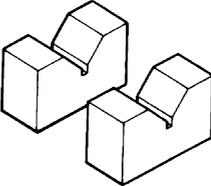
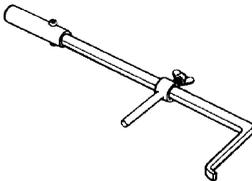
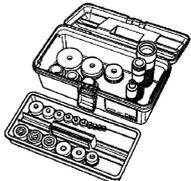
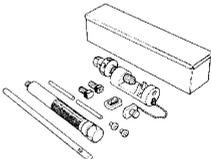
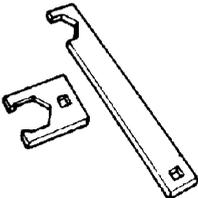
Required service material is also described in the following.

“Drive Chain / Rear Axle Related Components (Page 3A-2)”

“Rear Axle Assembly Construction (Page 3A-3)”

Special Tool

B933H23108002

09900-06107 Snap ring pliers ☞(Page 3A-13)		09900-20607 Dial gauge (1/100 mm, 10 mm) ☞(Page 3A-14)	
09900-20701 Magnetic stand ☞(Page 3A-14)		09900-21304 V-block (100 mm) ☞(Page 3A-14)	
09913-50121 Oil seal remover ☞(Page 3A-14)		09913-70210 Bearing installer set ☞(Page 3A-15) / ☞(Page 3A-15)	
09922-22711 Drive chain cutting and joining tool ☞(Page 3A-8)		09924-84510 Bearing installer set ☞(Page 3A-15)	
09940-92460 Rear axle nut wrench set ☞(Page 3A-5) / ☞(Page 3A-7) / ☞(Page 3A-7) / ☞(Page 3A-7)		09941-34513 Steering race installer ☞(Page 3A-15)	

Section 4

Brake

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Precautions

Precautions

Precautions for Brake System

B933H2400001

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

Brake Fluid Information

B933H2400002

⚠ WARNING

- This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not use or mix different types of fluid, such as silicone-based or petroleum-based.
- Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or which has been stored for a long period of time.
- When storing brake fluid, seal the container completely and keep it away from children.
- When replenishing brake fluid, take care not to get dust into the fluid.
- When washing brake components, use new brake fluid. Never use cleaning solvent.
- A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the disc with high quality brake cleaner or neutral detergent.

⚠ CAUTION

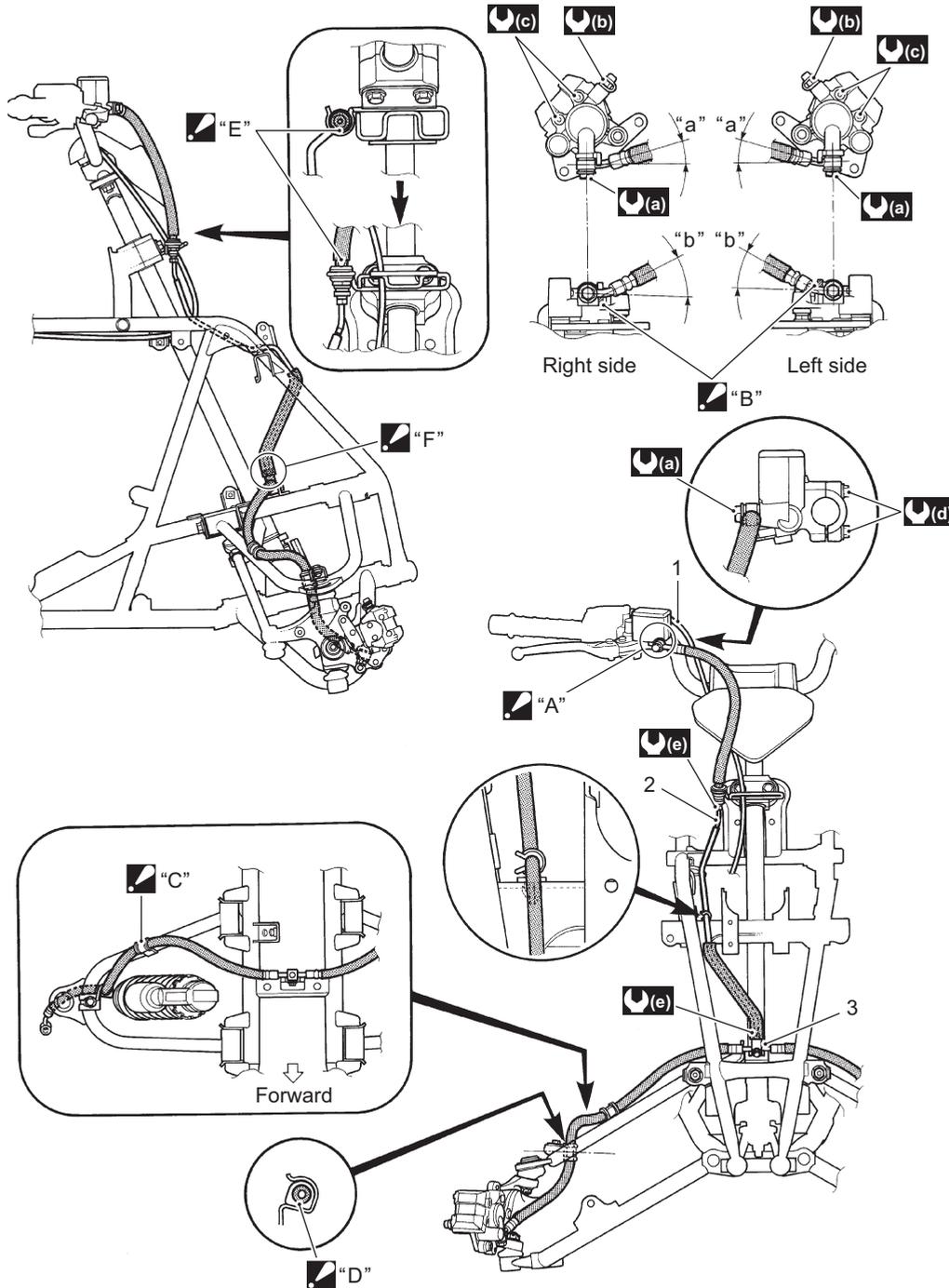
Immediately and completely wipe off any brake fluid contacting any part of the vehicle. The brake fluid reacts chemically with paint, plastics and rubber materials, etc., and will damage them severely.

Brake Control System and Diagnosis

Schematic and Routing Diagram

Front Brake Hose Routing Diagram

B933H24102001

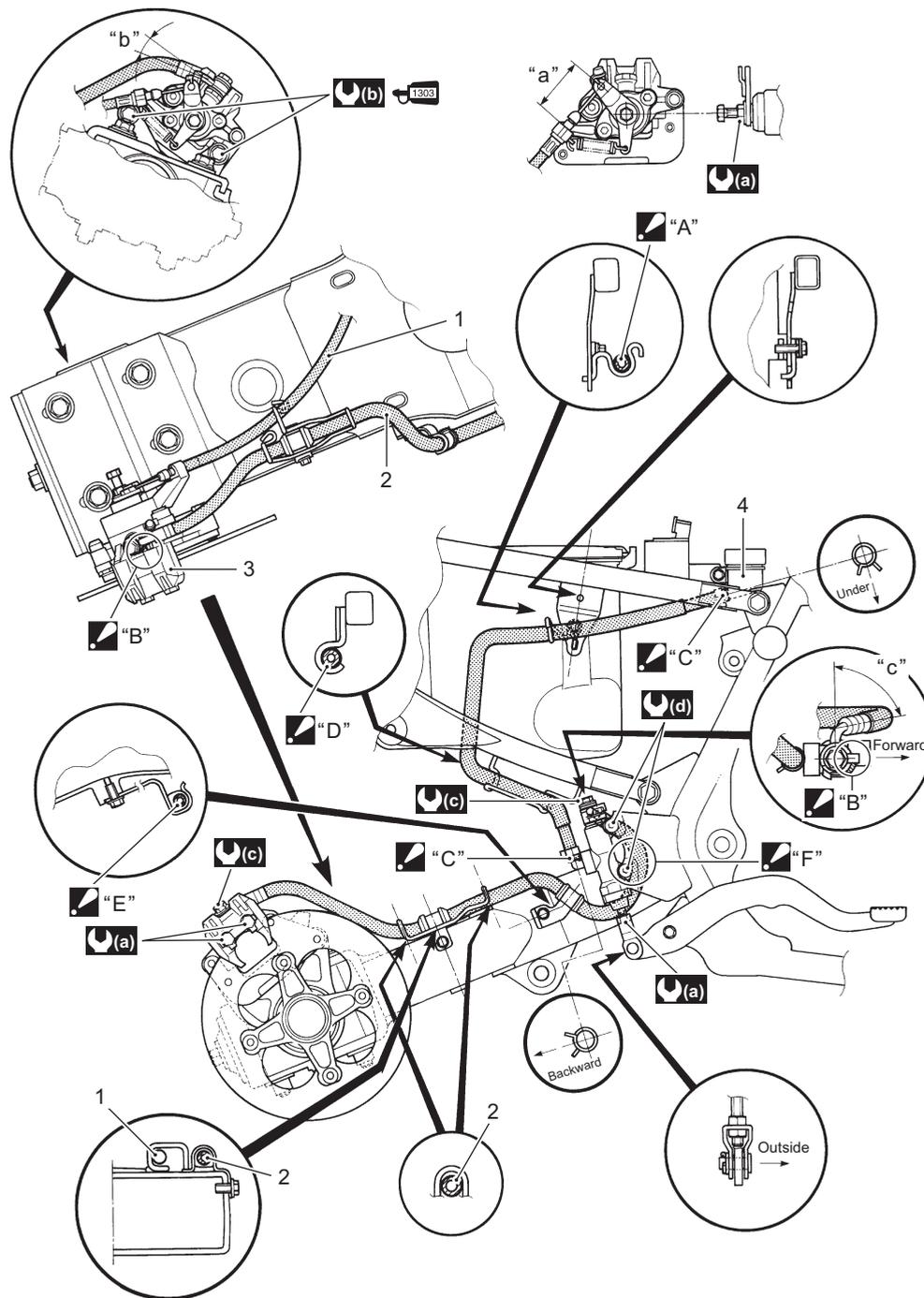


I933H1410055-06

1. Throttle cable	▲ "A": After the brake hose union has contacted the reservoir, tighten the bolt to the specified torque.
2. White mark	▲ "B": After the brake hose union has contacted the stopper, tighten the bolt to the specified torque.
3. Black mark	▲ "C": Fix the brake hose sleeve to the clamp firmly.
🔩(a) : 23 N·m (2.3 kgf-m, 16.5 lb-ft)	▲ "D": Fix the brake hose sleeve to the guide as shown in the figure.
🔩(b) : 6 N·m (0.6 kgf-m, 4.5 lb-ft)	▲ "E": Set the black mark on hose to forward.
🔩(c) : 18 N·m (1.8 kgf-m, 13.0 lb-ft)	▲ "F": After tighten the nut, set the brake pipe cover as shown in the figure.
🔩(d) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)	"a": 14°
🔩(e) : 16 N·m (1.6 kgf-m, 11.5 lb-ft)	"b": 28°

Rear Brake Hose Routing Diagram

B933H24102002

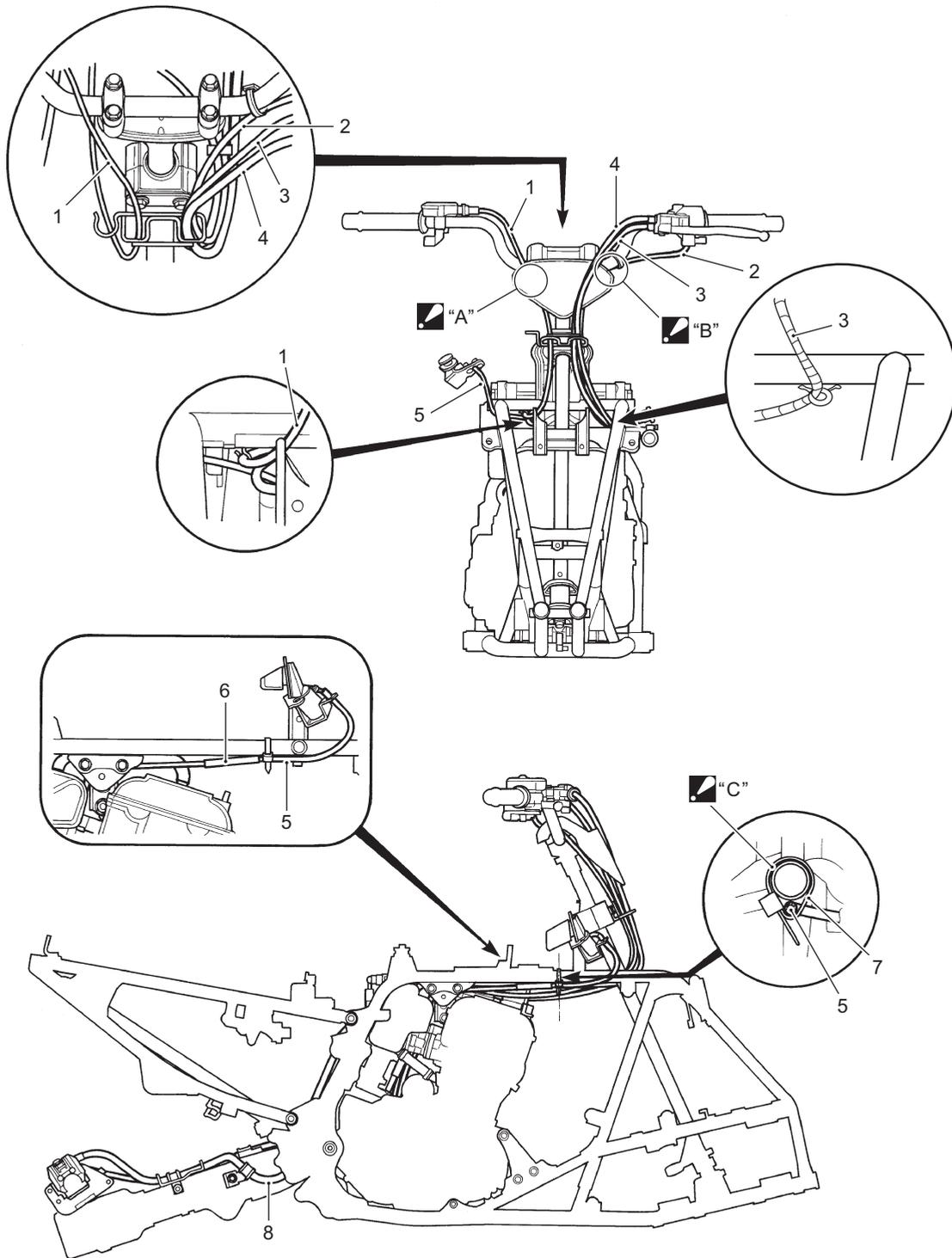


I933H1410056-05

1. Parking brake cable	"B": After the brake hose union has contacted the stopper, tighten the bolt to the specified torque.
2. Brake hose	"C": Set the white mark on hose to outside.
3. Brake caliper	"D": Fix the hose to the hose guide firmly.
4. Reservoir	"E": Fix the brake hose sleeve to the guide as shown in the figure.
(a) : 18 N·m (1.8 kgf·m, 13.0 lb-ft)	"F": Pass the brake hose between the rear swingarm and frame.
(b) : 26 N·m (2.6 kgf·m, 19.0 lb-ft)	1303 : Apply thread lock to the thread part.
(c) : 23 N·m (2.3 kgf·m, 16.5 lb-ft)	"a": 47 – 51 mm (1.9 – 2.0 in)
(d) : 10 N·m (1.0 kgf·m, 7.0 lb-ft)	"b": 14°
"A": Fix the hose to the hose guide firmly.	"c": 84°

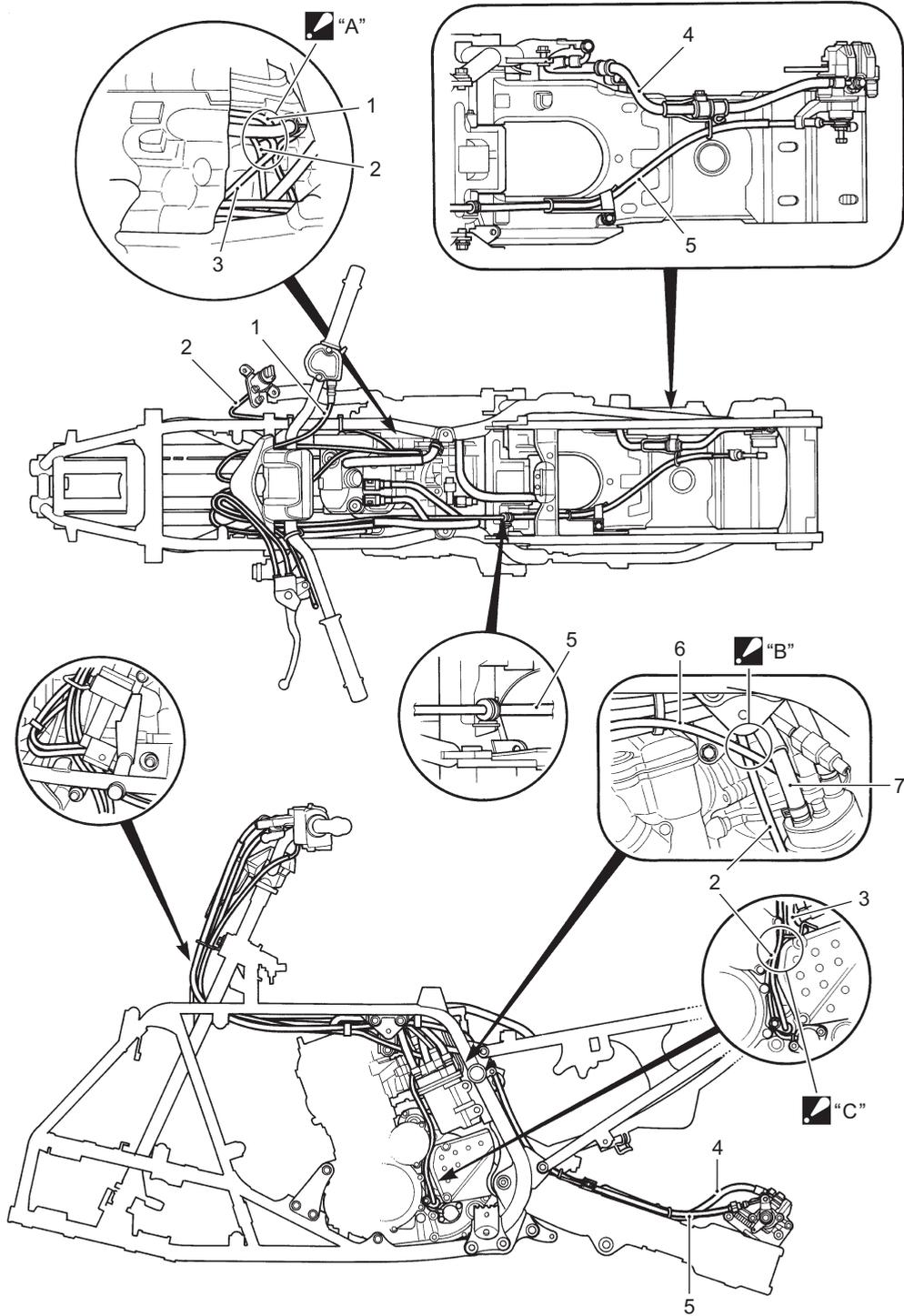
Hose and Cable Routing Diagram

B933H24102003



I933H1410057-05

1. Throttle cable	5. Reverse gear cable	☑ "A": Pass the throttle cable inside the steering cover.
2. Starter cable	6. Reverse cable adjuster	☑ "B": Pass the starter cable inside the steering cover.
3. Clutch cable	7. Clamp	☑ "C": Set the clamp as shown in the figure.
4. Parking brake cable	8. Rear brake hose	



I933H1410058-01

1. Throttle cable	5. Parking brake cable	☑ "B": Pass the starter cable between fuel hose and reverse gear cable.
2. Reverse gear cable	6. Starter cable	☑ "C": Set the reverse gear cable between the oil filter case and engine sprocket cover.
3. Clutch cable	7. Fuel hose	
4. Rear brake hose	☑ "A": Pass the reverse gear cable under the throttle cable and clutch cable.	

Diagnostic Information and Procedures

Brake Symptom Diagnosis

B933H24104001

Condition	Possible cause	Correction / Reference Item
Insufficient brake power	Leakage of brake fluid from hydraulic system.	<i>Repair or replace.</i>
	Worn pads or disc.	<i>Replace.</i>
	Oil adhesion on friction surface of pads.	<i>Clean disc and pads.</i>
	Worn disc.	<i>Replace.</i>
	Air in hydraulic system.	<i>Bleed air.</i>
	Not enough brake fluid in the reservoir.	<i>Replenish.</i>
	Defective adjustment of parking brake.	<i>Adjust.</i>
Brake squeaking	Carbon adhesion on pad surface.	<i>Repair surface with sandpaper.</i>
	Tilted pad.	<i>Correct pad fitting or replace.</i>
	Worn pads and disc.	<i>Replace.</i>
	Foreign material in brake fluid.	<i>Replace brake fluid.</i>
	Clogged return port of master cylinder.	<i>Disassemble and clean master cylinder.</i>
	Loose front wheel axle or rear wheel axle.	<i>Tighten to specified torque.</i>
Excessive brake lever stroke	Air in hydraulic system.	<i>Bleed air.</i>
	Insufficient brake fluid.	<i>Replenish fluid to specified level; bleed air.</i>
	Improper quality of brake fluid.	<i>Replace with correct fluid.</i>
Leakage of brake fluid	Insufficient tightening of connection joints.	<i>Tighten to specified torque.</i>
	Cracked hose.	<i>Replace.</i>
	Worn piston and/or cup.	<i>Replace piston and/or cup.</i>
	Worn piston seal and dust seal.	<i>Replace piston seal and dust seal.</i>
Brake drags	Rusty part.	<i>Clean and lubricate.</i>
	Insufficient brake lever or brake pedal pivot lubrication.	<i>Lubricate.</i>
	Improper parking brake adjustment.	<i>Adjust.</i>

Repair Instructions

Brake Pedal Height Inspection and Adjustment

B933H24106001

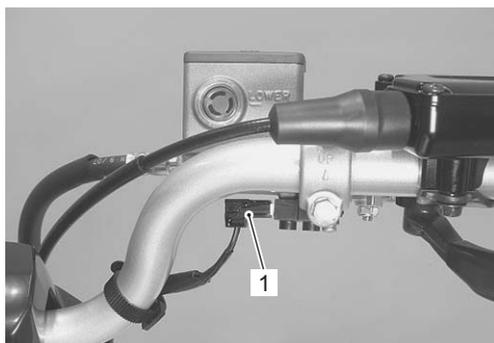
Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

Front Brake Light Switch Inspection

B933H24106002

Inspect the front brake light switch in the following procedures:

- 1) Disconnect the front brake light switch lead coupler (1).



I933H1410001-01

- 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-12)".

Special tool

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

Tester knob indication

Continuity (••)

Color / Position	Terminal (O)	Terminal (B)
ON	○	○
OFF		

I933H1410002-02

- 3) Connect the front brake light switch lead coupler.

Rear Brake Light Switch Inspection

B933H24106003

Inspect the rear brake light switch in the following procedures:

- 1) Remove the fuel tank cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Disconnect the rear brake light switch lead coupler (1).



I933H1410003-01

- 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

 : 09900-25008 (Multi-circuit tester set)

Tester knob indication

Continuity (•))

Color Position	O	W/B
ON		
OFF		

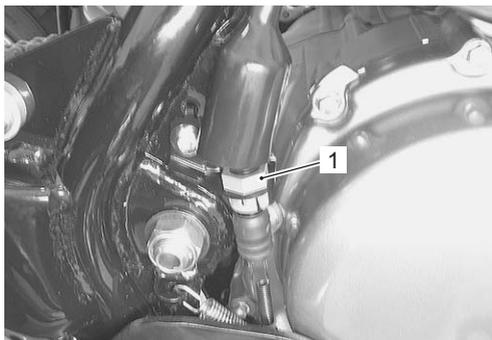
I933H1410059-01

- 4) Connect the rear brake light switch lead coupler (1).
- 5) Install the fuel tank cover.

Rear Brake Switch Inspection and Adjustment

B933H24106004

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.



I933H1410004-01

Brake Fluid Level Check

B933H24106005

Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

Brake Hose Inspection

B933H24106006

Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

Air Bleeding from Brake Fluid Circuit

B933H24106007

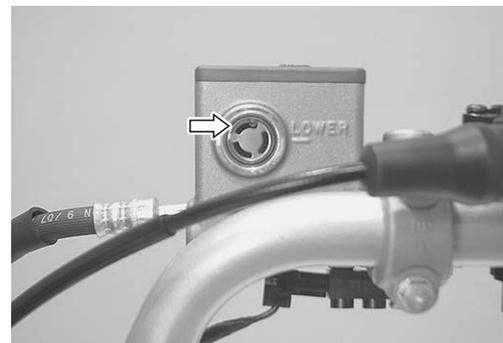
Air trapped in the brake fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by "sponginess" of the brake lever and also by lack of 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

- Make sure that the vehicle is supported securely.
- Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.

Front brake

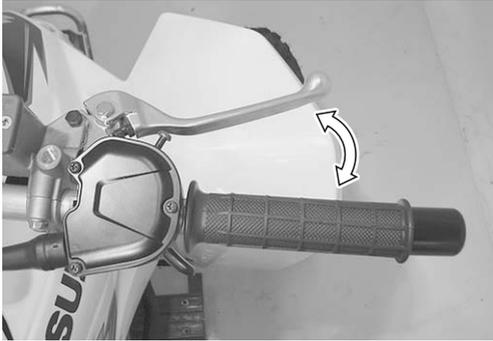
- 1) Fill the master cylinder reservoir to the top of the inspection window. Place the reservoir cap to prevent dirt from entering.



I933H1410005-01

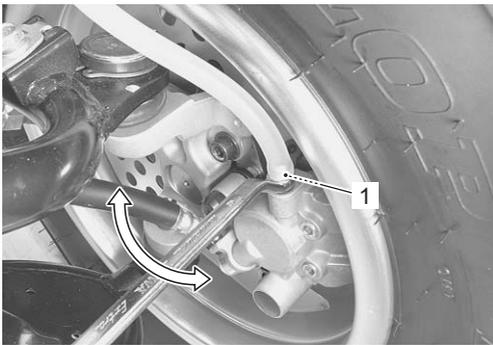
4A-7 Brake Control System and Diagnosis:

- 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.



I933H1410006-01

- 4) Loosen the air bleeder valve (1) 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.



I933H1410007-01

- 5) Close the air bleeder valve (1), 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

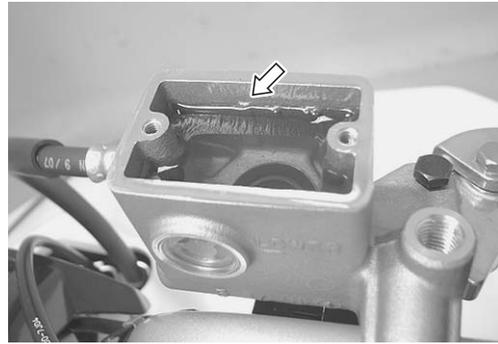
While bleeding the brake system, replenish the brake fluid in the reservoir as necessary. Make sure that there is always some fluid visible in the reservoir.

- 7) Close the air bleeder valve (1) and disconnect the hose.

Tightening torque

Brake air bleeder valve: 6 N·m (0.6 kgf-m, 4.5 lb-ft)

- 8) Fill the reservoir with brake fluid to the upper mark of the reservoir.



I933H1410008-01

- 9) Install the master cylinder reservoir cap.

Rear brake

Bleed air from the rear brake system as the same manner of front brake.

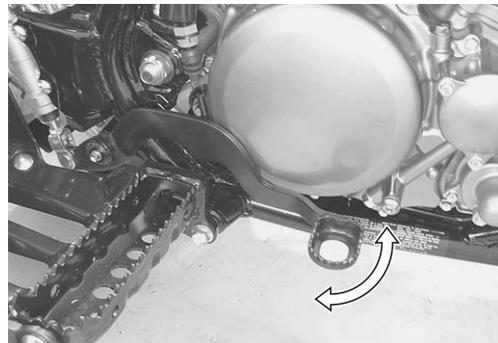
NOTE

The only difference of bleeding operation from the front brake is that the rear master cylinder is actuated by a pedal.

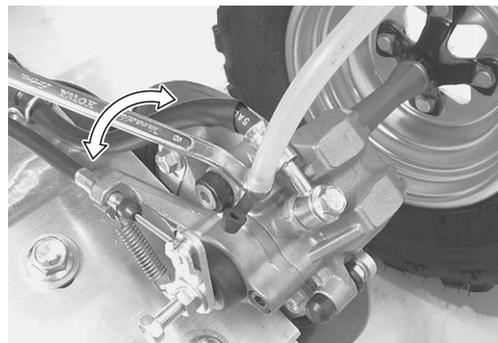
- Remove the fuel tank cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".

Tightening torque

Brake air bleeder valve: 6 N·m (0.6 kgf-m, 4.5 lb-ft)

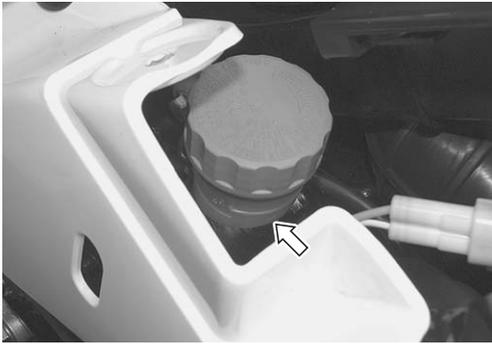


I933H1410009-01



I933H1410010-01

- Fill the reservoir with brake fluid to the upper mark of the reservoir.



I933H1410011-01

- Install the fuel tank cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.

Brake Fluid Replacement

B933H24106008

⚠ CAUTION

- **Make sure that the vehicle is supported securely.**
- **Handle brake fluid with care: the fluid reacts chemically with paint, plastic, rubber materials, etc.**

Front brake

- 1) Remove the master cylinder reservoir cap and diaphragm.
- 2) Suck up the old brake fluid as much as possible.

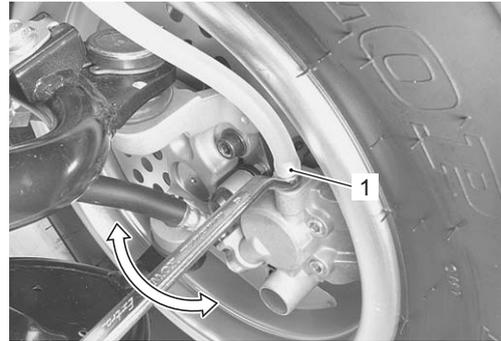


I933H1410012-01

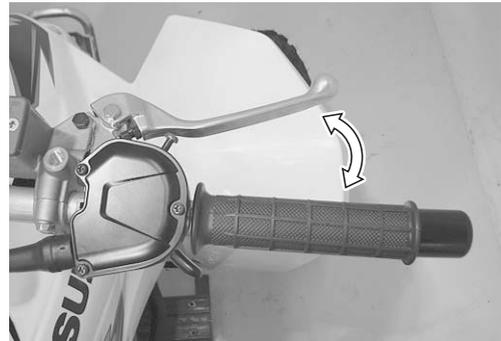
- 3) Fill the reservoir with new brake fluid.

BF: Brake fluid (DOT 4)

- 4) Connect a clear hose to the air bleeder valve (1) and insert the other end of the hose into a receptacle.
- 5) Loosen the air bleeder valve (1) and pump the brake lever until the old brake fluid flows out of the brake system.



I933H1410013-01



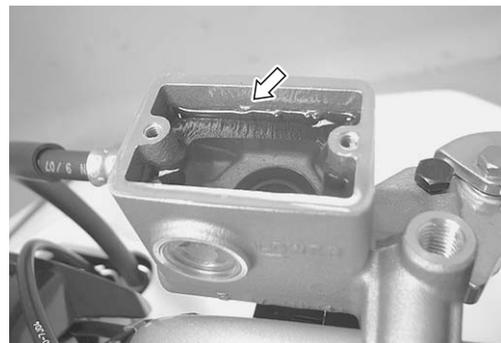
I933H1410006-01

- 6) Close the air bleeder valve (1) and disconnect the clear hose.

Tightening torque

Brake air bleeder valve: 6 N·m (0.6 kgf·m, 4.5 lb-ft)

- 7) Fill the reservoir with brake fluid to the upper mark of reservoir.



I933H1410008-01

- 8) Install the master cylinder reservoir cap.

4A-9 Brake Control System and Diagnosis:

Rear brake

- 1) Remove the fuel tank cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Remove the master cylinder reservoir cap and diaphragm.
- 3) Suck up the old brake fluid as much as possible.

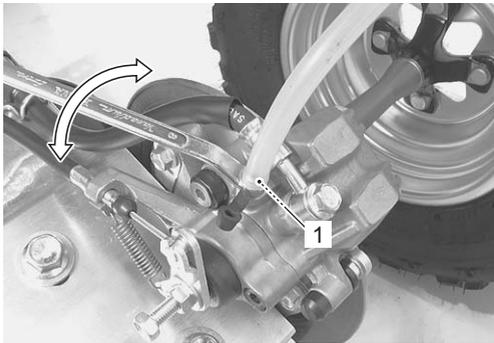


I933H1410014-01

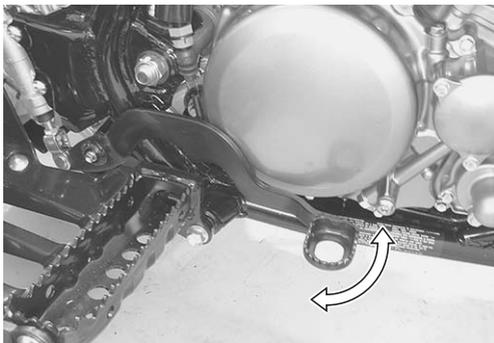
- 4) Fill the reservoir with new brake fluid.

BF: Brake fluid (DOT 4)

- 5) Connect a clear hose to the air bleeder valve (1) and insert the other end of the hose into a receptacle.
- 6) Loosen the air bleeder valve (1) and pump the brake pedal until the old brake fluid flows out of the brake system.



I933H1410017-01



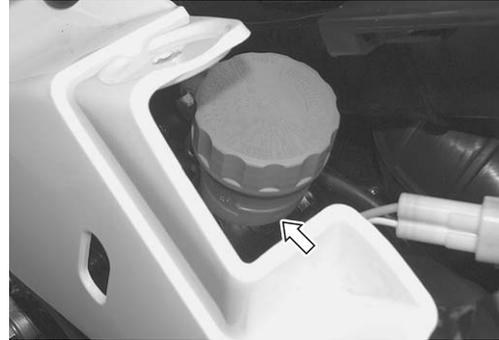
I933H1410009-01

- 7) Close the air bleeder valve (1) and disconnect the clear hose.

Tightening torque

Brake air bleeder valve: 6 N·m (0.6 kgf-m, 4.5 lb-ft)

- 8) Fill the reservoir with brake fluid to the upper mark of the reservoir.



I933H1410011-01

- 9) Install the fuel tank cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.

Brake Hose Removal and Installation

B933H24106009

Removal

- 1) Drain brake fluid. Refer to “Brake Fluid Replacement (Page 4A-8)”.
- 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

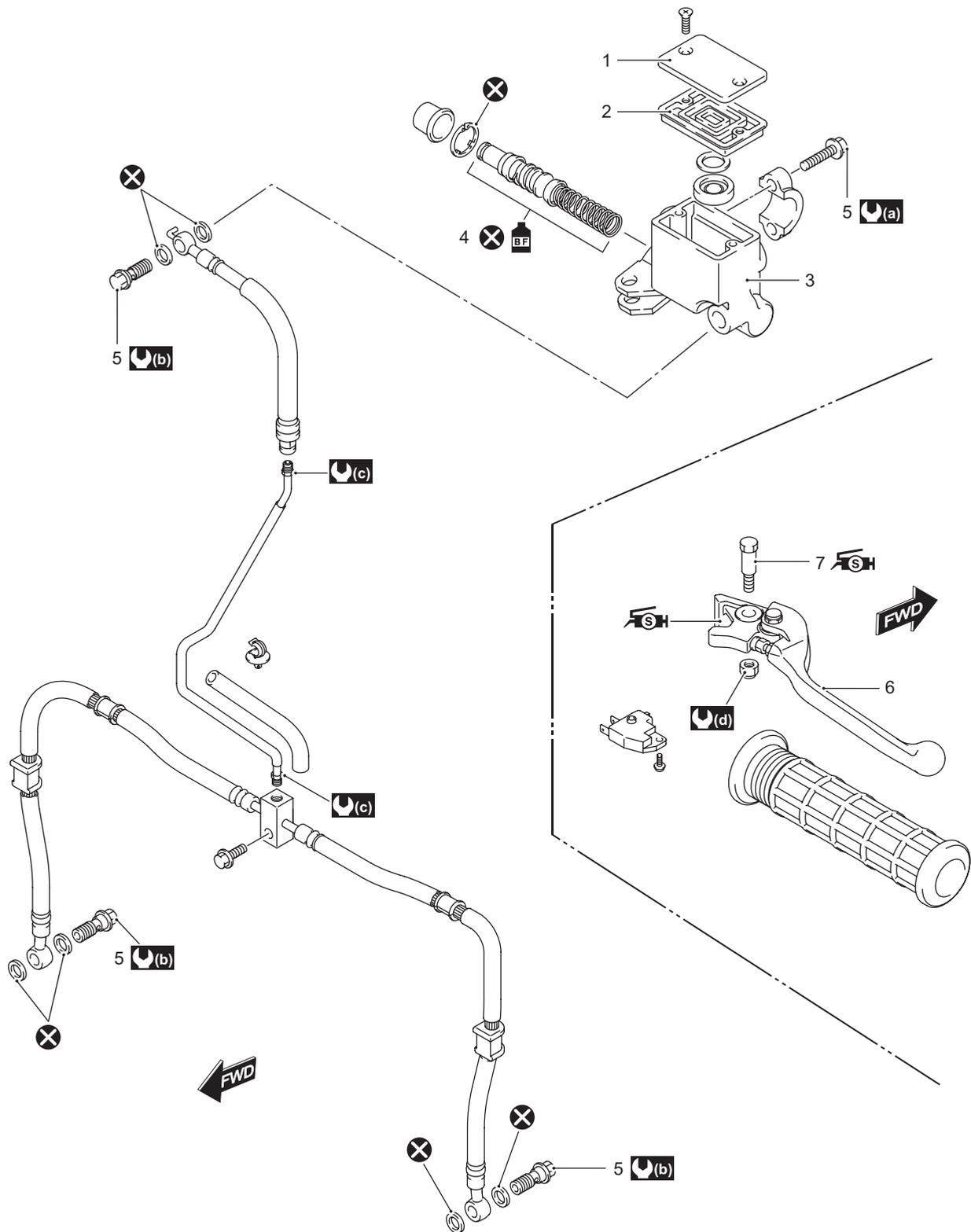
⚠ CAUTION

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-6)”.

Front Brake Master Cylinder Components

B933H24106010



I933H1410060-04

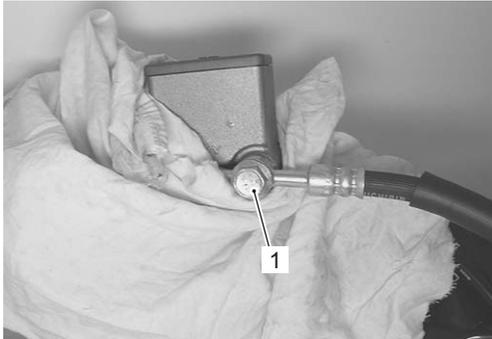
1. Reservoir cap	6. Brake lever	: Apply silicone grease.
2. Diaphragm	7. Brake lever pivot bolt	: Apply brake fluid.
3. Master cylinder	: 10 N·m (1.0 kgf-m, 7.0 lb-ft)	: Do not reuse.
4. Piston/Cup set	: 23 N·m (2.3 kgf-m, 16.5 lb-ft)	
5. Brake hose union bolt	: 16 N·m (1.6 kgf-m, 11.5 lb-ft)	

Front Brake Master Cylinder Assembly Removal and Installation

B933H24106011

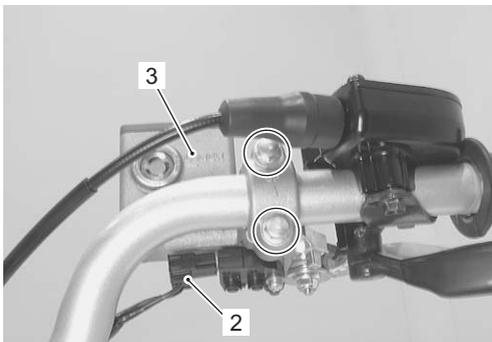
Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement (Page 4A-8)".
- 2) Place a rag underneath the brake hose union bolt (1) on the master cylinder to catch any spilt brake fluid.
- 3) Remove the brake hose union bolt (1) and disconnect the brake hose.



I933H1410020-02

- 4) Disconnect the front brake light switch lead wire coupler (2).
- 5) Remove the master cylinder assembly (3).



I933H1410021-01

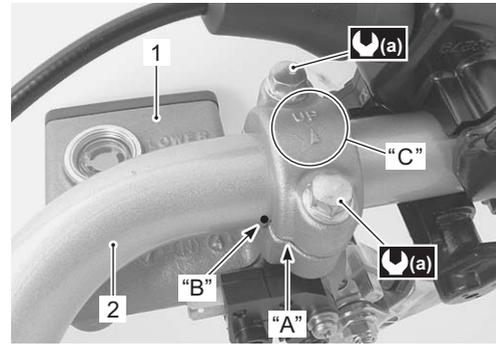
Installation

Install the front brake master cylinder in the reverse order of removal. Pay attention to the following points:

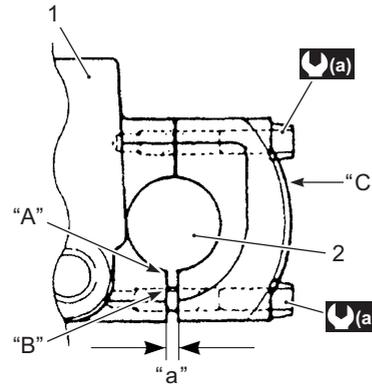
- When installing the master cylinder (1) onto the handlebars (2), align the master cylinder holder's mating surface "A" with the punch mark "B" on the handlebars (2) and tighten the upper holder bolt first.

Tightening torque

Front brake master cylinder holder bolt (Upper and Lower) (a): 10 N·m (1.0 kgf·m, 7.0 lb-ft)



I933H1410022-01



I933H1410023-01

"C": Up mark	"a": Clearance
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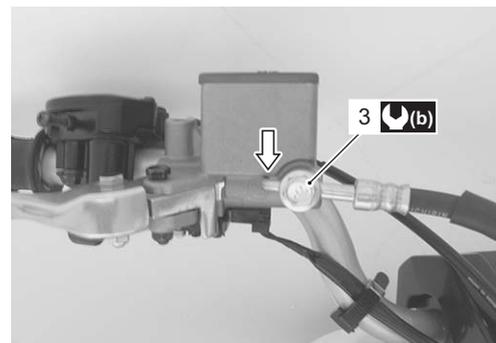
- Set the brake hose union as shown in the front brake hose routing diagram. Refer to "Front Brake Hose Routing Diagram (Page 4A-1)".
- After setting the brake hose union to the stopper, tighten the union bolt (3) to the specified torque.

⚠ 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 lb-ft)



I933H1410024-01

- Bleed air from the brake system. Refer to "Air Bleeding from Brake Fluid Circuit (Page 4A-6)".

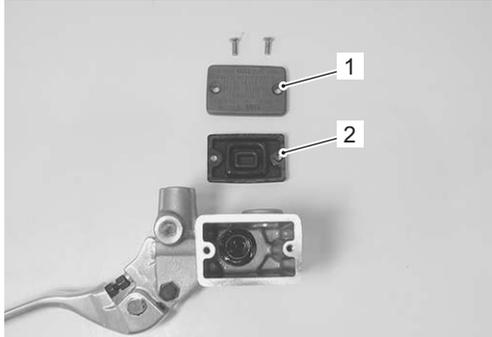
Front Brake Master Cylinder / Brake Lever Disassembly and Assembly

B933H24106012

Refer to "Front Brake Master Cylinder Assembly Removal and Installation (Page 4A-11)".

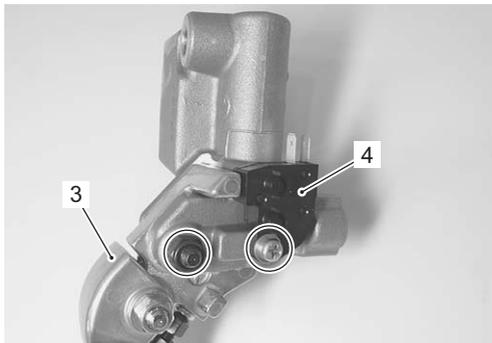
Disassembly

- 1) Remove the reservoir cap (1) and diaphragm (2).



I933H1410025-01

- 2) Remove the brake lever (3) and brake light switch (4).

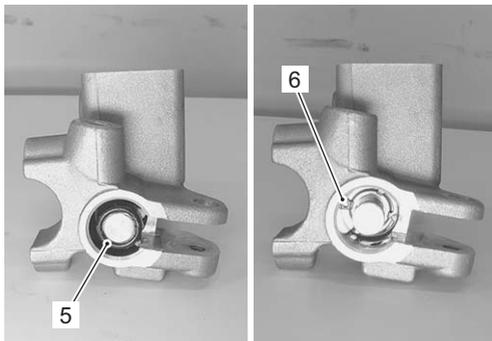


I933H1410026-01

- 3) Pull out the dust boot (5) and remove the snap ring (6) with a special tool.

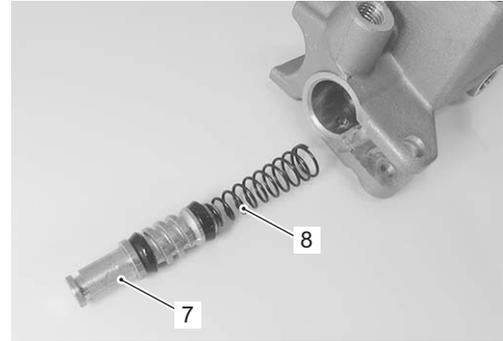
Special tool

TOOL : 09900-06108 (Snap ring pliers)



I933H1410027-01

- 4) Remove the piston/cup set (7) and spring (8).



I933H1410028-03

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.

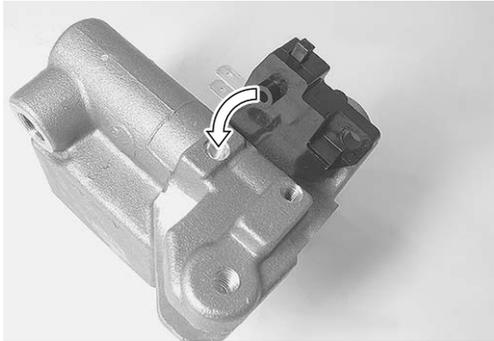
BF: Brake fluid (DOT 4)



I933H1410029-01

4A-13 Brake Control System and Diagnosis:

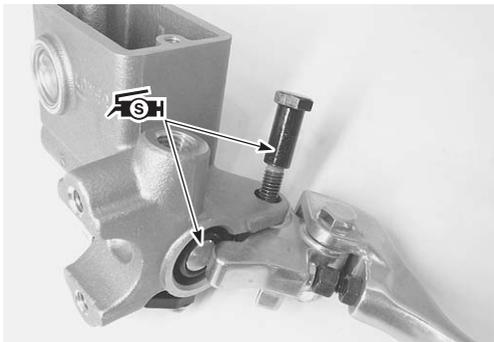
- When installing the brake light switch, align the projection on the switch with the hole on the master cylinder.



I933H1410030-01

- Apply grease to the brake lever pivot bolt.
- Apply grease to the contact point between piston and brake lever.

 **SH**: Grease 99000-25100 (SUZUKI Silicone Grease or equivalent)



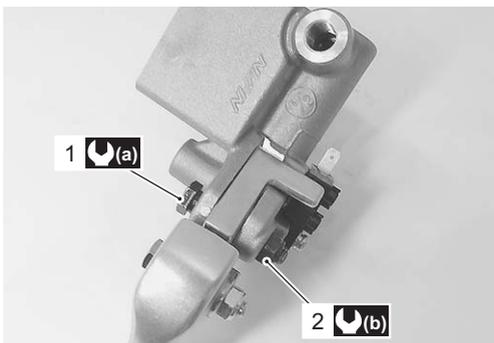
I933H1410031-01

- 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 lb-ft)

Brake lever pivot bolt lock-nut (b): 6 N·m (0.6 kgf-m, 4.5 lb-ft)



I933H1410032-01

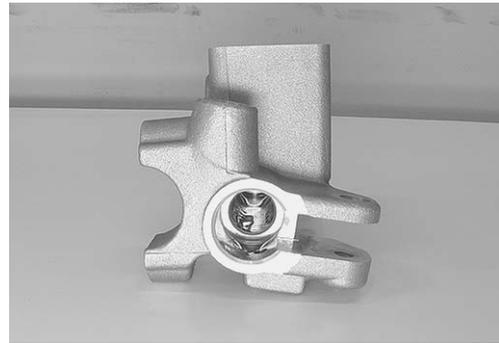
Front Brake Master Cylinder Parts Inspection

B933H24106013

Refer to "Front Brake Master Cylinder / Brake Lever Disassembly and Assembly (Page 4A-12)".

Master Cylinder

Inspect the master cylinder bore for any scratches or other damage.



I933H1410033-01

Piston and rubber parts

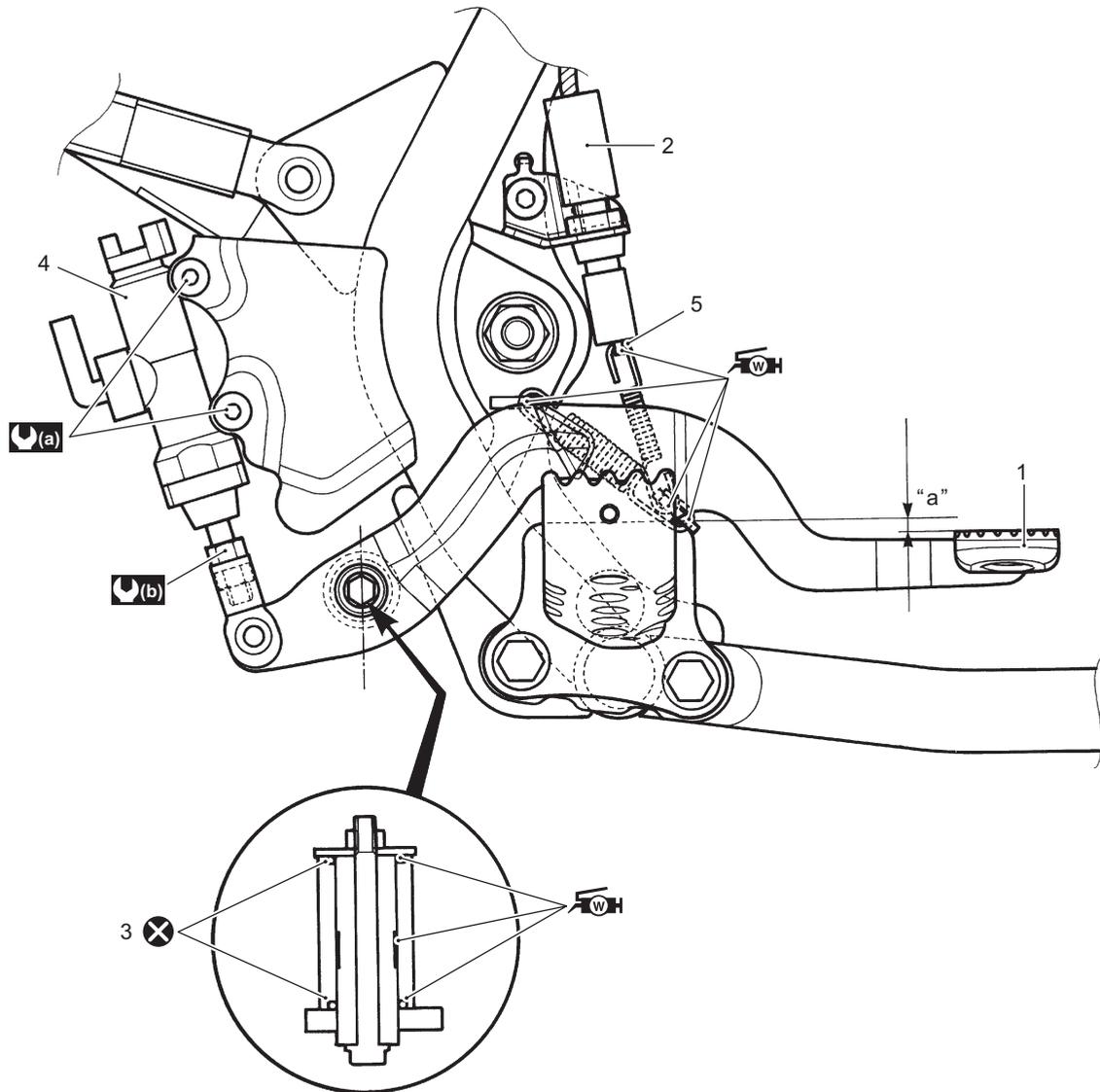
Inspect the piston surface, primary/secondary cup and dust boot for any scratches, wear or damage.



I933H1410034-01

Rear Brake Pedal Construction

B933H24106014



I933H1410061-01

1. Brake pedal	5. White mark	⊗ : Do not reuse.
2. Brake light switch	(a) : 10 N·m (1.0 kgf-m, 7.0 lb-ft)	"a": 5 mm (0.2 in)
3. O-ring	(b) : 18 N·m (1.8 kgf-m, 13.0 lb-ft)	
4. Brake master cylinder	WH : Apply water resistance grease.	

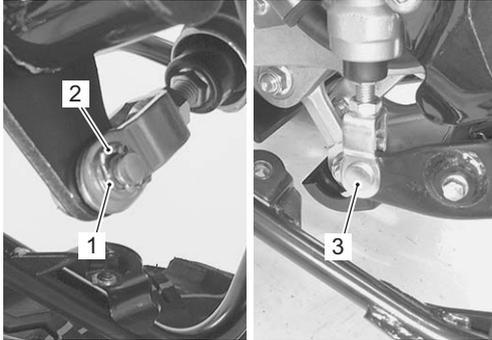
4A-15 Brake Control System and Diagnosis:

Rear Brake Pedal Removal and Installation

B933H24106015

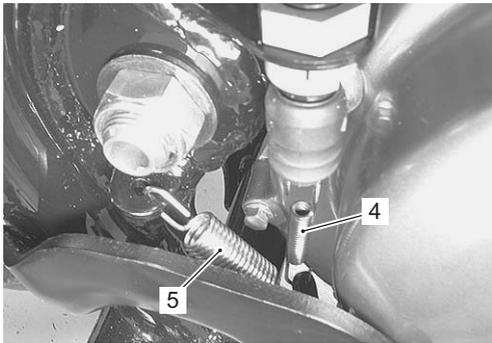
Removal

- 1) Remove the right footrest mud guard. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the right footrest. Refer to "Footrest Removal and Installation in Section 9E (Page 9E-2)".
- 3) Remove the cotter pin (1), washer (2) and pin (3).



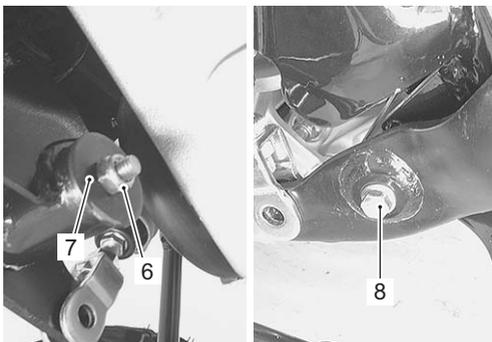
I933H1410050-02

- 4) Remove the rear brake light switch spring (4) and brake pedal spring (5).



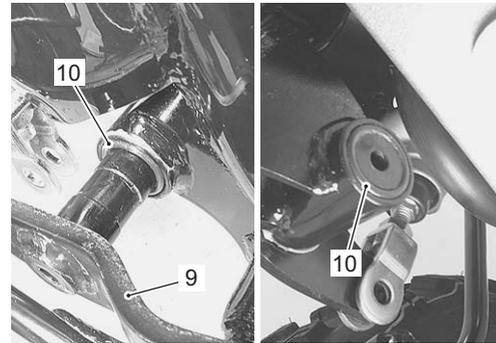
I933H1410051-01

- 5) Remove the rear brake pedal pivot nut (6), washer (7) and bolt (8).



I933H1410052-02

- 6) Remove the rear brake pedal (9) and O-rings (10).



I933H1410053-01

Installation

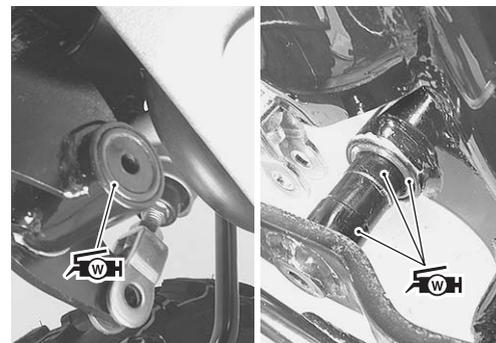
Install the rear brake pedal in the reverse order of removal. Pay attention to the following points:

CAUTION

The removed cotter pin and O-rings must be replaced with new ones.

- Apply grease to the O-rings and rear brake pedal pivot.

🔧 : Grease 99000-25160 (Water resistance grease or equivalent)

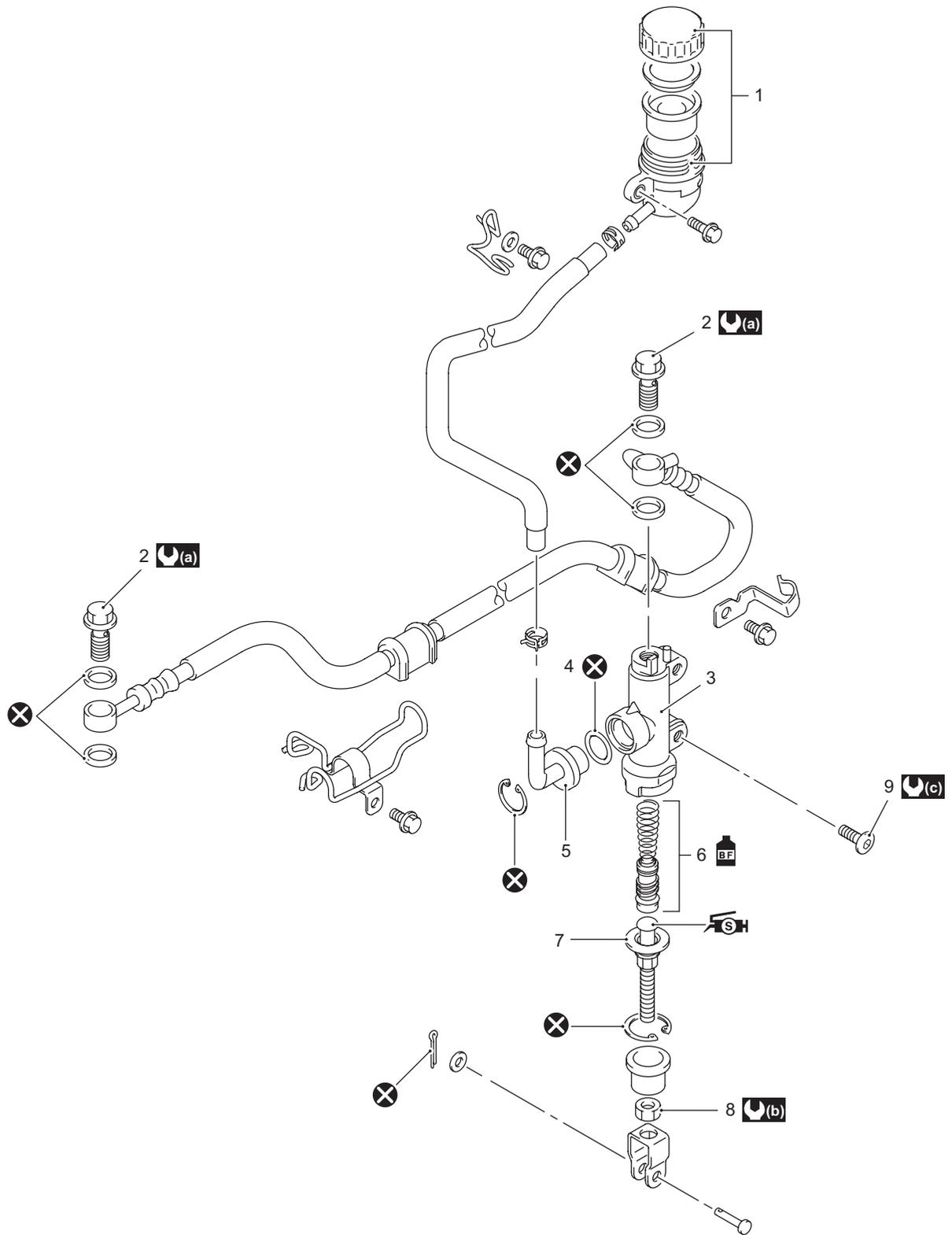


I933H1410054-02

- Install the brake pedal spring and rear brake light switch spring properly. Refer to "Rear Brake Pedal Construction (Page 4A-14)".
- After installing the rear brake pedal, check the rear brake height. Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

Rear Brake Master Cylinder Components

B933H24106016



I933H1410062-06

1. Reservoir tank	6. Piston/cup set	: 18 N·m (1.8 kgf·m, 13.0 lb·ft)
2. Brake hose union bolt	7. Push rod	: 10 N·m (1.0 kgf·m, 7.0 lb·ft)
3. Master cylinder	8. Rear brake master cylinder lock-nut	: Apply silicone grease.
4. O-ring	9. Rear brake master cylinder mounting bolt	: Apply brake fluid.
5. Connector	: 23 N·m (2.3 kgf·m, 16.5 lb·ft)	: Do not reuse.

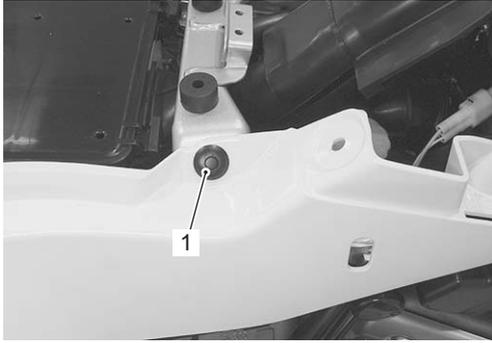
4A-17 Brake Control System and Diagnosis:

Rear Brake Master Cylinder Assembly Removal and Installation

B933H24106017

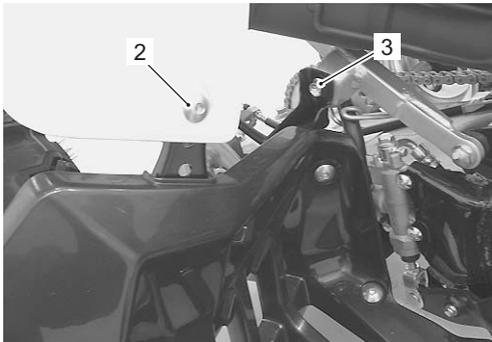
Removal

- 1) Remove the fuel tank cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Remove the fastener (1).

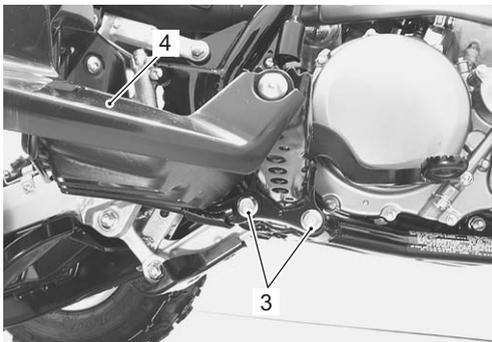


I933H1410035-01

- 3) Remove the rear fender mounting screw and nut (2) and mud guard reinforcement mounting bolts (3).
- 4) Remove the mud guard assembly (4).

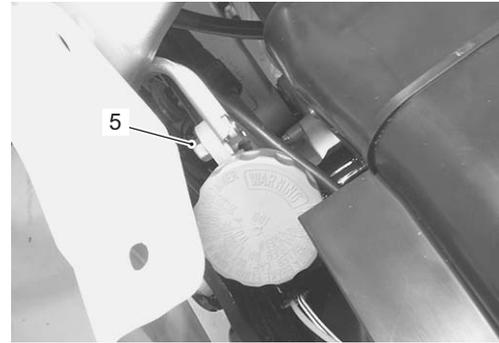


I933H1410036-01



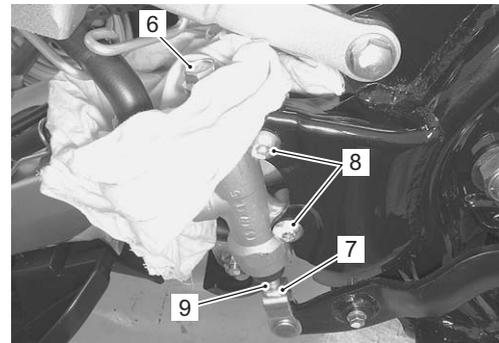
I933H1410037-01

- 5) Drain brake fluid. Refer to "Brake Fluid Replacement (Page 4A-8)".
- 6) Remove the reservoir mounting bolt (5).



I933H1410038-01

- 7) Place a rag underneath the brake hose union bolt (6) on the master cylinder to catch any spilt brake fluid.
- 8) Remove the brake hose union bolt (6) and disconnect the brake hose.
- 9) Loosen the lock-nut (7).
- 10) Remove the master cylinder mounting bolts (8).
- 11) Remove the master cylinder along with the reservoir by turning the push rod (9).



I933H1410039-01

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.

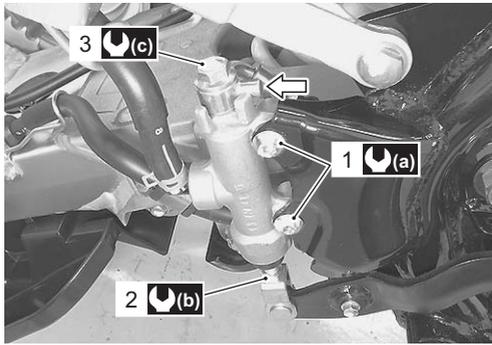
- Tighten the master cylinder mounting bolts (1) to the specified torque.
- Tighten the lock-nut (2) to the specified torque.
- After setting the brake hose union to the stopper, tighten the union bolt (3) to the specified torque.

Tightening torque

Rear brake master cylinder mounting bolt (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

Rear brake master cylinder rod lock-nut (b): 18 N·m (1.8 kgf-m, 13.0 lb-ft)

Brake brake hose union bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H1410040-03

- Bleed air from the brake system after reassembling the master cylinder. Refer to “Air Bleeding from Brake Fluid Circuit (Page 4A-6)”.
- Adjust the brake pedal height. Refer to “Brake System Inspection in Section 0B (Page 0B-17)”.

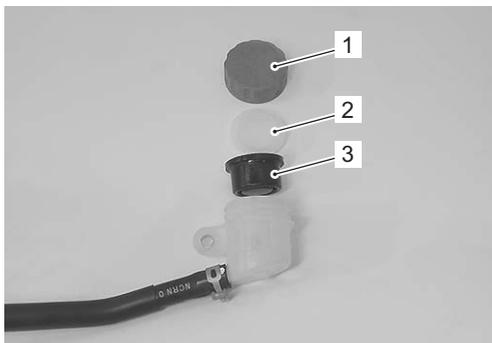
Rear Brake Master Cylinder Disassembly and Assembly

B933H24106018

Refer to “Rear Brake Master Cylinder Assembly Removal and Installation (Page 4A-17)”.

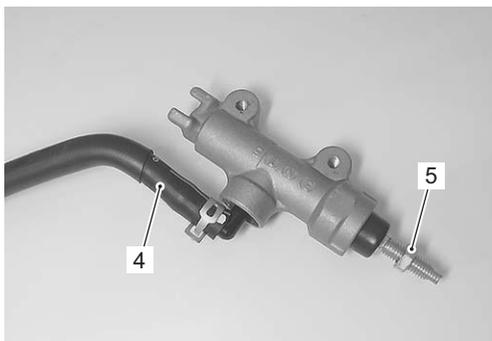
Disassembly

- 1) Remove the reservoir cap (1), plate (2) and diaphragm (3).



I933H1410041-01

- 2) Disconnect the reservoir hose (4).
- 3) Remove the lock-nut (5).

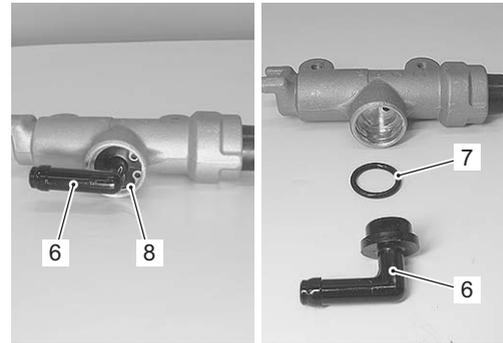


I933H1410042-01

- 4) Remove the connector (6) and O-ring (7) by removing the snap ring (8).

Special tool

TOOL : 09900-06108 (Snap ring pliers)

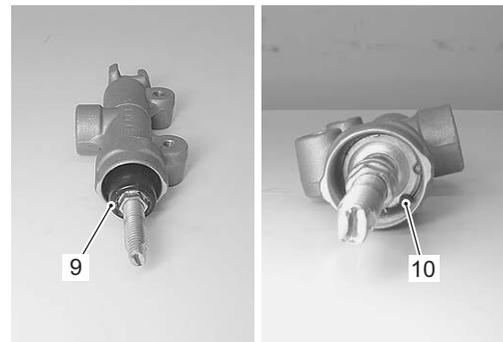


I933H1410043-01

- 5) Pull out the dust boot (9) and remove the snap ring (10).

Special tool

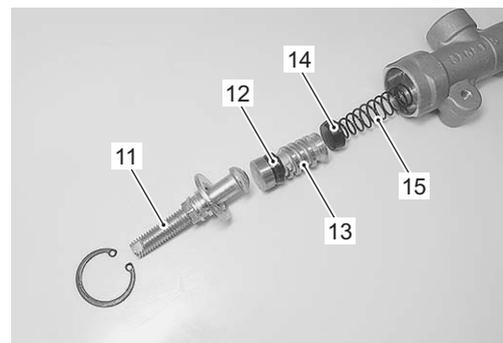
TOOL : 09900-06108 (Snap ring pliers)



I933H1410044-01

- 6) Remove the following parts from the master cylinder.

- Push rod (11)
- Secondary cup (12)
- Piston (13)
- Primary cup (14)
- Spring (15)



I933H1410045-01

4A-19 Brake Control System and Diagnosis:

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.
- Replace the O-ring and snap rings with new ones.

BF: Brake fluid (DOT 4)



I649G1410036-02

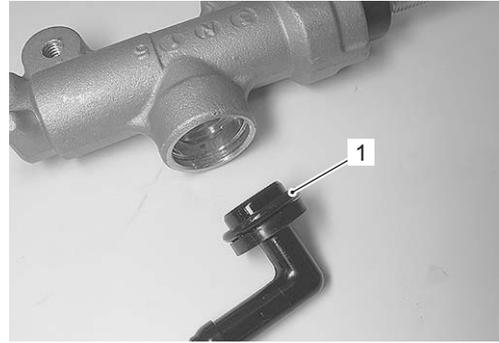
- Apply grease to the push rod end.

 **Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)**



I933H1410046-01

- Install the O-ring (1).



I933H1410047-01

Rear Brake Master Cylinder Parts Inspection

B933H24106019

Refer to "Rear Brake Master Cylinder Disassembly and Assembly (Page 4A-18)".

Master cylinder

Inspect the master cylinder bore for any scratches or other damage.



I933H1410048-05

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.



I933H1410049-01

Specifications

Service Data

B933H24107001

Brake

Unit: mm (in)

Item	Standard		Limit
Rear brake pedal height	0 – 10 (0 – 0.4)		—
Master cylinder bore	Front	12.700 – 12.743 (0.5000 – 0.5017)	—
	Rear	14.000 – 14.043 (0.5512 – 0.5529)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4994)	—
	Rear	13.957 – 13.984 (0.5495 – 0.5506)	—

Oil

Item	Specification	Note
Brake fluid type	DOT 4	

Tightening Torque Specifications

B933H24107002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Brake air bleeder valve	6	0.6	4.5	☞ (Page 4A-7) / ☞ (Page 4A-7) / ☞ (Page 4A-8) / ☞ (Page 4A-9)
Front brake master cylinder holder bolt (Upper and Lower)	10	1.0	7.0	☞ (Page 4A-11)
Brake hose union bolt	23	2.3	16.5	☞ (Page 4A-11)
Brake lever pivot bolt	6	0.6	4.5	☞ (Page 4A-13)
Brake lever pivot bolt lock-nut	6	0.6	4.5	☞ (Page 4A-13)
Rear brake master cylinder mounting bolt	10	1.0	7.0	☞ (Page 4A-17)
Rear brake master cylinder rod lock-nut	18	1.8	13.0	☞ (Page 4A-17)
Brake brake hose union bolt	23	2.3	16.5	☞ (Page 4A-17)

NOTE

The specified tightening torque is also 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-10)”

“Rear Brake Pedal Construction (Page 4A-14)”

“Rear Brake Master Cylinder Components (Page 4A-16)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H24108001

Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page 4A-8) / ☞ (Page 4A-9) / ☞ (Page 4A-12) / ☞ (Page 4A-19)
Grease	SUZUKI Silicone Grease or equivalent	P/No.: 99000-25100	☞ (Page 4A-13) / ☞ (Page 4A-19)
	Water resistance grease or equivalent	P/No.: 99000-25160	☞ (Page 4A-15)

NOTE

Required service material is also described in the following.

“Rear Brake Hose Routing Diagram (Page 4A-2)”

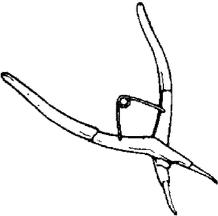
“Front Brake Master Cylinder Components (Page 4A-10)”

“Rear Brake Pedal Construction (Page 4A-14)”

“Rear Brake Master Cylinder Components (Page 4A-16)”

Special Tool

B933H24108002

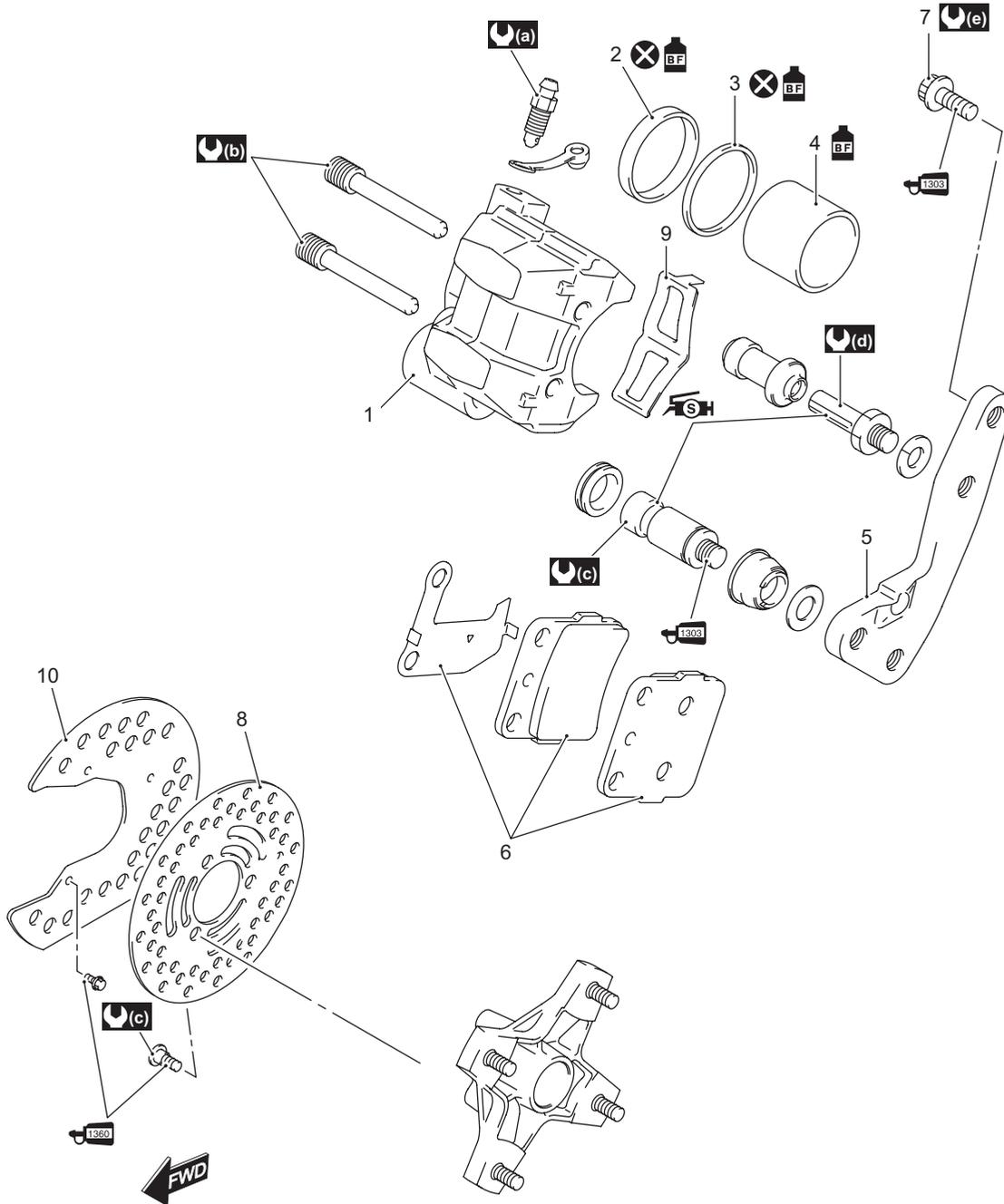
<p>09900-06108 Snap ring pliers ☞ (Page 4A-12) / ☞ (Page 4A-18) / ☞ (Page 4A-18)</p>		<p>09900-25008 Multi-circuit tester set ☞ (Page 4A-5) / ☞ (Page 4A-6)</p>	
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Front Brakes

Repair Instructions

Front Brake Components

B933H24206001



I933H1420001-07

1. Front brake caliper	8. Front brake disc	(e) : 26 N·m (2.6 kgf·m, 19.0 lb·ft)
2. Piston seal	9. Brake pad spring	1303 : Apply thread lock to the thread part.
3. Dust seal	10. Brake disc cover	1360 : Apply thread lock to the thread part.
4. Piston	(a) : 6 N·m (0.6 kgf·m, 4.5 lb·ft)	SH : Apply silicone grease to sliding surface.
5. Brake caliper holder	(b) : 18 N·m (1.8 kgf·m, 13.0 lb·ft)	BF : Apply brake fluid.
6. Front brake pad set	(c) : 23 N·m (2.3 kgf·m, 16.5 lb·ft)	X : Do not reuse.
7. Brake caliper mounting bolt	(d) : 18 N·m (1.8 kgf·m, 16.5 lb·ft)	

4B-2 Front Brakes:

Front Brake Pad Inspection

B933H24206002

Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

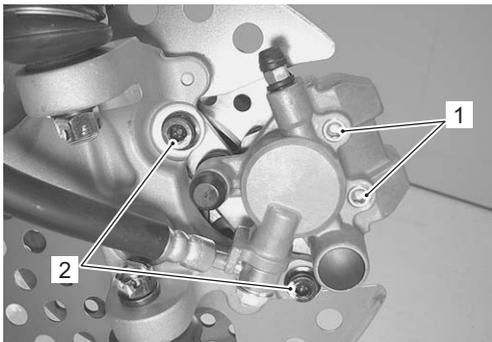
Front Brake Pad Replacement

B933H24206003

- 1) Remove the front wheel assembly. Refer to "Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)".
- 2) Loosen the brake pad mounting pins (1).
- 3) Remove the brake caliper mounting bolts (2).

⚠ CAUTION

Do not operate the brake lever while removing the brake caliper.

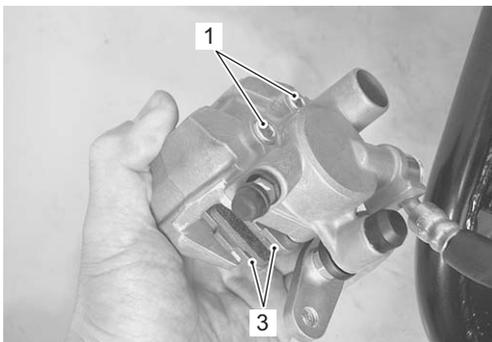


I933H1420002-01

- 4) Remove the brake pads (3) by removing the pad mounting pins (1).

NOTE

When removing the pads, push the piston all the way into the brake caliper.



I933H1420003-01

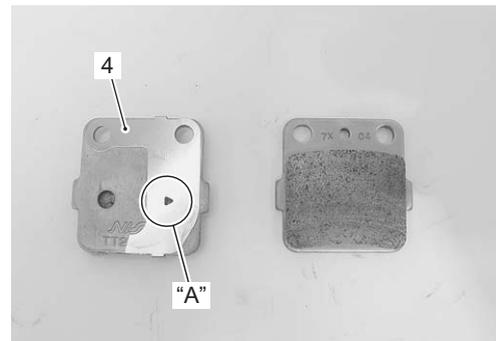
- 5) Clean up the caliper especially around the caliper piston.
- 6) Install the new brake pads.

⚠ CAUTION

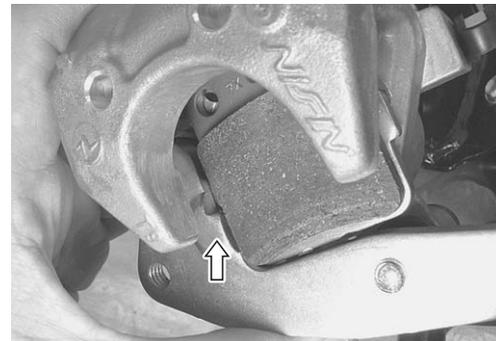
Replace the brake pads as a set, otherwise braking performance will be adversely affected.

NOTE

- The arrow mark "A" on the brake shim (4) must point in the direction of brake disc rotation.
- The brake shim (4) must be installed to the caliper piston side pad.
- Make sure that the detent of pad is fitted to correctly.



I933H1420004-01



I933H1420005-01

- 7) Temporarily tighten the pad mounting pins (1).
- 8) Install the brake caliper and apply a small quantity of thread lock to the brake caliper mounting bolts (2).

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

- 9) Tighten the brake caliper mounting bolts (2) to the specified torque.

Tightening torque

Brake caliper mounting bolt (a): 26 N·m (2.6 kgf-m, 19.0 lb-ft)

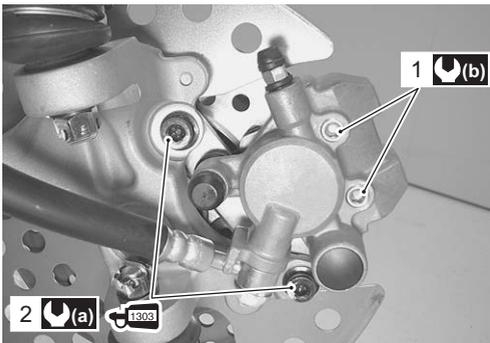
- 10) Tighten the front brake pad mounting pins (1) to the specified torque.

Tightening torque

Front brake pad mounting pin (b): 18 N·m (1.8 kgf-m, 13.0 lb-ft)

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.



I933H1420032-03

- 11) Install the front wheel assembly. Refer to "Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)".

Front Brake Caliper Removal and Installation

B933H24206004

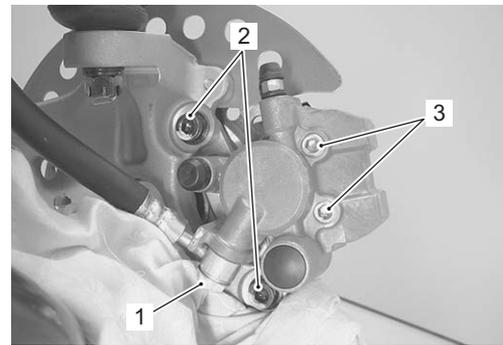
Removal

- 1) Remove the front wheel assembly. Refer to "Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)".
- 2) Drain brake fluid. Refer to "Brake Fluid Replacement in Section 4A (Page 4A-8)".
- 3) Disconnect the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.

NOTE

- Place a rag underneath the union bolt on the brake caliper to catch any spilt brake fluid.
- Slightly loosen the brake pad mounting pins (3) to facilitate later disassembly, if necessary.

- 4) Remove the brake caliper by removing the brake caliper mounting bolts (2).



I933H1420006-01

Installation

Install the brake caliper in the reverse order of removal. Pay attention to the following points:

- Apply a small quantity of thread lock to the brake caliper mounting bolts (1).
- 1303 : Thread lock cement 99000-32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)**
- Tighten the brake caliper mounting bolts (1) and brake pad mounting pins (2) to the specified torque.

Tightening torque

Brake caliper mounting bolt (a): 26 N·m (2.6 kgf-m, 19.0 lb-ft)

Front brake pad mounting pin (b): 18 N·m (1.8 kgf-m, 13.0 lb-ft)

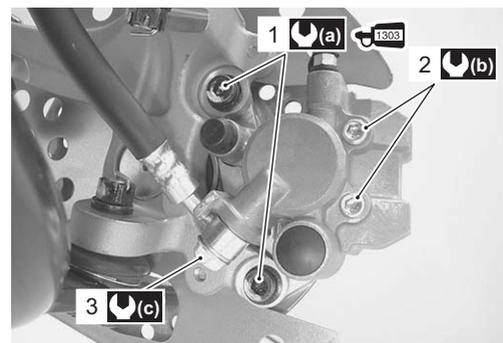
- After setting the brake hose union to the stopper, tighten the union bolt (3) to the specified torque.

CAUTION

The seal washers should be replaced with new ones to prevent fluid leakage.

Tightening torque

Brake hose union bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H1420007-03

4B-4 Front Brakes:

- Bleed air from the brake system after installing the caliper. Refer to "Air Bleeding from Brake Fluid Circuit in Section 4A (Page 4A-6)".
- Install the front wheel assembly. Refer to "Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)".
- 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.

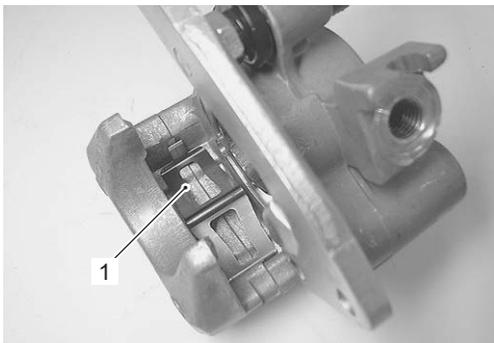
Front Brake Caliper Disassembly and Assembly

B933H24206005

Refer to "Front Brake Caliper Removal and Installation (Page 4B-3)".

Disassembly

- 1) Remove the brake pads. Refer to "Front Brake Pad Replacement (Page 4B-2)".
- 2) Remove the pad spring (1).



I933H1420008-01

- 3) Place a rag over the brake caliper piston to prevent it from popping out and then force out the piston using compressed air.

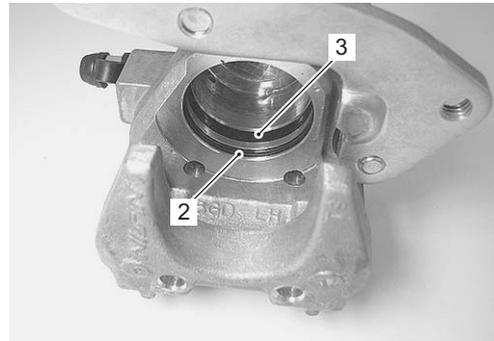
⚠ CAUTION

Do not use high pressure air to prevent brake caliper piston damage.



I933H1420009-01

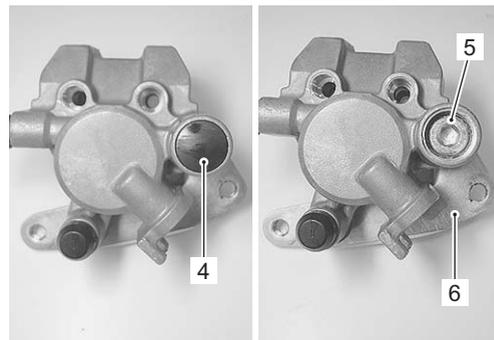
- 4) Remove the dust seal (2) and piston seal (3).



I933H1420010-01

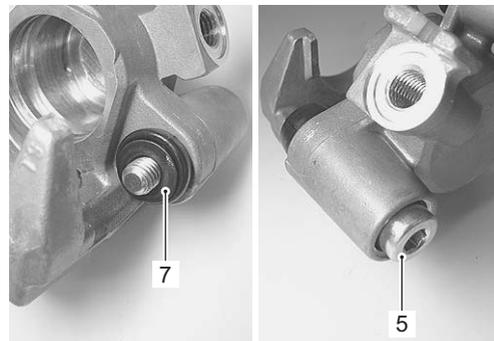
- 5) Remove the cap (4) and loosen the brake caliper holder slide pin (5).

- 6) Remove the caliper holder (6) from brake caliper.



I933H1420011-01

- 7) Remove the washer (7) and brake caliper holder slide pin (5).



I933H1420012-02

8) Remove the caliper holder pin (8).

NOTE

If there is no abnormal condition, the caliper holder pin removal is not necessary.

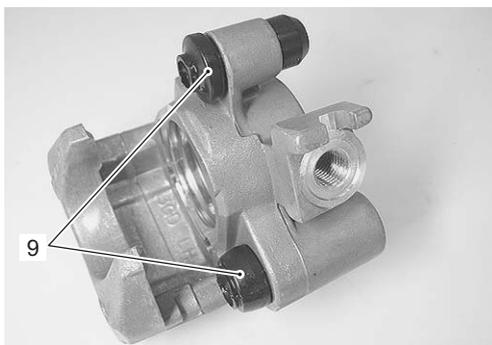


I933H1420013-02

9) Remove the rubber boots (9).

NOTE

If there is no abnormal condition, the rubber boots removal is not necessary.

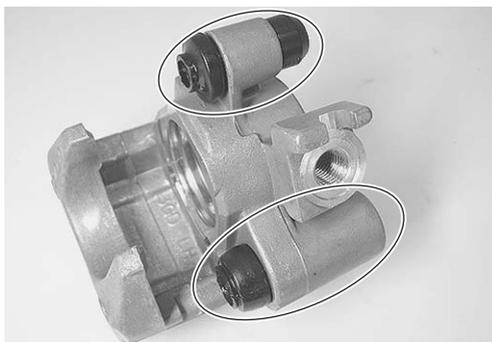


I933H1420014-02

Assembly

Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

- Set the rubber boots to the caliper.



I933H1420015-01

- Tighten the caliper holder pin to the specified torque.

Tightening torque

Front brake caliper holder pin (a): 18 N·m (1.8 kgf-m, 13.0 lb-ft)

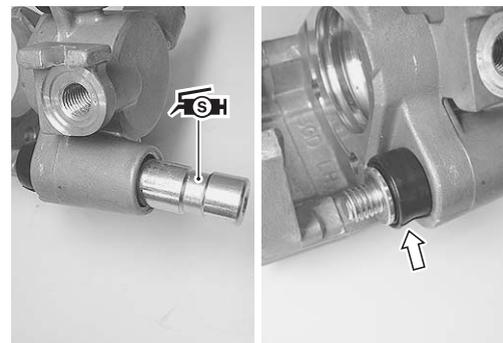


I933H1420016-02

- Apply silicone grease to the brake caliper holder slide pin.

 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)

- Set the rubber boot onto the brake caliper holder slide pin securely.



I933H1420017-01

- Apply silicone grease to the brake caliper holder pin.

 : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)

- Apply thread lock to the brake caliper holder slide pin (1).

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

- Install the caliper holder slide pin (1), washer (2) and caliper holder (3) to the caliper.

NOTE

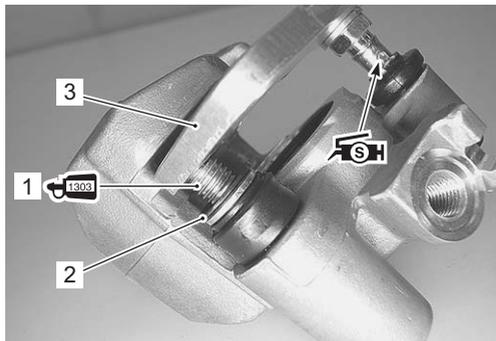
The convex side of the washer (2) faces brake caliper holder slide.

4B-6 Front Brakes:

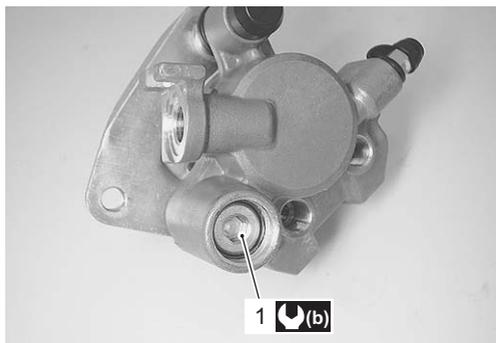
- Tighten the brake caliper holder slide pin (1) to the specified torque.

Tightening torque

Front brake caliper holder slide pin (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H1420018-03



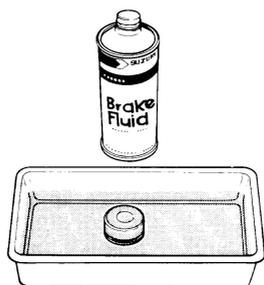
I933H1420019-01

- 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

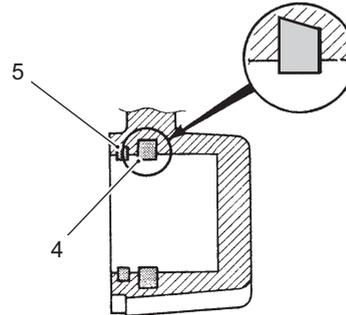
- Apply the brake fluid to piston seal (4) and dust seal (5).

⚠ CAUTION

Replace the piston seal (4) and dust seal (5) with new ones.

BF: Brake fluid (DOT 4)

- Install the piston seal as shown in the figure.



I933H1420034-02

- Install the brake pads. Refer to "Front Brake Pad Replacement (Page 4B-2)".

Front Brake Caliper Parts Inspection

B933H24206006

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.



I933H1420020-01

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.



I933H1420021-01

Boots

Inspect the boots for damage or wear. If any defects are found, replace them with new ones.



I933H1420022-01

Brake pad mounting pin

Inspect the brake pad mounting pins for wear or damage. If any defects are found, replace the mounting pin with new ones.



I933H1420023-01

Brake caliper holder slide pin

Inspect the brake caliper holder slide pin for wear or damage. If any damage is found, replace it with a new one.



I933H1420024-01

Brake pad spring

Inspect the brake pad springs for damage or excessive bend. If any damage is found, replace them with new a one.



I933H1420025-01

Brake caliper holder

Inspect the brake caliper holder and pin for damage. If any damage is found, replace the caliper holder with a new one.



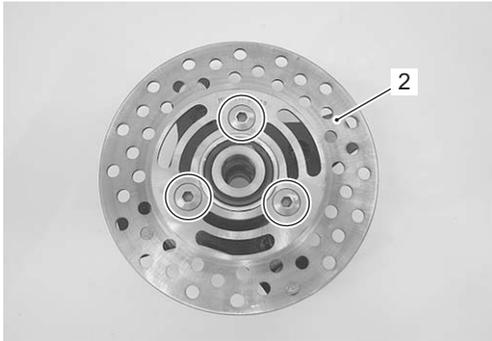
I933H1420026-01

Front Brake Disc Removal and Installation

B933H24206007

Removal

- 1) Remove the front wheel assembly. Refer to “Front / Rear Wheel Removal and Installation in Section 2D (Page 2D-2)”.
- 2) Remove the front wheel hub and front brake disc cover. Refer to “Front Wheel Hub / Steering Knuckle Removal and Installation in Section 2B (Page 2B-6)”.
- 3) Remove the brake disc (2) from the front wheel hub.



I933H1420027-01

Installation

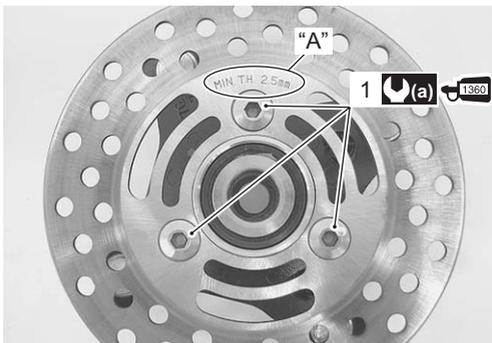
Install the front brake disc in the reverse order of removal. Pay attention to the following points:

- Make sure that the brake discs are clean and free of any grease.
- Install the disc to the wheel hub with the punch mark “A” on the disc as shown.
- Apply thread lock to the brake disc bolts (1) 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 lb-ft)



I933H1420028-01

Front Brake Disc Inspection

B933H24206008

Brake Disc Thickness

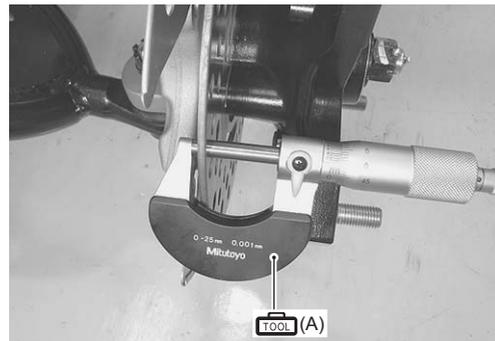
- 1) Dismount the front brake caliper. Refer to “Front Brake Pad Replacement (Page 4B-2)”.
- 2) Inspect the brake disc for damage or cracks and measure the thickness using the micrometer. Replace the brake disc if the thickness is less than the service limit or if defect is found.

Special tool

 (A): 09900–20205 (Micrometer (0 – 25 mm))

Brake disc thickness

Service limit: 2.5 mm (0.10 in)



I933H1420029-01

- 3) Remount the front brake caliper. Refer to “Front Brake Caliper Removal and Installation (Page 4B-3)”.

Brake Disc Runout

- 1) Dismount the front brake caliper. Refer to “Front Brake Pad Replacement (Page 4B-2)”.
- 2) Measure the runout using the dial gauge. Replace the disc if the runout exceeds the service limit.

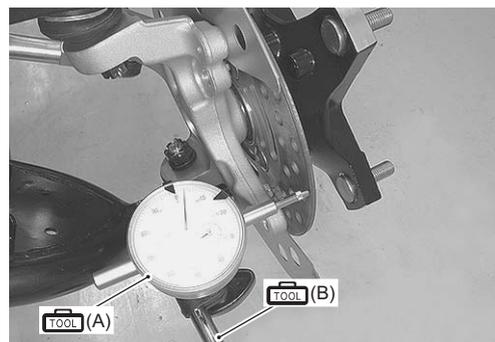
Special tool

 (A): 09900–20607 (Dial gauge (1/100 mm, 10 mm))

 (B): 09900–20701 (Magnetic stand)

Brake disc runout

Service limit: 0.30 mm (0.012 in)



I933H1420030-01

- 3) Remount the front brake caliper. Refer to “Front Brake Caliper Removal and Installation (Page 4B-3)”.

Front Brake Disc Cover Inspection

B933H24206009

Inspect the front brake disc cover in the following procedures:

- 1) Remove the front brake disc cover. Refer to “Front Wheel Hub / Steering Knuckle Removal and Installation in Section 2B (Page 2B-6)”.
- 2) Inspect the brake disc cover for damage. If any damage is found, replace the brake disc cover with a new one.



I933H1420031-01

- 3) Install the front brake disc cover. Refer to “Front Wheel Hub / Steering Knuckle Removal and Installation in Section 2B (Page 2B-6)”.

Specifications

Service Data

B933H24207001

Brake

Unit: mm (in)

Item		Standard	Limit
Brake disc thickness	Front	2.8 – 3.2 (0.11 – 0.13)	2.5 (0.10)
Brake disc runout		—	0.30 (0.012)
Brake caliper cylinder bore	Front	32.03 – 32.08 (1.2610 – 1.2630)	—
Brake caliper piston diam.	Front	31.948 – 31.998 (1.2578 – 1.2598)	—

Oil

Item	Specification	Note
Brake fluid type	DOT 4	

Tightening Torque Specifications

B933H24207002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Brake caliper mounting bolt	26	2.6	19.0	☞ (Page 4B-3) / ☞ (Page 4B-3)
Front brake pad mounting pin	18	1.8	13.0	☞ (Page 4B-3) / ☞ (Page 4B-3)
Brake hose union bolt	23	2.3	16.5	☞ (Page 4B-3)
Front brake caliper holder pin	18	1.8	13.0	☞ (Page 4B-5)
Front brake caliper holder slide pin	23	2.3	16.5	☞ (Page 4B-6)
Brake disc bolt	23	2.3	16.5	☞ (Page 4B-8)

NOTE

The specified tightening torque is also 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 Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H24208001

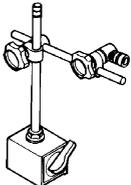
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page 4B-6) / ☞ (Page 4B-6)
Grease	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000-25100	☞ (Page 4B-5) / ☞ (Page 4B-5)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000-32030	☞ (Page 4B-2) / ☞ (Page 4B-3) / ☞ (Page 4B-5)
	THREAD LOCK CEMENT SUPER 1360 or equivalent	P/No.: 99000-32130	☞ (Page 4B-8)

NOTE

Required service material is also described in the following.
 “Front Brake Components (Page 4B-1)”

Special Tool

B933H24208002

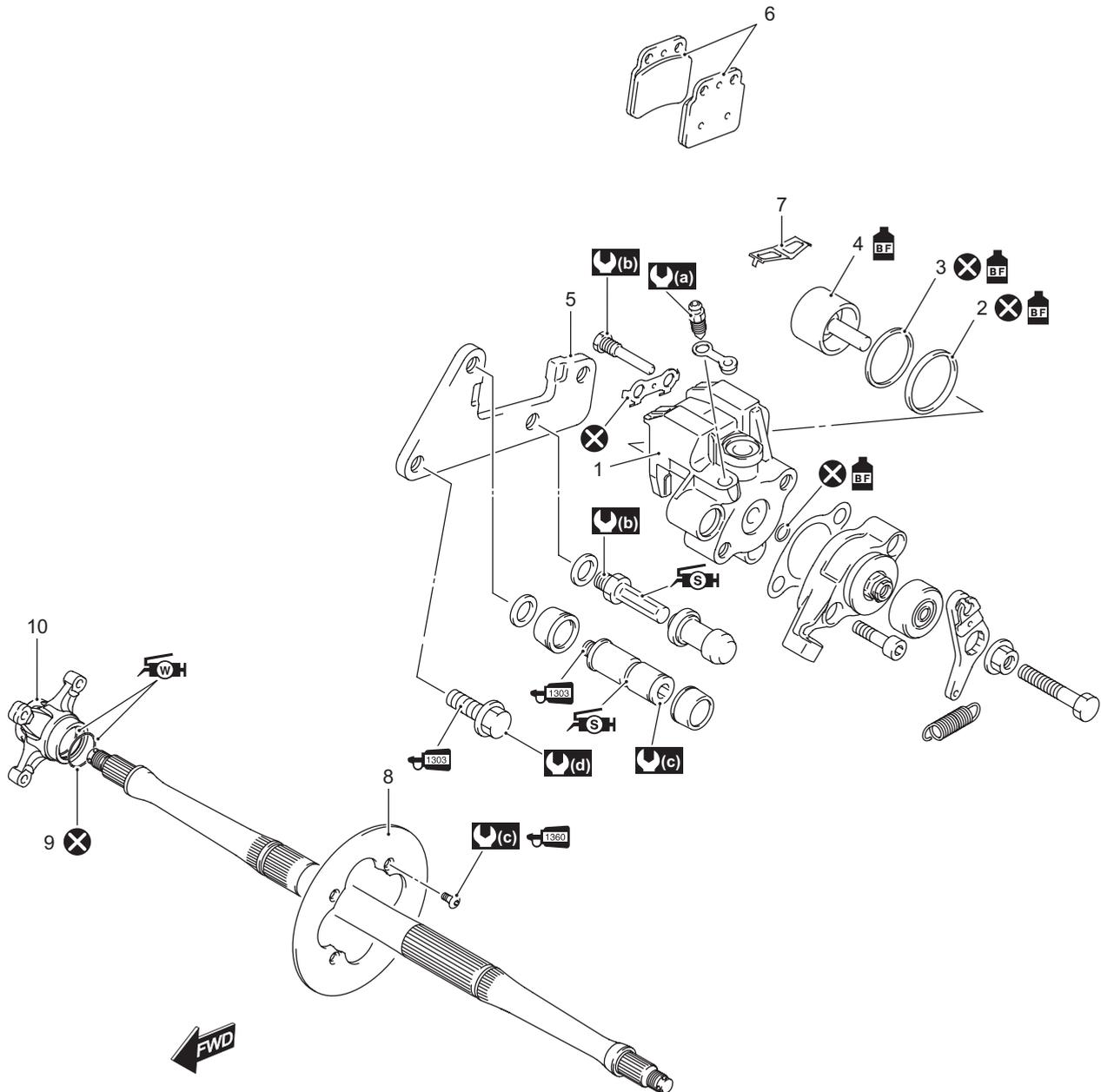
09900-20205 Micrometer (0 – 25 mm) ☞ (Page 4B-8) 	09900-20607 Dial gauge (1/100 mm, 10 mm) ☞ (Page 4B-8) 
09900-20701 Magnetic stand ☞ (Page 4B-8) 	

Rear Brakes

Repair Instructions

Rear Brake Components

B933H24306001



I933H1430001-09

1. Rear brake caliper	8. Front brake disc	: Apply thread lock to the thread part.
2. Piston seal	9. Stopper ring	: Apply thread lock to the thread part.
3. Dust seal	10. Rear brake disc plate housing	: Apply silicone grease.
4. Piston	: 6 N·m (0.6 kgf-m, 4.5 lb-ft)	: Apply water resistance grease.
5. Brake caliper holder	: 18 N·m (1.8 kgf-m, 13.0 lb-ft)	: Apply brake fluid.
6. Rear brake pad set	: 23 N·m (2.3 kgf-m, 16.5 lb-ft)	: Do not reuse.
7. Brake pad spring	: 26 N·m (2.6 kgf-m, 19.0 lb-ft)	

4C-2 Rear Brakes:

Rear Brake Pad Inspection

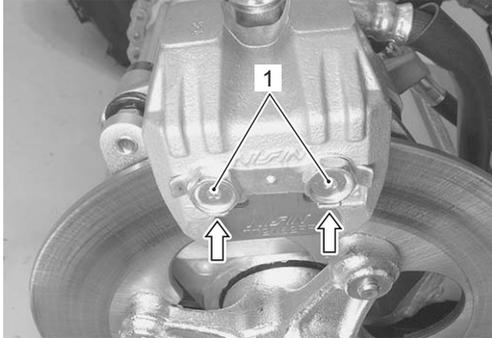
B933H24306002

Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

Rear Brake Pad Replacement

B933H24306003

- 1) Flatten the lock washer, and slightly loosen the pad mounting pins (1).

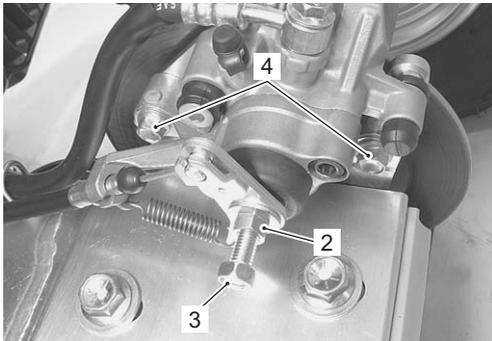


I933H1430002-02

- 2) Loosen the lock-nut (2) and parking brake adjuster (3) several turns.
- 3) Remove the brake caliper mounting bolts (4).

⚠ CAUTION

Do not operate the brake pedal while removing the brake caliper.

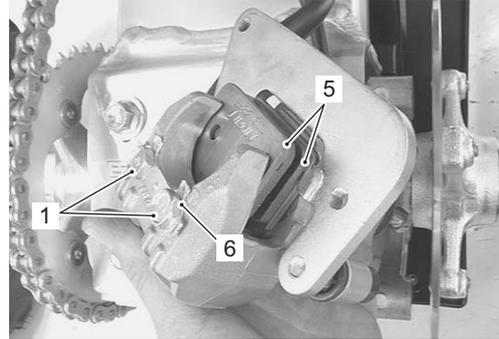


I933H1430003-01

- 4) Remove the brake pads (5) by removing the pad mounting pins (1) and lock washer (6).

NOTE

When removing the pads, push the piston all the way into the brake caliper.



I933H1430004-01

- 5) Clean up the caliper especially around the caliper piston.
- 6) Install the new brake pads.

⚠ CAUTION

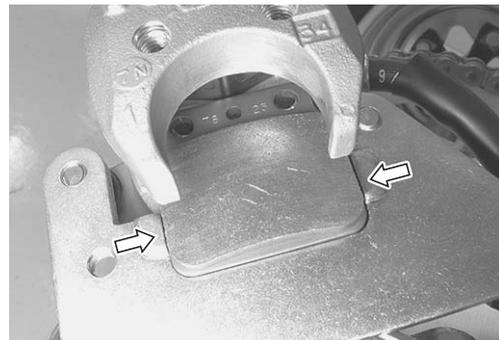
Replace the brake pads as a set, otherwise braking performance will be adversely affected.

NOTE

Make sure that the pad is fitted to correctly.



I933H1430005-01



I933H1430006-01

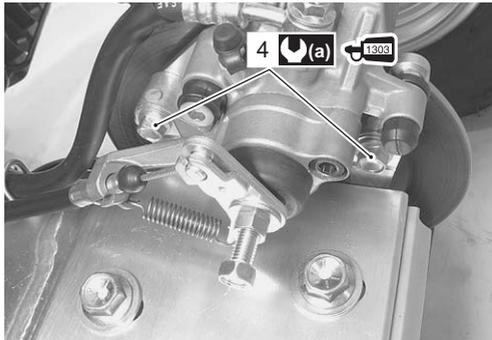
- 7) Install the new lock washer (6) and temporarily tighten the pad mounting pins (1).
- 8) Apply a small quantity of thread lock to the brake caliper mounting bolts (4).

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

- 9) Tighten the brake caliper mounting bolts (4) to the specified torque.

Tightening torque

Brake caliper mounting bolt (a): 26 N·m (2.6 kgf·m, 19.0 lb-ft)



I933H1430007-02

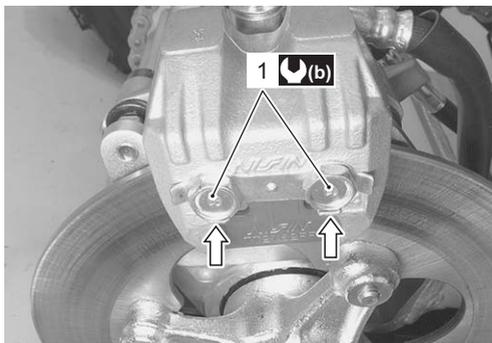
- 10) Tighten the pad mounting pins (1) to the specified torque, and then bend the lock washer.

Tightening torque

Rear brake pad mounting pin (b): 18 N·m (1.8 kgf·m, 13.0 lb-ft)

NOTE

After replacing the brake pads, pump the brake pedal several times to check for proper brake operation and then check the brake fluid level.



I933H1430008-01

- 11) Adjust the parking brake. Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

Rear Brake Caliper Removal and Installation

B933H24306004

Removal

- 1) Drain brake fluid. Refer to "Brake Fluid Replacement in Section 4A (Page 4A-8)".
- 2) Remove the parking brake. Refer to "Parking Brake Removal and Installation in Section 4D (Page 4D-2)".
- 3) Disconnect the brake hose from the caliper by removing the union bolt (1) and catch the brake fluid in a suitable receptacle.

NOTE

Place a rag underneath the union bolt on the brake caliper to catch any split brake fluid.

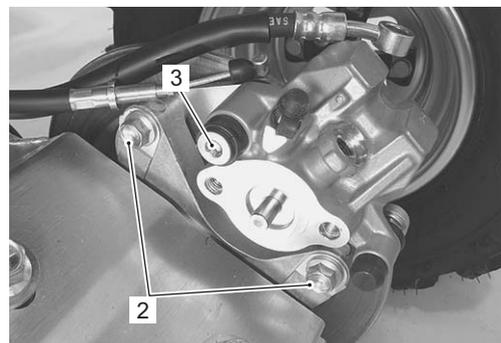


I933H1430009-01

- 4) Remove the brake caliper by removing the brake caliper mounting bolts (2).

NOTE

Slightly loosen the slide pin (3) to facilitate later disassembly, if necessary.



I933H1430010-01

4C-4 Rear Brakes:

Installation

- 1) Apply a small quantity of thread lock to the brake caliper mounting bolts (1).

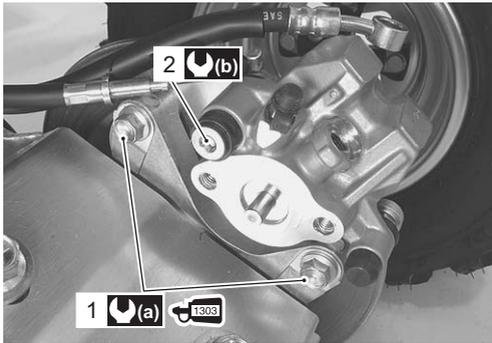
 **1303** : Thread lock cement 99000-32030 (THREAD LOCK CEMENT SUPER 1303 or equivalent)

- 2) Tighten the brake caliper mounting bolts (1) and slide pin (2).

Tightening torque

Brake caliper mounting bolt (a): 26 N·m (2.6 kgf-m, 19.0 lb-ft)

Rear brake caliper holder slide pin (b): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H1430011-02

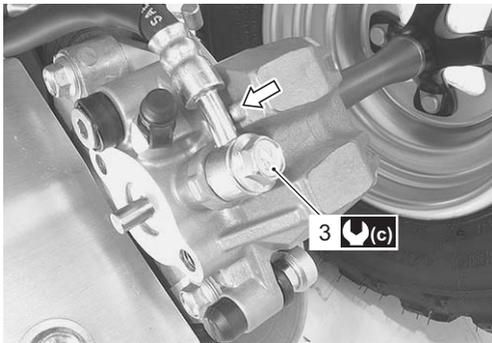
- 3) After setting the brake hose union to the stopper, tighten the union bolt (3) to the specified torque.

⚠ CAUTION

The seal washers should be replaced with the new ones to prevent fluid leakage.

Tightening torque

Brake hose union bolt (c): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H1430012-04

- 4) Install the parking brake. Refer to "Parking Brake Removal and Installation in Section 4D (Page 4D-2)".
- 5) Bleed air from the brake system. Refer to "Air Bleeding from Brake Fluid Circuit in Section 4A (Page 4A-6)".
- 6) 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.

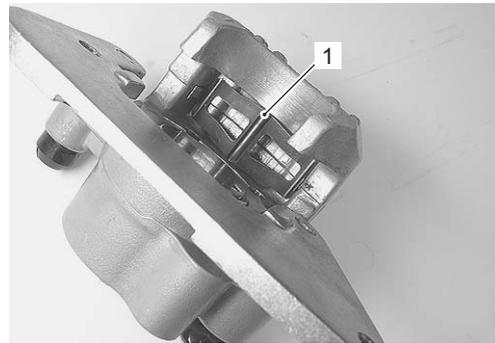
Rear Brake Caliper Disassembly and Assembly

B933H24306005

Refer to "Rear Brake Caliper Removal and Installation (Page 4C-3)".

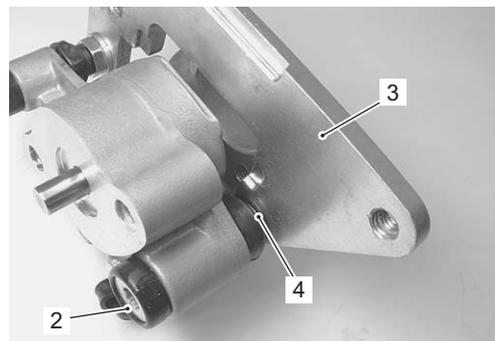
Disassembly

- 1) Remove the brake pads. Refer to "Rear Brake Pad Replacement (Page 4C-2)".
- 2) Remove the pad spring (1).



I933H1430013-01

- 3) Remove the caliper holder slide pin (2), and then remove the caliper holder (3) and washer (4).



I933H1430014-01

4) Remove the caliper holder pin (5).

NOTE

If there is no abnormal condition, the caliper holder pin removal is not necessary.

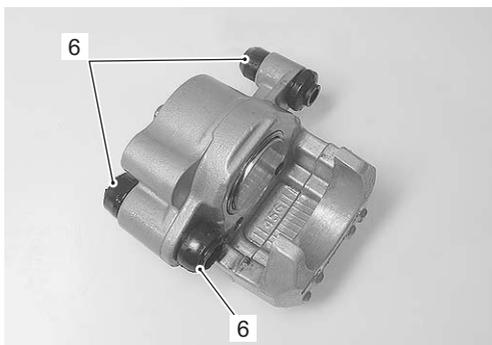


I933H1430015-01

5) Remove the rubber boots (6).

NOTE

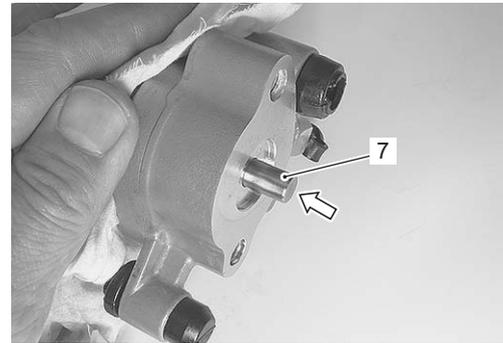
If there is no abnormal condition, the rubber boots removal is not necessary.



I933H1430016-01

6) Place a rag over the brake caliper piston to prevent the piston from popping out.

7) Force out the piston by pushing the piston pin (7).

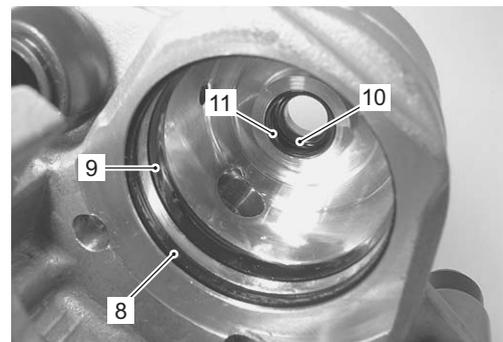


I933H1430017-01

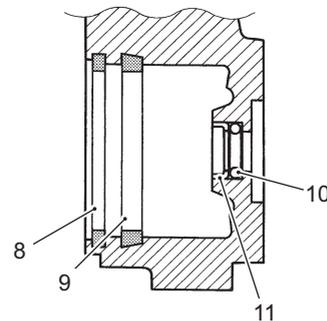
8) Remove the dust seal (8), piston seal (9) and O-ring (10).

⚠ CAUTION

Do not attempt to remove the retainer (11).



I933H1430018-02



I933H1430019-01

4C-6 Rear Brakes:

Assembly

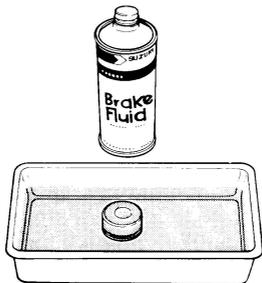
Assemble the caliper in the reverse order of disassembly. Pay attention to the following points:

- Wash the caliper bore and piston with specified brake fluid. Particularly wash the dust seal grooves and piston seal grooves.

BF: Brake fluid (DOT 4)

NOTE

- 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

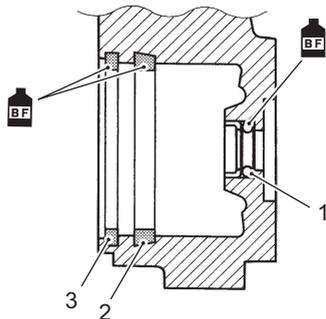
- Apply the brake fluid to O-ring (1), piston seal (2) and dust seal (3).

⚠ CAUTION

Replace the O-ring (1), piston seal (2) and dust seal (3) with new ones.

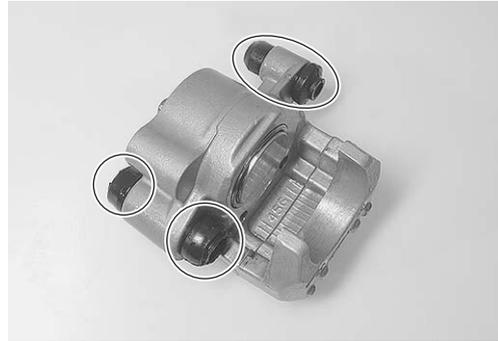
BF: Brake fluid (DOT 4)

- Install the O-ring (1), piston seal (2) and dust seal (3) as shown in the figure.



I933H1430021-01

- Set the rubber boots to the caliper.

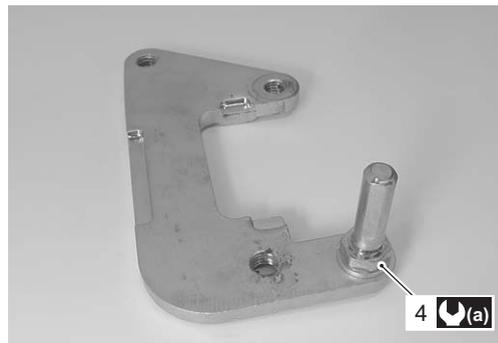


I933H1430022-01

- Tighten the caliper holder pin (4) to the specified torque.

Tightening torque

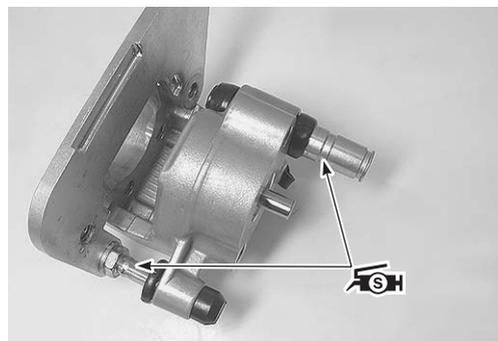
Rear brake caliper holder pin (a): 18 N·m (1.8 kgf-m, 13.0 lb-ft)



I933H1430023-01

- Apply silicone grease to the brake caliper holder pin and caliper holder slide pin.

⚠ : Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)



I933H1430024-02

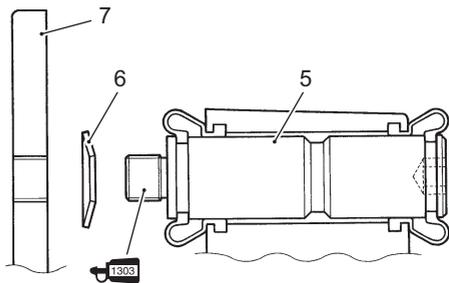
- Apply thread lock to the brake caliper holder slide pin (5).

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

- Install the caliper holder slide pin (5), washer (6) and caliper holder (7) to the caliper.

NOTE

When installing the caliper holder slide pin (5) and washer (6), the convex of washer must face caliper holder slide pin (5) as shown in the figure.

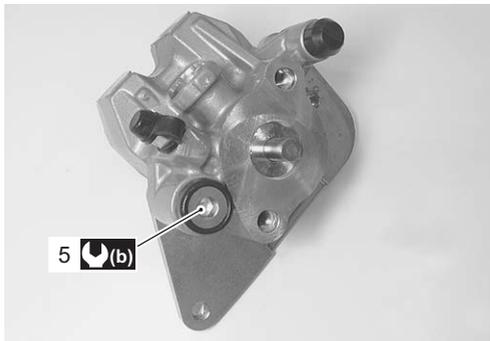


I933H1430025-04

- Tighten the brake caliper holder slide pin (5) to the specified torque.

Tightening torque

Rear brake caliper holder slide pin (b): 23 N·m (2.3 kgf·m, 16.5 lb·ft)



I933H1430026-03

- Install the brake pads. Refer to "Rear Brake Pad Replacement (Page 4C-2)".

Rear Brake Caliper Parts Inspection

B933H24306006

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.



I933H1430027-01

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.



I933H1430028-01

Boots

Inspect the boots for damage or wear. If any defects are found, replace them with new ones.



I933H1430029-01

4C-8 Rear Brakes:

Brake pad mounting pin

Inspect the brake pad mounting pins for wear or damage. If any defects are found, replace the mounting pin with new ones.



I933H1430030-01

Brake caliper slide pin

Inspect the brake caliper slide pin for wear or damage. If any damage is found, replace it with a new one.



I933H1430031-01

Brake pad spring

Inspect the brake pad spring for damage or excessive bend. If any damage is found, replace it with a new one.



I933H1430032-01

Brake caliper holder

- Inspect the brake caliper holder and pin for damage. If any damage is found, replace it with a new ones.



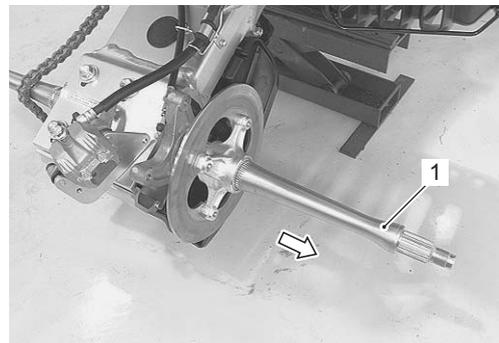
I933H1430033-01

Rear Brake Disc Removal and Installation

B933H243006007

Removal

- 1) Remove the rear sprocket assembly. Refer to "Rear Sprocket Removal and Installation in Section 3A (Page 3A-5)".
- 2) Remove the rear brake caliper. Refer to "Rear Brake Pad Replacement (Page 4C-2)".
- 3) Remove the rear axle (1) to the right side.



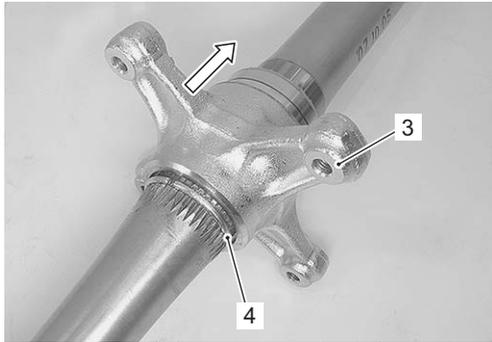
I933H1430034-01

- 4) Remove the brake disc (2).



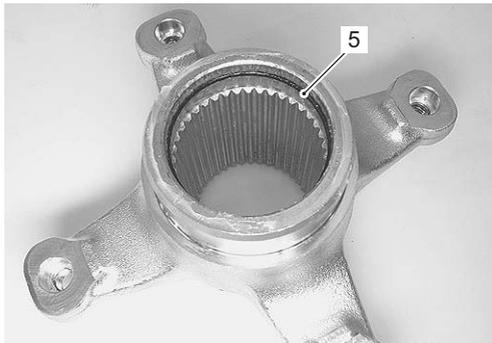
I933H1430035-01

- 5) Push the rear brake disc plate housing (3) and remove the stopper ring (4).
- 6) Remove the rear brake disc plate housing (3) from the rear axle.



I933H1430036-01

- 7) Remove the O-ring (5).



I933H1430037-01

Installation

Install the rear brake disc in the reverse order of removal. Pay attention to the following point:

- Apply grease to the O-ring and spline of the rear brake disc plate housing.

⚠ CAUTION

Replace the O-ring with a new one.

⚙️: Grease 99000-25160 (Water resistance grease or equivalent)

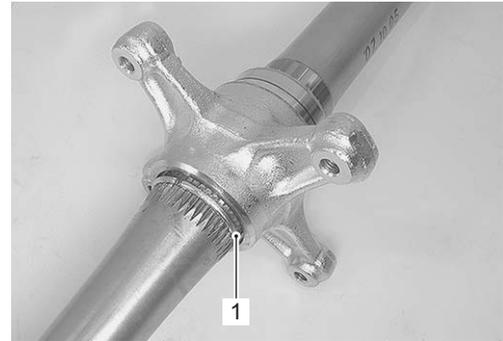


I933H1430038-02

- Install the stopper ring (1).

⚠ CAUTION

The removed stopper ring must be replaced with a new one.



I933H1430039-01

- Apply thread lock to the brake disc bolts and tighten them to the specified torque.

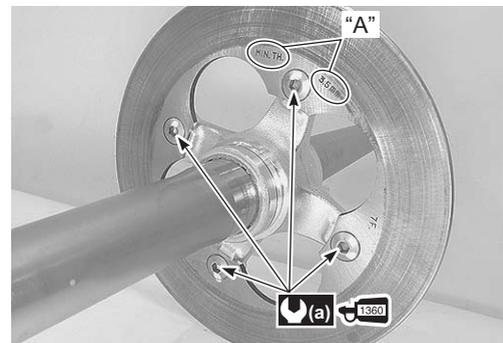
NOTE

The stamped mark "A" must face to left side of vehicle.

⚙️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 lb-ft)



I933H1430040-01

4C-10 Rear Brakes:

Rear Brake Disc Inspection

B933H24306008

Brake disc thickness

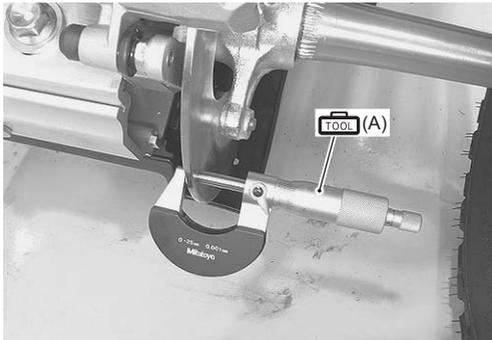
Inspect the brake disc for damage or cracks and measure the thickness using the micrometer. Replace the brake disc if the thickness is less than the service limit or if defect is found.

Special tool

TOOL (A): 09900-20205 (Micrometer (0 – 25 mm))

Brake disc thickness

Service limit (Rear): 3.5 mm (0.14 in)



I933H1430041-01

Brake disc runout

- 1) Dismount the rear brake caliper. Refer to "Rear Brake Pad Replacement (Page 4C-2)".
- 2) Measure the runout using the dial gauge. Replace the disc if the runout exceeds the service limit.

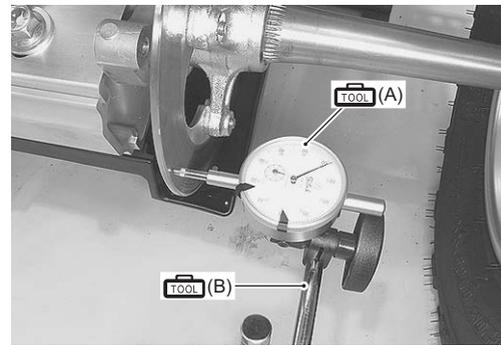
Special tool

TOOL (A): 09900-20607 (Dial gauge (1/100 mm, 10 mm))

TOOL (B): 09900-20701 (Magnetic stand)

Brake disc runout

Service limit: 0.30 mm (0.012 in)



I933H1430042-01

- 3) Remount the rear brake caliper. Refer to "Rear Brake Pad Replacement (Page 4C-2)".

Rear Brake Disc Plate Housing Inspection

B933H24306009

Inspect the rear brake disc plate housing in the following procedures:

- 1) Remove the rear brake disc plate housing from the rear axle. Refer to "Rear Brake Disc Removal and Installation (Page 4C-8)".
- 2) Inspect the rear brake disc plate housing flange for damage and wear of spline. If any defects are found, replace the rear brake disc plate housing with a new one.



I933H1430043-01

- 3) Install the rear brake disc plate housing. Refer to "Rear Brake Disc Removal and Installation (Page 4C-8)".

Specifications

Service Data

B933H24307001

Brake

Unit: mm (in)

Item		Standard	Limit
Brake disc thickness	Rear	3.8 – 4.2 (0.15 – 0.17)	3.5 (0.14)
Brake disc runout		—	0.30 (0.012)
Brake caliper cylinder bore	Rear	33.96 – 34.01 (1.3370 – 1.3390)	—
Brake caliper piston diam	Rear	33.878 – 33.928 (1.3338 – 1.3357)	—

Tightening Torque Specifications

B933H24307002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Brake caliper mounting bolt	26	2.6	19.0	☞ (Page 4C-3) / ☞ (Page 4C-4)
Rear brake pad mounting pin	18	1.8	13.0	☞ (Page 4C-3)
Rear brake caliper holder slide pin	23	2.3	16.5	☞ (Page 4C-4) / ☞ (Page 4C-7)
Brake hose union bolt	23	2.3	16.5	☞ (Page 4C-4)
Rear brake caliper holder pin	18	1.8	13.0	☞ (Page 4C-6)
Brake disc bolt	23	2.3	16.5	☞ (Page 4C-9)

NOTE

The specified tightening torque is also 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 Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H24308001

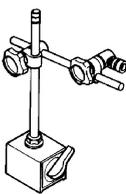
Material	SUZUKI recommended product or Specification		Note
Brake fluid	DOT 4	—	☞ (Page 4C-6) / ☞ (Page 4C-6)
Grease	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000–25100	☞ (Page 4C-6)
	Water resistance grease or equivalent	P/No.: 99000–25160	☞ (Page 4C-9)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000–32030	☞ (Page 4C-3) / ☞ (Page 4C-4) / ☞ (Page 4C-7)
	THREAD LOCK CEMENT SUPER 1360 or equivalent	P/No.: 99000–32130	☞ (Page 4C-9)

NOTE

Required service material is also described in the following.
 “Rear Brake Components (Page 4C-1)”

Special Tool

B933H24308002

09900–20205 Micrometer (0 – 25 mm) ☞ (Page 4C-10)		09900–20607 Dial gauge (1/100 mm, 10 mm) ☞ (Page 4C-10)	
09900–20701 Magnetic stand ☞ (Page 4C-10)			

Parking Brake

Repair Instructions

Parking Brake Inspection and Adjustment

B933H24406001

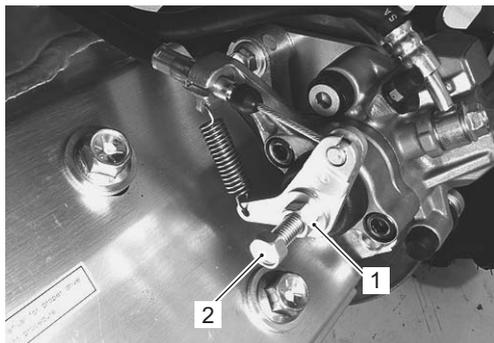
Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

Parking Brake Cable Removal and Installation

B933H24406002

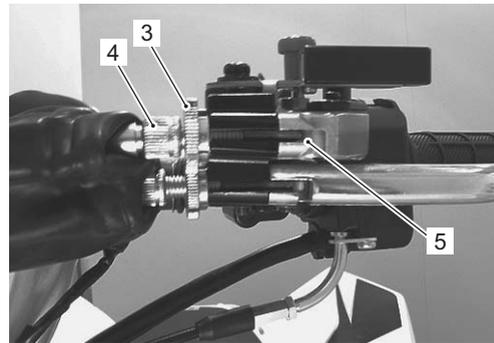
Removal

- 1) Loosen the parking brake cable adjuster lock-nut (1) while holding the adjuster (2).



I933H1440001-01

- 2) Loosen the parking brake cable adjuster lock-nut (3) and cable adjuster (4).
- 3) Disconnect the parking brake cable (5).



I933H1440002-02

- 4) Remove the fuel tank lower cover. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 5) Remove the parking brake cable as shown in the cable routing diagram. Refer to "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".

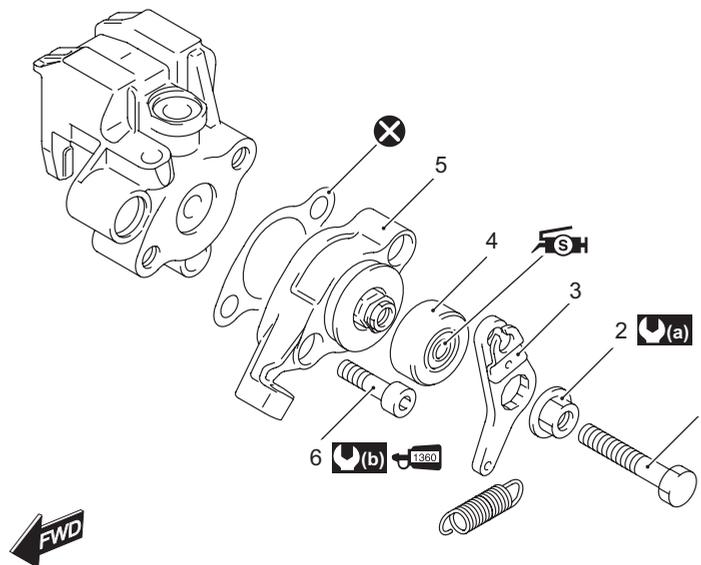
Installation

Install the parking brake cable in the reverse order of removal. Pay attention to the following points:

- 1) Connect the parking brake cable as shown in the cable routing diagram. Refer to "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".
- 2) After installing the parking brake cable, adjust the parking brake play. Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

Parking Brake Components

B933H24406003



I933H1440003-06

1. Parking brake adjuster bolt	5. Parking brake housing	1360 : Apply thread lock to thread part.
2. Parking brake adjuster lock-nut	6. Parking brake bolt	: Apply silicone grease.
3. Parking lever	: 18 N·m (1.8 kgf·m, 13.0 lb-ft)	: Do not reuse.
4. Boot	: 23 N·m (2.3 kgf·m, 16.5 lb-ft)	

Parking Brake Lock / Knob Removal and Installation

B933H24406004

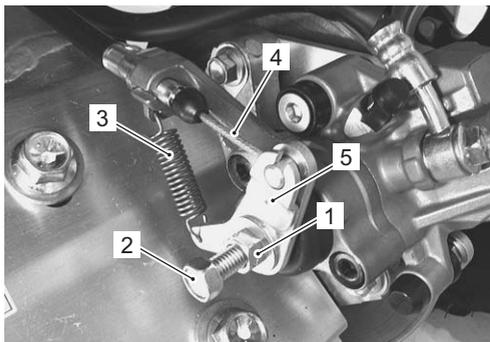
Refer to "Clutch Lever Removal and Installation in Section 5C (Page 5C-3)".

Parking Brake Removal and Installation

B933H24406005

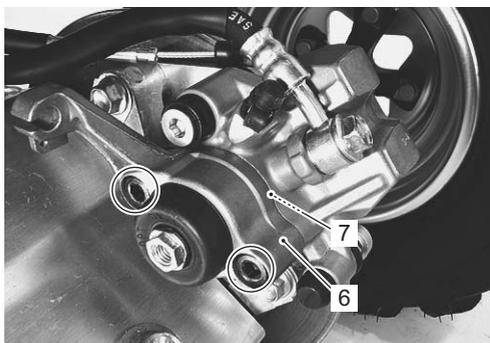
Removal

- 1) Loosen the lock-nut (1) and remove the parking brake adjuster (2).
- 2) Remove the spring (3) and disconnect the parking brake cable (4).
- 3) Remove the parking brake lever (5).



I933H1440004-01

- 4) Remove the parking brake (6) and gasket (7).

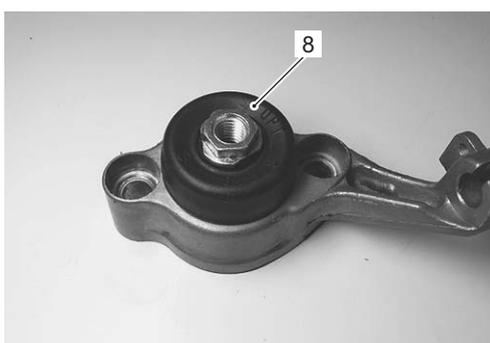


I933H1440005-02

- 5) Remove the boot (8).

NOTE

If there is no abnormal condition, the boot removal is not necessary.



I933H1440006-01

Installation

- 1) When replacing the boot with a new one, apply grease to the groove of parking brake axle.

 **Grease 99000-25100 (SUZUKI SILICONE GREASE or equivalent)**



I933H1440007-01

- 2) Install the gasket (1) and parking brake (2).

CAUTION

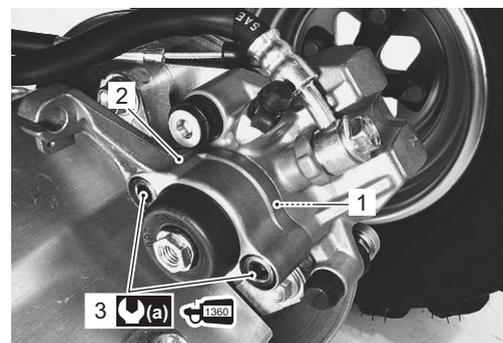
Replace the gasket with a new one.

- 3) Apply small quantity of thread lock to the parking brake bolts (3) and tighten them to the specified torque.

 **Thread lock cement 99000-32130 (THREAD LOCK CEMENT SUPER 1360 or equivalent)**

Tightening torque

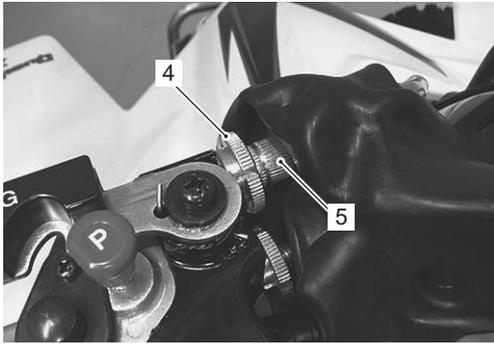
Parking brake bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H1440008-01

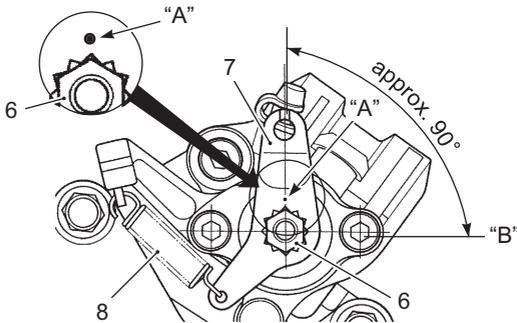
4D-3 Parking Brake:

- Loosen the lock-nut (4) and turn the adjuster (5) in completely, so that the cable play is maximum.



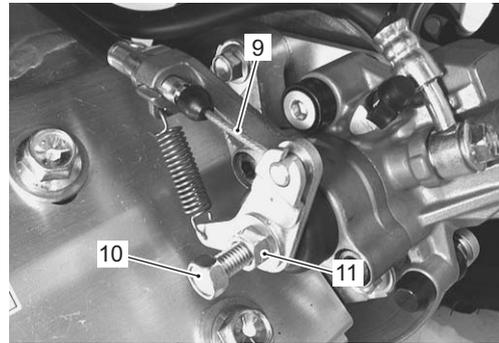
I933H144009-01

- Set the parking brake shaft (6) in neutral position by rotating the shaft.
- Install the parking lever (7) onto the parking brake shaft (6) with the punch mark "A" aligned with corner of hexagon on the shaft (6), so that parking lever (7) is at angle of approx. 90 degrees to the line "B" as shown in the figure.
- Hook the return spring (8) on the parking lever with the spring end faced the caliper as shown in the figure.



I933H144010-03

- Connect the parking cable (9).
- Install the adjuster (10) and the lock-nut (11).



I933H144012-03

- Adjust the parking brake. Refer to "Brake System Inspection in Section 0B (Page 0B-17)".

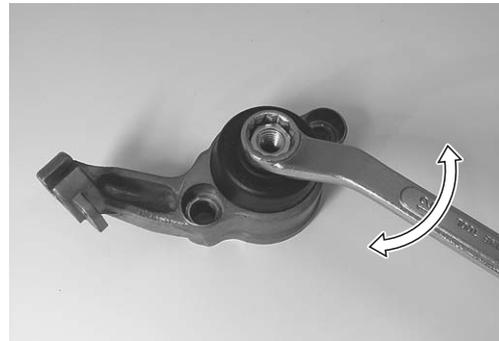
Parking Brake Inspection

B933H24406006

Refer to "Parking Brake Removal and Installation (Page 4D-2)".

Inspect the parking brake for damage and smooth rotation by turning the axle. If there is anything unusual, replace the parking brake a new one.

Inspect the boot for damage, If any defects are found, replace the boot with a new one.



I933H144011-01

Specifications

Tightening Torque Specifications

B933H24407001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Parking brake bolt	23	2.3	16.5	☞ (Page 4D-2)

NOTE

The specified tightening torque is also described in the following.
 “Parking Brake Components (Page 4D-1)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H24408001

Material	SUZUKI recommended product or Specification		Note
Grease	SUZUKI SILICONE GREASE or equivalent	P/No.: 99000-25100	☞ (Page 4D-2)
Thread lock cement	THREAD LOCK CEMENT SUPER 1360 or equivalent	P/No.: 99000-32130	☞ (Page 4D-2)

NOTE

Required service material is also described in the following.
 “Parking Brake Components (Page 4D-1)”

Section 5

Transmission / Transaxle

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Precautions

Precautions

Precautions for Transmission / Transaxle

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

B933H25000001

Manual Transmission

Diagnostic Information and Procedures

Manual Transmission Symptom Diagnosis

B933H25204001

Condition	Possible cause	Correction / Reference Item
Engine is noisy (Noise seems to come from the transmission)	Worn or rubbing gears.	Replace.
	Worn countershaft splines.	Replace countershaft.
	Worn driveshaft splines.	Replace driveshaft.
	Worn or rubbing primary gears.	Replace.
	Worn bearings.	Replace.
Transmission will not shift	Broken gearshift cam.	Replace.
	Distorted gearshift forks.	Replace.
	Worn gearshift pawl.	Replace.
Transmission will not shift back	Clutch cable out of adjustment	Adjust
	Broken gearshift shaft return spring.	Replace.
	Rubbing or stuck gearshift shaft.	Repair or replace.
	Worn or distorted gearshift forks.	Replace.
Transmission jumps out of gear	Clutch cable out of adjustment	Adjust
	Worn shifting gears on driveshaft or countershaft.	Replace.
	Worn or distorted gearshift forks.	Replace.
	Weakened gearshift stopper spring.	Replace.
	Worn gearshift cam stopper plate.	Replace.

Repair Instructions

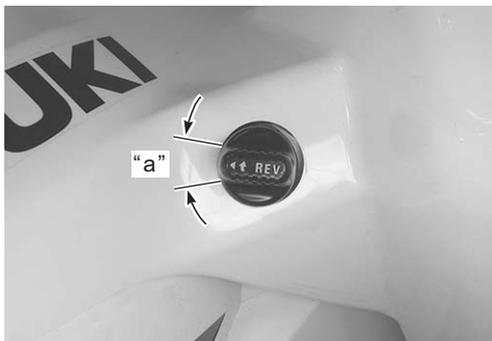
Reverse Lock Cable Play Inspection and Adjustment

B933H25206001

The cable adjuster is located at inside of the fuel tank right side cover.

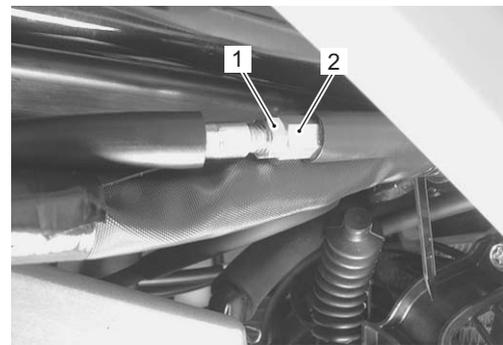
Inspect and adjust the reverse lock cable play "a" as follows:

Reverse lock cable play "a"
1 – 2 mm (0.04 – 0.08 in)



I933H1520001-01

- 1) Loosen the lock-nut (1).
- 2) Turn the adjuster (2) in or out until the reverse lock cable play "a" should be 1 – 2 mm (0.04 – 0.08 in) at the reverse lock release knob.
- 3) Tighten the lock-nut (1) securely.



I933H1520002-01

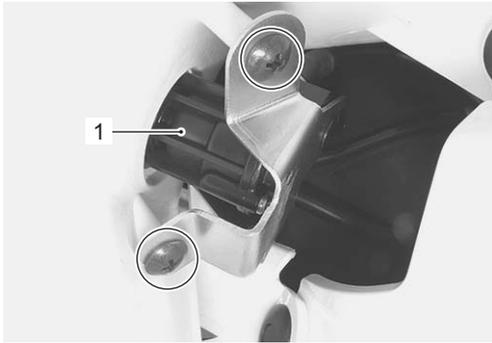
- 4) After a adjustment, be sure to check for reverse lock function.

Reverse Lock Cable Removal and Installation

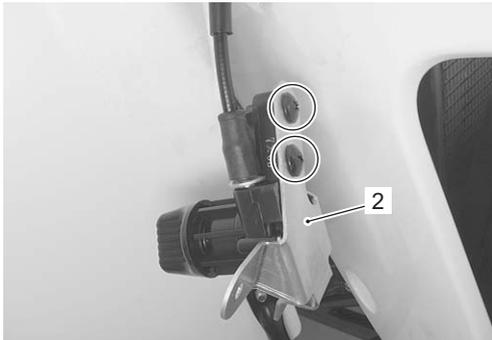
B933H25206002

Removal

- 1) Remove the reverse lock release knob (1) from the front fender.

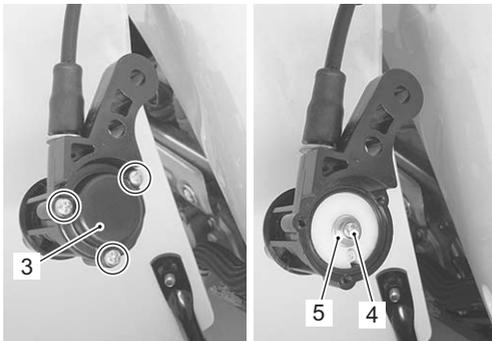


- 2) Remove the bracket (2) by removing the screws and nuts.



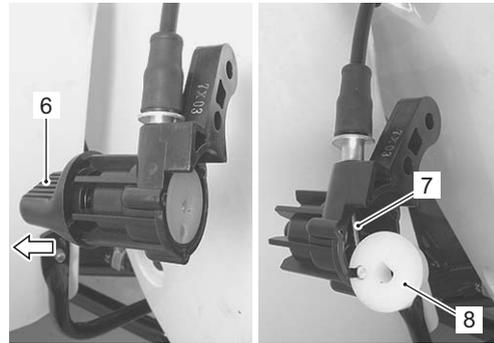
- 3) Remove the cap (3).

- 4) Remove the screw (4) and washer (5).

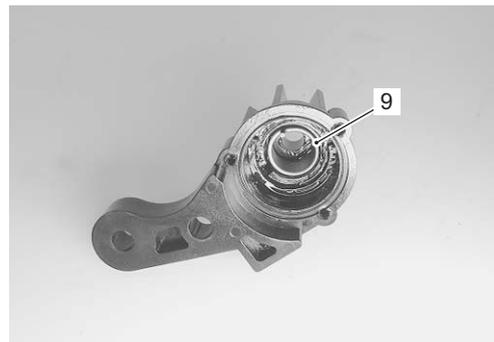


- 5) Draw out the reverse lock release knob (6).

- 6) Disconnect the reverse lock cable (7) by remove the rotor (8).



- 7) Remove the spring (9).



- 8) Remove the sprocket cover and bracket. Refer to "Engine Sprocket Removal and Installation in Section 3A (Page 3A-4)".

- 9) Disconnect the reverse lock cable (7) by removing the mounting bolt.

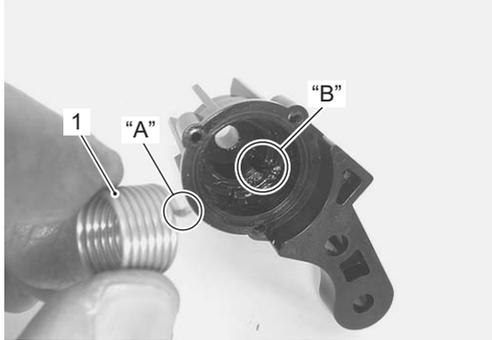


- 10) Remove the reverse lock cable (7) as shown in the cable routing diagram. Refer to "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".

Installation

Install the reverse lock cable in the reverse order of removal. Pay attention to the following points:

- Install the reverse lock cable as shown in the rear brake cable routing diagram. Refer to “Hose and Cable Routing Diagram in Section 4A (Page 4A-3)”.
- Install the spring (1) with the spring end “A” to the groove “B” on the housing.



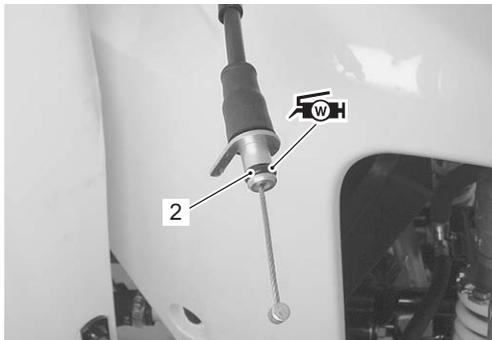
I933H1520009-01

- Apply grease to the O-ring (2).

⚠ CAUTION

Replace the O-ring with a new one.

🔧: Grease 99000–25160 (Water resistance grease or equivalent)

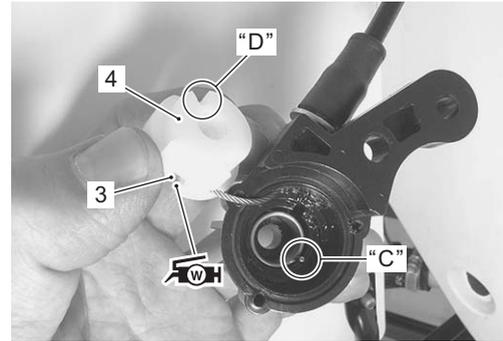


I933H1520010-02

- Connect the reverse lock cable (3) to the rotor (4) through the hole of the housing.
- Apply grease to the end of the reverse lock cable (3) and rotor (4).

🔧: Grease 99000–25160 (Water resistance grease or equivalent)

- When installing the rotor, hook the spring end “C” on the concave portion “D” of rotor (4).



I933H1520011-02

- Make sure that the reverse lock cable is routed correctly.

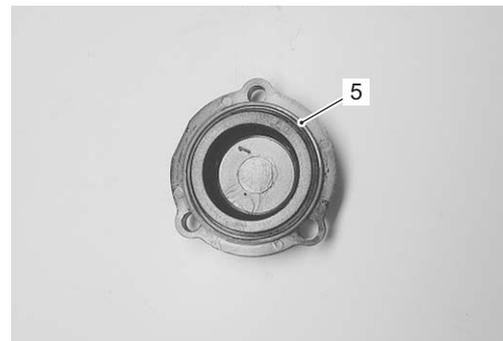


I933H1520012-01

- Install the dust seal (5).

⚠ CAUTION

Replace the dust seal (5) with a new one.

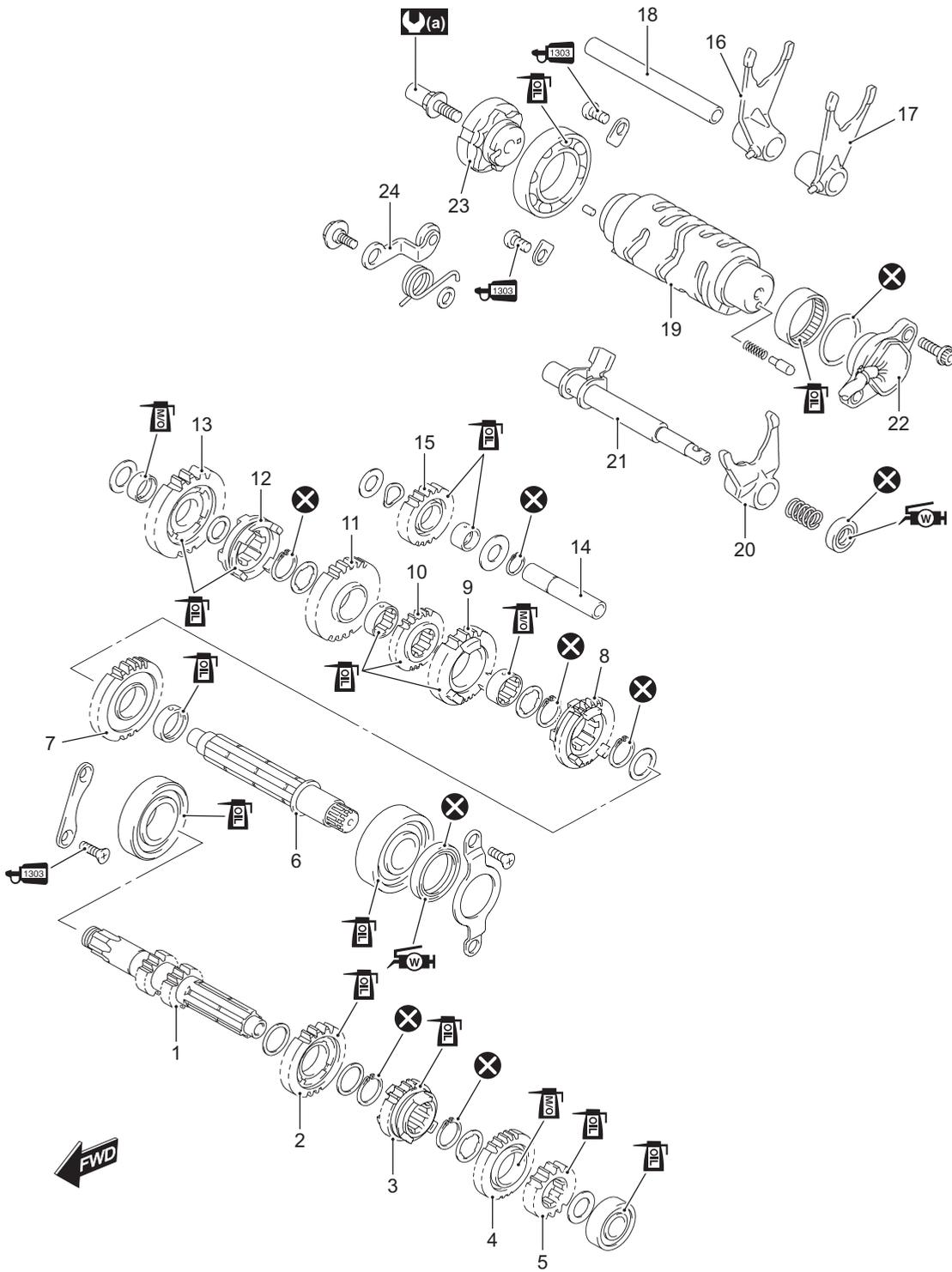


I933H1520013-01

- After installing the reverse lock, check the reverse lock cable play. Refer to “Reverse Lock Cable Play Inspection and Adjustment (Page 5B-1)”.

Transmission Components

B933H25206003



I933H1520014-05

1. Countershaft	11. Reverse driven gear	21. Reverse lock shaft
2. Top drive gear	12. 1st/reverse dog	22. Gear position switch
3. 3rd drive gear	13. 1st driven gear	23. Gearshift cam stopper plate
4. 4th drive gear	14. Reverse idle gear shaft	24. Gearshift cam stopper
5. 2nd drive gear	15. Reverse idle gear	(a) : 24 N·m (2.4 kgf-m, 17.5 lb-ft)
6. Driveshaft	16. Gearshift fork No. 1	: Apply engine oil.
7. 2nd driven gear	17. Gearshift fork No. 2	: Apply molybdenum oil solution.
8. 4th driven gear	18. Gearshift fork shaft	: Apply water resistance grease.
9. 3rd driven gear	19. Gearshift cam	1303 : Apply thread lock to the thread part.
10. Top driven gear	20. Gearshift fork No. 3	: Do not reuse.

Transmission Removal and Installation

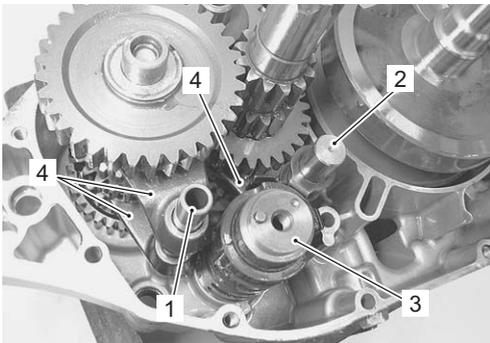
B933H25206004

Removal

- 1) Remove the engine assembly from the frame. Refer to “Engine Assembly Removal in Section 1D (Page 1D-13)”.
- 2) Remove the engine top side. Refer to “Engine Top Side Disassembly in Section 1D (Page 1D-17)”.
- 3) Separate the left and right crankcases. Refer to “Engine Bottom Side Disassembly in Section 1D (Page 1D-41)”.

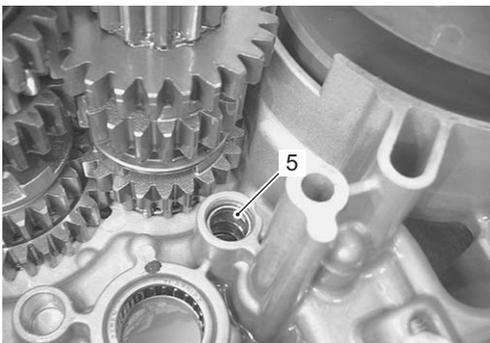
Reverse lock shaft / Gearshift cam / Gearshift fork

- 1) Remove the gearshift fork shaft (1), reverse lock shaft (2), gearshift cam (3) and gearshift forks (4).



I933H1520015-01

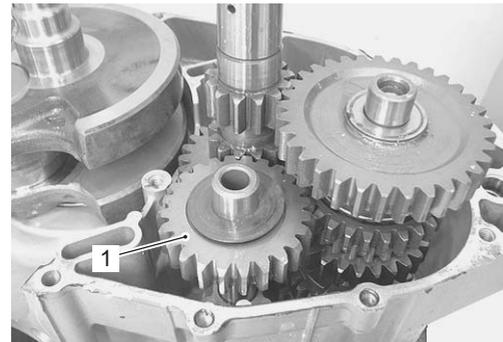
- 2) Remove the reverse lock spring (5).



I933H1520016-01

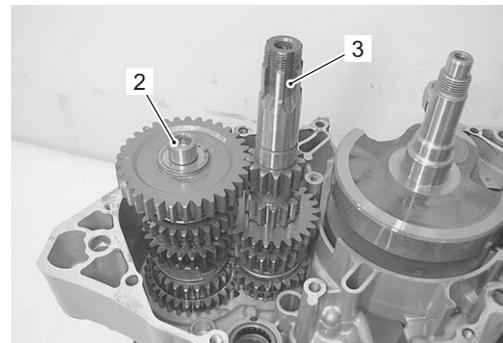
Reverse idle gear assembly / Driveshaft assembly / Countershaft assembly

- 1) Remove the reverse idle gear (1) with its shaft.



I933H1520017-02

- 2) Remove the driveshaft assembly (2) and countershaft assembly (3).



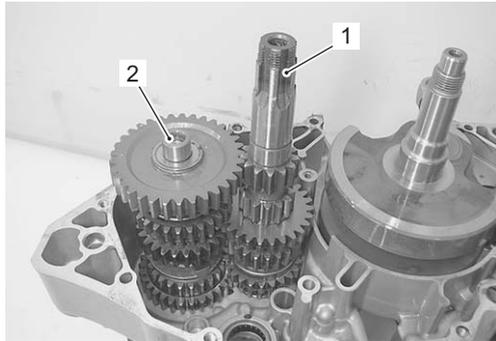
I933H1520018-03

5B-6 Manual Transmission:

Installation

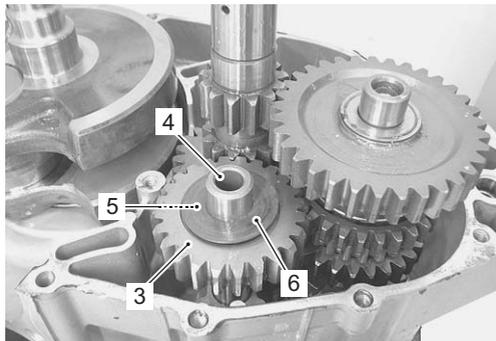
Reverse idle gear assembly / Driveshaft assembly / Countershaft assembly

- 1) Install the countershaft assembly (1) and driveshaft assembly (2).



I933H1520019-02

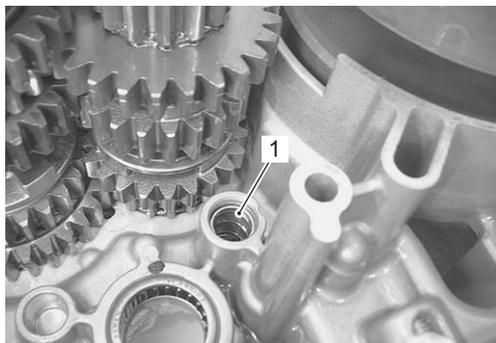
- 2) Install the reverse idle gear (3) and shaft (4).
- 3) Install the wave washer (5) and washer (6).



I933H1520020-01

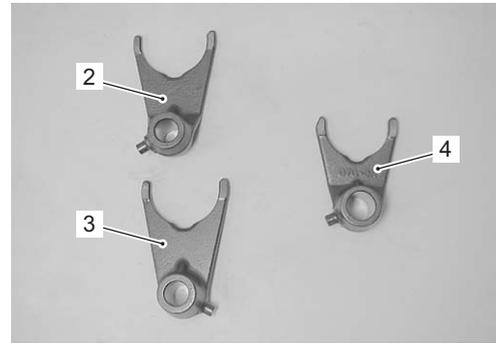
Reverse lock shaft / Gearshift cam / Gearshift fork

- 1) Install the reverse lock spring (1).



I933H1520021-01

- 2) Install the gearshift forks into the gearshifting grooves in the correct position and direction.



I933H1520022-01



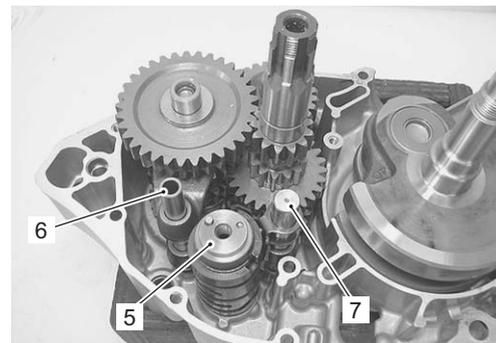
I933H1520023-01

- | |
|-------------------------|
| 2. Gearshift fork No. 1 |
| 3. Gearshift fork No. 2 |
| 4. Gearshift fork No. 3 |

- 3) Install the gearshift cam (5).
- 4) Install the gearshift fork shaft (6) and reverse lock shaft (7).

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.

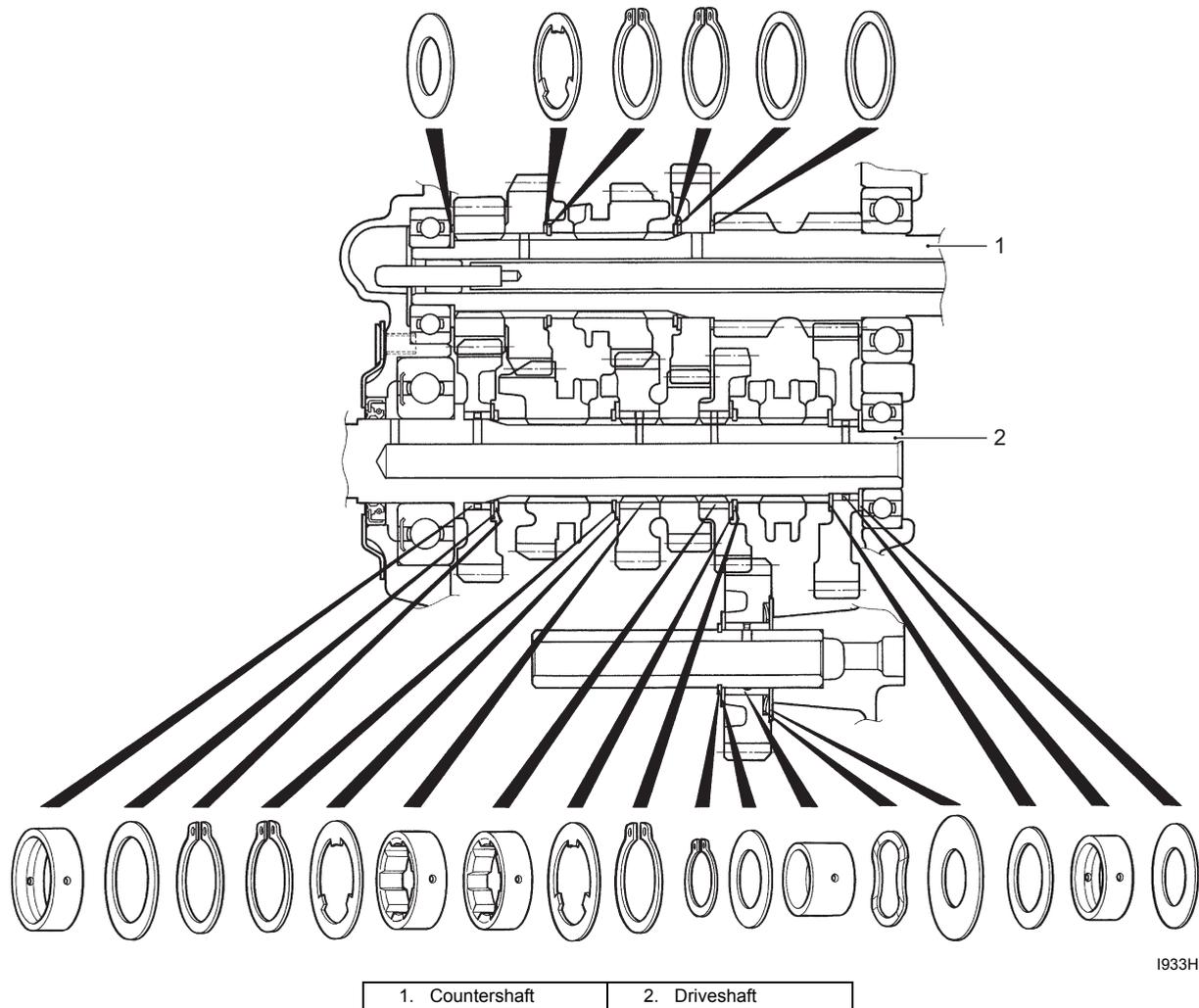


I933H1520024-01

- 5) Assemble the engine. Refer to "Engine Bottom Side Assembly in Section 1D (Page 1D-48)" and "Engine Top Side Assembly in Section 1D (Page 1D-20)".
- 6) Remount the engine assembly. Refer to "Engine Assembly Installation in Section 1D (Page 1D-16)".

Transmission Construction

B933H25206005



I933H1520025-03

Countershaft Gear / Driveshaft Gear / Reverse Idle Gear Disassembly and Assembly

B933H25206006

Refer to "Transmission Removal and Installation (Page 5B-5)".

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 transmission gears as shown in the transmission components and transmission construction. Refer to "Transmission Components (Page 5B-4)" and "Transmission Construction (Page 5B-7)".

Assembly

Assembly the transmission in the reverse order of disassembly. Pay attention to the following points:

NOTE

When reassembling the transmission gears, attention must be given to the locations and positions of washers and snap rings. The cross sectional view shows the correct position of the gears, bushings, washers and snap rings. Refer to "Transmission Construction (Page 5B-7)".

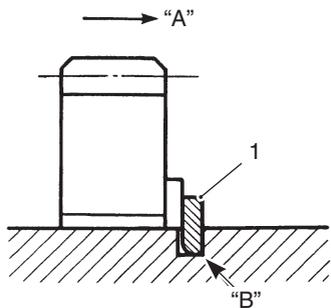
CAUTION

- Never reuse a snap ring. After a snap ring has been removed from the shaft, it should be discarded and a new snap ring must be installed.
- When installing a new snap ring, do not expand the end gap larger than required to slip the snap ring over the shaft.
- After installing a new snap ring, make sure that it is completely seated in the groove and securely fitted.

NOTE

Before installing the gears, apply engine oil to the inner surface of each gears and bushings.

- When installing a new snap ring (1), pay attention to its direction. Fit it to the side where the thrust is as shown in the figure.

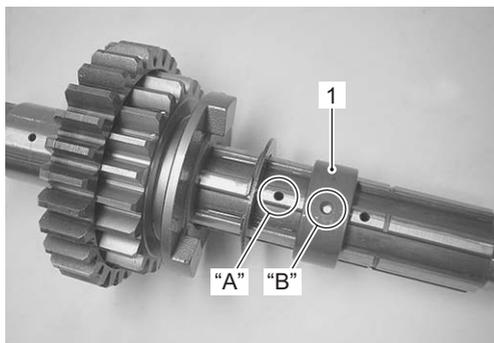


I649G1520049-02

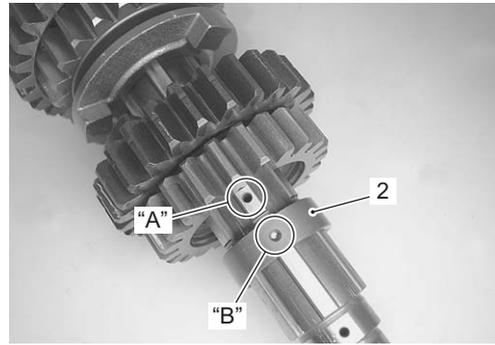
"A": Thrust	"B": Sharp edge
-------------	-----------------

Driveshaft

- When installing the 3rd gear bushing (1) and reverse driven gear bushing (2) onto the driveshaft, align the shaft oil hole "A" with the bushing oil hole "B".



I933H1520026-02

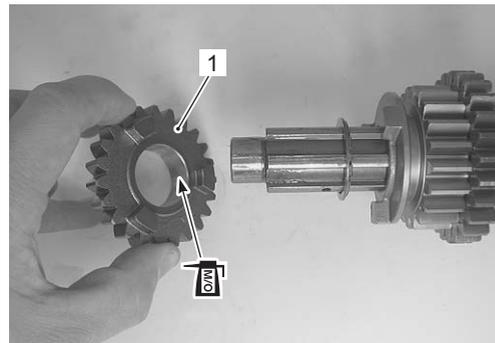


I933H1520027-02

Countershaft

- Apply molybdenum of solution to the surface of 4th drive gear (1).

M/O: Molybdenum oil (MOLYBDENUM OIL SOLUTION)



I933H1520028-01

Transmission Related Parts Inspection

B933H25206007

Refer to "Transmission Removal and Installation (Page 5B-5)" and "Countershaft Gear / Driveshaft Gear / Reverse Idle Gear Disassembly and Assembly (Page 5B-7)".

Gearshift fork to groove clearance

NOTE

The clearance for each gearshift fork plays an important role in the smoothness and positiveness of the shifting action.

Using the thickness gauge, check the gearshift fork clearance in the groove of its gear. If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

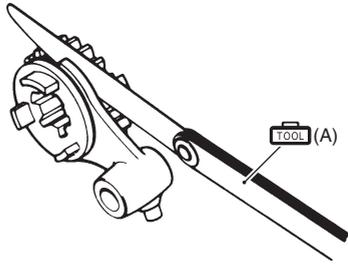
Special tool

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 (0.020 in)



I649G1520056-03

Gearshift fork groove width

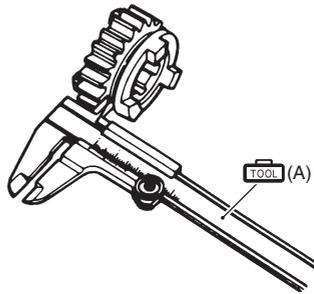
Measure the gearshift fork groove width using the vernier calipers.

Special tool

TOOL (A): 09900-20102 (Vernier calipers (1/20 mm, 200 mm))

Gearshift fork groove width

Standard: 5.0 – 5.1 mm (0.197 – 0.201 in)



I649G1520057-03

Gearshift fork thickness

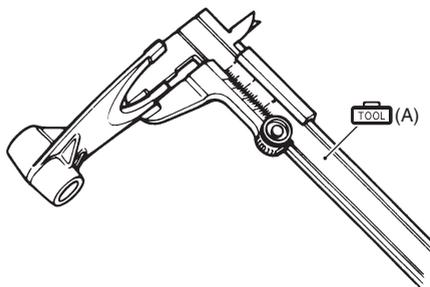
Measure the gearshift fork thickness using the vernier calipers.

Special tool

TOOL (A): 09900-20102 (Vernier calipers (1/20 mm, 200 mm))

Gearshift fork thickness

Standard: 4.8 – 4.9 mm (0.189 – 0.193 in)

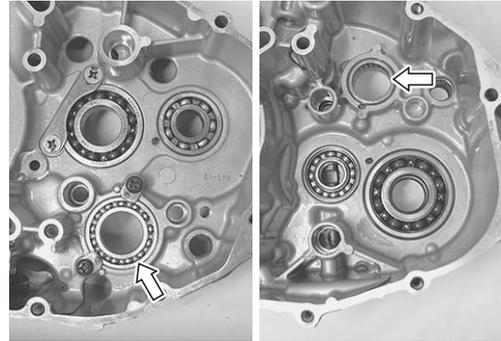


I649G1520058-03

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)".



I933H1520029-01

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.



I933H1520030-01

Reverse lock shaft

Inspect the reverse lock shaft for bend or wear. If any defects are found, replace the reverse lock shaft with a new one.



I933H1520031-01

5B-10 Manual Transmission:

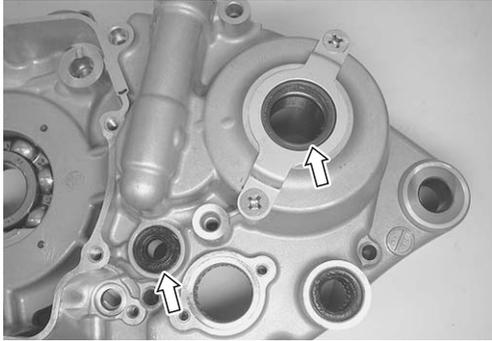
Transmission Oil Seal / Bearing Inspection

B933H25206008

Refer to "Transmission Removal and Installation (Page 5B-5)".

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)".

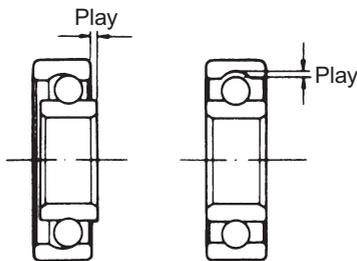


I933H1520032-01

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)".



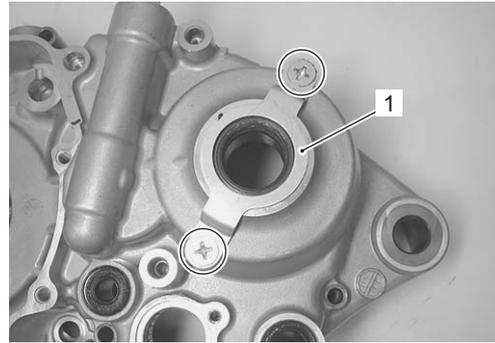
I933H1520033-01

Transmission Oil Seal / Bearing Removal and Installation

B933H25206009

Removal

- 1) Remove the transmission assembly. Refer to "Transmission Removal and Installation (Page 5B-5)".
- 2) Remove the oil seal retainer (1).

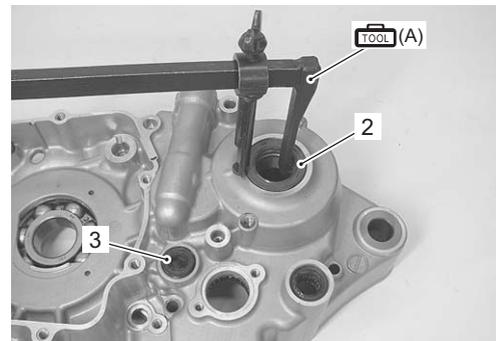


I933H1520034-01

- 3) Remove the driveshaft oil seal (2) with the special tool and reverse lock oil seal (3).

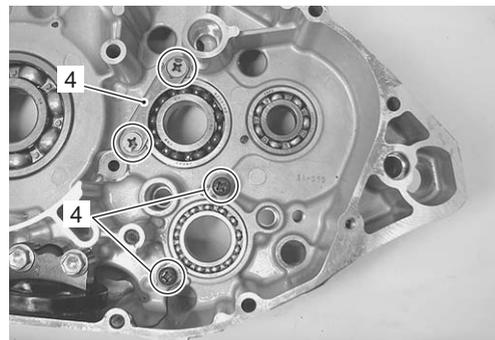
Special tool

 (A): 09913-50121 (Oil seal remover)



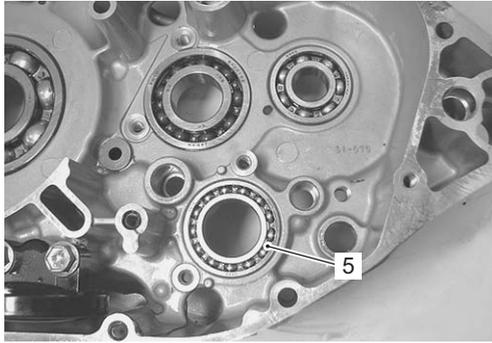
I933H1520035-01

- 4) Remove the bearing retainers (4).



I933H1520036-02

5) Remove the gearshift cam right bearing (5).

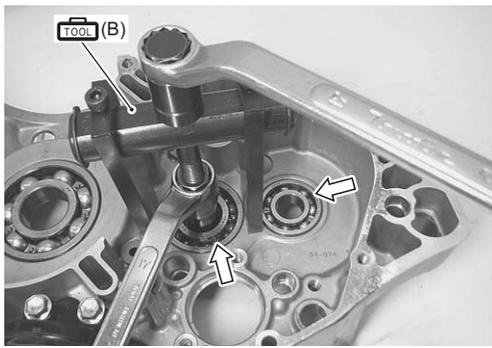


I933H1520037-02

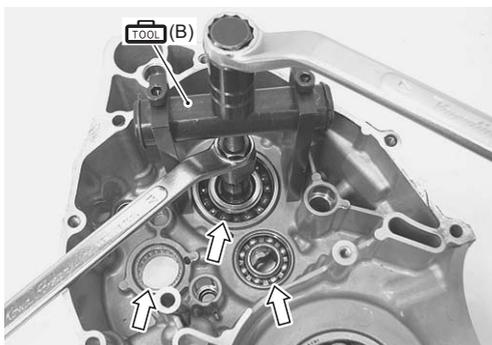
6) Remove the bearings using the special tool.

Special tool

TOOL (B): 09921-20240 (Bearing remover set)



I933H1520038-01



I933H1520039-01

Installation

⚠ CAUTION

The removed oil seals and bearings must be replaced with new ones.

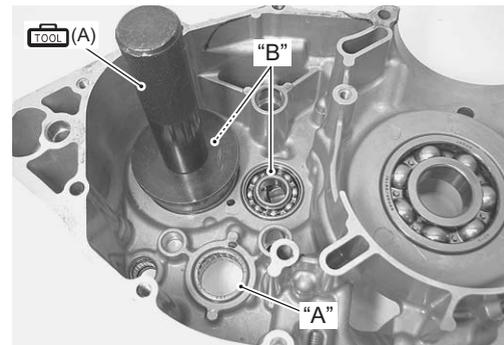
1) Install the bearings using the special tool.

Special tool

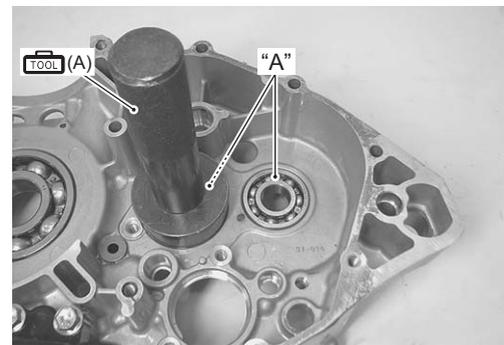
TOOL (A): 09913-70210 (Bearing installer set)

⚠ CAUTION

- The stamped mark side of bearing "A" faces inside.
- The sealed side of the bearing "B" faces outside.



I933H1520040-01



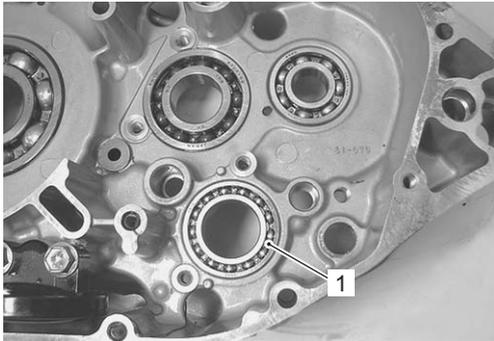
I933H1520041-01

5B-12 Manual Transmission:

2) Install the gearshift cam right bearing (1).

⚠ CAUTION

The stamped mark side of bearing face inside.

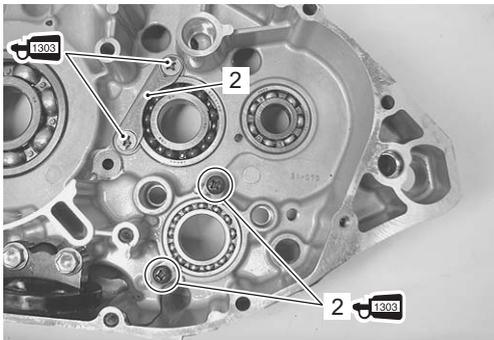


I933H1520042-01

3) Install the bearing retainers (2).

4) Apply a small quantity of thread lock to the bearing retainers screws, and tighten them securely.

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

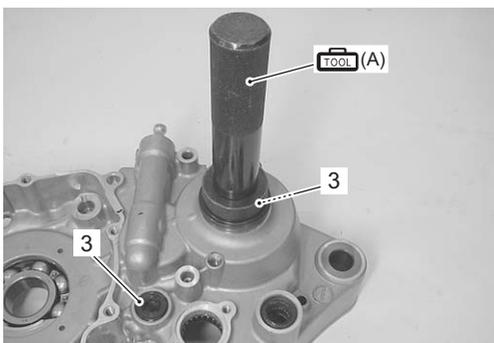


I933H1520043-01

5) Install the oil seals (3) using the special tool.

Special tool

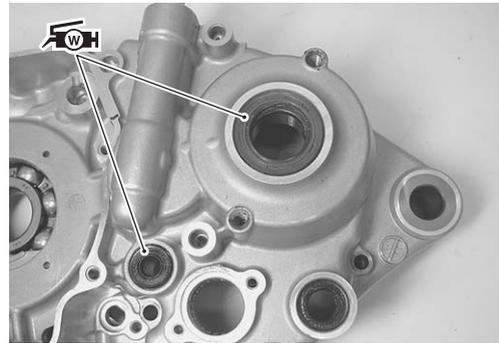
 (A): 09913-70210 (Bearing installer set)



I933H1520045-01

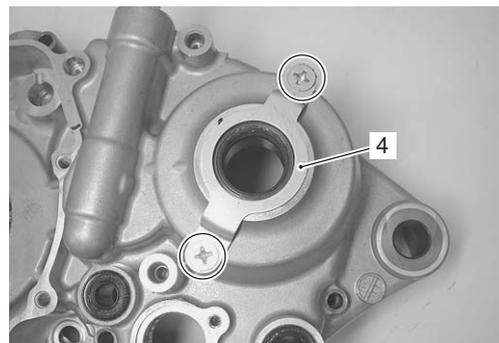
6) Apply grease to the oil seal lips.

 : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1520044-02

7) Install the oil seal retainer (4).



I933H1520046-01

8) Install the transmission assembly. Refer to "Transmission Removal and Installation (Page 5B-5)".

Gear Position (GP) Switch Inspection

B933H25206010

Refer to "Gear Position (GP) Switch Inspection in Section 1I (Page 1I-7)".

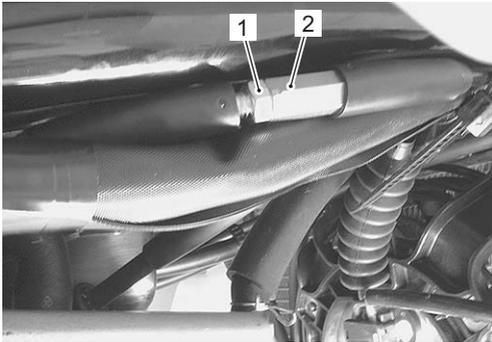
Gear Position (GP) Switch Removal and Installation

B933H25206011

Removal

- 1) Turn the ignition switch OFF.
- 2) Remove the engine sprocket cover and bracket. Refer to "Engine Sprocket Removal and Installation in Section 3A (Page 3A-4)".

- 3) Loosen the reverse lock release cable lock-nut (1) and adjuster (2).



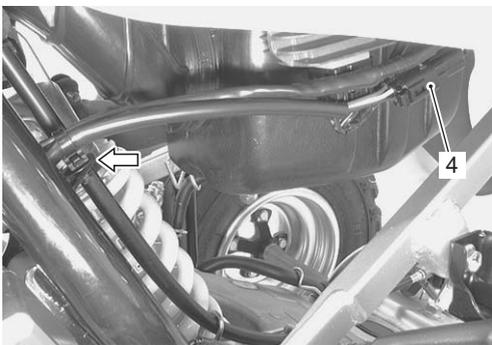
I933H1520047-01

- 4) Disconnect the reverse lock release cable (3) by removing the mounting bolt.



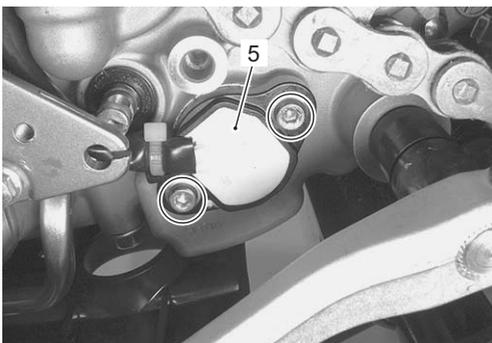
I933H1520048-01

- 5) Disconnect the gear position switch coupler (4) and clamp.



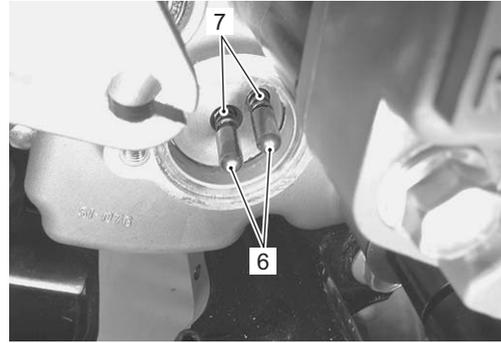
I933H1520049-01

- 6) Remove the gear position switch (5).



I933H1520050-01

- 7) Remove the switch contacts (6) and springs (7).



I933H1520051-01

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

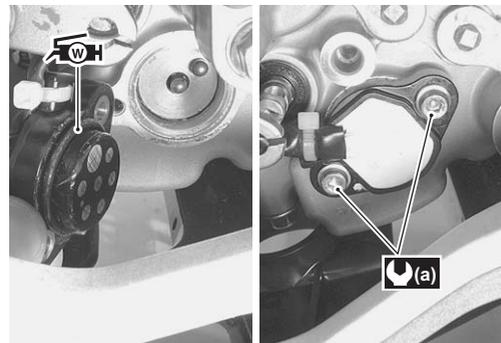
Replace the O-ring with a new one.

🔧 : Grease 99000-25160 (Water resistance grease or equivalent)

- Tighten the gear position switch mounting bolts to the specified torque.

Tightening torque

Gear position switch mounting bolt (a): 6.5 N·m (0.65 kgf-m, 4.7 lb-ft)

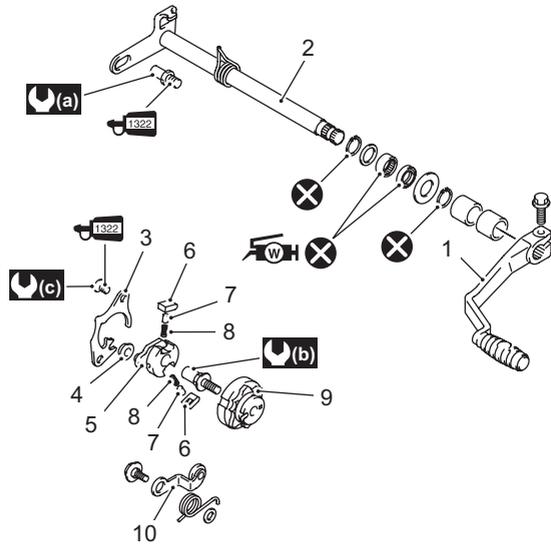


I933H1520052-04

- Route the gear position switch lead wire. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-3)".
- Adjust the reverse lock cable play. Refer to "Reverse Lock Cable Play Inspection and Adjustment (Page 5B-1)".

Gearshift Shaft / Gearshift Cam Plate Components

B933H25206012

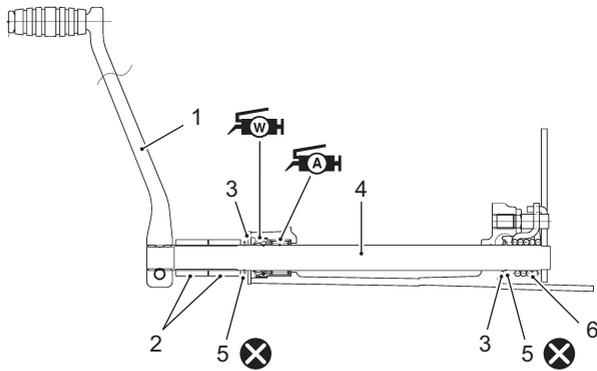


I933H1520053-03

1. Gearshift lever	9. Gearshift cam stopper plate
2. Gearshift shaft	10. Gearshift cam stopper
3. Gearshift pawl lifter	(a) : 19 N·m (1.9 kgf-m, 13.5 lb-ft)
4. Gearshift cam roller	(b) : 24 N·m (2.4 kgf-m, 17.5 lb-ft)
5. Gearshift cam driven gear	(c) : 9 N·m (0.9 kgf-m, 6.5 lb-ft)
6. Gearshift pawl	1322 : Apply thread lock to thread part.
7. Pin	WH : Apply water resistance grease.
8. Spring	X : Do not reuse.

Gearshift Construction

B933H25206013



I933H1520054-03

1. Gearshift lever	6. Gearshift return spring
2. Spacer	WH : Apply grease.
3. Washer	WH : Apply water resistance grease.
4. Gearshift shaft	X : Do not reuse.
5. Snap ring	

Gearshift Shaft / Gearshift Cam Plate Removal and Installation

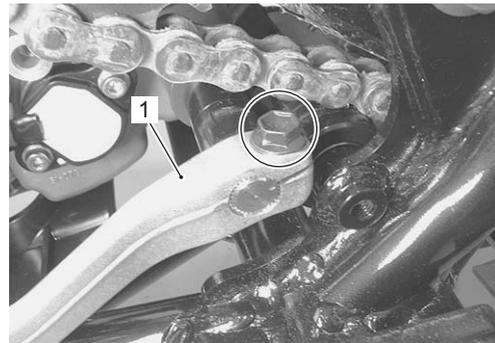
B933H25206014

Removal

- 1) Remove the engine sprocket cover. Refer to "Engine Sprocket Removal and Installation in Section 3A (Page 3A-4)".
- 2) Remove the gearshift lever (1).

NOTE

Mark the gearshift shaft head at which the gearshift lever set for correct reinstallation.

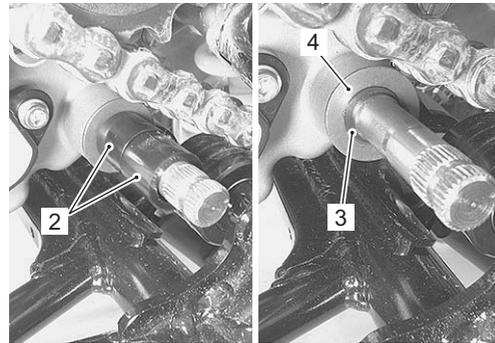


I933H1520055-01

- 3) Remove the spacers (2), snap ring (3) and washer (4) from the gearshift shaft.

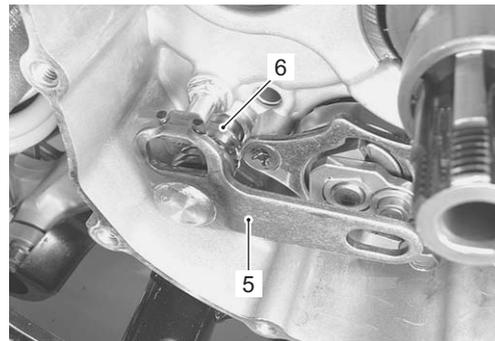
Special tool

TOOL : 09900-06107 (Snap ring pliers)



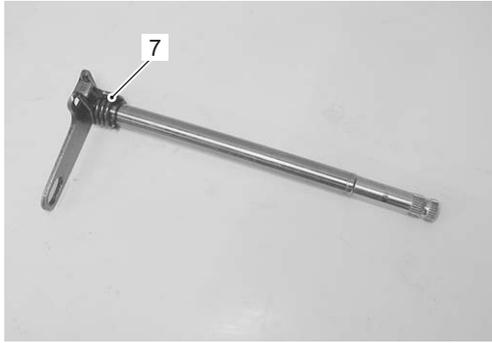
I933H1520056-01

- 4) Remove the gearshift shaft (5) and washer (6).



I933H1520057-01

5) Remove the gearshift return spring (7).

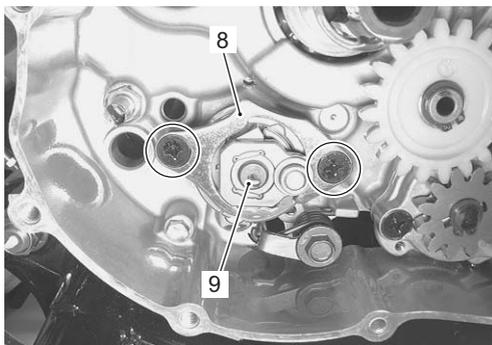


I933H1520058-01

6) Remove the gearshift pawl lifter (8) and gearshift cam driven gear (9).

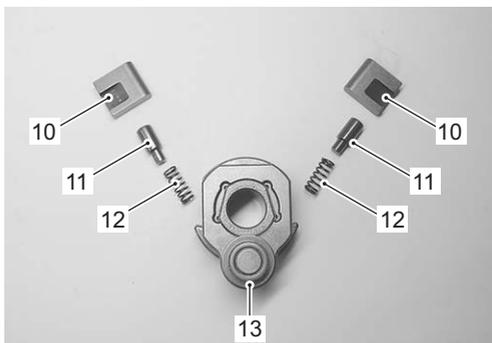
NOTE

Be careful not to drop the pins and springs when removing the gearshift cam driven gear.



I933H1520059-01

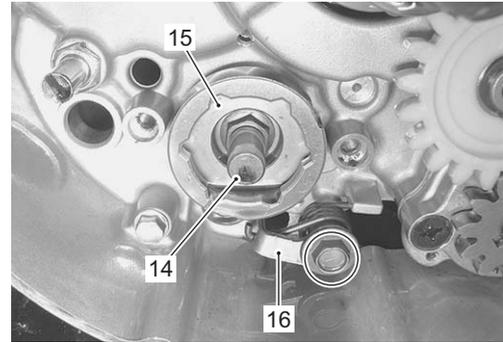
7) Remove the gearshift pawls (10), pins (11), springs (12) and roller (13).



I933H1520060-01

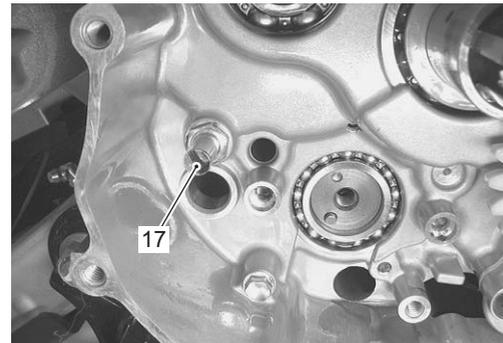
8) Remove the gearshift cam stopper plate bolt (14) and gearshift cam stopper plate (15).

9) Remove the gearshift cam stopper (16), washer and spring.



I933H1520061-01

10) Remove the gearshift arm stopper (17).



I933H1520062-01

Installation

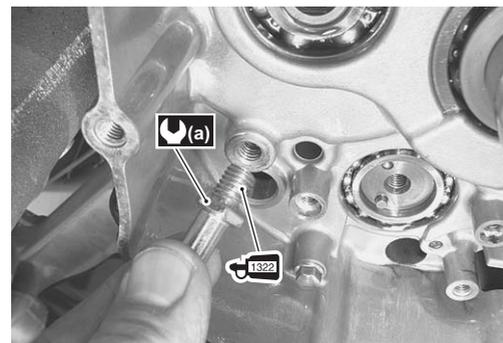
Install the gearshift shaft/gearshift cam plate in the reverse order of removal. Pay attention to the following points:

- Apply a small quantity of thread lock to the gearshift arm stopper and tighten it to the specified torque.

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

Tightening torque

Gearshift arm stopper (a): 19 N·m (1.9 kgf·m, 13.5 lb·ft)



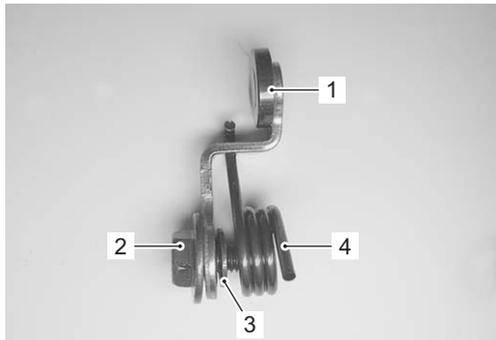
I933H1520063-03

5B-16 Manual Transmission:

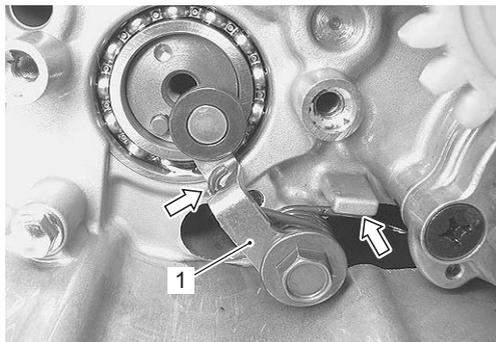
- Install the gearshift cam stopper (1), bolt (2), washer (3) and return spring (4).
- Tighten the gearshift cam stopper bolt (2).

NOTE

Hook the return spring end to the gearshift cam stopper (1) and crankcase.



I933H1520064-01

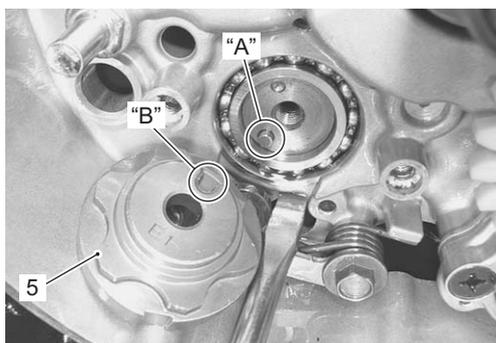


I933H1520065-01

- 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 pin "A" with the gearshift cam stopper plate groove "B".

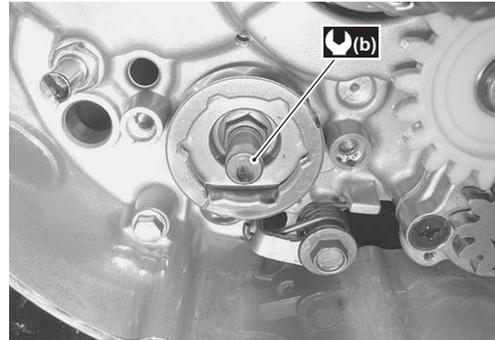


I933H1520066-01

- Tighten the gearshift cam stopper plate bolt to the specified torque.

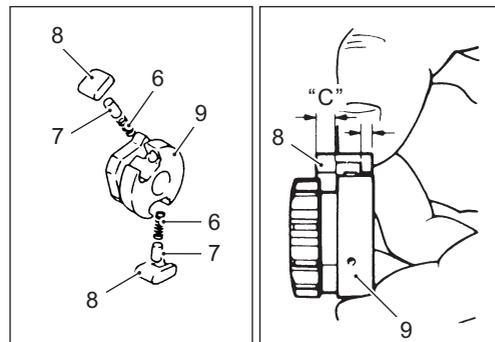
Tightening torque

Gearshift cam stopper plate bolt (b): 24 N·m (2.4 kgf-m, 17.5 lb-ft)

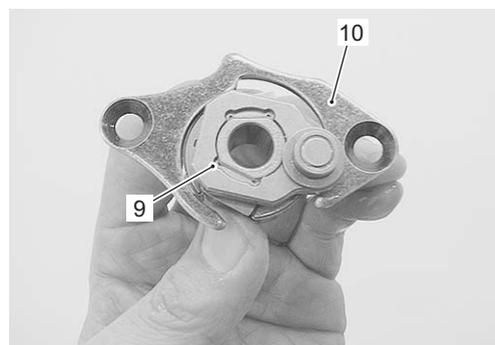


I933H1520067-01

- Install each springs (6), pins (7) and pawls (8) into the gearshift cam driven gear (9). The large shoulder "C" must face to the outside.
- With the pawls (8) held in pushed position, install the pawl lifter (10).



I933H1520068-02



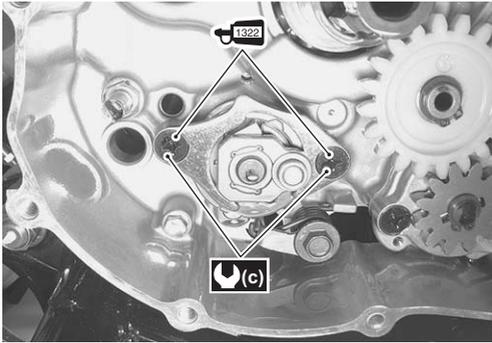
I933H1520069-01

- Apply a small quantity of thread lock to the gearshift pawl lifter screws, and then tighten the specified torque.

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

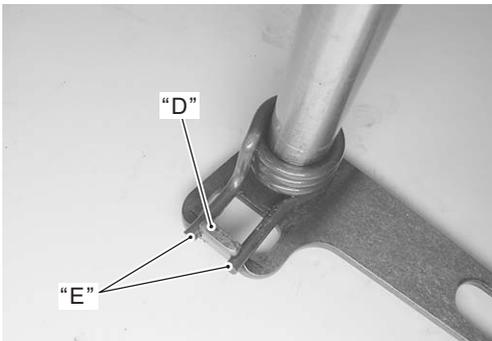
Tightening torque

Gearshift pawl lifter screw (c): 9 N·m (0.9 kgf-m, 6.5 lb-ft)



I933H1520070-02

- When installing the gearshift shaft return spring, position the stopper “D” of gearshift arm between the shaft return spring ends “E”.

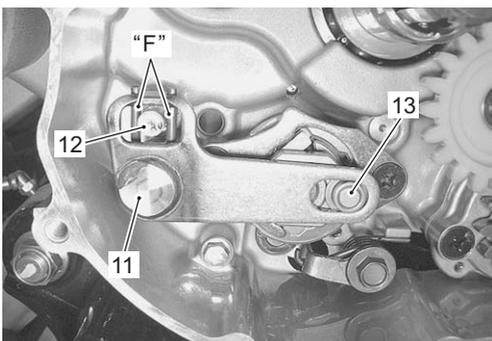


I933H1520071-01

- Install the gearshift shaft (11) with the washer.

NOTE

Set the gearshift shaft return spring ends “F” to the gearshift arm stopper (12) and gearshift cam roller (13) to the gearshift shaft (11).



I933H1520072-01

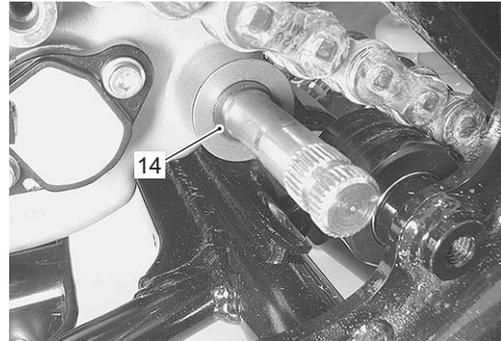
- Install a new snap ring (14).

CAUTION

The removed snap ring (14) must be replaced with a new one.

Special tool

 : 09900-06107 (Snap ring pliers)



I933H1520073-01

Gearshift Linkage Inspection

B933H25206015

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).

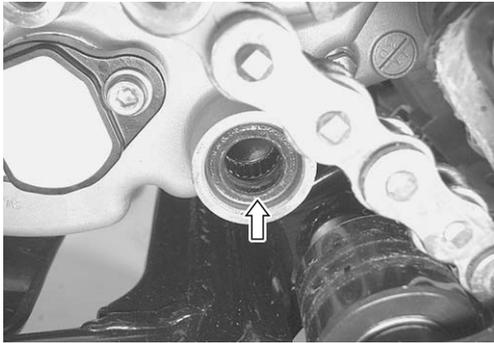


I933H1520074-01

5B-18 Manual Transmission:

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.



I933H1520075-01

Gearshift shaft bearing

Inspect the gearshift shaft bearings for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.



I933H1520076-01

Gearshift Shaft Oil Seal / Bearing Removal and Installation

B933H25206016

Removal

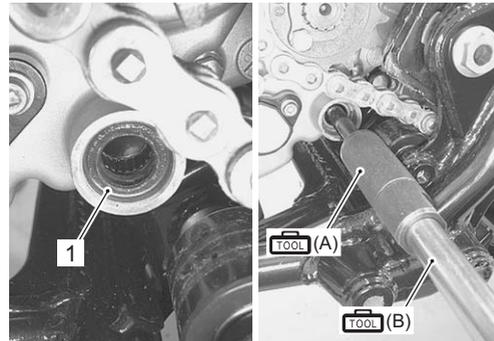
- 1) Remove the gearshift shaft. Refer to "Gearshift Shaft / Gearshift Cam Plate Removal and Installation (Page 5B-14)".
- 2) Remove the left mud guard and left mud guard reinforcement. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".

- 3) Remove the gearshift shaft oil seal (1).
- 4) Remove the bearing (2) with the special tools.

Special tool

 (A): 09921-20210 (Bearing remover)

 (B): 09930-30104 (Rotor remover slide shaft)



I933H1520077-01

Installation

Install the oil seal and bearings in the reverse order of removal. Pay attention to the following points:

CAUTION

The removed oil seal and bearing must be replaced with new ones.

- Install the bearing and oil seal with the special tool.

NOTE

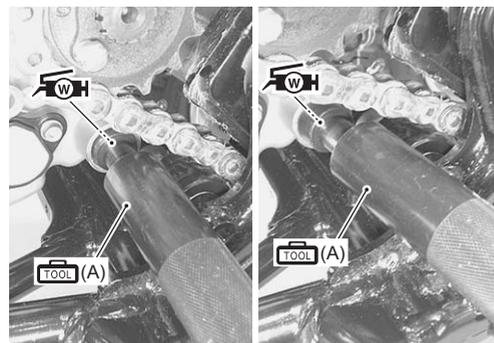
The stamped mark side of gearshift shaft bearing face outside.

Special tool

 (A): 09913-70210 (Bearing installer set)

- Apply grease to the oil seal lip.

 : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1520078-02

Specifications

Service Data

B933H25207001

Transmission + Drive chain

Unit: mm (in) Except ratio

Item		Standard	Limit
Primary reduction ratio		2.960 (74/25)	—
Final reduction ratio		2.857 (40/14)	—
Gear ratios	Low	2.538 (33/13)	—
	2nd	1.666 (30/18)	—
	3rd	1.238 (26/21)	—
	4th	1.000 (23/23)	—
	Top	0.846 (22/26)	—
	Reverse	2.153 (28/13)	—
Gearshift fork to groove clearance		0.1 – 0.3 (0.004 – 0.012)	0.5 (0.020)
Gearshift fork groove width		5.0 – 5.1 (0.197 – 0.201)	—
Gearshift fork thickness		4.8 – 4.9 (0.189 – 0.193)	—

Tightening Torque Specifications

B933H25207002

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Gear position switch mounting bolt	6.5	0.65	4.7	☞ (Page 5B-13)
Gearshift arm stopper	19	1.9	13.5	☞ (Page 5B-15)
Gearshift cam stopper plate bolt	24	2.4	17.5	☞ (Page 5B-16)
Gearshift pawl lifter screw	9	0.9	6.5	☞ (Page 5B-17)

NOTE

The specified tightening torque is also described in the following.

“Transmission Components (Page 5B-4)”

“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 Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H25208001

Material	SUZUKI recommended product or Specification		Note
Grease	Water resistance grease or equivalent	P/No.: 99000-25160	☞ (Page 5B-3) / ☞ (Page 5B-3) / ☞ (Page 5B-12) / ☞ (Page 5B-13) / ☞ (Page 5B-18)
Molybdenum oil	MOLYBDENUM OIL SOLUTION	—	☞ (Page 5B-8)
Thread lock cement	THREAD LOCK CEMENT SUPER 1303 or equivalent	P/No.: 99000-32030	☞ (Page 5B-12)
	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞ (Page 5B-15) / ☞ (Page 5B-17)

NOTE

Required service material is also described in the following.

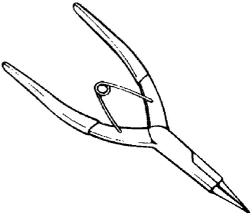
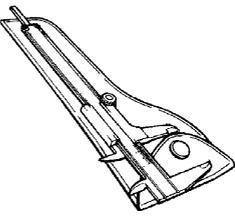
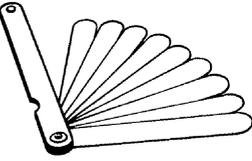
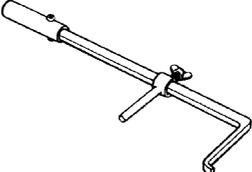
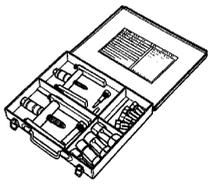
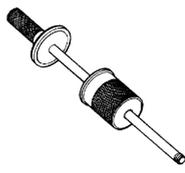
“Transmission Components (Page 5B-4)”

“Gearshift Shaft / Gearshift Cam Plate Components (Page 5B-14)”

“Gearshift Construction (Page 5B-14)”

Special Tool

B933H25208002

09900-06107 Snap ring pliers ☞ (Page 5B-14) / ☞ (Page 5B-17)		09900-20102 Vernier calipers (1/20 mm, 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 ☞ (Page 5B-11) / ☞ (Page 5B-12) / ☞ (Page 5B-18)		09921-20210 Bearing remover ☞ (Page 5B-18)	
09921-20240 Bearing remover set ☞ (Page 5B-11)		09930-30104 Rotor remover slide shaft ☞ (Page 5B-18)	

Clutch

Precautions

Precautions for Clutch System

B933H2530001

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

Diagnostic Information and Procedures

Clutch System Symptom Diagnosis

B933H25304001

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 plates.
	Distorted clutch plates.	Replace.
	Worn clutch release bearing.	Replace.
	Weakened clutch damper.	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 plate.	Replace.
	Distorted clutch plate.	Replace.

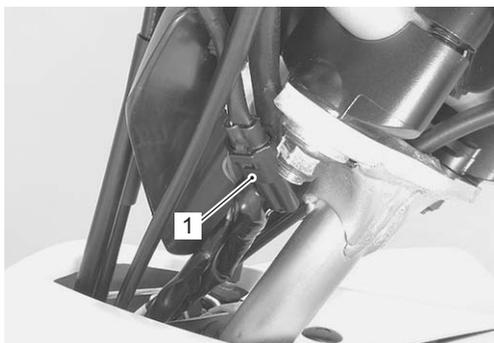
Repair Instructions

Clutch Lever Position Switch Inspection

B933H25306001

Inspect the clutch lever position switch in the following procedures:

- 1) Disconnect the clutch lever switch coupler (1).



I933H1530001-01

- 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

 : 09900-25008 (Multi-circuit tester set)

Tester knob indication

Continuity (•))

Color	B	B/Y
Position		
OFF		
ON	○	○

I933H1530002-05

- 3) Connect the clutch lever position switch lead wires.

5C-2 Clutch:

Clutch Cable Inspection and Adjustment

B933H25306002

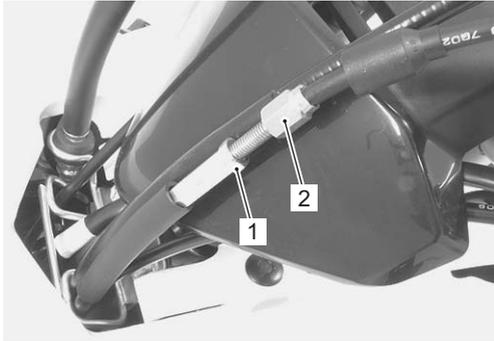
Refer to "Clutch Inspection and Adjustment in Section 0B (Page 0B-13)".

Clutch Cable Removal and Installation

B933H25306003

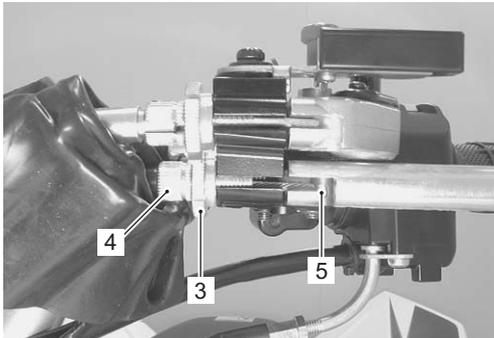
Removal

- 1) Loosen the cable adjuster lock-nut (1) and adjuster (2).



I933H1530003-01

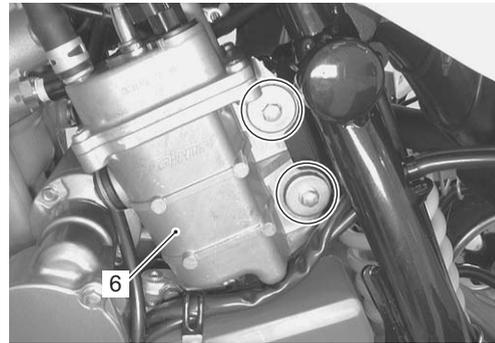
- 2) Loosen the cable lock-nut (3) and remove the adjuster (4).
- 3) Disconnect the clutch cable (5).



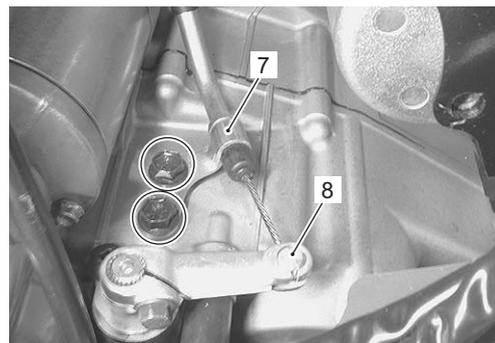
I933H1530004-01

- 4) Move the fuel pump (6).

- 5) Remove the clutch cable bracket (7) and disconnect the clutch cable (8).



I933H1530005-01



I933H1530006-01

- 6) Remove the fuel tank. Refer to "Fuel Tank Removal and Installation in Section 1G (Page 1G-9)".
- 7) Remove the clutch cable as shown in the cable routing diagram. Refer to "Hose and Cable Routing Diagram in Section 4A (Page 4A-3)".

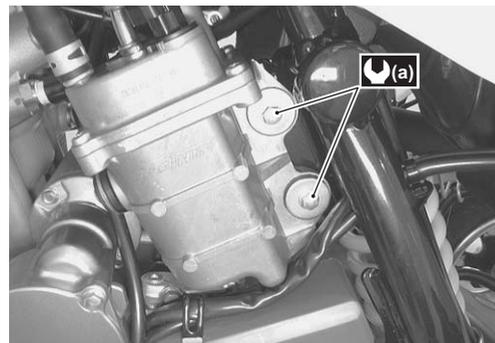
Installation

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

- Tighten the fuel pump mounting bolts to the specified torque.

Tightening torque

Fuel pump mounting bolts (a): 10 N·m (1.0 kgf-m, 7.0 lb-ft)

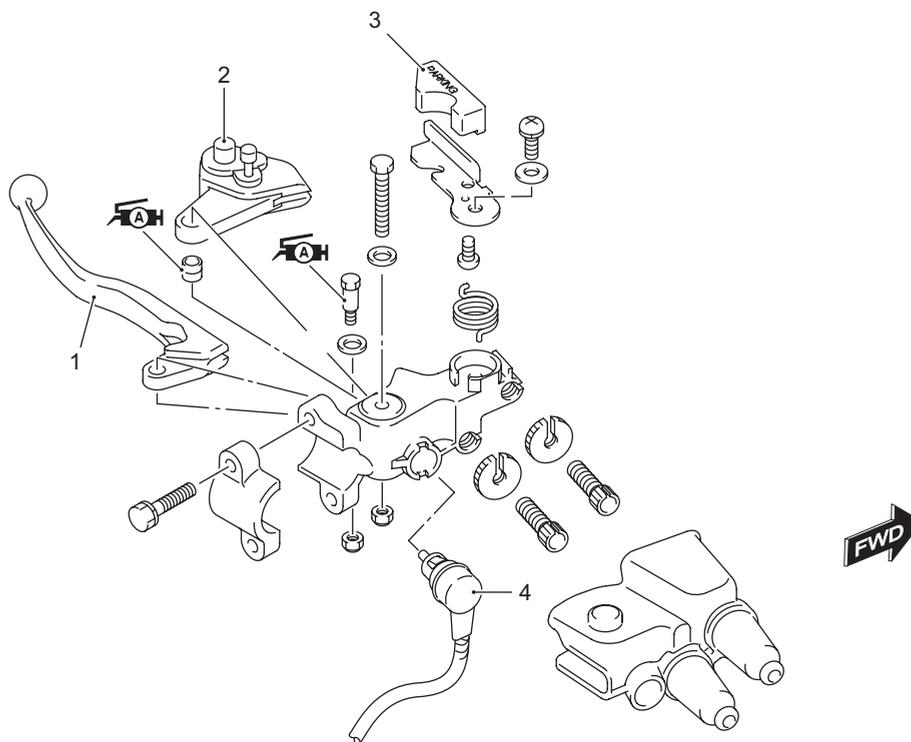


I933H1530007-01

- After install the removed parts, adjust the clutch cable play. Refer to "Clutch Inspection and Adjustment in Section 0B (Page 0B-13)".

Clutch Lever Components

B933H25306004



I933H1530008-03

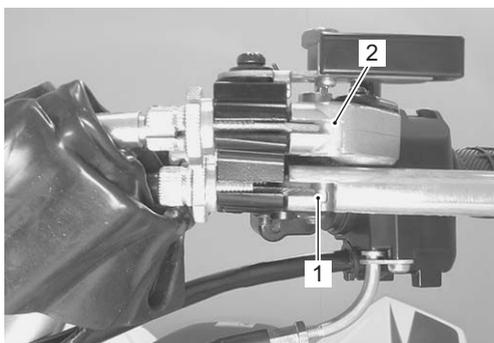
1. Clutch lever	3. Parking knob	AH : Apply grease.
2. Parking lock	4. Clutch lever position switch	

Clutch Lever Removal and Installation

B933H25306005

Removal

1) Disconnect the clutch cable (1) and parking brake cable (2). Refer to "Clutch Cable Removal and Installation (Page 5C-2)" and "Parking Brake Cable Removal and Installation in Section 4D (Page 4D-1)".



I933H1530009-01

2) Disconnect the clutch lever position switch coupler (3).



I933H1530010-01

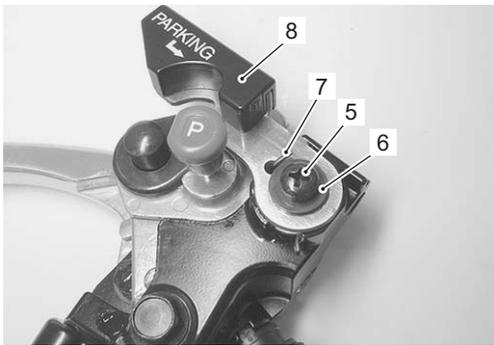
3) Remove the clutch lever holder (4).



I933H1530011-01

5C-4 Clutch:

- 4) Remove the screw (5), washer (6), parking knob (7) and spring (8).



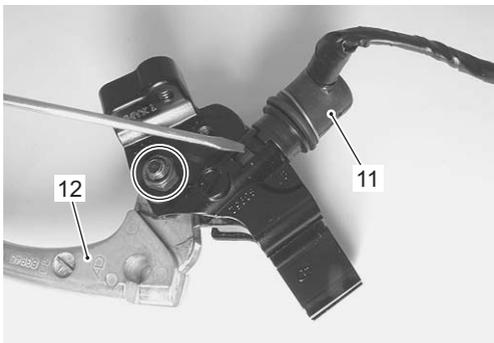
I933H1530012-02

- 5) Remove the parking lock set (9) and spacer (10).



I933H1530013-02

- 6) Disconnect clutch lever position switch (11).
- 7) Remove the clutch lever (12).

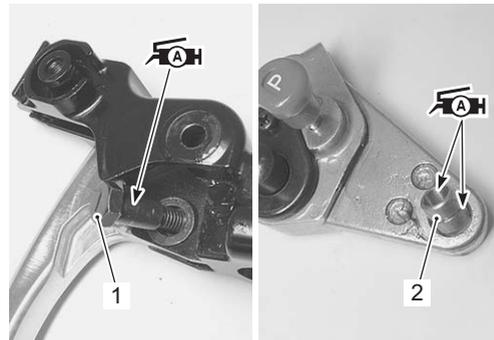


I933H1530014-02

Installation

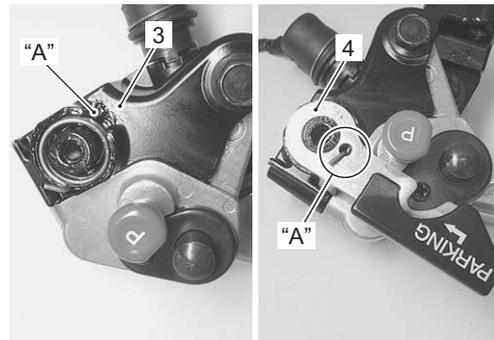
Install the clutch lever in the reverse order of removal. Pay attention to the following points:

- Apply grease to the clutch lever pivot bolt (1) and parking lock spacer (2).



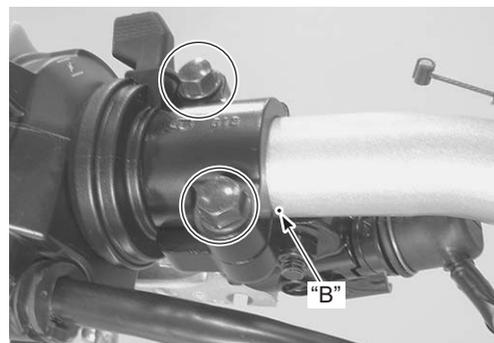
I933H1530015-01

- When installing the spring, hook the spring end "A" with the holder (3) and parking knob (4).



I933H1530016-01

- Align the punch mark "B" on the handlebars with the mating surface of clutch lever holder. Refer to "Handlebar Construction in Section 6B (Page 6B-2)".
- Tighten the clutch lever holder clamp bolt.



I933H1530017-01

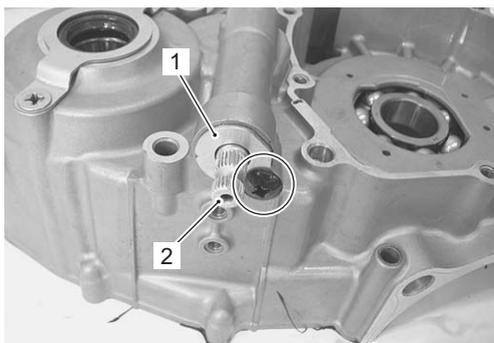
- After install the removed parts, adjust the clutch cable play and parking brake cable play. Refer to "Clutch Cable Inspection and Adjustment (Page 5C-2)" and "Brake System Inspection in Section 0B (Page 0B-17)".

Clutch Release Camshaft Removal and Installation

B933H25306006

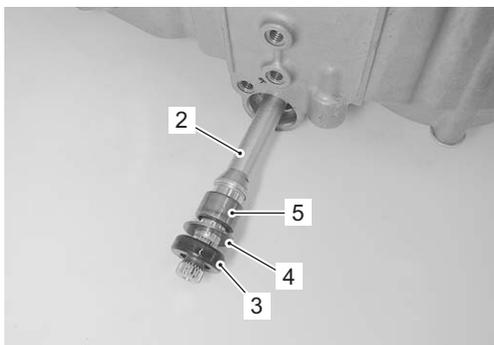
Removal

- 1) Remove the engine assembly from the frame. Refer to "Engine Assembly Removal in Section 1D (Page 1D-13)".
- 2) Disassemble the engine top side. Refer to "Engine Top Side Disassembly in Section 1D (Page 1D-17)".
- 3) Separate the left and right crankcase. Refer to "Engine Bottom Side Disassembly in Section 1D (Page 1D-41)".
- 4) Remove the oil seal retainer (1) and clutch release camshaft (2).



I933H1530018-01

- 5) Remove the following parts from the clutch release camshaft (2).
 - Oil seal (3)
 - Washer (4)
 - Bearing (5)



I933H1530019-02

Installation

Install the clutch release camshaft in the reverse order of removal. Pay attention to the following points:

⚠ CAUTION

The removed bearing and oil seal must be replaced with new ones.

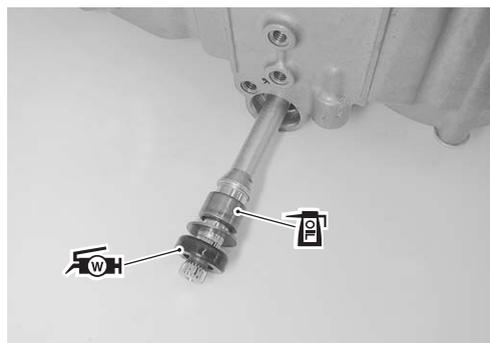
- Apply engine oil to the bearing.

NOTE

The stamped mark side of the bearing face upside.

- Apply grease to the oil seal lip.

 : Grease 99000-25160 (Water resistance grease or equivalent)



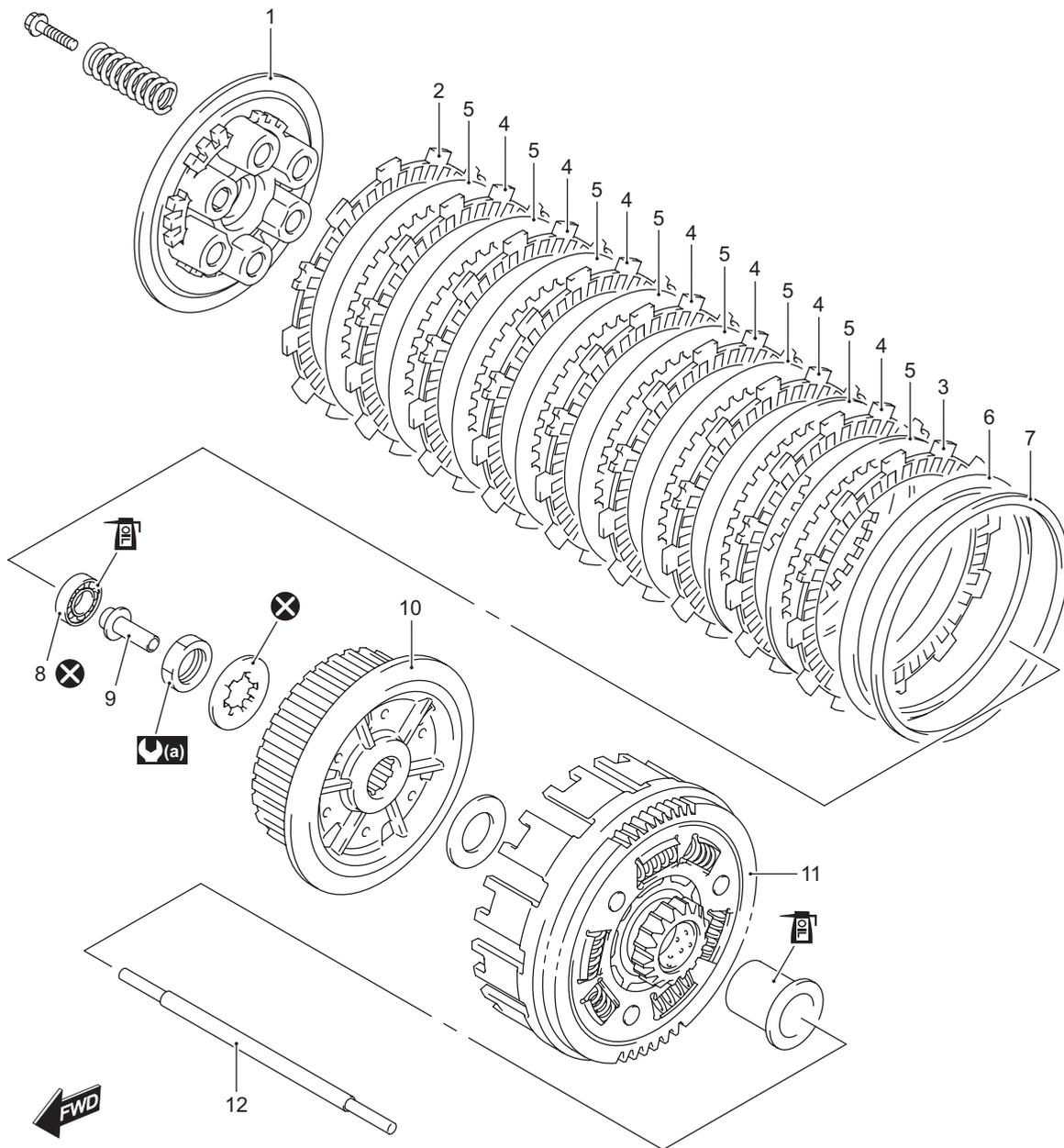
I933H1530020-02

- Assemble the engine. Refer to "Engine Bottom Side Assembly in Section 1D (Page 1D-48)". and "Engine Top Side Assembly in Section 1D (Page 1D-20)".
- Remount the engine assembly. Refer to "Engine Assembly Installation in Section 1D (Page 1D-16)".

5C-6 Clutch:

Clutch Components

B933H25306007



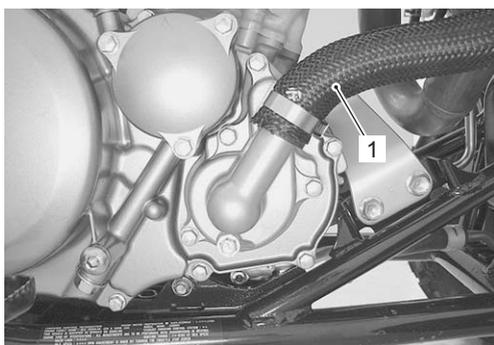
I933H1530021-02

1. Clutch pressure plate	6. Spring washer	11. Primary driven gear assembly
2. No. 3 drive plate	7. Spring washer seat	12. Push rod
3. No. 2 drive plate	8. Release bearing	(a) : 70 N·m (7.0 kgf·m, 50.5 lb-ft)
4. No. 1 drive plate (7 pcs.)	9. Clutch push piece	: Apply engine oil.
5. Driven plate (8 pcs.)	10. Clutch sleeve hub	: Do not reuse.

Clutch Removal

B933H25306008

- 1) Drain engine oil and coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)" and "Cooling System Inspection in Section 0B (Page 0B-13)".
- 2) Remove the rear brake pedal. Refer to "Rear Brake Pedal Removal and Installation in Section 4A (Page 4A-15)".
- 3) Disconnect the radiator outlet hose (1).



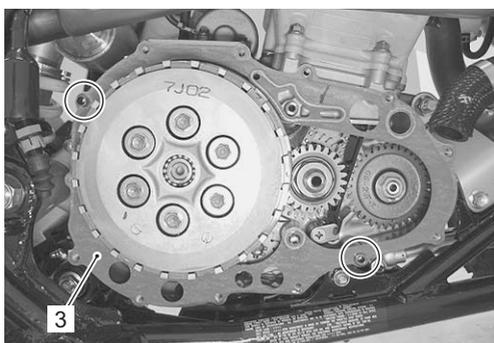
I933H1530022-01

- 4) Remove the clutch cover (2).



I933H1530023-01

- 5) Remove the gasket (3) and dowel pins.

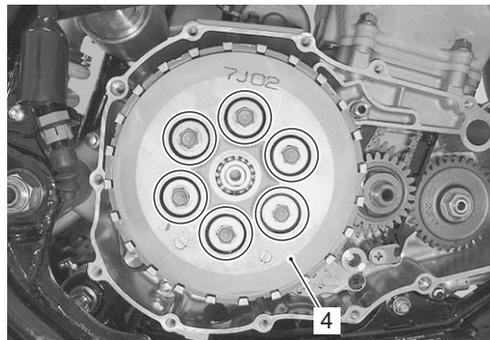


I933H1530024-01

- 6) Remove the clutch springs and clutch pressure plate (4).

NOTE

Loosen the clutch spring set bolts little by little and diagonally.



I933H1530025-01

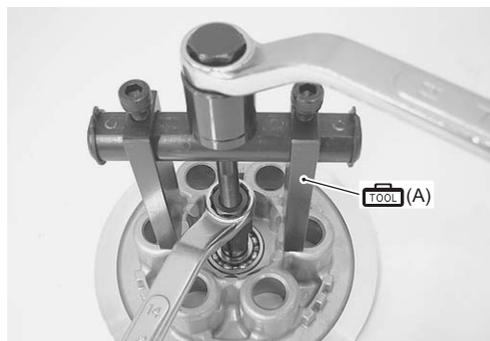
- 7) Remove the clutch release bearing with the special tool.

NOTE

If there is no abnormal condition, the clutch release bearing removal is not necessary.

Special tool

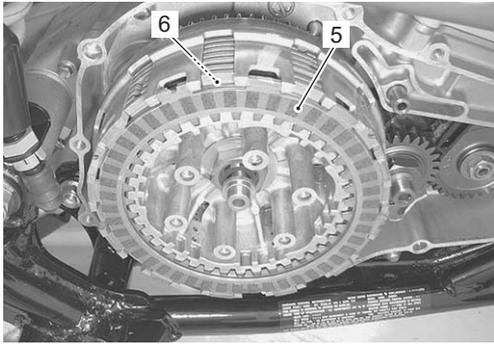
 (A): 09921-20240 (Bearing remover set)



I933H1530026-01

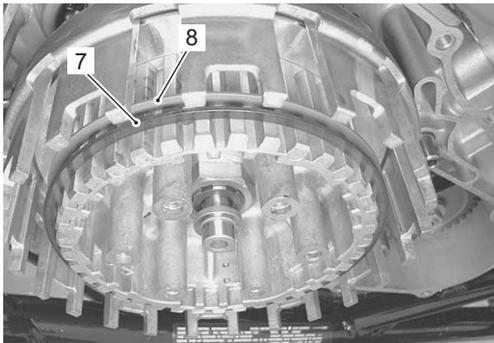
5C-8 Clutch:

8) Remove the clutch drive plates (5) and driven plates (6).



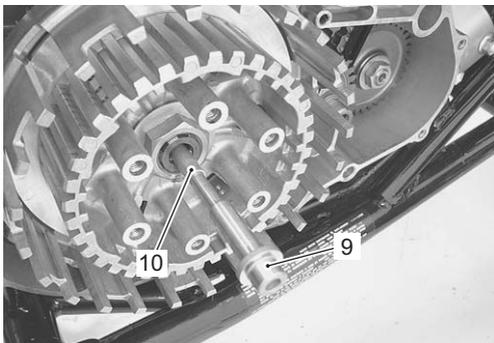
I933H1530027-01

9) Remove the spring washer (7) and its seat (8).



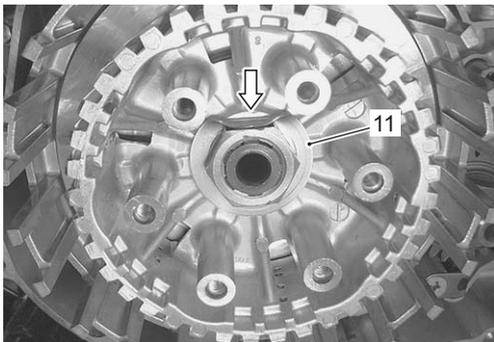
I933H1530028-01

10) Remove the clutch push piece (9) and push rod (10).



I933H1530029-01

11) Flatten the clutch sleeve hub washer (11).



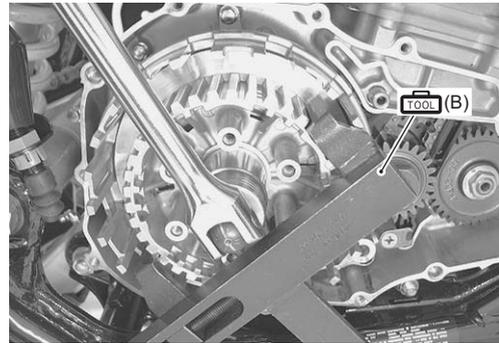
I933H1530030-01

12) Hold the clutch sleeve hub with the special tool.

Special tool

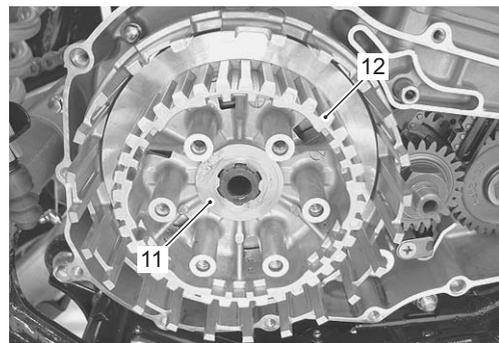
TOOL (B): 09920-53740 (Clutch sleeve hub holder)

13) Remove the clutch sleeve hub nut.



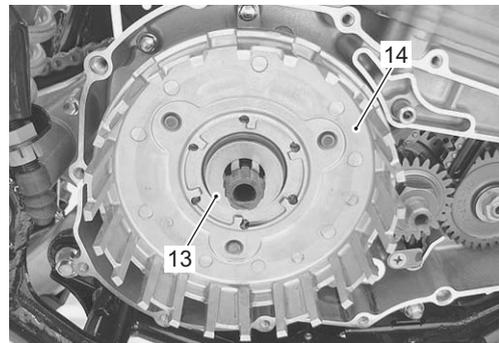
I933H1530031-01

14) Remove the washer (11) and clutch sleeve hub (12).



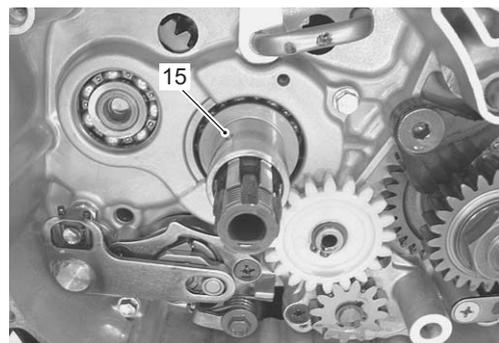
I933H1530032-01

15) Remove the thrust washer (13) and primary driven gear assembly (14).



I933H1530033-01

16) Remove the spacer (15).

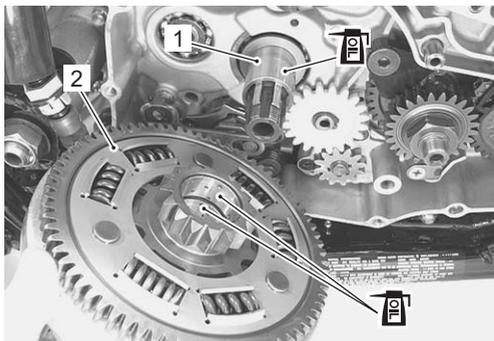


I933H1530034-01

Clutch Installation

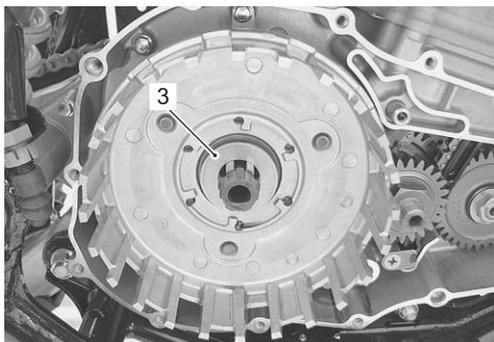
B933H25306009

- 1) Install the spacer (1).
- 2) Apply engine oil to the spacer (1) and bushing of the primary driven gear assembly (2).
- 3) Install the primary driven gear assembly (2).



I933H1530035-02

- 4) Install the thrust washer (3).

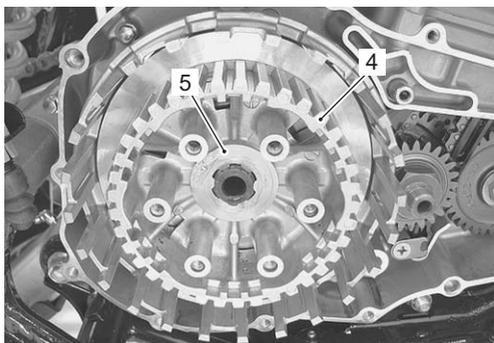


I933H1530036-01

- 5) Install the clutch sleeve hub (4) and new washer (5).

NOTE

The removed washer (5) must be replaced with a new one.



I933H1530037-01

- 6) Install the clutch sleeve hub nut (6).

NOTE

The concave side of clutch sleeve hub nut (6) faces inside.

- 7) Hold the clutch sleeve hub with the special tool.

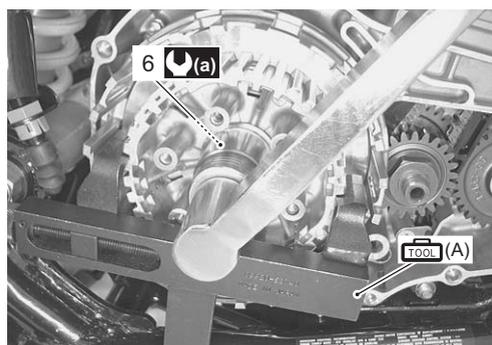
Special tool

TOOL (A): 09920-53740 (Clutch sleeve hub holder)

- 8) Tighten the clutch sleeve hub nut (6) to the specified torque.

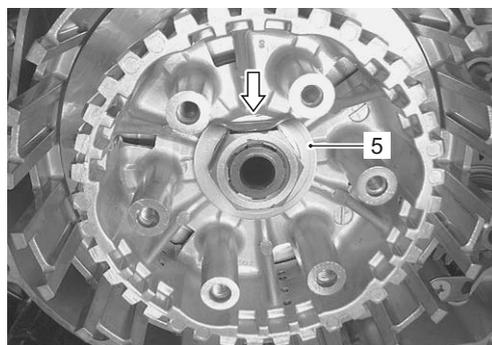
Tightening torque

Clutch sleeve hub nut (a): 70 N·m (7.0 kgf·m, 50.5 lb-ft)



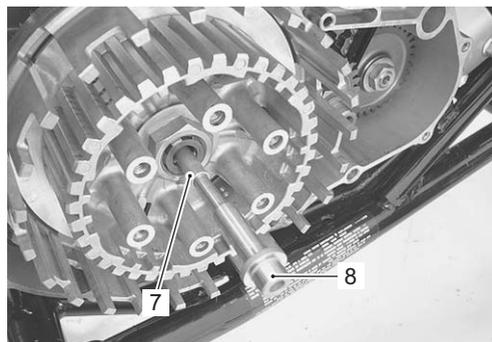
I933H1530053-01

- 9) Bend the tongue of the washer (5) securely.



I933H1530038-01

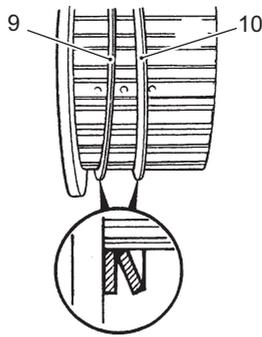
- 10) Install the clutch push rod (7) and clutch push piece (8) into the countershaft.



I933H1530039-01

5C-10 Clutch:

- 11) Install the spring washer seat (9) and spring washer (10) onto the clutch sleeve hub correctly.

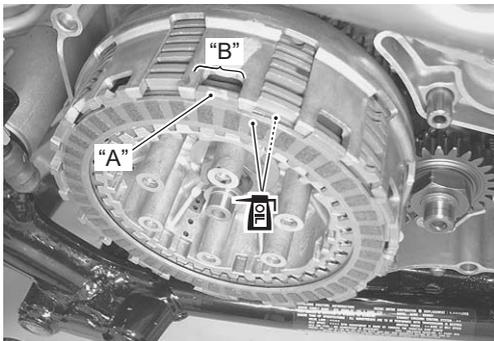


I933H1530040-01

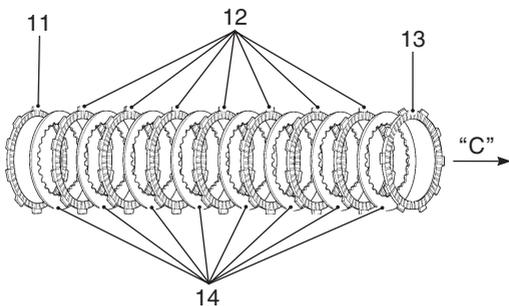
- 12) Apply engine oil to the clutch drive plates and driven plates.
 13) Insert the clutch drive plates and driven plates one by one into the clutch sleeve hub in the prescribed order.

NOTE

Insert the outermost No. 3 drive plate claws "A" to the other slits "B" of clutch housing as shown in the figure.



I933H1530041-01

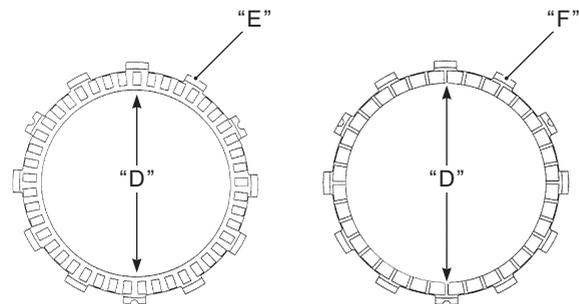


I933H1530042-02

11.	No. 2 drive plate
12.	No. 1 drive plate (7 pcs.)
13.	No. 3 drive plate
14.	Driven plate (8 pcs.)
"C":	Direction of outside

NOTE

Three kinds of the drive plate (No. 1, No. 2 and No. 3) are equipped in the clutch system, they can be distinguished by the inside diameter "D".



I933H1530043-02

Drive plate	I.D. "D"
No. 1 and No. 3 "E"	116 mm (4.5 in)
No. 2 "F"	122.5 mm (4.82 in)

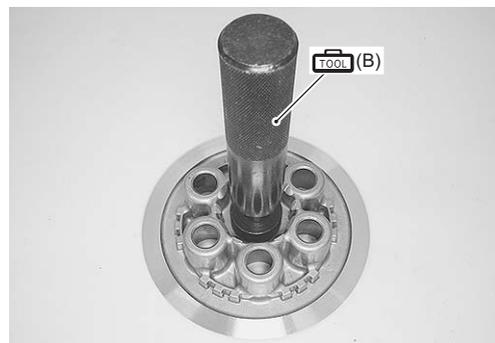
- 14) Install the clutch release bearing with the special tool.

NOTE

The stamped mark on the clutch release bearing faces clutch push piece side.

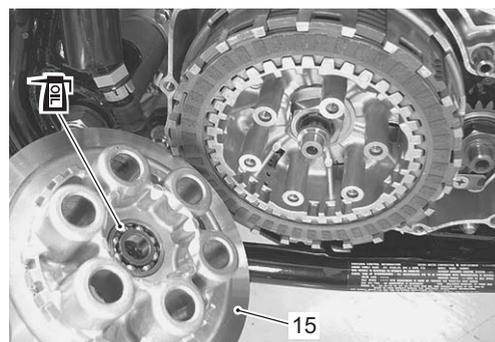
Special tool

TOOL (B): 09913-70210 (Bearing installer set)



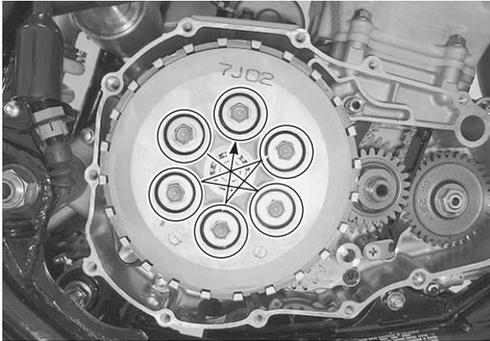
I933H1530044-01

- 15) Apply engine oil to the release bearing.
 16) Install the clutch pressure plate (15).



I933H1530045-01

- 17) Install the clutch springs.
 18) Tighten the clutch spring set bolts securely in diagonal stages.



I933H1530046-01

- 19) Install the gasket (17) and the dowel pins.

⚠ CAUTION

Use the new gasket to prevent oil leakage.

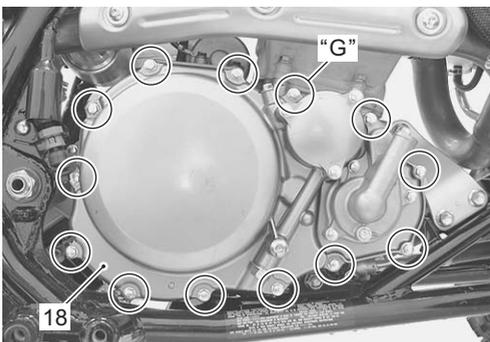


I933H1530047-01

- 20) Install the clutch cover (18) and tighten its bolts.

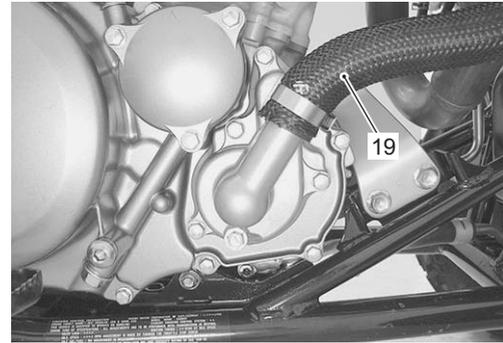
NOTE

Fit the gasket to the bolt "G".



I933H1530048-02

- 21) Connect the radiator outlet hose (19) securely. Refer to "Water Hose Routing Diagram in Section 1F (Page 1F-3)".



I933H1530049-01

- 22) Install the rear brake pedal. Refer to "Rear Brake Pedal Removal and Installation in Section 4A (Page 4A-15)".
 23) Pour engine oil and coolant. Refer to "Engine Oil and Filter Replacement in Section 0B (Page 0B-11)" and "Cooling System Inspection in Section 0B (Page 0B-13)".

Clutch Parts Inspection

B933H25306010

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.

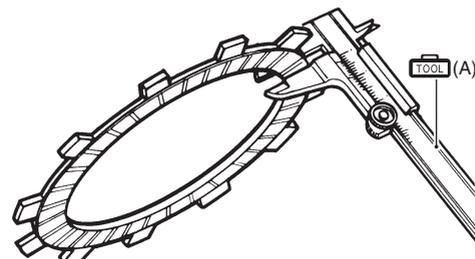
Measure the thickness of drive plates with a vernier calipers. If the drive plate thickness is found to have reached the limit, replace it with a new one.

Special tool

TOOL (A): 09900-20102 (Vernier calipers (1/20 mm, 200 mm))

Clutch drive plate thickness

Service limit (No. 1, No. 2 and No. 3 drive plate): 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.

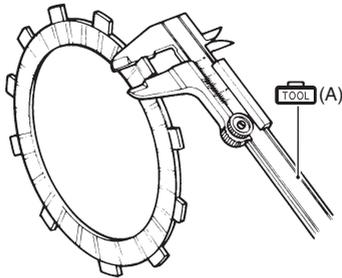
5C-12 Clutch:

Special tool

TOOL (A): 09900-20102 (Vernier calipers (1/20 mm, 200 mm))

Clutch drive plate claw width

Service limit (No. 1, No. 2 and No. 3 drive plate): 13.2 mm (0.520 in)



I649G1530057-03

Measure each driven plate for distortion with a thickness gauge and surface plate.

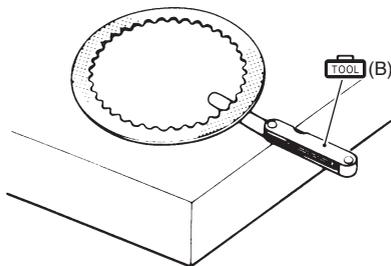
Replace driven plates which exceed the limit.

Special tool

TOOL (B): 09900-20803 (Thickness gauge)

Clutch driven plate distortion

Service limit: 0.10 mm (0.004 in)



I649G1530058-03

Clutch spring

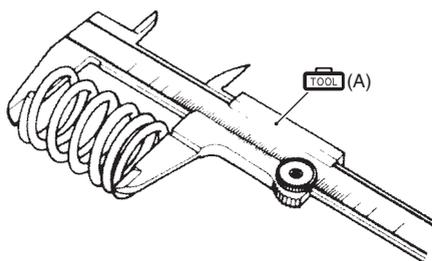
Measure the free length of each coil spring with a vernier calipers, and compare the length with the specified limit. Replace all the springs if any spring is not within the limit.

Special tool

TOOL (A): 09900-20102 (Vernier calipers (1/20 mm, 200 mm))

Clutch spring free length

Service limit: 49.9 mm (1.96 in)



I718H1530062-01

Clutch release bearing

Inspect the clutch release bearing for play, wear and damage. Move the inner race by finger and inspect for smooth movement. If any defects are found, replace the clutch release bearing with a new one.



I933H1530050-01

Push rod

Inspect the push rod for wear and damage.

If any defects are found, replace the push rod with a new one.



I933H1530051-01

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.



I933H1530052-01

Specifications

Service Data

B933H25307001

Clutch

Unit: mm (in)

Item	Standard		Limit
Clutch cable play	5 – 10 (0.2 – 0.4)		—
Clutch drive plate thickness	No. 1, No. 2 & No. 3	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
Clutch drive plate claw width	No. 1, No. 2 & No. 3	13.7 – 13.8 (0.539 – 0.543)	13.2 (0.520)
Clutch driven plate distortion	—		0.10 (0.004)
Clutch spring free length	52.5 (2.07)		49.9 (1.96)

Tightening Torque Specifications

B933H25307002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Fuel pump mounting bolts	10	1.0	7.0	☞ (Page 5C-2)
Clutch sleeve hub nut	70	7.0	50.5	☞ (Page 5C-9)

NOTE

The specified tightening torque is also described in the following.
 “Clutch Components (Page 5C-6)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H25308001

Material	SUZUKI recommended product or Specification	Note
Grease	Water resistance grease or equivalent	☞ (Page 5C-5)

NOTE

Required service material is also described in the following.

“Clutch Lever Components (Page 5C-3)”

“Clutch Components (Page 5C-6)”

Special Tool

B933H25308002

<p>09900-20102 Vernier calipers (1/20 mm, 200 mm) ☞ (Page 5C-11) / ☞ (Page 5C-12) / ☞ (Page 5C-12)</p>	<p>09900-20803 Thickness gauge ☞ (Page 5C-12)</p>
<p>09900-25008 Multi-circuit tester set ☞ (Page 5C-1)</p>	<p>09913-70210 Bearing installer set ☞ (Page 5C-10)</p>
<p>09920-53740 Clutch sleeve hub holder ☞ (Page 5C-8) / ☞ (Page 5C-9)</p>	<p>09921-20240 Bearing remover set ☞ (Page 5C-7)</p>

Section 6

Steering

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Precautions	6-1	Handlebars Inspection	6B-5
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Steering / Handlebar	6B-1	Service Data.....	6B-11
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Precautions

Precautions

Precautions for Steering

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

B933H26000001

Steering General Diagnosis

Diagnostic Information and Procedures

Steering Symptom Diagnosis

B933H26104001

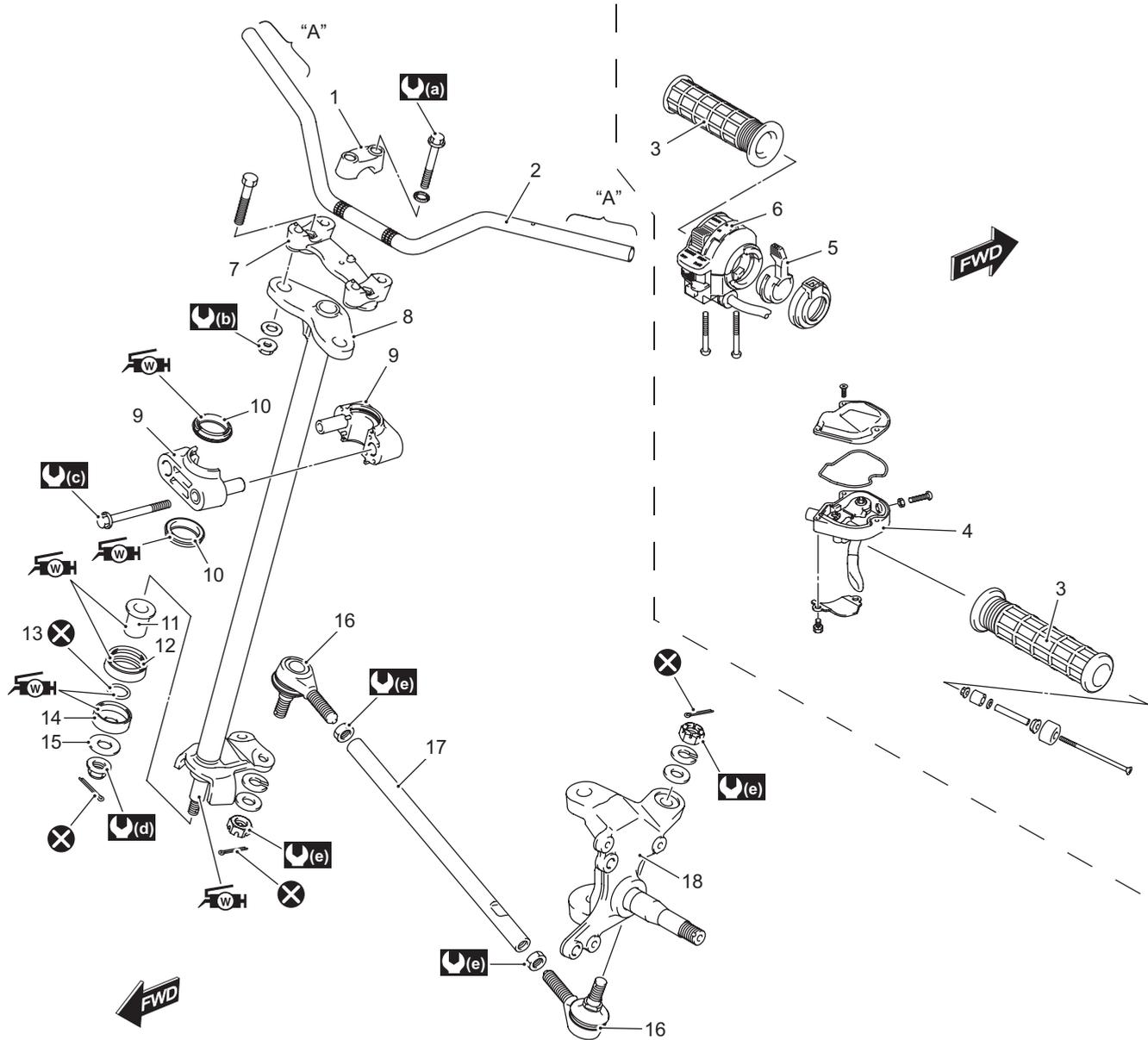
Condition	Possible cause	Correction / Reference Item
Handling is too Heavy or Stiff	Improper front wheel alignment.	<i>Adjust.</i>
	Insufficiently lubricated.	<i>Lubricate.</i>
	Low air pressure in front tires	<i>Adjust.</i>
	Tie rod ends tending to seize.	<i>Replace.</i>
	Linkage connections tending to seize.	<i>Repair or replace.</i>
Steering Wobbles	Unequally inflated tires.	<i>Regulate.</i>
	Loose front wheel hub nuts.	<i>Tighten.</i>
	Damaged or worn front wheel hub bearings.	<i>Replace.</i>
	Worn or loose tie-rod ends.	<i>Replace or tighten.</i>
	Defective or incorrect front tiers.	<i>Replace.</i>
	Damaged or worn wishbone arms and related bushings.	<i>Replace.</i>
	Distorted front wheels.	<i>Replace.</i>
	Loose chassis nuts and bolts.	<i>Tighten.</i>
Steering Pulls to One Side	Unequally inflated tires.	<i>Regulate.</i>
	Improper front wheel alignment.	<i>Adjust.</i>
	Worn front wheel hub bearings.	<i>Replace.</i>
	Distorted frame or wishbone.	<i>Repair or replace.</i>
	Defective shock absorber.	<i>Replace.</i>
Steering too Noisy	Loose nuts and bolts.	<i>Tighten.</i>
	Damaged or worn front wheel hub bearings.	<i>Replace.</i>
	Insufficiently lubricated.	<i>Lubricate.</i>

Steering / Handlebar

Repair Instructions

Steering / Handlebars Components

B933H26206001

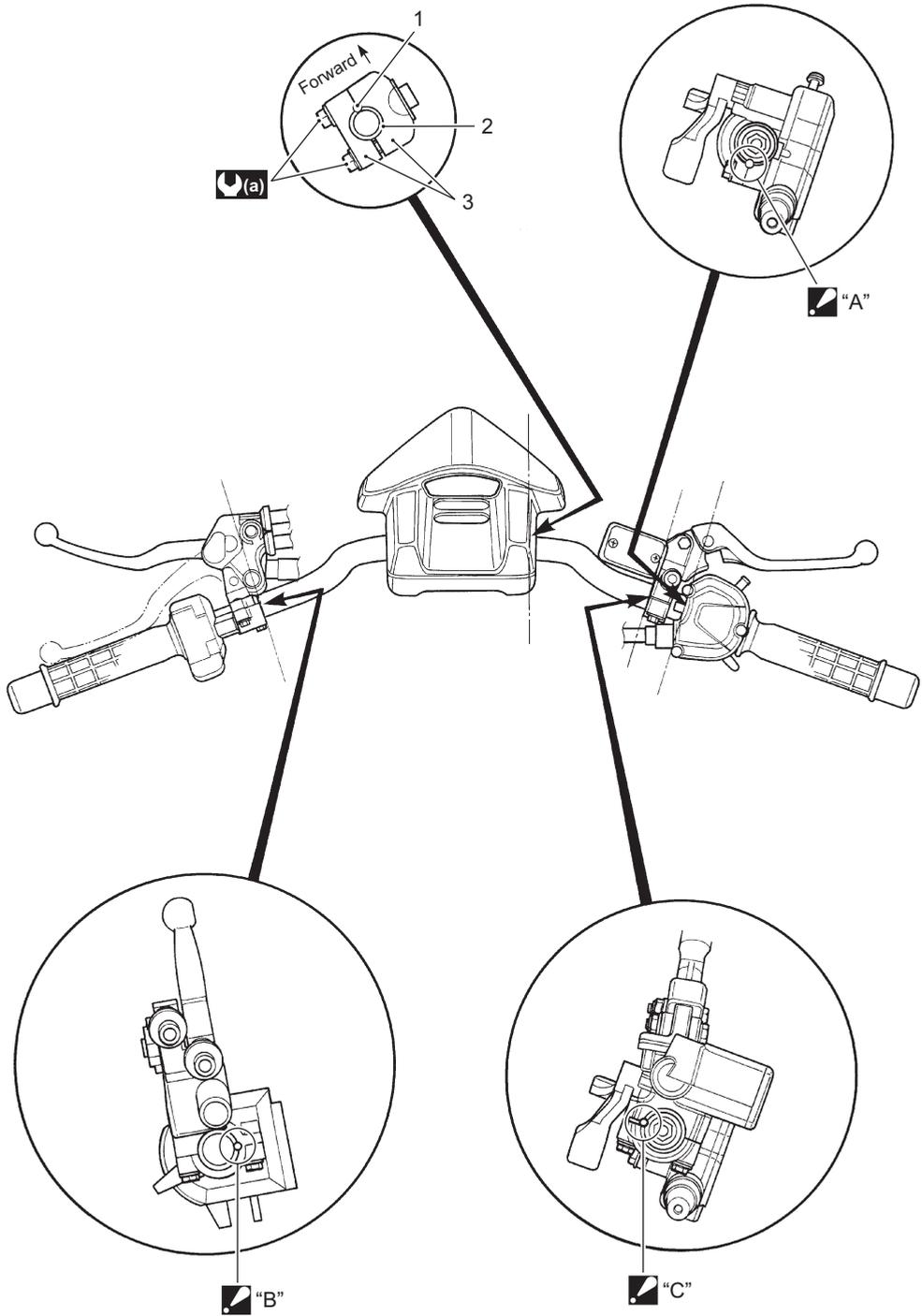


I933H1620001-09

1. Handlebar upper holder	10. Dust seal	"A": Apply handle grip bond.
2. Handlebars	11. Bushing	(a): 26 N-m (2.6 kgf-m, 19.0 lb-ft)
3. Handle grip	12. Dust seal	(b): 60 N-m (6.0 kgf-m, 43.5 lb-ft)
4. Throttle case	13. O-ring	(c): 23 N-m (2.3 kgf-m, 16.5 lb-ft)
5. Starter lever	14. Dust seal	(d): 49 N-m (4.9 kgf-m, 35.5 lb-ft)
6. Handlebar switch box	15. Washer	(e): 29 N-m (2.9 kgf-m, 21.0 lb-ft)
7. Handlebar lower holder	16. Tie-rod end	(WH): Apply Water resistance grease.
8. Steering shaft	17. Tie-rod	(X): Do not reuse.
9. Steering shaft holder	18. Steering knuckle	

Handlebar Construction

B933H26206002



I933H1620048-02

1. Punch mark	▣ "A": Align the edge of throttle case upper with punch mark on handlebars.
2. Handlebars	▣ "B": Align the edge of clutch lever holder with punch mark on handlebars.
3. Handlebar clamp	▣ "C": Align the edge of master cylinder holder with punch mark on handlebars.
⚙️ (a) : 26 N·m (2.6 kgf·m, 19.0 lb-ft)	

6B-3 Steering / Handlebar:

Handlebars Removal and Installation

B933H26206003

Refer to "Front Suspension / Steering Assembly Construction in Section 2B (Page 2B-2)".

Removal

- 1) Remove the throttle lever case (1).

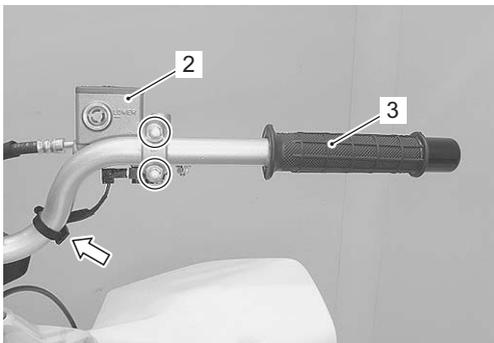


I933H1620002-01

- 2) Disconnect the clamp.
- 3) Remove front brake master cylinder (2) and right grip (3).

⚠ CAUTION

Do not turn the front brake master cylinder upside down.



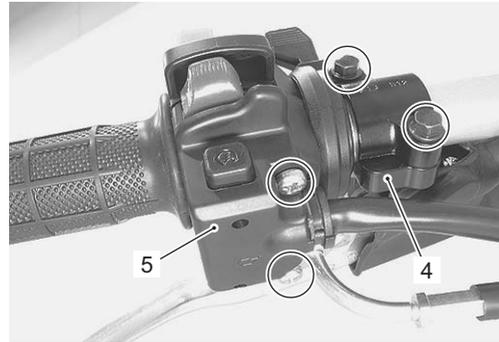
I933H1620003-01

- 4) Disconnect the clamp.



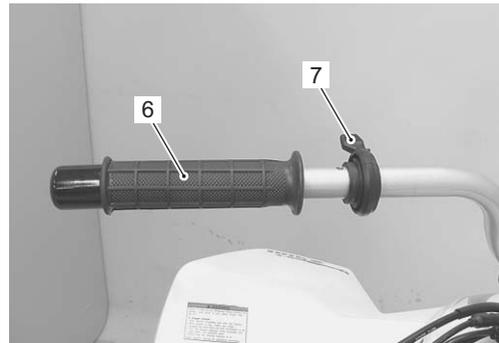
I933H1620004-02

- 5) Remove the clutch lever assembly (4) and handlebar switch box (5).



I933H1620005-03

- 6) Remove the left grip (6) and starter lever (7).



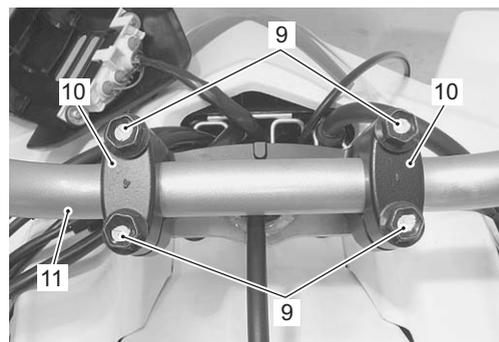
I933H1620006-01

- 7) Remove the steering head cover (8).



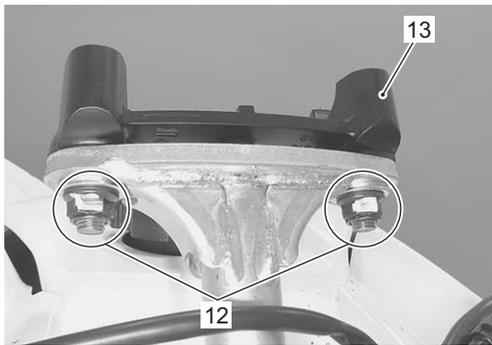
I933H1620007-01

- 8) Remove the handlebar clamp bolts and washers (9).
- 9) Remove the handlebar holders (10) and handlebars (11).



I933H1620008-01

- 10) Remove the handlebar lower holder nuts and washer (12).
- 11) Remove the handlebar lower holder (13).

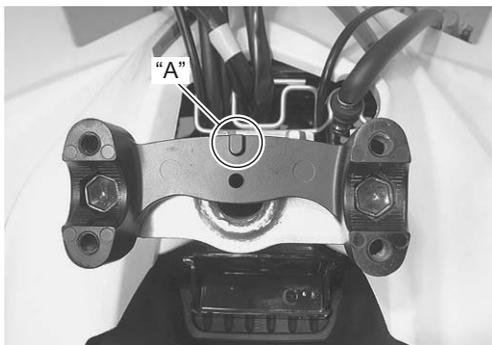


I933H1620009-01

Installation

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

- Set the handlebar holder with facing the projection "A" forward.



I933H1620010-01

- Tighten the handlebar holder nut to the specified torque.

Tightening torque

Handlebar holder nut (a): 60 N·m (6.0 kgf·m, 43.5 lb·ft)



I933H1620011-01

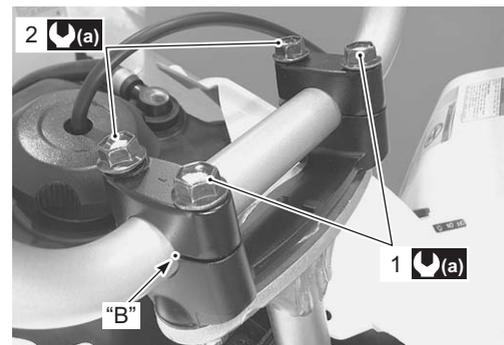
- Align the punch mark "B" on the handlebars with the mating surface of handlebar holder.
- First tighten the bolts (1) to the specified torque and then tighten the bolts (2) to the specified torque.

NOTE

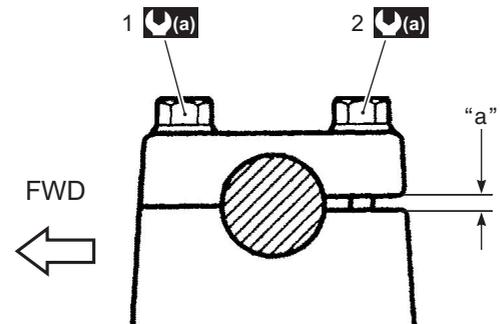
The higher portion of handlebar holder must face forward, so that the clearance "a" of holder is in back of the handlebars.

Tightening torque

Handlebar clamp bolt (a): 26 N·m (2.6 kgf·m, 19.0 lb·ft)



I933H1620012-03

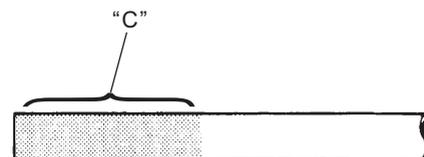


I933H1620046-01

"a": Clearance

- Apply handle grip bond "C" onto the left handlebars before installing the left grip.

■ BOND : Handle grip bond (Handle Grip Bond (commercially available))



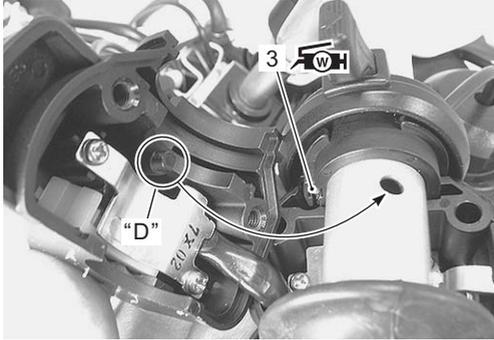
I933H1620047-01

6B-5 Steering / Handlebar:

- Connect the starter cable (3) to the starter lever.
- Apply grease to the end of starter cable (3).

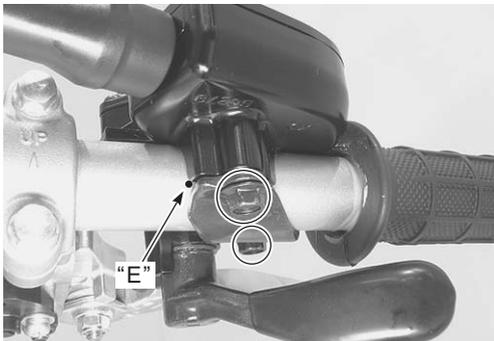
 **Grease 99000-25160 (Water resistance grease or equivalent)**

- Insert the projection “D” of the handlebar switch box into the hole of the handlebars.



I933H1620013-03

- Install the clutch lever assembly. Refer to “Clutch Lever Removal and Installation in Section 5C (Page 5C-3)”.
- Install the right grip as the same manner of left grip.
- Install the front brake master cylinder. Refer to “Front Brake Master Cylinder Assembly Removal and Installation in Section 4A (Page 4A-11)”.
- Align the punch mark “E” on the handlebars with the mating surface of the throttle lever case.
- Tighten the throttle lever case bolts.



I933H1620014-02

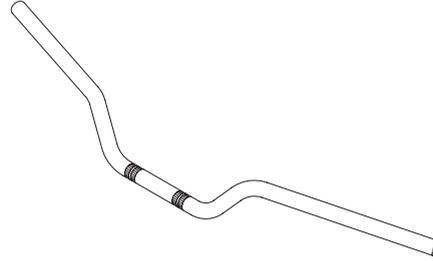
- Check the wiring harness routing and cable routing. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-3)”, “Hose and Cable Routing Diagram in Section 4A (Page 4A-3)”.

Handlebars Inspection

B933H26206004

Refer to “Handlebars Removal and Installation (Page 6B-3)”.

Inspect the handlebars for distortion or damage. If any defects are found, replace the handlebars with a new one.



I831G1620019-02

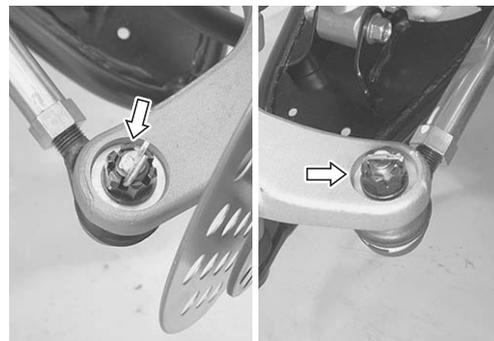
Steering Shaft / Tie-rod Removal and Installation

B933H26206005

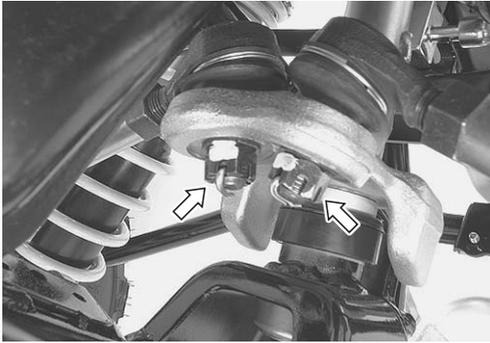
Refer to “Front Suspension / Steering Assembly Construction in Section 2B (Page 2B-2)”.

Removal

- 1) Remove the radiator assembly. Refer to “Radiator Reservoir Tank Removal and Installation in Section 1F (Page 1F-9)”.
- 2) Remove the oil tank. Refer to “Oil Tank Removal and Installation in Section 1E (Page 1E-9)”.
- 3) Remove the handlebars. Refer to “Handlebars Removal and Installation (Page 6B-3)”.
- 4) Remove the fuel tank cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 5) Remove cotter pins, tie-rod end nuts and spring washers.



I933H1620015-01

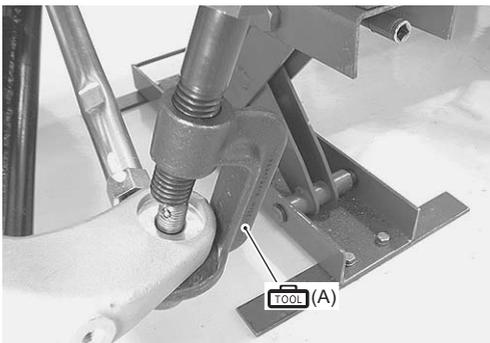


I933H1620016-01

- 6) Disconnect wheel side tie-rod ends using the special tool.

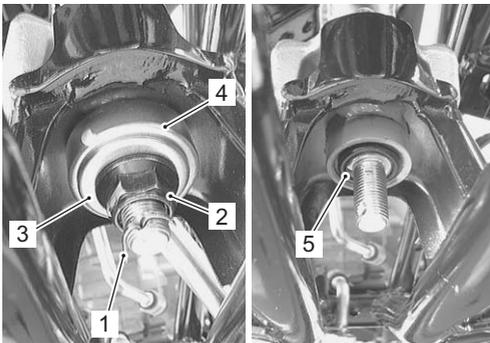
Special tool

TOOL (A): 09942-72410 (Tie-rod end remover)



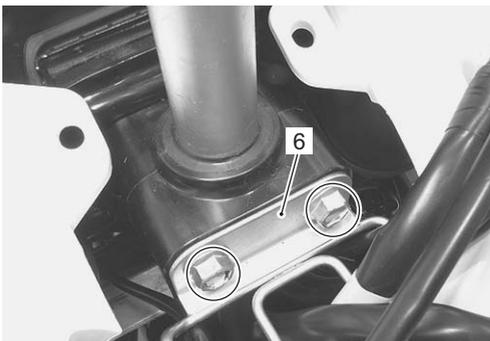
I933H1620017-01

- 7) Remove the cotter pin (1) and steering shaft nut (2), washer (3), dust seal (4) and O-ring (5).



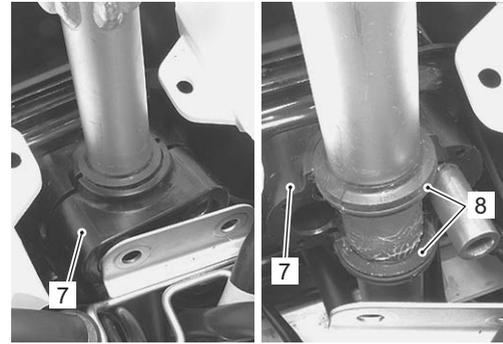
I933H1620018-01

- 8) Remove the guide (6).



I933H1620019-01

- 9) Remove the steering shaft holders (7) and dust seals (8).



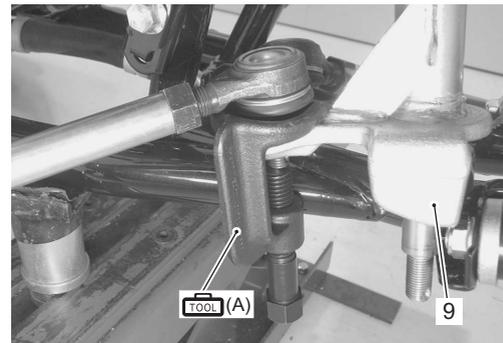
I933H1620020-01

- 10) Draw out the steering shaft (9).

- 11) Disconnect each tie-rod ends using the special tool.

Special tool

TOOL (A): 09942-72410 (Tie-rod end remover)



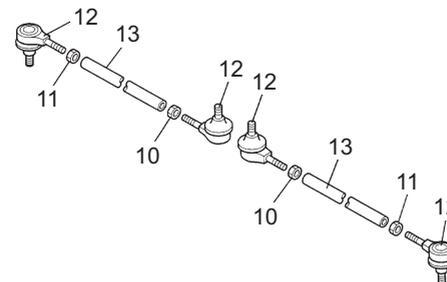
I933H1620021-02

- 12) Loosen the lock-nut (10) and (11).

⚠ CAUTION

The lock-nut (10) have left-hand threads.

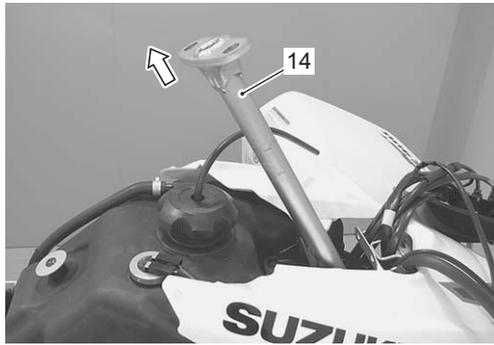
- 13) Remove the tie-rod end (12), lock-nut (10) and (11) from the tie-rod (13).



I933H1620022-01

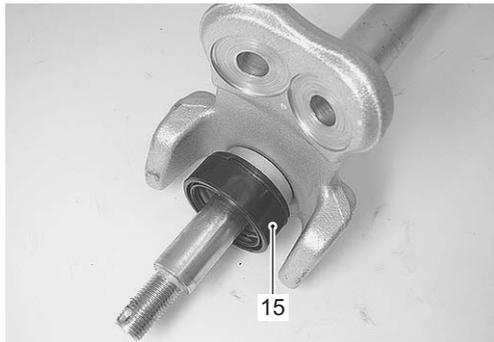
6B-7 Steering / Handlebar:

14) Remove the steering shaft (14).



I933H1620023-02

15) Remove the dust seal (15) from the steering shaft.



I933H1620024-01

16) Remove the steering shaft bushing (16) using the special tools and suitable socket wrench "A".

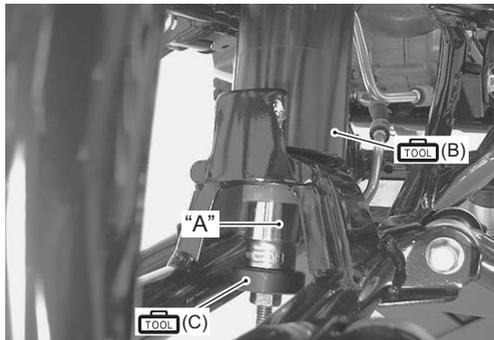
NOTE

If there are wear or damage, remove the steering shaft bushing (16). Refer to "Steering Parts Inspection (Page 6B-10)".

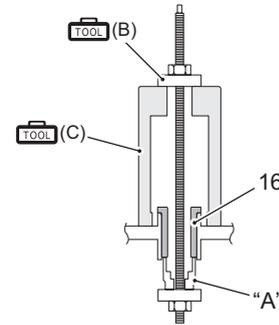
Special tool

 (B): 09924-84521 (Bearing installer set)

 (C): 09930-30721 (Rotor remover)



I933H1620025-02



I933H1620026-01

Installation

Install the steering shaft/tie-rod in the reverse order of removal. Pay attention to the following points:

- Install the steering bushing (1) using the special tool.

Special tool

 (A): 09924-84521 (Bearing installer set)



I933H1620050-01

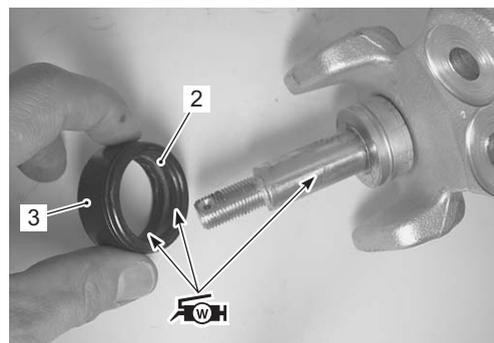
- Apply grease to the steering shaft, O-ring (2) and dust seal (3).

CAUTION

Replace the O-ring (2) with a new one.

 : Grease 99000-25160 (Water resistance grease or equivalent)

- Install the dust seal (3) to the steering shaft.

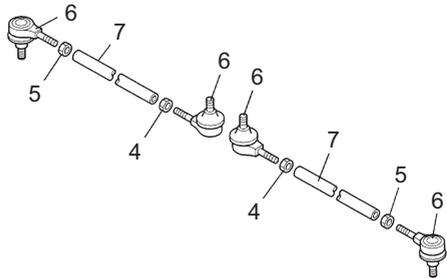


I933H1620027-04

- Temporarily install the lock-nuts (4), (5) and tie-rod end (6) to the tie-rod (7).

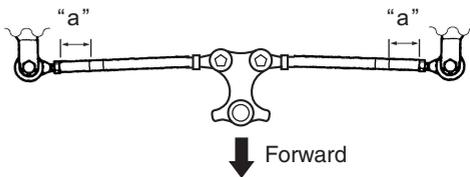
NOTE

The lock-nuts (4) have left-hand threads.



I933H1620028-02

- When installing the tie-rods, make sure the narrow end "a" of tie-rod comes outside.



I933H1620029-04

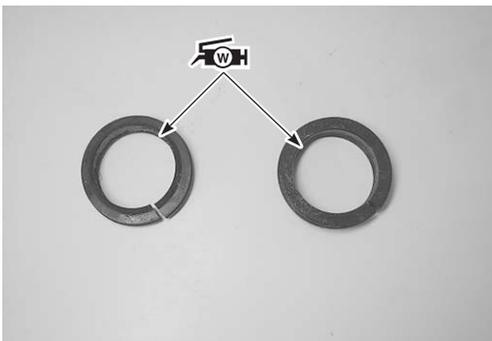
- Temporarily tighten the tie-rod end nuts.



I933H1620030-01

- Apply grease to the dust seals before installing the steering shaft.

 **Grease 99000-25160 (Water resistance grease or equivalent)**



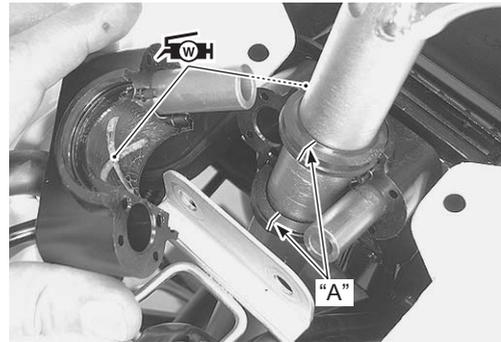
I933H1620031-02

- Apply grease to the dust seal lip and steering shaft holders before remounting the steering shaft holders.

 **Grease 99000-25160 (Water resistance grease or equivalent)**

CAUTION

To prevent the entry of dirt, the dust seal end "A" must face forward when installing the dust seals to steering shaft.



I933H1620032-02

- Tighten the steering shaft holder bolts to the specified torque.

Tightening torque

Steering shaft holder bolt (a): 23 N·m (2.3 kgf-m, 16.5 lb-ft)



I933H1620033-01

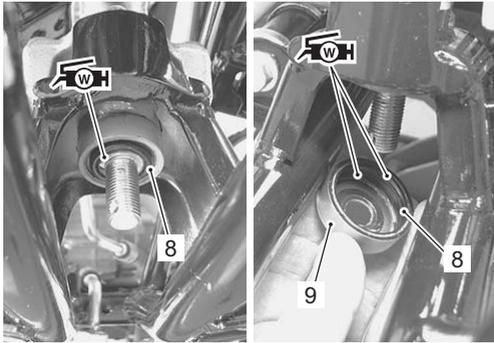
6B-9 Steering / Handlebar:

- Apply grease to the O-rings (8), and dust seal (9).

⚠ CAUTION

Replace the O-rings (8) with new ones.

🔧 WH : Grease 99000-25160 (Water resistance grease or equivalent)



I933H1620034-03

- Tighten the steering shaft nut to the specified torque.

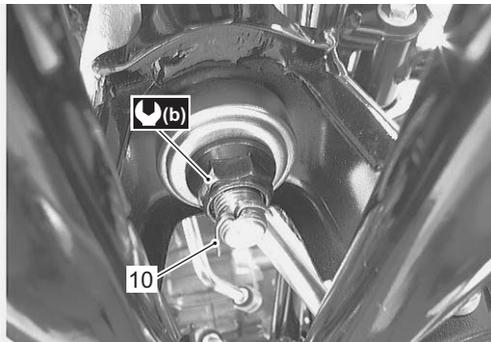
Tightening torque

Steering shaft nut (b): 49 N·m (4.9 kgf-m, 35.5 lb-ft)

- Install the new cotter pin (10).

⚠ CAUTION

Replace the cotter pin (10) with a new one.



I933H1620035-02

- Tighten the tie-rod end nuts to the specified torque.

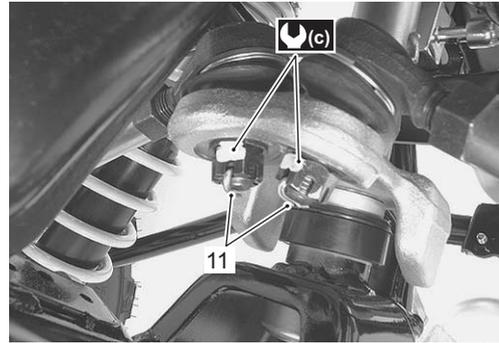
Tightening torque

Tie-rod end nut (c): 29 N·m (2.9 kgf-m, 21.0 lb-ft)

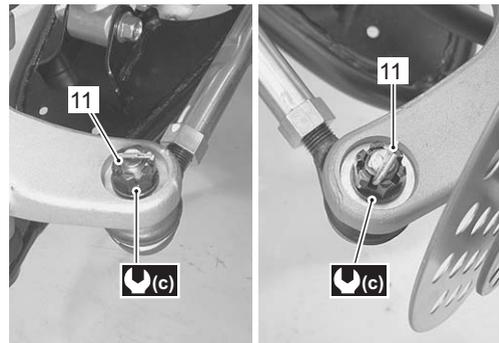
- Install the new cotter pins (11).

⚠ CAUTION

Replace the cotter pins (11) with new ones.



I933H1620036-03



I933H1620037-02

- Push the tie-rod to tie-rod lock-nut tightening direction.
- Tighten the lock-nuts to the specification.

⚠ CAUTION

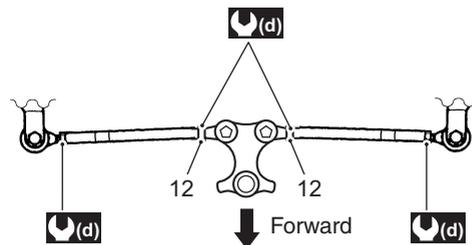
When tightening the lock-nuts, hold the tie-rod end with a open end wrench.

NOTE

The lock-nuts (12) have left-hand threads.

Tightening torque

Tie-rod lock-nut (d): 29 N·m (2.9 kgf-m, 21.0 lb-ft)



I933H1620038-04

- Install the handlebars. Refer to “Handlebars Removal and Installation (Page 6B-3)”.
- Check the steering moves smoothly.
- Check the wiring harness routing, cable routing and brake hose routing. Refer to “Wiring Harness Routing Diagram in Section 9A (Page 9A-3)”, “Hose and Cable Routing Diagram in Section 4A (Page 4A-3)” and “Front Brake Hose Routing Diagram in Section 4A (Page 4A-1)”.
- After installing the removed parts, inspect the toe-in. If the toe-in is out of specification, bring it into the specified range. Refer to “Toe-out Adjustment (Page 6B-11)”.

Steering Parts Inspection

B933H26206006

Refer to “Steering Shaft / Tie-rod Removal and Installation (Page 6B-5)”.

Dust seal

Inspect the dust seal for wear or damage. If any defects are found, replace the dust seal with new ones.



I933H1620039-02

Tie-rod

Inspect the tie-rod for distortion or damage. If any defects are found, replace the tie-rod with new ones.



I933H1620040-01

Tie-rod end

Inspect the tie-rod ends for smooth movement. If there are any abnormalities, replace the tie-rod ends with new ones.

Inspect the tie-rod end boots for wear or damage. If any defects are found, replace the tie-rod ends with new ones.



I933H1620041-01

Steering shaft

Inspect the steering shaft for distortion or bend. If any defects are found, replace the steering shaft with a new one.



I933H1620042-01

Steering shaft holder

Inspect the steering shaft holders for wear or damage. If any defects are found, replace the steering shaft holders with new ones.

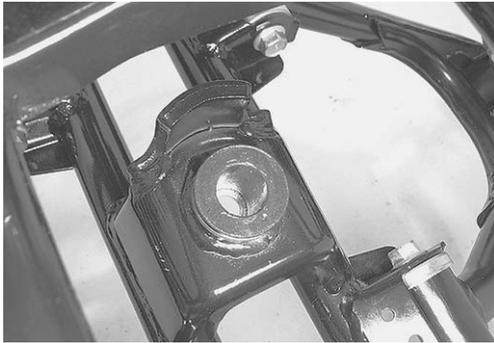


I933H1620043-01

6B-11 Steering / Handlebar:

Steering shaft bushing

Inspect the steering shaft bushing for wear or damage. If any defects are found, replace the steering shaft bushing with a new one.



I933H1620044-01

Toe-out Adjustment

B933H26206007

Adjust the toe-out as follows:

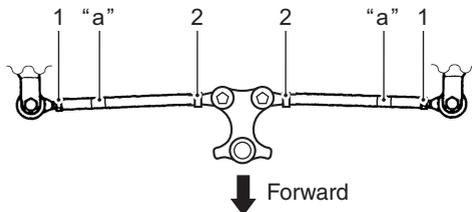
- 1) Inspect the toe-out. Refer to "Steering System Inspection in Section 0B (Page 0B-22)".
- 2) Loosen the lock-nuts (1) and (2) on each tie-rod.

⚠ CAUTION

The lock-nuts (2) have left-hand threads.

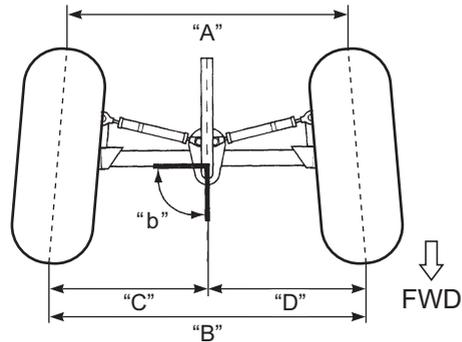
NOTE

Hold the concave part "a" of tie-rod with a wrench.



I933H1620045-01

- 3) Temporarily tighten the four lock-nuts.
- 4) Check that the distance "C" and "D" are equal, as shown. If the distances are not equal, adjust the tie-rod to the right or left until the toe-out is within specification. Check the toe-out again by measuring distances "A" and "B".
- 5) If the toe-out is not within specification, repeat the adjustment as above until the proper toe-out is obtained and distances "C" and "D" become equal.



I933H1620049-01

"b": Right angle (90°)

- 6) After adjustment has been made, tighten the four lock-nuts (1) and (2) to the specified torque.

Tightening torque

Tie-rod lock-nut: 29 N·m (2.9 kgf·m, 21.0 lb·ft)

Specifications

Service Data

B933H26207001

Wheel

Unit: mm

Item	Standard	Limit
Turning radius	3.3 m (10.8 ft)	—
Toe-out (with 75 kg, 165 lbs)	6 ± 4 mm (0.24 ± 0.16 in)	—
Camber	- 2.4°	—
Caster	6.3°	—

Tightening Torque Specifications

B933H26207002

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Handlebar holder nut	60	6.0	43.5	☞ (Page 6B-4)
Handlebar clamp bolt	26	2.6	19.0	☞ (Page 6B-4)
Steering shaft holder bolt	23	2.3	16.5	☞ (Page 6B-8)
Steering shaft nut	49	4.9	35.5	☞ (Page 6B-9)
Tie-rod end nut	29	2.9	21.0	☞ (Page 6B-9)
Tie-rod lock-nut	29	2.9	21.0	☞ (Page 6B-9) / ☞ (Page 6B-11)

NOTE

The specified tightening torque is also described in the following.

“Steering / Handlebars Components (Page 6B-1)”

“Handlebar Construction (Page 6B-2)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H26208001

Material	SUZUKI recommended product or Specification		Note
Grease	Water resistance grease or equivalent	P/No.: 99000-25160	☞ (Page 6B-5) / ☞ (Page 6B-7) / ☞ (Page 6B-8) / ☞ (Page 6B-8) / ☞ (Page 6B-9)
Handle grip bond	Handle Grip Bond (commercially available)	—	☞ (Page 6B-4)

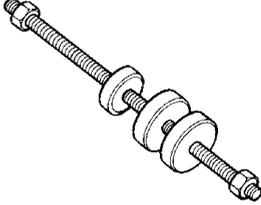
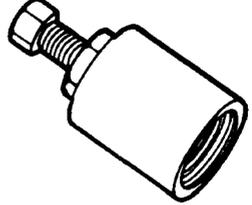
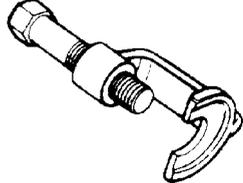
NOTE

Required service material is also described in the following.

“Steering / Handlebars Components (Page 6B-1)”

Special Tool

B933H26208002

09924-84521 Bearing installer set ☞ (Page 6B-7) / ☞ (Page 6B-7)		09930-30721 Rotor remover ☞ (Page 6B-7)	
09942-72410 Tie-rod end remover ☞ (Page 6B-6) / ☞ (Page 6B-6)			

Section 9

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Precautions

Precautions

Precautions for Electrical System

B933H29000001

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

B933H29003001

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

Wiring Systems

Schematic and Routing Diagram

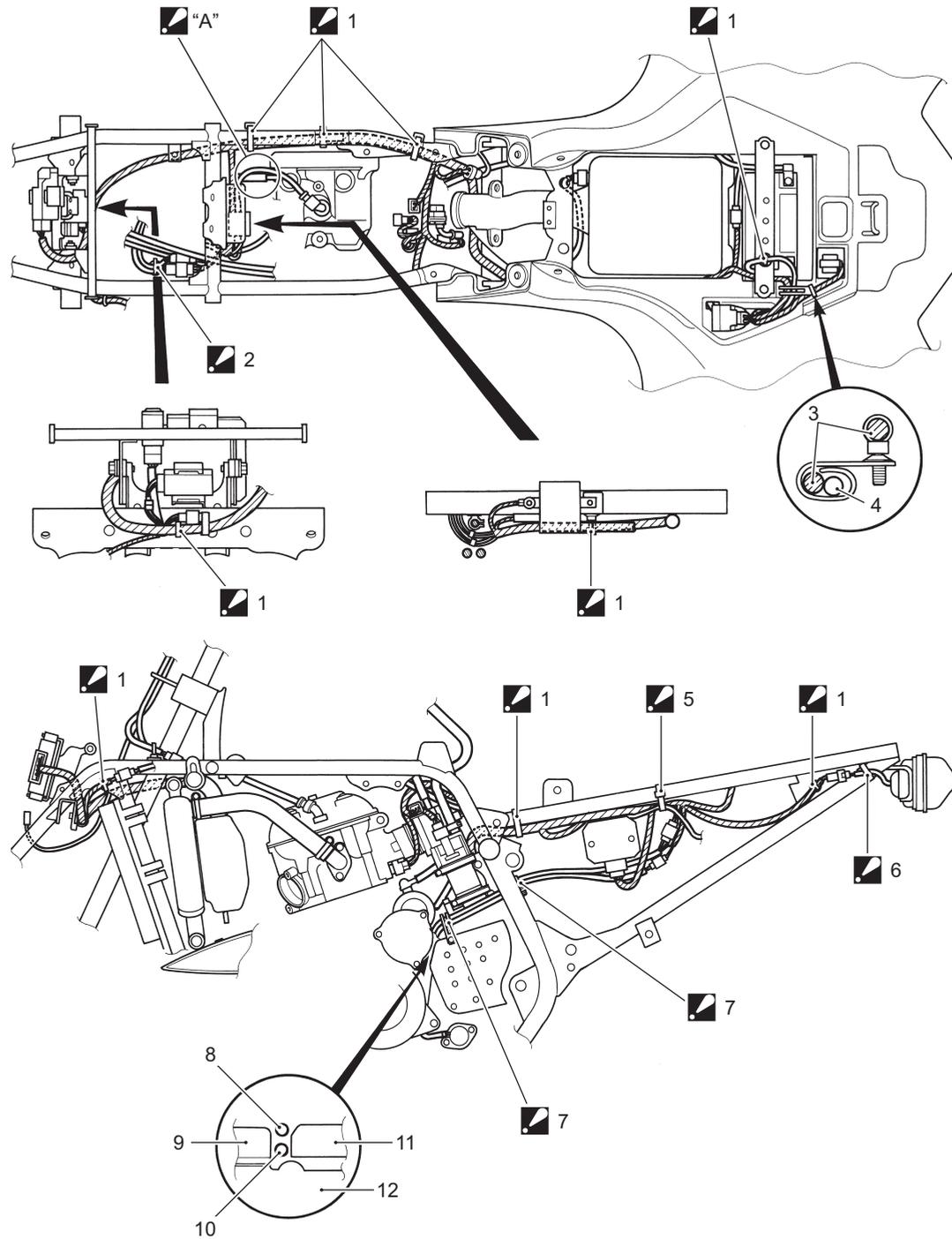
Wiring Diagram

Refer to "Wire Color Symbols in Section 0A (Page 0A-5)".

B933H29102001

Wiring Harness Routing Diagram

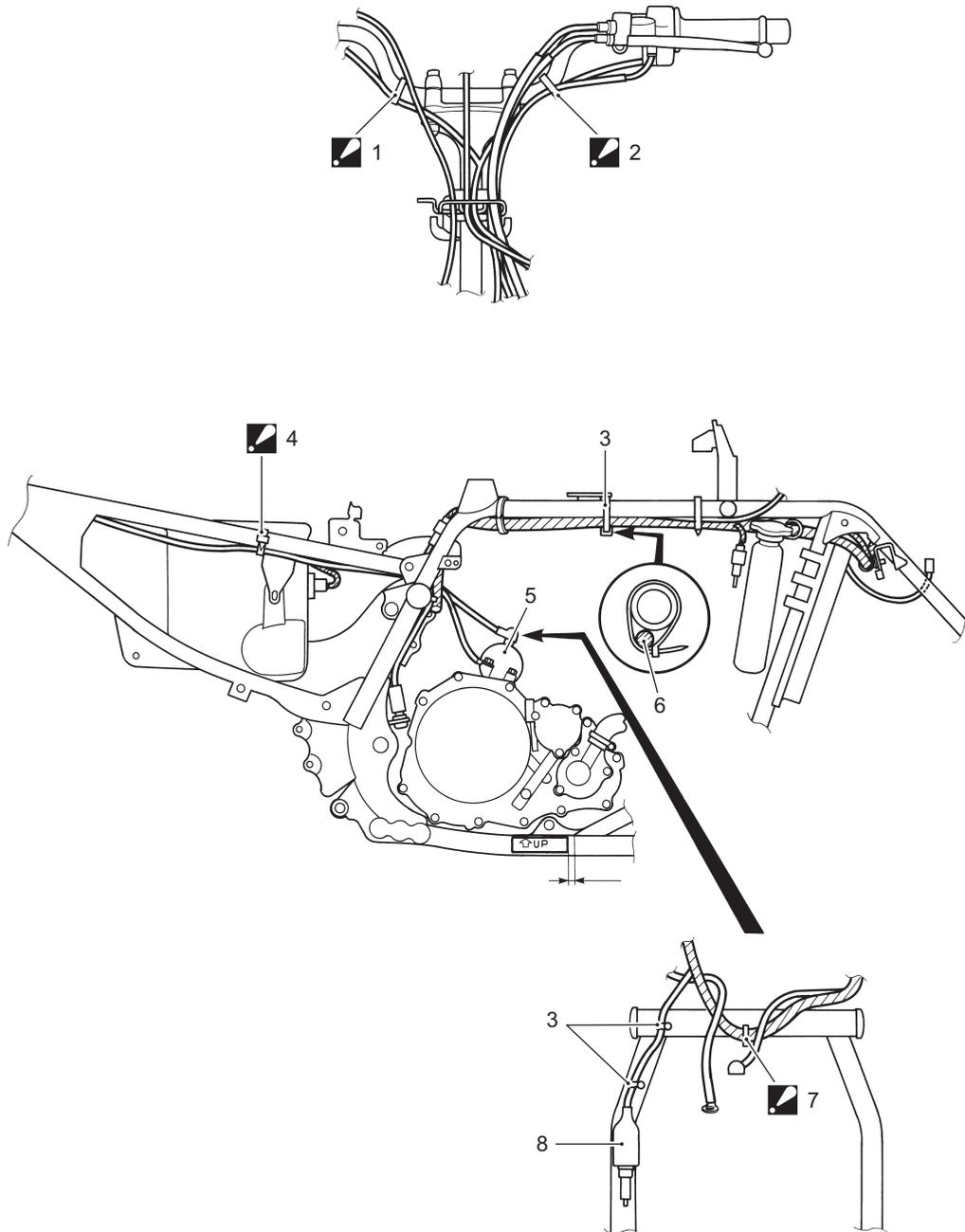
B933H29102002



I933H1910903-08

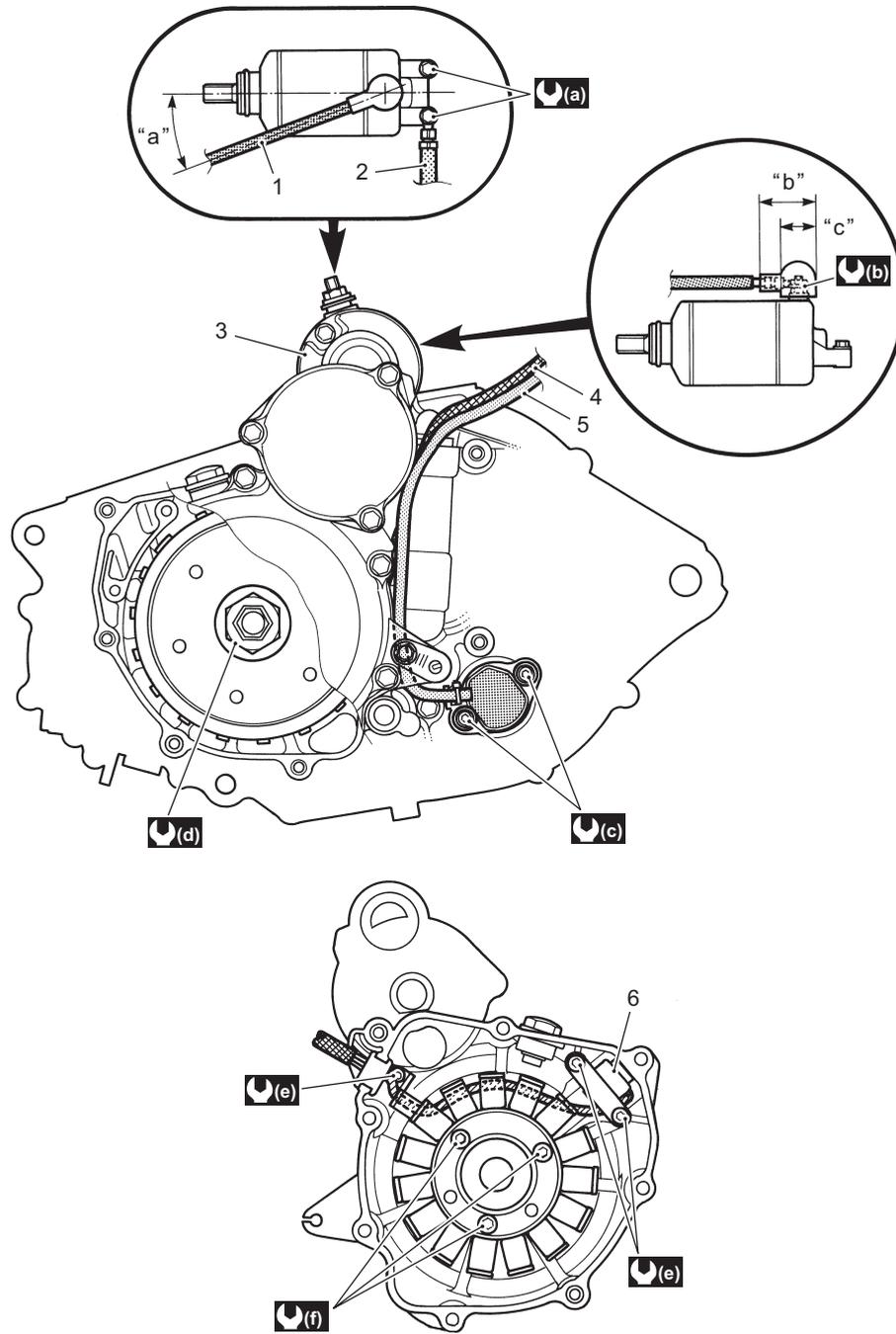
<p>1. Clamp : Bind the wiring harness with the clamp.</p>	<p>6. Clamp : Bind the brake light / taillight with the clamp.</p>	<p>11. Engine sprocket cover</p>
<p>2. Clamp : Bind the handlebar switch (L) and indicator light with the clamp.</p>	<p>7. Clamp : Bind the generator and gear position switch with the clamp.</p>	<p>12. Crankcase</p>
<p>3. Wiring harness</p>	<p>8. Reverse gear cable</p>	<p>"A": Pass the high tension cord of ignition coil over the overflow hose.</p>
<p>4. Battery (+)</p>	<p>9. Generator cover</p>	
<p>5. Clamp : Bind the wiring harness and starter motor with the clamp.</p>	<p>10. Gear position switch lead wire</p>	

9A-4 Wiring Systems:



I933H1910904-01

<p>1. Clamp : Bind the brake switch with the clamp.</p>	<p>5. Starter motor</p>
<p>2. Clamp : Bind the handlebar switch (L), starter cable and clutch lever position switch. with the clamp.</p>	<p>6. Wiring harness</p>
<p>3. Clamp</p>	<p>7. Clamp : Bind the wiring harness with the clamp.</p>
<p>4. Clamp : Bind the Battery (-) with the clamp.</p>	<p>8. Brake light switch</p>



I933H1910905-02

1. Starter motor lead wire	6. CKP sensor	(e) : 5.5 N·m (0.55 kgf·m, 4.0 lb·ft)
2. Battery ground wire	(a) : 10 N·m (1.0 kgf·m, 7.0 lb·ft)	(f) : 11 N·m (1.1 kgf·m, 8.0 lb·ft)
3. Starter motor	(b) : 6 N·m (0.6 kgf·m, 4.5 lb·ft)	"a": 20°
4. Generator lead wire	(c) : 6.5 N·m (0.65 kgf·m, 4.7 lb·ft)	"b": 20.4 mm (0.80 in)
5. Gear position switch lead wire	(d) : 120 N·m (12.0 kgf·m, 87.0 lb·ft)	"c": 12.8 mm (0.50 in)

Specifications

Service Data

B933H29107001

Electrical

Unit: mm

	Item	Specification	Note
Fuse size	Ignition	10 A	
	Cooling fan	10 A	
	Main	20 A	

Tightening Torque Specifications

B933H29107002

NOTE

The specified tightening torque is also described in the following.

“Wiring Harness Routing Diagram (Page 9A-3)”

Reference:

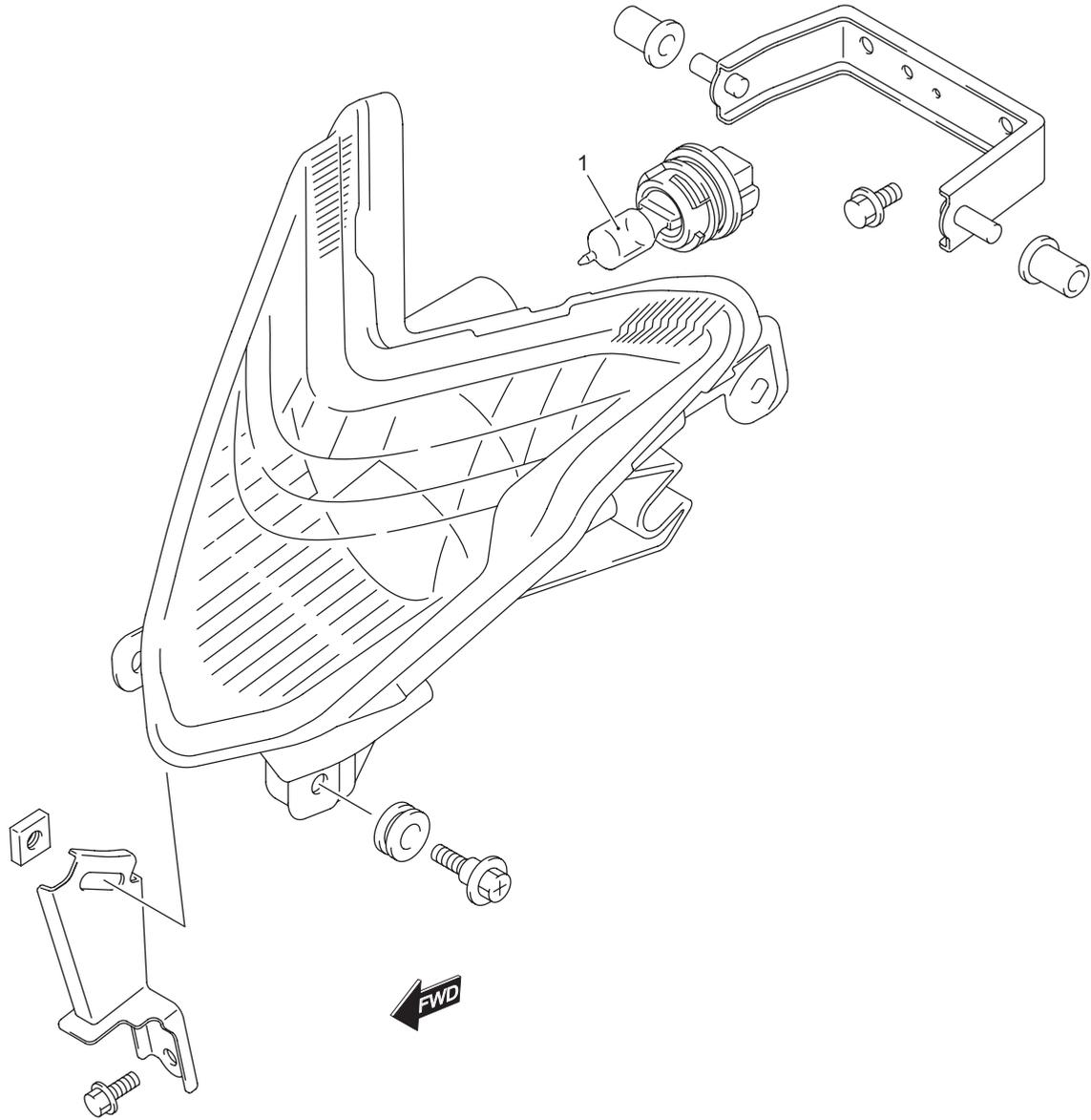
For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Lighting Systems

Repair Instructions

Headlight Components

B933H29206001



1. Headlight bulb (12 V 35/35 W)

I933H1920014-02

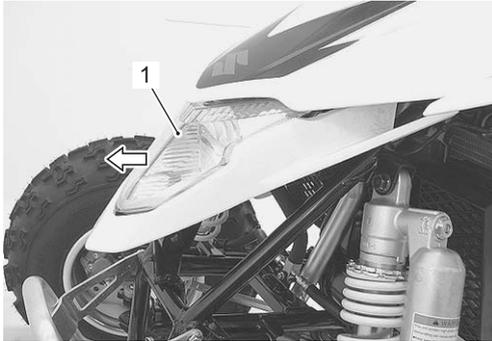
9B-2 Lighting Systems:

Headlight Removal and Installation

B933H29206002

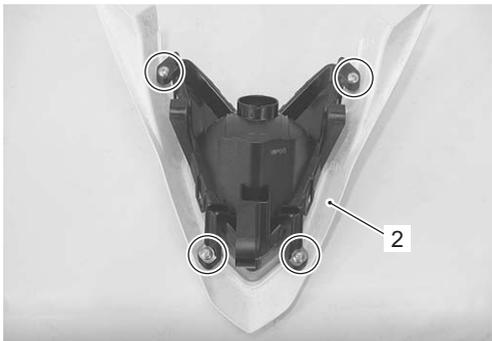
Removal

- 1) Remove the headlight bulb. Refer to “Headlight Bulb Replacement (Page 9B-2)”.
- 2) Remove the headlight assembly (1).



I933H1920001-01

- 3) Remove the headlight cover (2).



I933H1920002-01

Installation

Install the headlight in the reverse order of removal. After installing be sure to inspect the headlight beam. Refer to “Headlight Beam Adjustment (Page 9B-3)”.

Headlight Bulb Replacement

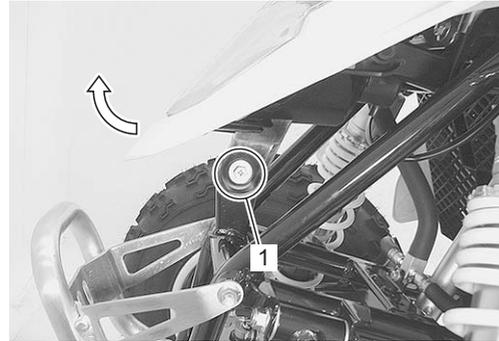
B933H29206003

Replace the headlight bulb in the following procedures:

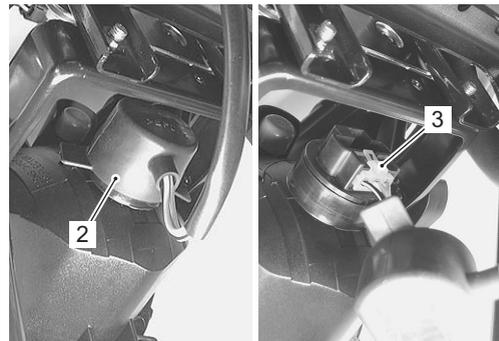
⚠ CAUTION

- 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.
- Remove the bulb when it gets cool, since it may be heated to an extremely high temperature when the headlight is turned ON.

- 1) Remove the left side cover. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Remove the headlight adjusting bolt (1).
- 3) Move the headlight assembly upward and disconnect the bulb socket rubber cap (2) and headlight coupler (3).

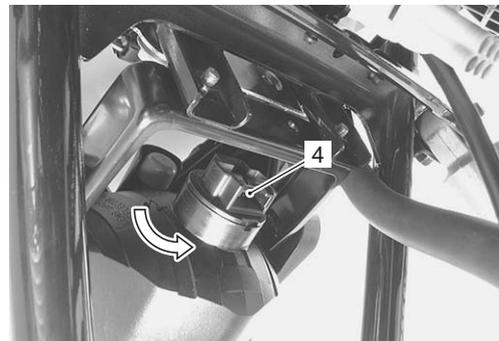


I933H1920003-02



I933H1920004-03

- 4) Replace the headlight bulb (4) by turning it counterclockwise.



I933H1920005-01

- 5) Reinstall the removed parts.

NOTE

Properly fit the bulb socket rubber cap (2).

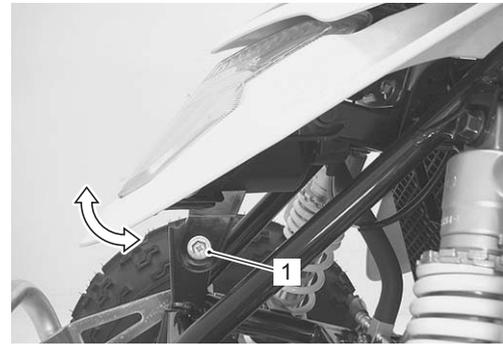
- 6) After installing be sure to inspect the headlight beam. Refer to “Headlight Beam Adjustment (Page 9B-3)”.

Headlight Beam Adjustment

B933H29206004

Adjust the headlight beam in the following procedures:

- 1) Loosen the headlight adjusting bolt (1).
- 2) Move the headlight up or downwards and adjust the headlight beam vertically.

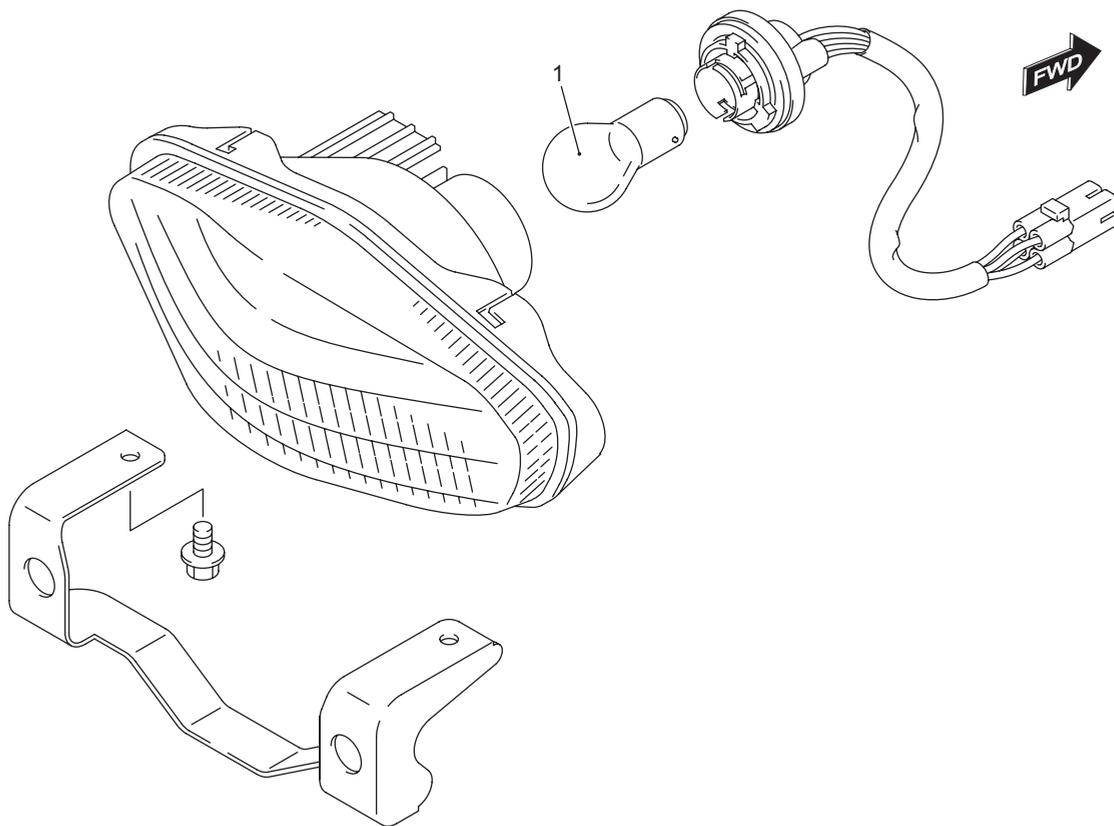


I933H1920006-04

- 3) Tighten the headlight adjusting bolt (1).

Rear Combination Light Components

B933H29206005



1. Brake light/Taillight bulb (12 V 21/5 W)

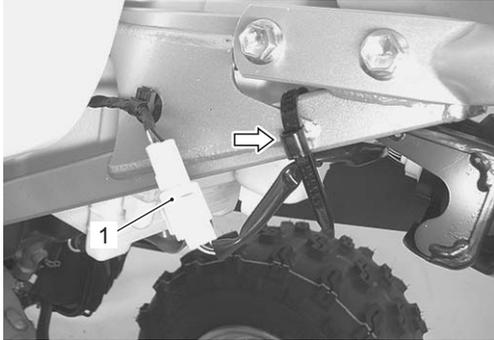
I933H1920015-02

Rear Combination Light Removal and Installation

B933H29206006

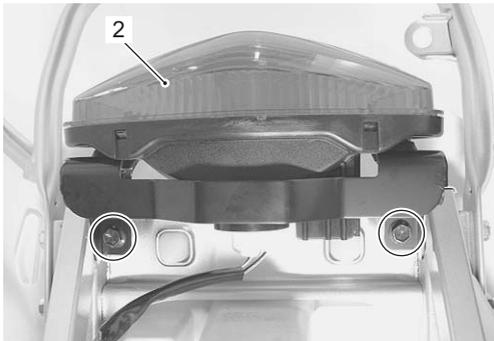
Removal

- 1) Disconnect the rear combination coupler (1) and clamp.



I933H1920007-01

- 2) Remove the rear combination light assembly (2).



I933H1920008-01

- 3) Remove the rear combination light assembly bracket (3).



I933H1920009-01

Installation

Install the rear combination light in the reverse order of removal.

Rear Combination Light Bulb Replacement

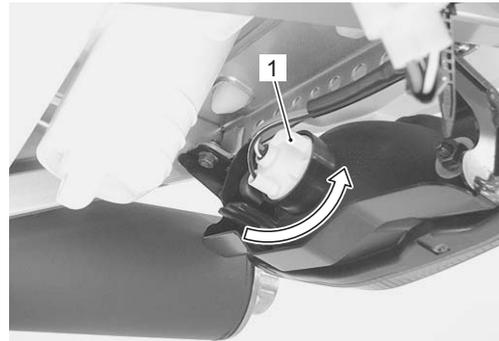
B933H29206007

Replace the rear combination 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 bulb socket (1) by turning it counterclockwise.



I933H1920010-02

- 2) Push in on the bulb, turn it counterclockwise, and pull it out.

- 3) Replace the bulb.



I933H1920011-01

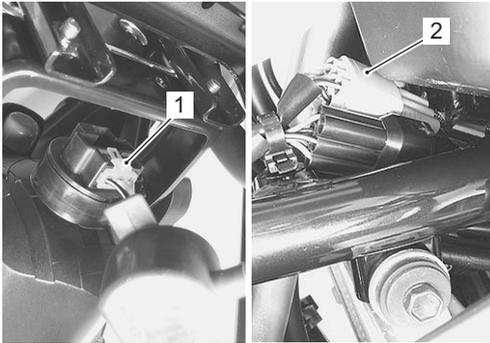
- 4) Reinstall the removed parts.

Dimmer Switch Inspection

B933H29206008

Inspect the dimmer switch in the following procedures:

- 1) Disconnect the headlight coupler (1). Refer to "Headlight Bulb Replacement (Page 9B-2)".
- 2) Disconnect the handlebar switch coupler (2).



I933H1920012-05

- 3) Inspect the dimmer switch for continuity with a tester. If any abnormality is found, replace the handlebar switch assembly with a new one. Refer to "Handlebars Removal and Installation in Section 6B (Page 6B-3)".

Special tool

 : 09900-25008 (Multi-circuit tester set)

Tester knob indication

Continuity (•))

Color Position	Y	W	Gr
HI	○	—	○
LO		○	○

I933H1920013-01

- 4) After finishing the dimmer switch inspection, reinstall the removed parts.

Specifications

Service Data

B933H29207001

Wattage

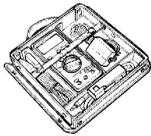
Unit: W

Item		Specification
Headlight	HI	40
	LO	40
Brake light/Taillight		21/5

Special Tools and Equipment

Special Tool

B933H29208001

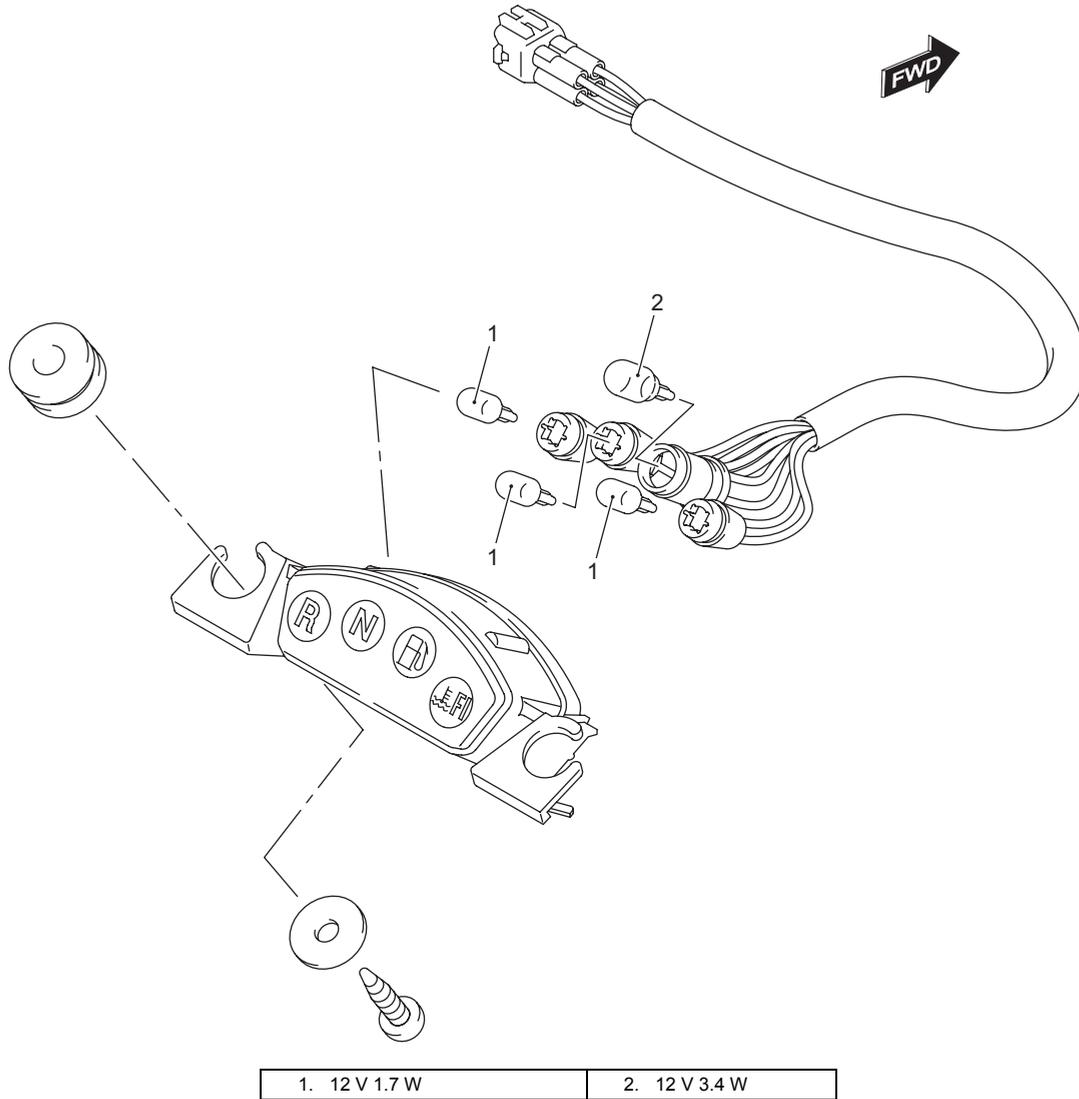
<p>09900-25008 Multi-circuit tester set  (Page 9B-5)</p>	
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Combination Meter / Fuel Meter / Horn

Repair Instructions

Indicator Light Components

B933H29306001



I933H1930011-02

Indicator Light Removal and Installation

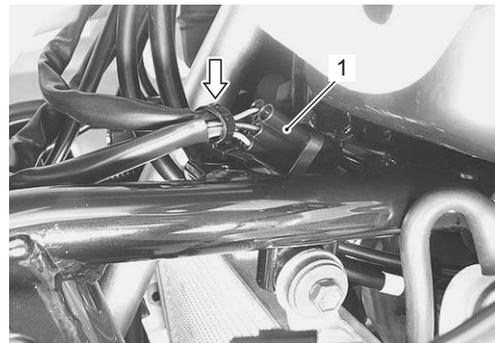
B933H29306002

⚠ CAUTION

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

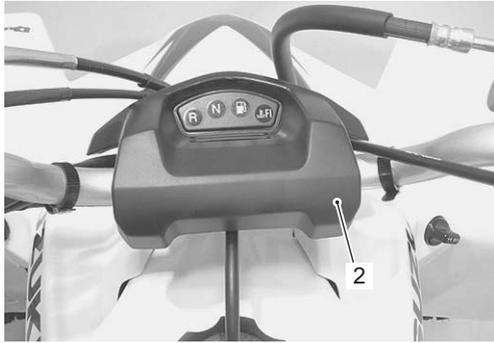
Removal

- 1) Disconnect the indicator light coupler (1) and clamp.



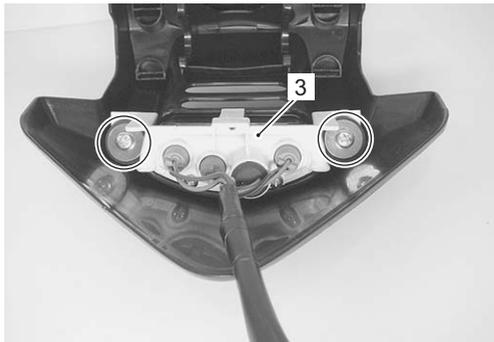
I933H1930001-01

2) Remove the steering head cover (2).



I933H1930002-01

3) Remove the indicator light assembly (3).



I933H1930003-01

Installation

Install the indicator light in the reverse order of removal.

Indicator Light Replacement

B933H29306003

Replace the indicator lights 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 steering head cover. Refer to "Indicator Light Removal and Installation (Page 9C-1)".
- 2) Replace the indicator lights as shown in the indicator light Components. Refer to "Indicator Light Components (Page 9C-1)".
- 3) Reinstall the removed parts.

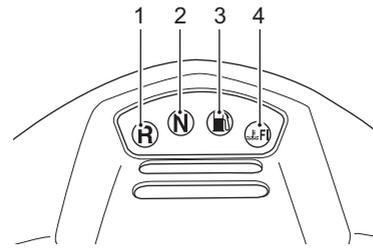
Indicator Light Inspection

B933H29306004

Check that the indicator lights (Fuel level indicator light and FI indicator light / Engine coolant temperature indicator light) immediately light up for two seconds when the ignition switch is turned to ON.

Check that other indicator lights (Neutral indicator light and reverse indicator light) light up/go off by operating each switch.

If abnormal condition is found, replace the indicator light with a new one after checking its wire harness/coupler. Refer to "Indicator Light Replacement (Page 9C-2)" and "Indicator Light Removal and Installation (Page 9C-1)".



I933H1930004-01

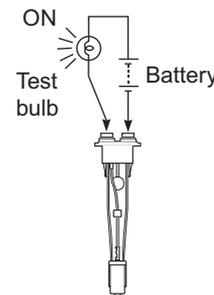
1. Revers indicator light	3. Fuel level indicator light
2. Neutral indicator light	4. FI indicator light/Engine coolant temperature indicator light.

Fuel Level Indicator Switch (Thermistor) Inspection

B933H29306005

Inspect the fuel level indicator switch (thermistor) in the following procedures:

- 1) Remove the fuel level gauge assembly. Refer to "Fuel Level Gauge Removal and Installation in Section 1G (Page 1G-7)".
- 2) Connect 12 V battery and test bulb (12 V, 3.4 W) to the fuel level indicator switch as shown in the figure. The bulb should come on after one minutes if the switch is in good condition.



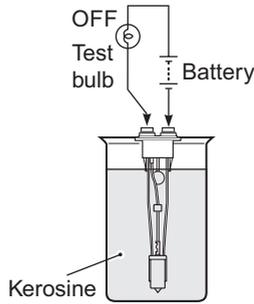
I933H1930005-01

9C-3 Combination Meter / Fuel Meter / Horn:

- When the switch is immersed in kerosene, the bulb should go out. If the bulb remains lit, replace the unit with a new one.

NOTE

- When the bulb turns off, immediately pick up the switch from kerosene.
- After the check has been completed, wash the switch with gasoline.



I933H1930006-01

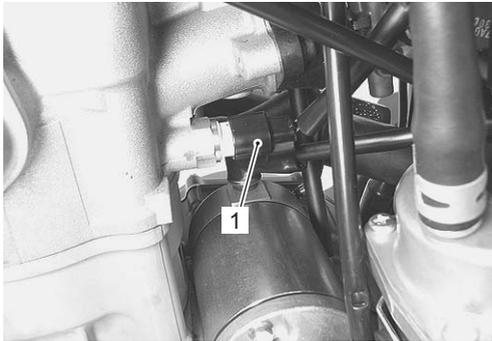
- Reinstall the fuel level gauge assembly. Refer to "Fuel Level Gauge Removal and Installation in Section 1G (Page 1G-7)".

Engine Coolant Temperature Indicator Light Inspection

B933H29306006

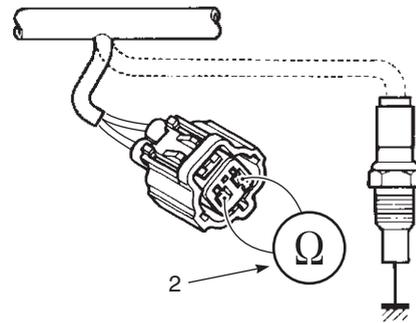
Inspect the engine coolant temperature indicator light in the following procedures:

- Disconnect the ECT sensor coupler (1).



I933H1930007-04

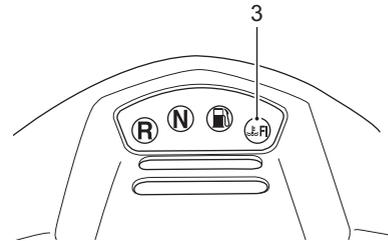
- Connect the variable resistor (2) between the terminals.



I718H1930009-05

- Turn the ignition switch ON.
- Check the indicator light (3) operations when the resistance is adjusted to the specified values. If either one or all indications are abnormal, replace the indicator light with a new one. Refer to "Indicator Light Removal and Installation (Page 9C-1)".

Resistance	Indicator light (3)	Water temperature
Approx. 0.14 kΩ	OFF	Approx. 115 °C
0 Ω (Jumper wire)	ON	120 °C and over



I933H1930008-01

- Connect the ECT sensor coupler (1).

Engine Coolant Temperature Removal and Installation

B933H29306007

Refer to "ECT Sensor Removal and Installation in Section 1C (Page 1C-5)".

Neutral Indicator Switch Inspection

B933H29306008

Refer to "Gear Position (GP) Switch Inspection in Section 1I (Page 1I-7)".

Reverse Indicator Switch Inspection

B933H29306009

Refer to "Gear Position (GP) Switch Inspection in Section 1I (Page 1I-7)".

Ignition Switch Inspection

B933H29306010

Inspect the ignition switch in the following procedures:

- 1) Remove the left side cover. Refer to "Exterior Parts Removal and Installation in Section 9D (Page 9D-4)".
- 2) Disconnect the ignition switch coupler (1).



I933H1930009-01

- 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

 : 09900-25008 (Multi-circuit tester set)

Tester knob indication

Continuity (•))

Color Position	B/R	B/O	Br
LIGHT	○	○	○
ON	○	○	
OFF			

I933H1930010-01

- 4) After finishing the ignition switch inspection, reinstall the removed parts.

Ignition Switch Removal and Installation

B933H29306011

Refer to "Ignition Switch Removal and Installation in Section 1H (Page 1H-7)".

Specifications

Service Data

B933H29307001

Wattage

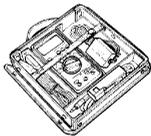
Unit: W

Item	Specification
Fuel indicator light	3.4
Neutral indicator light	1.7
Engine coolant temp. FI indicator light	1.7
Reverse indicator light	1.7

Special Tools and Equipment

Special Tool

B933H29308001

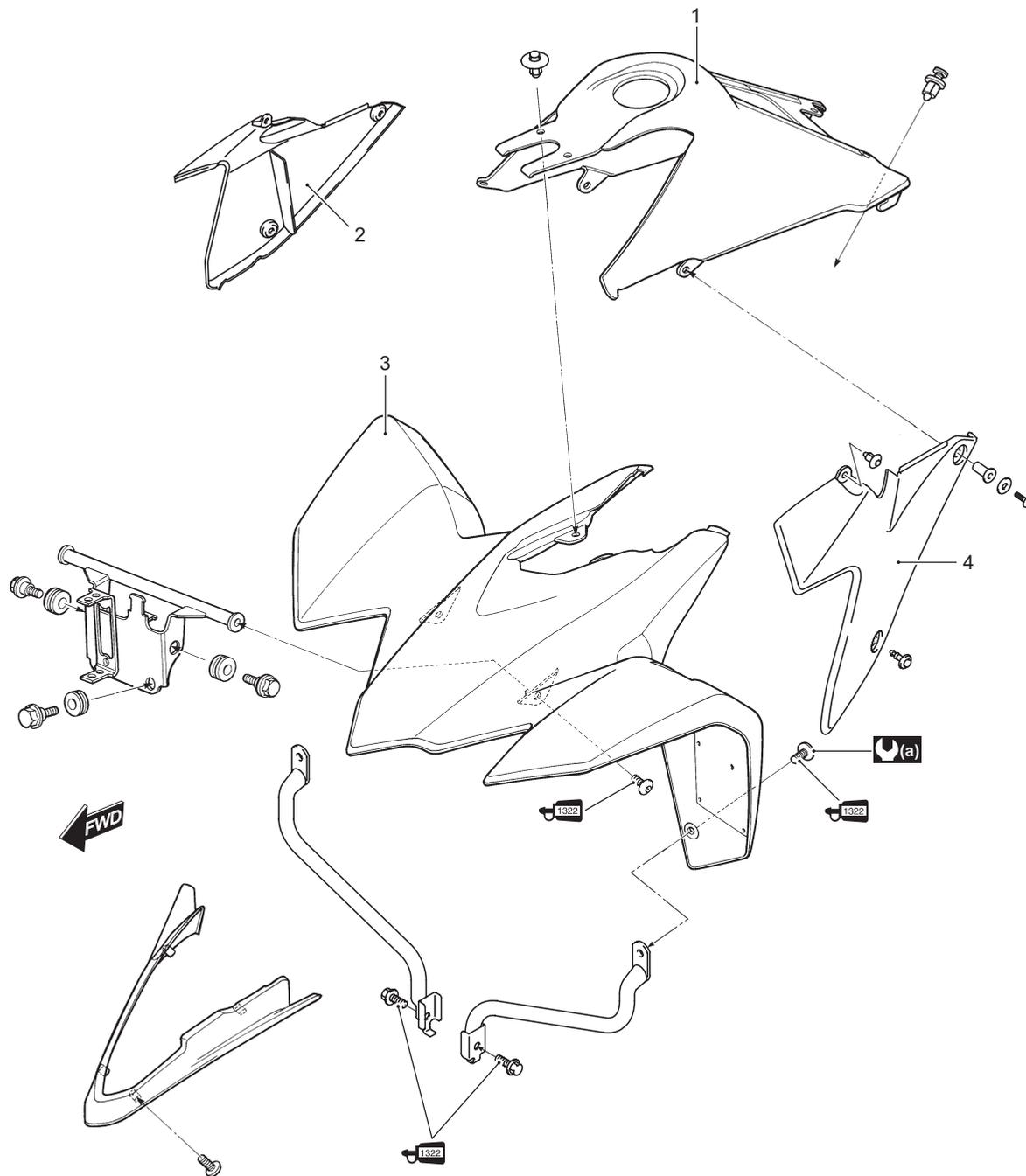
09900-25008 Multi-circuit tester set  (Page 9C-4)	
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Exterior Parts

Repair Instructions

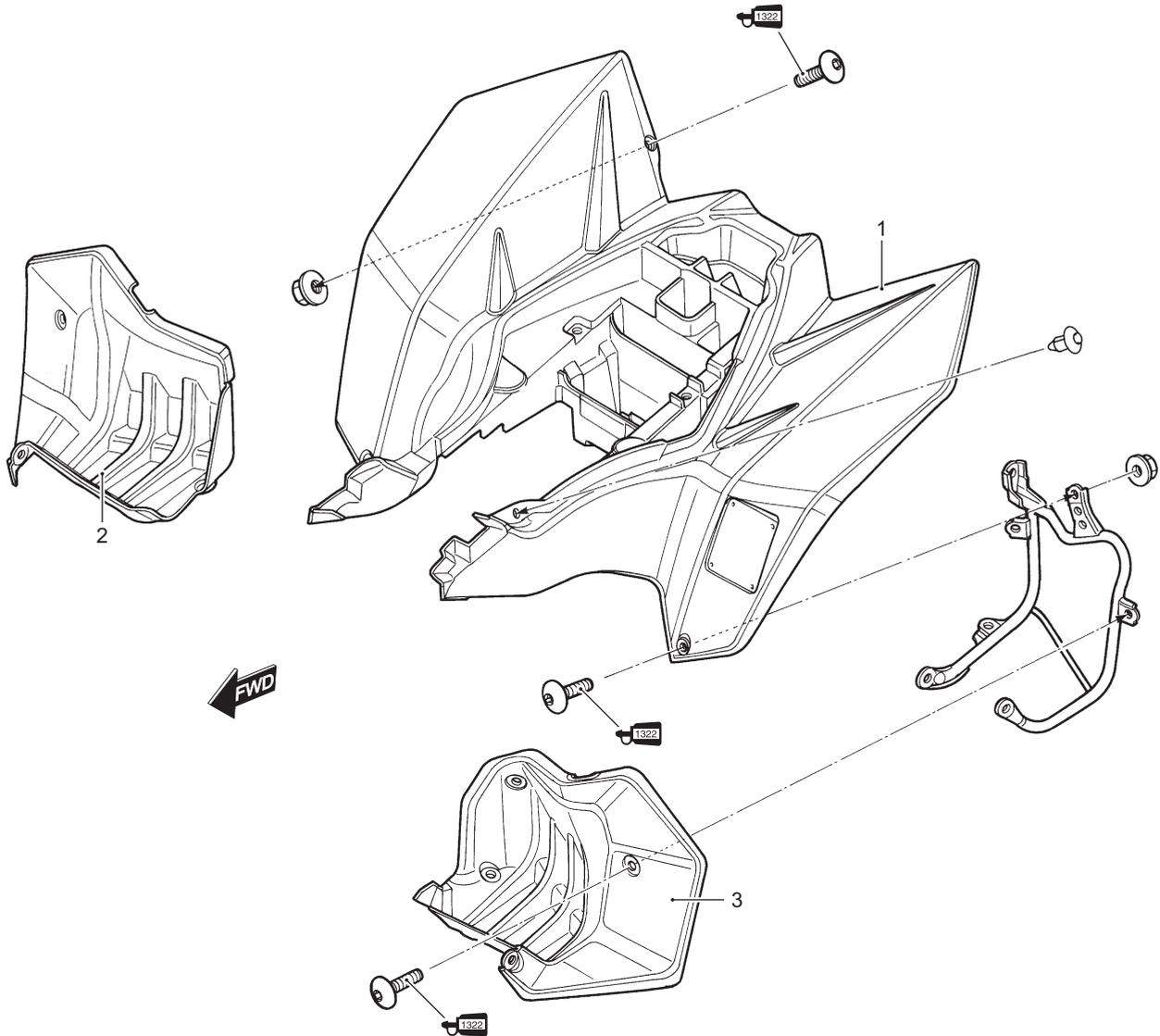
Exterior Parts Construction

B933H29406001



1. Fuel tank cover	4. Side cover (LH)
2. Side cover (RH)	(a) : 12 N·m (1.2 kgf-m, 8.5 lb-ft)
3. Front fender	1322 : Apply thread lock to thread part.

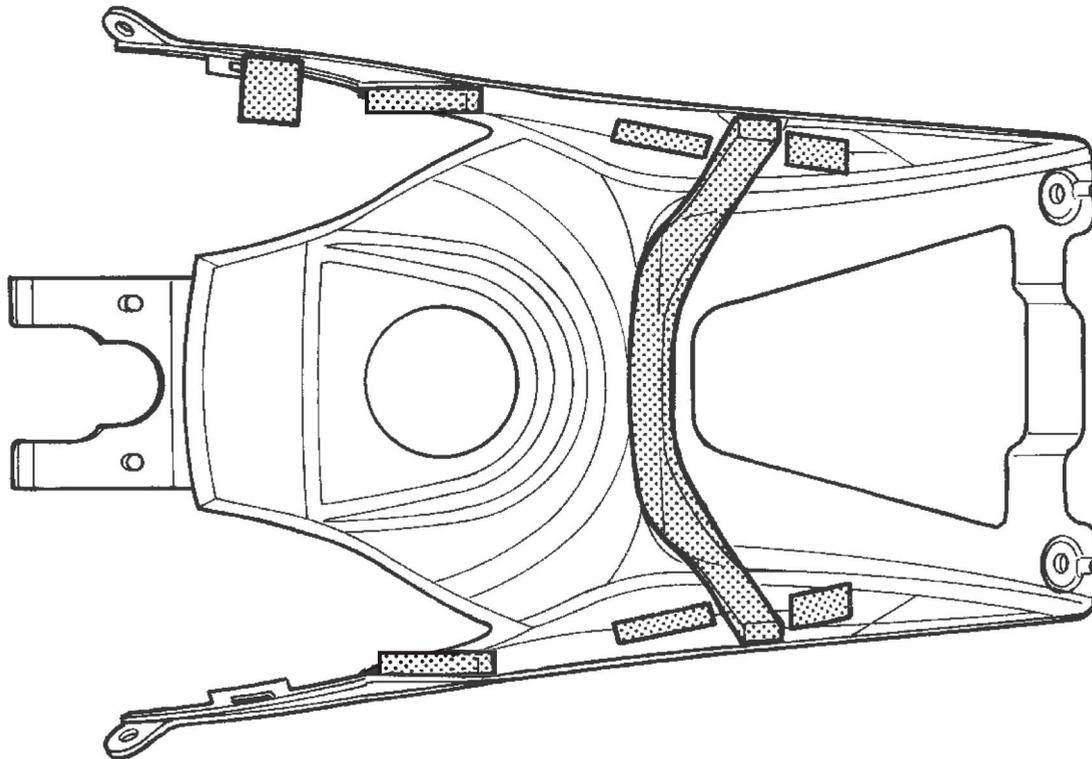
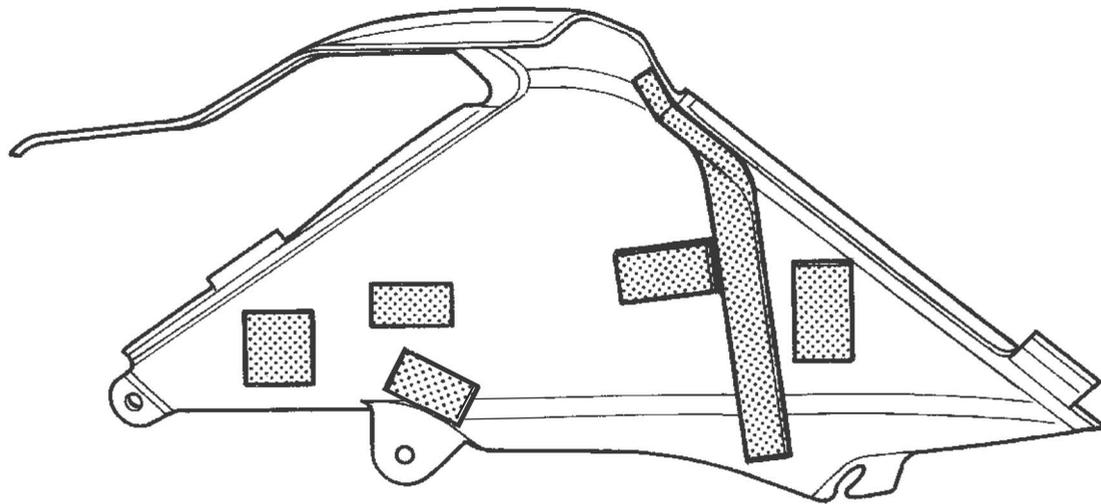
1933H1940023-08



1. Rear fender	3. Mudguard (LH)
2. Mudguard (RH)	1322 : Apply thread lock to thread parts.

Fuel Tank Cover Cushion Installation

B933H29406002



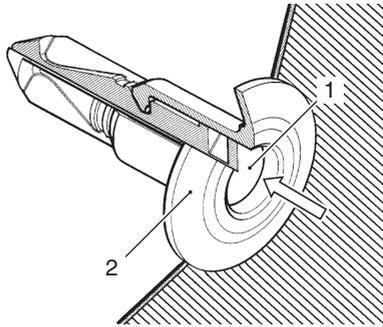
I933H1940025-09

Fastener Removal and Installation

B933H29406003

Removal

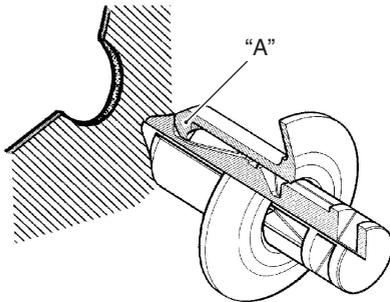
- 1) Depress the head of fastener center piece (1).
- 2) Pull out the fastener (2).



I649G1940005-02

Installation

- 1) Let the center piece stick out toward the head so that the pawls "A" closes.



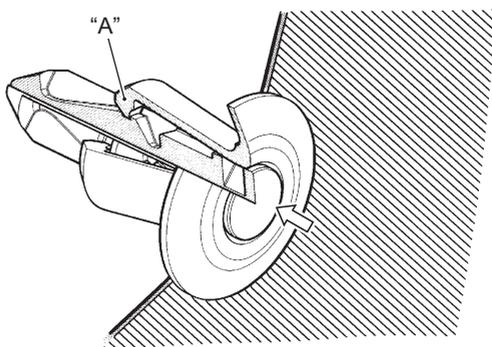
I649G1940006-02

- 2) Insert the fastener into the installation hole.

NOTE

To prevent the pawl "A" from damage, insert the fastener all the way into the installation hole.

- 3) Push in the head of center piece until it becomes flush with the fastener outside face.



I831G1940046-01

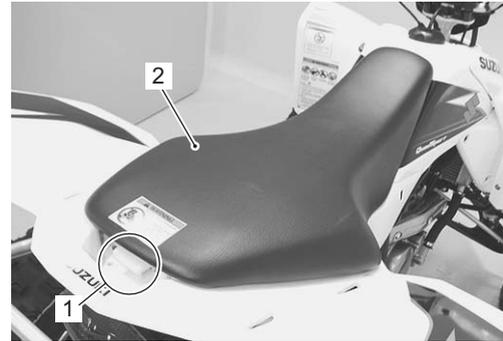
Exterior Parts Removal and Installation

B933H29406004

Seat

Removal

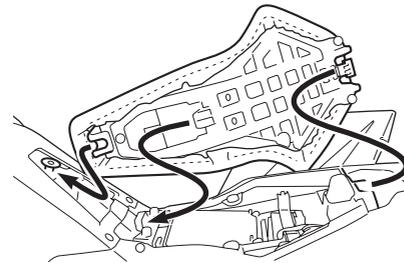
Pull the seat lock lever (1) upward and remove the seat (2).



I933H1940001-01

Installation

Slide the seat hooks into the seat hook retainers and push down firmly until the seat snaps into the locked position.

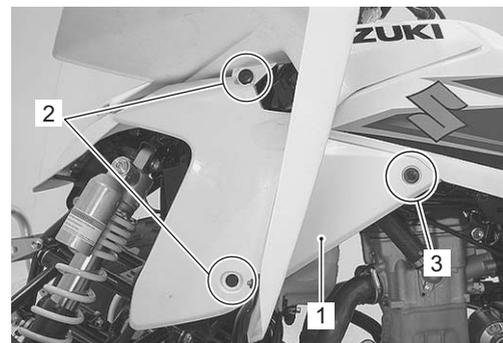


I933H1940002-02

Side cover and front fender

Removal

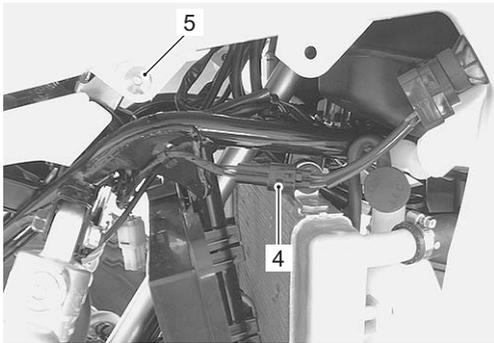
- 1) Remove the side covers (1), left and right by removing the fasteners (2) and screws (3).



I933H1940003-01

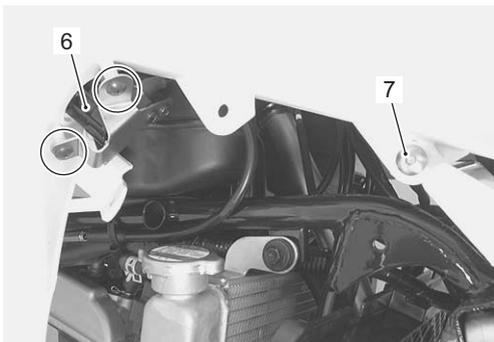
9D-5 Exterior Parts:

- 2) Disconnect the ignition switch coupler (4).
- 3) Remove the screw (5).



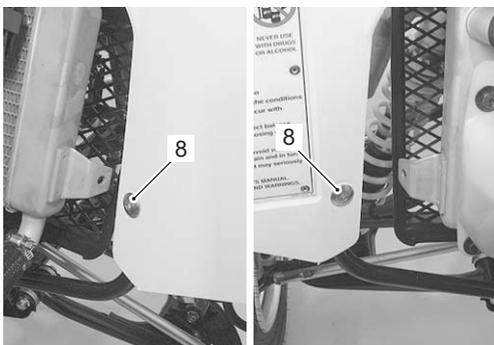
I933H1940004-02

- 4) Remove the reverse selection knob (6) and screw (7).



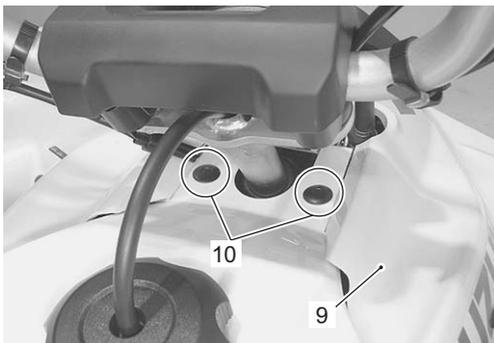
I933H1940005-01

- 5) Remove the screws (8).



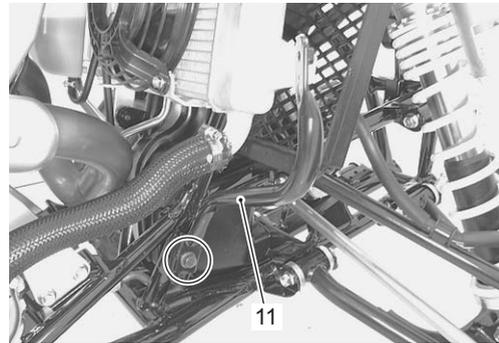
I933H1940006-01

- 6) Remove the front fender (9) by removing the fasteners (10).



I933H1940007-01

- 7) Remove the front fender bracket (11), left and right.



I933H1940010-01

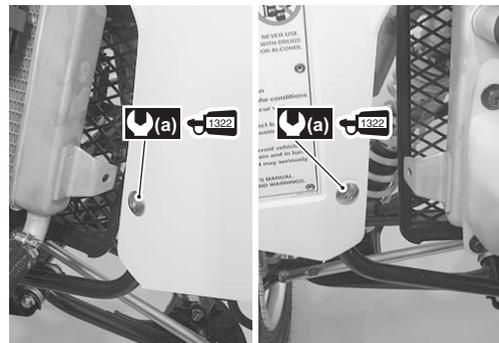
Installation

Install the side cover and front fender in the reverse order of removal. Pay attention to the following point: Apply thread lock to the front fender mounting screws and tighten them to the specified torque.

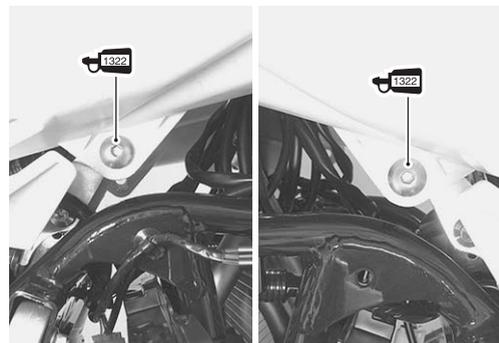
 : Thread lock cement 99000-32110 (THREAD LOCK CEMENT SUPER 1322 or equivalent)

Tightening torque

Front fender mounting screw (a): 12 N·m (1.2 kgf·m, 8.5 lb-ft)



I933H1940022-03



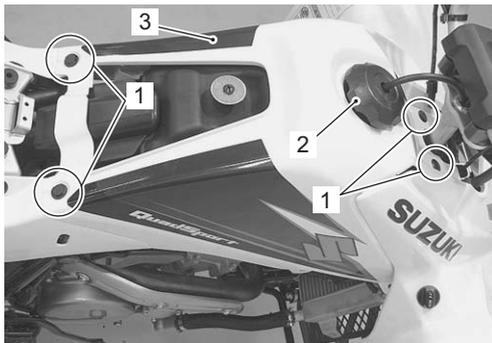
I933H1940008-07

**Fuel tank cover
Removal**

⚠ CAUTION

To prevent the fuel tank from contamination with foreign particles, install the fuel tank cap, after removing the fuel tank cover.

- 1) Remove the seat.
- 2) Remove the side covers, left and right.
- 3) Remove the fasteners (1) and fuel tank cap (2).
- 4) Remove the fuel tank cover (3).



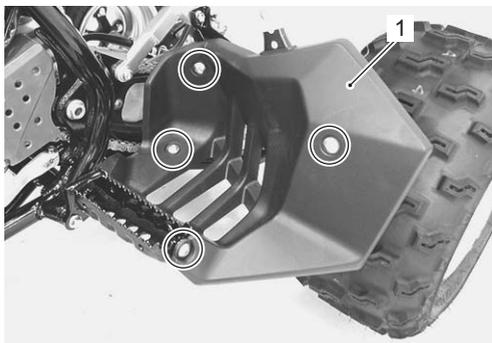
I933H1940009-01

Installation

Install the fuel tank cover in the reverse order of removal.

**Footrest mud guard
Removal**

- 1) Remove the footrest mud guards (1), left and right.



I933H1940011-01

- 2) Remove the mud guard reinforcements (2), left and right.



I933H1940012-02

Installation

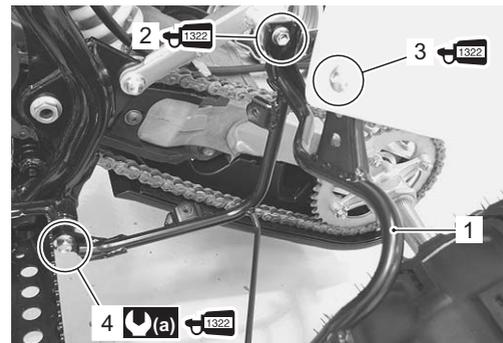
- 1) Install the mud guard reinforcement (1).
- 2) Apply thread lock to the mud guard reinforcements mounting bolt (2), rear fender mounting screw (3) and footrest mounting bolt (4).

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

- 3) Tighten the footrest mounting bolt (4) to the specified torque.

Tightening torque

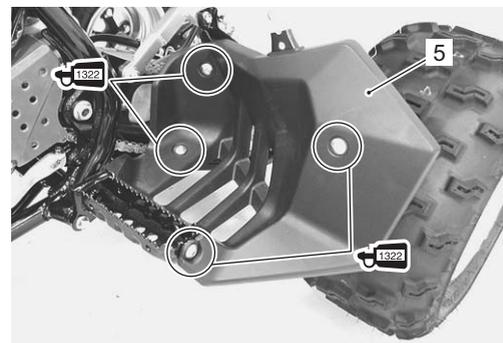
Footrest mounting bolt (a): 55 N·m (5.5 kgf-m, 40.0 lb-ft)



I933H1940013-01

- 4) Install the mud guard (5).
- 5) Apply thread lock to the footrest mud guard mounting screws and tighten them.

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



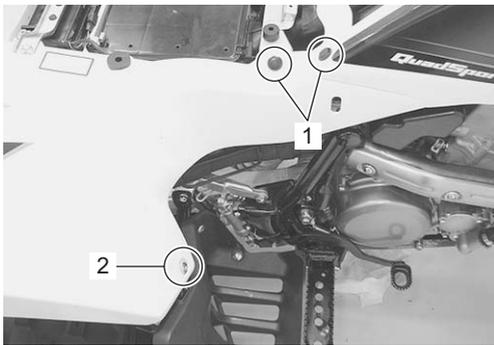
I933H1940014-01

9D-7 Exterior Parts:

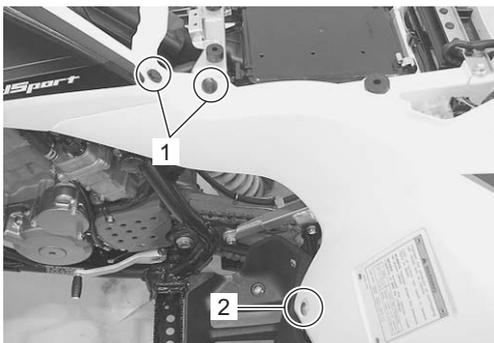
Rear fender

Removal

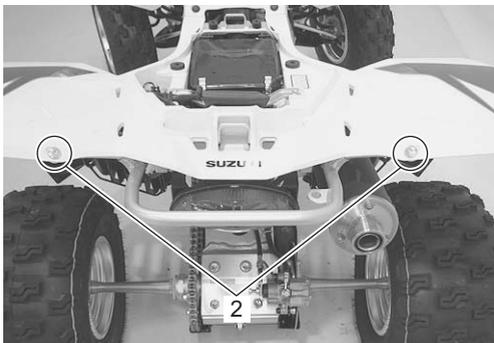
- 1) Remove the seat.
- 2) Remove the fasteners (1) and screws (2).



I933H1940015-01

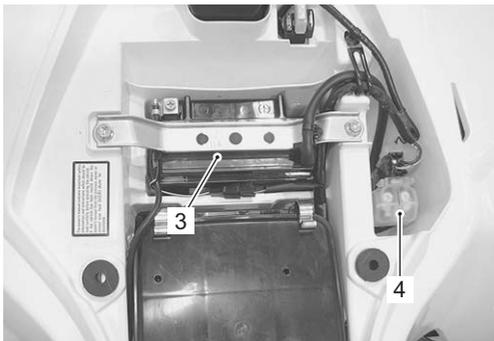


I933H1940016-01



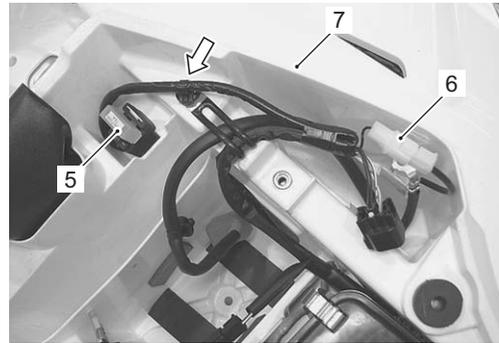
I933H1940017-04

- 3) Remove the battery (3). Refer to "Battery Removal and Installation in Section 1J (Page 1J-12)".
- 4) Remove the starter relay (4). Refer to "Starter Relay Removal and Installation in Section 1I (Page 1I-6)".



I933H1940018-01

- 5) Disconnect the ignition fuse assembly (5), starter motor lead wire coupler (6) and clamp.
- 6) Remove the rear fender (7).



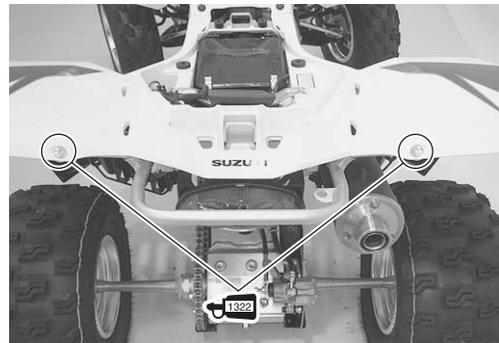
I933H1940019-01

Installation

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

- Route the wiring harness. Refer to "Wiring Harness Routing Diagram in Section 9A (Page 9A-3)".
- Apply thread lock to the rear fender mounting screws and tighten them.

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



I933H1940020-01



I933H1940021-01

Specifications

Tightening Torque Specifications

B933H29407001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Front fender mounting screw	12	1.2	8.5	☞ (Page 9D-5)
Footrest mounting bolt	55	5.5	40.0	☞ (Page 9D-6)

NOTE

The specified tightening torque is also described in the following.
 “Exterior Parts Construction (Page 9D-1)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H29408001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞ (Page 9D-5) / ☞ (Page 9D-6) / ☞ (Page 9D-6) / ☞ (Page 9D-7)

NOTE

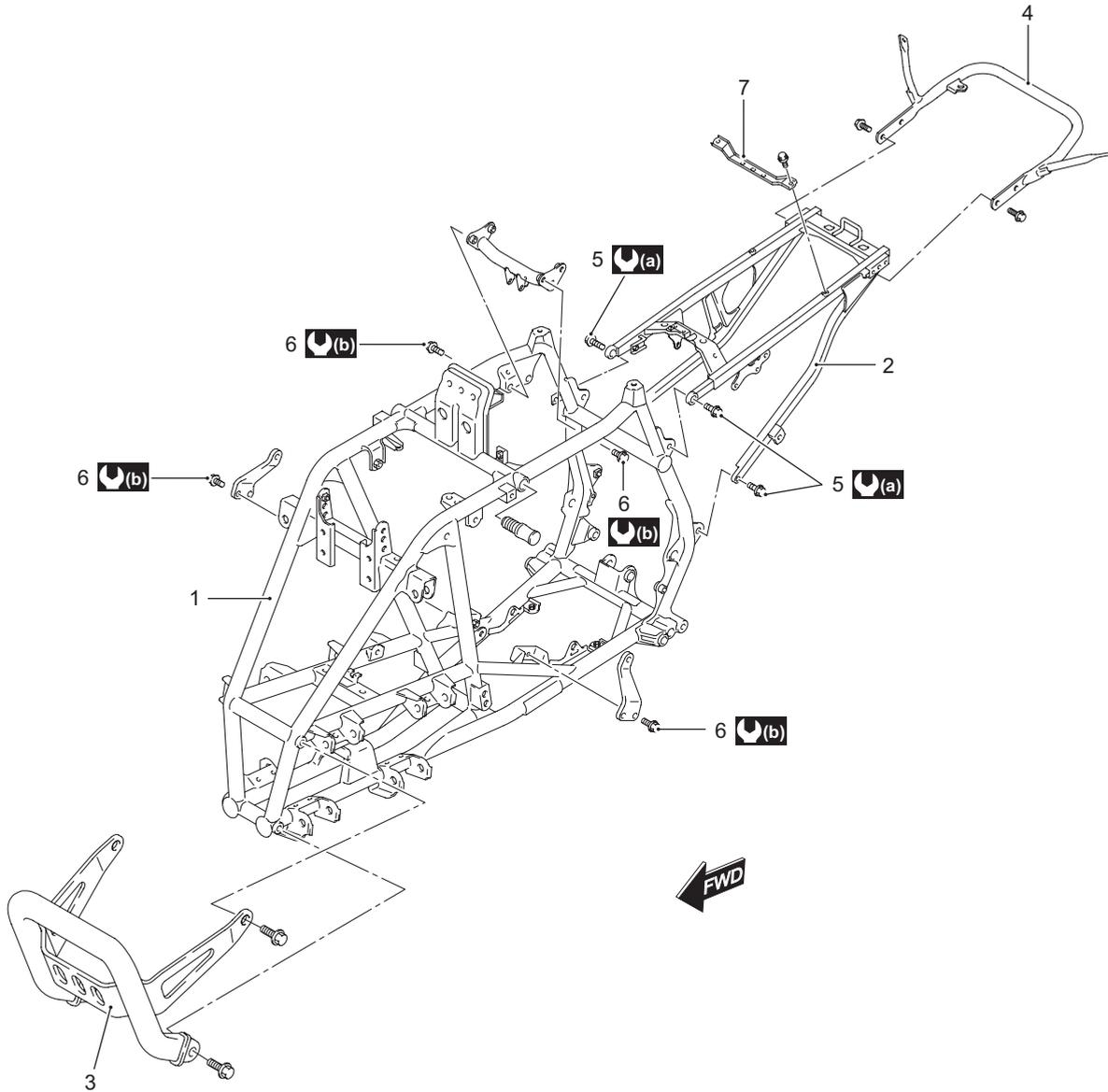
Required service material is also described in the following.
 “Exterior Parts Construction (Page 9D-1)”

Body Structure

Repair Instructions

Body Frame Construction

B933H29506001



1933H1950014-01

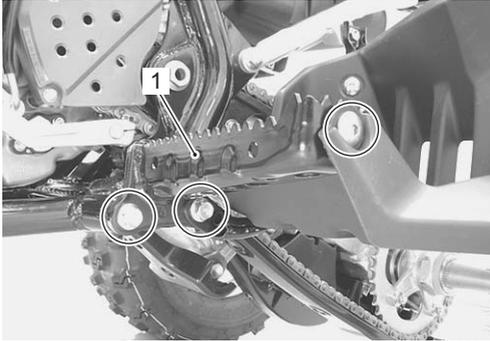
1. Frame	4. Rear grip	7. Battery plate
2. Seat rail	5. Seat rail mounting bolt	: 66 N·m (6.6 kgf·m, 47.5 lb-ft)
3. Front grip	6. Engine mounting bracket bolt	: 26 N·m (2.6 kgf·m, 19.0 lb-ft)

Footrest Removal and Installation

B933H29506002

Removal

Remove the footrests (1), left and right.



I933H1950001-01

Installation

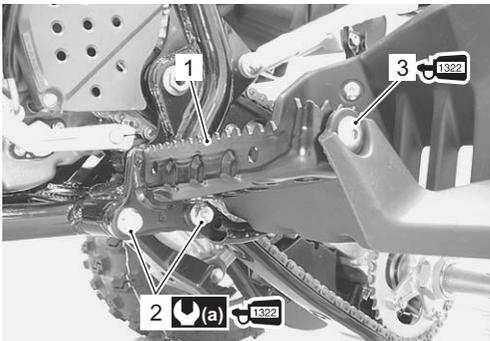
- 1) Install the footrest (1).
- 2) Apply thread lock to the footrest mounting bolts (2) and footrest mud guard mounting screw (3).

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

- 3) Tighten the footrest mounting bolts (2) to the specified torque.

Tightening torque

Footrest mounting bolt (a): 55 N·m (5.5 kgf·m, 40.0 lb-ft)



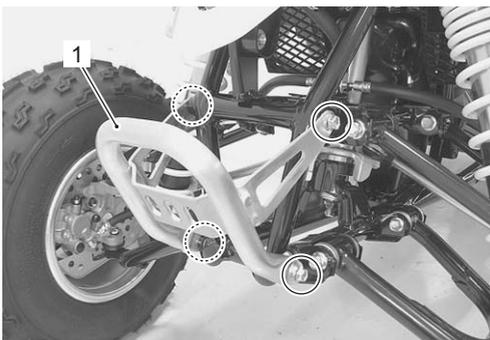
I933H1950002-01

Front Grip Removal and Installation

B933H29506003

Removal

Remove the front grip (1).



I933H1950003-01

Installation

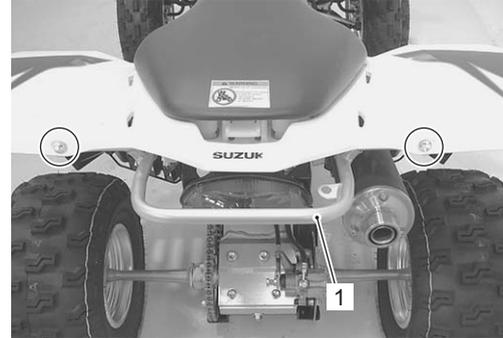
Install the front grip in the reverse order of removal.

Rear Grip Removal and Installation

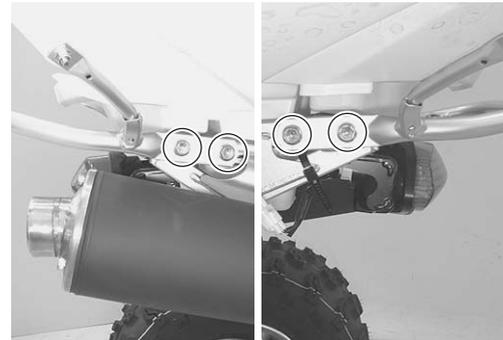
B933H29506004

Removal

Remove the rear grip (1).



I933H1950004-01



I933H1950005-01

Installation

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

- Apply thread lock to the rear fender mounting bolts and tighten them.

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



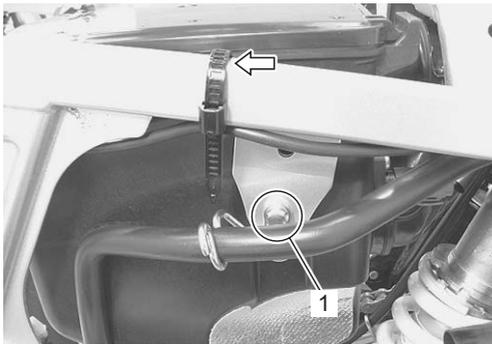
I933H1950006-01

Seat Rail Removal and Installation

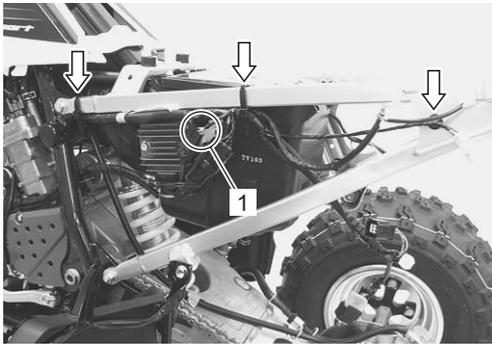
B933H29506005

Removal

- 1) Remove the seat and rear fender. Refer to “Exterior Parts Removal and Installation in Section 9D (Page 9D-4)”.
- 2) Remove the muffler. Refer to “Muffler / Exhaust Pipe Removal and Installation in Section 1K (Page 1K-3)”.
- 3) Remove the rear combination light. Refer to “Rear Combination Light Removal and Installation in Section 9B (Page 9B-4)”.
- 4) Remove the rear grip. Refer to “Rear Grip Removal and Installation (Page 9E-2)”.
- 5) Disconnect the clamps and remove the air cleaner box mounting bolts (1).

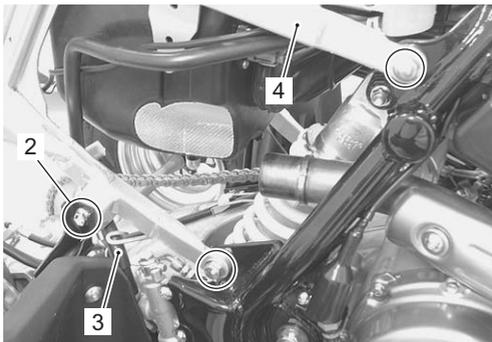


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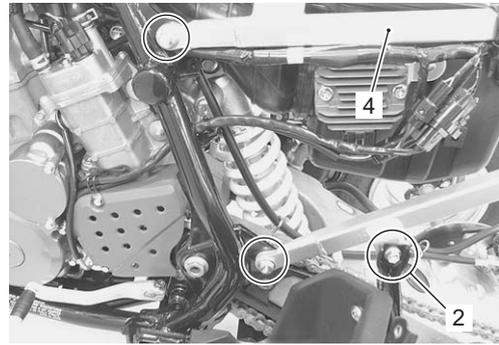


I933H1950008-01

- 6) Remove the footrest mud guard reinforcement mounting bolts (2) and move the rear brake hose (3) from the guide.
- 7) Remove the seat rail (4).



I933H1950009-01



I933H1950010-01

Installation

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

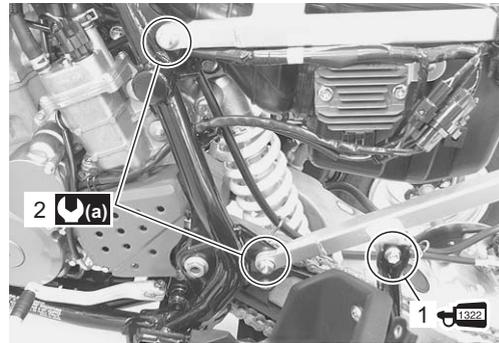
- Apply thread lock to the footrest mud guard mounting bolts (1) and tighten them.

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

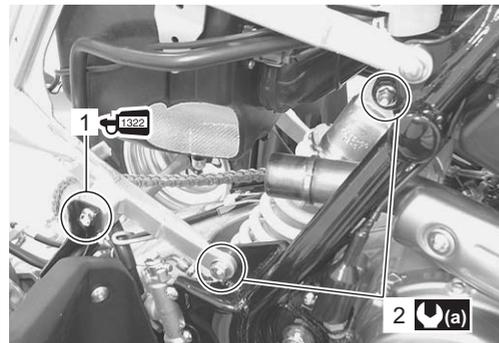
- Tighten the seat rail mounting bolts (2) to the specified torque.

Tightening torque

Seat rail mounting bolt (a): 66 N·m (6.6 kgf·m, 47.5 lb·ft)



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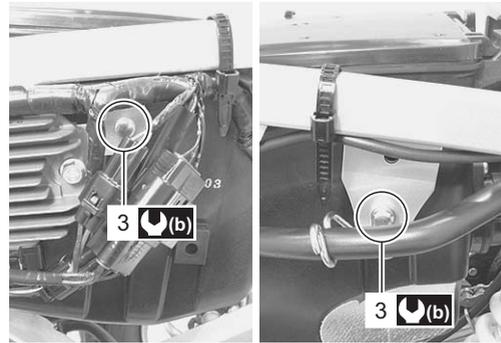


I933H1950012-02

- Rout the rear brake hose. Refer to “Rear Brake Hose Routing Diagram in Section 4A (Page 4A-2)” and “Wiring Harness Routing Diagram in Section 9A (Page 9A-3)”.
- Tighten the air cleaner box mounting bolts (3) to the specified torque.

Tightening torque

Air cleaner box mounting bolt (b): 4.5 N·m (0.45 kgf-m, 3.0 lb-ft)



I933H1950013-01

Specifications

Tightening Torque Specifications

B933H29507001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Footrest mounting bolt	55	5.5	40.0	☞ (Page 9E-2)
Seat rail mounting bolt	66	6.6	47.5	☞ (Page 9E-3)
Air cleaner box mounting bolt	4.5	0.45	3.0	☞ (Page 9E-4)

NOTE

The specified tightening torque is also described in the following.
 “Body Frame Construction (Page 9E-1)”

Reference:

For the tightening torque of fastener not specified in this section, refer to “Tightening Torque Specifications in Section 0C (Page 0C-6)”.

Special Tools and Equipment

Recommended Service Material

B933H29508001

Material	SUZUKI recommended product or Specification		Note
Thread lock cement	THREAD LOCK CEMENT SUPER 1322 or equivalent	P/No.: 99000-32110	☞ (Page 9E-2) / ☞ (Page 9E-2) / ☞ (Page 9E-3)

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