GENERAL INFORMATION

1

CONTENTS

COUNTRY AND AREA CODES

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

CODE	COUNTRY or AREA	EFFECTIVE FRAME NO.
E-19	E.U.	JSAAL41A 62100001 –
E-28	Canada	JSAAL41A 62100001 –
E-33	California (U.S.A.)	JSAAL41A 62100001 –

WARNING/CAUTION/NOTE

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

⚠ 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.**

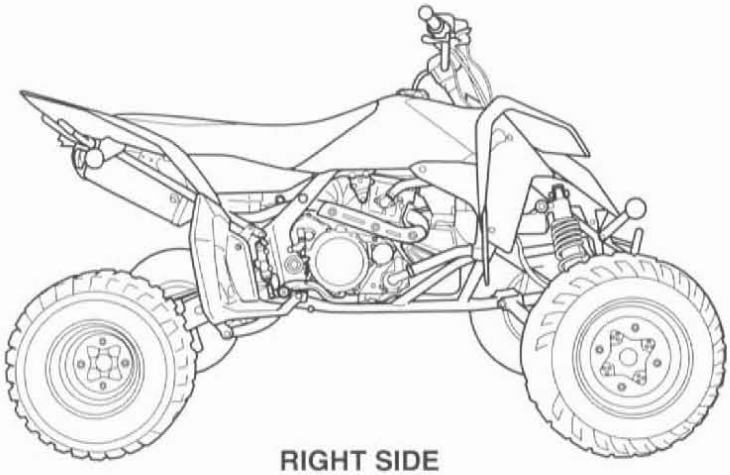
After servicing the fuel, oil, water, exhaust or brake systems, check all lines and fittings related to the system for leaks.

CAUTION

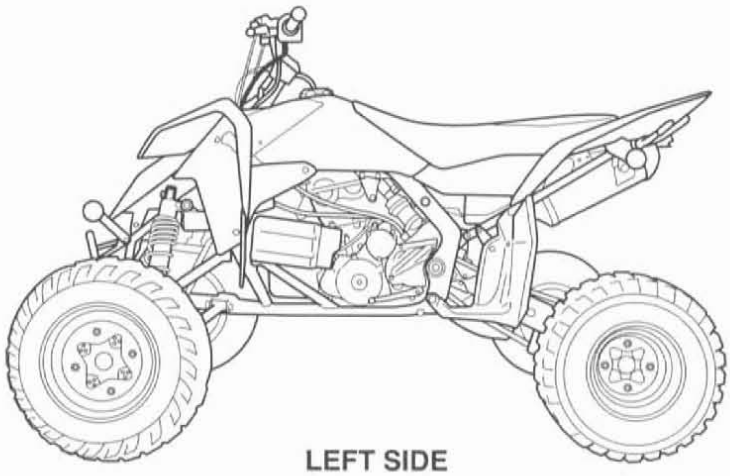
* If parts replacement is necessary, replace the parts with Suzuki Genuine Parts or their equivalent.
* When removing parts that are to be reused, keep them arranged in an orderly manner so that they may be reinstalled in the proper order and orientation.
* Be sure to use special tools when instructed.
* 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 from the battery.
* When tightening the cylinder head or case bolts and nuts, tighten the larger sizes first. Always tighten the bolts and nuts diagonally from the inside toward outside and to the specified tightening torque.
* Whenever you remove oil seals, gaskets, packing, O-rings, locking washers, self-locking nuts, cotter pins, circlips and certain other parts as specified, be sure to replace them with new ones. Also, before installing these new parts, be sure to remove any left over material from the mating surfaces.
* Never reuse a circlip. When installing a new circlip, take care not to expand the end gap larger than required to slip the circlip over the shaft. After installing a circlip, always ensure that it is completely seated in its groove and securely fitted.
* Use a torque wrench to tighten fasteners to the specified torque. Wipe off grease and oil if a thread is smeared with them.
* After reassembling, check parts for tightness and proper operation.

* To protect the environment, do not unlawfully dispose of used motor oil, engine coolant and other fluids: batteries and tires.
* To protect Earth's natural resources, properly dispose of used vehicle and parts.

SUZUKI LT-R450K6 ('06-MODEL)



RIGHT SIDE

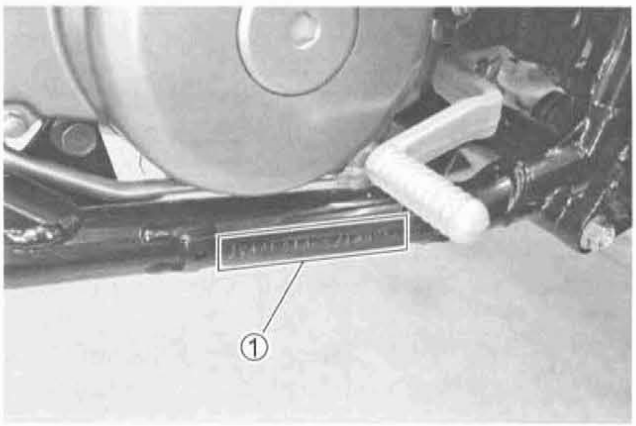


LEFT SIDE

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

SERIAL NUMBER LOCATION

The frame serial number or V.I.N. (Vehicle Identification Number) ① is stamped on the right side of the steering head pipe. The engine serial number ② is located on the rear side of the crankcase. These numbers are required especially for registering the machine and ordering spare parts.



FUEL, OIL AND ENGINE COOLANT RECOMMENDATION

FUEL (FOR USA AND CANADA)

Use only unleaded gasoline of at least 90 pump octane (R/2 + M/2).
Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.

FUEL (FOR OTHER COUNTRIES)

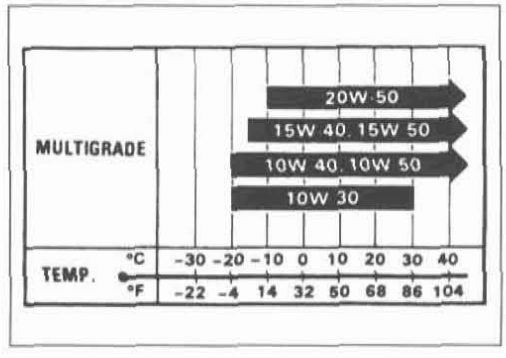
Gasoline used should be graded 95 octane (Research Method) or higher. Unleaded gasoline is recommended.

ENGINE OIL (FOR USA)

Oil quality is a major contributor to your engine's performance and life. Always select good quality engine oil. Suzuki recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL or equivalent engine oil. Use of SF/SG or SH/SJ in API with MA in JASO.
Suzuki recommends the use of SAE 10W-40 engine oil. If SAE 10W-40 engine oil is not available, select an alternative according to the following 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 right chart.



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 re-use brake fluid left over from a previous servicing, which has been stored for a long period.

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 performs 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): Approx. 1 400 ml (1.5/1.2 US/Imp qt)

For engine coolant mixture information, refer to cooling system section in page 6-2.

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

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.

- Keep to these break-in engine speed limits:

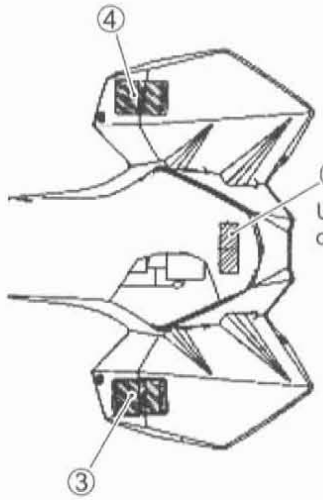
Break-in engine speeds
Initial 10 hours: Less than ½ throttle

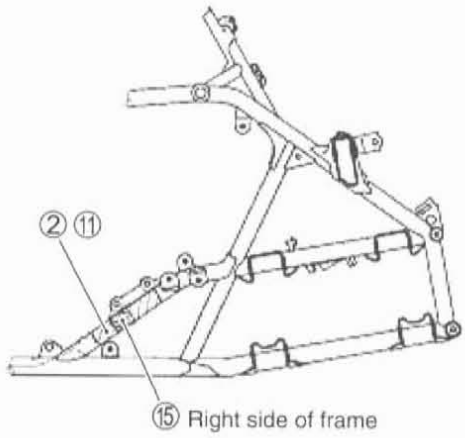
- After the engine has been operated for 10 hours the engine to full throttle operation, for short periods of time.

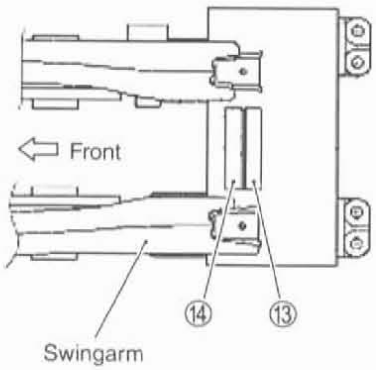
INFORMATION LABELS

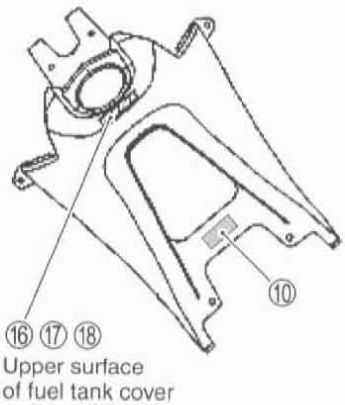
NO	LABEL or PLATE NAME	APPLIED SPECIFICATION		
		E-19	E-28	E-33
①	Certification plate Ⓔ	○	—	○
②	Information label Ⓔ	—	—	○
③	Tire air pressure label (Warning no-passenger) Ⓔ	○	○	○
④	Tire air pressure label (Warning no-passenger) Ⓕ	—	○	—
⑤	General warning and Age,16 label Ⓔ	○	○	○
⑥	General warning label Ⓕ	—	○	—
⑦	Warning no-passenger mark Ⓔ	○	—	○
⑧	Warning no-passenger mark Ⓔ Ⓕ	—	○	—
⑨	Age, 16 label Ⓕ	—	○	—
⑩	Manual notice label Ⓔ	—	—	○
⑪	ICES Canada label Ⓔ Ⓕ	—	○	—
⑫	Compliance label Ⓔ	—	○	—
⑬	Chain adjustment label Ⓕ	—	○	—
⑭	Chain adjustment label Ⓔ	○	○	○
⑮	EC approval mark	○	—	—
⑯	Fuel information label Ⓔ Ⓕ	—	○	—
⑰	Fuel information label Ⓔ	—	—	○
⑱	Fuel information label Ⓔ Ⓕ Ⓖ Ⓑ Ⓢ	○	—	—

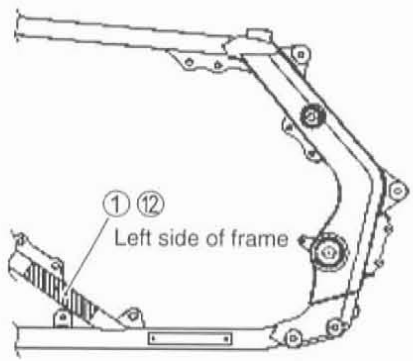
Ⓔ: English Ⓕ: French Ⓖ: German Ⓑ: Italino Ⓢ: Spanish











SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	1 845 mm (72.6 in)
Overall width	1 245 mm (49.0 in)
Overall height	1 085 mm (42.7 in)
Wheelbase	1 285 mm (50.6 in)
Front track	1 045 mm (41.1 in)
Rear track	985 mm (38.8 in)
Ground clearance	240 mm (9.4 in)
Seat height	780 mm (30.7 in)
Dry mass	167 kg (368 lbs)

ENGINE

Type	Four stroke, liquid-cooled, DOHC
Number of cylinders	1
Bore	95.5 mm (3.760 in)
Stroke	62.8 mm (2.472 in)
Displacement	450 cm^3 (27.5 cu. in)
Compression ratio	11.7 : 1
Fuel system	Fuel injection
Air cleaner	Polyurethane foam element
Starter system	Electric
Lubrication system	Dry sump
Idle speed	1 800 ± 100 r/min

DRIVE TRAIN

Clutch		Wet multi-plate type
Transmission		5-forward
Gearshift pattern		1 down 4 up, foot operated
Primary reduction ratio		2.851 (77/27)
Gear ratios,	Low	2.076 (27/13)
	2nd	1.647 (28/17)
	3rd	1.333 (28/21)
	4th	1.095 (23/21)
	Top	0.913 (21/23)
Final reduction ratio		2.571 (36/14)
Drive chain		RK 520SMOZ10S, 96 Links

CHASSIS

Front suspension	Independent, double wishbone, coil spring, oil damped
Rear suspension	Swingarm type, coil spring, oil damped
Front wheel travel	254 mm (10.0 in)
Rear wheel travel	277 mm (10.9 in)
Caster	8.0°
Trail	30 mm (1.18 in)
Toe-in	0 mm
Camber	–3.0°
Steering angle	41°
Turning radius	3.5 m (11.5 ft)
Front brake	Disc brake, twin
Rear brake	Disc brake
Front tire size	AT20 × 7 R10☆☆☆, tubeless
Rear tire size	AT18 × 10 R8☆☆☆, tubeless

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	8° B.T.D.C. at 1 800 r/min
Spark plug	NGK CR8EB
Battery	12 V 21.6 kC (6 Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	20 A
Fan fuse	10 A
Ignition fuse	10 A
Headlight	12 V 40/40 W
Brake light/Taillight	LED
Neutral indicator light	12 V 3.4 W
Fuel indicator light	12 V 3.4 W
Coolant tempereture/ Fuel injection warning light	12 V 3.4 W

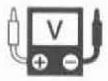
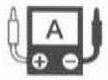
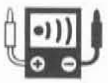
CAPACITIES

Fuel tank, including reserve		10.0 L (2.6/2.2 US/Imp gal)
Engine oil, oil change		Oil tank 1 200 ml (1.3/1.1 US/Imp qt) Engine 400 ml (0.4/0.4 US/Imp qt)
	with filter change	Oil tank 1 300 ml (1.4/1.1 US/Imp qt) Engine 400 ml (0.4/0.4 US/Imp qt)
	overhaul	Oil tank 1 400 ml (1.5/1.2 US/Imp qt) Engine 400 ml (0.4/0.4 US/Imp qt)
Coolant		1.4 L (1.5/1.2 US/Imp qt)

These specifications are subject to change without notice.

SYMBOL

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	SYMBOL	DEFINITION
	Torque control required. Data beside it indicates specified torque.		Apply THREAD LOCK "1342". 99000-32050
	Apply oil. Use engine oil unless otherwise specified.		Apply THREAD LOCK SUPER "1360". 99000-32130
	Apply molybdenum oil solution. (mixture of engine oil and SUZUKI MOLY PASTE in a ratio of 1 : 1)		Apply or use brake fluid.
	Apply SUZUKI SUPER GREASE "A" or equivalent grease. 99000-25010		Measure in voltage range.
	Apply SUZUKI SILICONE GREASE. 99000-25100		Measure in resistance range.
	Apply SUZUKI MOLY PASTE. 99000-25140		Measure in current range.
	Apply SUZUKI BOND "1215" or equivalent bond. 99000-31110		Measure in diode test range.
	Apply SUZUKI BOND "1216B". 99000-31230		Measure in continuity test range.
	Apply THREAD LOCK SUPER "1303". 99000-32030		Use special tool.
	Apply THREAD LOCK SUPER "1322" or equivalent thread lock. 99000-32110		Indicates service data.

ABBREVIATIONS USED IN THIS MANUAL

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) (MAP Sensor)
IAT Sensor	: Intake Air Temperature Sensor (IATS)
IG	: Ignition
IAS	: Idle air screw

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)

PERIODIC MAINTENANCE

CONTENTS

2

PERIODIC MAINTENANCE SCHEDULE

The chart below 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 months.

NOTE:

More frequent servicing may be performed on vehicles that are use under severe conditions.

PERIODIC MAINTENANCE CHART

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

NOTE:

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

R = Replace *C = Clean*

T = Tighten *L = Lubricate*

MAINTENANCE AND TUNE-UP PROCEDURES

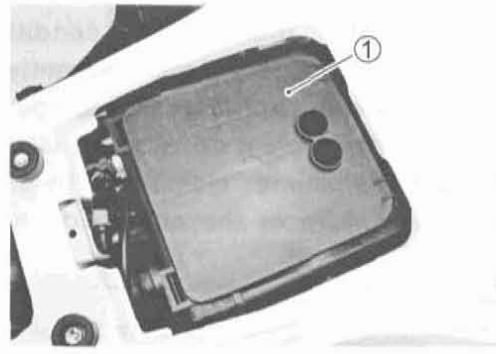
This section describes the servicing procedures for each item mentioned in the Periodic Maintenance chart.

AIR CLEANER

Clean every 3 months.

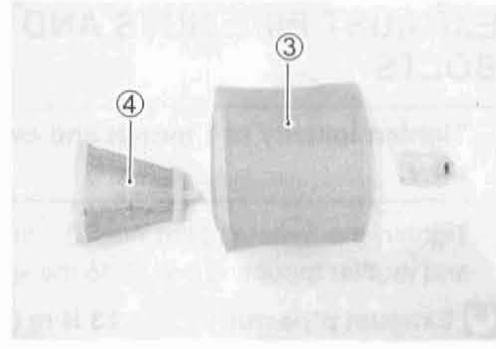
If the air cleaner is clogged with dust, intake resistance will be increased, with a resultant decrease in power output and an increase in fuel consumption. Check and clean the air cleaner element in the following manner.

- Remove the seat. (☞7-6)
- Remove the air cleaner case cover ①.

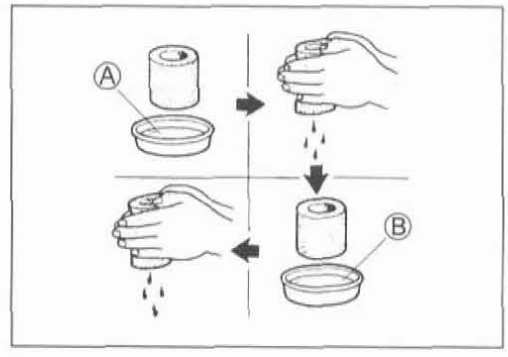


- Remove the air cleaner element ②.

- Separate the polyurethane foam element ③, element frame ④ and element holder.



- 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.
- 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.
- Immerse the element in motor oil, and then squeeze out the excess oil leaving the element slightly wet.

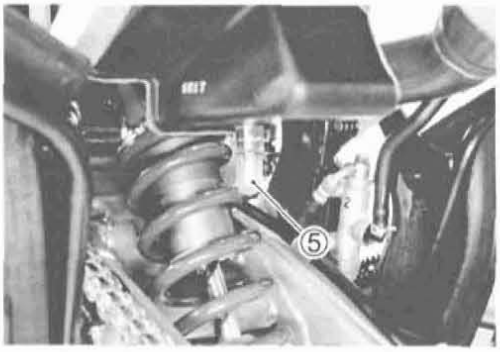


Ⓐ Non-flammable cleaning solvent
Ⓑ MOTUL AIR FILTER OIL or equivalent filter oil

CAUTION

*** Inspect the air cleaner element for tears. A torn element must be replaced.**
*** *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 with torn element. Make sure that the air cleaner element is in good condition at all times. Life of the engine depends largely on this component!**

- Remove the drain cap ⑤ of the air cleaner box to allow any water to drain out.

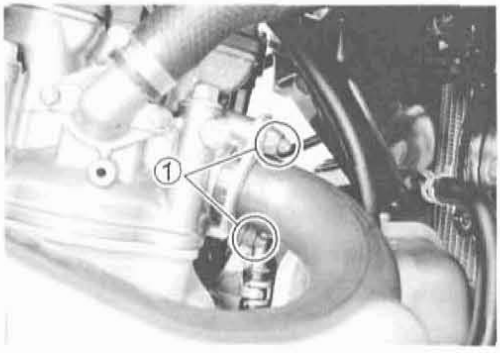


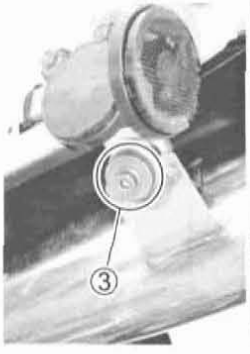
EXHAUST PIPE NUTS AND MUFFLER BOLTS

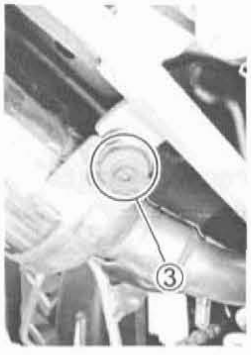
Tighten initially at 1 month and every 3 months thereafter.

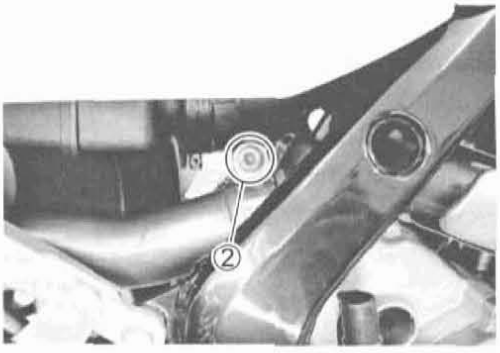
- Tighten the exhaust pipe nuts ①, muffler connection bolt ②, and muffler mounting bolt ③ to the specified torque.

Exhaust pipe nut: 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Muffler connection bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Muffler mounting bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)







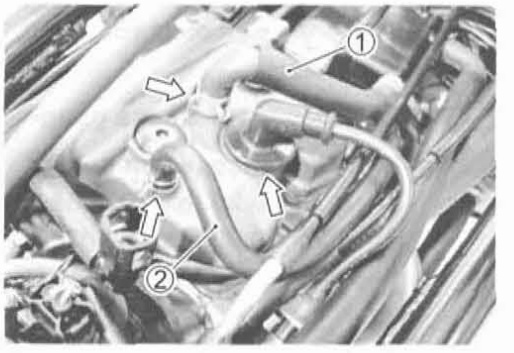


VALVE CLEARANCE

Inspect initially at 1 month and every 6 months thereafter.

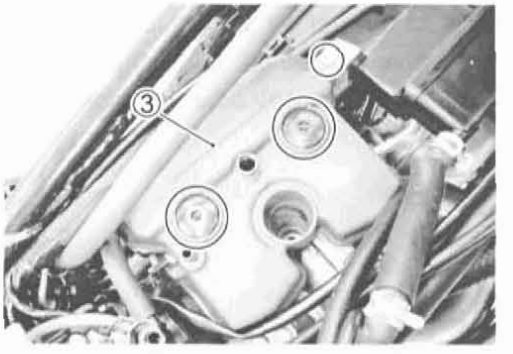
Excessive valve clearance results in valve noise and insufficient valve clearance results in valve damage and reduced power. Check the intake and exhaust valve clearances at the distances indicated above and adjust the valve clearances to specification, if necessary.

- Remove the seat. (☞7-6)
- Remove the side covers, fuel tank cover and front fender. (☞7-6)
- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- Remove the spark plug cap and spark plug. (☞2-10)
- Disconnect the breather hose ① and oil tank over-flow hose ②.



- Remove the cylinder head cover ③.

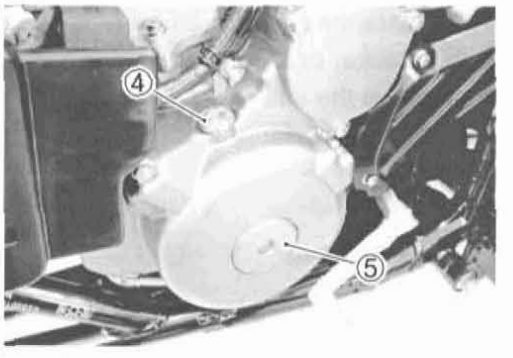
The valve clearance specification is different for intake and exhaust valves.
Valve clearance must be checked and adjusted, 1) at the time of periodic inspection, 2) when the valve mechanism is serviced, and 3) when the camshafts are removed for servicing.



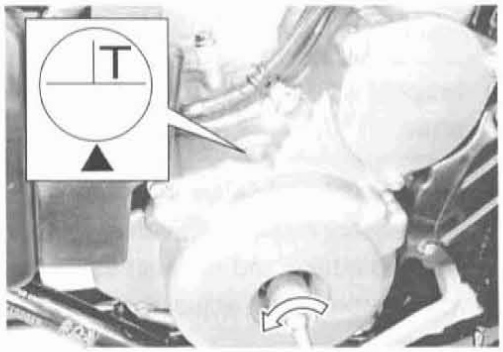
- Remove the valve timing inspection plug ④ and generator cover cap ⑤.

NOTE:

* *The piston must be at top dead center (TDC) on the compression stroke in order to check or adjust the tappet clearance.*
* *The tappet clearance should only be checked when the engine is cold.*



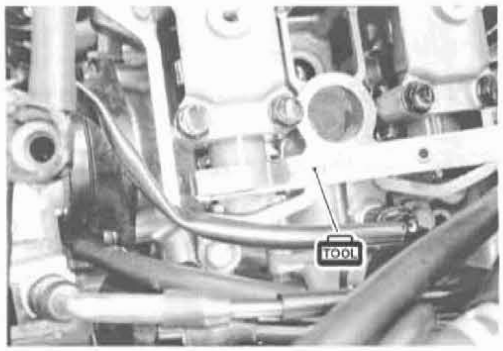
- Rotate the crankshaft with a box wrench to set the piston at TDC on the compression stroke. (Rotate the crankshaft until the "T" line on the generator rotor is aligned with the triangle mark on the generator cover.)



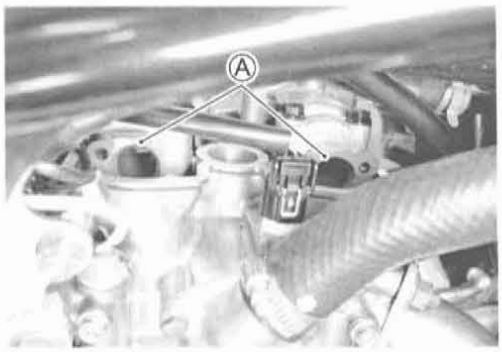
- Insert a thickness gauge between the tappet and the cam. If the clearance is out of specification, adjust it to the specification as follows.

TOOL 09900-20803: Thickness gauge

DATA Valve clearance (when cold)
IN: 0.10 – 0.20 mm (0.0039 – 0.0079 in)
EX: 0.20 – 0.30 mm (0.0079– 0.0118 in)

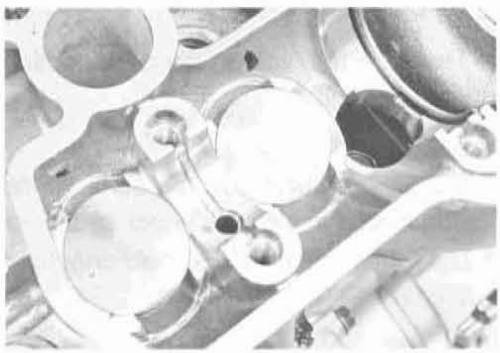


NOTE:
The cam must be at position Ⓐ, when checking and adjusting the valve clearance. Clearance readings should not be taken with the cam in any other position than this position.

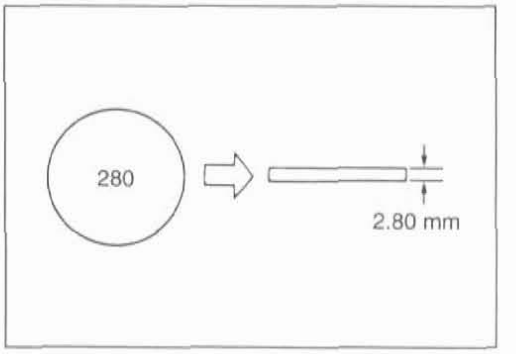


ADJUSTMENT
The clearance is adjusted by replacing the existing tappet shim with a thicker or thinner shim.

- Remove the intake or exhaust camshafts. (☞3-13)
- Remove the tappet and shim by hand or with a magnet. (☞3-25)



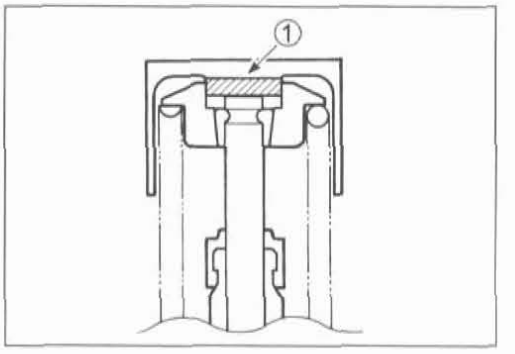
- Check the numbers printed on the tappet shim. These numbers indicate the thickness of the tappet shim, as illustrated.
- Select a replacement tappet shim that will provide the proper clearance. Tappet shims are available in 25 sizes, ranging from 2.30 to 3.50 mm (0.09 to 0.14 in) in increments of 0.05 mm (0.002 in). Install the selected shim ① at the valve stem end, with the numbers facing towards the tappet. Be sure to measure the shim with a micrometer to ensure that it is of the proper size.
  Refer to the tappet shim selection table for details.



NOTE:

** Be sure to apply molybdenum oil solution to the top and bottom faces of the tappet shim.*

** When installing the tappet shim, make sure that the side with the numbers face towards the tappet.*

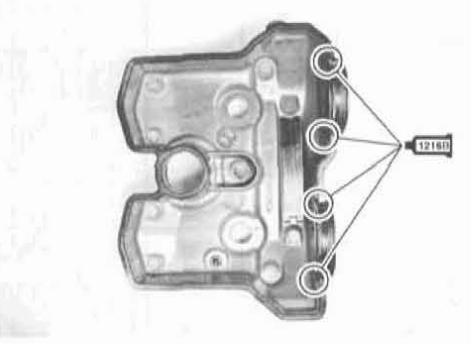


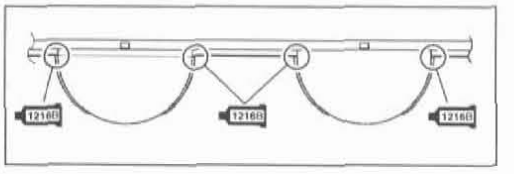
CAUTION

Install the camshafts as specified. (☞3-76)

- After replacing the tappet shim and camshafts, rotate the crankshaft so that the tappet is depressed fully (this will squeeze out any oil trapped between the tappet shim and the tappet that could cause an incorrect measurement). After rotating the crankshaft, check the valve clearance again to make sure that it is within specification.
- When installing the cylinder head cover, apply SUZUKI BOND "1216B" to the cam end caps of the cylinder head cover gasket.

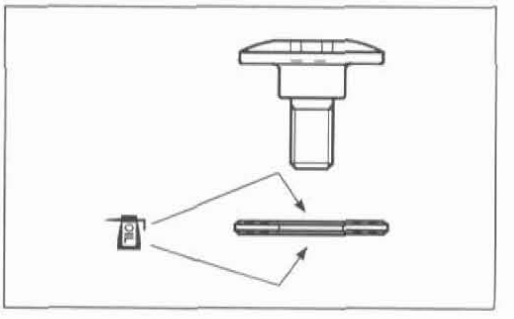
1216B 99000-31230: SUZUKI BOND "1216B"





- Tighten the generator cover cap and valve inspection plug. (☞3-78)
- Apply engine oil to both sides of the washers.
- Tighten the cylinder head cover bolts to the specified torque. (☞3-79)

Cylinder head cover bolt:
Initial 10 N·m (1.0 kgf-m, 7.0 lb-ft)
Final 14 N·m (1.4 kgf-m, 10.0 lb-ft)



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

TAPPET SHIM SET NO.(12800-41810)

MEASURED TAPPET CLEARANCE (mm) \ SUFFIX NO.	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
PRESENT SHIM SIZE (mm)	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
0.00–0.04			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
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
0.10–0.20	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																								
0.21–0.25	2.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50	
0.26–0.30	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50		
0.31–0.35	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50			
0.36–0.40	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50				
0.41–0.45	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50					
0.46–0.50	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50						
0.51–0.55	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50							
0.56–0.60	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50								
0.61–0.65	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50									
0.66–0.70	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50										
0.71–0.75	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50											
0.76–0.80	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50												
0.81–0.85	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50													
0.86–0.90	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50														
0.91–0.95	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50															
0.96–1.00	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50																
1.01–1.05	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50																	
1.06–1.10	3.25	3.30	3.35	3.40	3.45	3.50	3.50																		
1.11–1.15	3.30	3.35	3.40	3.45	3.50	3.50																			
1.16–1.20	3.35	3.40	3.45	3.50	3.50																				
1.21–1.25	3.40	3.45	3.50	3.50																					
1.26–1.30	3.45	3.50	3.50																						
1.31–1.35	3.50	3.50																							
1.36–1.40	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	0.23 mm
Present shim size	2.70 mm
Shim size to be used	2.80 mm

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

TAPPET SHIM SET NO.(12800-41810)

MEASURED TAPPET CLEARANCE (mm) \ SUFFIX NO.	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
PRESENT SHIM SIZE (mm)	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
0.00–0.04					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
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
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
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
0.20–0.30	SPECIFIED CLEARANCE/NO ADJUSTMENT REQUIRED																								
0.31–0.35	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	3.50	
0.36–0.40	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50		
0.41–0.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50			
0.46–0.50	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50				
0.51–0.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50					
0.56–0.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50						
0.61–0.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50							
0.66–0.70	2.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50								
0.71–0.75	2.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50									
0.76–0.80	2.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50										
0.81–0.85	2.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50											
0.86–0.90	2.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50												
0.91–0.95	3.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50													
0.96–1.00	3.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50														
1.01–1.05	3.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50															
1.06–1.10	3.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50																
1.11–1.15	3.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50																	
1.16–1.20	3.25	3.30	3.35	3.40	3.45	3.50	3.50																		
1.21–1.25	3.30	3.35	3.40	3.45	3.50	3.50																			
1.26–1.30	3.35	3.40	3.45	3.50	3.50																				
1.31–1.35	3.40	3.45	3.50	3.50																					
1.36–1.40	3.45	3.50	3.50																						
1.41–1.45	3.50	3.50																							
1.46–1.50	3.50																								

How to use this chart:

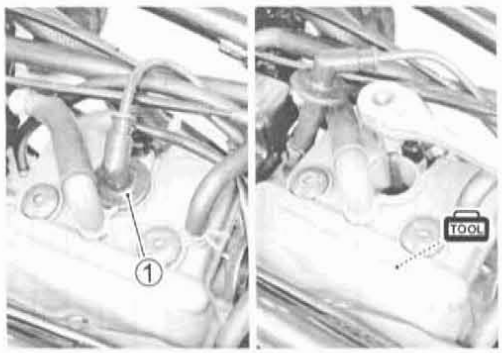
I. Measure tappet clearance when the engine is cold.
II. Measure present shim size.
III. Match clearance in vertical column with present shim size in horizontal column.

Example:

Tappet clearance is	0.38 mm
Present shim size	2.90 mm
Shim size to be used	3.05 mm

SPARK PLUG

Inspect every 6 months.
Replace every 18 months.

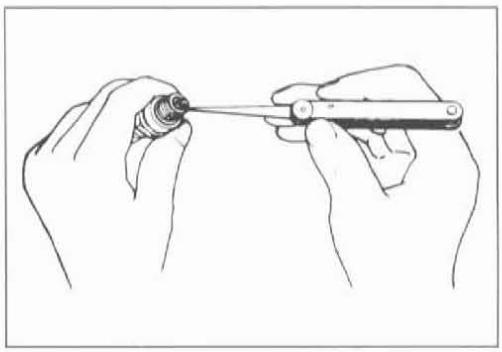


- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- Disconnect the spark plug cap ① and remove the spark plug.

	Hot type	Standard	Cold type
NGK	CR7EB	CR8EB	CR9EB

CARBON DEPOSITS

Check to see if there are 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.



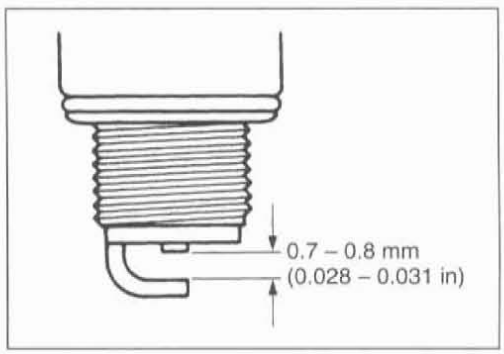
SPARK PLUG GAP

Measure the spark plug gap using a thickness gauge. If the spark plug gap is out of specification, adjust the gap.

DATA Standard

Spark plug gap: 0.7 – 0.8 mm (0.028 – 0.031 in)

TOOL 09900-20803: Thickness gauge



ELECTRODE

Check the condition of the electrode.

If the electrode is extremely worn or burnt, replace the spark plug with a new one.

Also, replace the spark plug if it has a broken insulator, damaged threads, etc.

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.

SPARK PLUG INSTALLATION

CAUTION

To avoid damaging the cylinder head threads; first, finger tighten the spark plug, and then tighten it to the specified torque using the spark plug wrench.

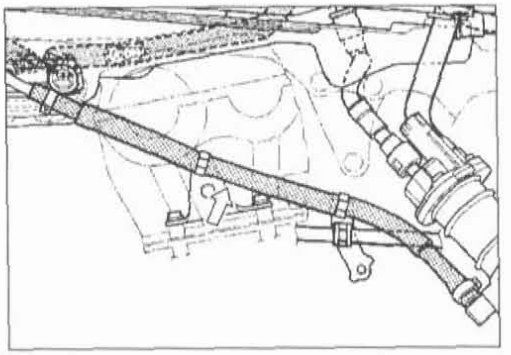
- Insert the spark plug and finger tighten it to the cylinder head and then, tighten it to the specified torque.

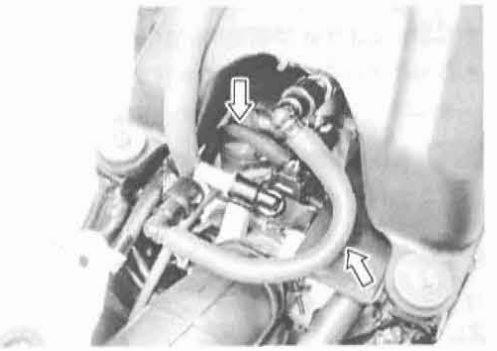
Spark plug: 11 N·m (1.1 kgf-m, 8.0 lb-ft)

FUEL LINE

Inspect every 3 months.
Replace every 4 years.

Inspect the fuel hose for damage and fuel leakage. If any defects are found, replace the fuel hoses with new ones.





FUEL FILTER

Replace every 4 years.

Inspect the fuel filter for damage and rust. If any defects are found, blow the fuel filter with compressed air or replace the fuel filter, O-ring and fuel filter cap with a new one. (☞5-9)

THROTTLE CABLE PLAY

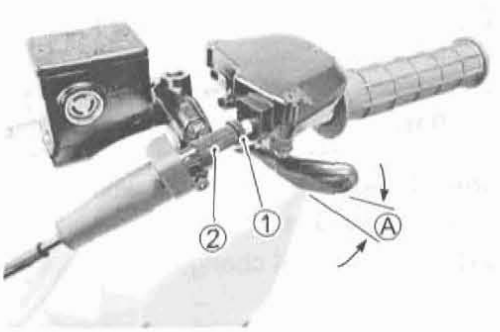
Inspect initially at 1 month and every 3 months thereafter.

Adjust the throttle cable play Ⓐ as follows.

- Loosen the lock-nut ① of the throttle cable.
- Turn the adjuster ② in or out to obtain the correct play.

DATA Throttle cable play: 3 – 5 mm (0.12 – 0.20 in)

- After adjusting the throttle cable play, tighten the lock-nut ①.



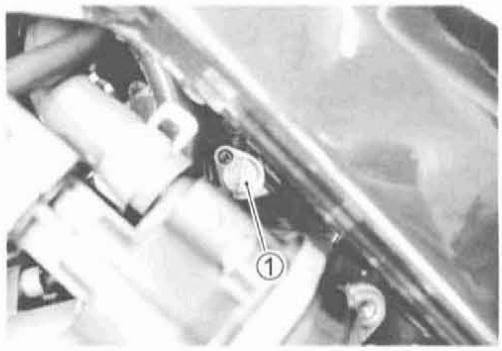
ENGINE IDLE SPEED

Inspect initially at 1 month and every 3 months thereafter.

NOTE:
Make this adjustment when the engine is hot.

- Connect the tachometer to the high-tension cord.
- Start the engine and set the engine idle speed between 1 700 and 1 900 r/min by turning the idle air screw ①.

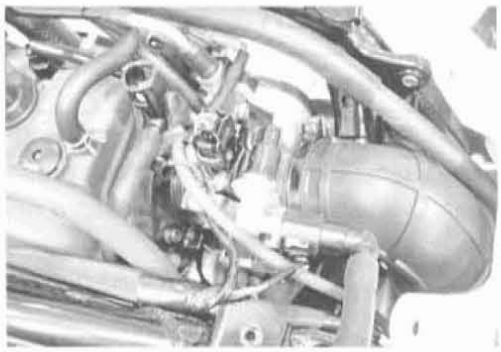
DATA **Engine idle speed: 1800 ± 100 r/min**



THROTTLE BODY

Inspect every 3 months.

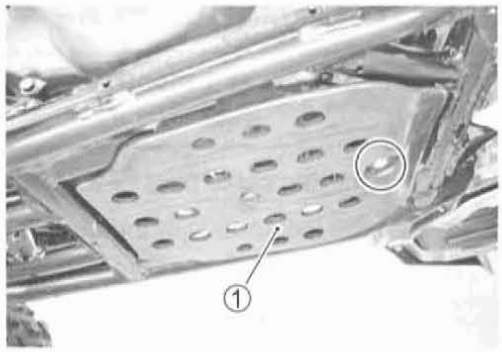
Inspect the throttle body for dirt.
Clean the throttle body if necessary.



ENGINE OIL AND OIL FILTER

Replace initially at 1 month and every 6 months thereafter.

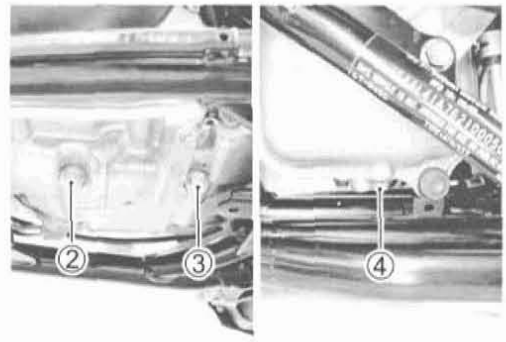
The oil should be changed while the engine is warm. Oil filter replacement at the above intervals, should be done together with the engine oil change.



ENGINE OIL REPLACEMENT

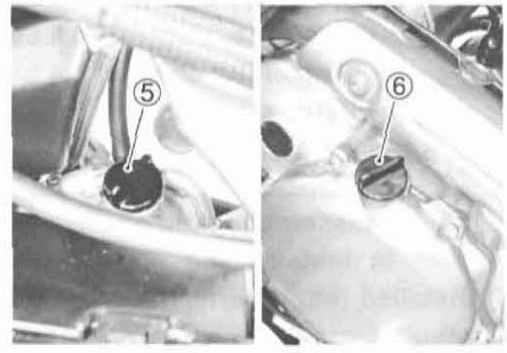
Crankcase side

- Remove the engine protector cover ①.
- Place an oil pan below the drain plug ② and ③ on the crankcase and drain plug ④ on the oil tank. Then drain out the engine oil by removing the engine oil drain plug ②, ③, ④ and engine oil filler cap ⑤, ⑥.
- Reinstall the drain plug ②, ③, ④ and gasket. Tighten the engine oil drain plug ②, ③ and ④ to the specified torque, and then pour the fresh oil through the oil filler hole. When performing an oil change (without oil filter replacement), the oil tank will hold about 1.2 L (1.3 US qt, 1.1 Imp qt) of oil and the engine will hold about 0.4 L (0.4 US qt, 0.4 Imp qt) of oil. Use of SF/SG or SH/SJ in API with MA in JASO.



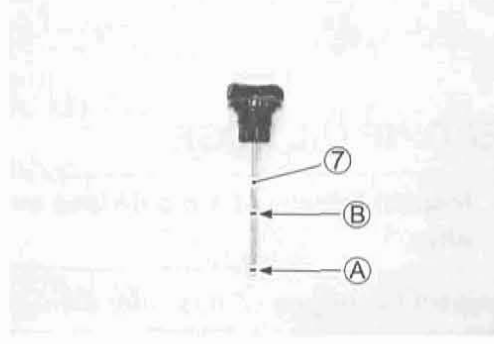
Engine oil drain plug ②, ③: 18 N·m (1.8 kgf-m, 13.0 lb-ft)
Engine oil tank drain plug ④: 12 N·m (1.2 kgf-m, 8.5 lb-ft)

- Make sure that the engine is cooled.
- Place the motorcycle on level ground and hold it vertically.
- Install the oil filter cap ⑤, ⑥.
- Start the engine and allow it to run for three minutes at idling speed.



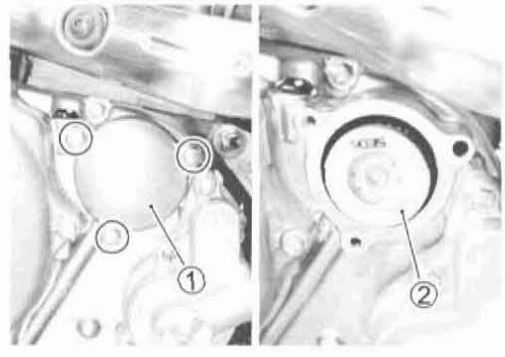
- Turn off the engine and wait about three minutes, and then check the oil level on the dipstick ⑦. The oil level should be between the "L" (low) Ⓐ and "F" (full) Ⓑ level lines. If the oil level is lower than the "L" Ⓐ level line, add oil to the "F" Ⓑ level line.

NOTE:
Engine oil expands and oil level increase when the engine oil is hot.

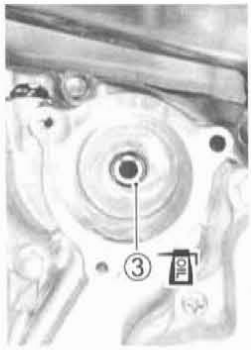


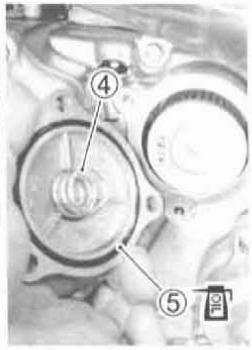
OIL FILTER REPLACEMENT

- Drain the engine oil as described in the engine oil replacement procedure.
- Remove the oil filter cap ① and oil filter ②.
- Replace the oil filter with a new one.



- Install the new O-ring ③.
- Install the spring ④ and new O-ring ⑤.





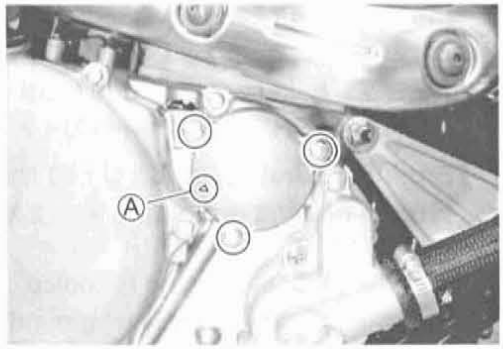
CAUTION

Apply engine oil to the O-rings.

- Replace the oil filter cap and tighten the bolts securely.

NOTE:
Face the triangle mark Ⓐ on the cap rearward.

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



DATA Engine oil capacity (oil tank side)

Oil change:	**1.2 L (1.3 US qt, 1.1 Imp qt)**
Oil and filter change:	**1.3 L (1.4 US qt, 1.1 Imp qt)**
Engine overhaul:	**1.4 L (1.5 US qt, 1.2 Imp qt)**

Engine oil capacity (engine side)

Oil change:	**0.4 L (0.4 US qt, 0.4 Imp qt)**
Oil and filter change:	**0.4 L (0.4 US qt, 0.4 Imp qt)**
Engine overhaul:	**0.4 L (0.4 US qt, 0.4 Imp qt)**

CAUTION

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

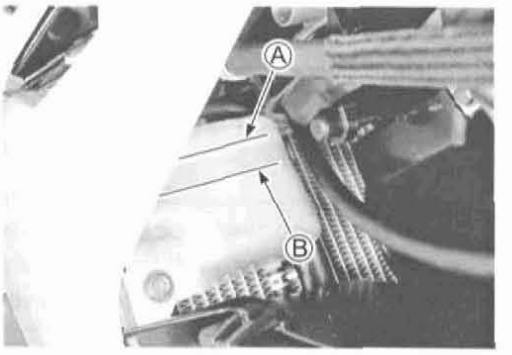
ENGINE OIL HOSE

Inspect 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.

ENGINE COOLANT

Replace the engine coolant every 2 years.

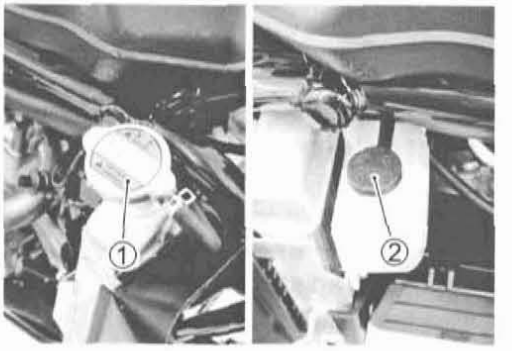


ENGINE COOLANT LEVEL CHECK

- Check the engine coolant level by observing the upper Ⓐ and lower Ⓑ lines on the engine coolant reservoir.
- If the level is below the lower line, remove the front fender (☞7-6), add engine coolant until the level reaches the upper line.

ENGINE COOLANT REPLACEMENT

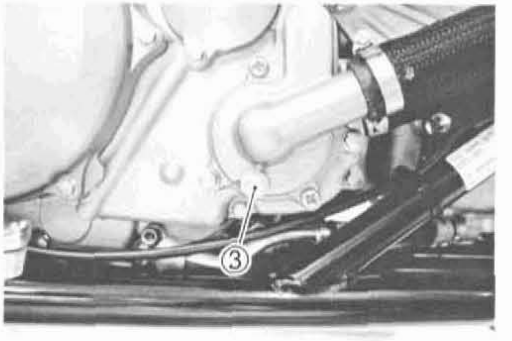
- Remove the front fender. (☞7-6)
- Remove the radiator cap ① and engine coolant reservoir cap ②.
- Place a pan below the water pump, and then drain the engine coolant by removing the drain plug ③.



⚠ WARNING

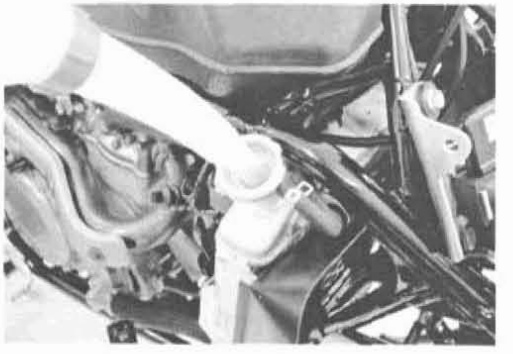
*** Do not open the radiator cap when the engine is hot, as you may be injured by escaping hot liquid or vapor.**

*** Engine coolant may be harmful if swallowed or if it comes in contact with the skin or eyes. If engine coolant gets into the eyes or contacts the skin, flush the eyes or wash the skin thoroughly, with plenty of water. If engine coolant is swallowed, induce vomiting and call a physician immediately.**



- Flush the radiator with fresh water, if necessary.
- Tighten the drain plug securely.
- Pour the specified engine coolant into the reservoir.

NOTE:
For engine coolant information, refer to page 6-2.



- Install the radiator cap securely.
- After warming up and cooling down the engine, add engine coolant until the level is between the upper and lower lines on the engine coolant reservoir.

CAUTION

Repeat the above procedure several times and make sure the radiator is filled with engine coolant to the upper line of the engine coolant reservoir.

DATA Engine coolant capacity (including reserve):
1 400 ml (1.5 US qt, 1.2 Imp qt)

RADIATOR

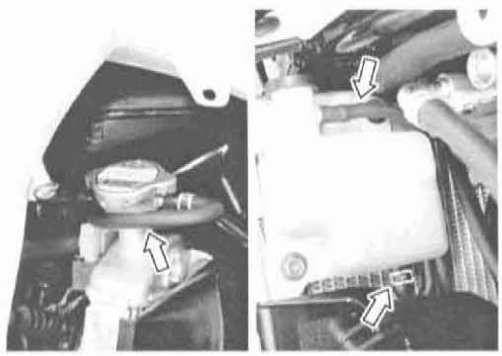
Inspect every 3 months.

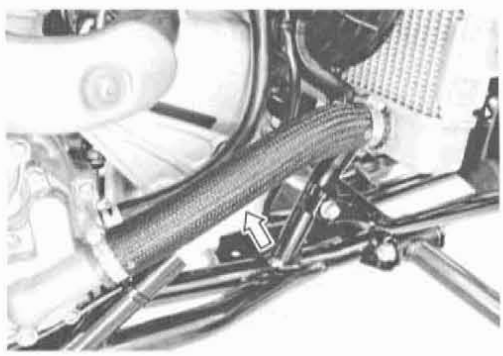
Inspect the radiator for dirt.
Clean the radiator if necessary.

RADIATOR HOSE

Inspect every 6 months.

Inspect the radiator hoses for damage and engine coolant leakage. If any defects are found, replace the radiator hoses with new ones.

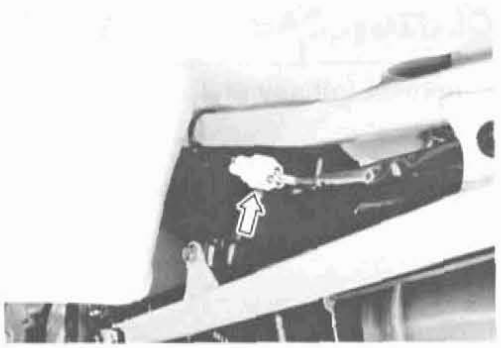




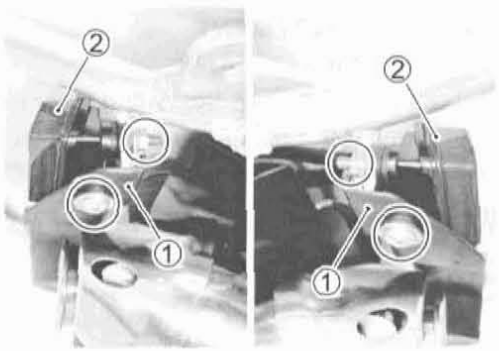
SPARK ARRESTER

Clean every 6 months.

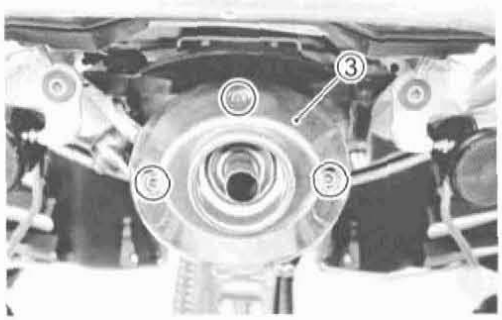
- Disconnect the brake light/taillight coupler.



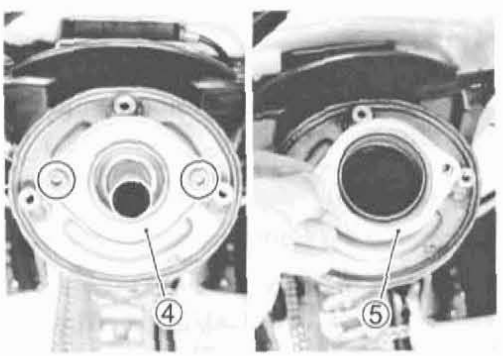
- Remove the brake light/taillight cover ① and rear brake light ②.



- Remove the spark arrester cover ③.



- Remove the spark arrester pipe ④.
- Remove the gasket ⑤.



- Clean the spark arrester pipe by brush.
- Reinstall the spark arrester pipe.
- Reinstall the spark arrester cover.
- Reinstall the brake light/taillight and brake light/taillight cover.

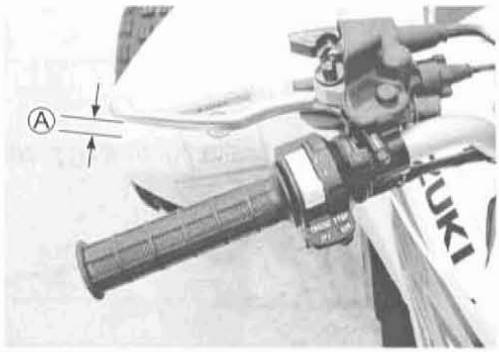
⚠ WARNING

Only clean the spark arrester in an open area away from combustible materials. Exhausted hot carbon particles can start a fire.

CLUTCH CABLE PLAY

Inspect initially at 1 month and every 3 months thereafter.

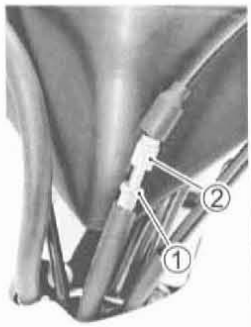
Adjust the clutch cable play as follows:



MAJOR ADJUSTMENT

- Loosen the lock-nut ①.
- Turn adjuster ② so the clutch lever has 10 – 15 mm (0.4 – 0.6 in) play at the clutch lever end before pressure is felt.
- Tighten the lock-nut ①.

DATA **Clutch lever play Ⓐ: 10 – 15 mm (0.4 – 0.6 in)**



MINOR ADJUSTMENT

- Turn adjuster ③ so the clutch lever has 10 – 15 mm (0.4 – 0.6 in) play at the clutch lever end before pressure is felt.

DATA **Clutch lever play Ⓐ: 10 – 15 mm (0.4 – 0.6 in)**

BRAKES

Inspect initially at 1 month and every 3 months thereafter.

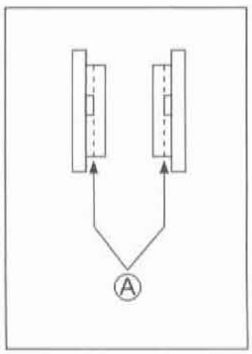
BRAKE PADS

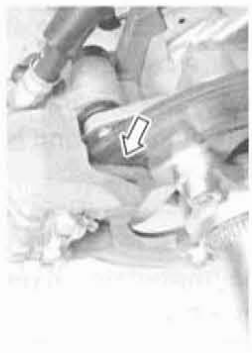
- Remove the front wheels. (☞7-10)

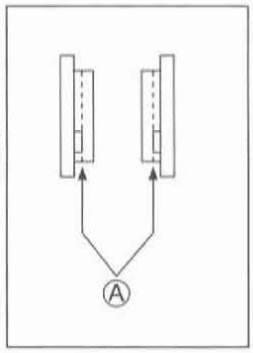
The extent of brake pad wear can be checked by observing the limit line Ⓐ on the brake pads. When the wear reaches the limit line, replace the pads with new ones. (☞7-19, -55)

CAUTION

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





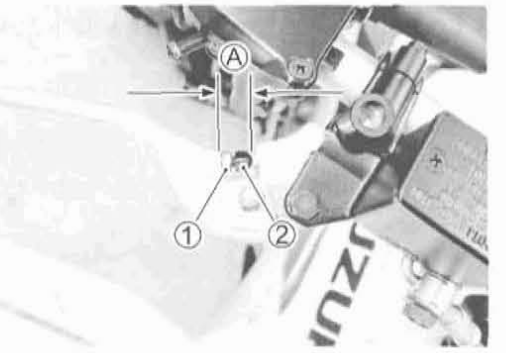


FRONT BRAKE LEVER ADJUSTMENT

Adjust the brake lever position as follows:

- Loosen the lock-nut ①.
- Turn in or out adjuster ② to obtain the proper brake lever position.
- The standard adjuster length Ⓐ is 11 – 15 mm (0.4 – 0.6 in).
- Tighten the lock-nut ① securely.

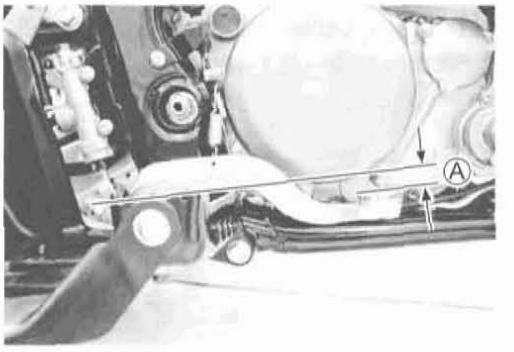
Front brake lever adjuster lock-nut:
5 N·m (0.5 kgf-m, 3.5 lb-ft)



REAR BRAKE PEDAL AND LEVER

The procedure for adjusting the rear brake pedal and brake lever is as follows:

NOTE:
First adjust the brake pedal, and then adjust the brake lever.

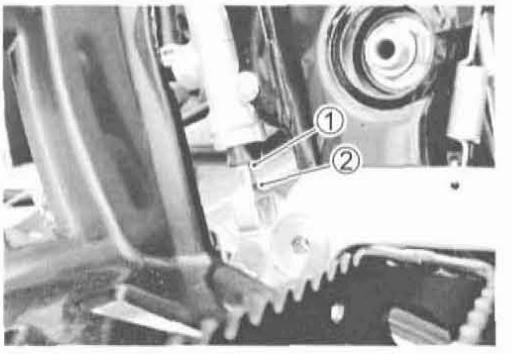


Brake pedal

- Turn the adjuster ① in or out until the pedal height Ⓐ to the specification, after loosening the lock-nut ②.
- Make sure to tighten the lock-nut ② securely.

DATA Brake pedal height Ⓐ: 0 – 10 mm (0 – 0.4 in)

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

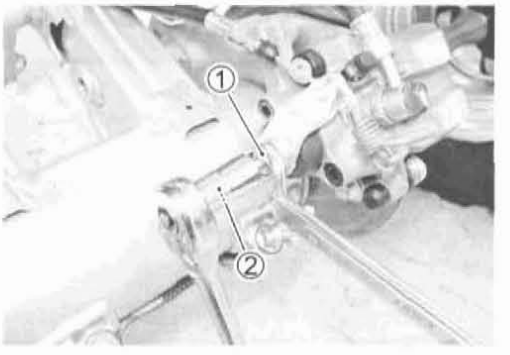


- Adjust the rear brake light switch so that the brake light will come on just before pressure is felt when the brake pedal is depressed.

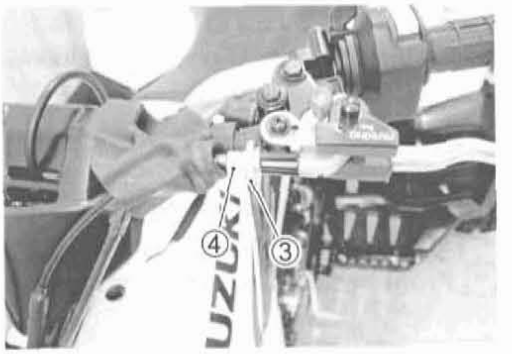
PARKING BRAKE

Parking brake adjustment may be required if the parking brake does not work properly. Every time the brake pads are replaced, adjust the parking brake.

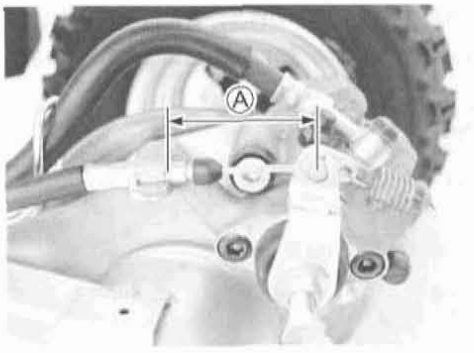
- Loosen the parking brake adjuster lock-nut ① while holding the adjuster ② with a tool.
- Loosen the adjuster ②.



- Loosen the parking brake cable adjuster lock-nut ③.

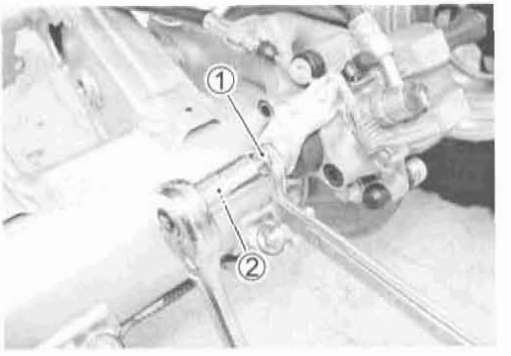


- Turn the cable adjuster ④ so that the cable length Ⓐ is 49 – 53 mm (1.9 – 2.1 in).



- Tighten the adjuster lock-nut ③.

- Turn the parking brake adjuster ② clockwise until it stops.
- Then, turn out the adjuster ② 1/8 – 1/4.
- Tighten the adjuster lock-nut ① while holding the adjuster ② with a tool.



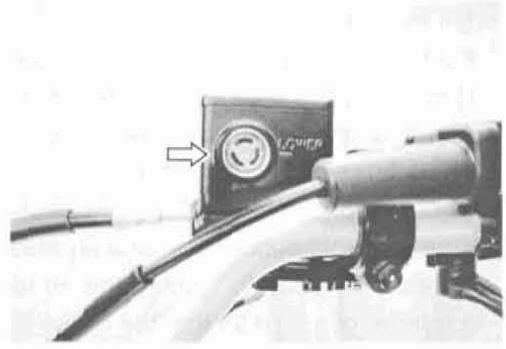
Parking brake adjuster lock-nut:
18 N·m (1.8 kgf-m, 13.0 lb-ft)

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

Inspect every 3 months.
Replace every 2 years.



BRAKE FLUID LEVEL

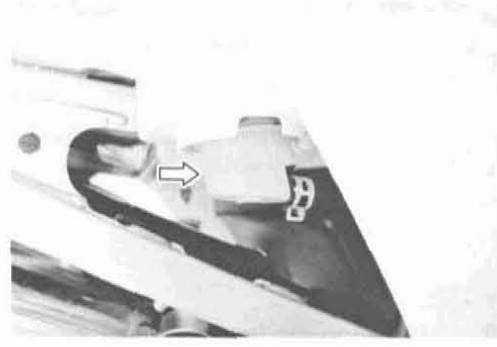
- Place the handlebar straight.
- Check the brake fluid level by observing the lower limit lines on the front and rear brake fluid reservoirs.
- When the brake fluid level is below the lower limit line, replenish with brake fluid that meets the following specification.

Specification and classification: DOT 4

⚠ 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 re-use brake fluid left over from the last servicing or stored for a long period of time.**

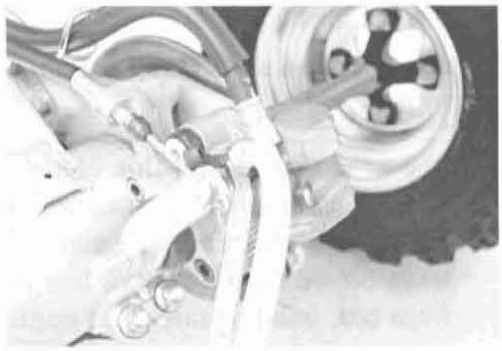
*** Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces. Check the brake hoses and hose joints for cracks and fluid leakage before riding.**



AIR BLEEDING THE BRAKE FLUID CIRCUIT

Air trapped in the brake fluid circuit acts like a cushion 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:

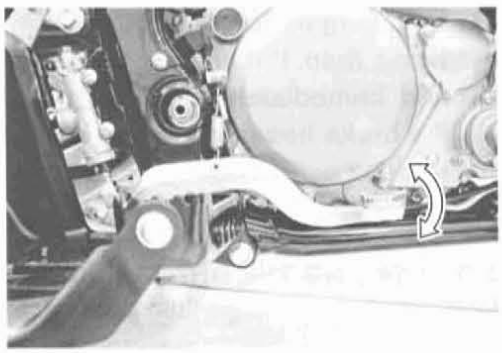
- Fill the front or rear brake reservoir with the specified brake fluid to the top of the inspection window or upper limit line. Replace the reservoir cap to prevent dirt from entering.
- Attach a hose to the air bleeder valve, and insert the free end of the hose into a receptacle.
- Squeeze and release the brake lever or brake pedal several times in rapid succession and squeeze the lever or pedal fully without releasing it. Loosen the air bleeder valve by turning it a quarter of a turn so that the brake fluid runs into the receptacle, this will remove the tension of the brake lever causing it to touch the handlebar grip or brake pedal reaching bottom of the stroke. Then, close the air bleeder valve, pump and squeeze the lever or pedal, and open the valve. 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.

- Close the air bleeder valve, and disconnect the hose. Fill the reservoir with brake fluid to the top of the inspection window or upper limit line.

Air bleeder valve: 6 N·m (0.6 kgf-m, 4.5 lb-ft)



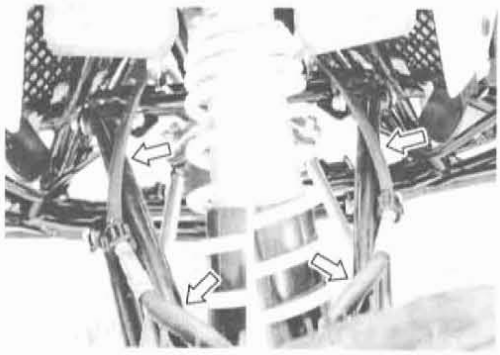
CAUTION

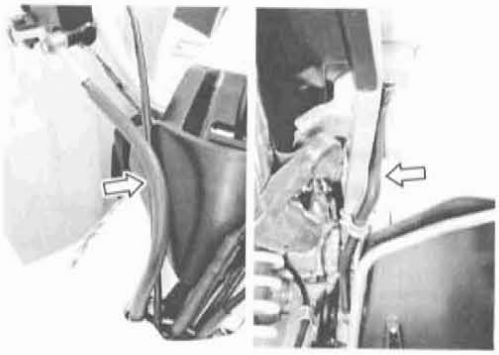
Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials, etc.

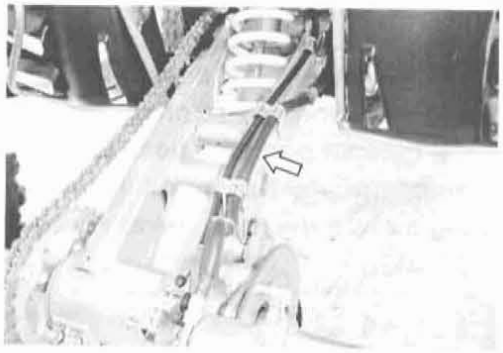
BRAKE HOSE

Inspect every 6 months.
Replace every 4 years.

Inspect the brake hoses for leakage, cracks, wear and damage. If any defects are found, replace the brake hoses with new ones.







TIRES

Inspect every 3 months.

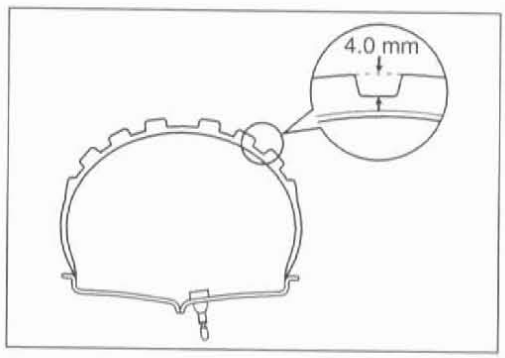
TIRE TREAD CONDITION

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 the tire tread reaches the following specification.

TOOL 09900-20805: Tire depth gauge

DATA Service Limit

Tire tread depth: Front 4.0 mm (0.16 in)
Rear 4.0 mm (0.16 in)



TIRE PRESSURE

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

DATA Cold inflation tire pressure
Front: 45 kPa (0.45 kgf/cm², 6.5 psi)
Rear : 45 kPa (0.45 kgf/cm², 6.5 psi)

VEHICLE LOAD CAPACITY LIMIT: 110 kg (243 lbs)

CAUTION

To minimize the possibility of tire damage from over-inflation, we strongly recommended 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 50 kPa (0.5 kgf/cm², 7 psi).

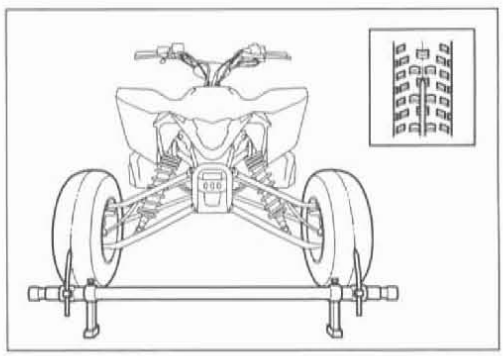
CAUTION

The standard tire fitted on this vehicle is AT20×7R10☆☆☆ for the front and AT18×10R8☆☆☆ for the rear. The use of tires other than those specified may cause instability. It is highly recommended to use the specified tires.

STEERING

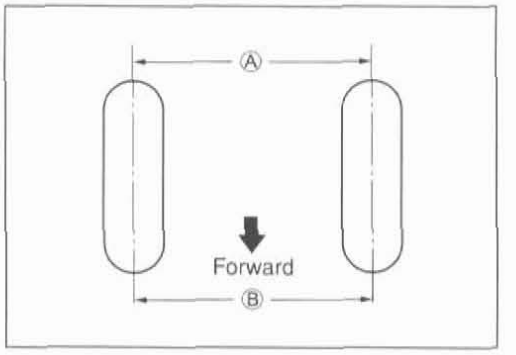
Inspect initially at 1 month and every 3 months thereafter.

Steering system should be adjusted properly for smooth manipulation of the handlebars and safe running.



TOE

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



DATA Toe-in: 0 ± 4 mm (0 ± 0.16 in)

- If the toe-in is out of specification, bring it into the specified range. (☞7-52)

DRIVE CHAIN

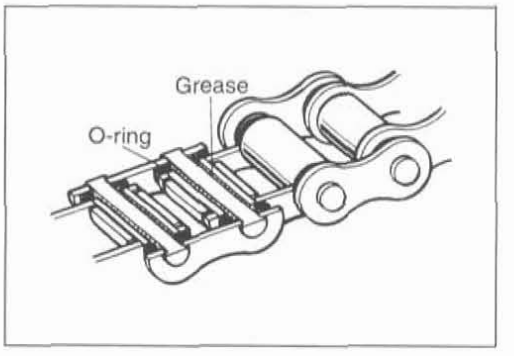
Clean, lubricate and inspect each time the vehicle is ridden.

Visually check the drive chain for the possible defects listed below. (Support the vehicle by a jack and a wooden block, turn the rear wheel slowly by hand with the transmission shifted to Neutral.)

* Loose pins
* Damaged rollers
* Dry or rusted links
* Kinked or binding links
* Excessive wear
* Improper chain adjustment
* Missing O-ring seals

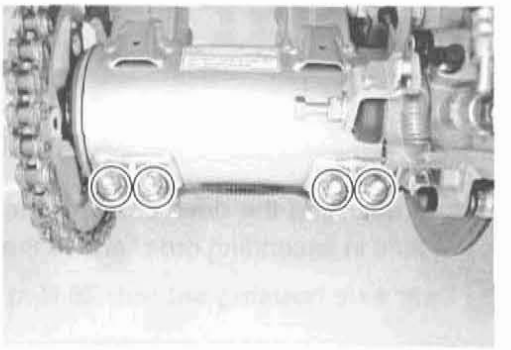
If any defects are found, the drive chain must be replaced.

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

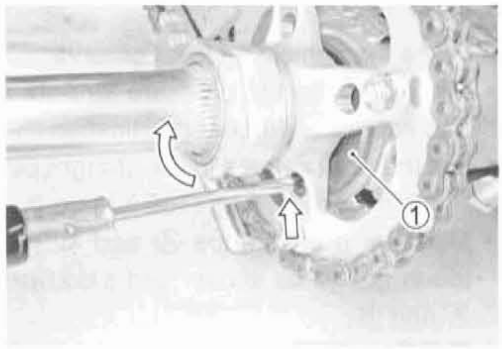


CHECKING

- Place the vehicle on a level ground.
- Loosen the rear axle housing set nuts.

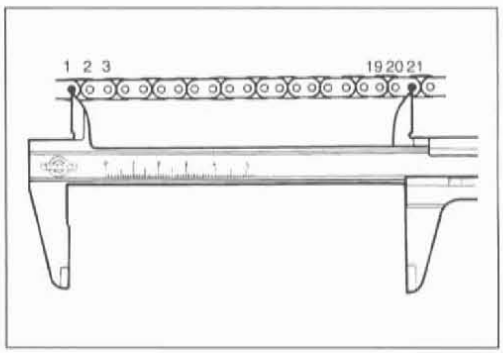


- Insert a tool into the rear sprocket hole and adjuster hole.
- Tense the drive chain fully by turning rear axle holder ①.



- 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.

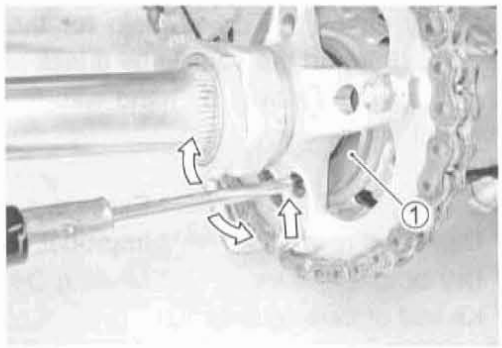
DATA Drive chain 20-pitch length
Service limit: 319.4 mm (12.57 in)

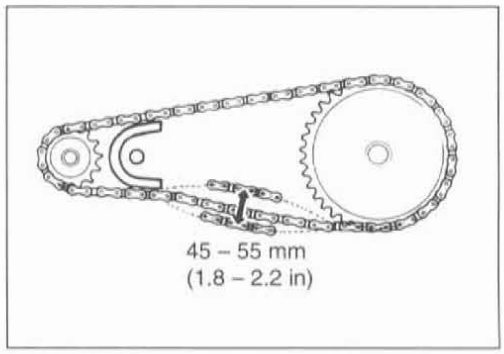


ADJUSTING

- Insert a tool in the rear sprocket hole and adjuster hole.
- Turn rear axle holder ①. Until there is 45 – 55 mm (1.8 – 2.2 in) of slack at the middle point between the chain buffer and the rear sprocket as shown.

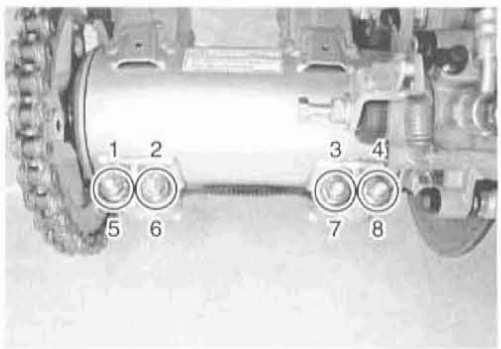
DATA Drive chain slack:
Standard: 45 – 55 mm (1.8 – 2.2 in)





- After adjusting the drive chain, tighten the rear axle housing set nuts in ascending order and to the specified torque.

Rear axle housing set nut: 28 N·m (2.8 kgf-m, 20.0 lb-ft)



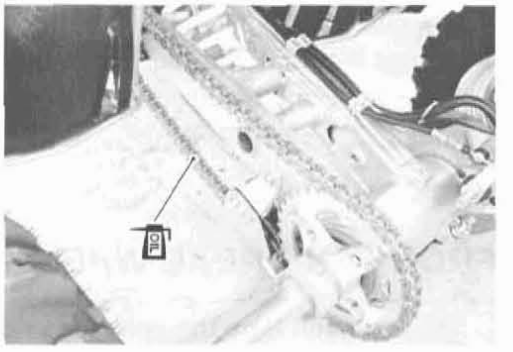
CLEANING AND LUBRICATING

- 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.

- After washing and drying the chain, oil it with a heavyweight motor oil.



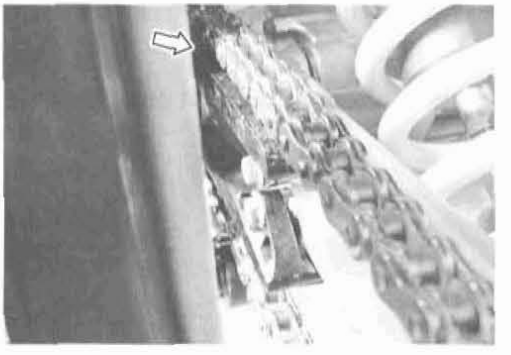
CAUTION

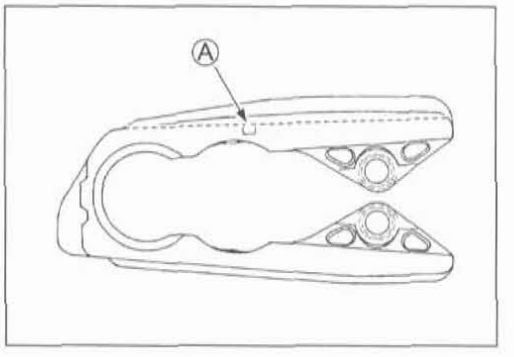
*** Do not use any oil sold commercially as "drive chain oil". Such oil can damage the O-rings.**
*** The standard drive chain is a RK 520SMOZ10S. Suzuki recommends to use this standard drive chain as a replacement.**

DRIVE CHAIN BUFFER

Inspect each time the vehicle is ridden.

The extent of chain buffer wear can be checked by observing the limit line Ⓐ on the chain buffer. When the wear reaches the limit line, replace the chain buffer with a new one.
(☞7-85)





SUSPENSIONS

Inspect every 6 months.

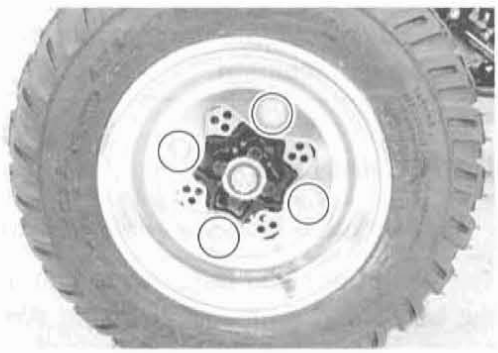
- Support the vehicle with a jack or wooden blocks.
- Remove the front and rear wheels. (☞7-10)
- Inspect the suspension arm and bearing for scratches, wear, or damage. If any defects are found, replace the suspension arm or bearing with a new one. (☞7-78)
- Inspect the swinging arm, rear axle and bearing for scratches, wear or damage. If any defects are found, replace them with a new one. (☞7-86, -94)
- Inspect the front and rear shock absorbers for oil leakage or damage. If any defects are found, replace them with a new one. (☞7-69, -73)

FRONT AND REAR WHEEL SET NUTS

Tighten each time the vehicle is ridden.

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

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

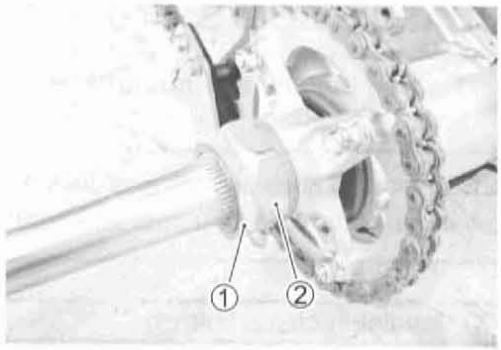


REAR AXLE NUT AND LOCK-NUT

Tighten initially at 1 month and every 3 months thereafter.

- Loosen the axle lock-nut ① and axle nut ② with the special tools.

TOOL 09940-92460: Rear axle nut wrench set

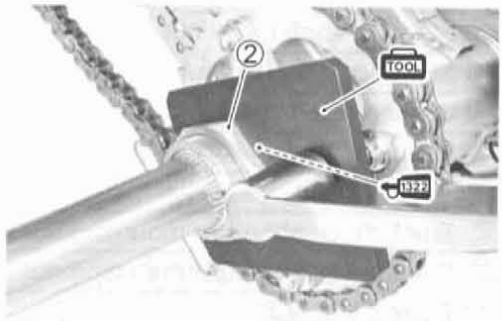


- Apply THREAD LOCK "SUPER 1322" to the thread portion of the axle nut holder.
- Tighten the axle nut ② to the specified torque with the special tool.

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

1322 99000-32110: THREAD LOCK SUPER "1322" (or equivalent thread lock)

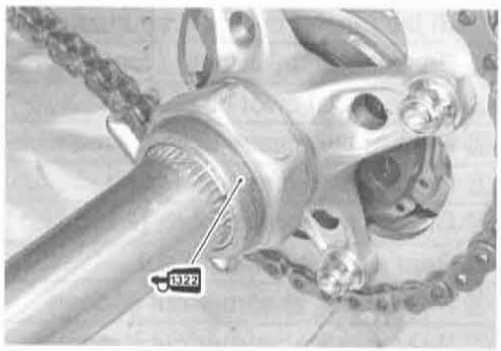
TOOL 09940-92460: Rear axle nut wrench set



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. (☞7-101)

- Apply THREAD LOCK SUPER "1322" to the thread portion of the axle nut holder.

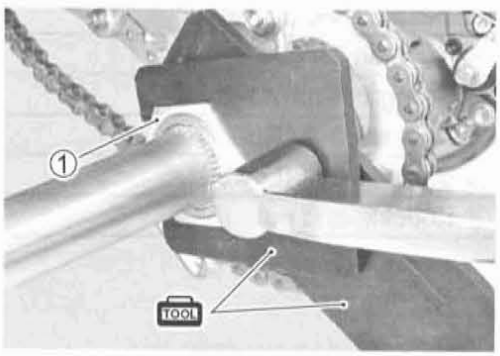
1322 99000-32110: THREAD LOCK SUPER "1322" (or equivalent thread lock)



- Tighten the axle lock-nut ① to the specified torque with the special tools.

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

TOOL 09940-92460: Rear axle nut wrench set



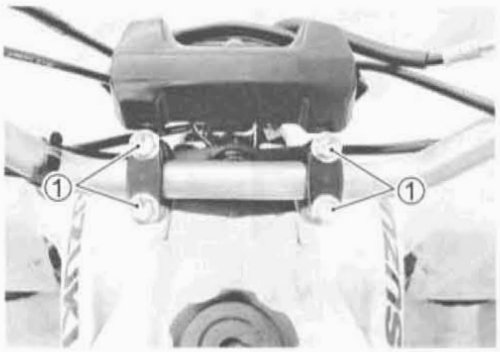
NOTE:
When tightening the axle lock-nut with the special tool, the reading torque on the torque wrench is smaller than actual torque that is applied to the axle lock-nut. Therefore convert the tightening torque. (☞7-101)

CHASSIS BOLTS AND NUTS

Tighten initially at 1 month and every 3 months thereafter.

Check that all chassis nuts and bolts are tightened to their specified torque. (Refer to page 2-31, -32 for the locations of the following nuts and bolts on the vehicle.)

Item	N·m	kgf-m	lb-ft
① Handlebar clamp bolt	26	2.6	19.0
② Steering shaft holder bolt	23	2.3	16.5
③ Steering shaft lower nut	120	12.0	87.0
④ Steering arm plate bolt	29	2.9	21.0
⑤ Wishbone arm pivot nut (Upper and Lower)	65	6.5	47.0
⑥ Front hub nut	65	6.5	47.0
⑦ Rear hub nut	121	12.1	87.5
⑧ Front shock absorber mounting nut (Upper)	60	6.0	43.5
⑨ Front shock absorber mounting nut (Lower)	60	6.0	43.5
⑩ Tie rod end nut	23	2.3	16.5
⑪ Tie rod lock-nut	29	2.9	21.0
⑫ Brake air bleeder valve	6	0.6	4.5
⑬ Front brake caliper mounting bolt	26	2.6	19.0
⑭ Rear brake caliper mounting bolt	26	2.6	19.0
⑮ Brake pipe nut	16	1.6	11.5
⑯ Footrest bolt	55	5.5	40.0
⑰ Brake master cylinder mounting bolt (Front and Rear)	10	1.0	7.0
⑱ Brake hose union bolt (Front and Rear)	23	2.3	16.5
⑲ Brake pedal pivot bolt	29	2.9	21.0
⑳ Rear brake master cylinder rod lock-nut	18	1.8	13.0
㉑ Rear sprocket mounting bolt	60	6.0	43.5
㉒ Disc plate mounting bolt (Front and Rear)	23	2.3	16.5
㉓ Rear axle housing set nut	28	2.8	20.0
㉔ Rear shock absorber nut (Upper)	60	6.0	43.5
㉕ Rear shock absorber nut (Lower)	60	6.0	43.5
㉖ Cushion rod nut	78	7.8	56.5
㉗ Cushion lever nut	78	7.8	56.5
㉘ Swingarm pivot nut	95	9.5	68.5
㉙ Seat rail bolt (Upper)	60	6.0	43.5
㉚ Seat rail bolt (Lower)	60	6.0	43.5
㉛ Knuckle end nut	23	2.3	16.5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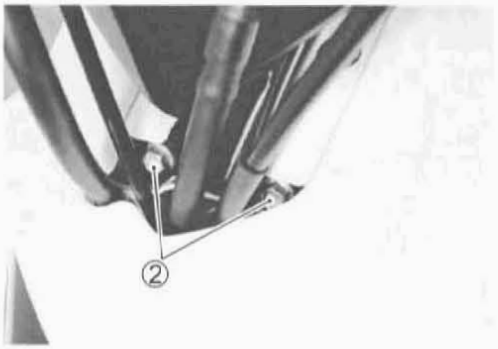
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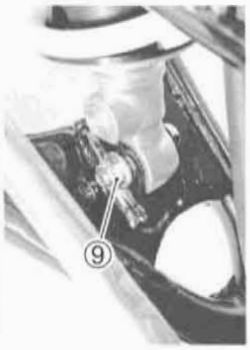
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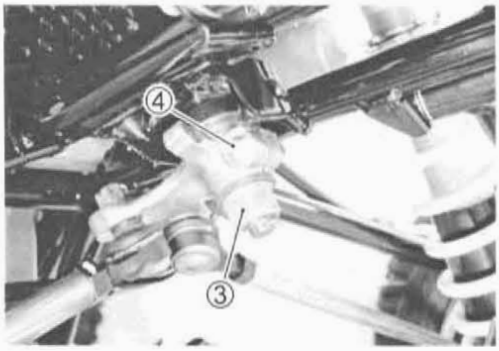
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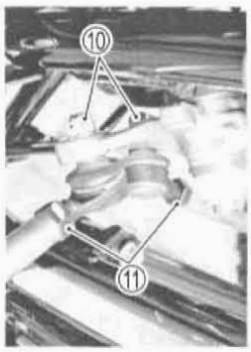
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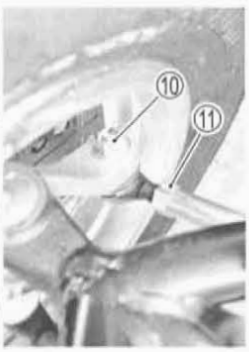
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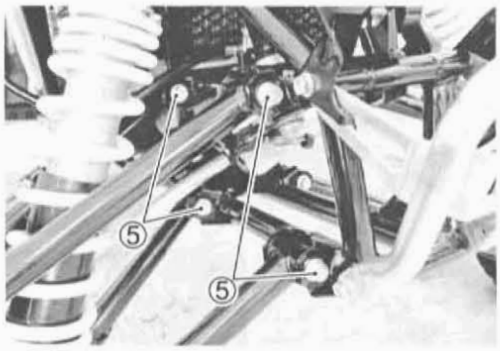
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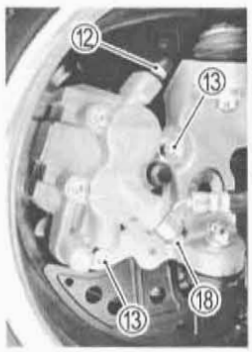
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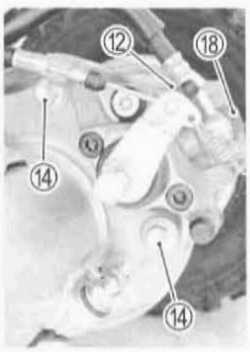
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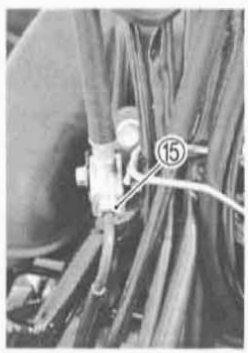
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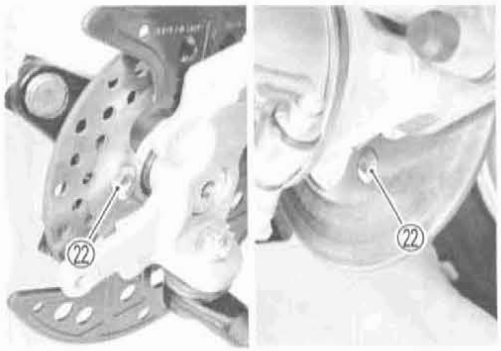
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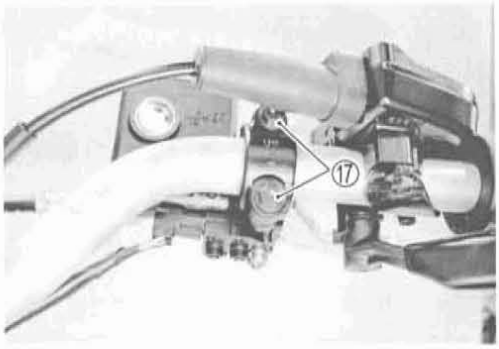
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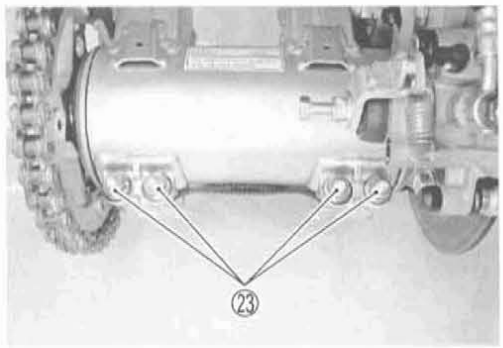
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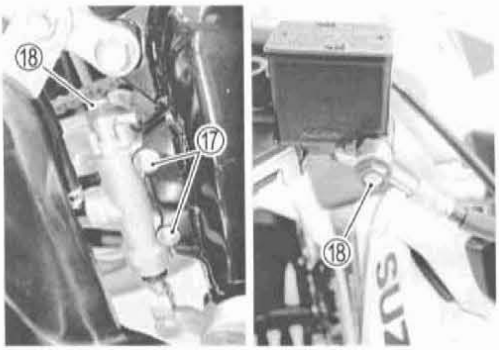
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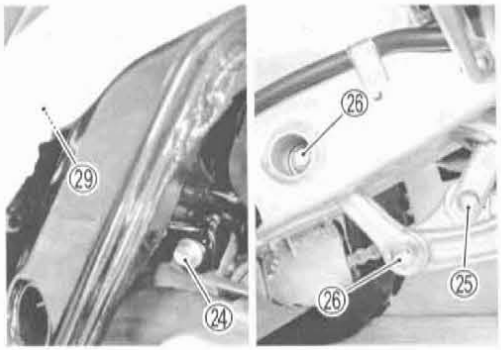
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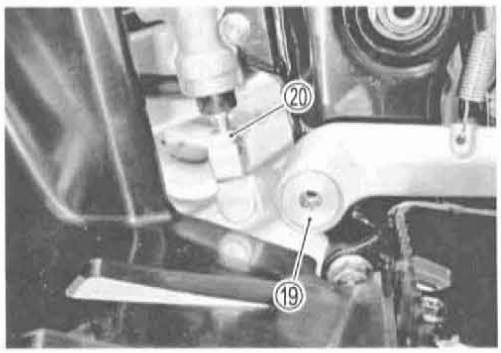
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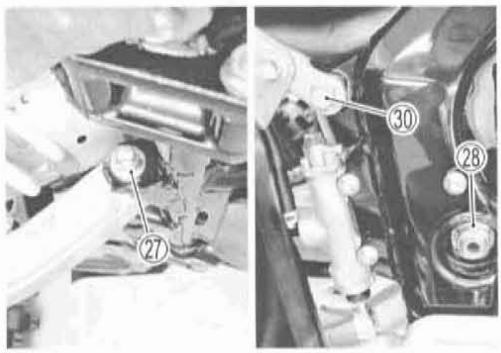
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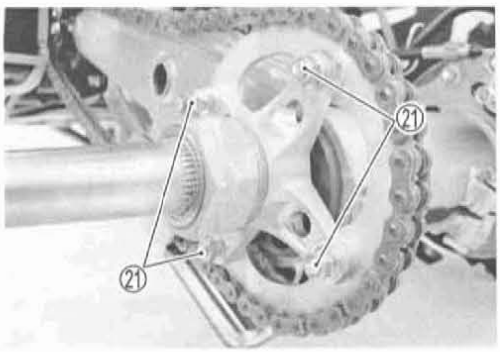
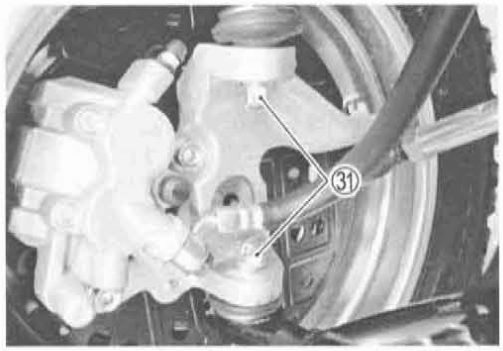
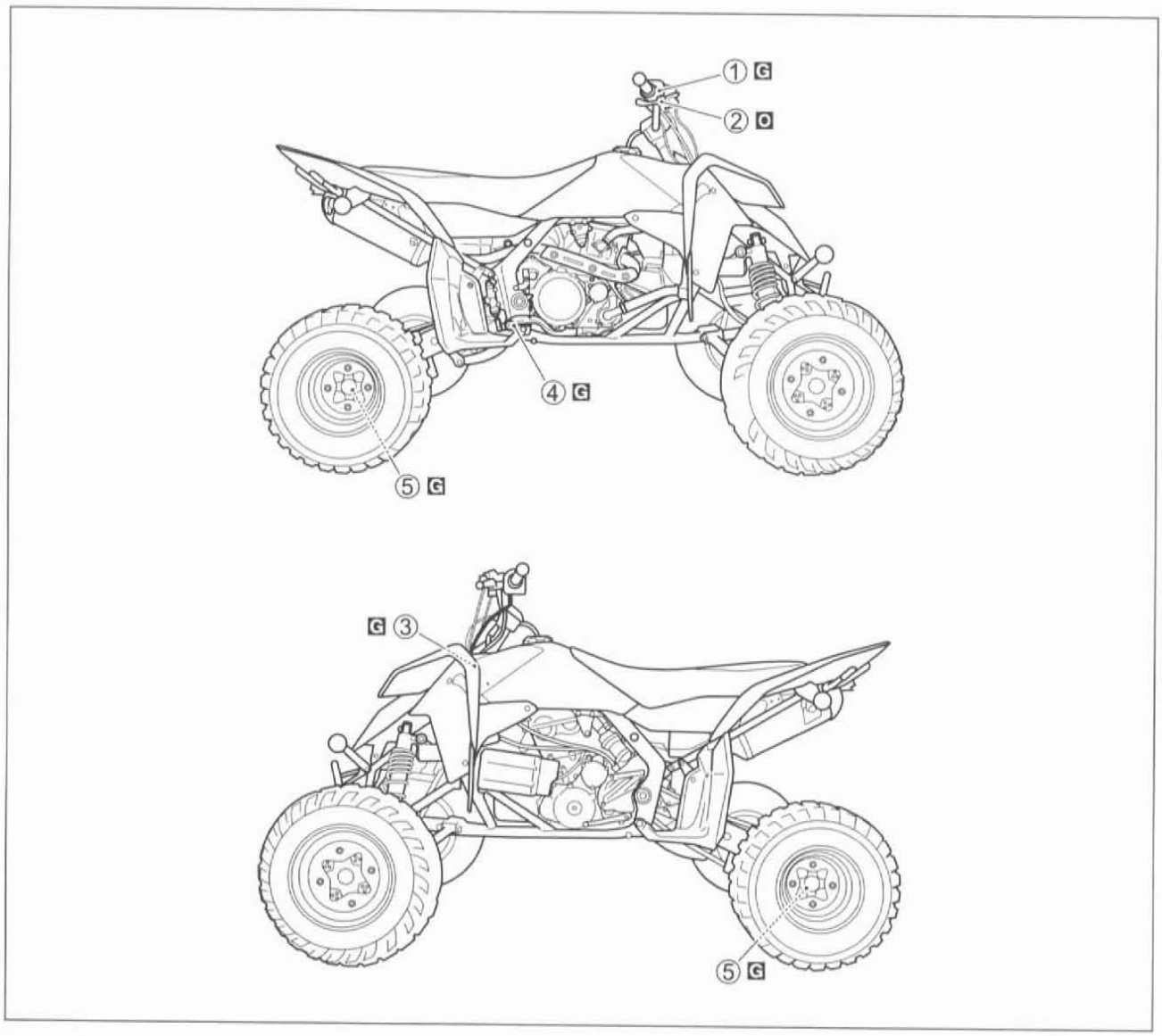

21
21


31

GENERAL LUBRICATION

Lubricate 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 below.



①Brake lever holder
②Throttle lever
③Steering shaft holder
④Brake pedal and rod link
⑤Rear axle joint spline

G Grease
O Motor oil

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.*

COMPRESSION PRESSURE CHECK

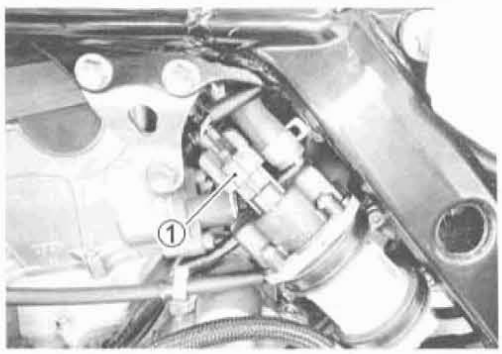
The compression pressure reading of a cylinder is a good indicator of its internal condition.
The decision to overhaul the cylinder is often based on the results of a compression test. Periodic maintenance records kept at your dealership should include compression readings for each maintenance service.

DATA **Compression pressure:**
Standard: 800 kPa (8.0 kgf/cm², 114 psi)
(Automatic decompression actuated)

Low compression pressure can indicate any of the following conditions:

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

NOTE:
When the compression pressure goes below specification, check the engine for conditions listed above.



COMPRESSION TEST PROCEDURE

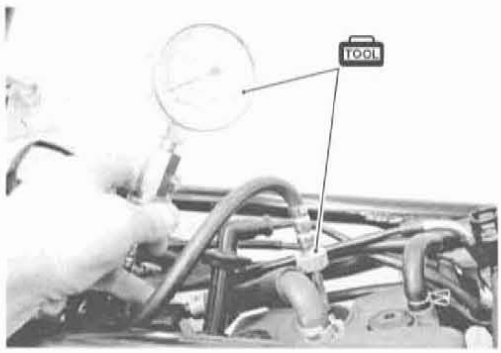
NOTE:

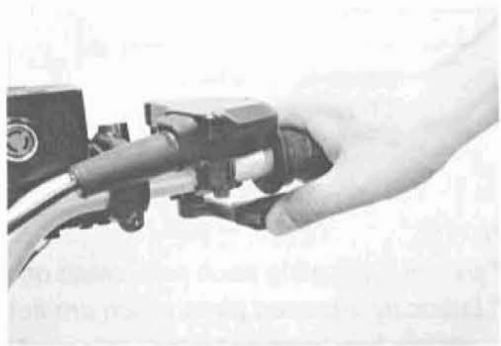
* *Before testing the engine for compression pressure, make sure that the cylinder head nuts are tightened to the specified torque values and the valves are properly adjusted.*
* *Have the engine warmed up before testing.*
* *Make sure that the battery is fully-charged.*

Remove the related parts and test the compression pressure in the following manner.

- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- Remove the spark plug. (☞2-10)
- Disconnect the fuel pump lead wire coupler ①.
- Install the compression gauge and adaptor in the spark plug hole. Make sure that the connection is tight.
- Keep the throttle lever in the fully open position.
- Press the starter button and crank the engine for a few seconds. Record the maximum gauge reading as the cylinder compression.

TOOL **09915-64512: Compression gauge set**
09913-10750: Adaptor





OIL PRESSURE CHECK

Check the engine oil pressure periodically. This will give a good indication of the condition of the moving parts.

DATA Oil pressure:
10 kPa (0.1 kgf/cm², 1.4 psi) at 3 000 r/min, Oil temp. at 60 °C (140 °F)

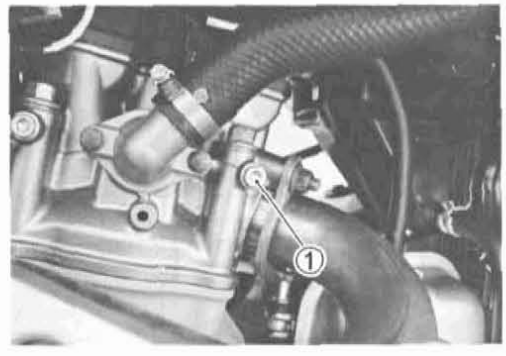
If the oil pressure is lower or higher than the specification, the following causes may be considered.

LOW OIL PRESSURE
* Clogged oil filter
* Oil leakage from the oil passage
* Damaged O-ring
* Defective oil pump
* Combination of the above items

HIGH OIL PRESSURE
* Engine oil viscosity is too high
* Clogged oil passage
* Combination of the above items

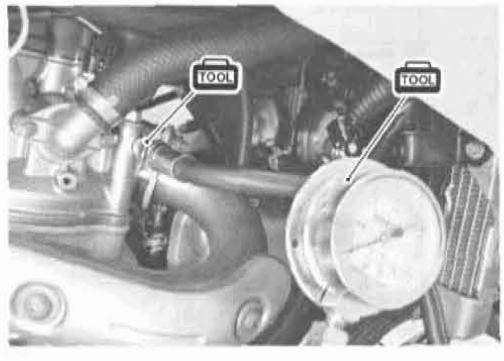
OIL PRESSURE TEST PROCEDURE

- Connect the tachometer onto the spark plug high-tension cord.



- Remove the main oil gallery plug ①.
- Install the oil pressure gauge and adaptor into the main oil gallery.
- Warm up the engine as follows:
  Summer: 10 minutes at 2 000 r/min
  Winter: 20 minutes at 2 000 r/min
- After warming up the engine, increase the engine speed to 3 000 r/min (observe the tachometer), and read the oil pressure gauge.

TOOL 09915-74511: Oil pressure gauge
09940-40211: Adaptor



- Apply engine oil to both sides of the main oil gallery plug washers.
- Tighten the main oil gallery plug ① to the specified torque.

Main oil gallery plug: 10 N·m (1.0 kgf-m, 7.0 lb-ft)

SDS CHECK

Using SDS, take the sample of data from the new vehicle and at the time of periodic maintenance at your dealership.

Save the data in the computer or by printing and filing the hard copies. The saved or filed data are useful for troubleshooting as they can be compared periodically with changes over time or failure conditions of the vehicle.

For example, when a vehicle is brought in for service but the troubleshooting is difficult, comparison with the normal data that have been saved or filed can allow the specific engine failure to be determined.

- Set up the SDS tool. (☞4-24)

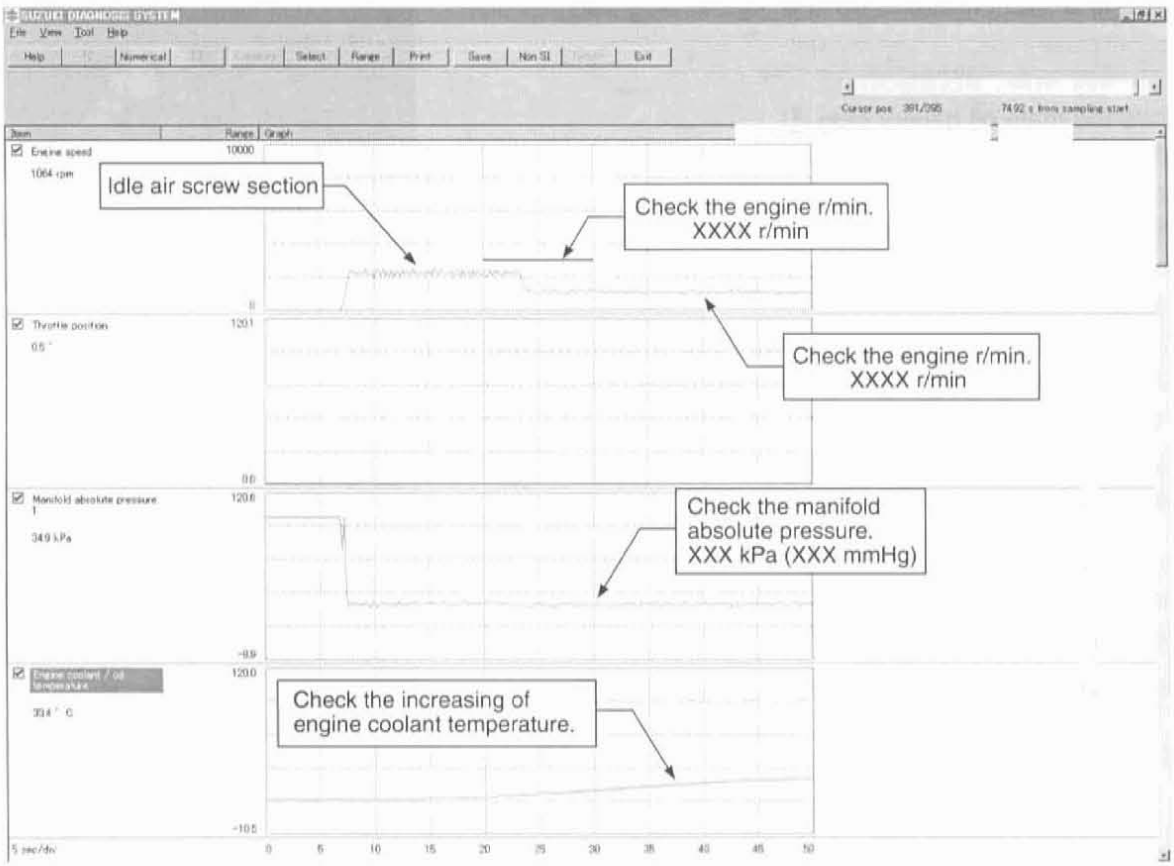
TOOL **09904-41010: SDS set tool**
99565-01010-007: CD-ROM Ver. 7

NOTE:

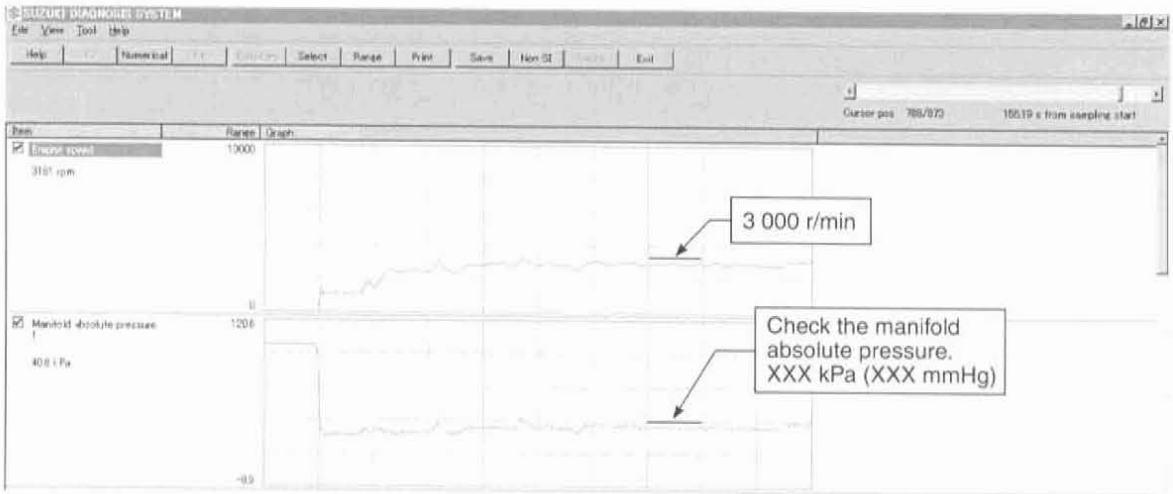
** Before taking the sample of data, check and clear the Past DTC. (☞4-25)*

** A number of different data under a fixed condition as shown below should be saved or filed as sample.*

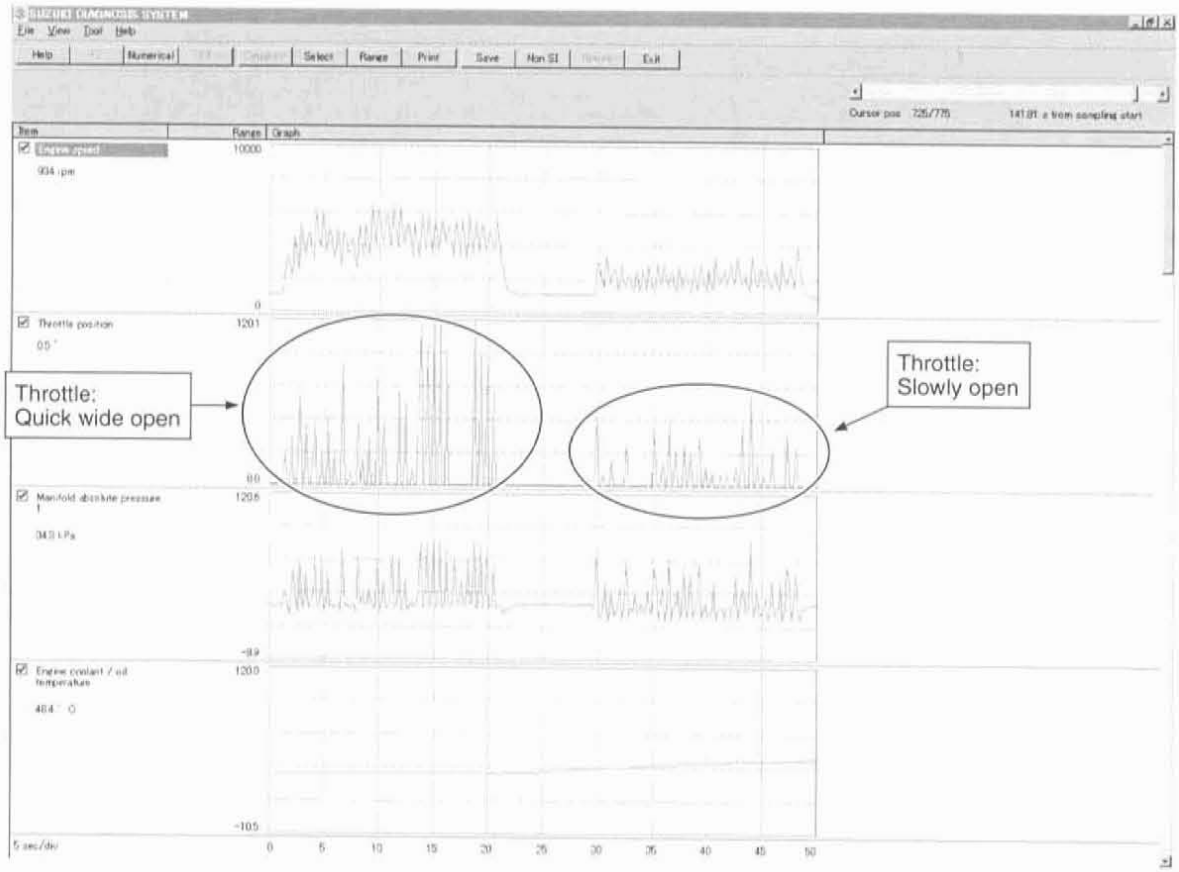
SAMPLE:
Data sampled from cold starting through warm-up



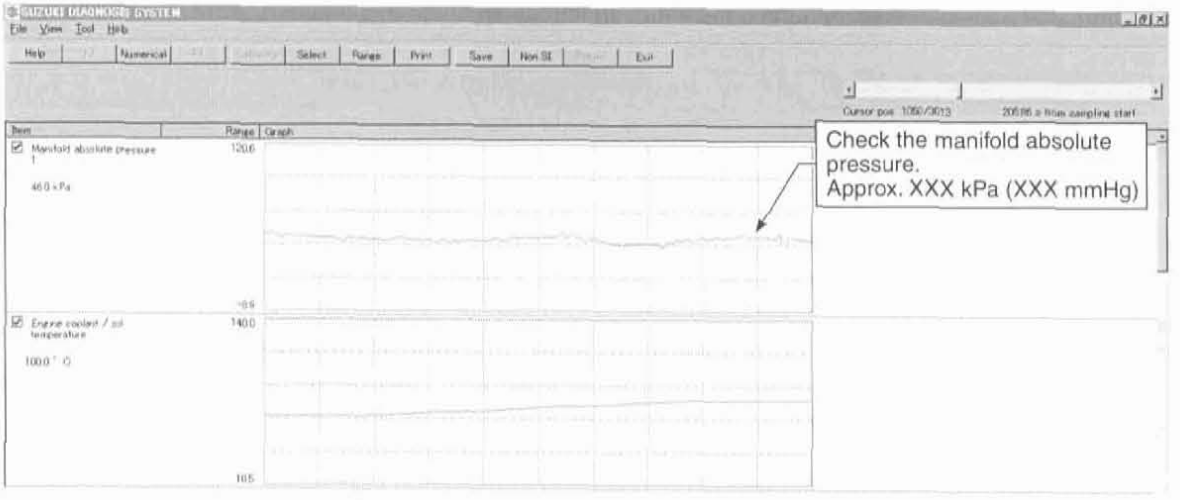
Data at 3 000 r/min under no load



Data at the time of racing



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



ENGINE

CONTENTS

3

ENGINE COMPONENTS REMOVABLE WITH ENGINE IN PLACE

The parts listed below can be removed and installed without removing the engine from the frame. Refer to the page listed in each section for removal and installation instructions.

ENGINE LEFT SIDE

PARTS	REMOVAL	INSTALLATION
Engine sprocket	3-6	3-9
Starter drive/driven gear	3-14, -15	3-71
Generator rotor	3-21	3-63
Starter clutch	3-21	3-62
Gear position switch	3-11	3-79
Oil pump No.2	3-21	3-62
Balancer crank	3-22	—
Cam chain tensioner	3-21	3-62

ENGINE RIGHT SIDE

PARTS	REMOVAL	INSTALLATION
Exhaust pipe/muffler	3-4	3-10
Oil filter	3-15	3-70
Clutch pressure plate, drive plates, and driven plates	3-16, -17	3-68, -69
Clutch sleeve hub	3-17	3-67
Primary driven gear assembly	3-17	3-67
Primary drive gear	3-20	3-63
Oil pump idle gear and driven gear	3-18	3-66, -67
Oil pump No.1	3-18	3-66
Gearshift shaft	3-18	3-65
Gearshift cam driven gear	3-19	3-65
Gearshift cam stopper plate	3-19	3-64
Gearshift cam stopper	3-19	3-64
Balancer drive/driven gear	3-20	3-63, -64

ENGINE CENTER

PARTS	REMOVAL	INSTALLATION
Throttle body	5-14	5-18
Starter motor	3-11	3-79
Cam chain tension adjuster	3-12	3-78
Cylinder head cover	3-11	3-79
Camshaft/automatic decompression assembly	3-13	3-76
Cylinder head	3-13	3-75
Cylinder	3-13	3-74
Piston	3-14	3-73
Cam chain	3-21	3-62
Cam chain guide	3-13	3-74

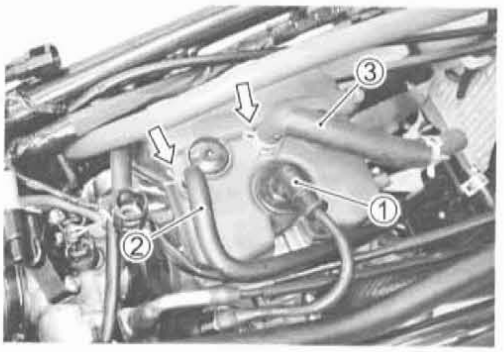
ENGINE REMOVAL AND REMOUNTING

ENGINE REMOVAL

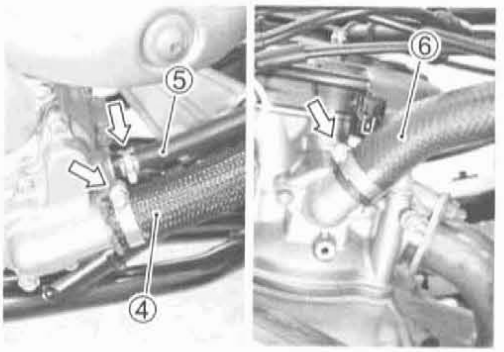
Before taking the engine out of the frame, wash the engine using a steam cleaner. Engine removal is sequentially explained in the following steps.

- Drain engine coolant. (☞2-15)
- Drain engine oil. (☞2-13)
- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- Remove the oil return tank. (☞6-23)
- Remove the oil tank. (☞6-22)

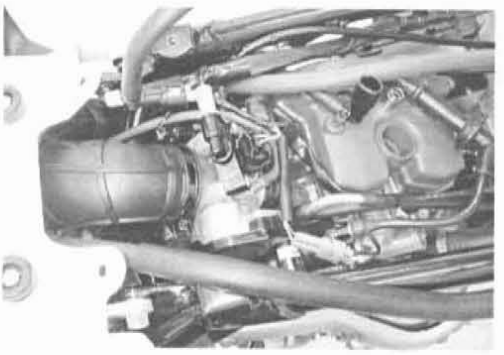
- Remove the spark plug cap ①.
- Disconnect the over-flow hose ② and breather hose ③.



- Disconnect the engine coolant inlet hose ④, brather hose ⑤ and engine coolant outlet hose ⑥.



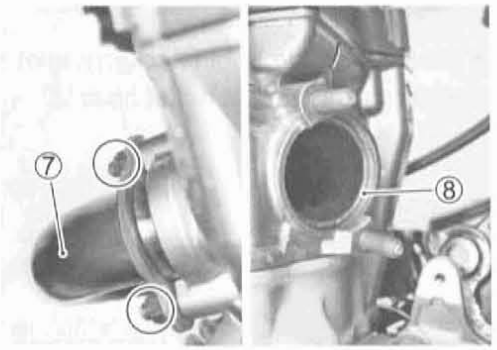
- Remove the throttle body assembly. (☞5-14)



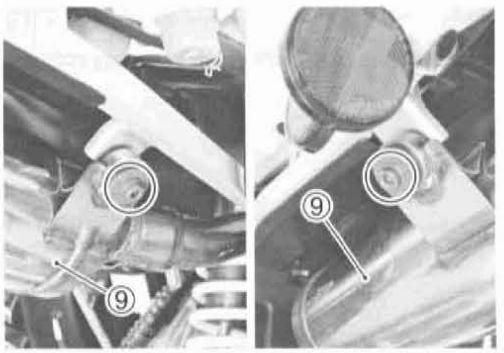
- Disconnect the ECT sensor coupler

- Loosen ther muffler clamp bolt.

- Remove the exhaust pipe ⑦.
- Remove the gasket ⑧.

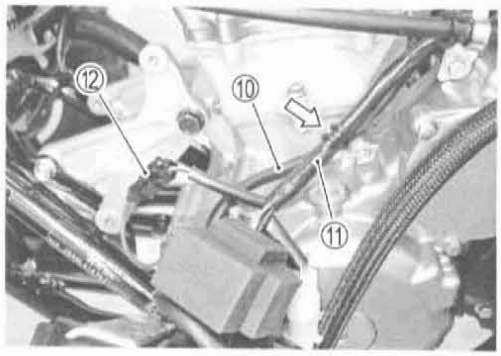


- Remove the muffler ⑨.

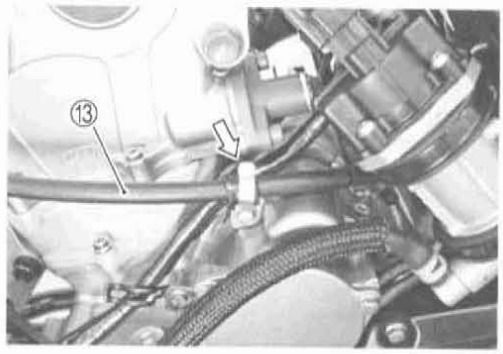


- Disconnect the motor lead wire.

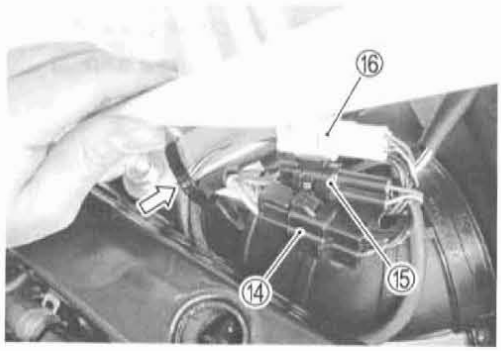
- Remove the starter motor lead wire ⑩ and wiring harness ⑪ from the clamp.
- Disconnect the ground lead wire coupler ⑫.



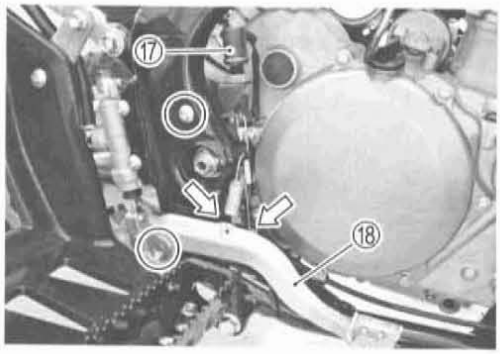
- Remove the parking brake cable ⑬ from the bracket.



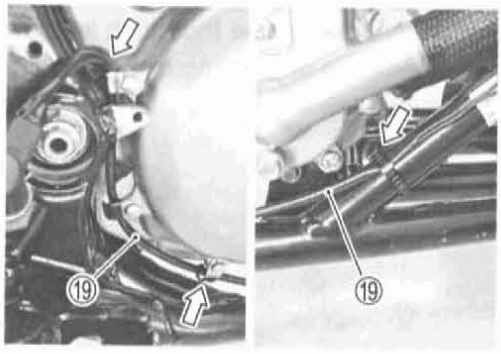
- Disconnect the generator startor coupler ⑭, CKP sensor ⑮ and gear position switch coupler ⑯.
- Remove the generator lead wire and gear position switch lead wire from the clamp.



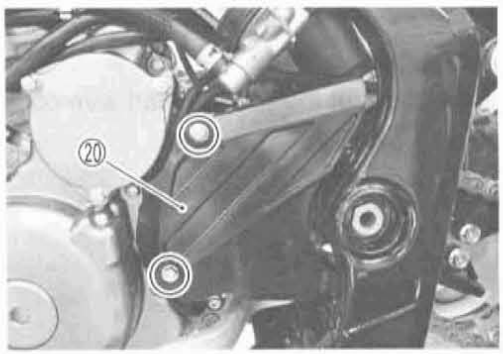
- Remove the rear brake switch ⑰ and brake pedal ⑱. (☞7-67)



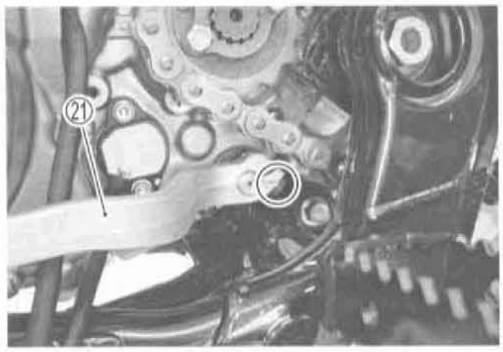
- Remove the rear brake switch wire ⑲ from the clamp.



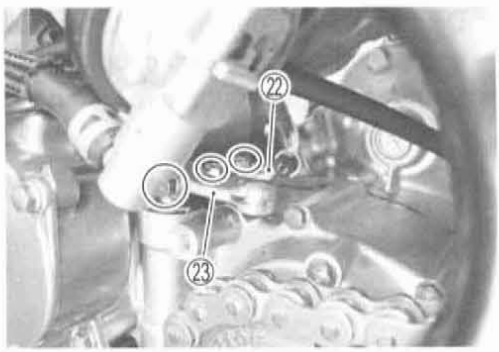
- Remove the engine sproket cover ⑳.



- Remove the gearshift lever ㉑.

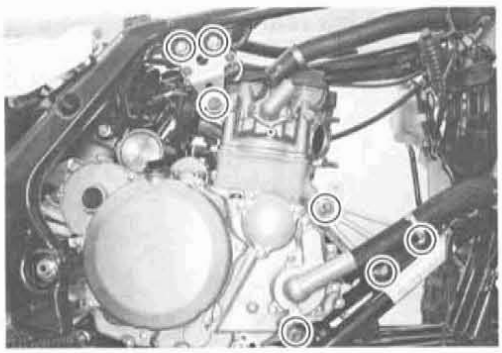


- Remove the clutch cable bracket ㉒.
- Remove the clutch release arm ㉓ along with the clutch cable.

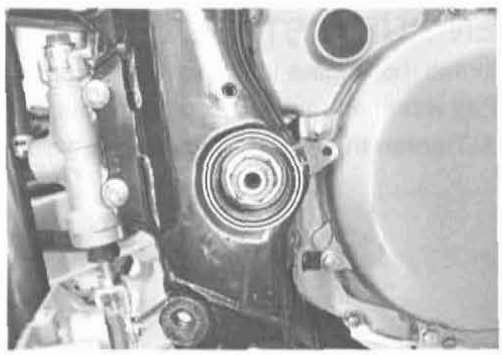


- Remove the engine sprocket ㉔ with drive chain.

- Remove the engine mounting lower brackets.
- Remove the engine mounting upper brackets.
- Remove teh engine mounting bolts and nuts.



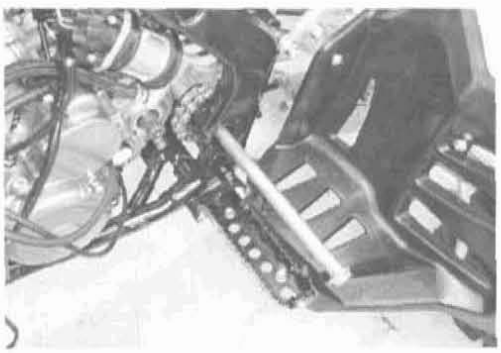
- Remove the swingarm pivot shaft nut and washer.



- Extract three quarters of the swingarm pivot shaft so as to keep the swingarm is position.

NOTE:
The swingarm will come off when the swingarm pivot shaft is completely removed.

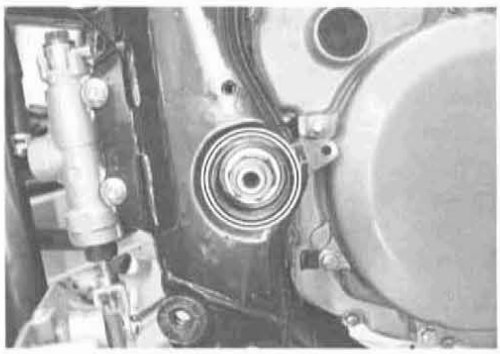
- Remove the engine from the right side.



ENGINE INSTALLATION

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

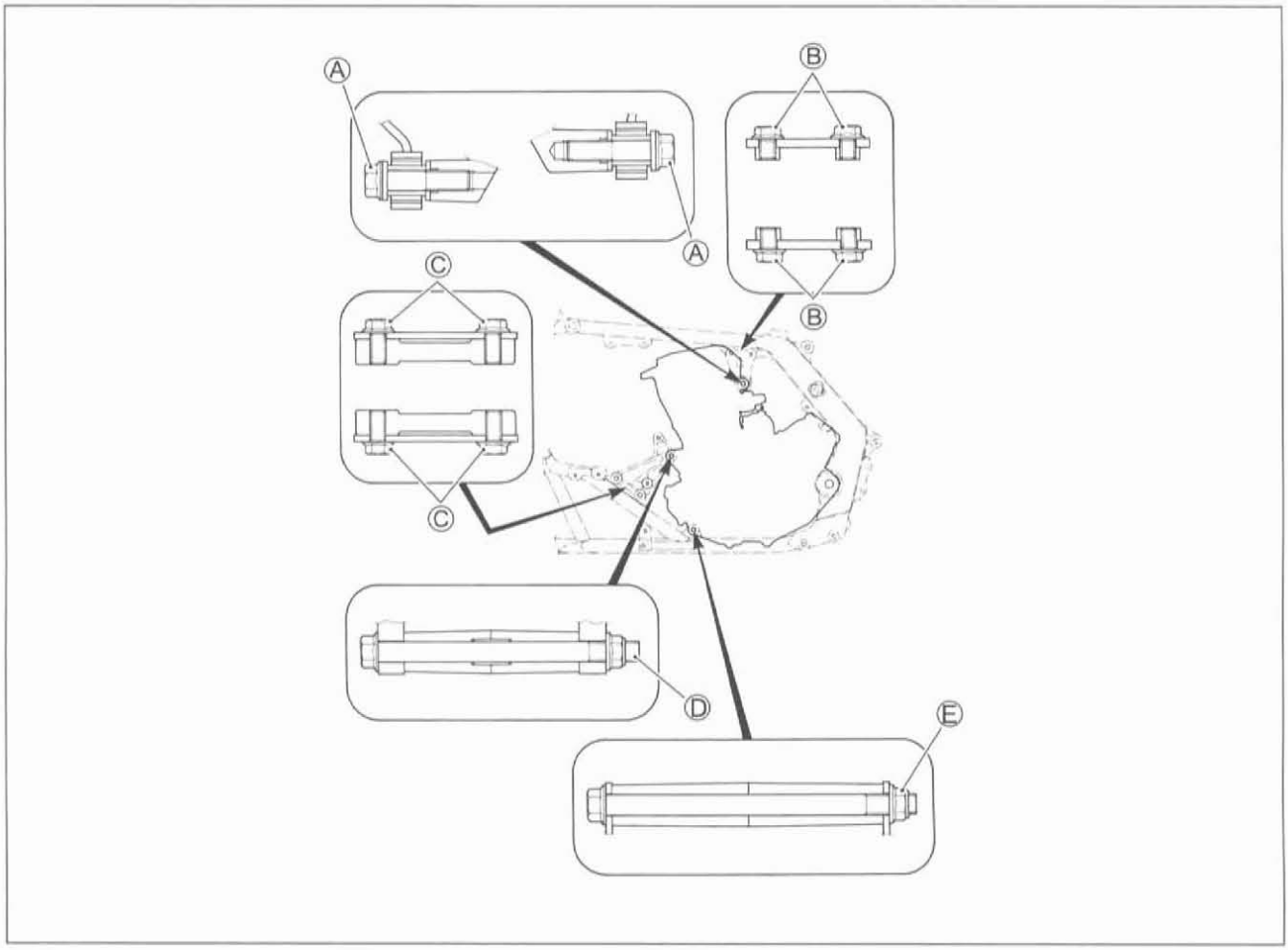
- Tighten the swingarm pivot shaft nut to the specified torque.



NOTE:

** The engine mounting nuts are self-locking.*

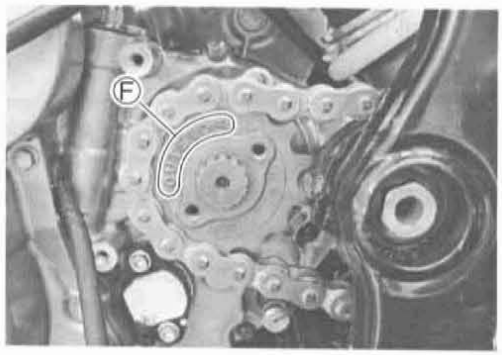
** Once the nut has been removed, it is no longer of any use. Be sure to use new nuts, and then tighten them to the specified torque.*



ITEM	N·m	kgf-m	lb-ft
Ⓐ	55	5.5	40.0
Ⓑ	26	2.6	19.0
Ⓒ	26	2.6	19.0
Ⓓ	55	5.5	40.0
Ⓔ	55	5.5	40.0

• Install the engine sprocket with drive chain.

NOTE:
The letter Ⓕ on the engine sprocket should face to the outside.

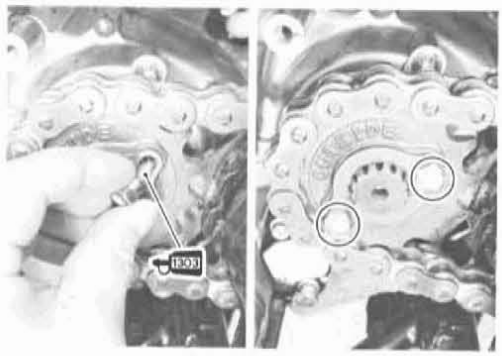


• Apply THREAD LOCK SUPER "1303" to the sprocket bolts.

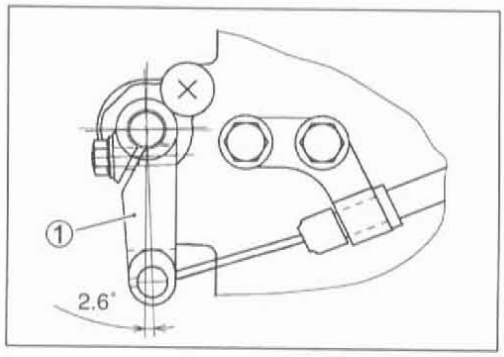
1303 99000-32030: THREAD LOCK SUPER "1303"

• Tighten the engine sprocket bolts to the specified torque.

Engine sprocket bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)



• Install the clutch release arm ① as shown in the illustration.

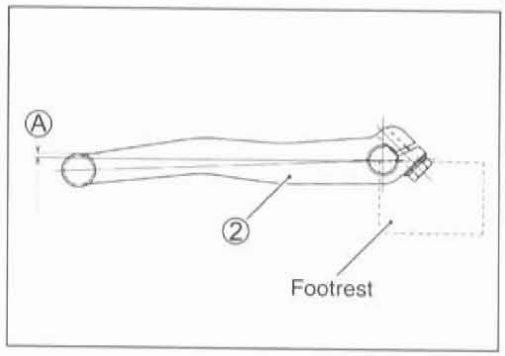


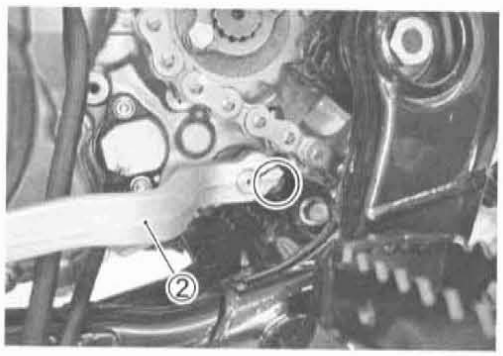
• Install the gearshift lever ② in the correct position.

DATA Gearshift lever height Ⓐ: 5 – 10 mm (0.2 – 0.4 in)

Gearshift lever bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)

Install the brake pedal and rear brake switch. (☞7-67)



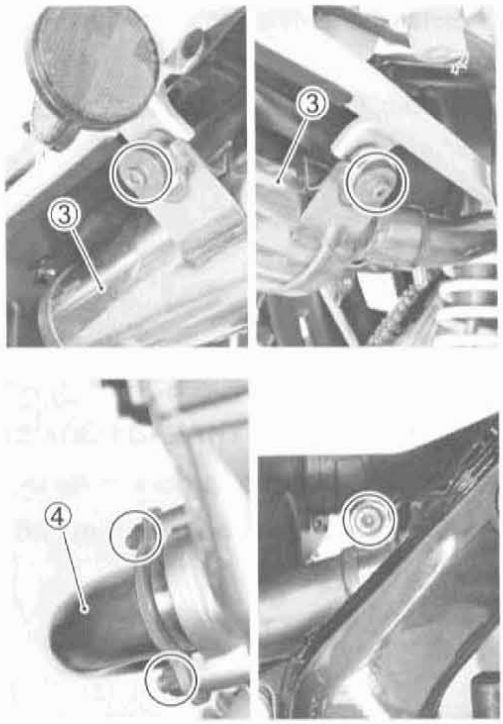


- Install the muffler ③ and exhaust pipe ④.

CAUTION

Use new gaskets to prevent exhaust gas leakage.

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



- Install the throttle body assembly. (☞5-18)
- Install the oil tank. (☞6-23)
- Install the oil return tank. (☞6-23)
- Install the fuel tank. (☞5-4)
- After installing the engine, route the wiring harness, cables and hoses properly. (☞9-15)
- Adjust the following items.

* Engine oil ☞2-13
* Engine coolant ☞2-15
* Throttle cable play ☞2-11
* Engine idle speed ☞2-12
* Clutch cable play ☞2-18
* Drive chain slack ☞2-26
* Brake pedal height ☞2-19
* Rear brake switch ☞2-19

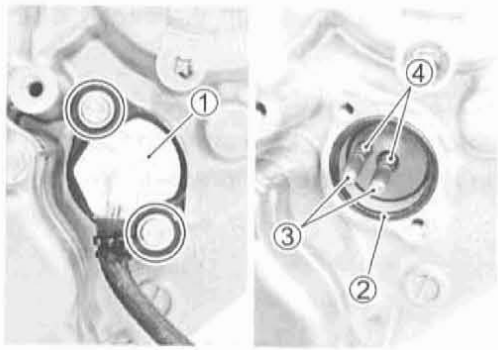
ENGINE DISASSEMBLY

STARTER MOTOR

- Remove the starter motor ①.

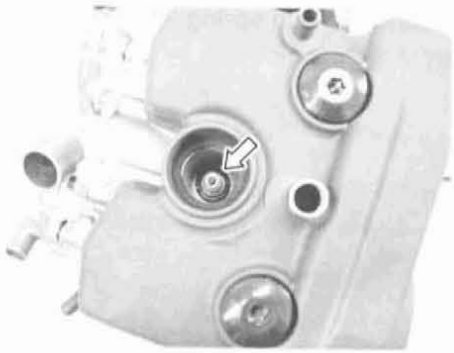
GEAR POSITION SWITCH

- Remove the gear position switch ①.
- Remove the O-ring ②, switch contacts ③ and springs ④.



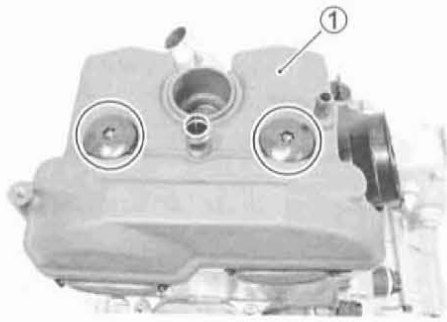
- Remove the spark plug.

TOOL **09930-10121: Spark plug wrench set**



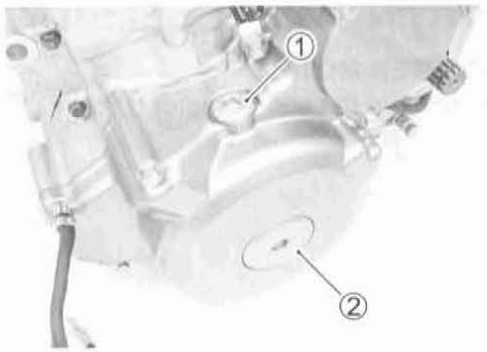
CYLINDER HEAD COVER

- Remove the cylinder head cover bolts, and then remove the cylinder head cover ①.



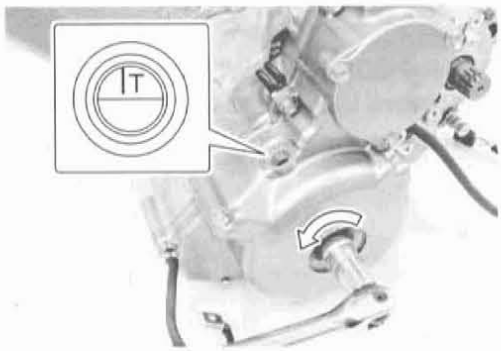
CAMSHAFT

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

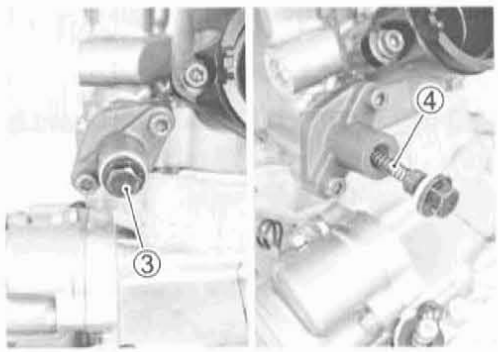


- Turn the generator rotor until the "T" line on the generator rotor is aligned with the center of the hole in the generator cover.

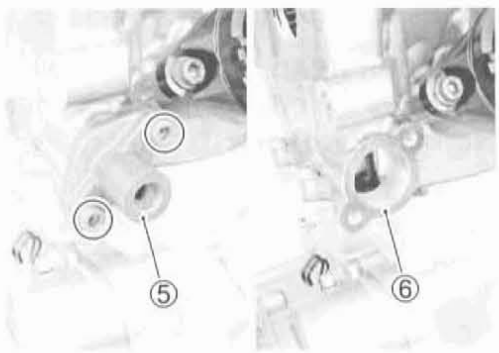
NOTE:
Before removing the camshaft journal holders, the piston must be at TDC of the compression stroke.



- Remove the spring holder bolt ③ of the can chain tension adjuster with spring ④.

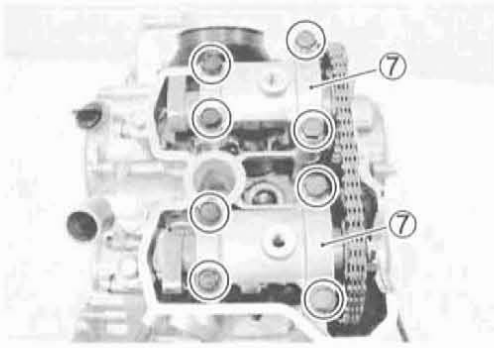


- Remove the cam chain tension adjuster ⑤ and gasket ⑥.



- Remove camshaft journal holders ⑦.

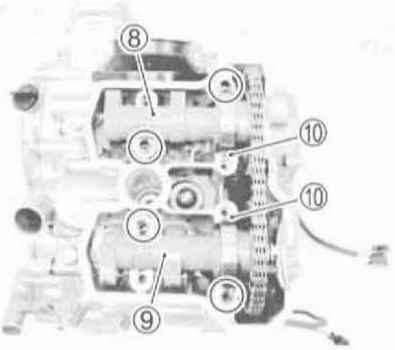
NOTE:
Loosen the camshaft journal holder bolts diagonally.



- Remove the dowel pins, intake camshaft ⑧, exhaust camshaft ⑨ and C-rings ⑩.

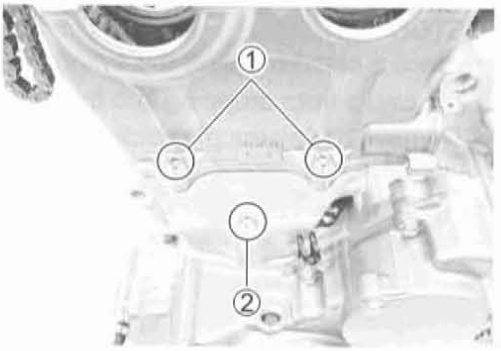
CAUTION

Do not drop the dowel pins, cam chain and C-rings into the crankcase.



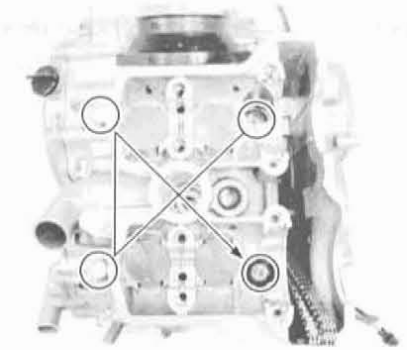
CYLINDER HEAD

- Remove the cylinder head bolts ①.
- Loosen the cylinder hase bolt ②.



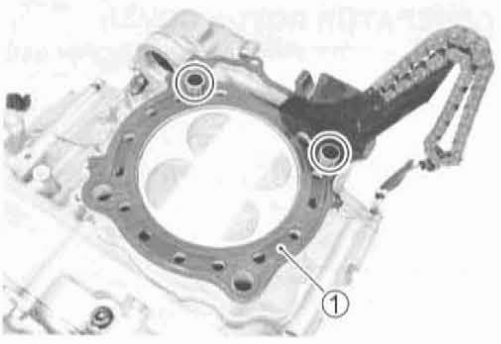
- Remove the four cylinder head bolts in diagonal stages, and then remove the cylinder head.

NOTE:
If the cylinder head does not come off easily, lightly tap it using a plastic mallet.



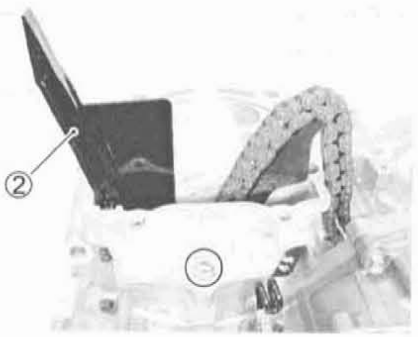
CYLINDER

- Remove the cylinder head gasket ① and dowel pins.



- Remove the cam chain guide ②.
- Remove the cylinder base bolt, and then remove the cylinder.

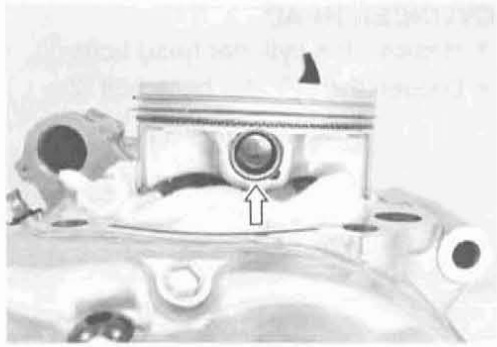
NOTE:
If the cylinder does not come off easily, lightly tap it using a plastic mallet.



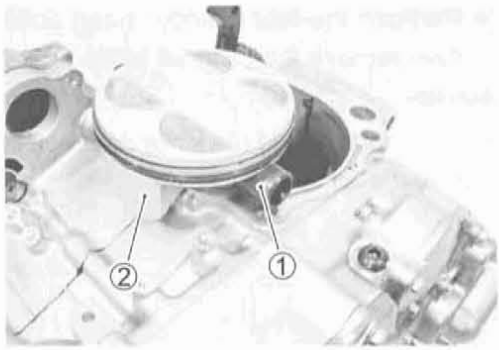
- Remove the cylinder gasket ③ and dowel pins.

PISTON

- Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into the crankcase.
- Remove the piston pin circlip.

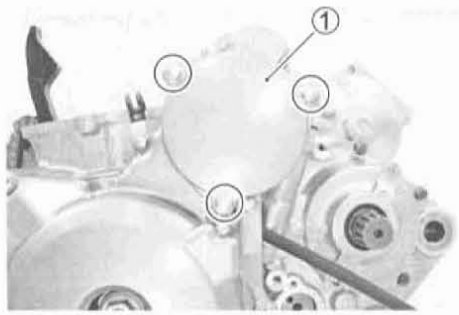


- Draw out the piston pin ① and remove the piston ②.

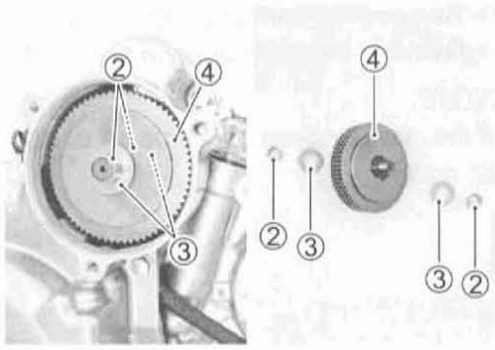


GENERATOR ROTOR COVER

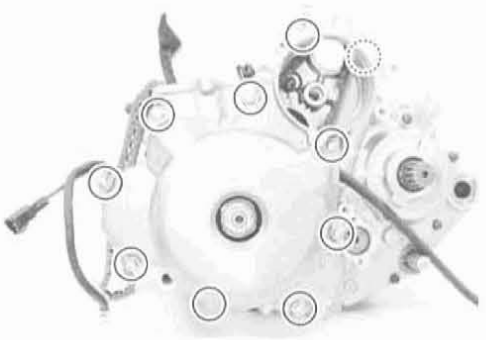
- Remove the starter torque limiter assembly cover ①.



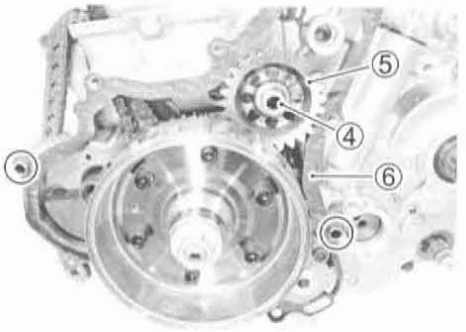
- Remove the collars ②, washers ③ and starter torque limiter assembly ④.



- Remove the generator rotor cover.

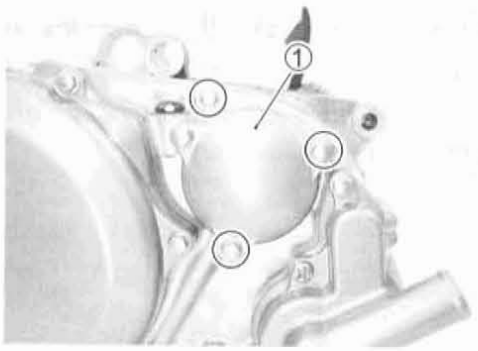


- Remove the shaft ④, starter idle gear ⑤, gasket ⑥ and dowel pins.

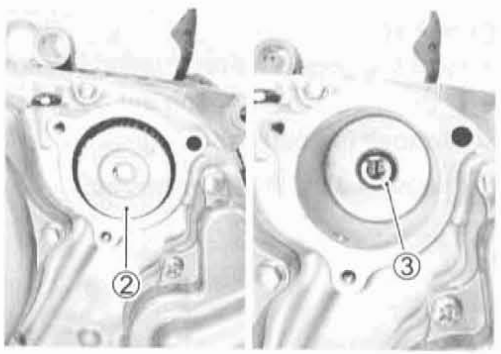


OIL FILTER

- Remove the oil filter cap ①.

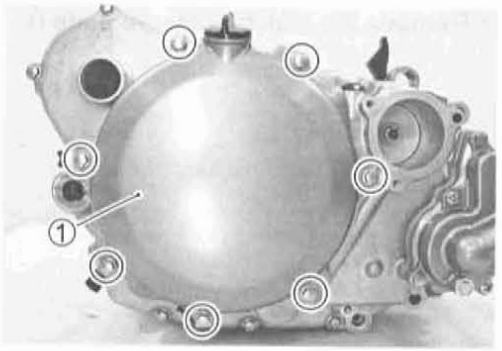


- Remove the oil filter ② and O-ring ③.

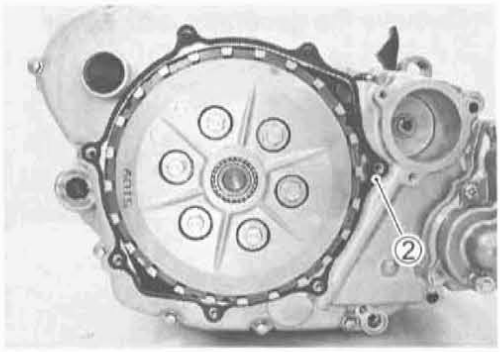


CLUTCH COVER

- Remove the clutch cover ①.

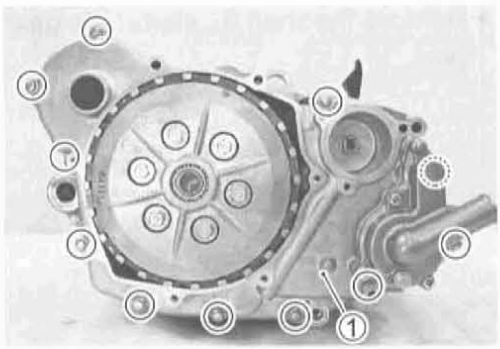


• Remove the gasket ②.



RIGHT CRANKCASE COVER

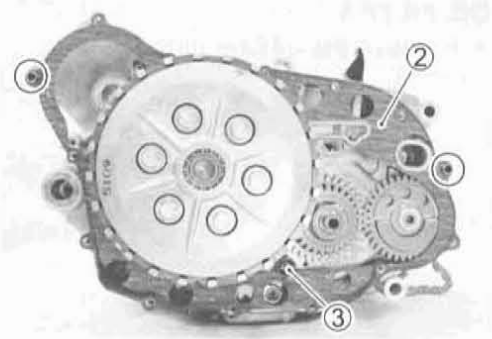
• Remove the right crankcase cover ①.



• Remove the gasket ②, dowel pins and oil seal ③.

NOTE:

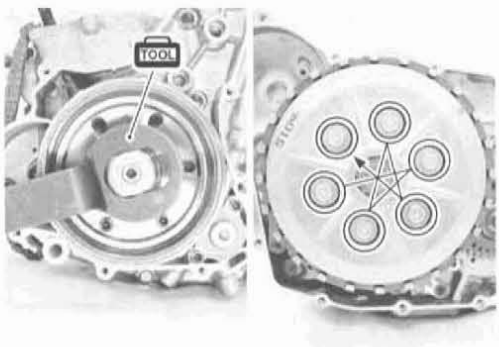
If there is no wear or damage at oil seal lip, the oil seal ③ removal is not necessary.



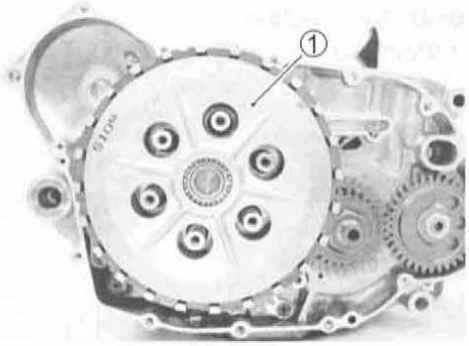
CLUTCH

• Hold the generator rotor using the special tool.
• Loosen the clutch spring set bolts working in diagonal stages.
• Remove the bolts and springs.

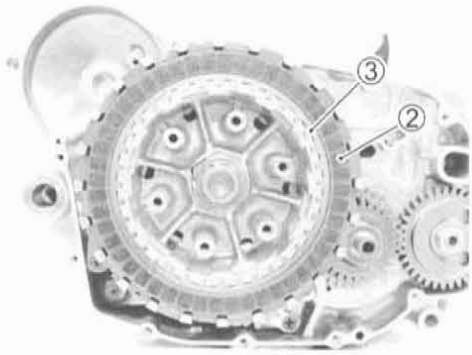
TOOL 09930-44520: Rotor holder



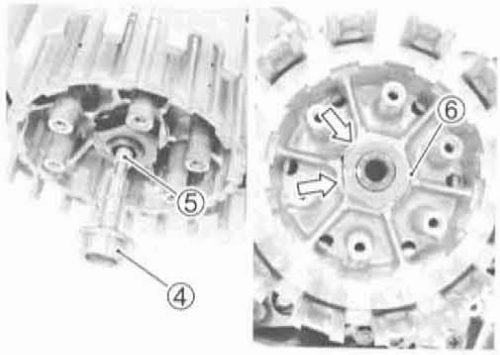
• Remove the clutch pressure plate ①.



- Remove the drive plates ② and driven plates ③.
- Remove the spring washer and spring washer seat.

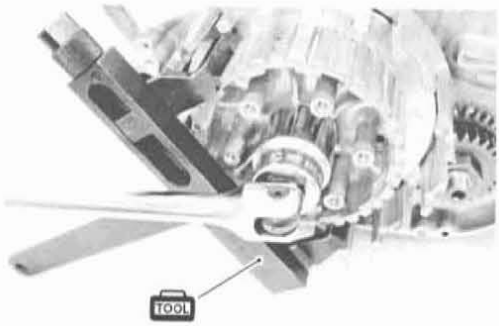


- Remove the push piece ④ and push rod ⑤.
- Flatten the lock washer ⑥.

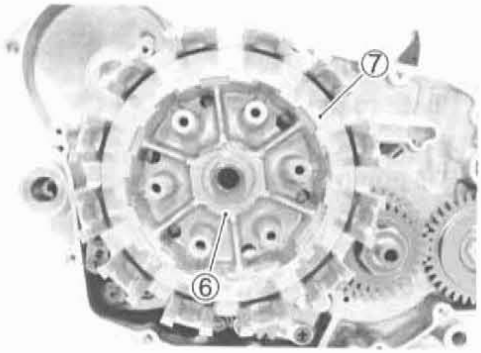


- Hold the clutch sleeve hub using the special tool, and then remove the clutch sleeve hub nut.

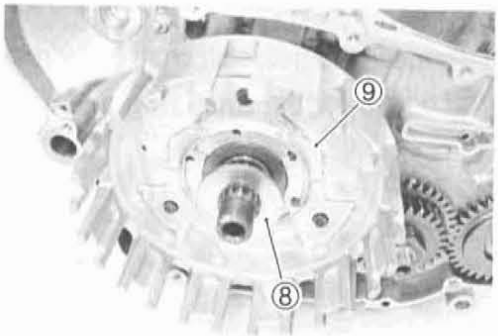
TOOL 09920-53740: Clutch sleeve hub holder



- Remove the lock washer ⑥ and clutch sleeve hub ⑦.



- Remove the washer ⑧ and primary driven gear assembly ⑨.

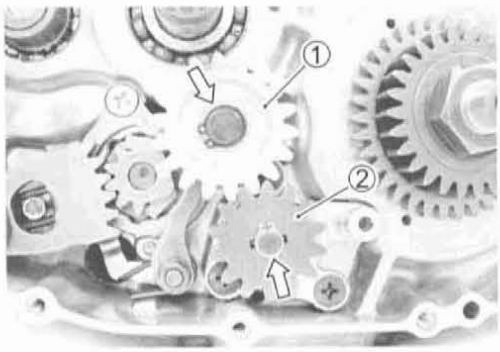


• Remove the spacer ⑩.

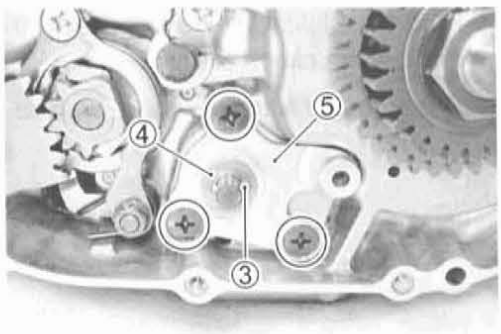
OIL PUMP (No.1)

• Remove the oil pump idle gear ① and oil pump driven gear ②.

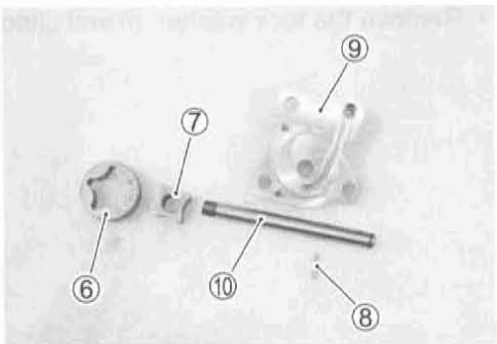
09900-06107: Snap ring pliers



• Remove the pin ③, washer ④ and oil pump assembly ⑤.



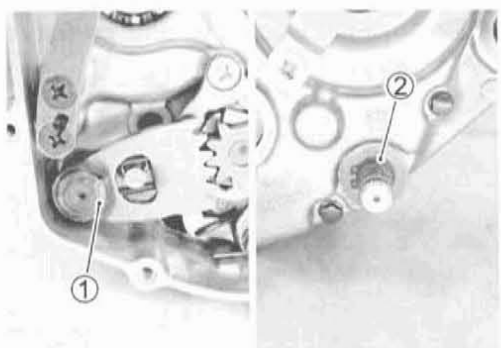
• Remove the following parts from the oil pump assembly.
Outer rotor ⑥
Inner rotor ⑦
Pin ⑧
Oil pump body ⑨
Oil pump shaft ⑩



GEARSHIFT SHAFT

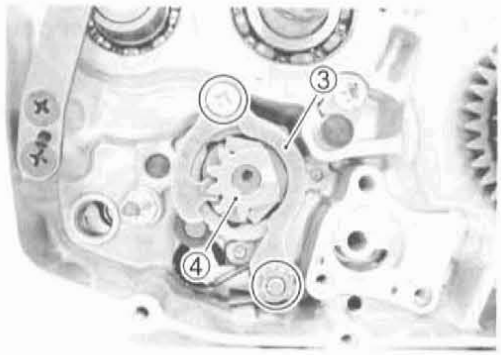
• Remove the gearshift shaft ① by removing the snap ring ②.

09900-06107: Snap ring pliers

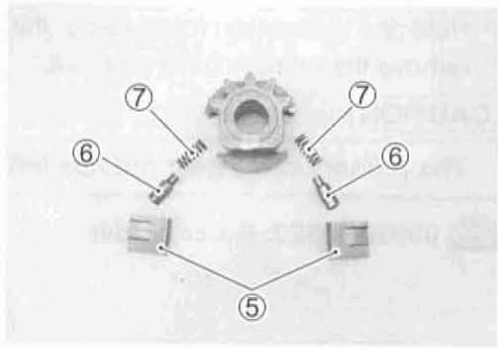


- Remove the gearshift pawl lifter ③ and gearshift cam driven gear ④.

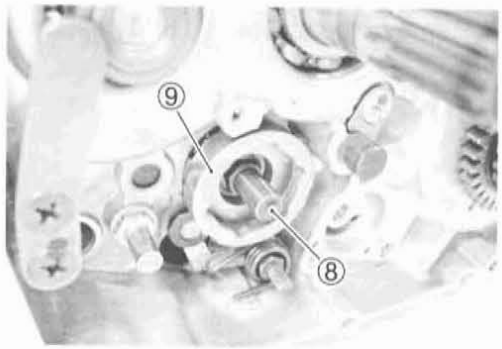
NOTE:
Be careful not to drop the pins and springs when removing the gearshift cam driven gear.



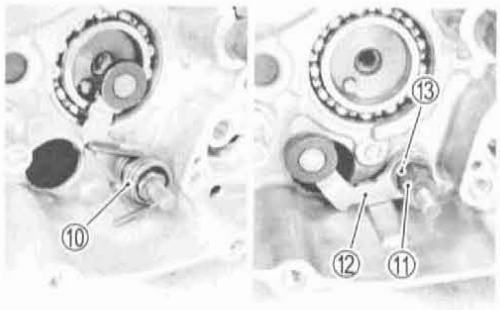
- Remove the gearshift pawls ⑤, pins ⑥ and springs ⑦.



- Remove the gearshift cam driven gear pin ⑧ and gearshift cam stopper plate ⑨.



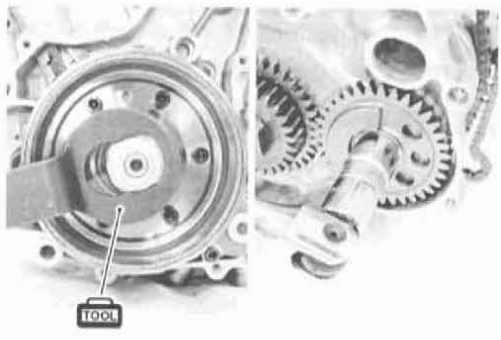
- Remove the spring ⑩.
- Remove the gearshift cam stopper bolt ⑪, gearshift cam stopper ⑫ and washer ⑬.



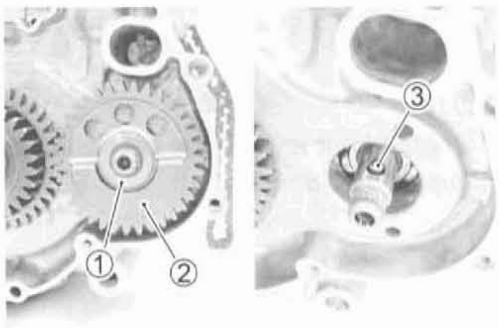
GENERATOR ROTOR

- Hold the generator rotor using the special tool, and then remove the balancer driven gear nut.

TOOL 09930-44520: Rotor holder



- Remove the washer ①, balancer driven gear ②.
- Remove the pin ③.

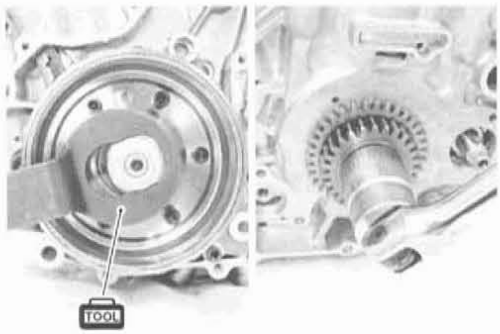


- Hold the generator rotor using the special tool, and then remove the primary drive gear nut.

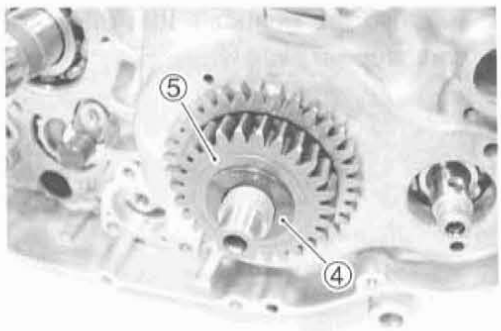
CAUTION

The primary drive gear nut has left-hand threads.

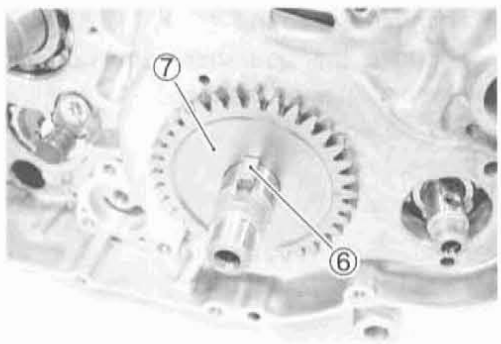
09930-44520: Rotor holder



- Remove the washer ④ and primary drive gear ⑤.

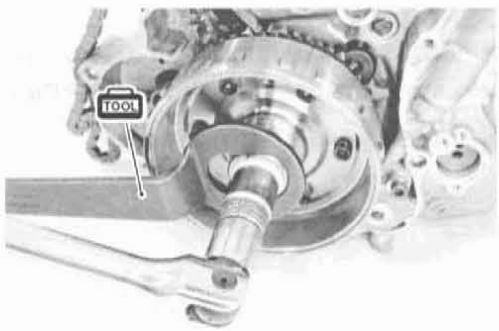


- Remove the key ⑥ and balancer drive gear ⑦.



- Hold the generator rotor using the special tool, and then remove the generator rotor nut.

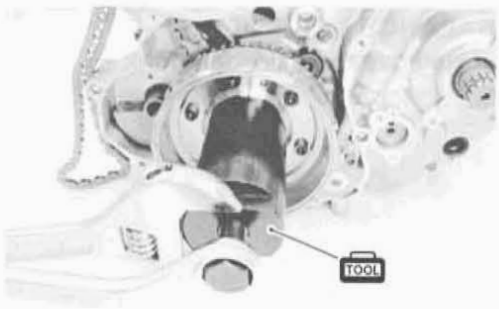
09930-44520: Rotor holder



- Remove the generator rotor using the special tool.

TOOL 09930-31921: Rotor remover

NOTE:
Temporarily install the generator rotor nut to the crankshaft, and then remove the generator rotor using the special tool.



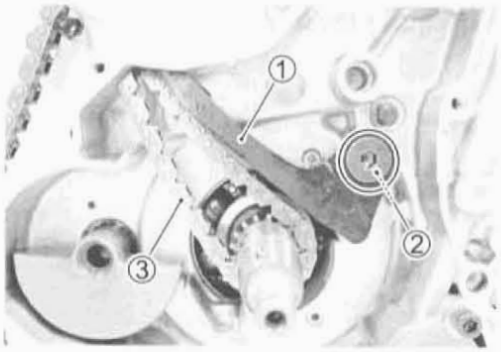
CAUTION

Do not hit the generator rotor with a hammer, otherwise the rotor may be damaged.

- Remove the generator rotor key ⑧.
- Remove the starter driven gear ⑨.

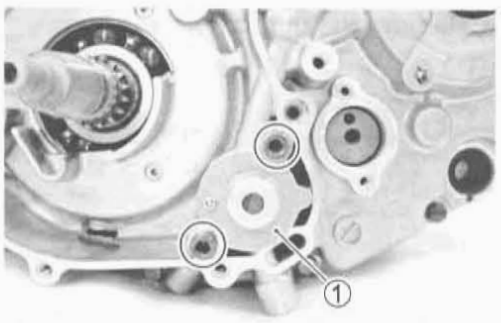
CAM CHAIN

- Remove the cam chain tensioner ①, washer ② and cam chain ③.

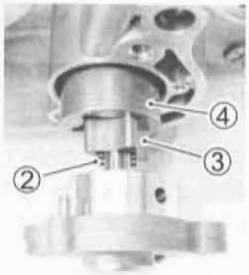


OIL PUMP (No.2)

- Remove the oil pump assembly ①.

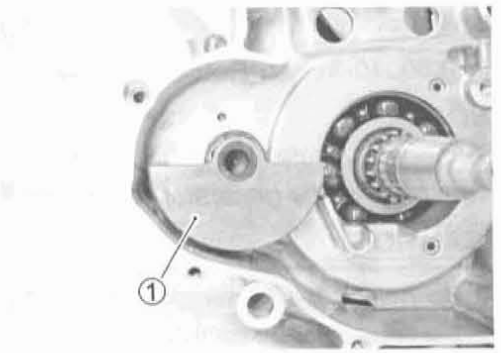


- Remove the pin ②, inner rotor ③ and outer rotor ④.



BALANCER CRANK

- Remove the balancer crank ①.

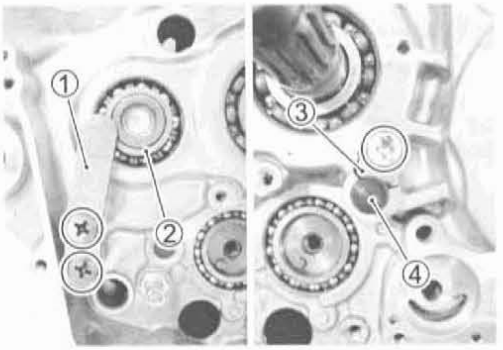


CRANKCASE

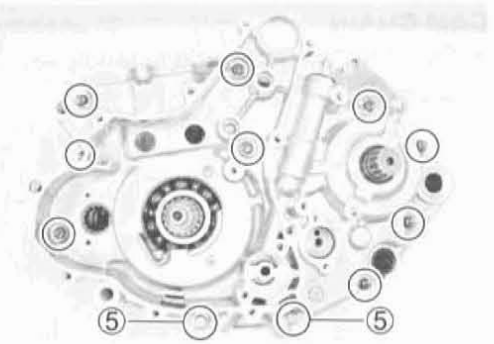
- Remove the retainer ①.
- Remove the spacer ②.
- Remove the gearshift fork shaft retainer ③.

CAUTION

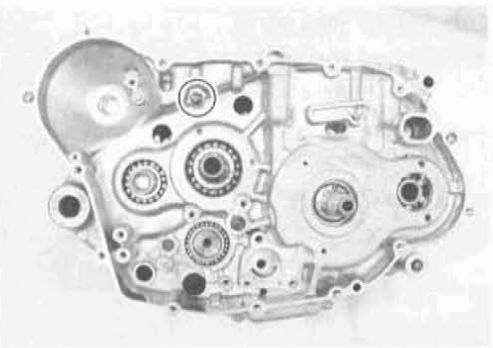
Do not pull out the gearshift fork shaft ④ at this point because the gearshift fork comes off in the crankcase.



- Remove the left crankcase bolts and engine oil drain plugs ⑤.



- Remove the right crankcase bolts.

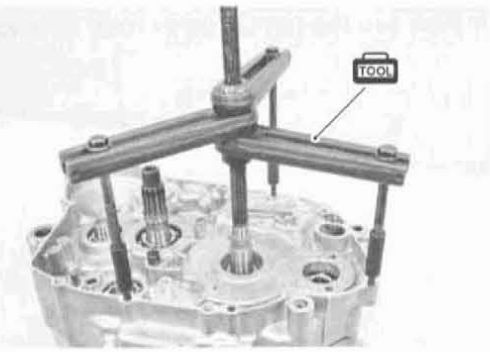


- Separate the crankcase using the special tool.

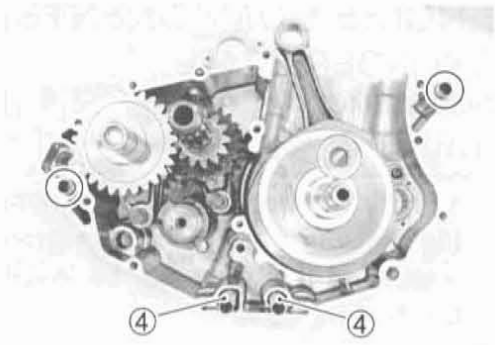
TOOL 09920-13120: Crankcase separating tool

NOTE:

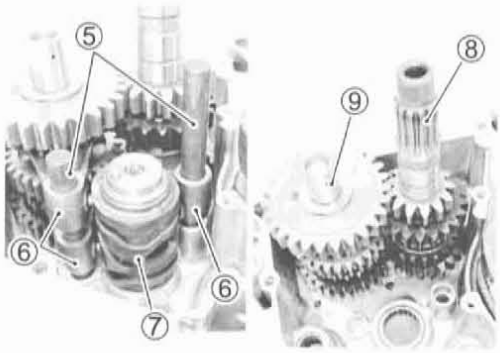
Fit the crankcase separating tool to the right crankcase, so that the tool plate is paralleled with the end face of the crankcase.



- Remove the dowel pins.
- Remove the oil strainers ④.

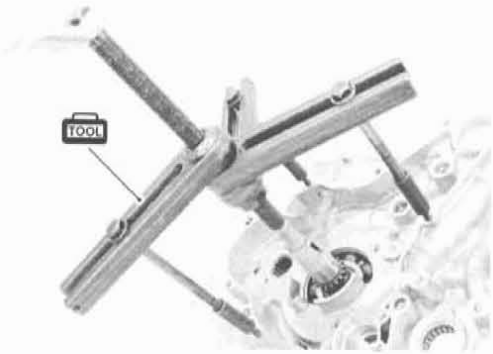


- Remove the gearshift fork shafts ⑤, gearshift forks ⑥ and gearshift cam ⑦.
- Remove the countershaft assembly ⑧ and driveshaft assembly ⑨.



- Remove the crankshaft from the crankcase using the special tool.

TOOL 09920-13120: Crankcase separating tool



ENGINE COMPONENTS INSPECTION AND SERVICE

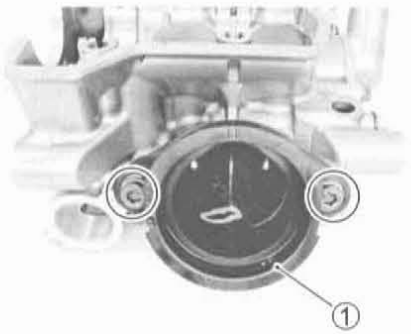
CYLINDER HEAD

DISASSEMBLY

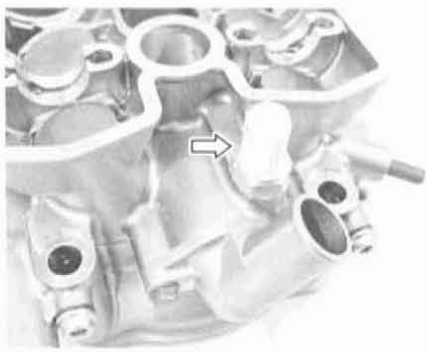
CAUTION

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

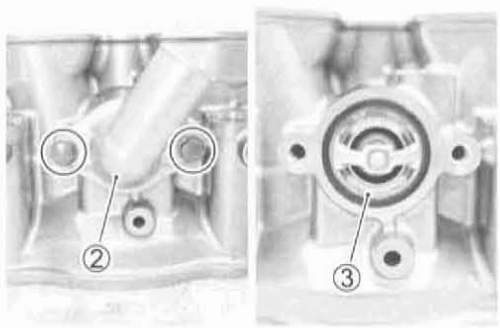
- Remove the intake pipe ①.



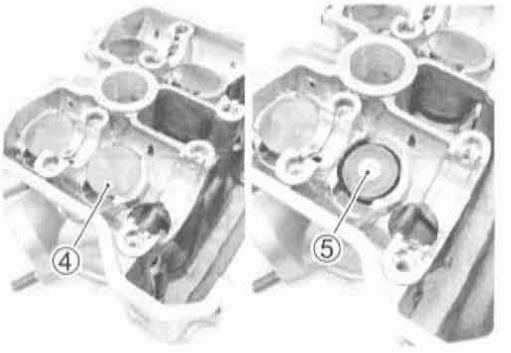
- Remove the ETC sensor from the cylinder head.



- Remove the thermostat cover ② and thermostat ③.



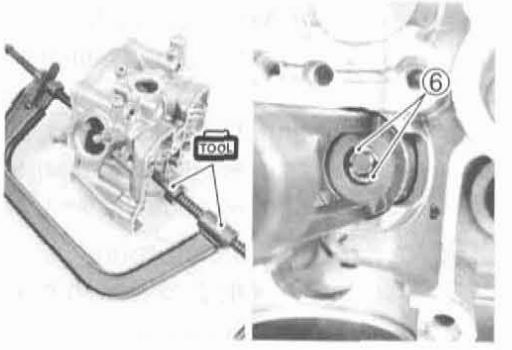
- Remove the tappets ④ and shims ⑤ by fingers or magnetic hand.



CAUTION

Identify the position of each removed part.

- Using the special tools, compress the valve spring and remove the two cotter halves ⑥ from the valve stem.

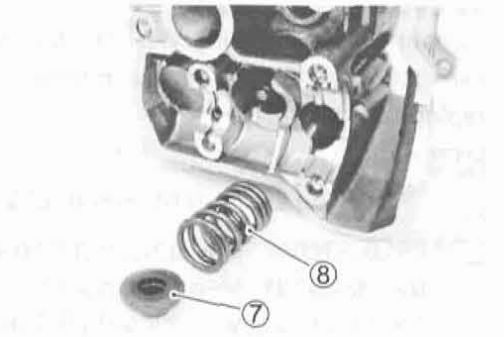


TOOL **09916-14510: Valve lifter**
09916-14521: Valve lifter attachment (Exhaust side)
09916-14910: Valve lifter attachment (Intake side)
09916-84511: Tweezers

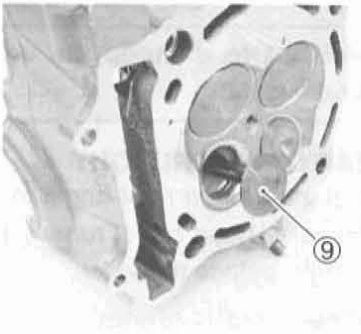
CAUTION

Be careful not to damage the tappet sliding surface with the special tool.

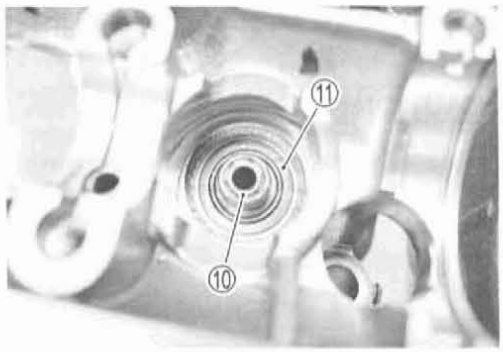
- Remove the valve spring retainer ⑦ and valve spring ⑧.



- Pull out the valve ⑨ from the combustin chamber side.



- Remove the oil seal ⑩ and spring seat ⑪.



CAUTION

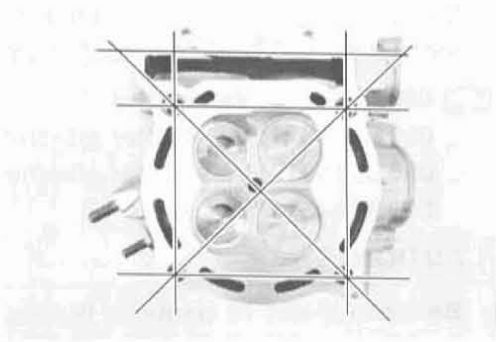
Do not reuse the removed oil seal.

- Remove the other valves in the same manner as described previously.

CYLINDER HEAD DISTORTION

Decarbonize the combustion chambers.

Check the gasket surface of the cylinder head for distortion with a straightedge and thickness gauge, taking a clearance reading at several places indicated. If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder head.

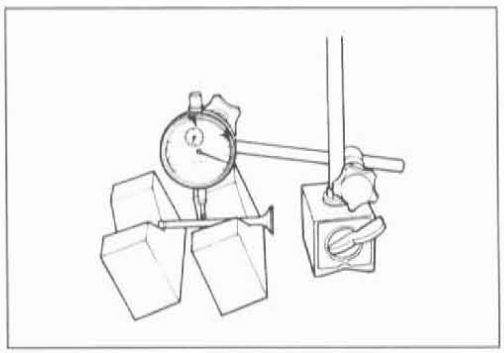


DATA Cylinder head distortion:
Service Limit: 0.05 mm (0.002 in)

TOOL 09900-20803: Thickness gauge

VALVE STEM RUNOUT

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



DATA Valve stem runout:
Service Limit: 0.05 mm (0.002 in)

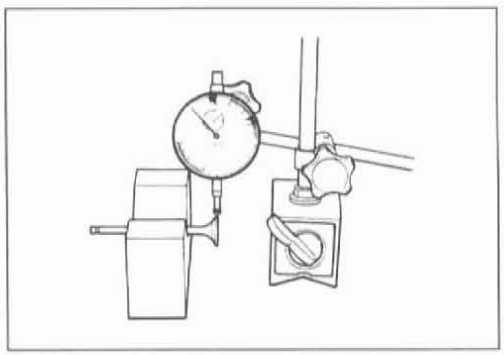
TOOL 09900-20607: Dial gauge (1/100 mm)
09900-20701: Magnetic stand
09900-21304: V-block set (100 mm)

CAUTION

Be careful not to damage the valve and valve stem when handling it.

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.



DATA Valve head radial runout:
Service Limit: 0.03 mm (0.001 in)

TOOL 09900-20607: Dial gauge (1/100 mm)
09900-20701: Magnetic stand
09900-21304: V-block set (100 mm)

CAUTION

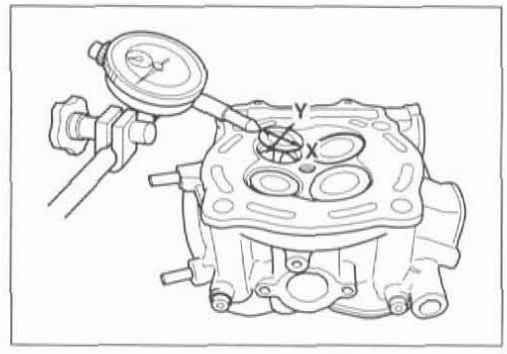
Be careful not to damage the valve and valve stem when handling it.

VALVE STEM AND VALVE FACE WEAR CONDITION

Visually inspect each valve stem and valve face for wear and pitting. If it is worn or damaged, replace the valve with a new one.

VALVE STEM DEFLECTION

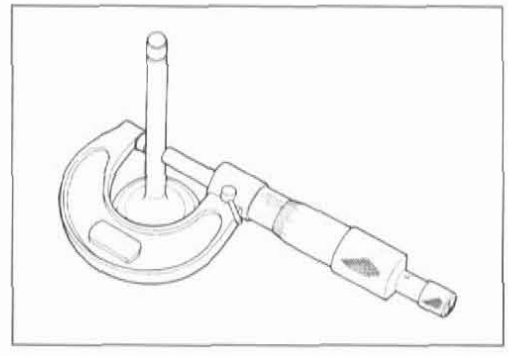
Lift the valve about 10 mm (0.39 in) from the valve seat.
Measure the valve stem deflection in two directions, perpendicular to each other, by positioning the dial gauge as shown.
If the deflection measured exceeds the limit, then determine whether the valve or the guide should be replaced with a new one.



DATA Valve stem deflection (IN & EX):
Service Limit: 0.25 mm (0.010 in)
TOOL 09900-20607: Dial gauge (1/100 mm)
09900-20701: Magnetic stand

VALVE STEM WEAR

If the valve stem is worn down to the limit, as measured with a micrometer, replace the valve.
If the stem is within the limit, then replace the guide.
After replacing valve or guide, be sure to recheck the deflection.



DATA Valve stem O.D.:
Standard (IN) : 5.475 – 5.490 mm (0.2156 – 0.2161 in)
(EX) : 5.455 – 5.470 mm (0.2148 – 0.2154 in)

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

NOTE:
If valve guides have to be removed for replacement after inspecting related parts, carry out the steps shown in valve guide servicing. (☞3-28)

VALVE GUIDE SERVICING

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

09916-44910: Valve guide remover/installer

NOTE:

* *Discard the removed valve guide subassemblies.*
* *Only oversized valve guides are available as replacement parts. (Part No. 11115-45G70)*

- Re-finish the valve guide holes in cylinder head with the reamer and handle.

09916-34580: Valve guide reamer (10.8 mm)
09916-34542: Reamer handle

CAUTION

When refinishing or removing the reamer from the valve guide hole, always turn it clockwise.

- 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

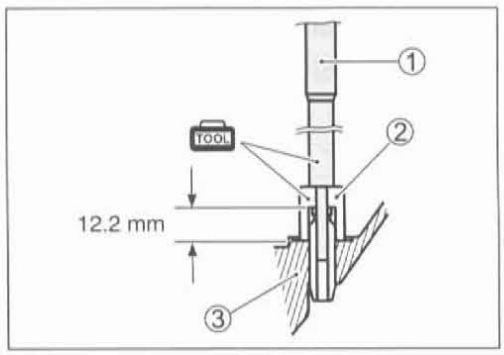
Do not use a burner to heat the valve guide hole to prevent cylinder head distortion.

- Apply engine oil to the valve guide hole.
- Drive the valve guide into the hole using the valve guide installer ① and attachment ②.

09916-44310: Valve guide remover/installer ①
09916-53360: Attachment ②

NOTE:

Install the valve guide until the attachment contacts with the cylinder head ③.

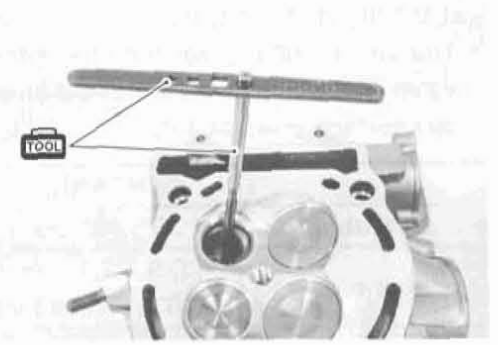


CAUTION

Failure to oil the valve guide hole before driving the new guide into place may result in a damaged guide or head.

- After installing the valve guides, re-finish their guiding bores using the reamer.
- Clean and engine oil the guides after reaming.

TOOL 09916-34550: Valve guide reamer (5.5 mm)
09916-34542: Reamer handle



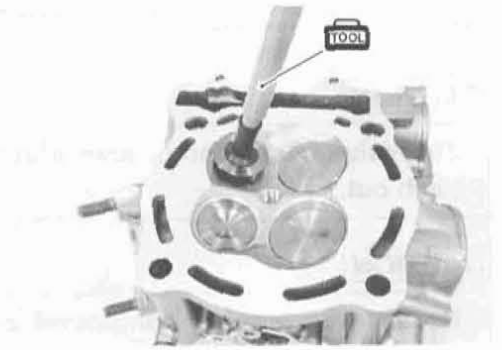
NOTE:

* *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.*

VALVE SEAT WIDTH INSPECTION

- Visually check for valve seat width on each valve face.
- If the valve face has worn abnormally, replace the valve.
- Coat the valve seat with a red lead (Prussian Blue) and set the valve in place. Rotate the valve with light pressure.
- Check that the transferred red lead (blue) on the valve face is uniform all around and in center of the valve face.

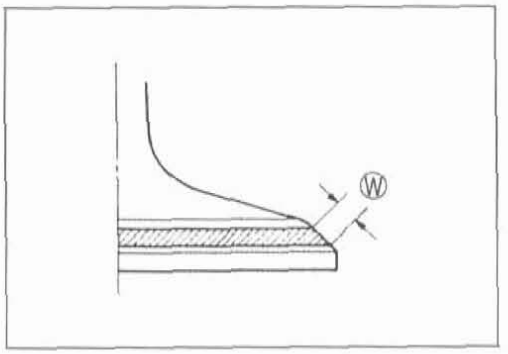
TOOL 09916-10911: Valve lapper set



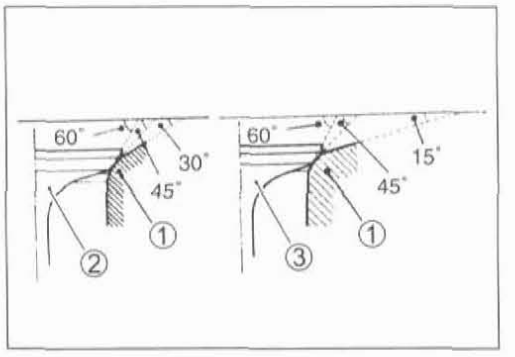
- If the seat width Ⓦ measured exceeds the standard value or seat width is not uniform, refuse the seat using the seat cutter.

DATA Valve seat width Ⓦ:
Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)

If the valve seat is out of specification, correct the seat by servicing it as follows:



VALVE SEAT SERVICING



- The valve seats ① for both the intake valve ② and exhaust valve ③ are machined to three different angles. The seat contact surface is cut at 45°.

	INTAKE	EXHAUST
seat angle	30°, 45°, 60°	15°, 45°, 60°
seat width	0.9 – 1.1 mm (0.035 – 0.043 in)	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.	5.500 – 5.512 mm (0.2165 – 0.2170 in)	5.500 – 5.512 mm (0.2165 – 0.2170 in)

CAUTION

The valve seat contact area must be inspected after each cut.

CAUTION

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.

CAUTION

The titanium valves are coated with an oxidized membrane treatment to resist wear but the membrane tend to be removed if lapped after valve seat servicing.

NOTE:

After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. (☞2-5)

- Clean and assemble the head and valve components. 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.

⚠ WARNING

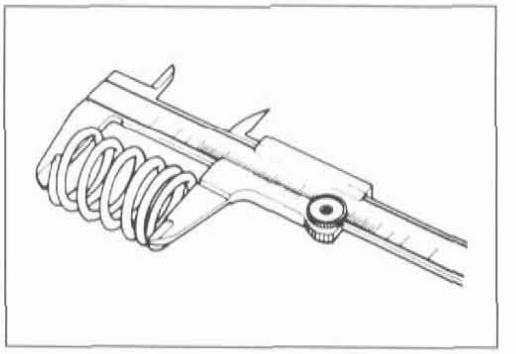
Always use extreme caution when handling gasoline.

VALVE SPRING

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

Check the valve spring for proper strength by measuring its free length and also by the force required to compress it.

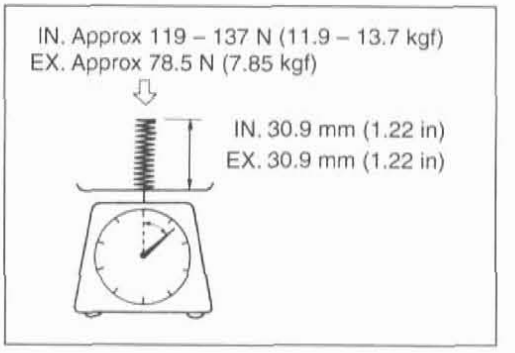
If the spring length is less than the service limit, or if the force required to compress the spring does not fall within the range specified, replace the spring.



DATA Valve spring free length:
Service limit: (IN.) 34.0 mm (1.34 in)
(EX.) 33.3 mm (1.31 in)

TOOL 09900-20102: Vernier calipers

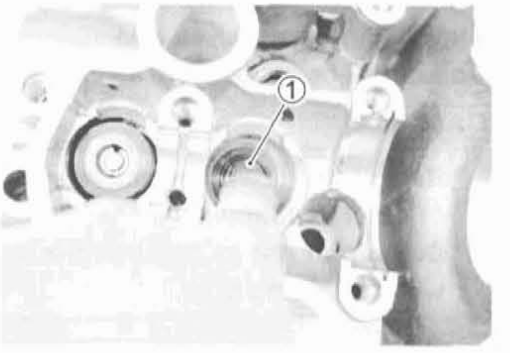
DATA Valve spring tension:
Standard:
(IN.) Approx. 119 – 137 N, 11.9 – 13.7 kgf/ 30.9 mm
(26.2 – 30.2lbs/ 1.22in)
(EX.) Approx. 78.5 N, 7.85 kgf/ 30.9 mm
(17.3 lbs/ 1.22in)



REASSEMBLY

- Install the valve spring seat.
- Apply MOLYBDENUM OIL SOLUTION to the oil seal ①, and press-fit it into position.

MOLYBDENUM OIL SOLUTION



CAUTION

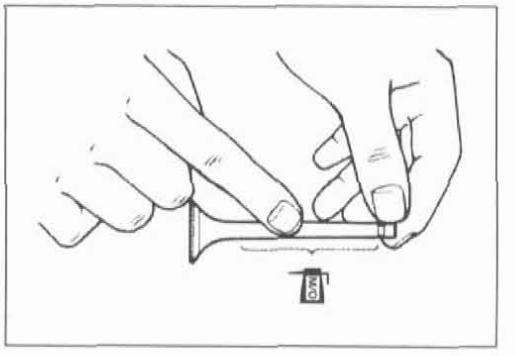
Do not reuse the removed oil seal.

- Insert the valve, with its stem coated with MOLYBDENUM OIL SOLUTION all around and along the full stem length without any break.

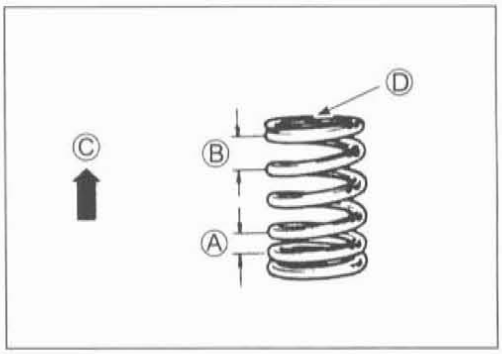
CAUTION

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

MOLYBDENUM OIL SOLUTION

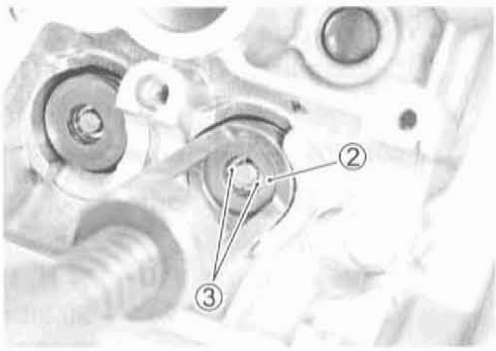


- Install the valve spring with the small-pitch portion Ⓐ facing cylinder head.



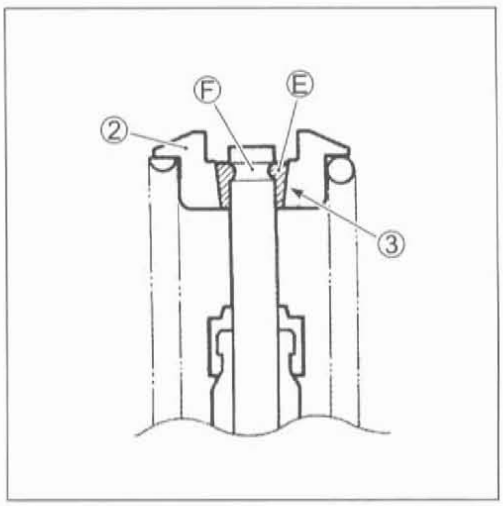
Ⓑ Large-pitch portion
Ⓒ UPWARD
Ⓓ Paint

- Put on the valve spring retainer ②, and using the valve lifter, press down the spring, fit the valve cotter halves to the stem end, and release the lifter to allow the valve cotter ③ to wedge in between retainer and stem.



TOOL **09916-14510: Valve lifter**
09916-14521: Valve lifter attachment (Exhaust side)
09916-14910: Valve lifter attachment (Intake side)
09916-84511: Tweezers

- Be sure that the rounded lip Ⓔ of the cotter fits snugly into the groove Ⓕ in the stem end.
- Install the other valves and springs in the same manner as described previously.

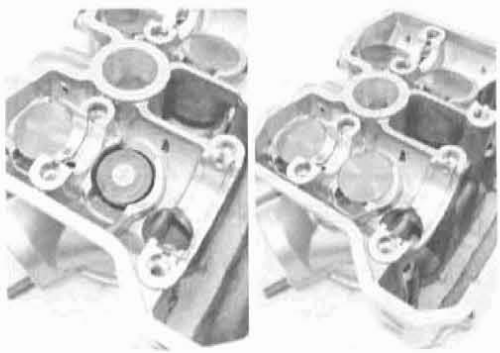


CAUTION

*** Be sure to restore each spring and valve to their original positions.**
*** Be careful not to damage the valve and valve stem when handling it.**

② Valve spring retainer
③ Valve cotter

- 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.*

- Install the ETC sensor. (☞6-11)
- Apply SUZUKI SUPER GREASE to the O-ring.

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

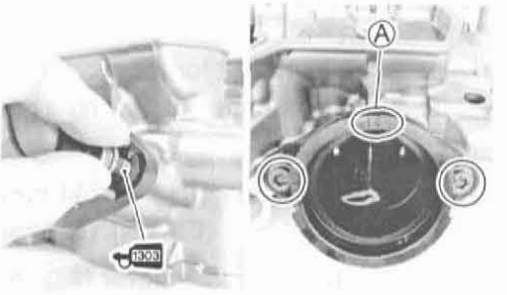
CAUTION

The removed O-ring must be replaced with a new one.

- Apply THREAD LOCK SUPER "1303" to the intake pipe bolts.
- Install the intake pipe.

NOTE:
Make sure that the "up mark" Ⓐ comes to the upper side.

99000-32030: THREAD LOCK SUPER "1303"



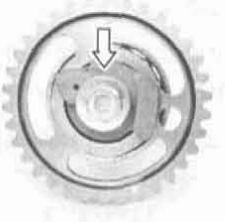
AUTOMATIC DECOMP.

Check the decomp. cam moves smoothly and shaft ① rotates together. If any abnormal condition are found, replace the camshaft assembly.

CAMSHAFT

CAUTION

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



CAM SPROCKET

Inspect the sprocket teeth for wear. If they are worn, replace the camshafts, crankshaft and cam chain as a set.

CAMSHAFT BEARING

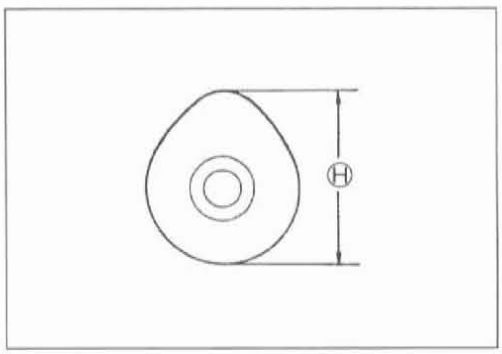
Inspect the bearings for play, discoloration, wear and seizure. Move the outer race by finger and inspect for smooth movement. If there is anything unusual, replace the camshaft assembly.

CAM WEAR

- Check the camshaft for wear or damage.
- Measure the cam height Ⓗ with a micrometer.

DATA Cam height Ⓗ
Service Limit (IN.) 32.264 mm (1.2702 in)
(EX.) 33.151 mm (1.3052 in)

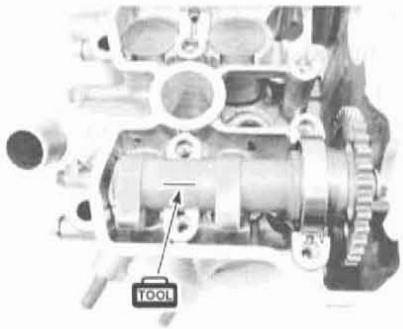
TOOL 09900-20202: Micrometer (25 – 50 mm)



CAMSHAFT JOURNAL WEAR

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

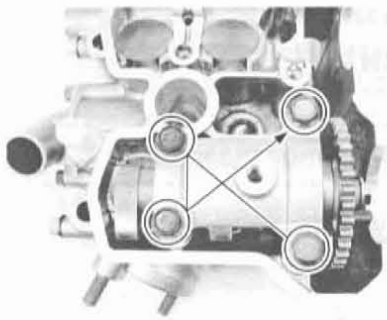
TOOL 09900-22301: Plastigauge
09900-22302: Plastigauge



NOTE:
Install the camshaft journal holders to their original positions.

- Tighten the camshaft journal holder bolts evenly and diagonally to the specified torque.

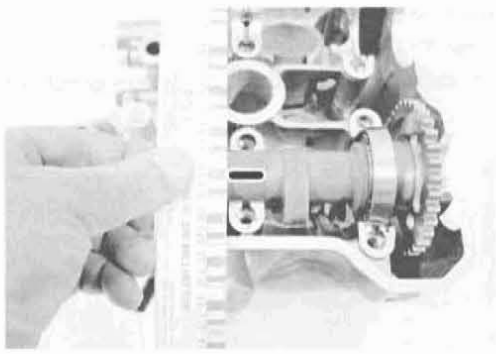
Camshaft journal holder bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)



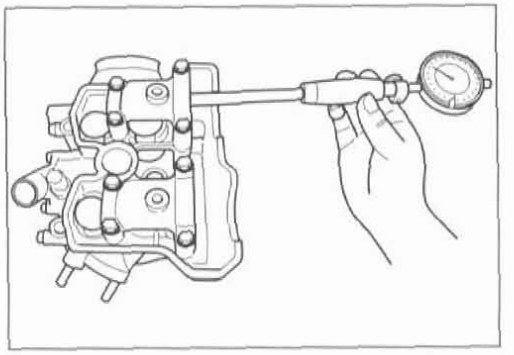
NOTE:
Do not rotate the camshaft with the plastigauge in place.

- Remove the camshaft journal holders, and read the width of the compressed plastigauge with envelope scale. This measurement should be taken at the widest part.

DATA Camshaft journal oil clearance:
Service Limit (IN. & EX.): 0.150 mm (0.006 in)

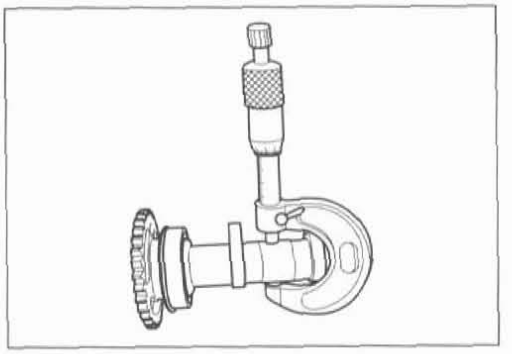


- If the camshaft journal oil clearance measured exceeds the limit, measure the inside diameter of the camshaft journal holder and outside diameter of the camshaft journal.
- Replace the camshaft or the cylinder head depending upon which one exceeds the specification.



DATA Camshaft journal holder I.D.:
Standard: (IN & EX): 22.012 – 22.025 mm
(0.8667 – 0.8671 in)

TOOL 09900-20602: Dial gauge (1/1000, 1 mm)
09900-22403: Small bore gauge (18 – 35 mm)



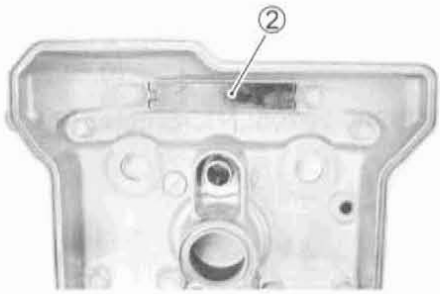
DATA Camshaft journal O.D.:
Standard (IN & EX): 21.959 – 21.980 mm
(0.8645 – 0.8653 in)

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

CAM CHAIN TENSION ADJUSTER AND TENSIONER

Check that the push rod slides smoothly when unlocking the ratchet mechanism ①.
If push rod does not slide smoothly, replace the cam chain tension adjuster with a new one.

- Remove the cam chain guide ② from cylinder head cover.



Check the contacting surface of the cam chain tensioner and cam chain guides.
If any defects are found, replace it with a new one.

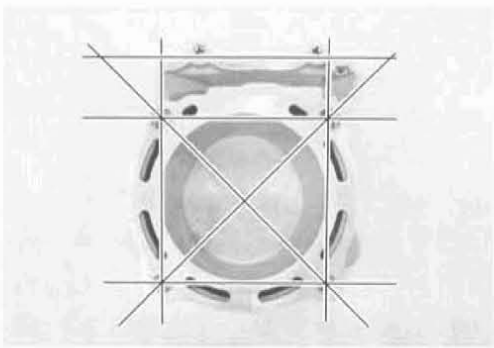
CYLINDER

CYLINDER DISTORTION

Check the gasket surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places indicated.
If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder head.

DATA Cylinder distortion:
Service Limit: 0.05 mm (0.002 in)

TOOL 09900-20803: Thickness gauge

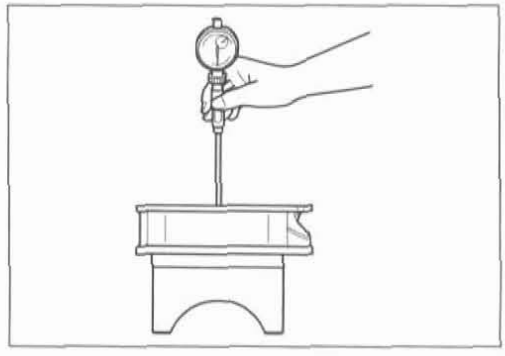


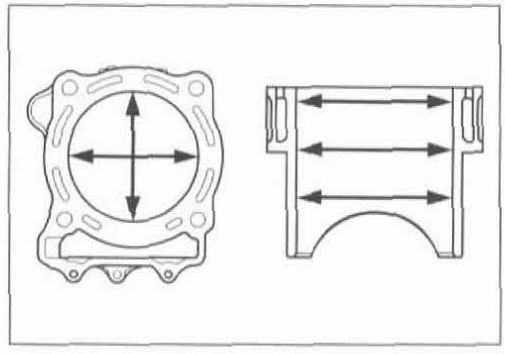
CYLINDER BORE

Inspect the cylinder wall for any scratches, nicks or other damage. Measure the cylinder bore diameter at six places.
If any one of the measurements exceed the limit, replace the cylinder.

DATA Cylinder bore
Standard: 95.500 – 95.515 mm (3.7598 – 3.7604 in)

TOOL 09900-20530: Cylinder gauge set
09900-20513: Rod (94 mm)





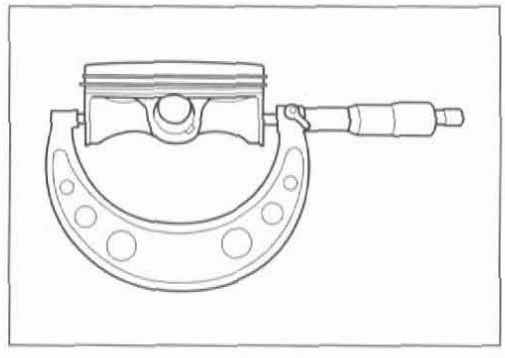
PISTON AND PISTON RING

PISTON DIAMETER

Using a micrometer, measure the piston outside diameter at 10 mm (0.4 in) Ⓐ from the piston skirt end.
If the measurement is less than the limit, replace the piston.

DATA Piston diameter:
Service Limit: 95.380 mm (3.7551 in)
at 15 mm (0.6 in) from the skirt end

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



PISTON-TO-CYLINDER CLEARANCE

Subtract the piston diameter from the cylinder bore diameter. (☞above)
If the piston-to-cylinder clearance exceeds the service limit, replace the cylinder or the piston, or both.

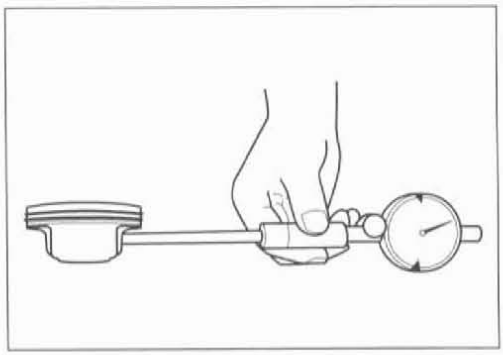
DATA Piston-to-cylinder clearance:
Service Limit: 0.120 mm (0.0047 in)

PISTON PIN AND PIN BORE

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

DATA Piston pin bore I.D.:
Service Limit: 19.030 mm (0.7492 in)

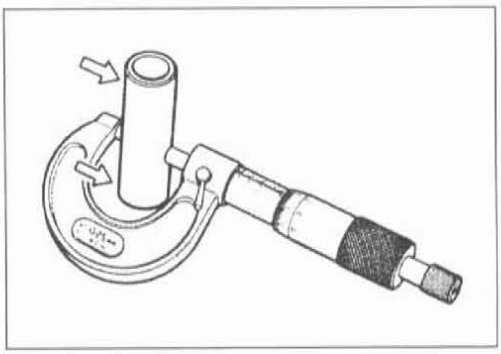
TOOL 09900-20602: Dial gauge (1/1000 mm)
09900-22403: Small bore gauge (18 – 35 mm)



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.

DATA Piston pin O.D.:
Service Limit: 18.980 mm (0.7472 in)

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

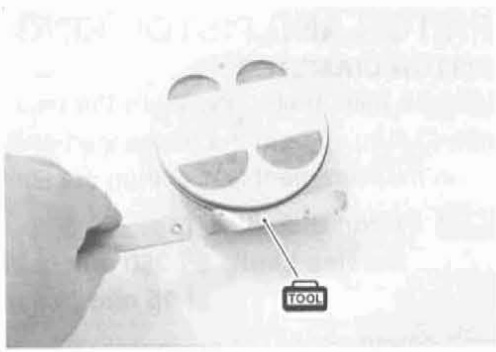


PISTON-RING-TO-GROOVE CLEARANCE

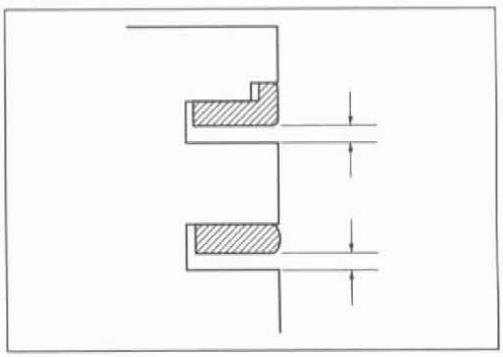
Measure the side clearances of the 1st and 2nd piston rings using the thickness gauge. If any of the clearances exceeds the limit, replace both the piston and piston rings.

TOOL 09900-20803: Thickness gauge
09900-20205: Micrometer (0 – 25 mm)

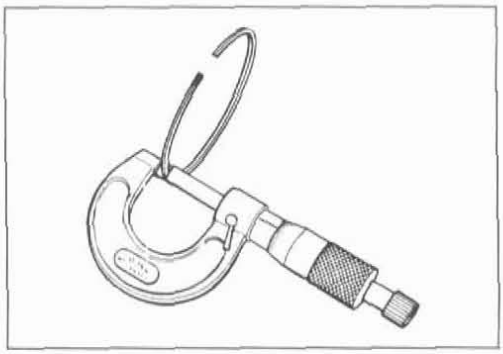
DATA Piston-ring-to-groove clearance
Service Limit:
1st: 0.180 mm (0.007 in)
2nd: 0.150 mm (0.006 in)



DATA Piston ring groove width
Standard:
1st: 0.78 – 0.80 mm (0.0307 – 0.0315 in)
1.30 – 1.32 mm (0.0512 – 0.0520 in)
2nd: 0.81 – 0.83 mm (0.0319 – 0.0327 in)
Oil: 2.01 – 2.03 mm (0.0791 – 0.0799 in)



DATA **Piston ring thickness**
Standard:
1st: 0.71 – 0.76 mm (0.0280 – 0.0299 in)
1.08 – 1.10 mm (0.0425 – 0.0433 in)
2nd: 0.77 – 0.79 mm (0.0303 – 0.0311 in)

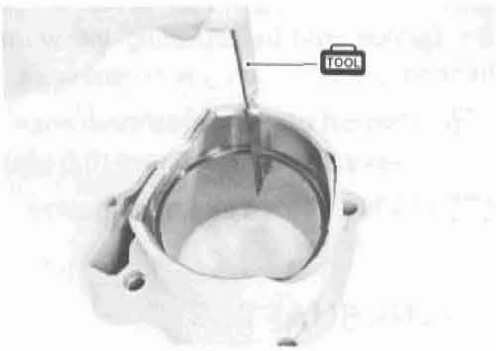


PISTON RING END GAP

Fit the piston ring squarely into the cylinder and measure the piston ring end gap using the thickness gauge.
If any of the measurements exceeds the service limit, replace the piston ring with a new one.

DATA **Piston ring end gap:**
Service Limit:
1st: 0.50 mm (0.020 in)
2nd: 0.50 mm (0.020 in)

TOOL **09900-20803: Thickness gauge**



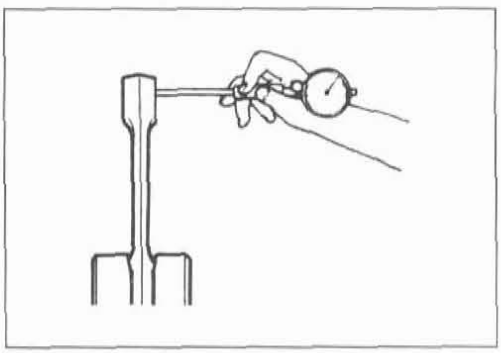
CONROD

CONROD SMALL END I.D.

Using a small bore gauge, measure the inside diameter of the conrod small end. If the inside diameter of the conrod small end exceeds the limit, replace the conrod.

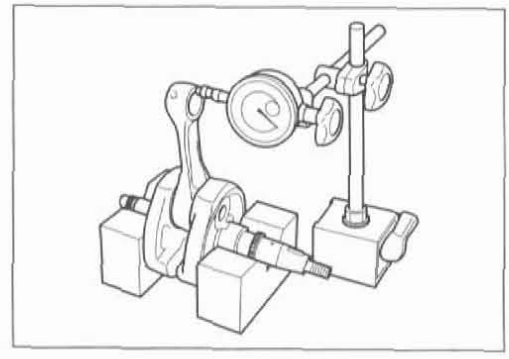
DATA **Conrod small end I.D.:**
Service Limit: 19.040 mm (0.7496 in)

TOOL **09900-20602: Dial gauge (1/1 000 mm, 1 mm)**
09900-22403: Small bore gauge (18 – 35 mm)



CONROD DEFLECTION AND BIG END SIDE CLEARANCE

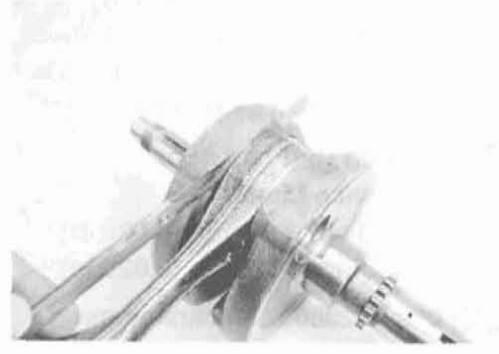
Wear on the big end of the conrod can be estimated by checking the movement of the small end of the rod. This method can also be used to check the extent of wear on the parts of the conrod big end.



DATA Conrod deflection
Service Limit: 3.0 mm (0.12 in)

TOOL 09900-20701: Magnetic stand
09900-20607: Dial gauge (1/100 mm)
09900-21304: V-block set (100 mm)

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.



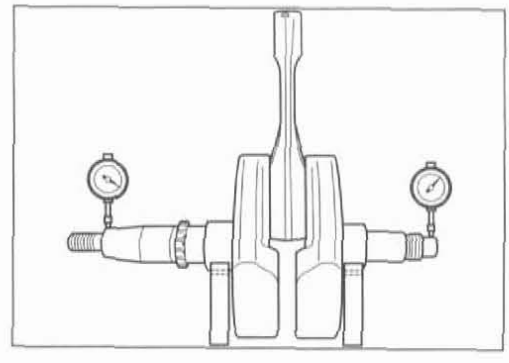
DATA Conrod big end side clearance
Service Limit: 1.0 mm (0.04 in)

TOOL 09900-20803: Thickness gauge

CRANKSHAFT

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.*

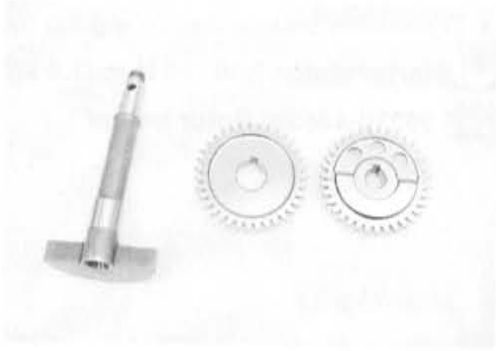
DATA Crankshaft runout
Service Limit: 0.080 mm (0.003 in)

TOOL 09900-20607: Dial gauge (1/100 mm)
09900-20701: Magnetic stand
09910-21304: V-block set (100 mm)

BALANCER SHAFT AND BALANCER DRIVEN AND DRIVE GEAR

INSPECTION

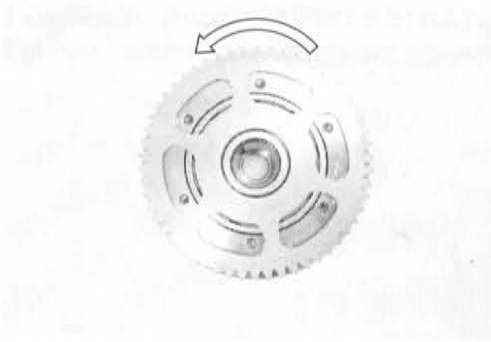
Inspect the balancer shaft and balancer driven and drive gear for wear or damage. If any defects are found, replace the defective part.



STARTER CLUTCH

INSPECTION

Install the starter driven gear onto the starter clutch and turn the starter driven gear by hand to inspect the starter clutch for a smooth movement. The gear turns one direction only. If a large resistance is felt to rotation, inspect the starter clutch for damage or inspect the starter clutch contacting surface of the starter driven gear for wear or damage.
If they are found to be damaged, replace them with new ones.



DISASSEMBLY

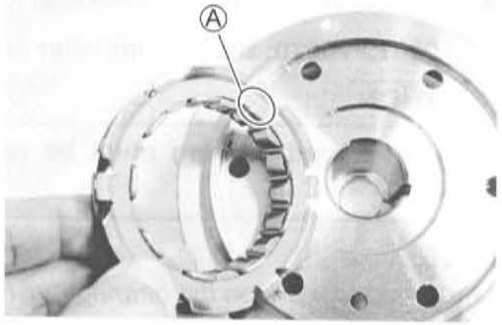
- Hold the rotor using the special tool and remove the bolts.

TOOL **09930-44520: Rotor holder**

REASSEMBLY

- Install the starter clutch in the proper direction as shown.

NOTE:
When installing the starter clutch onto the rotor, make sure that the arrow mark Ⓐ in the bearing faces to the rotor.



- Apply engine oil to the starter clutch.

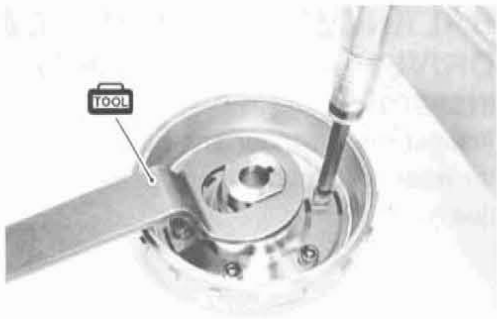
- Apply a small quantity of THREAD LOCK SUPER "1322" to the starter clutch bolt.

1322 **99000-32110: THREAD LOCK SUPER "1322"**
(or equivalent thread lock)

• Tighten the bolts while holding the rotor using the special tool.

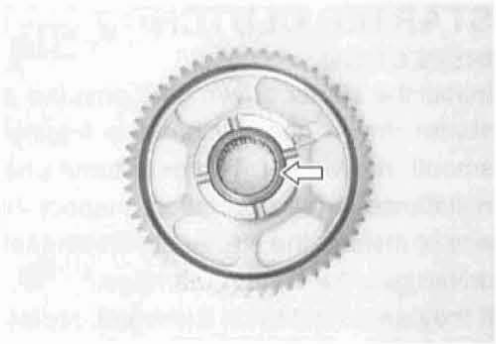
Starter clutch bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)

09930-44520: Rotor holder



STARTER DRIVEN GEAR BEARING INSPECTION

Inspect the starter driven gear bearing for any damages.



STARTER DRIVEN GEAR BEARING REPLACEMENT

• Remove the bearing using the special tool.

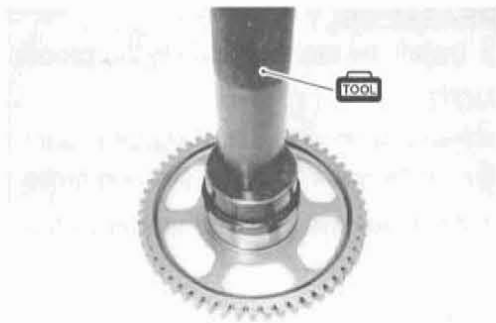
09913-70210: Bearing installer set

• Install the bearing using the special tool.

09913-70210: Bearing installer set

CAUTION

The removed bearing must be replaced with a new one.



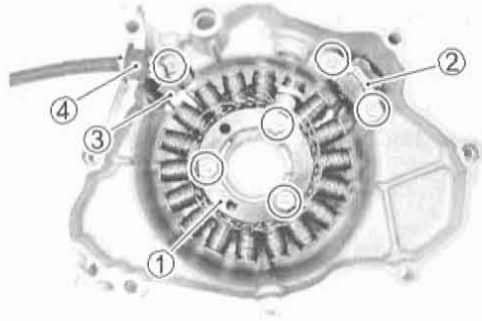
NOTE:

The stamped mark on the bearing must face crankcase side.

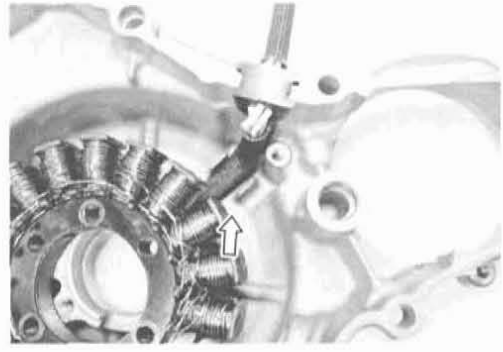
GENERATOR

INSPECTION (☞8-9, -21)

- Remove the generator stator ①, CKP sensor ②, bracket ③ and grommet ④.

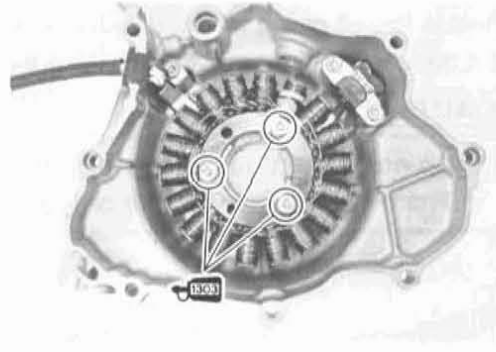


- When replacing the generator stator or CKP sensor, route the wire properly.



- Apply a small quantity of THREAD LOCK SUPER "1303" to the generator stator mounting bolts, and tighten them securely.

1303 99000-32030: THREAD LOCK SUPER "1303"



STARTER TORQUE LIMITER

CAUTION

Do not attempt to disassemble the starter torque limiter. It is unserviceable.

Check the slip torque of the starter torque limiter using the special tools and vise as shown, if the slip torque is not within the specified torque, replace the starter torque limiter with a new one.

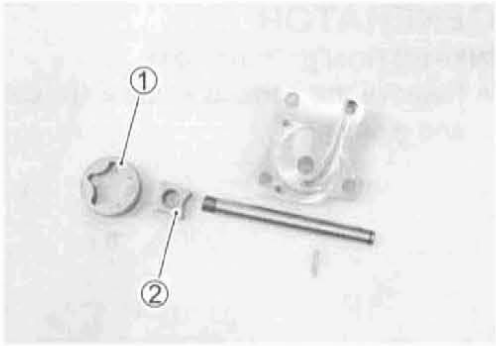
TOOL 09930-73170: Starter torque limiter holder
09930-73120: Starter torque limiter socket

Slip torque:
20.5 – 36.0 N·m (2.05 – 3.6 kgf-m, 14.8 – 26.0 lb-ft)

OIL PUMP

INSPECTION

Inspect the outer rotor ① and inner rotor ② for any scratches or other damage. If any damages are found, replace them with new ones.



Rotate the oil pump by hand and check that it moves smoothly. If it does not move smoothly, replace the oil pump assembly.

CAUTION

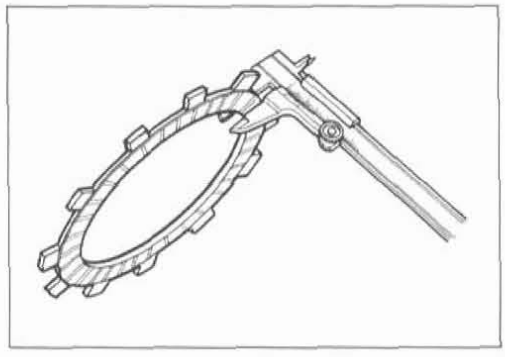
*** Do not attempt to disassemble the oil pump assembly.**
*** The oil pump is available only as an assembly.**

CLUTCH

CLUTCH DRIVE PLATE

NOTE:
Wipe off engine oil from the clutch drive plates with a clean rag.

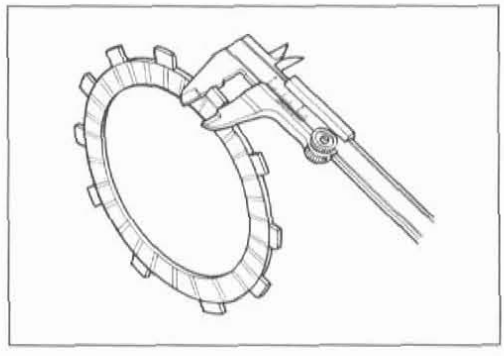
Measure the thickness of drive plates using the vernier calipers. If the drive plate thickness is found to have reached the limit, replace it with a new one.



DATA Drive plate thickness (No.1 & No.2):
Service Limit: 2.77 mm (0.109 in)

TOOL 09900-20101: Vernier calipers

Measure the claw width of drive plates using the vernier calipers. Replace the drive plates found to have worn down to the limit.



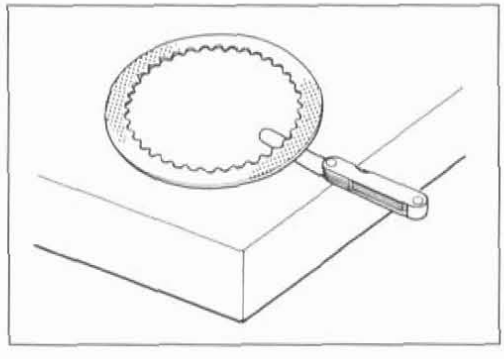
DATA Drive plate claw width (No.1 & No.2):
Service Limit: 13.35 mm (0.528 in)

TOOL 09900-20101: Vernier calipers

CLUTCH DRIVEN PLATE

NOTE:
Wipe off engine oil from the clutch driven plates with a clean rag.

Measure each driven plate for distortion with a thickness gauge and surface plate. Replace driven plates which exceed the limit.

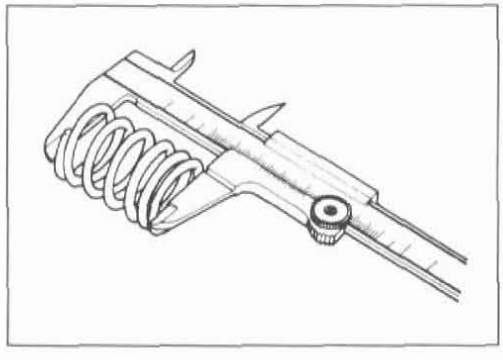


DATA Driven plate distortion:
Service Limit: 0.10 mm (0.004 in)

TOOL 09900-20803: Thickness gauge

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.



DATA Clutch spring free length:
Service Limit: 50.4 mm (1.98 in)

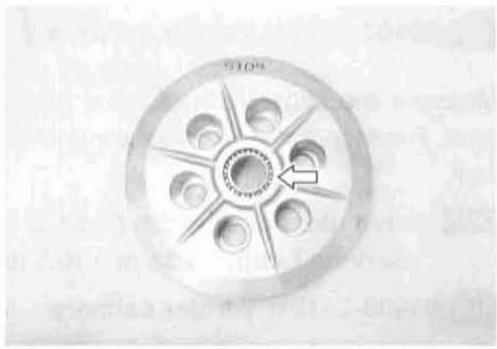
TOOL 09900-20101: Vernier calipers

PUSH ROD

Inspect the push rod for wear and damage.
If any defects are found, replace the push rod with a new one.

RELEASE BEARING

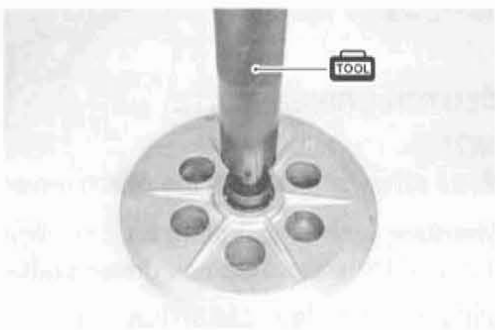
Inspect the release bearing for play, wear and damage.
Move the inner race by finger and inspect for smooth movement.
If any defects are found, replace the release bearing with a new one.



RELEASE BEARING REPLACEMENT

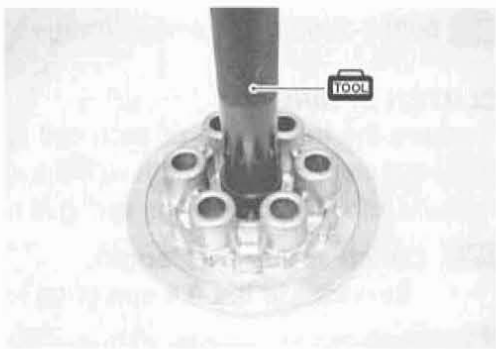
- Remove the release bearing using the special tool.

TOOL 09913-70210: Bearing installer set



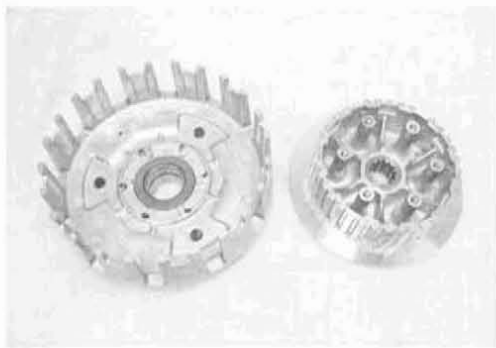
- Press the bearings using the special tool.

TOOL 09913-70210: Bearing installer set



CLUTCH SLEEVE HUB/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.



GEARSHIFT FORK AND GEAR

GEARSHIFT FORK-TO-GROOVE CLEARANCE

Using a thickness gauge, check the gearshift fork clearance in the groove of its gear.

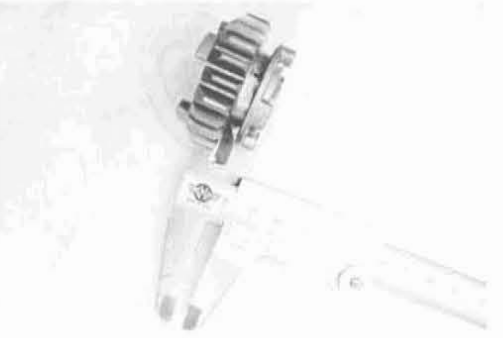
The clearance for each gearshift fork plays an important role in the smoothness and positiveness of the shifting action.

DATA Shift fork-to-groove clearance:
Service Limit: 0.5 mm (0.020 in)

TOOL 09900-20101: Vernier calipers
09900-20803: Thickness gauge

If the clearance checked is noted to exceed the limit specified, replace the fork or its gear, or both.

GEARSHIFT FORK GROOVE WIDTH



Measure the gearshift fork groove width using the vernier calipers.

DATA Shift fork groove width:
Standard: 4.8 – 4.9 mm (0.189 – 0.193 in)

TOOL 09900-20101: Vernier calipers

GEARSHIFT FORK THICKNESS

Measure the gearshift fork thickness using the vernier calipers.

DATA Shift fork thickness:
Standard: 4.6 – 4.7 mm (0.181 – 0.185 in)

TOOL 09900-20101: Vernier calipers

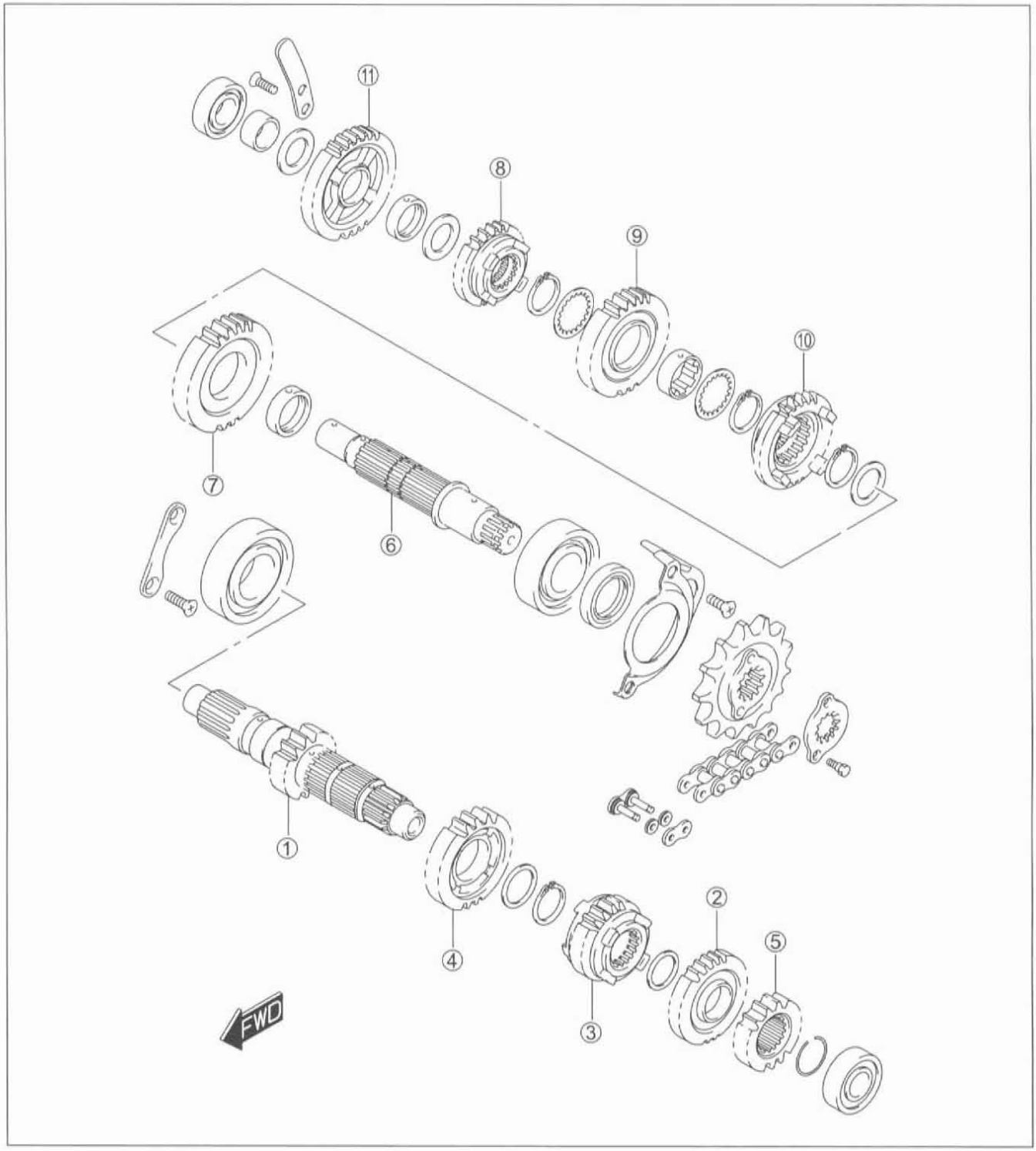
GEARSHIFT CAM

Inspect the gearshift cam groove for abnormal wear and damage. If any defects are found, replace the gearshift cam with a new one.

TRANSMISSION

DISASSEMBLY

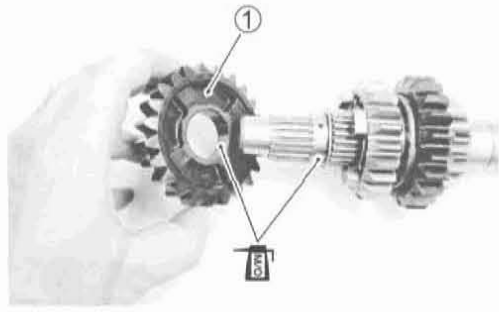
Disassemble the transmission gears as shown in the illustration.



①	Countershaft	⑤	2nd drive gear	⑨	3rd driven gear
②	5th drive gear	⑥	Driveshaft	⑩	5th driven gear
③	3rd drive gear	⑦	2nd driven gear	⑪	1st driven gear
④	4th drive gear	⑧	4th driven gear		

REASSEMBLY

Reassemble the countershaft and driveshaft in the reverse order of disassembly. Pay attention to the following points:



NOTE:

** Before installing the gears, apply engine oil to the inner surface of each gear and bushing.*

** Apply molybdenum oil solution to the surface of countershaft and inner surface of 5th drive gear ①.*

MO **MOLYBDENUM OIL SOLUTION**

CAUTION

*** Never reuse a snap ring. After a snap ring has been removed from a shaft, it should be discarded and a new snap ring must be installed.**

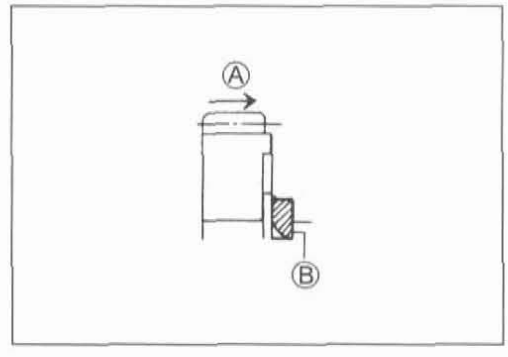
*** When installing a new snap ring, do not expand the end gap larger than required to slip the snap ring over the shaft.**

*** After installing a new snap ring, make sure that it is completely seated in its groove and securely fitted.**

NOTE:

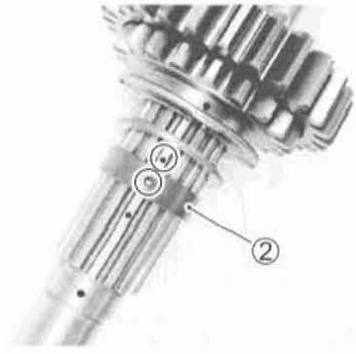
When reassembling the transmission, attention must be given to the locations and positions of the washers and snap rings. The cross sectional view shows the correct position of the gears, bushings, washers, and snap rings. (☞3-50)

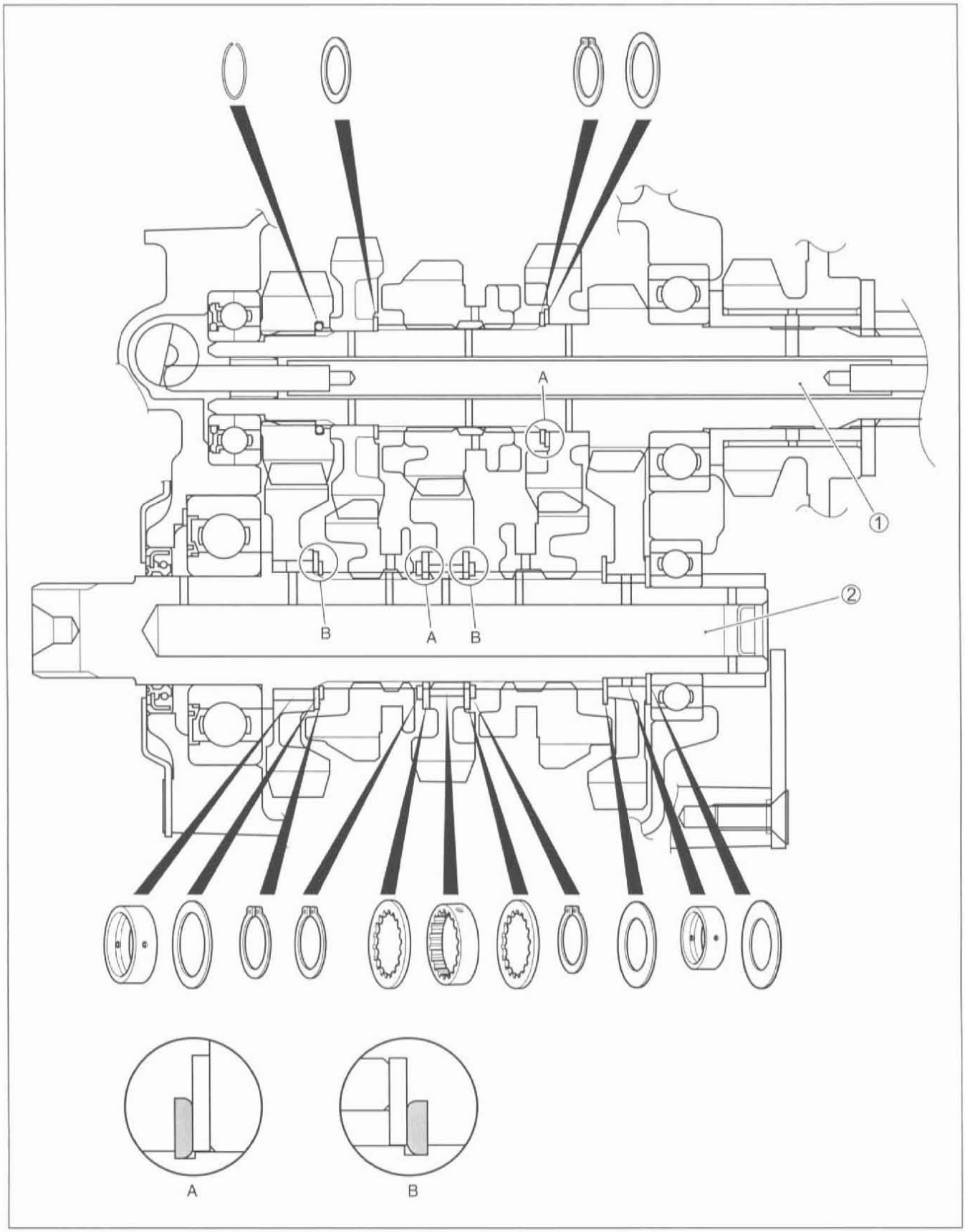
- When installing a new snap ring, pay attention to the direction. Fit it to the side where the thrust is as shown in the illustration.



Ⓐ Thrust
Ⓑ Sharp edge

- When installing the 3rd driven gear bushing ②, align the its oil hole with the driveshaft oil hole.





①	Countershaft	②	Driveshaft

OIL STRAINER

- Clean the oil strainers using the compressed air.

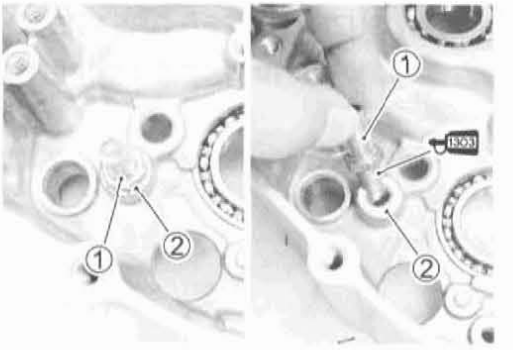
CRANKCASE

GEARSHIFT ARM STOPPER

- Remove the gearshift arm stopper ① and washer ②.
- Apply a small quantity of THREAD LOCK SUPER "1303" to the gearshift arm stopper.
- Install the washer ② and tightening the gearshift arm stopper ① to the specified torque.

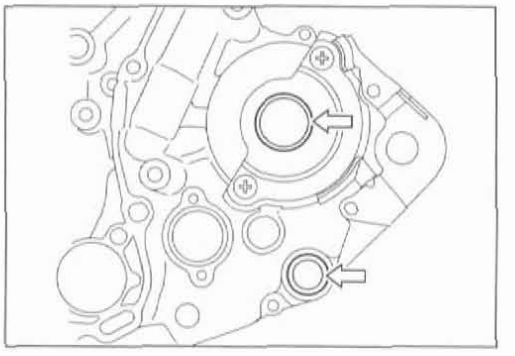
1303 99000-32030: THREAD LOCK SUPER "1303"

Gearshift arm stopper: 32 N·m (3.2 kgf-m, 23.0 lb-ft)



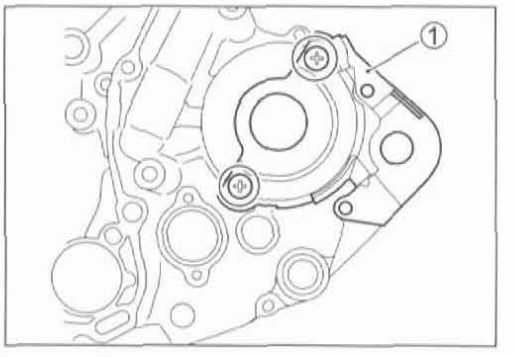
OIL SEAL INSPECTION

Inspect the oil seal lips for wear or damage. If any defects are found, replace the oil seal with new ones.

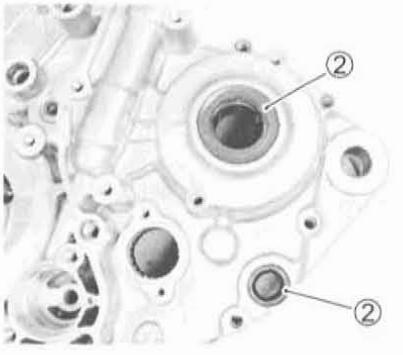


OIL SEAL REMOVAL

- Remove the crankcase plate ①.



- Remove the oil seals ②.



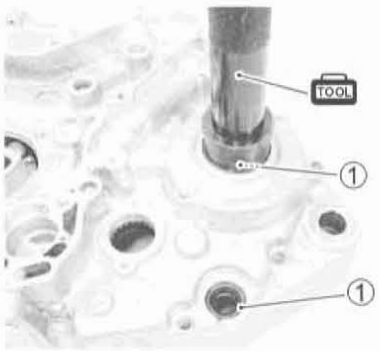
OIL SEAL INSTALLATION

- Install the oil seals ① using the special tool.

CAUTION

The removed oil seals must be replaced with new ones.

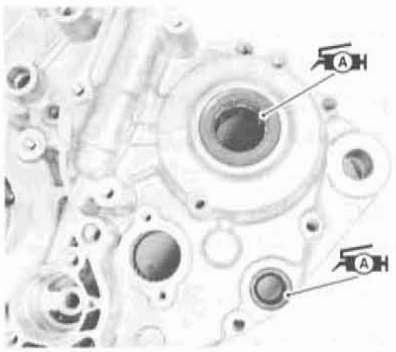
09913-70210: Bearing installer set



- Apply SUZUKI SUPER GREASE "A" to the lip of the oil seals.

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

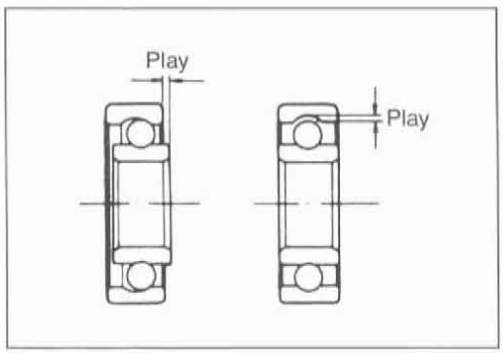
- Install the crankcase plate.



BEARING INSPECTION

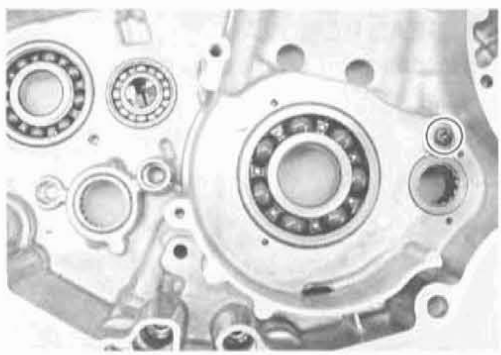
Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase.

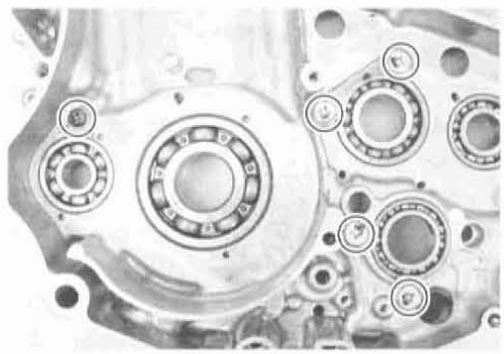
Replace the bearing in the following procedure if there is anything unusual.



BEARING REMOVAL

- Remove the oil seals. (☞3-51)
- Remove the bearing retainers.

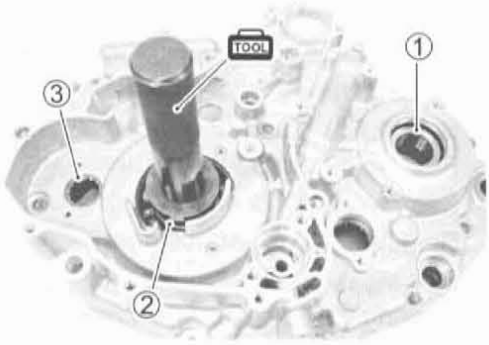


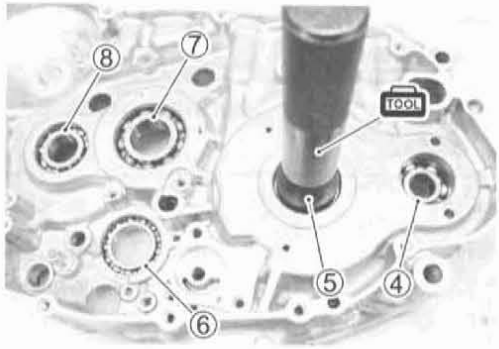


Remove the bearings using the special tool.

09913-70210: Bearing installer set

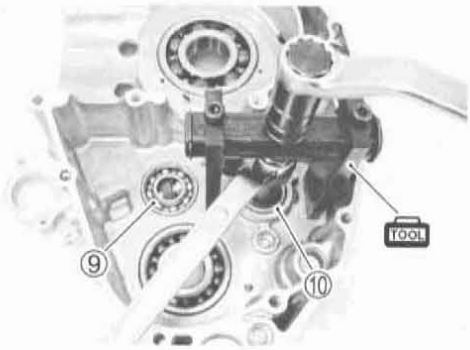
Bearing ④: ϕ 22 Attachment
Bearing ③: ϕ 25 Attachment
Bearing ⑥, ⑧: ϕ 30 Attachment
Bearing ①, ⑤, ⑦: ϕ 35 Attachment
Bearing ②: ϕ 42 Attachment





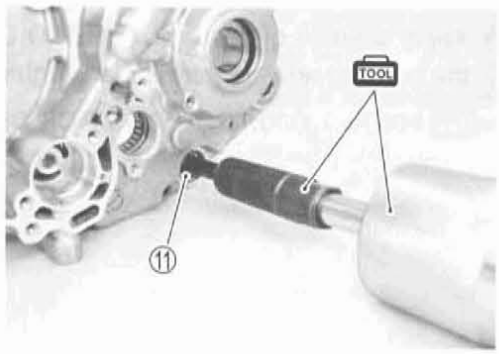
- Remove the bearings using the special tool.

09921-20240: Bearing remover set
Bearing ⑨: Remover ϕ 17 mm
Bearing ⑩: Remover ϕ 25 mm



- Remove the bearing ⑪.

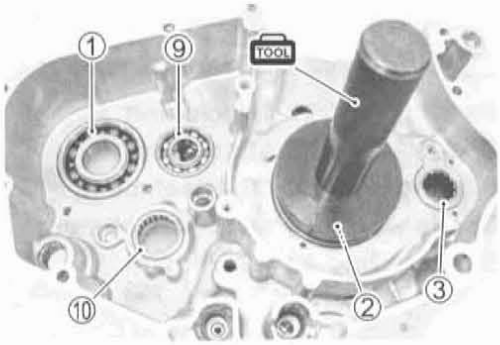
09921-20210: Bearing remover
09930-30104: Sliding shaft

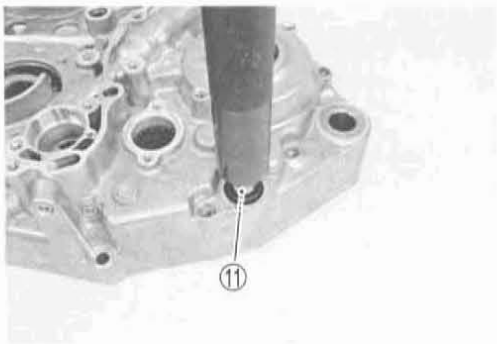


INSTALLATION

- Press the bearings using the special tool.
  Bearing ⑪: ϕ 20 Attachment
  Bearing ③, ⑩: ϕ 32 Attachment
  Bearing ⑨: ϕ 40 Attachment
  Bearing ⑥, ⑧: ϕ 42 Attachment
  Bearing ⑦: ϕ 52 Attachment
  Bearing ①: ϕ 62 Attachment
  Bearing ②, ⑤: ϕ 72 Attachment

09913-70210: Bearing installer set



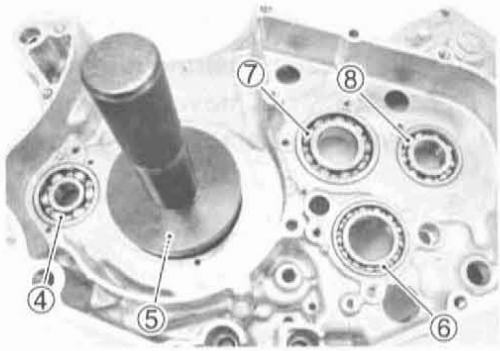


CAUTION

The removed bearings must be replaced with new ones.

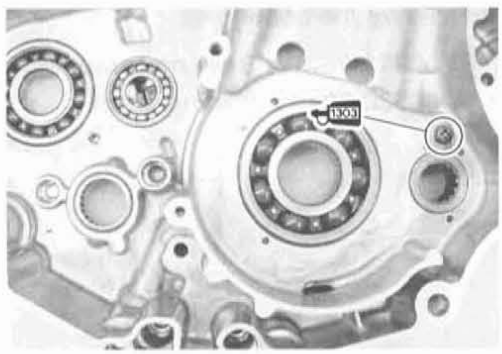
NOTE:

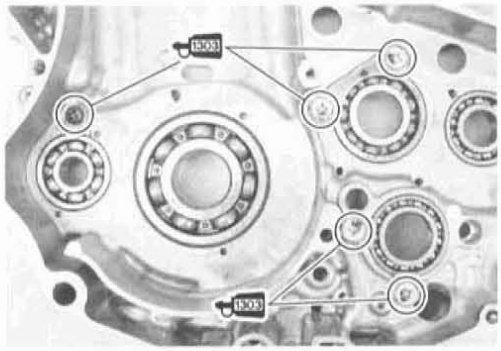
** The stamped mark side of the bearing faces ⑪ outside.*
** The stamped mark side of the bearing faces (②, ③, ④, ⑤, ⑥, ⑦, ⑧, ⑩) inside.*
** The sealed side of the bearing faces (①, ⑨) outside.*



- Apply a small quantity of THREAD LOCK SUPER "1303" to the bearing retainer screws, and tighten them securely.

1303 99000-32030: THREAD LOCK SUPER "1303"





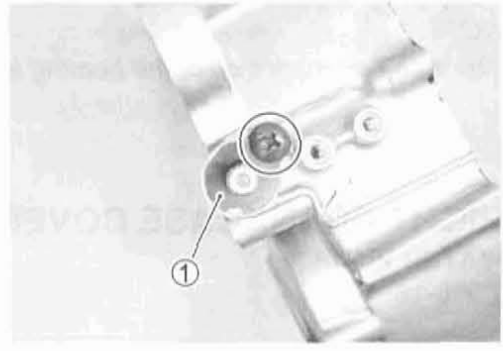
CLUTCH RELEASE CAMSHAFT INSPECTION

Rotate the clutch release camshaft by finger to inspect for abnormal noise or smooth movement.

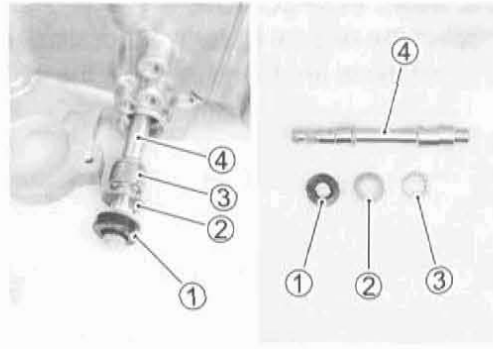
If any defects are found, replace the clutch release camshaft or bearings with new ones.

CLUTCH RELEASE CAMSHAFT AND BEARING REPLACEMENT

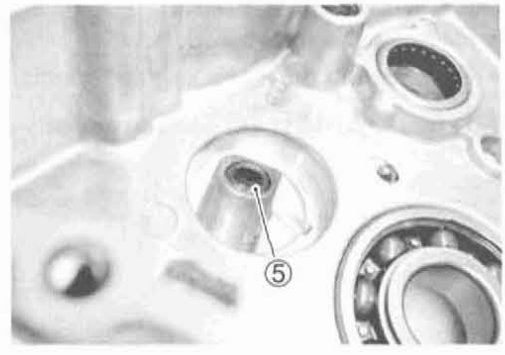
- Remove the oil seal retainer ①.



- Remove the following parts.
  - ① Oil seal
  - ② Washer
  - ③ Upper bearing
  - ④ Clutch release camshaft



- Remove the lower bearing ⑤.



- Apply engine oil to the bearings.
- Apply grease to the oil seal lip.

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

- Install the clutch release camshaft correctly.

CAUTION

The removed bearings and oil seal must be replaced with new ones.

NOTE:
The stamped mark side of the bearing faces upside.

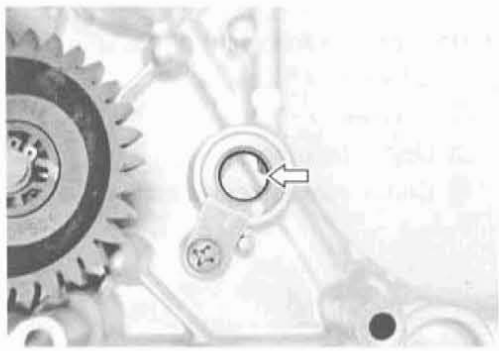
RIGHT CRANKCASE COVER

WATER PUMP

☞6-16

OIL SEAL INSPECTION

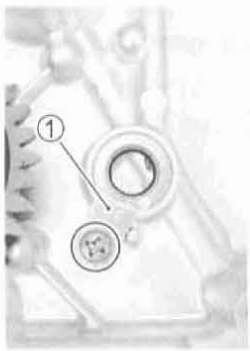
Inspect the oil seal lip for wear or damage.
If any defects are found, replace the oil seal with a new one.



OIL SEAL REPLACEMENT

- Remove the retainer ①.
- Remove the oil seal using the special tool.

09913-50121: Oil seal remover



- Install the oil seal using the special tool.

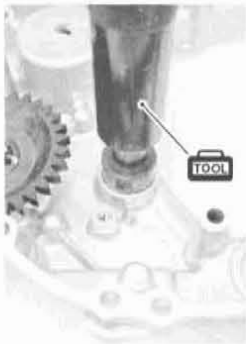
09913-70210: Bearing installer set

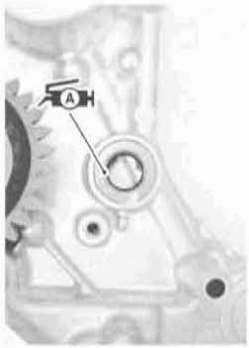
CAUTION

The removed oil seal must be replaced with a new one.

- Apply grease to the oil seal lip.

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





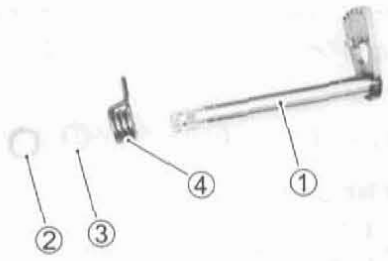
GEARSHIFT SHAFT

DISASSEMBLY

- Remove the following parts from the gearshift shaft ①.

② Shim
③ Snap ring
④ Return spring

09900-06107: Snap ring pliers



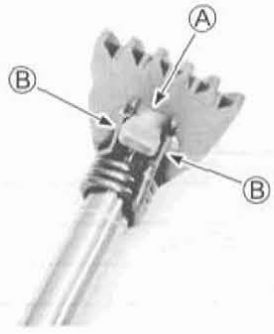
INSPECTION

Inspect the gearshift shaft for bend or damage.
Inspect the return spring for damage or fatigue.
Replace the defective parts with a new one if necessary.

REASSEMBLY

Reassemble the gearshift shaft in the reverse order of disassembly. Pay attention to the following points:

NOTE:
When installing the gearshift shaft return spring, position the stopper Ⓐ of gearshift arm between the shaft return spring ends Ⓑ.

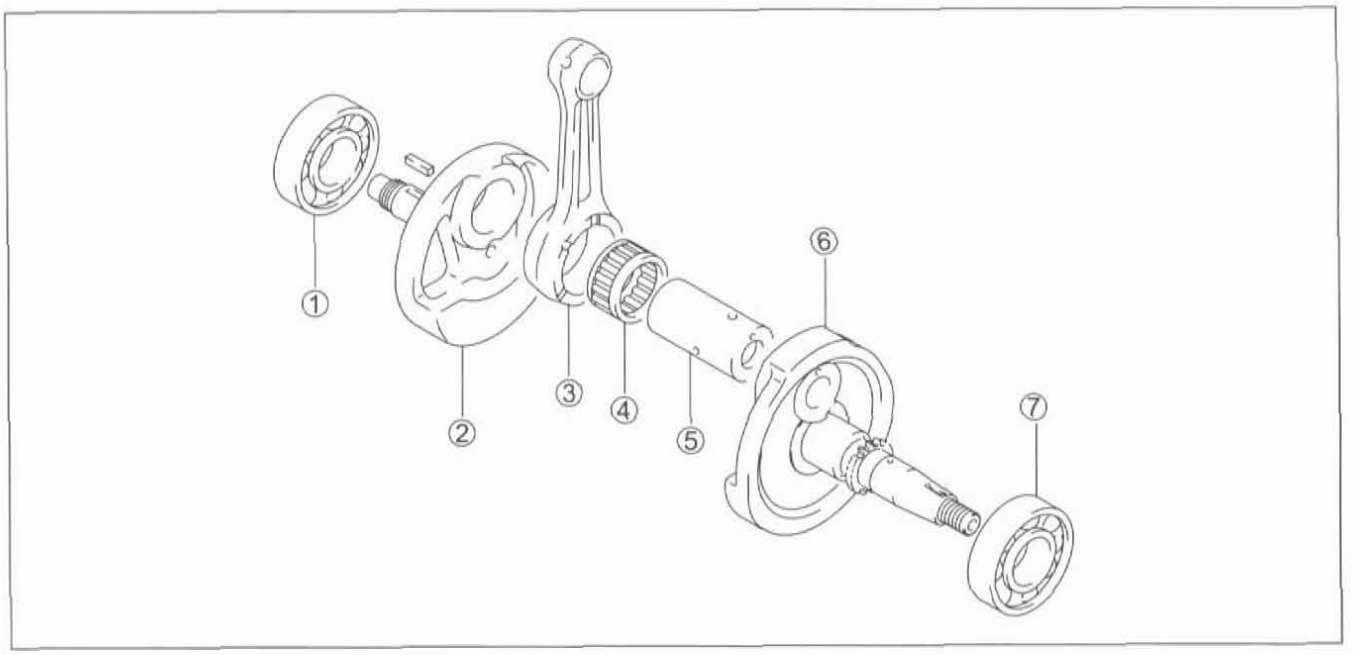


ENGINE REASSEMBLY

Reassemble the engine in the reverse order of disassembly. The following steps require special attention or precautionary measures should be taken.

NOTE:
Apply engine oil to each running and sliding part before reassembling.

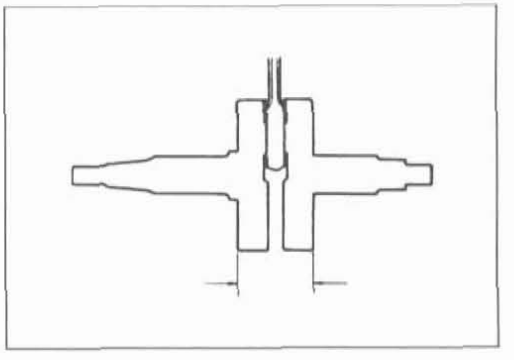
CRANKSHAFT



①	Bearing	④	Bearing	⑦	Bearing
②	Crankshaft (R)	⑤	Crank pin		
③	Conrod	⑥	Crankshaft (L)		

- Determine the width between the webs referring to the figure when rebuilding the crankshaft.

DATA Crank-web-to-web-width
Standard: 62.0 ± 0.1 mm (2.441 ± 0.004 in)

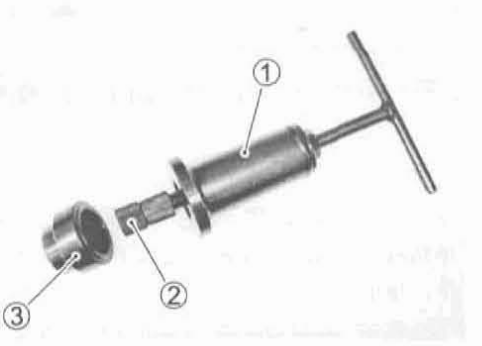


- When mounting the crankshaft in the crankcase, it is necessary to pull its left end into the crankcase by using the special tools.

TOOL 09910-32812: Crankshaft installer ①
09911-11310: Attachment ②
09913-70210: Bearing installer set ③
(inner driver attachment ϕ 35)

CAUTION

Never fit the crankshaft into the crankcase by striking it with a plastic hammer.
Always use the special tool, otherwise the accuracy of the crankshaft alignment will be affected.

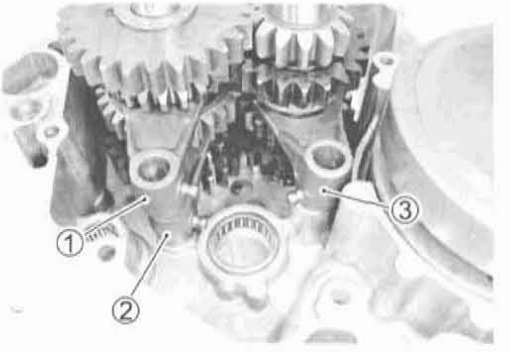


COUNTERSHAFT/DRIVESHAFT

- Install the countershaft assembly and driveshaft assembly.

GEARSHIFT CAM, FORK AND SHAFT

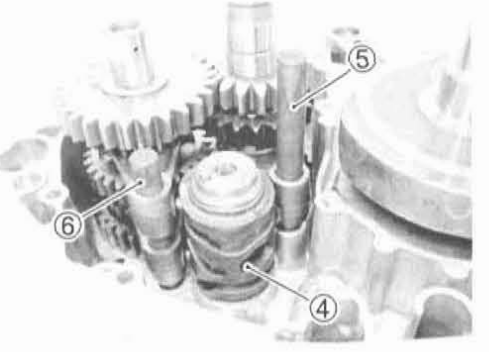
- Install the gearshift forks into the gearshifting grooves in the correct position and direction.
  ① Gearshift fork No.1
  ② Gearshift fork No.2
  ③ Gearshift fork No.3



- Install the gearshift cam ④.
- Install the gearshift fork shaft ⑤, ⑥.

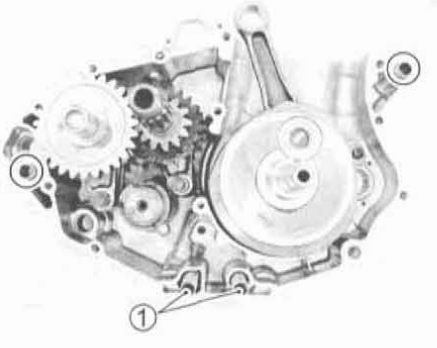
NOTE:

** 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.*



CRANKCASE

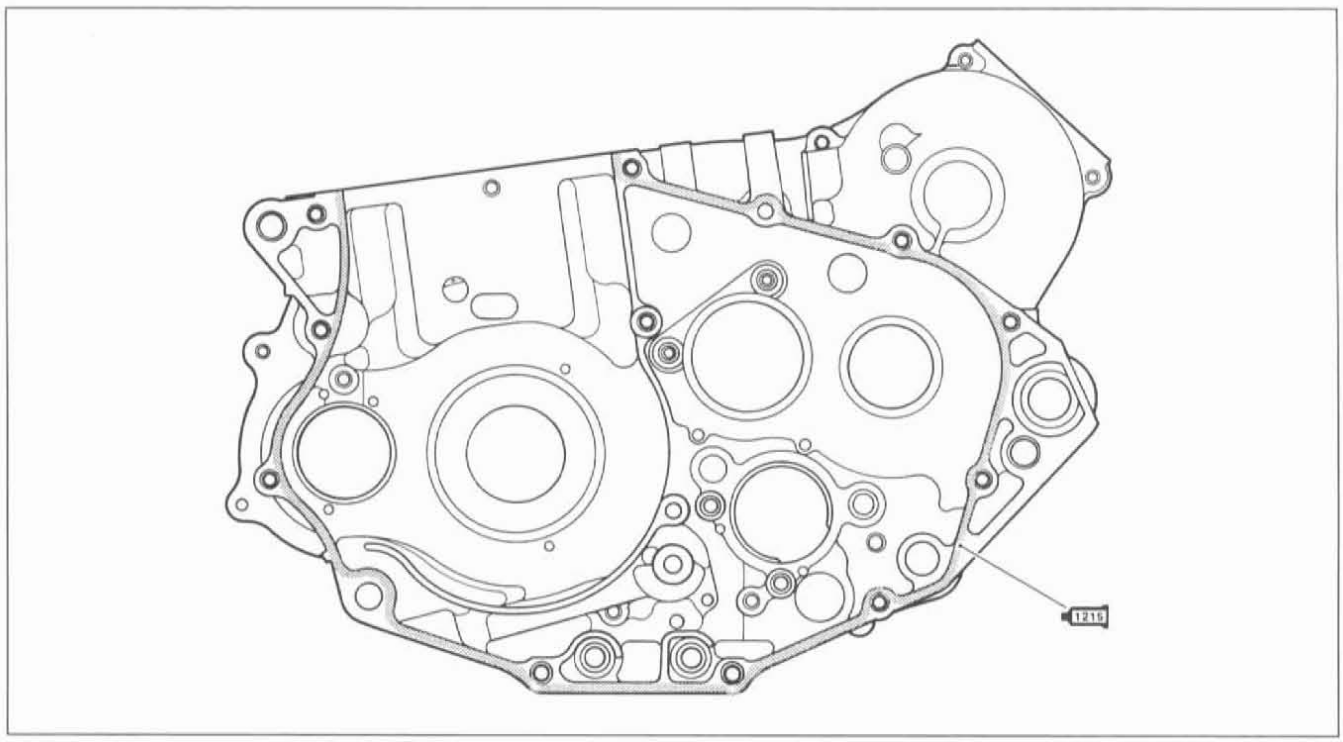
- Thoroughly remove the sealant material and oil stains on the mating surface of the right and left crankcases.
- Install the dowel pins to the left crankcase.
- Install the oil strainers ①.
- Apply engine oil to the conrod big end and to the transmission gears.



- Apply SUZUKI BOND "1215" to the mating surface of the right crankcase as shown.

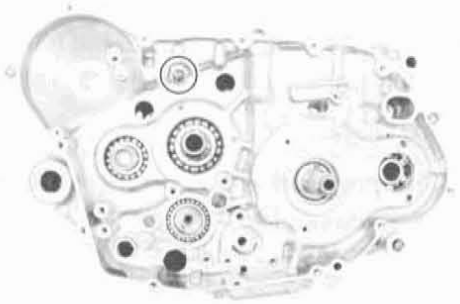
1215 99000-31110: SUZUKI BOND "1215"
(or equivalent bond)

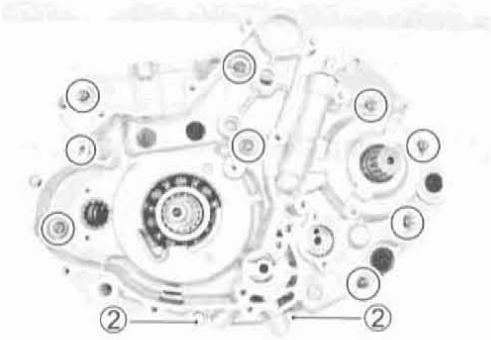
NOTE:
Use of SUZUKI BOND "1215" is as follows:
* *Make surfaces free from moisture, oil, dust and other foreign materials.*
* *Spread on surfaces thinly to form an even layer, and assemble the crankcases within few minutes.*
* *Take extreme care not to apply any BOND "1215" to the oil hole, oil groove and bearing.*
* *Apply to distorted surfaces as it forms a comparatively thick film.*



- Tighten the crankcase bolts and engine oil drain plug ② to the specified torque.

Crankcase bolt: 11 N·m (1.1 kgf-m, 8.0 lb-ft)
Engine oil drain plug: 18 N·m (1.8 kgf-m, 13.0 lb-ft)



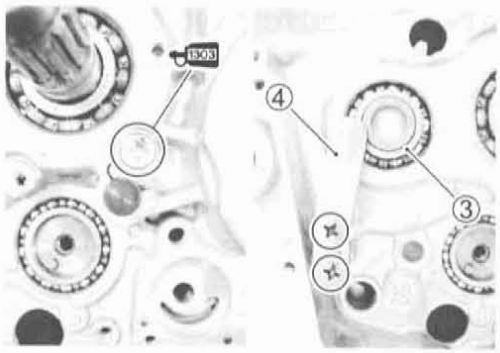


- After the crankcase bolts have been tightened, check if the crankshaft, countershaft, and driveshaft rotate smoothly.

- Apply a small quantity of THREAD LOCK SUPER "1303" to the gearshift fork shaft retainer screw, and tighten it securely.

1303 99000-32030: THREAD LOCK SUPER "1303"

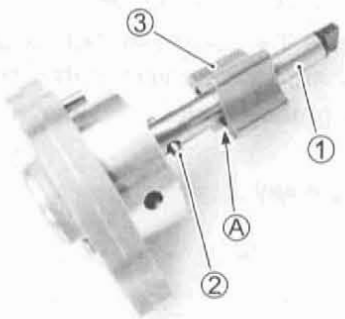
- Install the spacer ③ and retainer ④.
- Install the balancer crank.



OIL PUMP No.2

- Install the pin ② to oil pump No.2 shaft ①.
- Install the inner rotor ③ to oil pump No.2 shaft ①.

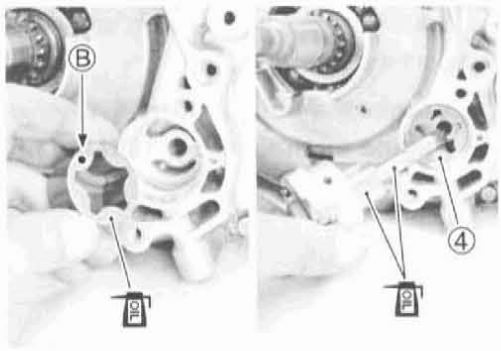
NOTE:
Fit the slot Ⓐ of the inner rotor on the pin ②.



- Apply engine oil to the outer rotor.
- Install the outer rotor ④ to the left crankcase.
- Apply engine oil to the oil pump shaft and inner rotor.

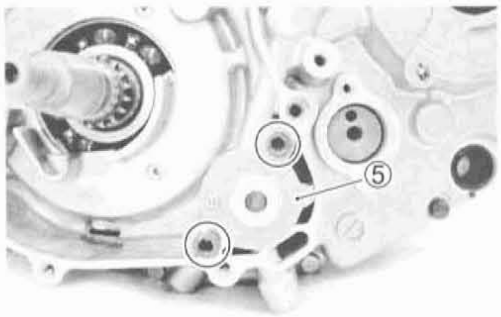
CAUTION

The punch mark Ⓑ on the outer rotor must face to the crankcase side.



- Install the oil pump No.2 ⑤.
- Tighten the oil pump No.2 mounting bolts to the specified torque.

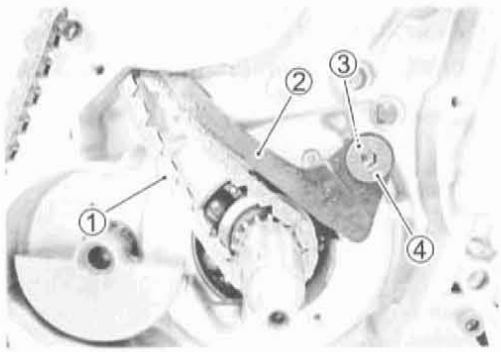
Oil pump No.2 mounting bolt: 10N·m (1.0 kgf-m, 7.0lb-ft)



CAM CHAIN

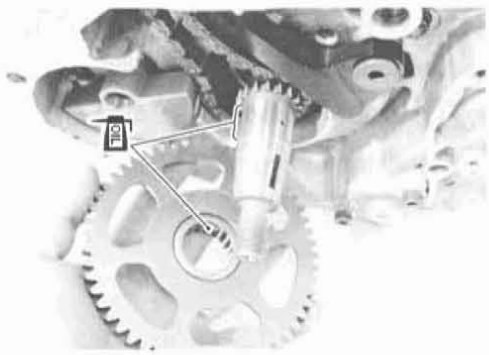
- Install the cam chain ① onto the sprocket.
- Install the cam chain tensioner ② and washer ③.
- Tighten the cam chain tensioner mounting bolt ④ to the specified torque.

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

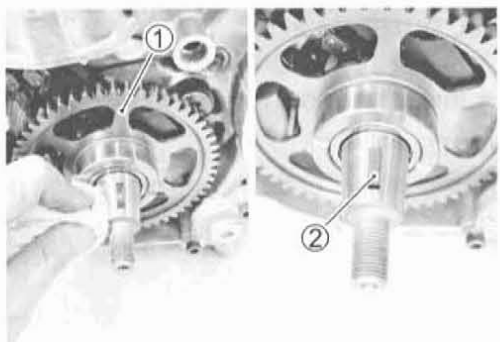


STARTER CLUTCH AND GENERATOR ROTOR

- Apply engine oil to the starter driven gear bearing and crankshaft.



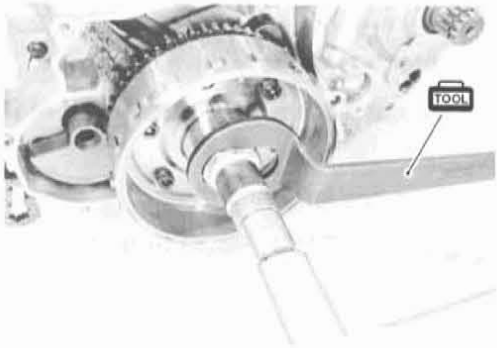
- Install the starter driven gear ①.
- Degrease the tapered portion of generator rotor and also the crankshaft. Use nonflammable cleaning solvent to wipe off oily or greasy matter and make these surfaces completely dry.
- Install the key ②.



- Install the generator rotor.
- Tighten the generator rotor nut to the specified torque using the special tool.

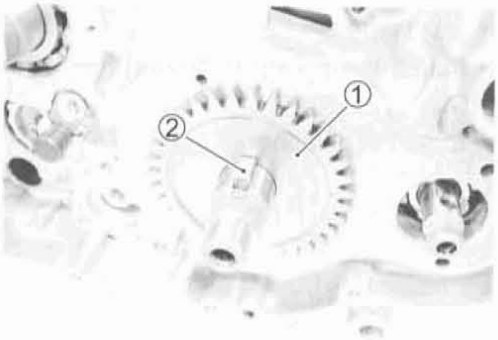
Generator rotor nut: 120 N·m (12.0 kgf-m, 87.0 lb-ft)

09930-44520: Rotor holder

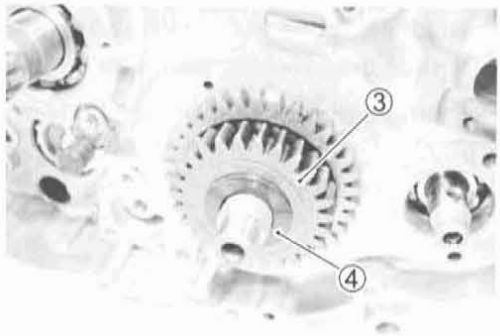


PRIMARY DRIVE GEAR AND BALANCER GEAR

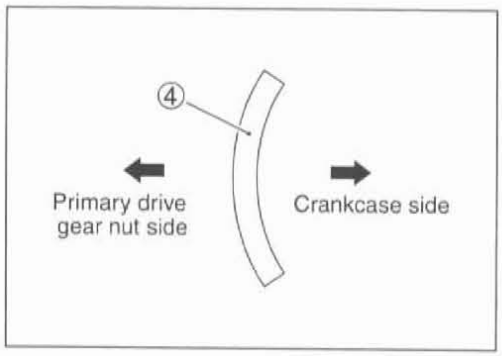
- Install the balancer drive gear ①.
- Install the key ②.



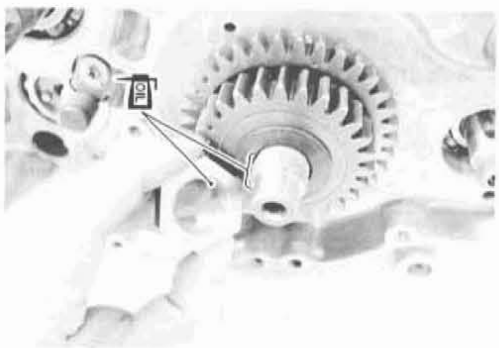
- Install the primary drive gear ③ and washer ④.



NOTE:
Install the washer ④ as shown in the illustration.



- Apply engine oil to the thread and inside surface of the nut.

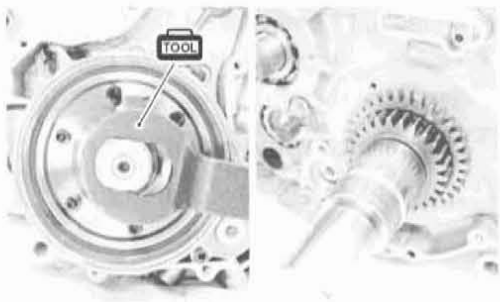


- Hold the generator rotor using the special tool, and then tighten the primary drive gear nut to the specified torque.

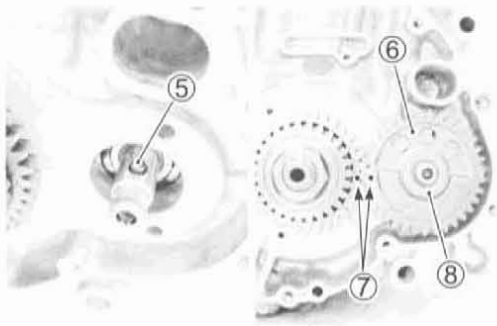
Primary drive gear nut: 140 N·m (14.0 kgf-m, 101.5 lb-ft)

NOTE:
This nut has left-hand thread.

09930-44520: Rotor holder

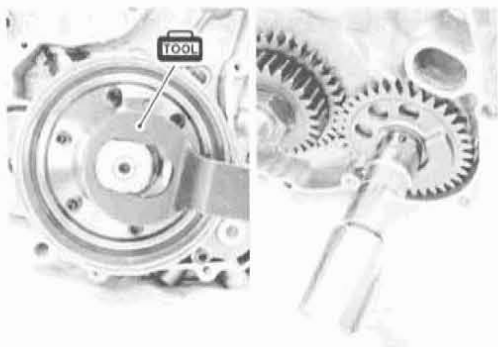


- Install the pin ⑤.
- Install the balancer driven gear ⑥ by aligning the matching marks ⑦.
- Install the washer ⑧.



- Hold the generator rotor using the special tool, and then tighten the balancer driven gear nut to the specified torque.

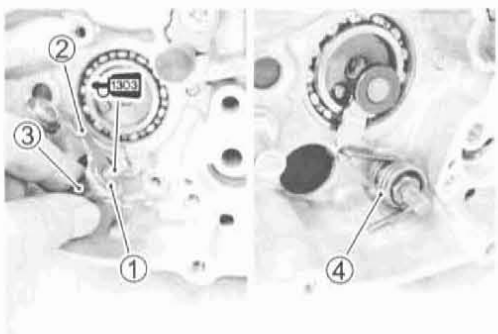
Balancer driven gear nut: 50 N·m (5.0 kgf-m, 36.0 lb-ft)



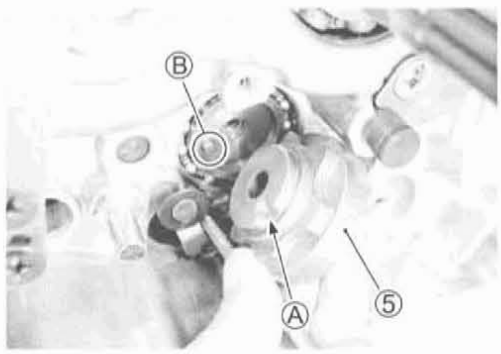
GEARSHIFT CAM DRIVEN GEAR

- Install the washer ① and gearshift cam stopper ② to the gearshift cam stopper bolt ③.
- Apply a small quantity of THREAD LOCK SUPER "1303" to the gearshift cam stopper bolt.
- Tighten the gearshift cam stopper bolt.
- Install the spring ④.

99000-32030: THREAD LOCK SUPER "1303"



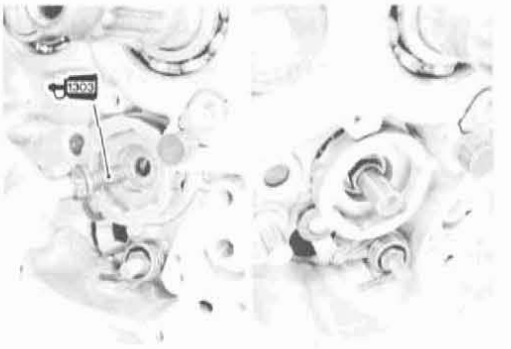
- Align the pin groove Ⓐ with the pin Ⓑ when installing the stopper plate ⑤.



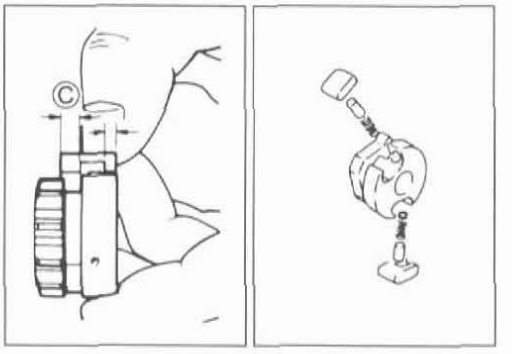
- Apply a small quantity of THREAD LOCK SUPER "1303" to the gearshift cam driven gear bolt.
- Tighten the gearshift cam driven gear bolt to the specified torque.

Gearshift cam driven gear bolt:
31 N·m (3.1 kgf-m, 22.5 lb-ft)

1303 99000-32030: THREAD LOCK SUPER "1303"



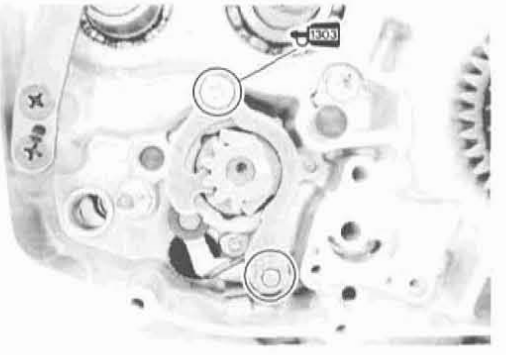
- Install each pawl lifter into the gearshift cam driven gear. The large shoulder Ⓒ must face to the outside.



- With the pawls held in pushed position, install the pawl lifter ⑥.

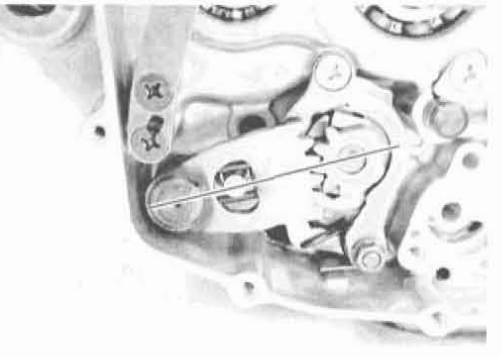
- Apply a small quantity of THREAD LOCK SUPER "1303" to the pawl lifter screw, and then tighten the screw and nut securely.

1303 99000-32030: THREAD LOCK SUPER "1303"



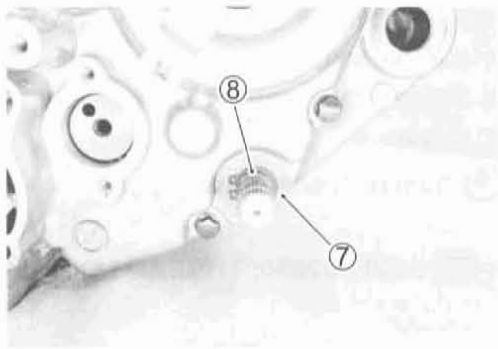
- Install the gearshift shaft.

NOTE:
Align the center teeth on the gearshift shaft with the center teeth on the gearshift cam driven gear.



• Install the washer ⑦ and new snap ring ⑧.

TOOL **09900-06107: Snap ring pliers**



OIL PUMP No.1

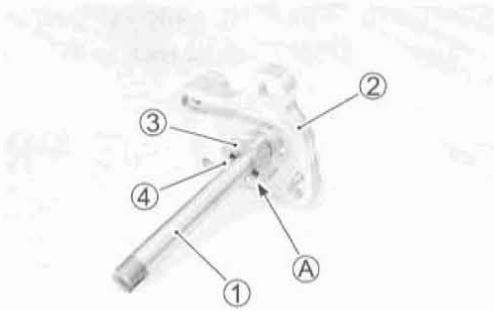
• Install the oil pump body ②, inner rotor ③ and pin ④ to oil pump shaft ①.

NOTE:

Fit the slot Ⓐ of the inner rotor on the pin ④.

CAUTION

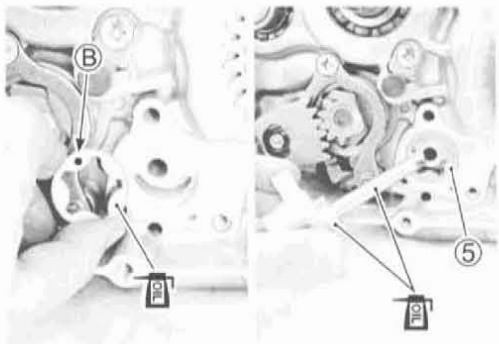
The slit must face to the crankcase side.



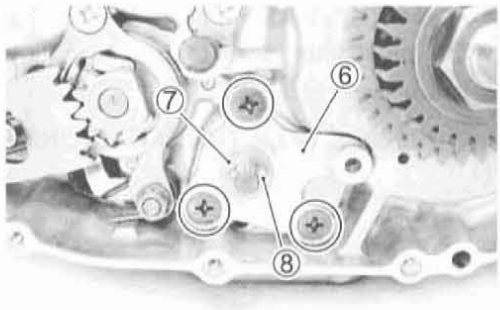
• Apply engine oil to the outer rotor.
• Install the outer rotor ⑤ to the right crankcase.
• Apply engine oil to the oil pump shaft and inner rotor.

CAUTION

The punch mark Ⓑ on the outer rotor must face to the oil pump body.

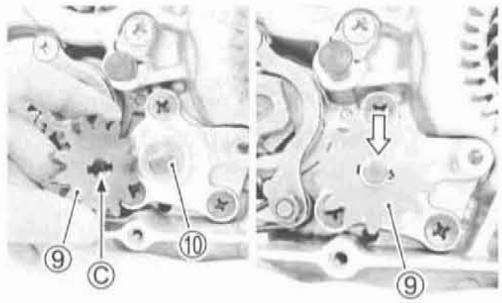


• Install the oil pump No.1 ⑥.
• Install the washer ⑦ and pin ⑧.



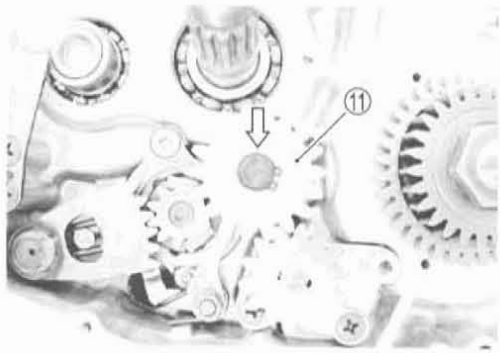
• When installing the oil pump driven gear ⑨, align the pin ⑩ with the groove Ⓒ.

TOOL **09900-06107: Snap ring pliers**



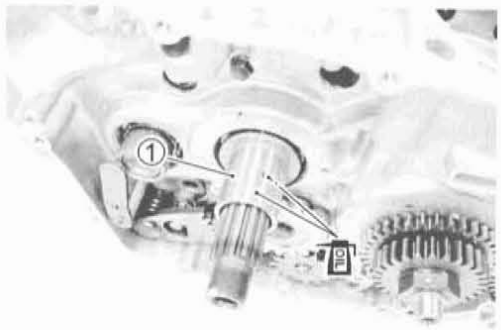
- Install the oil pump idle gear ⑪.

09900-06107: Snap ring pliers

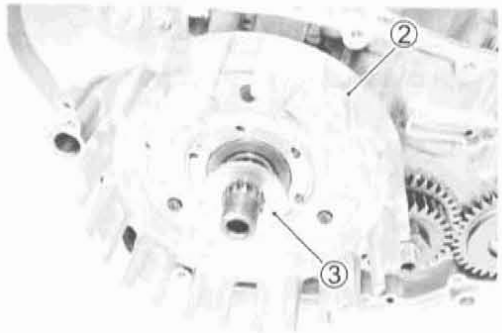


CLUTCH

- Apply engine oil to the spacer.
- Install the spacer ①.

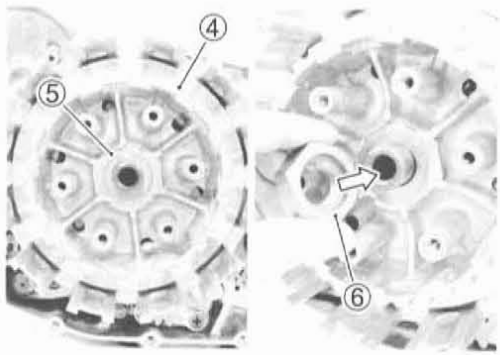


- Install the primary driven gear assembly ②.
- Install the washer ③.



- Install the clutch sleeve hub ④, new lock washer ⑤ and clutch sleeve hub nut ⑥.

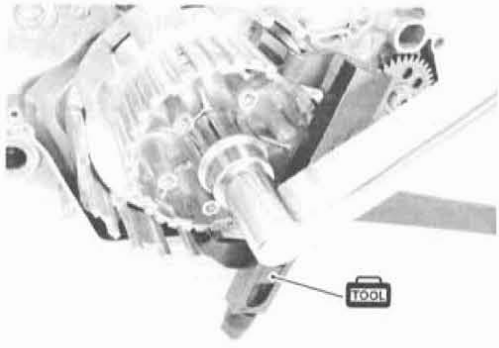
NOTE:
The concave side of clutch sleeve hub nut faces inside.



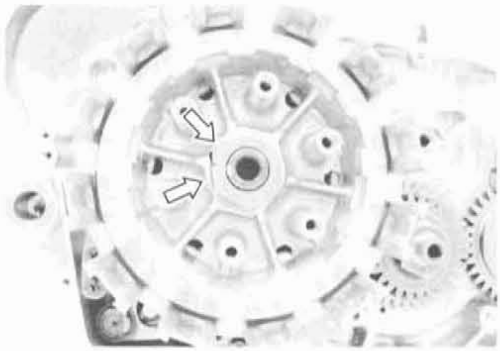
- Hold the clutch sleeve hub using the special tool, and then tighten the clutch sleeve hub nut to the specified torque.

Clutch sleeve hub nut: 90 N·m (9.0 kgf-m, 65.0 lb-ft)

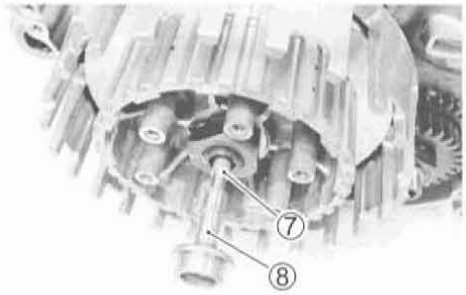
09920-53740: Clutch sleeve hub holder



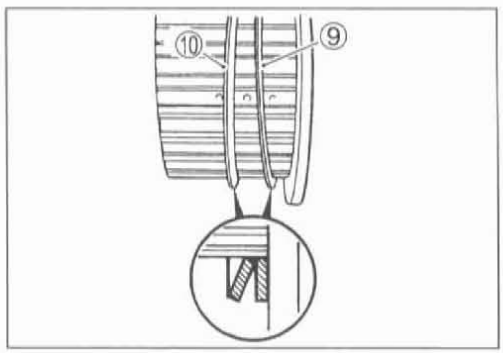
- Bend the tongue of the washer securely.



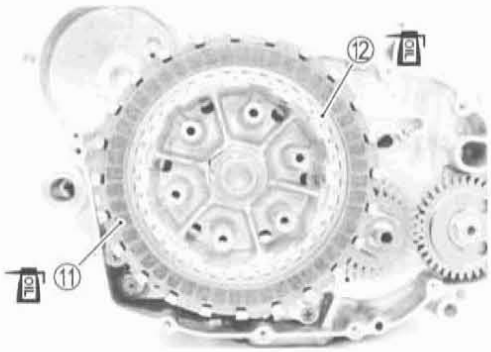
- Install the push rod ⑦ and push piece ⑧.

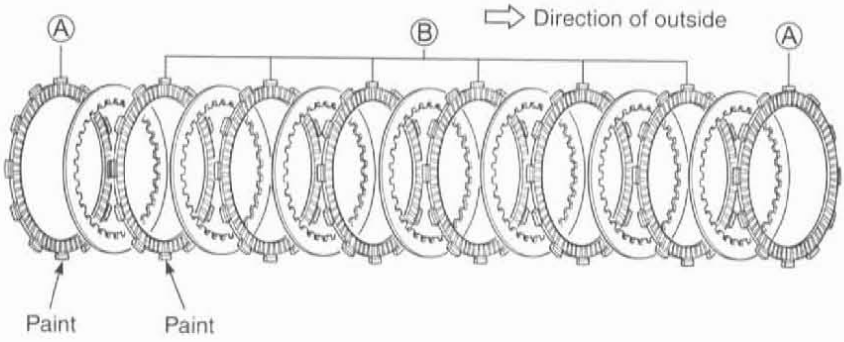


- Install the spring washer seat ⑨ and spring washer ⑩ onto the clutch sleeve hub correctly.



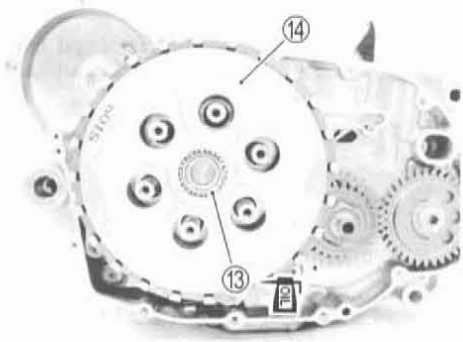
- Apply engine oil to the drive plates ⑪ and driven plates ⑫.
- Install the clutch drive plates and driven plates one by one into the clutch sleeve hub in the prescribed order as show in illustration.





	Paint
Driven No.1 plate Ⓐ	Black
Driven No.2 plate Ⓑ	Blue

- Apply engine oil to the release bearing ⑬.
- Install the clutch pressure plate ⑭.



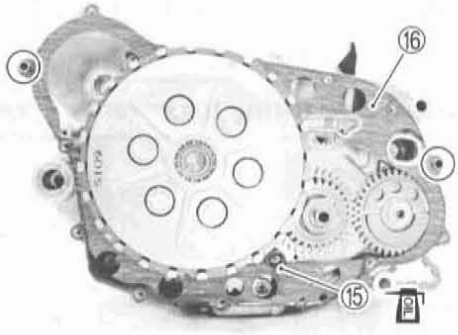
- Hold the generator rotor using the special tool.
- Tighten the clutch spring set bolts securely in diagonal stages.

TOOL **09930-44520: Rotor holder**

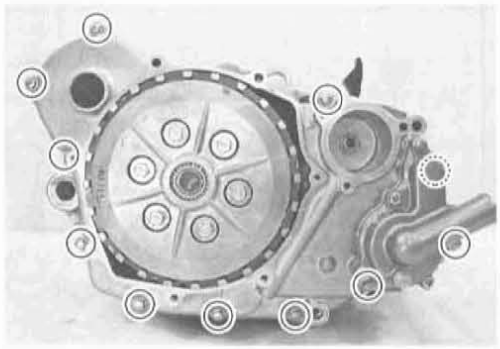
- Apply engine oil to the lip of the oil seal.
- Install the oil seal ⑮ dowel pins and gasket ⑯.

CAUTION

Use a new oil seal and gasket to prevent oil leakage.



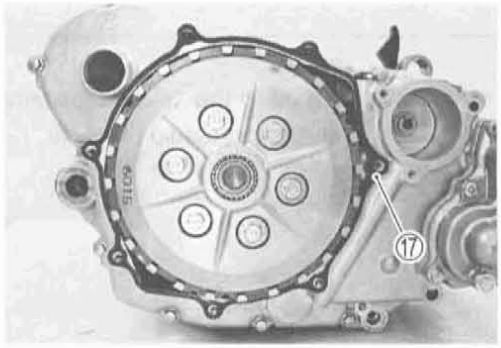
• Tighten the right crankcase cover bolts securely.



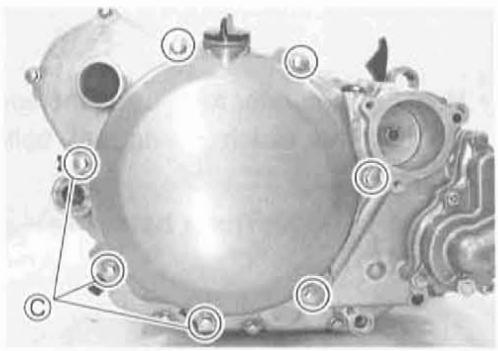
• Install the gasket ⑰.

CAUTION

Use a new gasket to prevent oil leakage.



• Tight the clutch cover bolts securely.
Ⓒ: Bolt with clamp

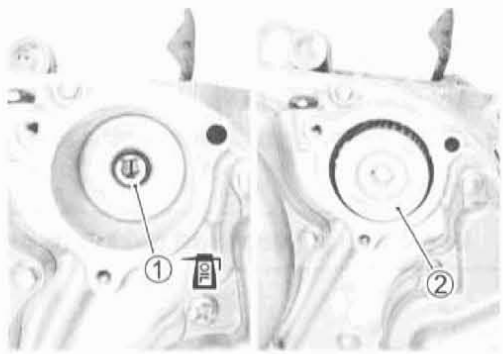


OIL FILTER

• Apply engine oil to the O-ring.
• Install the O-ring ① and oil filter ②.

CAUTION

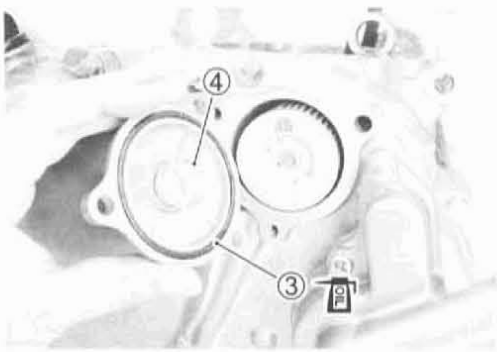
Use a new O-ring to prevent oil leakage.



• Apply engine oil to the O-ring.
• Install the O-ring ③ and spring ④.

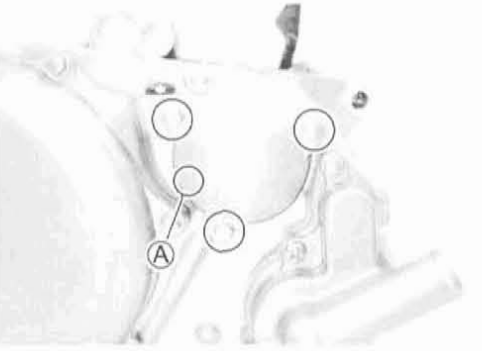
CAUTION

Use a new O-ring to prevent oil leakage.



• Replace the oil filter cap and tighten the bolts securely.

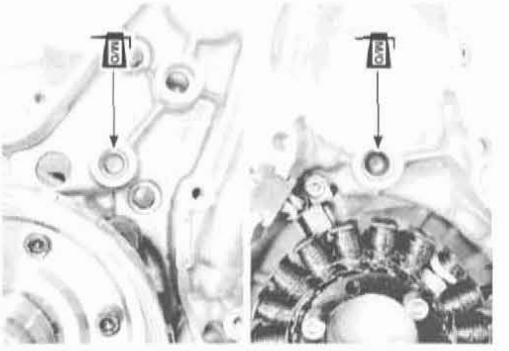
NOTE:
Face the triangle mark Ⓐ on the cap rearward.



GENERATOR ROTOR COVER

• Before installing the starter idle gear, apply molybdenum oil solution to the hole of starter idle gear shaft.

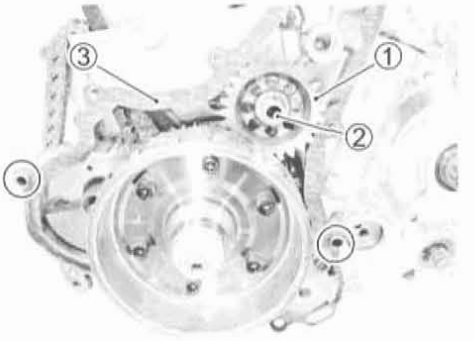
MOLYBDENUM OIL SOLUTION



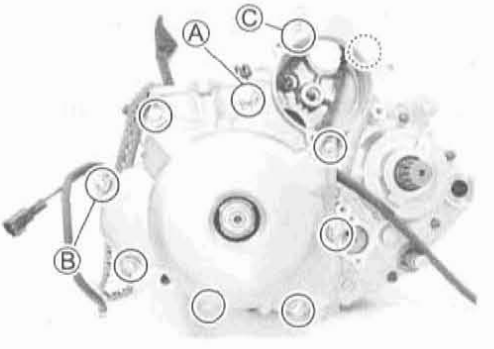
• Install the starter idle gear ①, shaft ②, dowel pins and gasket ③.

CAUTION

Use a new gasket to prevent oil leakage.

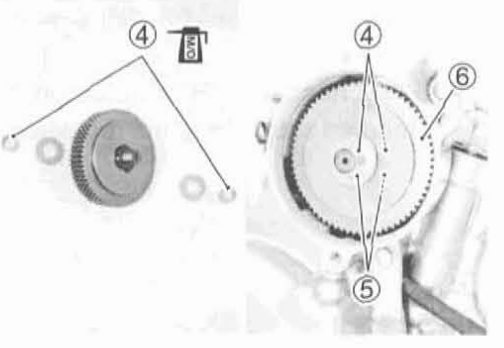


• Tighten the generator rotor cover bolts securely.
Ⓐ: Bolt with clamp
Ⓑ: Bolt with lead wire
Ⓒ: Bolt with bracket

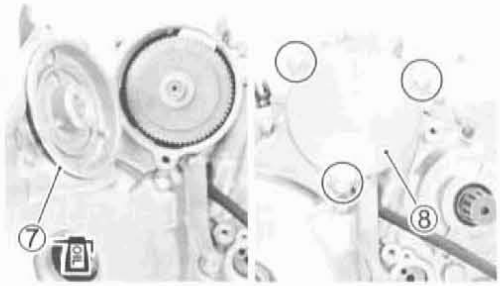


• Before installing the starter torque limiter assembly, apply molybdenum oil solution to the collars ④ of starter torque limiter assembly shaft.
• Install the collars ④, washers ⑤ and starter torque limiter assembly ⑥.

MOLYBDENUM OIL SOLUTION



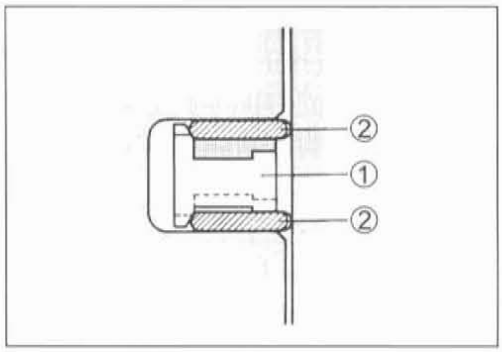
- Apply engine oil to the O-ring ⑦.
- Install the starter torque limiter assembly cover ⑧.



PISTON RING

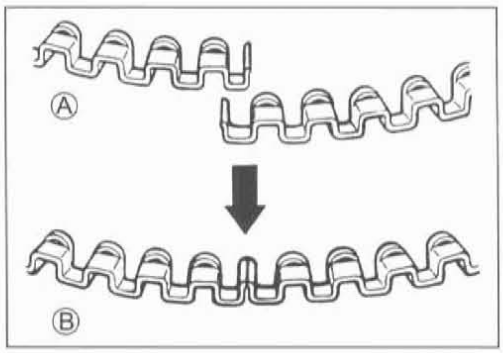
- Install the piston rings in the order of oil ring, 2nd ring and 1st ring.
- The first member to go into the oil ring groove is a spacer ①. After placing the spacer, fit the two side rails ②.

NOTE:
Side designations, top and bottom, are not applied to the spacer and side rails: you can position each either way.



CAUTION

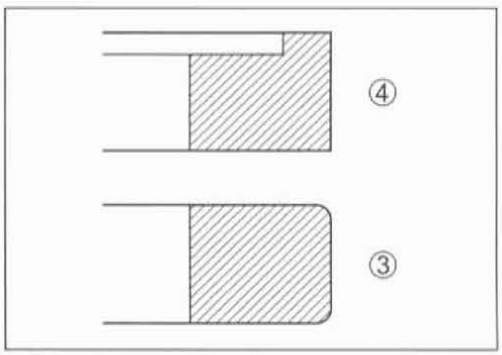
When installing the spacer, be careful not to allow its two ends to overlap in the groove.



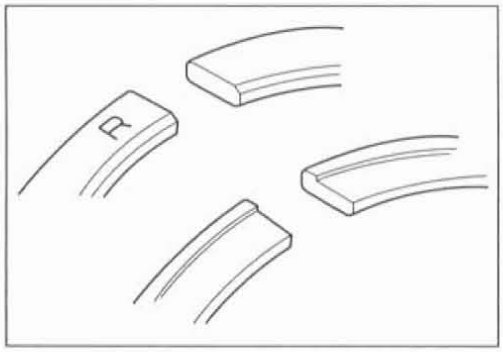
Ⓐ INCORRECT
Ⓑ CORRECT

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

NOTE:
1st ring and 2nd ring differ in shape.

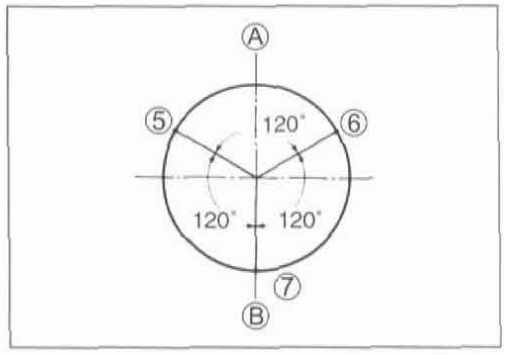


- Be sure to bring the concave side of 1st ring to the top when fitting it to the piston.
- 2nd ring has letter "R" marked on the side. Be sure to bring the marked side ring to the top when fitting it to the piston.



- Position the gaps of the three ring as shown. Before inserting each piston into the cylinder, check that the gaps are so located.

Ⓐ Exhaust side
Ⓑ Intake side
⑤ 2nd ring and lower side rail
⑥ Upper side rail
⑦ 1st ring and spacer

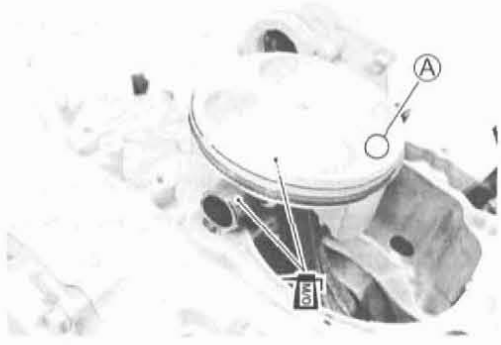


PISTON AND CYLINDER

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

NOTE:
Install the piston with the punch mark Ⓐ on the piston head facing toward the exhaust side.

MOLYBDENUM OIL SOLUTION

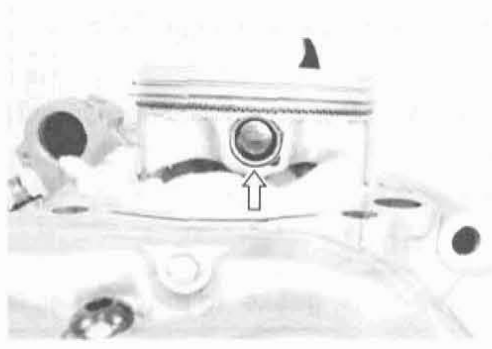


- Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into the crankcase, and then fit the piston pin circlip with long-nose pliers.

CAUTION

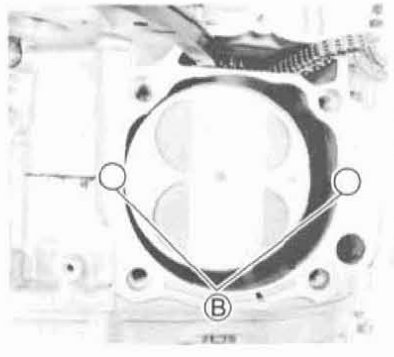
Use a new piston pin circlip to prevent circlip failure with a bent one.

NOTE:
End gap of the circlip should not be aligned with the cutaway in the piston pin bore.



- Thoroughly wipe off oil from the fitting surface of the crankcase.
- Apply SUZUKI BOND "1215" to the crankcase Ⓑ as shown.

99000-31110: SUZUKI BOND "1215"
(or equivalent bond)

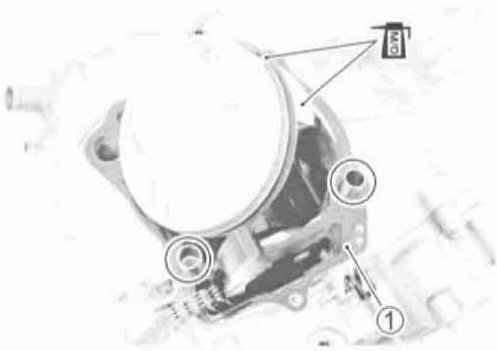


- Apply molybdenum oil solution to the sliding surface of the piston and piston rings.
- Install the dowel pins and gasket ① onto the crankcase.

CAUTION

Use a new gasket to prevent oil leakage.

MOLYBDENUM OIL SOLUTION



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

NOTE:

** When mounting the cylinder, after attaching the camshaft drive chain, 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.*

- Install the cam chain guide ②.

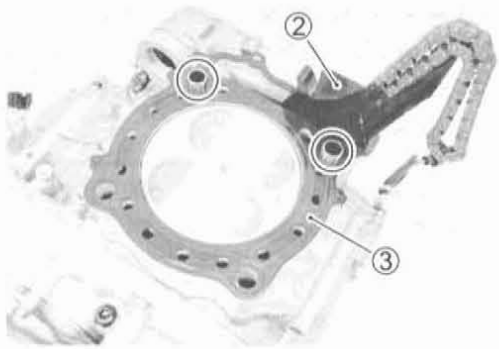
NOTE:

Make sure that the guide ② is inserted properly or binding of the cam chain and guide may result.

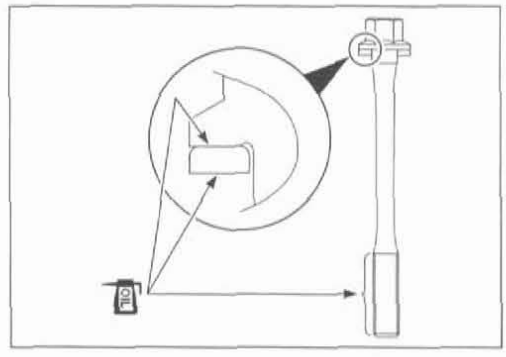
- Install the dowel pins and gasket ③.

CAUTION

Use a new gasket to prevent gas leakage.



CYLINDER HEAD



- With the head snugly seated on the cylinder, secure it by tightening the bolts in diagonal stages. Tighten the cylinder head bolts diagonally to the specified torque.

Cylinder head bolt

Initial: 25 N·m (2.5 kgf-m, 18.0 lb-ft)
Final: 47 N·m (4.7 kgf-m, 34.0 lb-ft)

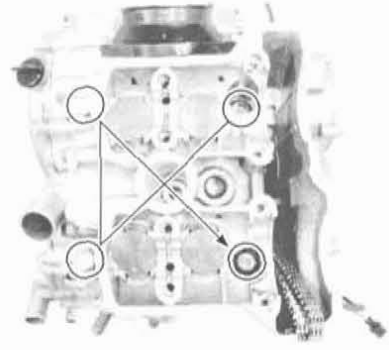
NOTE:

** Apply engine oil to the threaded parts of the cylinder head bolts and both sides of the its washers.*

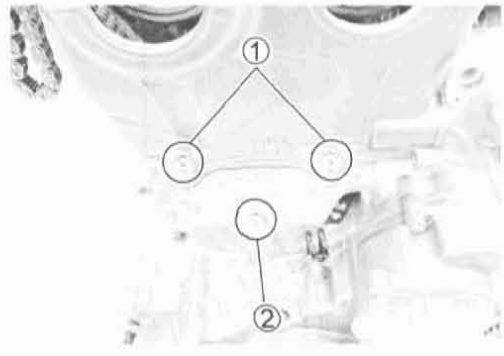
** Be sure to install the washer with rounded side facing up.*

CAUTION

Use new copper washers to prevent oil leakage.

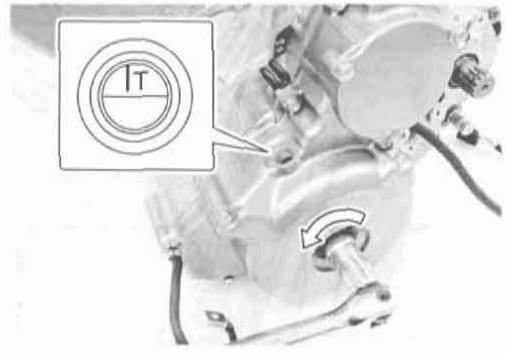


- After tightening the cylinder head bolts to specification, tighten the cylinder head bolts ① and cylinder bolts ② to the specified torque.



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

CAMSHAFT/AUTOMATIC DECOMP. ASSEMBLY

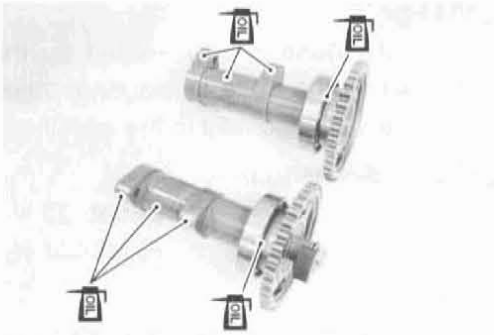


- Turn the generator rotor until the "T" line on the generator rotor is aligned with the center of the hole in the generator cover.

CAUTION

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

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

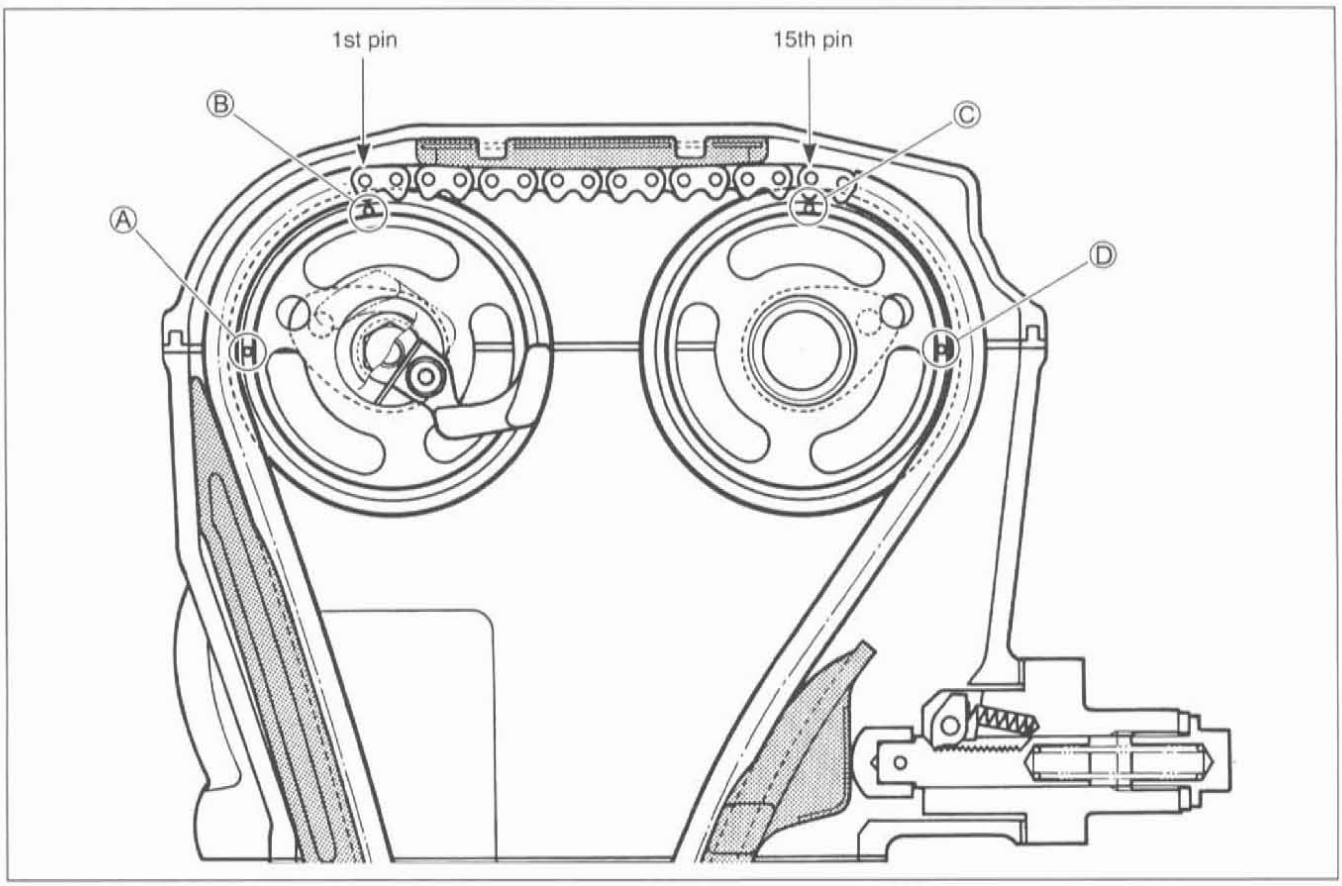


- With the "T" line aligned with the center of the hole, hold the camshaft steady and lightly pull up the cam chain to remove any slack between the cam chain drive sprocket and exhaust camshaft sprocket.
- The exhaust camshaft sprocket has an punch marked Ⓐ. Turn the exhaust camshaft so that the punch is aligned with the gasket surface of the cylinder head. Engage the cam chain with the exhaust camshaft sprocket.
- The other punch marked Ⓑ should now be pointing straight up. Starting from the roller pin that is directly above the punch marked Ⓑ, 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 punch marked Ⓒ on the intake sprocket. Refer to the following illustrations.

NOTE:

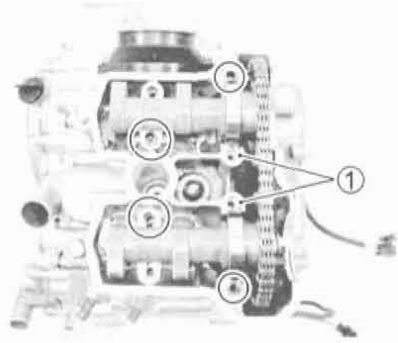
** The cam chain should now be on all three sprockets. Be careful not to move the crankshaft until the camshaft journal holders and cam chain tensioner are secured.*

** Make sure that the punch mark Ⓓ is aligned with the gasket surface of the cylinder head.*



- Install the dowel pins and C-ring ①.
- Place each camshaft journal holders into the correct position.

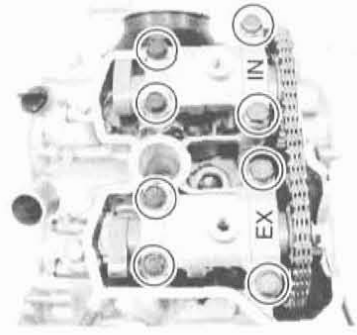
NOTE:
Camshaft journal holders marked "EX" are for the exhaust side and those marked "IN" are for the intake side.



- Tighten the camshaft journal holder bolts to the specified torque.

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

NOTE:
** When tightening the camshaft journal holder bolts, the piston position must be at TDC on the compression stroke.*
** Tighten the camshaft journal holder bolts diagonally.*



CAM CHAIN TENSION ADJUSTER

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

- Install the gasket ③ and cam chain tension adjuster to the cylinder.

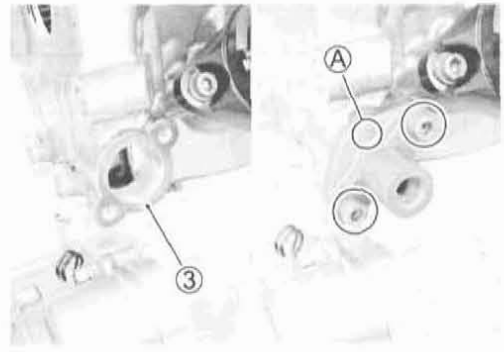
CAUTION

Use a new gasket to prevent oil leakage.

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

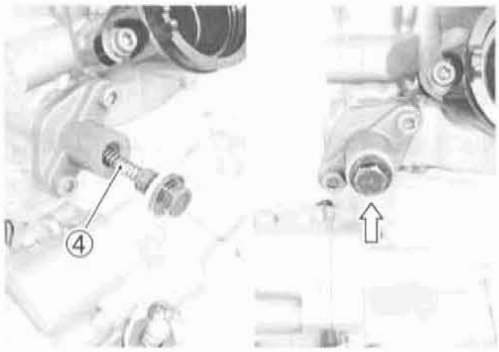
Cam chain tension adjuster mounting bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)

NOTE:
Make sure that the "up mark" Ⓐ comes to the upper side.



- Install the spring ④.
- Tighten the spring holder bolt to the specified torque.

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

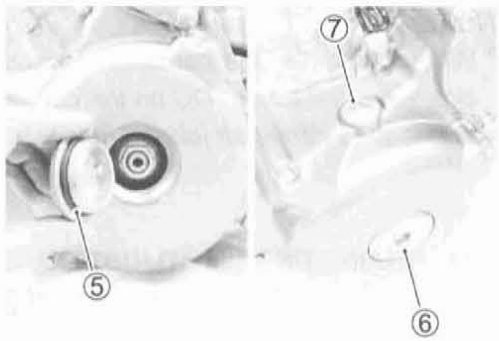


CAUTION

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

- After installing the cam chain tension adjuster, rotate the crankshaft (two turns), and recheck the positions of the camshafts. (☞3-76)
- Apply grease to the O-ring ⑤.
- Tighten the generator cover cap ⑥ and valve timing inspection plug ⑦.

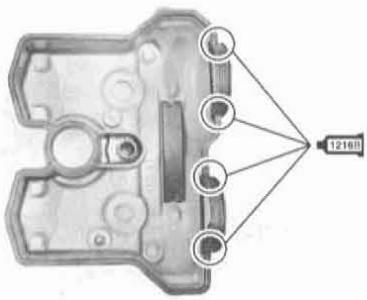
Generator cover cap: 15 N·m (1.5 kgf-m, 11 lb-ft)
Valve timing inspection plug:
23 N·m (2.3 kgf-m, 16.5 lb-ft)



CYLINDER HEAD COVER

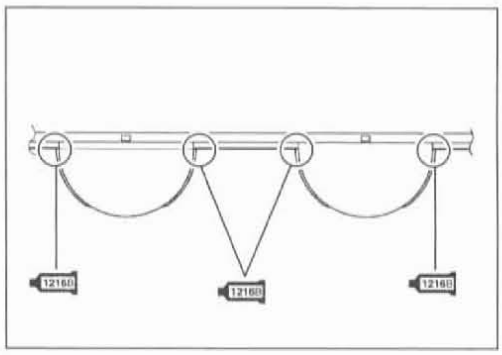
- Thoroughly wipe off oil from the fitting surfaces of the cylinder head and cover.
- Apply SUZUKI BOND "1216B" to the end caps of the cylinder head cover gasket as shown.

1216B 99000-31230: SUZUKI BOND "1216B"



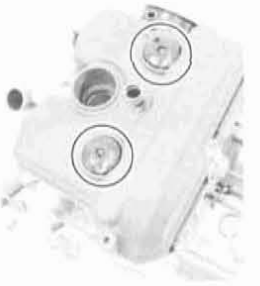
CAUTION

Use a new gasket to prevent oil leakage.



- Apply engine oil to both sides of the washers ①.
- Lightly tighten the cylinder head cover bolts and then tighten them to the specified torque.

Cylinder head cover bolt
Initial: 10 N·m (1.0 kgf-m, 7.0 lb-ft)
Final: 14 N·m (1.4 kgf-m, 10.0 lb-ft)



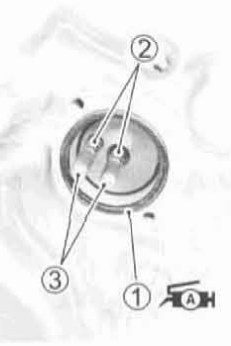
CAUTION

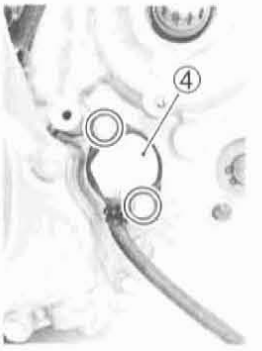
Use new washers to prevent oil leakage.

- Tighten the spark plug. (☞2-10)

GEAR POSITION SWITCH

- Apply grease to the O-ring.
- Install the O-ring ①, springs ② and contacts ③.





CAUTION

Use a new O-ring to prevent oil leakage.

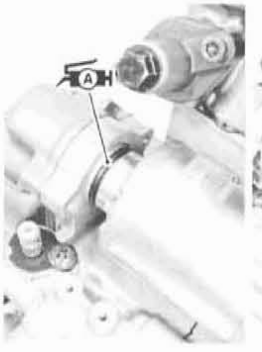
99000-25010: SUZUKI SUPER GREASE "A"
(or equivalent grease)

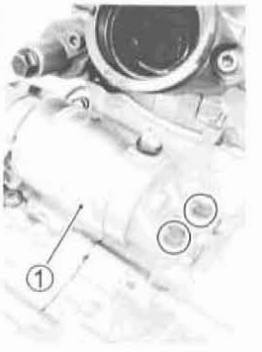
- Install the gear position switch ④ and tighten the bolts to the specified torque.

Gear position switch bolt: 6.5 N·m (0.65 kgf-m, 4.7 lb-ft)

STARTER MOTOR

- Apply grease to the O-ring.
- Install the starter motor ①.





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

FI SYSTEM DIAGNOSIS

CONTENTS

FI SYSTEM DIAGNOSIS

CONTENTS

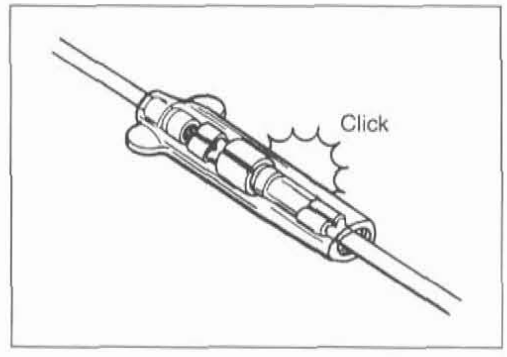
PRECAUTIONS IN SERVICING

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

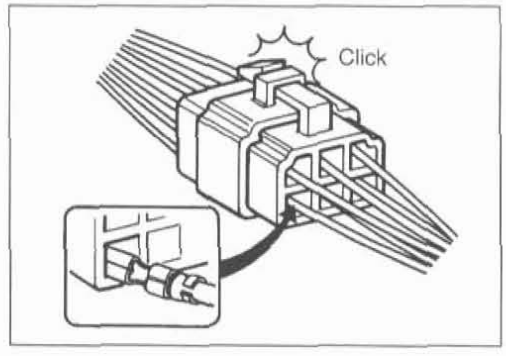
ELECTRICAL PARTS

CONNECTOR/COUPLER

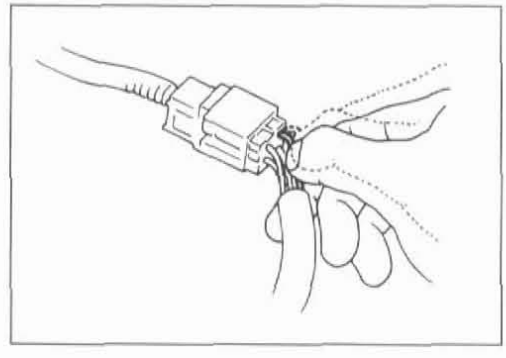
- When connecting a connector, be sure to push it in until a click is felt.



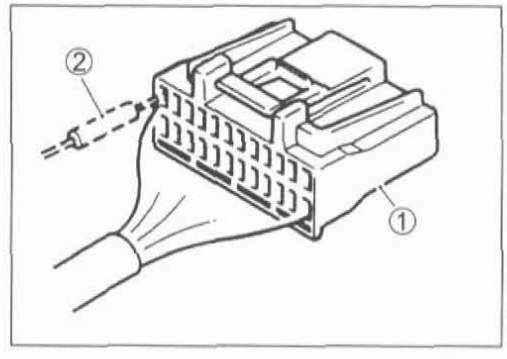
- With a lock type coupler, be sure to release the lock when disconnecting, and push in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or bending.
- Inspect each terminal for corrosion and contamination. The terminals must be clean and free of any foreign material which could impede proper terminal contact.



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

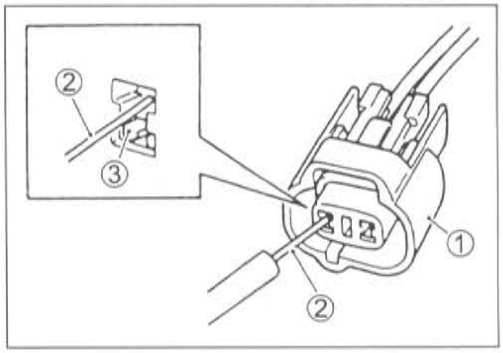


- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (backside) of the connector/coupler.



① Coupler
② Probe

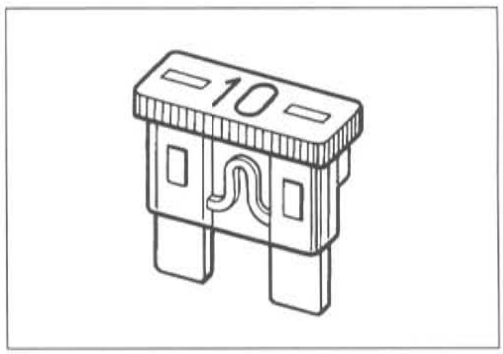
- When connecting meter probe from the terminal side of the coupler (where connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open.
  Connect the probe as shown to avoid opening of female terminal.
  Never push in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



① Coupler
② Probe
③ Where male terminal fits

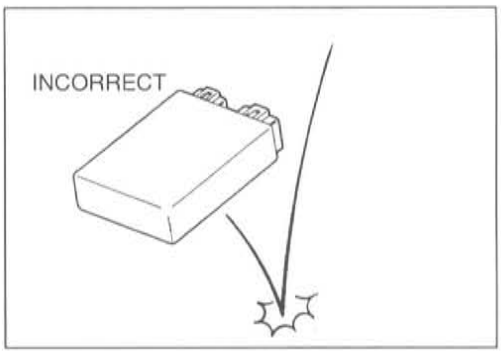
FUSE

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

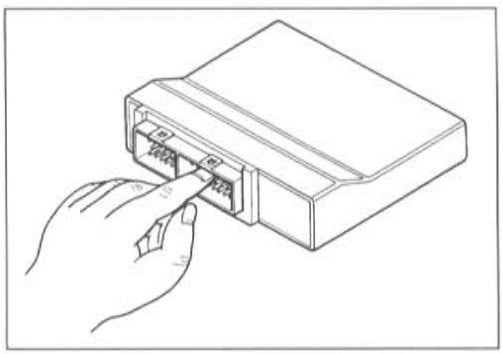


ECM/VARIOUS SENSORS

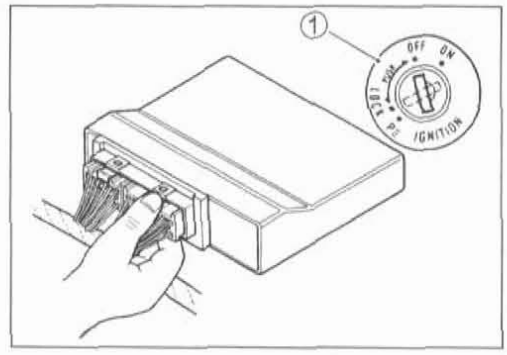
- Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.



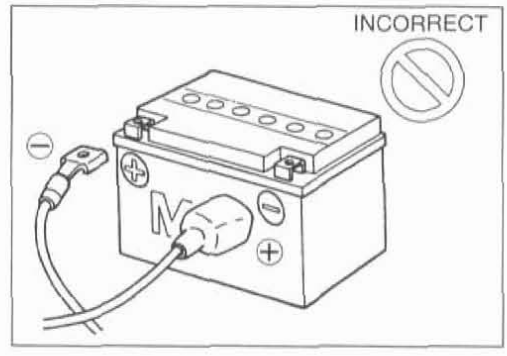
- Be careful not to touch the electrical terminals of the ECM. The static electricity from your body may damage this part.



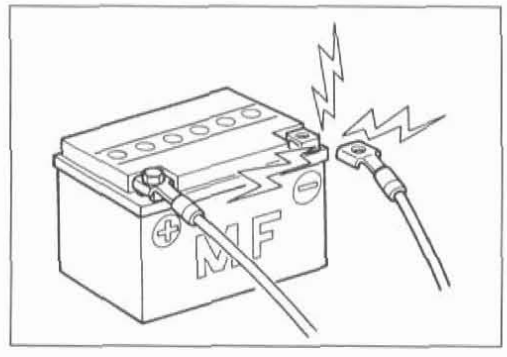
- When disconnecting and connecting the ECM, make sure to turn OFF the ignition switch ①, or electronic parts may get damaged.



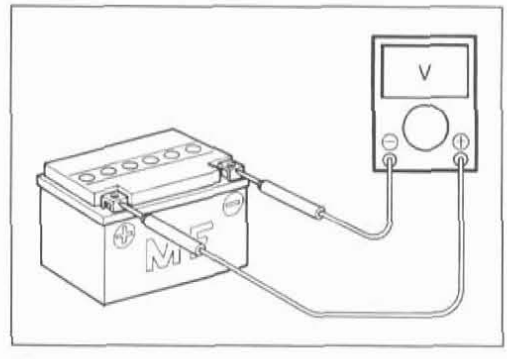
- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system instantly when reverse power is applied.



- 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 ECM which may result in serious damage.



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



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

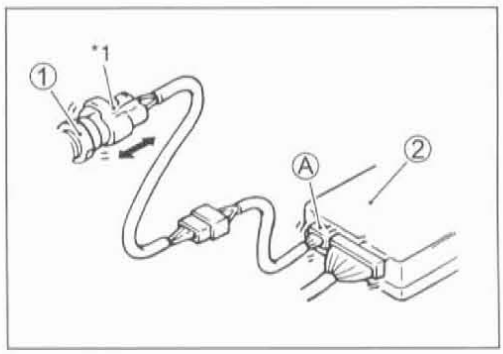
While there are various methods for electrical circuit inspection, described here is a general method to check for open and short circuit using an ohmmeter and a voltmeter.

OPEN CIRCUIT CHECK

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

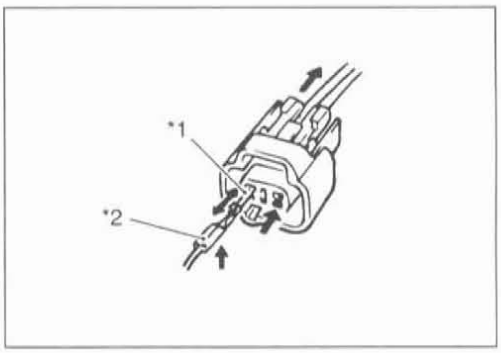
- Loose connection of connector/coupler.
- Poor contact of terminal (due to dirt, corrosion or rust, poor contact tension, entry of foreign object etc.).
- Wire harness being open.
- Poor terminal-to-wire connection.

- Disconnect the negative cable from the battery.
- 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.



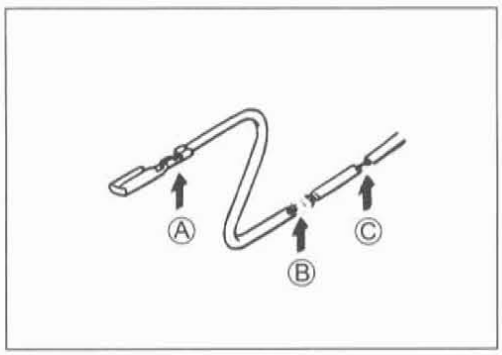
① Sensor
② ECM
*1 Check for loose connection.

- 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.



*1 Check contact tension by inserting and removing.
*2 Check each terminal for bend and proper alignment.

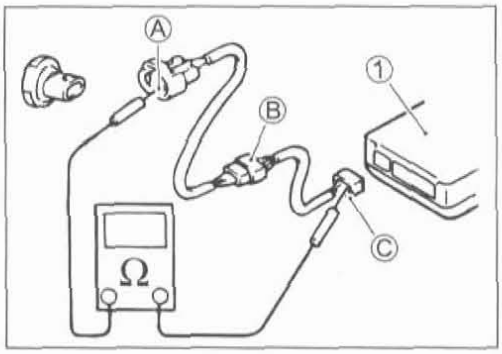
- Using continuity inspect or voltage check procedure as described below, inspect the wire harness terminals for open circuit and poor connection. Locate abnormality, if any.



Ⓐ Looseness of crimping
Ⓑ Open
Ⓒ Thin wire (a few strands left)

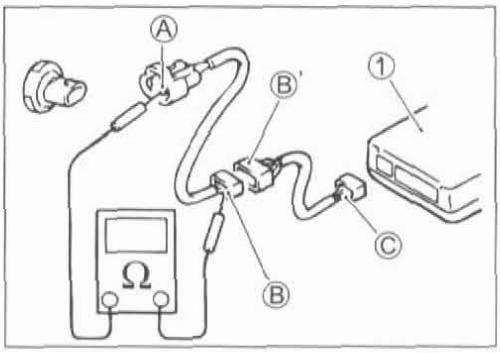
Continuity check

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



① ECM

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



① ECM

VOLTAGE CHECK

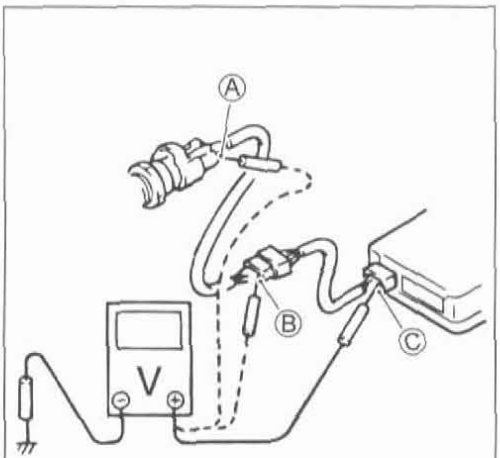
If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

- With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.

If measurements were taken as shown in the figure at the right and results are as listed below, it means that the circuit is open between terminals Ⓐ and Ⓑ.

Voltage Between:

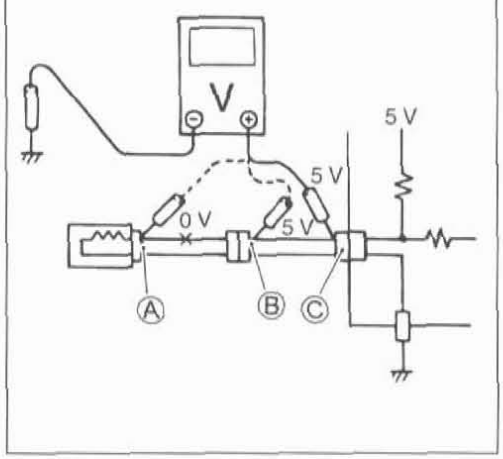
Ⓒ and body ground: Approx. 5 V
Ⓑ and body ground: Approx. 5 V
Ⓐ and body ground: 0 V



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

Voltage Between:

Ⓒ and body ground: Approx. 5 V
Ⓑ and body ground: Approx. 5 V — 2 V voltage drop
Ⓐ and body ground: 3 V

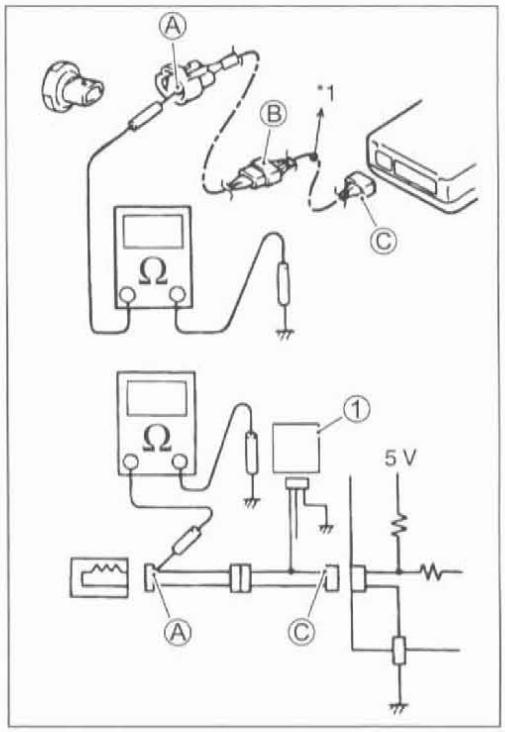


SHORT CIRCUIT CHECK (WIRE HARNESS TO GROUND)

- Disconnect the negative cable from the battery.
- Disconnect the connectors/couplers at both ends of the circuit to be checked.

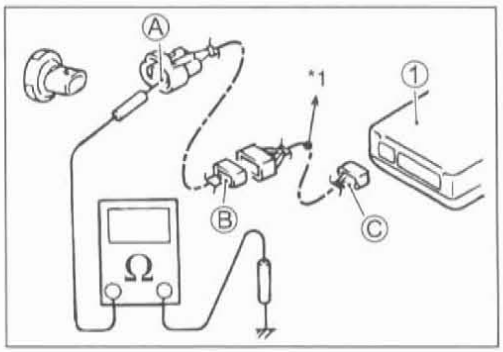
NOTE:
If the circuit to be checked branches to other parts as shown, disconnect all connectors/couplers of those parts. Otherwise, diagnosis will be misled.

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



① Other parts
*1 To other parts

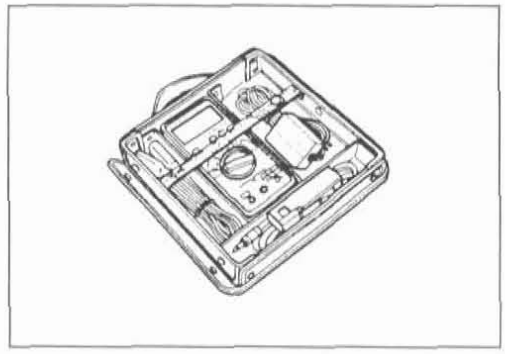
- Disconnect the connector/coupler included in circuit (coupler Ⓑ) and measure resistance between terminal Ⓐ and body ground.
  If continuity is indicated, the circuit is shorted to the ground between terminals Ⓐ and Ⓑ.



① ECM
*1 To other parts

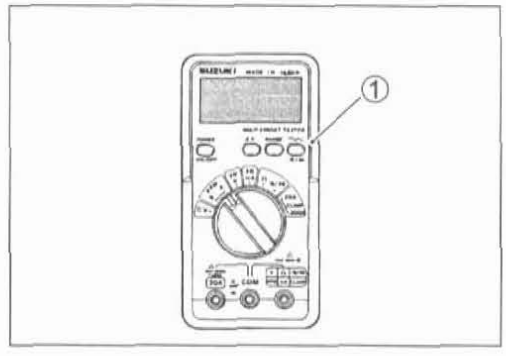
USING THE MULTI-CIRCUIT TESTER

- Use the Suzuki multi-circuit tester set (09900-25008).
- Use well-charged batteries in the tester.
- Be sure to set the tester to the correct testing range.



USING THE TESTER

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



TOOL 09900-25008: Multi-circuit tester set

NOTE:

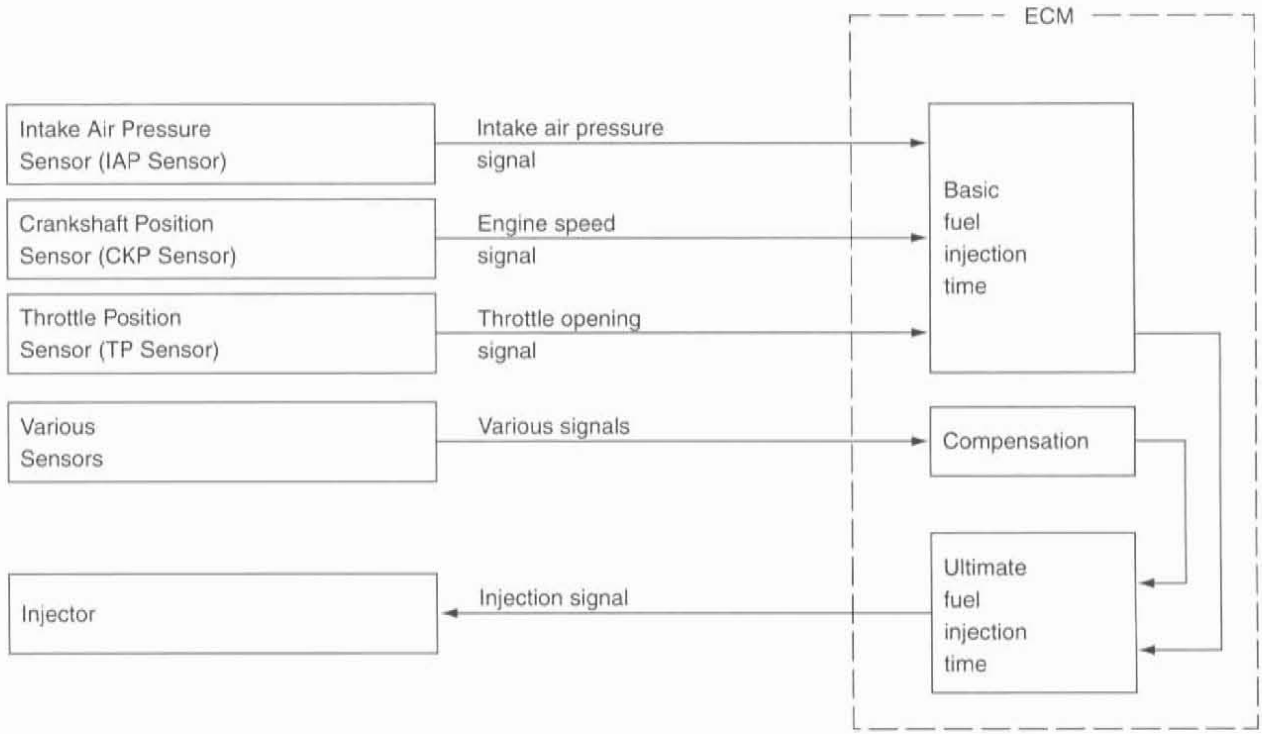
* *When connecting the multi-circuit tester, use the needle pointed probe to the back side of the lead wire coupler and connect the probes of tester to them.*
* *Use the needle pointed probe to prevent the rubber of the water proof coupler from damage.*

TOOL 09900-25009: Needle pointed probe set

FI SYSTEM TECHNICAL FEATURES

INJECTION TIME (INJECTION VOLUME)

The factors to determine the injection time include the basic fuel injection time, which is calculated on the basis of 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.



COMPENSATION OF INJECTION TIME (VOLUME)

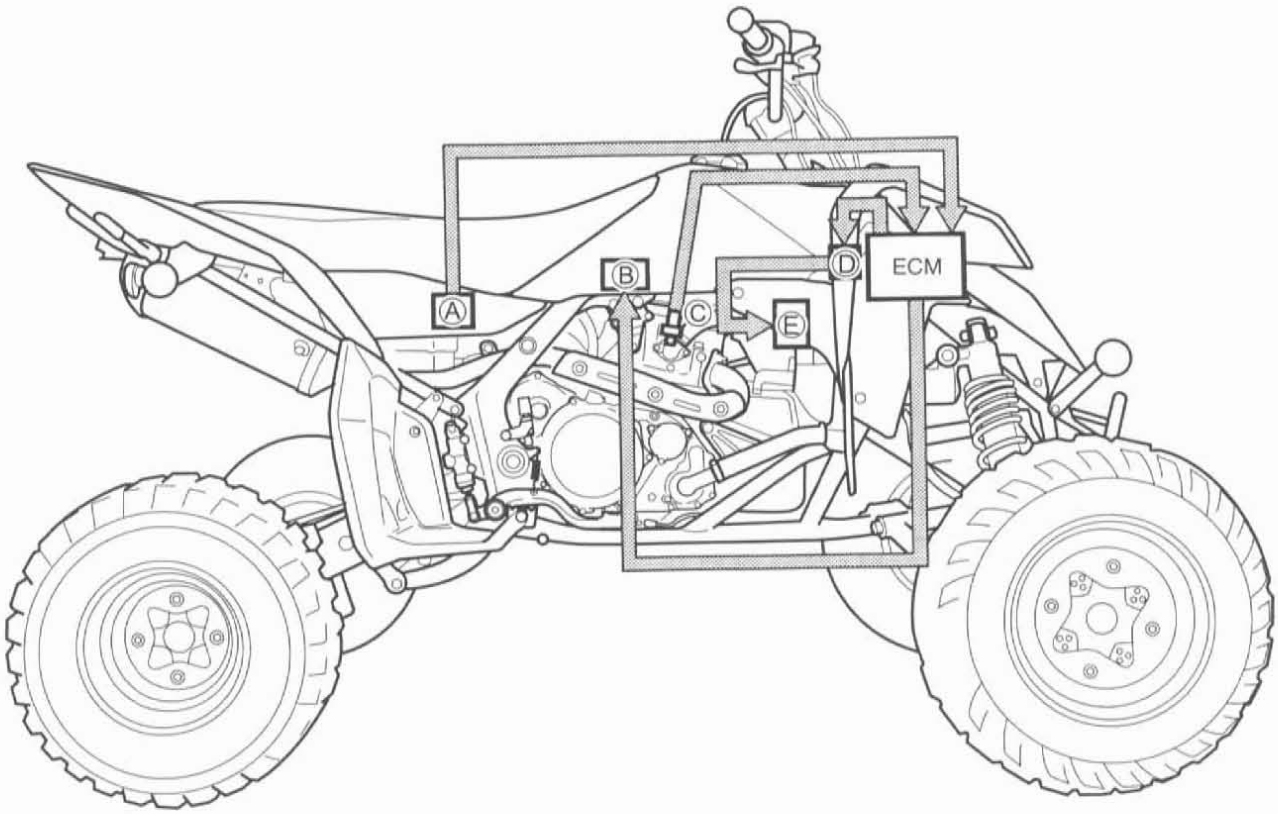
The following different signals are output from the respective sensors for compensation of the fuel injection time (volume).

SIGNAL	DESCRIPTION
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.

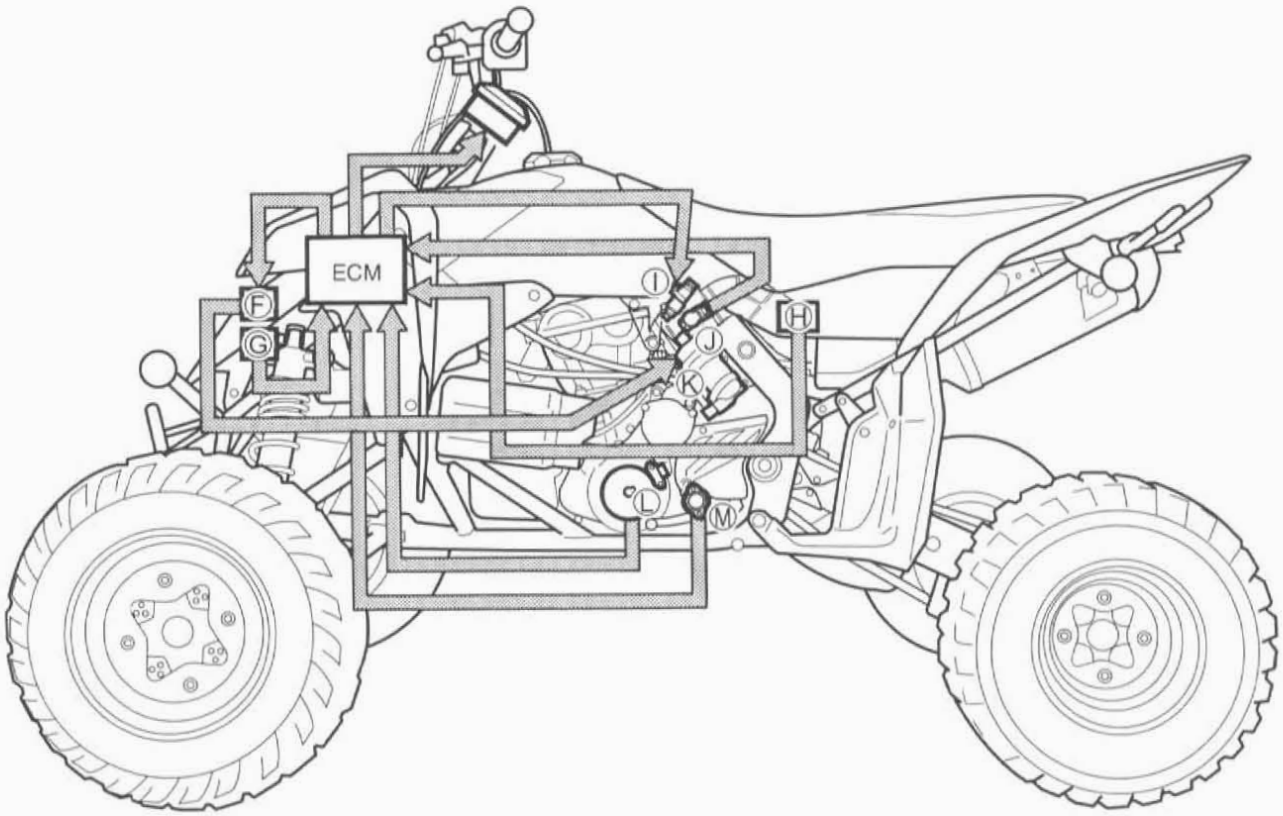
INJECTION STOP CONTROL

SIGNAL	DESCRIPTION
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 ignition stop operation when engine rpm reaches rev. limit rpm.

FI SYSTEM PARTS LOCATION

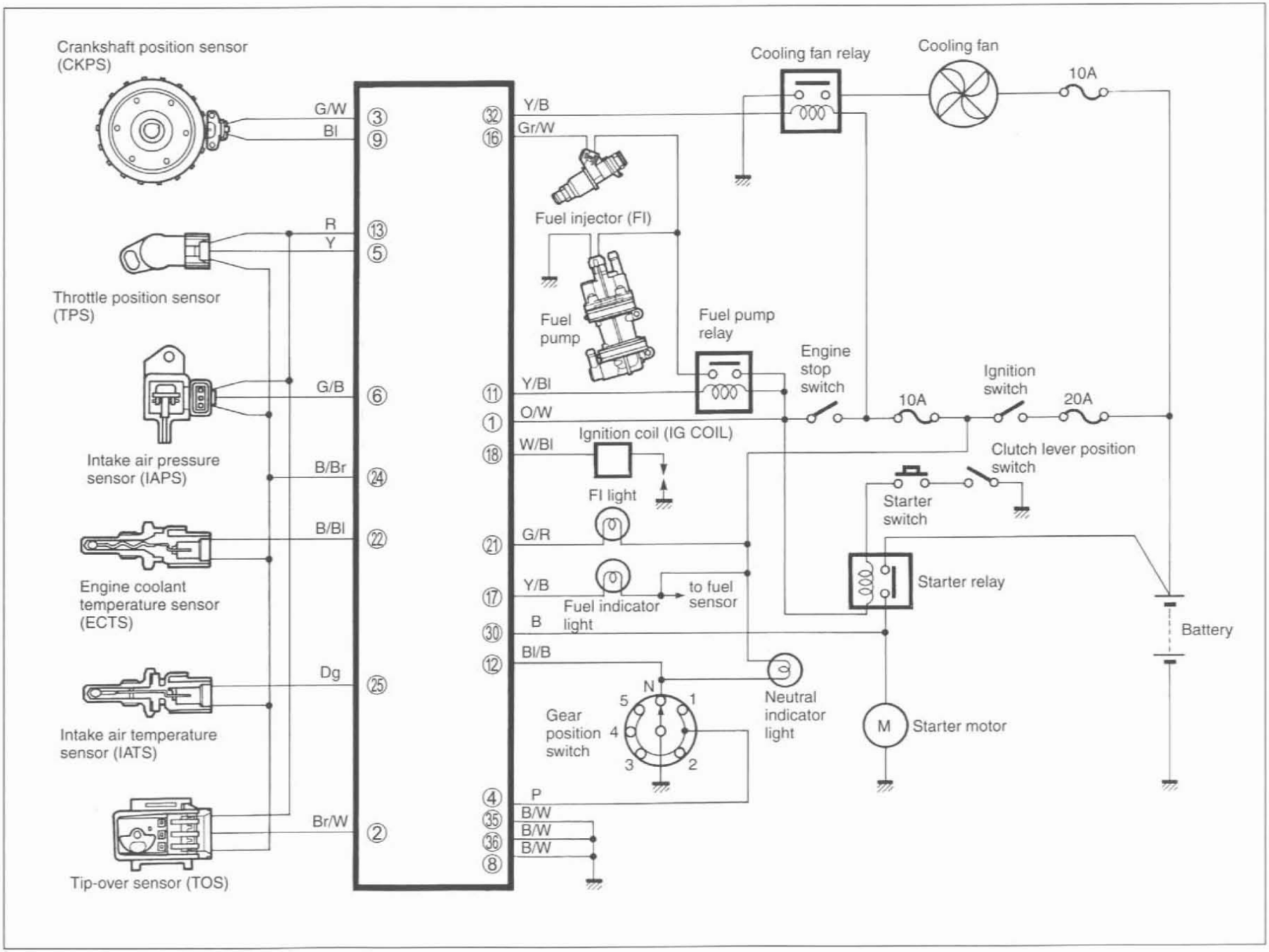


Ⓐ Intake air temperature sensor (IATS)
Ⓑ Ignition coil (IG COIL)
Ⓒ Engine coolant temperature sensor (ECTS)
Ⓓ Cooling fan relay
Ⓔ Cooling fan

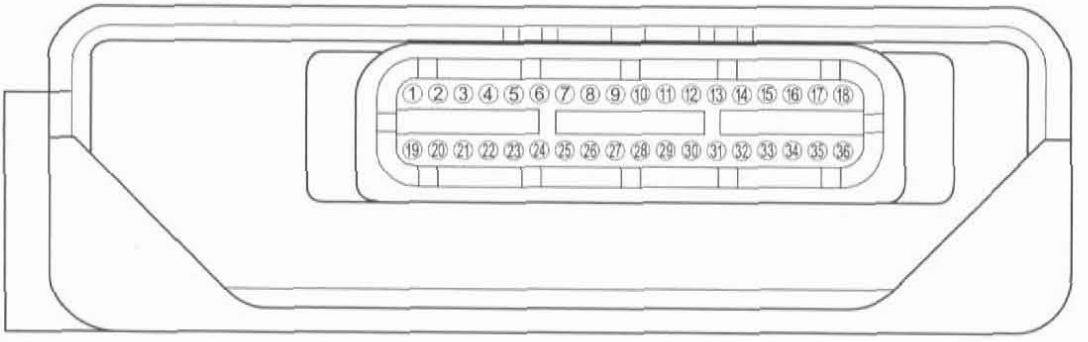


Ⓕ Fuel pump relay (FP RERAY)
Ⓖ Tip-over sensor (TOS)
Ⓗ Intake air pressure sensor (IAPS)
Ⓘ Fuel injector
Ⓙ Throttle position sensor (TPS)
Ⓚ Fuel pump (FP)
Ⓛ Crankshaft position sensor (CKPS)
Ⓜ Gear position switch

FI SYSTEM WIRING DIAGRAM



ECM TERMINAL



TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
①	Power source	⑲	—
②	TO sensor signal (TOS)	⑳	Blank
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	Blank
⑥	IAP sensor signal (IAP)	㉔	Sensors ground (E2)
⑦	Blank	㉕	IAT sensor signal (IAT)
⑧	ECM ground (E1)	㉖	Blank
⑨	CKP sensor signal (CKP–)	㉗	Blank
⑩	Serial data for self-diagnosis	㉘	Blank
⑪	Fuel pump (FP)	㉙	Mode select switch
⑫	Neutral switch (NT)	㉚	Starter motor (STA)
⑬	Power source for sensors (VCC)	㉛	—
⑭	—	㉜	—
⑮	—	㉝	Cooling fan relay (FAR)
⑯	Injector (#11)	㉞	Blank
⑰	Fuel indicator	㉟	Ground (E01)
⑱	Ignition coil	㊱	Ground (E02)

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 provided. In this check, the special tool is necessary to read the code of the malfunction items.

USER MODE

MALFUNCTION		FI LIGHT INDICATION
"NO"		—
"YES"		FI light turns ON.
	Engine can start	*1
	Engine can not start	FI light turns ON and blinks. *2

*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 relay 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.

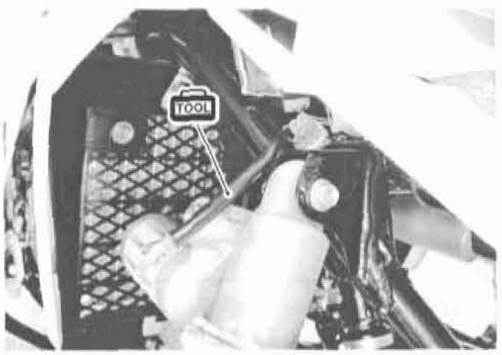
When ignition switch is turned ON, FI light is lit for 2 seconds and thereafter remains unlit.
The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the indicator panel does not receive any signal from ECM, and the indicator panel does not light "FI light".
If FI light 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.

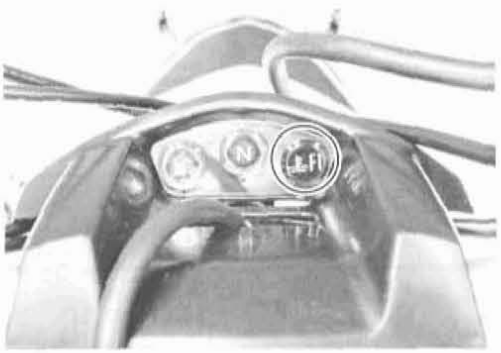
NOTE:
The FI light blinks quickly two times a second when the engine coolant temperature becomes too high.

DEALER MODE

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

TOOL 09930-82720: Mode select switch





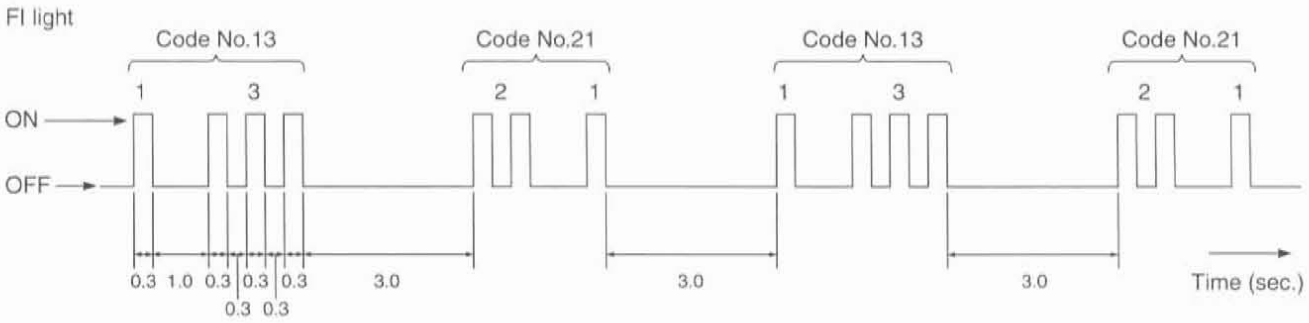
CAUTION

Before checking the malfunction code, do not disconnect the ECM lead wire couplers and turn the ignition switch OFF.
If the couplers from the ECM are disconnected, the malfunction code memory is erased and the malfunction code can not be checked.

MALFUNCTION	FI LIGHT INDICATION	INDICATION MODE
"NO"	FI light turns OFF.	—
"YES"	FI light turns ON and blinks. (Code is indicated from small numeral to large one.)	Refer to "DIAGNOSTIC TROUBLE CODE TABLE" (☞4-18)

DIAGNOSTIC TROUBLE CODE TABLE

EXAMPLE: When intake air pressure sensor and intake air tempreture sensor defective (Code No.13 and 21)



DTC NO.	FI LIGHT FLASHING PATTERN	MALFUNCTION PART	REMARKS
12	1 2	Crankshaft position sensor (CKPS)	Pick-up coil signal, signal generator
13	1 3	Intake air pressure sensor (IAPS)	
14	1 4	Throttle position sensor (TPS)	
15	1 5	Engine coolant temperature sensor (ECTS)	
21	2 1	Intake air temperature sensor (IATS)	
23	2 3	Tip-over sensor (TOS)	
24	2 4	Ignition signal (IG coil)	
31	3 1	Gear position signal (GP switch)	
32	3 2	Injector signal (FI)	
41	4 1	Fuel pump control system (FP control system)	Fuel pump relay
60	6 0	Cooling fan control system	Cooling fan relay

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

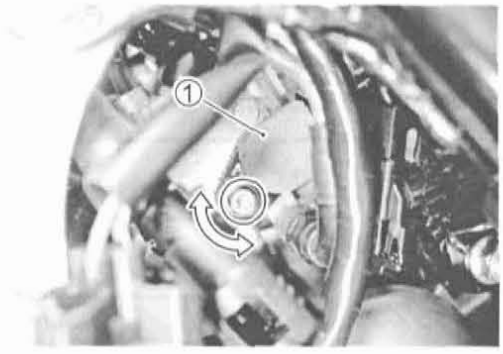
TPS ADJUSTMENT

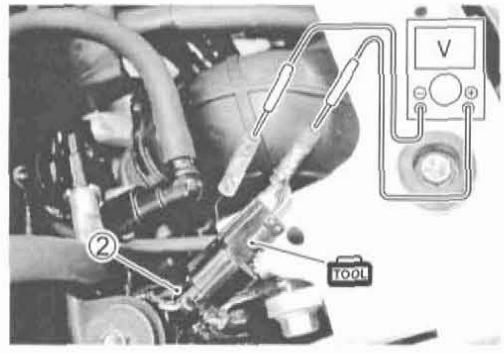
1. Adjust the engine rpm to 1 800 r/min. (☞2-12)
2. If the throttle position sensor adjustment is necessary, remove the fuel tank cover (☞7-6), fuel pump (☞5-6) and follow the procedure below.
3. Loosen the screw and turn the throttle position sensor ① and connect the TP sensor coupler ② to the test harness.
4. Turn the ignition switch ON.
5. Adjust the TP sensor ① until the output voltage comes within the specified value.
6. Then, tighten the screw to fix the throttle position sensor.

DATA TP sensor output voltage: 0.58 – 0.62 V
(⊕ Yellow – ⊖ B/Br)

TOOL 09900-25008: Multi-circuit tester set
09900-28630: TPS test wire harness
09930-11950: Torx wrench

7. Check the engine idle speed. (☞2-12)





FAIL-SAFE FUNCTION

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 (768 mmHg).	"YES"	"YES"
TP sensor	The throttle opening is fixed to close position. Ignition timing is also fixed.	"YES"	"YES"
ECT sensor	Engine coolant temperature value is fixed to 80 °C (176 °F). Cooling fan is fixed on position.	"YES"	"YES"
IAT sensor	Intake air temperature value is fixed to 40 °C (104 °F).	"YES"	"YES"
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 such 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 lamp condition	☐ Always ON ☐ Sometimes ON ☐ Always OFF ☐ Good condition
Malfunction indicator lamp/code	User mode: ☐ No indicator lamp ☐ Malfunction indicator lamp ( )
	Dealer mode: ☐ No code ☐ Malfunction code ( )

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

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

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

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 indicator panel with the use of mode select switch or SDS.

* Engine oil level and leakage (☞2-13)
* Engine coolant level and leakage (☞2-15)
* Fuel level and leakage (☞2-11 and 8-25)
* Clogged air cleaner element (☞2-3)
* Battery condition (☞8-31)
* Throttle cable play (☞2-11)
* Vacuum hoses looseness, bend and disconnection
* Burnt fuse
* FI light operation (☞4-16 and 8-23)
* Each warning light operation (☞8-23 to -25)
* Exhaust gas leakage and noise (☞2-4)
* Each coupler disconnection
* Clogged radiator fins (☞6-6)

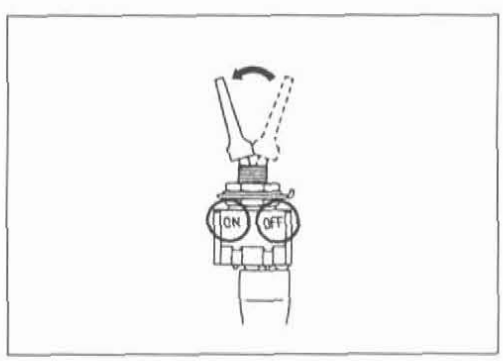
SELF-DIAGNOSTIC PROCEDURES

NOTE:

* *Do not disconnect couplers from the ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase the memorized information in ECM memory.*
* *Malfunction code stored in ECM memory can be checked by the special tool.*
* *Before checking malfunction code, read SELF-DIAGNOSIS FUNCTION "USER MODE and DEALER MODE" (☞4-16, -17) carefully to have good understanding as to what functions are available and how to use it.*
* *Be sure to read "PRECAUTIONS IN SERVICING" (☞4-3) before inspection and observe what is written there.*

- Connect the special tool to the dealer mode coupler at the wiring harness, and start the engine or crank the engine for more than 4 seconds.
- Turn the special tool's switch ON and check the malfunction code to determine the malfunction part.

TOOL 09930-82720: Mode select switch

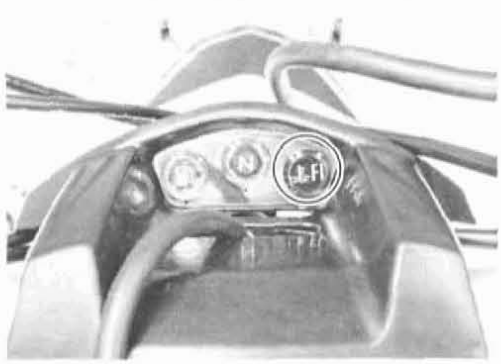


SELF-DIAGNOSIS RESET PROCEDURE

- After repairing the trouble, turn OFF the ignition switch and turn ON again.
- If the malfunction code does not indicate, the malfunction is cleared.
- Disconnect the special tool from the dealer mode coupler.

NOTE:

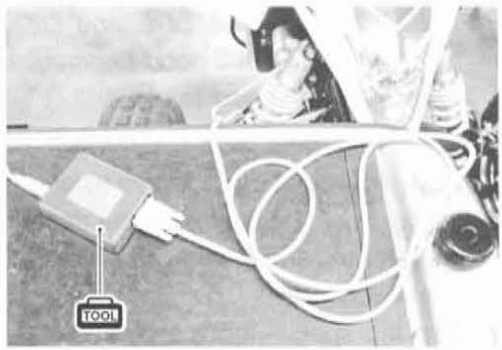
* *Even though the malfunction code (FI light blinks) is not indicated, the previous malfunction history code still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS.*
* *The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.*



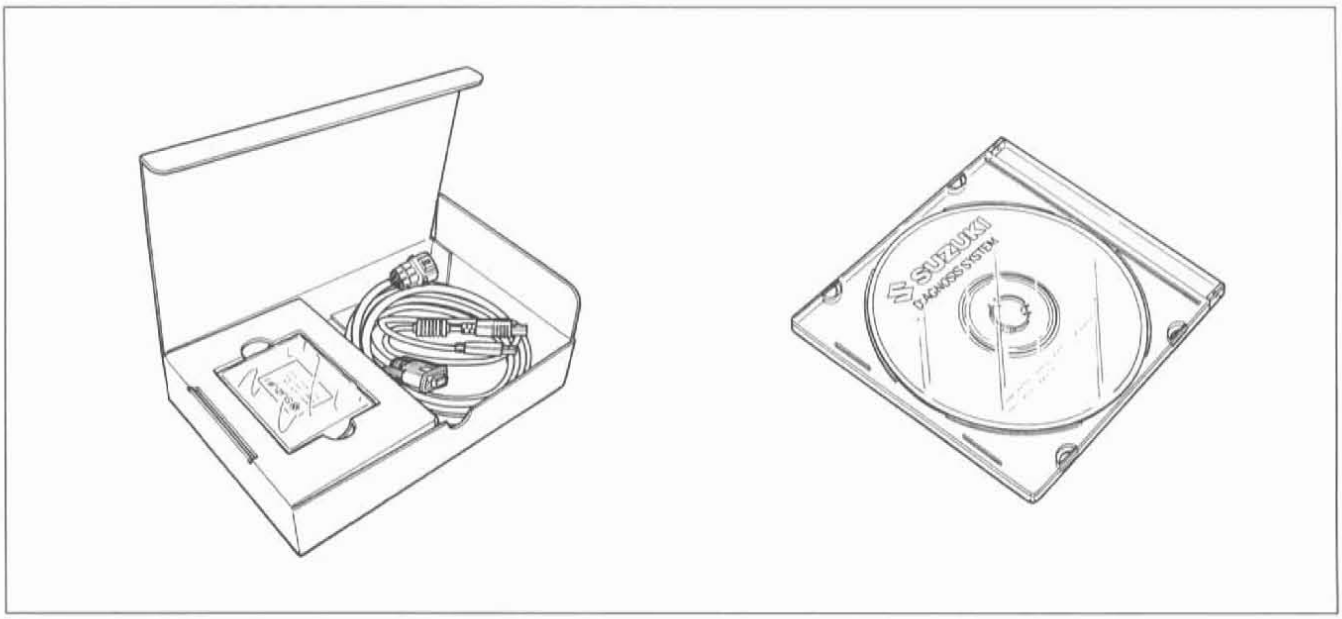
USE OF SDS DIAGNOSTIC PROCEDURES

* *Do not disconnect couplers from ECM, the battery cable from the battery, ECM ground wire harness from the engine or main fuse before confirming the malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase the memorized information in ECM memory.*
* *Malfunction code stored in ECM memory can be checked by the SDS.*
* *Be sure to read "PRECAUTIONS IN SERVICING" (☞4-3) before inspection and observe what is written there.*

- Set up the SDS tool. (Refer to the SDS operation manual for further details.)
- 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 is SDS used for detecting Diagnostic Trouble Codes but also for reproducing and checking on screen the failure condition as described by customers using the trigger.
- How to use trigger. (Refer to the SDS operation manual for further details.)



09904-41010: SDS set tool
99565-01010-007: CD-ROM Ver. 7

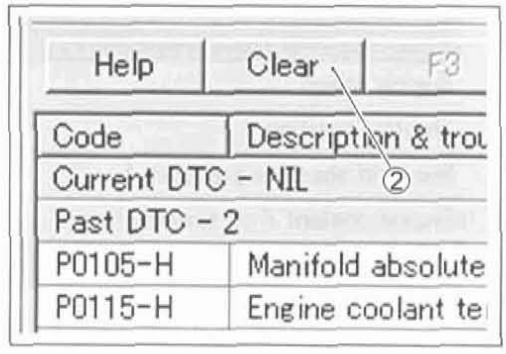


USE OF SDS DIAGNOSIS RESET PROCEDURE

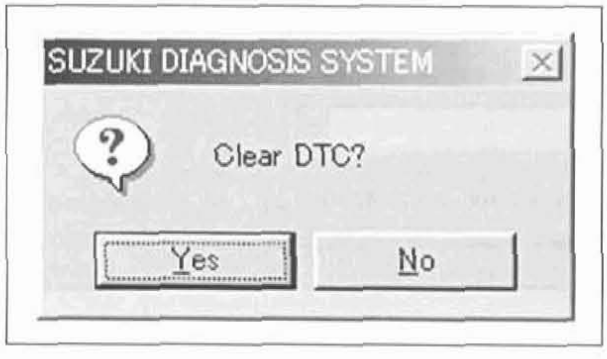
- After repairing the trouble, turn OFF the ignition switch and turn ON again.
- Click the DTC inspection button ①.
- Check the DTC.
- The previous malfunction history code (Past DTC) still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS tool.

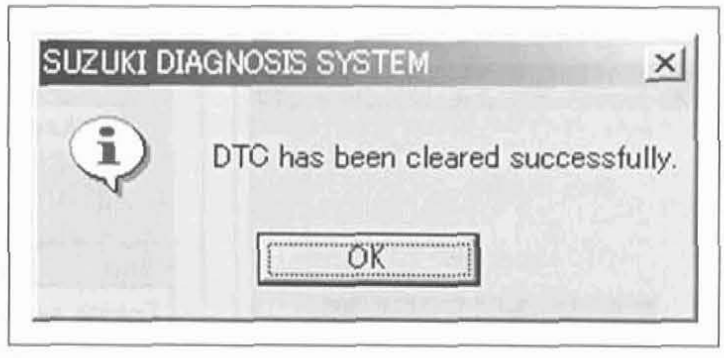
NOTE:
The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.

- Click "Clear" ② to delete history code (Past DTC).

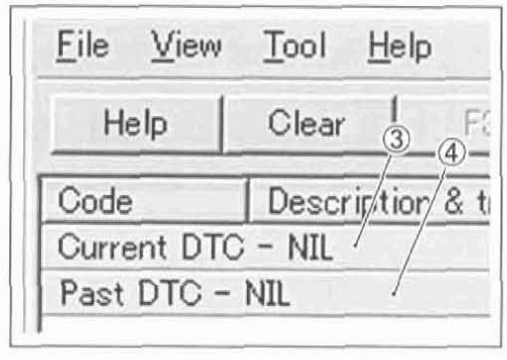


- Follow the displayed instructions.



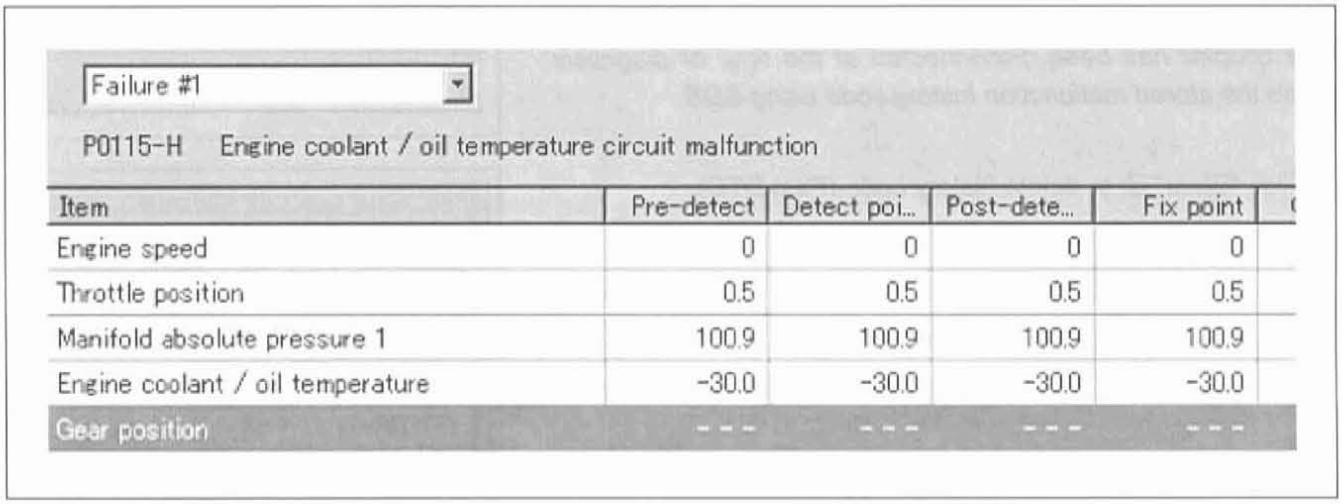


- Check that both "Current DTC" ③ and "Past DTC" ④ are deleted (NIL).

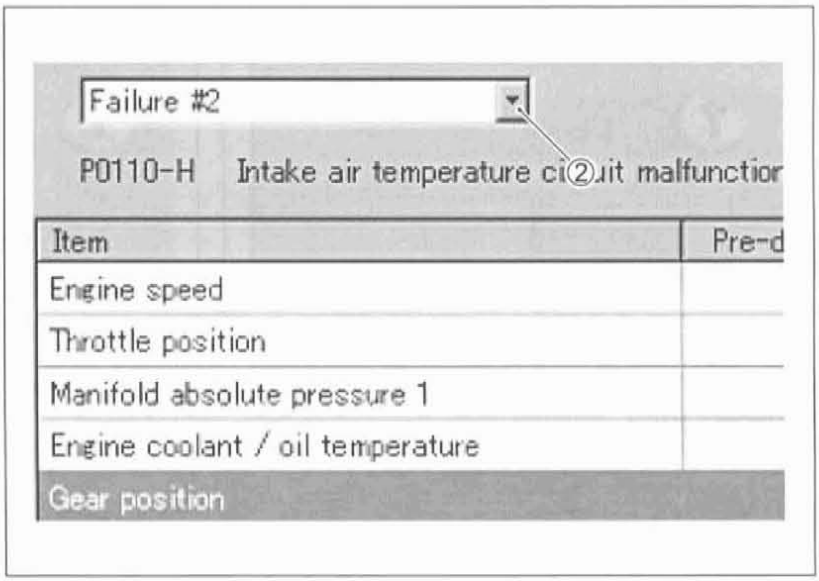


SHOW DATA WHEN TROUBLE (DISPLAING DATA AT THE TIME OF DTC)

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 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.



- Click "Show data when trouble" ① to display the data. By clicking the drop down button ②, either "Failure #1" or "Failure #2" can be selected.



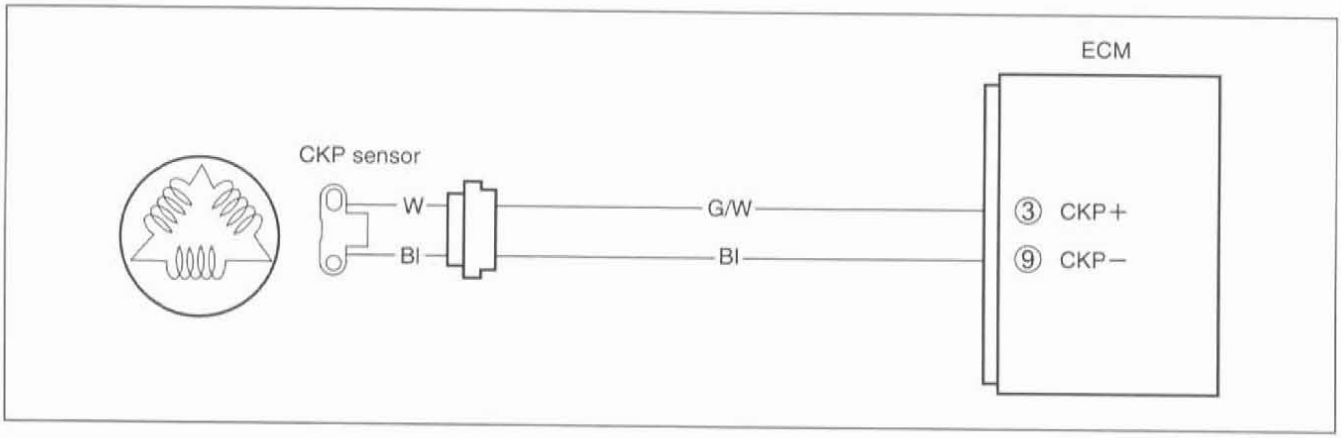
MALFUNCTION CODE AND DEFECTIVE CONDITION

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
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				
C13		IAP sensor	The sensor should produce following voltage. 0.5 V ≦ sensor voltage < 4.4 V In other than the above range, C13 (P0105) is indicated.	IAP sensor, lead wire/coupler connection
P0105	H		Sensor voltage is higher than specified value.	IAP sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	IAP sensor circuit open or shorted to ground or VCC circuit open
C14		TP sensor	The sensor should produce following voltage. 0.5 V ≦ sensor voltage < 4.8 V In other than the above range, C14 (P0120) is indicated.	TP sensor, lead wire/coupler connection
P0120	H		Sensor voltage is higher than specified value.	TP sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to ground or VCC circuit open
C15		ECT sensor	The sensor voltage should be the following. 0.1 V ≦ sensor voltage < 4.8 V In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection
P0115	H		Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground
C21		IAT sensor	The sensor voltage should be the following. 0.2 V ≦ sensor voltage < 4.8 V In other than the above range, C21 (P0110) is indicated.	IAT sensor, lead wire/coupler connection
P0110	H		Sensor voltage is higher than specified value.	IAT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	IAT sensor circuit shorted to ground

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C23		TO sensor	The sensor voltage should be the following for 1 sec. and more, after ignition switch is turned ON. 0.3 V ≦ sensor voltage < 4.6 V In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection
P1651	H		Sensor voltage is higher than specified value.	TO sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	TO sensor circuit open or shorted to ground or VCC circuit open
C24		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 switch 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 (pickup 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	Fuel pump relay signal is not input to ECM.	Fuel pump relay, lead wire/coupler connection.
P0230				
C60		Cooling fan relay	Cooling fan relay signal is not input to ECM.	Cooling fan relay, lead wire/coupler connection
P0480				

"C12" (P0335) CKP SENSOR CIRCUIT MALFUNCTION

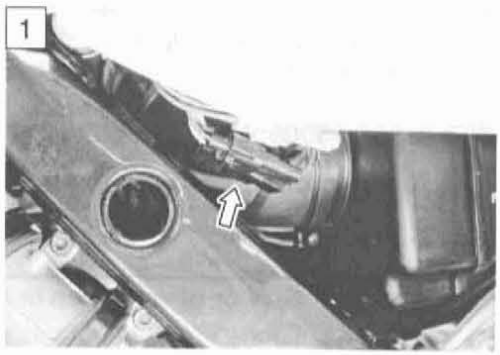
DETECTED CONDITION	POSSIBLE CAUSE
The signal does not reach ECM for 1 sec. or more, after receiving the IAP sensor input signal.	• Metal particles or foreign material being stuck on the CKP sensor and rotor tip • CKP sensor circuit open or short • CKP sensor malfunction • ECM malfunction



INSPECTION

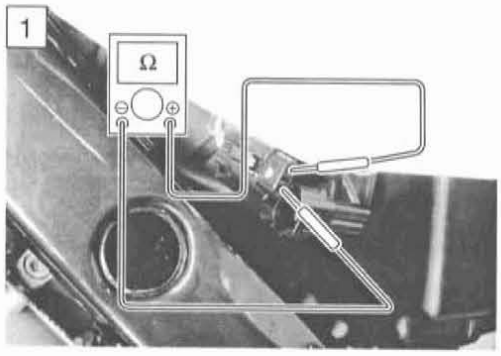
Step 1

1) Turn the ignition switch OFF.
2) Check the CKP sensor coupler for loose or poor contacts. If OK, then measure the CKP sensor resistance.



3) Disconnect the CKP sensor coupler and measure the resistance.

DATA **CKP sensor resistance: 155 – 232 Ω (White – Blue)**



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

DATA CKP sensor resistance: ∞ Ω (Infinity)
(White – Ground)
(Blue – Ground)

TOOL 09900-25008: Multi-circuit tester set

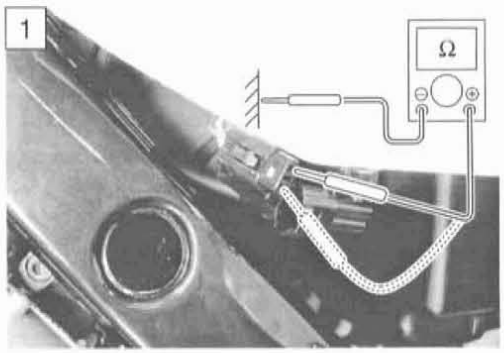
Tester knob indication: Resistance (Ω)

Are the resistance and continuity OK?

YES	Go to step 2.
NO	Replace the CKP sensor with a new one.

5) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

1



Step 2

1) Crank the engine a few seconds with the starter motor, and measure the CKP sensor peak voltage at the coupler.
2) Repeat the above test procedure a few times and measure the highest peak voltage.

DATA CKP sensor peak voltage: 0.5 V and more
(⊕ White – ⊖ Blue)

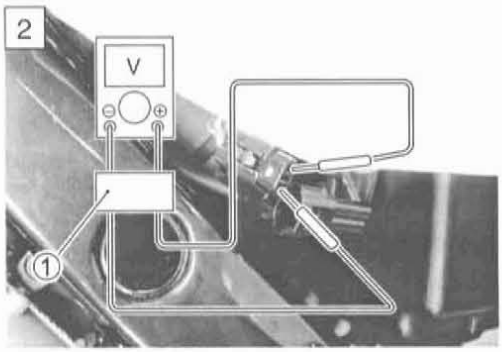
① Peak volt adaptor

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

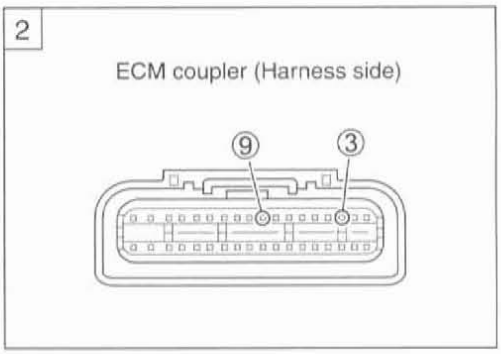
Is the voltage OK?

2



YES	• G/W or Bl wire open or shorted to 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.
NO	• Inspect that metal particles or foreign material stuck on the CKP sensor and rotor tip. • If there are no metal particles and foreign material, then replace the CKP sensor with a new one.

2



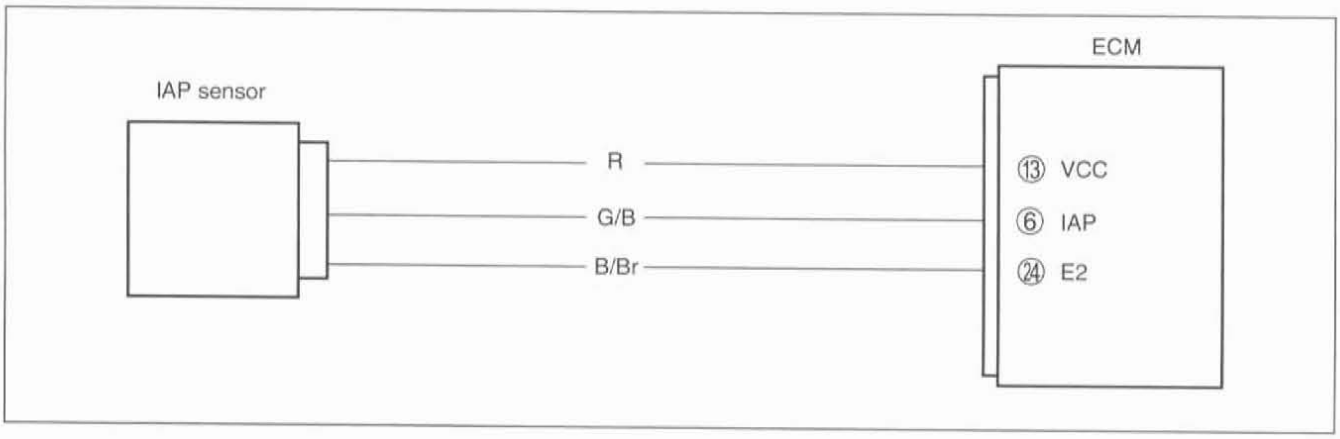
CAUTION

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

3) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

"C13" (P0105-H/L) IAP SENSOR CIRCUIT MALFUNCTION

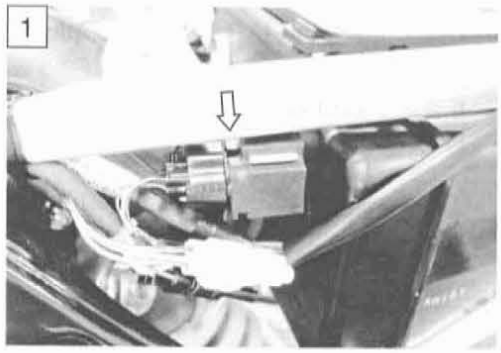
		DETECTED CONDITION	POSSIBLE CAUSE
C13		IAP sensor voltage is not within the following range. 0.5 V ≦ Sensor voltage < 4.4 V *NOTE:* *Note that atmospheric pressure varies depending on weather conditions as well as altitude.* *Take that into consideration when inspecting voltage.*	• Clogged vacuum passage between throttle body and IAP sensor. • Air being drawn from vacuum passage between throttle body and IAP sensor. • IAP sensor circuit open or shorted to ground. • IAP sensor malfunction. • ECM malfunction.
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.



INSPECTION

Step 1 (When indicating C13:)

1) Turn the ignition switch OFF.
2) Remove the rear fender. (☞7-8)
3) Check the IAP sensor coupler for loose or poor contacts.
   If OK, then measure the IAP sensor input voltage.



4) Disconnect the IAP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the voltage at the Red wire and ground.
7) If OK, then measure the voltage at the Red wire and B/Br wire.

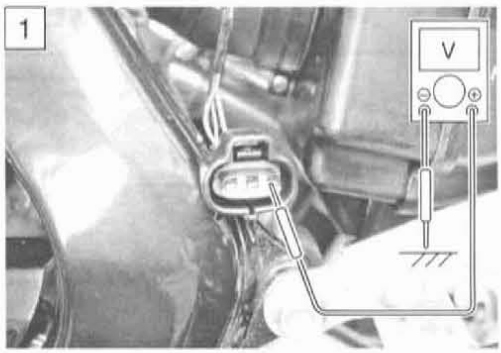
DATA IAP sensor input voltage: 4.5 – 5.5 V
(⊕ Red – ⊖ Ground)
(⊕ Red – ⊖ B/Br)

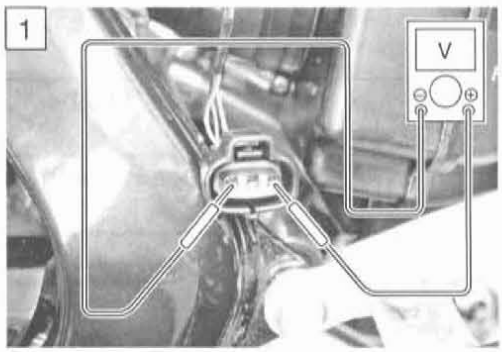
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

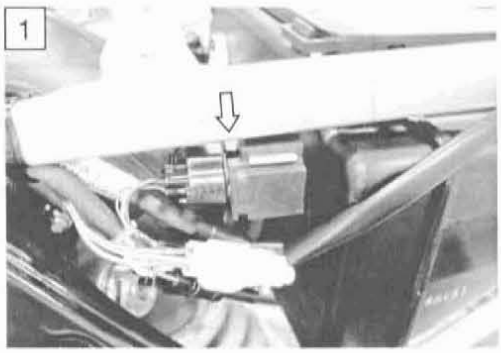
Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ⑬ or ㉔). • Open or short circuit in the Red wire or B/Br wire.

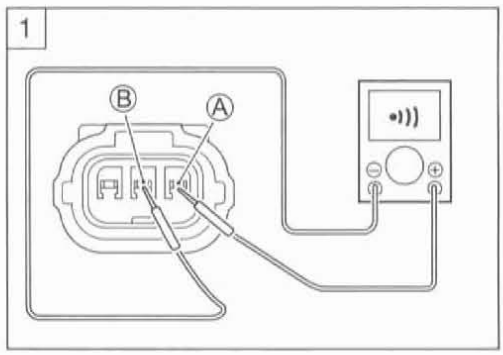




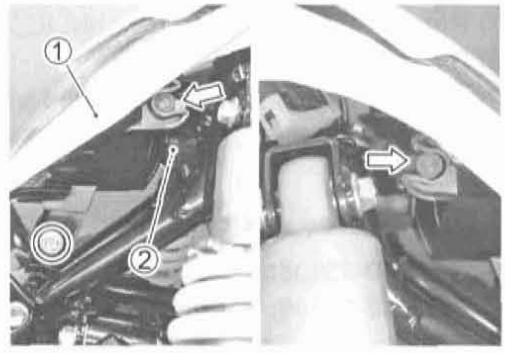
Step 1 (When indicating P0105-H:)
1) Turn the ignition switch OFF.
2) Remove the rear fender. (☞7-8)
3) Check the IAP sensor coupler for loose or poor contacts.
If OK, then check the IAP sensor lead wire continuity.



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



6) Remove the headlight assembly ① and disconnect the headlight coupler ②.

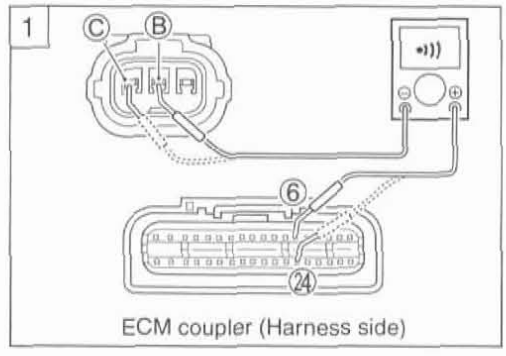


7) Disconnect the ECM coupler.
8) Check the continuity between G/B wire Ⓑ and terminal ⑥.
9) If OK, then check the continuity between B/Br wire Ⓒ and terminal ㉔.

DATA IAPS lead wire continuity: Continuity (•)))

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•)))



ECM coupler (Harness side)

CAUTION

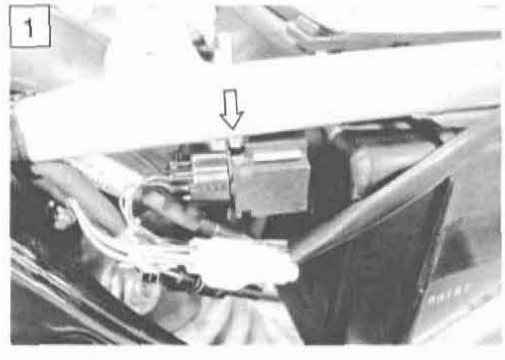
When using the multi-circuit tester, do not storongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

Is the continuity OK?

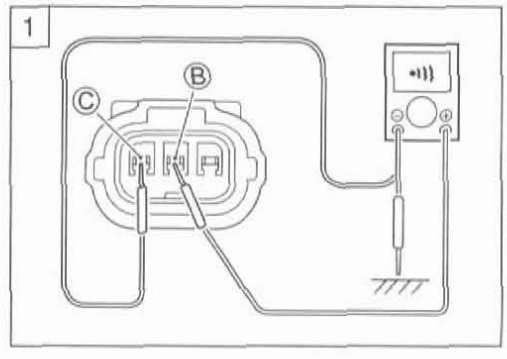
YES	Go to Step 2.
NO	G/B wire shorted to VCC, or B/Br wire open.

10) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 1 (When indicating P0105-L:)
1) Turn the ignition switch OFF.
2) Remove the rear fender. (☞7-8)
3) Check the IAP sensor coupler for loose or poor contacts. If OK, then check the IAP sensor lead wire continuity.



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



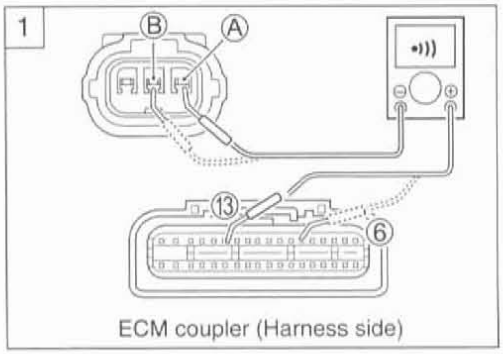
7) Remove the headlight assembly. (☞4-33)
8) Disconnect the ECM coupler.
9) Check the continuity between Red wire Ⓐ and terminal ⑬.
10) Also, check the continuity between G/B wire Ⓑ and terminal ⑥.

DATA IAPS lead wire continuity: Continuity (•)))

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•)))

1



ECM coupler (Harness side)

CAUTION

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

Is the continuity OK?

YES	Go to Step 1 (☞4-31) and go to Step 2.
NO	Red wire or G/B wire open, or G/B wire shorted to ground

11) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 2

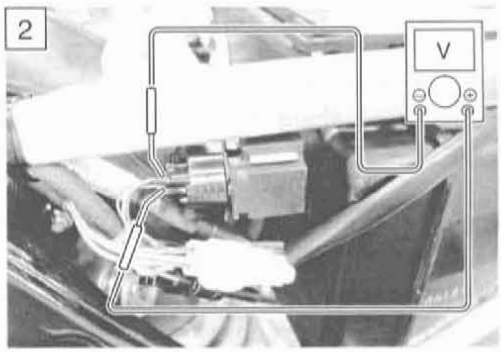
1) Connect the IAP sensor coupler and ECM coupler.
2) Insert the needle pointed probes to the lead wire coupler.
3) Start the engine at idle speed and measure the IAP sensor output voltage at the wire side coupler (between G/B and B/Br wires).

DATA IAP sensor output voltage: Approx. 2.7 V at idle speed (⊕ G/B – ⊖ B/Br)

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

2



Is the voltage OK?

YES	Go to Step 3.
NO	• Check the vacuum hose for crack or damage. • Open or short circuit in the G/B wire • If vacuum hose and wire are OK, replace the IAP sensor with a new one.

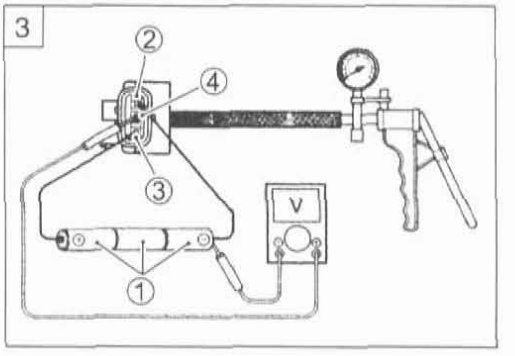
4) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 3

1) Turn the ignition switch OFF.
2) Remove the IAP sensor.
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 – 5.0 V) and connect ⊖ terminal to the ground - terminal ② and ⊕ terminal to the VCC terminal ③.
4) Check the voltage between Vout ④ and ground. Also, check if voltage reduces when vacuum is applied up to 53 kPa (400 mmHg) by using vacuum pump gauge. (☞4-36)

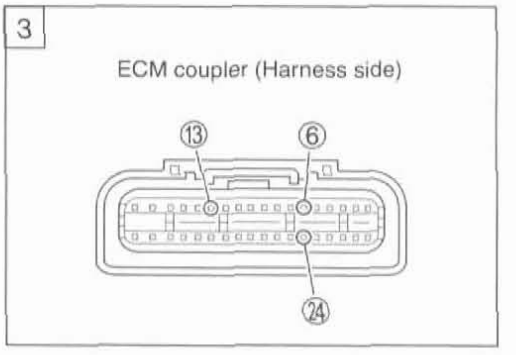
09917-47011: Vacuum pump gauge
09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)



Is the voltage OK?

YES	• G/B, Red 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.
NO	If check result is not satisfactory, replace the IAP sensor with a new one.



CAUTION

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

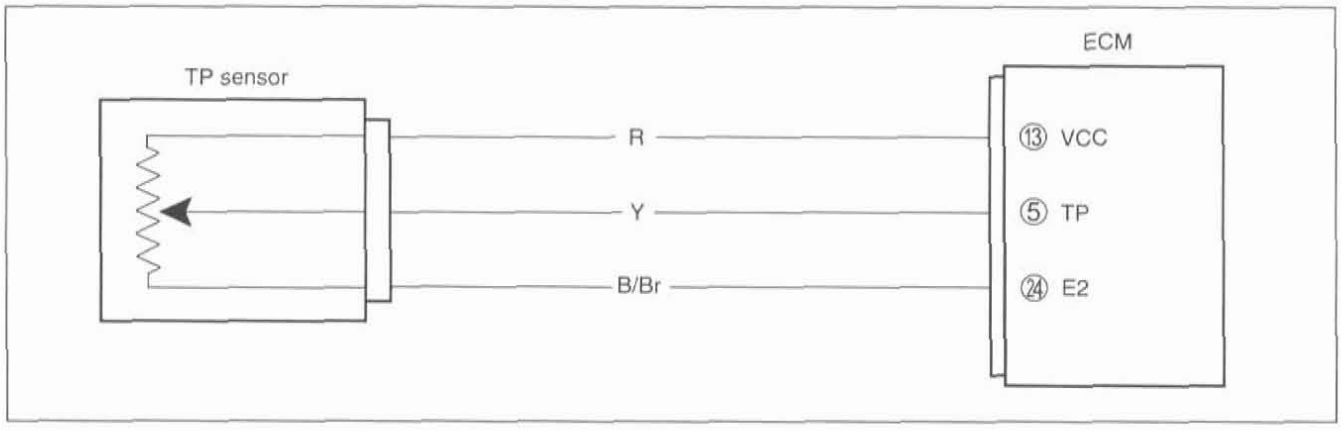
5) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Output voltage (VCC voltage 4.5 – 5.0 V, ambient temp. 20 – 30 °C, 68 – 86 °F)

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

"C14" (P0120-H/L) TP SENSOR CIRCUIT MALFUNCTION

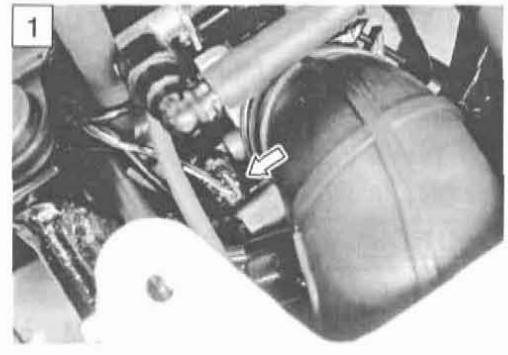
DETECTED CONDITION			POSSIBLE CAUSE
C14		Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.5 V ≦ Sensor voltage < 4.8 V	• TP sensor maladjusted • TP sensor circuit open or short • TP sensor malfunction • ECM malfunction
P0120	H	Sensor voltage is higher than specified value.	• TP sensor circuit shorted to VCC or ground circuit open
	L	Sensor voltage is lower than specified value.	• TP sensor circuit open or shorted to ground or VCC circuit open



INSPECTION

Step 1 (When indicating C14:)

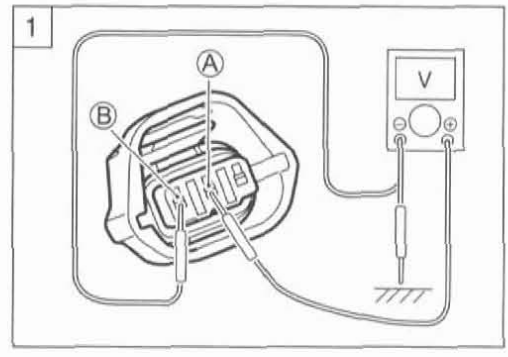
1) Turn the ignition switch OFF.
2) Remove the fuel tank cover. (☞7-6)
3) Check the TP sensor coupler for loose or poor contacts.
   If OK, then measure the TP sensor input voltage.
4) Disconnect the TP sensor coupler.
5) Turn the ignition switch ON.
6) Measure the voltage at the Red wire Ⓐ and ground.
7) If OK, then measure the voltage at the Red wire Ⓐ and B/Br wire Ⓑ.



DATA TP sensor input voltage: 4.5 – 5.5 V
(⊕ Red – ⊖ Ground)
(⊕ Red – ⊖ B/Br)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)



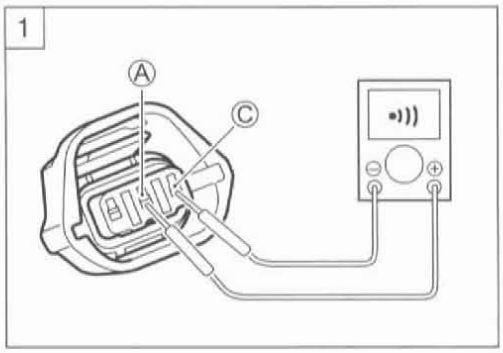
Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ⑬ or ㉛). • Open or short circuit in the Red wire or B/Br wire.

Step 1 (When indicating P0120-H:)

1) Turn the ignition switch OFF.
2) Remove the fuel tank cover. (☞7-6)
3) Check the TP sensor coupler for loose or poor contacts.
   If OK, then check the TP sensor lead wire continuity.

4) Disconnect the TP sensor coupler.
5) Check the continuity between Yellow wire Ⓒ and Red wire Ⓐ.
   If the sound is not heard from the tester, the circuit condition is OK.

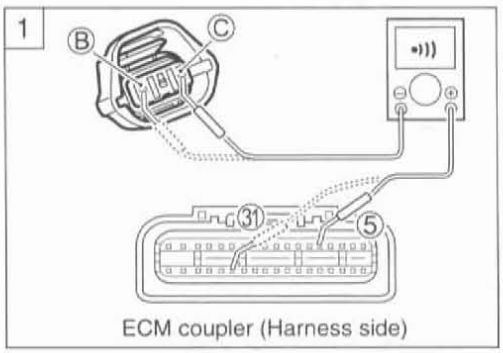


6) Remove the headlight assembly. (☞4-33)
7) Disconnect the ECM coupler.
8) Check the continuity between Yellow wire Ⓒ and terminal ⑤.
9) Also, check the continuity between B/Br wire Ⓑ and terminal ㉛.

DATA TPS lead wire continuity: Continuity (•)))

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•)))



ECM coupler (Harness side)

CAUTION

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

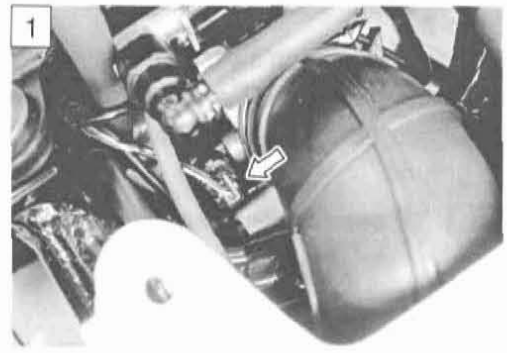
Is the continuity OK?

YES	Go to Step 2.
NO	Yellow wire shorted to VCC, or B/Br wire open

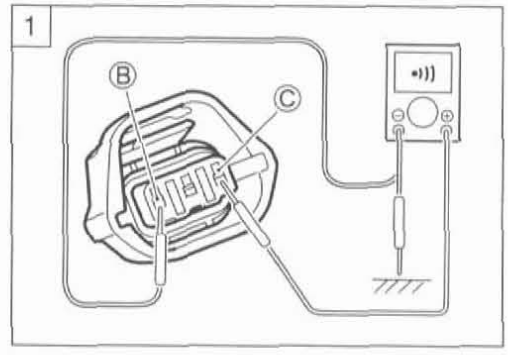
10)After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 1 (When indicating P0120-L:)

1) Turn the ignition switch OFF.
2) Remove the fuel tank cover. (☞7-6)
3) Check the TP sensor coupler for loose or poor contacts. If OK, then check the TP sensor lead wire continuity.



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

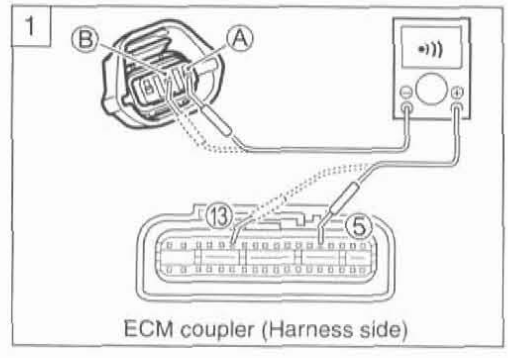


7) Remove the headlight assembly. (☞4-33)
8) Disconnect the ECM coupler.
9) Check the continuity between Yellow wire Ⓒ and terminal ⑤.
10) Also, check the continuity between Red wire Ⓐ and terminal ⑬.

DATA TPS lead wire continuity: Continuity (•))))

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•))))



ECM coupler (Harness side)

CAUTION

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

Is the continuity OK?

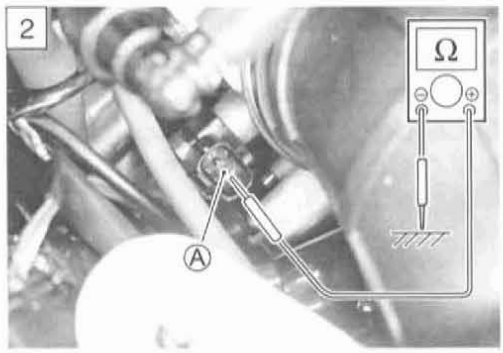
YES	Go to Step 1 (☞4-37) and go to Step 2.
NO	Red wire or Yellow wire open, or Yellow wire shorted to ground

11) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 2

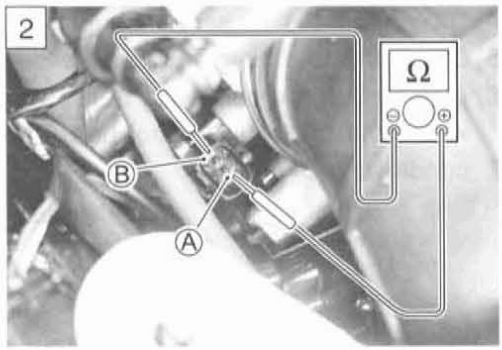
1) Turn the ignition switch OFF.
2) Disconnect the TP sensor coupler and ECM coupler.
3) Check the continuity between terminal Ⓐ (Yellow wire) and ground.

DATA TP sensor resistance: ∞ Ω (Infinity)
(Terminal Ⓐ – Ground)



4) If OK, then measure the TP sensor resistance at the terminals [between terminal Ⓐ (Yellow wire) and terminal Ⓑ (B/Br wire)].
5) Push the throttle lever and measure the resistance.

DATA TP sensor resistance
Throttle valve is closed: Approx. 1.4 kΩ
Throttle valve is opened: Approx. 4.2 kΩ

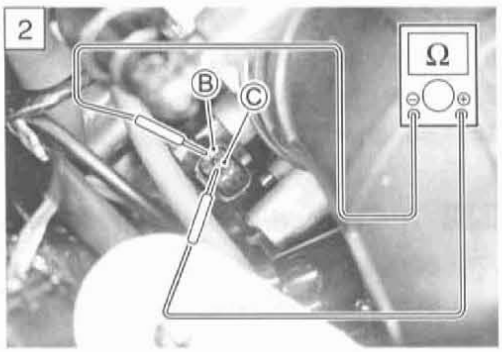


6) If OK, then measure the TP sensor resistance at the terminals [between terminal Ⓒ (Red wire) and terminal Ⓑ (B/Br wire)].

DATA TP sensor resistance: Approx. 5.0 kΩ
(Terminal Ⓒ – Terminal Ⓑ)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



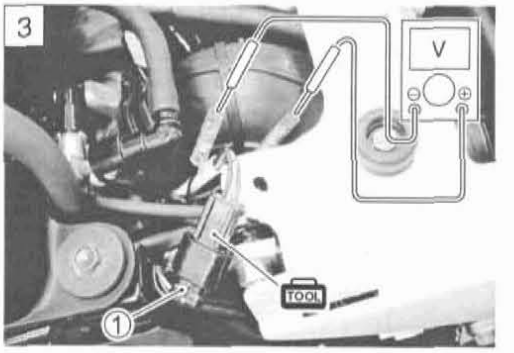
Are the continuity and resistance OK?

YES	Go to Step 3.
NO	• Reset the TP sensor position correctly. • Replace the TP sensor with a new one.

7) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 3

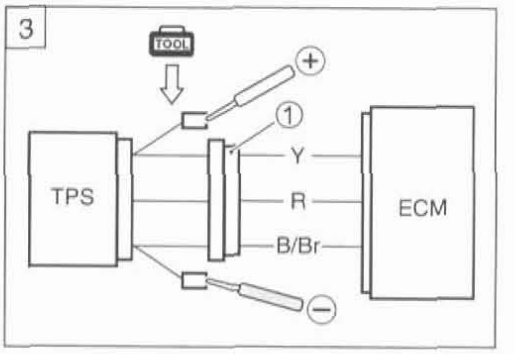
1) Connect the TP sensor coupler ① to the test harness.
2) Turn the ignition switch ON.
3) Measure the TP sensor output voltage at the coupler (between ⊕ Yellow and ⊖ B/Br) by pushing the throttle lever.



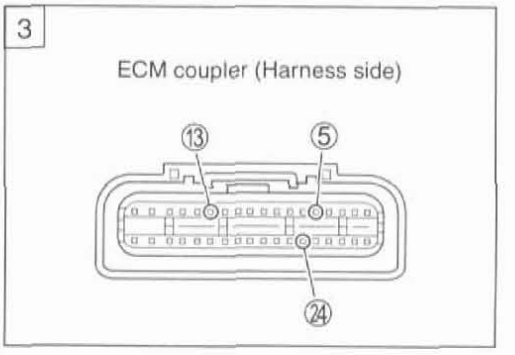
DATA TP sensor output voltage
Throttle valve is closed: Approx. 0.6 V
Throttle valve is opened: Approx. 3.8 V

TOOL 09900-25008: Multi-circuit tester set
09900-28630: TPS test wire harness

Tester knob indication: Voltage (⎓)



Is the voltage OK?



YES	• Yellow, Red 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.
NO	If check result is not satisfactory, replace TP sensor with a new one.

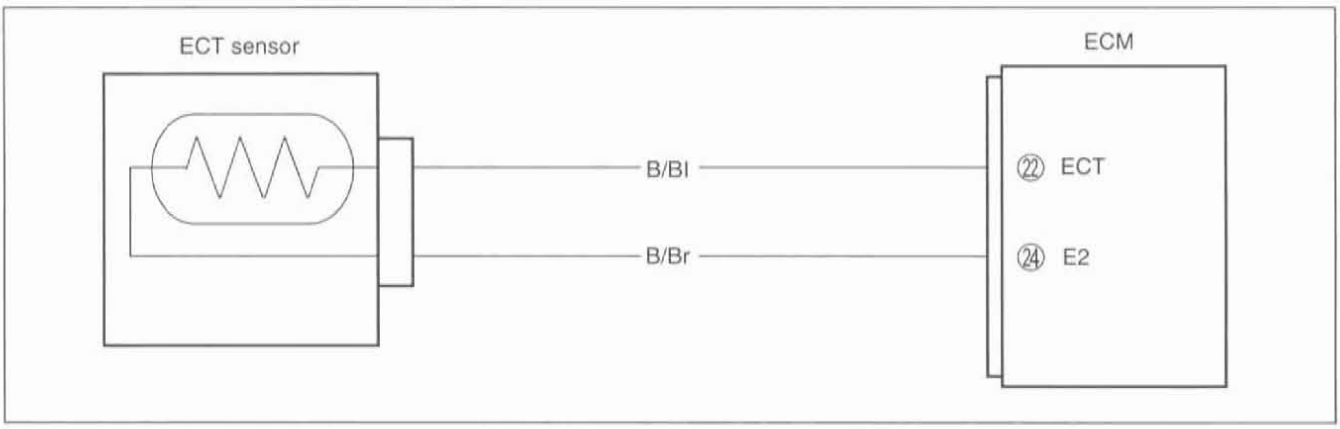
CAUTION

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

4) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

"C15" (P0115-H/L) ECT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION			POSSIBLE CAUSE
C15		Output voltage is not within the following range. 0.1 V ≦ Sensor voltage < 4.8 V	• ECT sensor circuit open or short • ECT sensor malfunction • ECM malfunction
P0115	H	Sensor voltage is higher than specified value.	• ECT sensor circuit open or ground circuit open
	L	Sensor voltage is lower than specified value.	• ECT sensor circuit shorted to ground

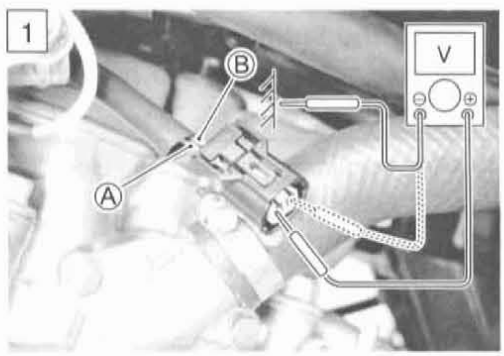


INSPECTION

Step 1 (When indicating C15:)

1) Turn the ignition switch OFF.
2) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then measure the ECT sensor voltage at the wire side coupler.
3) Disconnect the coupler and turn the ignition switch ON.
4) Measure the voltage between B/Bl wire terminal Ⓐ and ground.
5) If OK, then measure the voltage between B/Bl wire terminal Ⓐ and B/Br wire terminal Ⓑ.

DATA ECT sensor voltage: 4.5 – 5.5 V
(⊕ B/Bl – ⊖ Ground)
(⊕ B/Bl – ⊖ B/Br)



TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

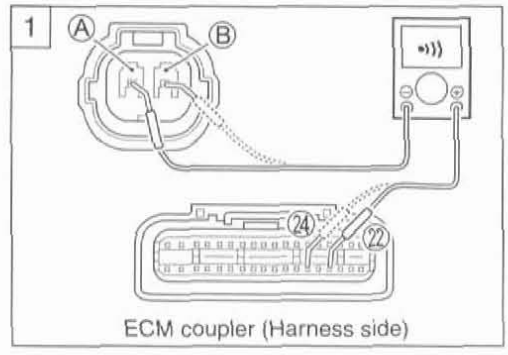
Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ㉒ or ㉔). • Open or short circuit in the B/Bl wire or B/Br wire

Step 1 (When indicating P0115-H:)

1) Turn the ignition switch OFF.
2) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then check the ECT sensor lead wire continuity.

3) Remove the headlight assembly. (☞4-33)
4) Disconnect the ECT sensor coupler and ECM coupler.
5) Check the continuity between B/Bl wire Ⓐ and terminal ㉒.
6) Also, check the continuity between B/Br wire Ⓑ and terminal ㉔.



DATA ECTS lead wire continuity: Continuity (•))))

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•))))

CAUTION

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

Is the continuity OK?

YES	Go to Step 2.
NO	B/Bl or B/Br wire open

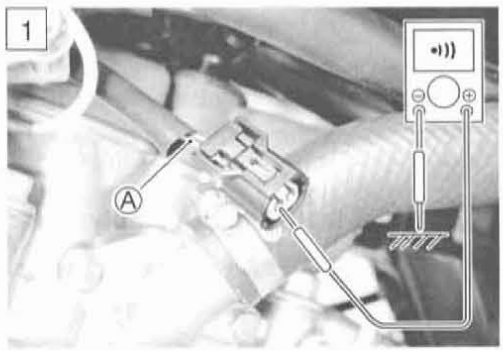
7) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 1 (When indicating P0115-L:)

1) Turn the ignition switch OFF.
2) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then measure the output voltage.

3) Disconnect the ECT sensor coupler.
4) Check the continuity between B/Bl wire Ⓐ and ground.
   If the sound is not heard from the tester, the circuit condition is OK.

Tester knob indication: Continuity test (•))))

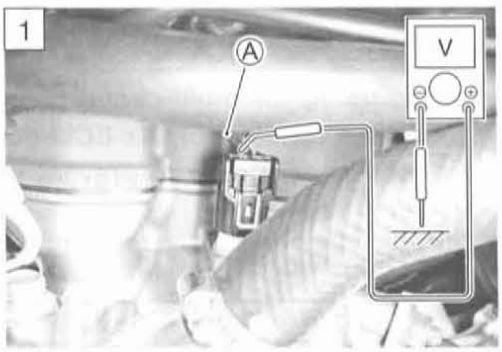


5) Connect the ECT sensor coupler.
6) Insert the needle pointed probe to the lead wire coupler.
7) Turn the ignition switch ON.
8) Measure the voltage between B/Bl wire Ⓐ and ground.

ECT sensor output voltage: 0.15 – 4.85 V
(⊕ B/Bl – ⊖ Ground)

09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)



Are the continuity and voltage OK?

YES	Go to Step 2.
NO	• B/Bl wire shorted to ground • If wire is OK, go to Step 2.

9) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 2

1) Turn the ignition switch OFF.
2) Remove the fuel tank and fuel tank lower cover. (☞5-4)
3) Disconnect the ECT sensor coupler.
4) Measure the ECT sensor resistance.

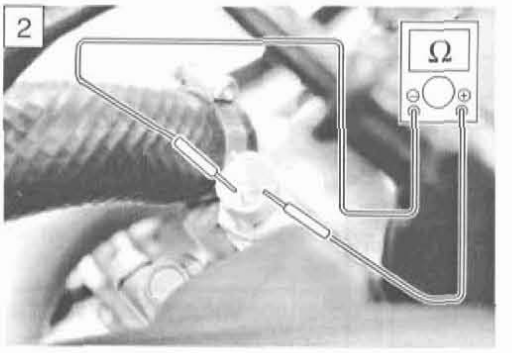
DATA ECT sensor resistance:

Approx. 2.6 kΩ at 20 °C (68 °F)
(Terminal – Terminal)

TOOL 09900-25008: Multi-circuit tester set

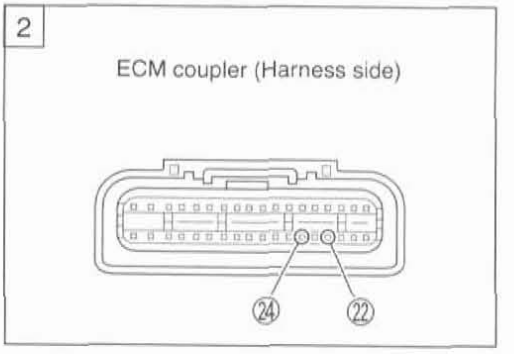
Tester knob indication: Resistance (Ω)

Refer to page 6-10 for details.



Is the resistance OK?

YES	• B/Bl 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.
NO	Replace the ECT sensor with a new one.



CAUTION

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

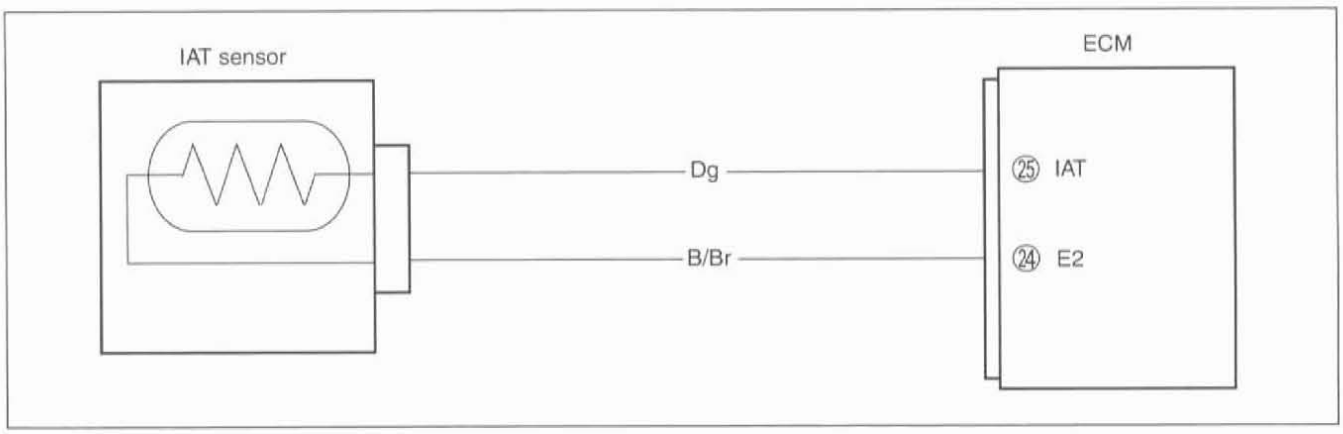
5) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

DATA ECT sensor specification

Engine Coolant Temp	Resistance
20 °C (68 °F)	Approx. 2.6 kΩ
50 °C (122 °F)	Approx. 0.772 kΩ
80 °C (176 °F)	Approx. 0.279 kΩ
110 °C (230 °F)	Approx. 0.118 kΩ

"C21" (P0110-H/L) IAT SENSOR CIRCUIT MALFUNCTION

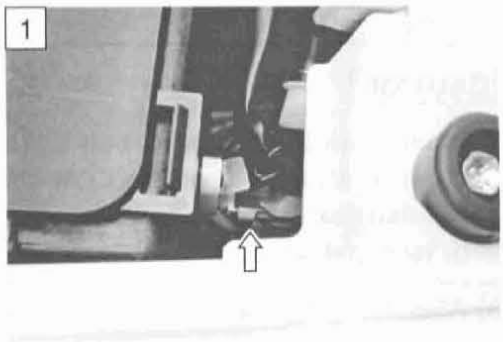
DETECTED CONDITION			POSSIBLE CAUSE
C21		Output voltage is not within the following range. 0.2 V ≦ Sensor voltage < 4.8 V	• IAT sensor circuit open or short • IAT sensor malfunction • ECM malfunction
P0110	H	Sensor voltage is higher than specified value.	• IAT sensor circuit open or ground circuit open
	L	Sensor voltage is lower than specified value.	• IAT sensor circuit shorted to ground



INSPECTION

Step 1 (When indicating C21:)

1) Turn the ignition switch OFF.
2) Remove the seat. (☞7-6)
3) Check the IAT sensor coupler for loose or poor contacts.
   If OK, then measure the IAT sensor voltage at the wire side coupler.
4) Disconnect the coupler and turn the ignition switch ON.

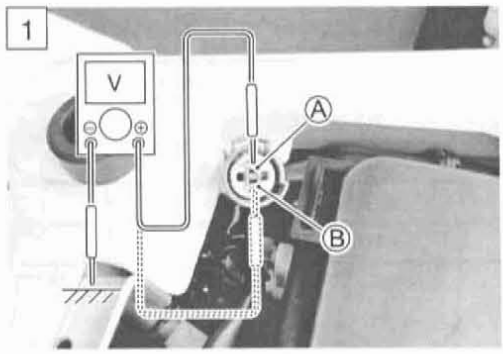


5) Measure the voltage between Dg wire terminal Ⓐ and ground.
6) If OK, then measure the voltage between Dg wire terminal Ⓐ and B/Br wire terminal Ⓑ.

DATA IAT sensor input voltage: 4.5 – 5.5 V
(⊕ Dg – ⊖ Ground)
(⊕ Dg – ⊖ B/Br)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

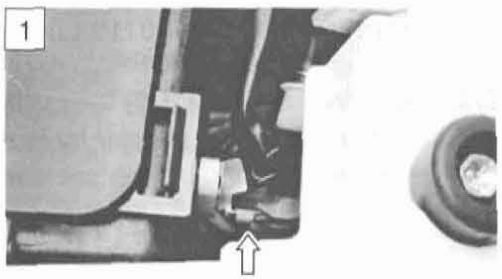


Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler (terminal ㉔ or ⑮) • Open or short circuit in the Dg wire or B/Br wire

Step 1 (When indicating P0110-H:)

1) Turn the ignition switch OFF.
2) Remove the seat. (☞7-6)
3) Check the IAT sensor coupler for loose or poor contacts.
   If OK, then check the IAT sensor lead wire continuity.

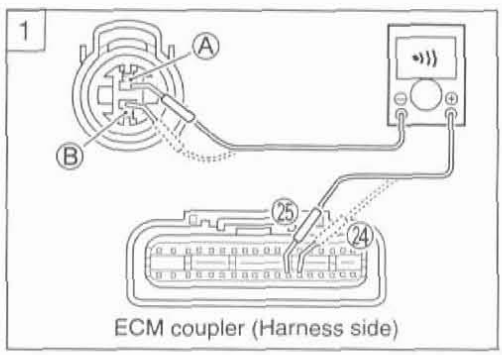


4) Remove the headlight assembly. (☞4-33)
5) Disconnect the IAT sensor coupler and ECM coupler.
6) Check the continuity between Dg wire Ⓐ and terminal ㉕.
7) Also, check the continuity between B/Br wire Ⓑ and terminal ㉔.

DATA IATS lead wire continuity: Continuity (•)))

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•)))



CAUTION

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

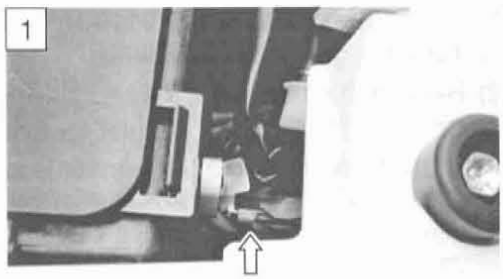
Is the continuity OK?

YES	Go to Step 2.
NO	Dg wire or B/Br wire open

8) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

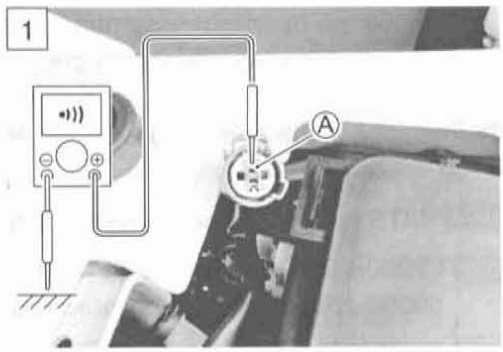
Step 1 (When indicating P0110-L:)

1) Turn the ignition switch OFF.
2) Remove the seat. (☞7-6)
3) Check the IAT sensor coupler for loose or poor contacts. If OK, then check the IAT sensor lead wire continuity.



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

Tester knob indication: Continuity test (•))))

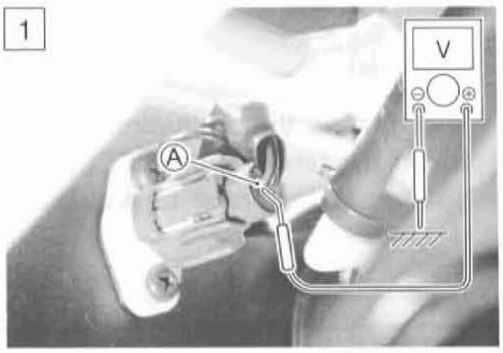


6) Connect the IAT sensor coupler.
7) Insert the needle pointed probe to the lead wire coupler.
8) Turn the ignition switch ON.
9) Measure the voltage between Dg wire Ⓐ and ground.

IAT sensor output voltage: 0.15 – 4.85 V
(⊕ Dg – ⊖ Ground)

09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)



Are the continuity and voltage OK?

YES	Go to Step 2.
NO	• Dg wire shorted to ground • If wire is OK, go to Step 2.

10) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

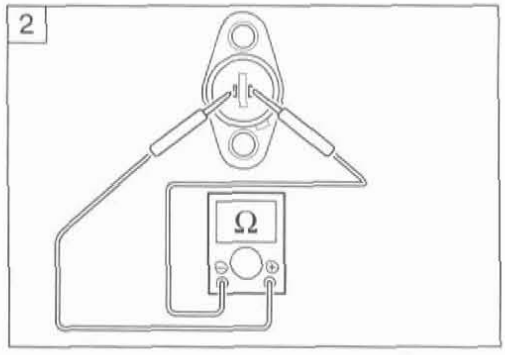
Step 2

1) Turn the ignition switch OFF.
2) Measure the IAT sensor resistance.

DATA IAT sensor resistance: Approx. 2.6 kΩ at 20 °C (68 °F) (Terminal – Terminal)

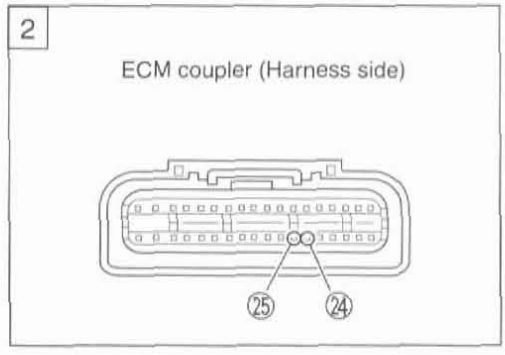
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



Is the resistance OK?

YES	• Dg or B/Br wire open or shorted to ground, or poor ㉕ 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.
NO	Replace the IAT sensor with a new one.



CAUTION

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

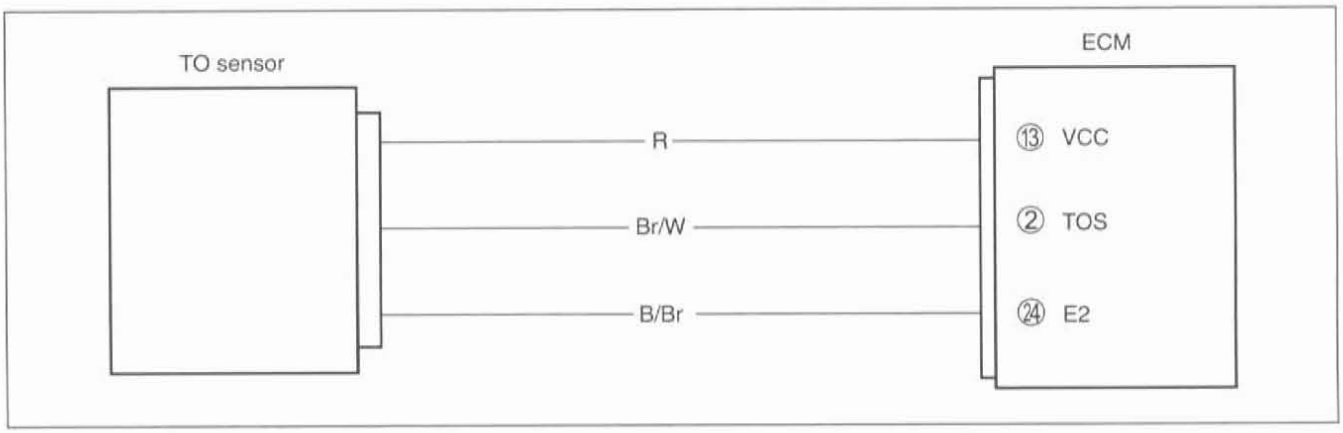
DATA IAT sensor specification

Intake Air Temp	Resistance
20 °C (68 °F)	Approx. 2.6 kΩ
50 °C (122 °F)	Approx. 0.772 kΩ
80 °C (176 °F)	Approx. 0.280 kΩ
110 °C (230 °F)	Approx. 0.118 kΩ

NOTE:
IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to page 6-10 for details.

"C23" (P1651-H/L) TO SENSOR CIRCUIT MALFUNCTION

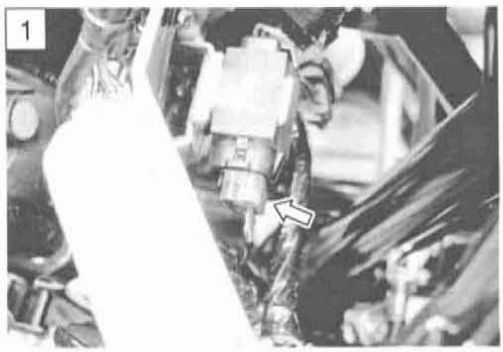
DETECTED CONDITION			POSSIBLE CAUSE
C23		The sensor voltage should be the following for 1 sec. and more, after ignition switch is turned ON. 0.3 V ≦ Sensor voltage < 4.6 V	• TO sensor circuit open or short • TO sensor malfunction • ECM malfunction
P1651	H	Sensor voltage is higher than specified value.	• TO sensor circuit shorted to VCC or ground circuit open
	L	Sensor voltage is lower than specified value.	• TO sensor circuit open or shorted to ground or VCC circuit open



INSPECTION

Step 1 (When indicating C23:)

1) Turn the ignition switch OFF.
2) Remove the front fender. (☞7-6)
3) Check the TO sensor coupler for loose or poor contacts.
   If OK, then measure the TO sensor resistance.
4) Disconnect the TO sensor coupler.

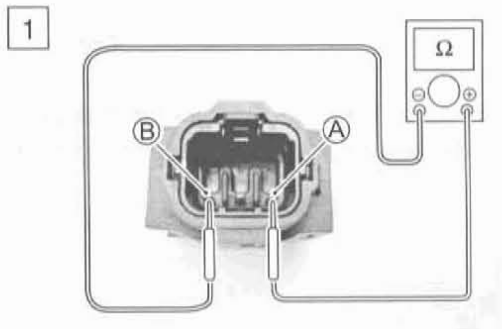


5) Measure the resistance between terminal Ⓐ (Red wire) and terminal Ⓑ (B/Br wire).

DATA TO sensor resistance: 15.0 – 25.0 kΩ
(Terminal Ⓐ – Terminal Ⓑ)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

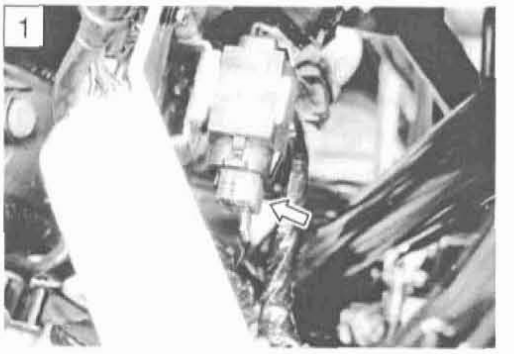


Is the resistance OK?

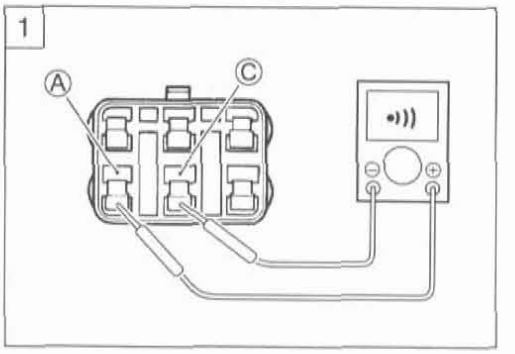
YES	Go to Step 2.
NO	Replace the TO sensor with a new one.

Step 1 (When indicating P1651-H:)

1) Turn the ignition switch OFF.
2) Remove the front fender. (☞7-6)
3) Check the TO sensor coupler for loose or poor contacts.
   If OK, then check the TO sensor lead wire continuity.



4) Disconnect the TO sensor coupler.
5) Check the continuity between Red wire Ⓐ and Br/W wire Ⓒ.
   If the sound is not heard from the tester, the circuit condition is OK.

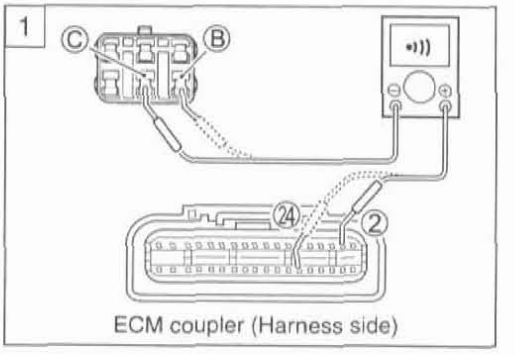


6) Remove the headlight assembly. (☞4-33)
7) Disconnect the ECM coupler.
8) Check the continuity between Br/W wire Ⓒ and terminal ②.
9) Also, check the continuity between B/Br wire Ⓑ and terminal ㉔.

DATA TOS lead wire continuity: Continuity (•)))

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•)))



CAUTION

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

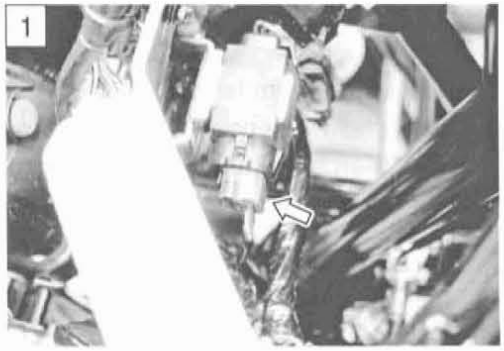
Is the continuity OK?

YES	Go to Step 2.
NO	Br/W wire shorted to VCC, or B/Br wire open.

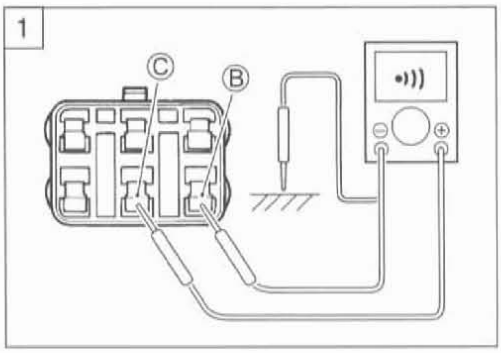
10) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 1 (When indicating P1651-L:)

1) Turn the ignition switch OFF.
2) Remove the front fender. (☞7-6)
3) Check the TO sensor coupler for loose or poor contacts.
   If OK, then check the TO sensor lead wire continuity.



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

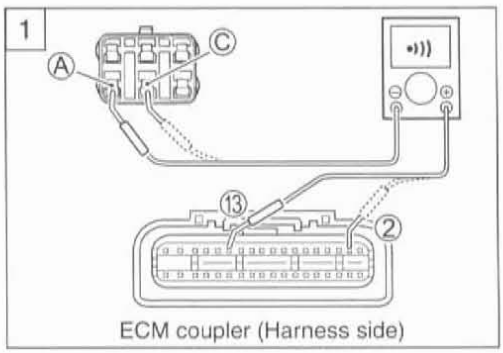


7) Remove the headlight assembly. (☞4-33)
8) Disconnect the ECM coupler.
9) Check the continuity between Red wire Ⓐ and terminal ⑬.
10) Also, then check the continuity between Br/W wire Ⓒ and terminal ②.

DATA TOS lead wire continuity: Continuity (•))))

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•))))



CAUTION

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

Is the continuity OK?

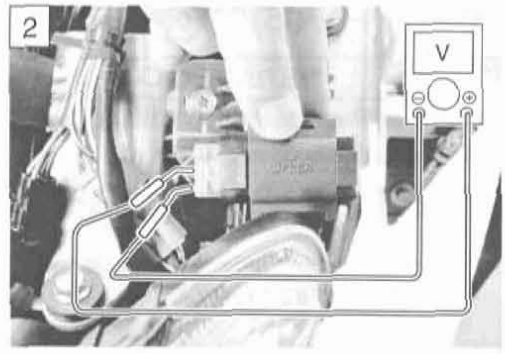
YES	Go to Step 2.
NO	Red or Br/W wire open, or Br/W wire shorted to ground.

11) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

Step 2

1) Connect the TO sensor coupler and ECM 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.

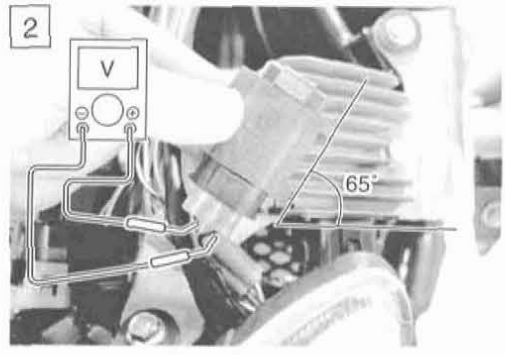
DATA TO sensor voltage (Normal): 0.4 – 1.4 V
(⊕ Br/W – ⊖ B/Br)



Also, measure the voltage when leaning the vehicle.

5) Dismount the TO sensor from its bracket and measure the voltage when it is leaned 65° and more, left and right, from the horizontal level.

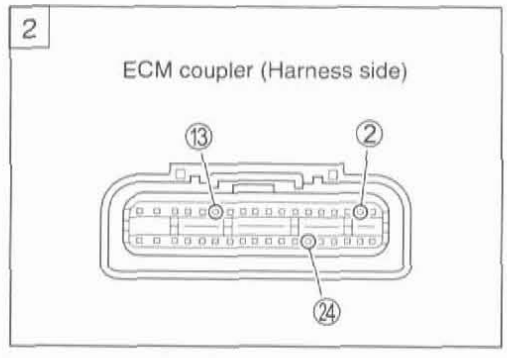
DATA TO sensor voltage (Leaning): 3.7 – 4.4 V
(⊕ Br/W – ⊖ B/Br)



TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Voltage (⎓)

Is the voltage OK?



YES	• Br/W, Red 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.
NO	• Loose or poor contacts on the ECM coupler • Open or short circuit • Replace the TO sensor with a new one.

CAUTION

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

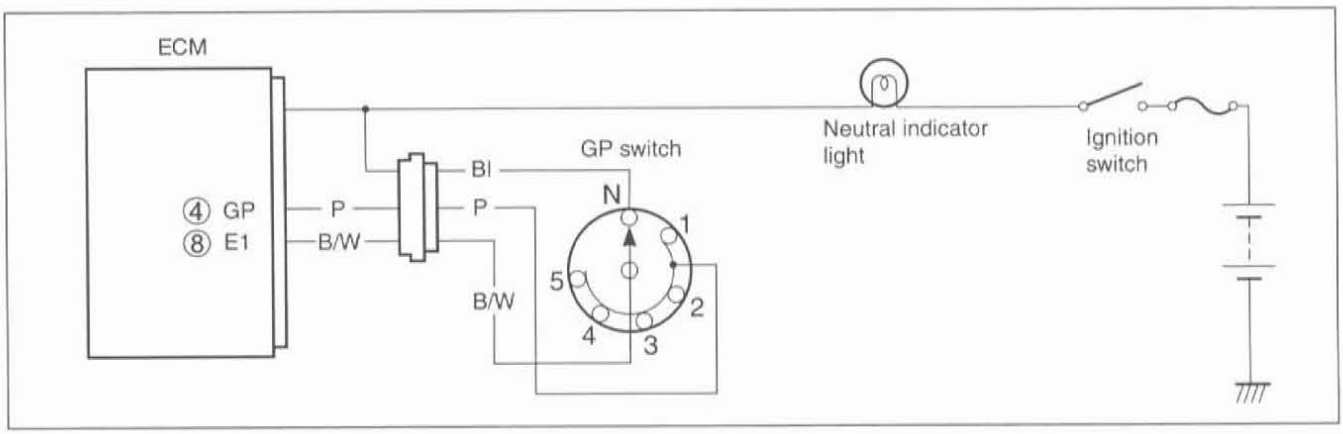
6) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

"C24" (P0351) IGNITION SYSTEM MALFUNCTION

*** Refer to the IGNITION SYSTEM for details. (☞8-17)**

"C31" (P0705) GP SWITCH CIRCUIT MALFUNCTION

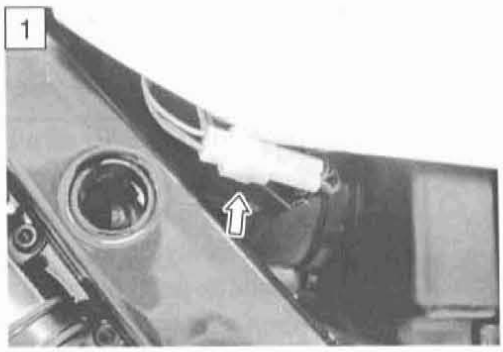
DETECTED CONDITION	POSSIBLE CAUSE
No Gear Position switch voltage Switch voltage is not within the following range. Switch voltage > 0.9 V	• Gear Position switch circuit open or short • Gear Position switch malfunction • ECM malfunction



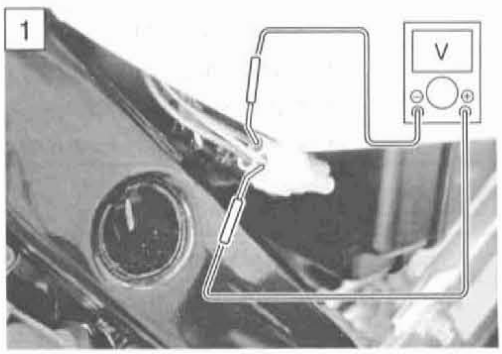
INSPECTION

Step 1

1) Turn the ignition switch OFF.
2) Check the GP switch coupler for loose or poor contacts.
   If OK, then measure the GP switch voltage.



3) Insert the needle pointed probes to the lead wire coupler.
4) Turn the ignition switch ON.
5) Measure the voltage at the wire side coupler between Pink wire and B/W wire, when shifting the gearshift lever from 1st to Top.



DATA GP switch voltage: 0.9 V and more
(⊕ Pink – ⊖ B/W)

TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

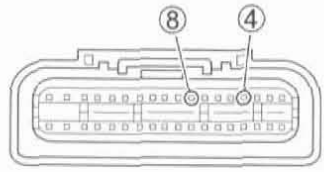
Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	• Pink 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.
NO	• Pink or B/W wire open, or Pink wire shorted to ground • Loose or poor contacts on the ECM coupler (terminal ④ or ⑧) • If wire and connection are OK, replace the GP switch with a new one.

1

ECM coupler (Harness side)



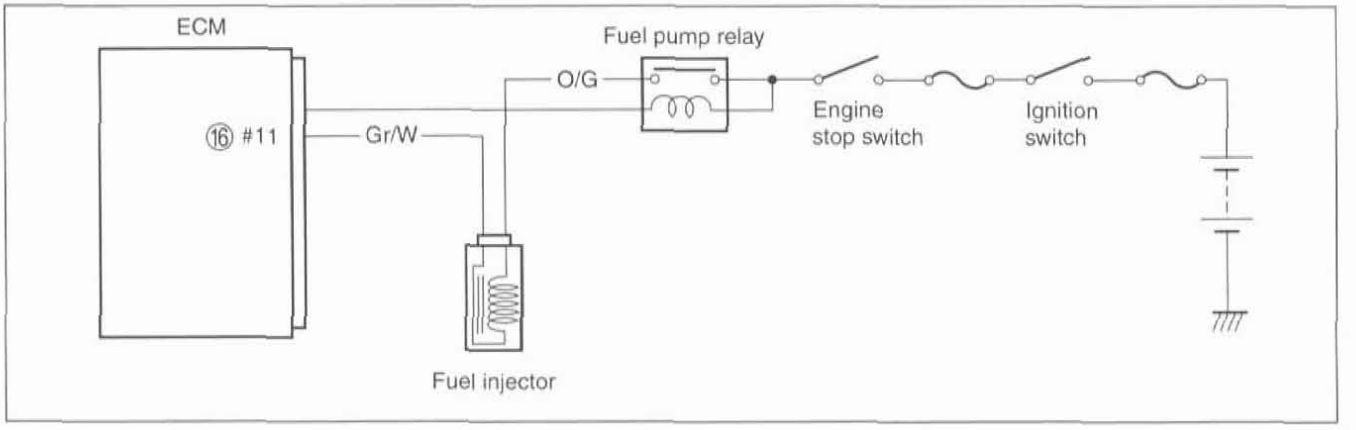
CAUTION

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

6) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

"C32" (P0201) FUEL INJECTOR CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
CKP signal is produced but fuel injector signal is interrupted by 8 times or more continuously.	• Injector circuit open or short • Injector malfunction • *ECM malfunction*

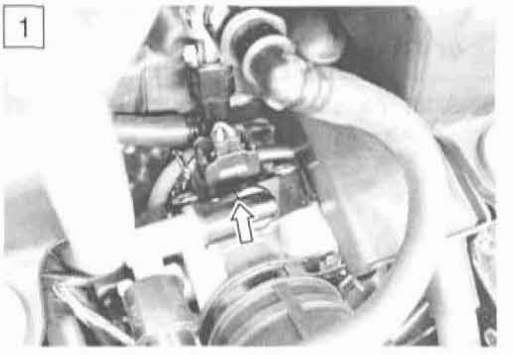


INSPECTION

Step 1

1) Turn the ignition switch to OFF.
2) Remove the fuel tank cover. (☞7-6)
3) Check the injector coupler for loose or poor contacts.
   If OK, then measure the injector resistance.

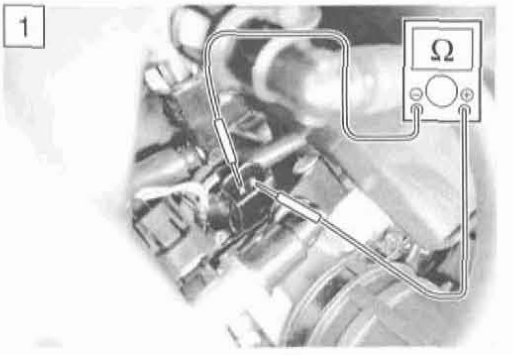
1



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

DATA **Injector resistance: 9 – 17 Ω at 20 °C (68 °F)**
(Terminal – Terminal)

1



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

DATA Injector resistance: ∞ Ω (Infinity)

TOOL 09900-25008: Multi-circuit tester set

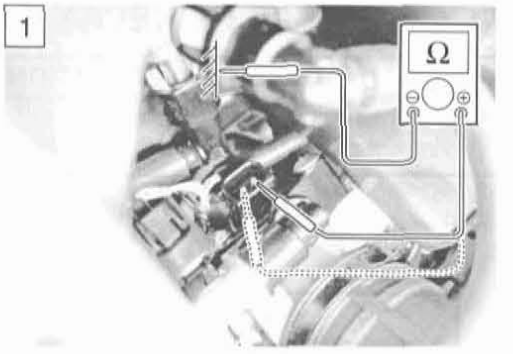
Tester knob indication: Resistance (Ω)

Are the resistance and continuity OK?

YES	Go to Step 2.
NO	Replace the injector with a new one. (☞5-18)

6) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

1



Step 2

1) Turn the ignition switch to ON.
2) Measure the injector voltage between O/G wire and ground.

DATA Injector voltage: Battery voltage (⊕ O/G – ⊖ Ground)

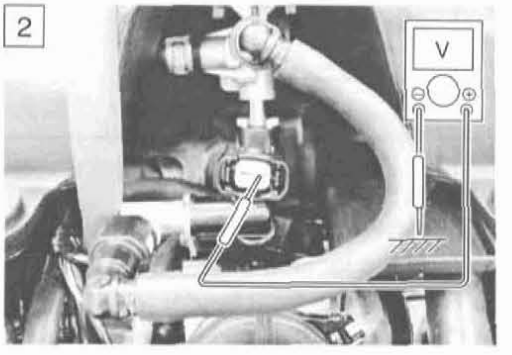
NOTE:
Injector voltage can be detected only 3 for seconds after ignition switch is turned ON.

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

Is the voltage OK?

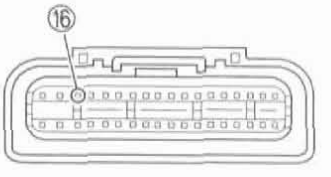
2



YES	• 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 wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	Open circuit in the O/G wire

2

ECM coupler (Harness side)



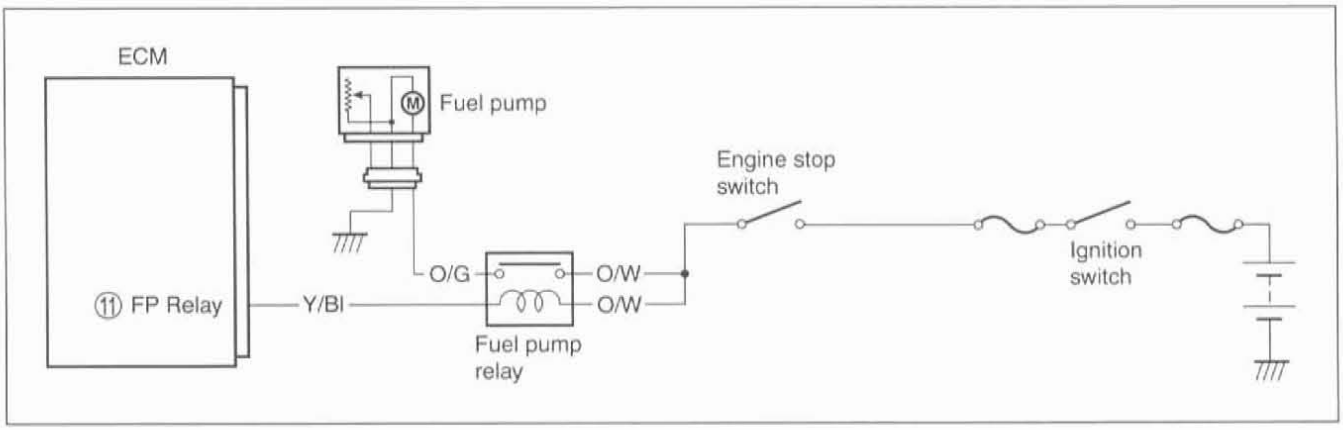
CAUTION

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

3) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

"C41" (P0230) FP RELAY CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Fuel pump relay signal is not input to ECM.	• Fuel pump relay circuit open or short • ECM malfunction



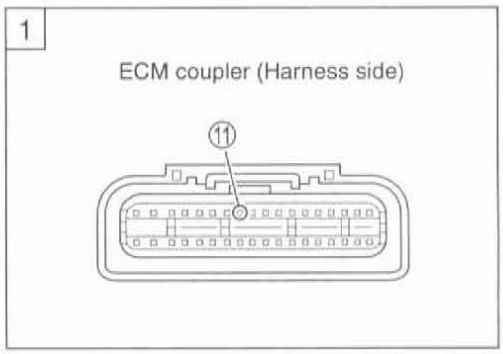
INSPECTION

Step 1 (When indicating C41:)

1) Turn the ignition switch OFF.
2) Remove the front fender. (☞7-6)
3) Check the FP relay coupler for loose or poor contacts.
   If OK, then check the FP relay. (☞5-8)

Is the FP relay OK?

YES	• O/W or Y/Bl wire open or shorted to ground, or poor ⑪ 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.
NO	Replace the FP relay with a new one.



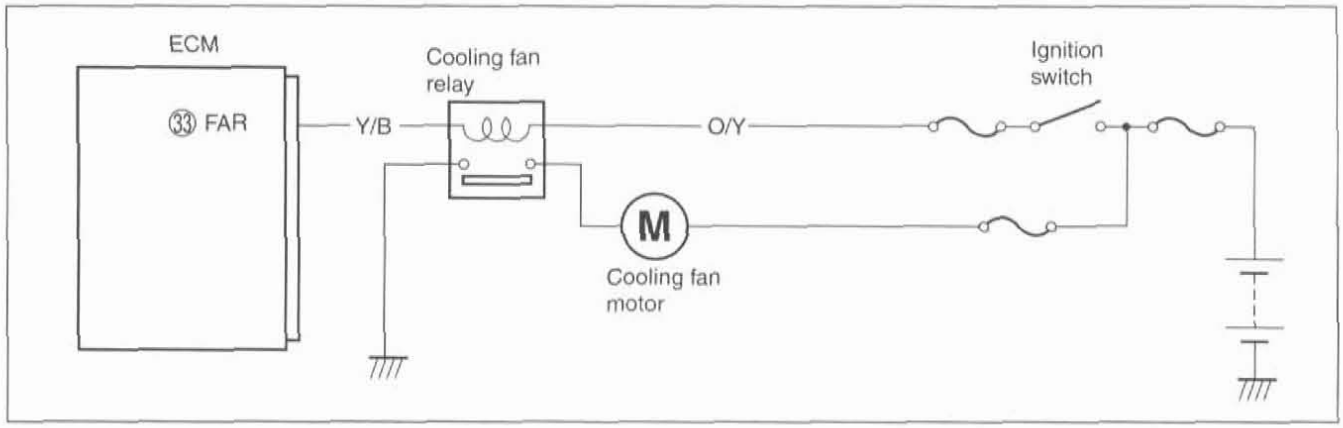
CAUTION

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

4) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

"C60" (P0480) COOLING FAN RELAY CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
Cooling fan relay signal is not input to ECM.	• Cooling fan relay circuit open or short • ECM malfunction



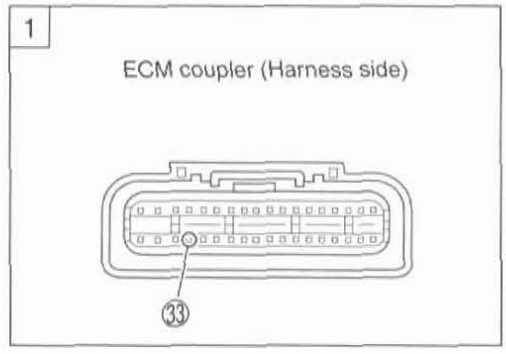
INSPECTION

Step 1

1) Turn the ignition switch OFF.
2) Remove the front fender. (☞7-6)
3) Check the cooling fan relay coupler for loose or poor contacts. If OK, then check the cooling fan relay. (☞6-10)

Is the cooling fan relay OK?

YES	• 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.
NO	Replace the cooling fan relay with a new one.



CAUTION

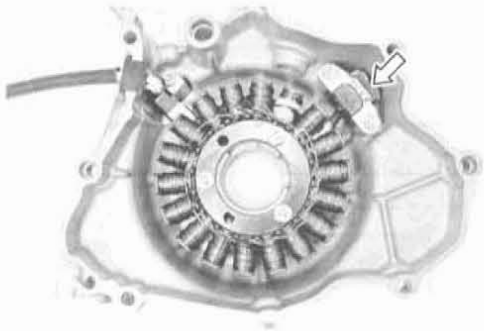
When using the multi-circuit tester, do not storongly touch the terminal of the ECM coupler with a needle pointed tester probe to prevent the terminal damage or terminal bend.

4) After repairing the trouble, clear the DTC using SDS tool. (☞4-25)

SENSORS

CKP SENSOR INSPECTION

The crankshaft position sensor is installed at the inside of the generator cover. (☞4-29)



CKP SENSOR REMOVAL AND INSTALLATION

- Remove the generator cover. (☞3-15)
- Remove the CKP sensor. (☞3-43)
- Install the CKP sensor in the reverse order of removal.

IAP SENSOR INSPECTION

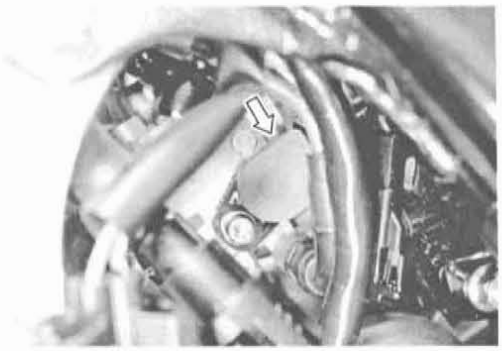
The intake air pressure sensor is installed at the left side of the seat rail. (☞4-31)

IAP SENSOR REMOVAL AND INSTALLATION

- Remove the rear fender. (☞7-8)
- Remove the IAP sensor from the seat rail.
- Install the IAP sensor in the reverse order of removal.

TP SENSOR INSPECTION

The throttle position sensor is installed at the left side of the throttle body. (☞4-37)



TP SENSOR REMOVAL AND INSTALLATION

- Remove the fuel tank cover. (☞7-6)
- Remove the fuel pump. (☞5-6)
- Remove the TP sensor. (☞5-14)
- Install the TP sensor in the reverse order of removal.

TPS ADJUSTMENT

- Adjust the TP sensor. (☞4-19)

ECT SENSOR INSPECTION

The engine coolant temperature sensor is installed on the right side of the cylinder. (☞4-42)

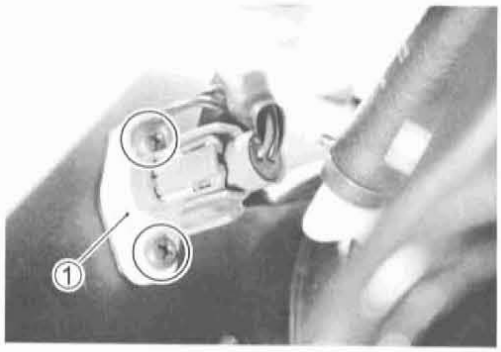
ECT SENSOR REMOVAL AND INSTALLATION

- Remove the ECT sensor. (☞6-10)
- Install the ECT sensor in the reverse order of removal.

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

IAT SENSOR INSPECTION

The intake air temperature sensor is installed at the right side of the air cleaner box. (☞4-46)

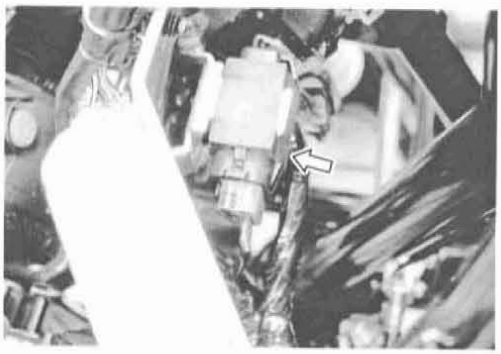


IAT SENSOR REMOVAL AND INSTALLATION

- Remove the seat. (☞7-6)
- Remove the IAT sensor ① from the air cleaner box.
- Install the IAT sensor in the reverse order of removal.

TO SENSOR INSPECTION

The tip-over sensor is located in rear of the headlight assembly. (☞4-50)

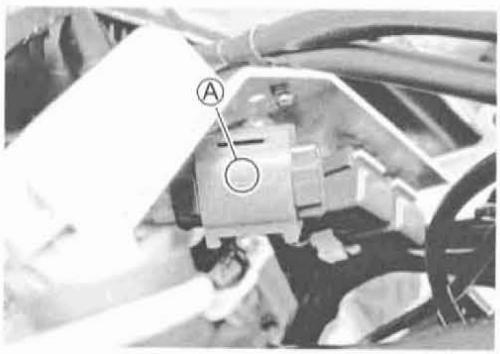


TO SENSOR REMOVAL AND INSTALLATION

- Remove the front fender. (☞7-6)
- Remove the TO sensor from the bracket.
- Install the TO sensor in the reverse order of removal.

NOTE:

When installing the TO sensor, the arrow mark Ⓐ must be pointed upward.



FUEL SYSTEM AND THROTTLE BODY

CONTENTS

5

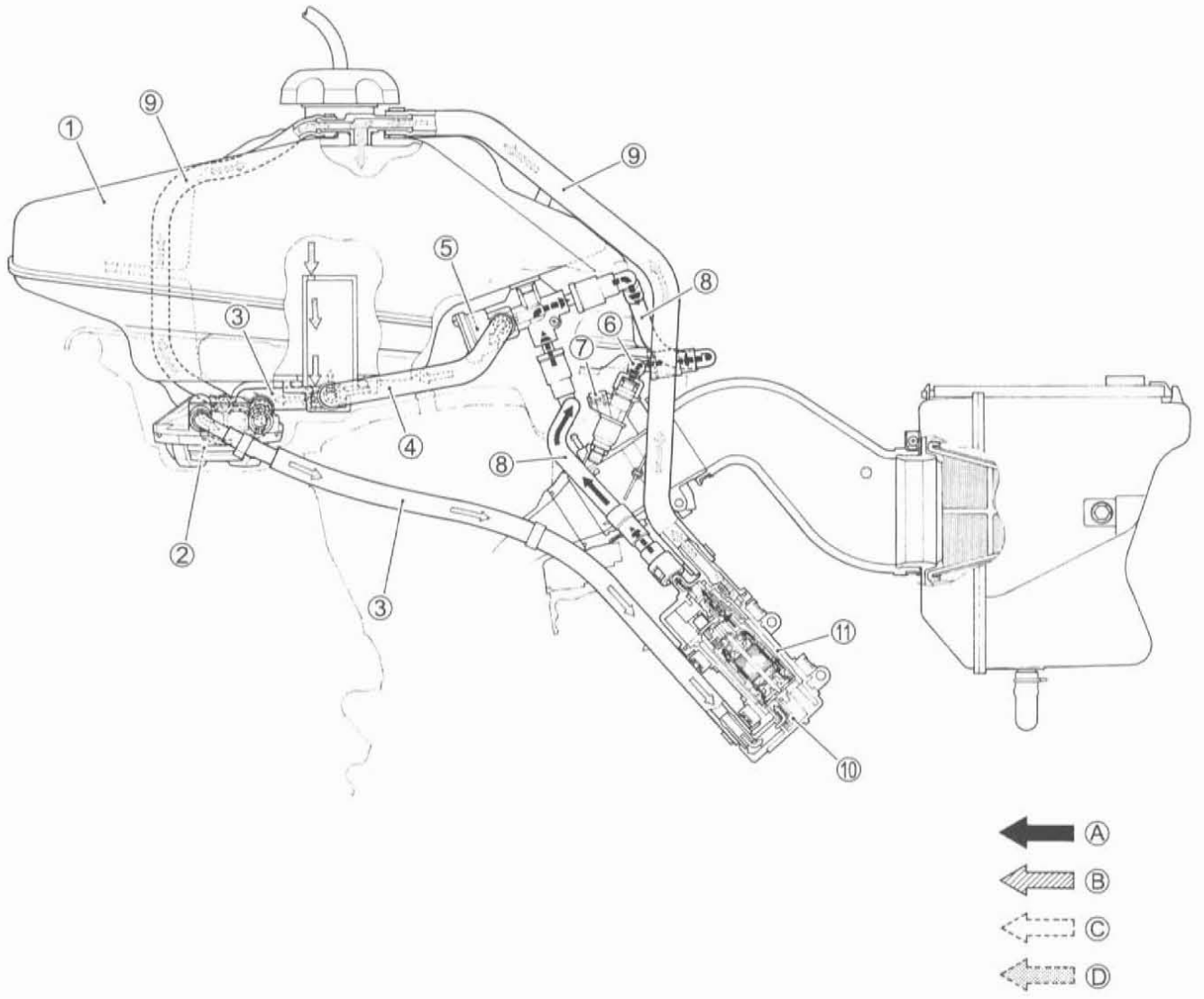
⚠ WARNING

Gasoline must be handled carefully in an area well ventilated and away from fire or sparks.

FUEL DELIVERY SYSTEM

The fuel delivery system consists of the fuel tank, fuel pump, fuel filters, fuel feed hoses, fuel delivery pipe (including fuel injector) and fuel pressure regulator. There is fuel return hose. The fuel in the fuel tank 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. 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 2.94 kgf/cm^2 (294 kPa, 41.81 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.

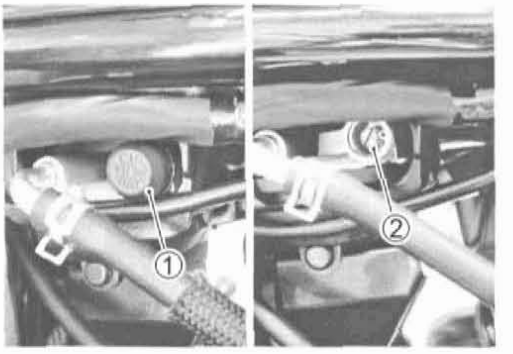


①	Fuel tank	⑥	Fuel delivery pipe	⑪	Fuel pump
②	Fuel filter (For fuel valve)	⑦	Fuel injector	Ⓐ	Pressurized fuel
③	Fuel hose	⑧	Fuel feed hose	Ⓑ	Before-pressurized fuel
④	Fuel return hose	⑨	Fuel vapor return hose	Ⓒ	Relieved fuel
⑤	Fuel pressure regulator	⑩	Fuel filter (For fuel pump)	Ⓓ	Fuel vapor

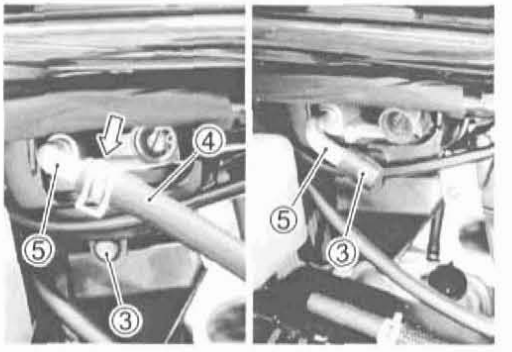
FUEL SYSTEM

FUEL TANK REMOVAL

- Remove the front fender. (☞7-6)
- Remove the fuel valve screw cap ①.
- Close the fuel valve screw ② by turning the fuel valve screw ② clockwise.



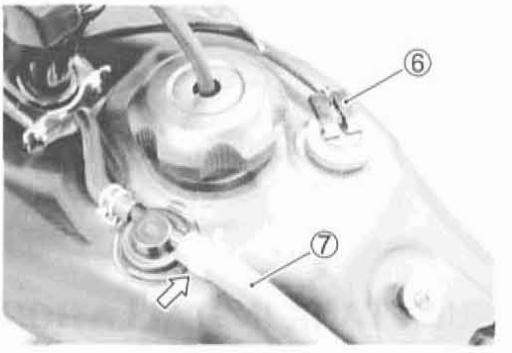
- Remove the fuel pipe cap ③.
- Place a rag under the fuel hose ④ and disconnect the fuel hose ④ from the fuel pipe ⑤.
- Install the fuel pipe cap ③ to the fuel pipe ⑤.



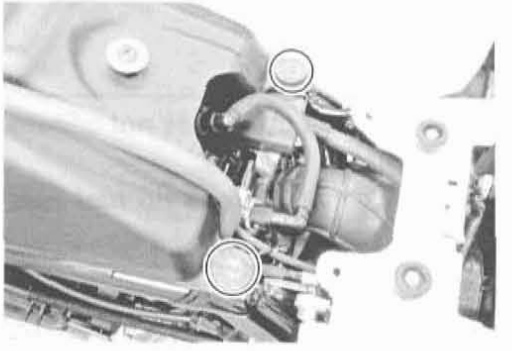
⚠ WARNING

*** Be sure to install the fuel pipe cap ③ to the fuel pipe ⑤ to prevent fuel leakage.**
*** Gasoline is highly flammable and explosive. Keep heat, spark and flame away.**

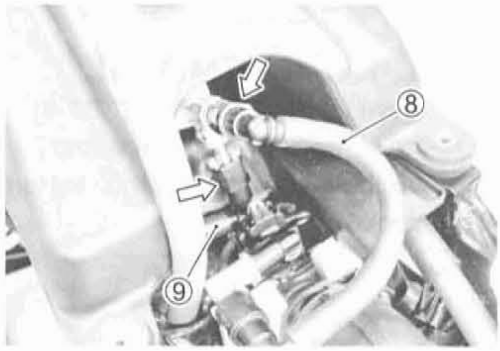
- Disconnect the fuel level gauge coupler ⑥ and fuel vapor return hose ⑦ from the fuel tank.



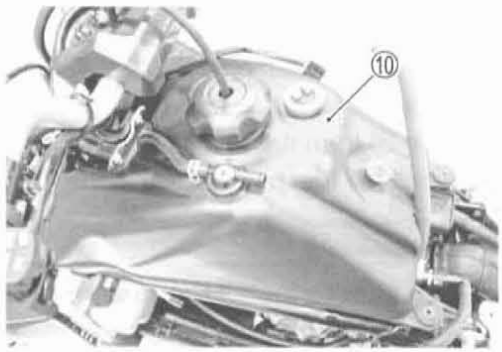
- Remove the fuel tank mounting bolts.



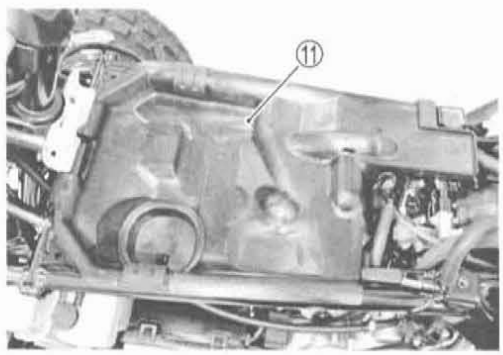
- Disconnect the fuel feed hose ⑧ and ⑨ from the fuel pressure regulator.



- Remove the fuel tank ⑩.



- Remove the fuel tank lower cover ⑪.



FUEL TANK INSTALLATION

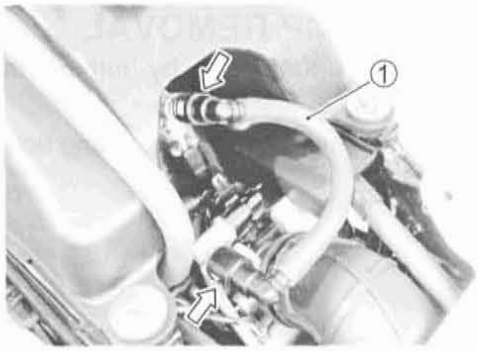
Install the fuel tank in the reverse order of removal. Pay attention to the following points:

CAUTION

*** Check that dust does not adhere to the fuel pressure regulator.**
*** Check that there is no fuel leak from the fuel pressure regulator.**

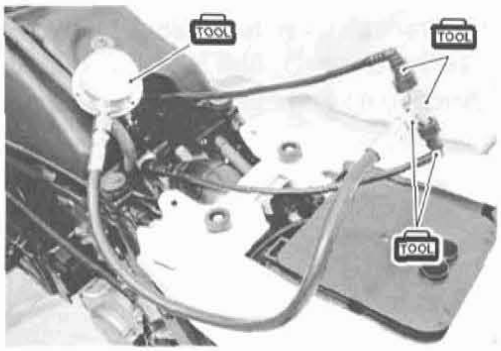
FUEL PRESSURE INSPECTION

- Remove the fuel tank cover. (☞7-6)
- Place a rag under the fuel feed hose and remove the fuel feed hose ①.



- Install the special tools between the fuel pressure regulator and fuel delivery pipe.

TOOL **09940-40211: Fuel pressure gauge adaptor**
09940-40220: Fuel pressure gauge hose attachment
09915-77331: Oil pressure gauge
09915-74521: Oil pressure gauge hose



Turn the ignition switch ON and check the fuel pressure.

DATA **Fuel pressure: Approx. 294 kPa (2.94 kgf/cm², 41.81 psi)**

If the fuel pressure is lower than the specification, inspect the following items:

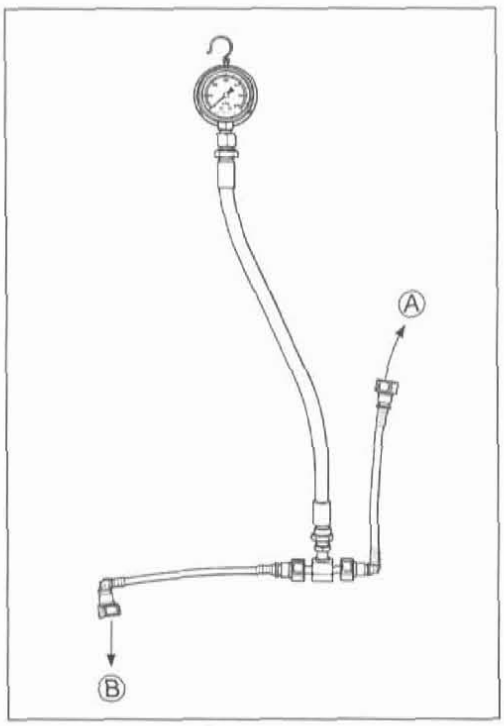
* Fuel hose leakage
* Clogged fuel filter
* Pressure regulator
* Fuel pump

If the fuel pressure is higher than the specification, inspect the following items:

* Fuel pump
* Pressure regulator

⚠ WARNING

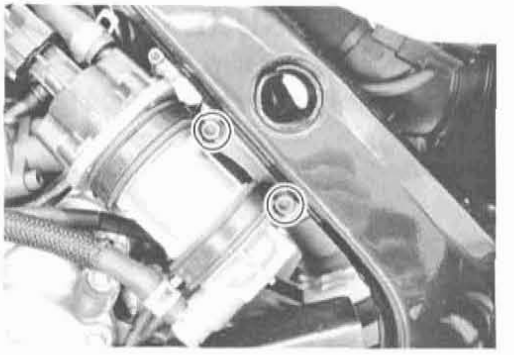
*** Before removing the special tools, turn the ignition switch to OFF position and release the fuel pressure slowly.**
*** Gasoline is highly flammable and explosive. Keep heat, sparks and flame away.**



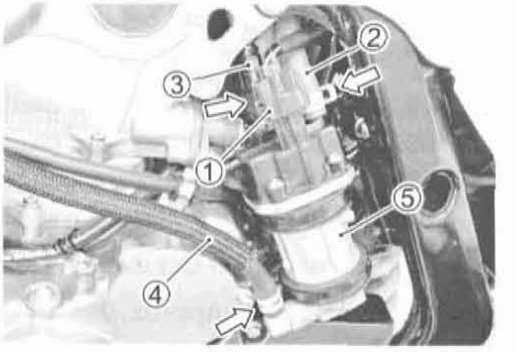
Ⓐ To fuel pressure regulator
Ⓑ To fuel delivery pipe

FUEL PUMP REMOVAL

- Close the fuel cock by turning the fuel cock clockwise. (☞5-3)
- Remove the fuel pump mounting bolts.



- Disconnect the fuel pump lead wire coupler ①, fuel vapor return hose ②, fuel feed hose ③ and fuel hose ④ from the fuel pump and remove the fuel pump ⑤.

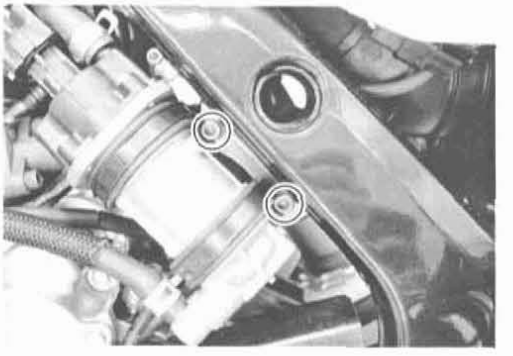


FUEL PUMP INSTALLATION

Install the fuel pump in the reverse order of removal. Pay attention to the following points:

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

Fuel pump mounting bolt: 9 N·m (0.9 kgf-m, 6.5 lb-ft)



FUEL PUMP INSPECTION

Turn the ignition switch ON and check that the fuel pump operates for 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 tip-over sensor.

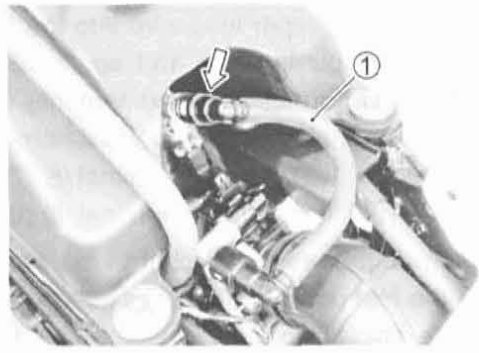
If the fuel pump relay, tip-over sensor and fuel pump circuit connections are OK, the fuel pump may be faulty, replace the fuel pump with a new one.

FUEL DISCHARGE AMOUNT INSPECTION

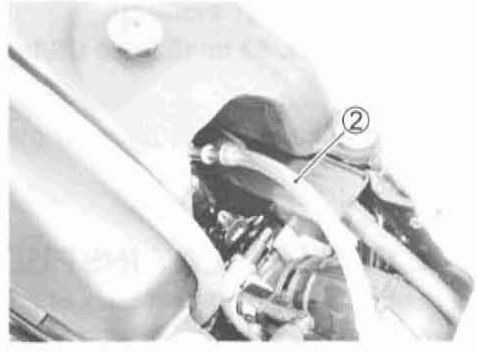
⚠ WARNING

Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.

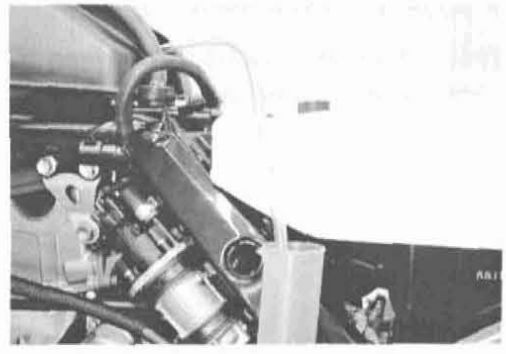
- Remove the fuel tank cover. (☞7-6)
- Place a rag under the fuel feed hose and disconnect the fuel feed hose ① from the fuel pressure regulator.



- Connect a proper fuel hose ② to the fuel pressure regulator.

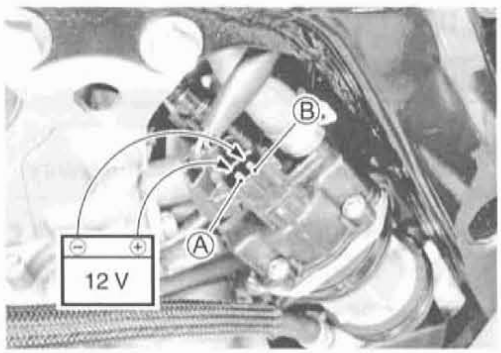


- Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.



- Disconnect the fuel pump lead wire coupler ③.

- Connect a proper lead wire into the fuel pump lead wire coupler (fuel pump side) and apply 12 volts to the fuel pump (between terminal Ⓐ and terminal Ⓑ) for 10 seconds and measure the amount of fuel discharged.
  Battery ⊕ terminal — terminal Ⓐ (O/G wire)
  Battery ⊖ terminal — terminal Ⓑ (B/W wire)



If the pump does not discharge the amount specified, it means that the fuel pump or fuel pressure regulator is defective or that the fuel filter is clogged.

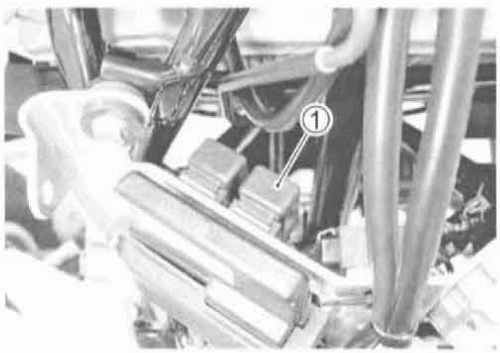
DATA Fuel discharge amount:
Approx. 83 ml (2.8/2.9 US/Imp oz) and more/10 sec.

NOTE:
The battery must be in fully charged condition.

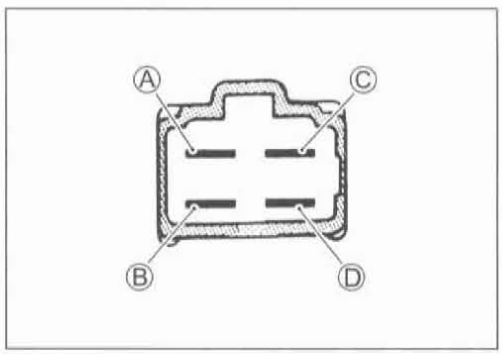
FUEL PUMP RELAY INSPECTION

Fuel pump relay is located in back of the headlight assembly.

- Remove the front fender. (☞7-6)
- Remove the fuel pump relay ①.

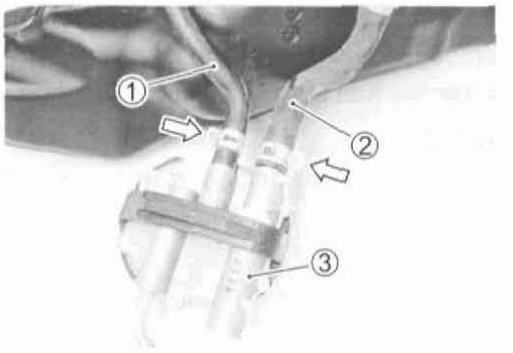


First, check the insulation between Ⓐ and Ⓑ terminals with pocket tester. Then apply 12 volts to Ⓒ and Ⓓ terminals, ⊕ to Ⓒ and ⊖ to Ⓓ, and check the continuity between Ⓐ and Ⓑ.
If there is no continuity, replace it with a new one.



FUEL VALVE/FUEL FILTER

FUEL VALVE REMOVAL AND DISASSEMBLY

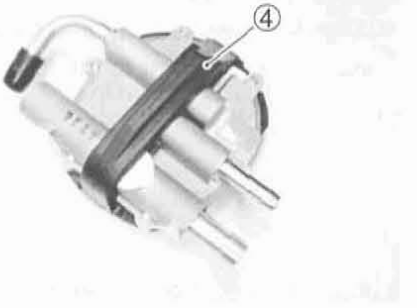


- Remove the front fender. (☞7-6)
- Drain the fuel completely.
- Remove the fuel tank. (☞5-4)
- Disconnect the fuel vapor return hose ① and fuel inlet hose ② and remove the fuel valve ③.

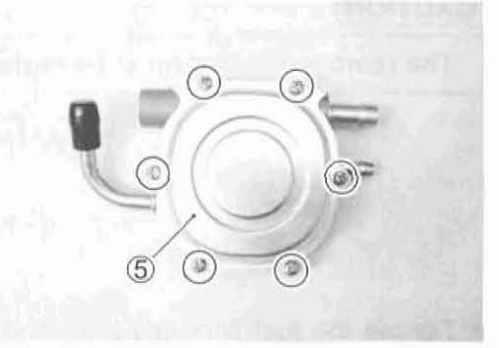
⚠ WARNING

Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.

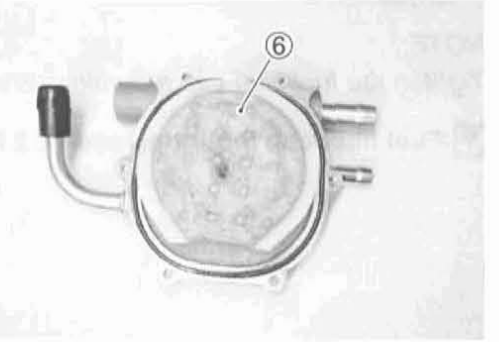
- Remove the rubber cushion ④.



- Remove the fuel filter cap ⑤ by removing its mounting screws diagonally.



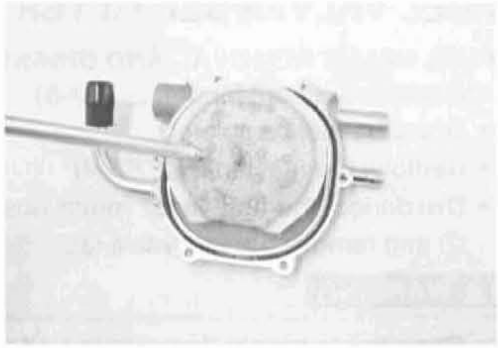
- Remove the fuel filter ⑥.



FUEL FILTER INSPECTION AND CLEANING

If the fuel filter is clogged with sediment or rust, fuel will not flow smoothly and loss in engine power may result.
Blow the fuel filter with compressed air.

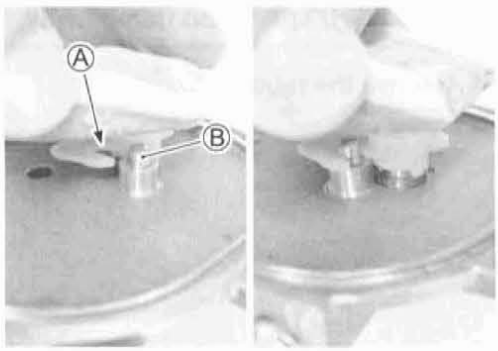
NOTE:
If the fuel filter is clogged with many sediment or rust, replace the fuel filter, O-ring and fuel filter cap with a new one.



FUEL VALVE REASSEMBLY AND INSTALLATION

Reassemble and install the fuel valve in the reverse order of removal and disassembly. Pay attention to the following points:

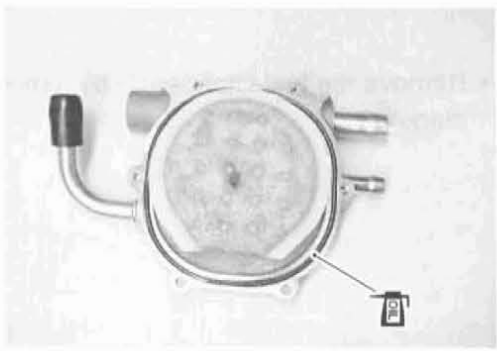
- Align the groove Ⓐ of fuel filter holder with the stopper Ⓑ and install the fuel filter to the fuel valve.



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

CAUTION

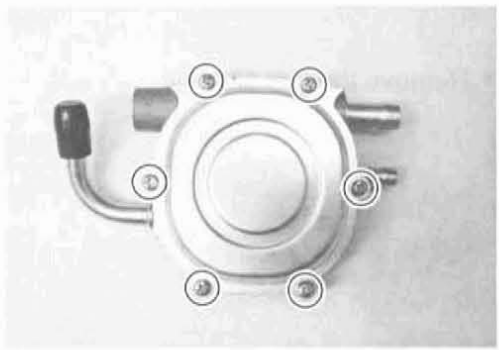
The removed O-ring must be replaced with a new one.



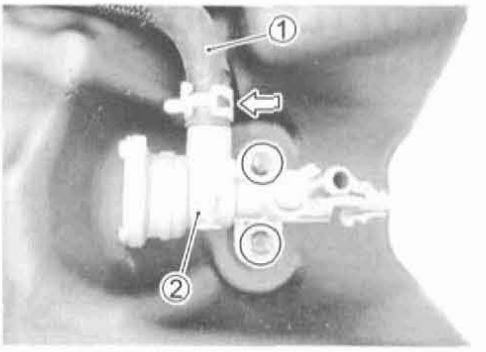
- Tighten the fuel filter cap mounting screws to the specified torque.

NOTE:
Tighten the fuel filter cap mounting screws diagonally.

Fuel filter cap mounting scerw: 2 N·m (0.2 kgf-m, 1.5 lb-ft)



FUEL PRESSURE REGULATOR



REMOVAL

- Remove the front fender. (☞7-6)
- Drain the fuel completely.
- Remove the fuel tank. (☞5-4)
- Disconnect the fuel return hose ①.
- Remove the fuel pressure regulator ②.

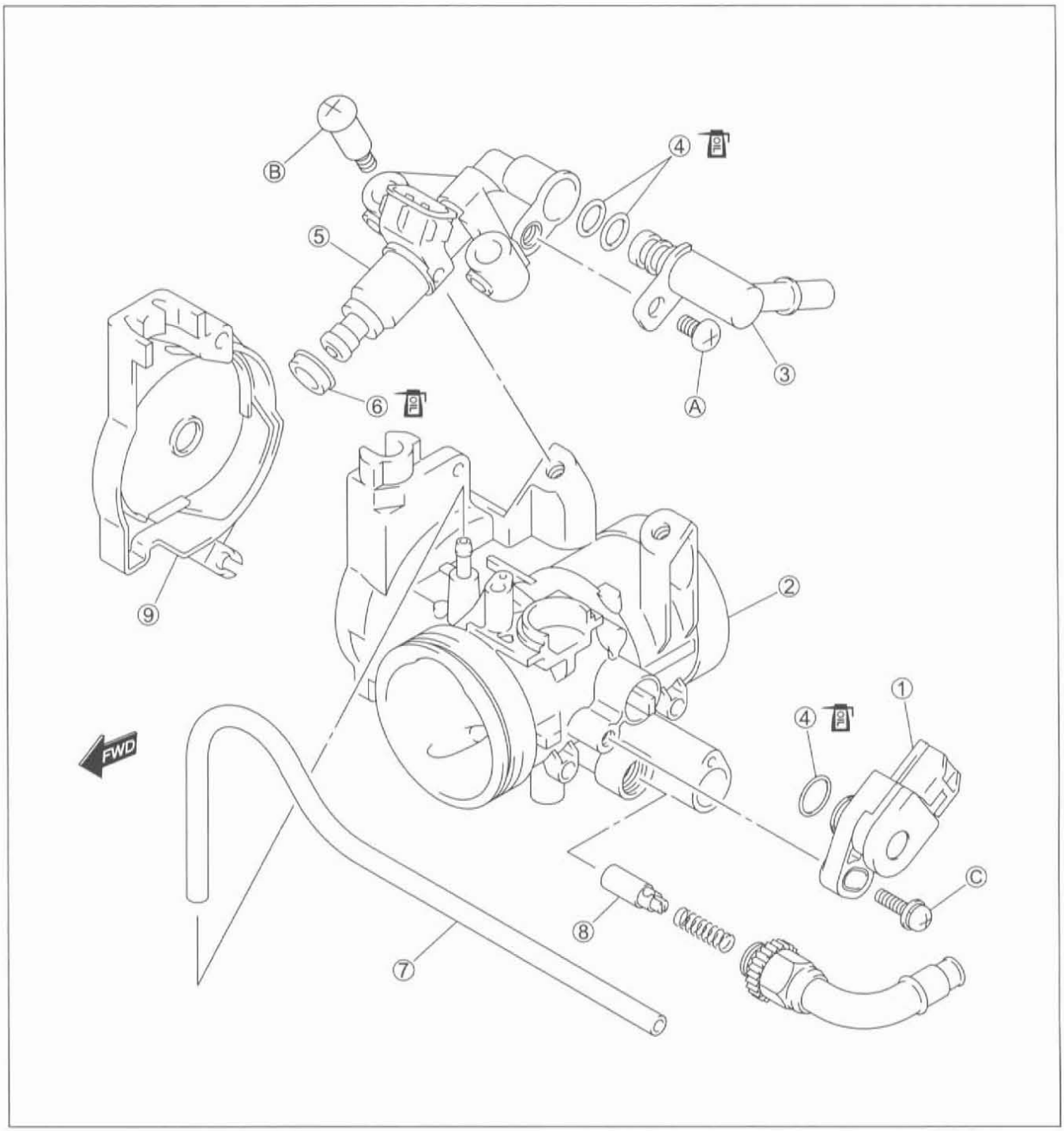
⚠ WARNING

Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.

INSTALLATION

Install the fuel pressure regulator in the reverse order of removal.

THROTTLE BODY
CONSTRUCTION

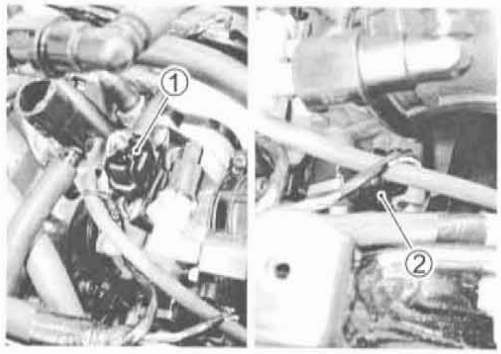


①	TP sensor	⑦	Vacuum hose
②	Throttle body	⑧	Starter valve
③	Fuel delivery pipe	⑨	Throttle cable cover
④	O-ring	Ⓐ	Fuel delivery pipe mounting screw
⑤	Fuel injector	Ⓑ	Fuel injector mounting screw
⑥	Injector seal	Ⓒ	TP sensor mounting screw

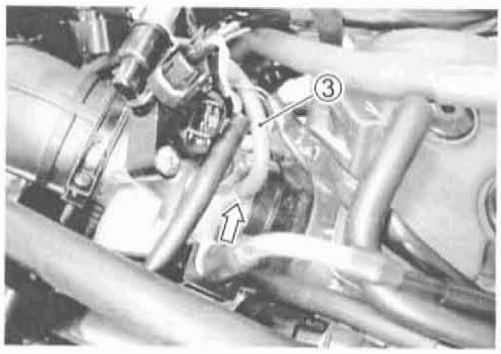
ITEM	N·m	kgf-m	lb-ft
Ⓐ	3.5	0.35	2.5
Ⓑ	3.5	0.35	2.5
Ⓒ	3.5	0.35	2.5

REMOVAL

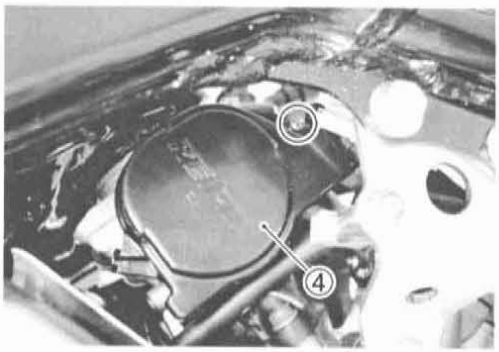
- Remove the front fender. (☞7-6)
- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- Disconnect the fuel injector coupler ① and TP sensor coupler ②.



- Disconnect the IAP hose ③.



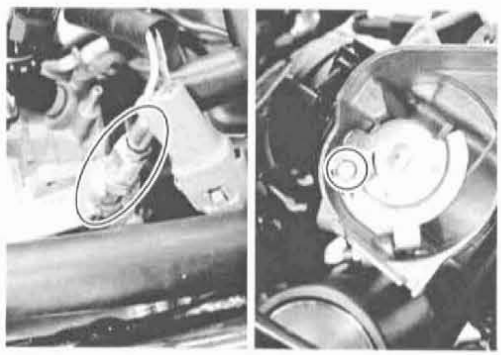
- Remove the throttle cable cover ④.



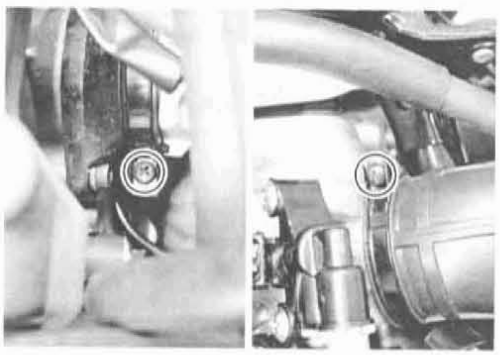
- Disconnect the throttle cable from drum.

CAUTION

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

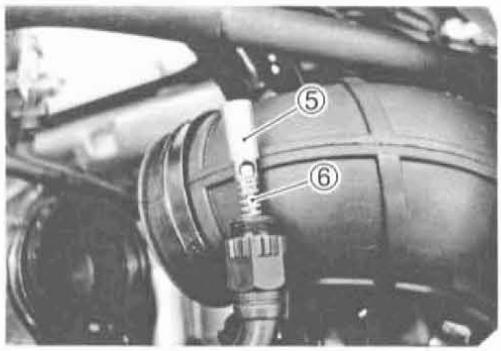


- Loosen the throttle body clamp screws and remove the throttle body assembly.



- Disconnect the starter cable from the throttle body assembly.

- Remove the starter valve ⑤ and spring ⑥ from the starter cable.



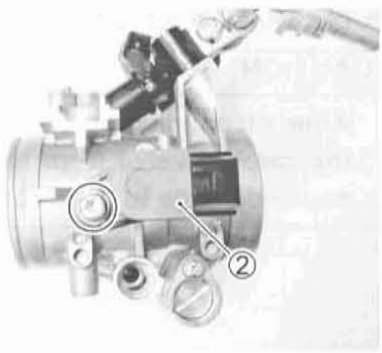
DISASSEMBLY

- Remove the fuel feed hose ①.

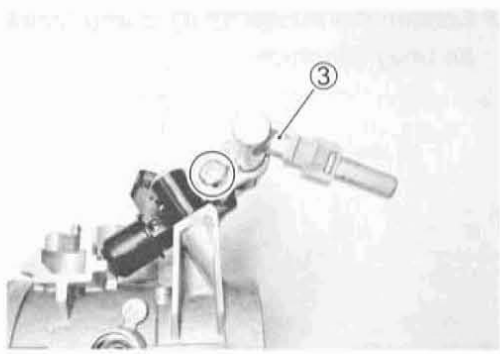
- Remove the TP sensor ② with the special tool.

09930-11950: Torx wrench

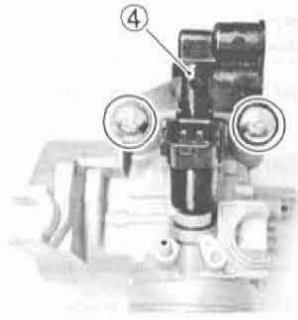
NOTE:
Prior to disassembly, mark the sensor original position with a paint or scribe for accurate reinstallation.



- Remove the fuel delivery pipe ③.

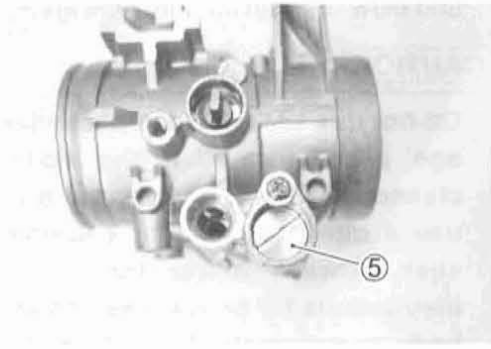


- Remove the fuel injector ④.



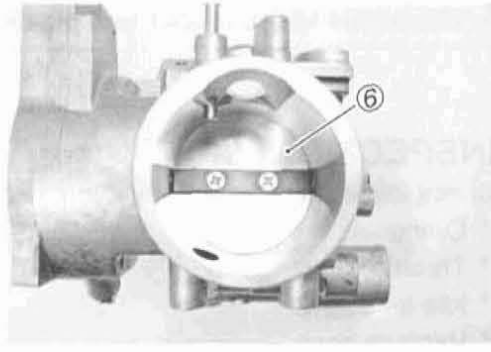
CAUTION

Avoid removing the idle air screw ⑤.



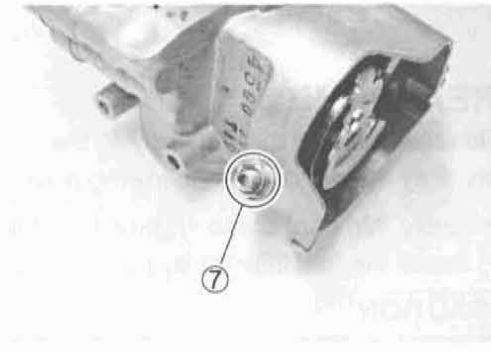
CAUTION

Never remove the throttle valve ⑥.



CAUTION

Avoid removing the throttle lever stopper screw ⑦.



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 all 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 damage or clogging.

* O-ring
* Throttle valve
* Idle air screw
* Vacuum hose

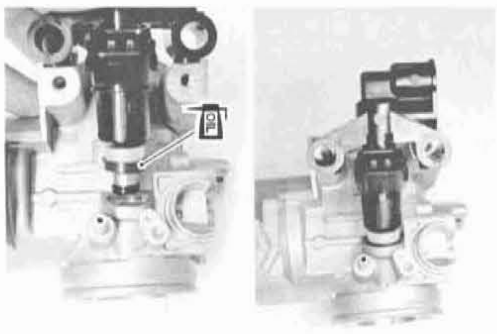
REASSEMBLY

Reassemble the throttle body in the reverse order of disassembly. Pay attention to the following points:

- Apply thin coat of the engine oil to the injector seal.
- Install the fuel injector by pushing it straight to throttle body.

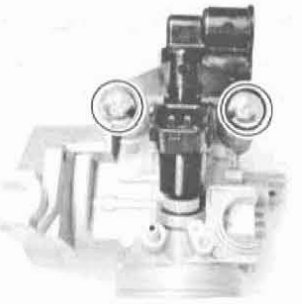
CAUTION

*** The removed injector seal must be replaced with a new one.**
*** Never turn the injector while pushing it.**



- Tighten the fuel injector mounting screws to the specified torque.

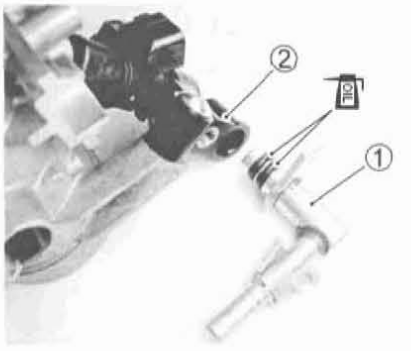
Fuel injector mounting screw:
3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



- Apply thin coat of the engine oil to the O-rings.
- Install the fuel delivery pipe ① to the injector ②.

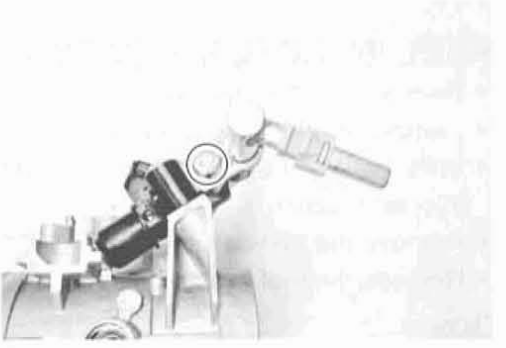
CAUTION

*** The removed O-rings must be replaced with new ones.**
*** Never turn the fuel delivery pipe while pushing it.**



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

Fuel delivery pipe mounting screw:
3.5 N·m (0.35 kgf-m, 2.5 lb-ft)



- With the throttle valve fully closed, install the TP sensor ③ and tighten the TP sensor mounting screw to the specified torque.

CAUTION

The removed O-ring must be replaced with a new one.

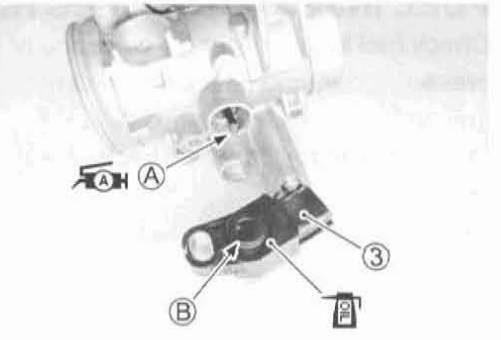
NOTE:
** Apply thin coat of the engine oil to the O-ring.*
** Align the throttle shaft end Ⓐ with the groove Ⓑ of TP sensor.*
** Apply grease to the throttle shaft end Ⓐ if necessary.*

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

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

09930-11950: Torx wrench

NOTE:
** Make sure the throttle valve open or close smoothly.*
** TP sensor setting procedure. (☞ 4-19)*



INSTALLATION

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

- Align the groove of starter valve with the starter cable end.

- Align the lug on the throttle body with the intake pipe's cutout.
- Adjust the throttle cable play. (☞2-11)
- Adjust the idle speed. (☞2-12)
- Adjust the TP sensor setting condition. (☞4-19)

FUEL INJECTOR REMOVAL

- Remove the front fender. (☞7-6)
- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- With battery negative cable disconnected, disconnect the injector coupler.
- Remove the fuel delivery pipe. (☞5-14)
- Remove the fuel injector. (☞5-15)

FUEL INJECTOR INSPECTION

Check 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.

The fuel injector can be checked without removing it from the throttle body.

Refer to page 4-56 for details.

FUEL INJECTOR INSTALLATION

- Apply thin coat of the engine oil to injector seal.
- Install the injector by pushing it straight to the throttle body. Never turn the injector while pushing it. (☞5-16)
- Install the fuel delivery pipe. (☞5-17)

THROTTLE POSITION SENSOR (TPS) SETTING

After all adjustments are completed, check or adjust the TPS setting condition. (Refer to page 4-19 for TPS setting procedure.)

COOLING AND LUBRICATION SYSTEM

CONTENTS

ENGINE COOLANT

At the time of manufacture, the cooling system is filled with a 50:50 mixture of distilled water and ethylene glycol anti-freeze. This 50:50 mixture will provide the optimum corrosion protection and excellent heat protection, and will protect the cooling system from freezing at temperatures above –31 °C (–24 °F).
If the vehicle is to be exposed to temperatures below –31 °C (–24 °F), this mixing ratio should be increased up to 55% or 60% according to the figure.

Anti-freeze density	Freezing point
50%	–30 °C (–24 °F)
55%	–40 °C (–44 °F)
60%	–55 °C (–67 °F)

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 60% and more anti-freeze or 50% and less. (Refer to below figure.)**
- **Do not use a radiator anti-leak additive.**

50% Engine coolant including reserve tank capacity

Anti-freeze	700 ml (1.5/1.2 US/Imp.pt)
Water	700 ml (1.5/1.2 US/Imp.pt)

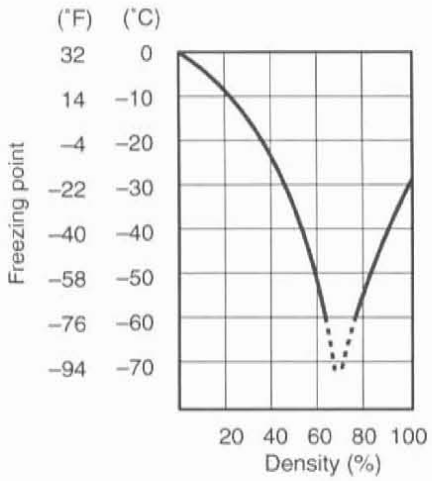


Fig. 1 Engine coolant density-freezing point curve

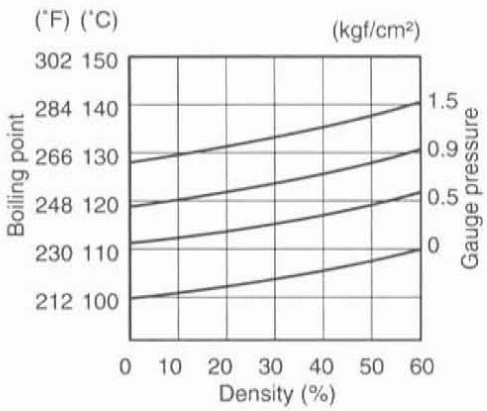
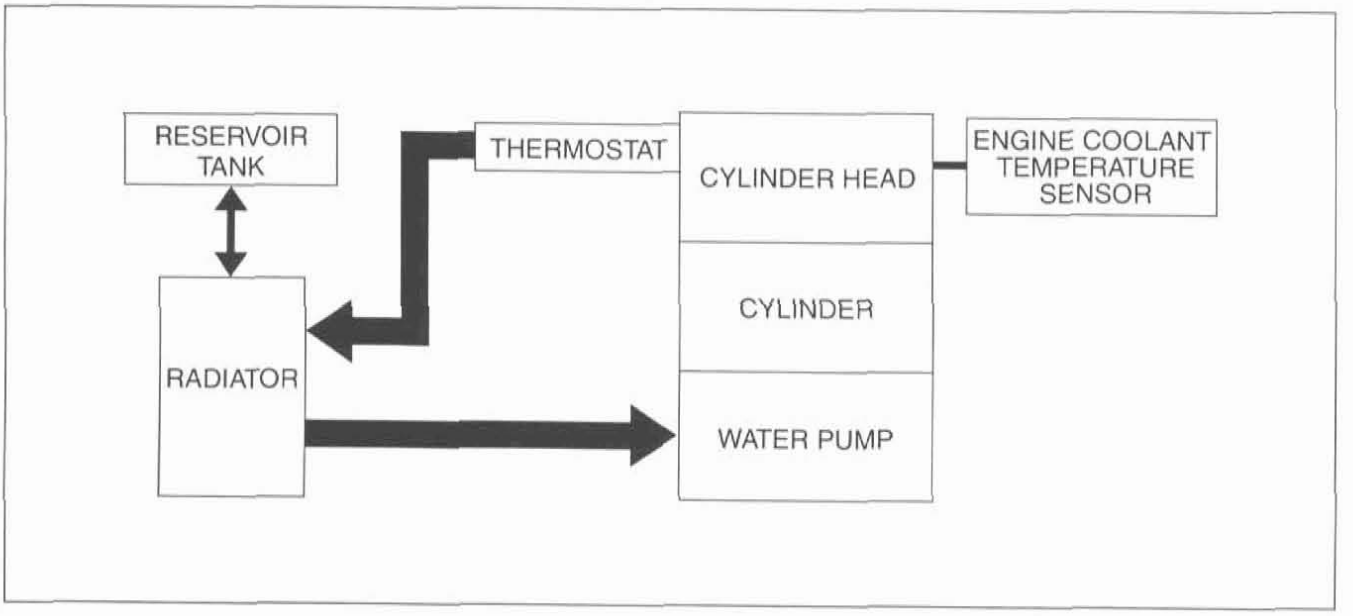


Fig. 2 Engine coolant density-boiling point curve

⚠ WARNING

- **You can be injured by scalding 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.**

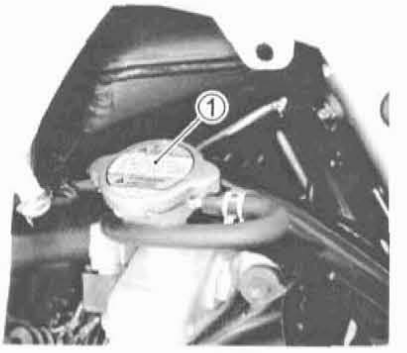
COOLING CIRCUIT



COOLING CIRCUIT INSPECTION

Before removing the radiator and draining the engine coolant, inspect the cooling circuit for tightness.

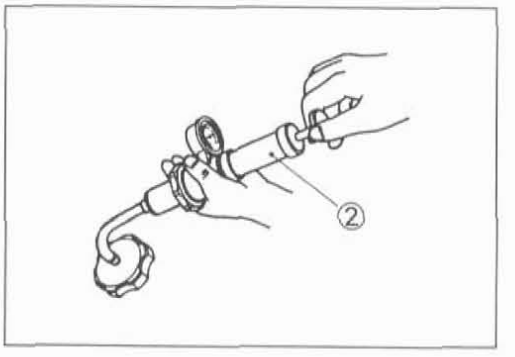
- Remove the side cover (R). (☞7-6)
- Remove the radiator cap ① and connect the tester ② to the filler.



⚠ WARNING

Do not remove the radiator cap when the engine is hot.

- Give a pressure of about 120 kPa (1.2 kgf/cm², 17 psi) and see if the system holds this pressure for 10 seconds.
- If the pressure should fall during this 10-second interval, it means that there is a leaking point in the system. In such a case, inspect the entire system and replace the leaking component or part.



⚠ WARNING

When removing the radiator cap tester, put a rag on the filler to prevent spouting of engine coolant.

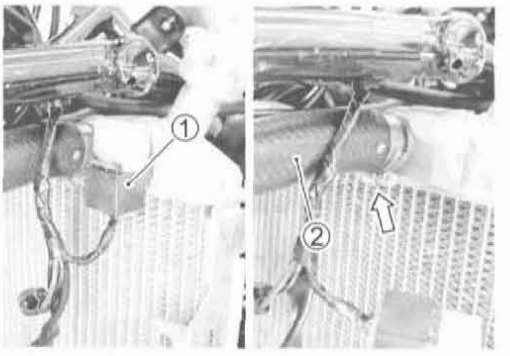
CAUTION

Do not allow the pressure to exceed the radiator cap release pressure, or the radiator can be damaged.

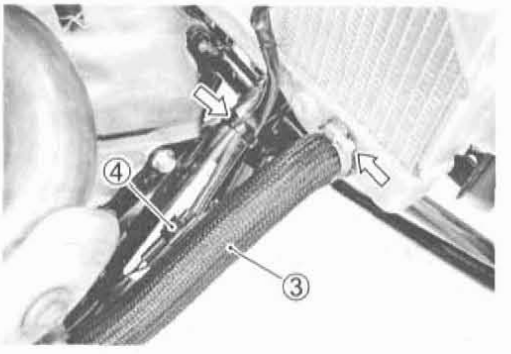
RADIATOR AND WATER HOSE

RADIATOR REMOVAL

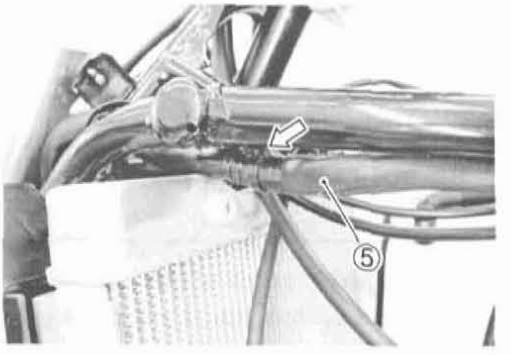
- Remove the front fender. (☞7-6)
- Drain engine coolant. (☞2-15)
- Remove the oil return tank. (☞6-23)
- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- Remove the cooling fan. (☞6-8)
- Remove the radiator reservoir tank. (☞6-7)
- Remove the battery holder. (☞6-21)
- Remove the cooling fan fuse ① from the radiator.
- Disconnect the inlet hose ②.



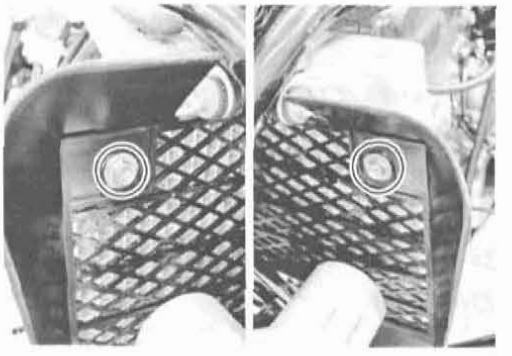
- Disconnect the outlet hose ③.
- Disconnect the rear brake switch coupler ④.
- Remove the rear brake switch wire harness from the clamp.



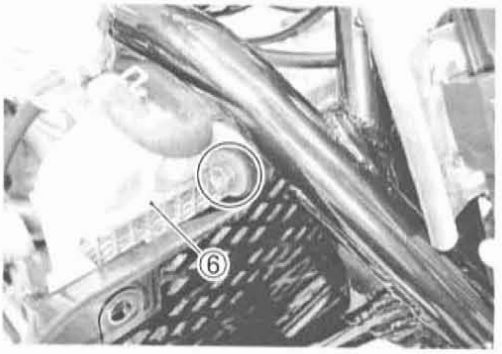
- Remove the main harness ⑤ from the clamp.

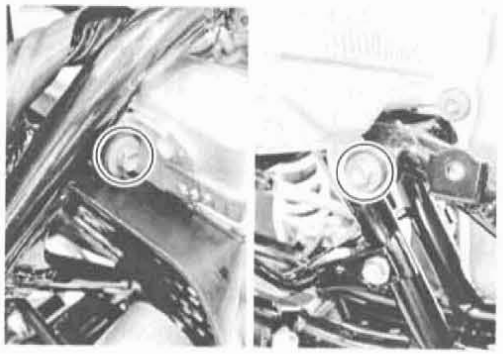


- Remove the radiator cover mounting bolts.

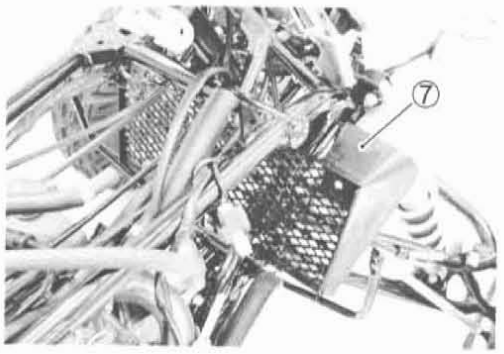


- Remove the radiator mounting bolts, and then radiator ⑥ from the body of a vehicle.

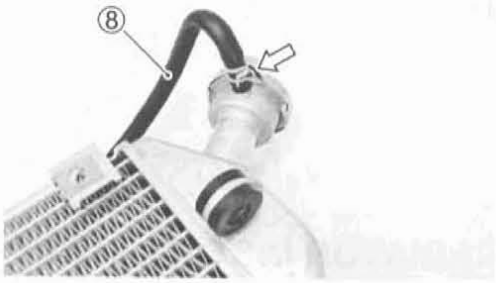




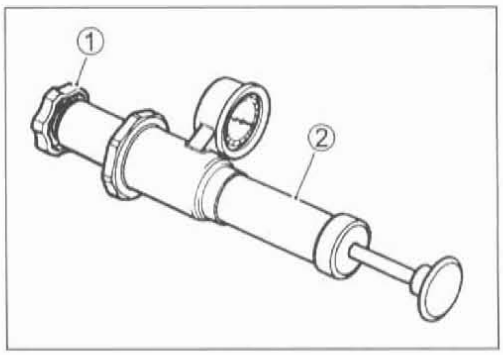
- Remove the radiator cover ⑦ from the body of a vehicle.



- Disconnect the siphon hose ⑧.



RADIATOR CAP INSPECTION

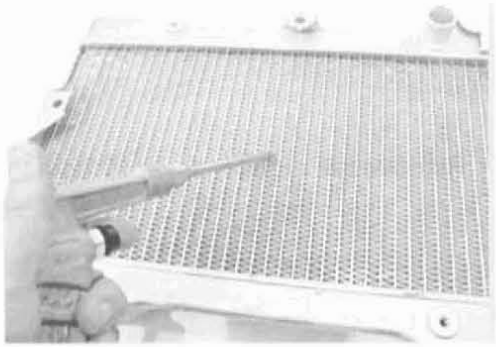


- Remove the radiator cap ① from the radiator.
- Fit the cap ① to the radiator cap tester ②.
- Build up pressure slowly by operating the tester. Make sure that the pressure build-up stops at 108 – 137 kPa (1.08 – 1.37 kgf/cm², 15.4 – 19.5 psi) and that, with the tester held stand-still, the cap is capable of holding that pressure for at least 10 seconds.
- Replace the cap if it is found not to satisfy either of these two requirements.

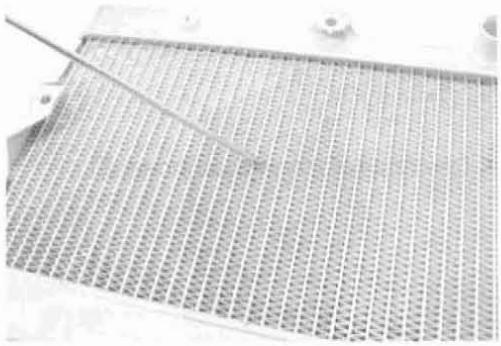
DATA **Radiator cap valve opening pressure**
Standard: 108 – 137 kPa
(1.08 – 1.37 kgf/cm², 15.4 – 19.5 psi)

RADIATOR INSPECTION AND CLEANING

Road dirt or trash stuck on the fins must be removed.
Use of compressed air is recommended for this cleaning.



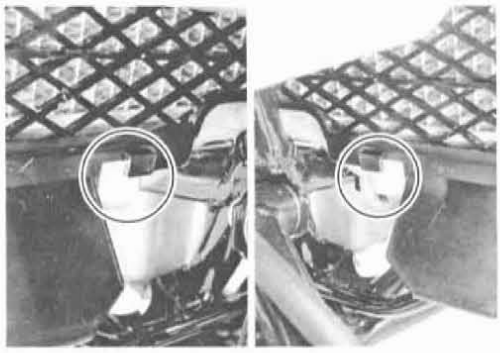
Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.



RADIATOR INSTALLATION

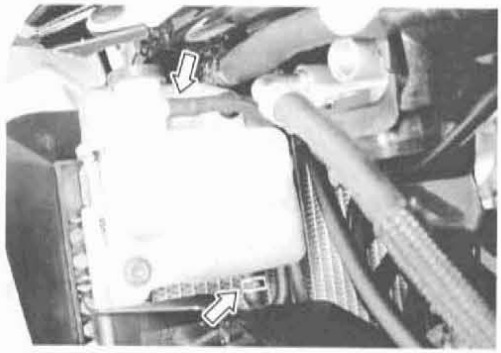
Install the radiator in the revers order of removal. Pay attention to the following points:

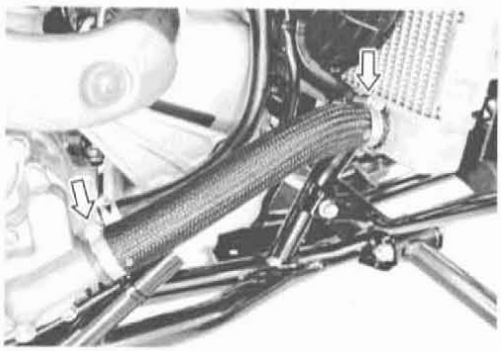
- Align the grooves on the radiator covers with the boss on the radiator.
- Install the radiator cover to the radiator.
- Install the radiator.
- Route the siphon hose and radiator hoses. (☞9-20)
- Pour engine coolant. (☞2-13)

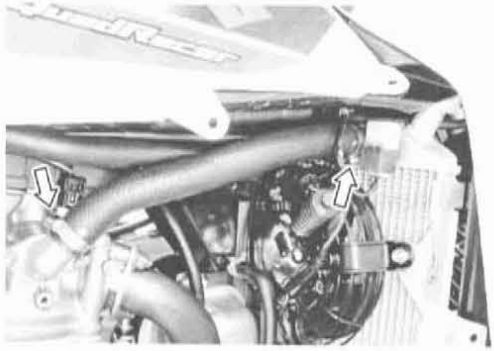


WATER HOSE INSPECTION

- Remove the side covers (R & L). (☞7-6)
- Any water hose found in a cracked condition or flattened must be replaced.
- Any leakage from the connecting section should be corrected by proper tightening.



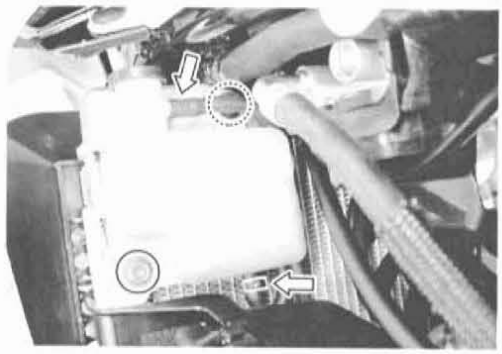




RADIATOR RESERVOIR TANK

REMOVAL/REMOUNTING

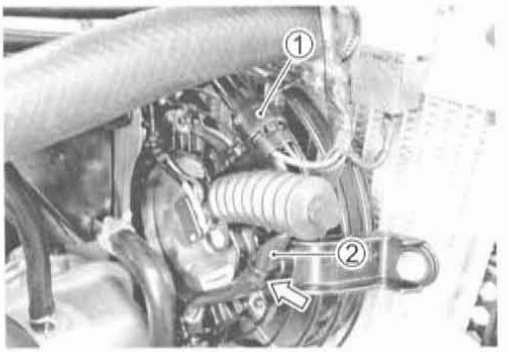
- Remove the side cover (L). (☞7-6)
- Remove the reservoir tank mounting bolts and disconnect the siphon hose from the reservoir tank and drain engine coolant.
- Install the reservoir tank in the reverse order of removal.
- Pour engine coolant. (☞2-15)



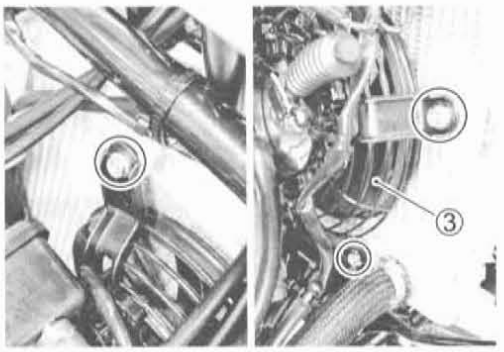
COOLING FAN

REMOVAL

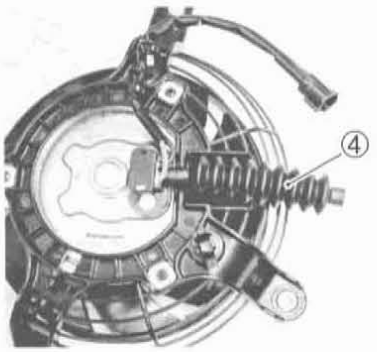
- Remove the front fender. (☞7-6)
- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- Disconnect the cooling fan motor lead wire coupler ①.
- Remove the rear brake switch wire harness ② from the clamp.



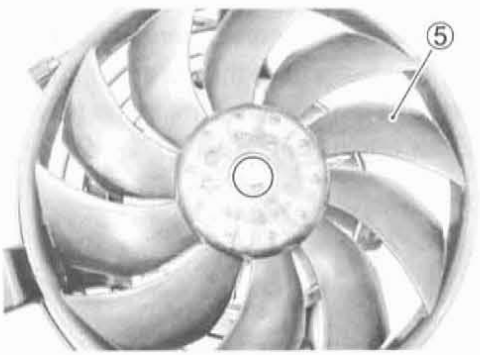
- Remove the cooling fan unit ③.



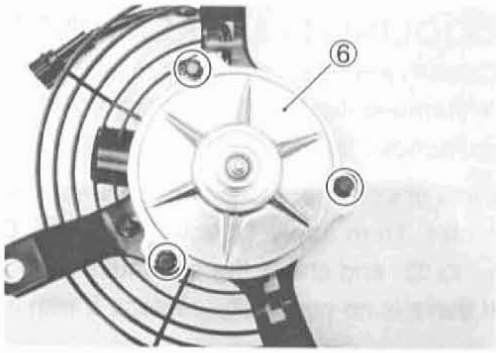
- Remove the cushion ④.



- Remove the cooling fan ⑤.



- Remove the cooling fan motor ⑥.

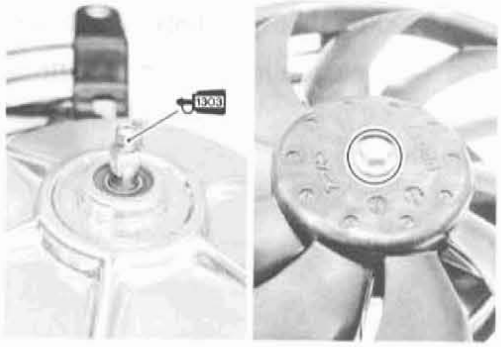


INSTALLATION

Install the cooling fan unit in the reverse order of removal. Pay attention to the following points:

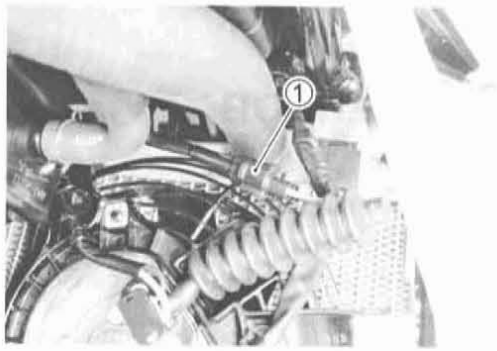
- Apply a small quantity of the THREAD LOCK SUPER "1303" on the cooling fan motor shaft.
- Tighten the cooling fan nut.

1303 99000-32030: THREAD LOCK SUPER "1303"



INSPECTION

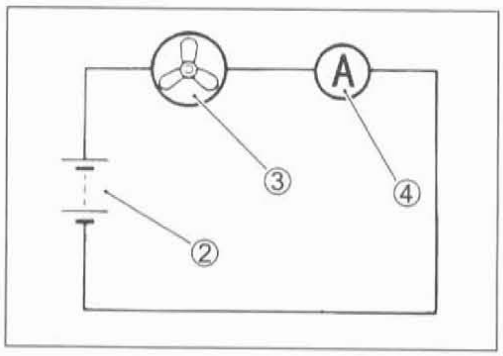
- Remove the front fender. (☞7-6)
- Disconnect the cooling fan coupler ①.
- Test the cooling fan motor for load current with an ammeter connected as shown in the illustration.



- The voltmeter is for making sure that the battery ② applies 12 volts to the cooling fan motor ③. With the cooling fan motor with electric motor fan running at full speed, the ammeter ④ should be indicating not 5 amperes and more.
- If the fan motor does not turn, replace the motor assembly with a new one.

NOTE:

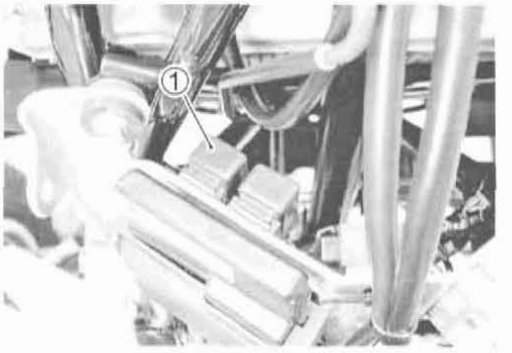
When making above test, it is not necessary to remove the cooling fan unit.



COOLING FAN RELAY INSPECTION

Cooling fan relay is located in rear of the headlight assembly.

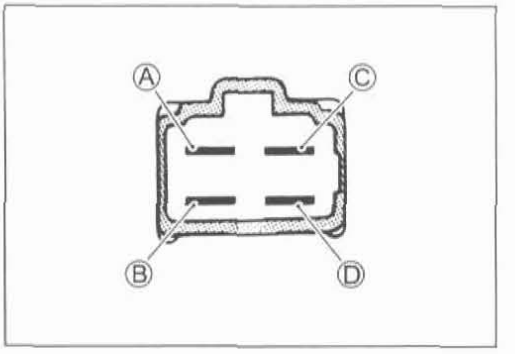
- Remove the front fender. (☞7-6)
- Remove the cooling fan relay ①.



First check the insulation between Ⓐ and Ⓑ terminals with tester. Then apply 12 volts to Ⓒ and Ⓓ terminals, ⊕ to Ⓒ and ⊖ to Ⓓ, and check the continuity between Ⓐ and Ⓑ.
If there is no continuity, replace it with a new one.

09900-25008: Multi-circuit tester set

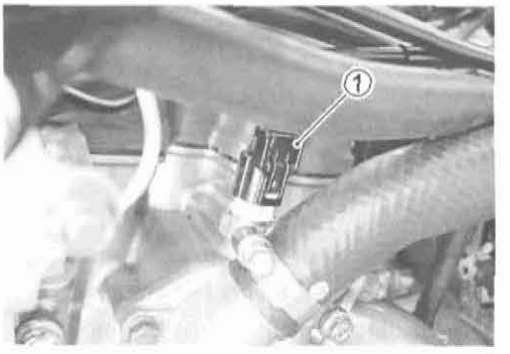
Tester knob indication: Continuity test (•)))



ECT SENSOR

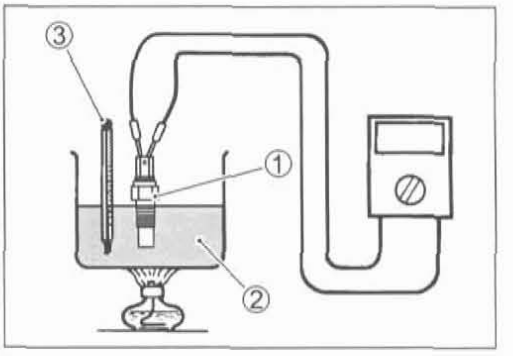
REMOVAL

- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- Disconnect the ECT sensor coupler ①.
- Place a rag under the ECT sensor and remove the ECT sensor.



INSPECTION

- Check the ECT sensor by testing it at the bench as shown in the figure. 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.
- Heat the oil to raise its temperature slowly and read the column thermometer ③ and the ohmmeter.



- If the ECT sensor ohmic value does not change in the proportion indicated, replace it with a new one.

DATA Temperature sensor specification

Temperature	Standard resistance
20 °C (68 °F)	Approx. 2.6 kΩ
50 °C (122 °F)	Approx. 0.772 kΩ
80 °C (176 °F)	Approx. 0.279 kΩ
110 °C (230 °F)	Approx. 0.118 kΩ

DATA Cooling fan operating temperature:
Standard (OFF→ON): Approx. 98 °C (208 °F)
(ON→OFF): Approx. 93 °C (199 °F)

If the resistance is noted to show infinity or too much different resistance value, replace the ECT sensor with a new one.

CAUTION

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

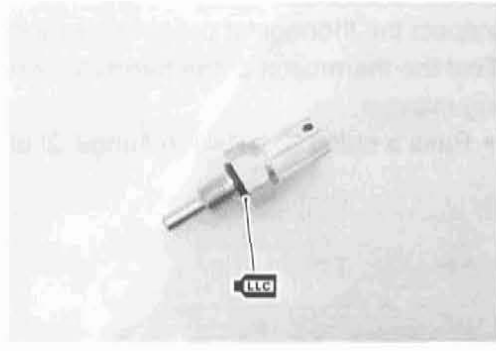
INSTALLATION

- Apply engine coolant to the O-ring.
- Tighten the ECT sensor to the specified torque.

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

CAUTION

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

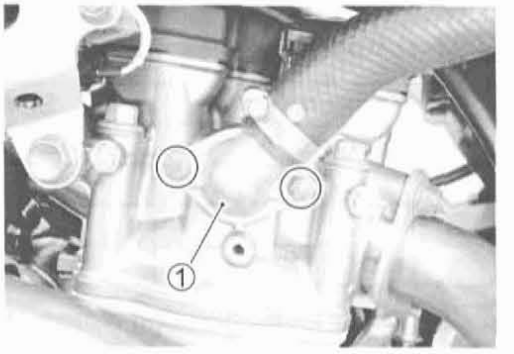


- Connect the ECT sensor coupler.
- Install the fuel tank lower cover and fuel tank.
- Check the engine coolant level. (☞2-15)

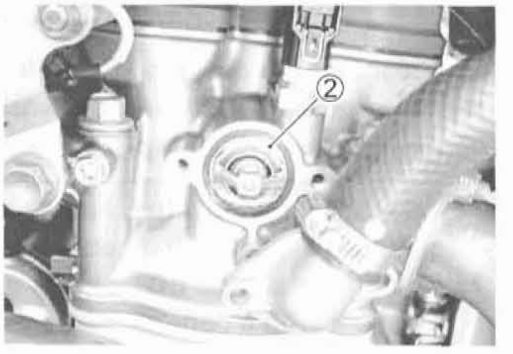
THERMOSTAT

REMOVAL

- Drain the engine coolant. (☞2-15)
- Place a rag under the thermostat case.
- Remove the thermostat case ①.



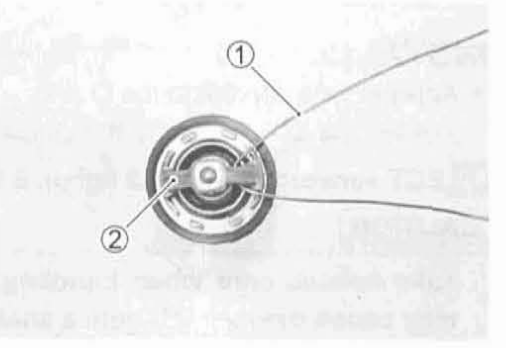
- Remove the thermostat ②.



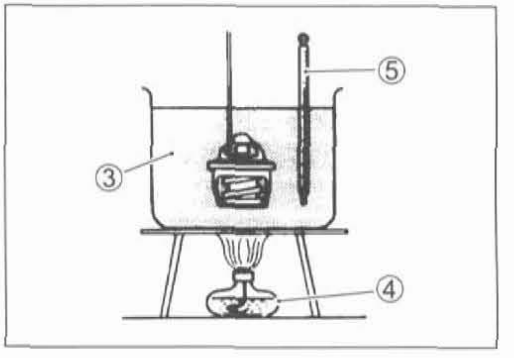
INSPECTION

Inspect the thermostat pellet for signs of cracking.
Test the thermostat at the bench for control action, in the following manner.

- Pass a string ① between flange ② of thermostat, as shown.



- Immerse the thermostat in the water contained in a beaker, as shown in the illustration. Note that the immersed thermostat is in suspension. Heat the water ③ by placing the beaker on a stove ④ and observe the rising temperature on a thermometer ⑤.
- Read the thermometer just when opening the thermostat. This reading, which is the temperature level at which the thermostat valve begins to open, should satisfy the standard value.

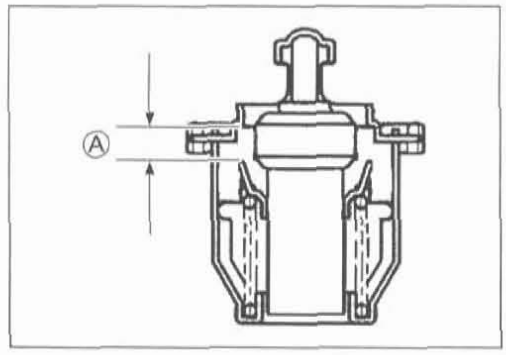


DATA ***Thermostat valve opening temperature***
Standard: Approx. 76.5 °C (169.7 °F)

- Keep on heating the water to raise its temperature.
- Just when the water temperature reaches specified value, the thermostat valve should have lifted by at least 4.5 mm (0.18 in).

DATA **Thermostat valve lift Ⓐ**
Standard:
4.5 mm and over at 90 °C (0.18 in and over at 194 °F)

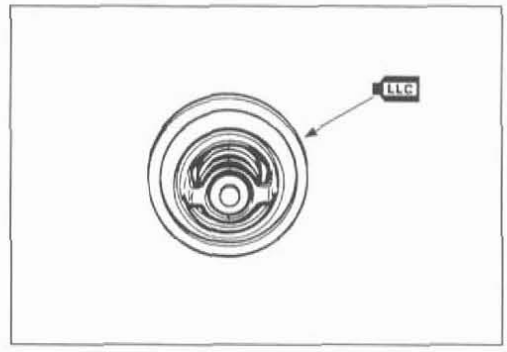
- A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.



INSTALLATION

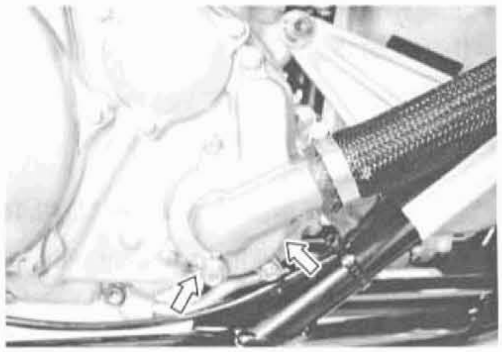
Install the thermostat in the reverse order of removal.

- Apply engine coolant to the rubber seal on the thermostat.
- After installing the thermostat and thermostat case, be sure to add engine coolant. (☞2-15)



WATER PUMP

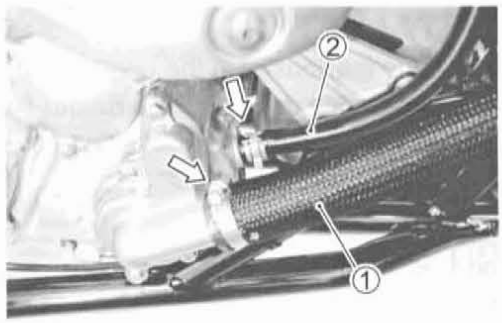
REMOVAL AND DISASSEMBLY



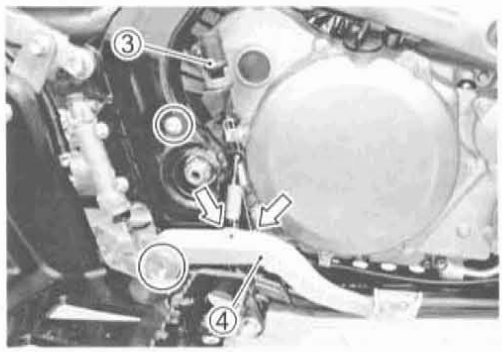
NOTE:

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. (☞6-16)

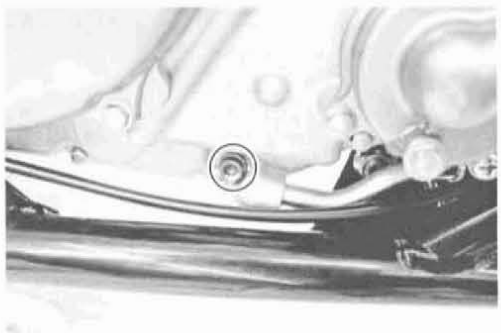
- Drain engine coolant. (☞2-15)
- Drain engine oil. (☞2-13)
- Disconnect the radiator hose ① and breather hose ②.



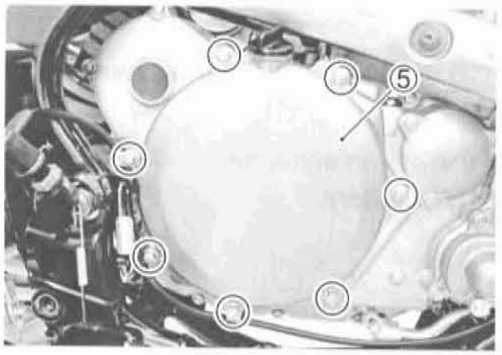
- Remove the rear brake switch ③ and brake pedal ④. (☞7-67)



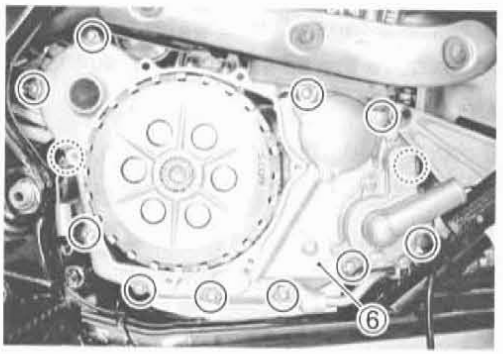
- Remove the right oil tank hose.



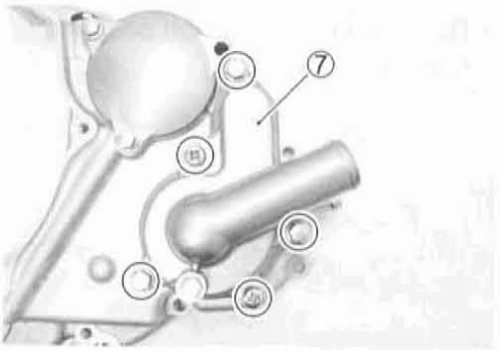
- Remove the clutch cover ⑤.



- Remove the right crankcase cover ⑥.

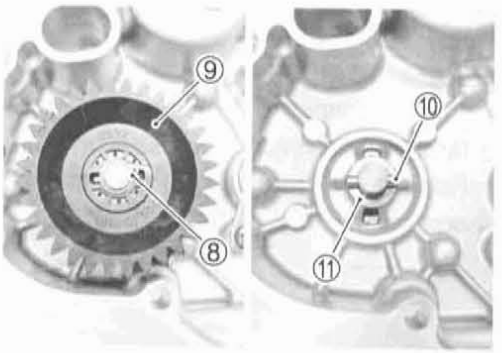


- Remove the water pump cover ⑦.

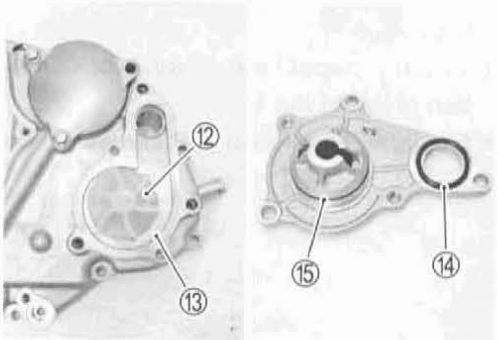


- Remove the snap ring ⑧, water pump driven gear ⑨, pin ⑩ and washer ⑪.

09900-06107: Snap ring pliers



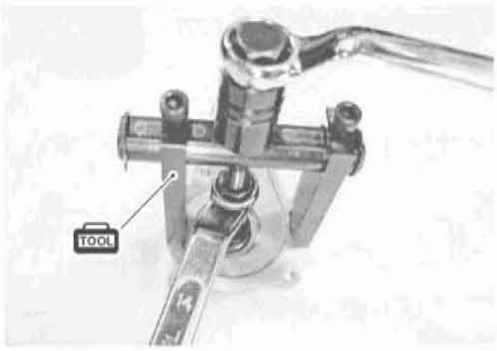
- Remove the impeller ⑫ and water pump body ⑬.
- Remove the O-ring ⑭ and ⑮.



- Remove the mechanical seal using the special tool.

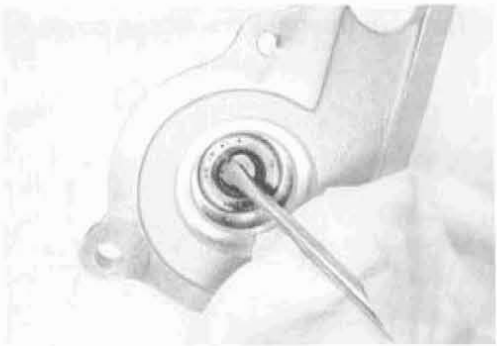
TOOL 09921-20240: Bearing remover set

NOTE:
If there is no abnormal condition, the mechanical seal removal is not necessary.

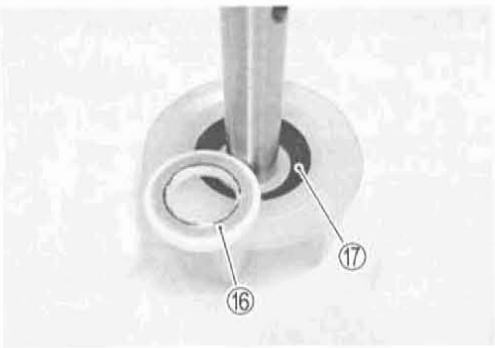


- Place a rag over the water pump.
- Remove the oil seal using a suitable bar.

NOTE:
If there is no abnormal condition, the oil seal removal is not necessary.



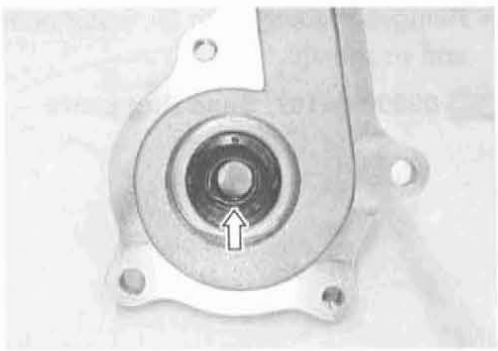
- Remove the mechanical seal ring ⑯ and the rubber seal ⑰ from the impeller.



INSPECTION

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.

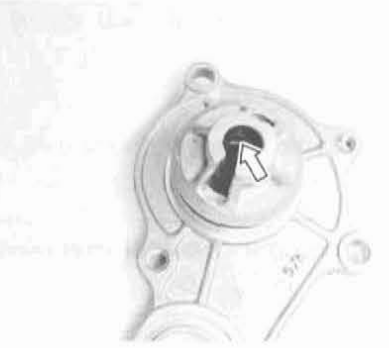


OIL SEAL

- Visually inspect the oil seal for damage, with particular attention given to the lip.
- Replace the oil seal that shows indications of leakage.

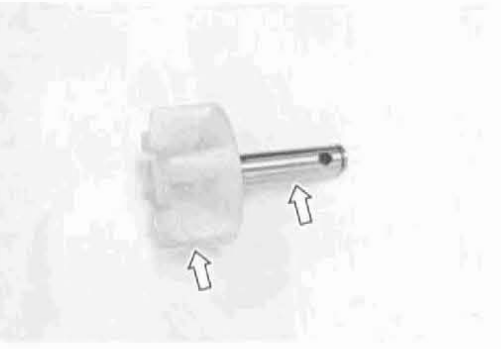
IMPELLER SHAFT JOURNAL

- Visually inspect the journal for damage or scratch.
- Replace the water pump body if necessary.



IMPELLER

- Visually inspect the impeller and its shaft for damage.



REASSEMBLY AND INSTALLATION

- Install the oil seal using the special tool.

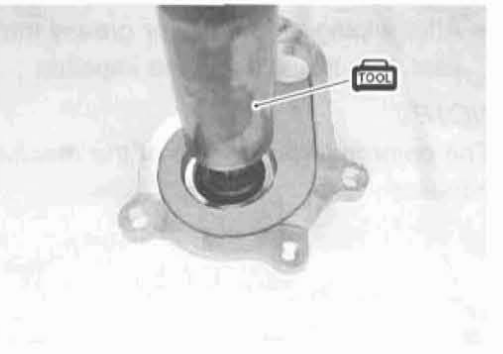
09913-70210: Bearing installer set

NOTE:

The stamped mark on the oil seal faces outside.

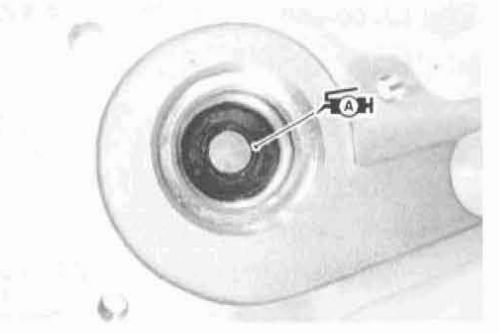
CAUTION

The removed oil seal must be replaced with a new one.



- Apply a small quantity of the SUZUKI SUPER GREASE "A" to the oil seal lip.

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



- Install the mechanical seal using a suitable size socket wrench.

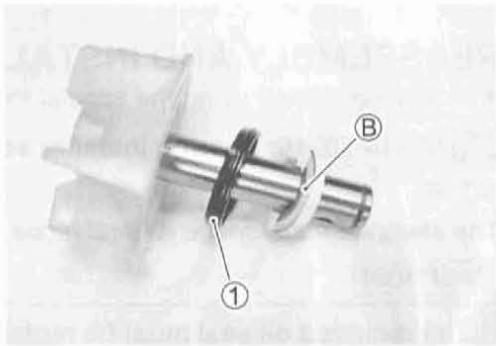
NOTE:
On the mechanical seal, the sealer Ⓐ has been applied.

CAUTION

The removed mechanical seal must be replaced with a new one.

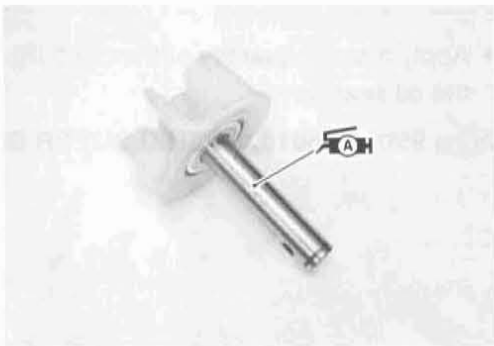
- Install the rubber seal ① into the impeller.
- After wiping off the oily or greasy matter from the mechanical seal ring, install it into the impeller.

NOTE:
The paint marked side Ⓑ of the mechanical seal ring faces the impeller.



- Apply grease to the impeller shaft.

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

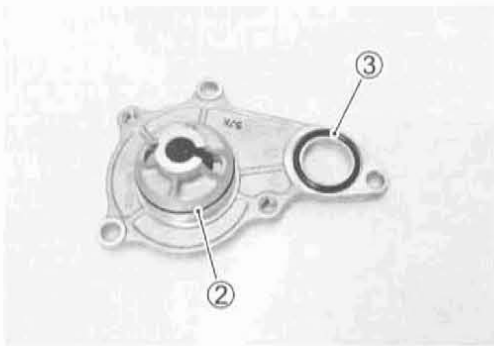


- Apply grease to the O-rings.
- Install the O-rings ② and ③.

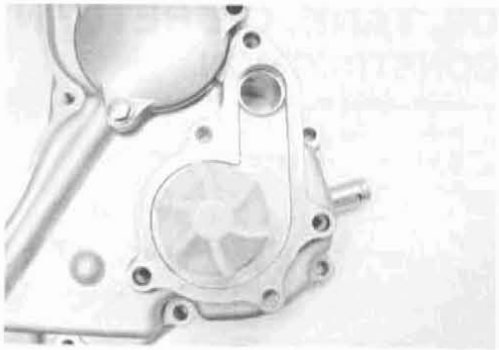
99000-25010: SUZUKI SUPER GREASE "A"
(or equivalent grease)

CAUTION

The removed O-rings must be replaced with new ones.

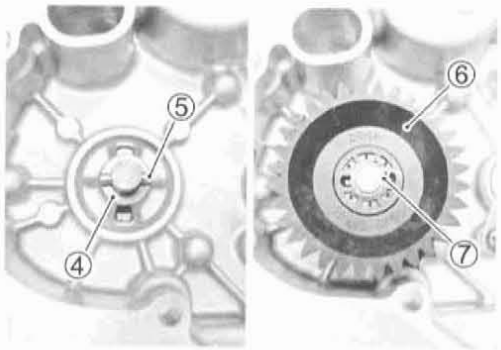


- Install the impeller shaft to the water pump body.
- Install the water pump body with the impeller to the clutch cover.



- Install the washer ④, pin ⑤, water pump driven gear ⑥ and snap ring ⑦.

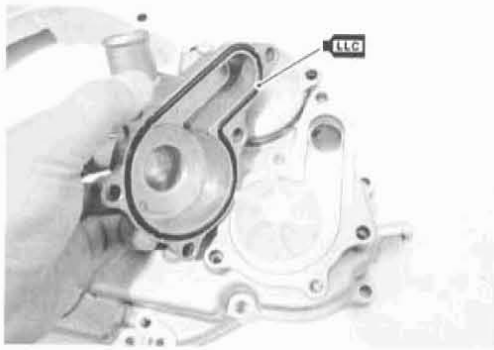
TOOL 09900-06107: Snap ring pliers



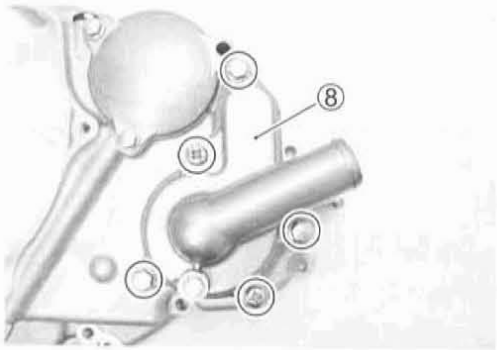
- Apply engine coolant to the O-ring.
- Install the O-ring to the water pump cover.

CAUTION

The removed O-ring must be replaced with a new one.

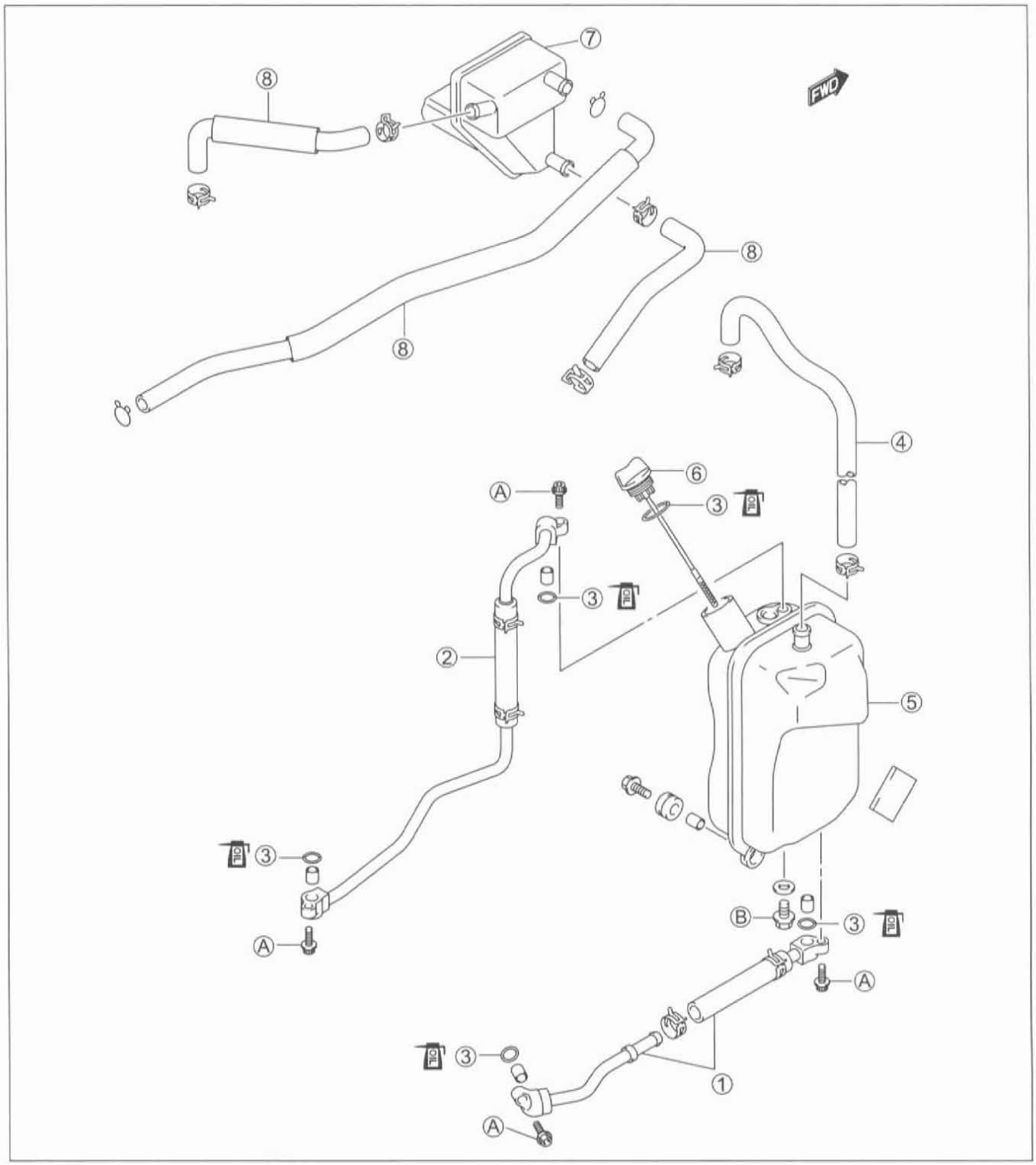


- Install the water pump cover ⑧ to the right crankcase cover.



- Install the right crankcase cover. (☞3-70)
- Install the clutch cover. (☞3-70)
- Install the right oil tank hose. (☞6-23)
- Install the brake pedal (☞7-67) and rear brake switch.
- Connect the breather hose and radiator hose.
- Pour engine oil. (☞2-13)
- Pour engine coolant. (☞2-15)
- Adjust the brake pedal. (☞2-19)
- Adjust the rear brake switch. (☞2-19)

OIL TANK, OIL RETURN TANK AND HOSES
CONSTRUCTION



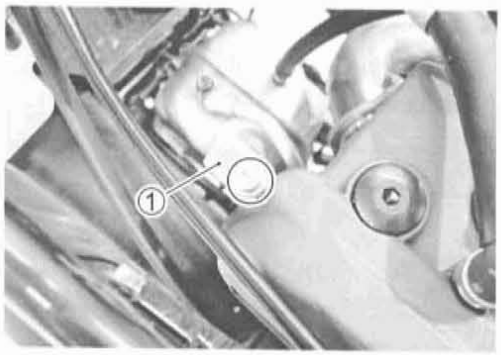
①	Oil tank hose (R)	⑥	Oil level gauge
②	Oil tank hose (L)	⑦	Oil return tank
③	O-ring	⑧	Breather hose
④	Oil tank over-flow hose	Ⓐ	Oil tank hose mounting bolt
⑤	Oil tank	Ⓑ	Drain plug

ITEM	N·m	kgf-m	lb-ft
Ⓐ	10	1.0	7.0
Ⓑ	12	1.2	8.5

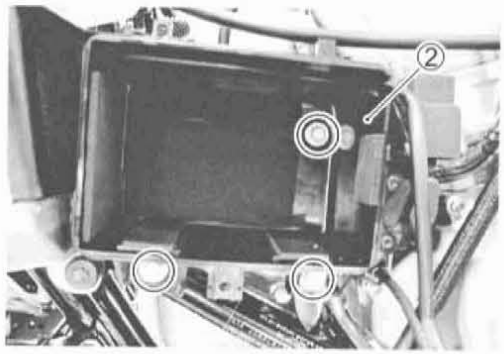
OIL TANK

REMOVAL

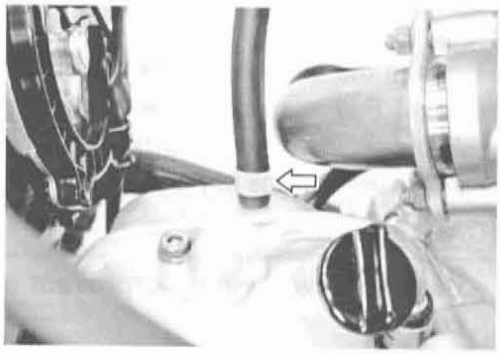
- Remove the front fender. (☞7-6)
- Drain engine oil. (☞2-13)
- Remove the oil return tank. (☞6-23)
- Remove the fuel tank and fuel tank lower cover. (☞5-4)
- Remove the battery. (☞8-3)
- Remove the oil return tank bracket ①.



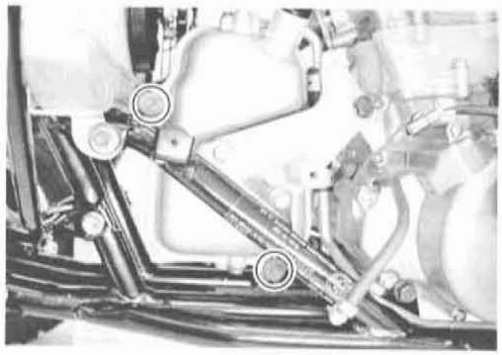
- Remove the battery holder ②.



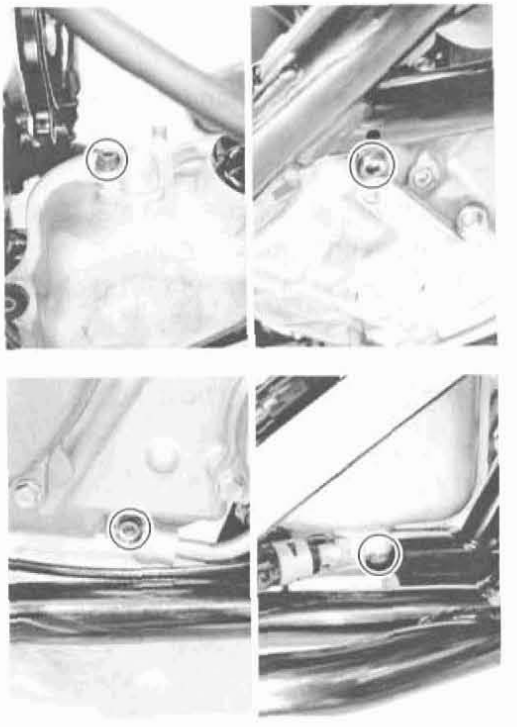
- Disconnect the oil tank over-flow hose.



- Remove the oil return tank mounting bolts.



- Remove the oil tank hose mounting bolts, and then remove the oil tank and right and left oil tank hoses from the body of a vehicle.



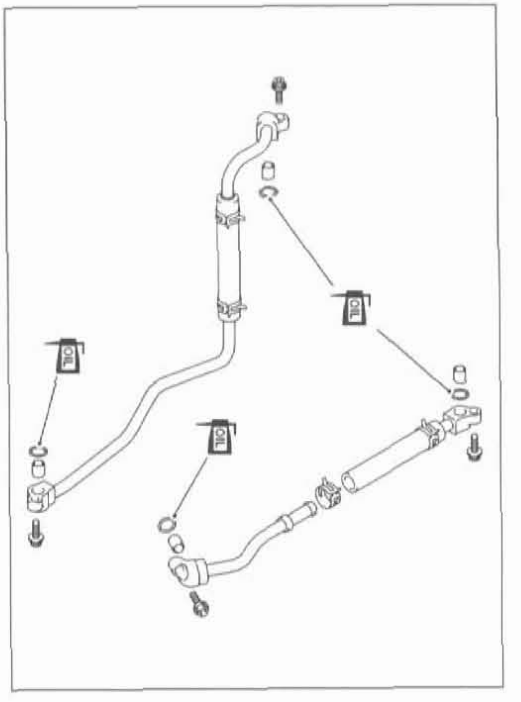
REMOUNTING

Remount the oil tank and oil tank hoses in the reverse order of removal. Pay attention to the following points.

- Apply engine oil to the O-rings.
- Install the O-rings to the right and left hoses.

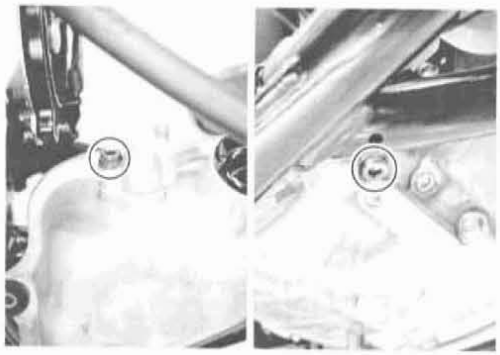
CAUTION

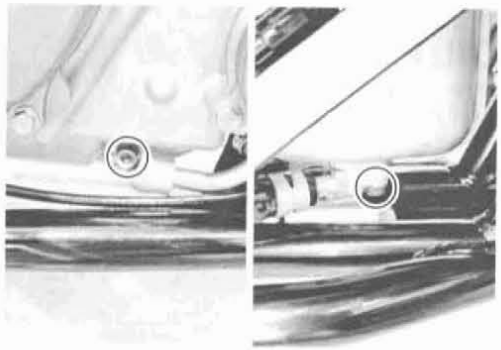
Use the new O-rings to prevent engine coolant leakage.



- Tighten the oil tank hose mounting bolts to the specified torque.

Oil tank hose mounting bolt:
10 N·m (1.0 kgf-m, 7.0 lb-ft)



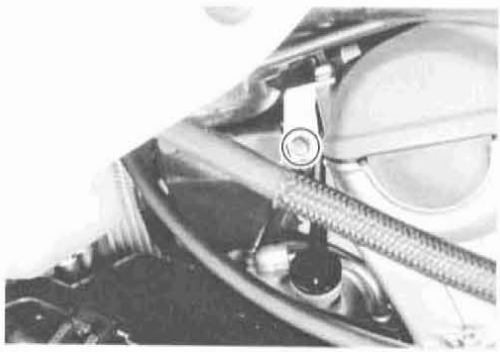


- Install the oil tank.
- Pour engine oil. (☞2-13)

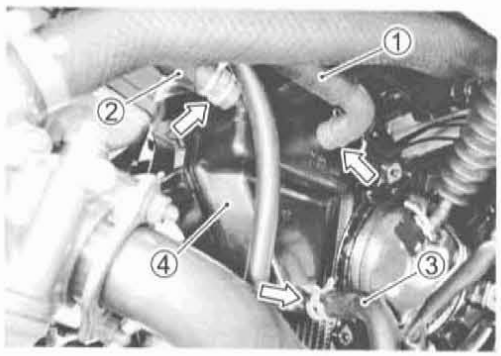
OIL RETURN TANK

REMOVAL AND DISASSEMBLY

- Remove the oil return tank mounting bolt.



- Disconnect the breather hoses ①, ② and ③ and then, remove the oil return tank ④.



INSPECTION

Inspect the oil return tank for damage.
Clean the oil return tank.

INSTALLATION

Install the oil return tank in the reverse order of removal.

LUBRICATION SYSTEM

OIL PRESSURE

☞2-35

OIL FILTER

☞2-13

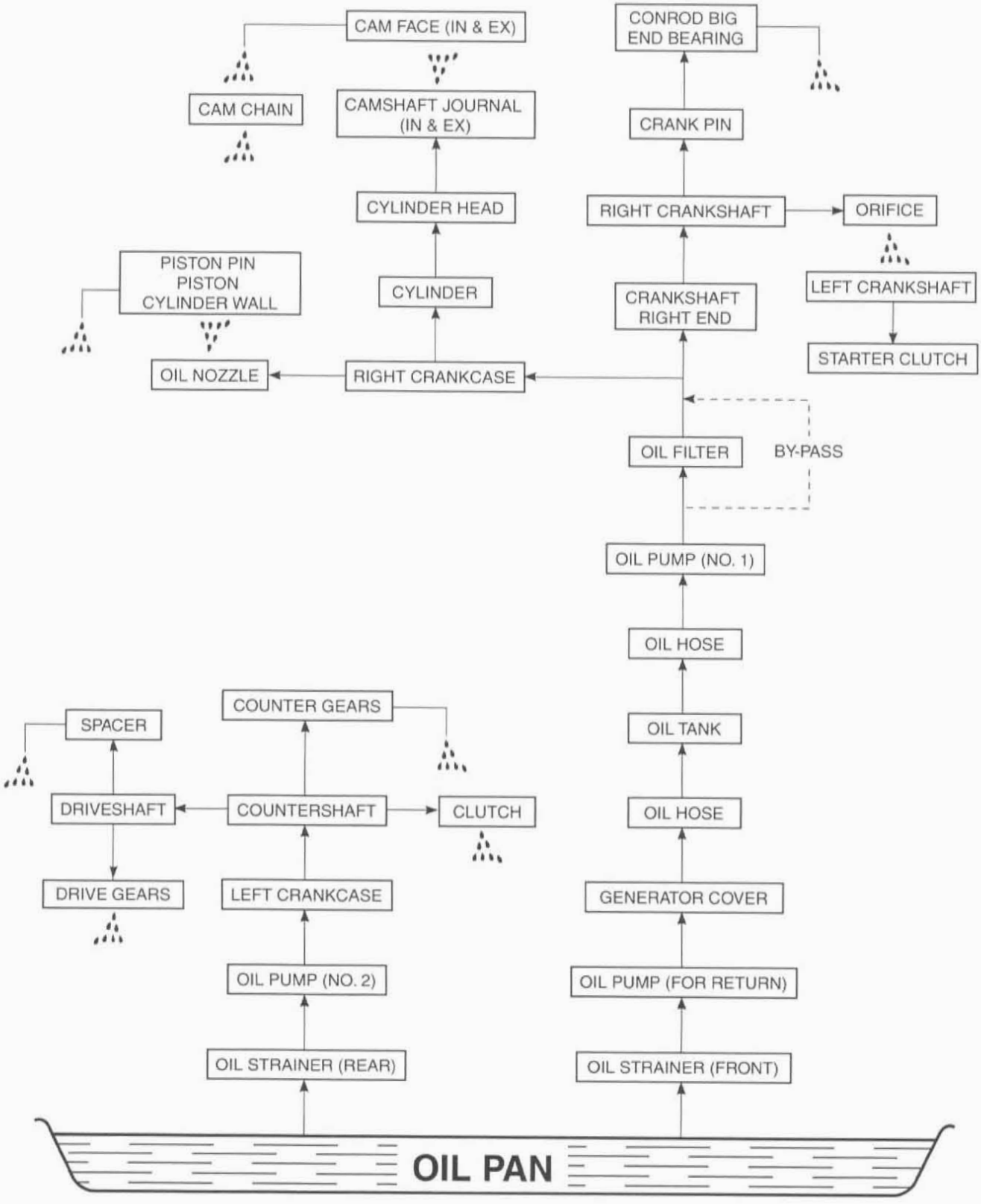
OIL STRAINER

☞3-51

OIL PUMP

☞3-44

ENGINE LUBRICATION SYSTEM CHART



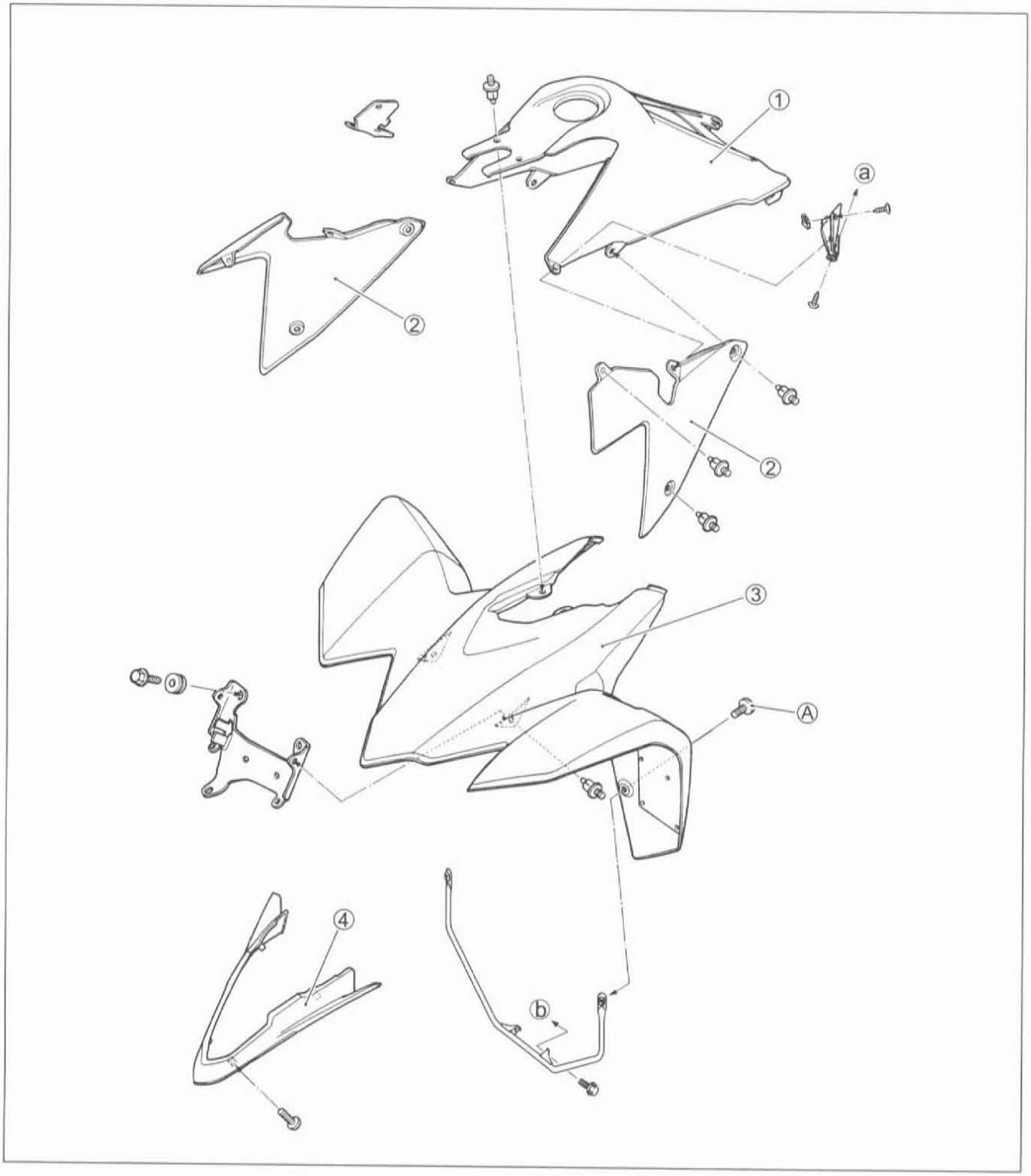
CHASSIS

CONTENTS

CHASSIS

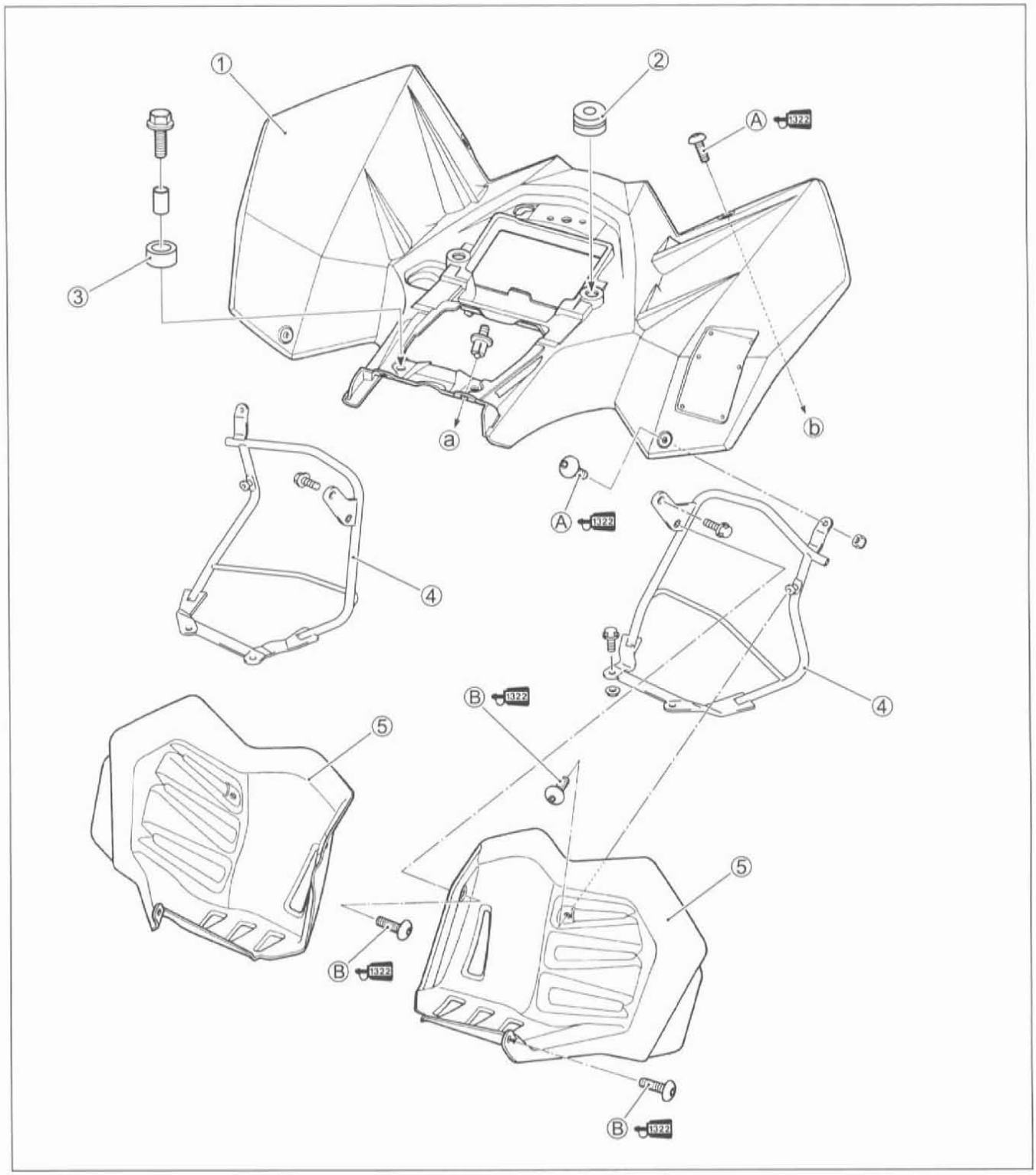
CONTENTS

EXTERIOR PARTS
CONSTRUCTION



①	Fuel tank cover	Ⓐ	Front fender mounting screw
②	Side cover	ⓐ	To front fender
③	Front fender	ⓑ	To frame
④	Headlight cover		

ITEM	N·m	kgf-m	lb-ft
Ⓐ	12	1.2	8.5



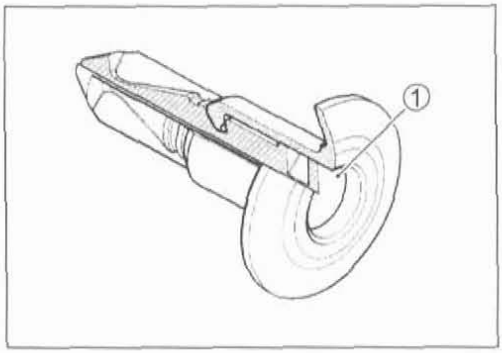
①	Rear fender	Ⓐ	Rear fender mounting screw
②	Cushion (Rear)	Ⓑ	Mud guard mounting screw
③	Cushion (Front)	ⓐ	To fuel tank cover
④	Mud guard reinforcement	ⓑ	To seat rail
⑤	Footrest mud guard		

ITEM	N·m	kgf-m	lb-ft
Ⓐ	12	1.2	8.5
Ⓑ	12	1.2	8.5

FASTENER REMOVAL AND REINSTALLATION

REMOVAL

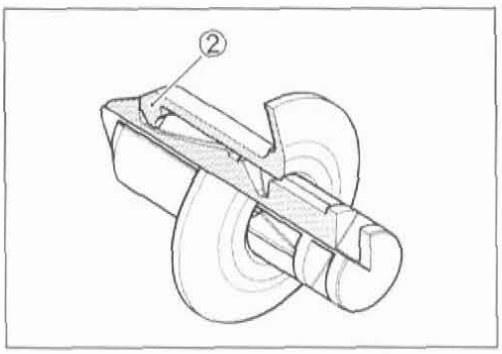
- Depress the head of fastener center piece ①.
- Pull out the fastener.



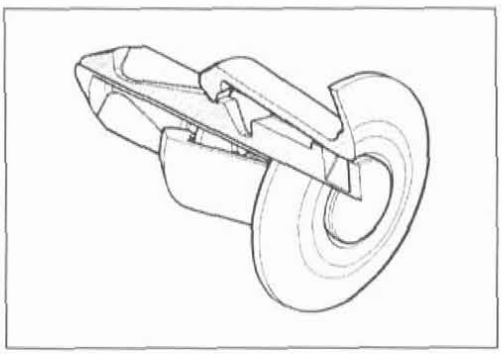
INSTALLATION

- Let the center piece stick out toward the head so that the pawls ② close.
- Insert the fastener into the installation hole.

NOTE:
To prevent the pawl ② from damage, insert the fastener all the way into the installation hole.



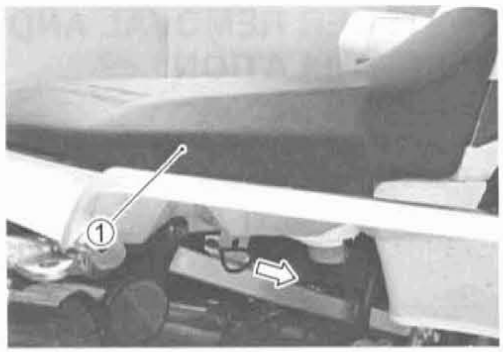
- Push in the head of center piece until it becomes flush with the fastener outside face.



REMOVAL

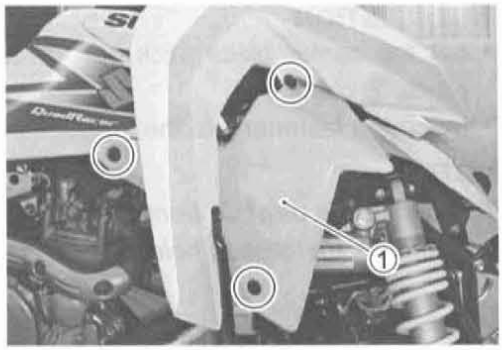
SEAT

- Remove the seat ① by pulling the lock release cable which is located behind the rear fender.



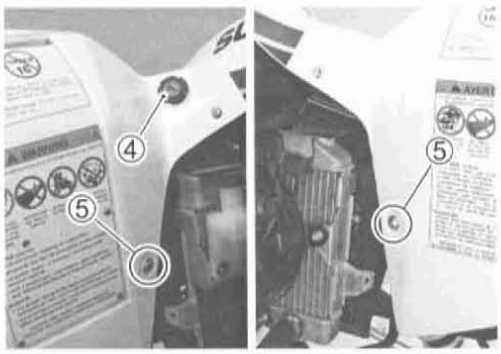
SIDE COVER, FRONT FENDER AND FUEL TANK COVER

- Remove the seat. (☞above)
- Remove the side covers ①, left and right.

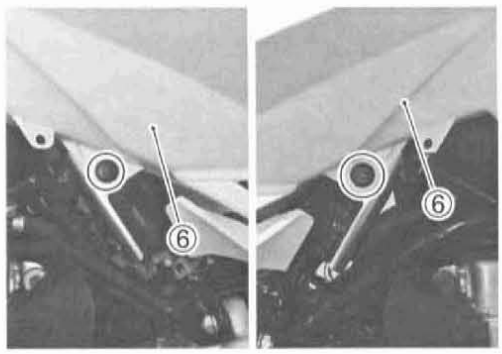


- Remove the fuel tank cap ②.
- Remove the fuel tank cover ③.

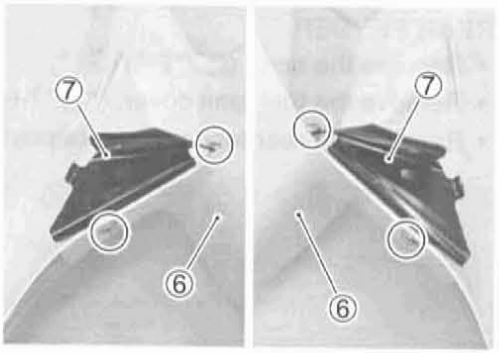
- Remove the ignition switch ④ and front fender mounting screws ⑤.



- Remove the front fender ⑥ by removing the fasteners.

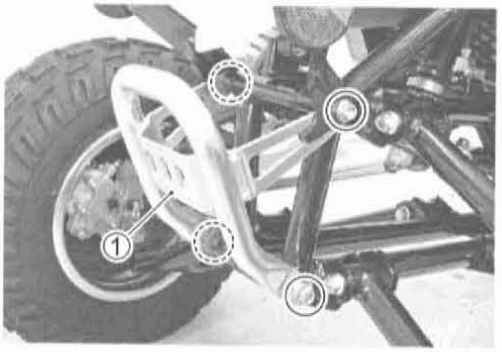


• Remove the brackets ⑦ from the front fender ⑥.



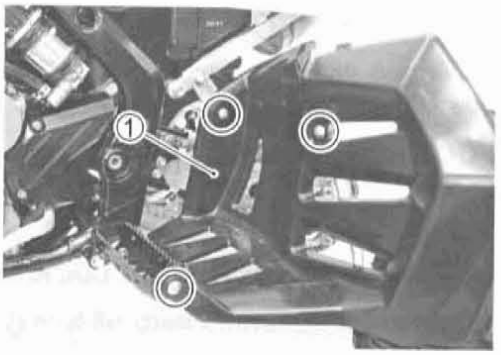
FRONT GRIP

• Remove the front grip ①.

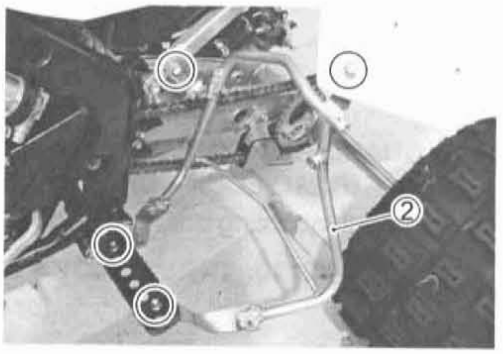


FOOTREST MUD GUARD AND MUD GUARD REINFORCEMENT

• Remove the footrest mud guards ①, left and right.

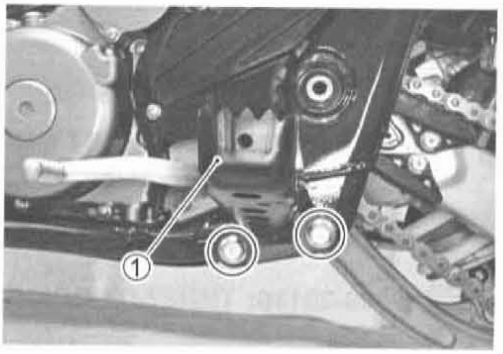


• Remove the mud guard reinforcements ②, left and right.



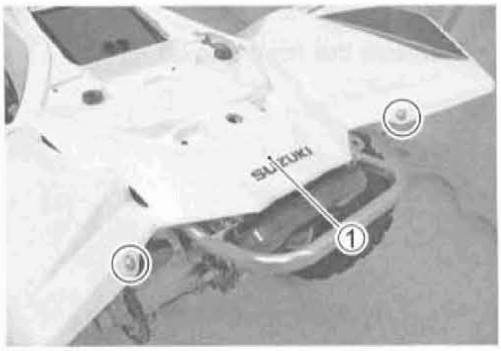
FOOTREST

• Remove the mud guard reinforcements. (☞above)
• Remove the footrests ①, left and right.



REAR FENDER

- Remove the seat. (☞7-6)
- Remove the fuel tank cover. (☞7-6)
- Remove the rear fender ① by removing the mounting screws.



INSTALLATION

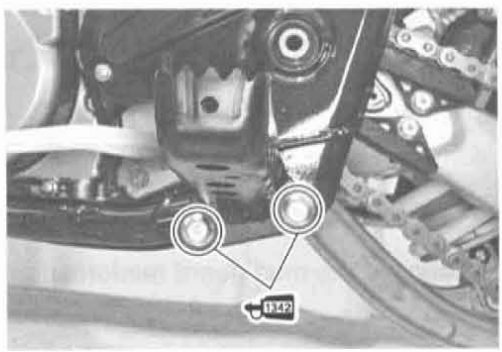
Install the exterior parts in the reverse order of removal. Pay attention to the following points:

FOOTREST

- Apply THREAD LOCK "1342" to the bolts and tighten bolts to the specified torque.

1342 99000-32050: THREAD LOCK "1342"

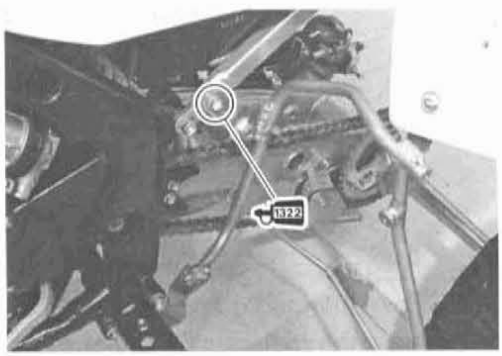
Footrest mounting bolt: 55 N·m (5.5 kgf-m, 40.0 lb-ft)



MUD GUARD REINFORCEMENT

- Apply THREAD LOCK SUPER "1322" to the mud guard reinforcement mounting bolts.

1322 99000-32110: THREAD LOCK SUPER "1322"
(or equivalent thread lock)

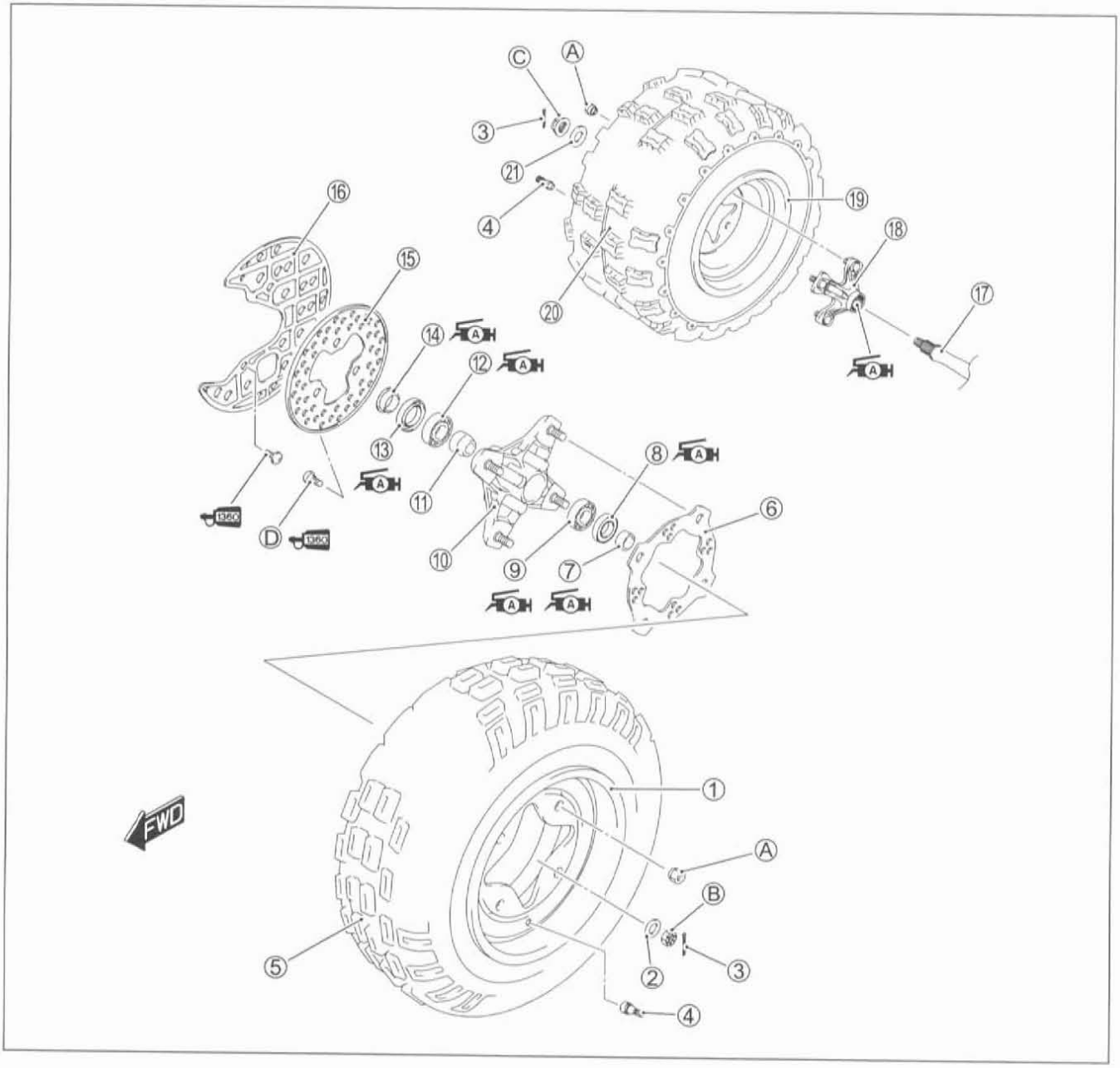


REAR FENDER AND FOOTREST MUD GUARD

- Apply THREAD LOCK SUPER "1322" to the rear fender mounting screws and footrest mud guard mounting screws. (☞7-4)

1322 99000-32110: THREAD LOCK SUPER "1322"
(or equivalent thread lock)

FRONT AND REAR WHEELS
CONSTRUCTION



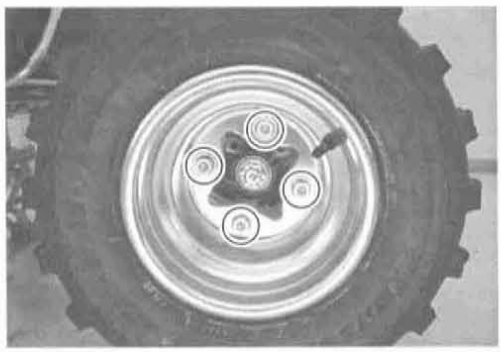
①	Front wheel	⑩	Front wheel hub	⑲	Rear wheel
②	Washer	⑪	Spacer	⑳	Rear tire
③	Cotter pin	⑫	Hub bearing	㉑	Washer
④	Air valve	⑬	Dust seal	Ⓐ	Wheel set nut
⑤	Front tire	⑭	Collar	Ⓑ	Front hub nut
⑥	Front hub plate	⑮	Front brake disc	Ⓒ	Rear hub nut
⑦	Spacer	⑯	Disc cover	Ⓓ	Brake disc bolt
⑧	Dust seal	⑰	Axle shaft		
⑨	Hub bearing	⑱	Rear wheel hub		

ITEM	N·m	kgf-m	lb-ft
Ⓐ	66	6.6	47.5
Ⓑ	65	6.5	47.0
Ⓒ	121	12.1	87.5
Ⓓ	23	2.3	16.5

REMOVAL

FRONT AND REAR WHEELS

- Place the vehicle on level ground.
- Support the vehicle with a jack or wooden block.
- Remove the wheels by removing the wheel set nuts.
- Remove the front hub plate ①.

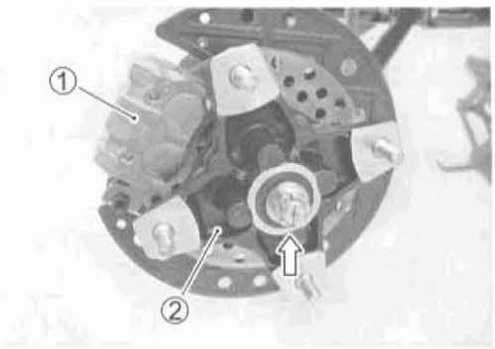


FRONT WHEEL HUB

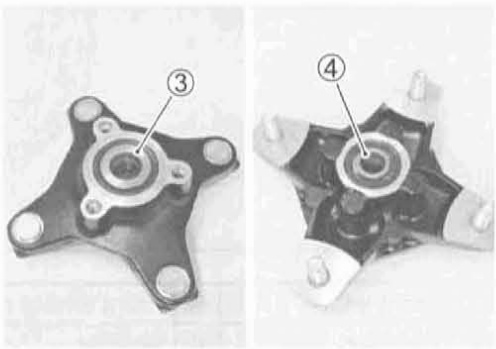
- Remove the front brake caliper ①. (☞7-20)
- Remove the cotter pin, and then loosen the wheel hub nut.
- Remove the wheel hub nut and washer.
- Remove the front wheel hub ②.

CAUTION

Do not operate the brake lever while removing the caliper.

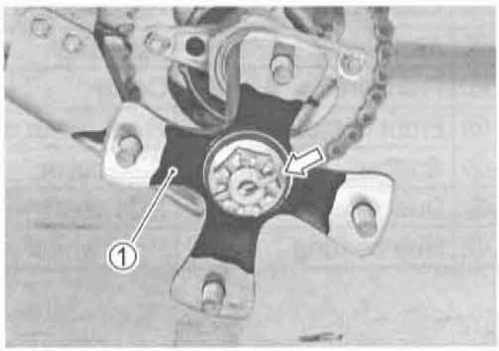


- Remove the brake disc. (☞7-24)
- Remove the collar ③ and spacer ④.



REAR WHEEL HUB

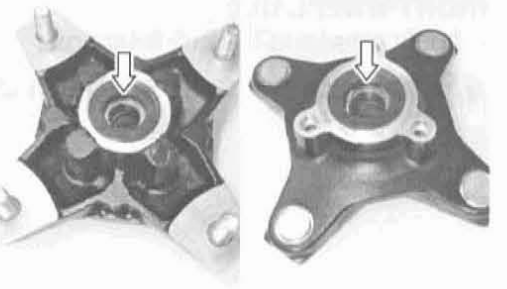
- Remove the rear wheel. (☞7-10)
- Remove the cotter pin and loosen the wheel hub nut by applying the rear brake.
- Remove the wheel hub nut and washer.
- Remove the wheel hub ①.



INSPECTION AND DISASSEMBLY

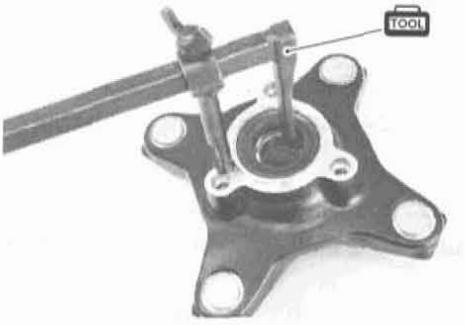
DUST SEAL

Inspect the dust seal lips for wear or damage.
If any defects are found, replace the dust seals with new ones.



- Remove the dust seals with the special tool.

TOOL 09913-50121: Oil seal remover

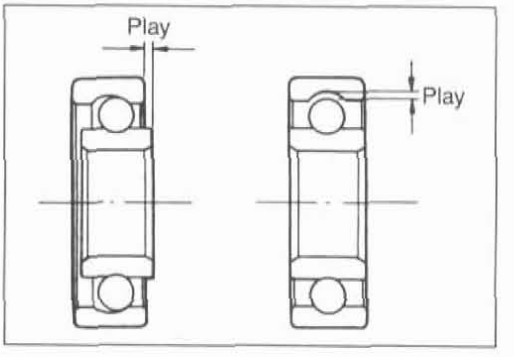


CAUTION

The removed dust seals must be replaced with new ones.

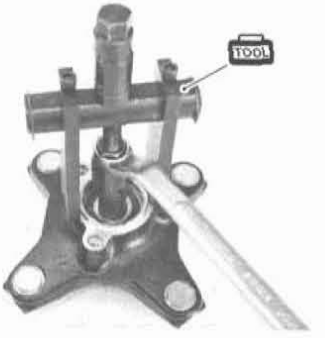
HUB BEARING

Inspect the inner race play of the hub bearing by hand while it is in the wheel hub.
Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. If there is anything unusual, replace the bearing with a new one.



- Remove the hub bearings with the special tool.

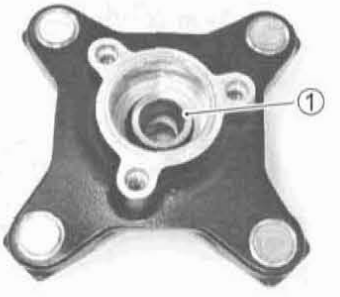
TOOL 09921-20240: Bearing remover set



CAUTION

Do not reuse the removed bearings.

- Remove the spacer ①.



REASSEMBLY AND INSTALLATION

FRONT WHEEL HUB

- Apply grease to the hub bearings.

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

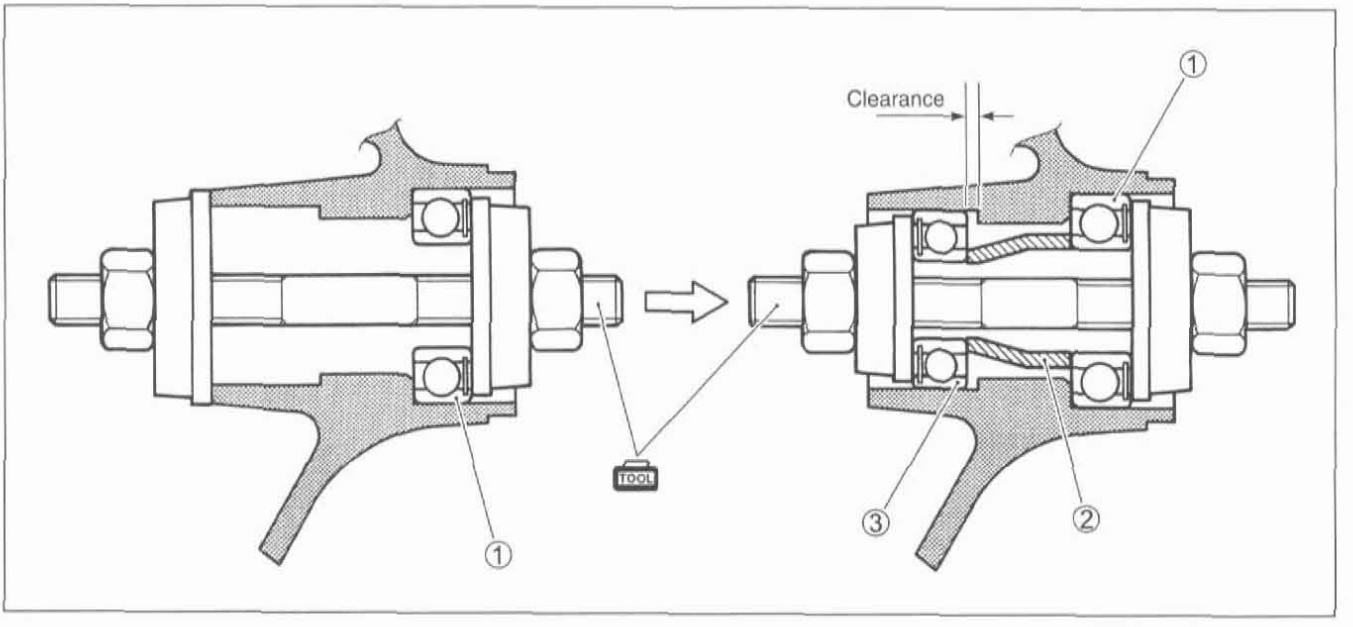
- Install the hub bearings and spacer into the front wheel hub with the special tool.

09913-70210: Bearing installer set
09924-84510: Bearing installer set

NOTE:

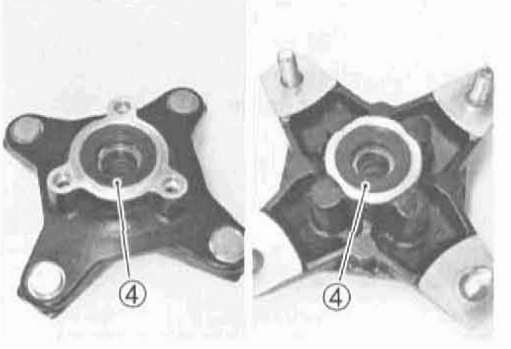
** Install the inner bearing ① first, and then install the spacer ② and the outer bearing ③.*

** Make sure that the sealed side of the bearing faces the bearing installer.*



- Install the dust seals ④ into the front wheel hub with fabric portion facing to outside.

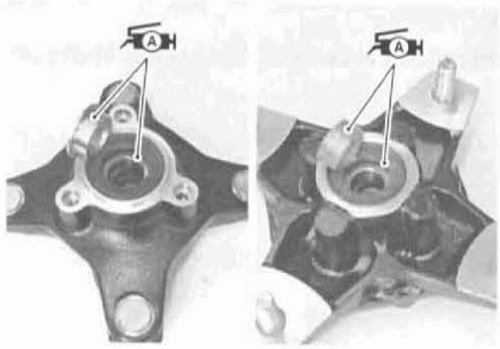
09913-70210: Bearing installer set



- Apply grease to the dust seal lips, collar and spacer.

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

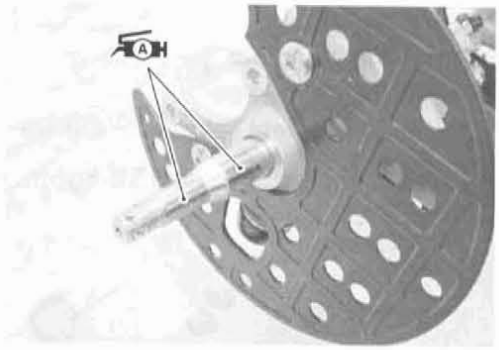
- Install the collar and spacer to the wheel hub.



- Install the front disc to the front wheel hub. (☞7-25)
- Apply grease to the front axle.

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

- Install the wheel hub.
- Install the front brake caliper. (☞7-24)



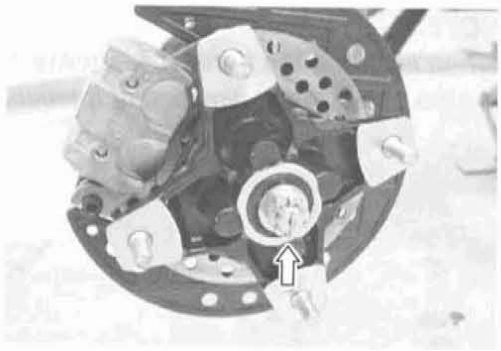
- Tighten the front wheel hub nut to the specified torque.

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

- Install the cotter pin into the front axle.
- Install the front wheel. (☞7-14)

CAUTION

Replace the removed cotter pin with a new one.



REAR WHEEL HUB

- Apply small amount of grease to the wheel hub spline.

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

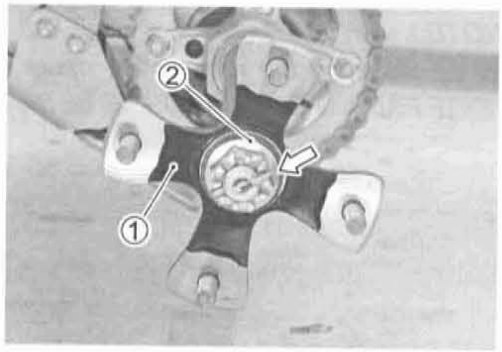
- Install the rear wheel hub ①, washer ② and nut.
- Tighten the rear wheel hub nut to the specified torque.

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

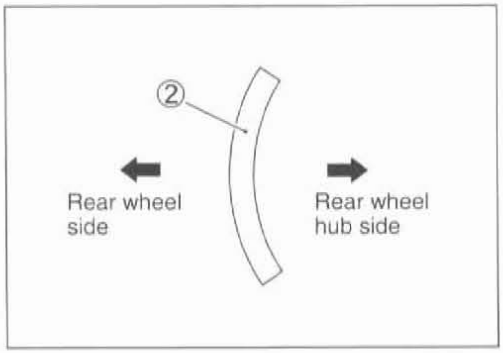
- Install the cotter pin into the rear axle.
- Install the rear wheel. (☞7-14)

CAUTION

Replace the removed cotter pin with a new one.

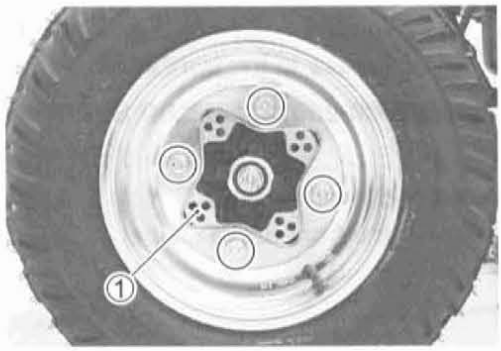


NOTE:
Install the washer ② as shown in the illustration.



FRONT WHEEL
- Install the hub plate ①.
- Install the front wheel.
- Tighten the wheel set nuts to the specified torque.

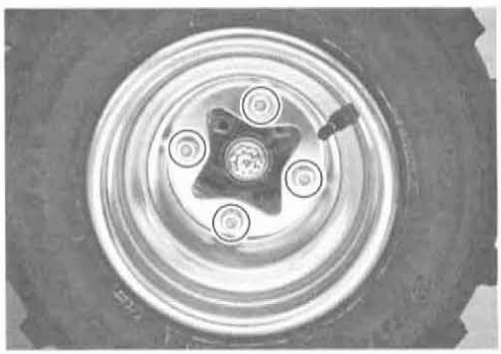
Wheel set nut: 66 N·m (6.6 kgf-m, 47.5 lb-ft)



NOTE:
When installing the front wheel, make sure that the arrow Ⓐ on the tire points in the direction of rotation.

REAR WHEEL
- Install the rear wheel.
- Tighten the wheel set nuts to the specified torque.

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

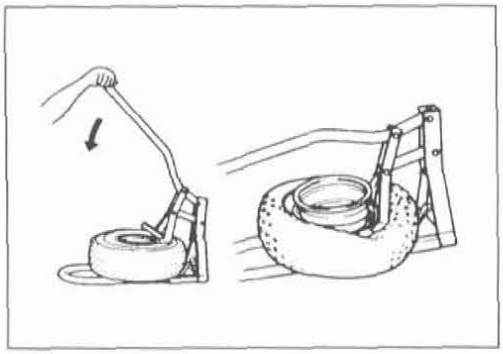


NOTE:
When installing the rear wheel, make sure that the instruction "SIDE FACING OUTWARDS" Ⓑ on the rear tire faces outwards.

TIRES

TIRE REPLACEMENT

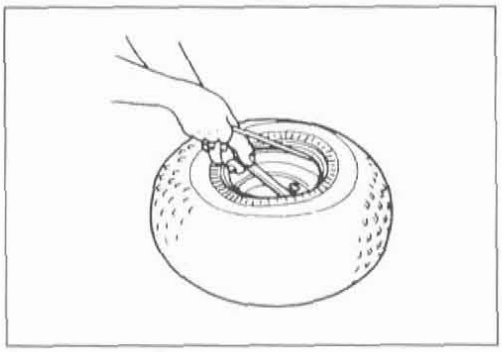
- Remove the front and rear wheels. (☞7-10)
- After removing the air valve cap, release the tire pressure by depressing the valve.
- Dismount the bead from the rim completely as shown.



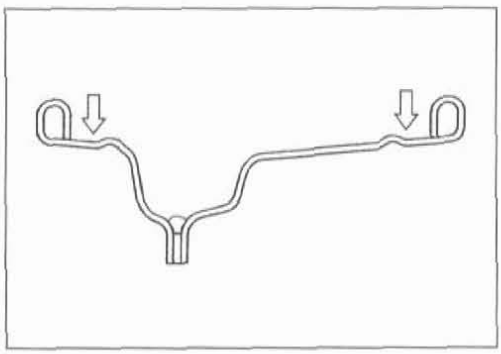
- Separate the tire from the rim by using a set of tire levers and rim protectors.

CAUTION

When using the tire lever, do not scratch or hit the sealing portion (hump) of the wheel or it may cause air-leakage.



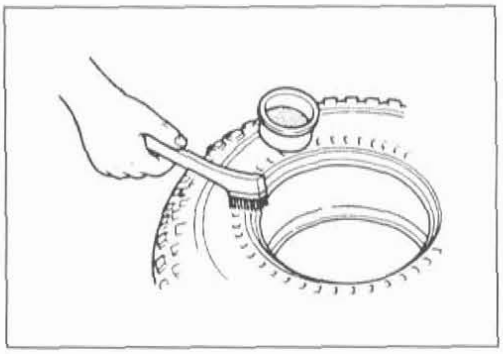
- Inspect the sealing portion of the rim for contamination and distortion. If any damages are found, replace the rim with a new one.
- Clear up the sealing portion of the rim.



- Apply tire lubricant to the tire bead and the flange of the rim.

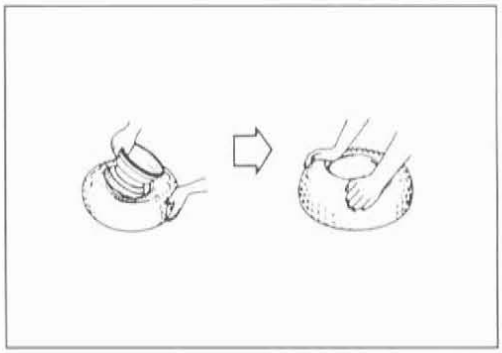
CAUTION

Never apply grease, oil or gasoline to the tire bead because they will deteriorate the tire.



CAUTION

The standard tire fitted on this vehicle is AT20×7R10☆☆☆ for the front and AT18×10R8☆☆☆ for the rear.
The use of tires other than the standard may cause instability. It is highly recommended to use the specified tire.

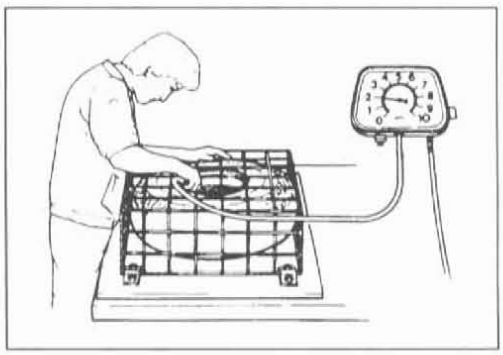


- Mount the tire on the rim.

NOTE:
** For inspecting the tire, refer to page 2-23.*
** Inspect the valve core, before installation.*
** When installing the front tire, make sure that the arrow Ⓐ 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" Ⓑ on the rear tire faces outwards.*

- Inflate the tire to seat the tire bead.

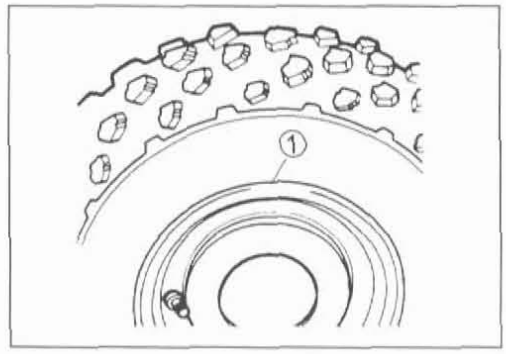
DATA Maximum tire bead seat pressure
Front : 250 kPa (2.5 kgf/cm², 36 psi)
Rear : 250 kPa (2.5 kgf/cm², 36 psi)



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.

NOTE:
Check the "rim line" ① cast on the tire side walls. 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.



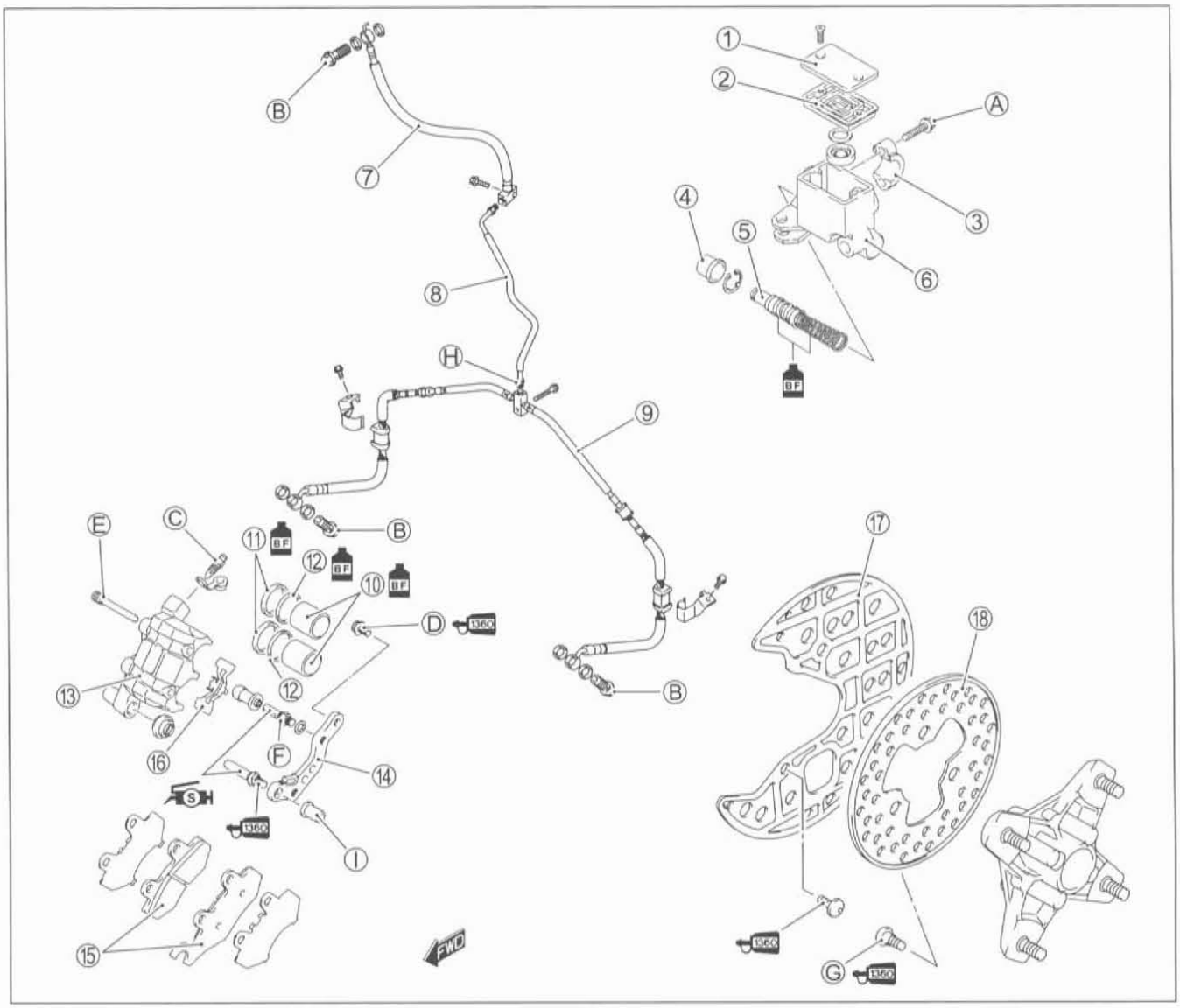
- Adjust the tire pressure to the specification. (☞2-24)

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 indicates the maximum operating pressure.

DATA Maximum operating pressure
☆☆☆: 45 kPa (0.45 kgf/cm², 6.5 psi)

FRONT BRAKE
CONSTRUCTION



①	Master cylinder reservoir cap	⑮	Brake pad
②	Diaphragm	⑯	Pad spring
③	Master cylinder clamp	⑰	Disc cover
④	Boot	⑱	Front brake disc
⑤	Piston assembly	Ⓐ	Master cylinder mounting bolt
⑥	Master cylinder	Ⓑ	Brake hose union bolt
⑦	Brake hose No.1	Ⓒ	Air bleeder valve
⑧	Brake pipe	Ⓓ	Brake caliper mounting bolt
⑨	Brake hose No.2	Ⓔ	Brake pad mounting pin
⑩	Piston	Ⓕ	Caliper holder pin
⑪	Piston seal	Ⓖ	Brake disc bolt
⑫	Dust seal	Ⓗ	Brake pipe nut
⑬	Brake caliper	ⓘ	Caliper holder nut
⑭	Brake caliper holder		

ITEM	N·m	kgf-m	lb-ft
Ⓐ	10	1.0	7.0
Ⓑ	23	2.3	16.5
Ⓒ	6	0.6	4.5
Ⓓ	26	2.6	19.0
Ⓔ	18	1.8	13.0
Ⓕ	18	1.8	13.0
Ⓖ	23	2.3	16.5
Ⓗ	16	1.6	11.5
ⓘ	23	2.3	16.5

⚠ WARNING

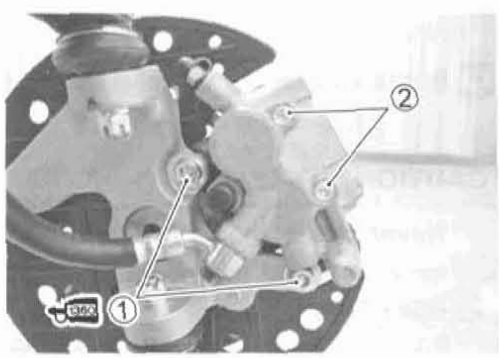
*** This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not use mix different types of fluid, such as silicone-based or petroleum-based.**
*** Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or which has been stored for a long periods of time.**
*** When storing brake fluid, seal the container completely and keep it away from children.**
*** When replenishing brake fluid, take care not to get dust into the fluid.**
*** When washing brake components, use new brake fluid. Never use cleaning solvent.**
*** A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the disc with high quality brake cleaner or neutral detergent.**

CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials etc. and will damage them severely.

BRAKE PAD REPLACEMENT

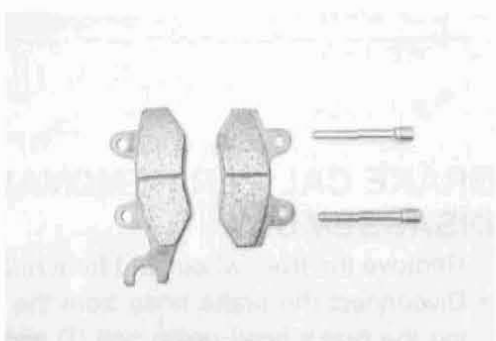
- Remove the front wheel and front hub plate. (☞7-10)
- Remove the brake caliper mounting bolts ① and brake pad mounting pins ②.



- Remove the brake pads.

CAUTION

*** Do not operate the brake lever during or after brake pad removal.**
*** Replace the brake pads as a set, otherwise braking performance will be adversely affected.**



- Install the new brake pads.

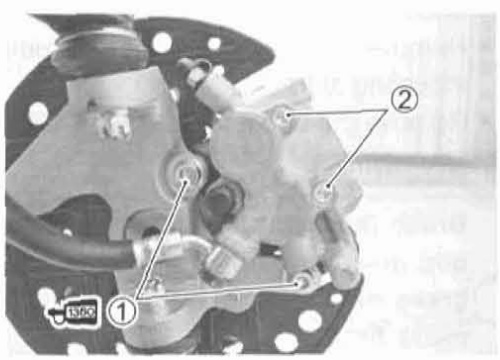
NOTE:
Before installing the new pads, inspect the pad mounting pins for wear. If excessive wear is found, replace them with new ones.

- Apply THREAD LOCK SUPER "1360" to the brake caliper mounting bolts ①.

1360 99000-32130: THREAD LOCK SUPER "1360"

- Tighten the brake pad mounting pins ② and brake caliper mounting bolts ① to the specified torque.

Brake pad mounting pin: 18 N·m (1.8 kgf-m, 13.0 lb-ft)
Brake caliper mounting bolt:
26 N·m (2.6 kgf-m, 19.0 lb-ft)

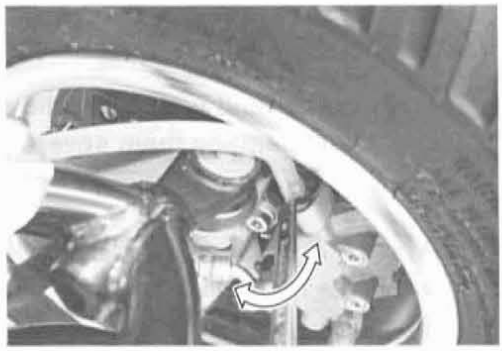


NOTE:
After replacing the brake pads, pump the brake lever several times to check for proper brake operation and then check the brake fluid level.

BRAKE FLUID REPLACEMENT

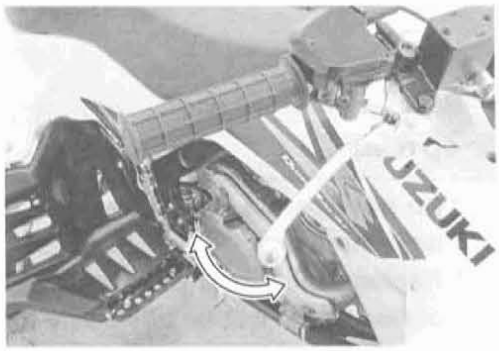
- Place the vehicle on a level surface and keep the handlebar straight.
- Remove the master cylinder reservoir cap and diaphragm.
- Suck up the old brake fluid as much as possible.
- Fill the reservoir with new brake fluid.

Specification and classification: DOT 4



- Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
- Loosen the air bleeder valve and pump the brake lever until the old brake fluid is completely out of the brake system.
- Close the air bleeder valve and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper mark of the reservoir.

Brake air bleeder valve: 6 N·m (0.6 kgf-m, 4.5 lb-ft)

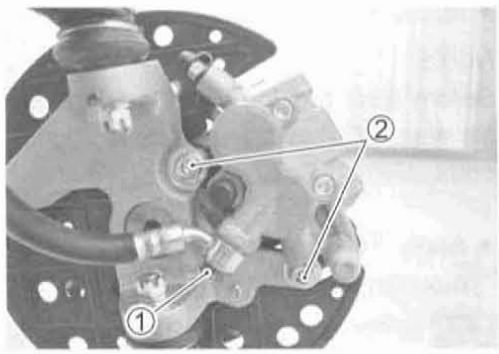


CAUTION

*** Never reuse the brake fluid left over from previous servicing and which has been stored for long periods of time.**

*** Bleed air from the brake system.**
(☞2-21)

BRAKE CALIPER REMOVAL AND DISASSEMBLY

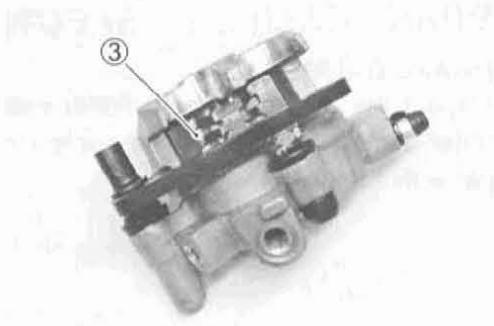


- Remove the front wheel and front hub plate. (☞7-10)
- Disconnect the brake hose from the brake caliper by removing the brake hose union bolt ① and allow the brake fluid to drain into a suitable receptacle.
- Remove the brake caliper by removing the brake caliper mounting bolts ②.
- Remove the brake pads. (☞7-19)

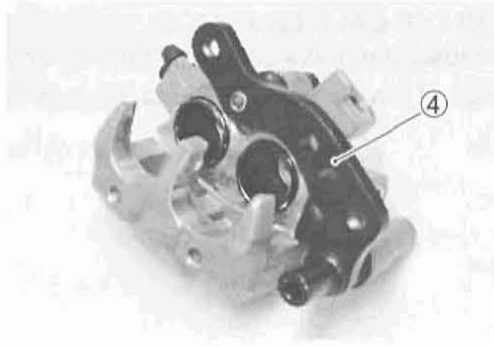
⚠ WARNING

Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose, brake pipe and hose joints for cracks and leakage of brake fluid.

- Remove the spring ③.



- Remove the brake caliper holder ④.

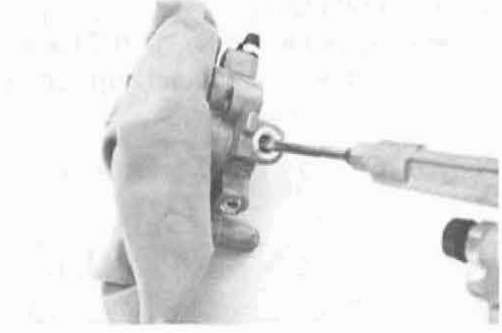


- Remove the rubber parts.

- Place a rag over the brake caliper piston to prevent the piston from popping out and then force out the piston using compressed air.

CAUTION

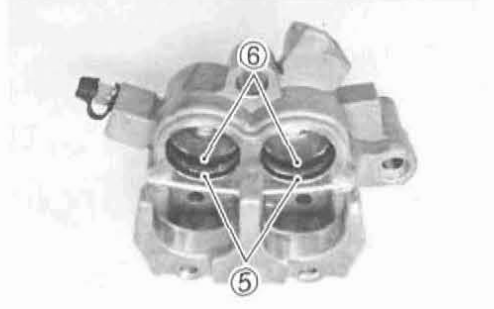
Do not use high pressure air to prevent brake caliper piston damage.



- Remove the dust seals ⑤ and piston seals ⑥.

CAUTION

Do not reuse the dust seals and piston seals to prevent fluid leakage.



BRAKE CALIPER INSPECTION

BRAKE CALIPER

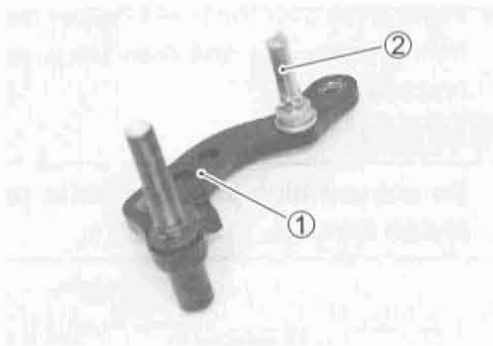
Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any defects are found, replace the brake caliper with a new one.

BRAKE CALIPER PISTON

Inspect the brake caliper pistons for any scratches or other damage. If any defects are found, replace the piston with new ones.

RUBBER PARTS

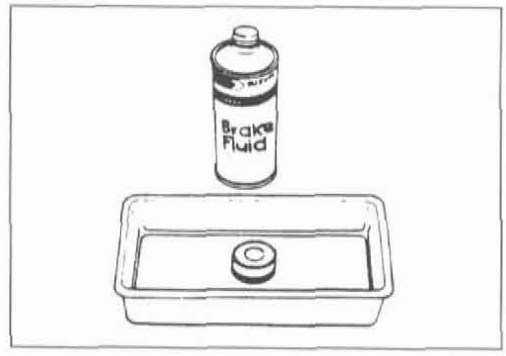
Inspect the rubber parts for damage. If any defects are found, replace them with new ones.



CALIPER HOLDER

Inspect the caliper holder ① and caliper holder pin ② for damage. If any defects are found, replace them with new ones.

BRAKE CALIPER REASSEMBLY AND INSTALLATION



Reassemble and install the brake caliper in the reverse order of removal and disassembly. Pay attention to the following points:

- Clean the caliper bores and pistons with the specified brake fluid. Thoroughly clean the dust seal grooves and piston seal grooves.

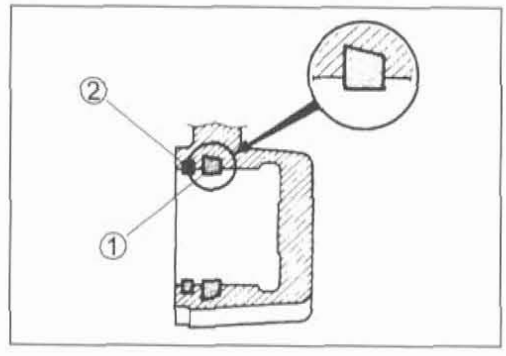
BF Specification and classification: DOT 4

CAUTION

*** Clean the brake caliper components with fresh brake fluid before reassembly.**
*** Do not wipe the brake fluid off after cleaning the components.**
*** When cleaning the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine or others.**
*** Replace the removed piston seals and dust seals with new ones.**
*** Apply brake fluid to all of the seals, brake caliper bores and pistons before reassembly.**

PISTON SEAL

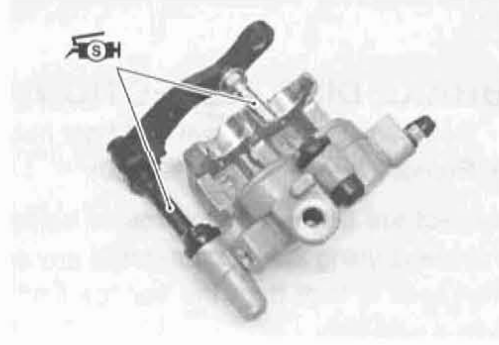
- Install the piston seals ① and dust seals ② as shown.



BRAKE CALIPER HOLDER

- Apply SUZUKI SILICONE GREASE to the brake caliper holder pins.

S H 99000-25100: SUZUKI SILICONE GREASE



- Apply THREAD LOCK SUPER "1360" to the brake caliper mounting bolts ②.

1360 99000-32130: THREAD LOCK SUPER "1360"

- Tighten the brake pad mounting pins ①, brake caliper mounting bolts ② and brake hose union bolt ③ to the specified torque.

Brake pad mounting pin: 18 N·m (1.8 kgf-m, 13.0 lb-ft)
Brake caliper mounting bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)
Brake hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

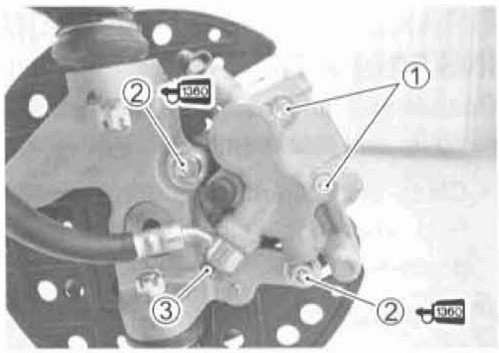
- For assembly procedure of brake hose. (☞9-22)

NOTE:
Before remounting the brake caliper, push the brake caliper pistons all the way into the caliper.

CAUTION

*** The removed brake hose washers should be replaced with new ones in order to prevent leakage of brake fluid.**
*** Bleed air from the system after reassembling the brake caliper. (☞2-21)**

- Install the front hub plate and front wheel. (☞7-14)



BRAKE DISC REMOVAL AND DISASSEMBLY

- Remove the front wheel. (☞7-10)
- Remove the front wheel hub. (☞7-10)
- Remove the brake disc.

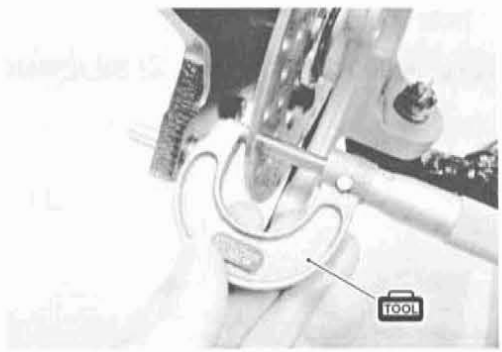
BRAKE DISC INSPECTION

- Remove the front wheel and front hub plate. (☞7-10)
- Remove the caliper. (☞7-20)

Inspect the brake disc for cracks or damage and measure the thickness using the micrometer. If any defects are found or if the thickness is less than the service limit, replace the brake disc with a new one.

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

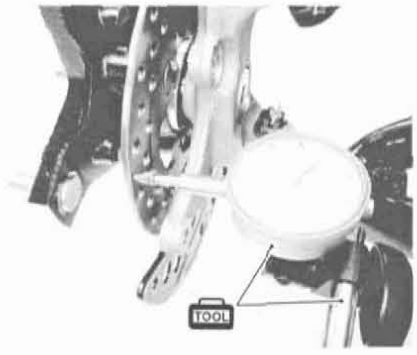
DATA Brake disc thickness
Service Limit: 2.5 mm (0.098 in)



Measure the runout using the dial gauge. If the runout exceeds the service limit, replace the brake disc with a new one.

TOOL 09900-20607: Dial gauge (1/100 mm)
09900-20701: Magnetic stand

DATA Brake disc runout
Service Limit: 0.3 mm (0.012 in)



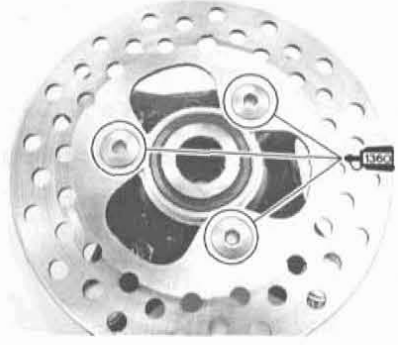
- If either measurement exceeds the service limit, replace the brake disc with a new one.
- Install the caliper. (☞7-24)
- Install the front hub plate and front wheel. (☞7-14)

BRAKE DISC REASSEMBLY AND INSTALLATION

Reassemble and install the brake disc in the reverse order of removal and disassembly. Pay attention to the following points:

- Apply THREAD LOCK SUPER "1360" to the brake disc bolts and tighten them to the specified torque.

NOTE:
Make sure that the disc is clean and free of any greasy matter.



1360 99000-32130: THREAD LOCK SUPER "1360"

Brake disc bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

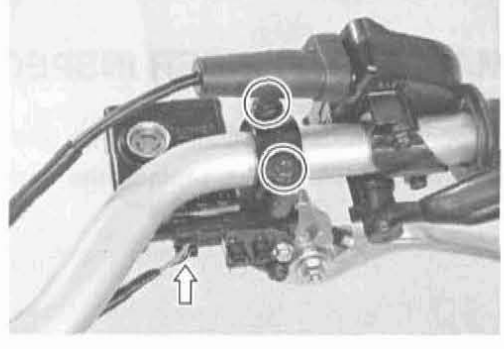
- Install the front wheel hub and front wheel. (☞7-13, 14)

MASTER CYLINDER REMOVAL AND DISASSEMBLY

- Place a rag underneath the brake hose union bolt on the master cylinder to catch any split brake fluid. Remove the brake hose union bolt and disconnect the brake hose.

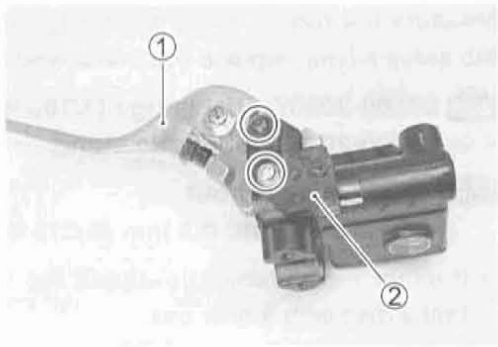
CAUTION

Immediately and completely wipe off any brake fluid contacting any part of the vehicle. The brake fluid reacts chemically with paint, plastics, rubber materials, etc., and will damage them severely.

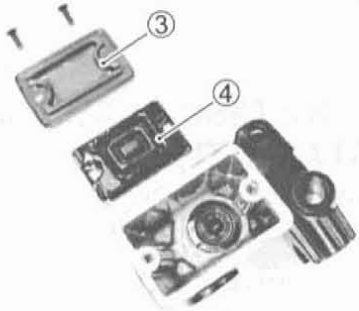


- Remove the master cylinder assembly.
- Disconnect the brake switch coupler.

• Remove the brake lever ① and brake switch ②.

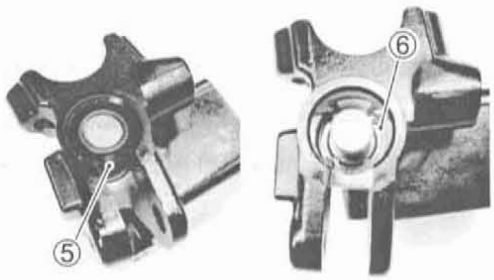


• Remove the reservoir cap ③ and diaphragm ④.



• Pull the dust boot ⑤ out and remove the snap ring ⑥.

TOOL **09900-06108: Snap ring pliers**

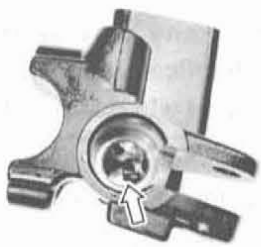


• Remove the piston assembly ⑦.

MASTER CYLINDER INSPECTION

MASTER CYLINDER

Inspect the master cylinder bore for any scratches or damage. If any defects are found, replace the master cylinder with a new one.

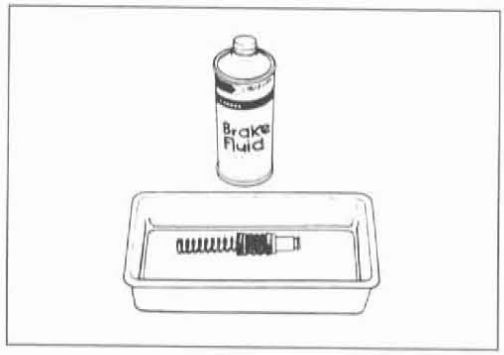


PISTON AND RUBBER PARTS

Inspect the piston surface, primary/secondary cup and dust boot for any scratches, wear or damage. If any defects are found, replace the piston set with a new one.

MASTER CYLINDER REASSEMBLY AND INSTALLATION

Reassemble and install the master cylinder in the reverse order of removal and disassembly. Pay attention to the following points:

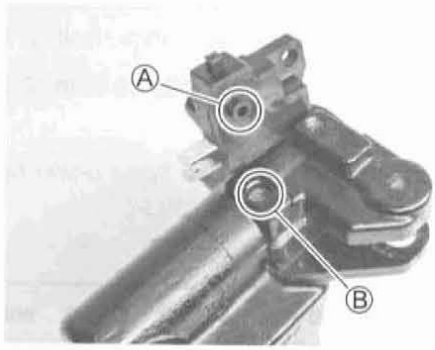


CAUTION

*** Clean the master cylinder components with fresh brake fluid before reassembly.**
*** Do not wipe the brake fluid off after cleaning the components.**
*** When cleaning the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine or others.**
*** Apply brake fluid to the cylinder bore and all the component to be inserted into the bore.**

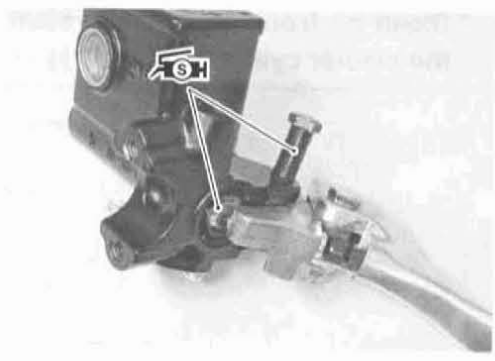
Specification and classification: DOT 4

- Align the convex part Ⓐ of brake switch with the hole Ⓑ of master cylinder when installing the brake switch.



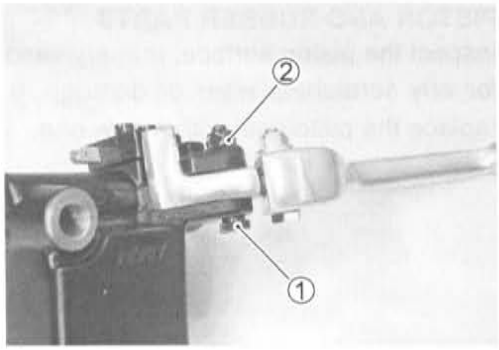
- Apply SUZUKI SILICONE GREASE to the brake lever bolt.
- Apply SUZUKI SILICONE GREASE to the contact point between piston and brake lever.

99000-25100: SUZUKI SILICONE GREASE



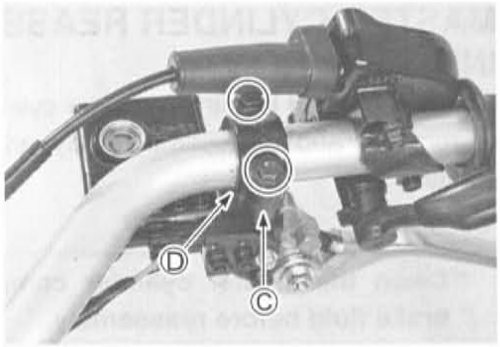
• Tighten the brake lever pivot bolt ① and lock-nut ②.

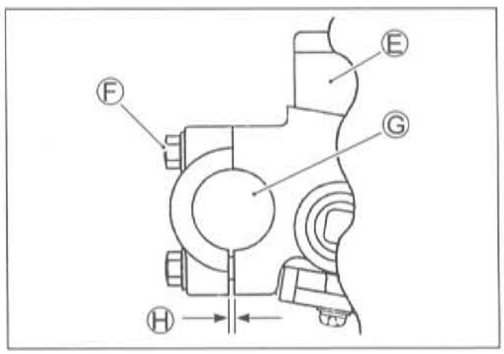
Brake lever pivot bolt: 6.0N·m (0.6 kgf-m, 4.5 lb-ft)
Brake lever pivot bolt lock-nut: 6.0N·m (0.6 kgf-m, 4.5 lb-ft)



• Align the master cylinder holder mating surface Ⓒ with the punch mark Ⓓ on the handlebars and tighten the upper clamp bolt first.

Master cylinder clamp bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)





Ⓔ Master cylinder
Ⓕ Master cylinder upper clamp bolt
Ⓖ Handlebar
Ⓗ Clearance

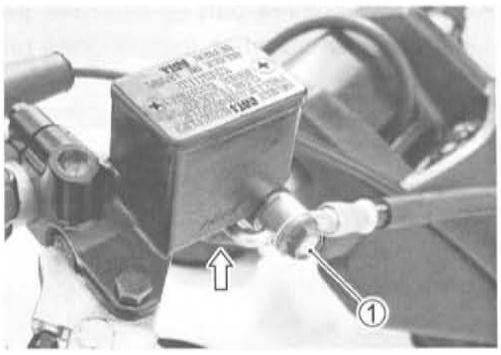
• Tighten the brake hose union bolt ① to the specified torque.

Brake hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

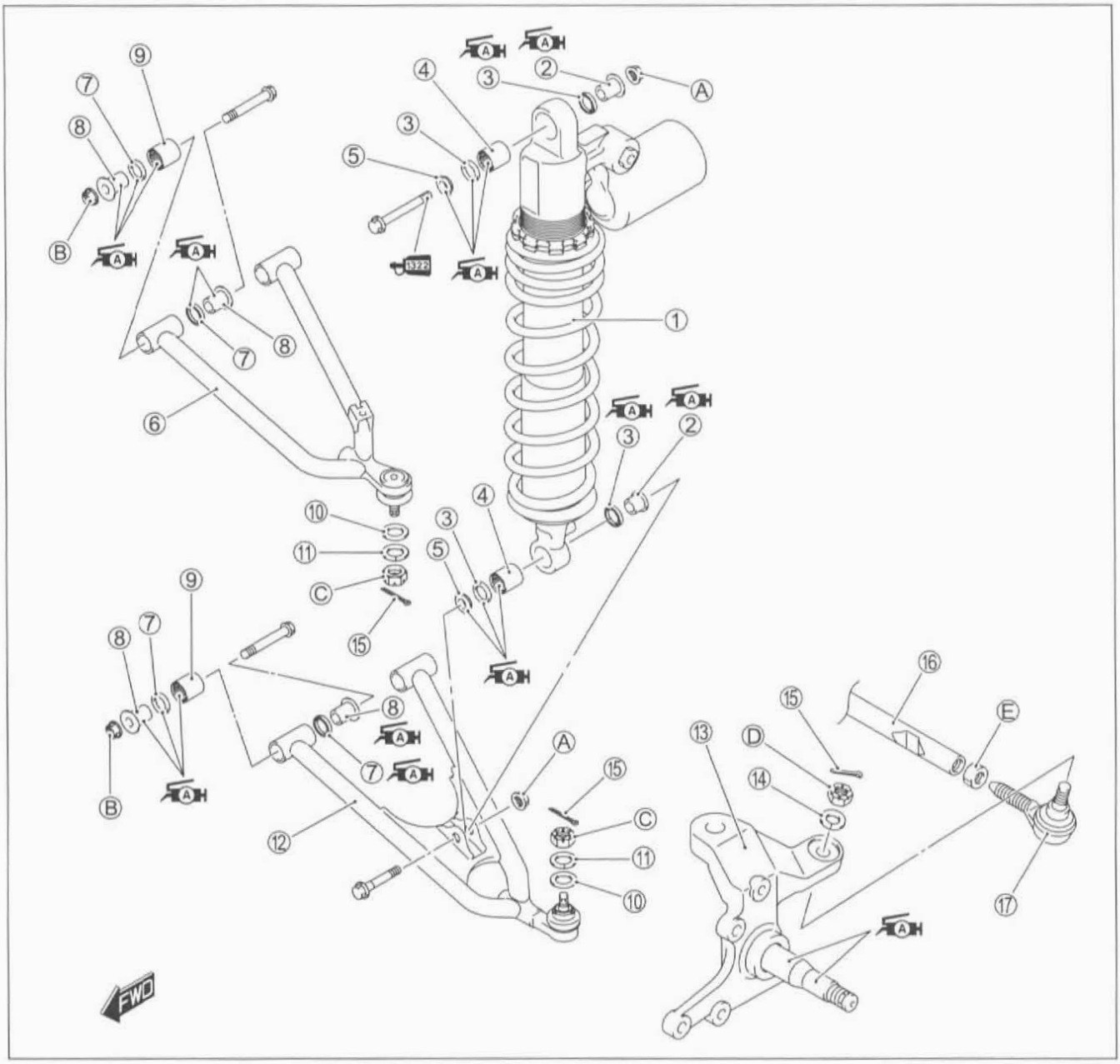
NOTE:
After contacting the brake hose union to the stopper, tighten the union bolt.

CAUTION

*** The removed brake hose washers should be replaced with new ones.**
*** Bleed air from the brake system after reassembling the master cylinder. (☞2-21)**



FRONT SUSPENSION
CONSTRUCTION

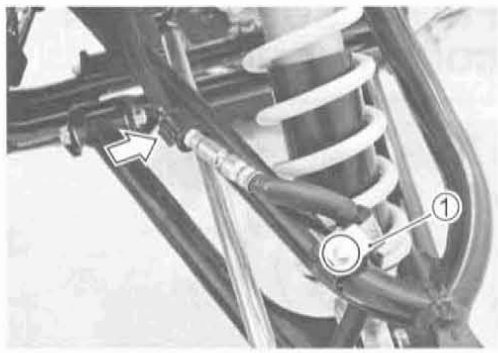


①	Front shock absorber	⑫	Lower wishbone arm
②	Collar	⑬	Steering knuckle
③	Dust seal	⑭	Spring washer
④	Bearing	⑮	Cotter pin
⑤	Collar	⑯	Tie rod
⑥	Upper wishbone arm	⑰	Tie rod end
⑦	Dust seal	Ⓐ	Shock absorber mounting nut
⑧	Collar	Ⓑ	Wishbone arm pivot nut
⑨	Bearing	Ⓒ	Knuckle end nut
⑩	Washer	Ⓓ	Tie rod end nut
⑪	Spring washer	Ⓔ	Tie rod lock-nut

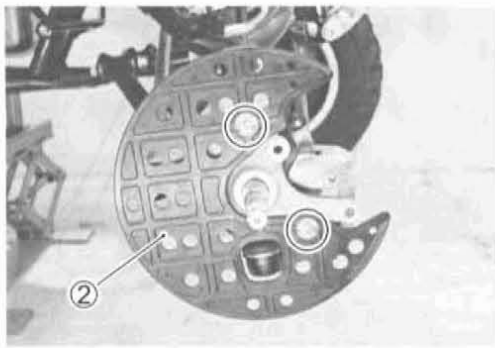
ITEM	N·m	kgf-m	lb-ft
Ⓐ	60	6.0	43.5
Ⓑ	65	6.5	47.0
Ⓒ	23	2.3	16.5
Ⓓ	23	2.3	16.5
Ⓔ	29	2.9	21.0

REMOVAL

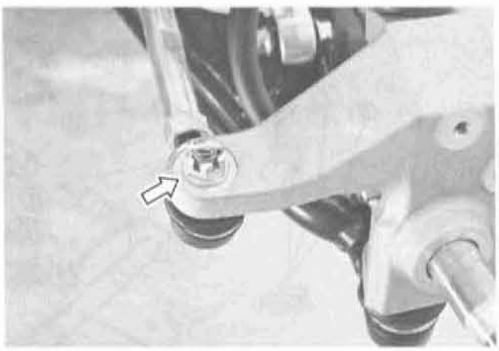
- Remove the front wheel. (☞7-10)
- Remove the front wheel hub. (☞7-10)
- Remove the brake caliper. (☞7-20)
- Remove the brake hose clamp ①.
- Disconnect the brake hose at the hose clamp.



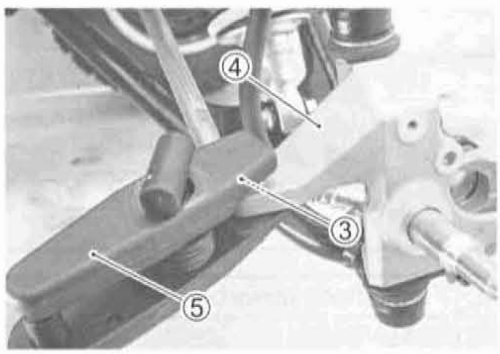
- Remove the front disc cover ②.



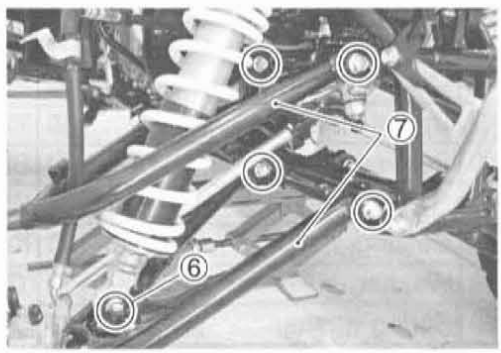
- Remove the cotter pin and tie rod end nut.



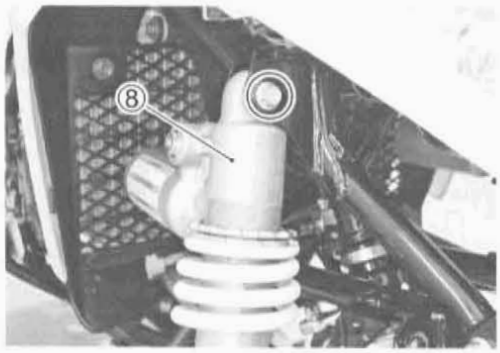
- Remove the tie rod end ③ from the steering knuckle ④ with a commercially available ball bearing joint remover ⑤.



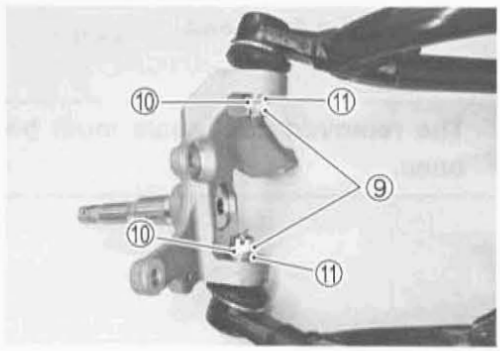
- Remove the front shock absorber lower mounting bolt ⑥.
- Remove the wishbone arm assembly ⑦.



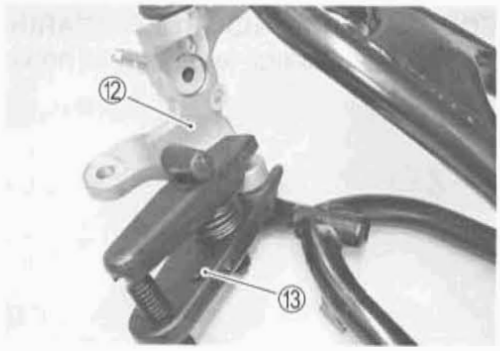
- Remove the front shock absorber ⑧ by removing the upper mounting bolt.



- Remove the cotter pins, nuts ⑨, spring washer ⑩ and washer ⑪.



- Remove the steering knuckle ⑫ with a commercially available ball bearing joint remover ⑬.



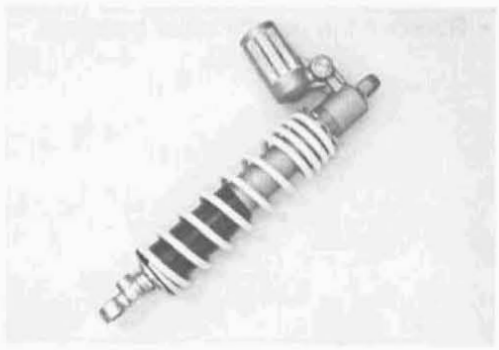
INSPECTION AND DISASSEMBLY

FRONT SHOCK ABSORBER

Inspect the shock absorber body for oil leakage or damage. If any defects are found, replace the shock absorber with a new one.

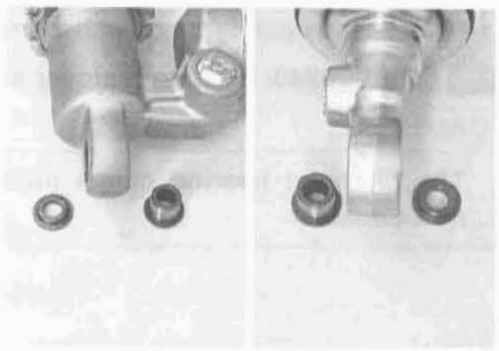
CAUTION

Do not attempt to disassemble the front shock absorber. It is unserviceable.

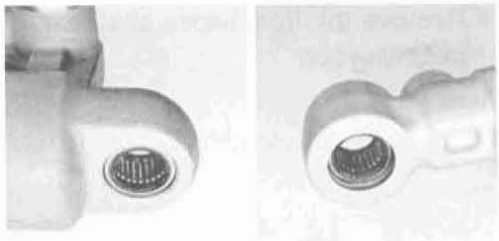


FRONT SHOCK ABSORBER DUST SEAL

- Remove the collars.



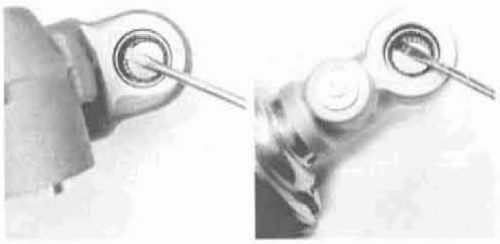
Inspect the dust seal lips and collars for wear or damage.
If any defects are found, replace the dust seals and collars with new ones.



- Remove the dust seals.

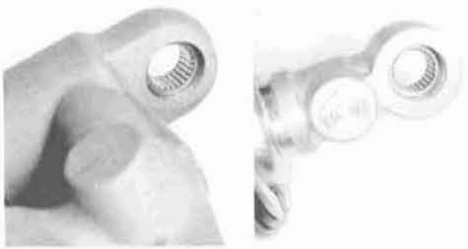
CAUTION

The removed dust seals must be replaced with new ones.

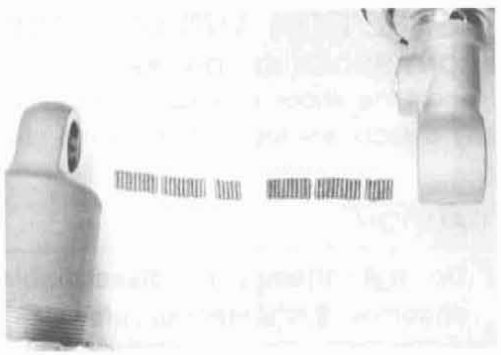


FRONT SHOCK ABSORBER BEARING

Inspect the bearings for abnormal noise and smooth movement.



- Remove the needle roller bearings.

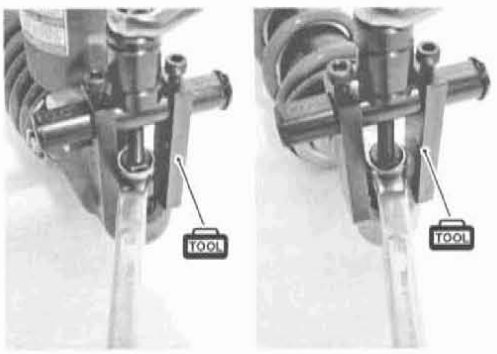


- Remove the bearing cages with the special tool.

TOOL 09921-20240: Bearing remover set

CAUTION

The removed bearing cages must be replaced with new ones.



STEERING KNUCKLE

Inspect the steering knuckle for damage. If any defects are found, replace the steering knuckle with a new one.

KNUCKLE END

Inspect the knuckle end boot for wear or damage. If any defects are found, replace the knuckle end with a new one.

Inspect the knuckle end for smooth movement. If there are any abnormalities, replace the wishbone arm with a new one.

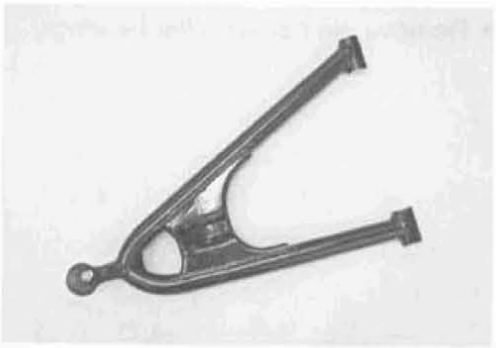
UPPER WISHBONE ARM

Inspect the upper wishbone arm for wear or damage. If any defects are found, replace the upper wishbone arm with a new one.

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.

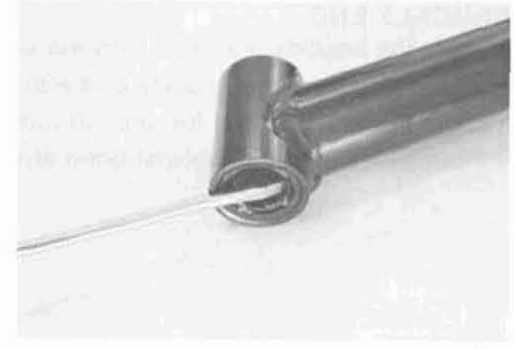


WISHBONE ARM DUST SEAL

- Remove the collars.

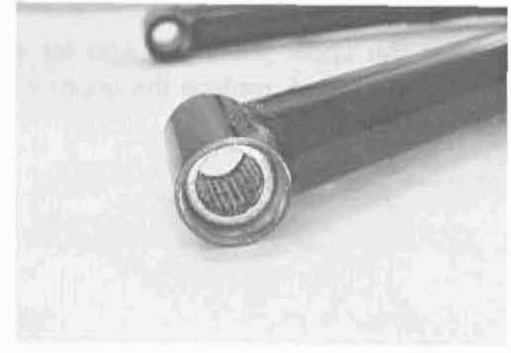
Inspect the dust seal lips and collars for wear and damage. If any defects are found, replace them with new ones.

- Remove the dust seals.

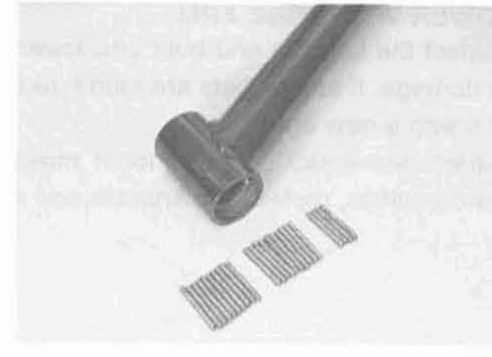


WISHBONE ARM PIVOT BEARING

Inspect the bearings for abnormal noise and smooth movement.



- Remove the needle roller bearings.

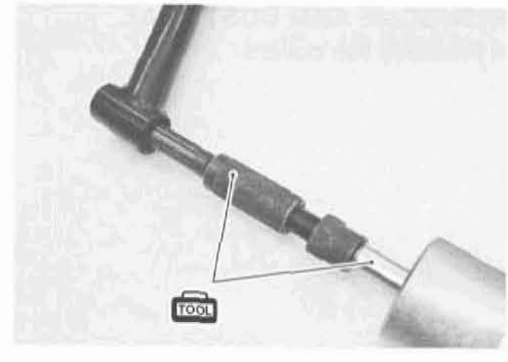


- Remove the bearing cages with the special tools.

TOOL **09923-73210: Bearing puller**
09930-30104: Sliding hammer

CAUTION

The removed bearing cages must be replaced with new ones.

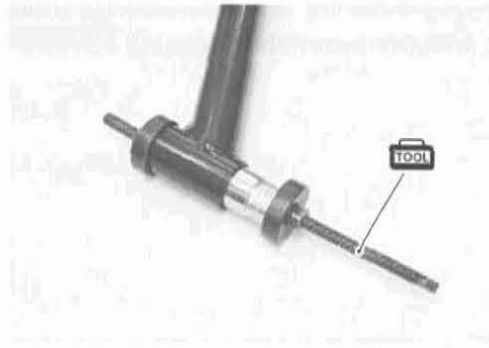


BRAKE DISC COVER

Inspect the brake disc cover for damage. If any defects are found, replace the brake disc cover with a new one.

REASSEMBLY AND INSTALLATION

Reassemble and install the front suspension in the reverse order of removal and disassembly. Pay attention to the following points:



WISHBONE ARM

- Press fit the bearing cages with the special tool and a suitable size socket wrench.

TOOL 09924-84521: Bearing installer set

NOTE:

Position the bearings by referring to the illustration of page 7-53.

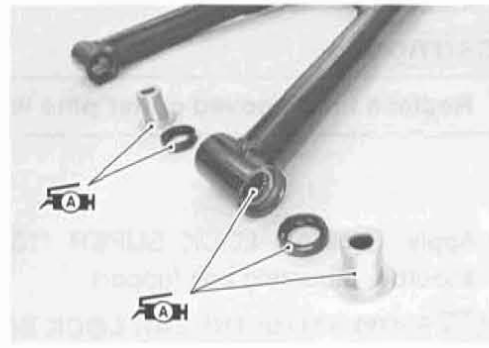
- Apply grease to the needle roller bearings.

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

- Apply grease to the dust seal lips and collars.

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

- Install the dust seals and collars into the upper wishbone arm and lower wishbone arm.



NOTE:

** Stamped mark on the dust seal must face outside.*

** Position the dust seals by referring to the illustration of page 7-53.*

FRONT SHOCK ABSORBER

- Press fit the bearing cages with the special tool and a suitable size socket wrench.

TOOL 09924-84510: Bearing installer set

NOTE:

Position the bearings by referring to the illustration of page 7-53.

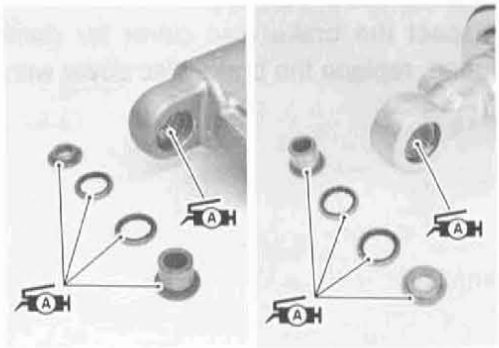
- Apply grease to the needle roller bearings.

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

- Apply grease to the dust seal lips and collars.

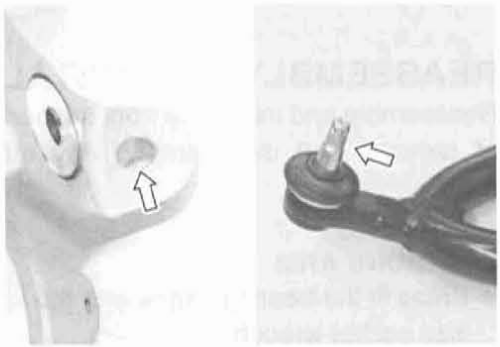
99000-25010: SUZUKI SUPER GREASE "A" (or equivalent grease)

- Install the dust seals and collars into the front shock absorber.



FRONT SUSPENSION

- Degrease the tapered portion of knuckle and also knuckle end with nonflammable cleaning solvent.



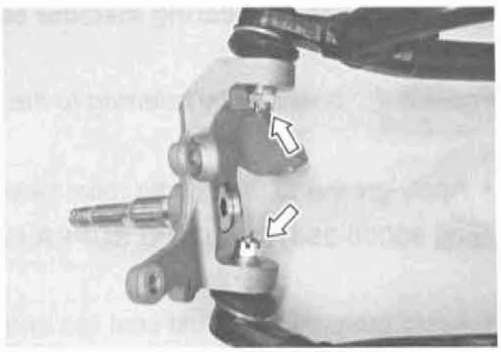
- Install the wishbone arms to the steering knuckle and tighten the knuckle end nuts to the specified torque.

Knuckle end nut: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

- Install the cotter pins.

CAUTION

Replace the removed cotter pins with new ones.

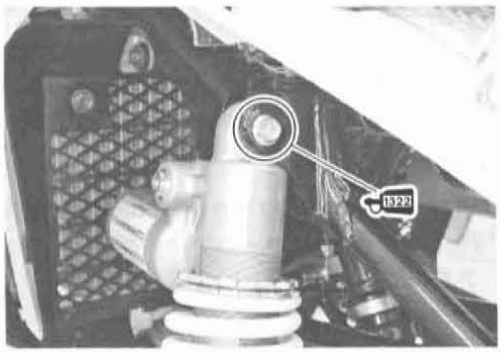


- Apply THREAD LOCK SUPER "1322" to the front shock absorber mounting bolt (upper).

1322 99000-32110: THREAD LOCK SUPER "1322" (or equivalent thread lock)

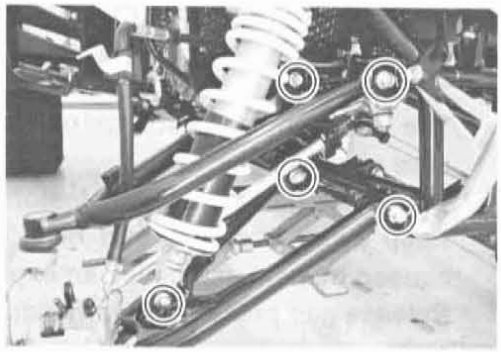
- Tighten the shock absorber mounting nuts to the specified torque.

Shock absorber mounting nut (Upper and Lower): 60 N·m (6.0 kgf-m, 43.5 lb-ft)



- Tighten the wishbone arm pivot nuts to the specified torque.

Wishbone arm pivot nut: 65 N·m (6.5 kgf-m, 47.0 lb-ft)



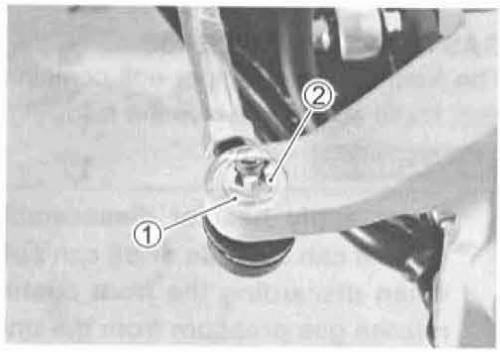
- Install the washer ①.
- Tighten the tie rod end nut ② to the specified torque.

Tie rod end nut: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

- Install the cotter pin.

CAUTION

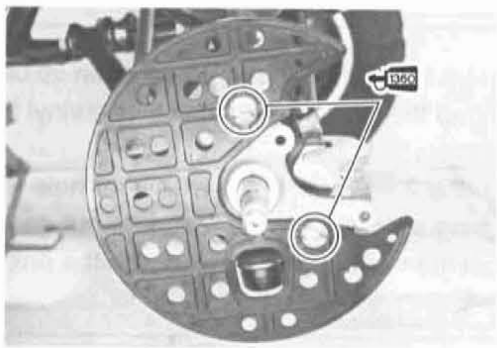
Replace the removed cotter pin with a new one.



- Apply THREAD LOCK SUPER "1360" to the disc cover mounting bolts, and then tighten the bolts.

99000-32130: THREAD LOCK SUPER "1360"

- Install the brake caliper. (☞7-24)
- Install the front wheel hub and front wheel. (☞7-13, 14)



FRONT SHOCK ABSORBER DISPOSAL

⚠ WARNING

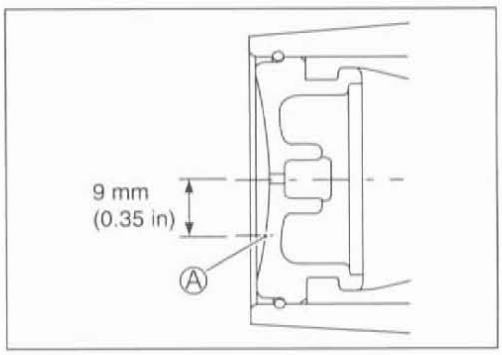
*** The front shock absorber unit contains high-pressure nitrogen gas.**
*** Mishandling can cause explosion.**
*** Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.**
*** Release gas pressure before disposing.**

GAS PRESSURE RELEASE

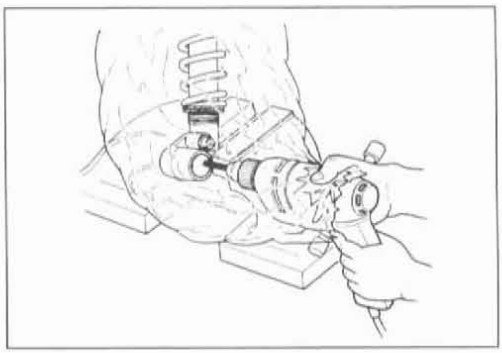
The front cushion damper unit contains high-pressure nitrogen gas. Make sure to observe the following precautions.

⚠ WARNING

*** Never apply heat or disassemble the damper unit since it can explode or oil can splash hazardously.**
*** When discarding the front cushion unit, be sure to release gas pressure from the unit following the procedures below.**



Mark the drill center at the location Ⓐ using a center punch.
Wrap the front cushion unit with a vinyl bag and fix it on a vise as shown.
Drill a 2 – 3 mm (0.08 – 0.12 in) hole at the marked drill center using a drilling machine and let out gas while taking care not to get the vinyl bag entangled with the drill bit.



⚠ WARNING

*** Be sure to wear protective glasses since drilling chips and oil may fly off with blowing gas when the drill bit has penetrated through the body.**
*** Make sure to drill at the specified position. Otherwise, pressurized oil may spout out forcefully.**

SUSPENSION SETTING

After installing the front suspension, adjust the spring pre-load and damping force as follows.

SPRING PRE-LOAD ADJUSTMENT

The set length 267.5 mm (10.53 in) provides the maximum spring pre-load.
The set length 281.5 mm (11.08 in) provides the minimum spring pre-load.

DATA STD length: 274.5 mm (10.81 in)

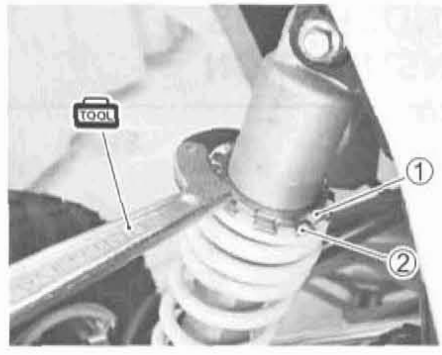
CAUTION

Do not set the spring length out of the specified range.

- Loosen the lock-nut ① with the special tool.
- Adjust the spring set length by turning the adjuster ②.
- Tighten the lock-nut ① to the specified torque.

Front shock absorber lock-nut:
30 N·m (3.0 kgf-m, 21.5 lb-ft)

09910-60611: Universal clamp wrench



DAMPING FORCE ADJUSTMENT

The rebound and compression damping force are adjustable for rider's preference, rider's weight and field condition.

NOTE:

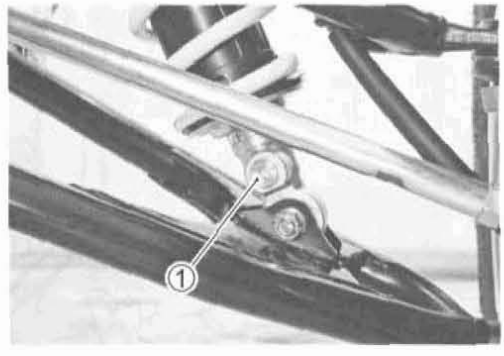
Do not turn the adjuster screws more than given position, or the adjuster may be damaged.

Rebound side

Fully turn the damping force adjuster ① clockwise. It is at stiffest position and turn it out to standard setting position.

STD position: 1 and 1/2 turns out from stiffest position

[Fine-tune the adjuster by turning it slightly until two punch marks align.]



Compression side

Fully turn the damping force adjuster ② clockwise. It is at stiffest position and turn it out to standard setting position.

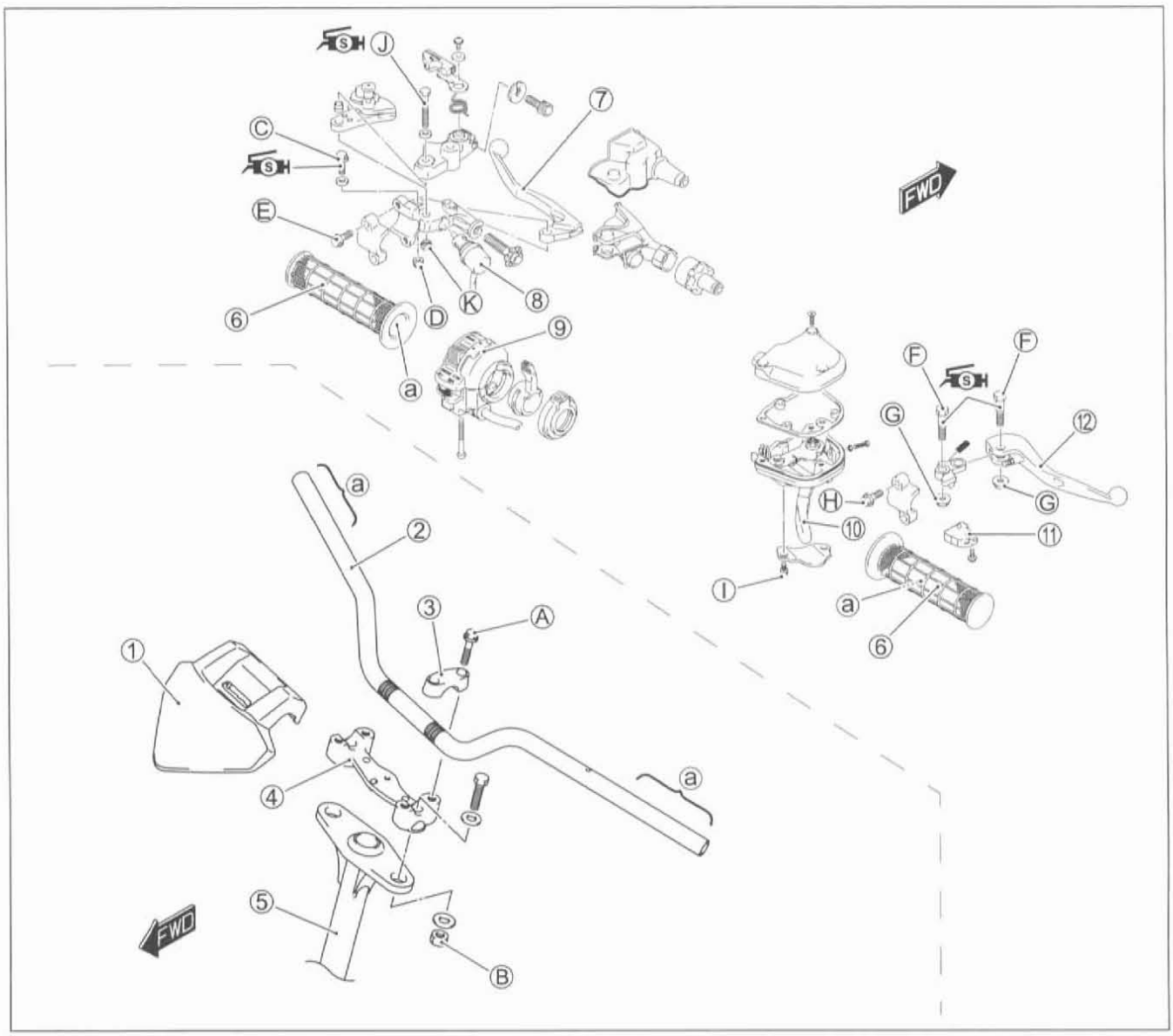
STD position: 2 and 1/4 turns out from stiffest position

[Fine-tune the adjuster by turning it slightly until two punch marks align.]

Standard suspension setting

	FRONT		
	Spring set length	Damping force adjuster	
		Rebound	Compression
Standard	274.5 mm (10.81 in)	1 and 1/2 turns out from stiffest position	2 and 1/4 turns out from stiffest position

HANDLEBARS
CONSTRUCTION

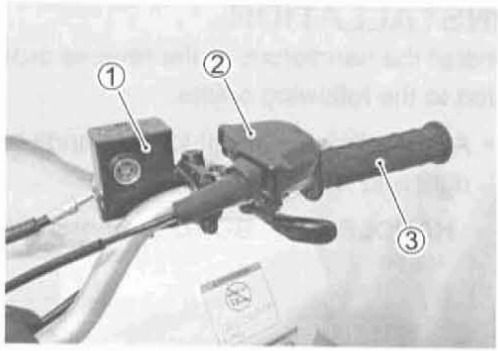


①	Steering head cover	Ⓐ	Handlebar clamp bolt
②	Handlebars	Ⓑ	Handlebar holder nut
③	Handlebar upper holder	Ⓒ	Clutch lever bolt
④	Handlebar Lower holder	Ⓓ	Clutch lever bolt lock-nut
⑤	Steering shaft	Ⓔ	Clutch lever holder clamp bolt
⑥	Grip	Ⓕ	Brake lever pivot bolt
⑦	Clutch lever	Ⓖ	Brake lever pivot bolt lock-nut
⑧	Clutch lever switch	Ⓗ	Master cylinder mounting bolt
⑨	Left handlebar switch box	Ⓘ	Throttle lever case bolt
⑩	Throttle lever	Ⓙ	Parking holder bolt
⑪	Brake switch	Ⓚ	Parking holder bolt lock-nut
⑫	Brake lever	ⓐ	Apply handle grip bond.

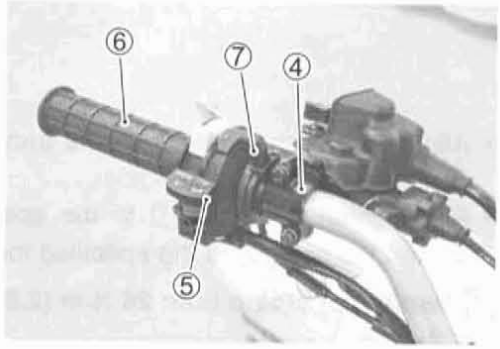
ITEM	N·m	kgf-m	lb-ft
Ⓐ	26	2.6	19.0
Ⓑ	60	6.0	43.5
Ⓒ	6	0.6	4.5
Ⓓ	6	0.6	4.5
Ⓔ	10	1.0	7.0
Ⓕ	6	0.6	4.5
Ⓖ	6	0.6	4.5
Ⓗ	10	1.0	7.0
Ⓘ	5	0.5	3.5
Ⓙ	6	0.6	4.5
Ⓚ	6	0.6	4.5

REMOVAL

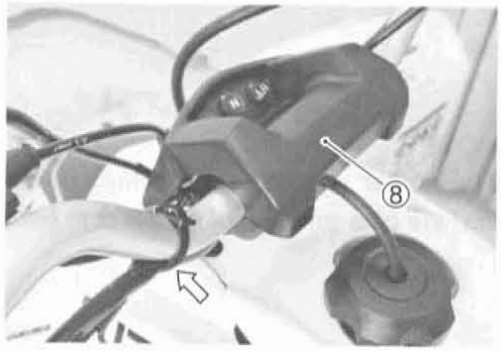
- Remove the master cylinder ① from the handlebars. (☞7-25)
- Remove the throttle lever case ②.
- Remove the right grip ③.



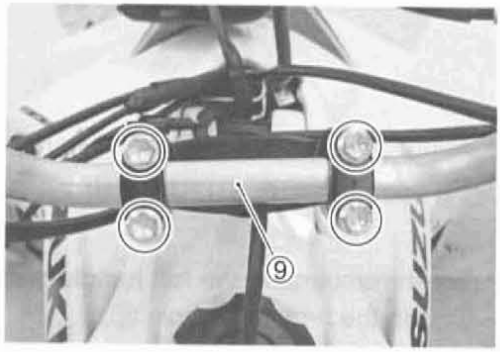
- Remove the clutch lever holder ④.
- Remove the left handlebar switch box ⑤.
- Remove the left grip ⑥.
- Remove the starter lever ⑦.



- Remove the steering head cover ⑧.
- Remove the harness clamp.

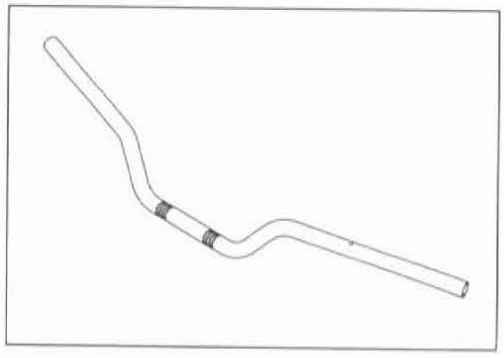


- Remove the handlebars ⑨.



INSPECTION

Inspect the handlebars for distortion or damage. If any defects are found, replace the handlebars with a new one.

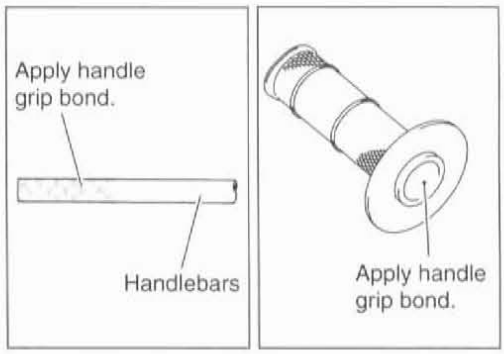


INSTALLATION

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

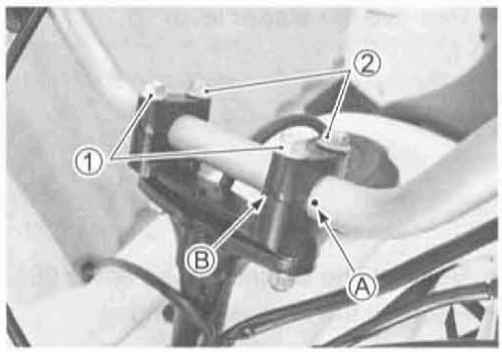
- Apply adhesive agent to the handlebar right and left end and right and left grip inner wall.

  HANDLE GRIP BOND (commercial available)

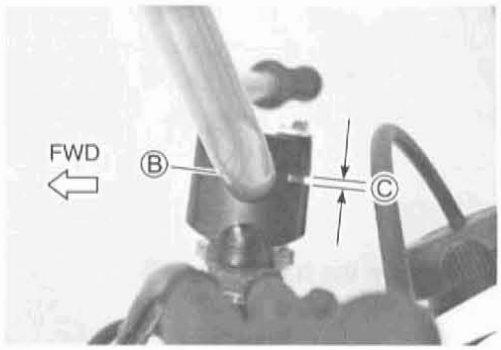


- Align the punch mark Ⓐ on the handlebars with the mating surface Ⓑ of handlebar holder.
- First tighten the bolts ① to the specified torque, and then tighten the bolts ② to the specified torque.

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



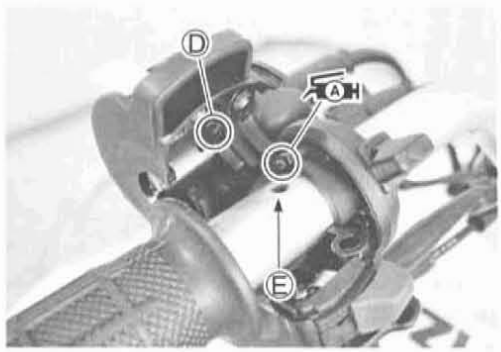
NOTE:
The higher portion of handlebar holder must face forward, so that the clearance Ⓒ of holder is in back of the handlebars.



- Apply the grease to the end of starter cable.

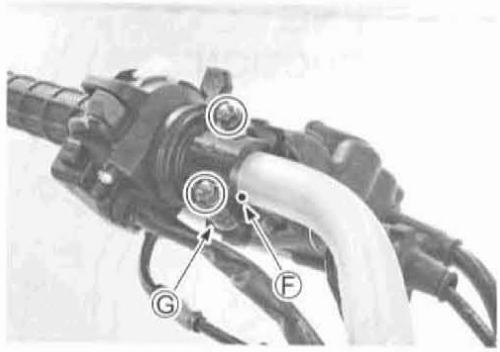
99000-25010: SUZUKI SUPER GREASE "A"
(or equivalent grease)

- When remounting the left handle switch, engage the stopper Ⓓ with the handlebar hole Ⓔ.



- Align the punch mark Ⓕ on the handlebars with the mating surface Ⓖ of clutch lever holder.
- Tighten the clutch lever holder clamp bolts to the specified torque.

Clutch lever holder clamp bolt:
10 N·m (1.0 kgf-m, 7.5 lb-ft)

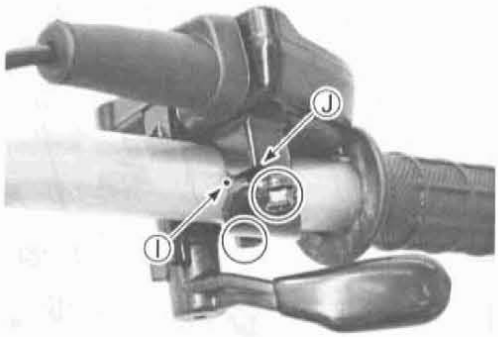


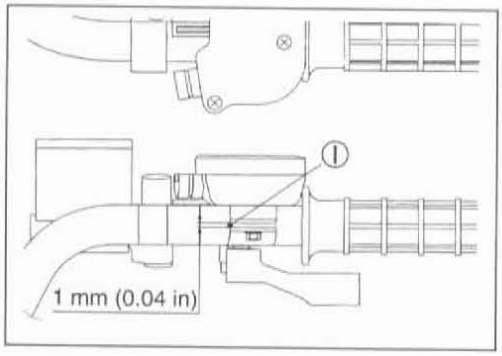
Ⓗ Clearance

- Align the punch mark Ⓘ on the handlebars with the mating surface Ⓙ of throttle lever case.
- Tighten the throttle lever case bolts to the specified torque.

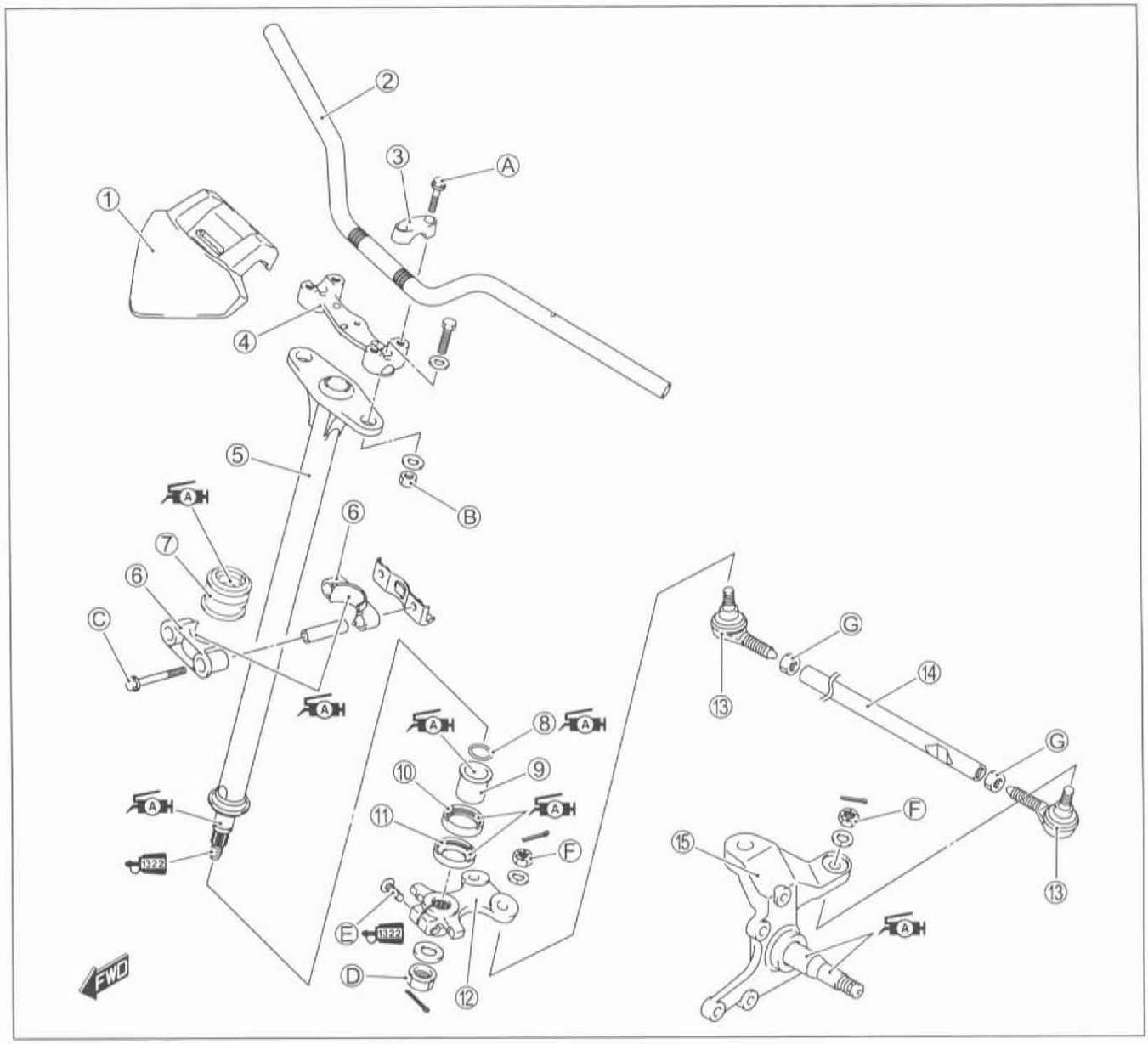
Throttle lever case bolt: 5 N·m (0.5 kgf-m, 3.5 lb-ft)

- Install the brake master cylinder. (☞7-28)





STEERING
CONSTRUCTION

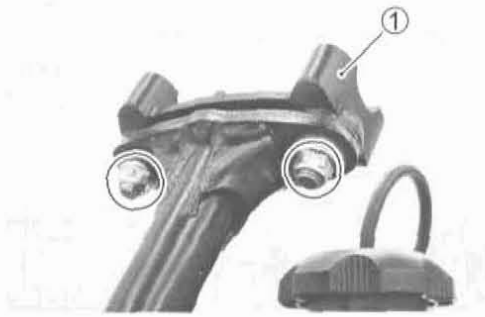


①	Steering head cover	⑫	Steering arm plate
②	Handlebars	⑬	Tie rod end
③	Handlebar upper holder	⑭	Tie rod
④	Handlebar Lower holder	⑮	Steering knuckle
⑤	Steering shaft	Ⓐ	Handlebar clamp bolt
⑥	Steering shaft holder	Ⓑ	Handlebar holder nut
⑦	Steering shaft holder bushing	Ⓒ	Steering shaft holder bolt
⑧	O-ring	Ⓓ	Steering shaft nut
⑨	Bushing	Ⓔ	Steering arm plate bolt
⑩	Dust seal	Ⓕ	Tie rod end nut
⑪	Dust seal	Ⓖ	Tie rod lock-nut

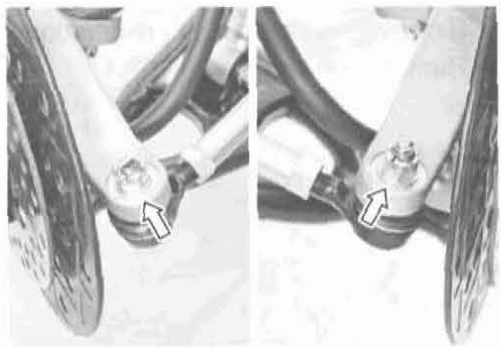
ITEM	N·m	kgf-m	lb-ft
Ⓐ	26	2.6	19.0
Ⓑ	60	6.0	43.5
Ⓒ	23	2.3	16.5
Ⓓ	120	12.0	87.0
Ⓔ	29	2.9	21.0
Ⓕ	23	2.3	16.5
Ⓖ	29	2.9	21.0

REMOVAL

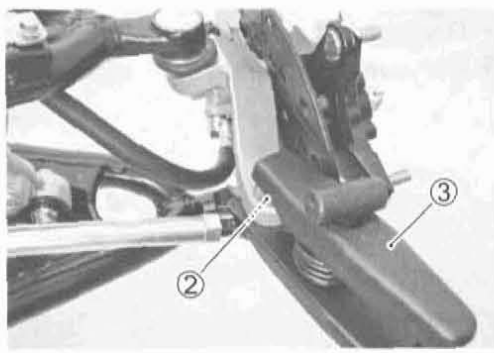
- Remove the front wheel. (☞7-10)
- Remove the side covers, fuel tank cover and front fender. (☞7-6)
- Remove the handlebars. (☞7-41)
- Remove the handlebar holder nuts, washers and handlebar holder ①.



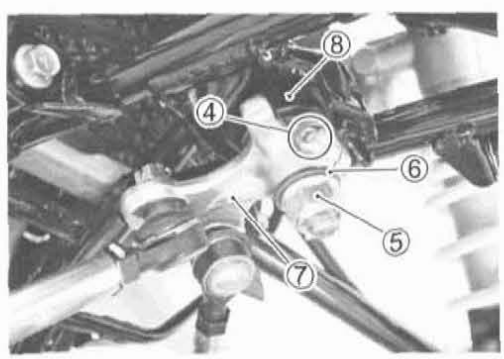
- Remove the cotter pins, tie rod end nuts and spring washers.



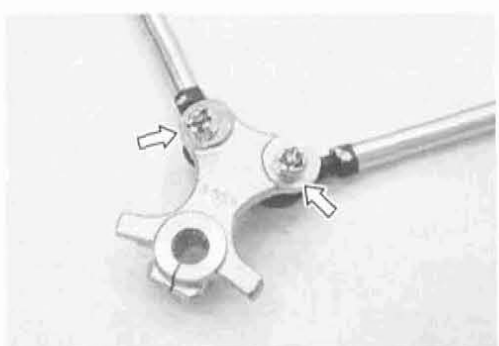
- Remove the tie rod end ② with a commercially available ball bearing joint remover ③.



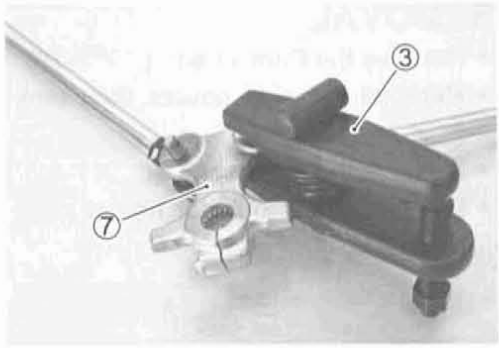
- Loosen the steering arm plate bolt ④.
- Remove the cotter pin and steering shaft nut ⑤, washer ⑥, steering arm plate ⑦ and dust seal ⑧.



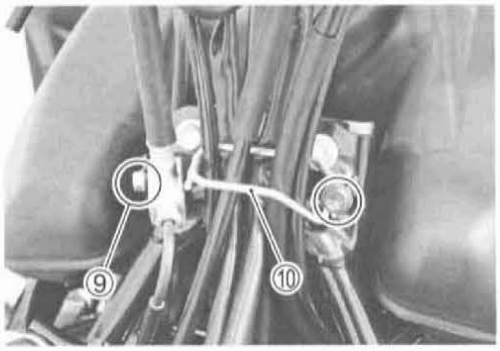
- Remove the cotter pins, tie rod end nuts and spring washers.



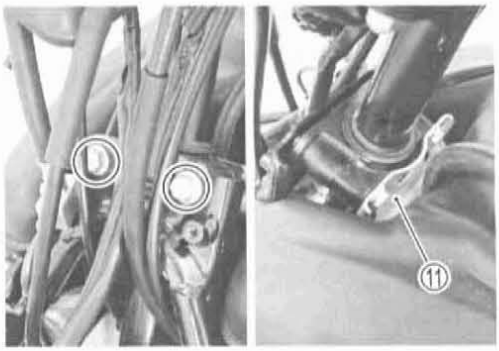
- Remove the steering arm plate ⑦ with a commercially available ball bearing joint remover ③.



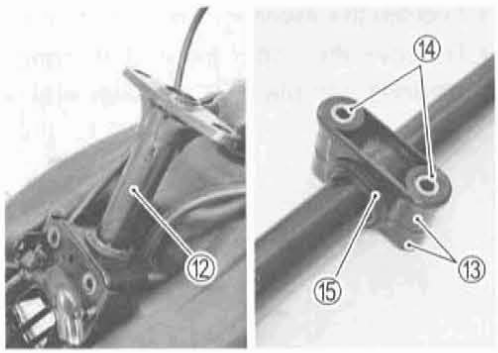
- Remove the brake pipe joint mounting bolt ⑨.
- Remove the cable guide ⑩.



- Remove the steering shaft holder bolts.
- Remove the steering shaft plate ⑪.



- Remove the steering shaft ⑫.
- Remove the steering shaft holder ⑬ and collars ⑭.
- Remove the steering shaft holder bushing ⑮ from the steering shaft.



INSPECTION AND DISASSEMBLY

STEERING SHAFT HOLDER BUSHING

Inspect the bushing for wear or damage. If any defects are found, replace the bushing with a new one.

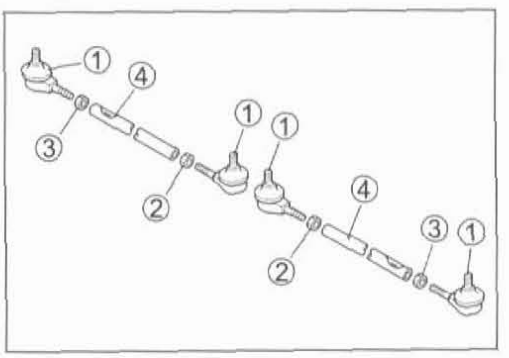
TIE ROD

Inspect the tie rod for distortion or damage. If any defects are found, replace the tie rod with a new one.

① Tie rod end
② Lock-nut
③ Lock-nut
④ Tie rod

CAUTION

The lock-nuts ② have left-hand threads.



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.

STEERING SHAFT

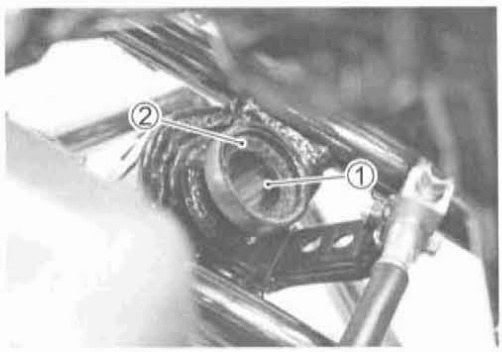
Inspect the steering shaft for distortion or bend. If any defects are found, replace the steering shaft with a new one.

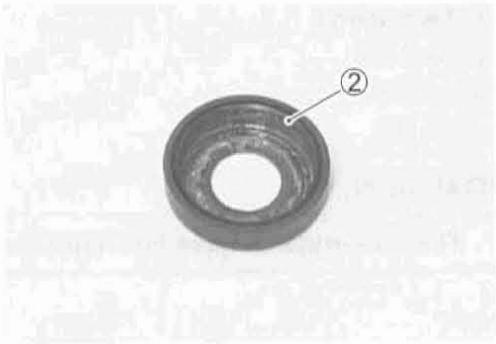
STEERING SHAFT HOLDER

Inspect the steering shaft holders for wear or damage. If any defects are found, replace the steering shaft holders with new ones.

STEERING SHAFT BUSHING AND DAST SEAL

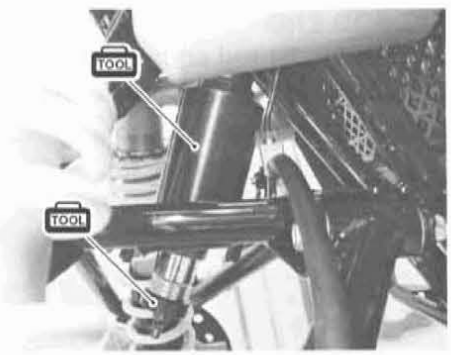
Inspect the steering shaft bushing ① and dust seals ② for wear and damage. If any defects are found, replace them with new ones.





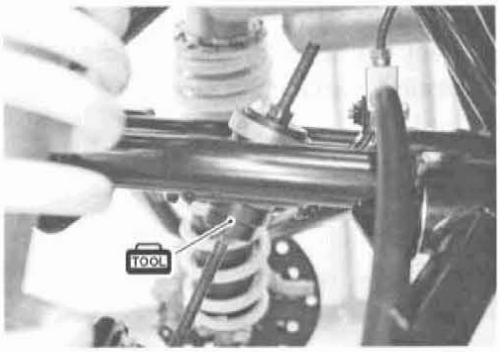
- Remove the steering shaft bushing and dust seals with the special tools and a suitable size socket wrench.

TOOL **09924-84521: Bearing installer set**
09930-30721: Rotor remover



- Install the steering shaft bushing and dust seal with the special tool.

TOOL **09924-84521: Bearing installer set**



REASSEMBLY AND INSTALLATION

Reassemble and install the steering shaft in the reverse order of removal and disassembly. Pay attention to the following points:

STEERING SHAFT

- Apply grease to the steering shaft holder bushing.

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

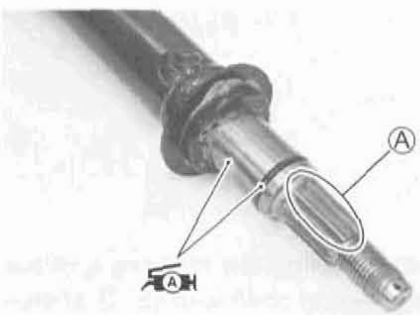
- Install the steering shaft holder bushing to the steering shaft.

- Apply grease to the steering shaft and O-ring.

CAUTION

Replace the O-ring with a new one.

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



NOTE:
When installing the steering to the vehicle, turn the recess Ⓐ in the spline part of steering shaft to the forward of the vehicle.

- Apply grease to the bushing and dust seal.

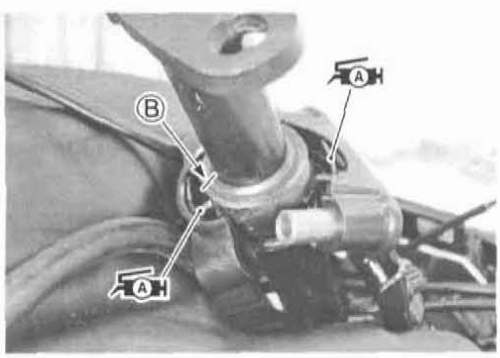
99000-25010: SUZUKI SUPER GREASE "A" (or equivalent grease)

- Apply grease to the steering shaft holders before remounting the steering shaft holders.

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

CAUTION

To prevent the entry of dirt, the dust seal end Ⓑ must face rearward when installing the dust seal to the steering shaft.



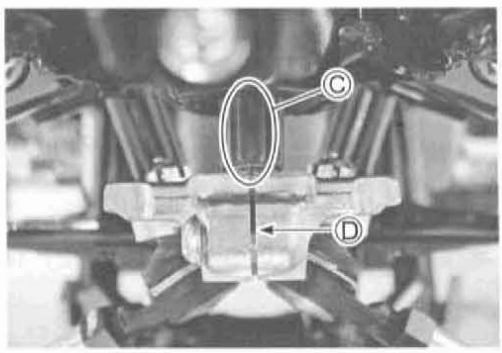
- Tighten the steering shaft holder bolts to the specified torque.

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

NOTE:
Make sure that the wiring harness, cables and brake hose routing are properly. (☞9-15, 18 and 22)

- Apply grease to the dust seal.
- Install the dust seal to the steering shaft.

- When installing the steering arm plate, align the wide spline Ⓒ of steering shaft with slit Ⓓ of steering arm plate.



- Apply THREAD LOCK SUPER "1322" to the thread part of steering shaft.

1322 99000-32110: THREAD LOCK SUPER "1322" (or equivalent thread lock)

- Tighten the steering shaft nut ① to the specified torque.

Steering shaft nut: 120 N·m (12.0 kgf-m, 87.0 lb-ft)

- Apply THREAD LOCK SUPER "1322" to the thread part of steering arm plate bolt ② and tighten it to the specified torque.

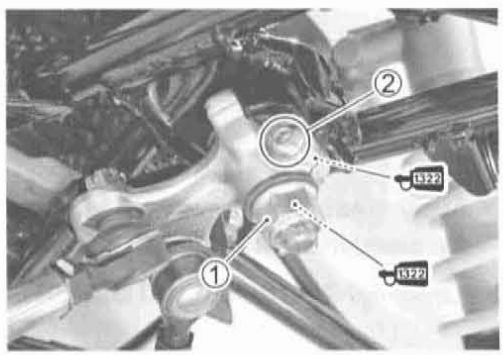
1322 99000-32110: THREAD LOCK SUPER "1322" (or equivalent thread lock)

Steering arm plate bolt: 29 N·m (2.9 kgf-m, 21.0 lb-ft)

- Install the cotter pin.

CAUTION

Replace the removed cotter pin with a new one.



TIE ROD

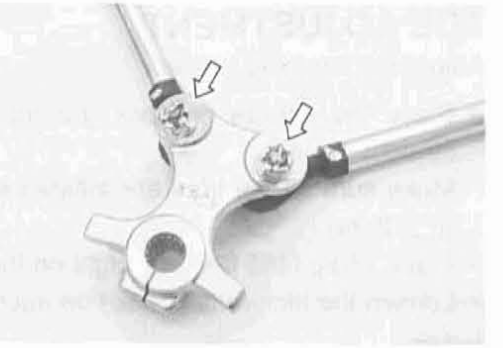
- Tighten the tie rod end nuts to the specified torque.

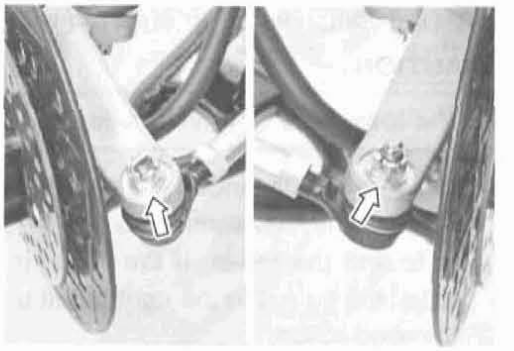
Tie rod end nut: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

- Install the cotter pins.

CAUTION

Replace the removed cotter pins with new ones.



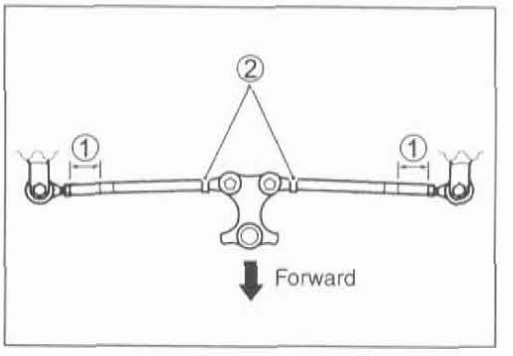


NOTE:

When installing the tie rod, make sure the narrow end ① of the tie rod comes out.

CAUTION

The lock-nuts ② surface have left-hand threads.

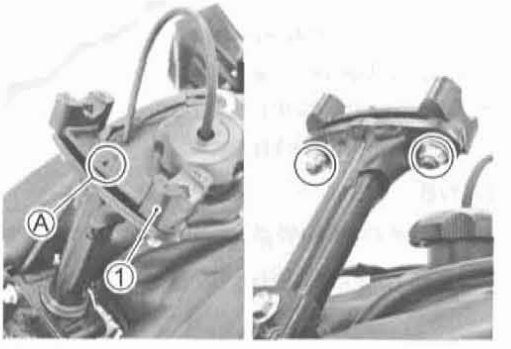


HANDLEBAR HOLDER

- Set the handlebar holder ① with facing the projection Ⓐ forward.
- Tighten the handlebar holder nut to the specified torque.

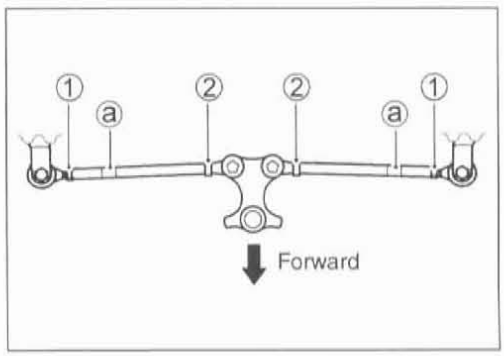
Handlebar holder nut: 60 N·m (6.0 kgf-m, 43.5 lb-ft)

- Reinstall the handlebars. (☞7-42)
- Reinstall the front fender.
- Reinstall the front wheel. (☞7-14)



TOE ADJUSTMENT

Adjust the toe-in as follows:

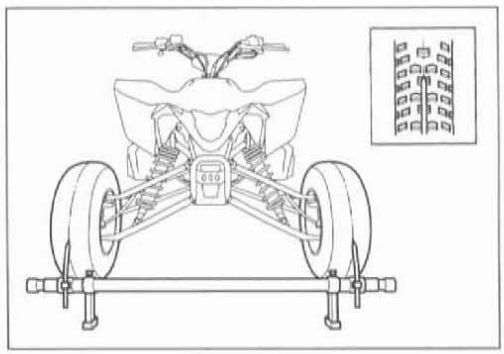


- Place the vehicle on level ground and set the handlebars straight.
  Make sure all the tires are inflated to the standard pressure. (☞2-24)
- Place 75 kg (165 lbs) of weight on the seat.
- Loosen the lock-nuts (①, ②) on each tie rod.

NOTE:
Hold the concave part ⓐ of tie rod with a wrench.

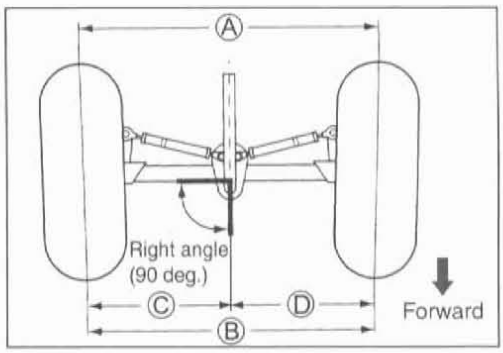
CAUTION

The lock-nuts ② have left-hand threads.



- Measure the distances (Ⓐ and Ⓑ) between the front wheels. Subtract the measurements of Ⓐ from the measurements of Ⓑ to find the toe-in. If the toe-in is not within specification, adjust the tie rod to the right or left until the toe-in is within the specified range.
  Ⓑ – Ⓐ = Toe-in

DATA Toe-in
Standard: 0 ± 4 mm (0 ± 0.16 in)

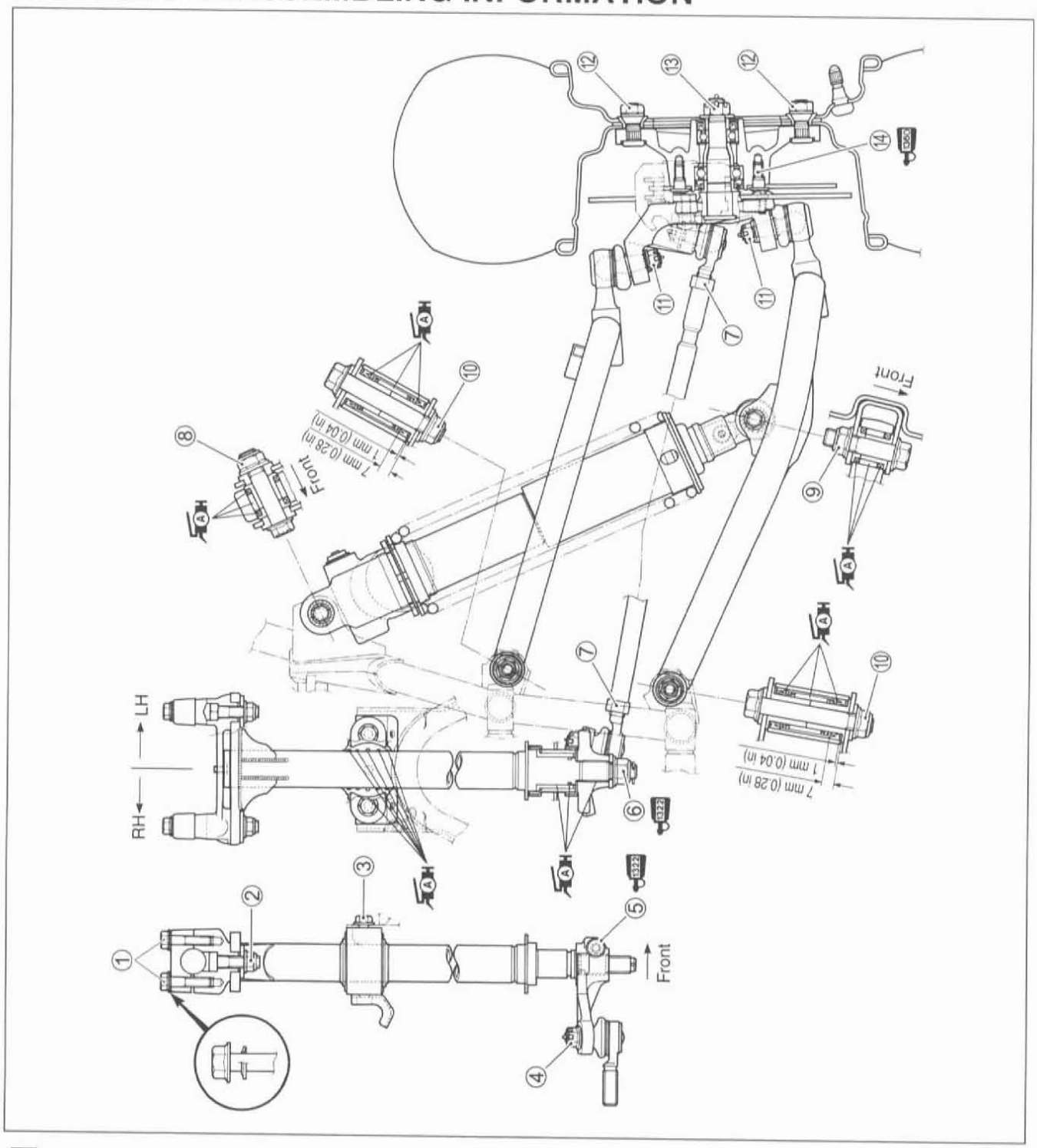


- Temporarily tighten the four lock-nuts.
- Check that the distances (Ⓒ and Ⓓ) are equal, as shown. If the distances are not equal, adjust the tie rod to the right or left until the toe-in is within specification. Check the toe-in again by measuring distances Ⓐ and Ⓑ.
- If the toe-in is not within specification, repeat the adjustment as above until the proper toe-in is obtained and distances Ⓒ and Ⓓ become equal.
- After adjustment has been made, tighten the four lock-nuts ① to the specified torque.

NOTE:
Hold the concave part ⓐ of tie rod a wrench.

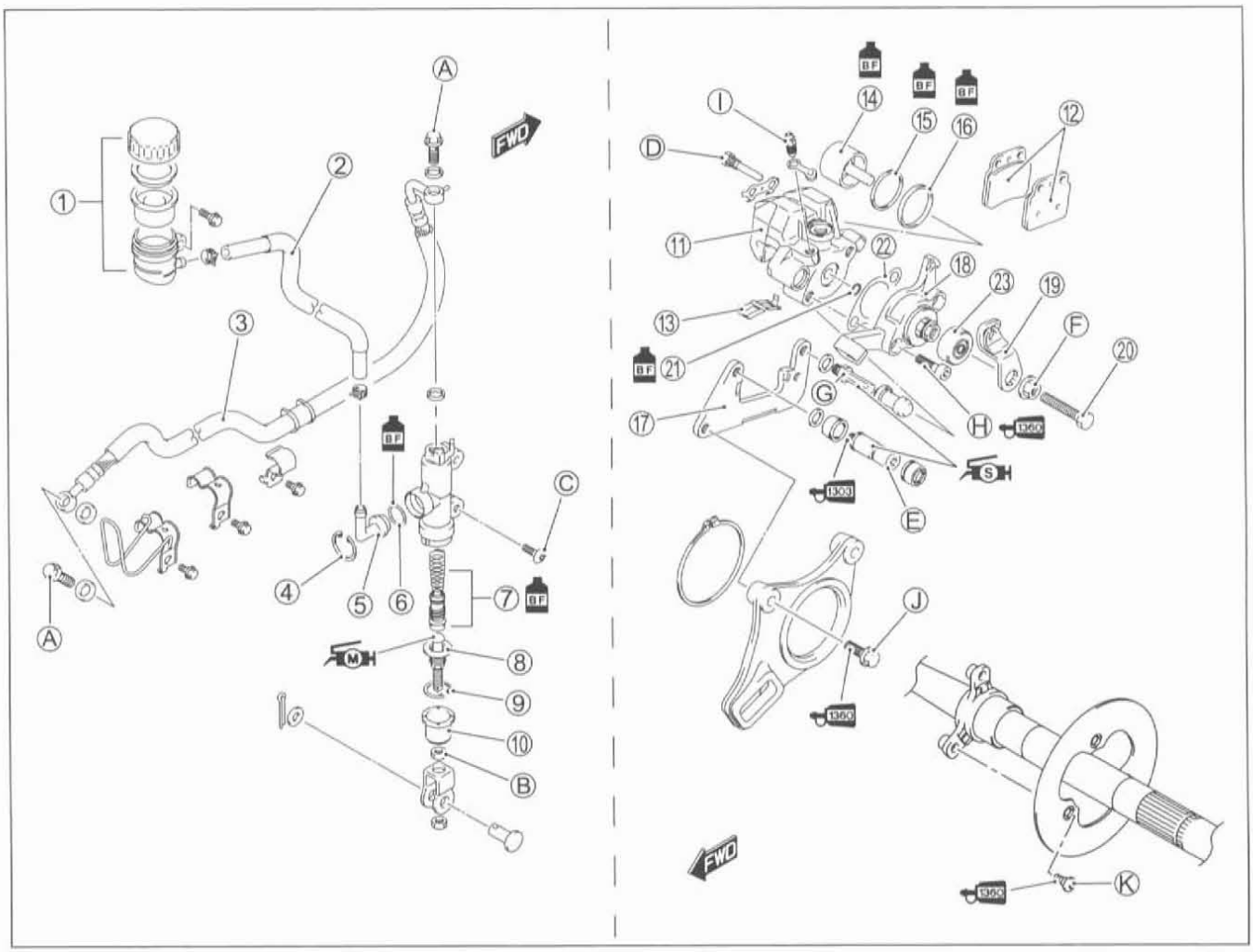
Tie rod lock-nut: 29 N·m (2.9 kgf-m, 21.0 lb-ft)

FRONT WHEEL, FRONT BRAKE, FRONT SUSPENSION AND STEERING REASSEMBLING INFORMATION



ITEM	N·m	kgf-m	lb-ft	ITEM	N·m	kgf-m	lb-ft	ITEM	N·m	kgf-m	lb-ft
①	26	2.6	19.0	⑥	120	12.0	87.0	⑪	23	2.3	16.5
②	60	6.0	43.5	⑦	29	2.9	21.0	⑫	66	6.6	47.5
③	23	2.3	16.5	⑧	60	6.0	43.5	⑬	65	6.5	47.0
④	23	2.3	16.5	⑨	60	6.0	43.5	⑭	23	2.3	16.5
⑤	29	2.9	21.0	⑩	65	6.5	47.0				

REAR BRAKE
CONSTRUCTION



①	Reservoir tank	⑱	Parking brake
②	Reservoir tank hose	⑲	Parking brake lever
③	Brake hose	⑳	Adjuster
④	Snap ring	㉑	O-ring
⑤	Connector	㉒	Gasket
⑥	O-ring	㉓	Boot
⑦	Piston assembly	Ⓐ	Brake hose union bolt
⑧	Push rod	Ⓑ	Brake master cylinder rod lock-nut
⑨	Snap ring	Ⓒ	Brake master cylinder mounting bolt
⑩	Boot	Ⓓ	Pad mounting pin
⑪	Caliper	Ⓔ	Brake caliper holder slide pin
⑫	Pad	Ⓕ	Parking brake adjuster lock-nut
⑬	Spring	Ⓖ	Brake caliper holder pin
⑭	Piston	Ⓗ	Parking brake housing bolt
⑮	Dust seal	Ⓘ	Air bleeder valve
⑯	Piston seal	Ⓙ	Brake caliper mounting bolt
⑰	Brake caliper holder	Ⓚ	Disc bolt

ITEM	N·m	kgf-m	lb-ft
Ⓐ	23	2.3	16.5
Ⓑ	18	1.8	13.0
Ⓒ	10	1.0	7.0
Ⓓ	18	1.8	13.0
Ⓔ	23	2.3	16.5
Ⓕ	18	1.8	13.0
Ⓖ	18	1.8	13.0
Ⓗ	28	2.8	20.0
Ⓘ	6	0.6	4.5
Ⓙ	26	2.6	19.0
Ⓚ	23	2.3	16.5

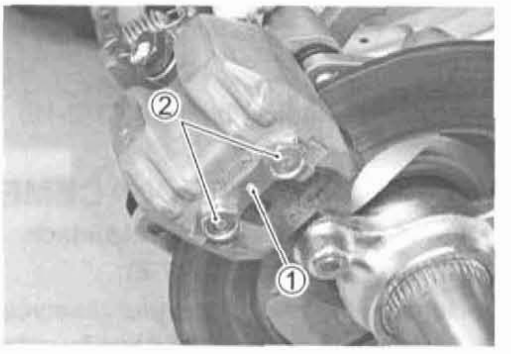
⚠ WARNING

*** This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not use mix different types of fluid such as silicone-based or petroleum-based.**
*** Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for long periods.**
*** When storing the brake fluid, seal the container completely and keep away from children.**
*** When replenishing brake fluid, take care not to get dust into fluid.**
*** When cleaning brake components, use fresh 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.**

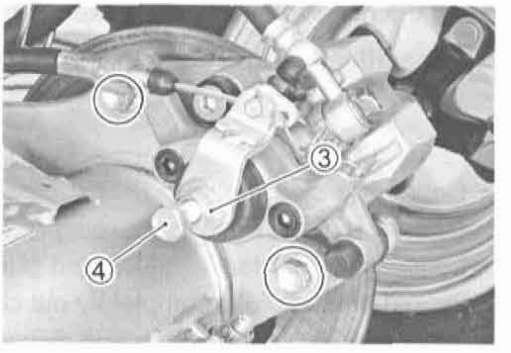
CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials etc. and will damage them severely.

BRAKE PAD REPLACEMENT



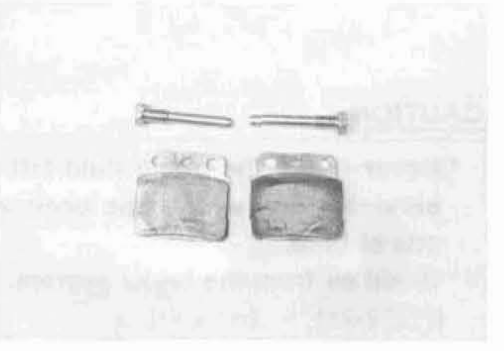
- Flatten the lock washer ①, and then slightly loosen the pad mounting pins ②.



- Loosen the lock-nut ③ and turn out the parking brake adjuster ④ several turns.
- Remove the caliper mounting bolts.
- Remove the brake pads by removing the pad mounting pins.

CAUTION

*** Do not operate the brake pedal while dismounting the pads.**
*** Replace the brake pads as a set, otherwise braking performance will be adversely affected.**



- Install the new brake pads.

NOTE:

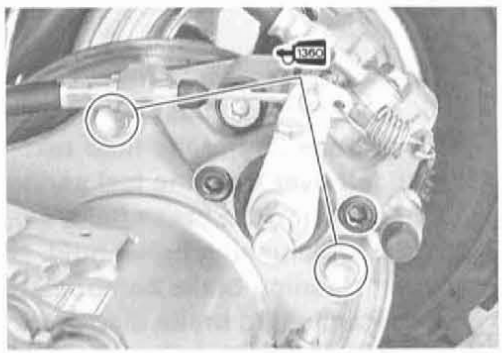
** Before installing the new pads, inspect the pad mounting pins for wear. If excessive wear is found, replace them with new ones.*
** Be sure to loosen the parking brake adjuster before installing the pads.*

- Apply THREAD LOCK SUPER"1360" to the caliper mounting bolts.

1360 99000-32130: THREAD LOCK SUPER "1360"

- Tighten the caliper mounting bolts to the specified torque.

Brake caliper mounting bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)

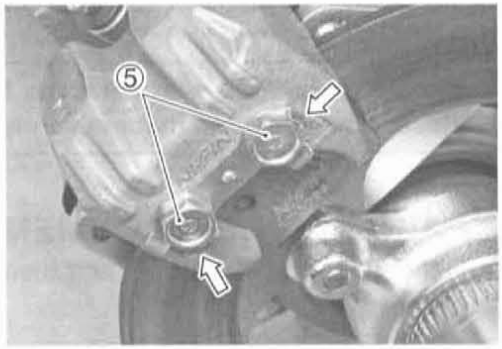


- Tighten the pad mounting pins ⑤ to the specified torque, and then bend the lock washer.

Pad mounting pin: 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.

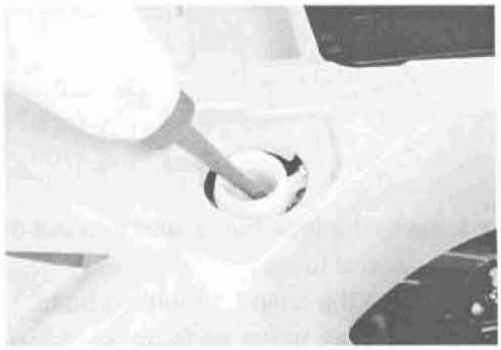
- Adjust the parking brake. (☞2-19)



BRAKE FLUID REPLACEMENT

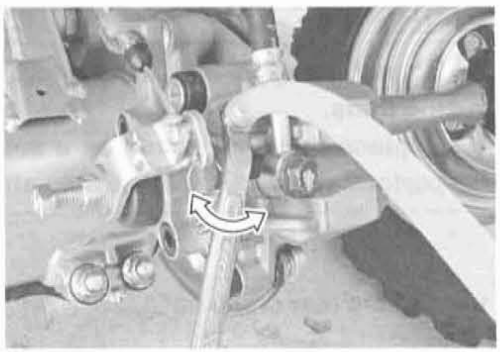
- Place the vehicle on a level surface.
- Remove the seat. (☞7-6)
- Remove the master cylinder reservoir cap and diaphragm.
- Suck up the old brake fluid as much as possible.
- Fill the reservoir with new brake fluid.

BF Specification and classification: DOT 4



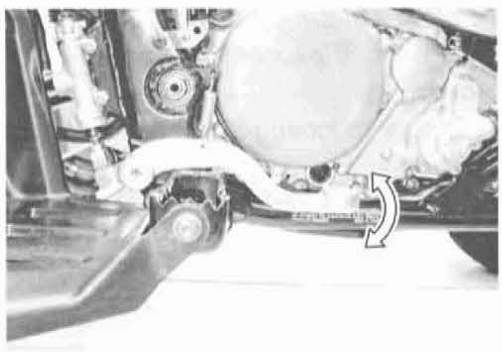
- Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
- Loosen the air bleeder valve and pump the brake pedal until the old brake fluid is completely out of the brake system.
- Close the air bleeder valve and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper level.

Brake air bleeder valve: 6 N·m (0.6 kgf-m, 4.5 lb-ft)

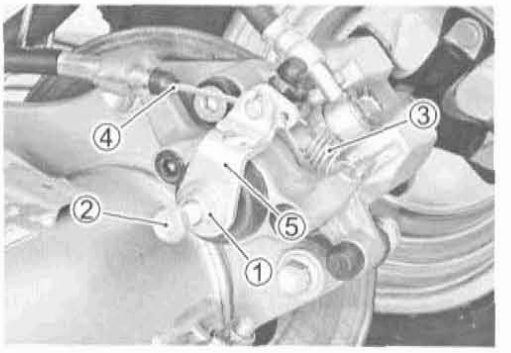


CAUTION

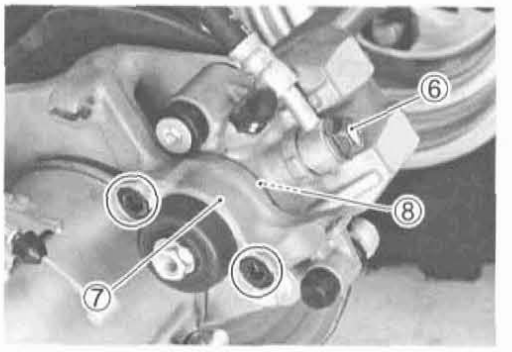
*** Never reuse the brake fluid left over from previous servicing and which has been stored for long periods of time.**
*** Bleed air from the brake system. (☞2-21)**



BRAKE CALIPER REMOVAL AND DISASSEMBLY



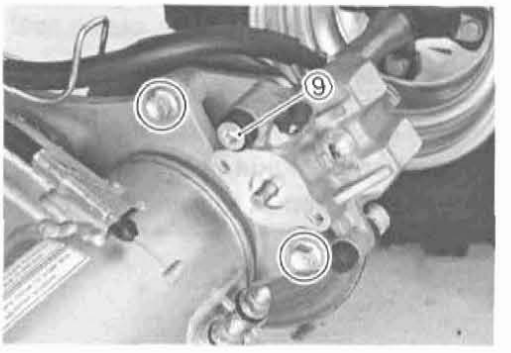
- Loosen the lock-nut ① and remove the parking brake adjuster ②.
- Remove the spring ③ and disconnect the parking brake cable ④.
- Remove the parking brake lever ⑤.



- Disconnect the brake hose by removing the brake hose union bolt ⑥ and allow the brake fluid to drain into a suitable receptacle.
- Remove the parking brake housing ⑦ and gasket ⑧.

⚠ WARNING

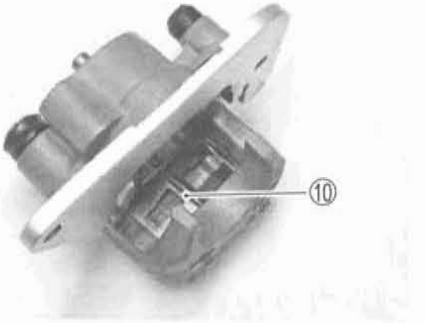
Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and fluid leakage.



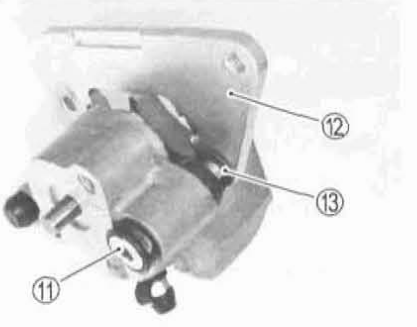
- Remove the brake caliper by removing the caliper mounting bolts.

NOTE:
Before removing the caliper, slightly loosen the caliper holder slide pin ⑨ to facilitate later disassembly.

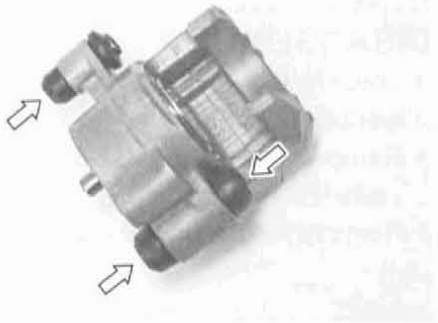
- Remove the pads. (☞7-55)
- Remove the pad spring ⑩.



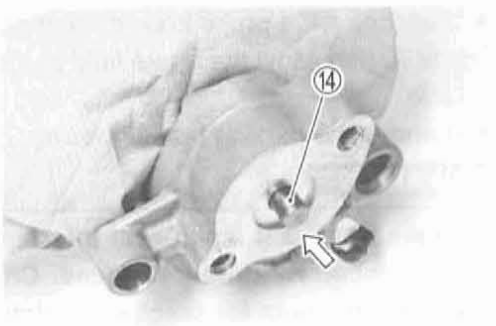
- Remove the caliper holder slide pin ⑪, and then remove the caliper holder ⑫ and washer ⑬.



- Remove the rubber parts.



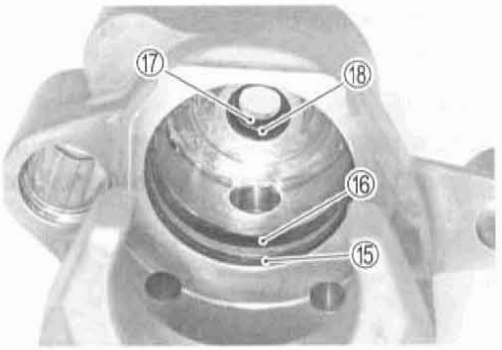
- Place a rag over the brake caliper piston to prevent the piston from popping out.
- Force out the piston by pushing the piston pin ⑭.

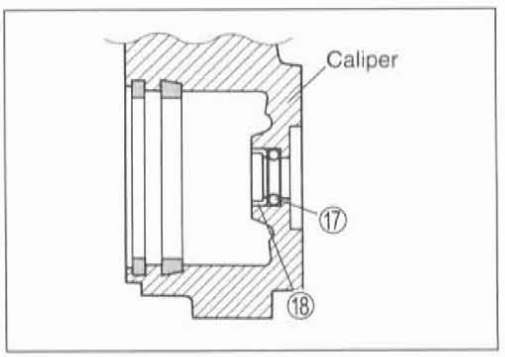


- Remove the dust seal ⑮, piston seal ⑯ and O-ring ⑰.

CAUTION

*** Do not reuse the dust seal, piston seal and O-ring to prevent leakage of brake fluid.**
*** Do not attempt to remove the retainer ⑱.**





BRAKE CALIPER INSPECTION

BRAKE CALIPER

Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any defects are found, replace the brake caliper with a new one.

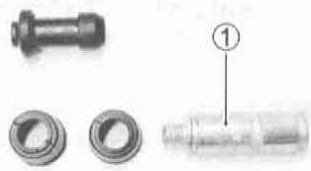
BRAKE CALIPER PISTON

Inspect the brake caliper piston for any scratches or other damage. If any defects are found, replace the piston with a new one.

RUBBER PARTS AND SLIDE PIN

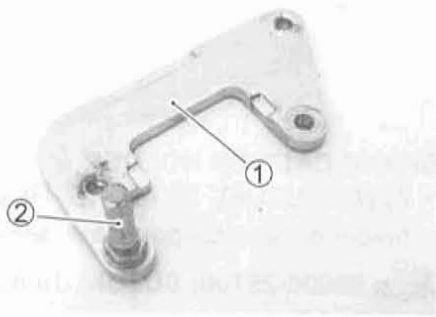
Inspect the rubber parts for damage. If any defects are found, replace them with new ones.

Inspect the slide pin ① for damage. If any defects are found, replace it with a new one.



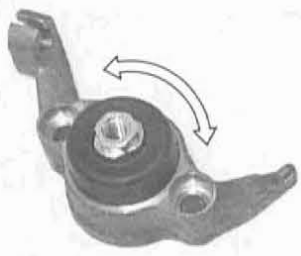
CALIPER HOLDER

Inspect the caliper holder ① and caliper holder pin ② for damage. If any defects are found, replace them with new ones.

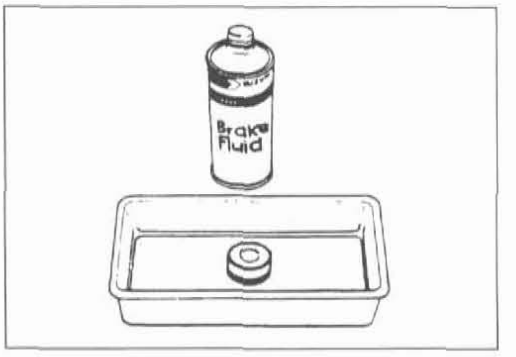


PARKING BRAKE

Inspect the parking brake for damage and smooth rotation by turning the axle. If there is anything unusual, replace the parking brake with a new one.



BRAKE CALIPER REASSEMBLY AND INSTALLATION



Reassemble and install the brake caliper in the reverse order of removal and disassembly. Pay attention to the following points:

- Clean the caliper bore and piston with the specified brake fluid. Thoroughly clean the dust seal grooves and piston seal grooves.

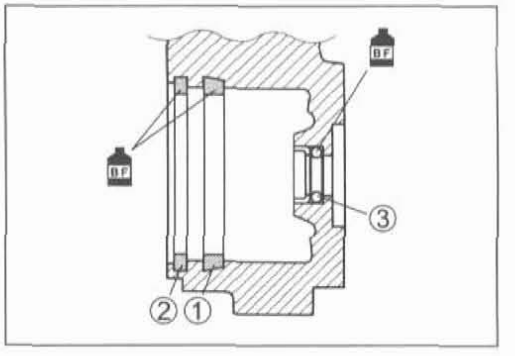
BF Specification and classification: DOT 4

CAUTION

*** Clean the brake caliper components with fresh brake fluid before reassembly.**
*** Do not wipe the brake fluid off with a rag after cleaning the components.**
*** *When cleaning the components, use the specified* brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine or others.**
*** Replace the removed piston seals and dust seals *with new ones*.**
*** Apply brake fluid to all of the seals, brake caliper bores and pistons before reassembly.**

PISTON SEALS

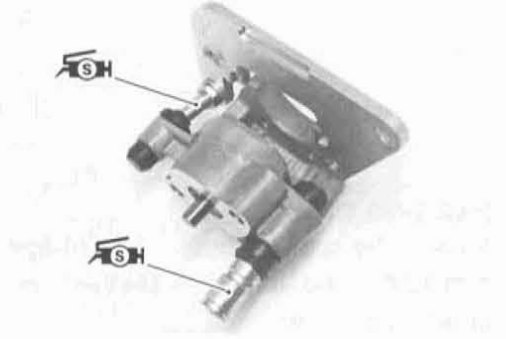
- Install the piston seal ①, dust seal ② and O-ring ③ as shown in illustration.



BRAKE CALIPER HOLDER

- Apply *SUZUKI SILICONE GREASE* to the brake caliper holder pin and caliper holder slide pin.

SH 99000-25100: SUZUKI SILICONE GREASE



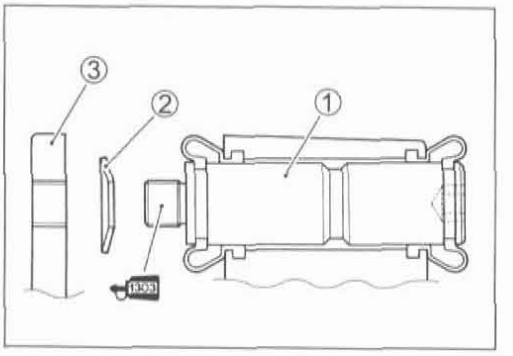
- Apply THREAD LOCK SUPER "1303" to the caliper holder slide pin ①.

1303 99000-32030: THREAD LOCK SUPER "1303"

- Install the caliper holder slide pin ①, washer ② and caliper holder ③ to the caliper.
- Tighten the caliper holder slide pin ① to the specified torque.

Caliper holder slide pin: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

- Install the pad spring and pads. (☞7-55)



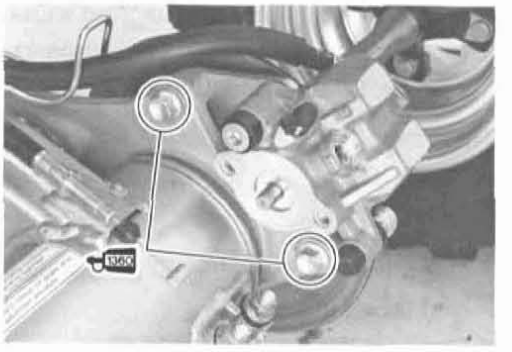
NOTE:
When installing the caliper holder slide pin ① and washer ②, the convex of washer must face slide pin as shown in illustration.

- Apply THREAD LOCK SUPER "1360" to the caliper mounting bolts and tighten the them to the specified torque.

1360 99000-32130: THREAD LOCK SUPER "1360"

Brake caliper mounting bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)

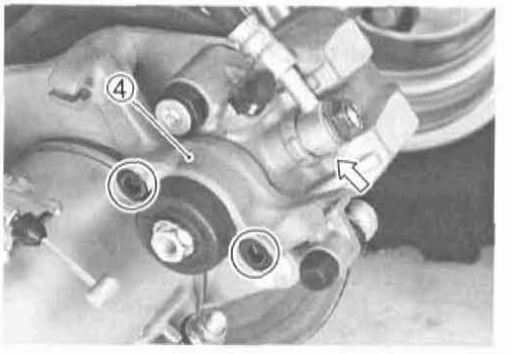
NOTE:
Before remounting the brake caliper, push the brake caliper piston all the way into the caliper.



- Tighten the brake hose union bolt.
- Install the parking brake housing ④ and new gasket.
- Apply THREAD LOCK SUPER "1360" to the parking brake bolts and tighten them to the specified torque.

1360 99000-32130: THREAD LOCK SUPER "1360"

Brake hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Parking brake housing bolt: 28 N·m (2.8 kgf-m, 20.0 lb-ft)

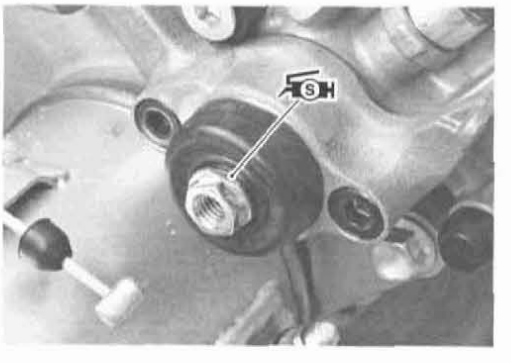


CAUTION

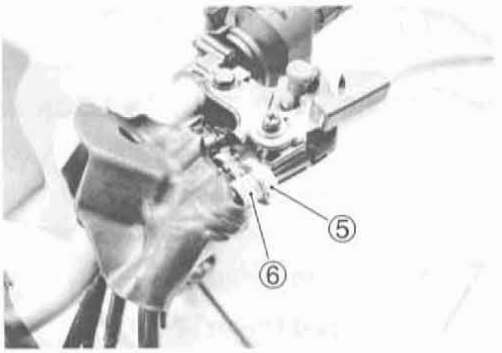
*** The removed brake hose washers should be replaced with new ones in order to prevent leakage of brake fluid.**
*** Bleed air from the system after reassembling the brake caliper. (☞2-21)**

- When replacing the boot with a new one, apply SUZUKI SILICONE GREASE to the groove of parking brake axle.

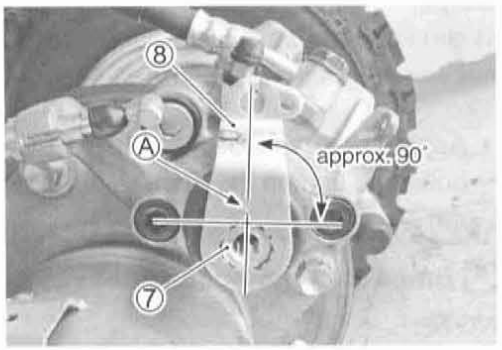
SH 99000-25100: SUZUKI SILICONE GREASE



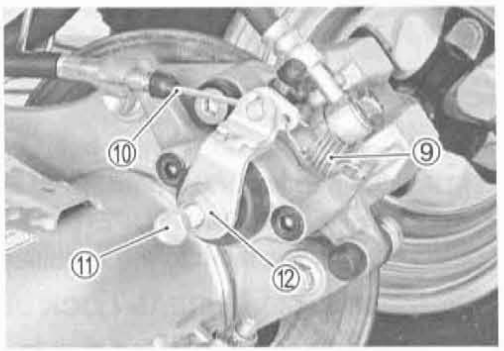
- Loosen the lock-nut ⑤ and turn the adjuster ⑥ in completely, so that the cable play is maximum.



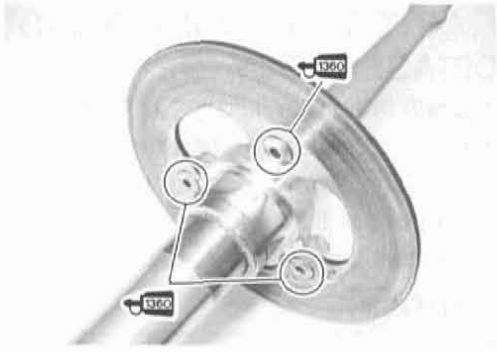
- Set the parking brake shaft ⑦ in neutral position by rotating the shaft.
- Install the parking lever ⑧ onto the parking brake shaft ⑦ with the punch mark Ⓐ aligned with corner of hexagon on the parking brake shaft ⑦, so that parking lever ⑧ is at angle of approx. 90 degrees to the line Ⓑ as shown in illustration.



- Hook the return spring ⑨ on the parking lever with the spring end faced the caliper.
- Connect the parking cable ⑩.
- Install the adjuster ⑪ and the lock-nut ⑫.
- Adjust the parking brake. (☞2-19)



BRAKE DISC REMOVAL AND INSTALLATION



REMOVAL

- Remove the rear wheel. (☞7-10)
- Remove the rear axle. (☞7-92)
- Remove the brake disc.

INSTALLATION

- Install the brake disc to the rear axle.

NOTE:
Make sure that the disc is free of any greasy matter.

- Apply THREAD LOCK SUPER "1360" to the brake disc bolts and tighten them to the specified torque.

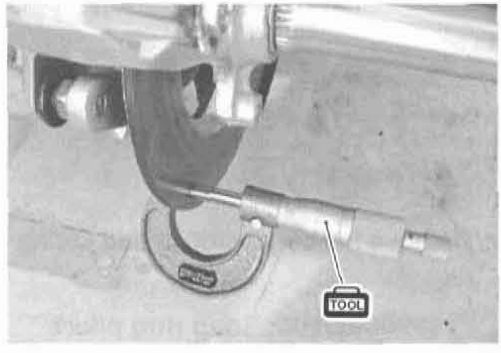
1360 99000-32130: THREAD LOCK SUPER "1360"

Brake disc bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

- Install the rear axle. (☞7-98)
- Install the rear wheel. (☞7-14)

BRAKE DISC INSPECTION

Inspect the brake disc for cracks or damage and measure the thickness using the micrometer. If any defects are found or if the thickness is less than the service limit, replace the brake disc with a new one.

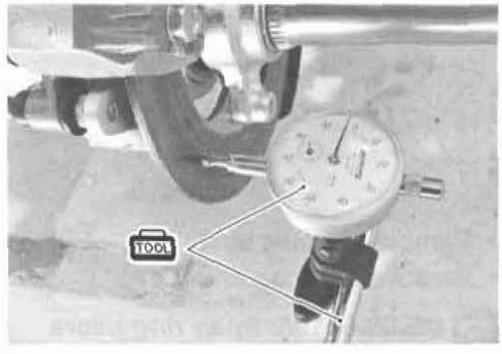


TOOL 09900-20205: Micrometer (0 – 25 mm)

DATA Brake disc thickness
Service Limit: 3.5 mm (0.138 in)

- Remove the brake caliper. (☞7-57)

Measure the runout using the dial gauge. If the runout exceeds the service limit, replace the brake disc with a new one.

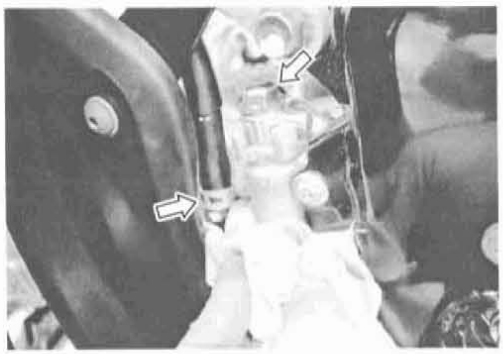


TOOL 09900-20607: Dial gauge (1/100 mm)
09900-20701: Magnetic stand

DATA Brake disc runout
Service Limit: 0.3 mm (0.012 in)

- Install the brake caliper. (☞7-61)

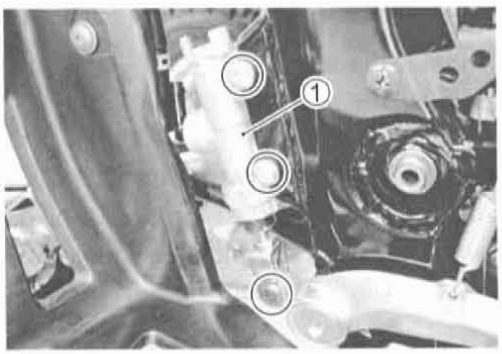
MASTER CYLINDER REMOVAL AND DISASSEMBLY



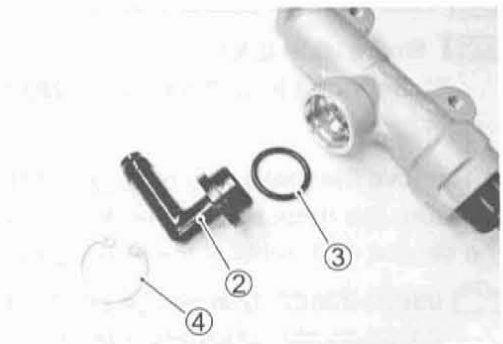
- Drain the brake fluid. (☞7-56)
- Place a rag underneath the brake hose union bolt and reservoir tank hose connector on the master cylinder to catch any split brake fluid. Remove the brake hose union bolt and disconnect the brake hose and reservoir tank hose.

CAUTION

Immediately and completely wipe off any brake fluid contacting any part of the vehicle. The brake fluid reacts chemically with paint, plastics, rubber materials, etc., and will damage them severely.

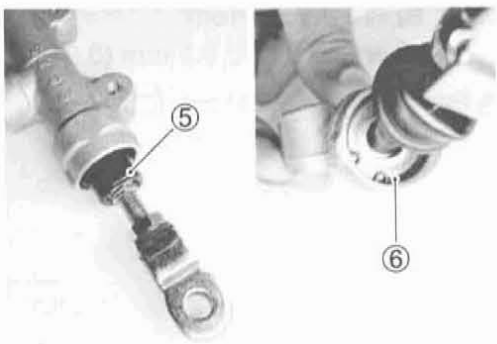


- Remove the master cylinder rod pin. (☞7-67)
- Remove the master cylinder mounting bolt.
- Remove the master cylinder ①.



- Remove the connector ② and O-ring ③ by removing the snap ring ④.

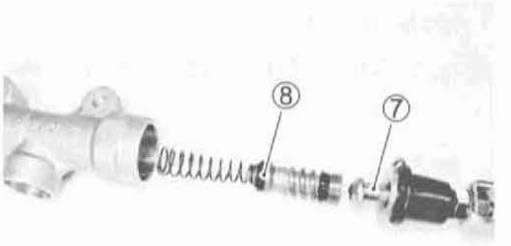
TOOL **09900-06108: Snap ring pliers**



- Remove the dust boot ⑤.
- Remove the snap ring ⑥.

TOOL **09900-06108: Snap ring pliers**

• Remove the push rod ⑦, piston assembly ⑧.



MASTER CYLINDER INSPECTION

MASTER CYLINDER

Inspect the master cylinder bore for any scratches or damage. If any defects are found, replace the master cylinder with a new one.

PISTON AND RUBBER PARTS

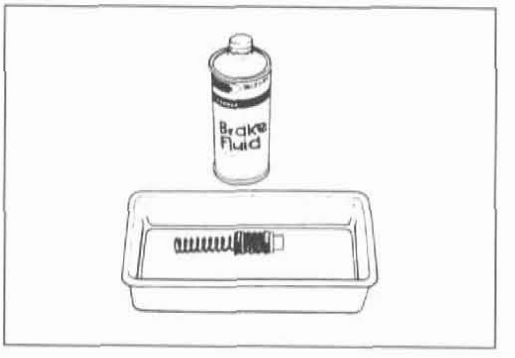
Inspect the piston surface, primary/secondary cup and dust boot for any scratches, wear or damage. If any defects are found, replace them with a new one.

MASTER CYLINDER REASSEMBLY AND INSTALLATION

Reassemble and install the master cylinder in the reverse order of removal and disassembly. Pay attention to the following point:

CAUTION

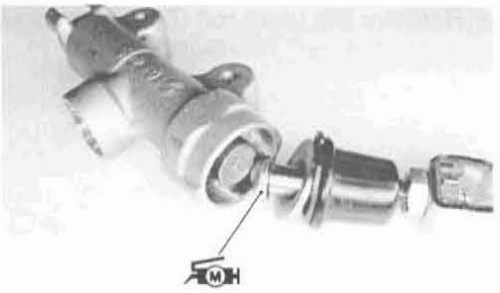
*** Clean the master cylinder components with fresh brake fluid before reassembly.**
*** Do not wipe the brake fluid off after cleaning the components.**
*** When cleaning the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine or others.**
*** Apply brake fluid to the cylinder bore and all the component to be inserted into the bore.**



BF **Specification and classification: DOT 4**

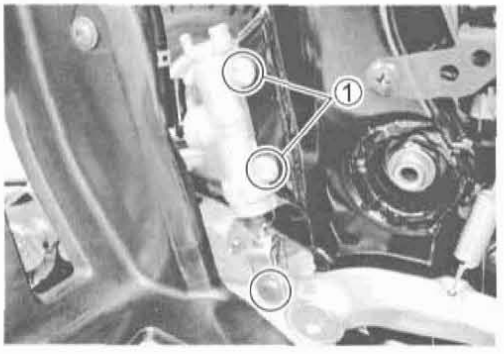
- Apply SUZUKI MOLY PASTE to the push rod.

99000-25140: SUZUKI MOLY PASTE



- Install the master cylinder rod pin. (☞7-67)
- Tighten the master cylinder mounting bolts ①.

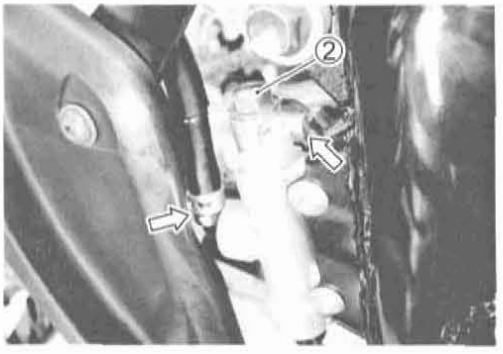
Master cylinder mounting bolt:
10 N·m (1.0 kgf-m, 7.0 lb-ft)



- Tighten the brake hose union bolt ② to the specified torque.
- Connect the reservoir tank hose.

Brake hose union bolt ②: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

NOTE:
After contacting the brake hose union to the stopper, tighten the union bolt.



CAUTION

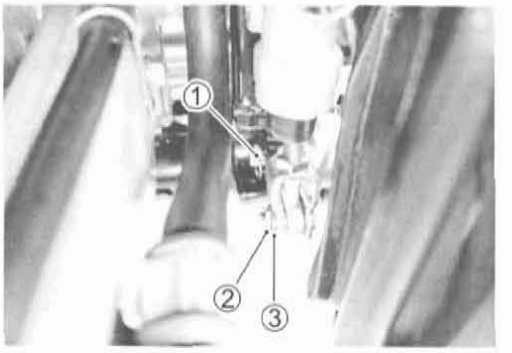
*** The removed brake hose washers should be replaced with new ones.**
*** Bleed air from the system after reassembling the brake master cylinder. (☞2-21)**

- Adjust the brake pedal height. (☞2-19)

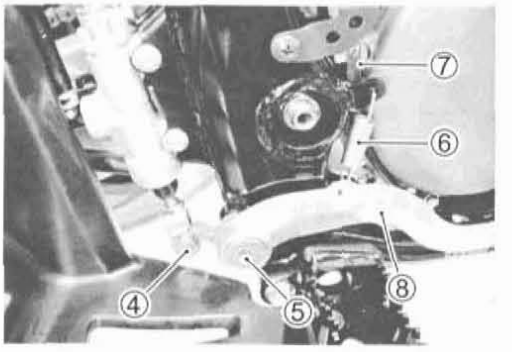
BRAKE PEDAL

REMOVAL

- Remove the clip ①.
- Remove the cotter pin ② and washer ③.



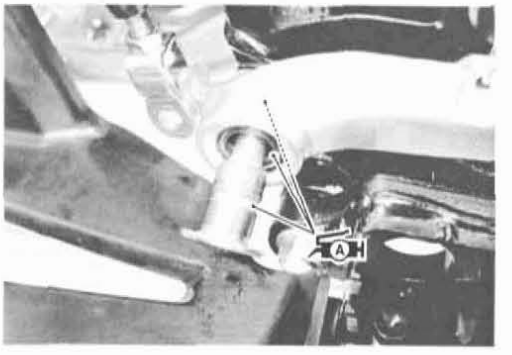
- Remove the master cylinder rod pin ④.
- Remove the brake pedal pivot bolt ⑤.
- Remove the return spring ⑥ and rear brake switch spring ⑦ from the brake pedal ⑧.



INSTALLATION

- Apply grease to the oil seal and brake pedal pivot bolt.

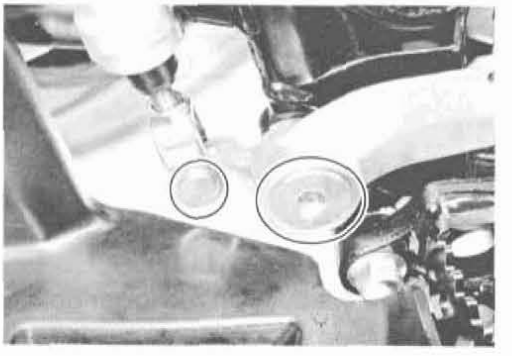
99000-25010: SUZUKI SUPER GREASE "A"
(or equivalent grease)



- Install the return spring and rear brake switch spring properly. (☞9-26)

- Tighten the brake pedal pivot bolt to the specified torque.

Brake pedal pivot bolt: 29 N·m (2.9 kgf-m, 21.0 lb-ft)



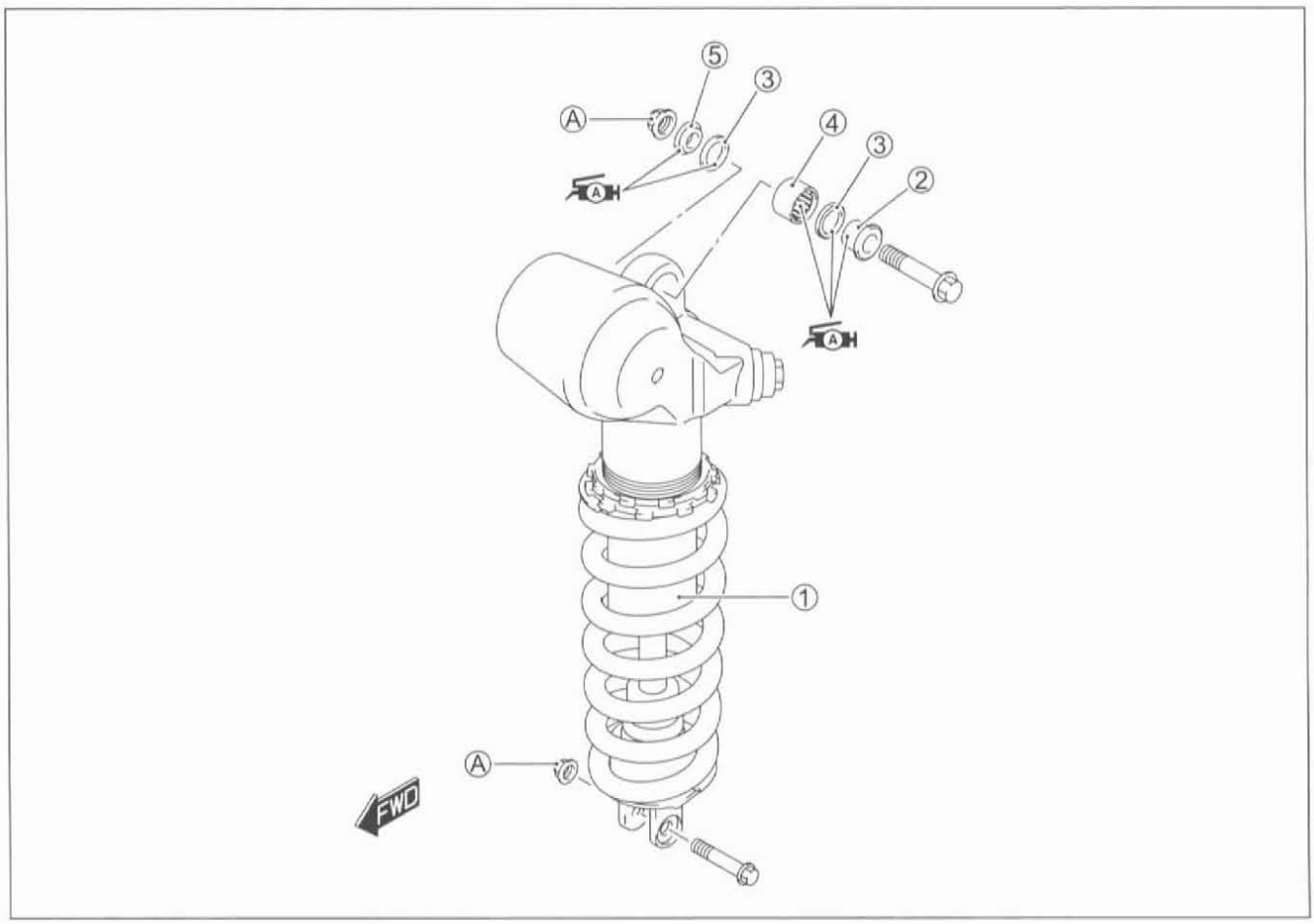
- Install cotter pins and clip.

CAUTION

Replace the removed cotter pin with a new one.

- Adjust the brake pedal height. (☞2-19)

REAR SHOCK ABSORBER
CONSTRUCTION

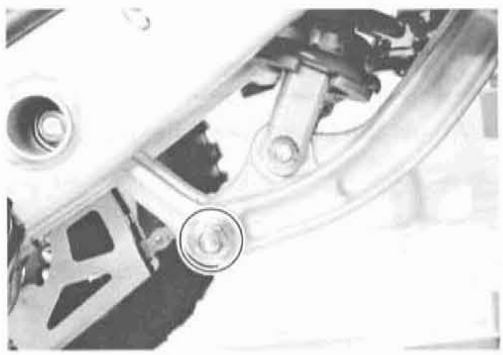


①	Rear shock absorber	⑤	Collar
②	Collar	Ⓐ	Rear shock absorber mounting nut
③	Dust seal		
④	Bearing		

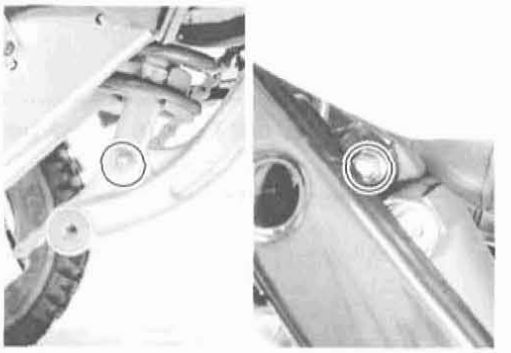
ITEM	N·m	kgf-m	lb-ft
Ⓐ	60	6.0	43.5

REMOVAL

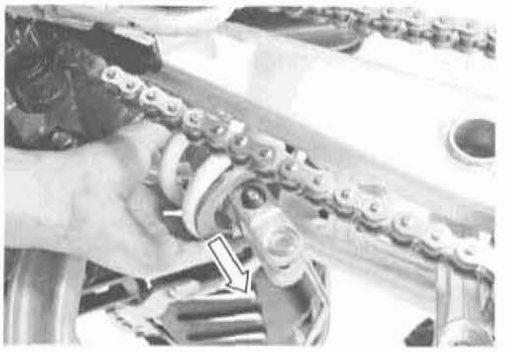
- Raise the rear wheel off the ground and support the vehicle with jack or wooden block.
- Remove the cushion rod lower bolt/nut.



- Remove the rear shock absorber mounting bolts/nuts.



- Remove the rear shock absorber.



INSPECTION AND DISASSEMBLY

REAR SHOCK ABSORBER

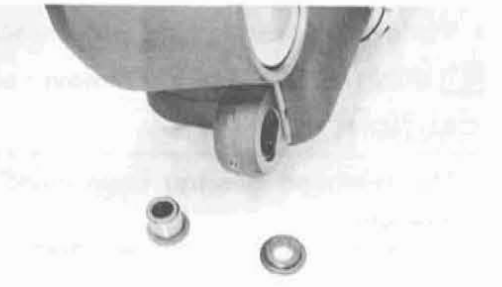
Inspect the shock absorber body for oil leakage or damage.
If any defects are found, replace the shock absorber with a new one.

CAUTION

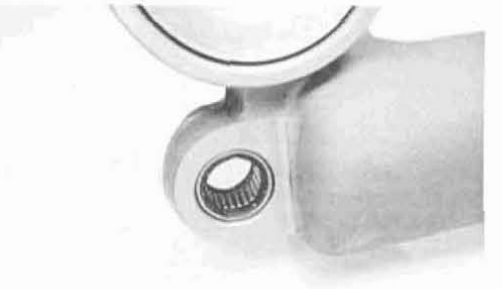
Do not attempt to disassemble the rear shock absorber. It is unserviceable.

REAR SHOCK ABSORBER DUST SEAL

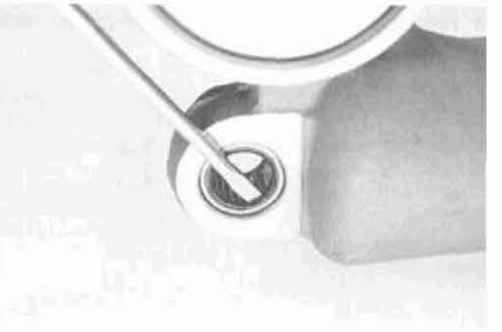
- Remove the collars.



Inspect the dust seal lips and collars for wear or damage.
If any defects are found, replace the dust seals and collars with new ones.



- Remove the dust seals.



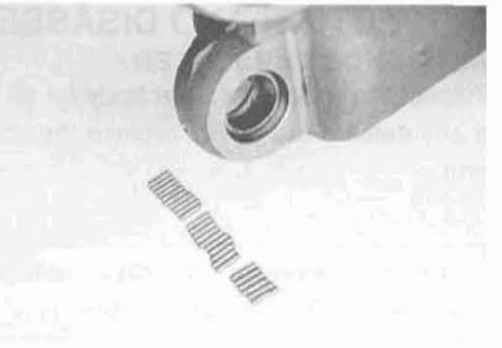
CAUTION

The removed dust seals must be replaced with new ones.

REAR SHOCK ABSORBER BEARING

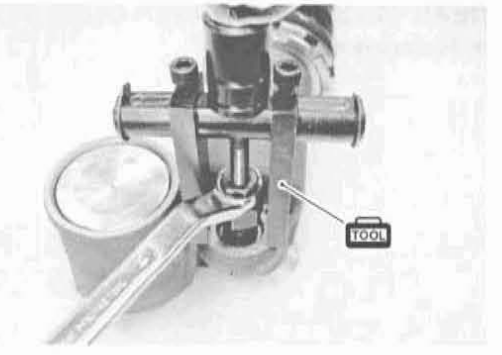
Inspect the bearings for abnormal noise and smooth movement.

- Remove the needle roller bearings.



- Remove the bearing cage with the special tool.

TOOL 09921-20240: Bearing remover set



CAUTION

The removed bearing cage must be replaced with a new one.

REASSEMBLY AND INSTALLATION

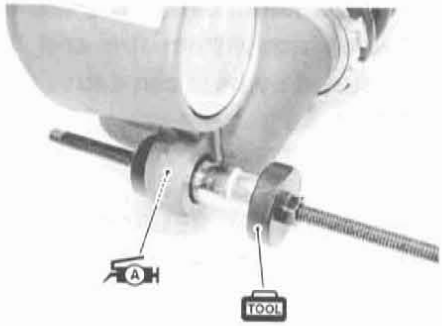
Reassemble and install the rear shock absorber in the reverse order of removal and disassembly. Pay attention to the following points:

- Press fit the bearing cage with the special tool and a suitable size socket wrench.

09924-84521: Bearing installer set

NOTE:

Position the bearings by referring to the illustration of page 7-82.



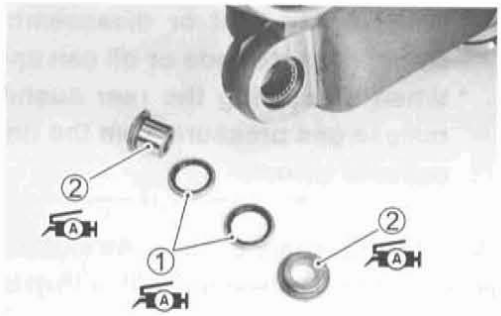
- Apply grease to the needle roller bearings.

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

- Apply grease to the dust seal lips and collars.

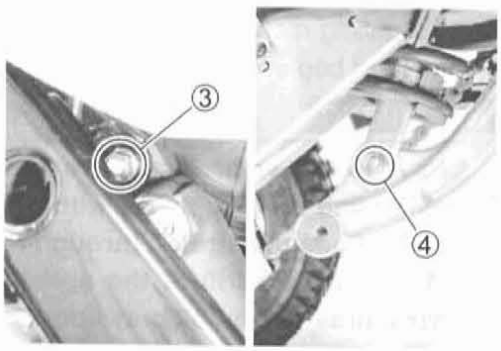
99000-25010: SUZUKI SUPER GREASE "A"
(or equivalent grease)

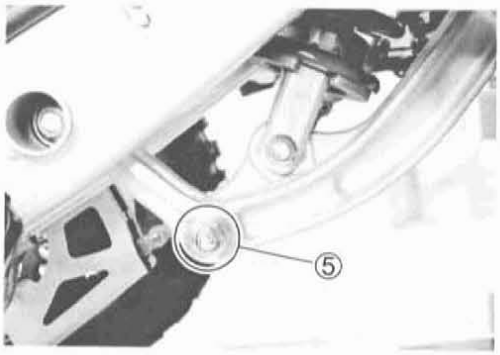
- Install the dust seals ① and collars ② into the rear shock absorber.



- Tighten each bolt/nut to the specified torque.

Rear shock absorber nut (Upper) ③:
60 N·m (6.0 kgf-m, 43.5 lb-ft)
Rear shock absorber nut (Lower) ④:
60 N·m (6.0 kgf-m, 43.5 lb-ft)
Rear cushion rod nut ⑤: 78 N·m (7.8 kgf-m, 56.5 lb-ft)





REAR SHOCK ABSORBER DISPOSAL

⚠ WARNING

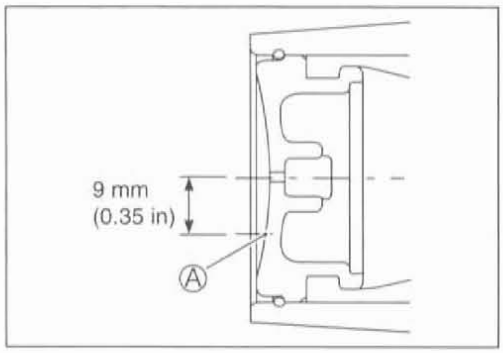
*** The rear shock absorber unit contains high-pressure nitrogen gas.**
*** Mishandling can cause explosion.**
*** Keep away from fire and heat. High gas pressure caused by heat can cause an explosion.**
*** Release gas pressure before disposing.**

GAS PRESSURE RELEASE

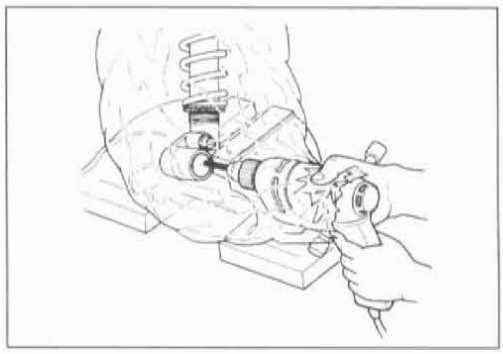
The rear cushion damper unit contains high-pressure nitrogen gas. Make sure to observe the following precautions.

⚠ WARNING

*** Never apply heat or disassemble the damper unit since it can explode or oil can splash hazardously.**
*** When discarding the rear cushion unit, be sure to release gas pressure from the unit following the procedures below.**



Mark the drill center at the location Ⓐ using a center punch.
Wrap the rear cushion unit with a vinyl bag and fix it on a vise as shown.
Drill a 2 – 3 mm (0.08 – 0.12 in) hole at the marked drill center using a drilling machine and let out gas while taking care not to get the vinyl bag entangled with the drill bit.

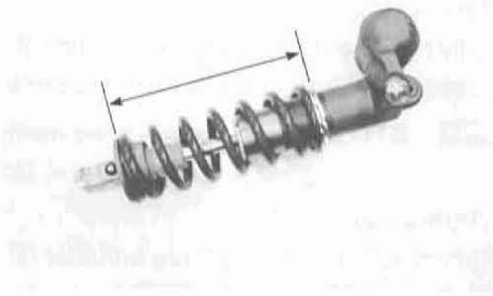


⚠ WARNING

*** Be sure to wear protective glasses since drilling chips and oil may fly off with blowing gas when the drill bit has penetrated through the body.**
*** Make sure to drill at the specified position. Otherwise, pressurized oil may spout out forcefully.**

SUSPENSION SETTING

After installing the rear suspension, adjust the spring pre-load and damping force as follows.



SPRING PRE-LOAD ADJUSTMENT

The set length 222 mm (8.7 in) provides the maximum spring pre-load.

The set length 236 mm (9.3 in) provides the minimum spring pre-load.

DATA STD length: 299 mm (11.8 in)

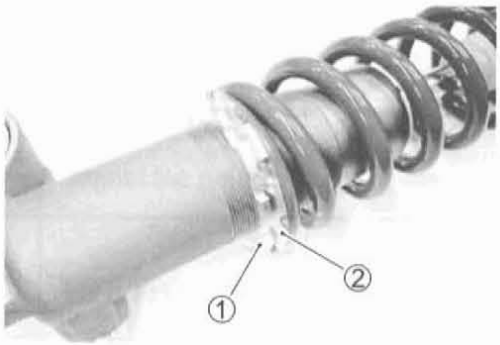
CAUTION

Do not set the spring length out of the specified range.

- Remove the rear shock absorber. (☞7-68)
- Loosen the lock-nut ①.
- Adjust the spring set length by turning the adjuster ②.
- Tighten the lock-nut ① to the specified torque.

Rear shock absorber lock-nut:
30 N·m (3.0 kgf-m, 21.5 lb-ft)

- Remount the rear shock absorber. (☞7-71)



DAMPING FORCE ADJUSTMENT

The rebound and compression damping force are adjustable for rider's preference, rider's weight and field condition.

NOTE:
Do not turn the adjuster screws more than given position, or the adjuster may be damaged.

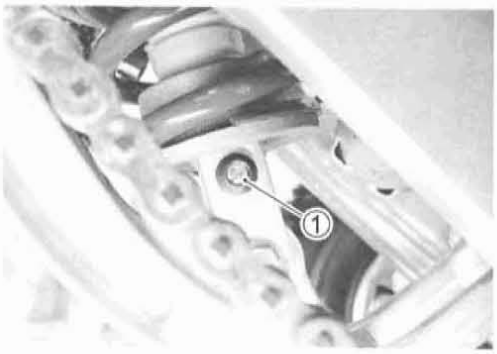
Rebound side

Fully turn the damping force adjuster ① clockwise. It is at stiffest position and turn it out to standard setting position.

DATA STD position: 7 clicks out from stiffest position

[Fine-tune the adjuster by turning it slightly until two punch marks align.]

NOTE:
Make sure to check the 1st click position by last sound when turning in the adjuster.



Compression side

(Low-side)

Fully turn the damping force adjuster ② clockwise. It is at stiffest position and turn it out to standard setting position.

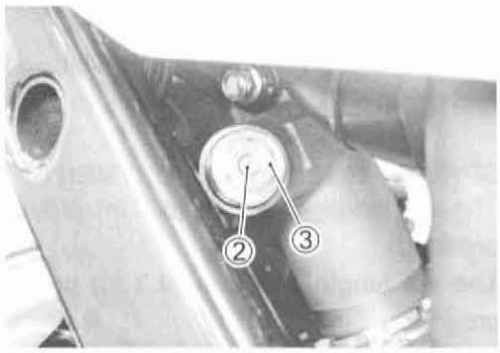
DATA **STD position (Low speed compression):**
8 clicks out from stiffest position

(High-side)

Fully turn the damping force adjuster ③ clockwise. It is at stiffest position and turn it out to standard setting position.

DATA **STD position (High speed compression):**
3/4 turns out from stiffest position

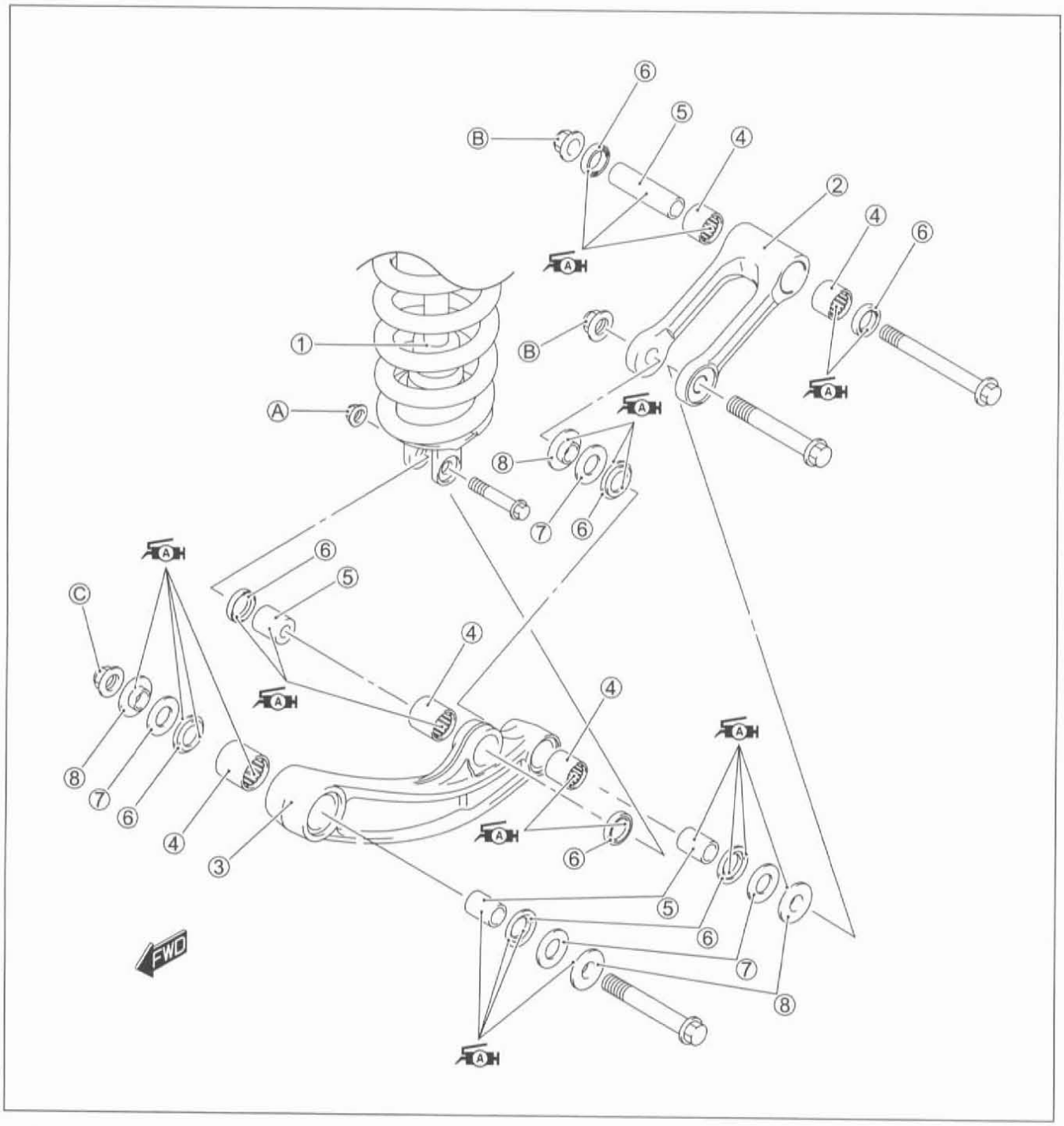
[Fine-tune the adjuster by turning it slightly until two punch marks align.]



DATA **Standard suspension setting**

	REAR			
	Spring set length	Damping force adjuster		
		Rebound	Compression	
Standard	299 mm (11.8 in)	7 clicks out from stiffest position	Low speed	8 clicks out from stiffest position
			High speed	3/4 turns out from stiffest position

CUSHION ROD AND CUSHION LEVER
CONSTRUCTION

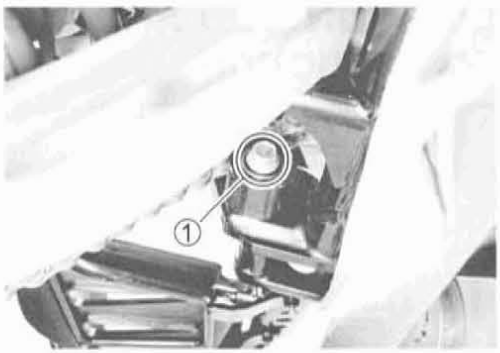


①	Rear shock absorber	⑦	Washer
②	Cushion rod	⑧	Collar
③	Cushion lever	Ⓐ	Rear shock absorber mounting nut
④	Bearing		
⑤	Spacer	Ⓑ	Cushion rod nut
⑥	Dust seal	Ⓒ	Cushion lever nut

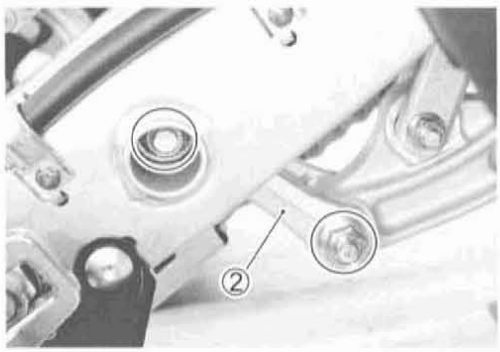
ITEM	N·m	kgf-m	lb-ft
Ⓐ	60	6.0	43.5
Ⓑ	78	7.8	56.5
Ⓒ	78	7.8	56.5

REMOVAL

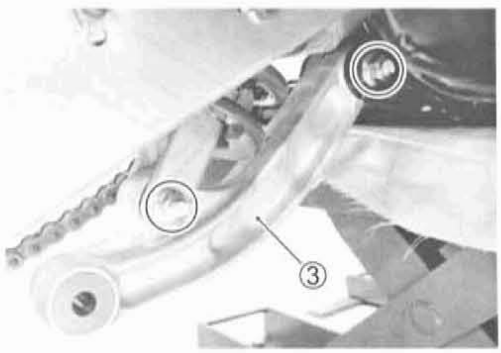
- Place the vehicle on the level ground and support the vehicle with a jack or wooden block.
- Remove the drive chain control roller ①.



- Remove the cushion rod ②.



- Remove the cushion lever ③.



INSPECTION AND DISASSEMBLY

SPACER

- Remove the collars, washers and spacers from the cushion lever.
- Remove the spacer from the cushion rod.

Inspect the spacers for damage. If any defects are found, replace the spacers with new ones.

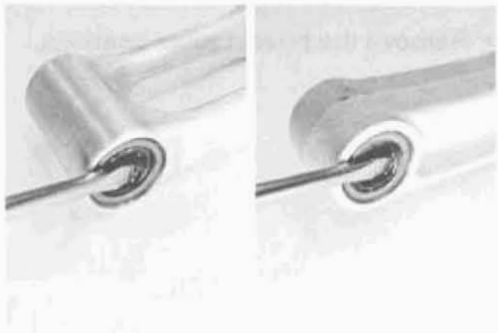
DUST SEAL

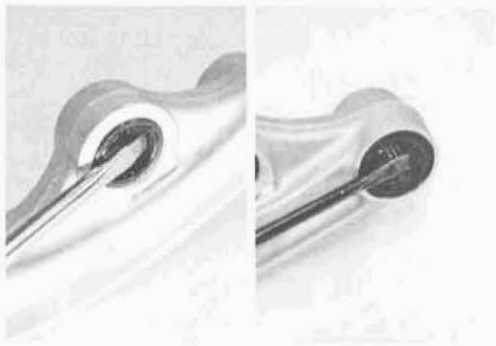
Inspect the dust seal lips for wear or damage. If any defects are found, replace them with new ones.

- Remove the dust seals.

CAUTION

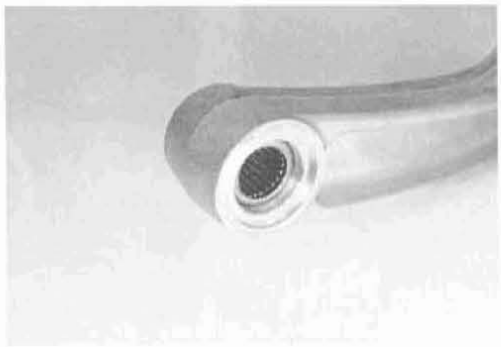
The removed dust seals must be replaced with new ones.

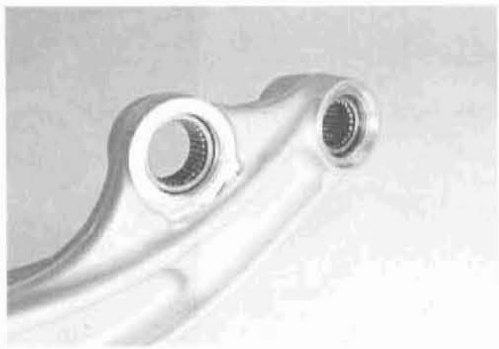




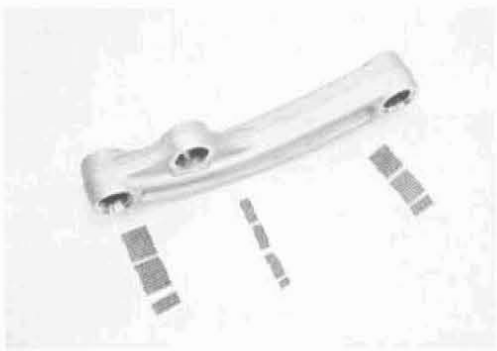
BEARING

Inspect the bearings for abnormal noise and smooth movement.





- Remove the needle roller bearings.

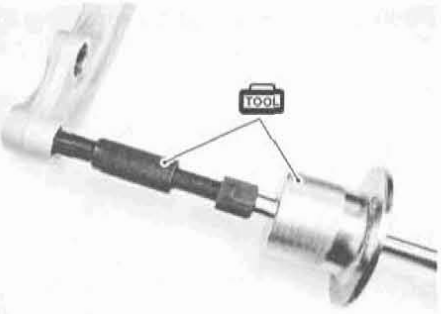


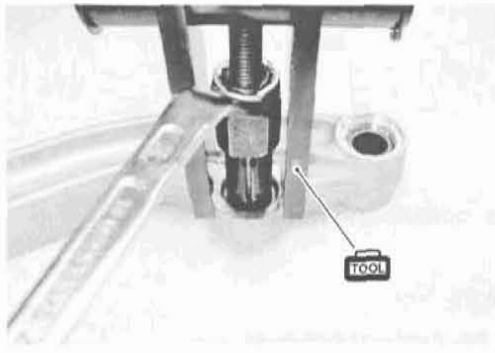
- Remove the needle bearing cages with the special tools.

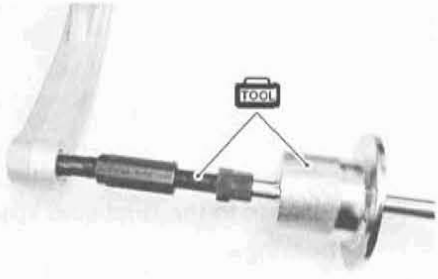
TOOL **09921-20240: Bearing remover set**
09923-73210: Bearing puller
09930-30104: Sliding hammer

CAUTION

The removed bearing cages must be replaced with new ones.







CUSHION ROD AND CUSHION LEVER

Inspect the cushion rod and cushion lever for damage and distortion. If any defects are found, replace them with new ones.

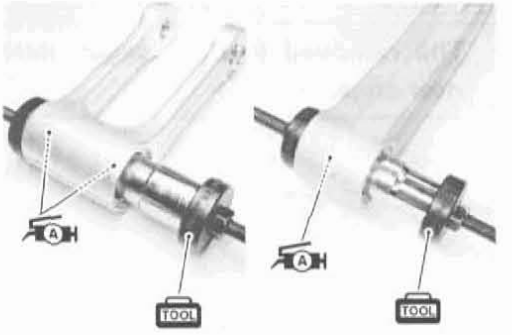
REASSEMBLY AND INSTALLATION

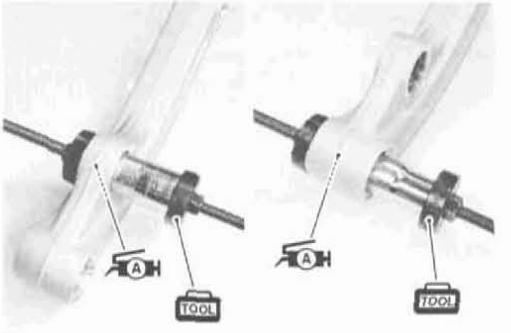
Reassemble and install the cushion rod and cushion lever in the reverse order of removal and disassembly. Pay attention to the following points:

- Press fit the bearing cages with the special tool and a suitable *size socket wrench.*

09924-84521: Bearing installer set

NOTE:
Position the bearings by referring to the illustration of page 7-82.

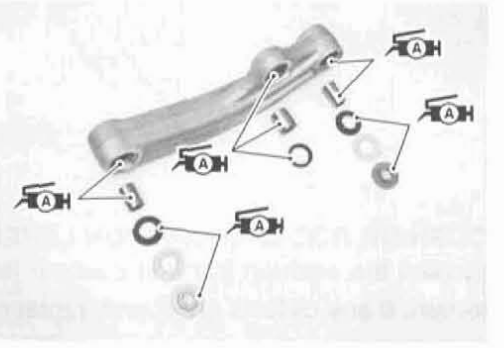


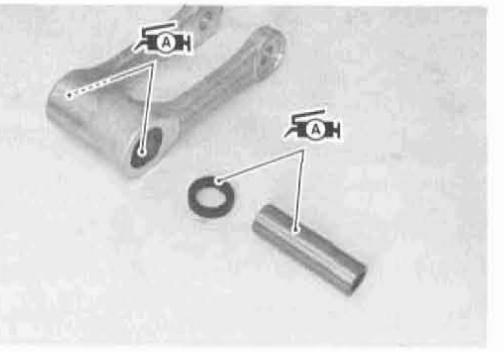


- Apply grease to the dust seal lips, spacers, collars and needle roller bearings.

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

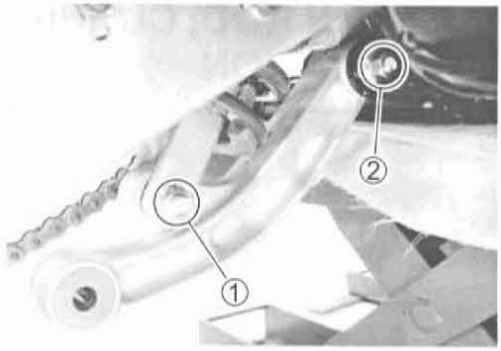
NOTE:
The stamped mark on the dust seals must face outside.





- Tighten the rear shock absorber mounting bolt/nut and cushion lever bolt/nut to the specified torque.

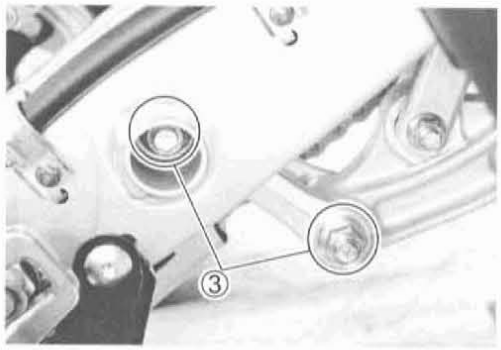
Rear shock absorber nut (Lower) ①:
60 N·m (6.0 kgf-m, 43.5 lb-ft)
Cushion lever nut ②: 78 N·m (7.8 kgf-m, 56.5 lb-ft)



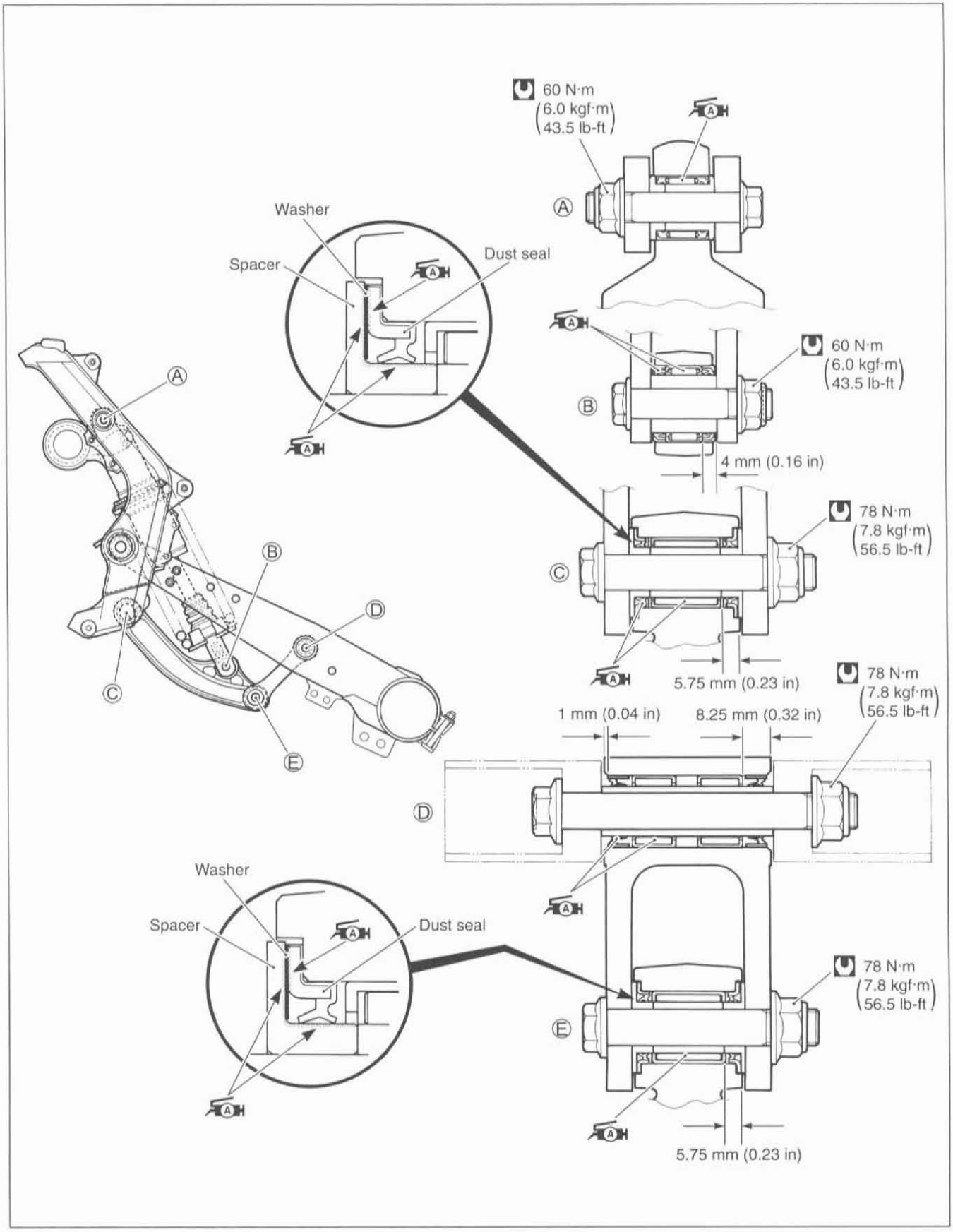
- Tighten the cushion rod bolts/nuts to the specified torque.

Cushion rod nut ③: 78 N·m (7.8 kgf-m, 56.5 lb-ft)

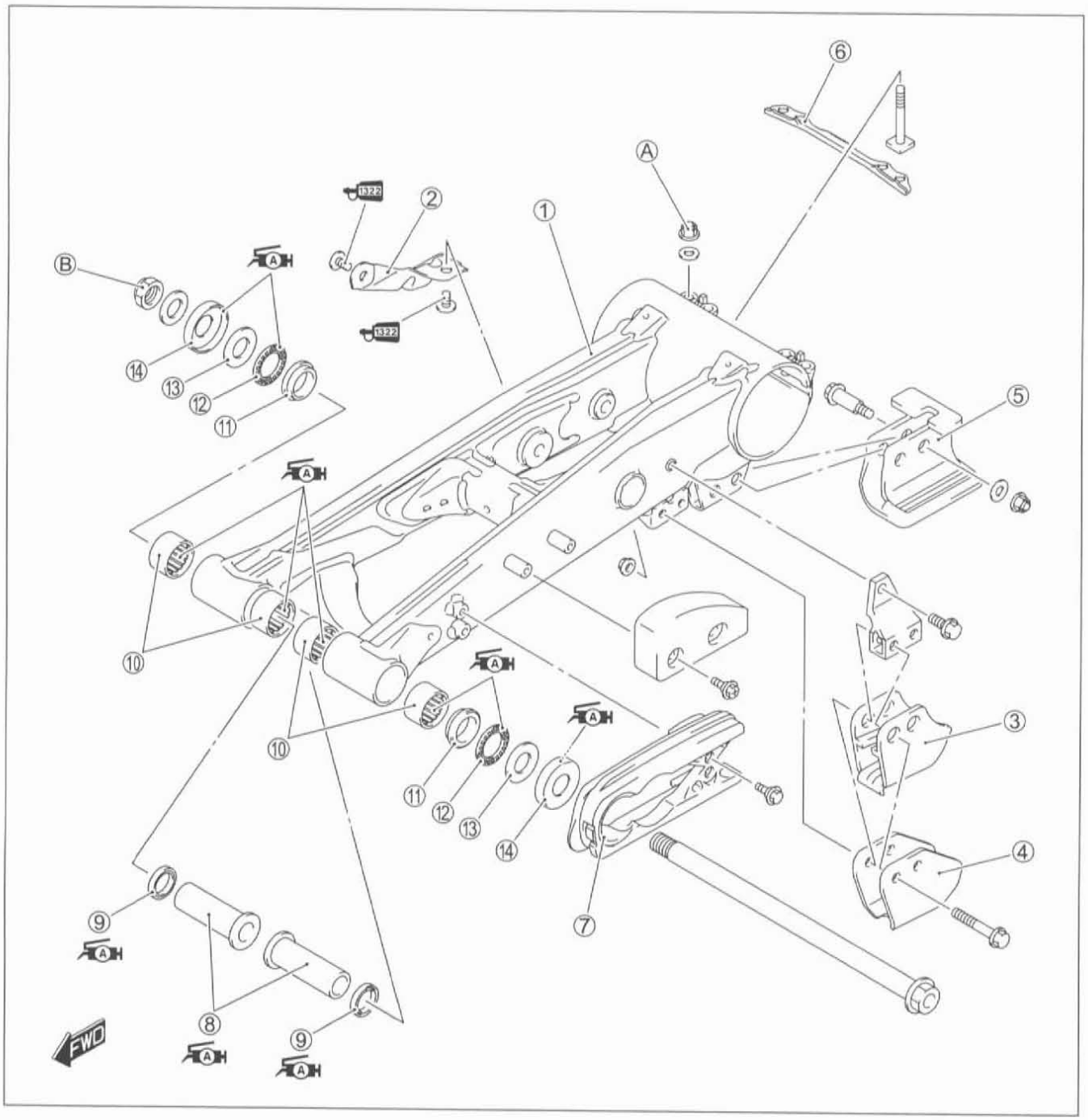
- Install the drive chain control roller. (☞7-107)



CUSHION ROD, CUSHION LEVER AND REAR SHOCK ABSORBER INFORMATION



SWINGARM
CONSTRUCTION

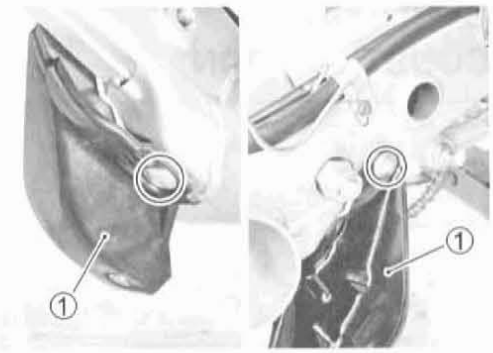


①	Swingarm	⑨	Inner dust seal
②	Rear brake disc cover	⑩	Bearing
③	Chain guide	⑪	Outer spacer
④	Chain guide plate	⑫	Thrust bearing
⑤	Sprocket guard	⑬	Thrust washer
⑥	Chain adjuster rubber seal	⑭	Outer dust seal
⑦	Chain buffer	Ⓐ	Rear axle housing set nut
⑧	Inner spacer	Ⓑ	Swingarm pivot nut

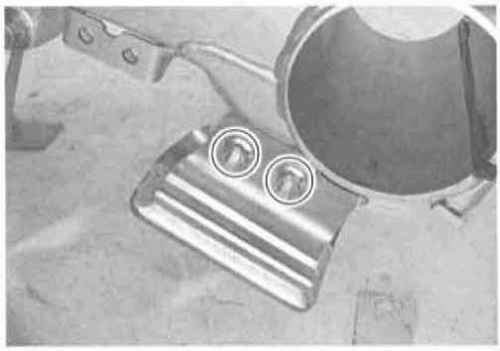
ITEM	N·m	kgf-m	lb-ft
Ⓐ	28	2.8	20.0
Ⓑ	95	9.5	68.5

REMOVAL

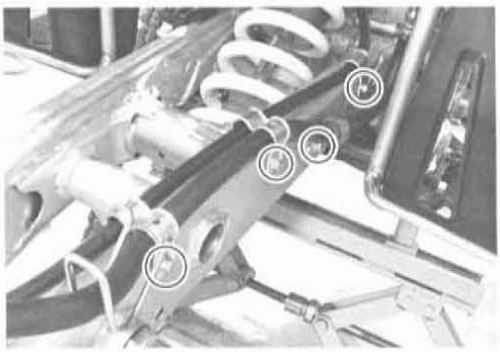
- Place the vehicle on the level ground and support the vehicle with a jack or wooden block.
- Remove the rear wheels. (☞7-10)
- Remove the rear wheel hubs. (☞7-10)
- Remove the rear axle. (☞7-92)
- Remove the axle housing. (☞7-94)
- Remove the rear brake disc cover ①.



- Remove the sprocket guard ②.

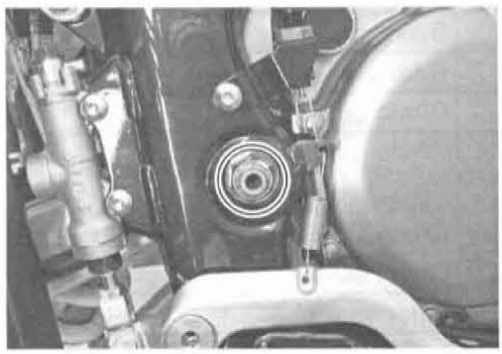


- Remove the brake hose/parking brake cable guides.

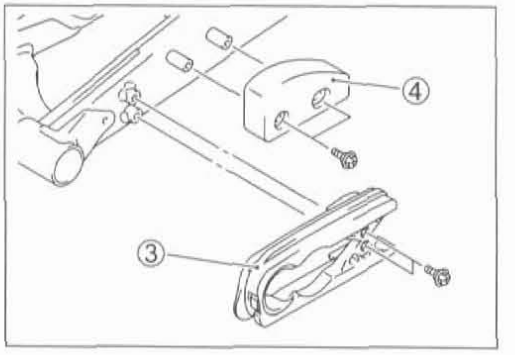


- Remove the cushion rod upper bolt/nut and rear shock absorber lower mounting bolt/nut.

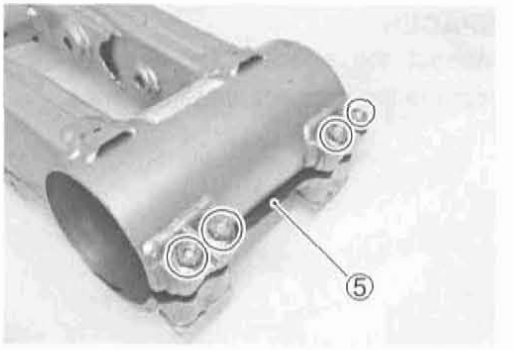
- Loosen the swingarm pivot nut and remove the washer and swingarm pivot shaft.
- Remove the swingarm assembly.



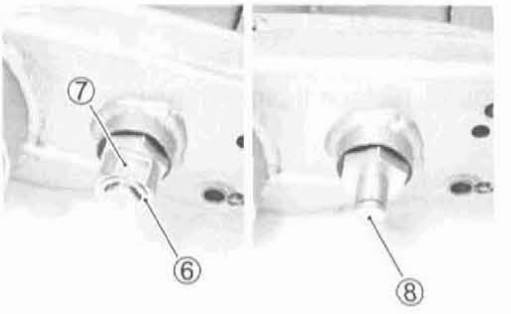
- Remove the chain buffer ③ and chain slider ④.



- Remove the rear axle housing set bolts/nuts and chain adjuster rubber seal ⑤.

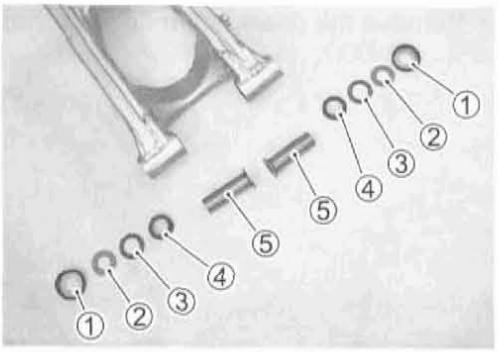


- Remove the E-ring ⑥ and rear brake caliper bracket bushing ⑦.
- Remove the rear brake caliper bracket stopper ⑧.



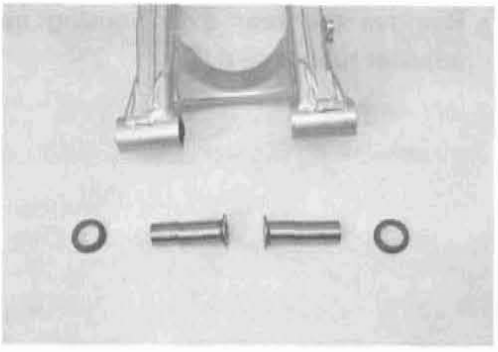
INSPECTION AND DISASSEMBLY

- Remove the following items from the swingarm:
  Outer dust seals ①
  Thrust washers ②
  Thrust bearings ③
  Outer spacers ④
  Inner spacers ⑤



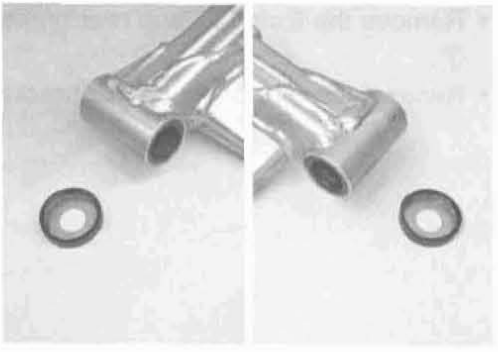
SPACER

Inspect the spacers for damage. If any defects are found, replace the spacers with new ones.



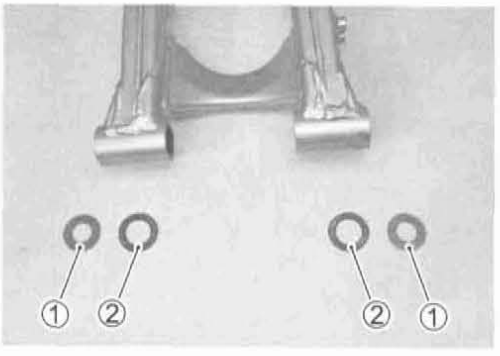
DUST SEAL

Inspect the dust seal lips for wear or damage. If any defects are found, replace them with new ones.



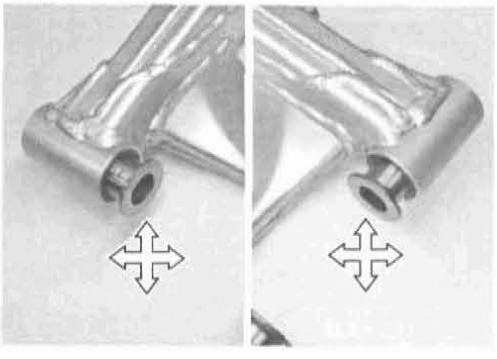
THRUST BEARING AND THRUST WASHER

- Inspect the thrust washers ① and thrust bearings ② for damage. If any defects are found, replace them with new ones.



BEARING

- Insert the inner spacers into bearings and check the play when moving the inner spacers up and down. If excessive play is noted, replace the bearings with new ones.
- Inspect the bearings for abnormal noise and smooth movement.



- Remove the bearings (outer) with special tools.

TOOL 09921-20240: Bearing remover set

CAUTION

The removed bearings must be replaced with new ones.

- Remove the dust seals (inner).
- Remove the bearings (inner) with special tool.

TOOL 09913-70210: Bearing installer set

CAUTION

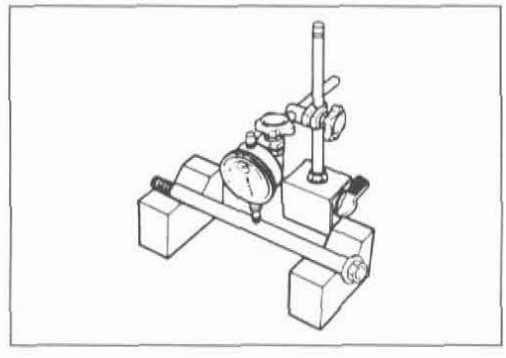
The removed bearings must be replaced with new ones.

SWINGARM PIVOT SHAFT

Using a dial gauge, check the pivot shaft runout. If the runout exceeds service limit, replace the pivot shaft with a new one.

TOOL 09900-20607: Dial gauge (1/100 mm, 10 mm)
09900-20701: Magnetic stand
09900-21304: V-block (100 mm)

DATA Swingarm pivot shaft runout:
Service Limit: 0.3 mm (0.01 in)



SWINGARM

Inspect the swingarm for cracks and damage. If any defects are found, replace the swingarm with a new one.

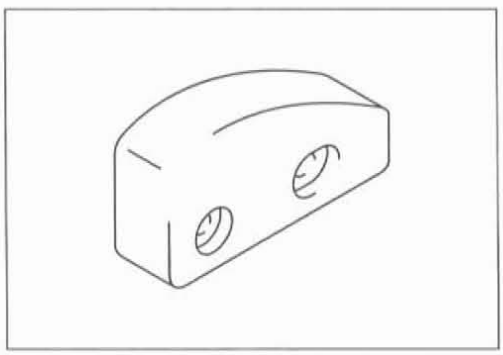
CHAIN BUFFER

Inspect the chain buffer for wear and damage. If any defects are found, replace the chain buffer with a new one.

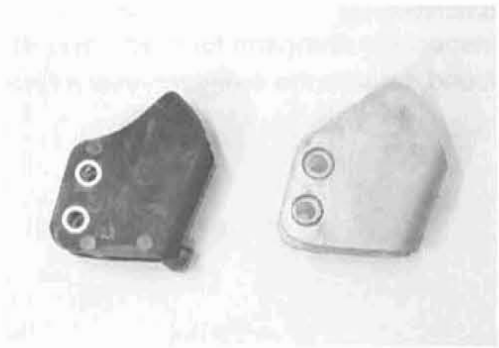
REAR BRAKE DISC COVER
Inspect the rear brake disc cover for damage.

SPROCKET GUARD
Inspect the sprocket guard for damage.

CHAIN SLIDER
Inspect the chain slider for wear and damage. If any defects are found, replace the chain slider with a new one.



CHAIN GUIDE AND CHAIN GUIDE PLATE
- Inspect the chain guide for wear and damage.
- Inspect the chain guide plate for damage.



CHAIN ADJUSTER RUBBER SEAL
- Inspect the chain adjuster rubber seal for wear and damage.

REASSEMBLY
Reassemble the swingarm in the reverse order of disassembly. Pay attention to the following points:

BEARING

- Press fit the bearings with the special tool and a suitable size socket wrench.

09924-84510: Bearing installer set

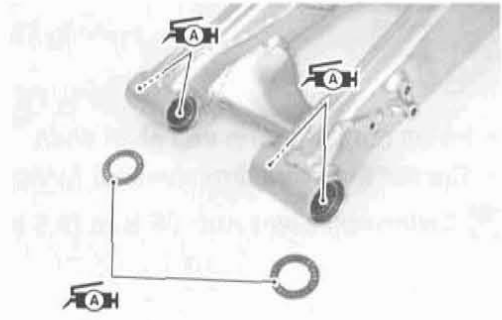
NOTE:

** The stamped mark on the bearings must face outside.*

** Position the bearings by referring to the illustration of page 7-102.*

- Apply grease to the bearings.

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



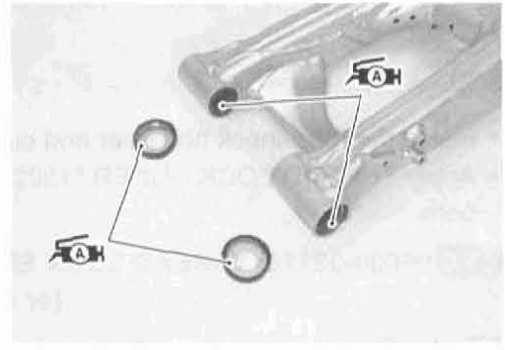
DUST SEAL

- Apply grease to the dust seal lips.

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

NOTE:

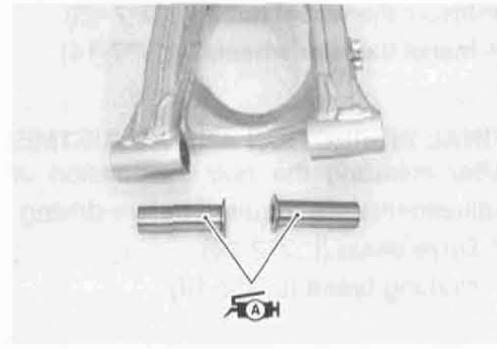
The stamped mark on the dust seals inner must face outside.



- Apply grease to the spacers.

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

- Install the spacers into the swingarm.



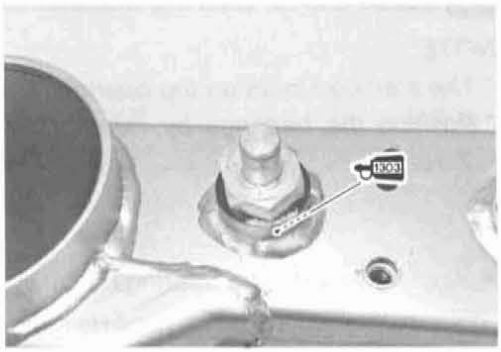
INSTALLATION

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

CALIPER BRACKET STOPPER

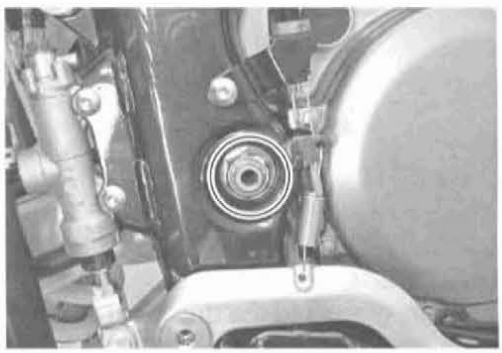
- Apply THREAD LOCK SUPER "1303" to the caliper bracket stopper and tighten it.

1303 99000-32030: THREAD LOCK SUPER "1303"



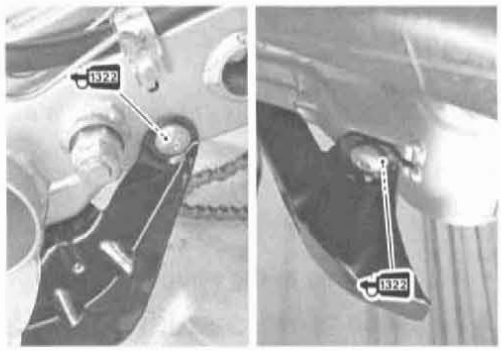
- Install the swingarm and pivot shaft.
- Tighten the swingarm pivot nut to the specified torque.

Swingarm pivot nut: 95 N·m (9.5 kgf-m, 68.5 lb-ft)



- Install the rear shock absorber and cushion rod. (☞7-71)
- Apply THREAD LOCK SUPER "1322" to disc cover mounting bolts.

1322 99000-32110: THREAD LOCK SUPER "1322"
(or equivalent thread lock)



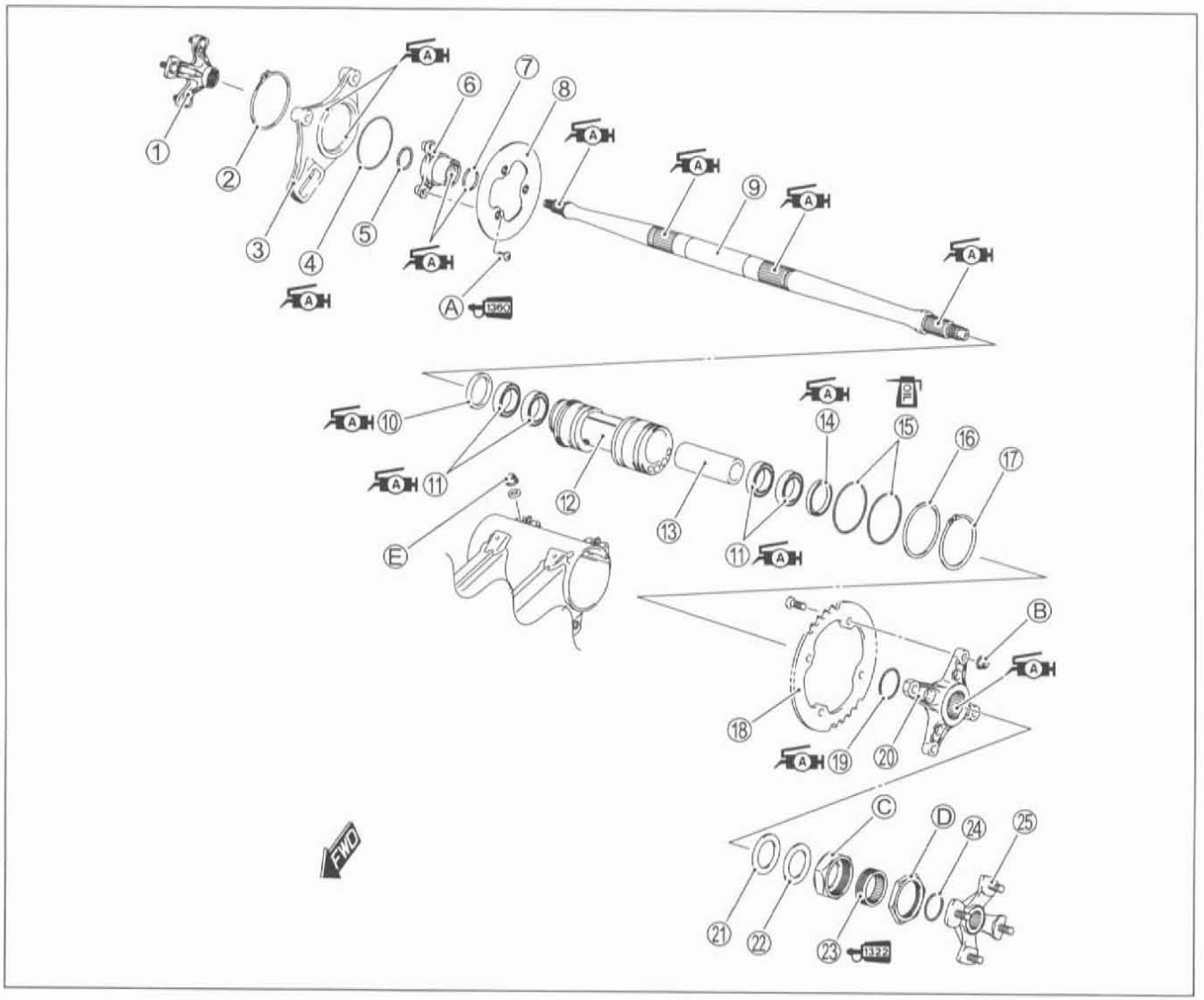
- Install the axle housing and rear axle. (☞7-98)
- Install the wheel hubs. (☞7-13)
- Install the rear wheels. (☞7-14)

FINAL INSPECTION AND ADJUSTMENT

After installing the rear suspension and wheel, the following adjustments are required before driving.

* Drive chain (☞2-26)
* Parking brake (☞2-19)

REAR AXLE
CONSTRUCTION

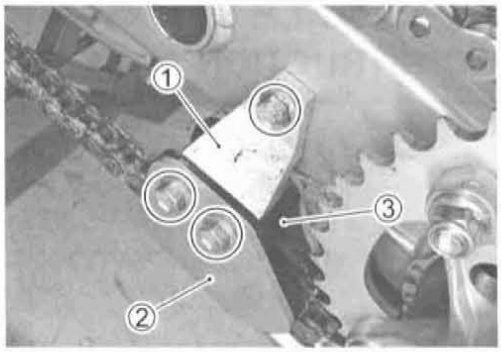


①	Rear wheel hub (Right)	⑯	Washer
②	Snap ring	⑰	Snap ring
③	Rear brake caliper bracket	⑱	Rear sprocket
④	O-ring	⑲	O-ring
⑤	C-ring	⑳	Sprocket flange
⑥	Rear brake disc plate housing	㉑	Washer (Thick)
⑦	O-ring	㉒	Washer (Thin)
⑧	Rear brake disc	㉓	Axle nut holder
⑨	Rear axle	㉔	C-ring
⑩	Dust seal	㉕	Rear wheel hub (Left)
⑪	Bearing	Ⓐ	Brake disc bolt
⑫	Axle housing	Ⓑ	Sprocket mounting nut
⑬	Spacer	Ⓒ	Axle nut
⑭	Dust seal	Ⓓ	Axle lock-nut
⑮	O-ring	Ⓔ	Rear axle housing set nut

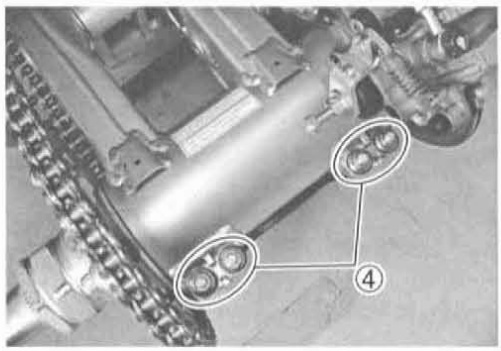
ITEM	N·m	kgf-m	lb-ft
Ⓐ	23	2.3	16.5
Ⓑ	60	6.0	43.5
Ⓒ	240	24.0	173.5
Ⓓ	240	24.0	173.5
Ⓔ	28	2.8	20.0

REMOVAL

- Place the vehicle on the level ground and support the vehicle with a jack or wooden block.
- Remove the rear wheels. (☞7-10)
- Remove the rear wheel hubs. (☞7-10)
- Remove the bracket ①, chain guide plate ② and chain guide ③.



- Loosen the rear axle housing set nuts ④.
- Move the rear axle forward and make sure that the drive chain has enough slack. (☞2-26)

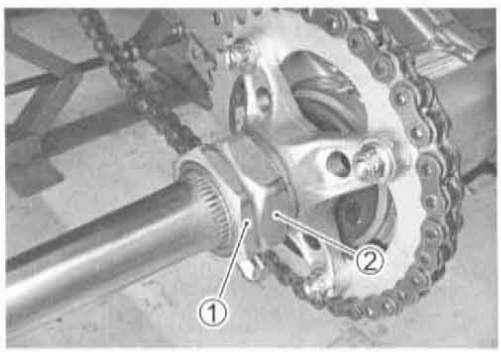


REAR AXLE

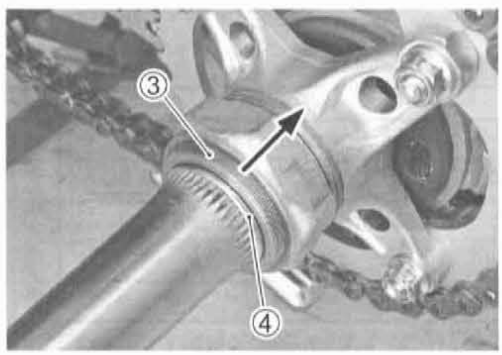
- Loosen the axle lock-nut ① and axle nut ② with the special tool by applying the rear brake.

TOOL 09940-92460: Rear axle nut wrench set

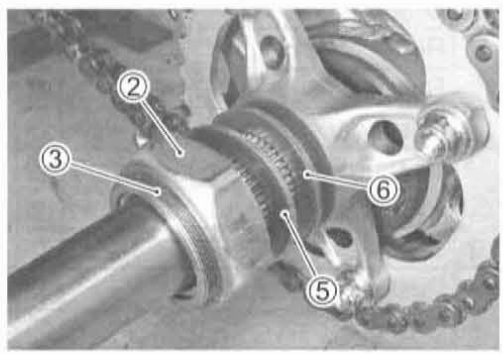
- Remove the axle lock-nut ①.



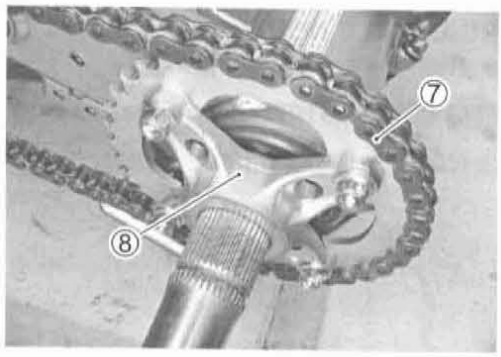
- Loosen the axle nut ② completely and push the axle nut holder ③.
- Remove the C-ring ④.



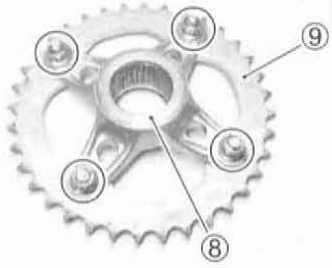
- Remove the axle nut ② (along with the axle nut holder ③).
- Remove the washers ⑤ and ⑥.



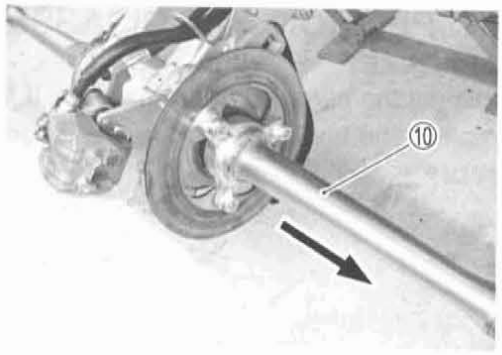
- Disengage the drive chain ⑦ from the rear sprocket.
- Remove the sprocket flange ⑧ (along with the rear sprocket).



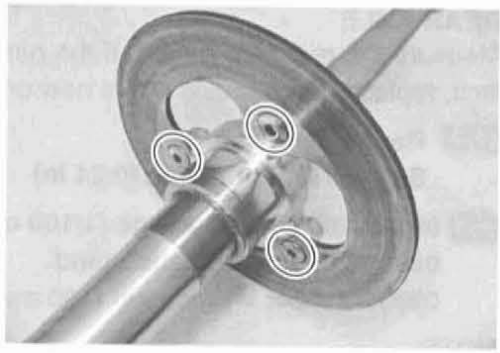
- Remove the rear sprocket ⑨ from the sprocket flange ⑧.



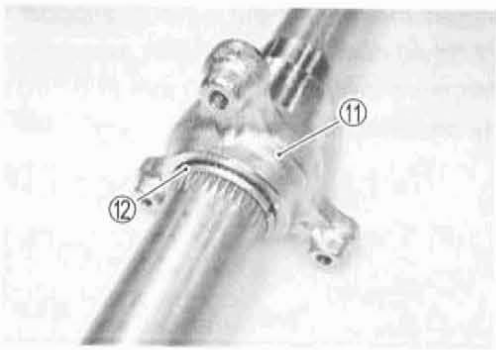
- Remove the brake caliper. (☞7-57)
- Draw out the rear axle ⑩ to the right side.



- Remove the brake disc.



- Push the rear brake disc plate housing ⑪ and remove the C-ring ⑫.
- Remove the rear brake disc plate housing ⑪ from the rear axle.

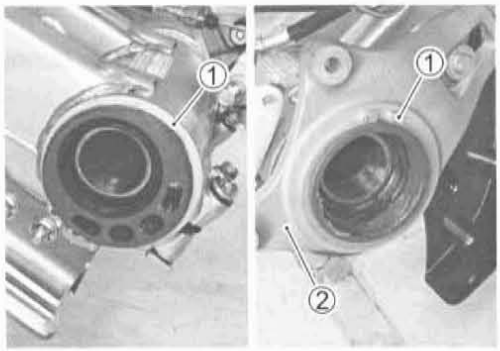


REAR AXLE HOUSING

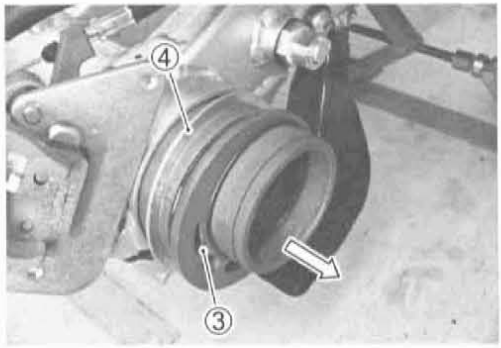
- Remove the snap rings ①.

TOOL **09900-06107: Snap ring pliers**

- Remove the rear brake caliper bracket ②.



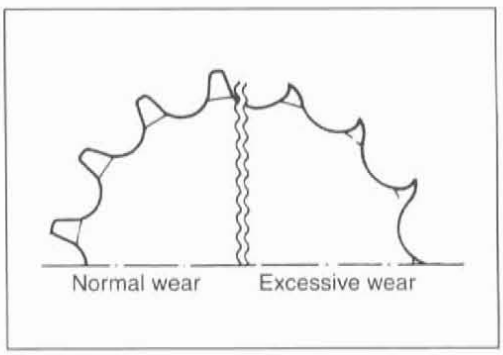
- Remove the axle housing ③ and washer ④.



INSPECTION AND DISASSEMBLY

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.



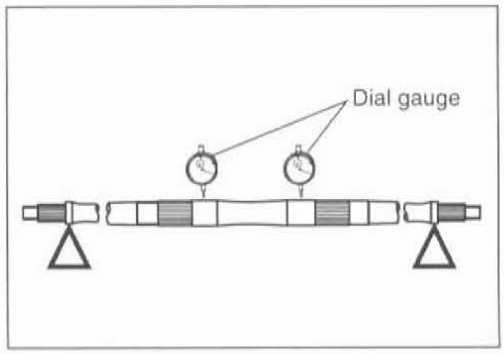
REAR AXLE

Measure the rear axle runout. If the runout exceeds the service limit, replace the rear axle with a new one.

DATA **Rear axle runout**
Service limit: 6.0 mm (0.24 in)

TOOL **09900-20607: Dial gauge (1/100 mm)**
09900-20701: Magnetic stand
09900-21304: V-block set (100 mm)

NOTE:
When measuring the runout, support the rear axle at 35 mm (1.38 in) diameter of the rear axle as shown in illustration.
Measure the runout at 40 mm (1.57 in) diameter of the rear axle as shown in illustration.



REAR BRAKE DISC PLATE HOUSING AND SPROKET FLANGE

Inspect the rear brake disc plate housing and sprocket flange for damage and wear of spline. If any defects are found, replace the rear brake disc plate housing or sprocket flange with a new one.

REAR BRAKE CALIPER BRACKET

Inspect the rear brake caliper bracket for distortion or damage. If any defects are found, replace the rear brake caliper bracket with a new one.

DUST SEAL

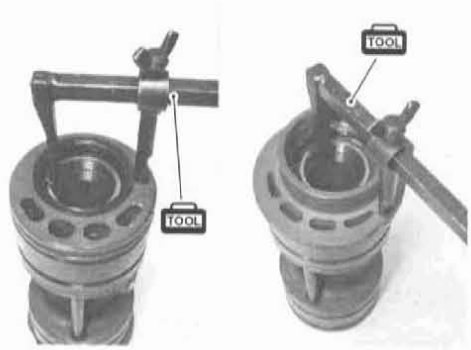
Inspect the dust seal lips for wear or damage. If any defects are found, replace the dust seals with new ones.

- Remove the dust seals with the special tool.

TOOL 09913-50121: Oil seal remover

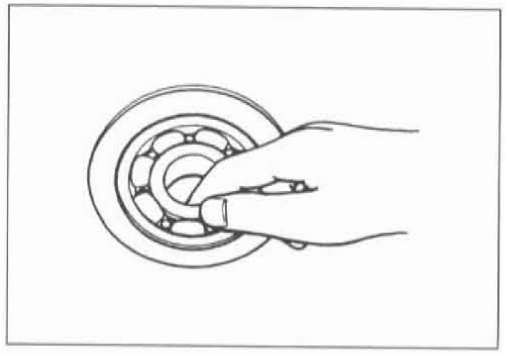
CAUTION

The removed dust seals must be replaced with new ones.



BEARING

Inspect the play of the axle bearings by hand while they are in the axle housing. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation.
If there is anything unusual, replace the bearings with new ones.

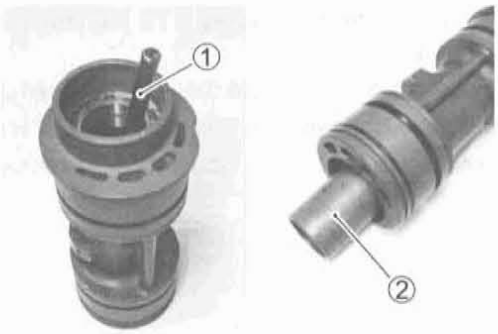


- Remove the left bearings (inner and outer) with appropriate bar ① and remove the spacer ②.

CAUTION

The removed bearings must be replaced with new ones.

- Remove the right bearing in the same manner as the left bearing.



AXLE HOUSING

Inspect the axle housing for damage. If any defects are found, replace the axle housing with a new one.

REASSEMBLY AND INSTALLATION

Reassemble and install the rear axle and rear axle housing in the reverse order of removal and disassembly. Pay attention to the following points:

AXLE HOUSING

- Apply grease to the bearings.

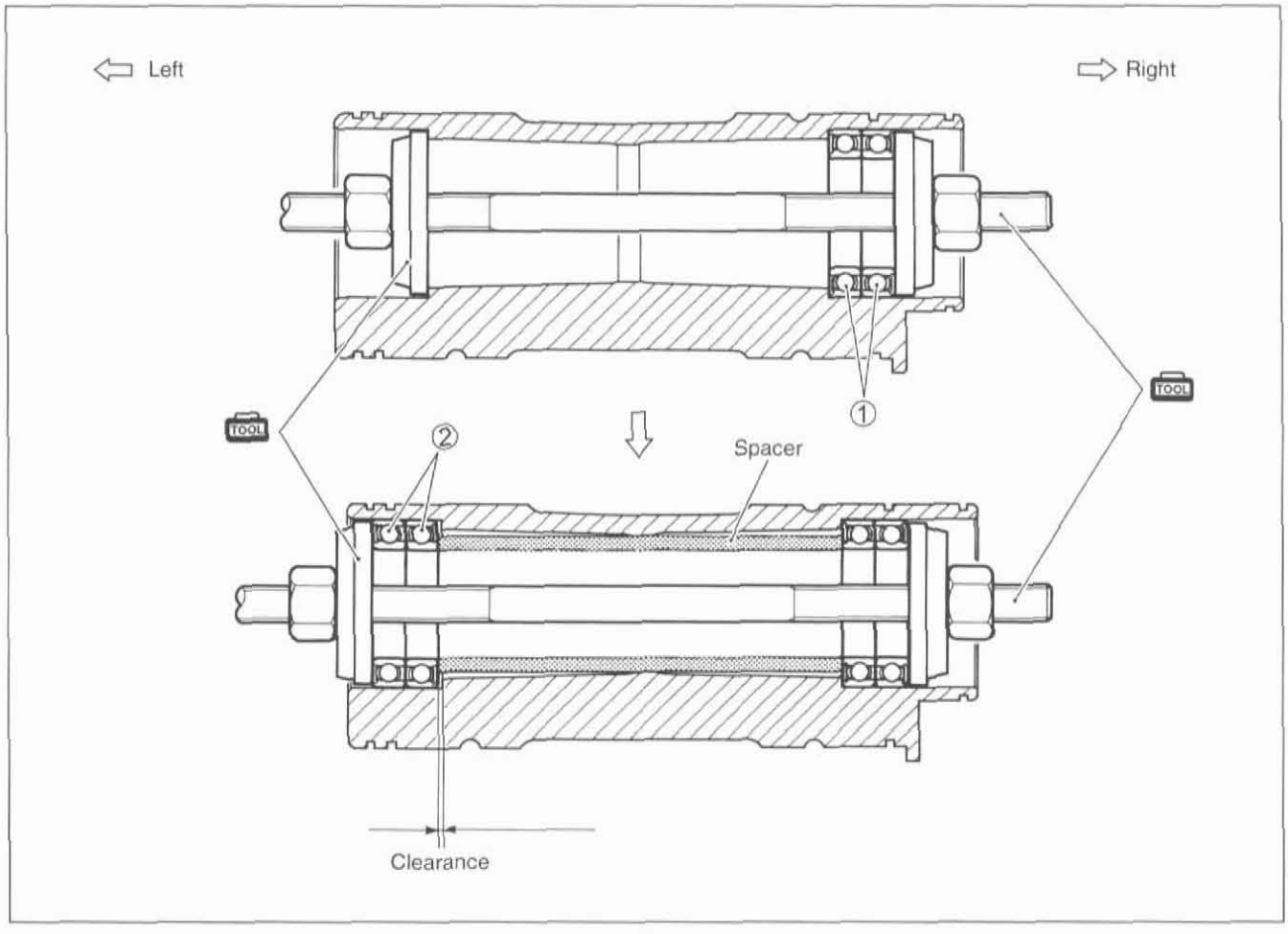
99000-25010: SUZUKI SUPER GREASE "A"
(or equivalent grease)

• Install the bearings to the axle housing with the special tool.

TOOL 09913-70210: Bearing installer set
09924-84510: Bearing installer set
09941-34513: Bearing installer set

CAUTION

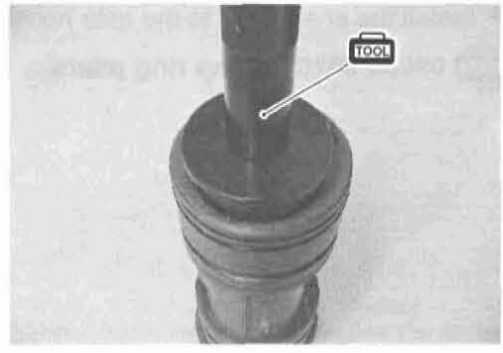
*** First install the right bearings ① to the bottom, and then install the spacer and left bearings ②.**
*** When installing the hub bearings to the axle housing, the sealed cover of inner bearing must face inside, and the sealed cover of outer bearing must face outside.**



• Install the dust seals with the special tool.

TOOL 09913-70210: Bearing installer set

NOTE:
The stamped mark on the dust seals must face outside.



• Apply grease to the dust seal lips.

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

• Apply engine oil to the O-rings.

CAUTION

Replace the O-rings with new ones.

• Install the O-rings to the axle housing and .

• Apply grease to the O-ring and install the O-ring.

CAUTION

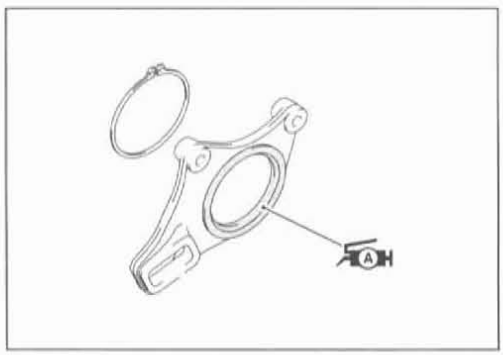
Replace the O-ring with a new one.

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

• Install the axle housing and washer into the swingarm.

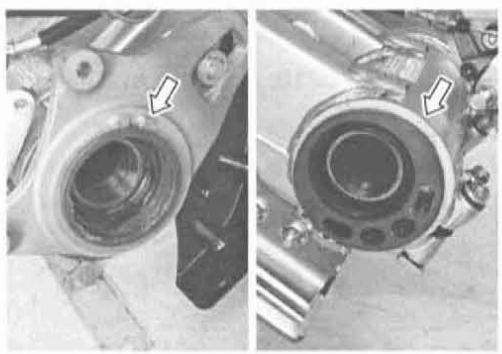
• Apply grease to the contact surface of the rear caliper bracket.

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



• Install the snap rings to the axle housing.

09900-06107: Snap ring pliers



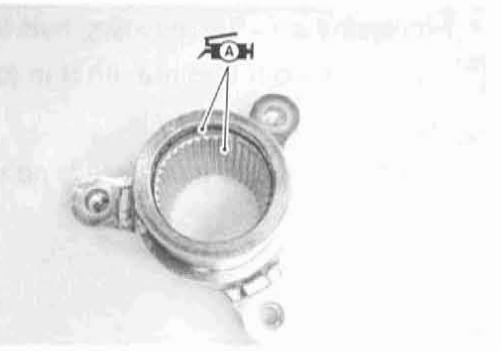
REAR AXLE

- Apply grease to the O-ring and spline of rear brake disc plate housing.

CAUTION

Replace O-ring with a new one.

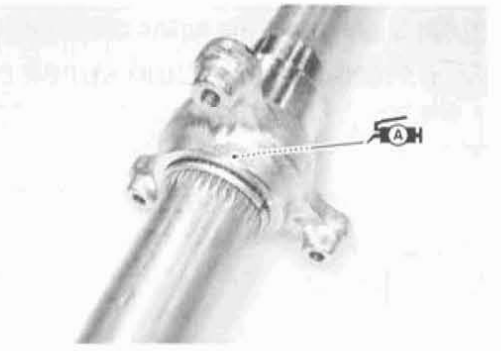
99000-25010: SUZUKI SUPER GREASE "A" (or equivalent grease)



- Apply grease to the spline of rear axle.

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

- Install the C-ring and rear brake disc plate housing to the rear axle.

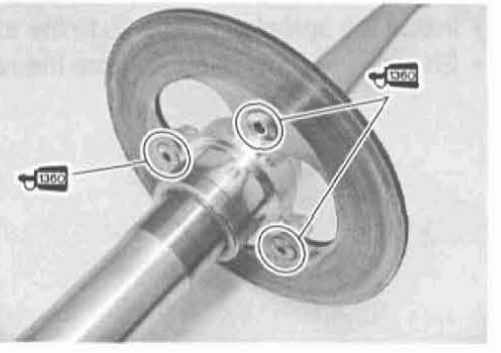


- Apply THREAD LOCK SUPER "1360" to the brake disc bolts and tighten them to the specified torque.

99000-32130: THREAD LOCK SUPER "1360"

Brake disc bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

NOTE:
Make sure that the brake disc is clean and free of any grease matter.



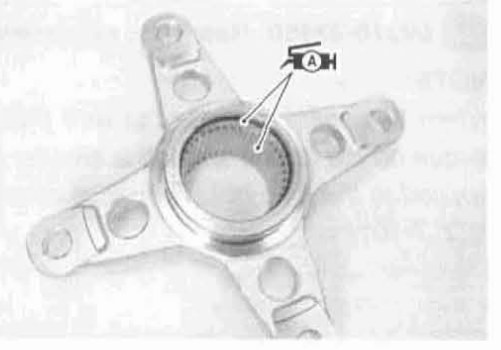
- Insert the rear axle through the axle housing and drive chain.
- Install the brake caliper. (☞7-61)

- Apply grease to the O-ring and spline of sprocket flange.

CAUTION

Replace the O-ring with a new one.

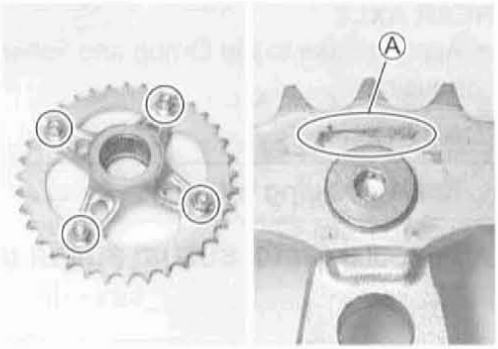
99000-25010: SUZUKI SUPER GREASE "A" (or equivalent grease)



- Tighten the sprocket mounting nuts to the specified torque.

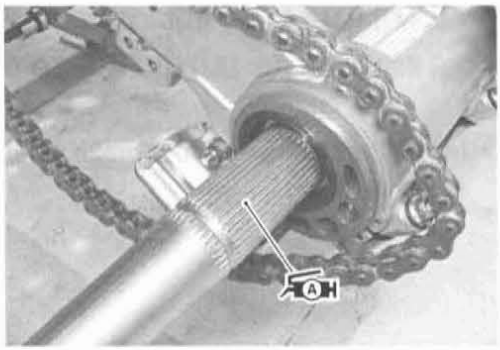
Sprocket mounting nut: 60 N·m (6.0 kgf-m, 43.5 lb-ft)

NOTE:
The stamped mark Ⓐ must face to right side of the vehicle.

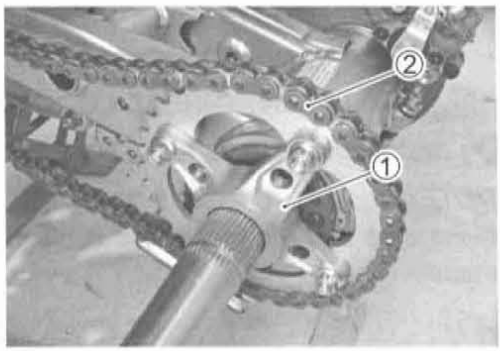


- Apply grease to the spline of rear axle.

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



- Install the sprocket flange ① to the axle shaft.
- Engage the drive chain ② from the rear sprocket.



- Install the washer (thick) ③, washer (thin) ④, axle nut ⑤ and C-ring ⑥.
- Apply THREAD LOCK SUPER "1322" to the thread portion of the axle nut holder.

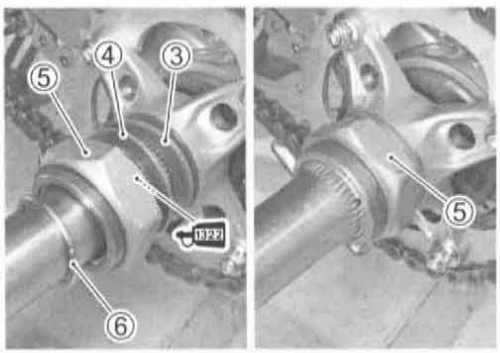
99000-32110: THREAD LOCK SUPER "1322"
(or equivalent thread lock)

- Tighten the axle nut ⑤ to the specified torque with the special tool.

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

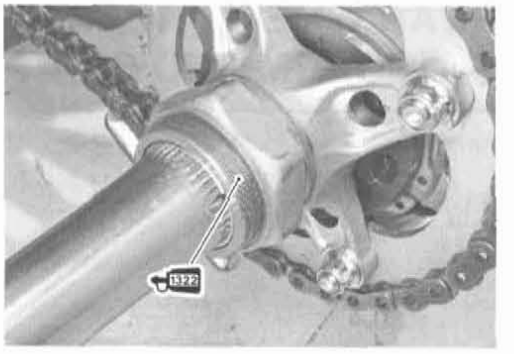
09940-92460: Rear axle nut wrench set

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. *(☞7-101)*



- Apply THREAD LOCK SUPER "1322" to the thread portion of the axle nut holder.

1322 99000-32110: THREAD LOCK SUPER "1322" (or equivalent thread lock)

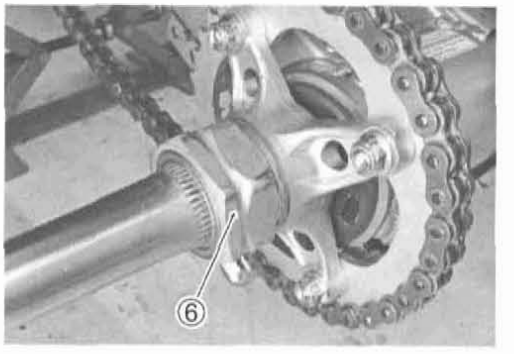


- Tighten the axle lock-nut ⑥ to the specified torque with special tool.

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

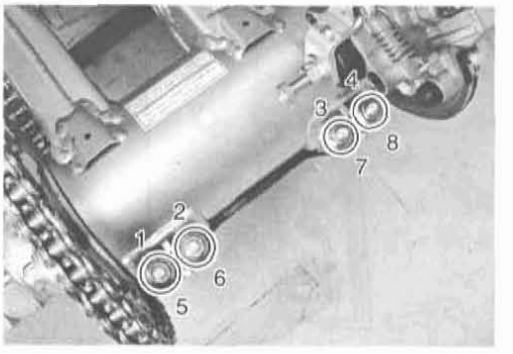
TOOL 09940-92460: Rear axle nut wrench set

NOTE:
When tightening the axle lock-nut with the special tool, the reading torque on the torque wrench is smaller than actual torque that is applied to the axle lock-nut. Therefore convert the tightening torque. (☞ below)



- Install the rear wheel hubs and wheels. (☞7-13, 14)
- After installing the rear axle, adjust the chain slack and parking brake cable. (☞2-19, 26)
- Tighten the rear axle housing set nuts in ascending order and to the specified torque.

Rear axle housing set nut: 28 N·m (2.8 kgf-m, 20.0 lb-ft)

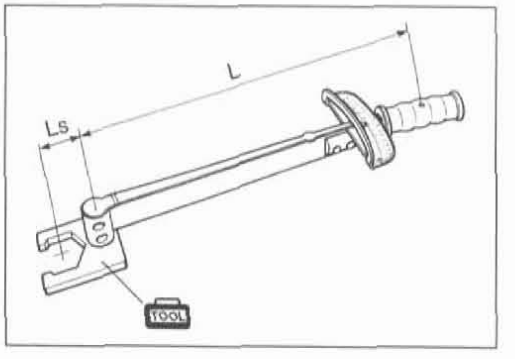


REAR AXLE NUT TIGHTENING TORQUE

Measure the effective length L of the torque wrench.
Calculate the reading torque on the torque wrench by use of the formula shown below.

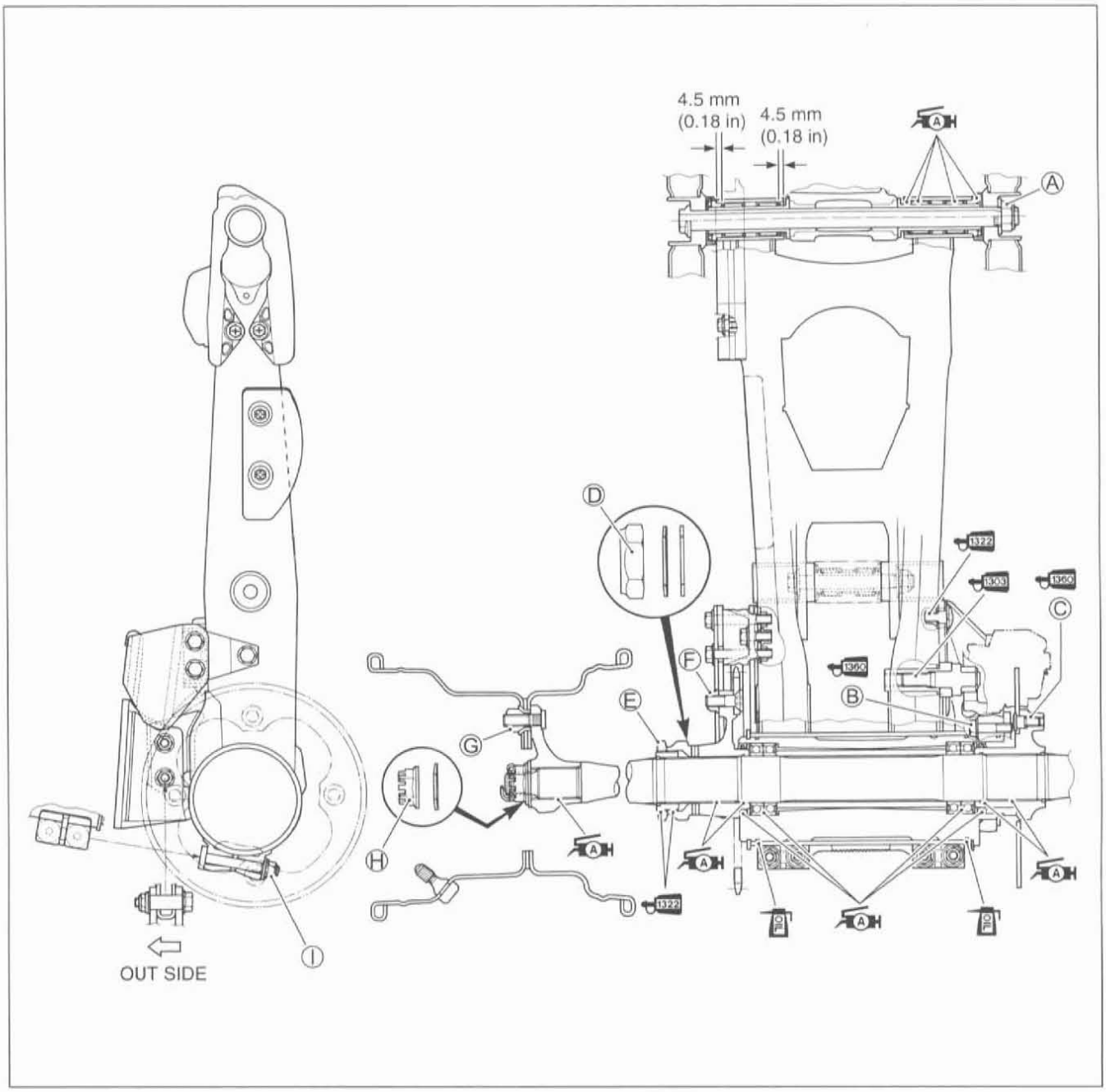
$$T = \frac{L \times Ts}{L + Ls}$$

T: Reading torque on the torque wrench
Ts: Specified torque
Ls: 0.060 m (2.36 in)
Off-set of the specified special tool (09940- 92460)
L: Effective length of the torque wrench



TOOL 09940-92460: Rear axle nut wrench set

REAR WHEEL, REAR BRAKE, REAR SUSPENSION, REAR SWINGARM AND REAR AXLE REASSEMBLING INFORMATION

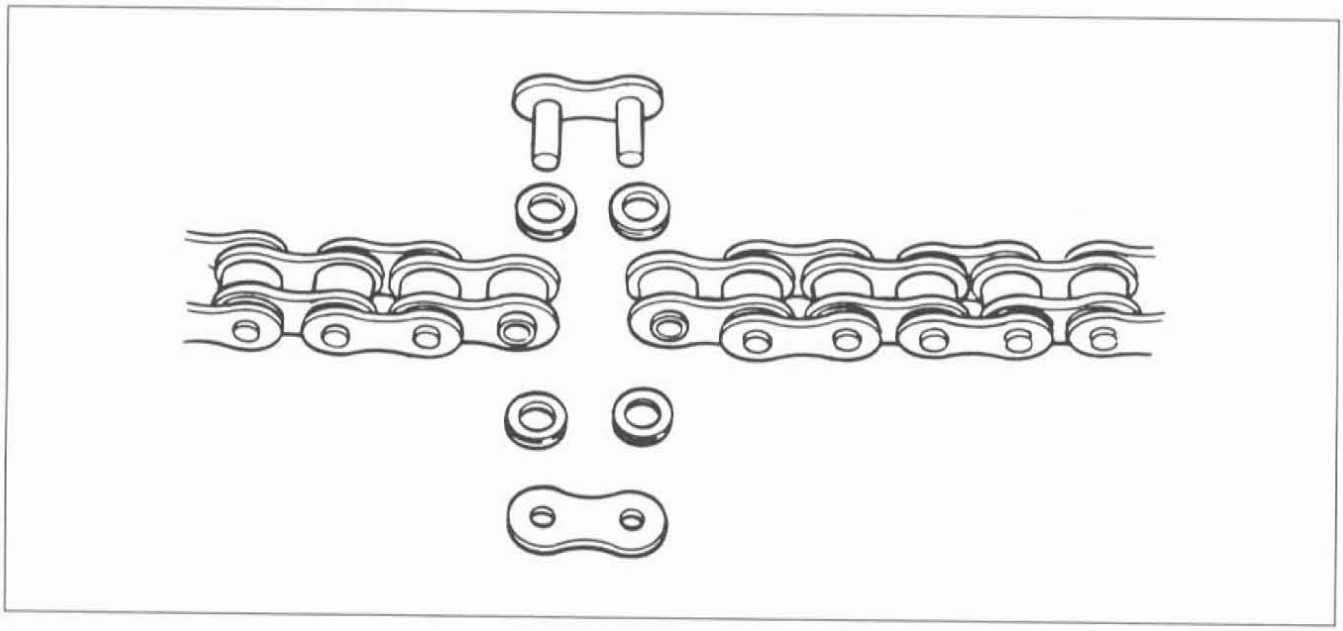


Ⓐ	Swingarm pivot nut
Ⓑ	Brake caliper mounting bolt
Ⓒ	Disc bolt
Ⓓ	Rear axle nut
Ⓔ	Rear axle lock-nut
Ⓕ	Sprocket mounting nut
Ⓖ	Wheel set nut
Ⓗ	Rear hub nut
Ⓘ	Rear axle housing set nut

ITEM	N·m	kgf-m	lb-ft
Ⓐ	95	9.5	68.5
Ⓑ	26	2.6	19.0
Ⓒ	23	2.3	16.5
Ⓓ	240	24.0	173.5
Ⓔ	240	24.0	173.5

ITEM	N·m	kgf-m	lb-ft
Ⓕ	60	6.0	43.5
Ⓖ	66	6.6	47.5
Ⓗ	121	12.1	87.5
Ⓘ	28	2.8	20.0

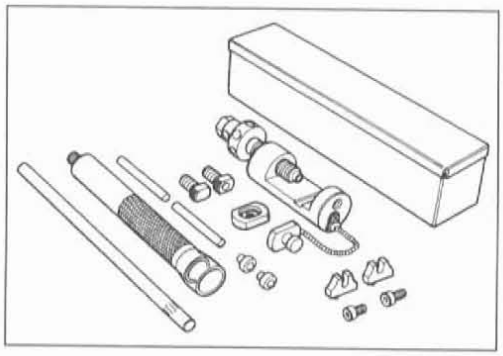
DRIVE CHAIN



Use the special tool in the following procedures, to cut and rejoin the drive chain.

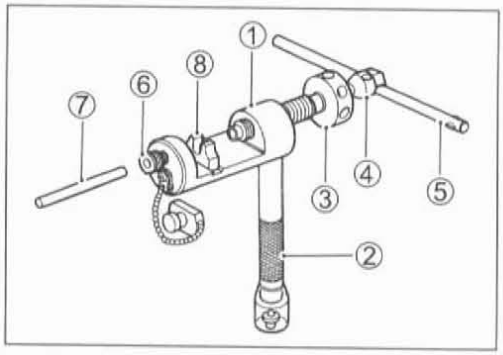
09922-22711: Drive chain cutting and joining tool set

NOTE:
When using the special tool, apply a small quantity of grease to the threaded parts of the special tool.

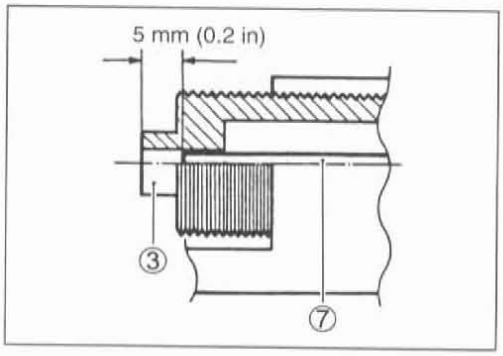


DRIVE CHAIN CUTTING

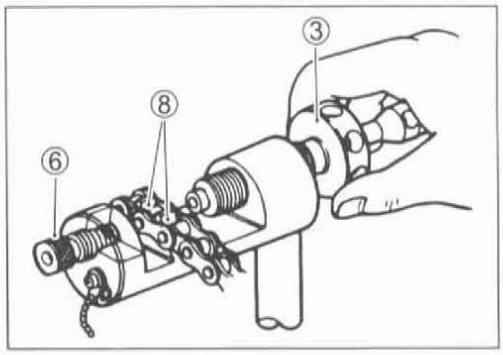
- Set up the special tool as shown in the illustration.
  - ① Tool body
  - ② Grip handle
  - ③ Pressure bolt "A"
  - ④ Pressure bolt "B"
  - ⑤ Bar
  - ⑥ Adjuster bolt (with through hole)
  - ⑦ Pin remover
  - ⑧ Chain holder (engraved mark 500) with reamer bolt M5 × 10



NOTE:
The tip of pin remover ⑦ should be positioned inside approximately 5 mm (0.2 in) from the end face of pressure bolt "A" ③ as shown in the illustration.



- Place the drive chain link being disjointed on the holder part ⑧ of the tool.
- 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.
- Tighten the pressure bolt "A" ③ with the bar.

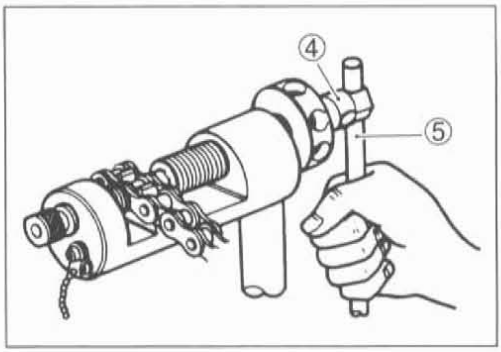


- Turn in the pressure bolt "B" ④ with the bar ⑤ and force out the drive chain joint pin ⑨.

CAUTION

Continue turning in the pressure bolt "B" ④ until the joint pin has been completely pushed out of the chain.

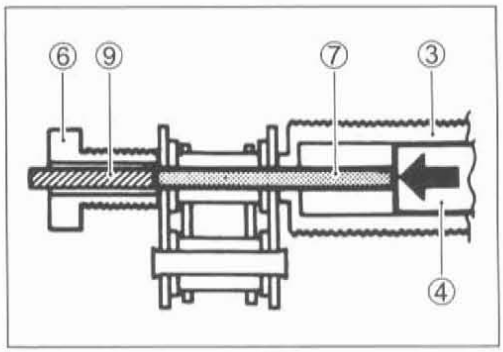
NOTE:
After the joint pin ⑨ is removed, loosen the pressure bolt "B" ④ and then pressure bolt "A" ③.



- Remove the joint pin ⑨ of the other side of joint plate.

CAUTION

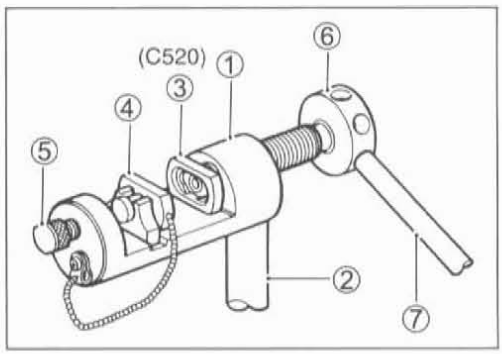
Never reuse joint pins, O-rings and plates. After joint pins, O-rings and plates have been removed from the drive chain, the removed joint pins, O-rings and plates should be discarded and new joint plate, O-rings and plate must be installed.



DRIVE CHAIN CONNECTING

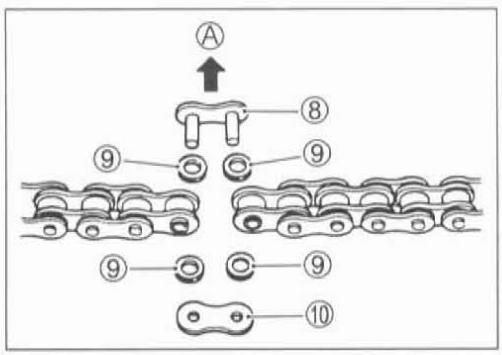
JOINT PLATE INSTALLATION

- Set up the special tool as shown in the illustration.
  - 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



- Connect both ends of the drive chain with the joint pin ⑧ inserted from the inside Ⓐ as installed on the motorcycle.
  - ⑨ O-ring ... 4 pcs.
  - ⑩ Joint plate

  Joint set part number
  RK: 27620-43B20

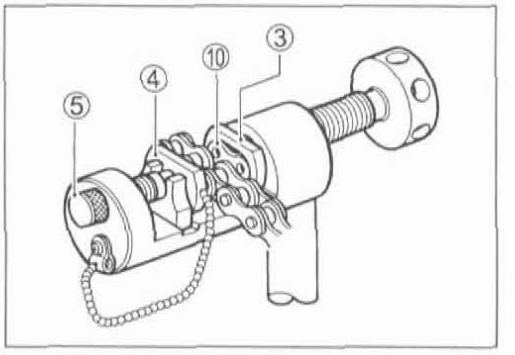


⚠ WARNING

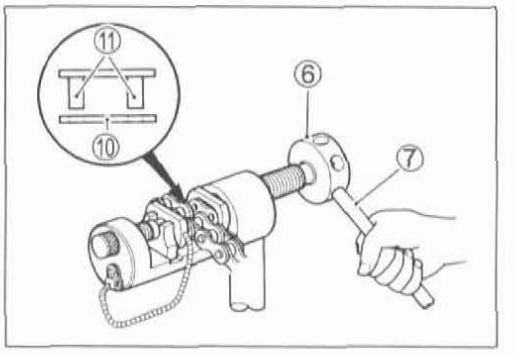
Do not use joint clip type of drive chain. The joint clip may have a chance to drop which may cause severe damage to motorcycle and severe injury.

- 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.



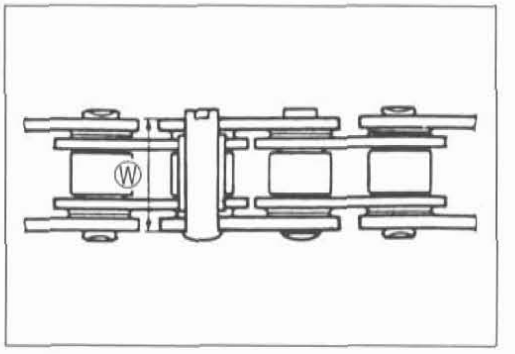
- Set the drive chain on the tool as illustrated and turn in the adjuster bolt ⑤ to secure the wedge holder & wedge pin ④.
- Turn in the pressure bolt "A" ⑥ and align two joint pins ⑪ properly with the respective holes of the joint plate ⑩
- Turn in the pressure bolt "A" ⑥ further using the bar ⑦ to press the joint plate over the joint pins.



- Continue pressing the joint plate until the distance between the two joint plates come to the specification.

DATA Joint plate distance specification Ⓦ

RK	17.25 – 17.55 mm (0.679 – 0.691 in)

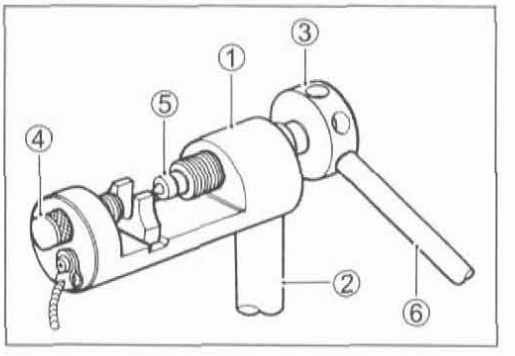


CAUTION

Should pressing of the joint plate be made excessively beyond the specified dimension, the work should be redone using the new joint parts.

JOINT PIN STAKING

- Set up the special tool as shown in the illustration.
  - 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.

- 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.

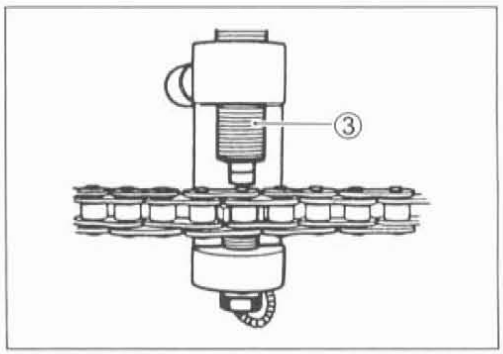
DATA Pin end diameter specification Ⓓ

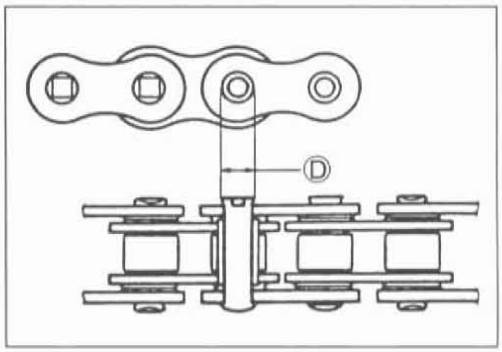
RK	5.4 – 5.8 mm (0.213 – 0.228 in)

CAUTION

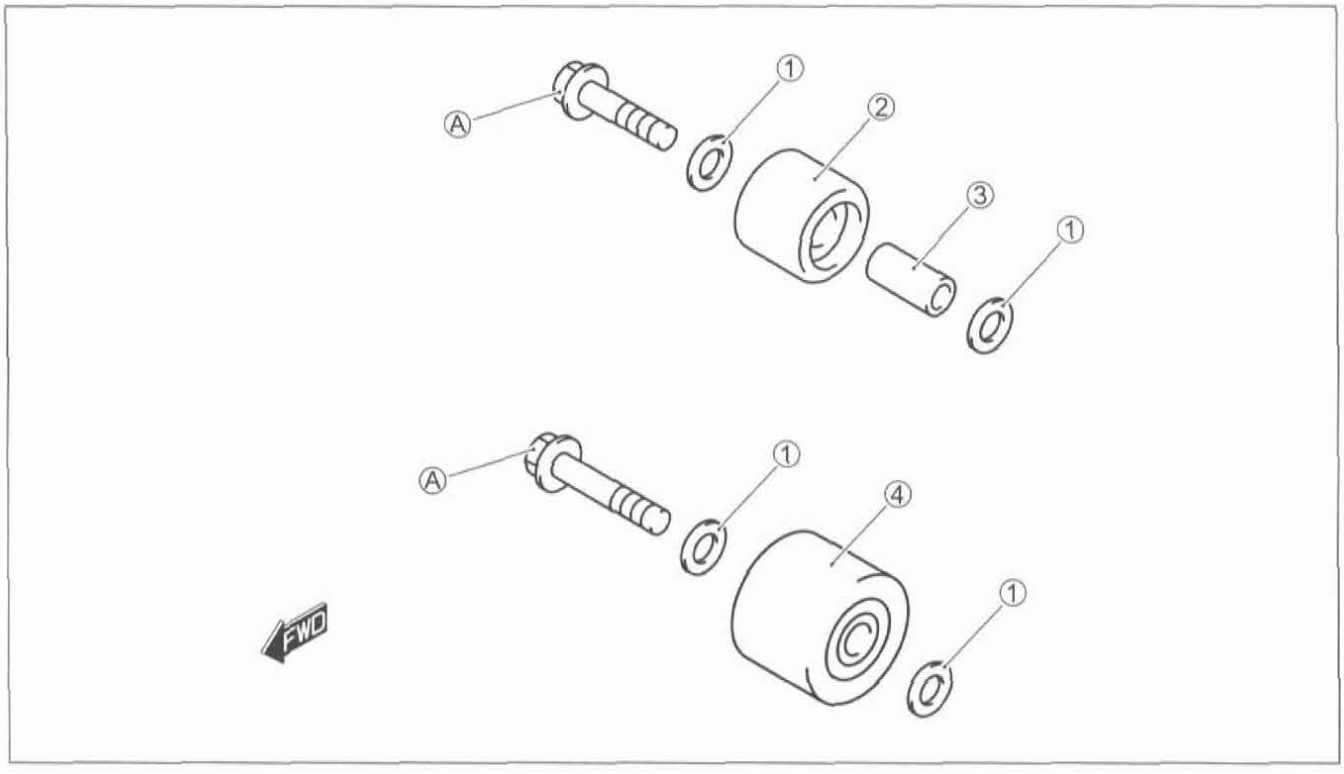
*** After joining of the chain has been completed, check to make sure that the link is smooth and no abnormal condition is found.**
*** Should any abnormal condition be found, reassemble the chain link using the new joint parts.**

- Adjust the drive chain, after connecting it. (☞2-26)





DRIVE CHAIN CONTROL ROLLER
CONSTRUCTION

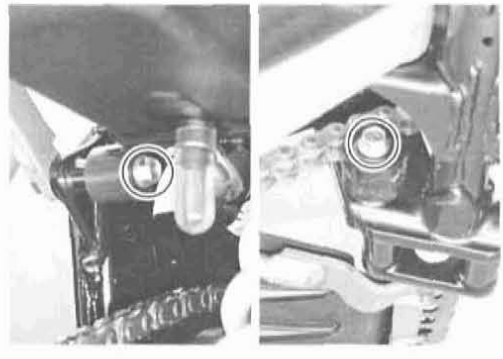


①	Washer	④	Drive chain control roller (Lower)
②	Drive chain control roller (Upper)	Ⓐ	Drive chain control mounting bolt
③	Spacer		

ITEM	N·m	kgf-m	lb-ft
Ⓐ	31	3.1	22.5

REMOVAL

- Remove the drive chain control roller, upper and lower.



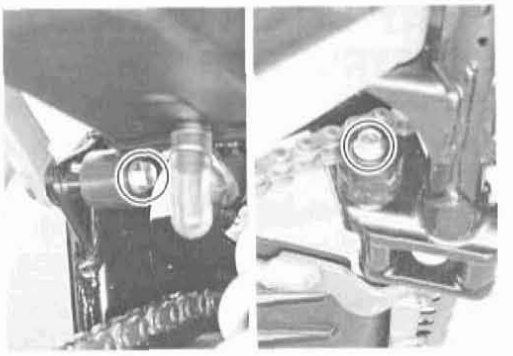
INSPECTION

- Inspect the drive chain control roller bearings (lower) for abnormal noise and smooth rotation.
- Inspect the drive chain control for damage.

INSTALLATION

- Tighten the drive chain control mounting bolts.

Drive chain control mounting bolt:
31 N·m (3.1 kgf-m, 22.5 lb-ft)



NOTE:
The concave side of chain control roller (upper) faces inside.

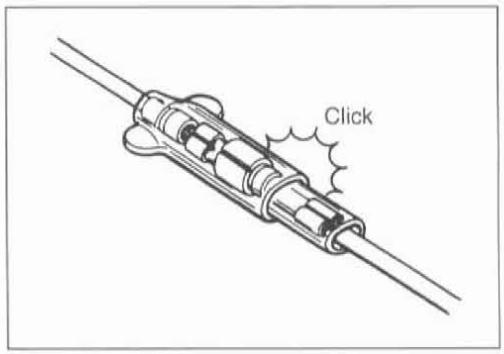
ELECTRICAL SYSTEM

CONTENTS

CAUTIONS IN SERVICING

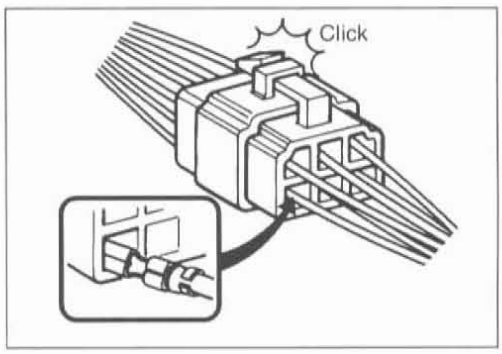
CONNECTOR

- When connecting a connector, be sure to push it in until a click is felt.
- Inspect the connector for corrosion, contamination and breakage in its cover.



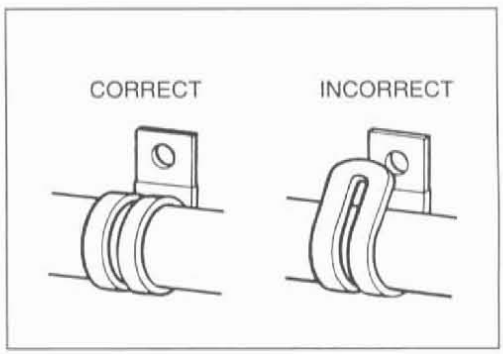
COUPLER

- With a lock type coupler, be sure to release the lock when disconnecting, and push in fully to engage the lock when connecting.
- When disconnecting the coupler, be sure to hold the coupler itself and do not pull the lead wires.
- Inspect each terminal on the coupler for being loose or bent.
- Inspect each terminal for corrosion and contamination.



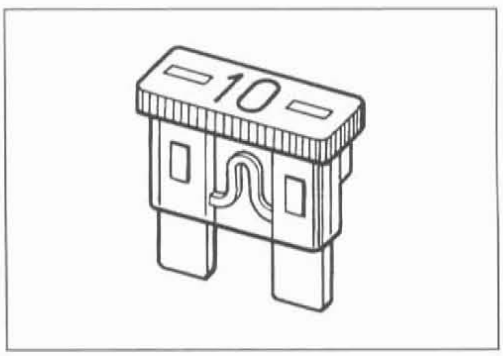
CLAMP

- Clamp the wire harness at such positions as indicated in "WIRING HARNESS ROUTING". (☞9-15 to -17)
- Bend the clamp properly so that the wire harness is clamped securely.
- In clamping the wire harness, use care not to allow it to hang down.
- Do not use wire or any other substitute for the band type clamp.

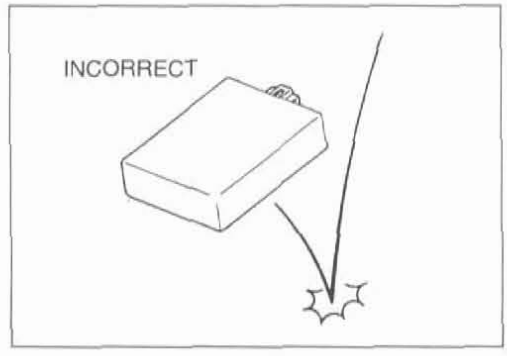


FUSE

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



SEMI-CONDUCTOR EQUIPPED PART

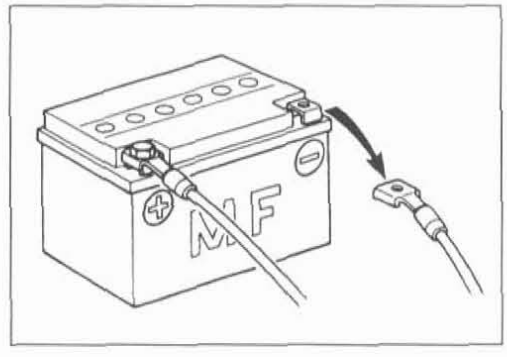


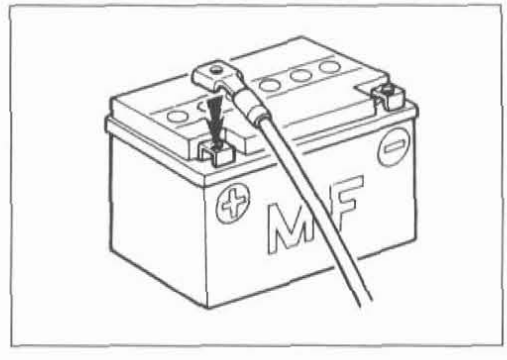
- Be careful not to drop the part with a semi-conductor built in such as a ECM.
- When inspecting this part, follow inspection instruction strictly. Neglecting proper procedure may cause damage to this part.

BATTERY

- The MF battery used in this motorcycle does not require maintenance (e.g., electrolyte level inspection, distilled water replenishment).
- During normal charging, no hydrogen gas is produced. However, if the battery is overcharged, hydrogen gas may be produced. Therefore, be sure there are no fire or spark sources (e.g., short circuit) nearby when charging the battery.
- Be sure to recharge the battery in a well-ventilated and open area.
- Note that the charging system for the MF battery is different from that of a conventional battery. Do not replace the MF battery with a conventional battery.

CONNECTING THE BATTERY





- When disconnecting terminals from the battery for disassembly or servicing, be sure to disconnect the ⊖ battery lead wire, first.
- When connecting the battery lead wires, be sure to connect the ⊕ battery lead wire, first.
- If the terminal is corroded, remove the battery, pour warm water over it and clean it with a wire brush.
- After connecting the battery, apply a light coat of grease to the battery terminals.
- Install the cover over the ⊕ battery terminal.

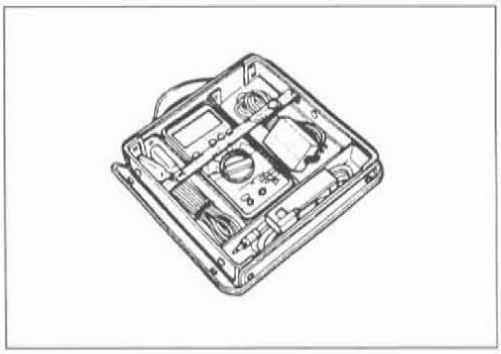
WIRING PROCEDURE

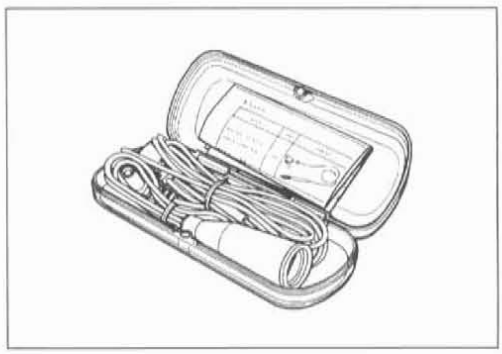
- Properly route the wire harness according to the "WIRING HARENESS ROUTING" section. (☞9-15 to -17)

USING THE MULTI-CIRCUIT TESTER

- Properly use the multi-circuit tester ⊕ and ⊖ probes. Improper use can cause damage to the motorcycle and tester.
- If the voltage and current values are not known, begin measuring in the highest range.
- When measuring the resistance, make sure that no voltage is applied. If voltage is applied, the tester will be damaged.
- After using the tester, be sure to turn the switch to the OFF position.

TOOL 09900-25008: Multi-circuit tester set





CAUTION

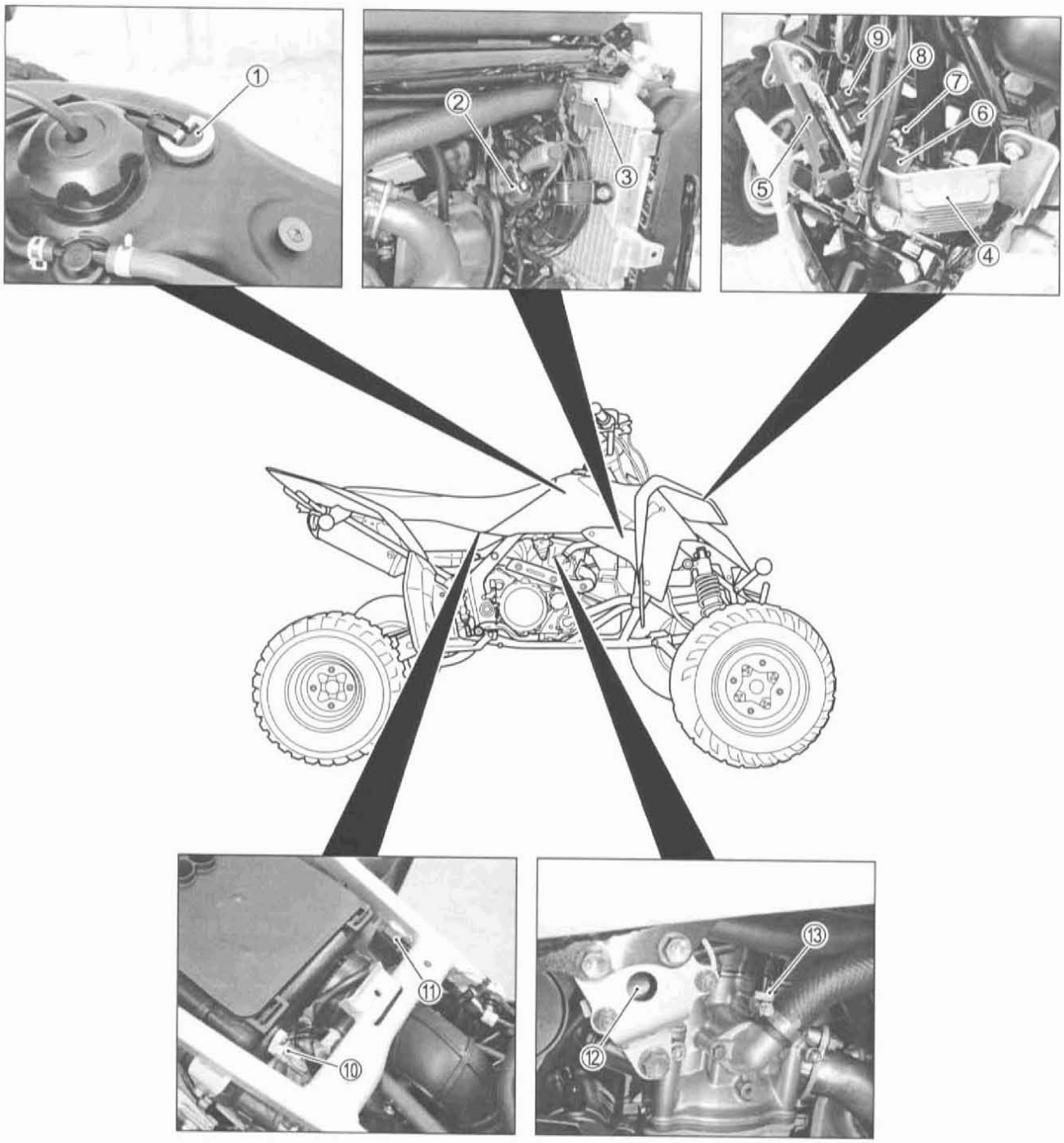
Before using the multi-circuit tester, read its instruction manual.

NOTE:

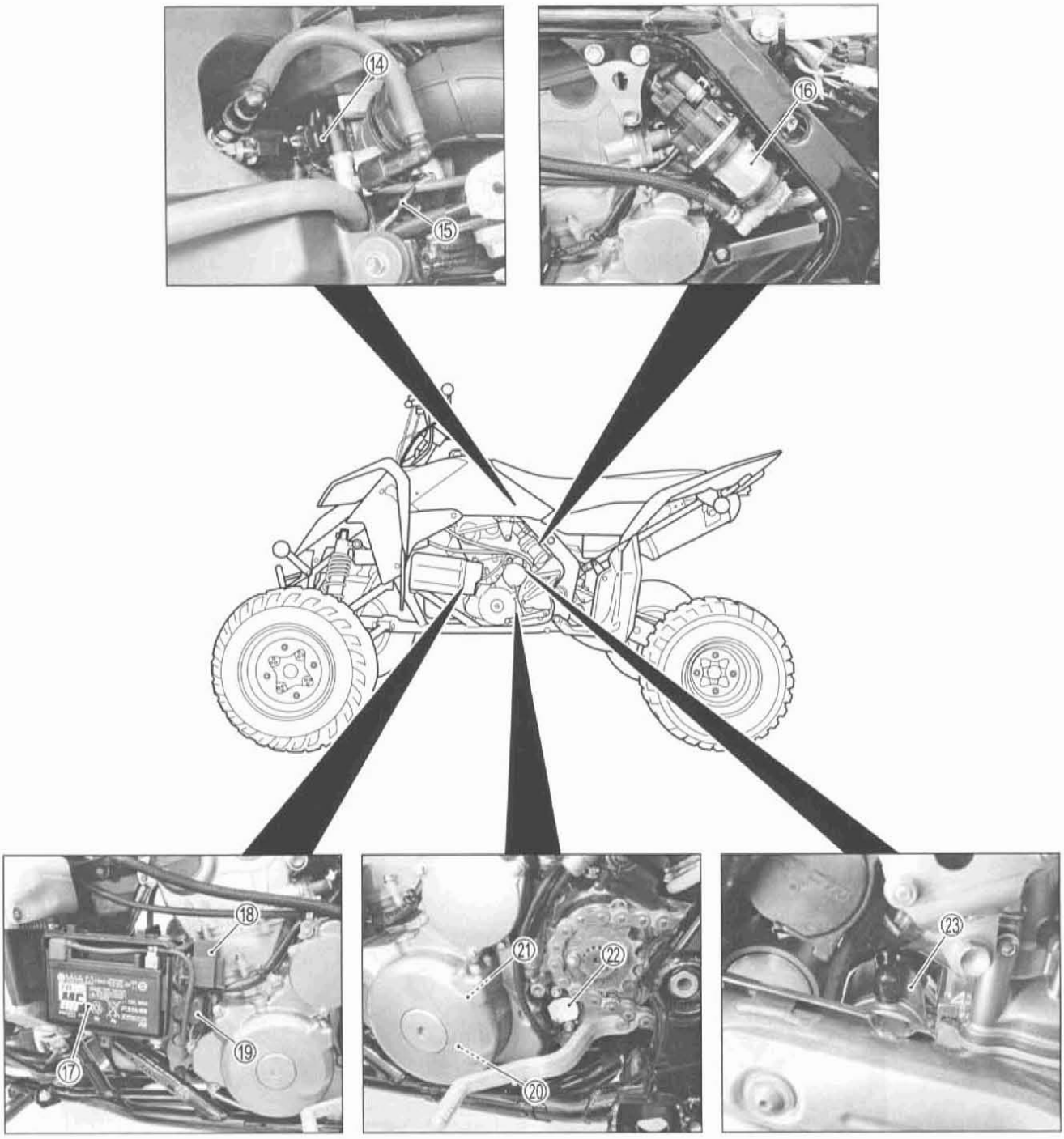
* *When connecting the multi-circuit tester, use the needle pointed probe to the back side of the lead wire coupler and connect the probes of tester to them.*
* *Use the needle pointed probe to prevent the rubber of the water proof coupler from damage.*

TOOL 09900-25009: Needle pointed probe set

LOCATION OF ELECTRICAL COMPONENTS

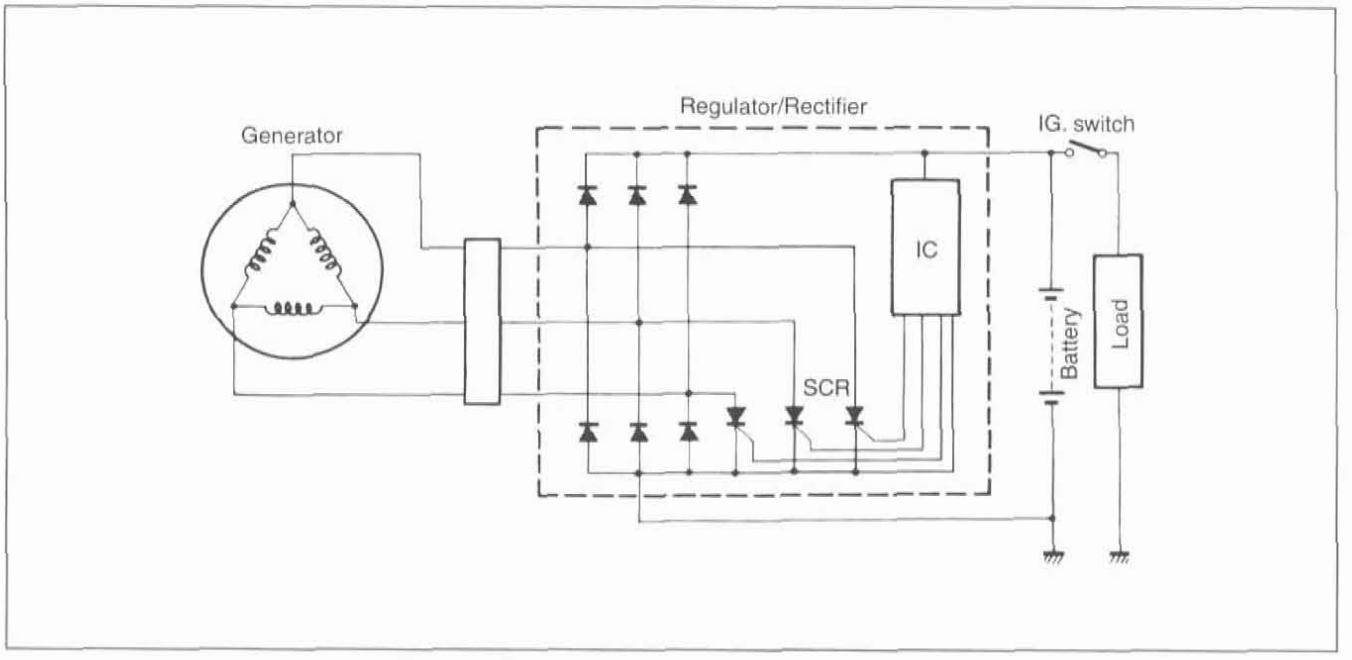


① Fuel level switch (☞8-25)
② Cooling fan (☞6-8)
③ Fuse (Fan)
④ Regulator/Rectifier
⑤ ECM (Engine Control Module)
⑥ TO sensor (☞4-50)
⑦ Mode selection switch coupler (☞4-23)
⑧ Fuel pump relay (☞5-6)
⑨ Cooling fan relay (☞6-10)
⑩ IAT sensor (☞4-46)
⑪ IAP sensor (☞4-31)
⑫ Ignition coil
⑬ ECT sensor (☞4-42)



⑭ Fuel injector (☞4-56)
⑮ TP sensor (☞4-37)
⑯ Fuel pump (☞5-6)
⑰ Battery
⑱ Fuse (Main, Ignition)
⑲ Starter relay (☞8-15)
⑳ Generator
㉑ CKP sensor (☞4-29)
㉒ GP switch (☞8-24)
㉓ Starter motor

CHARGING SYSTEM



TROUBLESHOOTING

Battery runs down quickly

Step 1

1) Check accessories which use excessive amounts of electricity.
   Are accessories being installed?

YES	Remove accessories.
NO	Go to Step 2.

Step 2

1) Check the battery for current leaks. (☞8-8)
   Is the battery for current leaks OK?

YES	Go to Step 3.
NO	• Short circuit of wire harness • Faulty electrical equipment

Step 3

1) Measure the regulated voltage between the battery terminals. (☞8-9)
   Is the regulated voltage OK?

YES	• Faulty battery • Abnormal driving condition
NO	Go to Step 4.

Step 4

1) Measure the resistance of the generator coil. (☞8-9)
   Is the resistance of generator coil OK?

YES	Go to Step 5.
NO	• Faulty generator coil • Disconnected lead wires

Step 5

1) Measure the generator no-load performance. (☞8-10)
   Is the generator no-load performance OK?

YES	Go to Step 6.
NO	Faulty generator

Step 6

1) Inspect the regulator/rectifier. (☞8-10)
   Is the regulator/rectifier OK?

YES	Go to Step 7.
NO	Faulty regulator/rectifier

Step 7

1) Inspect wirings.
   Is the wirings OK?

YES	Faulty battery
NO	• Short circuit of wire harness • Poor contact of couplers

Battery overcharges

- Faulty regulator/rectifier
- Faulty battery
- Poor contact of generator lead wire coupler

INSPECTION

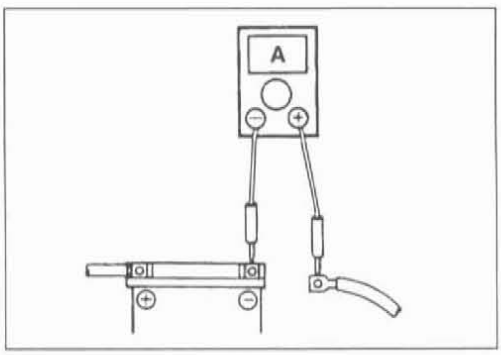
BATTERY CURRENT LEAKAGE

- Remove the battery holder cover.
- Turn the ignition switch to the OFF position.
- Disconnect the battery ⊖ lead wire.
- 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.

TOOL 09900-25008: Multi-circuit tester set

DATA Battery current (leak): Under 1.0 mA

Tester knob indication: Current (⎓, 20 mA)



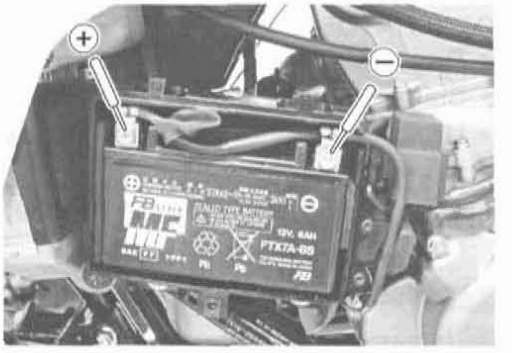
CAUTION

*** In case of a large current leak, turn the tester to high range first to avoid tester damage.**
*** Do not turn the ignition switch to the "ON" position when measuring current.**

NOTE:
When checking to find the excessive current leakage, remove the couplers and connectors, one by one, checking each part.

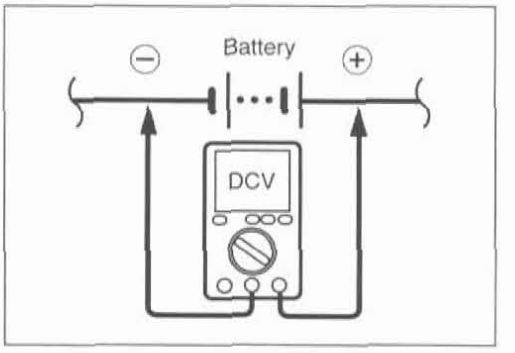
REGULATED VOLTAGE

- Remove the battery holder cover.
- Start the engine, turn the ignition switch to LIGHT (☼) and the dimmer switch to HI and run the engine at 5 000 r/min.
- 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. (☞8-10)



NOTE:

When making this test, be sure that the battery is in fully-charged condition.



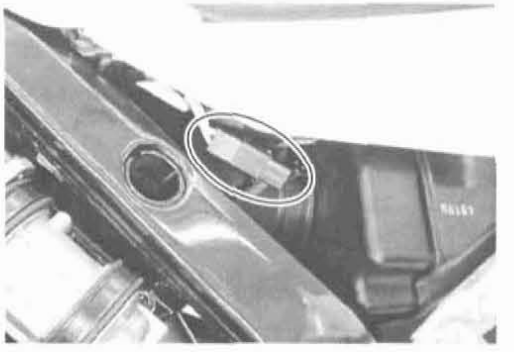
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

DATA Regulated voltage (Charging output):
13.5 – 15.0 V at 5 000 r/min

GENERATOR COIL RESISTANCE

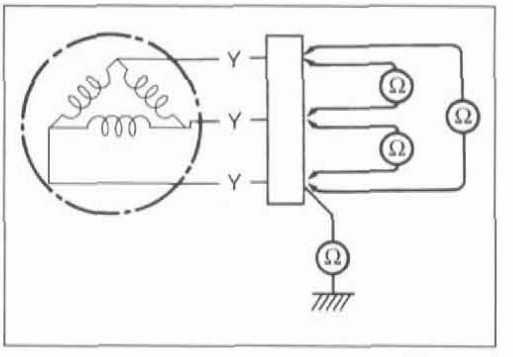
- Disconnect the generator coupler.
- Measure the resistance between the three lead wires.
  If the resistance is out of specified value, replace the stator with a new one. Also, check that the generator core is insulated properly.



TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

DATA Generator coil resistance: 0.1 – 1.5 Ω (Yellow – Yellow)
∞ Ω (Yellow – Ground)

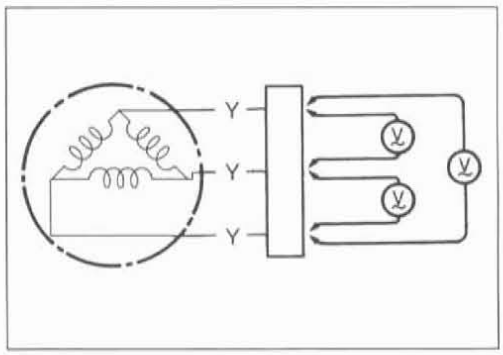


NOTE:

When making above test, it is not necessary to remove the generator.

GENERATOR NO-LOAD PERFORMANCE

- Disconnect the generator coupler.
- Start the engine and keep it running at 5 000 r/min.
- 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.



09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (~)

Generator no-load performance:
50 V and more at 5 000 r/min (When engine is cold)

REGULATOR/RECTIFIER

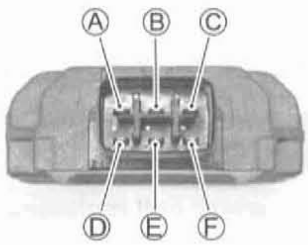
- Remove the front fender. (☞7-6)
- Remove the regulator/rectifier.
- Measure the voltage between the lead wires using the multi-circuit tester as indicated in the table below. If the voltage is not within the specified value, replace the regulator/rectifier with a new one.

09900-25008: Multi-circuit tester set

Tester knob indication: Diode test (⊣◀)

Unit: V

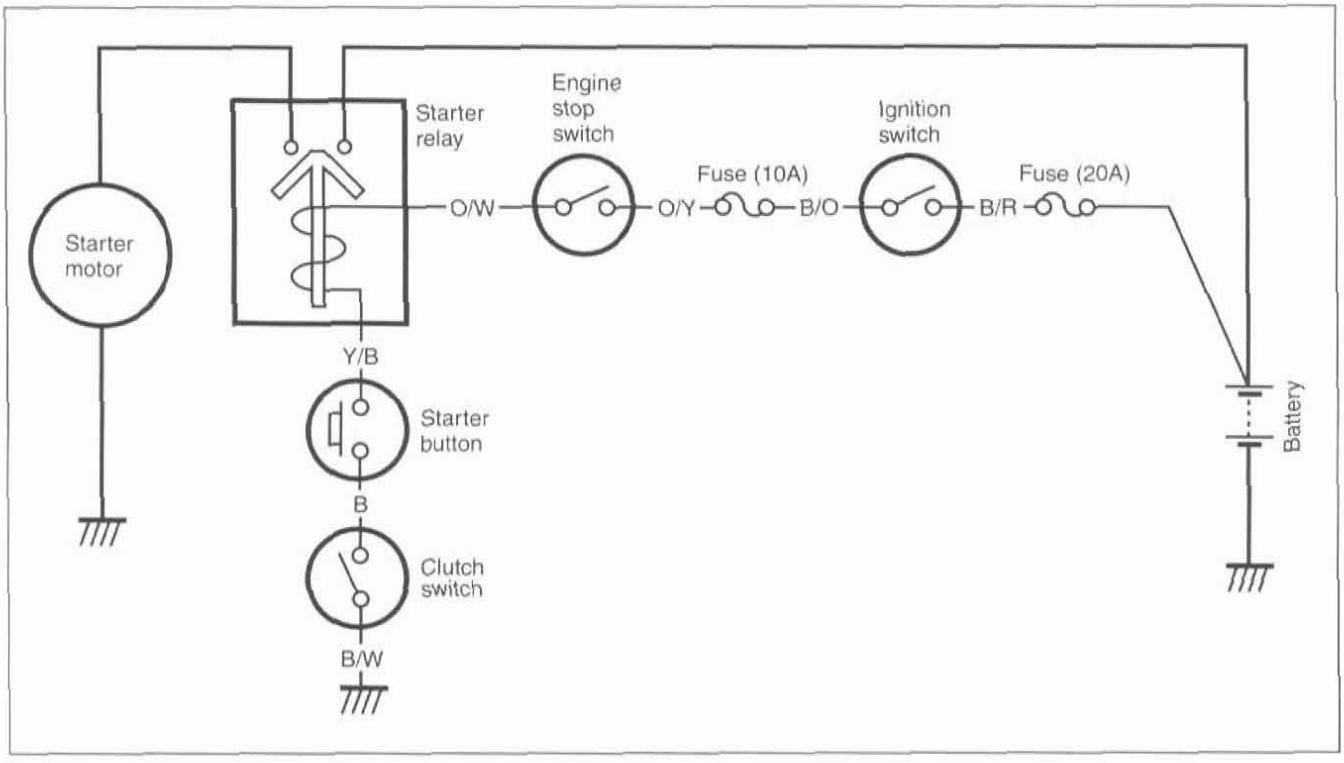
⊖ Tester probe	⊕ Tester probe Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ
Ⓐ		*	0.4–1.2	0.3–0.7	03–0.7	0.3–0.7
Ⓑ	*		*	*	*	*
Ⓒ	*	*		*	*	*
Ⓓ	*	*	0.3–0.7		*	*
Ⓔ	*	*	0.3–0.7	*		*
Ⓕ	*	*	0.3–0.7	*	*	



* More than 1.4 V (tester's battery voltage)

NOTE:
If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

STARTER SYSTEM AND SIDE-STAND/IGNITION INTERLOCK SYSTEM



TROUBLESHOOTING

Make sure that the fuses are not blown and the battery is fully-charged before diagnosing.

Starter motor will not run

Step 1

1) Shift the transmission to neutral.
2) Pull the clutch lever, turn on the ignition switch with the engine stop switch in the "RUN" position and listen for a click from the starter relay when the starter button is pushed.
   Is a click sound heard?

YES	Go to Step 2.
NO	Go to Step 3.

Step 2

1) Check if the starter motor runs when its terminal is connected to the battery ⊕ terminal. (Do not use thin "wire" because a large amount of current flows.)
   Does the starter motor run?

YES	• Faulty starter relay • Loose or disconnected starter motor lead wire • Loose or disconnected between starter relay and battery ⊕ terminal
NO	Faulty starter motor

Step 3

1) Measure the starter relay voltage at the starter relay connectors (between O/W ⊕ and Y/B ⊖) when the starter button is pushed.
   Is a voltage OK?

YES	Go to Step 4.
NO	• Faulty engine stop switch • Faulty clutch switch • Faulty starter button • Faulty ignition switch • Poor contact of connector • Open circuit in wire harness

Step 4

1) Check the starter relay. (☞8-15)
   Is the starter relay OK?

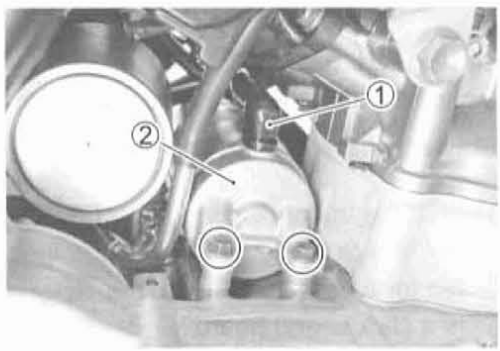
YES	Poor contact of the starter relay
NO	Faulty starter relay

Starter motor runs but does not crank the engine

- Faulty starter clutch

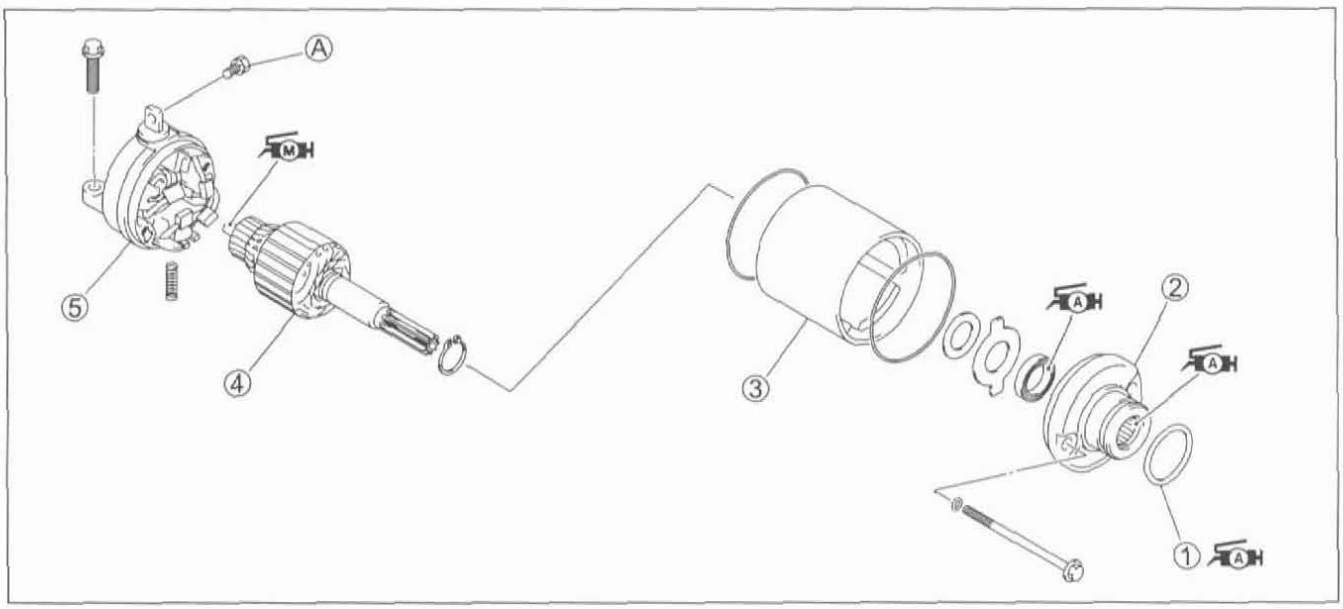
STARTER MOTOR REMOVAL

- Disconnect the battery ⊖ lead wire.
- Remove the exhaust pipe. (☞3-4)
- Disconnect the starter motor lead wire ①.
- Remove the starter motor ②.



STARTER MOTOR DISASSEMBLY

• Disassemble the starter motor as shown in the illustration.



①	O-ring	④	Armature
②	Housing end (inside)	⑤	Housing end (outside)
③	Starter motor case	Ⓐ	Lead wire mounting bolt

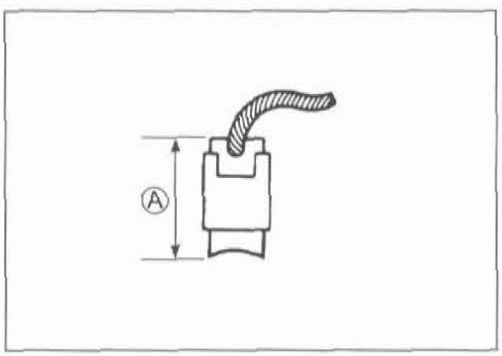
ITEM	N·m	kgf-m	lb-ft
Ⓐ	3	0.3	2.0

STARTER MOTOR INSPECTION

CARBON BRUSH

• Inspect the brushes for abnormal wear, cracks, or smoothness in the brush holder.
If any damages are found, replace the brush assembly with a new one.

• Measure the length Ⓐ of the carbon brushes using a vernier calipers. If the measurement is less then the service limit, replace the brush holder set with a new one.

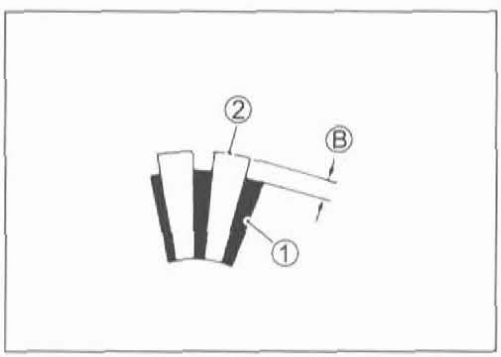


TOOL **09900-20102: Vernier calipers**

DATA **Standard: 7.0 mm (0.28 in)**
Service Limit: 3.5 mm (0.14 in)

COMMUTATOR

Inspect the commutator for discoloration, abnormal wear or undercut Ⓐ.
If abnormal wear is found, replace the armature with a new one.
If the commutator surface is discolored, polish it with #400 sand paper and wipe it using a clean dry cloth.
If there is no undercut, scrape out the insulator with a saw blade.



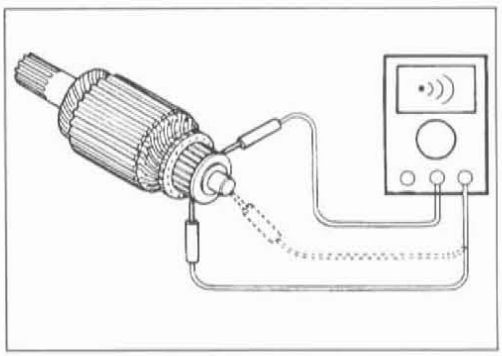
① Insulator
② Segment

ARMATURE COIL INSPECTION

Check for continuity between each segment and between each segment and the armature shaft using the multi-circuit tester.
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.

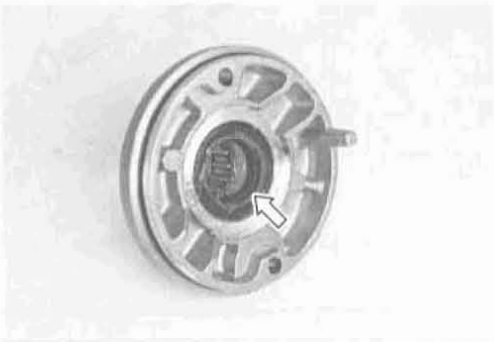
09900-25008: Multi-circuit tester set

Tester knob indication: Continuity test (•)))



OIL SEAL INSPECTION

Check the oil seal lip for damage or leakage.
If any damage is found, replace the housing end.

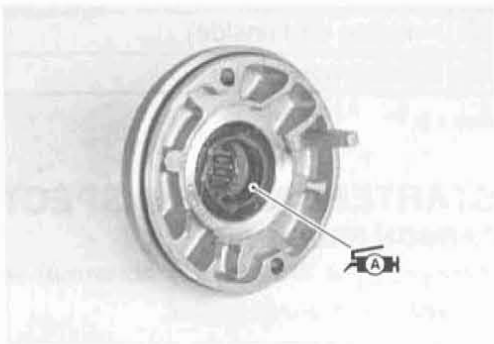


STARTER MOTOR REASSEMBLY

Reassemble the starter motor in the reverse order of disassembly. Pay attention to the following points:

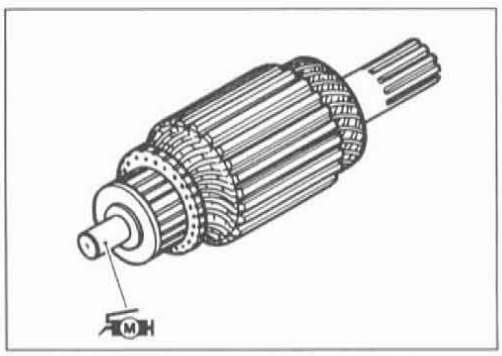
- Apply SUZUKI SUPER GREASE to the lip of the oil seal.

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

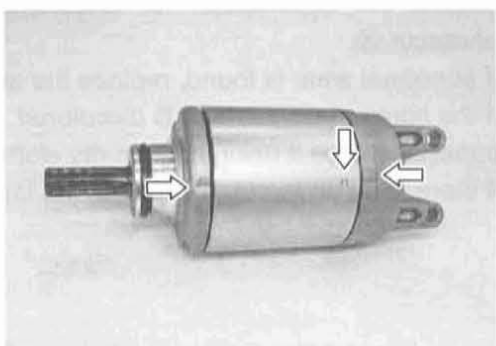


- Apply a small quantity of SUZUKI MOLY PASTE to the armature shaft.

99000-25140: SUZUKI MOLY PASTE

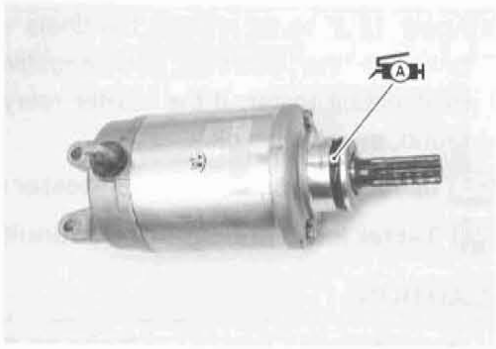


- Align the match mark on the starter motor case with the match marks on the housing end.



- Apply SUZUKI SUPER GREASE to the O-ring.

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

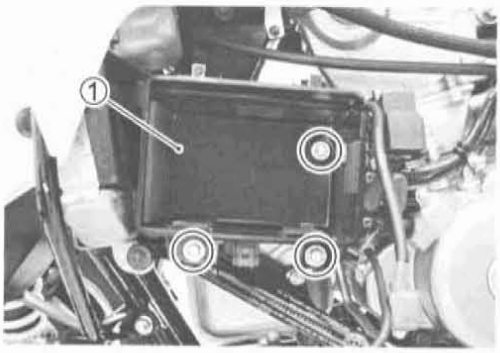


- Tighten the starter motor lead wire mounting bolt to the specified torque.

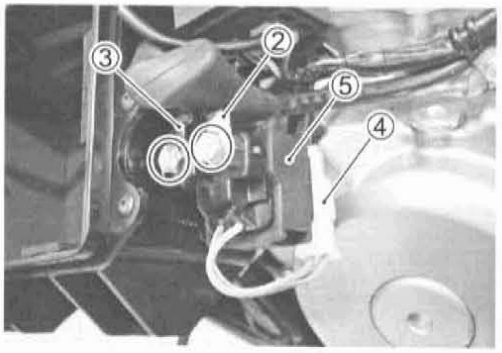
Lead wire mounting bolt: 3 N·m (0.3 kgf-m, 2.0 lb-ft)

STARTER RELAY INSPECTION

- Remove the battery holder cover and battery.
- Remove the battery holder ①.



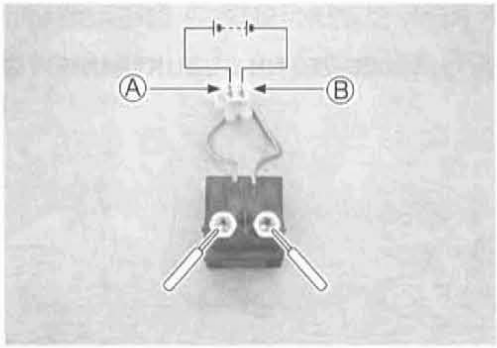
- Disconnect the starter motor lead wire ②, battery lead wire ③ and starter relay coupler ④.
- Remove the starter relay ⑤.



- Apply 12 V to Ⓐ and Ⓑ 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.

09900-25008: Multi-circuit tester set

Tester knob indication: Continuity test (•)))



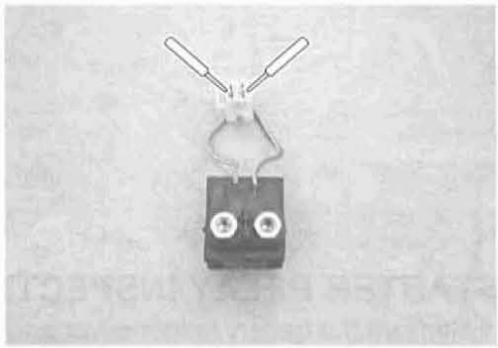
CAUTION

Do not apply battery voltage to the starter relay for more than five seconds, since the relay coil may overheat and get damaged.

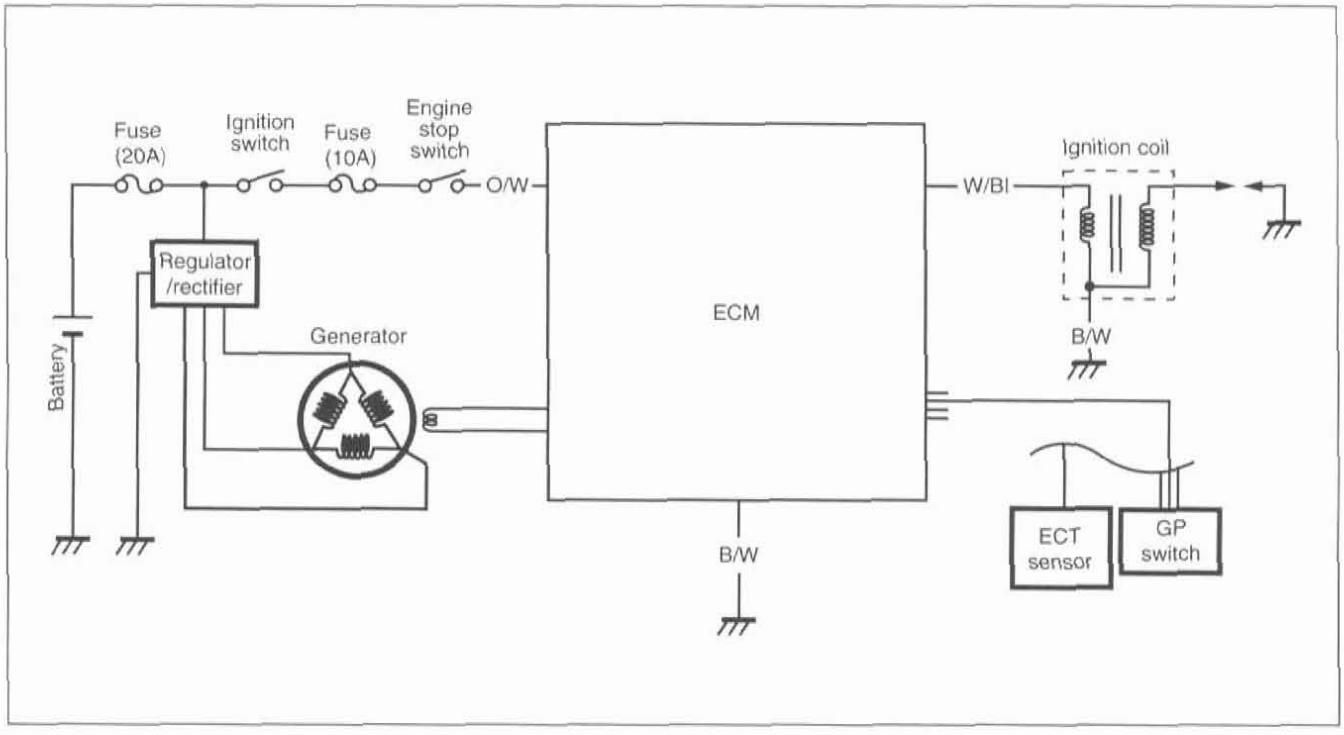
- Measure the relay coil resistance between the terminals using the multi-circuit tester. If the resistance is not within the specified value, replace the starter relay with a new one.

09900-25008: Multi-circuit tester set

Starter relay resistance: 3 – 6 Ω



IGNITION SYSTEM



NOTE:
The fuel cut-off circuit is incorporated in this ECM in order to prevent over-running of engine. When engine speed reaches 16 000 r/min, this circuit cuts off fuel at the fuel injector.

TROUBLESHOOTING

No spark or poor spark

NOTE:
Check that the transmission is in neutral and the engine stop switch is in the "RUN" position. Grasp the clutch lever. Check that the fuse is not blown and the battery is fully-charged before diagnosing.

Step 1

1) Check the ignition system couplers for poor connections.
   Is there connection in the ignition system couplers?

YES	Go to Step 2.
NO	Poor connection of couplers

Step 2

1) Measure the battery voltage between input lead wires (O/W and B/W) at the ECM with the ignition switch in the "ON" position.
   Is the voltage OK?

YES	Go to Step 3.
NO	• Faulty ignition switch • Faulty engine stop switch • Broken wire harness or poor connection of related circuit couplers

Step 3

1) Measure the ignition coil primary peak voltage. (☞8-19)

NOTE:

This inspection method is applicable only with the multi-circuit tester and the peak volt adaptor.

Is the peak voltage OK?

YES	Go to Step 4.
NO	Go to Step 5.

Step 4

1) Inspect the spark plug. (☞2-10)

Is the spark plug OK?

YES	Go to Step 5.
NO	Faulty spark plug.

Step 5

1) Inspect the ignition coil. (☞8-20)

Is the ignition coil OK?

YES	Go to Step 6.
NO	• Poor connection of the ignition coil. • Faulty ignition coil.

Step 6

1) Measure the crankshaft position sensor peak voltage and its resistance. (☞8-21)

NOTE:

The crankshaft position sensor peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor.

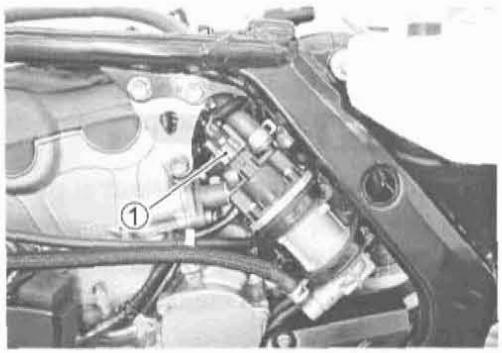
Is the peak voltage and resistance OK?

YES	• Faulty ECM • Open or short circuit in wire harness • Poor connection of ignition coupler
NO	• Faulty CKP sensor • Metal particles or foreign material being stuck on the CKP sensor and rotor tip

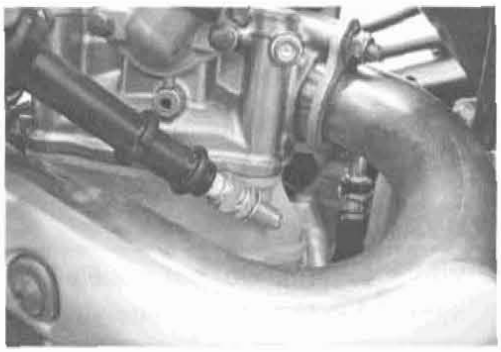
INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

- Remove the front fender, side covers and fuel tank. (☞5-3 and 7-6)
- Disconnect the fuel pump coupler ①.



- Remove the spark plug cap.
- Connect a new spark plug to spark plug cap and ground it to the cylinder.



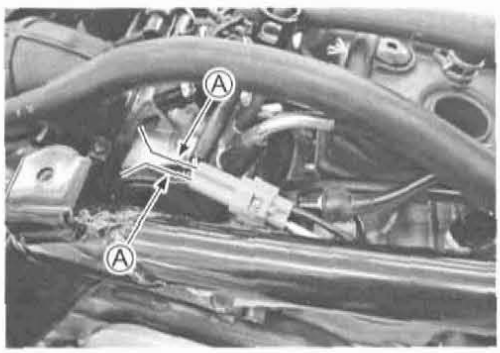
CAUTION

Avoid grounding the spark plugs and suppling the electrical shock to the cylinder head cover (magnesium parts) to prevent the magnesium material from damage.

NOTE:
Make sure that the spark plug cap and spark plug are connected properly and the battery is fully-charged.

Measure ignition coil primary peak voltage using the multi-circuit tester in the following procedure.

- Insert the needle pointed probes Ⓐ to the lead wire coupler.



CAUTION

Use the special tool, to prevent the rubber of the water proof coupler from damage.

TOOL 09900-25009: Needle pointed probe set

- Connect the multi-circuit tester with the peak voltage adaptor as follows.

⊕ Probe: Black/White lead wire
⊖ Probe: White/Blue lead wire

NOTE:
Do not disconnect the ignition coil lead wire coupler.

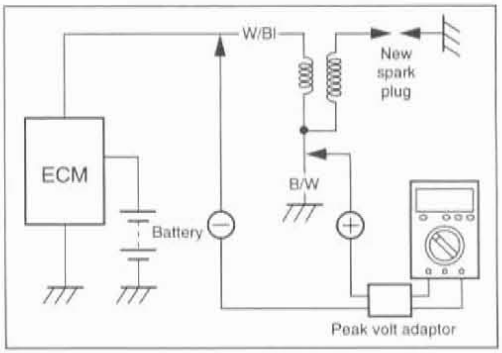
TOOL 09900-25008: multi-circuit tester set

CAUTION

When using the multi-circuit tester and peak volt adaptor, refer to the appropriate instruction manual.

- Shift the transfer to the neutral position and turn the ignition switch to the "ON" position.
- Push the starter button and allow the engine to crank for a few seconds, and then measure the ignition coil primary peak voltage.

Repeat the above procedure a few times and measure the highest ignition coil primary peak voltage. If the voltage is lower than the standard values, inspect the ignition coil. (☞below)



Tester knob indication: Voltage (⎓)

DATA Ignition coil primary peak voltage: 150 V and more

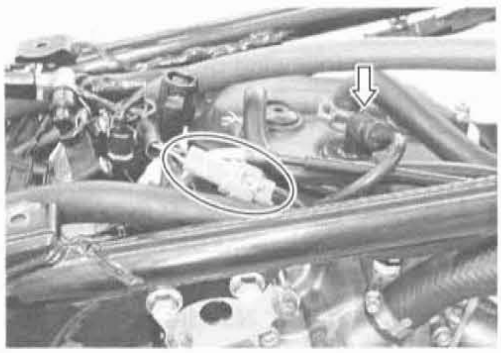
⚠ WARNING

While testing, do not touch the tester probes and spark plug to prevent receiving an electric shock.

NOTE:
After checking the ignition coil primary peak voltage, clear the DTC using SDS tool.

IGNITION COIL RESISTANCE

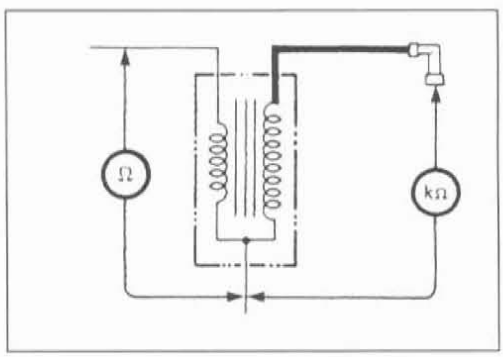
- Remove the front fender, side cover and fuel tank. (☞5-3 and 7-6)
- Disconnect the ignition coil lead wire coupler and spark plug cap.
- Measure the ignition coil resistance in both the primary and secondary windings using the multi-circuit tester. If the resistance in both the primary and secondary windings is close to the specified values, the windings are in sound condition.



TOOL 09900-25008: multi-circuit tester set

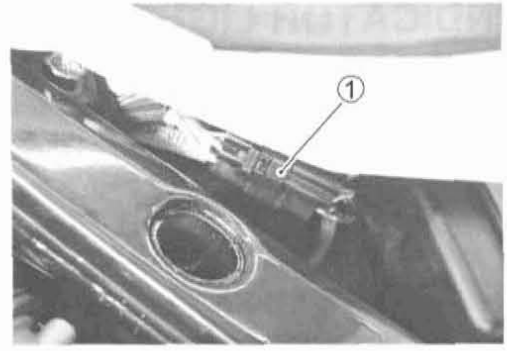
Tester knob indication: Resistance (Ω)

DATA Ignition coil resistance
Primary: 0.1 – 1.0 Ω (W/Bl – B/W)
Secondary: 8 – 15 kΩ (Spark plug cap – W/Bl)



CKP SENSOR PEAK VOLTAGE

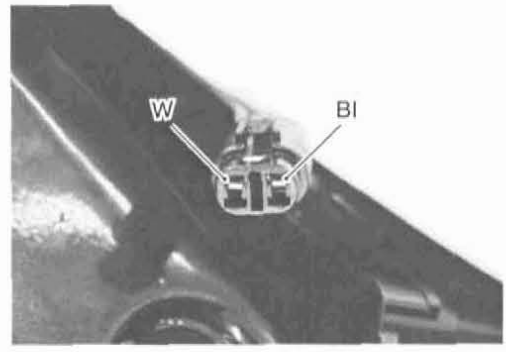
- Disconnect the CKP sensor coupler ①.



- Connect the multi-circuit tester with the peak volt adaptor as follows.

⊕ probe: White
⊖ probe: Blue

09900-25008: multi-circuit tester set



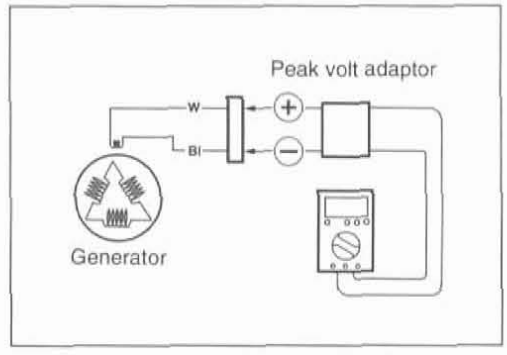
CAUTION

When using the multi-circuit tester and peak volt adaptor, refer to the appropriate instruction manual.

- Shift the transmission to the neutral position, turn the ignition switch to the "ON" position.
- Push the starter button and allow the engine to turn for a few seconds, and then measure the CKP sensor peak voltage.
- Repeat the above procedure a few times and measure the highest CKP sensor peak voltage.

Tester knob indication: Voltage (⎓)

CKP sensor peak voltage: 0.5 V and more



NOTE:

After checking the CKP sensor peak voltage, clear the DTC using SDS tool.

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.

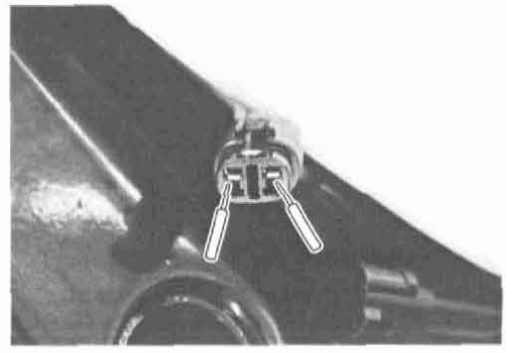
CKP SENSOR RESISTANCE

- Disconnect the CKP sensor coupler.
- Measure the resistance between the lead wires using the multi-circuit tester. If the resistance is not within the specified value, the CKP sensor must be replaced.

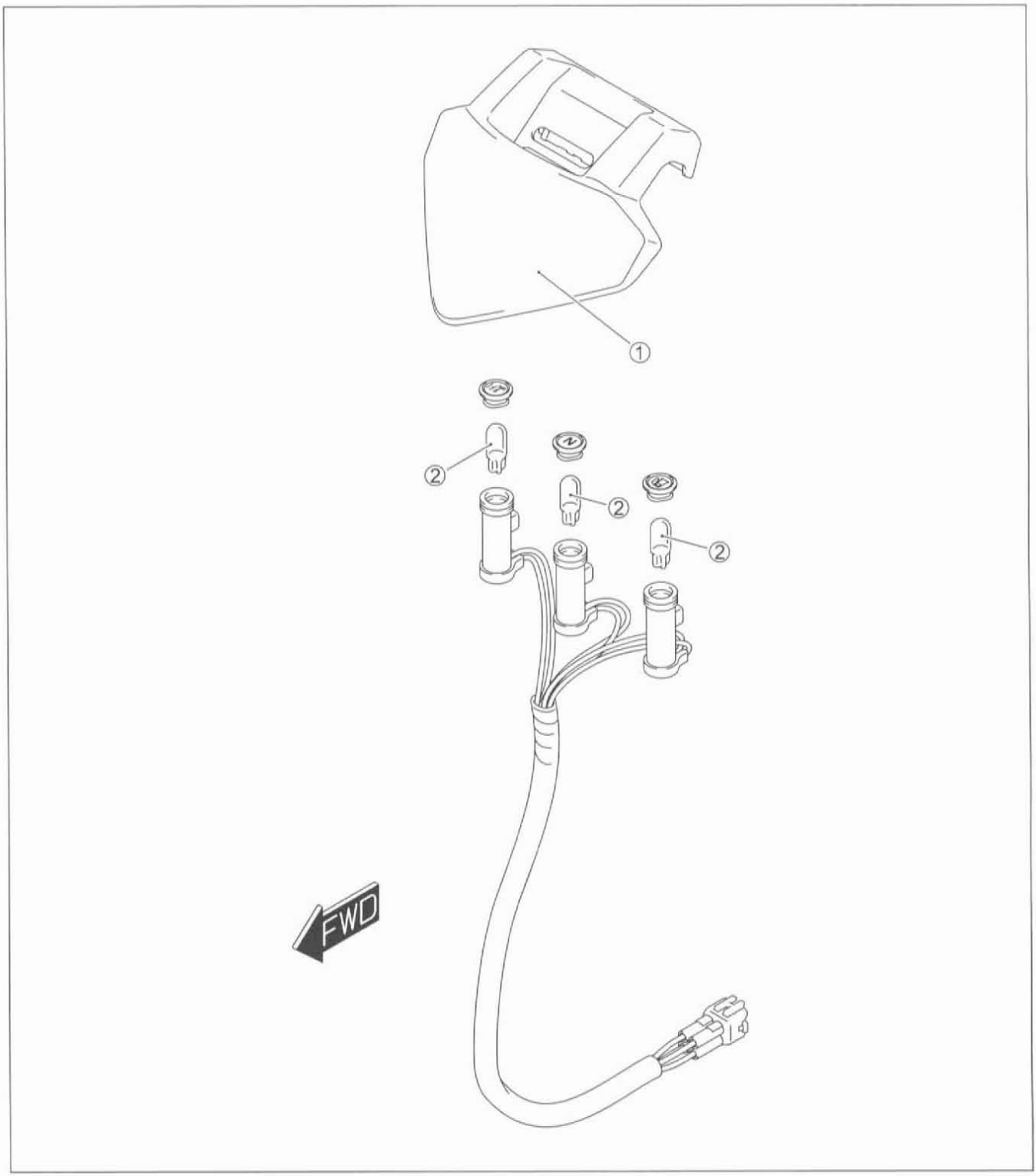
09900-25008: multi-circuit tester set

Tester knob indication: Resistance (Ω)

CKP sensor resistance: 155 – 232 Ω (White – Blue)



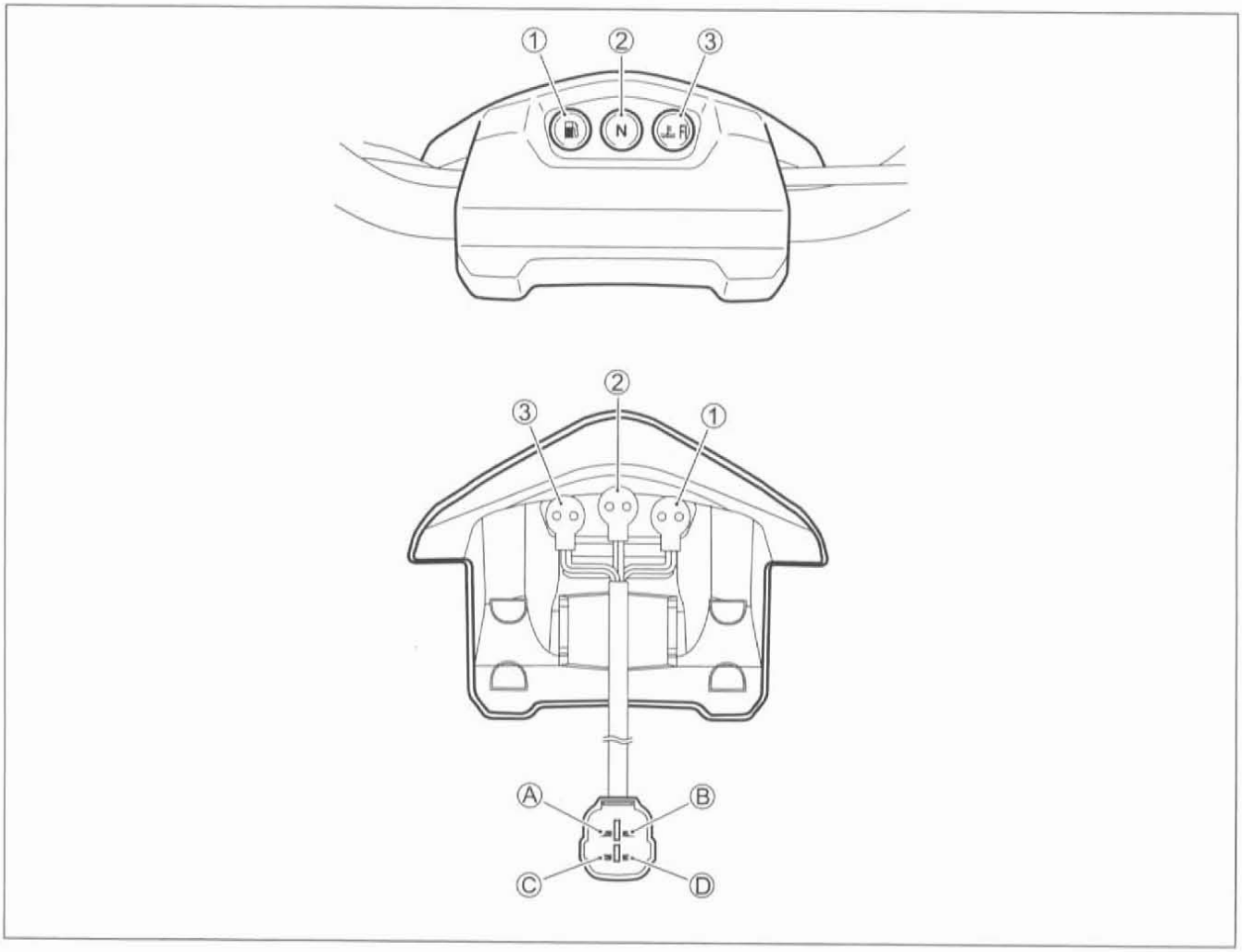
INDICATOR LIGHT



①	Steering head cover	②	Bulb (12 V 3.4 W)

INSPECTION

Measure the continuity between the lead wires in the diagram using a tester.



①	Fuel indicator	Ⓐ	B/Y: Ground (Fuel indicator)	Ⓒ	B/R: Ground (FI/Engine coolant temperature indicator)
②	Neutral indicator	Ⓑ	BI/B: Ground (Neutral indicator)	Ⓓ	B: Power source (Indicators)
③	FI/Engine coolant temperature indicator				

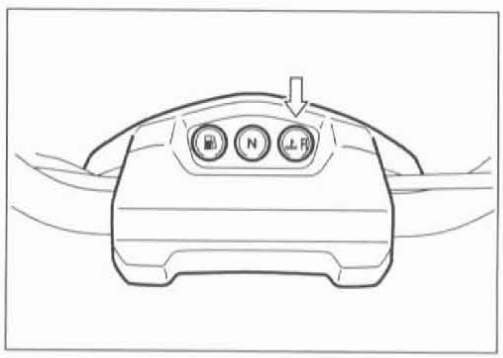
ECT SENSOR INSPECTION
FI/ENGINE COOLANT TEMPERATUER INDICATOR

Check that the indicator lights immediately after turning the ignition switch ON.

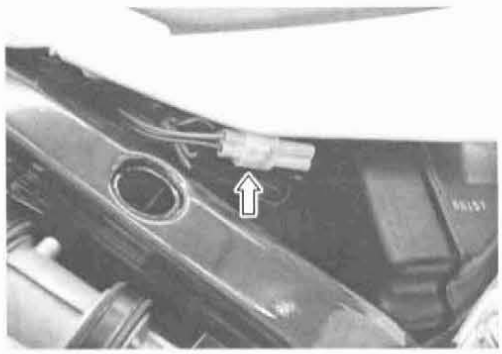
If the FI/Engine coolant temperature indicator does not light up, check the couplers, wires and bulb.

NOTE:

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



GEAR POSITION SWITCH INSPECTION



- Disconnect the gear position switch coupler and check the continuity between Blue and Black/White with the transmission in "NEUTRAL".

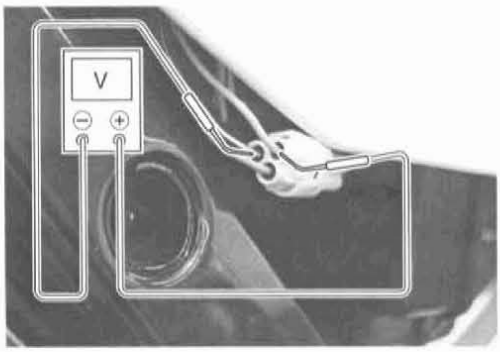
09900-25008: Multi-circuit tester set

Tester knob indication: Continuity test (•)))

	Blue	Black/White
ON (Neutral)	○———	———○
OFF (Except neutral)		

CAUTION

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



- Connect the gear position switch coupler to the wiring harness.
- Turn the ignition switch to "ON" position.
- Measure the voltage between Pink and Black/White lead wires using the multi-circuit tester when shifting the gearshift lever from low to top.

09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

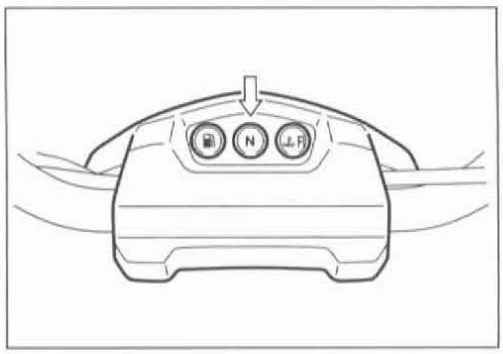
Tester knob indication: Voltage (⎓)

Gear position switch voltage: 0.9 V and more
*** Low to top gear position (Pink ⊕ – B/W ⊖)**
*** Except neutral position (Pink ⊕ – B/W ⊖)**

CAUTION

Use the special tool, to prevent the rubber of the water proof coupler from damage.

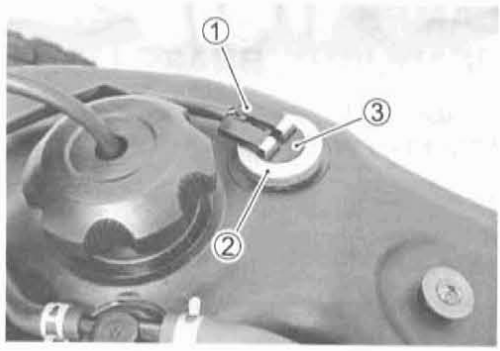
NEUTRAL INDICATOR



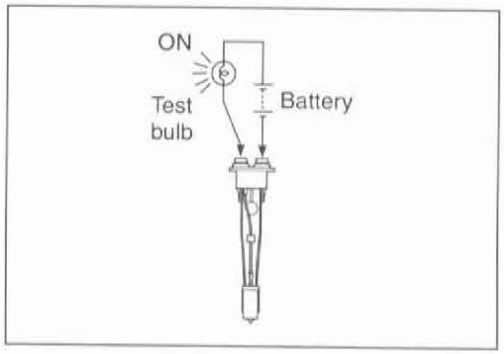
If the neutral indicator light does not function properly, check the GP switch and its lead wire/coupler.
If the GP switch and its lead wire/coupler are functioning properly, replace the bulb with a new one.

FUEL LEVEL SWITCH INSPECTION

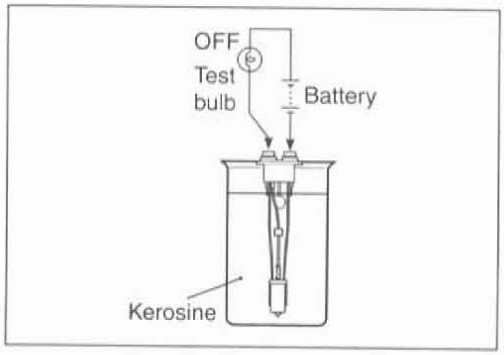
- Remove the fuel tank cover. (☞7-6)
- Disconnect the fuel level coupler ① and remove the fuel level switch cap ②.
- Remove the fuel level switch ③.



- Connect 12 V battery and test bulb (12 V, 3.4 W) to the fuel level indicator switch as shown in the right illustrations. The bulb should come on after several seconds if the switch is in good condition.



- When the switch is immersed in kerosine under the above condition, the bulb should go out. If the bulb remains it, replace the switch with a new one.



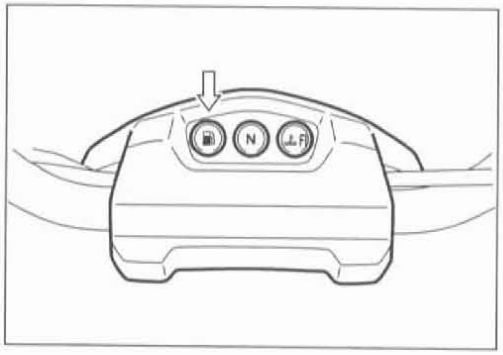
FUEL LEVEL INDICATOR LIGHT INSPECTION

Check that the indicator lights immediately after turning the ignition switch ON.

If the fuel level indicator light does not light up, check the couplers, wires and bulb.

NOTE:

When ignition switch is turned on, fuel level indicator light is lit for 2 seconds and thereafter remains unlit

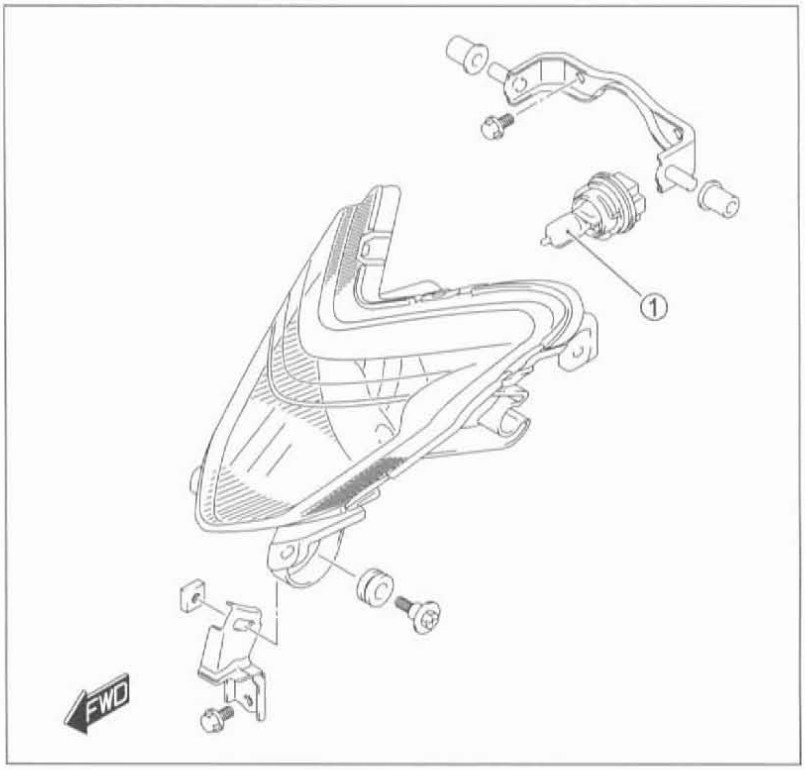


LAMPS

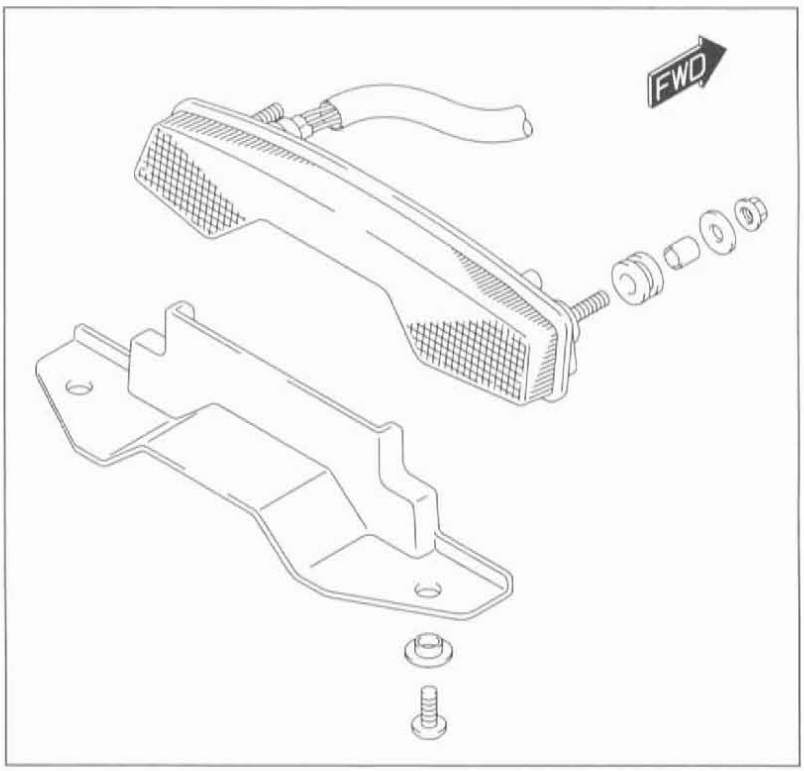
HEADLIGHT, BRAKE LIGHT/TAILLIGHT

HEADLIGHT

12 V 40/40 W ①



BRAKE LIGHT/TAILLIGHT: LED

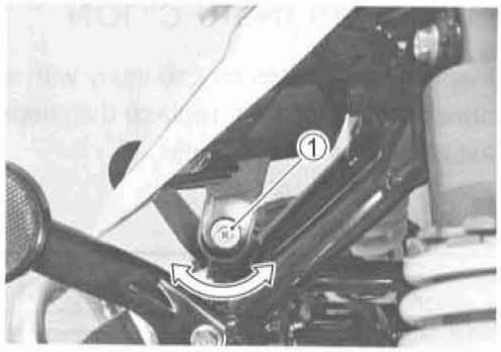


CAUTION

If you have touched and the bulb with your bare hands, clean it with a cloth moistened with alcohol or soapy water to maintain lens clarity.

HEADLIGHT BEAM ADJUSTMENT (Vertical)

- Loosen the headlight adjusting bolt ① and Adjust the headlight beam.
- Tighten the headlight adjusting bolt ①.



RELAYS

STARTER RELAY

☞8-15

FUEL PUMP RELAY

☞5-8

COOLING FAN RELAY

☞6-10

SWITCHES INSPECTION

Inspect each switch for continuity with a tester. If any abnormality is found, replace the respective switch assemblies with new ones.

DIMMER SWITCH

Color / Position	Y	W	Gr
HI (≡D)	○		○
LO (≡D)		○	○

ENGINE STOP SWITCH

Color / Position	O	O/W
OFF (⊗)		
RUN (Ω)	○	○

STARTER BUTTON

Color / Position	Y/B	B
•		
PUSH	○	○

IGNITION SWITCH

Color / Position	B/R	B/O	Br
LIGHT	○	○	○
ON	○	○	
OFF			

CLUTCH SWITCH

Color / Position	B	B/Y
OFF		
ON	○	○

FRONT BRAKE SWITCH

Color / Position	O	W/B
OFF		
ON	○	○

REAR BRAKE SWITCH

Color / Position	B	B
OFF		
ON	○	○

WIRE COLOR

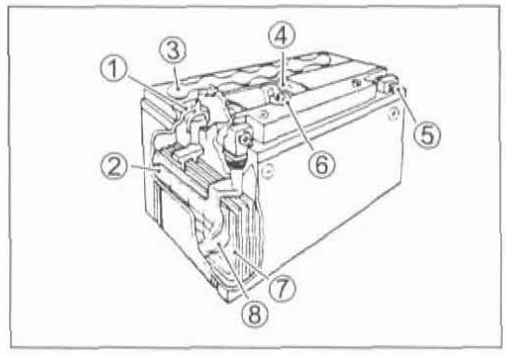
B : Black
Br : Brown
W : White
Gr : Gray
O : Orange
Y : Yellow
B/O : Black with Orange tracer
B/R : Black with Red tracer
B/Y : Black with Yellow tracer
O/W : Orange with White tracer
W/B : White with Black tracer
Y/B : Yellow with Black tracer

BATTERY

SPECIFICATIONS

Type designation	FTX7A-BS
Capacity	12 V, 21.6 kC (6 Ah)/10 HR

① Upper cover breather
② Cathode plates
③ Stopper
④ Filter
⑤ Terminal
⑥ Safety valve
⑦ Anode plates
⑧ Separator (Fiberglass plate)

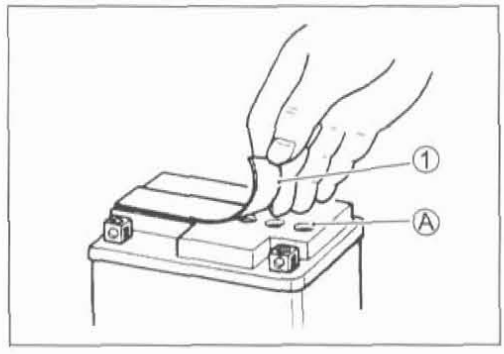


INITIAL CHARGING

Filling electrolyte

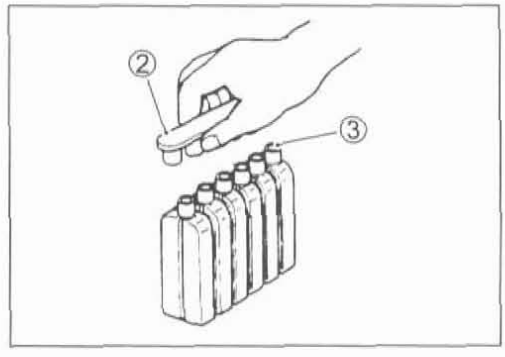
- Remove the aluminum tape ① sealing the battery electrolyte filler holes Ⓐ.

NOTE:
When filling electrolyte, the battery must be removed from the vehicle and must be put on the level ground.

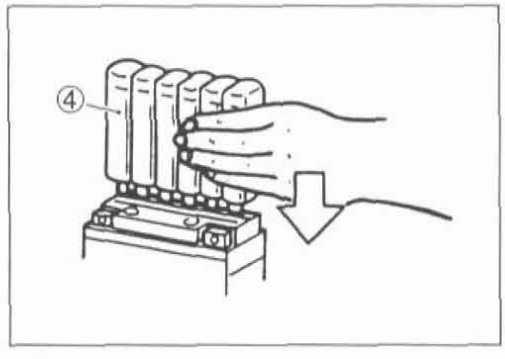


- Remove the caps ②.

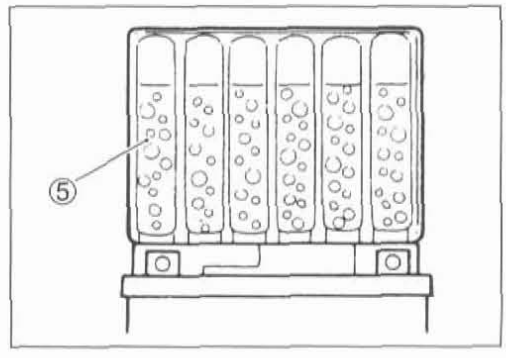
NOTE:
* *After filling the electrolyte completely, use the removed cap ② as sealing caps of battery-filler holes.*
* *Do not remove or pierce the sealed areas ③ of the electrolyte container.*



- Insert the nozzles of the electrolyte container ④ into the battery's electrolyte filler holes, holding the container firmly so that it does not fall. Take precaution not to allow any of the fluid to spill.

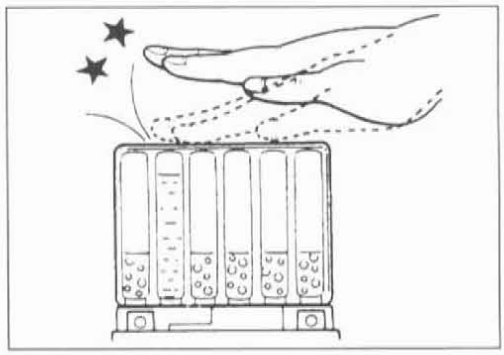


- Make sure air bubbles ⑤ are coming up each electrolyte container, and leave in this position for about more than 20 minutes.

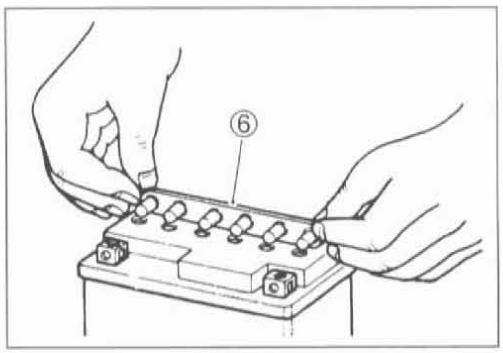


NOTE:
If no air bubbles are coming up from a filler port, tap the bottom of the electrolyte container two or three times.
Never remove the container from the battery.

- After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery. Wait for about 20 minutes.

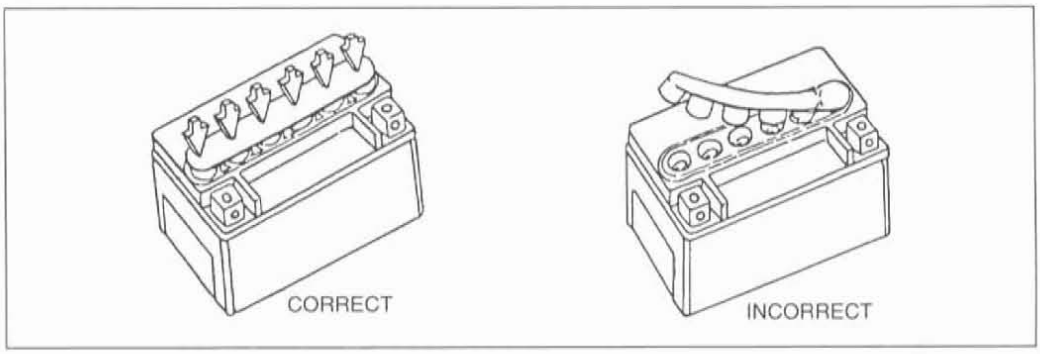


- Insert the caps ⑥ into the filler holes, pressing in firmly so that the top of the caps do not protrude above the upper surface of the battery's top cover.



CAUTION

*** Never use anything except the specified battery.**
*** Once the caps have been installed to the battery, do not remove the caps.**
*** Do not tap the caps with a tool such as hammer when installing them.**

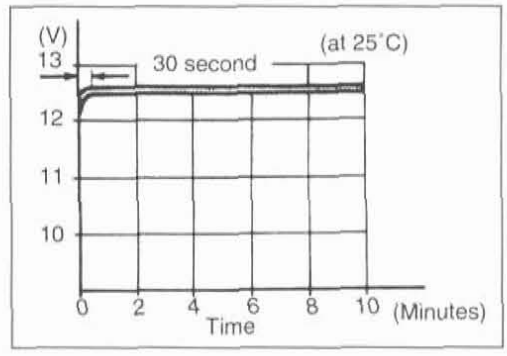


For initial charging, use the charger specially designed for MF battery.

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.**

Measure the battery voltage using multi circuit tester. The tester should indicate more than 12.5 – 12.6 V (DC) as shown in the Fig. If the battery voltage is lower than the specification, charge the battery with a battery charger. (Refer to the recharging operation)



CAUTION

Do not remove the caps on the battery top while charging.

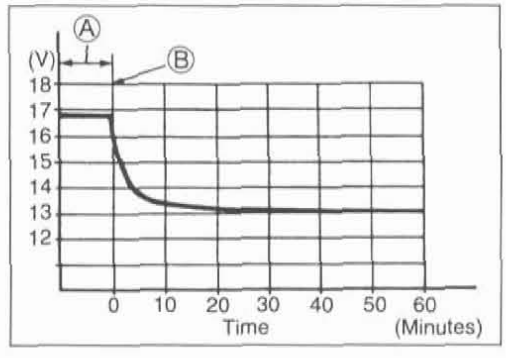
NOTE:
Initial charging for a new battery is recommended if two years have elapsed since the date of manufacture.

SERVICING

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.

RECHARGING OPERATION

- Using the multi-circuit tester, check the battery voltage. If the voltage reading is the 12.0 V (DC) and less, recharge the battery with a battery charger.



Ⓐ Charging period
Ⓑ Stop charging

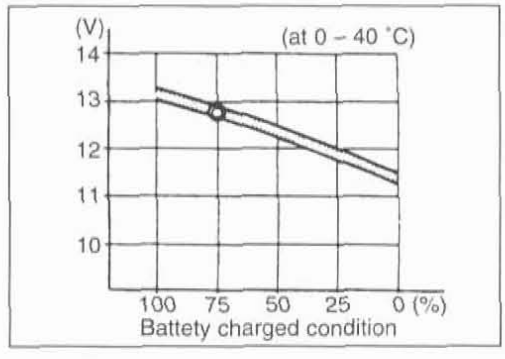
CAUTION

- *** When recharging the battery, remove the battery from the vehicle.**
- *** Do not remove the caps on the battery top while recharging.**

Recharging time: 0.7 A for 5 to 10 hours or 3 A for 1 hour

CAUTION

Be careful not to permit the charging current to exceed 3 A at any time.



- After recharging, wait for 30 minutes and more and check the battery voltage with a multi-circuit tester.
- If the battery voltage is the 12.5 V and less, recharge the battery again.
- If battery voltage is still 12.5 V and less, after recharging, replace the battery with a new one.
- When the vehicle is not used for a long period (especially during the winter season), check the battery every 1 month to prevent the battery discharge.

SERVICING INFORMATION

CONTENTS

TROUBLESHOOTING

FI SYSTEM MALFUNCTION CODE AND DEFECTIVE CONDITION

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
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				
C13		IAP sensor	The sensor should produce following voltage. 0.5 V ≦ sensor voltage < 4.4 V In other than the above range, C13 (P0105) is indicated.	IAP sensor, lead wire/coupler connection
P0105	H		Sensor voltage is higher than specified value.	IAP sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	IAP sensor circuit open or shorted to ground or VCC circuit open
C14		TP sensor	The sensor should produce following voltage. 0.5 V ≦ sensor voltage < 4.8 V In other than the above range, C14 (P0120) is indicated.	TP sensor, lead wire/coupler connection
P0120	H		Sensor voltage is higher than specified value.	TP sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to ground or VCC circuit open
C15		ECT sensor	The sensor voltage should be the following. 0.1 V ≦ sensor voltage < 4.8 V In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection
P0115	H		Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground
C21		IAT sensor	The sensor voltage should be the following. 0.2 V ≦ sensor voltage < 4.8 V In other than the above range, C21 (P0110) is indicated.	IAT sensor, lead wire/coupler connection
P0110	H		Sensor voltage is higher than specified value.	IAT sensor circuit open or ground circuit open
	L		Sensor voltage is lower than specified value.	IAT sensor circuit shorted to ground

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C23		TO sensor	The sensor voltage should be the following for 1 sec. and more, after ignition switch is turned ON. 0.3 V ≦ sensor voltage < 4.6 V In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection
P1651	H		Sensor voltage is higher than specified value.	TO sensor circuit shorted to VCC or ground circuit open
	L		Sensor voltage is lower than specified value.	TO sensor circuit open or shorted to ground or VCC circuit open
C24		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 switch 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 (pickup 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	Fuel pump relay signal is not input to ECM.	Fuel pump relay, lead wire/coupler connection.
P0230				
C60		Cooling fan relay	Cooling fan relay signal is not input to ECM.	Cooling fan relay, lead wire/coupler connection
P0480				

ENGINE

Complaint	Symptom and possible causes	Remedy
Engine will not start or is hard to start.	**Compression too low**	
	1. Valve clearance out of adjustment	Adjust.
	2. Worn valve guides or poor seating of valves	Repair or replace.
	3. Mistiming valves	Adjust.
	4. Excessively worn piston rings	Replace.
	5. Worn-down cylinder bore	Replace.
	6. Too slowly starter motor cranks	See electrical section.
	7. Poor seating of spark plug	Retighten.
	8. Broken, cracked or damaged piston	Replace.
	Plug not sparking	
	1. Fouled spark plug	Clean.
	2. Wet spark plug	Clean and dry.
	3. Defective ignition coil	Replace.
	4. Defective CKP sensor	Replace.
	5. Defective ECM	Replace.
	6. Open-circuited wiring connections	Repair or replace.
	No fuel reaching the intake manifold	
	1. Clogged fuel filter or fuel hose	Clean or replace.
	2. Defective fuel pump	Replace.
	3. Defective fuel pressure regulator	Replace.
	4. Defective fuel injector	Replace.
	5. Defective fuel pump relay	Replace.
	6. Defective ECM	Replace.
	7. Open-circuited wiring connections	Check and repair.
	Incorrect fuel/air mixture	
	1. TP sensor out of adjustment	Adjust.
	2. Defective fuel pump	Replace.
	3. Defective fuel pressure regulator	Replace.
	4. Defective TP sensor	Replace.
	5. Defective CKP sensor	Replace.
	6. Defective IAP sensor	Replace.
	7. Defective ECM	Replace.
	8. Defective ECT sensor	Replace.
	9. Defective IAT sensor	Replace.

Complaint	Symptom and possible causes	Remedy
Engine idles poorly.	1. Valve clearance out of adjustment	Adjust.
	2. Poor seating of valves	Replace or repair.
	3. Defective valve guides	Replace.
	4. Worn down camshafts	Replace.
	5. Too wide spark plug gap	Adjust or replace.
	6. Defective ignition coil/plug cap	Replace.
	7. Defective CKP sensor	Replace.
	8. Defective ECM	Replace.
	9. Defective TP sensor	Replace.
	10. Defective fuel pump	Replace.
	11. Damaged or cracked vacuum hose	Replace.
Engine stalls often.	**Incorrect fuel/air mixture**	
	1. Defective IAP sensor or circuit	Repair or replace.
	2. Clogged fuel filter	Clean or replace.
	3. Defective fuel pump	Replace.
	4. Defective fuel pressure regulator	Replace.
	5. Defective ECT sensor	Replace.
	6. Defective thermostat	Replace.
	7. Defective IAT sensor	Replace.
	8. Damaged or cracked vacuum hose	Replace.
	Fuel injector improperly operating	
	1. Defective fuel injectors	Replace.
	2. No injection signal from ECM	Repair or replace.
	3. Open or short circuited wiring connection	Repair or replace.
	4. Defective battery or low battery voltage	Replace or recharge.
	Control circuit or sensor improperly operating	
	1. Defective ECM	Replace.
	2. Defective fuel pressure regulator	Replace.
	3. Defective TP sensor	Replace.
	4. Defective IAT sensor	Replace.
	5. Defective CKP sensor	Replace.
	6. Defective ECT sensor	Replace.
	7. Defective fuel pump relay	Replace.
	Engine internal parts improperly operating	
	1. Fouled spark plug	Clean.
	2. Defective CKP sensor or ECM	Replace.
	3. Clogged fuel hose	Clean.
	4. Out of adjustment tappet clearance	Adjust.

Complaint	Symptom and possible causes	Remedy
Noisy engine	**Excessive valve chatter**	
	1. Too large tappet clearance	Adjust.
	2. Weakened or broken valve springs	Replace.
	3. Worn tappet or cam surface	Replace.
	4. Worn and burnt camshaft journal	Replace.
	Noise seems to come from piston	
	1. Worn down piston or cylinder	Replace.
	2. Carbon combustion chamber fouled with carbon	Clean.
	3. Worn piston pins or piston pin bore	Replace.
	4. Worn piston rings or ring grooves	Replace.
	Noise seems to come from timing chain	
	1. Stretched chain	Replace.
	2. Worn sprockets	Replace.
	3. Tension adjuster not working	Repair or replace.
	Noise seems to come from clutch	
	1. Worn splines of countershaft or hub	Replace.
	2. Worn teeth of clutch plates	Replace.
	3. Distorted clutch plates, driven and drive	Replace.
	4. Worn clutch release bearing	Replace.
	5. Weakened clutch damper	Replace the primary driven gear.
	Noise seems to come from crankshaft	
	1. Rattling bearings due to wear	Replace.
	2. Worn and burnt big-end bearings	Replace.
	3. Worn and burnt journal bearings	Replace.
	Noise seems to come from balancer	
	1. Worn and burnt journal bearings	Replace.
	Noise seems to come from transmission	
	1. Worn or rubbing gears	Replace.
	2. Worn splines	Replace.
	3. Worn or rubbing primary gears	Replace.
	4. Worn bearings	Replace.
	Noise seems to come from water pump	
	1. Too much play on pump shaft bearing	Replace.
	2. Worn or damaged impeller shaft	Replace.
	3. Worn or damaged mechanical seal	Replace.
	4. Contact between pump case and impeller	Replace.

Complaint	Symptom and possible causes	Remedy
Engine runs poorly in high speed range.	**Defective engine internal/electrical parts**	
	1. Weakened valve springs	Replace.
	2. Worn camshafts	Replace.
	3. Valve timing out of adjustment	Adjust.
	4. Too narrow spark plug gap	Adjust.
	5. Ignition not advanced sufficiently due to poorly working timing advance circuit	Replace ECM.
	6. Defective ignition coil	Replace.
	7. Defective CKP sensor	Replace.
	8. Defective ECM	Replace.
	9. Clogged air cleaner element	Clean.
	10. Clogged fuel hose, resulting in inadequate fuel supply to injector	Clean and prime.
	11. Defective fuel pump	Replace.
	12. Defective TP sensor	Replace.
	Defective air flow system	
	1. Clogged air cleaner element	Replace.
	2. Sucking air from throttle body joint	Repair or replace.
	3. Defective ECM	Replace.
	Defective control circuit or sensor	
	1. Low fuel pressure	Repair or replace.
	2. Defective TP sensor	Replace.
	3. Defective IAT sensor	Replace.
	4. Defective CKP sensor	Replace.
	5. Defective GP sensor	Replace.
	6. Defective IAP sensor	Replace.
	7. Defective ECM	Replace.
	8. TP sensor out of adjustment	Replace.

Complaint	Symptom and possible causes	Remedy
Engine lacks power.	**Defective engine internal/electrical parts**	
	1. Loss of tappet clearance	Adjust.
	2. Weakened valve springs	Replace.
	3. Valve timing out of adjustment	Adjust.
	4. Worn piston rings or cylinder	Replace.
	5. Poor seating of valves	Repair.
	6. Fouled spark plug	Clean or replace.
	7. Incorrect spark plug	Adjust or replace.
	8. Clogged fuel injector	Replace.
	9. TP sensor out of adjustment	Adjust.
	10. Clogged air cleaner element	Replace.
	11. Sucking air from throttle valve or vacuum hose	Retighten or replace.
	12. Too much engine oil	Drain out excess oil.
	13. Defective fuel pump or ECM	Replace.
	14. Defective CKP sensor and ignition coil	Replace.
	Defective control circuit or sensor	
	1. Low fuel pressure	Repair or replace.
	2. Defective TP sensor	Replace.
	3. Defective IAT sensor	Replace.
	4. Defective CKP sensor	Replace.
	5. Defective GP sensor	Replace.
	6. Defective IAP sensor	Replace.
	7. Defective ECM	Replace.
	8. TP sensor out of adjustment	Adjust.

Complaint	Symptom and possible causes	Remedy
Engine overheats	**Defective engine internal parts**	
	1. Heavy carbon deposit on piston crowns	Clean.
	2. Not enough oil in the engine	Add oil.
	3. Defective oil pump or clogged oil circuit	Replace or clean.
	4. Sucking air from intake pipe	Retighten or replace.
	5. Use incorrect engine oil	Change.
	6. Defective cooling system	See radiator section.
	Lean fuel/air mixture	
	1. Short-circuited IAP sensor/lead wire	Repair or replace.
	2. Short-circuited IAT sensor/lead wire	Repair or replace.
	3. Sucking air from intake pipe joint	Repair or replace.
	4. Defective fuel injector	Replace.
	5. Defective ECT sensor	Replace.
	Other factors	
	1. Ignition timing is too advanced due to defective timing advance system (ECT sensor, GP sensor, CKP sensor and ECM).	Replace.
	2. Drive chain is too tight.	Adjust.
Dirty or heavy exhaust smoke	1. Too much engine oil in the engine	Check with inspection window, drain out excess oil.
	2. Worn piston rings or cylinder	Replace.
	3. Worn valve guides	Replace.
	4. Scored or scuffed cylinder wall	Replace.
	5. Worn valves stems	Replace.
	6. Defective stem seal	Replace.
	7. Worn oil ring side rails	Replace.
Slipping clutch	1. Weakened clutch springs	Replace.
	2. Worn or distorted pressure plate	Replace.
	3. Distorted clutch plates or pressure plate	Replace.
Dragging clutch	1. Some clutch spring weakened while others are not.	Replace.
	2. Distorted pressure plates or clutch plates	Replace.
Transmission will not shift.	1. Broken gearshift cam	Replace.
	2. Distorted gearshift forks	Replace.
	3. Worn gearshift pawl	Replace.
Transmission will not shift back.	1. Broken return spring on shift shaft	Replace.
	2. Rubbing or stickily shift shaft	Repair or replace.
	3. Distorted or worn gearshift forks	Replace.
Transmission jumps out of gear.	1. Worn shifting gears on driveshaft or countershaft	Replace.
	2. Distorted or worn gearshift forks	Replace.
	3. Weakened stopper spring on gearshift stopper	Replace.
	4. Worn gearshift cam plate	Replace.
	5. Gear dog/dog hole worn	Replace.

RADIATOR (COOLING SYSTEM)

Complaint	Symptom and possible causes	Remedy
Engine overheats	1. Not enough engine coolant	Add coolant.
	2. Radiator core clogged with dirt or scale	Clean.
	3. Faulty cooling fan	Repair or replace.
	4. Defective cooling fan relay, or open- or short-circuited	Repair or replace.
	5. Defective ECM	Replace.
	6. Defective ECT sensor	Replace.
	7. Clogged water passage	Clean.
	8. Air trapped in the cooling circuit	Bleed air.
	9. Defective water pump	Replace.
	10. Use incorrect coolant	Replace.
	11. Defective thermostat	Replace.
Engine overcools	1. Defective ECT sensor	Replace.
	2. Extremely cold weather	Put on the radiator cover.
	3. Defective thermostat	Replace.
	4. Defective cooling fan relay, or open- or short-circuited	Repair or replace.
	5. Defective ECM	Replace.

CHASSIS

Complaint	Symptom and possible causes	Remedy
Handling is too heavy or stiff.	1. Improper front wheel alignment	Adjust.
	2. Insufficiently lubricated	Lubricate.
	3. Low air pressure in front tires	Adjust.
	4. Tie rod ends tending to seize	Replace.
	5. Linkage connections tending to seize	Repair or replace.
Steering wobbles.	1. Unequally inflated tires	Regulate.
	2. Loose front wheel hub nuts	Tighten.
	3. Damaged or worn front wheel hub bearings	Replace.
	4. Worn or loose tie rod ends	Replace or tighten.
	5. Defective or incorrect front tires	Replace.
	6. Damaged or worn wishbone arms and related bearings	Replace.
	7. Distorted front wheels	Replace.
	8. Loose chassis nuts and bolts.	Tighten.
Steering pulls to one side.	1. Unequally inflated tires	Regulate.
	2. Improper front wheel alignment	Adjust.
	3. Worn front wheel hub bearings	Replace.
	4. Distorted frame or wishbone	Repair or replace.
	5. Defective shock absorber	Replace.
Shocks felt in the steering.	1. High tire pressure	Regulate.
	2. Worn steering linkage connections	Replace.
	3. Loose suspension system bolts	Tighten.

Complaint	Symptom and possible causes	Remedy
Tires rapidly or unevenly wear.	1. Worn or loose front wheel hub bearings 2. Improper front wheel alignment	Replace. Adjust.
Steering too noisy.	1. Loose nuts and bolts 2. Damaged or worn front wheel hub bearings 3. Insufficiently lubricated	Tighten. Replace. Lubricate.
Front suspension too soft.	1. Weakened spring of shock absorber 2. Leakage oil or gas of shock absorber 3. Improperly set front spring pre-road adjusters 4. Improperly set damping force adjusters	Replace. Replace. Adjust. Adjust.
Front suspension too stiff.	1. Worn upper or lower wishbone arms and related bearings 2. Bent shock absorber rod 3. Improperly set front spring pre-road adjusters 4. Improperly set damping force adjusters	Tighten. Replace. Adjust. Adjust.
Front wheels wobble.	1. Distorted front wheel rims 2. Damage or worn front wheel hub bearings 3. Defective or incorrect front tires 4. Loose front wheel hub nuts 5. Damaged or worn wishbone arms and related bearings 6. Front shock absorber leaks oil 7. Loose chassis nuts and bolts	Replace. Replace. Replace. Tighten. Replace. Replace. Tighten.
Suspension too noisy.	1. Loose suspension system bolts 2. Worn wishbone arms and related bearings 3. Worn swingarm and suspension bearings	Tighten. Replace. Replace.
Rear suspension too soft.	1. Weakened spring of shock absorber 2. Leakage oil or gas of shock absorber 3. Improperly set rear spring pre-load adjuster 4. Improperly set damping force adjuster	Replace. Replace. Adjust. Adjust.
Rear suspension too stiff.	1. Bend shock absorber rod 2. Bent swingarm pivot shaft 3. Worn swingarm and rear suspension bearings 4. Improperly set rear spring pre-load adjuster 5. Improperly set damping force adjuster 6. Improper chain adjustment	Replace. Replace. Replace. Adjust. Adjust. Adjust.
Rear wheels wobble.	1. Distorted rear wheel rims 2. Damage or worn rear axel housing bearings 3. Defective or incorrect rear tires 4. Loose rear wheel hub nuts 5. Distorted rear axle 6. Loosen rear axle housing mounting bolts 7. Improper rear brake adjustment 8. Damaged or worn rear swingarm and related bearings 9. Rear shock absorber leaks oil 10. Loose rear swingarm nut	Replace. Replace. Replace. Tighten. Replace. Tighten. Adjust. Replace. Replace. Tighten.

BRAKES

Complaint	Symptom and possible causes	Remedy
Insufficient brake power	1. Leakage of brake fluid from hydraulic system	Repair or replace.
	2. Worn pads	Replace.
	3. Oil adhesion of engaging surface of pads/shoe	Clean disc and pads.
	4. Worn disc	Replace.
	5. Air in hydraulic system	Bleed air.
	6. Not enough brake fluid in the reservoir	Replenish.
	7. Improper parking brake adjustment	Adjust.
Brake squeaking	1. Carbon adhesion on pad surface	Repair surface with sandpaper.
	2. Tilted pad	Correct pad fitting or replace.
	3. Loosen front wheel axle or rear wheel axle	Tighten to specified torque.
	4. Worn pads	Replace.
	5. Foreign material in brake fluid	Replace brake fluid.
	6. Clogged return port of master cylinder	Disassemble and clean master cylinder.
Excessive brake lever stroke	1. Air in hydraulic system	Bleed air.
	2. Insufficient brake fluid	Replenish fluid to specified level; bleed air.
	3. Improper quality of brake fluid	Replace with correct fluid.
Leakage of brake fluid	1. Insufficient tightening of connection joints	Tighten to specified torque.
	2. Cracked hose	Replace.
	3. Worn piston and/or cup	Replace piston and/or cup.
Brake drags	1. Rusty part	Clean and lubricate.
	2. Insufficient brake lever or brake pedal pivot lubrication	Lubricate.
	3. Improper parking brake adjustment	Adjust.

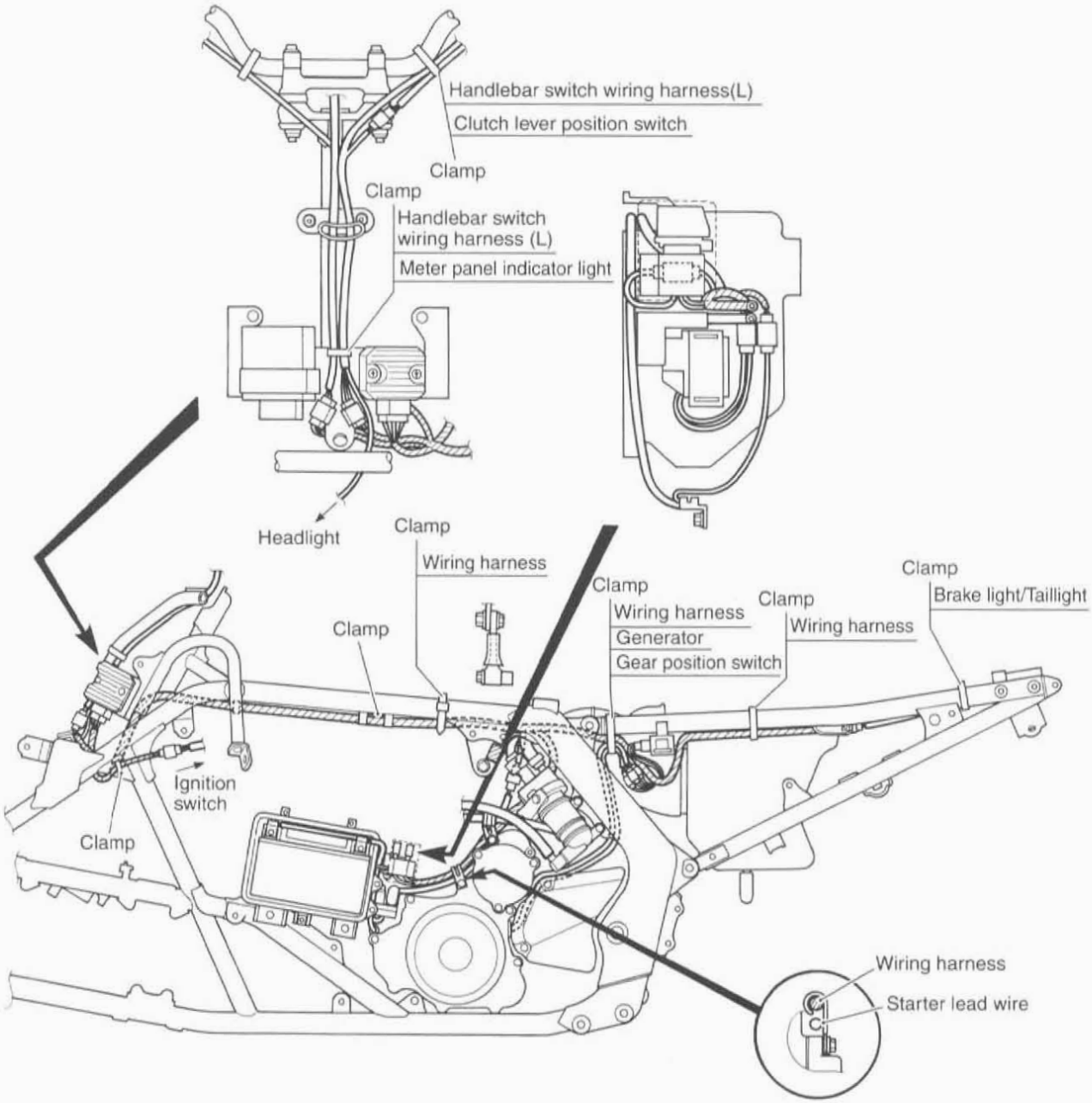
ELECTRICAL

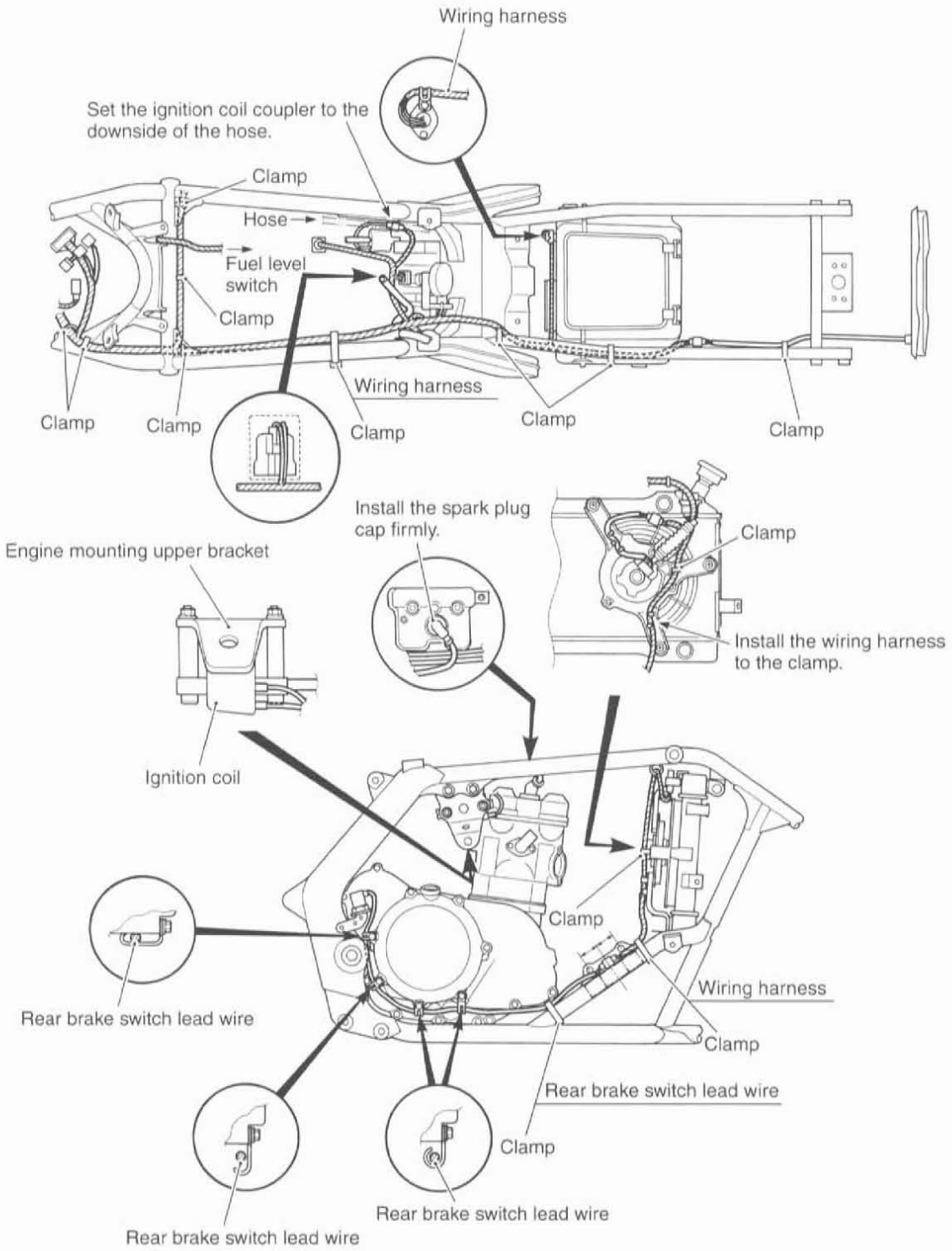
Complaint	Symptom and possible causes	Remedy
No sparking or poor sparking	1. Defective ignition coils	Replace.
	2. Defective spark plugs	Replace.
	3. Defective CKP sensor	Replace.
	4. Defective ECM	Replace.
	5. Defective TO sensor	Replace.
	6. Open-circuited wiring connections	Check and repair.
Spark plug soon become fouled with carbon.	1. Mixture too rich	Inspect FI system.
	2. Idling speed set too high	Adjust idle air screw.
	3. Incorrect gasoline	Change.
	4. Dirty air cleaner element	Replace.
	5. Too cold spark plugs	Replace with hot type plug.
Spark plug become fouled too soon.	1. Worn piston rings	Replace.
	2. Worn piston or cylinder	Replace.
	3. Excessive clearance of valve stems in valve guides	Replace.
	4. Worn stem oil seal	Replace.
Spark plug electrodes overheat or burn	1. Too hot spark plugs	Replace with cold type plugs.
	2. Overheated the engine	Tune up.
	3. Loose spark plugs	Retighten.
	4. Too lean mixture	Inspect FI system.
Generator does not charge.	1. Open- or short-circuited lead wires, or loose lead connections	Repair or replace or retighten.
	2. Short-circuited, grounded or open generator coil	Replace.
	3. Short-circuited or punctured regulator/rectifier	Replace.
Generator does charge, but charging rate is below the specification.	1. Lead wires tend to get shorted or open-circuited or loosely connected at terminals.	Repair or retighten.
	2. Grounded or open-circuited generator coil	Replace.
	3. Defective regulator/rectifier	Replace.
	4. Defective cell plates in the battery	Replace the battery.
Generator overcharges	1. Internal short-circuit in the battery	Replace the battery.
	2. Damaged or defective regulator/rectifier	Replace.
	3. Poorly grounded regulator/rectifier	Clean and tighten ground connection.
Unstable charging	1. Lead wire insulation frayed due to vibration, resulting in intermittent short-circuiting.	Repair or replace.
	2. Internally shorted generator	Replace.
	3. Defective regulator/rectifier	Replace.
Starter button is not effective.	1. Run down battery	Repair or replace.
	2. Defective switch contacts	Replace.
	3. Brushes not seating properly on starter motor commutator	Repair or replace.
	4. Defective starter relay	Replace.
	5. Defective main fuse	Replace.

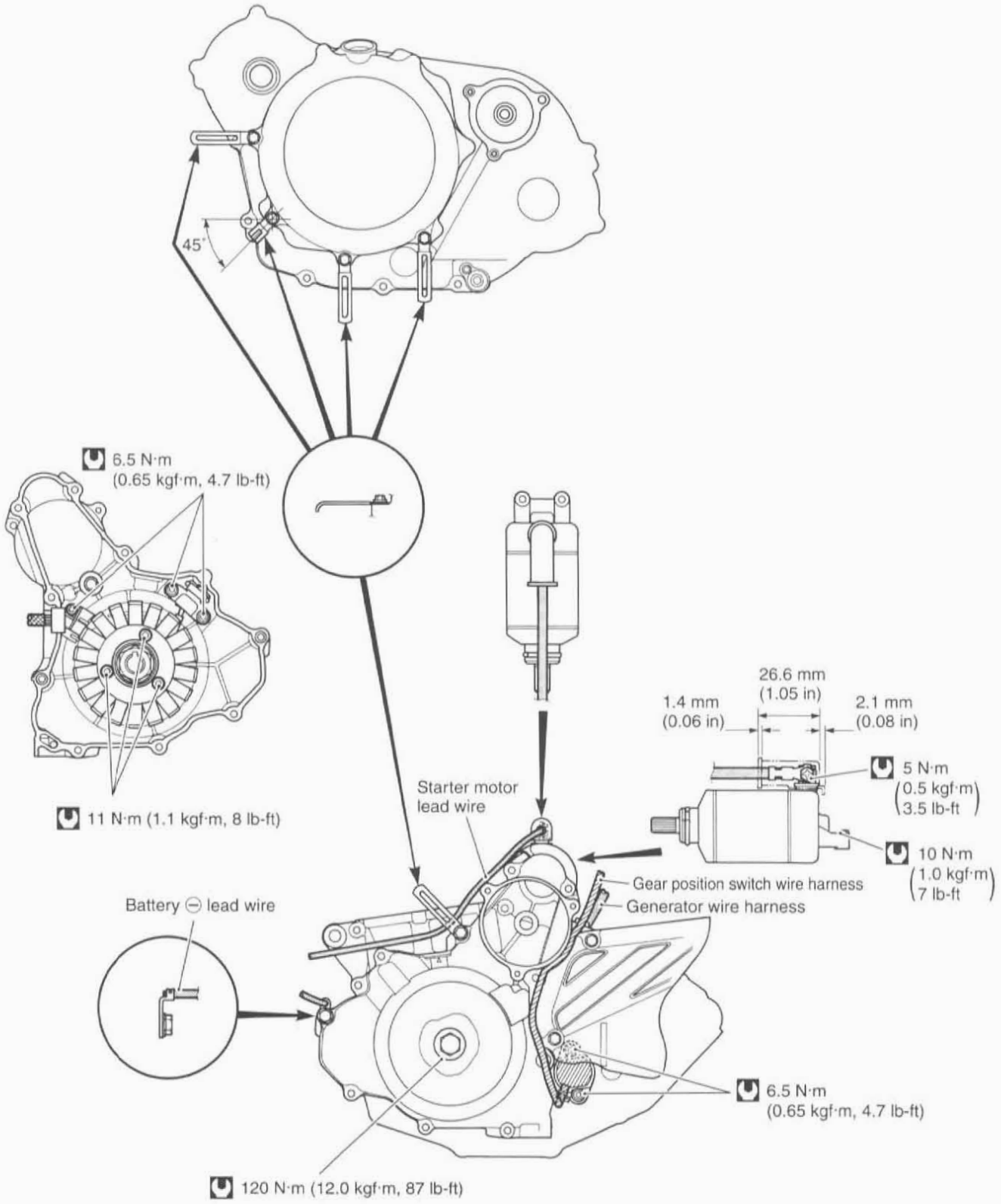
BATTERY

Complaint	Symptom and possible causes	Remedy
"Sulfation", acidic white powdery substance or spots on surface of cell plates	1. Cracked battery case 2. Battery has been left in a run-down condition for a long time.	Replace the battery. Replace the battery.
Battery runs down quickly.	1. Trouble in the charging system	Check the generator, regulator/rectifier and circuit connections and make necessary adjustments to obtain specified charging operation.
	2. Cell plates have lost much of their active material as a result of overcharging.	Replace the battery and correct the charging system.
	3. Internal short-circuit in the battery	Replace the battery.
	4. Too low battery voltage	Recharge the battery fully.
	5. Too old battery	Replace the battery.
Battery "sulfation"	1. Incorrect charging rate (When not in use batteries should be checked at least once a month to avoid sulfation.)	Replace the battery.
	2. The battery was left unused in a cold climate for too long.	Replace the battery if badly sulfated.
Battery discharged too polarity	1. Dirty container top and sides. 2. Old battery.	Clean. Replace the battery.

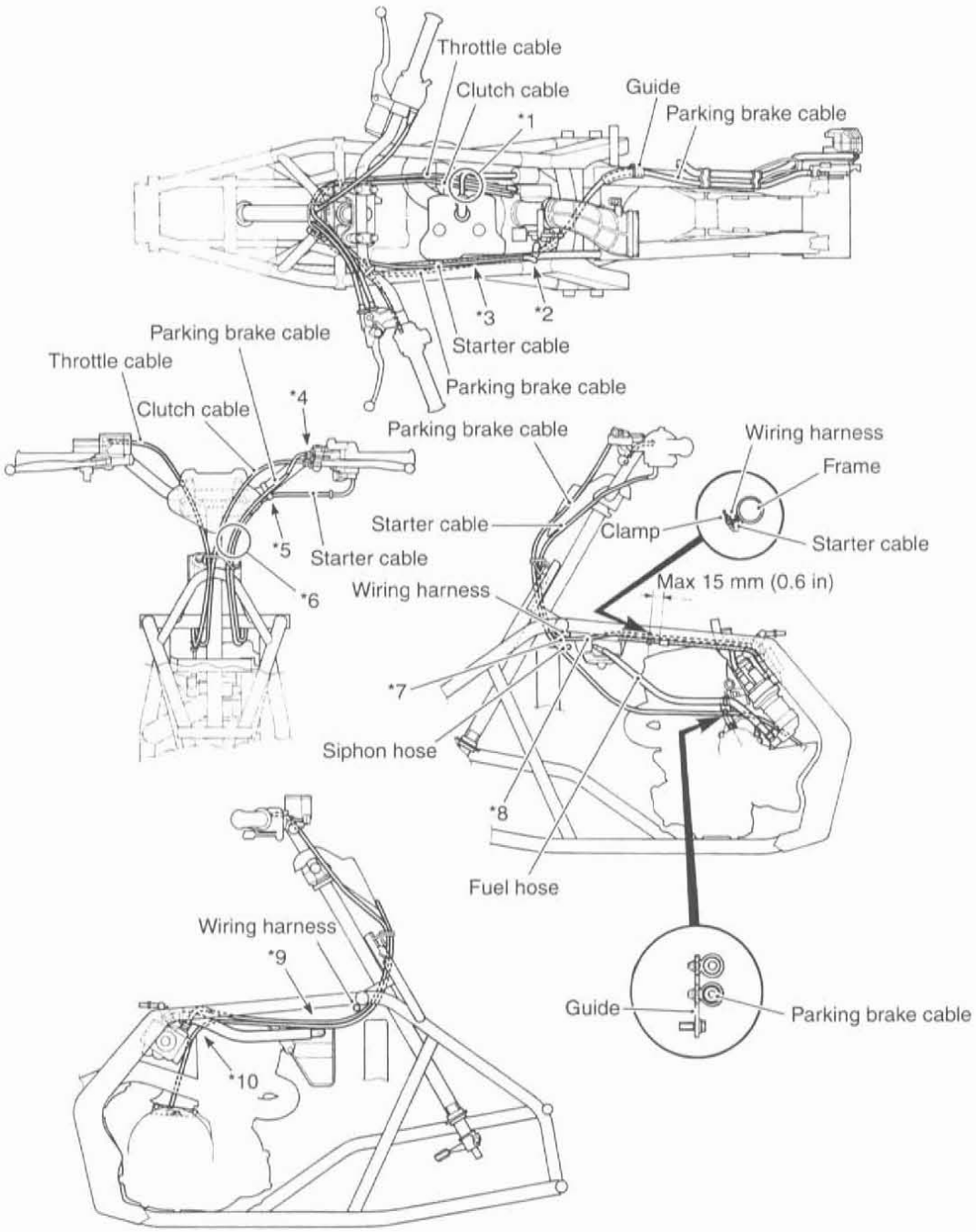
WIRING HARNESS, CABLE AND HOSE ROUTING
WIRING HARNESS ROUTING




Wiring harness
Set the ignition coil coupler to the downside of the hose.
Clamp
Hose
Fuel level switch
Clamp
Clamp
Clamp
Clamp
Wiring harness
Clamp
Clamp
Clamp
Install the spark plug cap firmly.
Engine mounting upper bracket
Clamp
Install the wiring harness to the clamp.
Ignition coil
Clamp
Wiring harness
Rear brake switch lead wire
Clamp
Rear brake switch lead wire
Clamp
Rear brake switch lead wire
Rear brake switch lead wire

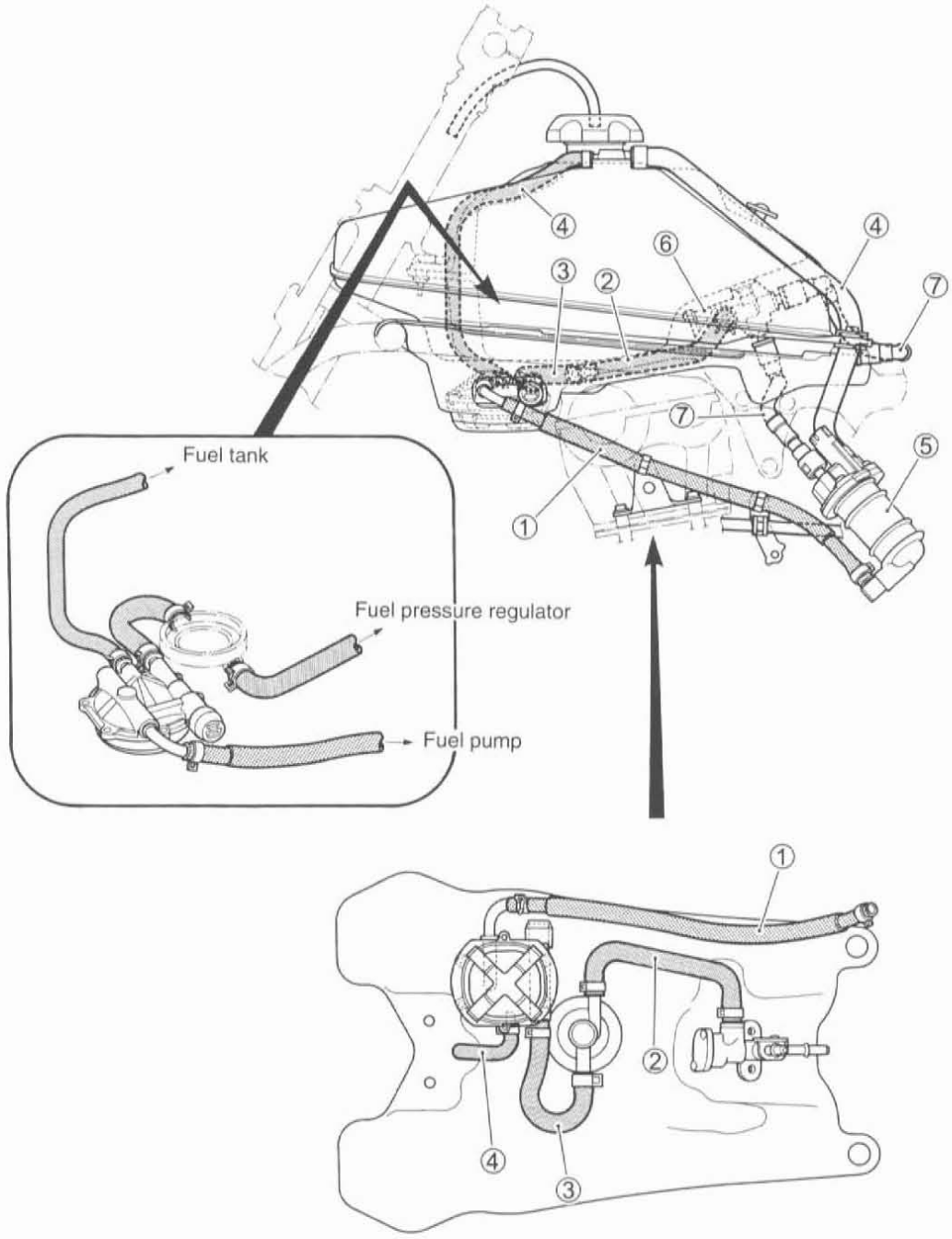

45°
6.5 N·m
(0.65 kgf·m, 4.7 lb-ft)
11 N·m (1.1 kgf·m, 8 lb-ft)
26.6 mm
(1.05 in)
1.4 mm
(0.06 in)
2.1 mm
(0.08 in)
5 N·m
(0.5 kgf·m
3.5 lb-ft)
10 N·m
(1.0 kgf·m
7 lb-ft)
Starter motor
lead wire
Gear position switch wire harness
Generator wire harness
Battery ⊖ lead wire
6.5 N·m
(0.65 kgf·m, 4.7 lb-ft)
120 N·m (12.0 kgf·m, 87 lb-ft)

CABLE ROUTING



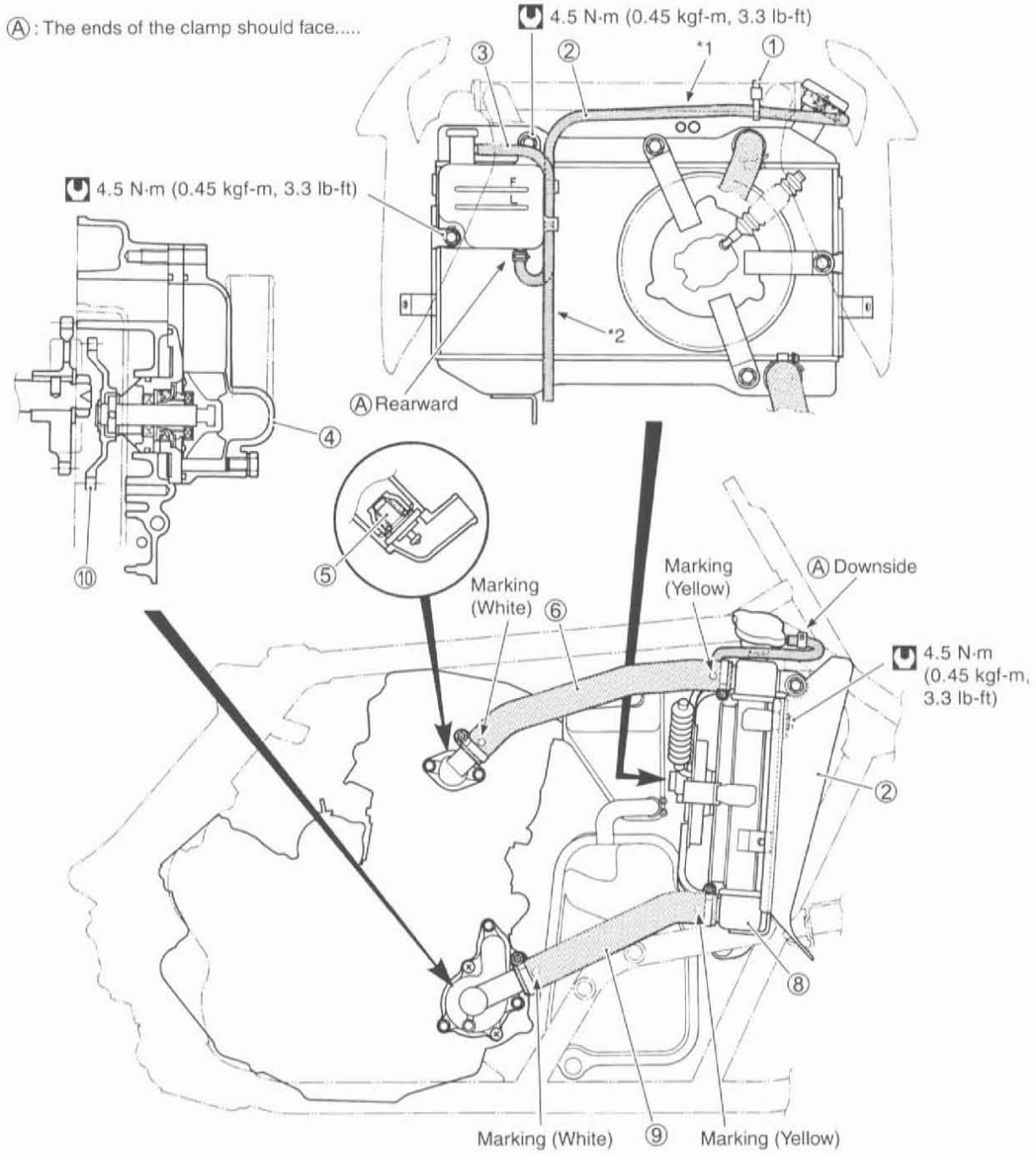
*1	Pass the throttle and clutch cables through downside of the high-tension cord.	*6	Pass the starter cable through rearward of the parking brake cable.
*2	Pass the starter cable between the frame and wiring harness.	*7	Pass the starter cable through upside of the siphon hose.
*3	Pass the starter cable through upside of the wiring harness.	*8	Pass the starter cable through upside of the fuel hose.
*4	Pass the clutch cable through downside of the lever.	*9	Pass the throttle and clutch cables through upside of the breather hose.
*5	Clamp the starter cable and left handle switch wiring harness.	*10	Pass the clutch cable through forward of the throttle body and inside of the ignition coil.

FUEL SYSTEM HOSE ROUTING



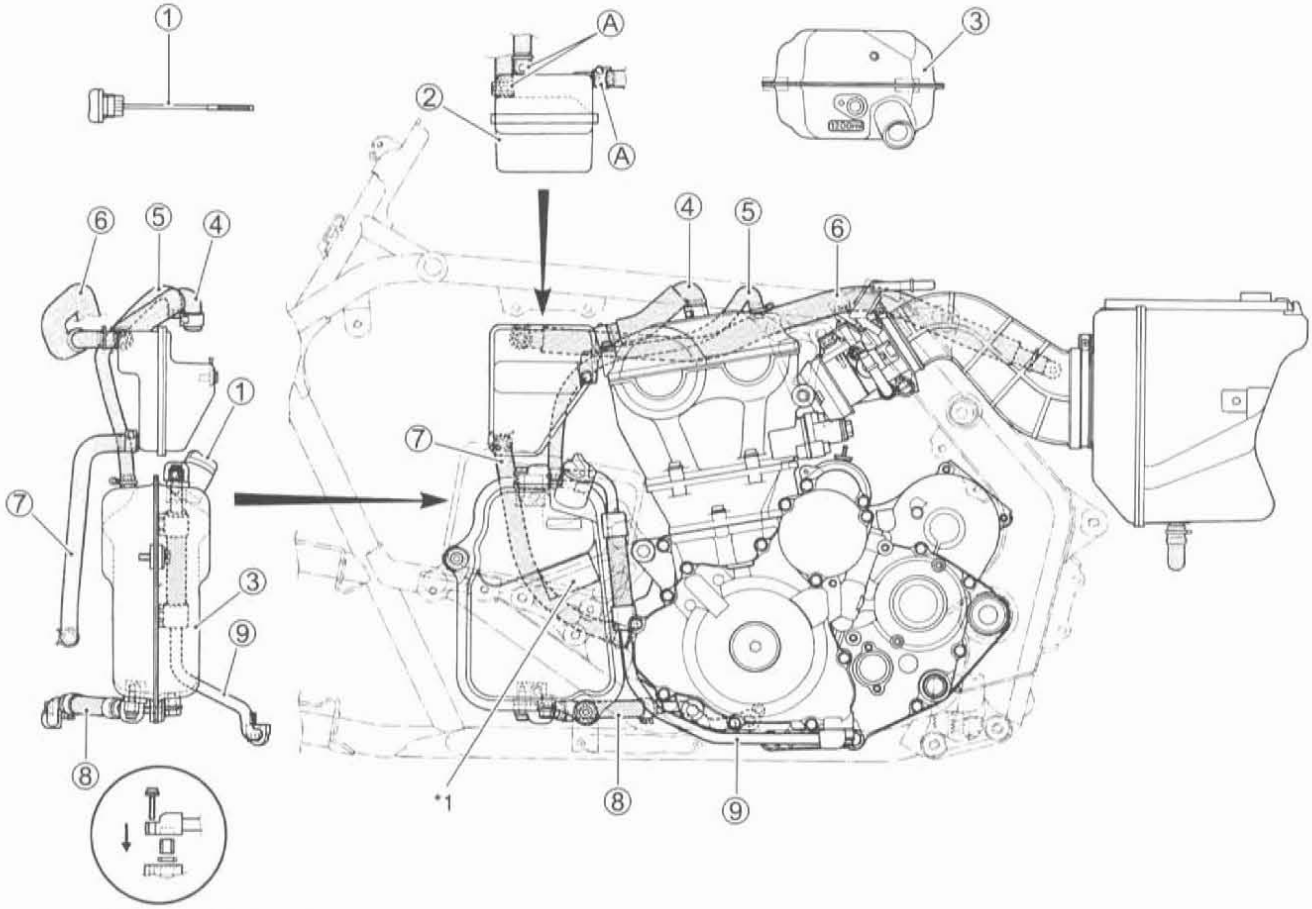
①	Fuel hose	⑤	Fuel pump
②	Fuel return hose	⑥	Fuel pressure regulator
③	Fuel hose	⑦	Fuel feed hose
④	Fuel vapor return hose		

COOLING SYSTEM HOSE ROUTING



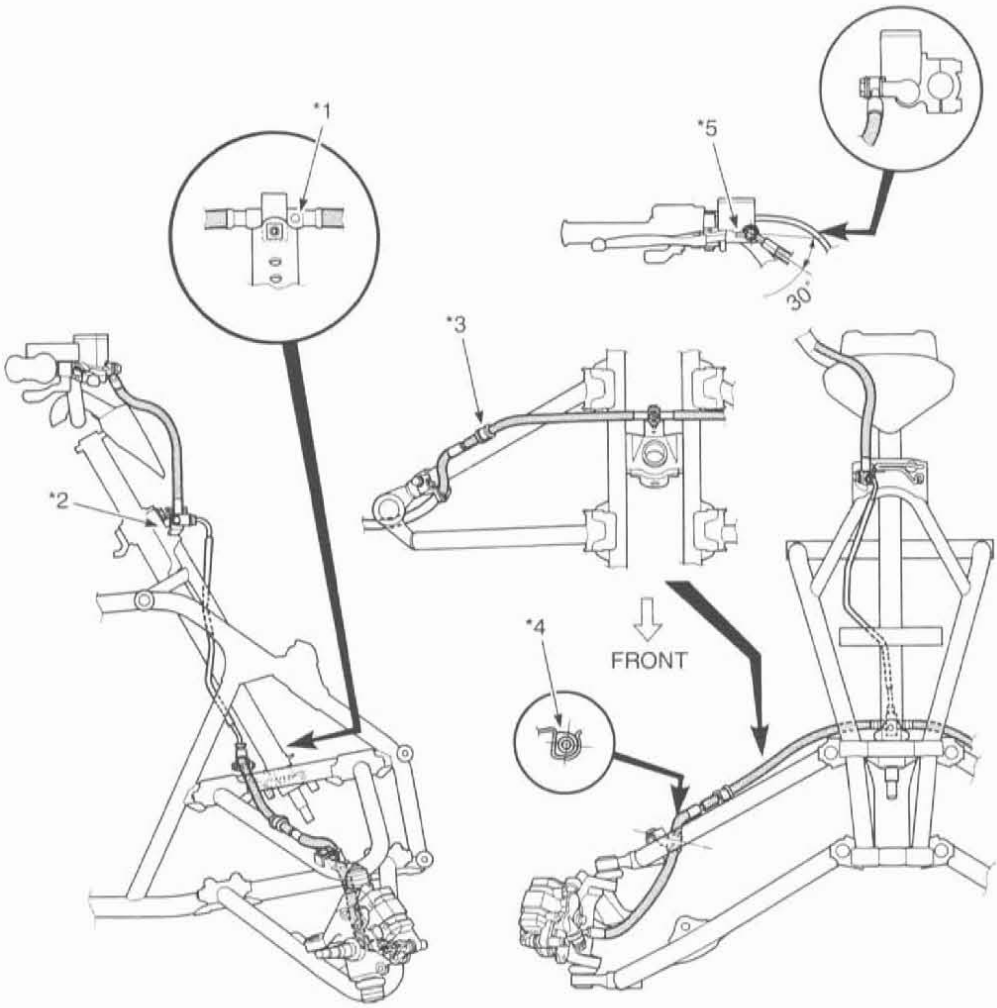
*1	Pass the siphon hose through the upside of the cables.	⑤	Thermostat
*2	Run this hose straightly down.	⑥	Inlet radiator hose
①	Clamp	⑦	Radiator cover
②	Siphon hose	⑧	Radiator
③	Reservoir tank over-flow hose	⑨	Outlet radiator hose
④	Water pump	⑩	Water pump driven gear

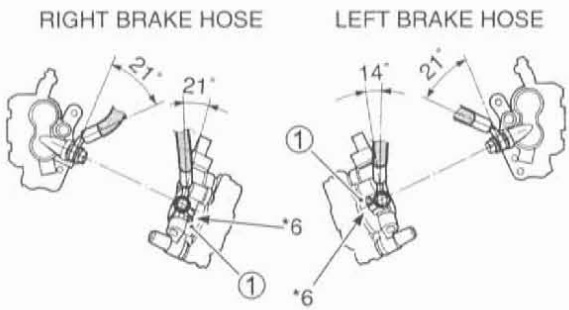
OIL HOSE ROUTING



*1	Install the oil tank cushion to the both sides of the oil tank.	⑥	Breather hose
①	Oil level gauge	⑦	Breather hose
②	Oil return tank	⑧	Oil hose (R)
③	Oil tank	⑨	Oil hose (L)
④	Breather hose	Ⓐ	Matching mark
⑤	Oil tank over-flow hose		

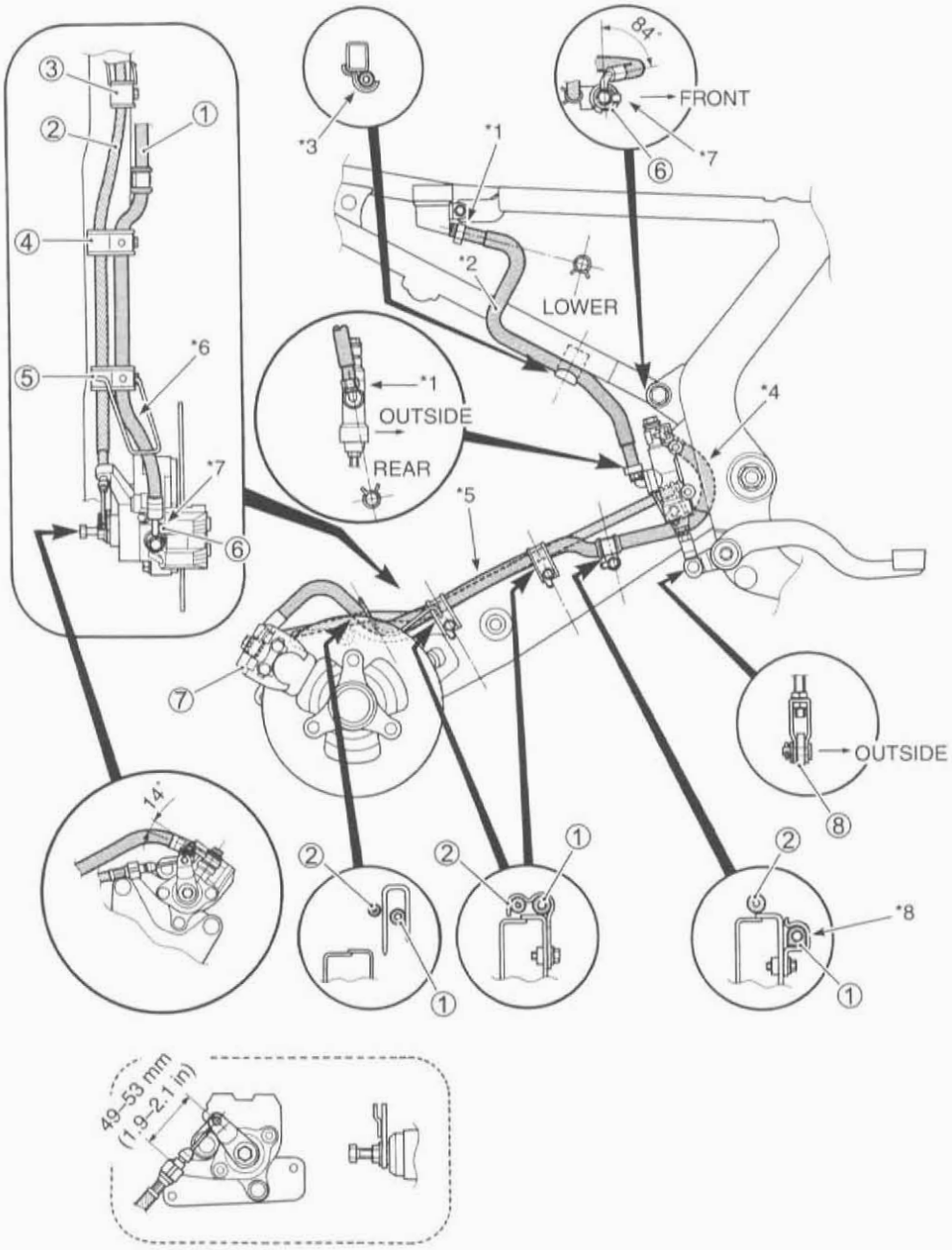
FRONT BRAKE HOSE ROUTING





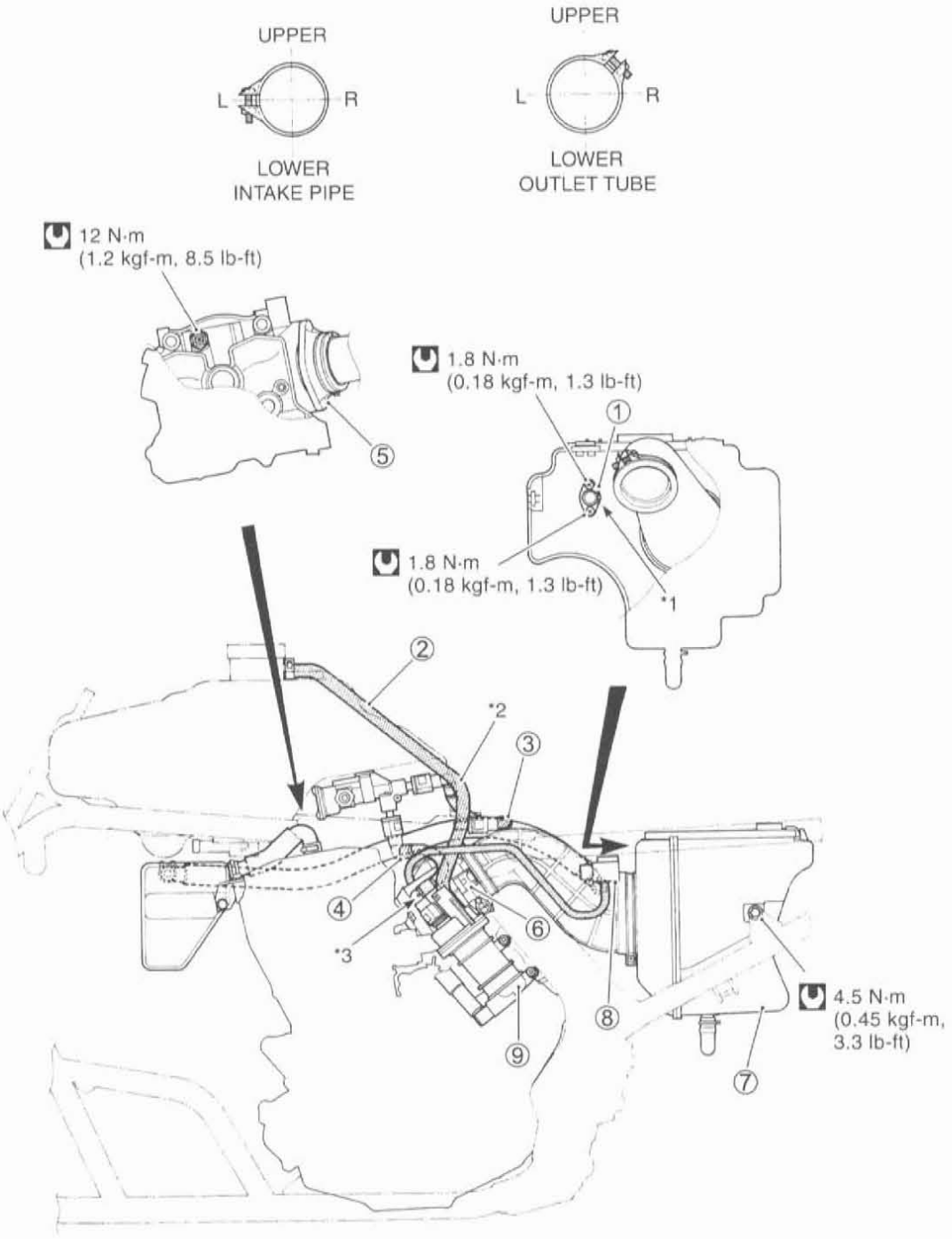
*1	The brack paint is forward.	*5	After the brake hose union has contacted the under surface of master cylinder, tighten the union bolt.
*2	After the under surface of brake pipe joint has contacted the end face of hose braket of frame, tighten the pipe joint mounting bolt.	*6	After the brake hose union has contacted the stopper, tighten the union bolt.
*3	Clamp the brake hose firmly.	①	Stopper
*4	Fit the brake hose with brake hose sleeve shape correctly fitted inside clamp.		

REAR BRAKE HOSE ROUTING



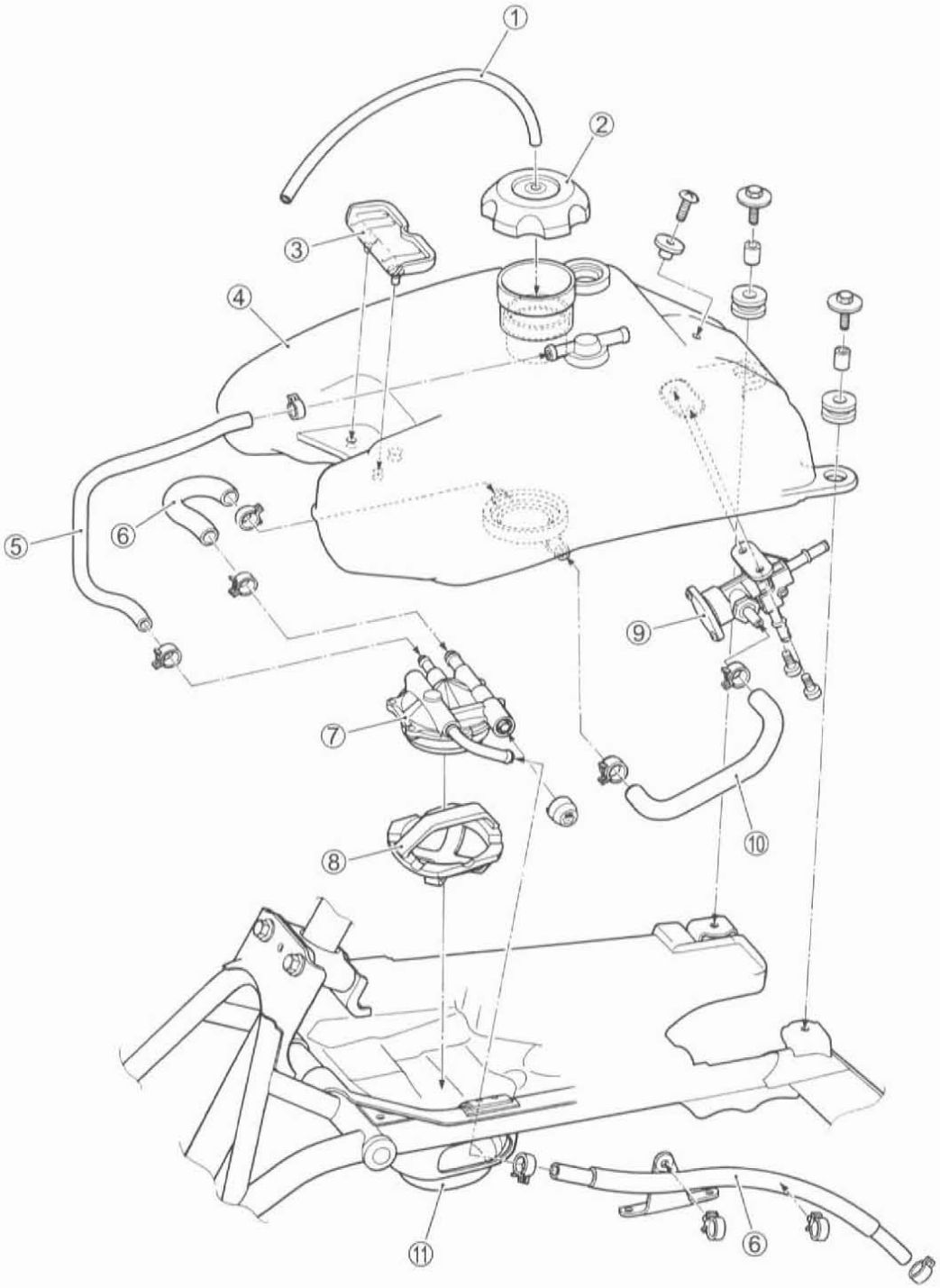
*1	Face the white mark on the reservoir hose to the outside.	①	Brake hose
*2	Fit the reservoir hose to the union all the way to the end.	②	Parking brake cable
*3	Clamp the reservoir hose firmly.	③	Guide
*4	Pass the brake hose between the face of the swingarm and frame.	④	Guide
*5	Install the brake hose along swingarm upper face without slack and fit guides in order of ④ and ⑤.	⑤	Guide
*6	Run brake hose through guide.	⑥	Stopper
*7	After the brake hose union has cantacted the stopper, tighten the union bolt.	⑦	Rear caliper
*8	Fit the brake hose with brake hose sleeve shape correctly fitted inside clamp.	⑧	Brake pedal

THROTTLE BODY INSTALLATION



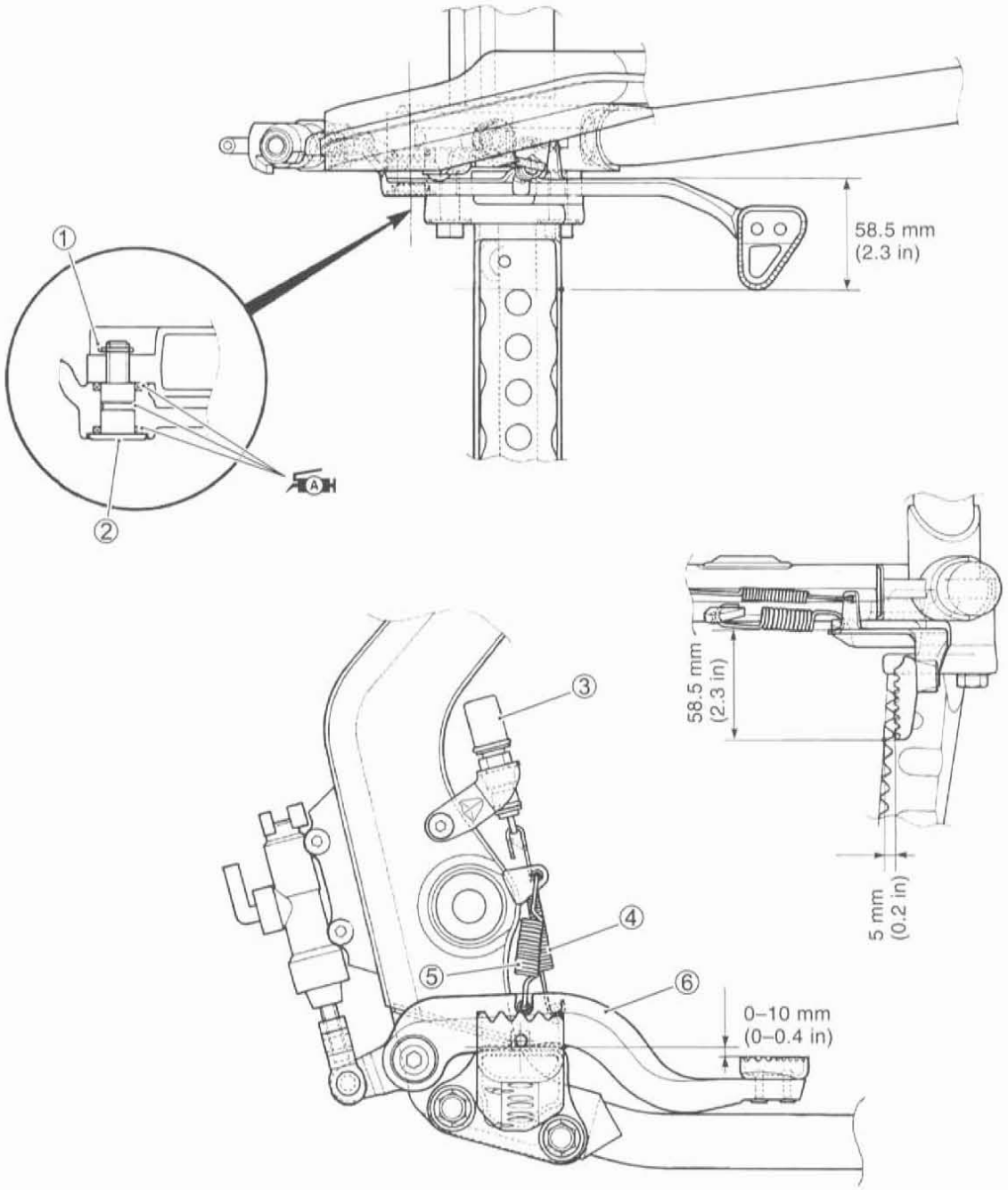
*1	Face the clamp ends left side.	④	Fuel feed hose No.2
*2	Pass the fuel vapor return hose through left side of the wiring harness.	⑤	Intake pipe
*3	Install the fuel feed hose No.2 with the white paint side to the fuel pump.	⑥	Throttle body
①	IAT sensor	⑦	Air cleaner
②	Fuel vapor return hose	⑧	IAP sensor
③	Fuel feed hose No.1	⑨	Fuel pump

FUEL TANK INSTALLATION



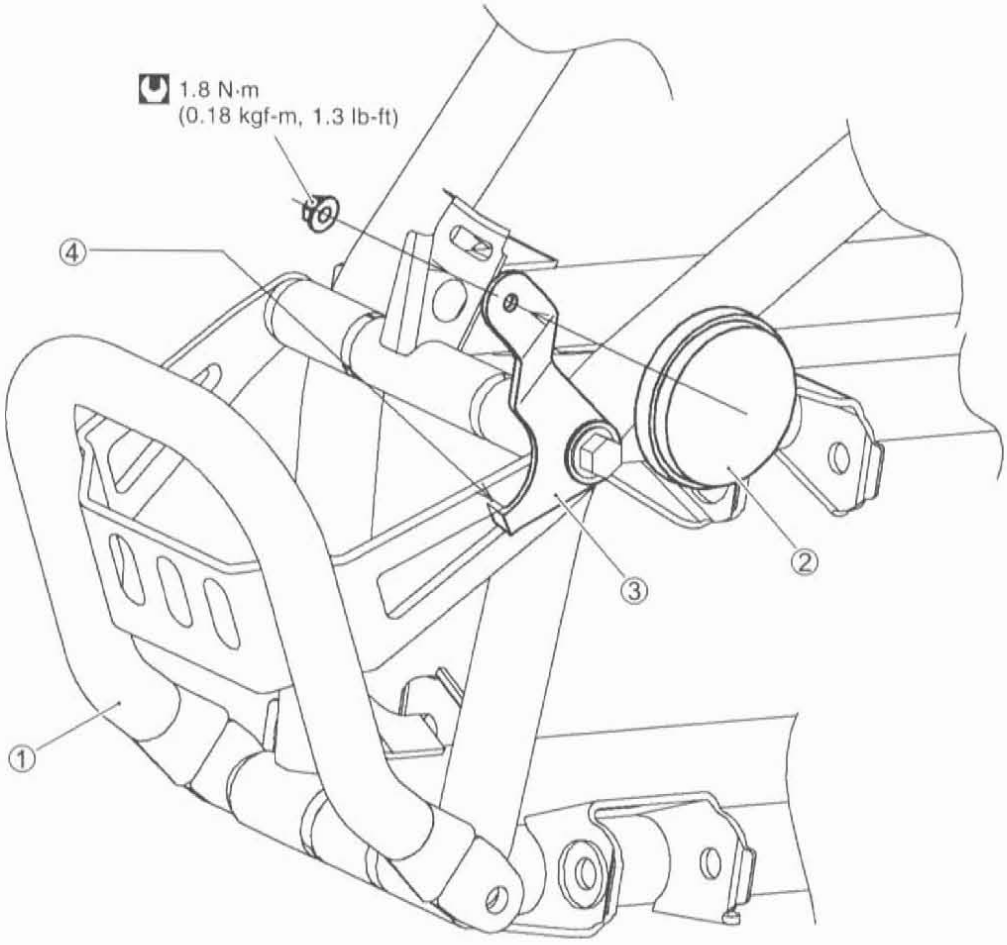
①	Fuel tank breather hose	⑦	Fuel valve
②	Fuel tank cap	⑧	Fuel valve cushion
③	Fuel tank cushion	⑨	Fuel pressure regulator
④	Fuel tank	⑩	Fuel return hose
⑤	Fuel vapor return hose	⑪	Fuel tank lower cover
⑥	Fuel hose		

BRAKE PEDAL INSTALLATION



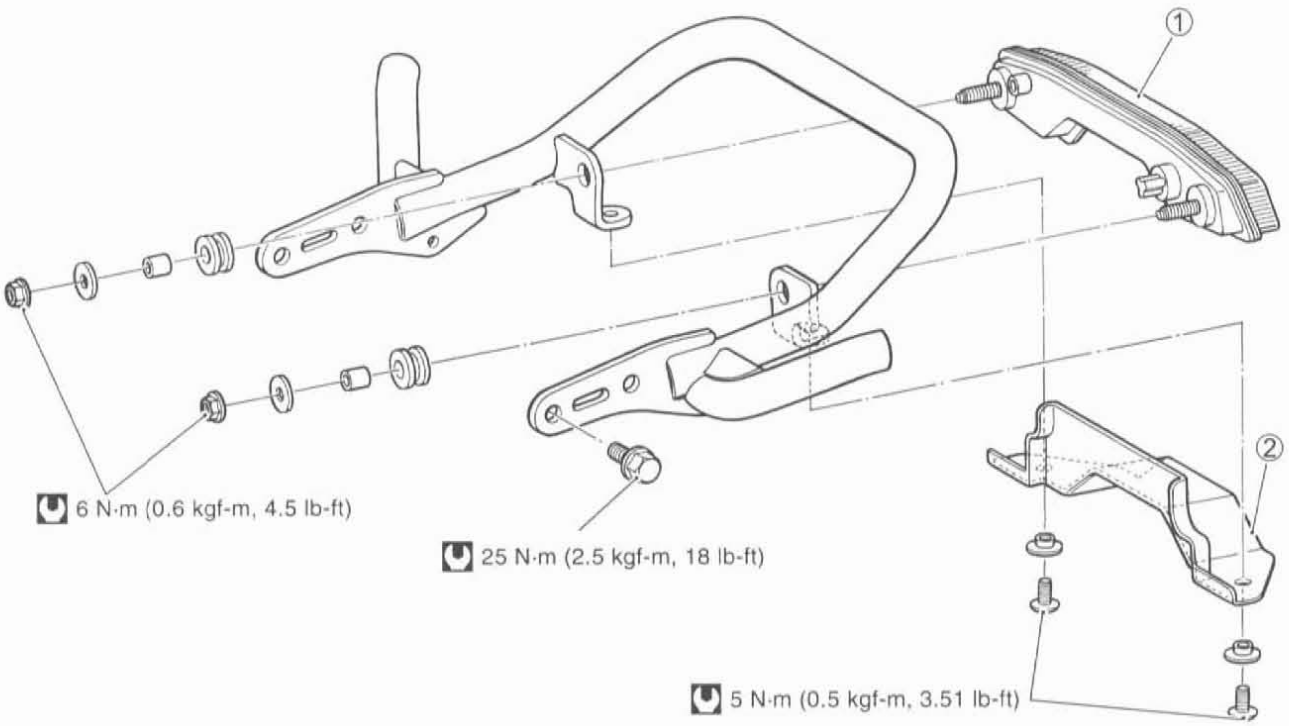
①	Cotter pin	④	Rear brake switch spring
②	Brake pedal pivot bolt	⑤	Brake pedal spring
③	Rear brake switch	⑥	Brake pedal

FRONT SIDE REFLEX REFLECTOR INSTALLATION (For E-28)



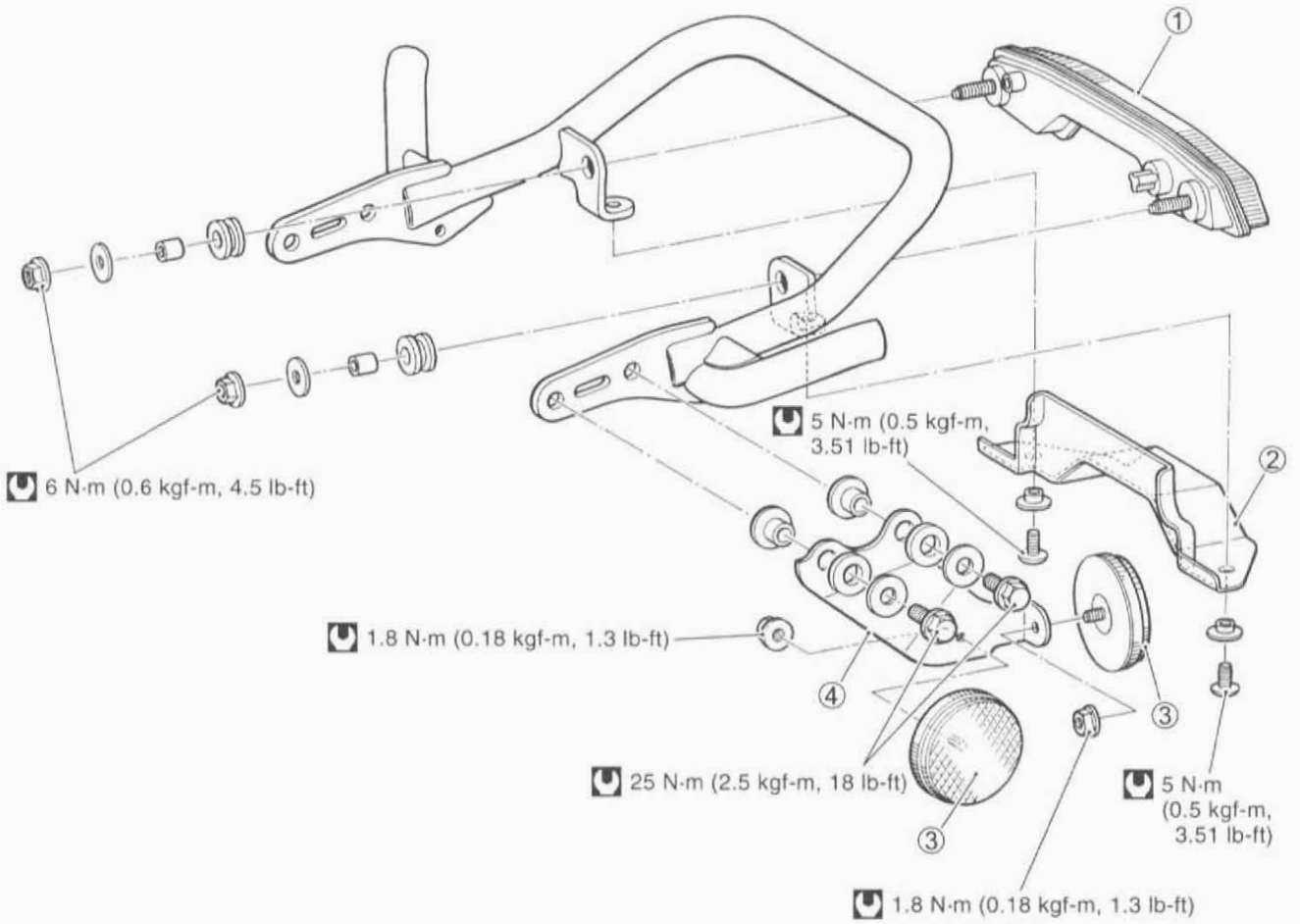
①	Front grip	③	Reflex reflector bracket
②	Reflex reflector	④	Stopper

BRAKE LIGHT/TAILLIGHT INSTALLATION (For others)



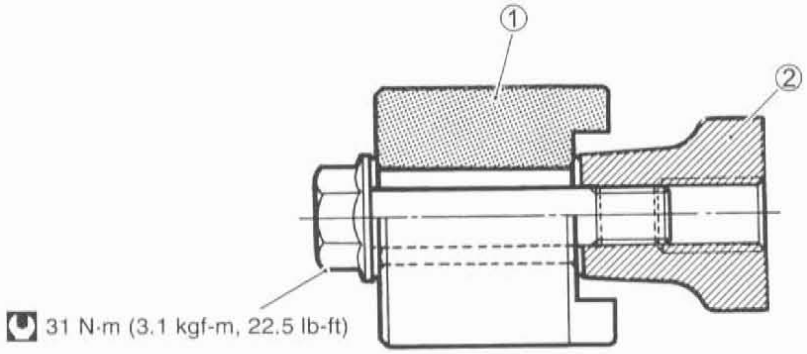
①	Brake light/Taillight	②	Brake light/Taillight cover

BRAKE LIGHT/TAILLIGHT INSTALLATION (For E-28)

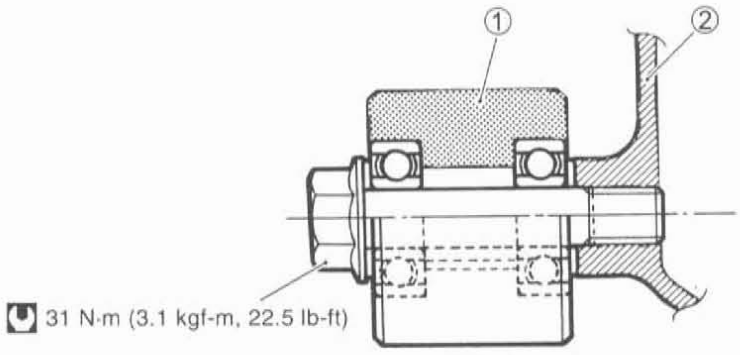


①	Brake light/Taillight	③	Reflex reflector
②	Brake light/Taillight cover	④	Reflex reflector bracket

DRIVE CHAIN ROLLER INSTALLATION



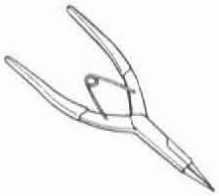
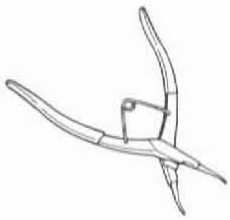
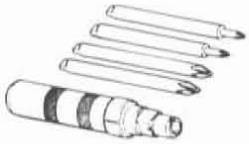
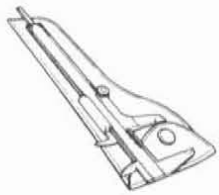
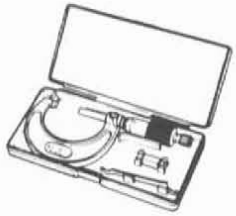
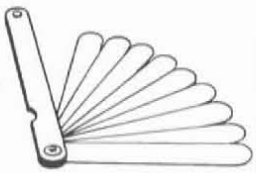
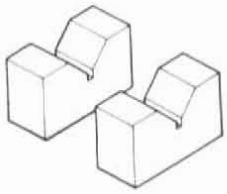
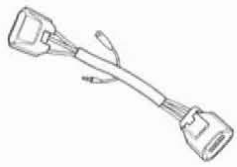
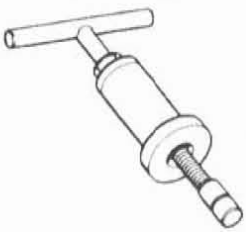
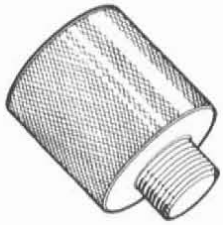
UPPER

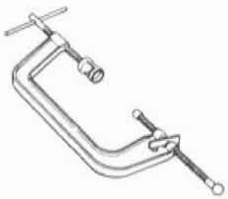
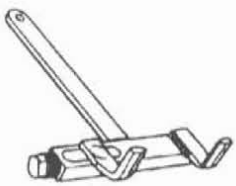
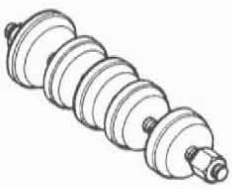


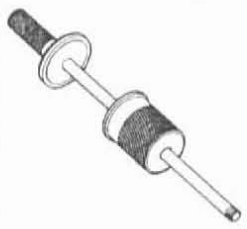
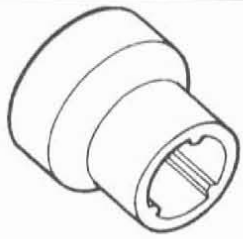
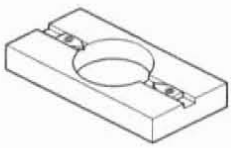
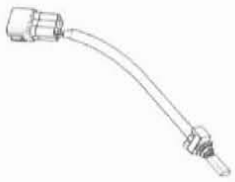
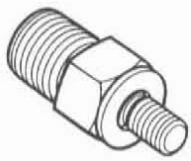
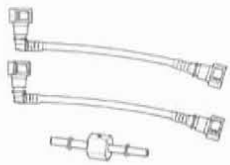
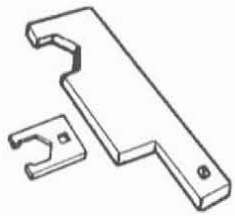
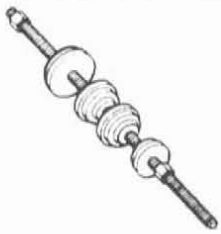
LOWER

①	Chain roller	②	Frame

SPECIAL TOOLS

 09900-06107 Snap ring pliers	 09900-06108 Snap ring pliers	 09900-09004 Impact driver set	 09900-20101 09900-20102 Vernier calipers	 09900-20202 Micrometer (25 – 50 mm)
 09900-20204 Micrometer (75 – 100 mm)	 09900-20205 Micrometer (0 – 25 mm)	 09900-20513 Cylinder gauge rod	 09900-20530 Cylinder gauge set	 09900-20602 Dial gauge (1/1000 mm)
 09900-20607 Dial gauge (1/100 mm)	 09900-20701 Magnetic stand	 09900-20803 Tickness gauge	 09900-20805 Tire depth gauge	 09900-21304 V-block set (100 mm)
 09900-22301 09900-22302 Plastigauge	 09900-22403 Small bore gauge (18 – 35 mm)	 09900-25008 Multi circuit tester set	 09900-25009 Needle pointed probe set	 09900-28630 TPS test wire harness
 09910-32812 Crankshaft installer	 09910-60611 Universal clamp wrench	 09911-11310 Attachment	 09913-10750 Adaptor	 09913-50121 Oil seal remover

 09913-70210 Bearing installer set	 09915-64512 Compression gauge set	 09915-74511 Oil pressure gauge set	 09915-74521 Oil pressure gauge hose	 09915-77331 Meter (for high pressure)
 09916-10911 Valve lapper set	 09916-14510 Valve lifter	 09916-14521 09916-14910 Attachment	 09916-34542 Reamer handle	 09916-34550 Valve guide reamer (5.5 mm)
 09916-34580 Valve guide reamer (10.8 mm)	 09916-44310 09916-44910 Valve guide remover/installer	 09916-53360 Valve guide installer attachment	 09916-84511 Tweezers	 09917-47011 Vacuum pump gauge
 09920-13120 Crankcase separating tool	 09920-53740 Clutch sleeve hub holder	 09921-20210 Bearing remover	 09921-20240 Bearing remover set	 09922-22711 Drive chain cutting and joining tool
 09923-73210 Bearing remover	 09924-84510 Bearing installer set	 09924-84521 Bearing installer set	 09930-10121 Spark plug wrench set	 09930-11950 Torx wrench

 09930-30104 Sliding hammer	 09930-30721 Rotor remover	 09930-31921 Rotor remover	 09930-44520 Rotor holder	 09930-73120 Starter torque limiter socket
 09930-73170 Starter torque limiter holder	 09930-82720 Mode selection switch	 09940-40211 Adaptor	 09940-40220 Fuel pressure gauge hose attachment	 09940-92460 Rear axle nut wrench set
 09941-34513 Bearing installer	 09904-41010 SDS Set	 99565-01010-007 CD-ROM Ver. 7		

TIGHTENING TORQUE

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)	47	4.7	18.0
(M6)	10	1.0	7.0
Cylinder bolt	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	90	9.0	65.0
Gearshift lever bolt	10	1.0	7.0
Gearshift arm stopper	32	3.2	23.0
Starter clutch bolt	10	1.0	7.0
Gearshift cam driven gear bolt	31	3.1	22.5
Cam chain tension adjuster mounting 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)	18	1.8	13.0
Engine oil drain bolt (on the oil tank)	12	1.2	8.5
Crankcase bolt	11	1.1	8.0
Gear position switch bolt	6.5	0.65	4.7
Oil hose mounting bolt	10	1.0	7.0
Starter motor mounting bolt	10	1.0	7.0
TDC plug	23	2.3	16.5
Generator cover cap	15	1.5	11.0
Engine mounting bolt	55	5.5	40.0
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
Engine sprocket bolt	10	1.0	7.0
Intake pipe mounting bolt	9	0.9	6.5

FI SYSTEM AND INTAKE AIR SYSTEM

ITEM	N·m	kgf-m	lb-ft
CKP sensor mounting bolt	6.5	0.65	4.7
IAT sensor mounting screw	1.8	0.18	1.3
Fuel delivery pipe mounting screw	3.5	0.35	2.5
Fuel pump mounting bolt	9	0.9	6.5
TP sensor mounting screw	3.5	0.35	2.5

COOLING SYSTEM

ITEM	N·m	kgf-m	lb-ft
Water pump cover screw	10	1.0	7.0
Water pump cover bolt	10	1.0	7.0
Engine coolant drain plug	5.5	0.55	4.0
ECT sensor	12	1.2	8.5
Thermostat cover bolt	10	1.0	7.0

CHASSIS

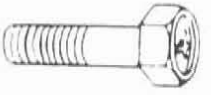
ITEM	N·m	kgf-m	lb-ft
Handlebar clamp bolt	26	2.6	19.0
Handlebar holder nut	60	6.0	43.5
Steering shaft holder bolt	23	2.3	16.5
Steering shaft lower nut	120	12.0	87.0
Steering arm plate bolt	29	2.9	21.0
Steering knuckle end nut (Upper & Lower)	23	2.3	16.5
Tie rod end nut	23	2.3	16.5
Tie rod lock-nut	29	2.9	21.0
Front shock absorber mounting nut (Upper & Lower)	60	6.0	43.5
Wishbone arm pivot nut	65	6.5	47.0
Wheel hub nut (Front)	65	6.5	47.0
(Rear)	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	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 lever pivot bolt	6	0.6	4.5
Front brake lever pivot bolt lock-nut	6	0.6	4.5
Front brake caliper holder pin	18	1.8	13.0
Front brake caliper holder nut	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 pivot bolt	29	2.9	21.0
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
Parking brake housing bolt	28	2.8	20.5
Parking brake adjuster lock-nut	18	1.8	13.0
Footrest mounting bolt	55	5.5	40.0
Seat rail bolt (Upper & Lower)	60	6.0	43.5
Rear sprocket mounting bolt	60	6.0	43.5
Rear axle nut	240	24.0	173.5
Rear axle lock-nut	240	24.0	173.5
Rear axle housing set nut	28	2.8	20.0
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
Drive chain control mounting bolt	31	3.1	22.5
Throttle lever case bolt	5	0.5	3.5
Clutch lever hold mounting bolt	10	1.0	7.5

TIGHTENING TORQUE CHART

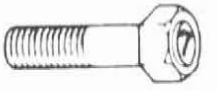
For other nuts and bolts not listed in the preceding page, refer to this chart:

Bolt Diameter Ⓐ (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

Conventional bolt



"4" marked bolt



"7" marked bolt

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	36 (1.42)	—
	EX.	29 (1.14)	—
Tappet clearance (when cold)	IN.	0.10 – 0.20 (0.0039 – 0.0078)	—
	EX.	0.20 – 0.30 (0.0078 – 0.0118)	—
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.	—	0.25 (0.010)
Valve guide I.D.	IN. & EX.	5.500 – 5.512 (0.2165 – 0.2170)	—
Valve stem O.D.	IN.	5.475 – 5.490 (0.2156 – 0.2161)	—
	EX.	5.455 – 5.470 (0.2148 – 0.2154)	—
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.	—	34.0 (1.34)
	EX.	—	33.3 (1.31)
Valve spring tension	IN.	119 – 137 N (11.9 – 13.7 kgf, 26.2 – 30.2 lbs) at length 30.9 mm (1.22 in)	—
	EX.	78.5 N (7.85 kgf, 17.3 lbs) at length 30.9 mm (1.22 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	32.564 – 32.604 (1.2820 – 1.2836)	32.264 (1.2702)
	EX.	33.451 – 33.491 (1.3170 – 1.3185)	33.151 (1.3052)
Camshaft journal oil clearance	IN. & EX.	0.032 – 0.066 (0.0013 – 0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8666 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.959 – 21.980 (0.8645 – 0.8653)	—
Cam chain pin	15th pin		—
Cylinder head distortion	—		0.05 (0.002)

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure (Automatic de-comp. actuated)	800 kPa (8.0 kgf/cm², 114 psi)		—
Piston to cylinder clearance	0.045 – 0.055 (0.0018 – 0.0022)		0.120 (0.0047)
Cylinder bore	95.500 – 95.515 (3.7598 – 3.7604)		Nicks or Scratches
Piston diam.	95.450 – 95.465 (8.9437 – 3.7585) Measure at 10 mm (0.6 in) from the skirt end.		95.380 (3.7551)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st	Approx. 7.6 (0.30)	—
	2nd R	Approx. 12.3 (0.48)	—
Piston ring end gap	1st	0.08 – 0.20 (0.003 – 0.008)	0.50 (0.020)
	2nd	0.08 – 0.20 (0.003 – 0.008)	0.50 (0.020)
Piston ring to groove clearance	1st	—	0.180 (0.007)
	2nd	—	0.150 (0.006)
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)	—

ITEM	STANDARD		LIMIT
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	19.002 – 19.008 (0.7481 – 0.7483)		19.030 (0.7492)
Piston pin O.D.	18.994 – 19.000 (0.7478 – 0.7480)		18.980 (0.7472)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	19.010 – 19.018 (0.7484 – 0.7487)	19.040 (0.7496)
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 (0.8563 – 0.8583)	—
Crank web to web width	62.0 ± 0.1 (2.441 ± 0.004)	—
Crankshaft runout	—	0.08 (0.003)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pressure (at 60°C, 140°F)	10 kPa (0.1 kgf/cm^2, 1.4 psi) at 3 000 r/min	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch cable play	10 – 15 (0.4 – 0.6)	—
Drive plate thickness (No. 1 & No. 2)	3.07 – 3.23 (0.120 – 0.127)	2.77 (0.109)
Drive plate claw width (No. 1 & No. 2)	13.85 – 13.95 (0.545 – 0.549)	13.35 (0.528)
Driven plate distortion	—	0.10 (0.004)
Clutch spring free length	53.06 (2.09)	50.4 (1.98)

DRIVE TRAIN + DRIVE CHAIN

Unit: mm (in) Except ratio

ITEM		STANDARD		LIMIT
Primary reduction ratio		2.851 (77/27)		—
Final reduction ratio		2.571 (36/14)		—
Gear ratios	Low	2.076 (27/13)		—
	2nd	1.647 (28/17)		—
	3rd	1.333 (28/21)		—
	4th	1.095 (23/21)		—
	Top	0.913 (21/23)		—
Shift fork to groove clearance		0.1 – 0.3 (0.004 – 0.012)		0.5 (0.020)
Shift fork groove width		No.1, No.2 & No.3	4.8 – 4.9 (0.189 – 0.193)	—
Shift fork thickness		No.1, No.2 & No.3	4.6 – 4.7 (0.181 – 0.185)	—
Drive chain		Type	RK 520SMOZ10S	—
		Links	96	—
		20-pitch length	—	319.4 (12.57)
Drive chain slack		45 – 55 (1.8 – 2.2)		—
Gearshift lever height		5 – 10 (0.2 – 0.4)		—

THERMOSTAT + RADIATOR + FAN + COOLANT

ITEM	STANDARD/SPECIFICATION		NOTE
Thermostat valve opening temperature	Approx. 76.5 °C (169.7 °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. 2.6 kΩ	—
	50 °C (122 °F)	Approx. 0.772 kΩ	—
	80 °C (176 °F)	Approx. 0.279 kΩ	—
	110 °C (230 °F)	Approx. 0.118 kΩ	—
Radiator cap valve opening pressure	108 – 137 kPa (1.08 – 1.37 kgf/cm², 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	Approx. 1 400 ml (1.5 – 1.2 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	Approx. 83 ml (2.8/ 2.9 US/Imp oz) and more /10 sec.	
Fuel pressure regulator operating set pressure	Approx. 294 kPa (2.94 kgf/cm², 41.81 psi)	

FI SENSORS

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	155 – 232 Ω		
CKP sensor peak voltage	0.5 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.7 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Approx. 4.5 kΩ		
	Closed	Approx. 1.4 kΩ	
	Opened	Approx. 4.2 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	0.15 – 4.85 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	0.15 – 4.85 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 – 1.4V	
	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

THROTTLE BODY

ITEM	SPECIFICATION
Bore size	43 mm
I.D. No.	45G0
Idle r/min	1 800 ± 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: CR8EB	
		Gap	0.7 – 0.8 (0.028 – 0.031)	
Spark performance		Over 8 (0.3) at 1 atm.		
CKP sensor resistance		155 – 232 Ω		
CKP sensor peak voltage		0.5 V and more		When cranking
Ignition coil resistance		Primary	0.1 – 1.0 Ω	Terminal – Terminal
		Secondary	8 – 15 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage		150 V and more		When cranking
Generator coil resistance		0.1 – 1.5 Ω		
Generator Max. output		Approx. 240 W at 5 000 r/min		
Generator no-load voltage (When engine is cold)		50 V (AC) and more at 5 000 r/min		
Starter motor bursh length		Standard	7.0 (0.28)	
		Limit	3.5 (0.14)	
Regulated voltage		13.5 – 15.0 V at 5 000 r/min		
Starter relay resistance		3 – 6 Ω		
GP switch voltage		0.9 V and more (From 1st to Top)		
Battery	Type designation	FTX7A-BS		
	Capacity	12 V 21.6 kC (6 Ah)/10 HR		
Fuse size	Ignition	10 A		
	Fan	10 A		
	Main	20 A		

WATTAGE

Unit: W

ITEM		SPECIFICATION
Headlight	HI	40
	LO	40
Brake light/Taillight		LED
Fuel indicator light		3.4
Neutral indicator light		3.4
Engine coolant temp. FI warning indicator light		3.4

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD/SPECIFICATION		LIMIT
Rear brake pedal height			0 – 10 (0 – 0.4)	—
Brake caliper cylinder bore		Front	25.40 – 25.45 (1.0000 – 1.0020)	—
		Rear	33.96 – 34.01 (1.3370 – 1.3390)	—
Brake caliper piston diam.		Front	25.318 – 25.368 (0.9968 – 0.9987)	—
		Rear	33.878 – 33.928 (1.3338 – 1.3357)	—
Brake fluid type			DOT 4	—
Brake disc thickness		Front	2.8 – 3.2 (0.110 – 0.126)	2.5 (0.098)
		Rear	3.8 – 4.2 (0.150 – 0.165)	3.5 (0.138)
Brake disc runout (Front & Rear)			—	0.30 (0.012)
Master cylinder bore		Front	12.700 – 12.743 (0.5000 – 0.5017)	—
		Rear	12.700 – 12.743 (0.5000 – 0.5017)	—
Master cylinder piston diam.		Front	12.657 – 12.684 (0.4983 – 0.4994)	—
		Rear	12.657 – 12.684 (0.4983 – 0.4994)	—
Turning radius			3.5 m (11.5 ft)	
Toe-in (with 75 kg, 165 lbs)			0 ± 4 (0 ± 0.16)	
Camber			– 3.0°	
Caster			8.0°	
Wheel rim runout	Front		—	2.0 (0.08)
	Rear		—	2.0 (0.08)
Wheel rim size	Front		10 × 5.5 AT	—
	Rear		8 × 8.0 AT	—
Tire size	Front		AT20 × 7R10 ☆☆☆	—
	Rear		AT18 × 10R8 ☆☆☆	—
Tire type	Front		DUNLOP: KT381	—
	Rear		DUNLOP: KT385	—
Tire tread depth	Front		—	4.0 (0.16)
	Rear		—	4.0 (0.16)
Wheel axle runout	Rear		—	6.0 (0.24)

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	kPa	kgf/cm²	psi
FRONT	45	0.45	6.5
REAR	45	0.45	6.5

VEHICLE LOAD CAPACITY LIMIT: 110 kg (243 lbs)

SUSPENSION

ITEM	STANDARD/SPECIFICATION		LIMIT
Front shock absorber spring pre-set length	274.5 (10.8)		—
Front shock absorber damping force adjuster	Rebound	1-1/2 turns out from stiffest position	—
	Compression	2-1/4 turns out from stiffest position	—
Rear shock absorber spring pre-set length	299 (11.8)		—
Rear shock absorber damping force adjuster	Rebound	7 clicks out from stiffest position	—
	Compression (Low speed)	8 clicks out from stiffest position	—
	Compression (High speed)	3/4 turn out from stiffest position	
Front wheel travel	254 (10.0)		—
Rear wheel travel	277 (10.9)		—

FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 90 pump octane (R/2 + M/2). Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-28, 33
	Gasoline used should be graded 95 octane or higher. An unleaded gasoline is recommended.		Others
Fuel tank including reserve	10.0 L (2.6/2.2 US/Imp gal)		
Engine oil type	SAE 10 W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Change	1 200 ml (1.3/1.1 US/Imp qt)	Oil tank side
		400 ml (0.4/0.4 US/Imp qt)	Engine side
	Filter change	1 300 ml (1.4/1.1 US/Imp qt)	Oil tank side
		400 ml (0.4/0.4 US/Imp qt)	Engine side
	Overhaul	1 400 ml (1.5/1.2 US/Imp qt)	Oil tank side
		400 ml (0.4/0.4 US/Imp qt)	Engine side

EMISSION CONTROL INFORMATION

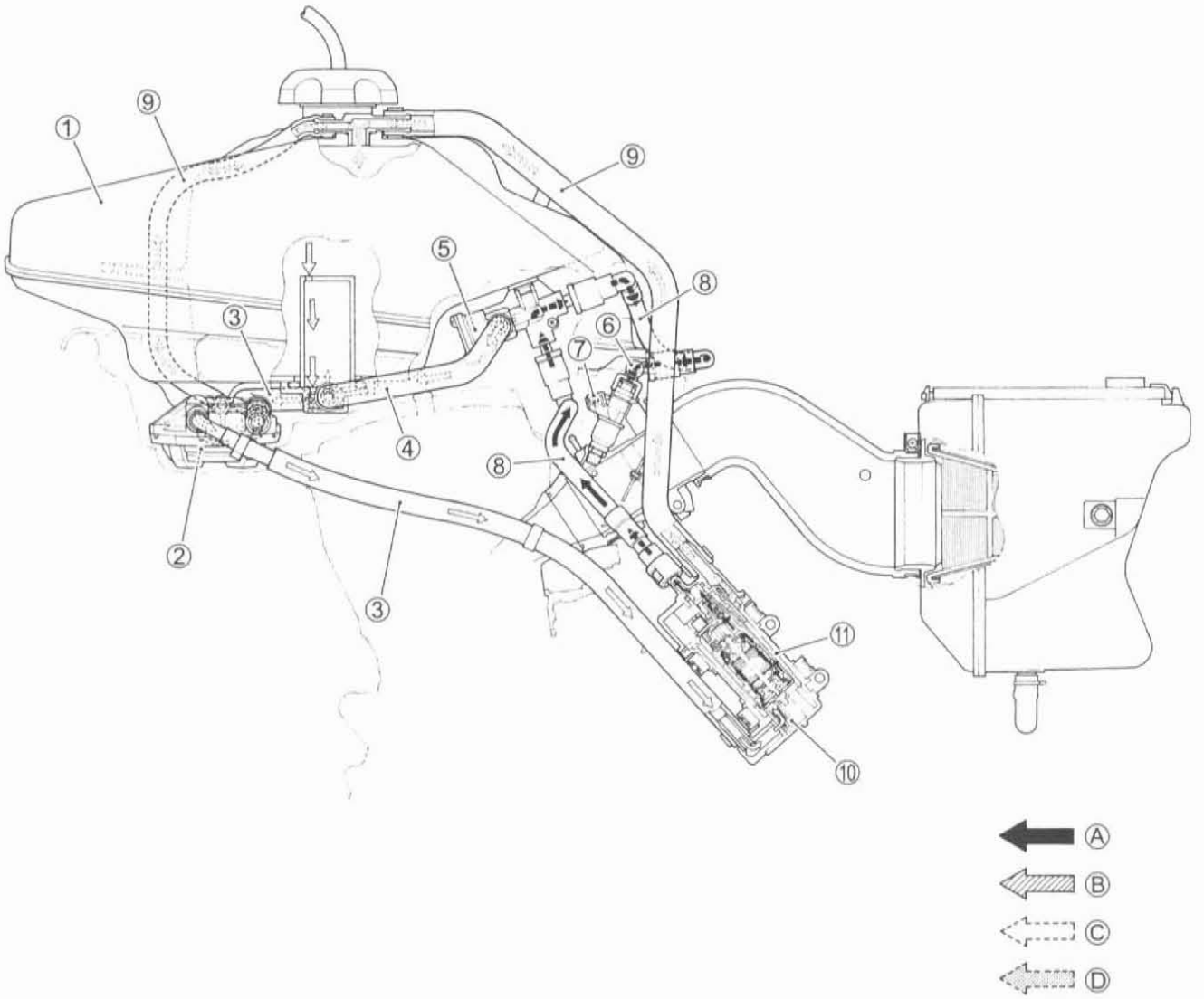
CONTENTS

EMISSION CONTROL SYSTEMS

FUEL INJECTION SYSTEM

LT-R450 vehicles are equipped with a fuel injection system for emission level control.

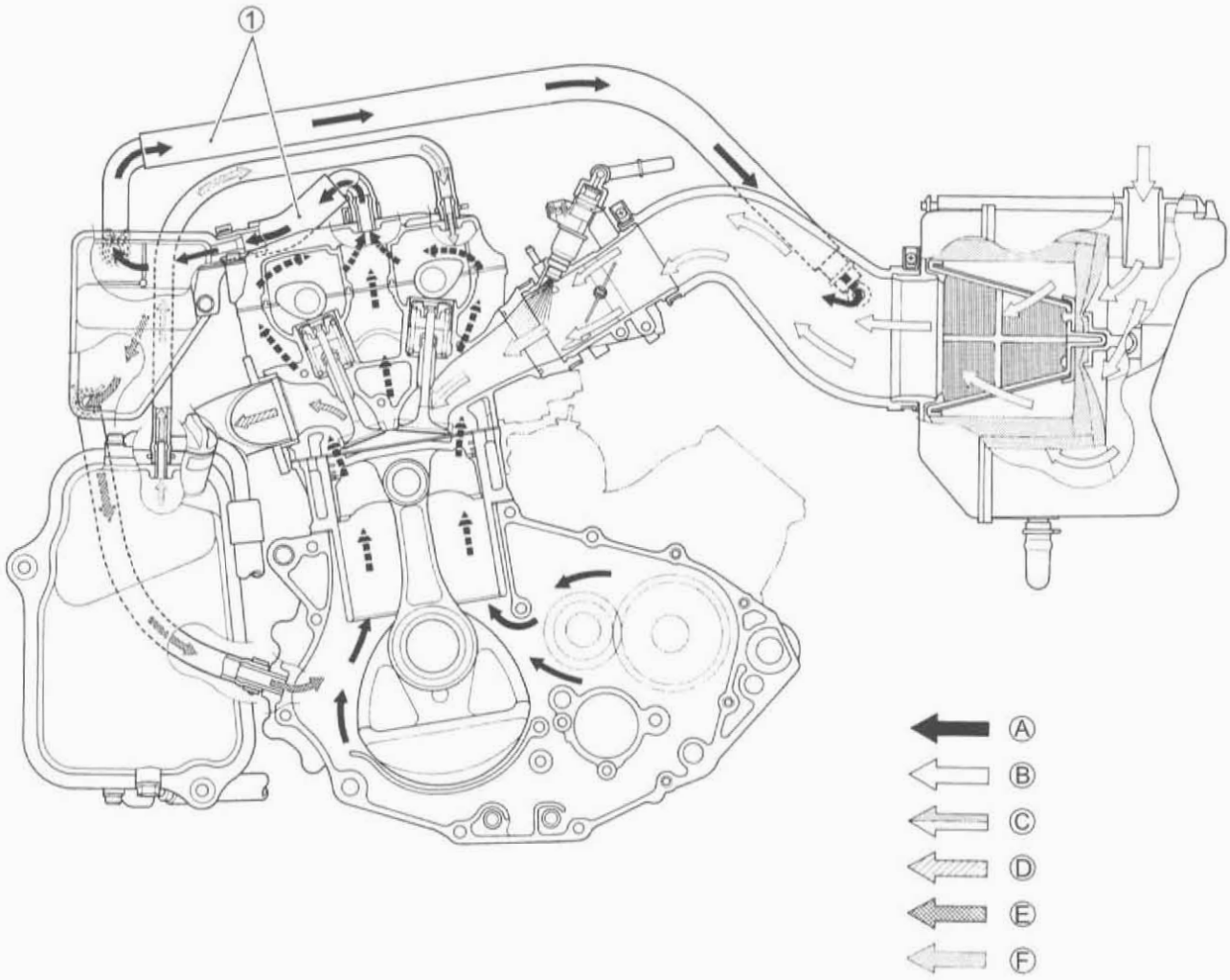
This fuel injection system is precision designed, manufactured and adjusted to comply with the applicable emission limits. With a view to reducing CO, NOX and HC, all of the fuel injection volumes are stringently controlled with the programmed injection maps in the ECM by varying engine conditions. Adjusting, interfering with, improper replacement, or resetting of any of the fuel injection components may adversely affect injection performance and cause the vehicle to exceed the exhaust emission level limits. if unable to effect repairs, contact the distributor's representative for further technical informaiton and assistance.



①	Fuel tank	⑥	Fuel delivery pipe	⑪	Fuel pump
②	Fuel filter (For fuel valve)	⑦	Fuel injector	Ⓐ	Pressurized fuel
③	Fuel hose	⑧	Fuel feed hose	Ⓑ	Before-pressurized fuel
④	Fuel return hose	⑨	Fuel vapor return hose	Ⓒ	Relieved fuel
⑤	Fuel pressure regulator	⑩	Fuel filter (For fuel pump)	Ⓓ	Fuel vapor

CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a PCV system. Blow-by gas in the engine is constantly drawn into the crankcase, which is returned to the combustion chamber through the PCV (breather) hose, air cleaner and throttle body.



①	PCV (breather) hose	Ⓒ	FUEL/AIR MIXTURE	Ⓕ	OVER-FLOW OIL
Ⓐ	BLOW-BY GAS	Ⓓ	EXHAUST GAS		
Ⓑ	FRESH AIR	Ⓔ	SEPARATED RETURN OIL		

WIRING DIAGRAM

Wiring diagram wire color, refer to section "WIRE COLOR".