FOREWORD

This manual contains an introductory description on the SUZUKI LT-A700X and procedures for its inspection/service and overhaul of its main components.
Other information considered as generally known is not included.
Read the GENERAL INFORMATION section to familiarize yourself with the motorcycle and its maintenance. Use this section as well as other sections to use as a guide for proper inspection and service.
This manual will help you know the vehicle better so that you can assure your customers of fast and reliable service.

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

⚠ WARNING

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

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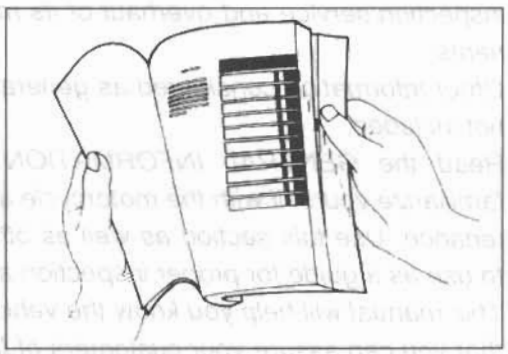
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HOW TO USE THIS MANUAL

TO LOCATE WHAT YOU ARE LOOKING FOR:

1. The text of this manual is divided into sections.
2. The section titles are listed in the GROUP INDEX.
3. Holding the manual as shown at the right will allow you to find the first page of the section easily.
4. The contents are listed on the first page of each section to help you find the item and page you need.



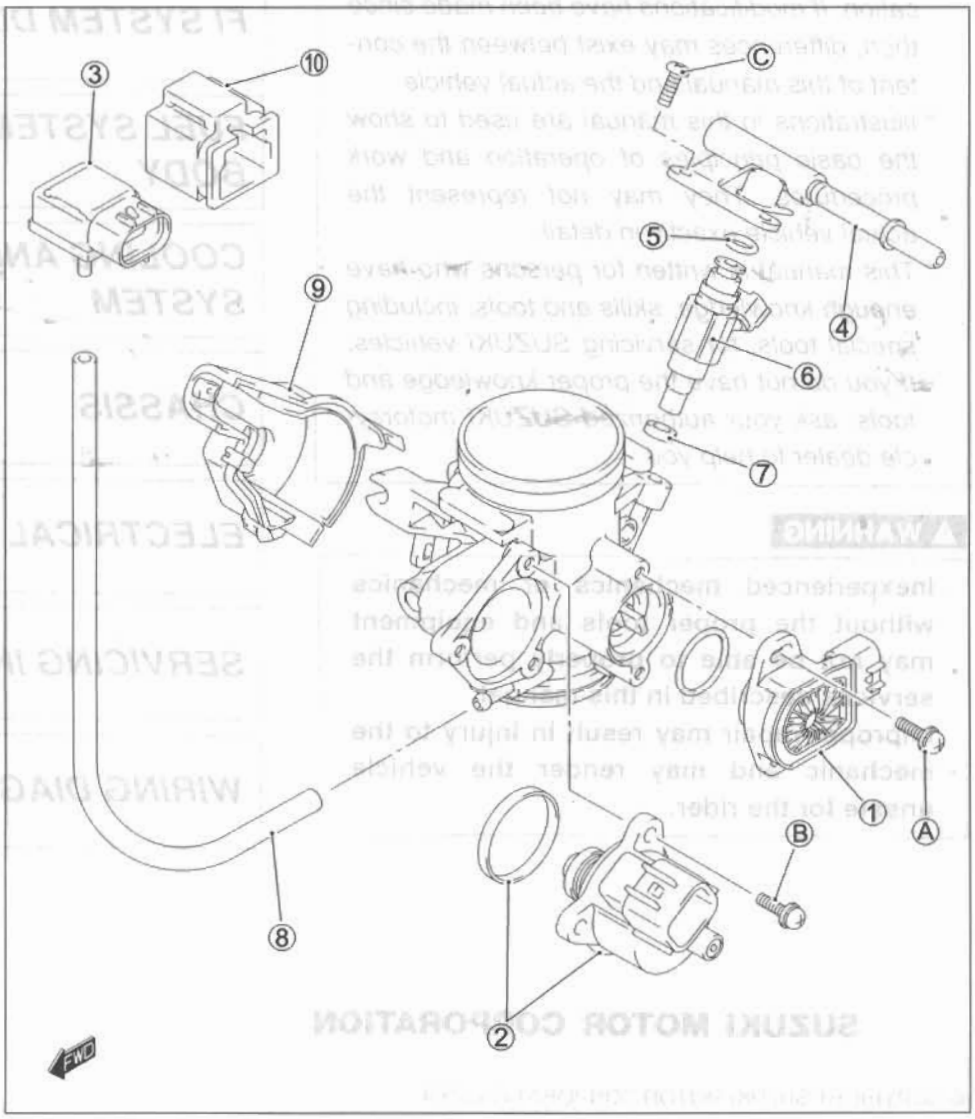
COMPONENT PARTS AND WORK TO BE DONE

Under the name of each system or unit, is its exploded view. Work instructions and other service information such as the tightening torque, lubricating points and locking agent points, are provided.

Example:

①	TP sensor
②	ISC valve
③	IAP sensor
④	Fuel delivery pipe
⑤	O-ring
⑥	Fuel injector
⑦	Cushion seal
⑧	Vacuum hose
⑨	Throttle linkage cover
⑩	IAP sensor cover
Ⓐ	TP sensor mounting screw
Ⓑ	ISC valve mounting screw
Ⓒ	Fuel delivery pipe mounting screw

ITEM	N·m	kgf-m	lb-ft
Ⓐ	2.0	0.2	1.5
Ⓑ	2.0	0.2	1.5
Ⓒ	5	0.5	3.5



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 SUPER "1305". 99000-32100
	Indicates service data.		Apply THREAD LOCK SUPER "1322". 99000-32110 (Except USA)
	Apply oil. Use engine oil unless otherwise specified.		Apply THREAD LOCK "1342". 99000-32050
	Apply hypoid gear oil.		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". 99000-25030 (USA) 99000-25010 (Others)		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 WATER RESISTANCE GREASE. 99000-25160		Measure in diode test range.
	Apply SUZUKI BOND "1207B" 99104-31140 (USA)		Measure in continuity test range.
	Apply SUZUKI BOND "1215". 99000-31110 (Except USA)		Use special tool.
	Apply SUZUKI BOND "1216B". 99100-31230		Use engine coolant. 99000-99032-11X (Except USA)
	Apply THREAD LOCK SUPER "1303". 99000-32030		

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
ATM Pressure	: Atmospheric Pressure
	: Atmospheric Pressure sensor (APS, AP Sensor)
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
CO	: Carbon Monoxide
CPU	: Central Processing Unit

D

DC	: Direct Current
DIFF-LOCK Relay	: Differential Lock Relay
DMC	: Dealer Mode Coupler
DOHC	: Double Over Head Camshaft
DRL	: Daytime Running Light

E

ECM	: Engine Control Module Engine Control Unit (ECU) (FI Control Unit)
ECT Sensor	: Engine Coolant Temperature Sensor (ECTS), Water Temp. Sensor (WTS)

F

FI	: Fuel Injection, Fuel Injector
FP	: Fuel Pump
FPR	: Fuel Pressure Regulator
FP Relay	: Fuel Pump Relay

G

GEN	: Generator
GND	: Ground
GP Switch	: Gear Position Switch

H

HC	: Hydrocarbons

I

IAP Sensor	: Intake Air Pressure Sensor (IAPS)
IAT Sensor	: Intake Air Temperature Sensor (IATS)
IG	: Ignition
ISC Valve	: Idle Speed Control Valve (ISCV)

L

LCD	: Liquid Crystal Display
LED	: Light Emitting Diode (Malfunction Indicator Lamp)
LH	: Left Hand

M

MAL-Code	: Malfunction Code (Diagnostic Code)
Max	: Maximum
MIL	: Malfunction Indicator Lamp (LED)
Min	: Minimum

N

NOX	: Nitrogen Oxides

O

OHC	: Over Head Camshaft
OPS	: Oil Pressure Switch

P

PCV	: Positive Crankcase Ventilation (Crankcase Breather)

R

REC	: Rectifier
REG	: Regulator
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)

WIRE COLOR

B	: Black	Gr	: Gray	R	: Red
Bl	: Blue	W	: White	Br	: Brown
Lg	: Light green	Y	: Yellow	Dg	: Dark green
O	: Orange	G	: Green		
P	: Pink				

B/Bl	: Black with Blue tracer	B/Br	: Black with Brown tracer
B/G	: Black with Green tracer	B/Lg	: Black with Light green tracer
B/R	: Black with Red tracer	B/W	: Black with White tracer
B/Y	: Black with Yellow tracer	Bl/B	: Blue with Black tracer
Bl/G	: Blue with Green tracer	Bl/R	: Blue with Red tracer
Bl/W	: Blue with White tracer	Bl/Y	: Blue with Yellow tracer
G/B	: Green with Black tracer	G/Bl	: Green with Blue tracer
G/W	: Green with White tracer	G/Y	: Green with Yellow tracer
Gr/B	: Gray with Black tracer	Gr/R	: Gray with Red tracer
Gr/W	: Gray with White tracer	Gr/Y	: Gray with Yellow tracer
O/B	: Orange with Black tracer	O/Bl	: Orange with Blue tracer
O/G	: Orange with Green tracer	O/R	: Orange with Red tracer
O/W	: Orange with White tracer	O/Y	: Orange with Yellow tracer
P/B	: Pink with Black tracer	P/W	: Pink with White tracer
R/B	: Red with Black tracer	R/Bl	: Red with Blue tracer
R/G	: Red with Green tracer	R/W	: Red with White tracer
W/B	: White with Black tracer	W/Bl	: White with Blue tracer
W/G	: White with Green tracer	W/R	: White with Red tracer
W/Y	: White with Yellow tracer	Y/B	: Yellow with Black tracer
Y/Bl	: Yellow with Blue tracer	Y/G	: Yellow with Green tracer
Y/R	: Yellow with Red tracer	Y/W	: Yellow with White tracer

GENERAL INFORMATION

1

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COUNTRY AND AREA CODES

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

MODEL	CODE	COUNTRY or AREA	EFFECTIVE FRAME NO.
LT-A700X K5	E-17	Sweden	JSAAP41A 52100001-
	E-24	Australia	
	E-28	Canada	
	E-33	U.S.A.	

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 equivalents.
* 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 snap ring. When installing a new snap ring, take care not to expand the end gap larger than required to slip the snap ring over the shaft. After installing a snap ring, 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-A700XK5 ('05-MODEL)



RIGHT SIDE

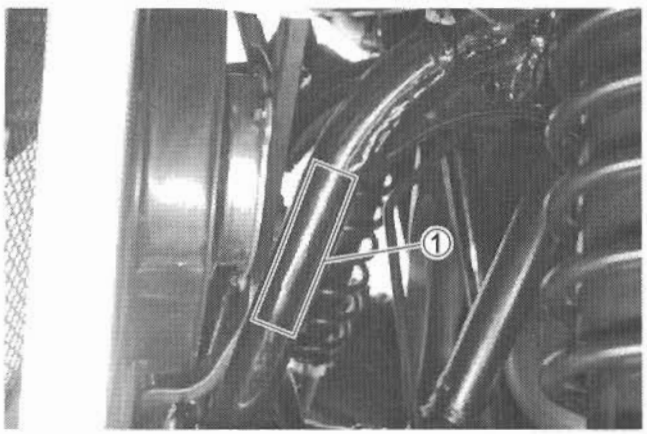


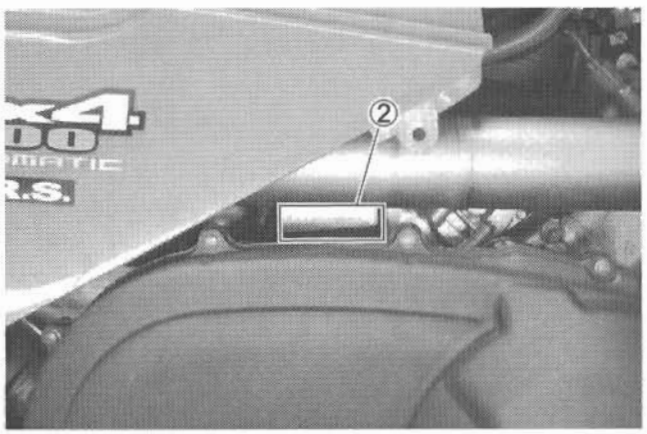
LEFT SIDE

- 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 left side of the front frame pipe. The engine serial number ② is located on the right 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 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the Research Method.

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

FUEL (FOR OTHER COUNTRIES)

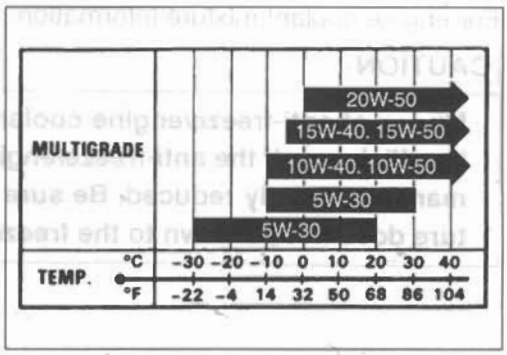
Gasoline used should be graded 91 octane (Research Method) or higher. An unleaded gasoline is recommended.

ENGINE OIL (FOR USA)

SUZUKI recommends the use of SUZUKI PERFORMANCE 4 MOTOR OIL or an oil which is rated SF or SG under the API (American Petroleum Institute) service classification. The recommended viscosity is SAE 10W-40. If SAE 10W-40 oil is not available, select an alternative according to the following chart.

ENGINE OIL (FOR OTHER COUNTRIES)

Use a premium quality 4-stroke motor oil to ensure longer service life of your vehicle. Use only oils which are rated SF or SG under the API service classification. The recommended viscosity is SAE 10W-40. If SAE 10W-40 motor oil is not available, select an alternative according to the right chart.



FRONT DIFFERENTIAL GEAR OIL

Use hypoid gear oil that meets the API service classification GL-5 and is rated SAE #90. Use a hypoid gear oil with a rattng of SAE #80 if the vehicle is operated where the ambient temperature is below 0 °C (32 °F).

REAR DRIVE (FINAL) GEAR OIL

Use mobil fluid 424 or equivalent oil.

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. 2 450 ml (2.59/2.16 US/Imp qt)

For engine coolant mixture information, refer to cooling system section in page 7-2

lixing beyond it would reduce

Mixing of anti-freeze/engine coolant should be limited to 60 %. M



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:

Brake-in engine speeds

Initial 500 km (300 miles): Less than 1/2 throttle

- Upon reaching an odometer reading of 500 km (300 miles) you can subject the vehicle to full throttle operation, for short periods of time.

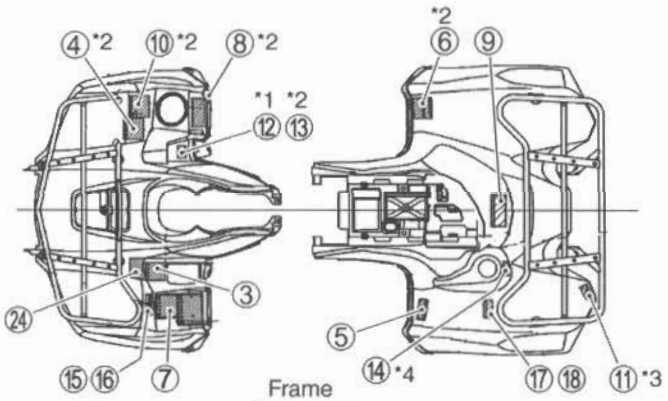
INFORMATION LABELS

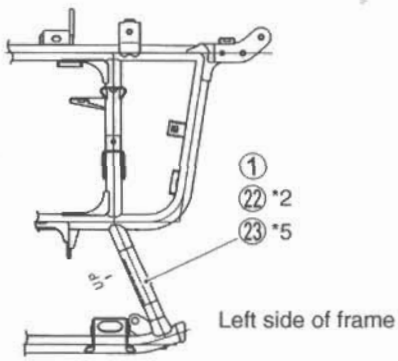
① Certification plate	A (For E-24, 33)
② Information label	A (For E-33)
③ Gearshift label	A
④ Gearshift label	A (For E-28)
⑤ Tire air pressure label	A
⑥ Tire air pressure label and warning no-passenger label	A (For E-28)
⑦ General warning & AGE, 16 label	A
⑧ General warning label	A (For E-28)
⑨ Warning no-passenger label	A
⑩ AGE, 16 label	A (For E-28)
⑪ Manual notice label	A (For E-33)
⑫ Max AMP caution label	A (Except for E-28)
⑬ Max AMP caution label	A (For E-28)
⑭ Fuel caution label	A (For E-24)
⑮ Front carrier warning label	A (For E-24, 33)
⑯ Front carrier warning label	A (For E-17, 28)
⑰ Rear carrier warning label	A (For E-24, 33)
⑱ Rear carrier warning label	A (For E-17, 28)
⑲ Trailer to warning label	A
⑳ Trailer to warning label	A (For E-17 (CH), 28)
㉑ ICES Canada label	A (For E-28)
㉒ Compliance label	A (For E-28)
㉓ ID plate	A (For E-17)
㉔ Cooling fan label	A

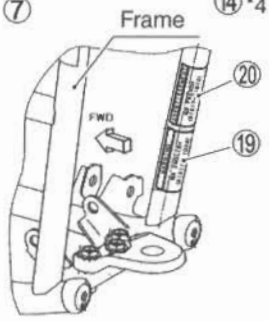
A: Attached

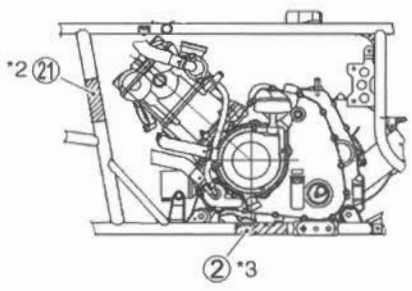
*1: Except for E-28 *2: For E-28 *3: For E-33 *4: For E-24 *5: For E-17

*6: This label is attached on the seat. *5: This label is attached on the left side of frame.









SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 115 mm (83.3 in)	E-28, 33
	2 135 mm (84.1 in)	E-17, 24
Overall width	1 210 mm (47.6 in)	E-28, 33
	1 250 mm (49.2 in)	E-17, 24
Overall height	1 220 mm (48.0 in)	
Wheelbase	1 280 mm (50.4 in)	
Ground clearance	260 mm (10.2 in)	
Seat height	860 mm (33.9 in)	
Dry mass	273 kg (601 lbs)	E-28, 33
	275 kg (606 lbs)	E-17, 24
Front track	930 mm (36.6 in)	
Rear track	940 mm (37.0 in)	

ENGINE

Type	4 stroke, liquid-cooled, DOHC
Number of cylinders	1
Bore	102.0 mm (4.016 in)
Stroke	85.0 mm (3.346 in)
Displacement	695 cm³ (42.4 cu.in)
Compression ratio	10.0:1
Fuel system	Fuel injection
Air cleaner	Nonwoven fabric element
Starter system	Electric and recoil starter
Lubrication system	Wet sump
Idle speed	1 300 ± 100 r/min

DRIVE TRAIN

Clutch	Wet shoe, automatic, centrifugal type
Transmission	Automatic variable ratio (V-belt)
Transfer	2-speed forward with reverse
Gearshift pattern, Transmission	Automatic
Transfer	L-H-N-R (Hand operated)
Automatic transmission ratio	Variable change (2.763 – 0.78)
Secondary reduction ratio	2.158 (40/21 × 17/15)
Final reduction ratio (Front & Rear)	3.600 (36/10)
Transfer gear ratio, Low	2.563 (41/16)
High	1.240 (31/25)
Reverse	1.882 (32/17)
Drive system	Shaft drive

CHASSIS

Front suspension	Independent, double wishbone, coil spring, oil damped
Rear suspension	Independent, double wishbone, coil spring, oil damped
Front wheel travel	180 mm (7.1 in)
Rear wheel travel	200 mm (7.9 in)
Caster	1.6 °
Trail	3.4 mm (0.13 in)
Toe-out	10 mm (0.39 in)
Camber	0.64 °
Steering angle	46 ° (right & left)
Turning radius	3.1 m (10.2 ft)
Front brake	Dual hydraulic disc
Rear brake	Sealed oil-bathed multi-disc
Front tire size	AT25 × 8 – 12☆☆, tubeless
Rear tire size	AT25 × 10 – 12☆☆, tubeless

ELECTRICAL

Ignition type	Electronic ignition (CDI)
Ignition timing	7 ° B.T.D.C.at 1 300 r/min
Spark plug	NGK CR6E or DENSO U20ESR-N
Battery	12 V 64.8 kC (18 Ah)/10 HR
Generator	Three-phase A.C. generator
Main fuse	30 A
Fuse	10/10/10/10/15/15 A
Headlight	12 V 30/30 W × 2
Auxiliary light	12 V 40 W
Brake light/Taillight	12 V 21/5 W
Backup light	12 V 21 W ... E-17
Speedometer light	LED
Neutral indicator light	LED
High beam indicator light	LED E-17
Coolant temperature/FI warning light	LED
Reverse indicator light	LED
Diff-lock indicator light	LED

CAPACITIES

Fuel tank	17.5 L (4.6/3.8 US/Imp gal)
Engine oil, oil change	2 300 ml (2.4/2.0 US/Imp qt)
with filter change	2 500 ml (2.6/2.2 US/Imp qt)
overhaul	3 000 ml (3.2/2.6 US/Imp qt)
Differential gear oil	500 ml (16.9/17.6 US/Imp oz)
Final gear oil	770 ml (26.0/27.1 US/Imp oz)
Coolant	2.45 L (2.6/2.2 US/Imp qt)

These specifications are subject to change without notice.

PERIODIC MAINTENANCE

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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 kilometers, miles and months, and are dependent on whichever comes first.

NOTE:
More frequent servicing may be performed on vehicles that are used under severe conditions.

PERIODIC MAINTENANCE CHART

Interval / Item	km	Initial 200	Every 1 000	Every 2 000
	miles	Initial 100	Every 600	Every 1 200
	months	1	3	6
Air cleaner		—	C	C
Exhaust pipe nuts and muffler mounting bolts		T	T	T
Valve clearance		I	—	I
Spark plug		—	—	I
		Replace every 6 000 km (4 000 miles).		
Spark arrester		—	—	C
Fuel line		—	I	I
		Replace every four years.		
Throttle cable play		I	I	I
Throttle body		—	I	I
Engine oil and oil filter		R	—	R
Differential gear oil		—	—	I
		Replace every two years.		
Final gear oil		—	—	I
		Replace every year.		
Engine coolant		Replace every two years.		
Radiator		—	I	I
Radiator hose		—	—	I
Drive belt		—	I	R
Brakes		I	I	I
Rear brake plates		Replace every 10 000 km (6 000 miles).		
Brake fluid		—	I	I
		Replace every two years.		
Brake hose		—	—	I
		Replace every four years.		
Tires		—	I	I
Steering		I	I	I
Suspensions		—	—	I
Chassis nuts and bolts		T	T	T
General lubrication		—	L	L

I = Inspect and adjust, clean, lubricate, or replace if necessary.
R = Replace
T = Tighten
C = Clean
L = Lubricate

MAINTENANCE AND TUNE-UP PROCEDURES

This section describes the servicing procedures for each item mentioned in the periodic maintenance chart.

Before performing the servicing procedures mentioned in the periodic maintenance chart, remove following parts to ease servicing work;

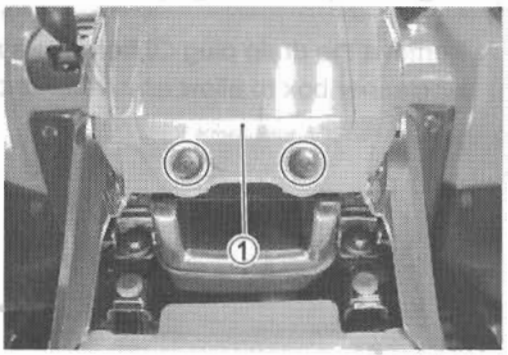
- Seat. (☞8-4)
- Front carrier. (☞8-4)
- Front grip bar. (☞8-5)
- Front fender. (☞8-5)
- Left inner fender. (☞8-6)
- Right inner fender. (☞8-6)
- Left side cover. (☞8-8)
- Right side cover. (☞8-8)
- Left mud guard. (☞8-8)
- Right mud guard. (☞8-8)
- Rear carrier. (☞8-9)
- Fuel tank cover. (☞8-10)
- Rear fender. (☞8-10)

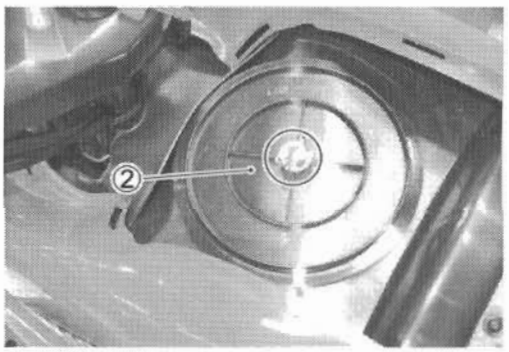
AIR CLEANER

Clean every 1 000 km (600 miles, 3 months).

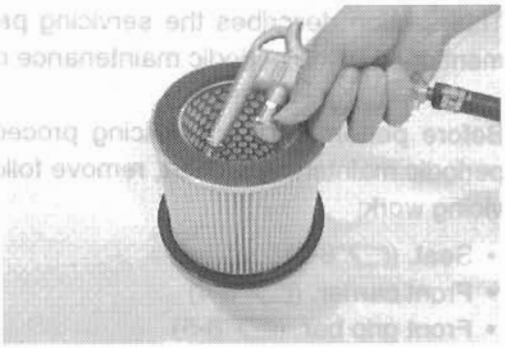
If the air cleaner element is clogged with dust, intake resistance will be increased, which results decrease in power output and increase in fuel consumption. Check and clean the air cleaner element in the following manner.

- Remove the seat. (☞8-4)
- Remove the air cleaner box cover ①.
- Remove the air cleaner box cap ②.
- Remove the air cleaner element.





- Using compressed air, blow the dust from the cleaner element.



CAUTION

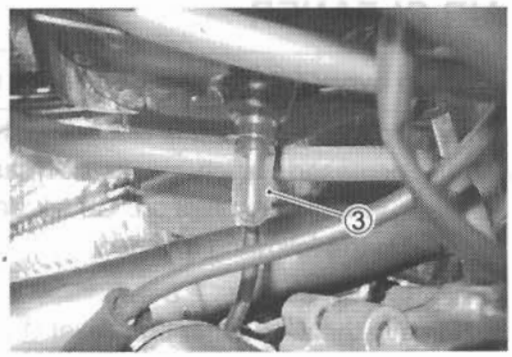
Always use air pressure from the inside of the air cleaner element. If air pressure is used on the other side, dirt will be forced into the pores of the air cleaner element thus restricting air flow through the air cleaner element.

- Reinstall the cleaned or new air cleaner element in the reverse order of removal.

CAUTION

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

- Remove the drain plug ③ from the air cleaner drain hose and air cleaner box to allow any water to drain out.



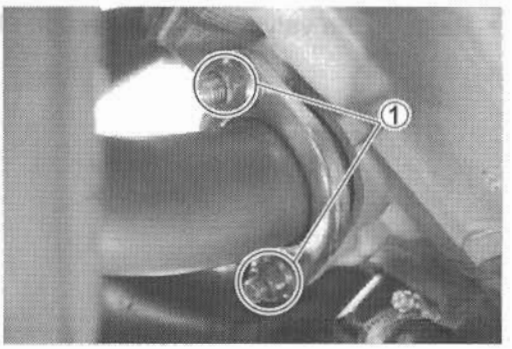


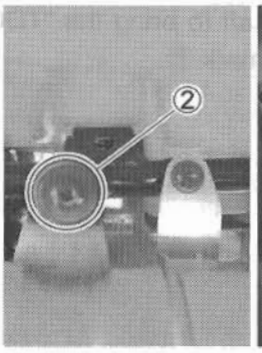
EXHAUST PIPE NUTS AND MUFFLER MOUNTING BOLTS

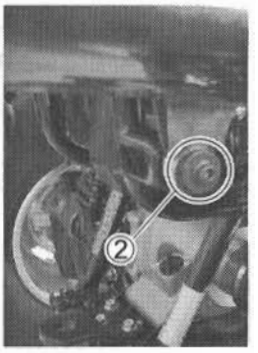
Tighten initially at 200 km (100 miles, 1 month) and every 1 000 km (600 miles, 3 months) thereafter.

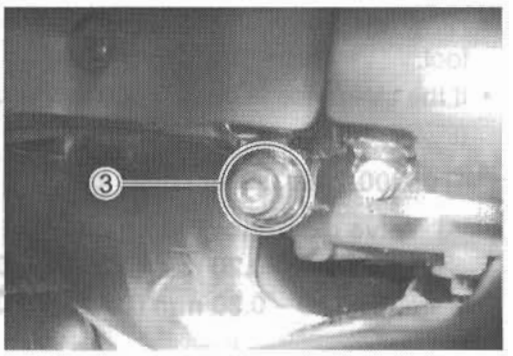
- Remove the right inner fender. (☞8-6)
- Remove the right side cover. (☞8-8)
- Tighten the exhaust pipe nuts ①, muffler mounting bolts ② and exhaust pipe and muffler joint bolts ③ to the specified torque.

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









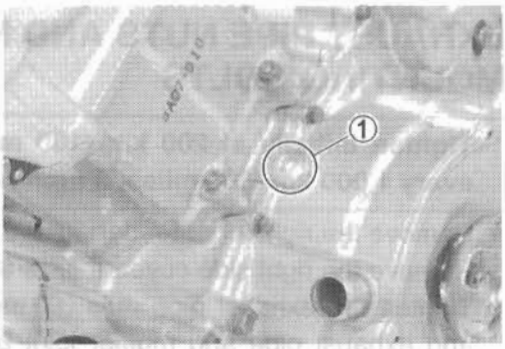
VALVE CLEARANCE

Inspect initially at 200 km (100 miles, 1 month) and

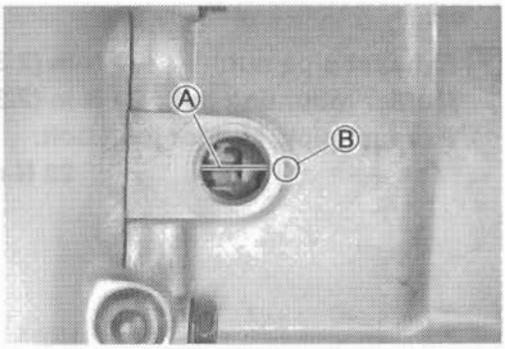
Excessive valve clearance results in valve noise and insufficient valve clearance results in valve damage and reduced power. Check the intake and exhaust valve clearances at the interval indicated above and adjust the valve clearances to specification, if necessary.

- Remove the front fender. (☞8-5)
- Remove the cylinder head cover. (☞3-13)
- Remove the recoil starter. (☞3-13)

- Remove the valve timing inspection plug ①.



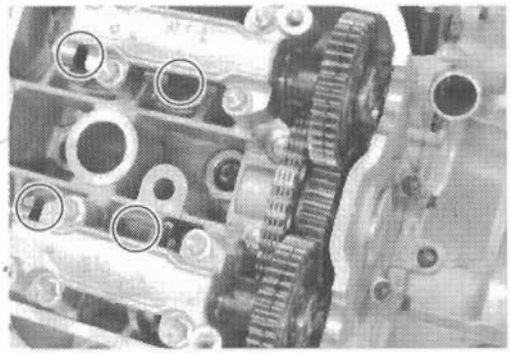
- Turn the crankshaft to bring the "TDC" line Ⓐ on the starter clutch to the lug mark Ⓑ.



- Read the valve clearance at all the valves with the special tool.
- If the clearance is out of specification, adjust the clearance. (☞2-7)

TOOL 09900-20803: Thickness gauge

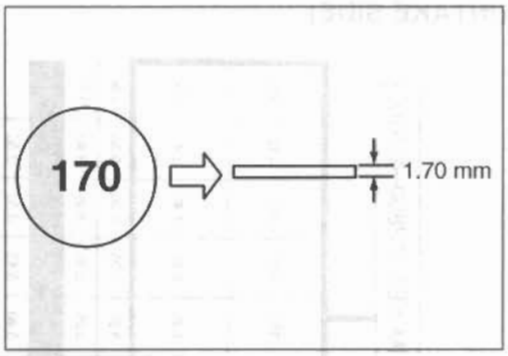
DATA Valve clearance (when cold)
IN: 0.10 – 0.20 mm (0.004 – 0.008 in)
EX: 0.20 – 0.30 mm (0.008 – 0.012 in)



VALVE CLEARANCE ADJUSTMENT

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

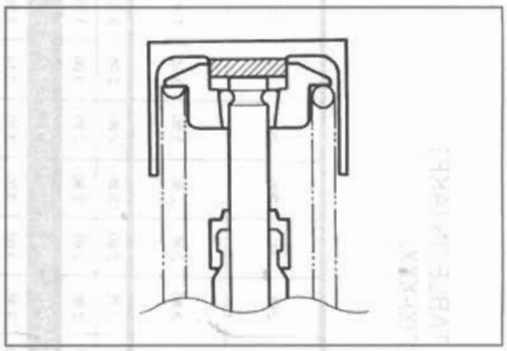
- Remove the intake or exhaust camshaft. (☞3-13)
- Remove the tappet and shim by fingers or magnetic hand.
- Check the figures printed on the shim. These figures indicate the thickness of the shim, as illustrated.
- Select a replacement shim that will provide a clearance within the specified range. For the purpose of this adjustment, a total of 21 sizes of tappet shim are available ranging from 2.50 to 3.50 mm in steps of 0.05 mm. Fit the selected shim to the valve stem end, with numbers toward tappet. Be sure to check shim size with micrometer to ensure its size. Refer to the tappet shim selection table (☞2-8, 2-9) for details.



NOTE:

** Be sure to apply engine oil to tappet shim top and bottom faces.*

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

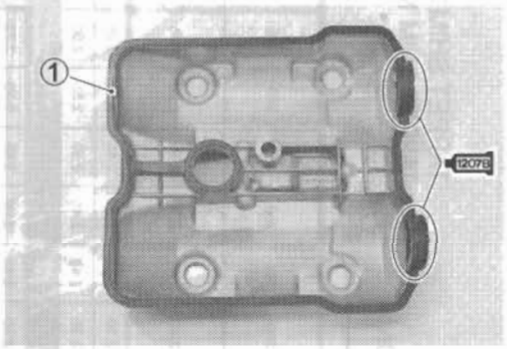


NOTE:

Reinstall the camshafts in the specified manner. (☞3-101)

- After replacing the tappet shim and camshafts, rotate the engine so that the tappet is depressed fully. This will squeeze out oil trapped between the shim and the tappet that could cause an incorrect measurement. Then check the clearance again to confirm that it is within the specified range.

- Install the new gasket ① to the cylinder head cover.
- Apply SUZUKI BOND to the cam end caps of the gasket as shown.



1207B 99104-31140: SUZUKI BOND "1207B" (USA)
99000-31110: SUZUKI BOND "1215" (Others)

CAUTION

Use the new gasket to prevent oil leakage.

- Tighten the head cover bolts to the specified two-step torque sequentially and diagonally.

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)

NOTE:

Apply engine oil to the both side of head cover washer before installing the head cover bolts.

TAPPET SHIM SELECTION TABLE [INTAKE]

TAPPET SHIM NO. (12892-41C00-XXX)

OPTION

TAPPET SHIM SET (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. "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

(INTAKE SIDE)

TAPPET SHIM SELECTION TABLE [EXHAUST]

TAPPET SHIM NO. (12892-41C00-XXX)

OPTION

TAPPET SHIM SET (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	2.550	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. "ENGINE IS COLD"

II. Measure present shim size.

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

EXAMPLE

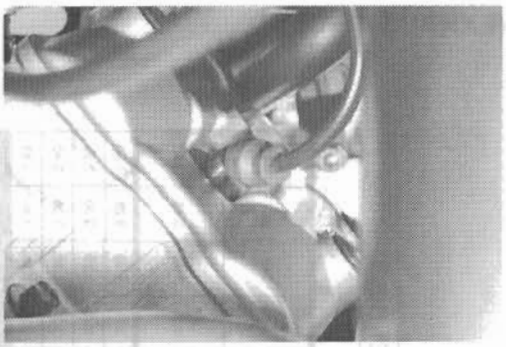
Tappet clearance is	0.38 mm
Present shim size	2.90 mm
Shim size to be used	3.05 mm

SPARK PLUG

Inspect every 2 000 km (1 200 miles, 6 months).
Replace every 6 000 km (4 000 miles).

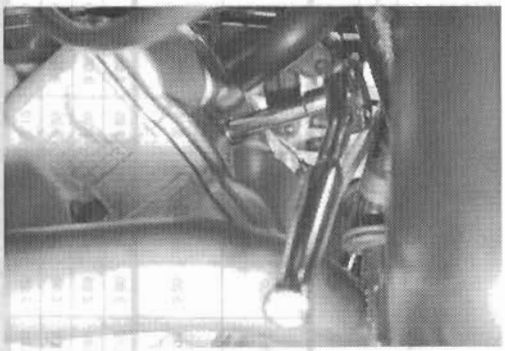
- Remove the right inner fender. (☞8-6)
- Disconnect the spark plug cap ① and remove the spark plug.

	Standard	Cold type
NGK	CR6E	CR7E
DENSO	U20ESR-N	U22ESR-N



CARBON DEPOSITS

Check to see if there are carbon deposits on the spark plug. If carbon is deposited, remove it with a spark plug cleaner machine or carefully use a tool with a pointed end.

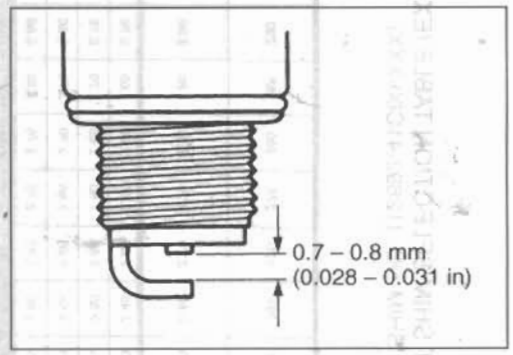


SPARK PLUG GAP

Measure the spark plug gap with 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, tighten the spark plug by hand, and then tighten it to the specified torque using the spark plug wrench.

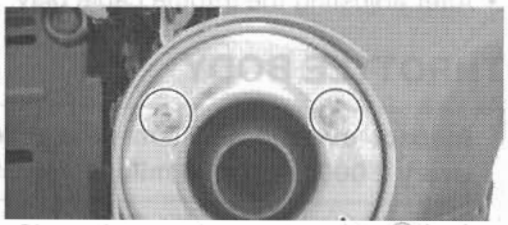
- Insert the spark plug and tighten it to the cylinder head by hand then tighten it to the specified torque.

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

SPARK ARRESTER

Clean every 2 000 km (1 200 miles, 6 months).
Replace every 6 000 km (4 000 miles).

- Remove the muffler end cover ①.
- Extract the spark arrester pipe ② from the muffler.



- Clean the spark arrester pipe ② by brus

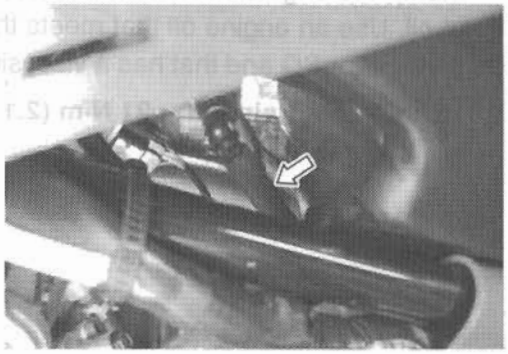


FUEL LINE

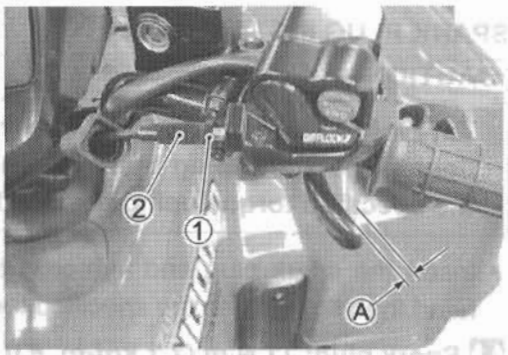
Inspect every 1 000 km (600 miles, 3 months).
Replace every four years.

Inspect the fuel feed hose for damage and fuel leakage. If any damages are found, replace it with a new one.

- When replacing the fuel feed hose, remove the fuel tank side cover. (☞6-2)



THROTTLE CABLE PLAY



Inspect initially at 200 km (100 miles, 1 month) and every 1 000 km (600 miles, 3 months) thereafter.

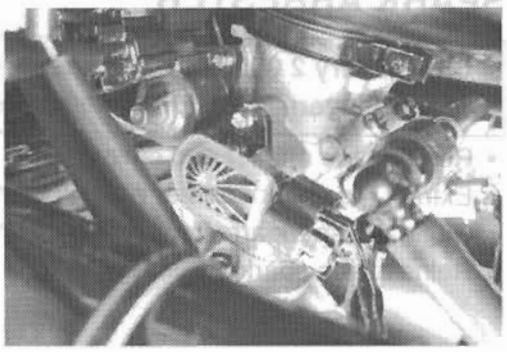
Adjust the throttle cable play Ⓐ as follows.

- Loosen the locknut 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 locknut ①.

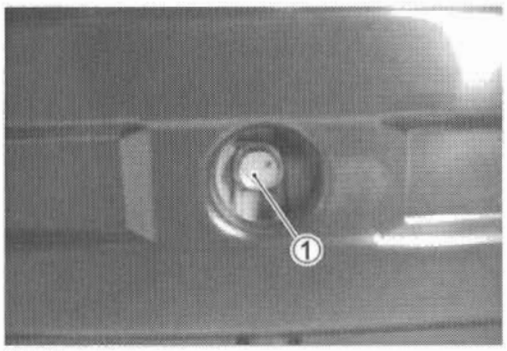
THROTTLE BODY



Inspect every 1 000 km (600 miles, 3 months) and every 2 000 km (1 200 miles, 6 months) thereafter.

Inspect the throttle body for dart or mud.
If any dirt or mud is found, clean it.

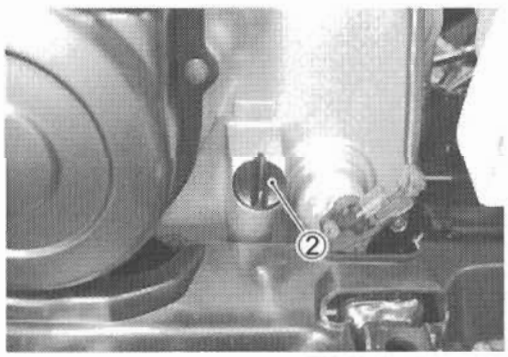
ENGINE OIL AND OIL FILTER



Replace initially at 200 km (100 miles, 1 month) and every 2 000 km (1 200 miles, 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.

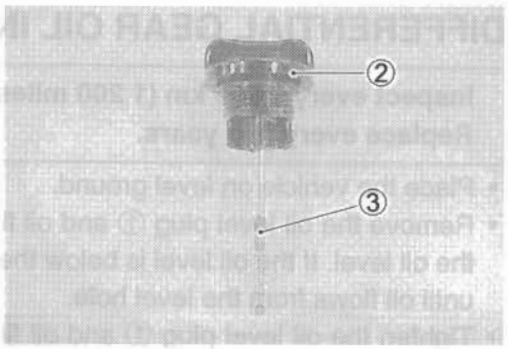
ENGINE OIL REPLACEMENT



- Remove the left upper mud guard. (☞8-8)
- Place an oil pan under the drain plug ①, and then drain out the engine oil by removing the engine oil drain plug ① and engine oil filler cap ②.
- Tighten the drain plug, with the new washer, to the specified torque, and then pour the new oil through the oil filler hole. When performing an oil change (without oil filter replacement), the engine will hold about 2.3 L (2.4 US qt, 2.0 Imp qt) of oil. Use an engine oil that meets the API service classifications SF or SG and that has a viscosity rating of SAE 10W/40.

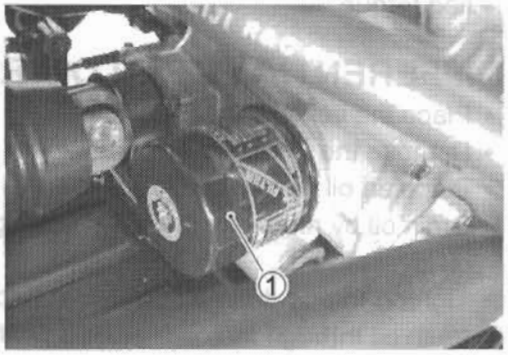
Engine oil drain plug: 21 N·m (2.1 kgf-m, 15.0 lb-ft)

- Tighten the oil filler cap ②.
- Start the engine and allow it to run for a few minutes at idling speed.
- Turn off the engine and wait about three minutes, and then check the oil level on the dipstick ③. If the level is below upper line, add oil to that level. The vehicle must be placed on level ground for accurate measurement.

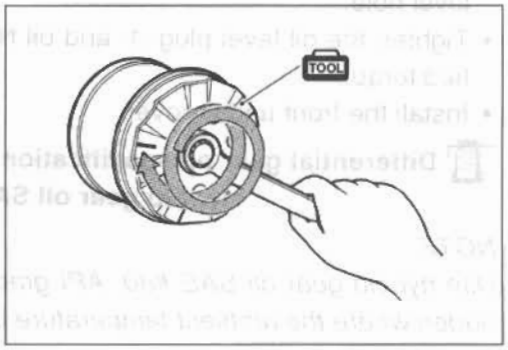


OIL FILTER REPLACEMENT

- Drain the engine oil. (☞2-12)
- Remove the left inner fender. (☞8-6)
- Remove the oil filter ① with the special tool.
- Apply engine oil lightly to the gasket of the new oil filter, before installation.



- Install the new oil filter to the engine. Turn it by hand until you feel that the oil filter gasket has contacted the oil filter mounting surface. Then, tighten the oil filter two full turns with the special tool.



TOOL 09915-40610: Oil filter wrench

NOTE:

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

- Pour the new engine oil through the oil filler hole. When performing the oil filter change, the engine will hold about 2.5 L (2.6 US qt, 2.2 Imp qt) of oil.
- Check the oil level. (☞2-12)
- Add new engine oil and check the oil level. (☞2-12)

DATA *Engine oil capacity*

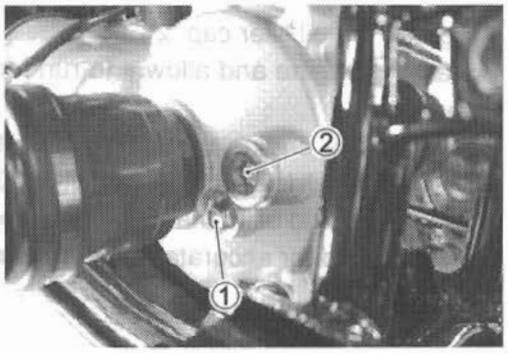
Oil change:	**2.3 L (2.4 US qt, 2.0 Imp qt)**
Oil and filter change:	**2.5 L (2.6 US qt, 2.2 Imp qt)**
Engine overhaul:	**3.0 L (3.2 US qt, 2.6 Imp qt)**

CAUTION

ONLY USE A GENUINE SUZUKI MOTORCYCLE OIL FILTER.
Other manufacture's oil filters may differ in thread specifications (thread diameter and pitch), filtering performance and durability which may lead to engine damage or oil leaks. Also, do not use a GENUINE SUZUKI AUTOMOBILE OIL FILTER on this vehicle.

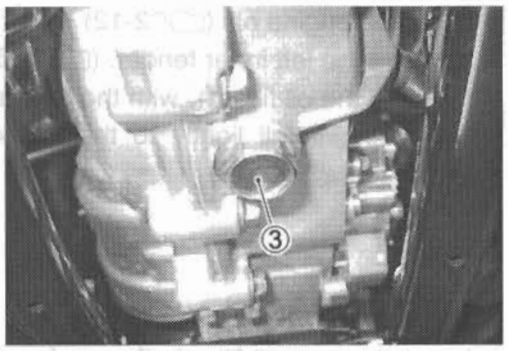
DIFFERENTIAL GEAR OIL INSPECTION

Inspect every 2 000 km (1 200 miles, 6 months).
Replace every two years.



- Place the vehicle on level ground.
- Remove the oil level plug ① and oil filler plug ②, and inspect the oil level. If the oil level is below the level hole, add fresh oil until oil flows from the level hole.
- Tighten the oil level plug ① and oil filler plug ② to the specified torque.

DIFFERENTIAL GEAR OIL REPLACEMENT



- Place the vehicle on level ground.
- Remove the front under cover.
- Place an oil pan below the differential gear case.
- Drain oil by removing the oil drain plug ③, oil filler plug ② and oil level plug ①.
- Tighten the oil drain plug ③ to the specified torque and pour fresh oil through the oil filler hole until it overflows from the oil level hole.
- Tighten the oil level plug ① and oil filler plug ② to the specified torque.
- Install the front under cover.

Differential gear oil specification:
Hypoid gear oil SAE #90, API grade GL-5

NOTE:
Use hypoid gear oil SAE #80, API grade GL-5, if the vehicle is ridden where the ambient temperature is below 0 °C (32 °F)

Front differential gear oil capacity:
500 ml (16.9 US oz, 17.6 Imp oz)

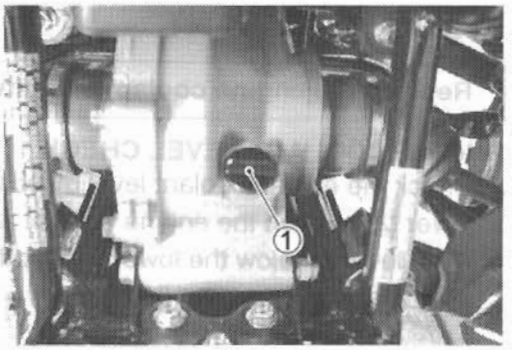
Front differential gear oil level plug:
9 N·m (0.9 kgf-m, 6.5 lb-ft)
Front differential gear oil drain plug:
32 N·m (3.2 kgf-m, 23.0 lb-ft)
Front differential gear oil filler plug:
35 N·m (3.5 kgf-m, 25.5 lb-ft)

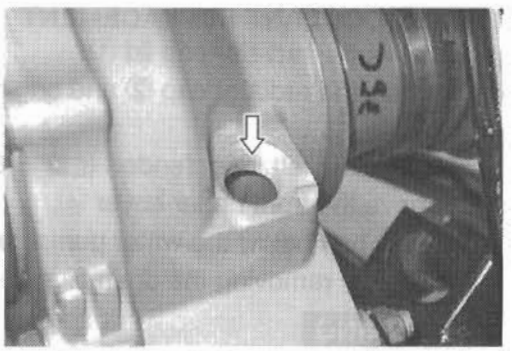
FINAL GEAR OIL

Inspect every 2 000 km (1 200 miles, 6 months).
Replace every year.

FINAL GEAR OIL INSPECTION

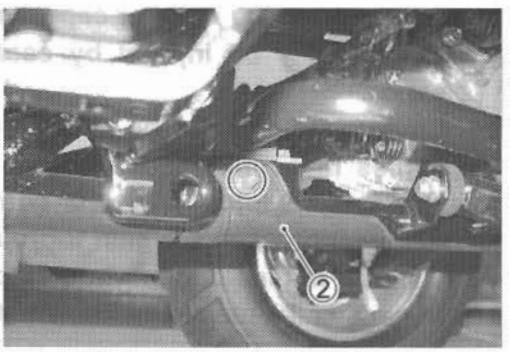
- Keep the vehicle on a level position.
- Remove the filler plug ①, and inspect the oil level. If the oil level is below, add fresh oil until the oil level reaches the bottom tip of the thread.
- Tighten the oil filler plug ① securely.





FINAL GEAR OIL REPLACEMENT

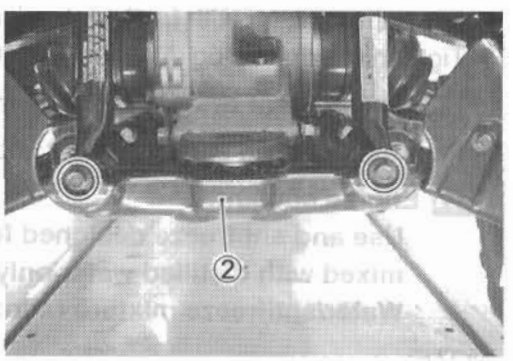
- Keep the vehicle on a level position.
- Remove the rear under cover ②.
- Place an oil pan below the final gear case.
- Drain oil by removing the oil drain plug ③ and oil filler plug ①.
- Tighten the oil drain plug ③ to the specified torque, and pour fresh oil through the oil filler hole until the oil level reaches the bottom tip of the thread.
- Tighten the oil filler plug ① securely.
- Install the rear under cover ②.

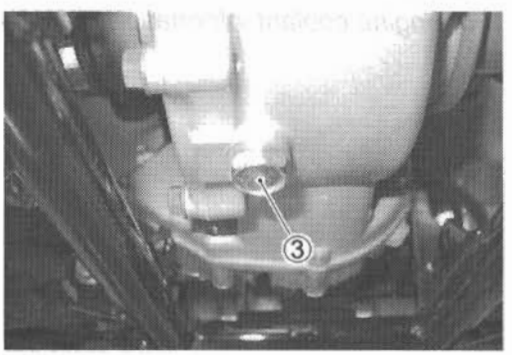


Final gear oil specification: Mobil fluid 424

DATA Final gear oil capacity:
770 ml (26.0 US oz, 27.1 Imp oz)

Final gear oil drain plug: 23 N·m (2.3 kgf-m, 16.5 lb-ft)



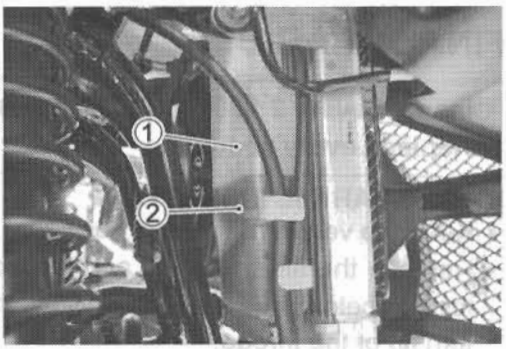


ENGINE COOLANT

Replace the engine coolant every two years.

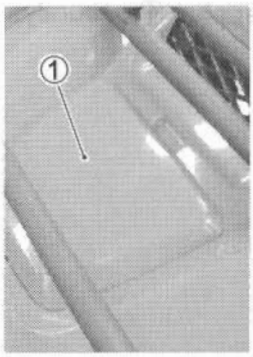
ENGINE COOLANT LEVEL CHECK

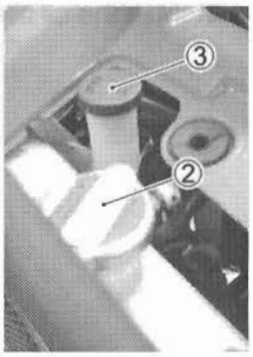
- Check the engine coolant level by observing the upper ① and lower ② lines on the engine coolant reservoir tank.
- If the level is below the lower line, add engine coolant until the level reaches the upper line.



ENGINE COOLANT REPLACEMENT

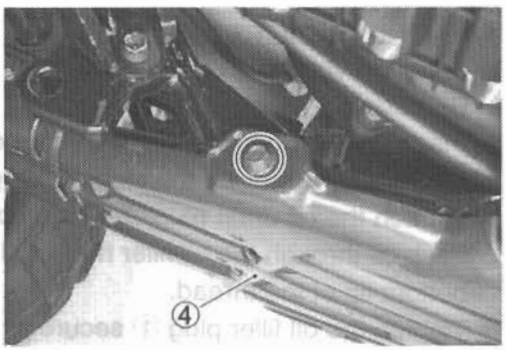
- Remove the radiator cap lid ①.
- Remove the radiator cap ② and engine coolant reservoir tank cap ③.
- Remove the left inner fender. (☞8-6)
- Remove the front under cover ④.
- Place a pan below the water pump, and then drain the engine coolant by removing the drain plug ⑤.





⚠ 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.**

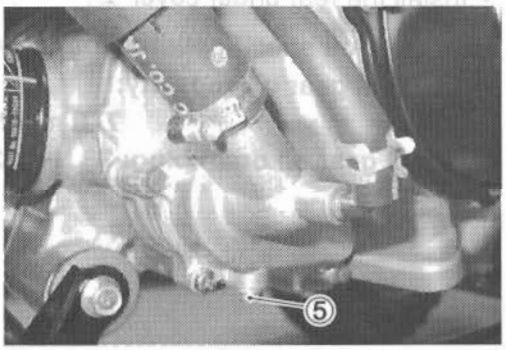


- Flush the radiator with fresh water, if necessary.
- Tighten the drain plug ⑤ to the specified torque.

Engine coolant drain plug: 13 N·m (1.3 kgf-m, 9.5 lb-ft)

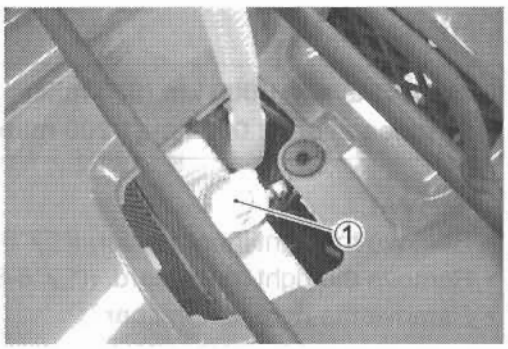
- Pour the specified engine coolant into the reservoir tank.

LLC Engine coolant:
Use and antifreeze designed for aluminum radiators mixed with distilled water only.
Water/antifreeze mixture ratio: 50:50 – 40:60



NOTE:
For engine coolant information, refer to page 7-2.

- Install the radiator cap ①.
- After warming up and cooling down the engine, add the specified engine coolant until the level is between the upper and lower lines on the engine coolant reservoir tank.



CAUTION

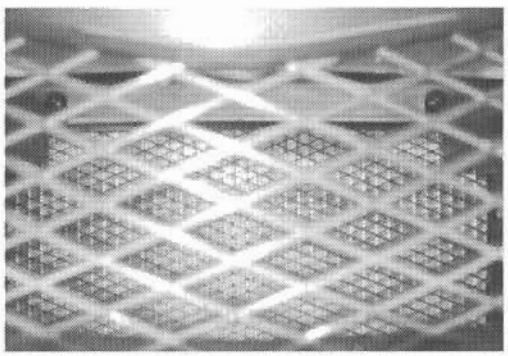
Repeat the above procedure several times and make sure the radiator is filled with engine coolant to the upper line of the engine coolant reservoir tank.

DATA **Engine coolant capacity:**
(including reservoir) 2 450 ml (2.6 US qt, 2.2 Imp qt)

RADIATOR

Inspect every 1 000 km (600 miles, 3 months).

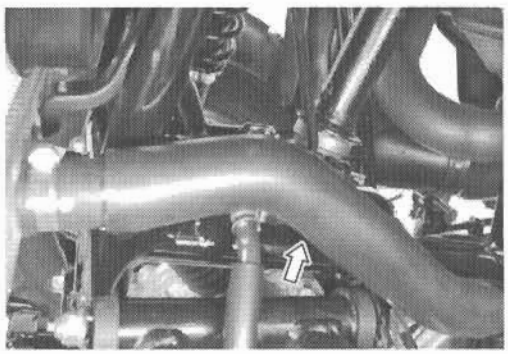
Inspect the radiator for damage and engine coolant leakage. If any damages are found, replace it with a new one.



RADIATOR HOSES

Inspect every 2 000 km (1 200 miles, 6 months).

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

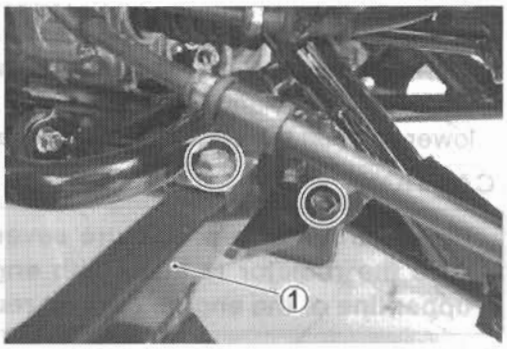


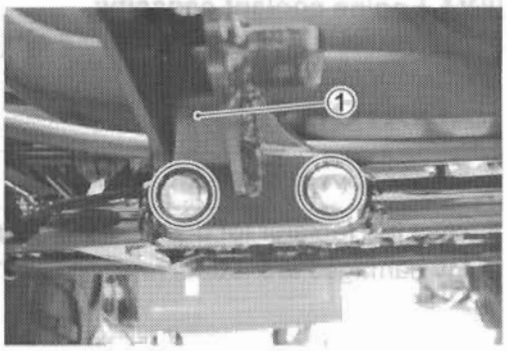
DRIVE BELT

Inspect every 1 000 km (600 miles, 3 months).
Replace every 2 000 km (1 200 miles, 6 months).

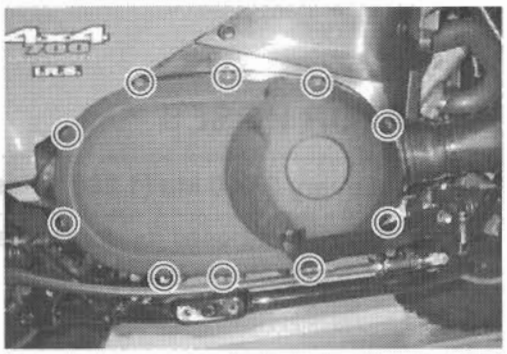
REMOVAL

- Remove the right inner fender. (☞8-6)
- Remove the right mud guard. (☞8-8)
- Remove the right footrest bar ①.

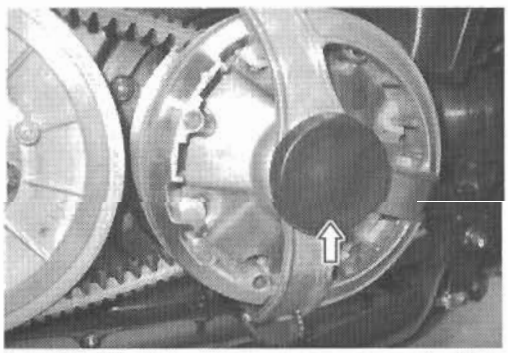




- Remove the drive belt cover.

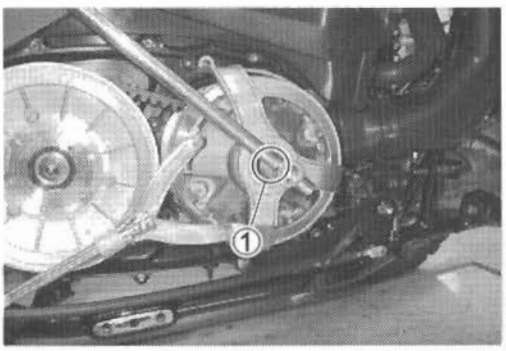


- Remove the cap.



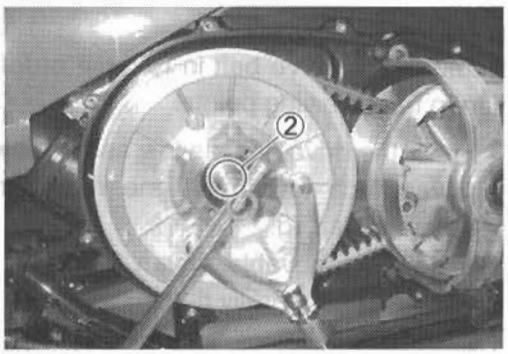
- Hold the movable drive face with the special tool and loose the movable drive face bolt ①.

TOOL **09930-40113: Rotor holder**

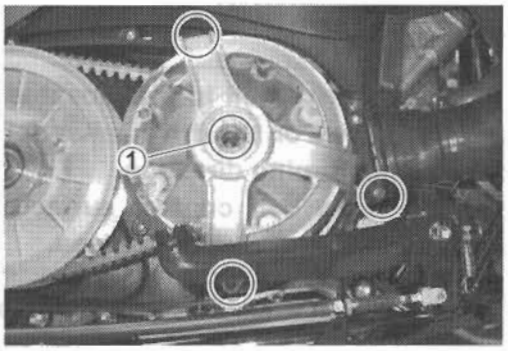


- Hold the movable driven face with the special tool and loose the movable driven face bolt ②.

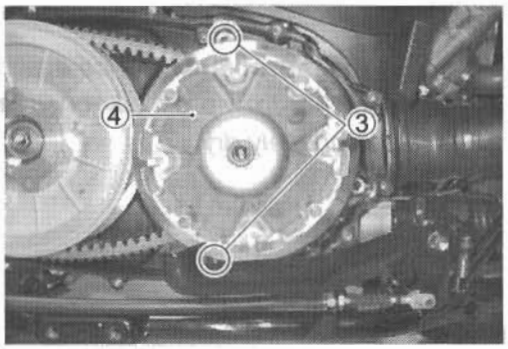
TOOL 09930-40113: Rotor holder



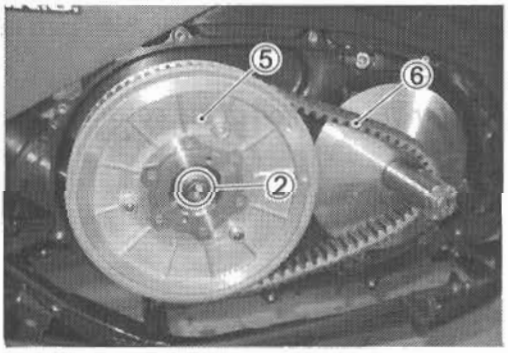
- Remove the movable drive face bolt ① and housing bolts.



- Remove the dowel pins ③.
- Remove the movable drive face ④.

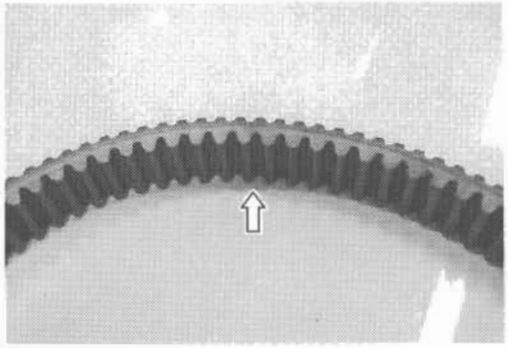


- Remove the movable driven face bolt ② and movable driven face ⑤ with drive belt ⑥.
- Remove the drive belt ⑥.



INSPECTION

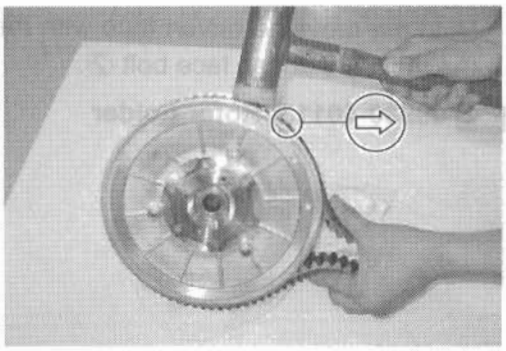
Inspect the drive belt for wear and damage. If any cracks or damages are found, replace it with a new one.



REMOUNTING

Remount the drive belt in reverse order of removal. Pay attention to the following points:

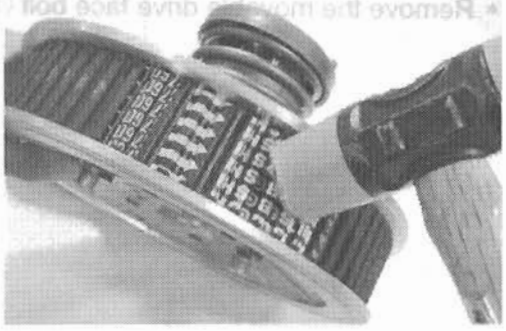
- Insert the drive belt, as low as possible, between the movable driven face to provide the maximum drive belt clearance before installing.
- Install the movable driven face with drive belt to the drive shaft and temporally tighten the nut.



CAUTION

*** Fit the drive belt to the movable driven face so that the arrows on the drive belt outer surface aim toward normal turning direction.**

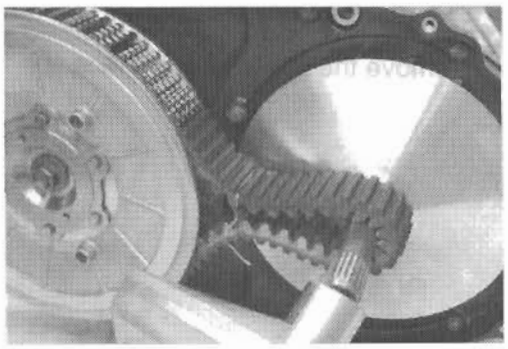
*** The drive belt contact surface of the driven face shoud be thoroughly cleaned.**



- Install the movable drive face assembly.

NOTE:

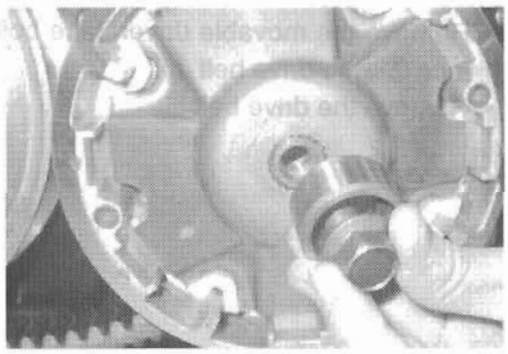
Degrease the movable drive face assembly. Use nonflammable cleaning solvent to wip off oily or greasy matter and make its surfaces completely dry.



- Install the callar and movable drive face bolt.

NOTE:

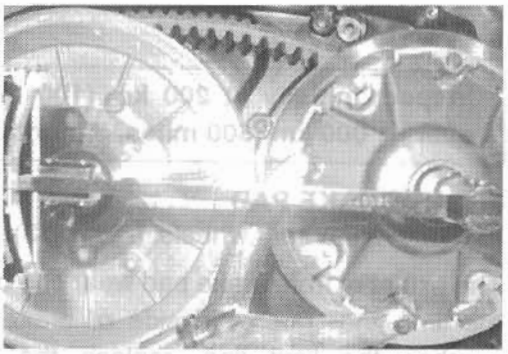
Be careful direction of the collar.



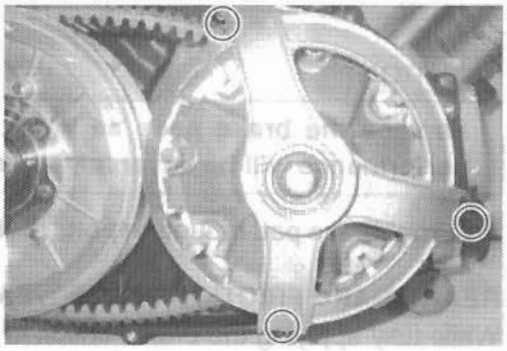
- Hold the movable drive face with the special tool, and tighten the bolts to the specified torque.

09930-40113: Rotor holder

Movable drive face bolt: 110 N·m (11.0 kgf-m, 79.5 lb-ft)



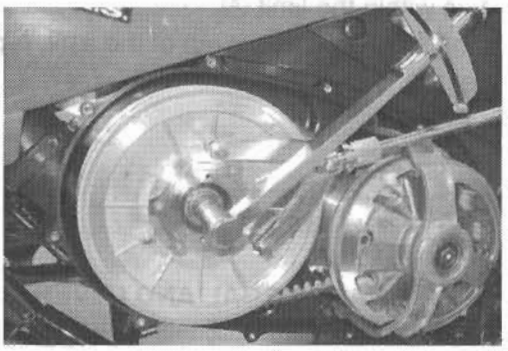
- Install the movable drive face cover.



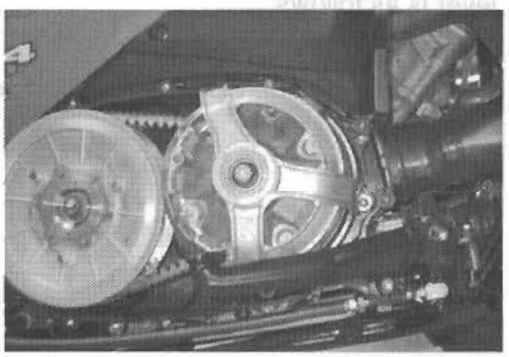
- Hold the movable driven face with the special tool and tighten the bolts to the specified torque.

09930-40113: Rotor holder

Movable driven face bolt: 110 N·m (11.0 kgf-m, 79.5 lb-ft)



- Turn the fixed drive face, until the drive belt is properly seated and both the drive and driven face rotate together smoothly and without slipping.



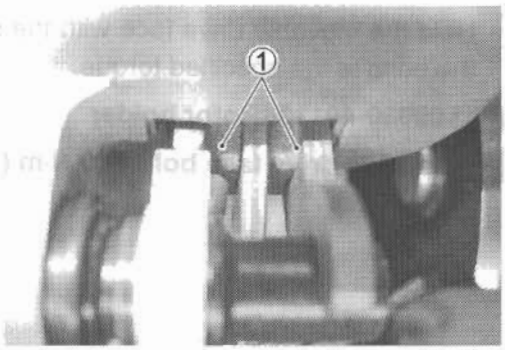
BRAKES

Inspect initially at 200 km (100 miles, 1 month) and every 1 000 km (600 miles, 3 months) thereafter.

FRONT BRAKE PAD

- Remove the front wheels. (☞8-13)

The extent of front brake pad wear can be checked by observing the limit line ① on the side of brake pads. When the wear reaches the limit line, replace the pads with new ones. (☞8-23)



CAUTION

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

Front brake pad mounting bolt: 18 N·m (1.8 kgf-m, 13.0 lb-ft)

REAR BRAKE FRICTION PLATE WEAR LIMIT

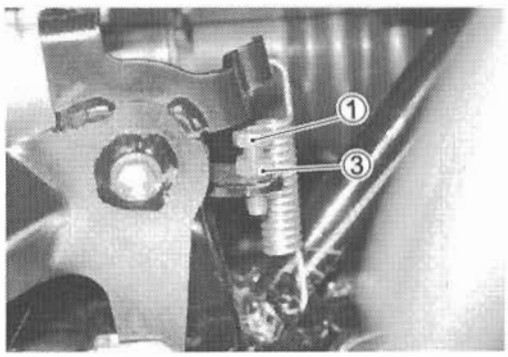
While fully applying the brake, check to see that the index mark

[redacted]

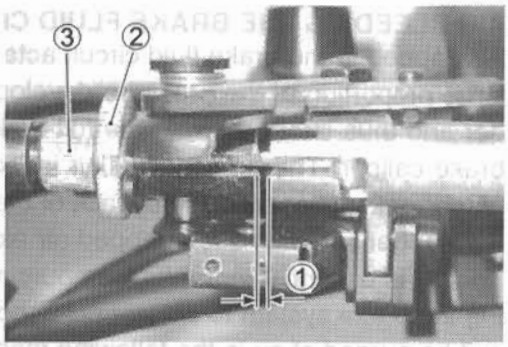
BRAKE PEDAL

- Turn the adjuster ① until the pedal height ② comes to the specification, after loosening the locknut ③.
- Make sure to tighten the locknut ③ securely.

DATA **Brake pedal height: 12.5 – 22.5 mm (0.5 – 0.9 in)**
Brake pedal free travel: 20 – 30 mm (0.8 – 1.2 in)



REAR BRAKE LEVER



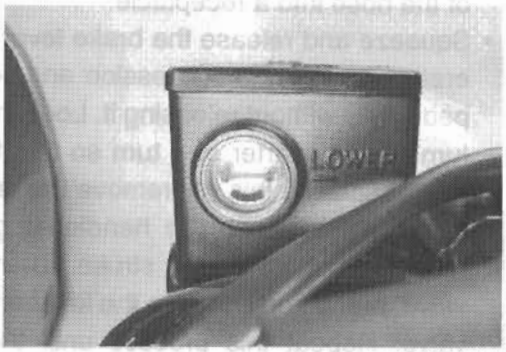
- After adjusting the brake pedal, check the rear brake lever play ①. The brake lever play ① as measured at the lever holder should be between 6 – 8 mm (0.2 – 0.3 in) when the lever is lightly pulled in towards the grip. If adjustment is necessary, slacken the cable by loosening the locknut ② and screwing the adjusters ③ on the brake lever holder all the way in.

DATA Rear brake lever play ①: 6 – 8 mm (0.2 – 0.3 in)

- After adjusting the play, check that the rear wheels roll freely without applying the brake, the transmission in neutral and the rear wheels off the ground. Readjust the rear brake lever if the rear wheels could not roll freely.

BRAKE FLUID

Inspect every 1 000 km (600 miles, 3 months).
Replace every two years.



BRAKE FLUID LEVEL

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

BF Specification and classification: DOT 4

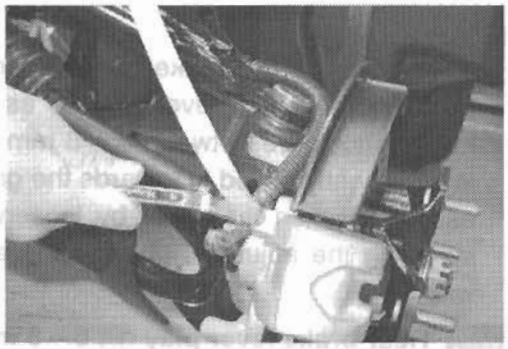
⚠ WARNING

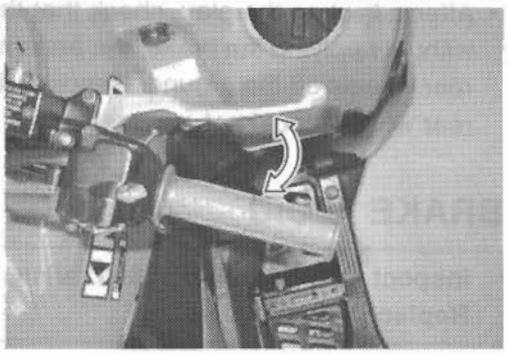
*** The brake system of this vehicle is filled with a glycol-based brake fluid. Do not use or mix different types of fluid such as silicone-based and petroleum-based fluids. Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for a long period of time.**

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

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 the 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 the brake pedal several times in rapid succession and squeeze the lever or the 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 the brake pedal reaching bottom of the stroke. Then, close the air bleeder valve, pump and squeeze the lever or the 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 the upper limit line.

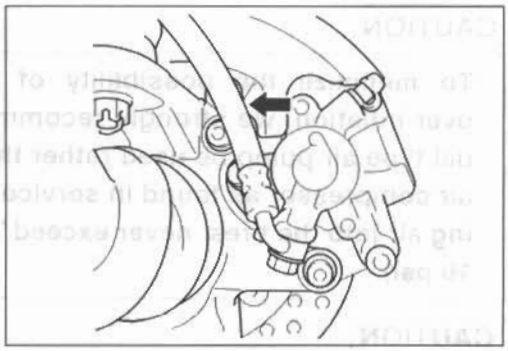
Air bleeder valve: 5.5 N·m (0.55 kgf-m, 4.0 lb-ft)

CAUTION

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

BRAKE HOSES

Inspect every 2 000 km (1 200 miles, 6 months).
Replace every four years.



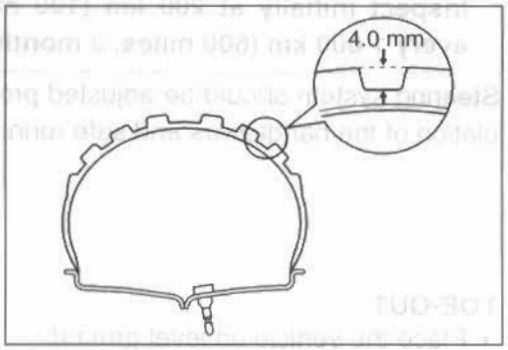
- Check the brake hoses for leakage, cracks, wear and damage. If any damages are found, replace the brake hoses with new ones.

TIRES

Inspect every 2 000 km (1 200 miles, 6 months).

TIRE TREAD CONDITION

Operating the vehicle with excessively worn tires will decrease riding stability and consequently invite a dangerous situation. It is highy 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.

COLD INFLATION TIRE PRESSURE	kPa	kgf/cm²	psi
FRONT	35	0.35	5.1
REAR	30	0.30	4.4

VEHICLE LOAD CAPACITY LIMIT: 172 kg (380 lbs)

CAUTION

To minimize the possiblility 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 70 kPa (0.7 kgf/cm², 10 psi).

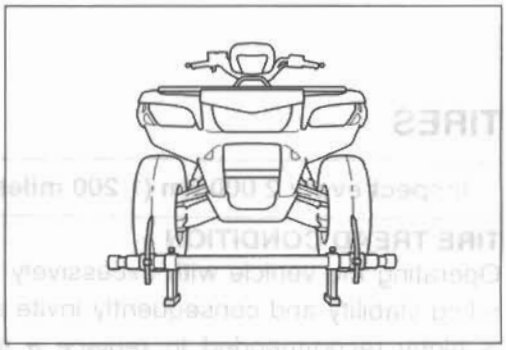
CAUTION

The standard tire fitted on this vehicle is an AT25×8-12☆☆ for the front and a AT25×10-12☆☆ 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 200 km (100 miles, 1 month) and every 1 000 km (600 miles, 3 months) thereafter.

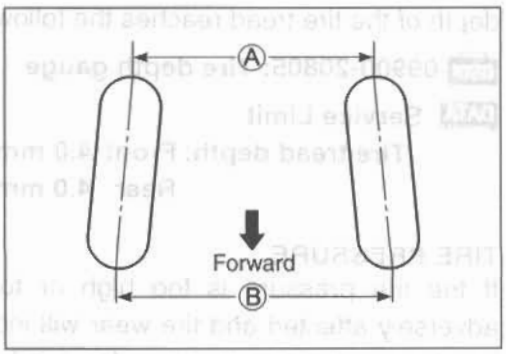
Steering system should be adjusted properly for smooth manipulation of the handlebars and safe running.



TOE-OUT

- 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 distances (Ⓐ and Ⓑ) between the front wheels. Subtract the measurement of Ⓑ from that of Ⓐ to find the toe-out. If the toe-out is not within specification, adjust the tie rod to the right or left until the toe-out is within the specified range.

  Ⓑ – Ⓐ = Toe-out



DATA Toe-out

Standard: 10 ± 4 mm (0.39 ± 0.16 in)

- If the toe-out is out of specification, bring it into the specified range. (☞8-52)

SUSPENSIONS

Inspect every 2 000 km (1 200 miles, 6 months).

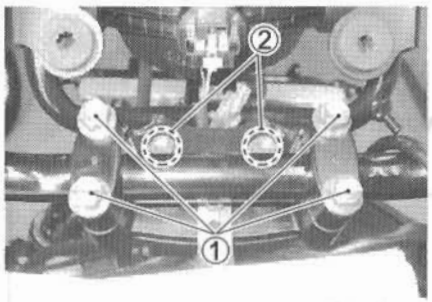
- Support the vehicle with a jack and wooden blocks.
- Remove the front and rear wheels. (☞8-13)
- Inspect the wishbone arm and bushing for scratches, wear, or damage. If any damages are found, replace them with new ones. (☞8-36 and 8-69)
- Inspect the front and rear shock absorbers for oil leakage or damage. If any damages are found, replace them with new ones. (☞8-36 and 8-69)

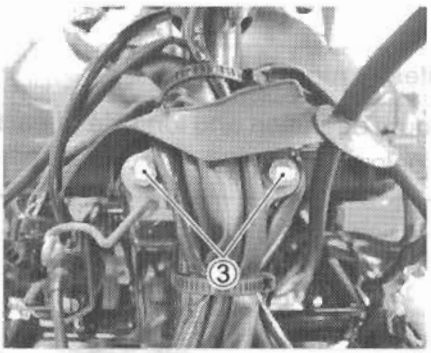
CHASSIS NUTS AND BOLTS

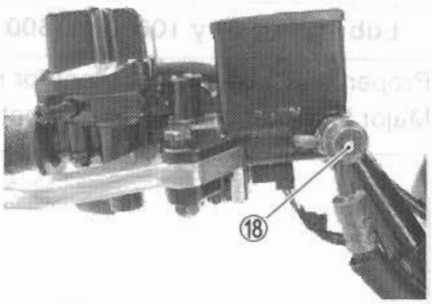
Tighten initially at 200 km (100 miles, 1 month) and every 1 000 km (600 miles, 3 months) thereafter.

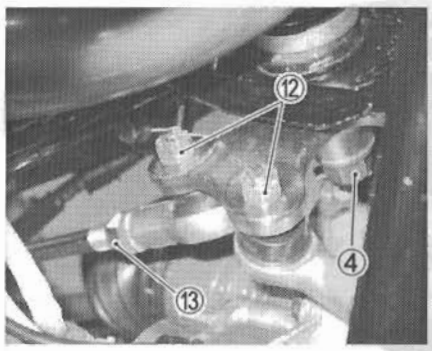
Check that all chassis nuts and bolts are tightened to their specified torque. (Refer to page 2-29 for the locations of the following nuts and bolts.)

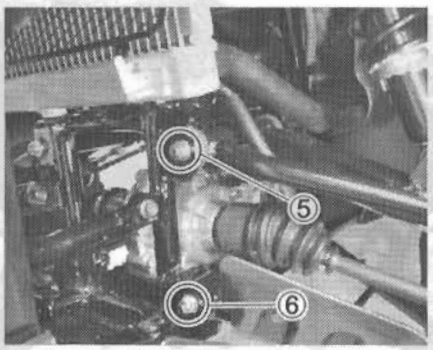
Item	N·m	kgf-m	lb-ft
① Handlebar upper clamp bolt	26	2.6	19.0
② Handlebar holder nut	60	6.0	43.5
③ Steering shaft holder bolt	23	2.3	16.5
④ Steering shaft lower nut	120	12.0	87.0
⑤ Front wishbone arm pivot nut (upper)	60	6.0	43.5
⑥ Front wishbone arm pivot nut (lower)	65	6.5	47.0
⑦ Hub nut (front and rear)	110	11.0	79.5
⑧ Wheel set nut (front and rear)	60	6.0	43.5
⑨ Steering knuckle end nut (upper and lower)	29	2.9	21.0
⑩ Front shock absorber mounting nut (lower)	60	6.0	43.5
⑪ Front shock absorber mounting bolt (upper)	55	5.5	40.0
⑫ Tie rod end nut	29	2.9	21.0
⑬ Tie rod locknut	45	4.5	32.5
⑭ Front brake air bleeder valve	5.5	0.55	4.0
⑮ Front brake caliper mounting bolt	26	2.6	19.0
⑯ Footrest bar mounting bolt (M8)	26	2.6	19.0
⑰ Footrest bar mounting bolt (M10)	55	5.5	40.0
⑱ Front brake hose union bolt	23	2.3	16.5
⑲ Rear shock absorber mounting nut (lower)	60	6.0	43.5
⑳ Rear shock absorber mounting nut (upper)	60	6.0	43.5
㉑ Rear wishbone arm pivot nut (upper and lower)	60	6.0	43.5
㉒ Rear knuckle nut (upper and lower)	60	6.0	43.5
㉓ Rear stabilizer link nut	34	3.4	24.5
㉔ Trailer towing mounting bolt (option)	60	6.0	43.5

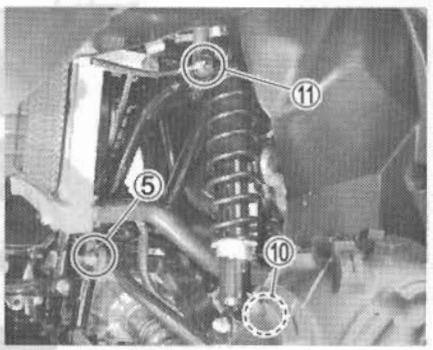

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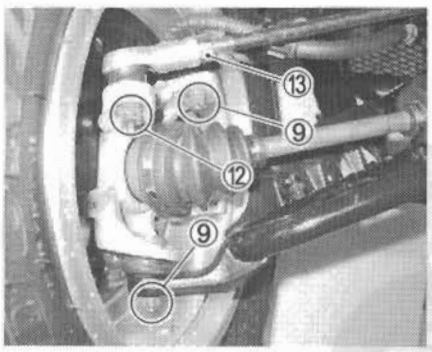

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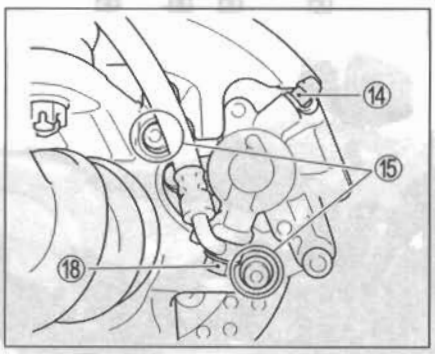

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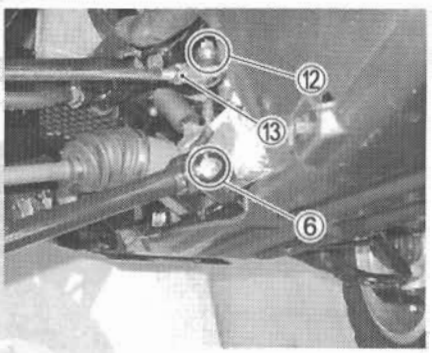

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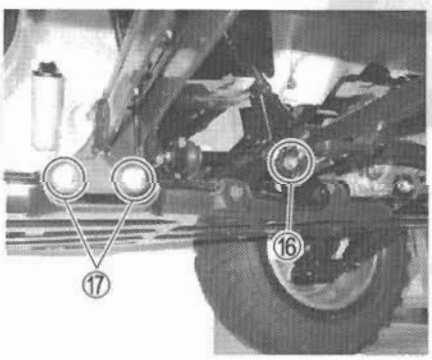

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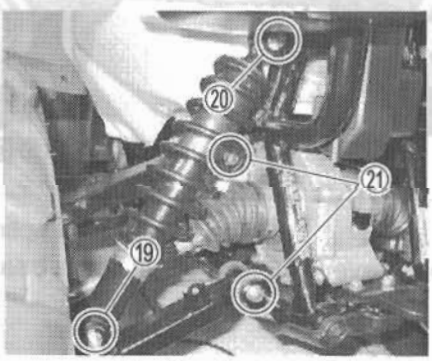

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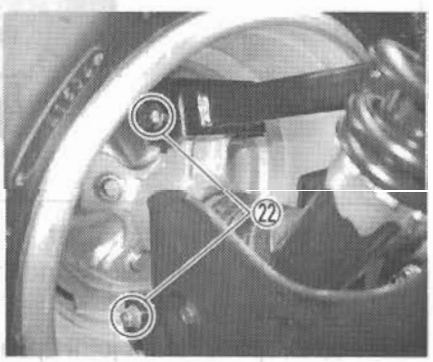

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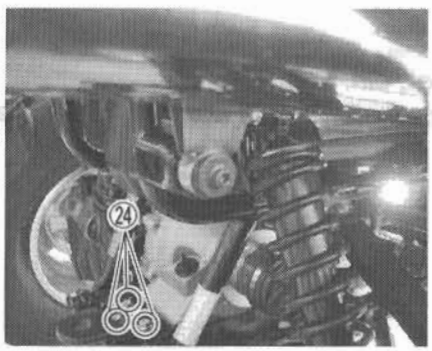

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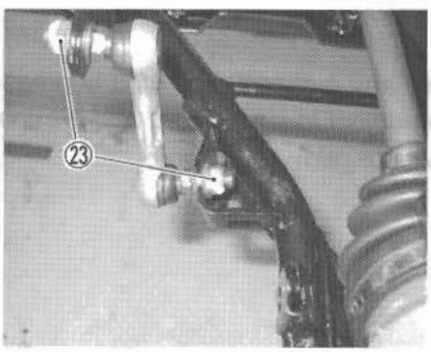

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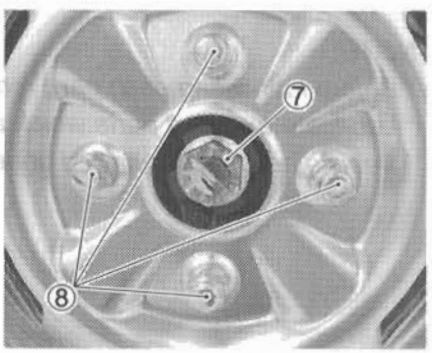

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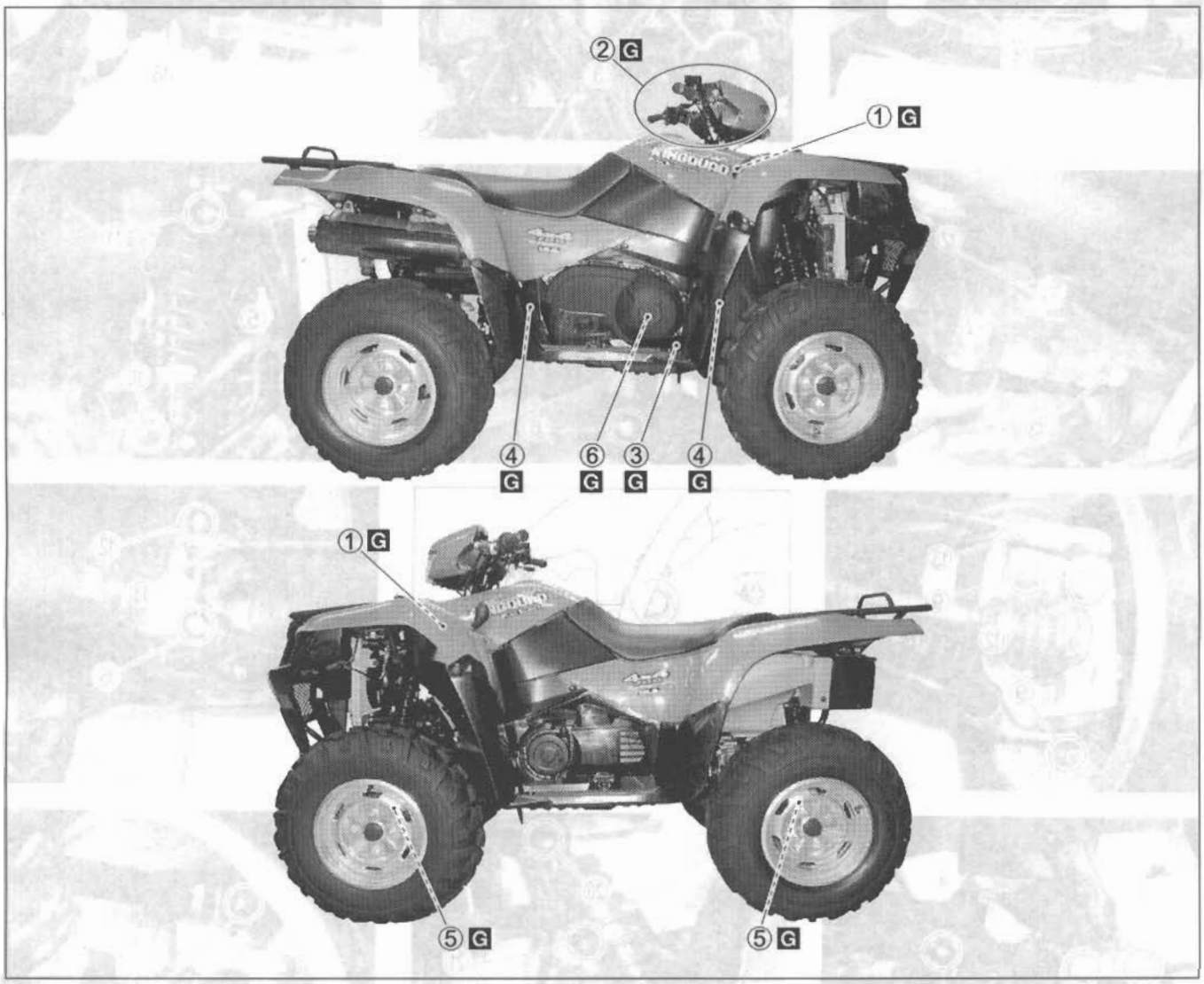

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GENERAL LUBRICATION

Lubricate every 1000 km (600 miles, 3 months).

Proper lubrication is important for smooth operation and long life of each working part of the vehicle. Major lubrication points are indicated below.



① Steering shaft holder
② Brake lever holder and throttle lever
③ Brake pedal
④ Propeller shaft joint spline
⑤ Drive shaft joint spline
⑥ Drive belt cover bearing (inner race)
G Grease

NOTE:

** Before lubricating each part, remove any rust 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 shoud include compression readings for each maintenance service.

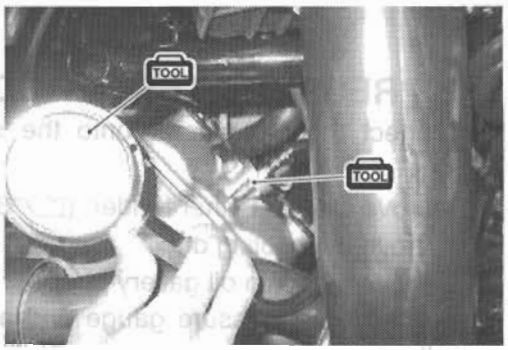
DATA **Compression pressure:**
Standard: 1 000 kPa (10.0 kgf/cm², 142 psi)
(Automatic decompression actuated)

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 and the valves are properly adjusted.*
** Warm up the engine 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 spark plug. (☞2-10)
- 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 **09915-64510: Compression gauge set**
09915-63310: 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:
Above 140 kPa (1.4 kgf/cm², 20.0 psi)
Below 180 kPa (1.8 kgf/cm², 26.0 psi)

Low or high oil pressure can indicate any of the following conditions:

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

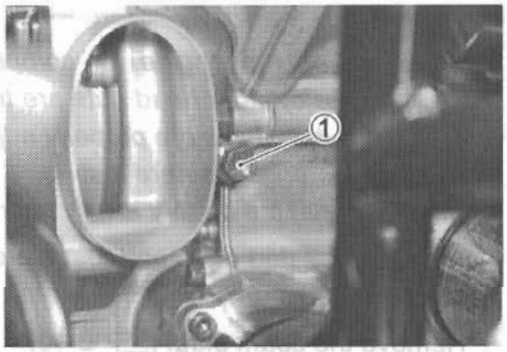
HIGH OIL PRESSURE
* Engine oil viscosity is too high
* Clogged oil passage
* Combination of the above items

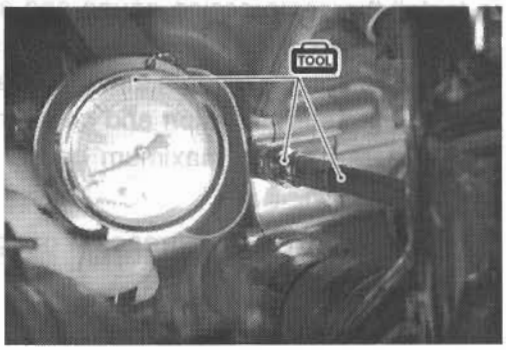
OIL PRESSURE TEST PROCEDURE

- Connect the tachometer onto the spark plug high-tension cord.
- Remove the right inner fender. (☞8-6)
- Remove the cooling duct.
- 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 pressrure gauge.

TOOL 09915-74511: Oil pressure gauge
09900-26006: Tachometer

Main oil gallery plug: 23 N·m (2.3 kgf-m, 16.5 lb-ft)





INITIAL ENGAGEMENT AND CLUTCH LOCK-UP INSPECTION

The LT-A700X is equipped with a centrifugal type automatic clutch.

To insure proper performance and longevity of the clutch assemblies it is essential that the clutches engage smoothly and gradually. Before checking the initial engagement and clutch lock-up two inspection checks must be performed to thoroughly check the operation of the drive train. Perform the following:

- Remove the fuel tank cover.
- Warm up the engine.

INITIAL ENGAGEMENT INSPECTION

- Connect the tachometer or the multi circuit tester onto the spark plug high-tension cord.
- Start the engine.
- Shift the range lever to the "High" position.
- Slowly open the throttle and note the engine speed (r/min) when the vehicle begins to move forward.

TOOL **09900-26006: Tachometer, or**
09900-25008: Multi circuit tester set

DATA **Engagement speed: 1 600 – 2 000 r/min**

If the engagement speed does not coincide with the standard range, inspect the following items for any abnormalities.

* Clutch shoe . . . . . ☞3-49
* Clutch wheel . . . . . ☞3-49
* Movable drive and driven face . . . . . ☞3-51

CLUTCH LOCK-UP INSPECTION

Perform this inspection to determine if the clutch is engaging fully and not slipping.

- Connect a tachometer onto the spark plug high-tension code.
- Start the engine.
- Shift the range lever to the "High" position.
- Apply the front and rear brakes as firmly as possible.
- Fully open the throttle for a brief period and note the maximum engine speed sustained during the test cycle.

DATA Lock-up speed: 3 500 – 4 100 r/min

CAUTION

Do not apply full power for more than 5 seconds or damage to the clutch or engine may occur.

If the lock-up speed (r/min) does not coincide with the standard range, inspect the following items for any abnormalities.

* Clutch shoe . . . . . ☞3-49
* Clutch wheel . . . . . ☞3-49
* Movable drive and driven face . . . . . ☞3-51

ENGINE

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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
Recoil starter	3-13	3-103
Water pump	3-16	3-96
Starter cup	3-16	3-95
Speed sensor	3-78	3-79

ENGINE RIGHT SIDE

PARTS	REMOVAL	INSTALLATION
Clutch cover	3-20	3-91
Movable drive/driven face	3-21	3-89
Fixed drive face	3-22	3-88
Gear position switch	3-22	3-88

ENGINE CENTER

PARTS	REMOVAL	INSTALLATION
Starter motor	3-12	3-103
Cam chain tensioner	3-14	3-100
Cylinder head cover	3-13	3-102
Camshaft	3-13	3-101
Cylinder head	3-14	3-98
Cylinder	3-15	3-98
Piston	3-15	3-96
Oil filter	3-16	3-96

ENGINE REMOVAL AND INSTALLATION

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.

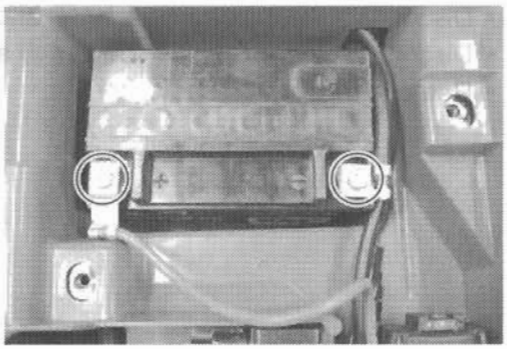
- Drain engine oil. (☞2-12)
- Drain engine coolant. (☞2-16)
- Remove the seat. (☞8-4)
- Remove the left and right inner fender. (☞8-6)
- Remove the rear propeller shaft. (☞4-35)



- Disconnect the battery lead wires.
- Remove the battery stay and the battery.

CAUTION

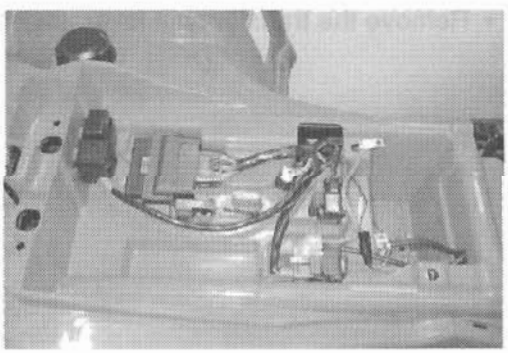
When disconnecting the battery lead wires, be sure to disconnect the ⊖ battery lead wire first.



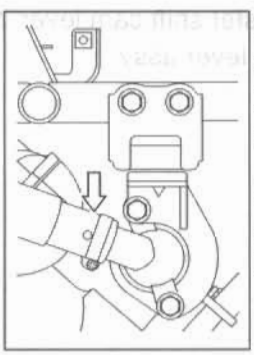
- Remove the front fender. (☞8-5)

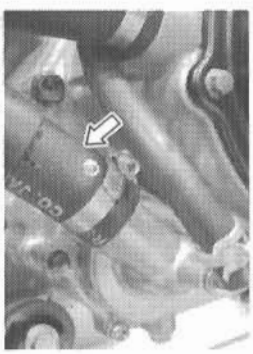


- Remove the rear fender. (☞8-10)

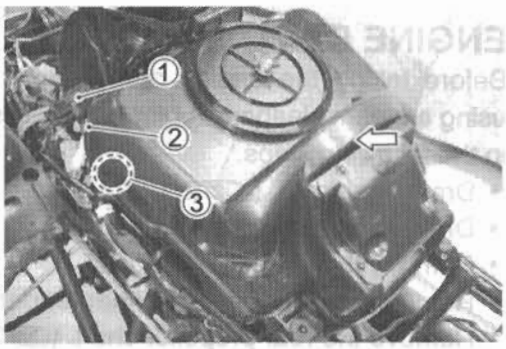


- Disconnect the water hoses.

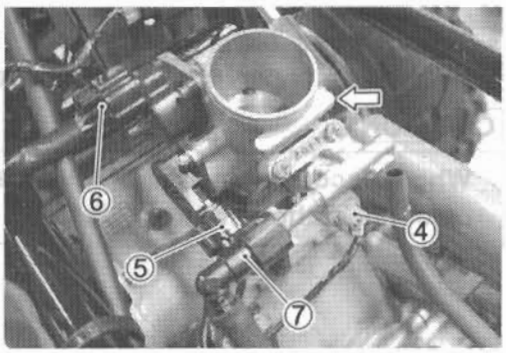




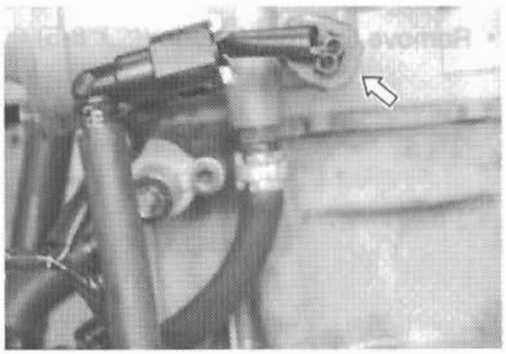
- Disconnect the IAP sensor coupler ① and hose ②.
- Disconnect the IAT sensor coupler ③.
- Remove the air cleaner box.



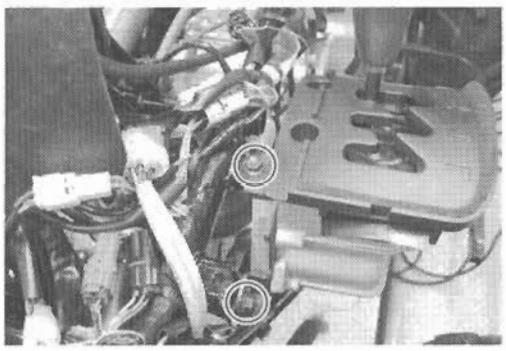
- Disconnect the injector coupler ④ and TPS coupler ⑤.
- Disconnect the ISC valve coupler ⑥ and fuel feed hose ⑦.
- Remove the throttle body.



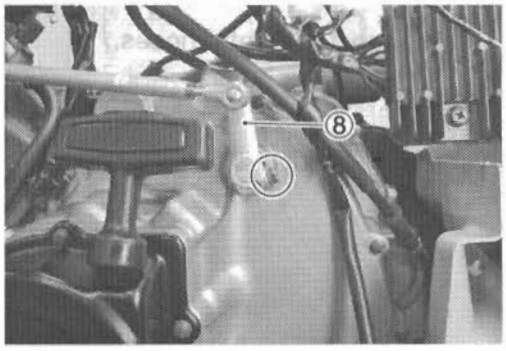
- Disconnect the ECT sensor coupler.



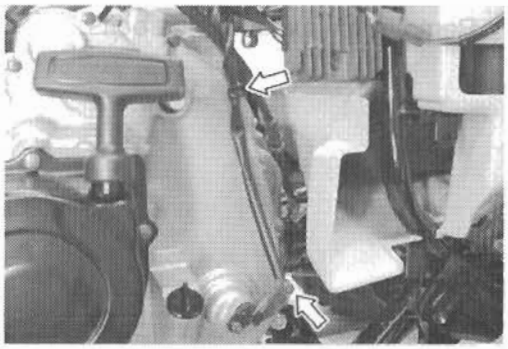
- Remove the transfer shift lever assy mounting bolts.



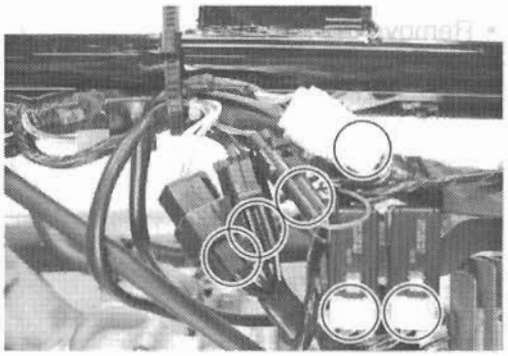
- Remove the transfer shift cam lever ⑧.
- Remove the shift lever assy.



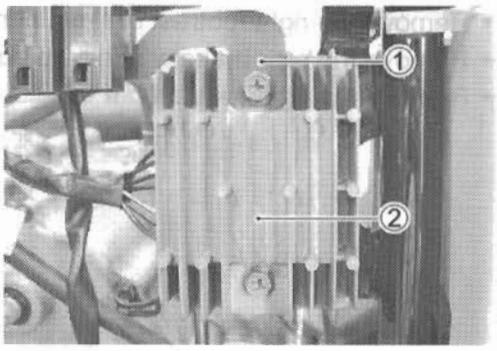
- Disconnect the speed sensor coupler and clamp.



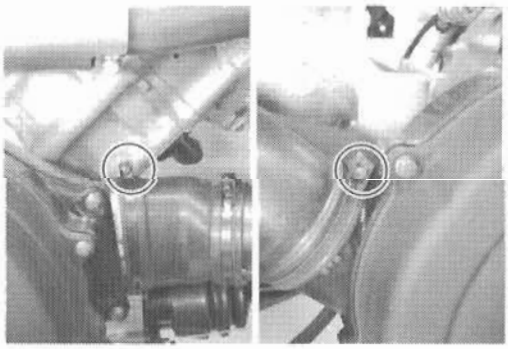
- Disconnect the couplers and wiring harness clamp.



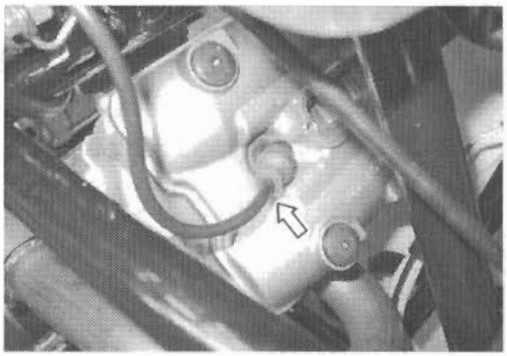
- Remove the differential relay stay ①.
- Remove the regulator/rectifier ②.



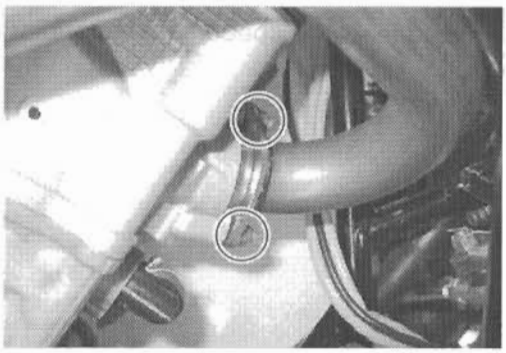
- Remove the cooling ducts. (Intake and outlet)



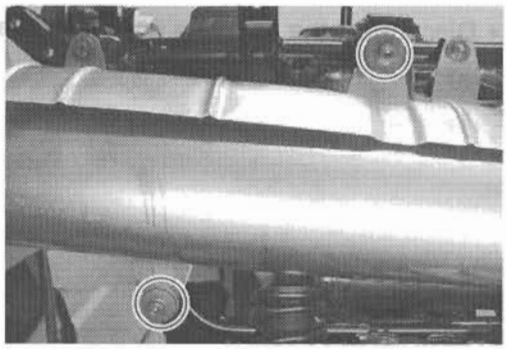
- Disconnect the spark plug cap.



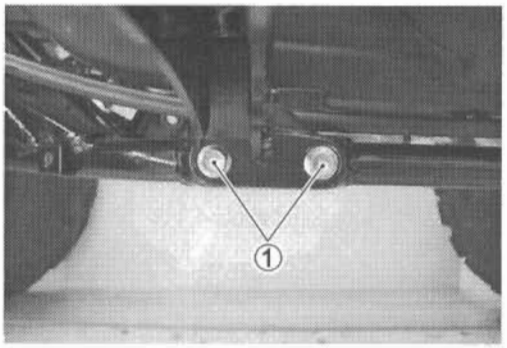
- Remove the exhaust pipe bolts.

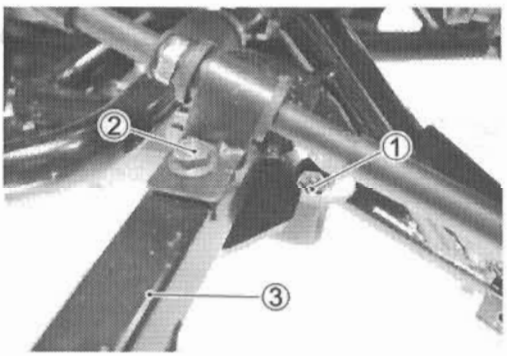


- Remove the muffler.

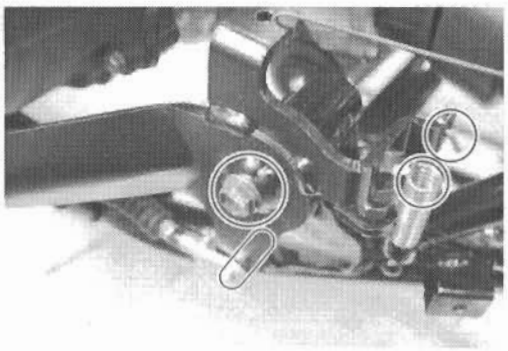


- Remove the right footrest bar mounting bolts ①.
- Remove the rear brake wire clamp bolt ②.
- Remove the right footrest bar ③.

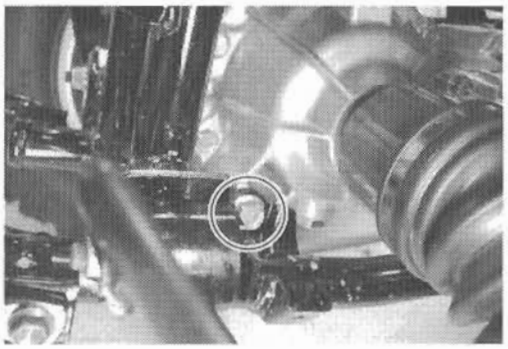




- Remove the rear brake pedal.

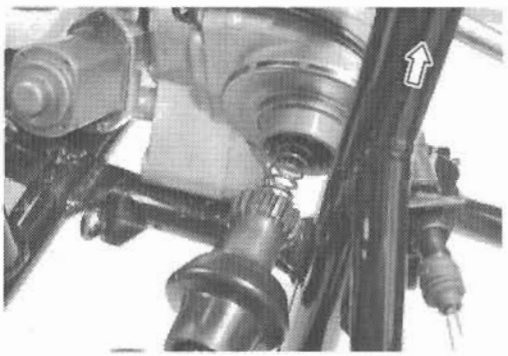


- Remove the front differential mounting bolts/nuts.

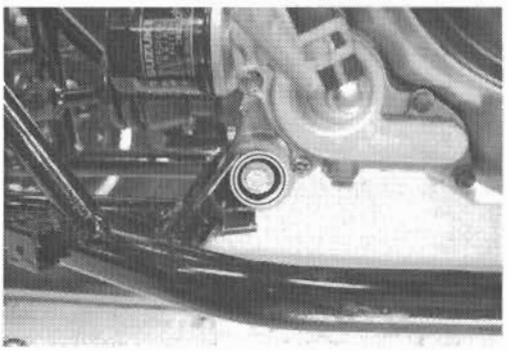




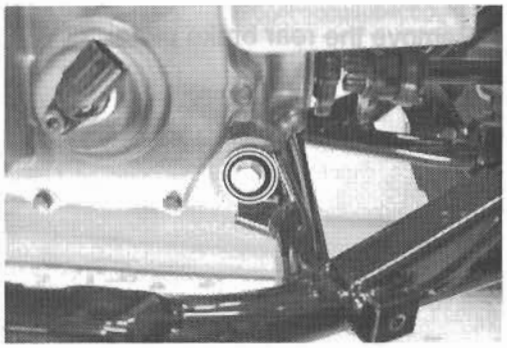
- Slide the front differential assy forward.
- Remove the front propeller shaft spring.

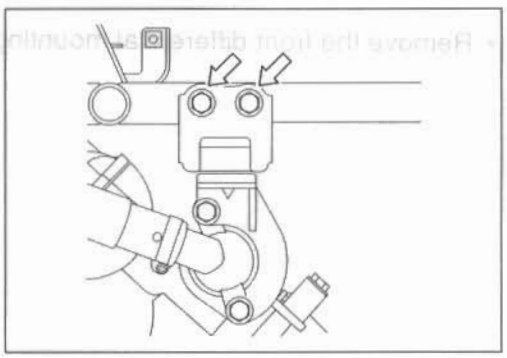


- Remove the engine mounting bolts/nuts.



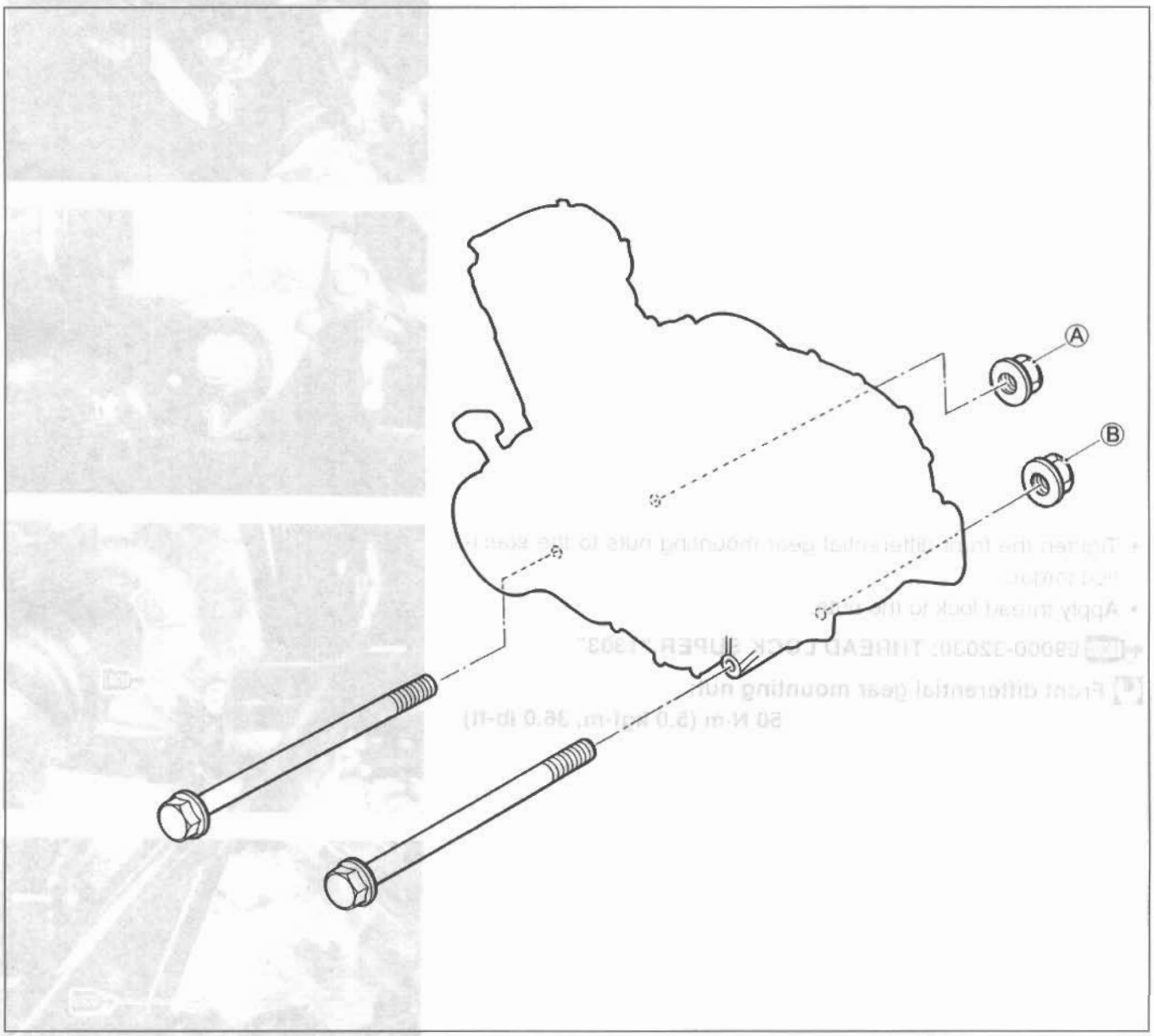
- Remove the engine from the right side.





ENGINE INSTALLATION

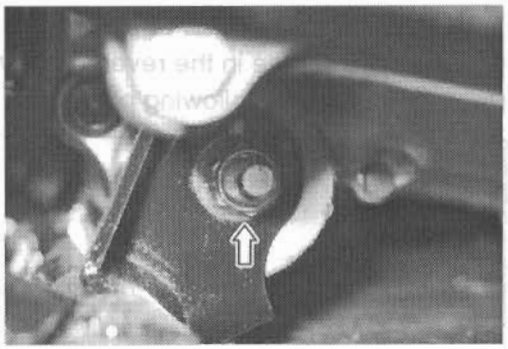
Remount the engine in the reverse order of engine removal.
Pay attention to the following points:

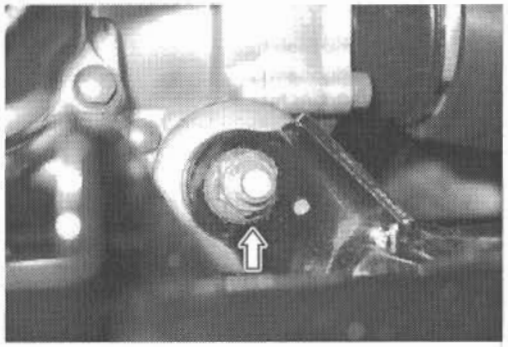


ITEM	N·m	kgf-m	lb-ft
Ⓐ	60	6.0	43.5
Ⓑ	60	6.0	43.5

- Tighten the engine mounting nuts to the specified torque.

Engine mounting nut: 60 N·m (6.0 kgf-m, 43.5 lb-ft)

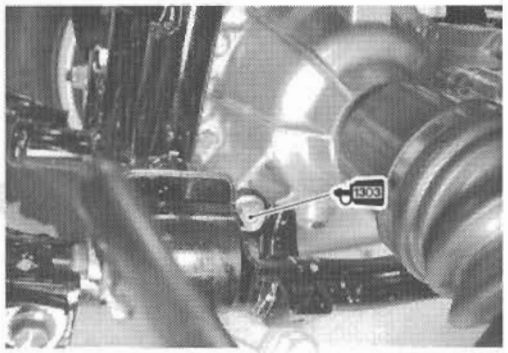




- Tighten the front differential gear mounting nuts to the specified torque.
- Apply thread lock to the nuts.

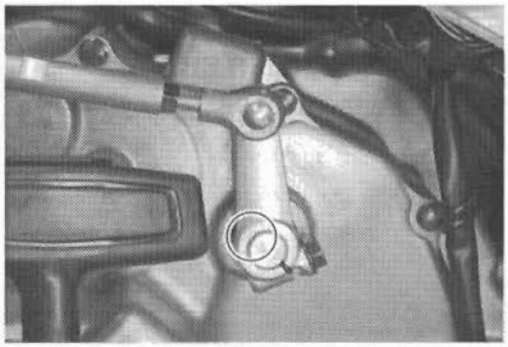
1303 99000-32030: THREAD LOCK SUPER "1303"

Front differential gear mounting nut:
50 N·m (5.0 kgf-m, 36.0 lb-ft)





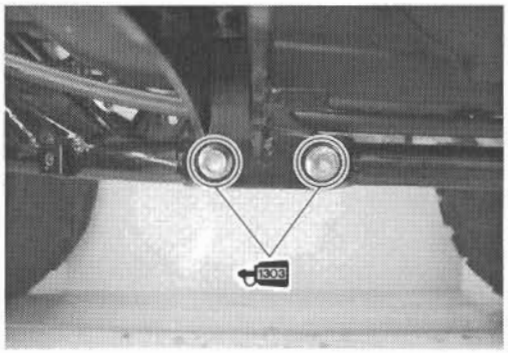
- When installing the transfer shift cam lever, align the both serrations.

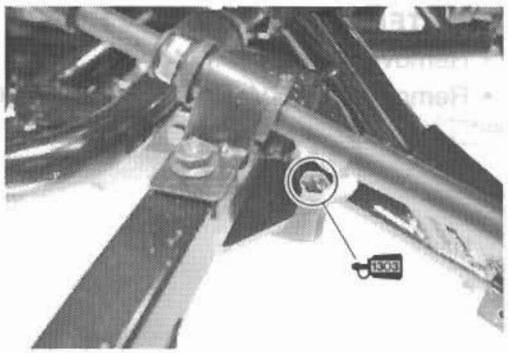


- Apply THREAD LOCK SUPER "1303" to the footrest bolts, and tighten them to the specified torque.

1303 99000-32030: THREAD LOCK SUPER "1303"

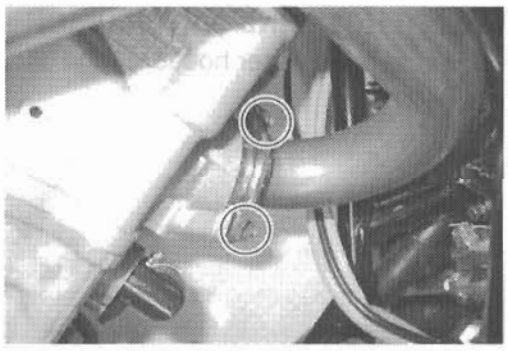
Footrest bolt (M8): 26 N·m (2.6 kgf-m, 19.0 lb-ft)
(M10): 55 N·m (5.5 kgf-m, 40.0 lb-ft)

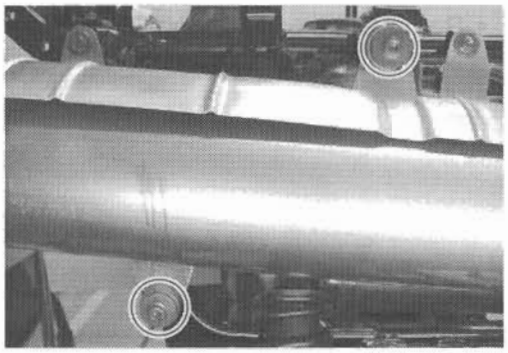




- Install the new gasket and tighten the muffler mounting bolts and exhaust pipe nuts to the specified torque.

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



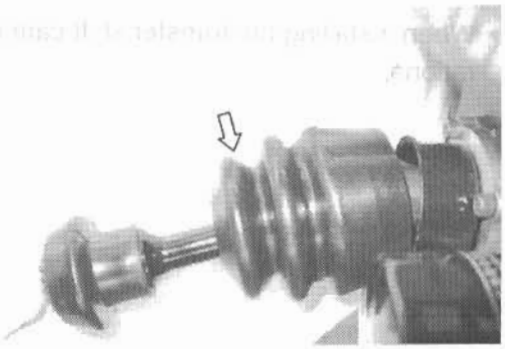


ENGINE DISASSEMBLY

ENGINE TOP SIDE

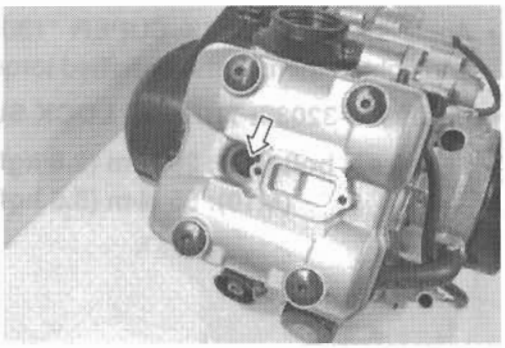
FRONT PROPELLER SHAFT

- Remove the front propeller shaft. (☞4-19)



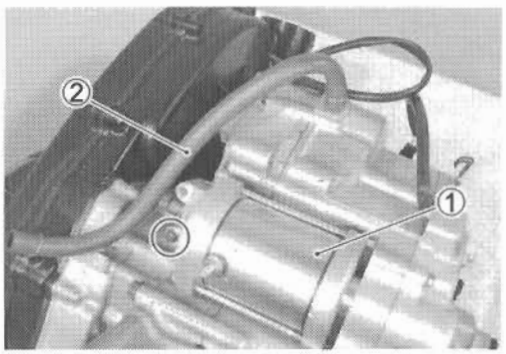
SPARK PLUG

- Remove the spark plug.



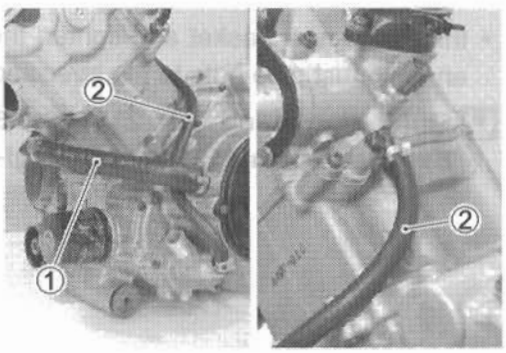
STARTER MOTOR AND PCV HOSE

- Remove the starter motor ①.
- Remove the PCV (Positive Crankcase Ventilation) hose ②.

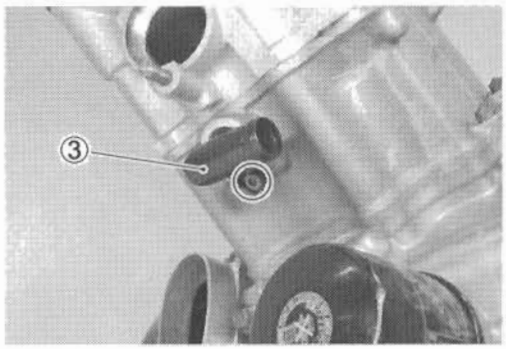


WATER HOSE AND WATER UNION

- Remove the water hoses ① and ②.

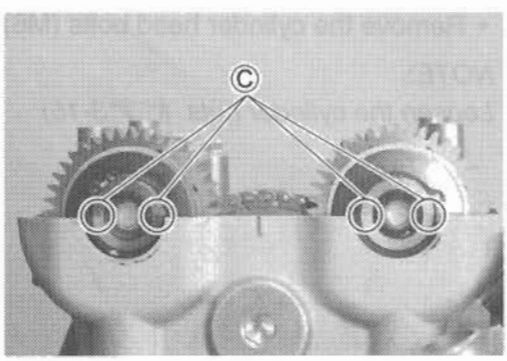


- Remove the water union ③.





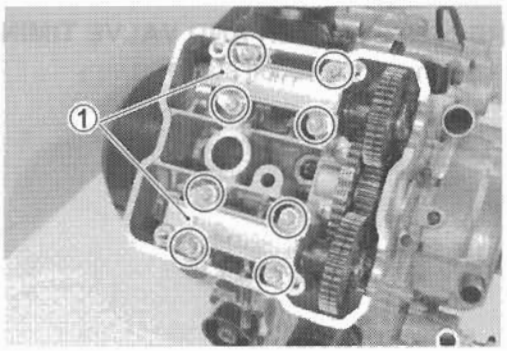
NOTE:
At the above condition, the piston is at TDC of compression stroke and also the engraved lines © on the camshafts are parallel with the mating surface of the cylinder head cover.



• Remove the camshaft journal holders ①.

CAUTION

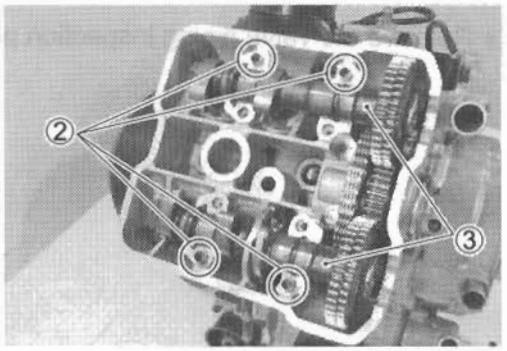
Be sure to loosen the camshaft journal holder bolts evenly by shifting the wrench diagonally.



• Remove the dowel pins ② and camshafts ③.

NOTE:

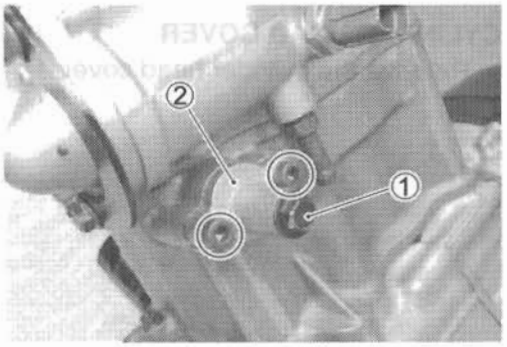
Be careful not to drop the dowel pins into the crankcase.



CAM CHAIN TENSIONER

• Remove the cam chain tensioner cap bolt ①.

• Remove the cam chain tensioner ② with the spring and O-ring.

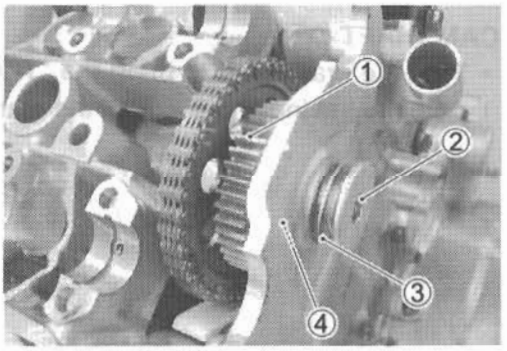


CYLINDER HEAD

• Remove the cam drive idle gear/sprocket ① by removing its shaft ② with the copper washer ③ and the thrust washer ④.

NOTE:

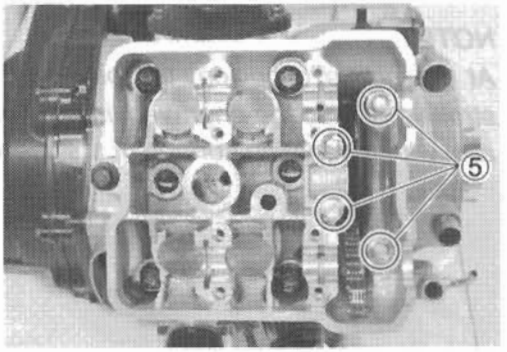
Be careful not to drop the thrust washer ④ into the crankcase.



• Remove the cylinder head bolts (M6) ⑤.

NOTE:

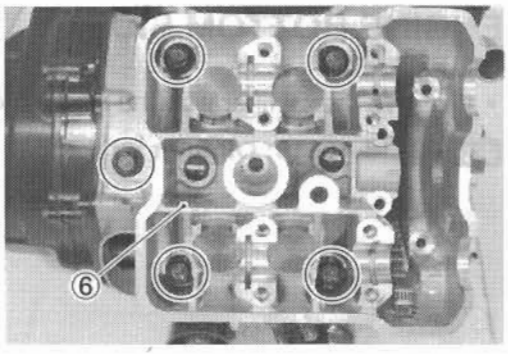
Loosen the cylinder nuts. (☞3-15)



- Remove the cylinder head bolts (M10) and washers.

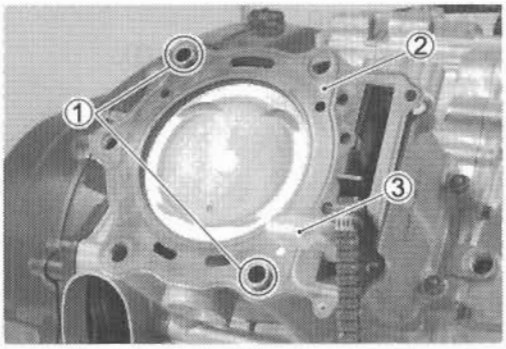
NOTE:
When loosening the cylinder head bolts, loosen each bolt little by little diagonally.

- Remove the cylinder head ⑥.

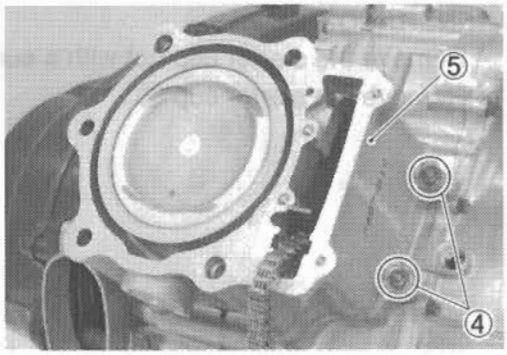


CYLINDER

- Remove the dowel pins ① and gasket ②.
- Remove the cam chain guide ③.



- Remove the cylinder nuts ④.
- Remove the cylinder ⑤.



- Remove the dowel pins ⑥ and gasket ⑦.

NOTE:
Be careful not to drop the dowel pins ⑥ into the crankcase.

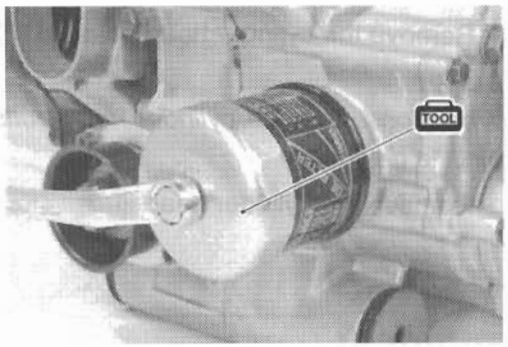


ENGINE BOTTOM SIDE

OIL FILTER

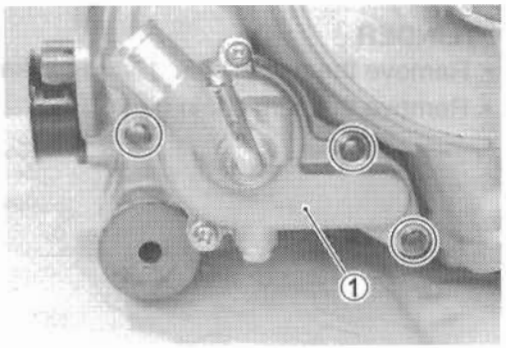
- Remove the oil filter with the special tool.

TOOL 09915-40610: Oil filter wrench



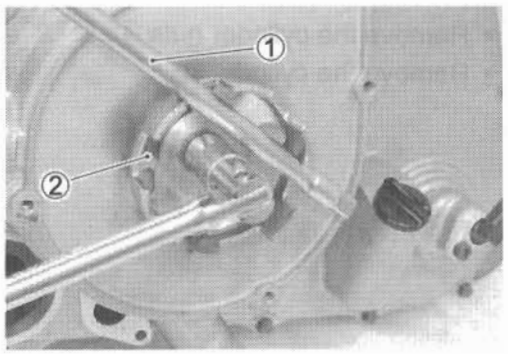
WATER PUMP

- Remove the water pump ①.

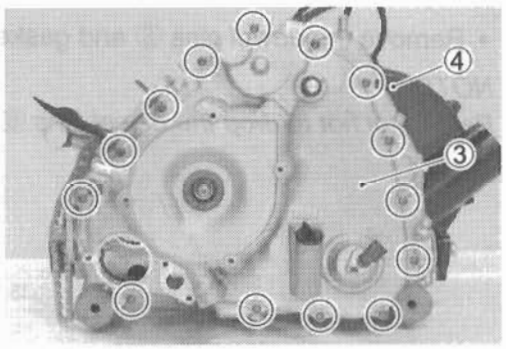


GENERATOR COVER

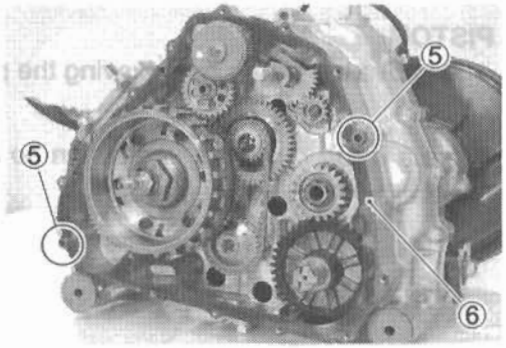
- Remove the starter cup nut with a suitable bar ①.
- Remove the starter cup ②.



- Remove the generator cover ③ and clamp ④.

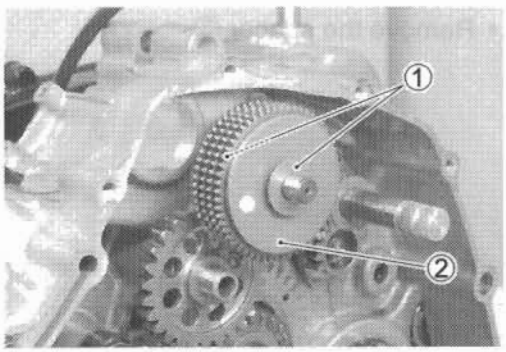


- Remove the dowel pins ⑤ and gasket ⑥.



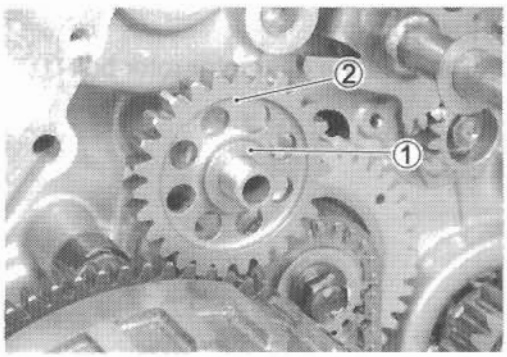
STARTER TORQUE LIMITER

- Remove the washers ① and starter torque limiter ②.



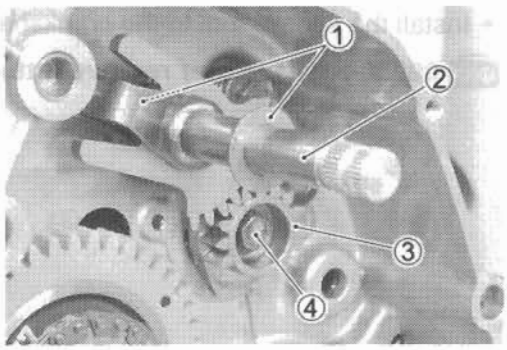
STARTER IDLE GEAR

- Remove the washer ① and starter idle gear ②.

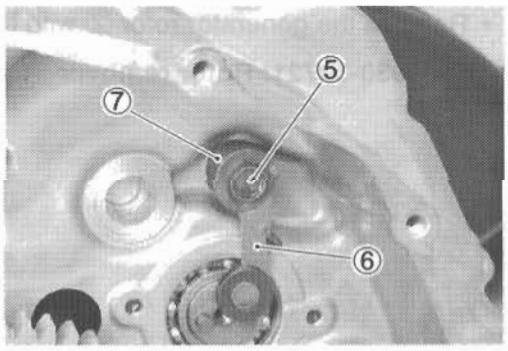


GEARSHIFT

- Remove the washers ① and gearshift shaft ②.
- Remove the cam driven gear ③ by removing its bolt ④.

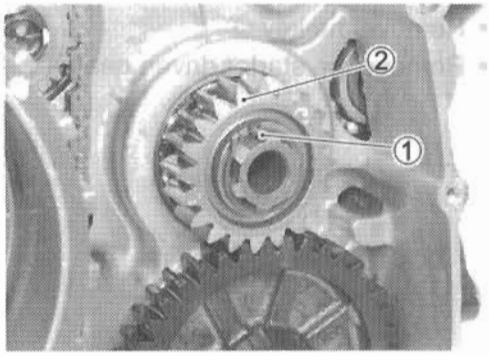


- Remove the gearshift cam stopper bolt ⑤, gearshift cam stopper ⑥, washer and return spring ⑦.

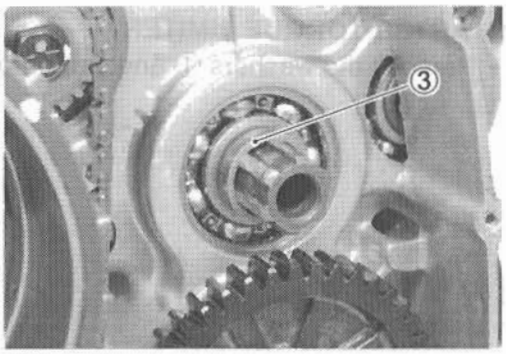


TRANSFER OUTPUT DRIVE GEAR

- Remove the snap ring ① and transfer output drive gear ②.

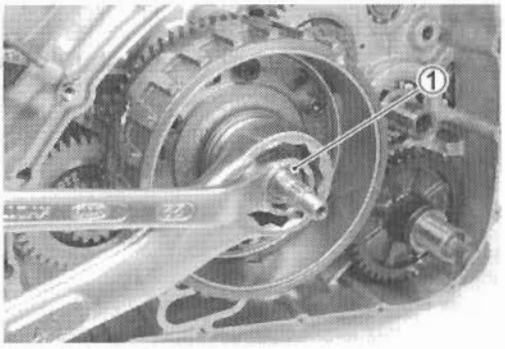


- Remove the spacer ③.



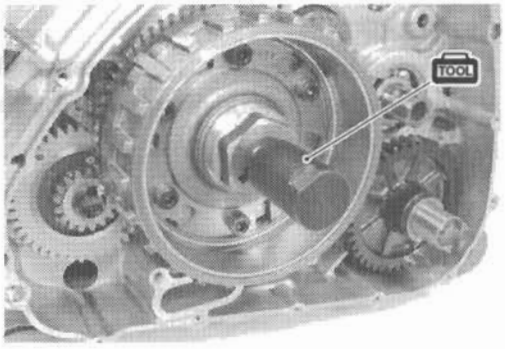
GENERATOR

- Remove the generator rotor bolt ①.



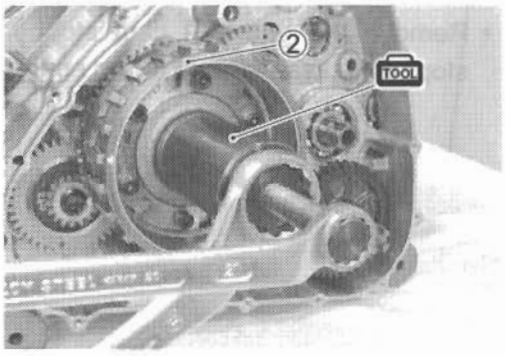
- Install the special tool to the crankshaft end.

09930-31921: Rotor remover attachment

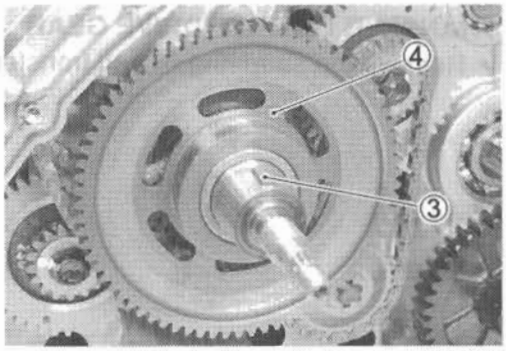


- Remove the generator rotor ② with the special tool.

09930-30721: Rotor remover

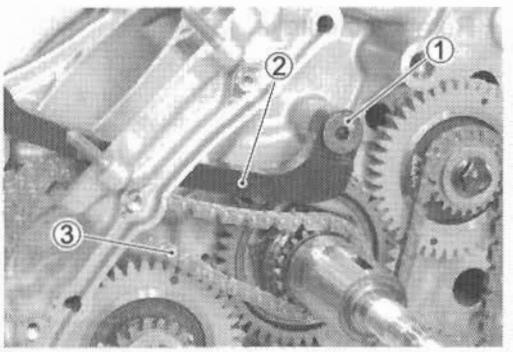


- Remove the key ③.
- Remove the starter driven gear ④.



CAM CHAIN AND CAM CHAIN TENSIONER

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

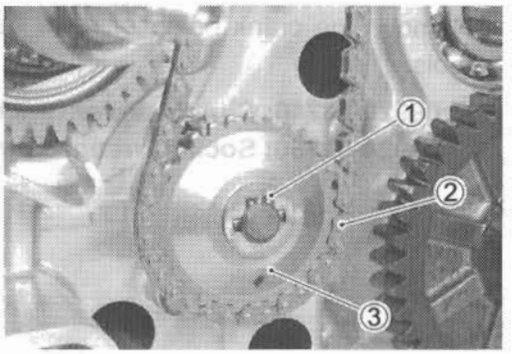


OIL PUMP

- Remove the snap ring ①.

NOTE:
Be careful not to drop the snap ring ① into the crankcase.

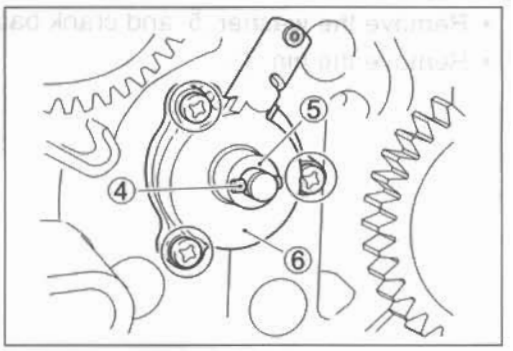
- Remove the oil pump drive chain ② and oil pump driven gear ③.



- Remove the pin ④ and washer ⑤.

NOTE:
Be careful not to drop the pin ④ and washer ⑤ into the crankcase.

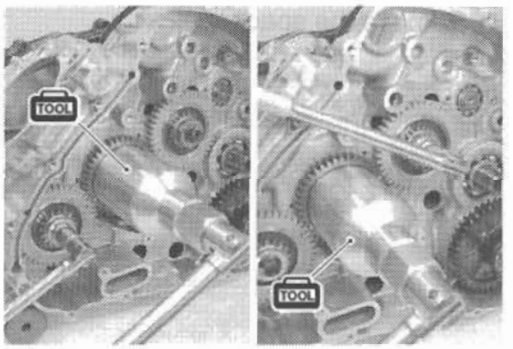
- Remove the oil pump ⑥.



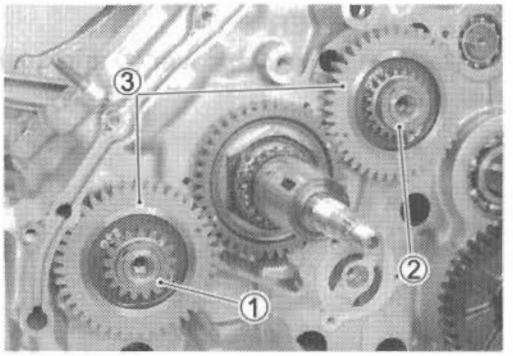
BALANCER SHAFT DRIVE/DRIVEN GEAR

- Remove the balancer shaft driven gear bolts with the special tool.

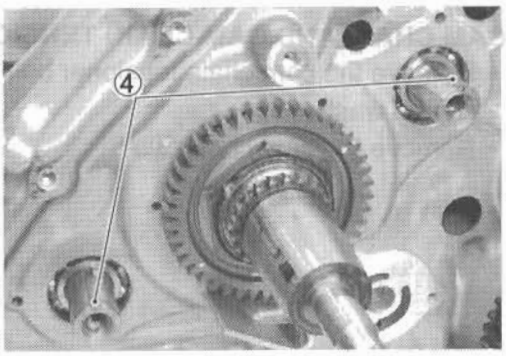
09924-52460: Socket wrench 52 mm



- Remove the water pump drive gear ① and oil pump drive gear ②.
- Remove the balancer shaft driven gears ③.

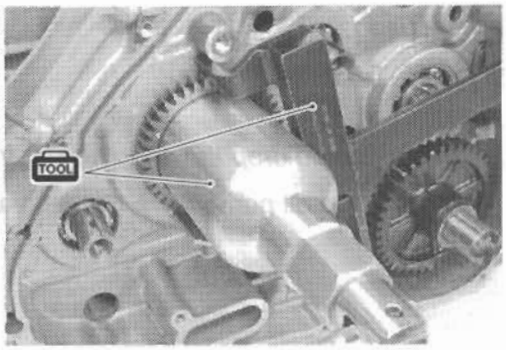


• Remove the keys ④.

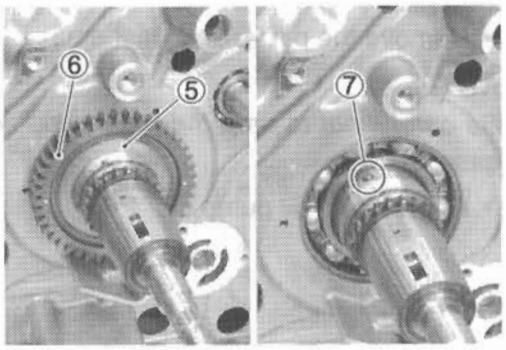


• Remove the crank balancer drive gear nut with the special tools.

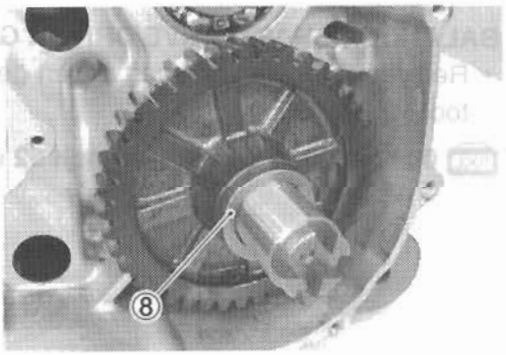
TOOL **09920-53740: Clutch sleeve hub holder**
09924-52460: Socket wrench 52 mm



• Remove the washer ⑤ and crank balancer drive gear ⑥.
• Remove the pin ⑦.

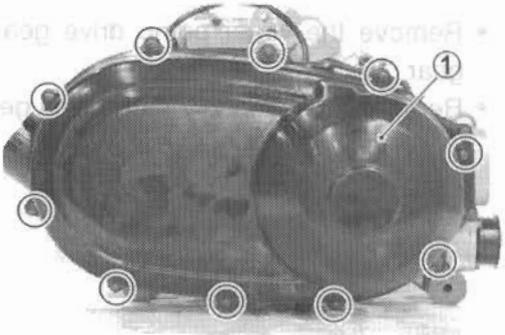


• Remove the spacer ⑧.

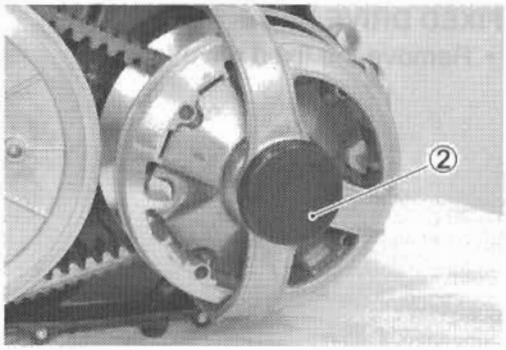


CLUTCH COVER

• Remove the clutch cover ① and gasket.



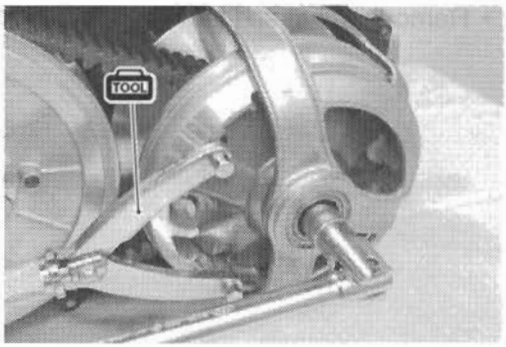
- Remove the cap ②.



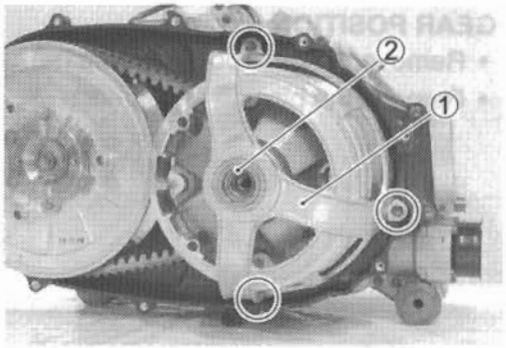
MOVABLE DRIVE FACE

- Remove the movable drive face bolt with the special tool.

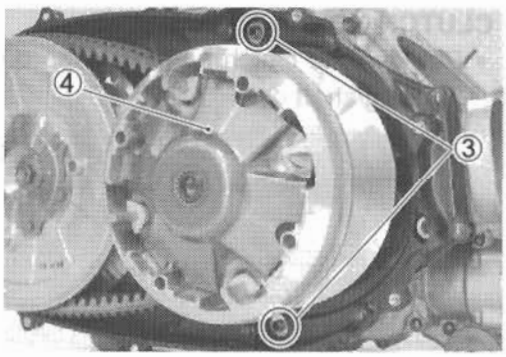
09930-40113: Rotor holder



- Remove the movable drive face cover ① and collar ②.



- Remove the dowel pins ③.
- Remove the movable drive face ④.

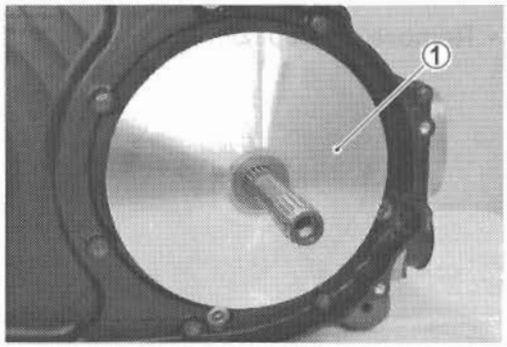


MOVABLE DRIVEN FACE

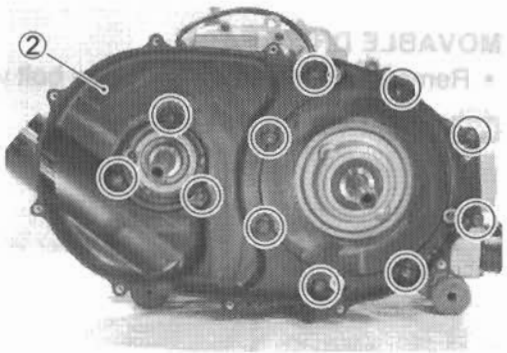
- Remove the movable driven face bolt with the special tool.

FIXED DRIVE FACE

- Remove the fixed drive face ①.

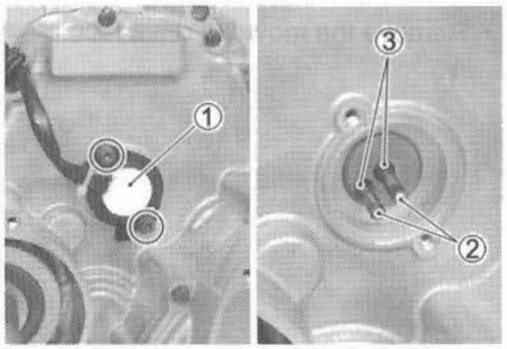


- Remove the clutch inner cover ② and gasket.



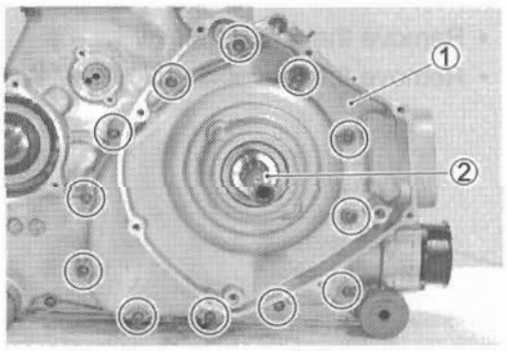
GEAR POSITION SWITCH

- Remove the gear position switch ①.
- Remove the pins ② and springs ③.

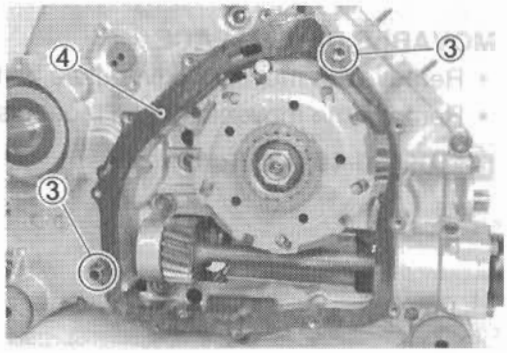


CLUTCH HOUSING CASE

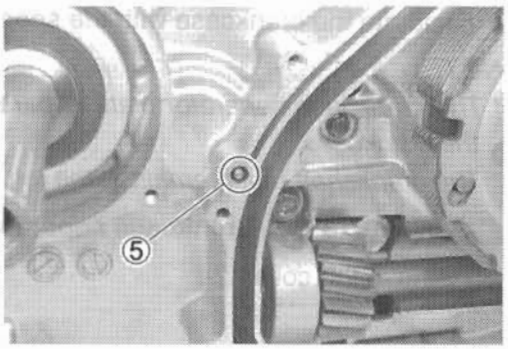
- Remove the clutch housing case ① together with the clutch housing/shaft ②.



- Remove the dowel pins ③ and gasket ④.

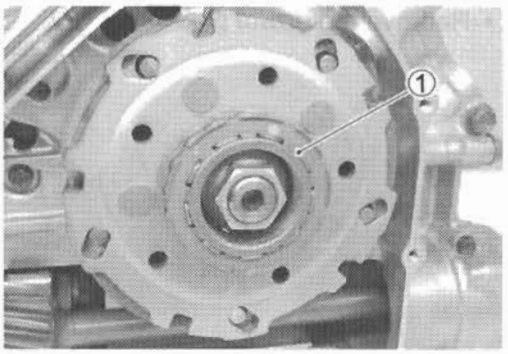


- Remove the oil jet ⑤.



CLUTCH SHOE

- Remove the one way clutch ①.

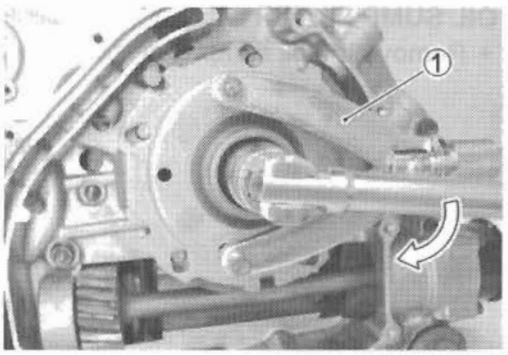


- Remove the clutch shoe nut with the special tool.

CAUTION

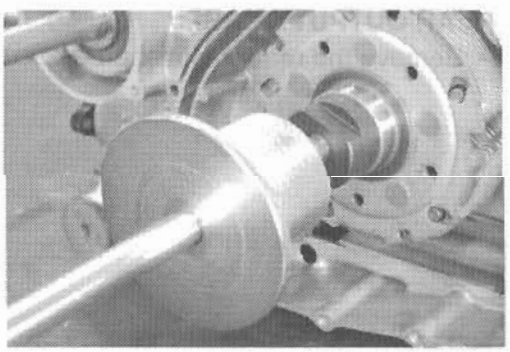
The clutch shoe nut has left-hand threads.

09930-40113: Rotor holder
09930-40131: Attachment



- Remove the clutch shoe with the special tool.

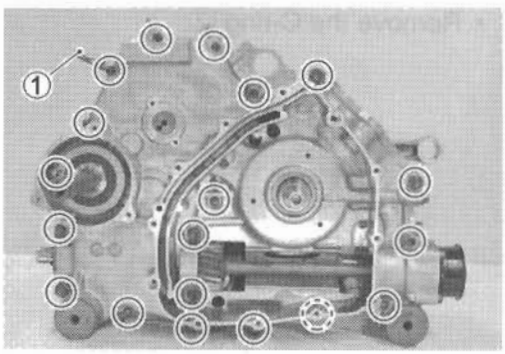
09930-30104: Sliding shaft
09920-33540: Clutch shoe remover



CRANKCASE

- Remove the right crankcase bolts (M6) and clamp ①.
- Remove the right crankcase bolts (M8).

NOTE:
Loosen the crankcase bolts diagonally with the smaller sizes first.



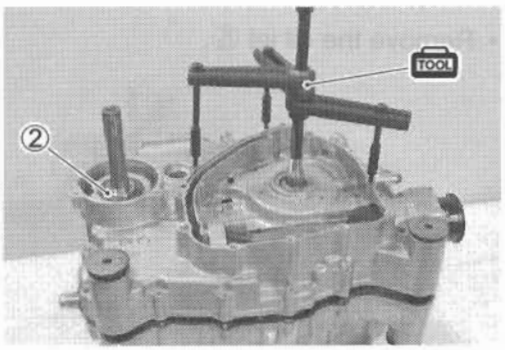
• Separate the crankcase with the special tool.

NOTE:

** The crankcase separator plate is parallel with the end face of the crankcase.*

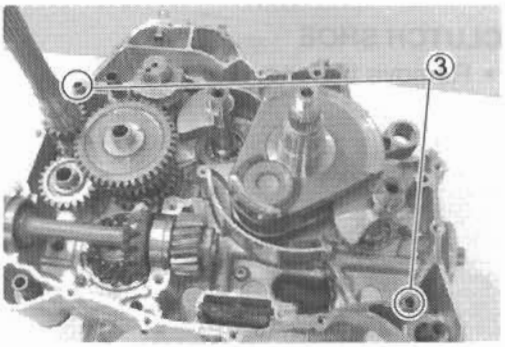
** The crankshaft must remain in the left crankcase half.*

TOOL 09920-13120: Crankcase separator



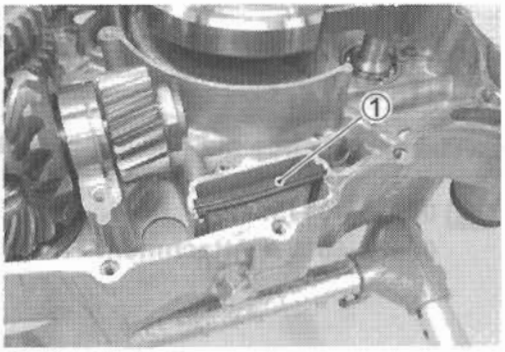
• Remove the collar ②.

• Remove the dowel pins ③.



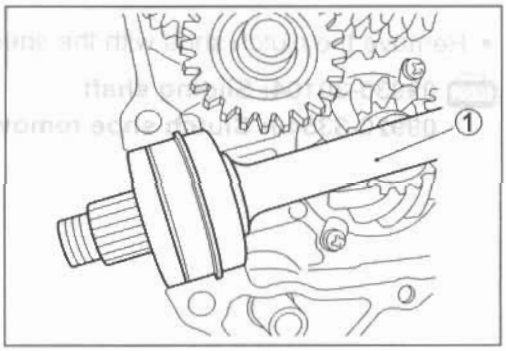
OIL SUMP FILTER

• Remove the oil sump filter ①.

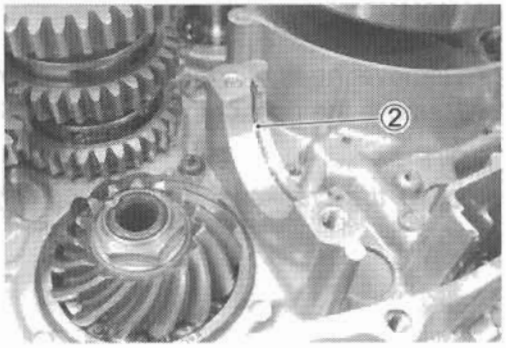


REAR OUTPUT SHAFT

• Remove the rear output shaft ①.

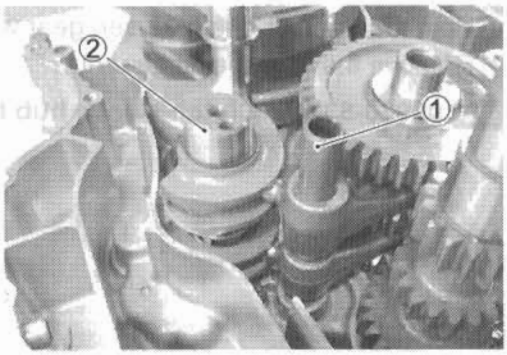


• Remove the C-ring ②.

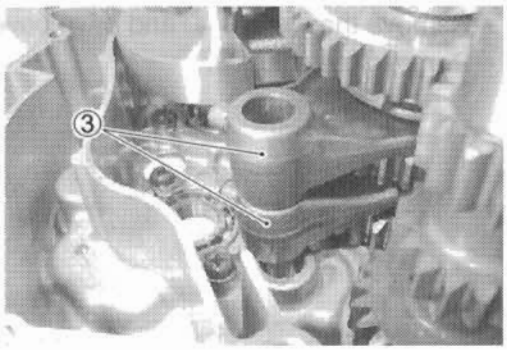


TRANSFER

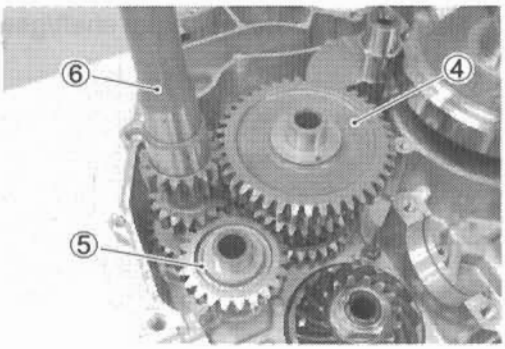
- Remove the gearshift fork shaft ① and gearshift cam ②.



- Remove the gearshift forks ③.

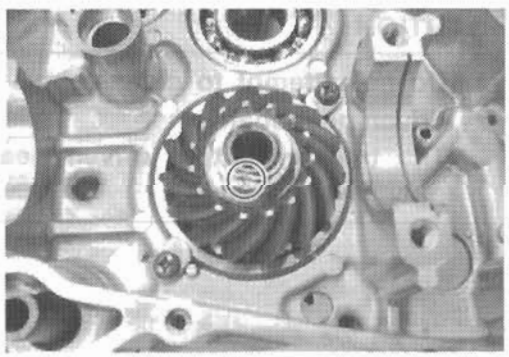


- Remove the transfer output shaft assembly ④, reverse idle gear ⑤ with shaft and transfer input shaft ⑥.



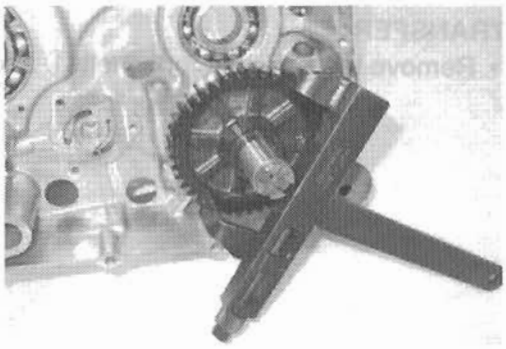
DRIVE BEVEL GEAR

- Using a chisel, unlock the nut.

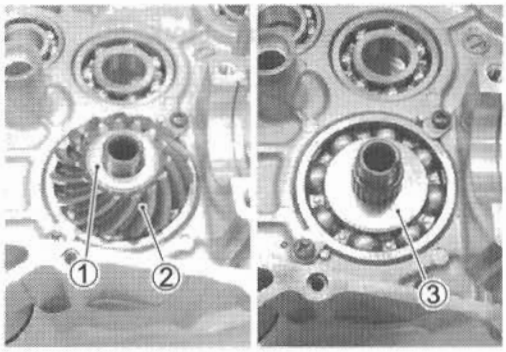


- Hold the transfer output driven gear with the special tool.
- Remove the drive bevel gear nut.

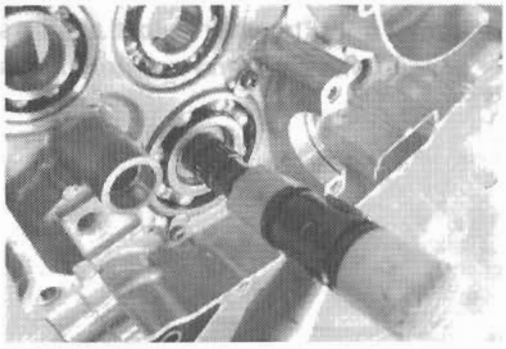
TOOL 09920-53740: Clutch sleeve hub holder



- Remove the washer ① and drive bevel gear ②.
- Remove the shim ③.



- Remove the transfer output shaft/gear with a plastic mallet.



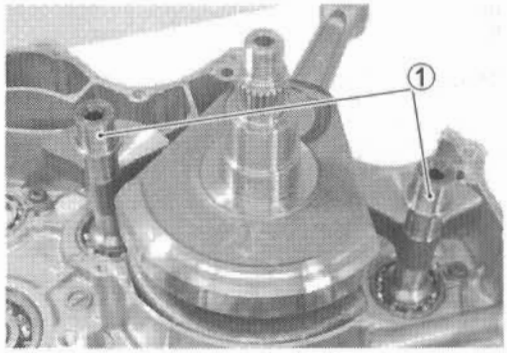
CAUTION

*** Do not attempt to disassemble the transfer output driven gear/shaft.**
*** The transfer output driven gear/shaft is available only as an assembly.**



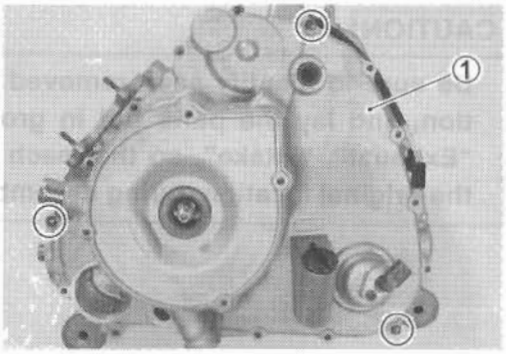
CRANK BALANCER

- Remove the crank balancer shafts ①.



CRANKSHAFT

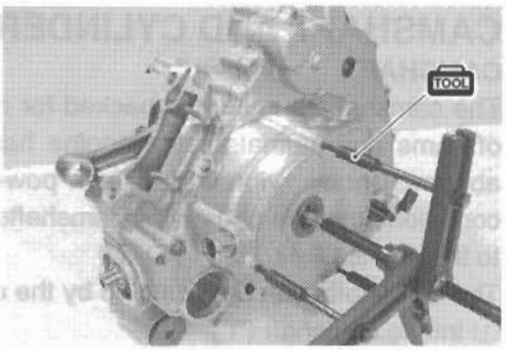
- Install the removed generator cover ① and tighten the bolts.



- Remove the crankshaft with the special tool.

TOOL 09920-13120: Crankcase separator

- Remove the generator cover.



ENGINE COMPONENTS INSPECTION AND SERVICING

CAUTION

Be sure to identify each removed part as to its location, and lay the parts out in groups designated as "Exhaust", "Intake", so that each will be restored to the original location during assembly.

CAMSHAFT AND CYLINDER HEAD

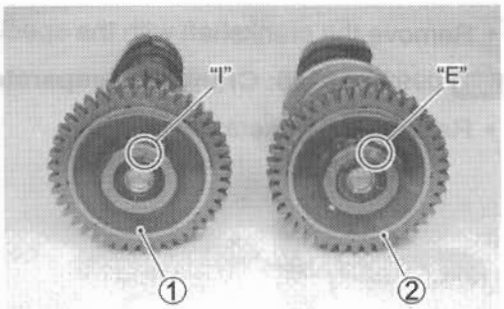
CAMSHAFT

The camshafts should be checked for runout and also for wear of cams and joumals if the engine has been noted as giving abnormal noise, vibration or lack power output. Any of these conditions may be caused by camshafts worn down or distorted to the service limit.

The camshafts can be identified by the engraved letter.

① Intake camshaft ("I")

② Exhaust camshaft ("E")

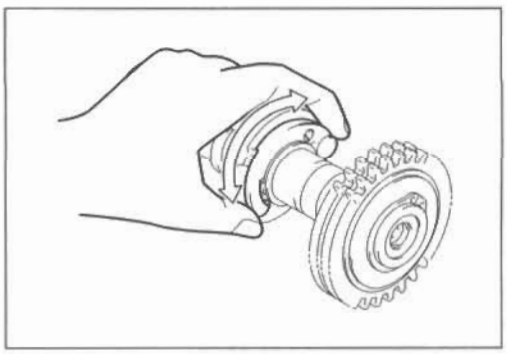


Inspect the cam gear teeth for wear and damage. If they are worn, replace the sprocket/camshaft assembly and cam chain as a set.

AUTOMATIC DECOMPRESSION

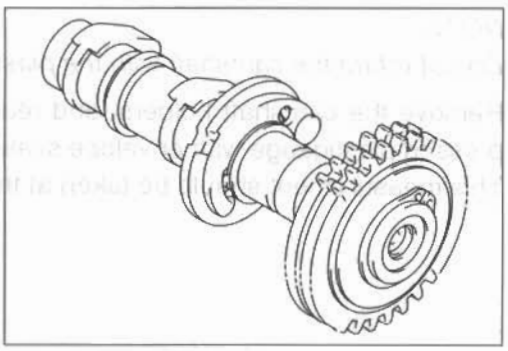
Move the automatic decompression weight by hand to inspect if it is operating smoothly.

If it does not operate smoothly replace the camshaft/automatic decompression assembly with a new one.



CAUTION

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

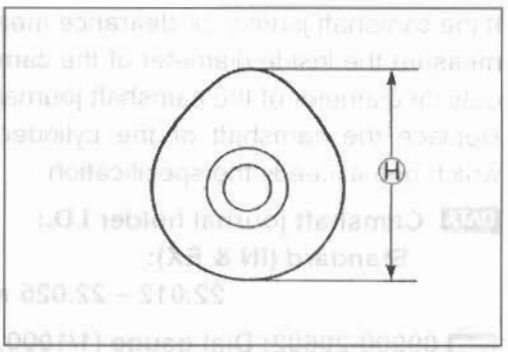


CAM WEAR

Worn-down cams are often the cause of mistimed valve operation resulting in reduced output power.

The limit of cam wear is specified for both intake and exhaust cams in terms of cam height Ⓗ, which is to be measured with a micrometer.

Replace camshaft if found worn down to the limit.



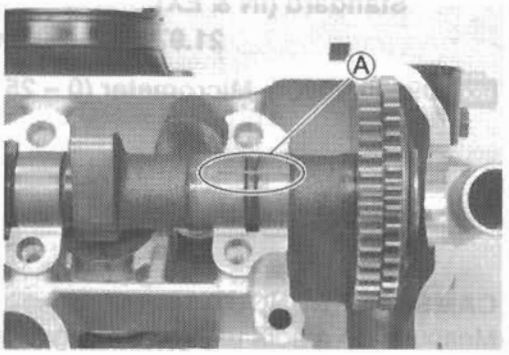
DATA **Cam height Ⓗ:**
Service Limit (IN) : 36.030 mm (1.4185 in)
(EX) : 35.000 mm (13.780 in)

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:



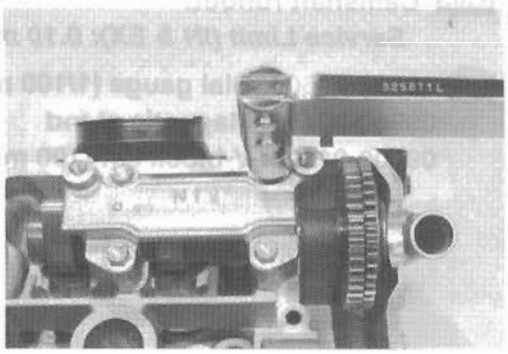
DATA **Camshaft journal oil clearance:**
Service Limit (IN & EX): 0.150 mm (0.0059 in)

TOOL **09900-22301: Plastigauge**
09900-22302: Plastigauge

NOTE:
Install camshaft journal holders to their original positions.

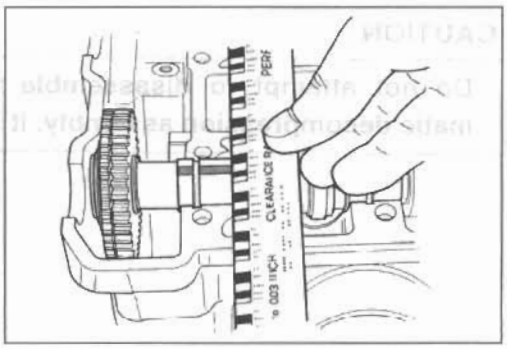
- Tighten the camshaft journal holder bolts evenly and diagonally to the specified torque.

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

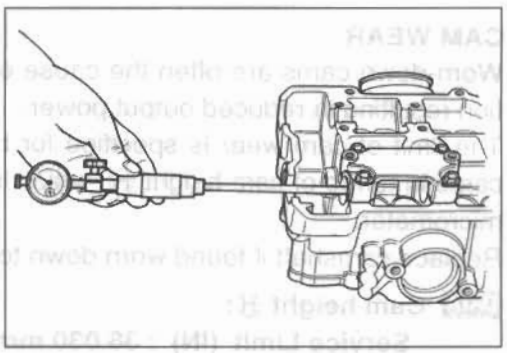


NOTE:
Do not rotate the camshaft with the plastigauge in place.

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

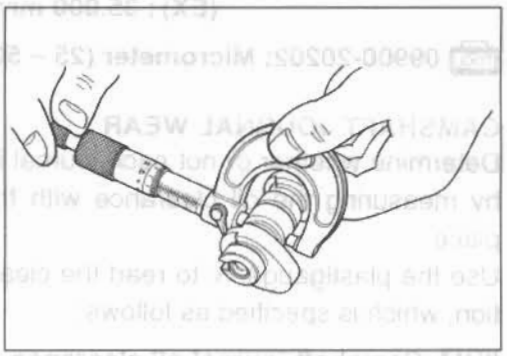


If the camshaft journal oil clearance measured exceeds the limit, measure the inside diameter of the camshaft journal holder and outside diameter of the camshaft journal.
Replace the camshaft or the cylinder head depending upon which one exceeds the specification.



DATA Camshaft journal holder I.D.:
Standard (IN & EX):
22.012 – 22.025 mm (0.8666 – 0.8671 in)

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

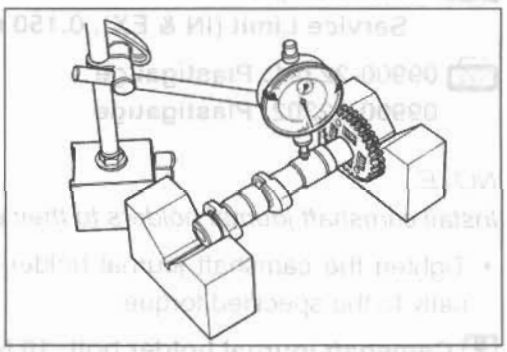


DATA Camshaft journal O.D.:
Standard (IN & EX):
21.972 – 21.993 mm (0.8650 – 0.8659 in)

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

CAMSHAFT RUNOUT

Measure the runout using the dial gauge.
Replace the camshaft if the runout exceeds the limit.

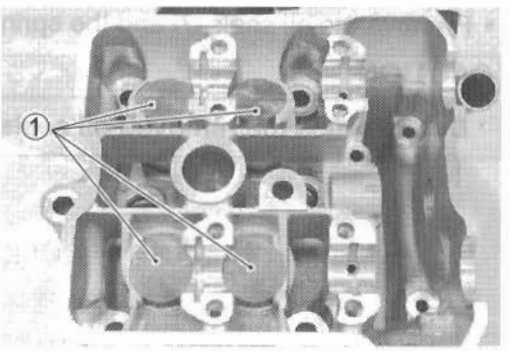


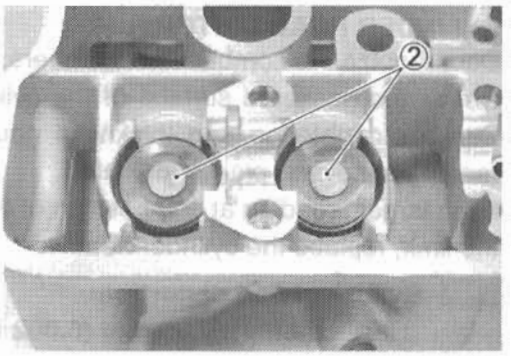
DATA Camshaft runout:
Service Limit (IN & EX): 0.10 mm (0.004 in)

TOOL 09900-20607: Dial gauge (1/100 mm, 10 mm)
09900-20701: Magnetic stand
09900-21304: V-block set (100 mm)

CYLINDER HEAD

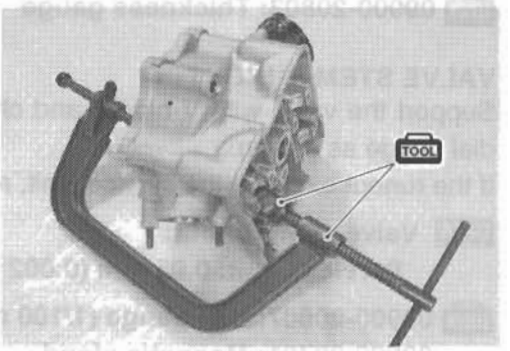
- Remove the tappets ① and shims ② by fingers or magnetic hand.



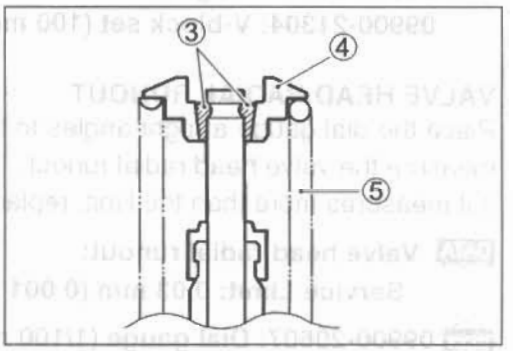


- Using special tools, compress the valve spring and remove the two cotter halves ③ from the valve stem.

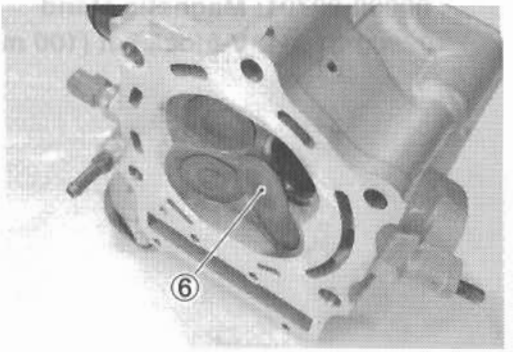
TOOL **09916-14510: Valve lifter**
09916-14910: Valve lifter attachment
09916-84511: Tweezers



- Remove the valve spring retainer ④ and valve spring ⑤.



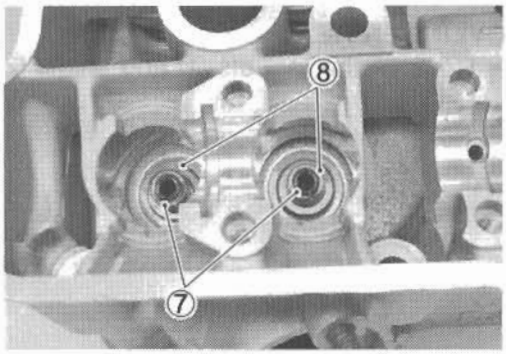
- Pull out the valve ⑥ from the combustion chamber side.



• Remove the oil seals ⑦ and the spring seats ⑧.

CAUTION

Do not reuse the removed oil seals.

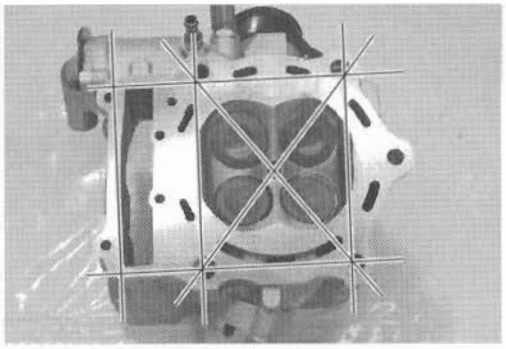


CYLINDER HEAD DISTORTION

Decarbonize the combustion chambers.

Check the gasketed 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.



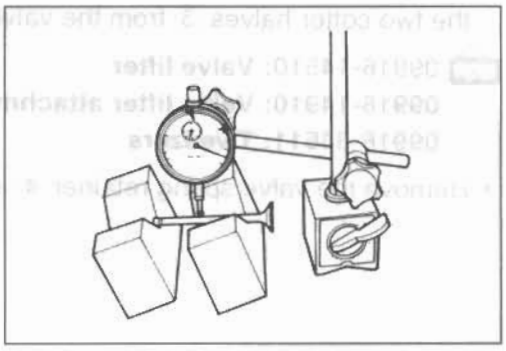
DATA Cylinder head distortion:
Service Limit: 0.05 mm (0.002 in)

TOOL 09900-20803: Thickness gauge

VALVE STEM RUNOUT

Support the valve with V-blocks and check its runout using the dial gauge as shown.

If the runout exceeds the service limit, replace the valve.



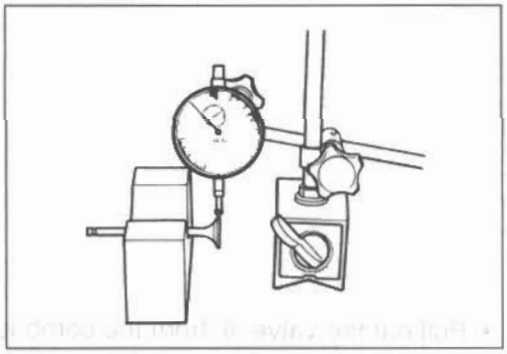
DATA Valve stem runout:
Service Limit: 0.05 mm (0.002 in)

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

VALVE HEAD RADIAL RUNOUT

Place the dial gauge at right angles to the valve head face, and measure the valve head radial runout.

If it measures more than the limit, replace the valve.

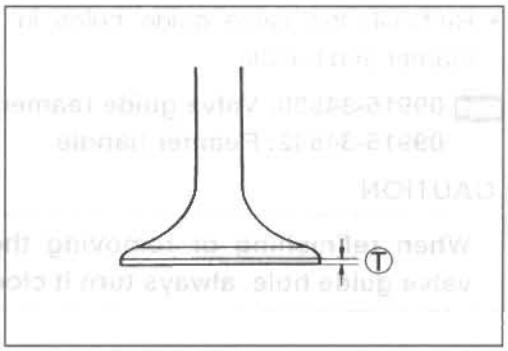


DATA Valve head radial runout:
Service Limit: 0.03 mm (0.001 in)

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

VALVE FACE WEAR

Visually inspect each valve for wear of its seating face.
Replace any valve with an abnormally worn face. The thickness Ⓣ decreases as the wear of the face advances.
Measure the thickness and, if the thickness is found to have been reduced to the limit, replace it.

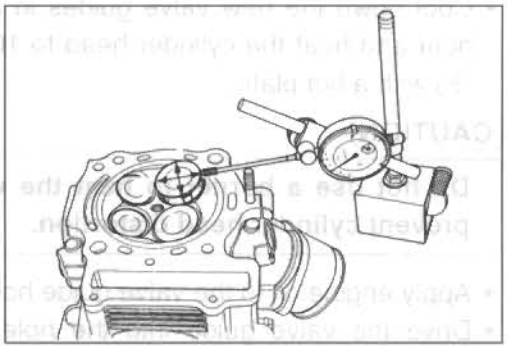


DATA Valve head thickness Ⓣ:
Service Limit: 0.5 mm (0.02 in)

TOOL 09900-20101: Vernier calipers

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, (see below) then determine whether the valve or the guide should be replaced with a new one.

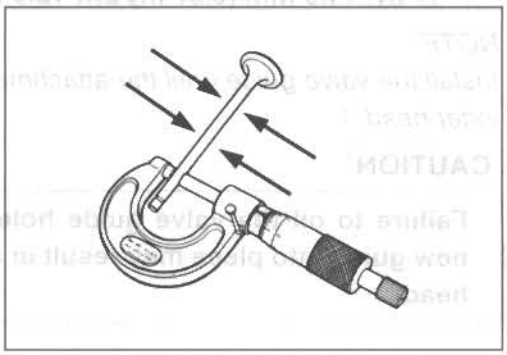


DATA Valve stem deflection (IN & EX):
Service Limit: 0.35 mm (0.014 in)

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, where the clearance is found to be in excess of the limit indicated, 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.



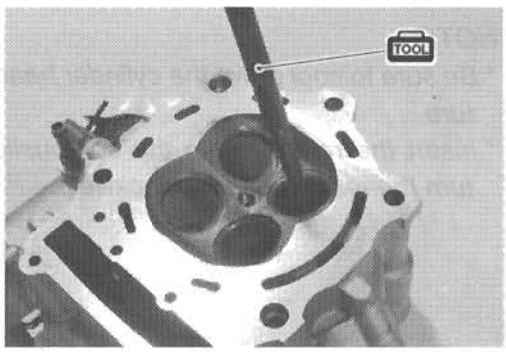
DATA Valve stem O.D.:
Standard (IN) : 5.475 – 5.490 mm (0.2156 – 0.2161 in)
(EX) : 5.455 – 5.470 mm (0.2148 – 0.2154 in)

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. (☞3-33)

VALVE GUIDE SERVICING

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

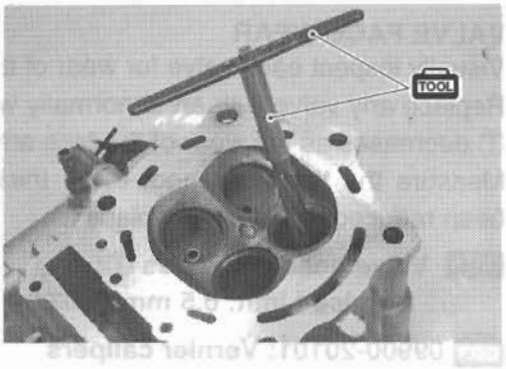


TOOL 09916-44910: Valve guide installer/remover

NOTE:
** Discard the removed valve guide.*
** Only oversized valve guides are available as replacement parts. (Part No.11115-31G70)*

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

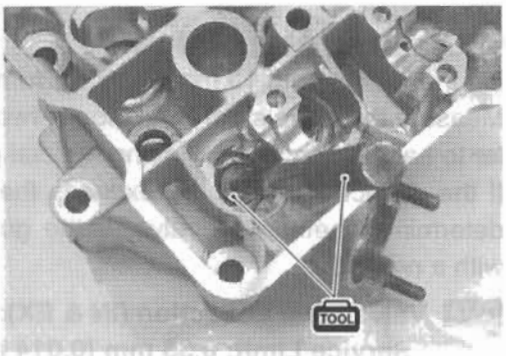
09916-34580: Valve guide reamer
09916-34542: Reamer handle



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.

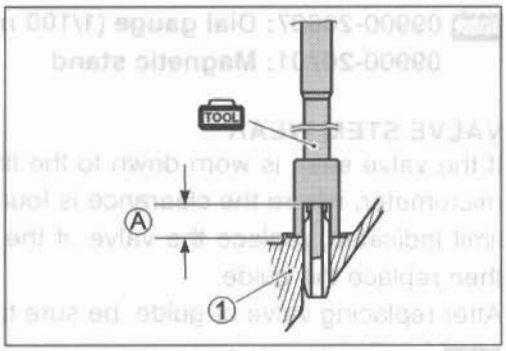


CAUTION

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 attachment.

09916-57360: Valve guide attachment.
Ⓐ IN: 14.5 mm (0.57 in)/EX: 12.5 mm (0.49 in)



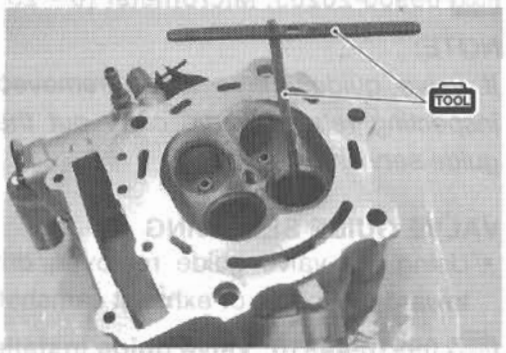
NOTE:
Install the valve guide until the attachment contacts with the cylinder head ①.

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 oil the guides after reaming.

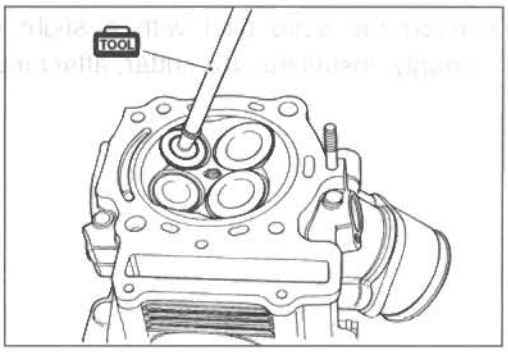
09916-34550: Valve guide reamer
09916-34542: Reamer handle



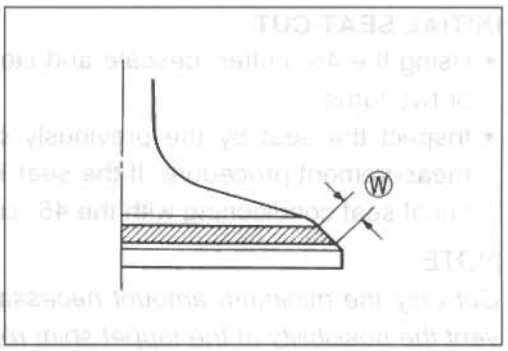
NOTE:
** Be sure to cool down the cylinder head to ambient air temperature.*
** Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.*

VALVE SEAT WIDTH INSPECTION

Coat the valve seat uniformly with Prussian blue. Fit the valve and tap the coated seat with the valve face in a rotating manner, in order to obtain a clear impression of the seating contact. In this operation, use the valve lapper to hold the valve head.



The ring-like dye impression left on the valve face must be continuous without any break. In addition, the width of the dye ring, which is the visualized seat "width", must be within the following specification:



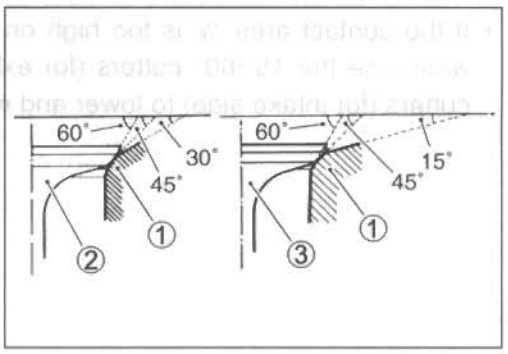
DATA **Valve seat width Ⓦ:**
Standard: 0.9 – 1.1 mm (0.035 – 0.043 in)

TOOL **09916-10911: Valve lapper set**

If either requirement is not met, correct the seat by servicing is as follows:

VALVE SEAT SERVICING

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

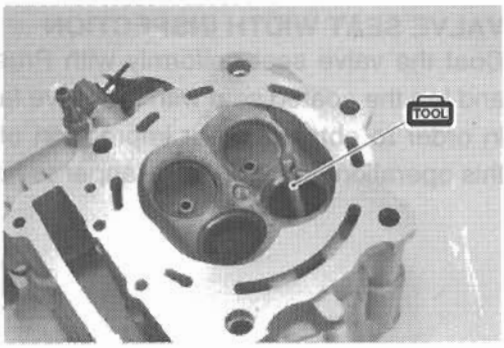


	INTAKE	EXHAUST
15°		N615
30°	N128	
45°	N128	N128
60°	N114	N114

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

TOOL **09916-21111: Valve seat cutter set**
09916-24210: Valve seat cutter (N-615)
09916-24450: Solid pilot (N-100-5.52)
09916-24480: Solid pilot (N-140-5.5)
09916-22420: Valve seat cutter (N-114)
09916-22430: Valve seat cutter (N-128)

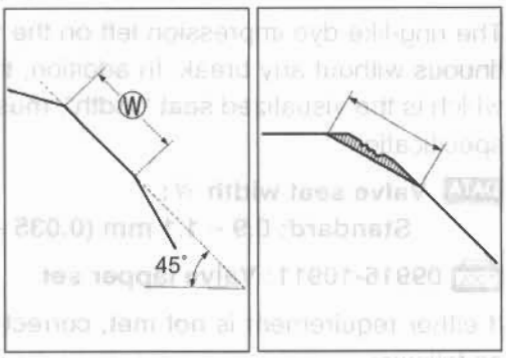
- Insert the solid pilot with a slight rotation. Seat the pilot snugly. Install the 45° cutter, attachment and T-handle.



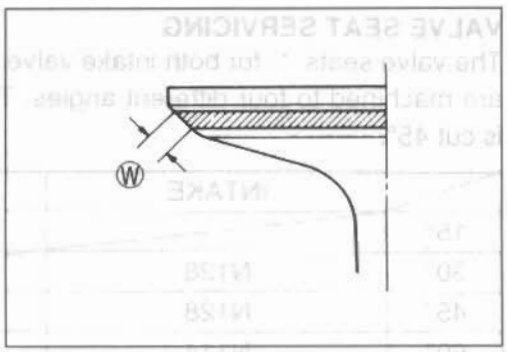
INITIAL SEAT CUT

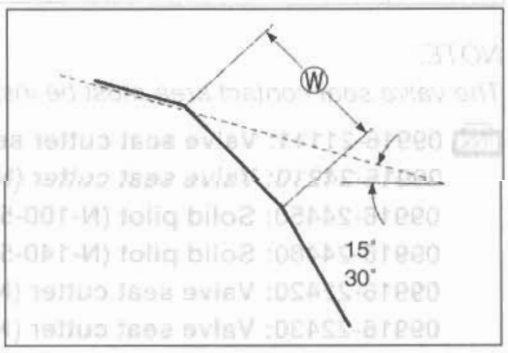
- Using the 45° cutter, descale and clean up the seat with one or two turns.
- Inspect the seat by the previously described seat width Ⓦ measurement procedure. If the seat is pitted or burned, additional seat conditioning with the 45° cutter is required.

NOTE:
Cut only the minimum amount necessary from the seat to prevent the possibility of the tappet shim replacement.

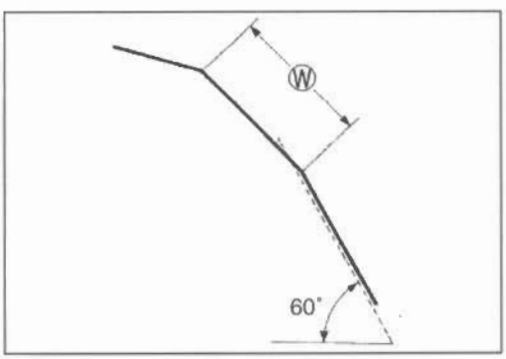


- If the contact area Ⓦ is too high on the valve, or if it is too wide, use the 15°/60° cutters (for exhaust side) and 30°/60° cutters (for intake side) to lower and narrow the contact area.



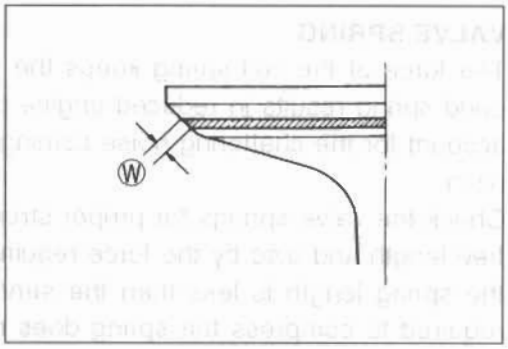


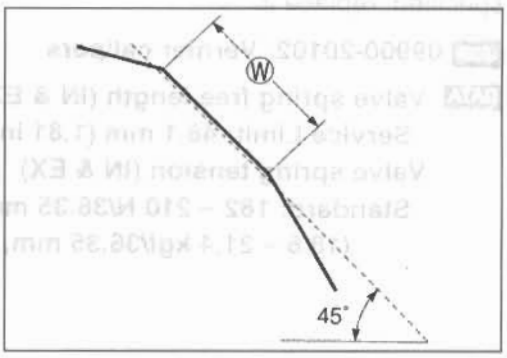
- If the contact area Ⓦ is too wide or too low, use the 60° cutter to narrow and raise the contact area.



- If the contact area is too low or too narrow, use the 45° cutter to raise and widen the contact area.

NOTE:
After cutting the 15°, 30° and 60° angles, it is possible that the valve seat (45°) is too valve seat to the correct width.

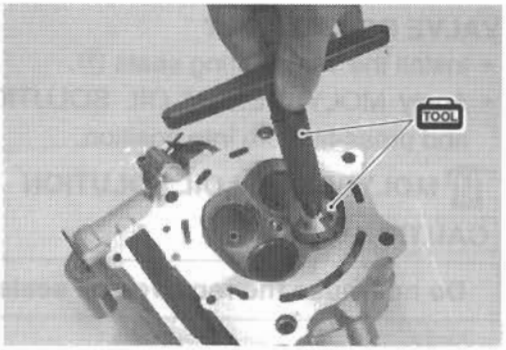




- After the desired seat position and width is achieved, use the 45° cutter very lightly to clean up any burrs caused by the previous cutting operations.

CAUTION

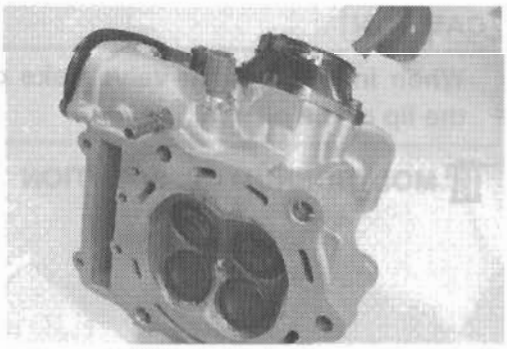
Do not use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish but not a highly polished or shiny finish.
This will provide a soft surface for the final seating of the valve which will occur during the first few seconds of engine operation.



- 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.

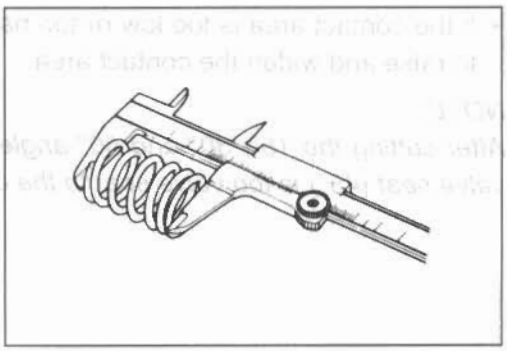


NOTE:
After servicing the valve seats, be sure to check the valve clearance after the cylinder head has been reinstalled. (☞2-7)

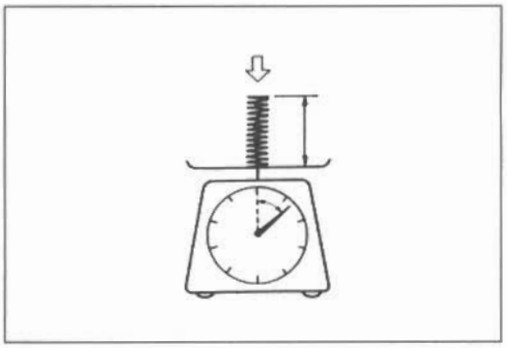
VALVE SPRING

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

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



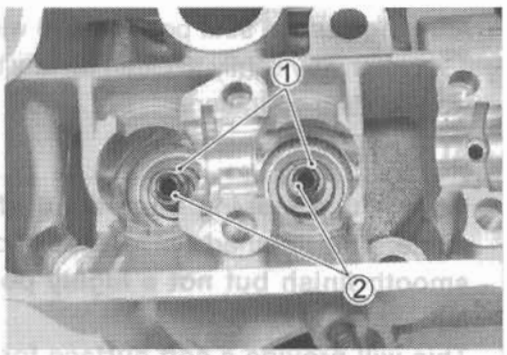
TOOL 09900-20102: Vernier calipers



DATA Valve spring free length (IN & EX):
Service Limit: 46.1 mm (1.81 in)
Valve spring tension (IN & EX)
Standard: 182 – 210 N/36.35 mm
(18.6 – 21.4 kgf/36.35 mm, 41.0 – 47.2 lbs/1.43 in)

VALVE REASSEMBLY

- Install the valve spring seats ①.
- Apply MOLYBDENUM OIL SOLUTION to each oil seal ②, and press-fit them into position.

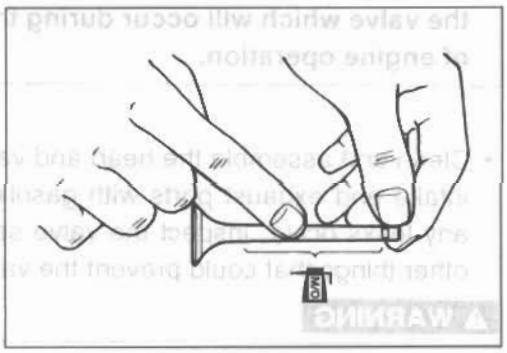


M/O MOLYBDENUM OIL SOLUTION

CAUTION

Do not reuse the removed oil seals.

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



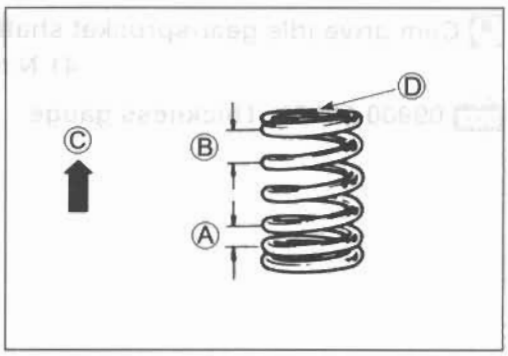
CAUTION

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

M/O MOLYBDENUM OIL SOLUTION

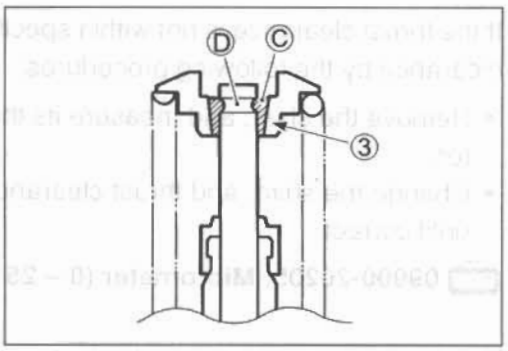
- Install the valve spring with the small-pitch portion Ⓐ facing cylinder head.

Ⓑ Large-pitch portion
Ⓒ UPWARD
Ⓓ Paint



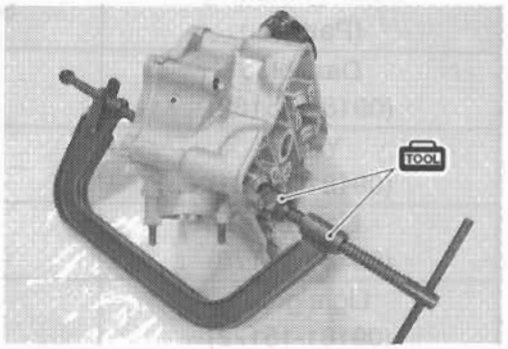
- Put on the valve spring retainer, and using the valve lifter, press down the spring, fit the cotter halves to the stem end, and release the lifter to allow the cotter ③ to wedge in between retainer and stem. Be sure that the rounded lip Ⓒ of the cotter fits snugly into the groove Ⓓ in the stem end.

TOOL 09916-14510: Valve lifter
09916-14910: Valve lifter attachment
09916-84511: Tweezers



CAUTION

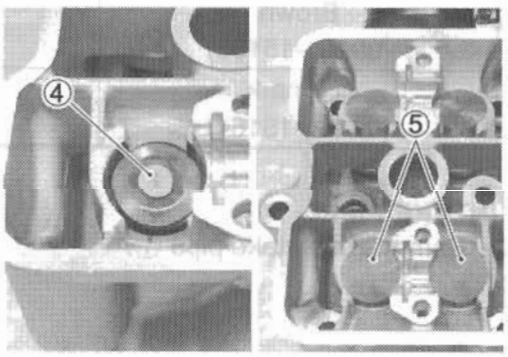
Be sure to restore each spring and valve to their original positions.



- Install the tappet shims ④ and tappets ⑤ to their original position.

NOTE:

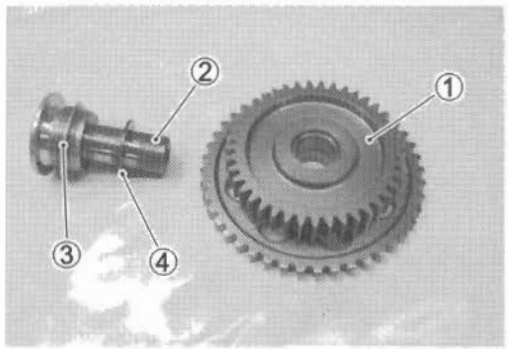
* *Apply engine oil to the shim and tappet before fitting them.*
* *When seating the tappet shim, be sure the figure printed surface faces the tappet.*



CAM DRIVE IDLE GEAR/SPROCKET THRUST CLEARANCE

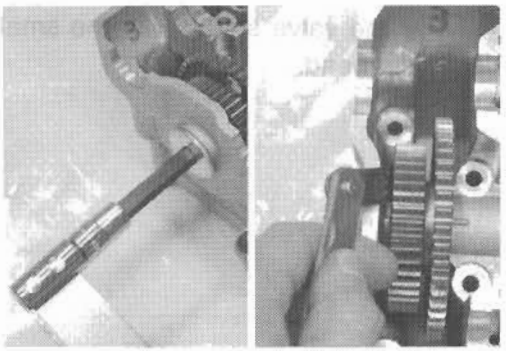
Install the cam drive idle gear/sprocket ①, shaft ②, copper gasket ③ and shim ④ to cylinder head. Tighten the shaft ② to the specified torque. Use a thickness gauge to measure the thrust clearance between the idle gear and the shim ④ as shown.

DATA Cam drive idle gear/sprocket thrust clearance:
Standard: 0.15 – 0.27 mm (0.006 – 0.011 in)



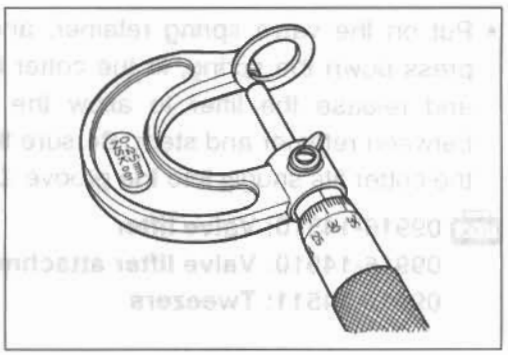
Cam drive idle gear/sprocket shaft:
41 N·m (4.1 kgf-m, 30.0 lb-ft)

09900-20803: Thickness gauge



If the thrust clearance is not within specification, adjust the thrust clearance by the following procedures:

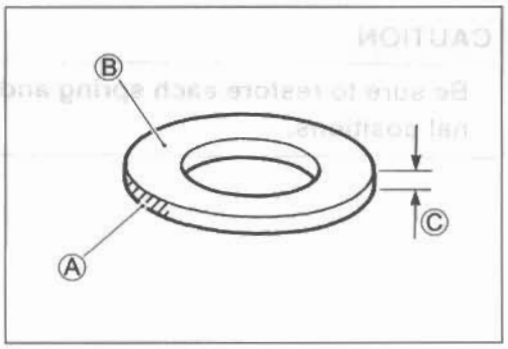
- Remove the shim, and measure its thickness with a micrometer.
- Change the shim, and thrust clearance should be re-checked until correct.



09900-20205: Micrometer (0 – 25 mm)

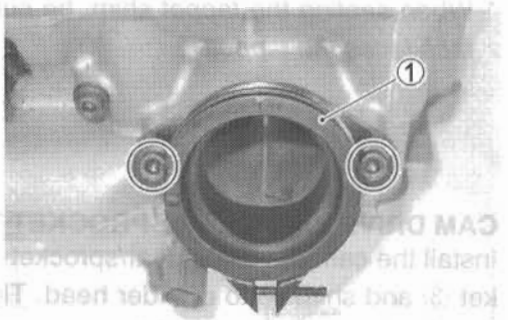
Unit: mm (in)

Color Ⓐ/Mark Ⓑ (Part No.)	Shim thickness Ⓒ
Dark blue (09181-15182)	1.38 – 1.42 (0.054 – 0.056)
Yellow (09181-15181)	1.28 – 1.32 (0.050 – 0.052)
Light blue (09181-15176)	1.18 – 1.22 (0.046 – 0.048)
Light green (09181-15172)	1.08 – 1.12 (0.043 – 0.044)
Brown (09181-15166)	0.98 – 1.02 (0.039 – 0.040)
"J" mark (09181-15164)	0.88 – 0.92 (0.035 – 0.036)



INTAKE PIPE

- Remove the intake pipe ①.



- Apply SUZUKI SUPER GREASE "A" to the O-ring.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

CAUTION

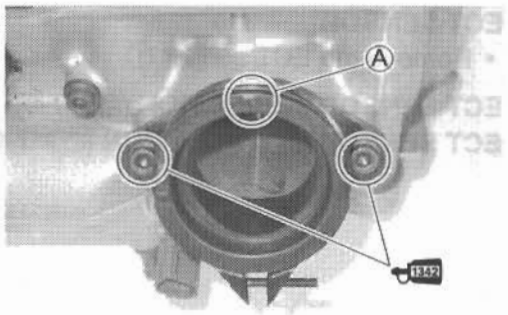
Use the new O-ring to prevent air from sucking through the joint.



- Apply THREAD LOCK to the intake pipe bolts.

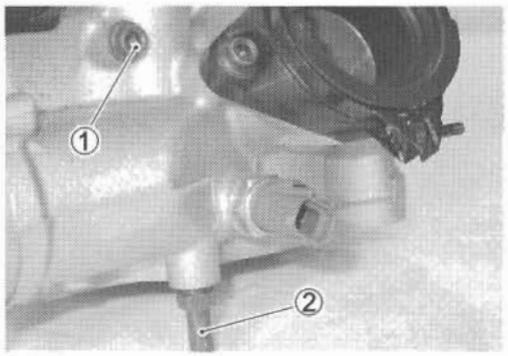
1342 99000-32050: THREAD LOCK "1342"

NOTE:
"UP" mark Ⓐ faces upward.



WATER BYPASS UNION AND OIL GALLERY PLUG

- Remove the oil gallery plug ① and water bypass union ②.

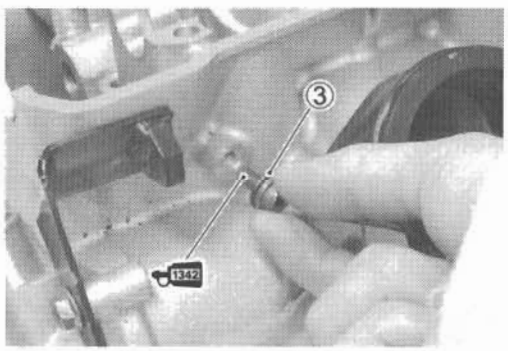


- Install the new gasket ③ and apply THREAD LOCK to the oil gallery plug.

CAUTION

Use the new gasket ③ to prevent oil leakage.

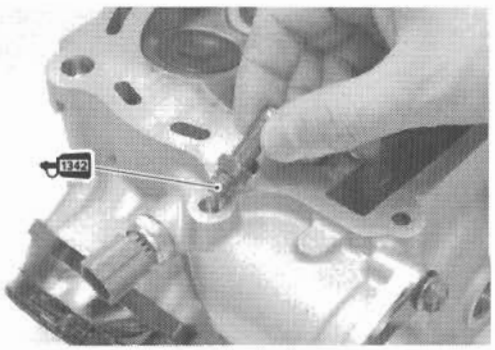
1342 99000-3205: THREAD LOCK "1342"



- Apply THREAD LOCK to the thread part of water bypass union and tighten it to the specified torque.

1342 99000-32050: THREAD LOCK "1342"

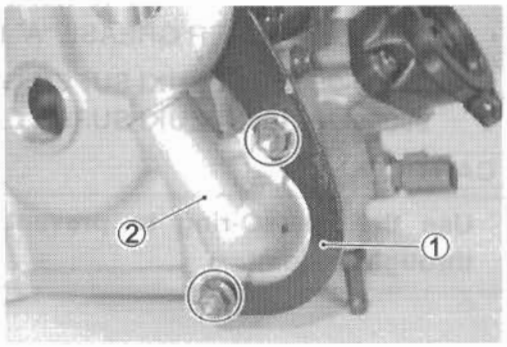
Water bypass union: 14 N·m (1.4 kgf-m, 10.0 lb-ft)



THERMOSTAT

- Remove the thermostat bracket ① and thermostat cover ②.
- Remove the thermostat.

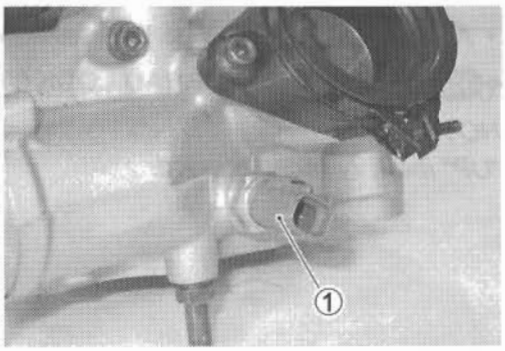
THERMOSTAT INSPECTION (☞7-10)
THERMOSTAT INSTALLATION (☞7-10)



ECT SENSOR

- Remove the ECT sensor ①.

ECT SENSOR INSPECTION (☞7-9)
ECT SENSOR INSTALLATION (☞7-9)

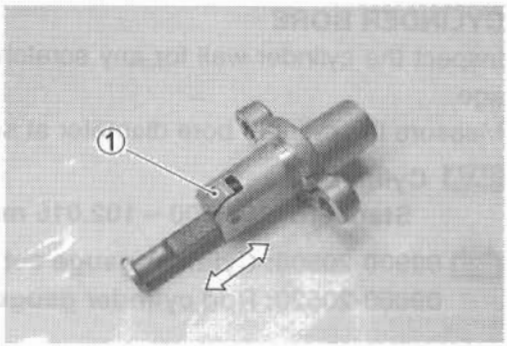


CAM CHAIN TENSIONER

INSPECTION

Check that the push rod slides smoothly when releasing stopper ①.

If it does not slide smoothly, replace the cam chain tensioner with a new one.

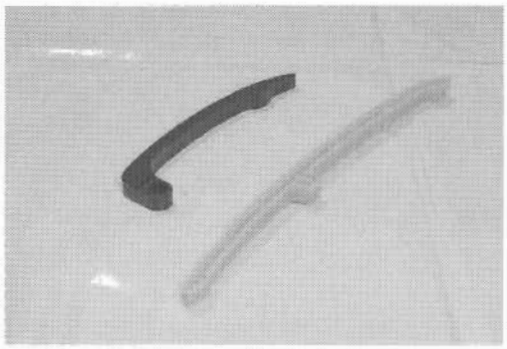


CAM CHAIN GUIDE

INSPECTION

Check the contacting surface of the cam chain guide for wear and damage.

If it is found to be damaged, replace it with a new one.



CYLINDER

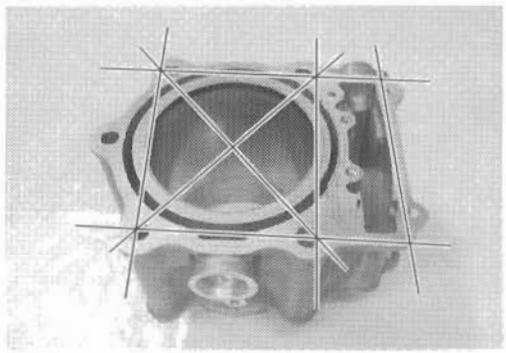
CYLINDER DISTORTION

Check the gasketed surface of the cylinder for distortion with a straightedge and thickness gauge, taking a clearance reading at several places as indicated.

If the largest reading at any position of the straightedge exceeds the limit, replace the cylinder.

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

TOOL **09900-20803: Thickness gauge**



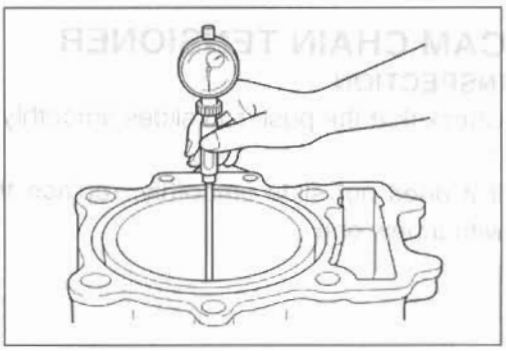
CYLINDER BORE

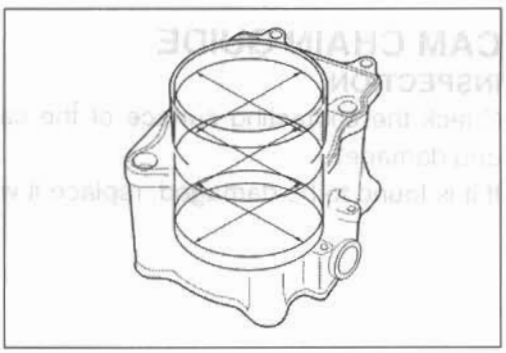
Inspect the cylinder wall for any scratches, nicks or other damage.

Measure the cylinder bore diameter at six places.

DATA **Cylinder bore:**
Standard: 102.000 – 102.015 mm (4.0157 – 4.0163 in)

TOOL **09900-20508: Cylinder gauge set**
09900-20520: Rod cylinder gauge 100 mm

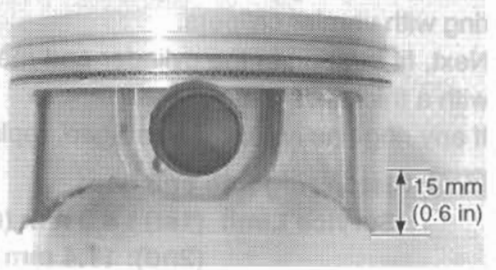




PISTON

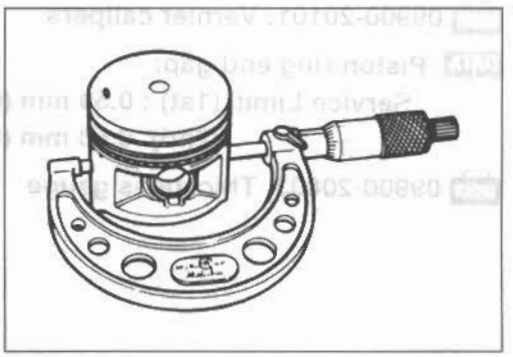
PISTON DIAMETER

Using a micrometer, measure the piston outside diameter at the place shown in Fig.
If the measurement is less than the limit, replace the piston.



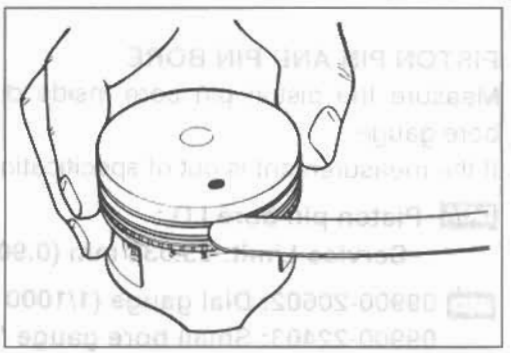
DATA Piston diameter:
Service Limit: 101.880 mm (4.0110 in)

TOOL 09900-20210: Micrometer (100 – 125 mm)



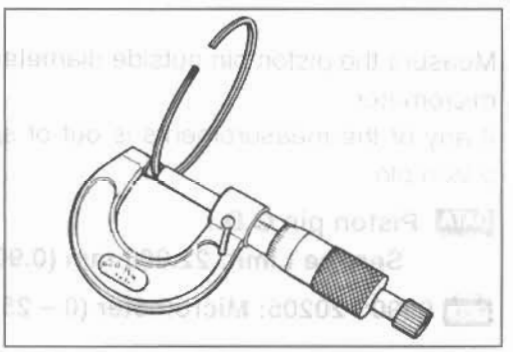
PISTON RING TO GROOVE CLEARANCE

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



DATA Piston ring to groove clearance:
Service Limit (1st) : 0.180 mm (0.0071 in)
(2nd) : 0.150 mm (0.0059 in)

DATA Piston ring groove width:
Standard (1st) : 0.83 – 0.85 mm (0.0327 – 0.0335 in)
(2nd): 1.01 – 1.03 mm (0.0398 – 0.0406 in)
(Oil) : 2.01 – 2.03 mm (0.0791 – 0.0799 in)



DATA Piston ring thickness:
Standard (1st) : 1.08 – 1.10 mm
(0.0425 – 0.0433 in)
(2nd): 0.97 – 0.99 mm
(0.0382 – 0.0390 in)

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

PISTON RING FREE END GAP AND PISTON RING END GAP

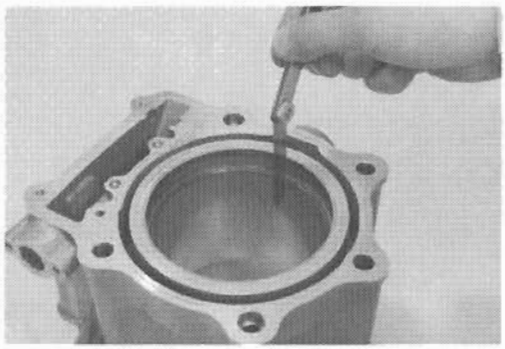
Before installing piston rings, measure the free end gap of each ring with vernier calipers.
Next, fit the ring in the cylinder and measure each ring end gap with a thickness gauge.
If any ring has an excess end gap, replace the ring.



DATA Piston ring free end gap:
Service Limit (1st) : 8.3 mm (0.33 in)
(2nd): 11.4 mm (0.45 in)

TOOL 09900-20101: Vernier calipers

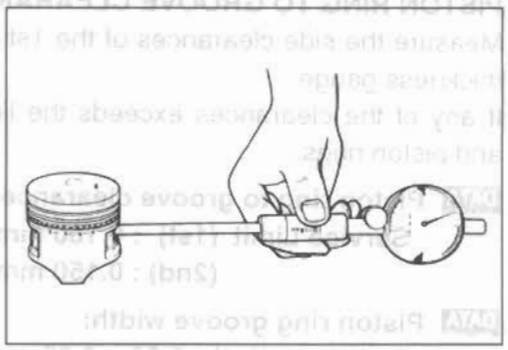
DATA Piston ring end gap:
Service Limit (1st) : 0.50 mm (0.020 in)
(2nd): 0.50 mm (0.020 in)



TOOL 09900-20803: Thickness gauge

PISTON PIN AND PIN BORE

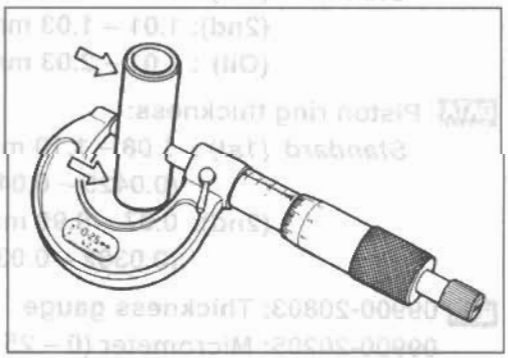
Measure the piston pin bore inside diameter using the small bore gauge.
If the measurement is out of specification, replace the piston.



DATA Piston pin bore I.D.:
Service Limit: 23.030 mm (0.9067 in)

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

Measure the piston pin outside diameter at three positions using micrometer.
If any of the measurements is out of specifications replace the piston pin.



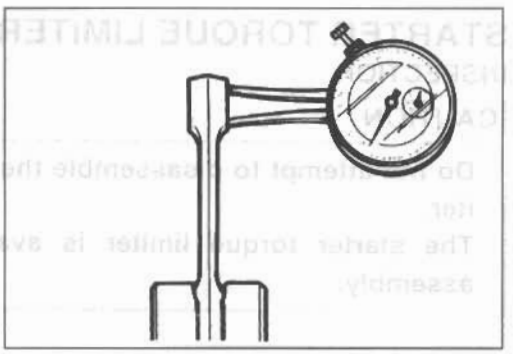
DATA Piston pin O.D.:
Service Limit: 22.980 mm (0.9047 in)

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

CONROD/CRANKSHAFT

CONROD SMALL END I.D.

Measure the conrod small end inside diameter using the caliper gauge.
If the conrod small end inside diameter exceeds the limit, replace the conrod.

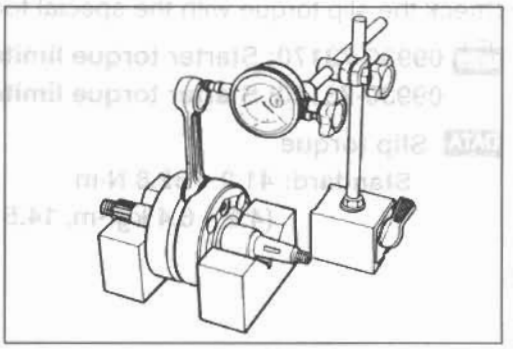


DATA Conrod small end I.D.:
Service Limit: 23.040 mm (0.9071 in)

TOOL 09900-20605: Dial calipers (10 – 34 mm)

CONROD DEFLECTION

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

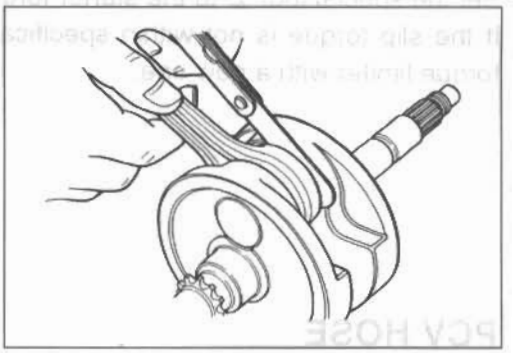


DATA Conrod deflection:
Service Limit: 3.0 mm (0.12 in)

TOOL 09900-20701: Magnetic stand
09900-20606: Dial gauge (1/100 mm)
09900-21304: V-block set (100 mm)

CONROD BIG END SIDE CLEARANCE

Push the big end of the conrod to one side and measure the side clearance with a thickness gauge.



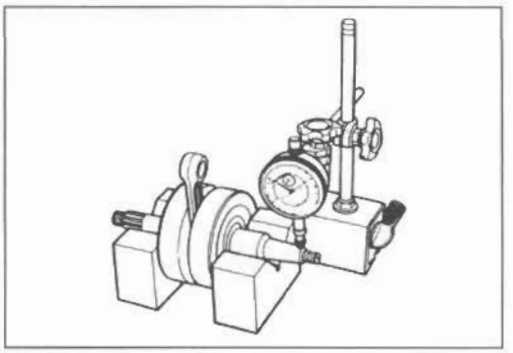
DATA Conrod big end side clearance:
Service Limit: 1.0 mm (0.04 in)

TOOL 09900-20803: Thickness gauge

If the clearance exceeds the 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 the new ones.

CRANKSHAFT RUNOUT

Support the crankshaft with V-blocks as shown, with the two end journals resting on the blocks.
Position the dial gauge, as shown, and rotate the crankshaft slowly to read the runout.
Correct or replace the crankshaft if the runout is greater than the limit.



DATA Crankshaft runout:
Service Limit: 0.08 mm (0.003 in)

TOOL 09900-20606: Dial gauge (1/100 mm)
09900-20701: Magnetic stand
09910-21304: V-block set (100 mm)

STARTER TORQUE LIMITER

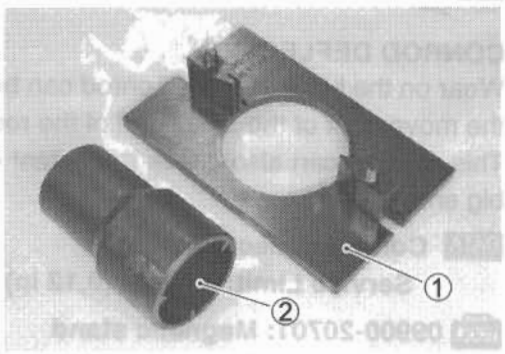
INSPECTION



CAUTION

Do not attempt to disassemble the starter torque limiter.
The starter torque limiter is available only as an assembly.

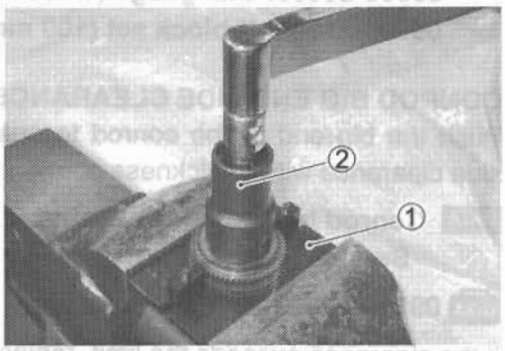
Check the slip torque with the special tools.



TOOL **09930-73170: Starter torque limiter holder ①**
09930-73140: Starter torque limiter socket ②

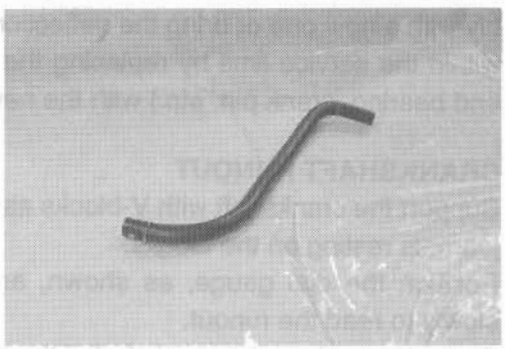
DATA **Slip torque**
Standard: 41.2 – 62.8 N·m
(4.2 – 6.4 kgf-m, 14.5 – 32.5 lb-ft)

Set the starter torque limiter to the special tool ①.
Set the special tool ② to the starter torque limiter.
If the slip torque is not within specification, replace the starter torque limiter with a new one.



PCV HOSE

Inspect the PCV hose for wear or damage.
If it is worn or damaged, replace the PCV hose with a new one.

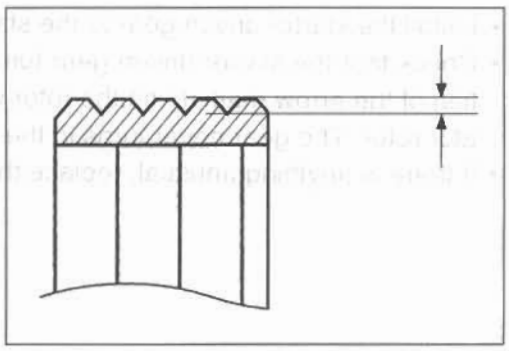


CLUTCH

CLUTCH SHOE

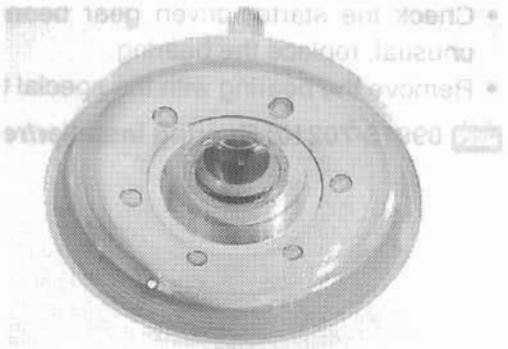
Inspect the clutch shoe for chips, cracks, uneven wear, and heat discoloration. Also, check the depth of the grooves on the clutch shoe.
If there is no groove at any part of the shoe, replace the shoe as a set.

NOTE:
The clutch shoe must always be changed as a set.



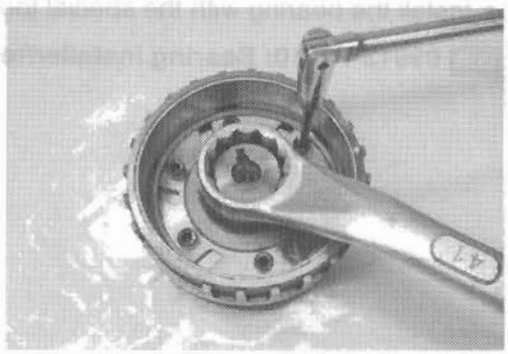
CLUTCH WHEEL

Inspect the condition of the inner clutch wheel surface for scuffs, scratches, cracks or uneven wear.
If any damages are found, replace the clutch wheel with a new one.



STARTER CLUTCH

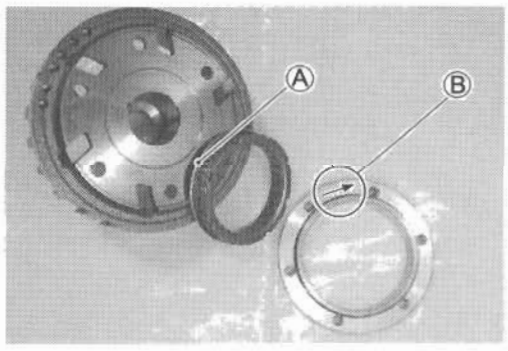
- Remove the starter clutch securing bolts.



- Install the starter clutch in the proper direction.

NOTE:
** When installing the starter clutch onto the rotor, make sure the flange side Ⓐ of the one way clutch faces to the rotor.*
** Face the arrow mark Ⓑ to the engine side.*

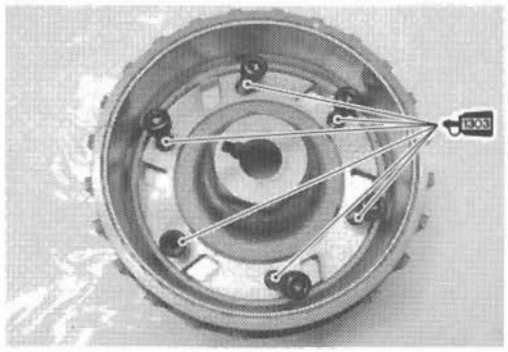
- Apply engine oil to the starter clutch.



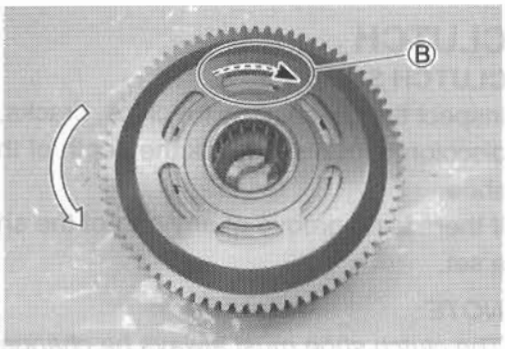
- Apply THREAD LOCK SUPER "1303" to the bolts, and then tighten them to the specified torque.

1303 99000-32030: THREAD LOCK SUPER "1303"

Starter clutch bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)

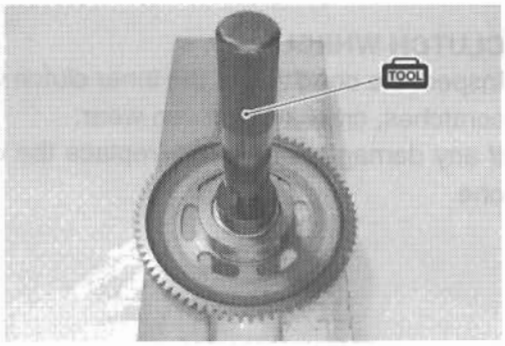


- Install the starter driven gear to the starter clutch.
- Check that the starter driven gear turns in the opposite direction of the arrow mark Ⓑ on the rotor while holding the generator rotor. The gear never turns in the direction of the arrow.
- If there is anything unusual, replace the one way clutch.



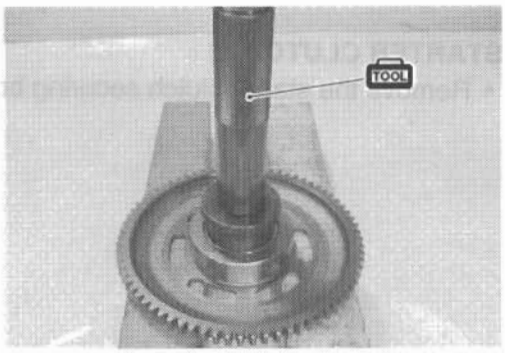
- Check the starter driven gear bearing. If there is anything unusual, replace the bearing.
- Remove the bearing with the special tool.

TOOL 09913-70210: Bearing installer/remover set (ϕ40)

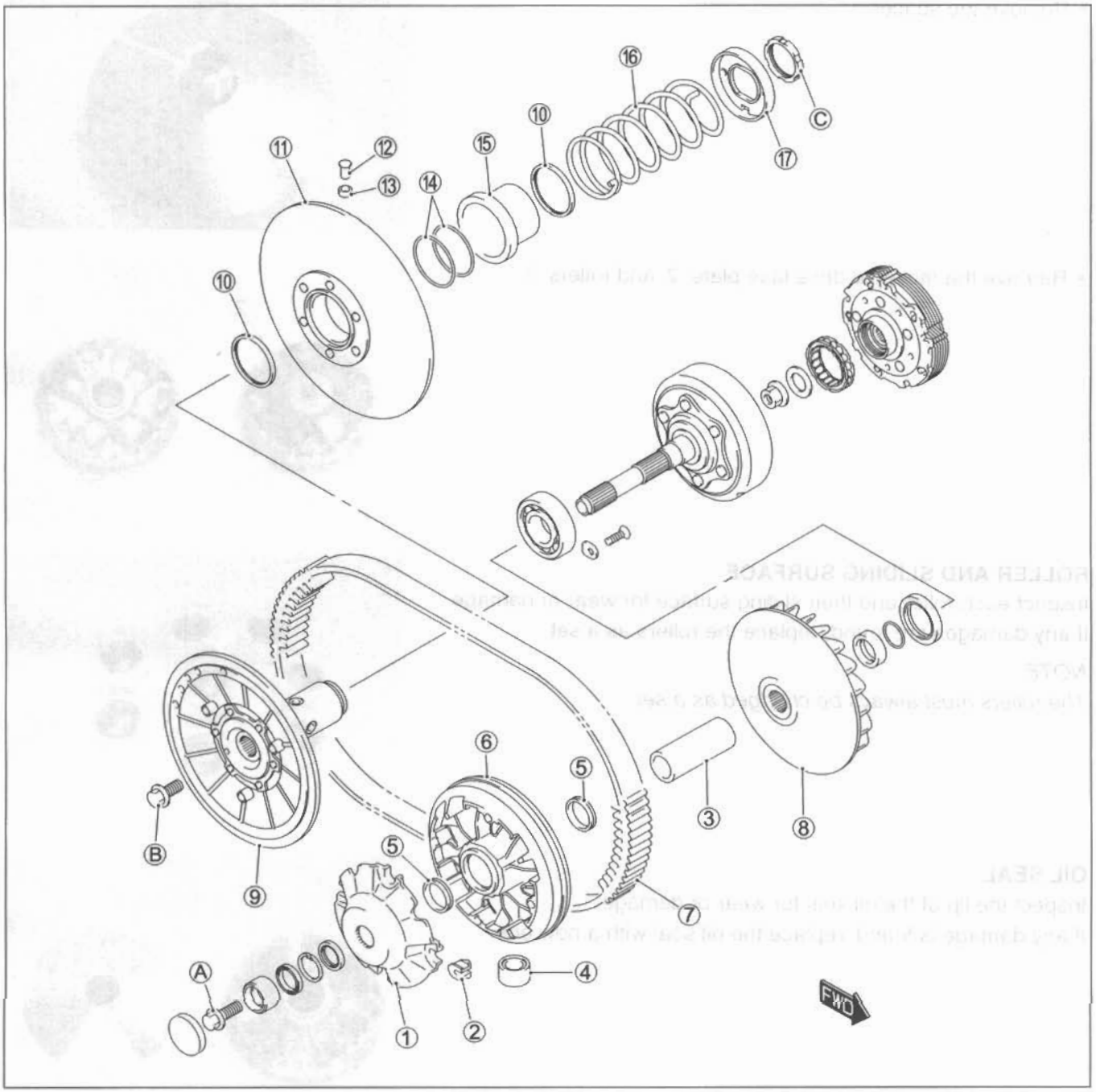


- Install the bearing with the special tool.

TOOL 09913-70210: Bearing installer/remover set (ϕ42)



MOVABLE DRIVE FACE AND DRIVEN FACE

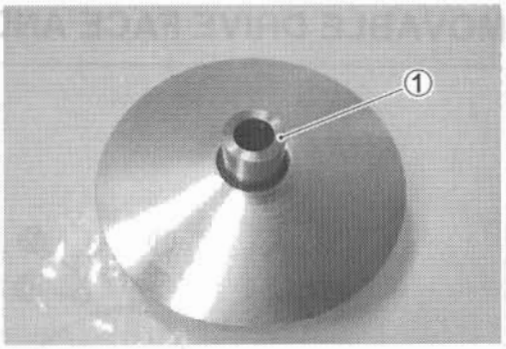


①	Movable drive plate	⑪	Movable driven face
②	Damper (4 pcs)	⑫	Pin (4 pcs)
③	Spacer	⑬	Spacer (4 pcs)
④	Roller (8 pcs)	⑭	O-ring (2 pcs)
⑤	Oil seal (2 pcs)	⑮	Spring seat
⑥	Movable drive face	⑯	Spring
⑦	Drive belt	⑰	Spring plate
⑧	Fixed drive face	Ⓐ	Movable drive face bolt
⑨	Fixed driven face	Ⓑ	Movable driven face bolt
⑩	Oil seal (2 pcs)	Ⓒ	Movable driven face ring nut

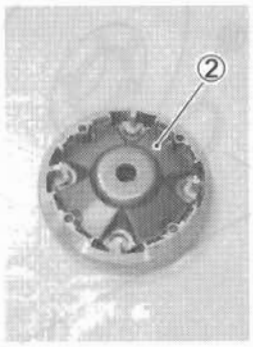
ITEM	N·m	kgf-m	lb-ft
Ⓐ	110	11.0	79.5
Ⓑ	110	11.0	79.5
Ⓒ	100	10.0	72.5

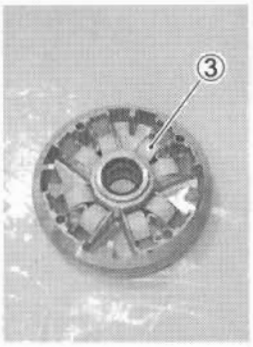
MOVABLE DRIVE FACE DISASSEMBLY

- Remove the spacer ①.



- Remove the movable drive face plate ② and rollers ③.

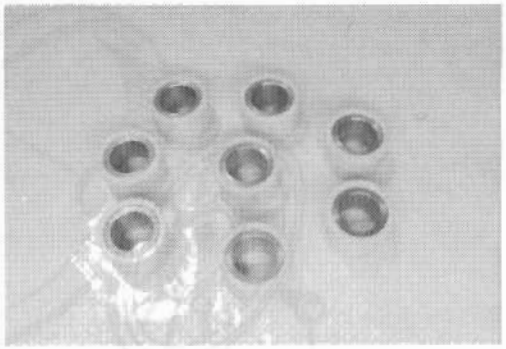




ROLLER AND SLIDING SURFACE

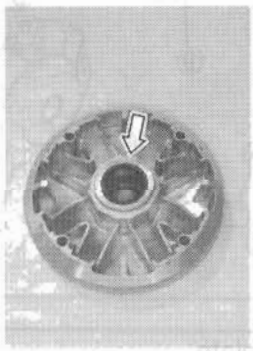
Inspect each roller and their sliding surface for wear or damage.
If any damages are found, replace the rollers as a set.

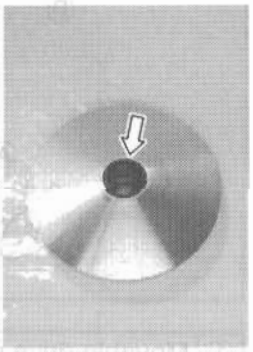
NOTE:
The rollers must always be changed as a set.



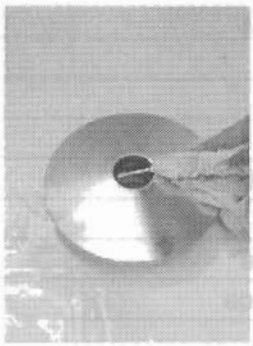
OIL SEAL

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





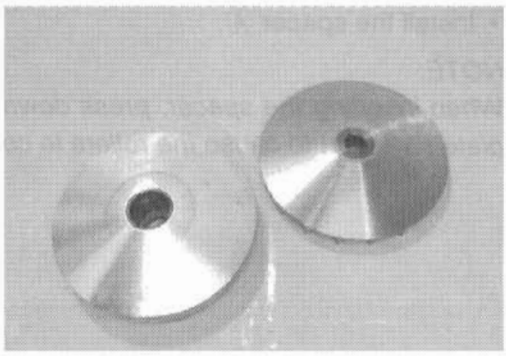
- Remove the oil seals.





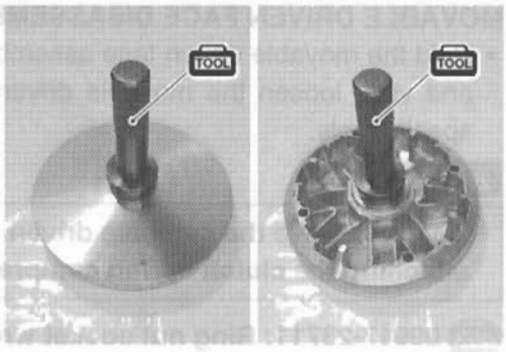
MOVABLE AND FIXED DRIVE FACE

Inspect the drive faces for any abnormal conditions such as stepped wear or discoloration caused by burning.
If any damages are found, replace the drive faces with new ones.



- Install the oil seal with the special tool.

TOOL 09913-70210: Bearing installer set (φ42)

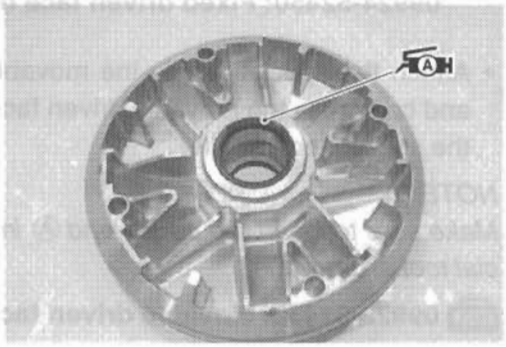


REASSEMBLY

Reassemble the movable and fixed drive face in the reverse order of disassembly. Pay attention to the following points:

- Apply a small amount of SUZUKI SUPER GREASE "A" to the bore and oil seal lip.

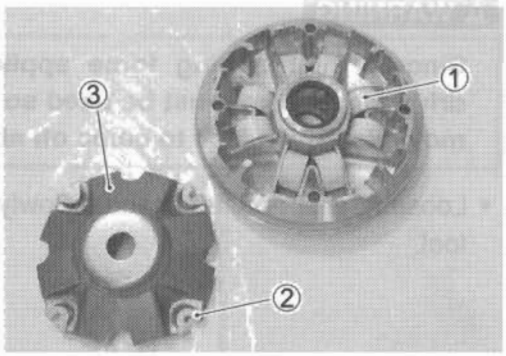
A 99000-25030:SUZUKI SUPER GREASE "A" (USA)
99000-25010:SUZUKI SUPER GREASE "A" (Others)



CAUTION

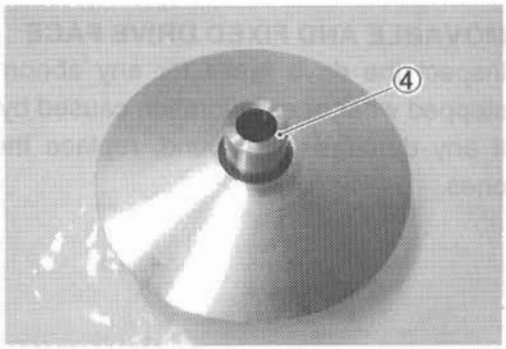
*** Wipe off any excess grease thoroughly.**
*** Take care not to apply grease to the contact surface of the drive belt.**

- Position the eight rollers ① on the movable drive face.
- Mount the dampers ② on the movable drive face plate ③.
- Position the movable drive face plate on the movable drive face.



• Install the spacer ④.

NOTE:
When inserting the spacer, press down the movable drive face plate so as not to cause the rollers to come out of position.



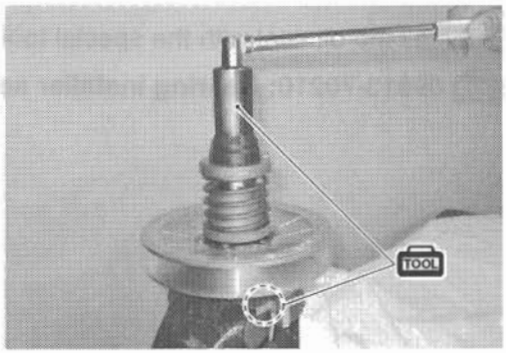
MOVABLE DRIVEN FACE DISASSEMBLY

• Hold the movable driven face assembly with the special tools and vise, loosen the movable driven face ring nut with the special tools.

⚠ WARNING

Do not remove the movable driven face ring nut before attaching the clutch spring compressor.

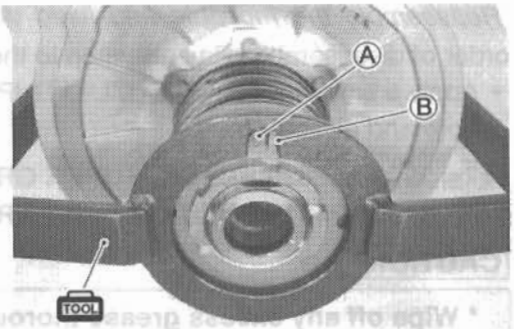
TOOL 09917-23711: Ring nut socket wrench
09924-52450: Fixed driven face holder



• Attach the special tool to the movable driven face assembly and compress the movable driven face assembly by turning in the special tool handle.

NOTE:
Make sure to insert the spring end Ⓐ into the slot Ⓑ of the special tool as shown.

TOOL 09922-31430: Movable driven face spring compressor

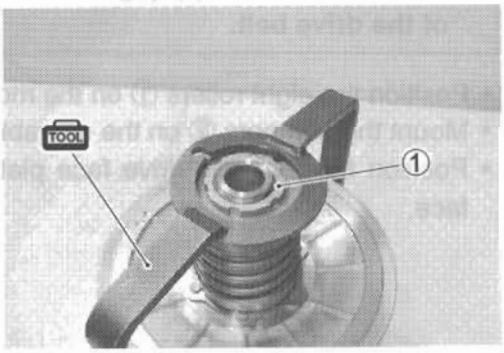


• Remove the movable driven face ring nut ①.

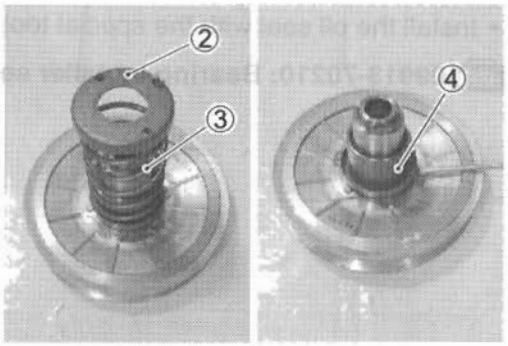
⚠ WARNING

Since a high spring force applies to the movable driven face, care must be used so as not to cause the movable driven face to come off abruptly.

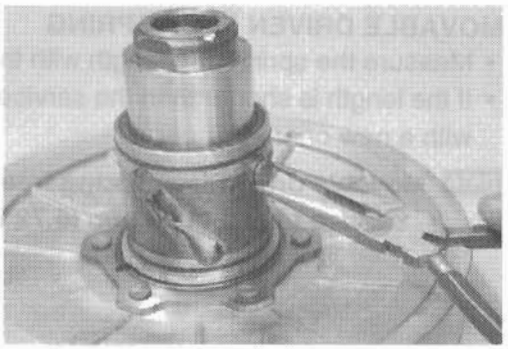
• Loosen the special tool handle slowly and remove the special tool.



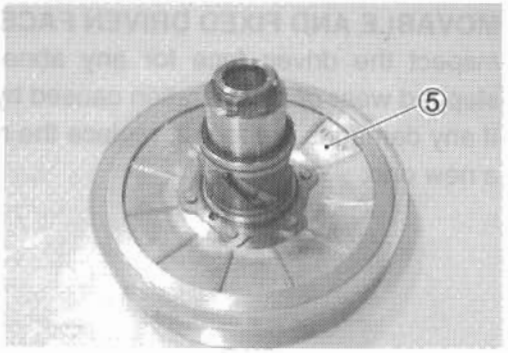
- Remove the spring plate ② and spring ③.
- Remove the spring seat ④.



- Remove the pins and rollers.

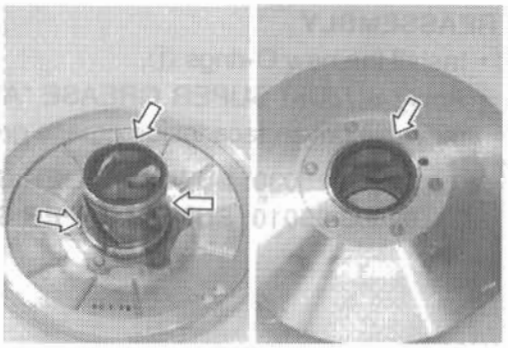


- Remove the movable driven face ⑤.

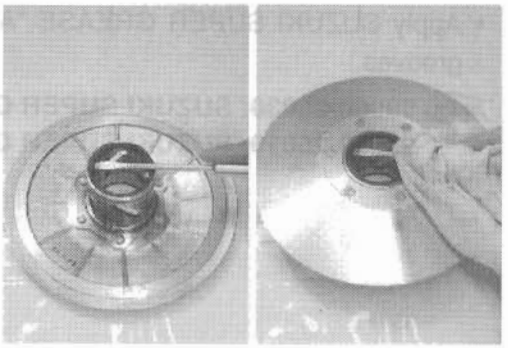


O-RING AND OIL SEAL

Inspect the O-rings and oil seals for wear or damage.
If any damages are found, replace the O-rings and oil seals with new ones.

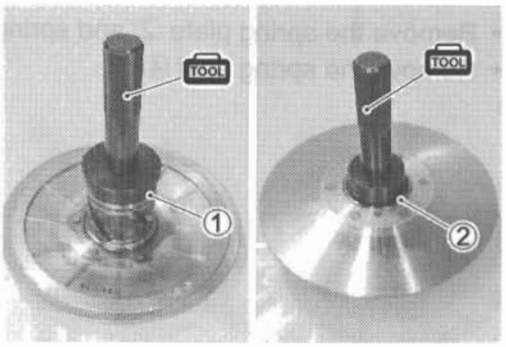


- Remove the oil seals.



- Install the oil seal with the special tool.

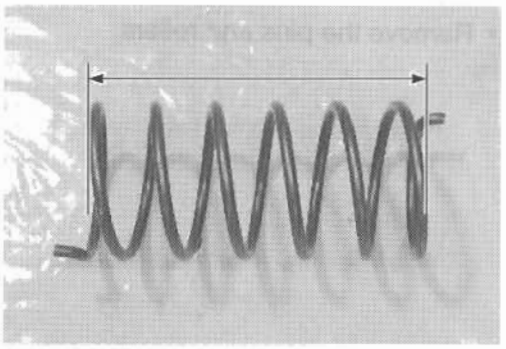
09913-70210: Bearing installer set (① ϕ62) (② ϕ55)



MOVABLE DRIVEN FACE SPRING

- Measure the spring free length with the vernier calipers.
- If the length is shorter than the service limit, replace the spring with a new one.

Movable driven face spring free length:
Service Limit: 145.4 mm (5.72 in)



MOVABLE AND FIXED DRIVEN FACE

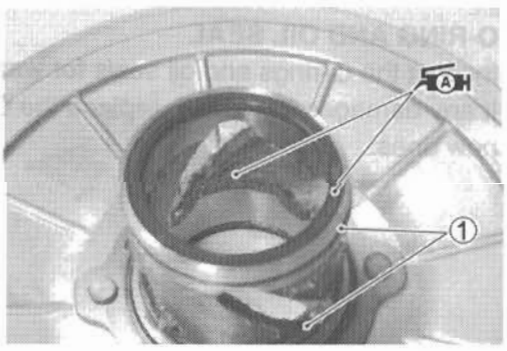
Inspect the driven face for any abnormal condition such as stepped wear or discoloration caused by burning.
If any damages are found, replace the movable driven face with a new one.



REASSEMBLY

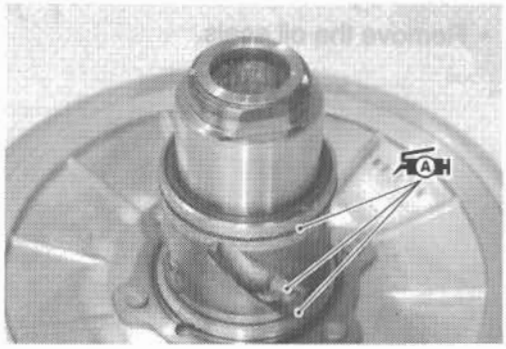
- Install the new O-rings ①.
- Apply SUZUKI SUPER GREASE "A" to the oil seal lips and movable driven face inside grease groove.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



- Apply SUZUKI SUPER GREASE "A" to the O-rings and pin grooves.

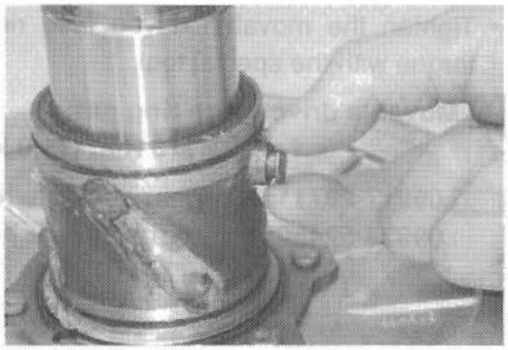
99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



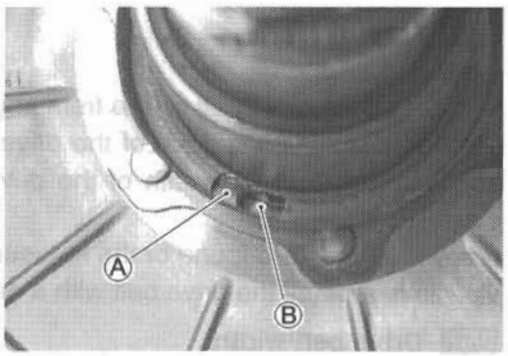
- Install the rollers and pins.

CAUTION

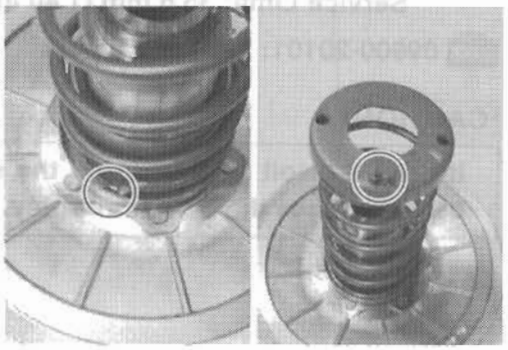
To prevent damaging the oil seal lip from during installation, slide the lip using a 0.1-mm steel sheet as a guide.



- Install the spring seat by aligning the hole Ⓐ with the hole Ⓑ.

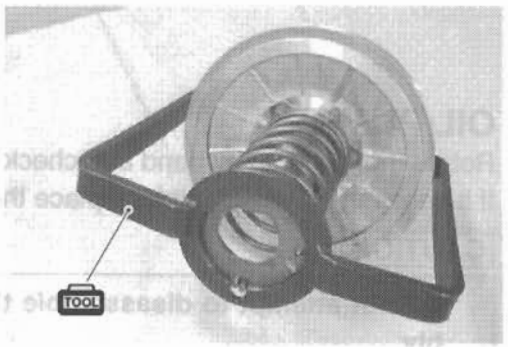


- Install the spring and spring plate by aligning the spring ends with the holes.

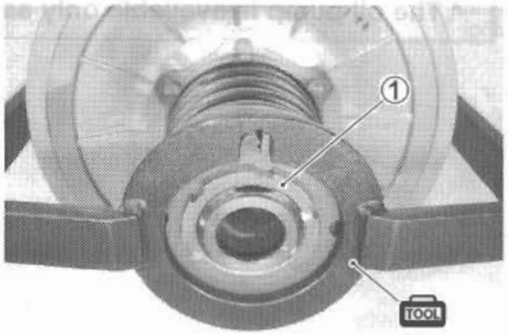


- Compress the spring with the special tool.

TOOL 09922-31430: Movable driven face spring compressor



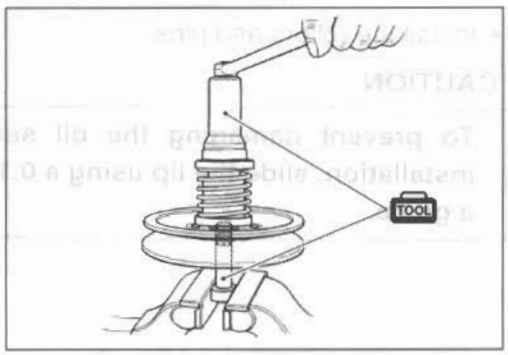
- Tighten the movable driven face ring nut ① temporarily.
- Remove the special tool from the movable driven face assembly.



- Tighten the movable driven face ring nut to the specified torque with the special tool.

Movable driven face ring nut:
110 N·m (11.0 kgf-m, 79.5 lb-ft)

09917-23711: Ring nut socket wrench
09924-52450: Fixed driven face holder



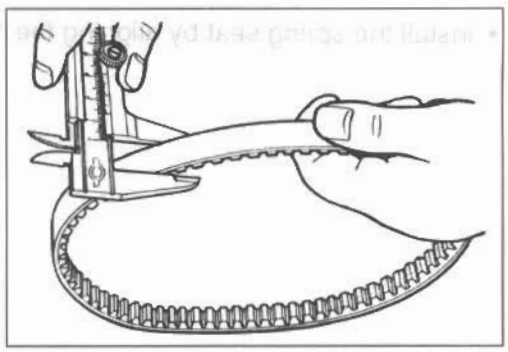
DRIVE BELT

INSPECTION

Check that the drive belt is free from any greasy substance.
Inspect the contact surface of the drive belt for cracks or damage and measure the width of the drive belt using the vernier calipers.
If any damages are found or the measurement exceeds the service limit, replace the drive belt with a new one.

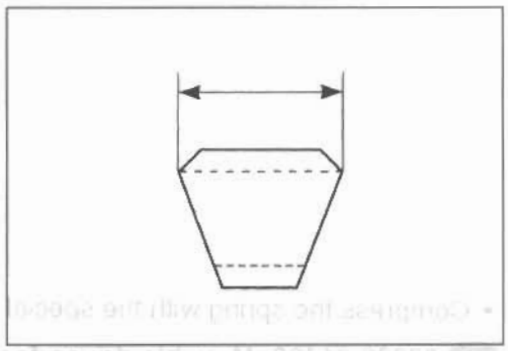
Drive belt width:
Service Limit: 35.6 mm (1.40 in)

09900-20101: Vernier calipers



CAUTION

If grease or oil is present on the surface of the drive belt, degrease the belt thoroughly.

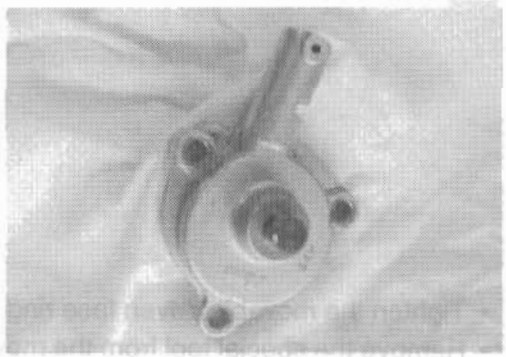


OIL PUMP

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

CAUTION

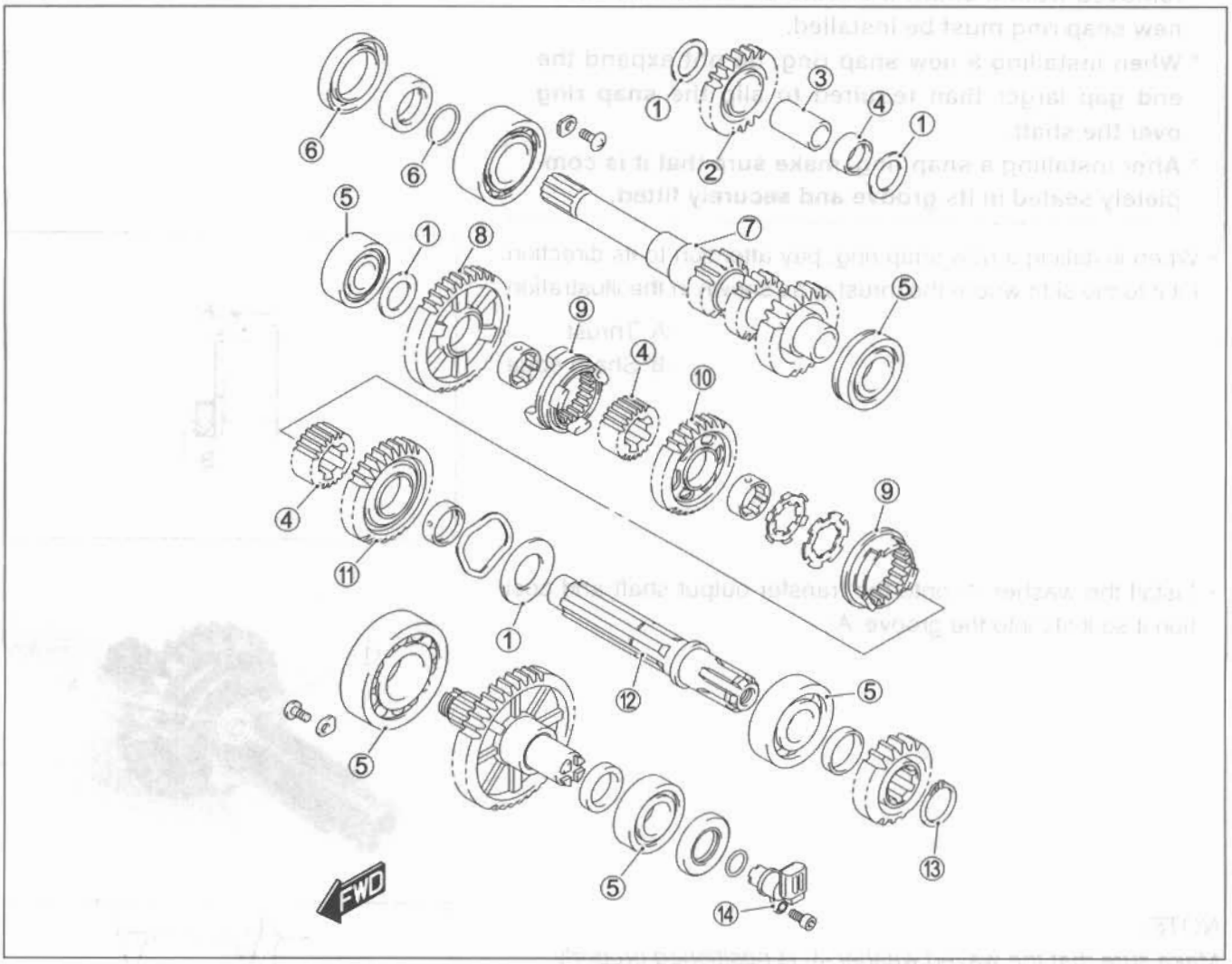
*** Do not attempt to disassemble the oil pump assembly.**
*** The oil pump is available only as an assembly.**



TRANSFER

DISASSEMBLY

- Disassemble the transfer as shown.



①	Washer	⑧	Low driven gear
②	Reverse idle gear	⑨	Dog
③	Reverse idle gear shaft	⑩	Reverse driven gear
④	Spacer	⑪	High driven gear
⑤	Bearing	⑫	Counter shaft
⑥	Oil seal	⑬	Snap ring
⑦	Transfer input shaft	⑭	Speed sensor

REASSEMBLY

Assemble the transfer in the reverse order of disassembly. Pay attention to the following points:

NOTE:

Always use new snap rings.

NOTE:

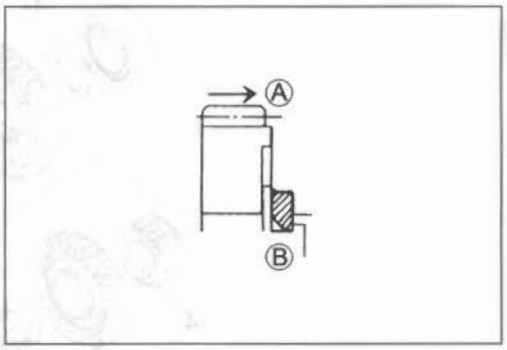
Before installing the gears, coat lightly engine oil to the transfer input/output shaft.

CAUTION

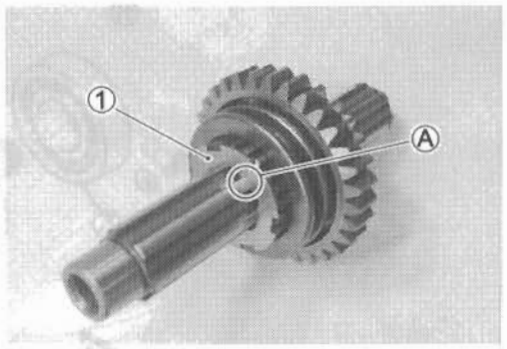
*** Never reuse a snap ring. After a snap ring has been removed from a shaft, it should be discarded and a new snap ring must be installed.**
*** When installing a new snap ring, do not expand the end gap larger than required to slip the snap ring over the shaft.**
*** After installing a snap ring, make sure that it is completely seated in its groove and securely fitted.**

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

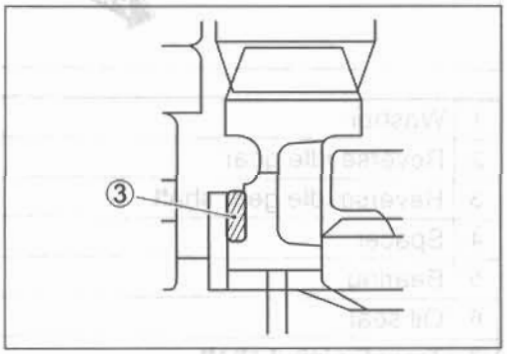
Ⓐ Thrust
Ⓑ Sharp edge



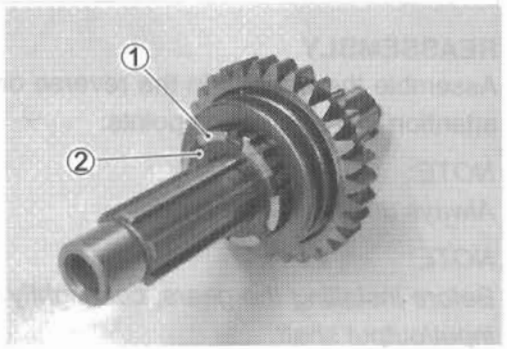
- Install the washer ① onto the transfer output shaft and position it so it fits into the groove Ⓐ.



NOTE:
Make sure that the waved washer ③ is positioned properly.



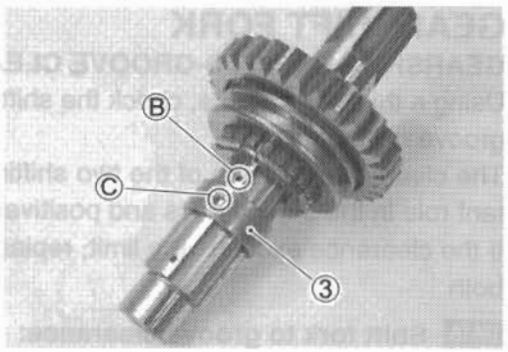
- Fit the lock washer ② into the washer ①.

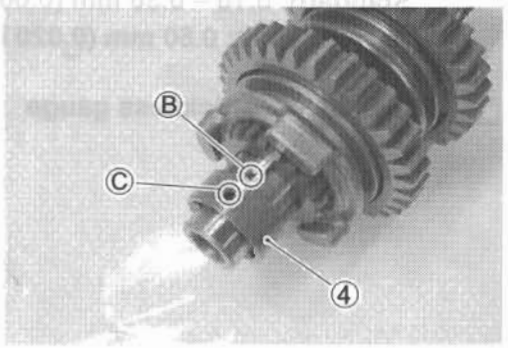


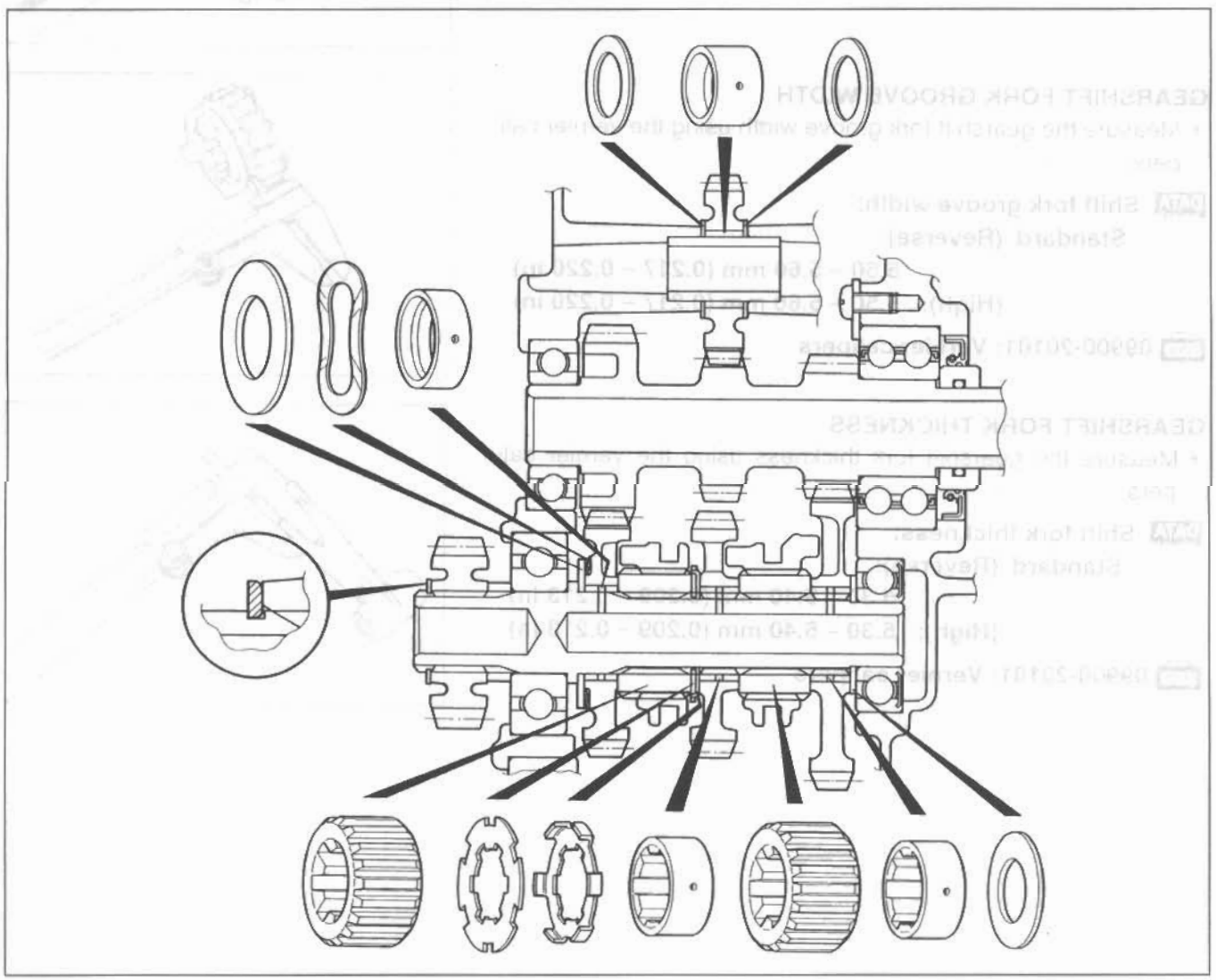
- Install the reverse drive gear bushing ③ and low driven gear bushing ④.

CAUTION

When installing the bushing onto the transfer output shaft, align the shaft oil hole Ⓑ with the bushing oil hole Ⓒ.







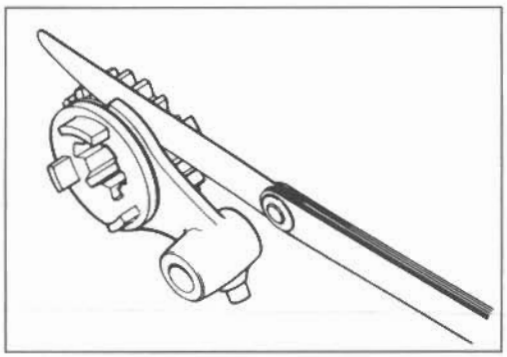
GEARSHIFT FORK

GEARSHIFT FORK-TO-GROOVE CLEARANCE

Using a thickness gauge, check the shifting fork clearance in the groove of its gear.
The clearance for each of the two shifting forks plays an important role in the smoothness and positiveness of shifting action.
If the clearance exceeds the limit, replace the fork or its gear, or both.

DATA Shift fork to groove clearance:
Standard: 0.10 – 0.30 mm (0.004 – 0.012 in)
Service Limit: 0.50 mm (0.020 in)

TOOL 09900-20803: Thickness gauge

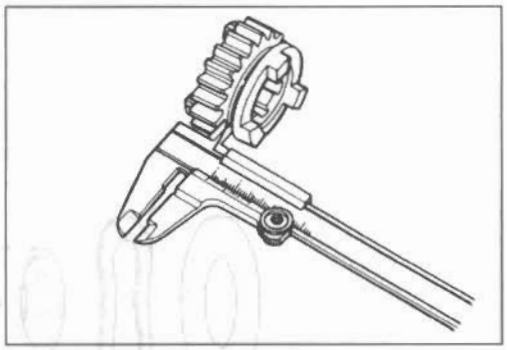


GEARSHIFT FORK GROOVE WIDTH

- Measure the gearshift fork groove width using the vernier calipers.

DATA Shift fork groove width:
Standard (Reverse): 5.50 – 5.60 mm (0.217 – 0.220 in)
(High): 5.50 – 5.60 mm (0.217 – 0.220 in)

TOOL 09900-20101: Vernier calipers

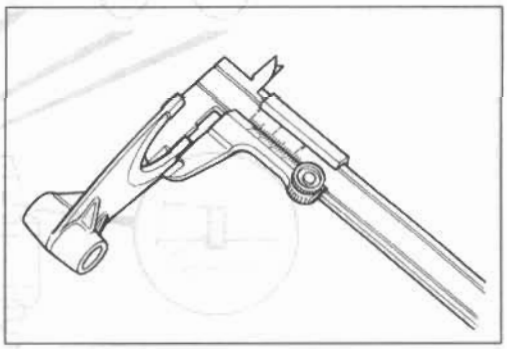


GEARSHIFT FORK THICKNESS

- Measure the gearshift fork thickness using the vernier calipers.

DATA Shift fork thickness:
Standard (Reverse): 5.30 – 5.40 mm (0.209 – 0.213 in)
(High): 5.30 – 5.40 mm (0.209 – 0.213 in)

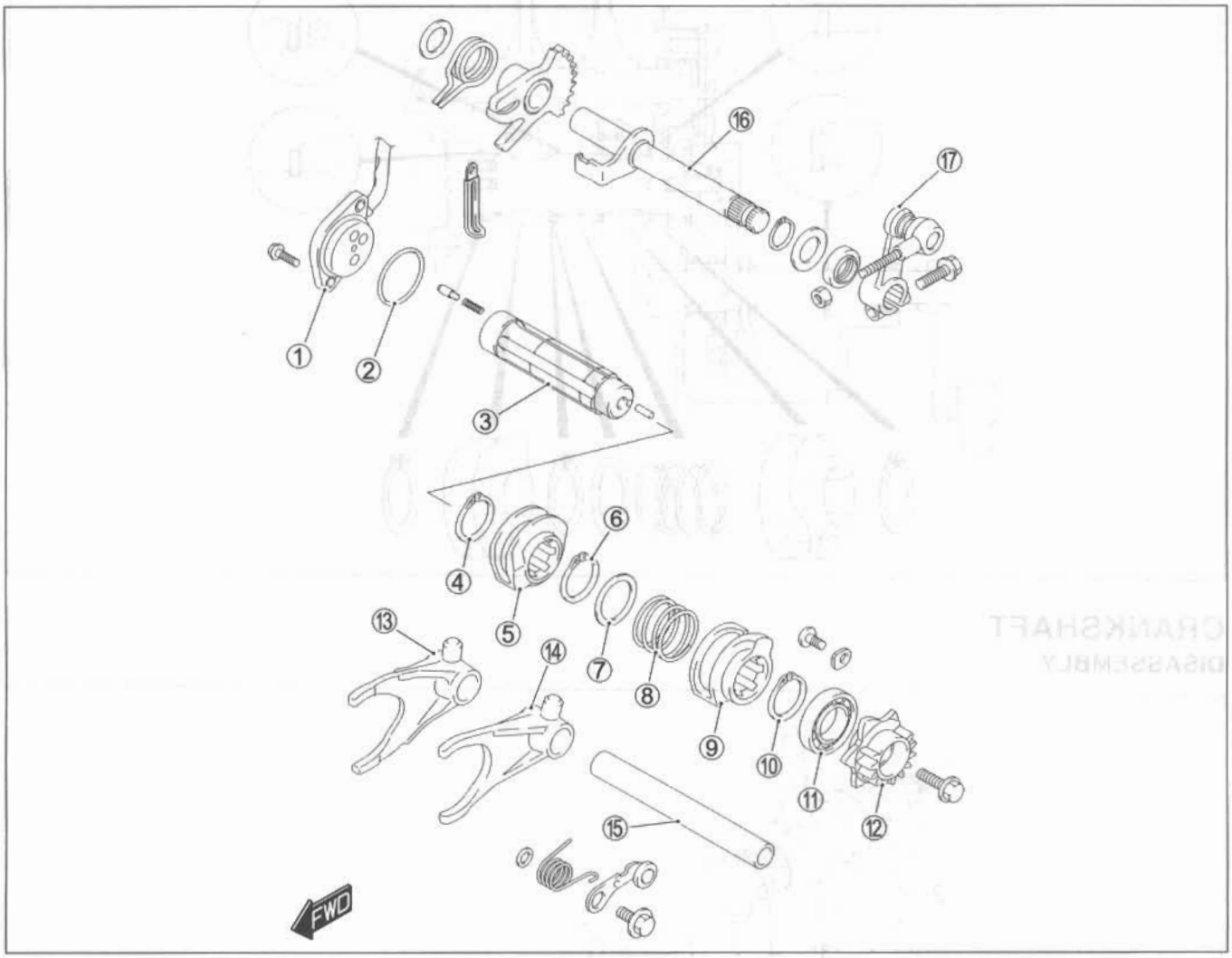
TOOL 09900-20101: Vernier calipers



GEARSHIFT CAM

DISASSEMBLY

- Disassemble the gearshift cam as shown.



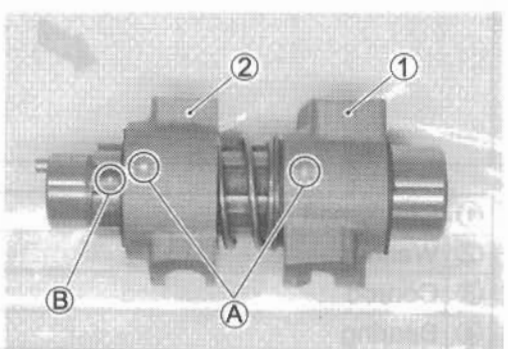
①	Gear position switch	⑦	Washer	⑬	Gearshift fork (for Reverse)
②	O-ring	⑧	Spring	⑭	Gearshift fork (for High/Low)
③	Gearshift shaft	⑨	Dog (for High/Low)	⑮	Gearshift fork shaft
④	Snap ring	⑩	Snap ring	⑯	Gearshift shaft
⑤	Dog (for Reverse)	⑪	Bearing	⑰	Gearshift lever
⑥	Snap ring	⑫	Gearshift cam		

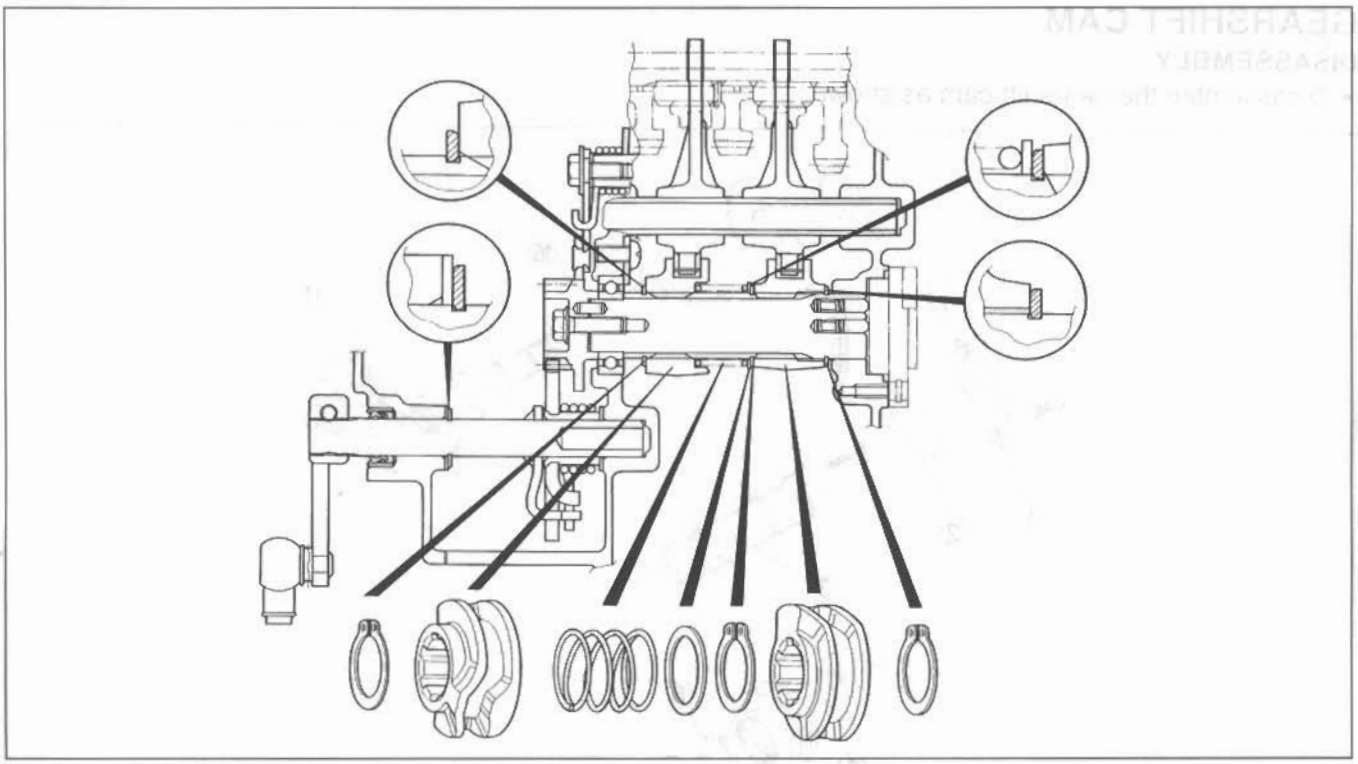
REASSEMBLY

- Install the dog ① and ② as shown.

NOTE:

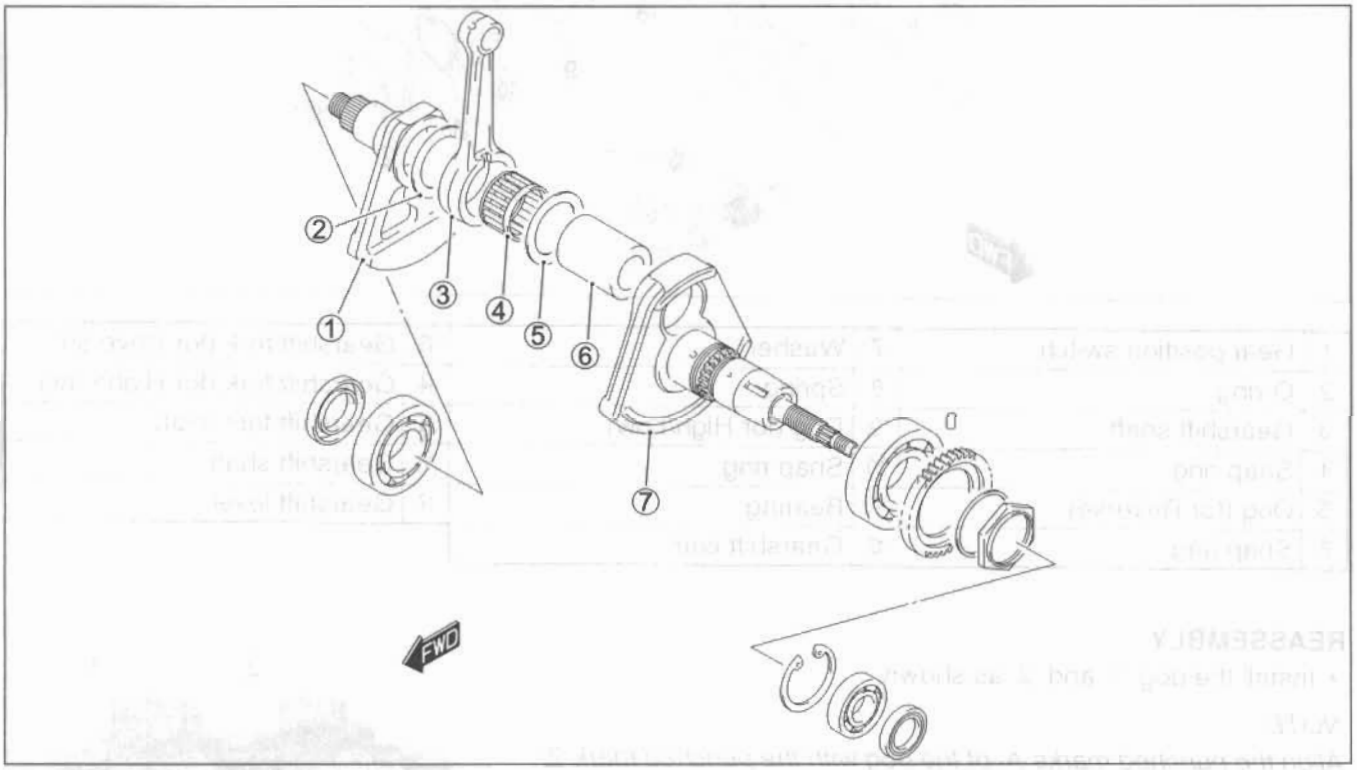
Align the punched marks Ⓐ of the dog with the punched mark Ⓑ on the shaft.





CRANKSHAFT

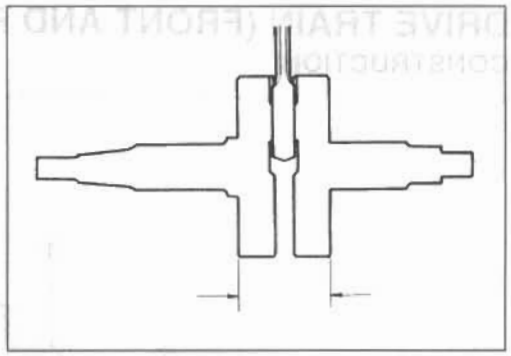
DISASSEMBLY



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

REASSEMBLY

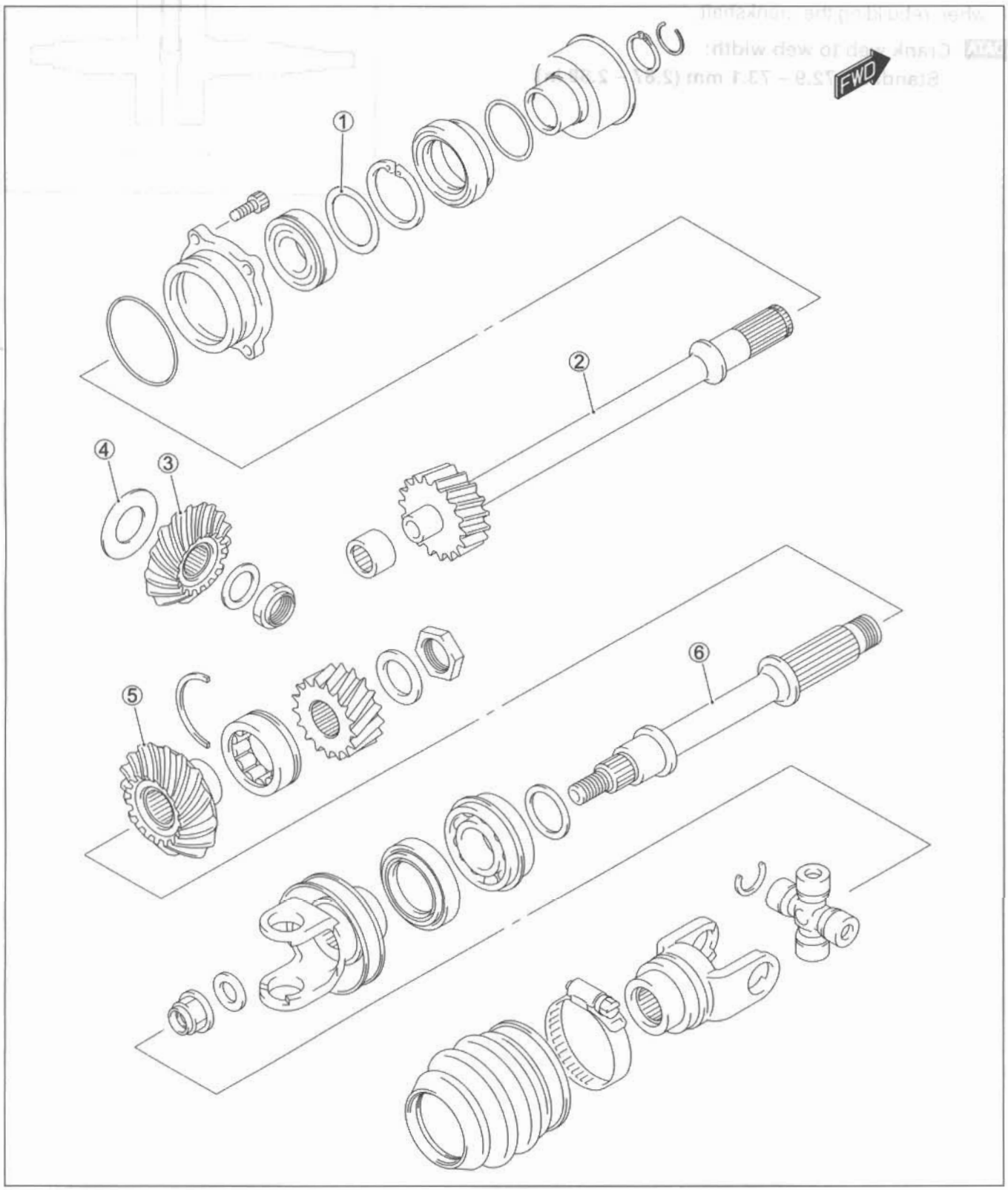
- Determine the width between the webs referring to the figure when rebuilding the crankshaft.



DATA **Crank web to web width:**
Standard: 72.9 – 73.1 mm (2.87 – 2.88 in)

DRIVE TRAIN (FRONT AND REAR OUTPUT SHAFT)

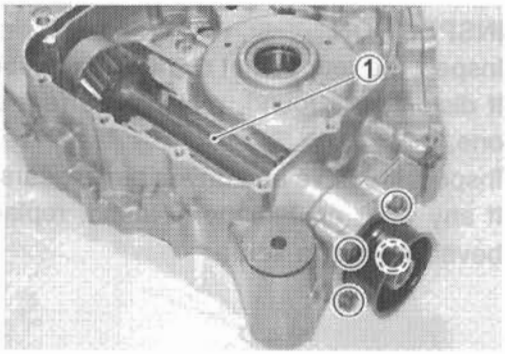
CONSTRUCTION



①	Shim (s)	④	Shim (s)
②	Front output shaft	⑤	Driven bevel gear
③	Drive bevel gear	⑥	Rear output shaft

FRONT OUTPUT SHAFT REMOVAL

- Remove the front output shaft ①.



INSPECTION

Inspect the front output shaft for distortion and gear for wear or damage.

If distortion and any wear or damage are found, replace the front output shaft with a new one.

FRONT OUTPUT SHAFT INSTALLATION

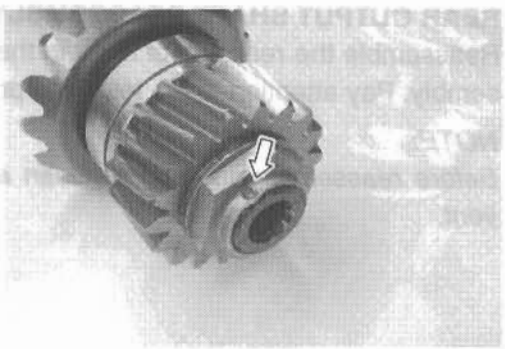
- Install the front output shaft in the reverse order of removal.

REAR OUTPUT SHAFT DISASSEMBLY

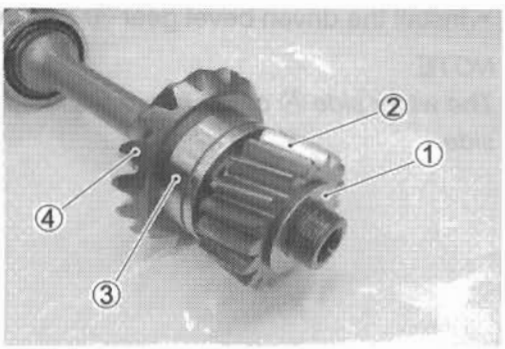
- Unlock the nut with a chisel.
- With the rear output shaft held immovable with a vise, remove the nut.

CAUTION

Replace the removed nut with a new one.



- Remove the washer ①, gear ②, bearing ③ and driven bevel gear ④.



INSPECTION

Inspect the rear output shaft for distortion.
If distortion is found, replace the rear output shaft with a new one.
Inspect the drive and driven bevel gears for wear or damage.
If any wear or damage is found, replace the drive and driven bevel gears as a set.

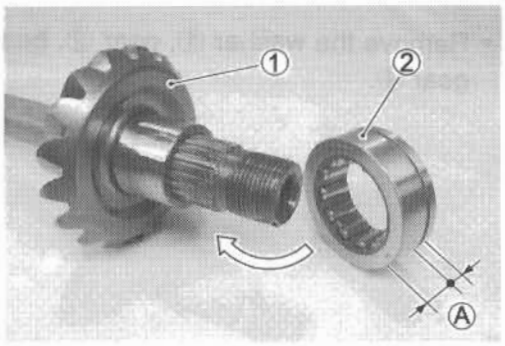
REAR OUTPUT SHAFT REASSEMBLY

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

NOTE:
Before reassembly, thoroughly clean all parts in cleaning solvent.

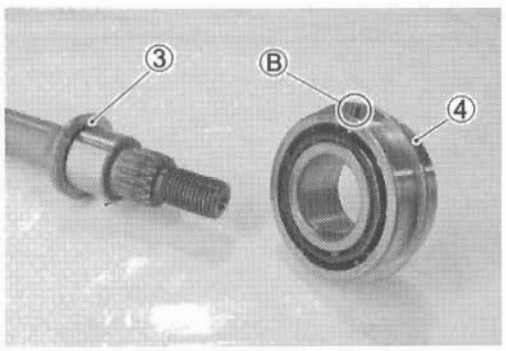
- Install the driven bevel gear ① and bearing ②.

NOTE:
The wider side Ⓐ of the bearing should be positioned bevel gear side.



- Install the shim(s) ③ and bearing ④.

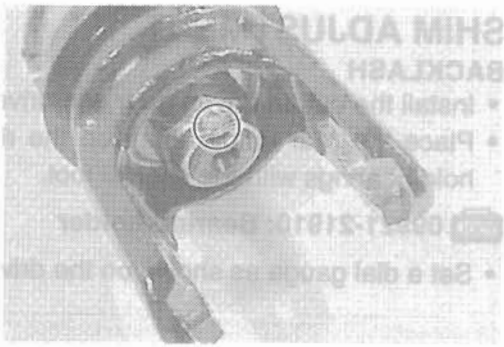
NOTE:
The bearing knock-pin Ⓑ should be positioned inside.



- With the rear output shaft held immovable with a vise, tighten the new nut to the specified torque.

Rear output shaft nut Ⓒ: 100 N·m (10.0 kgf-m, 72.5 lb-ft)

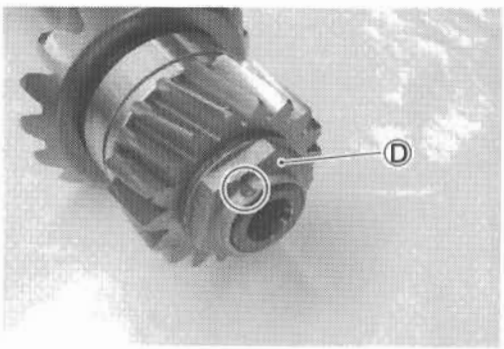
NOTE:
Do not stake a lock portion on the nut at this stage. After the backlash and tooth contact have been checked or adjusted, stake the nut with a center punch.



- With the rear output shaft held immovable with a vise, tighten the new nut to the specified torque.

Rear output shaft nut Ⓓ: 100 N·m (10.0 kgf-m, 72.5 lb-ft)

- Lock the rear output shaft nut Ⓓ with a center punch.



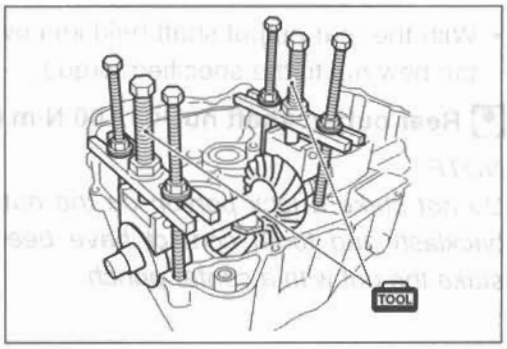
SHIM ADJUSTMENT

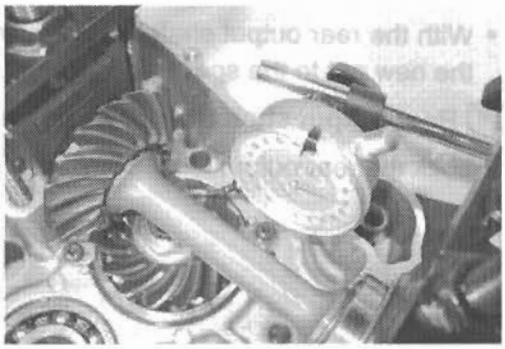
BACKLASH

- Install the output driven gear and drive bevel gear. (☞3-74)
- Place the rear output shaft on the right crankcase half and hold bearings with the special tool.

TOOL 09921-21910: Bearing holder

- Set a dial gauge as shown on the drive bevel gear.





Measure the backlash by turning the drive bevel gear shaft in each direction, reading the total backlash on the dial gauge. If the backlash is not within specification, the shim must be changed and the backlash should be re-checked until correct. Refer to the chart at the right for appropriate shim thickness.

DATA Bevel gear backlash
Standard: 0.03 – 0.15 mm (0.001 – 0.006 in)

NOTE:
Adjust the backlash by referring to the chart at the right and using the thickness of the removed shims as a guide.

Backlash	Shim adjustment
Under 0.03 mm (0.001 in)	Increase shim thickness
0.03 – 0.15 mm (0.001 – 0.006 in)	Correct
Over 0.15 mm (0.006 in)	Decrease shim thickness

For driven bevel gear (☞3-68)

Part No.	Shim thickness
24945-03G50-055	0.550 mm (0.022 in)
24945-03G50-058	0.575 mm (0.023 in)
24945-03G50-060	0.600 mm (0.024 in)
24945-03G50-063	0.625 mm (0.025 in)
24945-03G50-065	0.650 mm (0.026 in)
24945-03G50-068	0.675 mm (0.027 in)
24945-03G50-070	0.700 mm (0.028 in)
24945-03G50-073	0.725 mm (0.029 in)
24945-03G50-075	0.750 mm (0.030 in)
24945-03G50-078	0.775 mm (0.031 in)
24945-03G50-080	0.800 mm (0.031 in)
24945-03G50-083	0.825 mm (0.032 in)
24945-03G50-085	0.850 mm (0.033 in)
24945-03G50-088	0.875 mm (0.034 in)
24945-03G50-090	0.900 mm (0.035 in)
24945-03G50-093	0.925 mm (0.036 in)
24945-03G50-095	0.950 mm (0.037 in)
24945-03G50-098	0.975 mm (0.038 in)
24945-03G50-100	1.000 mm (0.039 in)
24945-03G50-103	1.025 mm (0.040 in)
24945-03G50-105	1.050 mm (0.041 in)
24945-03G50-108	1.075 mm (0.042 in)
24945-03G50-110	1.100 mm (0.043 in)
24945-03G50-113	1.125 mm (0.044 in)
24945-03G50-115	1.150 mm (0.045 in)
24945-03G50-118	1.175 mm (0.046 in)
24945-03G50-120	1.200 mm (0.047 in)
24945-03G50-123	1.225 mm (0.048 in)
24945-03G50-125	1.250 mm (0.049 in)
24945-03G50-128	1.275 mm (0.050 in)
24945-03G50-130	1.300 mm (0.051 in)

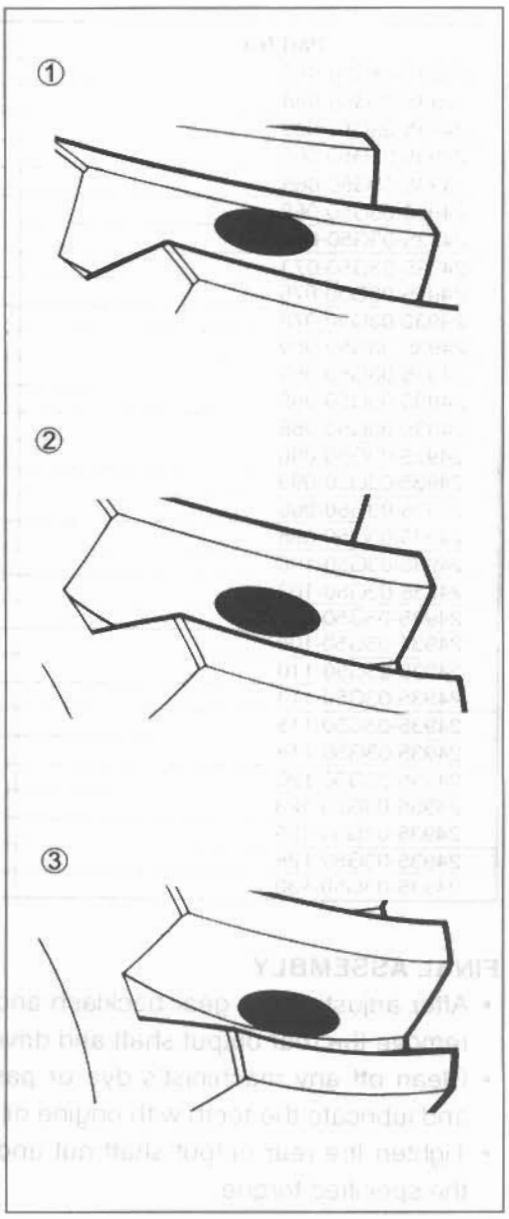
TOOTH CONTACT

After backlash adjustment is carried out, the tooth contact must be checked. Pay attention to the following procedures:

- Remove the rear output shaft from the crankcase.
- Clean and degrease several teeth of the drive and driven bevel gears.
- Apply a coating of machinist's layout dye or paste to several teeth of the driven bevel gear.
- Install the rear output shaft.
- Rotate the driven bevel gear several turns in both directions.
- Remove the output shaft and inspect the coated teeth of the drive bevel gear. The tooth contact pattern should be as shown in ①, ② and ③.
- If tooth contact is found to be correct (example ②), go to the FINAL ASSEMBLY section on page 3-67 to complete installation.

① Incorrect (contact at tooth top)
② Correct
③ Incorrect (contact at tooth root)

- If tooth contact is found to be incorrect (examples ① and ③), the shim thickness between the drive bevel gear and bearing must be changed and the tooth contact re-checked until correct.



CAUTION

Make sure to check the backlash after the tooth contact has been adjusted, since it may have changed. Adjust the tooth contact and backlash until they are both within specification. If the correct tooth contact cannot be maintained when adjusting the backlash, replace the drive and driven bevel gears.

Tooth contact	Shim adjustment
Contact at tooth top ①	Increase shim thickness
Contact at tooth root ③	Decrease shim thickness

For drive bevel gear (☞3-74)

Part No.	*Shim thickness*	
24935-19B00-025: 0.25 mm (0.0098 in)	Combined shim	0.25+0.25=0.50 mm (0.0197 in)
		0.25+0.30=0.55 mm (0.0217 in)
		0.30+0.30=0.60 mm (0.0236 in)
		0.30+0.35=0.65 mm (0.0256 in)
24935-19B00-030: 0.30 mm (0.0118 in)		0.35+0.35=0.70 mm (0.0276 in)
		0.25+0.25+0.25=0.75 mm (0.0295 in)
24935-19B00-030: 0.35 mm (0.0138 in)		0.25+0.25+0.30=0.80 mm (0.0315 in)
		0.25+0.25+0.35=0.85 mm (0.0335 in)

Part No.	Shim thickness
24935-03G50-055	0.550 mm (0.0217 in)
24935-03G50-058	0.575 mm (0.0226 in)
24935-03G50-060	0.600 mm (0.0236 in)
24935-03G50-063	0.625 mm (0.0246 in)
24935-03G50-065	0.650 mm (0.0256 in)
24935-03G50-068	0.675 mm (0.0266 in)
24935-03G50-070	0.700 mm (0.0276 in)
24935-03G50-073	0.725 mm (0.0285 in)
24935-03G50-075	0.750 mm (0.0295 in)
24935-03G50-078	0.775 mm (0.0305 in)
24935-03G50-080	0.800 mm (0.0315 in)
24935-03G50-083	0.825 mm (0.0325 in)
24935-03G50-085	0.850 mm (0.0335 in)
24935-03G50-088	0.875 mm (0.0344 in)
24935-03G50-090	0.900 mm (0.0354 in)
24935-03G50-093	0.925 mm (0.0364 in)
24935-03G50-095	0.950 mm (0.0374 in)
24935-03G50-098	0.975 mm (0.0384 in)
24935-03G50-100	1.000 mm (0.0394 in)
24935-03G50-103	1.025 mm (0.0404 in)
24935-03G50-105	1.050 mm (0.0413 in)
24935-03G50-108	1.075 mm (0.0423 in)
24935-03G50-110	1.100 mm (0.0433 in)
24935-03G50-113	1.125 mm (0.0443 in)
24935-03G50-115	1.150 mm (0.0453 in)
24935-03G50-118	1.175 mm (0.0463 in)
24935-03G50-120	1.200 mm (0.0472 in)
24935-03G50-123	1.225 mm (0.0482 in)
24935-03G50-125	1.250 mm (0.0492 in)
24935-03G50-128	1.275 mm (0.0502 in)
24935-03G50-130	1.300 mm (0.0512 in)

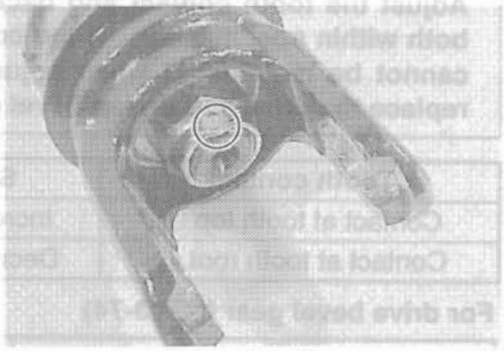
FINAL ASSEMBLY

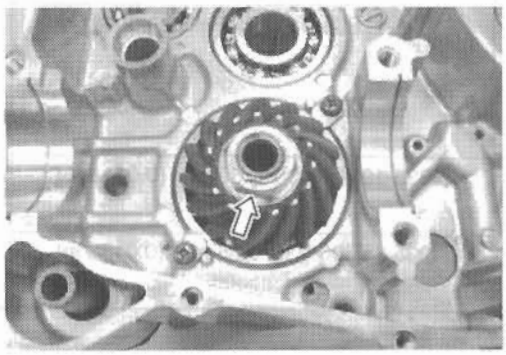
- After adjusting the gear backlash and tooth contact correctly, remove the rear output shaft and drive bevel gear.
- Clean off any machinist's dye or paste from the gear teeth, and lubricate the teeth with engine oil.
- Tighten the rear output shaft nut and drive bevel gear nut to the specified torque.

Front output shaft nut: 100 N·m (10.0 kgf-m, 72.5 lb-ft)
Drive bevel gear nut: 100 N·m (10.0 kgf-m, 72.5 lb-ft)

09920-53740: Clutch sleeve hub holder

- Stake the collar of the nut ① into the notch in the shaft.

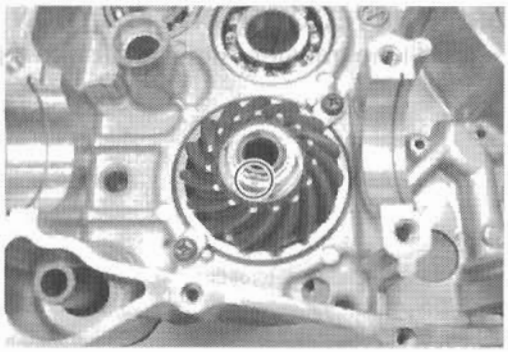




CRANKCASE

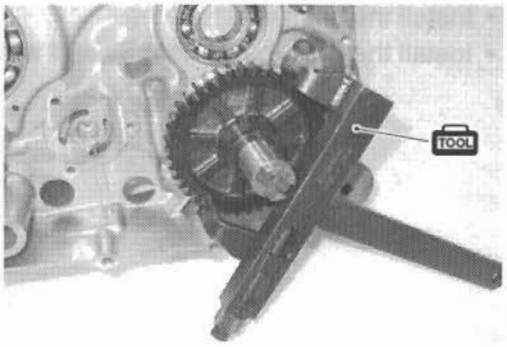
DRIVE BEVEL GEAR REMOVAL

- Using a chisel, unlock the nut.

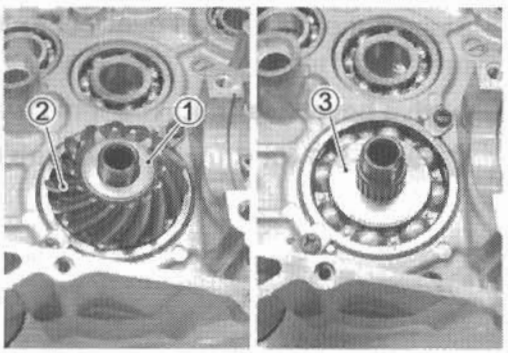


- Hold the transfer output driven gear with the special tool, and remove the drive bevel gear nut.

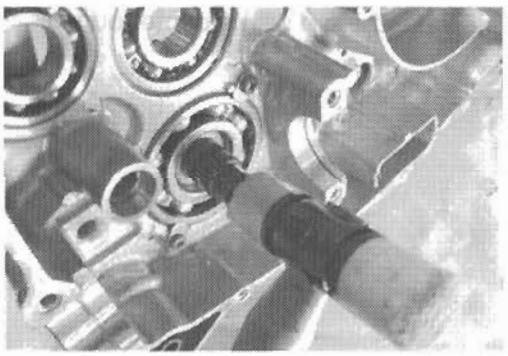
TOOL 09920-53740: Clutch sleeve hub holder



- Remove the washer ① and drive bevel gear ②.
- Remove the shim ③.



- Remove the output shaft with a plastic mallet.



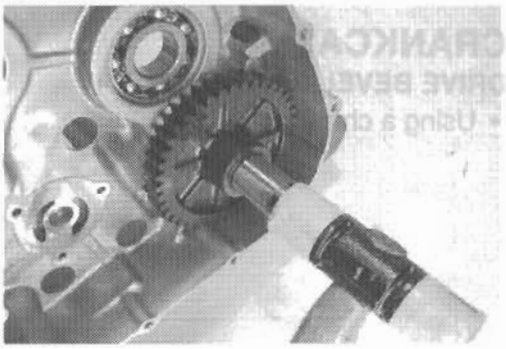
CAUTION

Do not remove the output driven gear from the output shaft.

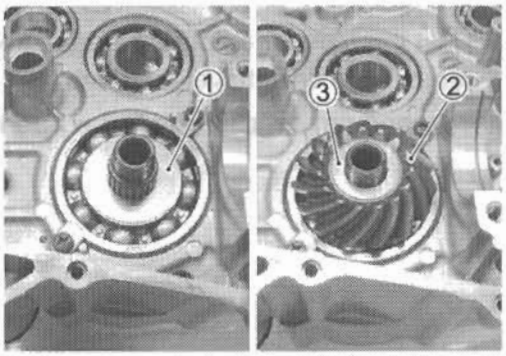


DRIVE BEVEL GEAR INSTALLATION

- Install the transfer output shaft with a plastic mallet.



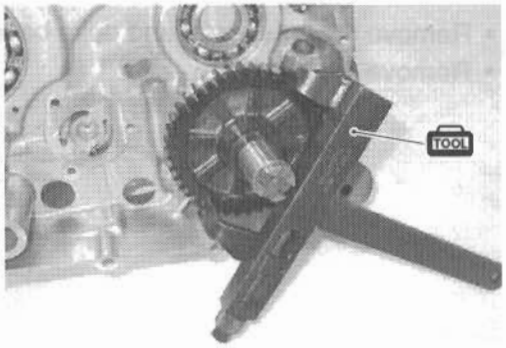
- Install the shim ①.
- Install the drive bevel gear ② and washer ③.



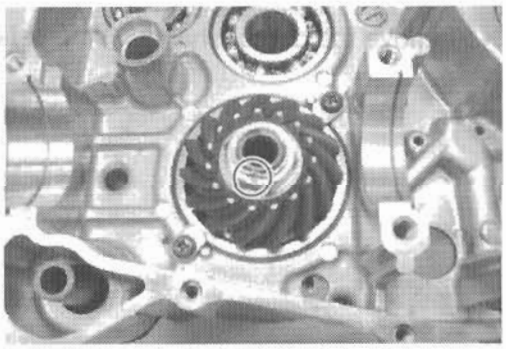
- Tighten the drive bevel gear nut to the specified torque with the special tool.

Drive bevel gear nut: 100 N·m (10.0 kgf-m, 72.5 lb-ft)

09920-53740: Clutch sleeve hub holder

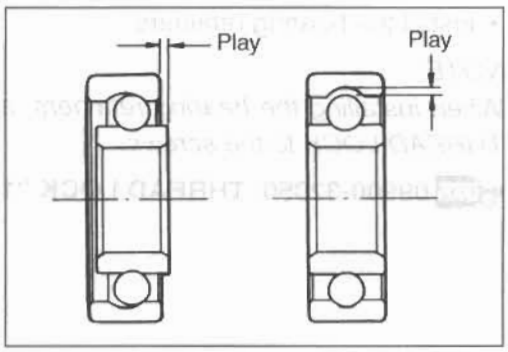


- Stake the nut with a center punch.



CRANKCASE BEARING INSPECTION

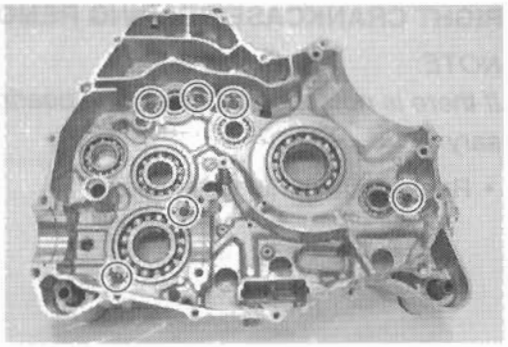
Rotate the bearing inner race by finger to inspect for abnormal play, noise and smooth rotation while the bearings are in the crankcase.
Replace the bearing in the following procedure if there is anything unusual.



LEFT CRANKCASE BEARING REMOVAL

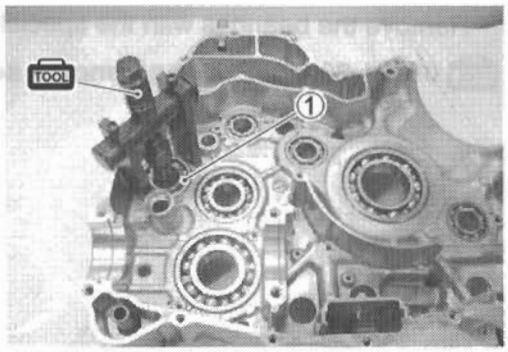
NOTE:
If there is no abnormal noise, the bearing removal is not necessary.

- Remove the bearing retainers.



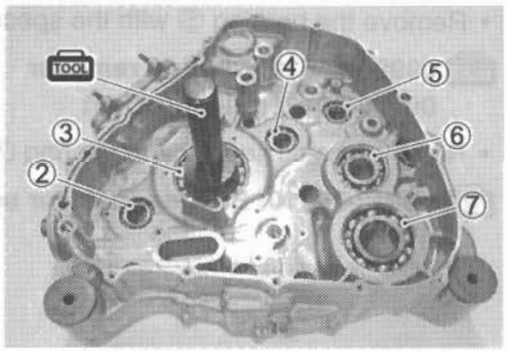
- Remove the bearing ① with the special tool.

TOOL 09921-20240: Bearing remover set (25 mm)



- Remove the bearings with the special tool.

TOOL 09913-70210: Bearing installer set (②, ④, ⑤: ϕ30)
(③, ⑦: ϕ55)
(⑥: ϕ40)

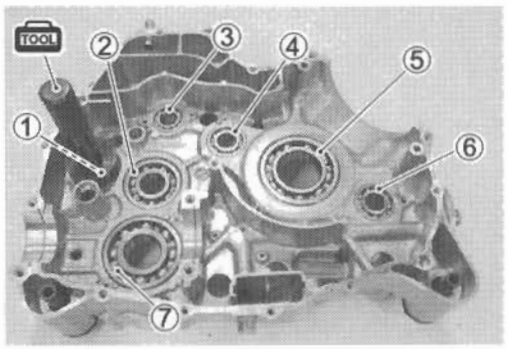


LEFT CRANKCASE BEARING INSTALLATION

- Install the bearings with the special tool.

TOOL 09913-70210: Bearing installer set (①: ϕ52)
(②: ϕ55)
(③, ④, ⑥: ϕ40)
(⑤, ⑦: ϕ75)

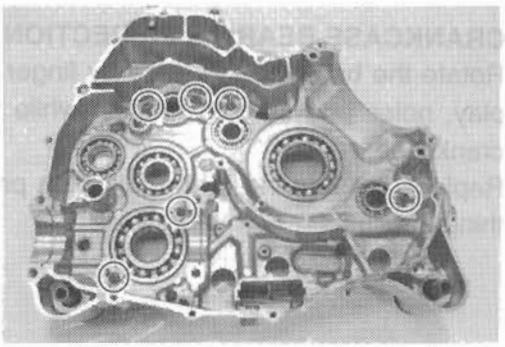
NOTE:
The stamped mark side of the bearing face outside.



• Install the bearing retainers.

NOTE:
When installing the bearing retainers, apply a small quantity of THREAD LOCK to the screws.

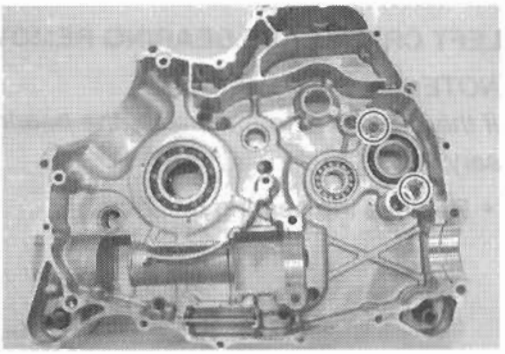
1342 09900-32050: THREAD LOCK "1342"



RIGHT CRANKCASE BEARING REMOVAL

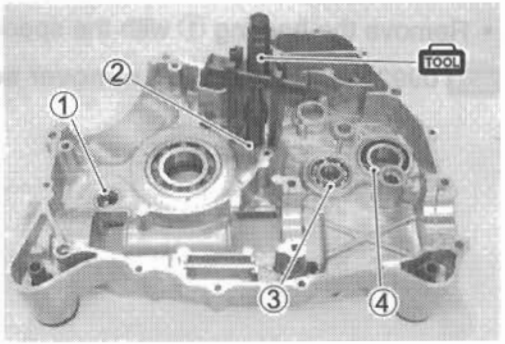
NOTE:
If there is no abnormal noise, the bearing removal is not necessary.

• Remove the bearing retainers.



• Remove the bearings with the special tool.

TOOL 09921-20240: Bearing remover set (①, ②, ③: 20 mm) (④: 30 mm)

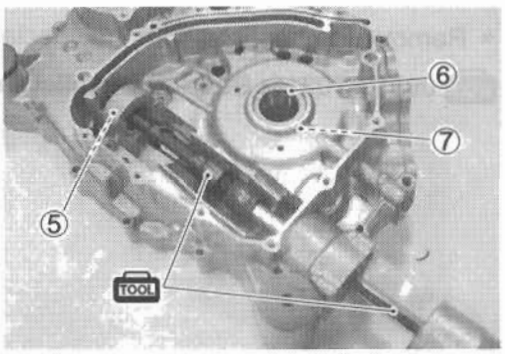


• Remove the bearing ⑤ with the special tools.

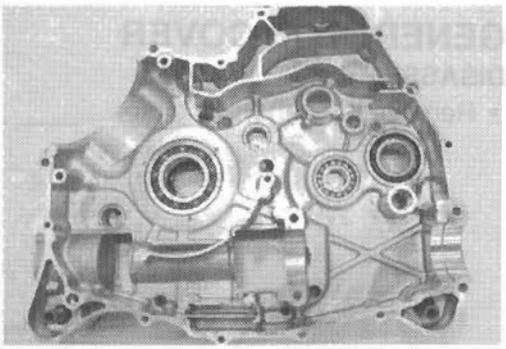
TOOL 09923-74511: Bearing remover
09930-30104: Sliding shaft

• Remove the oil seal ⑥ and bearing ⑦ with the special tool.

TOOL 09913-70210: Bearing installer set



RIGHT CRANKCASE BEARING INSTALLATION



- Install the bearings with the special tool.

TOOL 09913-70210: Bearing installer set

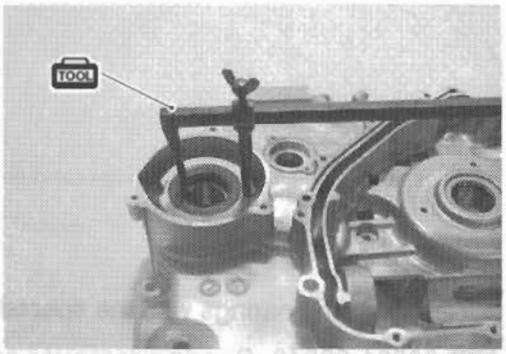
NOTE:
The stamped mark side of the bearing face outside.

- Install the bearing retainers.

NOTE:
When installing the bearing retainers, apply THREAD LOCK to the screws.

1342 09900-32050: THREAD LOCK "1342"

OIL SEAL



- Remove the oil seal with the special tool.

TOOL 09913-50121: Oil seal remover

- Install the oil seal with the special tool.

TOOL 09913-70210: Bearing installer set

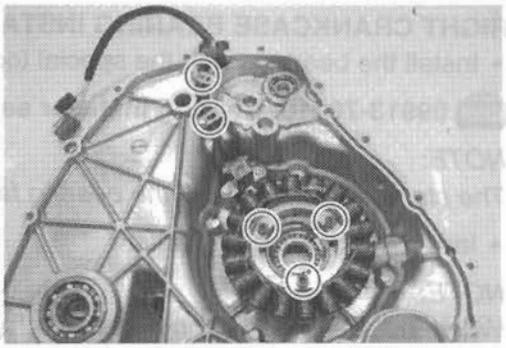
CAUTION

Use the new oil seal to prevent oil leakage.

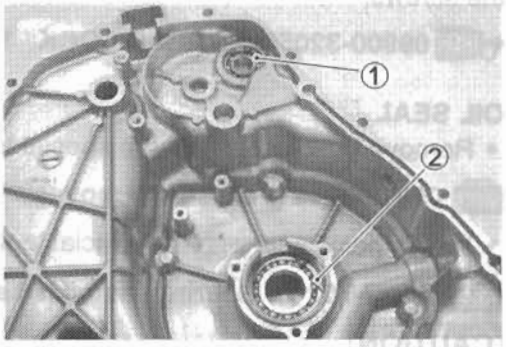
GENERATOR COVER

DISASSEMBLY

- Remove the generator stator.



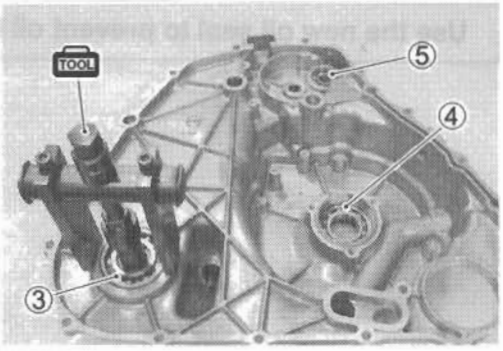
- Remove the snap rings ① and ②.



- Remove the bearings with the special tool.

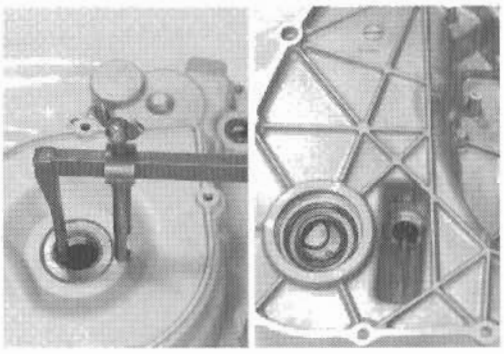
TOOL **09921-20240: Bearing remover set (③, ④: 25 mm) (⑤: 12 mm)**

NOTE:
If there is no abnormal noise, the bearing removal is not necessary.

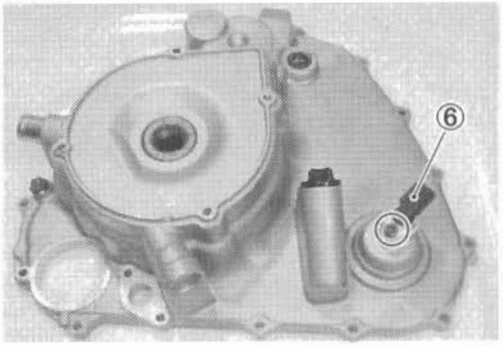


- Remove the oil seals.

TOOL **09913-50121: Oil seal remover**



- Remove the speed sensor ⑥.
- Inspect the speed sensor. (☞9-30)

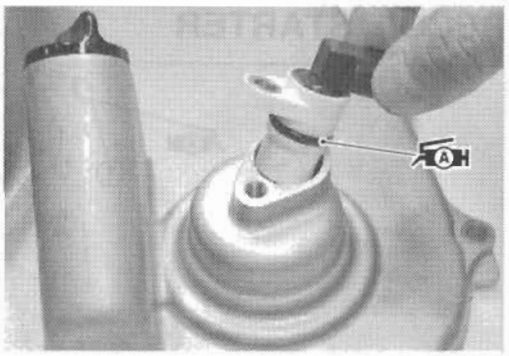


REASSEMBLY

- Apply SUZUKI SUPER GREASE "A" to the O-ring.

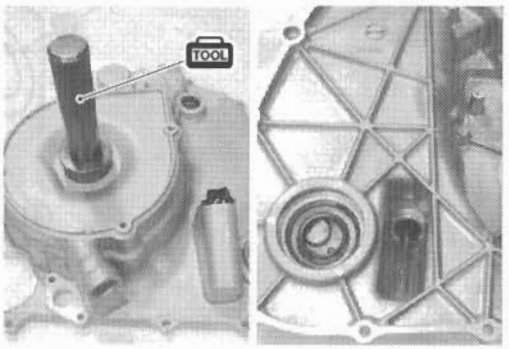
99000-25010: SUZUKI SUPER GREASE "A" (USA)
99000-25030: SUZUKI SUPER GREASE "A" (Others)

- Install the speed sensor.



- Install the oil seals with the special tool.

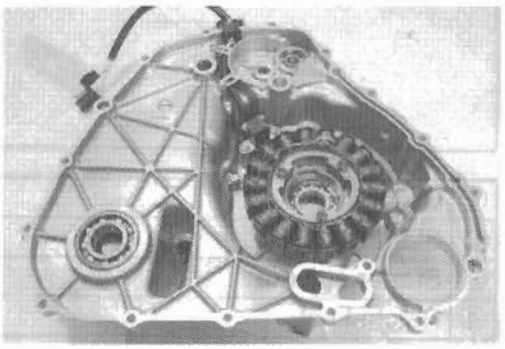
09913-70210: Bearing installer set



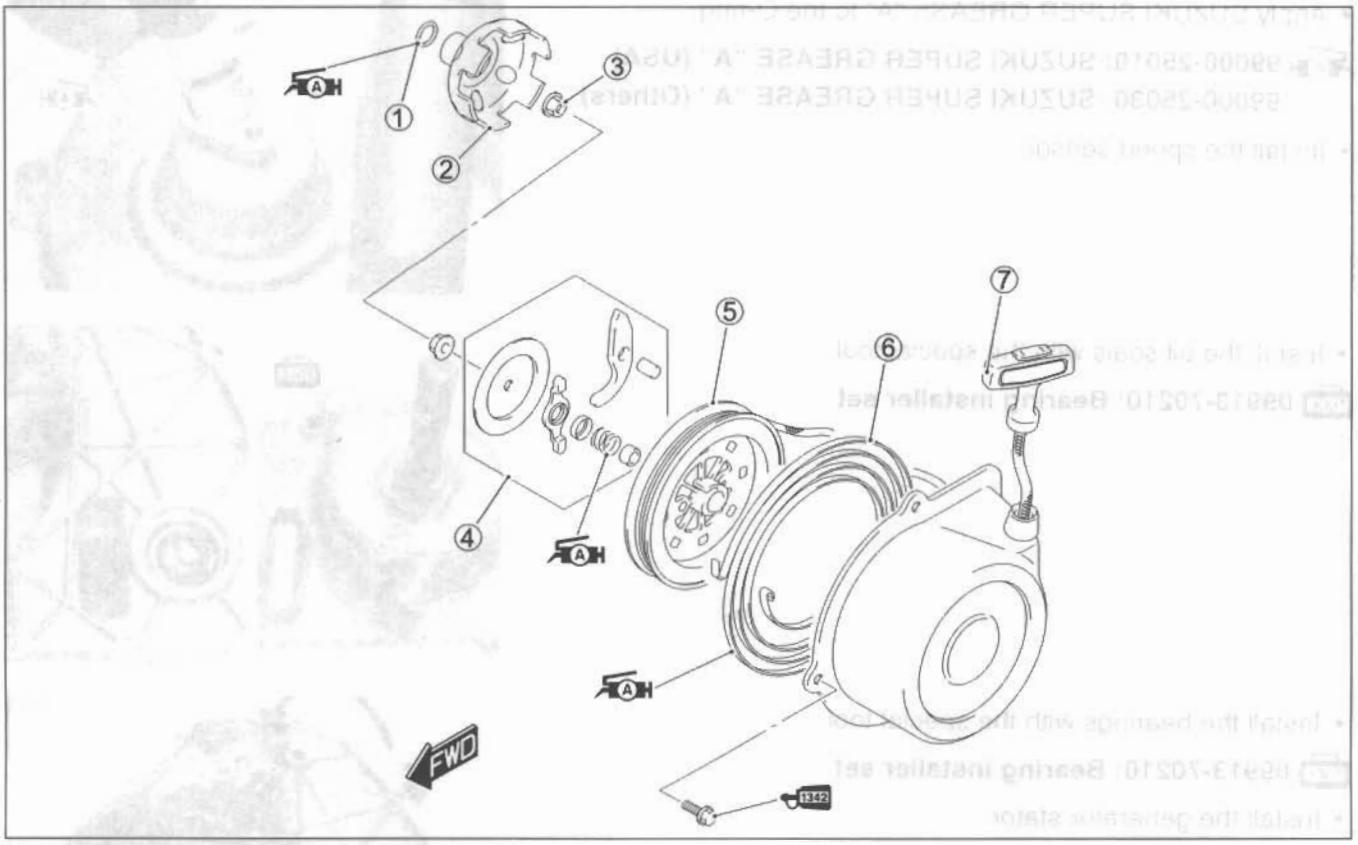
- Install the bearings with the special tool.

09913-70210: Bearing installer set

- Install the generator stator.



RECOIL STARTER

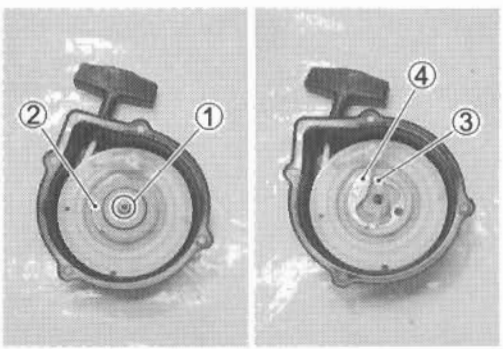


①	O-ring	⑤	Reel
②	Starter cup	⑥	Spiral spring
③	Starter cup nut	⑦	Rope assembly
④	Ratchet set		

DISASSEMBLY

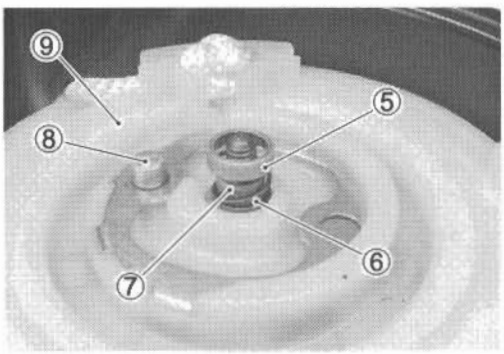
- After removing the nut ①, take out the recoil starter related parts from the housing.

① Nut
② Friction plate
③ Ratchet guide
④ Ratchet
⑤ Spring cover
⑥ Spring
⑦ Spacer
⑧ Pin
⑨ Reel



⚠ WARNING

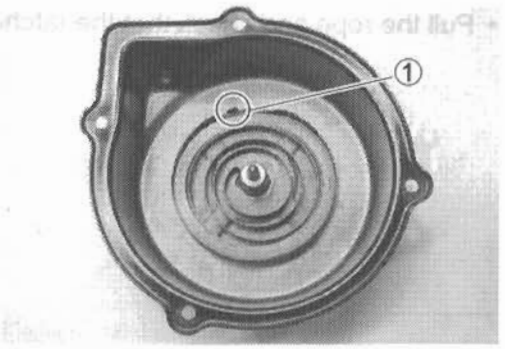
Wear hand and eye protection when removing the reel, since the spring may quickly unwind and cause an injury.



REASSEMBLY

Reassemble the recoil starter in the reverse order of disassembly. Pay attention to the following points:

- When installing the spiral spring, hook the spiral spring end ① with the recoil starter case.



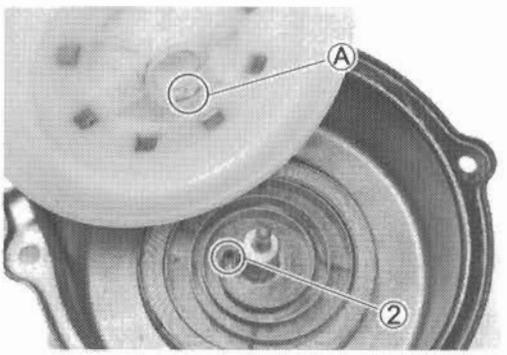
⚠ WARNING

Wear hand and eye protection when installing the reel, since the spring may quickly unwind and cause an injury.

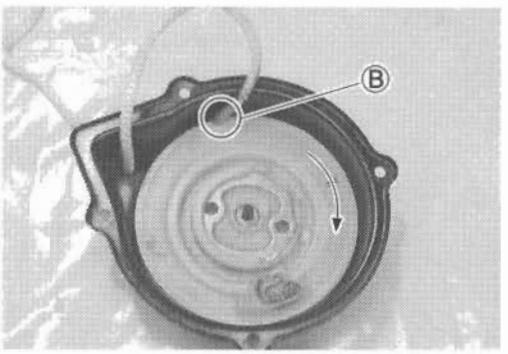
- Apply SUZUKI SUPER GREASE "A" to the spiral spring.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

- Turn the starter rope on the reel properly.
- After installing the spiral spring, engage the part Ⓐ of the reel with the spiral spring end ②.



- Hook the rope onto the hook part Ⓑ of the reel, turn the reel clockwise four of five times with the rope.

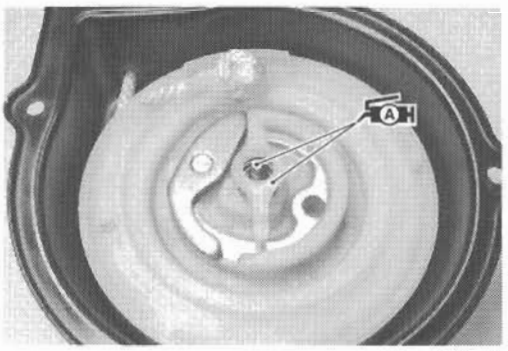


- Install the pin, spacer, spring cover, ratchet and ratchet guide.

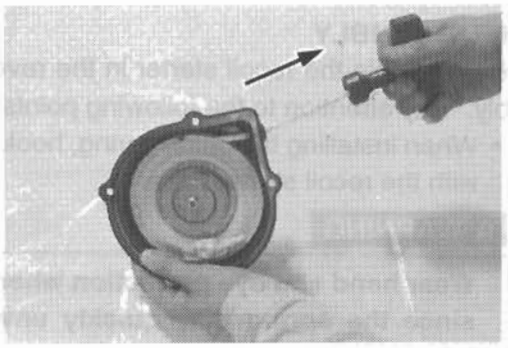
NOTE:

- Apply SUZUKI SUPER GREASE "A" to the shaft and ratchet guide.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



- Pull the rope and check that the ratchet is pushed out.



ENGINE REASSEMBLY

Reassemble the engine in the reverse order of disassembly.
Pay special attention to the following points:

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

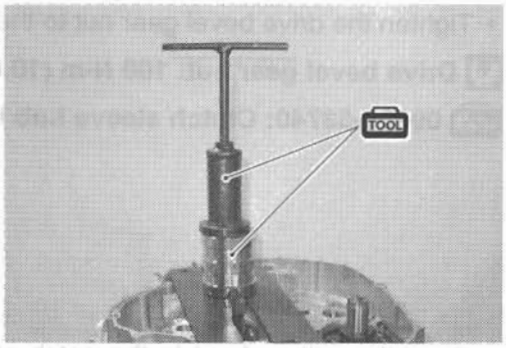
CAUTION

Always keep the drive belt, drive face and driven face away from any greasy matter.

ENGINE BOTTOM SIDE

CRANKSHAFT

- When mounting the crankshaft into the crankcase, it is necessary to pull its left end into the crankcase with the special tool.



NOTE:
Use the front fork oil seal installer and suitable bars Ⓐ as an attachment.

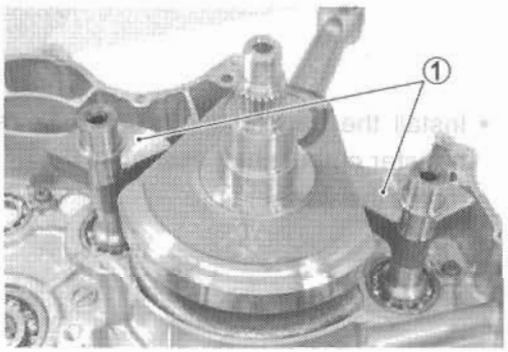
TOOL **09910-32812: Crankshaft installer**
09940-52861: Front fork oil seal installer

CAUTION

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

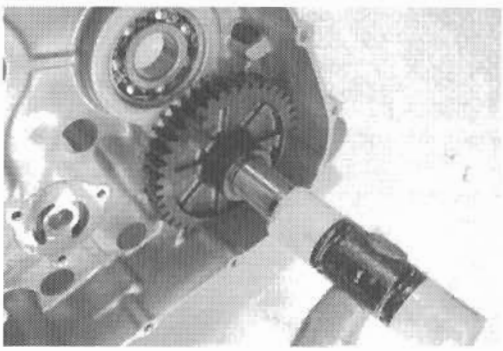
CRANK BALANCER

- Install the crank balancershafts ①.

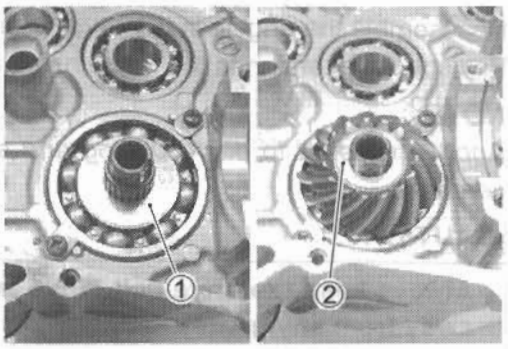


DRIVE BEVEL GEAR

- Install the transfer output driven gear/shaft with a plastic mallet.



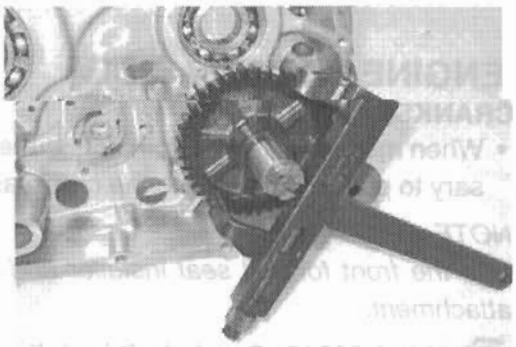
- Install the shim ①.
- Install the drive bevel gear and washer ②.



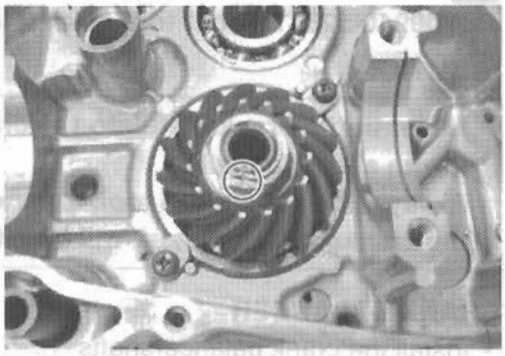
- Hold the transfer out driven gear with the special tool.
- Tighten the drive bevel gear nut to the specified torque.

Drive bevel gear nut: 100 N·m (10.0 kgf-m, 72.5 lb-ft)

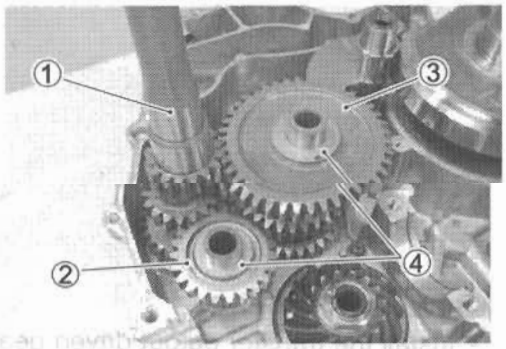
09920-53740: Clutch sleeve hub holder



- Bend the collar of nut to the notch at the shaft with a center punch.

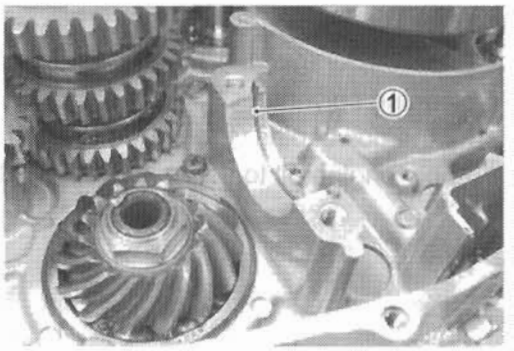


- Install the transfer input shaft ①, reverse idle gear ② and transfer output shaft assembly ③.
- Install the washer ④.



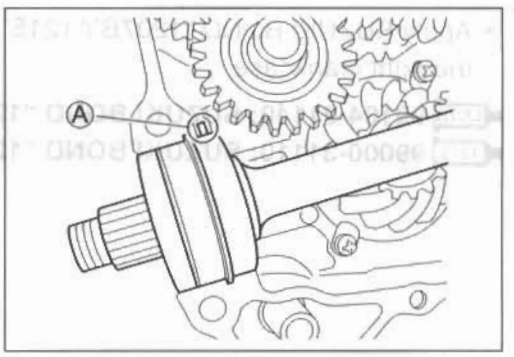
REAR OUTPUT SHAFT

- Install the C-ring ①.



- Install the rear output shaft.

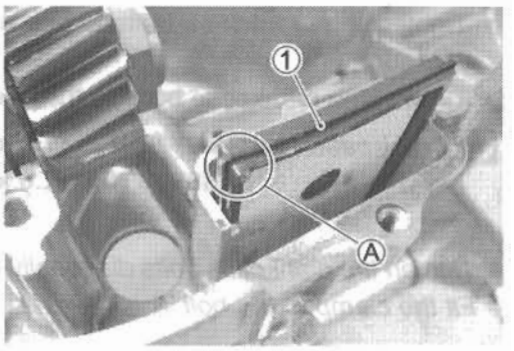
NOTE:
Be sure to fit the pin Ⓐ on the bearing into the groove of the crankcase.



OIL SUMP FILTER

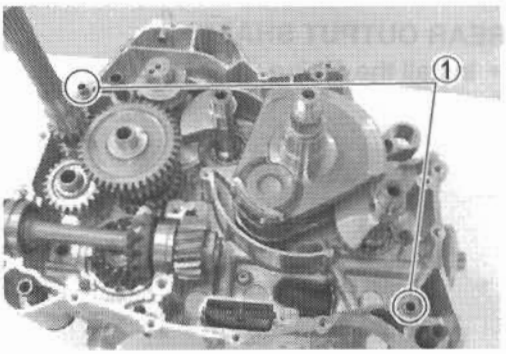
- Install the oil sump filter ①.

NOTE:
Fit the projection Ⓐ of the oil sump filter in the concave portion of the crankcase.



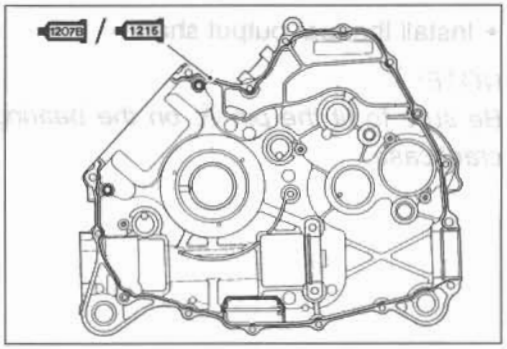
CRANKCASE

- Wipe the crankcase mating surfaces (both surfaces) with a cleaning solvent.
- Fit the dowel pins ① onto the left half on the crankcase.
- Apply engine oil to the conrod big end and the gears.



- Apply SUZUKI BOND "1207B"/"1215" to the mating surface of the right crankcase.

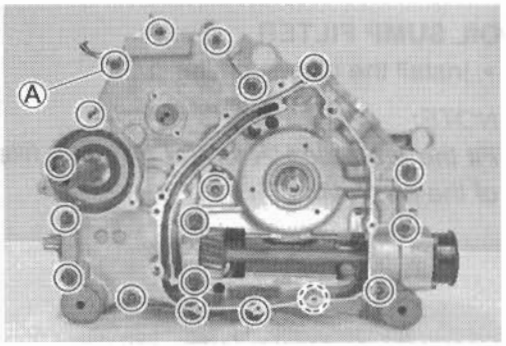
1207B 99104-31140: SUZUKI BOND "1207B" (USA)
1215 99000-31110: SUZUKI BOND "1215" (Others)



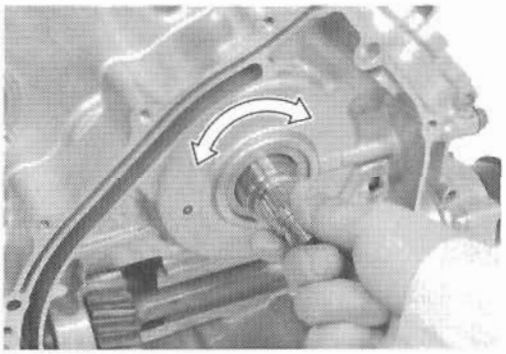
- Tighten the crankcase bolts a little at a time to equalize the pressure.
- Tighten the crankcase bolts to the specified torque.

Crankcase bolt: (M6) 10 N·m (1.0 kgf-m, 7.0 lb-ft)
(M8) 26 N·m (2.6 kgf-m, 19.0 lb-ft)

NOTE:
** Tighten the crankcase bolts diagonally with the bigger sizes first.*
** Fit the clamp to the bolt Ⓐ.*



- After the crankcase bolts have been tightened, check if the each shaft rotates smoothly. If a large resistance is felt to rotation, try to free the shafts by tapping them with a plastic mallet.



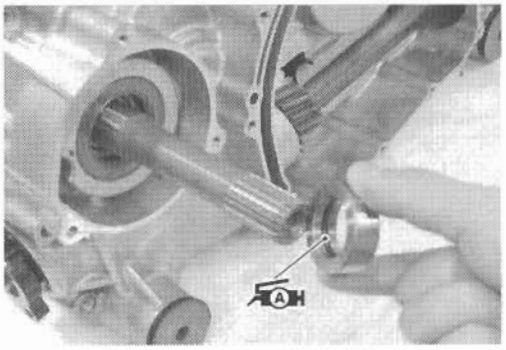
- Apply SUZUKI SUPER GREASE "A" to the O-ring.

Ⓐ 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

CAUTION

Use the new O-ring to prevent oil leakage.

- Install the collar.



CLUTCH SHOE

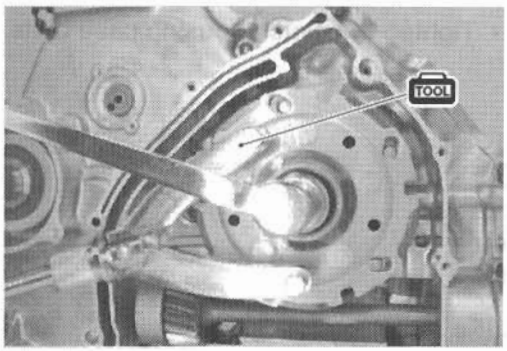
- Apply THREAD LOCK to the clutch shoe nut.
- Install the clutch shoe assembly and tighten the clutch shoe nut to the specified torque with the special tool.

NOTE:
The clutch shoe nut has left-hand threads.

Clutch shoe nut: 150 N·m (15.0 kgf-m, 108.5 lb-ft)

99000-32030: THREAD LOCK SUPER "1303"

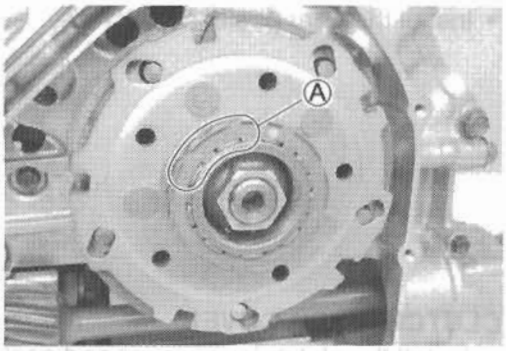
09930-40113: Rotor holder
09930-40131: Attachment



- Apply MOLYBDENUM OIL SOLUTION to the inside of the one way clutch.

MOLYBDENUM OIL SOLUTION

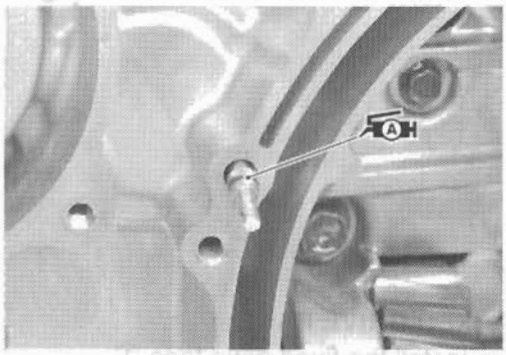
- Install the one way clutch with facing the "OUTSIDE" mark Ⓐ outside.



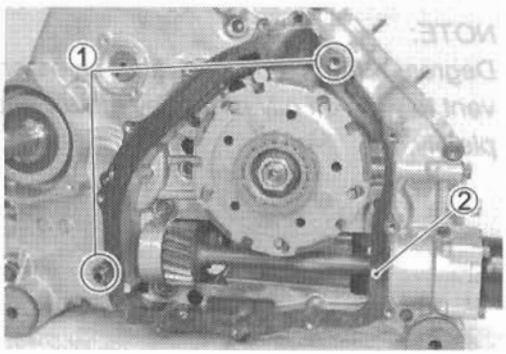
CLUTCH HOUSING CASE

- Apply SUZUKI SUPER GREASE "A" to the O-ring.
- Install the oil jet as shown in photograph.

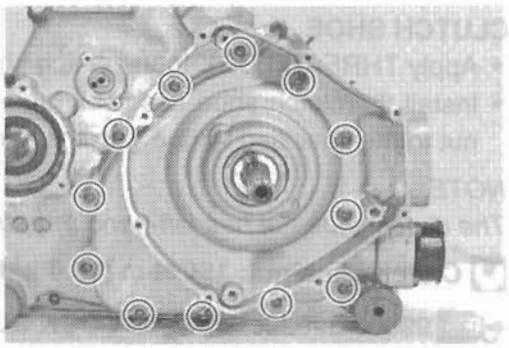
99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



- Install the dowel pins ① and new gasket ②.

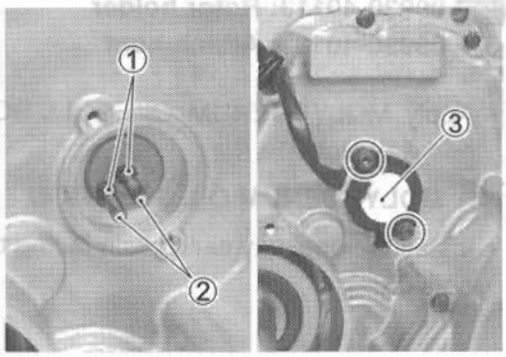


- Tighten the clutch housing case bolts.



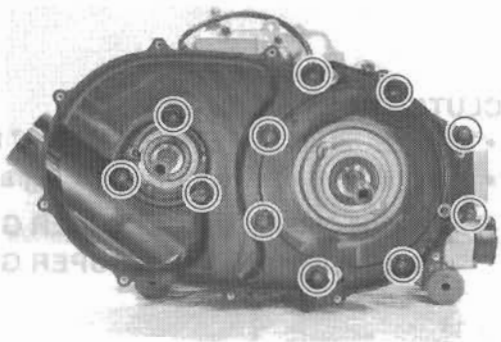
GEAR POSITION SWITCH

- Install the springs ① and switch contacts ②.
- Install the gear position switch ③.



CLUTCH INNER COVER

- Install the clutch inner cover and gasket.

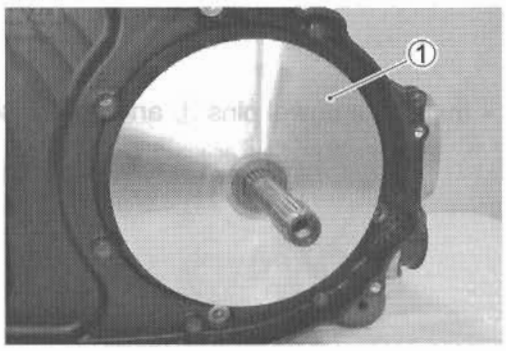


FIXED DRIVE FACE

- Install the fixed drive face ①.

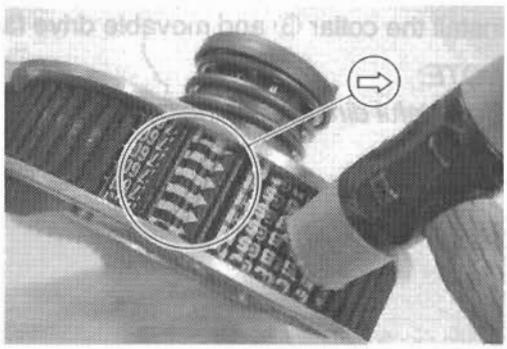
NOTE:

Degrease the fixed drive face. Use nonflammable cleaning solvent to wipe off oily or greasy matter and make its surfases completely dry.



MOVABLE DRIVE/DRIVEN FACE AND DRIVE BELT

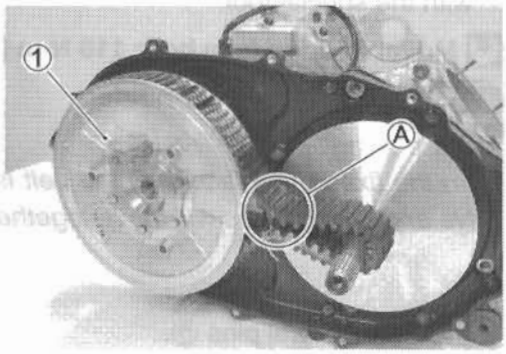
- Install the drive belt, as low as possible, between the movable driven face and fixed driven face by tapping with a plastic mallet.



CAUTION

*** The drive belt should be installed so that the arrows on the drive belt periphery point in the normal turning direction.**
*** The drive belt contact surface of the driven face should be thoroughly cleaned.**

- Install the movable driven face assembly ①.

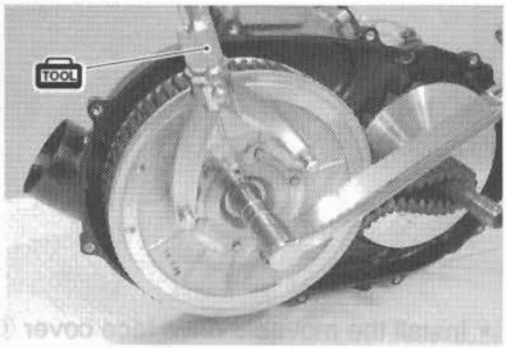


CAUTION

Pull the center area Ⓐ of upper and lower belt lines to be close to each other to prevent the belt from expanding.

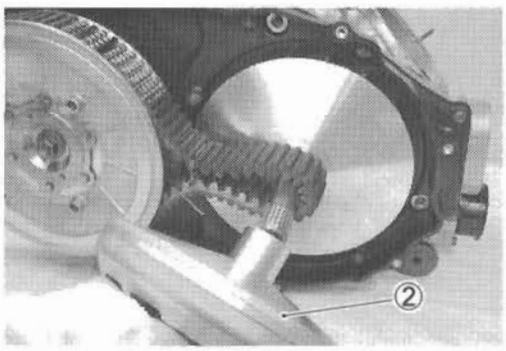
- Tighten the movable driven face bolt to the specified torque with the special tool.

Movable driven face bolt: 110 N·m (11.0 kgf-m, 79.5 lb-ft)
09930-40113: Rotor holder



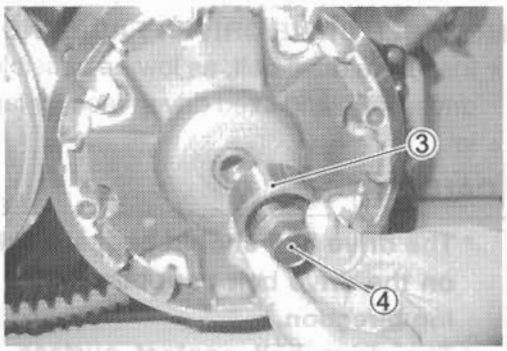
- Install the movable drive face assembly ②.

NOTE:
Degrease the movable drive face assembly. Use nonflammable cleaning solvent to wipe off oily or greasy matter and make its surfaces completely dry.



Install the collar ③ and movable drive face bolt ④.

NOTE:
Be careful direction of the collar ③.

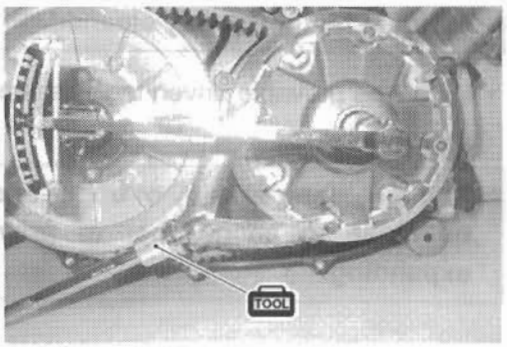


- Tighten the movable drive face bolt to the specified torque with the special tool.

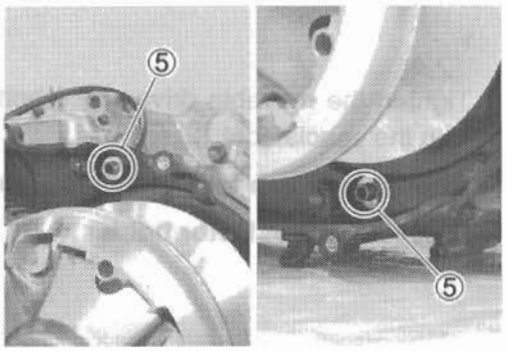
Movable drive face bolt: 110 N·m (11.0 kgf-m, 79.5 lb-ft)

09930-40113: Rotor holder

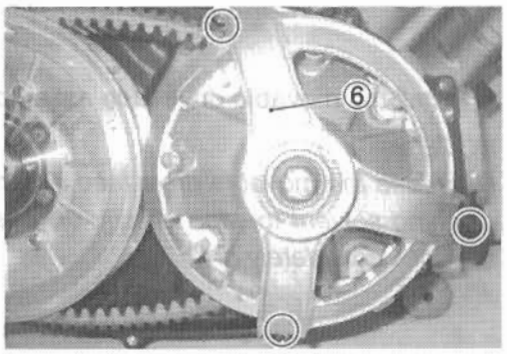
NOTE:
Turn the fixed drive face until the belt is seated in and both the drive and driven faces will move together smoothly without slip.



- Install the dowel pins ⑤.



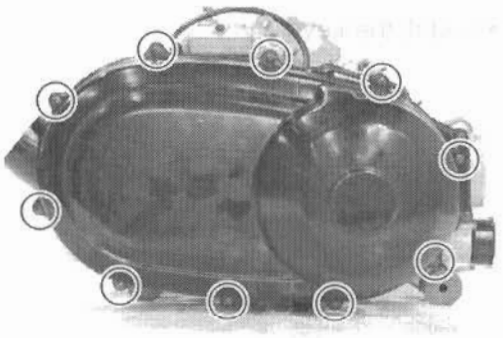
- Install the movable drive face cover ⑥.



CLUTCH COVER

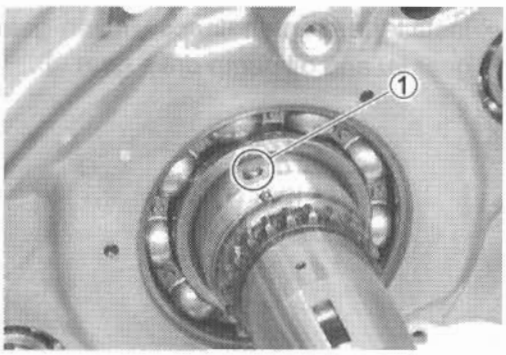
- Install the new gasket and clutch cover.
- Tighten the clutch cover bolts to the specified torque.

Clutch cover bolt: 9 N·m (0.9 kgf-m, 6.5 lb-ft)



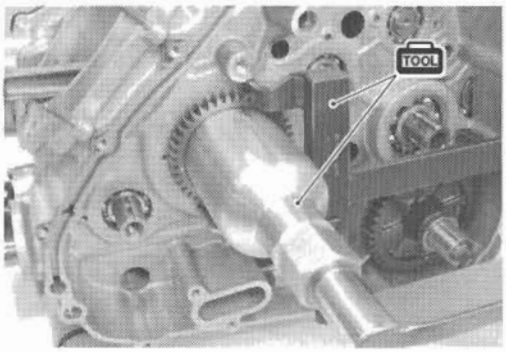
BALANCER SHAFT DRIVE/DRIVEN GEAR

- Install the pin ①.



- Install the balancer shaft drive gear and washer.
- Hold the crank balancer shaft drive gear with the special tool.

09920-53740: Clutch sleeve hub holder
09924-52460: Socket wrench 52 mm



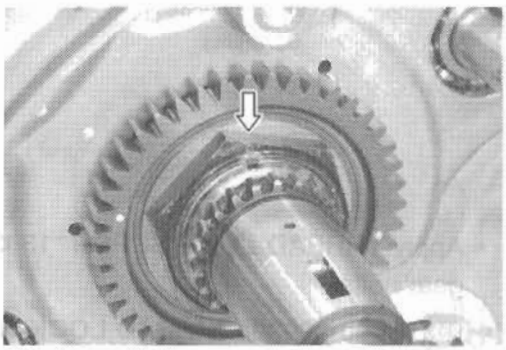
- Tighten the crank balancer drive gear nut to the specified torque.

Crank balancer drive gear nut:
150 N·m (15.0 kgf-m, 108.5 lb-ft)

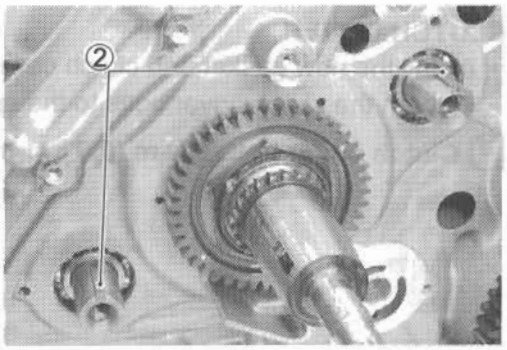
CAUTION

Use the new nut.

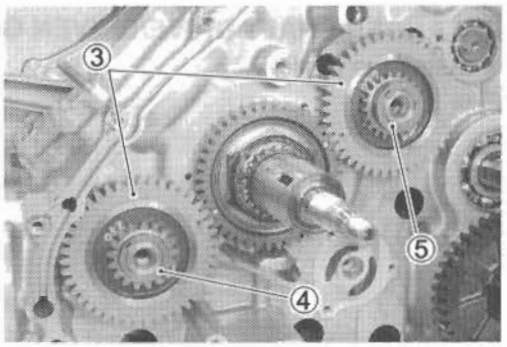
- *Lock the balancer shaft drive gear nut with a center punch.*



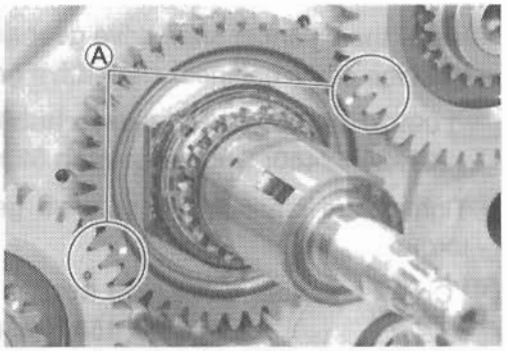
• Install the keys ②.



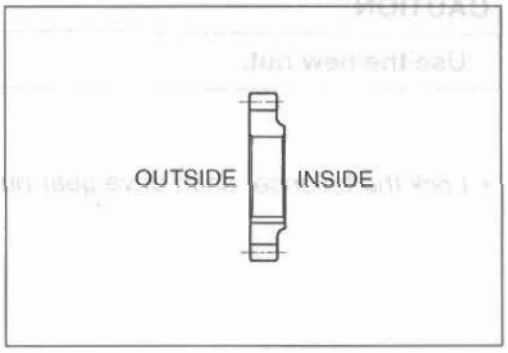
• Install the crank balancer driven gears ③, water pump drive gear ④ and oil pump drive gear ⑤.



NOTE:
Align the punched marks Ⓐ as shown.

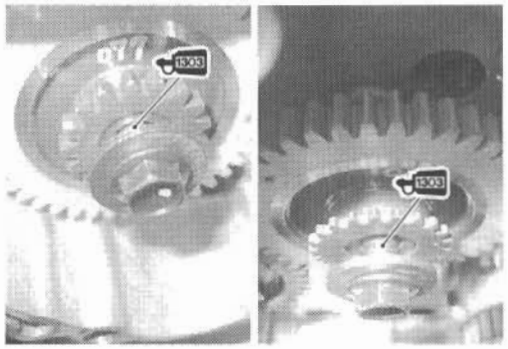


NOTE:
Pay attention to the direction of the water pump drive gear and oil pump drive gear.



• Apply THREAD LOCK SUPER "1303" to the balancer driven gear bolts.

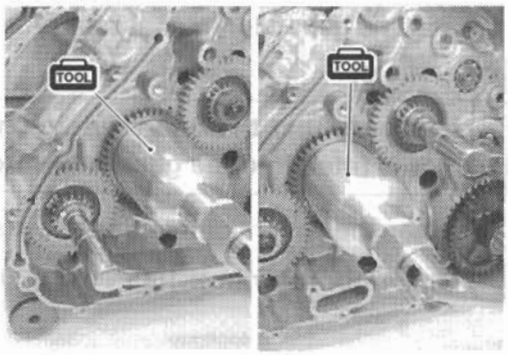
1303 99000-32030: THREAD LOCK SUPER "1303"



- Hold the crank balancer drive gear nut with the special tool and tighten the crank balancer shaft driven gear bolts to the specified torque.

09924-52460: Socket wrench 52 mm

Crank balancer driven gear bolt:
50 N·m (5.0 kgf-m, 36.0 lb-ft)



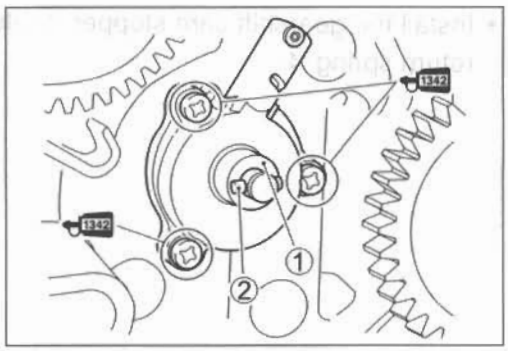
OIL PUMP

- Apply THREAD LOCK to the oil pump mounting bolts.

99000-32050: THREAD LOCK "1342"

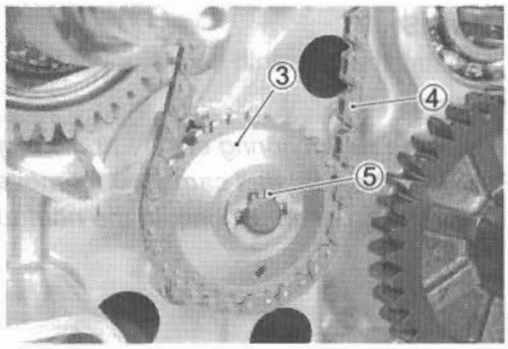
- Install the washer ① and pin ②.

NOTE:
Be careful not to drop the washer ① and pin ② into the crankcase.



- Install the oil pump drive gear ③ with chain ④.
- Install the snap ring ⑤.

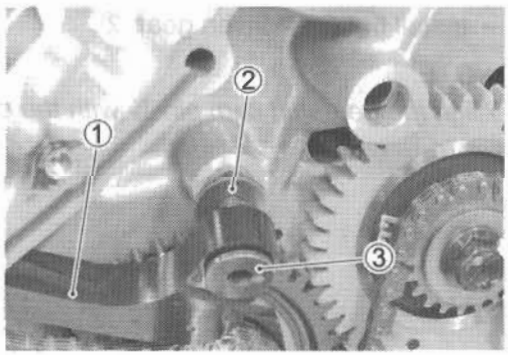
NOTE:
Be careful not to drop the snap ring into the crankcase.



CAM CHAIN TENSIONER

- Install the cam chain tensioner ① along with the washer ②.
- Tighten the cam chain tensioner bolt ③ to the specified torque.

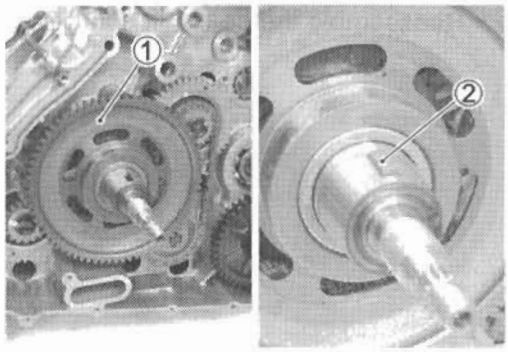
Cam chain tensioner bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)



GENERATOR

- Install the starter driven gear ①.
- Install the key ②.

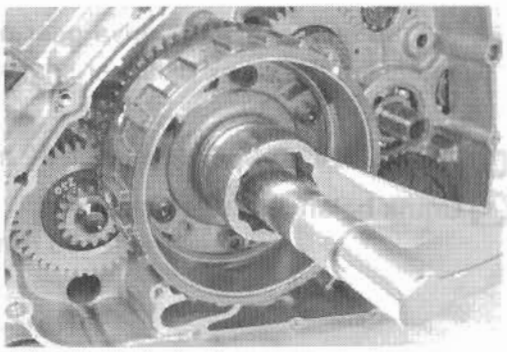
NOTE:
Degrease the tapered portion of the generator rotor assembly and also the crankshaft. Use nonflammable cleaning solvent to wipe off the oily or greasy matter to make these surfaces completely dry.



• Install the generator rotor assembly.

CAUTION

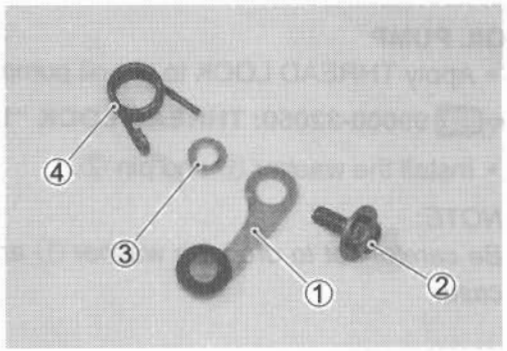
Make sure that the one way clutch on the crankshaft rotor is fitted into the generator rotor properly.



• Tighten the generator rotor nut to the specified torque.

Generator rotor nut: 160 N·m (16.0 kgf-m, 115.5 lb-ft)

• Install the gearshift cam stopper ①, its bolt ②, washer ③ and return spring ④.



GEARSHIFT

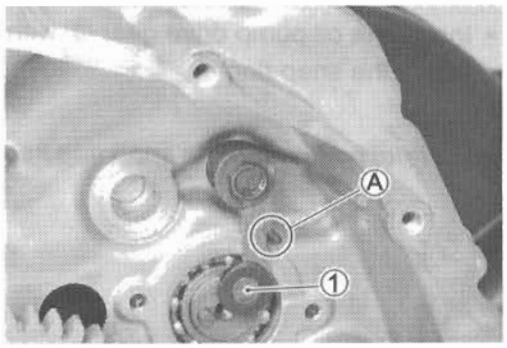
• Install the gearshift cam stopper ①.

NOTE:

Hook the return spring end Ⓐ to the stopper.

** Check the gearshift cam stopper moves smoothly.*

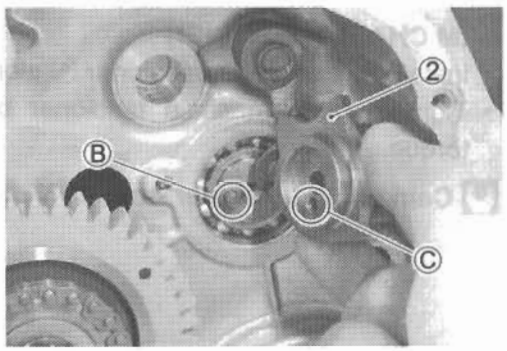
** Locate the gearshift cam in the neutral position.*



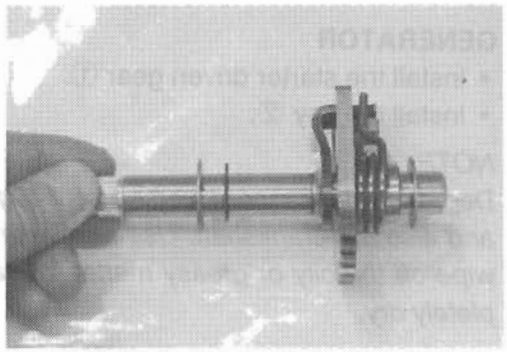
• Install the cam driven gear ②.

NOTE:

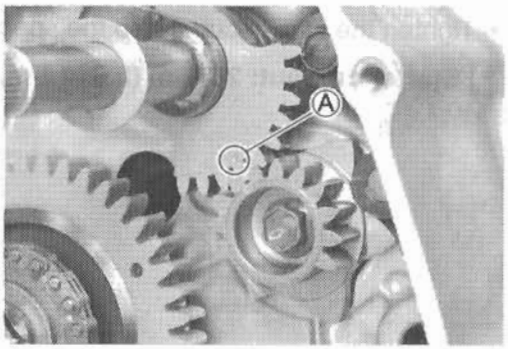
Align the gearshift cam pin Ⓑ with the cam driven gear hole Ⓒ.



• Reassemble the gearshift shaft.

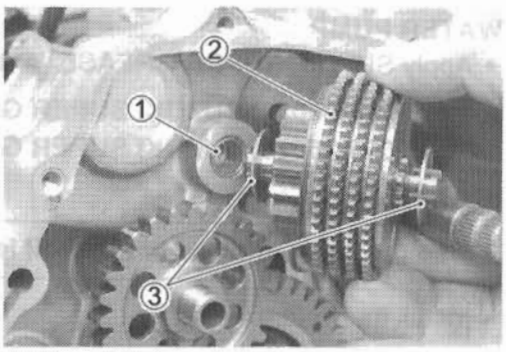


- Install the gearshift by aligning the punched mark Ⓐ with the center of the cam driven gear.



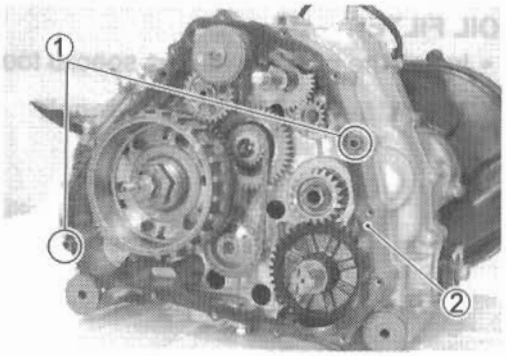
STARTER TORQUE LIMITER

- Install the spacer ①, starter torque limiter ② and washers ③.



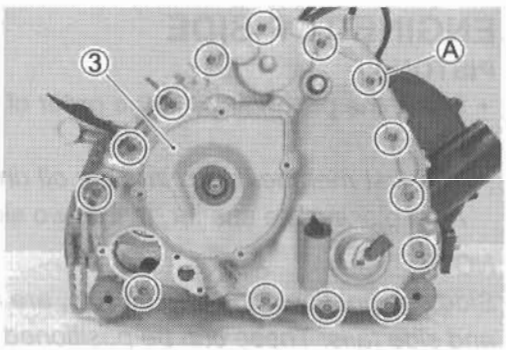
GENERATOR COVER

- Install the dowel pins ① and new gasket ②.



- Install the generator cover ③.

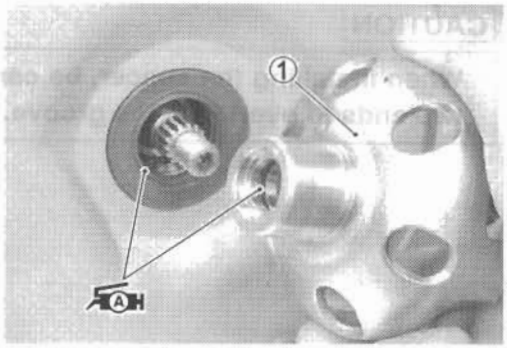
NOTE:
Fit the clamp to the bolt Ⓐ.



STARTER CUP

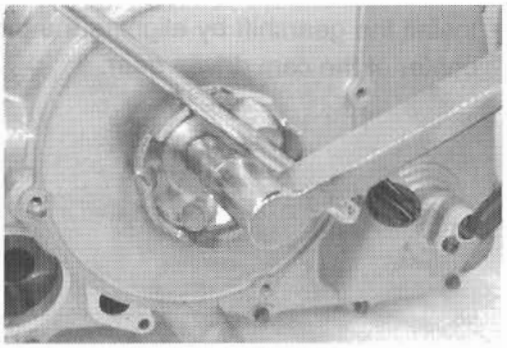
- Apply SUZUKI SUPER GREASE "A" to the O-ring and lip of the oil seal.
- Install the starter cup ①.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



- Tighten the starter cup nut to the specified torque.

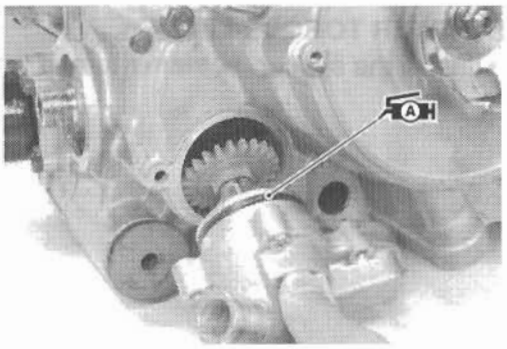
Starter cup nut: 26 N·m (2.6 kgf-m, 19.0 lb-ft)



WATER PUMP

- Apply SUZUKI SUPER GREASE "A" to the O-ring.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



CAUTION

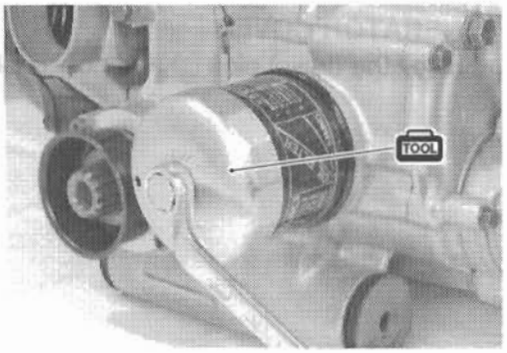
Use the new O-ring to prevent oil leakage.

- Install the water pump.

OIL FILTER

- Install the oil filter with the special tool. (☞2-13)

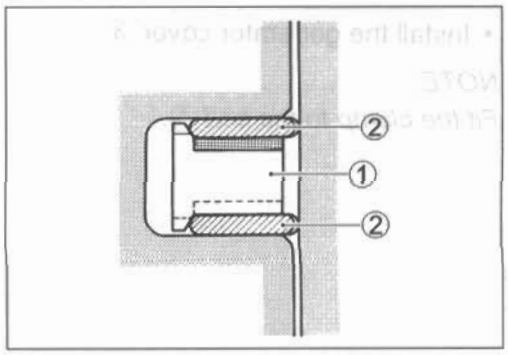
09915-40610: Oil filter wrench



ENGINE TOP SIDE

PISTON

- 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.

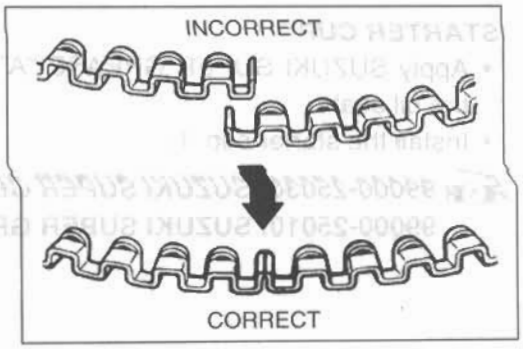


NOTE:

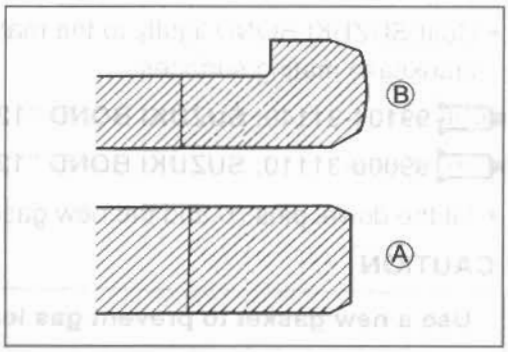
Side designations, top and bottom, are not applied to the spacer and side rails: Those can be positioned each either way.

CAUTION

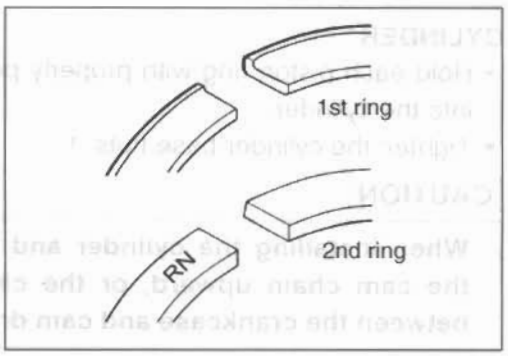
When installing the spacer, be careful not to allow its two ends to overlap in the groove.



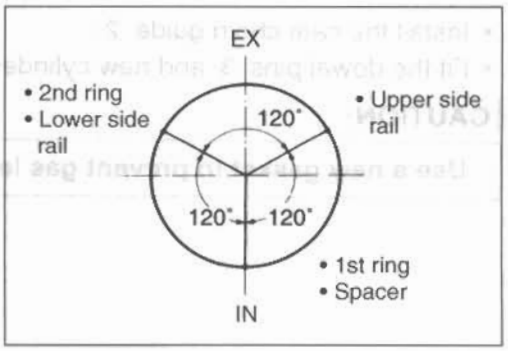
- Install the 2nd ring Ⓐ and 1st ring Ⓑ.



- 2nd ring has letter "RN" marked on the side. Be sure to bring the marked side to the top when fitting it to the piston.



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

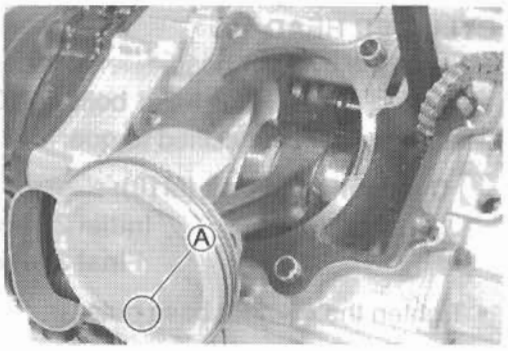


- Apply a light coat of MOLYBDENUM OIL SOLUTION to the piston pin.

MOLYBDENUM OIL

- Install the piston and piston pin.

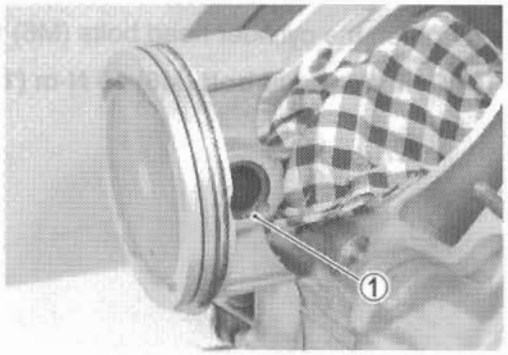
NOTE:
When installing the piston, the punched mark Ⓐ on the piston head is located to the exhaust side.



- Place a clean rag over the crankcase.
- Install the circlip ①.

CAUTION

When turning the crankshaft, pull the cam chain upward, or the chain will be caught between the crankcase and the cam drive sprocket.



- Coat SUZUKI BOND lightly to the mating surfaces among the crankcase mating surfaces.

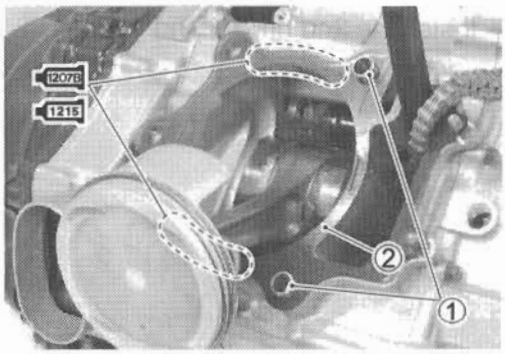
1207B 99104-31140: SUZUKI BOND "1207B" (USA)

1215 99000-31110: SUZUKI BOND "1215" (Others)

- Fit the dowel pins ① and the new gasket ②.

CAUTION

Use a new gasket to prevent gas leakage.

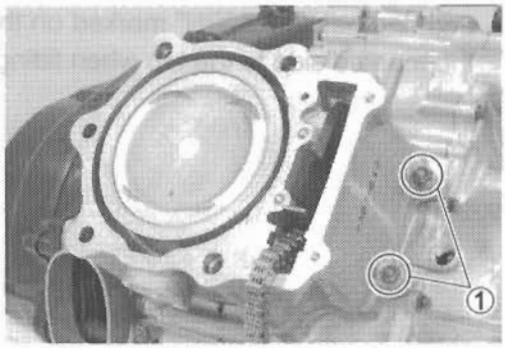


CYLINDER

- Hold each piston ring with properly position, insert the piston into the cylinder.
- Tighten the cylinder base nuts ①.

CAUTION

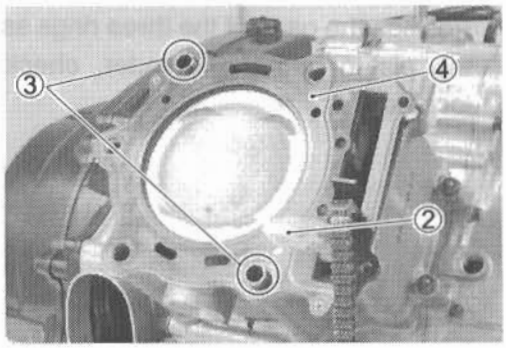
When installing the cylinder and cylinder head, pull the cam chain upward, or the chain will be caught between the crankcase and cam drive sprocket.



- Install the cam chain guide ②.
- Fit the dowel pins ③ and new cylinder head gasket ④.

CAUTION

Use a new gasket to prevent gas leakage.



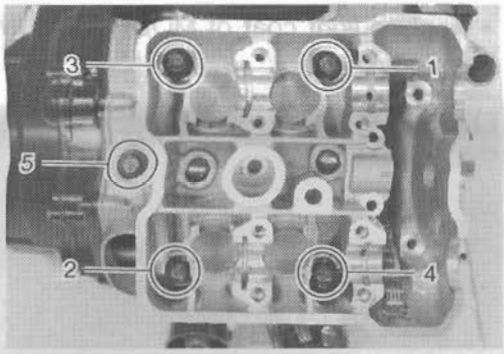
CYLINDER HEAD

- Install the cylinder head.
- Tighten the cylinder head bolts (M10) in ascending order of numbers to the specified torque.

Cylinder head bolt (M10):

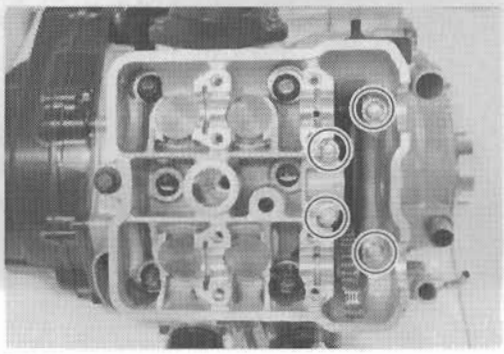
Initial 25 N·m (2.5 kgf-m, 18.0 lb-ft)
Final 37 N·m (3.7 kgf-m, 27.0 lb-ft)

- Tighten the cylinder base nuts ①.



- Tighten the cylinder head bolts (M6) to the specified torque.

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



- Coat SUZUKI BOND lightly to the mating surfaces among the crankcase mating surfaces.

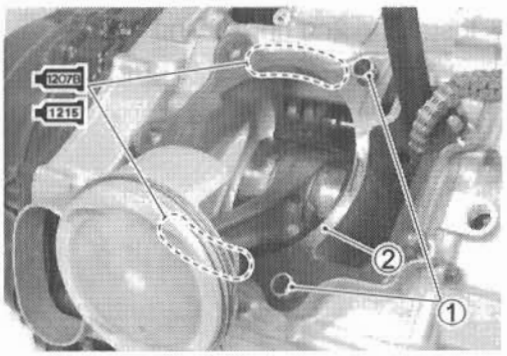
1207B 99104-31140: SUZUKI BOND "1207B" (USA)

1215 99000-31110: SUZUKI BOND "1215" (Others)

- Fit the dowel pins ① and the new gasket ②.

CAUTION

Use a new gasket to prevent gas leakage.

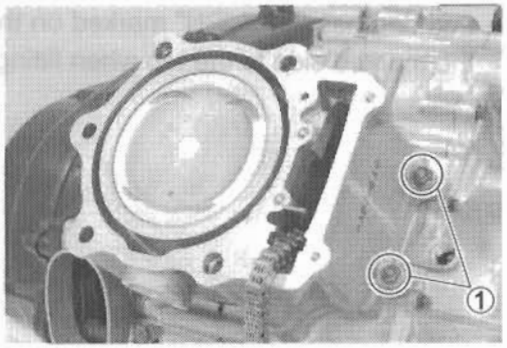


CYLINDER

- Hold each piston ring with properly position, insert the piston into the cylinder.
- Tighten the cylinder base nuts ①.

CAUTION

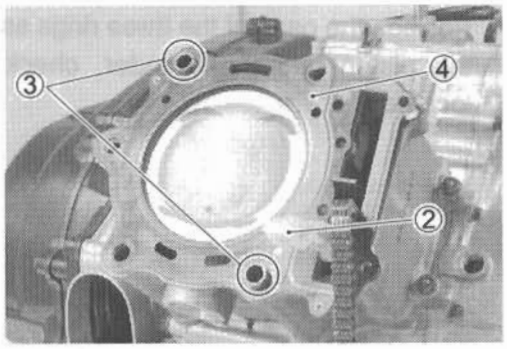
When installing the cylinder and cylinder head, pull the cam chain upward, or the chain will be caught between the crankcase and cam drive sprocket.



- Install the cam chain guide ②.
- Fit the dowel pins ③ and new cylinder head gasket ④.

CAUTION

Use a new gasket to prevent gas leakage.



CYLINDER HEAD

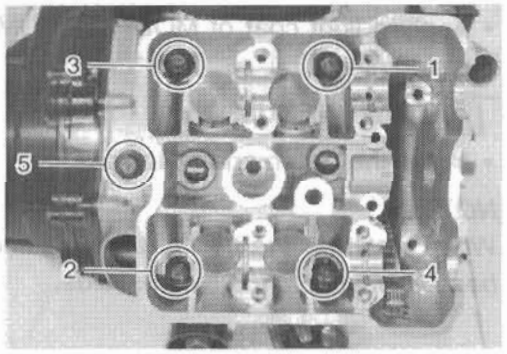
- Install the cylinder head.
- Tighten the cylinder head bolts (M10) in ascending order of numbers to the specified torque.

Cylinder head bolt (M10):

Initial 25 N·m (2.5 kgf-m, 18.0 lb-ft)

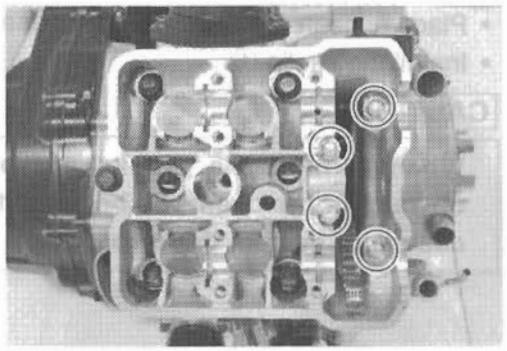
Final 37 N·m (3.7 kgf-m, 27.0 lb-ft)

- Tighten the cylinder base nuts ①.

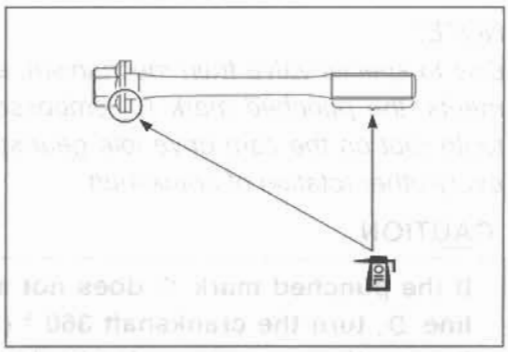


- Tighten the cylinder head bolts (M6) to the specified torque.

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

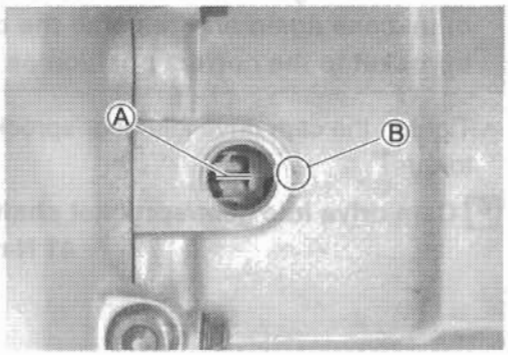


NOTE:
Apply engine oil to the both side of washer and thread portion of the bolts before installing the cylinder head bolts.

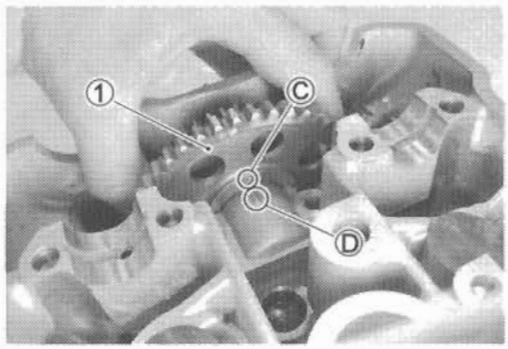


CAM DRIVE IDLE GEAR/SPROCKET

- Align the line Ⓐ on the generator rotor with the index mark Ⓑ on the crankcase.



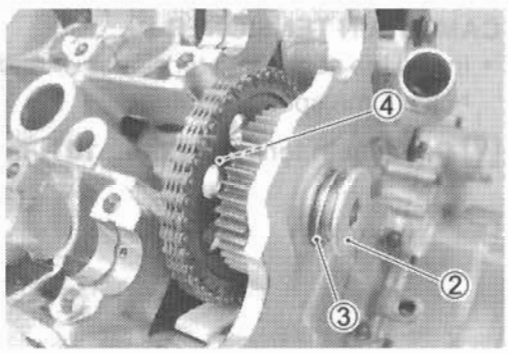
- Install the cam drive idle gear/sprocket ① with cam drive chain onto the cylinder head and engine the cam chain on it.
- Align the punched mark Ⓒ on the cam drive idle gear/sprocket with the embossed line Ⓓ on the cylinder head.



- Install the cam drive idle gear/sprocket shaft ②, copper washer ③ and shim ④.

CAUTION

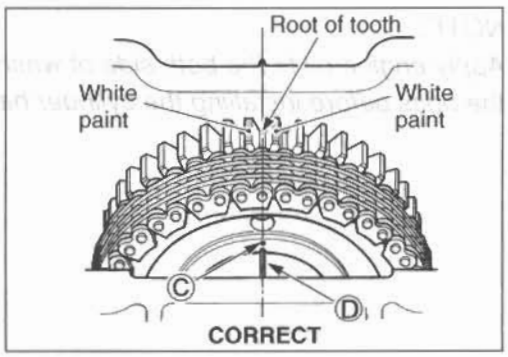
When checking the positions, remove the cam chain slack at the cam chain guide side by holding the cam drive idle gear/sprocket by hand.

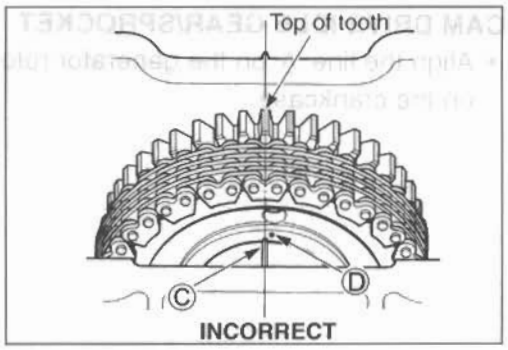


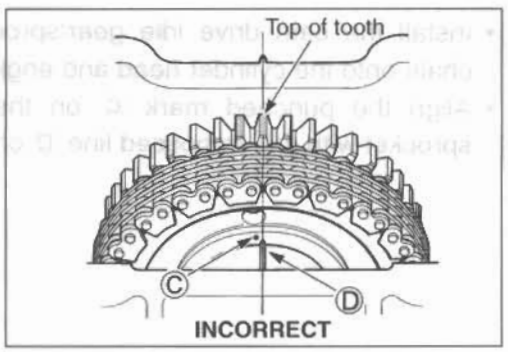
NOTE:
Due to special valve train mechanism, aligning of the three elements; the punched mark Ⓒ, embossed line Ⓓ and the gear tooth root on the cam drive idle gear/sprocket; can occur once every other rotation of crankshaft.

CAUTION

If the punched mark Ⓒ does not align the embossed line Ⓓ, turn the crankshaft 360 ° (1 turn) to bring the line on the generator rotor to the index mark on the crankcase again and reinstall the cam drive idle gear/sprocket to the correct position as shown.







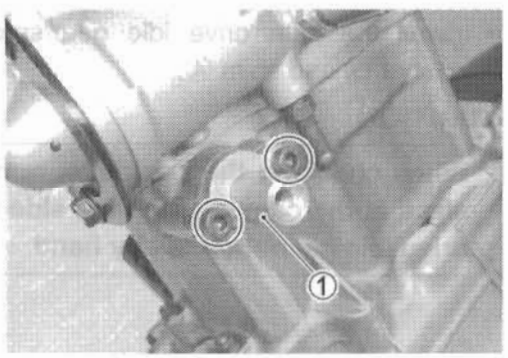
- Tighten the cam drive idle gear/sprocket shaft to the specified torque.

Cam drive idle gear/sprocket shaft:
41 N·m (4.1 kgf-m, 29.5 lb-ft)

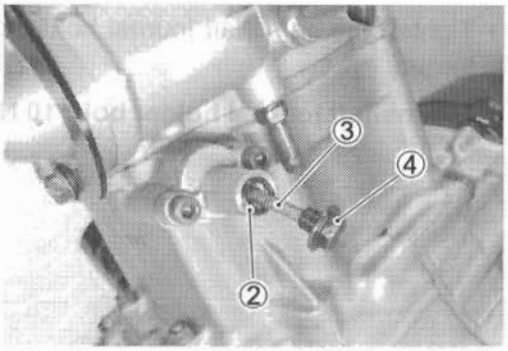
CAM CHAIN TENSIONER

- Install the cam chain tensioner ① and tighten the its mounting bolts to the specified torque.

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



- Install the new O-ring ② and spring ③.



CAUTION

Use the new O-ring to prevent oil leakage.

- Install the cam chain tensioner cap bolt ④.

NOTE:
Click sound is heard when the cam chain tensioner cap bolt is installed.

- Tighten the cam chain tensioner cap bolt to the specified torque.

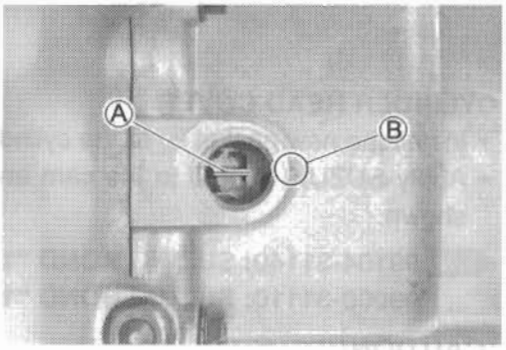
Cam chain tensioner cap bolt: 7 N·m (0.7 kgf-m, 5.0 lb-ft)

CAUTION

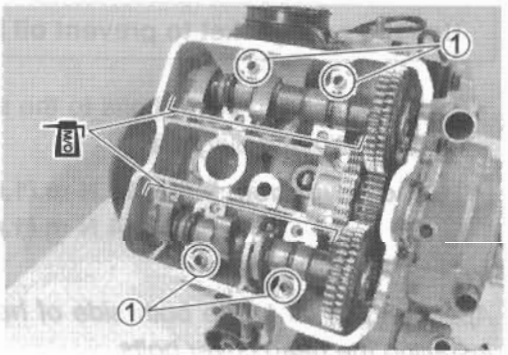
After installing the cam chain tensioner, check to be sure that the adjuster works properly by checking the slack of cam chain.

CAMSHAFT

- Align the line Ⓐ on the starter clutch with the index mark Ⓑ on the crankcase.



- Install the dowel pins ①.
- The camshafts are identified by the engraved letters.
- Before replacing the camshafts on cylinder head, apply MOLYBDENUM OIL SOLUTION to their journals and cam faces.
- Apply MOLYBDENUM OIL SOLUTION to the camshaft journal holders.

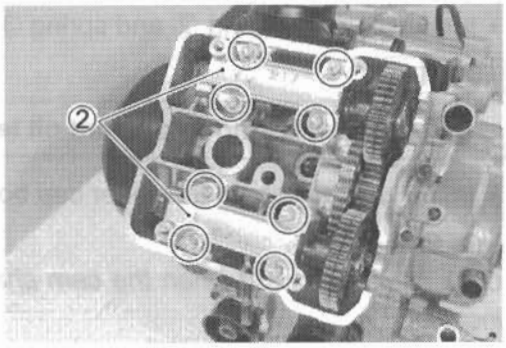


MOLYBDENUM OIL SOLUTION

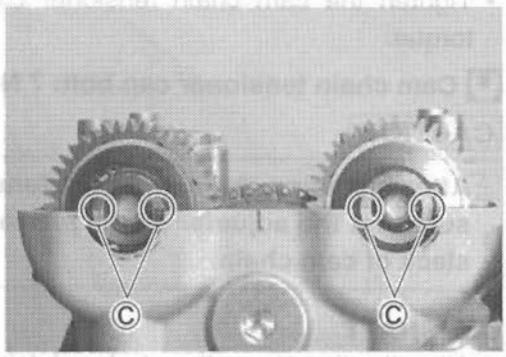
NOTE:
Before installing the camshaft, check that the tappets are installed correctly.

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

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



- Align the engraved lines Ⓒ on the camshafts so it is parallel with the mating surface of the cylinder head cover.
- Check the valve clearance. (☞2-5)
- Pour engine oil in each oil pocket in the cylinder head.



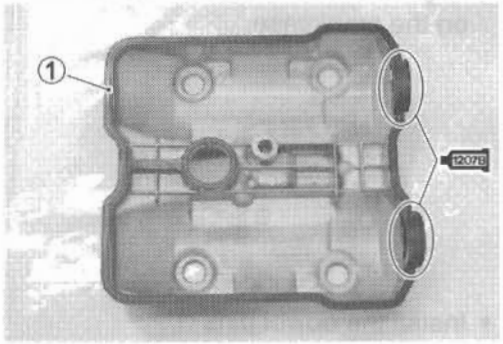
CYLINDER HEAD COVER

- Install the new gasket ① to the cylinder head cover.
- Apply SUZUKI BOND to the cam end caps of the gasket as shown.

1207B **99104-31140: SUZUKI BOND "1207B" (USA)**
99000-31110: SUZUKI BOND "1215" (Others)

CAUTION

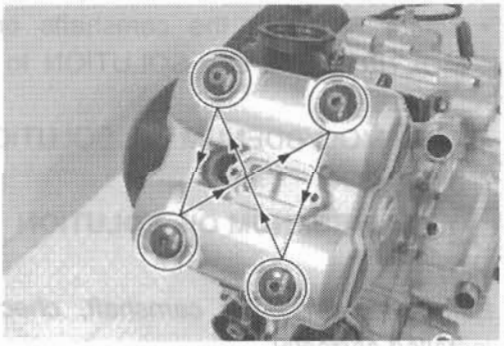
Use the new gasket to prevent oil leakage.



- Tighten the head cover bolts to the specified two-step torque sequentially and diagonally.

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)

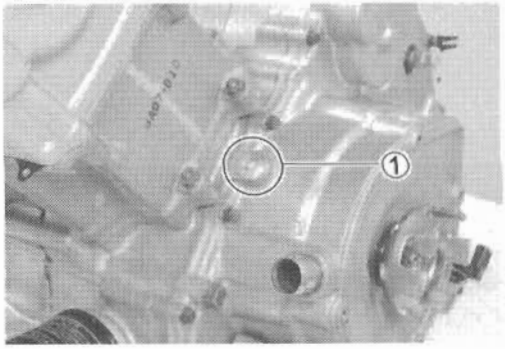
NOTE:
Apply engine oil to the both side of head cover washer before installing the head cover bolts.



VALVE TIMING INSPECTION PLUG

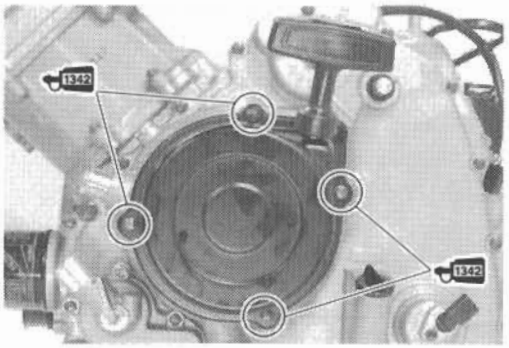
- Tighten the valve timing inspection plug ① to the specified torque.

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



- Apply a small quantity of THREAD LOCK to the bolts.
- Install the recoil starter.

1342 **99000-32050: THREAD LOCK "1342"**



WATER UNION

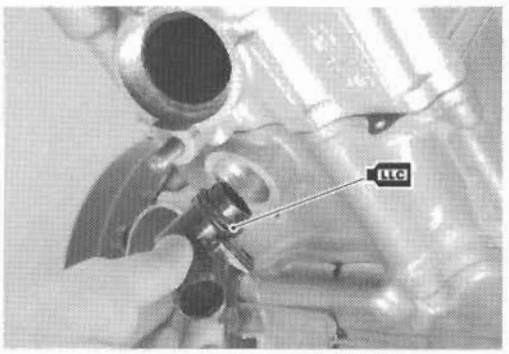
- Install the new O-ring to the water union.

CAUTION

Use a new O-ring to prevent engine coolant leakage.

- Apply engine coolant to the O-ring.

LLC **99000-99032-11X: ENGINE COOLANT**



STARTER MOTOR

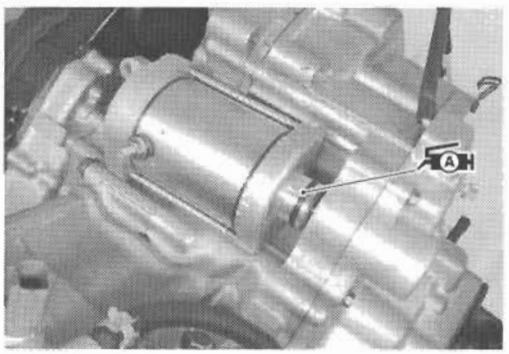
- Install the new O-ring to the starter motor.

CAUTION

Use the new O-ring to prevent oil leakage.

- Apply SUZUKI SUPER GREASE "A" to the O-ring.

A **99000-25030: SUZUKI SUPER GREASE "A" (USA)**
99000-25010: SUZUKI SUPER GREASE "A" (Others)



DRIVE TRAIN

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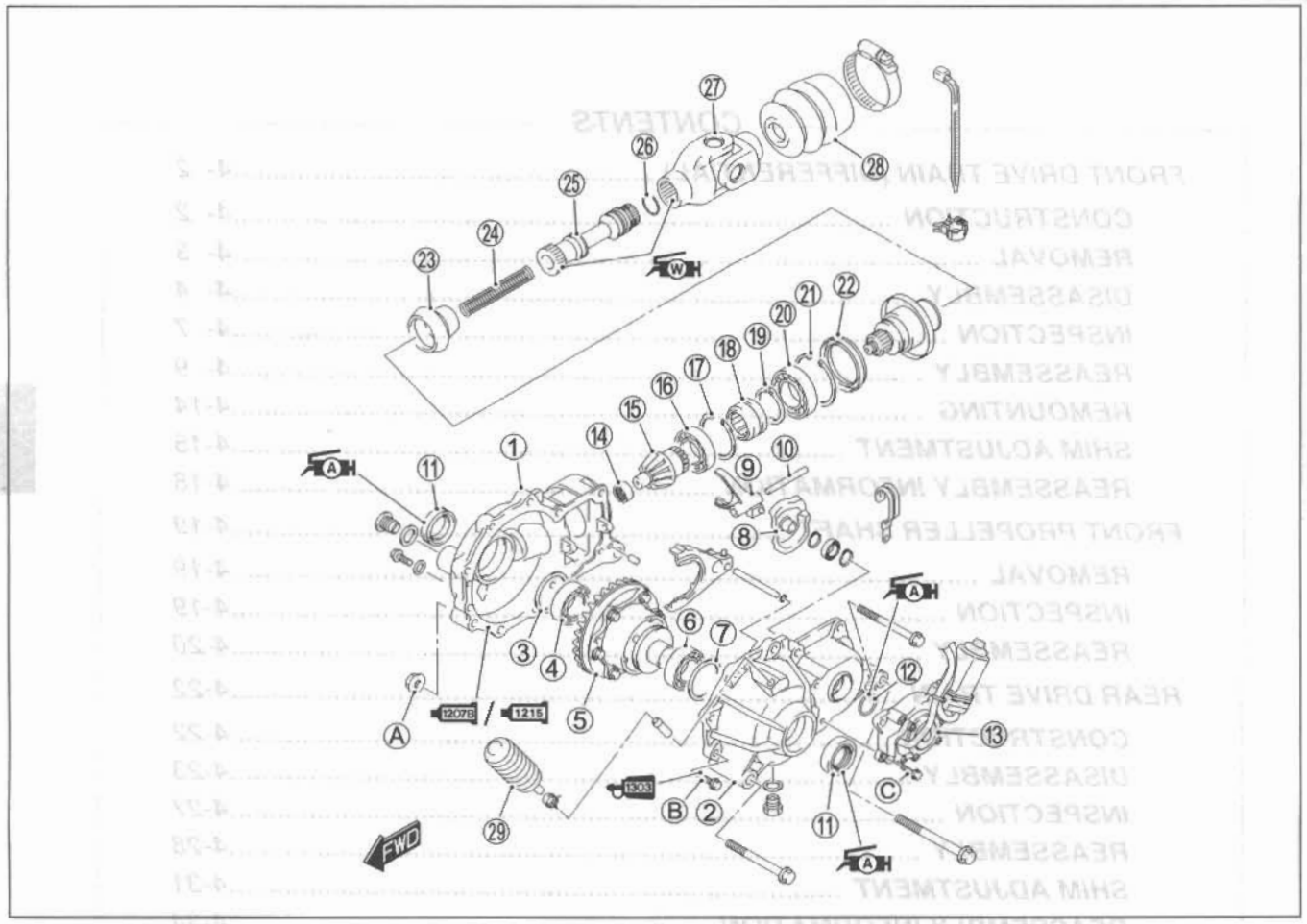
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4

FRONT DRIVE TRAIN (DIFFERENTIAL)
CONSTRUCTION

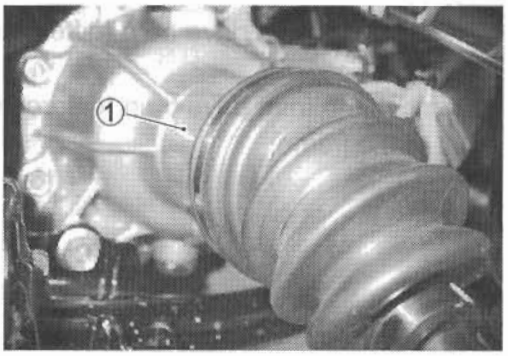


①	Front drive train (differential) gear case	⑰	Snap ring
②	Front drive train (differential) gear case cover	⑱	2WD/4WD shifting sleeve
③	Shim (right side)	⑲	Snap ring
④	Bearing	⑳	Bearing
⑤	Front drive train (differential) gear	㉑	Snap ring
⑥	Bearing	㉒	Oil seal
⑦	Shim (left side)	㉓	Boot
⑧	2WD/4WD shifting cam	㉔	Front propeller shaft spring
⑨	2WD/4WD shifting fork	㉕	Front propeller shaft
⑩	2WD/4WD shifting fork shaft	㉖	Circlip
⑪	Oil seal	㉗	Universal joint
⑫	O-ring	㉘	Boot
⑬	Actuator	㉙	Breather rubber case
⑭	Bearing	Ⓐ	Front drive train (differential) gear case mounting nut
⑮	Drive bevel gear	Ⓑ	Front drive train (differential) gear case cover bolt
⑯	Bearing	Ⓒ	Actuator mounting bolt

ITEM	N·m	kgf-m	lb-ft
Ⓐ	50	5.0	36.0
Ⓑ	22	2.2	16.0
Ⓒ	22	2.2	16.0

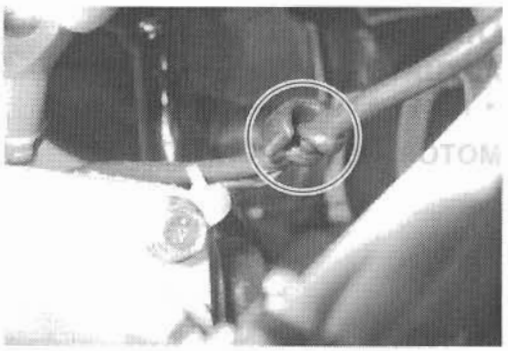
REMOVAL

- Remove the front wheels. (☞8-13)
- Drain the front differential gear oil. (☞2-14)
- Remove the front suspension. (☞8-36)
- Hold the inboard joint ① of the front drive shaft and tug the drive shaft horizontally.

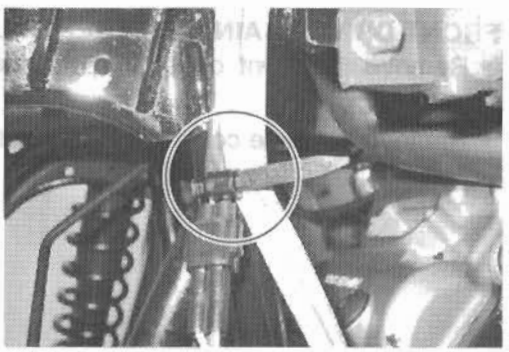


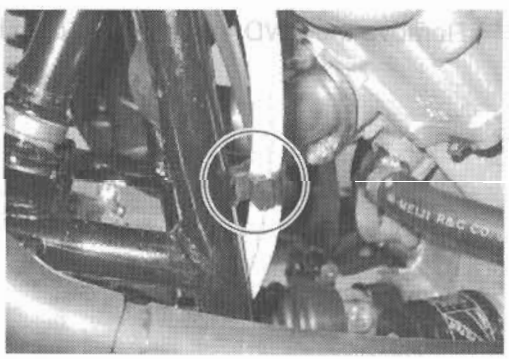
NOTE:
If it is difficult to remove the front drive shaft from the front differential gear case, use the suitable tool.

- Remove the brake sensor lead wire clamp.

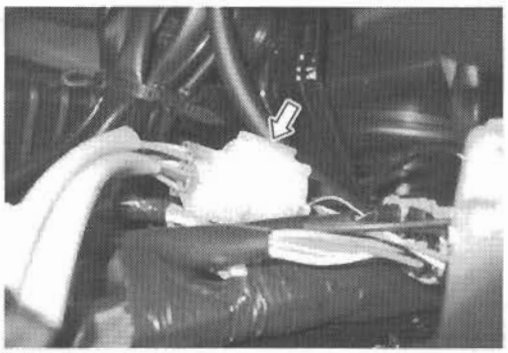


- Remove the actuator lead wire and brake sensor lead wire band.

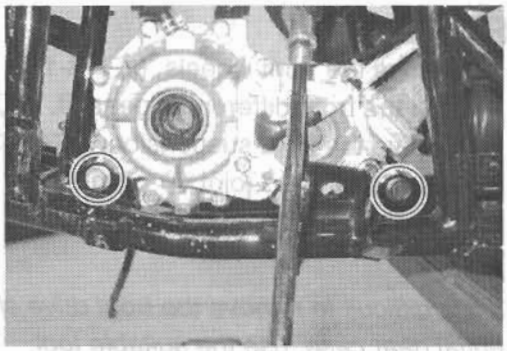




- Disconnect the actuator lead wire coupler.



- Remove the front drive train (differential) gear case mounting bolts/nuts.
- Remove the front drive train (differential) gear case assembly out of the frame.

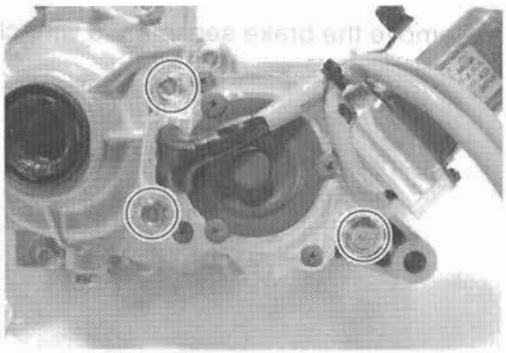


DISASSEMBLY

ACTUATOR

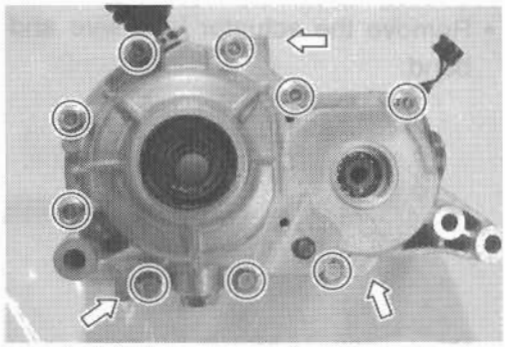
- Remove the actuator assembly.

MOTOR INSPECTION (☞9-22)

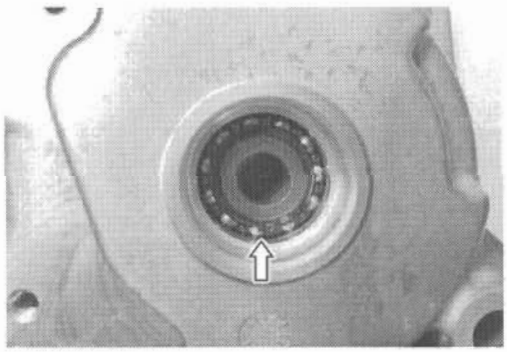


FRONT DRIVE TRAIN (DIFFERENTIAL) GEAR

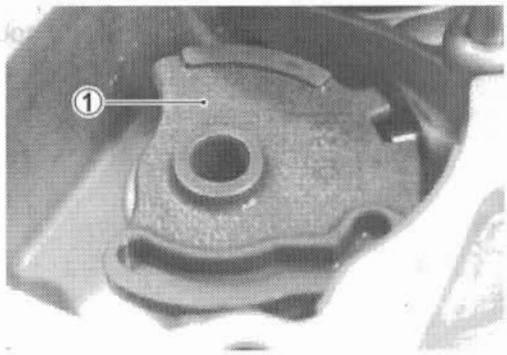
- Remove the front drive train (differential) gear case cover bolts.
- Remove the case cover with the plastic mallet.



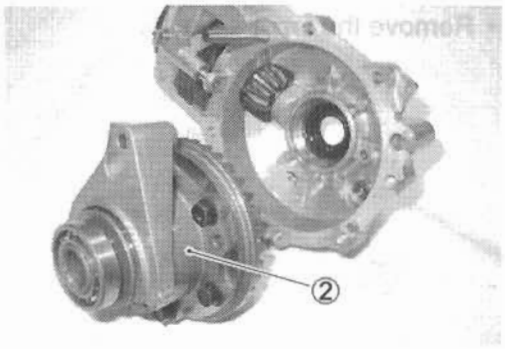
- Remove the 2WD/4WD shifting cam bearing snap ring.



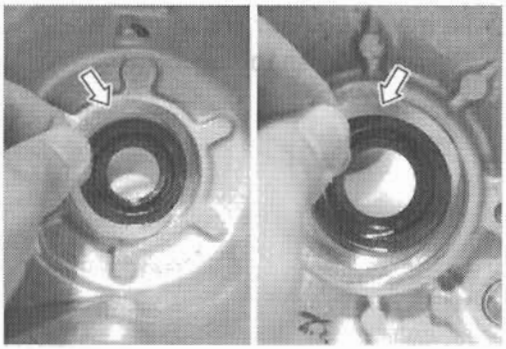
- Remove the 2WD/4WD shifting cam ① from the gear case cover.



- Remove the front drive train (differential) gear assembly ②.

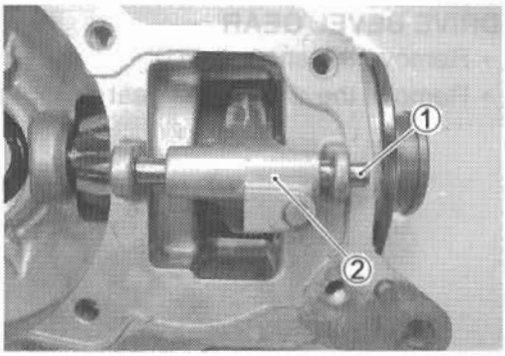


- Remove the shims from the case and case cover.

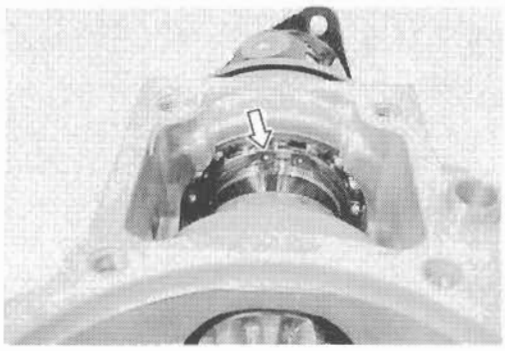


2WD/4WD SHIFTING DEVICE

- Remove the gear shifting fork shaft ①.
- Remove the gear shifting fork ②.



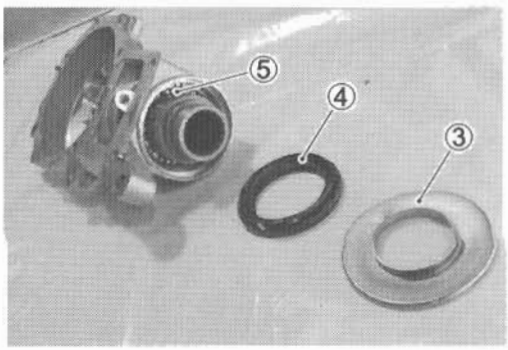
- Remove the snap ring.



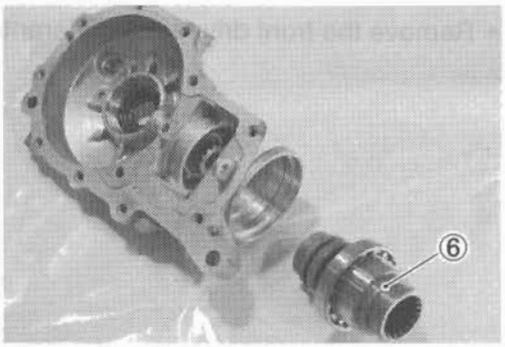
- Remove the oil seal cap ③, oil seal ④ and snap ring ⑤.

CAUTION

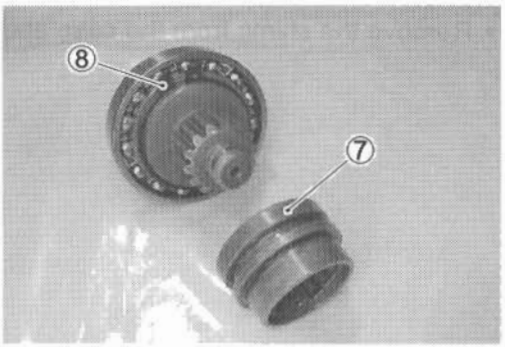
The removed oil seal must be replaced with a new one.



- Remove the input shaft ⑥.

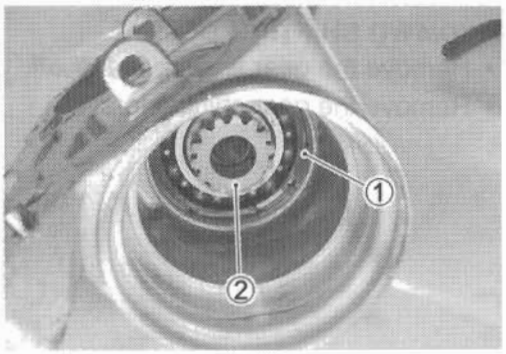


- Remove the gear shifting sleeve ⑦.
- Remove the snap ring ⑧.



DRIVE BEVEL GEAR

- Remove the snap ring ①.
- Remove the drive bevel gear ② together with the bearing.

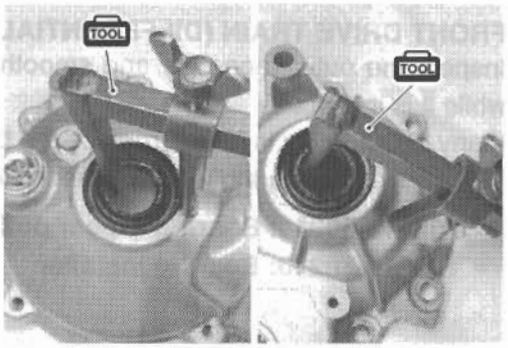


INSPECTION

FRONT DRIVE TRAIN (DIFFERENTIAL) GEAR CASE OIL SEAL

Inspect the oil seal for wear or damage.
If any wear or damage is found, replace the oil seal a new one.
- Remove the oil seal with the special tool.

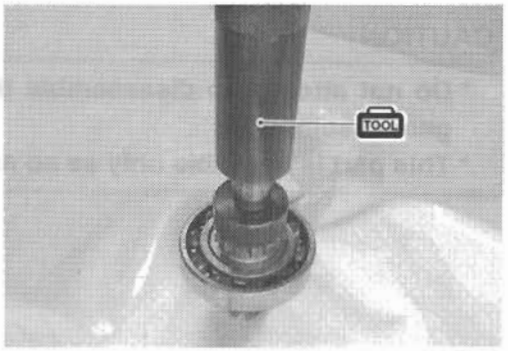
TOOL 09913-50121: Oil seal remover



DRIVE BEVEL GEAR BEARING

Inspect the outer race play and smooth rotation of the bearing by hand while it is on the drive bevel gear.
If any abnormality is found, replace the bearing with a new one.
- Remove the bearing with the special tool.

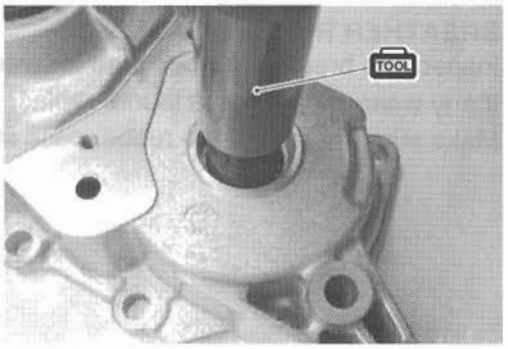
TOOL 09913-70210: Bearing installer set



2WD/4WD SHIFTING CAM BEARING

Inspect the 2WD/4WD shifting cam bearing for abnormal noise or smooth rotation.
If any wear or damage is found, replace the bearing with a new one.
- Remove the bearing with the special tool.

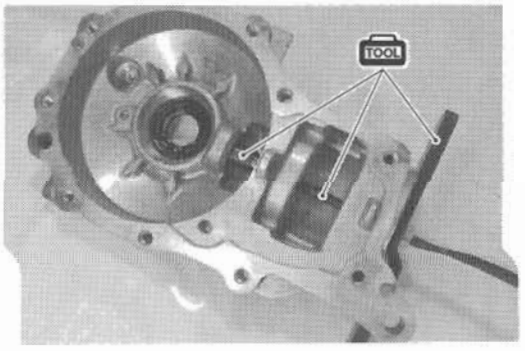
TOOL 09913-70210: Bearing installer set



DRIVE BEVEL GEAR PILOT BEARING

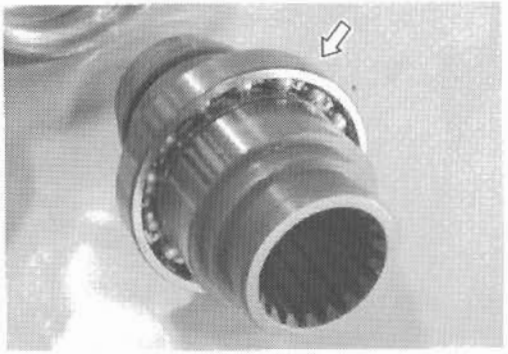
Inspect the drive bevel gear pilot bearing for wear or damage.
If any wear or damage is found, replace it with a new one.
- Remove the bearing with the special tool.

TOOL 09921-20240: Bearing remover set
09917-50410: Bearing remover
09924-84521: Bearing installer set



INPUT SHAFT BEARING

Inspect the input shaft bearing for wear or damage.
If any wear or damage is found, replace it with a new one.



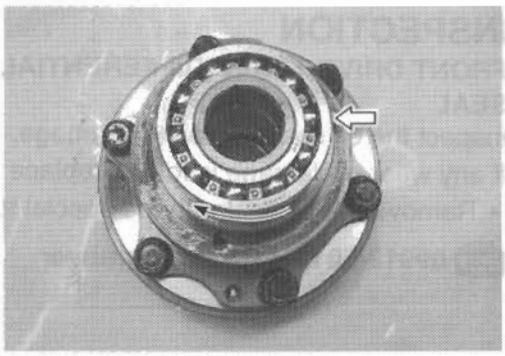
FRONT DRIVE TRAIN (DIFFERENTIAL) GEAR BEARING

Inspect the outer race play and smooth rotation of the bearing while it is in place.

If any abnormality is found, replace the bearing with a new one.

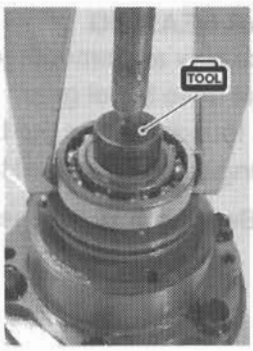
- Remove the bearing with the special tool.

TOOL 09913-60910: Bearing & gear puller
09913-70210: Bearing installer



CAUTION

*** Do not attempt to disassemble the front differential gear assembly.**
*** This part is available only as an assembly.**



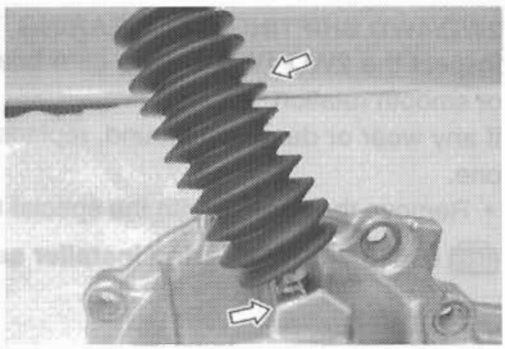


BREATHER RUBBER CASE

Inspect the breather rubber case for wear or damage.

If any wear or damage is found, replace it with a new one.

Make sure the joint of the rubber case fits tightly.



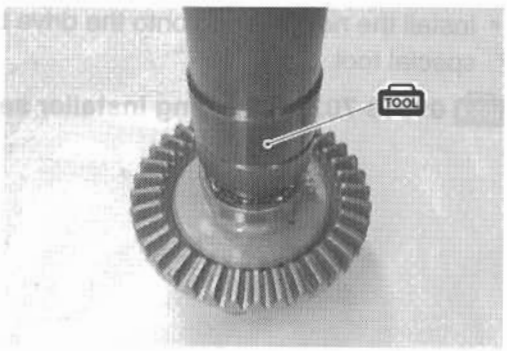
REASSEMBLY

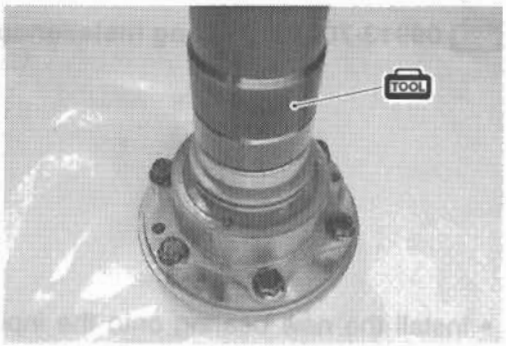
- Reassemble the front drive train (differential) in the reverse order of removal and disassembly. Pay attention to the following points:

NOTE:
Before reassembly, thoroughly clean all the parts with cleaning solvent.

- Install the new bearings to the front differential gear assembly with the special tool.

09913-70210: Bearing installer set

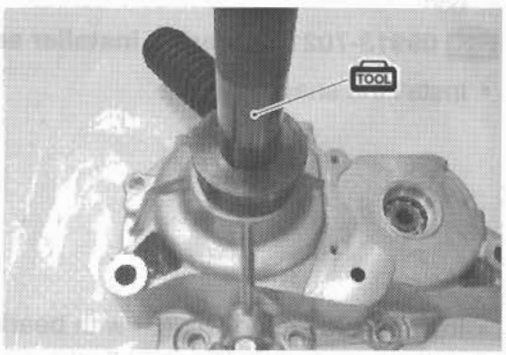


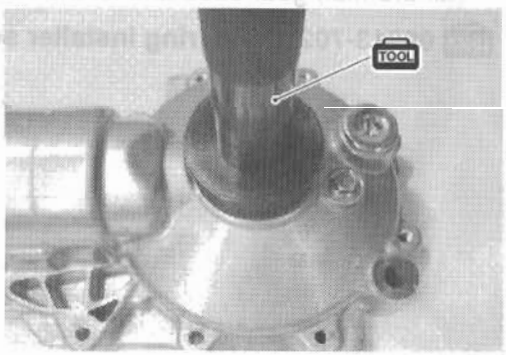


- Install the new oil seals into the front differential gear case and case cover with the special tool.
- Apply grease to the oil seal lips.

09913-70210: Bearing installer set

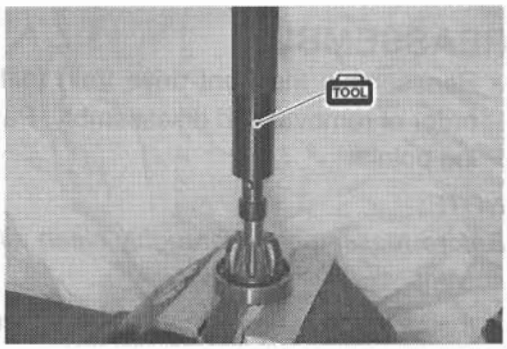
99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)





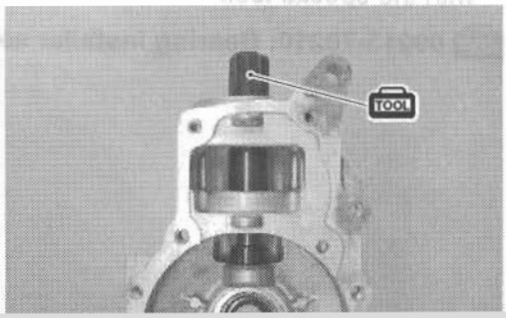
- Install the new bearing onto the drive bevel gear shaft with the special tool.

TOOL 09913-70210: Bearing installer set



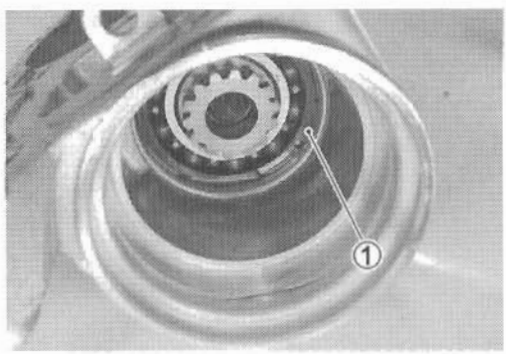
- Install the new bearing into the front drive train (differential) gear case with the special tool.

TOOL 09913-70210: Bearing installer set



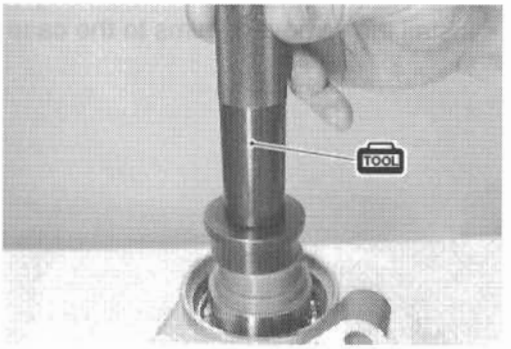
[redacted]



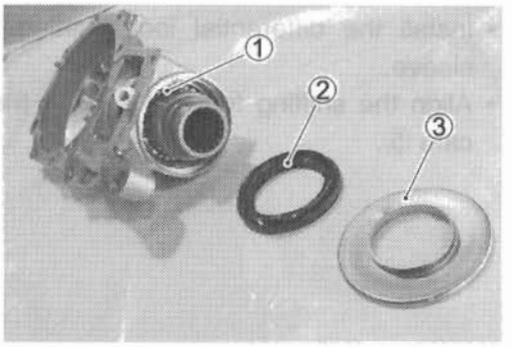


- Install the input shaft with the special tool.

TOOL **09913-70210: Bearing installer set**

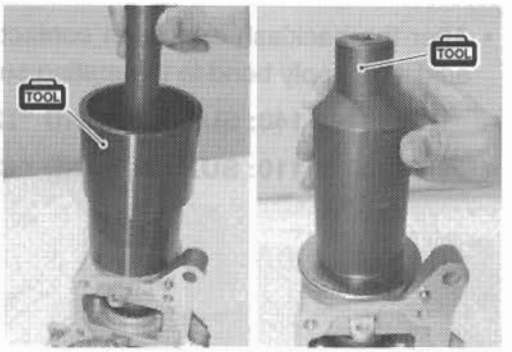


- Install the new snap ring ①, new oil seal ② and cap ③.

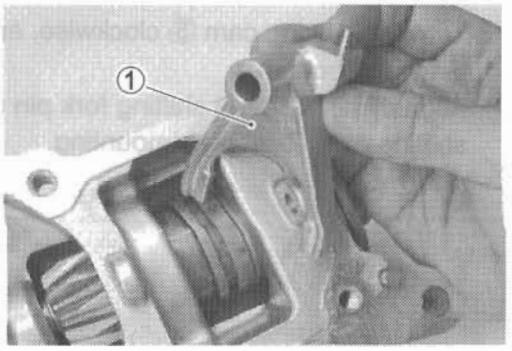


- Install the input shaft into the gear case with the special tool.

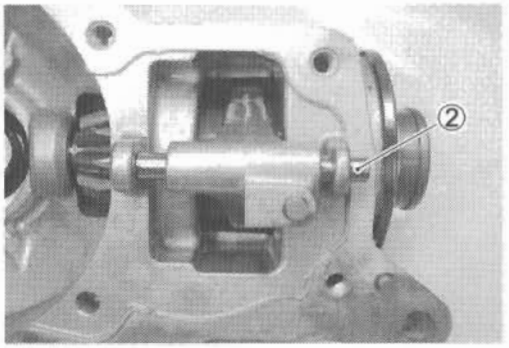
TOOL **09913-70210: Bearing installer set**
09924-74550: Final gear case oil seal installer
09922-21410: Long socket 46 mm



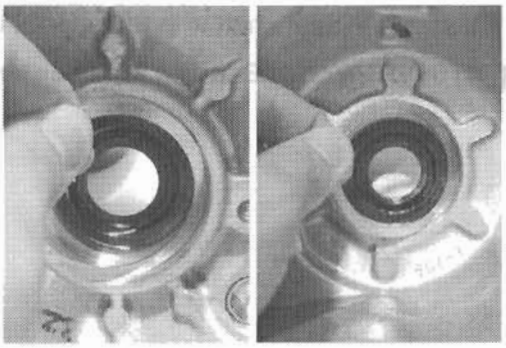
- Install the 2WD/4WD shifting fork ①, as shown in the photograph.



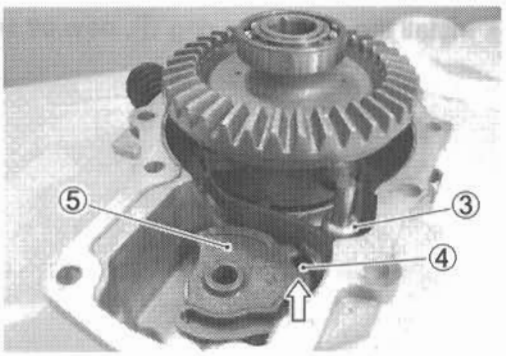
- Apply front differential gear oil to the 2WD/4WD sifting fork shaft ②.
- Install the shaft as shown in the photograph.



- Install the removed shims to the case and cover.



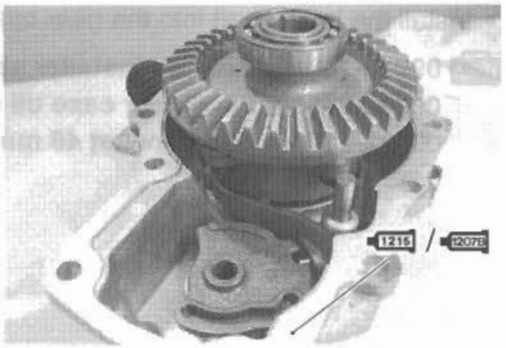
- Install the differential lock shifting fork ③ to the shifting sleeve.
- Align the shifting fork pin ④ with the groove of the shifting cam ⑤.



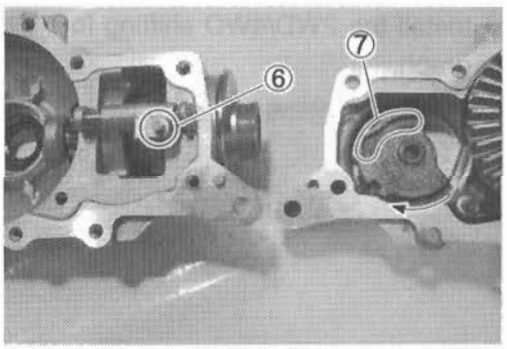
- After the backlash and tooth contact have been checked or adjusted, apply bond to the mating surface of the case.

1207B **99104-31140: SUZUKI BOND "1207B" (USA)**

1215 **99000-31110: SUZUKI BOND "1215" (Others)**



- Turn the shifting cam ⑤ clockwise, and install the shifting fork pin to the bottom.
- Align the 2WD/4WD shifting fork pin ⑥ with the groove of the shifting cam ⑦ when remounting.

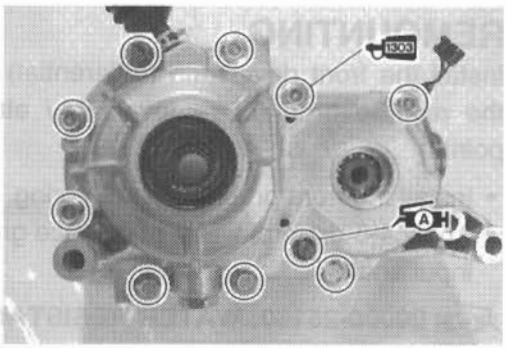


- Apply grease to the new O-ring.
- Apply thread lock to the case cover bolts and tighten them to the specified torque diagonally.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

99000-32030: THREAD LOCK SUPER "1303"

Gear case cover bolt: 22 N·m (2.2 kgf-m, 16.0 lb-ft)

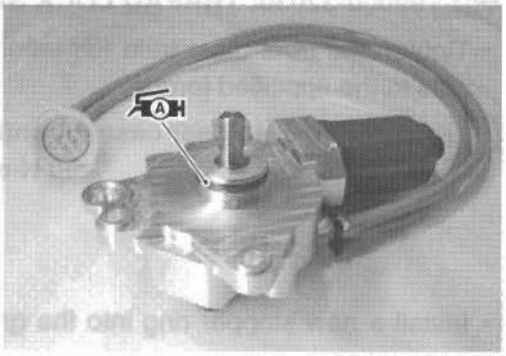


NOTE:

After the backlash and tooth contact have been checked or adjusted, apply thread lock to the case cover bolts.

- Apply grease to the new O-ring.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



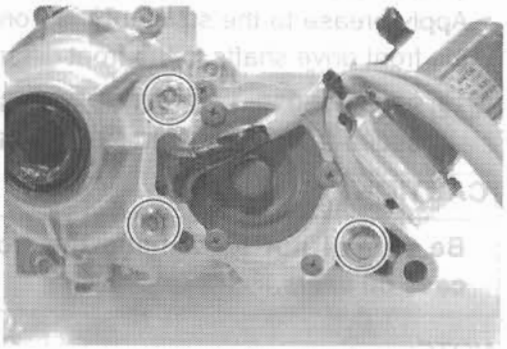
CAUTION

Use the new O-ring to prevent differential gear oil leakage.

- Apply thread lock to the M8 bolt.
- Install the actuator assembly and tighten its mounting bolts to the specified torque.

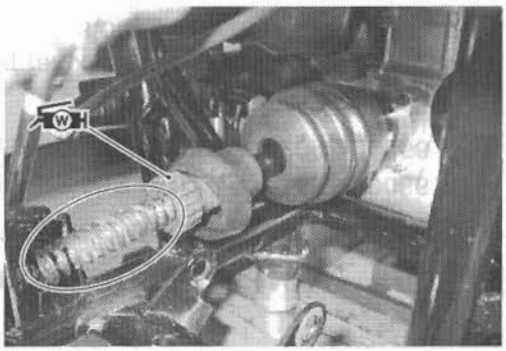
99000-32030: THREAD LOCK SUPER "1303"

Actuator mounting bolt: 22 N·m (2.2 kgf-m, 16.0 lb-ft)



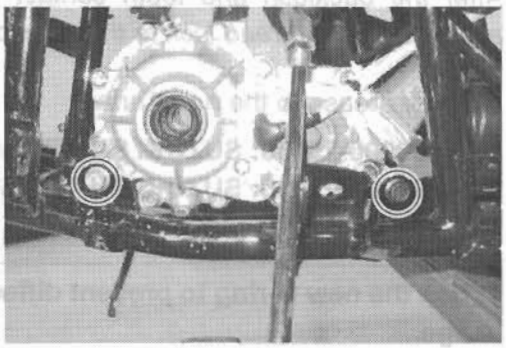
REMOUNTING

Install the front drive train (differential) gear case assembly in the reverse order of removal. Pay attention to the following points:



- Install the front propeller shaft spring.
- Apply 4-5 gram of water resistance grease to the spline of the input shaft.

W 99000-25160: WATER RESISTANCE GREASE

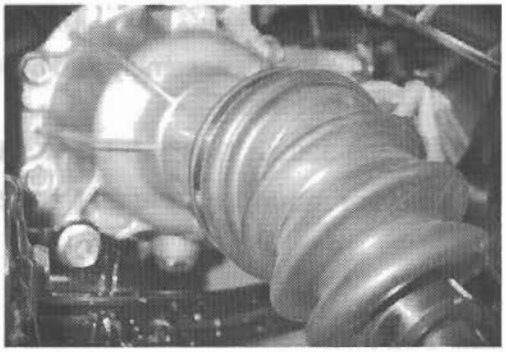


- Apply THREAD LOCK SUPER "1303" to the nuts.

1303 99000-32030: THREAD LOCK SUPER "1303"

- Tighten the front drive train (differential) gear case mounting nuts to the specified torque.

Front drive train gear case mounting nut:
50 N·m (5.0 kgf-m, 36.0 lb-ft)



- Install a new stopper ring into the groove of front differential gear spline.
- Apply grease to the spline of the front drive shafts and install the front drive shafts to the front differential gear case.

A 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

CAUTION

Be careful not to damage the front differential gear case oil seals.

NOTE:
After installing both drive shafts, make sure the stopper rings are seated properly by pulling both inboard joints lightly.

- Pour the specified hypoid gear oil (SAE #90) through the filler hole. (☞2-14)

Gear oil capacity: 500 ml (16.9/17.6 US/Imp oz)

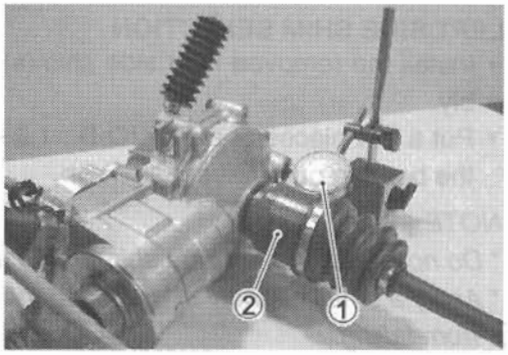
- Install the front suspension. (☞8-41)
- Install the front wheels. (☞8-13)

SHIM ADJUSTMENT

BACKLASH

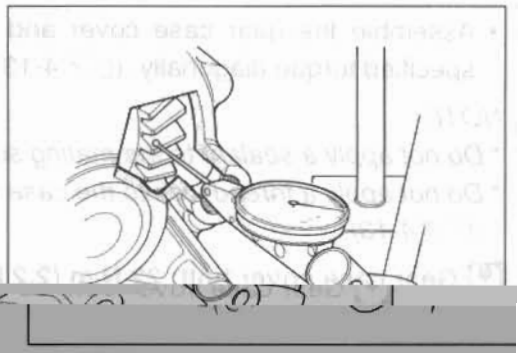
- Install the removed left and right side shims and differential assembly.
- Assemble the gear case cover. (☞4-9)

NOTE:
At this time, it is not necessary to apply a sealant to the mating surface of the gear case.



Remove the oil filler cap and measure the backlash of the differential ring gear using the horizontal type dial gauge ① and drive shaft ②, as shown. Take backlash readings at three places while turning the ring gear slightly in each direction and securely holding the pinion gear. Read the total backlash on the dial gauge.

Remove the dial gauge and turn the ring gear 120°, then measure the backlash. Repeat this procedure once more and compare the difference of the three measurements.



If the backlash is not within specification, the shim must be changed and the backlash should be re-checked until the back lash is within specification. Refer to the chart at the right for the appropriate shim thickness.

DATA Backlash
Standard: 0.05 – 0.10 mm (0.0020 – 0.0040 in)

NOTE:
Adjust the backlash by referring to the chart at the right and using the thickness of the removed shims as a guide.

Backlash	Shim adjustment
Under 0.05 mm (0.0020 in)	Increase shim thickness
0.05 – 0.10 mm (0.0020 – 0.0040 in)	Correct
Over 0.10 mm (0.0040 in)	Decrease shim thickness

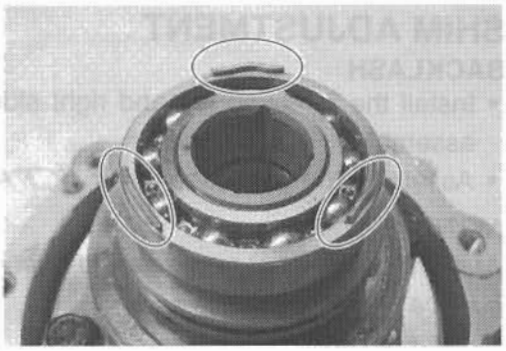
If the backlash is too small, replace the right side shim(s) with a thicker one.
If the backlash is too large, replace the right side shim(s) with a thinner one.
If the right side shim was changed with a 0.10 mm thicker shim, replace the left side shim with one that is 0.10 mm thinner.

List of shims

Part No.	Shim thickness
27445-38FA0 (Shim set: 15 pcs)	0.75 mm (0.0295 in)
	0.80 mm (0.0315 in)
	0.85 mm (0.0335 in)
	0.90 mm (0.0354 in)
	0.95 mm (0.0374 in)
	1.00 mm (0.0394 in)
	1.05 mm (0.0413 in)
	1.10 mm (0.0433 in)
	1.15 mm (0.0453 in)
	1.20 mm (0.0472 in)
	1.25 mm (0.0492 in)
	1.30 mm (0.0512 in)
	1.35 mm (0.0531 in)
	1.40 mm (0.0551 in)
	1.45 mm (0.0571 in)

LEFT SIDE SHIM SELECTION

- Install the removed right side shim(s) and differential assembly.
- Put a few pieces of solder (O.D.: 1.2 – 1.5 mm × L: 6 mm) on the bearing outer race, as shown.



NOTE:

** Do not install the left side shim(s) at this time.*

** Apply a small quantity of grease to the solders to prevent them from falling.*

- Assemble the gear case cover and tighten its bolts to the specified torque diagonally. (☞4-13)

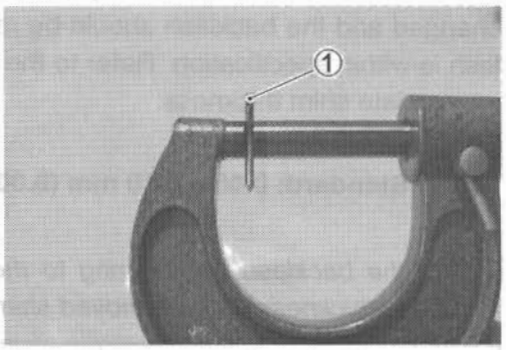
NOTE:

** Do not apply a sealant to the mating surface of the gear case.*

** Do not apply a thread lock to the case cover bolts. (☞4-13)*

Gear case cover bolt: 22 N·m (2.2 kgf-m, 16.0 lb-ft)

- Remove the gear case cover. (☞4-3)
- Measure the thickness of compressed solder ① with the micrometer.



09900-20205: Micrometer

- Select the proper size of shim(s) from the right chart, according as the compressed solder thickness.
- After selecting the proper size of shim(s), check or adjust the backlash and tooth contact.

List of shims

Part No.	Shim thickness
27445-38FA0 (Shim set: 15 pcs)	0.75 mm (0.0295 in)
	0.80 mm (0.0315 in)
	0.85 mm (0.0335 in)
	0.90 mm (0.0354 in)
	0.95 mm (0.0374 in)
	1.00 mm (0.0394 in)
	1.05 mm (0.0413 in)
	1.10 mm (0.0433 in)
	1.15 mm (0.0453 in)
	1.20 mm (0.0472 in)
	1.25 mm (0.0492 in)
	1.30 mm (0.0512 in)
	1.35 mm (0.0531 in)
	1.40 mm (0.0551 in)
	1.45 mm (0.0571 in)

TOOTH CONTACT

After backlash adjustment and left side shim selection are carried out, the tooth contact must be checked. Pay attention to the following points:

- Remove the differential ring gear.
- Clean and degreas several teeth on the ring gear and pinion gear, and then apply a coating of machinist's layout dye or paste to several teeth of the pinion gear.
- Install the removed left and right side shims and differential assembly.
- Assemble the gear case cover. (☞4-9)

NOTE:

** Do not apply a sealant to the mating surface of the gear case.*

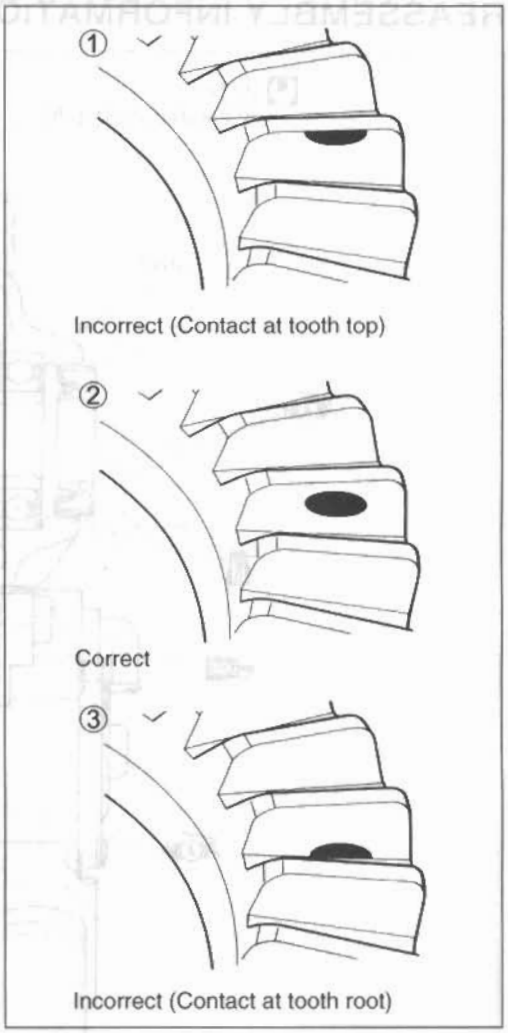
** Do not apply a thread lock to the case cover bolts.*

Gear case cover bolt: 22 N·m (2.2 kgf-m, 16.0 lb-ft)

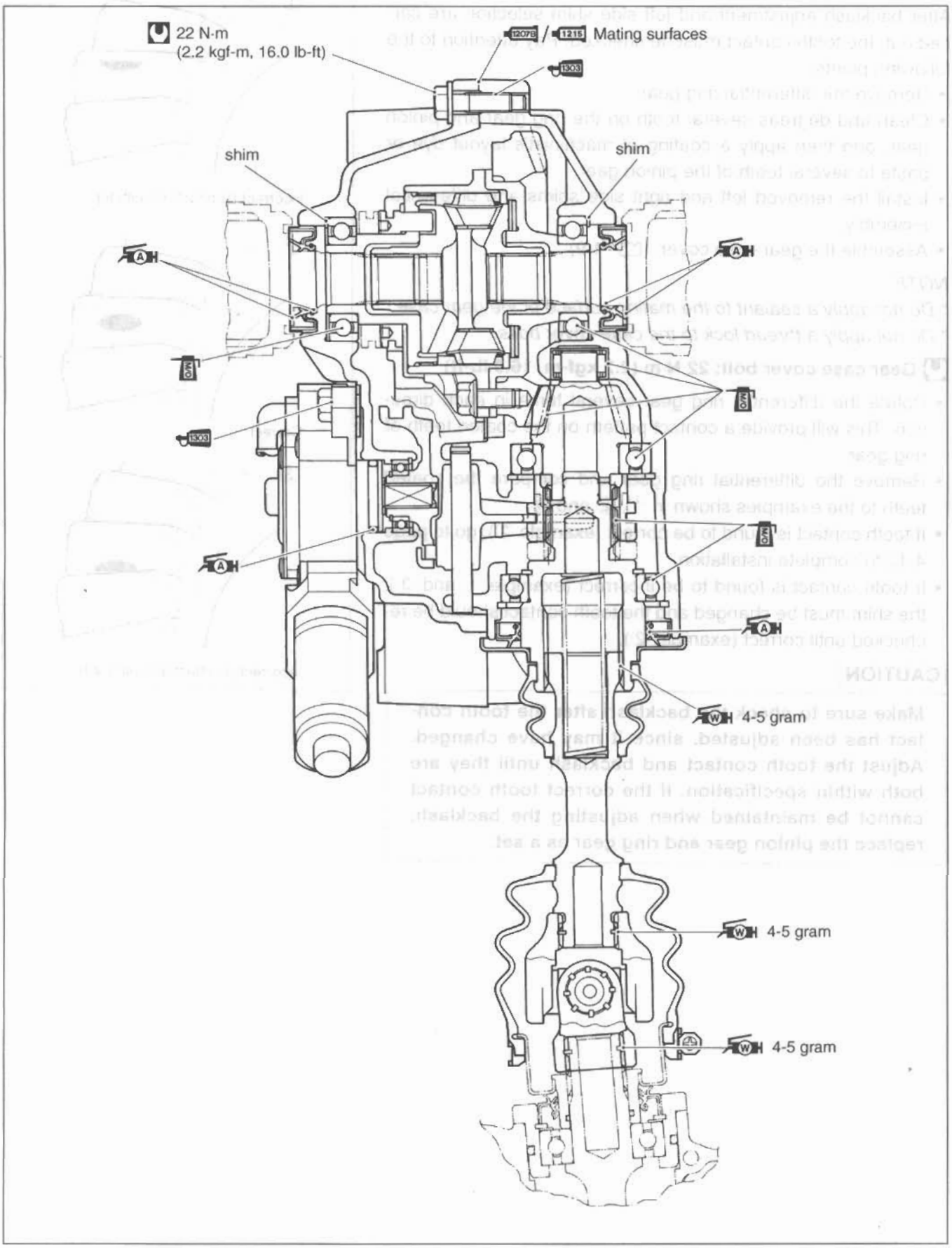
- Rotate the differential ring gear several turns in each direction. This will provide a contact pattern on the coated teeth of ring gear.
- Remove the differential ring gear and compare the coated teeth to the examples shown in ①, ② and ③.
- If tooth contact is found to be correct (example ②), go to page 4-12 to complete installation.
- If tooth contact is found to be incorrect (example ① and ③), the shim must be changed and the tooth contact should be rechecked until correct (example ②).

CAUTION

Make sure to check the backlash after the tooth contact has been adjusted, since it may have changed. Adjust the tooth contact and backlash until they are both within specification. If the correct tooth contact cannot be maintained when adjusting the backlash, replace the pinion gear and ring gear as a set.



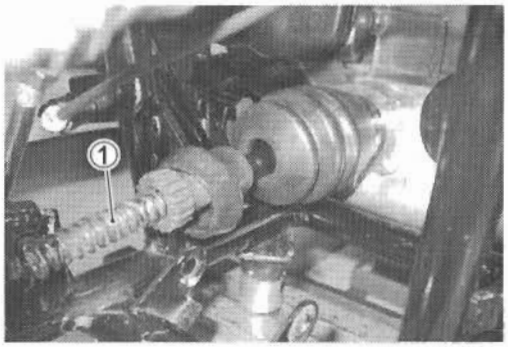
REASSEMBLY INFORMATION



FRONT PROPELLER SHAFT

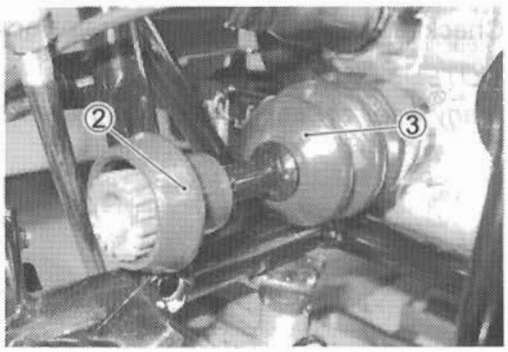
REMOVAL

- Remove the front drive train (differential) gear case assembly. (☞4-3)
- Remove the front propeller shaft spring ①.

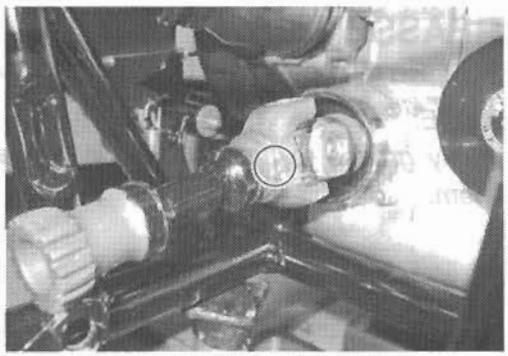


- Loosen the clamp screw and remove the boots (② and ③).

NOTE:
Apply oil to the removing direction of the boots before removing.

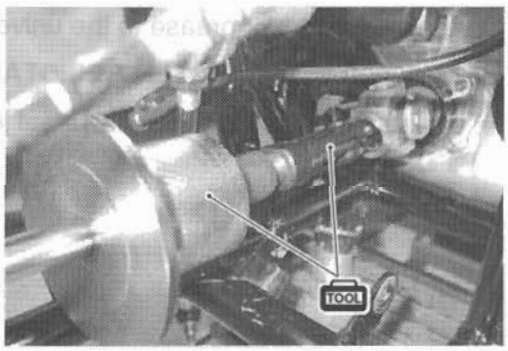


- Insert a screwdriver or the like into a notch of the universal joint and remove the propeller shaft.



- Remove the universal joint from the joint portion (at the engine side) with special tools.

TOOL 09923-74511: Bearing remover (ϕ 20 – 38)
09930-30104: Rotor remover thrust shaft



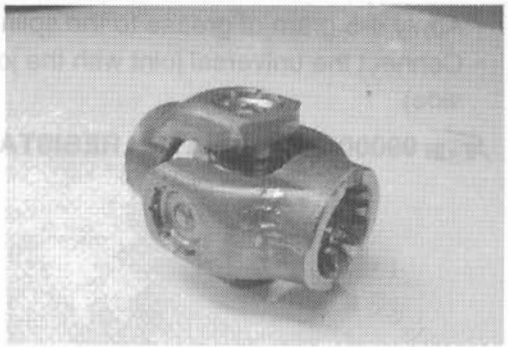
INSPECTION

UNIVERSAL JOINT

- Check the play by turning the universal joint. If excessive play is noted, replace it with a new one.

CAUTION

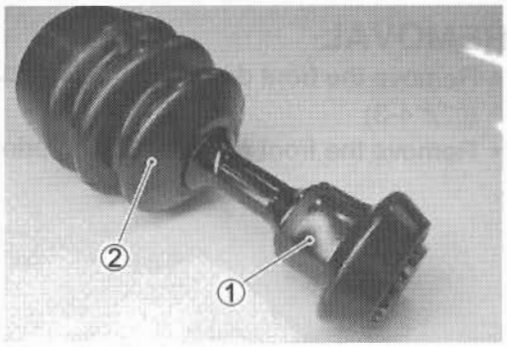
Do not attempt to disassemble the universal joint.



BOOTS

Inspect the boots for wear or damage.

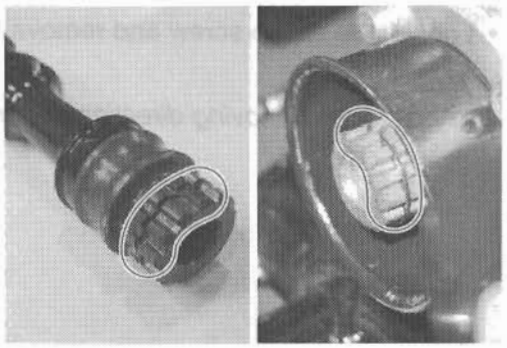
If any crack or damage is found, replace it with a new one.



Check the circlip attached to the universal joint portion.

NOTE:

If any wear or damage is found, replace it with a new one.

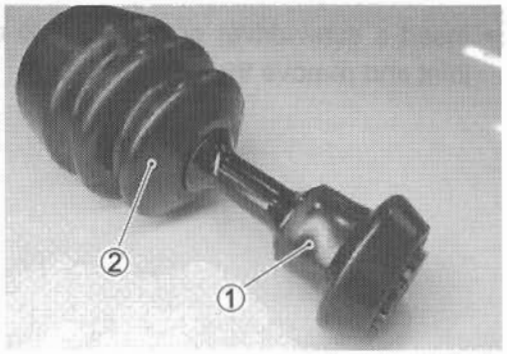


REASSEMBLY

- Attach the boots (① and ②) to the shaft.

NOTE:

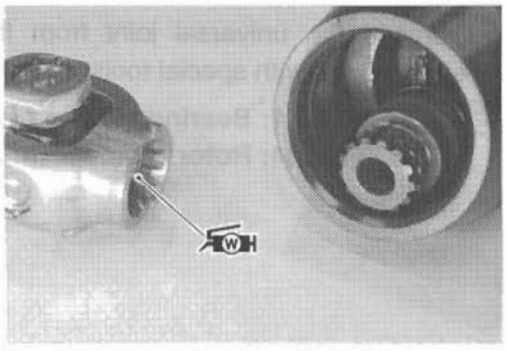
Apply grease to the hole inside of the boots before installing them.



- Apply 4-5 gram of grease to the universal joint.

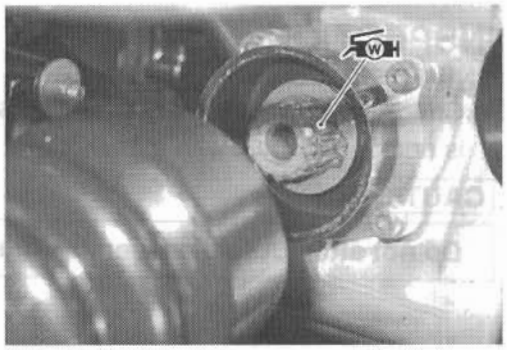
99000-25160: WATER RESISTANCE GREASE

- Connect the shaft with the universal joint.



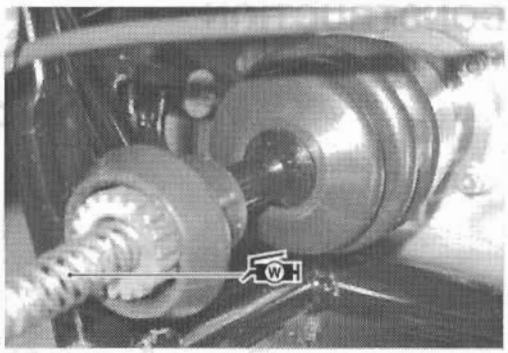
- Apply 4-5 gram of grease to the spline.
- Connect the universal joint with the joint portion (at the engine side).

99000-25160: WATER RESISTANCE GREASE



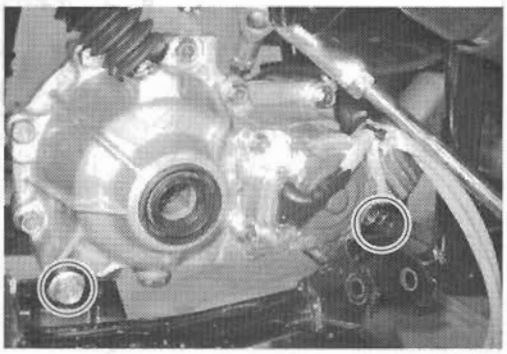
- Attach the spring.
- Apply 4-5 gram of grease to the spline of the input shaft and spring.

99000-25160: WATER RESISTANCE GREASE

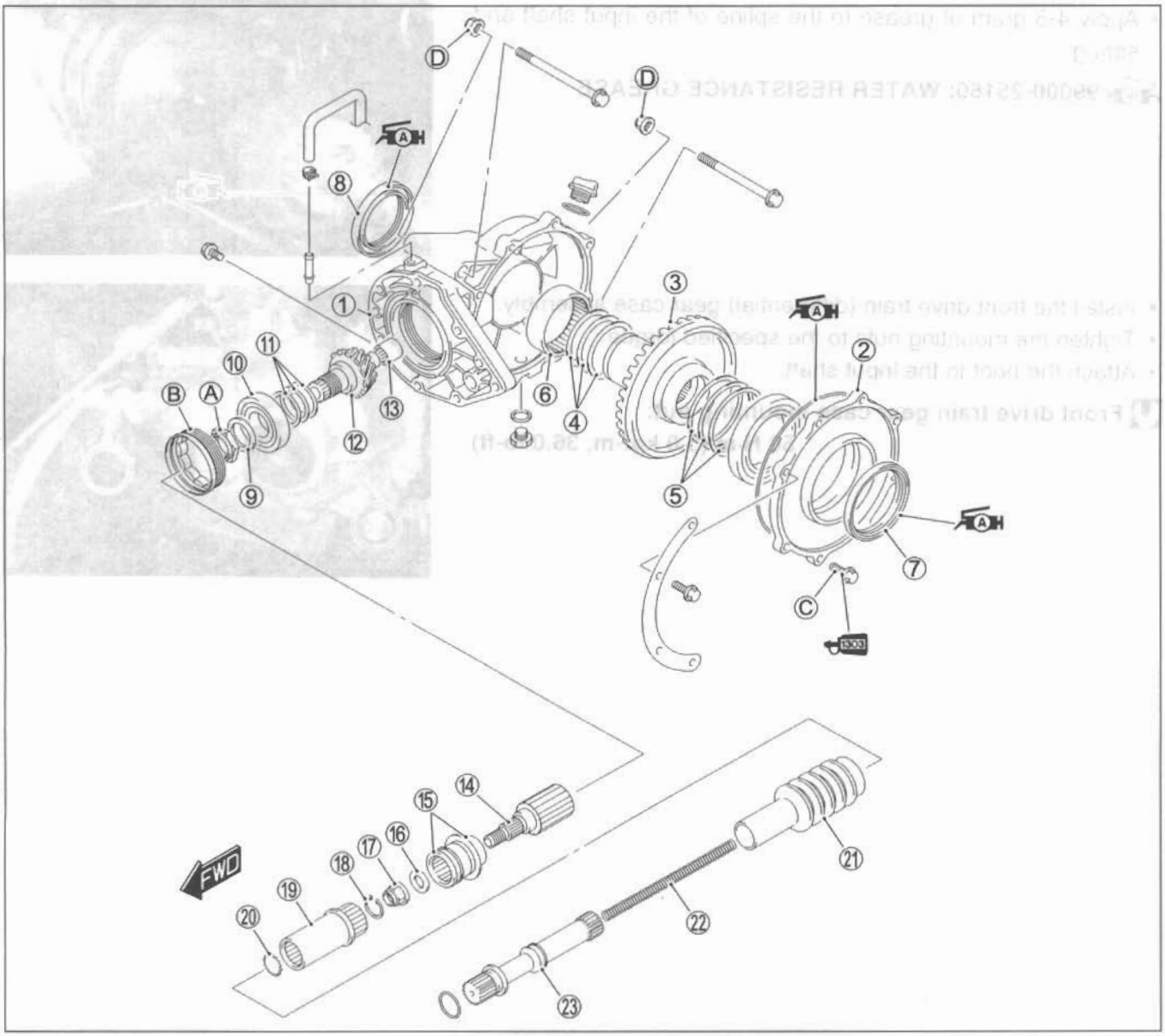


- Install the front drive train (differential) gear case assembly.
- Tighten the mounting nuts to the specified torque.
- Attach the boot to the input shaft.

Front drive train gear case mounting nut:
50 N·m (5.0 kgf-m, 36.0 lb-ft)



REAR DRIVE TRAIN
CONSTRUCTION

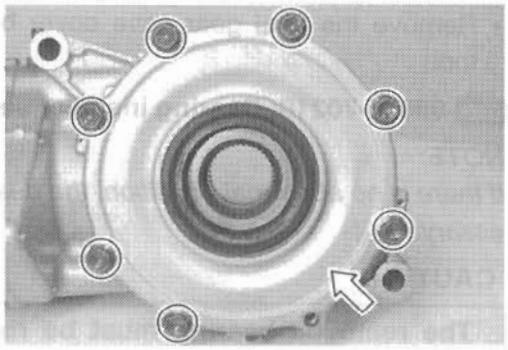


①	Final gear case	⑮	Rear propeller shaft coupling
②	Final gear case cover	⑯	Washer
③	Ring gear	⑰	Locknut
④	Shim (right side)	⑱	Snap ring
⑤	Shim (left side)	⑲	Propeller shaft joint
⑥	Bearing	⑳	Spring plate
⑦	Oil seal	㉑	Boot
⑧	Oil seal	㉒	Spring
⑨	Washer	㉓	Rear propeller shaft
⑩	Bearing	Ⓐ	Pinion gear locknut
⑪	Shim	Ⓑ	Bearing locknut
⑫	Pinion gear	Ⓒ	Final gear case cover bolt
⑬	Bearing	Ⓓ	Final gear case mounting nut
⑭	Input shaft		

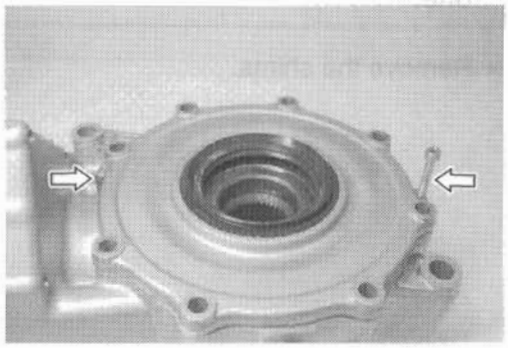
ITEM	N·m	kgf-m	lb-ft
Ⓐ	100	10.0	72.5
Ⓑ	100	10.0	72.5
Ⓒ	26	2.6	19.0
Ⓓ	65	6.5	47.0

DISASSEMBLY

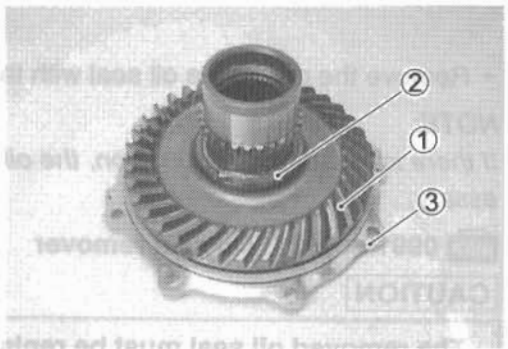
- Remove the rear brake. (☞8-59)
- Remove the cover bolts diagonally and evenly.



- Pry the case cover with 5 mm screw as shown.

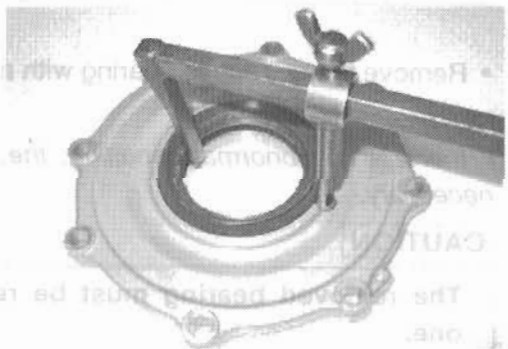


- Remove the ring gear ① and shims ② from the final gear case cover ③.



- Remove the final gear case cover oil seal with the special tool.

TOOL 09913-20121: Oil seal remover

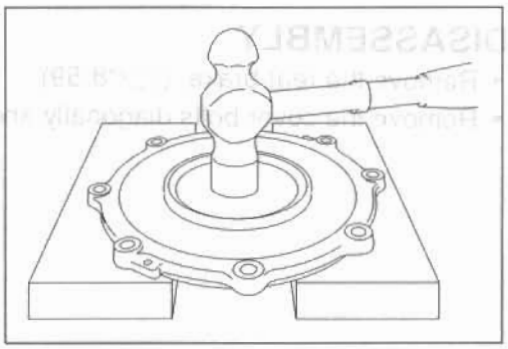


NOTE:
If there is no abnormal condition, the oil seal removal is not necessary.

CAUTION

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

- Remove the final gear case cover bearing with the special tool.



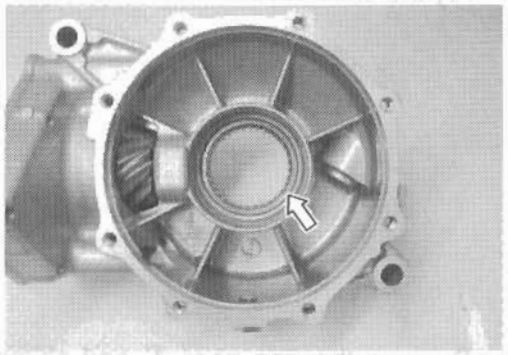
09913-70210: Bearing installer set

NOTE:
If there is no abnormal condition, the bearing removal is not necessary.

CAUTION

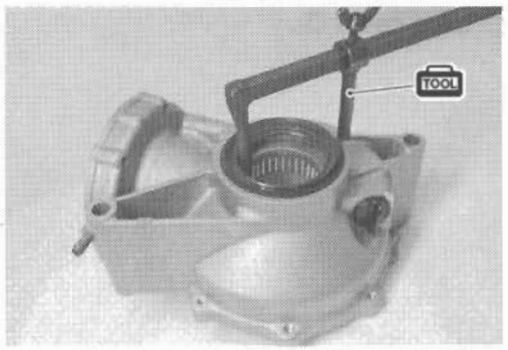
The removed bearing must be replaced with a new one.

- Remove the shims.



- Remove the gear case oil seal with the special tool.

NOTE:
If there is no abnormal condition, the oil seal removal is not necessary.



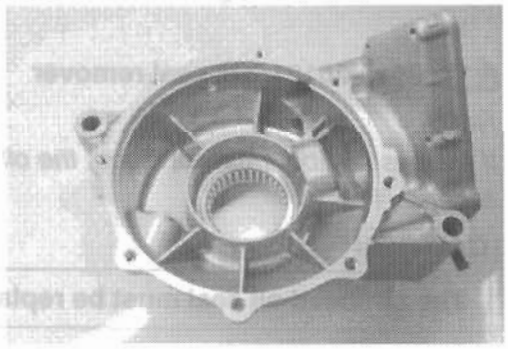
09913-50121: Oil seal remover

CAUTION

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

- Remove the gear case bearing with a suitable tool.

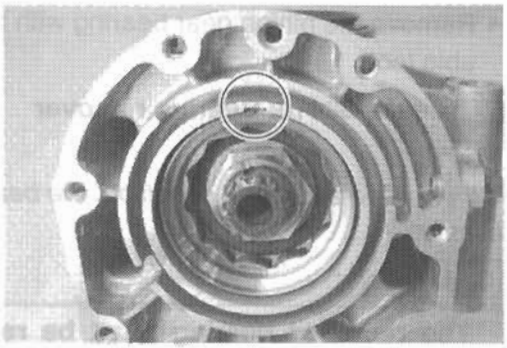
NOTE:
If there is no abnormal condition, the, bearing removal is not necessary.



CAUTION

The removed bearing must be replaced with a new one.

- Unlock the bearing with a small chisel or drill.

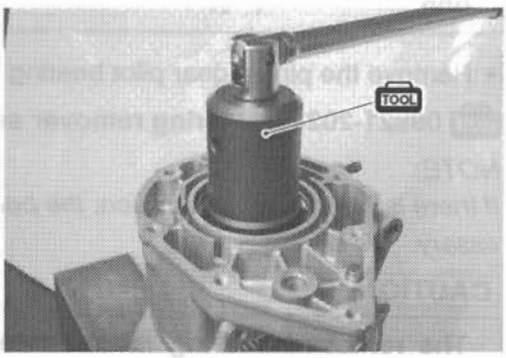


- Remove the bearing locknut with the special tool.

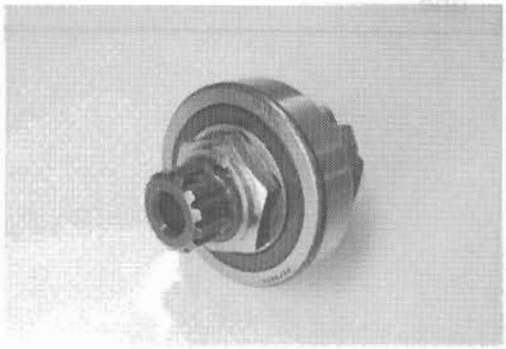
TOOL 09924-41830: Bearing locknut wrench

CAUTION

The removed locknut must be replaced with a new one.



- Remove the pinion gear assembly.

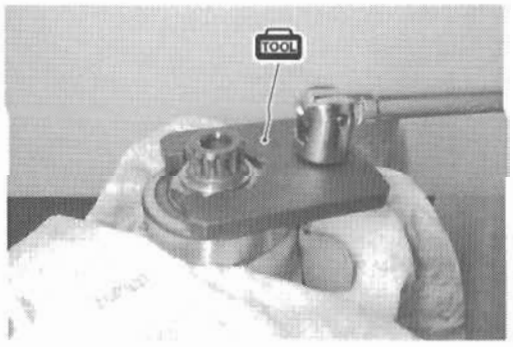


- Remove the pinion gear locknut with the special tool.

TOOL 09940-92430: Rear axle wrench A

CAUTION

The removed locknut must be replaced with a new one.



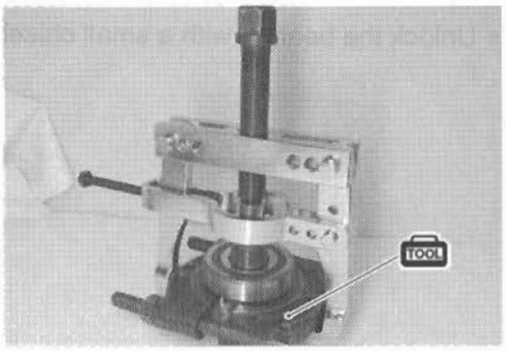
- Remove the pinion gear bearing with the special tool and suitable tool.

TOOL 09917-50410: Bearing remover

NOTE:
If there is no abnormal condition, the bearing removal is not necessary.

CAUTION

The removed bearing must be replaced with a new one.



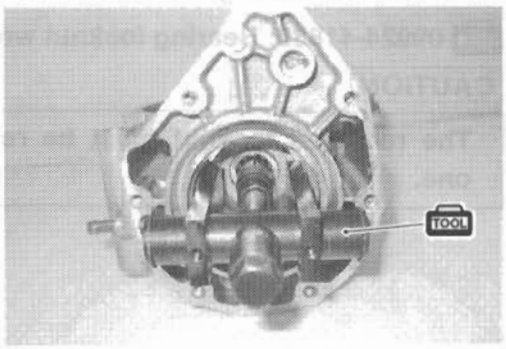
- Remove the pinion gear pilot bearing with the special tool.

TOOL 09921-20240: Bearing remover set

NOTE:
If there is no abnormal condition, the bearing removal is not necessary.

CAUTION

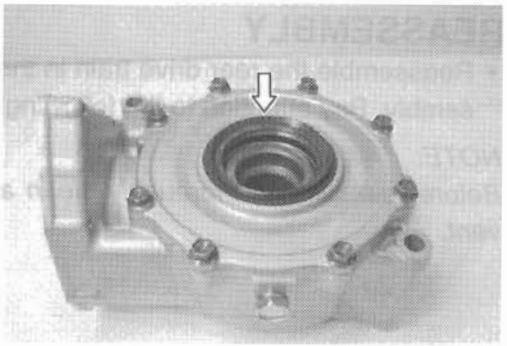
The removed bearing must be replaced with a new one.



INSPECTION

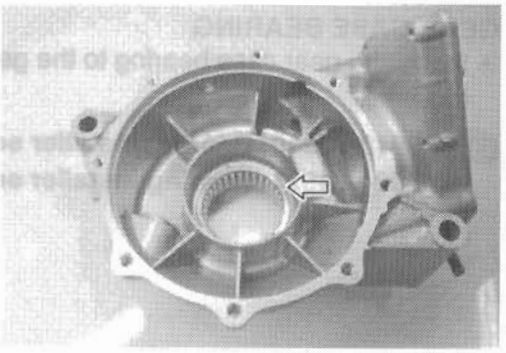
GEAR CASE COVER/FINAL GEAR CASE COVER OIL SEAL

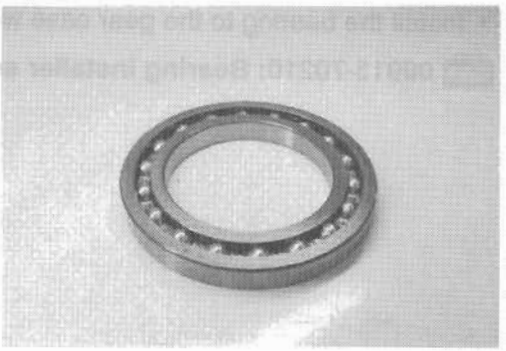
Inspect the oil seal for wear or damage.
If any wear or damage is found, replace it with a new one.



GEAR CASE COVER/FINAL GEAR CASE COVER BEARING

Inspect the bearing for wear or damage.
Check the smooth rotation of the bearing by hand while it is in the case.
If any wear or damage is found, replace it with a new one.

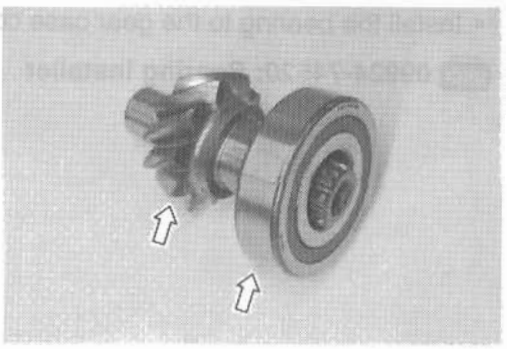




PINION GEAR/PINION GEAR BEARING

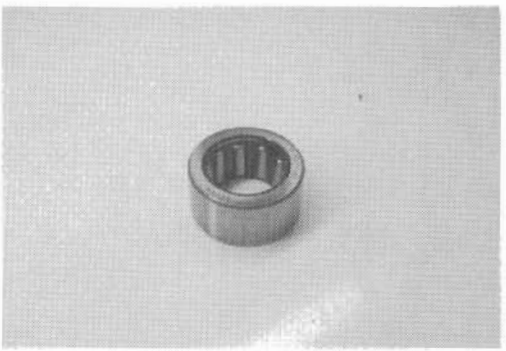
- Check the outer race play and smooth rotation of the bearing by hand while it is on the pinion gear shaft.
- Inspect the pinion gear for wear or damage.
- If the pinion gear is damaged, inspect the ring gear also.
- If any defects are found, replace the bearing and gear with new ones.

BEARING AND GEAR REMOVAL (☞4-25)



PINION GEAR PILOT BEARING

- Check the pinion gear pilot bearing for wear or damage.
- If any wear or damage is found, replace it with a new one.



REASSEMBLY

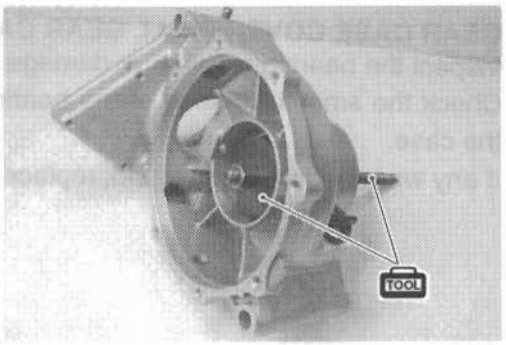
- Reassemble the rear drive train in the reverse order of disassembly. Pay attention to the following points:

NOTE:
Before reassembly, thoroughly clean all parts in cleaning solvent.

GEAR CASE BEARING

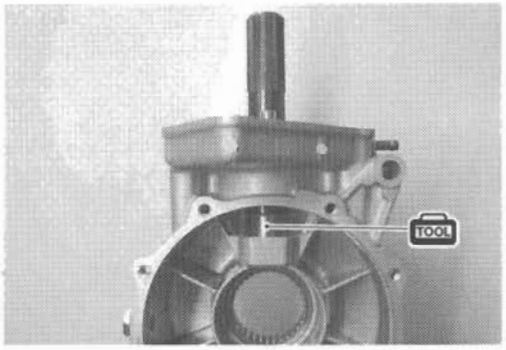
- Install the gear case bearing to the gear case with the special tool.

TOOL 09913-70210: Bearing installer set
09924-84521: Bearing installer set



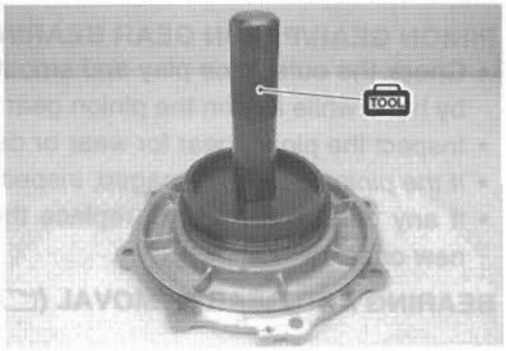
- Install the bearing to the gear case with the special tool.

TOOL 09913-70210: Bearing installer set



- Install the bearing to the gear case cover with the special tool.

TOOL 09924-74520: Bearing installer

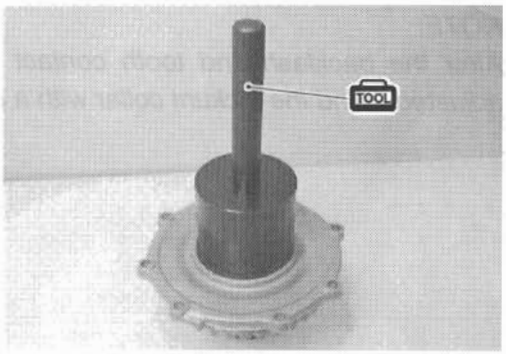


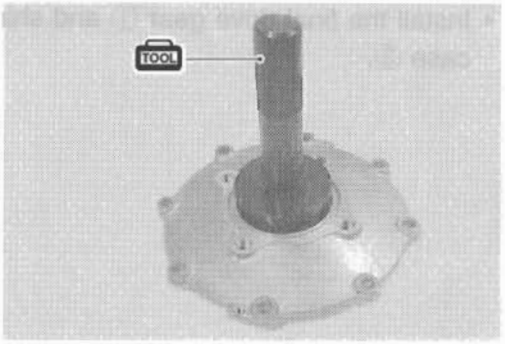
GEAR CASE OIL SEAL

- Install the new oil seals to the gear case and case cover using the special tool.
- Apply grease to the oil seal lips.

09913-70210: Bearing installer set
09913-84510: Bearing installer

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

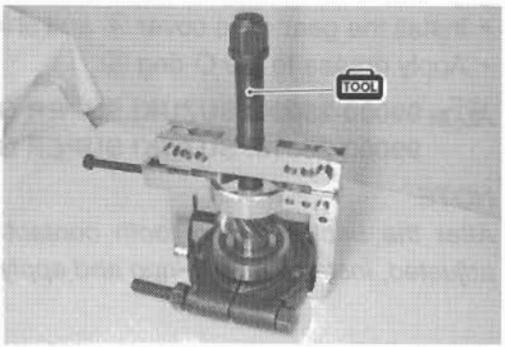




PINION GEAR SHAFT BEARING AND LOCKNUT

- Drive the bearing onto the shaft with the special tool and suitable tool.

09913-70210: Bearing installer set



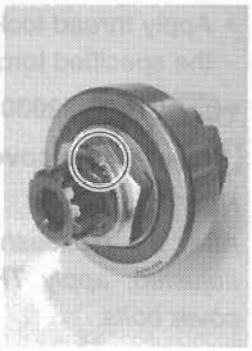
- Tighten the new locknut to the specified torque with the special tools.

09940-92430: Rear axle wrench A

Pinion gear locknut: 100 N·m (10.0 kgf-m, 72.5 lb-ft)

- Bend the locknut collar to the notch of the shaft.

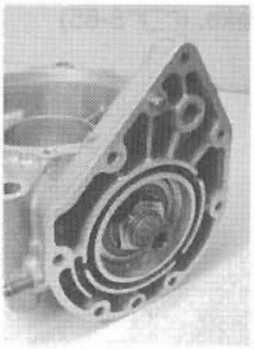




- Install the shim and pinion gear assembly.
- Tighten the bearing locknut with the special tool to the specified torque.

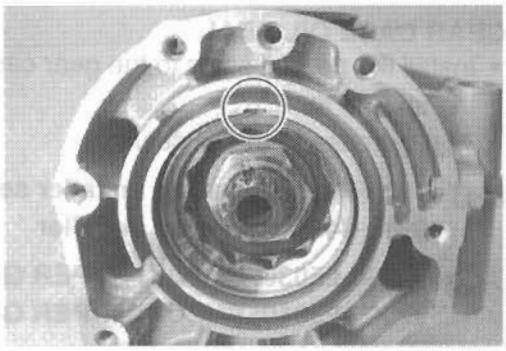
09924-41830: Bearing locknut wrench

Bearing locknut: 100 N·m (10.0 kgf-m, 72.5 lb-ft)

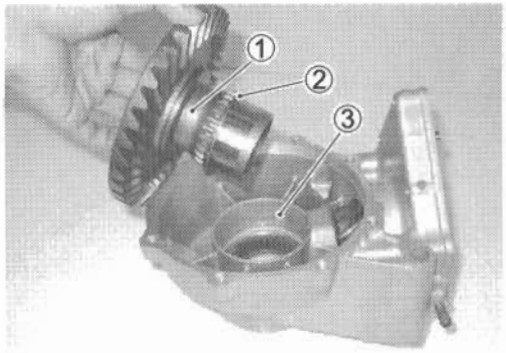




NOTE:
After the backlash and tooth contact have been checked or adjusted, bend the lockunt collar with a center punch.



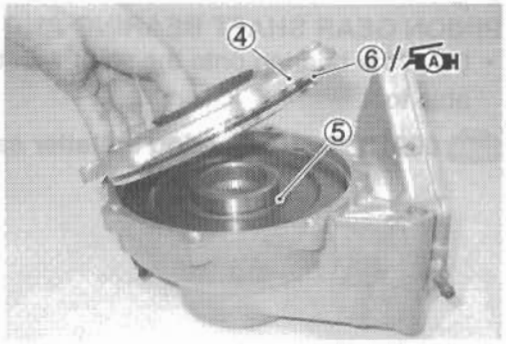
- Install the final drive gear ① and shims ② into the final gear case ③.



- Install the gear case cover ④ and shims ⑤.
- Apply grease to the O-ring ⑥.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

NOTE:
After the backlash and tooth contact have been checked or adjusted, install a new O-ring and apply grease.

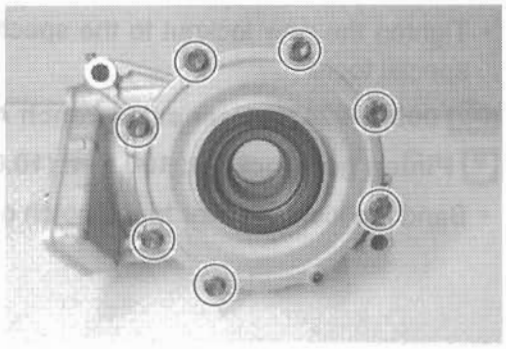


- Apply thread lock to the case cover bolts and tighten them to the specified torque diagonally.

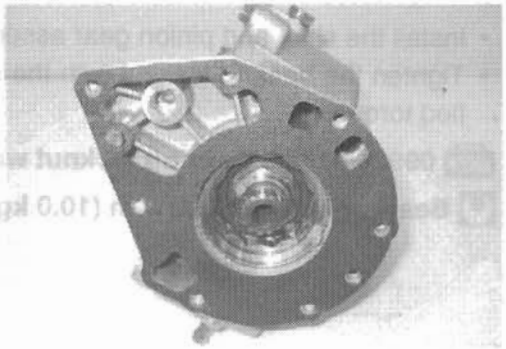
99000-32030: THREAD LOCK SUPER "1303"

Gear case cover bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)

NOTE:
After the backlash and tooth contact have been checked or adjusted, apply THREAD LOCK SUPER "1303" to the case cover bolts.



- Install the rear brake. (☞8-65)



SHIM ADJUSTMENT

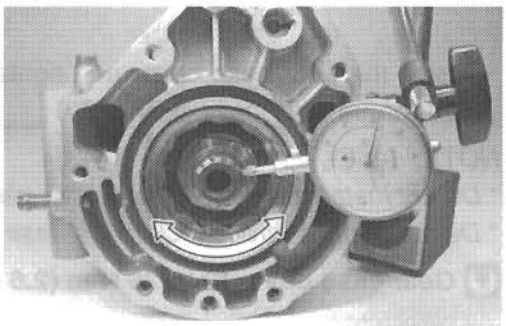
BACKLASH

- Install the pinion gear assembly, removed shim(s) and new bearing locknut. (☞4-28)
- Tighten the bearing locknut to the specified torque. (☞4-29)

NOTE:
At this time, it is not necessary to bend the bearing locknut collar.

- Install the removed left side shim(s) and ring gear. (☞4-32)

Measure the backlash with the dial gauge, as shown. Take backlash readings at several places while turning the pinion gear shaft in each direction and securely holding the ring gear. If the backlash is not within specification, the shim must be changed and the backlash should be re-checked until the backlash is within specification. Refer to the chart for the appropriate shim thickness.



DATA Backlash

Standard: 0.02 – 0.06 mm (0.0008 – 0.0024 in)
.....Without gear case cover specification
0.08 – 0.15 mm (0.0031 – 0.0059 in)
.....Gear case cover assembled specification

NOTE:
Adjust the backlash by referring to the chart at the right and using the thickness of the removed shims as a guide.

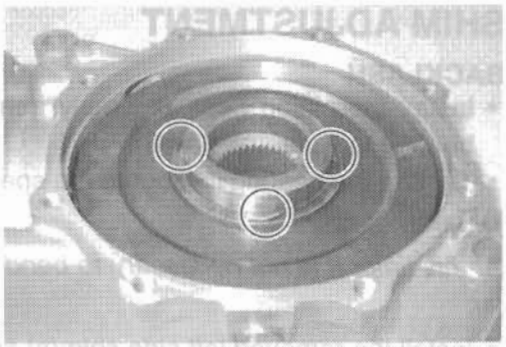
Backlash	Shim adjustment
Under 0.02 mm (0.0008 in)	Increase shim thickness
0.02 – 0.06 mm (0.0008 – 0.0024 in)	Correct
Over 0.06 mm (0.0024 in)	Decrease shim thickness

For right side of ring gear Ⓐ (☞4-34)

Part No.	Shim thickness
27327-31G00-030	0.30 mm (0.0118 in)
27327-31G00-035	0.35 mm (0.0138 in)
27327-31G00-040	0.40 mm (0.0157 in)
27327-31G00-050	0.50 mm (0.0197 in)
27327-31G00-060	0.60 mm (0.0236 in)

LEFT SIDE SHIM SELECTION

- After the backlash has been checked or adjusted, put a few pieces of solder (O.D.: 1.2 – 1.5 mm × L: 6 mm) on the ring gear back side, as shown.

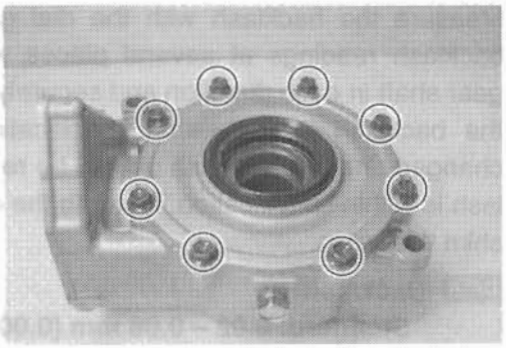


NOTE:

** Do not install the left side shim(s) at this time.*

** Apply a small quantity of grease to the solders to prevent them from falling.*

- Install the gear case cover and tighten its bolts to the specified torque diagonally. (☞4-30)



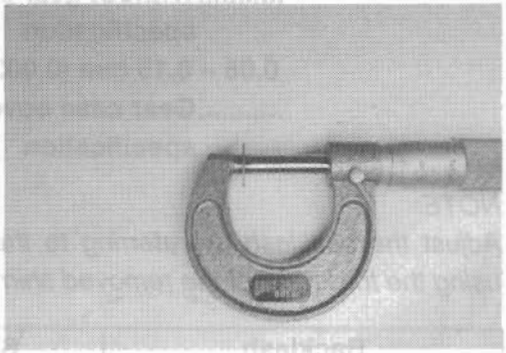
NOTE:

** Do not install the new O-ring to the gear case cover.*

** Do not apply a thread lock to the case cover bolts.*

Gear case cover bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)

- Remove the gear case cover. (☞4-23)
- Measure the thickness of compressed solder with the micrometer.



09900-20205: Micrometer

Decide the proper shim thickness Ⓑ by the following formula.

Ⓓ + 0.10 mm = Shim thickness Ⓑ

0.10 mm: Proper clearance

Ⓓ: Compressed solder thickness

Ⓑ: Proper shim thickness

- Select the proper size of shim(s) from the right chart, according as the compressed solder thickness.
- After selecting the proper size of shim(s), install it on the ring gear back side.

For left side of ring gear Ⓑ (☞4-34)

Part No.	Shim thickness
27326-31G00-030	0.30 mm (0.0118 in)
27326-31G00-035	0.35 mm (0.0138 in)
27326-31G00-040	0.40 mm (0.0157 in)
27326-31G00-050	0.50 mm (0.0197 in)
27326-31G00-060	0.60 mm (0.0236 in)

TOOTH CONTACT

After backlash adjustment and left shim selection are carried out, the tooth contact must be checked. Pay attention to the following procedures:

- Remove the ring gear.
- Clean and degreas several teeth on the ring gear and pinion gear, and then apply a coating of machinist's layout dye or paste to several teeth of the pinion gear.
- Install the ring gear with the shims in place.
- Install the gear case cover, and then tighten the bolts to the specified torque diagonally. (☞4-30)

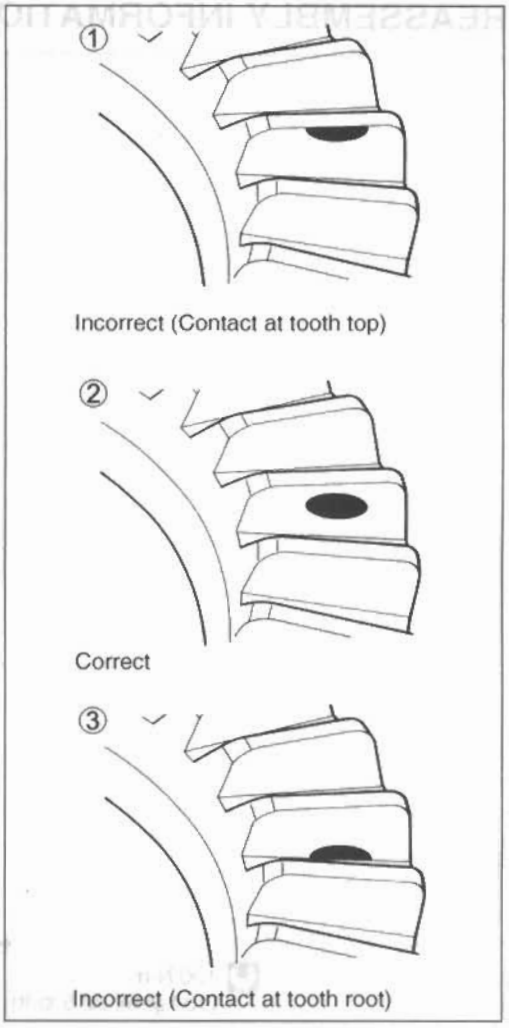
Gear case cover bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)

NOTE:

At this time, it is not necessary to install the gear case cover's O-ring.

- Rotate the gear several turns in each direction. This will provide a contact pattern on the coated teeth of the gear.
- Remove the ring gear and compare the coated teeth to the examples shown in ①,② and ③.
- If tooth contact is found to be correct (example ②), go to page 4-30 to complete installation.
- If tooth contact is found to be incorrect (examples ① and ③), the shim between the pinion gear bearing and gear case must be changed and the tooth contact should be re-checked until the tooth contact is found to be correct (example ②).

Tooth contact	Shim adjustment
Contact at tooth top ①	Decrease shim thickness
Contact at tooth root ③	Increase shim thickness



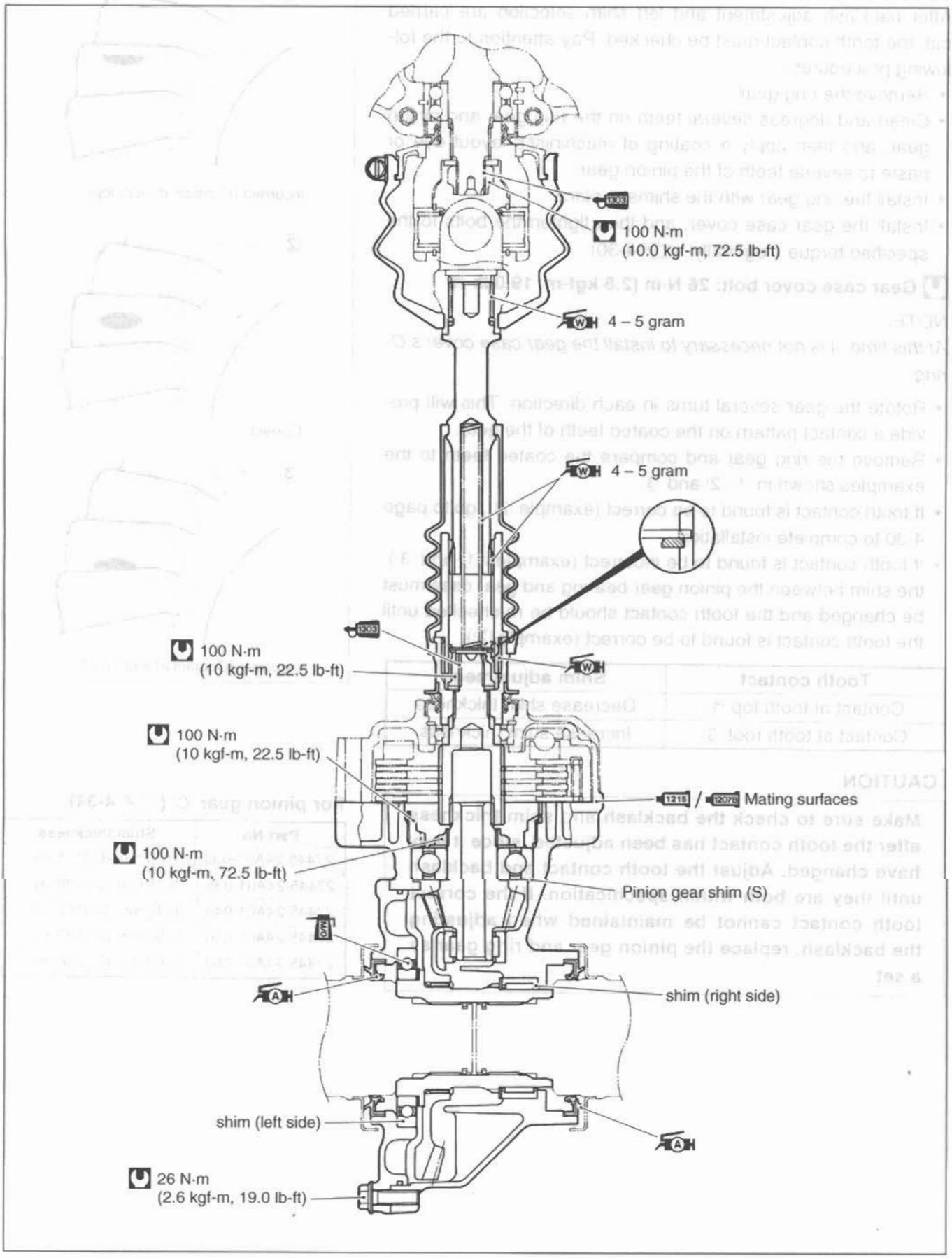
CAUTION

Make sure to check the backlash and shim thickness after the tooth contact has been adjusted, since it may have changed. Adjust the tooth contact and backlash until they are both within specification. If the correct tooth contact cannot be maintained when adjusting the backlash, replace the pinion gear and ring gear as a set.

For pinion gear © (☞4-34)

Part No.	Shim thickness
27445-24A01-030	0.30 mm (0.0118 in)
27445-24A01-035	0.35 mm (0.0138 in)
27445-24A01-040	0.40 mm (0.0157 in)
27445-24A01-050	0.50 mm (0.0197 in)
27445-24A01-060	0.60 mm (0.0236 in)

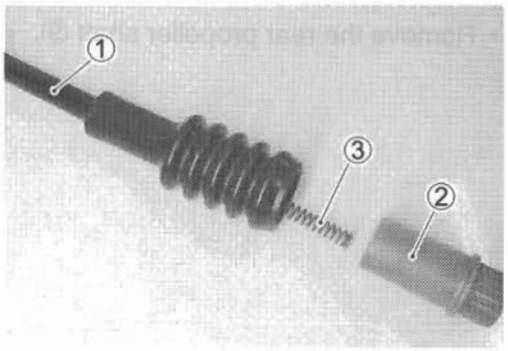
REASSEMBLY INFORMATION



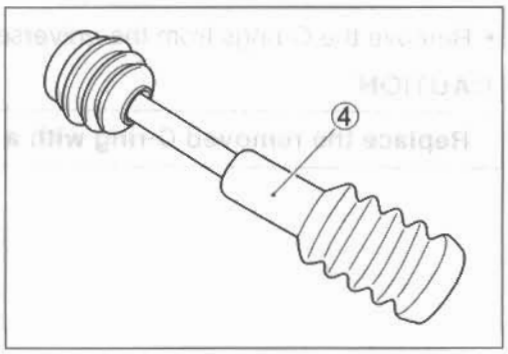
REAR PROPELLER SHAFT

REMOVAL AND DISASSEMBLY

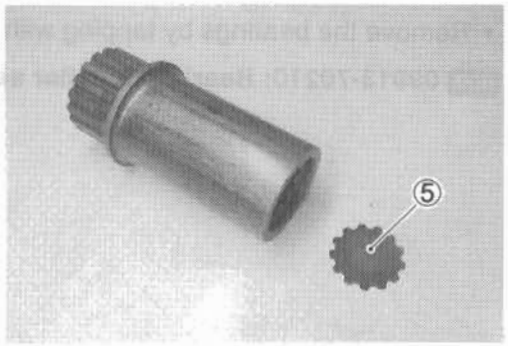
- Remove the rear drive shaft. (☞8-54)
- Remove the rear final gear assy. (☞8-59)
- Remove the rear propeller shaft joint ② and spring ③ from the rear propeller shaft ①.



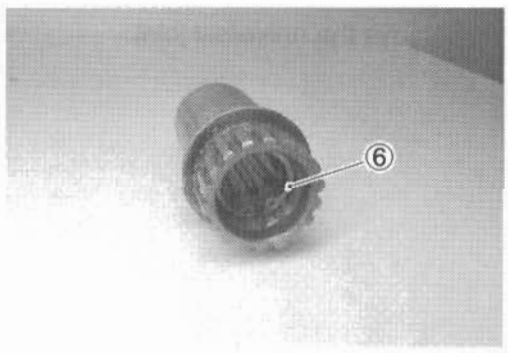
- Remove the joint shaft boot ④.



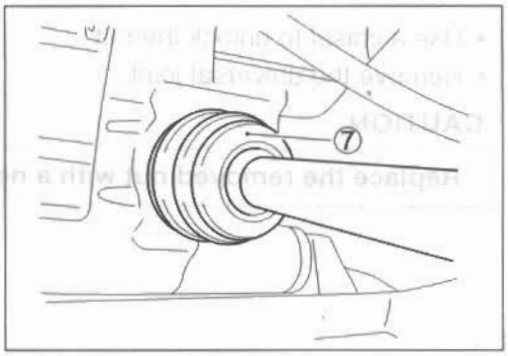
- Remove the rear propeller shaft spring plate ⑤.



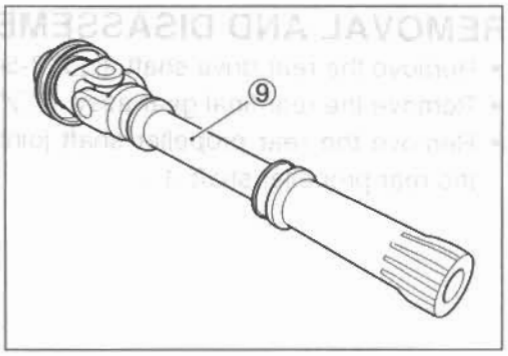
- Remove the joint shaft snap ring ⑥.



- Remove the rear propeller shaft boot ⑦.



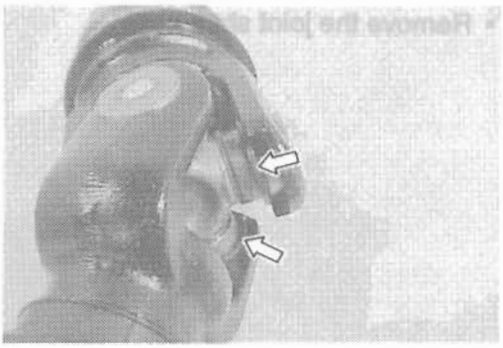
• Remove the rear propeller shaft ⑨.



• Remove the C-rings from the universal joint.

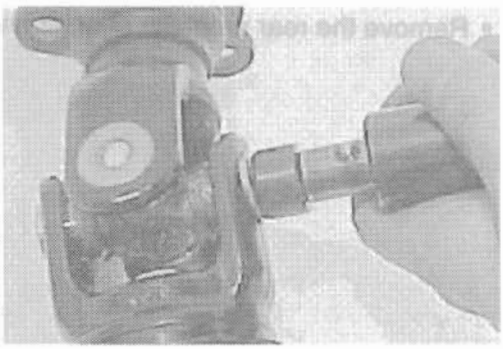
CAUTION

Replace the removed C-ring with a new one.

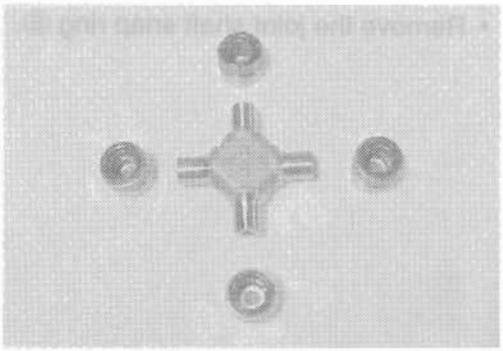


• Remove the bearings by tapping with the special tool.

TOOL 09913-70210: Bearing installer set



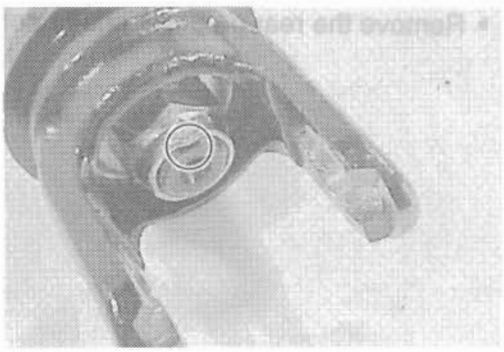
• Remove the universal joint.



• Use a chisel to unlock the nut.
• Remove the universal joint.

CAUTION

Replace the removed nut with a new one.



INSPECTION

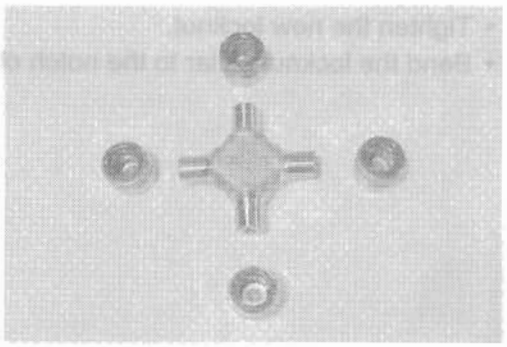
REAR PROPELLER SHAFT

Inspect the rear propeller shaft for wear or damage.
If any wear or damage is found, replace it with a new one.

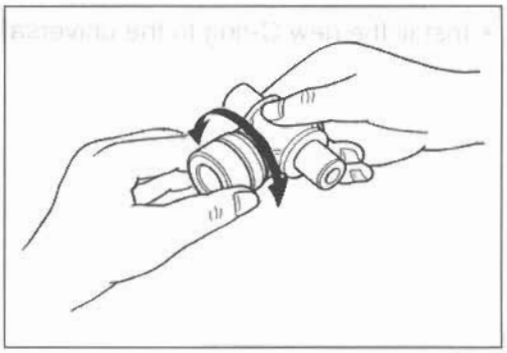


UNIVERSAL JOINT

Inspect the universal joint and outer surface of the bearing for scuffing, wear and damage. If any defects are found, replace the bearings and universal joint as a set.

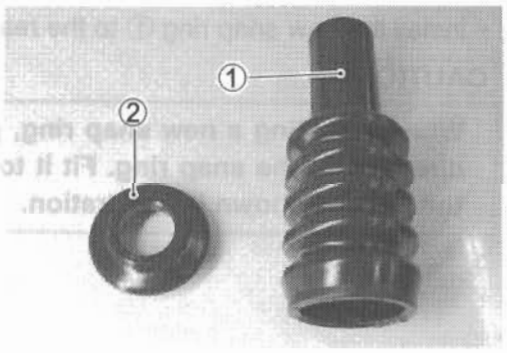


Insert the universal joint to the bearing and check the play by turning the universal joint, as shown. If excessive play is noted, replace the bearing with a new one.



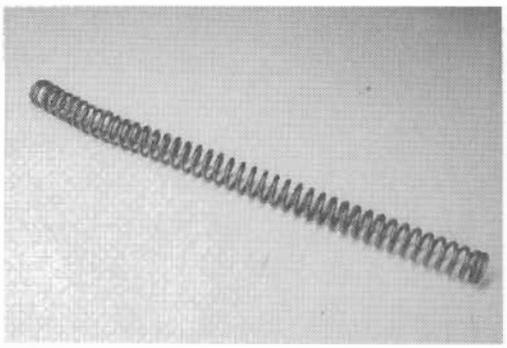
SHAFT BOOT

Inspect the joint shaft boot ① and propeller shaft boot ② for wear or damage.
If any wear or damage is found, replace it with a new one.



REAR PROPELLER SHAFT SPRING

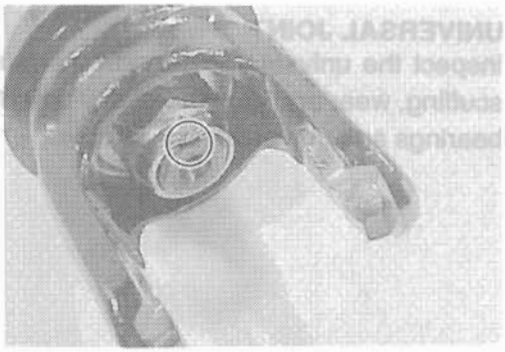
Inspect the rear propeller shaft spring for wear or damage.
If any wear or damage is found, replace it with a new one.



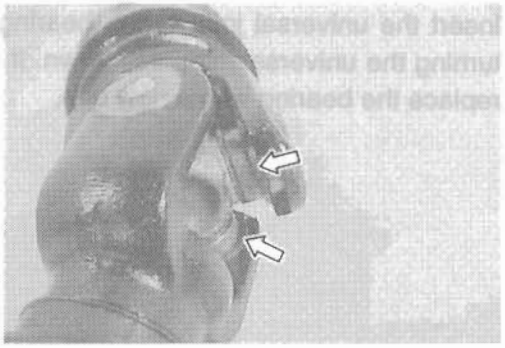
REASSEMBLY AND REMOUNTING

- Reassemble and remount the rear propeller shaft assembly in the reverse order of removal and disassembly.

- Tighten the new locknut.
- Bend the locknut callar to the notch of the shaft.



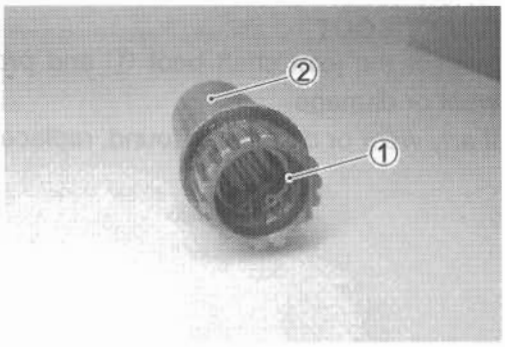
- Install the new C-ring to the universal joint.



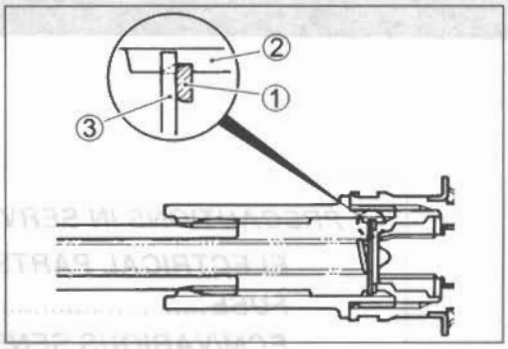
- Install the new snap ring ① to the rear propeller shaft joint ②.

CAUTION

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

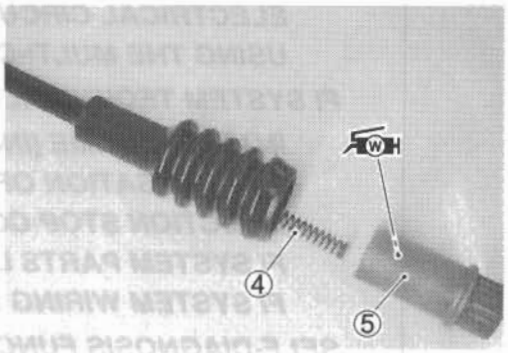


- Install the rear propeller shaft spring plate ③.



- Install the rear propeller shaft spring ④.
- Install the rear propeller shaft joint ⑤.
- Apply 4-5 gram of grease to the inner spline of the rear propeller shaft joint ⑤.

99000-25160: WATER RESISTANCE GREASE



FI SYSTEM DIAGNOSIS

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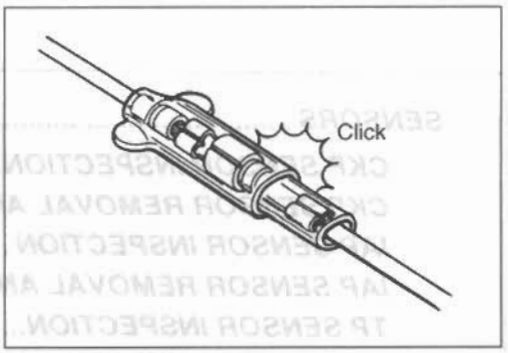
PRECAUTIONS IN SERVICING

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

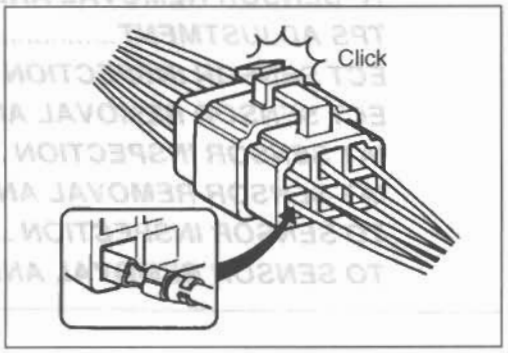
ELECTRICAL PARTS

CONNECTOR/COUPLER

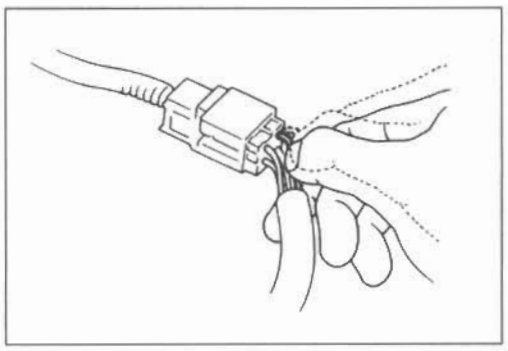
- When connecting a connector, be sure to push it in until a click is felt.



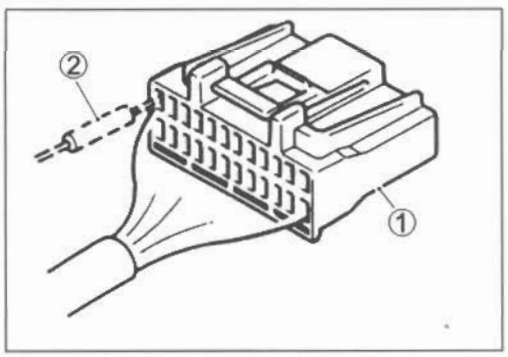
- With a lock type coupler, be sure to release the lock when disconnecting, and push it in fully till the lock works when connecting it.
- When disconnecting the coupler, be sure to hold the coupler body and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for looseness or 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.

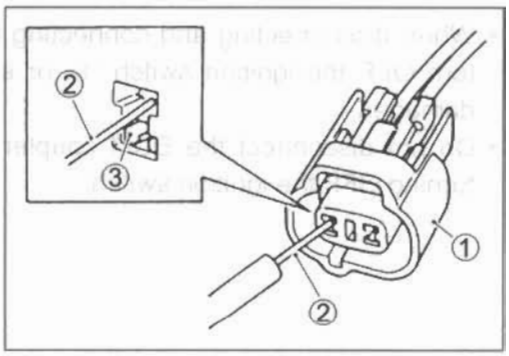


- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (backside) of the connector/coupler.



① Coupler
② Probe

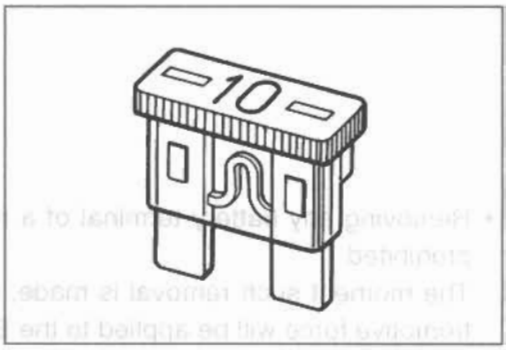
- When connecting meter probe from the terminal side of the coupler (connection from harness side not being possible), use extra care not to force and cause the male terminal to bend or the female terminal to open.
  Connect the probe as shown to avoid opening of female terminal.
  Never push in the 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

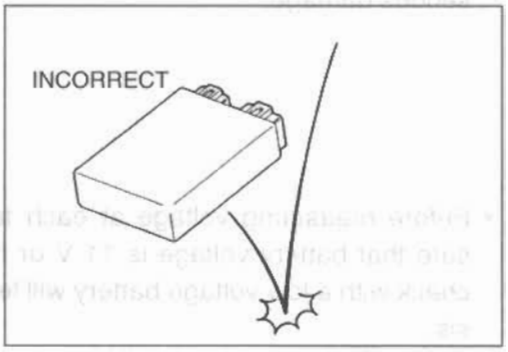
FUSE

- 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.

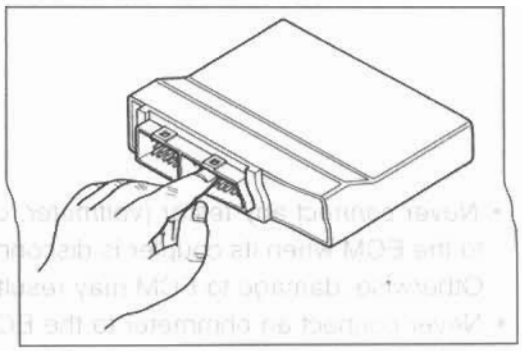


ECM/VARIOUS SENSORS

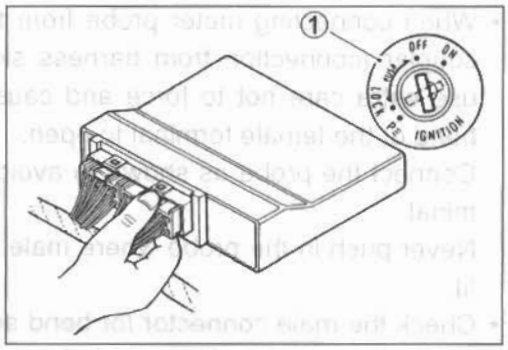
- Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.



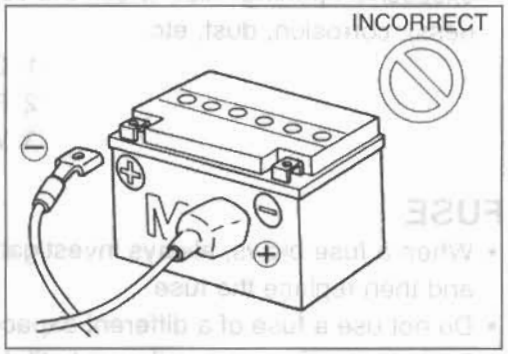
- Be careful not to touch the electrical terminals of the ECM. The static electricity from your body may damage this part.



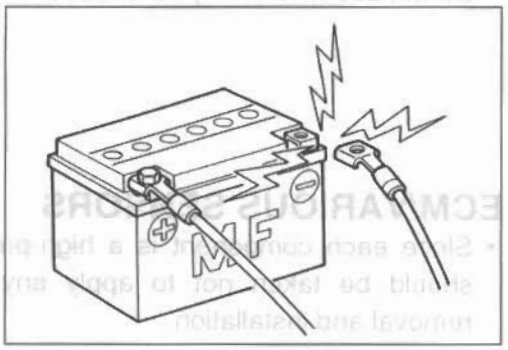
- When disconnecting and connecting the ECM, make sure to turn OFF the ignition switch ①, or electronic parts may get damaged.
- Do not disconnect the ECM coupler within 3 seconds from turning OFF the ignition switch.



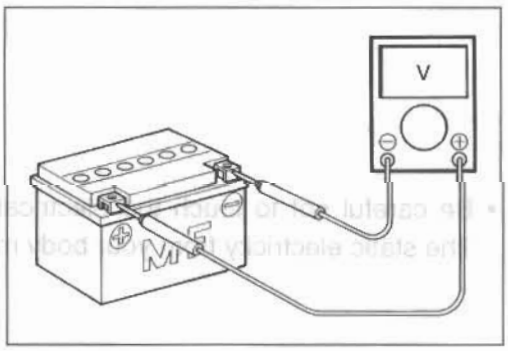
- Battery connection in reverse polarity is strictly prohibited. Such a wrong connection will damage the components of the FI system instantly when reverse power is applied.



- 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.

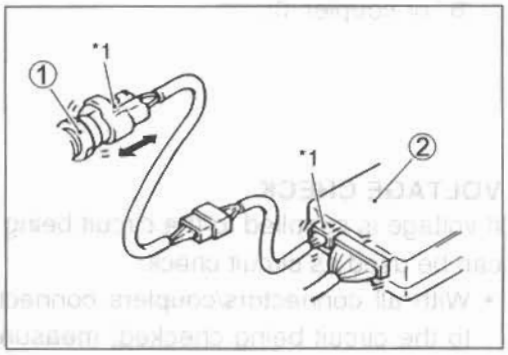
OPEN CIRCUIT CHECK

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.

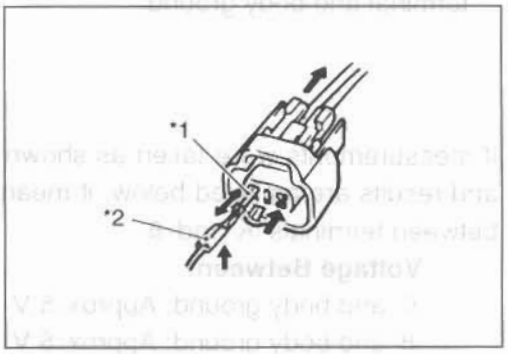
- Disconnect the negative cable from the battery.
- Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check for condition of the coupler lock if equipped.

① Sensor
② ECM
*1 Check for loose connection.



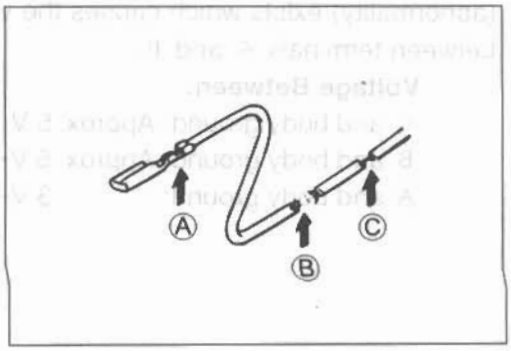
- Using a test male terminal, check the female terminals of the circuit being checked for contact tension.
  Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust, entry of foreign object, etc.). At the same time, check to make sure that each terminal is fully inserted 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.

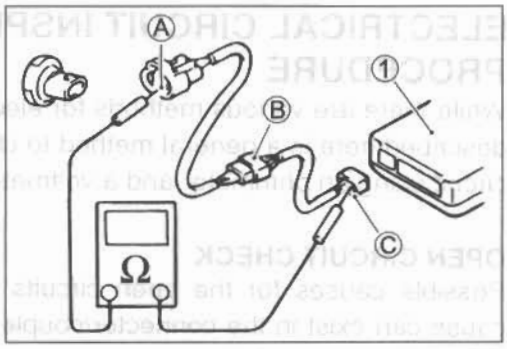
Ⓐ Looseness of crimping
Ⓑ Open
Ⓒ Thin wire (a few strands left)



Continuity check

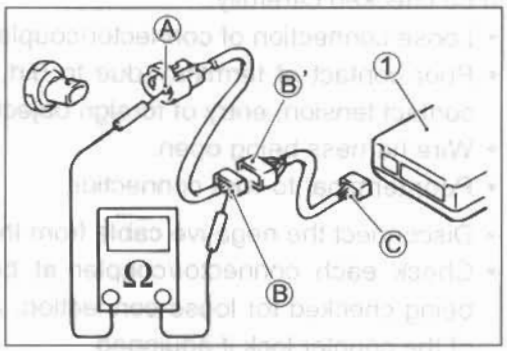
- Measure resistance across coupler Ⓑ (between Ⓐ and Ⓒ in the figure).
  If no continuity is indicated (infinity or over limit), the circuit is open between terminals Ⓐ and Ⓒ.

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

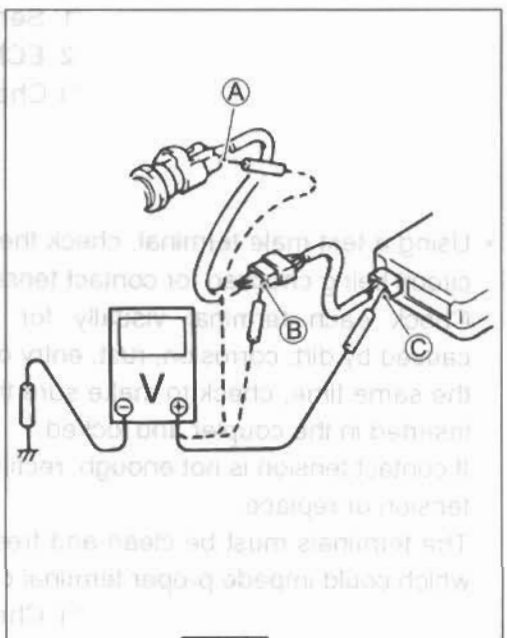
If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

- 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

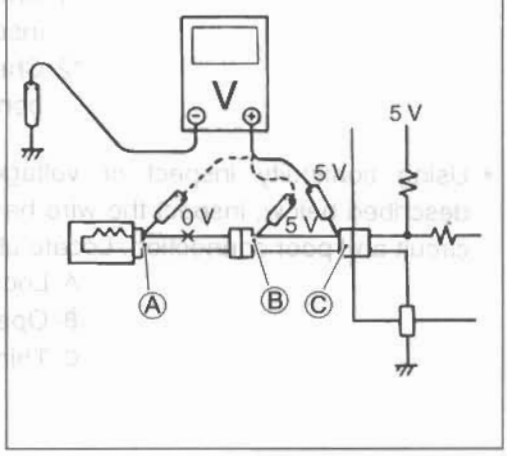


Also, if measured values are as listed below, a resistance (abnormality) exists which causes the voltage drop in the circuit between terminals Ⓐ and Ⓑ.

Voltage Between:

Ⓒ and body ground: Approx. 5 V
Ⓑ and body ground: Approx. 5 V
Ⓐ and body ground: 3 V

2 V voltage drop



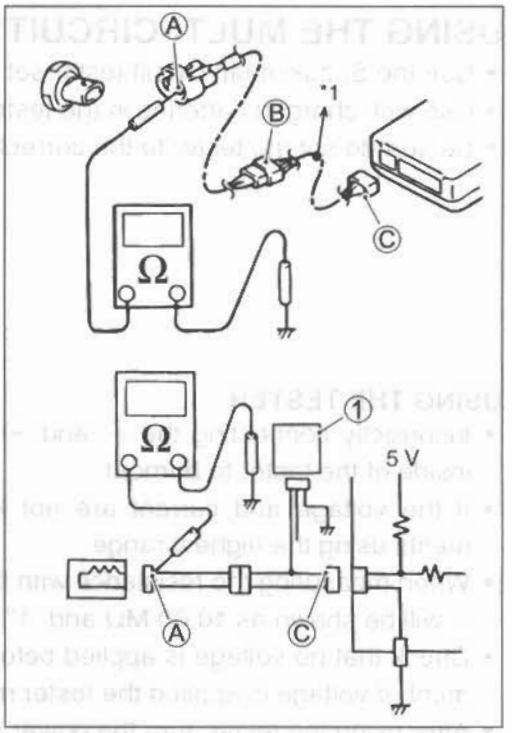
SHORT CIRCUIT CHECK (WIRE HARNESS TO GROUND)

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

NOTE:

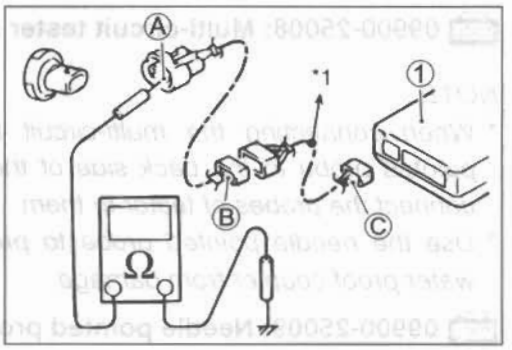
If the circuit to be checked branches to other parts as shown, disconnect all connectors/couplers of those parts. Otherwise, diagnosis will be misled.

- 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.

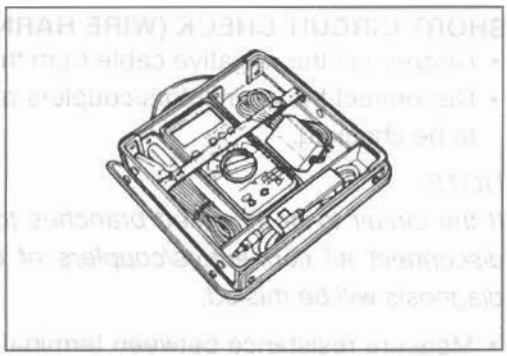
- Disconnect the connector/coupler included in circuit (coupler Ⓑ) and measure resistance between terminal Ⓐ and body ground.
  If continuity is indicated, the circuit is shorted to the ground between terminals Ⓐ and Ⓑ.



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

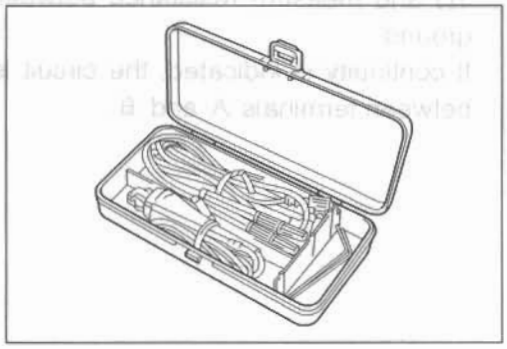
- Incorrectly connecting the ⊕ and ⊖ probes may cause the inside of the tester to burnout.
- If the voltage and current are not known, make measurements using the highest range.
- When measuring the resistance with the multi-circuit tester ①, ∞ will be shown as 10.00 MΩ and "1" flashes in the display.
- 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.*

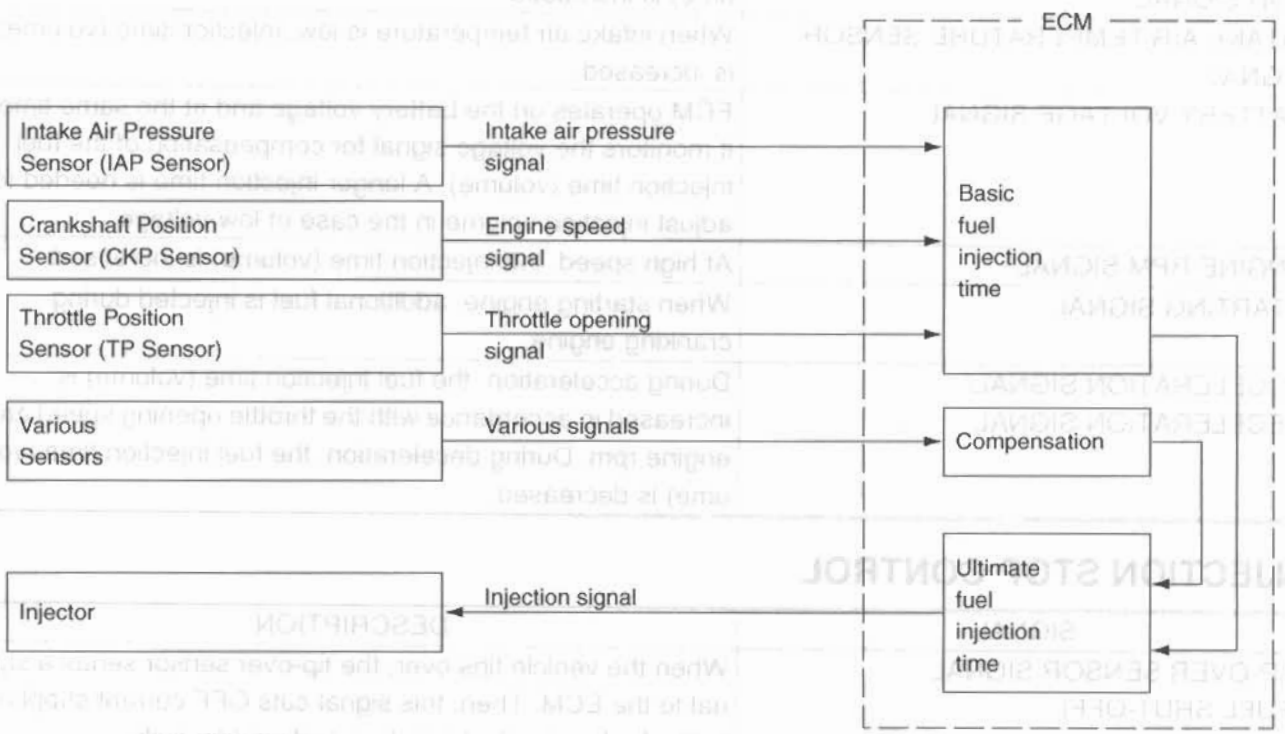


TOOL 09900-25009: Needle pointed probe set

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)

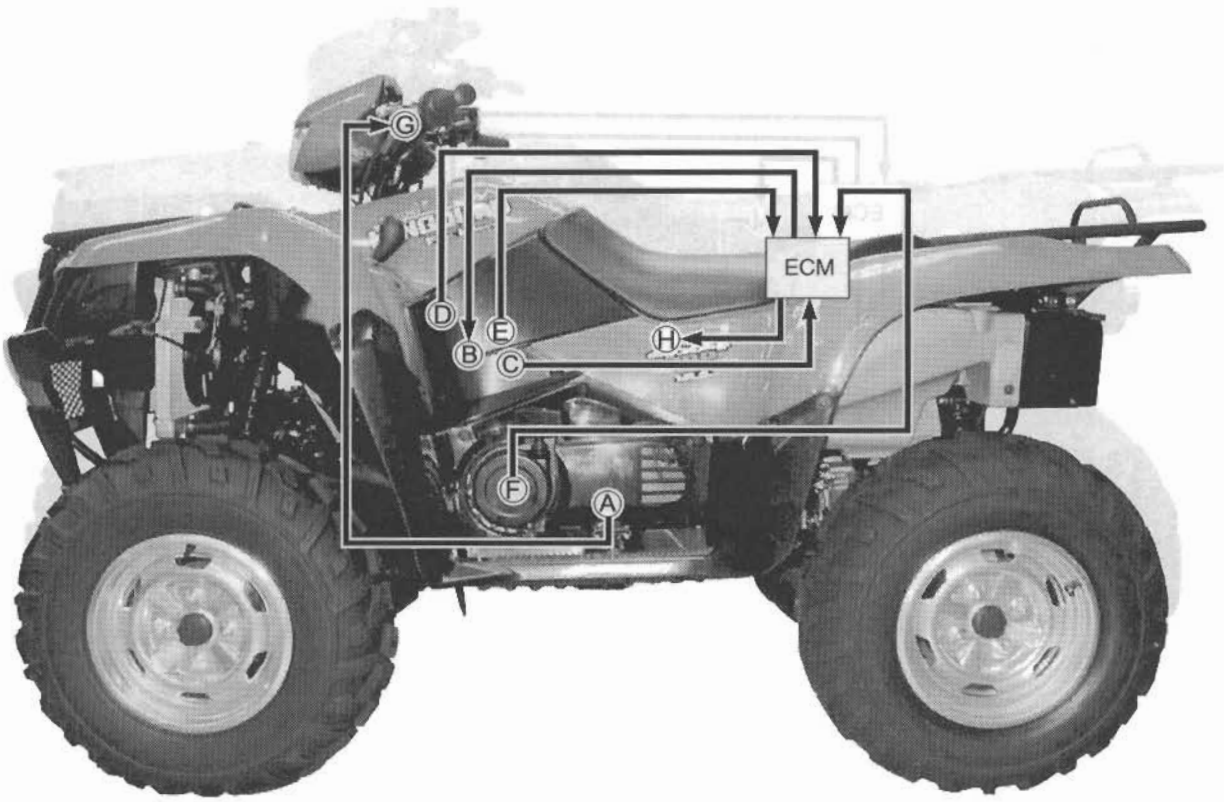
The following different signals are output from the respective sensors for compensation of the fuel injection time (volume).

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.
ENGINE RPM SIGNAL	At high speed, the injection time (volume) is increased.
STARTING SIGNAL	When starting engine, additional fuel is injected during cranking engine.
ACCELERATION SIGNAL/ DECELERATION SIGNAL	During acceleration, the fuel injection time (volume) is increased in accordance with the throttle opening speed and engine rpm. During deceleration, the fuel injection time (volume) is decreased.

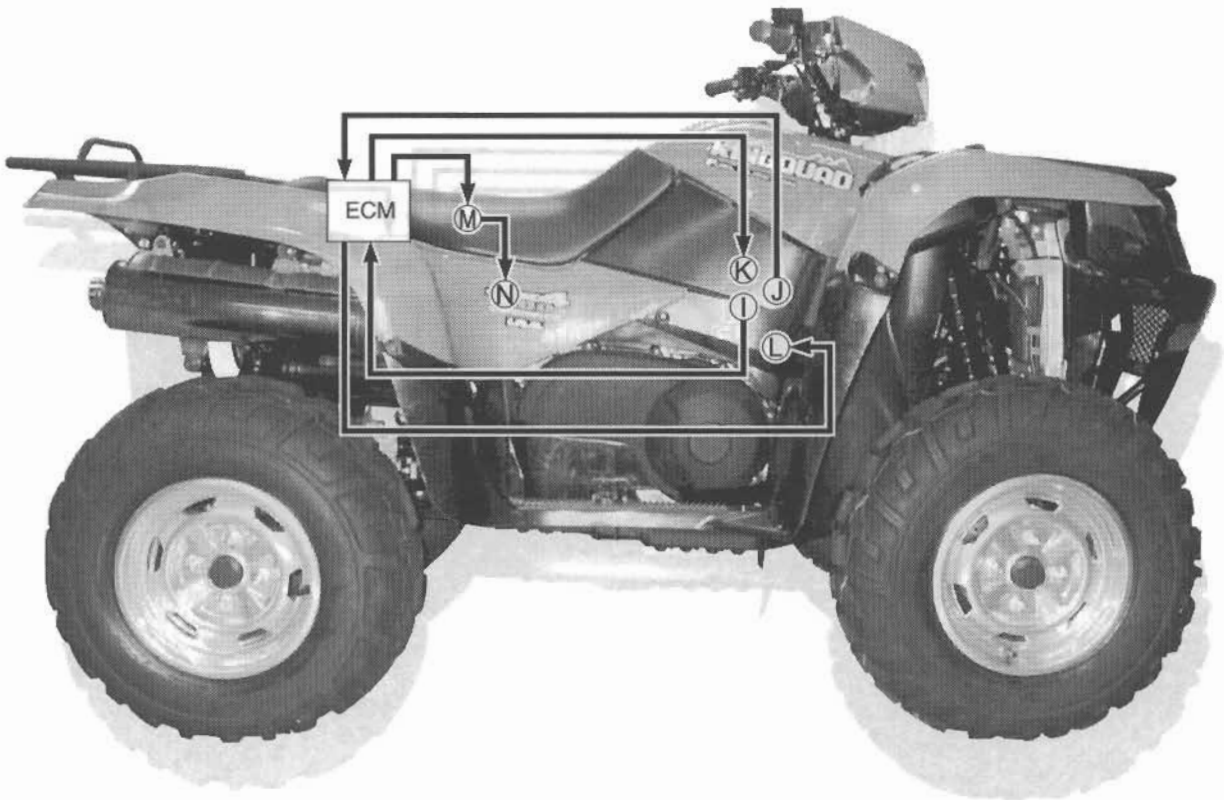
INJECTION STOP CONTROL

SIGNAL	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 injectors and ignition coils.
OVER-REV. LIMITER SIGNAL	The fuel injector stops operation when engine rpm reaches rev. limit rpm.

FI SYSTEM PARTS LOCATION

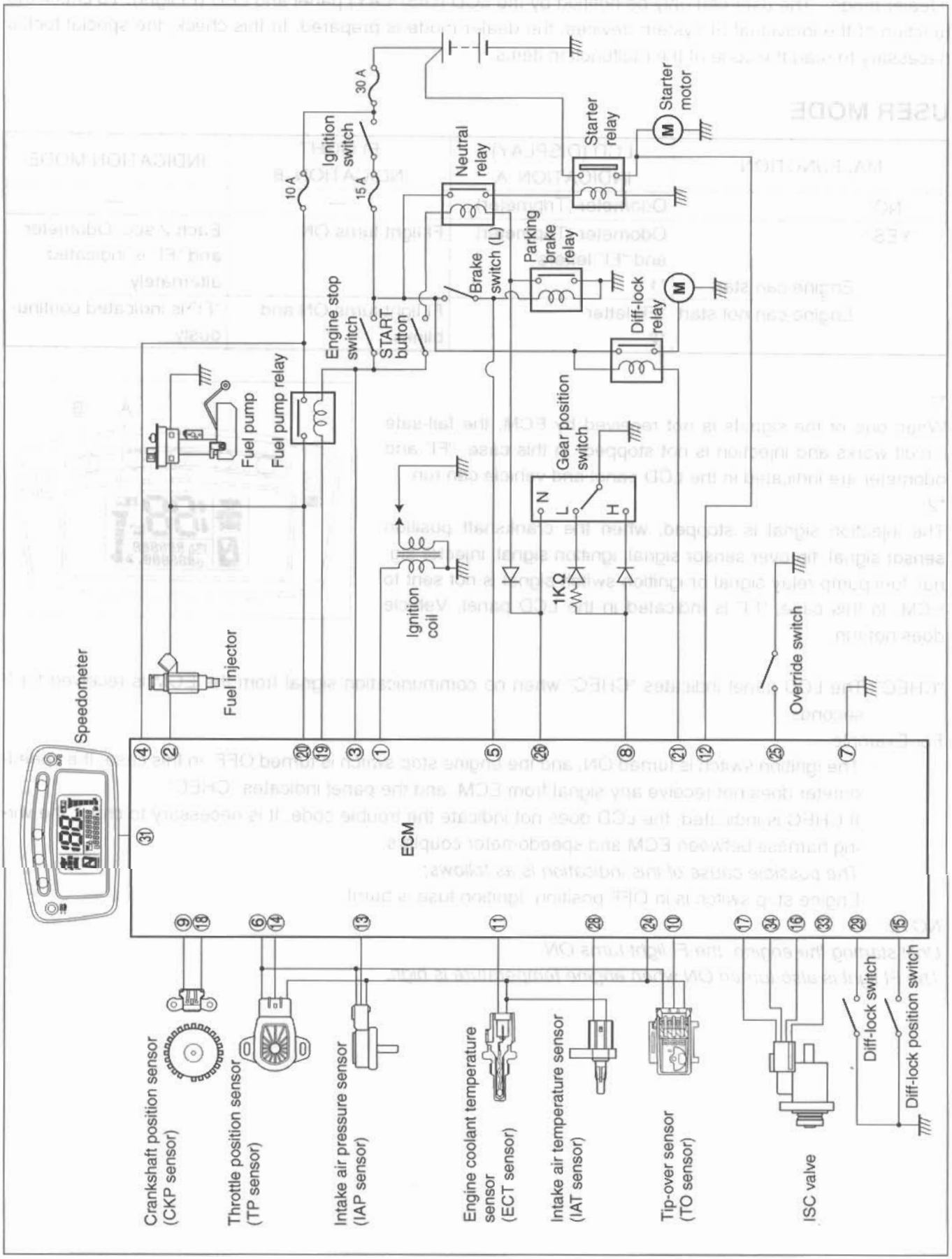


Ⓐ Speed sensor
Ⓑ ISC valve
Ⓒ TP sensor
Ⓓ IAP sensor
Ⓔ IAT sensor
Ⓕ CKP sensor
Ⓖ Combination meter
Ⓗ Diff-lock relay



Ⓘ ECT sensor
Ⓙ TO sensor
Ⓚ Fuel injector
Ⓛ Ignition coil
Ⓜ FP relay
Ⓝ Fuel pump

FI SYSTEM WIRING DIAGRAM

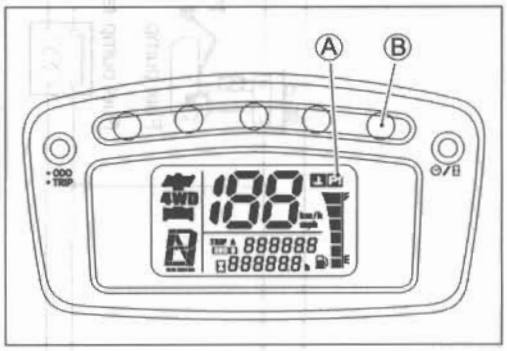


SELF-DIAGNOSIS FUNCTION

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

USER MODE

MALFUNCTION	LCD (DISPLAY) INDICATION Ⓐ	FI LIGHT INDICATION Ⓑ	INDICATION MODE
"NO"	Odometer (Tripmeter)	—	—
"YES"	Odometer (Tripmeter) and "FI" letters	FI light turns ON.	Each 2 sec. Odometer and "FI" is indicated alternately.
Engine can start	*1		
Engine can not start	"FI" letter *2	FI light turns ON and blinks.	"FI" is indicated continuously.



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

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

For Example

: The ignition switch is turned ON, and the engine stop switch is turned OFF. In this case, the speedometer does not receive any signal from ECM, and the panel indicates "CHEC".
If CHEC is indicated, the LCD does not indicate the trouble code. It is necessary to check the wiring harness between ECM and speedometer couplers.
The possible cause of this indication is as follows;
Engine stop switch is in OFF position. Ignition fuse is burnt.

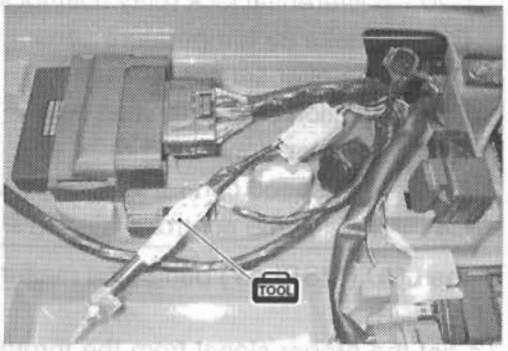
NOTE:
Until starting the engine, the FI light turns ON.
The FI light is also turned ON when engine temperature is high.

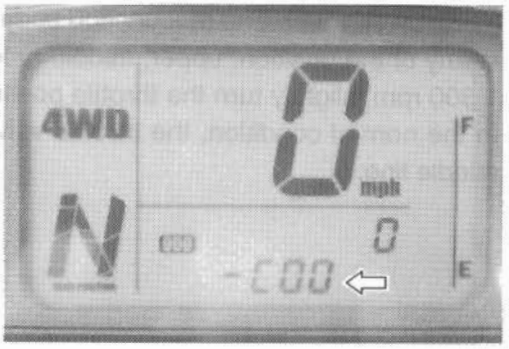
DEALER MODE

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 LCD (DISPLAY) panel. 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. If the couplers from the ECM are disconnected, the malfunction code memory is erased and the malfunction code can not be checked.

MALFUNCTION	LCD (DISPLAY) INDICATION	FI LIGHT INDICATION	INDICATION MODE
"NO"	C00	FI light turns OFF.	—
"YES"	C**code is indicated from small numeral to large one.		For each 2 sec., code is indicated.

CODE	MALFUNCTION PART	REMARKS
C00	None	No defective part
C12	Crankshaft position sensor (CKP sensor)	Pick-up coil signal, signal generator
C13	Intake air pressure sensor (IAP sensor)	
C14	Throttle position sensor (TP sensor)	*1
C15	Engine coolant temperature sensor (ECT sensor)	
C20	Differential lock relay (Diff-lock relay)	
C21	Intake air temperature sensor (IAT sensor)	
C23	Tip-over sensor (TO sensor)	
C24	Ignition signal (Ignition coil)	
C32	Injector signal (FI)	
C40	Idle speed control valve (ISC valve)	
C41	Fuel pump control system (FP relay)	Fuel pump, Fuel pump relay

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

*1

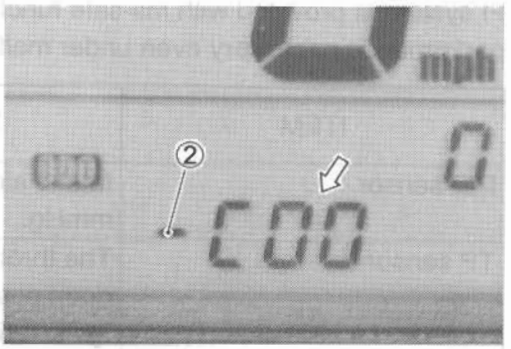
To get the proper signal from the throttle position sensor, the sensor basic position is indicated in the LCD (DISPLAY) panel. The malfunction code is indicated in three digits. In front of the three digits, a line appears in any of the position, upper, middle or lower line. If the indication is upper or lower line when engine rpm is 1 300 rpm, slightly turn the throttle position sensor and bring the line to middle.

In the normal condition, the throttle valve stop screw pushes throttle valves slightly, and indication point is middle line.

TPS ADJUSTMENT

1. Remove the left side cover. (☞8-8)
2. Connect the special tool (Mode select switch) to the dealer mode coupler at the wiring harness.

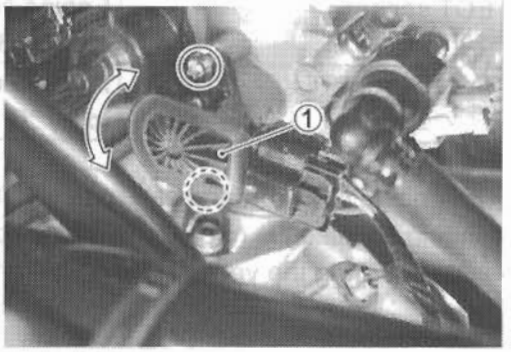
NOTE:
Check the engine has warmed up before adjusting the TPS.



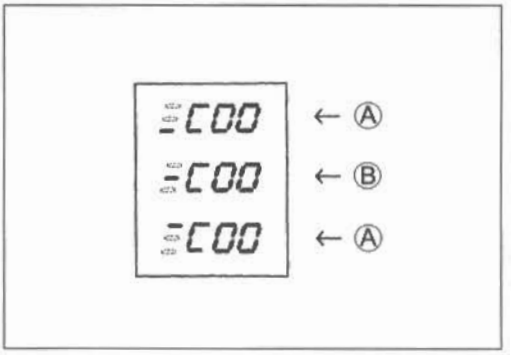
3. If the throttle position sensor adjustment is necessary, loosen the screws and turn the throttle position sensor ① and bring the line ② to middle.
4. Then, tighten the screws to fix the throttle position sensor.

TOOL 09930-82720: Mode select switch

The LCD displays the line for 0.4 sec. at a time, and when such a display repeats two times, it indicates the current position where the sensor is fixed.



Ⓐ Incorrect
Ⓑ Correct position



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 760 mmHg.	"YES"	"YES"
TP sensor	The throttle opening is fixed to full open position. Ignition timing is also fixed.	"YES"	"YES"
ECT sensor	Engine coolant temperature value is fixed to 80 °C (176 °F).	"YES"	"YES"
IAT sensor	Intake air temperature value is fixed to 40 °C (104 °F).	"YES"	"YES"

The engine can start and can run even if the above signal is not received from each sensor. But, the engine running condition is not complete, providing only emergency help (by fail-safe circuit). In this case, it is necessary to bring the vehicle to the workshop for complete repair.

FI SYSTEM TROUBLESHOOTING

CUSTOMER COMPLAINT ANALYSIS

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

EXAMPLE: CUSTOMER PROBLEM INSPECTION FORM

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

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

PROBLEM SYMPTOMS	
☐ **Difficult Starting**	☐ **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**
☐ Poor fast idle	☐ Immediately after start
☐ Abnormal idling speed	☐ Throttle valve is opened
(☐ High ☐ Low) (r/min)	☐ Throttle valve is closed
☐ Unstable	☐ Load is applied
☐ Hunting (r/min. to r/min)	☐ Other _____
☐ Other _____	
☐ OTHERS:	

VEHICLE/ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
Environmental condition	
Weather	☐ Fair ☐ Cloudy ☐ Rain ☐ Snow ☐ Always ☐ Other
Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (°F/ °C) ☐ Always
Frequency	☐ Always ☐ Sometimes (times/ day, month) ☐ Only once
	☐ Under certain condition
Road	☐ Mountainous (☐ Uphill ☐ Downhill) ☐ 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 condition 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 screen with the use of mode select switch or SDS.

* Engine oil level and leakage. (☞2-13)
* Engine coolant level and leakage. (☞2-16)
* Fuel level and leakage. (☞2-11)
* Clogged air cleaner element. (☞2-3)
* Battery condition. (☞9-38)
* Throttle cable play. (☞2-12)
* Vacuum hose looseness, bend and disconnection.
* Broken fuse.
* Each warning light operation. (☞9-24)
* Exhaust gas leakage and noise. (☞2-5)
* *Each coupler disconnection.*
* Clogged radiator core. (☞7-4)

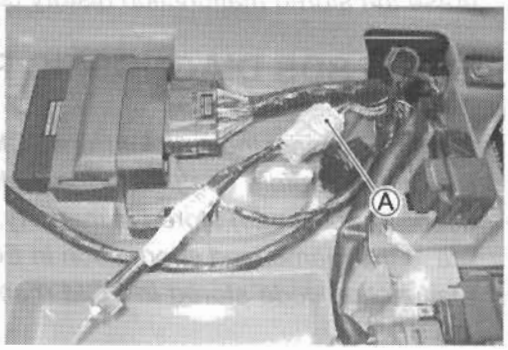
SELF-DIAGNOSTIC PROCEDURES

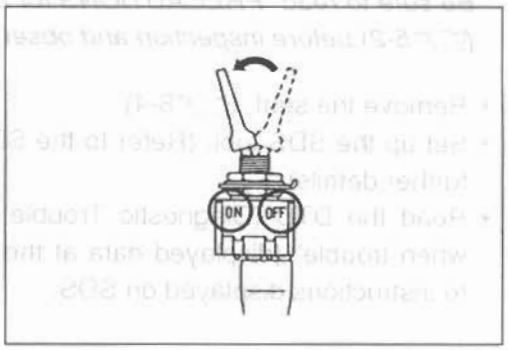
NOTE:

* *Don't disconnect the coupler from ECM, the battery cable from the battery, before confirming the malfunction code (self-diagnostic trouble code) stored in the 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" (☞5-14) carefully to have good understanding what functions are available and how to use it.*
* *Be sure to read "PRECAUTIONS for Electrical Circuit Service" (☞5-2) before inspection and observe what is written there.*

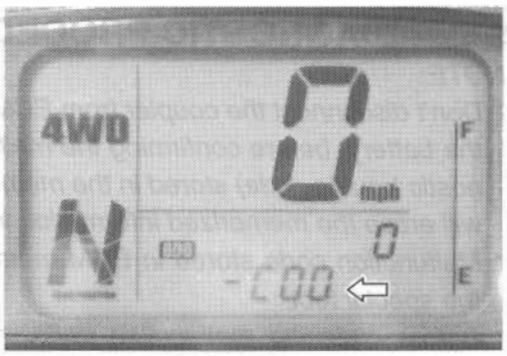
- Remove the seat. (☞8-4)
- Connect the special tool to the dealer mode coupler Ⓐ at the wiring harness, and start the engine or crank the engine for more than 4 seconds.
- Turn the special tool's switch to ON and check the malfunction code to determine the malfunction part.

TOOL **09930-82720: Mode select switch**





SELF-DIAGNOSIS RESET PROCEDURE



- After repairing the trouble, turn the ignition switch to OFF and turn to ON again.
- If the malfunction code indicates (C00), the malfunction is cleared.
- Disconnect the special tool from the dealer mode coupler.

NOTE:

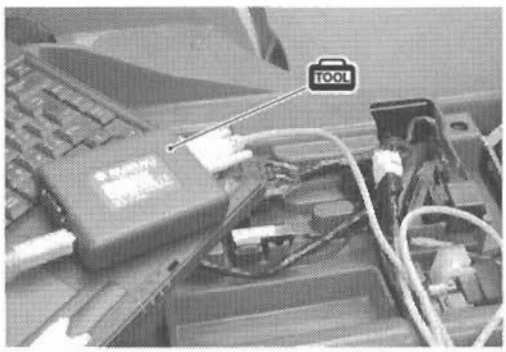
* *Even though the malfunction code (C00) is indicated, the previous malfunction history code still remains stored in the ECM. Therefore, erase the history code memorized in the ECM using SDS.*
* *The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, 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

NOTE:

* *Don't disconnect the coupler from ECM, the battery cable from the battery, 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 for Electrical Circuit Service" (☞5-2) before inspection and observe what is written there.*

- Remove the seat. (☞8-4)
- 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" (displayed 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)

TOOL 09904-41010: SDS Set
99565-01010-005: CD-ROM Ver.5

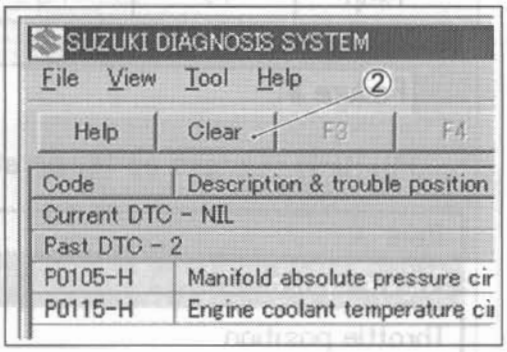
USE OF SDS DIAGNOSIS RESET PROCEDURE

- After repairing the trouble, turn the ignition switch to OFF and turn to 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.

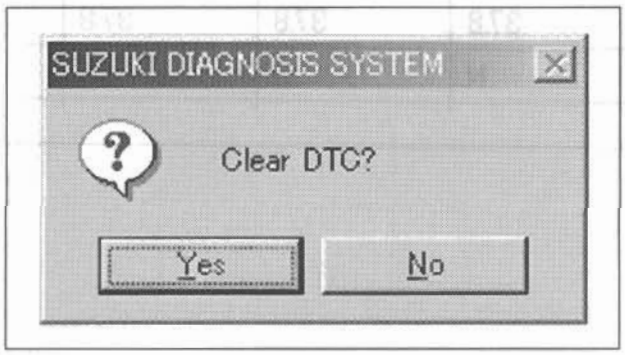
NOTE:
The malfunction code is memorized in the ECM also when the wire coupler of any sensor is disconnected. Therefore, when a wire coupler has been disconnected at the time of diagnosis, erase the stored malfunction history code using SDS.

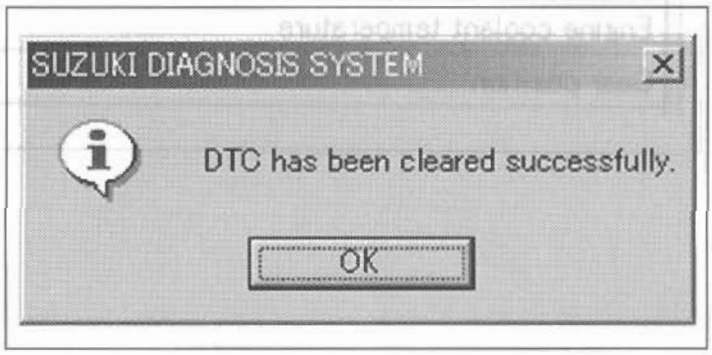


- Click "Clear" ② to delete history code (Past DTC).

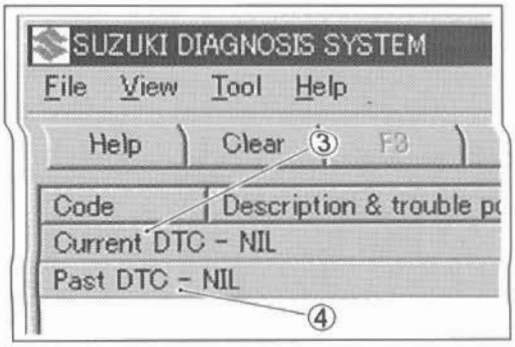


- Follow the displayed instructions.



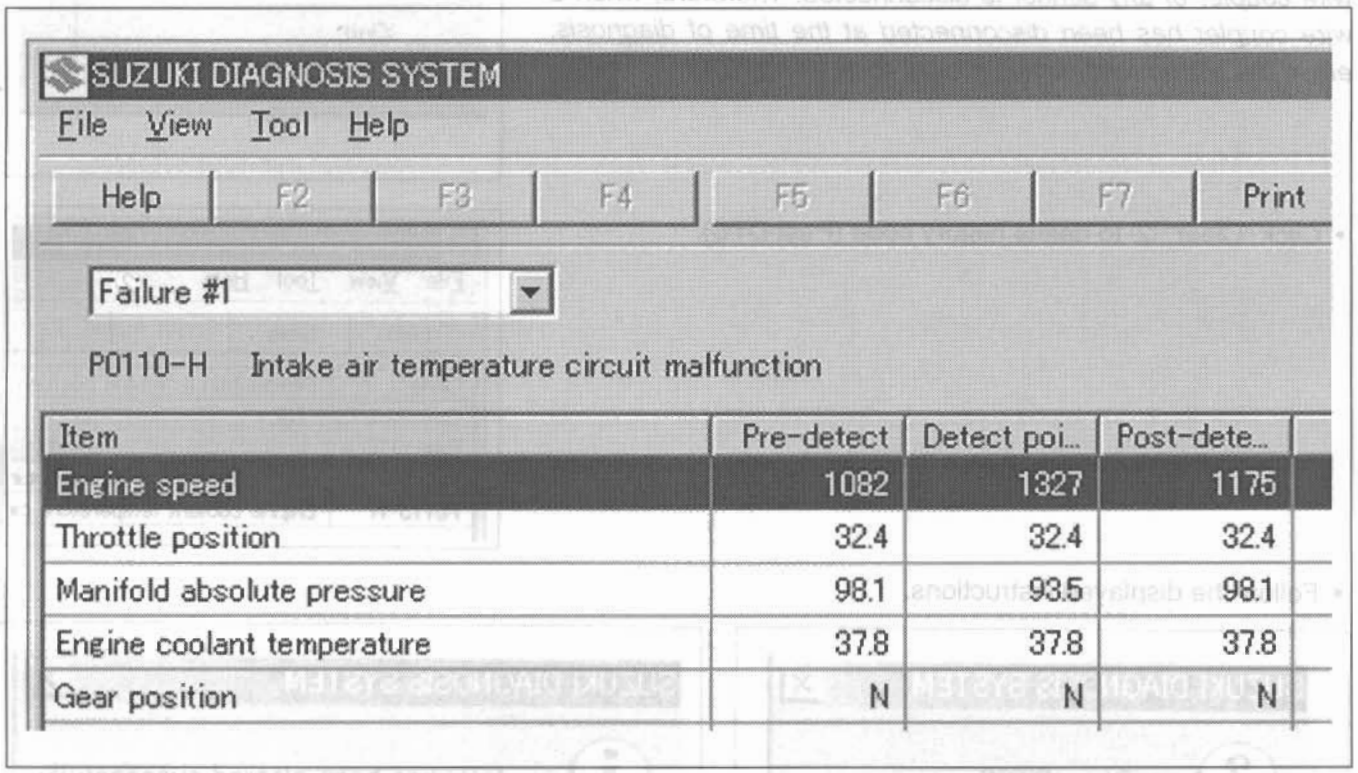


- Check that both "Current DTC" ③ and "Past DTC" ④ are deleted (NIL).



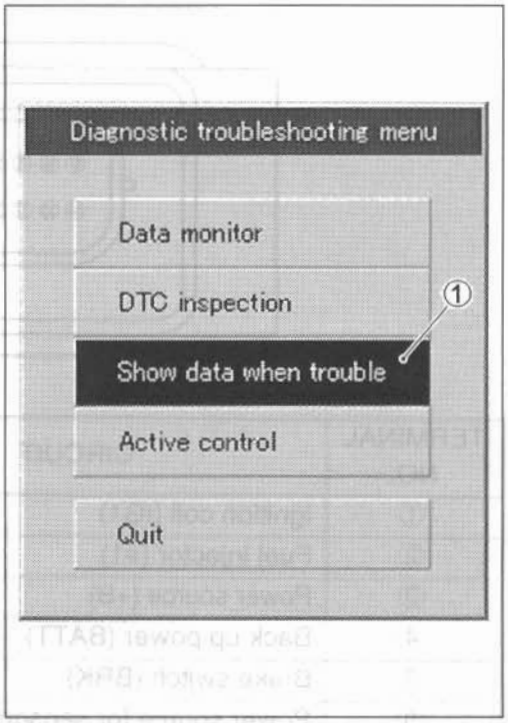
SHOW DATA WHEN TROUBLE (DISPLAYING DATA AT THE TIME OF DTC)

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.



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

- 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.



SUZUKI DIAGNOSIS SYSTEM

File View Tool Help

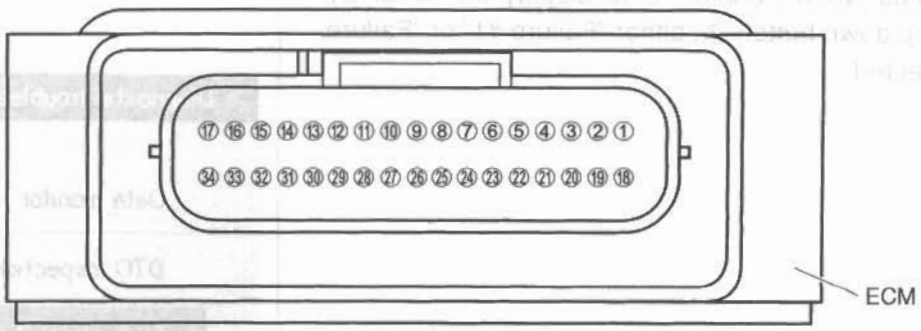
Help | F2 | F3 | F4 | F5 | F6 | F7 | Print

Failure #2 ②

P0115-H Engine coolant temperature circuit malfunction

Item	Pre-detect	Detect poi...	Post-dete...
Engine speed	971	1074	1099
Throttle position	32.4	32.4	32.4
Manifold absolute pressure	98.1	94.1	98.7
Engine coolant temperature	37.8	-30.0	-30.0
Gear position	N	N	N

ECM TERMINAL



TERMINAL NO.	CIRCUIT	TERMINAL NO.	CIRCUIT
①	Ignition coil (IG1)	⑱	CKP sensor signal (CKP-)
②	Fuel injector (#1)	⑲	Fuel pump relay (FP Relay)
③	Power source (+B)	⑳	Injector power voltage (VM)
④	Back up power (BATT)	㉑	Diff-lock relay (DL Relay)
⑤	Brake switch (BRK)	㉒	Serial data for self-diagnosis (SDL)
⑥	Power source for sensors (VCC)	㉓	Serial data for speedometer (TECH)
⑦	ECM ground (E1)	㉔	Sensor ground (E2)
⑧	Forward sensor signal (FOW)	㉕	Override switch (OVR)
⑨	CKP sensor signal (CKP+)	㉖	Neutral switch (NT)
⑩	TO sensor signal (TO)	㉗	Test switch (TS)
⑪	ECT sensor signal (ECT)	㉘	IAT sensor signal (IAT)
⑫	Starter relay (STR)	㉙	Diff-lock switch (DL)
⑬	IAP sensor signal (IAP)	㉚	–
⑭	TP sensor signal (TP)	㉛	–
⑮	Diff-lock position sensor signal (DLP)	㉜	–
⑯	ISC valve (IS2A)	㉝	ISC valve (IS2B)
⑰	ISC valve (IS1A)	㉞	ISC valve (ISIB)

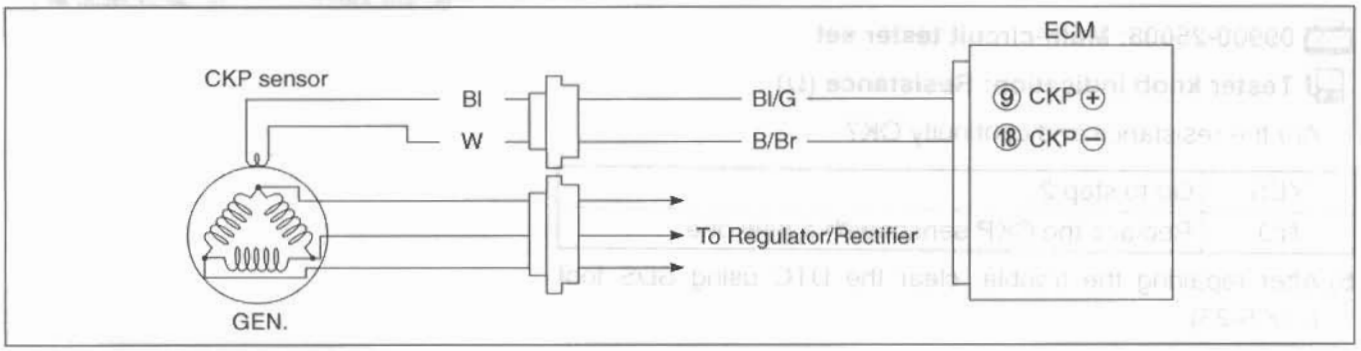
MALFUNCTION CODE AND DEFECTIVE CONDITION

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C00		NO FAULT	———	———
C12 P0335		CKP sensor	The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	CKP sensor wiring and mechanical parts. (CKP sensor, lead wire/coupler connection)
C13		IAP sensor	The sensor should produce following voltage. 0.5 V < sensor voltage ≦ 4.85 V In other than the above range, C13 (P0105) is indicated.	IAP sensor, lead wire/coupler connection.
P0105	H		Sensor voltage is higher than specified value.	IAP sensor circuit shorted to VCC or ground circuit open.
	L		Sensor voltage is lower than specified value.	IAP sensor circuit open or shorted to ground or VCC circuit open.
C14		TP sensor	The sensor should produce following voltage. 0.2 V < sensor voltage ≦ 4.8 V In other than the above range, C14 (P0120) is indicated.	TP sensor, lead wire/coupler connection.
P0120	H		Sensor voltage is higher than specified value.	TP sensor circuit shorted to VCC or ground circuit open.
	L		Sensor voltage is lower than specified value.	TP sensor circuit open or shorted to ground or VCC circuit open.
C15		ECT sensor	The sensor voltage should be the following. 0.15 V < sensor voltage ≦ 4.85 V In other than the above range, C15 (P0115) is indicated.	ECT sensor, lead wire/coupler connection.
P0115	H		Sensor voltage is higher than specified value.	ECT sensor circuit open or ground circuit open.
	L		Sensor voltage is lower than specified value.	ECT sensor circuit shorted to ground.
C20 P1752		Diff-lock relay	Diff-lock relay is turned OFF or open or shorted to ground.	Diff-lock relay circuit open or shorted to ground.

DTC No.		DETECTED ITEM	DETECTED FAILURE CONDITION	CHECK FOR
C21		IAT sensor	The sensor voltage should be the following. 0.15 V < sensor voltage ≦ 4.85 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.
C23		TO sensor	The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 V < sensor voltage ≦ 4.8 V In other than the above value, C23 (P1651) is indicated.	TO sensor, lead wire/coupler connection.
P1651	H		Sensor voltage is higher than specified value.	TO sensor circuit open or shorted to VCC or ground circuit open.
	L		Sensor voltage is lower than specified value.	TO sensor circuit 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 8 times or more continuously. In this case, the code C24 (P0351) is indicated.	Ignition coil, lead wire/coupler connection, power supply from the battery.
P0351				
C32		Fuel injector	CKP sensor (pickup coil) signal is produced, but fuel injector signal is interrupted 4 times or more continuously. In this case, the code C32 (P0201) is indicated.	Fuel injector, wiring/coupler connection, power supply to the injector.
P0201				
C40		ISC valve	ISC valve circuit open or shorted to ground.	ISC valve, lead wire/coupler connection.
P0505				
C41		Fuel pump relay	No voltage is applied to the fuel pump, although fuel pump relay is turned ON, or voltage is applied to fuel pump, although fuel pump relay is turned OFF.	Fuel pump relay, lead wire/coupler connection, power source to the fuel pump relay and fuel injectors.
P0230	H		More than 8 V is applied to the injector and fuel pump relay is turned OFF.	Fuel pump relay, lead wire/coupler connection, or power supply to the injector shorted to ground.
	L		Less than 0.3 V is applied to the injector and fuel pump relay is turned ON.	Fuel pump relay, lead wire/coupler connection, or power supply to the injector open.

"C12" (P0335) CKP SENSOR CIRCUIT MALFUNCTION

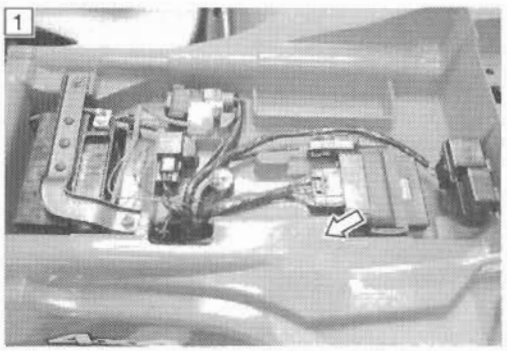
DETECTED CONDITION	POSSIBLE CAUSE
The signal does not reach ECM for 3 sec. or more, after receiving the starter signal.	• Metal particles or foreign material being stuck on the CKP sensor and rotor tip. • CKP sensor circuit open or short. • CKP sensor malfunction. • ECM malfunction.



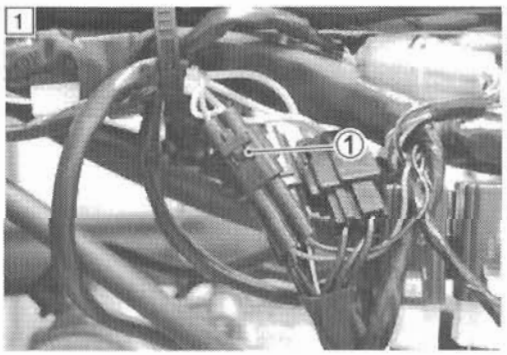
INSPECTION

Step 1

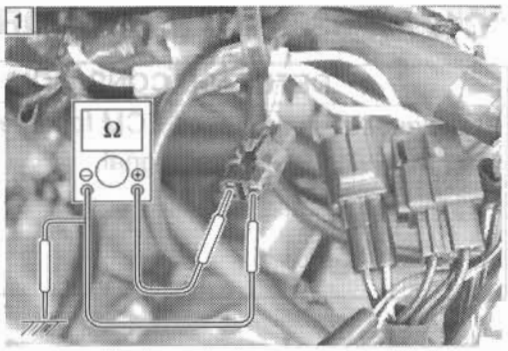
1) Remove the rear fender. (☞8-10)



2) Check the CKP sensor coupler ① 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: 150 – 250 Ω (Blue – White)**

4) Also, check the continuity between each terminal and ground.

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

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Resistance (Ω)

Are the resistance and continuity OK?

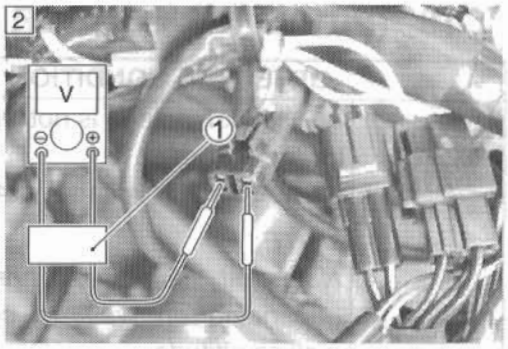
YES	Go to step 2.
NO	Replace the CKP sensor with a new one.

5) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

Step 2

1) Disconnect the CKP sensor coupler.
2) Crank the engine a few seconds with the starter motor, and measure the CKP sensor peak voltage at the coupler.

DATA CKP sensor peak voltage: 5.0 V and more
(⊕ Blue – ⊖ White)



① Peak volt adaptor

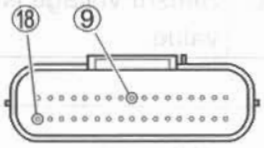
3) Repeat the above test procedure a few times and measure the highest peak voltage.

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	• Blue or White wire open or shorted to ground, or poor ⑨ or ⑱ 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 CKP sensor coupler or ECM coupler. • Replace the CKP sensor with a new one.

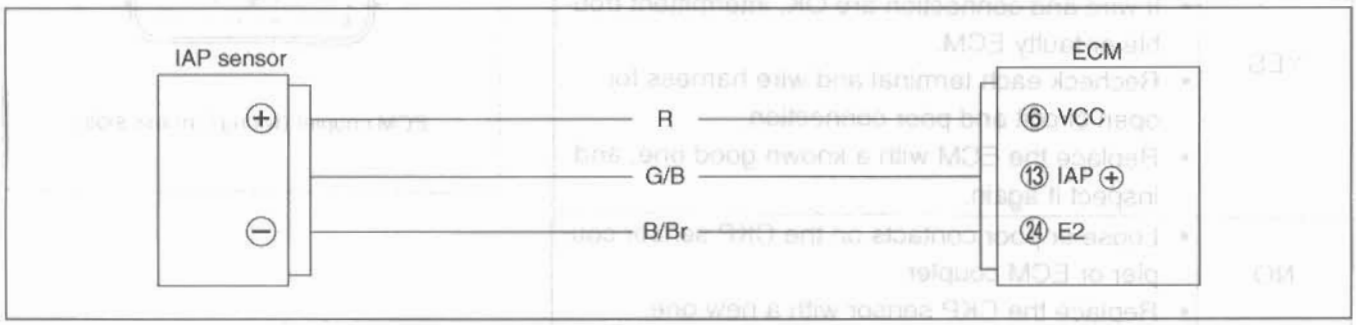


ECM coupler (wiring harness side)

4) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

"C13" (P0105) IAP SENSOR CIRCUIT MALFUNCTION

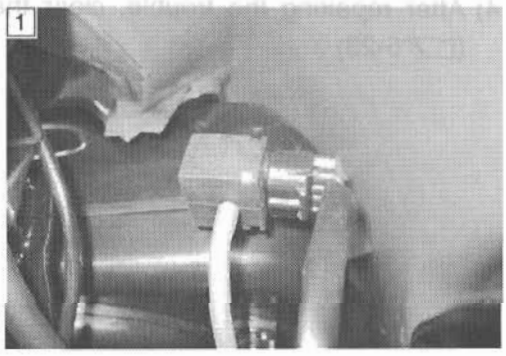
DETECTED CONDITION			POSSIBLE CAUSE
C13		IAP sensor voltage is not within the following range. 0.5 V < Sensor voltage ≦ 4.85 V *NOTE:* *Note that atmospheric pressure varies depending on weather conditions as well as altitude.* *Take that into consideration when inspecting voltage.*	• Clogged vacuum 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.	
	L	Sensor voltage is lower than specified value.	



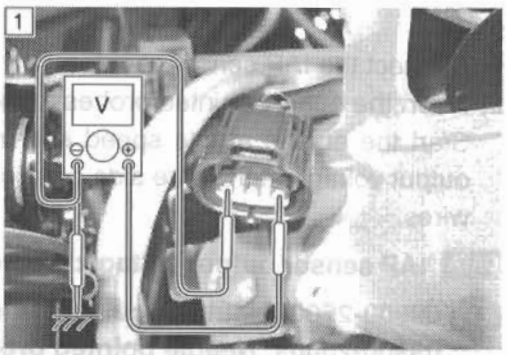
INSPECTION

Step 1

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



4) Remove the IAP sensor from the air cleaner box.
5) Disconnect the IAP sensor coupler.
6) Turn the ignition switch ON.
7) Measure the voltage at the Red wire and ground.
8) Also, 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. • Open or short circuit in the Red wire or B/Br wire.

Step 2

1) Connect the IAP sensor coupler.
2) Insert the needle pointed probes to the lead wire coupler.
   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. 2.63 V at idle speed

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

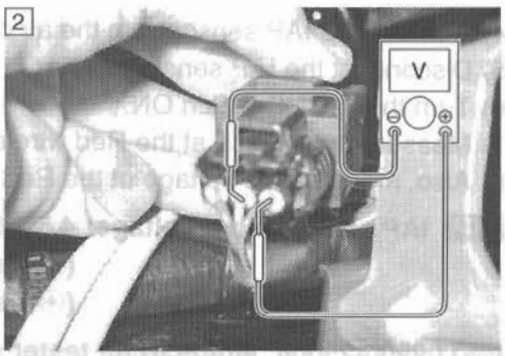
Tester knob indication: Voltage (⎓)

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. • Replace the IAP sensor with a new one.

3) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

2



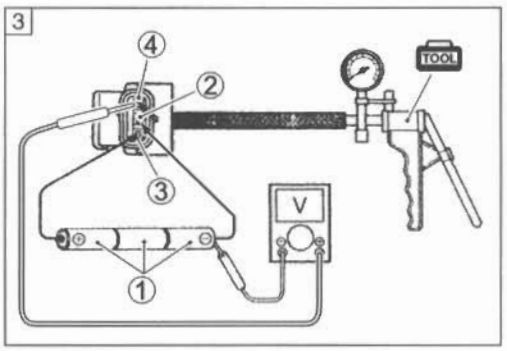
Step 3

1) Remove the IAP sensor.
2) Connect the vacuum pump gauge to the vacuum port of the IAP sensor.
   Arrange 3 new 1.5 V batteries in series ① (check that total voltage is 4.5 – 5.5 V) and connect ⊖ terminal to the ground terminal ② and ⊕ terminal to the Vcc terminal ③.
3) Check the voltage between Vout ④ and ground. Also, check if voltage reduces when vacuum is applied up to 400 mmHg by using vacuum pump gauge.

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

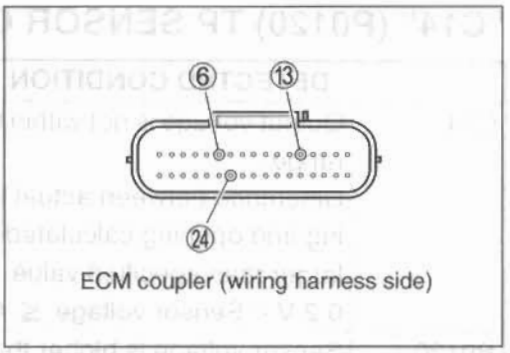
Tester knob indication: Voltage (⎓)

3



Is the voltage OK?

YES	• G/B, R or B/Br wire open or shorted to ground, or poor ⑥, ⑬ or ㉔ connection. • If wire and connection are OK, intermittent trouble or faulty ECM. • Recheck each terminal and wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	If check result is not satisfactory, replace IAP sensor with a new one.



ECM coupler (wiring harness side)

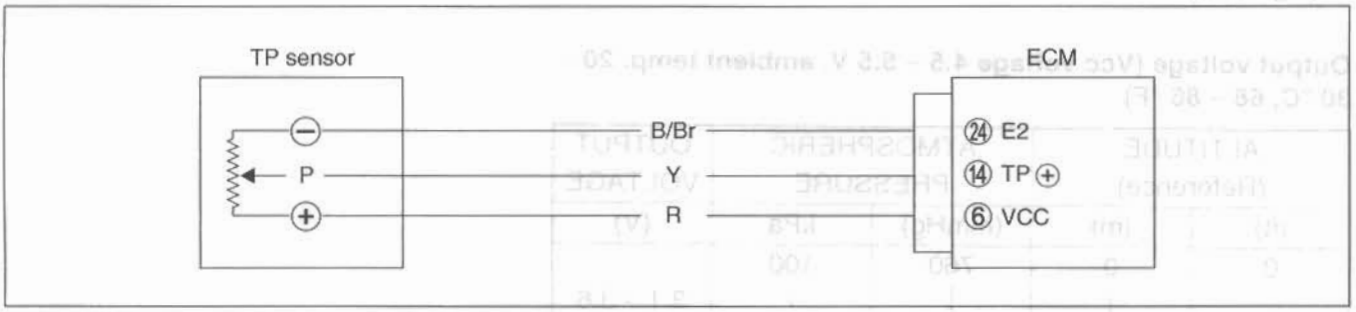
4) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

Output voltage (Vcc voltage 4.5 – 5.5 V, ambient temp. 20 – 30 °C, 68 – 86 °F)

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

"C14" (P0120) TP SENSOR CIRCUIT MALFUNCTION

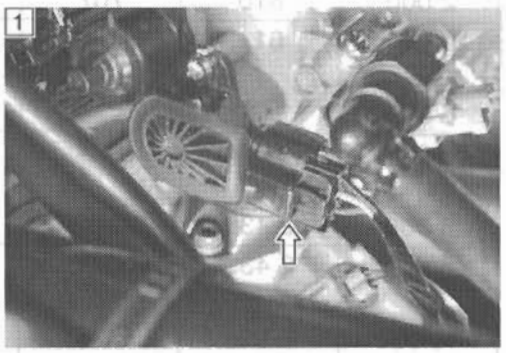
DETECTED CONDITION			POSSIBLE CAUSE
C14		Output voltage is not within the following range. Difference between actual throttle opening and opening calculated by ECM is larger than specified value. 0.2 V < Sensor voltage ≤ 4.8 V	• TP sensor maladjusted. • TP sensor circuit open or short. • TP sensor malfunction. • 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) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
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.

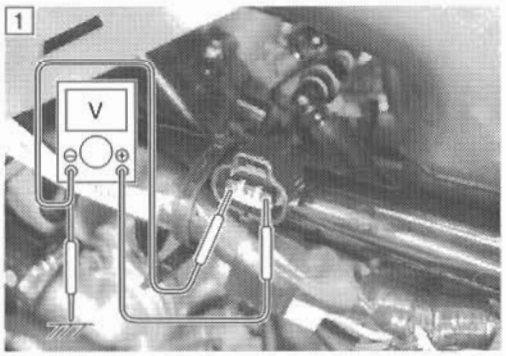


5) Turn the ignition switch ON.
6) Measure the voltage at the Red wire and ground.
7) Also, measure the voltage at the Red wire and B/Br wire.

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 (⎓)

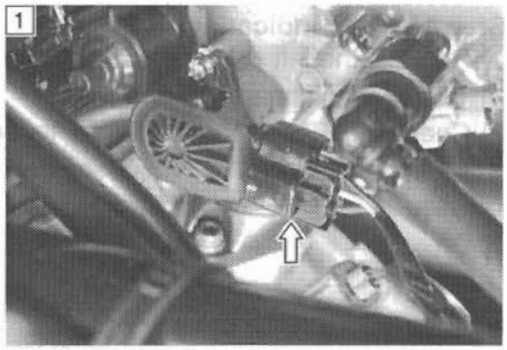


Is the voltage OK?

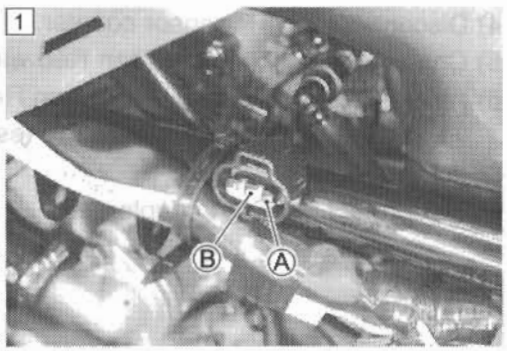
YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the Red wire or B/Br wire.

Step 1 (When indicating P0120-H:)

1) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
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 Red wire Ⓐ and Yellow wire Ⓑ. If sound is not heard from the tester, the circuit condition is OK.
6) Disconnect the ECM coupler.



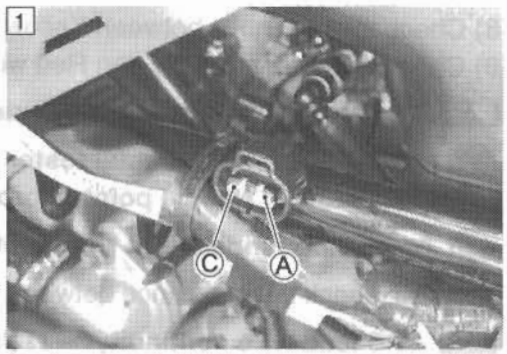
7) Check the continuity between Red wire Ⓐ and terminal ⑥.
8) Also, check the continuity between B/Br wire Ⓒ and terminal ㉔.

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

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

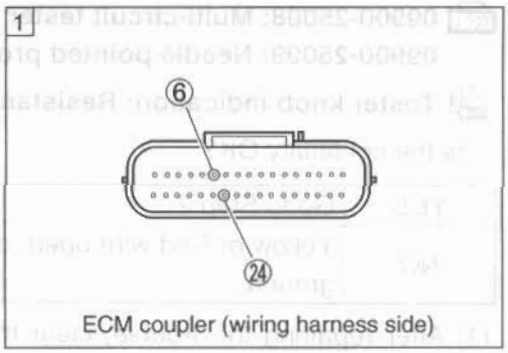
Tester knob indication: Continuity test (•))))

Is the continuity OK?



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

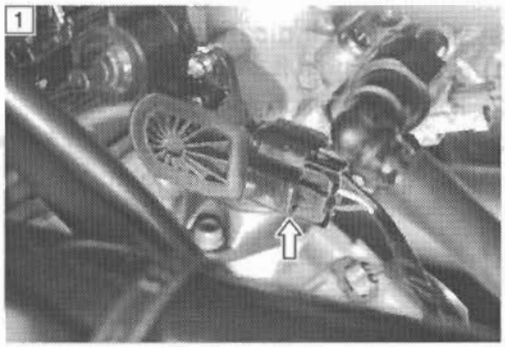
9) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)



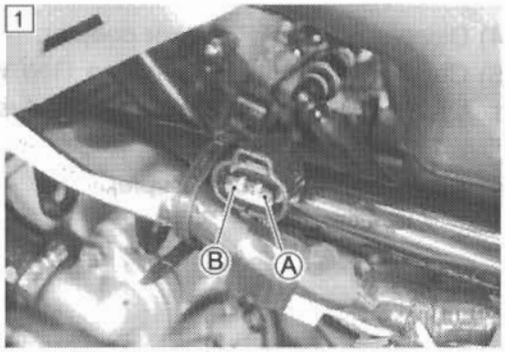
ECM coupler (wiring harness side)

Step 1 (When indicating P0120-L:)

1) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
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 Red wire Ⓐ and ground.
6) Also, check the continuity between Red wire Ⓐ and B/Br wire Ⓑ. If sound is not heard from the tester, the circuit condition is OK.
7) Disconnect the ECM coupler.

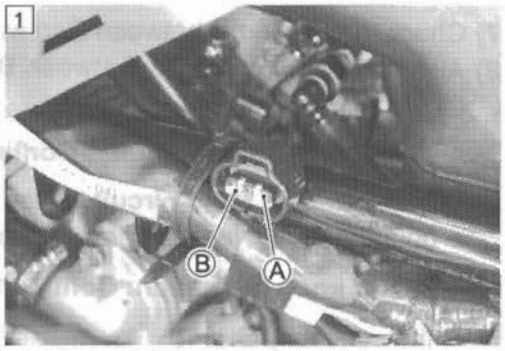


8) Check the continuity between Yellow wire Ⓑ and terminal ⑭.
9) Check the continuity between Red wire Ⓐ and terminal ⑥.

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

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

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



10) Also, check the resistance between Red wire Ⓐ and ground.

DATA TPS lead wire continuity: ∞ Ω (Infinity)

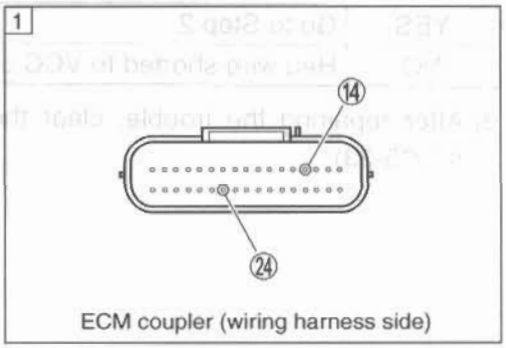
TOOL 09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Resistance (Ω)

Is the continuity OK?

YES	Go to Step 2.
NO	Yellow or Red wire open, or Red wire shorted to ground.

11) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

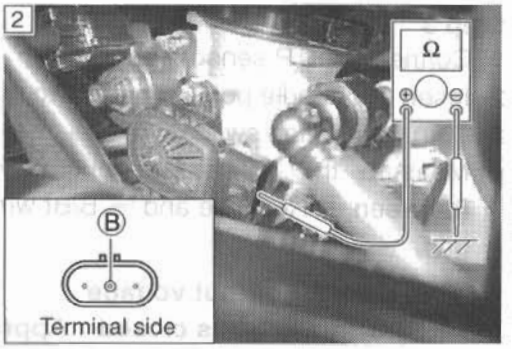


ECM coupler (wiring harness side)

Step 2

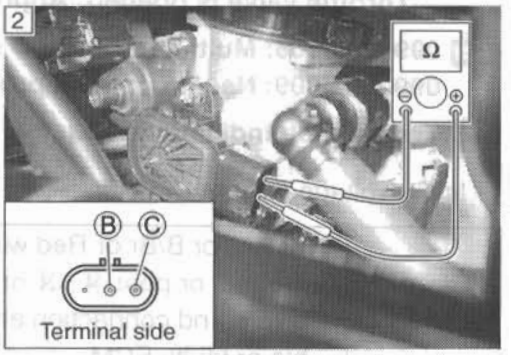
1) Turn the ignition switch OFF.
2) Disconnect the TP sensor coupler.
3) Check the continuity between terminal Ⓑ and ground.

DATA TP sensor continuity: ∞ Ω (Infinity)
(Terminal Ⓑ – Ground)



4) If OK, then measure the TP sensor resistance between terminal Ⓑ and terminal Ⓒ.
5) Turn the throttle grip and measure the resistance.

DATA TP sensor resistance
Throttle valve is closed : Approx. 1.22 kΩ
Throttle valve is opened: Approx. 4.36 kΩ



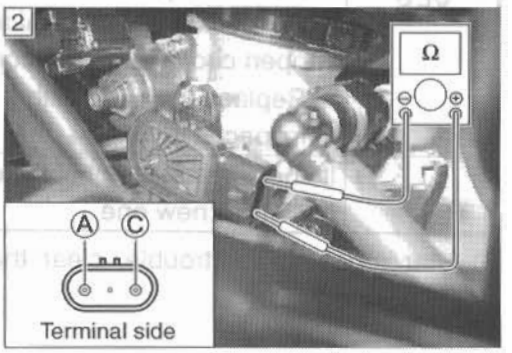
6) Also, measure the TP sensor resistance between terminal Ⓐ and terminal Ⓒ.

DATA TP sensor resistance: Approx. 4.05 kΩ
(Terminal Ⓐ – Terminal Ⓒ)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

Are the continuity and resistance OK?

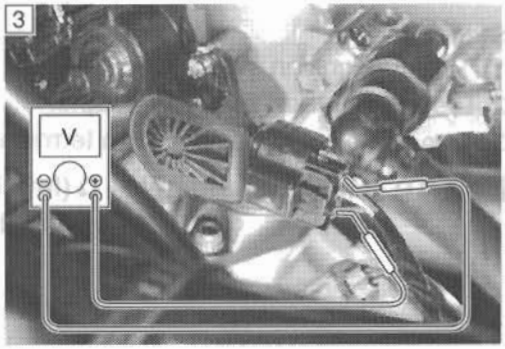


YES	Go to Step 3.
NO	• Reset the TP sensor position correctly. • Replace the TP sensor with a new one.

7) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

Step 3

1) Connect the TP sensor coupler.
2) Insert the needle pointed probes to the lead wire coupler.
3) Turn the ignition switch ON.
4) Measure the TP sensor output voltage at the coupler (between ⊕ Red wire and ⊖ B/Br wire) by turning the throttle grip.



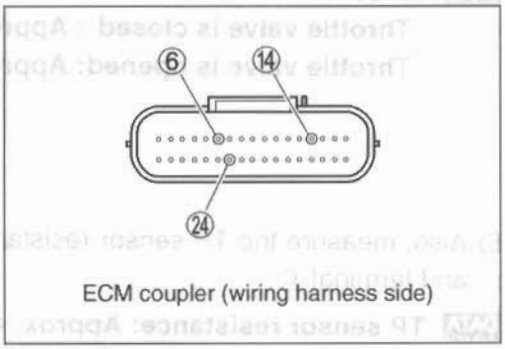
DATA TP sensor output voltage
Throttle valve is closed : Approx. 1.12 V
Throttle valve is opened: Approx. 4.32 V

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

Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	• Yellow or B/Br or Red wire open or shorted to ground, or poor ⑭, ㉔ or ⑥ 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.

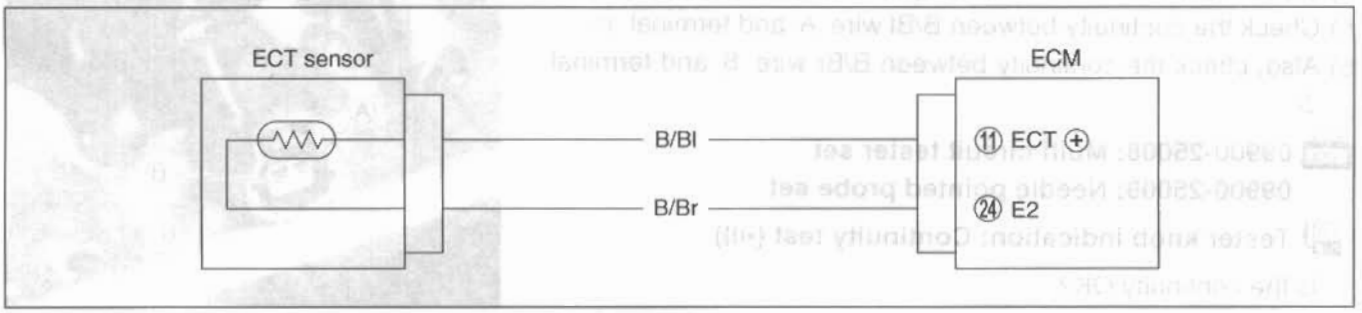


ECM coupler (wiring harness side)

5) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

"C15" (P0115) ECT SENSOR CIRCUIT MALFUNCTION

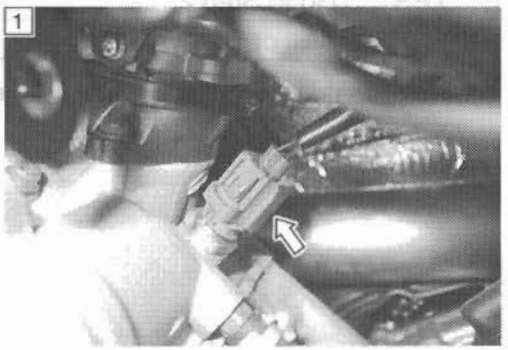
DETECTED CONDITION			POSSIBLE CAUSE
C15		Output voltage is not within the following range. 0.15 < Sensor voltage ≦ 4.85 V	• ECT sensor circuit open or short. • ECT sensor malfunction. • ECM malfunction.
P0115	H	Sensor voltage is higher than specified value.	• ECT sensor circuit open or ground circuit open.
	L	Sensor voltage is lower than specified value.	• ECT sensor circuit shorted to ground.



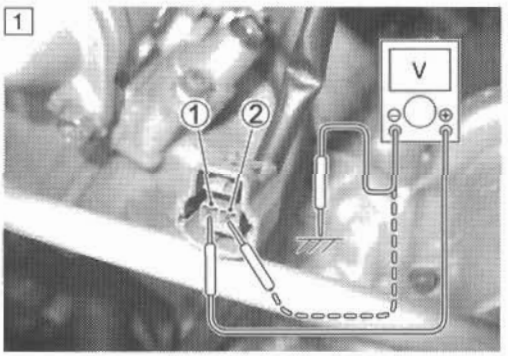
INSPECTION

Step 1 (When indicating C15:)

1) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then measure the ECT sensor voltage at the wire side coupler.



4) Disconnect the coupler and turn the ignition switch ON.
5) Measure the voltage between B/Bl wire terminal ① and ground.
6) Also, measure the voltage between B/Bl wire terminal ① and B/Br wire terminal ②.



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

TOOL 09900-25008: Multi-circuit tester set

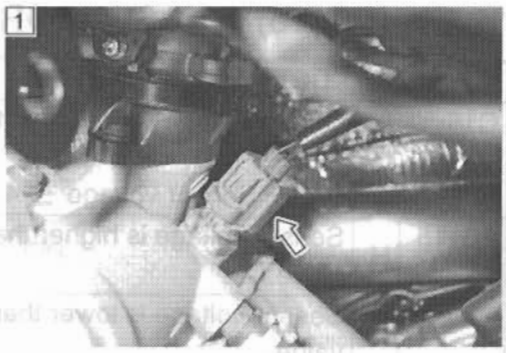
Tester knob indication: Voltage (⎓)

Is the voltage OK?

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

Step 1 (When indicating P0115-H:)

1) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then check the ECT sensor lead wire continuity.

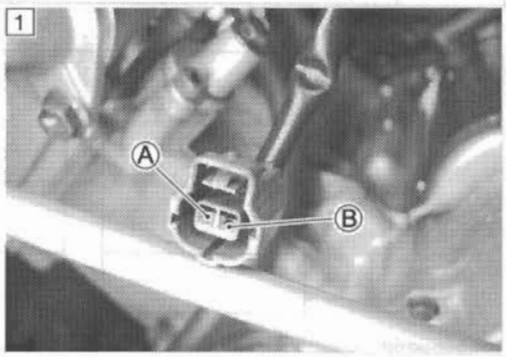


4) Disconnect the ECT sensor coupler and ECM coupler.
5) Check the continuity between B/Bl wire Ⓐ and terminal ⑪.
6) Also, check the continuity between B/Br wire Ⓑ and terminal ㉔.

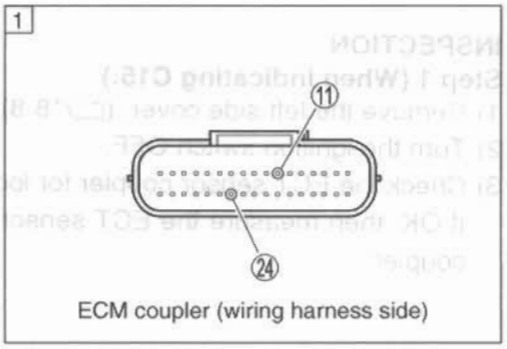
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

Tester knob indication: Continuity test (•)))

Is the continuity OK?



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



ECM coupler (wiring harness side)

7) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

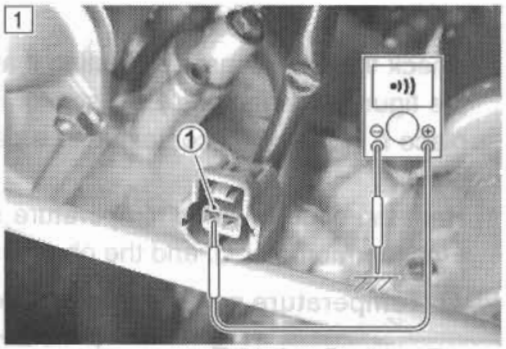
Step 1 (When indicating P0115-L:)

1) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the ECT sensor coupler for loose or poor contacts.
   If OK, then check the ECT sensor lead wire continuity.



4) Disconnect the ECT sensor coupler.
5) Check the continuity between B/Bl wire ① and ground. If sound is not heard from the tester, the circuit condition is OK.

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



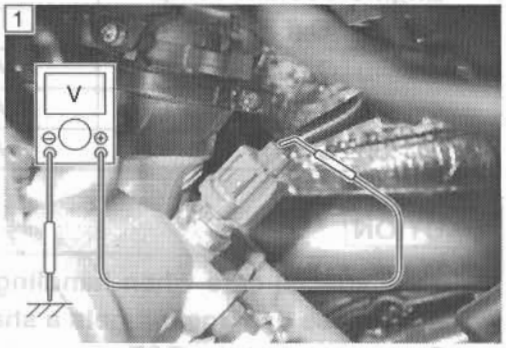
6) Connect the ECT sensor coupler.
7) Turn the ignition switch ON.
8) Measure the voltage between B/Bl wire and ground.

Output voltage: 0.1 – 4.6 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.

9) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

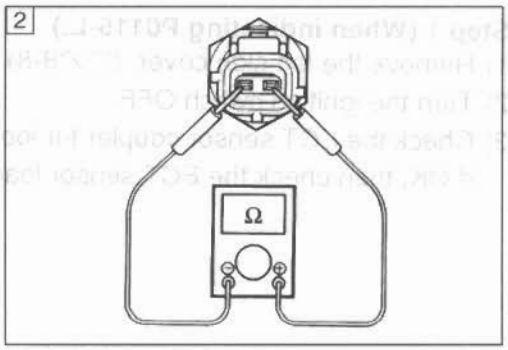
Step 2

1) Turn the ignition switch OFF.
2) Measure the ECT sensor resistance.

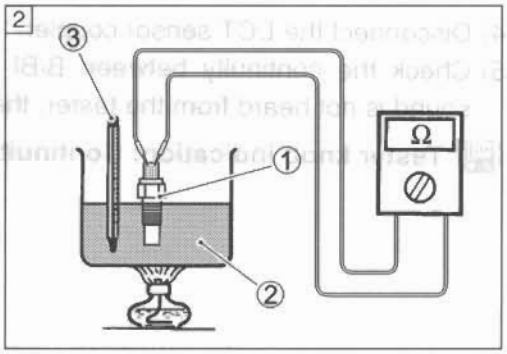
DATA ECT sensor resistance: 2.3 – 2.6 kΩ at 20 °C (68 °F)
(Terminal – Terminal)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)



3) Remove the ECT sensor.
4) 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.
5) Heat the oil to raise its temperature slowly and read the column thermometer ③ and the ohmmeter.



DATA Temperature sensor specification

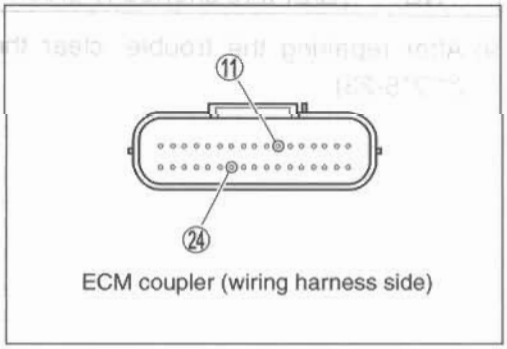
Engine Coolant Temp	Resistance
20 °C (68 °F)	Approx. 2.45 kΩ
40 °C (104 °F)	Approx. 1.148 kΩ
60 °C (140 °F)	Approx. 0.587 kΩ
80 °C (176 °F)	Approx. 0.318 kΩ

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.**

Is the resistance OK?

YES	• B/Br or B/Bl wire open or shorted to ground, or poor ㉔ or 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 ECT sensor with a new one.

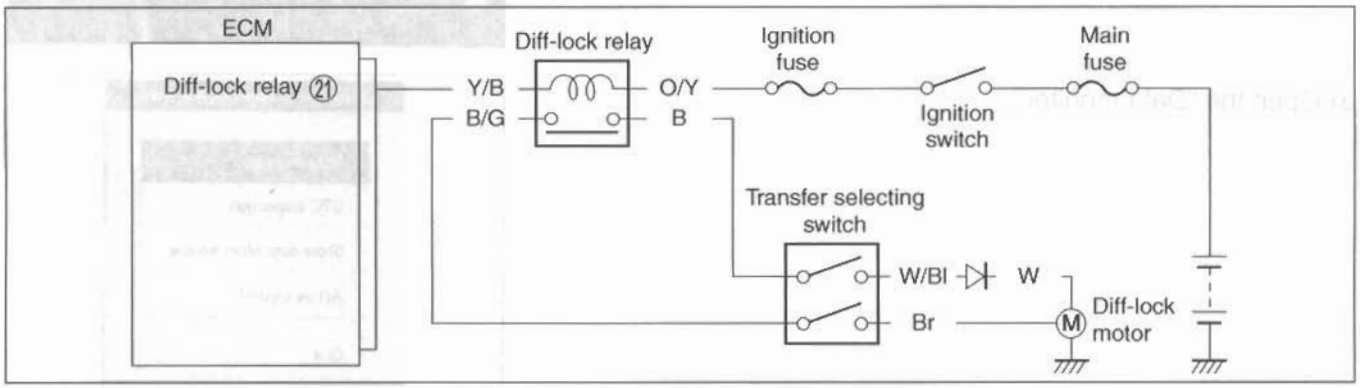


ECM coupler (wiring harness side)

6) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

"C20" (P1752) DIFF-LOCK RELAY CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No voltage is applied to diff-lock motor, although ignition switch is turned ON, or voltage is applied to diff-lock motor, although ignition switch is turned OFF.	• Diff-lock relay circuit open or short. • Diff-lock relay malfunction. • ECM malfunction.



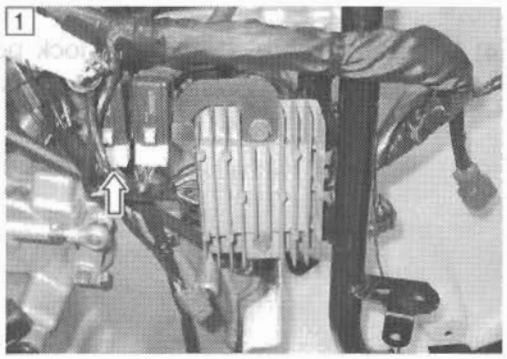
INSPECTION

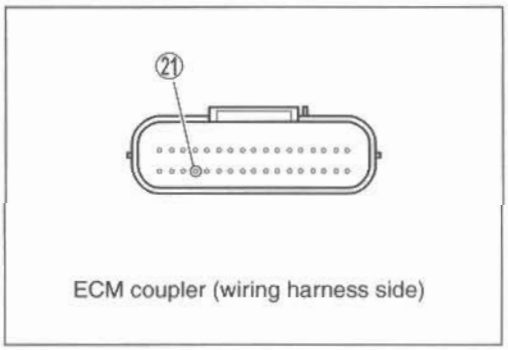
Step 1

1) Remove the rear fender (☞8-10).
2) Connect the disconnected couplers and battery.
3) Turn the ignition switch OFF.
4) Check the diff-lock relay coupler for loose or poor contacts.
5) If OK, then check the diff-lock relay insulation and continuity. (☞9-23)
   Is the diff-lock relay OK?

YES	• Inspect the transfer selecting switch. (☞9-37) • Y/B wire open or shorted to ground, or poor ㉑ 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 diff-lock relay with a new one.

5) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

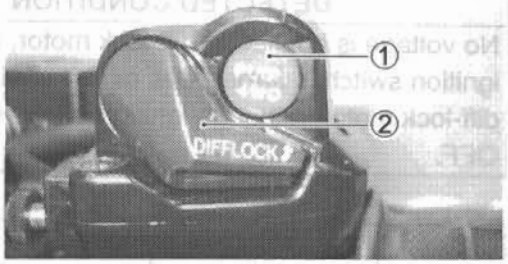




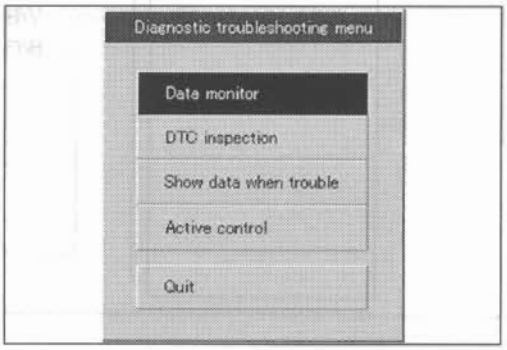
ECM coupler (wiring harness side)

SDS operation check (Transfer selecting switch)

1) Check that the transfer selecting switch (diff-lock position switch ① and diff-lock switch ②) is turned OFF.
2) Set up the SDS tool. (Refer to the SDS operation manual for further details.)



3) Open the "Data monitor".



4) Check that both "Differential lock position switch signal" ③ and "Differential lock switch signal" ④ are "Open".

☐ Differential lock relay	Off	
☐ Fuel pump relay	On	
☐ Starter signal	Off	
☐ Neutral switch signal	GND	
☐ Brake switch signal	Off	
☐ Override switch signal	Open	
☐ Ignition switch signal	On	
☐ Differential lock position switch signal	Open	③
☐ Differential lock switch signal	Open	④

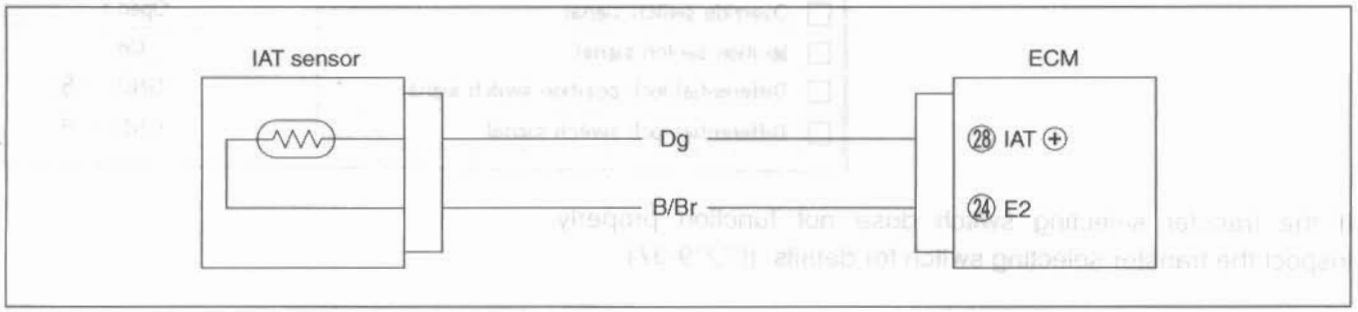
5) Turn the transfer selecting switch (diff-lock position switch and diff-lock switch) ON position.
6) Check that both "Differential lock position switch signal" ⑤ and "Differential lock switch signal" ⑥ are "GND".

☐ Differential lock relay	On	
☐ Fuel pump relay	On	
☐ Starter signal	Off	
☐ Neutral switch signal	GND	
☐ Brake switch signal	Off	
☐ Override switch signal	Open	
☐ Ignition switch signal	On	
☐ Differential lock position switch signal	GND	⑤
☐ Differential lock switch signal	GND	⑥

If the transfer selecting switch dose not function properly, inspect the transfer selecting switch for details. (☞9-37)

"C21" (P0110) IAT SENSOR CIRCUIT MALFUNCTION

DETECTED CONDITION			POSSIBLE CAUSE
C21		Output voltage is not within the following range. 0.15 < Sensor voltage ≦ 4.85 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.



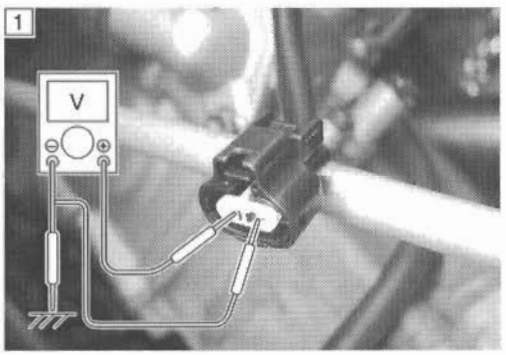
INSPECTION

Step 1 (When indicating C21:)

1) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
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) Also, measure the voltage between Dg wire terminal and B/Br wire terminal.



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

TOOL 09900-25008: Multi-circuit tester set

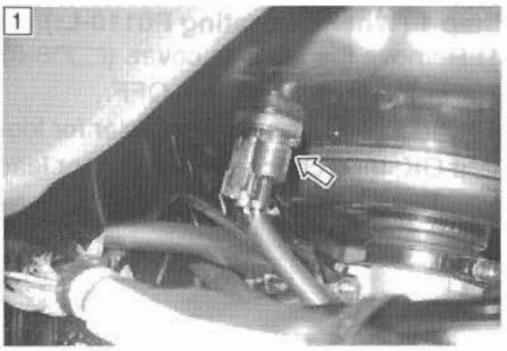
Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	Go to Step 2.
NO	• Loose or poor contacts on the ECM coupler. • Open or short circuit in the Dg wire or B/Br wire.

Step 1 (When indicating P0110-H:)

1) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the IAT sensor coupler for loose or poor contacts.
   If OK, then check the IAT sensor lead wire continuity.

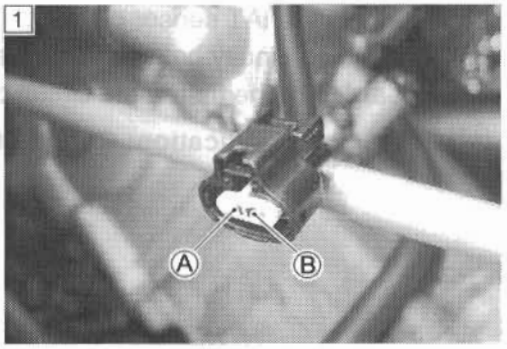


4) Disconnect the IAT sensor coupler and ECM coupler.
5) Check the continuity between Dg wire Ⓐ and terminal ㉘.
6) Also, check the continuity between B/Br wire Ⓑ and terminal ㉔.

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

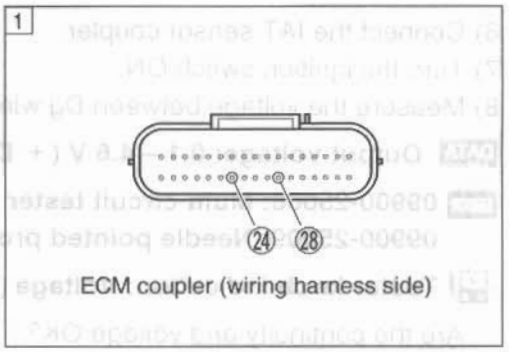
Tester knob indication: Continuity test (•)))

Is the continuity OK?



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

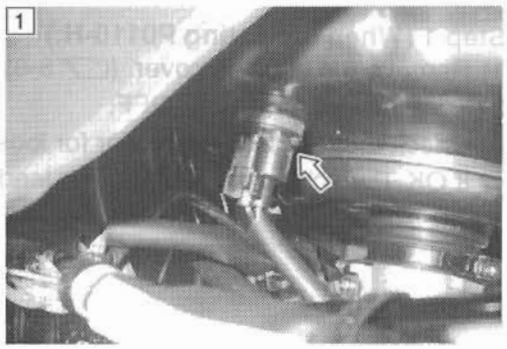
7) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)



ECM coupler (wiring harness side)

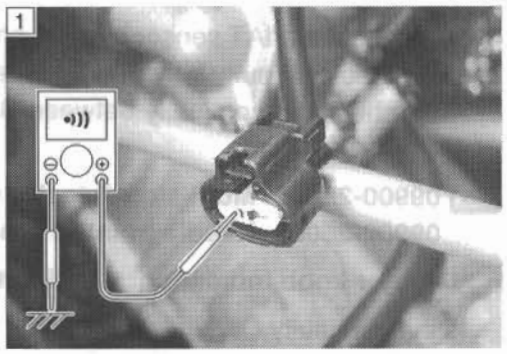
Step 1 (When indicating P0110-L:)

1) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
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 sound is not heard from the tester, the circuit condition is OK.

Tester knob indication: Continuity test (•)))



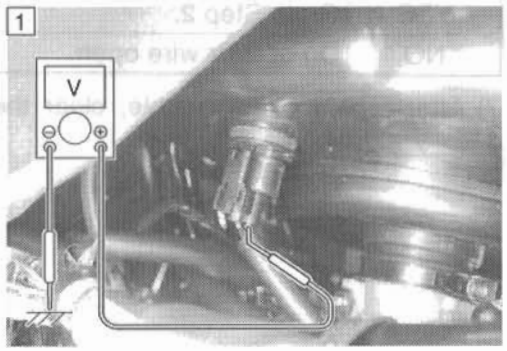
6) Connect the IAT sensor coupler.
7) Turn the ignition switch ON.
8) Measure the voltage between Dg wire and ground.

Output voltage: 0.1 – 4.6 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.

9) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

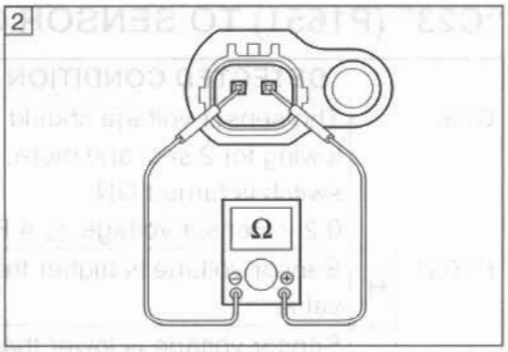
Step 2

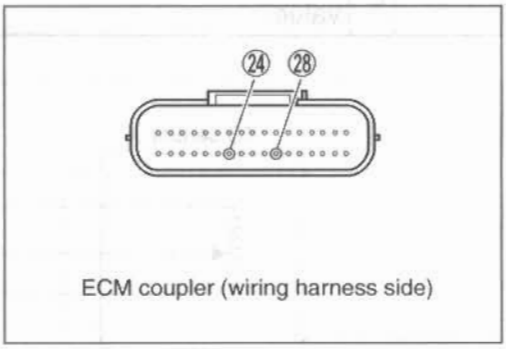
1) Turn the ignition switch OFF.
2) Measure the IAT sensor resistance.

DATA **IAT sensor resistance:**
Approx. 1.6 kΩ at 20 °C (68 °F) (Terminal – Terminal)

TOOL **09900-25008: Multi-circuit tester set**

Tester knob indication: Resistance (Ω)





ECM coupler (wiring harness side)

Is the resistance OK?

YES	• Dg or B/Br wire open or shorted to ground, or poor ㉘ 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.

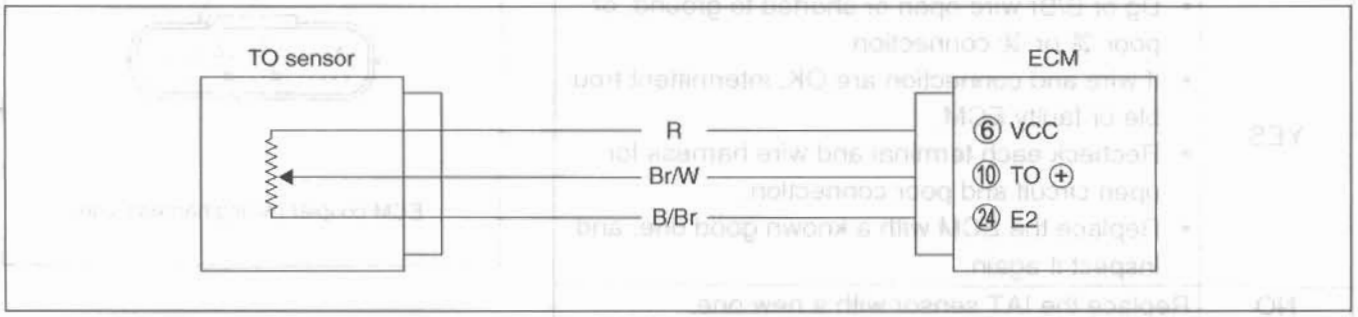
Intake Air Temp	Resistance
20 °C (68 °F)	Approx. 2.45 kΩ
80 °C (176 °F)	Approx. 0.32 kΩ
120 °C (248 °F)	Approx. 0.117 kΩ

NOTE:
IAT sensor resistance measurement method is the same way as that of the ECT sensor. Refer to page 5-44 for details.

3) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

"C23" (P1651) TO SENSOR CIRCUIT MALFUNCTION

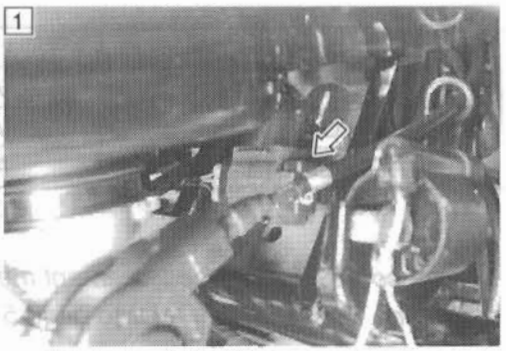
DETECTED CONDITION			POSSIBLE CAUSE
C23		The sensor voltage should be the following for 2 sec. and more, after ignition switch is turned ON. 0.2 < Sensor voltage ≦ 4.8 V	• TO sensor circuit open or short. • TO sensor malfunction. • ECM malfunction.
P1651	H	Sensor voltage is higher than specified value.	• TO sensor circuit open or shorted to VCC or ground circuit open.
	L	Sensor voltage is lower than specified value.	• TO sensor circuit shorted to ground or VCC circuit open.



INSPECTION

Step 1 (When indicating C23:)

1) Remove the side covers. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the TO sensor coupler for loose or poor contacts.
   If OK, then measure the TO sensor resistance.
4) Remove the TO sensor.
5) Disconnect the TO sensor coupler.

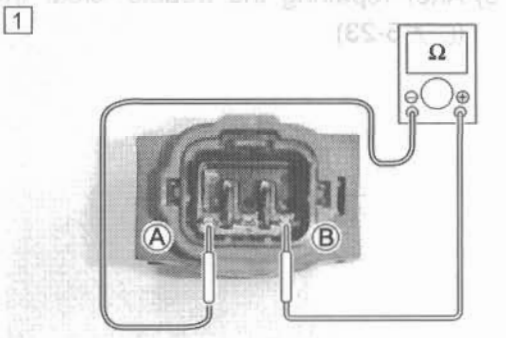


6) Measure the resistance between terminal Ⓐ and terminal Ⓑ.

DATA TO sensor resistance: 19.0 – 20.0 kΩ
(Terminal Ⓐ – Terminal Ⓑ)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

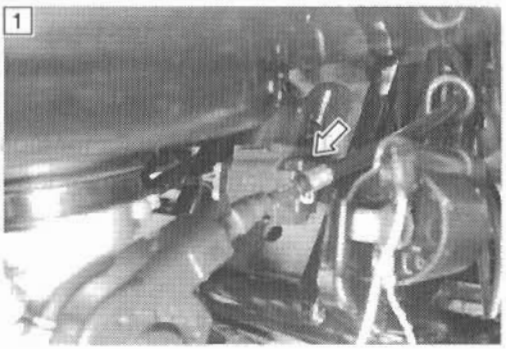


Is the resistance OK?

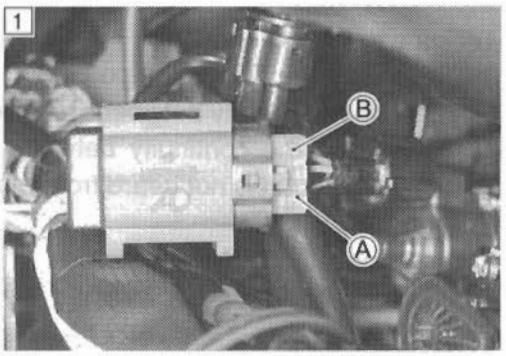
YES	Go to Step 2.
NO	Replace the TO sensor with a new one.

Step 1 (When indicating P1651-H:)

1) Remove the side covers. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the TO sensor coupler for loose or poor contacts.
   If OK, then check the TO sensor lead wire continuity.



4) Remove the TO sensor.
5) Disconnect the TO sensor coupler.
6) Check the continuity between B/Br wire Ⓐ and Red wire Ⓑ. If sound is not heard from the tester, the circuit condition is OK.
7) Disconnect the ECM coupler.

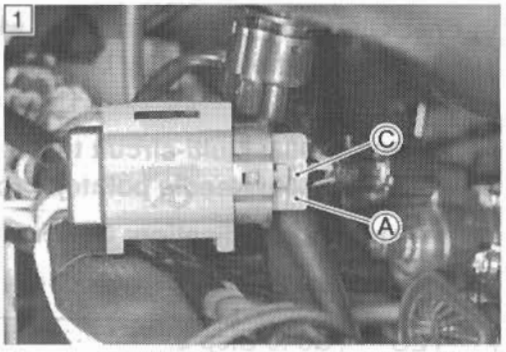


8) Check the continuity between Br/W wire Ⓒ and terminal ⑩.
9) Also, check the continuity between B/Br wire Ⓐ and terminal ㉔.

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

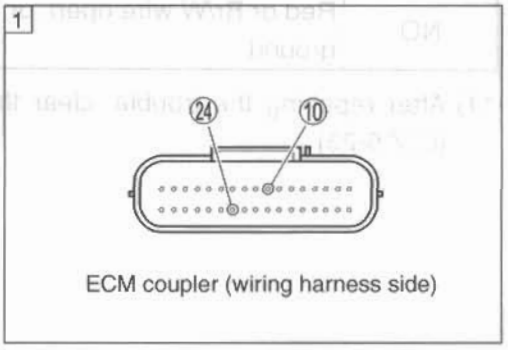
Tester knob indication: Continuity test (•))))

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. (☞5-23)



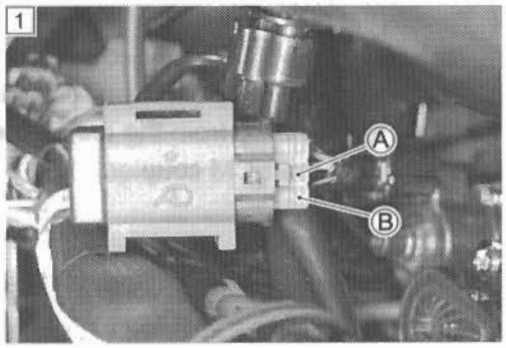
ECM coupler (wiring harness side)

Step 1 (When indicating P1651-L:)

1) Remove the side covers. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the TO sensor coupler for loose or poor contacts.
   If OK, then check the TO sensor lead wire continuity.



4) Remove the TO sensor.
5) Disconnect the TO sensor coupler.
6) Check the continuity between Br/W wire Ⓐ and ground.
7) Also, check the continuity between Br/W wire Ⓐ and B/Br wire Ⓑ. If sound is not heard from the tester, the circuit condition is OK.
8) Disconnect the ECM coupler.

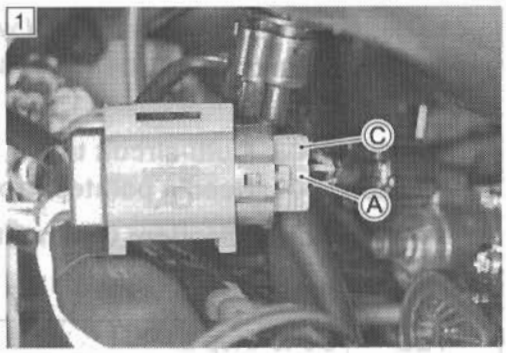


9) Check the continuity between Red wire Ⓒ and terminal ⑥.
10) Also, check the continuity between Br/W wire Ⓐ and terminal ⑩.

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

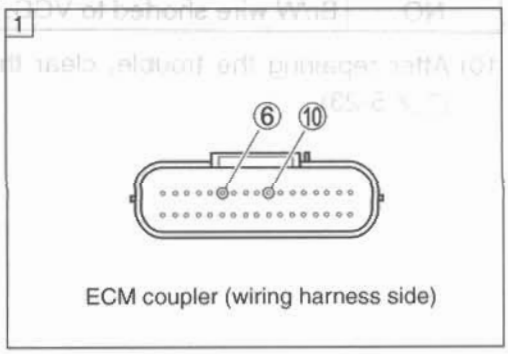
Tester knob indication: Continuity test (•))))

Is the continuity OK?



YES	Go to Step 2.
NO	Red or Br/W wire open, or Br/W wire shorted to ground.

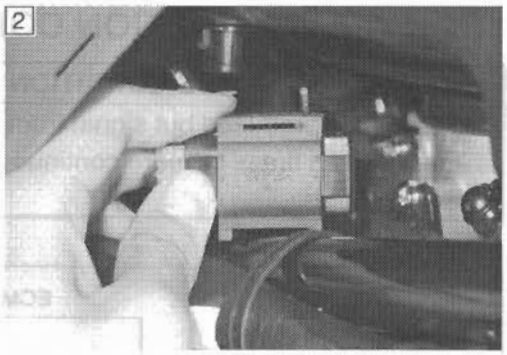
11) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)



ECM coupler (wiring harness side)

Step 2

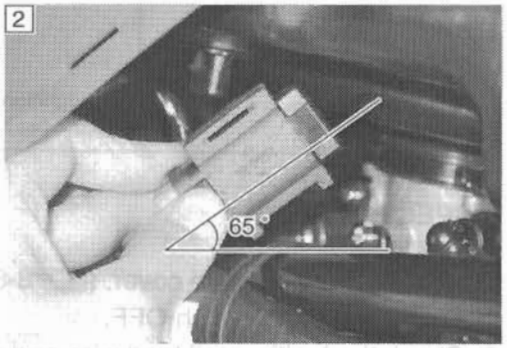
1) Connect the TO sensor coupler.
2) Insert the needle pointed probes to the lead wire coupler.
3) Turn the ignition switch ON.
4) Measure the voltage at the wire side coupler between Br/W and B/Br wires.



DATA TO sensor voltage: 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.



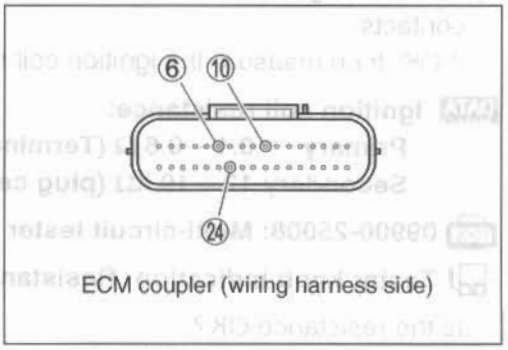
DATA TO sensor voltage: 3.7 – 4.4 V
(⊕ Br/W – ⊖ B/Br)

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

Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	• Red, B/Br or Br/W wire open or shorted to ground, or poor ⑥, ㉔ or ⑩ 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.

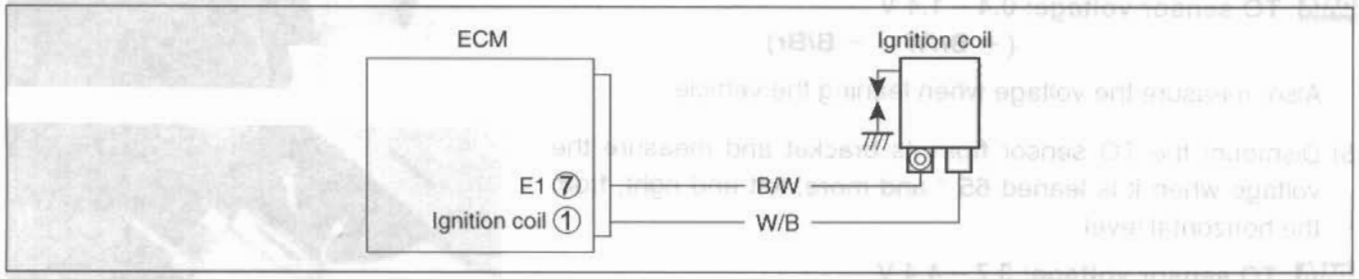


ECM coupler (wiring harness side)

6) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

"C24" (P0351) IGNITION COIL CIRCUIT MALFUNCTION

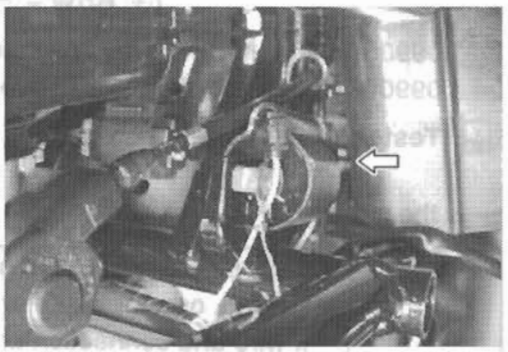
DETECTED CONDITION	POSSIBLE CAUSE
CKP signal is produced but signal from ignition coil is interrupted 8 times or more continuously.	• Ignition coil circuit open or short. • Ignition coil malfunction. • ECM malfunction.



INSPECTION

Step 1

1) Remove the right side cover. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the ignition coil lead wire and coupler for loose or poor contacts.
   If OK, then measure the ignition coil resistance.

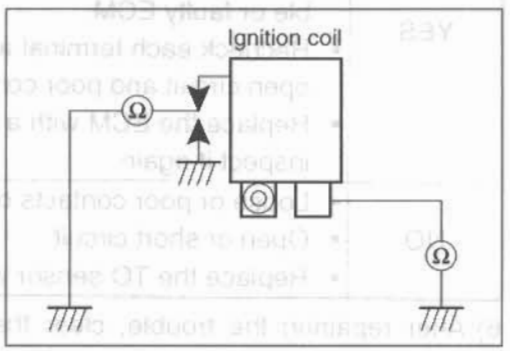


DATA Ignition coil resistance:
Primary 0.1 – 0.6 Ω (Terminal – ground)
Secondary 12 – 19 kΩ (plug cap – Terminal)

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

Is the resistance OK?



YES	Go to Step 2.
NO	Replace the ignition coil with a new one.

Step 2

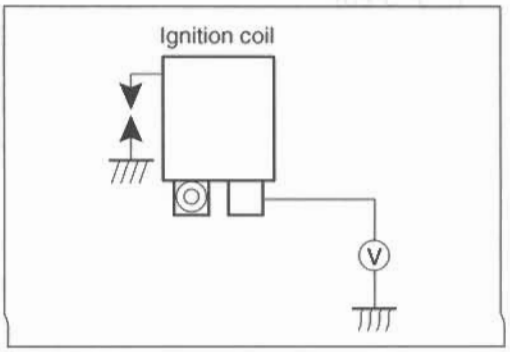
1) Turn the ignition switch ON.
2) Check the ignition coil primary peak voltage.

DATA Ignition coil primary peak voltage: 5.0 V and more

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

Is the voltage OK?



YES	Go to Step 3.
NO	Replace the ignition coil with a new one.

3) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

Step 3

1) Disconnect the ECM coupler.
2) Check the continuity between B/W wire Ⓐ and terminal ⑦.
3) Also, check the continuity between W/B wire Ⓑ and terminal ①.

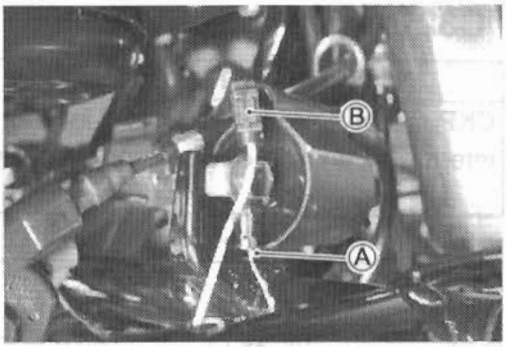
09900-25008: Multi-circuit tester set
09900-25009: Needle pointed probe set

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

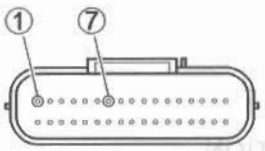
Is the continuity OK?

YES	• B/W or W/B wire open or shorted to ground, or poor ① or ⑦ connection. • If wire and connection are OK, intermittent trouble of faulty ECM. • Recheck each terminal, wire harness for open circuit and poor connection. • Replace the ECM with a known good one, and inspect it again.
NO	• Replace the lead wire with a new one.

4)After repairing the trouble, clear the DTC using SDS tool. (☞5-23)



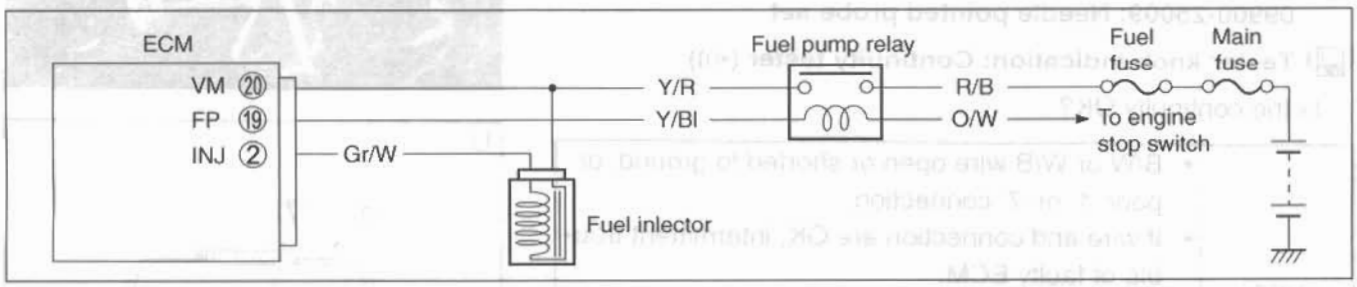
1



ECM coupler (wiring harness side)

"C32" (P0201) FUEL INJECTOR CIRCUIT MALFUNCTION

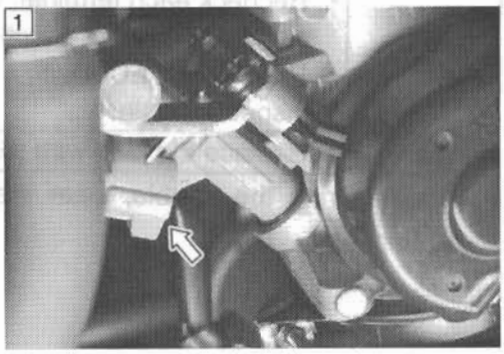
DETECTED CONDITION	POSSIBLE CAUSE
CKP signal is produced but fuel injector signal is interrupted 4 times or more continuously.	• Injector circuit open or short. • Injector malfunction. • ECM malfunction.



INSPECTION

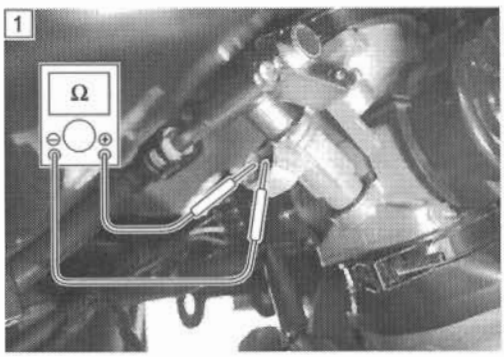
Step 1

1) Remove the right side cover. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the injector coupler for loose or poor contacts.
   If OK, then measure the injector resistance.



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

DATA **Injector resistance: Approx. 12 ± 1 Ω at 20 °C (68 °F)**
(Terminal – Terminal)



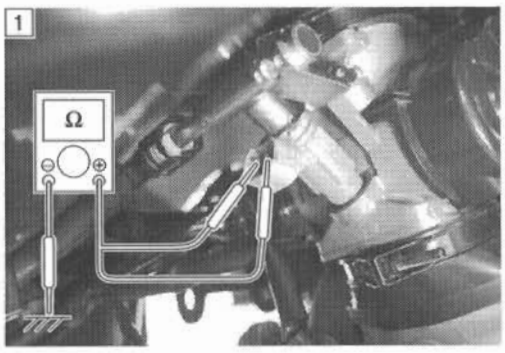
5) If OK, then check the continuity between each terminal and ground.

DATA **Injector continuity: ∞ Ω (Infinity)**
(Terminal – 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 Injector with a new one. (☞6-14)

6) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

Step 2

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

DATA Injector voltage: Battery voltage
(⊕ Y/R – ⊖ Ground)

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

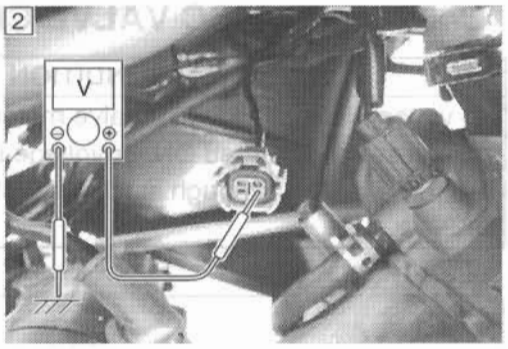
TOOL 09900-25008: Multi-circuit tester set

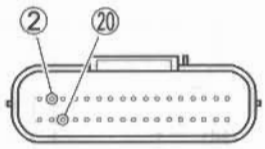
Tester knob indication: Voltage (⎓)

Is the voltage OK?

YES	• Gr/W or Y/R wire open or shorted to ground, or poor ② or ⑳ 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 Y/R wire.

3) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

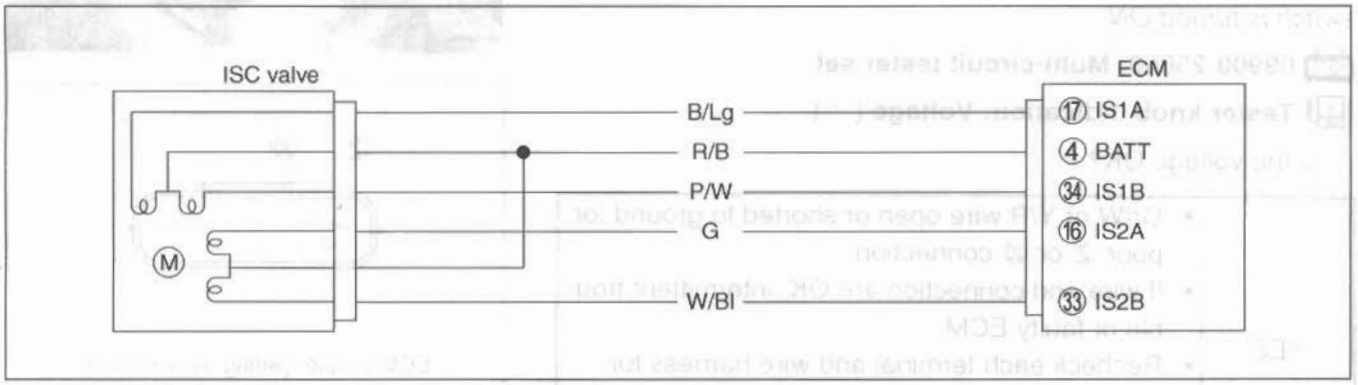




ECM coupler (wiring harness side)

"C40" (P0505) ISC VALVE CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No voltage is applied to ISC valve motor, although ignition switch is turned ON, or voltage is applied to ISC valve motor, although ignition switch is turned OFF.	ISC valve circuit open or short. ISC valve malfunction. ECM malfunction.



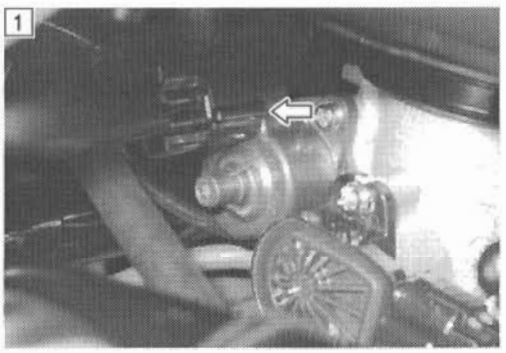
CAUTION

Be careful not to disconnect at least 3 seconds after ignition switch is turned to OFF.
If the ECM coupler is disconnected within 3 seconds after ignition switch is turned to OFF, there is a possibility of an usual value being written in ECM and causing an error of ISC valve operation.

INSPECTION

Step 1

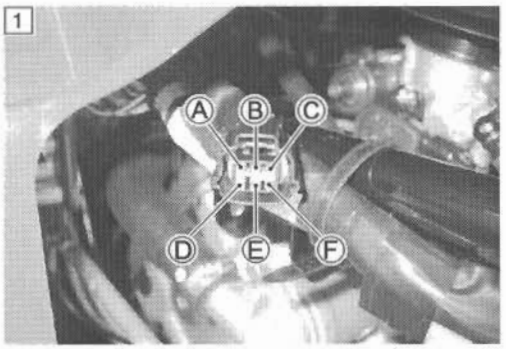
1) Remove the left side cover. (☞8-8)
2) Turn the ignition switch OFF.
3) Check the ISC valve coupler for loose or poor contacts.
4) If OK, then check the ISC valve lead wire continuity.



5) Disconnect the ISC valve coupler.
6) Check the continuity between terminals Ⓐ and ㉞, terminals Ⓑ and ④, terminals Ⓒ and ⑰, terminals Ⓓ and ㉝, terminals Ⓔ and ④ and terminals Ⓕ and ⑯.

DATA ISC valve wire continuity: Continuity (•))))

TOOL 09900-25008: Multi-circuit tester set

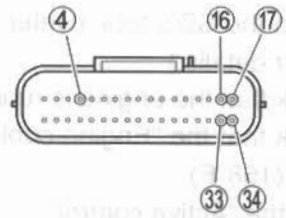


Tester knob indication: Continuity test (•)))

Is the continuity OK?

YES	Go to Step2
NO	B/Lg, R/B, P/W, G or W/Bl wire open.

1



ECM coupler (wiring harness side)

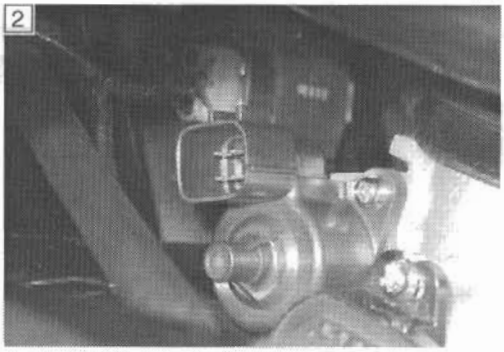
Step 2

Measure the resistance between terminals ① and ②, terminals ③ and ④.

DATA **ISC valve resistance: Approx. ∞**

(Terminal ① – Terminal ③)
(Terminal ② – Terminal ④)
Approx. 31 ± 3 kΩ
(Terminal ③ – Terminal ④)
(Terminal ① – Terminal ②)

2

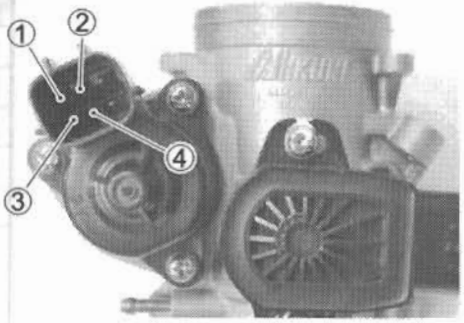


Is the resistance OK?

YES	If wire is OK, intermittent trouble or faulty ECM.
NO	Replace the ISC valve with a new one.

After repairing the trouble, clear the DTC using SDS tool. (☞5-23)

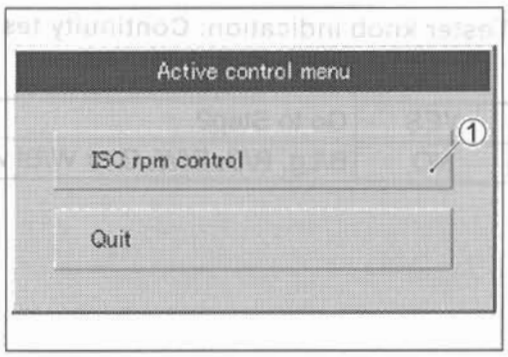
2



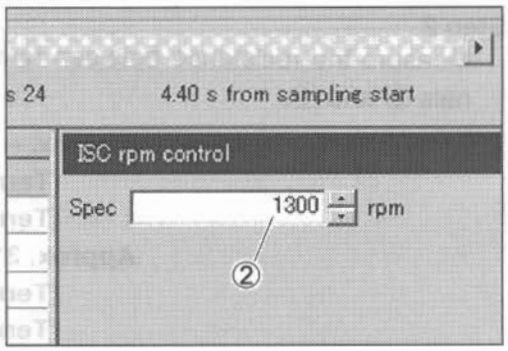
ACTIVE CONTROL INSPECTION (ISC RPM CONTROL)

Check 1

1) Set up the SDS tool. (Refer to the SDS operation manual for further details.)
2) Check that the engine is running.
3) Check that the "Engine coolant/oil temperature" is more than 70°C (158°F).
4) Click the "Active control".
5) Click the "ISC rpm control" ①.



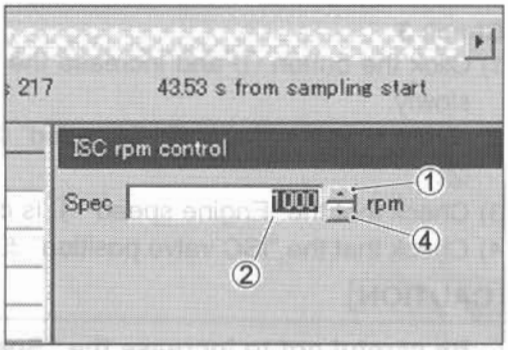
6) Check that the "Spec" ② is 1 300 rpm.
7) Check that the "Desired idle speed" ③ is 1 300 rpm.



Item	Value	Unit
Engine speed	1439	rpm
Throttle position	27.0	°
Manifold absolute pressure 1	33.6	kPa
Engine coolant / oil temperature	84.2	° C
Intake air temperature	38.4	° C
Battery voltage	14.3	V
Gear position	N	
Desired idle speed	1300	rpm
ISC valve position	③ 36	step

Check 2

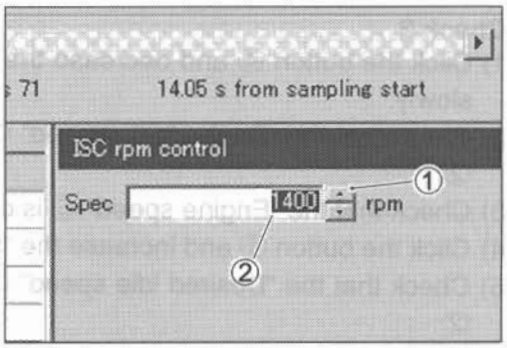
1) Click the button ④ and decrease the "Spec" ② to 1 000 rpm slowly.
2) Check that the "Desired idle speed" ③ is equal to the "Spec" ②.
3) Check that the "Engine speed" ⑤ is close to the "Spec" ②.
4) Click the button ① and increase the "Spec" ② slowly.
5) Check that the "Desired idle speed" ③ is equal to the "Spec" ②.



Item	Value	Unit
☐ Engine speed	1292	rpm
☐ Throttle position	⑤ 27.0	°
☐ Manifold absolute pressure 1	53.9	kPa
☐ Engine coolant / oil temperature	84.2	° C
☐ Intake air temperature	38.4	° C
☐ Battery voltage	14.4	V
☐ Gear position	N	
☐ Desired idle speed	1000	rpm
☐ ISC valve position	③ 15	step

Check 3

1) Click the button ① and increase the "Spec" ② to 1 600 rpm slowly.
2) Check that the "Desired idle speed" ③ is equal to the "Spec" ②.
3) Check that the "Engine speed" ④ is close to the "Spec" ②.
4) Check that the "ISC valve position" ⑤ increases.



CAUTION

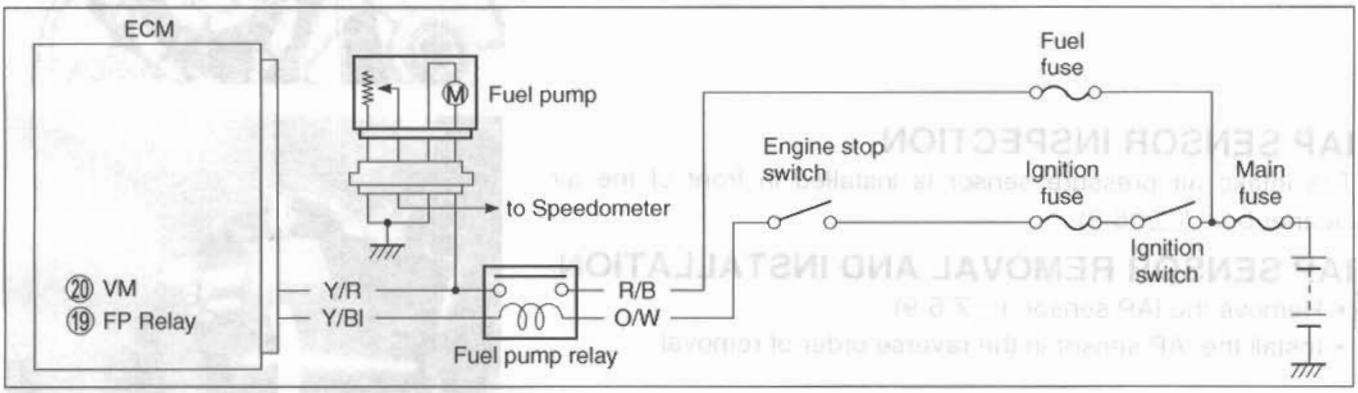
Be careful not to increase the "Spec" to 1 650 rpm, or the "Engine speed" m

☐ Engine speed	1438	rpm
☐ Throttle position	③ 26.5	°
☐ Manifold absolute pressure 1	100.9	kPa
☐ Engine coolant / oil temperature	85.5	° C
☐ Intake air temperature	38.4	° C
☐ Battery voltage	14.3	V
☐ Gear position	N	
☐ Desired idle speed	1600	rpm
☐ ISC valve position	② 56	step

If the ISC valve does not function propely, inspect the ISC valve for details. (☞5-60)

"C41" (P0230) FP RELAY CIRCUIT MALFUNCTION

DETECTED CONDITION	POSSIBLE CAUSE
No voltage is applied to fuel pump, although fuel pump relay is turned ON, or voltage is applied to fuel pump, although fuel pump relay is turned OFF.	• Fuel pump relay circuit open or short. • Fuel pump relay malfunction. • ECM malfunction.



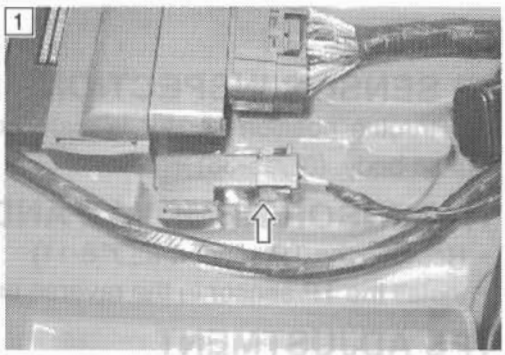
INSPECTION

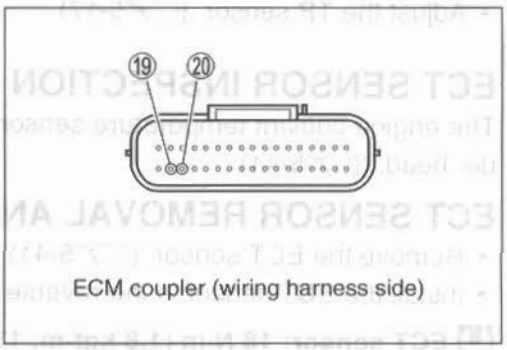
Step 1

1) Remove the seat. (☞8-4)
2) Turn the ignition switch OFF.
3) Check the FP relay coupler for loose or poor contacts.
4) If OK, then check the insulation and continuity. Refer to page 6-5 for details.
   Is the FP relay OK?

YES	• Y/Bl or Y/R wire open or shorted to ground, or poor ⑲ or ⑳ 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.

5) After repairing the trouble, clear the DTC using SDS tool. (☞5-23)



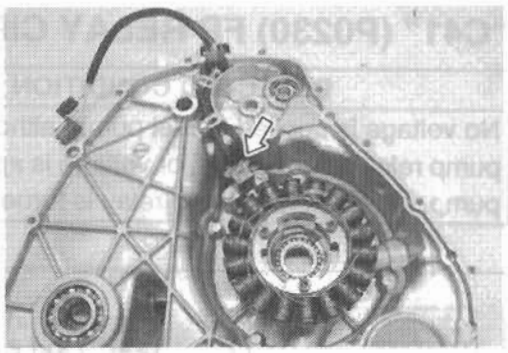


ECM coupler (wiring harness side)

SENSORS

CKP SENSOR INSPECTION

The crankshaft position sensor is installed in the generator cover. (☞3-16)

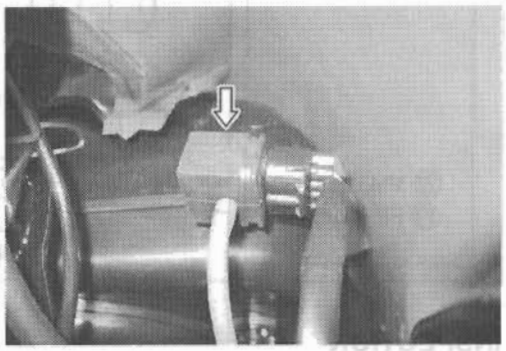


CKP SENSOR REMOVAL AND INSTALLATION

- Remove the generator cover. (☞3-16)
- Install the generator cover in the reverse order of removal.

IAP SENSOR INSPECTION

The intake air pressure sensor is installed in front of the air cleaner box. (☞6-9)

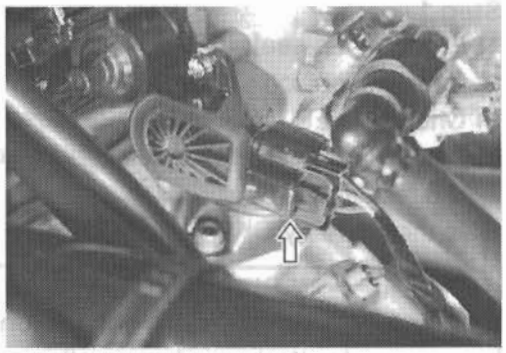


IAP SENSOR REMOVAL AND INSTALLATION

- Remove the IAP sensor. (☞6-9)
- 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. (☞5-36)



TP SENSOR REMOVAL AND INSTALLATION

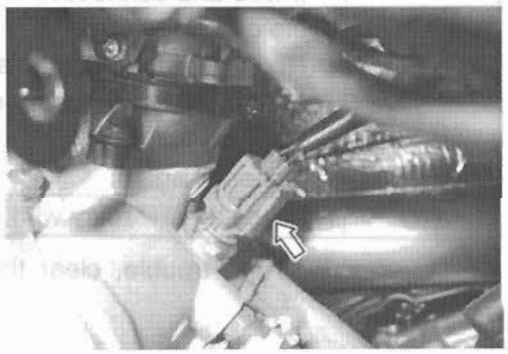
- Remove the TP sensor. (☞6-11)
- Install the TP sensor in the reverse order of removal.

TPS ADJUSTMENT

- Adjust the TP sensor. (☞5-17)

ECT SENSOR INSPECTION

The engine coolant temperature sensor is installed on the cylinder head. (☞5-41)



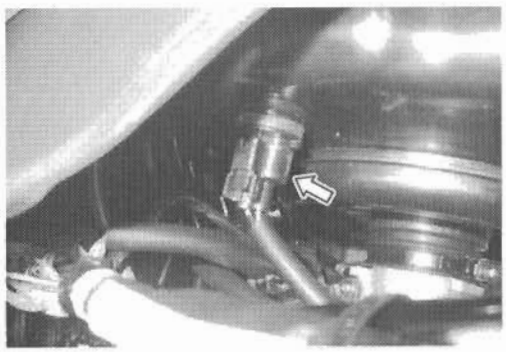
ECT SENSOR REMOVAL AND INSTALLATION

- *Remove the ECT sensor. (☞5-41)*
- Install the ECT sensor in the reverse order of removal.

ECT sensor: 18 N·m (1.8 kgf-m, 13.0 lb-ft)

IAT SENSOR INSPECTION

The intake air temperature sensor is installed at the left side of the throttle body. (☞5-48)

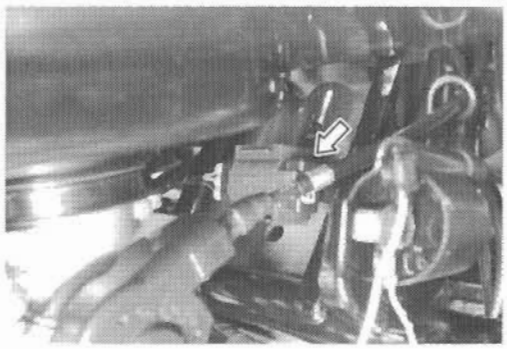


IAT SENSOR REMOVAL AND INSTALLATION

- Remove the IAT sensor. (☞5-48)
- Install the IAT sensor in the reverse order of removal.

TO SENSOR INSPECTION

The tip-over sensor is located in front of the throttle body. (☞5-52)

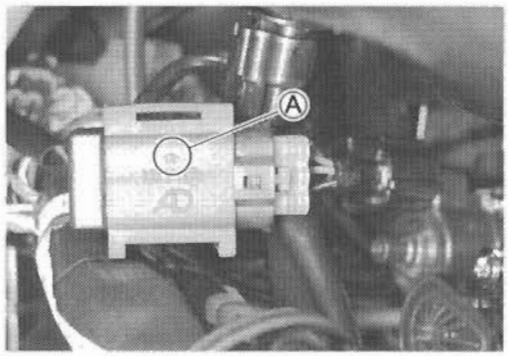


TO SENSOR REMOVAL AND INSTALLATION

- Remove the TO sensor. (☞5-52)
- 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

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- FUEL LINE INSPECTION 6- 2
- FUEL TANK REMOVAL 6- 2
- FUEL TANK INSPECTION 6- 3
- FUEL TANK INSTALLATION 6- 3
- FUEL PRESSURE INSPECTION 6- 4
- FUEL PUMP INSPECTION 6- 5
- FUEL PUMP RELAY INSPECTION 6- 6
- FUEL PUMP REMOVAL 6- 6
- FUEL FILTER CLEANING AND FUEL FILTER INSPECTION 6- 7
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- FUEL TANK PRESSURE CONTROL (FTPC) VALVE INSPECTION 6- 7

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- THROTTLE BODY INSPECTION 6-13
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- AIR CLEANER BOX INSTALLATION 6-16
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- FUEL INJECTOR INSTALLATION 6-16
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⚠ WARNING

Gasoline must be handled carefully in an area well ventilated and away from fire or sparks.

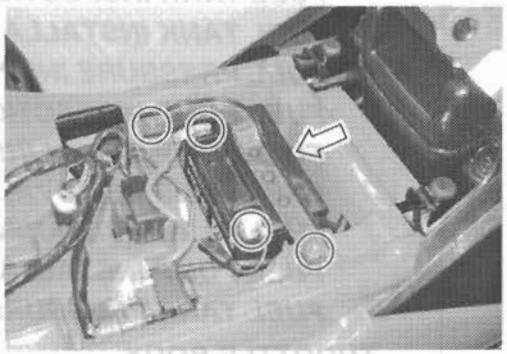
FUEL TANK AND FUEL PUMP

FUEL LINE INSPECTION

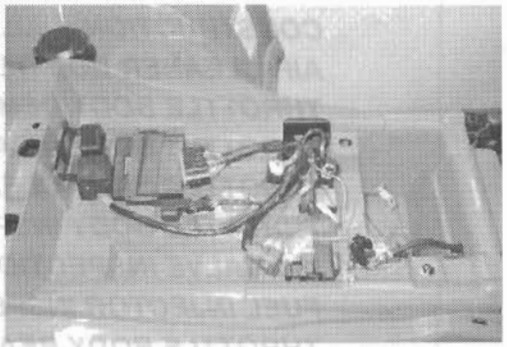
Inspect the fuel hose, fuel tank cap for damage or fuel leakage.
If any damage or fuel leakage is found, replace them with new ones.

FUEL TANK REMOVAL

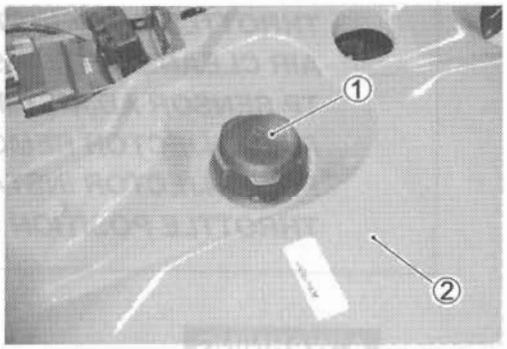
- Remove the seat. (☞8-4)
- Remove the rear carrier. (☞8-9)
- Remove the mud guard. (☞8-8)
- Remove the rear box. (☞8-8)
- Disconnect the ⊖ battery cable first, and then ⊕ battery cable.
- Remove the battery stay and battery.



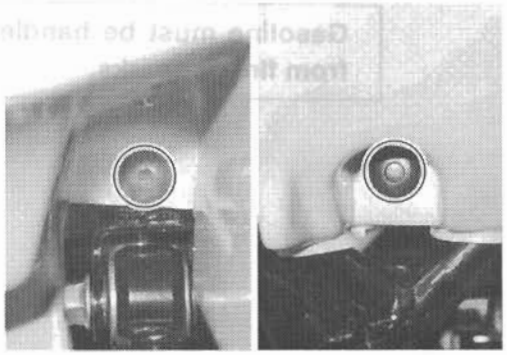
- Disconnect the couplers.



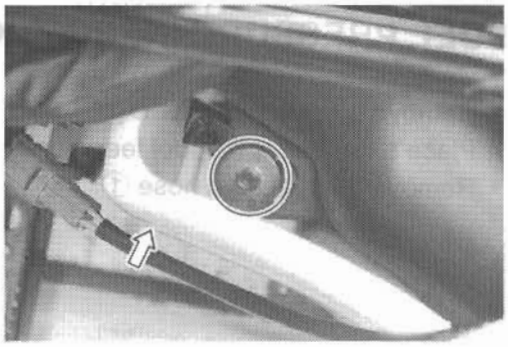
- Remove the fuel tank cap ①.
- Remove the rear fender ②. (☞8-10)

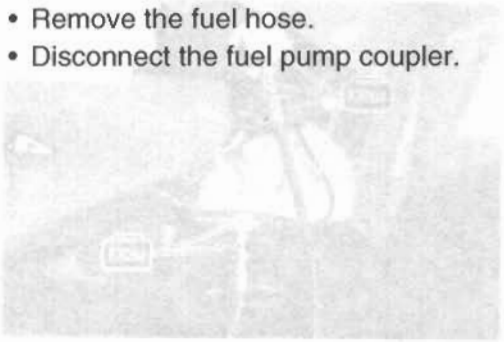


- Remove the fuel tank side cover bolt and clip.

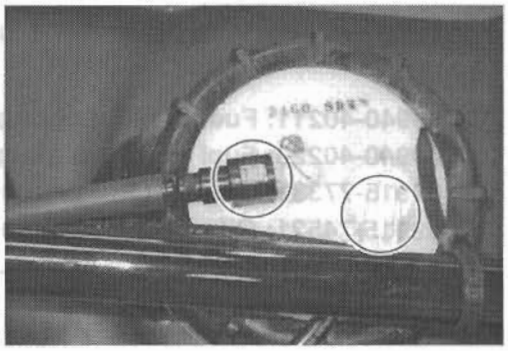


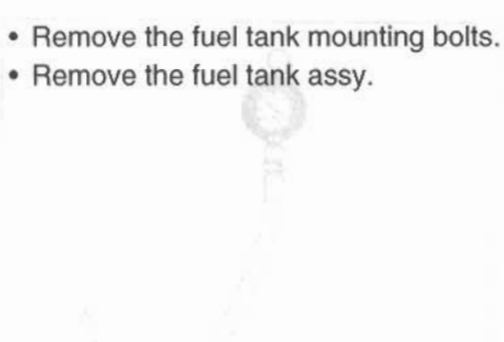
- Remove the fuel tank mounting bolt.
- Remove the fuel tank side cover.



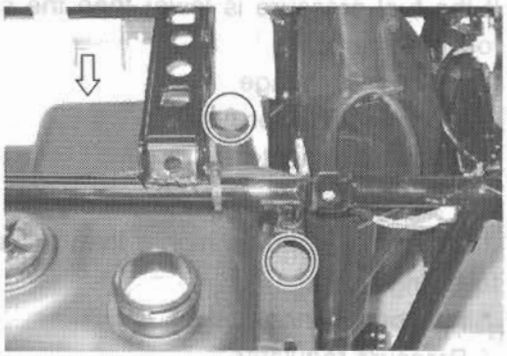


- Remove the fuel hose.
- Disconnect the fuel pump coupler.



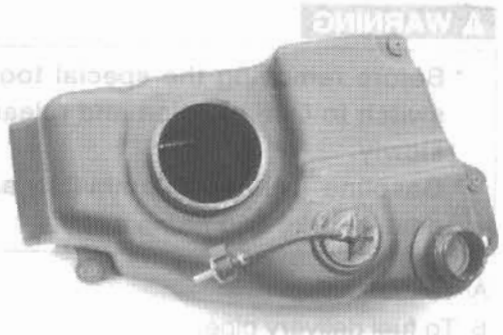


- Remove the fuel tank mounting bolts.
- Remove the fuel tank assy.



FUEL TANK INSPECTION

Inspect the fuel tank for damage or fuel leakage.
If any damage or fuel leakage is found, replace them with new ones.



FUEL TANK INSTALLATION

- Install the fuel tank in the reverse order of removal.

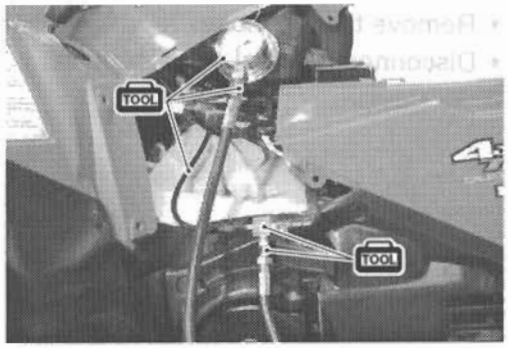
FUEL PRESSURE INSPECTION

- Remove the seat. (☞8-4)
- Remove the left side cover. (☞8-8)
- Place a rag under the fuel feed hose.
- Remove the fuel feed hose ①.



- Install the special tools between the fuel tank 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. 300 kPa (3.0 kgf/cm², 43 psi)**

If the fuel pressure is lower than the specification, inspect the following items:

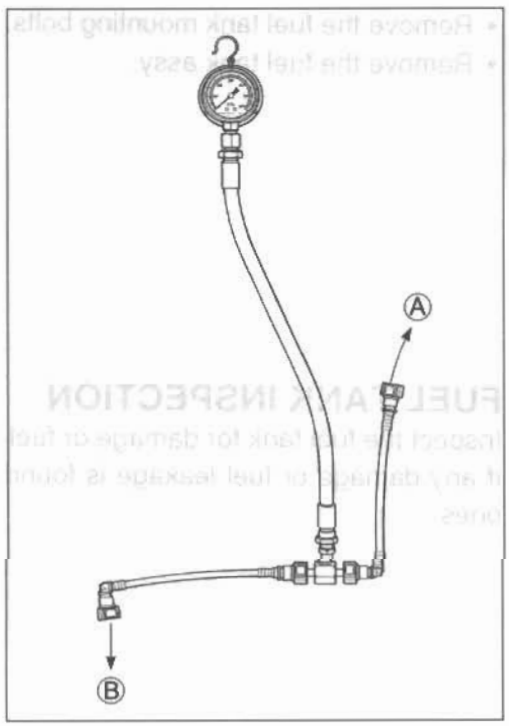
* Fuel hose leakage
* Clogged fuel filter
* Pressure regulator
* Fuel pump

If the fuel pressure is higher than the specification, inspect the following items:

* Fuel pump check valve
* 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 tank.
Ⓑ To fuel delivery pipe.

FUEL PUMP INSPECTION

Turn the ignition switch ON and check that the fuel pump operates for a few seconds.
If the fuel pump motor does not make operating sound, replace the fuel pump assembly or inspect the fuel pump relay and tip-over sensor.

FUEL DISCHARGE AMOUNT INSPECTION

⚠ WARNING

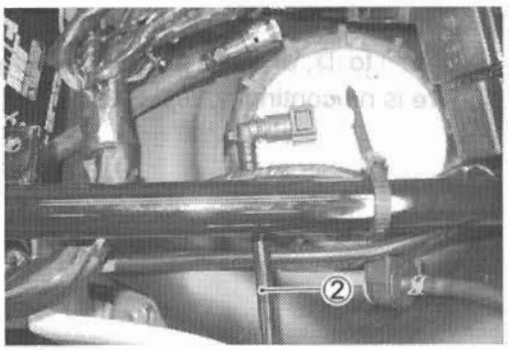
Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.

- Remove the rear fender. (☞8-10)
- Connect the couplers and battery terminals.
- Disconnect the fuel feed hose ① from the fuel pump.

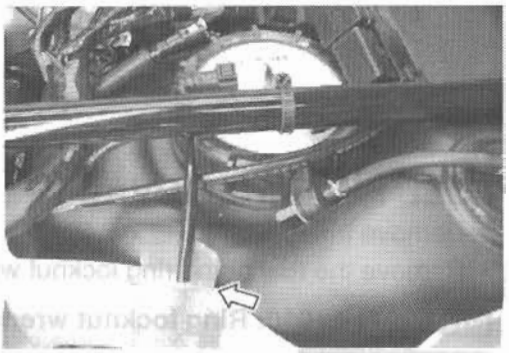


- Connect the special tool ② to the fuel pump.

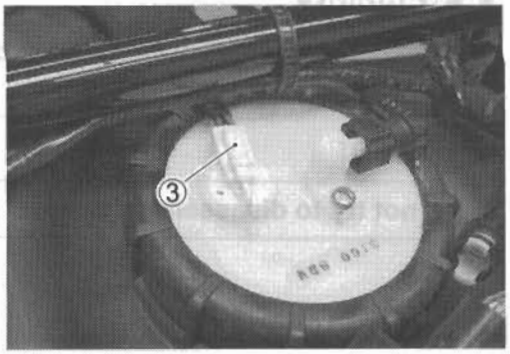
TOOL 09940-40220: Fuel pressure gauge hose attachment



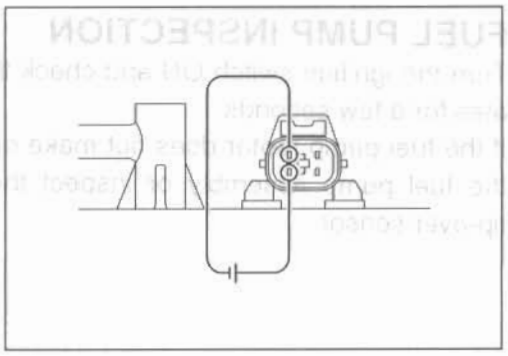
- Place the measuring cylinder and insert the fuel hose end into the measuring cylinder.



- 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 Y/R wire and B/W wire) for 10 seconds and measure the amount of fuel discharged.
  Battery ⊕ Terminal ——(Yellow with red tracer)
  Battery ⊖ Terminal ——(Black with white tracer)



If the pump does not discharge the amount specified, it means that the fuel pump is defective or that the fuel filter is clogged.

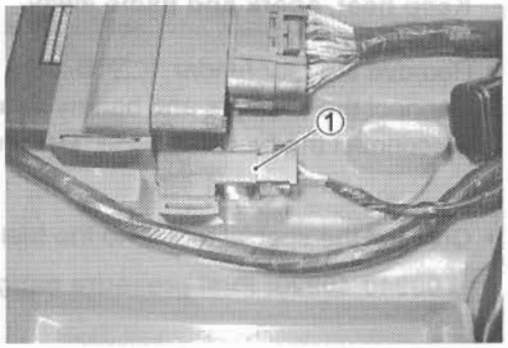
DATA Fuel discharge amount: 168 ml and more/10 sec.
(5.7/5.9 US/Imp oz)/10 sec.

NOTE:
The battery must be in fully charged condition.

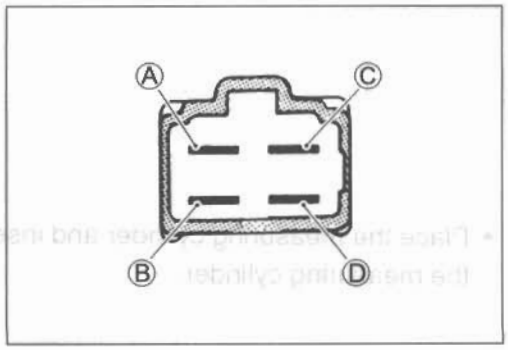
FUEL PUMP RELAY INSPECTION

Fuel pump relay is located in front of ECM.

- Remove the seat. (☞8-4)
- Remove the fuel pump relay ①.



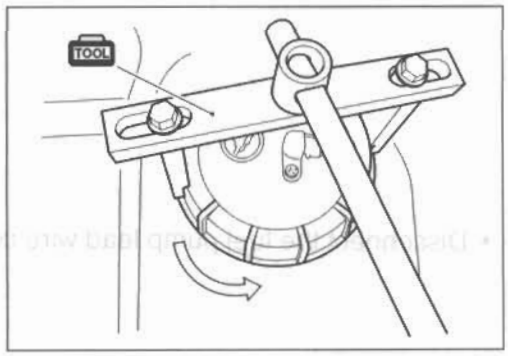
First, check the insulation between Ⓐ and Ⓑ terminals with pocket tester. Then apply 12 volts to Ⓒ and Ⓓ terminals, ⊕ to Ⓒ and ⊖ to Ⓓ, and check the continuity between Ⓐ and Ⓑ.
If there is no continuity, replace it with a new one.



FUEL PUMP REMOVAL

- Remove the fuel tank. (☞6-2)
- Remove the fuel pump ring locknut with the special tool.

TOOL 09941-51010: Ring locknut wrench



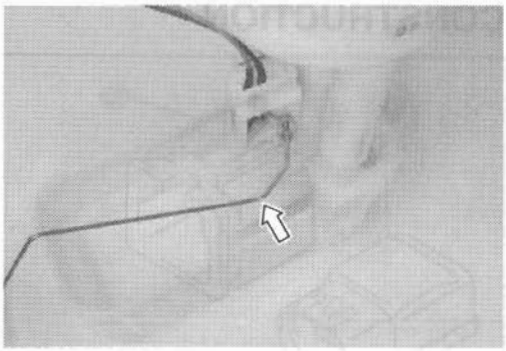
⚠ WARNING

*** Gasoline is highly flammable and explosive.**
*** Keep heat, spark or flame away.**

CAUTION

Do not try to disassemble the fuel pump.

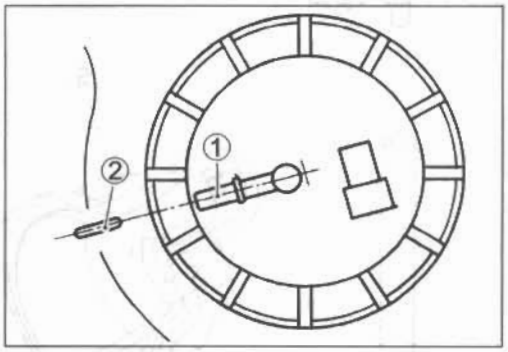
FUEL FILTER CLEANING AND FUEL FILTER INSPECTION



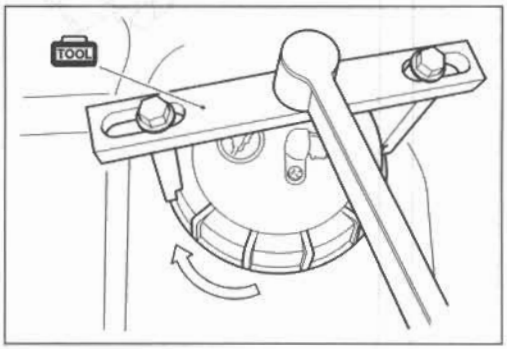
- If the fuel filter is clogged with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Clean the fuel filter.

Inspect whether the float moves smoothly or not.
If the float dose not move smoothly, replace the fuel pump assembly.

FUEL PUMP INSTALLATION



- Install the fuel pump in the revere order of removal.
- Align the fuel pump nipple ① with alignment mark ② on the fuel tank.

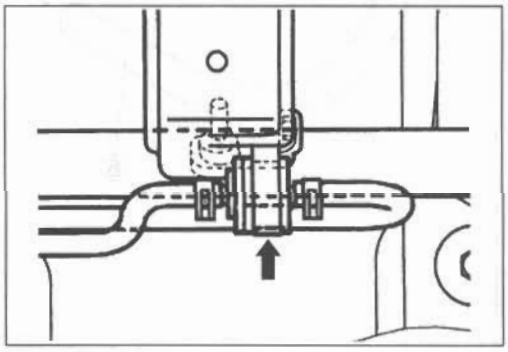


- Tighten the fuel pump ring locknut with the special tool to the specified torque.

TOOL 09941-51010: Ring locknut wrench

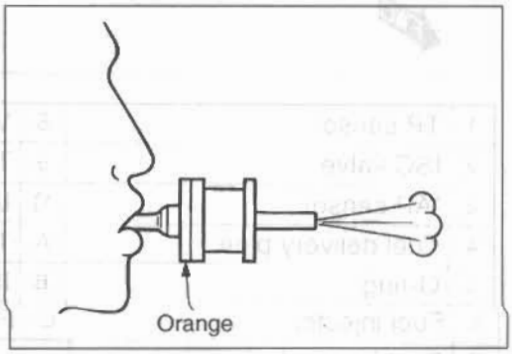
Ring locknut: 35 N·m (3.5 kgf-m, 25.5 lb-ft)

FUEL TANK PRESSURE CONTROL (FTPC) VALVE INSPECTION

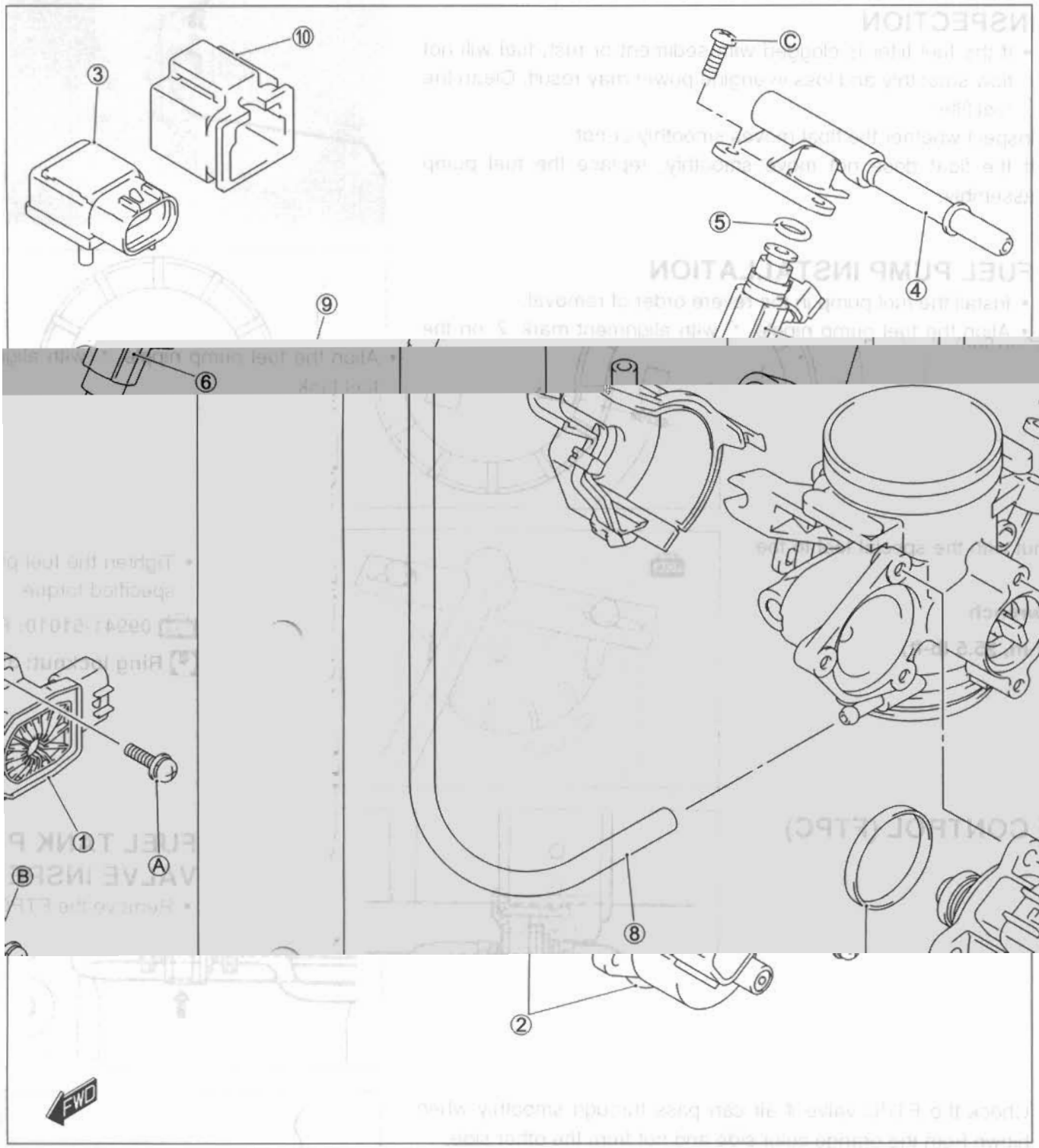


- Remove the FTPC valve.

Check the FTPC valve if air can pass through smoothly when blown from the orange color side and not from the other side.
If abnormal condition is found, replace the valve with a new one.



THROTTLE BODY
CONSTRUCTION

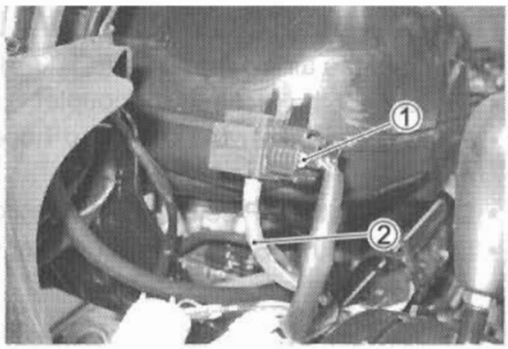


①	TP sensor	⑧	Vacuum hose
②	ISC valve	⑨	Throttle linkage cover
③	IAP sensor	⑩	IAP sensor cover
④	Fuel delivery pipe	Ⓐ	TP sensor mounting screw
⑤	O-ring	Ⓑ	ISC valve mounting screw
⑥	Fuel injector	Ⓒ	Fuel delivery pipe mounting screw
⑦	Cushion seal		

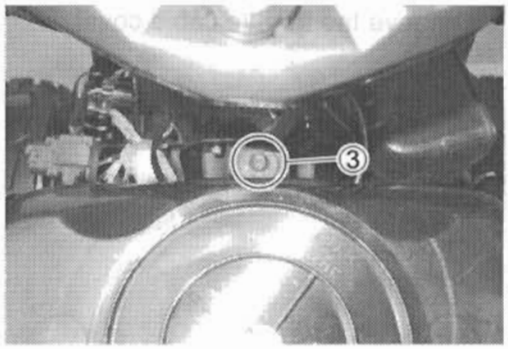
ITEM	N·m	kgf-m	lb-ft
Ⓐ	2	0.2	1.5
Ⓑ	2	0.2	1.5
Ⓒ	5	0.5	3.5

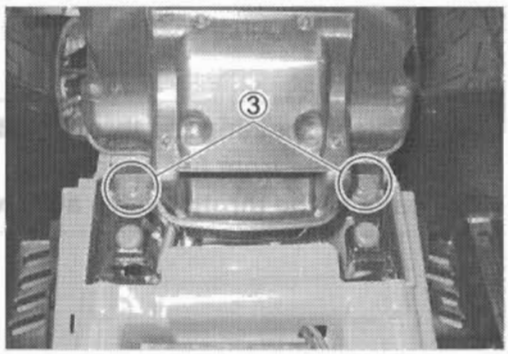
AIR CLEANER BOX REMOVAL

- Remove the front fender. (☞8-5)
- Disconnect the IAP sensor lead wire coupler ① and vacuum hose ②.



- Remove the air cleaner box mounting bolts ③.

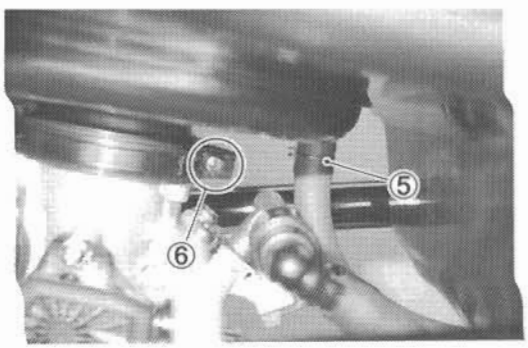




- Remove the IAT sensor lead wire coupler ④.

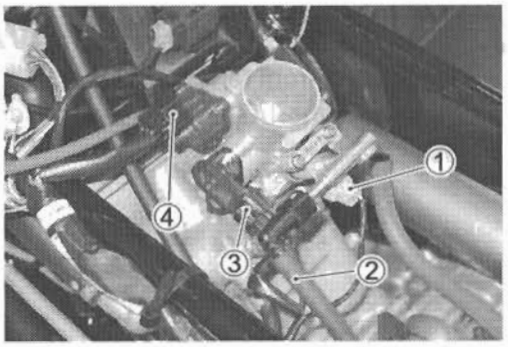


- Remove the PCV hose ⑤.
- Loosen the throttle body clamp screw ⑥.
- Remove the air cleaner box.

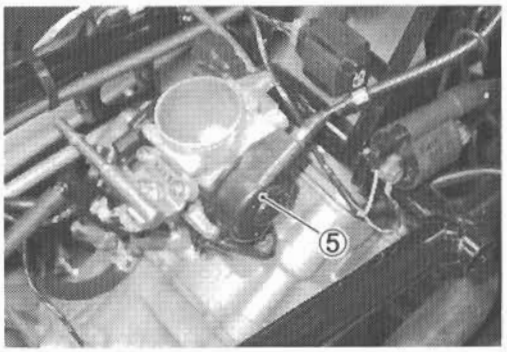


THROTTLE BODY REMOVAL

- Remove the air cleaner box. (☞3-4)
- Disconnect the fuel injector coupler ①.
- Place a rag under the fuel feed hose ② and disconnect its hose.
- Disconnect the TP sensor lead wire coupler ③.
- Disconnect the ISC lead wire coupler ④.



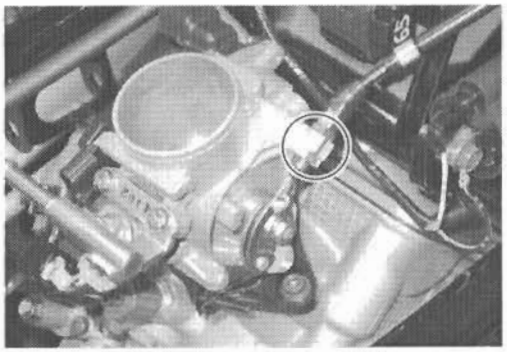
- Remove the throttle cable cover ⑤.



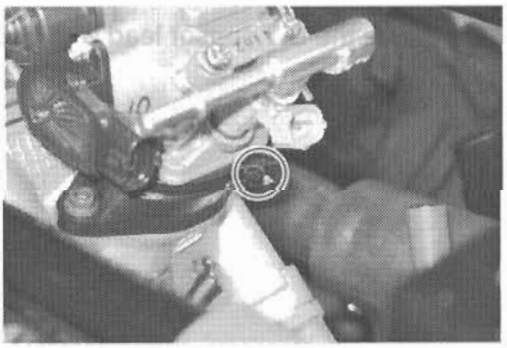
- Disconnect the throttle cable from the drum.

CAUTION

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

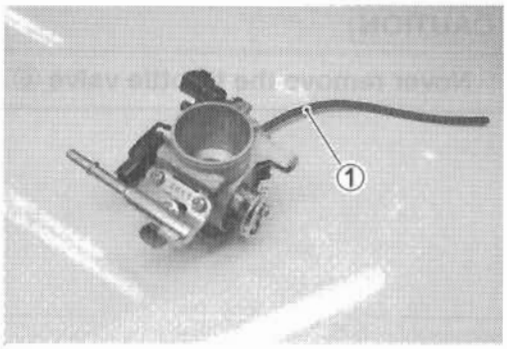


- Loosen the throttle body clamp screw and remove the throttle body assembly.

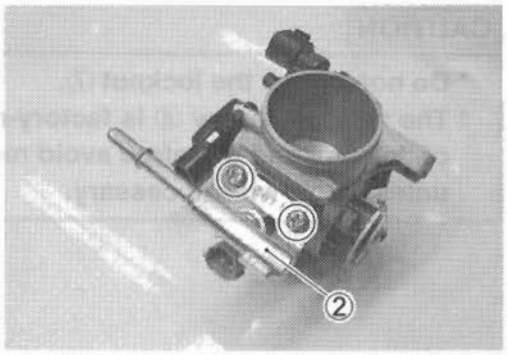


THROTTLE BODY DISASSEMBLY

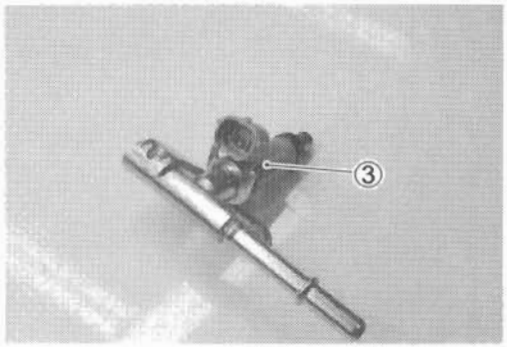
- Disconnect the vacuum hose ①.



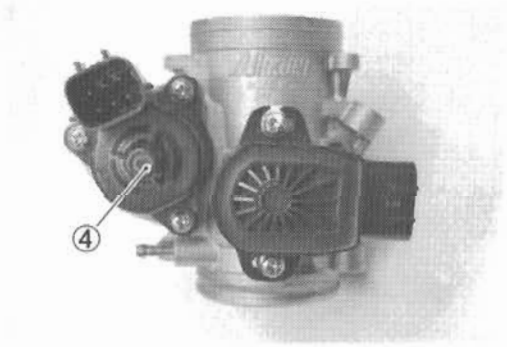
- Remove the fuel delivery pipe assembly ② by removing its mounting screws.



- Remove the fuel injector ③.

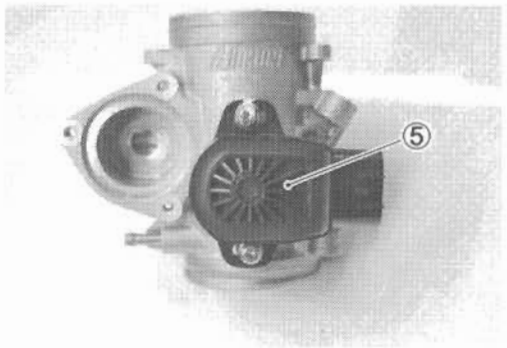


- Remove the ISC valve ④.



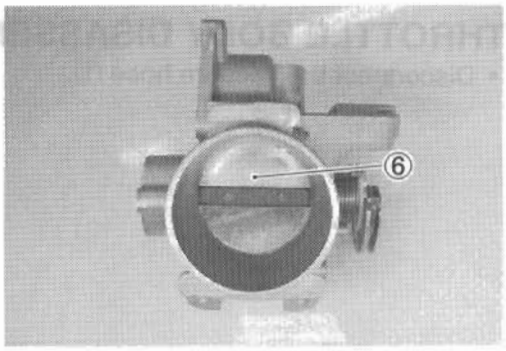
- Remove the TP sensor ⑤.

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



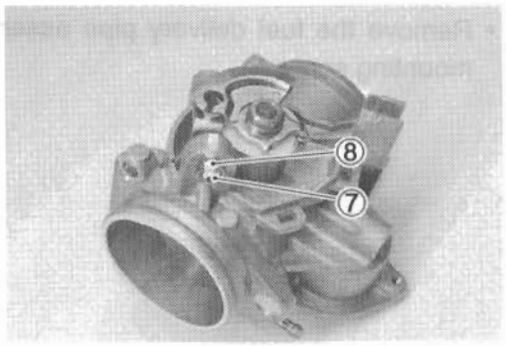
CAUTION

Never remove the throttle valve ⑥.



CAUTION

*** Do not loosen the locknut ⑦.**
*** The fast idle screw ⑧ is factory-adjusted at the time of delivery and therefore avoid removing or turning it unless otherwise necessary.**



THROTTLE BODY 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 for 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.

THROTTLE BODY INSPECTION

Check following items for any damage or clogging.

* O-ring
* Throttle valve
* Vacuum hose

ISC VALVE INSPECTION

Check the ISC valve O-ring ① for crack and other damage.



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 5-58 for details.



THROTTLE BODY REASSEMBLY

Reassemble the throttle body in the reverse order of disassembly. Pay attention to the following points:

- With the TV fully closed, install the TP sensor ① and tighten the TP sensor mounting screw to the specified torque.

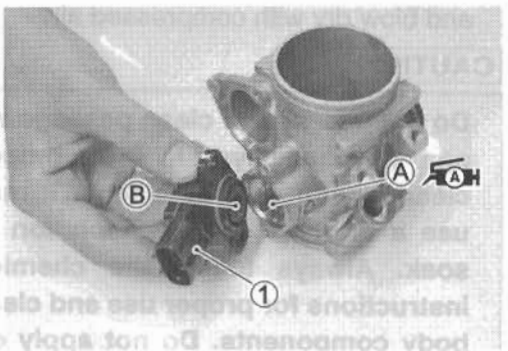
NOTE:

** Align the throttle shaft end Ⓐ with the groove Ⓑ of TP sensor.*
** Apply SUZUKI SUPER GREASE "A" to the secondary throttle shaft end Ⓐ if necessary.*

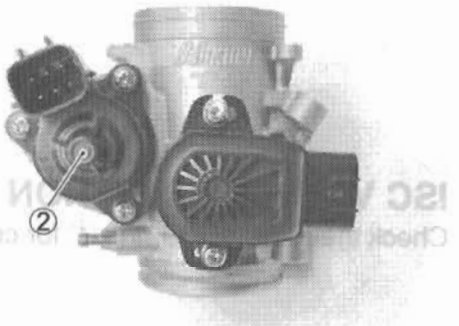
99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

TP sensor mounting screw: 2 N·m (0.2 kgf-m, 1.5 lb-ft)

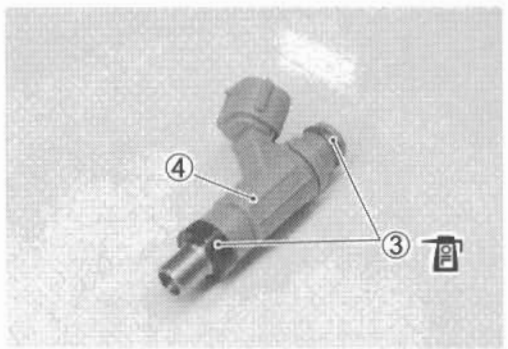
NOTE:
If the TP sensor adjustment is necessary, refer to page 5-17 for TP sensor setting procedure.



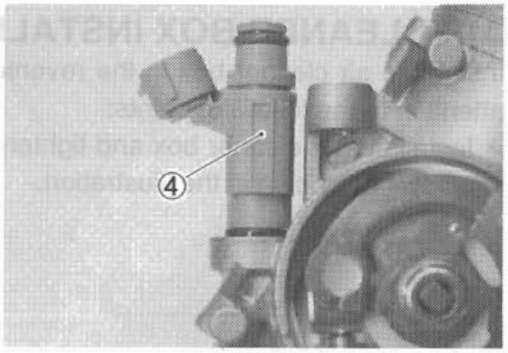
- Install the ISC valve ②.



- Install the new O-rings ③ to the fuel injector ④.
- Apply thin coat of the engine oil to the O-rings.



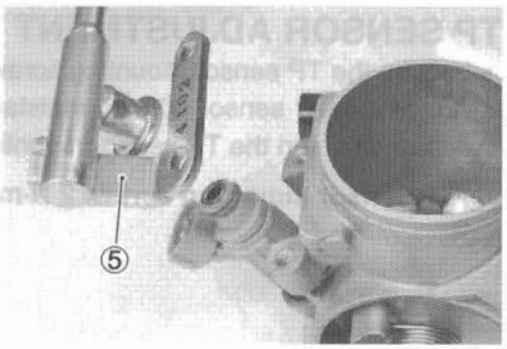
- Install the fuel injector ④ by pushing it straight to the throttle body.



CAUTION

Replace the dust seal and O-ring with the new ones. Never turn the injector while pushing it.

- Install the fuel delivery pipe assembly ⑤ to the throttle body.



CAUTION

Never turn the fuel injector while installing the delivery pipe.

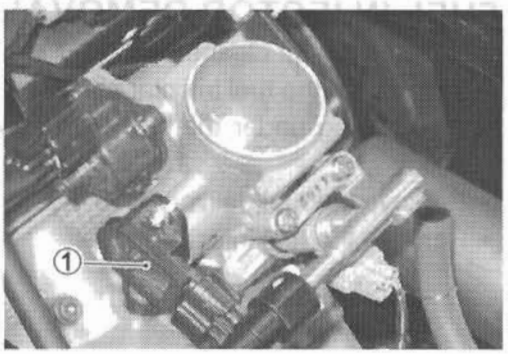
- Tighten the fuel delivery pipe mounting screws to the specified torque.

Fuel delivery pipe mounting screw:
5 N·m (0.5 kgf-m, 3.5 lb-ft)

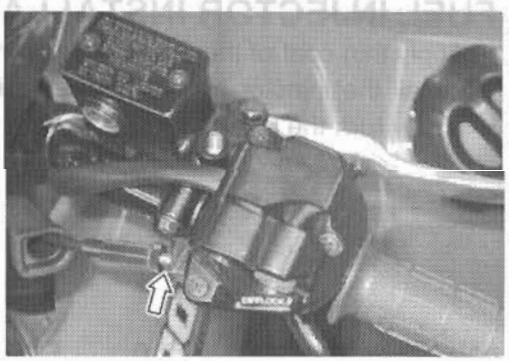
THROTTLE BODY INSTALLATION

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

- Connect the TP sensor lead wire coupler ①.



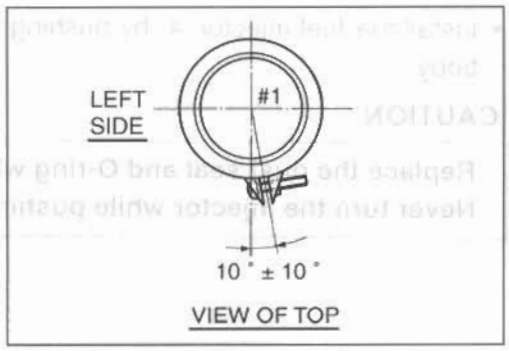
- Adjust the throttle cable play.
  Refer to page 2-12 for details.



AIR CLEANER BOX INSTALLATION

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

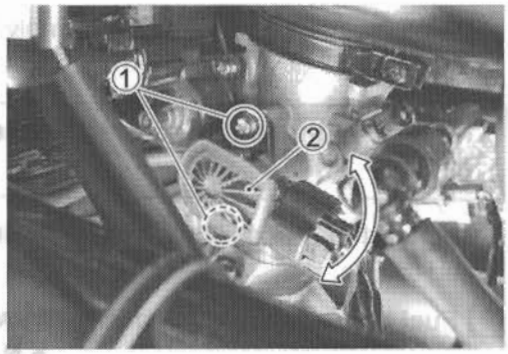
- Install the air cleaner box and tighten the throttle body clamp screws as shown in the illustration.



TP SENSOR ADJUSTMENT

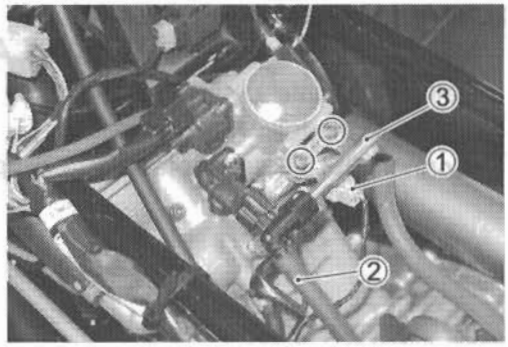
- Loosen the TP sensor mounting screws ①.
- Adjust the TP sensor ② until resistance comes to specification and tighten the TP sensor mounting screw.

TP sensor mounting screw: 2 N·m (0.2 kgf-m, 1.5 lb-ft)



FUEL INJECTOR REMOVAL

- Remove the air cleaner box. (☞3-4)
- Disconnect the fuel injector coupler ①.
- Place a rag under the fuel feed hose ② and disconnect its hose.
- Remove the fuel delivery pipe ③.
- Remove the fuel injector.

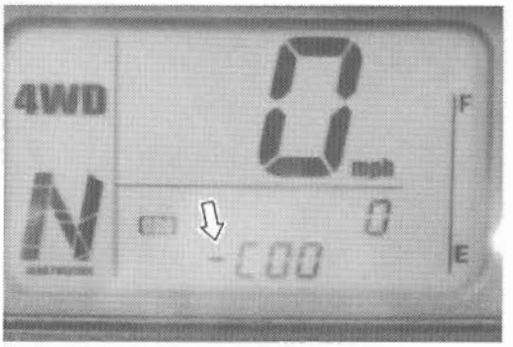


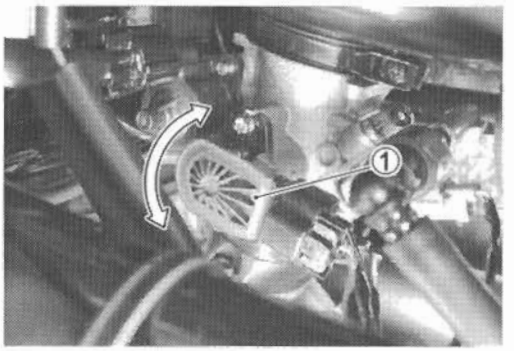
FUEL INJECTOR INSTALLATION

- Apply thin coat of the engine oil to new injector O-ring.
- Install the injector by pushing it straight to the throttle body. Never turn the injector while pushing it. (☞6-15)

THROTTLE POSITION SENSOR (TPS) SETTING

After all adjustments are completed, check or adjust the TPS ① setting condition.
(Refer to page 5-17 for TPS setting procedure.)





COOLING AND LUBRICATION SYSTEM

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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 (–22°F)
55%	–40°C (–40°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 more than 60% anti-freeze or less than 50%. (Refer to figure.)**
- **Do not use a radiator anti-leak additive.**

50% Engine coolant including reserve tank capacity

Anti-freeze	1 225 ml (2.6/2.2 US/Imp. pt)
Water	1 225 ml (2.6/2.2 US/Imp. pt)

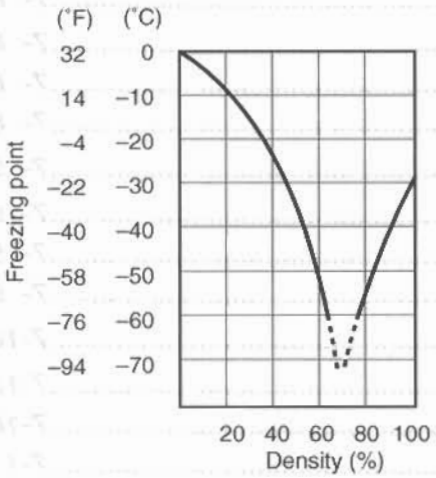


Fig.1 Engine coolant density-freezing point curve.

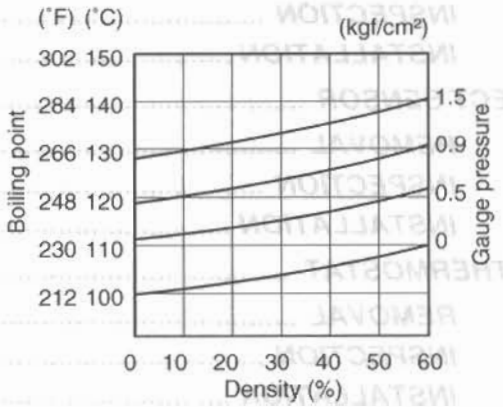
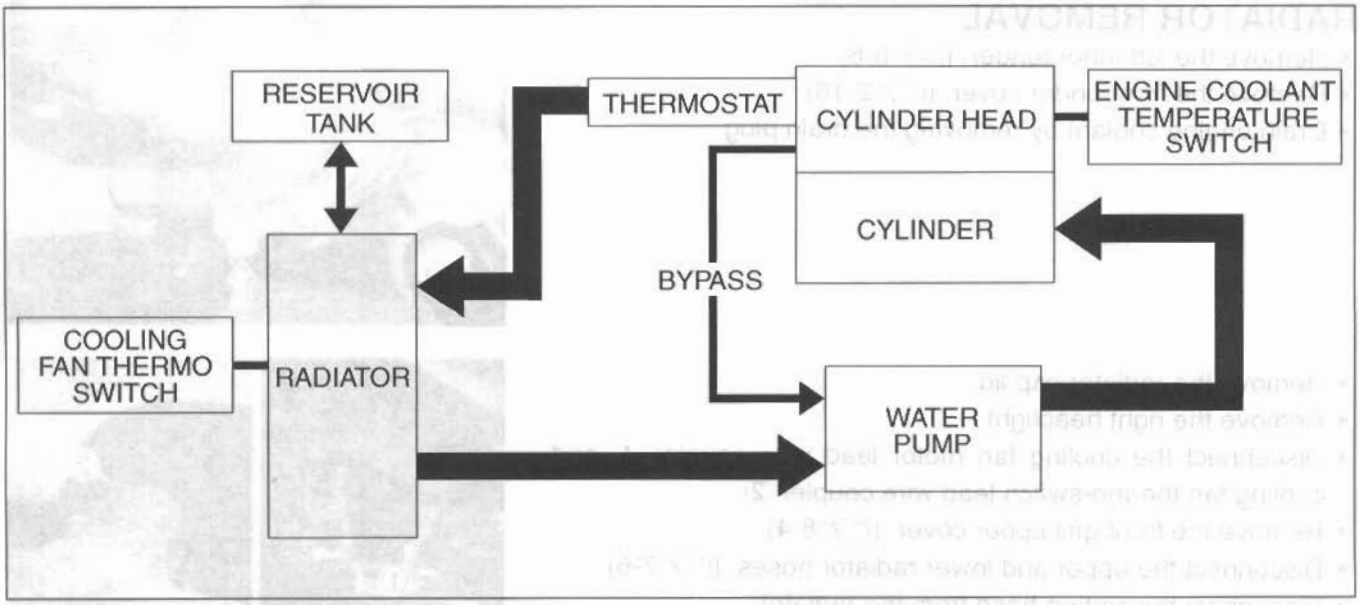


Fig.2 Engine coolant density-boiling point curve.

⚠ 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.**

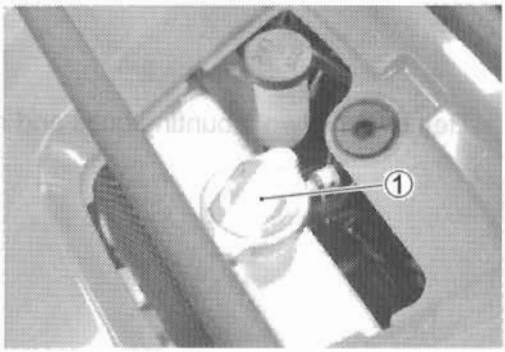
COOLING CIRCUIT



COOLING CIRCUIT INSPECTION

Before removing the radiator and draining the engine coolant, inspect the cooling circuit for tightness.

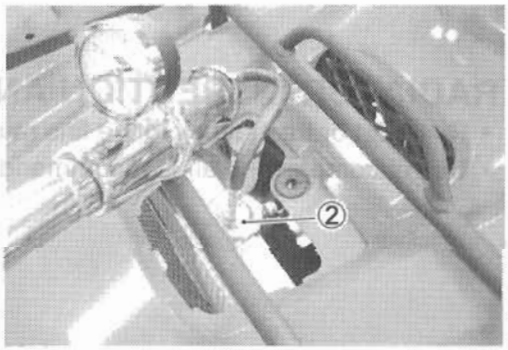
- Remove the radiator cap lid.
- Remove the radiator cap ① and connect the tester ② to the filler.



⚠ WARNING

Do not remove the radiator cap when the engine is hot.

Give a pressure of about 130 kPa (1.3 kgf/m², 18 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.

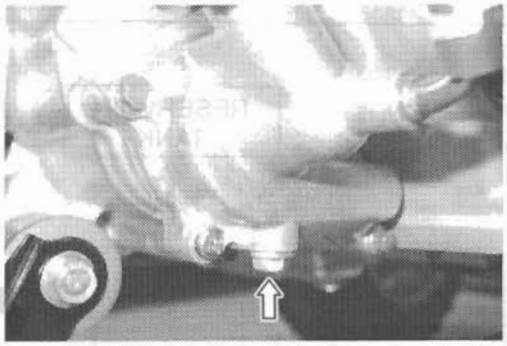
CAUTION

Do not allow the pressure to exceed the radiator cap release pressure, or the radiator can be damaged.

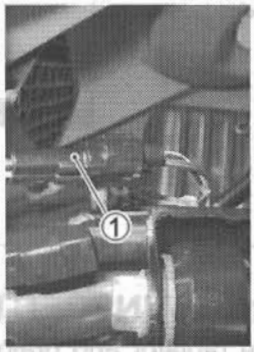
RADIATOR AND HOSES

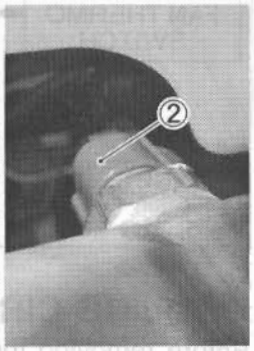
RADIATOR REMOVAL

- Remove the left inner fender. (☞8-6)
- Remove the front under cover. (☞2-16)
- Drain engine coolant by removing the drain plug.



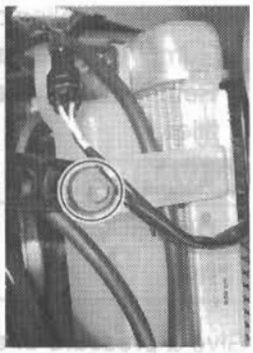
- Remove the radiator cap lid.
- Remove the right headlight.
- Disconnect the cooling fan motor lead wire coupler ① and cooling fan thermo-switch lead wire coupler ②.
- Remove the front grill upper cover. (☞8-4)
- Disconnect the upper and lower radiator hoses. (☞7-6)
- Disconnect the siphon hose from the radiator.





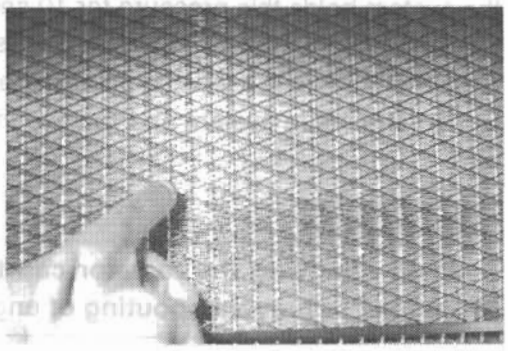
- Remove the two mounting bolts and radiator assembly.



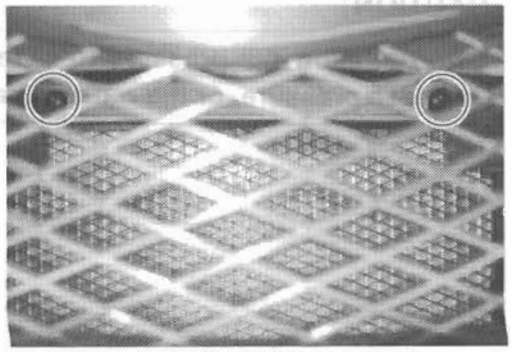


RADIATOR INSPECTION AND CLEANING

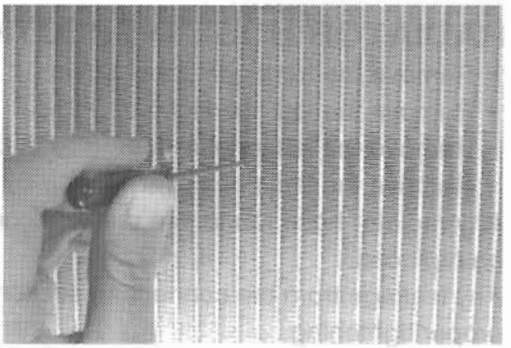
- Road dirt or trash stuck to the fins must be removed.
- Use of compressed air is recommended for this cleaning.



- Remove the radiator fin guard net.



- Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.



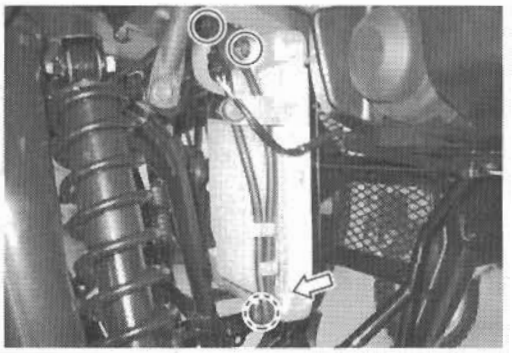
RADIATOR REMOUNTING

- Install the radiator in the reverse order of removal.
- Pay attention to the following points:
- Connect the radiator hoses.
- Install the drain plug. (☞2-16)
- Pour engine coolant. (☞2-16)
- Bleed air from the cooling circuit. (☞2-16)

RADIATOR RESERVOIR TANK

REMOVAL/INSTALLATION

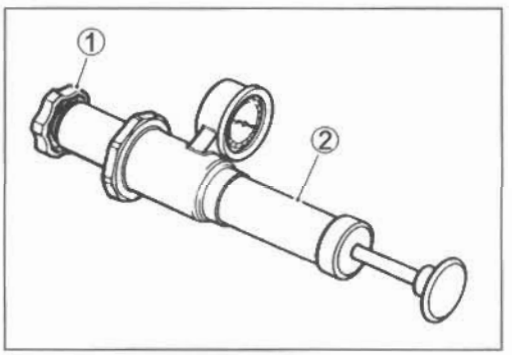
- Remove the reservoir tank mounting bolts and disconnect the siphon hose from the reservoir tank and drain engine coolant.
- Install the reservoir tank in the reverse order of removal.
- Fill the reservoir tank to the upper level line.



RADIATOR CAP INSPECTION

- Remove the radiator cap lid.
- 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 110 – 140 kPa (1.1 – 1.4 kgf/cm², 15.6 – 19.9 psi) and that, with the tester held standstill, 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.



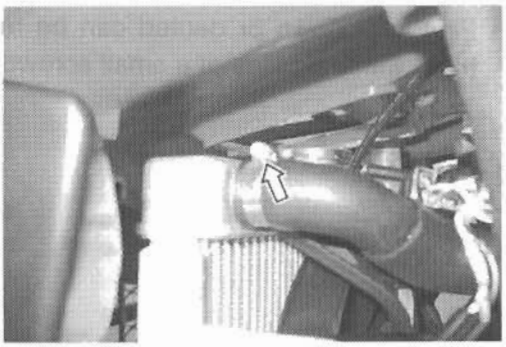
DATA **Radiator cap valve opening pressure**
Standard: 110 – 140 kPa
(1.1 – 1.4 kgf/cm², 15.6 – 19.9 psi)

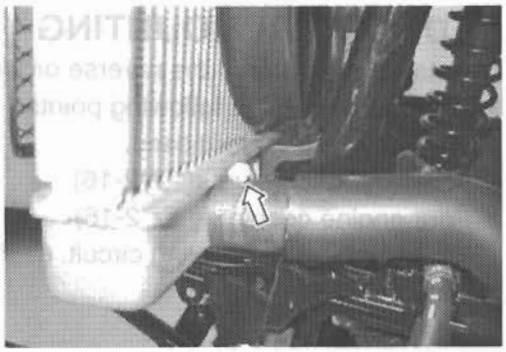
RADIATOR HOSE INSPECTION

- Remove the front grill upper cover. (☞8-4)
- Remove the left headlight. (☞8-5)
- Remove the left inner fender. (☞8-6)
- Remove the left side cover. (☞8-8)

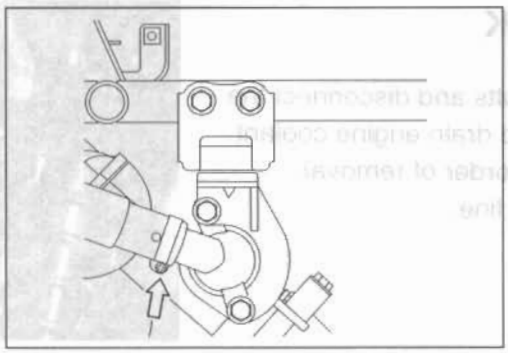
Any radiator hose found in a cracked condition or flattened must be replaced.

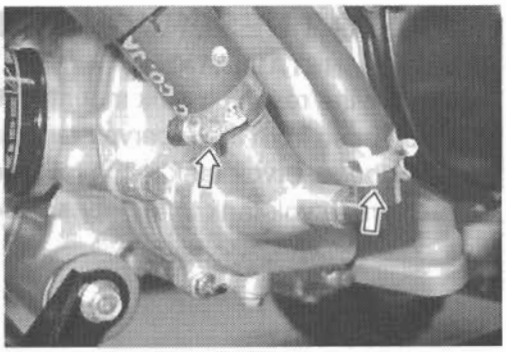
Any leakage from the connecting section should be corrected by proper tightening.





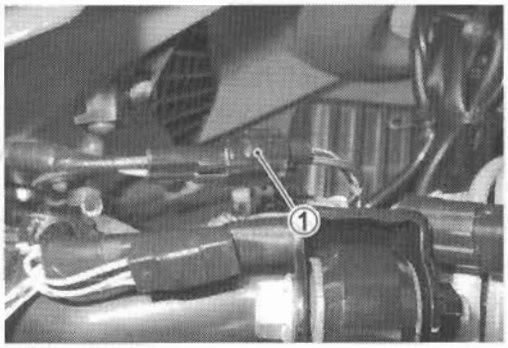
Cooling hose clamp: 1.5 N·m (0.15 kgf-m, 1.0 lb-ft)





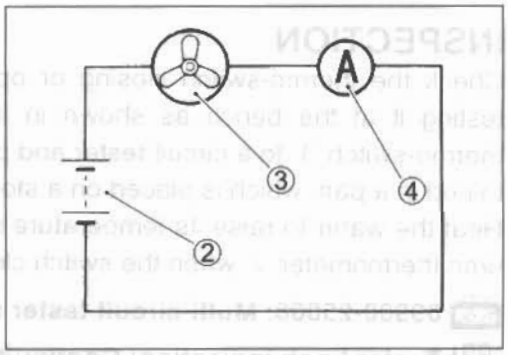
COOLING FAN

INSPECTION



- Remove the radiator cap lid.
- Disconnect the cooling fan motor lead wire coupler ①.

Test the cooling fan motor for load current with an ammeter connected as shown in the illustration.



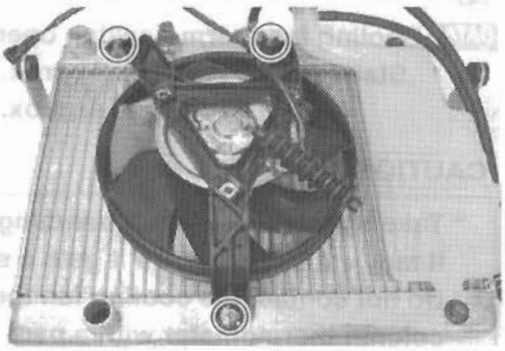
The voltmeter is for making sure that the battery ② applies 12 volts to the motor ③. With the motor with electric motor fan running at full speed, the ammeter ④ should be indicating not more than 8 amperes.

If the fan motor does not turn, replace the cooling fan assembly with a new one.

NOTE:

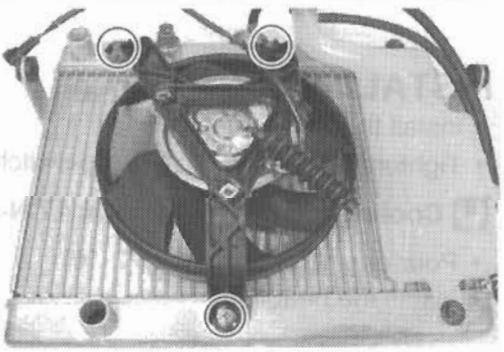
When making above test, it is not necessary to remove the cooling fan.

REMOVAL



- Remove the radiator. (☞7-4)
- Remove the cooling fan mounting bolts and collars.

REMOUNTING

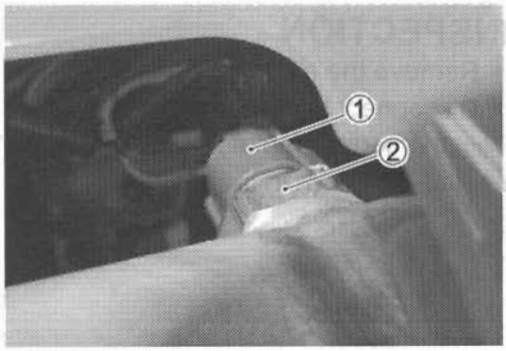


- Install the cooling fan in the reverse order of removal.
- Tighten the cooling fan mounting bolts to the specified torque.

Cooling fan mounting bolt: 8.5 N·m (0.85 kgf-m, 6.15 lb-ft)

COOLING FAN THERMO-SWITCH

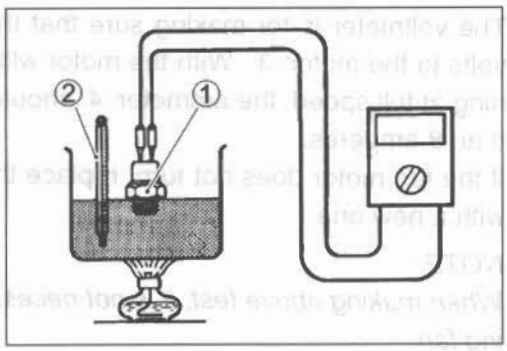
REMOVAL



- Remove the left headlight. (☞8-5)
- Drain engine coolant. (☞2-16)
- Disconnect the cooling fan thermo-switch lead wire coupler ①.
- Remove the cooling fan thermo-switch ②.

INSPECTION

Check the thermo-switch closing or opening temperatures by testing it at the bench as shown in the figure. Connect the thermo-switch ① to a circuit tester and place it in the water contained in a pan, which is placed on a stove.
Heat the water to raise its temperature slowly and read the column thermometer ② when the switch closes or opens.



TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Continuity test (•)))

DATA Cooling fan thermo-switch operating temperature
Standard (OFF→ON): Approx. 93°C (199°F)
(ON→OFF): Approx. 87°C (189°F)

CAUTION

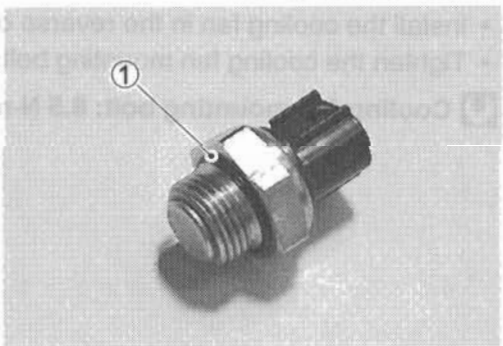
*** Take special care when handling the thermo-switch. It may cause damage if it gets a sharp impact.**
*** Do not contact the cooling fan thermo-switch and the column thermometer with a pan.**

INSTALLATION

- Install the new O-ring ①.
- Tighten the cooling fan thermo-switch to the specified torque.

Cooling fan thermo-switch: 17 N·m (1.7 kgf-m, 12.5 lb-ft)

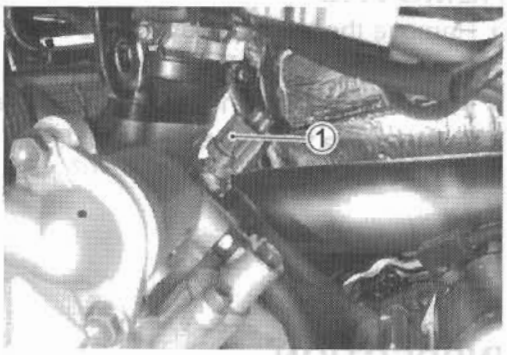
- Pour engine coolant. (☞2-16)
- Install the headlight.



ECT SENSOR

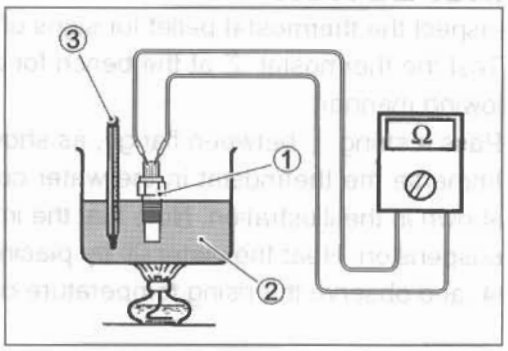
REMOVAL

- Remove the left side cover. (☞8-8)
- 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. 2.45 kΩ
50 °C (122 °F)	Approx. 0.811 kΩ
80 °C (176 °F)	Approx. 0.318 kΩ
110 °C (230 °F)	Approx. 0.142 kΩ

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.**

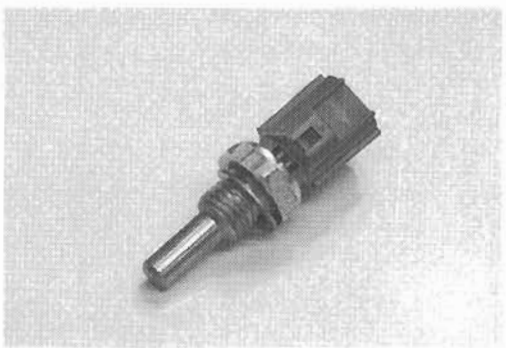
INSTALLATION

- Install the ECT sensor in the reverse order of removal.
- Tighten the ECT sensor to the specified torque.

ECT sensor: 18 N·m (1.8 kgf-m, 13.0 lb-ft)

CAUTION

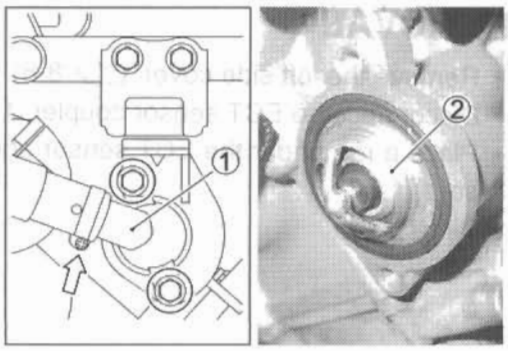
Take special care when handling the ECT sensor. It may cause damage if it gets a sharp impact.



- Pour engine coolant. (☞2-16)

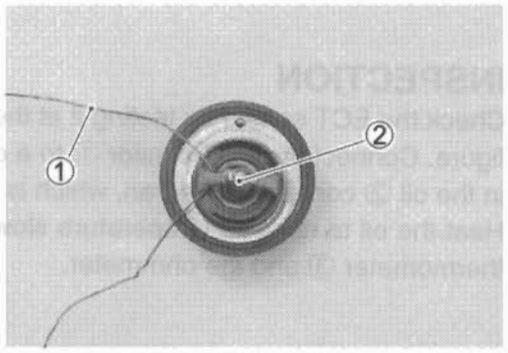
THERMOSTAT

REMOVAL

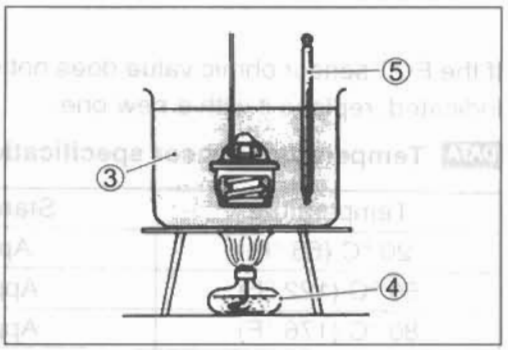


- Remove the left side cover. (☞8-8)
- Drain engine coolant. (☞2-16)
- Place a rag under the thermostat cover ①.
- Remove the thermostat cover ①.
- Remove the thermostat ②.

INSPECTION

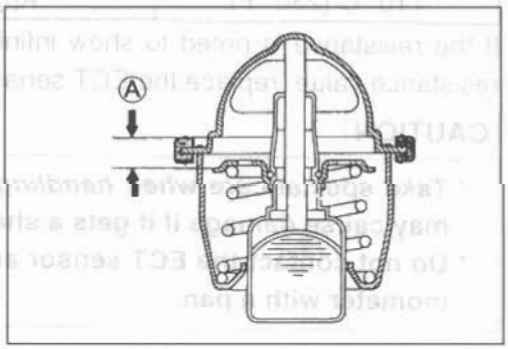


Inspect the thermostat pellet for signs of cracking.
Test the thermostat ② at the bench for control action, in the following manner.
Pass a string ① between flange, as shown in the photograph.
Immerse the thermostat in the water contained in a beaker, as shown in the illustration. Note that the immersed 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: 80.5 – 83.5 °C (177 – 182 °F)

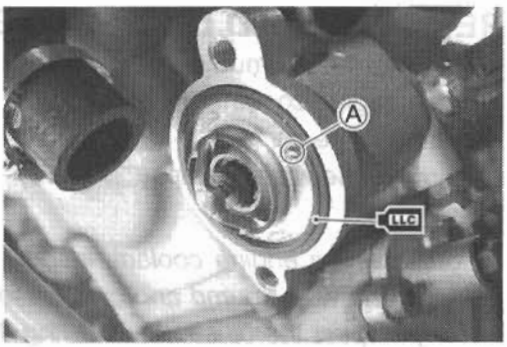


Keep on heating the water to raise its temperature.
Just when the water temperature reaches specified value, the thermostat valve should have lifted Ⓐ by at least 8.0 mm (0.31 in).

DATA Thermostat valve lift
Standard: Over 8.0 mm at 95 °C (Over 0.31 in at 203 °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.

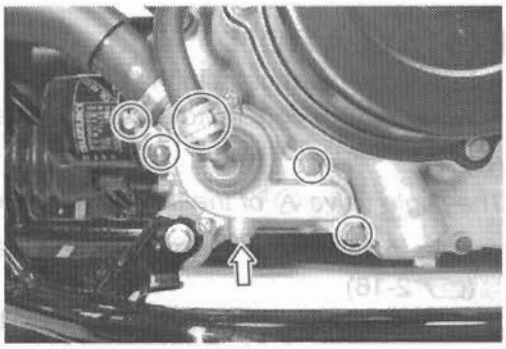
NOTE:
The jiggle valve Ⓐ of the thermostat faces upside.

- After installing the thermostat, be sure to add engine coolant. (☞2-16)
- Tighten the thermostat cover bolts to the specified torque.

Thermostat cover bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)

WATER PUMP

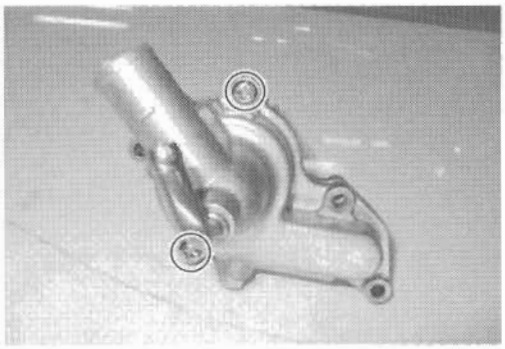
REMOVAL AND DISASSEMBLY



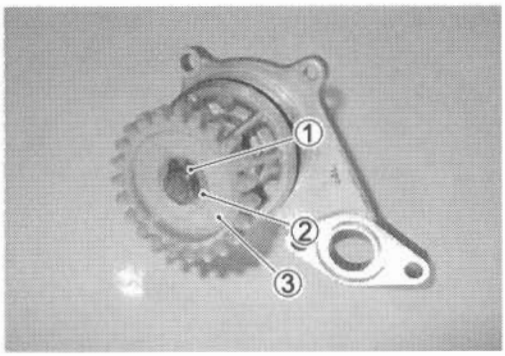
- Remove the left mud guard. (☞8-8)
- Drain engine coolant. (☞2-16)
- Drain engine oil. (☞2-12)
- Remove the water pump. (☞3-16)

NOTE:
Before draining engine coolant, inspect engine coolant leakage between the water pump and crankcase. If engine oil is leaking, visually inspect the oil seal and O-ring. If engine coolant is leaking, visually inspect the mechanical seal and seal ring.

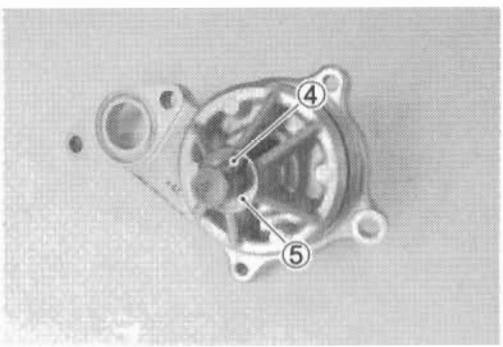
- Remove the water pump cover.



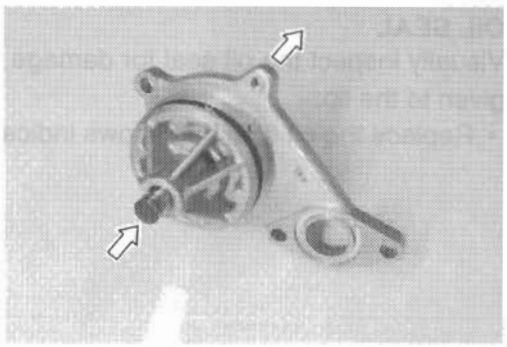
- Remove the circlip ①, washer ② and water pump drive gear ③.



- Remove the impeller shaft pin ④ and washer ⑤.

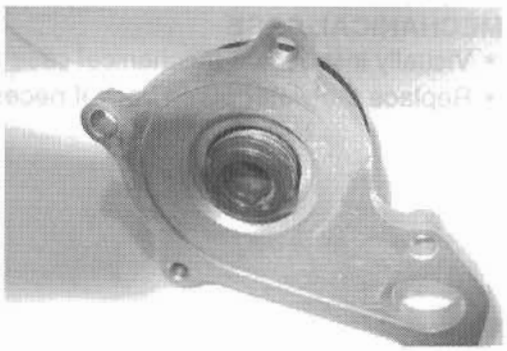


- Remove the impeller shaft.



MECHANICAL SEAL

Visually inspect the mechanical seal for damage, with particular attention given to the sealing face.
Replace the mechanical seal that shows indications of leakage.
Also replace the seal ring if necessary.

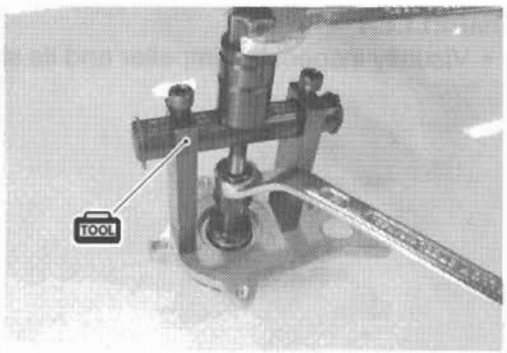


- Remove the mechanical seal using the special tool.

TOOL 09921-20240: Bearing remover set

CAUTION

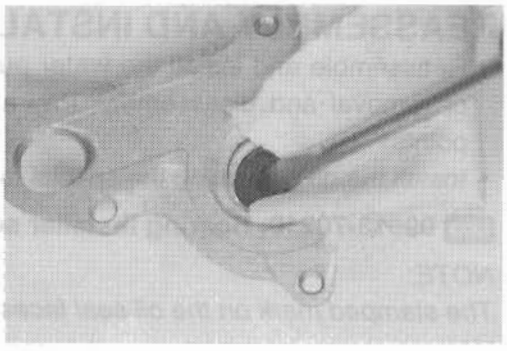
The removed mechanical seal must be replaced with a new one.



- Place a rag over the water pump.
- Remove the oil seal using a suitable bar.

CAUTION

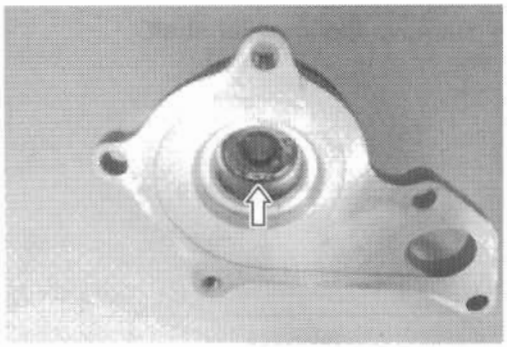
The removed oil seal must be replaced with a new one.



OIL SEAL

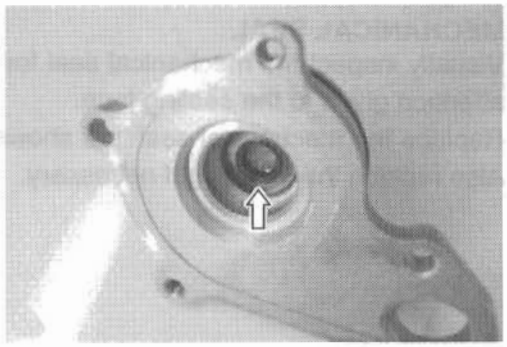
Visually inspect the oil seal for damage, with particular attention given to the lip.

- Replace the oil seal that shows indications of leakage.



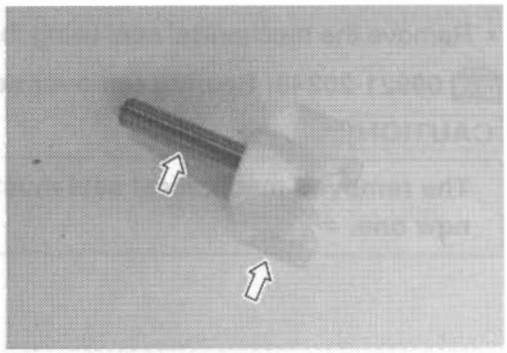
MECHANICAL CASE

- Visually inspect the mechanical case for damage.
- Replace the water pump body if necessary.



IMPELLER

- Visually inspect the impeller and its shaft for damage.

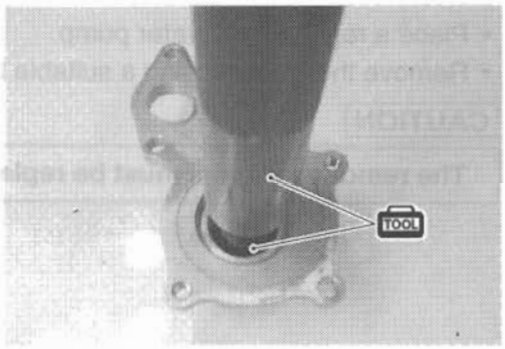


REASSEMBLY AND INSTALLATION

- Reassemble and install the water pump in the reverse order of removal and disassembly. Pay attention to the following points:
- *Install the oil seal using the special tool.*

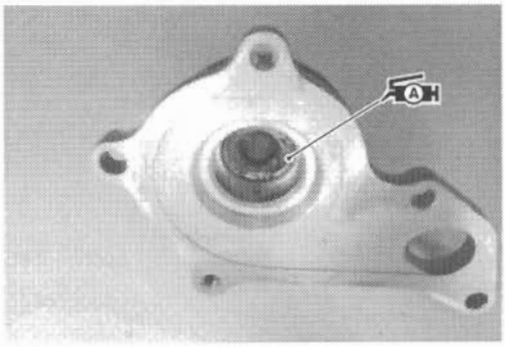
09913-70210: Bearing installer set

NOTE:
The stamped mark on the oil seal faces outside.



- Apply a small quantity of the SUZUKI SUPER GREASE "A" to the oil seal lip.

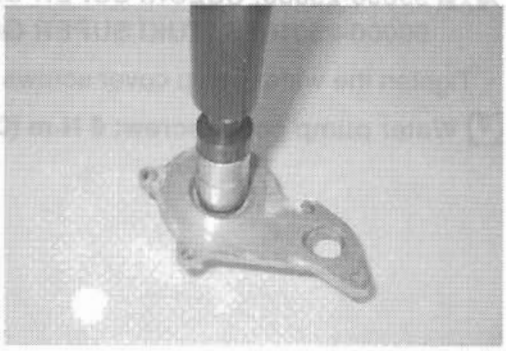
99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



- Install the new mechanical seal using a suitable size socket wrench.

NOTE:
On the new mechanical seal, the sealer Ⓐ has been applied.

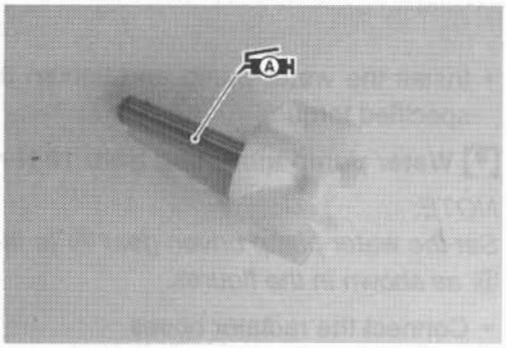




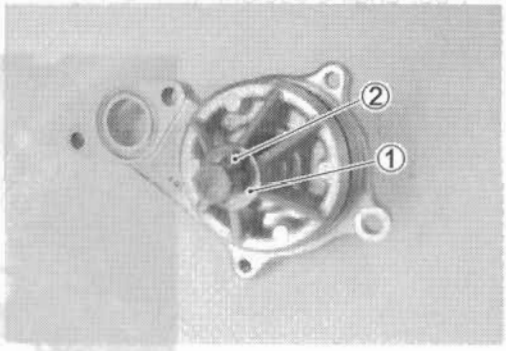
- Apply grease to the impeller shaft.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

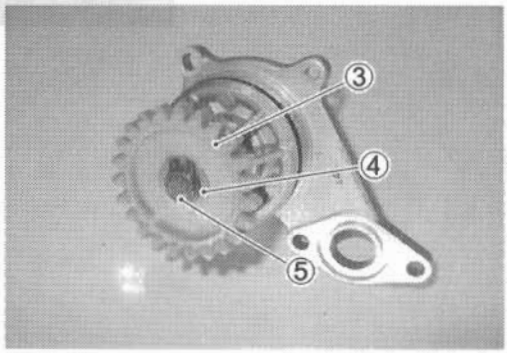
- Install the impeller shaft to the water pump body.



- Install the washer ① and inpeller shaft pin ② to the impeller shaft.



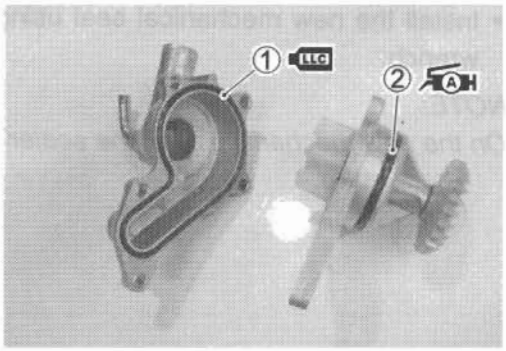
- Install the water pump driven gear ③, washer ④ and circlip ⑤.



- Install the new O-rings, ① and ②.

CAUTION

Use the new O-rings to prevent engine coolant and engine oil leakage.



NOTE:

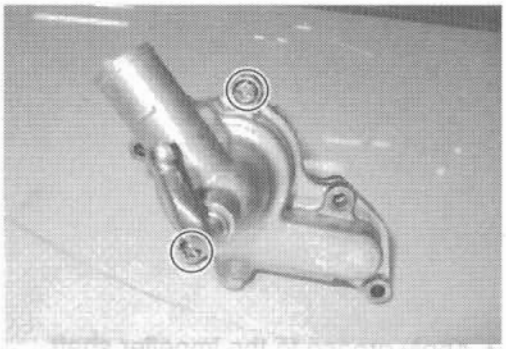
** Apply engine coolant to the O-ring ①.*

** Apply grease to the O-ring ②.*

A H 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

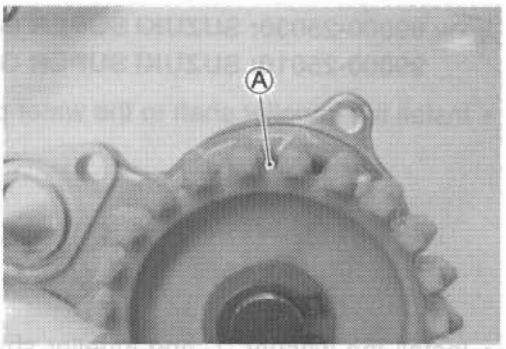
- Tighten the water pump cover screws to the specified torque.

Water pump cover screw: 6 N·m (0.6 kgf-m, 4.5 lb-ft)



- Install the water pump and tighten its mounting bolts to the specified torque.

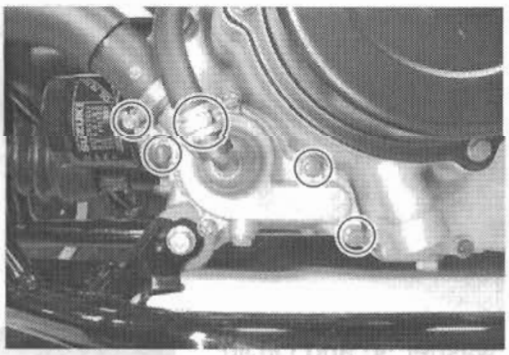
Water pump mounting bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)

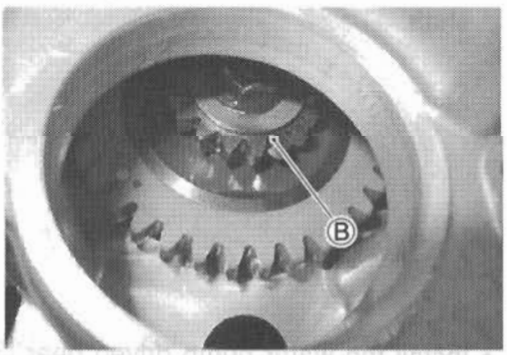


NOTE:

Set the water pump driven gear Ⓐ to the water pump drive gear Ⓑ as shown in the figures.

- Connect the radiator hoses.
- Pour engine coolant. (☞2-16)





LUBRICATION SYSTEM

OIL PRESSURE

☞2-32

OIL FILTER

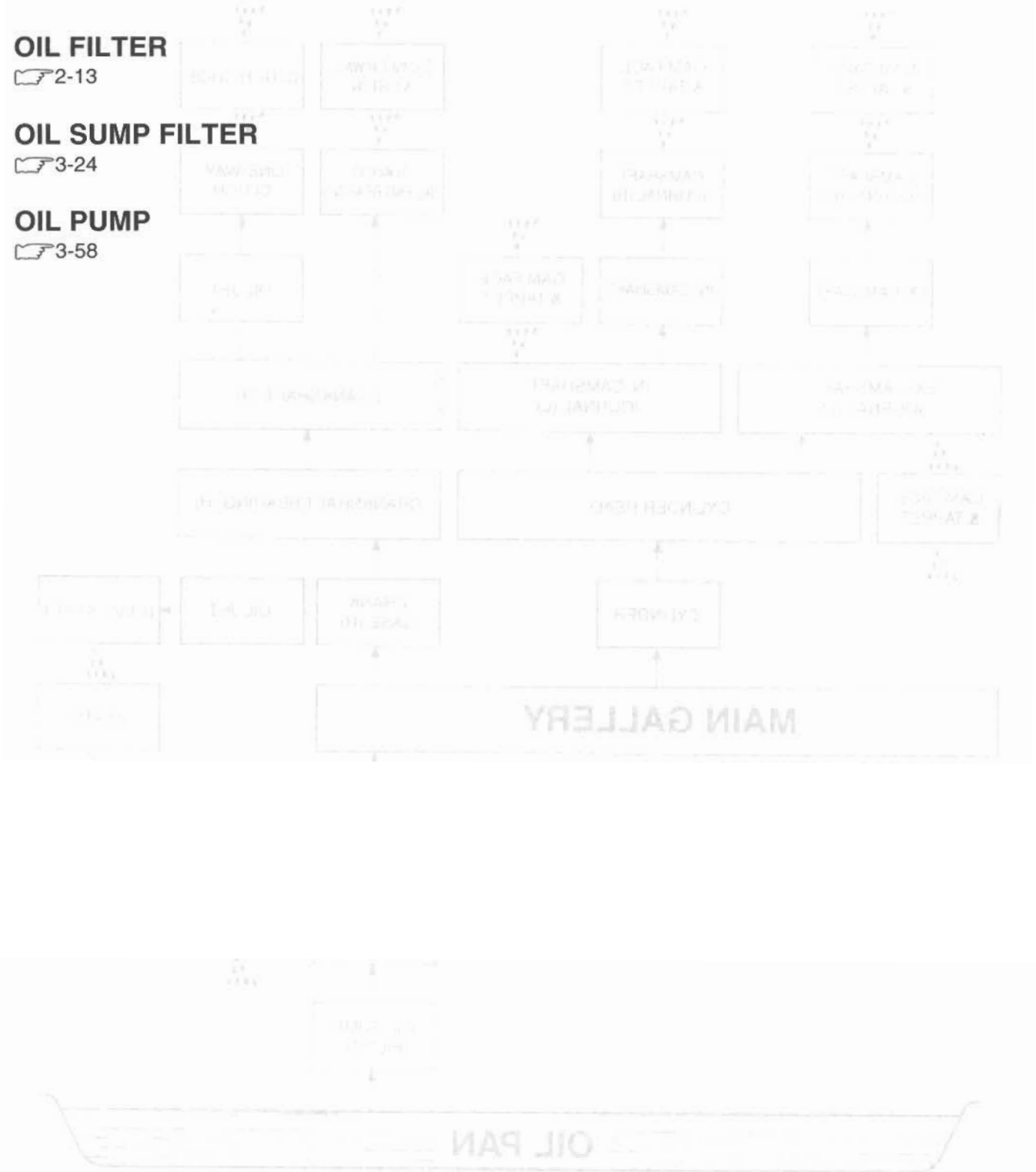
☞2-13

OIL SUMP FILTER

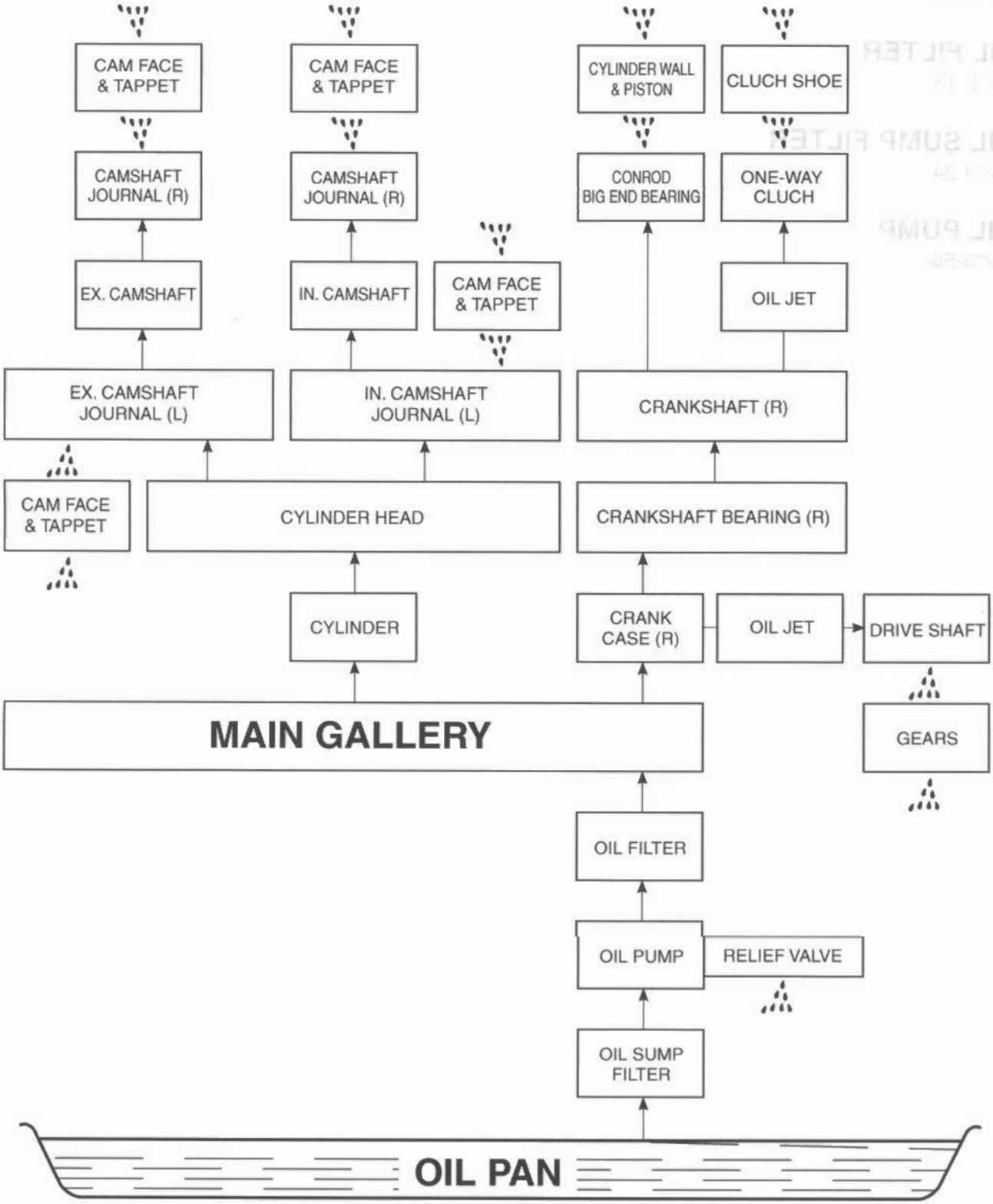
☞3-24

OIL PUMP

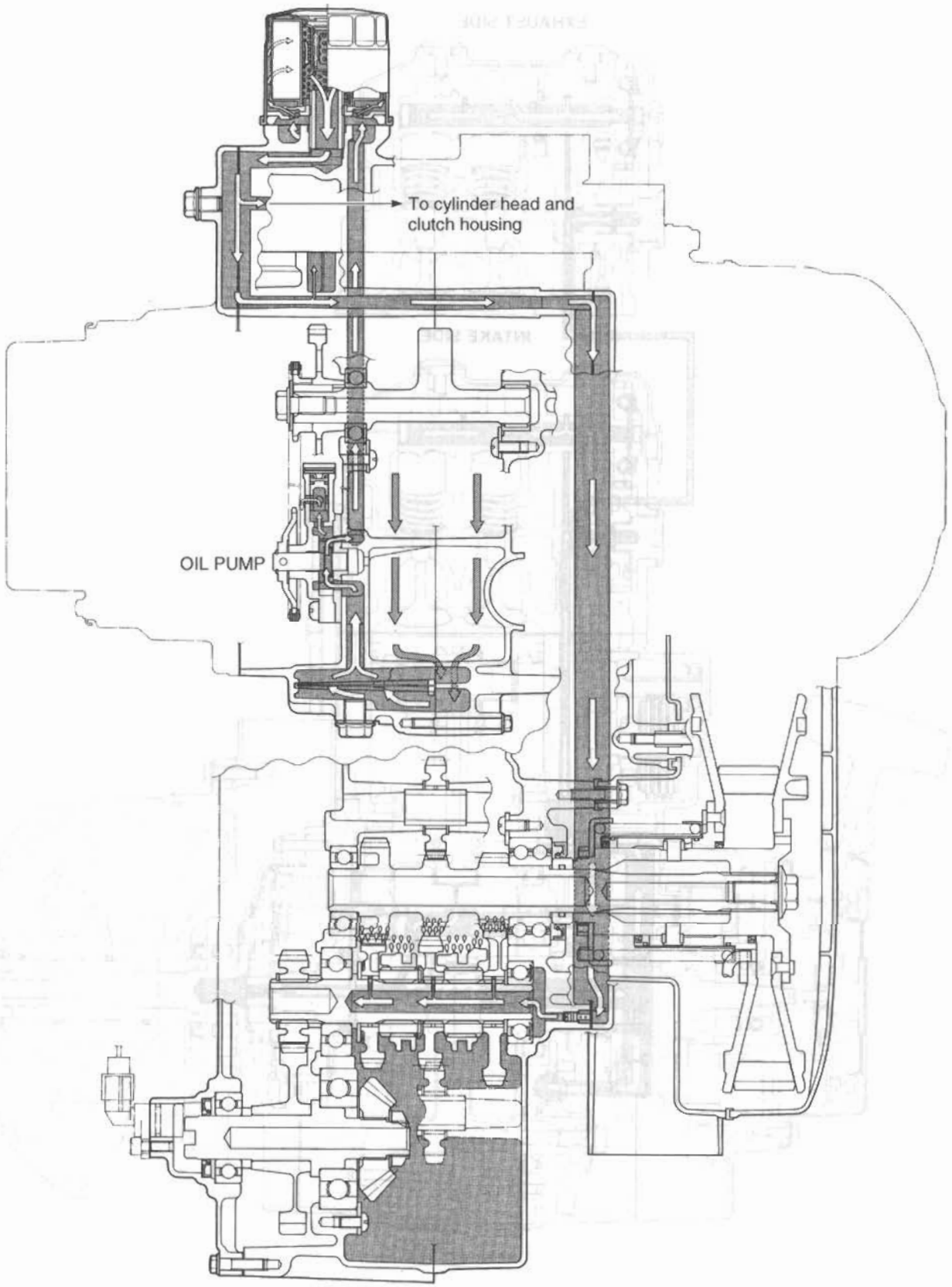
☞3-58

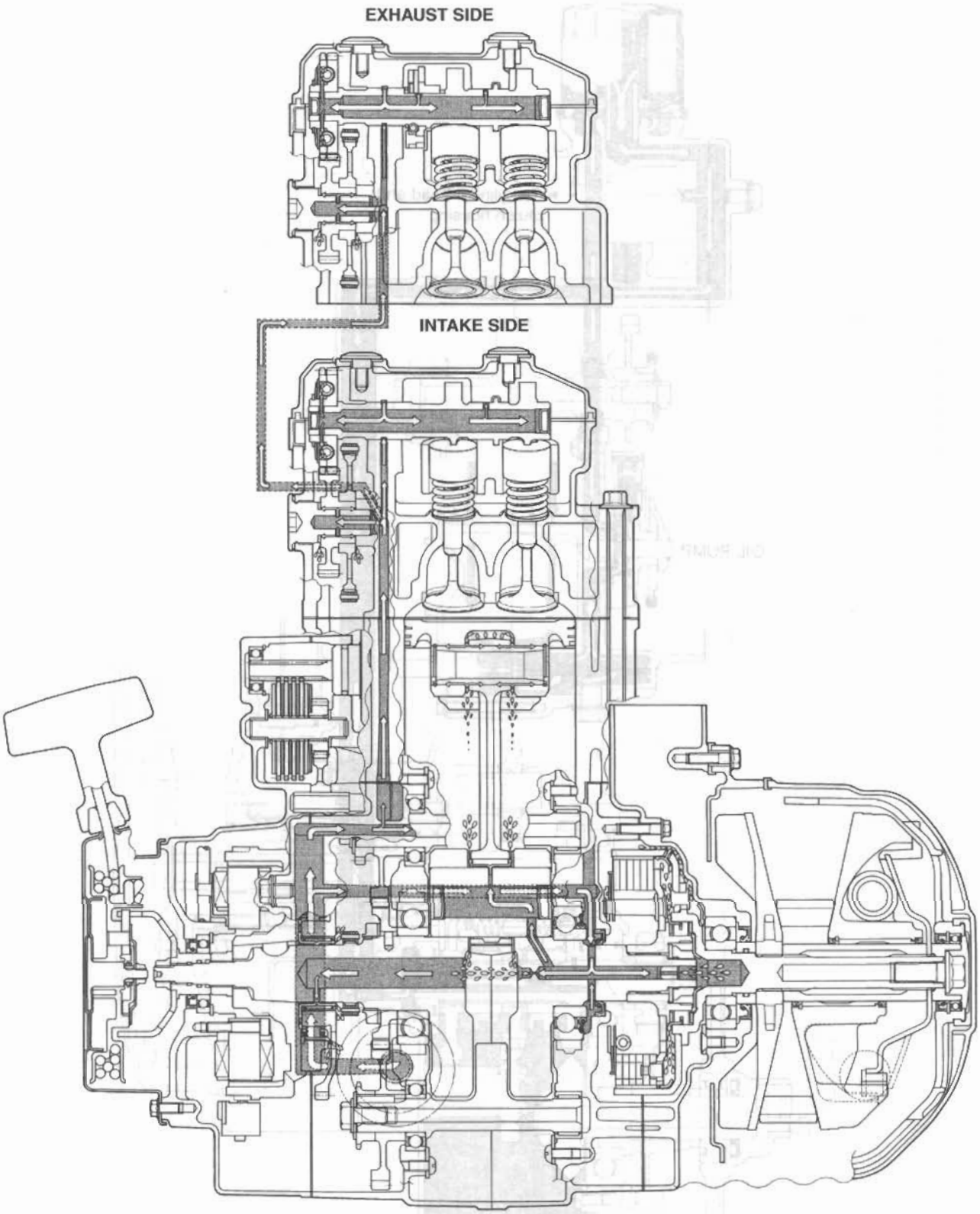


ENGINE LUBRICATION SYSTEM CHART



ENGINE LUBRICATION SYSTEM




EXHAUST SIDE
INTAKE SIDE

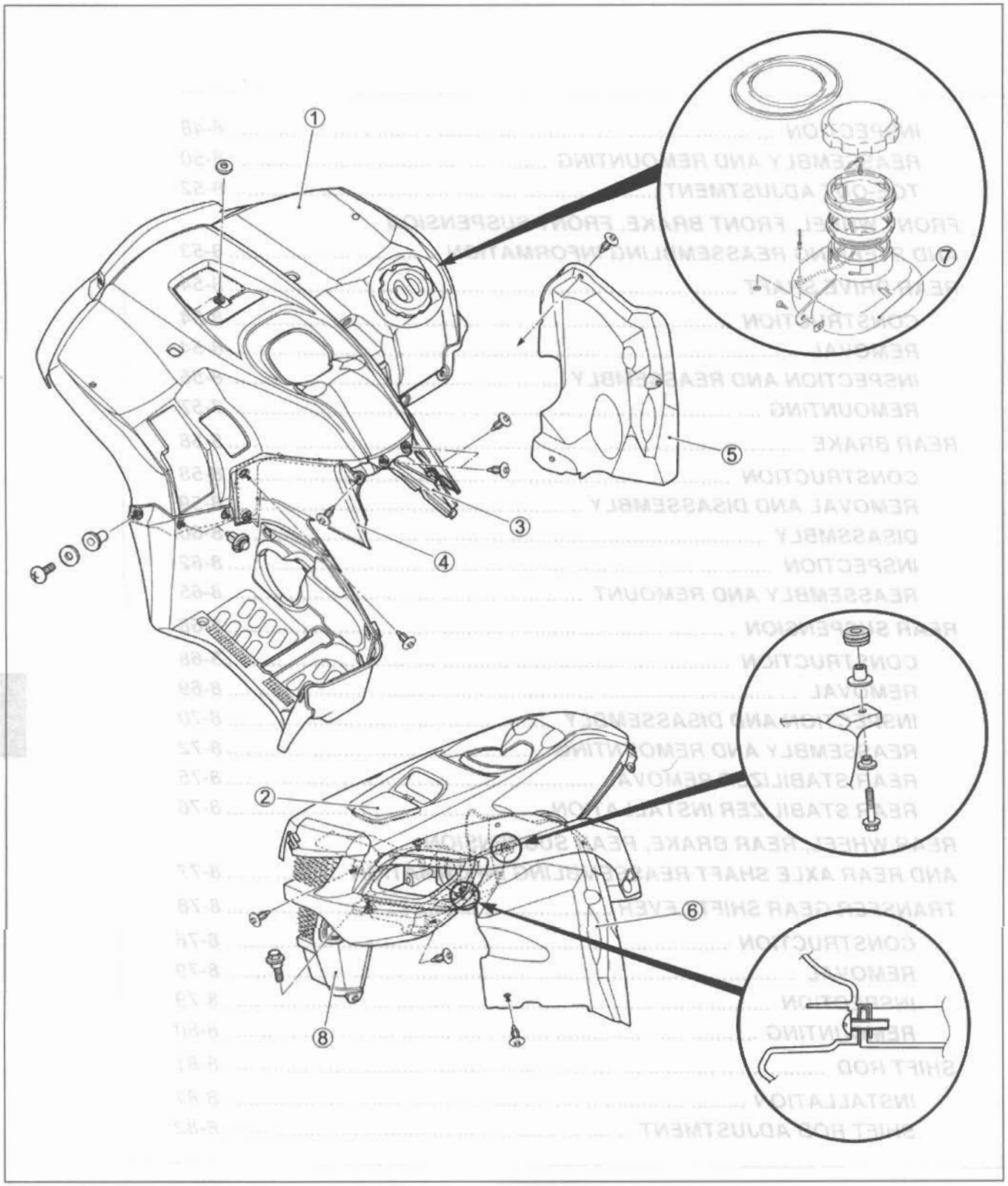
CHASSIS

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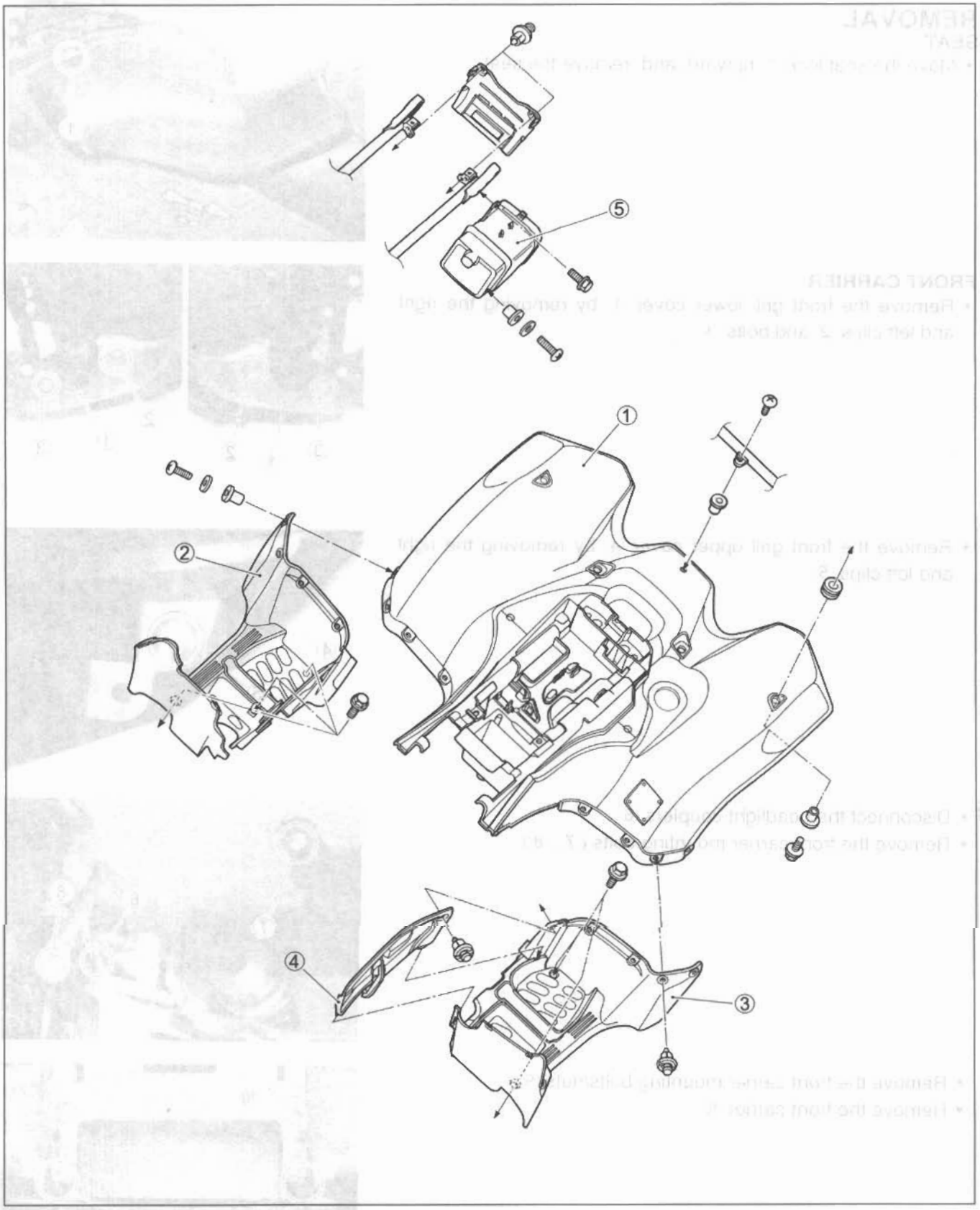
EXTERIOR PARTS 8- 2
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EXTERIOR PARTS
CONSTRUCTION



①	Front fender	⑤	Right inner fender
②	Radiator cap lid	⑥	Left inner fender
③	Right side cover	⑦	Front box
④	Left side cover	⑧	Front grill upper cover

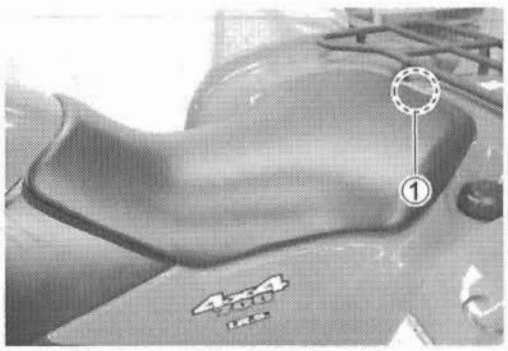


①	Rear fender	④	Left upper mud guard
②	Right mud guard	⑤	Rear box
③	Left lower mud guard		

REMOVAL

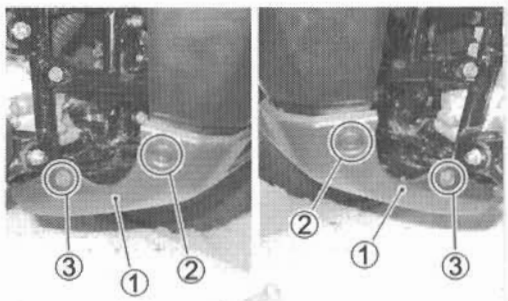
SEAT

- Move the seat lock ① upward, and remove the seat.

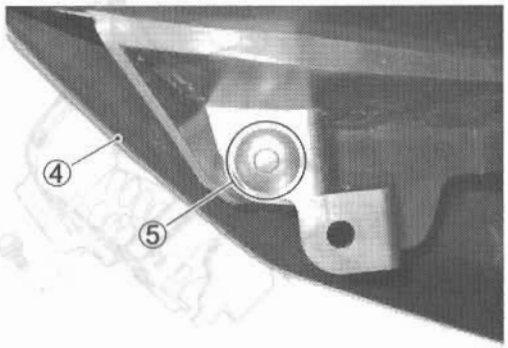


FRONT CARRIER

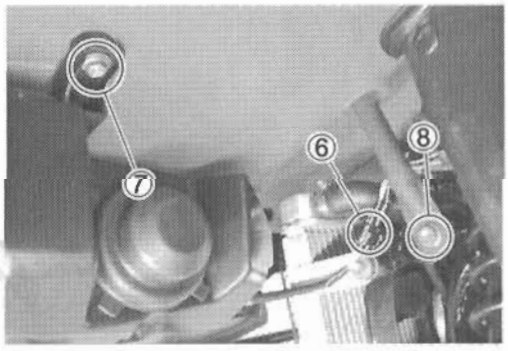
- Remove the front grill lower cover ① by removing the right and left clips ② and bolts ③.



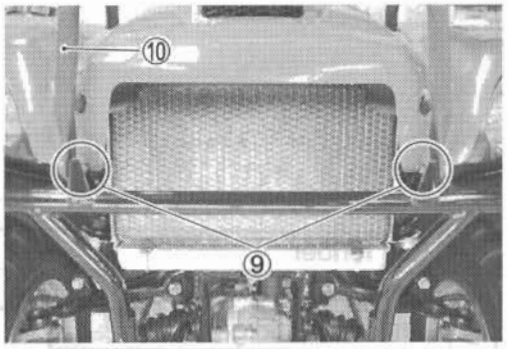
- Remove the front grill upper cover ④ by removing the right and left clips ⑤.



- Disconnect the headlight couplers ⑥.
- Remove the front carrier mounting bolts (⑦, ⑧).

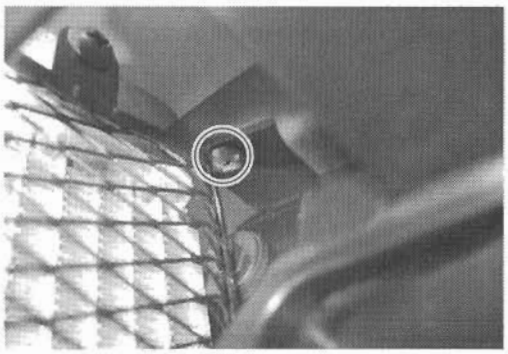


- Remove the front carrier mounting bolts/nuts ⑨.
- Remove the front carrier ⑩.

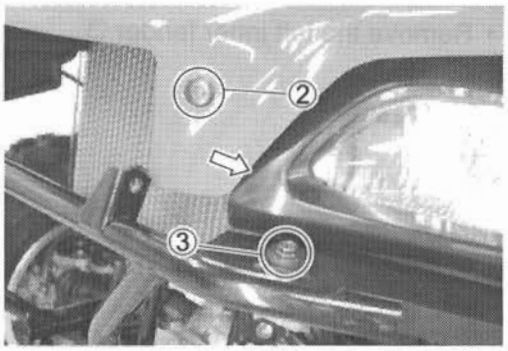


FRONT GRIP BAR

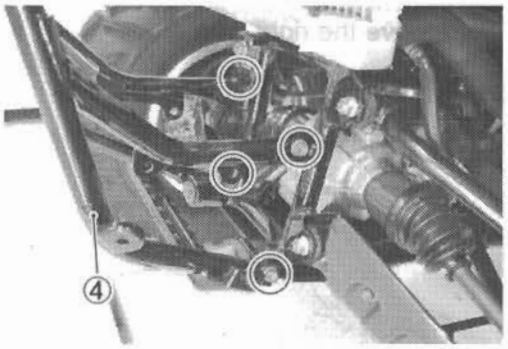
- Remove the front carrier. (☞8-4)
- Remove the headlight housing screws ①.



- Remove the headlight housing clips ②.
- Remove the headlight housing bolts ③.
- Disconnect the headlight couplers.
- Remove the right and left headlight assemblies.

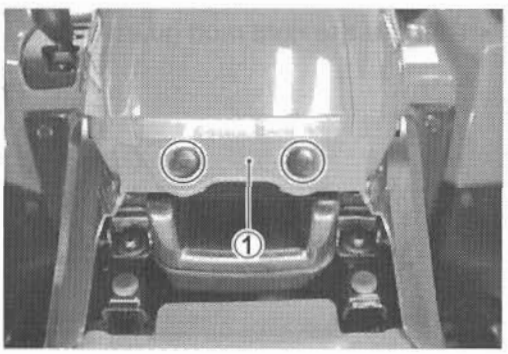


- Remove the front grip bar mounting bolts.
- Remove the front grip bar ④.

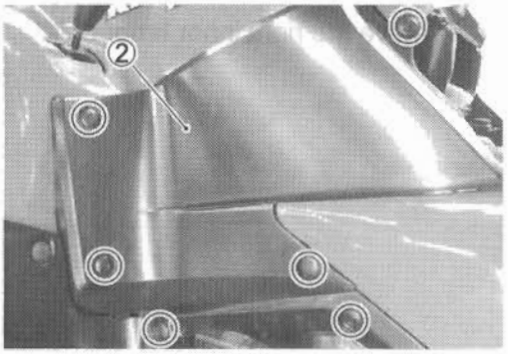


FRONT FENDER

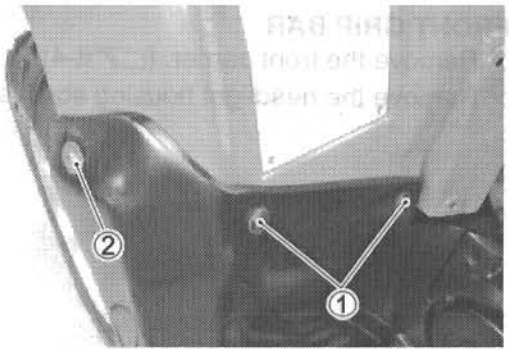
- Remove the seat. (☞8-4)
- Remove the front carrier. (☞8-4)
- Remove the front grip bar. (☞8-5)
- Remove the air cleaner box cover ①.



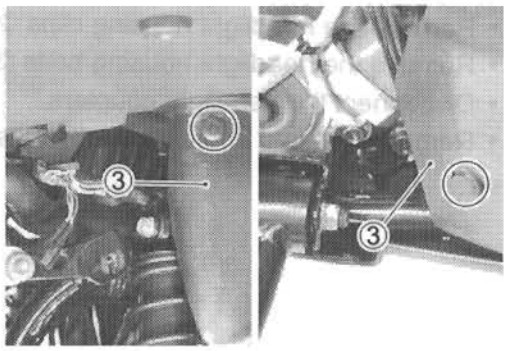
- Remove the left side cover ②.



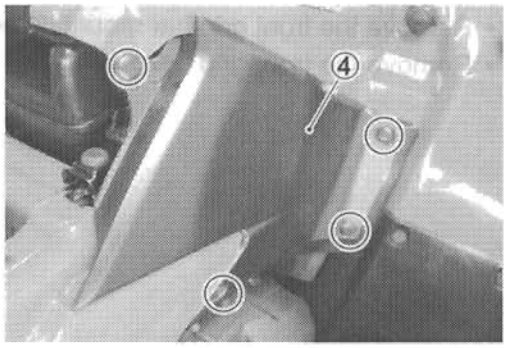
- Remove the left mud guard clips ① and screw ②.



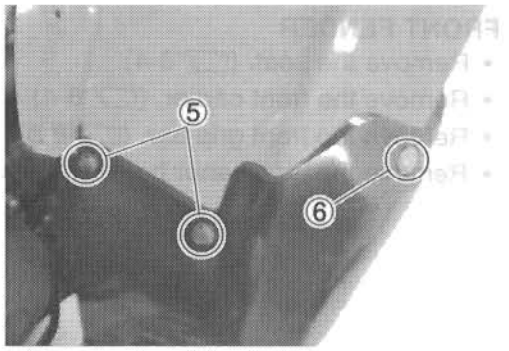
- Remove the left inner fender ③.



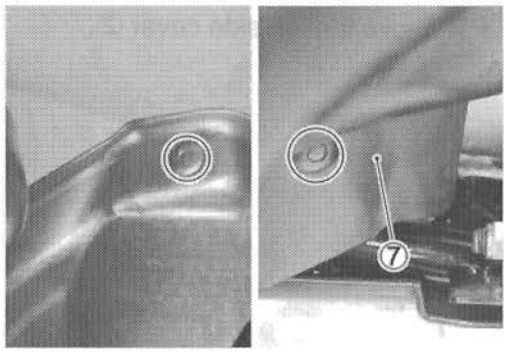
- Remove the right side cover ④.



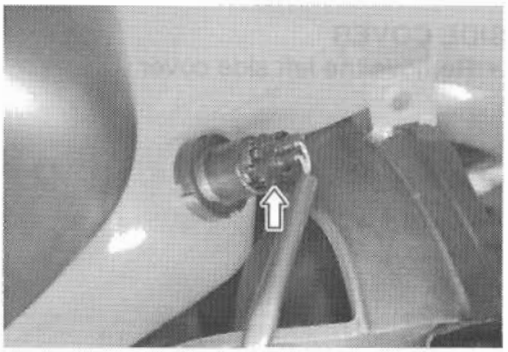
- Remove the right mud guard clips ⑤ and screw ⑥.



- Remove the right inner fender ⑦.



- Disconnect the power source socket coupler.

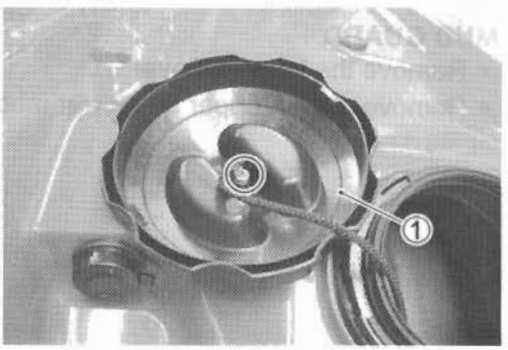


- Remove the front fender.

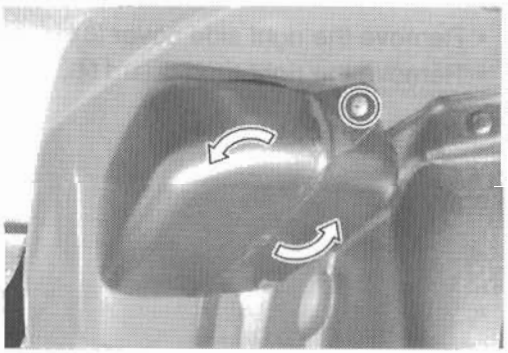


FRONT BOX

- Remove the front box cap ①.
- Disconnect the front box cap wire.

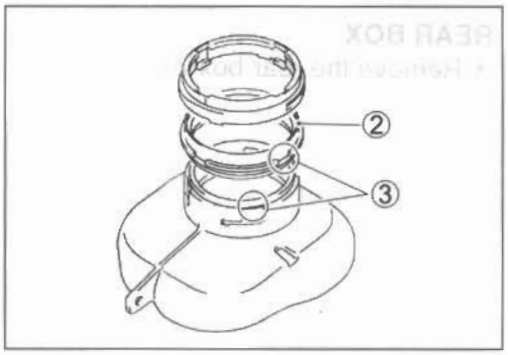


- Remove the front box mounting screw.
- Turn the front box counterclockwise and remove it.



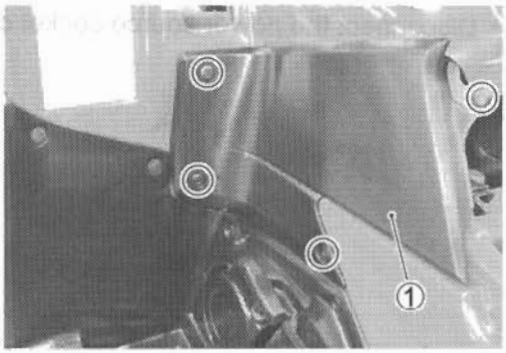
- Remove the cushion ② from the front box as shown in the illustration.

NOTE:
Installing the cushion to the front box, align the cutout ③.

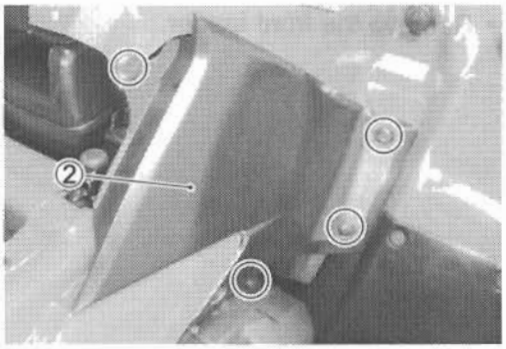


SIDE COVER

- Remove the left side cover ①.

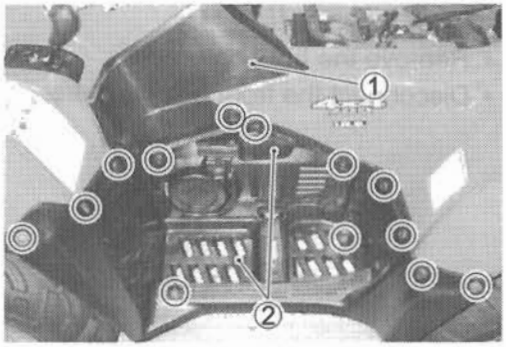


- Remove the right side cover ②.

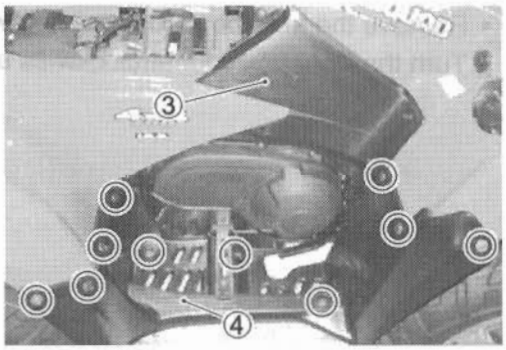


MUD GUARD

- Remove the left side cover ①.
- Remove the left upper and lower mud guard ②.

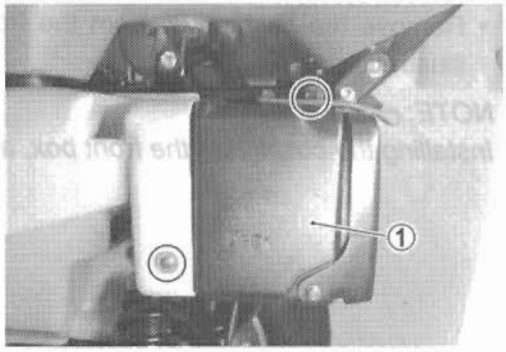


- Remove the right side cover ③.
- Remove the right mud guard ④.



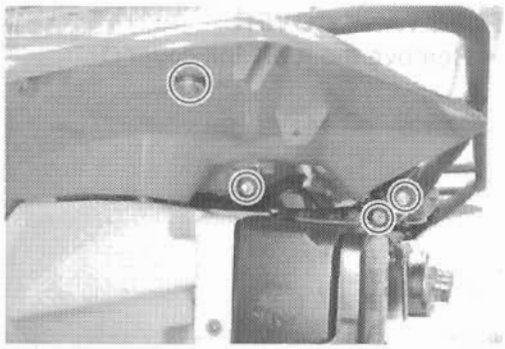
REAR BOX

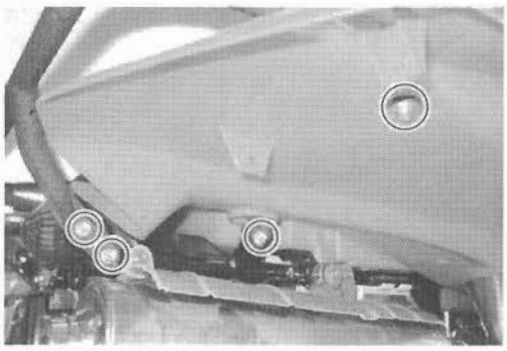
- Remove the rear box ①.

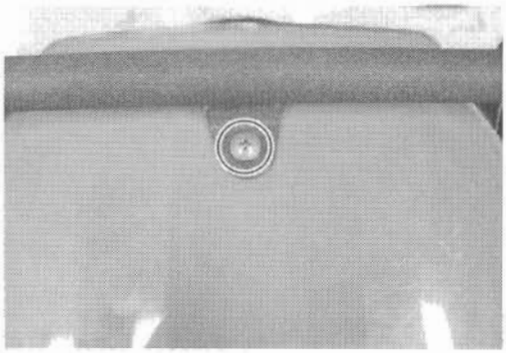


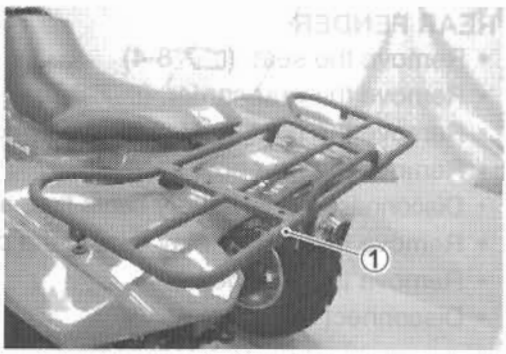
REAR CARRIER

- Remove the rear carrier ①.



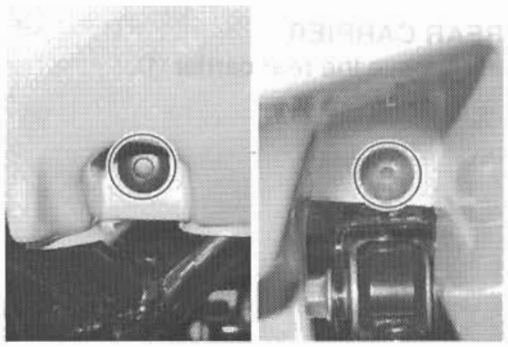


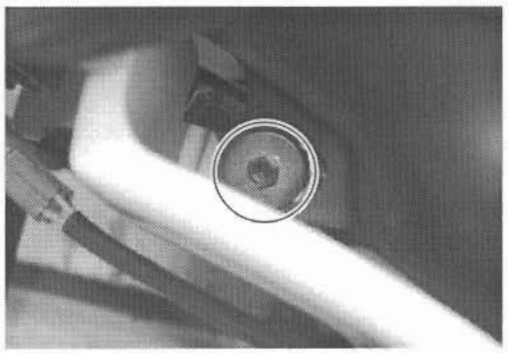


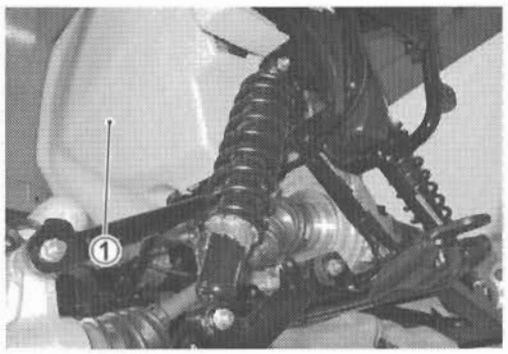


FUEL TANK COVER

- Remove the fuel tank cover ①.

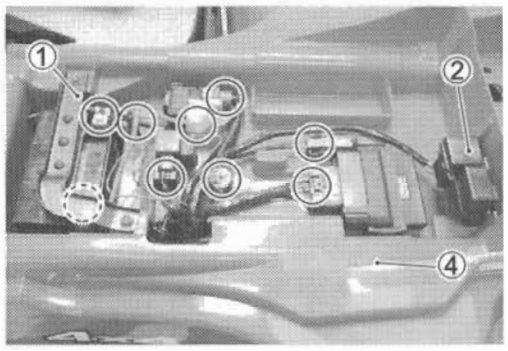




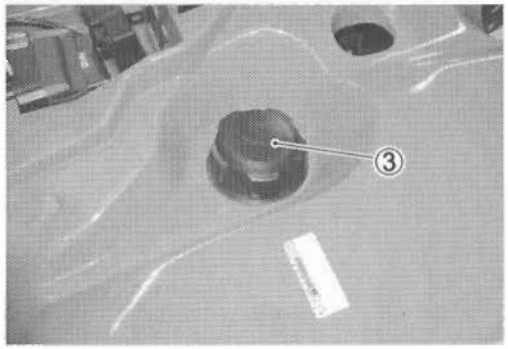


REAR FENDER

- Remove the seat. (☞8-4)
- Remove the rear carrier. (☞8-9)
- Remove the right and left mud guard. (☞8-8)
- Remove the rear box. (☞8-8)
- Disconnect the ⊖ battery cable first, and then ⊕ battery cable.
- Remove the battery stay ① and the battery.
- Remove the fuse box ②.
- Disconnect the couplers.



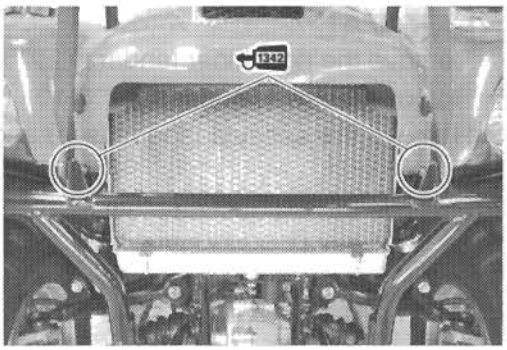
- Remove the fuel tank cap ③.
- Remove the rear fender ④.

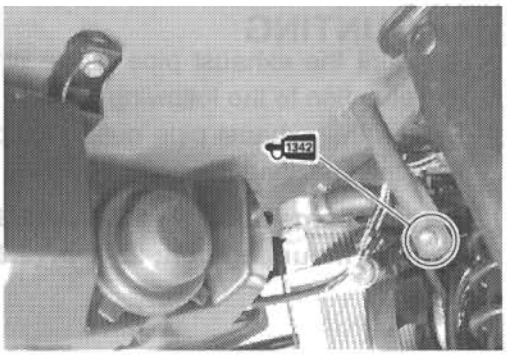


REMOUNTING

- Remount the exterior parts in the reverse order of removal. Pay attention to the to following points.
- Apply thread lock to the front carrier mounting bolts/nuts.

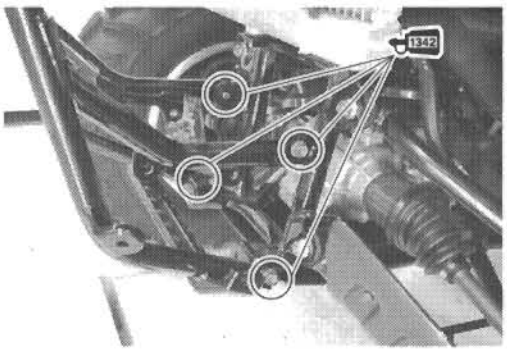
1342 99000-32050: THREAD LOCK "1342"





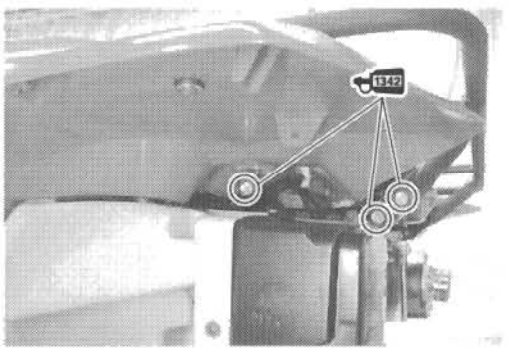
- Apply thread lock to the front grip bar mounting bolts.

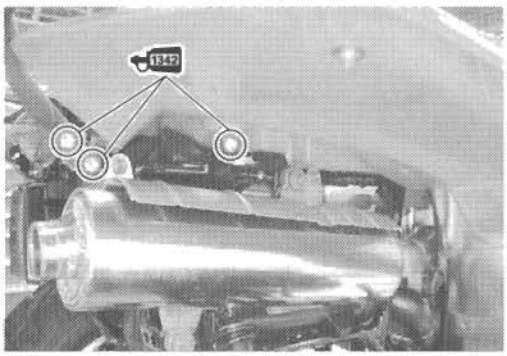
1342 99000-32050: THREAD LOCK "1342"



- Apply thread lock to the rear carrier mounting bolts.

1342 99000-32050: THREAD LOCK "1342"

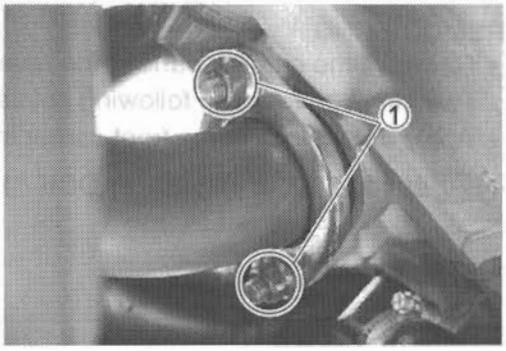




EXHAUST PIPE

REMOVAL

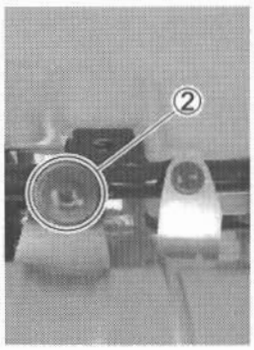
- Remove the right inner fender. (☞8-6)
- Remove the rear fender. (☞8-10)
- Remove the exhaust pipe nuts ① and muffler mounting bolts ②.
- Remove the exhaust pipe out of the frame.

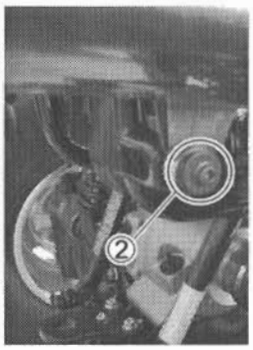


REMOUNTING

- Remount the exhaust pipe in the reverse order of removal. Pay attention to the following points.
- Tighten the exhaust pipe nuts ① and muffler mounting bolts ② to the specified torque.

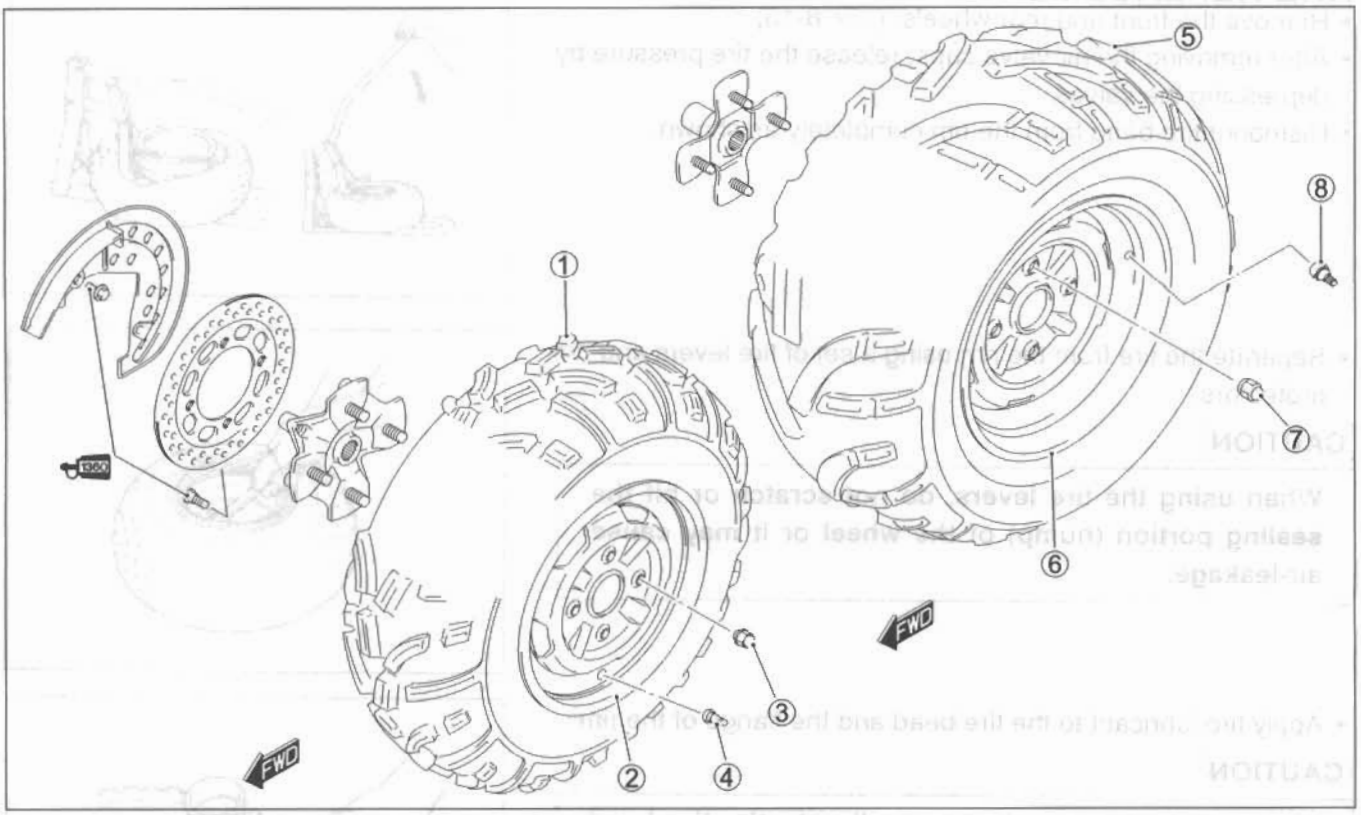
Exhaust pipe nut: 23 N·m (2.3 kgf-m, 16.5 lb-ft)
Muffler mounting bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)





FRONT AND REAR WHEELS

CONSTRUCTION

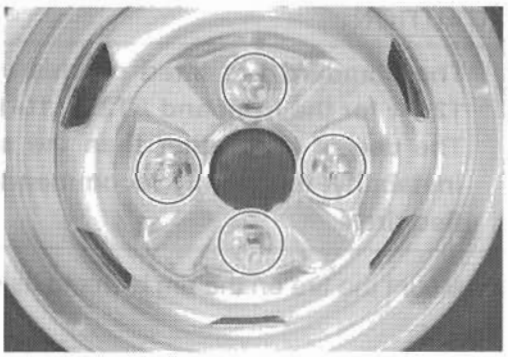


①	Front tire	⑥	Rear wheel
②	Front wheel	⑦	Rear wheel set nut
③	Front wheel set nut	⑧	Rear wheel air valve
④	Front wheel air valve	⑨	Brake disc bolt
⑤	Rear tire		

ITEM	N·m	kgf-m	lb-ft
③	60	6.0	43.5
⑦	60	6.0	43.5
⑨	23	2.3	16.5

REMOVAL

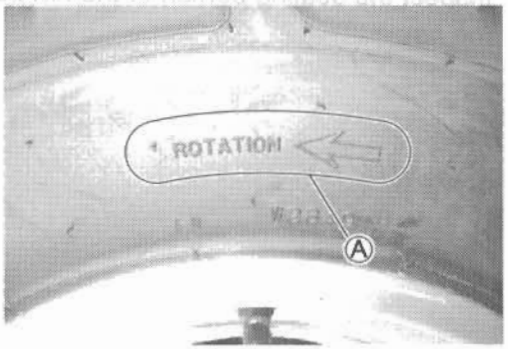
- Place the vehicle on level ground.
- Support the vehicle with a jack or wooden block and remove the front and rear wheel set nuts.
- Remove the front and rear wheels.



REMOUNTING

- Remount the wheels in the reverse order of removal. Pay attention to the following points:
- Installing each wheel, make sure the arrow Ⓐ on the tire points in the direction of rotation.
- Tighten the wheel set nuts to the specified torque.

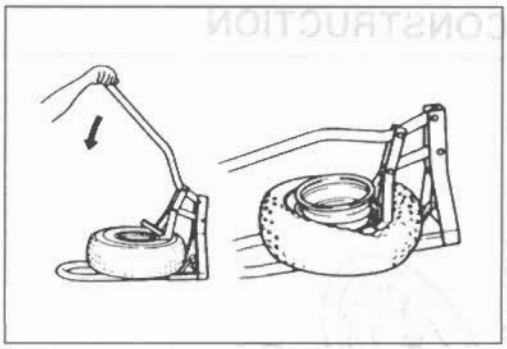
Front and rear wheel set nut: 60 N·m (6.0 kgf-m, 43.5 lb-ft)



TIRES

TIRE REPLACEMENT

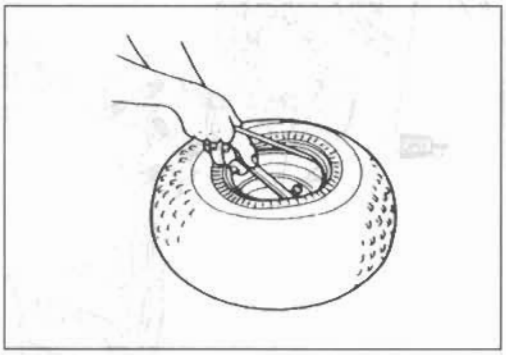
- Remove the front and rear wheels. (☞8-13)
- After removing the air valve caps, release the tire pressure by depressing the valves.
- Dismount the bead from the rim completely as shown.



- Separate the tire from the rim using a set of tire levers and rim protectors.

CAUTION

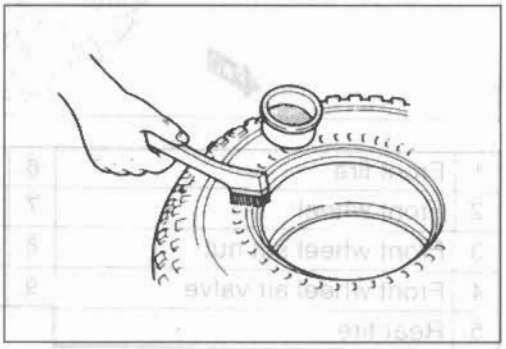
When using the tire levers, do not scratch or hit the sealing portion (hump) of the wheel or it may cause air-leakage.



- Apply tire lubricant to the tire bead and the flange of the rim.

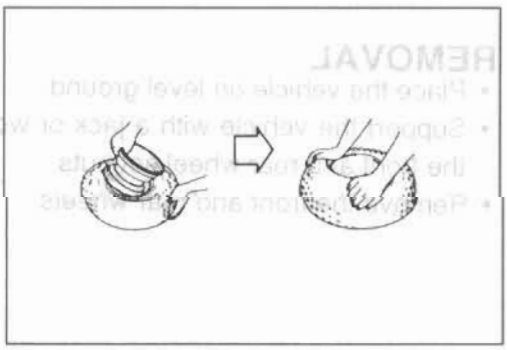
CAUTION

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 AT25 × 8-12☆☆ for the front and AT25 × 10-12☆☆ for the rear. The use of tires other than the standard may cause instability. It is highly recommended to use the specified tire.

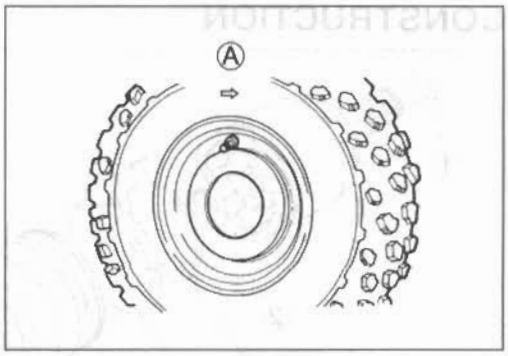


- Mount the tire on the rim by hand as shown.

NOTE:

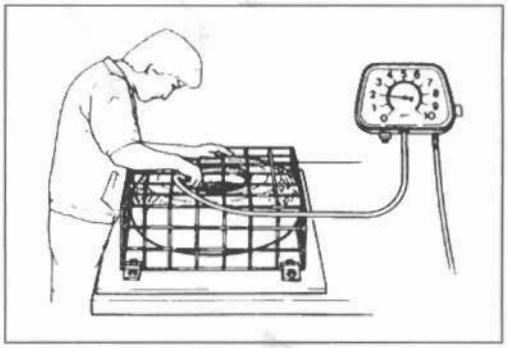
Inspect the sealing portion of the rim before installing the tire on the rim.

- When installing each tire, make sure the arrow Ⓐ on the tire points in the direction of rotation. Also, make sure the outer side of the wheel rim is facing outward.



NOTE:
For inspecting the tires, refer to page 2-25.
Inspect the valve cores, before installing.

- Inflate the tire to seat the tire bead.

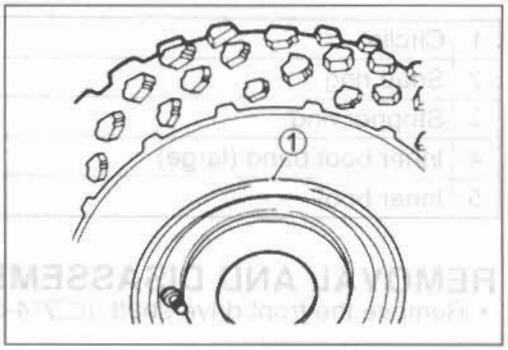


DATA Maximum tire bead seat pressure
Front : 250 kPa (2.5 kgf/cm², 36 psi)
Rear : 250 kPa (2.5 kgf/cm², 36 psi)

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 sidewalls. It must be equidistant from the wheel rim all the way around. If the distance between the rim line and the wheel rim varies, this indicates that the bead is not properly seated. If this is so, deflate the tire completely, and unseat the tire bead on both sides. Then, coat the bead with clean water, and re-seat the tire.



- Adjust the tire pressure to the specified pressure.

DATA Cold inflation tire pressure
Front : 35 kPa (0.35 kgf/cm², 5.1 psi)
Rear : 30 kPa (0.30 kgf/cm², 4.4 psi)

DATA Vehicle load capacity: 172 kg (380 lbs)

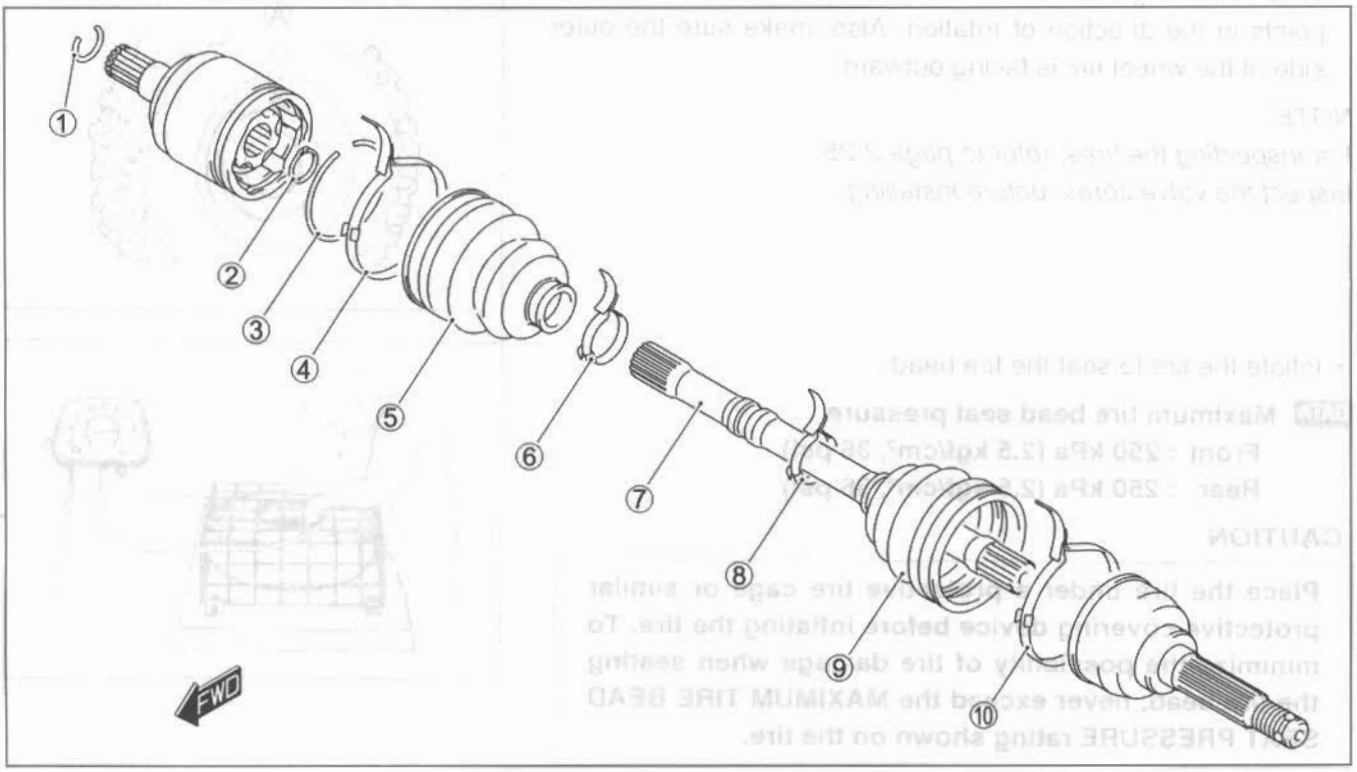
CAUTION

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
☆: 25 kPa (0.25 kgf/cm², 3.6 psi)
☆☆: 35 kPa (0.35 kgf/cm², 5.1 psi)
☆☆☆: 45 kPa (0.45 kgf/cm², 6.5 psi)

FRONT DRIVE SHAFT

CONSTRUCTION



①	Circlip	⑥	Inner boot band (small)
②	Snap ring	⑦	Drive shaft
③	Stopper ring	⑧	Outer boot band (small)
④	Inner boot band (large)	⑨	Outer boot
⑤	Inner boot	⑩	Outer boot band (large)

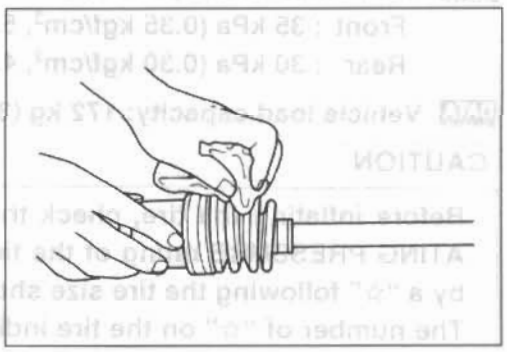
REMOVAL AND DISASSEMBLY

- Remove the front drive shaft. (☞4-3)

NOTE:

If it is difficult to remove the front drive shaft by hand, use the special tools.

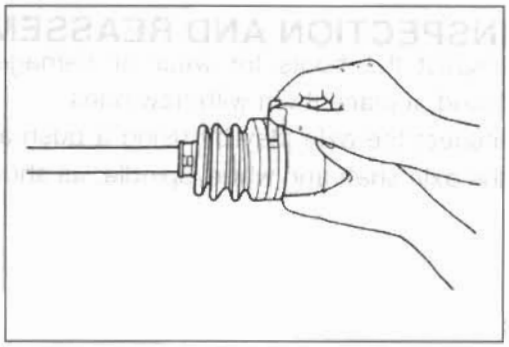
TOOL 09924-21940: Wheel hub remover
09924-21920: Drive shaft remover
09930-30104: Sliding hammer
09924-21950: Front drive shaft remover



- Remove the boot bands of the differential side joint (double offset joint).

CAUTION

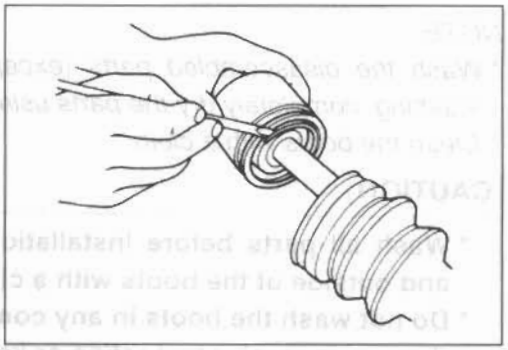
Replace the removed boot bands with new ones.



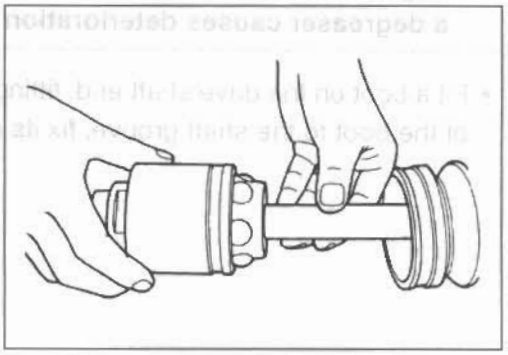
- Slide the boot toward the center of the front drive shaft and remove the stopper ring from the outer race.

CAUTION

Replace the removed stopper ring with a new one.



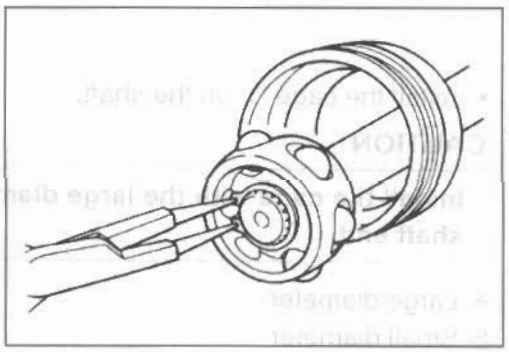
- Separate the outer race from the front drive shaft.



- Wipe off any grease and remove the snap ring.

CAUTION

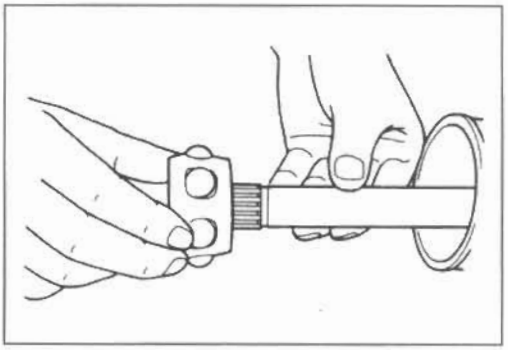
Replace the removed snap ring with a new one.



- Remove the cage and boot from the front drive shaft.

CAUTION

Do not disassemble the wheel side joint (ball fixed joint). If any damages are found, replace it with a new one.

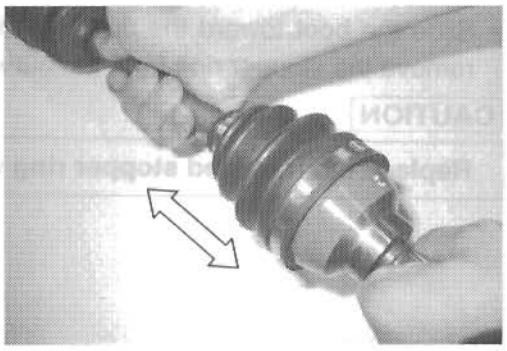


INSPECTION AND REASSEMBLY

Inspect the boots for wear or damage. If any damages are found, replace them with new ones.

Inspect the axle play by using a push-and-pull motion given to the axle shaft and wheel spindle, as shown.





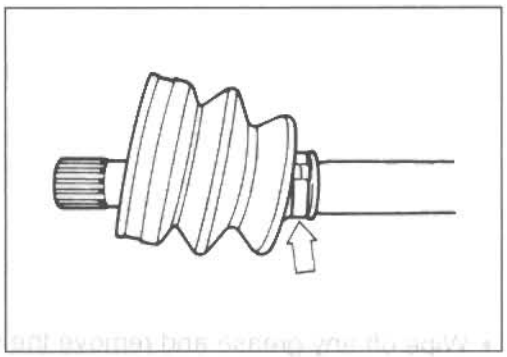
NOTE:

* *Wash the disassembled parts (except for the boots). After washing, completely dry the parts using compressed air.*
* *Clean the boots with a cloth.*

CAUTION

*** Wash all parts before installation, clean the inside and outside of the boots with a cloth.**
*** Do not wash the boots in any commercially available degreaser, such as gasoline or kerosene. Washing in a degreaser causes deterioration of the boots.**

- Fit a boot on the drive shaft end, fitting the small diameter side of the boot to the shaft groove, fix its end with a new band.

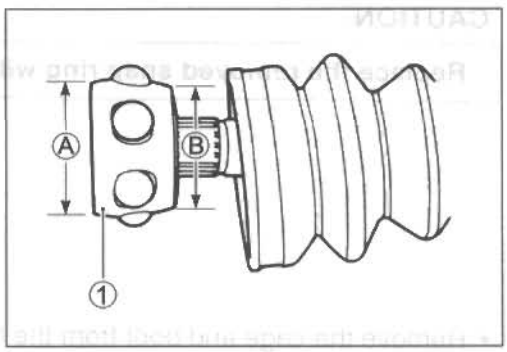


- Install the cage ① on the shaft.

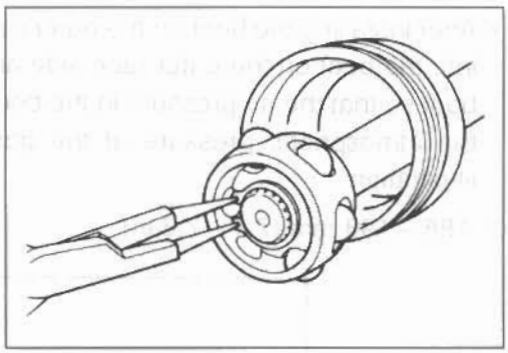
CAUTION

Install the cage with the large diameter side facing the shaft end.

Ⓐ Large diameter
Ⓑ Small diameter

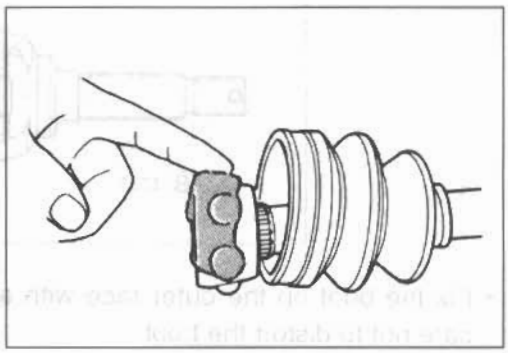


- Install the new snap ring.

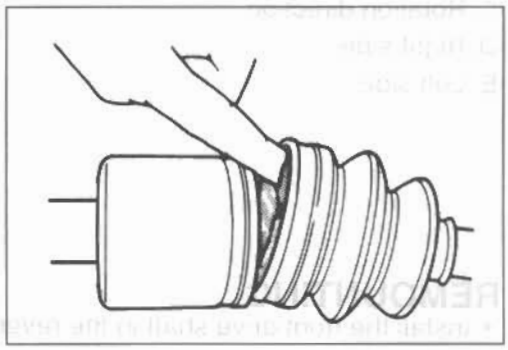


- Apply grease to the entire surface of the cage and the inside of the outer race.

Grease \ Position	Wheel side	Differential side
Quantity	45 g	85 g



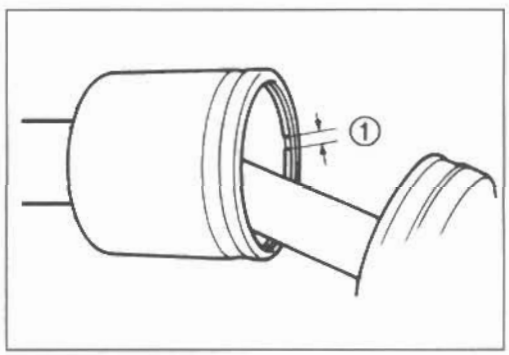
NOTE:
The tube of joint grease is included in the wheel side boot set or wheel side joint assembly of spare parts.



- Insert the cage into the outer race and install the new stopper ring to the groove of the outer race.

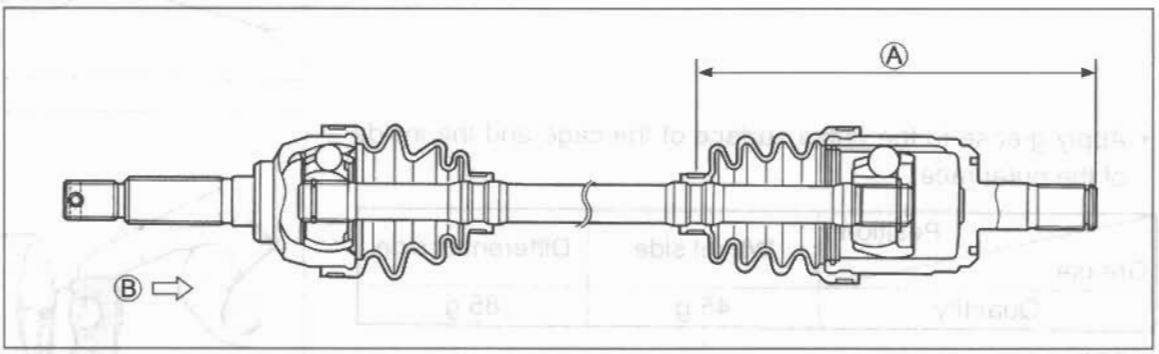
CAUTION

Locate the opening of the stopper ring ① so that the opening is not lined up with a ball.



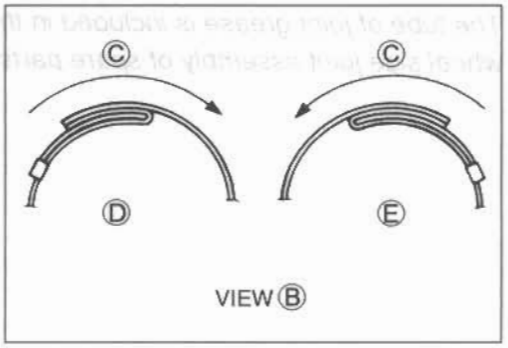
- After installing the boot on the outer race, insert a screw driver into the boot on the outer race side and allow air to enter the boot so that the air pressure in the boot becomes the same as the atmospheric pressure at the positions indicated in the illustration.

Ⓐ 188 – 198 mm (7.4 – 7.8 in)



- Fix the boot on the outer race with a new boot band, taking care not to distort the boot.

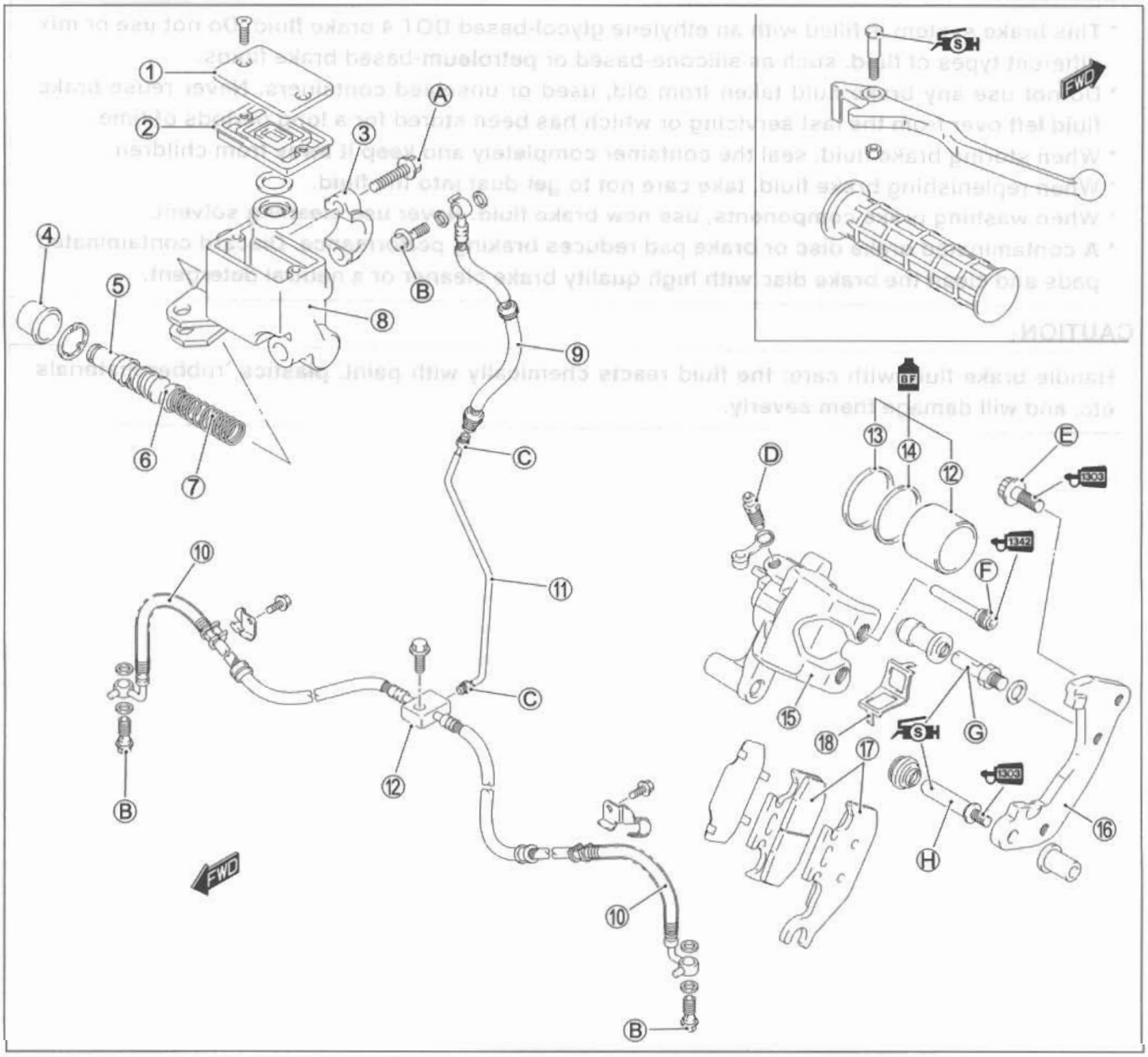
Ⓒ Rotation direction
Ⓓ Right side
Ⓔ Left side



REMOUNTING

- Install the front drive shaft in the reverse order of removal

FRONT BRAKE
CONSTRUCTION



①	Master cylinder reservior cap	⑭	Dust seal
②	Diaphragm	⑮	Brake caliper
③	Master cylinder clamp	⑯	Brake caliper holder
④	Boot	⑰	Brake pad
⑤	Piston/cup set	⑱	Pad spring
⑥	Cup	Ⓐ	Master cylinder clamp bolt
⑦	Spring	Ⓑ	Brake hose union bolt
⑧	Master cylinder	Ⓒ	Brake pipe nut
⑨	Brake hose No.1	Ⓓ	Air bleeder valve
⑩	Brake hose No.2	Ⓔ	Brake caliper mounting bolt
⑪	Brake pipe	Ⓕ	Brake pad mounting pin
⑫	Piston	Ⓖ	Caliper holder pin
⑬	Piston seal	Ⓗ	Calipr holder slide pin

ITEM	N·m	kgf-m	lb-ft
Ⓐ	10	1.0	7.0
Ⓑ	23	2.3	16.5
Ⓒ	16	1.6	11.5
Ⓓ	5.5	0.55	4.0
Ⓔ	26	2.6	19.0
Ⓕ	18	1.8	13.0
Ⓖ	18	1.8	13.0
Ⓗ	23	2.3	16.5

⚠ WARNING

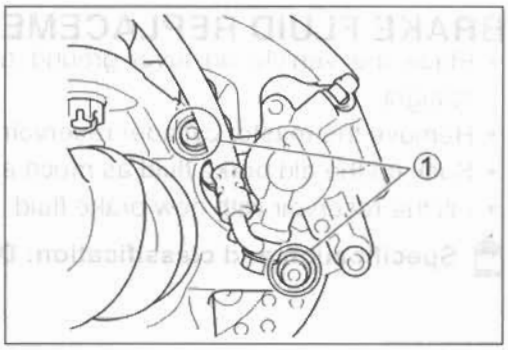
*** This brake system is filled with an ethylene glycol-based DOT 4 brake fluid. Do not use or mix different types of fluid, such as silicone-based or petroleum-based brake fluids.**
*** Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or 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 brake disc with high quality brake cleaner or a neutral detergent.**

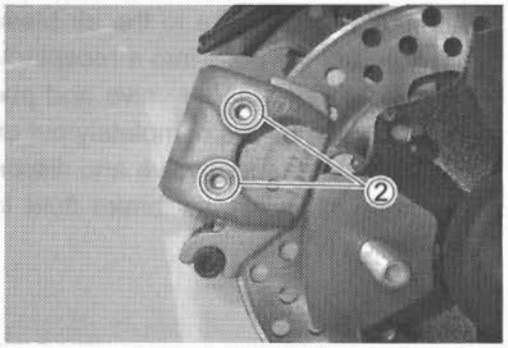
CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials etc. and will damage them severly.

BRAKE PAD REPLACEMENT

- Remove the front wheel. (☞8-13)
- Remove the brake caliper mounting bolts ① and brake pad mounting pins ②.

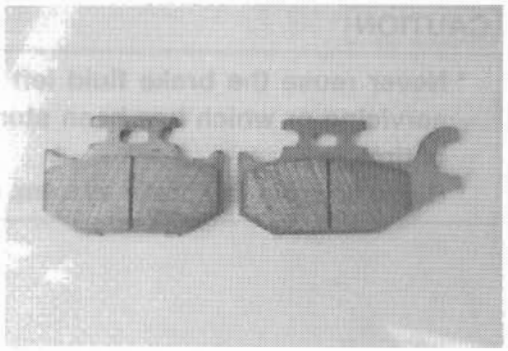




- Remove the brake pads.

CAUTION

*** Do not operate the brake lever during or after brake pads removal.**
*** Replace the brake pads as a set, otherwise braking performance will be adversely affected.**



- Install the new brake pads.

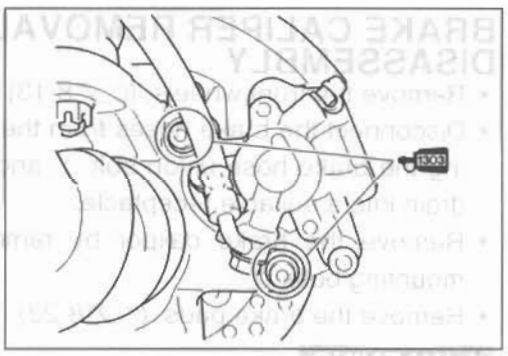
- Apply thread lock to the brake pad mounting pins and brake caliper mounting bolts.
- Tighten the brake pad mounting pins and brake caliper mounting bolts to the specified torque.

Brake pad mounting pin: 18 N·m (1.8 kgf-m, 13.0 lb-ft)

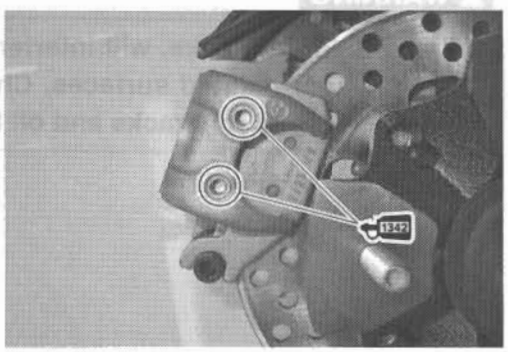
1342 99000-32050: THREAD LOCK "1342"

Brake caliper mounting bolt:
26 N·m (2.6 kgf-m, 19.0 lb-ft)

1303 99000-32030: THREAD LOCK SUPER "1303"



NOTE:
After replacing the brake pads, pump the brake lever a few times to check for proper brake operation and then check the brake fluid level.



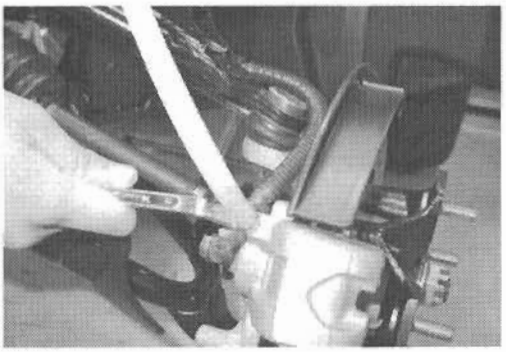
BRAKE FLUID REPLACEMENT

- Place the vehicle on level ground 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

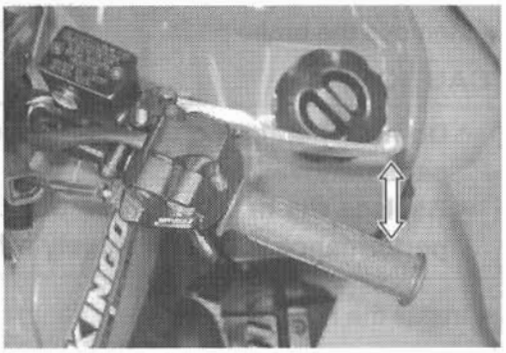


- Connect a clear hose to the air bleeder valve and insert the other end of the hose into a receptacle.
- Loosen the air bleeder valve and pump the brake lever until the old brake fluid is completely out of the brake system.
- Close the air bleeder valve and disconnect the clear hose. Fill the reservoir with new brake fluid to the upper end of the inspection window.



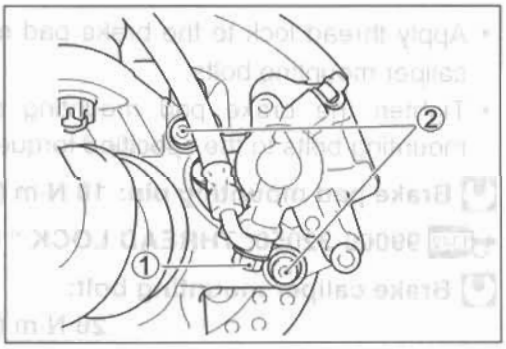
CAUTION

*** Never reuse the brake fluid left over from previous servicing or which has been stored for long periods of time.**
*** Bleed air from the brake system. (☞2-24)**



BRAKE CALIPER REMOVAL AND DISASSEMBLY

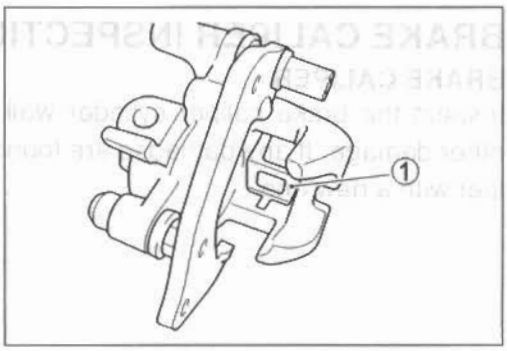
- Remove the front wheels. (☞8-13)
- Disconnect the brake hoses from the brake caliper by removing the brake hose union bolt ① and allow the brake fluid to drain into a suitable receptacle.
- Remove the brake caliper by removing the brake caliper mounting bolts ②.
- Remove the brake pads. (☞8-23)



⚠ 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 oil leakage.

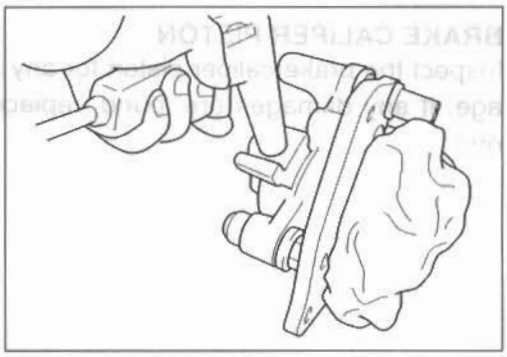
- Remove the pad spring ①.



- Place a rag over the brake caliper piston to prevent it from popping out and then force out the piston using compressed air.

CAUTION

Do not use high pressure air to prevent brake caliper piston damage.

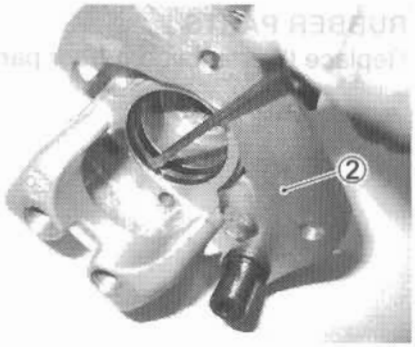


- Remove the dust seals and piston seals.

CAUTION

Do not reuse the dust seal and piston seal to prevent fluid leakage.

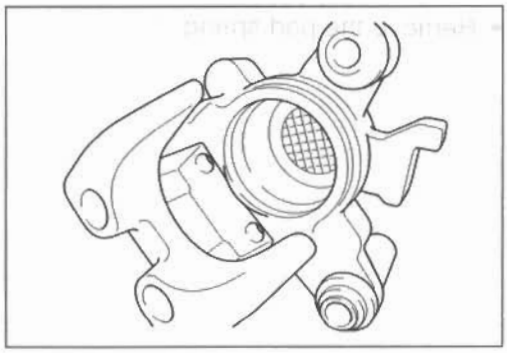
- Remove the caliper holder ②.



BRAKE CALIPER INSPECTION

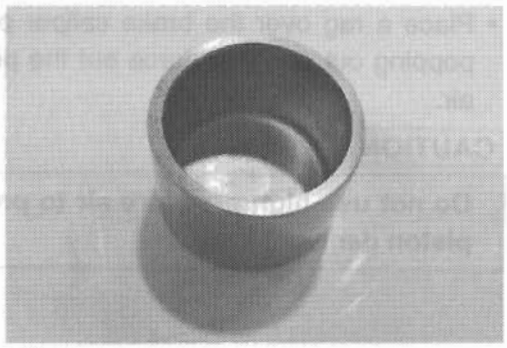
BRAKE CALIPER

Inspect the brake caliper cylinder wall for nicks, scratches or other damage. If any damages are found, replace the brake caliper with a new one.



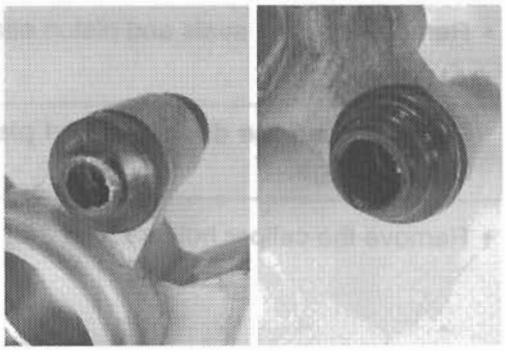
BRAKE CALIPER PISTON

Inspect the brake caliper piston for any scratches or other damage. If any damages are found, replace the piston with a new one.



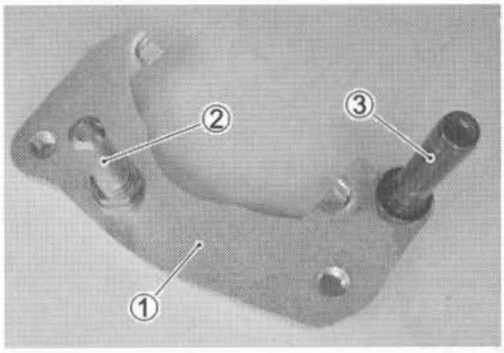
RUBBER PARTS

Replace the removed rubber parts with new ones.

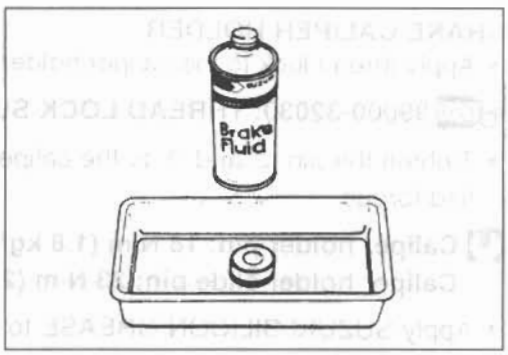


CALIPER HOLDER

Inspect the caliper holder ① and caliper holder pin ② and caliper holder slide pin ③ for damage. If any damages are found, replace them with new ones.



BRAKE CALIPER REASSEMBLY AND REMOUNTING



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

- Clean the caliper bore and piston with specified brake fluid, especially the dust seal groove and piston seal groove.

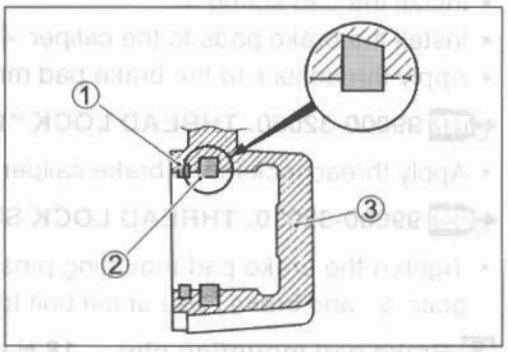
Specification and Classification: DOT 4

CAUTION

*** Clean the caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to clean them.**
*** 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 solvent such as gasoline, kerosine or others.**
*** Replace the piston seal and dust seal with the new ones during reassembly. Apply the brake fluid to both seals when installing them.**

PISTON SEAL

- Install the piston seal as shown in the illustration.



① Dust seal
② Piston seal
③ Caliper body

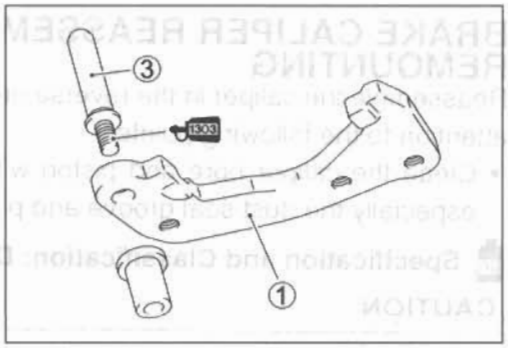
BRAKE CALIPER HOLDER

- Apply thread lock to the caliper holder slide pin ③.

1303 99000-32030: THREAD LOCK SUPER "1303"

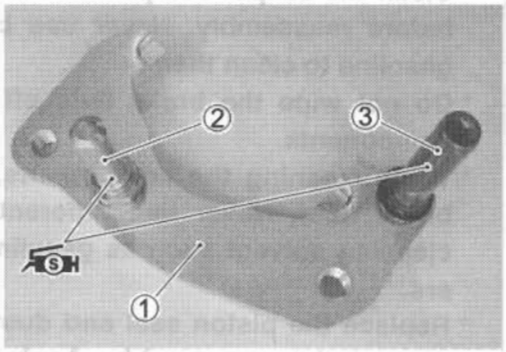
- Tighten the pin ② and ③ to the caliper holder ① to the specified torque.

Caliper holder pin: 18 N·m (1.8 kgf-m, 13.0 lb-ft)
Caliper holder slide pin: 23 N·m (2.3 kgf-m, 16.5 lb-ft)



- Apply SUZUKI SILICON GREASE to the brake caliper holder pin.

SH 99000-25100: SUZUKI SILICONE GREASE



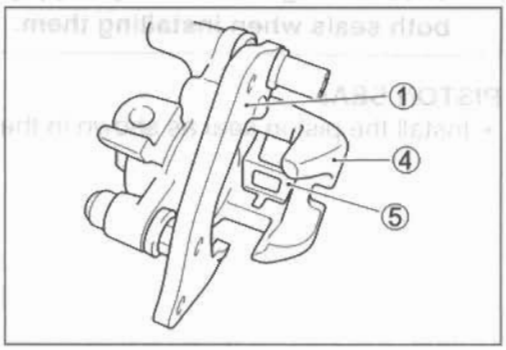
- Install the caliper holder ① to the caliper ④.
- Install the pad spring ⑤.
- Install the brake pads to the caliper ④.
- Apply thread lock to the brake pad mounting pins.

1342 99000-32050: THREAD LOCK "1342"

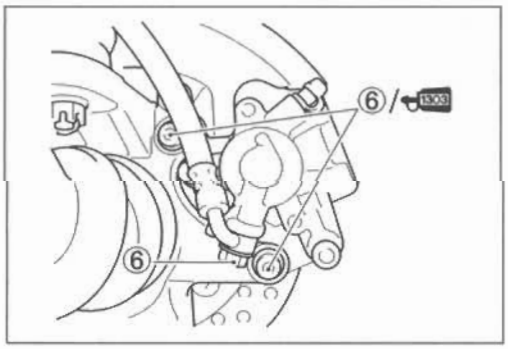
- Apply thread lock to the brake caliper mounting bolts ⑥.

1303 99000-32030: THREAD LOCK SUPER "1303"

- Tighten the brake pad mounting pins, brake caliper mounting bolts ⑥, and brake hose union bolt 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)

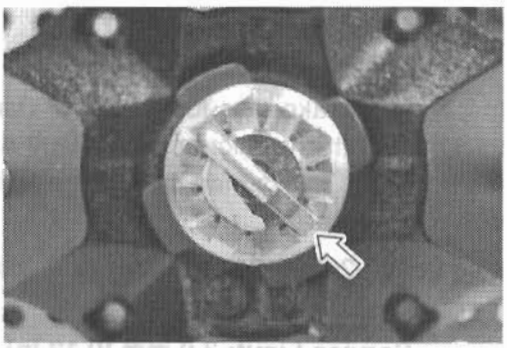


NOTE:
Before remounting the brake caliper, push the brake caliper piston all the way into the caliper.

CAUTION

Bleed air from the system after reassembling the brake caliper. (☞2-24)

BRAKE DISC REMOVAL AND DISASSEMBLY

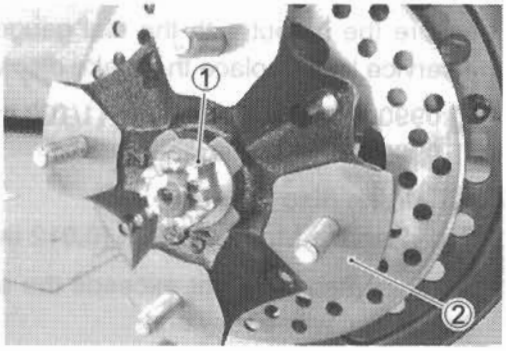


- Remove the front wheel. (☞8-13)
- Remove the cotter pin.

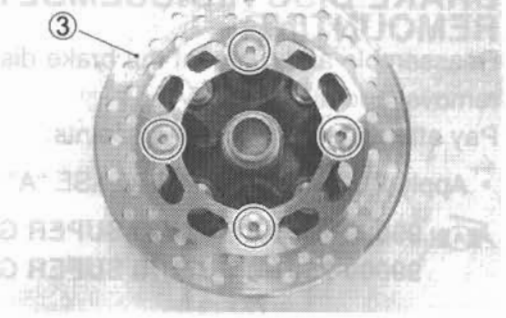
CAUTION

Replace the removed cotter pin with a new one.

- Loosen the hub nut ①.
- Remove the brake caliper. (☞8-24)



- Remove the hub nut ①.
- Remove the front wheel hub ②.



- Remove the brake disc ③.

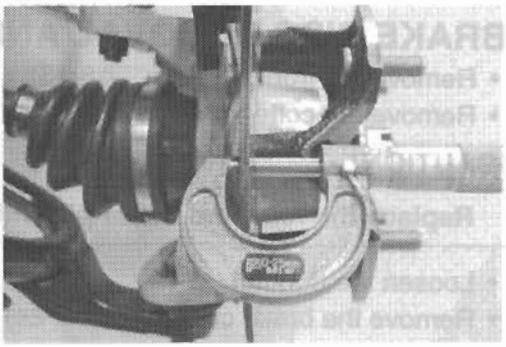
BRAKE DISC INSPECTION

- Remove the front wheel. (☞8-13)

Inspect the brake disc for cracks or damage and measure the thickness with the micrometer. If any damages are found or if the thickness is less than the service limit, replace the brake disc with a new one.

09900-20205: Micrometer (0 – 25 mm)

Brake disc thickness
Service Limit: 3.0 mm (0.12 in)

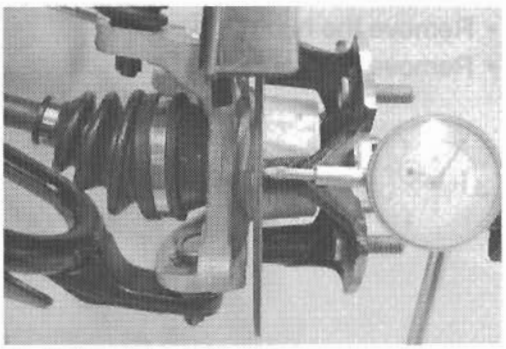


Measure the runout with the dial gauge. If the runout exceeds the service limit, replace the brake disc with a new one.

09900-20607: Dial gauge (1/100 mm)
09900-20701: Magnetic stand

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.

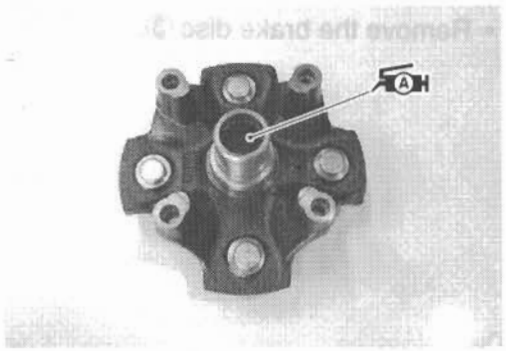


BRAKE DISC REASSEMBLY AND REMOUNTING

Reassemble and remount the brake disc in the reverse order of removal and disassembly.
Pay attention to the following points:

- Apply SUZUKI SUPER GREASE "A" to the wheel hub spline.

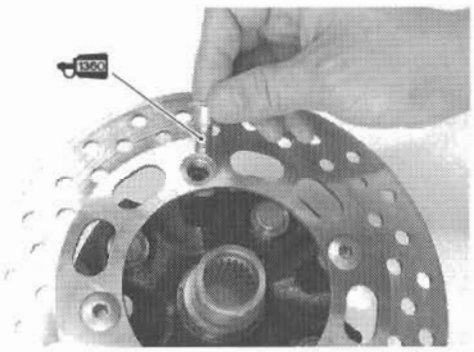
99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



- Install the brake disc to the wheel hub with the punching letter showed.
- Apply THREAD LOCK SUPER "1360" to the brake disc bolts and tighten them to the specified torque.

99000-32130: THREAD LOCK SUPER "1360"

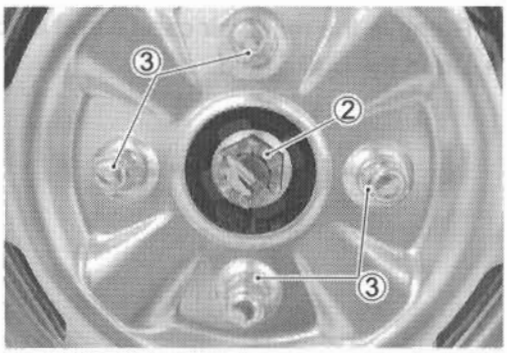
Brake disc bolt: 23 N·m (2.3 kgf·m, 16.5 lb-ft)



- Install the wheel hub.
- Install the front caliper. (☞8-27)

- Tighten the front wheel set nuts ②, and hub nut ③ to the specified torque.

Front wheel set nut: 60 N·m (6.0 kgf-m, 43.5 lb-ft)
Front hub nut: 110 N·m (11.0 kgf-m, 79.5 lb-ft)



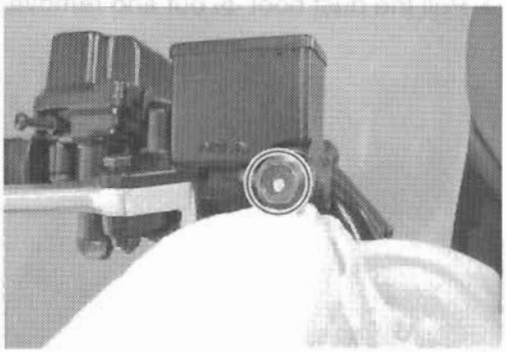
NOTE:

** First, remount the front wheels, and then tighten the front hub nut to specified torque.*

** After tightening the front hub nut, insert a new cotter pin into the driver shaft.*

MASTER CYLINDER REMOVAL AND DISASSEMBLY

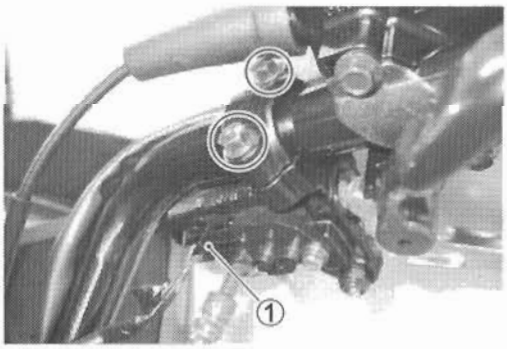
- Place a rag underneath the brake hose union bolt on the master cylinder to catch any spilt brake fluid. Remove the brake hose union bolt and disconnect the brake hose.



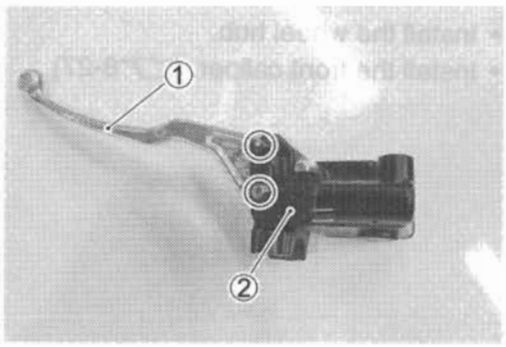
CAUTION

Immediately 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.

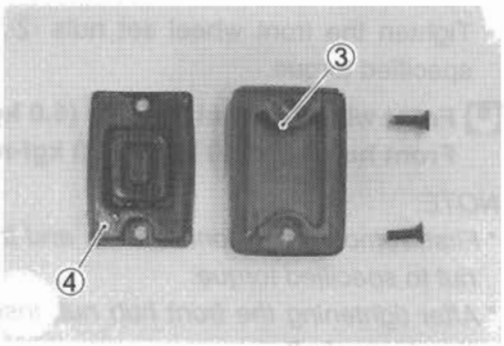
- Remove the master cylinder assembly.
- Disconnect the front brake switch coupler ①.



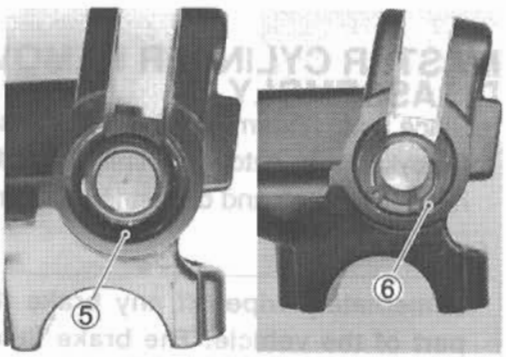
- Remove the brake lever ① and front brake switch ②.



- Remove the reservoir cap ③ and diaphragm ④.
- Drain the brake fluid.

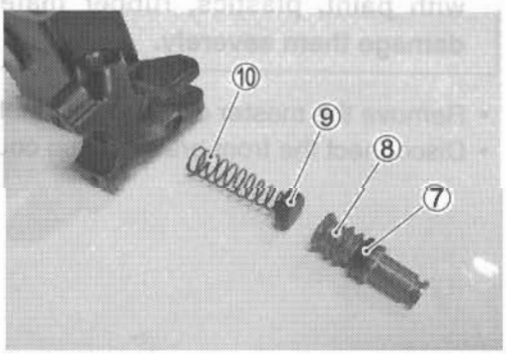


- Pull the dust boot ⑤ out and remove the circlip ⑥.



- Remove the piston/secondary cup, primary cup and spring.

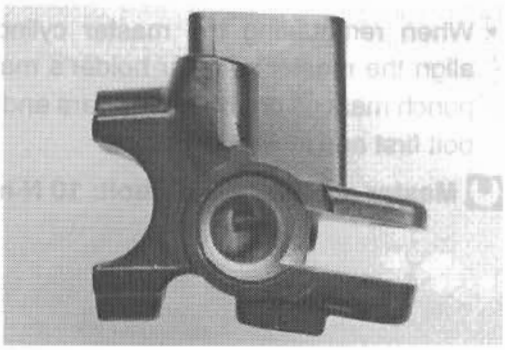
⑦ Secondary cup
⑧ Piston
⑨ Primary cup
⑩ Spring



MASTER CYLINDER INSPECTION

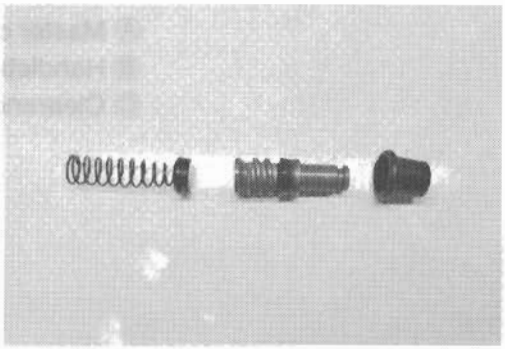
MASTER CYLINDER

Inspect the master cylinder bore for any scratches or damage. If any damages are found, replace the master cylinder with a new one.



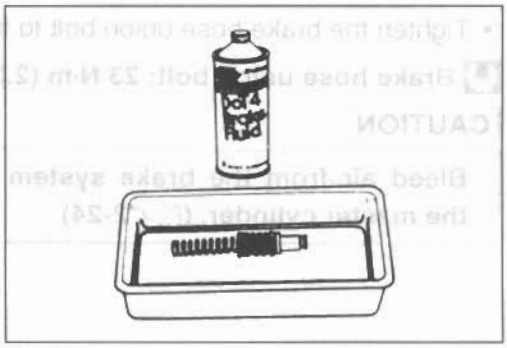
PISTON AND RUBBER PARTS

Inspect the piston surface, primary cup, secondary cup and dust boot for any scratches, wear or damage. If any damages are found, replace them with new ones.



MASTER CYLINDER REASSEMBLY AND REMOUNTING

Reassemble and remount the master cylinder in the reverse order of removal and disassembly. Pay attention to the following points:



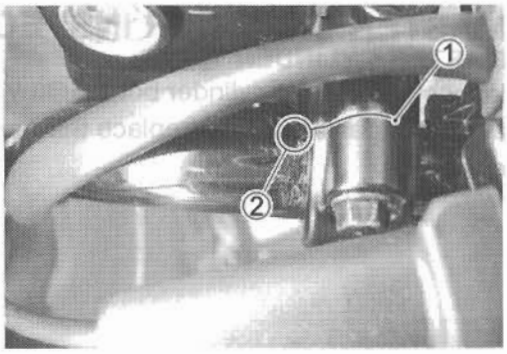
CAUTION

*** Wash the master cylinder components with new brake fluid before reassembly.**
*** Do not wipe the brake fluid off with a rag after washing the components.**
*** When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvents such as gasoline, kerosine, etc.**
*** Apply brake fluid to the master cylinder bore and all the component to be inserted to the bore.**

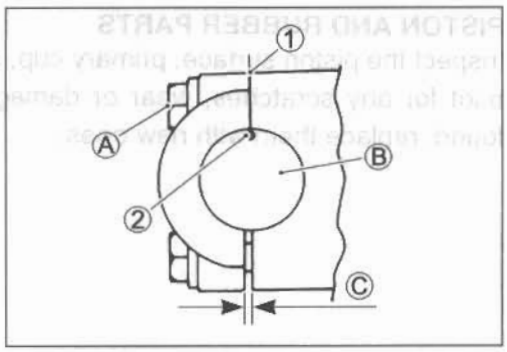
Specification and classification: DOT 4

- When remounting the master cylinder on the handlebars, align the master cylinder holder's mating surface ① with the punch mark ② on the handlebars and tighten the upper clamp bolt first and lower clamp bolt.

Master cylinder clamp bolt: 10 N·m (1.0 kgf-m, 7.0 lb-ft)



Ⓐ Master cylinder upper clamp bolt
Ⓑ Handlebars
Ⓒ Clearance



- Tighten the brake hose union bolt to the specified torque.

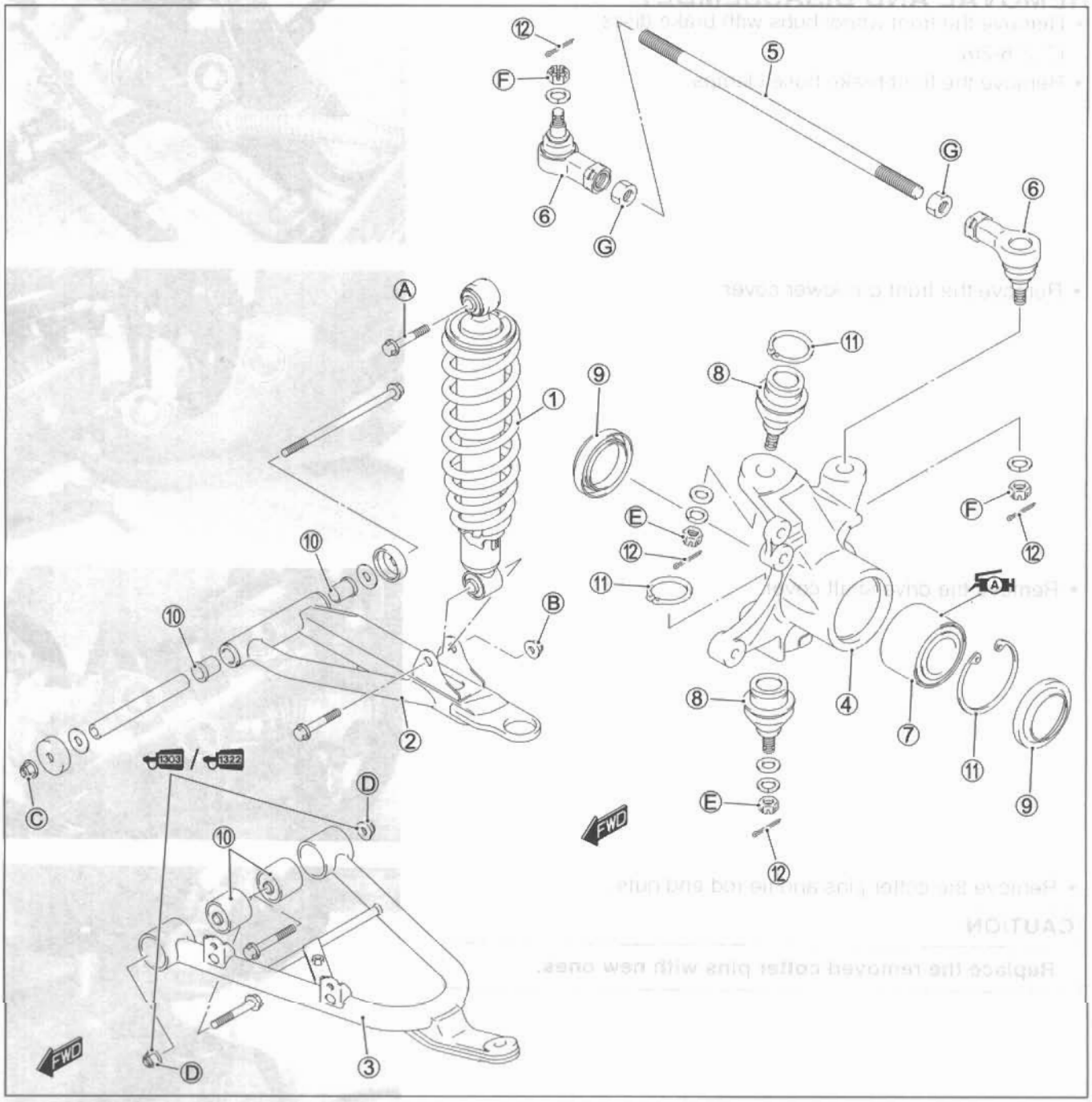
Brake hose union bolt: 23 N·m (2.3 kgf-m, 16.5 lb-ft)

CAUTION

Bleed air from the brake system after reassembling the master cylinder. (☞2-24)



FRONT SUSPENSION
CONSTRUCTION

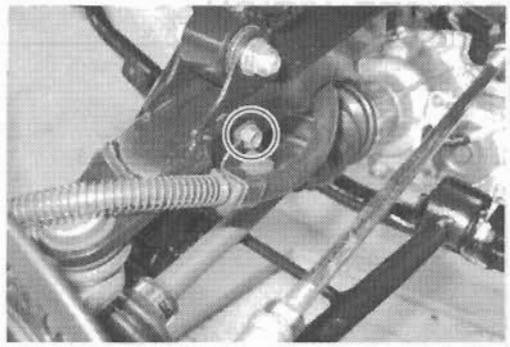


①	Shock absorber	⑪	Snap ring
②	Upper wishbone arm	⑫	Cotter pin
③	Lower wishbone arm	Ⓐ	Shock absorber mounting upper bolt
④	Steering knuckle	Ⓑ	Shock absorber mounting lower nut
⑤	Tie rod	Ⓒ	Wishbone arm pivot nut (upper)
⑥	Tie rod end	Ⓓ	Wishbone arm pivot nut (lower)
⑦	Hub bearing	Ⓔ	Knuckle end nut (upper and lower)
⑧	Knuckle end	Ⓕ	Tie rod end nut
⑨	Dust seal	Ⓖ	Tie rod locknut
⑩	Bushing		

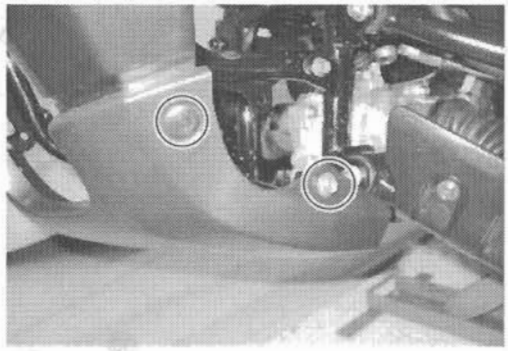
ITEM	N·m	kgf-m	lb-ft
Ⓐ	55	5.5	40.0
Ⓑ	60	6.0	43.5
Ⓒ	60	6.0	43.5
Ⓓ	65	6.5	47.0
Ⓔ	29	2.9	21.0
Ⓕ	29	2.9	21.0
Ⓖ	45	4.5	32.5

REMOVAL AND DISASSEMBLY

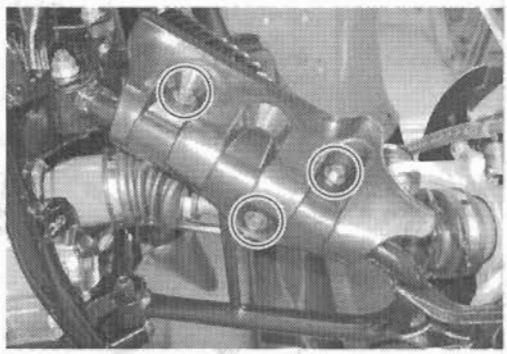
- Remove the front wheel hubs with brake discs. (☞8-29)
- Remove the front brake hose clamps.



- Remove the front grill lower cover.



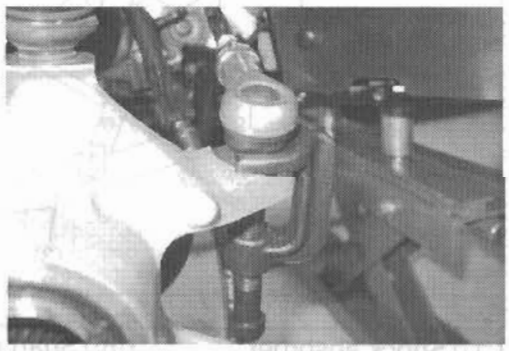
- Remove the drive shaft cover.



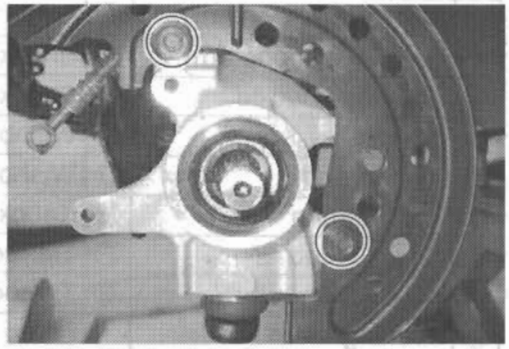
- Remove the cotter pins and tie rod end nuts.

CAUTION

Replace the removed cotter pins with new ones.



- Remove the front brake disc covers.



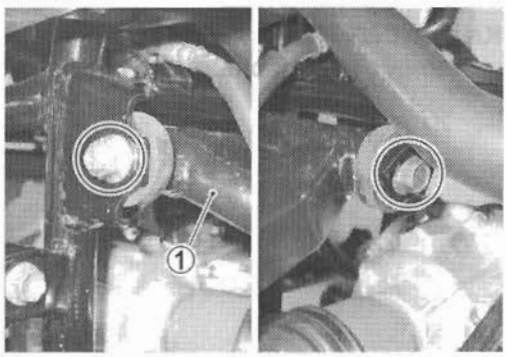
- Remove the cotter pins and knuckle end nuts.

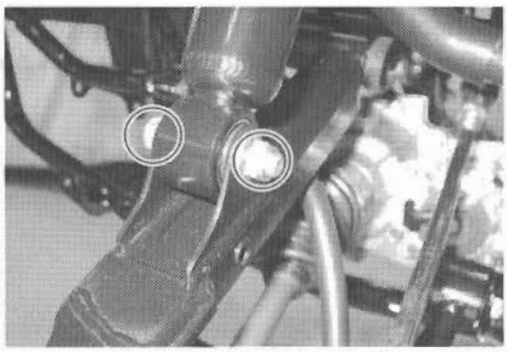
CAUTION

Replace the removed cotter pins with new ones.

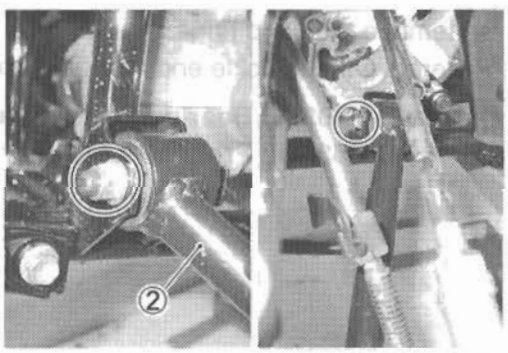


- Remove the upper wishbone arm pivot bolts/nuts and the shock absorber mounting lower bolts/nuts.
- Remove the upper wishbone arms ①.

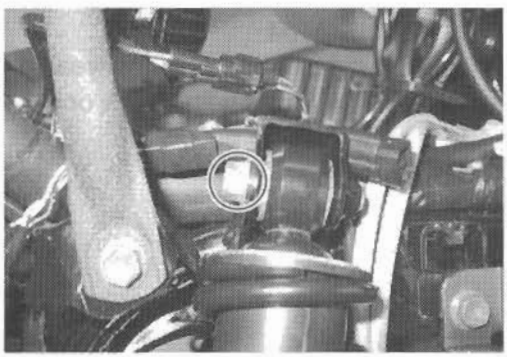




- Remove the lower wishbone arm pivot bolts/nuts.
- Remove the lower wishbone arms ②.



- Remove the inner fender.
- Remove the shock absorber mounting upper bolts.
- Remove the shock absorbers.



INSPECTION

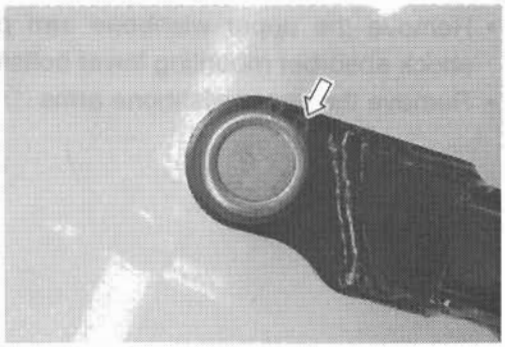
FRONT SHOCK ABSORBER

Inspect the shock absorbers for oil leakage or damage. If any damages are found, replace it with a new one.

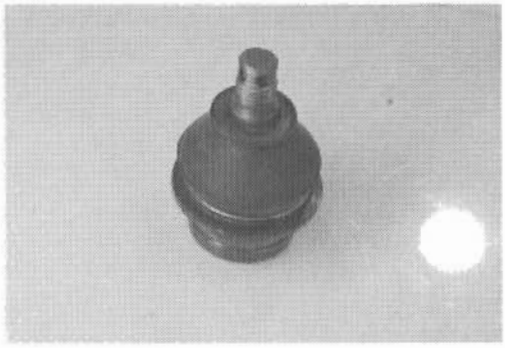


KNUCKLE END

- Remove the snap ring.

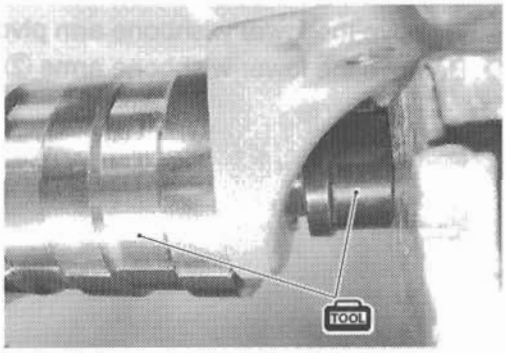


Inspect the knuckle end boots for wear or damage. If any damages are found, replace it with a new one.



- Remove the snap rings.
- Remove the knuckle ends with the special tool.

TOOL **09913-70210: Bearing installer set**
09941-53610: Front fork installer hammer

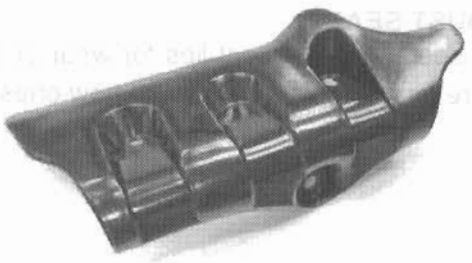


WISHBONE ARM

Inspect the wishbone arm for wear or damage. If any damage are found, replace it with a new one.

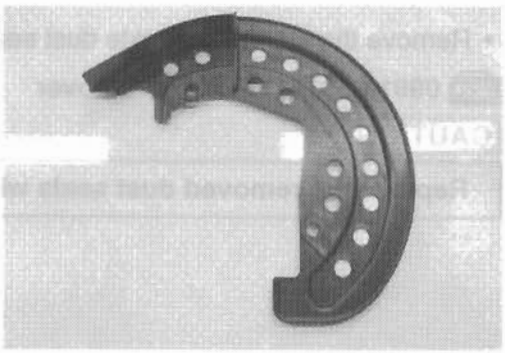
DRIVE SHAFT COVER

Inspect the drive shaft cover for wear or damage. If any damages are found, replace it with a new one.



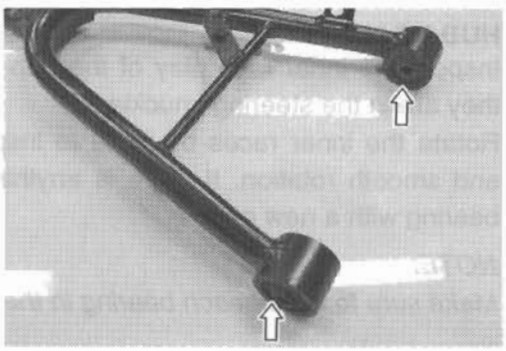
BRAKE DISC COVER

Inspect the brake disc covers for wear or damage. If any damages are found, replace it with a new one.



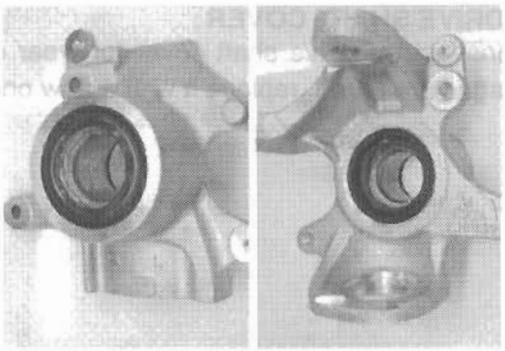
BUSHING

Inspect the rubber bushings (shock absorber/wishbone arm) for wear or other damage. If any damages are found, replace them with new ones.



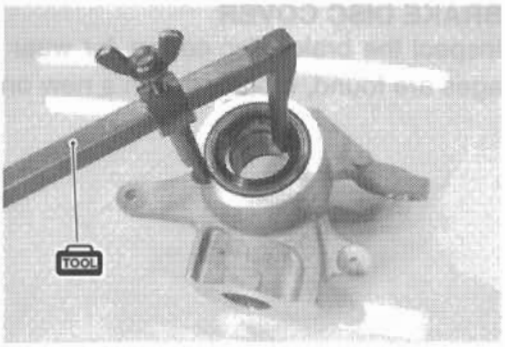
DUST SEAL

Inspect the dust seal lips for wear or damage. If any damages are found, replace them with new ones.



- Remove the steering knuckle dust seals with the special tool.

TOOL 09913-50121: Oil seal remover



CAUTION

Replace the removed dust seals with new ones.

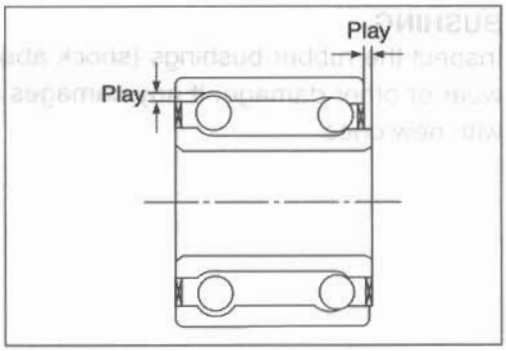
HUB BEARING

Inspect the inner race play of the hub bearings by hand while they are in the steering knuckles.

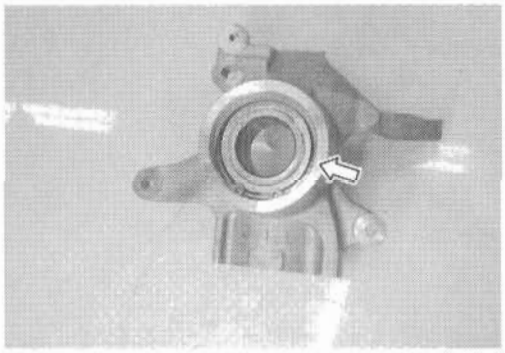
Rotate the inner races by hand to inspect for abnormal noise and smooth rotation. If there is anything unusual, replace the bearing with a new one.

NOTE:

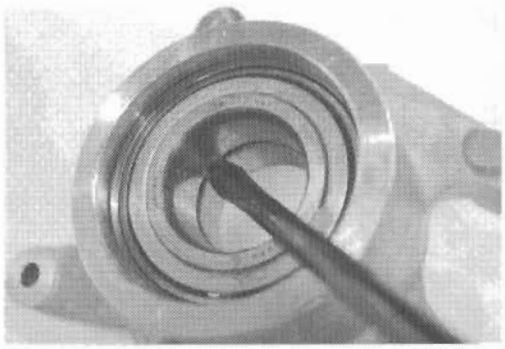
Make sure to check each bearing in the same manner.



- Remove the snap ring.



- Remove the hub bearings using the appropriate bar.

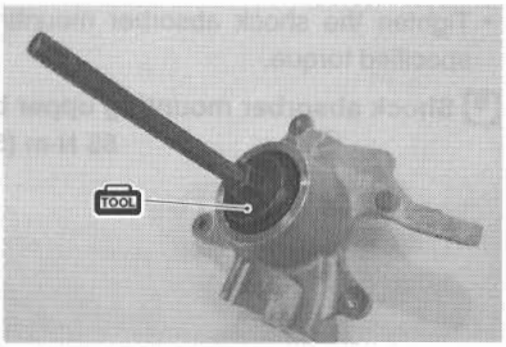


REASSEMBLY AND REMOUNTING

Reassemble and remount the front suspension in the reverse order of removal and disassembly. Pay attention to the following points:

- Install the hub bearings with the special tool.

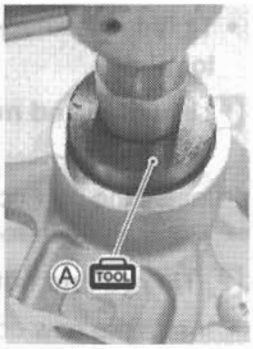
TOOL **09924-84510: Bearing installer set**



- Install the steering knuckle dust seals with the special tool.

TOOL Ⓐ **09913-70210: Bearing installer set**
Ⓑ **09944-66020: Bearing installer**

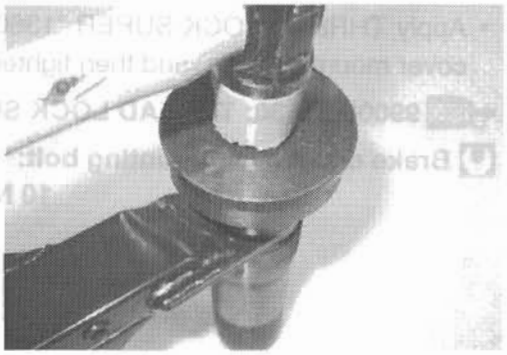




- Install the knuckle ends to the upper wishbone arms and the knuckles with the special tools.

TOOL **09913-70210: Bearing installer**

- Install the snap ring.

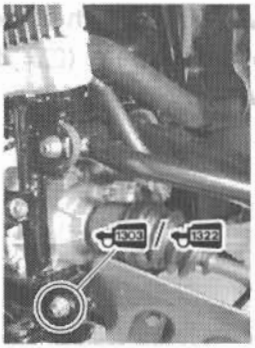


- Apply THREAD LOCK SUPER "1303" or "1322" to the wishbone arm pivot nut (lower), and then tighten the nut to the specified torque.

1303 **99000-32030: THREAD LOCK SUPER "1303" (USA)**

1322 **99000-32110: THREAD LOCK SUPER "1322" (Others)**

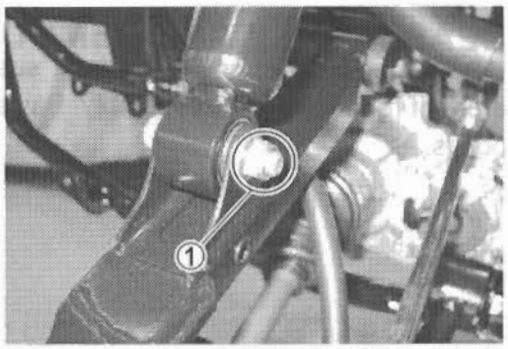
Wishbone arm pivot nut (upper): 60 N·m (6.0 kgf-m, 43.5 lb-ft)
Wishbone arm pivot nut (lower): 65 N·m (6.5 kgf-m, 47.0 lb-ft)





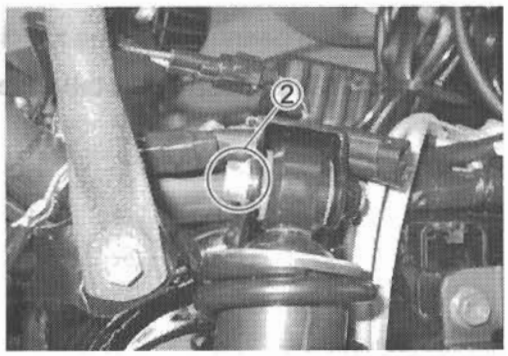
- Tighten the shock absorber mounting lower nut ① to the specified torque.

Shock absorber mounting lower nut:
60 N·m (6.0 kgf-m, 43.5 lb-ft)



- Tighten the shock absorber mounting upper bolt ② to the specified torque.

Shock absorber mounting upper bolt:
55 N·m (5.5 kgf-m, 40.0 lb-ft)



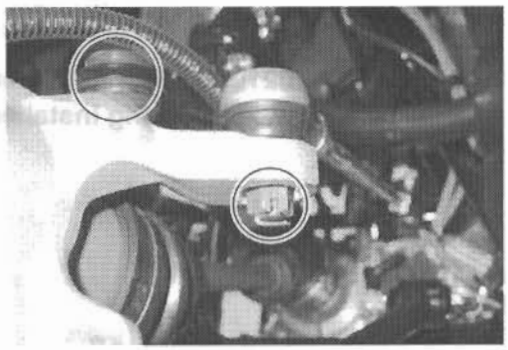
- Tighten the knuckle end nut (upper and lower) to the specified torque.

Knuckle end nut (uper and lower):
29 N·m (2.9 kgf-m, 21.0 lb-ft)

- Install the new cotter pins to the nuts.
- Tighten the tie rod end nut to the specified torque.

Tie rod end nut: 29 N·m (2.9 kgf-m, 21.0 lb-ft)

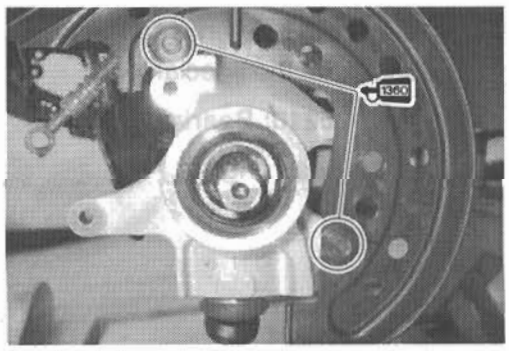
- Install the new cotter pins to the nuts.



- Apply THREAD LOCK SUPER "1360" to the front brake disk cover mounting bolts, and then tighten them securely.

1360 99000-32130: THREAD LOCK SUPER "1360"

Brake disk cover mounting bolt:
10 N·m (1.0 kgf-m, 7.0 lb-ft)



- Install the front wheel hubs with brake disks. (☞8-30)
- Install the front brake calipers. (☞8-27)
- Install the front wheels. (☞8-13)

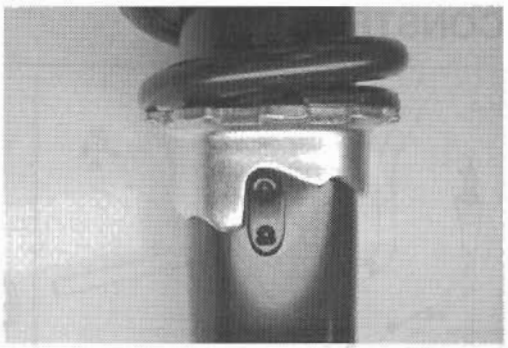
SPRING PRE-LOAD ADJUSTMENT

After installing the front shock absorbers, adjust the spring pre-load.

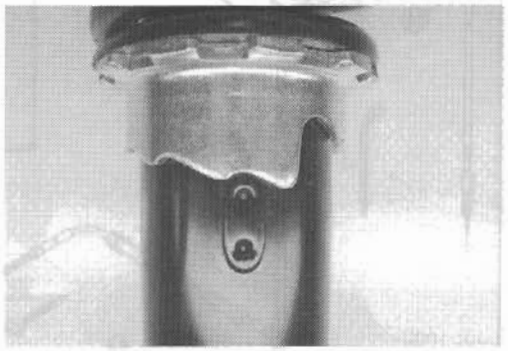
Position "1" provides the minimum spring pre-load.

Position "5" provides the maximum spring pre-load.

STD POSITION: 2/5



POSITION "1"

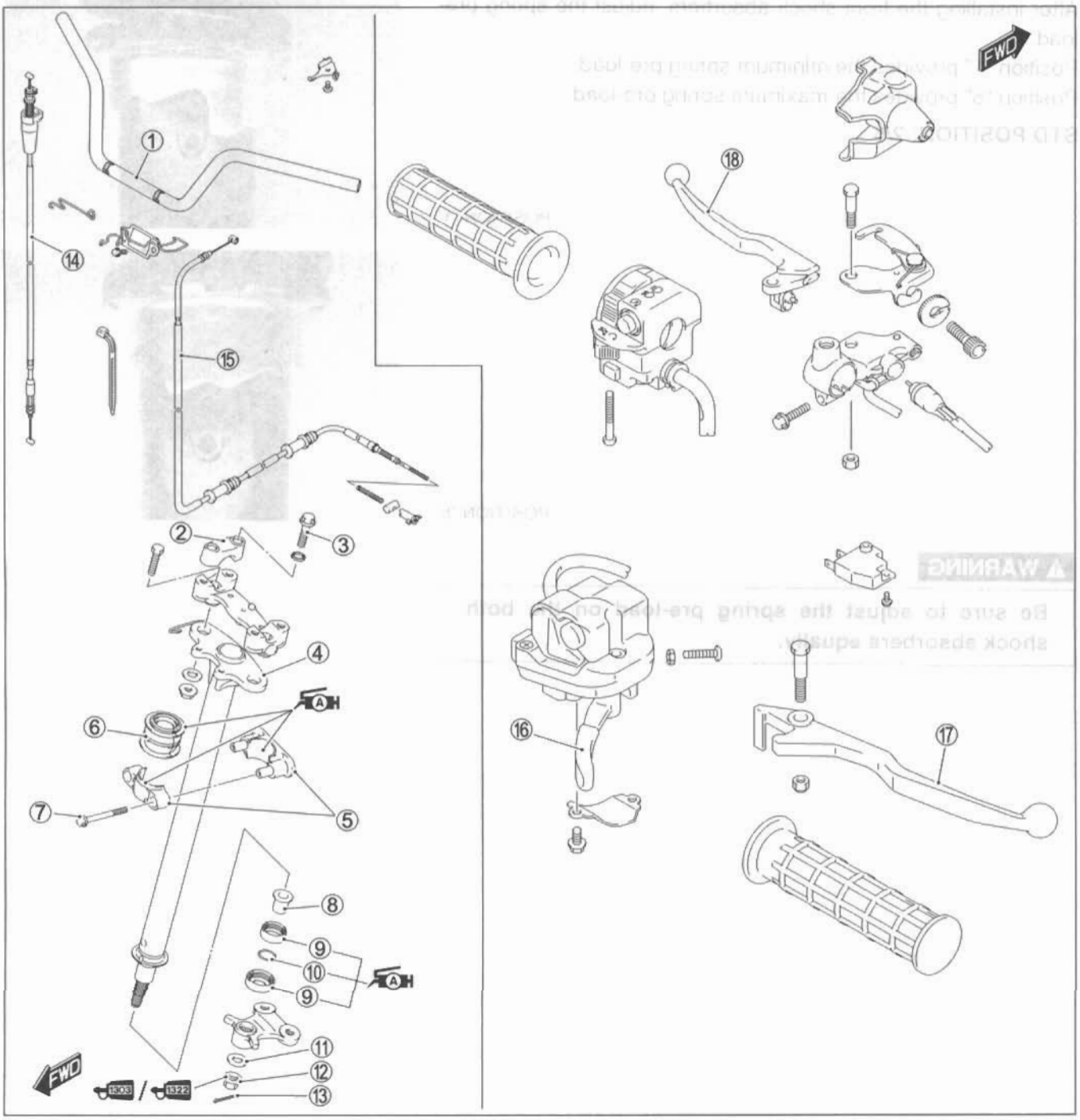


POSITION "5"

⚠ WARNING

Be sure to adjust the spring pre-load on the both shock absorbers equally.

STEERING
CONSTRUCTION

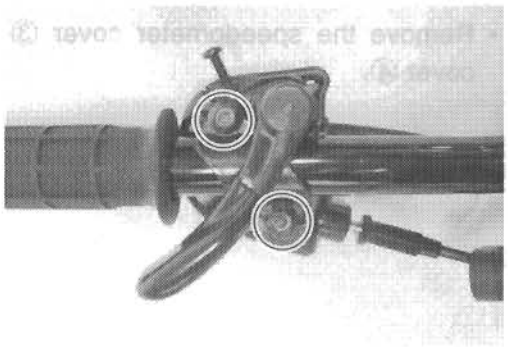


①	Handlebar	⑩	O-ring
②	Handlebar upper clamp	⑪	Washer
③	Handlebar upper clamp bolt	⑫	Steering shaft lower nut
④	Steering shaft	⑬	Cotter pin
⑤	Steering shaft holder	⑭	Throttle cable
⑥	Dust seal	⑮	Rear brake cable
⑦	Steering shaft holder bolt	⑯	Throttle lever
⑧	Bushing	⑰	Front brake lever
⑨	Dust seal	⑱	Rear brake lever

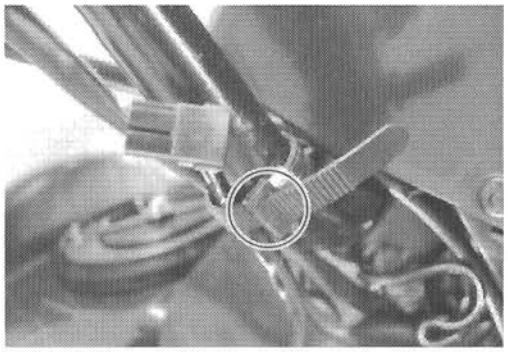
ITEM	N·m	kgf-m	lb-ft
③	26	2.6	19.0
⑦	23	2.3	16.5
⑫	120	12.0	87.0

REMOVAL AND DISASSEMBLY

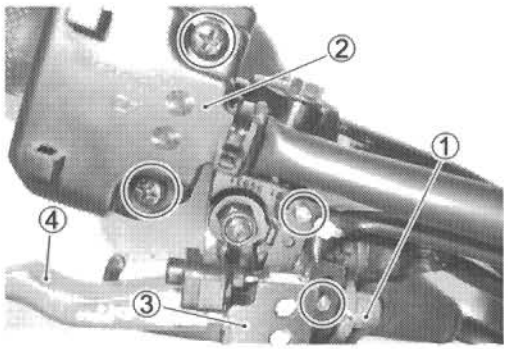
- Remove the front fender. (☞8-5)
- Remove the front wheels. (☞8-13)
- Remove the front brake master cylinder assembly. (☞8-31)
- Remove the throttle lever case.

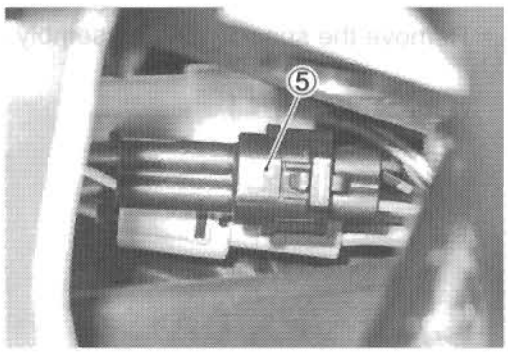


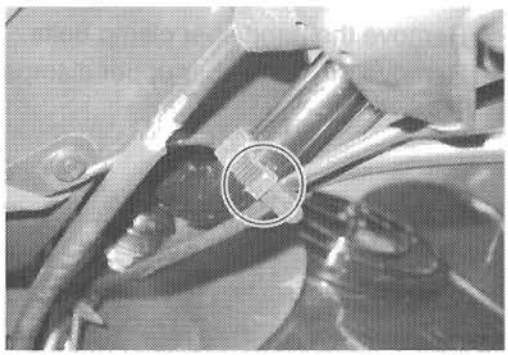
- Remove the throttle cable band.



- Disconnect the parking brake cable ① and remove the handle switch (L) ②.
- Remove the brake lever switch (L) ③.
- Remove the rear brake lever ④.
- Disconnect parking brake switch coupler ⑤.
- Remove the parking brake cable band.

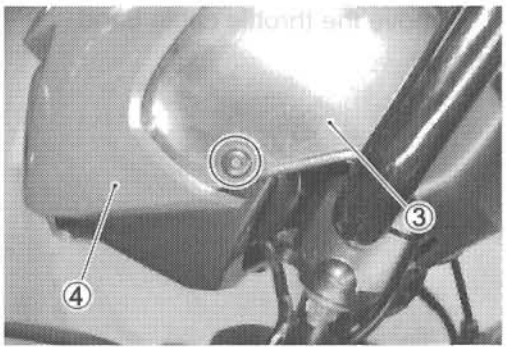


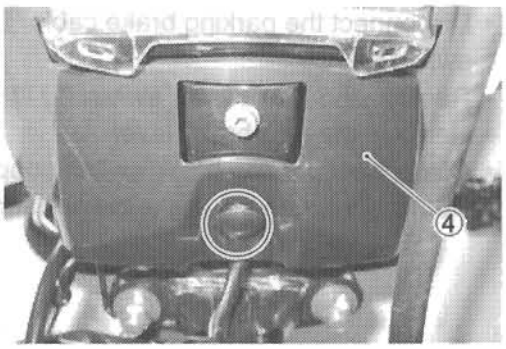




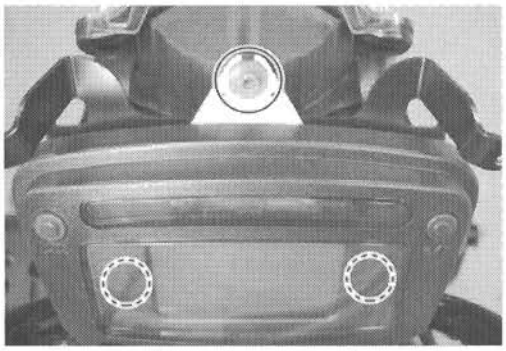
- Remove the speedometer cover ③ and auxiliary headlight cover ④.



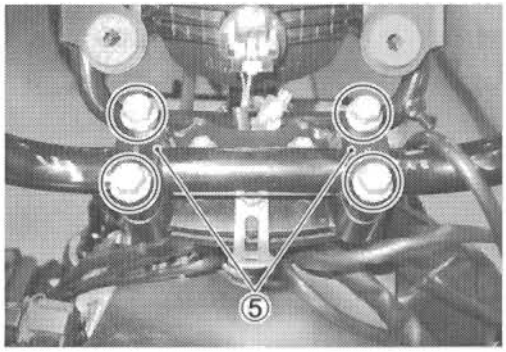




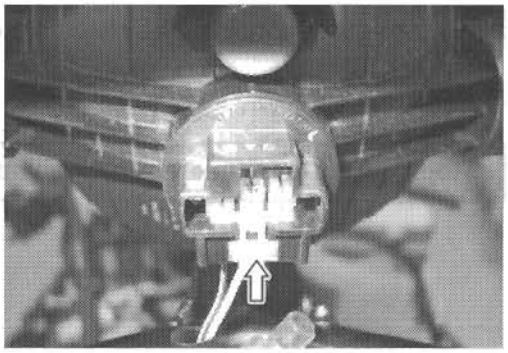
- Remove the speedometer assembly.



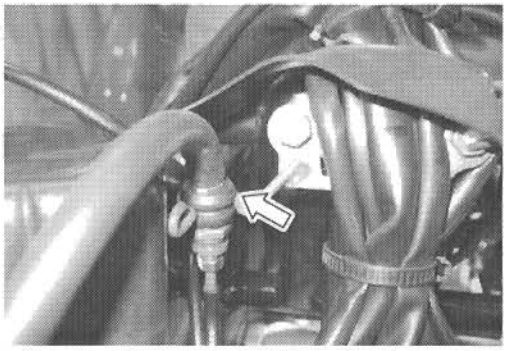
- Remove the handlebar clamp bolts.
- Remove the handlebar upper clamps ⑤ and handlebars.



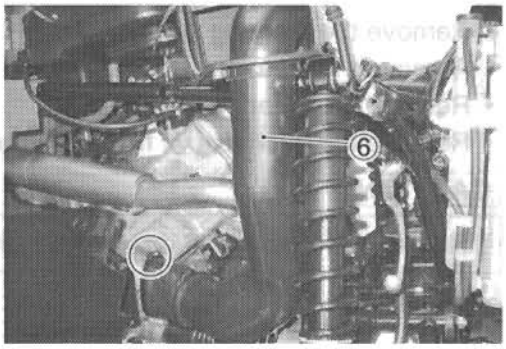
- Disconnect the auxiliary headlight coupler.



- Disconnect the brake hose clamp.



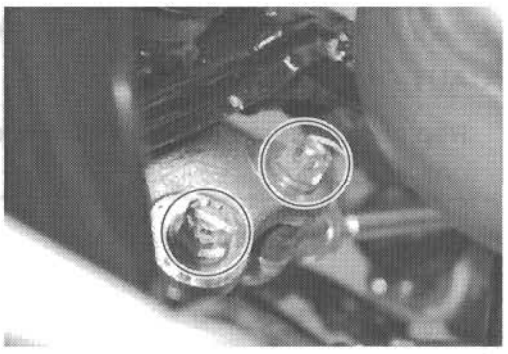
- Remove the cooling duct ⑥.



- Remove the cotter pins and tie rod end nuts.

CAUTION

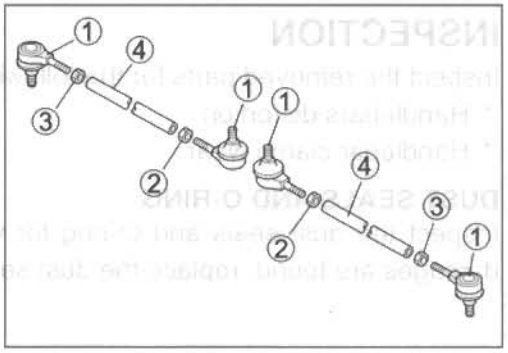
Replace the removed cotter pins with new ones.



- Separate the tie rod ends ①, nuts ② and ③, and tie rods ④.

CAUTION

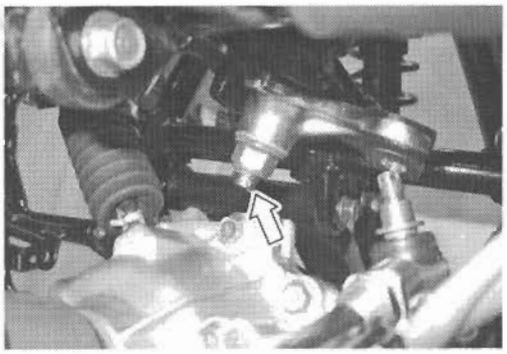
The locknuts ② have left-hand threads.



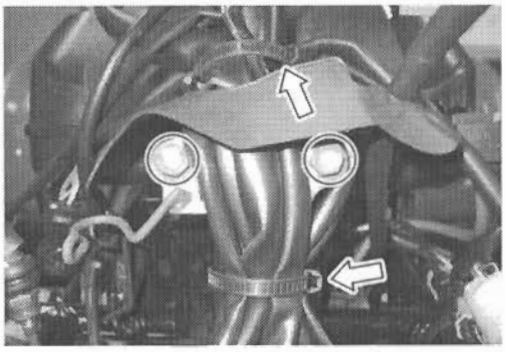
- Remove the cotter pin and steering shaft lower nut and washer.

CAUTION

Replace the removed cotter pin with a new one.



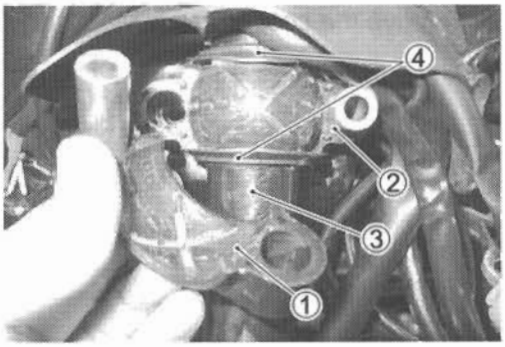
- Remove the steering shaft holder bolts and harness holder bands.



- Remove the steering shaft holder ①.
- Remove the steering shaft holder ②.
- Remove the steering shaft ③.
- Remove the dust seal ④ from the steering shaft.

CAUTION

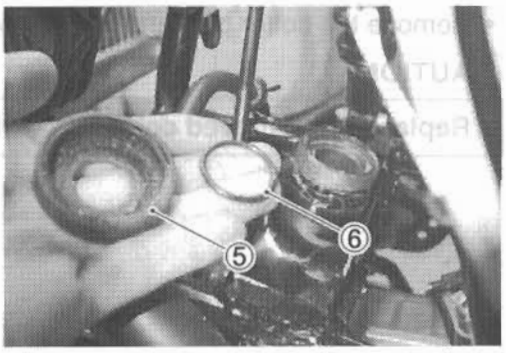
Replace the removed dust seals with new ones.



- Remove the dust seal ⑤ and O-ring ⑥.

CAUTION

Replace the removed dust seal and O-ring with a new one.



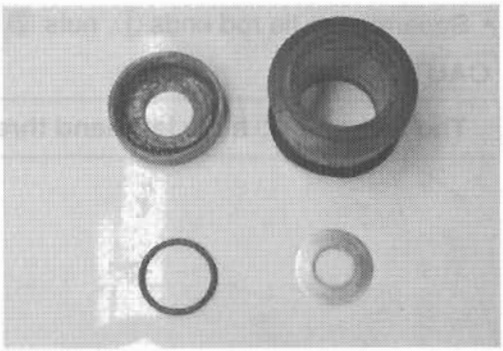
INSPECTION

Inspect the removed parts for the following abnormalities.

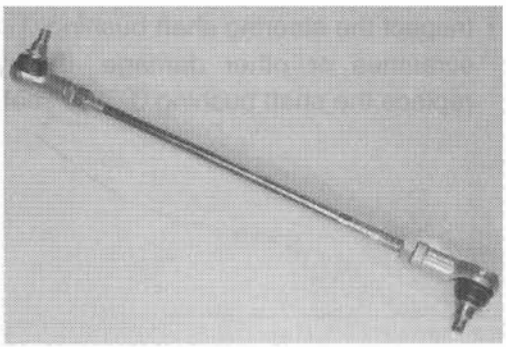
* Handlebars distortion
* Handlebar clamp wear

DUST SEALS AND O-RING

Inspect the dust seals and O-ring for wear or damage. If any damages are found, replace the dust seals with new ones.

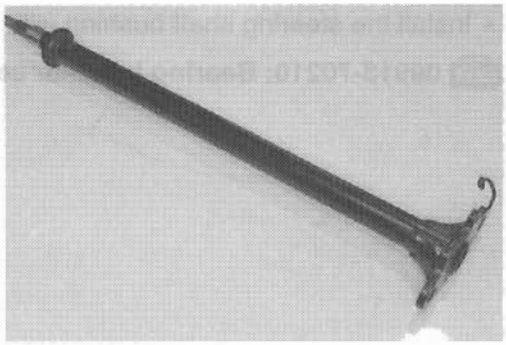


TIE ROD
Inspect the tie rod for distortion or damage. If any damages are found, replace it with a new one.

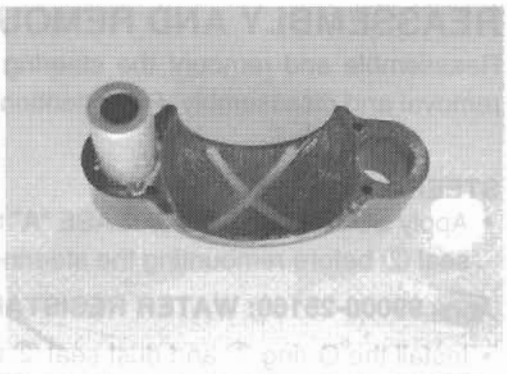


TIE ROD END
Inspect the tie rod ends and boots for smooth movement. If there are any abnormalities, replace them with new ones.

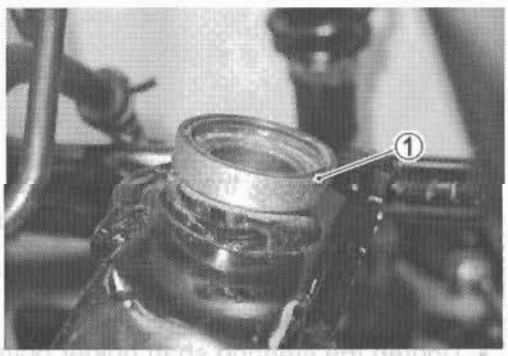
STEERING SHAFT AND HOLDER
Inspect the steering shaft for distortion or bends. If any damages are found, replace it with a new one.



Inspect the steering shaft holders for wear or damage. If any damages are found, replace them with new ones.

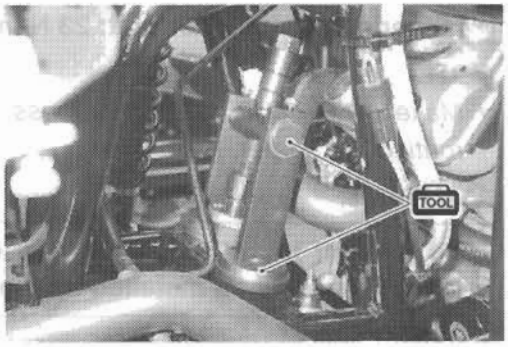


STEERING SHAFT BUSHING
Inspect the steering shaft bushing ① for wear and damage. If any damages are found, replace it with a new one.

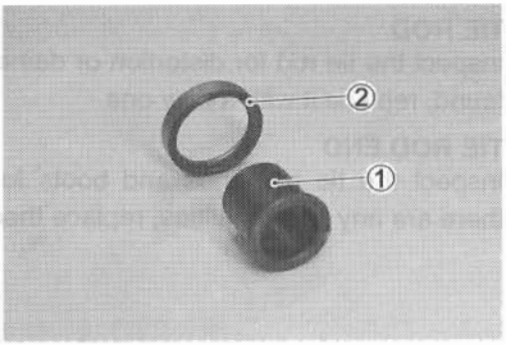


- Remove the steering shaft bushing with the special tools.

TOOL 09913-70210: Bearing installer set
09921-20240: Bearing remover set

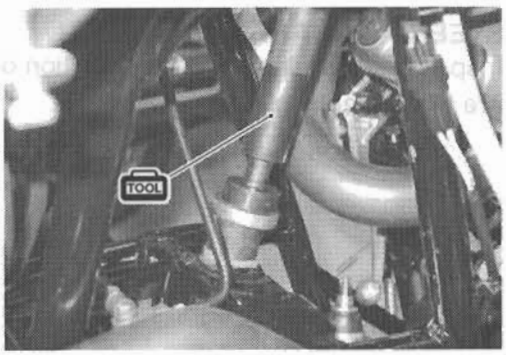


- Inspect the steering shaft bushing ① and dust seal ② for any scratches or other damage. If any damages are found, replace the shaft bushing ① and seal ② with new ones.



- Install the steering shaft bushing with the special tool.

09913-70210: Bearing installer set



REASSEMBLY AND REMOUNTING

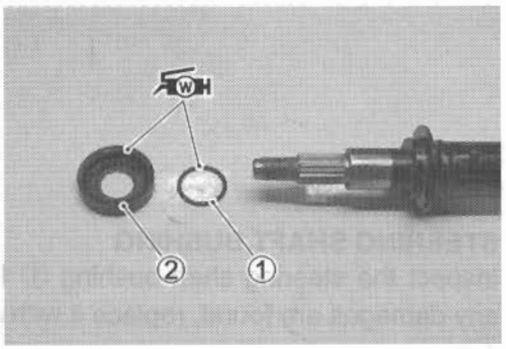
Reassemble and remount the steering in the reverse order of removal and disassembly. Pay attention to the following points:

STEERING SHAFT

- Apply SUZUKI SUPER GREASE "A" to the O-ring ① and dust seal ② before remounting the steering shaft.

99000-25160: WATER RESISTANCE GREASE

- Install the O-ring ① and dust seal ② to the steering shaft.

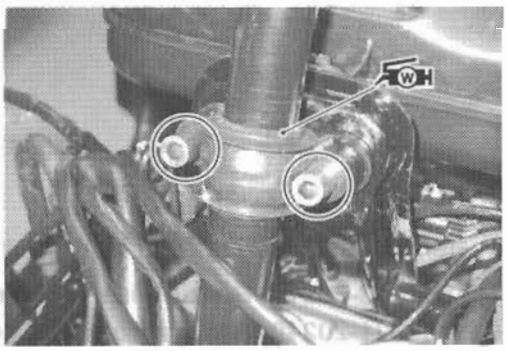


- *Apply grease to the steering shaft holder and dust seals* before remounting the steering shaft holder.

99000-25160: WATER RESISTANCE GREASE

- Install 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 proper. (☞ 10-17)*

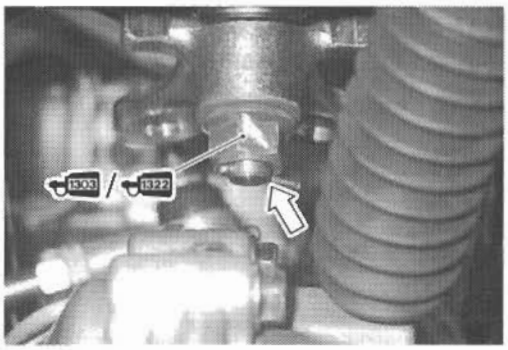
CAUTION

To prevent the entry of dirt, the dust seal end must face forward when installed on the steering shaft.

- Install the steering shaft lower nut and washer.
- Tighten the steering shaft lower nut to the specified torque.

Steering shaft lower nut: 120 N·m (12.0 kgf-m, 87.0 lb-ft)

NOTE:
After installing the steering shaft lower nut, install a new cotter pin into the steering shaft.



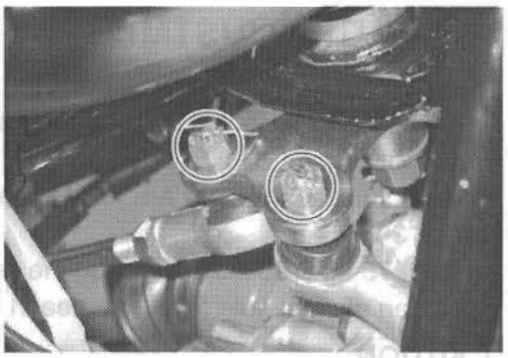
TIE ROD

- Tighten the tie rod end nuts to the specified torque.

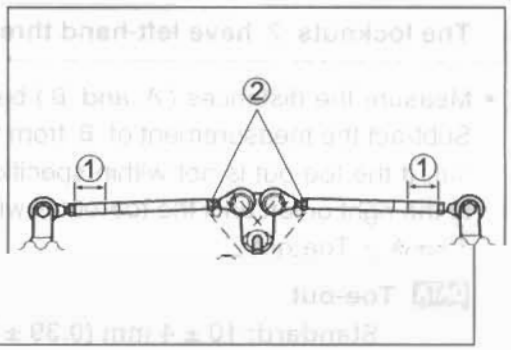
Tie rod end nut: 29 N·m (2.9 kgf-m, 21.0 lb-ft)

NOTE:
After installing the tie rod end nuts, install the new cotter pins into the tie rod ends.

- When installing the tie rods, make sure the short sides ① of the tie rods come outside.

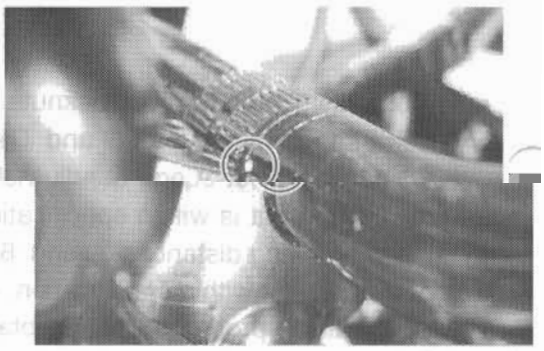


NOTE:
The locknuts ② have left-hand threads.



HANDLEBARS

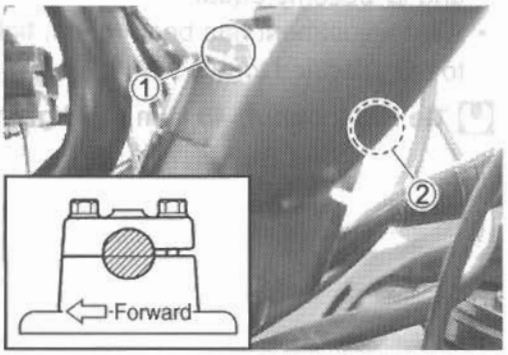
- When installing the handlebars on the handlebar lower clamp, align the punched mark on the handlebars with the foward edge of the handlebar lower holder.



- Install the handlebar upper clamps as shown.
- First, tighten the bolts ① to the specified torque, and then tighten the bolts ② to the specified torque.

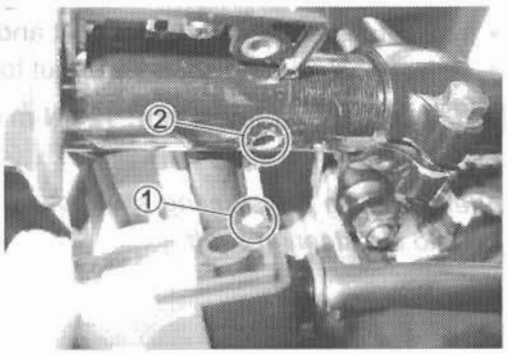
Handlebar upper clamp bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)

- Make sure the cable, harness and brake hose are routing properly.



HANDLEBAR SWITCH

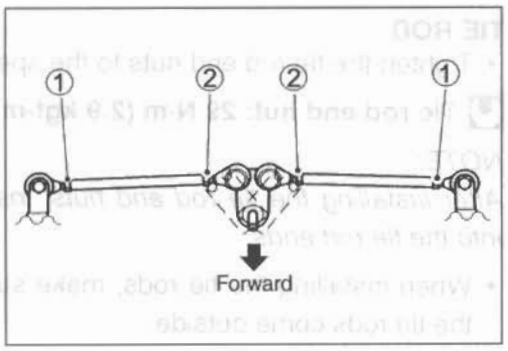
- Align the handlebar switch lug ① with the handlebar hole ②.



TOE-OUT ADJUSTMENT

Adjust the toe-out as follows:

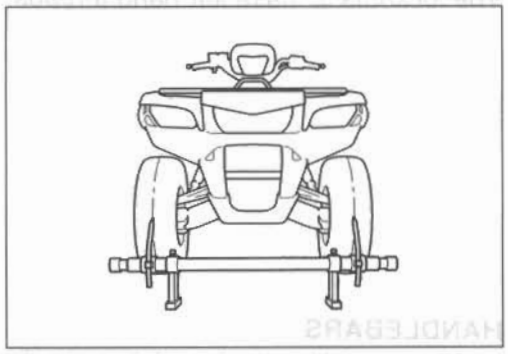
- Place the vehicle on level ground and set the handlebars straight.
- Make sure all the tires are inflated to the standard pressure. (☞2-25)
- Place 75 kg (165 lbs) weight on the seat.
- Loosen the locknuts (①, ②) on each tie rod.



CAUTION

The locknuts ② have left-hand threads.

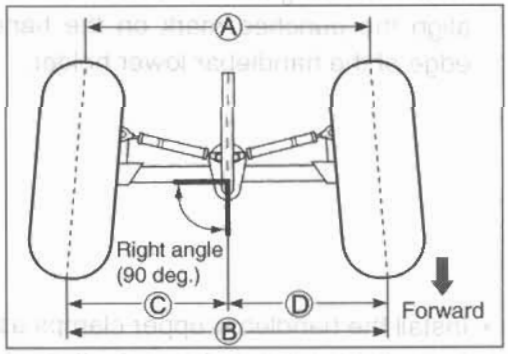
- Measure the distances (Ⓐ and Ⓑ) between the front wheels. Subtract the measurement of Ⓑ from that of Ⓐ to find the toe-out. If the toe-out is not within specification, adjust the tie rod to the right or left until the toe-out is within the specified range.
  Ⓑ – Ⓐ = Toe-out



DATA Toe-out

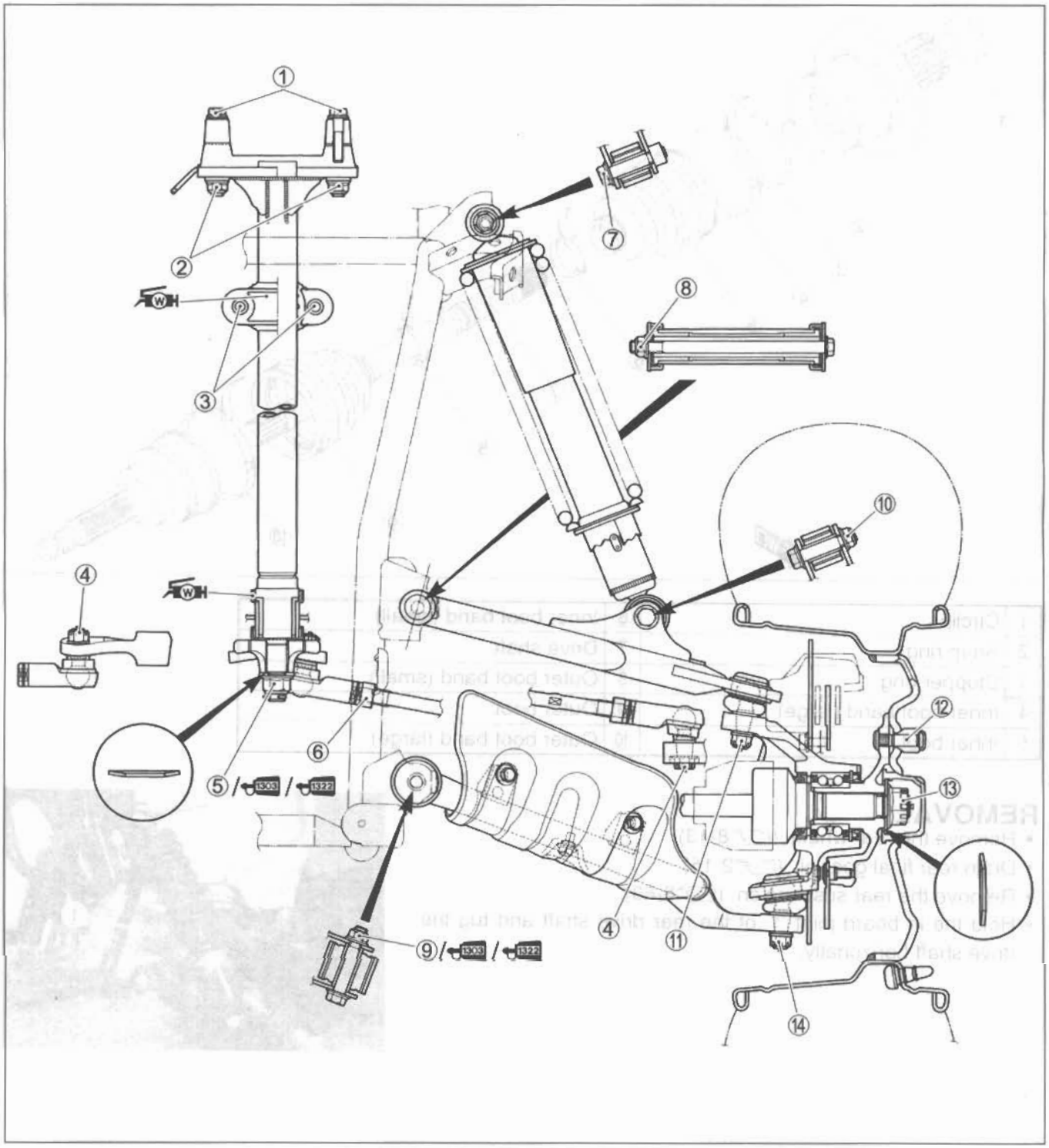
Standard: 10 ± 4 mm (0.39 ± 0.16 in)

- Temporarily tighten the four locknuts.
- 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-out is within specification. Check the toe-out again by measuring distances Ⓐ and Ⓑ.
- If the toe-out is not within specification, repeat the adjustment as above until the proper toe-out is obtained and distances Ⓒ and Ⓓ become equal.
- After adjustment has been made, tighten the four locknuts ① to the specified torque.



Tie rod locknut: 45 N·m (4.5 kgf-m, 32.5 lb-ft)

FRONT WHEEL, FRONT BRAKE, FRONT SUSPENSION AND STEERING REASSEMBLING INFORMATION



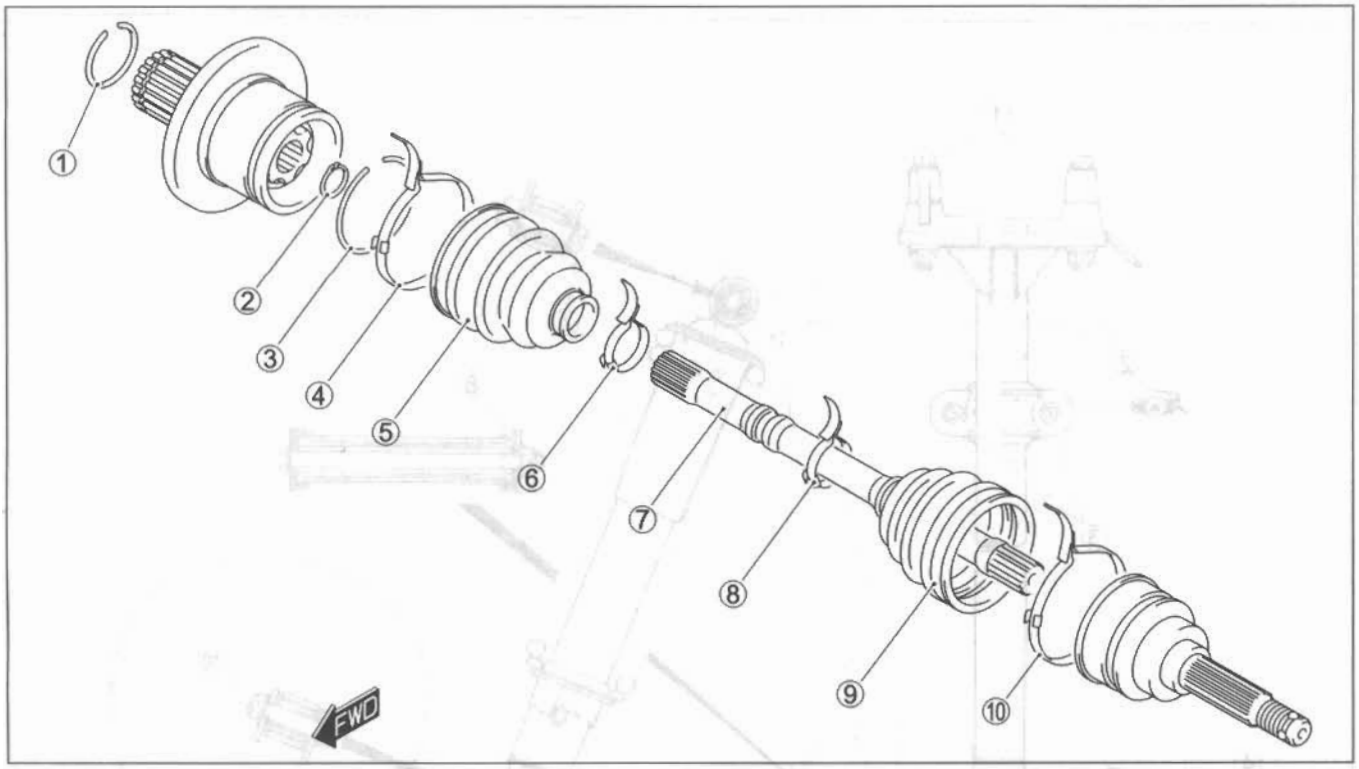
ITEM	N·m	kgf-m	lb-ft
①	26	2.6	19.0
②	60	6.0	43.5
③	23	2.3	16.5
④	29	2.9	21.0
⑤	120	12.0	87.0

ITEM	N·m	kgf-m	lb-ft
⑥	45	4.5	32.5
⑦	55	5.5	40.0
⑧	60	6.0	43.5
⑨	65	6.5	47.0
⑩	60	6.0	43.5

ITEM	N·m	kgf-m	lb-ft
⑪	29	2.9	21.0
⑫	60	6.0	43.5
⑬	110	11.0	49.5
⑭	29	2.9	21.0

REAR DRIVE SHAFT

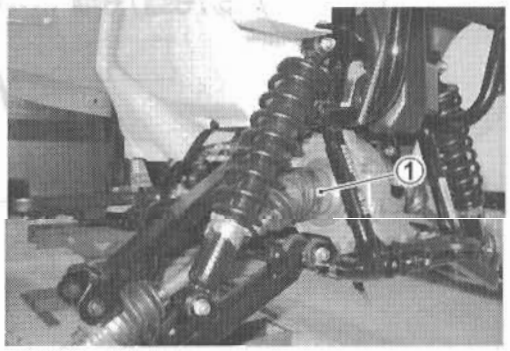
CONSTRUCTION



①	Circlip	⑥	Inner boot band (small)
②	Snap ring	⑦	Drive shaft
③	Stopper ring	⑧	Outer boot band (small)
④	Inner boot band (large)	⑨	Outer boot
⑤	Inner boot	⑩	Outer boot band (large)

REMOVAL

- Remove the rear wheel. (☞8-13)
- Drain rear final gear oil. (☞2-15)
- Remove the rear suspension. (☞8-69)
- Hold the in board joint ① of the rear drive shaft and tug the drive shaft horizonally.

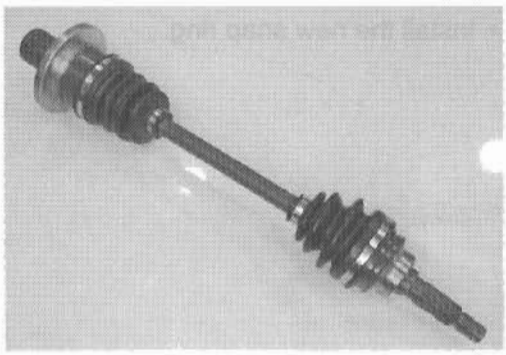


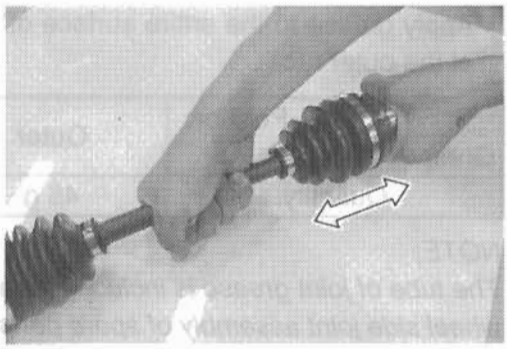
INSPECTION AND REASSEMBLY

Inspect the boots for wear or damage. If any damages are found, replace the boots with new ones.

Inspect the stopper ring, snap ring and boot bands for wear or damage. If any damages are found, replace them with new ones.

Inspect the axle play by using a push-and-pull motion given to the axle shaft and wheel spindle, as shown.





NOTE:

** Wash the disassembled parts (except for the boot). After washing, completely dry the parts using compressed air.*

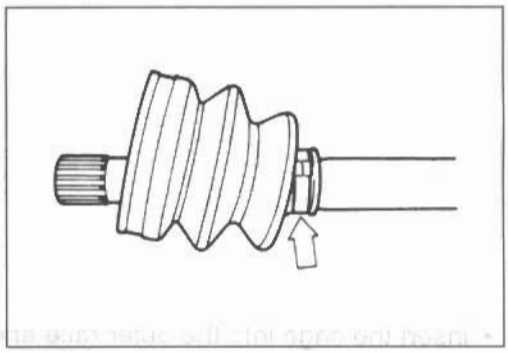
** Clean the boots with a cloth.*

CAUTION

*** Wash all parts before installation, clean the inside and outside of the boot with a cloth.**

*** Do not wash the boots in any commercially available degreaser, such as gasoline or kerosene. Washing in a degreaser causes deterioration of the boot.**

- Fit a boot on the drive shaft end, fitting the small diameter side of the boot to the shaft groove, fix its end with a new band.

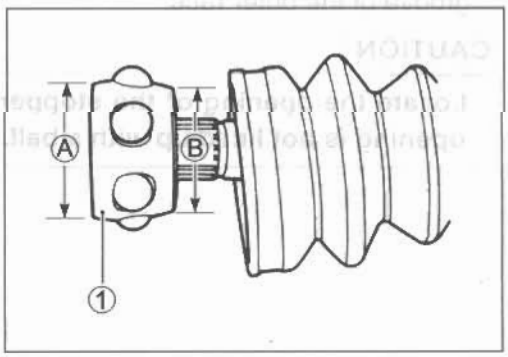


- Install the cage ① on the shaft.

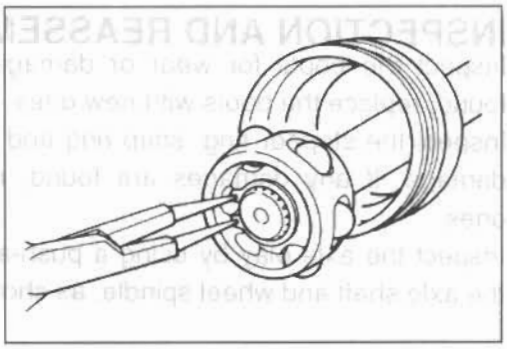
CAUTION

Install the cage with the large diameter side facing the shaft end.

Ⓐ Large diameter
Ⓑ Small diameter

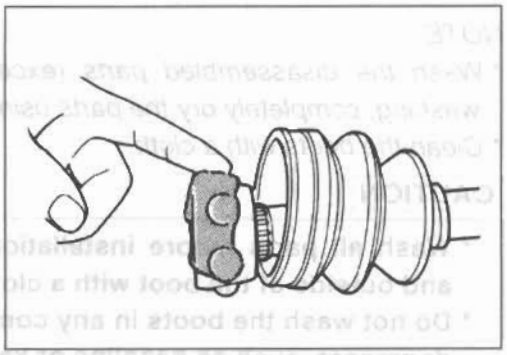


- Install the new snap ring.

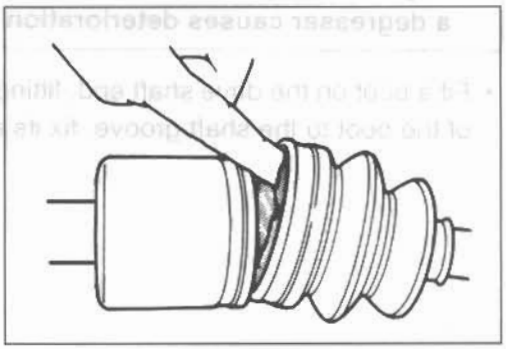


- Apply grease to the entire surface of the cage and the inside of the outer race.

Position / Grease	Outer	Inner
Quantity	45 g	85 g



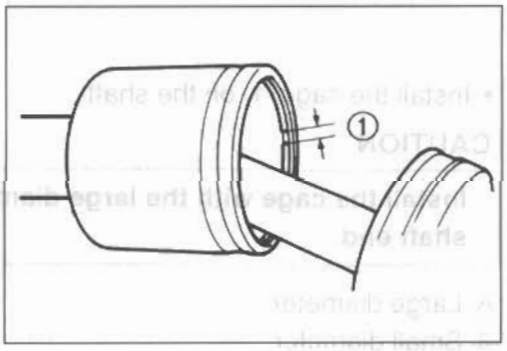
NOTE:
The tube of joint grease is included in the wheel side boot set or wheel side joint assembly of spare parts.



- Insert the cage into the outer race and fit a stopper ring in the groove of the outer race.

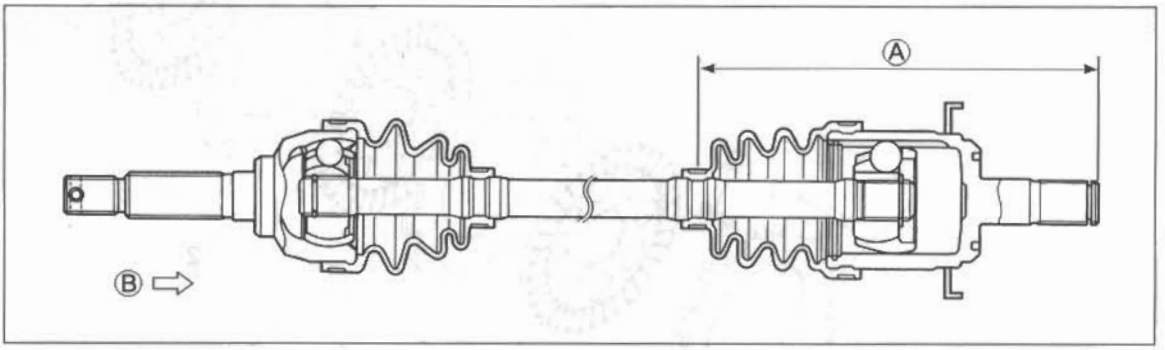
CAUTION

Locate the opening of the stopper ring ① so that the opening is not lined up with a ball.



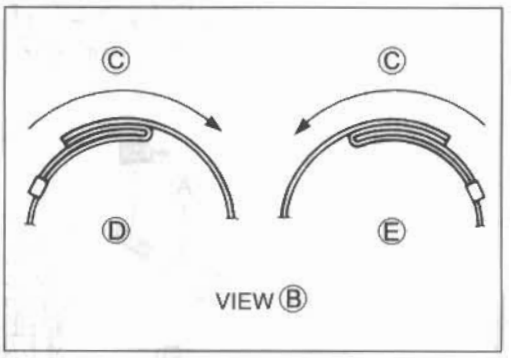
- After fitting the boot on the outer race, insert a screw driver into the boot on the outer race side and allow air to enter the boot so that the air pressure in the boot becomes the same as the atmospheric pressure at the positions indicated in the illustration.

Ⓐ 188 – 198 mm (7.4 – 7.8 in)



- Fix the boot on the outer race with a boot band, taking care not to distort the boot.

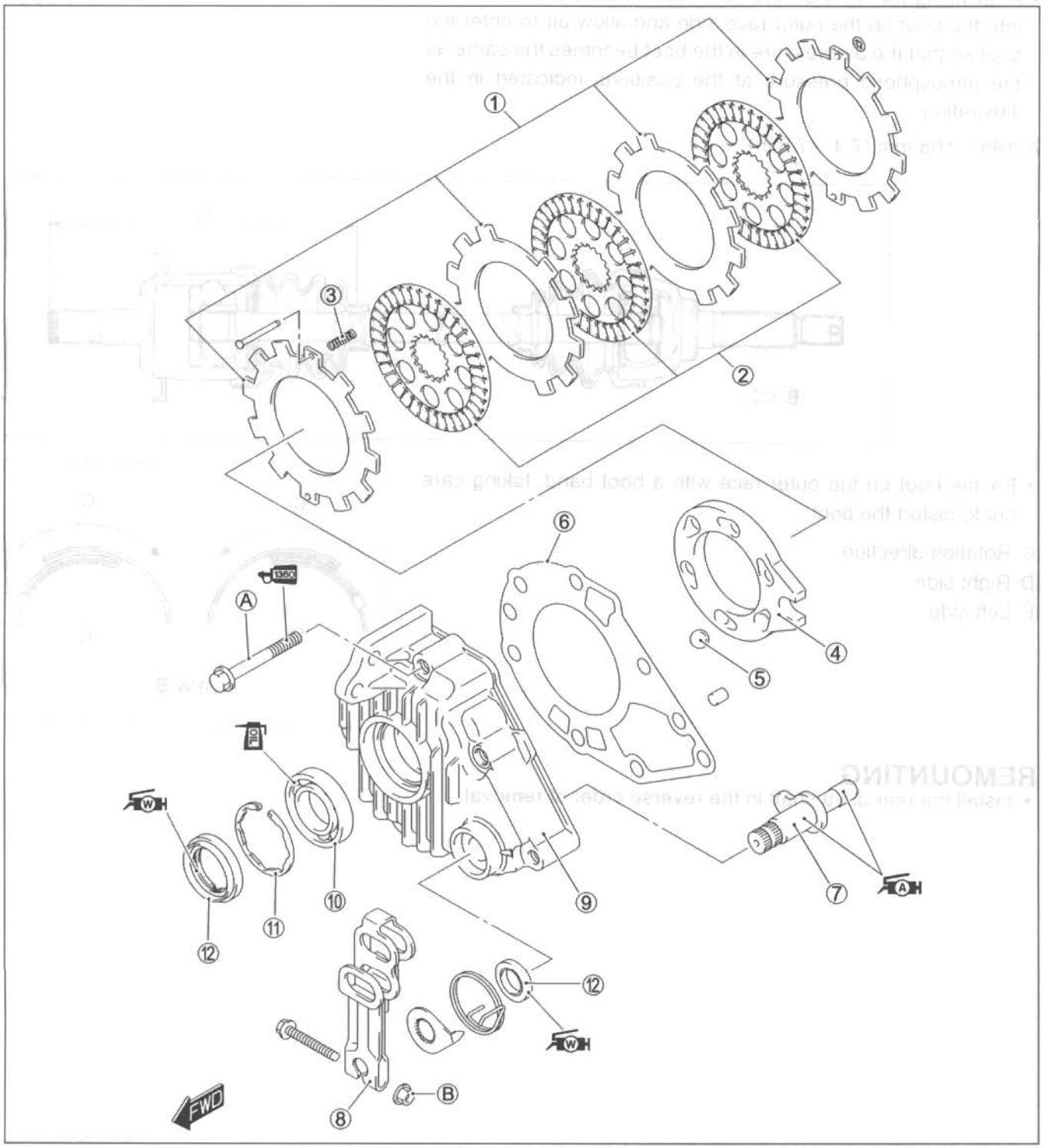
Ⓒ Rotation direction
Ⓓ Right side
Ⓔ Left side



REMOUNTING

- Install the rear drive shaft in the reverse order of removal.

REAR BRAKE
CONSTRUCTION



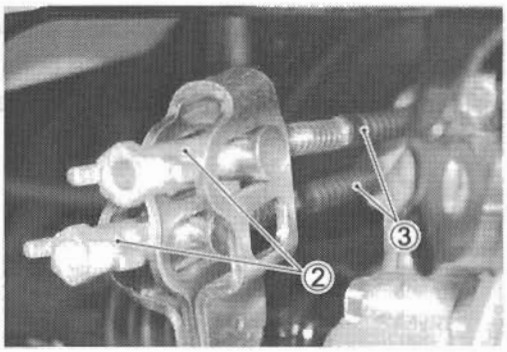
①	Steel plates	⑧	Rear brake cam lever
②	Friction plates	⑨	Rear brake case cover
③	Rear brake return spring	⑩	Bearing
④	Rear brake pressure plate	⑪	Snap ring
⑤	Ball	⑫	Oil seal
⑥	Gasket	Ⓐ	Rear brake case cover bolts
⑦	Rear brake cam shaft	Ⓑ	Rear brake cam lever nut

ITEM	N·m	kgf-m	lb-ft
Ⓐ	26	2.6	19.0
Ⓑ	11	1.1	8.0

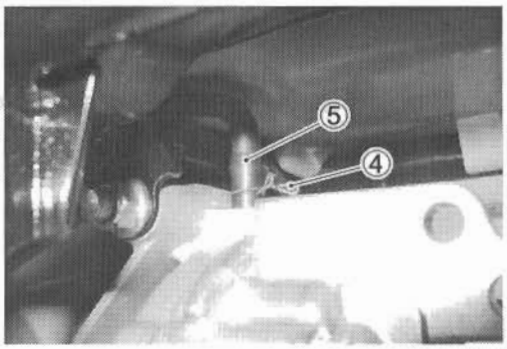
REMOVAL AND DISASSEMBLY

- Remove the rear wheels. (☞8-13)
- Remove the exhaust pipe. (☞8-12)
- Drain the final gear oil. (☞2-15)
- Remove the rear drive shaft. (☞8-54)

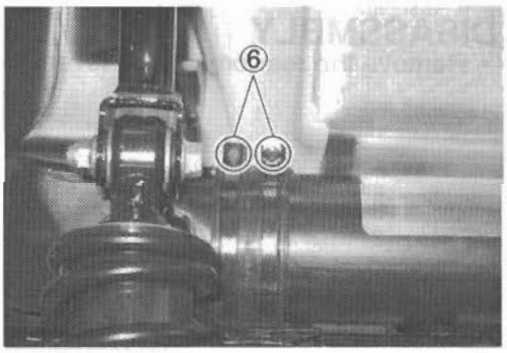
- Remove the rear brake adjust nut ② and brake cables ③.



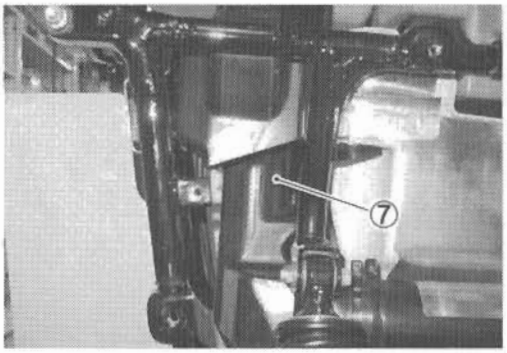
- Remove the clamp ④ and breather hose ⑤.



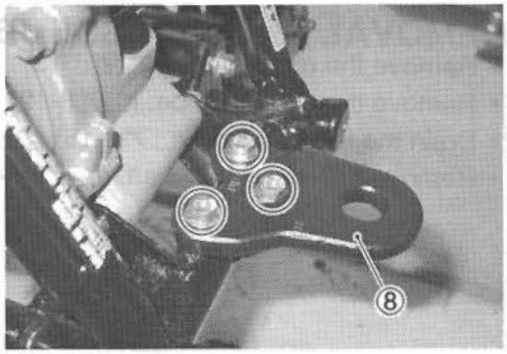
- Loosen the outlet pipe connecting screws ⑥.



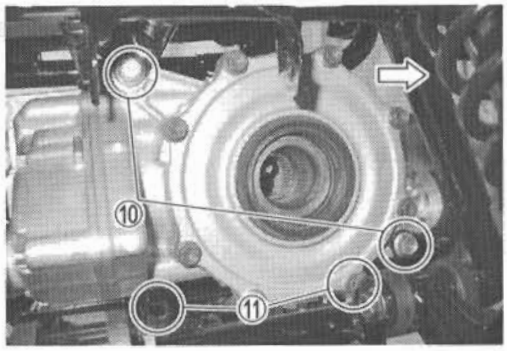
- Remove the outlet pipe ⑦.



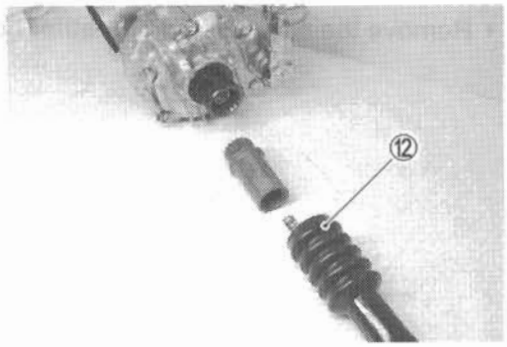
- Remove the trailer towing (option) ⑧.



- Remove the rear final gear case assembly mounting bolts ⑩.
- Remove the rear final gear case bolts ⑪.
- Rear final gear case assembly is pulled for a while back.

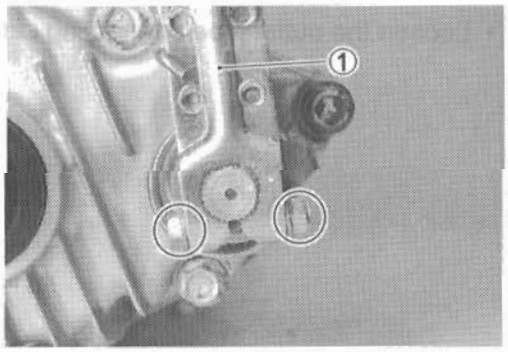


- Remove the rear propeller shaft boots by the rear differential side ⑫.
- Remove the rear final gear case assembly out of the frame.

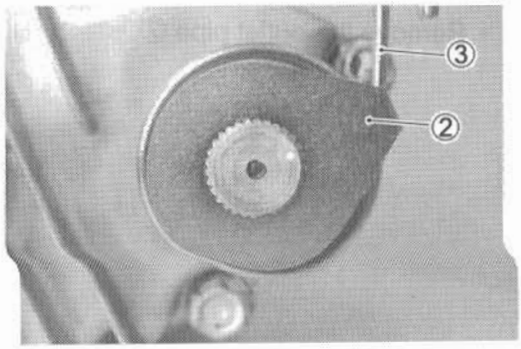


DISASSMBLY

- Remove the rear brake cam lever ①.



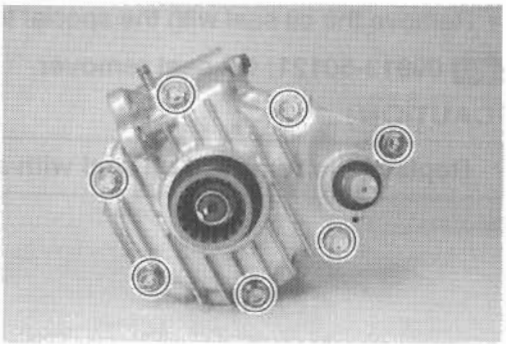
- Remove the rear brake wear limit indicator ②.
- Remove the return spring ③.



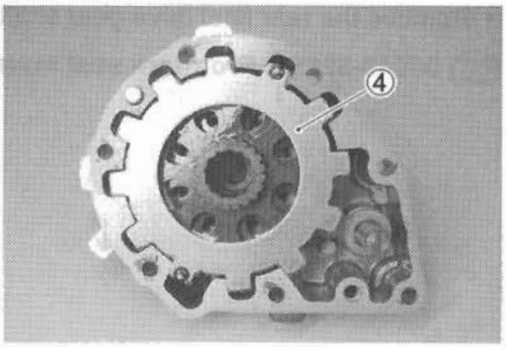
- Remove the rear brake case cover.
- Remove the gasket.

CAUTION

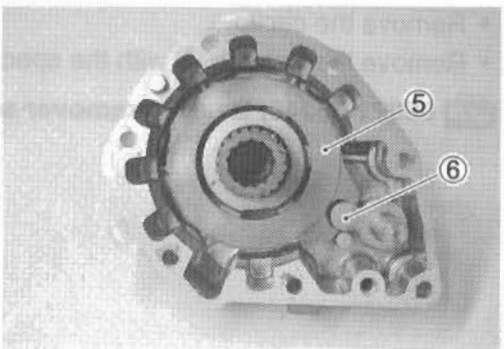
Replace the removed gasket with a new one.



- Remove the rear brake friction plate and steel plate ④.



- Remove the rear brake cam ⑤.
- Remove the rear brake cam shaft ⑥.



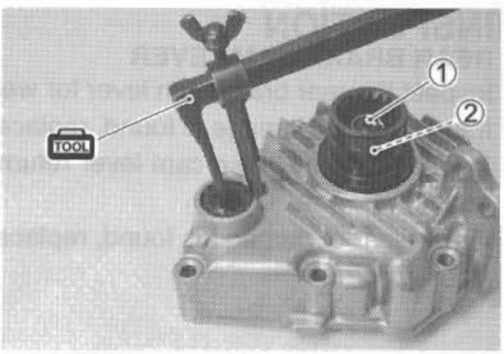
- Remove the oil seal with the special tool.

09913-50121: Oil seal remover

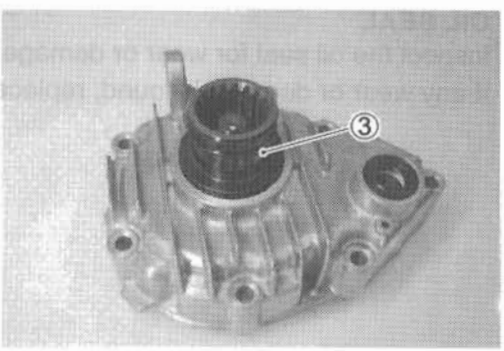
CAUTION

Replace the removed oil seal with a new one.

- Remove the lock nut ① and washer ②.



- Remove the rear propeller shaft coupling ③.

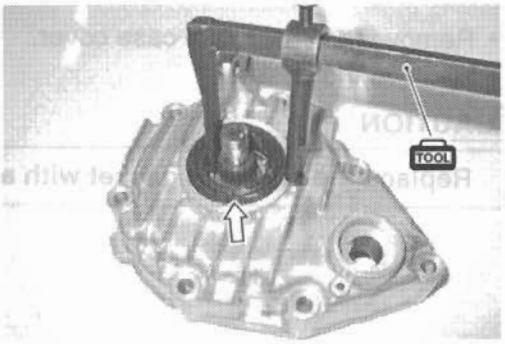


• Remove the oil seal with the special tool.

TOOL 09913-50121: Oil seal remover

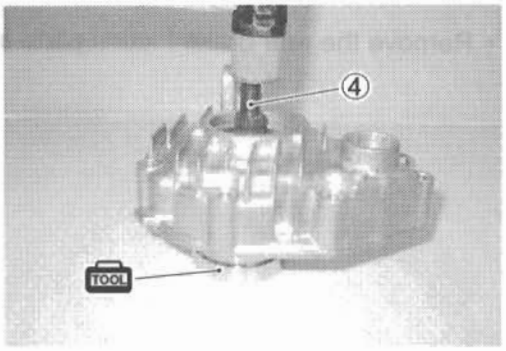
CAUTION

Replace the removed oil seal with a new one.



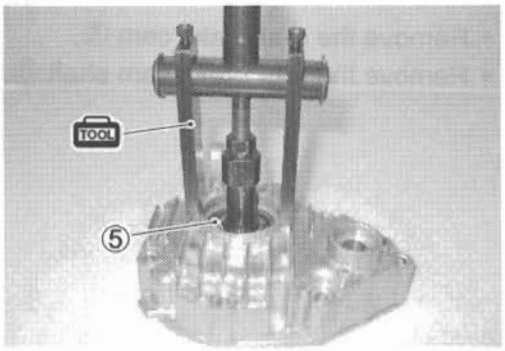
• Remove the rear final drive gear shaft ④ with the special tool.

TOOL 09940-52861: Frontfork seal installer set



• Remove the circlip.
• Remove the bearing ⑤ with the special tool.

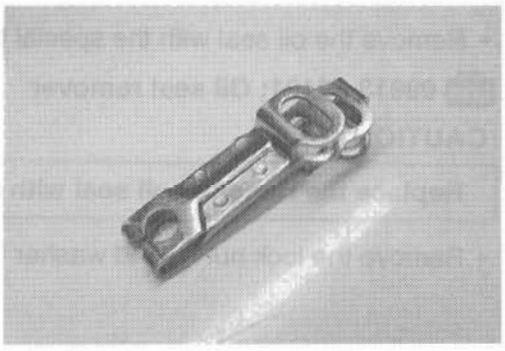
TOOL 09921-20240: Bearing remover set



INSPECTION

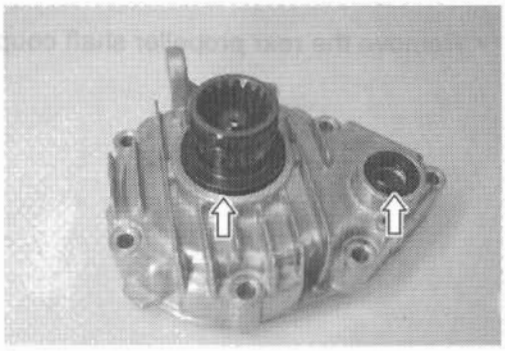
REAR BRAKE CAM LEVER

Inspect the rear brake cam lever for wear or damage.
If any wear or damage is found, replace it with a new one.
Inspect the rear brake cam lever return spring for wear or damage.
If any wear or damage is found, replace it with a new one.



OIL SEAL

Inspect the oil seal for wear or damage.
If any wear or damage is found, replace it with a new one.

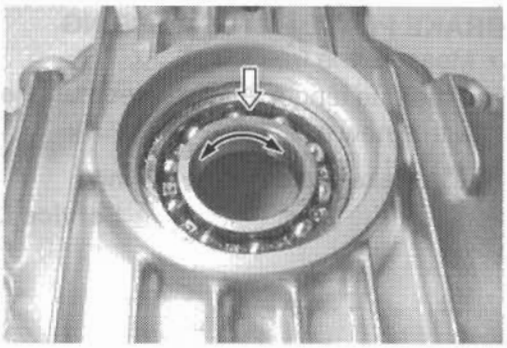


BEARING

Inspect the inner race play of the bearing by hand while it is in the rear brake case cover.

Turn the inner race by hand to inspect for abnormal noise or smooth rotation.

- If there is anything unusual, replace it with a new one.



REAR BRAKE CAM SHAFT

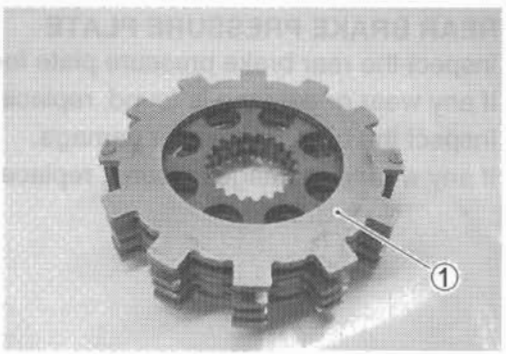
Inspect the rear brake cam shaft for wear or damage.

If any wear or damage is found, replace it with a new one.

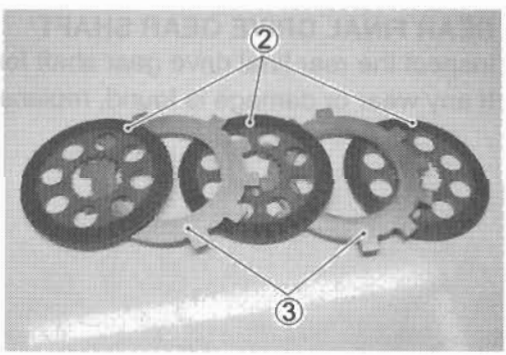


REAR BRAKE PLATE

- Inspect the plates ① for wear or damage.
- If any wear or distortion is found, replace them as a set.



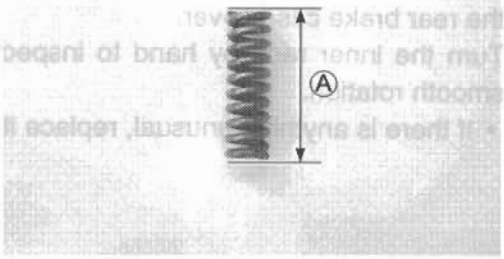
- Inspect the rear brake friction plate ② and steel plate ③ for wear or distortion.
- If any wear or distortion is found, replace them as a set.



BRAKE PLATE RETURN SPRING

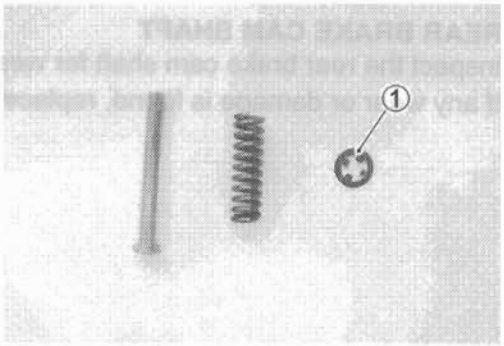
- Measure the free length Ⓐ.
- If the free length Ⓐ is shorter than the limit, replace the spring with a new one.

DATA **Brake plate return spring:**
Service Limit: 20.2 mm (0.80 in)



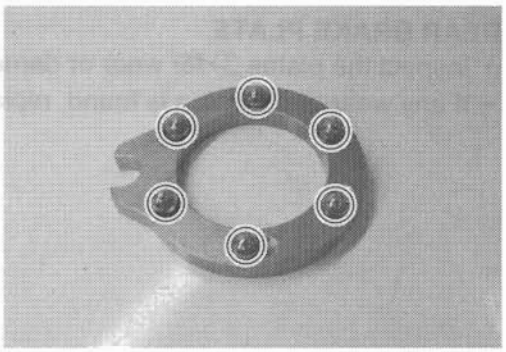
CAUTION

Replace the removed plate stopper ① with a new one.



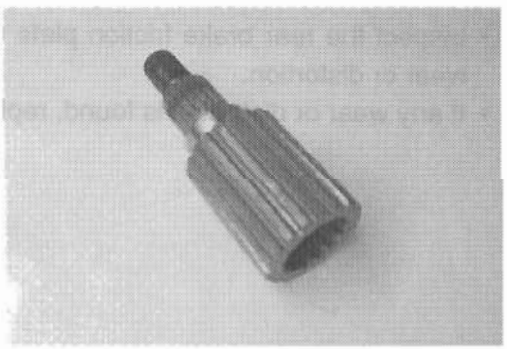
REAR BRAKE PRESSURE PLATE

Inspect the rear brake pressure plate for wear or damage.
If any wear or damage is found, replace it with a new one.
Inspect the balls for wear or damage.
If any wear or damage is found, replace them with new ones.



REAR FINAL DRIVE GEAR SHAFT

Inspect the rear final drive gear shaft for wear or damage.
If any wear or damage is found, replace it with a new one.



REASSEMBLY AND REMOUNT

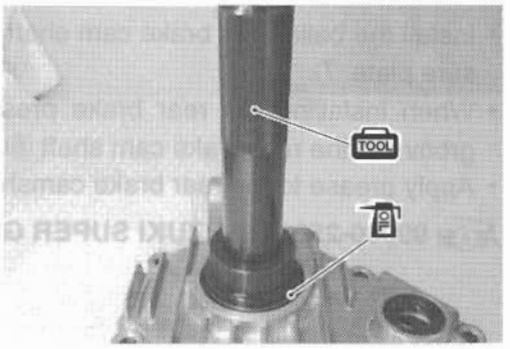
- Reassemble and remount the rear brake in the reverse order of removal and disassembly. Pay attention to the following points.
- Install the bearing with the special tool.

TOOL 09913-70210: Bearing installer set

- Apply oil to the bearing before installing it.

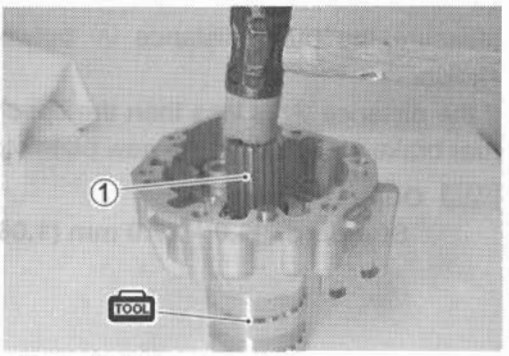
OIL Specification and classification: MOBIL FLUID 424

- Install the snap ring.

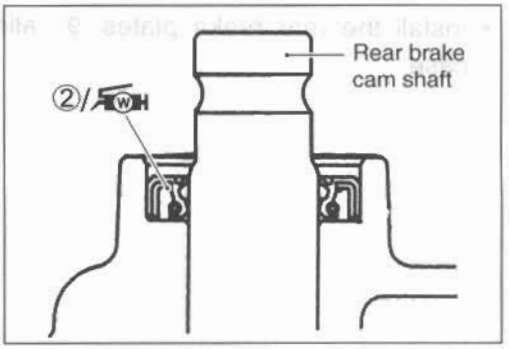


- Install the rear final drive gear shaft ① with the special tool.

TOOL 09940-52861: Frontfork seal installer set



- Install the oil seal ② with the special tool as shown.

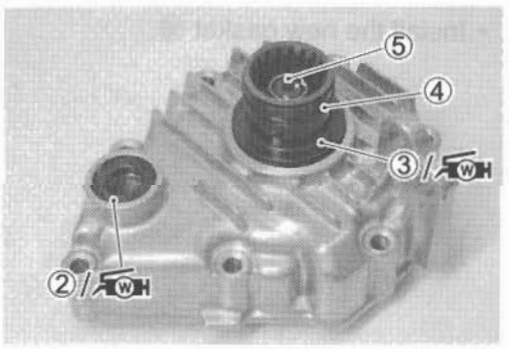


- Install the oil seals ③ with the special tool.

TOOL 09913-70210: Bearing installer set

- Apply grease to the seals before installing them.

W 99000-25160: WATER PESISTANCE GREASE

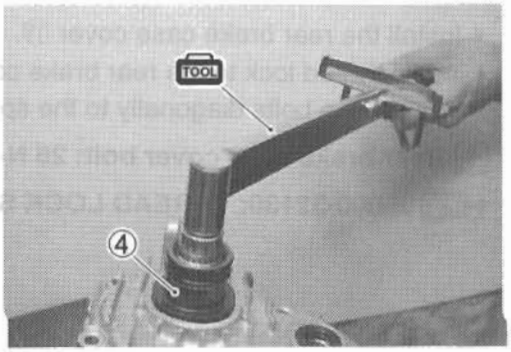


- Install the rear propeller shaft coupling ④.
- Install the washer and new locknut ⑤.
- Tighten the new locknut ⑤ to the specified torque with the special tool.

TOOL 09900-23104: Torque wrench

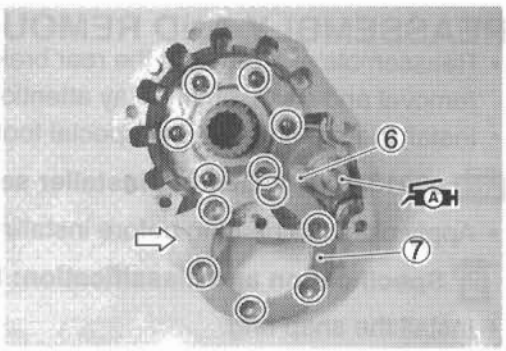
Locknut: 100 N·m (10.0 kgf-m, 72.5 lb-ft)

NOTE:
After tightening the locknut, lock it with a center punch.



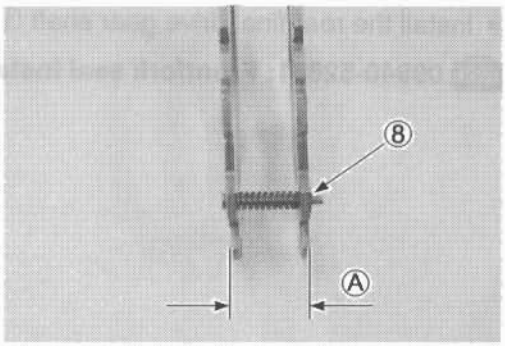
- Install the balls, rear brake cam shaft ⑥ and rear brake pressure plate ⑦.
- When installing the rear brake pressure plate ⑦, align its groove to the rear brake cam shaft ⑥.
- Apply grease to the rear brake camshaft ⑥.

99000-25010: SUZUKI SUPER GREASE "A"

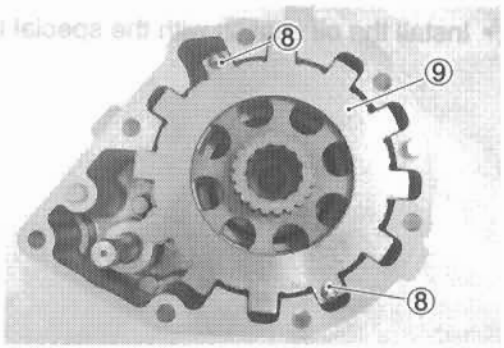


Measure the outer distance Ⓐ between the steel plates as shown.
If the distance Ⓐ is less than the specification, reassemble the rear brake plates using the new plate stopper ⑧.

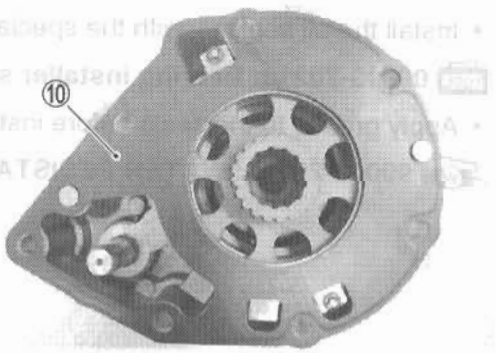
Outer distance Ⓐ
Standard: 26.0 – 27.0 mm (1.06 – 1.07 in)



- Install the rear brake plates ⑨, alining the grooves of the case.



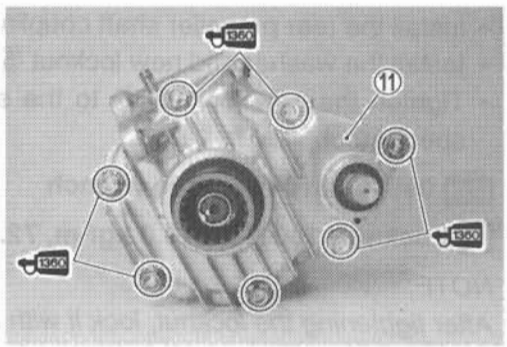
- Install the new gasket ⑩.



- Install the rear brake case cover ⑪.
- Apply thread lock to the rear brake case cover bolts.
- Tighten the bolts diagonally to the specified torque.

Rear brake case cover bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)

1360 99000-32130: THREAD LOCK SUPER "1360"

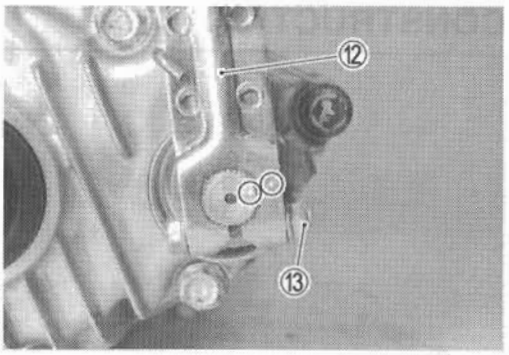


- Install the rear brake cam lever ⑫ to the shaft.

NOTE:
When installing the brake cam lever, align the punched mark.

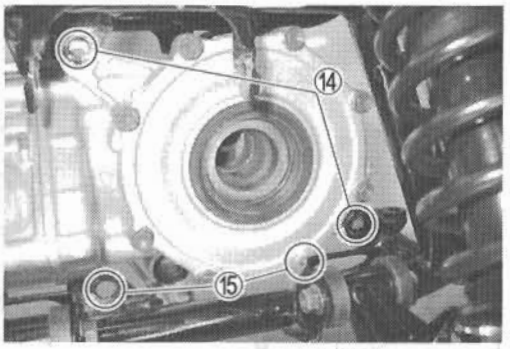
- Tighten the cam lever nut ⑬ to the specified torque.

Rear brake cam lever nut: 11 N·m (1.1 kgf-m, 8.0 lb-ft)



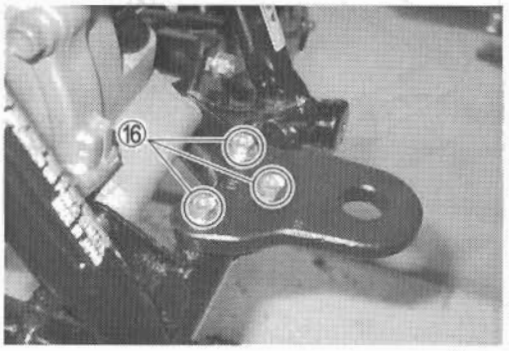
- Install the rear drive assy to the frame.
- Tighten the rear drive mounting bolt/nut ⑭ and case cover bolt ⑮ to the specified torque.

Rear drive mounting nut: 65 N·m (6.5 kgf-m, 47.0 lb-ft)

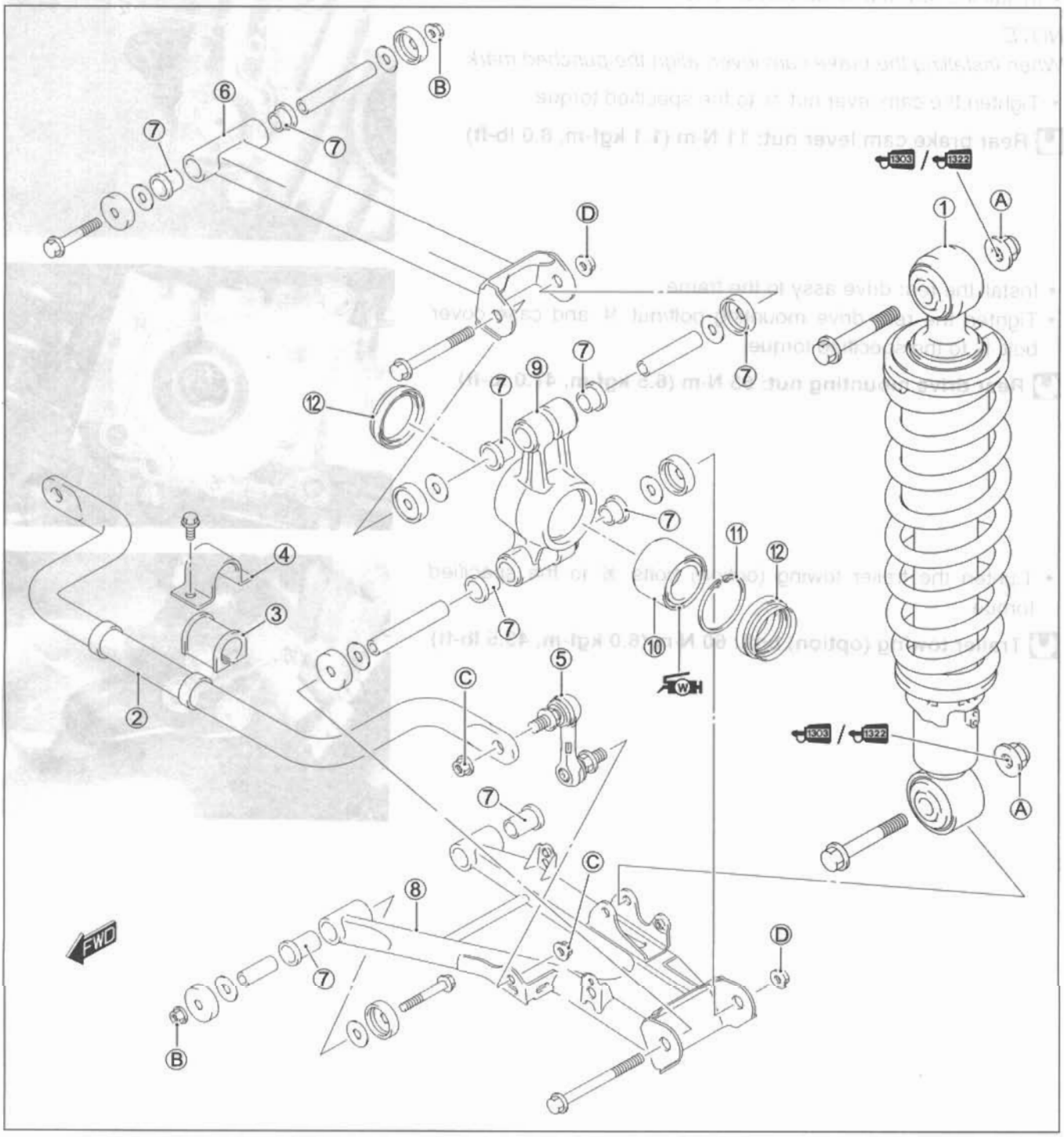


- Tighten the trailer towing (option) bolts ⑯ to the specified torque.

Trailer towing (option) bolt: 60 N·m (6.0 kgf-m, 43.5 lb-ft)



REAR SUSPENSION
CONSTRUCTION

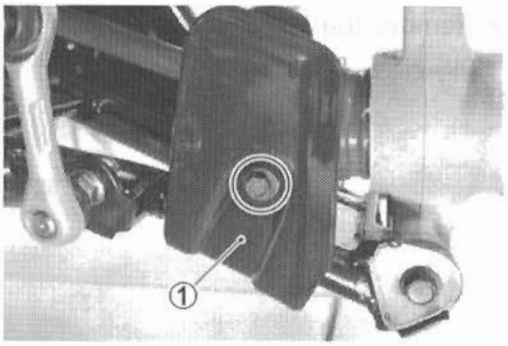


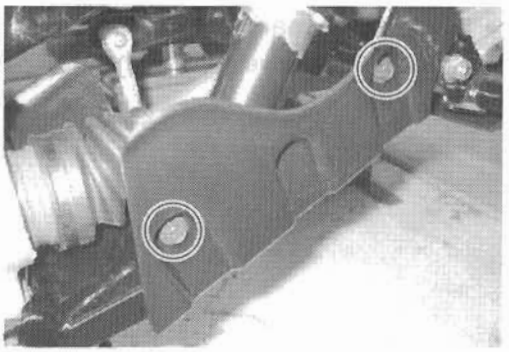
①	Rear shock absorber	⑨	Rear knuckle
②	Rear stabilizer bar	⑩	Hub bearing
③	Rear stabilizer bushing	⑪	Snap ring
④	Rear stabilizer bracket	⑫	Dust seal
⑤	Rear stabilizer link	Ⓐ	Rear shock absorber mounting nut
⑥	Upper wishbone arm	Ⓑ	Wishbone arm pivot nut
⑦	Bushing	Ⓒ	Rear stabilizer link nut
⑧	Lower wishbone arm	Ⓓ	Rear knuckle nut

ITEM	N·m	kgf-m	lb-ft
Ⓐ	60	6.0	43.5
Ⓑ	60	6.0	43.5
Ⓒ	34	3.4	24.5
Ⓓ	60	6.0	43.5

REMOVAL

- Remove the rear wheel. (☞8-13)
- Remove the rear box. (☞8-8)
- Remove the exhaust pipe. (☞8-12)
- Drain the final gear oil. (☞2-15)
- Remove the rear drive shaft cover ①.

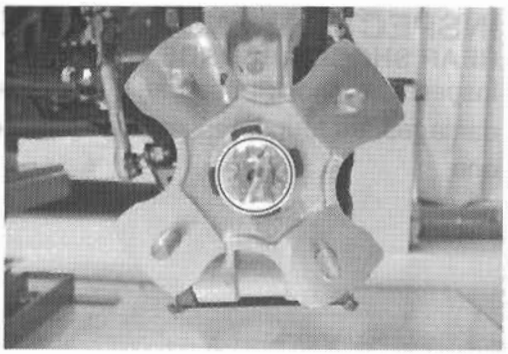




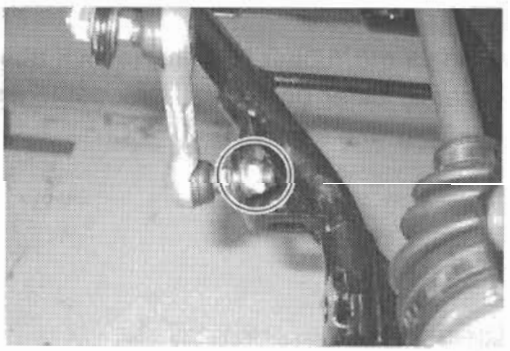
- Remove the cotter pin and rear hub nut.
- Remove the rear wheel hub.

CAUTION

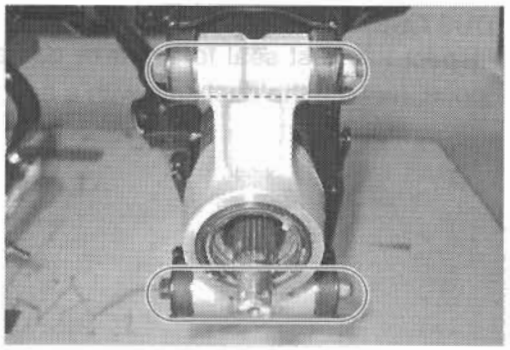
Replace the removed cotter pin with a new one.



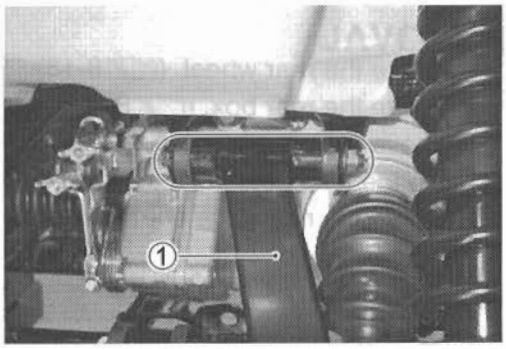
- Remove the rear stabilizer link lower bolt/nut.



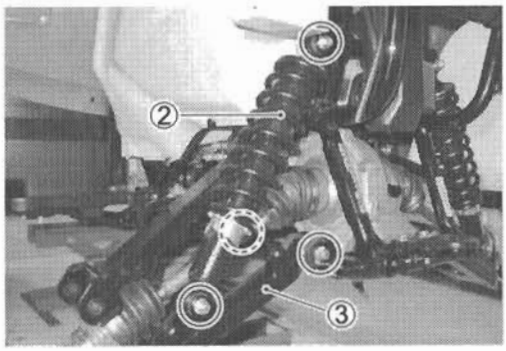
- Remove the rear knuckle mounting bolts/nuts and remove the rear knuckle.



- Remove the upper wishbone arm by removing the pivot bolt/nut.



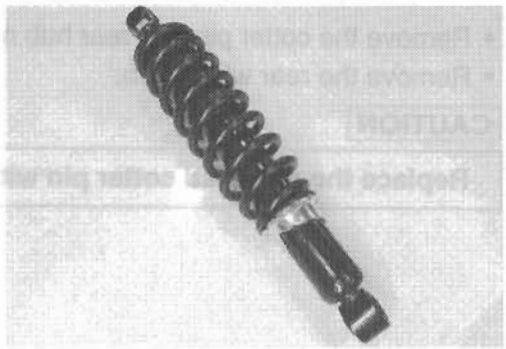
- Remove the rear shock absorber ②.
- Remove the lower wishbone arm ③ by removing the pivot bolt/nuts.



INSPECTION AND DISASSEMBLY

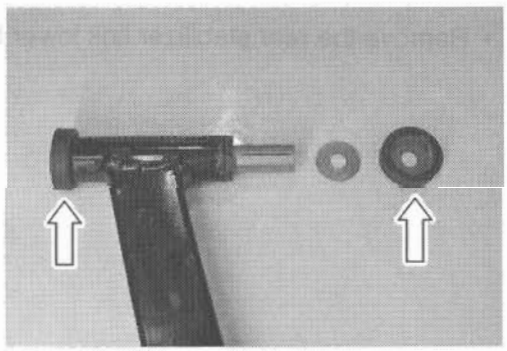
REAR SHOCK ABSORBER

Inspect the shock absorber for oil leakage or damage. If any damages are found, replace the rear shock absorber with a new one.



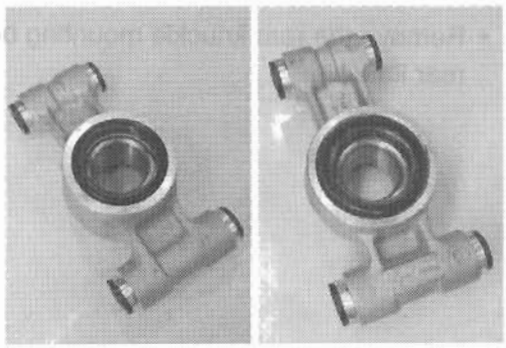
BUSHING

Inspect the rubber bushing (shock absorber/wishbone arm) for wear or other damage. If any damages are found, replace the bushing with a new one.



DUST SEAL INSPECTION

Inspect the dust seal for wear or damage. If any damages are found, replace the dust seal with a new one.

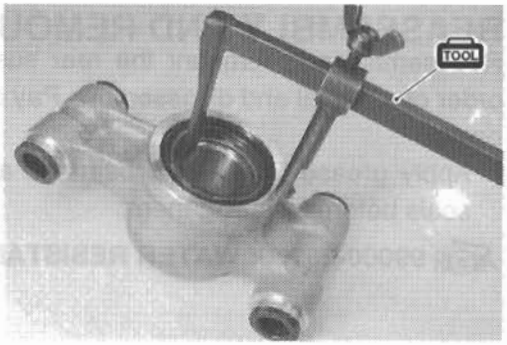


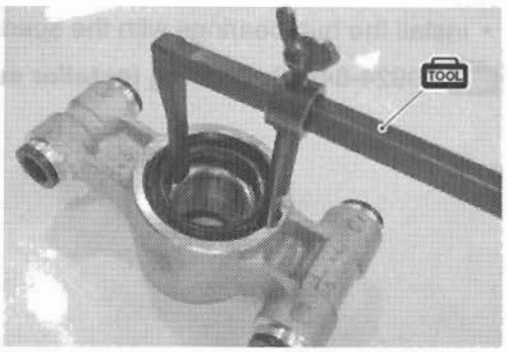
- Remove the rear knuckle dust seal with the special tool.

TOOL 09913-50121: Oil seal remover

CAUTION

Replace the removed dust seal with a new one.

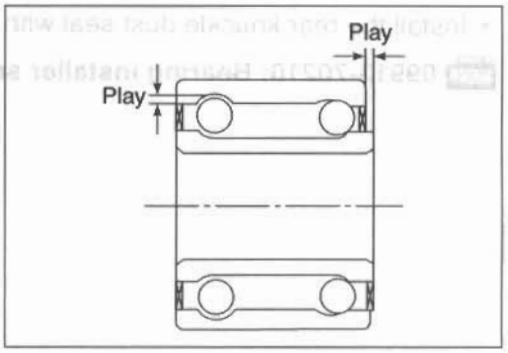




HUB BEARINGS

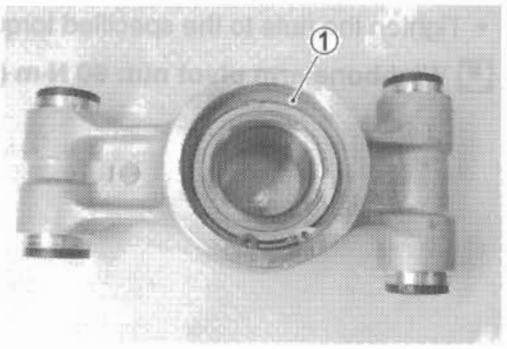
Inspect the inner race play of the hub bearing by hand while it is in the rear knuckle.

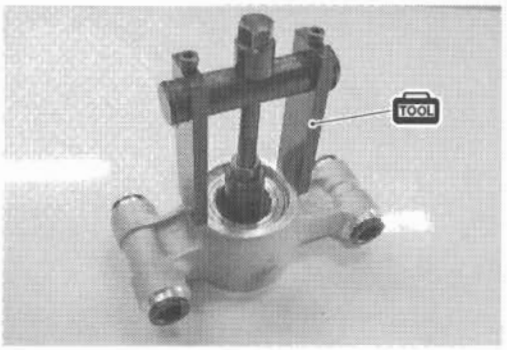
Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. If there is anything unusual, replace the bearing with a new one.



- Remove the hub bearing snap ring ①.
- Remove the hub bearings with the special tool.

TOOL 09921-20240: Bearing remover set



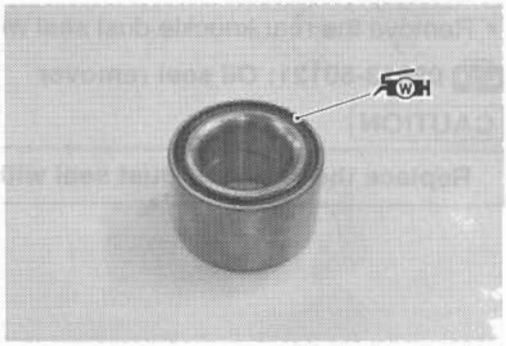


REASSEMBLY AND REMOUNTING

Reassemble and remount the rear suspension in the reverse order of removal and disassembly. Pay attention to the following points:

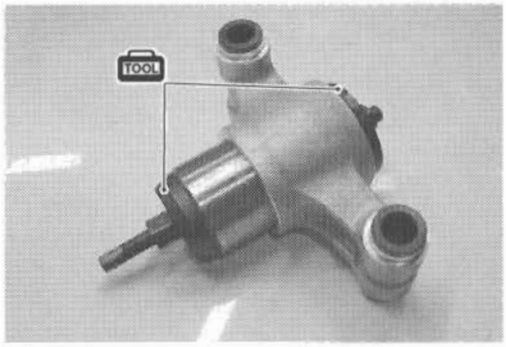
- Apply grease to the hub bearings and the lips of the dust seals before installing them.

99000-25160: WATER RESISTANCE GREASE



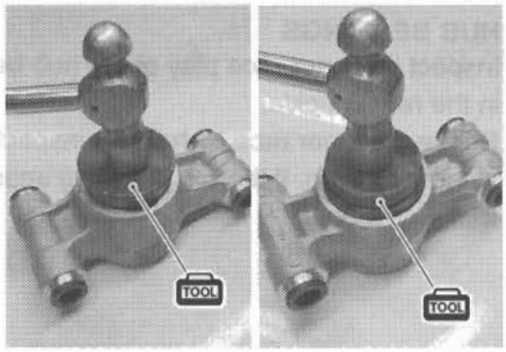
- Install the hub bearings with the special tool.

09924-84510: Bearing installer set



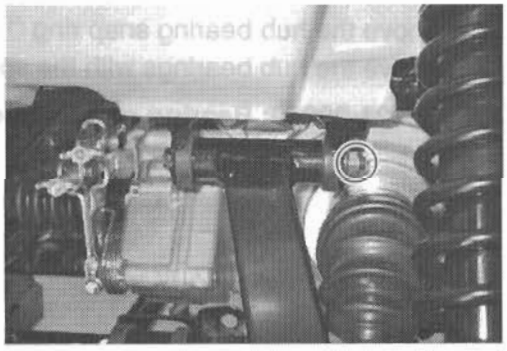
- Install the rear knuckle dust seal with the special tool.

09913-70210: Bearing installer set



- Tighten the nuts to the specified torque.

Wishbone arm pivot nut: 60 N·m (6.0 kgf-m, 43.5 lb-ft)

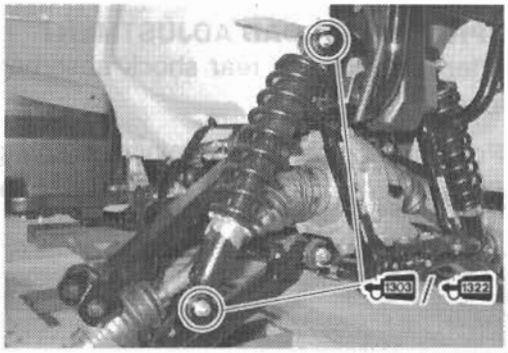


- Apply THREAD LOCK SUPER "1303 " or "1322" to the rear shock absorber mounting bolts, and then tighten the nut to the specified torque.

1303 99000-32030: THREAD LOCK SUPER "1303" (USA)

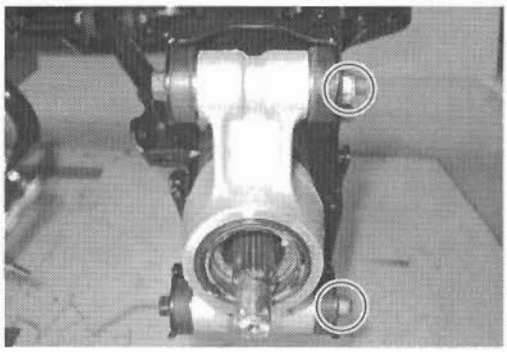
1322 99000-32110: THREAD LOCK SUPER "1322" (Others)

Shock absorber mounting nut (upper and lower): 60 N·m (6.0 kgf-m, 43.5 lb-ft)



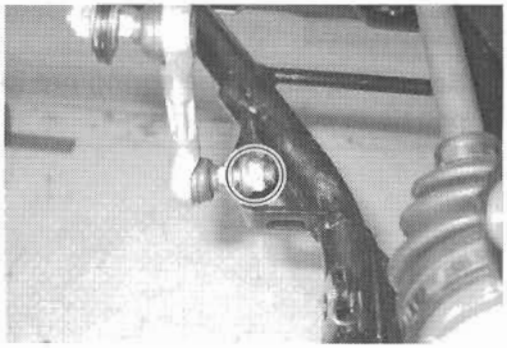
- Tighten rear knuckle bolt/nut to the specified torque.

Rear knuckle nut: 60 N·m (6.0 kgf-m, 43.5 lb-ft)



- Tighten the rear stabilizer link bolt/nut.

Rear stabilizer link nut: 34 N·m (3.4 kgf-m, 24.5 lb-ft)

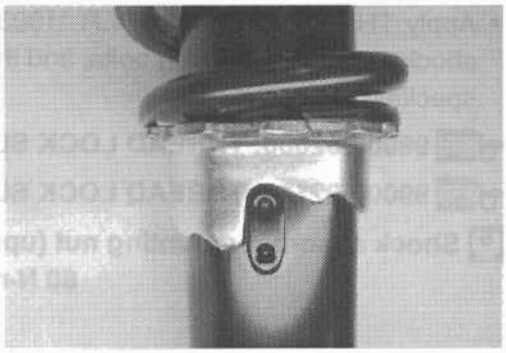


SPRING PRE-LOAD ADJUSTMENT

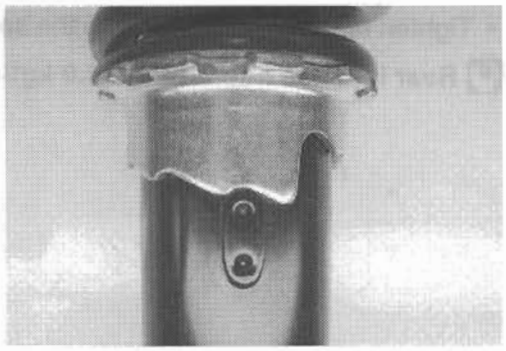
After installing the rear shock absorber, adjust the spring pre-load.

Position "1" provides the minimum spring pre-load.
Position "5" provides the maximum spring pre-load.

STD POSITION: 2/5



POSITION "1"



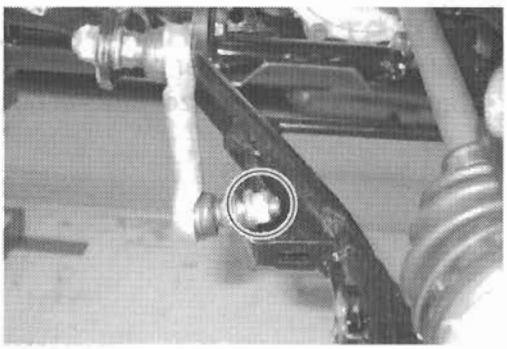
POSITION "5"

⚠ WARNING

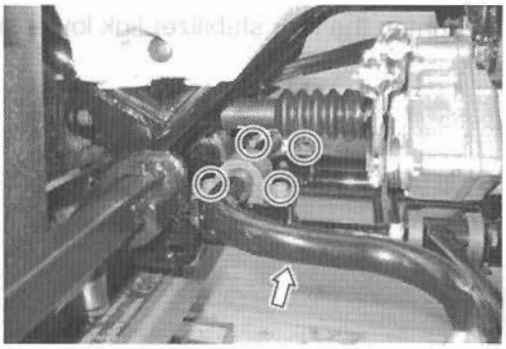
Be sure to adjust the spring pre-load on the both suspensions equally.

REAR STABILIZER REMOVAL

- Remove the rear wheel. (☞8-13)
- Remove the rear stabilizer link lower bolt/nut.



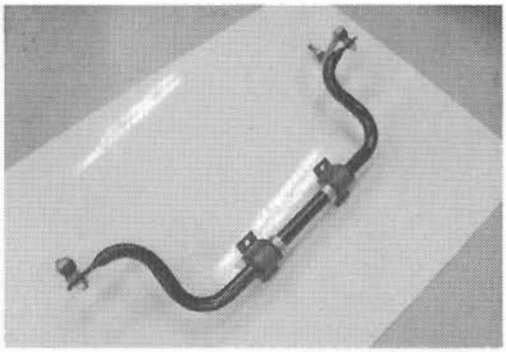
- Remove the rear stabilizer bracket bolts.
- Remove the rear stabilizer bar.



INSPECTION

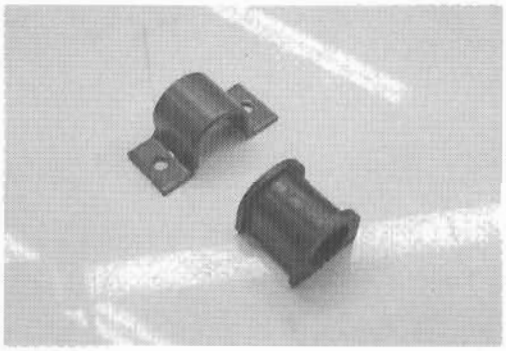
REAR STABILIZER BAR

Inspect the stabilizer for damage. If any damages are found, replace the rear stabilizer bar with a new one.



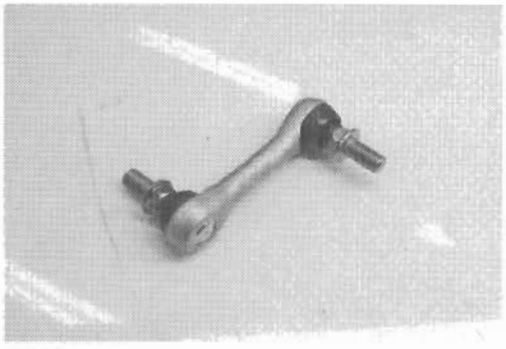
STABILIZER BRACKET/BUSHING

Inspect the stabilizer bracket for damage. If any damage are found, replace the stabilizer bracket with a new one.
Inspect the plastic bushing for wear or other damage. If any damages are found, replace the bushing with a new one.



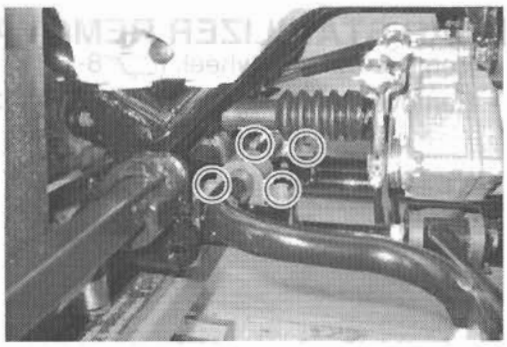
STABILIZER LINK

Inspect the stabilizer link for wear or damage. If any damages are found, replace the stabilizer link with a new one.

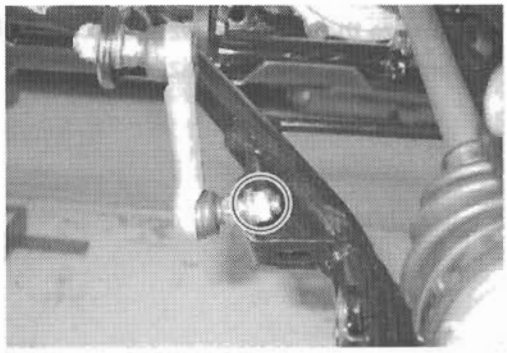


REAR STABILIZER INSTALLATION

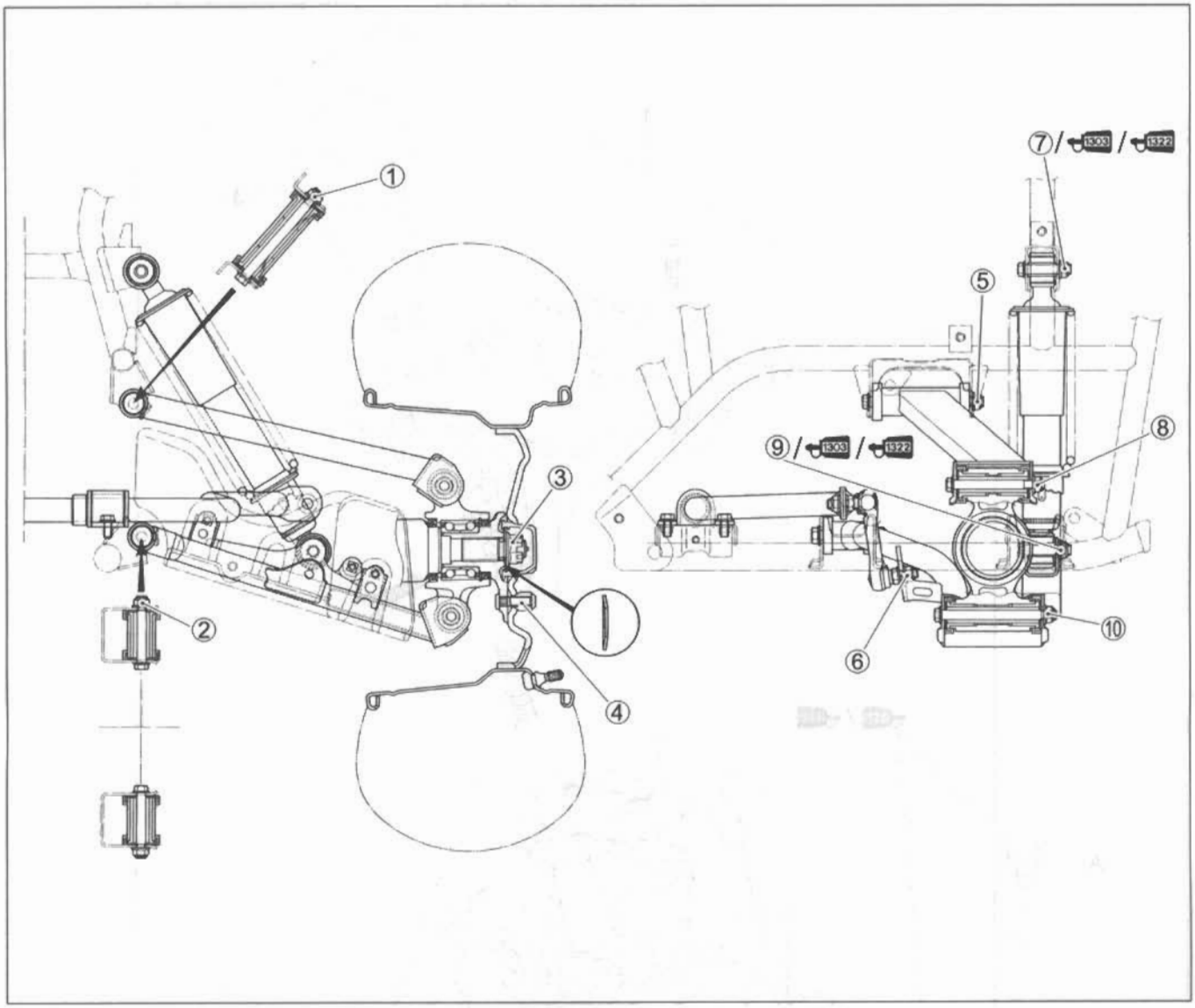
- Install the rear stabilizer bar.
- Tighten the rear stabilizer bracket bolts.



- Tighten the rear stabilizer link lower bolt/nut.



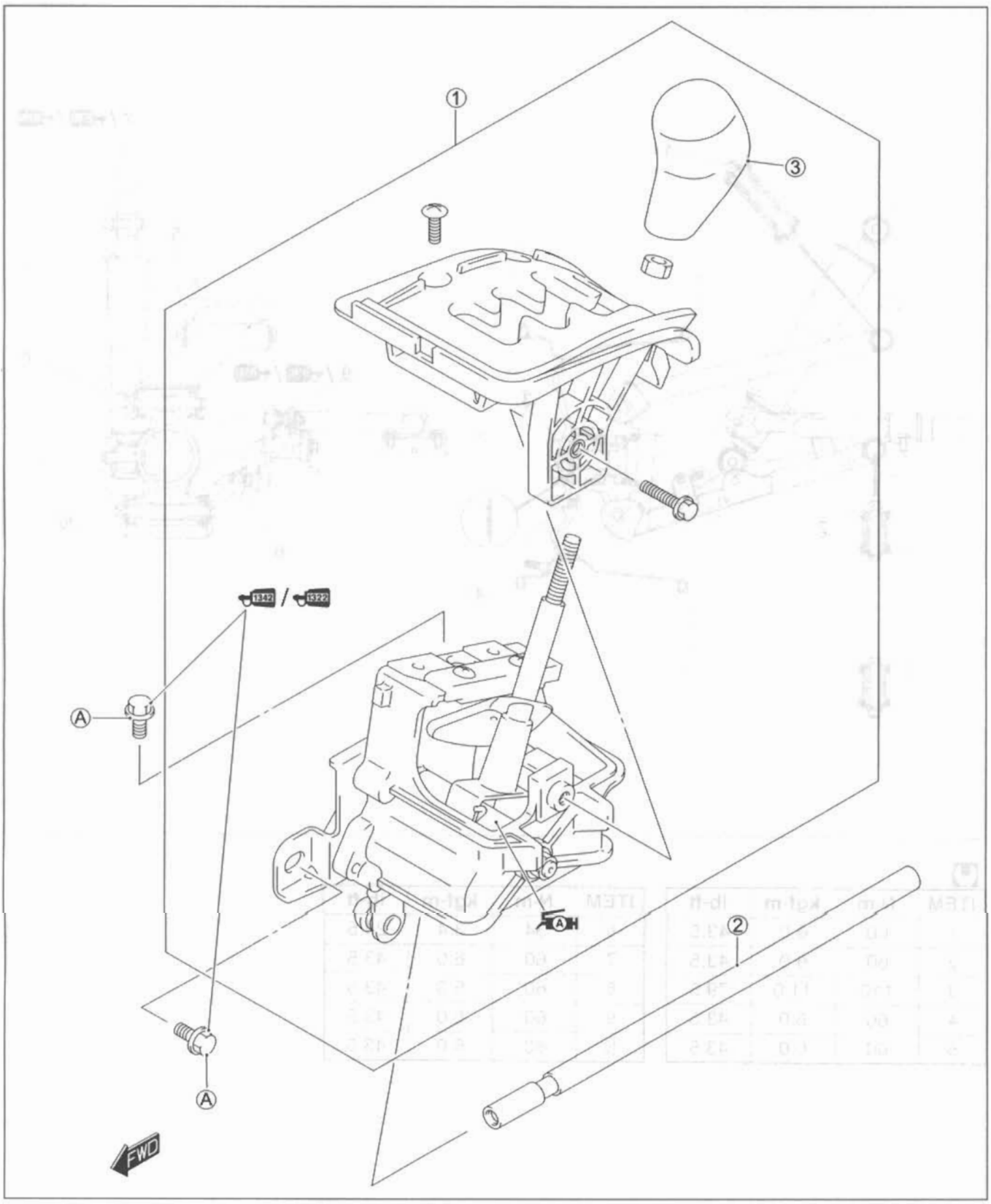
REAR WHEEL, REAR BRAKE, REAR SUSPENSION AND REAR AXLE SHAFT REASSEMBLING INFORMATION



ITEM	N·m	kgf-m	lb-ft
①	60	6.0	43.5
②	60	6.0	43.5
③	110	11.0	79.5
④	60	6.0	43.5
⑤	60	6.0	43.5

ITEM	N·m	kgf-m	lb-ft
⑥	34	3.4	24.5
⑦	60	6.0	43.5
⑧	60	6.0	43.5
⑨	60	6.0	43.5
⑩	60	6.0	43.5

TRANSFER GEAR SHIFT LEVER
CONSTRUCTION

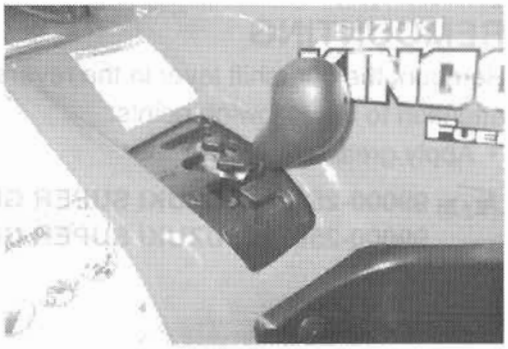


①	Transfer gear shift lever assembly	③	Knob
②	Rod	④	Mounting bolt

ITEM	N·m	kgf-m	lb-ft
Ⓐ	10	1.0	7.0

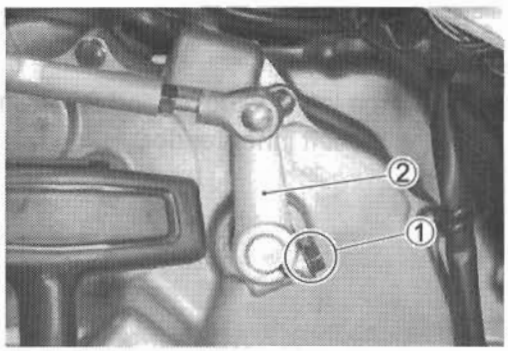
REMOVAL

- Remove the left inner fender. (☞8-6)
- Remove the left side cover. (☞8-8)
- Remove the left upper mud guard. (☞8-8)
- Remove the transfer gear shift lever mounting bolts.





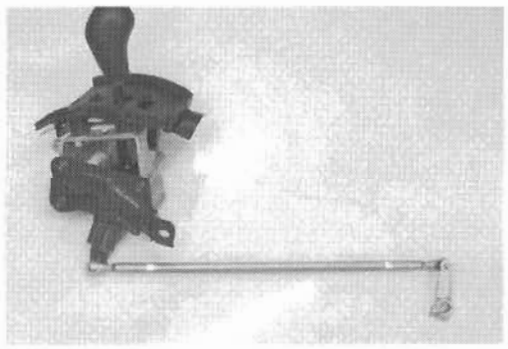
- Loosen the bolt ① and remove the gear shift arm ②.
- Remove the shift lever assembly.



INSPECTION

TRANSFER ASSEMBLY

Inspect the shift lever assembly for wear or damage. If any damage are found, replace it with a new one.

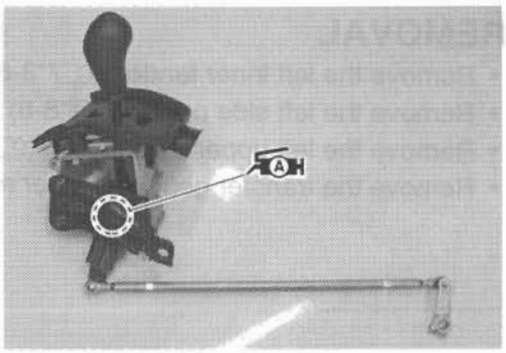


REMOUNTING

Remount the gearshift lever in the reverse order of removal. Pay attention to the following points:

- Apply grease to pivot.

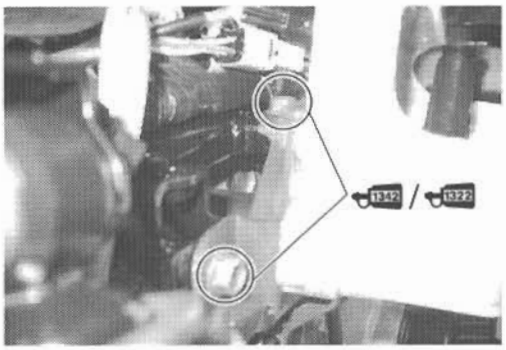
A: 99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



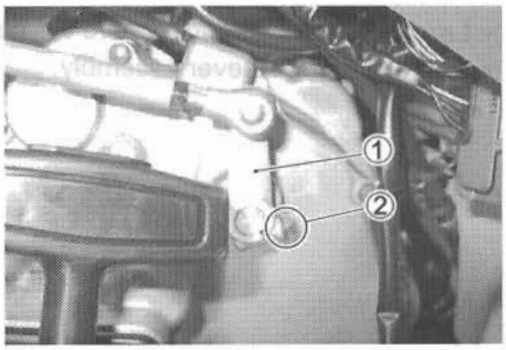
- Install the shift lever assembly to the frame bracket.
- Apply THREAD LOCK SUPER "1322" or "1342" to the shift lever assembly mounting bolts.

1342 THREAD LOCK"1342" (USA)

1322 THREAD LOCK SUPER "1322" (Others)



- Install the gear shift arm ①.
- Tighten the bolt ②.
- Install the left side cover and upper mud guard.
- Install the left inner fender.

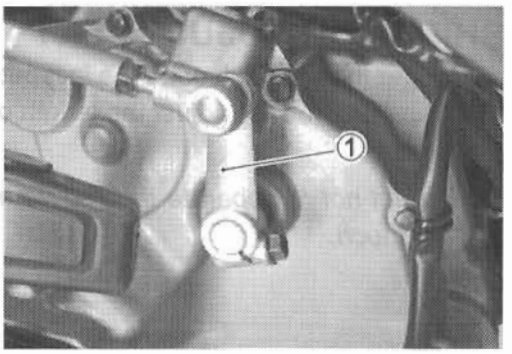


SHIFT ROD

INSTALLATION

GEAR SELECTION ROD

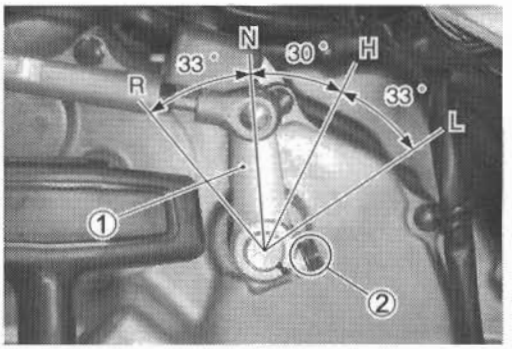
Before removing the shift lever assembly, keep the gear shift arm ① in the "N" position.



- Install the gear shift arm ① on its shaft.

NOTE:
When remounting the gear shift arm, align the arm's grooves with the spline of the shaft.

- Tighten the bolt ② securely.



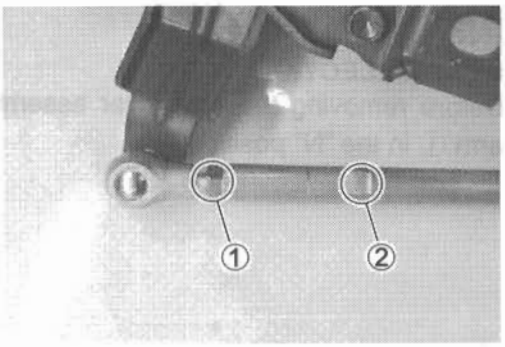
CAUTION

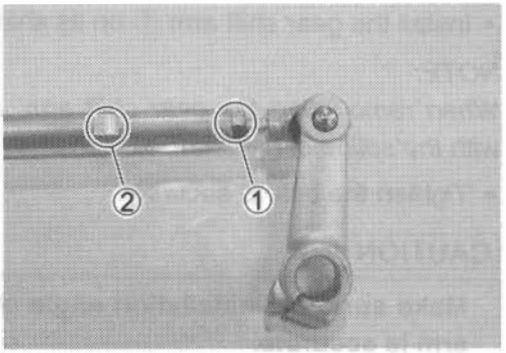
Make sure the installation angle of the gear selection arm is accurate.

SHIFT ROD ADJUSTMENT

- Holding the rod ②, loosen the locknuts ①.
- Turning the rod ②, adjust the length of the rod.

NOTE:
Be careful not to separate the rod from the joint by turning the rod too much.





ELECTRICAL SYSTEM

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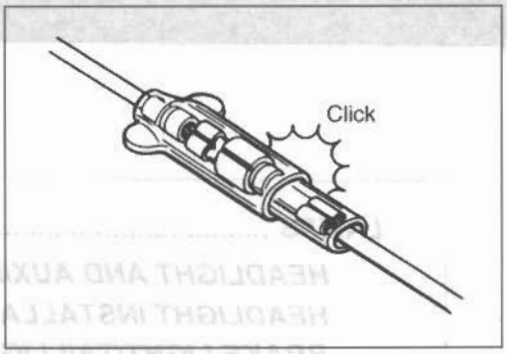
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CAUTIONS IN SERVICING

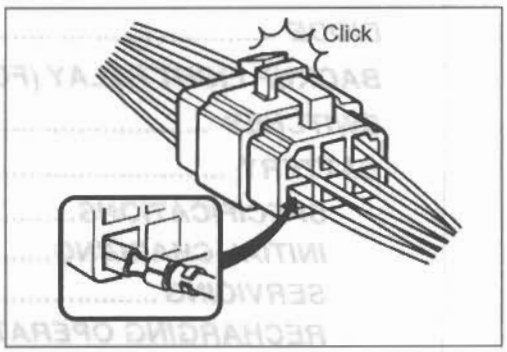
CONNECTOR

- 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.



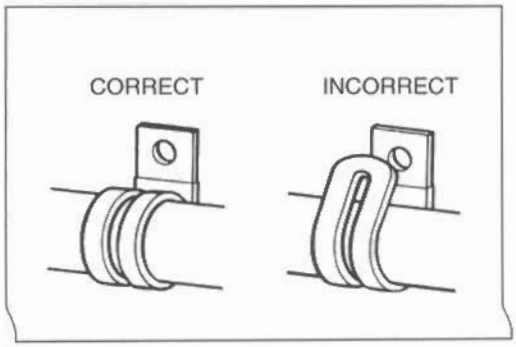
COUPLER

- With a lock type coupler, be sure to release the lock before disconnecting and push it in fully till the lock works 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.



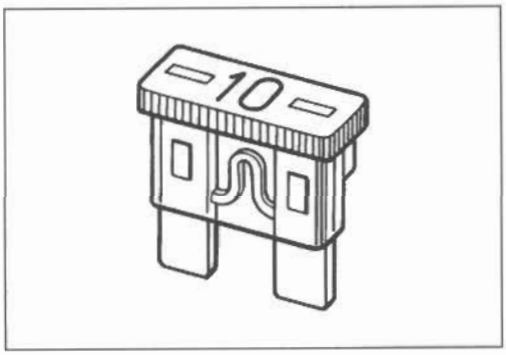
CLAMP

- Clamp the wire harness at such positions as indicated in "WIRING HARNESS ROUTING". (☞10-17)
- 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.



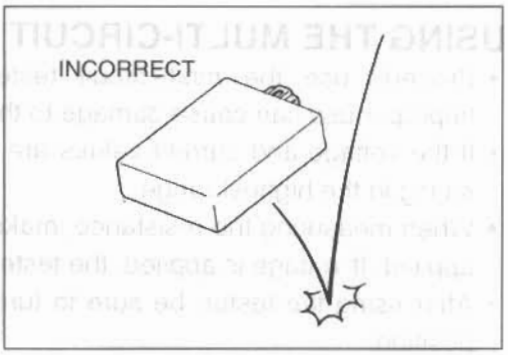
FUSE

- When a fuse blows, always investigate the cause, 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.

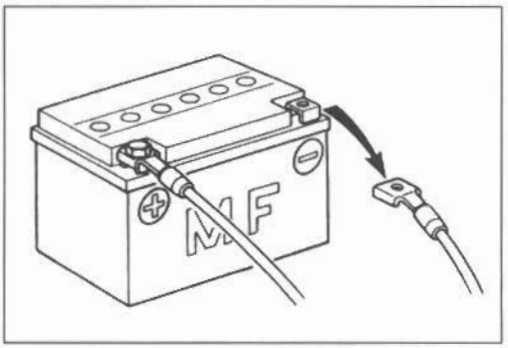


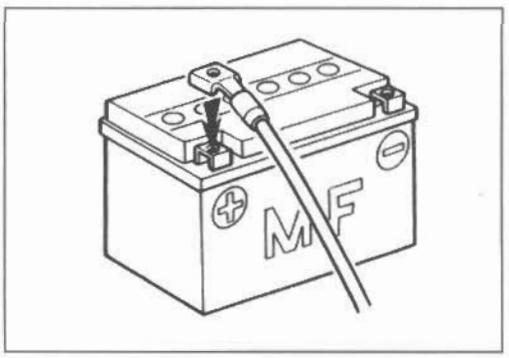
BATTERY

- The MF battery used in this vehicle 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.

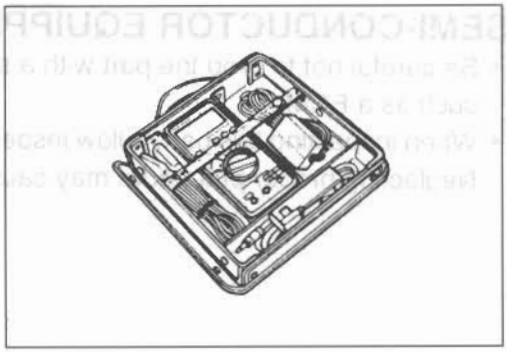




WIRING PROCEDURE

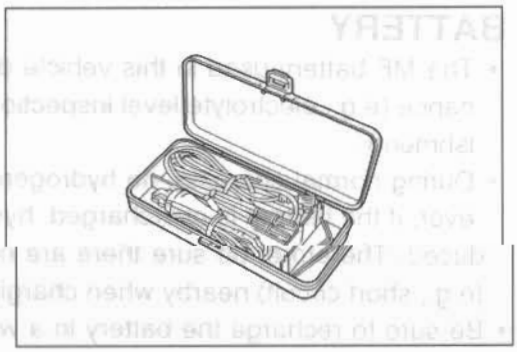
- Properly route the wire harness according to the "WIRING HARNESS ROUTING" section. (☞10-17)

USING THE MULTI-CIRCUIT TESTER



- Properly use the multi-circuit tester ⊕ and ⊖ probes. Improper use can cause damage to the vehicle 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.

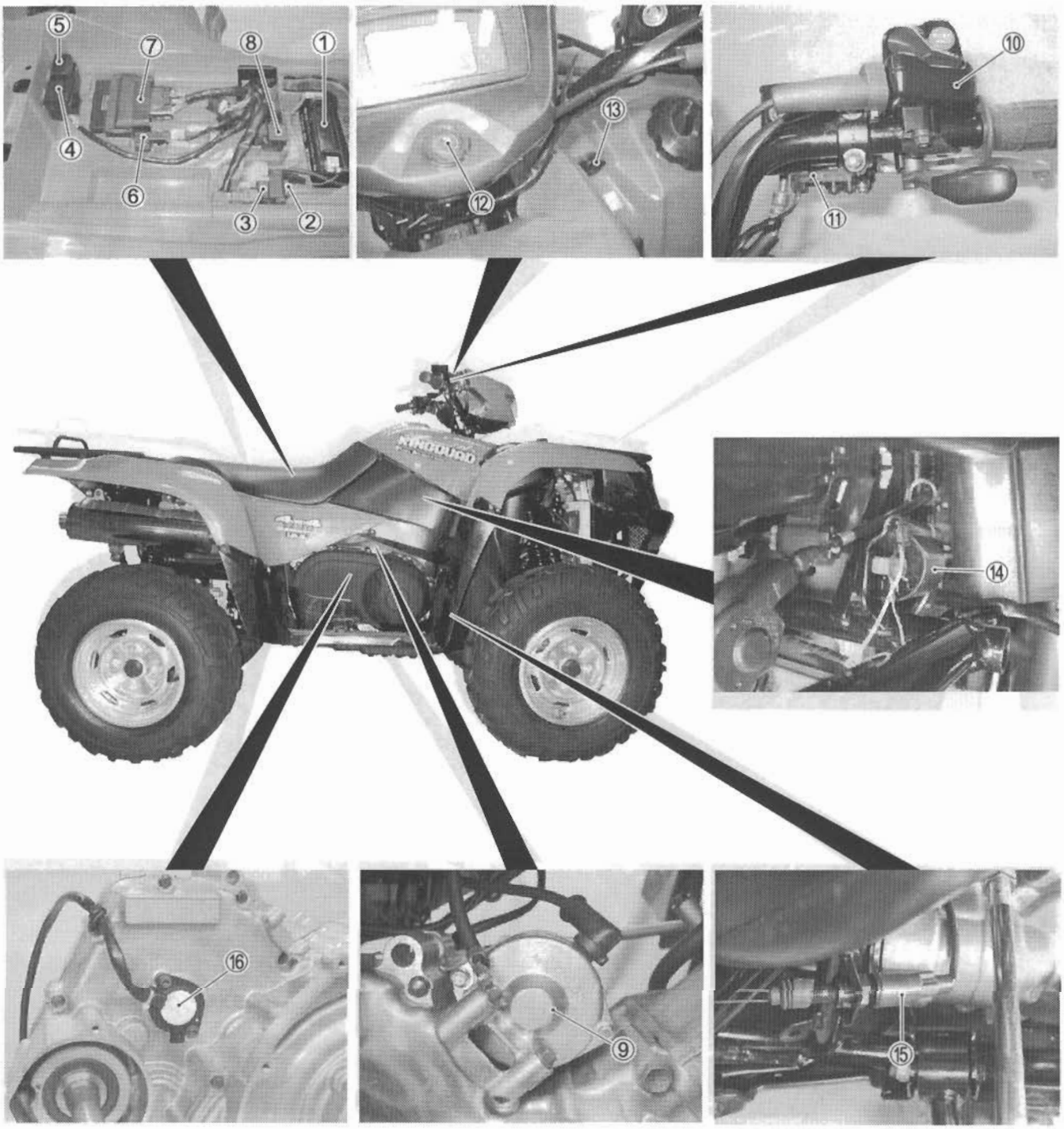
NOTE:

** 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.*

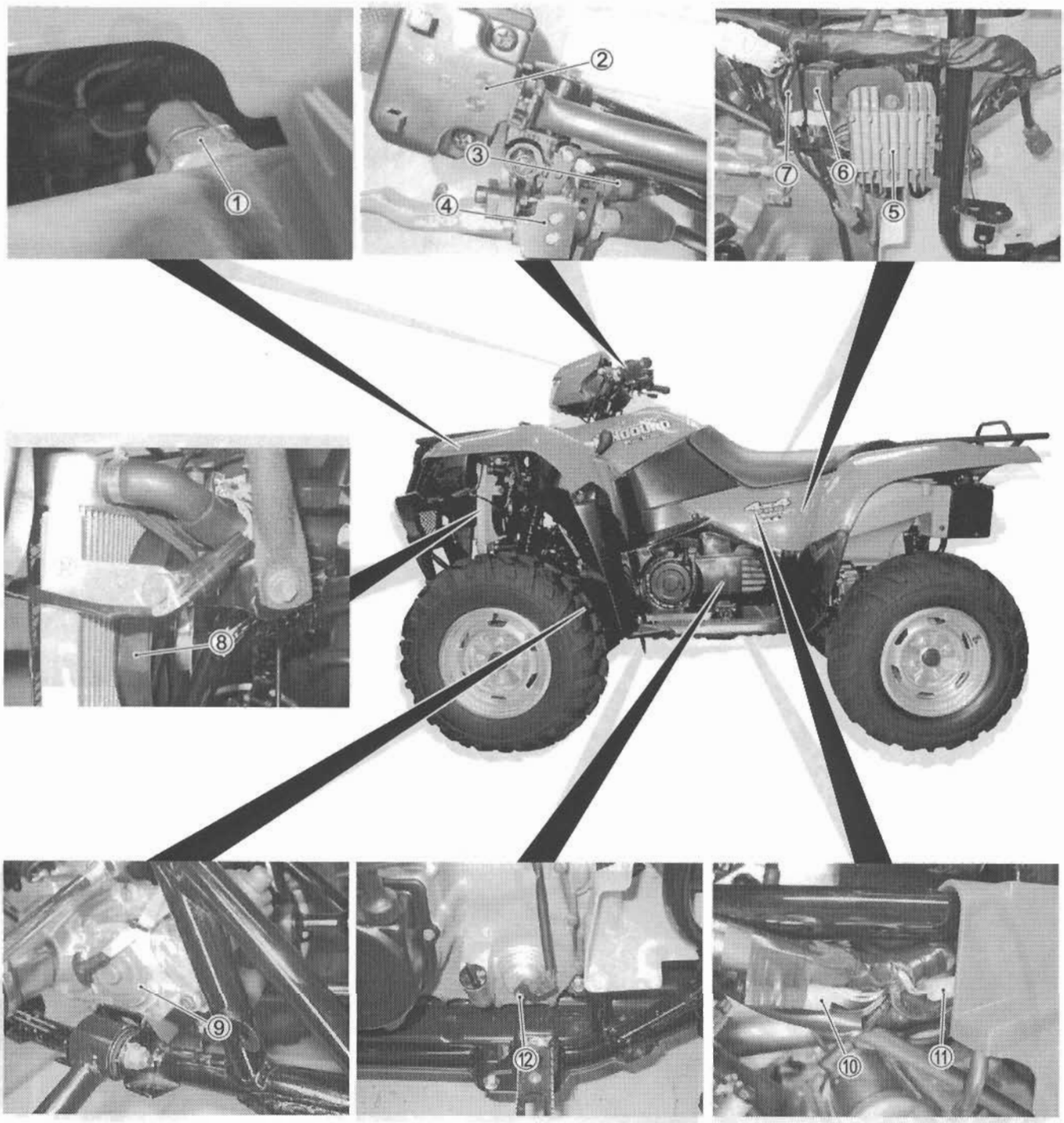
** Use the needle pointed probe to prevent the rubber of the water proof coupler from damage.*

TOOL 09900-25009: Needle pointed probe set

LOCATION OF ELECTRICAL COMPONENTS

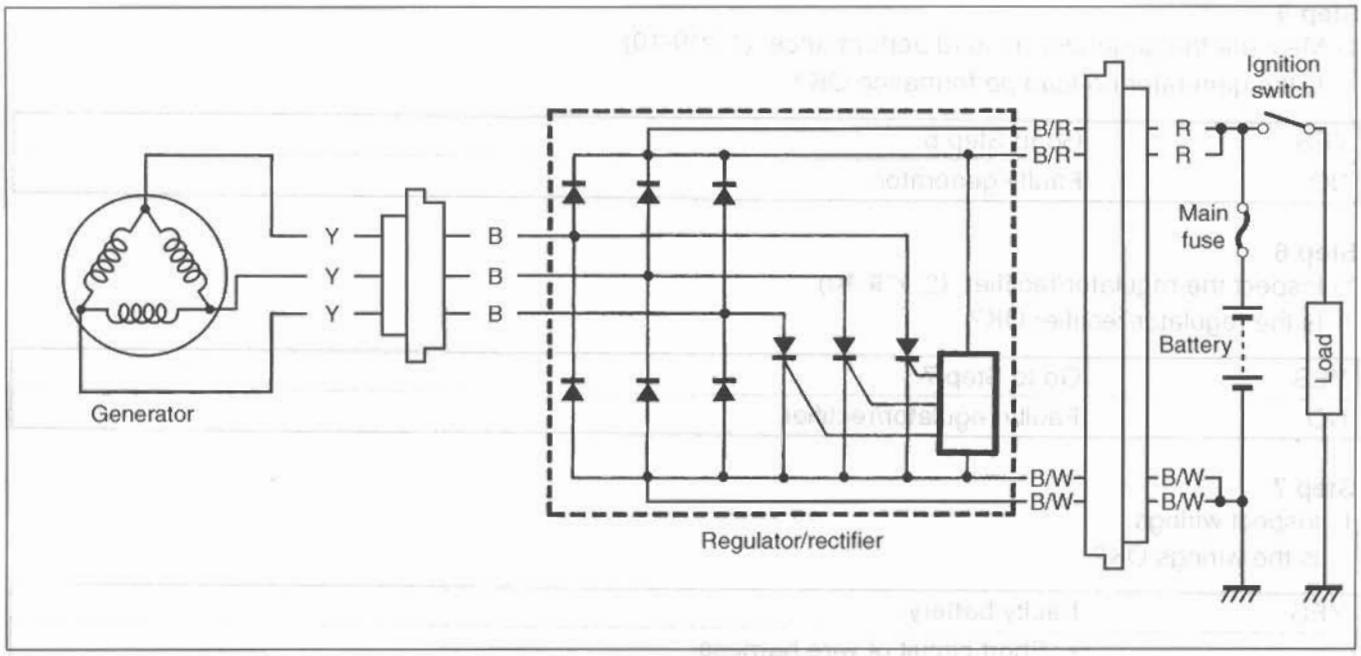


① Battery
② Main fuse
③ Starter relay
④ Fuse box
⑤ Neutral relay
⑥ Fuel pump relay
⑦ ECM
⑧ Drive relay
⑨ Starter motor
⑩ Transfer selecting switch
⑪ Brake lever switch (R)
⑫ Ignition switch
⑬ Power source
⑭ Ignition coil
⑮ Foot brake switch
⑯ Gear position switch



① Cooling fan thermo-switch
② Handlebar switch (L)
③ Parking brake switch
④ Brake lever switch (L)
⑤ Regulator/rectifier
⑥ Ignition/starter control relay
⑦ Diff-lock relay
⑧ Cooling fan
⑨ Actuator
⑩ High position diode
⑪ Low position diode
⑫ Speed sensor

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. (☞9-8)
   Is the battery current leakage 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. (☞9-9)
   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. (☞9-9)
   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. (☞9-10)
   Is the generator no-load performance OK?

YES	Go to Step 6.
NO	Faulty generator.

Step 6

1) Inspect the regulator/rectifier. (☞9-10)
   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

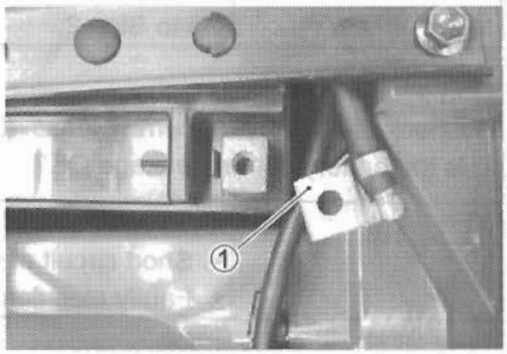
- Faulty regulator/rectifier.
- Faulty battery.
- Poor contact of generator lead wire coupler.

INSPECTION

BATTERY CURRENT LEAKAGE

- Remove the seat. (☞8-4)
- Turn the ignition switch to the OFF position.
- Disconnect the battery ⊖ lead wire ①.

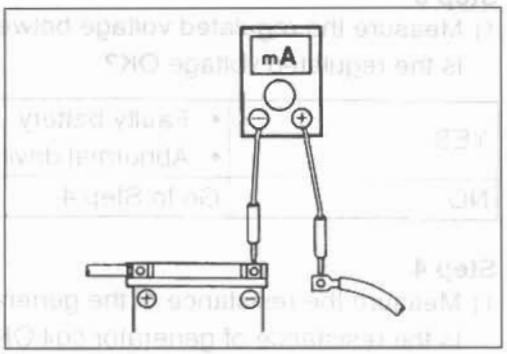
Measure the current between ⊖ battery terminal and the ⊖ battery lead wire with the multi-circuit tester. If the reading exceeds the specified value, leakage is evident.



09900-25008: Multi-circuit tester set

Tester knob indication: Current (⎓, 20 mA)

Battery current (leak): Under 2.6 mA



CAUTION

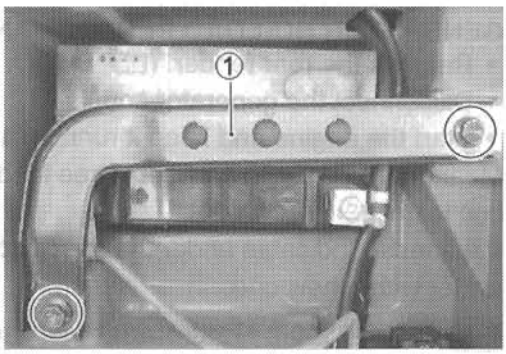
*** Because the current leak might be large, turn the tester to high range first to avoid tester damage.**
*** Do not turn the ignition switch to the "ON" position when measuring current.**

When checking for excessive current leakage, remove the couplers and connectors, one by one, so as to locate the position of trouble.

REGULATED VOLTAGE

- Remove the seat. (☞8-4)
- Remove the battery stay ①.
- Start the engine and keep it running at 5 000 r/min. with the ignition switch turned to AUX.

Measure the DC voltage between the ⊕ and ⊖ battery terminals with the multi-circuit tester. If the voltage is not within the specified value, inspect the generator and regulator/rectifier. (☞9-9 and 9-10)

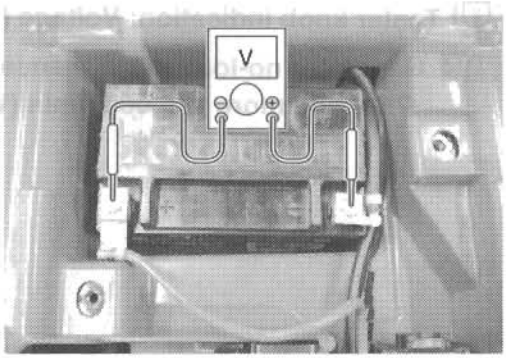


NOTE:
When making this test, be sure that the battery is in fully-charged condition.

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

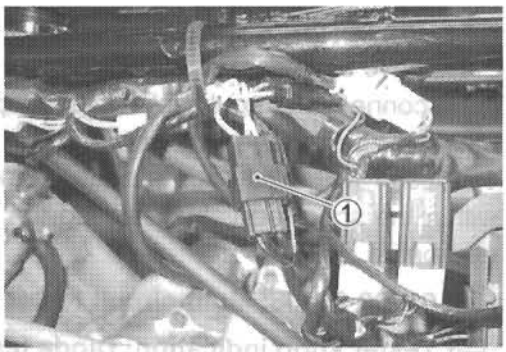
DATA Regulated voltage (Charging output):
13.5 – 15.0 V at 5 000 r/min.



GENERATOR COIL RESISTANCE

- Remove the rear fender. (☞8-10)
- Disconnect the generator coupler ①.

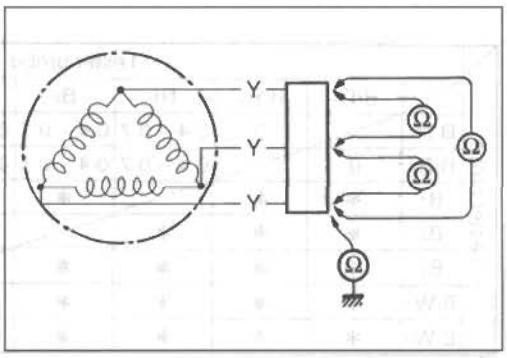
Measure the resistance between the three lead wires with the multi-circuit tester.
If the resistance is out of specified value, replace the stator with a new one. Also, check that the generator core is insulated properly.



TOOL 09900-25008: Multi-circuit tester set

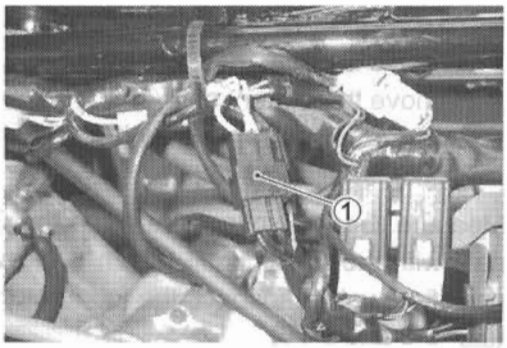
Tester knob indication: Resistance (Ω)

DATA Generator coil resistance: 0.4 – 1.0 Ω (Yellow – Yellow)
∞ Ω (Yellow – Ground)



NOTE:
When making above test, it is not necessary to remove the generator.

GENERATOR NO-LOAD PERFORMANCE



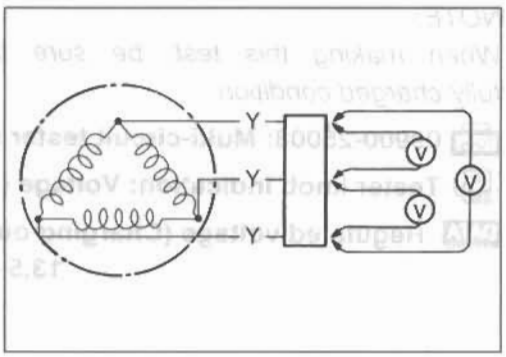
- Remove the rear fender. (☞8-10)
- Disconnect the generator coupler ①.
- Start the engine and keep it running at 5 000 r/min.

Measure the voltage between three lead wires with the multi-circuit tester.
If the tester indicates under the specified value, replace the generator with a new one.

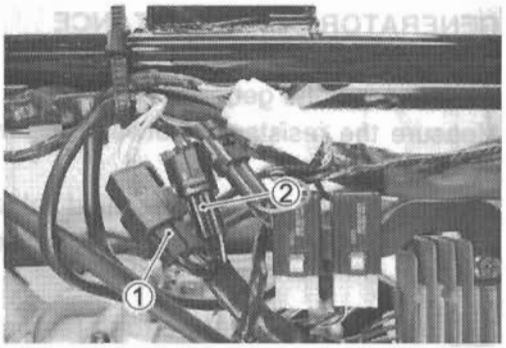
TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)

DATA Generator no-load performance:
75 V and more at 5 000 r/min (When engine is cold)



REGULATOR/RECTIFIER



- Remove the rear fender. (☞8-10)
- Disconnect the regulator/rectifier coupler ① and ②.

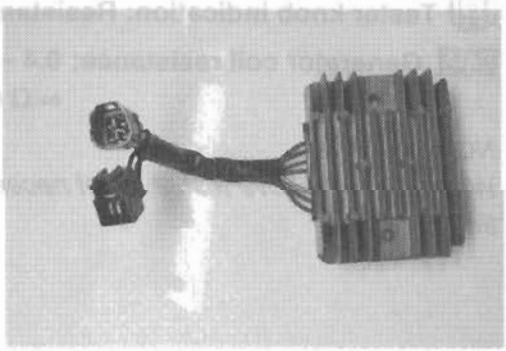
Measure the voltage between the lead wires with the multi-circuit tester as indicated in the table below. If the voltage is not within the specified value, replace the regulator/rectifier with a new one.

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Diode test (⊣◀)

Unit: V

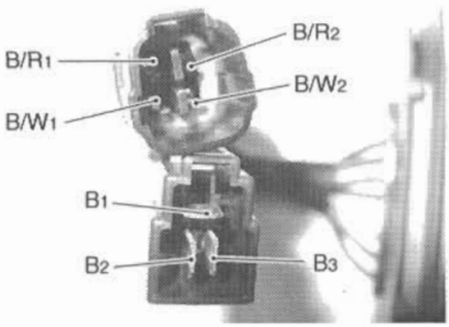
⊖ Tester probe / ⊕ Tester probe	B/R1	B/R2	B1	B2	B3	B/W1	B/W2
B/R1		0	0.4 – 0.7	0.4 – 0.7	0.4 – 0.7	0.5 – 1.2	0.5 – 1.2
B/R2	0		0.4 – 0.7	0.4 – 0.7	0.4 – 0.7	0.5 – 1.2	0.5 – 1.2
B1	*	*		*	*	0.4 – 0.7	0.4 – 0.7
B2	*	*	*		*	0.4 – 0.7	0.4 – 0.7
B3	*	*	*	*		0.4 – 0.7	0.4 – 0.7
B/W1	*	*	*	*	*		0
B/W2	*	*	*	*	*	0	



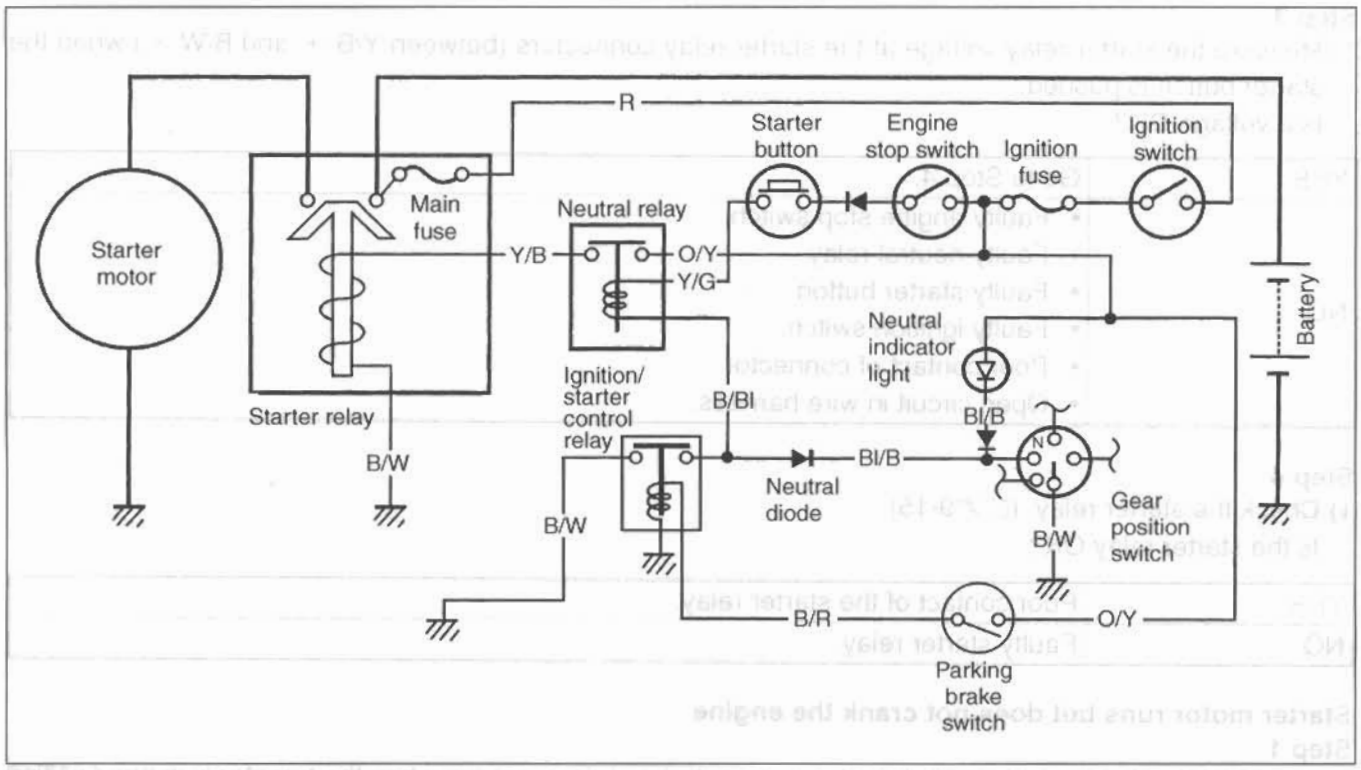
*1.4 V and more (tester's battery voltage)

NOTE:
If the tester reads 1.4 V and below when the tester probes are not connected, replace its battery.

WIRE COLOR
B: Black
B/R: Black with Red tracer
B/W: Black with White tracer



STARTER 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 transfer to neutral.
2) Turn on the ignition switch with the engine stop switch in the "RUN" position and listen for a click from the starter relay when the starter 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 Y/B ⊕ and B/W ⊖) when the starter button is pushed.
   Is a voltage OK?

YES	Go to Step 4.
NO	• Faulty engine stop switch. • Faulty neutral relay. • Faulty starter button. • Faulty ignition switch. • Poor contact of connector. • Open circuit in wire harness.

Step 4

1) Check the starter relay. (☞9-15)
   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

Step 1

1) The starter motor runs when the transfer is in neutral, but does not run when the transfer is in any position other than neutral, with the parking brake lever grasped firmly.
2) Check the parking brake switch.
   Is the parking brake switch OK?

YES	Go to Step 2.
NO	Faulty parking brake switch.

Step 2

1) Check the ignition/starter control relay.
   Is the ignition/starter control relay OK?

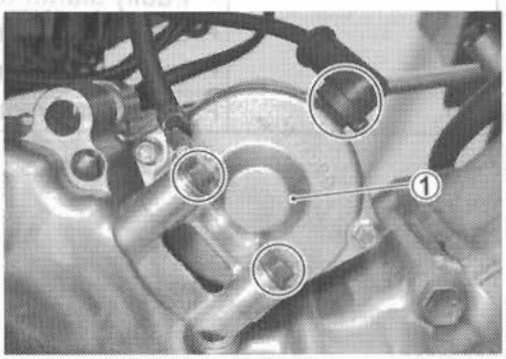
YES	• Open circuit in wire harness. • Poor contact of connector.
NO	• Faulty ignition/starter control relay.

Engine does not turn though the starter motor runs.

• Faulty stater clutch. (☞3-49)

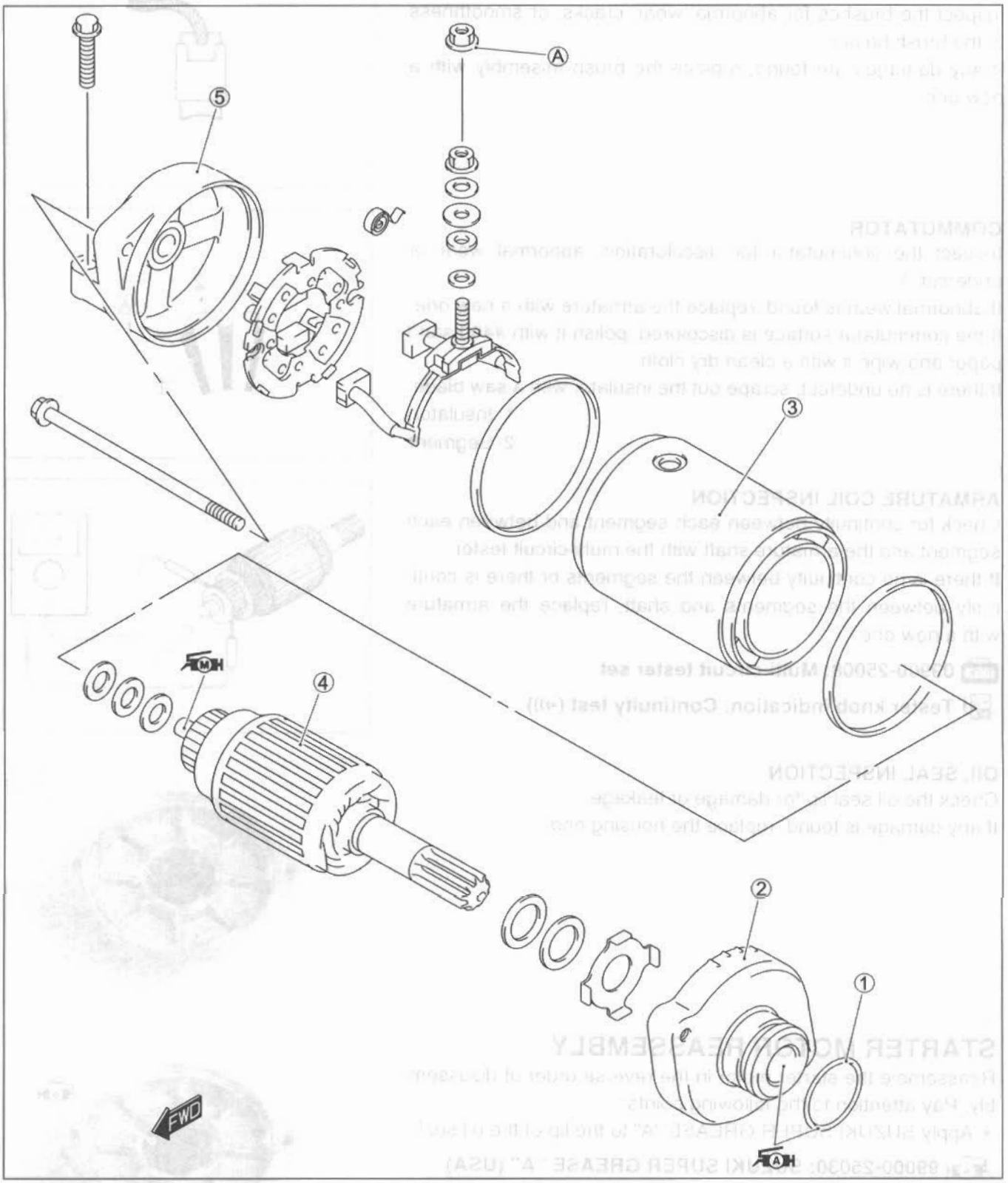
STARTER MOTOR REMOVAL

• Disconnect the battery ⊖ lead wire.
• Remove the right side cover. (☞8-8)
• Remove the starter motor ①.



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 connecting nut

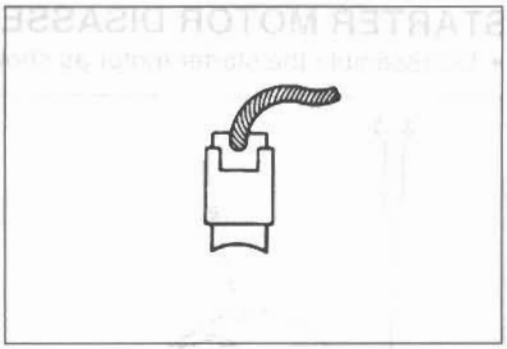
ITEM	N·m	kgf-m	lb-ft
Ⓐ	6	0.6	4.5

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.



COMMUTATOR

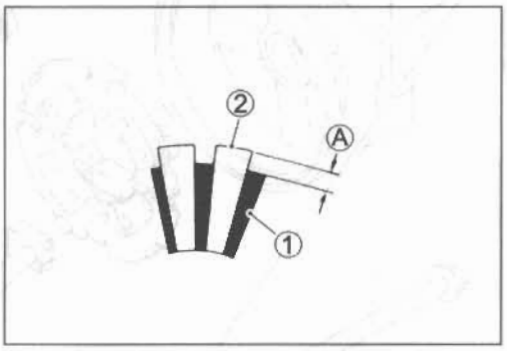
Inspect the commutator for discoloration, abnormal wear or undercut Ⓐ.

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 with a clean dry cloth.

If there is no undercut, scrape out the insulator with a saw blade.

① Insulator
② Segment



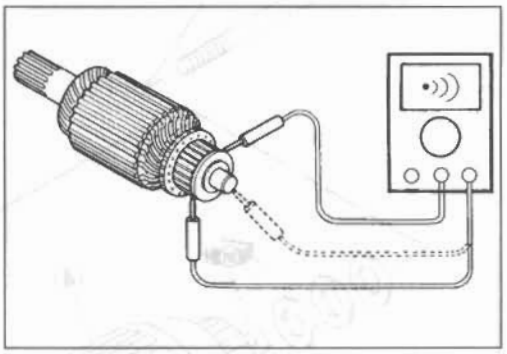
ARMATURE COIL INSPECTION

Check for continuity between each segment and between each segment and the armature shaft with 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

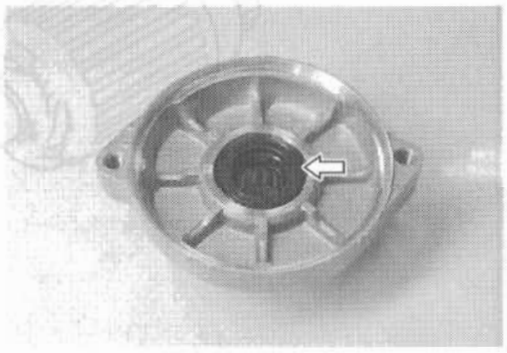
Tester knob indication: Continuity test (•)))



OIL SEAL INSPECTION

Check the oil seal lip for damage or leakage.

If any damage is found, replace the housing end.

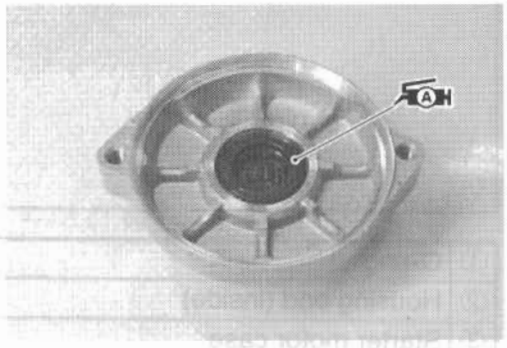


STARTER MOTOR REASSEMBLY

Reassemble the starter motor in the reverse order of disassembly. Pay attention to the following points:

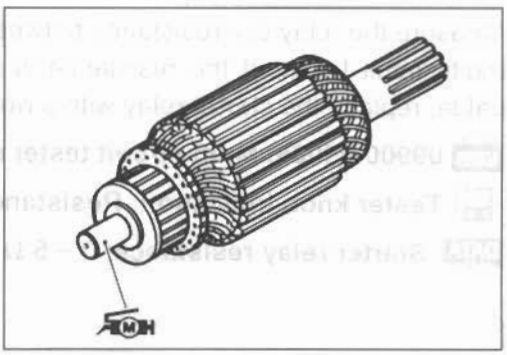
- Apply SUZUKI SUPER GREASE "A" to the lip of the oil seal.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)



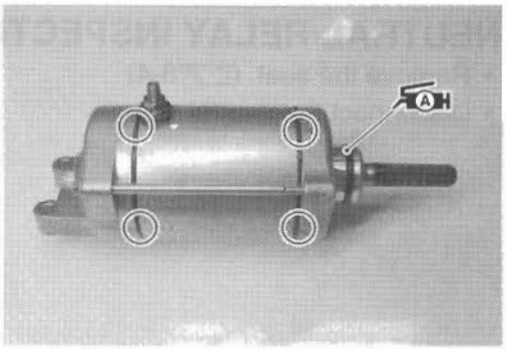
- Apply a small quantity of SUZUKI MOLY PASTE to the armature shaft.

99000-25140: SUZUKI MOLY PASTE



- Align the marks on the housing ends with the marks on the starter motor case.
- Apply SUZUKI SUPER GREASE "A" to the O-ring.

99000-25030: SUZUKI SUPER GREASE "A" (USA)
99000-25010: SUZUKI SUPER GREASE "A" (Others)

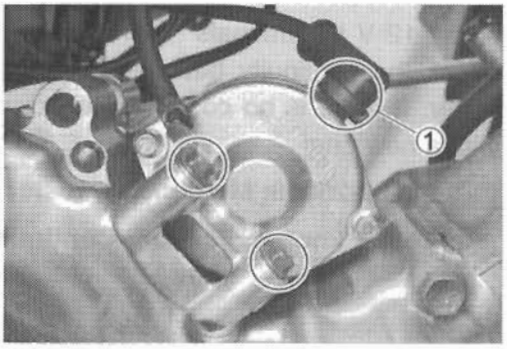


STARTER MOTOR INSTALLATION

- Tighten the starter motor lead wire connecting nut ① to the specified torque.

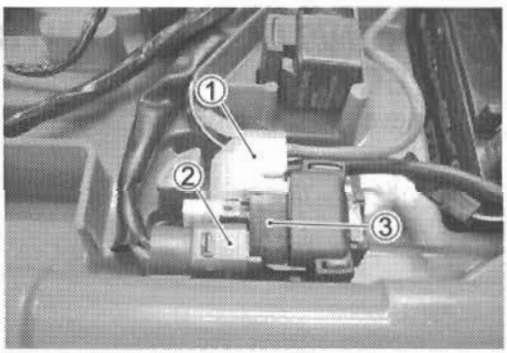
Lead wire connecting nut: 6 N·m (0.6 kgf-m, 4.5 lb-ft)

- Tighten the starter motor mounting bolts.



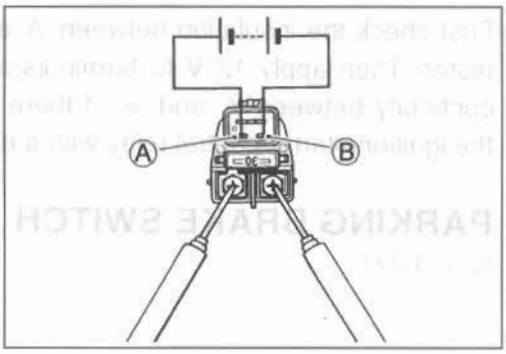
STARTER RELAY INSPECTION

- Remove the seat. (☞8-4)
- Disconnect the battery ⊖ lead wire from the battery.
- Remove the starter relay cover ①.
- Disconnect the starter motor lead wire, battery lead wire and starter relay coupler ②.
- Remove the starter relay ③.
- Apply 12 V to Ⓐ and Ⓑ terminals and check for continuity between the positive and negative terminals with 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

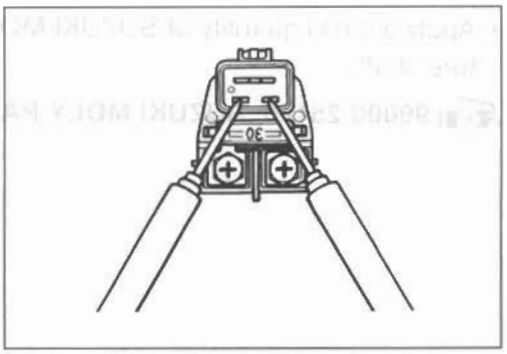
Do not apply battery voltage to the starter relay for five seconds and more, since the relay coil may overheat and get damaged.

Measure the relay coil resistance between the terminals with 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

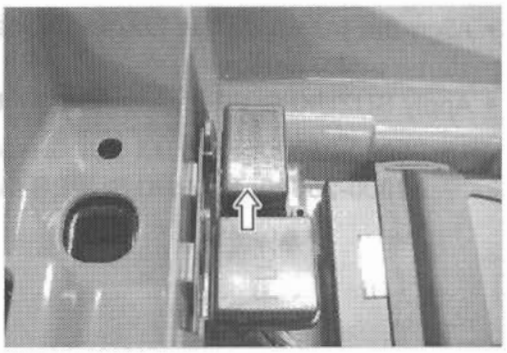
Tester knob indication: Resistance (Ω)

Starter relay resistance: 3 – 5 Ω



NEUTRAL RELAY INSPECTION

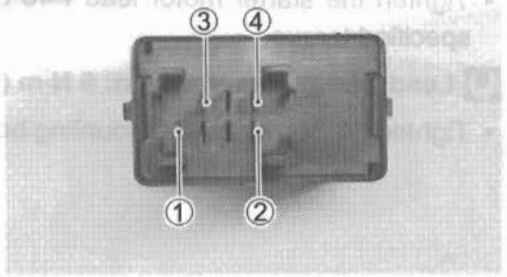
- Remove the seat. (☞8-4)
- Disconnect the neutral relay.



Apply 12 V to terminals ① and ② (⊕ to ① and ⊖ to ②) and check the continuity between ③ and ④ with the multi-circuit tester. If there is no continuity found, replace the neutral relay with a new one.

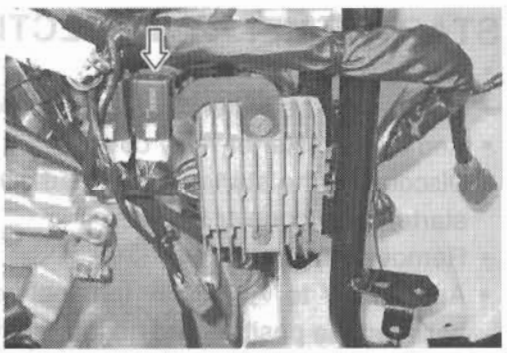
09900-25008: Multi-circuit tester set

Tester knob indication: Continuity set (•)))

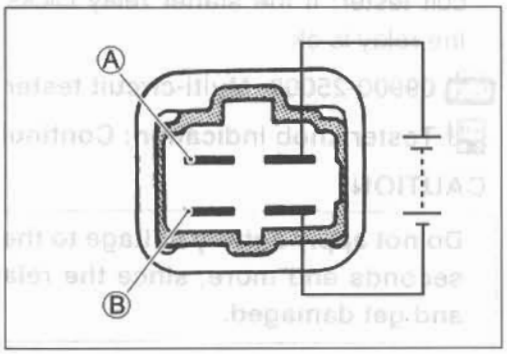


IGNITION/STARTER CONTROL RELAY INSPECTION

- Remove the rear fender. (☞8-10)



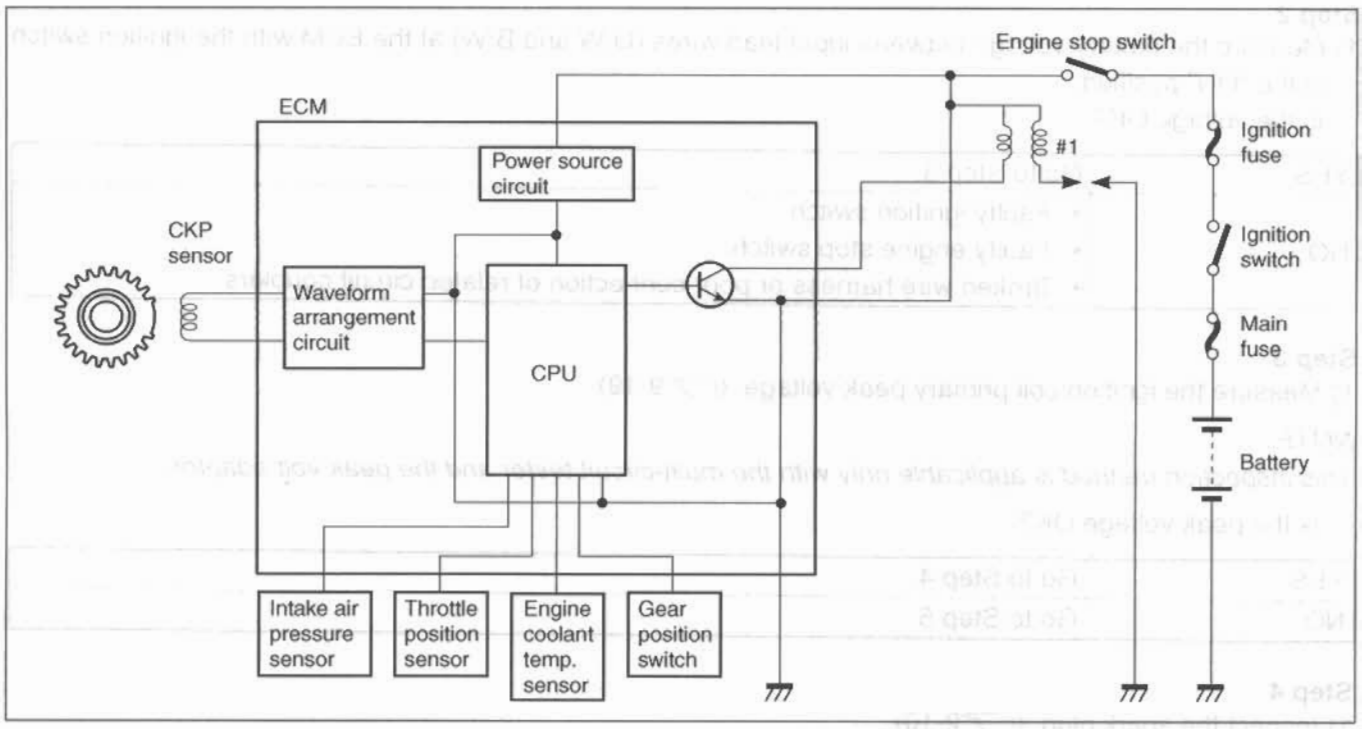
First check the insulation between Ⓐ and Ⓑ terminals with the tester. Then apply 12 V to terminals as shown and check the continuity between Ⓐ and Ⓑ. If there is no continuity, replace the ignition/starter control relay with a new one.



PARKING BRAKE SWITCH

(☞9-37)

IGNITION SYSTEM



TROUBLESHOOTING

No spark or poor spark

NOTE:

Check that the transfer is in neutral and the engine stop switch is in the "RUN" position. Check that the fuse is not blown and the battery is fully-charged before diagnosing.

Step 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. (☞9-19)

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. (☞9-19)
   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 CKP sensor peak voltage and its resistance. (☞9-20 and 9-21)

NOTE:

The CKP sensor peak voltage inspection is applicable only with the multi-circuit tester and peak volt adaptor.

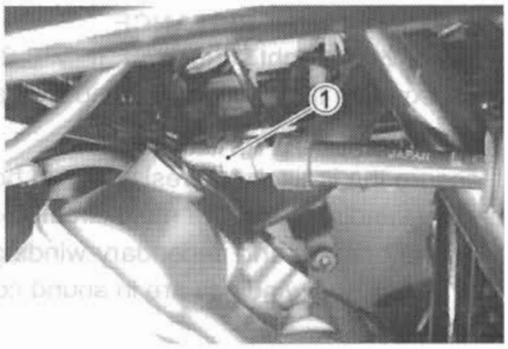
   Is the peak voltage and resistance OK?

YES	• Faulty ECM. • Poor connection of ignition couplers. • Open circuit in wiring harness.
NO	Faulty CKP sensor.

INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

- Remove the right side cover. (☞8-8)
- Remove the right inner fender. (☞8-6)
- Remove the spark plug cap.
- Connect a new spark plug ① to spark plug cap and ground it to the cylinder head cover bolt.



CAUTION

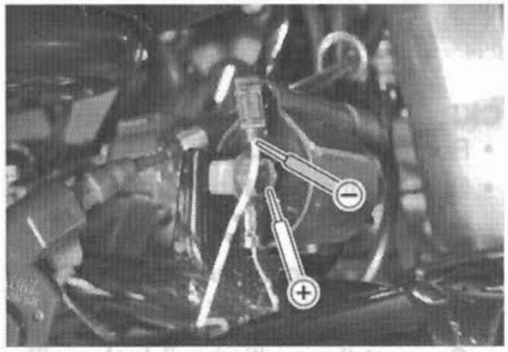
Avoid grounding the spark plug and suppling the electrical shock to the cylinder head cover (magnesium parts) to prevent the magnesium material from damage.

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 with the multi-circuit tester in the following procedure.

- Connect the multi-circuit tester with the peak voltage adaptor as follows.

⊕ Probe: Black/White lead wire or ground
⊖ Probe: White/Blue lead wire

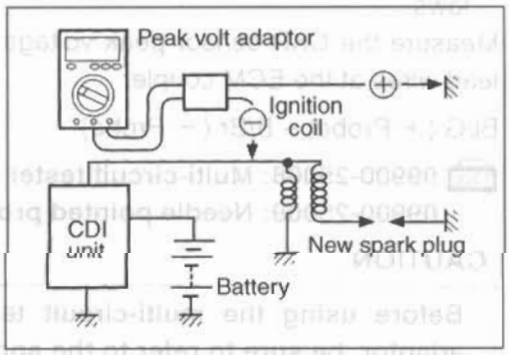


NOTE:
Do not disconnect the ignition coil primary wire.

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.
- Press 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.

Tester knob indication: Voltage (⎓)

DATA Ignition coil primary peak voltage: More than 80 V

⚠ WARNING

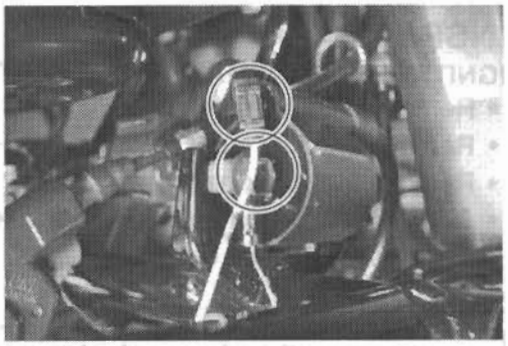
While testing, do not touch the tester probes and spark plug to prevent receiving an electric shock.

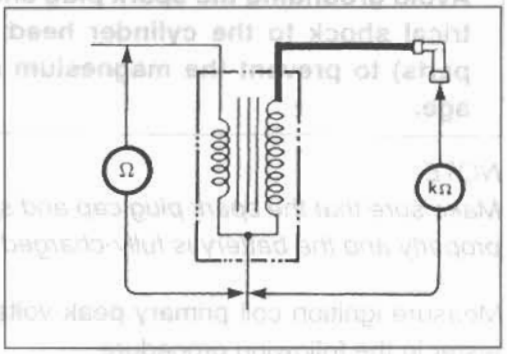
If the voltage is lower than the standard values, inspect the ignition coil. (☞9-20)

IGNITION COIL RESISTANCE

- Remove the right side cover. (☞8-8)
- Disconnect the ignition coil lead wire and spark plug cap, and remove the ignition coil.

Measure the ignition coil resistance in both the primary and secondary windings with 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.





09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

Ignition coil resistance

Primary : 0.1 – 0.6 Ω (Terminal – Ground)

Secondary : 12 – 19 kΩ (spark plug cap – terminal)

CKP SENSOR PEAK VOLTAGE

- Remove the seat. (☞8-4)
- Remove the rear fender. (☞8-10)

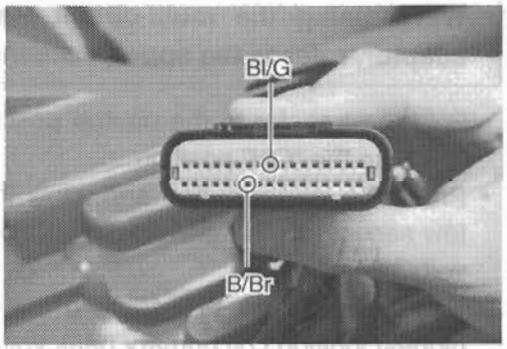
NOTE:

Be sure that all couplers are connected properly and the battery used is in fully-charged condition.

- Connect the multi-circuit tester with peak volt adaptor as follows.

Measure the CKP sensor peak voltage between Bl/G and B/Br lead wires at the ECM coupler.

Bl/G (⊕ Probe) – B/Br (⊖ Probe)



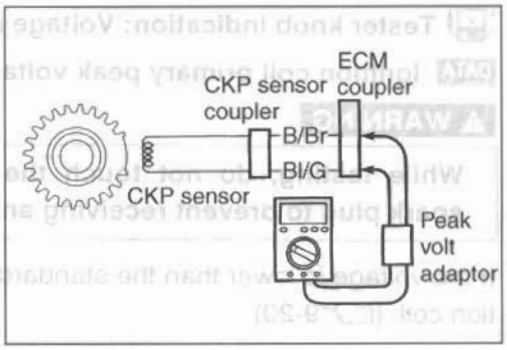
09900-25008: Multi-circuit tester set

09900-25009: Needle pointed probe set

CAUTION

Before using the multi-circuit tester and peak volt adaptor, be sure to refer to the appropriate instruction manual.

- Shift the transfer to the neutral and turn ignition switch "ON".
- Crank the engine a few seconds with the starter motor by depressing starter button and check the CKP sensor peak voltage.
- Repeat the above test procedure a few times and measure the highest peak voltage.



Tester knob indication: Voltage (⎓)

CKP sensor peak voltage: 5.0 V and more (Bl/G – B/Br)

If the peak voltage is lower than the standard range, check the peak voltage at the CKP sensor lead wire coupler.

- Remove the seat. (☞8-4)
- Disconnect the CKP sensor lead wire coupler ① and connect the multi-circuit tester with the peak volt adaptor.

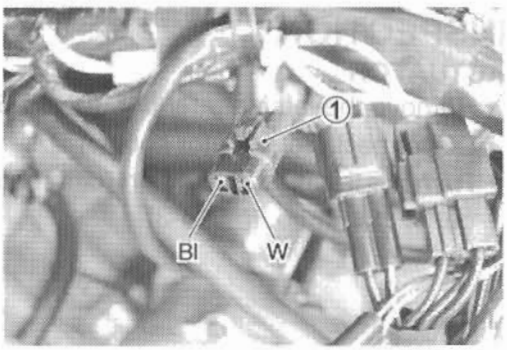
Blue (⊕ Probe) – White (⊖ Probe)

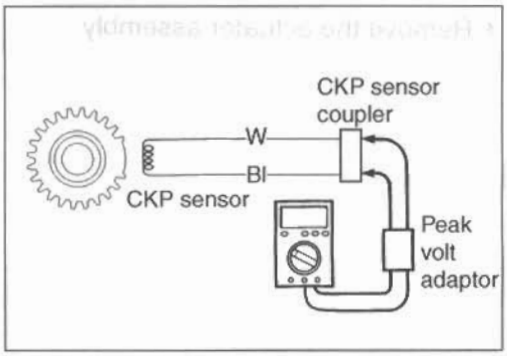
Measure the CKP sensor peak voltage at the CKP sensor lead wire coupler.

Tester knob indication: Voltage (⎓)

DATA CKP sensor peak voltage: 5.0 V and more (Blue – White)

If the peak voltage is lower than the standard range, check each coupler connection or replace the CKP sensor and inspect it again.





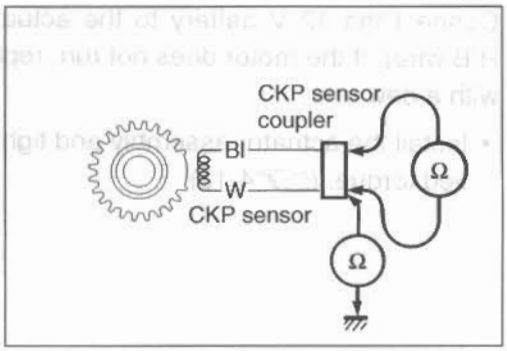
CKP SENSOR RESISTANCE

Measure the resistance between the lead wires and ground. If the resistance is not as specified, the CKP sensor must be replaced.

TOOL 09900-25008: Multi-circuit tester set

Tester knob indication: Resistance (Ω)

DATA CKP sensor resistance: 150 – 250 Ω (Blue – White)
∞ Ω (White – Ground)

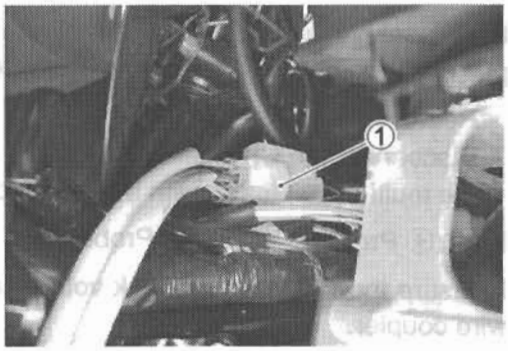


TRANSFER SELECTING SYSTEM

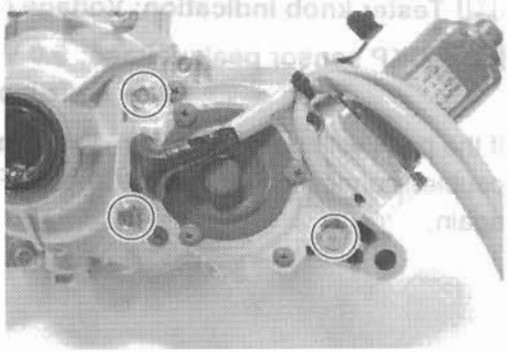
INSPECTION

ACTUATOR

- Remove the left inner fender. (☞8-6)
- Disconnect the actuator coupler ①.
- Remove the front drive train (differential) gear case assembly out of the frame. (☞4-3)

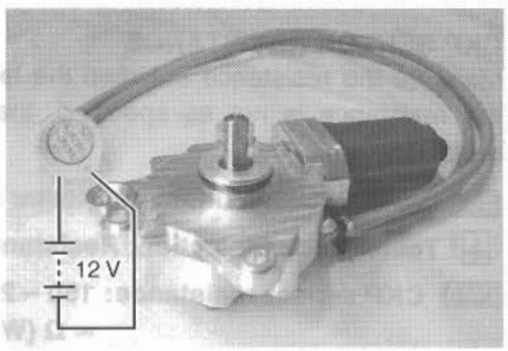


- Remove the actuator assembly.



Connect the 12 V battery to the actuator lead wires (B/R and R/B wire). If the motor does not run, replace the motor assembly with a new one.

- Install the actuator assembly and tighten its bolts to the specified torque. (☞4-13)



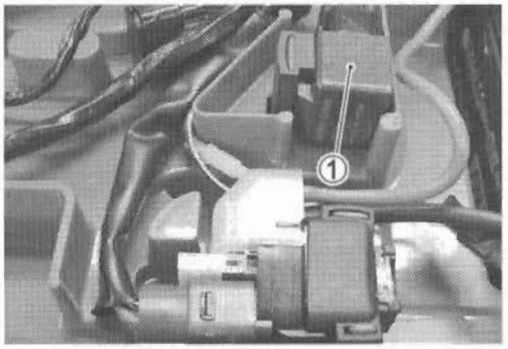
TRANSFER SELECTING SWITCH

(☞9-37)



DRIVE RELAY

- Remove the seat. (☞8-4)
- Remove the drive relay ①.



First check the continuity between Ⓑ and Ⓒ and between Ⓐ and Ⓒ terminals with the tester.
Check the insulation between ⑤ and Ⓑ and between ⑤ and Ⓐ.
Apply 12 V to the terminals as shown in Fig-1, and check the insulation between Ⓑ and Ⓒ.
Apply 12 V to the terminals as shown in Fig-2, and check the insulation between Ⓐ and Ⓒ.
If there is no continuity, replace the drive relay with a new one.

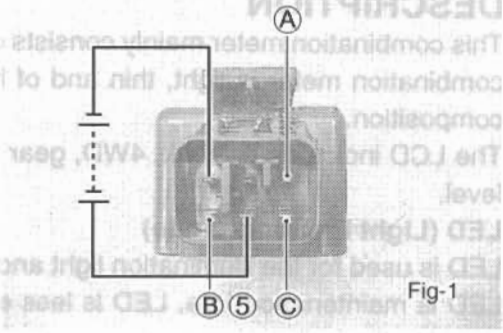


Fig-1

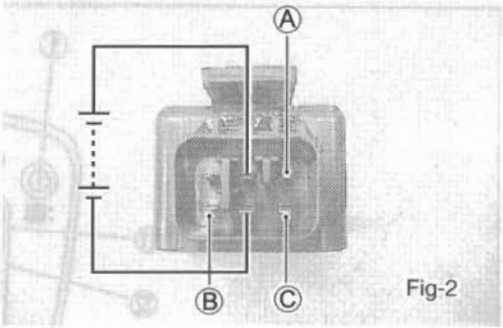
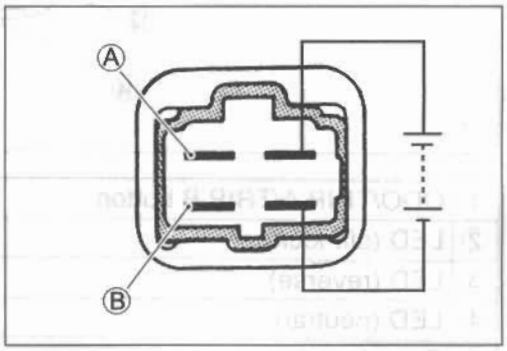


Fig-2

DIFF-LOCK RELAY

First check the insulation between Ⓐ and Ⓑ terminals (B wire and B/G wire) with the tester. Then apply 12 V to terminals (O/Y wire and Y/B wire) as shown and check the continuity between Ⓐ and Ⓑ. If there is no continuity, replace the diff-lock relay with a new one.



COMBINATION METER

DESCRIPTION

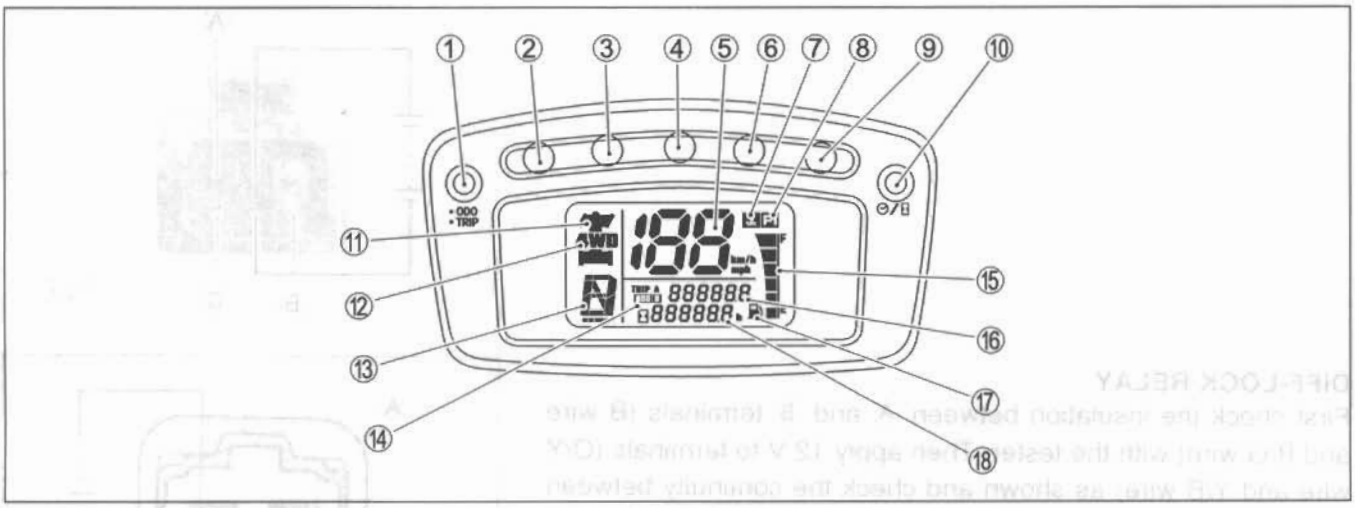
This combination meter mainly consists of LCD (Liquid Crystal Display) and LED (Light Emitting Diode). This combination meter is light, thin and of high response compared to those currently in use because of this composition.

The LCD indicates diff-lock, 4WD, gear position, speed, ECT, FI, ODO/TRIP A/TRIP B, clock/hour and fuel level.

LED (Light Emitting Diode)

LED is used for the illumination light and each indicator light.

LED is maintenance free. LED is less electric-power consuming and stronger to vibration resistance compared to the bulb.



①	ODO/TRIP A/TRIP B button	⑩	Clock/hour button
②	LED (diff-lock)	⑪	Diff-lock indicator
③	LED (reverse)	⑫	4WD indicator
④	LED (neutral)	⑬	Gear position indicator
⑤	Speedometer	⑭	ODO/TRIP A/TRIP B indicator
⑥	LED (high beam) For E-17	⑮	Fuel level indicator
⑦	ECT indicator	⑯	ODO/TRIP A/TRIP B indicator
⑧	FI indicator	⑰	Fuel indicator
⑨	LED (ECT/FI)	⑱	Clock/hour indicator

OPERATING PROCEDURE

INITIAL DISPLAY

When the ignition switch is set to ON, all LCD, ECT/FI, neutral indicator, reverse indicator and diff-lock indicator light. light up for two seconds.

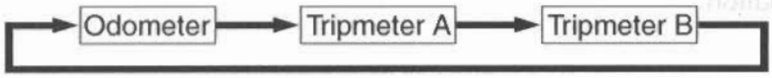
NOTE:

If the power supply is cut (e.g., when the battery is replaced);

* *The odometer, tripmeter and clock are displayed after the initial display appears.*
* *Since the clock resets to "1:00", it will need to be readjusted.*

CHANGE THE DISPLAY MODE

With each press of the ODO/TRIP button, the display changes between odometer, tripmeter A and tripmeter B as shown.



Hold down the ODO/TRIP button over two seconds while pressing the ⏲/⊠ (CLOCK/HOUR) button, the display changes between "mph" and "km/h", when displaying odometer as shown.



With each press of the ⏲/⊠ (CLOCK/HOUR) button, the display changes between clock and hour as shown.



⚠ WARNING

To aboid riding with only one hand, do not operate the buttons while riding.

ODOMETER

Displays the total distance travelled.

TRIPMETER

Displays the distance travelled since the tripmeter was last reset.

NOTE:

The tripmeters A and B can be used independently.

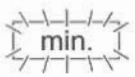
Hold down the ODO/TRIP button over two seconds to reset the tripmeter.

CLOCK

Displays the time (hour and minutes) on a 12-hour clock.

Setting the time

Hold down the ⏲/⊠ button over two seconds and then flashing the minute display.



⇨ Select the correct minutes by pressing the ⏲/⊠ button.

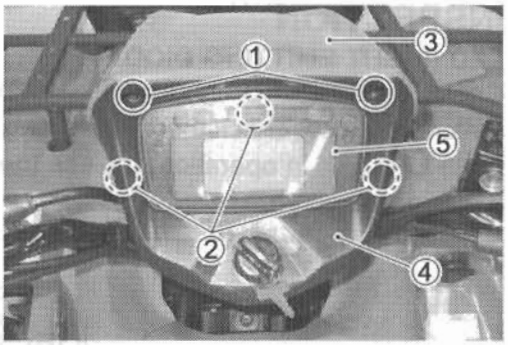
Decide the minutes by pressing the ODO/TRIP button, and then flashing the hour display.



⇨ Select the correct hour by pressing the ⏲/⊠ button.

Decide the hours by pressing the ODO/TRIP button.

REMOVAL AND DISASSEMBLY



- Remove the screws ① and clips ②.
- Remove the auxiliary headlight cover ③.
- Remove the combination meter cover ④.
- Remove the combination meter ⑤.

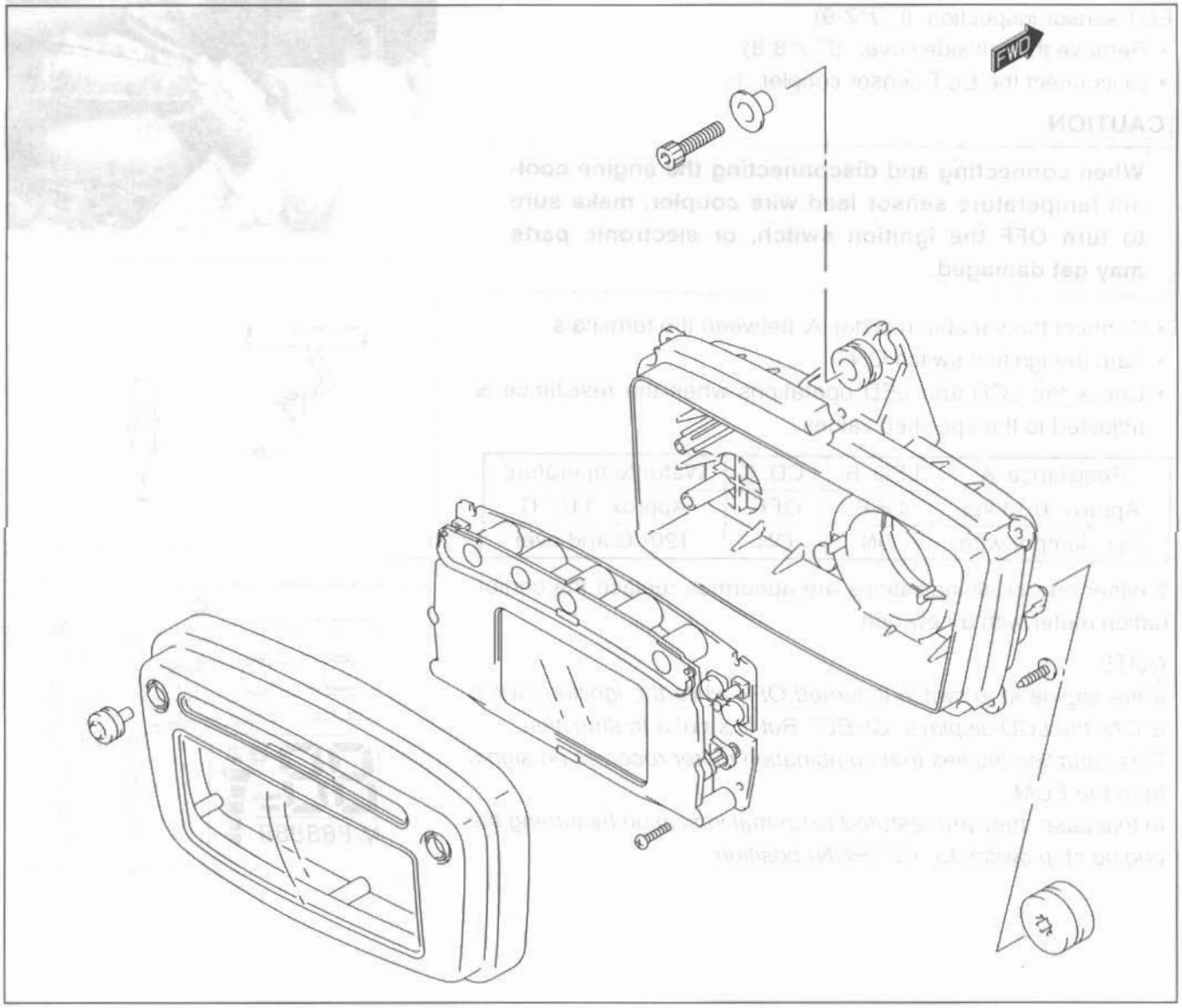
CAUTION

*** When disconnecting and reconnecting the combination meter coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.**
*** Make sure that the speedometer coupler boots is positioned properly.**

- Disassemble the combination meter ⑤ as follows.

CAUTION

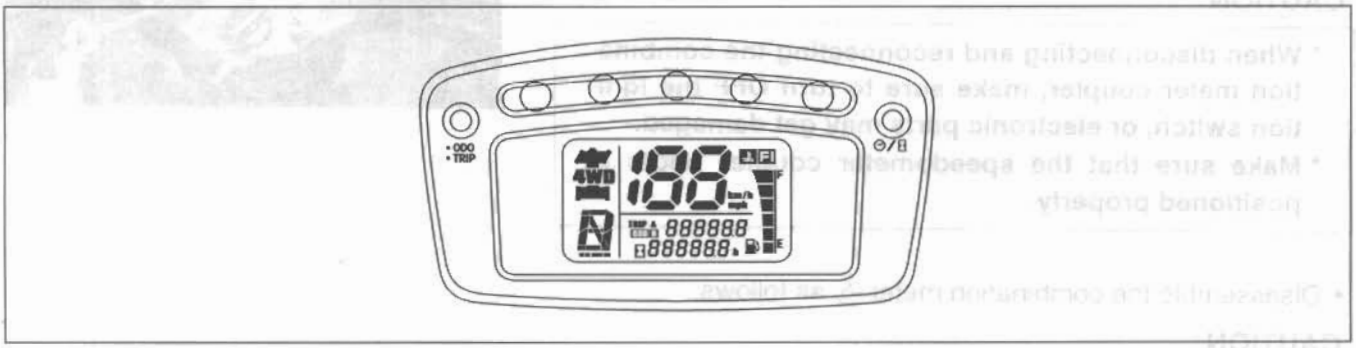
Do not attempt to disassemble the combination meter unit.



INSPECTION

LED (LIGHT EMITTING DIODE)

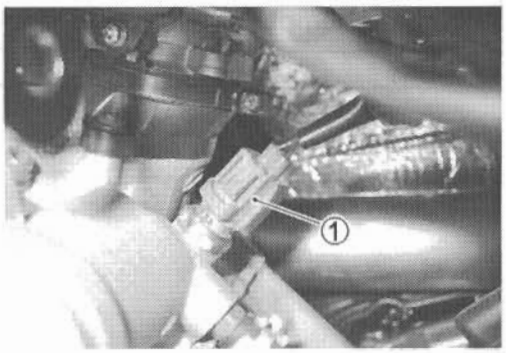
Check that the LED lights (diff-lock, reverse, neutral and ECT/FI) immediately after turning the ignition switch ON. Also, check them for lighting in accordance with their switch positions.
If the LED fails in operation, replace the combination meter unit with a new one after checking its wire harness/coupler.



ENGINE COOLANT TEMPERATURE METER AND INDICATOR

ECT sensor inspection. (☞7-9)

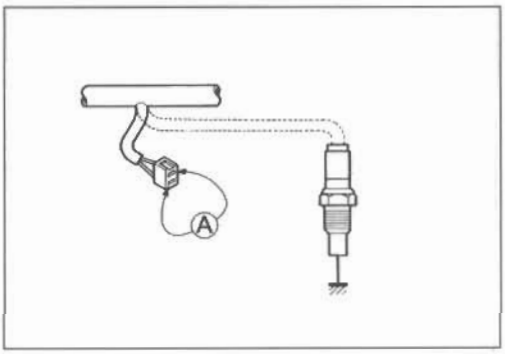
- Remove the left side cover. (☞8-8)
- Disconnect the ECT sensor coupler ①.



CAUTION

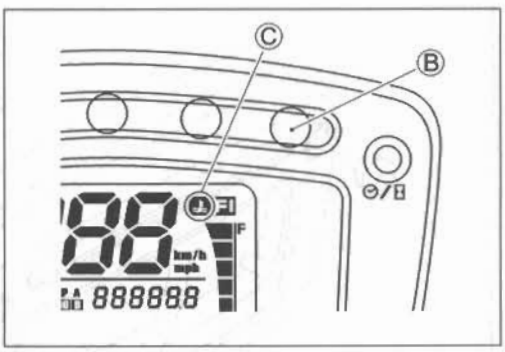
When connecting and disconnecting the engine coolant temperature sensor lead wire coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.

- Connect the variable resistor Ⓐ between the terminals.
- Turn the ignition switch ON.
- Check the LCD and LED operations when the resistance is adjusted to the specified values.



Resistance Ⓐ	LED Ⓑ	LCD Ⓒ	Water temperature
Approx. 0.14 kΩ	OFF	OFF	Approx. 110 °C
0 Ω (Jumper wire)	ON	ON	120 °C and over

If either one or all indications are abnormal, replace the combination meter with a new one.

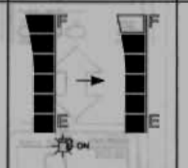
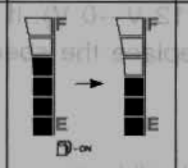
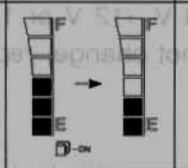
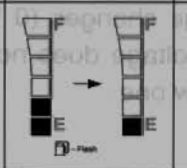
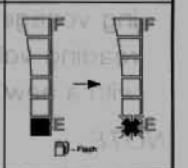


NOTE:
If the engine stop switch is turned OFF while the ignition switch is ON, the LCD displays "CHEC". But it is not a malfunction.
This condition implies that combination meter receives no signal from the ECM.
In that case, they are restored to normal indication by turning the engine stop switch to "❍" (RUN) position.

FUEL METER

- Remove the rear fender. (☞8-10)
- Connect each resistor between the terminals as shown.
- Turn the ignition switch "ON" position and wait for approx. 13 seconds.

Check the display of fuel meter as shown below, If any abnormality is found, replace the combination meter with a new one.

Less than 16 Ω	16.5 – 21.5 Ω	23.5 – 30.5 Ω	33 – 41 Ω	53 – 65 Ω	82 – 100 Ω	164 – 208 Ω
						

FUEL GAUGE

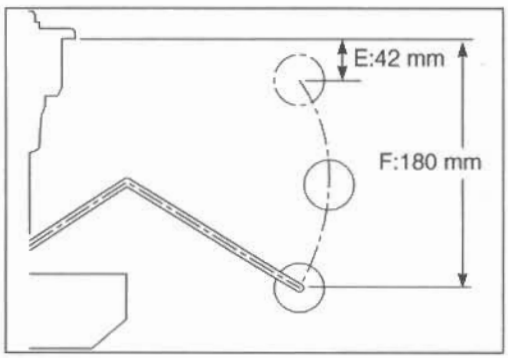
- Remove the fuel pump. (☞6-6)

Measure the resistance at each fuel level gauge float position. If the resistance is incorrect, replace the fuel pump with a new one.

Float position	Resistance
"F" (Full)	Approx. 7.4 Ω
"E" (Empty)	Approx. 219 Ω

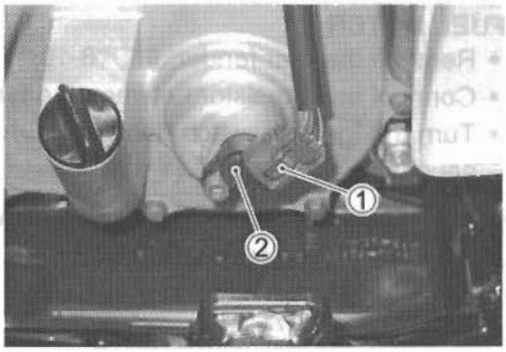
09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)



SPEEDOMETER

If the speedometer, odometer or trip meter does not function properly, inspect the speed sensor and connection of coupler.
If the speed sensor and connection are functioning properly, replace the speedometer with a new one.



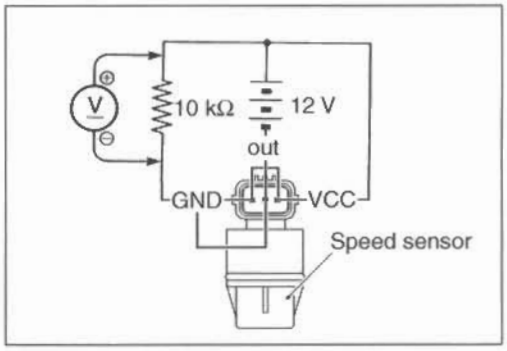
SPEED SENSOR

- Remove the left mud guard. (☞8-8)
- Disconnect speed sensor coupler ①.
- Remove the speed sensor ② by removing its mounting bolt.
- Connect 12 V battery, 10 kΩ resistor and the multi-circuit tester as shown in the right illustration.

B/R: Black with Red tracer
B/W: Black with White tracer
B: Black

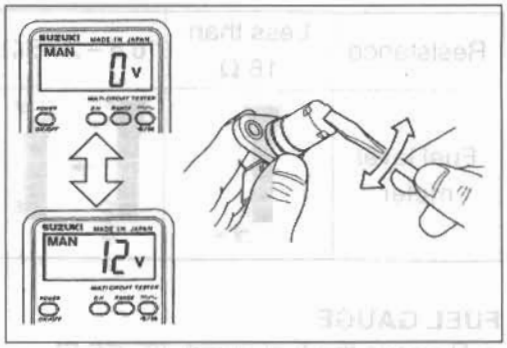
09900-25008: Multi-circuit tester set

Tester knob indication: Voltage (⎓)



- Under above condition, if a suitable screwdriver touching the pick-up surface of the speed sensor is moved, the tester reading voltage changes (0 V→12 V or 12 V→0 V). If the tester reading voltage does not change, replace the speed sensor with a new one.

NOTE:
The highest voltage reading in this test will be the same as that of battery (12 V).

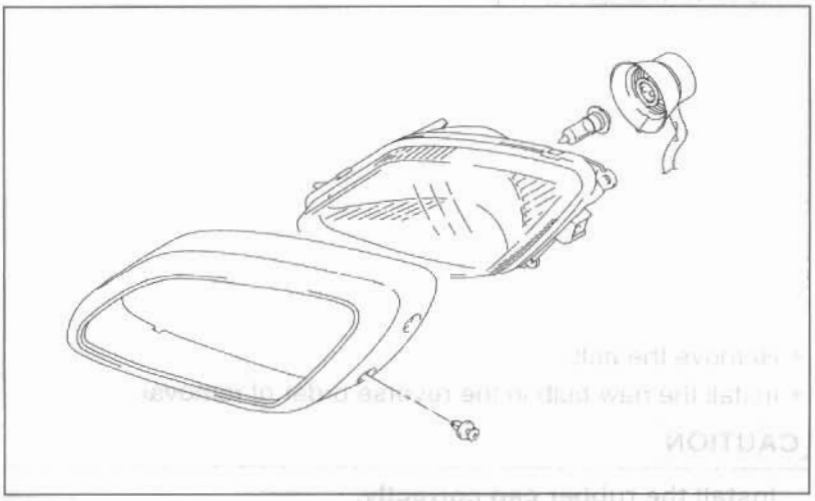


LAMPS

HEADLIGHT AND AUXILIARY HEADLIGHT

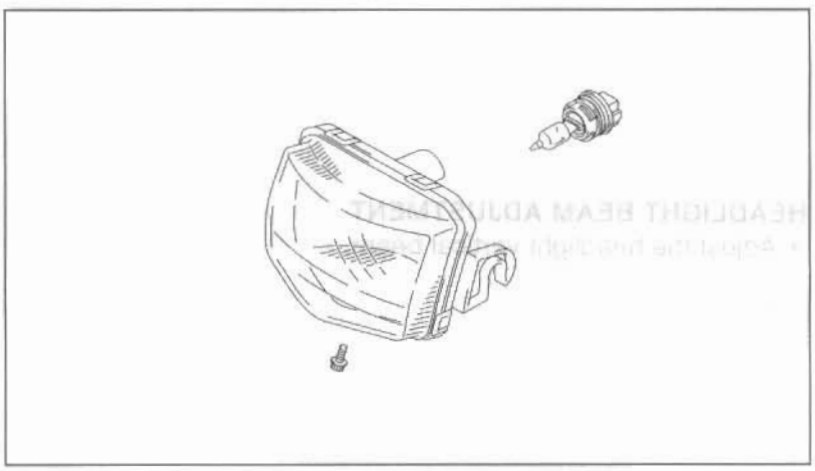
HEADLIGHT BULB

12 V 30/30 W × 2



AUXILIARY HEADLIGHT

12 V 40 W

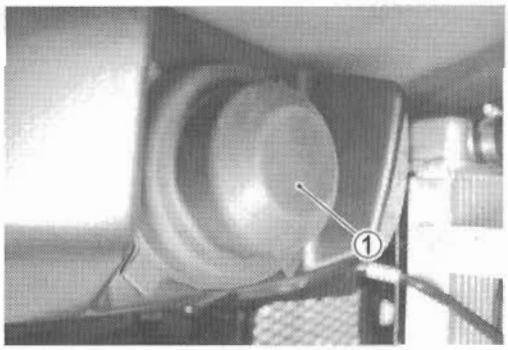


CAUTION

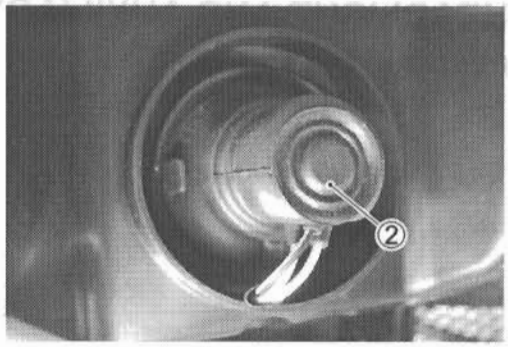
If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

HEADLIGHT BULB REPLACEMENT

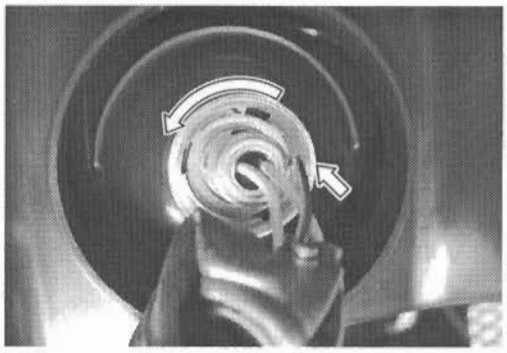
- *Remove the cover ①.*



- Remove the rubber cap ②.



- Remove the bulb.
- Install the new bulb in the reverse order of removal.

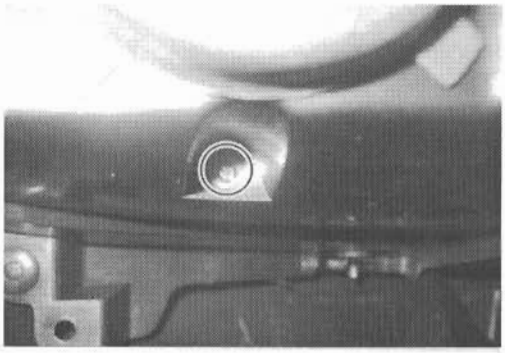


CAUTION

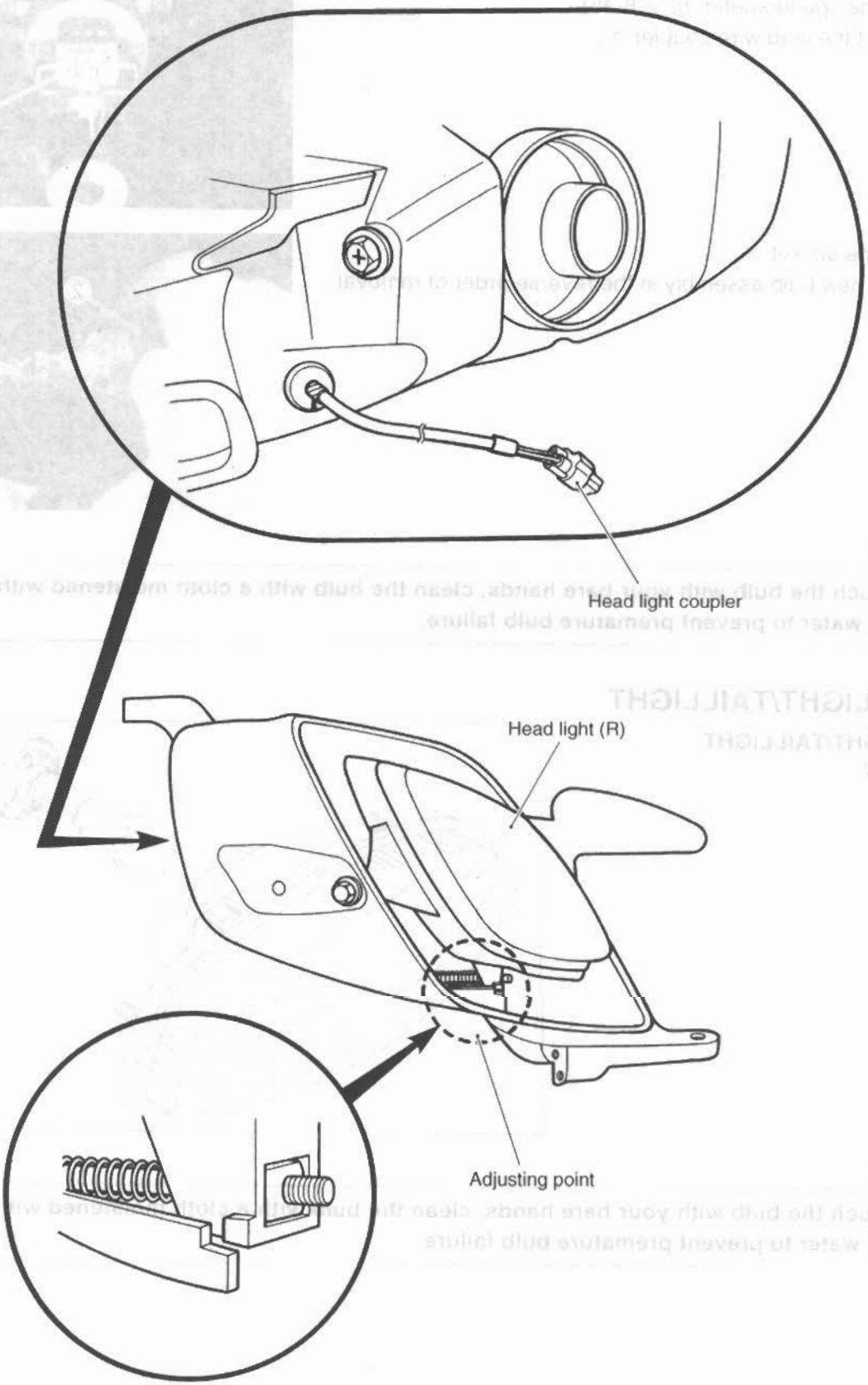
Install the rubber cap correctly.

HEADLIGHT BEAM ADJUSTMENT

- Adjust the headlight vertical beam.

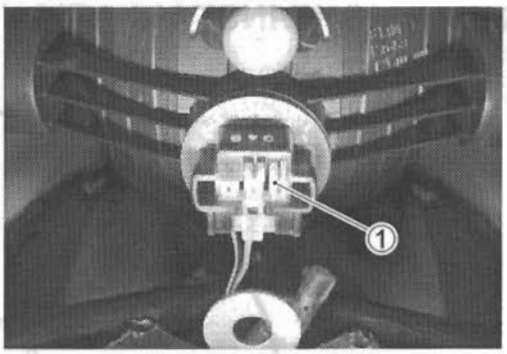


HEADLIGHT INSTALLATION



AUXILIARY HEADLIGHT BULB REPLACEMENT

- Remove the auxiliary headlight cover. (☞8-45)
- Remove the speedometer. (☞8-45)
- Disconnect the lead wire coupler ①.



- Remove the socket ②.
- Install the new bulb assembly in the reverse order of removal.

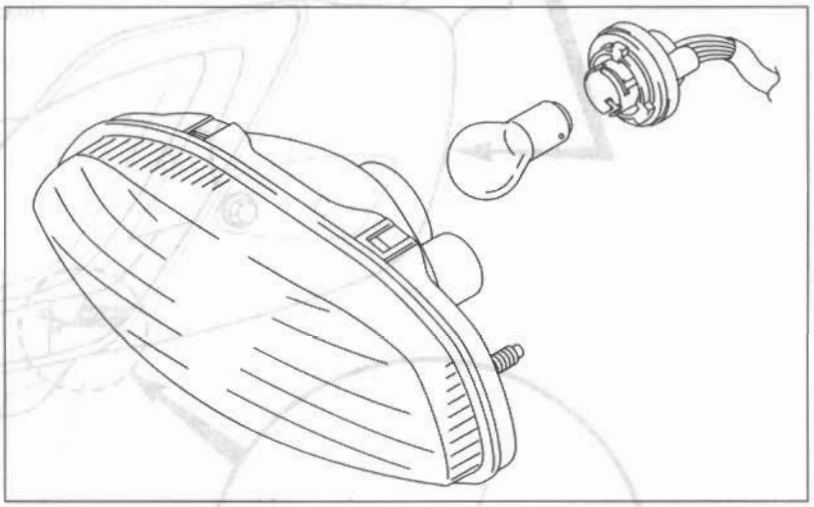


CAUTION

If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

BRAKE LIGHT/TAILLIGHT

BRAKE LIGHT/TAILLIGHT
12 V 21/5 W

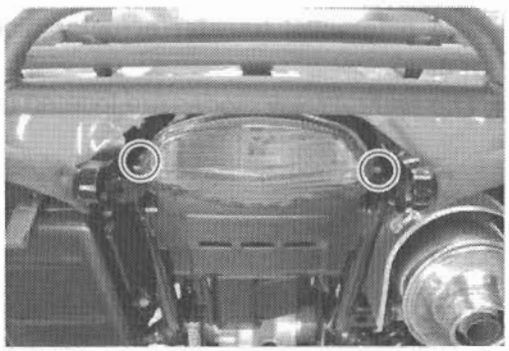


CAUTION

If you touch the bulb with your bare hands, clean the bulb with a cloth moistened with alcohol or soapy water to prevent premature bulb failure.

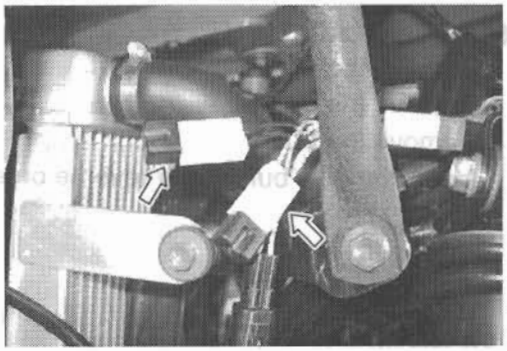
BULB REPLACEMENT

- Remove the brake light/taillight.
- Remove the socket.
- Remove the bulb.
- Install the new bulb in the reverse order of removal.



DIODE

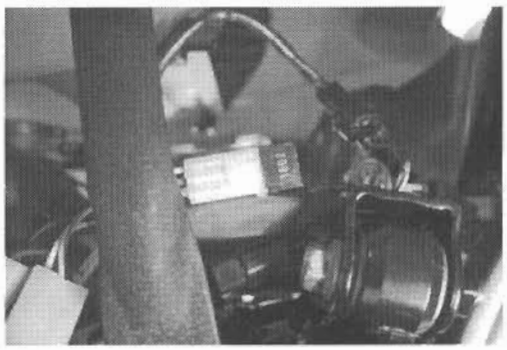
- The differential transfer actuator diode is located near the radiator.
- The neutral relay diodes are located near the radiator.



Measure the voltage between the terminals using the multi-circuit tester as indicated in the table below.

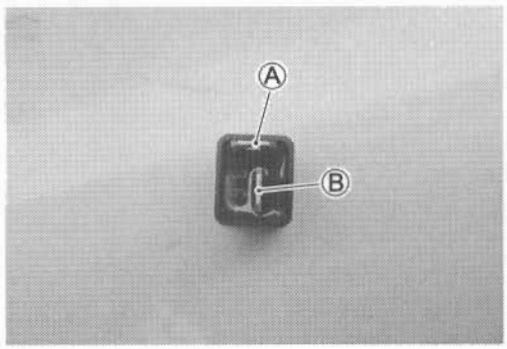
09900-25008: Multi-circuit tester set

Tester knob indication: Diode test (⊣◀)



Unit: V

⊖ Tester probe		
⊕ Tester probe	Ⓐ	Ⓑ
Ⓐ		0.3 – 0.6
Ⓑ	*	

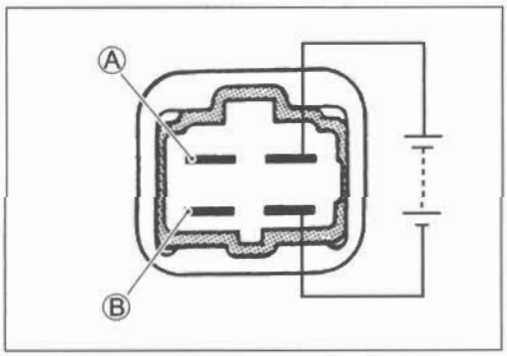


* More than 1.4 V (tester's battery voltage)

NOTE:
If the tester reads under 1.4 V when the tester probes are not connected, replace the battery of multi circuit tester.

BACKUP LIGHT RELAY (FOR E-17)

First check the insulation between Ⓐ and Ⓑ terminals with the tester. Then apply 12 V to terminals as shown and check the continuity between Ⓐ and Ⓑ. If there is no continuity, replace the backup light relay with a new one.



SWITCHES

Measure each switch for continuity using a multi-circuit tester. If any abnormality is found, replace the respective switch assemblies with new ones.

TOOL 09900-25008: Multi-circuit tester set

IGNITION SWITCH

Position \ Color	R	O	Gr	P
AUX	○	○	○	○
☼	○	○	○	
ON	○	○		
OFF				

DIMMER SWITCH

Position \ Color	Y	W	Gr
HI	○		○
LO		○	○

ENGINE STOP SWITCH

Position \ Color	O	O/W
"○" (RUN)	○	○
"⊗" (OFF)		

STARTER BUTTON

Position \ Color	O/W	Y/G
•		
PUSH	○	○

TRANSFER SELECTING SWITCH

Position \ Color	Bl/R	O	B	W	Br	B/R	B/Y	B/W
2WD	○	○			○			
4WD	○	○	○	○				
Diff-lock			○	○	○	○	○	○

BRAKE LEVER SWITCH (L)

Position \ Color	B	B
ON	○	○
OFF		

BRAKE LEVER SWITCH (R)

Position \ Color	Terminal	Terminal
ON	○	○
OFF		

REAR BRAKE SWITCH

Position \ Color	O	W/B
ON	○	○
OFF		

OVER RIDE SWITCH

Position \ Color	B/W	Br
•		
PUSH	○	○

PARKING BRAKE SWITCH

Position \ Color	O/Y	B/R
ON	○	○
OFF		

HORN BUTTON (For E-17, 24)

Position \ Color	G	B/W
•		
PUSH	○	○

COOLING FAN THERMO-SWITCH

Position \ Color	B/R	O/R
ON	○	○
OFF		

WIRE COLOR

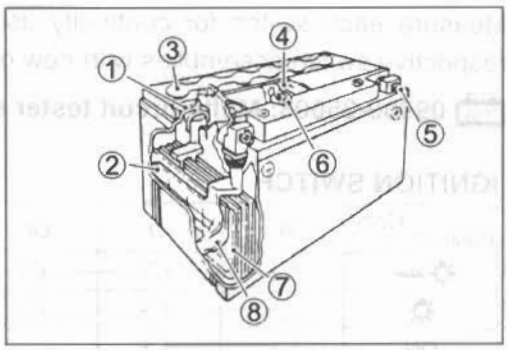
B	: Black	B/Bl	: Black with Blue tracer
Bl	: Blue	B/W	: Black with White tracer
G	: Green	O/W	: Orange with White tracer
Gr	: Gray	R/W	: Red with White tracer
O	: Orange	W/B	: White with Black tracer
P	: Pink	Y/G	: Yellow with Green tracer
R	: Red		
V	: Violet		
W	: White		
Y	: Yellow		

BATTERY

SPECIFICATIONS

Type designation	FTZ16-BS
Capacity	12 V, 64.8 kC (18 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)



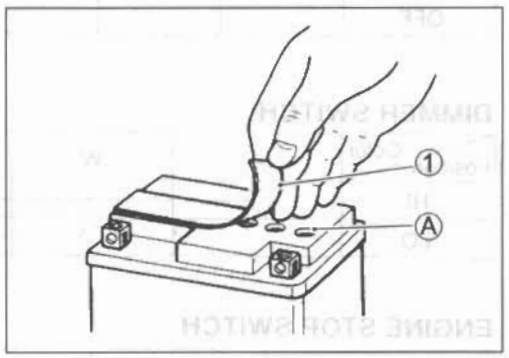
INITIAL CHARGING

Filling electrolyte

- Remove the aluminum tape ① sealing the battery electrolyte filler holes Ⓐ.

NOTE:

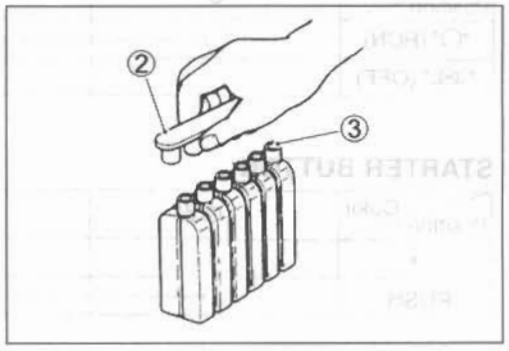
When filling electrolyte, the battery must be removed from the vehicle and must be put on the level ground.



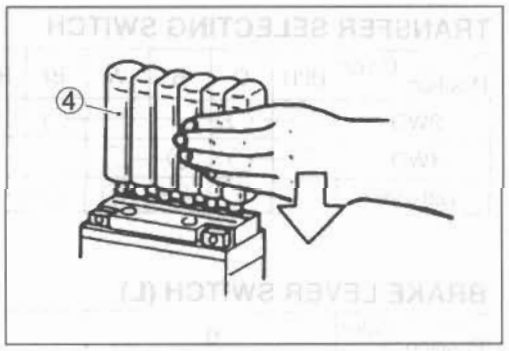
- Remove the caps ②.

NOTE:

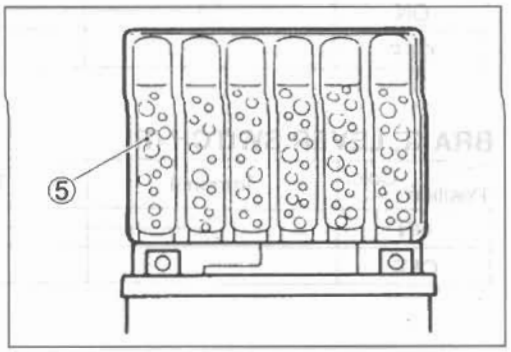
* *After filling the electrolyte completely, use the removed cap ② as sealing caps of battery-filler holes.*
* *Do not remove or pierce the sealed areas ③ of the electrolyte container.*



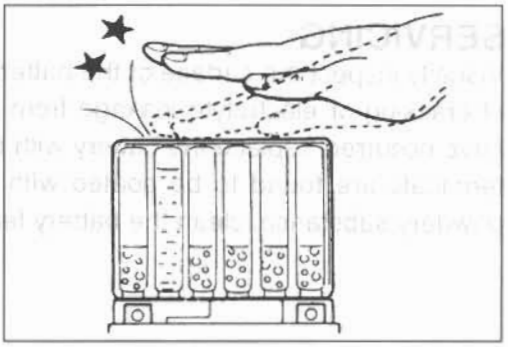
- Insert the nozzles of the electrolyte container ④ into the battery's electrolyte filler holes, holding the container firmly so that it does not fall. Take precaution not to allow any of the fluid to spill.



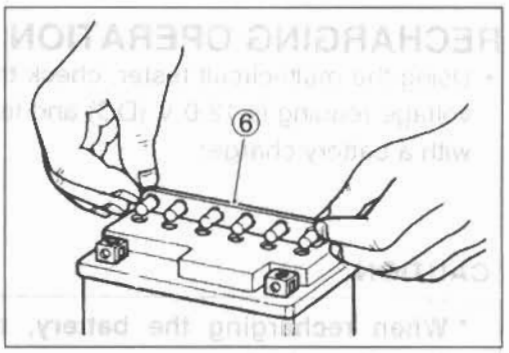
- Make sure air bubbles ⑤ are coming up in each electrolyte container, and leave in this position for about more than 20 minutes.



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.



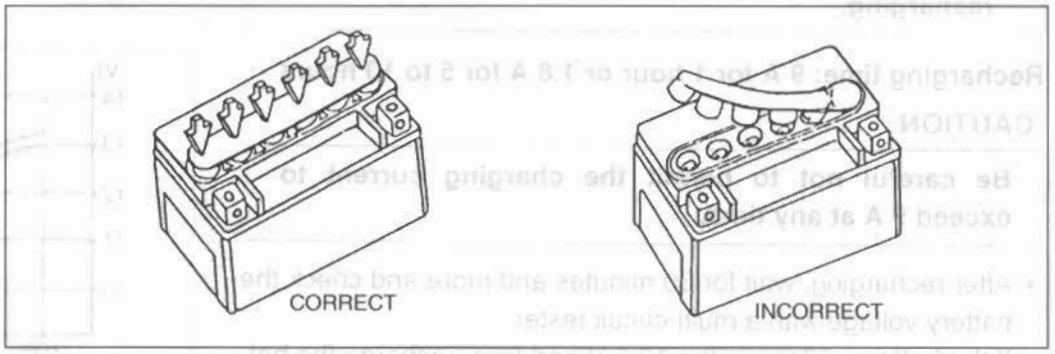
- After confirming that the electrolyte has entered the battery completely, remove the electrolyte containers from the battery. Wait for about 20 minutes.



- 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

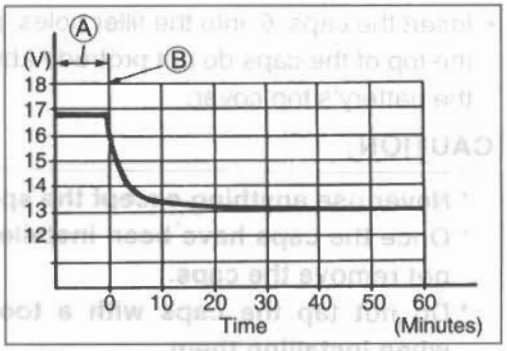
*** For charging the battery, make sure to use the charger specially designed for MF battery. Otherwise, the battery may be overcharged resulting in shortened service life.**
*** Do not remove the cap during charging.**
*** Position the battery with the cap facing upward during charging.**

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 12.0 V (DC) and less, recharge the battery with a battery charger.

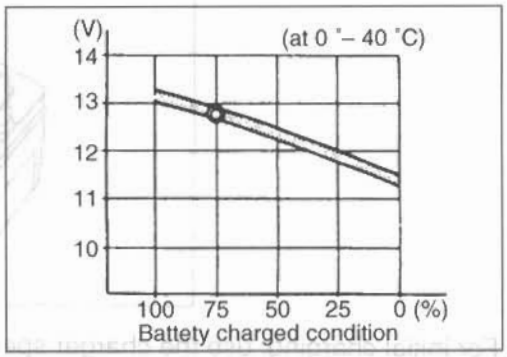


Ⓐ Charging period
Ⓑ Stop charging

CAUTION

*** When recharging the battery, remove the battery from the vehicle.**
*** Do not remove the caps on the battery top while recharging.**

Recharging time: 9 A for 1 hour or 1.8 A for 5 to 10 hours



CAUTION

Be careful not to permit the charging current to exceed 9 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, check the battery every 1 month to prevent the battery discharge.

SERVICING INFORMATION

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TROUBLESHOOTING

FI SYSTEM MALFUNCTION CODE AND DEFECTIVE CONDITION

MALFUNCTION CODE	DETECTED ITEM	DETECTED FAILURE CONDITION CHECK FOR
C00	NO FAULT	———
C12	CKP sensor	The signal does not reach ECM for 3 sec. and more, after receiving the starter signal.
		The CKP sensor wiring and mechanical parts. (CKP sensor, lead wire/coupler connection)
C13	IAP sensor	The sensor should produce following voltage. 0.5 V ≦ sensor voltage < 4.85 V Without the above range, C13 is indicated.
		IAP sensor, lead wire/coupler connection.
C14	TP sensor	The sensor should produce following voltage. 0.2 V ≦ sensor voltage < 4.80 V Without the above range, C14 is indicated.
		TP sensor, lead wire/coupler connection.
C15	ECT sensor	The sensor voltage should be the following. 0.15 V ≦ sensor voltage < 4.85 V Without the above range, C15 is indicated.
		ECT sensor, lead wire/coupler connection.
C20	Diff-lock relay	No voltage is applied to diff-lock motor, although ignition switch is turned ON, or voltage is applied to diff-lock motor, although ignition switch is turned OFF.
		Diff-lock relay lead wire/coupler connection, power supply to the ignition switch.
C21	IAT sensor	The sensor voltage should be the following. 0.15 V ≦ sensor voltage < 4.85 V Without the above range, C21 is indicated.
		IAT sensor, lead wire/coupler connection.
C23	TO sensor	The sensor voltage should be the following for 2 sec. and more, after ignition switch turns ON. 0.2 V ≦ sensor voltage ≦ 4.8 V Without the above value, C23 is indicated.
		TO sensor, lead wire/coupler connection.
C24	Ignition signal	CKP sensor (pick-up coil) signal is produced, but signal from ignition coil is interrupted continuous by 8 times or more. In this case, the code C24 is indicated.
		Ignition coil, wiring/coupler connection, power supply from the battery.
C32	Fuel injector	CKP sensor (pickup coil) signal is produced, but fuel injector signal is interrupted continuous by 4 times or more. In this case, the code C32 is indicated.
		Injector, wiring/coupler connection, power supply to the injector.
C40	ISC valve	No voltage is applied to ISC valve motor, although ignition switch is turned ON, or voltage is applied to ISC valve motor, although ignition switch is turned OFF.
		ISC valve lead wire/coulper connection.

MALFUNCTION CODE	DETECTED ITEM	DETECTED FAILURE CONDITION CHECK FOR
C41	Fuel pump relay	No voltage is applied to the fuel pump, although fuel pump relay is turned ON, or voltage is applied to fuel pump although fuel pump relay is turned OFF.
		Fuel pump relay, connecting lead wire, power source to fuel pump relay, fuel injector.

ENGINE

ENGINE WILL NOT START OR IS HARD TO START

Symptom, possible causes and remedy	
1) Compression too low	
• Valve clearance out of adjustment.	Adjust.
• Worn valve guides or poor seating of valves.	Repair or replace.
• Mistimed valves.	Adjust.
• Excessively worn piston rings.	Replace.
• Worn-down cylinder bores.	Replace.
• Starter motor cranks too slowly.	See electrical section.
• Poor seating of spark plug.	Retighten.
2) Plug not sparking	
• Fouled spark plug.	Clean or replace.
• Wet spark plug.	Clean and dry.
• Defective ignition coil.	Replace.
• Defective CKP sensor.	Replace.
• Defective ECM.	Replace.
• Open-circuited wiring connections.	Repair or replace.
3) Incorrect fuel/air mixture	
• TP sensor out of adjustment.	Adjust.
• Defective fuel pump.	Replace.
• Defective TP sensor.	Replace.
• Defective CKP sensor.	Replace.
• Defective IAP sensor.	Replace.
• Defective ECM.	Replace.
• Defective ECT sensor.	Replace.
• Defective IAT sensor.	Replace.

ENGINE IDLES POORLY

Symptom, possible causes and remedy

• Valve clearance out of adjustment.	Adjust.
• Poor seating of valves.	Replace or repair.
• Defective valve guides.	Replace.
• Worn down camshafts.	Replace.
• Too wide spark plug gap.	Adjust or replace.
• Defective ignition coil.	Replace.
• Defective CKP sensor.	Replace.
• Defective ECM.	Replace.
• Defective TP sensor.	Replace.
• Defective fuel pump.	Replace.
• Defective ISC valve	Replace.

ENGINE STALLS OFTEN

Symptom, possible causes and remedy

1) Incorrect fuel/air mixture

• Defective IAP sensor or circuit.	Repair or replace.
• Clogged fuel filter.	Clean or replace.
• Defective fuel pump.	Replace.
• Defective fuel pressure regulator.	Replace.
• Defective ECT sensor.	Replace.
• Defective thermostat.	Replace.
• Defective IAT sensor.	Replace.

2) Fuel injector improperly operating

• Defective fuel injector.	Replace.
• No injection signal from ECM.	Repair or replace.
• Open or short circuited wiring connection.	Repair or replace.
• Defective battery or low battery voltage.	Replace or recharge.

3) Control circuit or sensor improperly operating

• Defective ECM.	Replace.
• Defective fuel pressure regulator.	Replace.
• Defective TP sensor.	Replace.
• Defective IAT sensor.	Replace.
• Defective CKP sensor.	Replace.
• Defective ECT sensor.	Replace.
• Defective fuel pump relay.	Replace.

4) Engine internal parts improperly operating

• Fouled spark plug.	Clean.
• Defective CKP sensor or ECM.	Replace.
• Clogged fuel hose.	Clean.
• Valve clearance out of adjustment.	Adjust.

NOISY ENGINE

Symptom, possible causes and remedy

1) Excessive valve chatter	
• Too large valve clearance.	Adjust.
• Weakened or broken valve springs.	Replace.
• Worn tappet or cam surface.	Replace.
• Worn and burnt camshaft journal.	Replace.
2) Noise seems to come from piston	
• Worn down piston or cylinder.	Replace.
• Combustion chamber fouled with carbon.	Clean.
• Worn piston pin or piston pin bore.	Replace.
• Worn piston rings or ring grooves.	Replace.
3) Noise seems to come from cam chain	
• Stretched chain.	Replace.
• Worn sprockets.	Replace.
• Tension adjuster not working.	Repair or replace.
4) Noise seems to come from crankshaft	
• Rattling bearings due to wear.	Replace.
• Worn and burnt big-end bearings.	Replace.
• Worn and burnt journal bearings.	Replace.
• Too large thrust clearance.	Replace thrust bearing.
5) Noise seems to come from transfer	
• Worn or rubbing gears.	Replace.
• Worn splines.	Replace.
• Worn bearings.	Replace.
6) Noise seems to come from water pump	
• Too much play on pump shaft bearing.	Replace.
• Worn or damaged impeller shaft.	Replace.
• Worn or damaged mechanical seal.	Replace.
• Contact between pump case and impeller.	Replace.
7) Noise seems to come from the movable drive and driven face	
• Worn or slipping drive belt.	Replace.
• Worn rollers in movable drive face.	Replace.
8) Noise seems to come from front/rear output shaft bevel gear, front differetial bevel gear and rear drive bevel gear	
• Worn or damaged drive and driven bevel gears.	Replace.
• Excessive backlash.	Adjust.
• Improper tooth contact.	Adjust.
• Damaged bearing.	Replace.
• Worm or rubbing gears.	Replace.
• Worm output shaft spline.	Replace.
• Front differential gear thrust clearance too large.	Adjust or replace.
• Rear drive gear thrust clearance too large.	Adjust or replace.

ENGINE RUNS POORLY IN HIGH SPEED RANGE

Symptom, possible causes and remedy

1) Defective engine internal/electrical parts

• Weakened valve springs.	Replace.
• Worn camshafts.	Replace.
• Valve timing out of adjustment.	Adjust.
• Too narrow spark plug gap.	Adjust.
• Ignition not advanced sufficiently due to poorly working timing advance circuit.	Replace ECM.
• Defective ignition coil.	Replace.
• Defective CKP sensor.	Replace.
• Defective ECM.	Replace.
• Clogged fuel hose, resulting in inadequate fuel supply to injector.	Clean and prime.
• Defective fuel pump.	Replace.
• Defective TP sensor.	Replace.
• Clogged air cleaner element.	Replace

2) Defective air flow system

• Clogged air cleaner element.	Clean or replace.
• Sucking air from throttle body joint.	Repair or replace.
• Defective ECM.	Replace.

3) Defective control circuit or sensor

• Low fuel pressure.	Repair or replace.
• Defective TP sensor.	Replace.
• Defective IAT sensor.	Replace.
• Defective CKP sensor.	Replace.
• Defective IAP sensor.	Replace.
• Defective ECM.	Replace.
• TP sensor out of adjustment.	Adjust.

ENGINE LACKS POWER

Symptom, possible causes and remedy

1) Defective engine internal/electrical parts

• Loss of valve clearance.	Adjust.
• Weakened valve springs.	Replace.
• Valve timing out of adjustment.	Adjust.
• Worn piston rings or cylinder.	Replace.
• Poor seating of valves.	Repair.
• Fouled spark plug.	Clean or replace.
• Incorrect spark plug.	Adjust or replace.
• Clogged injector.	Clean or replace.
• TP sensor out of adjustment.	Adjust.
• Clogged air cleaner element.	Replace.
• Sucking air from throttle valve or vacuum hose.	Retighten or replace.
• Too much engine oil.	Drain out excess oil.
• Defective fuel pump or ECM.	Replace.
• Defective CKP sensor and ignition coil.	Replace.

2) Defective control circuit or sensor

• Low fuel pressure.	Repair or replace.
• Defective TP sensor.	Replace.
• Defective IAT sensor.	Replace.
• Defective CKP sensor.	Replace.
• Defective IAP sensor.	Replace.
• Defective ECM.	Replace.
• TP sensor out of adjustment.	Adjust.

ENGINE OVERHEATS

Symptom, possible causes and remedy

1) Defective engine internal parts

• Heavy carbon deposit on piston head.	Clean.
• Not enough oil in the engine.	Add oil.
• Defective oil pump or clogged oil circuit.	Replace or clean.
• Use of incorrect engine oil.	Change.
• Defective cooling system.	See radiator section.

2) Lean fuel/air mixture

• Short-circuited IAP sensor/lead wire.	Repair or replace.
• Short-circuited IAT sensor/lead wire.	Repair or replace.
• Defective fuel injector.	Replace.
• Defective ECT sensor.	Replace.

3) Other factors

• Ignition timing too advanced due to defective timing advance system (ECT sensor, CKP sensor and ECM.)	Replace.
• Drive chain too tight.	Adjust.

DIRTY OR HEAVY EXHAUST SMOKE

Symptom, possible causes and remedy

• Too much engine oil in the engine.	Check with inspection window. Drain excess oil.
• Worn piston rings or cylinder.	Replace.
• Worn valve guides.	Replace.
• Scored or scuffed cylinder wall.	Replace.
• Worn valves stems.	Replace.
• Defective stem seal.	Replace.
• Worn oil ring side rail.	Replace.

DRIVE TRAIN

Power will not transmit from the engine

1) To the rear wheel

• Broken drive and driven bevel gear teeth.	Replace.
• Broken rear output shaft.	Replace.
• Worn or broken rear axle serration.	Replace.
• Worn or damaged coupling joint serration.	Replace.
• Broken or damaged rear drive and driven bevel gears	Replace.
• Worn or damage universal joint.	Replace.

2) To the front wheel

• Broken drive and driven bevel gear teeth.	Replace.
• Worn or broken propeller shaft serration.	Replace.
• Broken or damaged front drive (differential) gear or pinion.	Replace.
• Improperly operated front differential shifting motor.	Repair or replace.
• Worn or damaged shifting sleeve, shaft and fork of the 2WD/4WD and diff-lock shifting.	Replace.
• Worn or damaged universal joint.	Replace.
• Worn or damaged front axle or universal joint serration.	Replace.

TRANSFER WILL NOT SHIFT BACK

Symptom, possible causes and remedy

• Broken return spring on shift shaft.	Replace.
• Rubbing or sticky shift shaft.	Repair or replace.
• Distorted or worn gearshift forks.	Replace.

TRANSFER JUMPS OUT OF GEAR

Symptom, possible causes and remedy

• Worn shifting gears on driveshaft or countershaft.	Replace.
• Distorted or worn gearshift forks.	Replace.
• Weakened stopper spring on gearshift stopper.	Replace.
• Worn gearshift cam plate.	Replace.

RADIATOR (COOLING SYSTEM)

ENGINE OVERHEATS

Symptom, possible causes and remedy	
• Not enough engine coolant.	Add coolant.
• Radiator core clogged with dirt.	Clean.
• Faulty cooling fan.	Repair or replace.
• Defective cooling fan thermo-switch.	Replace.
• Clogged water passage.	Clean.
• Air trapped in the cooling circuit.	Bleed air.
• Defective water pump.	Replace.
• Use of incorrect engine coolant.	Replace.
• Defective thermostat.	Replace.

ENGINE OVERCOOLS

Symptom, possible causes and remedy	
• Defective cooling fan thermo-switch.	Replace.
• Extremely cold weather.	Put on radiator cover.
• Defective thermostat.	Replace.

CHASSIS

HEAVY STEERING

Symptom, possible causes and remedy

• Distorted steering shaft.	Replace.
• Not enough pressure in tires.	Adjust.
• Improper front wheel alignment.	Adjust.
• Insufficiently lubricated.	Lubricate.
• Linkage connections tending seize.	Repair or replace.
• Tie rod ends tending to seize.	Replace.

WOBBLY HANDLEBAR

Symptom, possible causes and remedy

• Unequally inflated tires.	Regulate.
• Loose front wheel hub nuts.	Tighten.
• Damaged or worn front wheel hub bearings.	Replace.
• Worn or loose tie rod ends.	Replace or tighten.
• Defective or incorrect front tires.	Replace.
• Damaged or worn wishbone arms and related bushings.	Replace.
• Distorted front wheels.	Replace.
• Loose chassis nuts and bolts.	Tighten.

STEERING PULLS TO ONE SIDE

Symptom, possible causes and remedy

• Unequally inflated tires.	Regulate.
• Improper front wheel alignment.	Adjust.
• Worn front wheel hub bearings.	Replace.
• Distorted frame.	Repair or replace.
• Defective shock absorber.	Replace.

SHOCKS FELT IN THE STEERING

Symptom, possible causes and remedy

• High tire pressure.	Regulate.
• Worn steering linkage connection.	Replace.
• Loose suspension system bolts.	Tighten.

TIRES RAPIDLY OR UNEVENLY WEAR

Symptom, possible causes and remedy

• Worn or loose front wheel hub bearings.	Replace.
• Improper front wheel alignment.	Adjust.

STEERING TOO NOISY

Symptom, possible causes and remedy

• Loose nuts and bolts.	Tighten.
• Damaged or worn front wheel hub bearings.	Replace.
• Insufficiently lubricated.	Lubricate.

FRONT SUSPENSION TOO SOFT

Symptom, possible causes and remedy

- Weakened spring of shock absorber. Replace.
- Shock absorber leaks oil. Replace.
- Improperly set front shock absorber. Adjust.

FRONT SUSPENSION TOO STIFF

Symptom, possible causes and remedy

- Bent shock absorber shaft. Replace.
- Worn upper or lower wishbone arms and related bushing. Replace.
- Improperly set front shock absorber. Adjust.

NOISY FRONT SUSPENSION

Symptom, possible causes and remedy

- Loose nuts or bolts on suspension. Retighten.
- Worn wishbone arms and related bushings. Replace.

WOBBLY REAR WHEEL

Symptom, possible causes and remedy

- Distorted wheel rims. Replace.
- Damage or worn rear wheel hub bearings. Replace.
- Defective or incorrect tires. Replace.
- Loose nuts or bolts on rear suspensions. Retighten.
- Loose rear wheel hub nuts. Tighten.
- Loosen rear axle housing mounting bolts. Tighten.
- Improper rear brake adjustment. Adjust.
- Rear shock absorber leaks oil. Replace.
- Loosen rear stabilizer mounting bolts. Tighten.

REAR SUSPENSION TOO SOFT

Symptom, possible causes and remedy

- Weakened spring of shock absorber. Replace.
- Leakage of oil from shock absorber. Replace.
- Improperly set rear shock absorber. Adjust.

REAR SUSPENSION TOO STIFF

Symptom, possible causes and remedy

- Bent shock absorber shaft. Replace.
- Bent wishbone arm pivot bolt. Replace.
- Worn wishbone arm. Replace.
- Improperly set rear shock absorber. Adjust.

NOISY REAR SUSPENSION

Symptom, possible causes and remedy

- Loose nuts or bolts on rear suspension. Retighten.
- Worn wishbone arm. Replace.

BRAKES

INSUFFICIENT BRAKE POWER

Symptom, possible causes and remedy

Front

- Leakage of brake fluid from hydraulic system. — Repair or replace.
- Worn pads. — Replace.
- Oil adhesion on friction surface of pads. — Clean disc and pads.
- Worn disc. — Replace.
- Air in hydraulic system. — Bleed air.
- Not enough brake fluid in the reservoir. — Replenish.

Rear

- Too much play on brake pedal or lever. — Adjust.

BRAKE SQUEAKING

Symptom, possible causes and remedy

- Carbon adhesion on pad surface. — Repair surface with sandpaper.
- Tilted pad. — Correct pad fitting or replace.
- Damaged wheel hub bearings. — Replace.
- Worn pads or disc. — Replace.
- Foreign material in brake fluid. — Replace brake fluid.
- Clogged return port of master cylinder. — Disassemble and clean master cylinder.

EXCESSIVE BRAKE LEVER STROKE

Symptom, possible causes and remedy

- Air in hydraulic system. — Bleed air.
- Insufficient brake fluid. — Replenish fluid to specified level; bleed air.
- Improper quality of brake fluid. — Replace with correct fluid.

LEAKAGE OF BRAKE FLUID

Symptom, possible causes and remedy

- Insufficient tightening of connection joints. — Tighten to specified torque.
- Cracked hose. — Replace.
- Worn piston and/or cup. — Replace piston and/or cup.

BRAKE DRAGS

Symptom, possible causes and remedy

- Rusty part. — Clean and lubricate.
- Insufficient brake lever or brake pedal pivot lubrication. — Lubricate.

SLIPPING REAR BRAKE

Symptom, possible causes and remedy

- Weakened brake spring. — Replace.

ELECTRICAL

NO SPARKING OR POOR SPARKING

Symptom, possible causes and remedy

• Defective ignition coil.	Replace.
• Defective spark plug.	Replace.
• Defective CKP sensor.	Replace.
• Defective ECM.	Replace.
• Defective TO sensor.	Replace.
• Open-circuited wiring connections.	Check and repair.

SPARK PLUG SOON BECOME FOULED WITH CARBON

Symptom, possible causes and remedy

• Mixture too rich.	Inspect FI system.
• Idling speed set too high.	Adjust fast idle or throttle stop screw.
• Incorrect gasoline.	Change.
• Dirty air cleaner element.	Replace.

SPARK PLUG BECOME FOULED TOO SOON

Symptom, possible causes and remedy

• Worn piston rings.	Replace.
• Worn piston or cylinder.	Replace.
• Excessive clearance of valve stems in valve guides.	Replace.
• Worn stem oil seal.	Replace.

SPARK PLUG ELECTRODES OVERHEAT OR BURN

Symptom, possible causes and remedy

• Too hot spark plug.	Replace with cold type plugs.
• Overheated the engine.	Tune up.
• Loose spark plug.	Retighten.
• Too lean mixture.	Inspect FI system.

GENERATOR DOES NOT CHARGE

Symptom, possible causes and remedy

• Open- or short-circuited lead wires, or loose lead connections.	Repair or replace or retighten.
• Short-circuited, grounded or open generator coil.	Replace.
• Short-circuited or punctured regulator/rectifier.	Replace.

GENERATOR DOES CHARGE, BUT CHARGING RATE IS BELOW THE SPECIFICATION

Symptom, possible causes and remedy

• Lead wires tend to get short- or open-circuited or loosely connected at terminals.	Repair or retighten.
• Grounded or open-circuited generator coil.	Replace.
• Defective regulator/rectifier.	Replace.
• Defective cell plates in the battery.	Replace the battery.

GENERATOR OVERCHARGES

Symptom, possible causes and remedy

• Internal short-circuit in the battery.	Replace the battery.
• Damaged or defective regulator/rectifier.	Replace.
• Poorly grounded regulator/rectifier.	Clean and tighten ground connection.

UNSTABLE CHARGING

Symptom, possible causes and remedy	
• Lead wire insulation frayed due to vibration, resulting in intermittent short-circuiting.	Repair or replace.
• Internally short-circuited generator.	Replace.
• Defective regulator/rectifier.	Replace.

START BUTTON IS NOT EFFECTIVE

Symptom, possible causes and remedy	
• Run down battery.	Repair or replace.
• Defective switch contacts.	Replace.
• Brushes not seating properly on starter motor commutator.	Repair or replace.
• Defective starter relay/starter interlock switch.	Replace.
• Defective main fuse.	Replace.

2WD/4WD BUTTON DOES NOT WORK

Symptom, possible causes and remedy	
• Defective 2WD/4WD selecting relay.	Replace.
• Wiring connections loose or disconnected.	Connect, tighten or repair.

DIFF-LOCK BUTTON DOES NOT WORK

Symptom, possible causes and remedy	
• Defective diff-lock relay.	Replace.
• Defective diff-lock switch.	Replace.
• Wiring connections loose or disconnected.	Connect, tighten or repair.

BATTERY

"SULFATION", ACIDIC WHITE POWDERY SUBSTANCE OR SPOTS ON SURFACE OF CELL PLATES

Symptom, possible causes and remedy	
• Cracked battery case.	Replace the battery.
• Battery has been left in a run-down condition for a long time.	Replace the battery.

BATTERY RUNS DOWN QUICKLY

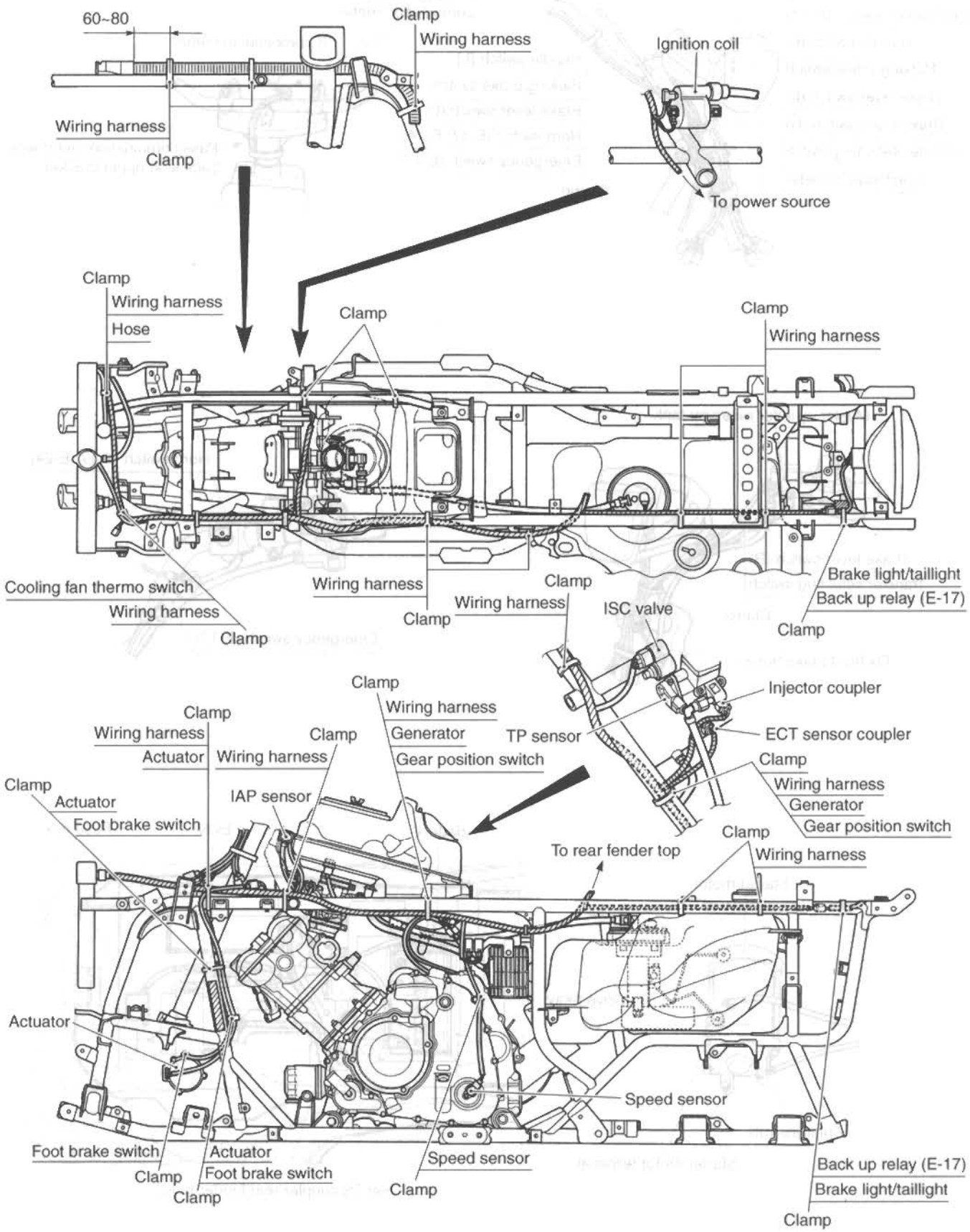
Symptom, possible causes and remedy	
• Trouble in charging system.	Check the generator, regulator/rectifier and circuit connections and make necessary adjustments to obtain specified charging operation.
• Cell plates have lost much of their active material as a result of overcharging.	Replace the battery and correct the charging system.
• Internal short-circuit in the battery.	Replace the battery.
• Too low battery voltage.	Recharge the battery fully.
• Too old battery.	Replace the battery.

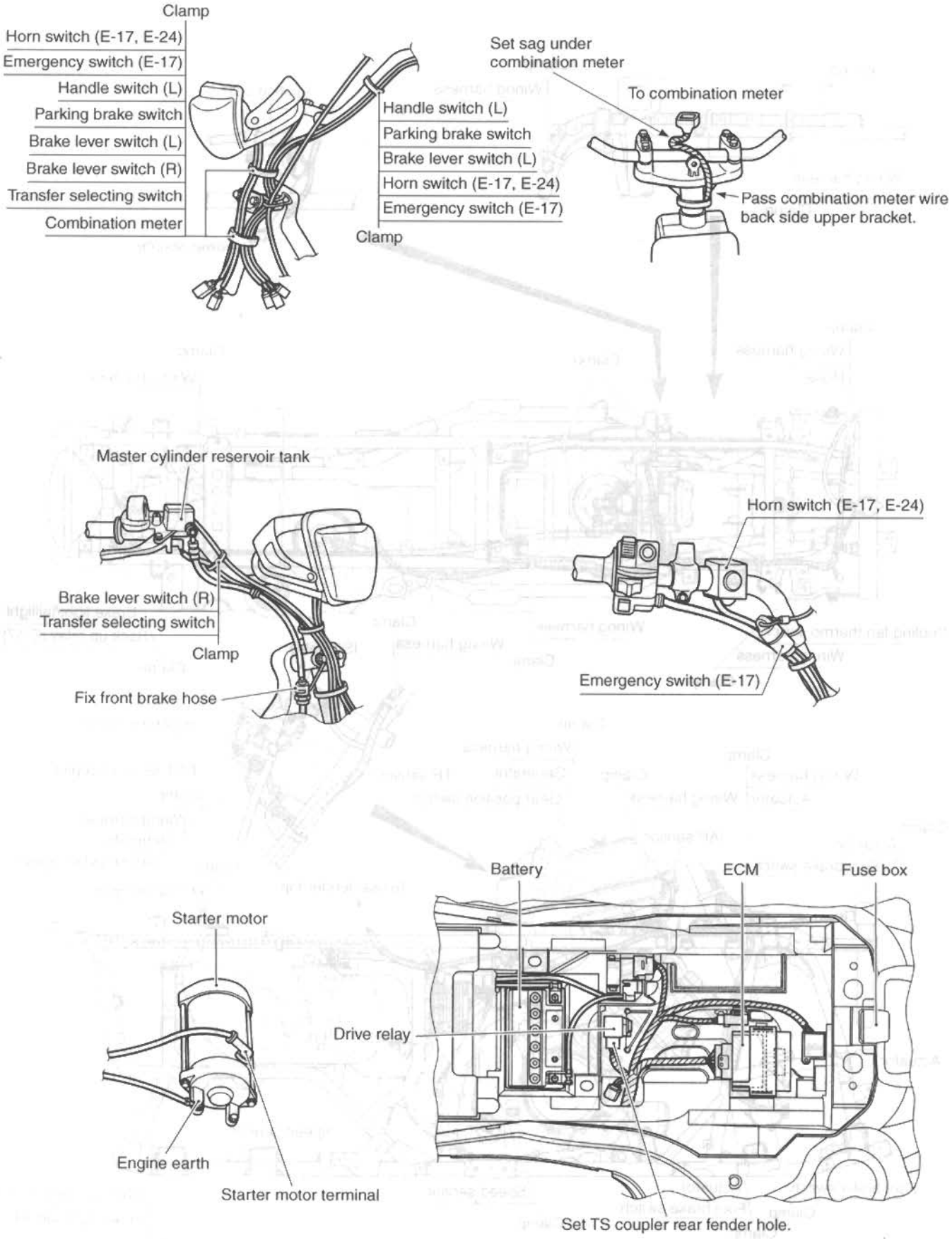
BATTERY "SULFATION"

Symptom, possible causes and remedy	
• Incorrect charging rate. (When not in use battery should be checked at least once a month to avoid sulfation.)	Replace the battery.
• The battery was left unused in a cold climate for too long.	Replace the battery if badly sulfated.

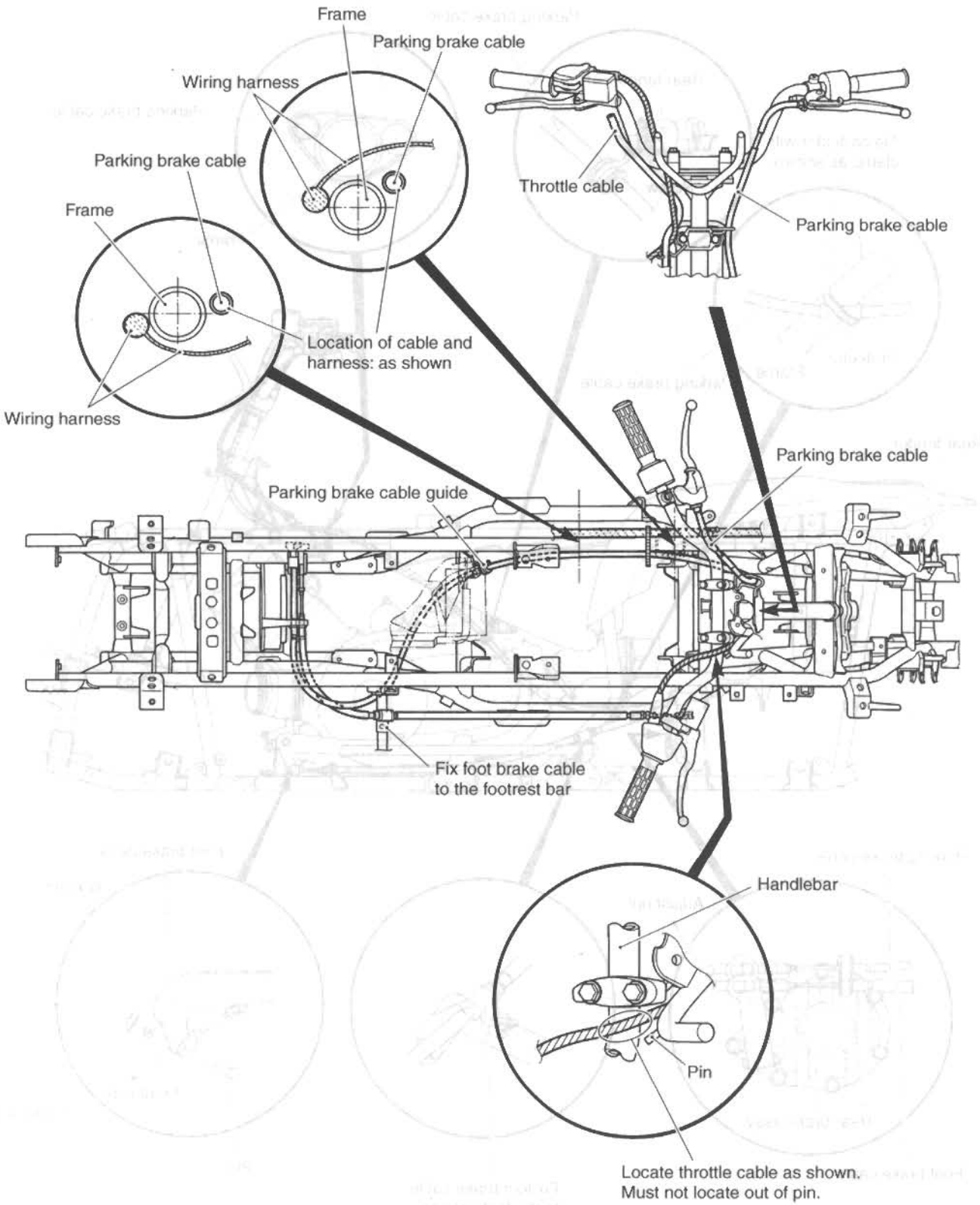
WIRING HARNESS, CABLE AND HOSE ROUTING

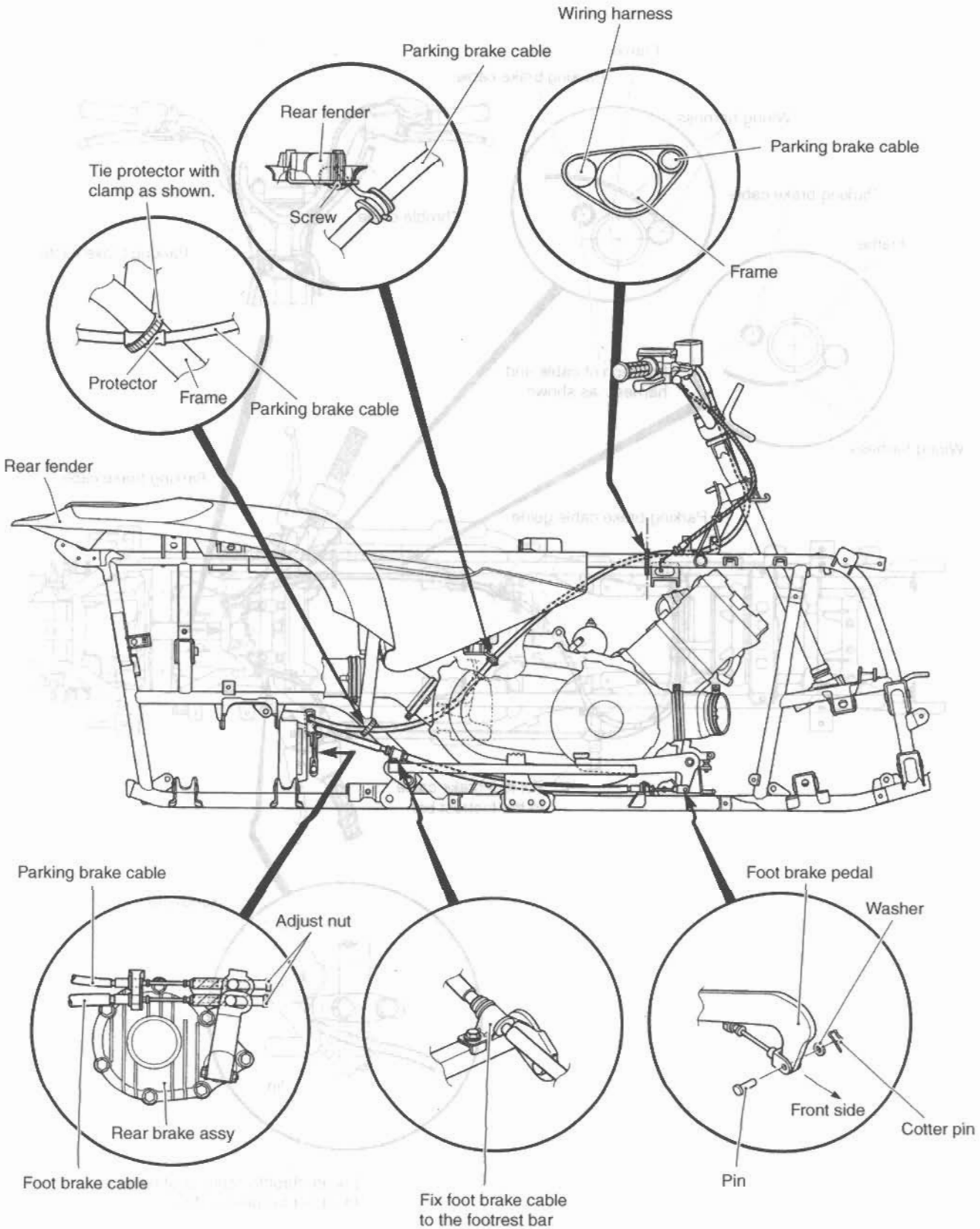
WIRING HARNESS ROUTING



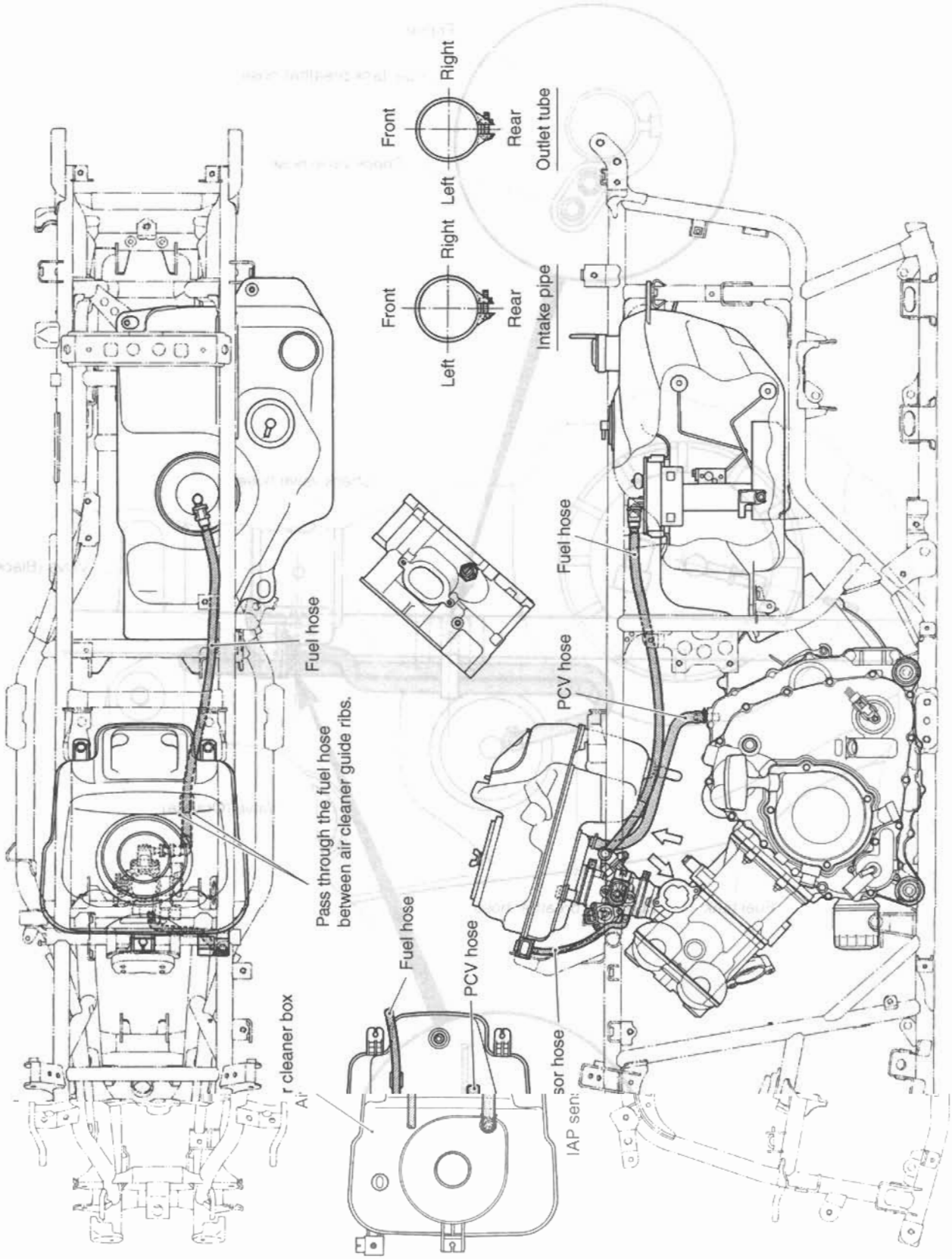

Clamp
Horn switch (E-17, E-24)
Emergency switch (E-17)
Handle switch (L)
Parking brake switch
Brake lever switch (L)
Brake lever switch (R)
Transfer selecting switch
Combination meter
Handle switch (L)
Parking brake switch
Brake lever switch (L)
Horn switch (E-17, E-24)
Emergency switch (E-17)
Clamp
Set sag under combination meter
To combination meter
Pass combination meter wire back side upper bracket.
Master cylinder reservoir tank
Brake lever switch (R)
Transfer selecting switch
Clamp
Fix front brake hose
Horn switch (E-17, E-24)
Emergency switch (E-17)
Starter motor
Engine earth
Starter motor terminal
Battery
ECM
Fuse box
Drive relay
Set TS coupler rear fender hole.

CABLE ROUTING

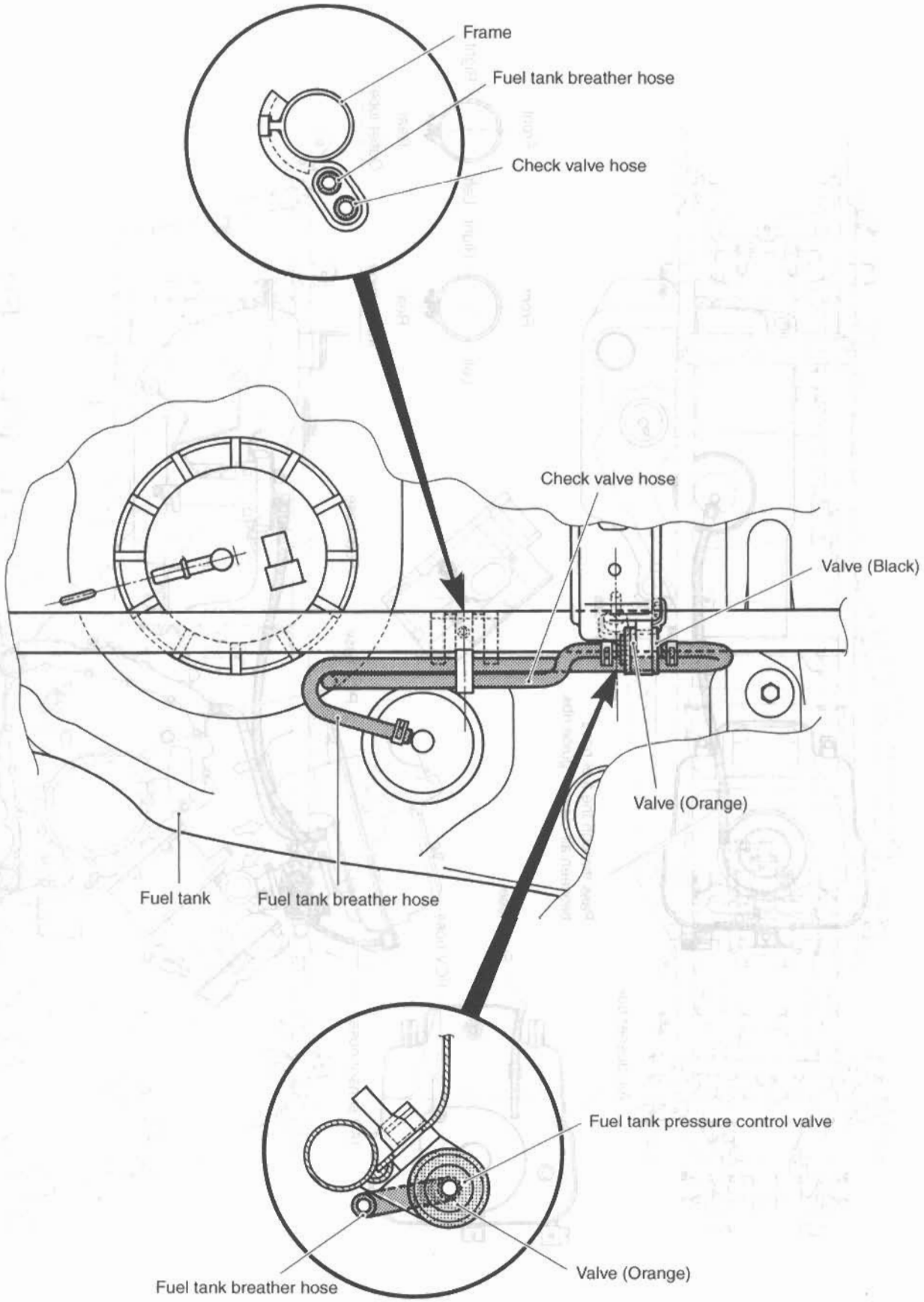



Wiring harness
Parking brake cable
Rear fender
Parking brake cable
Tie protector with clamp as shown.
Screw
Frame
Protector
Frame
Parking brake cable
Rear fender
Parking brake cable
Adjust nut
Foot brake pedal
Washer
Rear brake assy
Front side
Cotter pin
Foot brake cable
Pin
Fix foot brake cable to the footrest bar

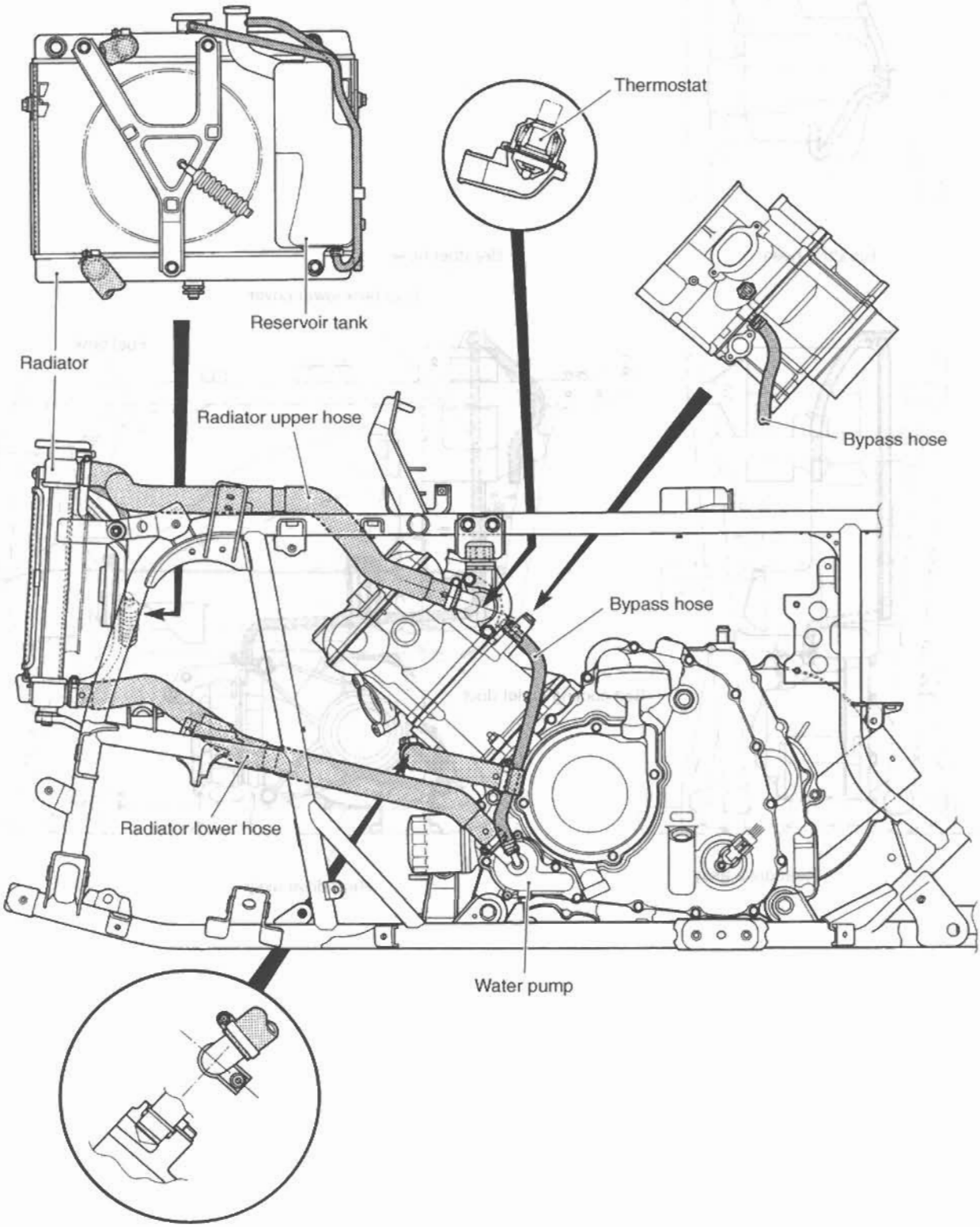
FUEL HOSE ROUTING



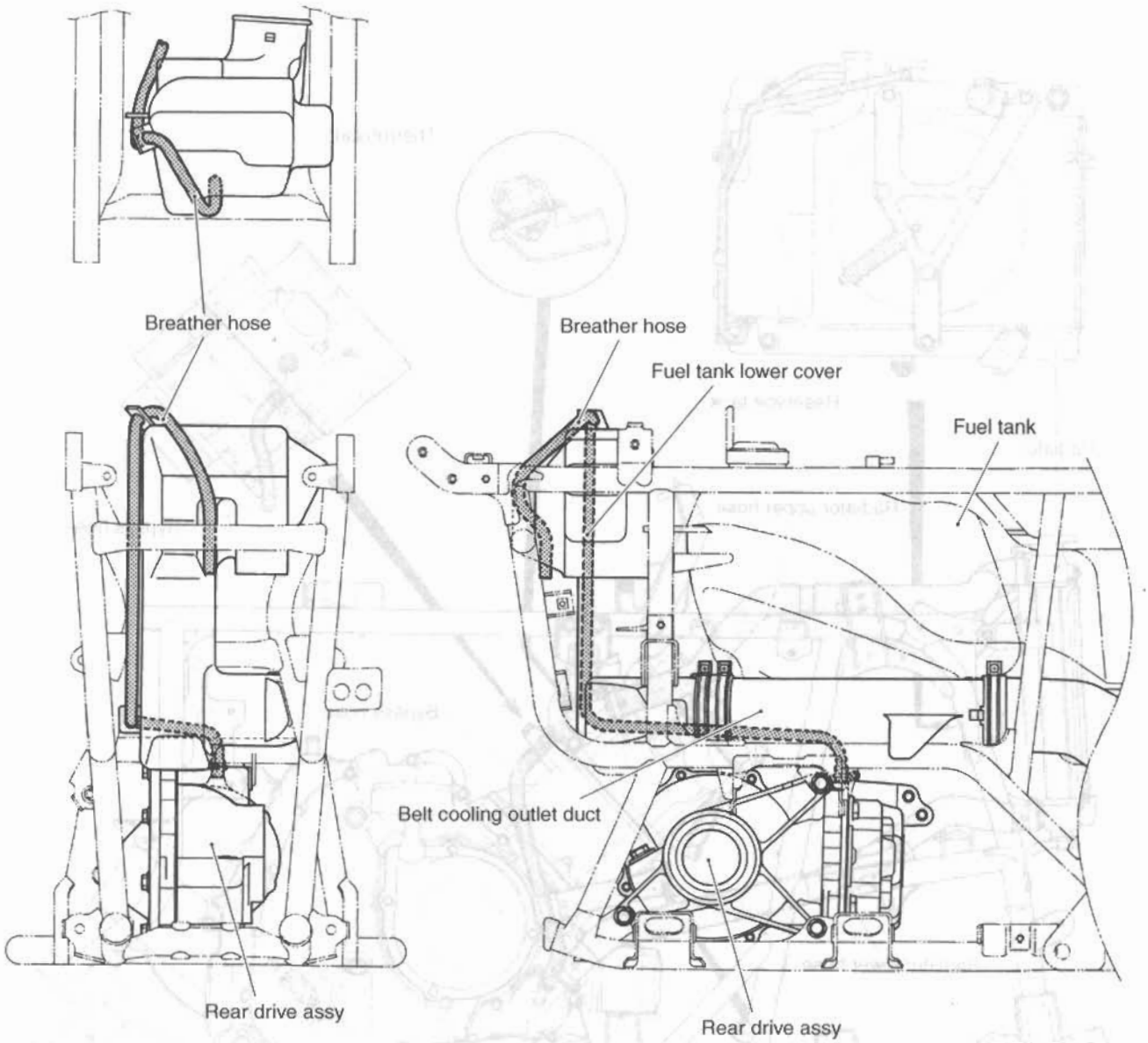
FUEL TANK BREATHER HOSE ROUTING



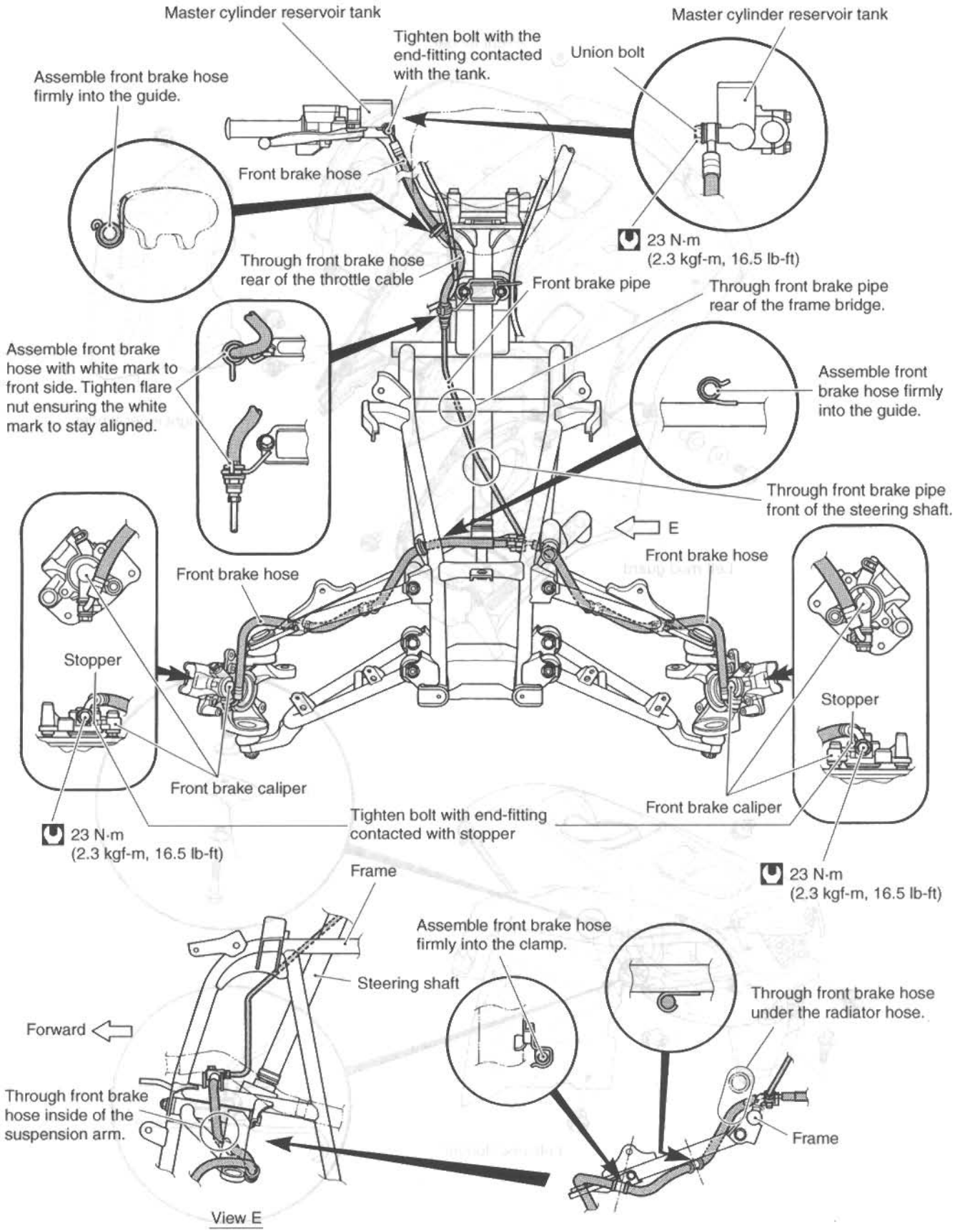
COOLING SYSTEM HOSE ROUTING



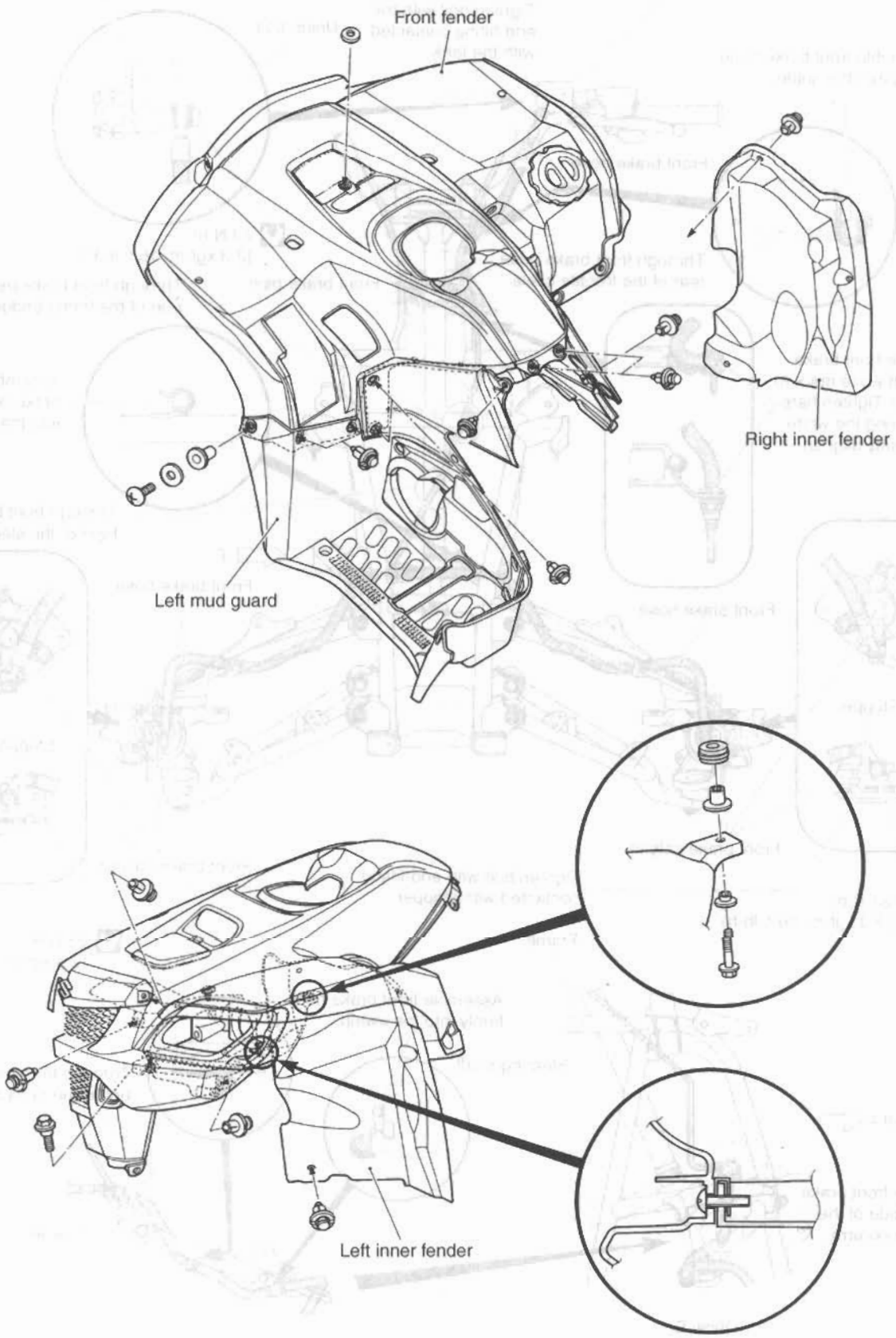
REAR DRIVE BREATHER HOSE ROUTING

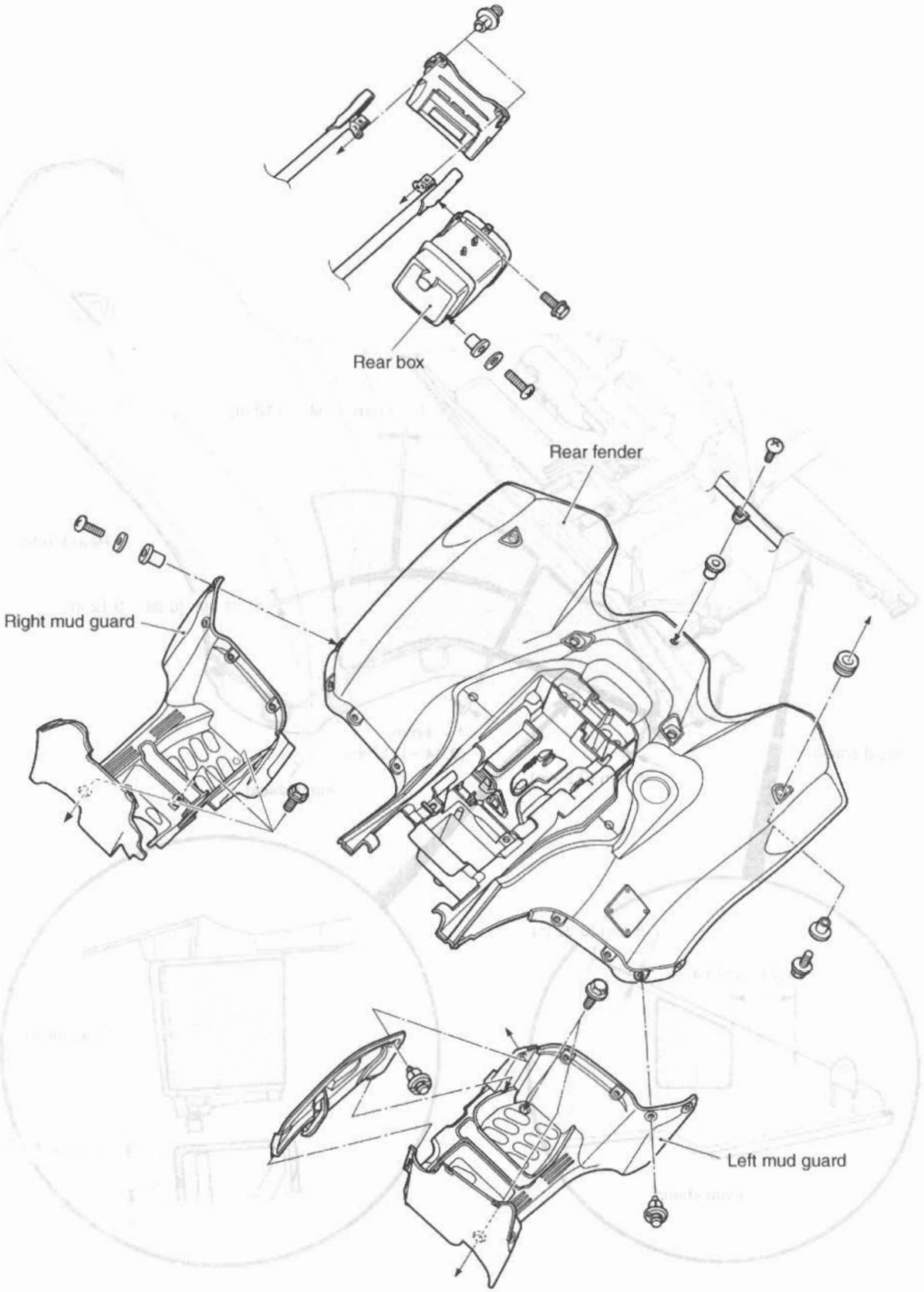


FRONT BRAKE HOSE AND PIPE ROUTING

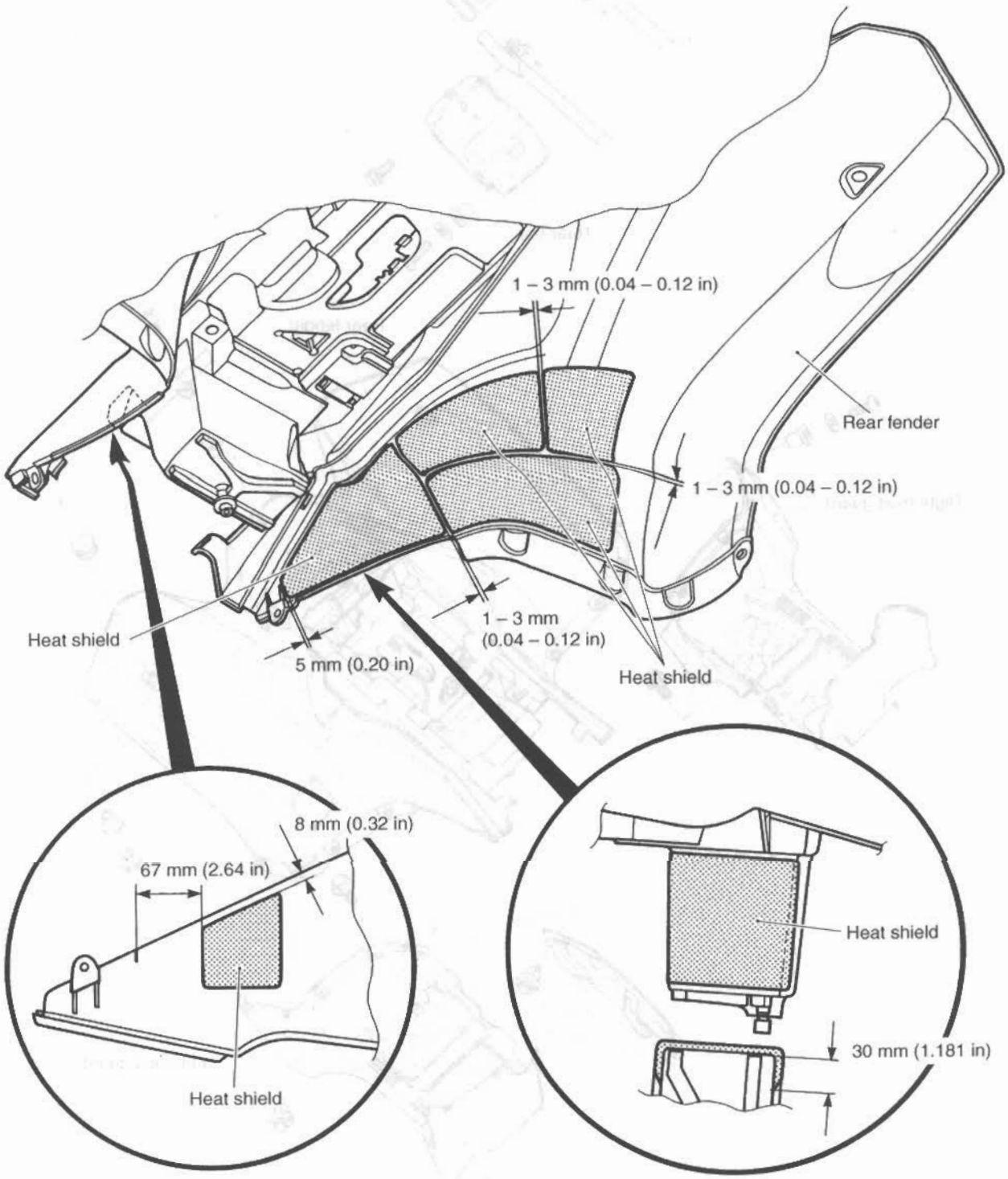


FENDER INSTALLATION

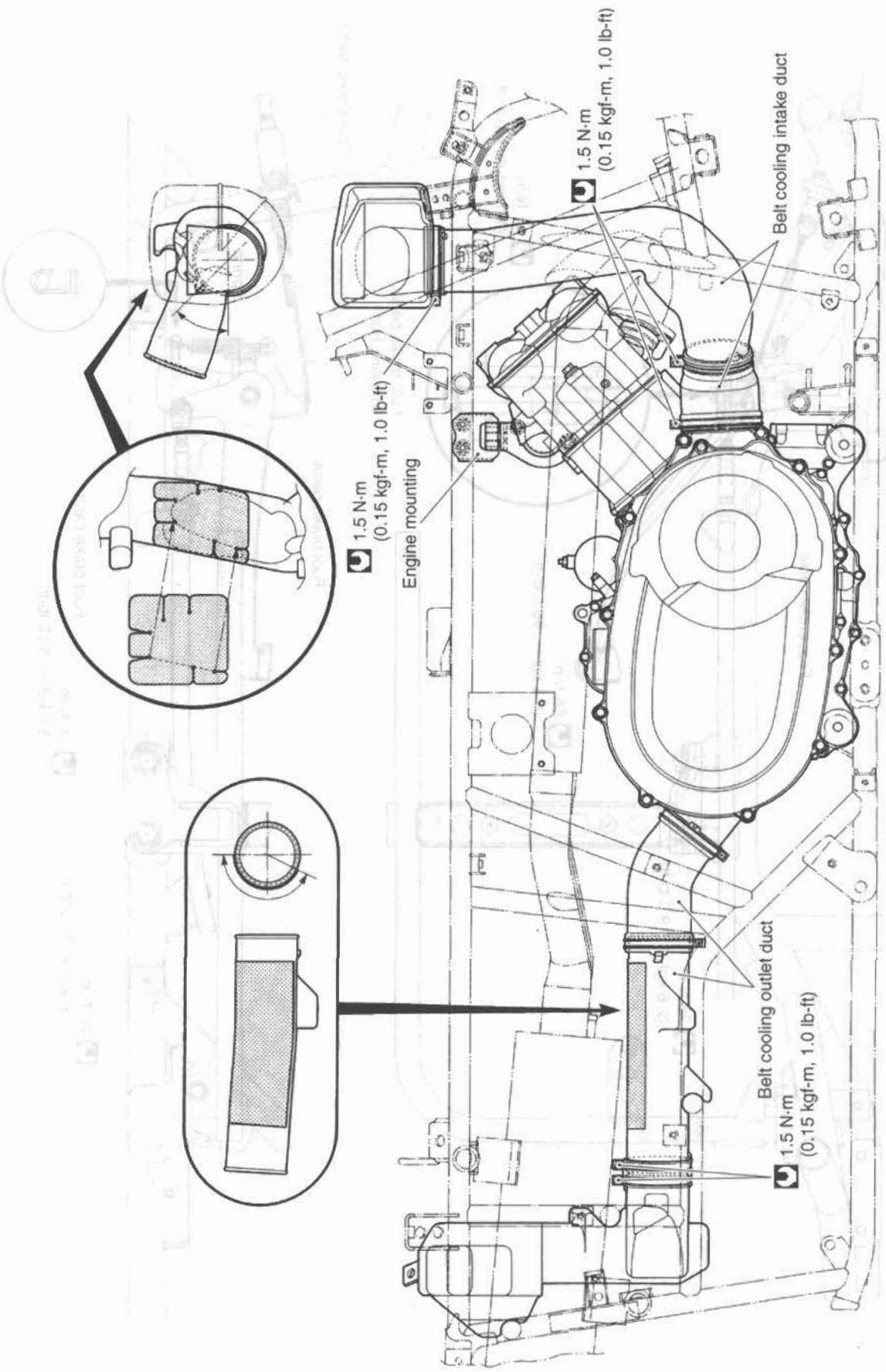



Rear box
Rear fender
Right mud guard
Left mud guard

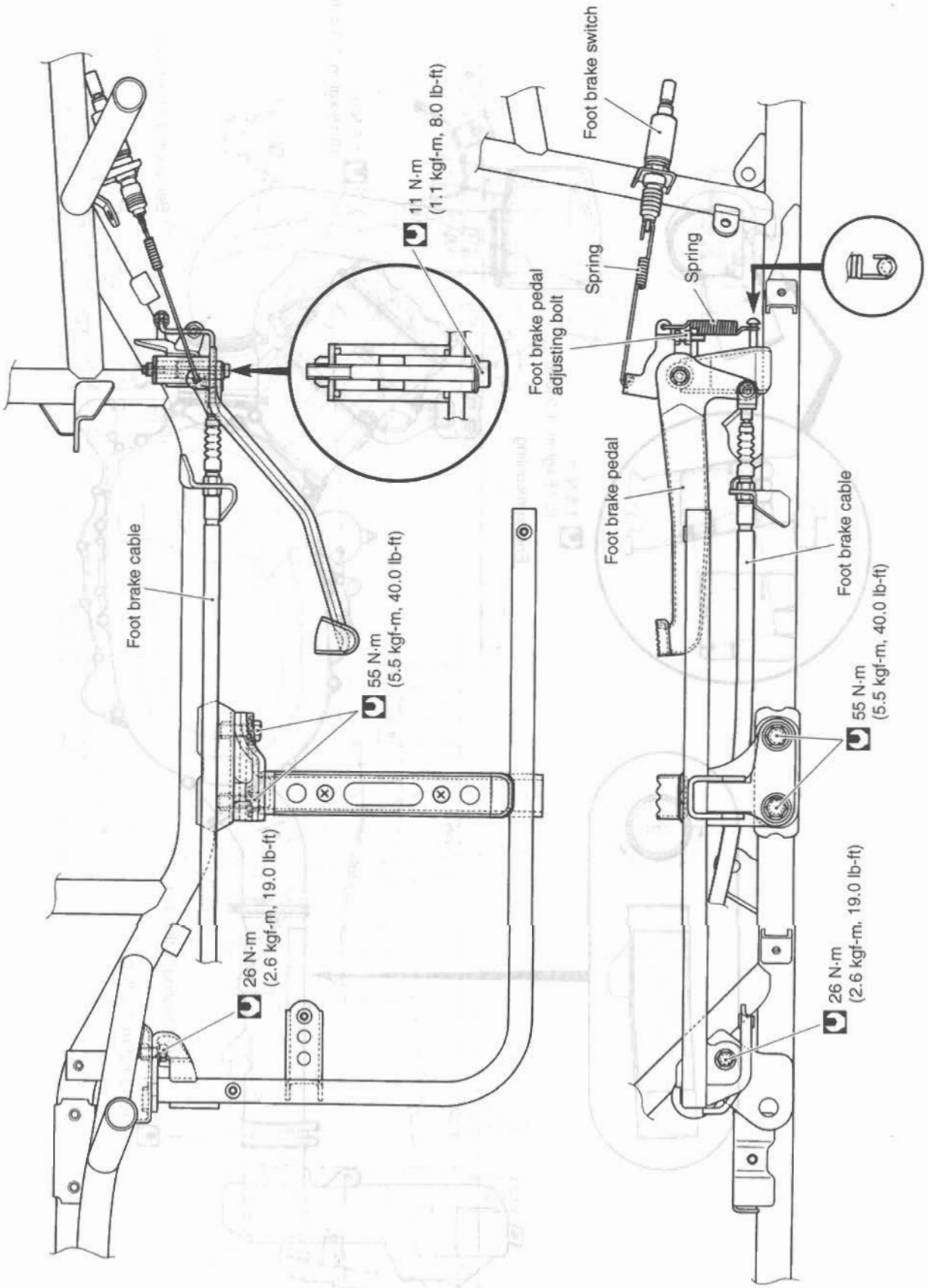
REAR FENDER HEAT SHIELD INSTALLATION



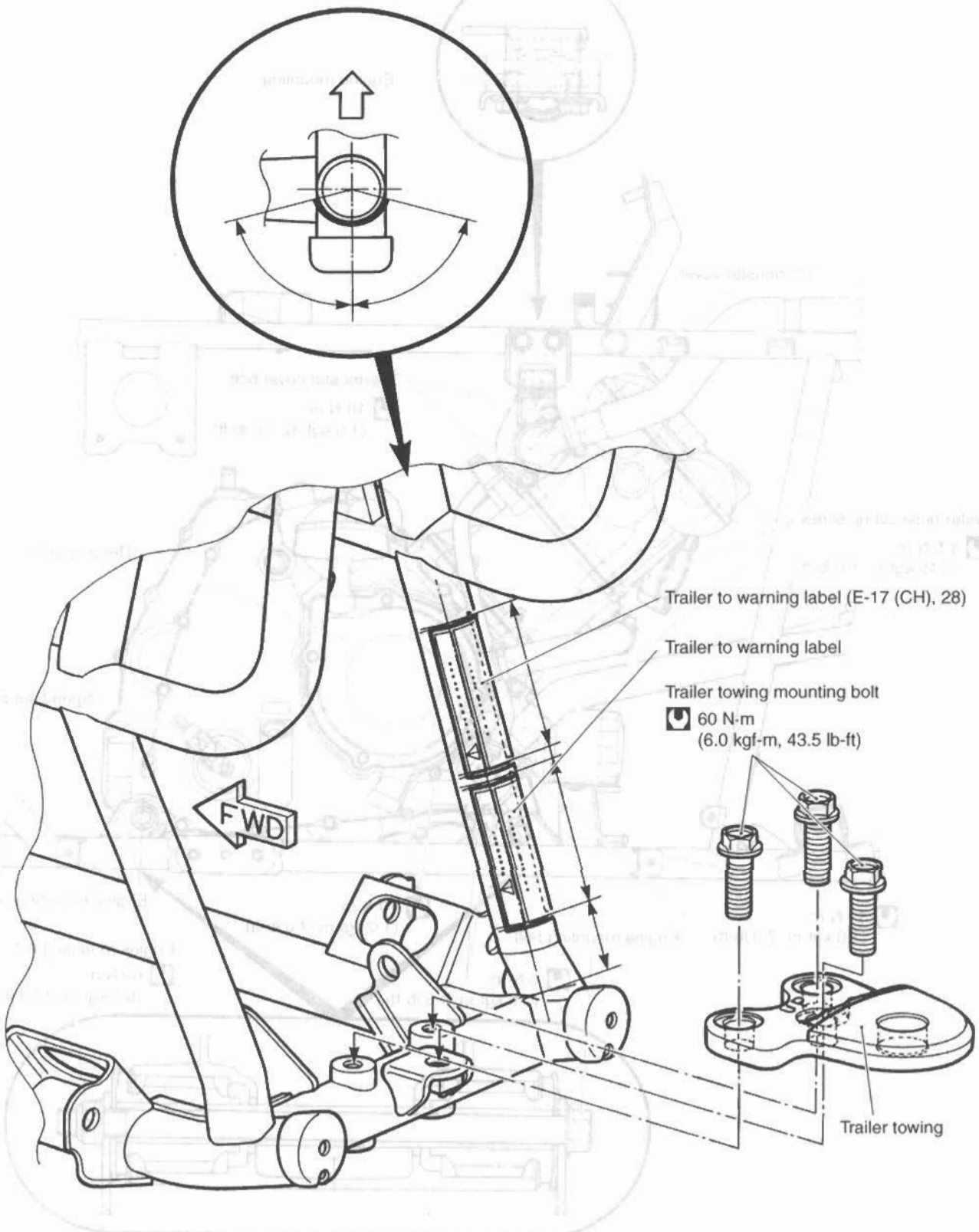
BELT COOLING DUCT INSTALLATION



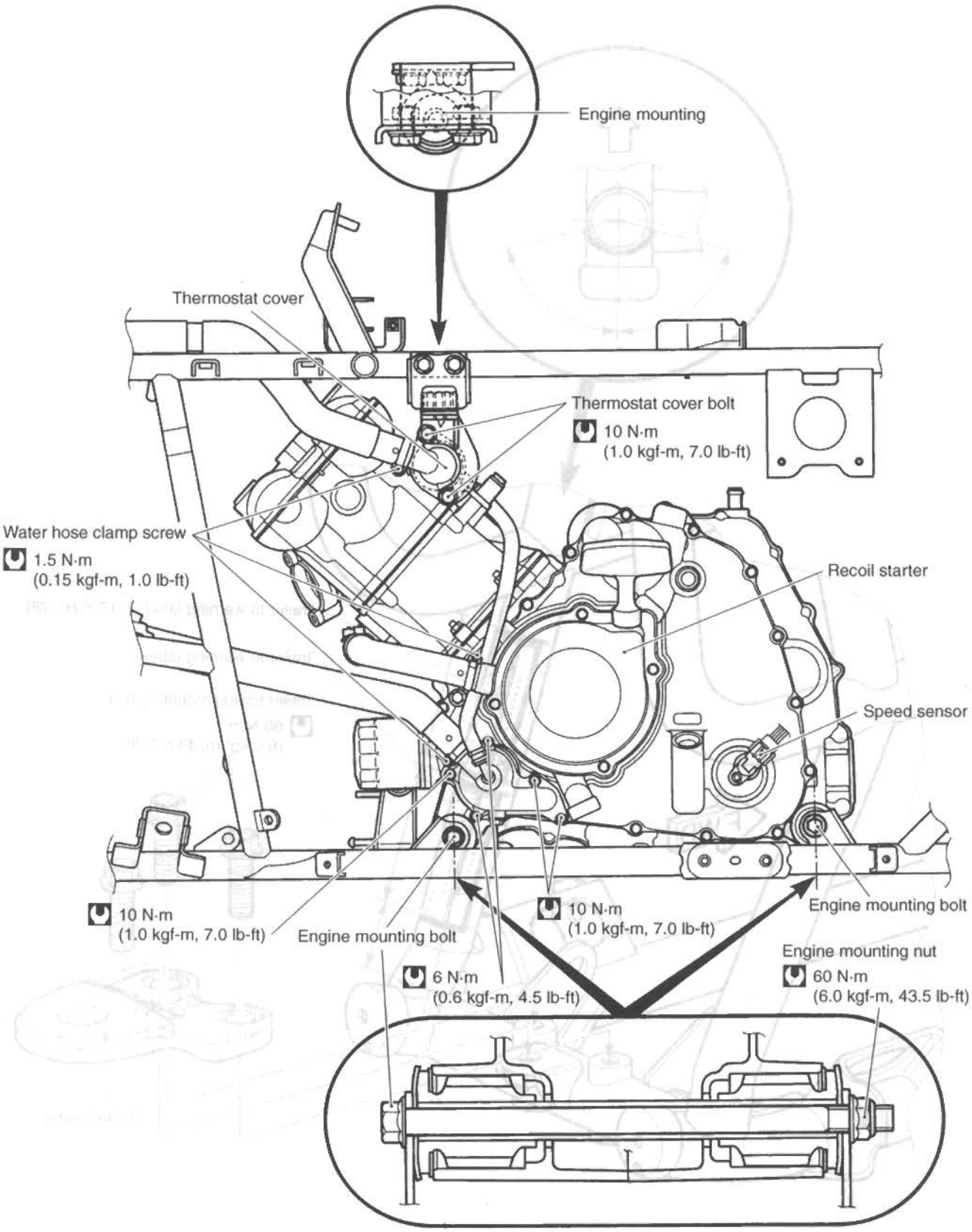
REAR BRAKE PEDAL



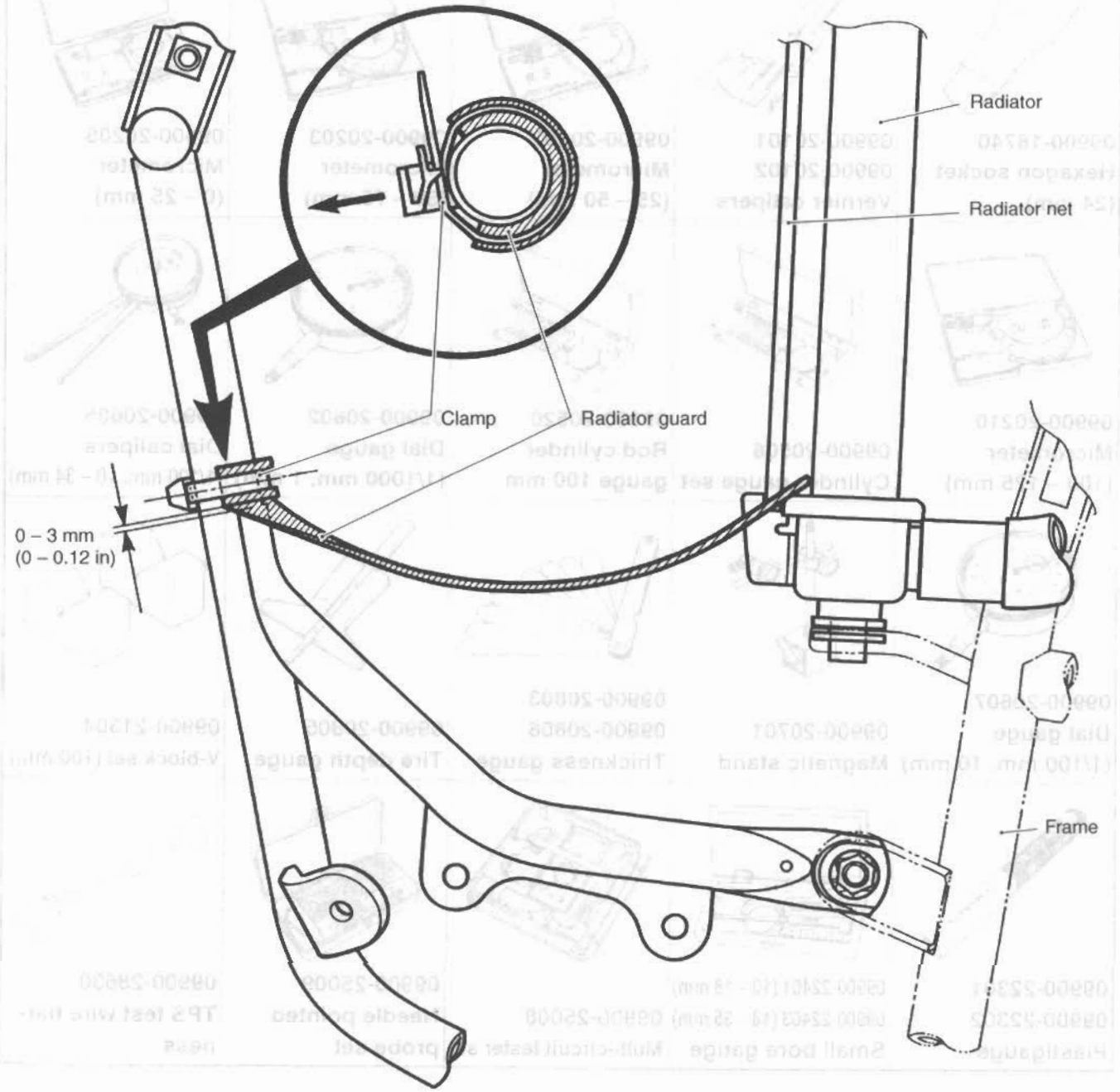
TRAILER TOWING INSTALLATION (OPTION)



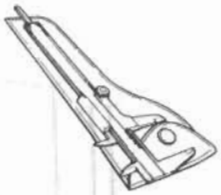
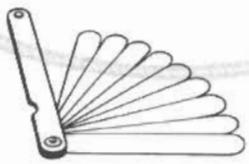
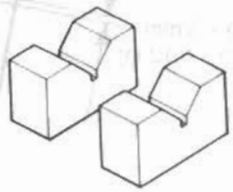
ENGINE MOUNTING

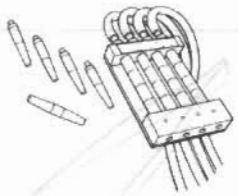
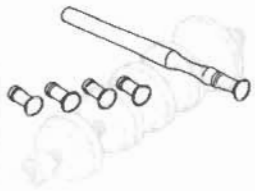
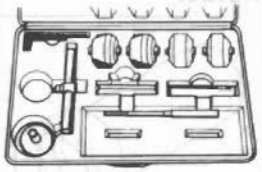


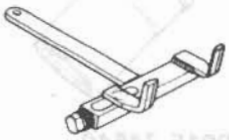
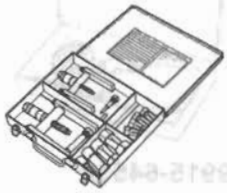
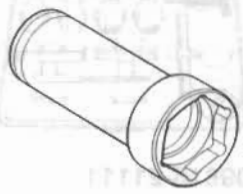
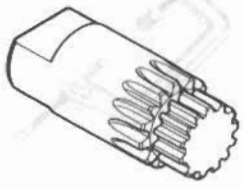
RADIATOR GUARD INSTALLATION (For E-24)

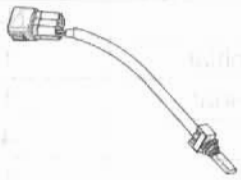
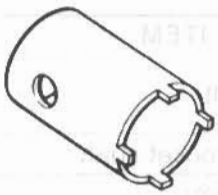
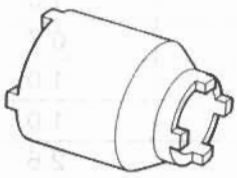
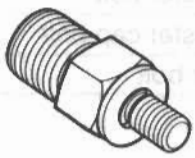
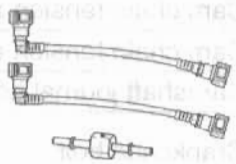
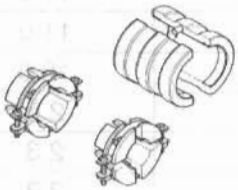


SPECIAL TOOLS

 09900-18740 Hexagon socket (24 mm)	 09900-20101 09900-20102 Vernier calipers	 09900-20202 Micrometer (25 – 50 mm)	 09900-20203 Micrometer (50 – 75 mm)	 09900-20205 Micrometer (0 – 25 mm)
 09900-20210 Micrometer (100 – 125 mm)	 09900-20508 Cylinder gauge set	 09900-20520 Rod cylinder gauge 100 mm	 09900-20602 Dial gauge (1/1000 mm, 1 mm)	 09900-20605 Dial calipers (1/100 mm, 10 – 34 mm)
 09900-20607 Dial gauge (1/100 mm, 10 mm)	 09900-20701 Magnetic stand	 09900-20803 09900-20806 Thickness gauge	 09900-20805 Tire depth gauge	 09900-21304 V-block set (100 mm)
 09900-22301 09900-22302 Plastigauge	 09900-22401 (10 – 18 mm) 09900-22403 (18 – 35 mm) Small bore gauge	 09900-25008 Multi-circuit tester set	 09900-25009 Needle pointed probe set	 09900-28630 TPS test wire har- ness

 09910-20115 Conrod stopper	 09913-10750 Adaptor	 09913-13121 Vacuum balancer gauge	 09913-50121 Oil seal remover	 09913-70210 Bearing installer set
 09915-40610 Oil filter wrench	 09915-64512 Compression gauge set	 09915-74521 Oil pressure gauge hose	 09915-74540 Oil pressure gauge attachment	 09915-77331 Meter (for high pressure)
 09916-10911 Valve lapper set	 09916-14510 Valve lifter	 09916-14521 09916-14530 Valve lifter attachment	 09916-21111 Valve seat cutter set	 09916-20630 Valve seat cutter (N–126)
 09916-20640 Solid pilot (N–100 – 4.5)	 09916-33210 Valve guide reamer (4.5 mm)	 09916-34542 Reamer handle	 09916-33320 Valve guide reamer (9.8 mm)	 09916-43211 Valve guide remover/installer

				
09916-53330 **Attachment**	**09916-57360** **Valve guide installer attachment (12.5 mm: EX. 14.5 mm: IN.)**	**09916-84511** **Tweezers**	**09917-47011** **Vacuum pump gauge**	**09920-33540** **Clutch shoe remover**
				
09920-34830 **Starter clutch holder**	**09920-53740** **Clutch sleeve hub holder**	**09921-20210** **Bearing remover**	**09921-20240** **Bearing remover set**	**09922-22711** **Drive chain cutting and joining tool set**
				
09924-52450 **Fixed driven face holder**	**09924-52460** **Socket wrench 52 mm**	**09924-52470** **Fixed final drive gear holder**	**09924-52480** **Fixed propeller shaft holder**	**09924-84510** **Bearing installer set**
				
09925-18011 **Steering bearing installer**	**09930-11920** **Torx bit JT40H**	**09930-11940** **Bit holder**	**09930-11950** **Torx wrench**	**09930-30104** **Sliding shaft**

 09930-34980 Rotor remover	 09930-44520 Rotor holder	 09930-82720 Mode select switch	 09940-14911 Steering stem nut wrench	 09940-14960 Steering stem nut wrench socket
 09940-14940 Swingarm pivot thrust adjuster socket wrench	 09940-14990 Engine mounting thrust adjuster socket wrench	 09940-30221 Front fork assembling tool	 09940-40211 Fuel pressure gauge adaptor	 09940-40220 Fuel pressure gauge hose attachment
 09940-52841 Inner rod holder	 09940-52861 Front fork oil seal installer	 09940-92720 Spring scale	 09940-94922 Stopper plate	 09940-94930 Front fork spacer holder
 09941-34513 Steering race installer	 09941-51010 Ring locknut wrench	 09943-74111 Front fork oil level gauge	 99565-01010-005 CD-ROM Ver.5	

NOTE:
When order the special tool, please confirm whether it is available or not.

TIGHTENING TORQUE

ENGINE

ITEM		N·m	kgf-m	lb-ft
Cylinder head cover bolt	Initial	10	1.0	7.0
	Final	14	1.4	10.0
Cam drive idle gear/sprocket shaft		41	4.1	29.5
Cylinder head bolt (6 mm)		10	1.0	7.0
Cylinder head bolt (10 mm)	Initial	25	2.5	18.0
	Final	37	3.7	27.0
Cam chain tensioner bolt		23	2.3	16.5
Cam chain tension adjuster bolt		10	1.0	7.0
Cam chain tension adjuster cap bolt		7	0.7	5.0
Camshaft journal holder bolt		10	1.0	7.0
Crankcase bolt	6 mm	10	1.0	7.0
	8 mm	26	2.6	19.0
Valve timing inspection plug		23	2.3	16.5
Clutch shoe nut		150	15.0	108.5
Movable drive face bolt		110	11.0	79.5
Movable driven face bolt		110	11.0	79.5
Movable driven face ring nut		110	11.0	79.5
Generator rotor nut		160	16.0	115.5
Starter clutch bolt		26	2.6	19.0
Exhaust pipe nut		23	2.3	16.5
Muffler mounting bolt		23	2.3	16.5
Engine oil drain plug		21	2.1	15.0
Drive/driven bevel gear nut		100	10.0	72.5
Engine mounting nut		60	6.0	43.5
Front drive (differential) gear case mounting bolt		45	4.5	32.5
Rear output shaft nut		100	10.0	72.5
Driven bevel gear nut		100	10.0	72.5
Crank balancer drive gear nut		150	15.0	108.5
Crank balancer drive gear bolt		50	5.0	36.0
Clutch cover bolt		9	0.9	6.5

DRIVE TRAIN

ITEM	N·m	kgf-m	lb-ft
2WD/4WD shifting motor mounting bolt	22	2.2	16.0
Front differential gear case bolt	22	2.2	16.0
Front drive train gear case mounting nut	50	5.0	36.0
Front differential gear oil filler plug	35	3.5	25.5
Front propeller shaft boot clamp screw	1.8	0.18	1.5
Front differential gear oil drain plug	32	3.2	23.0
Rear pinion gear locknut	100	10.0	72.5
Rear drive bearing locknut	100	10.0	72.5
Rear drive gear case cover bolt	26	2.6	19.0
Rear drive train gear case mounting nut and bolt	65	6.5	47.0
Rear propeller shaft boot clamp screw	2	0.2	1.5
Rear drive gear oil drain plug	23	2.3	16.5

FI SYSTEM, INTAKE AIR SYSTEM AND FUEL SYSTEM

ITEM	N·m	kgf-m	lb-ft
Fuel delivery pipe mounting screw	5	0.5	3.5
TPS mounting screw	2	0.2	1.5
Fuel pump ring locknut	35	3.5	25.5

COOLING SYSTEM

ITEM	N·m	kgf-m	lb-ft
Water pump cover screw	6	0.6	4.5
Water pump mounting bolt	10	1.0	7.0
Cooling fan thermo-switch	17	1.7	12.5
ECT sensor	18	1.8	13.0
Thermostat cover bolt	10	1.0	7.0
Cooling fan mounting bolt	8.5	0.85	6.0
Water hose clamp screw	1.5	0.15	1.0

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
Front wishbone arm pivot nut	(upper)	60	6.0	43.5
	(lower)	65	6.5	47.0
Steering knuckle end nut (upper and lower)		29	2.9	21.0
Tie rod end nut		29	2.9	21.0
Tie rod locknut		45	4.5	32.5
Front shock absorber mounting bolt (upper)		55	5.5	40.0
Front shock absorber mounting nut (lower)		60	6.0	43.5
Hub nut (front and rear)		110	11.0	79.5
Wheel set nut (front and rear)		60	6.0	43.5
Front brake hose union bolt		23	2.3	16.5
Front brake air bleeder valve		5.5	0.55	4.0
Front brake pad mounting bolt		18	1.8	13.0
Front brake caliper mounting bolt		26	2.6	19.0
Front brake pipe nut		16	1.6	11.5
Front brake disc bolt		23	2.3	16.5
Front brake master cylinder mounting bolt		10	1.0	7.0
Footrest bar mounting bolt	(M8)	26	2.6	19.0
	(M10)	55	5.5	40.0
Rear stabilizer link nut		34	3.4	24.5
Rear shock absorber mounting nut (upper and lower)		60	6.0	43.5
Rear wishbone arm pivot nut (upper and lower)		60	6.0	43.5
Rear knuckle nut (upper and lower)		60	6.0	43.5
Rear brake cam lever nut		11	1.1	8.0
Rear brake case bolt		26	2.6	19.0
Rear brake pedal nut		11	1.1	8.0
Trailer towing mounting bolt (option)		60	6.0	43.5

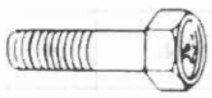
TIGHTENING TORQUE CHART

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 + VALVE GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	36.0 (1.42)	—
	EX.	33.0 (1.30)	—
Tappet clearance (when cold)	IN.	0.10 – 0.20 (0.004 – 0.008)	—
	EX.	0.20 – 0.30 (0.008 – 0.012)	—
Valve guide to valve stem clearance	IN.	0.010 – 0.037 (0.0004 – 0.0015)	—
	EX.	0.030 – 0.057 (0.0012 – 0.0022)	—
Valve 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 deflection	IN. & EX.	—	0.35 (0.014)
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve seat width	IN. & EX.	0.9 – 1.1 (0.035 – 0.043)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length	IN. & EX.	—	46.1 (1.81)
Valve spring tension	IN. & EX.	182 – 210 N (18.6 – 21.4 kgf, 41.0 – 47.2 lbs) at length 36.35 mm (1.43 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.330 – 36.380 (1.4303 – 1.4323)	36.030 (1.4185)
	EX.	35.300 – 35.350 (1.3898 – 1.3917)	35.000 (1.3780)
Camshaft journal oil clearance	IN. & EX.	0.019 – 0.053 (0.0007 – 0.0021)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	22.012 – 22.025 (0.8666 – 0.8671)	—
Camshaft journal O.D.	IN. & EX.	21.972 – 21.993 (0.8650 – 0.8659)	—
Camshaft runout	—		0.10 (0.004)
Cylinder head distortion	—		0.05 (0.002)

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD			LIMIT
Compression pressure (Automatic-decomp. actuated)	Approx. 1 000 kPa (10.0 kgf/cm², 142 psi)			—
Piston-to-cylinder clearance	0.030 – 0.040 (0.0012 – 0.0016)			0.120 (0.0047)
Cylinder bore	102.000 – 102.015 (4.0157 – 4.0163)			Nicks or Scratches
Piston diam.	101.965 – 101.980 (4.0144 – 4.0150) Measure at 15 mm (0.6 in) from the skirt end.			101.880 (4.0110)
Cylinder distortion	—			0.05 (0.102)
Piston ring free end gap	1st	R	Approx 10.4 (0.41)	8.3 (0.33)
	2nd	RN	Approx 14.3 (0.56)	11.4 (0.45)
Piston ring end gap	1st	R	0.10 – 0.25 (0.004 – 0.010)	0.50 (0.020)
	2nd	RN	0.10 – 0.25 (0.004 – 0.010)	0.50 (0.020)
Piston ring to groove clearance	1st		—	0.180 (0.0071)
	2nd		—	0.150 (0.0059)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	0.83 – 0.85 (0.0327 – 0.0335) 1.30 – 1.32 (0.0512 – 0.0520)	—
	2nd	1.01 – 1.03 (0.0398 – 0.0406)	—
	Oil	2.01 – 2.03 (0.0791 – 0.0799)	—
Piston ring thickness	1st	1.08 – 1.10 (0.0425 – 0.0433)	—
	2nd	0.97 – 0.99 (0.0382 – 0.0390)	—
Piston pin bore I.D.		23.002 – 23.008 (0.9056 – 0.9058)	23.030 (0.9067)
Piston pin O.D.		22.992 – 23.000 (0.9052 – 0.9055)	22.980 (0.9047)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006 – 23.014 (0.9057 – 0.9061)	23.040 (0.9071)
Conrod deflection	—	0.30 (0.012)
Conrod big end side clearance	0.10 – 0.75 (0.004 – 0.030)	1.0 (0.04)
Conrod big end width	24.95 – 25.00 (0.982 – 0.984)	—
Crank web to web width	72.9 – 73.1 (2.87 – 2.88)	—
Crankshaft runout	—	0.08 (0.003)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pressure (at 60 °C, 140 °F)	Above 140 kPa (1.4 kgf/cm², 20 psi) Below 180 kPa (1.8 kgf/cm², 26 psi)	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch wheel I.D.	140.0 – 140.2 (5.512 – 5.520)	140.5 (5.53)
Clutch shoe	—	No groove at any part
Clutch engagement r/min.	1 600 – 2 000 r/min.	—
Clutch lock-up r/min.	3 500 – 4 100 r/min.	—

DRIVE TRAIN

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Automatic transmission ratio		Variable change (2.763 – 0.780)	—
Secondary reduction ratio		2.158 (40/21 x 17/15)	—
Final reduction ratio	Front	3.600 (36/10)	—
	Rear	3.600 (36/10)	—
Transfer gear ratio	Low	2.563 (41/16)	—
	High	1.240 (31/25)	—
	Reverse	1.882 (32/17)	—
Drive belt width		36.6 (1.44)	35.6 (1.40)
Movable driven face spring free length		153.0 (6.02)	145.4 (5.72)
Shift fork to groove clearance		0.10 – 0.30 (0.004 – 0.012)	0.50 (0.020)
Shift fork groove width	Reverse	5.50 – 5.60 (0.217 – 0.220)	—
	High	5.50 – 5.60 (0.217 – 0.220)	—
Shift fork thickness	Reverse	5.30 – 5.40 (0.209 – 0.213)	—
	High	5.30 – 5.40 (0.209 – 0.213)	—
Front/rear output shaft bevel gear backlash		0.03 – 0.15 (0.001 – 0.006)	—
Front drive (differential) gear backlash		0.05 – 0.10 (0.002 – 0.004)	—
Rear drive (final) gear backlash		0.08 – 0.015 (0.003 – 0.006)	—
Front differential gear oil type		Hypoid gear oil SAE #90, API grade GL-5	—
Rear drive gear oil type		Mobil 424 or equivalent gear oil	—
Front differential gear oil capacity		500 ml (16.9/17.6 US/Imp oz)	—
Rear drive gear oil capacity		770 ml (26.0/27.1 US/Imp oz)	—

THERMOSTAT + RADIATOR + FAN + COOLANT

ITEM	STANDARD/SPECIFICATION		NOTE
Thermostat valve opening temperature	Approx. 82 °C (180 °F)		
Thermostat valve lift	8 mm (0.315 in) and over at 95 °C (203 °F)		
ECT sensor resistance	20 °C (68 °F)	Approx. 2.45 kΩ	
	50 °C (122 °F)	Approx. 0.811 kΩ	
	80 °C (176 °F)	Approx. 0.318 kΩ	
	110 °C (230 °F)	Approx. 0.142 kΩ	
Radiator cap valve opening pressure	110 – 140 kPa (1.1 – 1.4 kgf/cm², 15.6 – 19.9 psi)		
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 93 °C (199 °F)	
	ON→OFF	Approx. 87 °C (189 °F)	
Engine coolant type	Use an antifreeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		
Engine coolant	Reservoir	250 ml (0.26/0.22 US/Imp qt)	
	Engine	2 200 ml (2.32 – 1.94 US/Imp qt)	

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11 – 13 Ω at 20 °C (68 °F)	
Fuel discharge amount	55.5 ml (1.88/1.95 US/Imp oz) and more/10 sec.	
Fuel pressure regulator operating set pressure	Approx. 294 kPa (2.9 kgf/cm², 41 psi)	

FI SENSORS+ SECONDARY THROTTLE VALVE ACTUATOR

ITEM	SPECIFICATION		NOTE
CKP sensor resistance	150 – 250 Ω		
CKP sensor peak voltage	5.0 V and more		When cranking
IAP sensor input voltage	4.5 – 5.5 V		
IAP sensor output voltage	Approx. 2.63 V at idle speed		
TP sensor input voltage	4.5 – 5.5 V		
TP sensor resistance	Closed	Approx. 1.17 kΩ	
	Opened	Approx. 4.30 kΩ	
TP sensor output voltage	Closed	Approx. 1.17 V	
	Opened	Approx. 4.30 V	
ECT sensor input voltage	4.5 – 5.5 V		
ECT sensor resistance	Approx. 2.45 kΩ at 20 °C (68 °F)		
IAT sensor input voltage	4.5 – 5.5 V		
IAT sensor resistance	Approx. 1.60 kΩ at 20 °C (68 °F)		
TO sensor resistance	19 – 20 kΩ		
TO sensor voltage	Normal	0.4 – 1.4 V	
	Leaning	3.7 – 4.4 V	When leaning 65 °
Injector voltage	Battery voltage		
Ignition coil primary peak voltage	80 V and more		When cranking

THROTTLE BODY

ITEM	STANDARD/SPECIFICATION
Bore size	42 mm
I.D. No.	31G0
Idle r/min.	1 300 ± 100 r/min.
Fast idle r/min.	1 500 – 2 000 r/min. (When cold engine)
Throttle cable play	3 – 5 mm (0.12 – 0.20 in)

ELECTRICAL

Unit: mm (in)

ITEM			STANDARD/SPECIFICATION		NOTE
Spark plug			Type	NGK: CR6E DENSO: U20ESR-N	
			Gap	0.7 – 0.8 (0.028 – 0.031)	
Spark performance			Over 8 (0.3) at 1 atm.		
CKP sensor resistance			150 – 250 Ω		
CKP sensor peak voltage			5.0 V and more		
Ignition coil resistance			Primary	0.1 – 0.6 Ω	Terminal – Ground
			Secondary	12 – 19 kΩ	Plug cap – Terminal
Ignition coil primary peak voltage			80 V and more		
Generator coil resistance			0.4 – 1.0 Ω		
Generator no-load voltage (when engine is cold)			75 V (AC) and more at 5 000 r/min.		
Regulated voltage			13.5 – 15.5 V at 5 000 r/min.		
Starter relay resistance			3 – 5 Ω		
Battery	Type designation		FTZ16-BS		
	Capacity		12 V 64.8 kC (18 Ah)/10 HR		
Fuse size	Headlight	HI	10 A		
		LO	10 A		
	Power source		10 A		
	Ignition		15 A		
	Fuel		10 A		
	Fan		15 A		
	Main		30 A		

WATTAGE

Unit: W

ITEM		STANDARD/SPECIFICATION	
		E-24, -28, -33	E-17
Headlight	HI	30 × 2	←
	LO	30 × 2	←
Auxiliary headlight		40	←
Brake light/Taillight		21/5	←
Backup light			21
Speedometer light		LED	←
High beam indicator light			LED
Neutral indicator light		LED	←
FI indicator light/Engine coolant temp. indicator light		LED	←
Reverse indicator light		LED	←
Differential lock indicator light		LED	←

BRAKE + WHEEL

Unit: mm (in)

ITEM	STANDARD/SPECIFICATION	LIMIT
Rear brake pedal height	12.5 – 22.5 (0.5 – 0.9)	—
Rear brake pedal free travel	20 – 30 (0.8 – 1.2)	—
Front brake disc thickness	3.3 – 3.7 (0.13 – 0.15)	3.0 (0.20)
Front brake disc runout	—	0.30 (0.012)
Front master cylinder bore	14.000 – 14.043 (0.5512 – 0.5529)	—
Front master cylinder piston diam.	13.957 – 13.984 (0.5495 – 0.5506)	—
Front brake caliper cylinder bore	33.960 – 34.010 (1.3370 – 1.3390)	—
Front brake caliper piston diam.	33.878 – 33.928 (1.3338 – 1.3357)	—
Rear brake lever play	6 – 8 (0.2 – 0.3)	—
Brake fluid type	DOT 4	—

ITEM	STANDARD	LIMIT
Steering angle	46 ° (right & left)	—
Turning radius	3.1 m (10.2 ft)	—
Toe-out (with 75 kg, 165 lbs)	10 ± 4 mm (0.39 ± 0.16 in)	—
Camber	0.64 °	—
Caster	1.6 °	—

TIRE

Unit: mm (in)

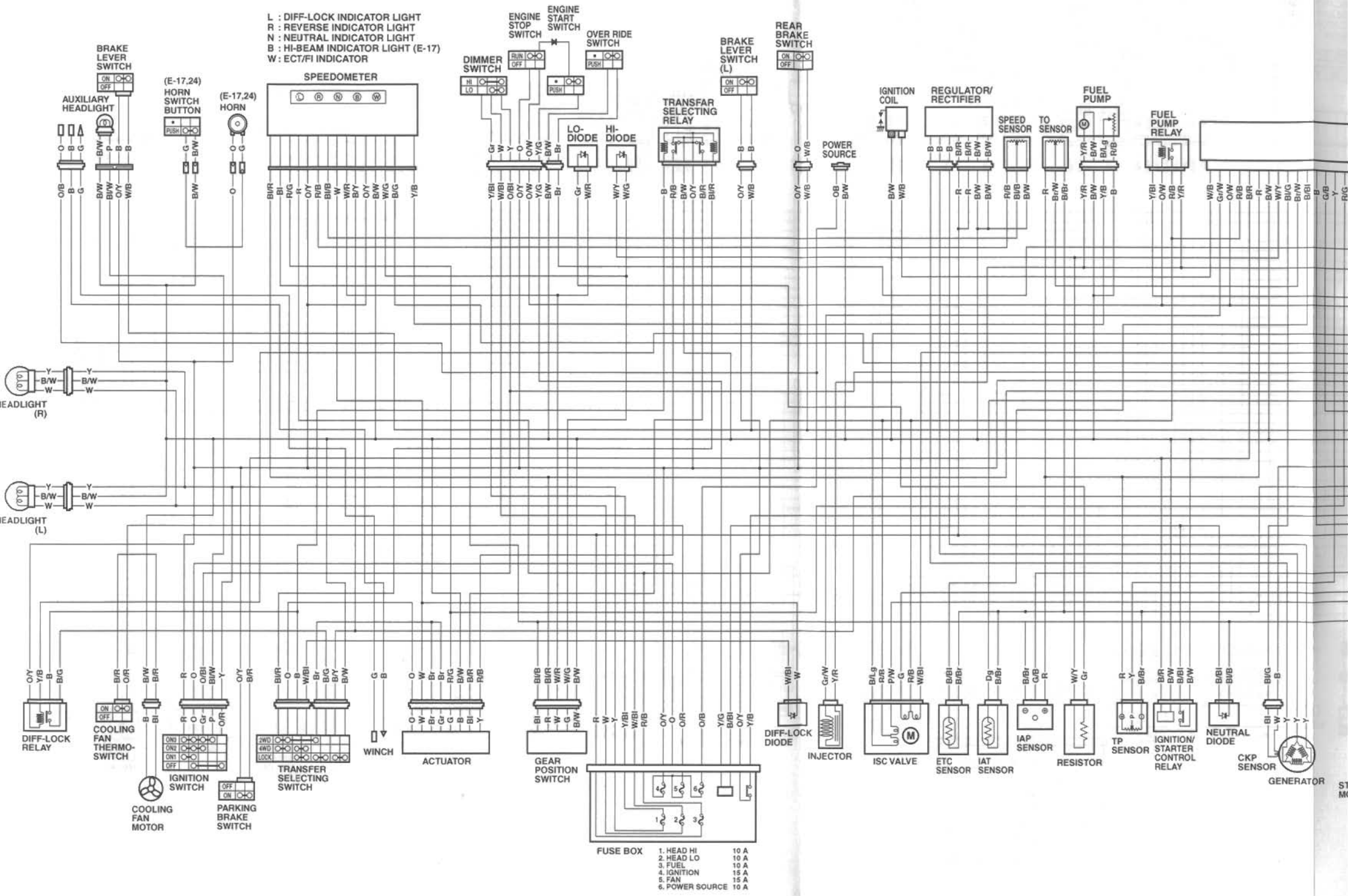
ITEM	STANDARD		LIMIT
Cold inflation tire pressure (Solo riding)	Front	35 kPa (0.35 kgf/cm², 5.1 psi)	—
	Rear	30 kPa (0.30 kgf/cm², 4.4 psi)	—
Tire size	Front	AT 25 x 8-12 ☆☆, tubeless	—
	Rear	AT 25 x 10-12 ☆☆, tubeless	—
Tire tread depth	Front	—	4.0 (0.16)
	Rear	—	4.0 (0.16)

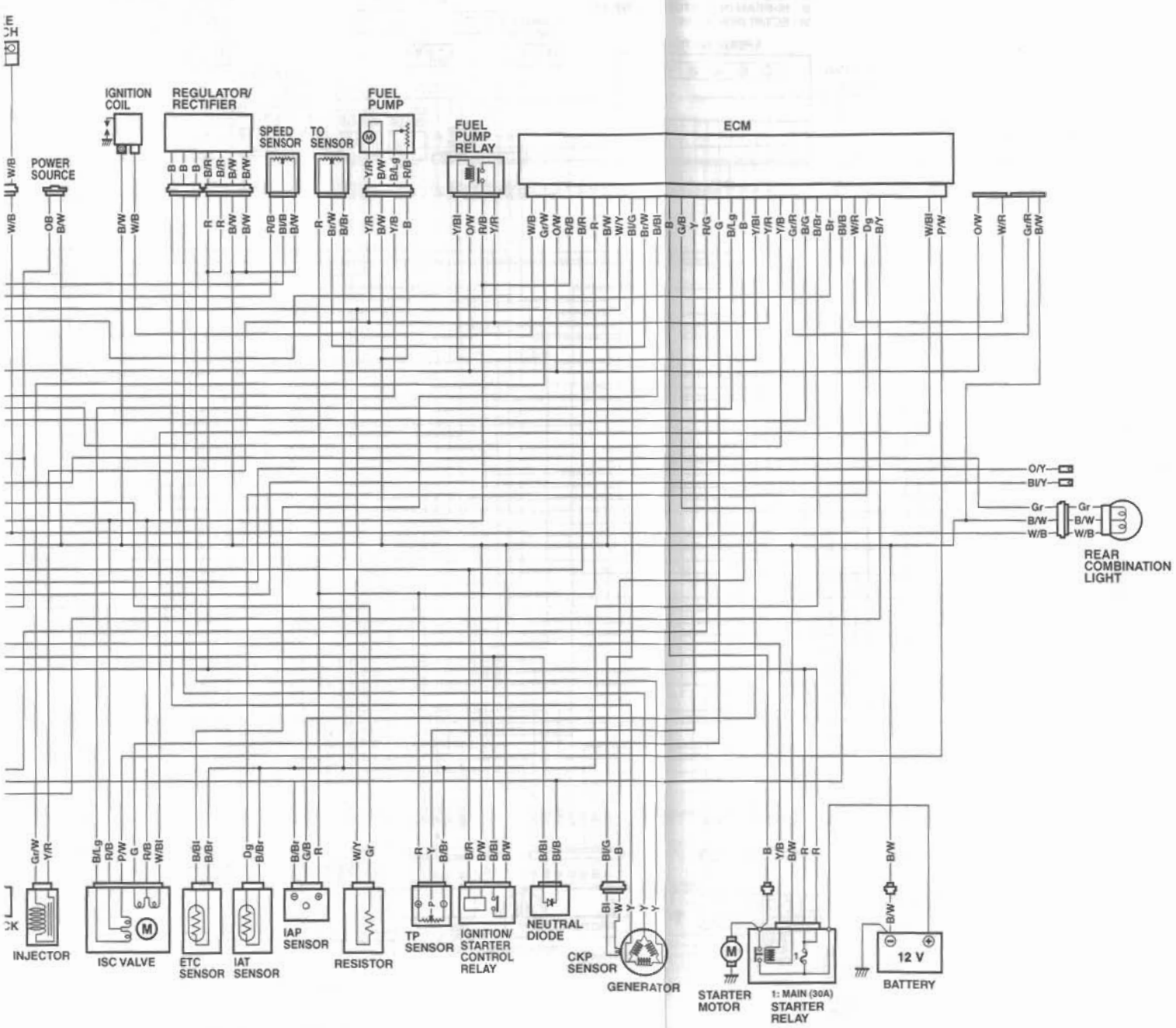
SUSPENSION

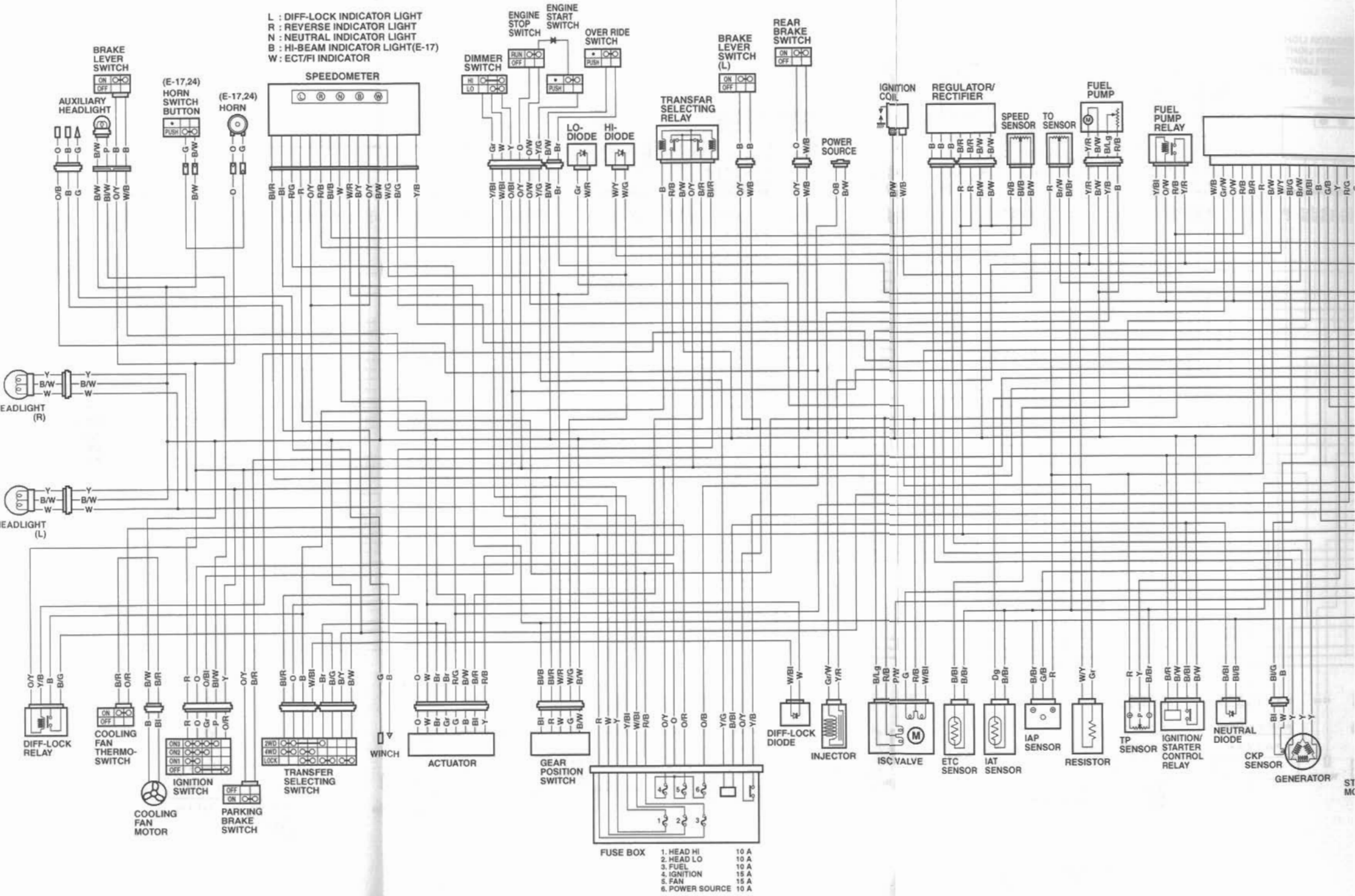
ITEM	STANDARD	LIMIT
Front shock absorber spring adjustor	2/5 position	—
Rear shock absorber spring adjuster	2/5 position	—

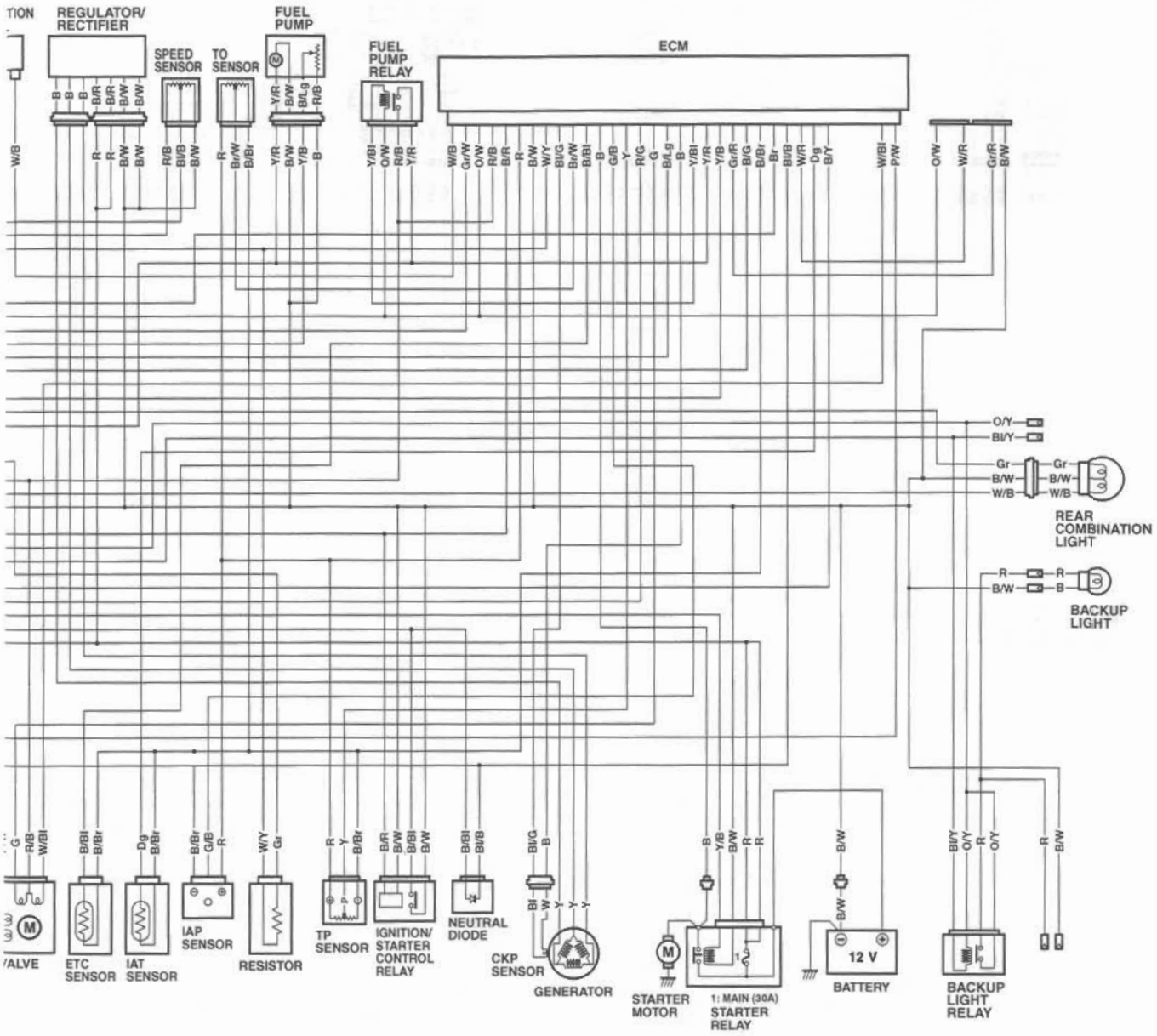
FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the Research Method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10 % ethanol, or less than 5 % methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-28, 33
	Gasoline used should be graded 91 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank capacity	17.5 L (4.6/3.8 US/Imp gal)		
Engine oil type	SAE 10 W-40, API, SF or SG		
Engine oil capacity	change	2 300 ml (2.4/2.0 US/Imp qt)	
	Filter change	2 500 ml (2.6/2.2 US/Imp qt)	
	Overhaul	3 000 ml (3.2/2.6 US/Imp qt)	


L : DIFF-LOCK INDICATOR LIGHT
R : REVERSE INDICATOR LIGHT
N : NEUTRAL INDICATOR LIGHT
B : HI-BEAM INDICATOR LIGHT (E-17)
W : ECT/FI INDICATOR
BRAKE LEVER SWITCH
AUXILIARY HEADLIGHT
(E-17,24) HORN SWITCH BUTTON
(E-17,24) HORN
SPEEDOMETER
DIMMER SWITCH
ENGINE STOP SWITCH
ENGINE START SWITCH
OVER RIDE SWITCH
LO-DIODE
HI-DIODE
TRANSFAR SELECTING RELAY
BRAKE LEVER SWITCH (L)
REAR BRAKE SWITCH
POWER SOURCE
IGNITION COIL
REGULATOR/ RECTIFIER
SPEED SENSOR
TO SENSOR
FUEL PUMP
FUEL PUMP RELAY
HEADLIGHT (R)
HEADLIGHT (L)
DIFF-LOCK RELAY
COOLING FAN THERMO-SWITCH
COOLING FAN MOTOR
IGNITION SWITCH
PARKING BRAKE SWITCH
TRANSFER SELECTING SWITCH
WINCH
ACTUATOR
GEAR POSITION SWITCH
DIFF-LOCK DIODE
INJECTOR
ISC VALVE
ETC SENSOR
IAT SENSOR
IAP SENSOR
RESISTOR
TP SENSOR
IGNITION/ STARTER CONTROL RELAY
NEUTRAL DIODE
CKP SENSOR
GENERATOR
FUSE BOX
1. HEAD HI 10 A
2. HEAD LO 10 A
3. FUEL 10 A
4. IGNITION 15 A
5. FAN 15 A
6. POWER SOURCE 10 A


IGNITION COIL
REGULATOR/ RECTIFIER
SPEED SENSOR
TO SENSOR
FUEL PUMP
FUEL PUMP RELAY
ECM
POWER SOURCE
REAR COMBINATION LIGHT
INJECTOR
ISC VALVE
ETC SENSOR
IAT SENSOR
IAP SENSOR
RESISTOR
TP SENSOR
IGNITION/ STARTER CONTROL RELAY
NEUTRAL DIODE
CKP SENSOR
GENERATOR
STARTER MOTOR
1: MAIN (30A) STARTER RELAY
12 V
BATTERY


L : DIFF-LOCK INDICATOR LIGHT
R : REVERSE INDICATOR LIGHT
N : NEUTRAL INDICATOR LIGHT
B : HI-BEAM INDICATOR LIGHT(E-17)
W : ECT/FI INDICATOR
SPEEDOMETER
BRAKE LEVER SWITCH
AUXILIARY HEADLIGHT
(E-17,24) HORN SWITCH BUTTON
(E-17,24) HORN
DIMMER SWITCH
ENGINE STOP SWITCH
ENGINE START SWITCH
OVER RIDE SWITCH
LO-DIODE
HI-DIODE
TRANSFAR SELECTING RELAY
BRAKE LEVER SWITCH (L)
REAR BRAKE SWITCH
POWER SOURCE
IGNITION COIL
REGULATOR/ RECTIFIER
SPEED SENSOR
TO SENSOR
FUEL PUMP
FUEL PUMP RELAY
HEADLIGHT (R)
HEADLIGHT (L)
DIFF-LOCK RELAY
COOLING FAN THERMO-SWITCH
COOLING FAN MOTOR
IGNITION SWITCH
PARKING BRAKE SWITCH
TRANSFER SELECTING SWITCH
WINCH
ACTUATOR
GEAR POSITION SWITCH
DIFF-LOCK DIODE
INJECTOR
ISC VALVE
ETC SENSOR
IAT SENSOR
IAP SENSOR
RESISTOR
TP SENSOR
IGNITION/ STARTER CONTROL RELAY
NEUTRAL DIODE
CKP SENSOR
GENERATOR
FUSE BOX
1. HEAD HI 10 A
2. HEAD LO 10 A
3. FUEL 10 A
4. IGNITION 15 A
5. FAN 15 A
6. POWER SOURCE 10 A


REGULATOR/ RECTIFIER
SPEED SENSOR
TO SENSOR
FUEL PUMP
FUEL PUMP RELAY
ECM
REAR COMBINATION LIGHT
BACKUP LIGHT
/ALVE
ETC SENSOR
IAT SENSOR
IAP SENSOR
RESISTOR
TP SENSOR
IGNITION/ STARTER CONTROL RELAY
NEUTRAL DIODE
CKP SENSOR
GENERATOR
STARTER MOTOR
1: MAIN (30A) STARTER RELAY
12 V
BATTERY
BACKUP LIGHT RELAY