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SUZUKI

GSX-R750

SERVICE MANUAL

99500-37083-03E
(英)

SUZUKI MOTOR CORPORATION PRINTED IN JAPAN November, '95 (TK)

FOREWORD

This manual contains an introductory description on SUZUKI GSX-R750 and procedures for its inspection/service and overhaul of its main components. Other information considered as generally known is not included.
Read GENERAL INFORMATION section to familiarize yourself with outline of the vehicle and MAINTENANCE and 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 your optimum and quick service.

- *This manual has been prepared on the basis of the latest specification at the time of publication.*
  If modification has been made since then, difference 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 intended for those who have enough knowledge and skills for servicing SUZUKI vehicles. Without such knowledge and skills, you should not attempt servicing by relying on this manual only.*
  Instead, please contact your nearby authorized SUZUKI motorcycle dealer.

IMPORTANT

All street-legal Suzuki motorcycles with engine displacement of 50cc or greater are subject to Environmental Protection agency emission regulations. These regulations set specific standards for exhaust emission output levels as well as particular servicing requirements. This manual includes specific information required to properly inspect and service GSX-R750 in accordance with all EPA regulations. It is strongly recommended that the chapter on Emission Control, Periodic Servicing and Carburetion be thoroughly reviewed before any type of service work is performed.

Further information concerning the EPA emission regulations and U.S. Suzuki's emission control program can be found in the U.S. SUZUKI EMISSION CONTROL PROGRAM MANUAL/SERVICE BULLETIN.

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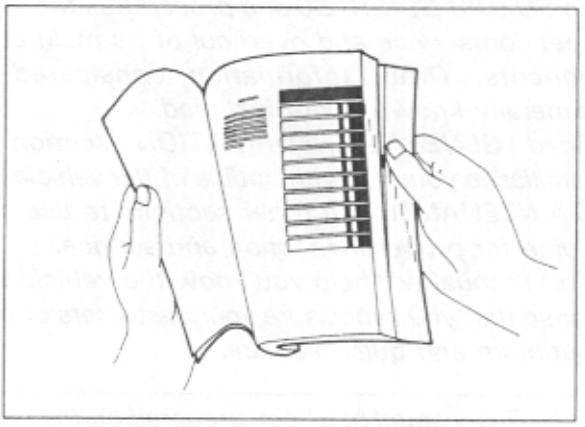
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SUZUKI MOTOR CORPORATION
Motorcycle Service Department

HOW TO USE THIS MANUAL

TO LOCATE WHAT YOU ARE LOOKING FOR:

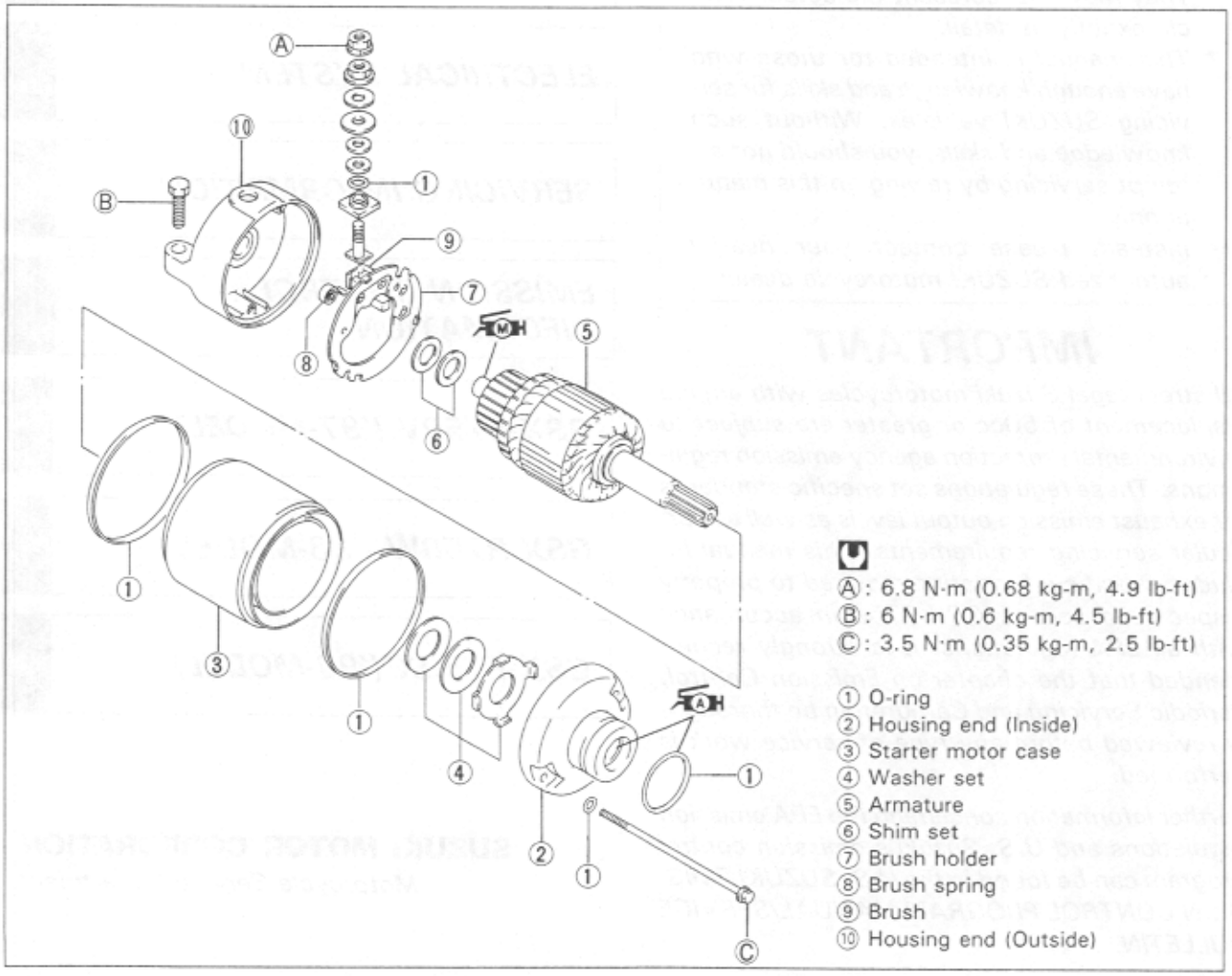
1. The text of this manual is divided into sections.
2. As the title of these sections are listed on the previous page as GROUP INDEX, select the section where what you are looking for belong.
3. Holding the manual as shown at the right will allow you to find the first page of the section easily.
4. On the first page of each section, its contents are listed. Find the item and page you need.



COMPONENT PARTS AND WORK TO BE DONE

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

Example: Starter motor

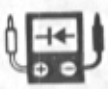


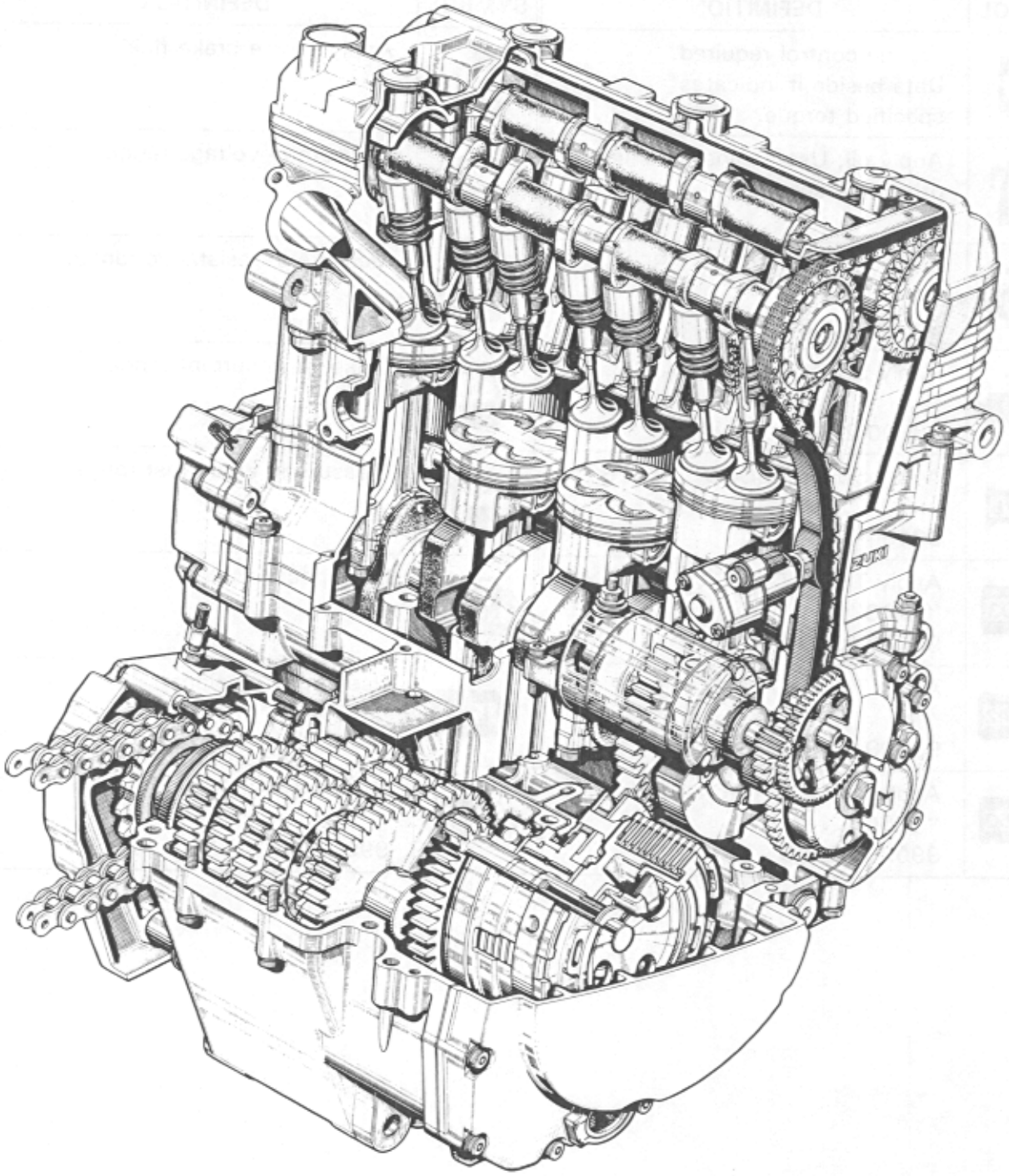
Ⓐ: 6.8 N·m (0.68 kg-m, 4.9 lb-ft)
Ⓑ: 6 N·m (0.6 kg-m, 4.5 lb-ft)
Ⓒ: 3.5 N·m (0.35 kg-m, 2.5 lb-ft)

① O-ring
② Housing end (Inside)
③ Starter motor case
④ Washer set
⑤ Armature
⑥ Shim set
⑦ Brush holder
⑧ Brush spring
⑨ Brush
⑩ Housing end (Outside)

SYMBOL

Listed in the table below are the symbols indicating instructions and other information necessary for servicing and meaning associated with them respectively.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Torque control required. Data beside it indicates specified torque.		Apply or use brake fluid.
	Apply oil. Use engine oil unless otherwise specified.		Measure in voltage range.
	Apply SUZUKI SUPER GREASE "A". 99000-25030		Measure in resistance range.
	Apply SUZUKI MOLY PASTE. 99000-25140		Measure in current range.
	Apply SUZUKI BOND "1207B" 99104-31140		Measure in diode test range
	Apply THREAD LOCK SUPER "1303". 99000-32030		Use special tool.
	Apply THREAD LOCK "1342" 99000-32050		Use engine coolant.
	Apply THREAD LOCK SUPER "1360". 99000-32130		Use fork oil. 99000-99044-10G



GENERAL INFORMATION

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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 motorcycle. In addition to the WARNINGS and CAUTIONS stated, you must use good judgement and basic mechanical safety principles. If you are unsure about how to perform a particular service operation, ask a more experienced mechanic for advice.

GENERAL PRECAUTIONS

⚠ 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 or exhaust system during or for a while after engine operation.**
- **After servicing fuel, oil, water, exhaust or brake systems, check all lines and fittings related to the system for leaks.**

⚠ CAUTION

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

- To protect 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 vehicles and parts.

SUZUKI GSX-R750T ('96-MODEL)



RIGHT SIDE

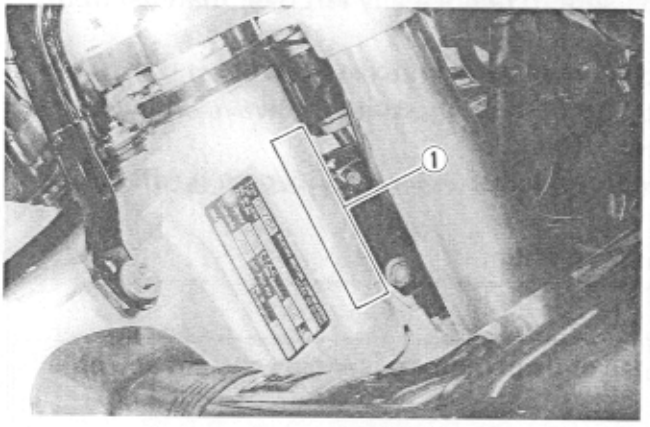


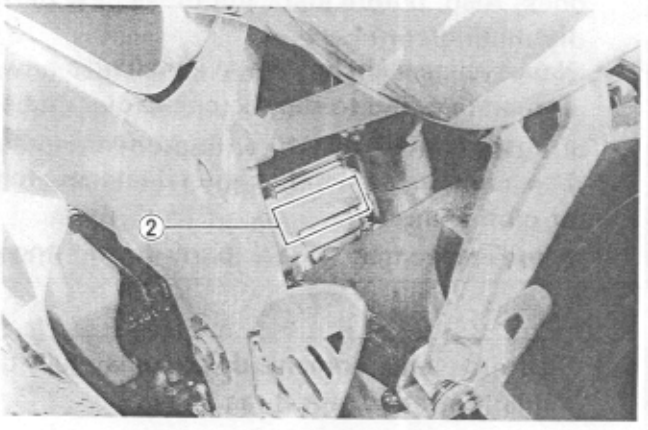
LEFT SIDE

*Difference between photographs and actual motorcycles depends on the markets.

SERIAL NUMBER LOCATION

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





FUEL, OIL AND ENGINE COOLANT RECOMMENDATION

FUEL (For U.S.A. model)

1. Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) method or 91 octane or higher rated by the research method.
2. Suzuki recommends that customers use alcohol free, unleaded gasoline whenever possible.
3. Use of blended gasoline containing MTBE (Methyl Tertiary Butyl Ether) is permitted.
4. Use of blended gasoline/alcohol fuel is permitted, provided that the fuel contains not more than 10% ethanol. Gasoline/alcohol fuel may contain up to 5% methanol if appropriate cosolvents and corrosion inhibitors are present in it.
5. If the performance of the vehicle is unsatisfactory while using blended gasoline/alcohol fuel, you should switch to alcohol-free unleaded gasoline.
6. Failure to follow these guideline could possibly void applicable warranty coverage. Check with your fuel supplier to make sure that the fuel you intend to use meets the requirements listed above.

FUEL (For Canadian model)

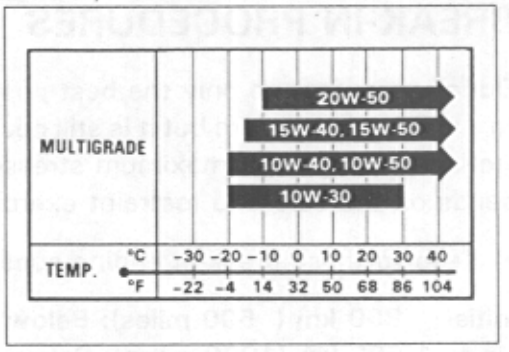
Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) method or 91 octane or higher rated by the research method.

FUEL (For the other models)

Gasoline used should be graded 85—95 octane (Research Method) or higher. An unleaded gasoline type is recommended.

ENGINE OIL (For U.S.A. model)

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



ENGINE OIL (For the other models)

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

BRAKE FLUID

Specification and classification: DOT 4

⚠ WARNING

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

FRONT FORK OIL

Use fork oil # 10.

ENGINE COOLANT

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

WATER FOR MIXING

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

ANTI-FREEZE/ENGINE COOLANT

The engine coolant perform as a corrosion and rust inhabit 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.

LIQUID AMOUNT OF WATER/ENGINE COOLANT

Solution capacity (total): 2 550 ml (2.7/2.2 US/Imp qt)

For engine coolant mixture information, refer to cooling system section, page 5-4.

⚠ CAUTION

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

BREAK-IN PROCEDURES

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

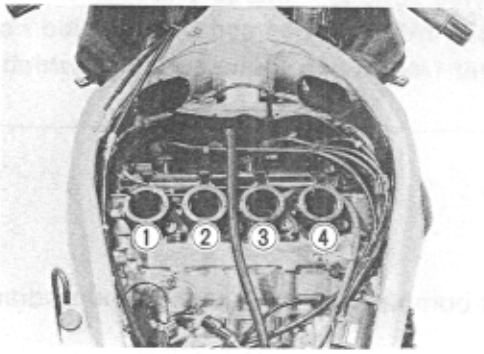
- Keep to these break-in engine speed limits:

Initial 800 km (500 miles): Below 6 500 r/min
Up to 1 600 km (1000 miles): Below 10 000 r/min
Over 1 600 km (1000 miles): Below 13 500 r/min

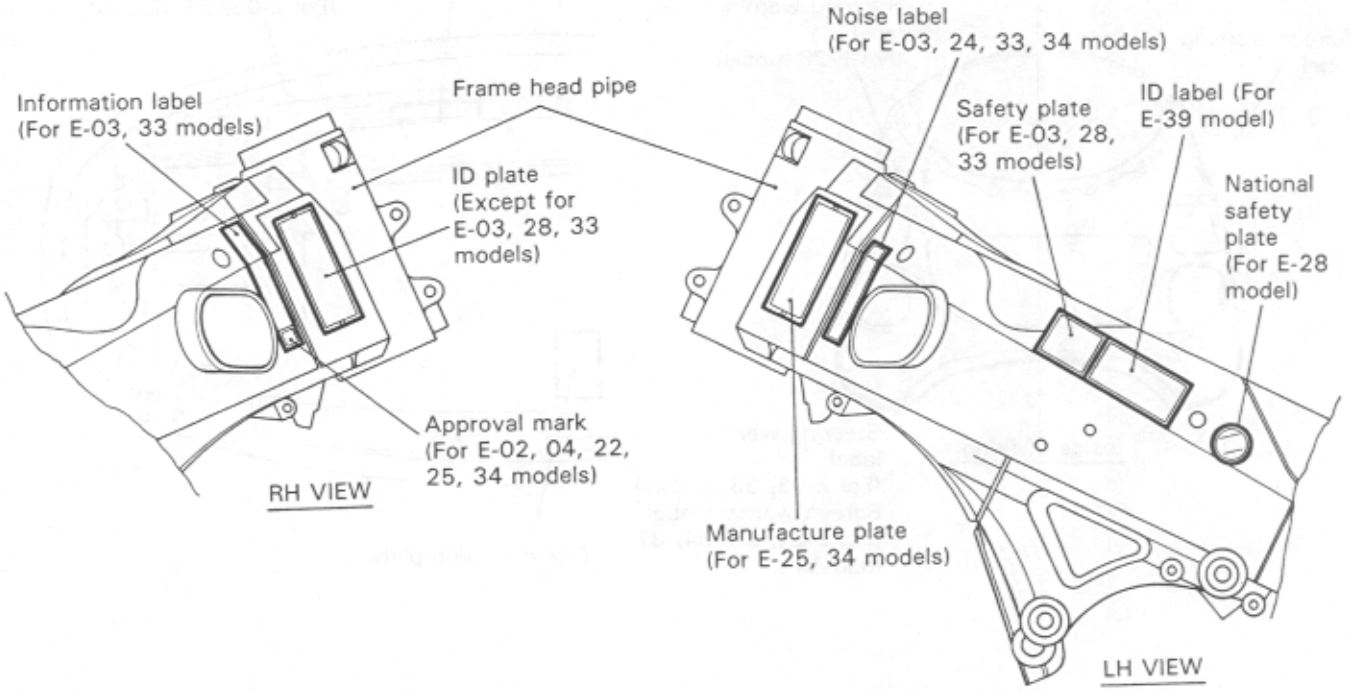
- Upon reaching an odometer reading of 1 600 km (1 000 miles) you can subject the motorcycle to full throttle operation. However, do not exceed 13 500 r/min at any time.

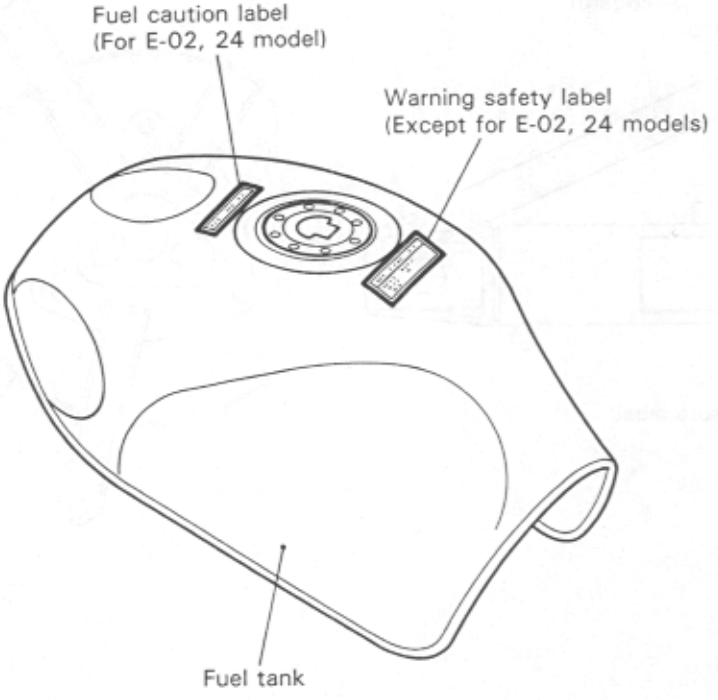
CYLINDER IDENTIFICATION

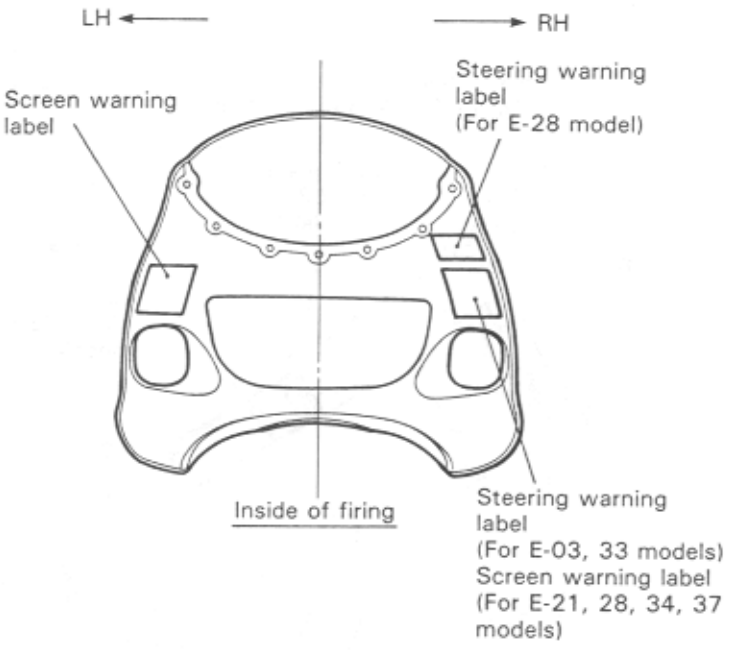
The four cylinders of this engine are identified as No.1, No.2, No.3 and No.4 cylinder, as counted from left to right (as viewed by the rider on the seat).

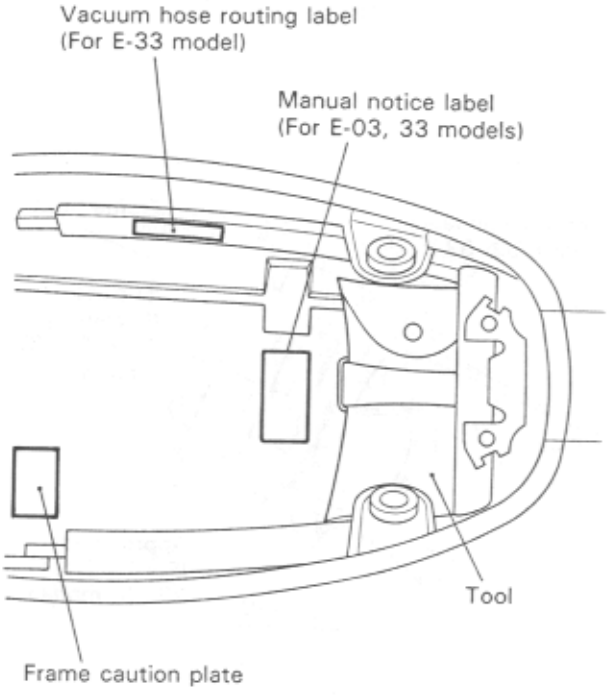


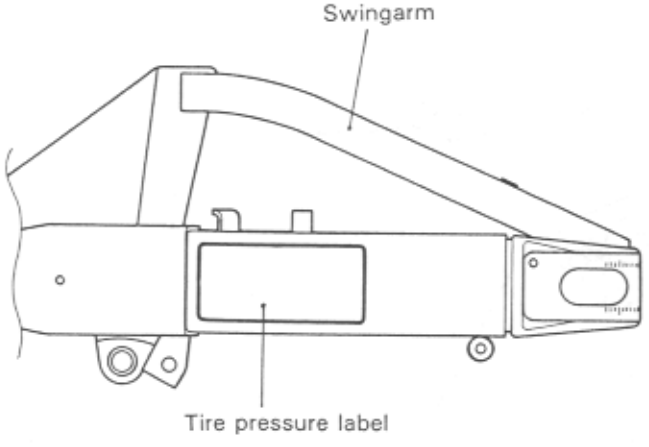
INFORMATION LABELS

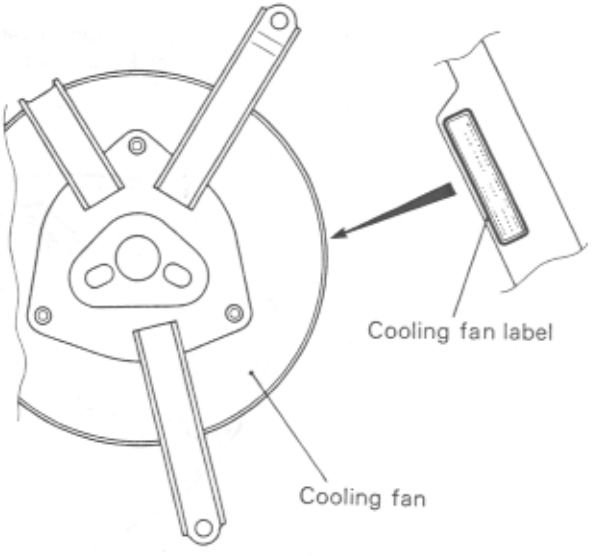





LH
RH
Screen warning label
Steering warning label (For E-28 model)
Inside of firing
Steering warning label (For E-03, 33 models)
Screen warning label (For E-21, 28, 34, 37 models)


Vacuum hose routing label (For E-33 model)
Manual notice label (For E-03, 33 models)
Tool
Frame caution plate


Swingarm
Tire pressure label


Cooling fan label
Cooling fan

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 100 mm (82.7 in)	For E-18,22,24,39 models
	2 055 mm (80.9 in)	For other models
Overall width	720 mm (28.3 in)	
Overall height	1 135 mm (44.7 in)	
Wheelbase	1 400 mm (55.1 in)	
Ground clearance	130 mm (5.1 in)	
Seat height	830 mm (32.7 in)	
Dry mass	180 kg (396 lbs)	For E-18,33,39 models
	179 kg (394 lbs)	For other models

ENGINE

Type	Four-stroke, Liquid-cooled, DOHC, TSCC
Number of cylinders	4
Tappet clearance, IN	0.10—0.20 mm (0.004—0.008 in)
EX	0.20—0.30 mm (0.008—0.012 in)
Bore	72.0 mm (2.834 in)
Stroke	46.0 mm (1.811 in)
Piston displacement	749 cm^3 (45.7 cu. in)
Compression ratio	11.8 : 1
Carburetor	MIKUNI BDSR39
Air cleaner	Non-woven fabric element
Starter system	Electric starter
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	6-speed constant mesh
Gearshift pattern	1-down, 5-up
Primary reduction ratio	1.756 (72/41)
Gear ratios, Low	2.866 (43/15)
2nd	2.058 (35/17)
3rd	1.650 (33/20)
4th	1.428 (30/21)
5th	1.260 (29/23)
Top	1.120 (28/25)
Final reduction ratio	2.687 (43/16)
Drive chain	TAKASAGO RK50MFOZ1, 108 links

CHASSIS

Front suspension	Inverted telescopic, coil spring, oil damped, spring pre-load fully adjustable, rebound and compression damping force fully adjustable.
Rear suspension	Link type system, gas/oil damped, coil spring, spring pre-road fully adjustable, rebound damping force and compression damping force fully adjustable.
Front fork stroke	120 mm (4.7 in)
Rear wheel travel	133 mm (5.2 in)
Steering angle	30° (right & left)
Caster	66°
Trail	96 mm (3.8 in)
Turning radius	3.1 mm (10.2 ft)
Front brake	Disc brake, twin, hydraulically operated
Rear brake	Disc brake, hydraulically operated
Front tire size	120/70 ZR17, tubeless
Rear tire size	190/50 ZR17, tubeless

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	4° B.T.D.C. at 1 500 r/min
Spark plug	N.G.K. CR9E, NIPPONDENSO U27ESR-N
Battery	12V 28.8 kC (8 Ah)/10HR
Generator	Three-phase A.C. Generator
Main fuse	30A
Fuse	15/15/10/15/10A
Headlight	12V 55/50W × 2 ..... E-02,03,24,28,33 models 12V 55W + 12V 55W ..... For other models
Turn signal light	12V 21W
Front position light	12V 5W ..... Except for E-03,24,28,33 models
Tail/Brake light	12V 5/21W × 2
Speedometer light	12V 1.7W
Tachometer light	12V 1.7W
Neutral indicator light	12V 1.7W
High beam indicator light	12V 1.7W
Turn signal indicator light	12V 1.7W
Fuel indicator light	12V 1.7W

CAPACITIES

Fuel tank, including reserve	18.0 L (4.8/4.0 US/Imp gal)
Engine oil, oil change	2 600 ml (2.7/2.3 US/Imp qt)
with filter change	2 800 ml (3.0/2.5 US/Imp qt)
overhaul	3 500 ml (3.7/3.1 US/Imp qt)
Coolant	2 550 ml (2.7/2.2 US/Imp qt)

These specifications are subject to change without notice.

COUNTRY OR AREA

The series of symbols on the left stand for the countries or area on the right.

SYMBOL	COUNTRY or AREA
E-02	England
E-03	U.S.A. (except California)
E-04	France
E-18	Switzerland
E-21	Belgium
E-22	Germany
E-24	Australia
E-25	Netherlands
E-28	Canada
E-33	California (U.S.A.)
E-34	Italy
E-37	Brazil
E-39	Austria
E-53	Spain

E-21 and 53 countries are included in E-34.

PERIODIC MAINTENANCE

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PERIODIC MAINTENANCE SCHEDULE

IMPORTANT: The periodic maintenance intervals and service requirements have been established in accordance with EPA regulations. Following these instructions will ensure that the motorcycle will not exceed emission standards and it will also ensure the reliability and performance of the motorcycle.

The chart below lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy. Mileages are expressed in terms of kilometer, miles and time for your convenience.

NOTE:
More frequent servicing may be performed on motorcycles that are used under severe conditions however, it is not necessary for ensuring emission level compliance.

PERIODIC MAINTENANCE CHART

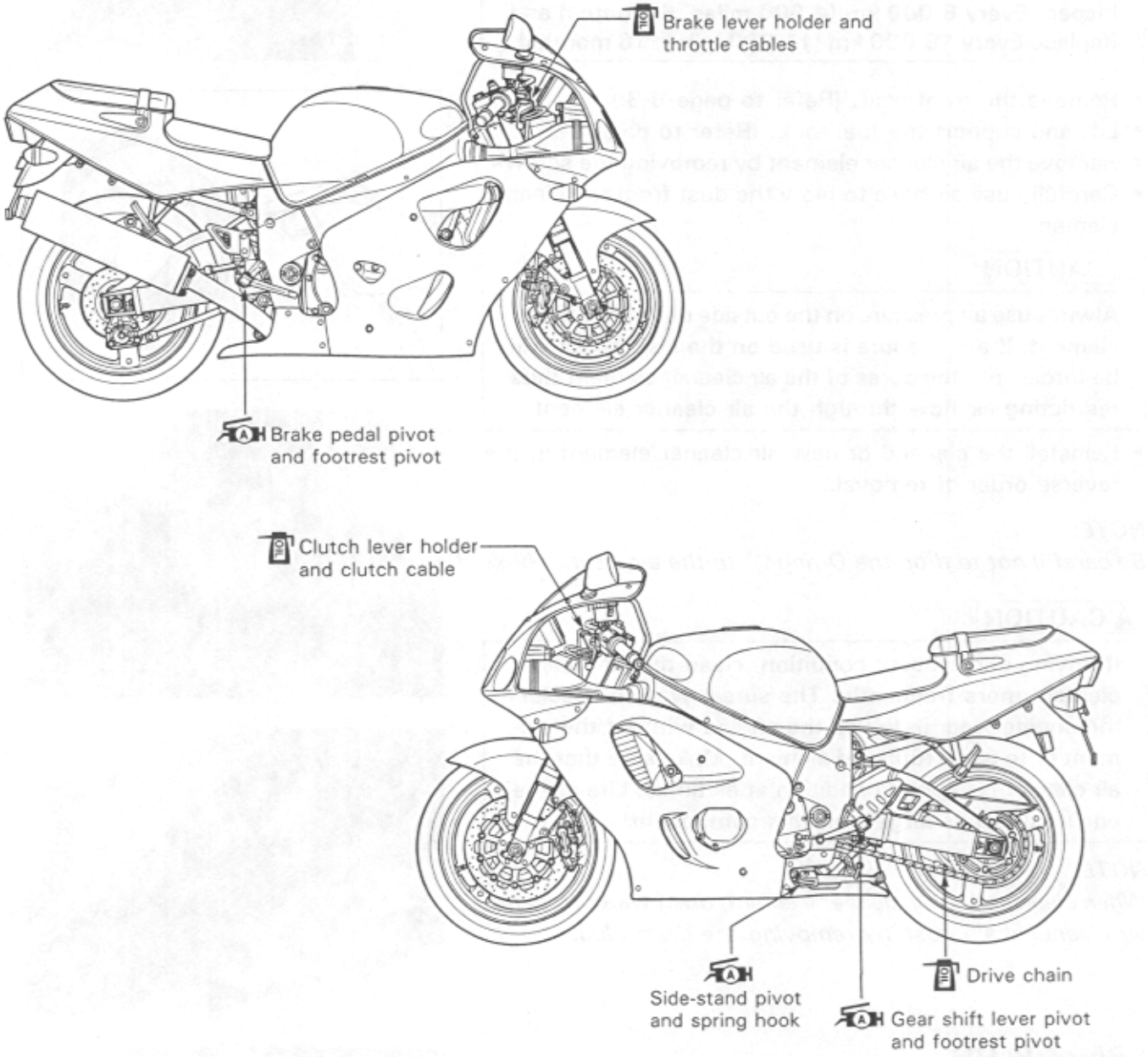
Item \ Interval	km	1 000	6 000	12 000	18 000	24 000
	miles	600	4 000	7 500	11 000	15 000
	months	1	6	12	18	24
Air cleaner elements		—	I	I	R	I
Spark plugs		—	I	R	I	R
Tappet clearance		—	—	—	—	I
Fuel hose (Evap hose ..... California model only)		—	I	I	I	I
		Replace every four years.				
Engine oil		R	R	R	R	R
Engine oil filter		R	—	—	R	—
Engine idle speed		I	I	I	I	I
Throttle cable play		I	I	I	I	I
Carburetor synchronization		—	—	I	—	I
Clutch		—	I	I	I	I
Radiator hose		—	I	I	I	I
Engine coolant		Replace every two years.				
Drive chain		I	I	I	I	I
		Clean and lubricate every 1 000 km (600 miles).				
Brakes		I	I	I	I	I
Brake hose		—	I	I	I	I
		Replace every four years.				
Brake fluid		—	I	I	I	I
		Replace every two years.				
Tires		—	I	I	I	I
Steering		I	—	I	—	I
Front forks		—	—	I	—	I
Rear suspension		—	—	I	—	I
Exhaust pipe bolts and muffler bolts		T	—	T	—	T
Chassis bolts and nuts		T	T	T	T	T

NOTE: I = Inspect and clean, adjust, replace or lubricate as necessary;
R = Replace; T = Tighten; C = Clean

LUBRICATION POINTS

Proper lubrication is important for smooth operation and long life of each working part of the motorcycle.

Major lubrication points are indicated below.

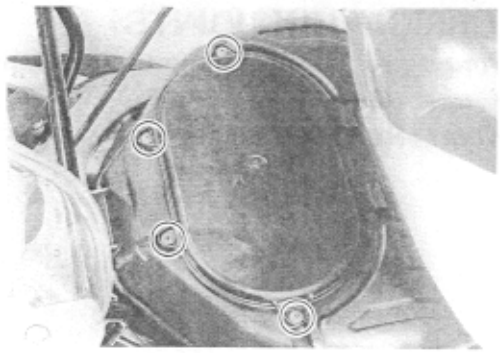


NOTE:

* *Before lubricating each part, clean off any rusty spots and wipe off any grease, oil, dirt or grime.*
* *Lubricate exposed parts which are subject to rust, with a rust preventative spray whenever the motorcycle has been operated under wet or rainy conditions.*

MAINTENANCE AND TUNE-UP PROCEDURES

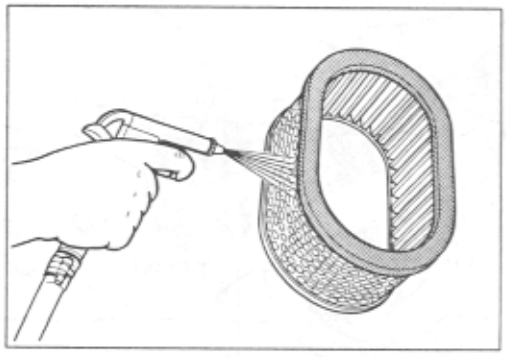
This section describes the servicing procedures for each item of the Periodic Maintenance requirements.



AIR CLEANER

Inspect Every 6 000 km (4 000 miles, 6 months) and Replace Every 18 000 km (11 000 miles, 18 months).

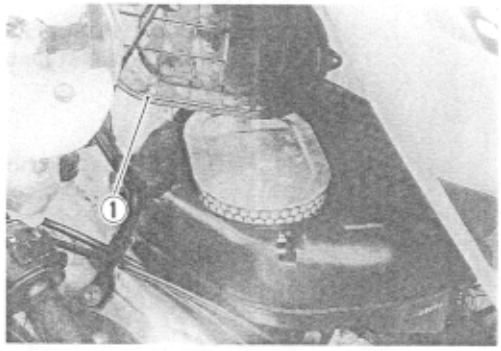
- Remove the front seat. (Refer to page 6-3.)
- Lift and support the fuel tank. (Refer to page 4-2.)
- Remove the air cleaner element by removing the screws.
- Carefully use air hose to blow the dust from the cleaner element.



⚠ CAUTION

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

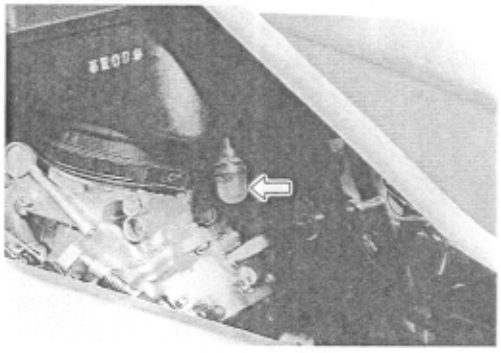
- Reinstall the cleaned or new air cleaner element in the reverse order of removal.



NOTE:
Be careful not to drop the O-ring ① to the air cleaner box.

⚠ CAUTION

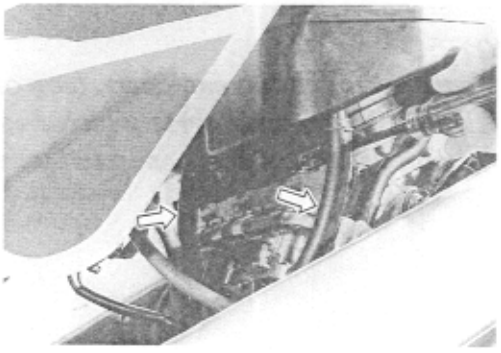
If driving under dusty condition, clean the air cleaner element more frequently. The surest way to accelerate engine wear is to use the engine without the element or to use a ruptured element. Make sure that the air cleaner is in good condition at all times. Life of the engine depends largely on this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



NOTE:
When cleaning the air cleaner element, drain water from the air cleaner drain hose by removing the drain plug.

SPARK PLUG

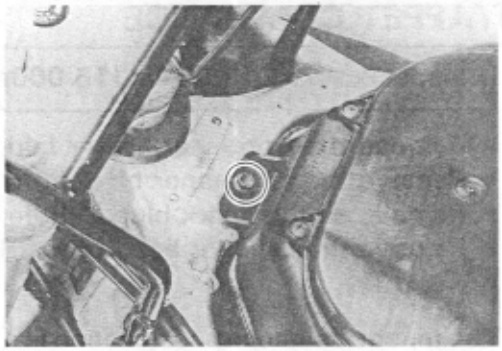
Inspect Every 6 000 km (4 000 miles, 6 months) and Replace Every 12 000 km (7 500 miles, 12 months).



- Remove the front seat. (Refer to page 6-3.)
- Lift and support the fuel tank. (Refer to page 4-2.)
- Remove the air cleaner box. (Refer to page 4-14.)

- Remove the spark plug caps.
- Remove the spark plugs with the spark plug wrench.

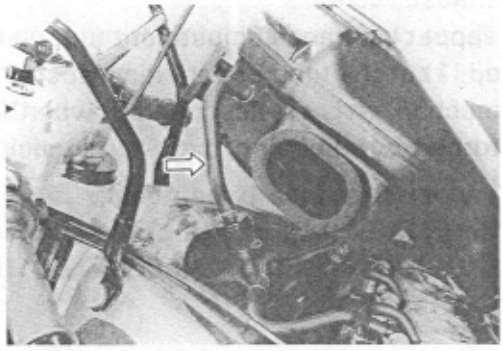
TOOL **09930-10121: Socket wrench set**



HEAT RANGE

- Check to see the heat range of the plug.
  If the electrode of the plug is wet appearing or dark color, replace the plug with hotter type one. If it is white or glazed appearing, replace the plug with colder type one.

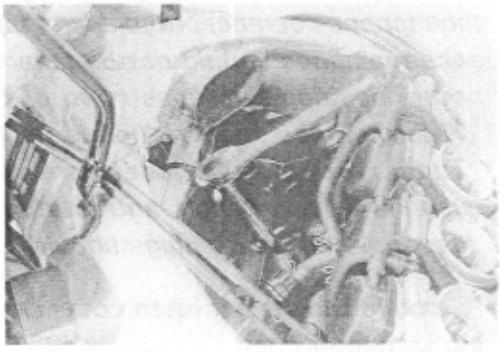
	NGK	ND
Hotter type	CR8E	U24ESR-N
Standard	CR9E	U27ESR-N
Colder type	CR10E	U31ESR-N



NOTE:
"R" type spark plug has a resistor located at the center electrode to prevent radio noise.

CARBON DEPOSIT

- Check to see the carbon deposit on the plug. If the carbon is deposited, remove it with a spark plug cleaner machine or carefully using a tool with a pointed end.

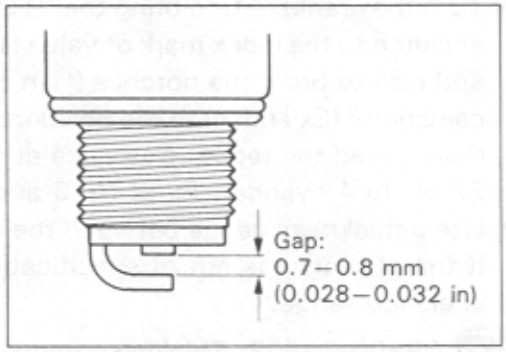


SPARK PLUG GAP

- Measure the plug gap with a thickness gauge if it is correct. If not, adjust it to the following gap.

TOOL **09900-20803: Thickness gauge**

Standard
Spark plug gap: 0.7—0.8 mm (0.028—0.032 in)



ELECTRODES CONDITION

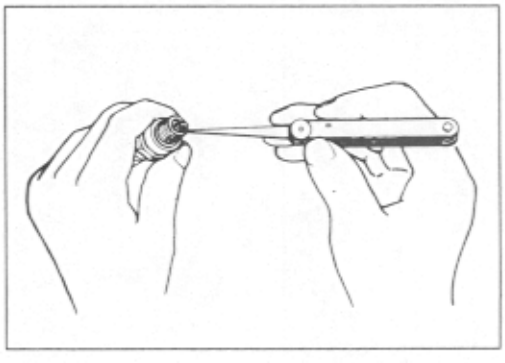
- Check to see the worn or burnt condition of the electrodes. If it is extremely worn or burnt, replace the plug. And also replace the plug if it has a broken insulator, damaged thread.

⚠ CAUTION

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

⚠ CAUTION

To prevent damaging the cylinder head, hand-tighten the spark plug before using a wrench to tighten to the specified torque.



- Install the spark plugs to the cylinder head with a hand-tighten, and tighten them to the specified torque.

Spark plug: 12 N·m (1.2 kg-m, 8.5 lb-ft)

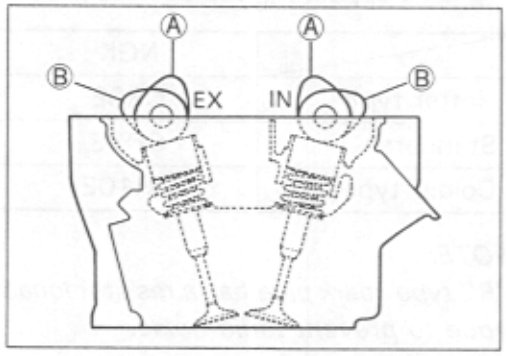
TAPPET CLEARANCE

Inspect Every 24 000 km (15 000 miles, 24 months).

- Remove the front seat, lower fairing assembly and fuel tank. (Refer to pages 6-2, -3 and 4-2.)
- Remove the air cleaner box and carburetors. (Refer to pages 4-14 and -15.)
- Remove all the spark plugs. (Refer to page 2-4.)
- Remove the cylinder head cover. (Refer to page 3A-1.)

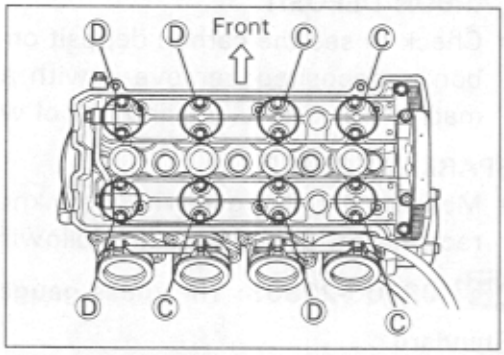
The tappet clearance specification is different for intake and exhaust valves.
Tappet clearance adjustment must be checked and adjusted, 1) at the time of periodic inspection, 2) when the valve mechanism is serviced, and 3) when the camshafts are disturbed by removing them for servicing.

Tappet clearance (when cold):
IN. : 0.10—0.20 mm (0.004—0.008 in)
EX.: 0.20—0.30 mm (0.008—0.012 in)

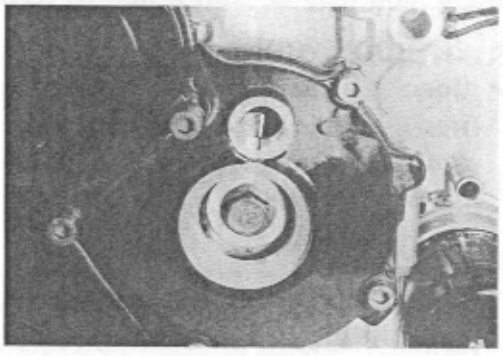


NOTE:

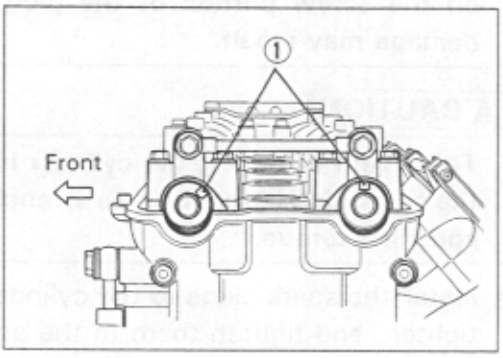
* *The cam must be at positions, Ⓐ or Ⓑ, in order to check the tappet clearance, or to adjust tappet clearance. Clearance readings should not be taken with the cam in any other position than these two positions.*
* *The clearance specification is for COLD state.*
* *To turn the crankshaft for clearance checking, be sure to use a 14-mm wrench, and rotate in the normal running direction. All spark plugs should be removed.*



- Remove the starter clutch cover cap and the valve timing inspection cap.
- Turn the crankshaft to bring the "TOP" line on the starter clutch to the index mark of valve timing inspection hole and also to bring the notches ① in the left ends of both camshafts (Ex and In) to the positions shown. In this condition, read the tappet clearance at the valves Ⓒ (In and Ex of No.4 cylinder, Ex of No.3 and In of No.2).
- Use a thickness gauge between the tappet and the cam. If the clearance is out of specification, bring it into the specified range.

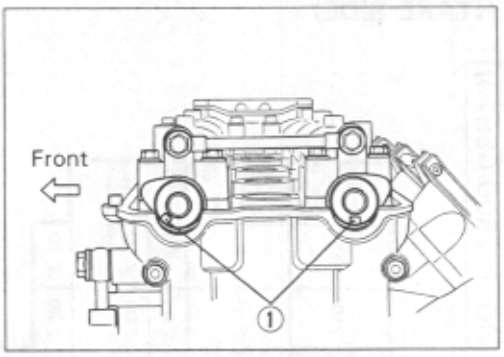


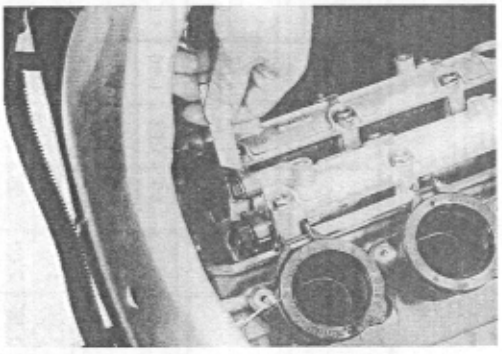
TOOL **09900-20803: Thickness gauge**

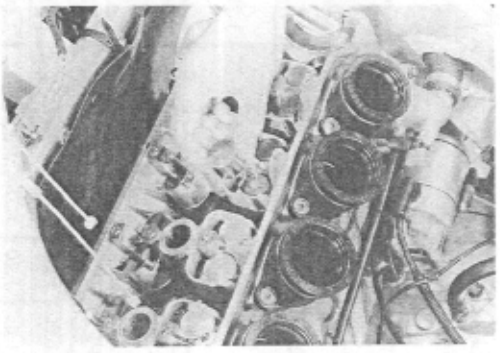


- Turn the crankshaft 360° (one rotation) to bring the "TOP" line on the starter clutch to the index mark of valve timing inspection hole and also to bring the notches ① to the positions shown.
- Read the clearance at the remaining valves Ⓓ and adjust the clearance if necessary.

Cam Position	Notch ① position	
	Exhaust Camshaft	Intake Camshaft
Ⓒ	←Front	←Front
Ⓓ	←Front	←Front







TAPPET CLEARANCE ADJUSTMENT

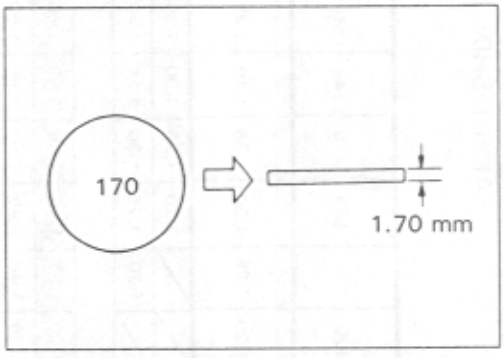
The clearance is adjusted by replacing the existing tappet shim by a thicker or thinner shim.

- Remove the intake or exhaust camshafts. (Refer to page 3A-1.)
- Remove the tappet and shim by fingers or magnetic hand. (Refer to page 3A-7.)
- 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 1.20 to 2.20 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 (Pages 2-7 and -8) for details.

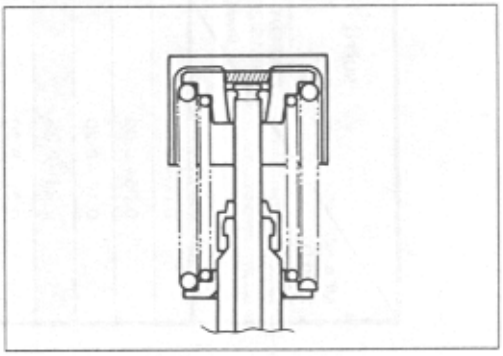
NOTE:

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

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



- 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.
- Tighten the head cover bolts to the specified torque. (Refer to page 3A-19.)



TAPPET SHIM SELECTION TABLE [INTAKE]

TAPPET SHIM NO.(12892-05C00-× × ×)

TAPPET SHIM SET NO. (12800-05820)

(INTAKE SIDE)

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

HOW TO USE THIS CHART:

I. Measure tappet clearance. "ENGINE IS COLD"

II. Measure present shim size.

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

EXAMPLE

Tappet clearance is 0.23 mm

Present shim size 1.70 mm

Shim size to be used 1.80 mm

TAPPET SHIM SELECTION TABLE [EXHAUST]

TAPPET SHIM NO.(12892-05C00-×××)

TAPPET SHIM SET NO. (12800-05820)

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

HOW TO USE THIS CHART:

I. Measure tappet clearance. "ENGINE IS COLD"

II. Measure present shim size.

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

EXAMPLE

Tappet clearance is 0.33 mm

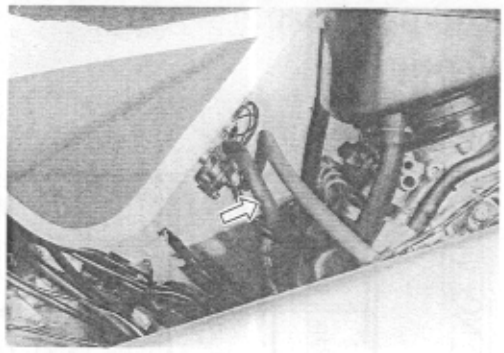
Present shim size 1.70 mm

Shim size to be used 1.80 mm

FUEL HOSE (EVAP HOSE ... California model only)

Inspect Every 6 000 km (4 000 miles, 6 months).
Replace Every 4 years.

Inspect the fuel hose for damage and fuel leakage. If any defects are found, the fuel hose must be replaced. (Refer to chaptor 9 for EMISSION CONTROL INFORMATION.)



ENGINE OIL AND OIL FILTER

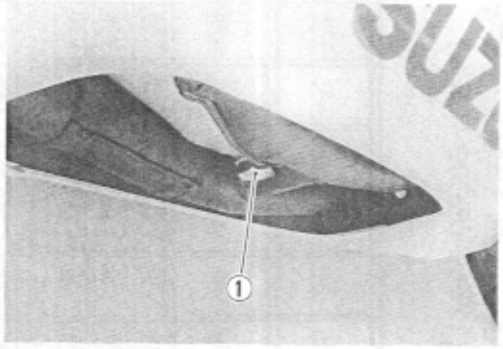
(ENGINE OIL)
Replace Initially at 1 000 km (600 miles, 1 month) and Every 6 000 km (4 000 miles, 6 months) thereafter.

(OIL FILTER)
Replace Initially at 1 000 km (600 miles, 1 month) and Every 18 000 km (11 000 miles, 18 months) thereafter.

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

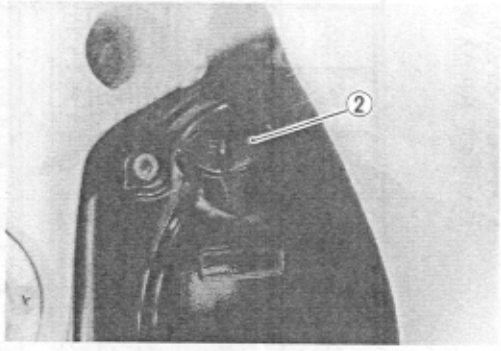
ENGINE OIL REPLACEMENT

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

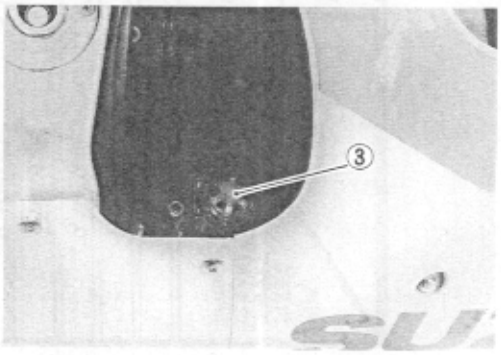


- Fit the drain plug ① securely, and pour fresh oil through the oil filler. The engine will hold about 2.6 L (2.7 US qt) of oil. Use an API classification of SE, SF or SG oil with SAE 10W/40 viscosity.

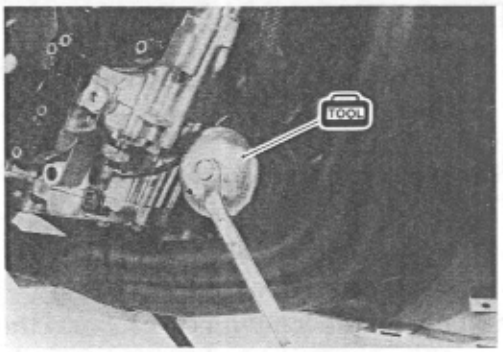
Oil drain plug: 28 N·m (2.8 kg-m, 20.0 lb-ft)



- Start up the engine and allow it to run for several minutes at idling speed.
- Turn off the engine and wait about one minute, then check the oil level through the inspection window ③ . If the level is below mark "F", add oil to that level.

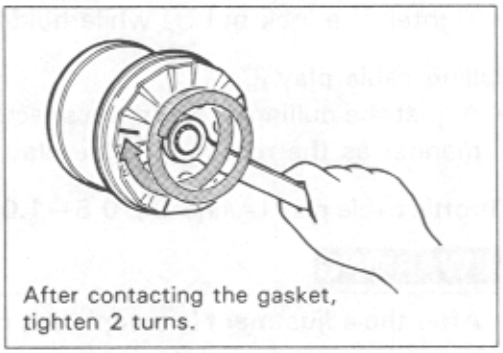


OIL FILTER REPLACEMENT



- Drain engine oil in the same manner of engine oil replacement procedure.
- Remove the right side lower fairing. (Refer to page 6-2.)
- Remove the oil filter by using the oil filter wrench. (Special tool)
- Apply engine oil lightly to the gasket of the new filter before installation.
- Install the new filter turning it by hand until you feel that the filter gasket contacts the mounting surface. Then tighten it 2 turns using the oil filter wrench. (Special tool)

TOOL 09915-40610: Oil filter wrench


After contacting the gasket, tighten 2 turns.

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

- Pour fresh engine oil and check the oil level in the same manner of engine oil replacement procedure.

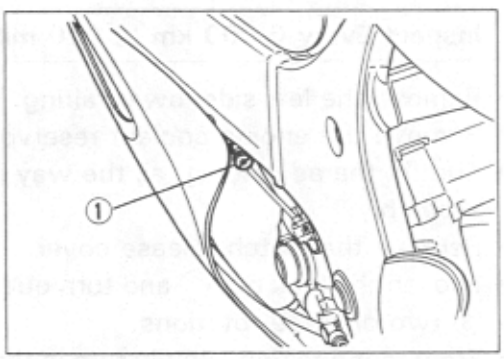
NECESSARY AMOUNT OF ENGINE OIL
Oil change: 2.6 L (2.7/2.3 US/Imp qt)
Filter change: 2.8 L (3.0/2.5 US/Imp qt)
Overhaul engine: 3.5 L (3.7/3.1 US/Imp qt)

⚠ CAUTION

Use SUZUKI MOTORCYCLE GENUINE OIL FILTER only, since the other make's genuine filters and after-market parts may differ in thread specifications (thread diameter and pitch), filtering performance and durability, which could cause engine damage or oil leaks. Suzuki automobile genuine oil filter is also not usable for the motorcycles.

ENGINE IDLE SPEED

Inspect Initially at 1 000 km (600 miles, 1 month) and Every 6 000 km (4 000 miles, 6 months) thereafter.



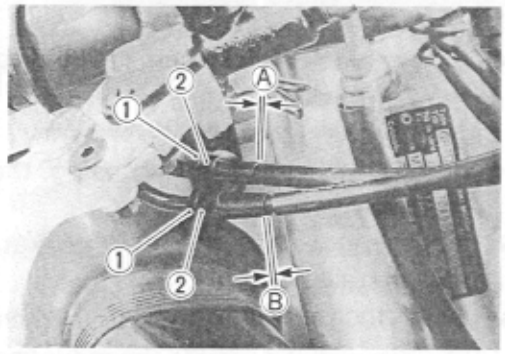
NOTE:
Make this adjustment when the engine is hot.

- Connect a tachometer.
- Start up the engine and set its speed to the specified range by turning the throttle stop screw ① .

Engine idle speed:
1 200 $^{+100}_{-50}$ r/min ... for E-18 model
1 200 ± 100 r/min ... for the other models

THROTTLE CABLE PLAY

Inspect Initially at 1 000 km (600 miles, 1 month) and Every 6 000 km (4 000 miles, 6 months) therefore.



Returning cable play Ⓐ

There should be 0.5—1.0 mm (0.02—0.04 in) play Ⓐ in the throttle cable. Adjust the throttle cable play with the following procedures.

- Loosen the lock nut ① and turn the adjuster ② in or out until the specified play is obtained.
- Tighten the lock nut ① while holding the adjuster.

Pulling cable play Ⓑ

- Adjust the pulling cable to the specified play in the same manner as the returning cable play adjustment.

Throttle cable play (Ⓐ and Ⓑ): 0.5—1.0 mm (0.02—0.04 in)

⚠ WARNING

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

CARBURETOR SYNCHRONIZATION

Inspect Every 12 000 km (7 500 miles, 12 months).

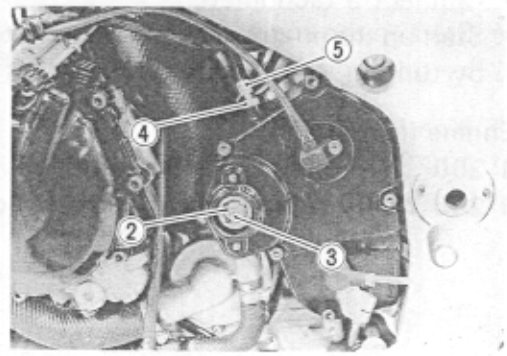
(Refer to page 4-28.)

CLUTCH

Inspect Every 6 000 km (4 000 miles, 6 months).



- Remove the left side lower fairing. (Refer to page 6-2.)
- Remove the engine coolant reservoir tank.
- Turn in the adjuster ① all the way into the clutch lever assembly.
- Remove the clutch release cover.
- Loosen the lock nut ② and turn out the adjusting screw ③ two or three rotations.
- From that position, slowly turn in the adjusting screw ③ to feel resistance.
- From this position, turn out the adjusting screw ③ 1-¼ rotations, and tighten the lock nut ②.
- Loosen the lock nut ④, and turn the cable adjuster ⑤ to obtain 3—13 mm (0.12—0.51 in) of free play Ⓐ at the clutch lever end.
- Tighten the lock nuts ④.



Clutch lever play Ⓐ: 3—13 mm (0.12—0.51 in)

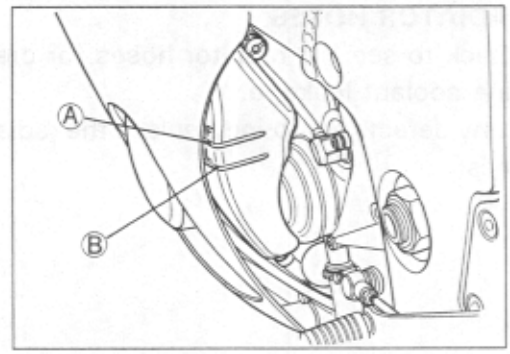
COOLING SYSTEM

Inspect Every 6 000 km (4 000 miles, 6 months).
Replace engine coolant Every 2 years.

ENGINE COOLANT LEVEL CHECK

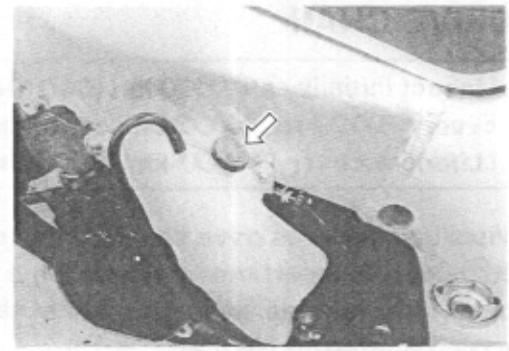
- Keep the motorcycle upright.
- Check the engine coolant level by observing the full and lower lines on the engine coolant reservoir.
- If the level is below the lower line, remove the left side lower fairing (Refer to page 6-2.) and add engine coolant to the full line from the engine coolant reservoir filler.

Ⓐ Full line Ⓑ Lower line



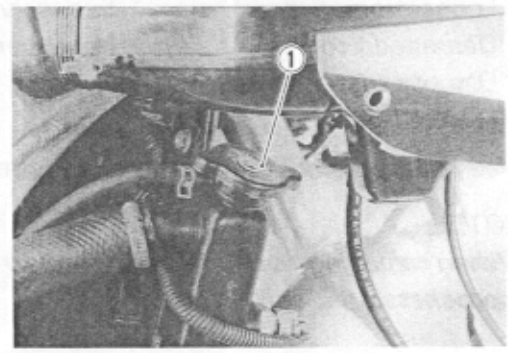
ENGINE COOLANT CHANGE

- Remove the lower fairing assembly. (Refer to page 6-2.)
- Remove the radiator cap ① and disconnect the water hose ② from the water pump, then drain engine coolant.



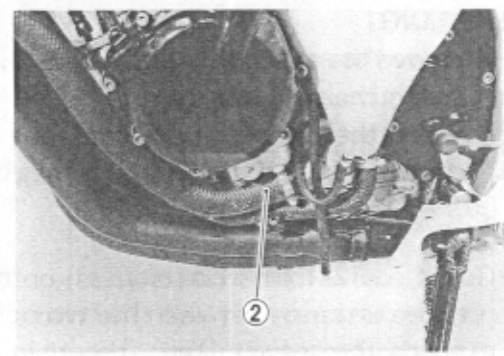
⚠ WARNING

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



- Flush the radiator with fresh water if necessary.
- Connect the water hose ② securely.
- Pour the specified engine coolant up to the radiator inlet.

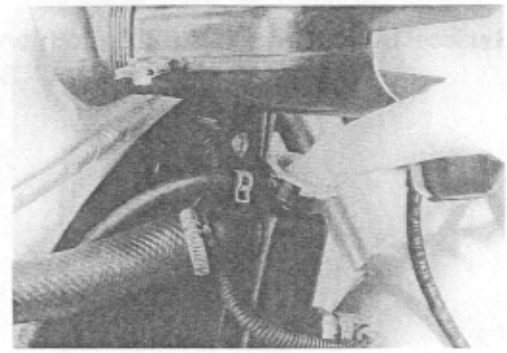
NOTE:
For engine coolant information, refer to page 5-4.



- Close the radiator cap ① securely.
- After warming up and cooling down the engine, add the specified engine coolant up to the engine coolant reservoir.

⚠ CAUTION

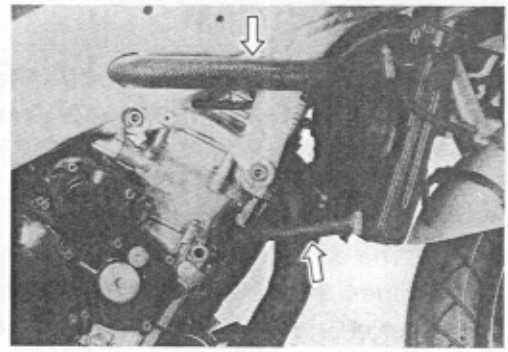
Repeat above procedure several times and make sure that the radiator is filled with engine coolant up to the engine coolant reservoir.



LLC Engine coolant capacity:
2 550 ml (2.7/2.2 US/Imp qt)

RADIATOR HOSES

Check to see the radiator hoses for crack, damage or engine coolant leakage.
If any defects are found, replace the radiator hoses with new ones.



DRIVE CHAIN

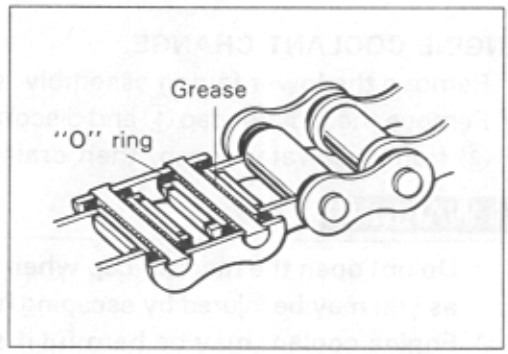
Inspect Initially at 1 000 km (600 miles, 1 month) and Every 6 000 km (4 000 miles, 6 months) thereafter. Lubricate Every 1 000 km (600 miles).

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

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

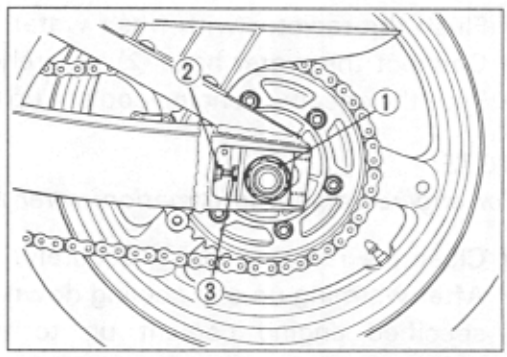
If any defects are found, the drive chain must be replaced.

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



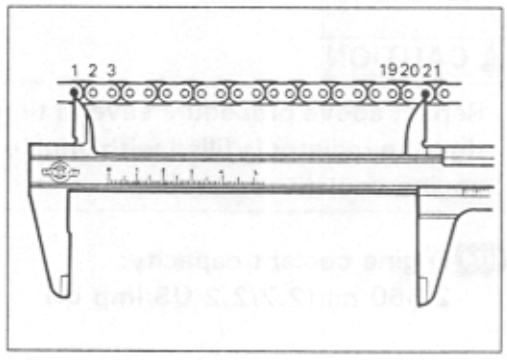
CHECKING

- Remove the axle cotter pin. (For E-03, 28 and 33 models)
- Loosen the axle nut ① .
- Loosen the chain adjuster lock nuts ②.
- Tense the drive chain fully by turning both chain adjusters ③ .



- Count out 21 pins (20 pitches) on the chain and measure the distance between the two points. If the distance exceeds the service limit, the chain must be replaced.

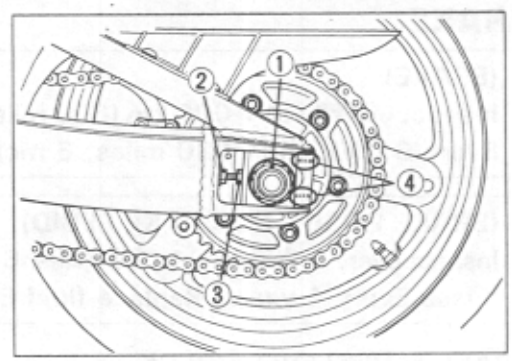
Service Limit (Drive chain 20-pitch length):
319.4 mm (12.6 in)

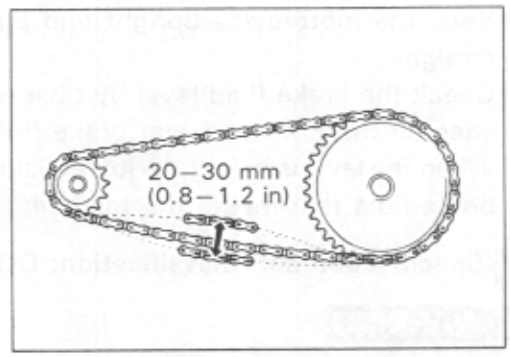


ADJUSTING

- Loosen or tighten both chain adjusters ③ until the chain has 20—30 mm (0.8—1.2 in) of slack in the middle between engine and rear sprockets. The mark ④ on both chain adjusters must be at the same position on the scale to ensure that the front and rear wheels are correctly aligned.
- Place the motorcycle on its side-stand for accurate adjustment.
- After adjusting the drive chain, tighten the axle nut ① securely.
- Tighten both chain adjuster lock nuts ② securely.

Rear axle nut: 100 N·m (10 kg-m, 72.5 lb-ft)





CLEANING AND LUBRICATING

- Wash the chain with kerosene. If the chain tends to rust quickly, the intervals must be shortened.

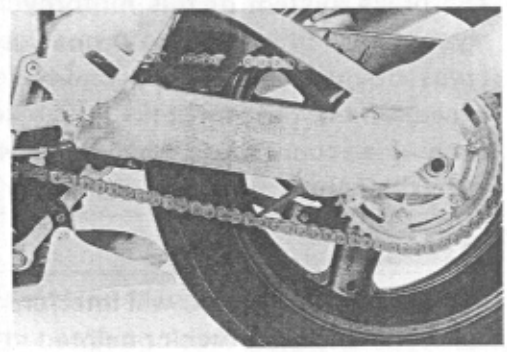
⚠ CAUTION

Do not use trichlene, gasoline or any similar fluids: These fluids have too great a dissolving power for this chain and, what is more important, they can damage the "O"-rings (or seals) confining the grease in the bush to pin clearance. Remember, high durability comes from the presence of grease in that clearance.

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

⚠ CAUTION

*** Do not use any oil sold commercially as "drive chain oil". Such oil can damage the "O"-rings (or seals).**
*** The standard drive chain is TAKASAGO RK50MFO Z1. SUZUKI recommends that this standard drive chain should be used for the replacement.**



BRAKE

(BRAKE)
Inspect Initially at 1 000 km (600 miles, 1 month) and Every 6 000 km (4 000 miles, 6 months) thereafter.

(BRAKE HOSE AND BRAKE FLUID)
Inspect Every 6 000 km (4 000 miles, 6 months). Replace hoses Every 4 years. Replace fluid Every 2 years.

BRAKE FLUID LEVEL CHECK

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

Specification and Classification: DOT 4

⚠ WARNING

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

⚠ WARNING

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

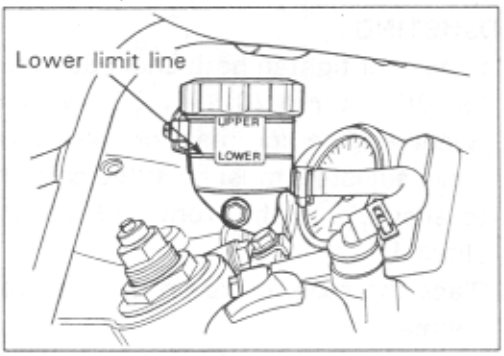
BRAKE PADS

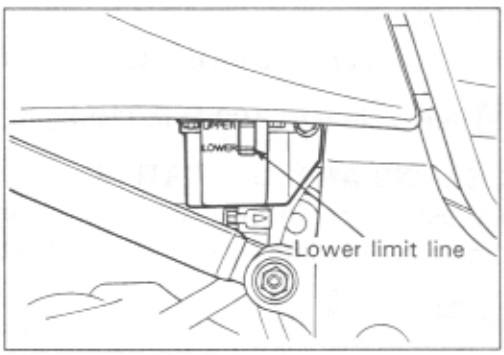
- Remove the brake pad spring by removing bolts (Front brake).

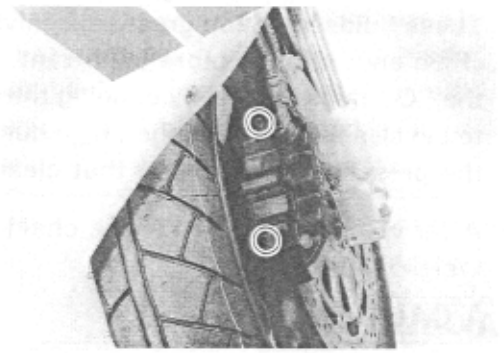
The extent of brake pad wear can be checked by observing the grooved limit line ① on the pad. When the wear exceeds the grooved limit line, replace the pads with new ones. (Refer to pages 6-44 and -52.)

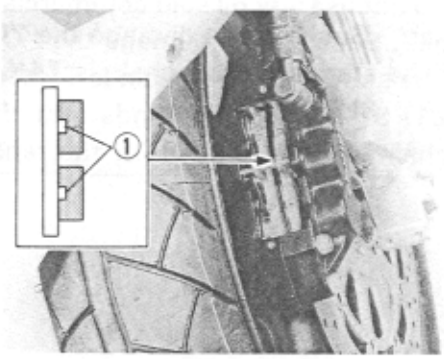
⚠ CAUTION

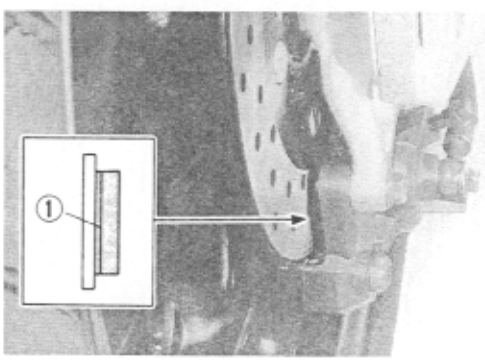
Replace the brake pad as a set, otherwise braking performance will be adversely affected.









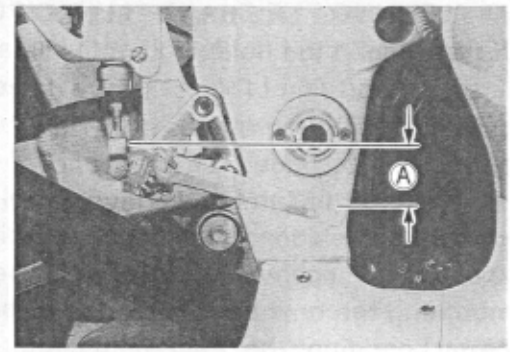


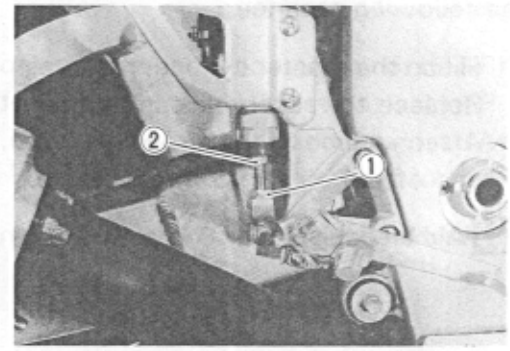
BRAKE PEDAL HEIGHT

- Loosen the lock nut ① and rotate the push rod ② to locate brake pedal 55 mm (2.2 in) Ⓐ below the top face of the footrest.
- Retighten the lock nut ① to secure the push rod ② in the proper position.

Brake pedal height Ⓐ: 55 mm (2.2 in)

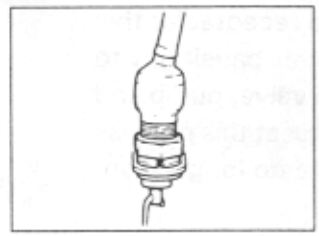
Rear brake master cylinder rod lock nut ①:
18 N·m (1.8 kg-m, 13.0 lb-ft)

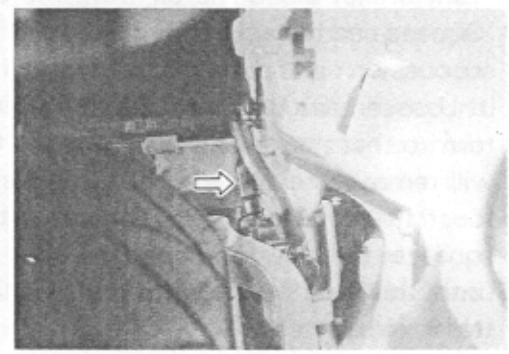




BRAKE LIGHT SWITCH

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



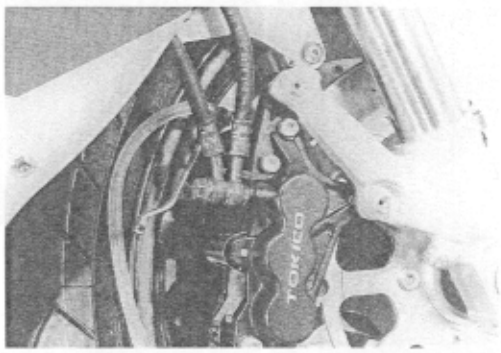


AIR BLEEDING THE BRAKE FLUID CIRCUIT

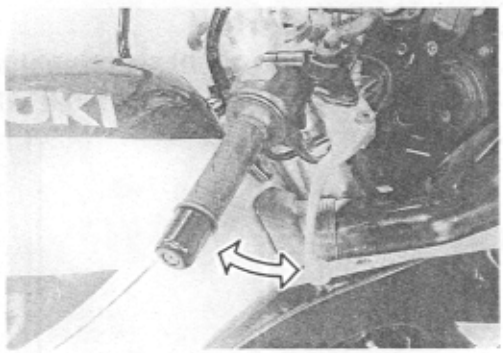
Air trapped in the fluid circuit acts like a cushion to absorb a large proportion of the pressure developed by the master cylinder and thus interferes with the full braking performance of the brake caliper. The presence of air is indicated by "sponginess" of the brake lever and also by lack of braking force. Considering the danger to which such trapped air exposes the machine and rider, it is essential that, after remounting the brake and restoring the brake system to the normal condition, the brake fluid circuit be purged of air in the following manner:

- Fill up the master cylinder reservoir to the "UPPER" line. Replace the reservoir cap to prevent entry of dirt.
- Attach a pipe to the air bleeder valve, and insert the free end of the pipe into a receptacle.

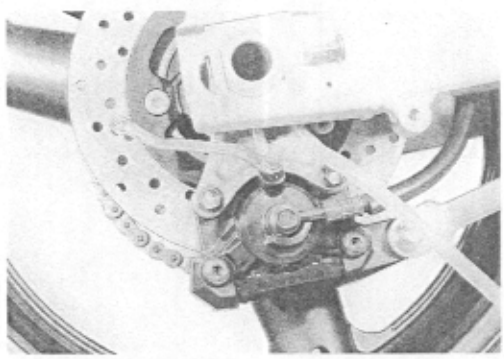
Air bleeder valve: 8 N·m (0.8 kg-m, 6.0 lb-ft)



- Front brake: Bleed the air from the air bleeder valve.
- Squeeze and release the brake lever several times in rapid succession and squeeze the lever fully without releasing it. Loosen the 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. Then, close the valve, pump and squeeze the lever, and open the valve. Repeat this process until the fluid flowing into the receptacle no longer contains air bubbles.



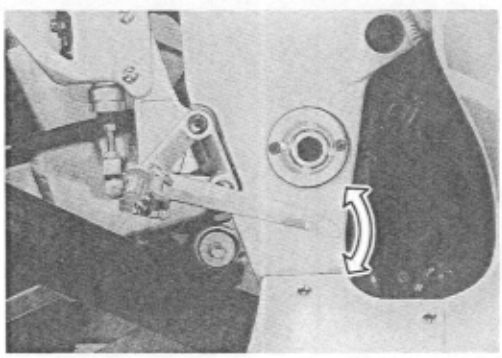
NOTE:
Replenish the brake fluid in the reservoir as necessary while bleeding the brake system. Make sure that there is always some fluid visible in the reservoir.



- Close the bleeder valve, and disconnect the pipe. Fill the reservoir with brake fluid to the "UPPER" line.

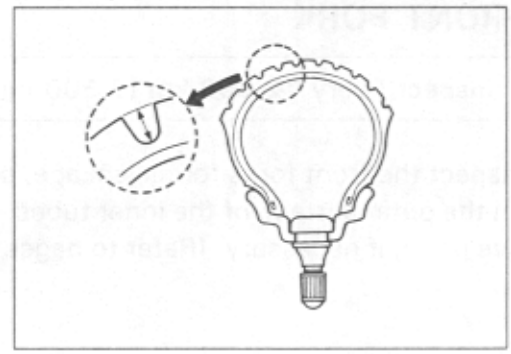
⚠ CAUTION

Handle brake fluid with care: the fluid reacts chemically with paint, plastics, rubber materials and so on.



- The only difference between bleeding the front and rear brakes is that the rear master cylinder is actuated by a pedal.

TIRE



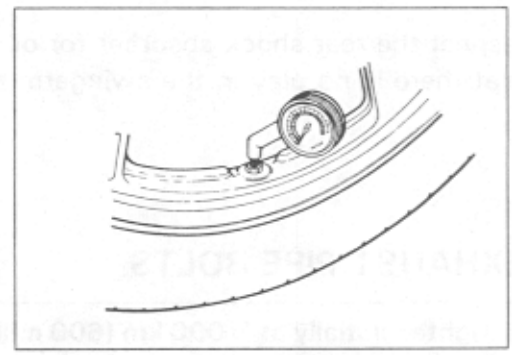
Inspect Every 6 000 km (4 000 miles, 6 months).

TIRE TREAD CONDITION

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

Tire tread depth limit: FRONT 1.6 mm (0.06 in)
REAR 2.0 mm (0.08 in)

TIRE PRESSURE



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

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	250	2.50	36	250	2.50	36
REAR	250	2.50	36	250	2.50	36

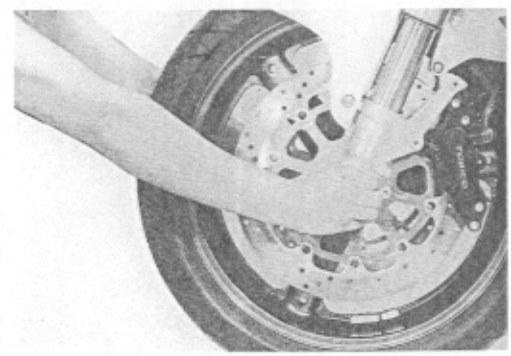
⚠ CAUTION

The standard tire fitted on this motorcycle is 120/70 ZR17 for front and 190/50 ZR17 for rear. The use of tires other than those specified may cause instability. It is highly recommended to use a SUZUKI Genuine Tire.

TIRE TYPE

DUNLOP (front ... D204FM, rear ... D204G) ... E-03, 24, 28, 33, 37
MICHELIN (front ... TX15, rear ... TX25) ... E-02, 04, 34
METZELER (front ... MEZI Front RACING, rear ... MEZI RACING) ... E-18, 22, 25, 39

STEERING



Inspect Initially at 1 000 km (600 miles, 1 month) and Every 12 000 km (7 500 miles, 12 months) thereafter.

Steering should be adjusted properly for smooth turning of handlebars and safe running. Overtight steering prevents smooth turning of the handlebars and too loose steering will cause poor stability. Check that there is no play in the steering stem while grasping the lower fork tubes by supporting the machine so that the front wheel is off the ground, with the wheel straight ahead, and pull forward. If play is found, perform steering bearing adjustment as described in page 6-26 of this manual.

FRONT FORK

Inspect Every 12 000 km (7 500 miles, 12 months).

Inspect the front forks for oil leakage, scoring or scratches on the outer surface of the inner tubes. Replace any defective parts, if necessary. (Refer to pages 6-11 through -20.)

REAR SUSPENSION

Inspect Every 12 000 km (7 500 miles, 12 months).

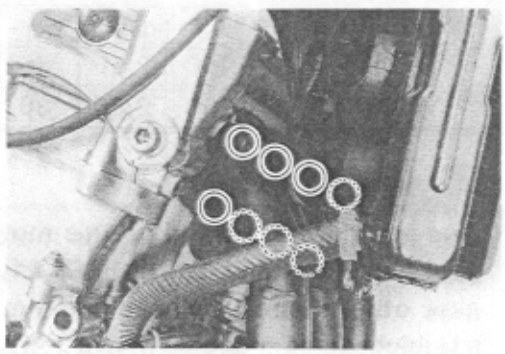
Inspect the rear shock absorber for oil leakage and check that there is no play in the swingarm assembly.

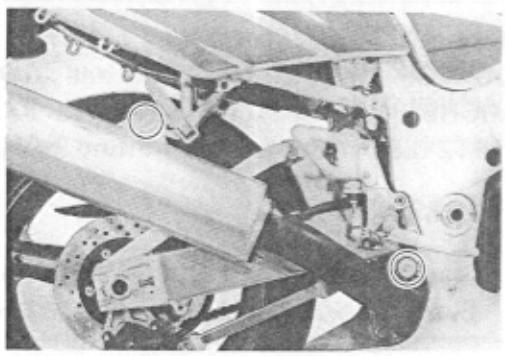
EXHAUST PIPE BOLTS

Tighten initially at 1 000 km (600 miles, 1 month) and Every 12 000 km (7 500 miles, 12 months) thereafter.

- Remove the lower fairing assembly. (Refer to pages 6-2 and -3.)
- Remove the radiator mounting bolts.
- Tighten the exhaust pipe clamp bolts and muffler mounting bolts to the specified torque with a torque wrench.

Exhaust pipe clamp bolt & Muffler mounting bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)



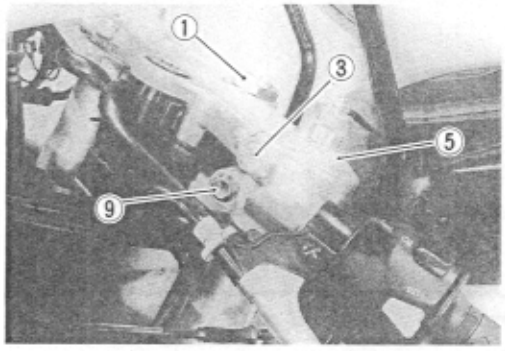


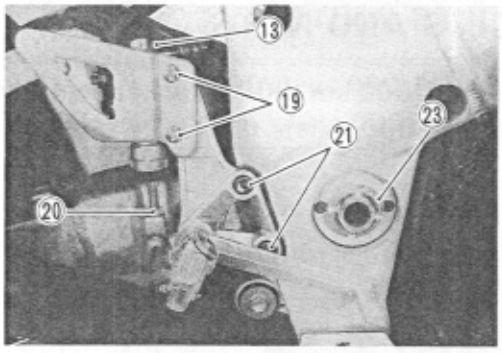
CHASSIS BOLTS AND NUTS

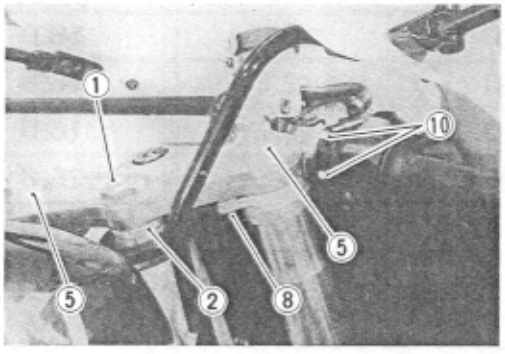
Tighten Initially at 1 000 km (600 miles, 1 month) and Every 6 000 km (4 000 miles, 6 months) thereafter.

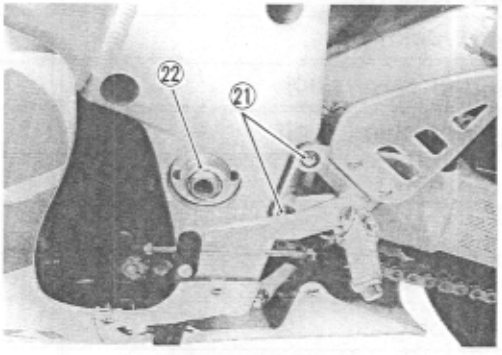
Check that all chassis bolts and nuts are tightened to their specified torque. (Refer to page 2-21 for the locations of the following nuts and bolts on the motorcycle.)

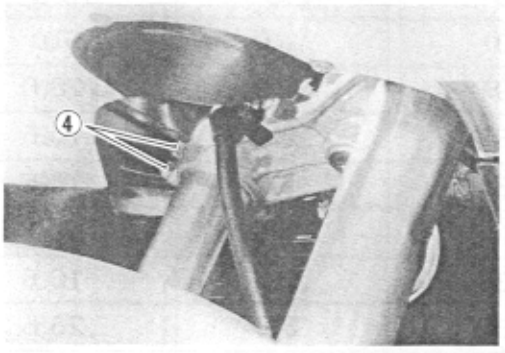
Item	N·m	kg-m	lb-ft
① Steering stem head nut	90	9.0	65.0
② Steering stem lock nut	80	8.0	58.0
③ Front fork upper clamp bolt	23	2.3	16.5
④ Front fork lower clamp bolt	23	2.3	16.5
⑤ Front fork cap bolt	35	3.5	25.5
⑥ Front axle	100	10.0	72.5
⑦ Front axle pinch bolt	23	2.3	16.5
⑧ Handlebar set bolt	10	1.0	7.0
⑨ Handlebar clamp bolt	23	2.3	16.5
⑩ Front brake master cylinder mounting bolt	10	1.0	7.0
⑪ Front brake caliper mounting bolt	39	3.9	28.0
⑫ Front brake caliper housing bolt	23	2.3	16.5
⑬ Brake hose union bolt (Front & Rear)	23	2.3	16.5
⑭ Caliper air bleeder valve (Front & Rear)	8	0.8	6.0
⑮ Brake disc bolt (Front)	23	2.3	16.5
⑯ Brake disc bolt (Rear)	35	3.5	25.5
⑰ Rear brake caliper mounting bolt	26	2.6	19.0
⑱ Rear brake caliper housing bolt	33	3.3	24.0
⑲ Rear brake master cylinder mounting bolt	10	1.0	7.0
⑳ Rear brake master cylinder rod lock nut	18	1.8	13.0
㉑ Front footrest bracket mounting bolt	39	3.9	28.0
㉒ Swingarm pivot nut	100	10.0	72.5
㉓ Swingarm pivot lock nut	90	9.0	65.0
㉔ Torque link bolt and nut (front)	28	2.8	20.0
㉕ Torque link bolt and nut (Rear)	35	3.5	25.5
㉖ Rear suspension height adjuster nut	85	8.5	61.5
㉗ Rear shock absorber mounting bolt/nut (Upper & Lower)	50	5.0	36.0
㉘ Rear cushion lever/rod mounting nut	78	7.8	56.5
㉙ Rear axle nut	100	10.0	72.5
㉚ Rear sprocket nut	60	6.0	43.5

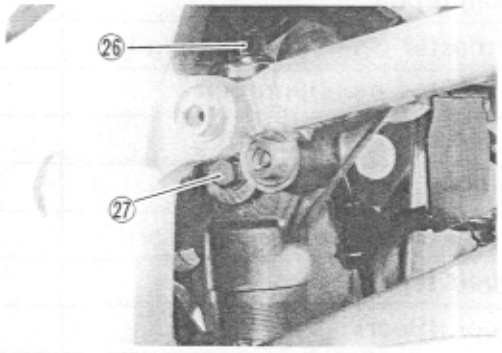

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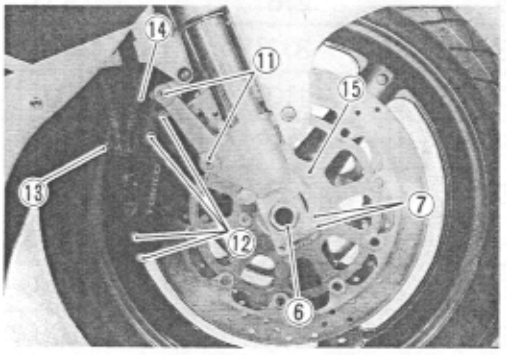

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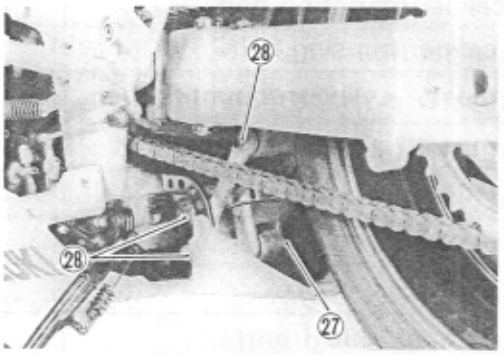

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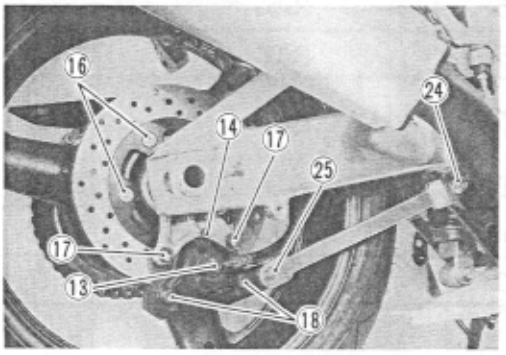

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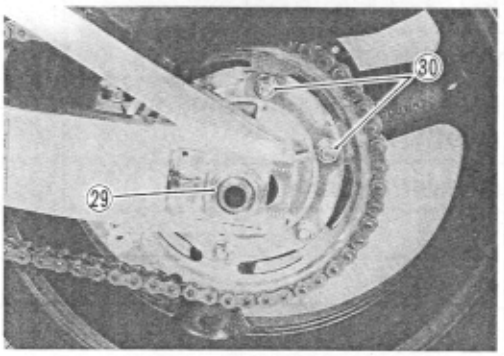

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COMPRESSION PRESSURE CHECK

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

COMPRESSION PRESSURE SPECIFICATION

Standard	Limit	Difference
1 100—1 500 kPa (11—15 kg/cm²) 156—213 psi	900 kPa (9 kg/cm²) 128 psi	200 kPa (2 kg/cm²) 28 psi

Low compression pressure can indicate any of the following conditions:

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

Overhaul the engine in the following cases:

* Compression pressure in one of the cylinders is less than 900 kPa (9 kg/cm², 128 psi).
* Difference in compression pressure between any two cylinders is more than 200 kPa (2 kg/cm², 28 psi).
* All compression pressure are below 1 100 kPa (11 kg/cm², 156 psi) even when they measure more than 900 kPa (9 kg/cm², 128 psi).

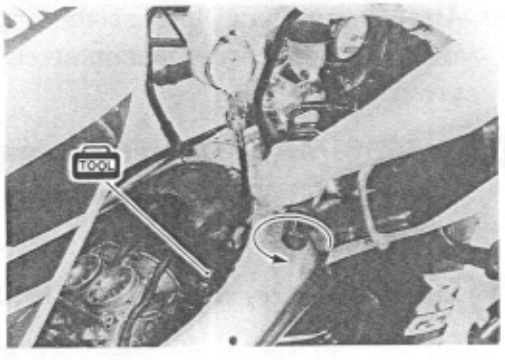
COMPRESSION TEST PROCEDURE

NOTE:

* *Before testing the engine for compression pressure, make sure that the cylinder head bolts are tightened to the specified torque values and valves are properly adjusted.*
* *Have the engine warmed up by idling before testing.*
* *Be sure that the battery used is in fully-charged condition.*

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

- Remove the seat. (Refer to page 6-3.)
- Lift and support the fuel tank. (Refer to page 4-2.)
- Remove the air cleaner box. (Refer to page 4-14.)
- Remove all the spark plugs. (Refer to page 2-4.)
- Fit the compression gauge in one of the plug holes, while taking care that the connection tight.
- Keep the throttle grip in full-open position.
- While cranking the engine a few seconds with the starter, and record the maximum gauge reading as the compression of that cylinder.
- Repeat this procedure with the other cylinders.



TOOL **09915-64510: Compression gauge**
09913-10750: Adaptor

OIL PRESSURE CHECK

Check periodically the oil pressure in the engine to judge roughly the condition of the moving parts.

OIL PRESSURE SPECIFICATION

Above 200 kPa (2.0 kg/cm², 28 psi) **Below 500 kPa (5.0 kg/cm², 71 psi)**	**at 3 000 r/min., Oil temp. at 60°C (140°F)**

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

LOW OIL PRESSURE

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

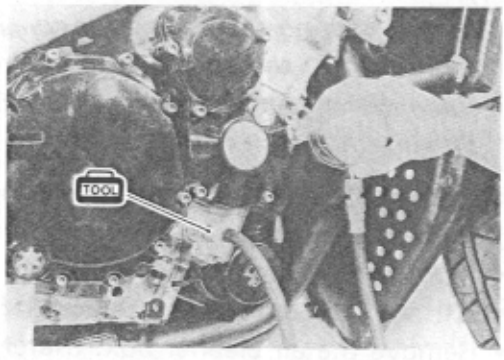
HIGH OIL PRESSURE

* Used a engine oil which is too high viscosity
* Clogged oil passage way
* Combination of above items

OIL PRESSURE TEST PROCEDURE

Start the engine and check if the oil pressure indicator light is turned on. If it keeps on lighting, check the oil pressure indicator light circuit. If it is in good condition, check the oil pressure in the following manner.

- Remove the right side lower fairing. (Refer to page 6-2).
- Remove the main oil gallery plug.
- Install the oil pressure gauge with attachment in the position shown in the figure.
- Warm up the engine as follows:
  Summer 10 min. at 2 000 r/min.
  Winter 20 min. at 2 000 r/min.
- After warming up, increase the engine speed to 3 000 r/min. (with the engine tachometer), and read the oil pressure gauge.



TOOL 09915-74510: Oil pressure gauge
09915-74540: Oil pressure gauge attachment
09915-77330: Meter (for high pressure)

Main oil gallery plug: 40 N·m (4.0 kg-m, 29.0 lb-ft)

ENGINE

CONTENTS

ENGINE COMPONENTS REMOVABLE WITH ENGINE IN PLACE 3- 1

ENGINE REMOVAL AND INSTALLATION 3- 2

3

CAMSHAFT/CYLINDER HEAD 3A

CYLINDER/PISTON 3B

CLUTCH 3C

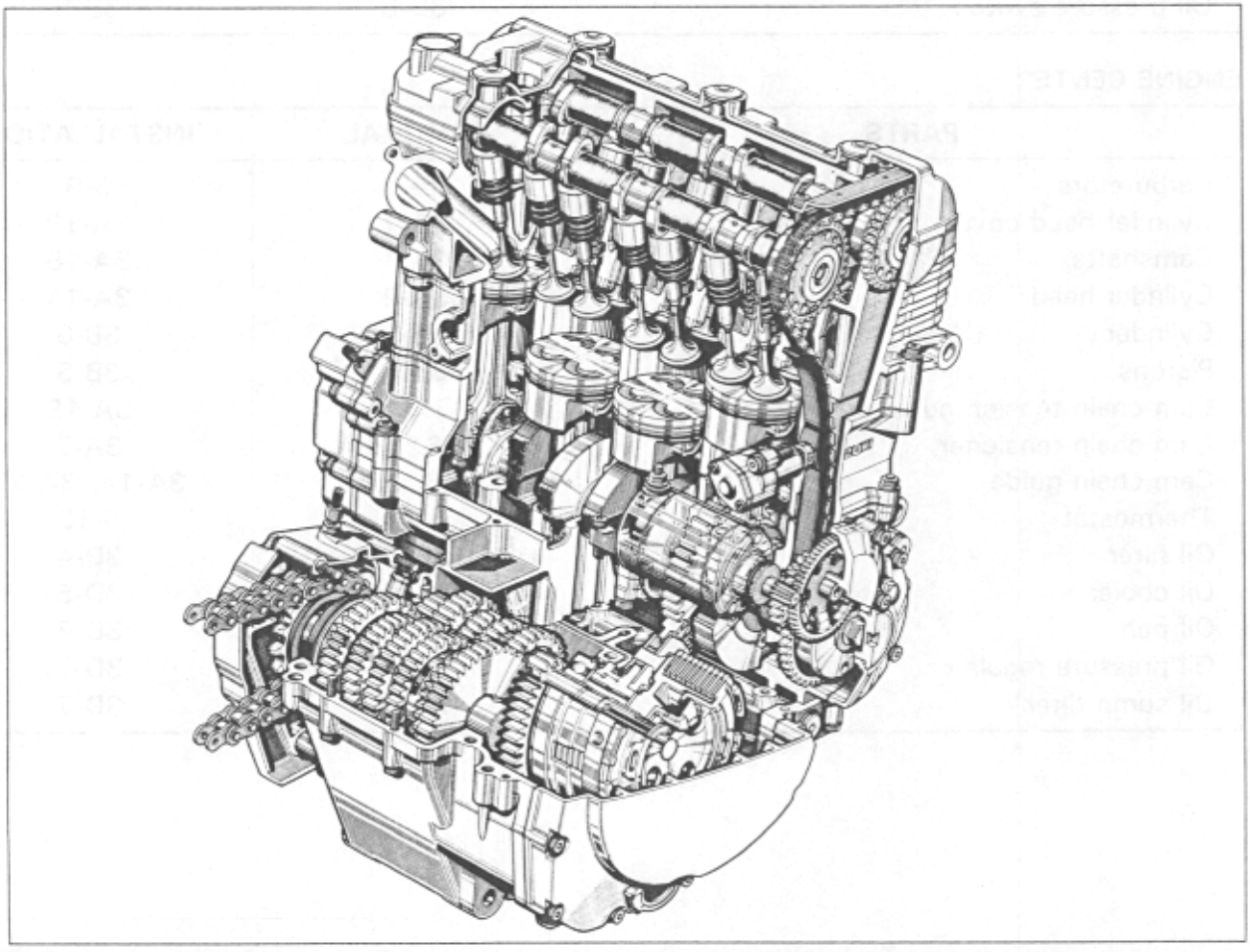
ENGINE LUBRICATION SYSTEM 3D

STARTER SYSTEM/SIGNAL GENERATOR 3E

GENERATOR 3F

GEARSHIFT LINKAGE 3G

CRANKCASE/TRANSMISSION/CRANKSHAFT/CONROD 3H



ENGINE COMPONENTS REMOVABLE WITH ENGINE IN PLACE

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

ENGINE LEFT SIDE

PARTS	REMOVAL	INSTALLATION
Gearshift lever	3-5	3-10, 3G-0
Engine sprocket cover	3-5	3-10
Speedometer sensor	3-5	3-10
Engine sprocket and drive chain	3-5	3-10
Neutral indicator switch body	3H-5	3H-5
Water pump	5-13	5-15
Generator	3F-1	3F-2

ENGINE RIGHT SIDE

PARTS	REMOVAL	INSTALLATION
Clutch	3C-1	3C-4
Primary driven gear	3C-2	3C-4
Oil pump drive and driven gear	3D-1	3D-3
Oil pump	3D-1	3D-2
Gearshift linkage	3G-1	3G-2
Starter clutch	3E-1	3E-3
Starter motor	3E-5	3E-5
Signal generator	3E-2	3E-3
Oil pressure switch	3D-8	3D-8

ENGINE CENTER

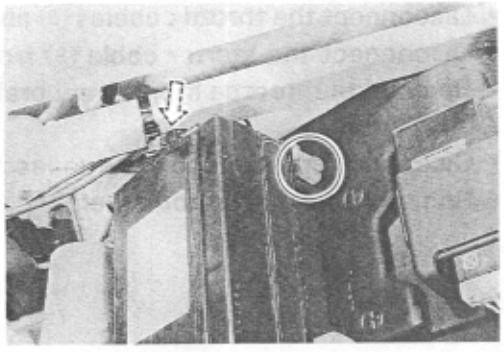
PARTS	REMOVAL	INSTALLATION
Carburetors	3-3	3-9
Cylinder head cover	3A-1	3A-19
Camshafts	3A-1	3A-15
Cylinder head	3A-2	3A-14
Cylinder	3B-1	3B-6
Pistons	3B-1	3B-5
Cam chain tension adjuster	3A-1	3A-18
Cam chain tensioner	3A-6, 3H-4	3A-7
Cam chain guide	3A-6, 3B-1	3A-14, 3A-18
Thermostat	5-11	5-12
Oil filter	3D-4	3D-4
Oil cooler	3D-5	3D-5
Oil pan	3D-6	3D-7
Oil pressure regulator	3D-6	3D-7
Oil sump filter	3D-6	3D-7

ENGINE REMOVAL AND INSTALLATION

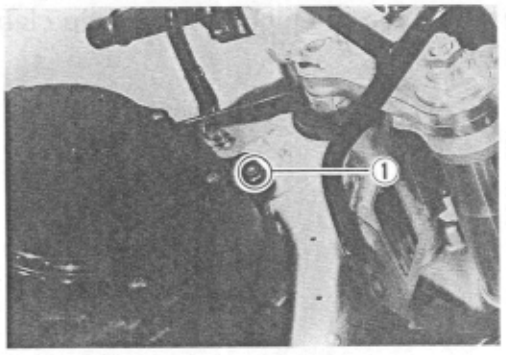
ENGINE REMOVAL

Before taking the engine out of the frame, wash the engine with a steam cleaner. The procedure of engine removal is sequentially explained in the following steps, and engine installation is effected by reversing the removal procedure.

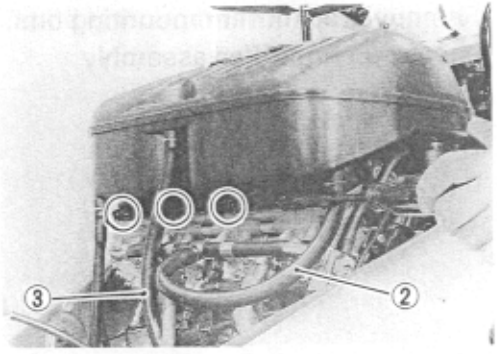
- Remove the oil drain plug to drain out engine oil.
- Remove the rear and front seats.
- Remove the fuel tank. (See page 4-2.)
- Remove the lower fairing assembly and under fairing. (See page 6-2.)
- Disconnect the battery ⊖ lead wire terminal and battery ⊖ lead wire coupler.



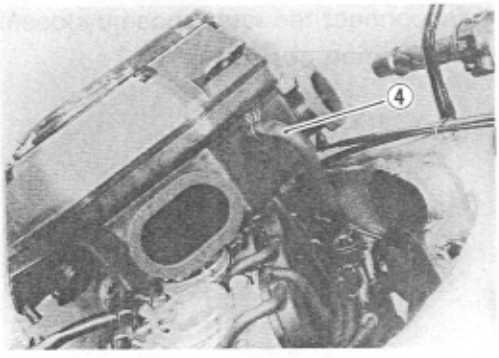
- Remove the air cleaner box mounting bolt ①.



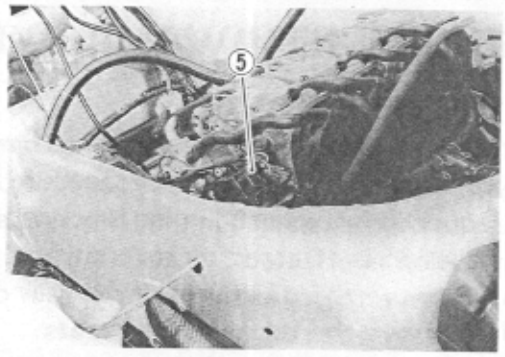
- Loosen the respective carburetor clamp screws at air cleaner box side as shown.
- Disconnect the lift control valve air hose No.1 ②.
- Disconnect the crankcase breather hose ③.



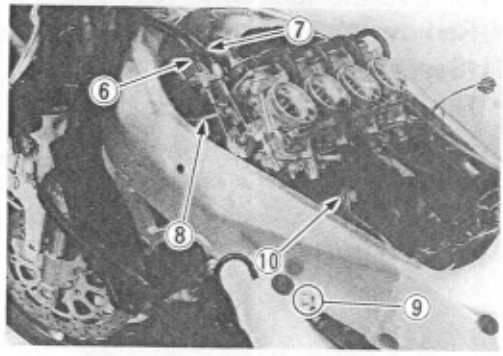
- Disconnect the carburetor air vent hose ④ and remove the air cleaner box.



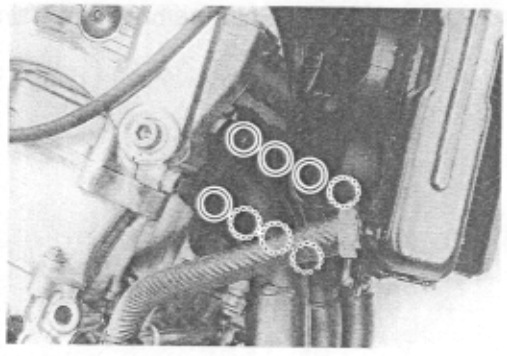
- Loosen the respective carburetor clamp screws at engine side as shown.
- Disconnect the throttle position sensor lead wire coupler ⑤.



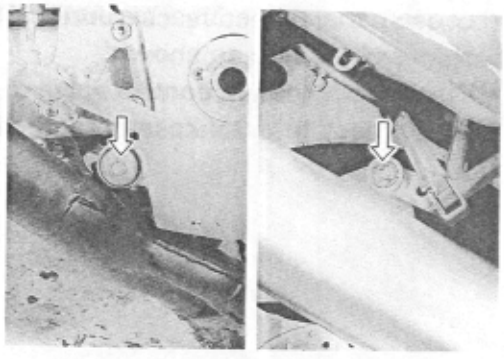
- Disconnect the throttle cables ⑥ and ⑦ from their drum.
- Disconnect the starter cable ⑧ from the carburetor.
- Remove the throttle stop screw bracket mounting screw ⑨.
- Disconnect the solenoid valve lead wire coupler ⑩.
- Remove the carburetor assembly.



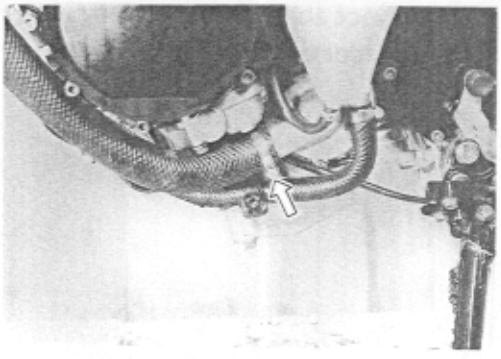
- Remove the eight exhaust pipe clamp bolts.



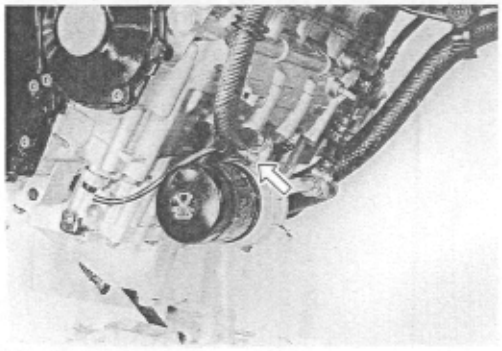
- Remove the muffler mounting bolts, then remove the exhaust pipe/muffler assembly.



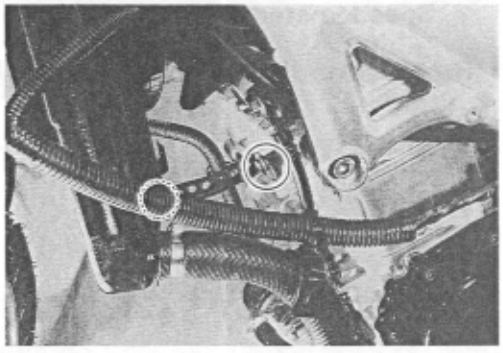
- Disconnect the water hose by loosening its clamp to drain out engine coolant.



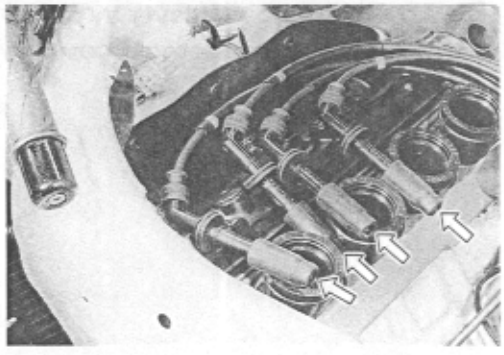
- Loosen the water hose clamp and disconnect the water hose from the oil cooler.



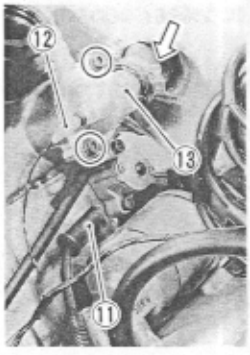
- Remove the radiator bracket bolts.

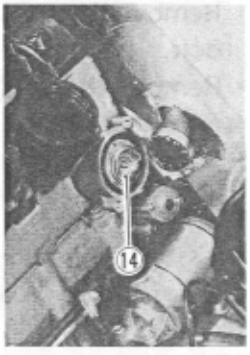


- Disconnect all the spark plug caps.

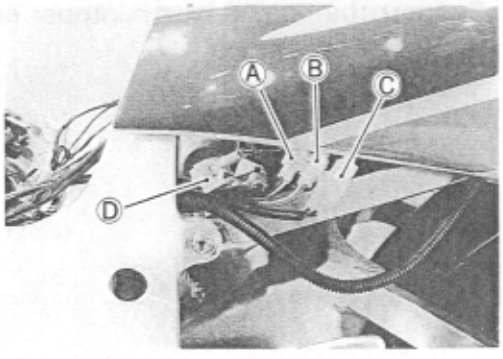


- Disconnect the starter motor lead wire ⑪.
- Disconnect the water temperature gauge lead wire ⑫.
- Remove the thermostat cover ⑬ by removing the bolts and loosening the water hose clamp.
- Remove the thermostat ⑭.

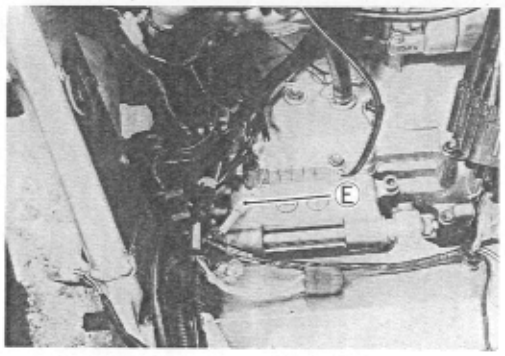




- Disconnect the various lead wires.
  Ⓐ Signal generator (Black & Green ②P)
  Ⓑ Gear position switch (Blue & Pink ②P)
  Ⓒ Generator (Black ③P)
  Ⓓ Side-stand switch (Green & Black/White ②P)

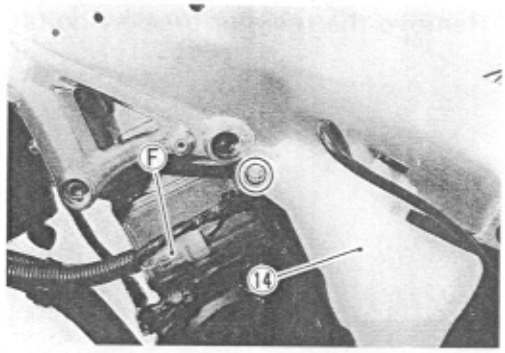


Ⓔ Oil pressure switch (Green/Yellow ①P)

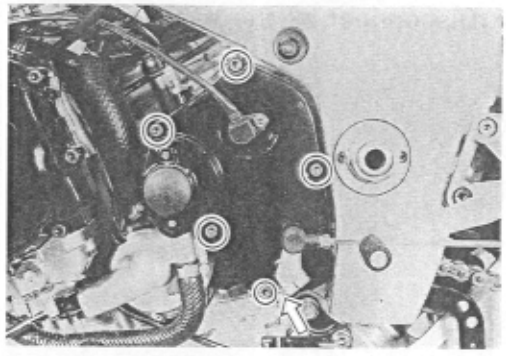


Ⓕ Speedometer sensor (Red, Yellow & Black ③P)

- Remove the engine coolant reservoir tank ⑭.

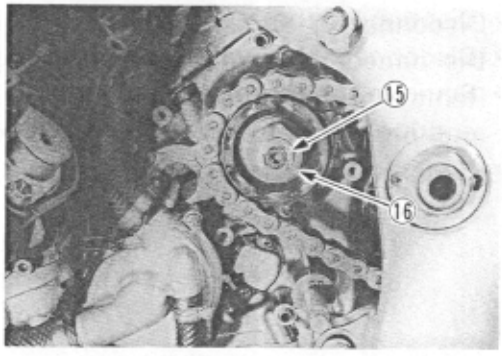


- Remove the gearshift lever by removing its mounting bolt.
- Remove the engine sprocket cover by removing the bolts.

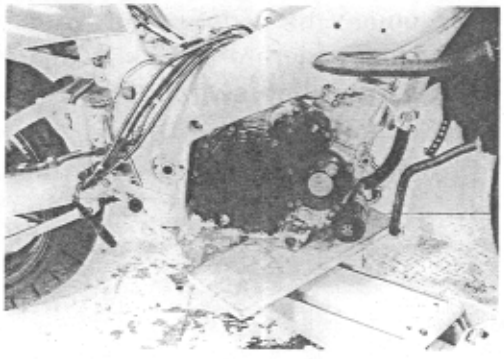


- Remove the speedometer sensor rotor ⑮ by removing the bolt.
- Remove the engine sprocket nut ⑯ while depressing the rear brake pedal.
- Remove the engine sprocket.

NOTE:
If it is difficult to remove the engine sprocket, loosen the axle nut and chain adjusters to provide additional chain slack.

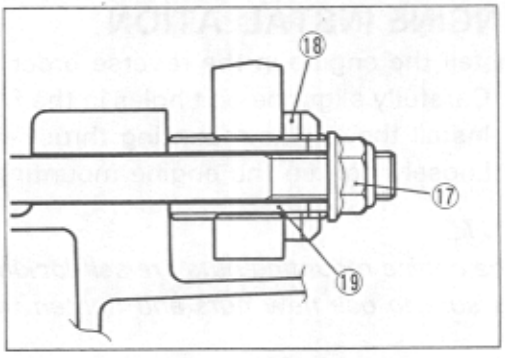


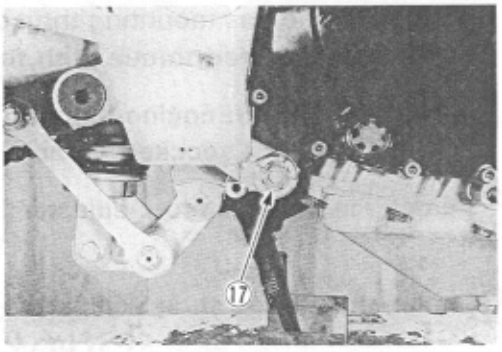
- Support the engine with a proper engine jack.

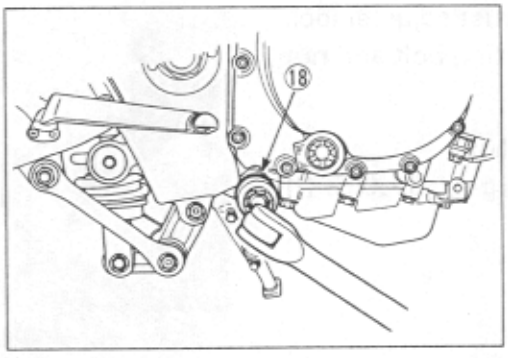


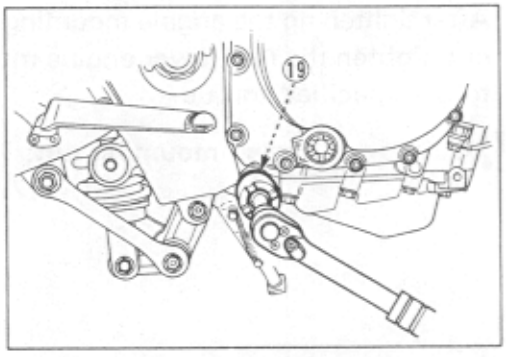
- Remove the rear lower engine mounting nut ⑰.
- Remove the engine mounting thrust adjuster lock nut ⑱ with the special tool and loosen the engine mounting thrust adjuster ⑲ fully with the special tool.

TOOL **09940-14980: Engine mounting thrust adjuster socket wrench**

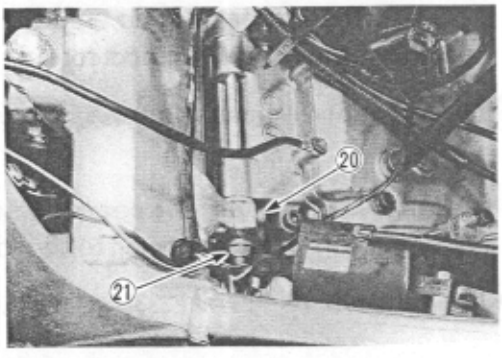




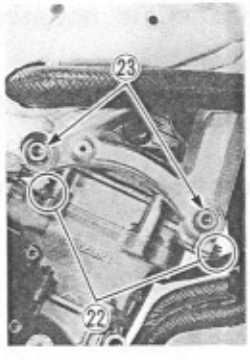


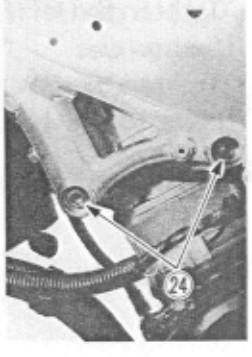


- After loosening the pinch bolt ⑳, remove the rear upper engine mounting nut ㉑.



- After loosening the pinch bolts ㉒, remove the right front engine mounting bolts ㉓.
- Remove the left front engine mounting bolts ㉔.
- Remove the two long engine mounting bolts and spacer.
- Gradually lower the engine assembly.





⚠ CAUTION

Be careful not to damage the frame and engine when removing the engine from the frame.

ENGINE INSTALLATION

Install the engine in the reverse order of engine removal.

- Carefully align the bolt holes in the frame and engine then insert the two long bolts from left side. Install the engine mounting thrust adjuster, spacers, bolts and nuts properly.
- Loosely tighten the engine mounting bolts and nuts.

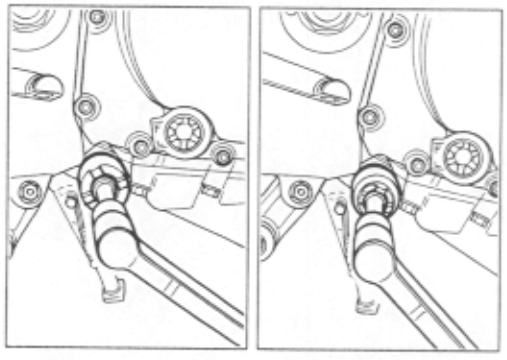
NOTE:
The engine mounting nuts are self-locking. Once the nut has been removed, it is no longer of any use. Be sure to use new nuts and tighten them to the specified torque.

- Tighten the engine mounting thrust adjuster and its lock nut to the specified torque with the special tool.

TOOL 09940-14980: Engine mounting thrust adjuster socket wrench

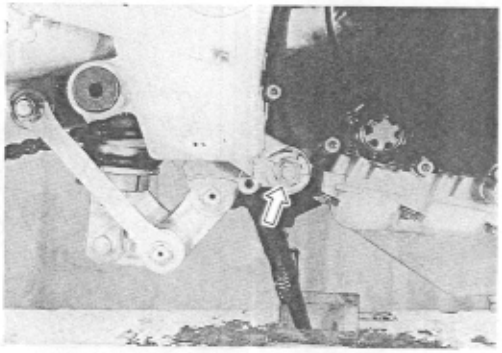
Engine mounting thrust adjuster: 10 N·m (1.0 kg-m, 7.0 lb-ft)

Engine mounting thrust adjuster lock nut: 45 N·m (4.5 kg-m, 32.5 lb-ft)



- After tightening the engine mounting thrust adjuster lock nut, tighten the rear lower engine mounting bolt and nut to the specified torque.

Rear lower engine mounting nut: 79 N·m (7.9 kg-m, 57.0 lb-ft)

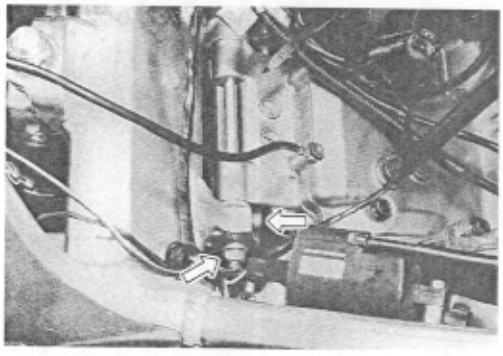


- Push the rear upper engine mounting bolt fully and tighten the nut to the specified torque.

Rear upper engine mounting nut: 79 N·m (7.9 kg-m, 57.0 lb-ft)

- After tightening the rear upper engine mounting bolt and nut, tighten the pinch bolt to the specified torque.

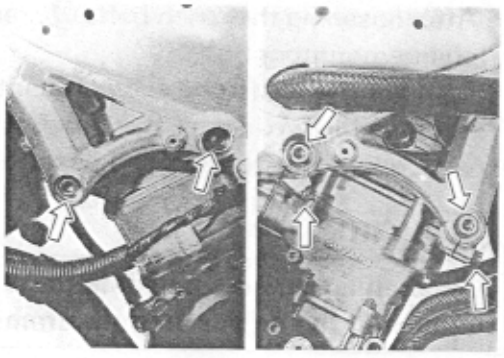
Pinch bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)

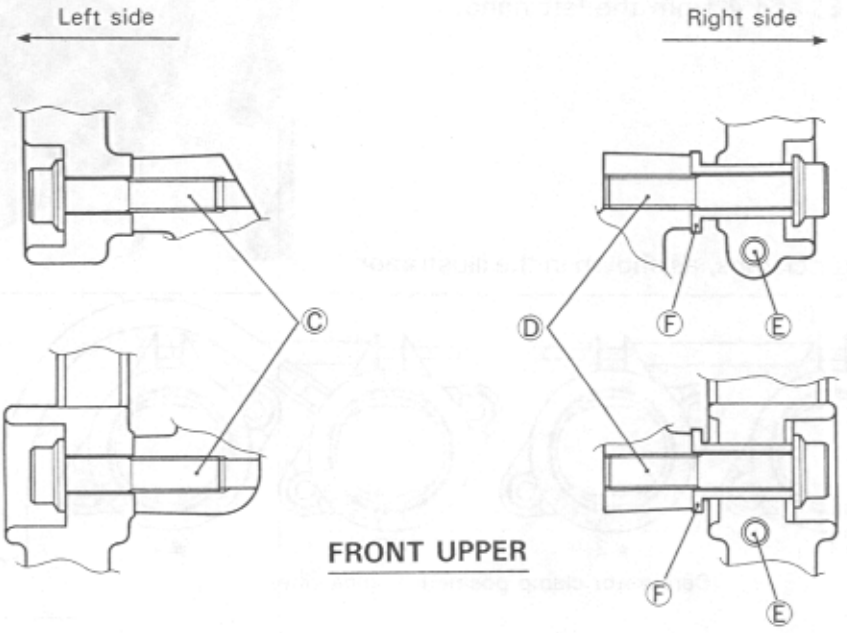


- Tighten the left front engine mounting bolts to the specified torque.
- Tighten the right front engine mounting bolts and pinch bolts to the specified torque.

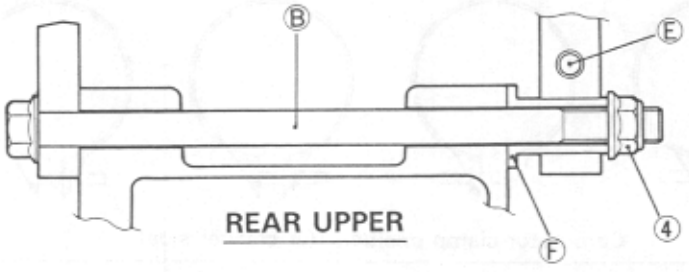
Left and right front engine mounting bolt: 79 N·m (7.9 kg-m, 57.0 lb-ft)

Pinch bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)

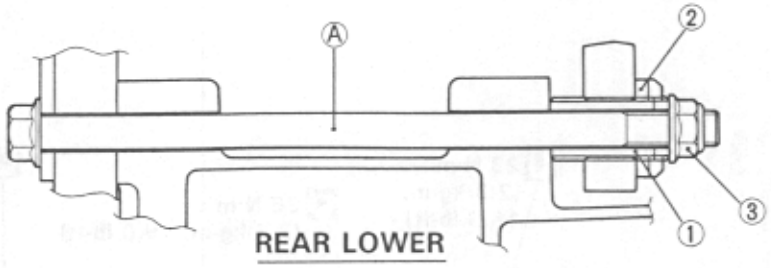




FRONT UPPER



REAR UPPER



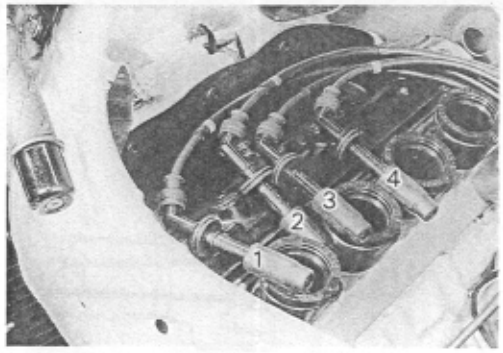
REAR LOWER

ITEM	N·m	kg-m	lb-ft
①	10	1.0	7.0
②	45	4.5	32.5
③, ④, Ⓒ, Ⓓ	79	7.9	57.0
Ⓔ	23	2.3	16.5

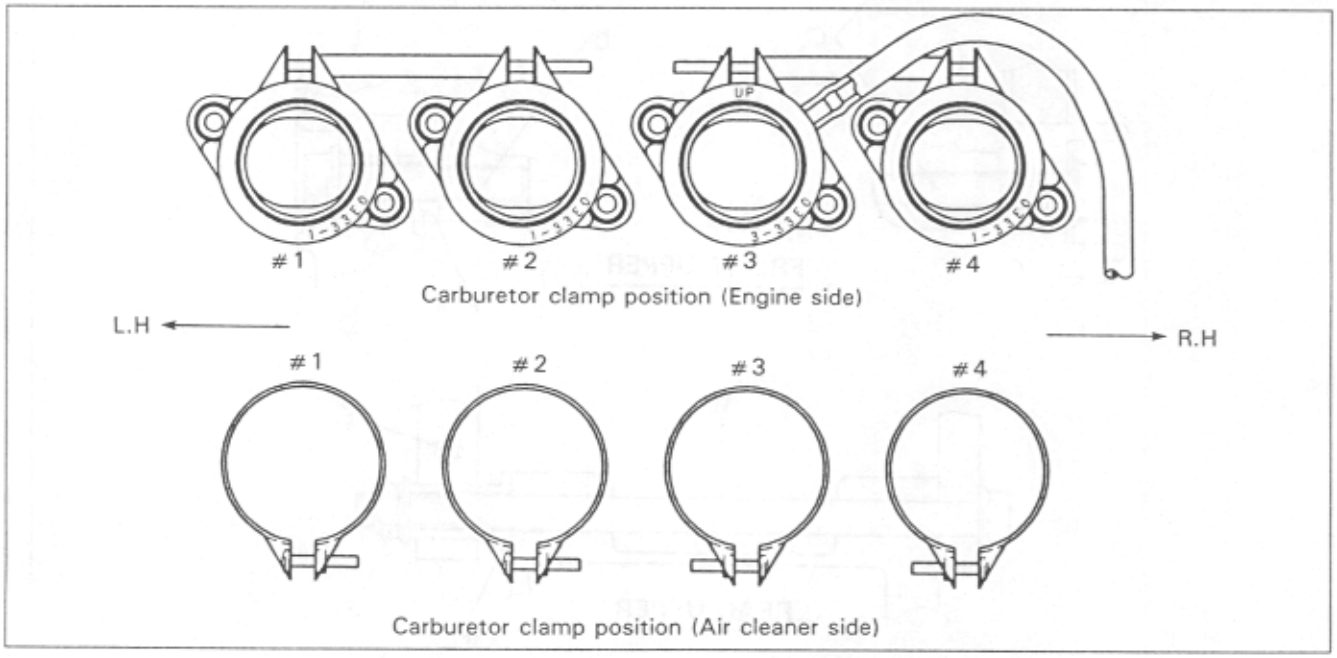
LENGTH

Bolt Ⓐ	200 mm (7.9 in)
Bolt Ⓑ	185 mm (7.3 in)
Bolt Ⓒ	45 mm (1.8 in)
Bolt Ⓓ	55 mm (2.2 in)
Bolt Ⓔ	30 mm (1.1 in)
Spacer Ⓕ	30.5 mm (1.2 in)

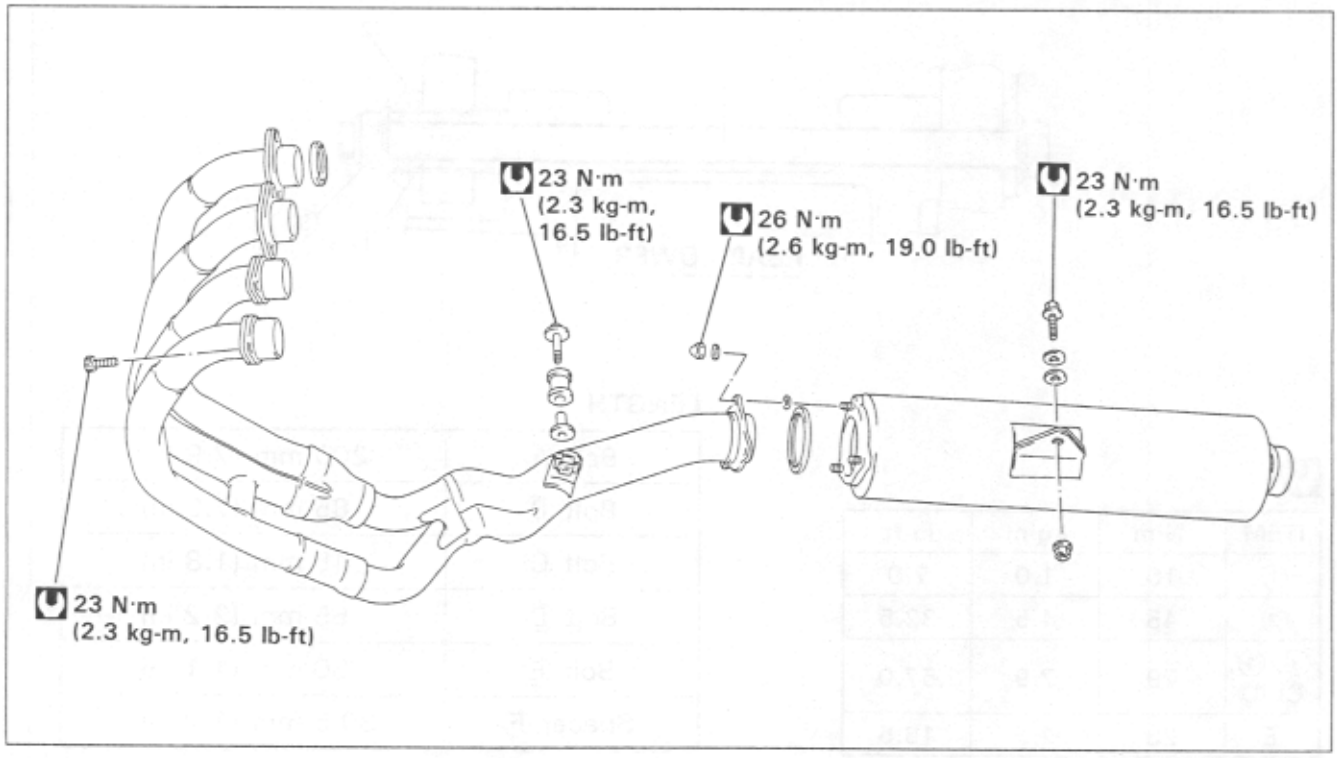
- Replace the plug caps on the spark plugs so that their code markings correspond to the cylinder numbers arranged in the order of **1, 2, 3,** and **4** from the left hand.



- Locate the carburetor clamps, as shown in the illustration.



- Tighten the exhaust pipe bolts and muffler mounting bolts to the specified torque.

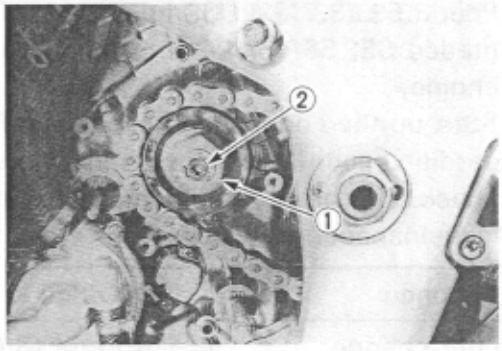


- Tighten the engine sprocket nut ① to the specified torque while depressing the rear brake pedal.

Engine sprocket nut: 120 N·m (12 kg-m, 87 lb-ft)

- Tighten the speedometer sensor rotor bolt ② to the specified torque.

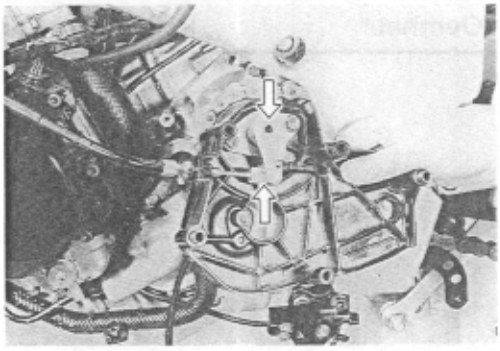
Speedometer sensor rotor bolt: 13 N·m (1.3 kg-m, 9.5 lb-ft)

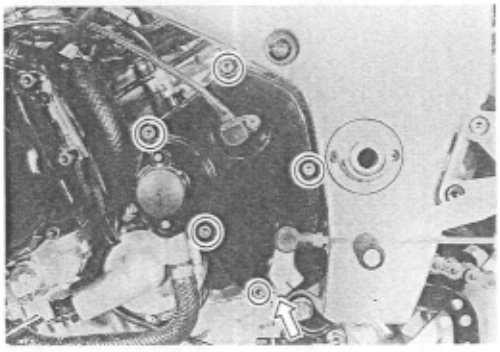


- Before installing the engine sprocket cover, apply a small quantity of SUZUKI SUPER GREASE "A" to the clutch release mechanism.

99000-25030: SUZUKI SUPER GREASE "A"

- Install the gearshift lever to the gearshift shaft in the correct position. (See page 3G-0.)



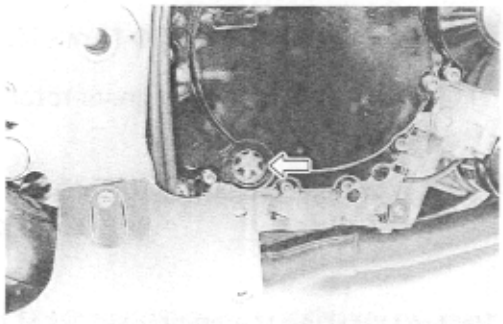


- Tighten the rear axle nut to the specified torque. (See page 8-30.)
- After remounting the engine, route wiring harnesses, cables and hoses properly by referring to the sections, for wire routing, cable routing and hose routing. (See pages 8-13 through 22.)
- Adjust the following items to the specification.

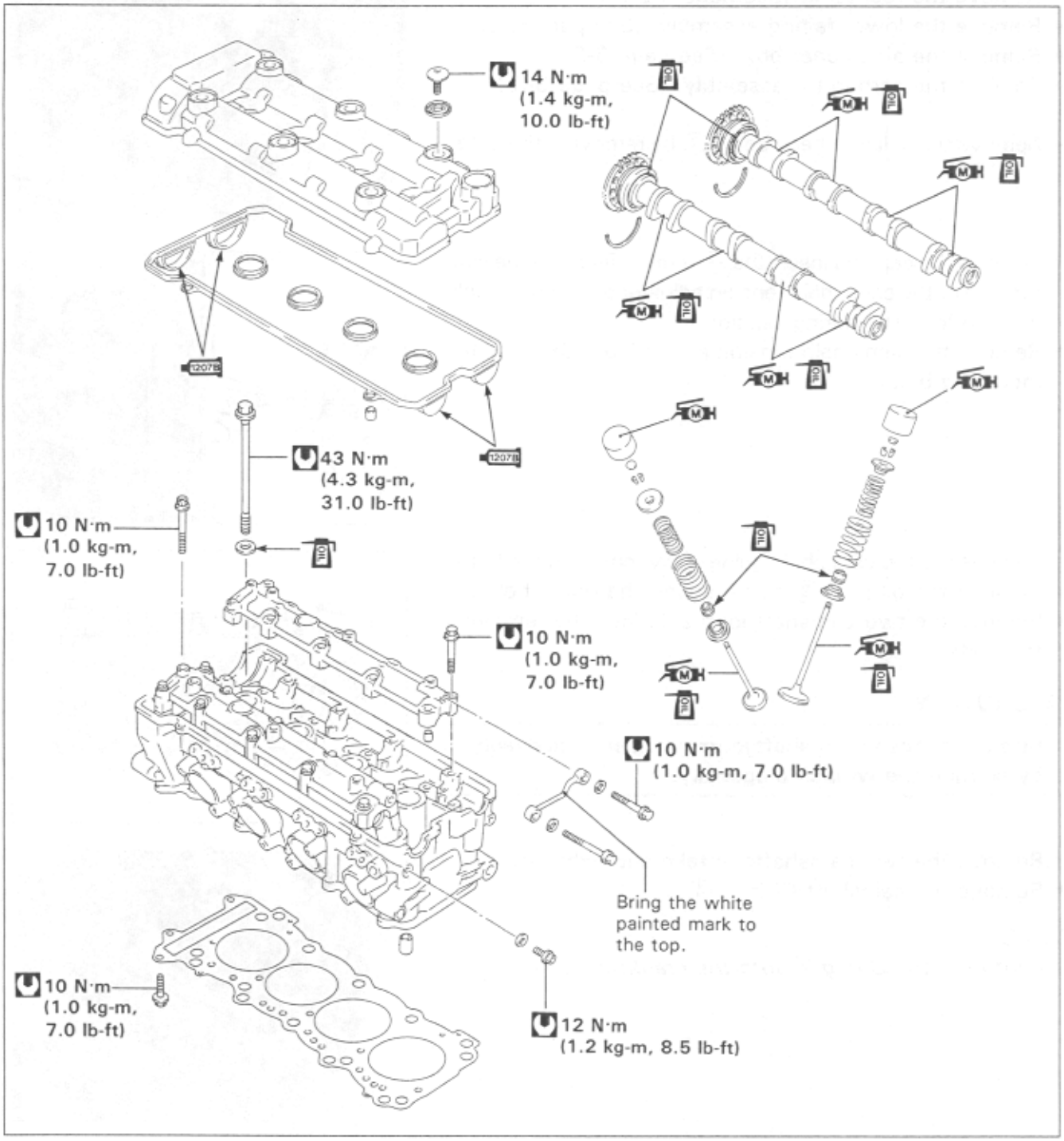
	page
* Filling engine coolant	2-12
* Throttle cable play	2-11
* Idling adjustment	2-10
* Balancing carburetors	4-28
* Drive chain	2-13

- Pour 3.5 L (3.7/3.1 US/Imp qt) of engine oil SAE 10W/40 graded SE, SF or SG into the engine after overhauling engine.
- Start up the engine and allow it run for several minutes at idle speed. About one minute after stopping engine, check that the oil level remains between the marks of oil level inspection window.

Change	2 600 ml (2.7/2.3 US/Imp qt)
filter change	2 800 ml (3.0/2.5 US/Imp qt)
Overhaul	3 500 ml (3.7/3.1 US/Imp qt)



CAMSHAFT/CYLINDER HEAD



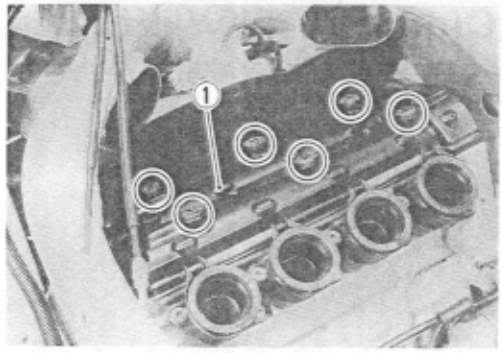
3A

CONTENTS

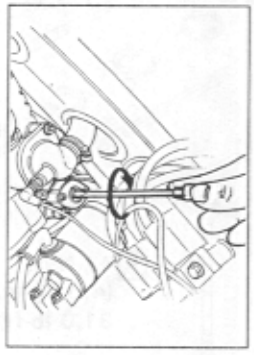
CAMSHAFT REMOVAL 3A- 1
CYLINDER HEAD REMOVAL 3A- 2
CAMSHAFT/CYLINDER HEAD INPECTION AND SERVICE 3A- 3
CYLINDER HEAD INSTALLATION 3A-14
CAMSHAFT INSTALLATION 3A-15

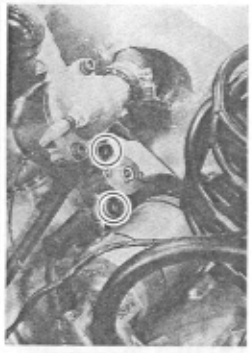
CAMSHAFT REMOVAL

- Remove the fuel tank. (See page 4-2.)
- Remove the lower fairing assembly. (See page 6-2.)
- Remove the air cleaner box. (See page 3-2.)
- Remove the carburetor assembly. (See page 3-3.)

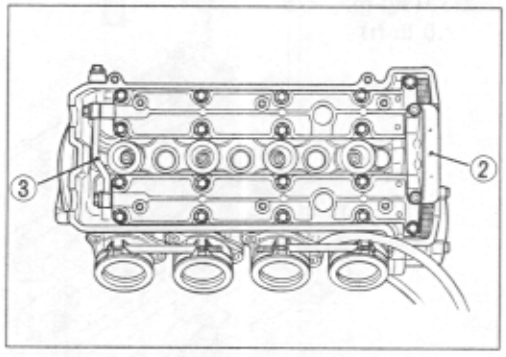


- Remove the cylinder head cover ① by removing the bolts.





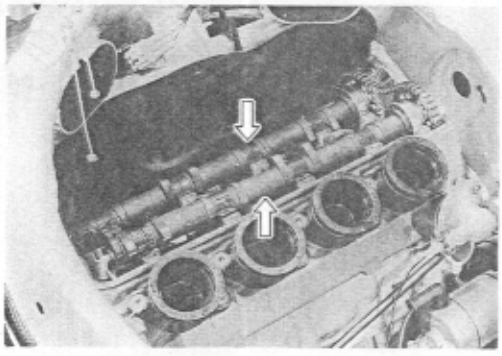
- Remove the cap and insert the ⊖ screwdriver into the slotted end of the cam chain tension adjuster and turn it clockwise to lock the spring tension.
- Remove the cam chain tension adjuster by removing the mounting bolts.



- Remove the top cam chain guide ② by removing the bolts.
- Remove the oil pipe ③ by removing the union bolts.
- Remove the two camshaft journal holders by removing the bolts.

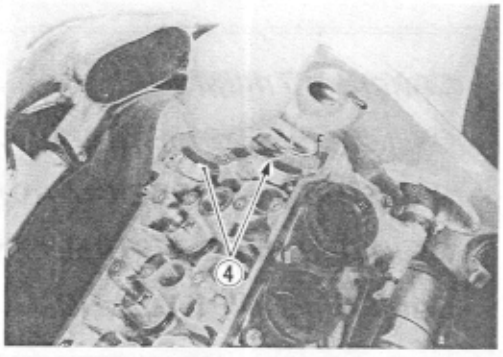
⚠ CAUTION

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



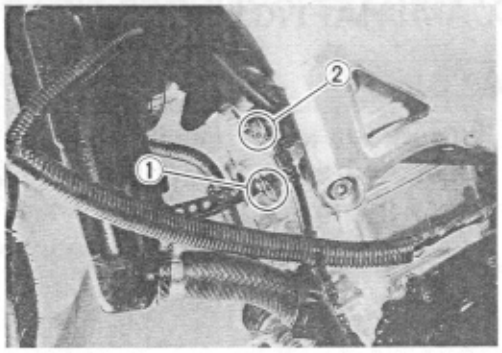
- Remove the two camshafts, intake and exhaust.
- Remove the camshaft C-rings ④.

NOTE:
Do not drop the C-ring ④ into the crankcase.



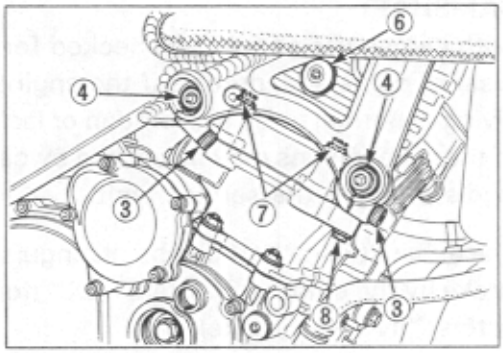
CYLINDER HEAD REMOVAL

- Remove the camshafts, intake and exhaust. (See page 3A-1.)
- Remove the exhaust pipe/muffler assembly. (See page 3-3.)
- Drain out engine coolant. (See page 3-3.)
- Remove the thermostat cover and thermostat. (See page 3-4.)

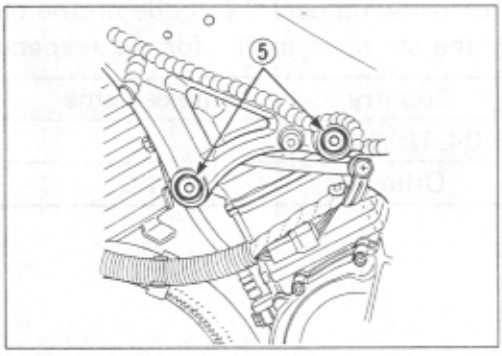


- Remove the radiator bracket bolts ① and oil hose union bolt ②.
- Loosen the pinch bolts ③ and remove the right front engine mounting bolts ④.
- Remove the left front engine mounting bolts ⑤.
- Remove the cam chain stopper bolt ⑥.

NOTE:
Before removing the cam chain stopper bolt ⑥, suspend the cam chain with a piece of wire.

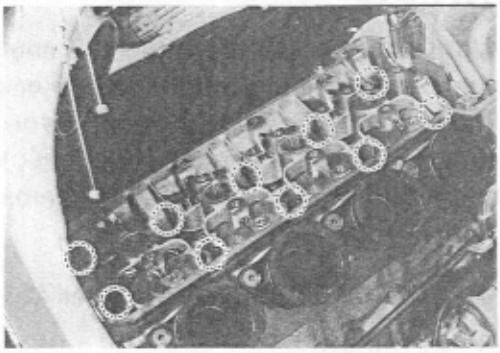


- Remove the 6-mm bolts, ⑦ and ⑧.



- Remove the 10-mm bolts.
- Remove the cylinder head assembly.

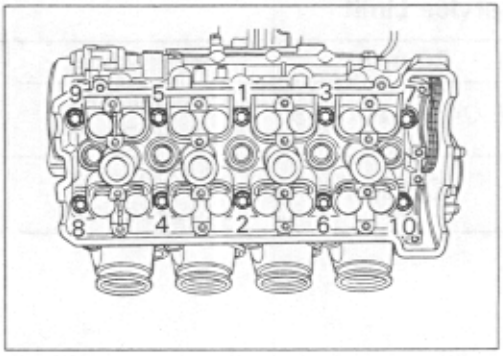
TOOL 09911-74520: Long socket 12 mm
09914-24510: T-handle



NOTE:
When loosening the cylinder head bolts, loosen each bolt little by little, in a descending order, according to the numbers.

⚠ CAUTION

Be careful not to damage the fins when removing or handling the cylinder head. This precaution applies to the cylinder block also.



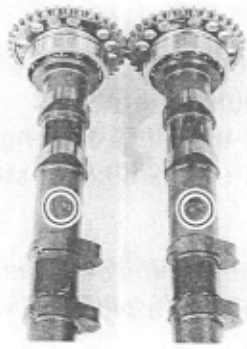
CAMSHAFT/CYLINDER HEAD INSPECTION AND SERVICE

⚠ CAUTION

Be sure to identify each removed part as to its location, and lay the parts out in groups designated as "No.1", "No.2", "Exhaust", "Inlet", so that each will be restored to the original location during assembly.

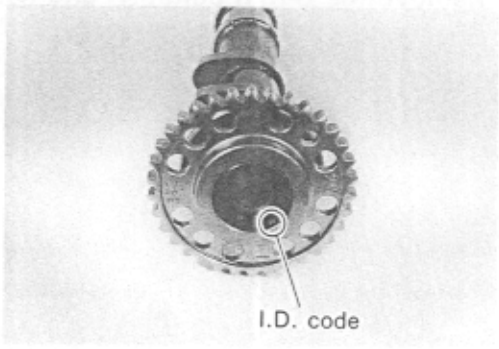
CAMSHAFT

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



The exhaust camshaft can be distinguished from that of the intake by the embossed letters "EX" (for exhaust) as against letters "IN" (for intake).

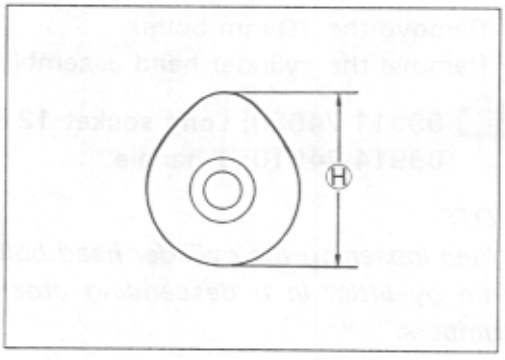
The following each I.D. code on the camshaft is identified by the stamped marks for the respective countries.



Country	Intake cams	Exhaust cams
E-04,18 and 33	A	NIL
Others	NIL	NIL

CAM WEAR

Worn-down cams are often the cause of mistimed valve operation resulting in reduced power output.
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 camshafts if found worn down to the limit.



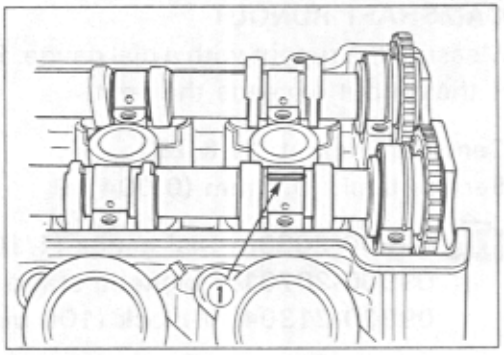
TOOL 09900-20202: Micrometer (25—50 mm)

Cam height Ⓗ
Service Limit

Country	Intake cams	Exhaust cams
E-04,18 and 33	33.70 mm (1.327 in)	35.40 mm (1.394 in)
Others	36.21 mm (1.426 in)	35.40 mm (1.394 in)

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 ① to read the clearance at the widest portion, which is specified as follows:

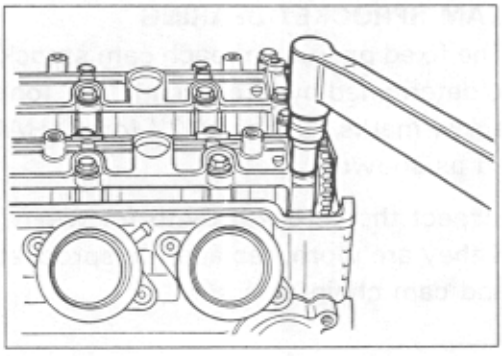


Camshaft-Journal oil clearance (IN & EX)
Service Limit: 0.150 mm (0.0059 in)

TOOL 09900-22301: Plastigauge

NOTE:
Install each holder to their original positions. (page 3A-17.)

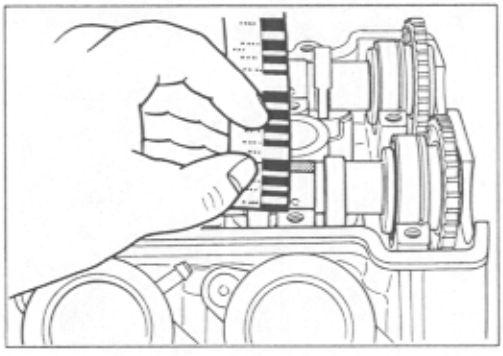
Tighten the camshaft holder bolts evenly and diagonally to the specified torque.



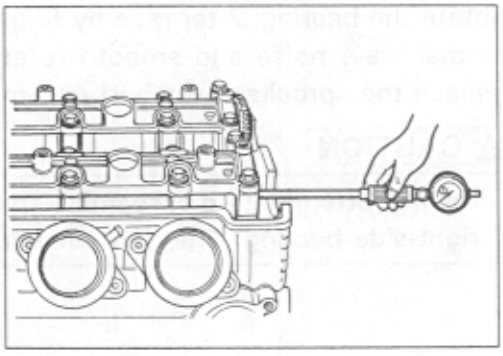
Camshaft holder bolt: 10 N·m (1.0 kg-m, 7.0 lb-ft)

NOTE:
Do not rotate the camshafts 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.

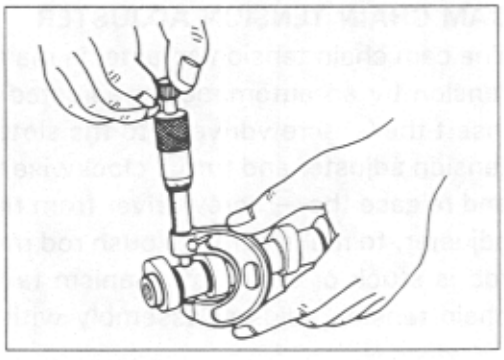


If the camshaft journal oil clearance measured exceeds the limit, measure the inside diameter of the camshaft journal holder and outside diameter of the camshaft journal. Replace the camshaft or the cylinder head depending upon which one exceeds the specification.



Standard
Journal holder I.D. (IN & EX): 24.012—24.025 mm (0.9454—0.9459 in)

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



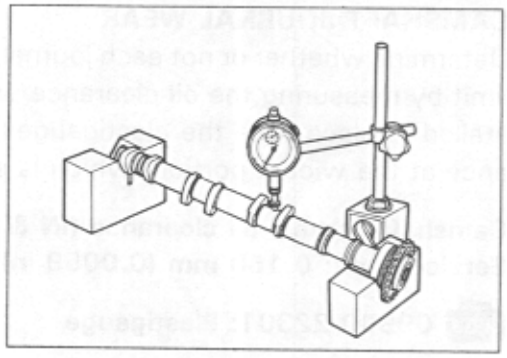
Standard
Camshaft journal O.D. (IN & EX): 23.959—23.980 mm (0.9433—0.9441 in)

CAMSHAFT RUNOUT

Measure the runout with a dial gauge. Replace the camshaft if the runout exceeds the limit.

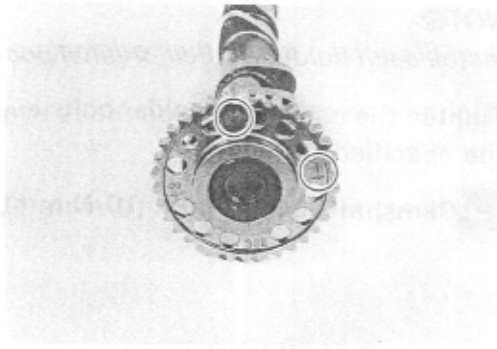
Camshaft runout (IN & EX)
Service Limit: 0.1 mm (0.004 in)

TOOL **09900-20606: Dial gauge (1/100 mm, 10 mm)**
09900-20701: Magnetic stand
09900-21304: V-block (100 mm)

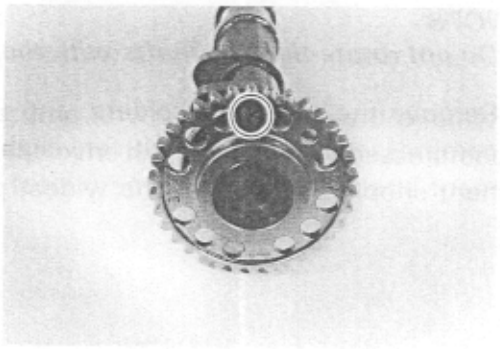


CAM SPROCKET/BEARING

The fixed position of each cam sprocket on each camshaft is determined by arrow mark "3" (on INTAKE sprocket) or arrow marks "1" and "2" (on EXHAUST sprocket) located as shown.



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



Rotate the bearing outer race by fingers to inspect for abnormal play, noise and smooth rotation. If it is unusual, replace the sprocket/camshaft assembly with a new one.

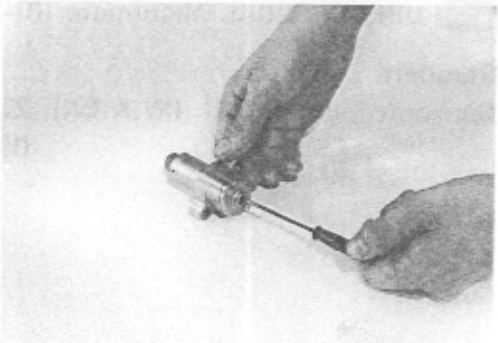
⚠ CAUTION

Do not attempt to disassemble the cam sprocket or right-side bearing. They are unserviceable.



CAM CHAIN TENSION ADJUSTER

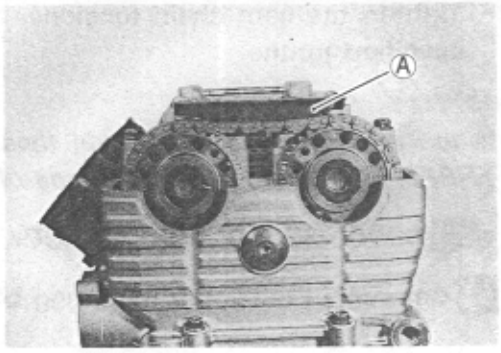
The cam chain tension adjuster is maintained at the proper tension by an automatically adjusted tensioner.
Insert the ⊖ screwdriver into the slotted end of cam chain tension adjuster and turn it clockwise to lessen the tension and release the ⊖ screwdriver from the cam chain tension adjuster, to make sure the push rod movement. If the push rod is stuck or spring mechanism failed, replace the cam chain tension adjuster assembly with a new one.

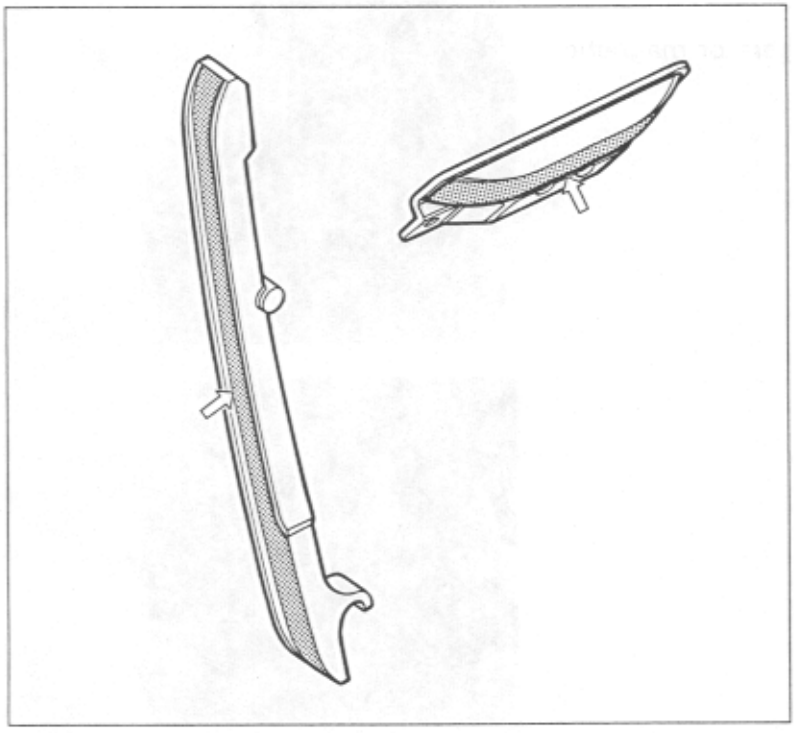


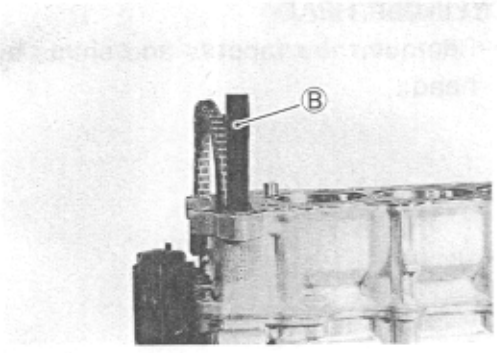
CAM CHAIN GUIDE

Check the cam chain guide for wear and damage. If it is found to be damaged, replace it with a new one.

Ⓐ Top cam chain guide
Ⓑ Front cam chain guide



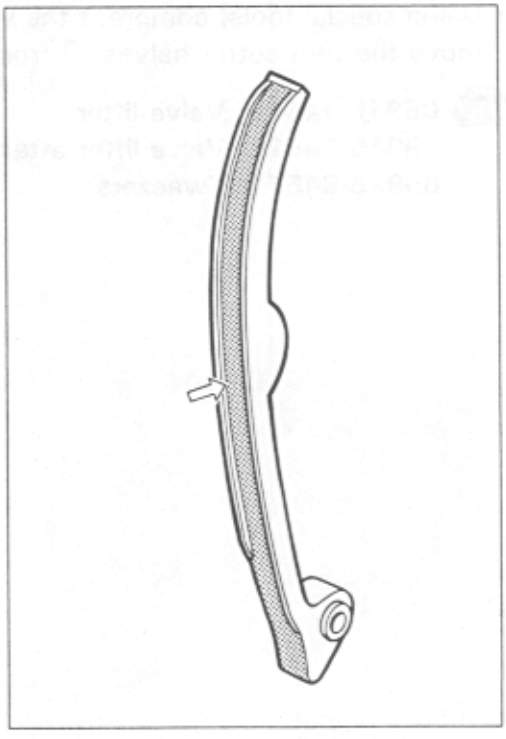




CAM CHAIN TENSIONER

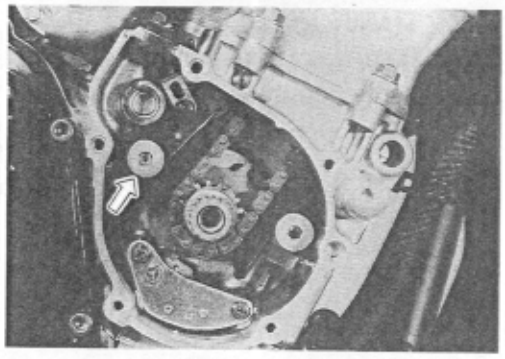
Check the cam chain tensioner for wear and damage. If it is found to be damaged, replace it with a new one.

If it is necessary to replace the cam chain tensioner, remove the starter clutch and intake camshaft. (See pages 3E-1 and 3A-1.)



—Continued on next page—

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



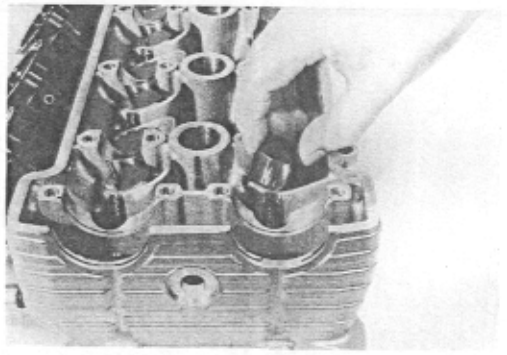
NOTE:
When replacing the cam chain tensioner, apply SUZUKI THREAD LOCK "1342" to threads of bolt.

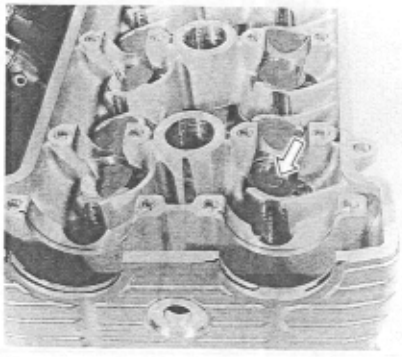
99000-32050: THREAD LOCK "1342"

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

CYLINDER HEAD

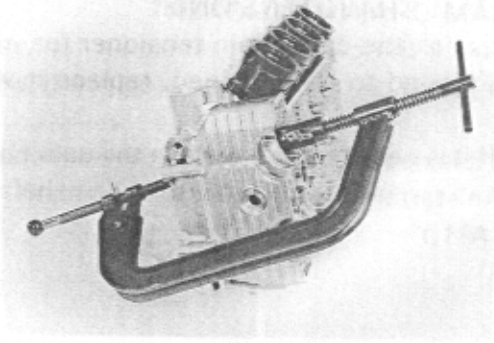
- Remove the tappets and shims by fingers or magnetic hand.

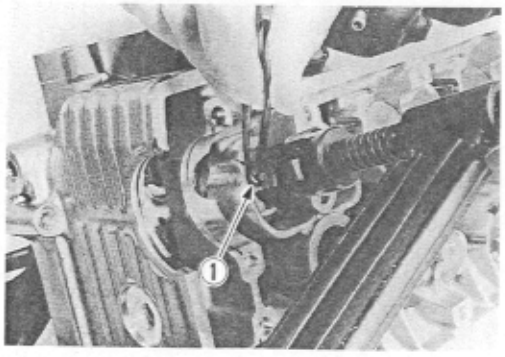




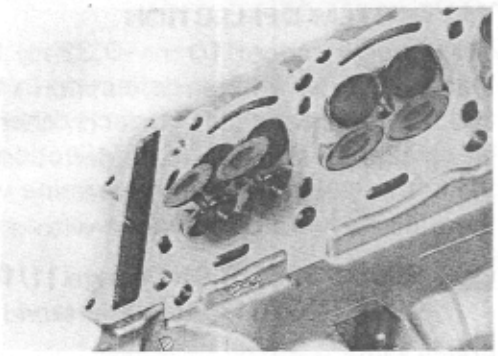
- Using special tools, compress the valve springs and remove the two cotter halves ① from valve stem.

09916-14510: Valve lifter
09916-14521: Valve lifter attachment
09916-84511: Tweezers





- Remove the valve spring retainer, valve springs and valve spring seat.
- Pull out the valve from the other side.

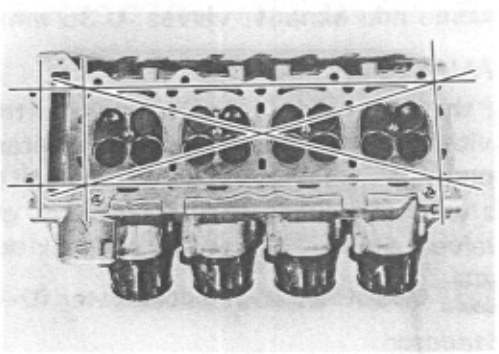


CYLINDER HEAD DISTORTION

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.

TOOL **09900-20803: Thickness gauge**

Service Limit: 0.2 mm (0.008 in)

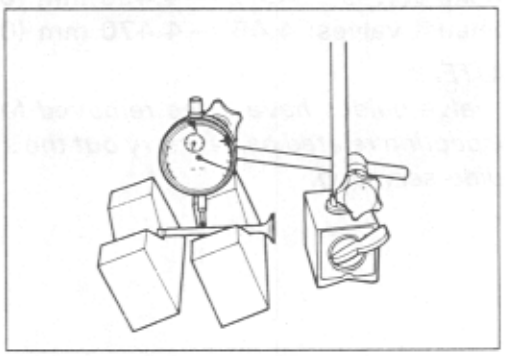


VALVE STEM RUNOUT

Support the valve with "V" blocks, as shown, and check its runout with a dial gauge.
The valve must be replaced if the runout exceeds the limit.

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

Service Limit: 0.05 mm (0.002 in)

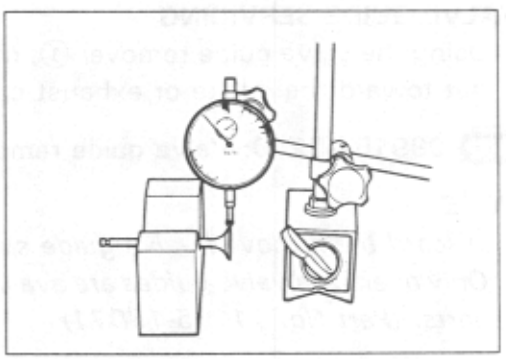


VALVE HEAD RADIAL RUNOUT

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.

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

Service Limit: 0.03 mm (0.001 in)

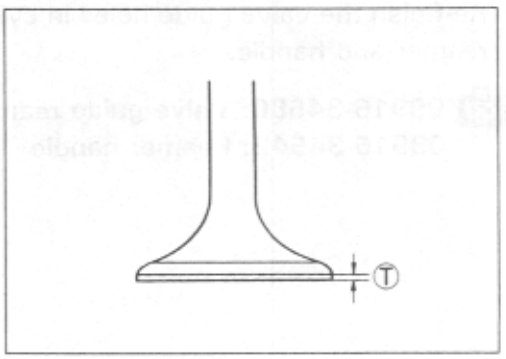


VALVE FACE WEAR

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.

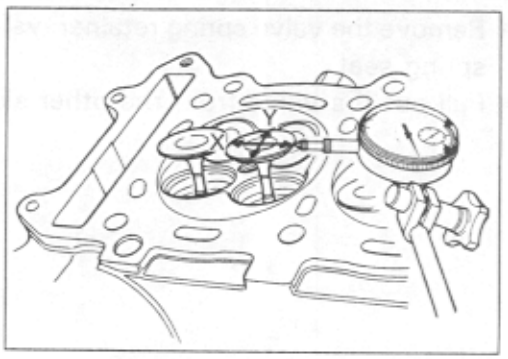
TOOL **09900-20102: Vernier calipers**

Service Limit Ⓣ: 0.5 mm (0.02 in)



VALVE STEM DEFLECTION

Lift the valve about 10 mm (0.39 in) from the valve seat. Measure the valve stem deflection in two directions, "X" and "Y", perpendicular to each other, 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.

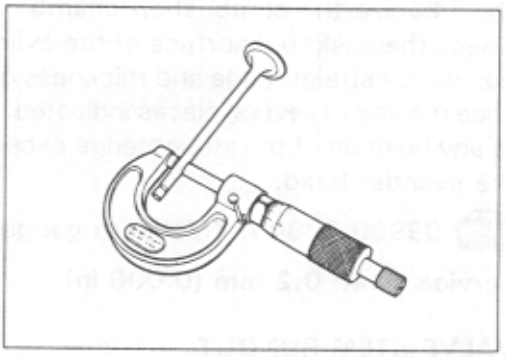


TOOL **09900-20606: Dial gauge (1/100 mm)**
09900-20701: Magnetic stand

Service Limit
Intake and exhaust valves: 0.35 mm (0.014 in)

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 clearance.



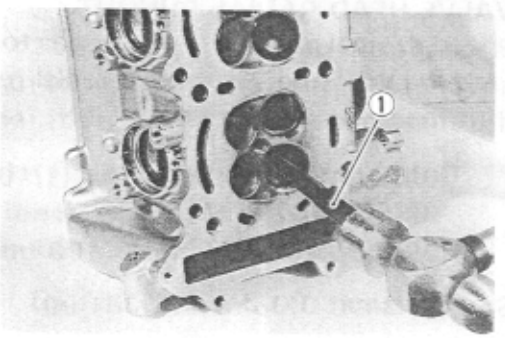
TOOL **09900-20205: Micrometer (0—25 mm)**

Standard
Intake valves : 4.475—4.490 mm (0.1762—0.1768 in)
Exhaust valves: 4.455—4.470 mm (0.1754—0.1760 in)

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

VALVE GUIDE SERVICING

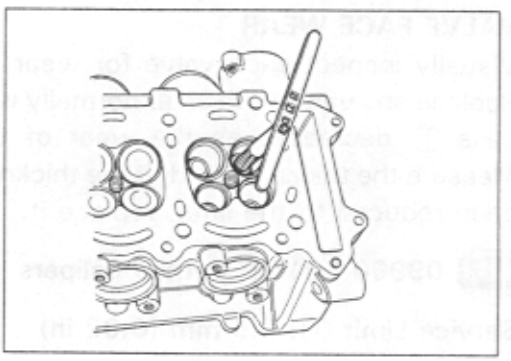
- Using the valve guide remover ①, drive the valve guide out toward the intake or exhaust camshaft side.



TOOL **09916-43210: Valve guide remover/installer**

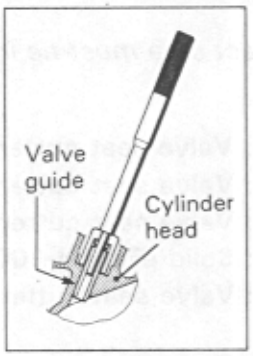
NOTE:
* *Discard the removed valve guide subassemblies.*
* *Only oversized valve guides are available as replacement parts. (Part No. 11115-18D71)*

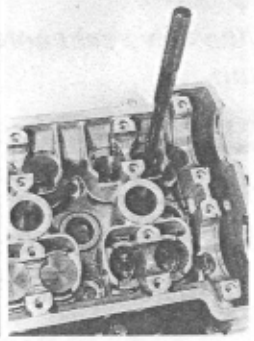
- Re-finish the valve guide holes in cylinder head with the reamer and handle.



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

- Oil the stem hole, too, of each valve guide and drive the guide into the guide hole with the valve guide installer and attachment.



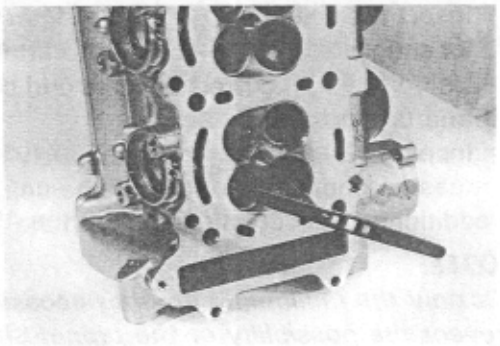


TOOL **09916-43210: Valve guide remover/installer**
09916-53330: Attachment

⚠ CAUTION

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

- After fitting the valve guides, re-finish their guiding bores with the reamer. Be sure to clean and oil the guides after reaming.

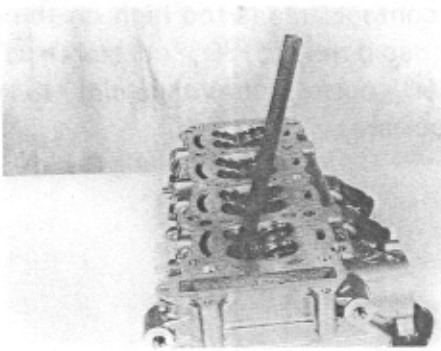


TOOL **09916-33210: Valve guide reamer**
09916-34542: Reamer handle

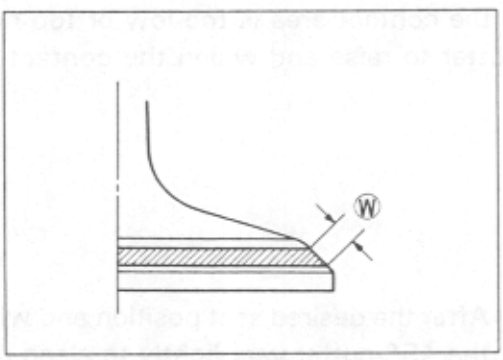
NOTE:
Insert the reamer from the combustion chamber and always turn the reamer handle clockwise.

VALVE SEAT WIDTH

- 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:



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

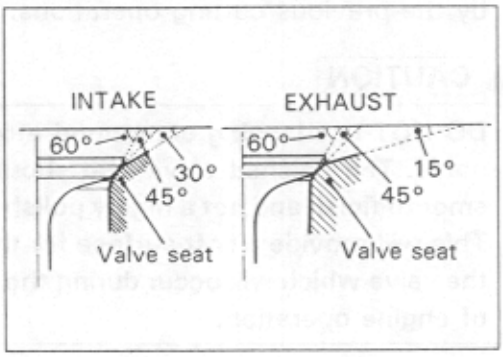


If either requirement is not met, correct the seat by servicing is as follows:

VALVE SEAT SERVICING

The valve seats for both intake and exhaust valves are machined to four different angles. (The seat contact surface is cut 45°.)

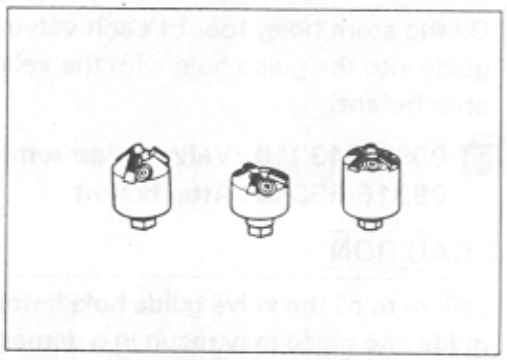
	INTAKE		EXHAUST
45°	N-116 or N-122	45°	N-116 or N-122
30°	N-126	15°	N-120 or N-121
60°	N-111	60°	N-111



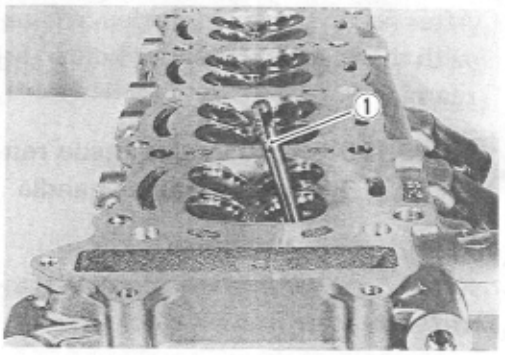
TOOL **Valve seat cutter: (N-111), (N-126), (N-121), (N-122), (N-116) and (N-120)**
Solid pilot: (N-100-4.5)

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

TOOL **09916-20610: Valve seat cutter (N-121)**
09916-20620: Valve seat cutter (N-122)
09916-20630: Valve seat cutter (N-126)
09916-20640: Solid pilot (N-100-4.5)
09916-21110: Valve seat cutter set



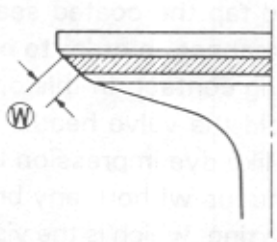
- Insert the solid pilot ① with a slight rotation. Seat the pilot snugly. Install the 45° cutter, attachment and T-handle.
- Using the 45° cutter, descale and clean up the seat with one or two turns.
- Inspect the seat by the previously described seat width measurement procedure. If the seat is pitted 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.

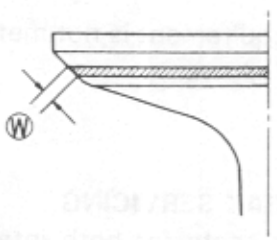
If the contact area is too high on the valve, or if it is too wide, use the 15°/60° cutters (for exhaust side) and 30°/60° cutters (for intake side) to lower and narrow the contact area.

Contact area too high and too wide on face of valve



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

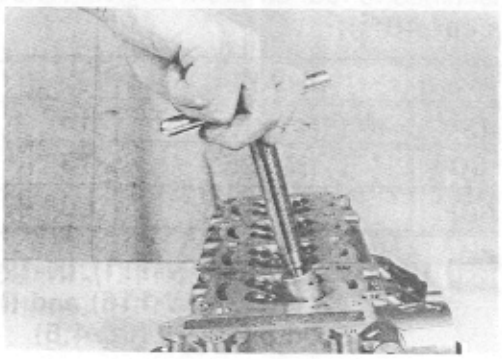
Contact area too low and too narrow on face of valve



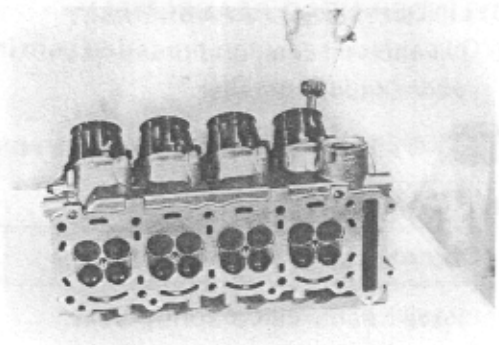
- After the desired seat position and width is achieved, use the 45° cutter very lightly to clean up any burrs caused by the previous cutting operations.

⚠ CAUTION

DO NOT use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish and 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 tappet clearance after the cylinder head has been reinstalled. (See page 2-5.)

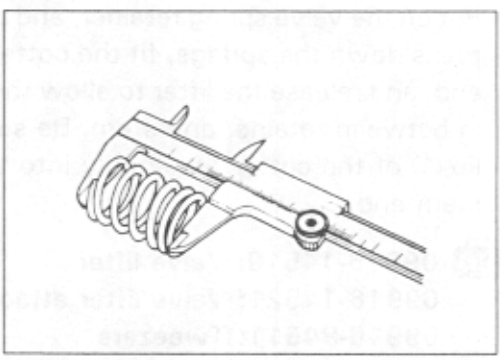
VALVE SPRING

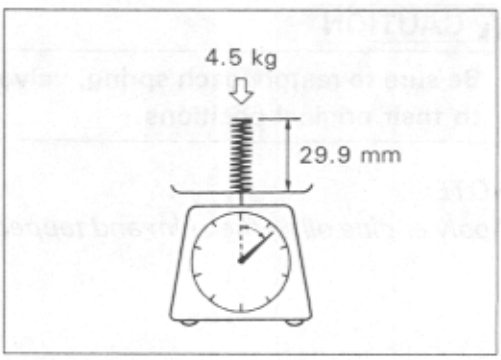
The force of the coil spring keeps the valve seat tight. Weakened spring result in reduced engine power output, and often account for the chattering noise coming from the valve mechanism.
Check the valve springs for proper strength by measuring their free length and also by the force required to compress 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 both the inner and outer springs as a set.

TOOL 09900-20102: Vernier calipers

Valve spring free length (IN & EX)
Service limit INNER : 36.8 mm (1.45 in)
OUTER: 38.6 mm (1.52 in)

Valve spring tension (IN & EX)
Standard INNER : 4.5 kg/29.9 mm (9.9 lbs/1.18 in)
OUTER: 15.5 kg/33.4 mm (34.2 lbs/1.31 in)

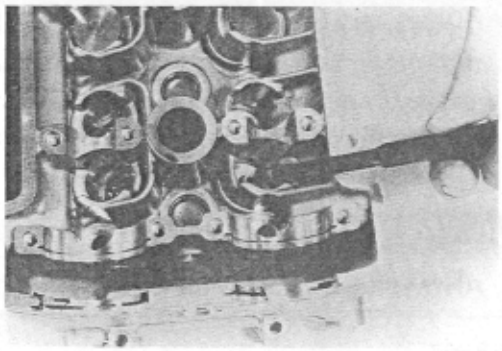




CYLINDER HEAD REASSEMBLY

- Oil each oil seal, and press-fit them into position with the valve guide installer.

TOOL **09916-43210: Valve guide remover/installer**

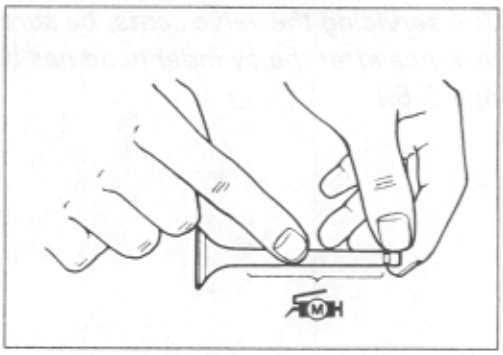


⚠ CAUTION

Do not reuse the oil seals.

- Install each valve spring seat.

- Insert the valves, with their stems coated with high quality molybdenum disulfide lubricant (SUZUKI MOLY PASTE) all around and along the full stem length without any break.

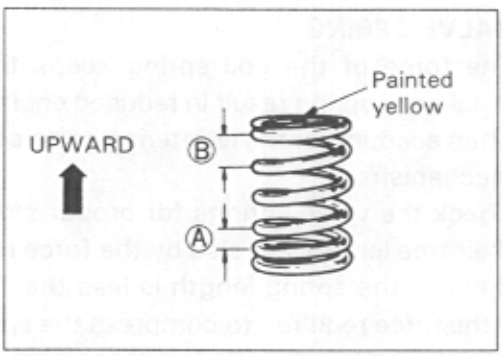


⚠ CAUTION

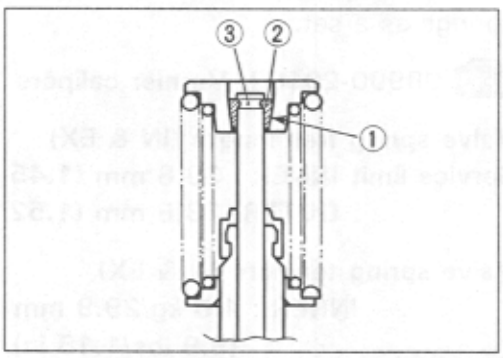
When inserting each valve, take care not to damage the lip of the oil seal.

99000-25140: SUZUKI MOLY PASTE

- Install the valve springs with the small-pitch portion Ⓐ facing cylinder head. Ⓑ Large-pitch portion.



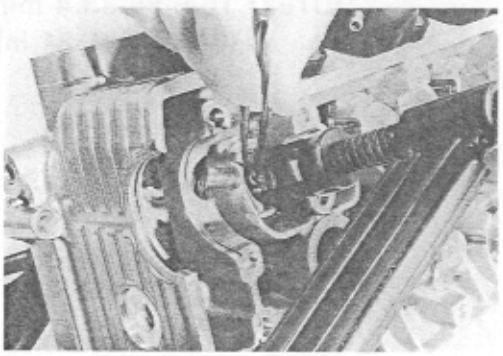
- Put on the valve spring retainer, and using the valve lifter, press down the springs, fit the cotter halves to the stem end, and release the lifter to allow the cotter ① to wedge in between retainer and stem. Be sure that the rounded lip ② of the cotter fits snugly into the groove ③ in the stem end.



TOOL **09916-14510: Valve lifter**
09916-14521: Valve lifter attachment
09916-84511: Tweezers

⚠ CAUTION

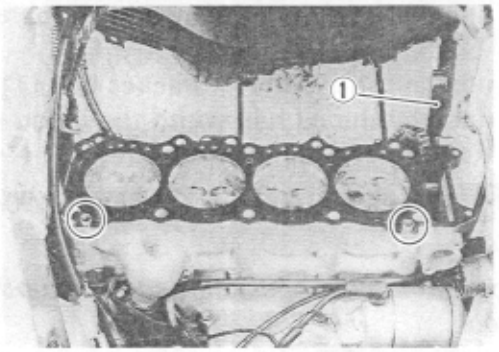
Be sure to restore each spring, valve, shim and tappet to their original positions.



NOTE:
Apply engine oil to the shim and tappet before fitting them.

CYLINDER HEAD INSTALLATION

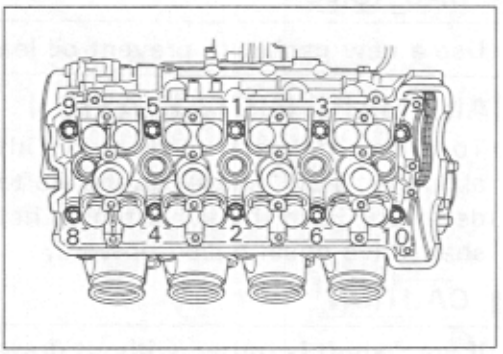
- Install the cam chain guide ① properly.
- Place the dowel pins and new cylinder head gasket on the cylinder.



⚠ CAUTION

Use a new gasket to prevent gas leakage.

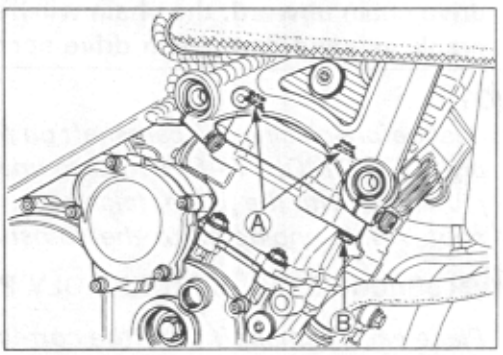
- Place the cylinder head on the cylinder block.
- Tighten the 10-mm bolts to the specified two-step torque with a torque wrench sequentially in the ascending order of numbers.



Cylinder head bolt: Initial 25 N·m (2.5 kg-m, 18.0 lb-ft)
Final 43 N·m (4.3 kg-m, 31.0 lb-ft)

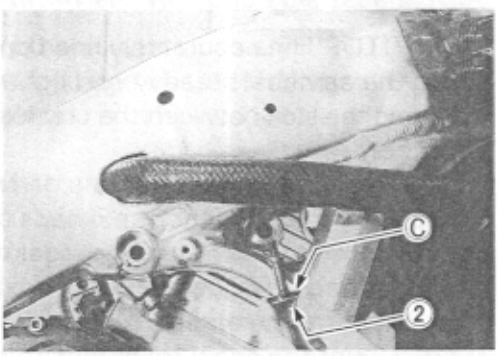
NOTE:
Apply engine oil to the cylinder head bolt's washers before installing the cylinder head bolts.

- After firmly tightening the 10-mm bolts, install the 6-mm bolts, Ⓐ and Ⓑ, then tighten them to the specified torque.



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

- Fit a new gasket washer Ⓒ to the cam chain stopper bolt ② and tighten it to the specified torque.



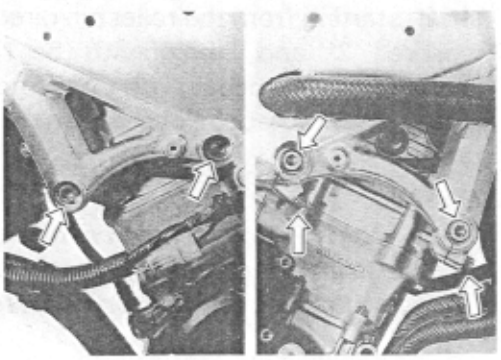
Cam chain stopper bolt: 14 N·m (1.4 kg-m, 10.0 lb-ft)

⚠ CAUTION

Use a new gasket to prevent oil leakage.

NOTE:
Apply engine oil to the seal lip on the gasket washer and seal lip side faces cylinder head.

- Tighten the left front engine mounting bolts to the specified torque.
- Tighten the right front engine mounting bolts and pinch bolts to the specified torque.



Left and right front engine mounting bolt: 79 N·m (7.9 kg-m, 57.0 lb-ft)

Pinch bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)

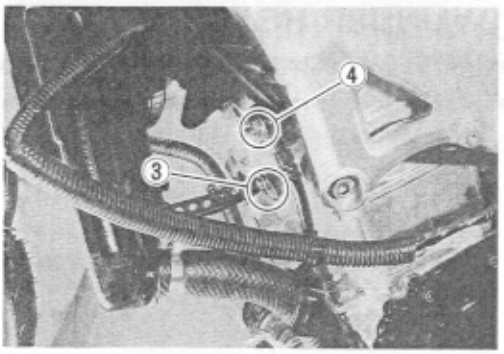
- Install the thermostat and termostat cover. (See page 5-12.)
- Install the radiator bracket bolts ③ and tighten them.
- Install the oil hose with the union bolt ④ and tighten it to the specified torque.

Oil hose union bolt: 20 N·m (2.0 kg-m, 14.5 lb-ft)

NOTE:
Install the new gasket washers to both sides of the union bolt.

⚠ CAUTION

Use a new gasket to prevent oil leakage.

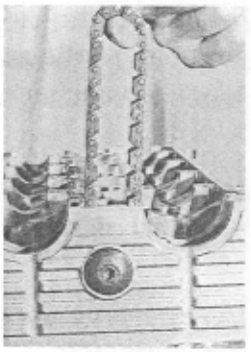


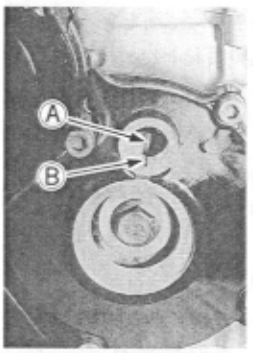
CAMSHAFT INSTALLATION

- Turn the crankshaft clockwise with a box wrench and align the "TOP" line Ⓐ on the starter clutch with the index mark Ⓑ in the valve timing hole keeping the camshaft drive chain pulled upward.

⚠ CAUTION

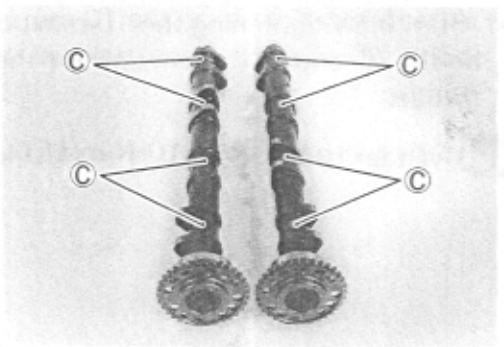
If crankshaft is turned without drawing the camshaft drive chain upward, the chain will be caught between crankcase and cam chain drive sprocket.





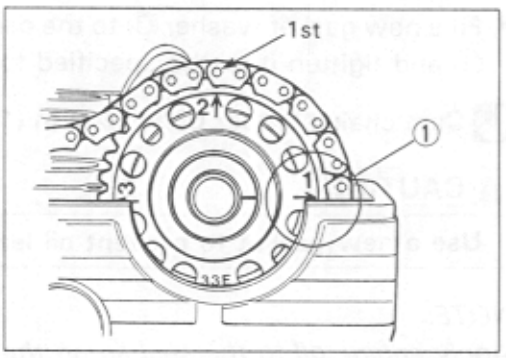
NOTE:
* *Just before placing the camshaft on the cylinder head, apply SUZUKI MOLY PASTE to its journals, fully coating each journal Ⓒ with the paste, taking care not to leave any dry spot. Apply engine oil to the camshaft journal holders.*

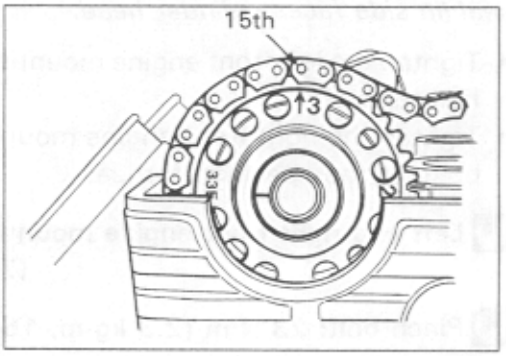
99000-25140: SUZUKI MOLY PASTE



* *Place each camshaft onto the correct position. ("EX" is for exhaust side and "IN" is for intake side.)*

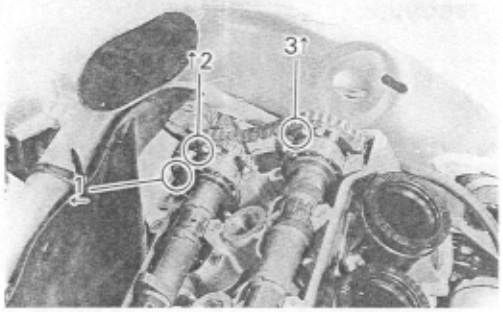
- With "TOP" line accurately lined up with the index mark, hold the camshaft steady and lightly pull up the chain to remove the slack between the crank sprocket and exhaust sprocket.
- The exhaust sprocket bears an arrow marked "1" indicated as ①. Turn over the exhaust camshaft so that the arrow points flush with the gasketed surface of the cylinder head. Engage the cam chain with this sprocket.
- The other arrow marked "2" is now pointing straight upward. Count the chain roller pins toward the intake camshaft, starting from the roller pin directly above this arrow marked "2" and ending with the 15th roller pin.
  Engage the cam chain with intake sprocket, locating the 15th pin at the above the arrow marked "3" on the intake sprocket.

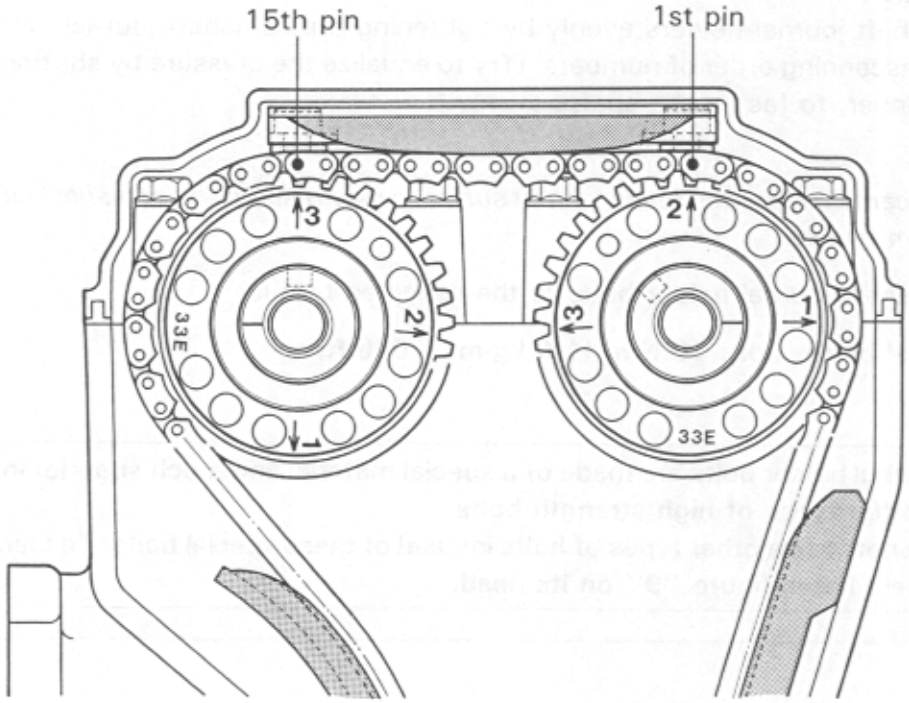


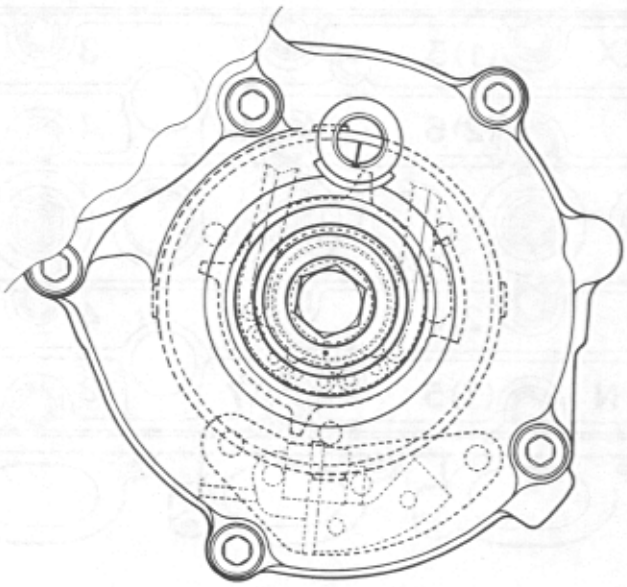


NOTE:
The cam chain is now riding on all three sprockets. Be careful not to disturb the crankshaft until the camshaft journal holders and cam chain tension adjuster are secured.

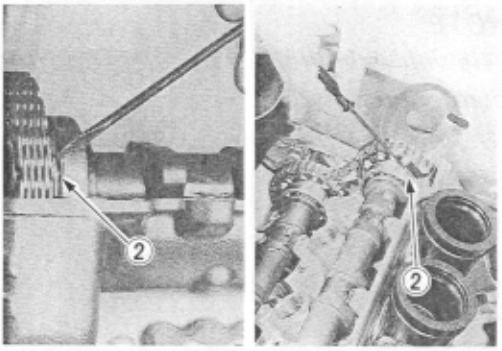
NOTE:
The valve timing can be checked from the backside of the cam sprockets.







- Insert the C-rings ② into each camshaft ring groove correctly.



- Each camshaft journal holder is identified with a cast-on letter. Install the dowel pins to each camshaft journal holder.
- Fasten the camshaft journal holders evenly by tightening the camshaft journal holder bolts sequentially in the ascending order of numbers. (Try to equalize the pressure by shifting the wrench in this above manner, to fasten the shafts evenly.)

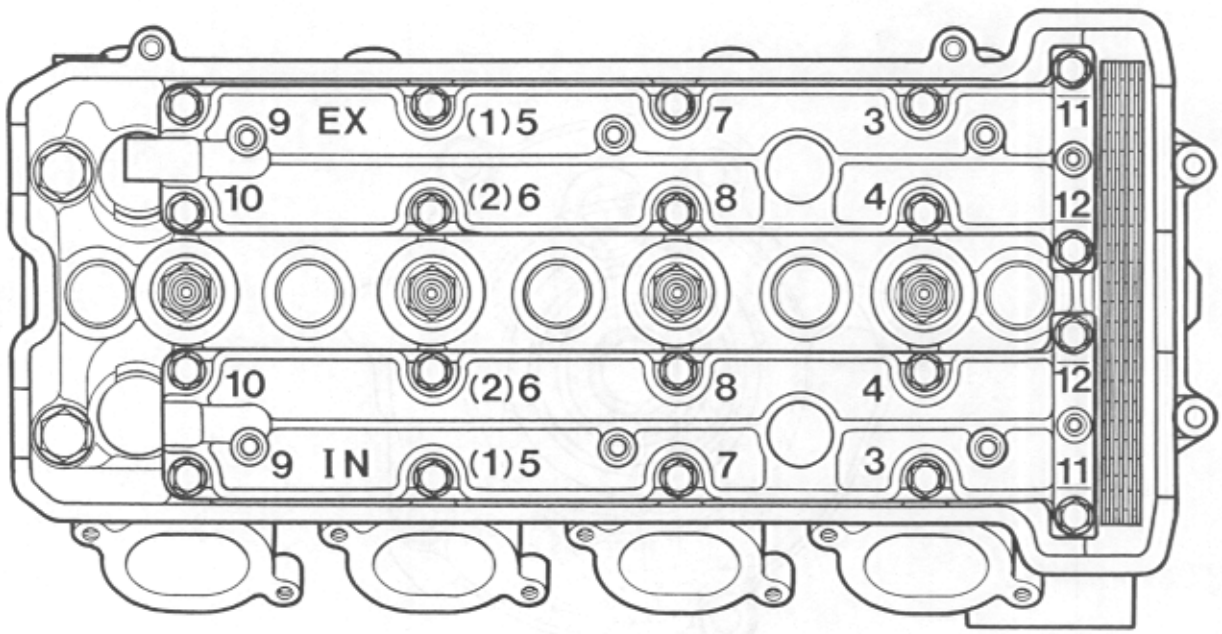
NOTE:
Damage to head or camshaft journal holder thrust surfaces may result if the camshaft journal holders are not drawn down evenly.

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

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

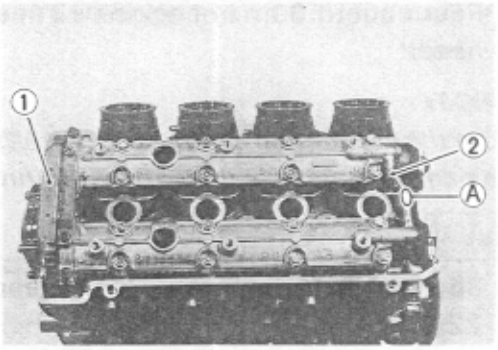
⚠ CAUTION

The camshaft journal holder bolts are made of a special material and much superior in strength, compared with other types of high strength bolts.
Take special care not to use other types of bolts instead of these special bolts. To identify these bolts, each of them has a figure "9" on its head.



- Install the top cam chain guide ① with the bolts and tighten them to the specified torque.

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

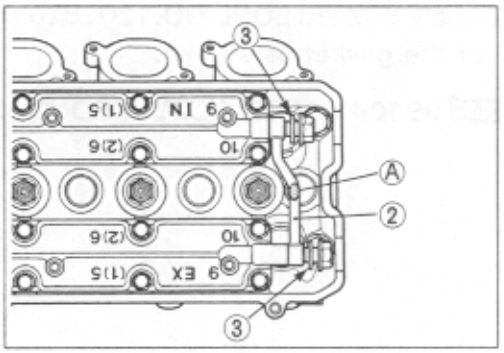


- Install the oil pipe ② with the union bolts and tighten them to the specified torque.

NOTE:

* *Install a washer ③ to the union bolt when installing the oil pipe.*
* *Be sure to bring the WHITE painted Ⓐ on the oil pipe to the top when installing it.*

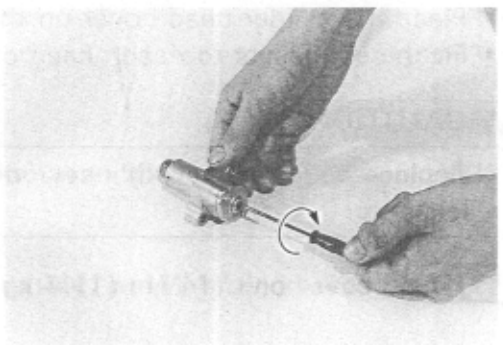
Oil pipe union bolt: 10 N·m (1.0 kg-m, 7.0 lb-ft)



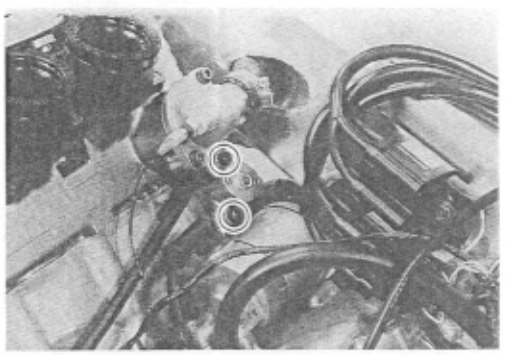
- Install a new gasket and the cam chain tension adjuster to the cylinder block with the two bolts and tighten them to the specified torque.

NOTE:

* *Before installing the cam chain tension adjuster, lock the tension spring with a ⊖ screwdriver. (See page 3A-1.)*
* *Before installing the cam chain tension adjuster, turn the crankshaft clockwise to remove the cam chain slack between the crank sprocket and exhaust sprocket.*



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

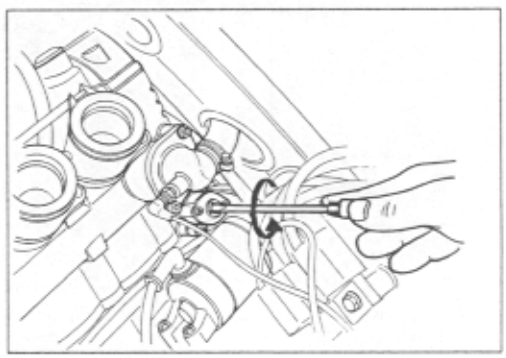


NOTE:

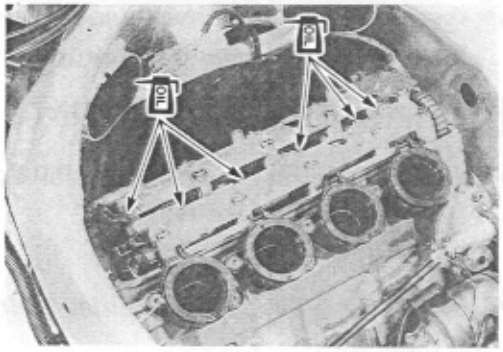
After installing the cam chain tension adjuster, turn a ⊖ screwdriver counterclockwise. As the slotted of the cam chain tension adjuster turns, the tension rod is advanced under spring force and pushes the cam chain tension adjuster against the cam chain.

⚠ CAUTION

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



- Pour about 50 ml of engine oil in each oil pocket in the head.

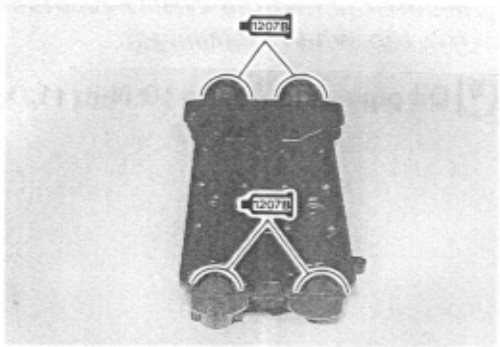


NOTE:
Turn the crankshaft and check that all the moving parts such as cam follower, camshaft, work properly.

⚠ CAUTION

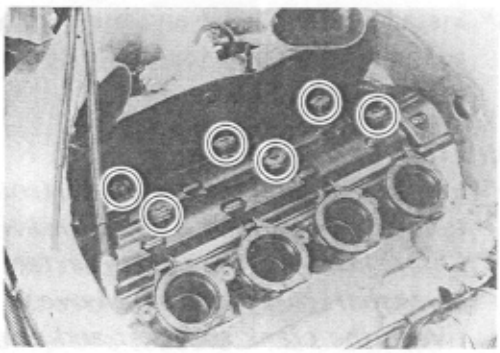
Be sure to check the tappet clearance. (Refer to page 2-5.)

- Apply SUZUKI BOND NO.1207B to the four cam end caps of the gasket as shown.



1207B 99104-31140: SUZUKI BOND NO.1207B

- Place the cylinder head cover on the cylinder head.
- Fit the six gaskets to each head cover bolt.

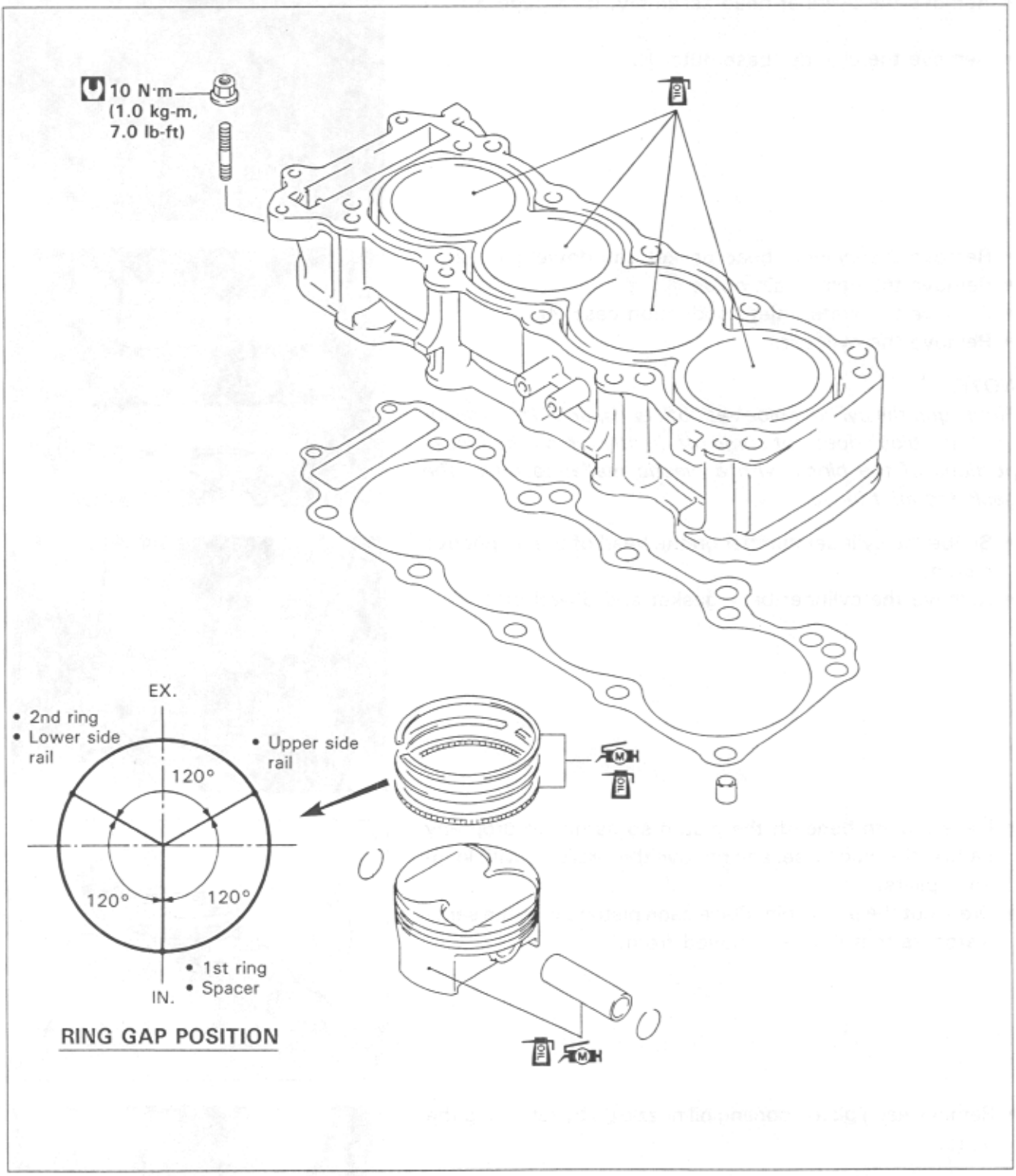


⚠ CAUTION

Replace the gaskets with new ones to prevent oil leakage.

Head cover bolt: 14 N·m (1.4 kg-m, 10.0 lb-ft)

CYLINDER/PISTON

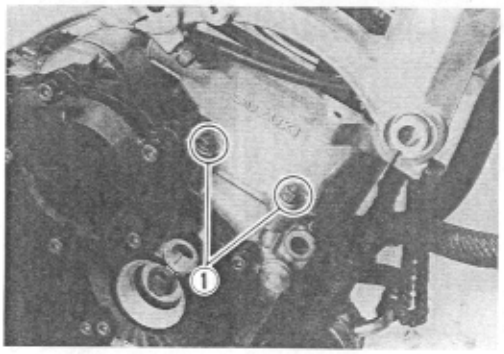


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CYLINDER/PISTON REMOVAL 3B- 1
CYLINDER/PISTON INSPECTION 3B- 2
PISTON/CYLINDER INSTALLATION 3B- 4

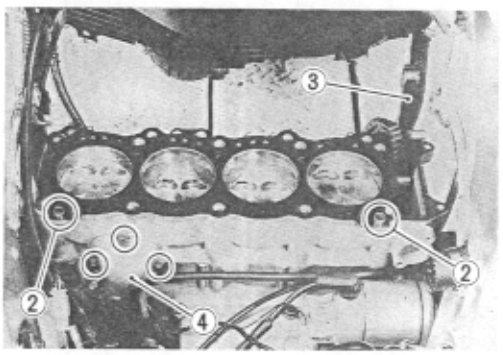
CYLINDER/PISTON REMOVAL

- Remove the cylinder head assembly. (See page 3A-2.)
- Remove the cylinder base nuts ①.

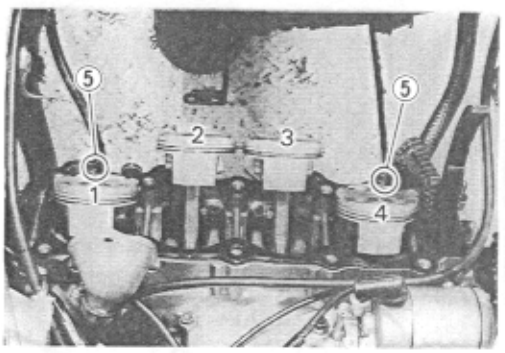


- Remove the cylinder head gasket and dowel pins ②.
- Remove the cam chain guide ③.
- Remove the water inlet conduction case ④.
- Remove the cylinder.

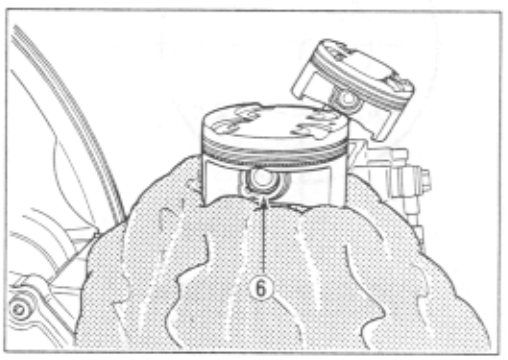
NOTE:
Firmly grip the cylinder block at both ends, and lift it straight up. If the block does not come off, lightly tap on the finless portions of the block with a plastic mallet to make the gasketed joint loose.



- Scribe the cylinder number on the head of the respective pistons.
- Remove the cylinder base gasket and dowel pins ⑤.

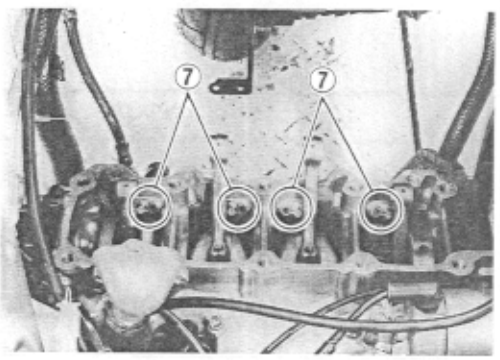


- Place a cloth beneath the piston so as not to drop any parts in the crankcase, and remove the circlip ⑥ with long-nose pliers.
- Draw out the piston pin. Place each piston pin in the same piston as that it was removed from.



- Remove each piston cooling oil nozzle ⑦ by removing the bolts.

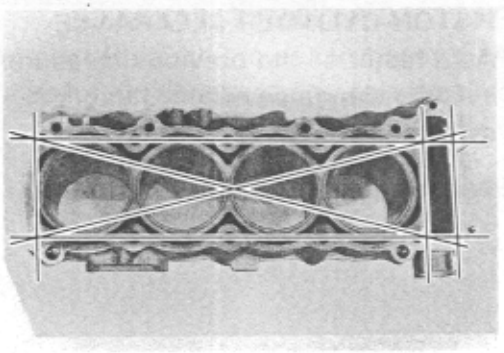
NOTE:
Do not drop the bolt into the crankcase.



CYLINDER/PISTON INSPECTION

CYLINDER BLOCK DISTORTION

Check the gasketed surface of the cylinder block 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 block.

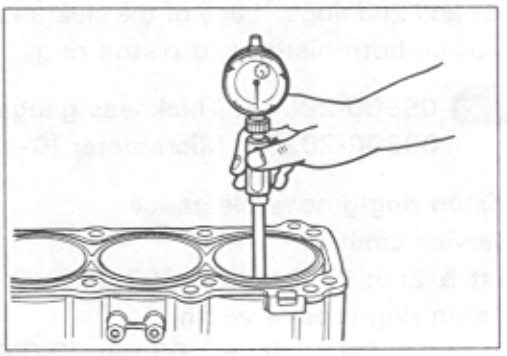


TOOL **09900-20803: Thickness gauge**

Cylinder distortion
Service Limit: 0.2 mm (0.008 in)

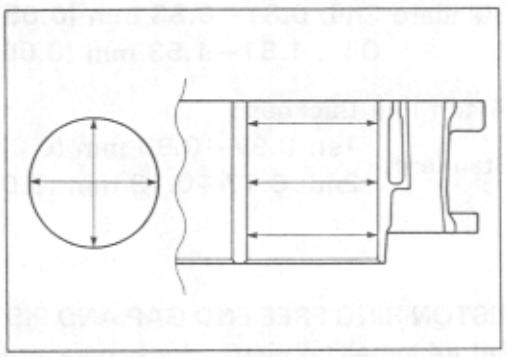
CYLINDER BORE

Inspect the cylinder wall for any scratches, nicks or other damage. Measure the cylinder bore diameter at six places.



Cylinder bore
Standard: 72.000—72.015 mm (2.8346—2.8352 in)

TOOL **09900-20508: Cylinder gauge set**

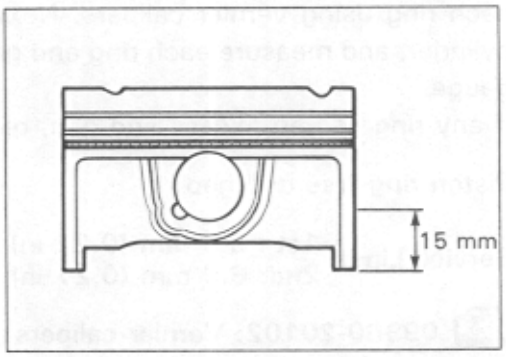


PISTON DIAMETER

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

Service Limit: 71.880 mm (2.8299 in)

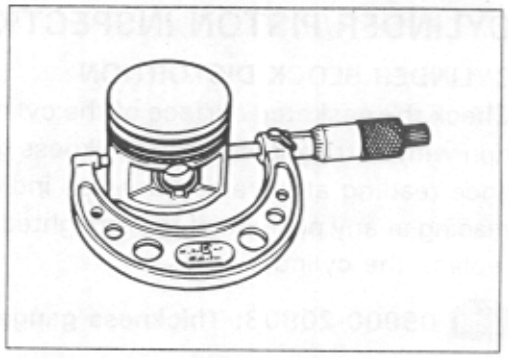
TOOL **09900-20203: Micrometer (50—75 mm)**



PISTON-CYLINDER CLEARANCE

As a result of the previous measurement, if the piston to cylinder clearance exceeds the following limit, replace both cylinder and piston.

Service Limit: 0.12 mm (0.0047 in)



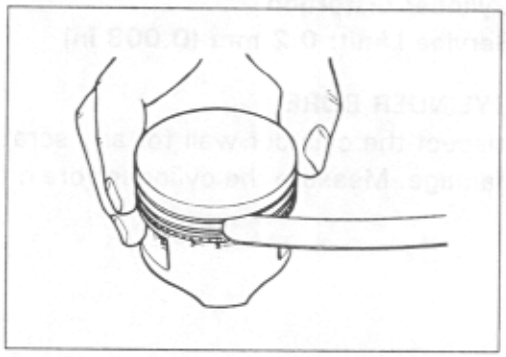
PISTON RING-GROOVE CLEARANCE

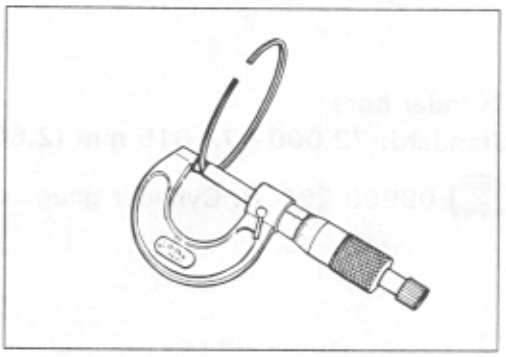
Using a thickness gauge, measure the side clearances of the 1st and 2nd rings. If any of the clearances exceeds the limit, replace both piston and piston rings.

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

Piston ring-groove clearance
Service Limit
1st & 2nd: 0.18 mm (0.007 in)
Piston ring groove width
Standard
1st : 1.01—1.03 mm (0.040—0.041 in)
2nd: 0.81—0.83 mm (0.032—0.033 in)
Oil : 1.51—1.53 mm (0.059—0.060 in)

Piston ring thickness
Standard
1st: 0.97—0.99 mm (0.038—0.039 in)
2nd: 0.77—0.79 mm (0.030—0.031 in)





PISTON RING FREE END GAP AND PISTON RING END GAP

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

Piston ring free end gap

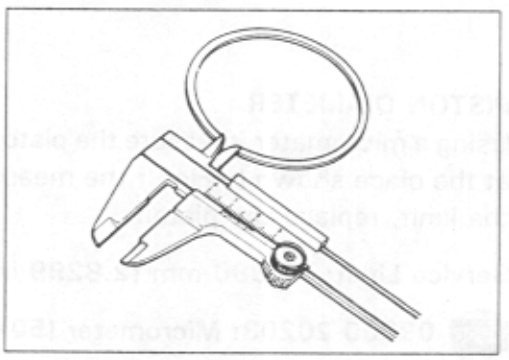
Service Limit
1st : 5.5 mm (0.22 in)
2nd: 6.9 mm (0.27 in)

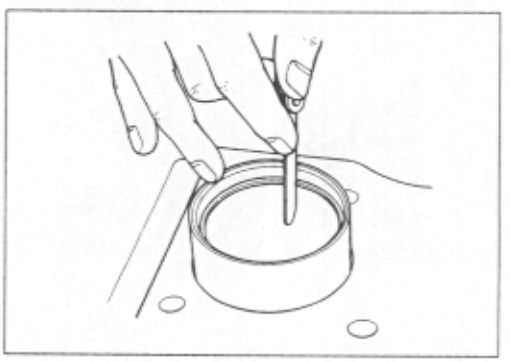
TOOL **09900-20102: Vernier calipers**

Piston ring end gap

Service Limit
1st : 0.5 mm (0.02 in)
2nd: 0.5 mm (0.02 in)

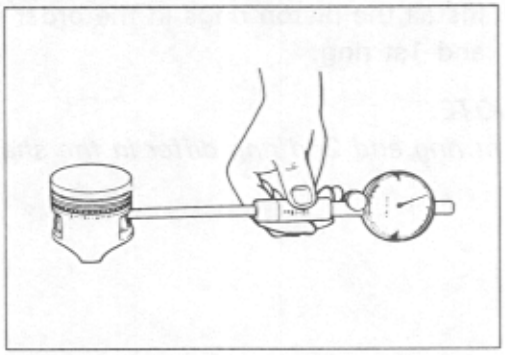
TOOL **09900-20803: Thickness gauge**





PISTON PIN AND PIN BORE

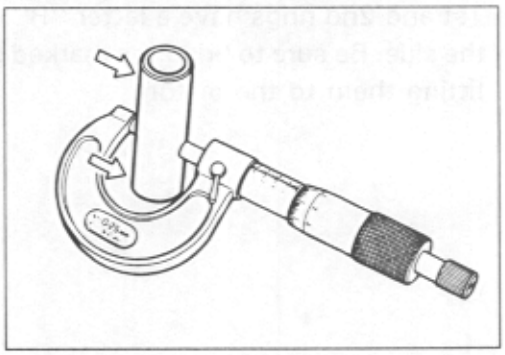
Using a small bore gauge, measure the piston pin bore inside diameter, and using a micrometer, measure the piston pin outside diameter. If the difference between these two measurements is more than the limits, replace both piston and piston pin.



Piston pin bore I.D.
Service Limit: 16.030 mm (0.6311 in)

TOOL **09900-20602: Dial gauge (1/1000 mm, 1 mm)**
09900-22401: Small bore gauge (10—18 mm)

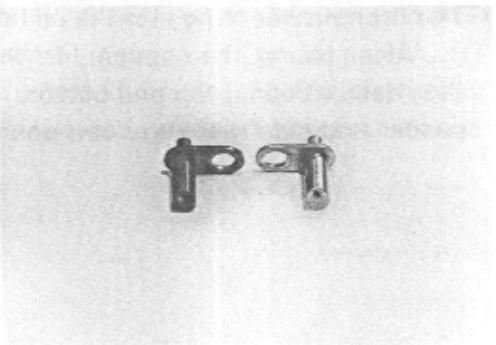
Using a micrometer, measure the piston pin outside diameter at three positions.



Piston pin O.D.
Service Limit: 15.980 mm (0.6291 in)

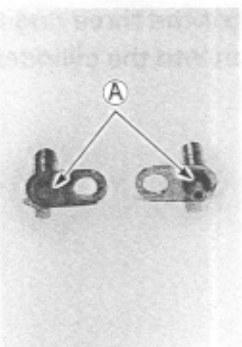
TOOL **09900-20205: Micrometer (0—25 mm)**

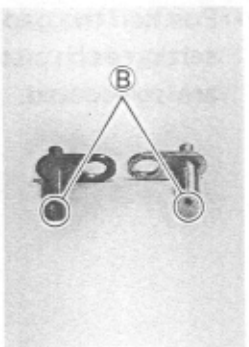
Check the piston cooling oil nozzle for clogging. If it is clogged, clean its oil passage with a proper wire and compressed air.



PISTON/CYLINDER INSTALLATION

- Fit the new O-rings Ⓐ to each piston cooling oil nozzle as shown.



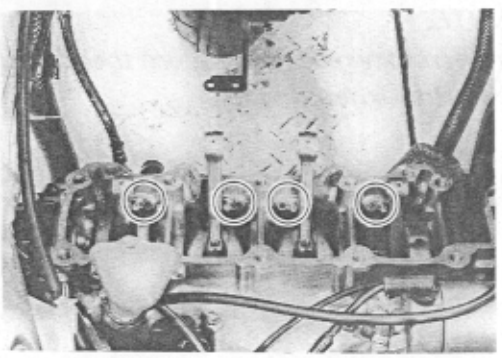


⚠ CAUTION

Use a new O-ring to prevent the oil pressure down.

NOTE:
Be sure to face the oil holes Ⓑ on each piston cooling oil nozzle to the top when installing them.

- Install each piston oil cooling nozzle with the bolts.

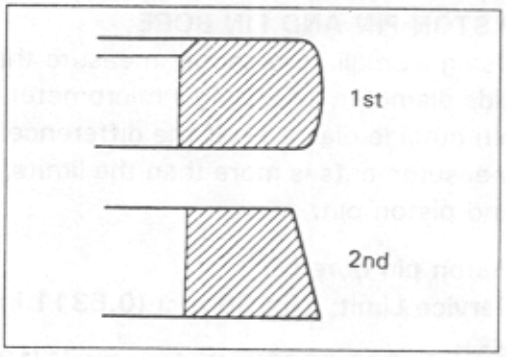


NOTE:
Apply a small quantity of THREAD LOCK "1342" to the bolts.

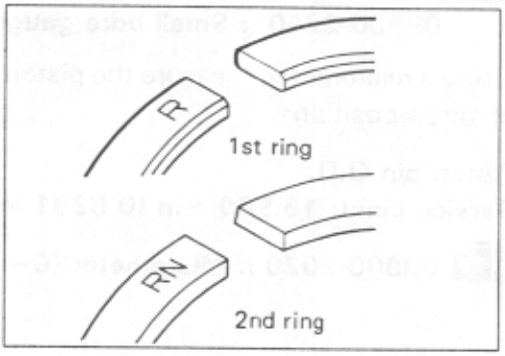
1342 **99000-32050: THREAD LOCK "1342"**

- Install the piston rings in the order of oil ring, 2nd ring and 1st ring.

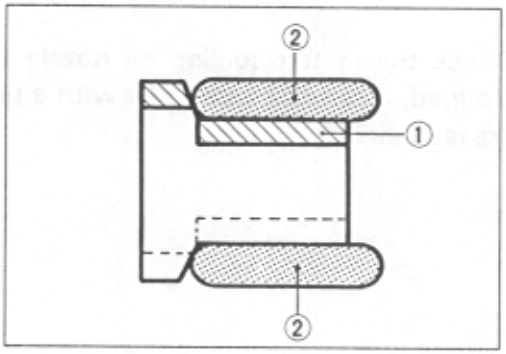
NOTE:
1st ring and 2nd ring differ in the shape of the ring face.



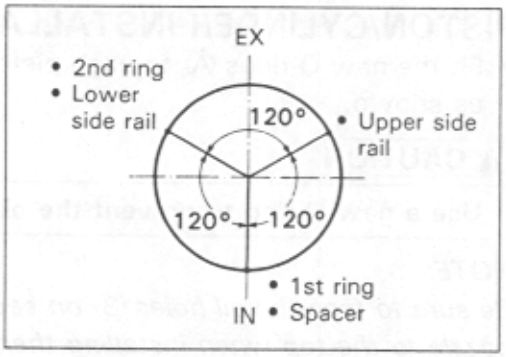
- 1st and 2nd rings have a letter "R" or "RN" marked on the side. Be sure to bring the marked side to the top when fitting them to the piston.



- The first member to go into the oil ring groove is a spacer ①. After placing the spacer, fit the two side rails ②. Side designations, top and bottom, are not applied to the spacer and side rails: you can position each either way.



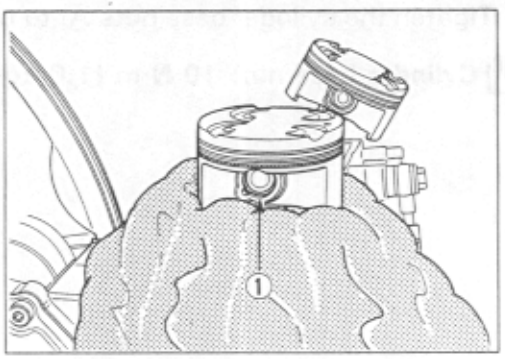
- Position the gaps of the three rings as shown. Before inserting each piston into the cylinder, check that the gaps are so located.



NOTE:
When fitting the piston, turn the triangle mark on the piston head to exhaust side.



- Have each piston pin moly paste oiled lightly before installing it.



99000-25140: SUZUKI MOLY PASTE

NOTE:
Be sure to install the pistons in the cylinder from which they were removed in disassembly, refer to the letter mark, "1" through "4", scribed on the piston.

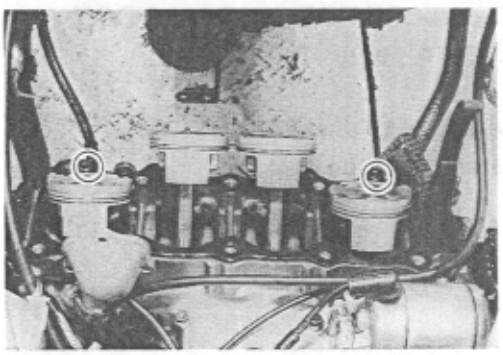
- Place a cloth beneath the piston, and install the circlips.

⚠ CAUTION

Use a new piston pin circlip ① to prevent circlip failure which will occur with a bent one.

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

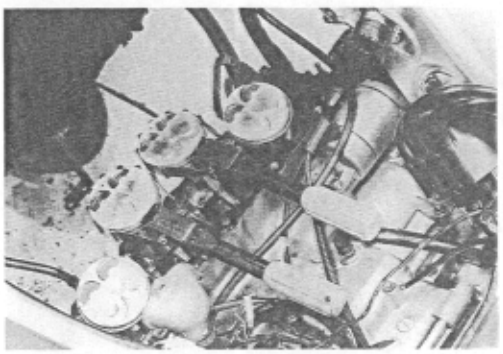
- Place the dowel pins and new cylinder gasket on the crankcase.



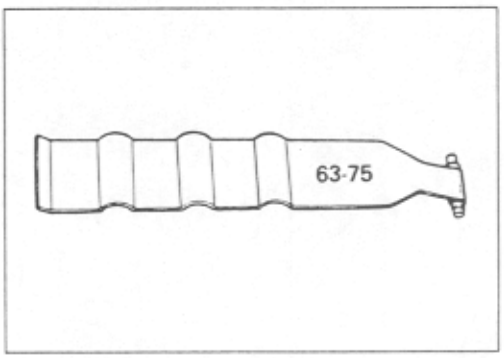
⚠ CAUTION

Use a new gasket to prevent oil leakage.

- Before putting on the cylinder block, oil the big and small ends of each conrod and also the sliding surface of each piston.
- Install piston ring holders in the indicated manner. Some light resistance must be overcome to lower the cylinder block.
- With No.2 and No.3 pistons in place, install No.1 and No.4 pistons, and insert them into the cylinder.



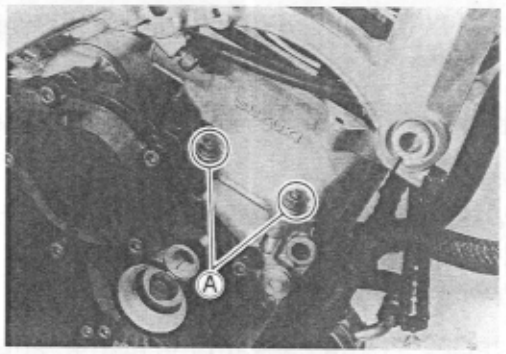
09916-74521: Holder body
09916-74540: Band



NOTE:
Do not overtighten the special tool bands or the pistons entry into the cylinders will be difficult.

- Tighten the cylinder base nuts Ⓐ to the specified torque.

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

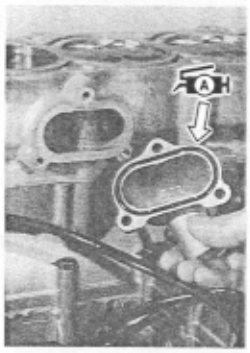


- Apply SUZUKI SUPER GREASE "A" to the rubber seal on the water inlet conduction case.

99000-25030: SUZUKI SUPER GREASE "A"

- Tighten the water inlet conduction case bolts to the specified torque.

Water inlet conduction case bolt: 10 N·m (1.0 kg-m, 7.0 lb-ft)





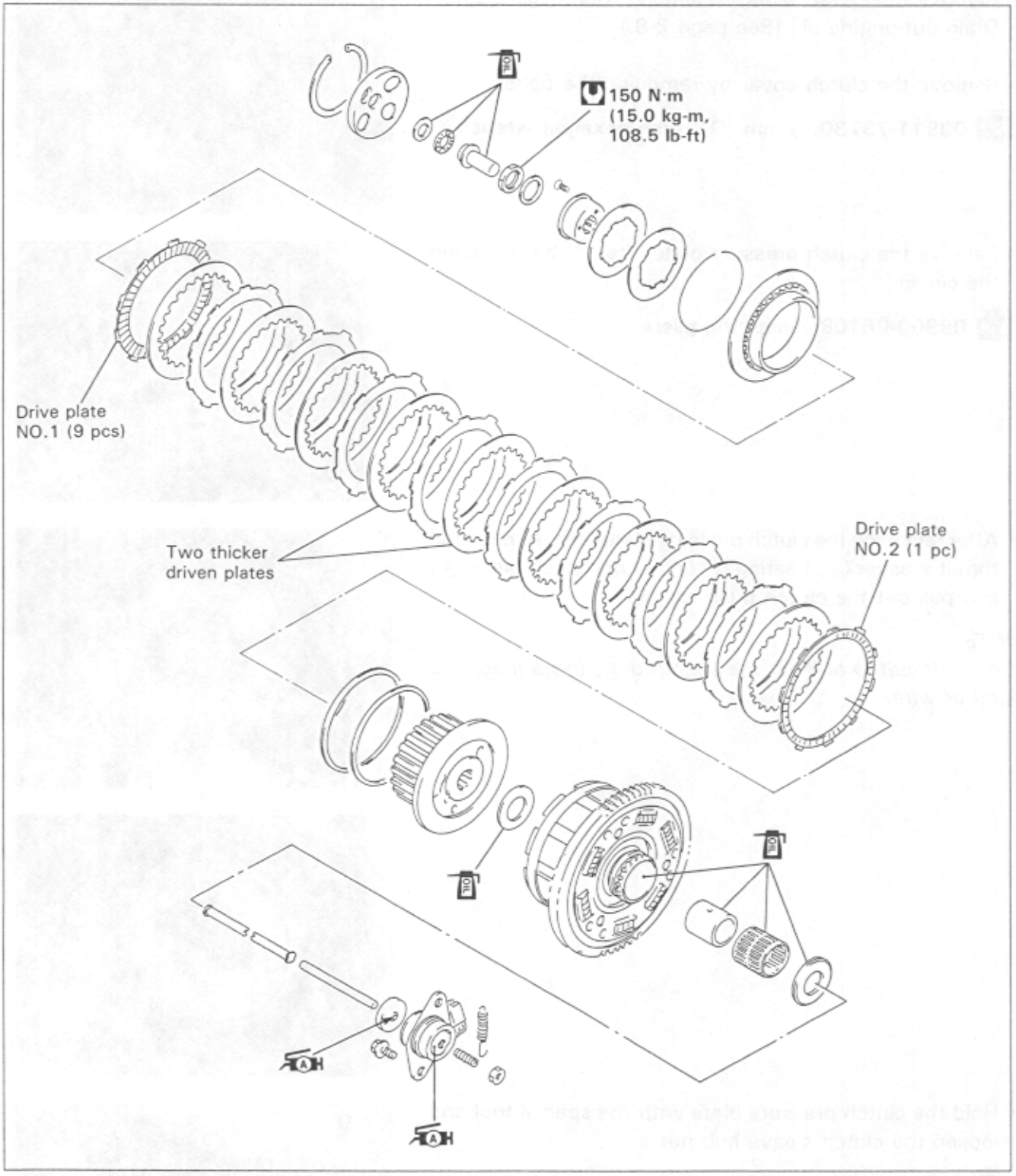
CYLINDER HEAD INSTALLATION

Refer to page 3A-14.

CAMSHAFT INSTALLATION

Refer to page 3A-15.

CLUTCH

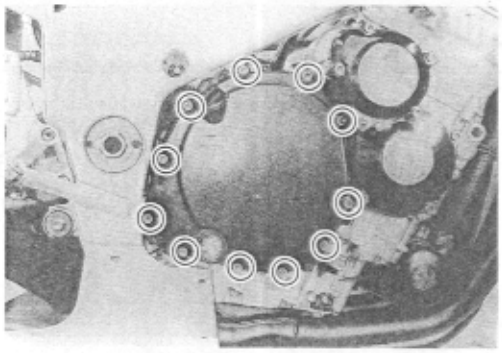


CONTENTS

CLUTCH REMOVAL 3C- 1
CLUTCH INSPECTION 3C- 3
CLUTCH INSTALLATION 3C- 4

CLUTCH REMOVAL

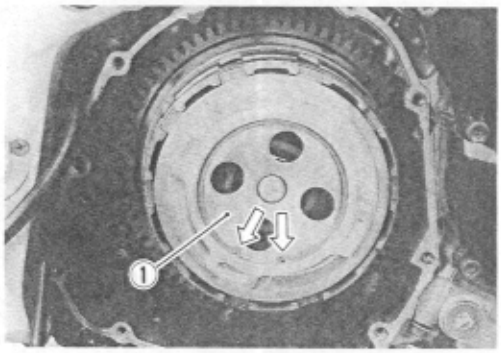
- Remove the lower fairing assembly. (See page 6-2.)
- Drain out engine oil. (See page 2-9.)



- Remove the clutch cover by removing the bolts.

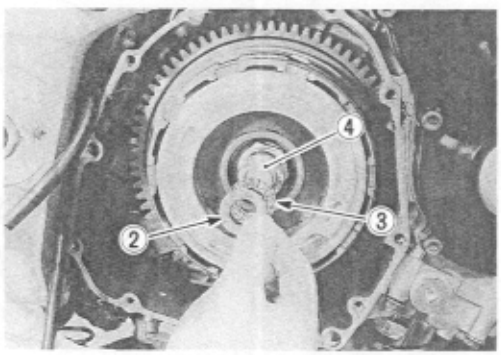
TOOL **09911-73730: 5 mm "T" type hexagon wrench**

- Remove the clutch pressure plate lifter ① by removing the circlip.

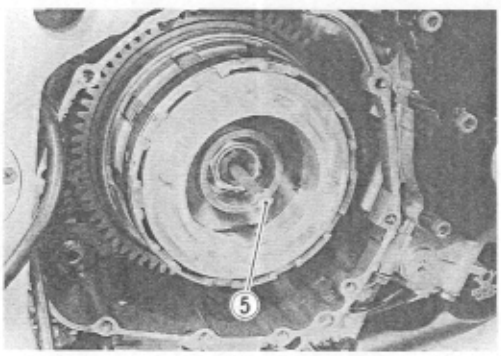


TOOL **09900-06108: Snap ring pliers**

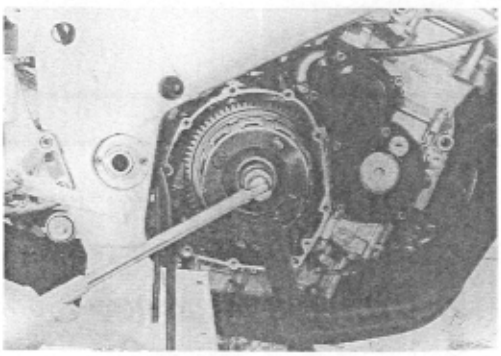
- After removing the clutch pressure plate lifter, remove the thrust washer ②, bearing ③ and clutch push piece ④, and pull out the clutch push rod ⑤.



NOTE:
If it is difficult to pull out the push rod ⑤, use a magnetic hand or wire.

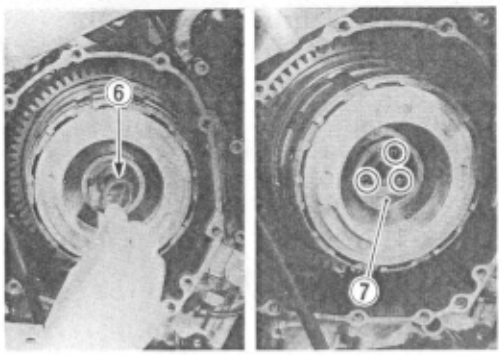


- Hold the clutch pressure plate with the special tool and loosen the clutch sleeve hub nut.

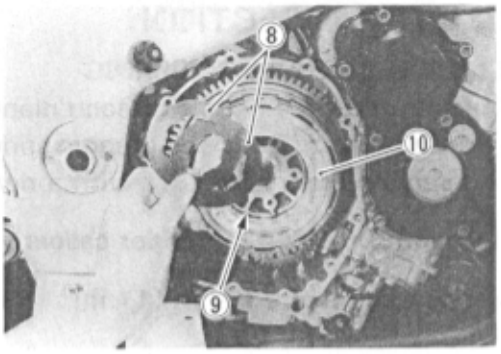


TOOL **09920-34820: Clutch pressure plate holder**

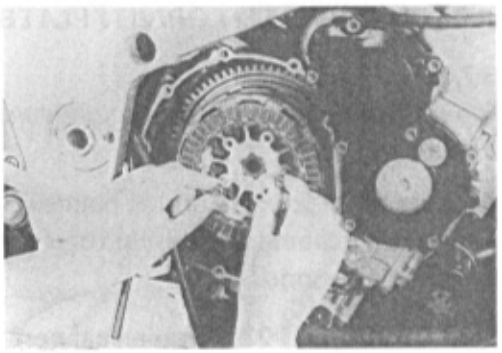
- After removing the clutch sleeve hub nut, remove the lock washer ⑥.
- Remove the clutch diaphragm spring holder ⑦ by removing the screws.



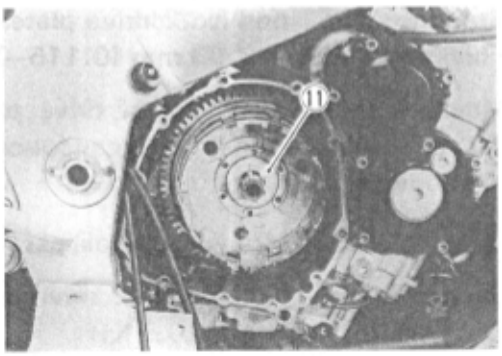
- Remove the clutch diaphragm springs ⑧, clutch diaphragm spring seat ⑨ and clutch pressure plate ⑩.



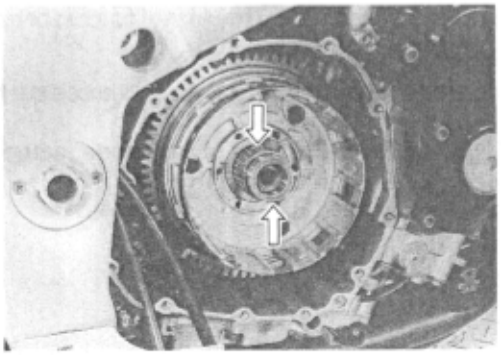
- Screw two 6-mm bolts into the threaded of the clutch sleeve hub as shown.
- Remove the clutch drive and driven plates along with the clutch sleeve hub.



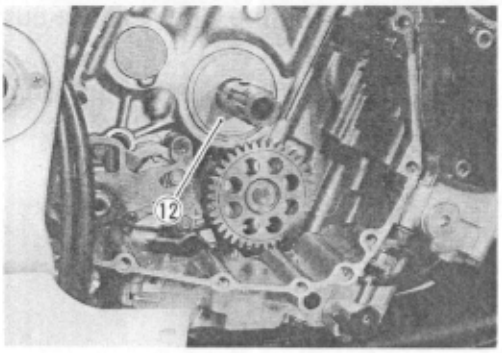
- Remove the thrust washer ⑪.



- With the spacer and bearing removed, the primary driven gear (integral with the clutch housing) is free to disengage from the primary drive gear.
- Remove the primary driven gear assembly with the oil pump drive gear.



• Remove the thrust washer ⑫.



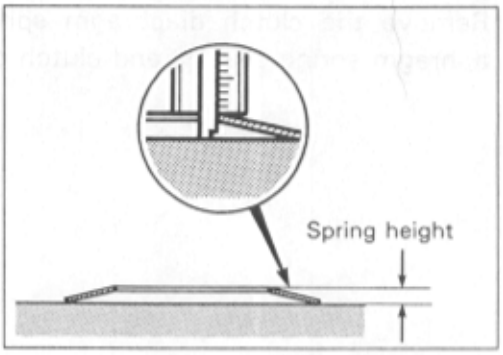
CLUTCH INSPECTION

CLUTCH DIAPHRAGM SPRING

Measure the free height of each diaphragm spring with a vernier calipers. If each diaphragm spring height is less than the service limit, replace it with a new one.

09900-20102: Vernier calipers

Service Limit: 2.9 mm (0.11 in)



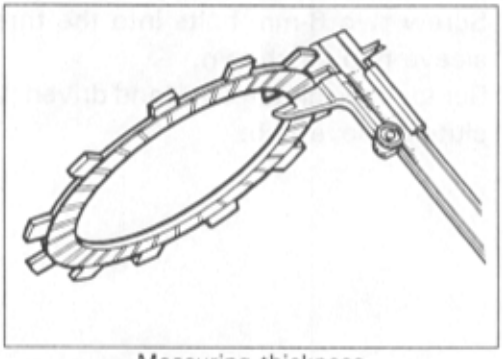
CLUTCH DRIVE AND DRIVEN PLATES

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

Measure the thickness of drive plates with a vernier calipers. If each drive plate is not within the standard range, replace it with a new one.

09900-20102: Vernier calipers

Standard (No.1 and No.2 drive plates)
Thickness: 2.92—3.08 mm (0.115—0.121 in)

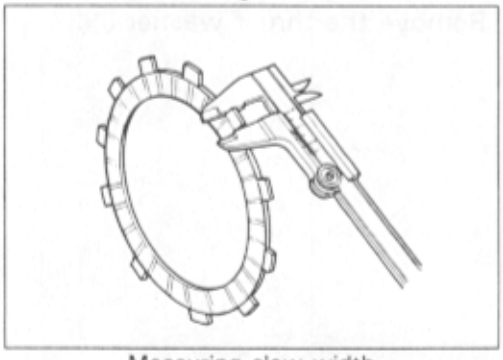


Measuring thickness

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

09900-20102: Vernier calipers

Service Limit (No.1 and No.2 drive plates)
Claw width: 13.0 mm (0.51 in)

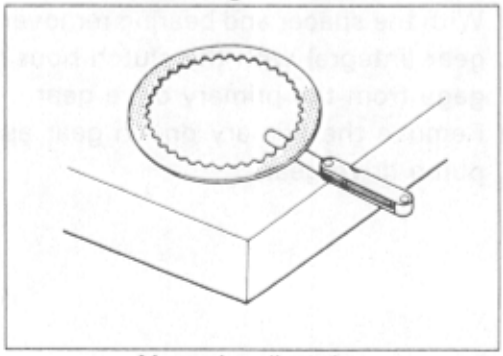


Measuring claw width

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

09900-20803: Thickness gauge

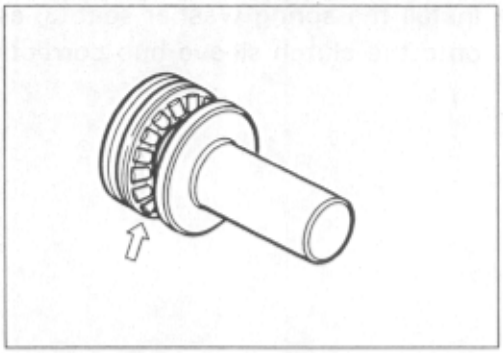
Service Limit: 0.1 mm (0.004 in)



Measuring distortion

CLUTCH BEARING

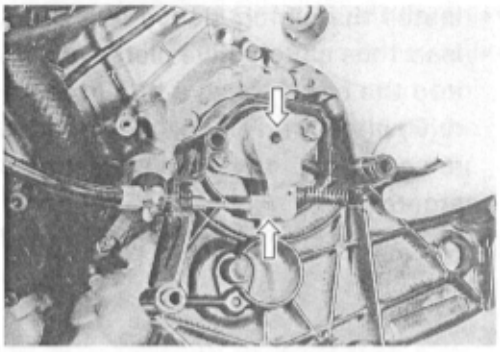
Inspect the clutch release bearing for any abnormality, particularly cracks, to decide whether it can be reused or should be replaced.
Smooth engagement and disengagement of the clutch depends on the condition of the bearing.



CLUTCH RELEASE

- Remove the gearshift lever and engine sprocket cover. (See page 3-5.)

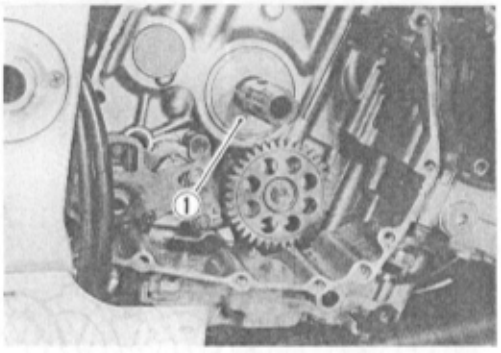
Operate the clutch lever by hand to inspect the clutch release for a smooth movement and abnormal noise. If a large resistance is felt to movement, apply a grease or oil to the clutch release.



CLUTCH INSTALLATION

- Install the thrust washer ① onto the countershaft.

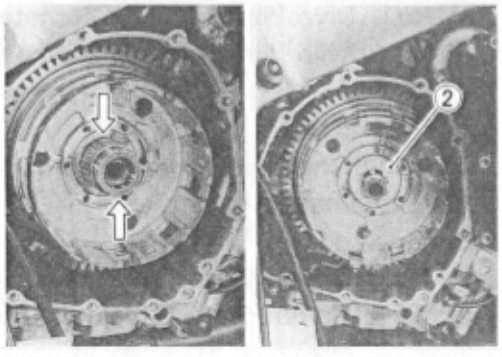
NOTE:
Flat surface of washer is positioned outside.



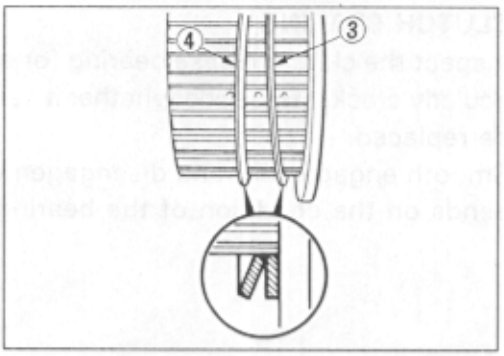
- Install the oil pump drive gear onto the primary driven gear.



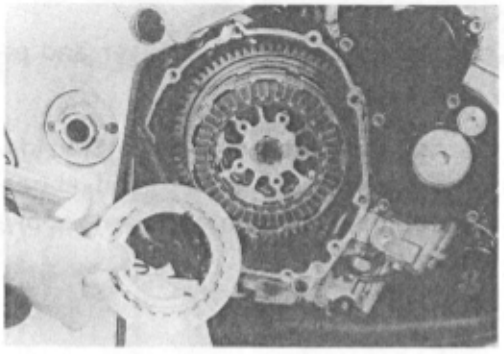
- Install the primary driven gear assembly onto the countershaft, and apply engine oil to the needle bearing and spacer.
- Install the thrust washer ② onto the countershaft.

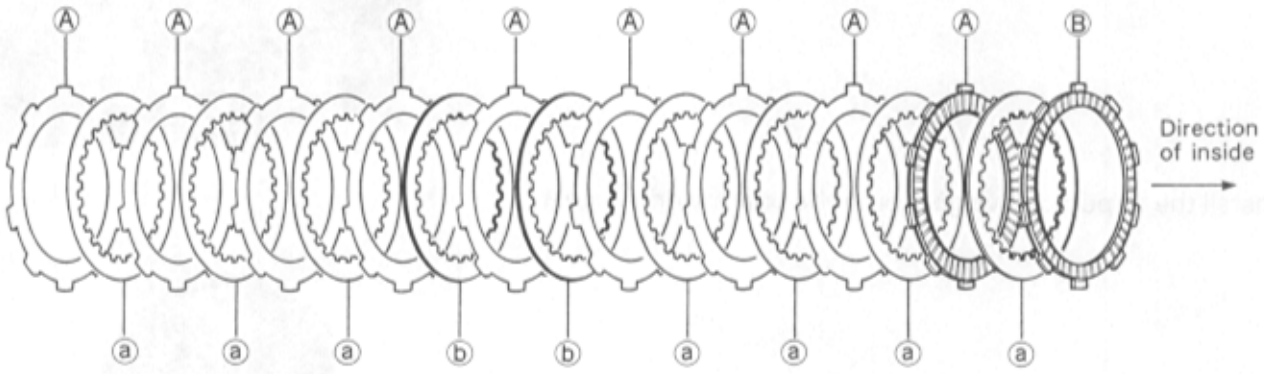


- Install the spring washer seat ③ and spring washer ④ onto the clutch sleeve hub correctly.



- Install the clutch sleeve hub onto the countershaft.
- Insert the clutch drive plates and driven plates one by one into the clutch sleeve hub in the prescribed order, No.2 drive plate first. (Two kinds of drive plate, No.1 and No.2 are equipped, they can be distinguished by the inside diameter.)
- Put the clutch pressure plate onto the clutch sleeve hub securely.



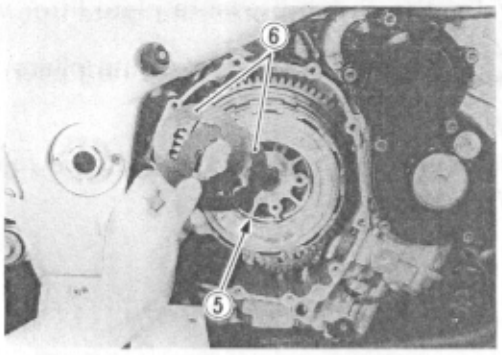


DRIVE PLATE:
Ⓐ No.1 Drive Plate (Inside Diameter): 101 mm (3.98 in) ... 9 pcs
Ⓑ No.2 Drive Plate (Inside Diameter): 108 mm (4.25 in) ... 1 pc

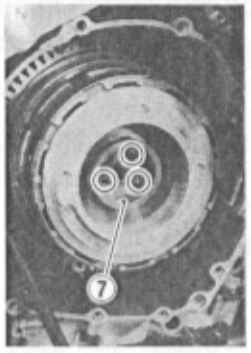
DRIVEN PLATE:
Two kinds of the driven plate, No.1 and No.2, are equipped in the clutch system, they can be distinguished by the thickness. (The spare part of the No.2 driven plate is not available individually.)
ⓐ No.1 Driven Plate (Thickness): 1.6 mm (0.06 in) ... 7 pcs
ⓑ No.2 Driven Plate (Thickness): 2.0 mm (0.08 in) ... 2 pcs

- Put the clutch diaphragm spring seat ⑤ and clutch diaphragm springs ⑥ onto the clutch pressure plate properly.

NOTE:
Pay attention to the direction of the clutch diaphragm springs. (See page 3C-8.)



- Install the diaphragm spring holder ⑦ with three screws.
- Install the lock washer ⑧.

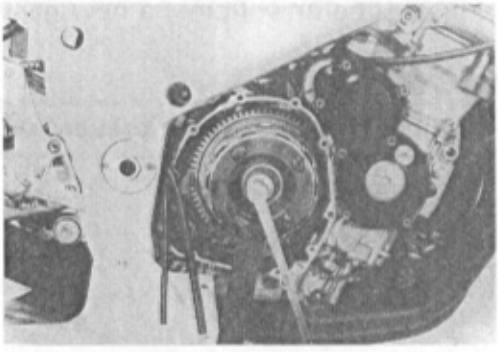




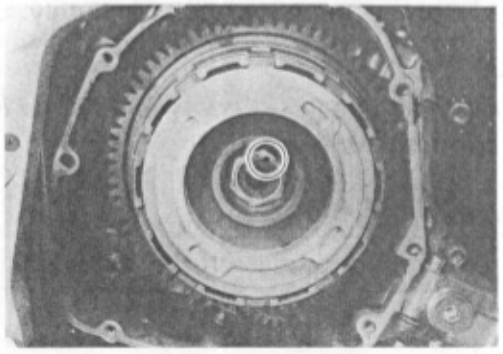
- Tighten the clutch sleeve hub nut to the specified torque by using the torque wrench and clutch pressure plate holder.

TOOL 09920-34820: Clutch pressure plate holder

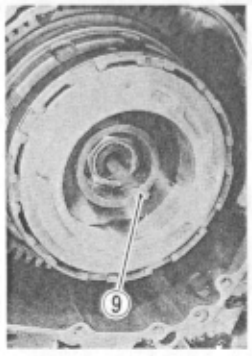
Clutch sleeve hub nut: 150 N·m (15.0 kg-m, 108.5 lb-ft)

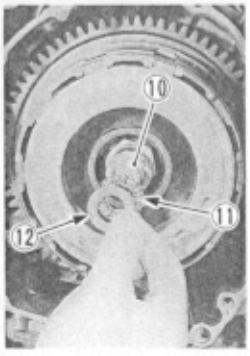


- Lock the clutch sleeve hub nut with a center punch.



- Insert the clutch push rod ⑨ into the countershaft.
- Install the clutch push piece ⑩, bearing ⑪ and thrust washer ⑫ to the countershaft.

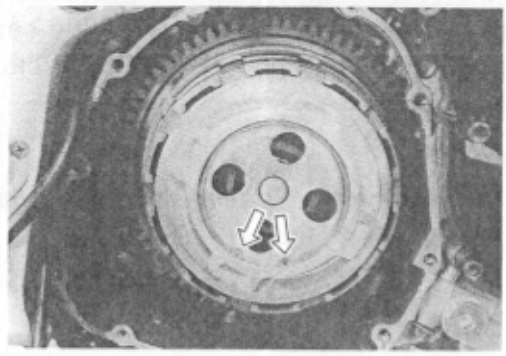




- Fix the clutch pressure plate lifter with the circlip.

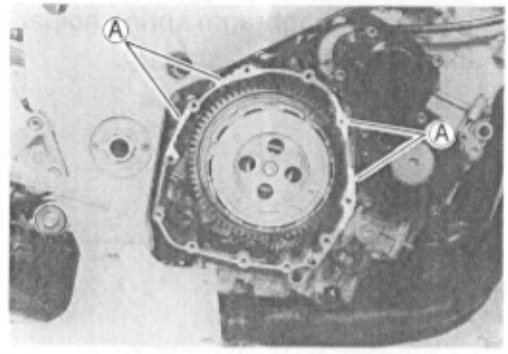
TOOL **09900-06108: Snap ring pliers**

NOTE:
When fitting the circlip, make sure that the sharp edge of the circlip faces outside.



- Coat SUZUKI BOND NO.1207B lightly to the mating surfaces Ⓐ among upper, middle and lower crankcases as shown.

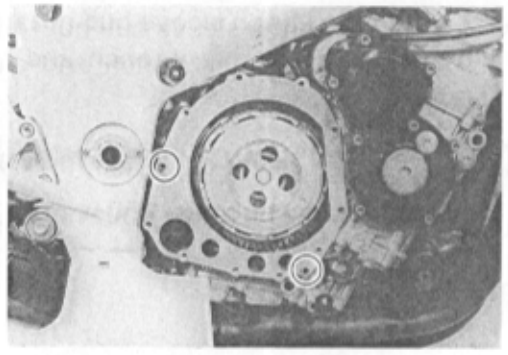
1207B **99104-31140: SUZUKI BOND NO.1207B**



- Install the dowel pins, a new gasket and clutch cover.

⚠ CAUTION

Use only new gasket to prevent oil leakage.

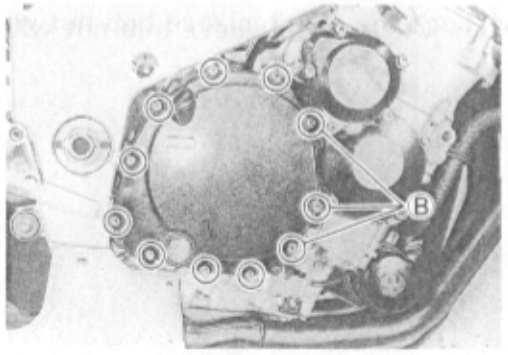


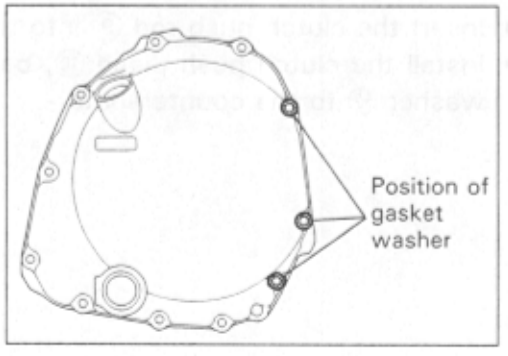
- Tighten the cover bolts securely.

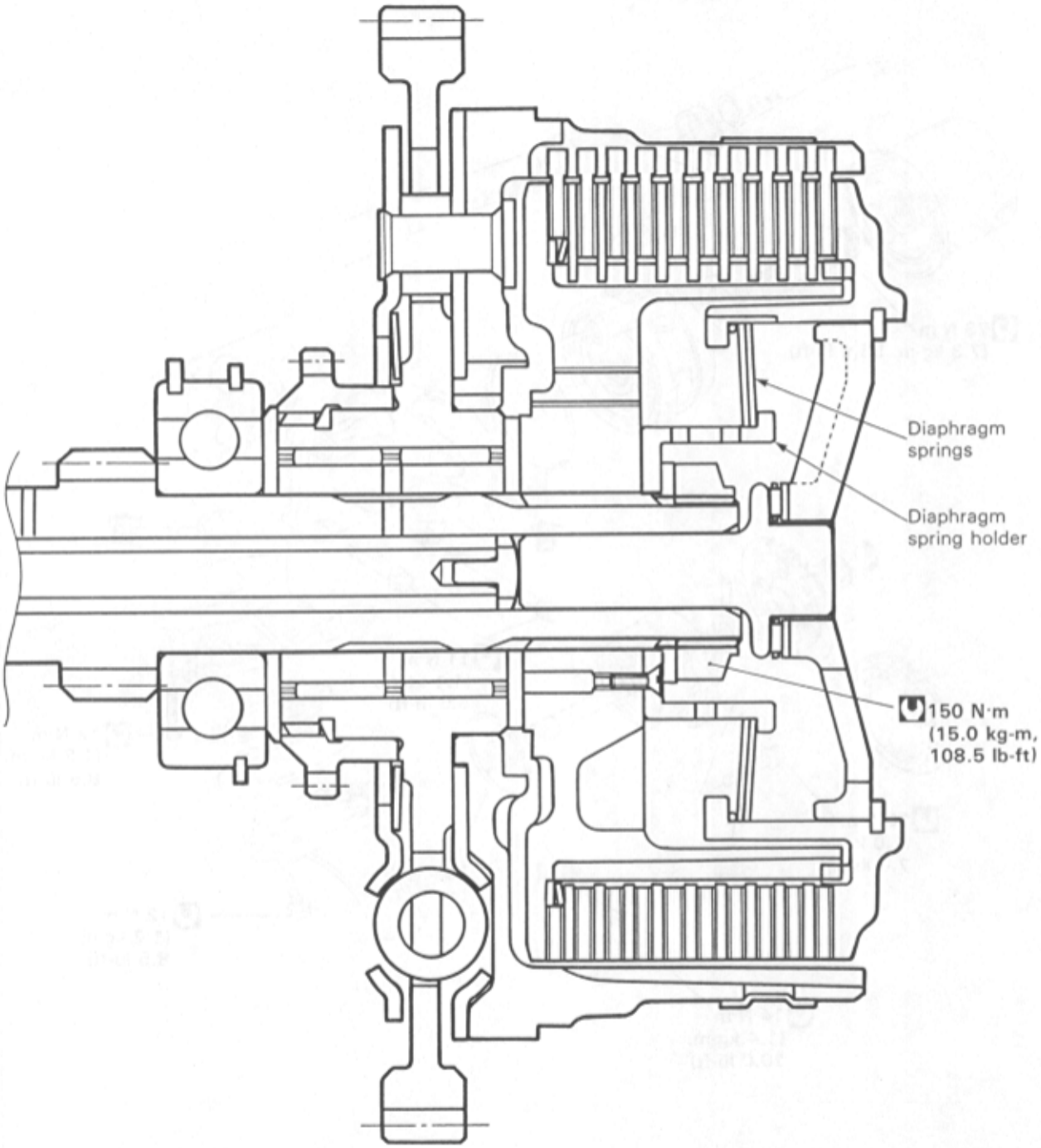
NOTE:
Fit the three gasket washers to the clutch cover bolts Ⓑ correctly as shown.

⚠ CAUTION

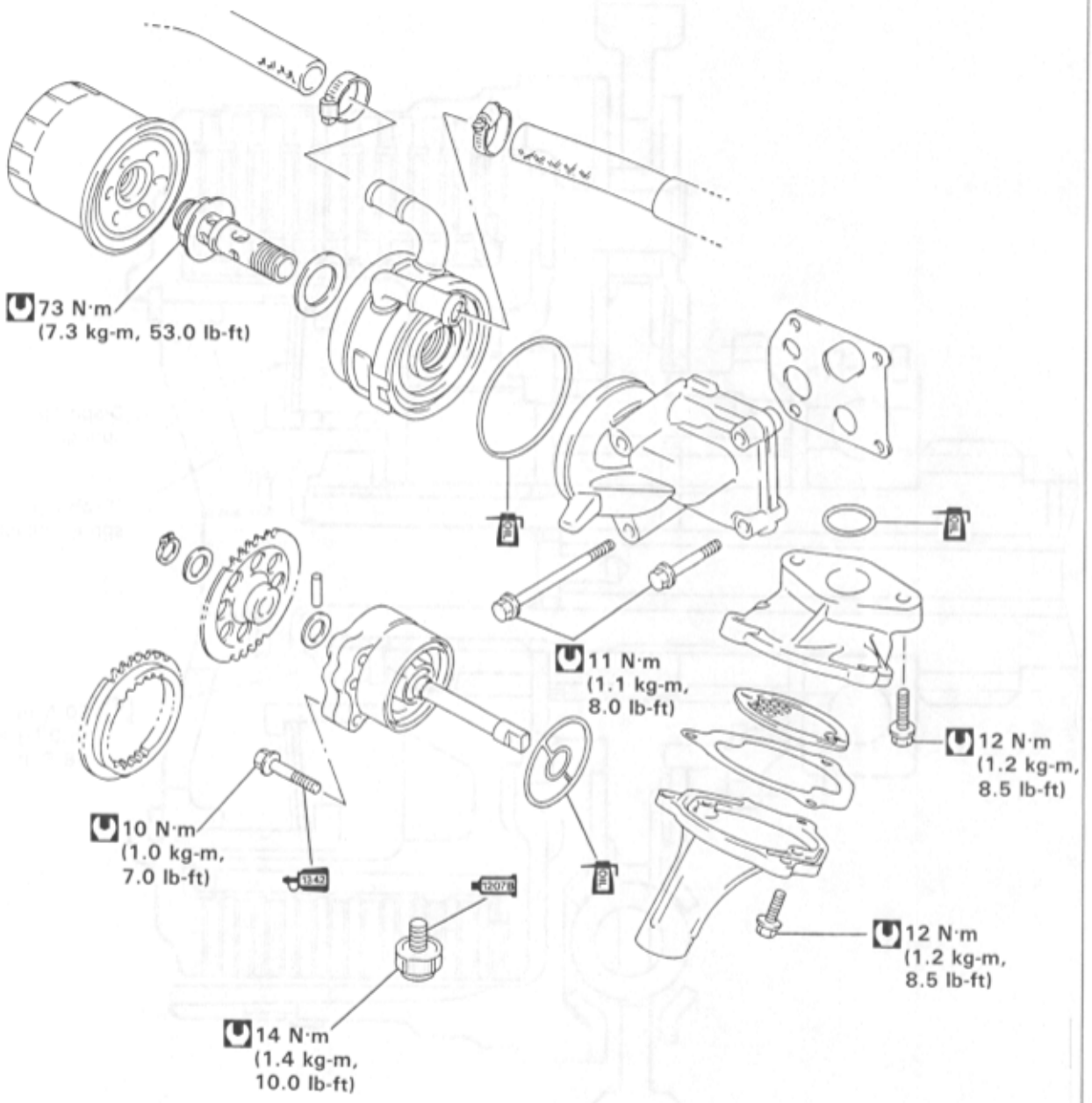
Use only new gasket to prevent oil leakage.

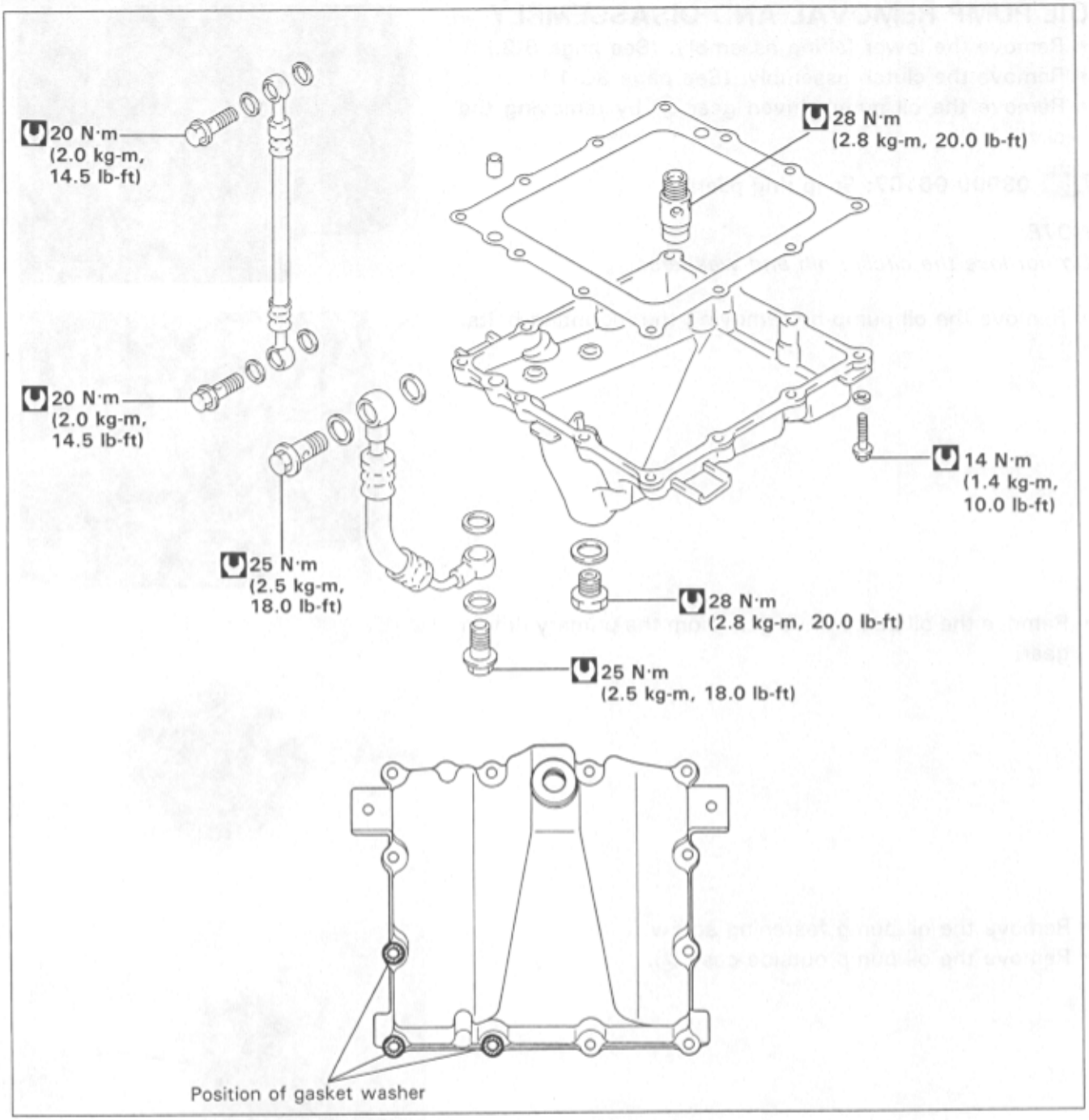





Diaphragm springs
Diaphragm spring holder
150 N·m (15.0 kg-m, 108.5 lb-ft)

ENGINE LUBRICATION SYSTEM





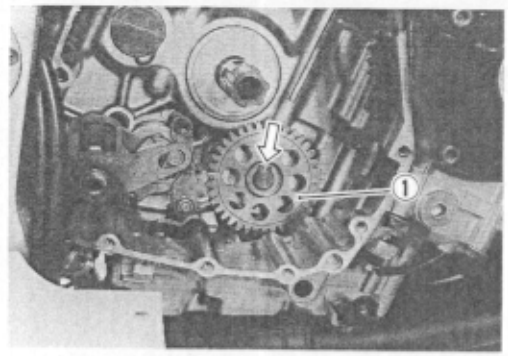
3D

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OIL PUMP 3D- 1
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OIL PAN/OIL SUMP FILTER/OIL PRESSURE REGULATOR 3D- 6
OIL PRESSURE SWITCH 3D- 8
PISTON COOLING OIL NOZZLE 3D- 8
OIL JETS 3D- 9

OIL PUMP REMOVAL AND DISASSEMBLY

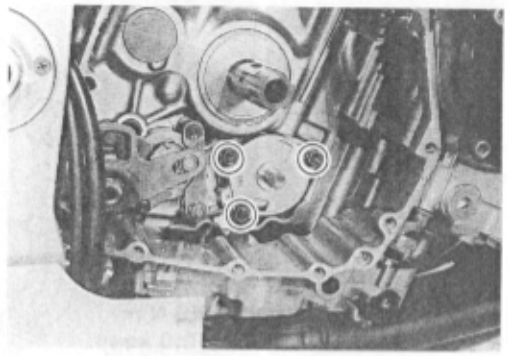
- Remove the lower fairing assembly. (See page 6-2.)
- Remove the clutch assembly. (See page 3C-1.)
- Remove the oil pump driven gear ① by removing the circlip.



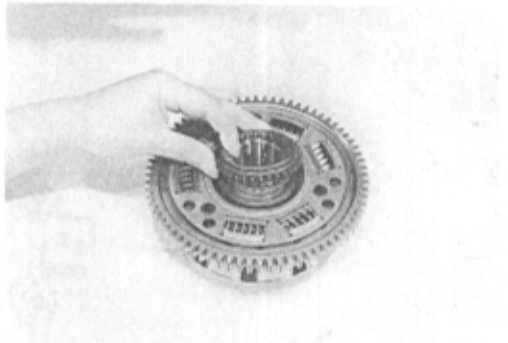
TOOL **09900-06107: Snap ring pliers**

NOTE:
Do not lose the circlip, pin and washers.

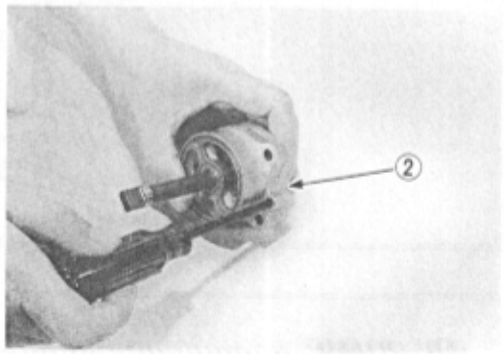
- Remove the oil pump by removing the mounting bolts.



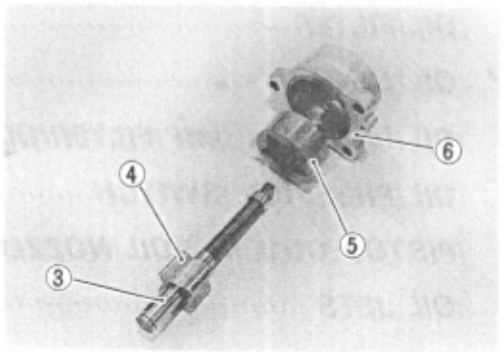
- Remove the oil pump drive gear from the primary driven gear.



- Remove the oil pump fastening screw.
- Remove the oil pump outside case ②.



- Remove the rotor shaft ③, inner rotor ④ and outer rotor ⑤ from the oil pump body ⑥.

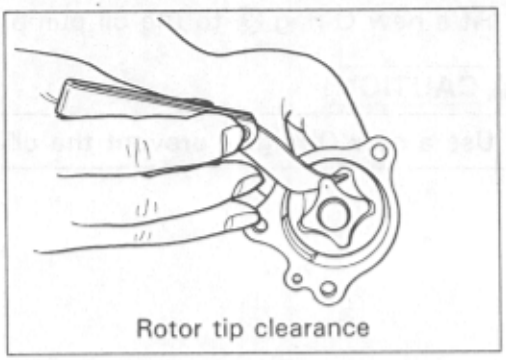


OIL PUMP INSPECTION

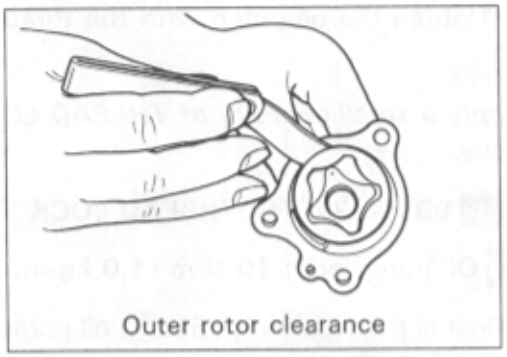
Inspect the rotor tip clearance and outer rotor clearance with a thickness gauge.
If the clearance exceeds the service limit, replace the oil pump with a new one.

TOOL **09900-20803: Thickness gauge**

Rotor tip clearance
Service Limit: 0.20 mm (0.008 in)


Rotor tip clearance

Outer rotor clearance
Service Limit: 0.35 mm (0.014 in)

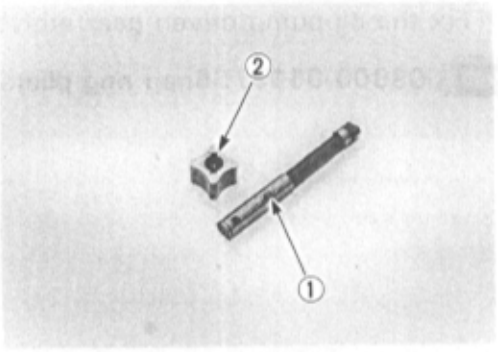

Outer rotor clearance

OIL PUMP REASSEMBLY AND INSTALLATION

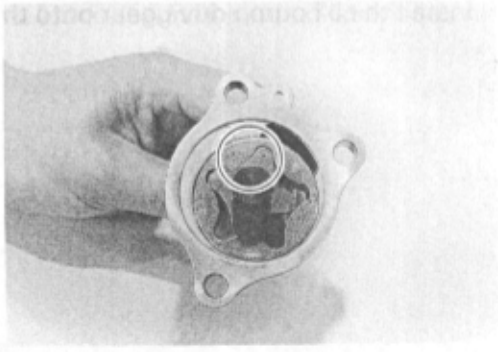
⚠ CAUTION

Wash the oil pump with fresh engine oil before reassembly.

- Insert the rotor shaft into the inner rotor by aligning the drive pin ① with a slot ② in the inner rotor.

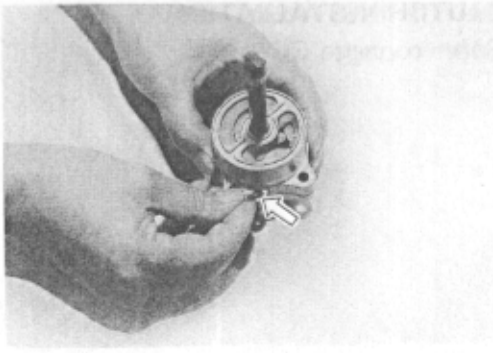


- When installing the outer rotor and inner rotor into the oil pump body, be sure to face the punch marks on the inner and outer rotors to the outside.

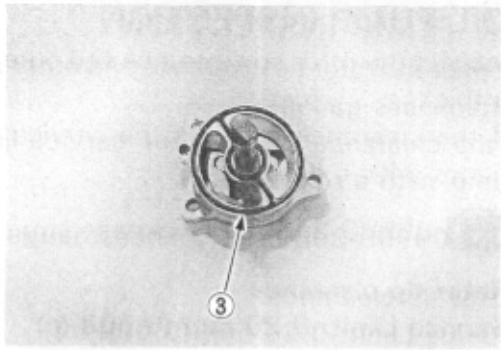


- Apply a small quantity of THREAD LOCK "1342" to the screw and tighten it.

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



- Fit a new O-ring ③ to the oil pump body.



⚠ CAUTION

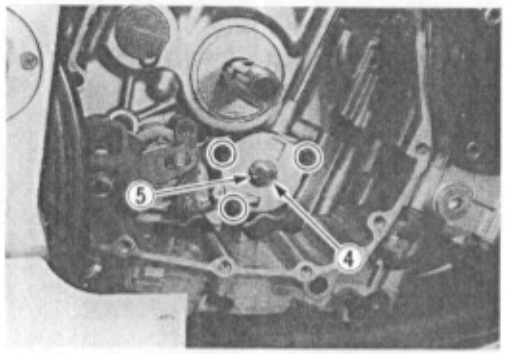
Use a new O-ring to prevent the oil pressure down.

- Tighten the oil pump with the three bolts.

NOTE:
Apply a small quantity of THREAD LOCK "1342" to the bolts.

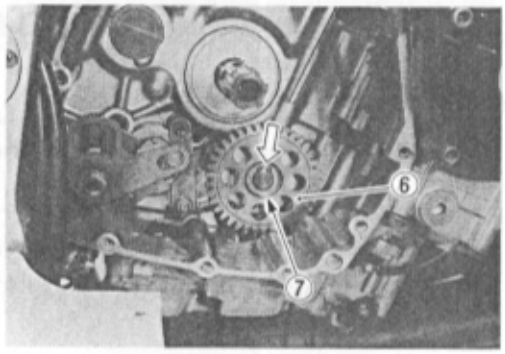
99000-32050: THREAD LOCK "1342"

Oil pump bolt: 10 N·m (1.0 kg-m, 7.0 lb-ft)



- Install the washer ④, pin ⑤, oil pump driven gear ⑥ and washer ⑦.
- Fix the oil pump driven gear with the circlip.

09900-06107: Snap ring pliers



- Install the oil pump drive gear onto the primary driven gear.



CLUTCH INSTALLATION

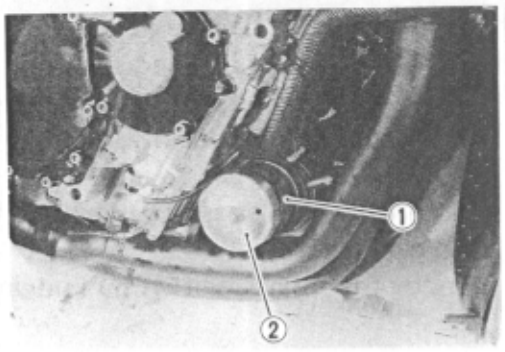
Refer to page 3C-4.

OIL FILTER REMOVAL

- Remove the lower fairing assembly. (See page 6-2.)

- Place an oil pan below the oil filter and remove the oil filter ① by using the oil filter wrench ②.

TOOL **09915-40610: Oil filter wrench**



OIL FILTER INSTALLATION

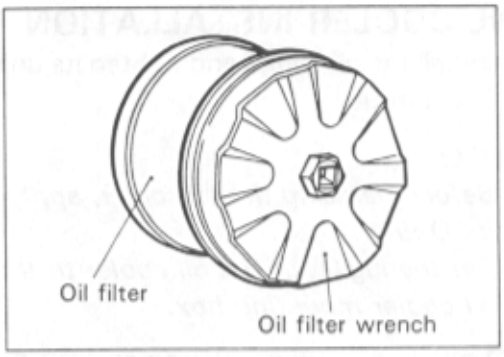
- Apply engine oil lightly to the gasket of the new filter before installation.
- Install the new filter turning it by hand until you feel that the filter gasket contacts the mounting surface. Then tighten it 2 turns using the oil filter wrench.

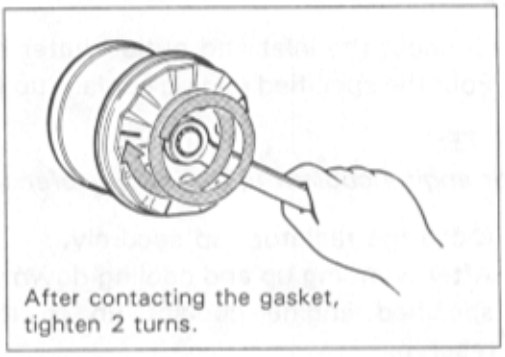
TOOL **09915-40610: Oil filter wrench**

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

⚠ CAUTION

Use SUZUKI MOTORCYCLE GENUINE OIL FILTER only, since the other make's genuine filters and after-market parts may differ in thread specifications (thread diameter and pitch), filtering performance and durability, which could cause engine damage or oil leaks. Suzuki automobile genuine oil filter is also not usable for the motorcycles.



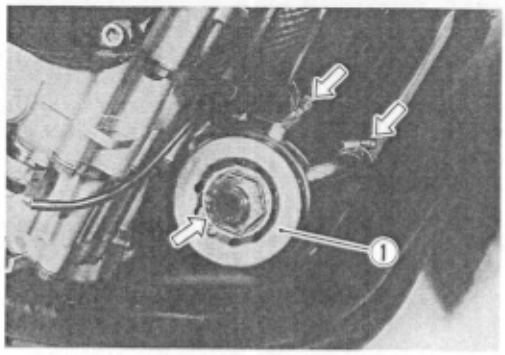


- Start up the engine and allow it to run for several seconds at idling speed.
- Turn off the engine and wait about one minute, then check the oil level through the inspection window. If the level is below mark "F", add oil to the level.

NECESSARY AMOUNT OF ENGINE OIL
Oil change: 2.6 L (2.7/2.3 US/Imp qt)
Filter change: 2.8 L (3.0/2.5 US/Impt qt)
Overhaul engine: 3.5 L (3.7/3.1 US/Imp qt)

OIL COOLER REMOVAL

- Remove the lower fairing assembly. (See page 6-2.)
- Remove the oil filter. (See page 3D-4.)
- Drain out engine coolant. (See page 3-3.)



- Disconnect the inlet and outlet water hoses by loosening the clamp screws.
- Remove the oil cooler ① by removing its union bolt.

OIL COOLER INSTALLATION

- Install the oil cooler and tighten its union bolt to the specified torque.



NOTE:

* *Before installing the oil cooler, apply engine oil lightly to its O-ring.*

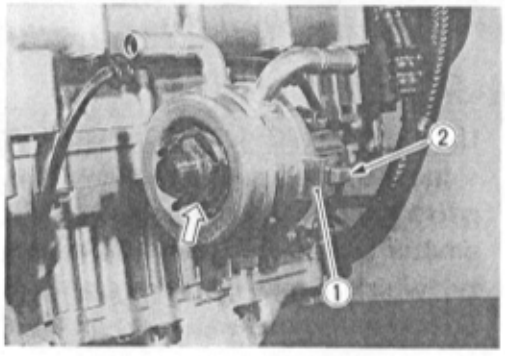
* *Set the lug ① of the oil cooler to the stopper ② on the oil cooler mounting box.*

Oil cooler union bolt: 73 N·m (7.3 kg-m, 53.0 lb-ft)

- Connect the inlet and outlet water hoses securely.
- Pour the specified engine coolant up to the radiator inlet.

NOTE:

For engine coolant information, refer to page 5-4.



- Close the radiator cap securely.
- After warming up and cooling down the engine, add the specified engine coolant up to the engine coolant reservoir.

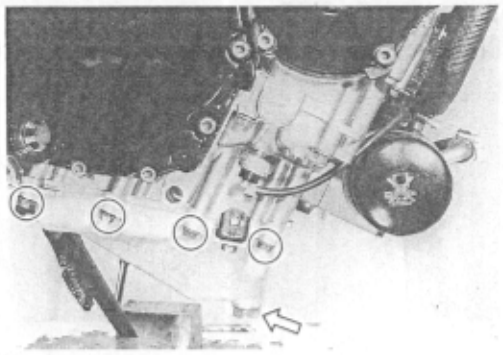
⚠ CAUTION

Repeat above procedure several times and make sure that the radiator is filled with engine coolant up to the engine coolant reservoir.

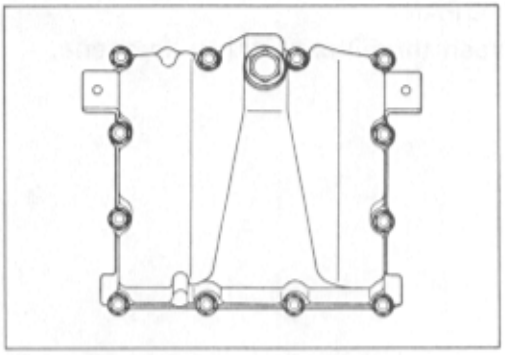
Engine coolant capacity: 2 550 ml (2.7/2.2 US/Imp qt)

OIL PAN/OIL SUMP FILTER/OIL PRESSURE REGULATOR REMOVAL

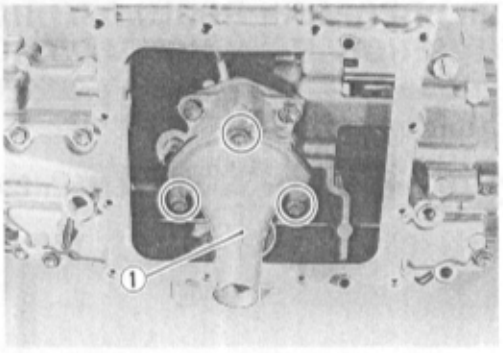
- Remove the lower fairing assembly. (See page 6-2.)
- Drain out engine oil. (See page 2-9.)
- Remove the exhaust pipe/muffler assembly. (See page 3-3.)



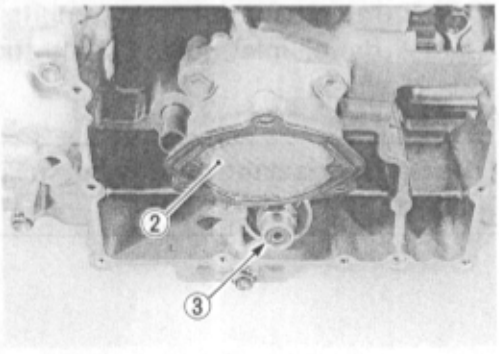
- Remove the oil pan by removing the bolts.



- Remove the oil inlet guide ① by removing the bolts.



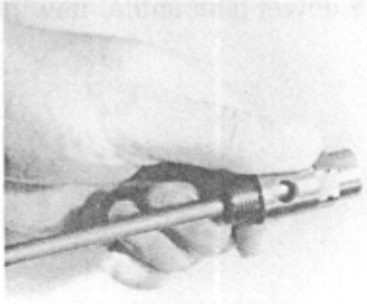
- Remove the oil sump filter ② and its gasket.
- Remove the oil pressure regulator ③.



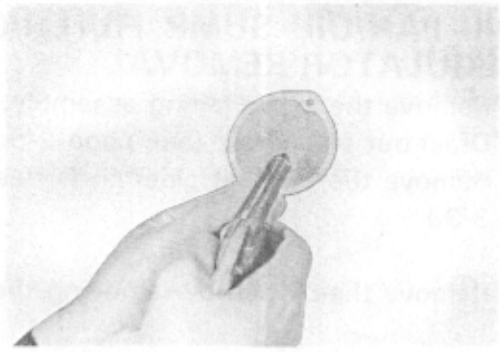
INSPECTION AND CLEANING

OIL PRESSURE REGULATOR

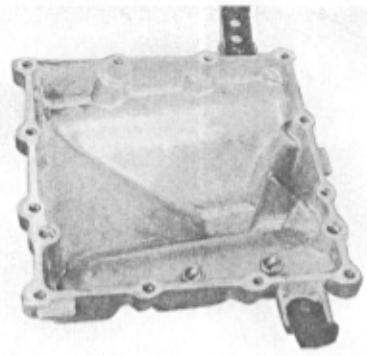
Check the operation of the oil pressure regulator by pushing on the piston with a proper bar. If the piston does not operate, replace the oil pressure regulator with a new one.



OIL SUMP FILTER
Clean the oil sump filter with a compressed air.

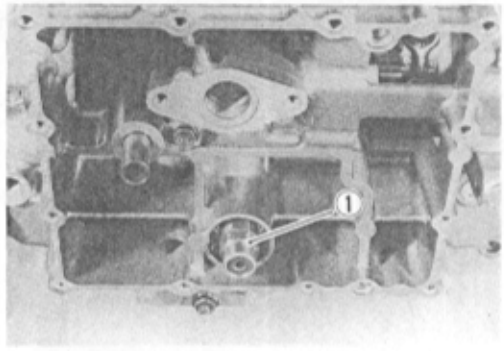


OIL PAN
Wash the oil pan with a kerosene.



OIL PRESSURE REGULATOR/OIL SUMP FILTER/OIL PAN INSTALLATION
- Tighten the oil pressure regulator ① to the specified torque.

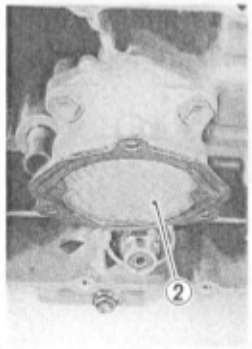
Oil pressure regulator: 28 N·m (2.8 kg-m, 20.0 lb-ft)

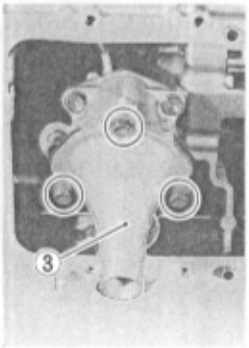


- Install the oil sump filter ② and its gasket.
- Install the oil inlet guide ③ with the bolts.

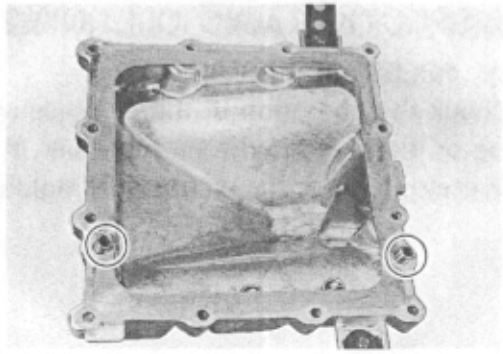
⚠ CAUTION

Use a new gasket to prevent sucking dust from the joint.



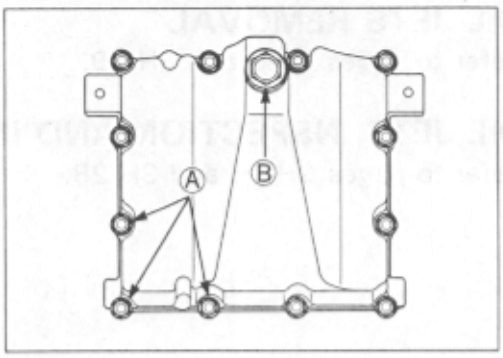


- Install the dowel pins and a new gasket to the oil pan.



- Fit the new gasket washers to the oil pan bolts Ⓐ correctly, then tighten the oil pan bolts diagonally to the specified torque.

Oil pan bolt: 14 N·m (1.4 kg-m, 10.0 lb-ft)



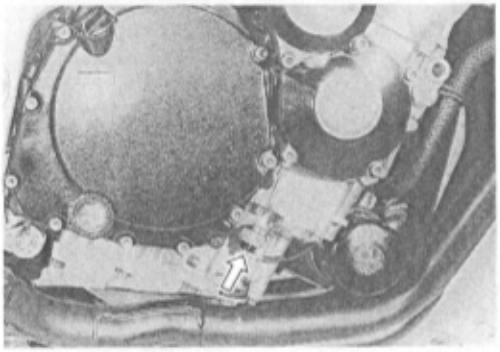
⚠ CAUTION

Use a new gasket to prevent oil leakage.

Oil drain plug Ⓑ: 28 N·m (2.8 kg-m, 20.0 lb-ft)

OIL PRESSURE SWITCH REMOVAL

- Remove the lower fairing assembly. (See page 6-2.)
- Disconnect the oil pressure switch lead wire.
- Remove the oil pressure switch.



OIL PRESSURE SWITCH INSPECTION

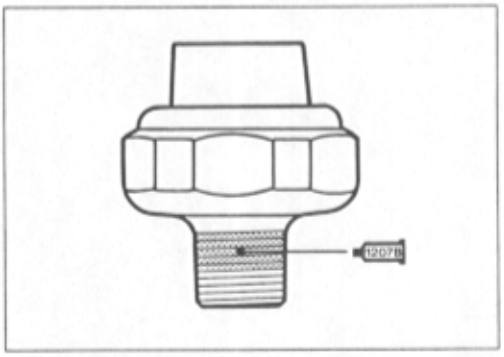
Refer to page 7-36.

OIL PRESSURE SWITCH INSTALLATION

- Apply SUZUKI BOND NO.1207B to the thread of the oil pressure switch, then tighten it securely.

99104-31140: SUZUKI BOND NO.1207B

Oil pressure switch 14 N·m (1.4 kg-m, 10,0 lb-ft)



PISTON COOLING OIL NOZZLE REMOVAL

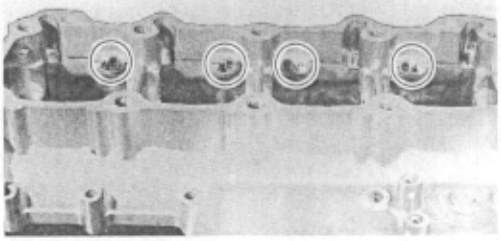
Refer to page 3B-1.

PISTON COOLING OIL NOZZLE INSPECTION

Refer to page 3B-4.

PISTON COOLING OIL NOZZLE INSTALLATION

Refer to page 3B-4.

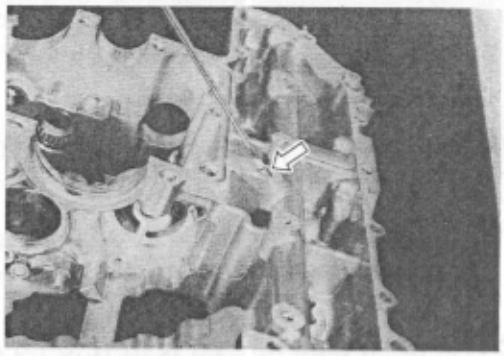


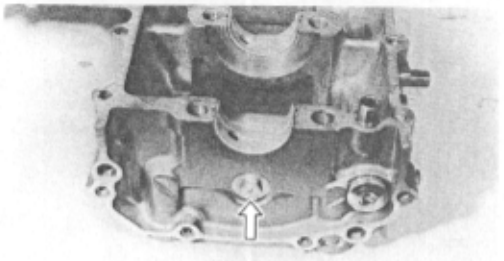
OIL JETS REMOVAL

Refer to pages 3H-9 and 3H-20.

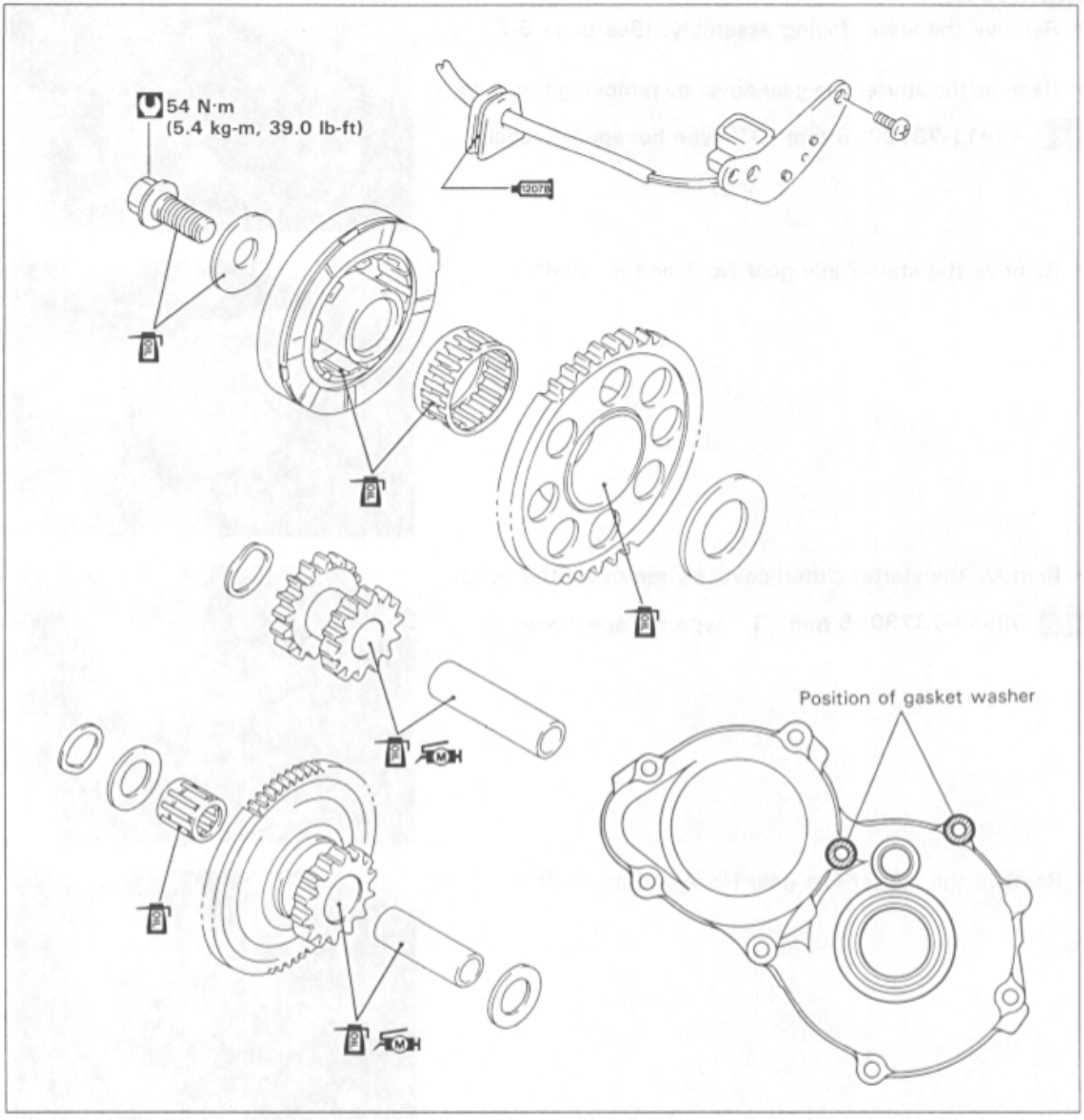
OIL JETS INSPECTION AND INSTALLATION

Refer to pages 3H-16 and 3H-28.





STARTER SYSTEM/SIGNAL GENERATOR



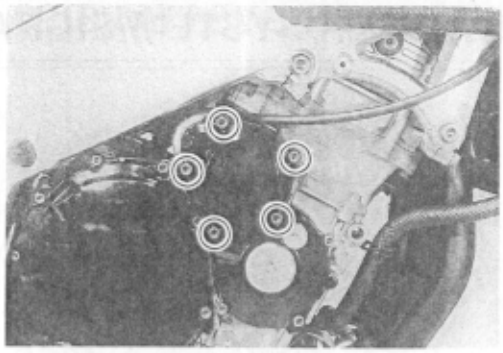
CONTENTS

STARTER CLUTCH/SIGNAL GENERATOR REMOVAL 3E- 1
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SIGNAL GENERATOR/STARTER CLUTCH INSTALLATION 3E- 3
STARTER MOTOR REMOVAL 3E- 5
STARTER MOTOR INSPECTION 3E- 5
STARTER MOTOR INSTALLATION 3E- 5

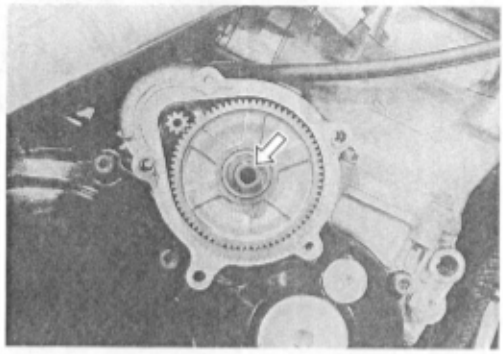
STARTER CLUTCH/SIGNAL GENERATOR REMOVAL

- Remove the lower fairing assembly. (See page 6-2.)
- Remove the starter idle gear cover by removing the bolts.

TOOL **09911-73730: 5 mm "T" type hexagon wrench**

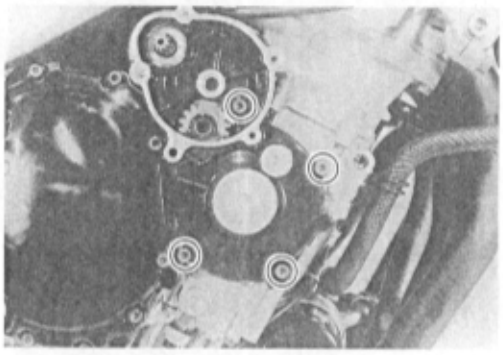


- Remove the starter idle gear No.1 and its shaft.

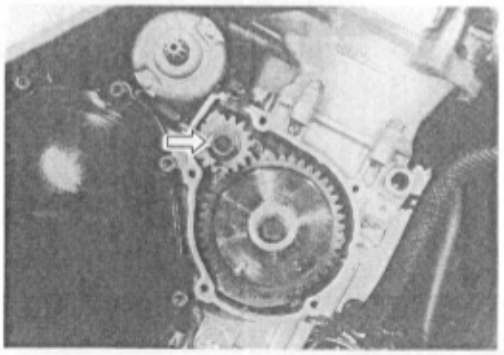


- Remove the starter clutch cover by removing the bolts.

TOOL **09911-73730: 5 mm "T" type hexagon wrench**



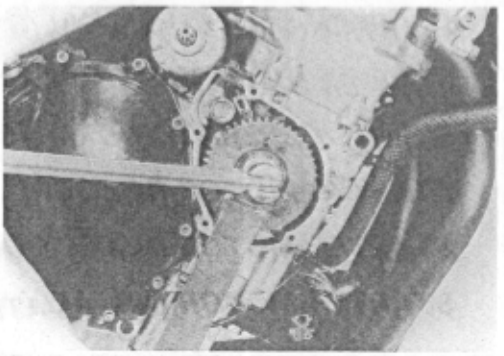
- Remove the starter idle gear No.2 and its shaft.



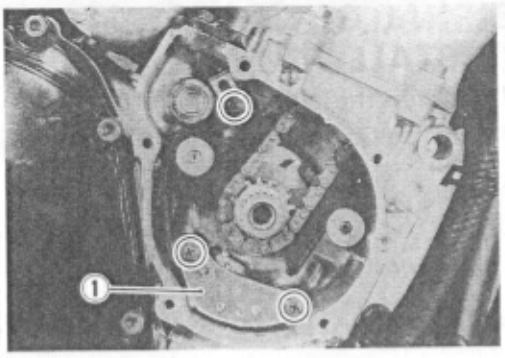
- Hold the starter clutch with the special tool and remove the starter clutch bolt.

TOOL **09920-34830: Starter clutch holder**

- Remove the starter clutch assembly.



- Remove the signal generator ① by removing its mounting screws and lead wire clamp screw.



NOTE:
If it is necessary to remove the cam drive sprocket/signal rotor, remove the camshafts, cam chain guide and cam drive chain. (Refer to page 3H-4.)

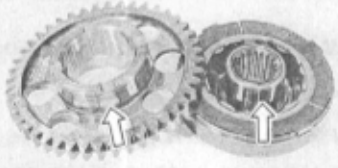
STARTER CLUTCH/SIGNAL GENERATOR INSPECTION

STARTER CLUTCH

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







SIGNAL GENERATOR

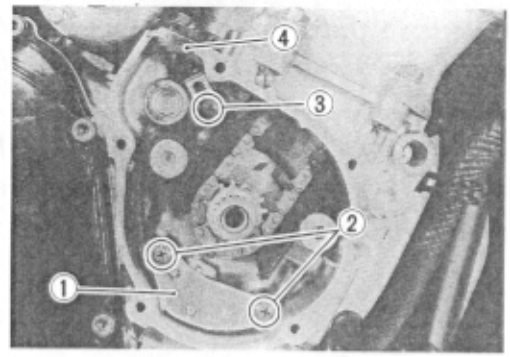
Refer to pages 7-24 and 25 for signal generator inspection.

SIGNAL GENERATOR/STARTER CLUTCH INSTALLATION

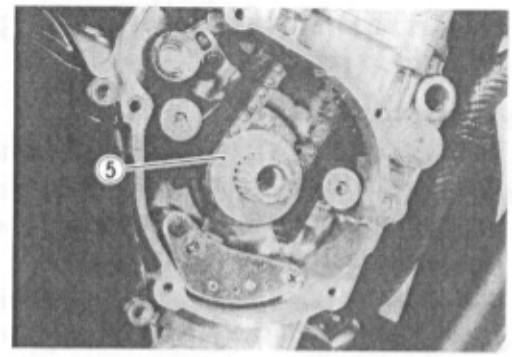
- Install the signal generator ① with two screws ②.
- Fix the signal generator lead wire clamp screw ③.

NOTE:
BOND NO.1207B should be applied to the groove of the signal generator lead wire grommet ④.

99104-31140: SUZUKI BOND NO.1207B

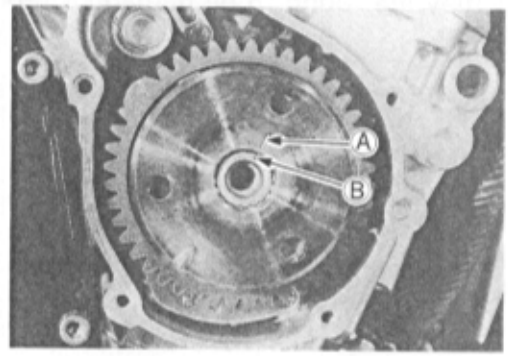


- Install the starter clutch thrust washer ⑤ onto the crankshaft.



- Install the starter clutch assembly onto the crankshaft.

NOTE:
Align the engraved line mark Ⓐ on the starter clutch with the punched mark Ⓑ on the crankshaft.

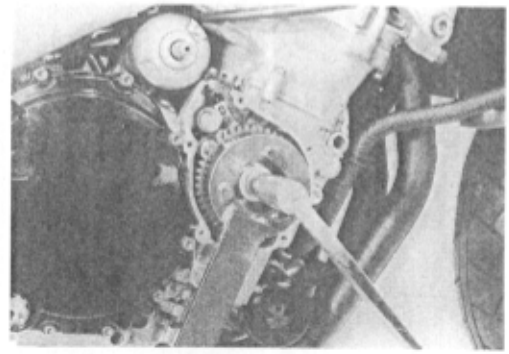


- Tighten the starter clutch bolt to the specified torque with the special tool and torque wrench.

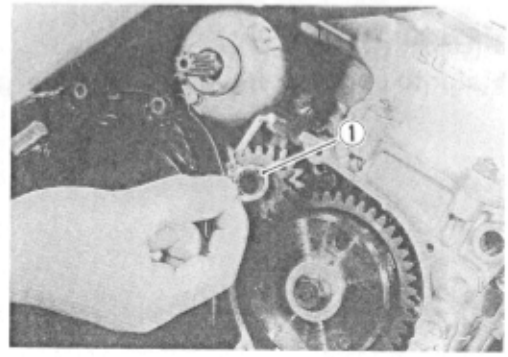
09920-34830: Starter clutch holder

Starter clutch bolt: 54 N·m (5.4 kg-m, 39.0 lb-ft)

NOTE:
Apply a small quantity of engine oil to the starter clutch bolt and its washer before installing.

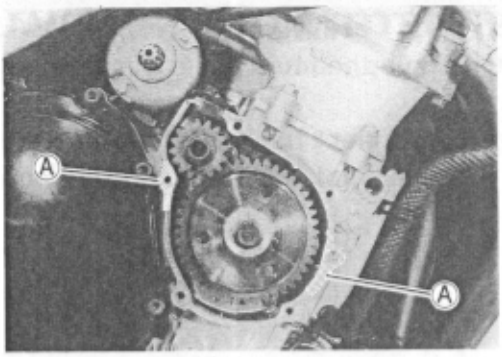


- After installing the starter idle gear No.2 and its shaft, install the wave washer ① onto the shaft.



- Coat SUZUKI BOND NO.1207B lightly to the mating surfaces Ⓐ between upper and middle crankcases as shown.

1207B **99104-31140: SUZUKI BOND NO.1207B**

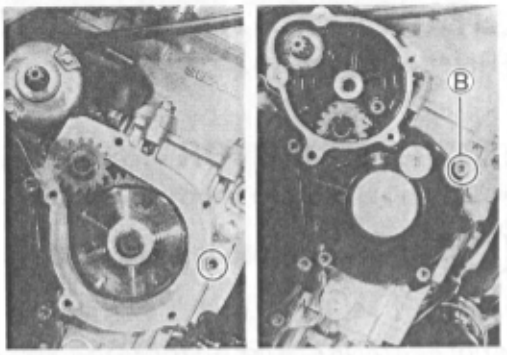


- Install a dowel pin, new gasket and starter clutch cover.
- Tighten the cover bolts securely.

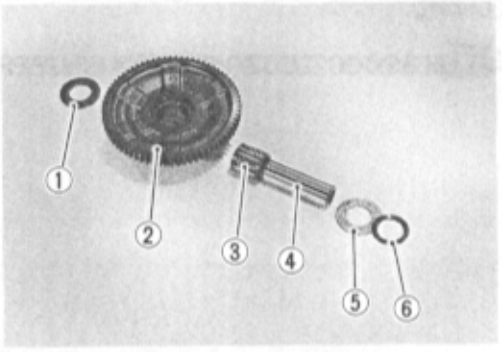
NOTE:
Fit a new gasket washer to the starter clutch cover bolt Ⓑ as shown.

⚠ CAUTION

Use a new gasket to prevent oil leakage.



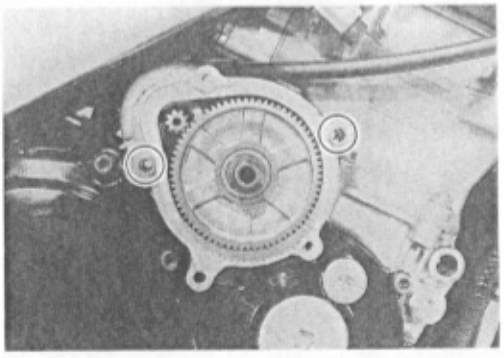
- Install the starter idle gear assembly in the prescribed order as shown.
  ① Thrust washer
  ② Starter idle gear No.1
  ③ Bearing
  ④ Shaft
  ⑤ Thrust washer
  ⑥ Wave washer



- Install a dowel pins and new gasket.

⚠ CAUTION

Use a new gasket to prevent oil leakage.

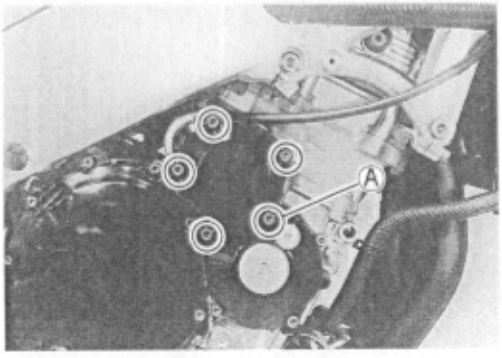


- Install the starter idle gear cover.
- Tighten the cover bolts securely.

NOTE:
Fit a new gasket washer to the starter idle gear cover bolt Ⓐ as shown.

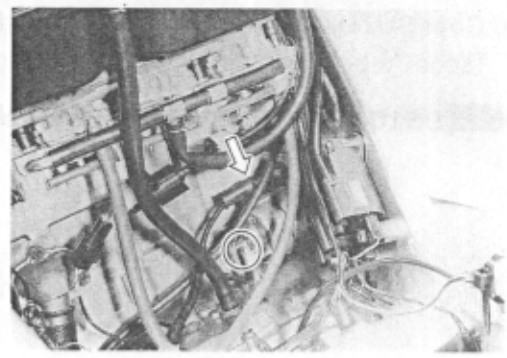
⚠ CAUTION

Use a new gasket to prevent oil leakage.



STARTER MOTOR REMOVAL

- Prop up the fuel tank with a prop stay. (See page 7-14.)
- Disconnect the starter motor lead wire and remove the starter motor by removing the mounting bolts.



STARTER MOTOR INSPECTION

Refer to page 7-14.

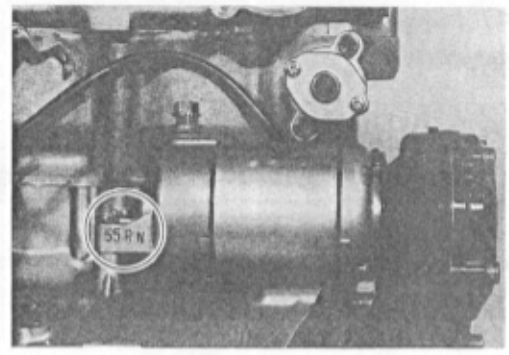
STARTER MOTOR INSTALLATION

- Install the starter motor with two bolts.

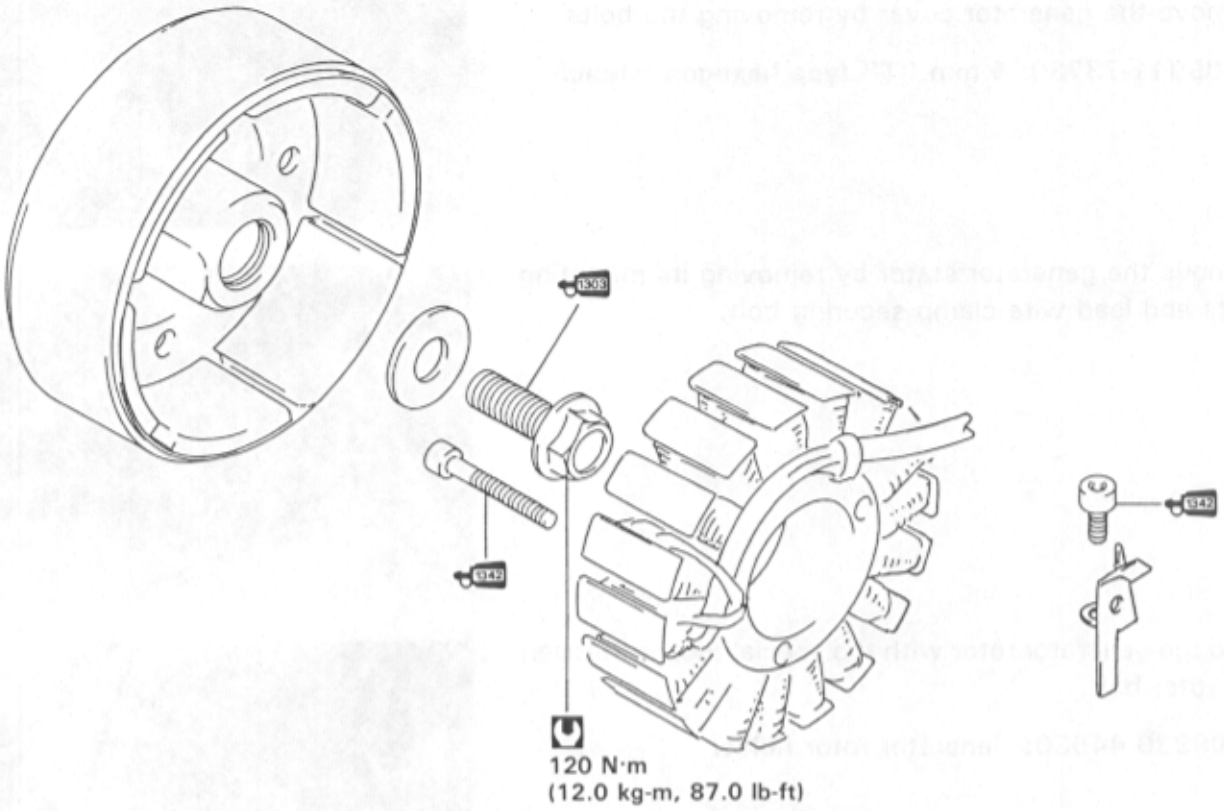
Starter motor mounting bolt: 6 N·m (0.6 kg-m, 4.5 lb-ft)

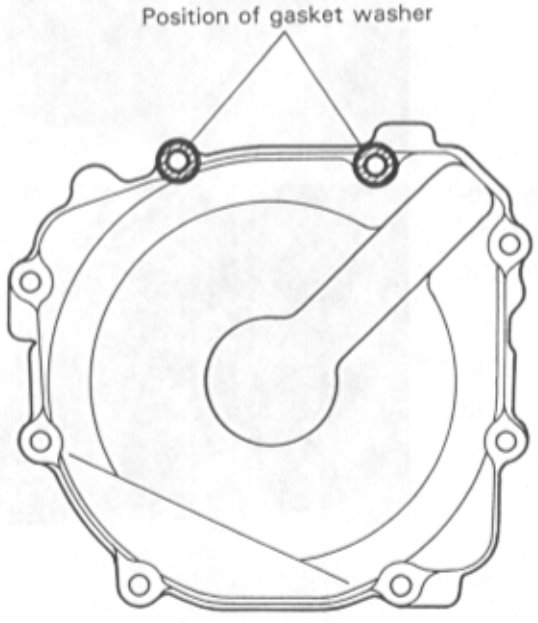
NOTE:
Apply SUZUKI SUPER GREASE "A" to the starter motor O-ring.

99000-25030: SUZUKI SUPER GREASE "A"



GENERATOR





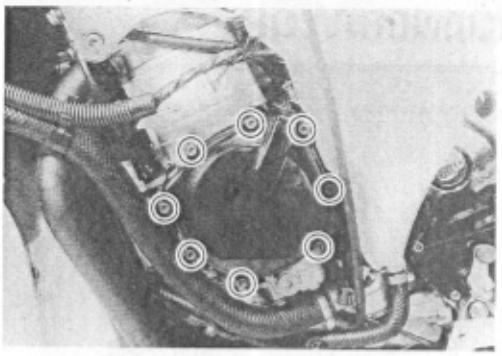
CONTENTS

GENERATOR REMOVAL 3F- 1
GENERATOR INSPECTION 3F- 1
GENERATOR INSTALLATION 3F- 2

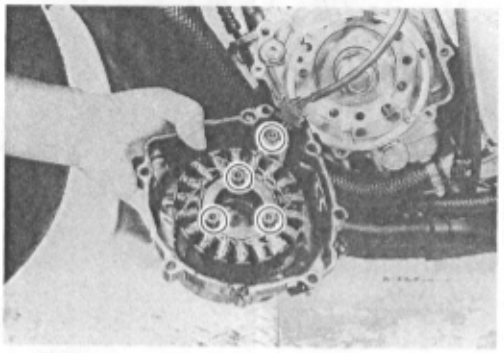
GENERATOR REMOVAL

- Remove the lower fairing assembly. (See page 6-2.)
- Remove the generator cover by removing the bolts.

TOOL **09911-73730: 5 mm "T" type hexagon wrench**

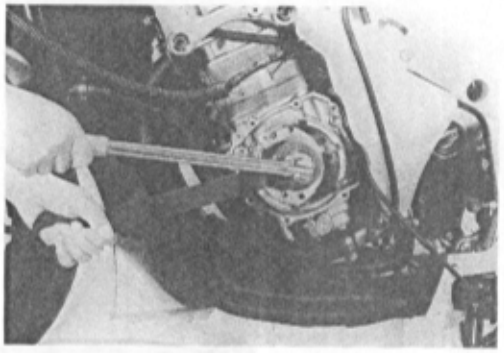


- Remove the generator stator by removing its mounting bolts and lead wire clamp securing bolt.



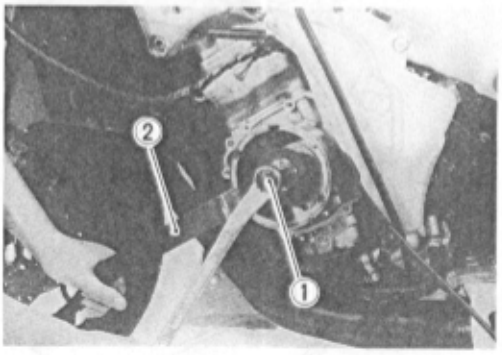
- Hold the generator rotor with the special tool and loosen the rotor bolt.

TOOL **09930-44530: Generator rotor holder**



- After removing the generator rotor bolt, install the special tool into the boss of the rotor and remove the generator rotor by turning the special tool ① while holding the generator rotor with the special tool ②.

TOOL **09930-30450: Generator remover**
09930-44530: Generator rotor holder



GENERATOR INSPECTION

Refer to page 7-9.

GENERATOR INSTALLATION

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



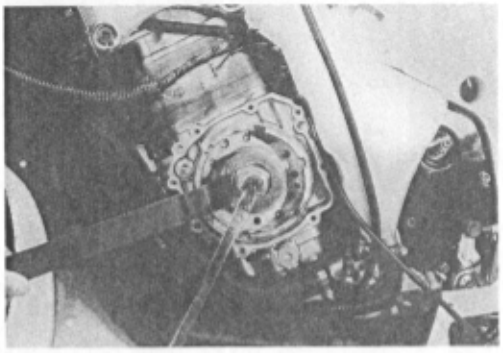
NOTE:
Apply a small quantity of THREAD LOCK SUPER "1303" to the generator rotor bolt.

99000-32030: THREAD LOCK SUPER "1303"

- Tighten the generator rotor bolt to the specified torque with the special tool and torque wrench.

Generator rotor bolt: 120 N·m (12.0 kg-m, 87 lb-ft)

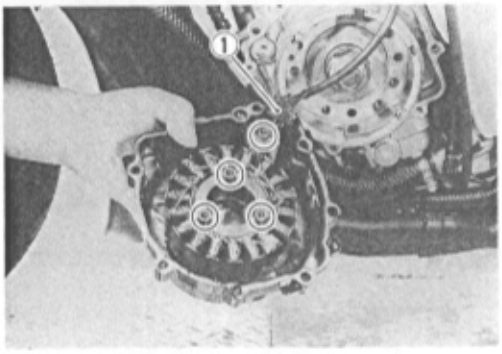
09930-44530: Generator rotor holder



- Apply a small quantity of THREAD LOCK "1342" to the generator stator mounting bolts and lead wire clamp securing bolt.

99000-32050: THREAD LOCK "1342"

- Tighten the generator stator mounting bolts and lead wire clamp securing bolt securely.

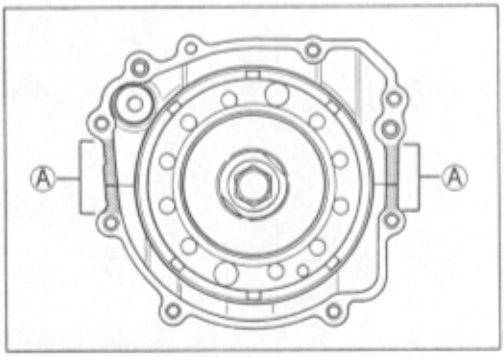


NOTE:
SUZUKI BOND NO.1207B should be applied to the groove of the generator lead wire grommet ①.

99104-31140: SUZUKI BOND NO.1207B

- Coat SUZUKI BOND NO.1207B lightly to the mating surfaces Ⓐ between upper and middle crankcases.

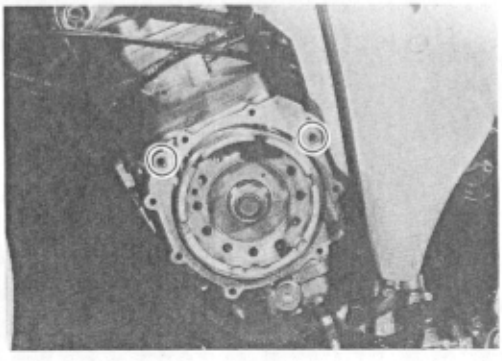
99104-31140: SUZUKI BOND NO.1207B



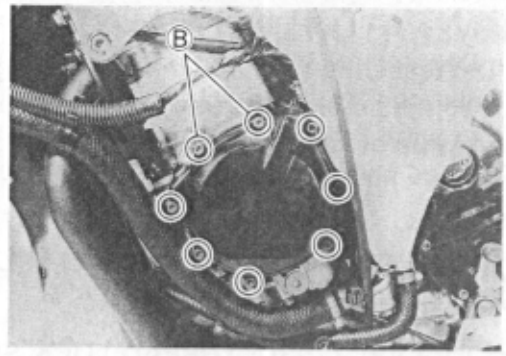
- Install the dowel pins, a new gasket and generator cover.

⚠ CAUTION

Use a new gasket to prevent oil leakage.



- Tighten the generator cover bolts securely.

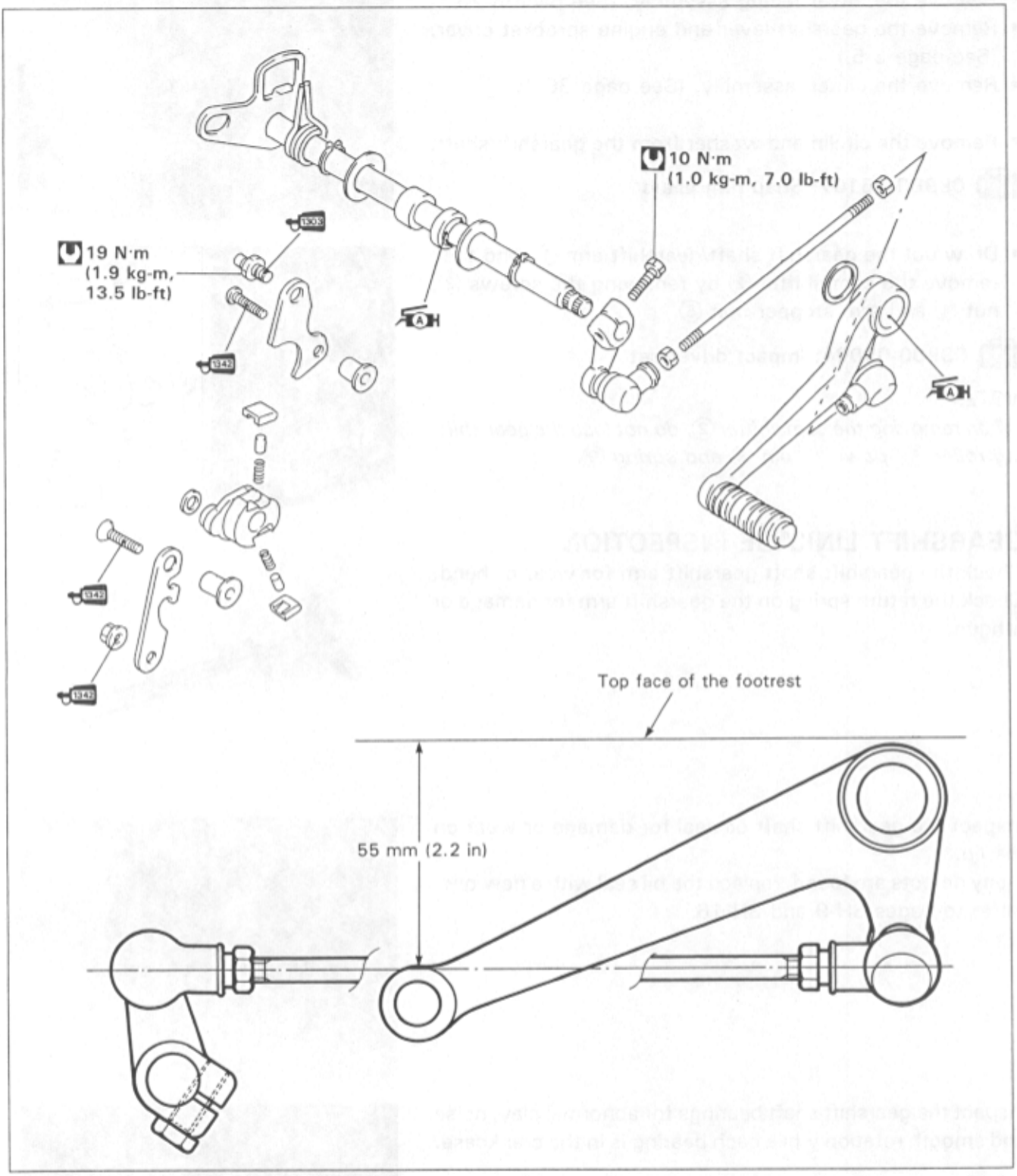


NOTE:
Fit the new gasket washers to the generator cover bolts Ⓑ correctly as shown.

⚠ CAUTION

Use a new gasket to prevent oil leakage.

GEARSHIFT LINKAGE

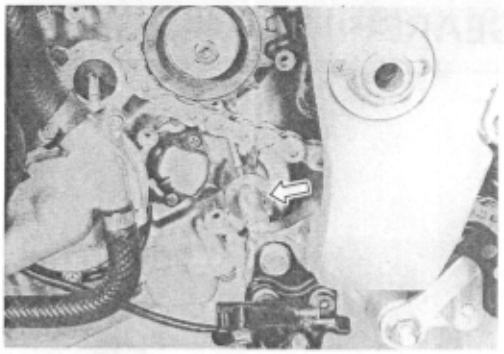


CONTENTS

GEARSHIFT LINKAGE REMOVAL 3G- 1
GEARSHIFT LINKAGE INSPECTION 3G- 1
GEARSHIFT LINKAGE INSTALLATION 3G- 2

GEARSHIFT LINKAGE REMOVAL

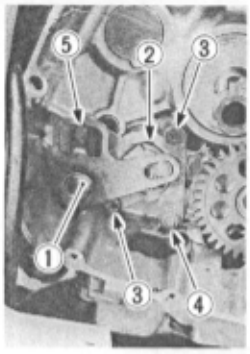
- Remove the lower fairing assembly. (See page 6-2.)
- Remove the gearshift lever and engine sprocket cover. (See page 3-5.)
- Remove the clutch assembly. (See page 3C-1.)

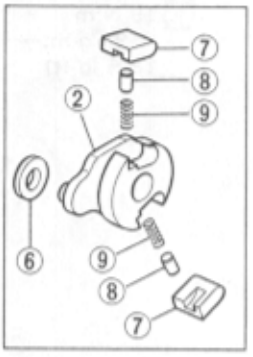


- Remove the circlip and washer from the gearshift shaft.

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

- Draw out the gearshift shaft/gearshift arm ①, and then remove the cam shifter ② by removing the screws ③, nut ④ and arm stopper bolt ⑤.



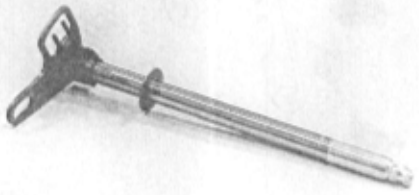


TOOL **09900-09004: Impact driver set**

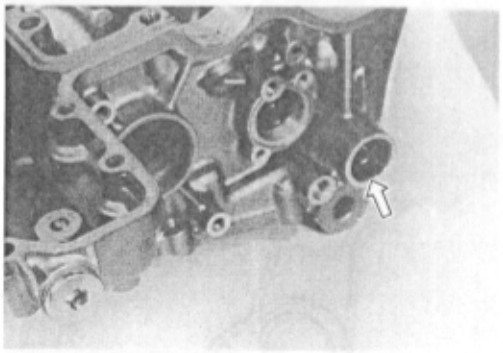
NOTE:
When removing the cam shifter ②, do not lose the gear shifting roller ⑥, pawl ⑦, pin ⑧ and spring ⑨.

GEARSHIFT LINKAGE INSPECTION

Check the gearshift shaft/gearshift arm for wear or bend.
Check the return spring on the gearshift arm for damage or fatigue.



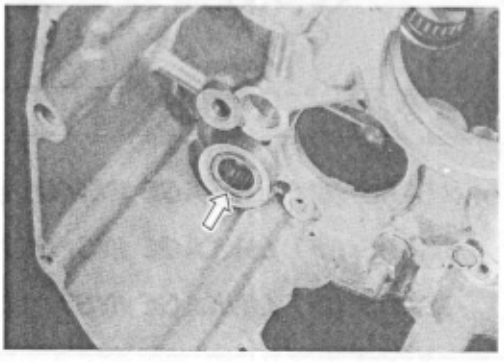
Inspect the gearshift shaft oil seal for damage or wear on the lip.
If any defects are found, replace the oil seal with a new one.
Refer to pages 3H-9 and 3H-16.



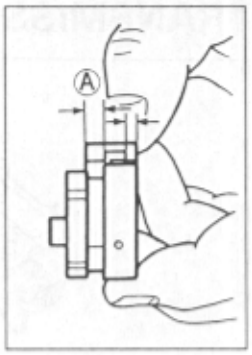
Inspect the gearshift shaft bearings for abnormal play, noise and smooth rotation while each bearing is in the crankcase.

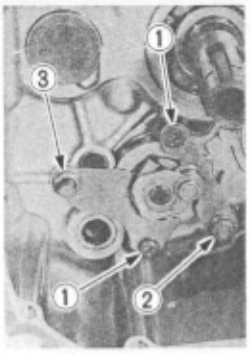
NOTE:
If abnormal noise does not occur, it is not necessary to remove the bearing.

Refer to pages 3H-9 and 3H-16.



GEARSHIFT LINKAGE INSTALLATION





- Install each gear shifting pawl into the cam shifter. The large shoulder Ⓐ must face to the outside as shown.
- Apply a small quantity of THREAD LOCK "1342" to the screws ① and nut ②.

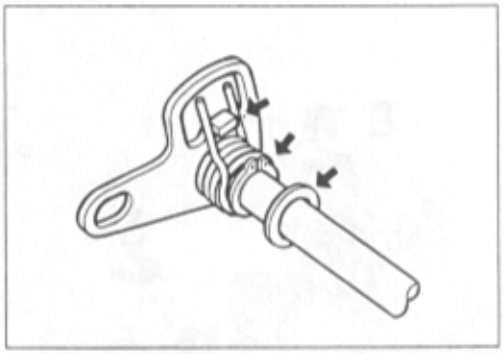
1342 99000-32050: THREAD LOCK "1342"

TOOL 09900-09004: Impact driver set

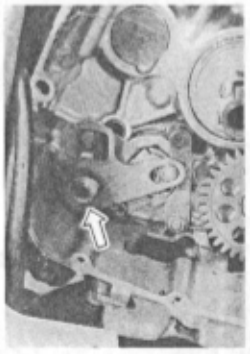
- Apply a small quantity of THREAD LOCK SUPER "1303" to the gearshift arm stopper bolt ③ and tighten it to the specified torque.

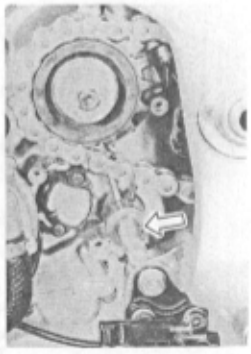
1303 99000-32030: THREAD LOCK SUPER "1303"

Gearshift arm stopper bolt: 19 N·m (1.9 kg-m, 13.5 lb-ft)



- Install the gearshift arm return spring, circlip and washer onto the gearshift shaft/gearshift arm properly.





- Install the gearshift shaft/gearshift arm and washer.
- Fix the gearshift shaft with the circlip.

TOOL 09900-06107: Snap ring pliers

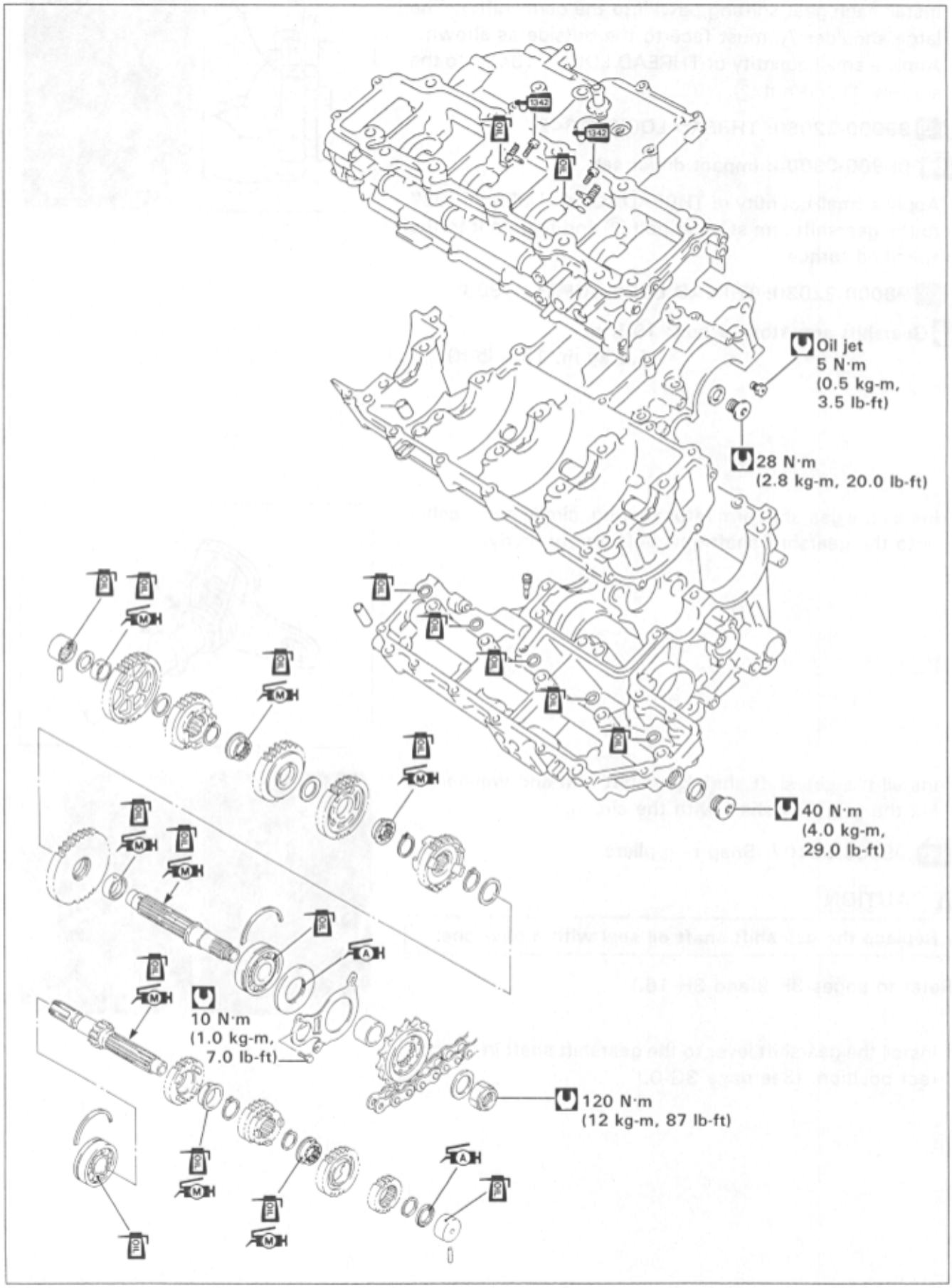
⚠ CAUTION

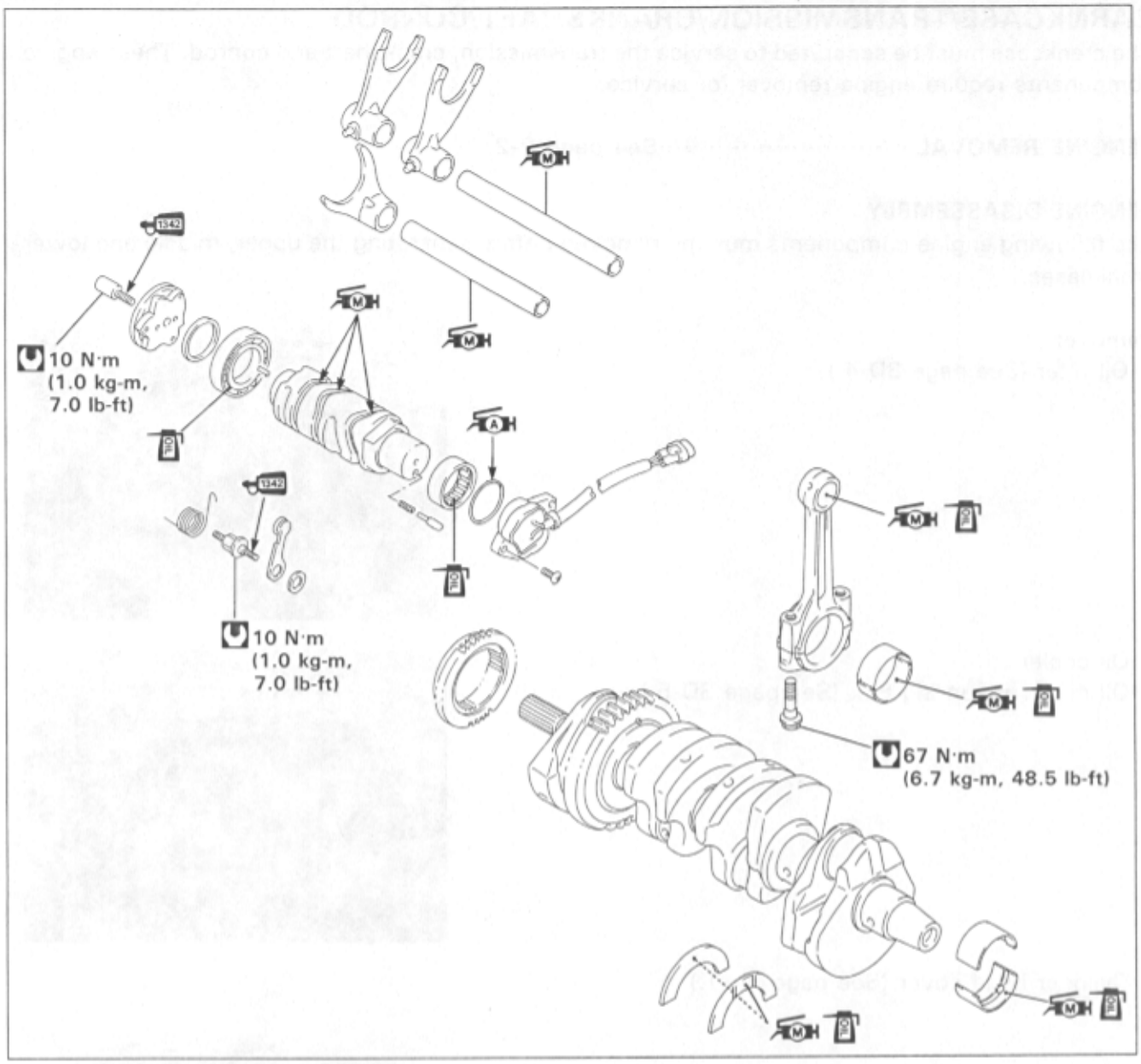
Replace the gearshift shaft oil seal with a new one.

(Refer to pages 3H-9 and 3H-16.)

- Install the gearshift lever to the gearshift shaft in the correct position. (See page 3G-0.)

CRANKCASE/TRANSMISSION/CRANKSHAFT/CONROD





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CRANKCASE/TRANSMISSION/CRANKSHAFT/CONROD 3H- 1
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ENGINE DISASSEMBLY 3H- 1
LOWER CRANKCASE/TRANSMISSION REMOVAL 3H- 7
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LOWER CRANKCASE/TRANSMISSION INSTALLATION 3H-16
UPPER AND MIDDLE CRANKCASES/CRANKSHAFT/CONROD REMOVAL 3H-20
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CARNKCASE/TRANSMISSION/CRANKSHAFT/CONROD

The crankcase must be separated to service the transmission, crankshaft and conrod. These engine components require engine removal for service.

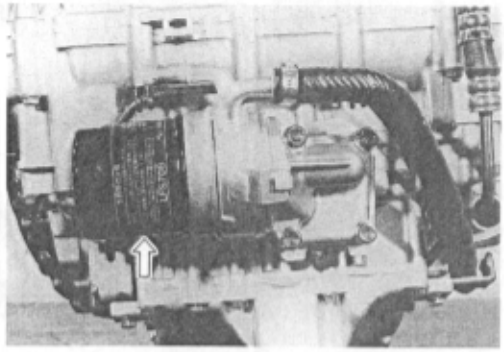
*ENGINE REMOVAL·····See page 3-2.

*ENGINE DISASSEMBLY

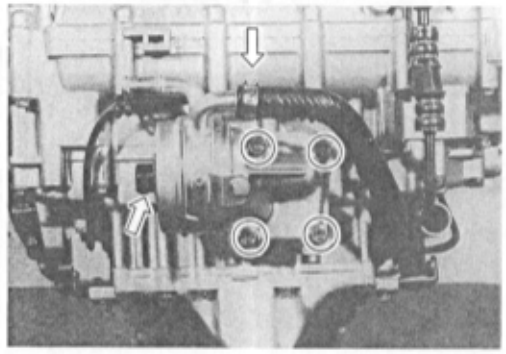
The following engine components must be removed before separating the upper, middle and lower crankcases.

Remove:

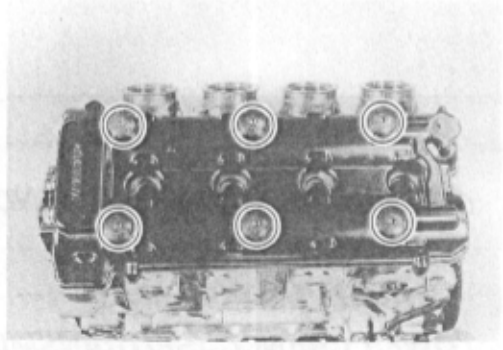
- Oil filter (See page 3D-4.)



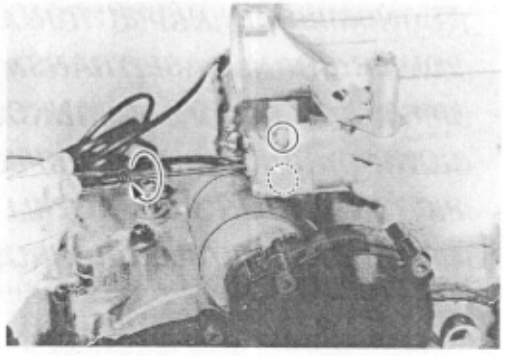
- Oil cooler
- Oil cooler mounting box (See page 3D-5.)



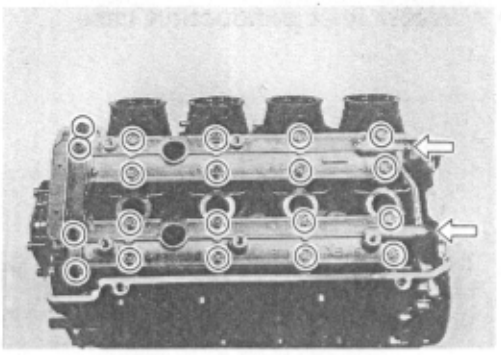
- Cylinder head cover (See page 3A-1.)



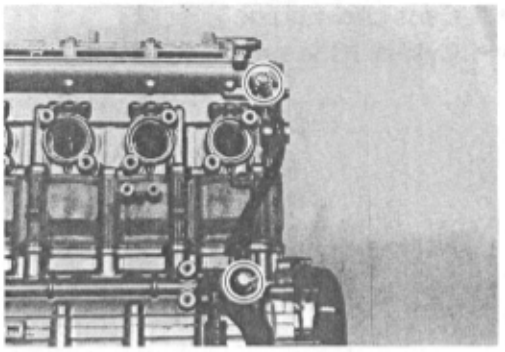
- Cam chain tension adjuster (See page 3A-1.)



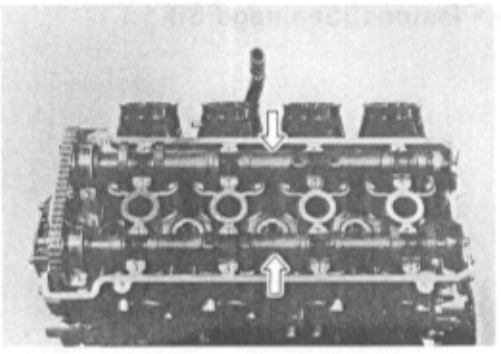
- Top cam chain guide
- Oil pipe
- Camshaft journal holders (See page 3A-1.)



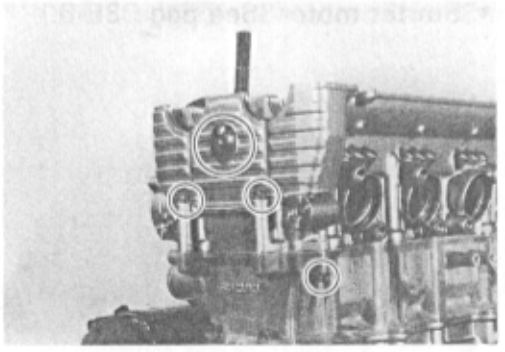
- Oil hose (See page 3A-2.)

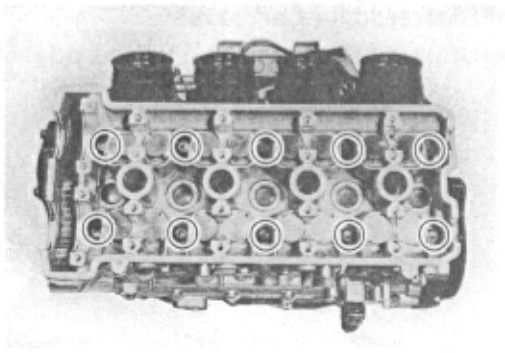


- Camshafts (See page 3A-1.)

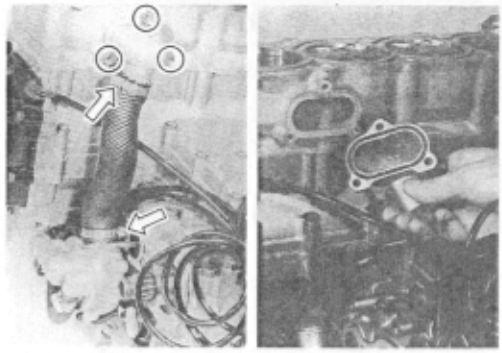


- Cylinder head (See page 3A-1.)

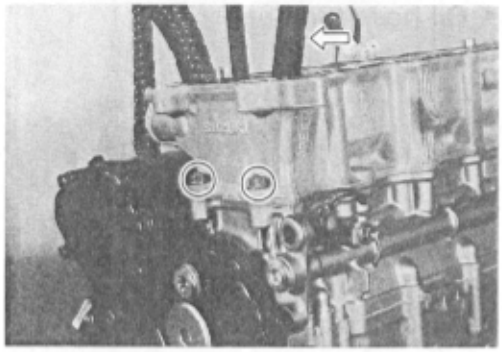




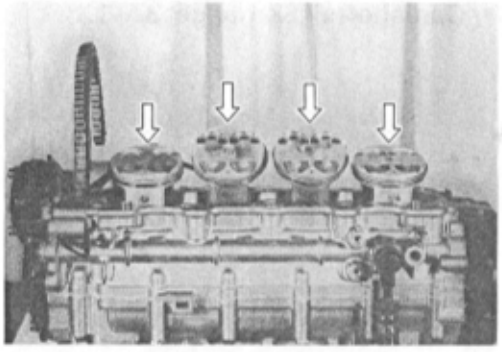
- Water inlet conduction case



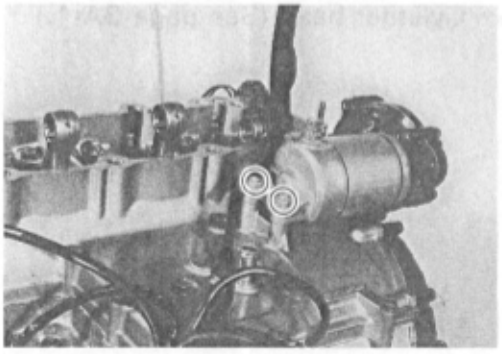
- Cam chain guide
- Cylinder (See page 3B-1.)



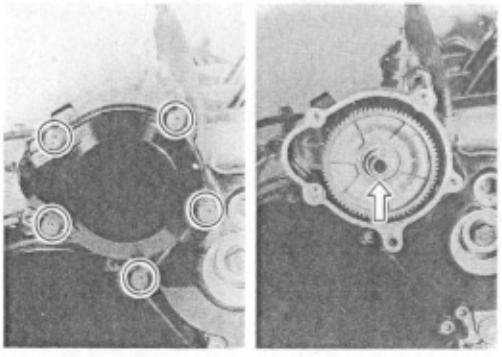
- Pistons (See page 3B-1.)



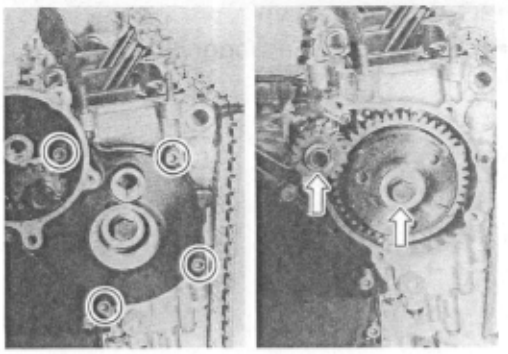
- Starter motor (See page 3E-5.)



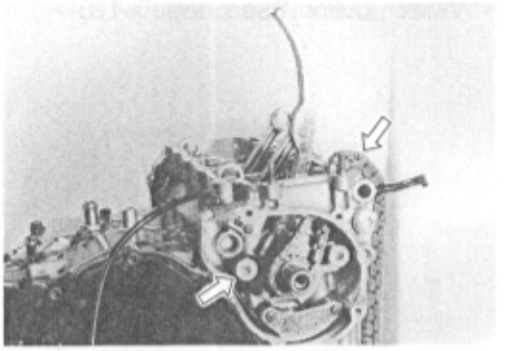
- Starter idle gear cover
- Starter idle gear NO.1 (See page 3E-1.)



- Starter clutch cover
- Starter idle gear NO.2
- Starter clutch (See page 3E-1.)

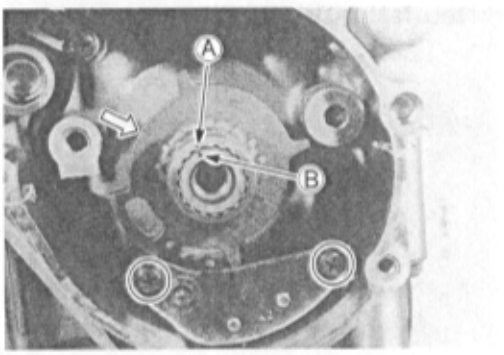


- Cam drive chain
- Cam chain tensioner

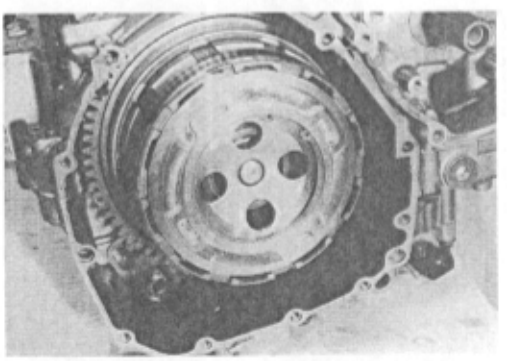


- Signal generator (See page 3E-2.)
- Cam drive sprocket/signal rotor

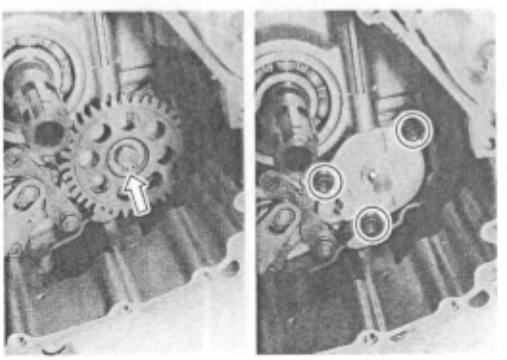
NOTE:
When installing the cam drive sprocket/signal rotor onto the crankshaft, align the punched mark Ⓐ on the cam drive sprocket/signal rotor with the punched mark Ⓑ on the crankshaft end.



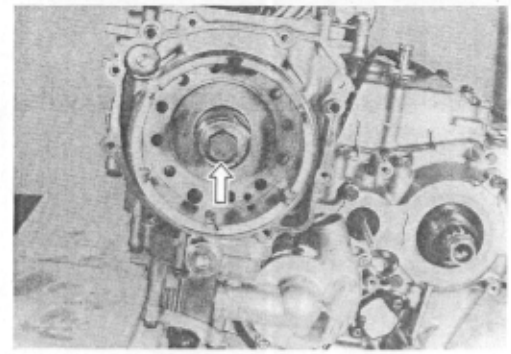
- Clutch cover
- Clutch assembly (See page 3C-1.)



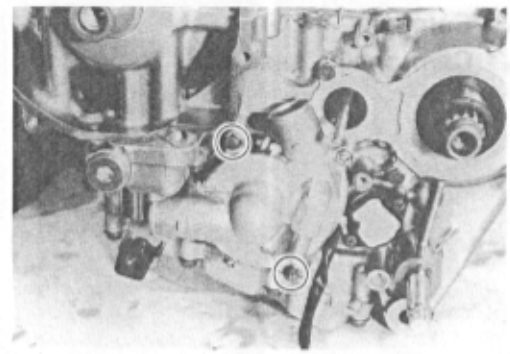
- Oil pump driven gear
- Oil pump (See page 3D-1.)



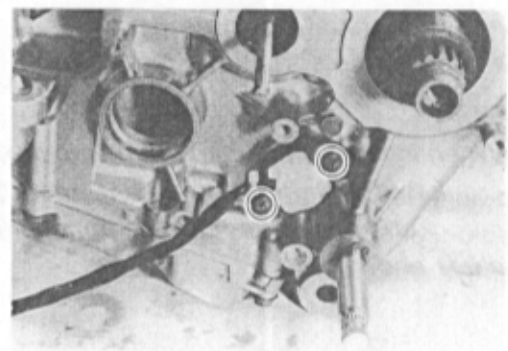
- Generator cover
- Generator (See page 3F-1.)



- Water pump (See page 5-13.)

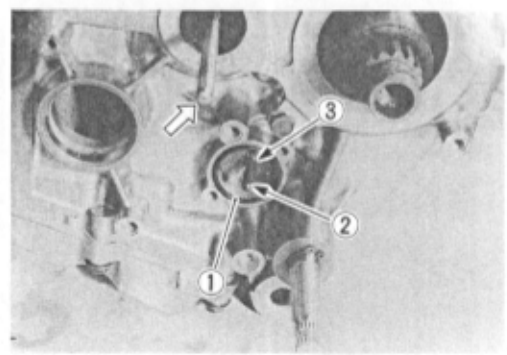


- Neutral position indicator switch

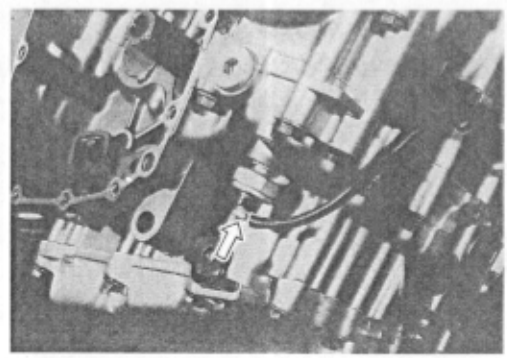


NOTE:
Do not lose the O-ring ①, switch contact ② and its spring ③.

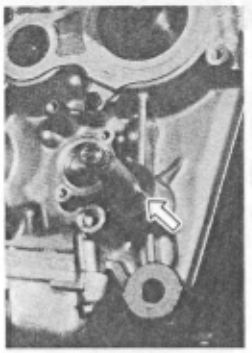
- Clutch push rod

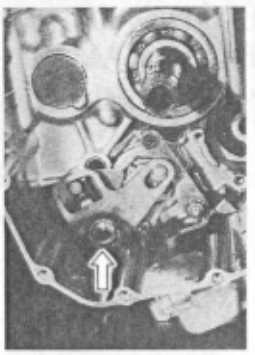


- Oil pressure switch

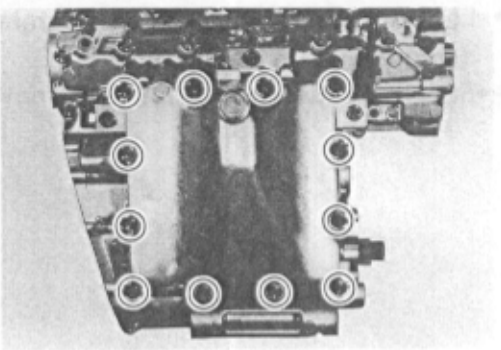


- Gearshift linkage (See page 3G-1.)

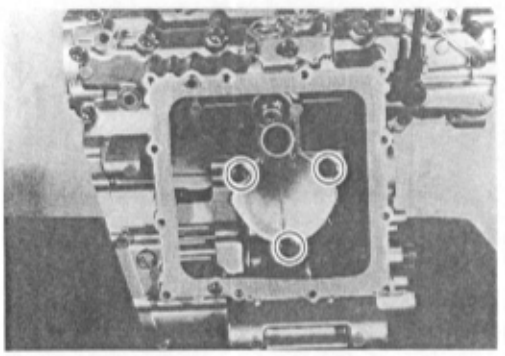




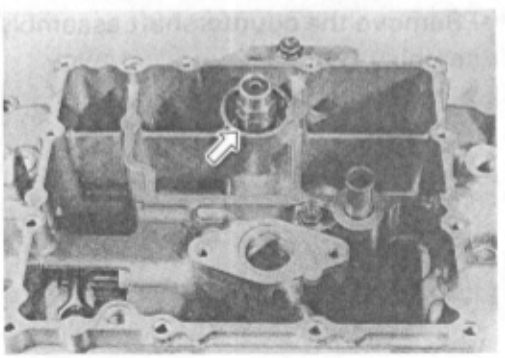
- Oil pan (See page 3D-6.)



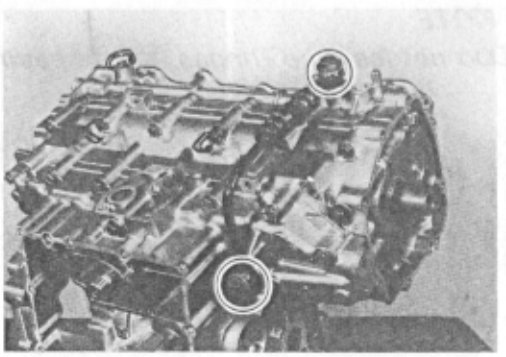
- Oil inlet guide (See page 3D-6.)



- Oil pressure regulator (See page 3D-6.)

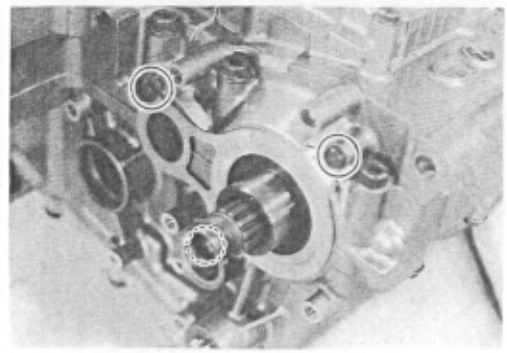


- Oil hose

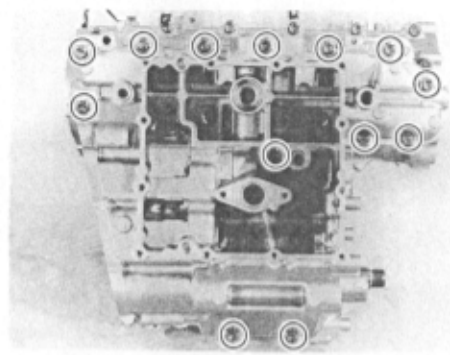


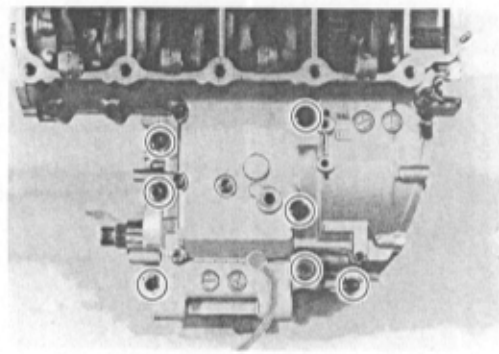
LOWER CRANKCASE/TRANSMISSION REMOVAL

- Remove the oil seal retainer by removing the bolts.

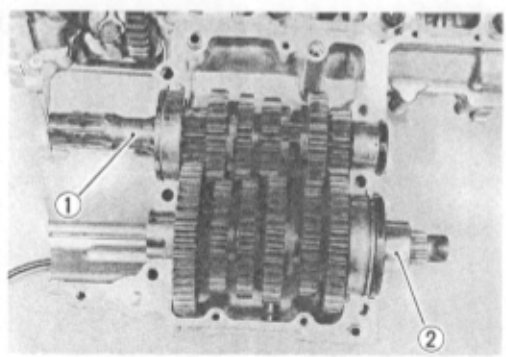


- Loosen and remove the lower crankcase tightening bolts diagonally.
- Separate the lower crankcase from the middle crankcase.

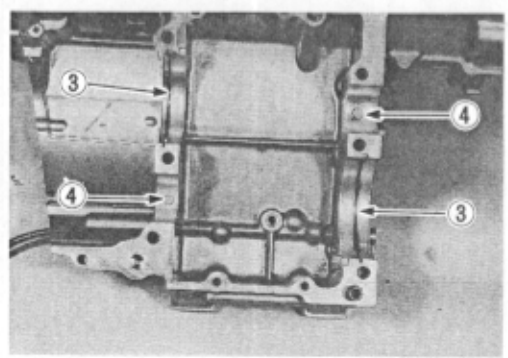




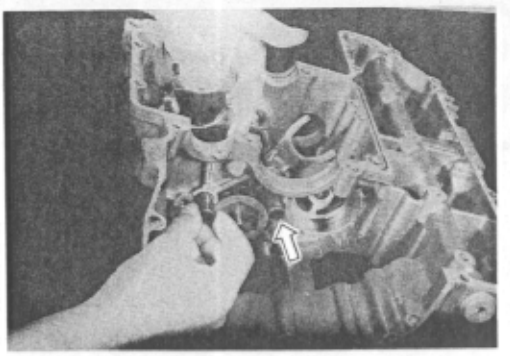
- Remove the countershaft assembly ① and driveshaft assembly ②.



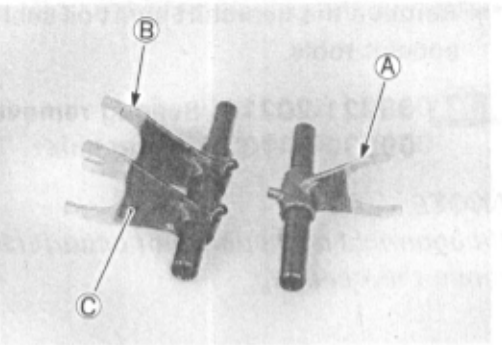
NOTE:
Do not lose the C-rings ③ and bearing pins ④.



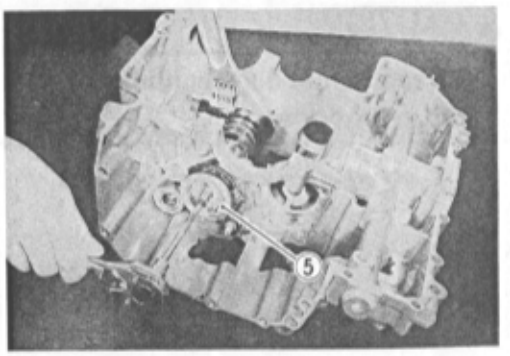
- Hold the gearshift forks by hand while drawing out the gearshift fork shafts from the lower crankcase.



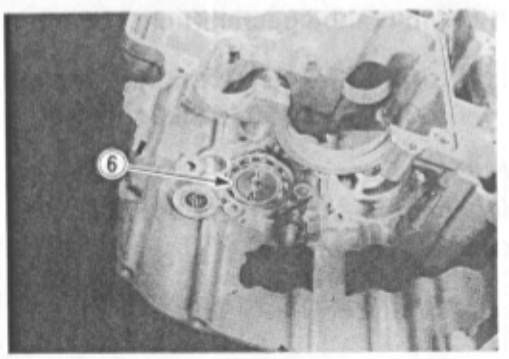
Ⓐ For 3rd/4th drive gears
Ⓑ For Top driven gear
Ⓒ For 5th driven gear



- Remove the gearshift cam stopper plate ⑤ by removing the bolt while holding the gearshift cam with an adjuster wrench.

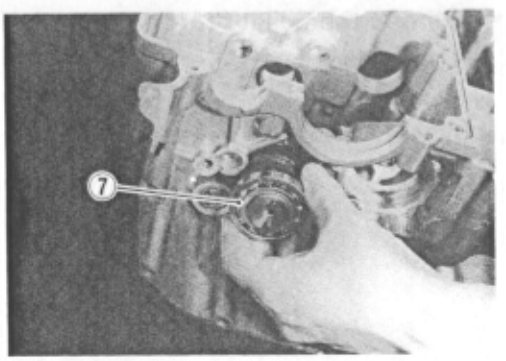


- Remove the washer ⑥.



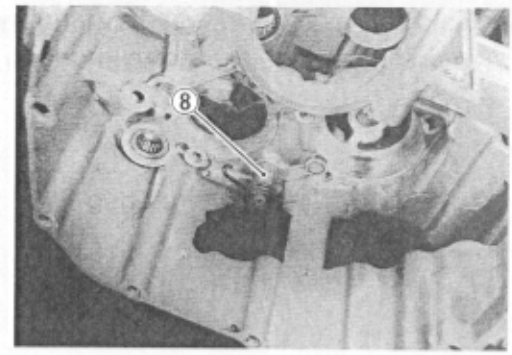
- Draw out the gearshift cam with bearing from the lower crankcase.

NOTE:
Rotate the bearing ⑦ on the gearshift cam by hand to inspect for abnormal noise and smooth ratation. Replace the bearing if there is anything unusual.



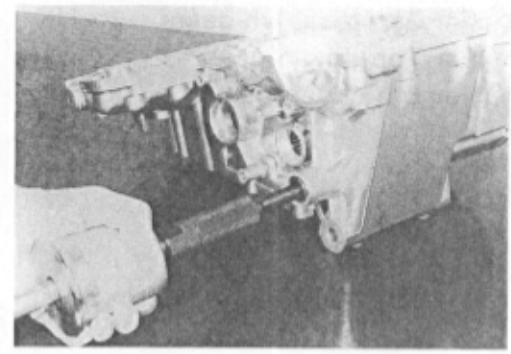
NOTE:
When replacing the gearshift cam stopper bolt ⑧, apply a small quantity of THREAD LOCK "1342" to the bolt.

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



- Remove the gearshift shaft oil seal and bearings with the special tools.

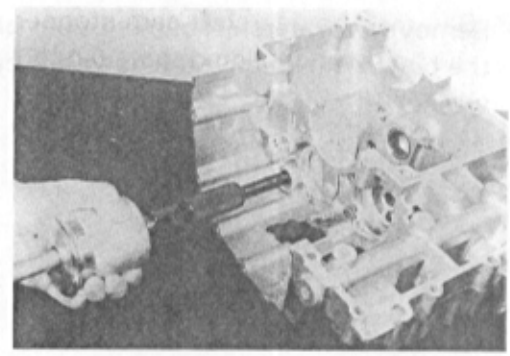
TOOL **09921-20210: Bearing remover**
09930-30102: Sliding shaft



NOTE:
If abnormal noise does not occur, it is not necessary to remove the bearing.

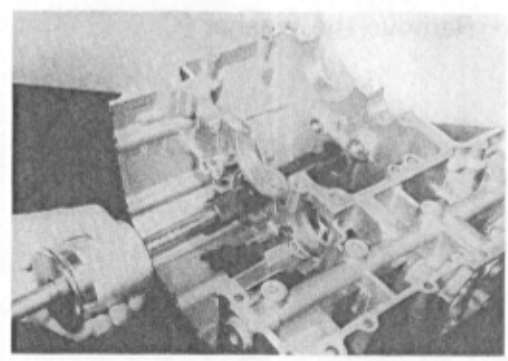
⚠ CAUTION

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



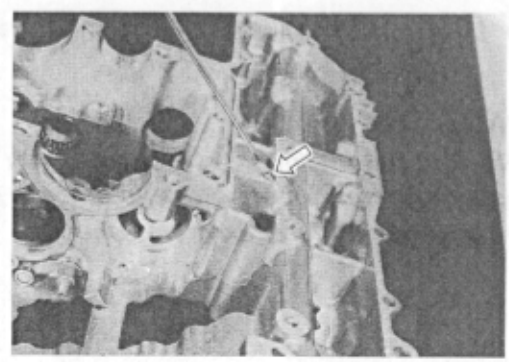
- Remove the gearshift cam bearing with the special tools.

TOOL **09923-74510: Bearing remover**
09930-30102: Sliding shaft



NOTE:
If abnormal noise does not occur, it is not necessary to remove the bearing.

- Remove the oil jet for the transmission fixed in the lower crankcase.



TRANSMISSION INSPECTION AND SERVICE

⚠ CAUTION

Be sure to identify each removed part as to its location, and lay the parts out in groups designated as "No.1", "No.2", so that each will be restored to the original location during assembly.

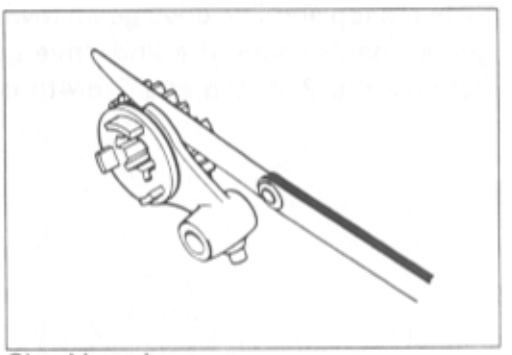
GEARSHIFT FORK-GROOVE CLEARANCE

Using a thickness gauge, check the gearshift fork clearance in the groove of its gear.
The clearance for each of the three gearshift forks plays an important role in the smoothness and positiveness of the shifting action.

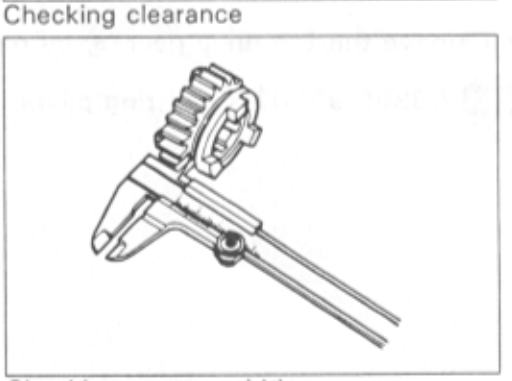
Gearshift fork-Groove clearance
Standard : 0.10—0.30 mm (0.004—0.012 in)
Service Limit: 0.50 mm (0.020 in)

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

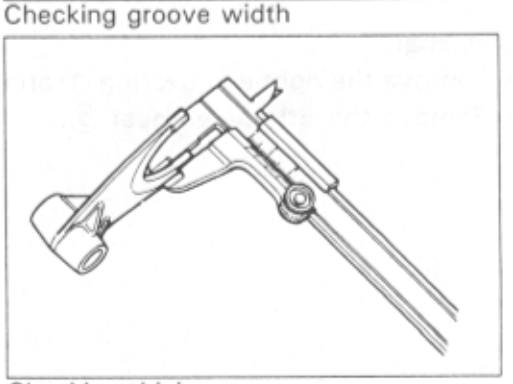
TOOL **09900-20803: Thickness gauge**
09900-20102: Vernier calipers


Checking clearance

Shift fork groove width
Standard: 5.00—5.10 mm (0.197—0.201 in)


Checking groove width

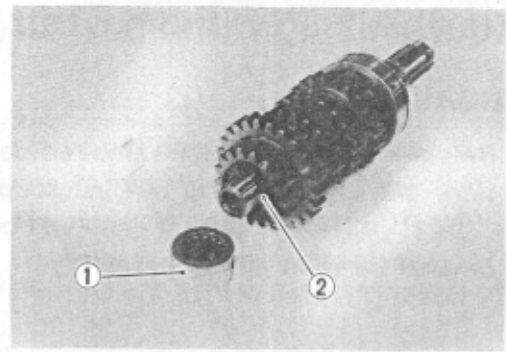
Shift fork thickness
Standard: 4.80—4.90 mm (0.189—0.193 in)


Checking thickness

DISASSEMBLY

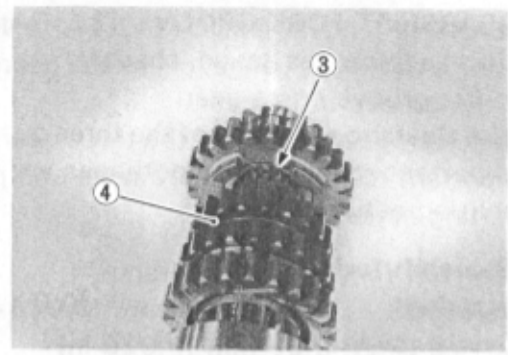
Countershaft

- Remove the left end bearing ① and oil seal ②.

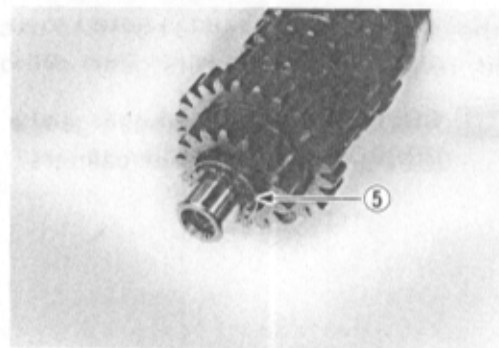


- Remove the top drive gear circlip ③ from its groove and slide toward the 3rd/4th drive gears ④.

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

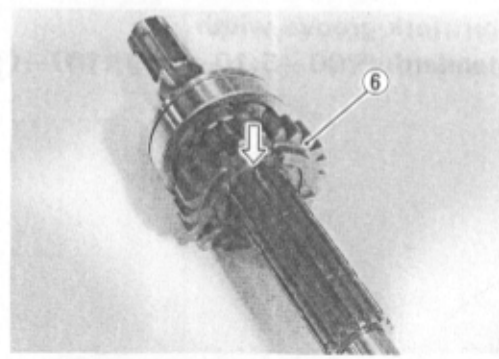


- Slide the top and 2nd drive gears toward the 3rd/4th drive gears, then remove the 2nd drive gear circlip ⑤.
- Remove the 2nd, top and 3rd/4th drive gears.



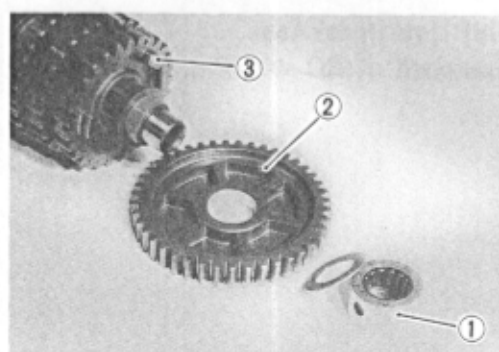
- Remove the 5th drive gear ⑥ by removing the circlip.

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



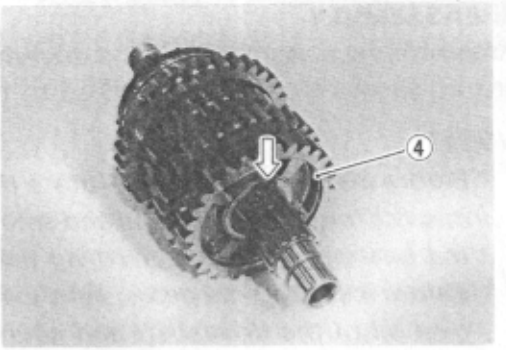
Driveshaft

- Remove the right end bearing ① and low driven gear ②.
- Remove the 5th driven gear ③.

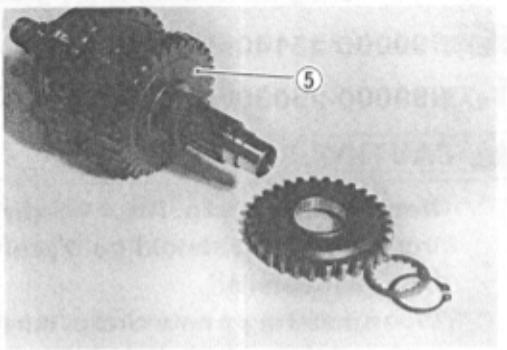


- Remove the 4th driven gear ④ by removing the circlip.

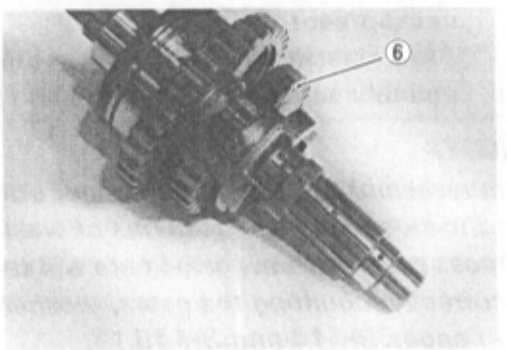
TOOL **09900-06107: Snap ring pliers**



- Remove the 3rd driven gear ⑤.

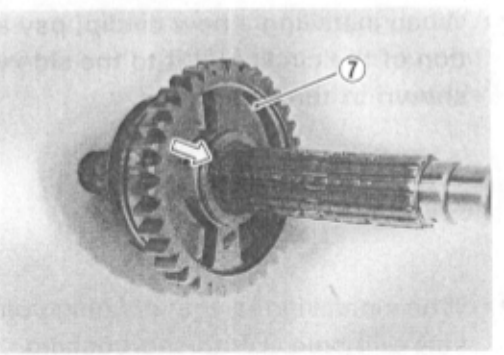


- Remove the top driven gear ⑥.

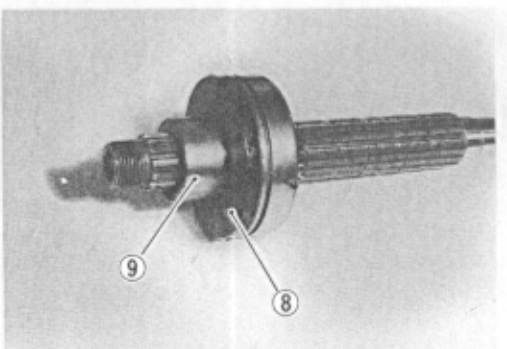


- Remove the 2nd driven gear ⑦ by removing the circlip.

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



- Remove the oil seal ⑧ and spacer ⑨.



REASSEMBLY

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

NOTE:

* *Before installing the gears, rotate the bearing by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.*
* *Before installing the gears, lightly coat moly paste or engine oil to the driveshaft and countershaft.*
* *Before installing the oil seal, apply grease to the oil seal lip.*

(M)H99000-25140: SUZUKI MOLY PASTE

(A)H99000-25030: SUZUKI SUPER GREASE "A"

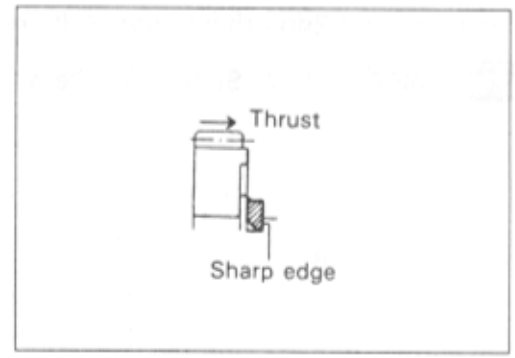
⚠ CAUTION

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

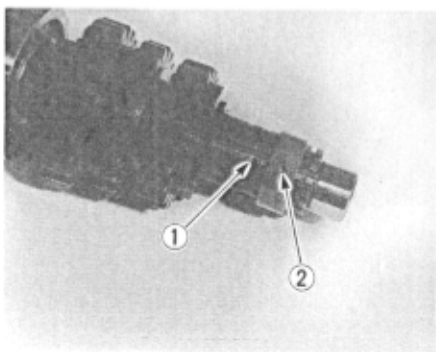
NOTE:

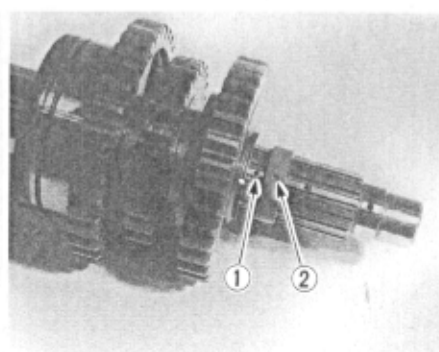
In reassembling the transmission, attention must be given to the locations and positions of washers and circlips. The cross sectional view given here will serve as a reference for correctly mounting the gears, washers and circlips. (Refer to pages 3H-14 and 3H-15.)

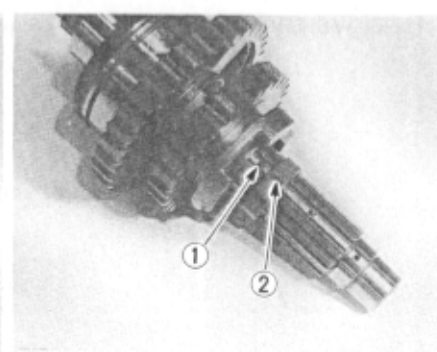
- When installing a new circlip, pay attention to the direction of the circlip. Fit it to the side where the thrust is as shown in the illustration.

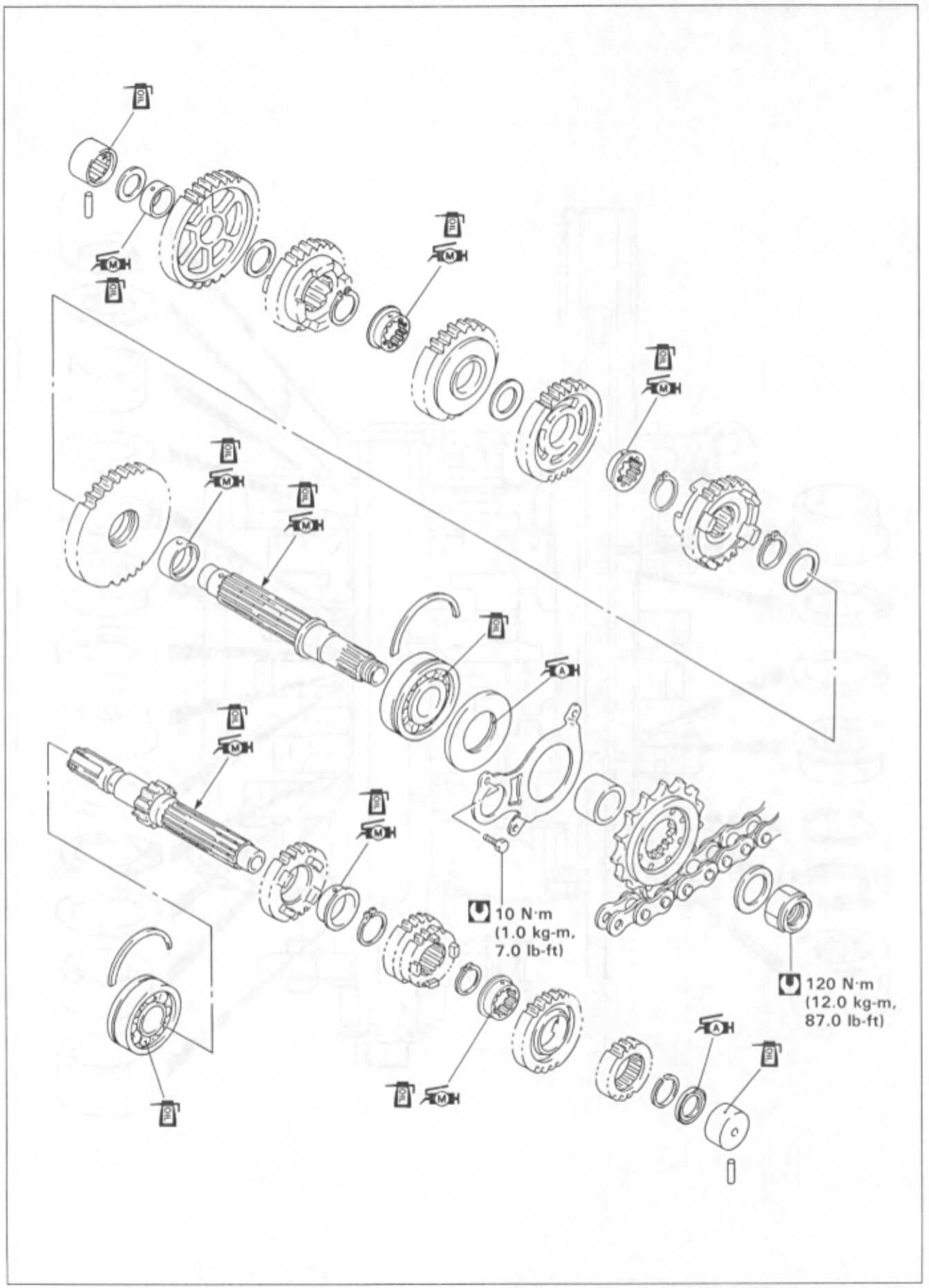


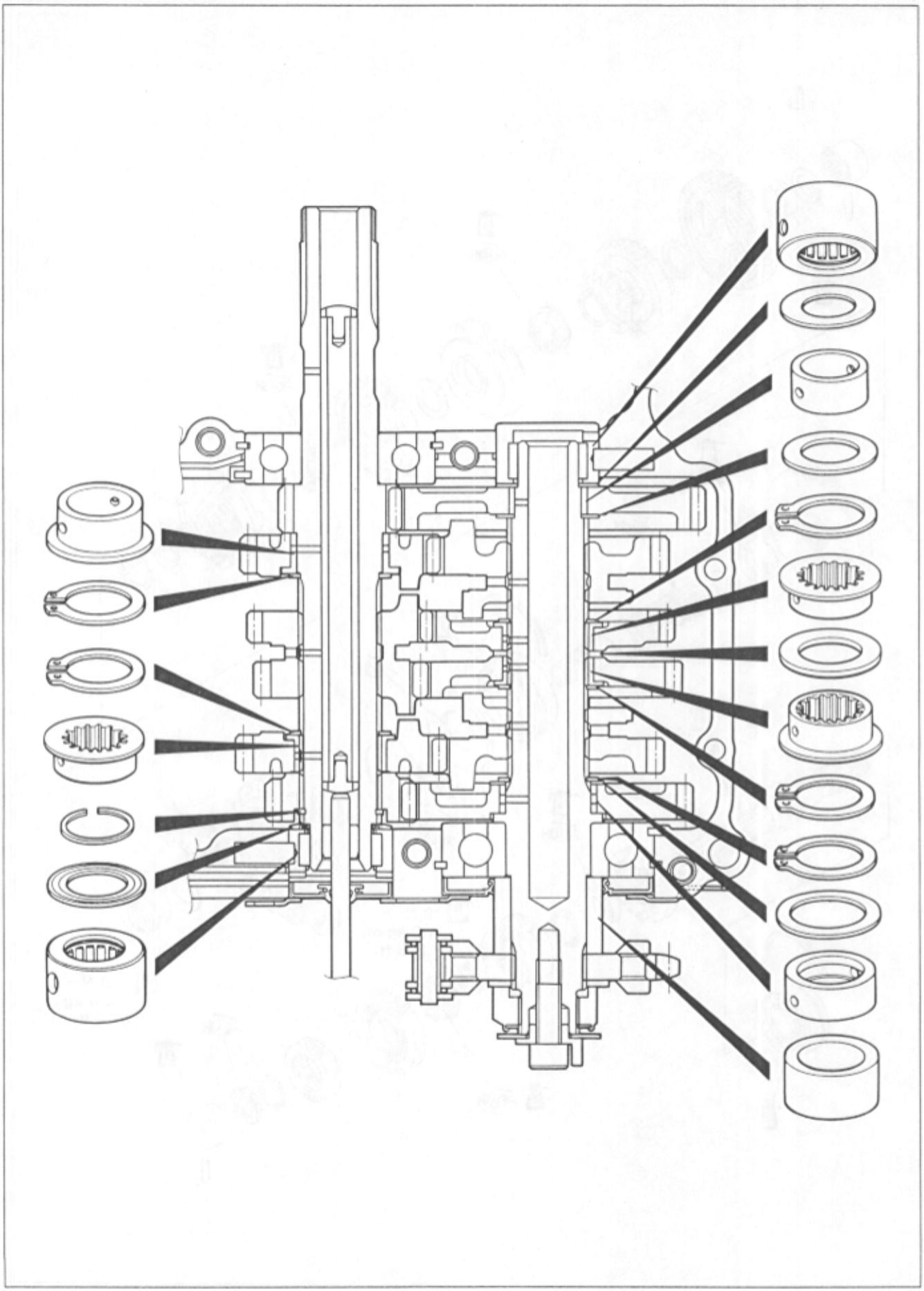
- When installing the gear bushing onto the shaft, align the shaft oil hole ① with the bushing oil hole ②.







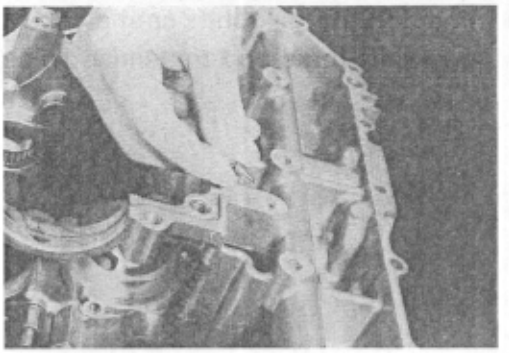

10 N·m
(1.0 kg-m,
7.0 lb-ft)
120 N·m
(12.0 kg-m,
87.0 lb-ft)



LOWER CRANKCASE/TRANSMISSION INSTALLATION

- Install the transmission oil jet into the lower crankcase.

NOTE:
Check the oil jet for clogging. If it is dirty with oil sediment, oil will not flow smoothly. Clean the oil jet with compressed air.

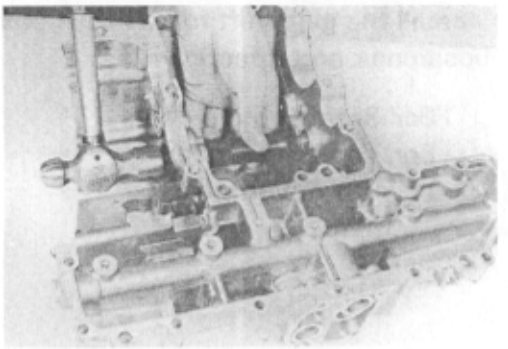


- Install the gearshift cam bearing with the special tool.

TOOL **09913-75821: Bearing installer**

⚠ CAUTION

The removed bearing should be replaced with a new one.

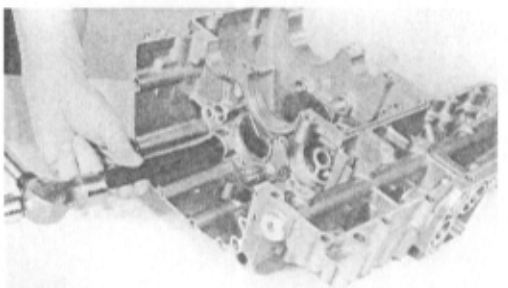


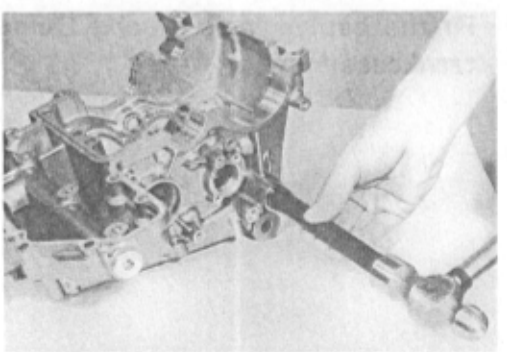
- Install the gearshift shaft bearings, left and right, with the special tool.
- Install the gearshift shaft oil seal with the special tool.

TOOL **09943-88211: Bearing installer**

⚠ CAUTION

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



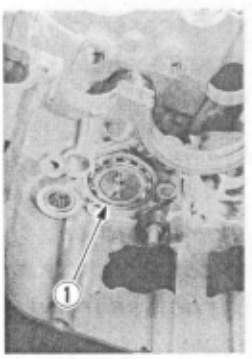


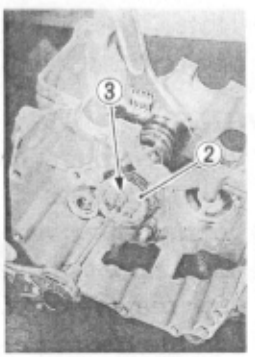
- Install the gearshift cam related parts.
  ① Washer
  ② Gearshift cam stopper plate
  ③ Bolt

NOTE:
When installing the gearshift cam stopper plate ②, apply a small quantity of THREAD LOCK "1342" to its bolt ③.

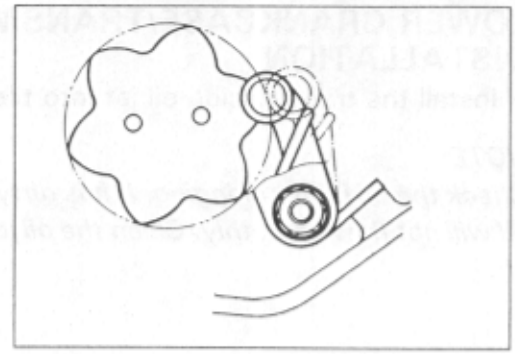
1342 **99000-32050: THREAD LOCK "1342"**

Bolt ③: 10 N·m (1.0 kg-m, 7.0 lb-ft)



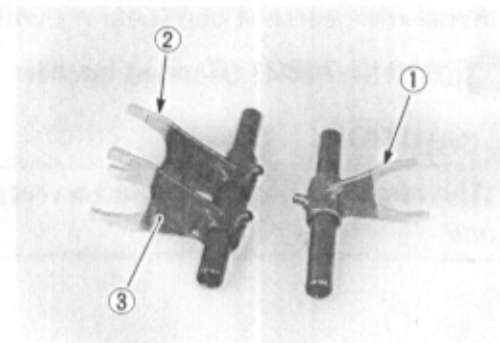


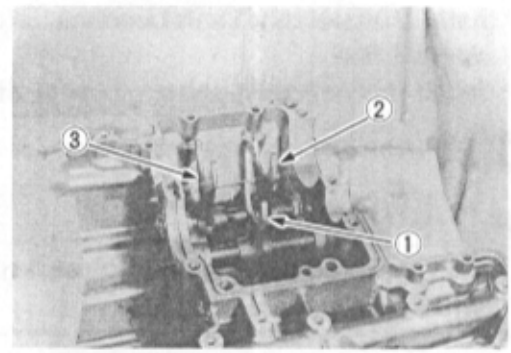
- Position the gearshift cam as shown in Fig. so that the gearshift forks and transmission can be installed easily.



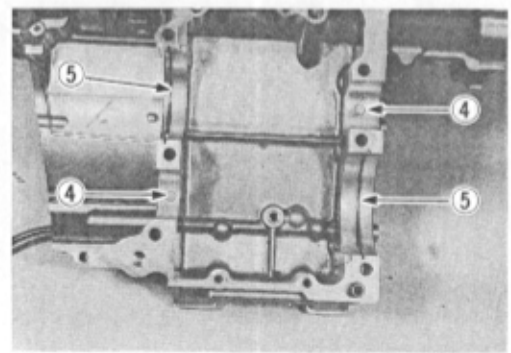
- Install the gearshift forks to the crankcase in the correct positions and directions.

  ① For 3rd/4th drive gears
  ② For Top driven gear
  ③ For 5th driven gear





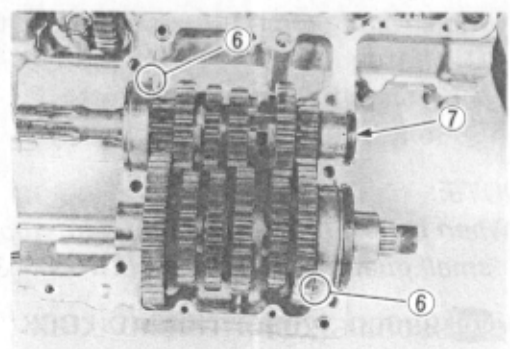
- Fit the bearing pins ④ and C-rings ⑤ on the middle crankcase.



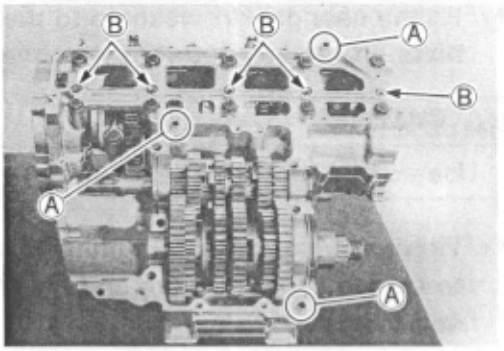
- Install the countershaft assembly and driveshaft assembly on the middle crankcase.

NOTE:

* *Be sure to install the bearing dowel pins ⑥ in the respective positions.*
* *Install the countershaft end cap ⑦ to the position.*
* *Make sure that the countershaft turns freely while holding the driveshaft. If not, shift the gear which is engaged to the neutral position.*



- Clean the mating surfaces of the crankcases before matching the middle and lower ones.
- Install the dowel pins Ⓐ to the middle crankcase.
- Fit the O-rings Ⓑ to the correct positions.



⚠ CAUTION

Replace the O-rings with new ones to prevent oil leakage.

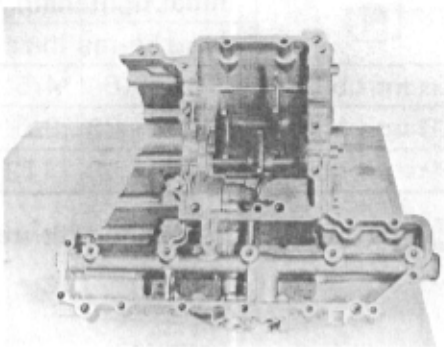
- Apply SUZUKI BOND NO.1207B to the mating surface of the lower crankcase in the following procedure.

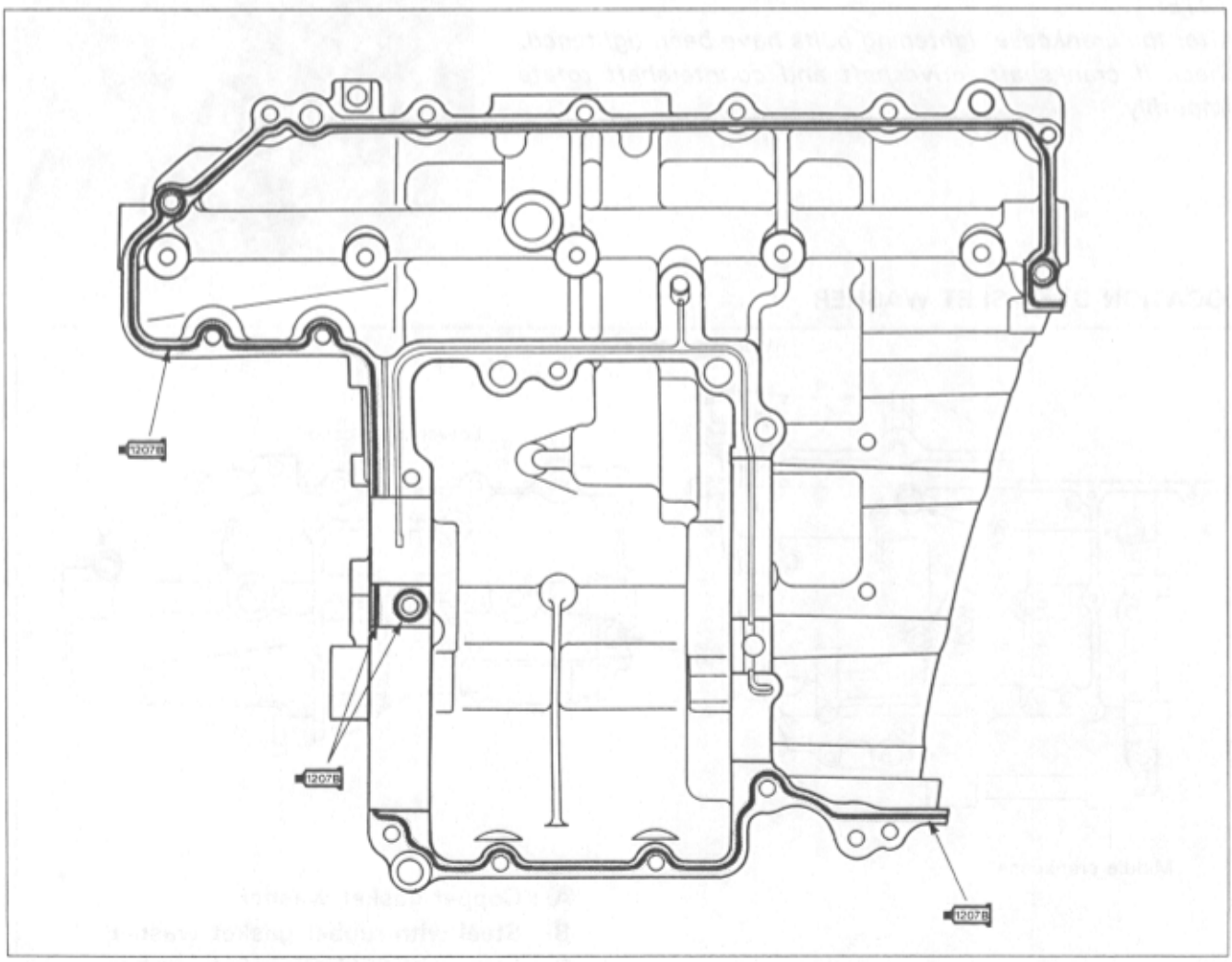
1207B 99104-31140: SUZUKI BOND NO.1207B

NOTE:

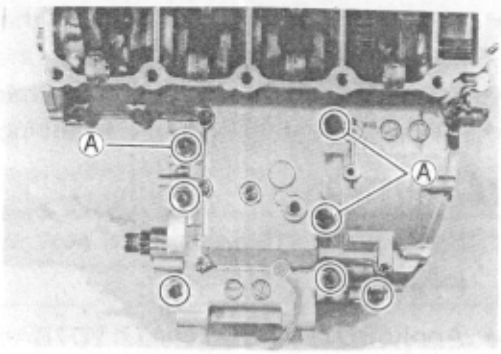
Use of SUZUKI BOND NO.1207B is as follows:

* *Make surfaces free from moisture, oil, dust and other foreign materials.*
* *Spread on surfaces thinly to form an even layer, and assemble the cases within few minutes.*
* *Take extreme care not to apply any BOND NO.1207B to the bearing surfaces and oil passage area.*
* *Apply to cornered suface as it forms a comparatively thick film.*





- Fit the new gasket washers to the crankcase tightening bolts, Ⓐ and Ⓑ, correctly as shown.



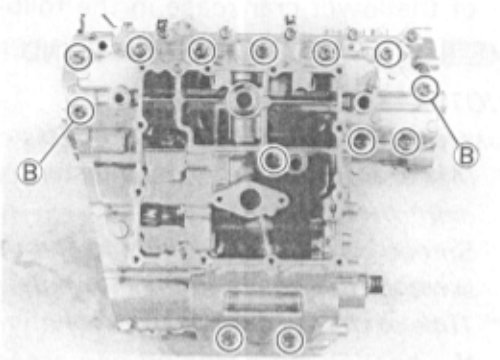
⚠ CAUTION

Use a new gasket to prevent oil leakage.

- Tighten the crankcase tightening bolts a little at a time to equalize the pressure and tighten them to the specified torque.

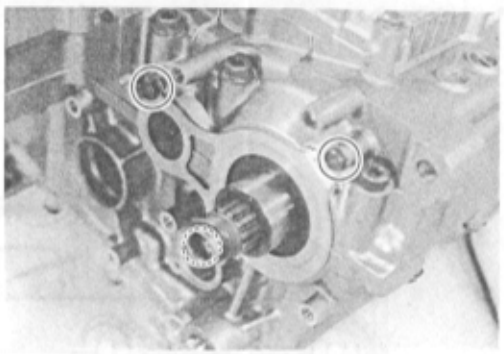
	Initial tightening			Final tightening		
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
6 mm bolt	6	0.6	4.5	11	1.1	8.0
8 mm bolt	13	1.3	9.5	24	2.4	17.5
9 mm bolt	18	1.8	13	32	3.2	23.0

TOOL **09900-00410: Hexagon bit wrench set**

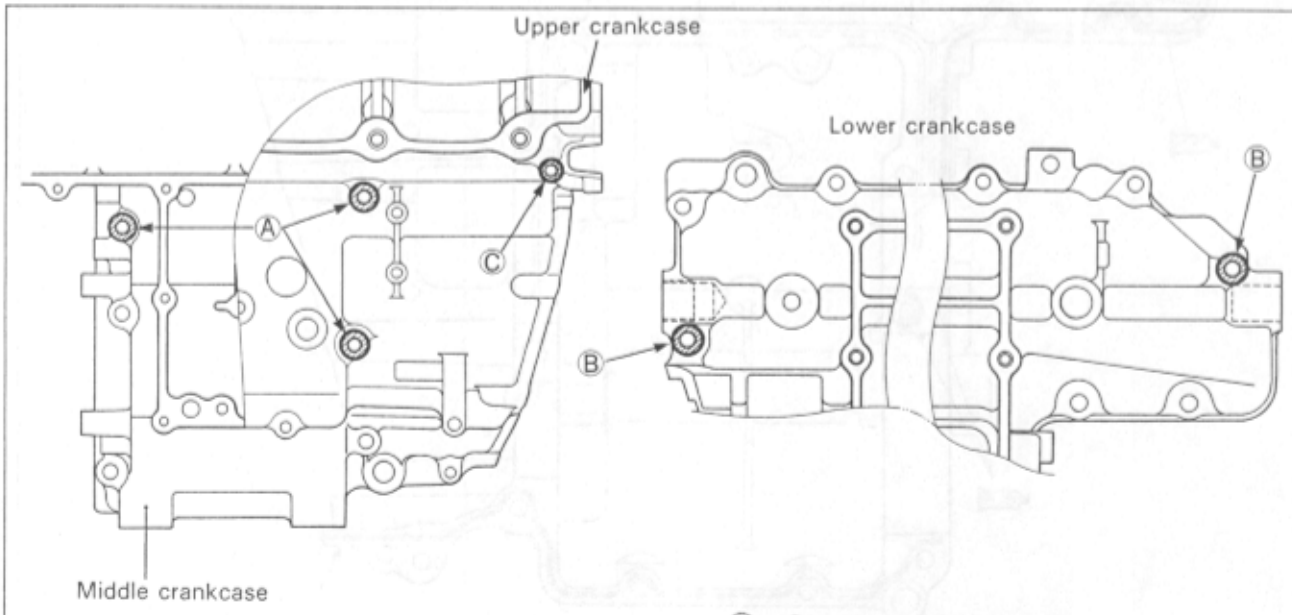


- Install the oil seal retainer with three bolts.

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



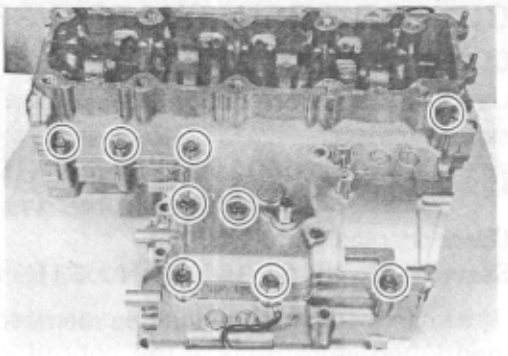
LOCATION OF GASKET WASHER



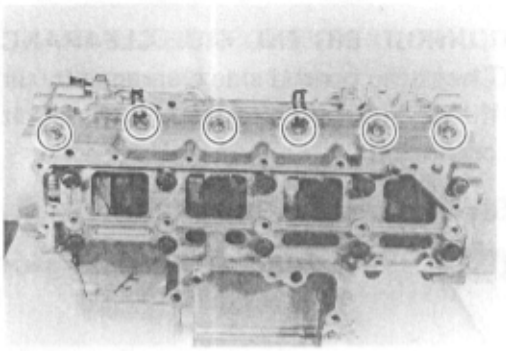
Ⓐ : Copper gasket washer
Ⓑ : Steel with rubber gasket washer
Ⓒ : Steel with rubber gasket washer

UPPER AND MIDDLE CRANKCASES/ CRANKSHAFT/CONROD REMOVAL

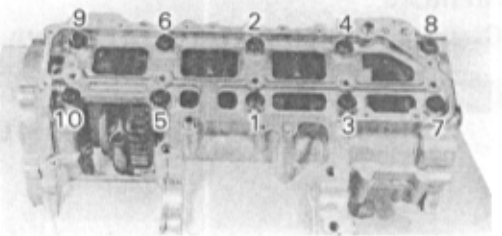
- Separate the lower crankcase from the middle crankcase. (See page 3H-7.)
- Remove the countershaft assembly and driveshaft assembly. (See page 3H-7.)



- Loosen and remove the crankcase tightening bolts diagonally.



- When removing the crankshaft tightening bolts, loosen them in the descending order of numbers assigned to these bolts.
- Make sure that all bolts are removed without fail. Hammer lightly the middle crankcase side with a plastic hammer to separate the upper and middle crankcase halves and then lift the latter.

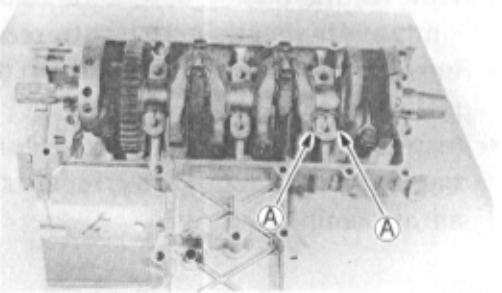


⚠ CAUTION

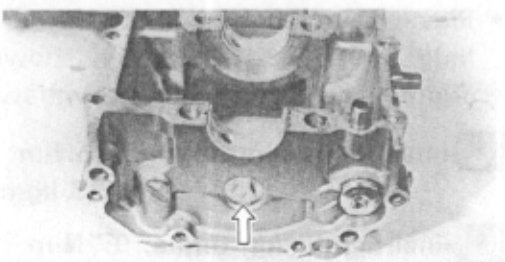
Do not drop the crankshaft journal bearings from the middle crankcase.

- Remove the crankshaft assembly from the upper crankcase.

NOTE:
Bear in mind that the crankshaft thrust bearings Ⓐ are located between the shaft and the case.



- Remove the oil jet for the generator fixed on the upper crankcase.



CONROD/CRANKSHAFT INSPECTION

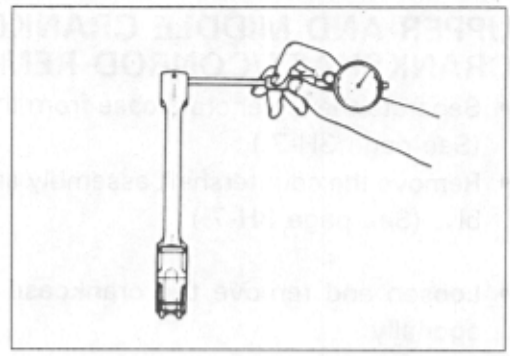
CONROD SMALL END I.D.

Using a small bore gauge, measure the conrod small end inside diameter.

TOOL **09900-20602: Dial gauge (1/1000 mm, 1 mm)**
09900-22401: Small bore gauge (10—18 mm)

Conrod small end I.D.
Service Limit: 16.040 mm (0.6315 in)

If the conrod small end inside diameter exceeds the above-mentioned limit, replace the conrod.

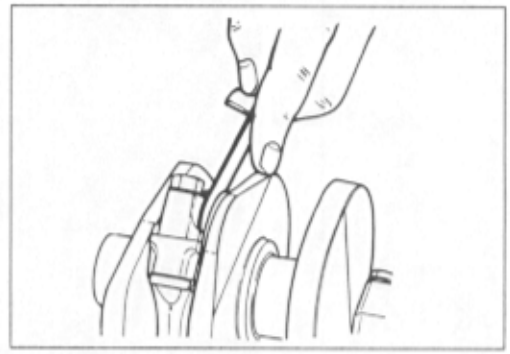


CONROD BIG END SIDE CLEARANCE

Check the conrod side clearance by using a thickness gauge. If the clearance exceeds the limit, replace conrod or crankshaft.

Service Limit: 0.3 mm (0.01 in)

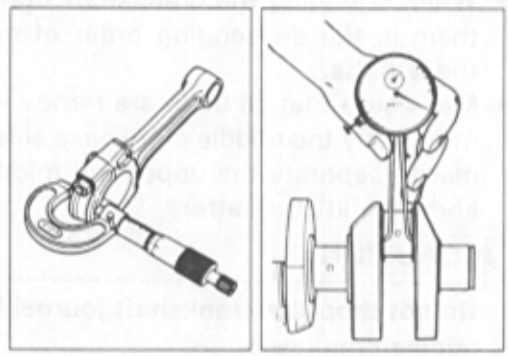
TOOL **09900-20803: Thickness gauge**



Standard
Big end width: 20.95—21.00 mm (0.825—0.827 in)

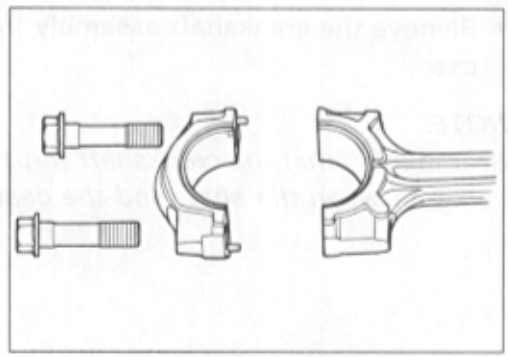
Standard
Crank pin width: 21.10—21.15 mm (0.831—0.833 in)

TOOL **09900-20205: Micrometer (0—25 mm)**
09900-20605: Dial calipers (10—34 mm)



CONROD-CRANK PIN BEARING SELECTION

- Remove the bearing cap bolts, and tap the bearing cap lightly with plastic hammer to remove the bearing cap.
- Remove the rods, and mark them to identify the cylinder position.
- Inspect the bearing surfaces for any sign of fusion, pitting, burn, or flaws. If any, replace them with a specified set of bearings.

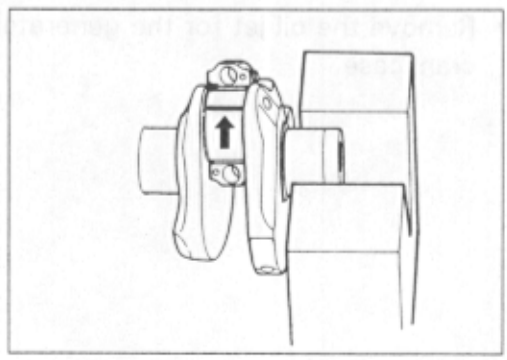


- Place plastigauge axially on the crank pin avoiding the oil hole, at TDC or BDC side as shown.
- Tighten the bearing cap bolts with two-step torque values.

Initial tightening torque: 35 N·m
(3.5 kg-m, 25.5 lb-ft)

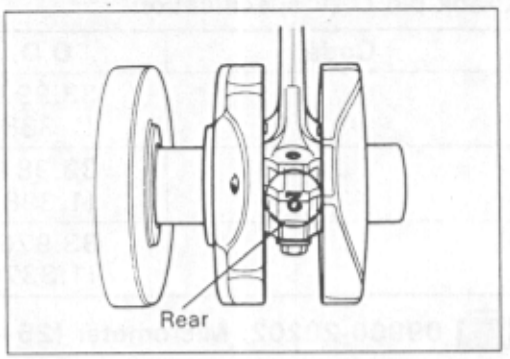
Final tightening torque: 67 N·m
(6.7 kg-m, 48.5 lb-ft)

TOOL **09900-22301: Plastigauge**



NOTE:
When fitting bearing cap to crank pin, be sure to discriminate one end from the other, namely front and rear.

NOTE:
Never rotate the crankshaft or conrod when a piece of plastigauge is in the clearance.

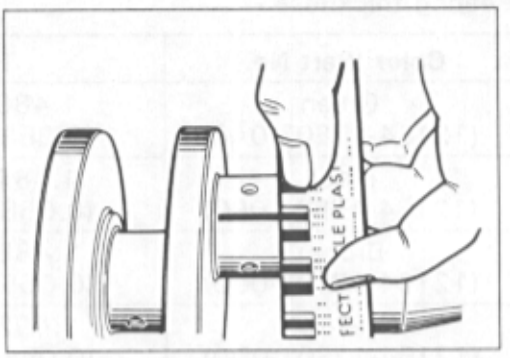


- Remove the caps, and measure the width of compressed plastigauge with envelope scale. This measurement should be taken at the widest part.

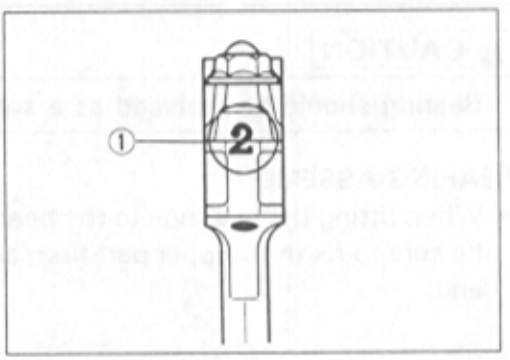
Crank pin bearing oil clearance

Standard: 0.032—0.056 mm (0.0013—0.0022 in)

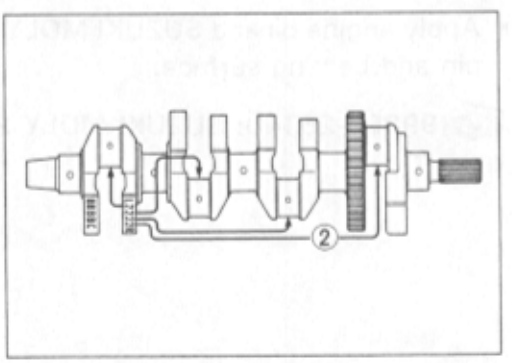
Service Limit: 0.080 mm (0.0031 in)



- If oil clearance exceeds the service limit, select the specified bearings from the bearing selection table.
- Check the corresponding conrod I.D. code number ①, "1" or "2".



- Check the corresponding crank pin O.D. code number ② , "1", "2" or "3".



Bearing selection table

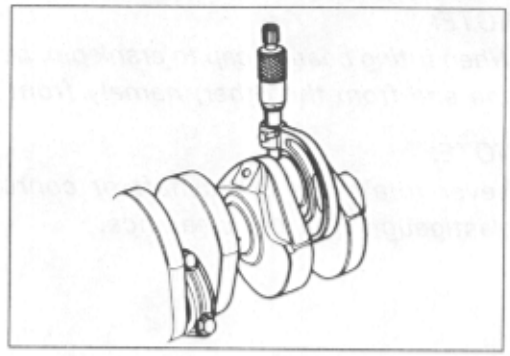
		Crank pin O.D. ②		
	Code	1	2	3
Conrod I.D. ①	1	Green	Black	Brown
	2	Black	Brown	Yellow

Conrod I.D. specification

Code	I.D. specification
1	37.000—37.008 mm (1.4567—1.4570 in)
2	37.008—37.016 mm (1.4570—1.4573 in)

Crank pin O.D. specification

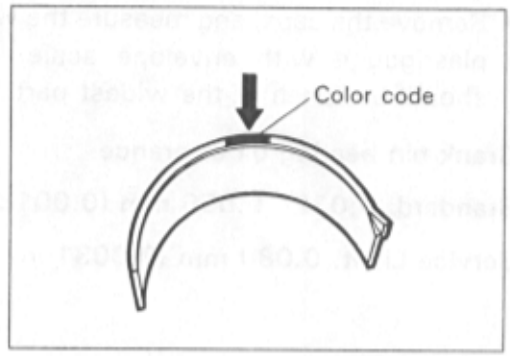
Code	O.D. specification
1	33.992—34.000 mm (1.3383—1.3386 in)
2	33.984—33.992 mm (1.3380—1.3383 in)
3	33.976—33.984 mm (1.3376—1.3380 in)



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

Bearing thickness

Color (Part No.)	Thickness
Green (12164-17E01-0A0)	1.480—1.484 mm (0.0583—0.0584 in)
Black (12164-17E01-0B0)	1.484—1.488 mm (0.0584—0.0586 in)
Brown (12164-17E01-0C0)	1.488—1.492 mm (0.0586—0.0587 in)
Yellow (12164-17E01-0D0)	1.492—1.496 mm (0.0587—0.0589 in)

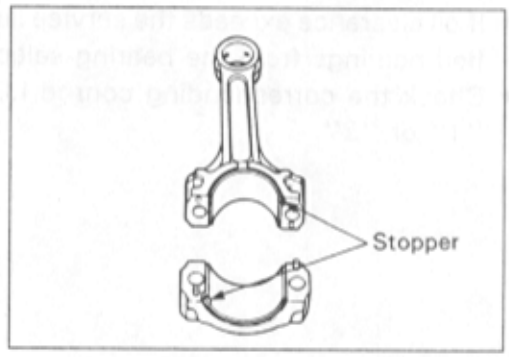


⚠ CAUTION

Bearing should be replaced as a set.

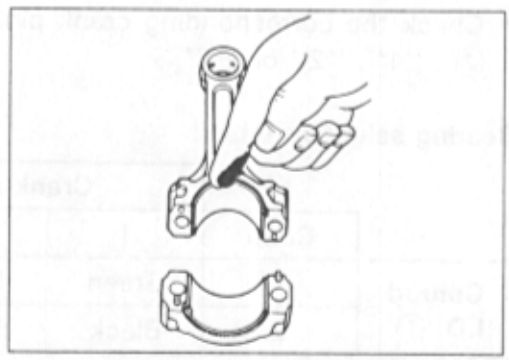
BEARING ASSEMBLY

- When fitting the bearings to the bearing cap and conrod, be sure to fix the stopper part first, and press in the other end.



- Apply engine oil and SUZUKI MOLY PASTE to the crank pin and bearing surface.

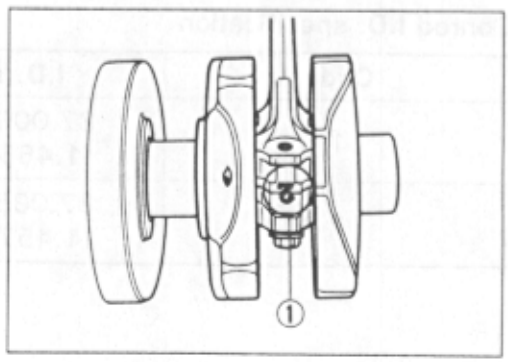
M 99000-25140: SUZUKI MOLY PASTE



- When mounting the conrod on the crankshaft, make sure that numeral figure ① of the conrod faces rearward.
- Tighten the bearing cap bolts with specified torque.

Initial tightening torque: 35 N·m (3.5 kg-m, 25.5 lb-ft)

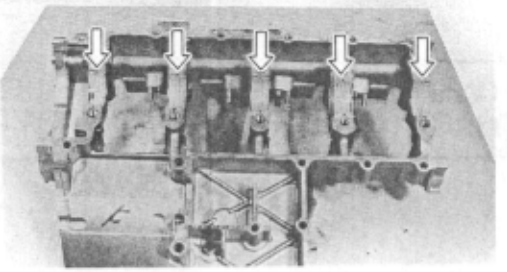
Final tightening torque : 67 N·m (6.7 kg-m, 48.5 lb-ft)



- Check the conrod movement for smooth turning.

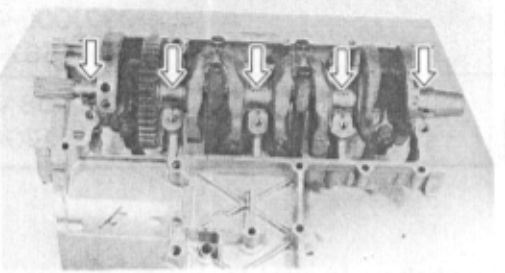
CRANKCASE-CRANKSHAFT BEARING SELECTION

- Inspect each bearing of upper and middle crankcases for any damage.



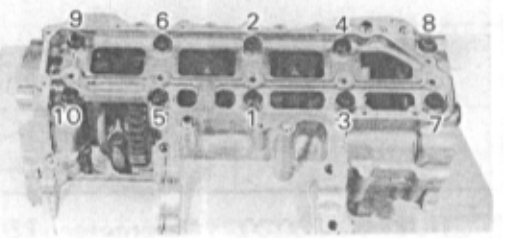
- Place the plastigauge on each crankshaft journal in the usual manner.

TOOL **09900-22301: Plastigauge**



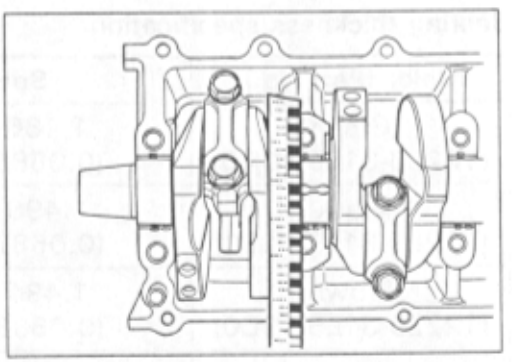
NOTE:
Do not place the plastigauge on the oil hole, and do not rotate the shaft when plastigauge is in place.

- Mate the middle crankcase with the upper crankcase, and tighten the crankshaft tightening bolts with the specified torque value in the indicated order.



	Initial Tightening	Final Tightening
9 mm bolt	18 N·m 1.8 kg-m 13 lb-ft	32 N·m 3.2 kg-m 23 lb-ft

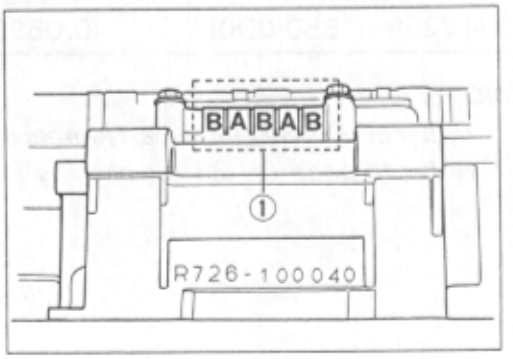
- Remove the middle crankcase, and measure the width of compressed plastigauge in the usual manner.



Crankshaft journal bearing oil clearance
Standard: 0.020—0.044 mm (0.0008—0.0017 in)

Service Limit: 0.08 mm (0.0031 in)

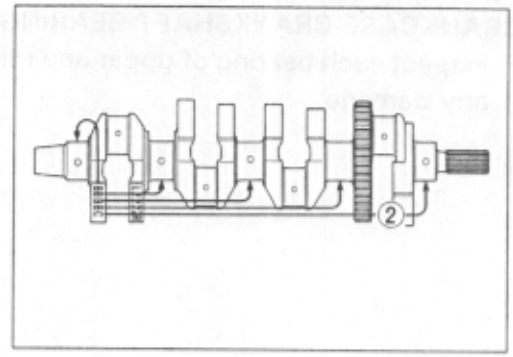
- If the width at the widest part exceeds the limit, replace the set of bearings with new ones by referring to the selection table.



- Check the corresponding crankcase journal I.D. code number ①, "A" or "B" which are stamped on the rear of upper crankcase.
- Check the corresponding crankshaft journal O.D. code number ②, "A", "B" or "C" which are stamped on the crankshaft.

Bearing selection table

		Crankshaft O.D. ②		
	Code	A	B	C
Crankcase I.D. ①	A	Green	Black	Brown
	B	Black	Brown	Yellow

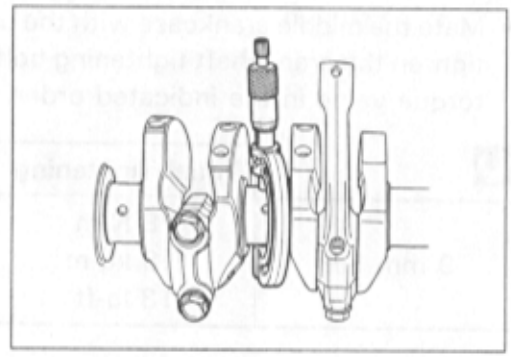


Crankcase I.D. specification

Code	I.D. specification
A	37.000–37.008 mm (1.4567–1.4570 in)
B	37.008–37.016 mm (1.4570–1.4573 in)

Crankshaft journal O.D. specification

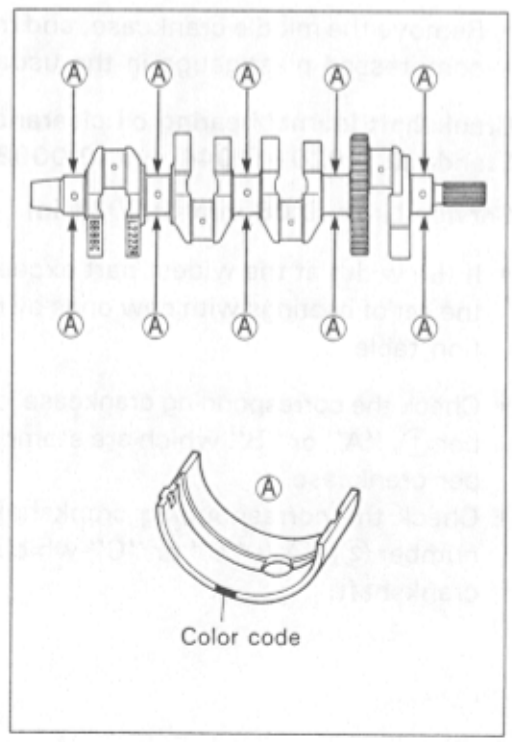
Code	O.D. specification
A	33.992–34.000 mm (1.3383–1.3386 in)
B	33.984–33.992 mm (1.3380–1.3383 in)
C	33.976–33.984 mm (1.3376–1.3380 in)



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

Bearing thickness specification

Color (Part No.)	Specification
Green (12229-31E50-0A0)	1.486–1.490 mm (0.0585–0.0587 in)
Black (12229-31E50-0B0)	1.490–1.494 mm (0.0587–0.0588 in)
Brown (12229-31E50-0C0)	1.494–1.498 mm (0.0588–0.0590 in)
Yellow (12229-31E50-0D0)	1.498–1.502 mm (0.0590–0.0591 in)

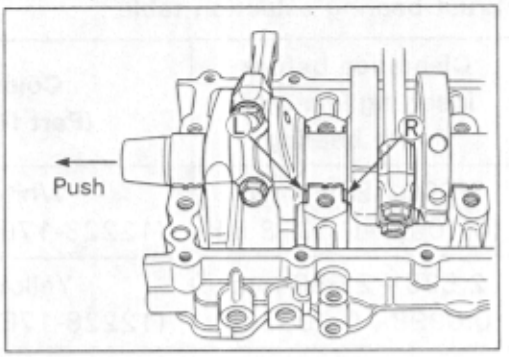


NOTE:

* *Upper and lower crankshaft journal bearings are the same.*
* *Refer to page 3H-28 for bearing installation.*

CRANKSHAFT THRUST CLEARANCE

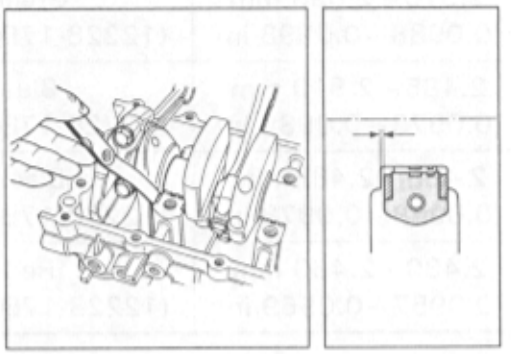
- With the crankshaft, right-side thrust bearing and left-side thrust bearing inserted in the upper crankcase, use a thickness gauge to measure the thrust clearance on the left-side. Ⓡ: Right-side thrust bearing
  Ⓛ: Left-side thrust bearing



NOTE:
Push the crankshaft to the left-side, so that there is no clearance on the right-side thrust bearing.

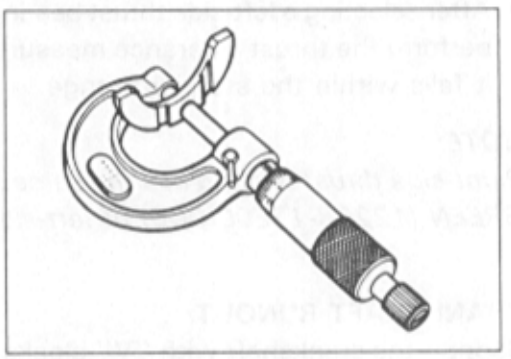
Thrust clearance
Standard: 0.055—0.110 mm (0.0022—0.0043 in)

If the thrust clearance exceeds the standard range, adjust the thrust clearance by the following procedures:

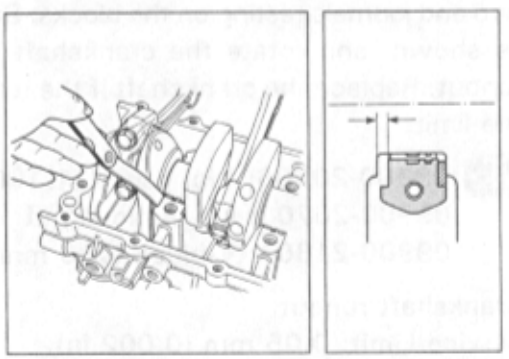


- Remove the right-side thrust bearing and measure its thickness with a micrometer. If the thickness of the right-side thrust bearing is below standard, replace with a new bearing and once again perform the thrust clearance measurement listed above, checking to make sure it is within standard.

Right-side thrust bearing thickness
Standard: 2.425—2.450 mm (0.0955—0.0965 in)



- If the right-side thrust bearing is within the standard range, reinsert the right-side thrust bearing and remove the left-side thrust bearing.
- As shown in the illustration, use a thickness gauge to measure the clearance before inserting of the left-side thrust bearing, and select a left-side thrust bearing from the selection table.

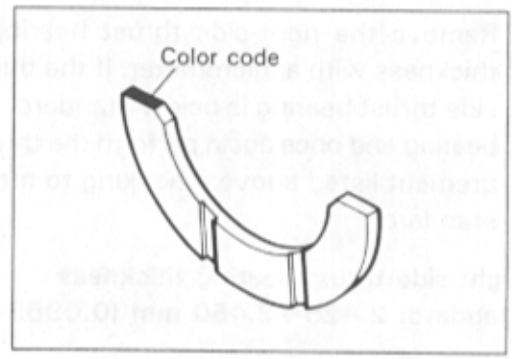


Thrust bearing selection table

Clearance before inserting left-side thrust bearing	Color (Part No.)	Thrust bearing thickness	Thrust clearance
2.560–2.585 mm (0.1008–0.1018 in)	White (12228-17E00-0F0)	2.475–2.500 mm (0.0974–0.0984 in)	0.060–0.110 mm (0.0024–0.0043 in)
2.535–2.560 mm (0.0998–0.1008 in)	Yellow (12228-17E00-0E0)	2.450–2.475 mm (0.0965–0.0974 in)	0.060–0.110 mm (0.0024–0.0043 in)
2.510–2.535 mm (0.0988–0.0998 in)	Green (12228-17E00-0D0)	2.425–2.450 mm (0.0955–0.0965 in)	0.060–0.110 mm (0.0024–0.0043 in)
2.485–2.510 mm (0.0978–0.0988 in)	Blue (12228-17E00-0C0)	2.400–2.425 mm (0.0945–0.0955 in)	0.060–0.110 mm (0.0024–0.0043 in)
2.460–2.485 mm (0.0969–0.0978 in)	Black (12228-17E00-0B0)	2.375–2.400 mm (0.0935–0.0945 in)	0.060–0.110 mm (0.0024–0.0043 in)
2.430–2.460 mm (0.0957–0.0969 in)	Red (12228-17E00-0A0)	2.350–2.375 mm (0.0925–0.0935 in)	0.055–0.110 mm (0.0022–0.0043 in)

- After selecting a left-side thrust bearing, insert it and again perform the thrust clearance measurement to make sure it falls within the standard range.

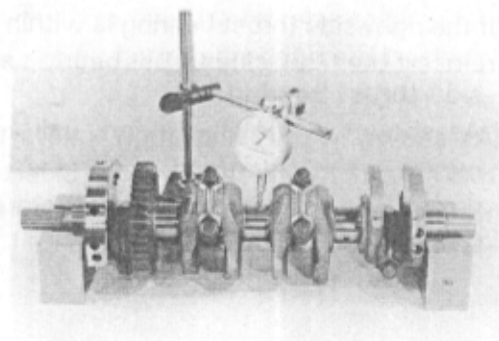
NOTE:
Right-side thrust bearing has the same specification as the GREEN (12228-17E00-0D0) of left-side thrust bearing.



CRANKSHAFT RUNOUT

Support the crankshaft with "V" blocks as shown, with the two end journals resting on the blocks. Set up the dial gauge, as shown, and rotate the crankshaft slowly to read the runout. Replace the crankshaft if the runout is greater than the limit.

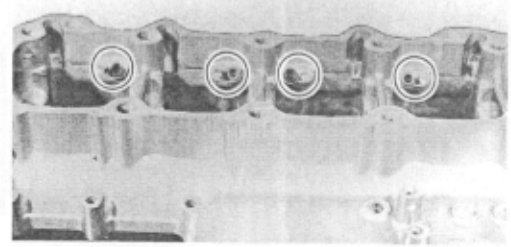
TOOL **09900-20606: Dial gauge (1/100 mm, 10 mm)**
09900-20701: Magnetic stand
09900-21304: V-block (100 mm)



Crankshaft runout
Service Limit: 0.05 mm (0.002 in)

PISTON COOLING OIL NOZZLE SERVICE

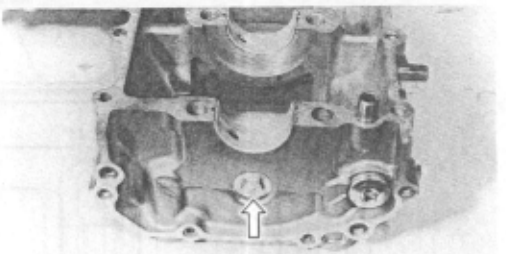
(Refer to pages 3B-1, 3B-4 and 3B-5 for removal, inspection and installation.)



UPPER AND MIDDLE CRANKCASES/CRANKSHAFT/CONROD INSTALLATION

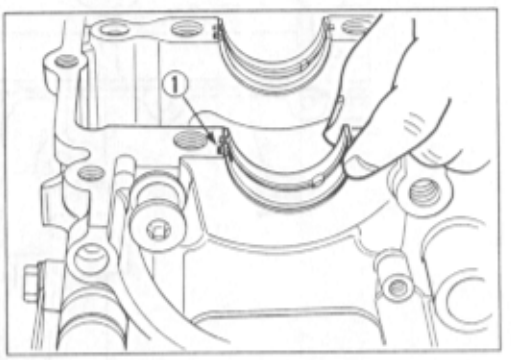
- Install the generator oil jet onto the upper crankcase and tighten it to the specified torque.

Oil jet: 5 N·m (0.5 kg-m, 3.5 lb-ft)



NOTE:
Check the oil jet for clogging. If it is dirty with oil sediment, oil will not flow smoothly. Clean the oil jet with compressed air.

- When fitting the crankshaft journal bearings to the upper and middle crankcases, be sure to fix the stopper part ① first and press the other end. (Refer to page 3H-25 for bearing specification.)



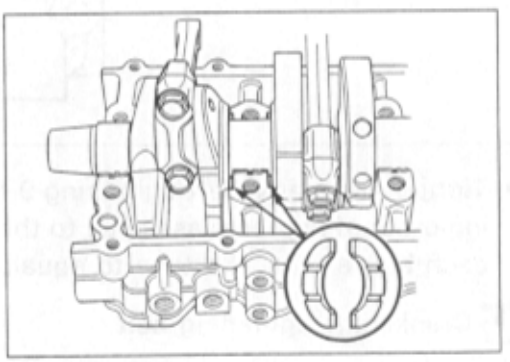
⚠ CAUTION

Do not touch the bearing surfaces with your hands. Grasp by the edge of the bearing shell.

- Before installing the crankshaft, apply SUZUKI MOLY PASTE to each journal bearing lightly.

99000-25140: SUZUKI MOLY PASTE

- Install the crankshaft to the upper crankcase.
- Insert the right and left-thrust bearings with oil grooved facing the crank web. (Refer to page 3H-27 for thrust bearing specification.)

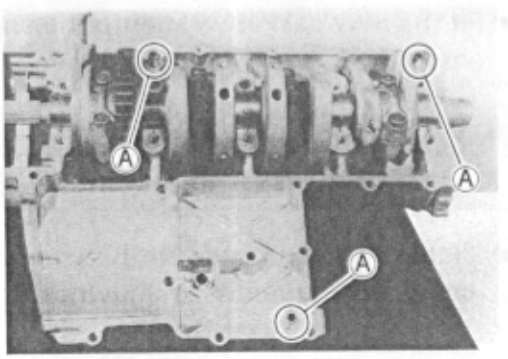


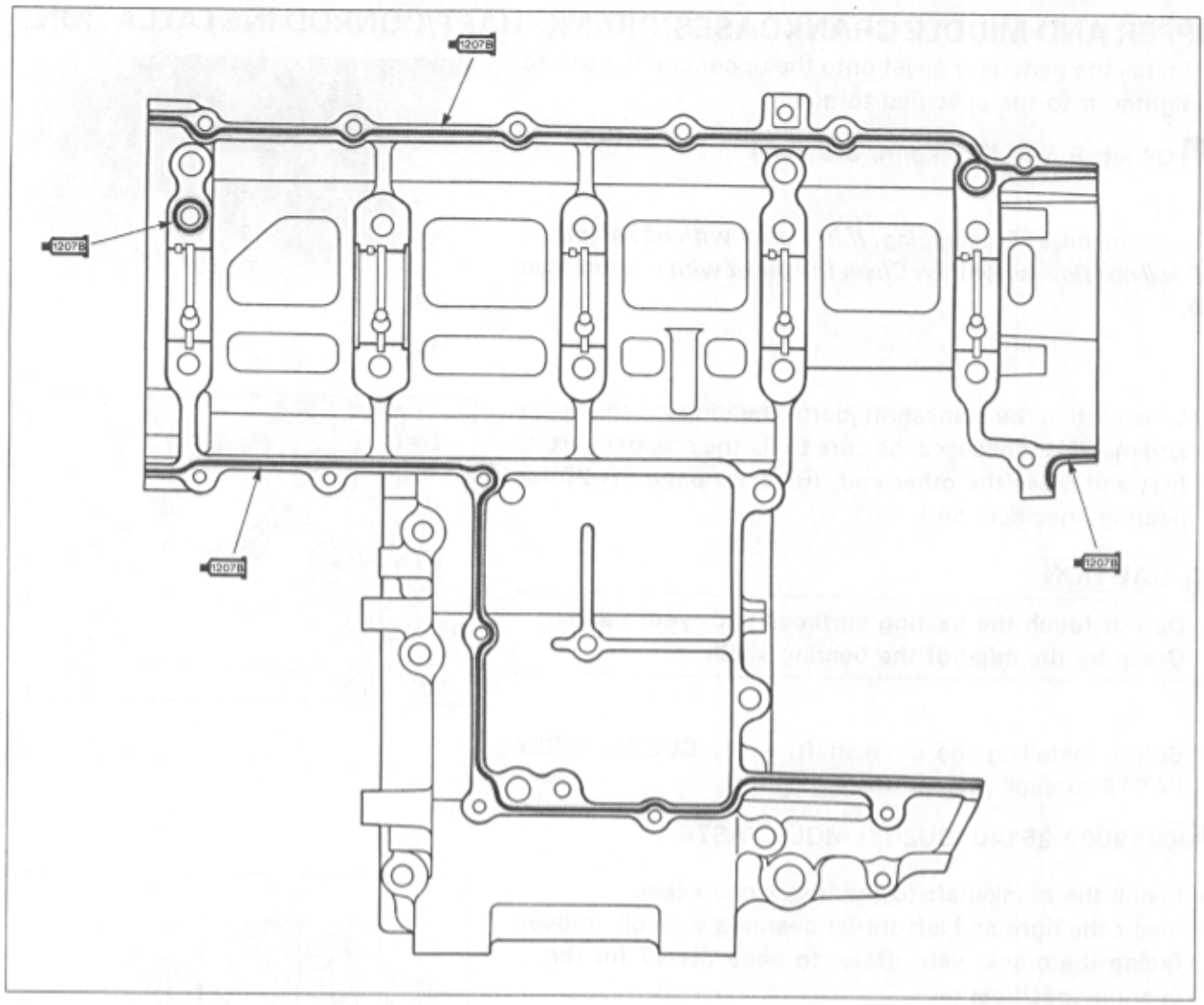
- Clean the mating surfaces of the crankcases before matching the upper and middle ones.
- Install the dowel pins Ⓐ to the upper crankcase.
- Apply SUZUKI BOND NO.1207B to the mating surface of the middle crankcase in the following procedure.

99104-31140: SUZUKI BOND NO.1207B

NOTE:
Use of SUZUKI BOND NO.1207B is as follows:

- ** Make surfaces free from moisture, oil, dust and other foreign materials.*
- ** Spread on surfaces thinly to form an even layer, and assemble the cases within few minutes.*
- ** Take extreme care not to apply any BOND NO.1207B to the bearing surfaces and oil passage area.*
- ** Apply to cornered surface as it forms a comparatively thick film.*

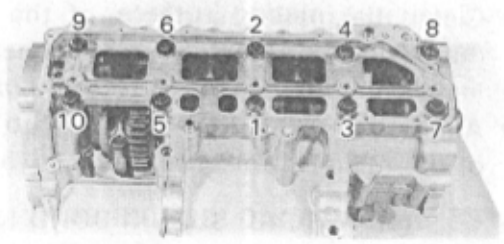




- Tighten the crankshaft tightening 9-mm bolts in ascending order of numbers assigned to these bolts, tightening each bolt a little at a time to equalize the pressure.

Crankshaft tightening bolt

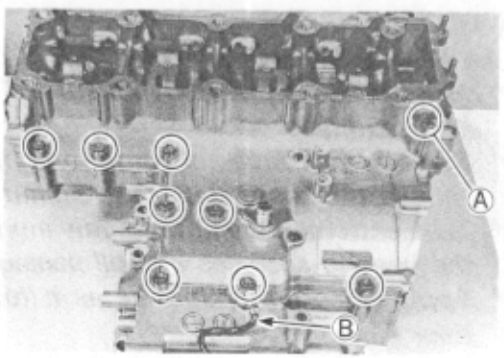
Initial tightening			Final tightening		
N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
18	1.8	13	32	3.2	23.0



- Fit the new gasket washer to the upper crankcase tightening bolt Ⓐ correctly as shown.

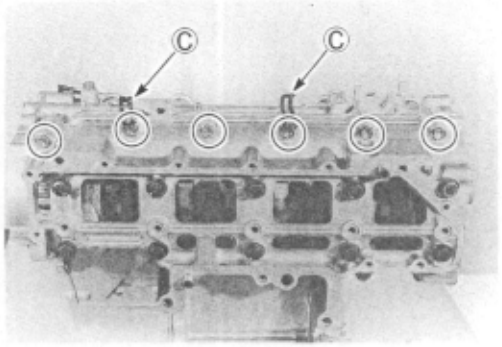
⚠ CAUTION

Use a new gasket to prevent oil leakage.



- Fit the engine ground wire Ⓑ to the upper crankcase tightening bolt correctly as shown.

- Fit the lead wire clamps Ⓒ to the middle crankcase tightening bolts correctly as shown.
- Tighten the crankcase tightening bolts a little at a time to equalize the pressure and tighten them to the specified torque.

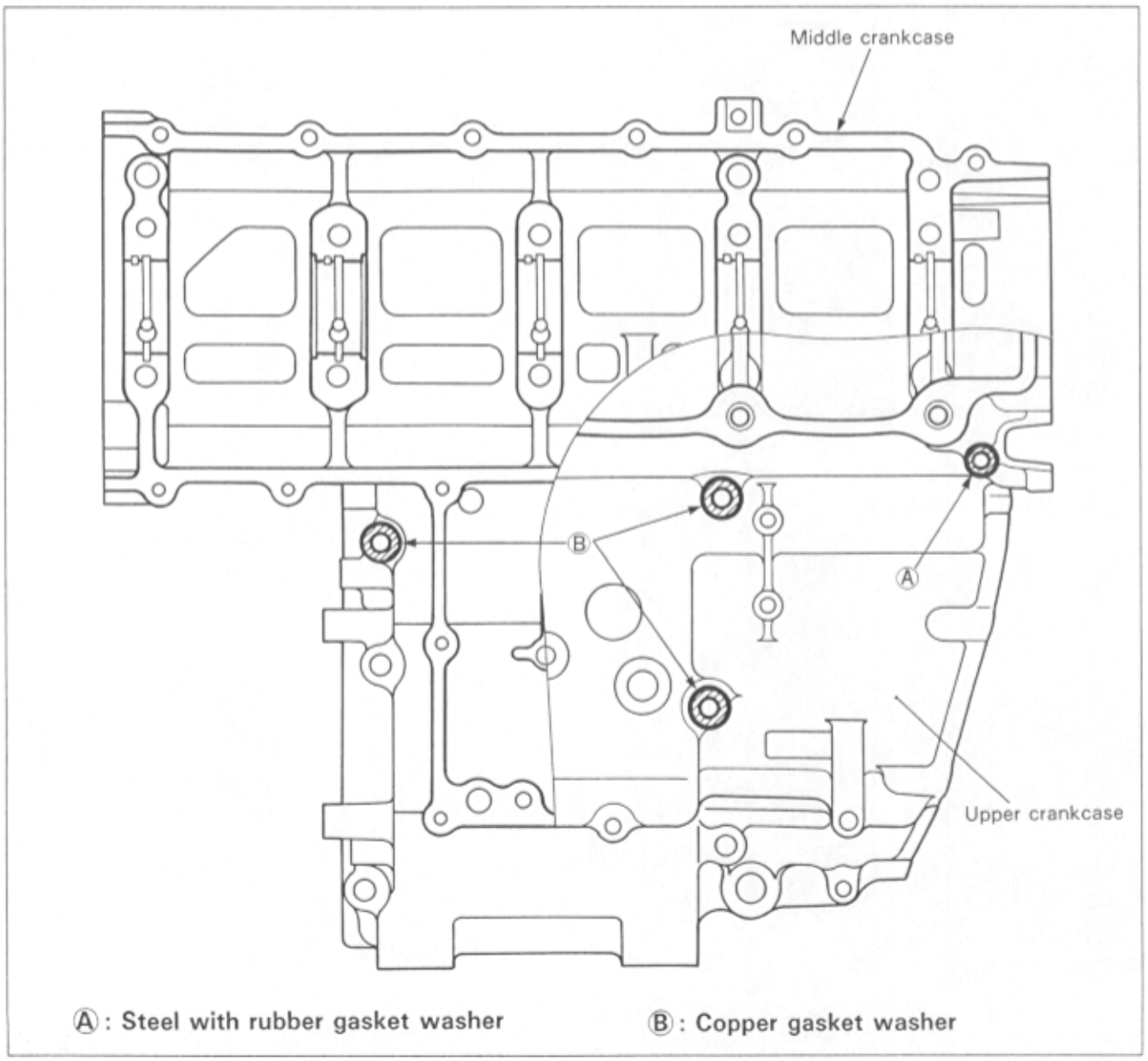


	Initial tightening			Final tightening		
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
6 mm bolt	6	0.6	4.5	11	1.1	8.0
8 mm bolt	13	1.3	9.5	24	2.4	17.5
9 mm bolt	18	1.8	13	32	3.2	23.0

TOOL **09900-00410: Hexagon wrench set**

Refer to page 3H-17 for lower crankcase and transmission installation.

LOCATION OF GASKET WASHER



Ⓐ : Steel with rubber gasket washer

Ⓑ : Copper gasket washer

FUEL AND LUBRICATION SYSTEM

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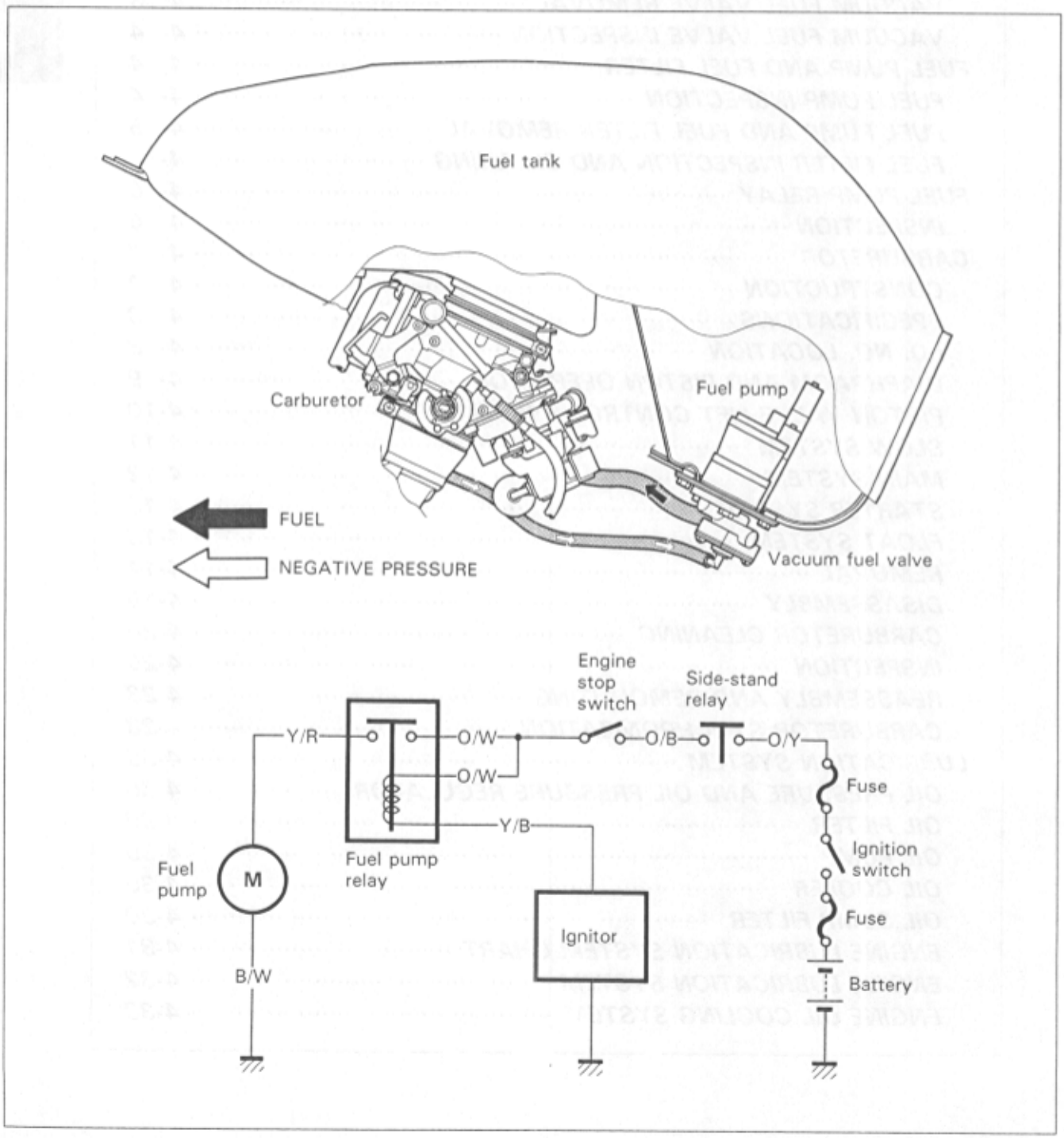
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FUEL SYSTEM

The fuel system consists of the fuel tank, fuel pump, fuel pump relay, vacuum fuel valve, ignitor and carburetors.

The fuel pump relay is located behind the left frame cover. The fuel pump located in the fuel tank is an electric-motor type and its electrical energy is supplied from battery which is controlled by the ignitor and fuel pump relay.

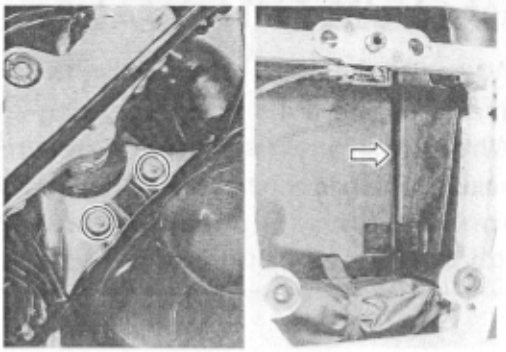
When the engine stop switch "RUN" position and turning the ignition switch ON, the fuel pump operates and applies pressure to fuel (After a few seconds, the fuel pump will stop unless depressing the starter button.). When turning the starter motor by depressing the starter button, a negative pressure is generated in the combustion chamber. This negative pressure draws the vaccum fuel valve diaphragm, (through a passage way in the vacuum hose.) The vacuum fuel valve is then forced to open and allow fuel to flow into the carburetor float chamber.



FUEL TANK

FUEL TANK LIFT-UP

- Remove the front and the rear seats. (Refer to page 6-3.)
- Take up the fuel tank prop.
- Remove the fuel tank mounting bolts.

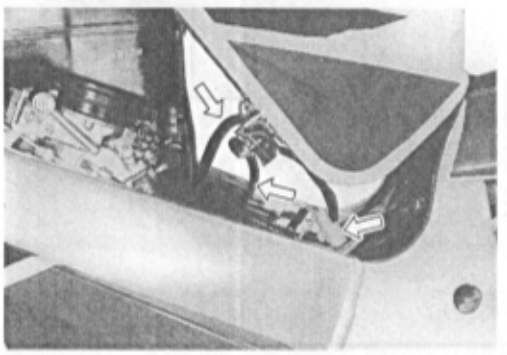


- Lift and support the fuel tank with its prop.

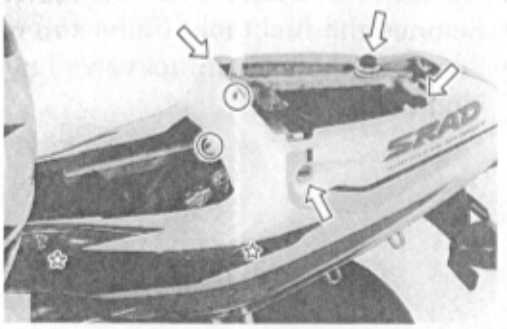


FUEL TANK REMOVAL

- Remove the front and the rear seats. (Refer to page 6-3.)
- Lift and support the fuel tank with its prop.
- Disconnect the fuel hose and vacuum hose from the vacuum fuel valve.
- Disconnect the fuel pump lead wire coupler.

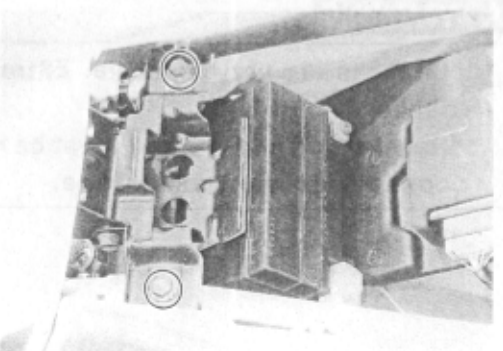


- Remove the frame cover bolts and extract the hooked parts, left and right.



☆: hooked part

- Remove the fuel tank bracket bolts.
- Remove the fuel tank.



⚠ WARNING

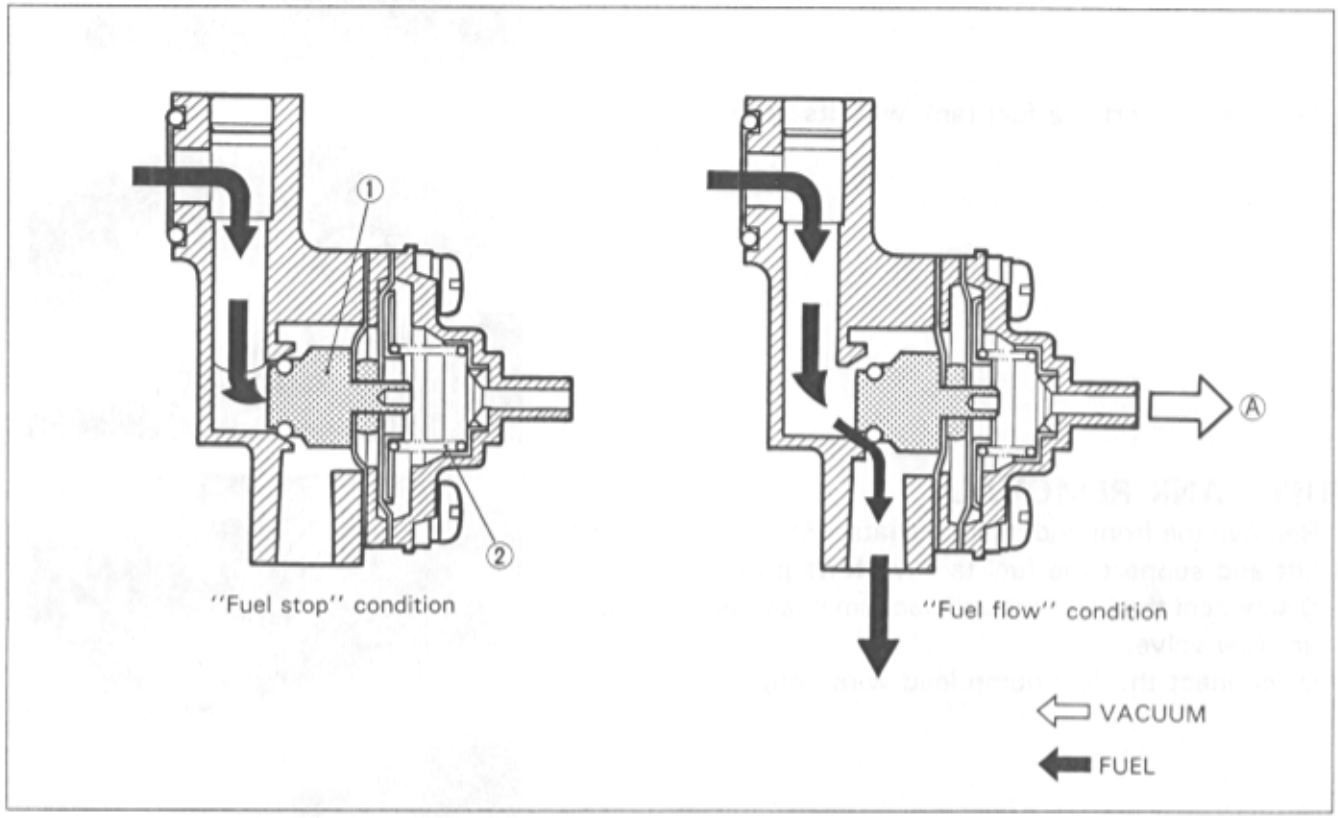
Gasoline is highly flammable and explosive. Keep heat, spark and flame away.

⚠ CAUTION

Avoid bending the fuel tank air breather hose when remounting the fuel tank to prevent the stoppage of fuel flow. (Refer to page 8-18 for the air breather hose routing.)

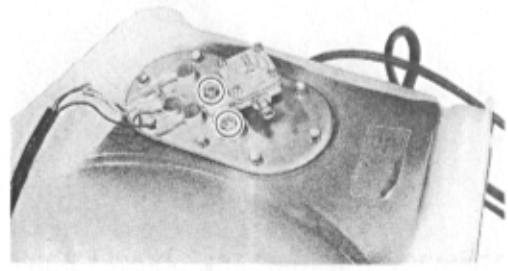
VACUUM FUEL VALVE

When the engine is not runing, the fuel valve ① is kept in the closed position by applying pressure and utilizing the tension of spring ② so that no fuel will flow to the carburetors.
When the engine is started, a vacuum Ⓐ is generated in the diaphragm chamber through the vaccum hose which is connected to the intake pipe, and builds up a vacuum Ⓐ which is higher than the tension of spring ② so that the diaphragm is forced to open the fuel valve ① and thus allow the fuel to flow to the carburetors.



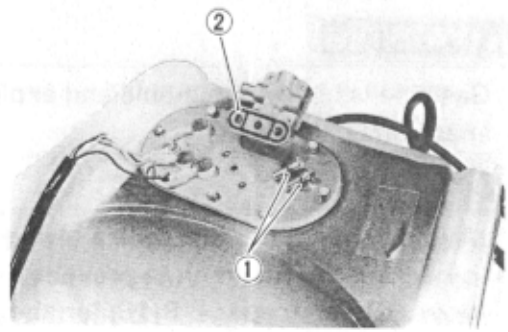
VACUUM FUEL VALVE REMOVAL

- Remove the fuel tank. (Refer to page 4-2.)
- Remove the vacuum fuel valve by removing its mounting bolts.



⚠ WARNING

* Gasoline is very explosive. Extreme care must be taken.
* Gaskets ① and O-ring ② must be replaced with new ones to prevent fuel leakege.

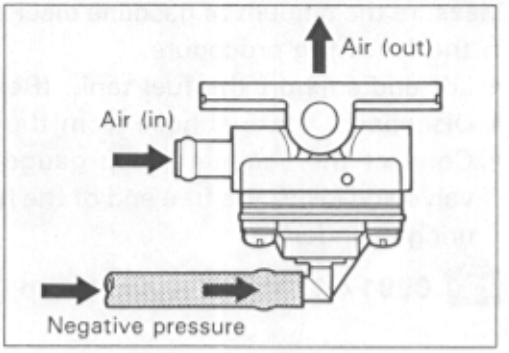


VACUUM FUEL VALVE INSPECTION

Connect the vacuum pump gauge to the vacuum port of the vacuum fuel valve. Apply negative pressure to the vacuum fuel valve and blow the fuel outlet port. If air does not flow out, replace the vacuum fuel valve with a new one.

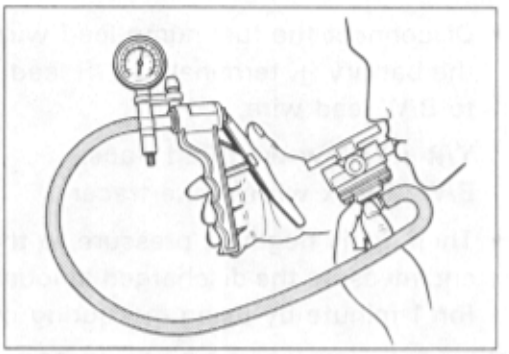
TOOL **09917-47910: Vacuum pump gauge**

Negative pressure: 13.3 kPa (0.133 kg/cm², 1.89 psi)



⚠ WARNING

Gasoline and gasoline vapar is toxic. A small amount of fuel is remaining in the vacuum fuel valve, when checking it.
Do not swallow the fuel when blowing the fuel outlet port.



⚠ CAUTION

Use a hand operated vacuum pump. Avoid applying high negative pressure to prevent the vacuum fuel valve damage.

FUEL PUMP AND FUEL FILTER

FUEL PUMP INSPECTION

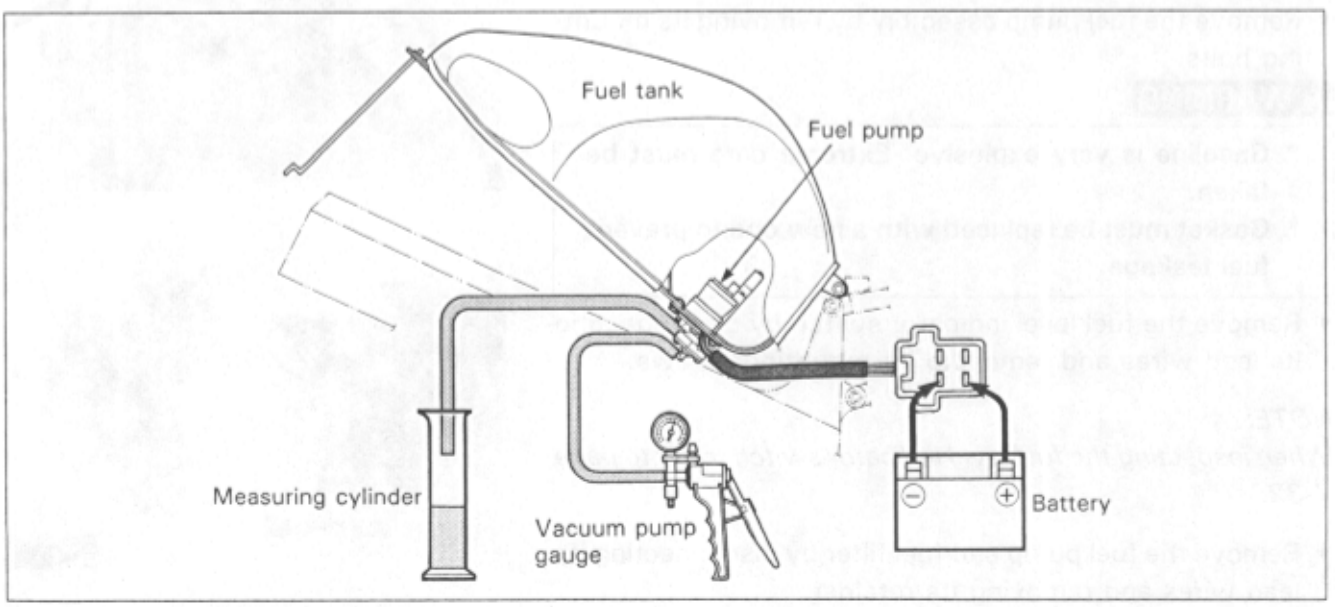
Place the measuring cylinder and connect the battery and vacuum pump gauge as shown in the following figure. Measure the amount of gasoline discharged from fuel pump. The measuring procedure is described in next page.

⚠ WARNING

Gasoline is highly flammable and explosive. Keep heat, sparks and flame away.

NOTE:

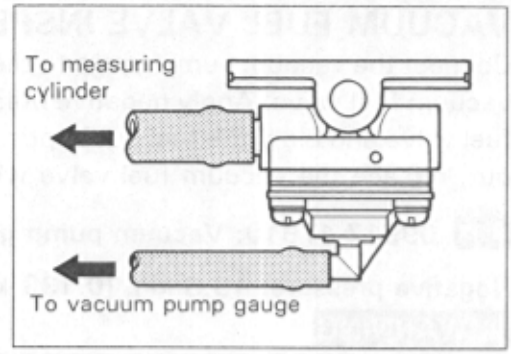
* *The battery must be fully charged condition.*
* *Fill the fuel tank with more than 5 liters of gasoline.*



Measure the amount of gasoline discharged from fuel pump in the following procedure.

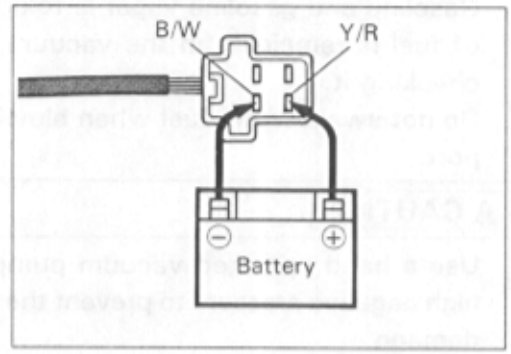
- Lift and support the fuel tank. (Refer to page 4-2.)
- Disconnect the fuel hose from the carburetor.
- Connect the vacuum pump gauge to the vacuum fuel valve and insert the free end of the fuel hose to the measuring cylinder.

09917-47910: Vacuum pump gauge



- Disconnect the fuel pump lead wire coupler and attach the battery ⊕ terminal to Y/R lead wire and ⊖ terminal to B/W lead wire.

  Y/R : Yellow with Red tracer
  B/W : Black with White tracer



- Then apply negative pressure to the vacuum fuel valve and measure the discharged amount from the fuel pump for 1 minute by using measuring cylinder.

Negative pressure: 13.3 kPa (0.133 kg/cm², 1.89 psi)
Discharged amount: Over 1.0 L/min
(1.06 (US) qt/min, 0.88 (Imp) qt/min)

⚠ CAUTION

Use a hand operated vacuum pump. Avoid applying high negative pressure to prevent the vacuum fuel valve damage.

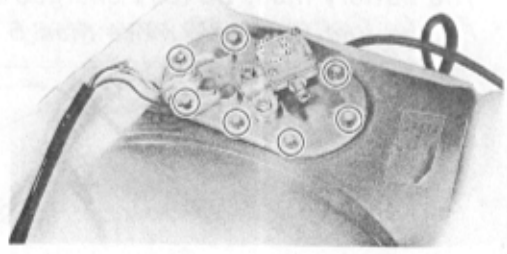
If the discharged amount is less than the specified value, check the vacuum fuel valve. (Refer to page 4-4.)
If the vacuum fuel valve is all right, replace the fuel pump assembly with a new one.

FUEL PUMP AND FUEL FILTER REMOVAL

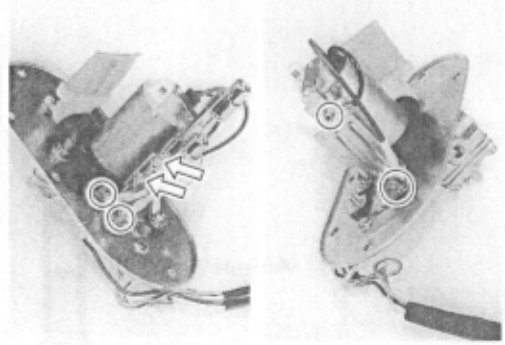
- Remove the fuel tank. (Refer to page 4-2.)
- Remove the fuel pump assembly by removing its mounting bolts.

⚠ WARNING

*** Gasoline is very explosive. Extreme care must be taken.**
*** Gasket must be replaced with a new one to prevent fuel leakage.**



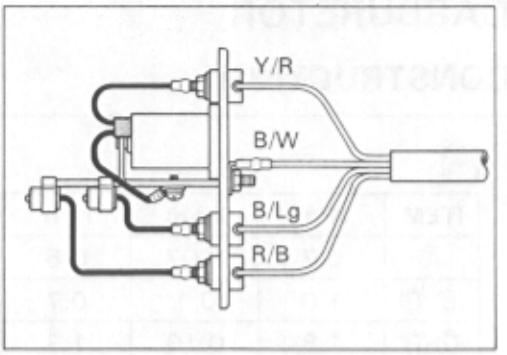
- Remove the fuel level indicator switch by disconnecting its lead wires and removing its mounting screws.



NOTE:
When inspecting the fuel level indicator switch, refer to page 7-32.

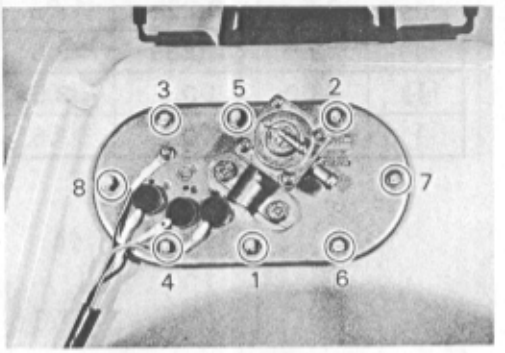
- Remove the fuel pump and fuel filter by disconnecting its lead wires and removing its retainer.

NOTE:
When assembling the fuel pump and fuel level indicator switch, connect the lead wires as shown in the right illustration.



NOTE:
When installing the fuel pump, lightly tighten all the fuel pump mounting bolts and then tighten them to the specified torque in the ascending order of numbers.

Fuel pump mounting bolt : 3 N·m (0.3 kg-m, 2.0 lb-ft)

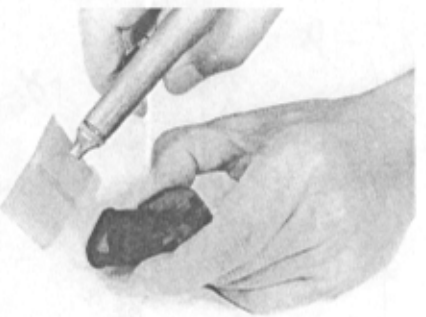


⚠ CAUTION

Use a new gasket to prevent fuel leakage.

FUEL FILTER INSPECTION AND CLEANING

If the filter is clogged with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Blow the fuel filter with compressed air.

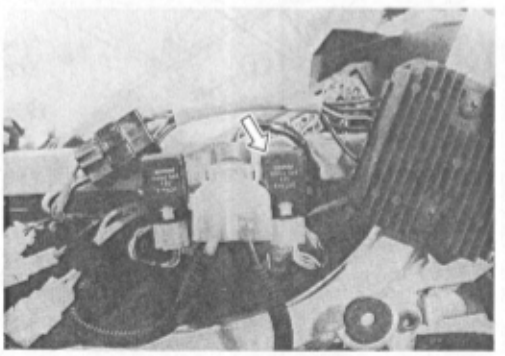


FUEL PUMP RELAY

INSPECTION

Fuel pump relay is located behind the left frame cover.

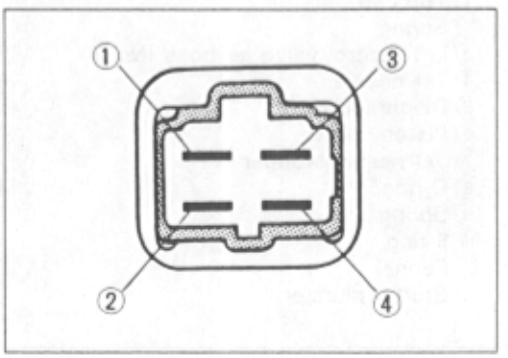
- Remove the seats and frame cover. (Refer to pages 6-3 and 4.)



First, check the insulation between ① and ② terminals with pocket tester. Then apply 12 volts to ③ and ④ terminals, ⊕ to ③ and ⊖ to ④, and check the continuity between ① and ②.
If there is no continuity, replace it with a new one.

TOOL 09900-25002: Pocket tester

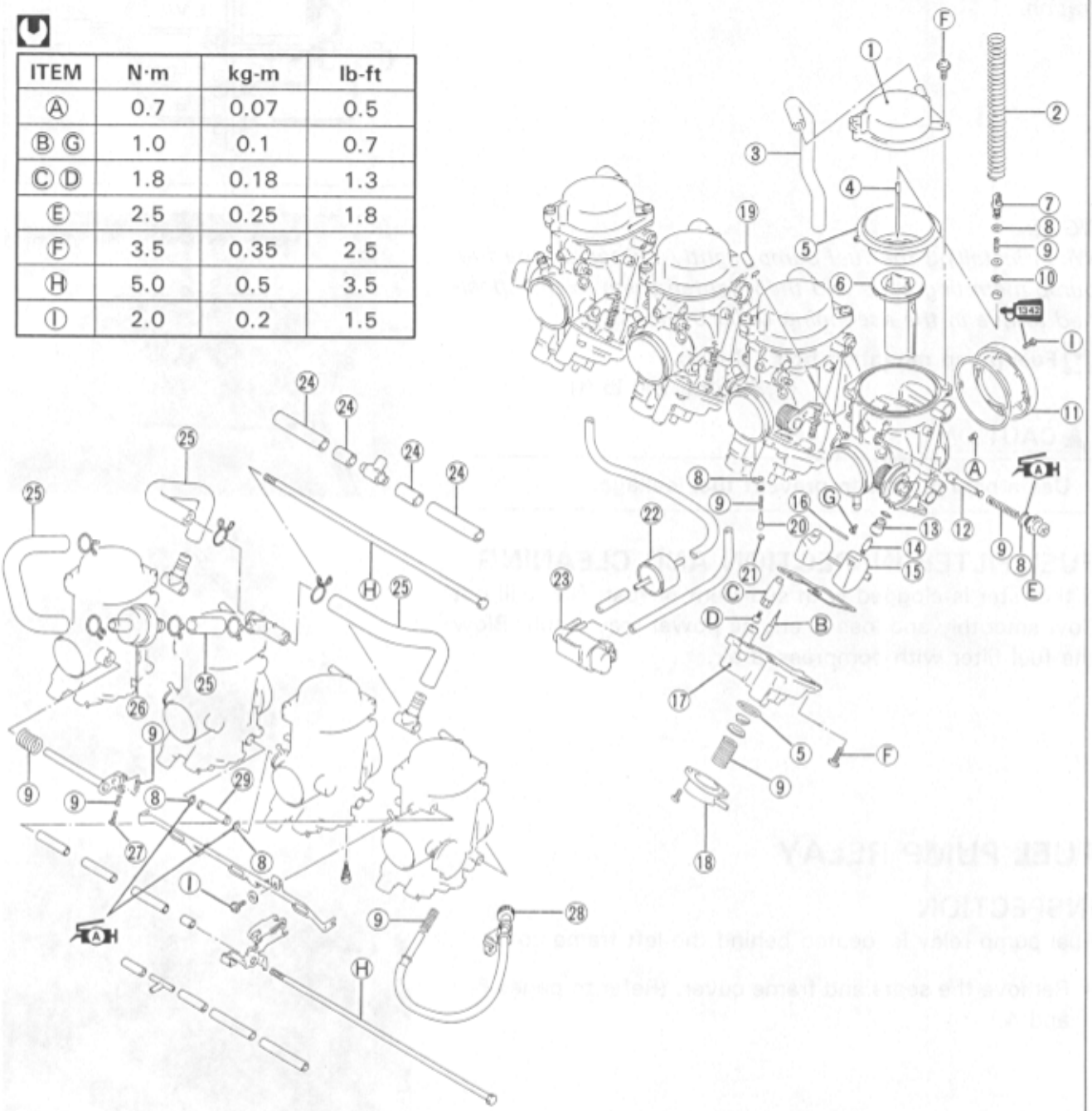
Tester knob indication: × 1Ω range



CARBURETOR

CONSTRUCTION

ITEM	N·m	kg-m	lb-ft
Ⓐ	0.7	0.07	0.5
Ⓑ Ⓖ	1.0	0.1	0.7
Ⓒ Ⓓ	1.8	0.18	1.3
Ⓔ	2.5	0.25	1.8
Ⓕ	3.5	0.35	2.5
Ⓗ	5.0	0.5	3.5
Ⓘ	2.0	0.2	1.5



① Top cap
② Spring
③ Lift control valve air hose (No.2)
④ Jet needle
⑤ Diaphragm
⑥ Piston valve
⑦ Jet needle stopper
⑧ O-ring
⑨ Spring
⑩ E-ring
⑪ Funnel
⑫ Starter plunger
⑬ Valve seat
⑭ Needle valve
⑮ Float
⑯ Float pin
⑰ Float chamber
⑱ Lift control valve body
⑲ Vacuum nipple cap
⑳ Pilot screw
㉑ Plug (For E-03, 18, 24 and 33 models)
㉒ V.T.V. (Vacuum Transmitting Valve)
㉓ Solenoid valve
㉔ Lift control valve air hose (No.1)
㉕ Air vent hose
㉖ Air vent cleaner
㉗ Throttle valve balance screw
㉘ Throttle stop screw
㉙ Fuel joint pipe
Ⓐ Pilot air jet
Ⓑ Pilot jet
Ⓒ Main jet holder
Ⓓ Main jet
Ⓗ Carburetor set shaft

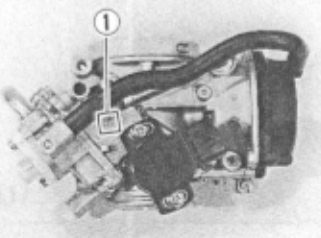
SPECIFICATIONS

ITEM	SPECIFICATION		
	E-02,04,21,25, 28,34,53	E-03,18,24	E-22
Carburetor type	BDSR39	←	←
Bore size	39 mm	←	←
I.D. No.	33E0	33E1	33E4
Idle r/min.	1 200 ± 100 r/min.	1 200 ± 100 r/min. ... E03,24 1 200 $^{+100}_{-50}$ r/min. ... E18	1 200 ± 100 r/min.
Float height	7.0 ± 1.0 mm (0.28 ± 0.04 in)	←	←
Main jet (M.J.)	Nos.1 and 4: #127.5 Nos.2 and 3: #125	Nos.1 and 4: #127.5 Nos.2 and 3: #125	Nos.1 and 4: #127.5 Nos.2 and 3: #125
Jet needle (J.N.)	6E38-54-3	6E41-55	6E38-54-3
Needle jet (N.J.)	P-0	P-0M	P-0
Throttle valve (Th.V.)	#100	#105	#100
Pilot jet (P.J.)	#12.5	#12.5	#12.5
Pilot screw (P.S.)	PRE-SET (2 turns back)	PRE-SET	PRE-SET (2⅛ turns back)
Throttle cable play	0.5—1.0 mm (0.02—0.04 in)	←	←

ITEM	SPECIFICATION		
	E-33	E-37	E-39
Carburetor type	BDSR39	←	←
Bore size	39 mm	←	←
I.D. No.	33E7	33E8	33E9
Idle r/min.	1 200 ± 100 r/min	←	←
Float height	7.0 ± 1.0 mm (0.28 ± 0.04 in)	←	←
Main jet (M.J.)	Nos.1 and 4: #127.5 Nos.2 and 3: #125	Nos.1 and 4: #127.5 Nos.2 and 3: #125	←
Jet needle (J.N.)	6E39-55	6E38-54-3	6E41-55
Needle jet (N.J.)	P-0M	P-0	P-0M
Throttle valve (Th.V.)	#105	#100	#105
Pilot jet (P.J.)	#12.5	#12.5	←
Pilot screw (P.S.)	PRE-SET	PRE-SET (2 turns back)	PRE-SET (Nos.1 and 4: 4 turns back Nos.2 and 3: 3⅜ turns back)
Throttle cable play	0.5—1.0 mm (0.02—0.04 in)	←	←

I.D. NO. LOCATION

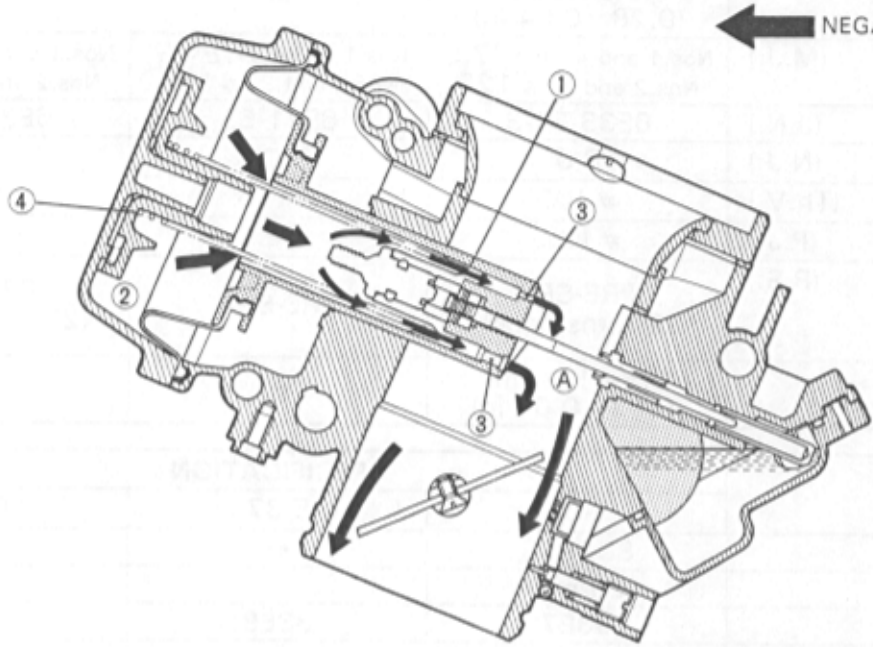
Each carburetor has I.D. Number ① printed on the carburetor body according to its specification.



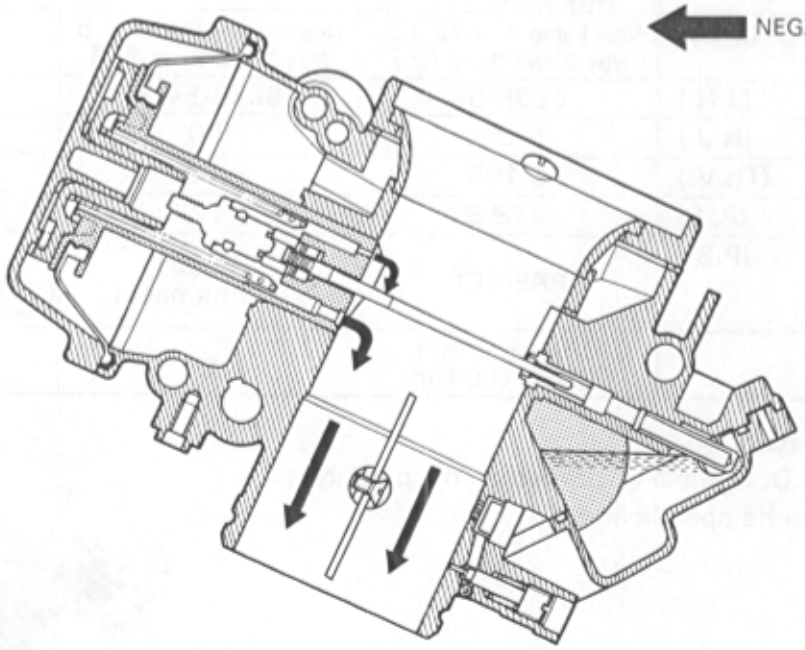
DIAPHRAGM AND PISTON OPERATION

The carburetor is a variable-venturi type. While the piston valve lift control system do not function, the venturi cross section area of carburetor is increased or decreased automatically by the piston valve ① which moves according to the negative pressure present on the downstream side of the venturi Ⓐ. Negative pressure is admitted into the diaphragm chamber ② through two orifices ③ provided in the piston valve ①.

Rising negative pressure overcomes the spring ④ force, causing the piston valve ① to rise to increase the said area and thus prevent the air velocity from increasing. Thus, air velocity in the venturi passage is kept relatively constant for improved fuel atomization and for securing optimum ratio of fuel/air mixture.



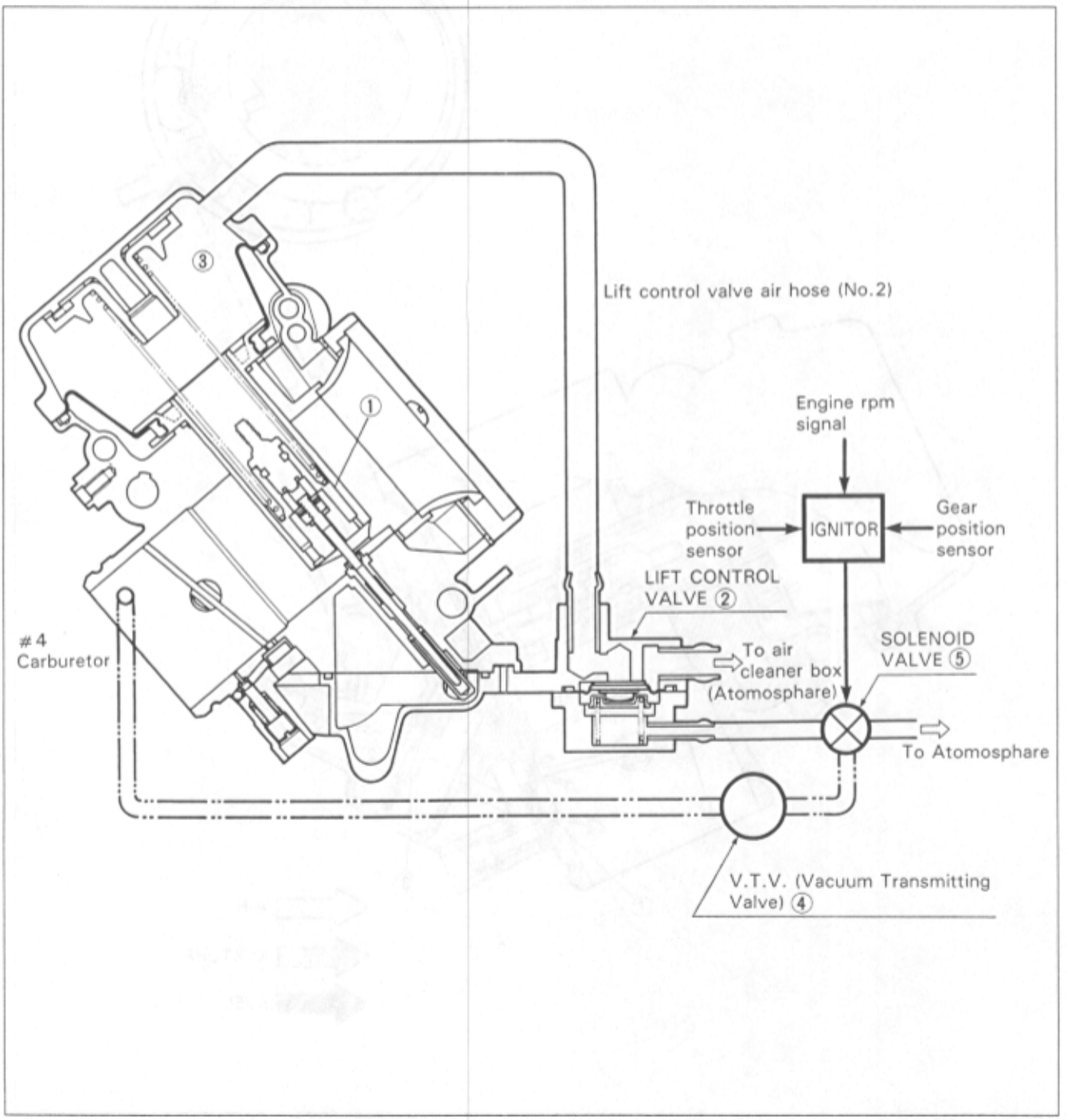
LOWER POSITION OF PISTON VALVE



UPPER POSITION OF PISTON VALVE

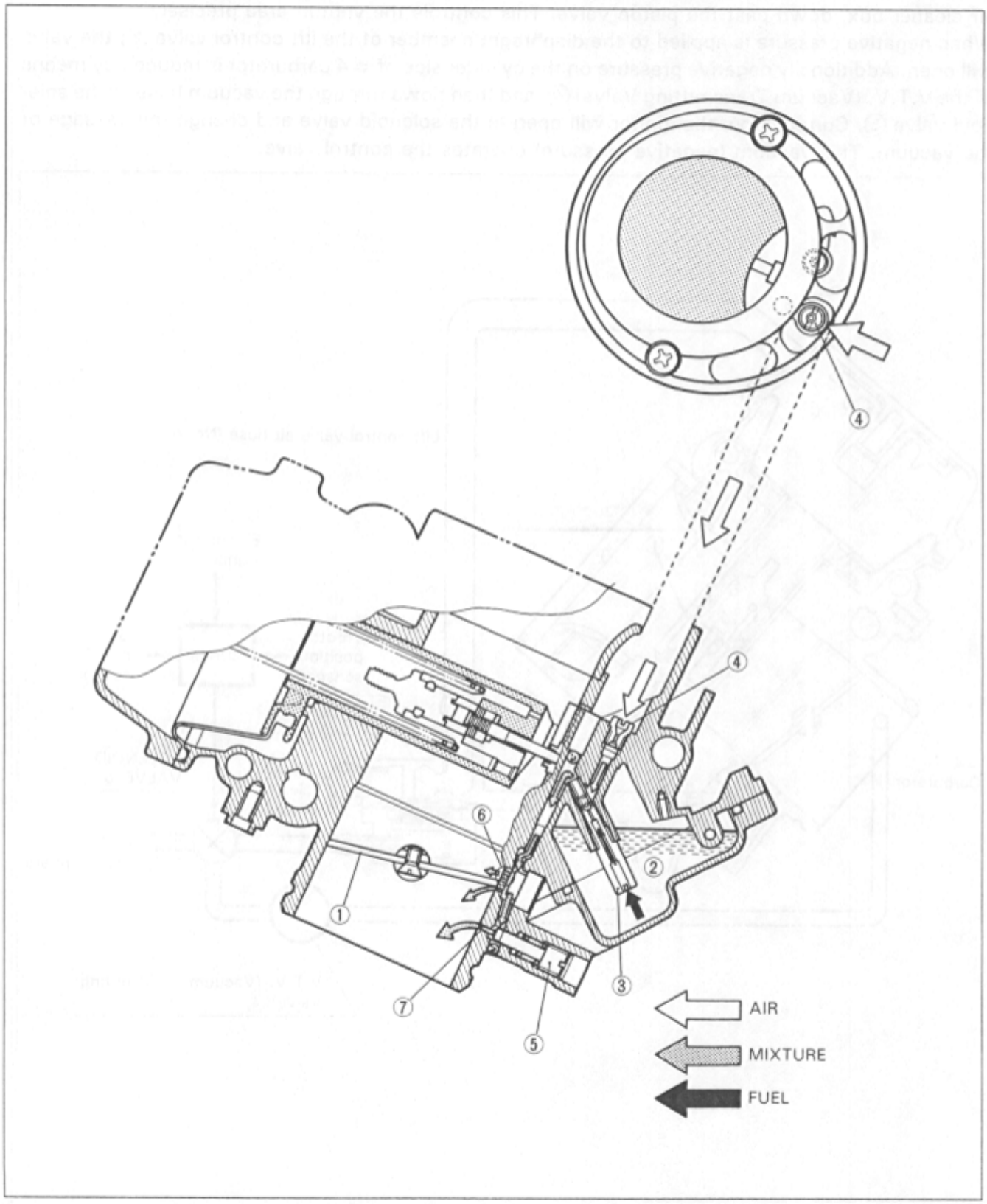
PISTON VALVE LIFT CONTROL SYSTEM

The piston valve control system prevents sudden rising movement of the piston valve ① and therefore varies the size of venturi area to keep fuel/air mixture constant at low engine speeds.
If carburetor tuning for high speed running is attempted when the engine is at a low operating speed, the piston valve ① will rise excessively and the lift control valve ② will open the air passage. Positive pressure will then flow into the diaphragm chamber ③ from the discharge (clear) side of the air cleaner box, down past the piston valve. This controls the venturi area precisely.
When negative pressure is applied to the diaphragm chamber of the lift control valve ②, the valve will open. Additionally negative pressure on the cylinder side of #4 carburetor is reduced by means of the V.T.V. (Vacuum Transmitting Valve) ④, and then flows through the vacuum hose to the solenoid valve ⑤. Current from the ignitor will operate the solenoid valve and change the passage of the vacuum. This vacuum (negative pressure) operates the control valve.



SLOW SYSTEM

This system supplies fuel during engine operation with throttle valve ① closed or slight opened. The fuel from float chamber ② is metered by pilot jet ③ where it mixes with air coming in through pilot air jet ④. This mixture, rich with fuel, then goes up through pilot passage to pilot screw ⑤. A part of the mixture is discharged into the main bore out of bypass ports ⑥. The remainder is then metered by pilot screw ⑤ and sprayed out into the main bore through pilot outlet ⑦.



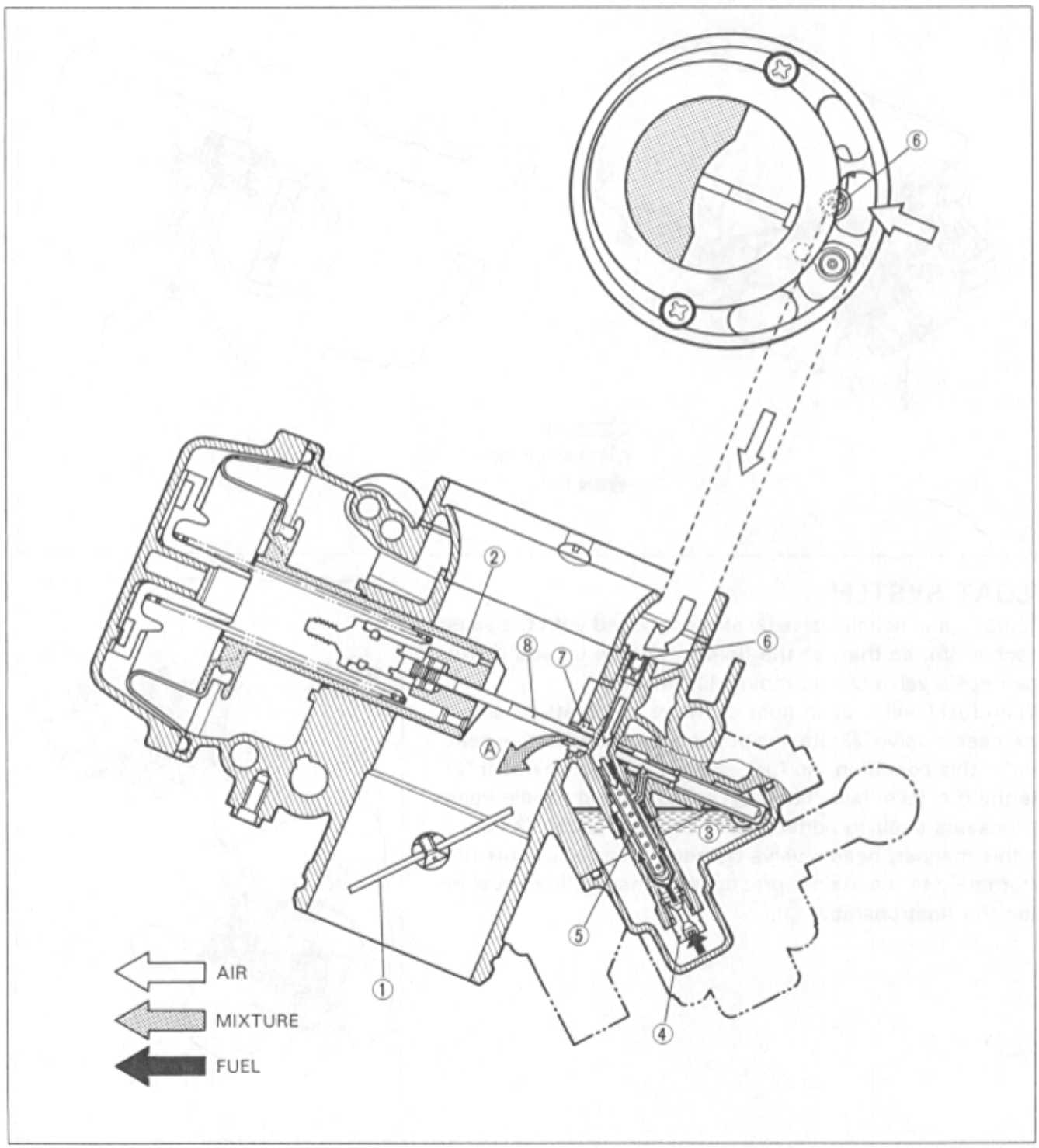
MAIN SYSTEM

As throttle valve ① is opened, engine speed rises, and this increase negative pressure in the venturi Ⓐ. Consequently the piston valve ② moves upward.

Meanwhile, the fuel in float chamber ③ is metered by main jet ④, and the metered fuel passes around main bleed pipe ⑤, in which it mixes with the air admitted through main air jet ⑥ to form an emulsion and the emulsified fuel enters needle jet ⑦.

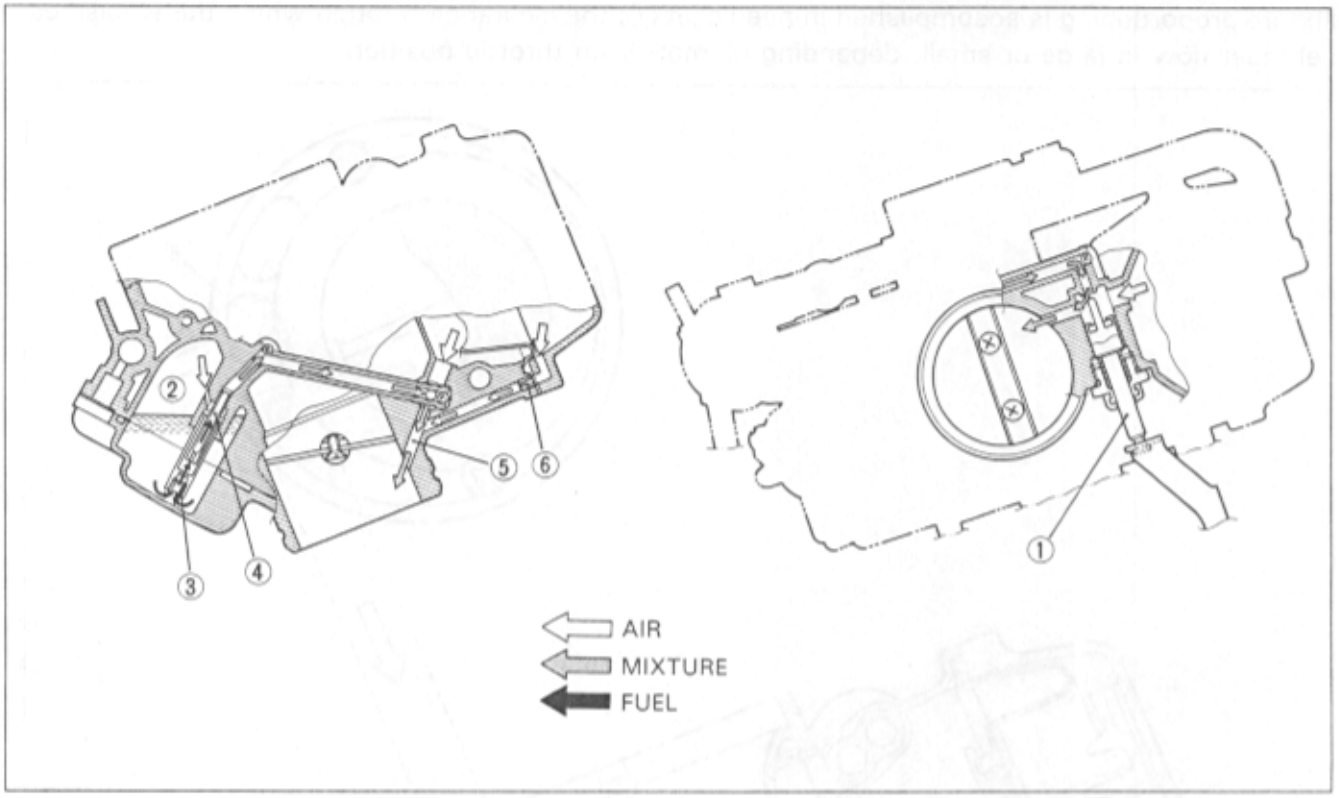
The emulsified fuel then passes through the clearance between needle jet ⑦ and jet needle ⑧, and is discharged into the venturi Ⓐ, in which it meets main air stream being drawn by the engine.

Mixture proportioning is accomplished in needle jet ⑦; the clearance through which the emulsified fuel must flow in large or small, depending ultimately on throttle position.



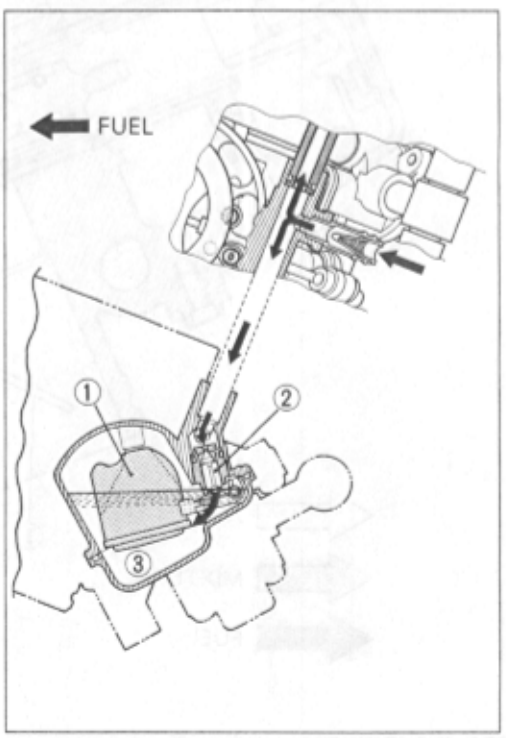
STARTER SYSTEM

Pulling up the starter plunger ①, fuel is drawn into the starter circuit from the float chamber ②. Starter jet ③ meters this fuel, which then flows into starter pipe ④ and mixes with the air coming from the float chamber ②. The mixture, rich in fuel content, reaches starter plunger ①, in which it mixes again with the air coming from behind diaphragm, and flows starter outlet ⑤, in which it mixes again with air coming through the starter air jet ⑥ from diaphragm chamber.
The three successive mixings of fuel with air are such that proper fuel/air mixture for starting is produced when the mixture is sprayed out through starter outlet ⑤ into the main bore.



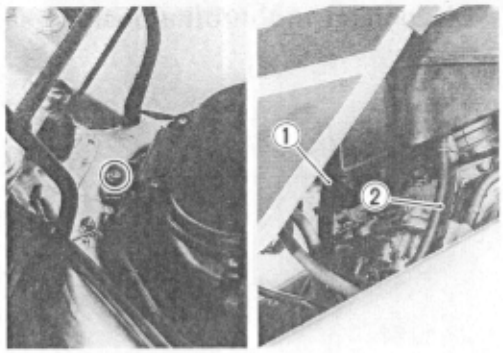
FLOAT SYSTEM

Floats ① and needle valve ② are associated with the same mechanism, so that, as the floats ① move up and down, the needle valve ② too moves likewise.
When fuel level is up in float chamber ③, floats ① are up and needle valve ② remains pushed up against valve seat. Under this condition, no fuel enters the float chamber ③.
As the fuel level falls, floats ① go down and needle valve ② unseats itself to admit fuel into the chamber ③.
In this manner, needle valve ② admits and shuts off fuel alternately to maintain a practically constant fuel level inside the float chamber ③.

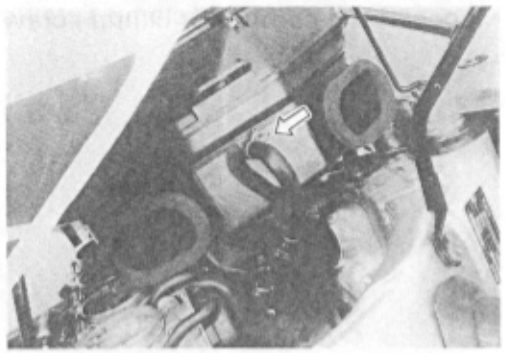


REMOVAL

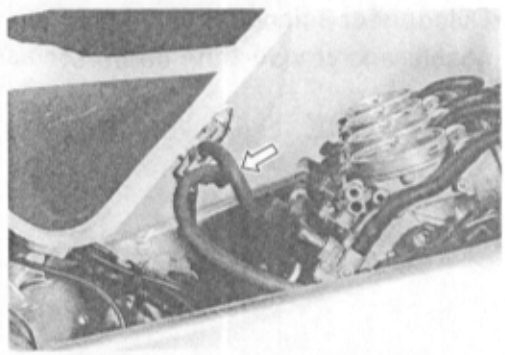
- Lift and support the fuel tank. (Refer to page 4-2.)
- Remove the lower fairing. (Refer to page 6-2.)
- Remove the air cleaner box mounting bolt.
- Loosen the carburetor clamp screws at the air cleaner box side.
- Disconnect the breather hose ① and lift control valve air hose No.1 ②.



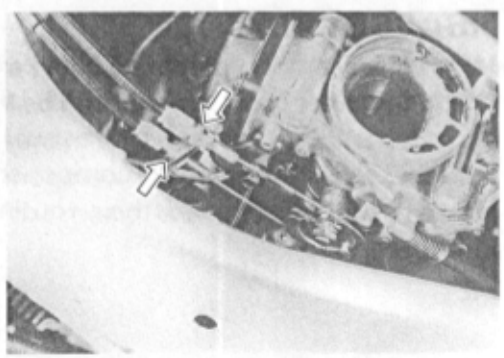
- Disconnect the carburetor air vent hose and remove the air cleaner box.



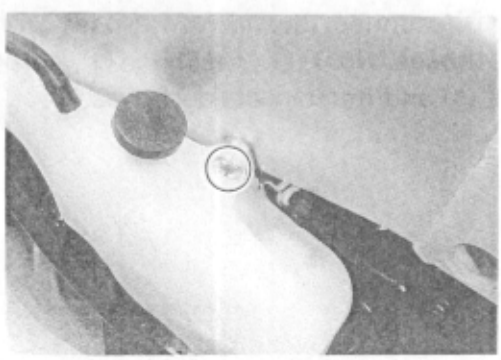
- Disconnect the fuel hose from the vacuum fuel valve.



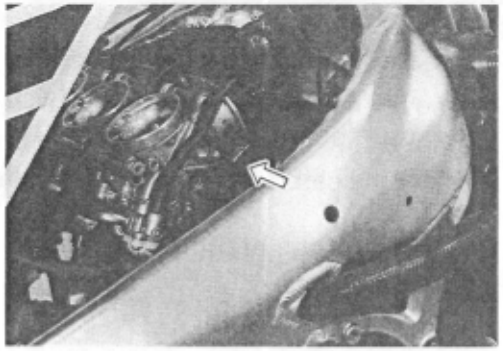
- Disconnect the throttle cables from the carburetor.



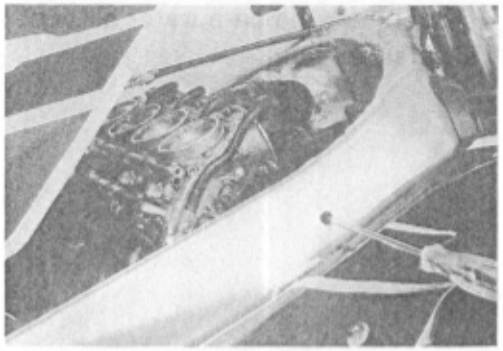
- Remove the throttle stop screw bracket mounting screw.



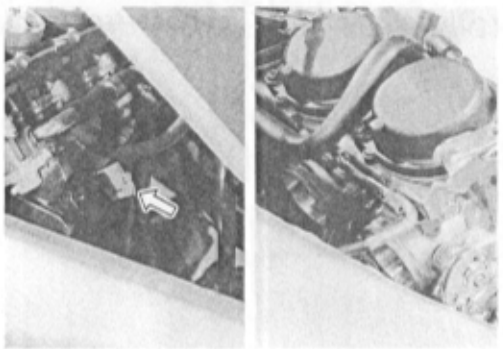
- Disconnect the throttle position sensor coupler.



- Loosen the carburetor clamp screws at the engine side.



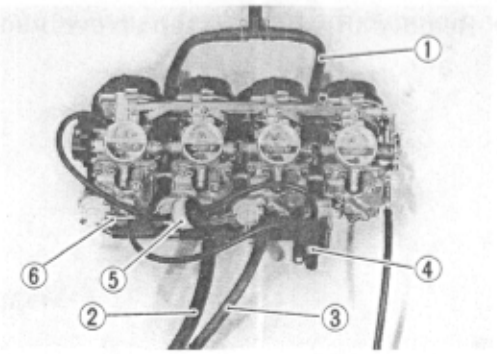
- Disconnect solenoid valve lead wire coupler and starter cable and remove the carburetor assembly.



DISASSEMBLY

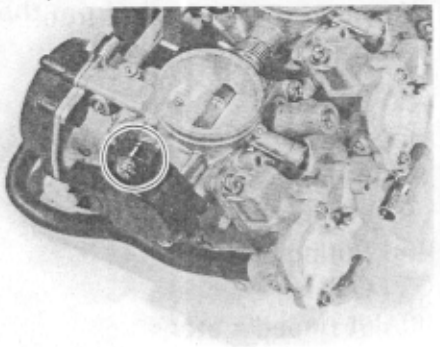
Before disassembly, prepare a clean and well lit work place where carburetor components can be laid out nearly and will not get lost. Study the service manual carburetor diagram and familiarize yourself with component locations and the different fuel circuits and their routing through the carburetor.

- Disconnect the air vent hoses ①, lift control valve air hoses (No.1) ②, fuel hose ③, solenoid valve ④, V.T.V. ⑤ and its connecting hoses ⑥.

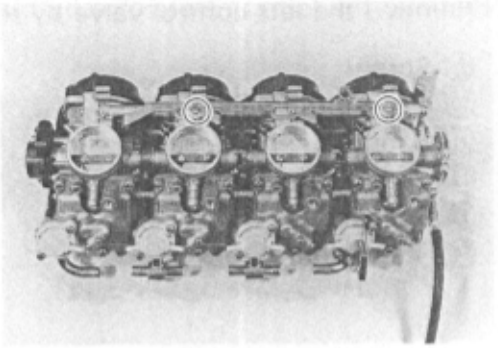


⚠ CAUTION

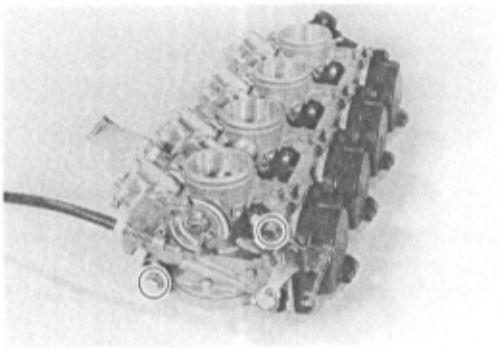
Prior to disassembly, mark with a paint or notch the initial position of the throttle sensor which is PRE-SET accurately at the factory.
Avoid removing the throttle position sensor from the carburetor body unless you really need to do so.



- Remove the starter shaft lever.



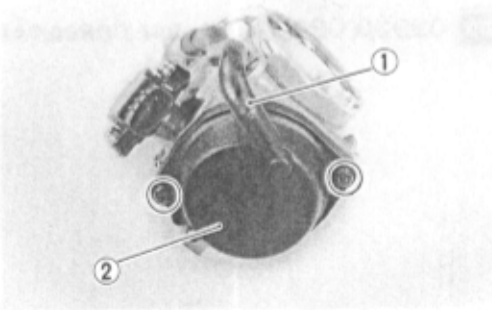
- Remove the upper and lower carburetor set shafts.
- Separate the carburetor assembly.



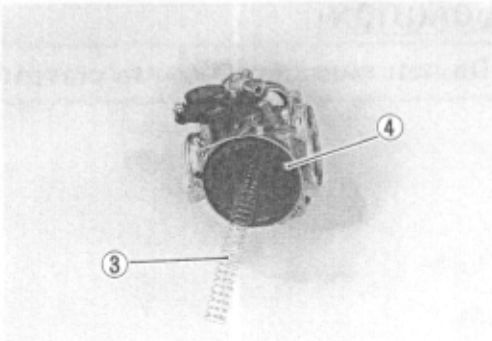
- Disconnect the lift control valve air hose (No.2) ①.
- Remove the carburetor top cap ②.

⚠ CAUTION

Do not blow the carburetor body with compressed air, before removing the diaphragm. It may cause a damage to the diaphragm.

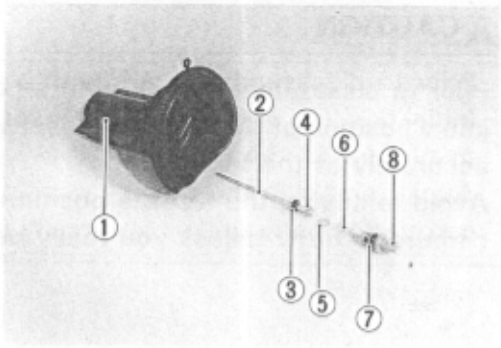


- Remove the piston valve return spring ③ and piston valve with diaphragm ④.



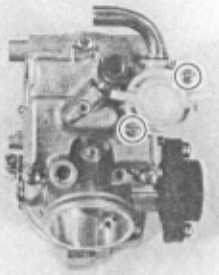
- Remove the jet needle from the piston valve.

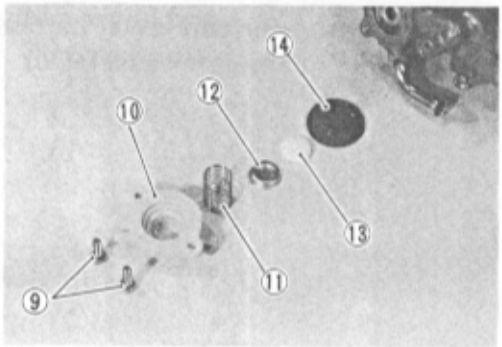
① Piston valve
② Jet needle
③ Spacer
④ E-ring
⑤ Washer
⑥ Spring
⑦ O-ring
⑧ Jet needle stopper



- Remove the left control valve by removing the screws.

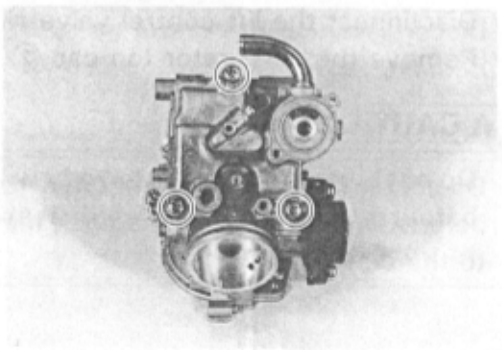
⑨ Screw
⑩ Lift control valve body
⑪ Spring
⑫ Spring retainer
⑬ Spacer
⑭ Diaphragm





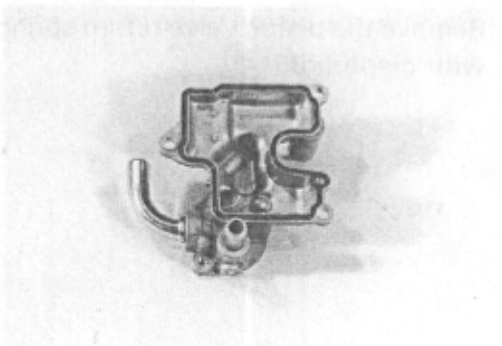
- Remove the float chamber body.

TOOL 09900-09004: Impact driver set

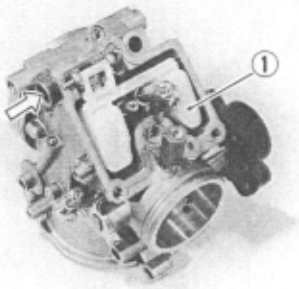


⚠ CAUTION

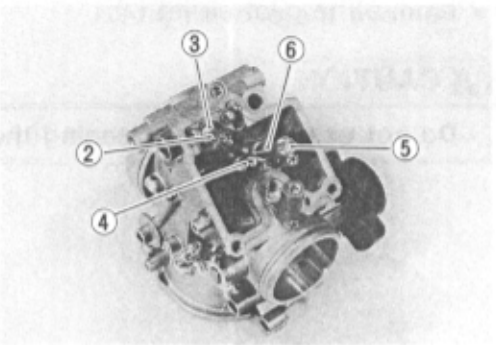
Do not reuse the O-ring to prevent fuel leakage.



- Remove the float ① by removing the float pin.



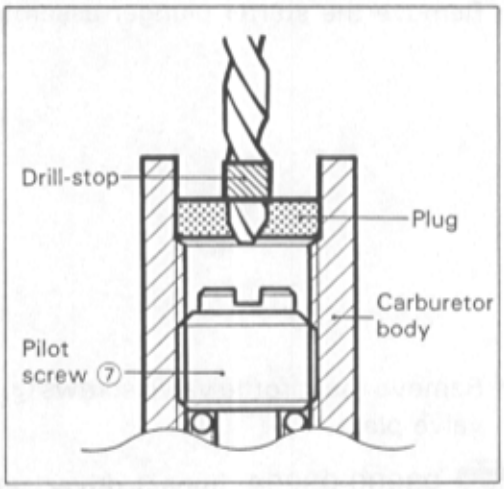
- Remove the following parts.
  ② Needle valve
  ③ Valve seat
  ④ Pilot jet
  ⑤ Main jet
  ⑥ Main jet holder



⚠ CAUTION

Do not use a wire for cleaning the passage, jets and valve seat.

- Use a 1/8'' size drill bit with a drill-stop to remove the pilot screw plug. Set the drill-stop 6 mm from the end of the bit to prevent drilling into the pilot screw. Carefully drill through the plug.
  Thread a self-tapping sheet metal screw into the plug. Pull on the screw head with pliers to remove the plug. Carefully clean any metal shavings from the area. (For E-03, 18, 24 and 33 models)

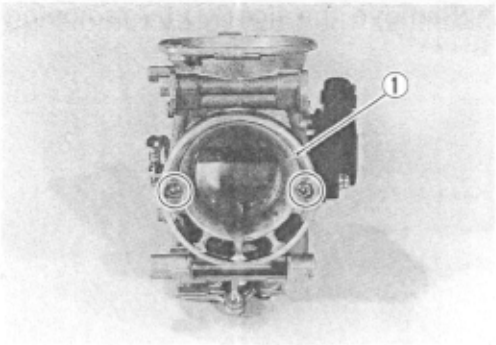


⚠ CAUTION

Replace the plug with a new one.

- Slowly turn the pilot screw ⑦ in clockwise and count the number of turns until the screw is lightly seated. Make a note of how many turns were made so the screw can be reset correctly after cleaning.
- Remove the pilot screw ⑦ with the spring, washer and O-ring.

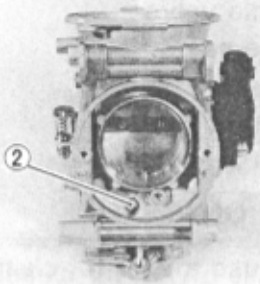
- Remove the funnel ①.



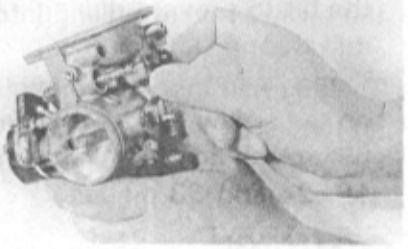
- Remove the pilot air jet ②.

⚠ CAUTION

Do not use a wire for cleaning the passage and jets.



- Remove the starter plunger assembly.

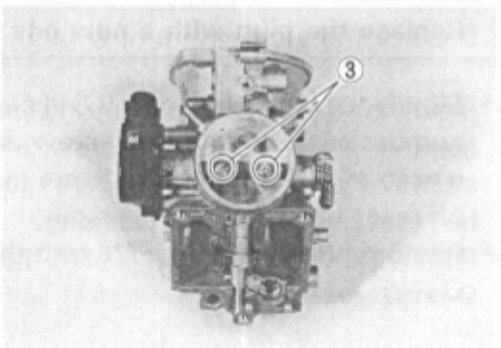


- Remove the throttle valve screws ③ and pull out throttle valve plate.

TOOL 09900-09004: Impact driver set

⚠ CAUTION

These two screws are locked by punching these ends. Once removing the screws, they will be damaged.

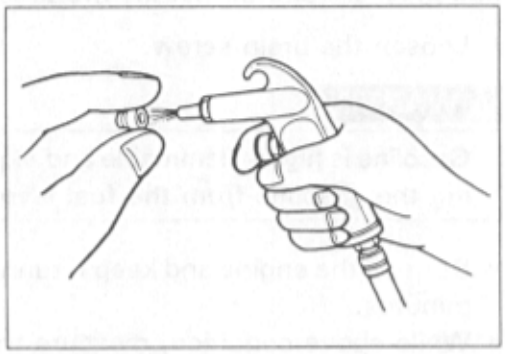


CARBURETOR CLEANING

⚠ WARNING

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

- Clean all jets with a spray-type carburetor cleaner and blow dry with compressed air.
- Clean all circuits of the carburetor thoroughly - not just the perceived problem area. Clean the circuits in the carburetor body with a spray-type cleaner and allow each circuit to soak if necessary to loosen dirt and varnish. Blow the body dry with compressed air.



⚠ CAUTION

Do not use wire to clean jets or passageways. Wire can damage jets and 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 carburetor components.

- Reassemble the carburetor with new seals and gaskets.

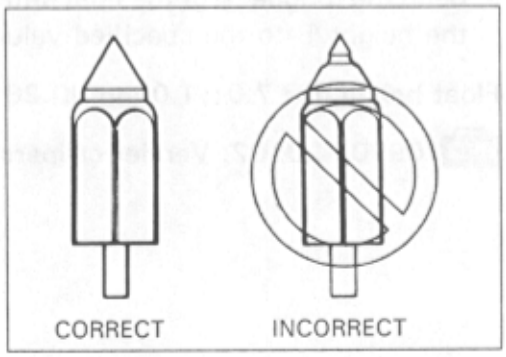
INSPECTION

Check following items for any damage or clogging.

* Pilot jet
* Main jet
* Main air jet
* Pilot air jet
* Needle valve
* Valve seat
* Starter jet
* O-rings
* Piston valve diaphragm
* Lift controll valve diaphragm
* Jet needle
* Needle jet
* Main bleed pipe hole
* Float
* Throttle shaft oil seal
* Pilot outlet and by-pass hole

NEEDLE VALVE INSPECTION

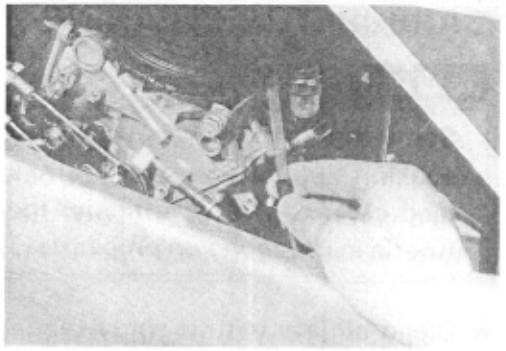
If foreign matter is caught between the valve seat and the needle, the gasoline will continue flowing and cause it to overflow. If the seat and needle are worn beyond the permissible limits, similar trouble will occur. Conversely, if the needle sticks, the gasoline will not flow into the float chamber. Clean the float chamber and float parts with gasoline. If the needle is worn as shown in the illustration, replace it together with a valve seat. Clean the fuel passage of the mixing chamber with compressed air.



FUEL LEVEL INSPECTION

- Lift and support the fuel tank. (Refer to page 4-2.)
- Connect the fuel level gauge to the one of four carburetor drain nipples.

TOOL **09913-10760: Fuel level gauge**



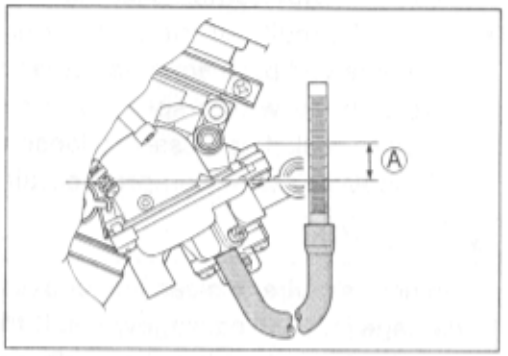
- Keep the motorcycle upright position.

NOTE:
When measuring the fuel level, inflate the tires to the specified pressure and do not lift the tires off the ground.

- Loosen the drain screw.

⚠ WARNING

Gasoline is highly flammable and explosive. Avoid spilling the gasoline from the fuel level gauge.



- Start up the engine and keep it running at idling for a few minutes.
- While above condition, measure the fuel level Ⓐ at the #1 or #4 carburetor body as shown in the right illustration.

NOTE:
Measure the fuel level after bleeding the air trapped in the fuel level gauge completely.

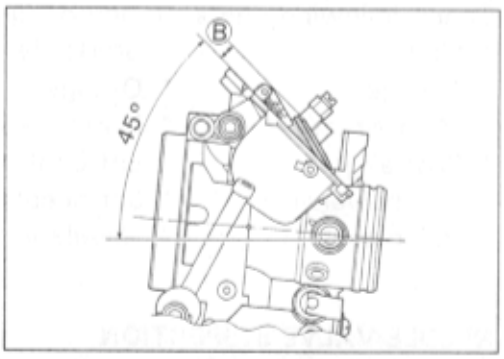
Fuel level Ⓐ: 15.7 ± 0.5 mm (0.62 ± 0.02 in)

NOTE:
This specified value is determined by the special tool (09913-10760).

- Adjust the fuel level Ⓐ as necessary to bring the fuel height Ⓑ to the specified below.
- Measure the fuel level of each carburetor in the same manner as the above inspection.

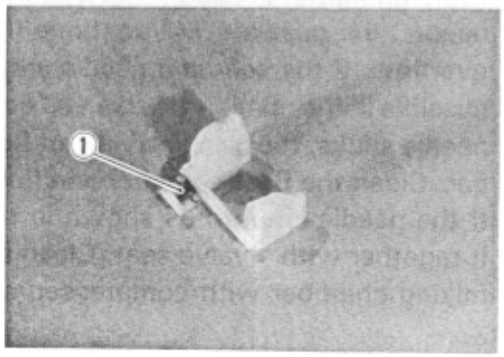
FLOAT HEIGHT ADJUSTMENT

- Measure the float height Ⓑ by using a calipers with the carburetor slanting at an angle of 45° (as shown in the right illustration) and the float arm just contacting the needle valve.
- Bend the tongue ① of the float arm as necessary to bring the height Ⓑ to the specified value.



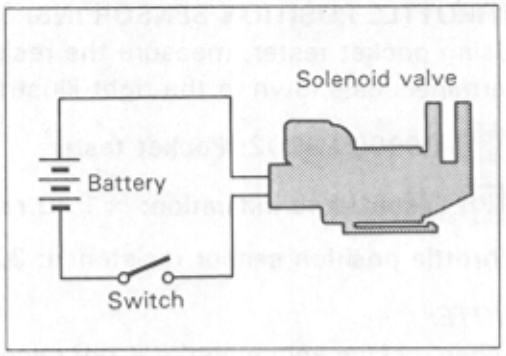
Float height Ⓑ: 7.0 ± 1.0 mm (0.28 ± 0.04 in)

TOOL **09900-20102: Vernier calipers**



SOLENOID VALVE INSPECTION

- Connect lead wires from the battery to the terminals in the solenoid valve coupler.
- Check the solenoid valve operation by turning the switch to ON and OFF.
- If clicks is found, it is in sound condition.



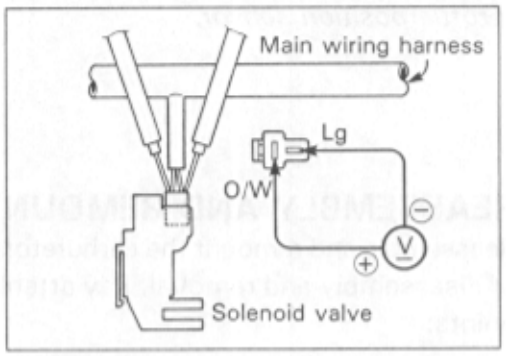
SOLENOID VALVE VOLTAGE INSPECTION

Inspect the solenoid valve voltage after installing all the removed parts properly.

- Connect the pocket tester as shown in the right illustration.

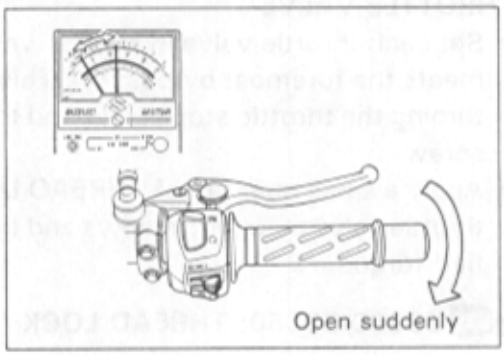
O/W (⊕ probe) — Lg (⊖ probe)

O/W: Orange with white tracer
Lg : Light green



09900-25002: Pocket tester

- Turn the ignition switch to the ON position and start the engine by depressing the starter button.
- Check that the pocket tester indicator point will deflect when opening throttle suddenly at the idling speed.



Tester knob indication: DC25V range

If the pocket tester indicater point will deflect, the solenoid valve voltage is all right.

V.T.V. INSPECTION

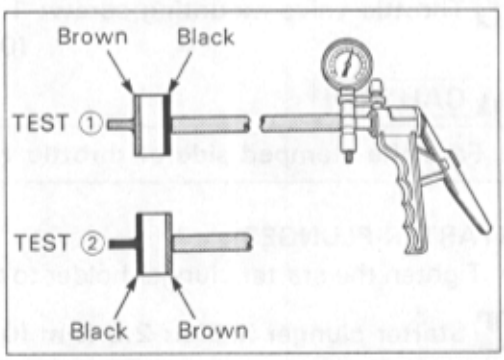
Check the V.T.V. in the following two tests.

TEST①:

Connect the vacuum pump gauge to the Black side of V.T.V.. If the vacuum pump gauge point will deflect when squeezing the vacuum pump lever, it is in sound condition.

TEST②:

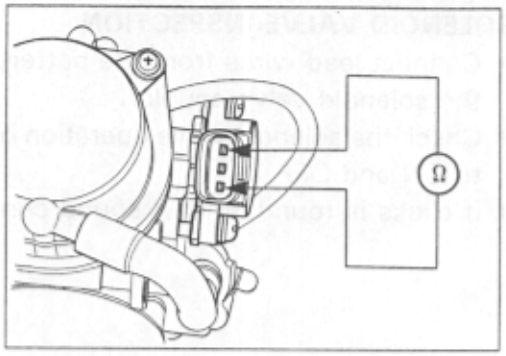
Connect the vacuum pump gauge to the Brown side of V.T.V.. If the vacuum is not applied to V.T.V. by squeezing the vacuum pump lever, it is in sound condition.



09917-47910: Vacuum pump gauge

THROTTLE POSITION SENSOR INSPECTION

Using pocket tester, measure the resistance between the terminals as shown in the right illustration.



09900-25002: Pocket tester

Tester knob indication: × 1 kΩ range

Throttle position sensor resistance: 3.5 – 6.5 kΩ

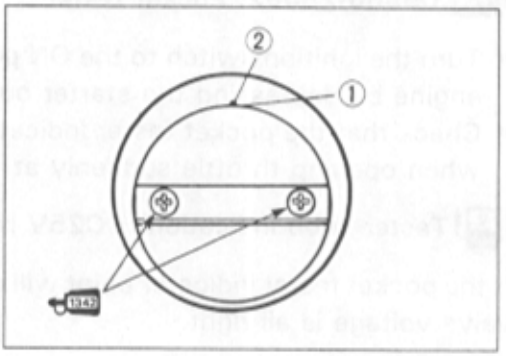
NOTE:
When making above test, it is not necessary to remove the throttle position sensor.

REASSEMBLY AND REMOUNTING

Reassemble and remount the carburetors in the reverse order of disassembly and removal. Pay attention to the following points:

THROTTLE VALVE

- Set each throttle valve in such a way that its top end ① meets the foremost by-pass ②. This is accomplished by turning the throttle stop screw and throttle valve balance screw.
- Apply a small quantity of THREAD LOCK "1342" to the throttle valve mounting screws and tighten it to the specified torque.



99000-32050: THREAD LOCK "1342"

Throttle valve mounting screw: 1.0 N·m (0.1 kg-m, 0.7 lb-ft)

⚠ CAUTION

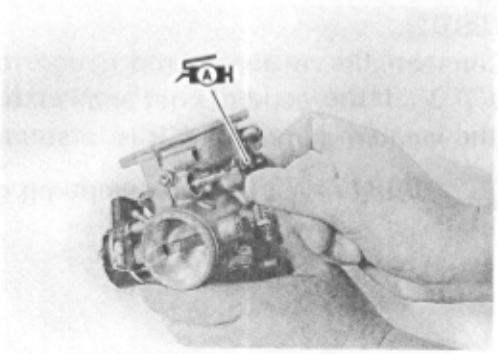
Face the stamped side of throttle valve to outside.

STARTER PLUNGER

- Tighten the starter plunger holder to the specified torque.

Starter plunger holder: 2.5 N·m (0.25 kg-m, 1.8 lb-ft)

NOTE:
Apply a small quantity of grease to the starter plunger O-ring.



99000-25030: SUZUKI SUPER GREASE "A"

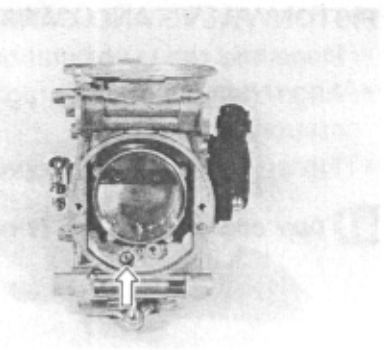
⚠ CAUTION

Replace the O-rings with new ones.

PILOT AIR JET

- Tighten the pilot air jet to the specified torque.

Pilot air jet: 0.7 N·m (0.07 kg-m, 0.5 lb-ft)

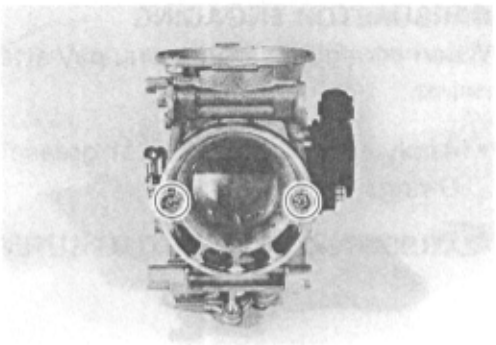


FUNNEL

- Apply a small quantity of THREAD LOCK "1342" to the funnel stopper screws and tighten them to the specified torque.

99000-32050: THREAD LOCK "1342"

Funnel stopper screw: 2.0 N·m (0.2 kg-m, 1.5 lb-ft)

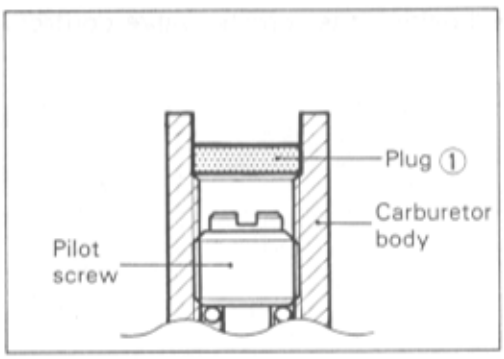


PILOT SCREW

- After cleaning, reinstall the pilot screw to the original setting by turning the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.
- Install new plug ① by tapping it into place with a punch. (For E-03, 18, 24 and 33 models.)

⚠ CAUTION

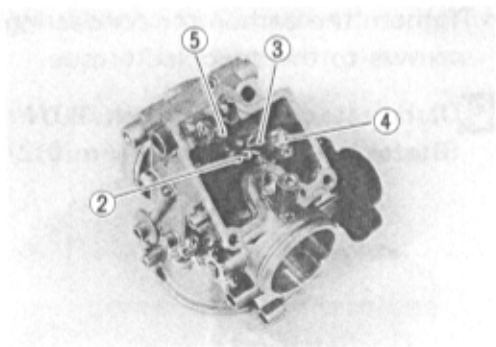
Replace the O-ring with a new one.



PILOT JET, MAIN JET AND VALVE SEAT

- Tighten the following parts to the specified torque.

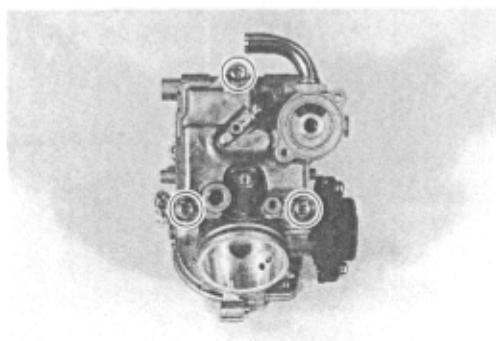
Pilot jet ②	: 1.0 N·m (0.1 kg-m, 0.7 lb-ft)
Main jet holder ③	: 1.8 N·m (0.18 kg-m, 1.3 lb-ft)
Main jet ④	: 1.8 N·m (0.18 kg-m, 1.3 lb-ft)
Valve seat retainer ⑤	: 1.0 N·m (0.1 kg-m, 0.7 lb-ft)



FLOAT CHAMBER

- Tighten the float chamber body mounting screws to the specified torque.

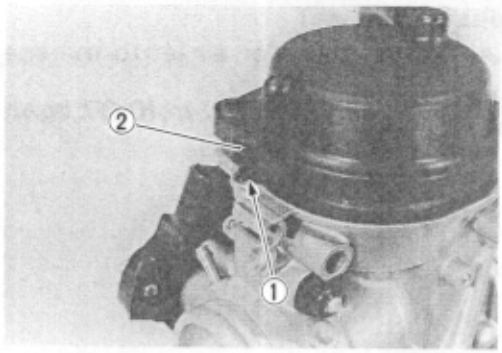
Float chamber body mounting screw: 3.5 N·m (0.35 kg-m, 2.5 lb-ft)



PISTON VALVE AND CARBURETOR TOP CAP

- Place the tab ① of diaphragm to carburetor properly.
- Align the hole of diaphragm with the protrusion ② of the carburetor top cap.
- Tighten the top cap screws to the specified torque.

Top cap screw: 3.5 N·m (0.35 kg-m, 2.5 lb-ft)

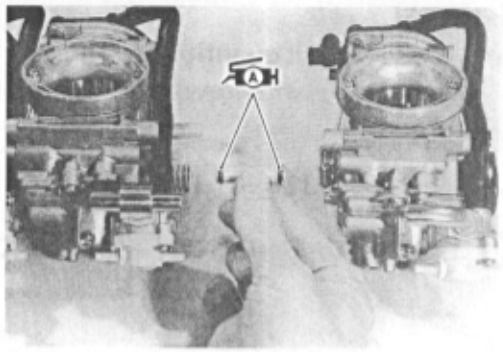


CARBURETOR ENGAGING

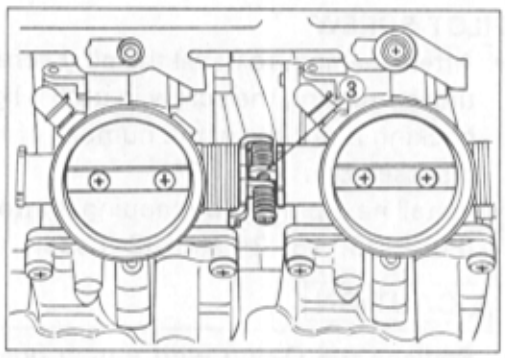
When engaging carburetors, pay attention to the following points:

- Apply a small quantity of grease to the fuel joint pipe O-rings.

99000-25030: SUZUKI SUPER GREASE "A"

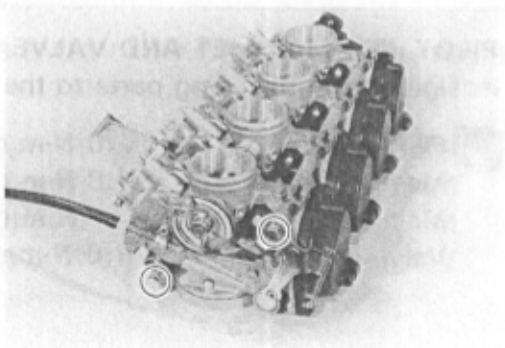


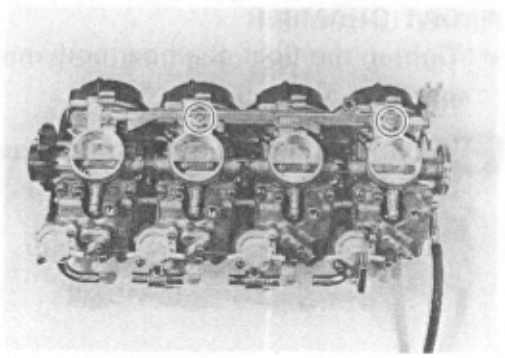
- Position the throttle valve control lever ③ correctly.



- Tighten the carburetor connecting bolts and starter link screws to the specified torque.

Carburetor connecting bolt: 5.0 N·m (0.5 kg-m, 3.5 lb-ft)
Starter link screw: 2.0 N·m (0.2 kg-m, 1.5 lb-ft)

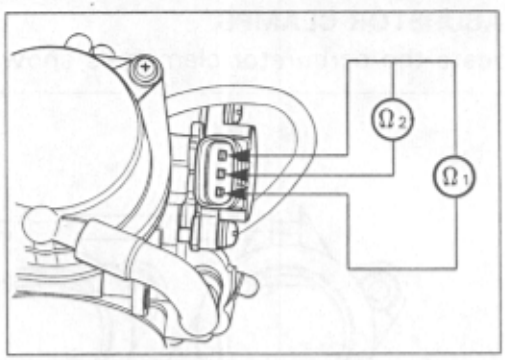




THROTTLE POSITION SENSOR POSITIONING

When removing the throttle position sensor from the carburetor body, install it to the exact position mentioned below;

- Measure the resistance (Ω1) between terminals of the throttle position sensor as shown in the right illustration.

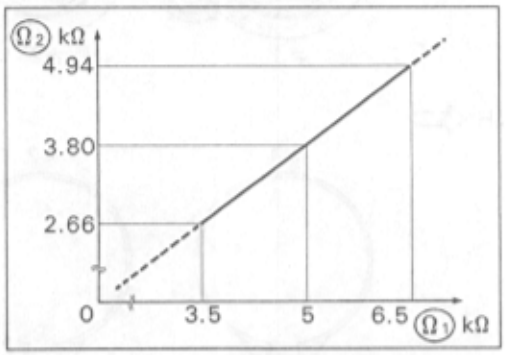


09900-25002: Pocket tester

Tester knob indication: × 1kΩ range

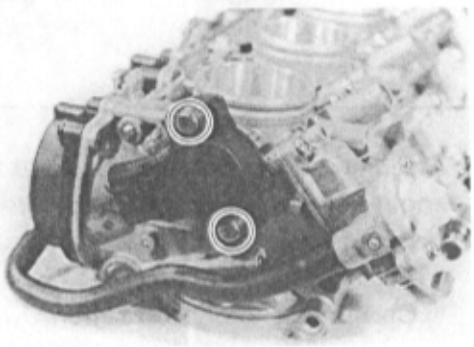
Throttle position sensor resistance (Ω1): 3.5—6.5 kΩ

- Measure the resistance (Ω2) between terminals of the throtttle position sensor as shown in the right illustration.
- Open the throttle valve fully by turning the throttle lever.
- Under above condition, see the throttle position sensor angle to have the resistance (Ω2) as 76% of the resistance (Ω1) .



For example: When (Ω1) is 5 kΩ, (Ω2) should be 3.8 kΩ.

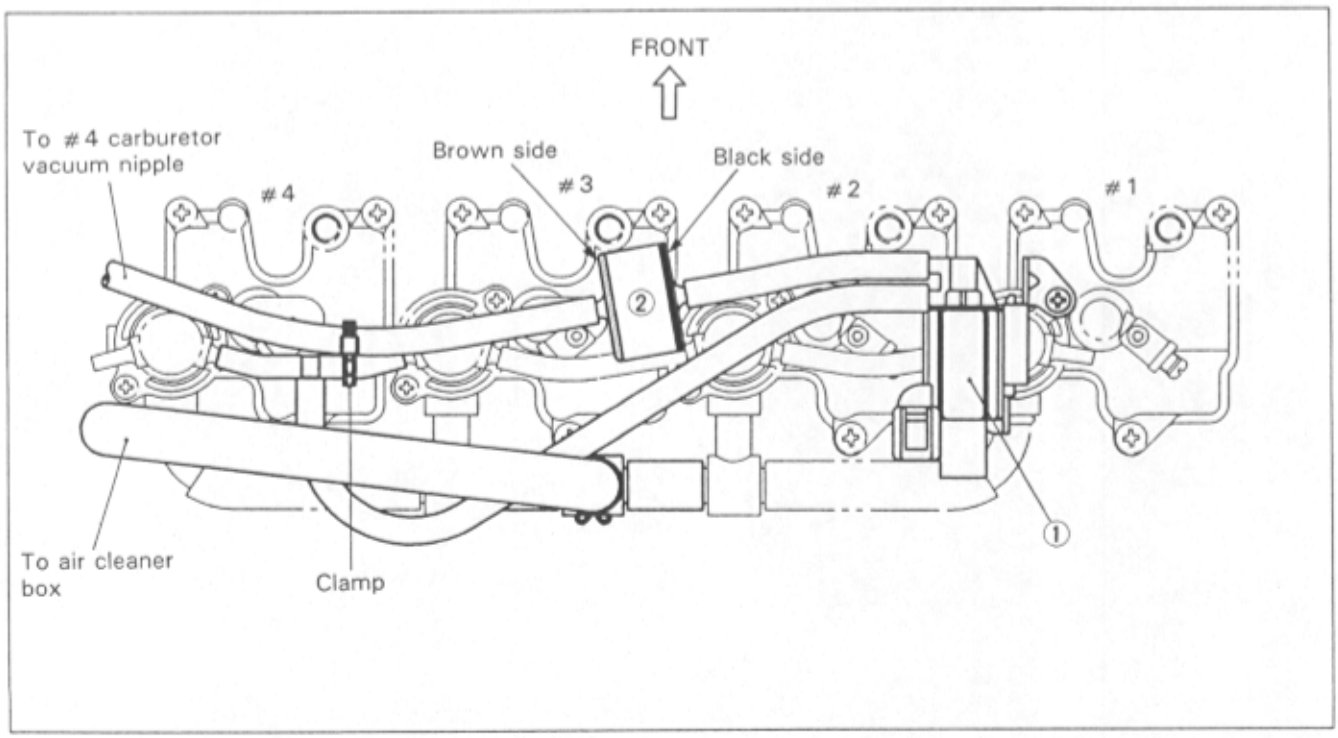
- When reading the above-mentioned resistance as (Ω2), tighten the throttle position sensor mounting screws to the specified torque.



Throttle position sensor mounting screw: 3.5 N·m (0.35 kg-m, 2.5 lb-ft)

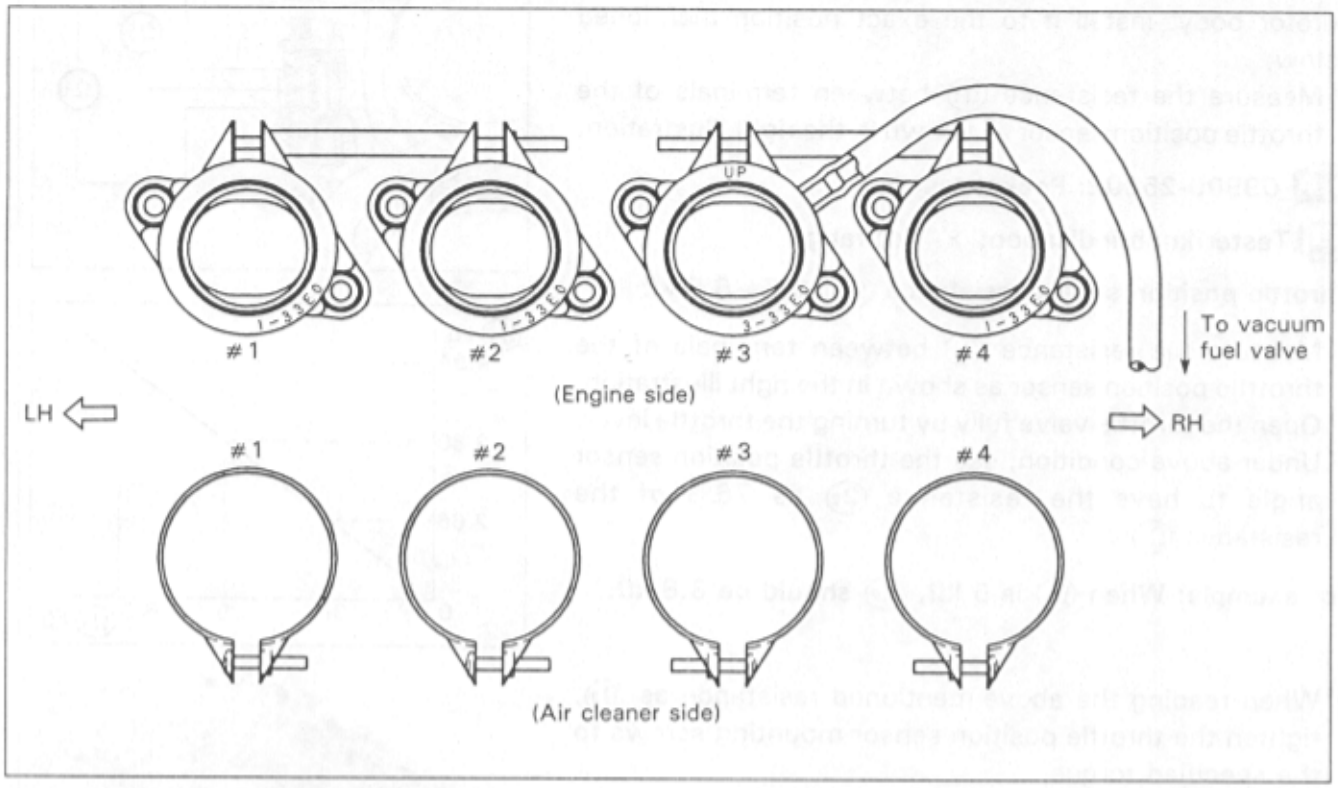
PISTON VALVE LIFT CONTROL SYSTEM

Connect the solenoid valve ① and V.T.V. ② as shown in the following illustration.



CABURETOR CLAMPS

Locate the carburetor clamps as shown in the following illustration.



- After all work is completed, mount the carburetors on the engine and the following adjustments are necessary.
  - * Engine idle r/min ..... Page 2-10
  - * Throttle cable play ..... Page 2-11
  - * Carburetor synchronization ..... Page 4-28

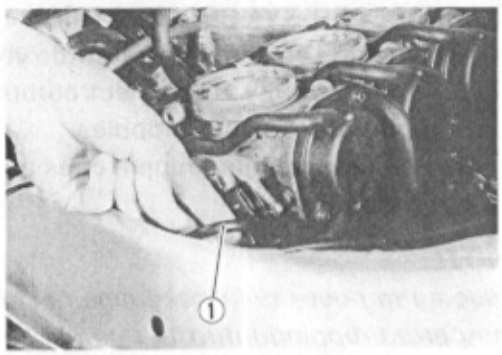
CARBURETOR SYNCHRONIZATION

Check and adjust the carburetor synchronization among four carburetors following the procedures below.

NOTE:
Keep the fuel tank lifting and the air cleaner box removing while performing this procedures.

CALIBRATING EACH GAUGE

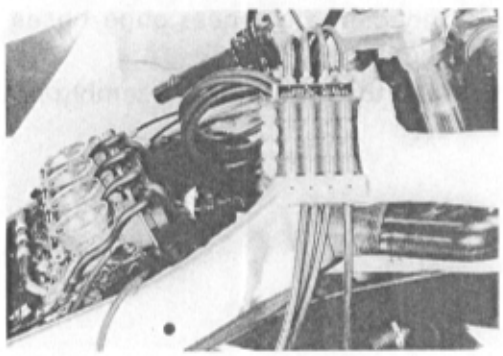
- Lift and support the fuel tank. (Refer to page 4-2.)
- Clean the carburetor main bore with a clean cloth.
- Start up the engine and run it in idling condition for warming up.
- Stop the warmed-up engine.
- Remove the air cleaner box. (Refer to page 4-14.)
- Disconnect the throttle position sensor lead wire coupler.
- Disconnect the vacuum hose ① from the #4 carburetor.



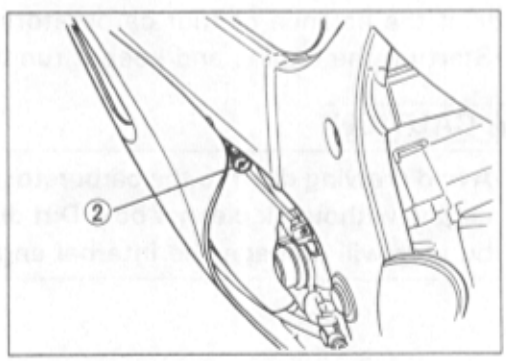
- Connect one of the four rubber hoses of carburetor balancer gauge to this nipple.

TOOL **09913-13121: Carburetor balancer**

- Connect the throttle position sensor lead wire coupler.



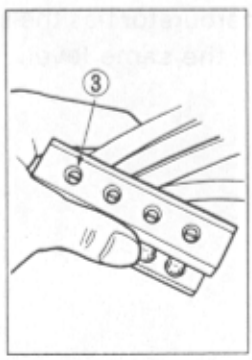
- Start up the engine and keep it running at 1750 r/min by turning throttle stop screw ②.

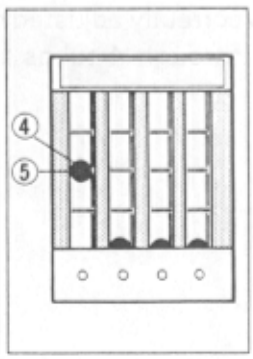


⚠ CAUTION

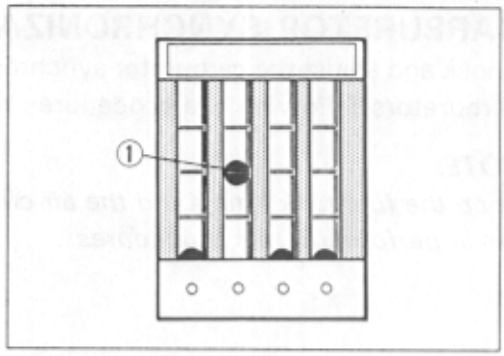
Avoid drawing dirt into the carburetor while running the engine without air cleaner box. Dirt drawn into the carburetor will damage the internal engine parts.

- Turn the air screw ③ of the gauge so that the vacuum acting on the tube of that hose will bring the steel ball ④ in the tube to the center line ⑤.



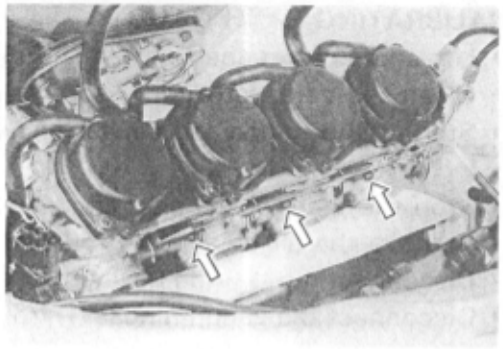


- After making sure that the steel ball stays steady at the center line, disconnect the hose from nipple and connect the next hose to the nipple.
- Turn air screw to bring the other steel ball ① to the center line.
- Repeat the above process on the third and fourth hoses. The balancer gauge is now ready for use in balancing the carburetors.



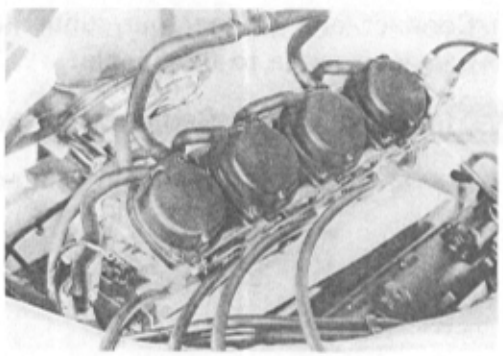
CARBURETOR SYNCHRONIZATION

- To synchronize carburetor throttle valves, remove the carburetor assembly to connect carburetor balancer hoses to carburetor vacuum nipples.
- Remove the vacuum nipple caps and vacuum hose from each carburetor.



NOTE:
Place a rag over the intake pipes of the engine to prevent any parts dropping into the combustion chamber.

- Connect the balancer gauge hoses to vacuum nipples respectively.
- Install the carburetor assembly properly.

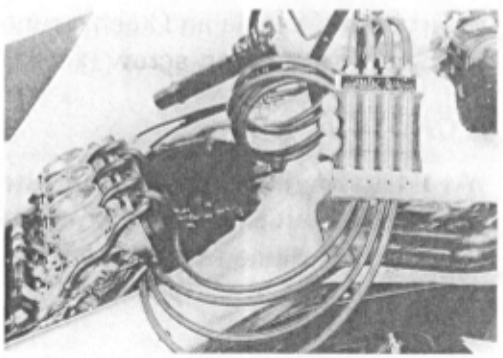


Adjust the balance of four carburetors as follows:

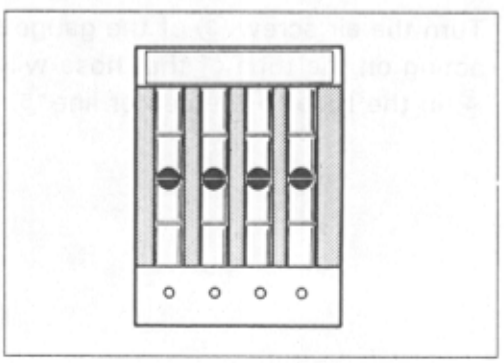
- Start up the engine and keep it running at 1 750 r/min.

⚠ CAUTION

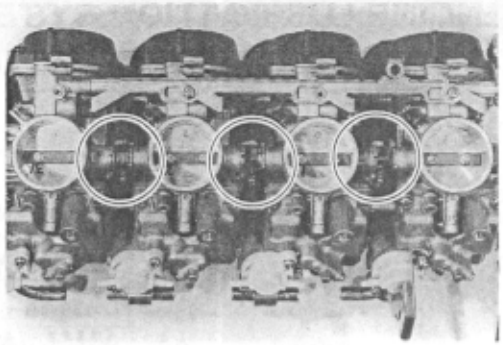
Avoid drawing dirt into the carburetor while running the engine without air cleaner box. Dirt drawn into the carburetor will damage the internal engine parts.



A correctly adjusted carburetor has the steel balls in the Nos. 1 through 4 tubes at the same level.



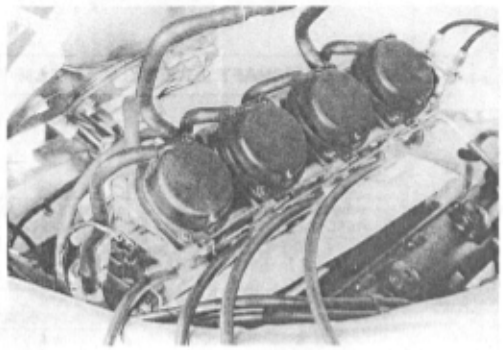
- If the steel balls are not aligned, adjust the throttle valve balance screws properly to align the balls.



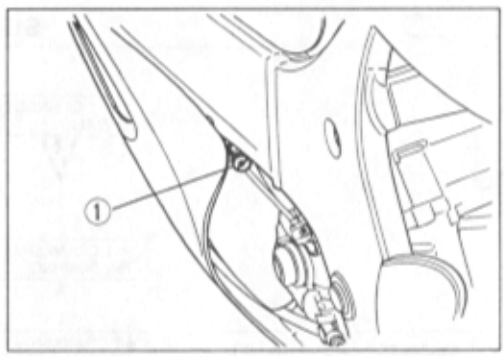
⚠ WARNING

A hot engine can burn you if you touch the engine. The engine will still be hot for sometime after stopping the engine.

- After completing the carburetor synchronization, remove the carburetor assembly.
- Remove the balancer gauge hose from carburetor nipples and install nipple caps and vacuum hose respectively.
- Reinstall the carburetor assembly onto the engine and air cleaner box onto the carburetor assembly respectively.



- Adjust the engine idle speed by turning the throttle stop screw ①.



Engine idle speed

1 200 $^{+100}_{-50}$ r/min ... for E-18 model

1 200 ± 100 r/min ... for the other models

LUBRICATION SYSTEM

OIL PRESSURE AND OIL PRESSURE REGULATOR

Refer to pages 2-22 and 3D-6.

OIL FILTER

Refer to page 2-9.

OIL PUMP

Refer to page 3D-1.

OIL COOLER

Refer to page 3D-5.

OIL SUMP FILTER

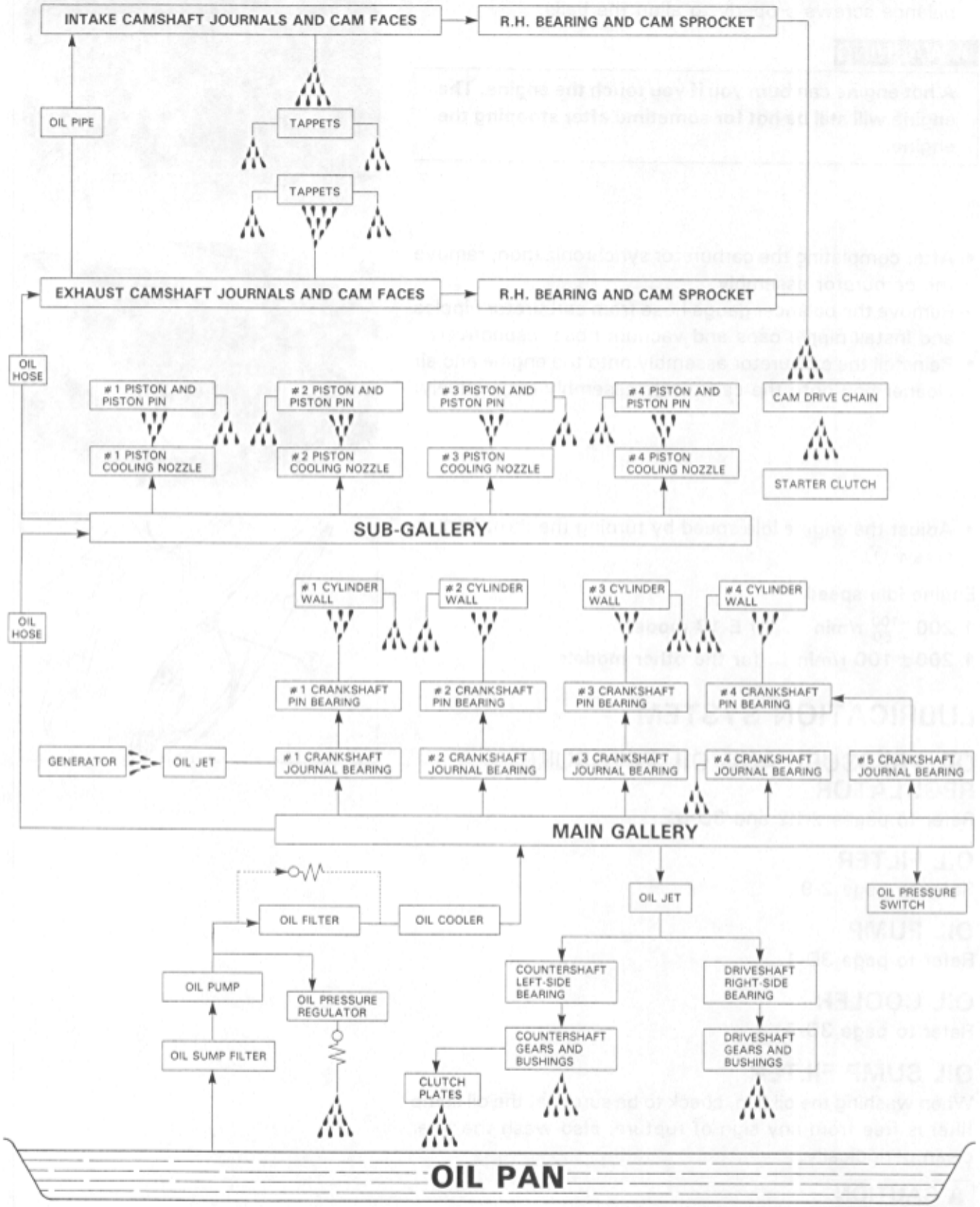
When washing the oil pan, check to be sure that the oil sump filter is free from any sign of rupture, also wash the filter clean periodically.

⚠ CAUTION

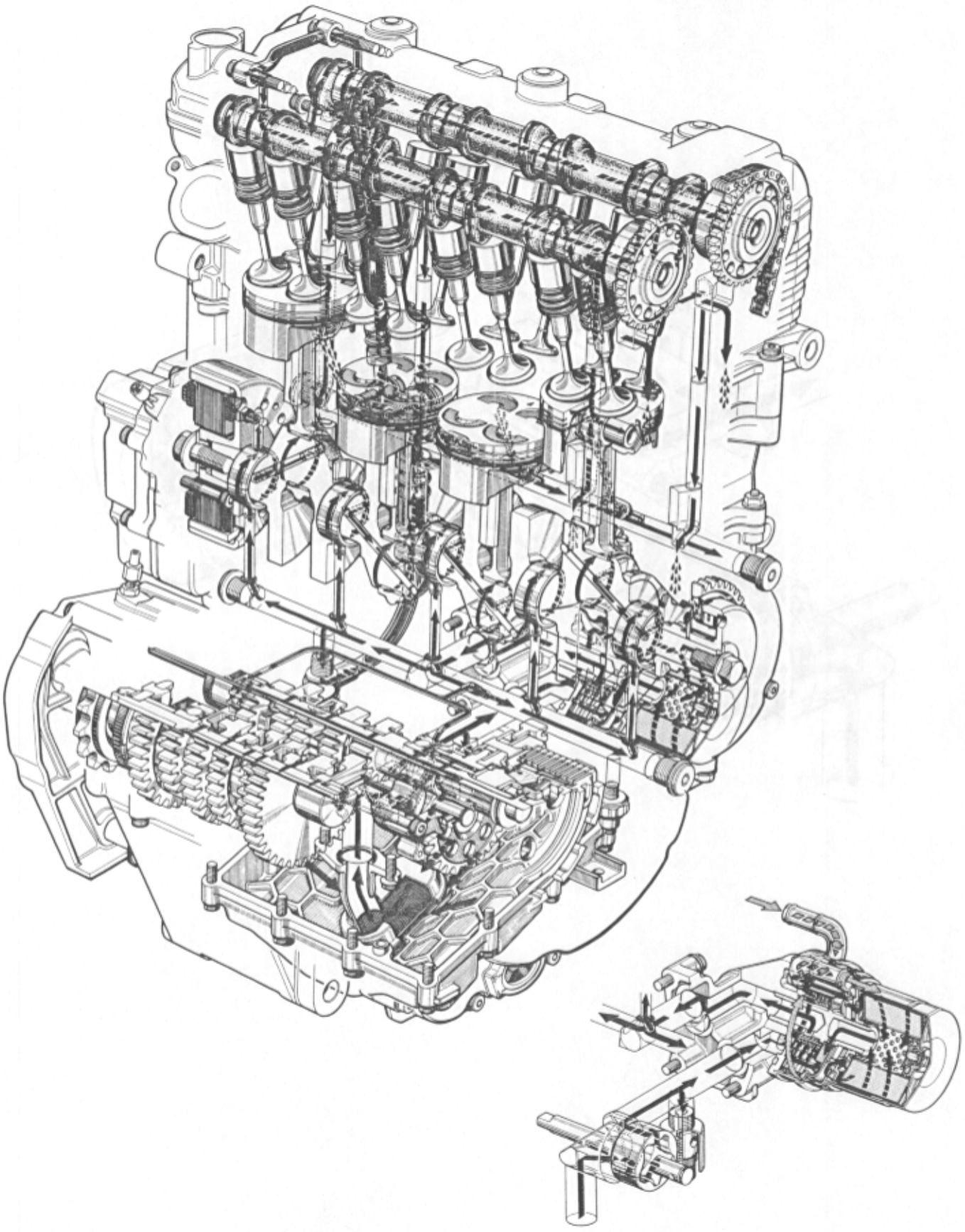
Replace the oil pan gasket with a new one to prevent oil leakage.

(Refer to page 3D-6.)

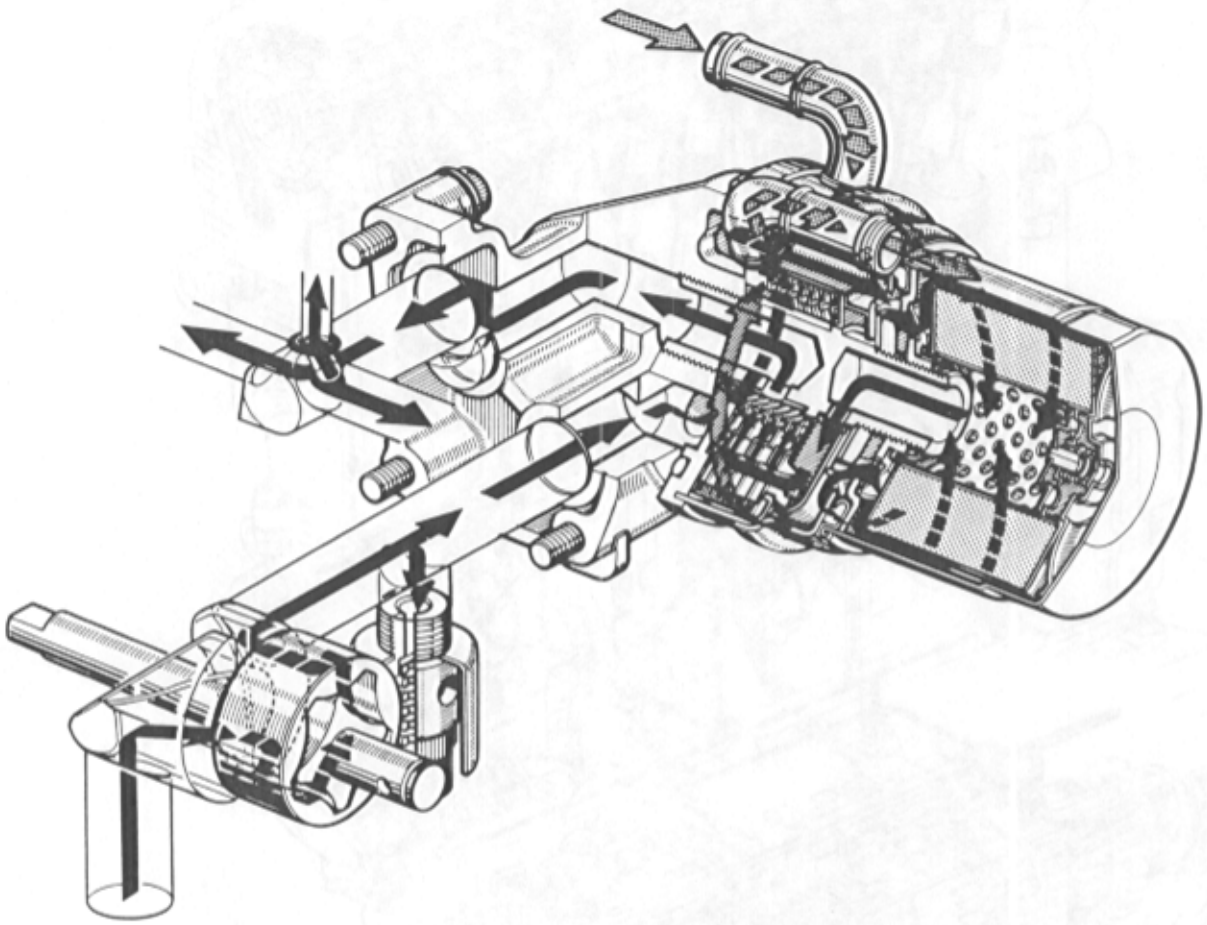
ENGINE LUBRICATION SYSTEM CHART



ENGINE LUBRICATION SYSTEM



ENGINE OIL COOLING SYSTEM



COOLING SYSTEM

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COOLING SYSTEM

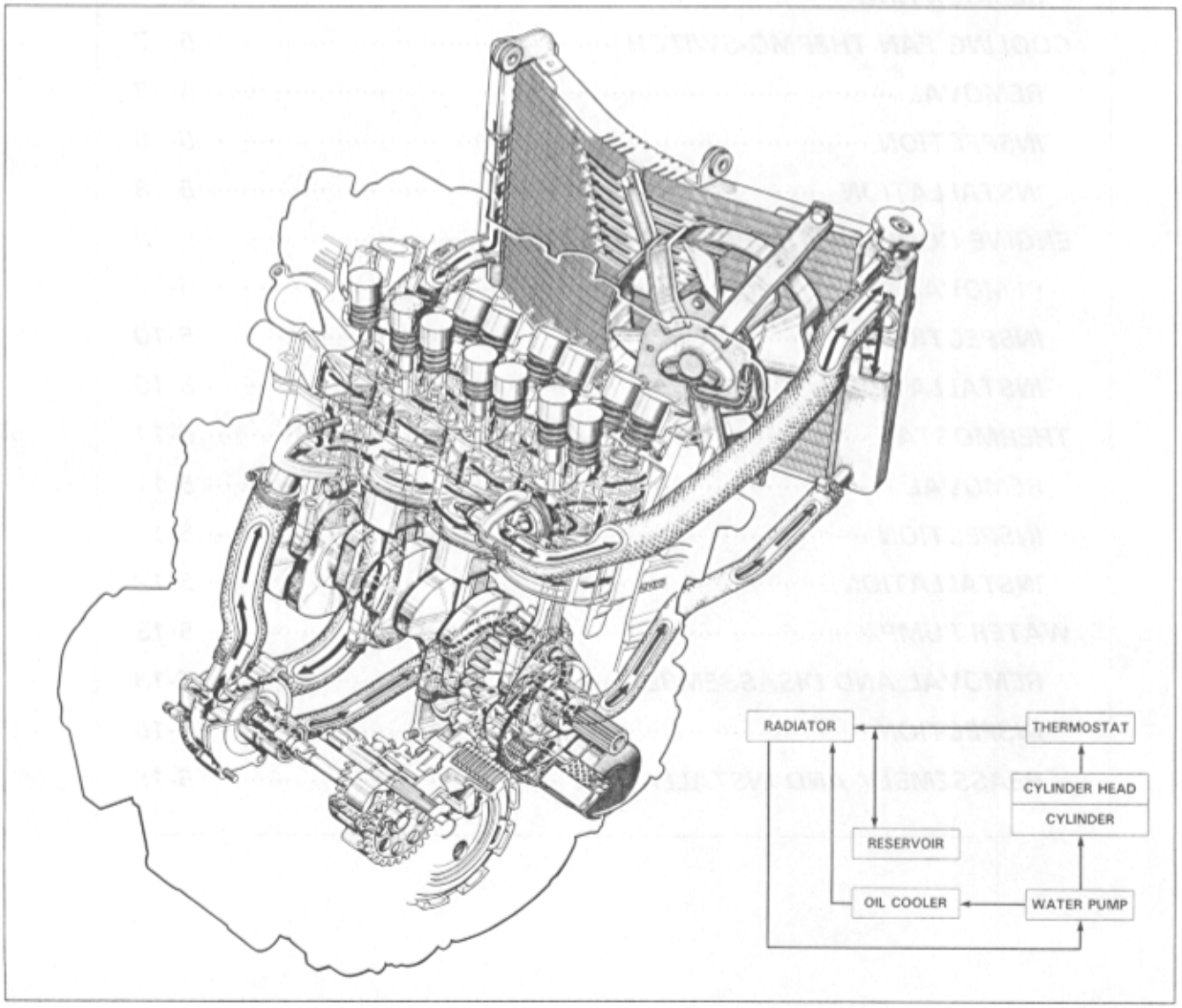
DESCRIPTION

The engine is cooled by engine coolant set in forced recirculation through jackets formed in the cylinder and cylinder head, and through the radiator. For the water pump, a high-capacity centrifugal pump is used. The radiator is a tube-and-fin type made of aluminum material, which is characterized by lightness in weight and good heat dissipation.

The thermostat is of wax pellet type, complete with a valve as the means of temperature-dependent control over the flow of engine coolant through the radiator. The valve is actuated by the temperature-sensitive wax contained in the pellet.

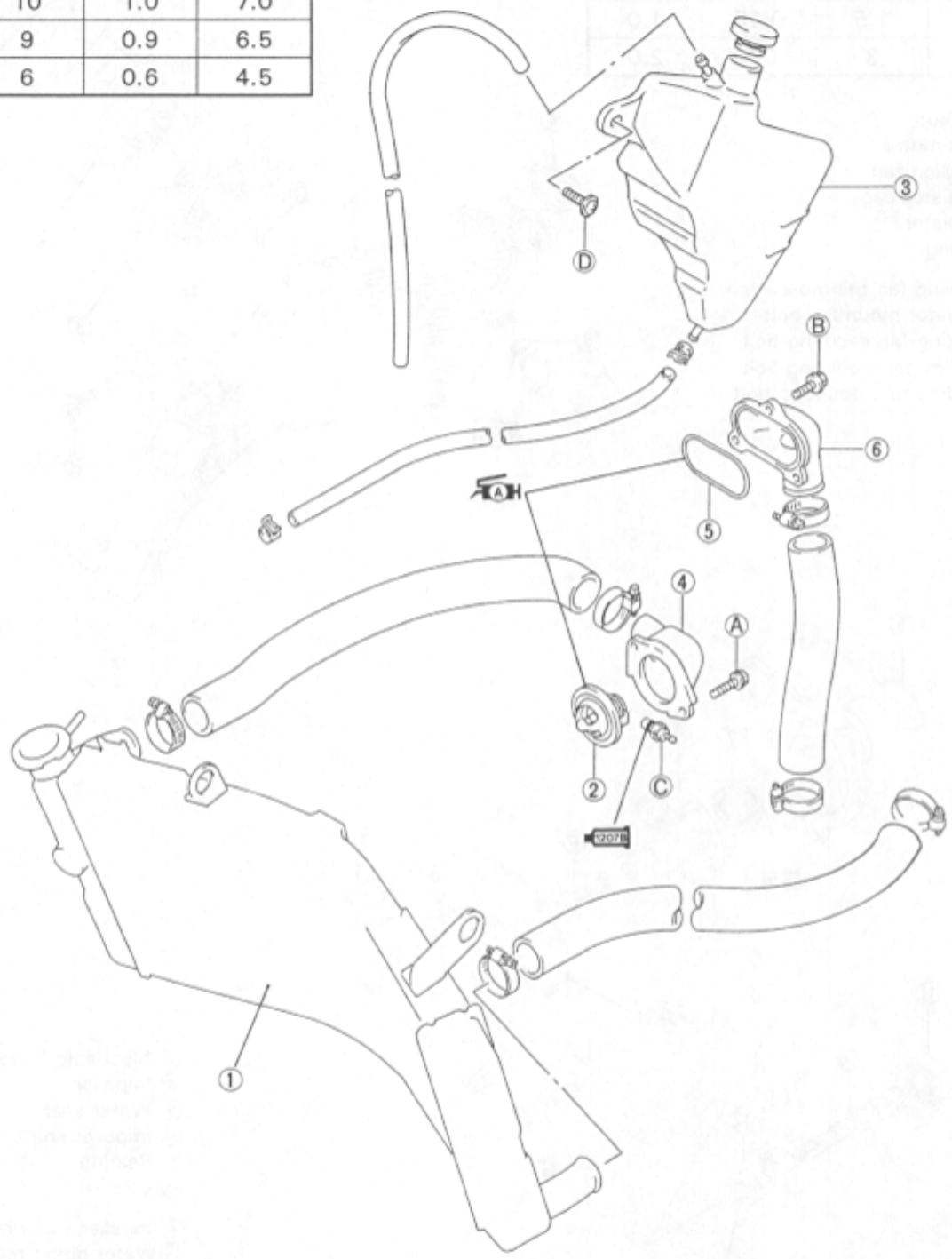
Referring to the following illustration, the thermostat is in the closed condition, so that engine coolant recirculates through the route comprising pump, engine, by-pass hole of the thermostat and radiator in the regulated condition.

As the coolant temperature rises to about 76.5°C and the thermostat valve unseats, the normal coolant flow is established. At about 90°C of coolant temperature, the thermostat becomes completely open and most of heat is released to the atmosphere through the radiator core.



CONSTRUCTION

ITEM	N·m	kg-m	lb-ft
Ⓐ, Ⓑ	10	1.0	7.0
Ⓒ	9	0.9	6.5
Ⓓ	6	0.6	4.5

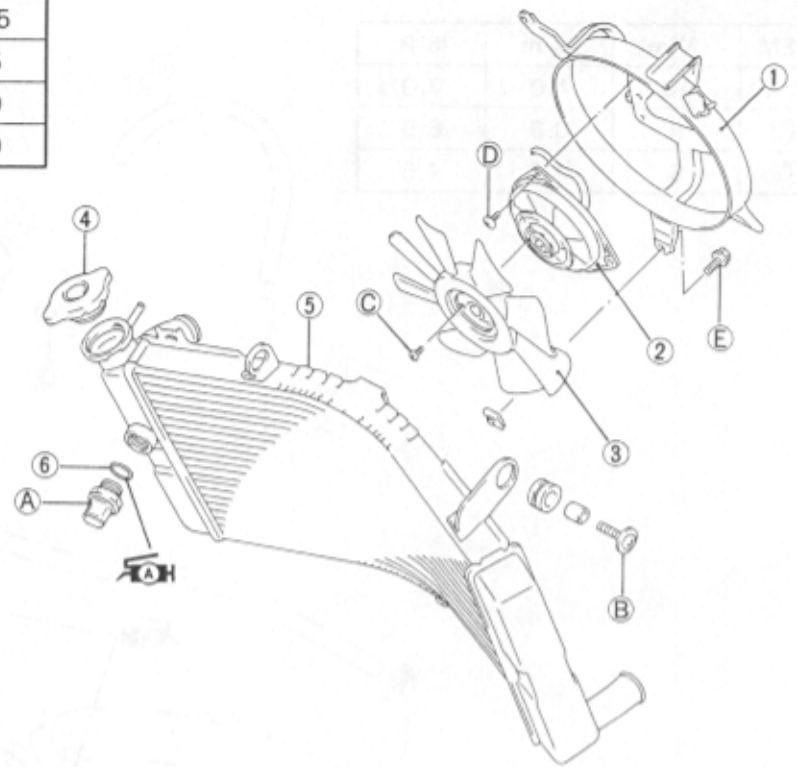


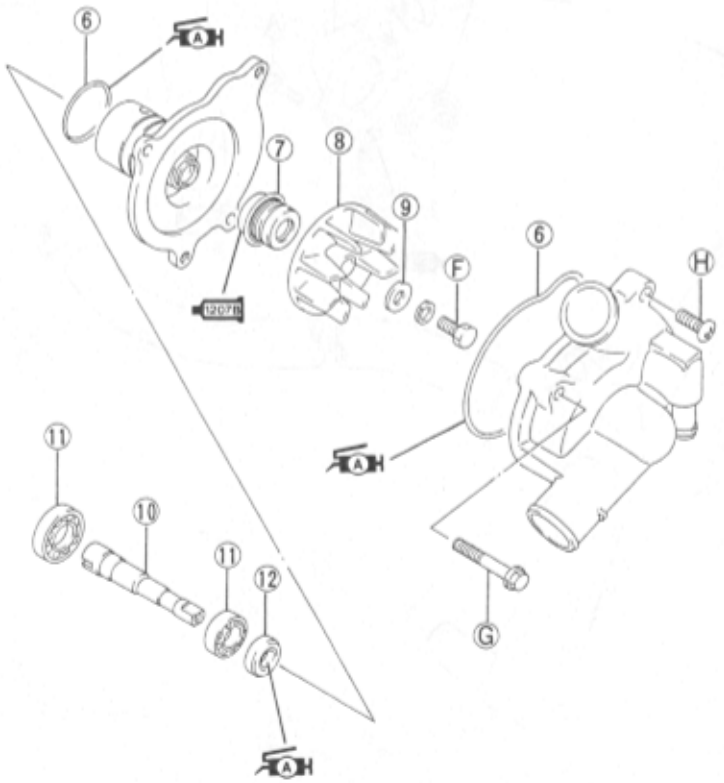
① Radiator
② Thermostat
③ Engine coolant reservoir tank
④ Thermostat case
⑤ O-ring
⑥ Water inlet conduction case
Ⓐ Thermostat case bolt
Ⓑ Water inlet conduction case bolt
Ⓒ Engine coolant temperature gauge
Ⓓ Reservoir tank mounting screw

ITEM	N·m	kg-m	lb-ft
Ⓐ	17	1.7	12.5
Ⓑ, Ⓔ	6	0.6	4.5
Ⓒ	1.5	0.15	1.0
Ⓓ	3	0.3	2.0

① Shroud
② Fan motor
③ Cooling fan
④ Radiator cap
⑤ Radiator
⑥ O-ring

Ⓐ Cooling fan thermo-switch
Ⓑ Radiator mounting bolt
Ⓒ Cooling fan securing bolt
Ⓓ Fan motor mounting bolt
Ⓔ Cooling fan mounting bolt





⑦ Mechanical seal
⑧ Impeller
⑨ Water seal
⑩ Impeller shaft
⑪ Bearing
⑫ Oil seal

Ⓕ Impeller securing bolt
Ⓖ Water pump mounting bolt
Ⓗ Water pump cover screw

ITEM	N·m	kg-m	lb-ft
Ⓕ	8	0.8	6.0
Ⓖ, Ⓗ	6	0.6	4.5

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 motorcycle 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%	−31°C (−24°F)
55%	−40°C (−40°F)
60%	−55°C (−67°F)

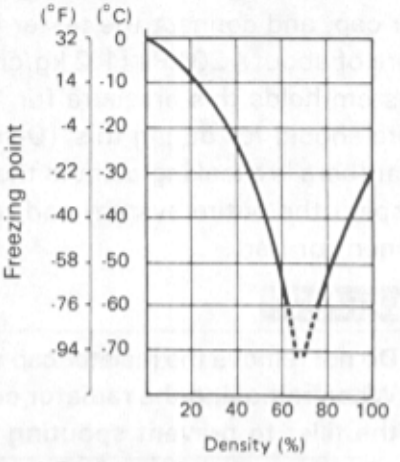


Fig. 1 Engine coolant density-freezing point curve.

⚠ CAUTION

- **Use a high quality ethylene glycol base anti-freeze, mixed with distilled water. Do not mix a 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 Right figure.)**
- **Do not use a radiator anti-leak additive.**

50% Engine coolant including reserve

Anti-freeze	1 275 ml (1.3/1.1 US/Imp. qt)
Water	1 275 ml (1.3/1.1 US/Imp. qt)

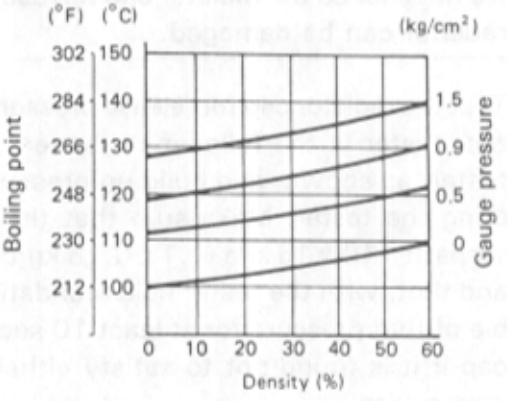


Fig. 2 Engine coolant density-boiling point curve.

⚠ WARNING

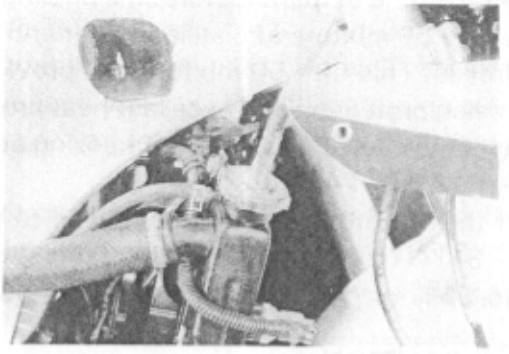
- **You can be injured by scalding fluid or steam if you open the radiator cap when the engine is hot. After the engine cools, wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow pressure to escape and then turn the cap all the way off.**
- **The engine must be cool before servicing the cooling system.**
- **The coolant is harmful;**
  - **If it comes in contact with skin or eyes, flush with water.**
  - **If swallow it accidentally, induce vomiting and call physician immediately.**
  - **Keep it away from children.**

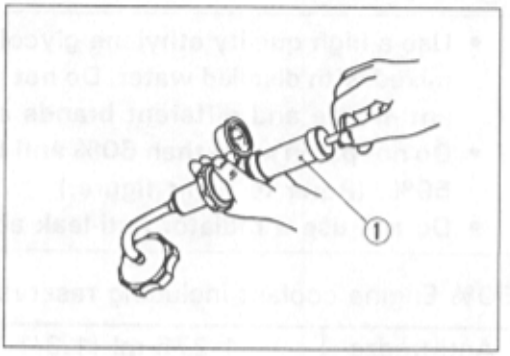
RADIATOR AND COOLING FAN

RADIATOR INSPECTION

Before removing the radiator and draining the engine coolant, inspect the following items.

1. Test the cooling system for tightness by using the radiator tester as follows:
   Remove the right lower fairing, air intake pipe and radiator cap, and connect the tester to the filler. Give a pressure of about 120 kPa (1.2 kg/cm², 17 psi) and see if the system holds this pressure for 10 seconds. If the pressure should fall during this 10-second interval, it means that there is a leaking point in the system. In such a case, inspect the entire system and replace the leaking component or part.



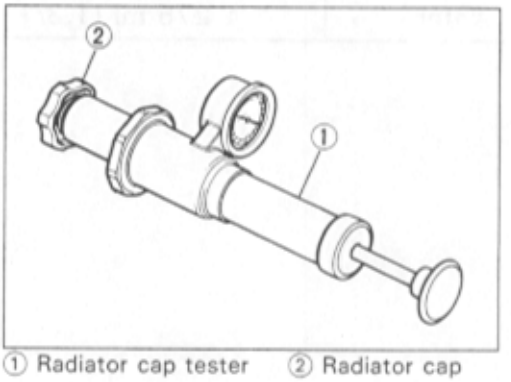


⚠ WARNING

*** Do not remove the radiator cap when the engine is hot.**
*** When removing the radiator cap tester, put a rag on the filler to prevent spouting of engine coolant.**

⚠ CAUTION

Do not exceed the radiator cap release pressure, or the radiator can be damaged.

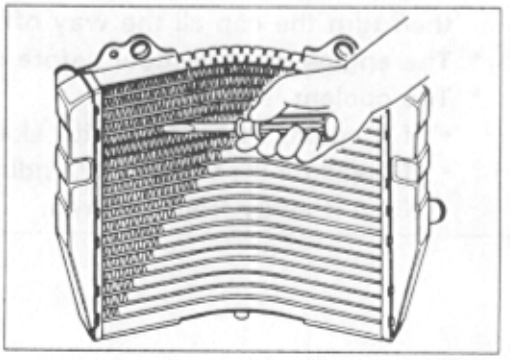


① Radiator cap tester ② Radiator cap

2. Test the radiator cap for release pressure by using the radiator tester in the following manner: Fit the cap to the tester, as shown, and build up pressure slowly by operating the tester. Make sure that the pressure build-up stops at 110 ± 15 kPa (1.1 ± 0.15 kg/cm², 15.6 ± 2.1 psi) and that, with the tester held standstill, the cap is capable of that pressure for at least 10 seconds. Replace the cap if it is found not to satisfy either of these two requirements.

Radiator cap valve release pressure: 110 ± 15 kPa (1.1 ± 0.15 kg/cm², 15.6 ± 2.1 psi)

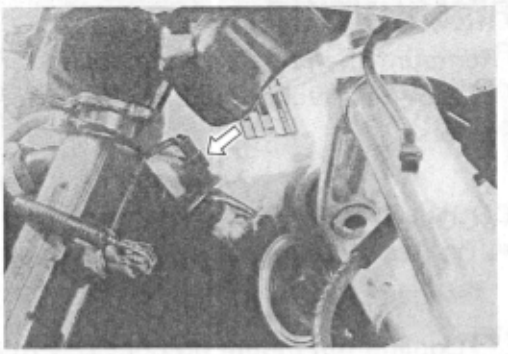
3. Road dirt or trash stuck to the fins must be removed. Use of compressed air is recommended for this cleaning. Fins bent down or dented can be repaired by straightening them with the blade of a small screwdriver.
4. Any water hose found in a cracked condition or flattened must be replaced. Any leakage from the connecting section should be corrected by proper tightening.

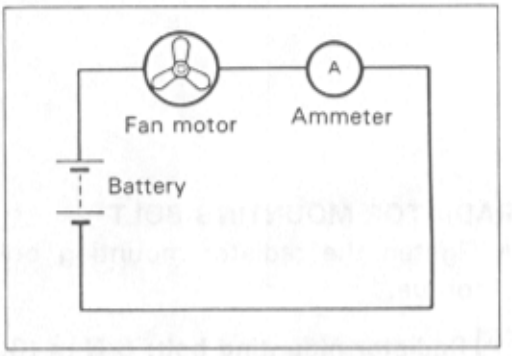


COOLING FAN INSPECTION

- Remove the lower fairing. (Refer to page 6-2.)
- Remove the cooling fan lead wire coupler.

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 applies 12 volts to the motor. With the motor with electric motor fan running at full speed, the ammeter should be indicating not more than 5 amperes.
If the fan motor does not turn, replace the motor assembly with a new one.



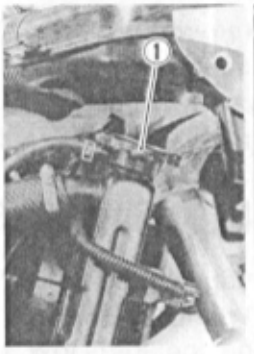


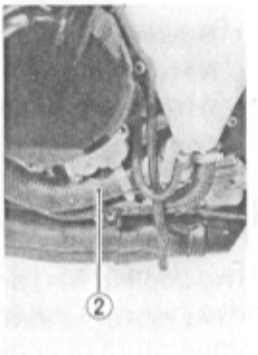
REMOVAL

- Remove the lower fairing. (Refer to page 6-2.)
- Remove the radiator cap ① and disconnect the water hose ② from the water pump, then drain engine coolant.

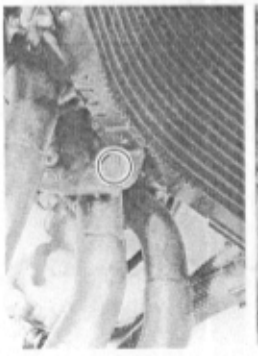
⚠ WARNING

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



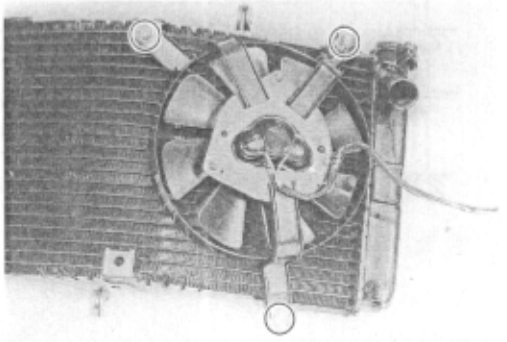


- Disconnect the water hoses from the radiator.
- Disconnect the cooling fan and the cooling fan thermoswitch lead wire couplers.
- Remove the radiator by removing the its mounting bolts.





- Remove the cooling fan.



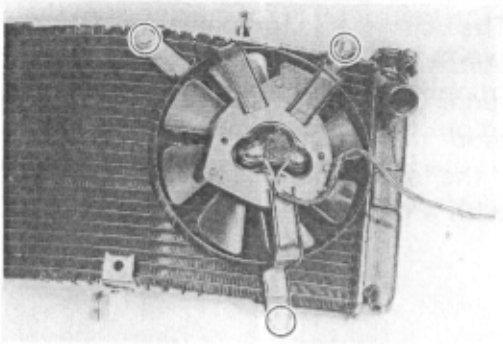
REMOUNTING

Remount the radiator and cooling fan in the reverse order of their removal procedure. Pay attention to the following points:

COOLING FAN MOUNTING BOLT AND NUT

- Tighten the cooling fan mounting bolt to the specified torque.

Cooling fun mounting bolt: 6 N·m (0.6 kg-m, 4.5 lb-ft)

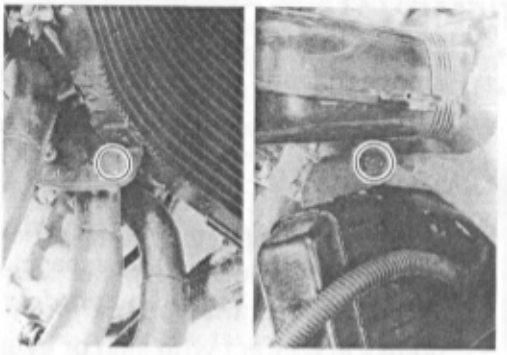


RADIATOR MOUNTING BOLT

- Tighten the radiator mounting bolts to the specified torque.

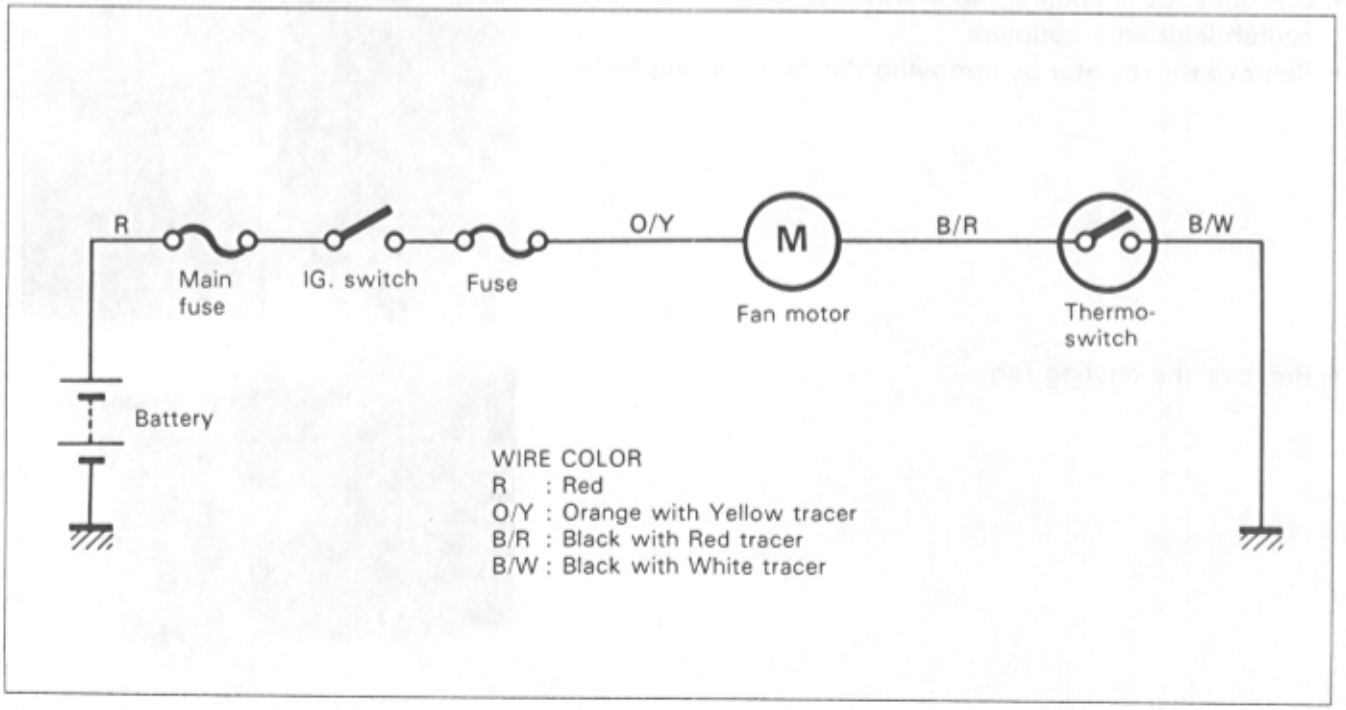
Radiator mounting bolt: 6 N·m (0.6 kg-m, 4.5 lb-ft)

- Be sure to route the water hoses and radiator overflow hose. (Refer to page 8-19.)
- After remounting the radiator, be sure to add engine coolant: refer to page 2-12 for refilling information.



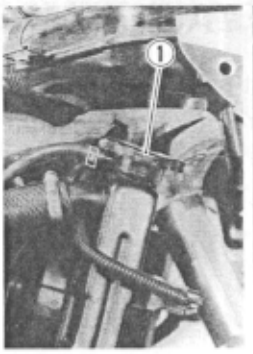
COOLING FAN THERMO-SWITCH

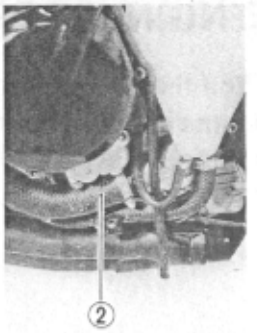
The cooling fan, being located behind the radiator, is secured to the radiator by three bolts. The fan drive motor is automatically controlled by the thermo-switch. This switch remains open when the temperature of engine coolant is low, but it closes at about 105°C (221°F) of rising engine coolant temperature to set the fan in motion.



REMOVAL

- Remove the lower fairing. (Refer to page 6-2.)
- Remove the radiator cap ① and disconnect the water hose ② from the water pump, then drain engine coolant.

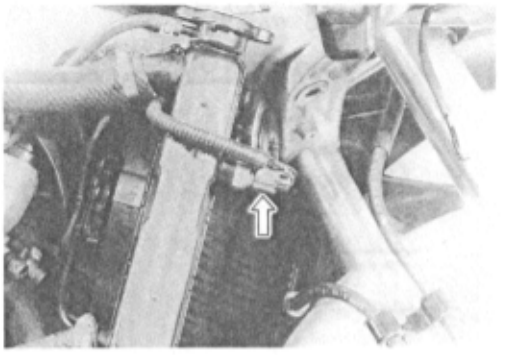




⚠ WARNING

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

- Disconnect the cooling fan thermo-switch lead wire coupler.
- Remove the cooling fan thermo-switch.

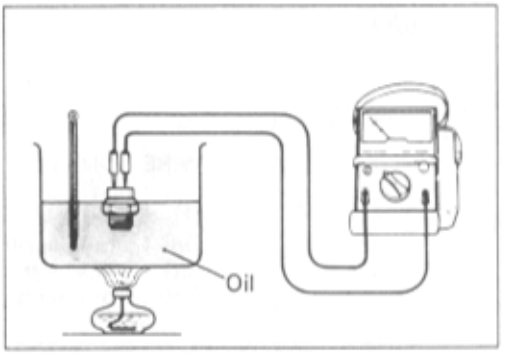


INSPECTION

The thermo-switch must be checked for its temperature-initiated closing action at the specification value of 105°C (221°F) by testing it at the bench as shown in the figure. Connect the thermo-switch to a circuit tester and place it in the oil contained in a pan, which is placed on a stove; heat the oil to raise its temperature slowly, and read the column thermometer when the switch closes.

TOOL 09900-25002: Pocket tester

Tester knob indication: × 1Ω range



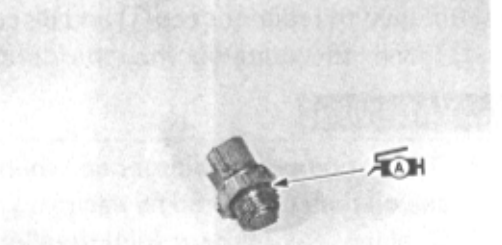
Thermo-switch specification

OFF → ON	Approx. 105°C (221°F)
ON → OFF	Approx. 100°C (212°F)

INSTALLATION

- Apply grease to the O-ring.

A 99000-25030: SUZUKI SUPER GREASE "A"



- Tighten the cooling fan thermo-switch to the specified torque.

Cooling fan thermo-switch: 17 N·m (1.7 kg-m, 12.5 lb-ft)

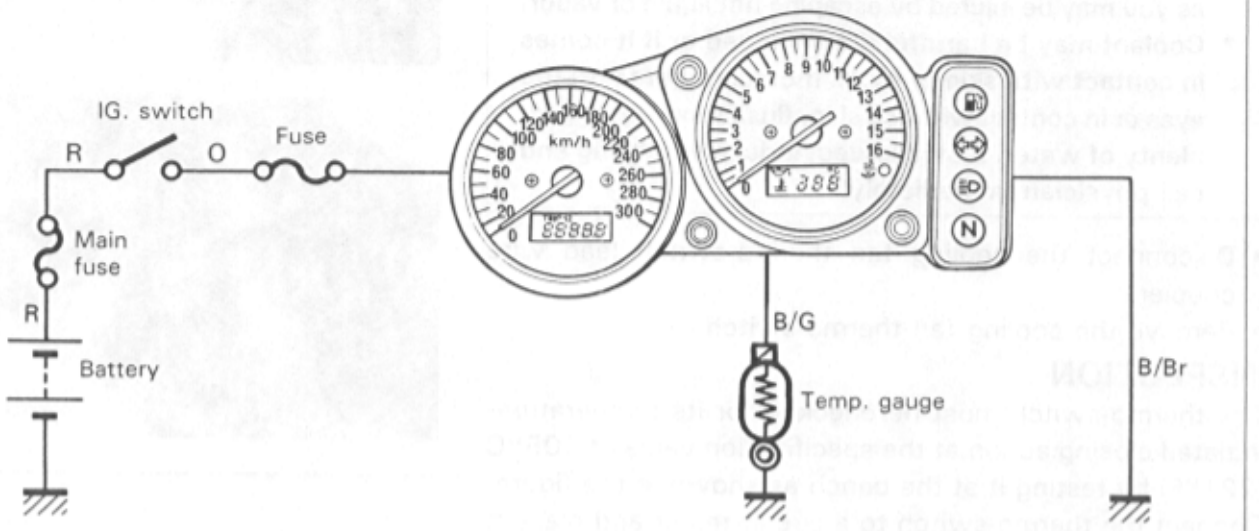
⚠ CAUTION

Take special care when handling the thermo-switch. It may cause damage if it gets a sharp impact. Replace the O-ring with a new one.

- After installing the radiator, be sure to add engine coolant: refer to page 2-12 for refilling information.

ENGINE COOLANT TEMPERATURE GAUGE

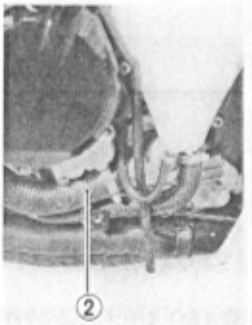
The following circuit diagram shows the electrical wiring for the thermometer. The major components are temperature gauge in contact with coolant; and temperature indicator (engine coolant temperature meter).

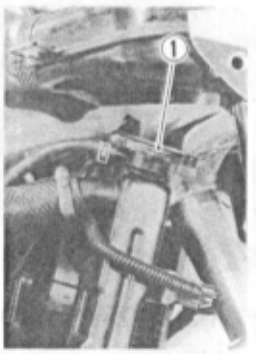


WIRE COLOR
R : Red
O : Orange
O/G : Orange with Green tracer
B/G : Black with Green tracer
B/Br : Black with Brown tracer

REMOVAL

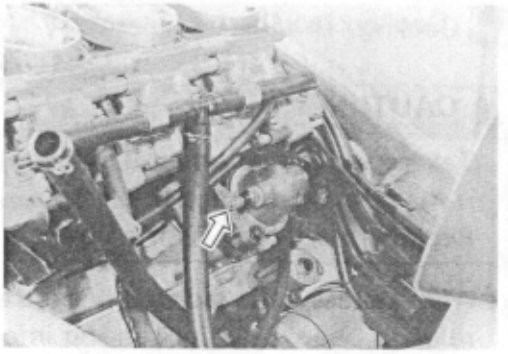
- Remove the lower fairing and seat. (Refer to page 6-2 and 3.)
- Lift and support the fuel tank. (Refer to page 4-2.)
- Remove the radiator cap ① and disconnect the water hose ② from the water pump, then drain engine coolant.





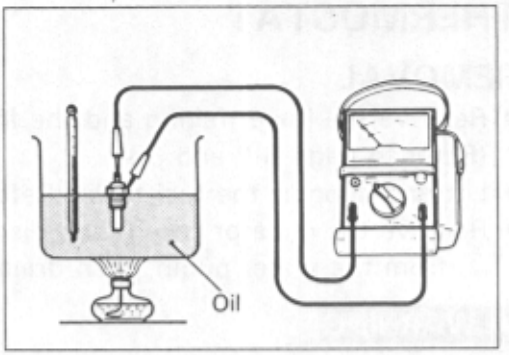
⚠ WARNING

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



- Disconnect the lead wire connector.
- Remove the engine coolant temperature gauge.

INSPECTION



Test the temperature gauge sensor at the bench to see if its ohmic value changes, as specified, with temperature. The test is to be run as follows: Connect the temperature gauge to the ohmmeter and place it in the oil contained in a pan, which is placed on a stove; heat the oil to raise its temperature slowly, reading the thermometer placed in the pan and also the ohmmeter. A temperature gauge whose ohmic value does not change in the proportion indicated in the table must be replaced.

09900-25002: Pocket tester

Temperature gauge specification

Water temperature	Standard resistance
50°C (122°F)	Approx. 9.56 kΩ
100°C (212°F)	Approx. 2.78 kΩ
120°C (248°F)	Approx. 0.69 kΩ
130°C (266°F)	Approx. 0.50 kΩ

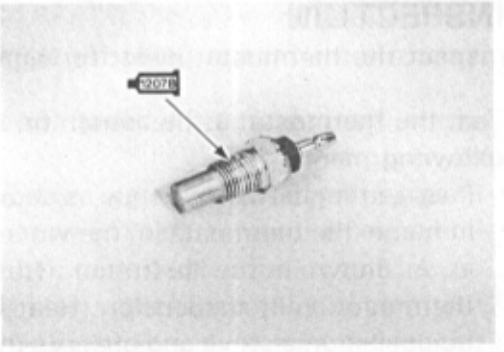
If the resistance noted to show infinity or too much different resistance value, temperature gauge must be replaced. For inspecting the engine coolant temperature meter and indicator, refer to page 7-30.

INSTALLATION

Apply SUZUKI BOND "1207B" to the thread portion of the temperature gauge and tighten it to the specified torque.

99104-31140: SUZUKI BOND "1207B"

Engine coolant temperature gauge: 9.0 N·m (0.9 kg-m, 6.5 lb-ft)



⚠ CAUTION

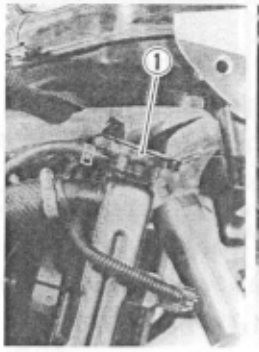
Take special care when handling the temperature gauge. If may cause damage if it gets a sharp impact.

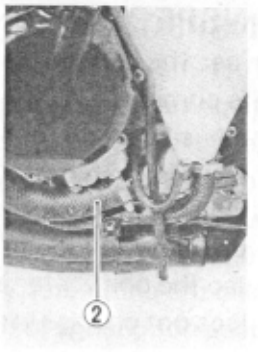
- After installing the engine coolant temperature gauge, be sure to add engine coolant: refer to page 2-12 for refilling information.

THERMOSTAT

REMOVAL

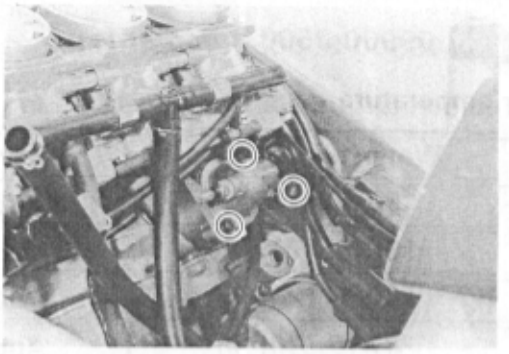
- Remove the lower fairing and the front seat. (Refer to page 6-2 and 3.)
- Lift and support the fuel tank. (Refer to page 4-2.)
- Remove the radiator cap ① and disconnect water hose ② from the water pump, then drain engine coolant.



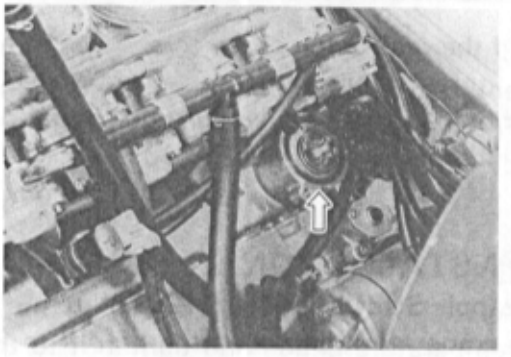


⚠ WARNING

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



- Disconnect the engine coolant temperature gauge lead wire connector.
- Remove the thermostat case bolts.
- Remove the thermostat.



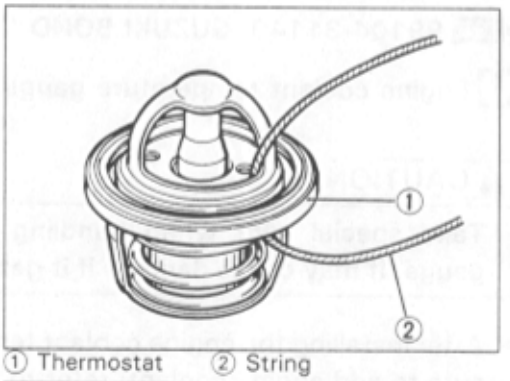
INSPECTION

Inspect the thermostat pellet for signs of cracking.

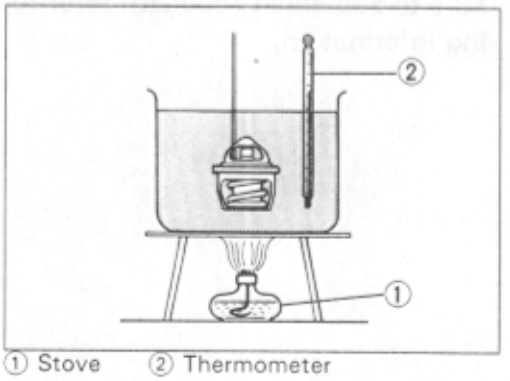
Test the thermostat at the bench for control action, in the following manner.

- Pass a string between flange, as shown in the illustration.
- 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 by placing the beaker on a stove and observe the rising temperature on a thermometer.
- Read the thermometer just when opening the thermostat. This reading, which is the temperature level at which the thermostat valve begins to open, should be anywhere between 74.5°C (166.1°F) and 78.5°C (173.3°F).

Thermostat valve opening temperature: 74.5–78.5°C (166.1–173.3°F)

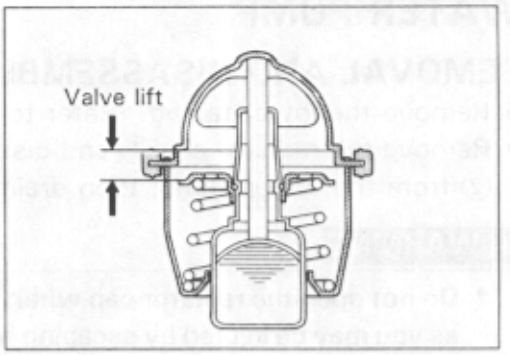


① Thermostat ② String



① Stove ② Thermometer

- Keep on heating the water to raise its temperature to and beyond 90°C (194°F).
- Just when the water reaches 90°C (194°F), the thermostat valve should have lifted by at least 7.0 mm (0.28 in).



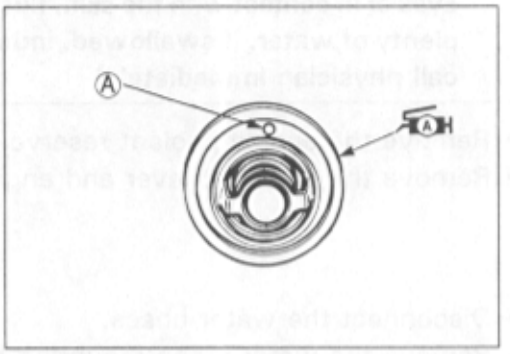
Thermostat valve lift: Over 7.0 mm at 90°C (Over 0.28 in at 194°F)

- A thermostat failing to satisfy either of the two requirements (start-to-open temperature and valve lift) must be replaced.

INSTALLATION

- The air bleeder hole Ⓐ of the thermostat faces upside.
- Apply grease to the rubber seal on the thermostat.

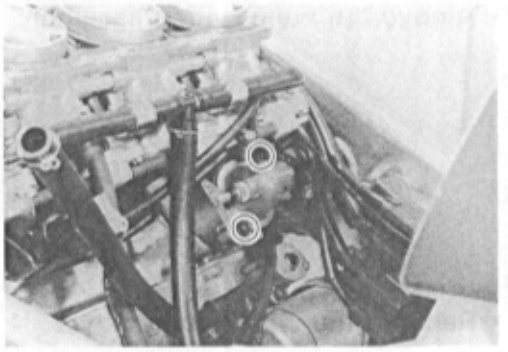
99000-25030: SUZUKI SUPER GREASE "A"



- Tighten the thermostat case bolts to the specified torque.

Thermostat case bolt: 10 N·m (1.0 kg-m, 7.0 lb-ft)

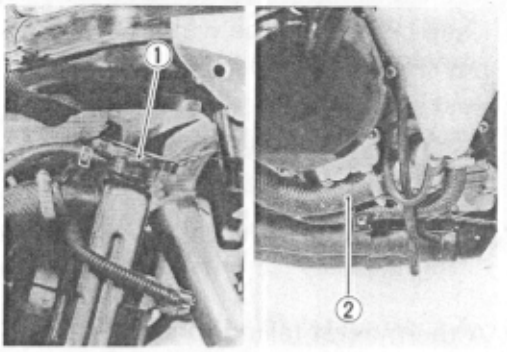
- After installing the thermostat, be sure to add engine coolant: refer to page 2-12 for refilling information.



WATER PUMP

REMOVAL AND DISASSEMBLY

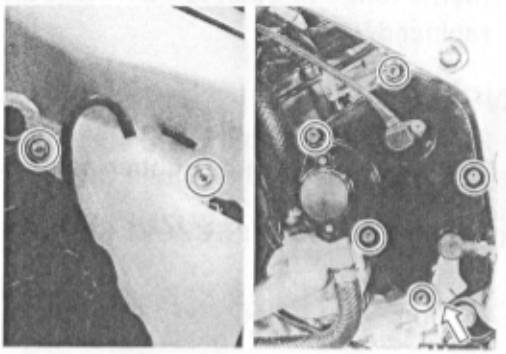
- Remove the lower fairing. (Refer to page 6-2.)
- Remove the radiator cap ① and disconnect water hose ② from the water pump, then drain engine coolant.



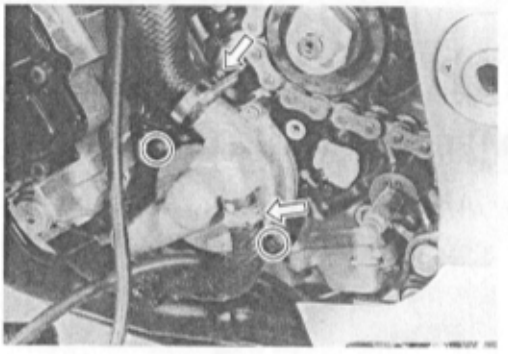
⚠ WARNING

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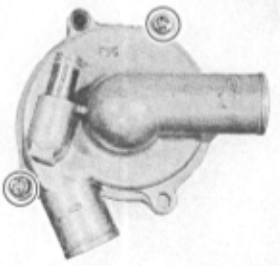
- Remove the engine coolant reservoir tank.
- Remove the gearshift lever and engine sprocket cover.



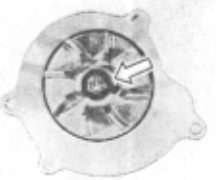
- Disconnect the water hoses.
- Remove the water pump mounting bolt.
- Remove the water pump assembly.



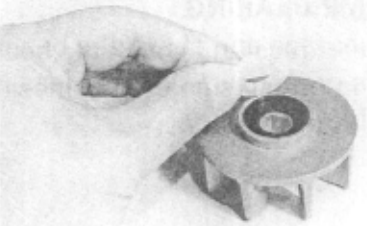
- Remove the water pump cover.



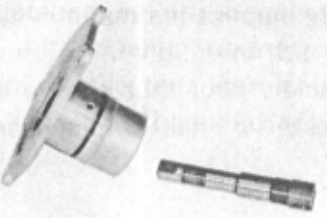
- Remove the impeller securing bolt by holding the impeller shaft with a water pump pliers.



- Remove the mechanical seal ring.

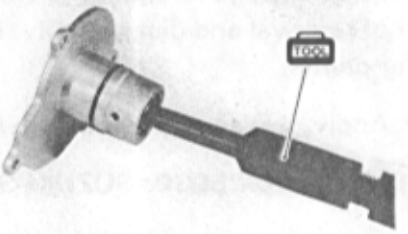


- Remove the impeller shaft.



- Draw out the bearings by using the special tools.

TOOL **09921-20200: Bearing remover**
09930-30102: Sliding shaft

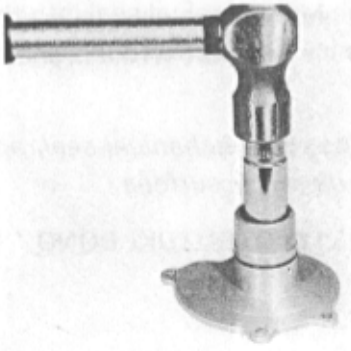


⚠ CAUTION

The removed bearings must be replaced with new ones.

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

- Drive out the mechanical seal with oil seal by using a suitable size box wrench and so on.



⚠ CAUTION

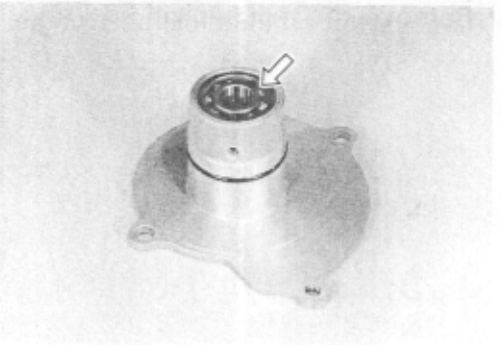
The removed mechanical seal and oil seal must be replaced with new ones.

NOTE:
If no water or oil leakage, mechanical seal and oil seal removal is not necessary.

INSPECTION

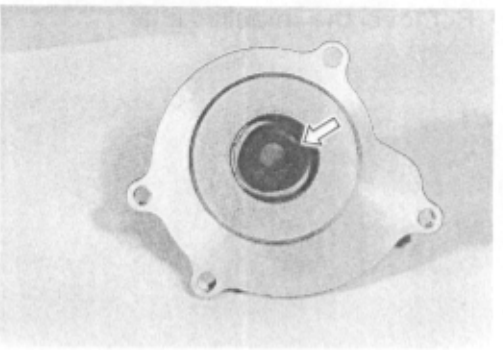
WATER PUMP BEARING

Turn the inner race and check the bearing play. If abnormal noise occurs or any sign of stickiness is noted, replace the bearing with a new one.



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 oil seal if necessary.



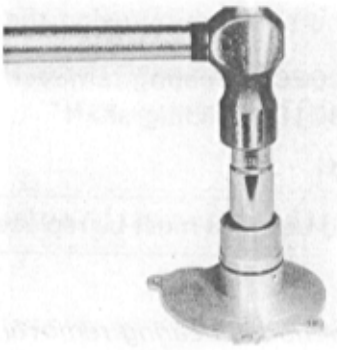
REASSEMBLY AND INSTALLATION

Reassemble and remount the water pump in the reverse order of removal and disassembly. Pay attention to the following points:

- Apply grease to the oil seal lip before installing.

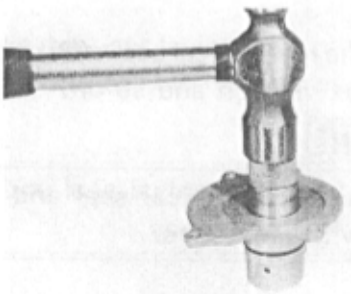
A 99000-25030: SUZUKI SUPER GREASE "A"

- Press the new oil seal into the stuffing box with a suitable size socket wrench and so on.
- Press the new mechanical seal into the stuffing box with a suitable size socket wrench and so on.

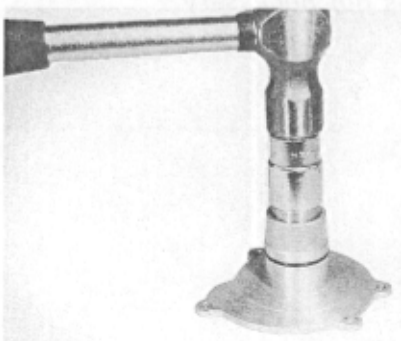


NOTE:
When installing the mechanical seal, apply SUZUKI BOND "1207B" to its outer surface.

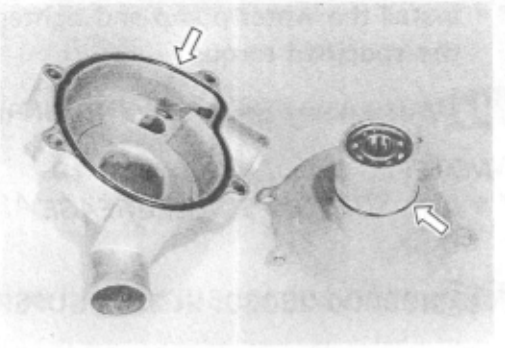
1207B 99104-31140: SUZUKI BOND "1207B"



- Press the new bearings into the stuffing box with a suitable size socket wrench and so on.



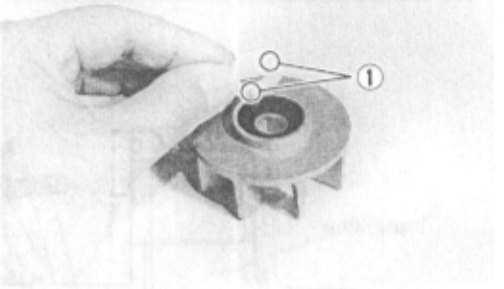
- Replace the O-rings and water seal with new ones when reassembling the water pump.



NOTE:
** Apply SUZUKI SUPER GREASE "A" to the O-rings*

A 99000-25030: SUZUKI SUPER GREASE "A"

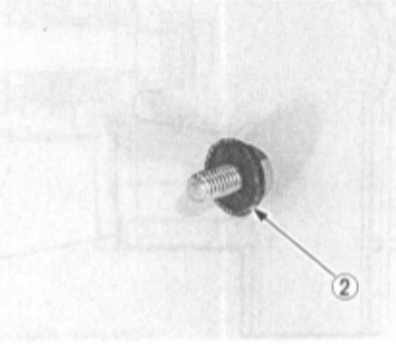
** The mechanical seal ring must be assembled with marked face ① of the ring toward the impeller.*



- Tighten the impeller securing bolt to the specified torque.

Impeller securing bolt: 8 N·m (0.8 kg-m, 6.0 lb-ft)

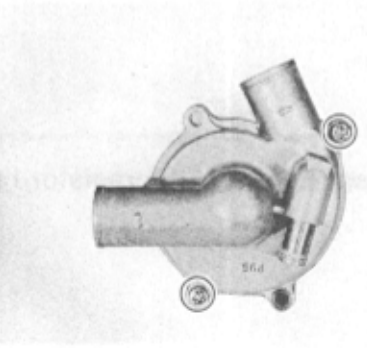
NOTE:
The seal lip side ② faces impeller.



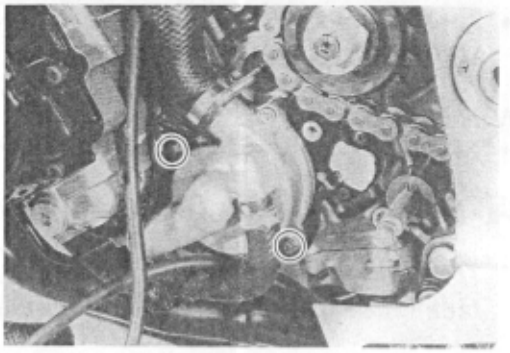
- Tighten the water pump cover screws to the specified torque.

Water pump cover screw: 6 N·m (0.6 kg-m, 4.5 lb-ft)

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



- Install the water pump and tighten its mounting bolt to the specified torque.



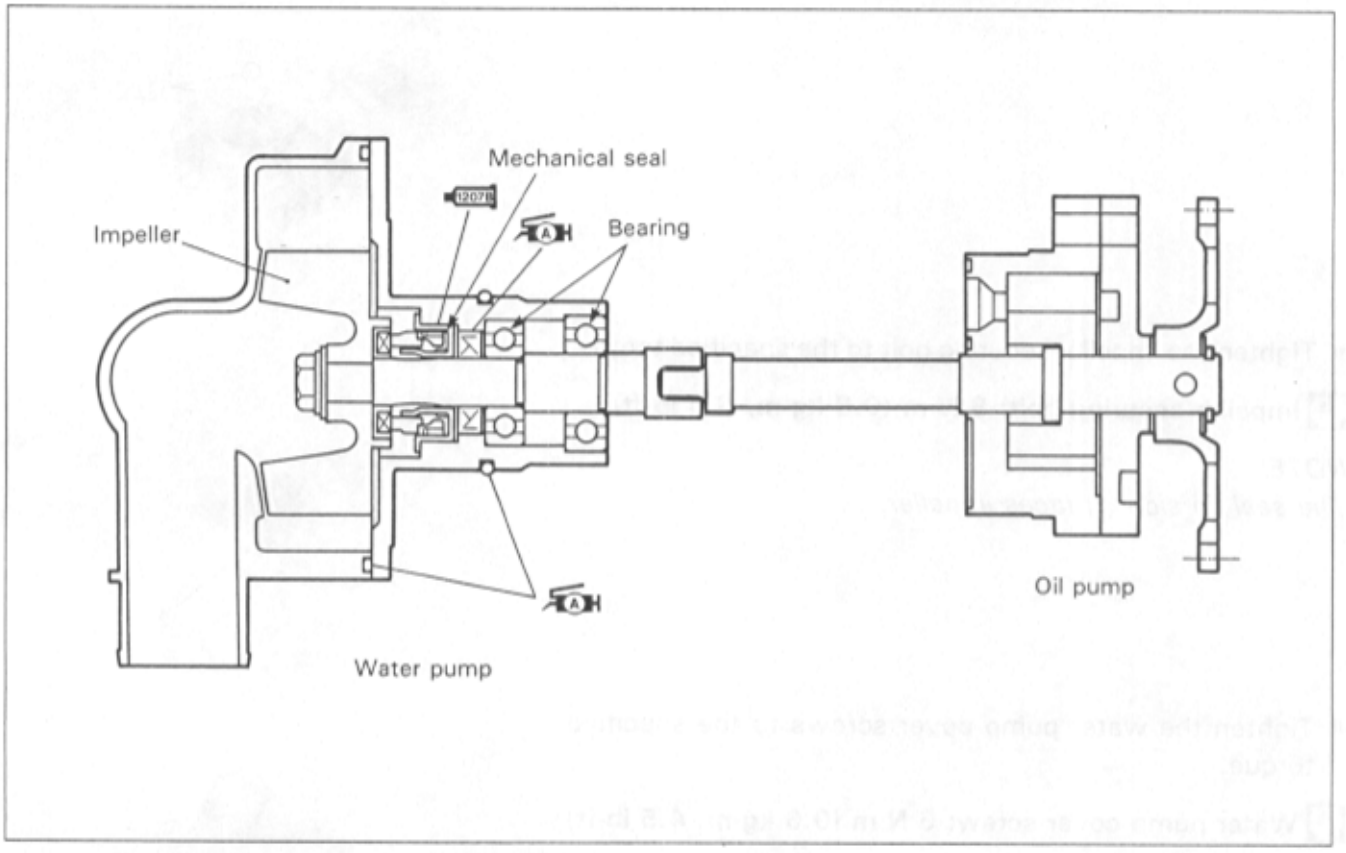
Water pump mounting bolt: 6 N·m (0.6 kg-m, 4.5 lb-ft)

NOTE:

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

99000-25030: SUZUKI SUPER GREASE "A"

* *Set the water pump shaft to the oil pump shaft as shown in the following illustration.*



Refer to page 8-19 for the radiator hose routing.

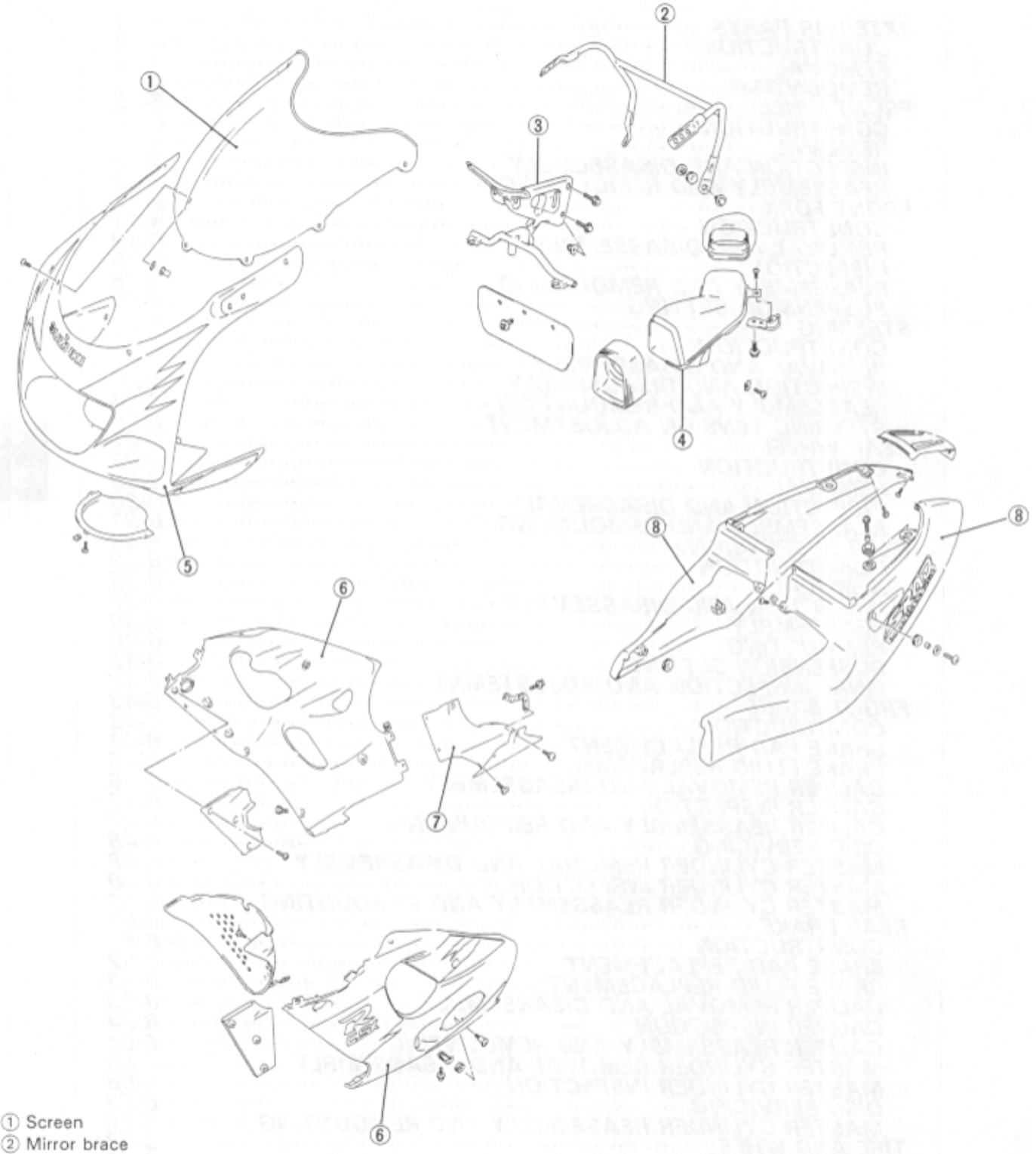
CHASSIS

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EXTERIOR PARTS

CONSTRUCTION

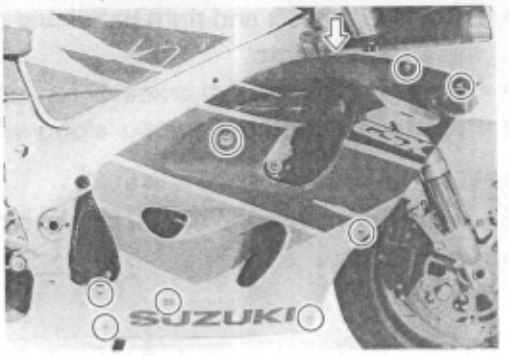


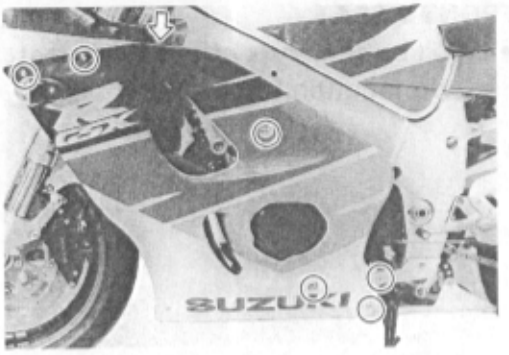
① Screen
② Mirror brace
③ Fairing brace
④ Air intake pipe
⑤ Upper fairing
⑥ Lower fairing
⑦ Under fairing
⑧ Frame cover

REMOVAL

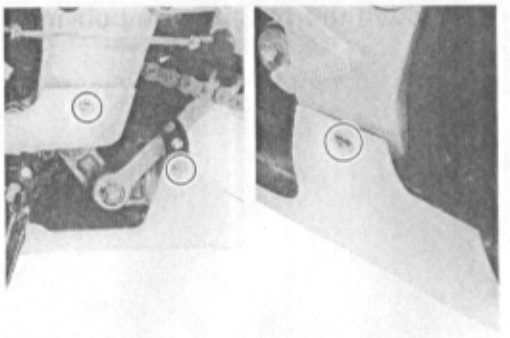
FAIRING

- Remove the lower fairing screws and disconnect the turn signal light lead wire couplers.
- Remove both sides of the lower fairing.

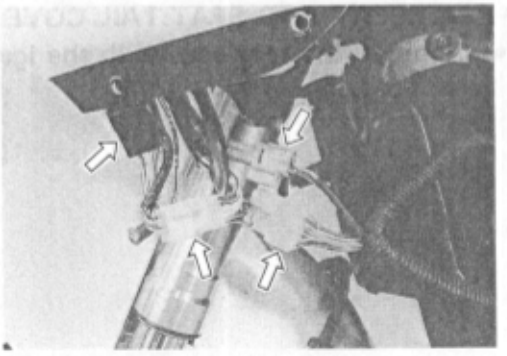




- Remove the under fairing by removing the screws.



- Disconnect the four lead wire couplers under the left air intake pipe.

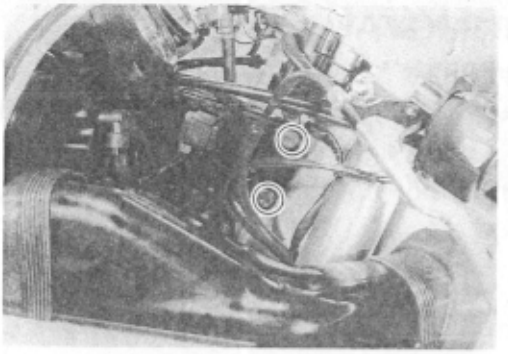


- Remove the rear view mirrors, left and right.
- Remove the mirror brace by removing its mounting bolts.



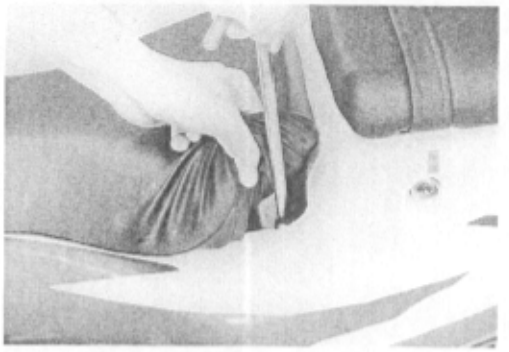
- Release the left and right handlebar switch lead wires from the fixed clamp.
- Remove the fairing brace bolts, upper and lower.
- Remove the upper fairing along with the fairing brace.

NOTE:
Be careful not to drop the air intake pipe when removing the upper fairing.

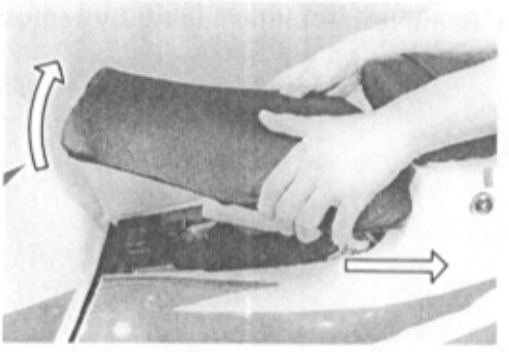


FRONT SEAT

- Pull up the ends of the front seat, and then remove the two mounting bolts.

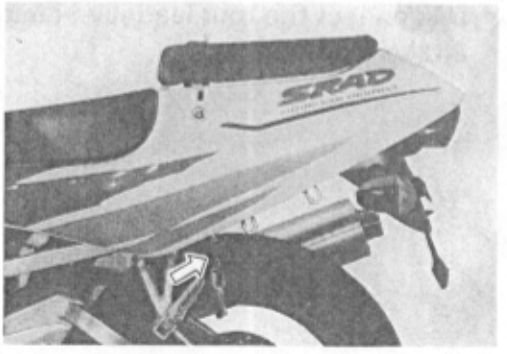


- Remove the front seat by pulling the seat back and up.



REAR SEAT AND SEAT TAIL COVER

- Remove the rear seat with the ignition key.

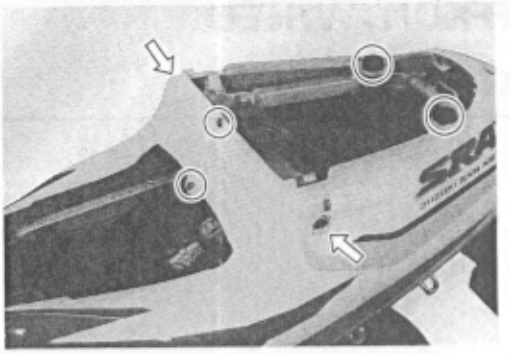


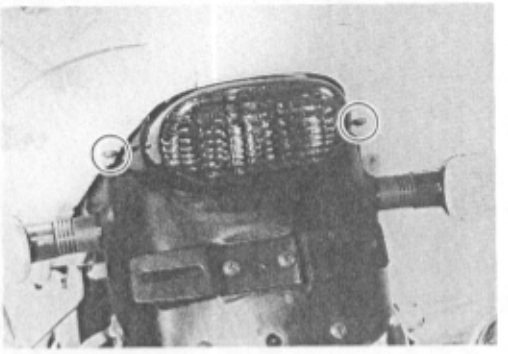
- Remove the seat tail cover with the ignition key.



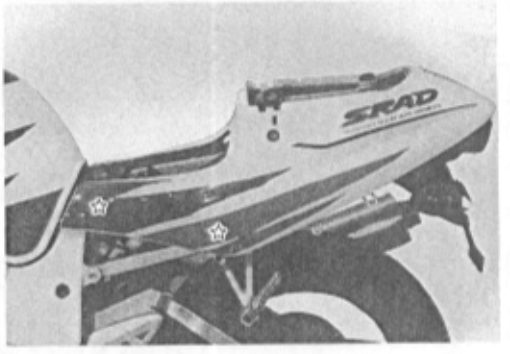
FRAME COVER

- Remove the seats. (Refer to page 6-3.)
- Remove the frame cover mounting screws.





- Extract the hooked parts of the frame cover, left and right.
- Remove the frame cover.



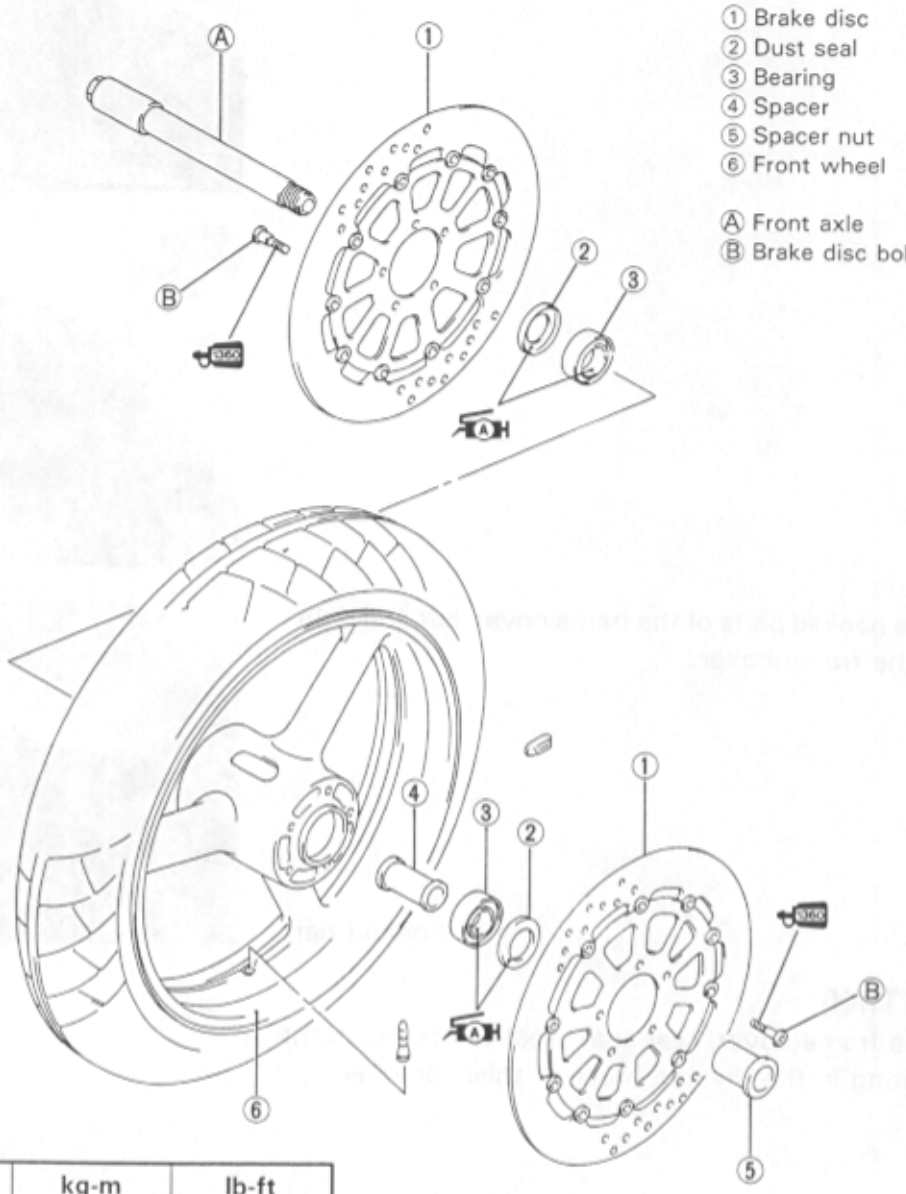
☆hooked part

REMOUNTING

Remount the frame cover, rear seat, seat tail cover, front seat and fairing in the reverse order of thier removal.

FRONT WHEEL

CONSTRUCTION

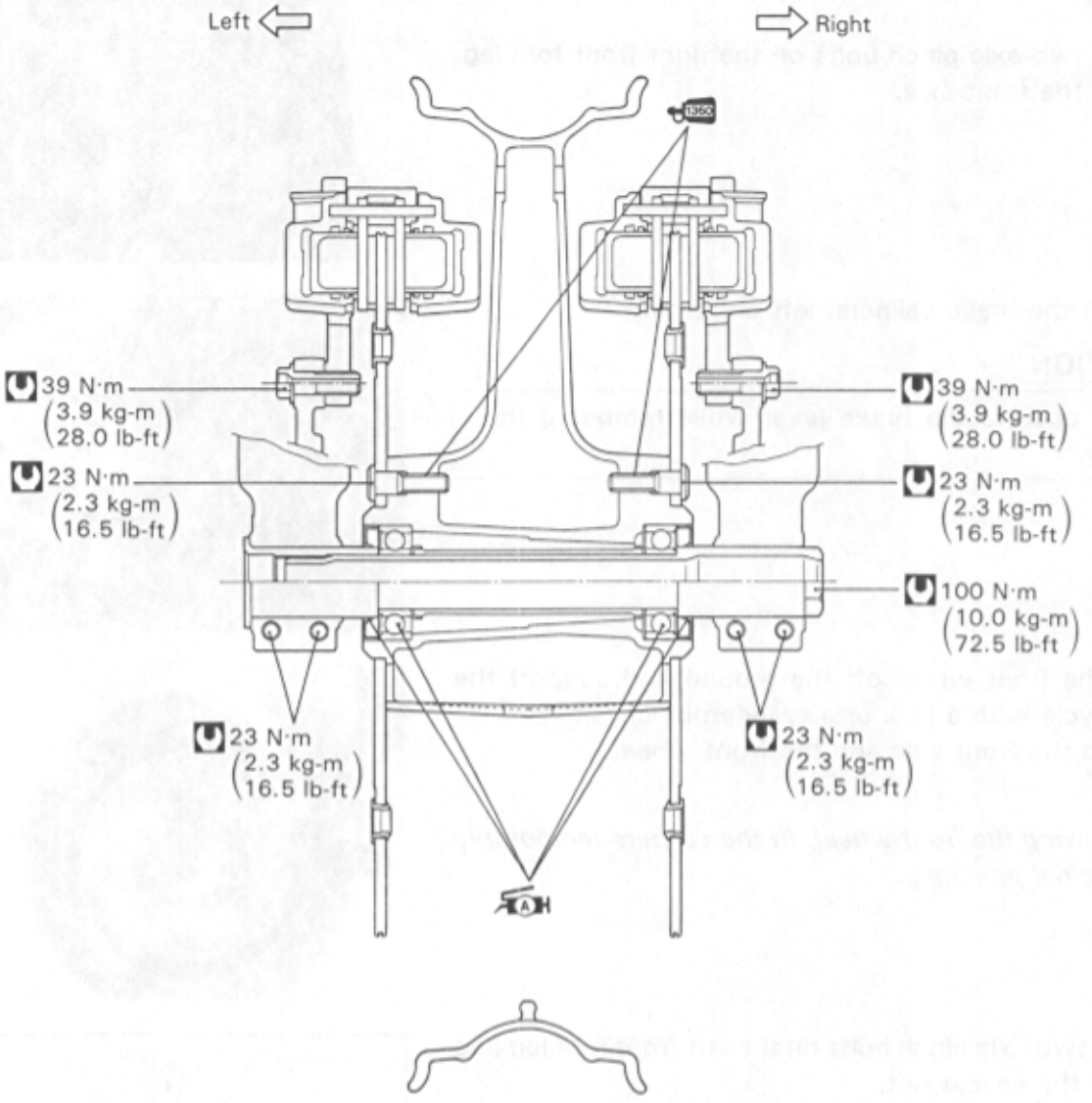


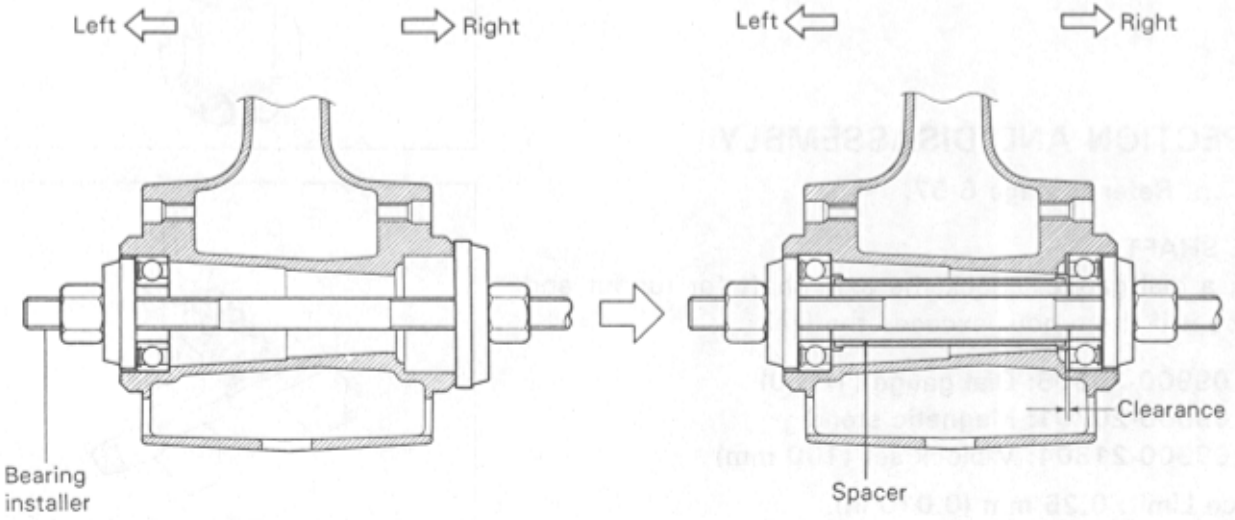
ITEM	N·m	kg-m	lb-ft
Ⓐ	100	10.0	72.5
Ⓑ	23	2.3	16.5

SPECIFICATIONS

Unit: mm (in)

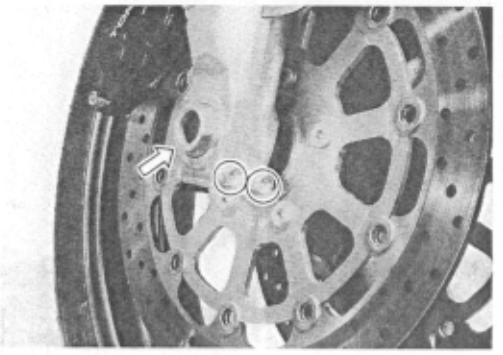
ITEM	STANDARD		LIMIT
Axle runout	Front	———	0.25 (0.010)
Wheel rim runout	Axial	———	2.0 (0.08)
	Radial	———	2.0 (0.08)
Wheel rim size	Front	J17 x MT3.50	———


Left
Right
39 N·m
(3.9 kg-m
28.0 lb-ft)
23 N·m
(2.3 kg-m
16.5 lb-ft)
39 N·m
(3.9 kg-m
28.0 lb-ft)
23 N·m
(2.3 kg-m
16.5 lb-ft)
100 N·m
(10.0 kg-m
72.5 lb-ft)
23 N·m
(2.3 kg-m
16.5 lb-ft)
23 N·m
(2.3 kg-m
16.5 lb-ft)


Left
Right
Left
Right
Bearing
installer
Clearance
Spacer

REMOVAL

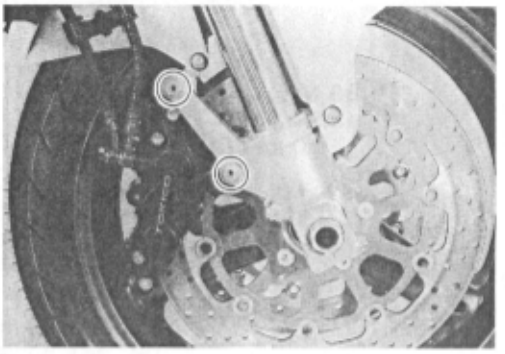
- Remove both sides of the lower fairing. (Refer to page 6-2.)
- Loosen two axle pinch bolts on the right front fork leg.
- Loosen the front axle.



- Remove the brake calipers, left and right.

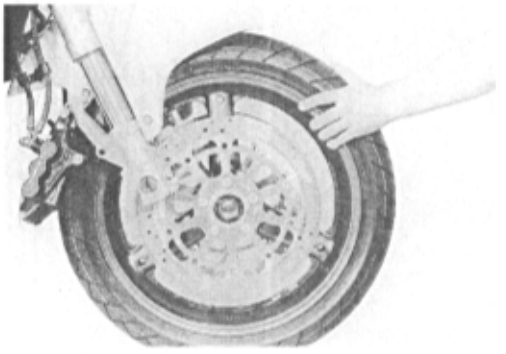
⚠ CAUTION

Do not operate the brake lever while removing the calipers.

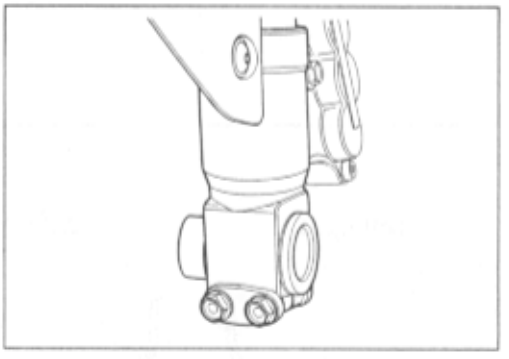


- Raise the front wheel off the ground and support the motorcycle with a jack or a wooden block.
- Remove the front axle and the front wheel.

NOTE:
After removing the front wheel, fit the calipers temporarily to the original positions.



- Loosen two axle pinch bolts on the left front fork leg and remove the spacer nut.



INSPECTION AND DISASSEMBLY

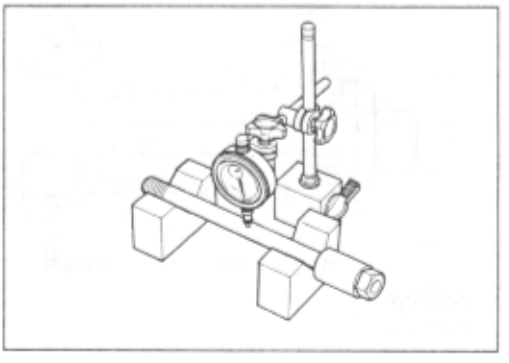
TIRE ..... Refer to page 6-57.

AXLE SHAFT

Using a dial gauge, check the axle shaft for runout and replace it if the runout exceeds the limit.

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

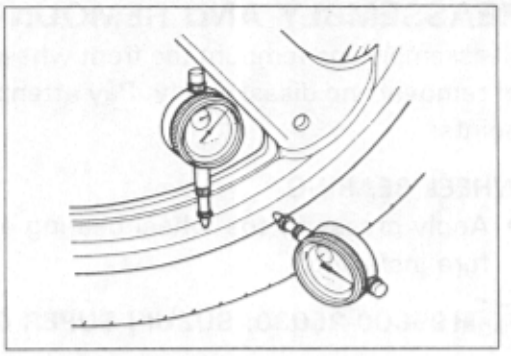
Service Limit: 0.25 mm (0.010 in)



WHEEL

Make sure that the wheel runout checked as shown does not exceed the service limit. An excessive runout is usually due to worn or loosen wheel bearings and can be reduced by replacing the bearings. If bearing replacement fails to reduce the runout, replace the wheel.

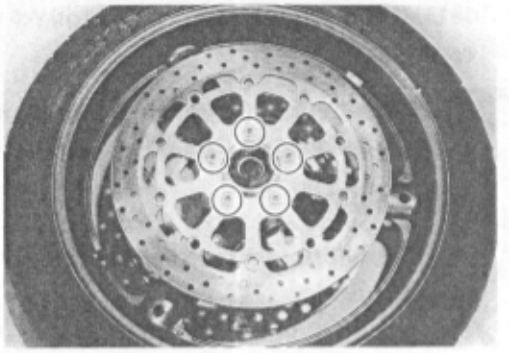
Service Limit (Axial and Radial): 2.0 mm (0.08 in)



BRAKE DISC

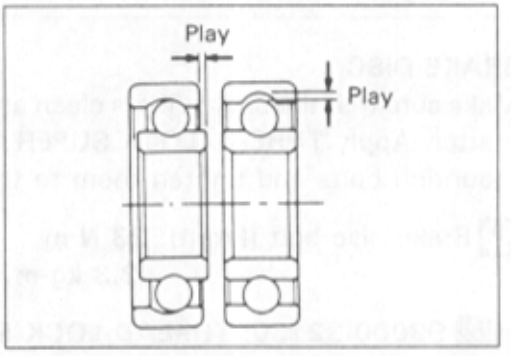
Inspect the brake disc. Replace it if its thickness or runout exceed the limit. (Refer to page 6-48.)

- Remove the brake disc from the front wheel with a hexagon wrench.



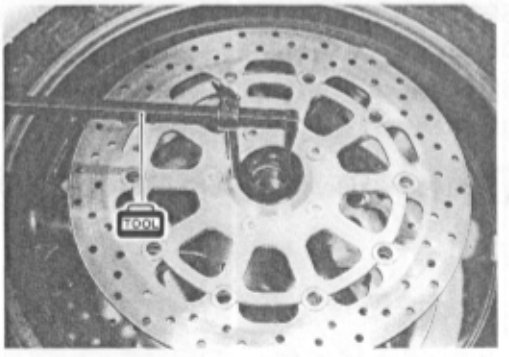
WHEEL BEARINGS

Inspect the play of the wheel bearings by hand while they are in the wheel. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.



- Remove both side dust seals by using the oil seal remover.

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

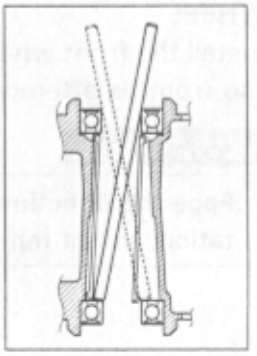


⚠ CAUTION

The removed dust seals must be replaced with new ones.

Drive out both side wheel bearings by using a intensified screw driver.



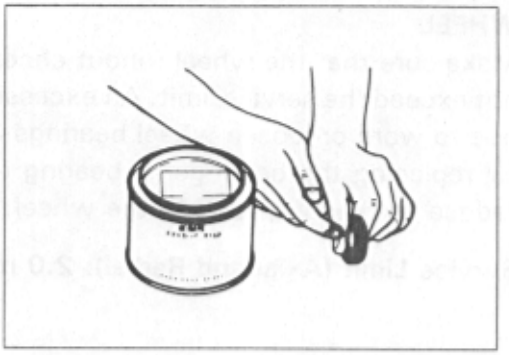


⚠ CAUTION

The removed wheel bearings must be replaced with new ones.

REASSEMBLY AND REMOUNTING

Reassemble and remount the front wheel in the reverse order of removal and disassembly. Pay attention to the following points:



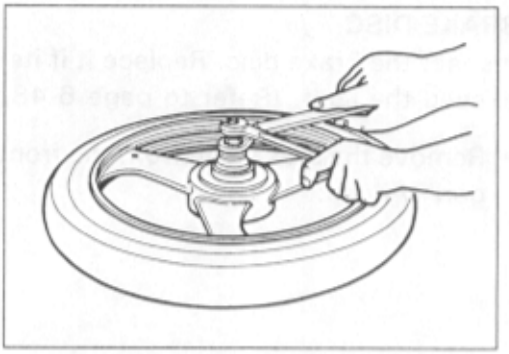
WHEEL BEARING

- Apply grease to the wheel bearing and dust seal lip before installing.

99000-25030: SUZUKI SUPER GREASE "A"

- Install the wheel bearings as follows by using the special tools.

09924-84510: Bearing installer set
09941-34513: Bearing installer set

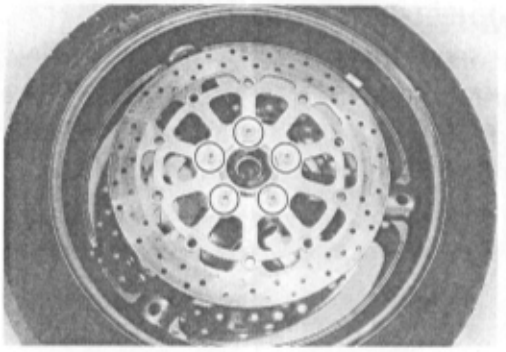


⚠ CAUTION

First install the left wheel bearing, then install the right wheel bearing.
The sealed cover of the bearing must face outside. Refer to page 6-6 for details.

BRAKE DISC

Make sure that the brake disc is clean and free of any greasy matter. Apply THREAD LOCK SUPER "1360" to the disc mounting bolts and tighten them to the specified torque.

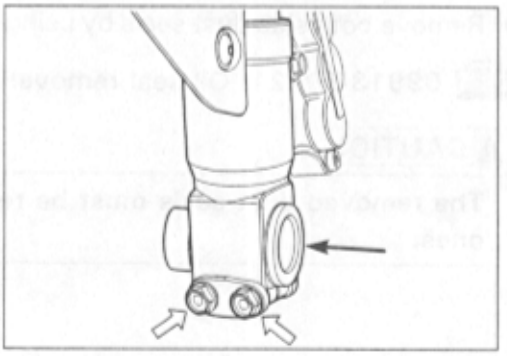


Brake disc bolt (Front): 23 N·m (2.3 kg-m, 16.5 lb-ft)

99000-32130: THREAD LOCK SUPER "1360"

SPACER NUT

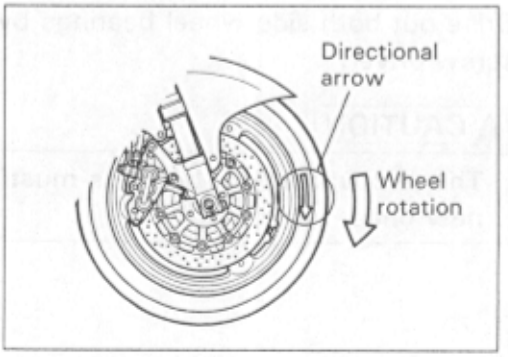
After touching the flange of spacer nut to the left front fork leg, then tighten the two axle pinch bolts on the left front fork leg to the specified torque.



Front axle pinch bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)

WHEEL

Install the front wheel with the front axle and hand-tighten the front axle temporarily.



⚠ WARNING

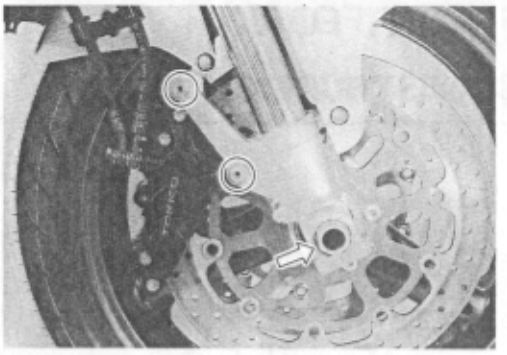
Face the directional arrow on the tire to the wheel rotation, when remounting the wheel.

BRAKE CALIPER

Tighten the brake caliper mounting bolts to the specified torque.

Front brake caliper mounting bolt: 39 N·m (3.9 kg-m, 28.0 lb-ft)

NOTE:
Push the pistons all the way into the caliper and remount the calipers.



FRONT AXLE

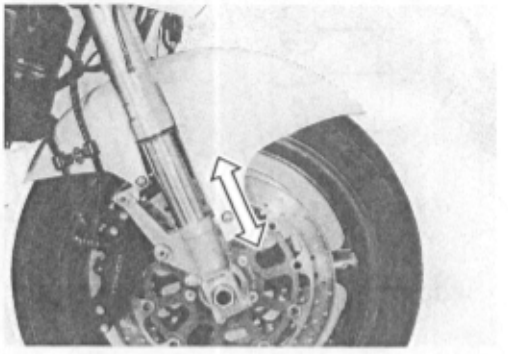
- Tighten the front axle to the specified torque.

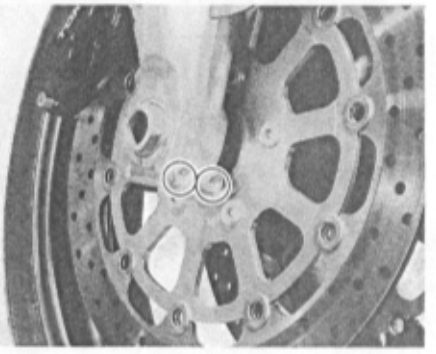
Front axle: 100 N·m (10.0 kg-m, 72.5 lb-ft)

- Tighten two axle pinch bolts on the right front fork leg to the specified torque.

Front axle pinch bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)

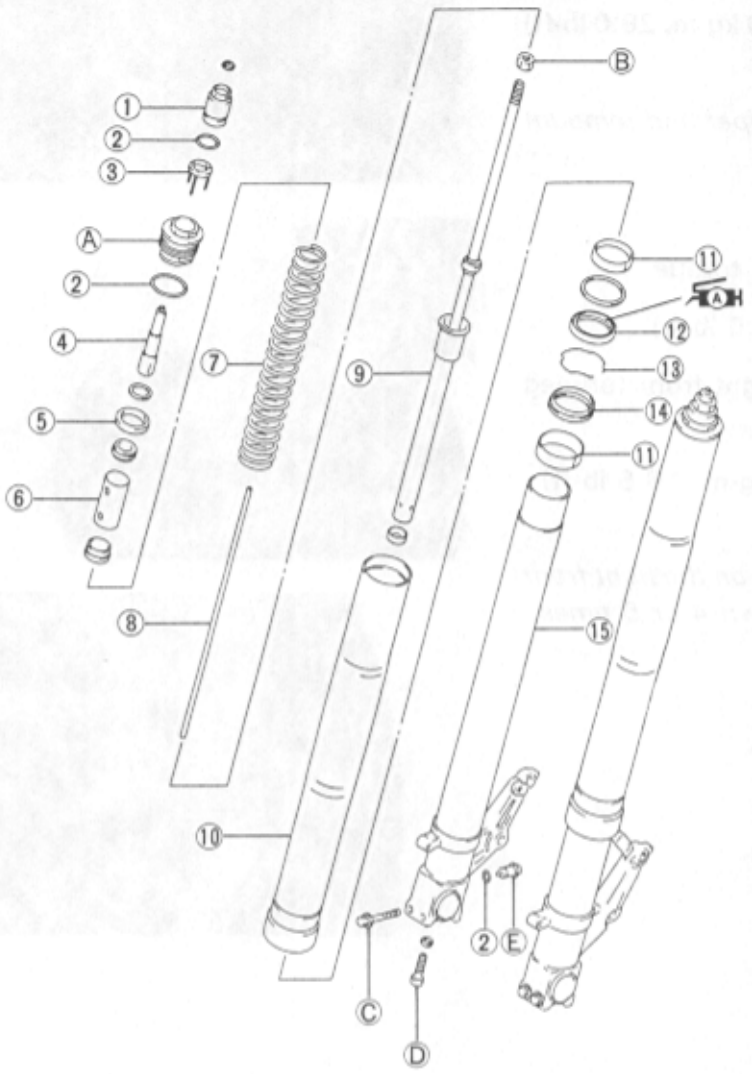
NOTE:
Before tightening the two axle pinch bolts on the right front fork leg, move the front fork up and down 4 or 5 times.





FRONT FORK

CONSTRUCTION



① Spring adjuster bolt
② O-ring
③ Spring adjuster
④ Rebound damping force adjuster
⑤ Rubber seat
⑥ Spacer
⑦ Spring
⑧ Oil flow pipe
⑨ Inner rod/damper rod (cartridge)
⑩ Outer tube
⑪ Anti-friction metal
⑫ Oil seal
⑬ Oil seal stopper ring
⑭ Dust seal
⑮ Inner tube

Ⓐ Front fork cap bolt
Ⓑ Lock nut
Ⓒ Front axle pich bolt
Ⓓ Damper rod bolt
Ⓔ Compression damping force adjuster

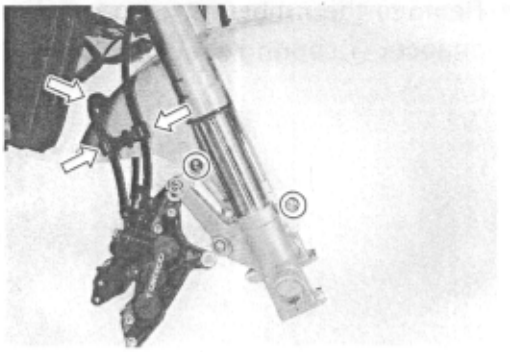
ITEM	N·m	kg-m	lb-ft
Ⓐ	35	3.5	25.5
Ⓑ	20	2.0	14.5
Ⓒ	23	2.3	16.5
Ⓓ	35	3.5	25.5
Ⓔ	18	1.8	13.0

SPECIFICATIONS

ITEM	STANDARD		LIMIT
Front fork stroke	120 mm (4.7 in)		———
Front fork spring free length	———		250 mm (9.9 in)
Front fork oil level	105 mm (4.1 in)		———
Front fork spring adjuster	4th groove from top		———
Front fork damping force adjuster	rebound	At punch mark (about 9/8 turns out)	———
	compression	At punch mark (about 1 turn out)	———
Front fork oil type	Fork oil #10		———
Front fork oil capacity (each leg)	480 ml (16.2/16.9 US/Imp oz)		———

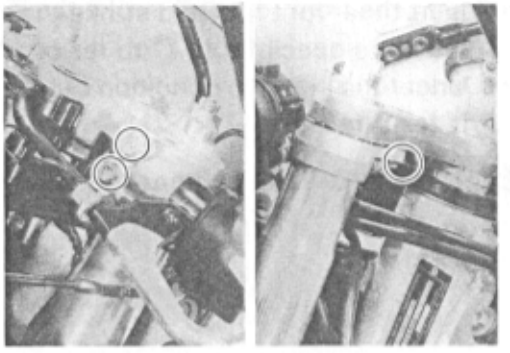
REMOVAL AND DISASSEMBLY

- Remove both sides of the lower fairing. (Refer to page 6-2.)
- Remove the front wheel. (Refer to page 6-7.)
- Disconnect the brake hose from the brake hose guide on the front fender.
- Remove the front fender.

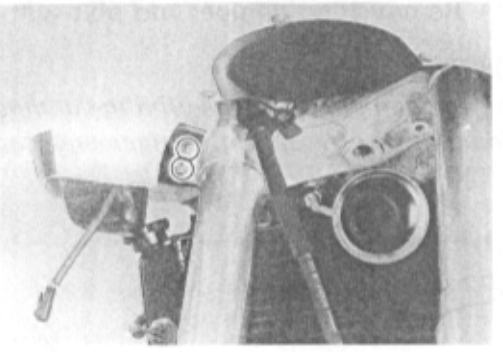


- Loosen the front fork upper clamp bolts, left and right.
- Loosen the handlebar clamp bolts and set bolts, left and right.

NOTE:
Slightly loosen the front fork cap bolts before loosening the lower clamp bolts to facilitate later disassembly.

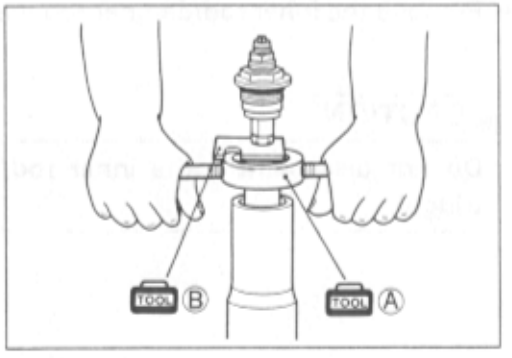


- Loosen the front fork lower clamp bolts, left and right.
- Remove the front forks, left and right.

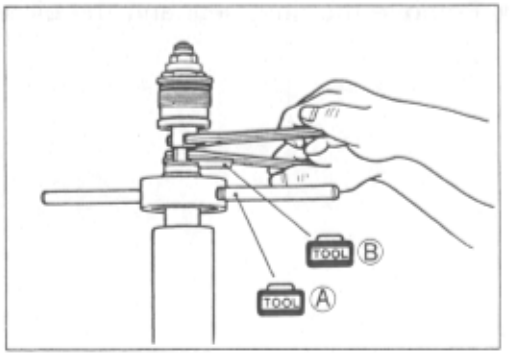


- Loosen the front fork cap bolt completely.
- Compress the fork spring with the front fork spacer holder Ⓐ and insert the stopper plate Ⓑ between the lock nut and the washer.

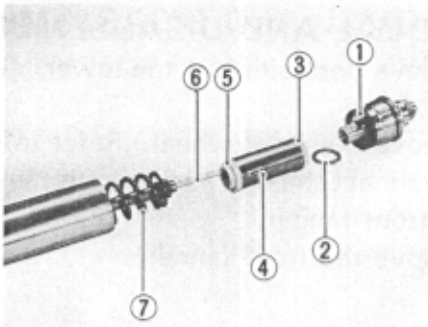
09940-94930: Front fork spacer holder Ⓐ
09940-94921: Stopper plate Ⓑ



- Remove the front fork cap bolt from the inner rod by loosening the lock nut.
- Compress the fork spring with the front fork spacer holder Ⓐ and remove the stopper plate Ⓑ.

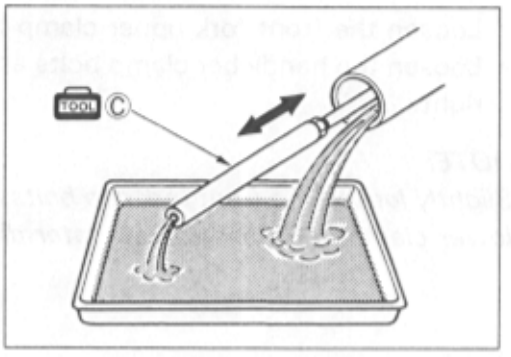


- Remove the rubber seat ①, washer ②, spacer seat ③, spacer ④, spring seat ⑤, oil flow pipe ⑥ and spring ⑦.



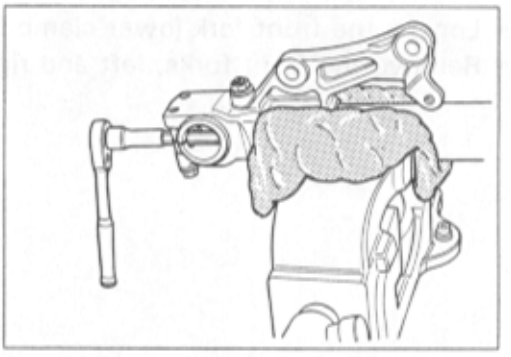
- Invert the front fork and stroke the inner rod several times with the special tool Ⓒ to let out fork oil.
- Under the inverted condition of front fork, drain oil to hold it for a few time.

TOOL 09940-52841: Inner rod holder



- Remove the damper rod bolt with a hexagon wrench.

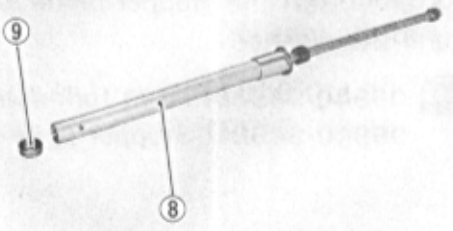
NOTE:
If the damper rod turns with the damper rod bolt, temporarily install the fork spring, spacer and cap bolt.



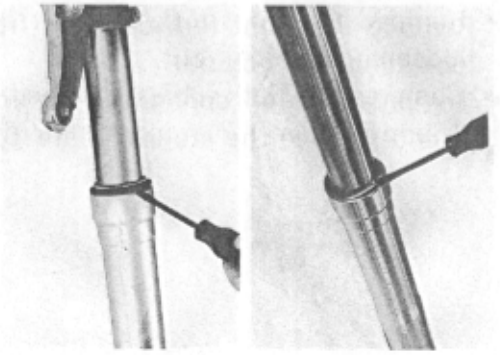
- Remove the inner rod/damper rod (cartridge) ⑧ and plate ⑨.

⚠ CAUTION

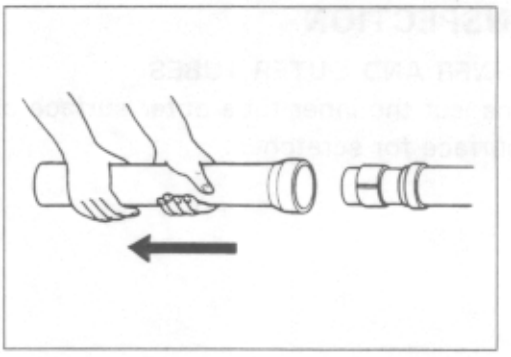
Do not disassemble the inner rod/damper rod (cartridge).



- Remove the dust seal and the oil seal stopper ring.



• Extract the outer tube from the inner tube.



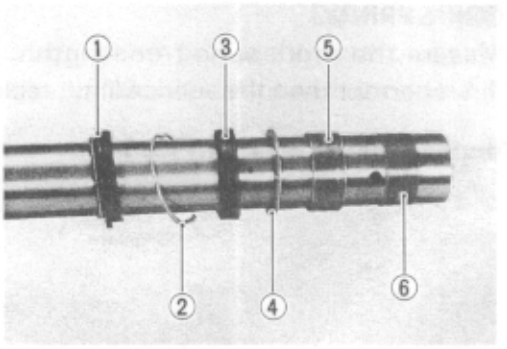
NOTE:
Be careful not to damage the inner tube.

⚠ CAUTION

The "ANTI-FRICTION" metals, oil seals and dust seals must be replaced with new ones, when reassembling the front forks.

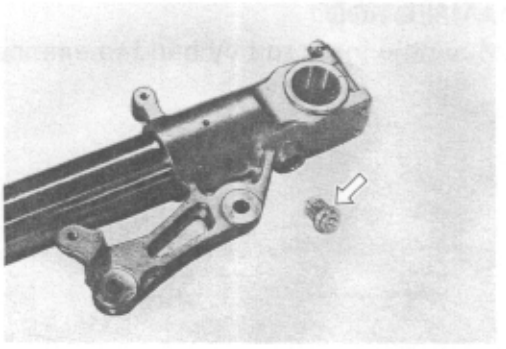
• Remove the following parts.

① Dust seal
② Oil seal stopper ring
③ Oil seal
④ Oil seal retainer
⑤ Anti-friction metal (Outer tube)
⑥ Anti-friction metal (Inner tube)



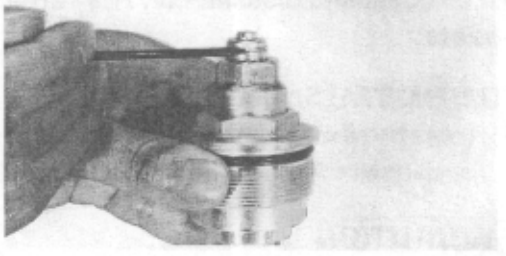
• Remove the compression damping force adjuster.

NOTE:
Never disassemble the compression damping force adjuster.

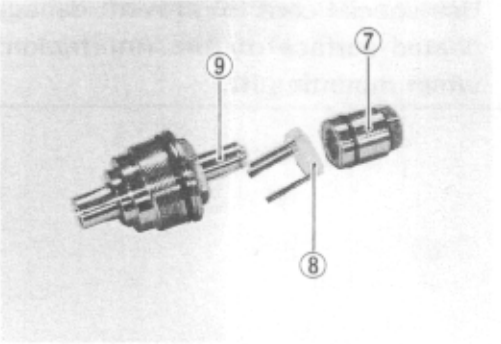


FRONT FORK CAP BOLT DISASSEMBLY

• Remove the spring adjuster stopper ring.



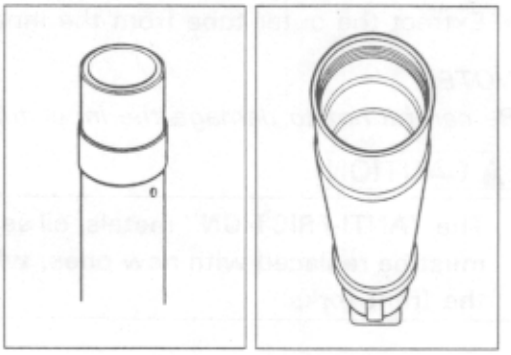
• Remove the spring adjuster bolt ⑦ and adjuster ⑧.
• Remove the rebound damping force adjuster ⑨.



INSPECTION

INNER AND OUTER TUBES

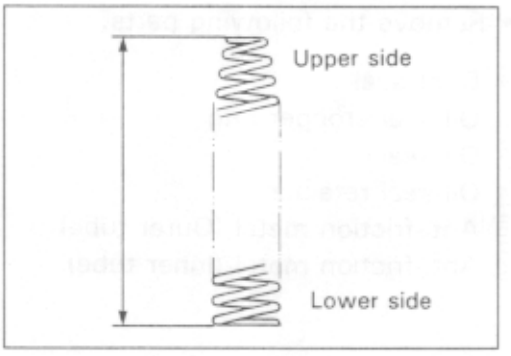
Inspect the inner tube outer surface and outer tube inner surface for scratches.



FORK SPRING

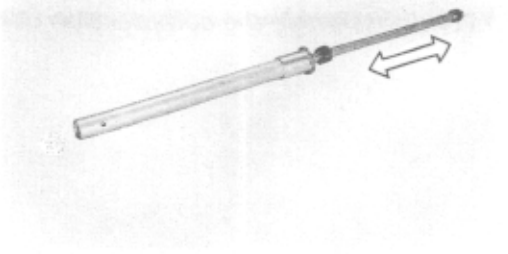
Measure the fork spring free length.
If it is shorter than the service limit, replace it with a new one.

Service Limit: 250 mm (9.9 in)



DAMPER ROD

Move the inner rod by hand to examine it for smoothness.



REASSEMBLY AND REMOUNTING

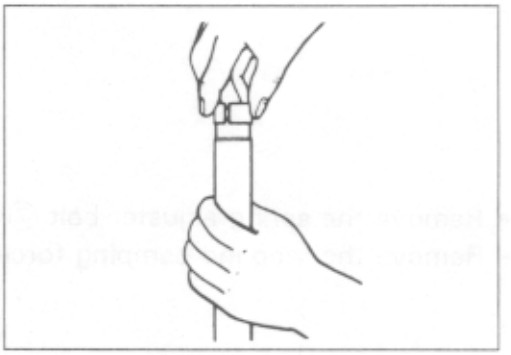
Reassemble and remount the front fork in the reverse order of removal and disassembly. Pay attention to the following points:

TUBE METALS AND SEALS

- Hold the inner tube vertically and clean the metal groove and install the ANTI-FRICTION metal by hand as shown.

⚠ CAUTION

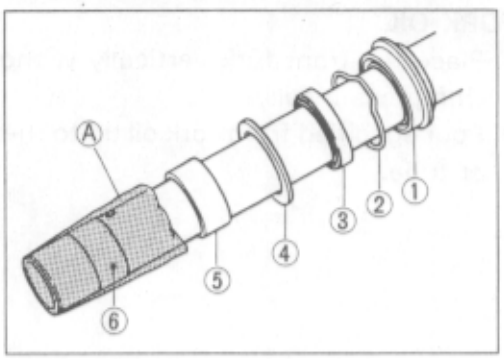
Use special care to prevent damage to the "Teflon" coated surface of the Anti-friction inner tube metal when mounting it.



- Apply grease to the oil seal lip lightly before installing it.

A H 99000-25030: SUZUKI SUPER GREASE "A"

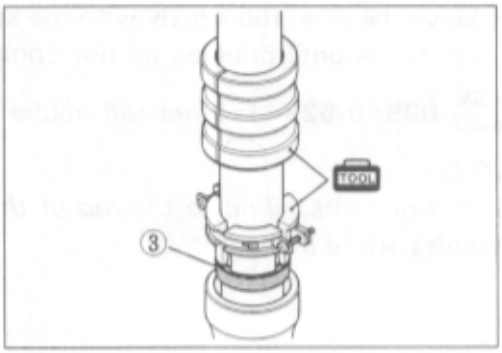
- Install the dust seal, oil seal stopper ring, oil seal, oil seal retainer and anti-friction metal onto the inner tube.



① Dust seal
② Oil seal stopper ring
③ Oil seal
④ Oil seal retainer
⑤ Anti-friction metal (Outer tube)
⑥ Anti-friction metal (Inner tube)

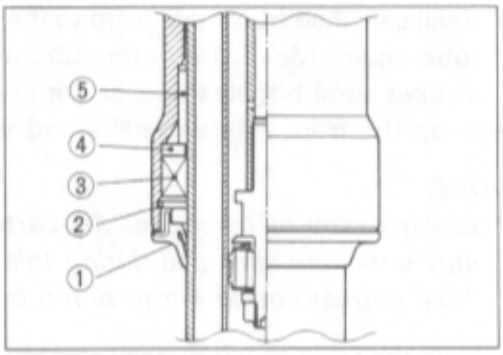
⚠ CAUTION

*** When installing the dust seal ① and oil seal ③ onto the inner tube, protect their seal lips with a vinyl film Ⓐ to prevent oil seal lip damage.**
*** Do not use solvents for washing to prevent oil seal damage.**
*** Apply fork oil to the Anti-friction metals, lip of oil seal and dust seal.**



- Insert the inner tube into the outer tube and fit the oil seal and dust seal with the special tool.

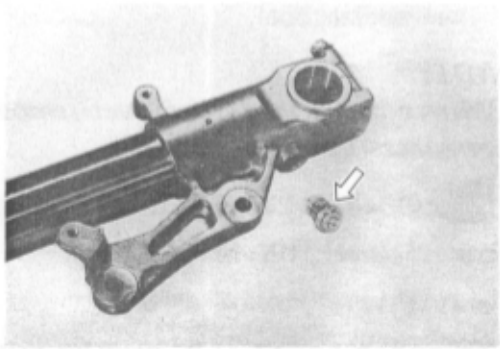
TOOL 09940-52861: Front fork oil seal installer



COMPRESSION DAMPING FORCE ADJUSTER

- Tighten the compression damping force adjuster to the specified torque.

Compression damping force adjuster: 18 N·m (1.8 kg-m, 13.0 lb-ft)



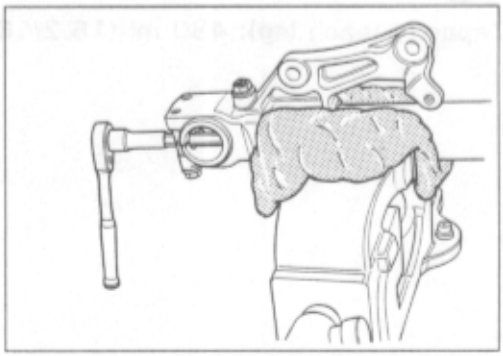
⚠ CAUTION

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

DAMPER ROD BOLT

Insert the inner rod/damper rod (cartridge) and the plate into the inner tube and tighten the damper rod bolt to the specified torque with a hexagon wrench.

Damper rod bolt: 35 N·m (3.5 kg-m, 25.5 lb-ft)



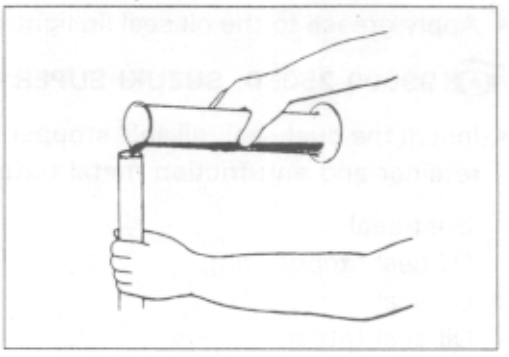
⚠ CAUTION

Use a new damper rod bolt gasket to prevent oil leakage.

NOTE:
If the damper rod turns with the damper rod bolt, temporarily install the fork spring, spacer and cap bolt.

FORK OIL

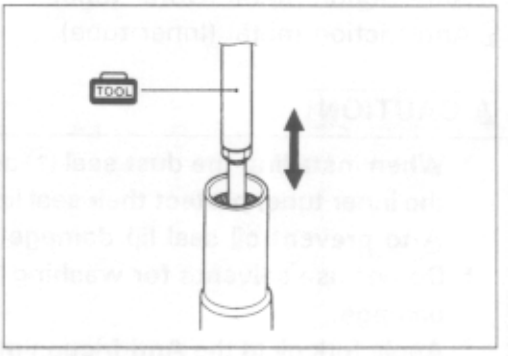
- Place the front fork vertically without spring.
- Compress it fully.
- Pour specified front fork oil up to the top level of the outer tube.



- Move the inner rod slowly with the special tool more than ten times until bubbles do not come out from the oil.

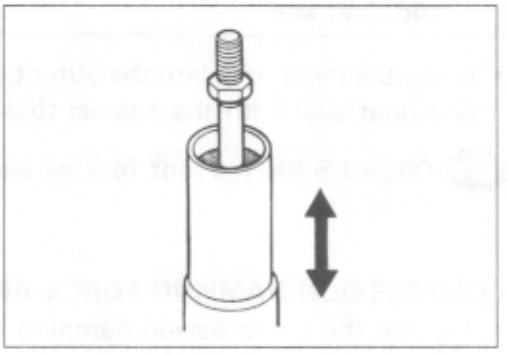
TOOL **09940-52841: Inner rod holder**

NOTE:
Refill front fork oil up to the top of the outer tube to find bubbles while bleeding air.



- Refill specified front fork oil up to the top level of the outer tube again. Move the outer tube up and down several strokes until bubbles do not come out from the oil.
- Keep the front fork vertically and wait 5—6 minutes.

NOTE:
* *Always keep oil level over the cartridge top end, or air may enter the cartridge during this procedure.*
* *Take extream attention to pump out air completely.*



- Hold the front fork vertically and adjust fork oil level with the special tool.

NOTE:
When adjusting the fork oil level, remove the fork spring and compress the outer tube fully.

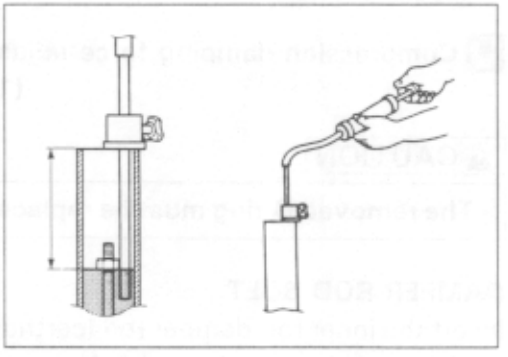
TOOL **09943-74111: Front oil level gauge**

Fork oil level: 105 mm (4.1 in)

Fork oil type: Fork oil #10

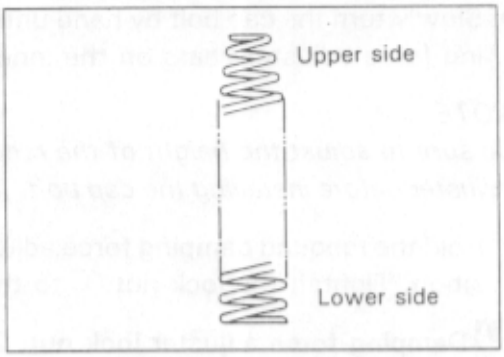
FORK **99000-99044-10G: SUZUKI FORK OIL #10**

Capacity (each leg): 480 ml (16.2/16.9 US/Imp oz)



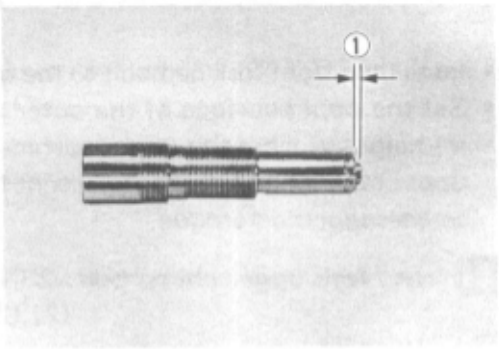
FORK SPRING

- Install the fork spring as shown in the illustration.



FRONT FORK CAP BOLT

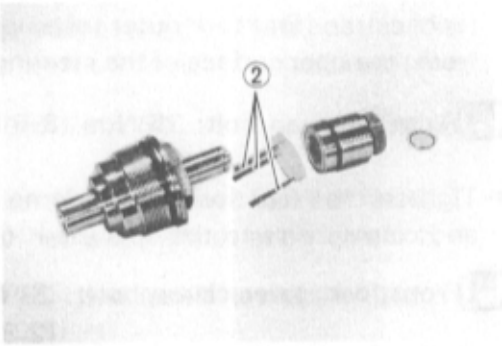
- Adjust the height ① of the rebound damping force adjuster at 1.5 mm (0.06 in).
- Install the rebound damping force adjuster housing to the cap bolt.



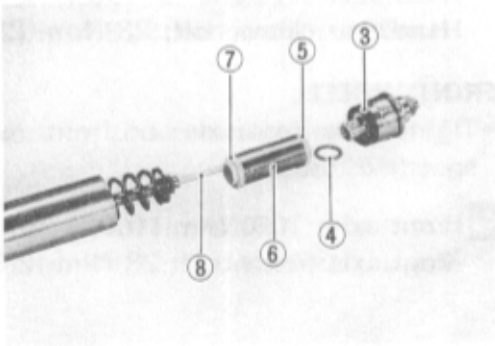
- When installing the spring adjuster to the cap bolt, align the three legs ② of the spring adjuster with the holes of the cap bolt.
- Install the spring adjuster bolt and its stopper ring to the front fork cap bolt.

⚠ CAUTION

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



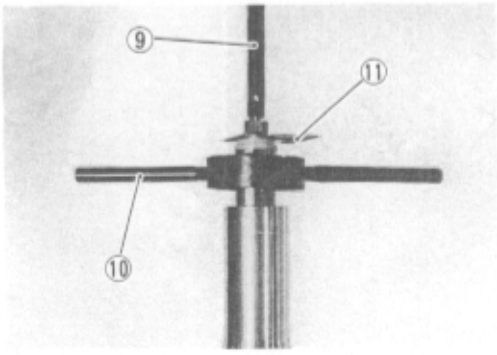
- Install the rubber seat ③, washer ④, spacer seat ⑤, spacer ⑥, spring seat ⑦ and oil flow pipe ⑧.



- While holding the inner rod with the special tool ⑨, compress the spring with the special tool ⑩ and then insert the special tool ⑪ between the lock nut and washer.

NOTE:
Screw the damping force adjuster lock nut fully on the inner rod threads before installing the cap bolt.

TOOL **09940-52841: Inner rod holder ⑨**
09940-94930: Front fork spacer holder ⑩
09940-94921: Stopper plate ⑪



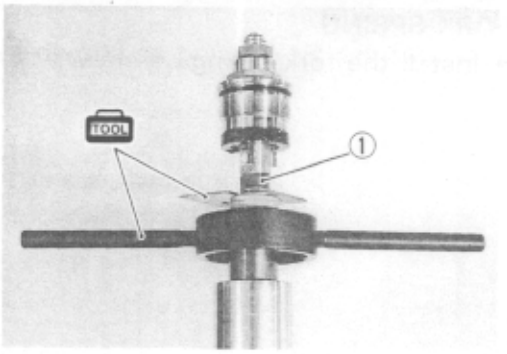
- Slowly turn the cap bolt by hand until the rebound damping force adjuster seats on the inner-rod.

NOTE

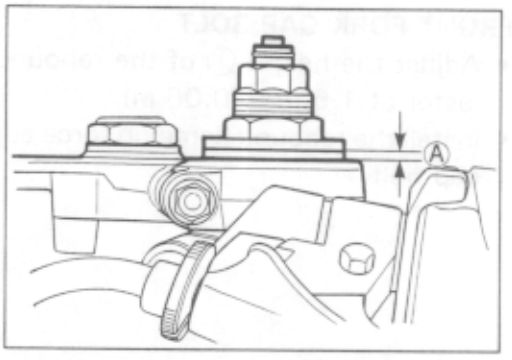
Be sure to adjust the height of the rebound damping force adjuster before installing the cap bolt. (Refer to page 6-18.)

- Hold the rebound damping force adjuster housing in a position. Tighten the lock nut ① to the specified torque.

Damping force adjuster lock nut: 20 N·m (2.0 kg-m, 14.5 lb-ft)

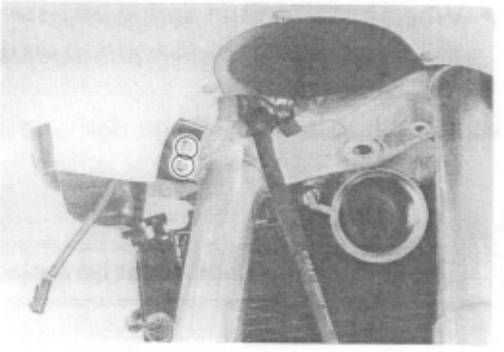


- Install the front fork cap bolt to the outer tube temporarily.
- Set the upper surface of the outer tube at 2.0 mm (0.08 in) height Ⓐ from the upper surface of the steering stem upper bracket and tighten the front fork upper clamp bolts to the specified torque.



Front fork upper clamp bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)

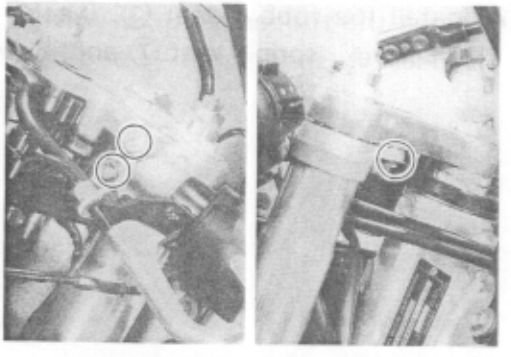
- Tighten the front fork cap bolt to the specified torque and recheck the front fork outer tube upper surface height Ⓐ from the upper surface of the steering stem upper bracket.



Front fork cap bolt: 35 N·m (3.5 kg-m, 25.5 lb-ft)

- Tighten the front fork lower clamp bolts, handlebar set and clamp bolts to the specified torque.

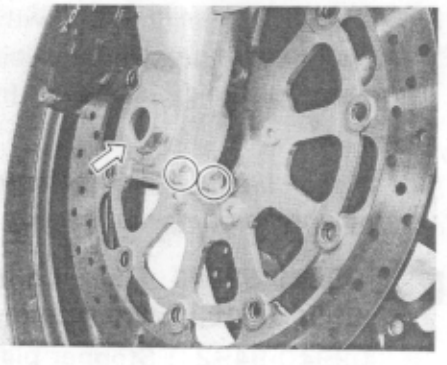
Front fork lower clamp bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)
Handleber set bolt: 10 N·m (1.0 kg-m, 7.0 lb-ft)
Handlebar clamp bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)



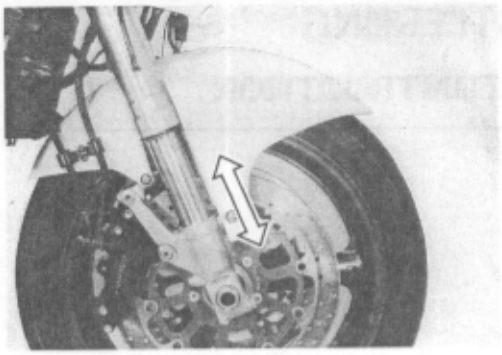
FRONT WHEEL

- Tighten the front axle and front axle pinch bolts to the specified torque.

Front axle: 100 N·m (10.0 kg-m, 72.5 lb-ft)
Front axle pinch bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)



NOTE:
Before tightening the two axle pinch bolts on right front fork leg, move the front fork up and down 4 or 5 times.

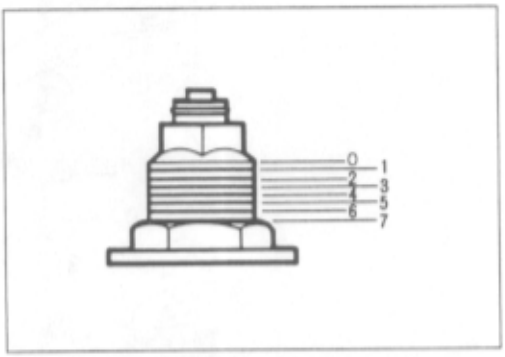


SUSPENSION SETTING

After installing the front fork, adjust the spring pre-load and damping force as follows.

SPRING PRE-LOAD ADJUSTMENT

There are seven grooved lines on the side of the spring adjuster. Position 0 provides the maximum spring pre-load and position 7 provides the minimum spring pre-load.
(STD position: 4)



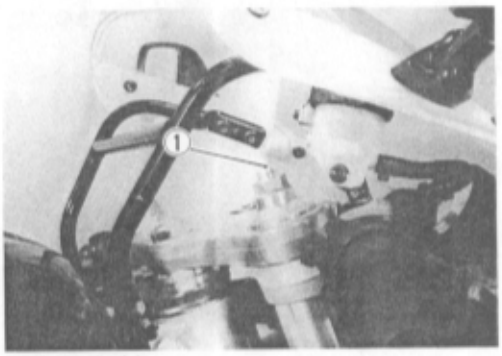
DAMPING FORCE ADJUSTMENT

(Rebound side)

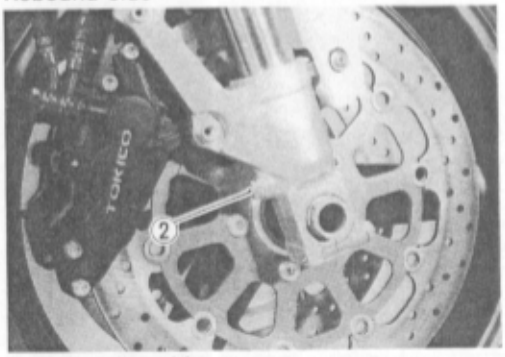
Fully turn the damping force adjuster ① clockwise. It is at stiffest position and turn it out to standard setting position.
(STD position: 9/8 turn out)

(Compression side)

Fully turn the damping force adjuster ② clockwise. It is at stiffest position and turn it out to standard setting position.
(STD position: 1 turn out)



Rebound side



Compression side

STANDARD FRONT SUSPENTION SETTING

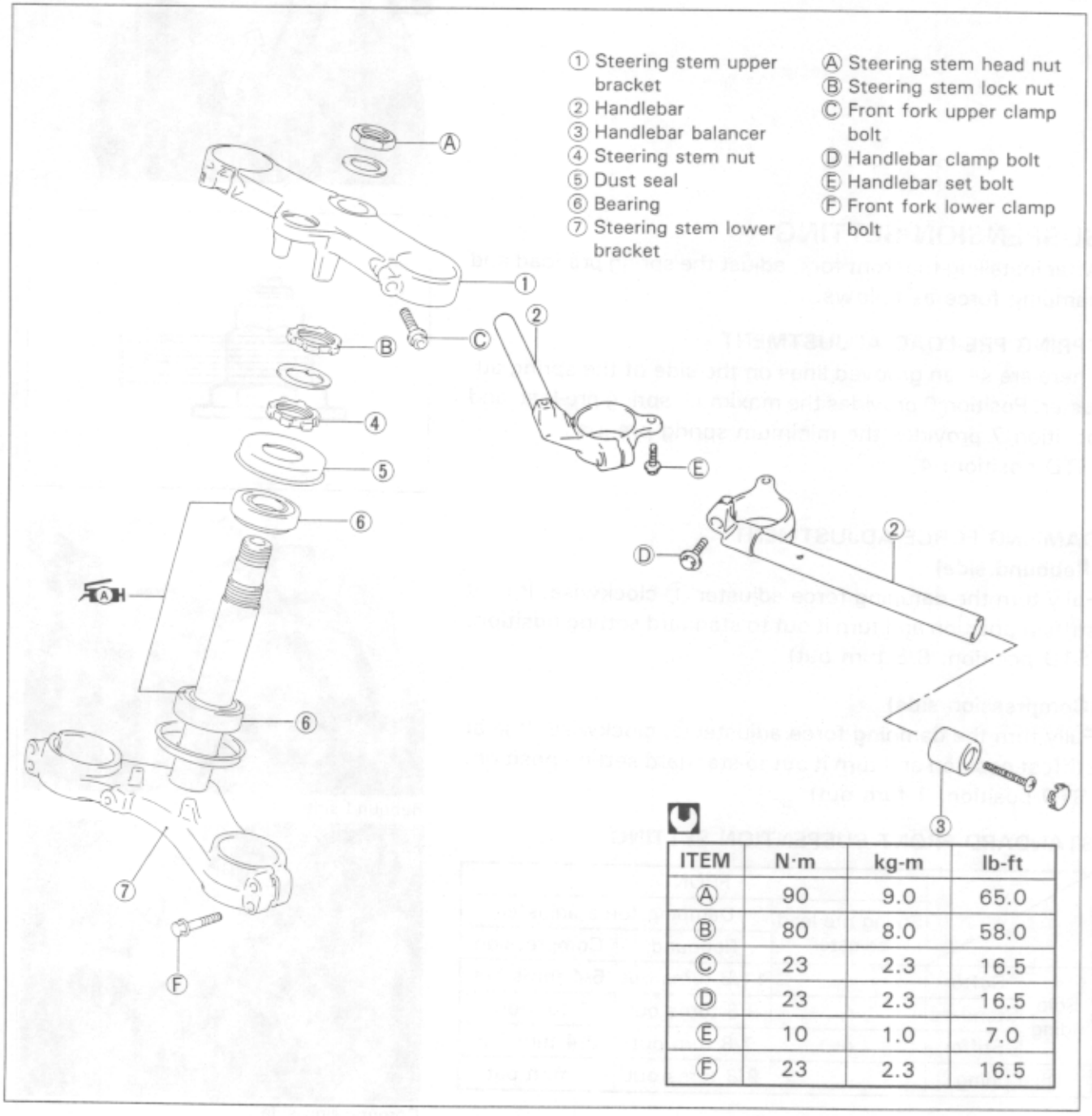
		FRONT		
		Spring pre-load adjuster	Damping force adjuster	
			Rebound	Compression
Solo riding	Softer	4	11/8 turns out	5/4 turns out
	Standard	4	9/8 turns out	1 turn out
	Stiffer	4	7/8 turn out	3/4 turn out
Dual riding		4	9/8 turns out	1 turn out

⚠ WARNING

Be sure to adjust the spring pre-load and damping force on both front fork legs equally.

STEERING

CONSTRUCTION



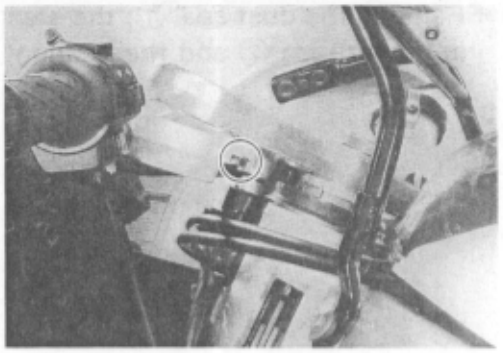
ITEM	N·m	kg-m	lb-ft
Ⓐ	90	9.0	65.0
Ⓑ	80	8.0	58.0
Ⓒ	23	2.3	16.5
Ⓓ	23	2.3	16.5
Ⓔ	10	1.0	7.0
Ⓕ	23	2.3	16.5

REMOVAL AND DISASSEMBLY

- Remove both sides of the lower fairing. (Refer to page 6-2.)
- Remove the front wheel. (Refer to page 6-5.)
- Remove the front fork. (Refer to page 6-11.)

- Remove the left and right handlebars by removing its set bolts.
- Remove the left and right handlebar switch lead wires from the guide.

NOTE:
Place the rags under each handlebar to prevent scratching the upper fairing and the air intake pipes.



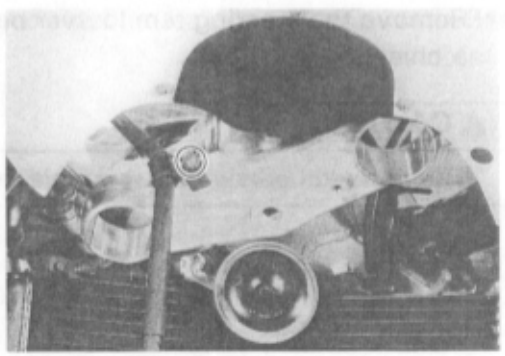
- Disconnect the ignition switch lead wire coupler located behind the radiator.
- Remove the ignition switch lead wire clamp.



- Remove the steering stem upper bracket by removing its head nut.
- Remove the mirror brace. (Refer to page 6-2.)



- Remove the brake hose clamp bolt.

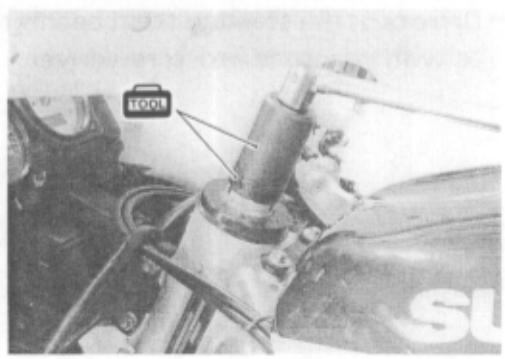


- Remove the steering stem lock nut, the washer and the steering stem nut with the special tools.

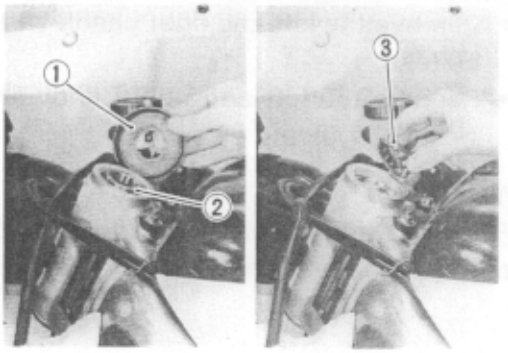
TOOL **09940-14911: Steering stem nut wrench**
09940-14960: Steering stem nut wrench socket

- Draw out the steering stem lower bracket.

NOTE:
Hold the steering stem lower bracket by hand to prevent it from falling.

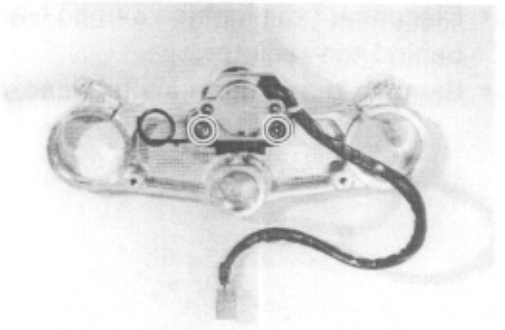


- Remove the dust seal ①, the steering stem upper bearing inner race ② and the bearing ③.



- Remove the ignition switch with the special tool.

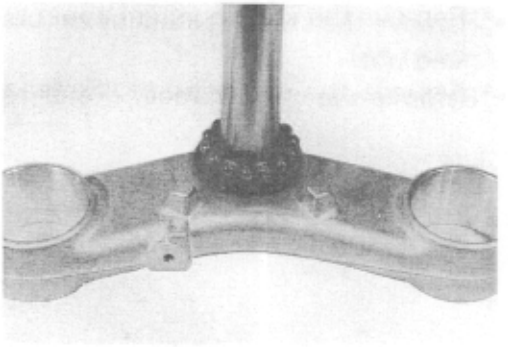
TOOL **09930-11920: Torx bit**
09930-11940: Bit holder



INSPECTION AND DISASSEMBLY

Inspect the removal parts for the following abnormalities.

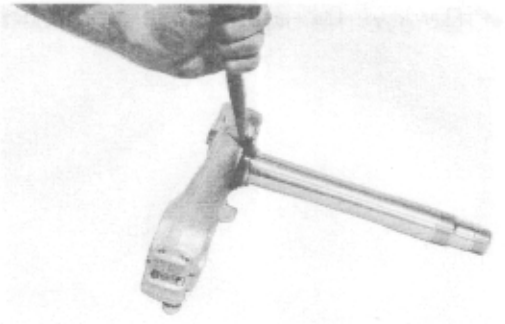
* Handlebar distortion
* Race wear and brinelling
* Bearing wear or damage
* Abnormal noise of bearing
* Distortion of steering stem



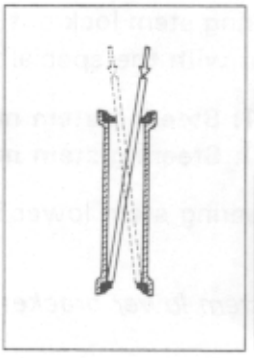
- Remove the steering stem lower bearing inner race with a chisel.

⚠ CAUTION

The removed bearing must be replaced with a new one.



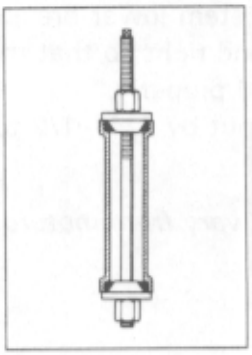
- Drive out the steering stem bearing races upper and lower with a intensified screwdriver.

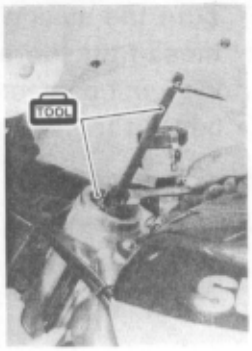




REASSEMBLY AND REMOUNTING

Reassemble and remount the steering stem in the reverse order of removal and disassembly.
Pay attention to the following points:

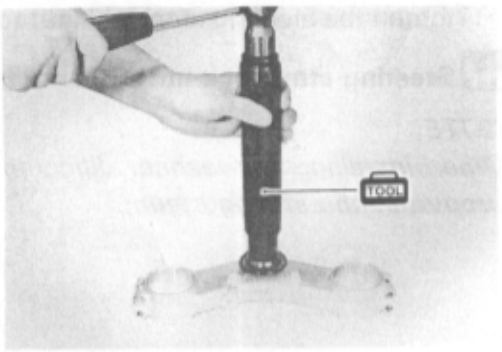




OUTER RACE

- Press in the upper and lower bearing outer races with the special tools.

TOOL **09941-34513: Steering outer race installer**
09924-84510: Bearing installer



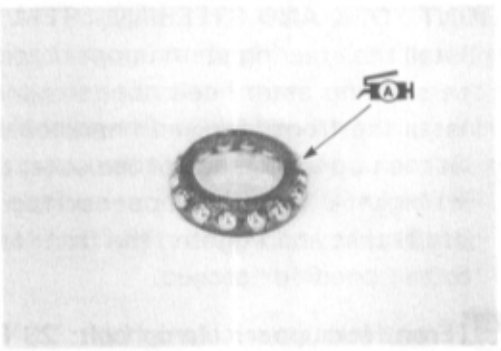
INNER RACE

- Press in the lower bearing inner race with the special tool.

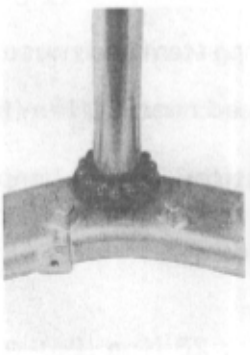
TOOL **09925-18010: Steering bearing installer**

- Apply grease to upper and lower bearings before remounting the steering stem.

A H **99000-25030: SUZUKI SUPER GREASE "A"**



- Install the bearing.



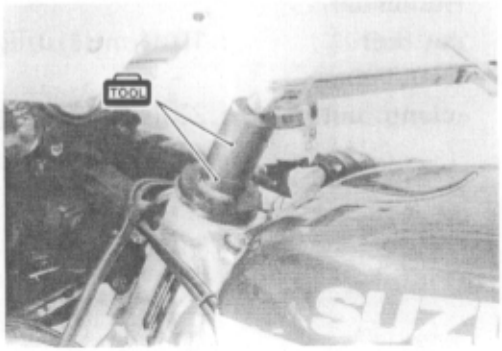


STEM NUT

- Tighten the steering stem nut to the specified torque.

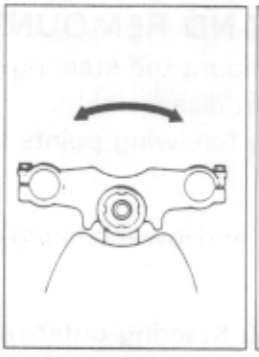
TOOL **09940-14911: Steering stem nut wrench**
09940-14960: Steering stem nut wrench socket

Steering stem nut: 45 N·m (4.5 kg-m, 32.5 lb-ft)



- Turn the steering stem lower bracket about five or six times to the left and right so that the angular ball bearings will be seated properly.
- Loosen the stem nut by 1/4—1/2 turn.

NOTE:
This adjustment will vary from motorcycle to motorcycle.

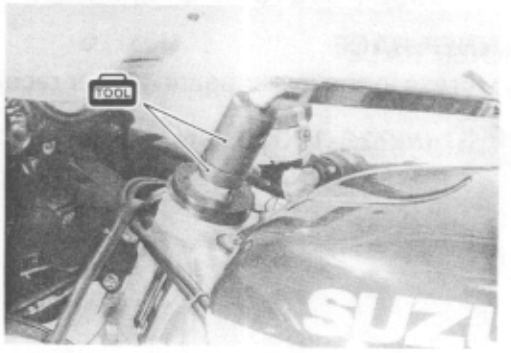




- Tighten the steering stem lock nut to the specified torque.

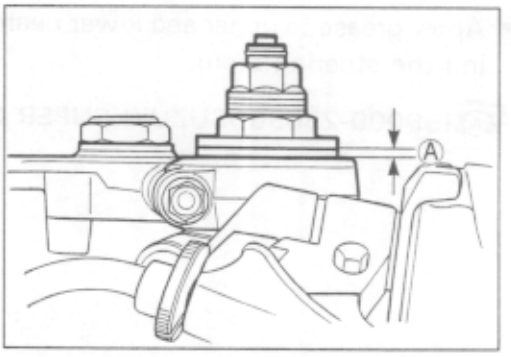
Steering stem lock nut: 80 N·m (8.0 kg-m, 58.0 lb-ft)

NOTE:
When installing the washer, align the stopper lug to the groove of the steering stem.



FRONT FORK AND STEERING STEM UPPER BRACKET

- Install the steering stem upper bracket and hand-tighten the steering stem head nut temporarily.
- Install the front fork and handlebars temporarily.
- Set the upper surface of the outer tube at 2.0 mm (0.08 in) height Ⓐ from the upper surface of steering stem upper bracket and tighten the front fork upper clamp bolts to the specified torque.



Front fork upper clamp bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)

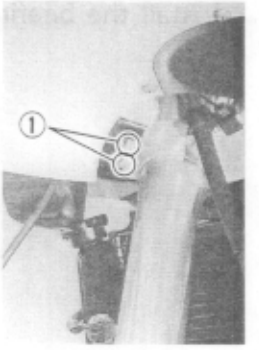
- Tighten the steering stem head nut to the specified torque.

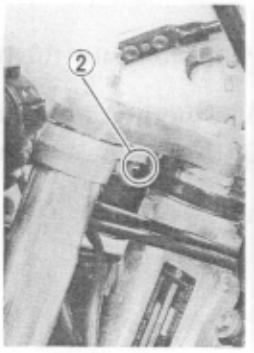
Steering stem head nut: 90 N·m (9.0 kg-m, 65.0 lb-ft)

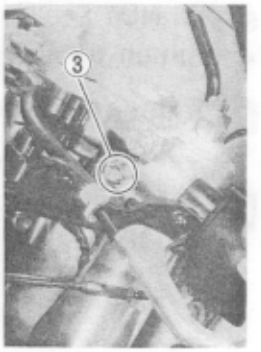
- Tighten the front fork lower clamp bolt ①, handlebar holder set bolt ② and handlebar holder mounting bolt ③ to the specified torque.

Front fork lower clamp bolt ① : 23 N·m (2.3 kg-m, 16.5 lb-ft)
Handlebar set bolt ② : 10 N·m (1.0 kg-m, 7.0 lb-ft)
Handlebar clamp bolt ③ : 23 N·m (2.3 kg-m, 16.5 lb-ft)





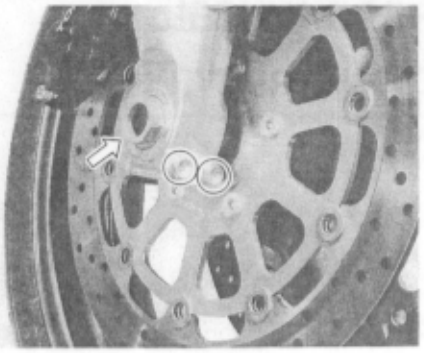




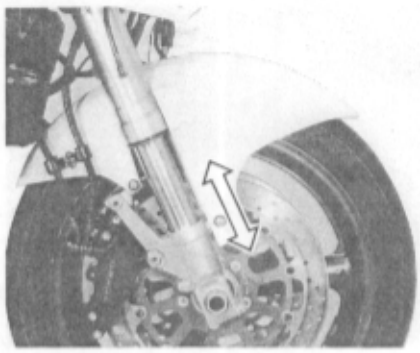
FRONT WHEEL

- Tighten the front axle and front axle pinch bolts to the specified torque.

Front axle: 100 N·m (10.0 kg-m, 72.5 lb-ft)
Front axle pinch bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)



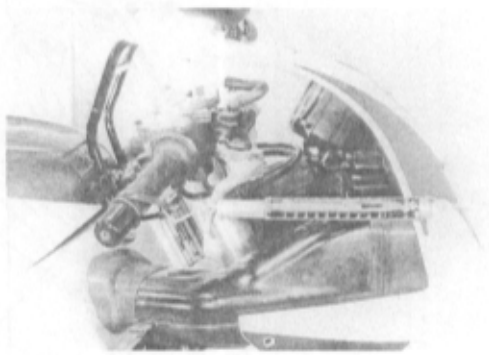
NOTE:
Before tightening the two axle pinch bolts on the right front fork leg, move the front fork up and down 4 or 5 times.



STEERING TENSION ADJUSTMENT

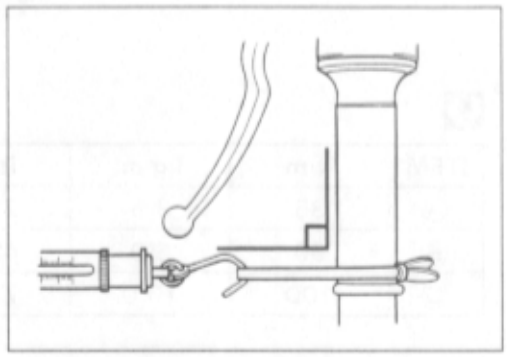
Check the steering movement in the following procedure.

- By supporting the motorcycle with a jack, lift the front wheel until it is off the floor by 20—30 mm (0.8—1.2 in).
- Check to make sure that the cables and wire harnesses are properly routed. (Refer to pages 8-13 through -16.)
- With the front wheel in the straight ahead state, hitch the spring scale (special tool) on one handlebar grip end as shown in the figure and read the graduation when the handlebar starts moving. Do the same on the other grip end.

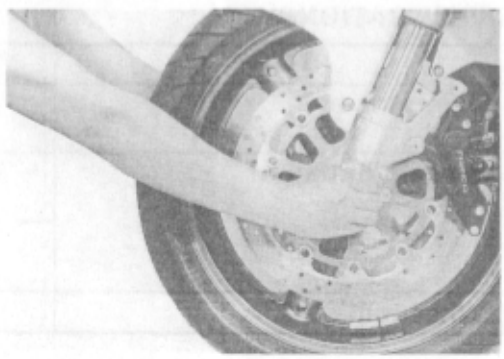


Initial force: 200—500 grams

TOOL 09940-92720: Spring scale



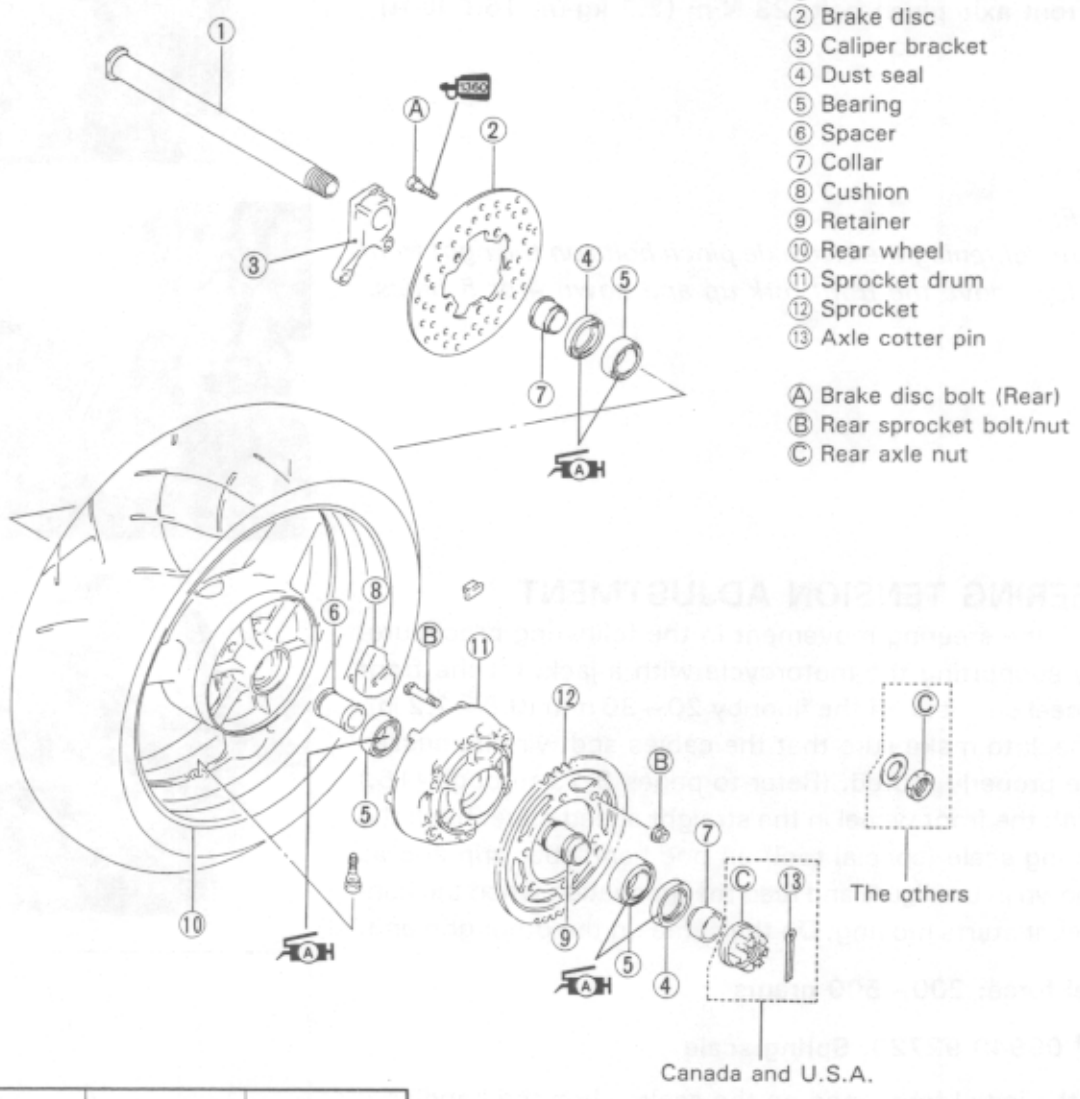
- If the initial force read on the scale when the handlebar starts turning is either too heavy or too light, adjust it till it satisfies the specification.
  1) First, loosen the front fork lower clamp bolts, steering stem head nut, steering stem nut and its lock nut, and then adjust the steering stem nut by loosening or tightening it.
  2) Tighten the steering stem lock nut, stem head nut and front fork lower clamp bolts to the specified torque and re-check the initial force with the spring scale according to the previously described procedure.
  3) If the initial force is found within the specified range, adjustment has been completed.



NOTE:
Hold the front fork legs, move them back and forth and make sure that the steering is not loose.

REAR WHEEL

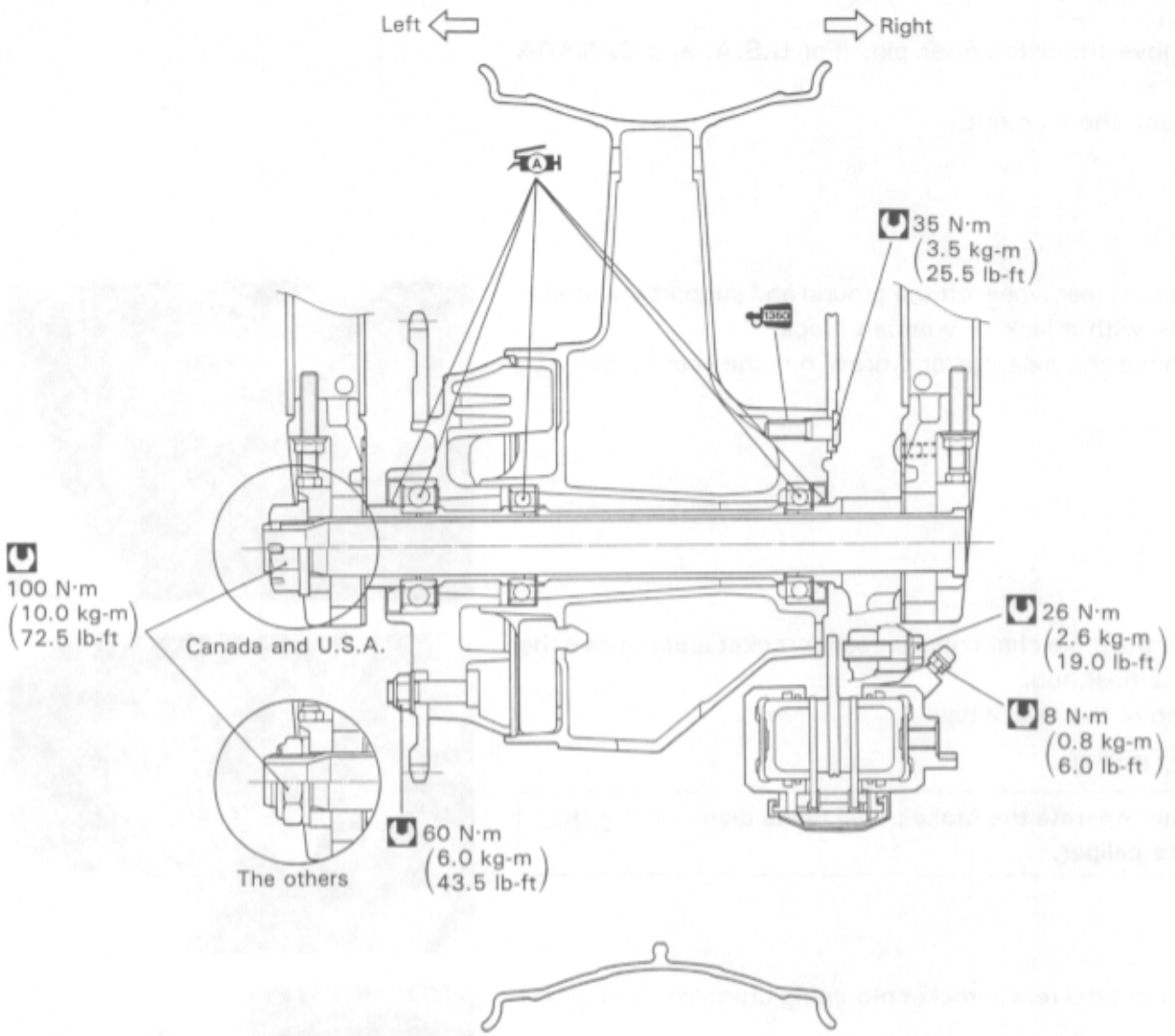
CONSTRUCTION

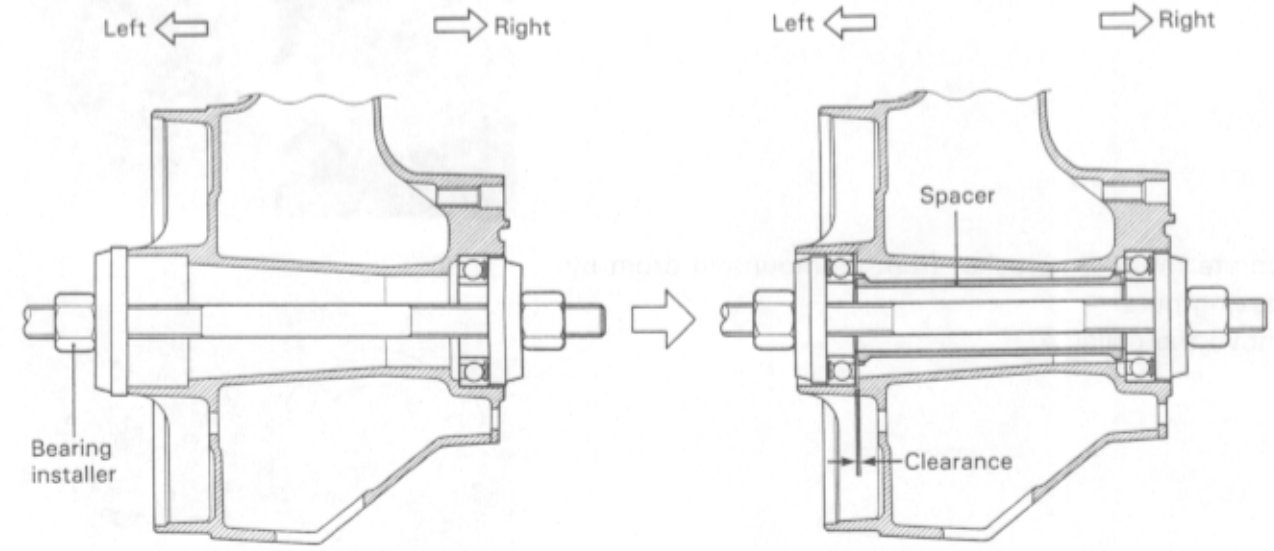


ITEM	N·m	kg-m	lb-ft
Ⓐ	35	3.5	25.5
Ⓑ	60	6.0	43.5
Ⓒ	100	10.0	72.5

SPECIFICATIONS

ITEM	STANDARD		LIMIT
Axle runout	Rear	———	0.25 (0.010)
Wheel rim runout	Axial	———	2.0 (0.08)
	Radial	———	2.0 (0.08)
Wheel rim size	Rear	J17 x MT6.00	———

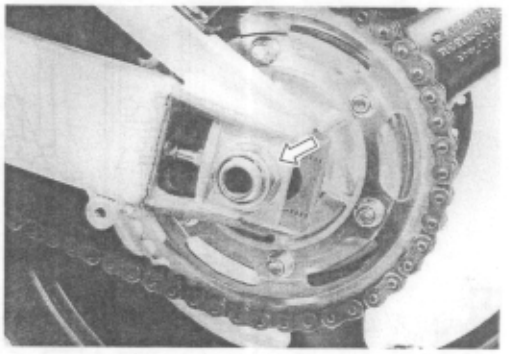

Left
Right
A
35 N·m
(3.5 kg-m
25.5 lb-ft)
100 N·m
(10.0 kg-m
72.5 lb-ft)
Canada and U.S.A.
26 N·m
(2.6 kg-m
19.0 lb-ft)
8 N·m
(0.8 kg-m
6.0 lb-ft)
60 N·m
(6.0 kg-m
43.5 lb-ft)
The others


Left
Right
Left
Right
Spacer
Bearing
installer
Clearance

REMOVAL

- Remove both sides of the lower fairing. (Refer to page 6-2.)
- Remove the axle cotter pin. (For U.S.A. and CANADA models)
- Loosen the axle nut.

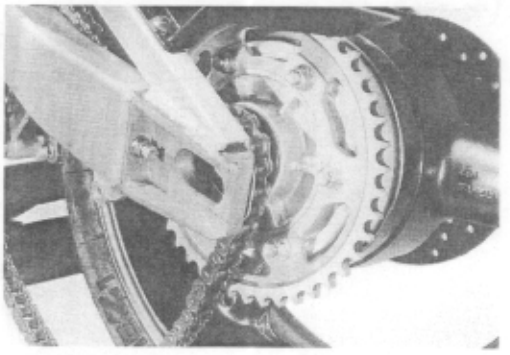
- Raise the rear wheel off the ground and support the motorcycle with a jack or wooden block.
- Remove the axle nut and draw out the rear axle.



- Take the drive chain off the rear sprocket and remove the rear wheel hub.
- Remove the rear wheel.

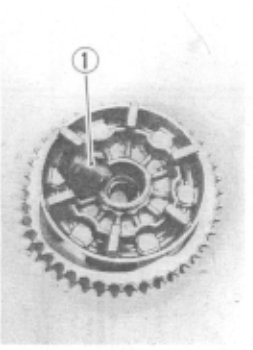
⚠ CAUTION

Do not operate the brake pedal while dismounting the brake caliper.

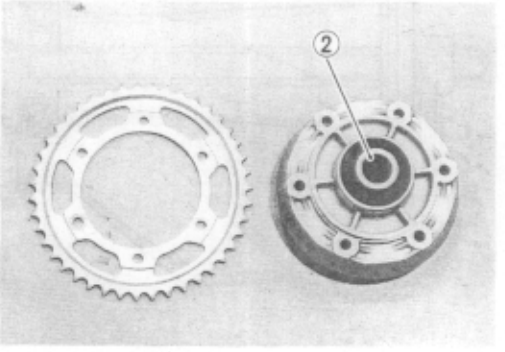


- Draw out the rear sprocket mounting drum from the wheel hub.
- Remove the rear sprocket mounting drum retainer ①.



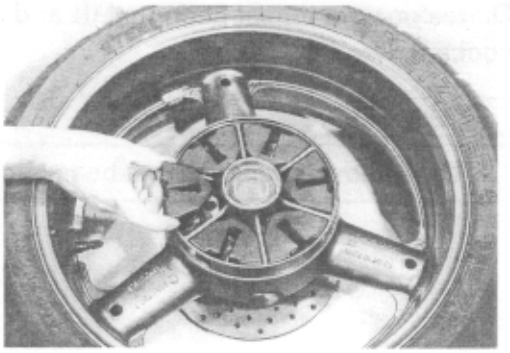


- Separate the rear sprocket from its mounting drum by removing nuts.
- Remove the collar ②.



INSPECTION AND DISASSEMBLY

TIRE ..... Refer to page 6-57.
AXLE SHAFT ..... Refer to page 6- 7.
WHEEL ..... Refer to page 6- 8.



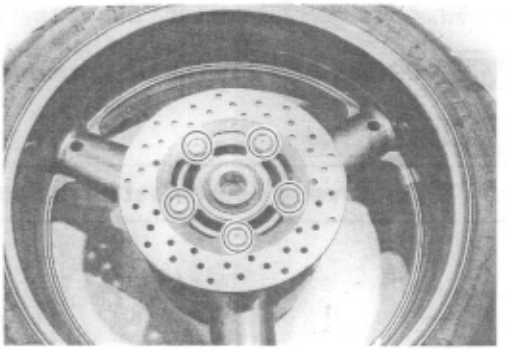
CUSHION

Inspect the cushion for wear and damage.
Replace the cushion if there is anything unusual.

BRAKE DISC

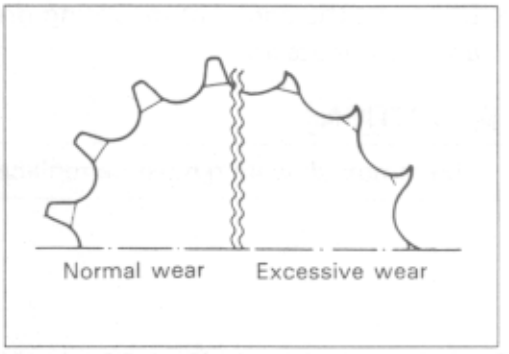
Inspect the brake disc. Replace it if its thickness or runout exceed the limit. (Refer to page 6-48.)

- Remove the brake disc from the rear wheel with a hexagon wrench.



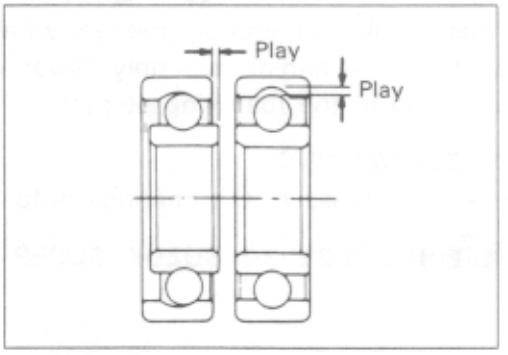
SPROCKET

Inspect the sprocket teeth for wear. If they are worn as shown, replace the two sprockets and drive chain as a set.



BEARINGS

Inspect the play of the wheel and sprocket mounting drum bearings by hand while they are in the wheel. Rotate the inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.

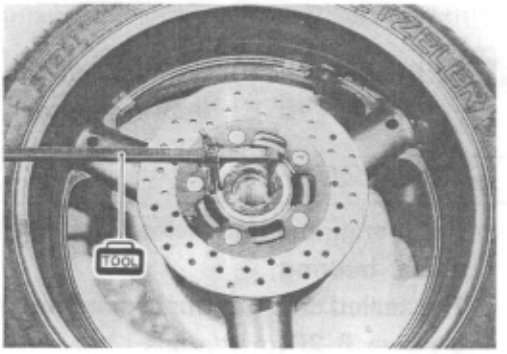


- Remove the oil seal with the special tool.

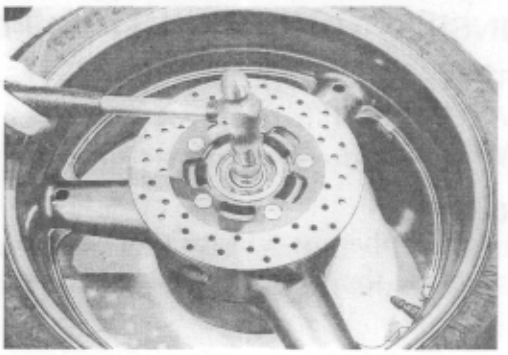
TOOL **09913-50121: Oil seal remover**

⚠ CAUTION

The removed oil seal must be replaced with new ones.



Drive out the wheel bearings, left and right, with a suitable socket wrench.

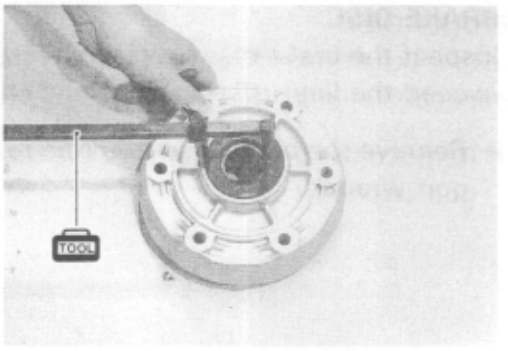


⚠ CAUTION

The removed bearings must be replaced with new ones.

- Remove the oil seal by using the special tool.

TOOL 09913-50121: Oil seal remover



⚠ CAUTION

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

- Drive out the sprocket mounting drum bearing by using an appropriate tool.



⚠ CAUTION

The removed bearing must be replaced with a new one.

REASSEMBLY AND REMOUNTING

Reassemble and remount the rear wheel in the reverse order of removal and disassembly. Refer to page 6-28 and pay attention to the following points:

WHEEL BEARING

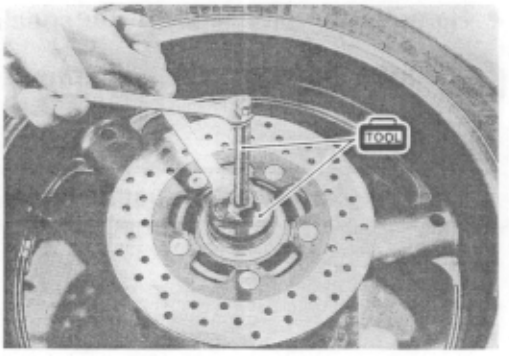
- Apply grease to the bearings before installing.

A H 99000-25030: SUZUKI SUPER GREASE "A"



- Install the wheel bearings by using the special tools.

TOOL 09924-84510: Bearing installer set
09941-34513: Bearing installer set

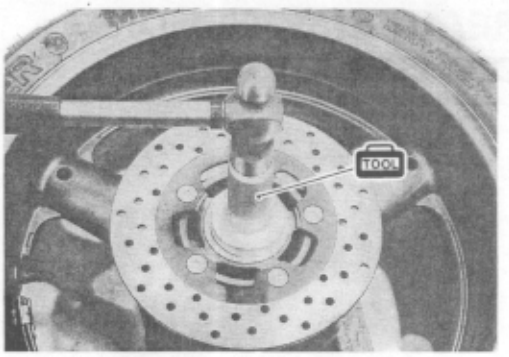


⚠ CAUTION

First install the right wheel bearing, then install the left wheel bearing.
The sealed cover of the bearing must face outside. Refer to page 6-28 for details.

- Install the oil seal by using the special tool.

TOOL 09913-75520: Oil seal installer



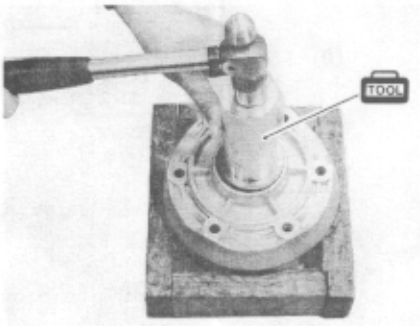
NOTE:
Apply grease to the oil seal lip before assembling rear wheel.

A H 99000-25030: SUZUKI SUPER GREASE "A"

SPROCKET MOUNTING DRUM BEARING AND OIL SEAL

- Install the bearing and the oil seal using the bearing installer.

TOOL 09913-75520: Bearing installer

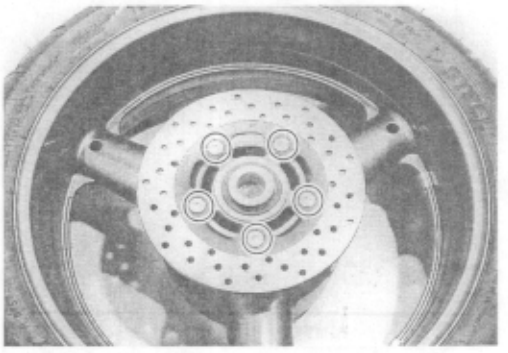


NOTE:
Apply grease to the bearing and oil seal lip before assembling rear wheel.

A H 99000-25030: SUZUKI SUPER GREASE "A"

BRAKE DISC

- Apply THREAD LOCK SUPER "1360" to the disc bolts and tighten them to the specified torque.



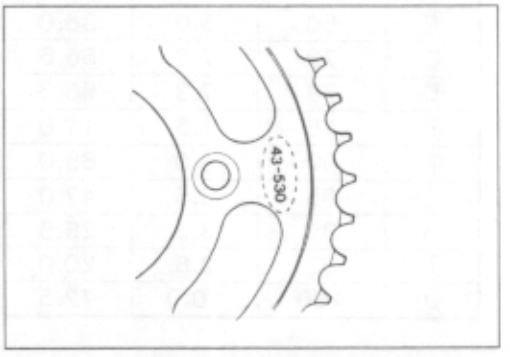
NOTE:
Make sure that the brake disc is clean and free of any greasy matter.

1360 99000-32130: THREAD LOCK SUPER "1360"

Brake disc bolt (Rear): 35 N·m (3.5 kg-m, 25.5 lb-ft)

REAR SPROCKET

- Tighten the sprocket mounting nuts to the specified torque.

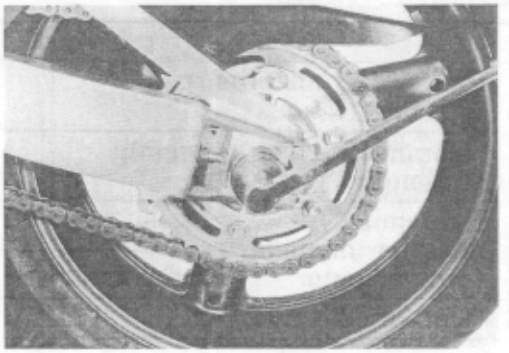


Rear sprocket nut: 60 N·m (6.0 kg-m, 43.5 lb-ft)

NOTE:
Face the stamped mark on the sprocket to outside.

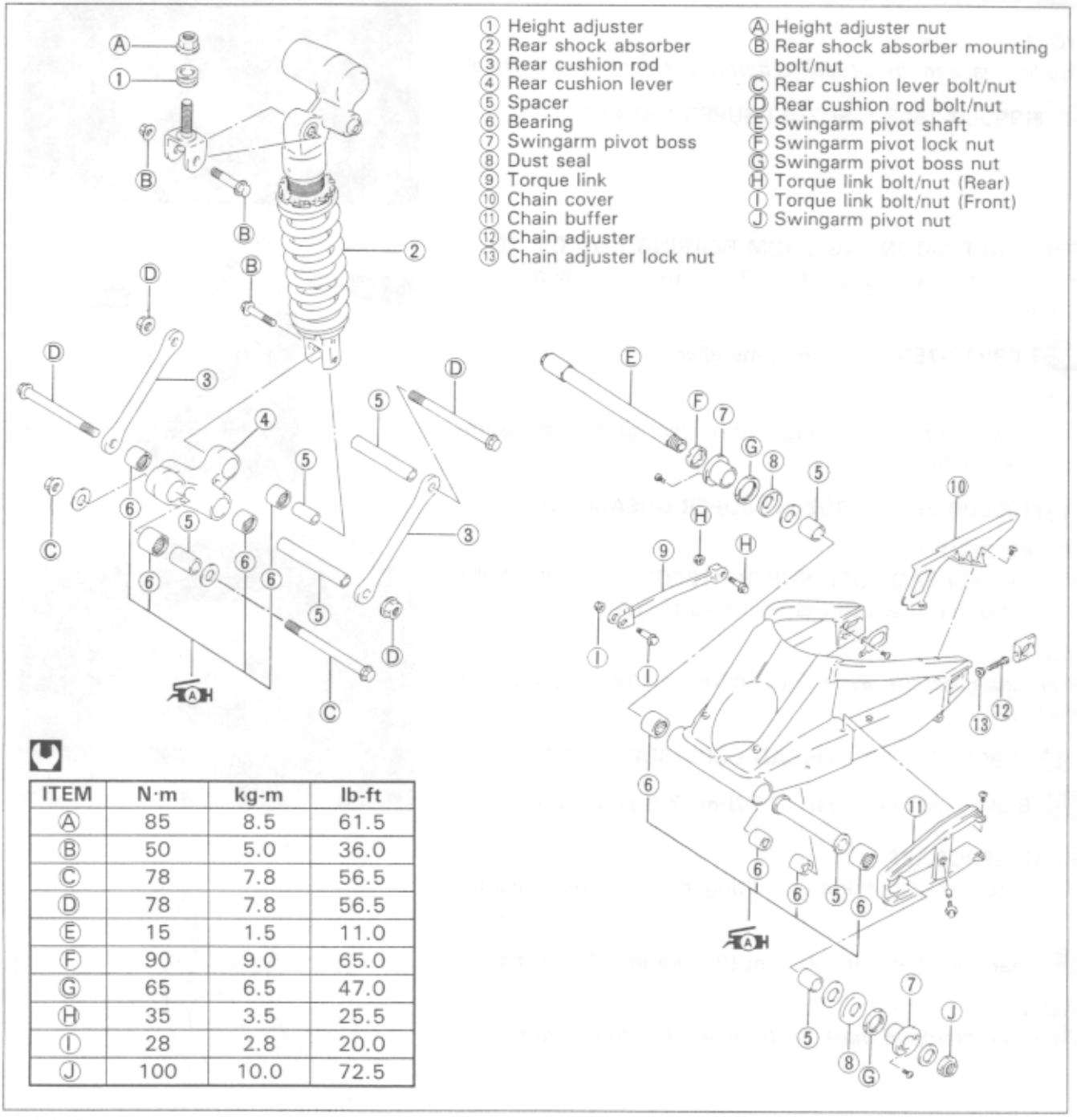
REAR AXLE SHAFT

- Adjust the chain slack after rear wheel installation. (Refer to page 2-11.)
- Tighten the rear axle nut to the specified torque.
- Tighten both chain adjuster lock nuts securely.



Rear axle nut: 100 N·m (10.0 kg-m, 72.5 lb-ft)

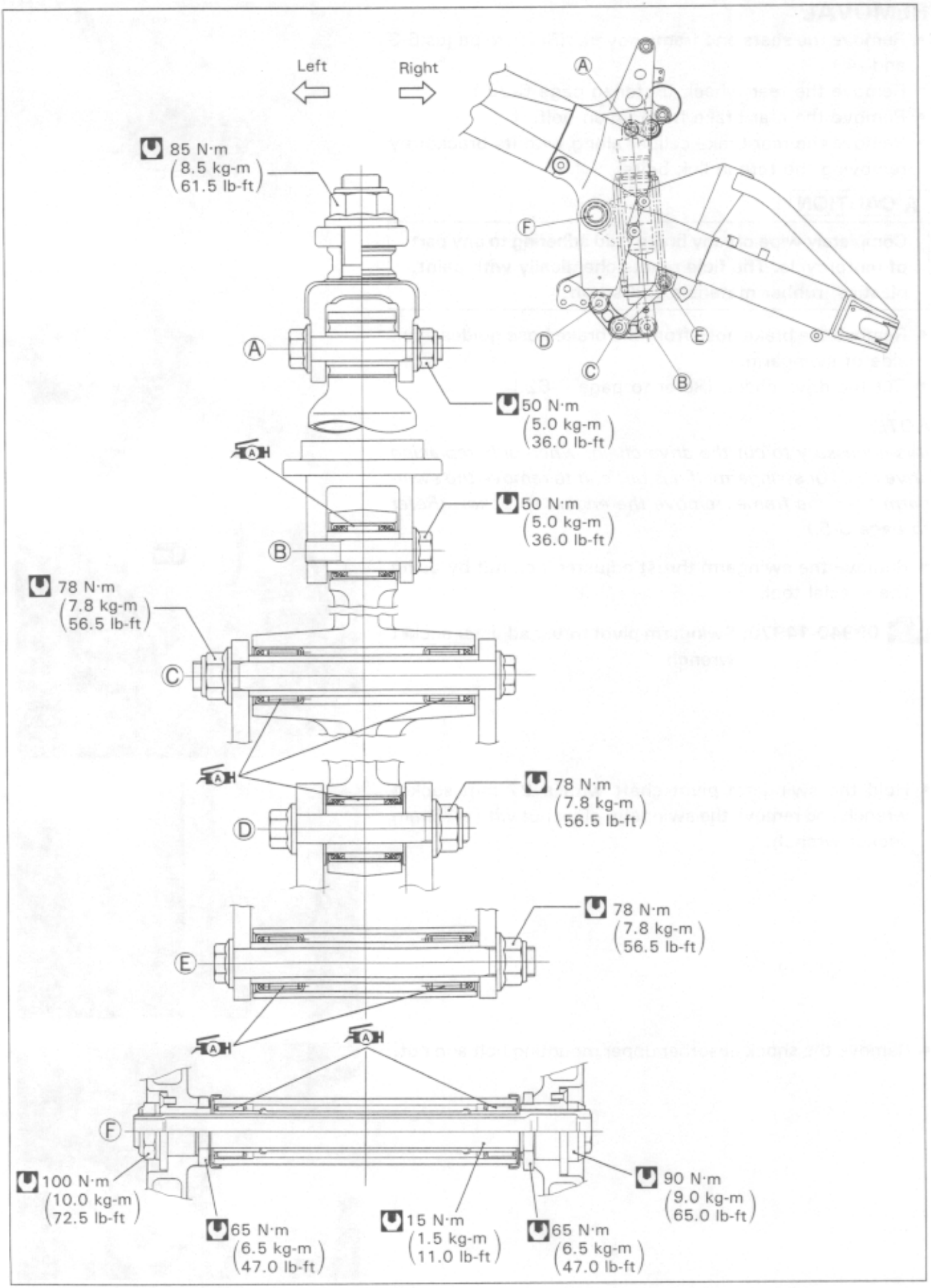
REAR SUSPENSION
CONSTRUCTION



ITEM	N·m	kg-m	lb-ft
Ⓐ	85	8.5	61.5
Ⓑ	50	5.0	36.0
Ⓒ	78	7.8	56.5
Ⓓ	78	7.8	56.5
Ⓔ	15	1.5	11.0
Ⓕ	90	9.0	65.0
Ⓖ	65	6.5	47.0
Ⓗ	35	3.5	25.5
Ⓘ	28	2.8	20.0
Ⓙ	100	10.0	72.5

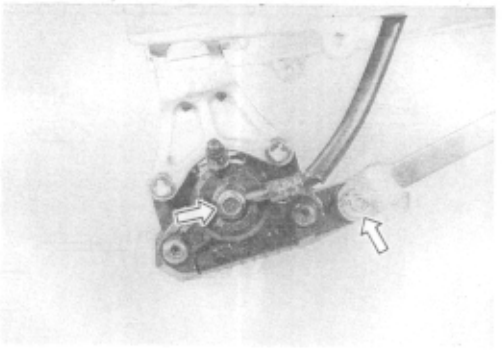
SPECIFICATIONS

ITEM		STANDARD	LIMIT
Rear shock absorber gas pressure (N_2 gas)		1 000 kPa (10 kg/cm², 142 psi)	———
Rear shock absorber spring set length		193.9 mm (7.6 in)	———
Rear shock absorber damping force adjuster	Rebound	At punch mark (about 1 turn out)	———
	Compression	At punch mark (about 5/6 turn out)	———
Rear wheel travel		133 mm (5.2 in)	———
Swingarm pivot shaft runout		———	0.3 mm (0.01 in)


Left
Right
85 N·m (8.5 kg-m / 61.5 lb-ft)
50 N·m (5.0 kg-m / 36.0 lb-ft)
50 N·m (5.0 kg-m / 36.0 lb-ft)
78 N·m (7.8 kg-m / 56.5 lb-ft)
78 N·m (7.8 kg-m / 56.5 lb-ft)
78 N·m (7.8 kg-m / 56.5 lb-ft)
100 N·m (10.0 kg-m / 72.5 lb-ft)
65 N·m (6.5 kg-m / 47.0 lb-ft)
15 N·m (1.5 kg-m / 11.0 lb-ft)
65 N·m (6.5 kg-m / 47.0 lb-ft)
90 N·m (9.0 kg-m / 65.0 lb-ft)
A
B
C
D
E
F
A

REMOVAL

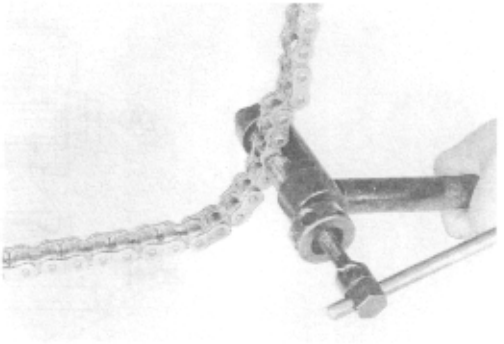
- Remove the seats and frame covers. (Refer to pages 6-3 and -4.)
- Remove the rear wheel. (Refer to page 6-29.)
- Remove the rear brake hose union bolt.
- Remove the rear brake caliper along with its bracket by removing the torque link bolts.



⚠ CAUTION

Completely wipe off any brake fluid adhering to any part of motorcycle. The fluid reacts chemically with paint, plastics, rubber materials and so on.

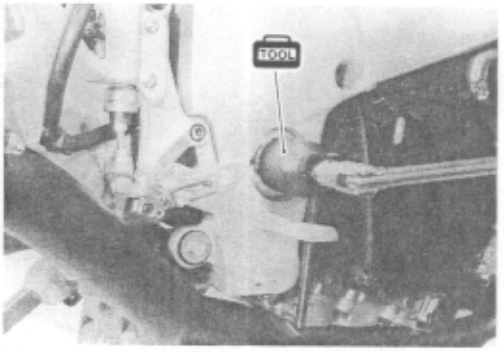
- Remove the brake hose from the brake hose guides at inside of swingarm.
- Cut the drive chain. (Refer to page 6-62.)



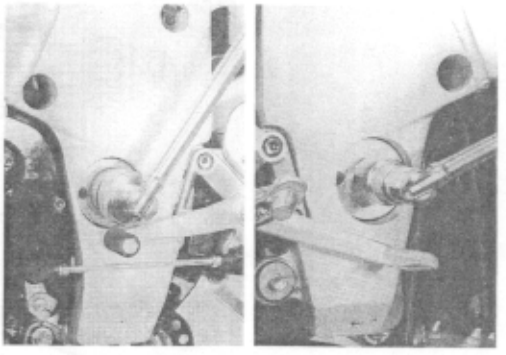
NOTE:
It is necessary to cut the drive chain, when only replacing drive chain or swingarm. If it is difficult to remove the swingarm from the frame, remove the engine sprocket. (Refer to page 3-5.)

- Remove the swingarm thrust adjuster lock nut by using the special tool.

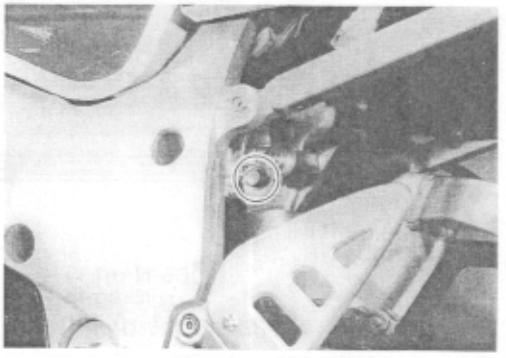
TOOL **09940-14970: Swingarm pivot thrust adjuster socket wrench**



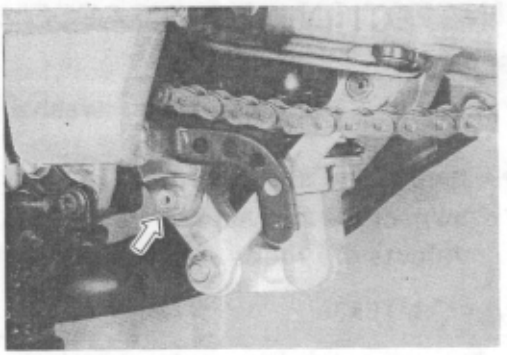
- Hold the swingarm pivot shaft with a 27 mm socket wrench and remove the swingarm pivot nut with a 36 mm socket wrench.



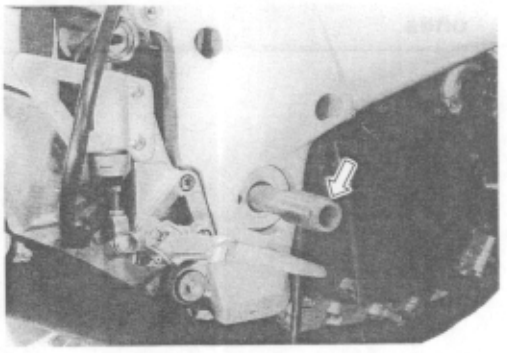
- Remove the shock absorber upper mounting bolt and nut.



- Remove the cushion lever mounting bolt and nut.



- Remove the swingarm pivot shaft.
- Remove the rear suspension assembly.

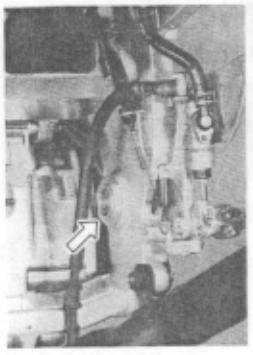


- Remove the swingarm pivot boss by removing its nut and set screws.

NOTE:
Remove the swingarm pivot boss when only replacing it.

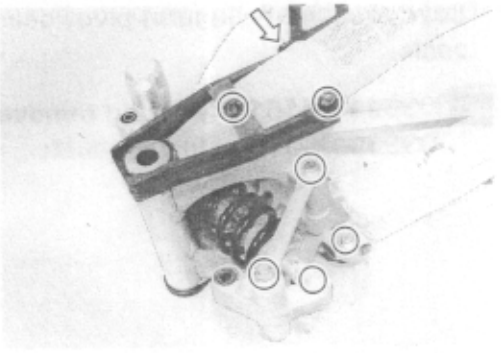
- Remove the height adjuster by removing its nut.

NOTE:
Remove the height adjuster when only replacing it.

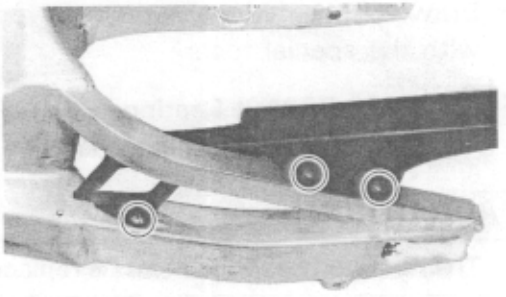




- Remove the shock absorber, cushion lever, cushion rod, chain buffer and torque link from the swingarm.



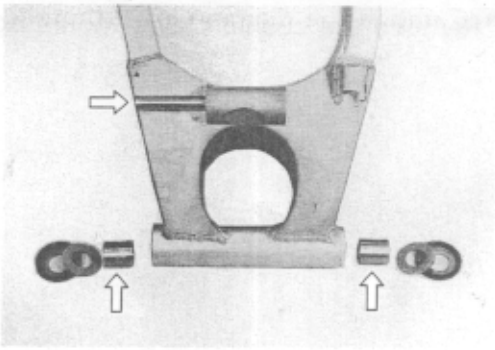
- Remove the chain cover from the swingarm.



INSPECTION AND DISASSEMBLY

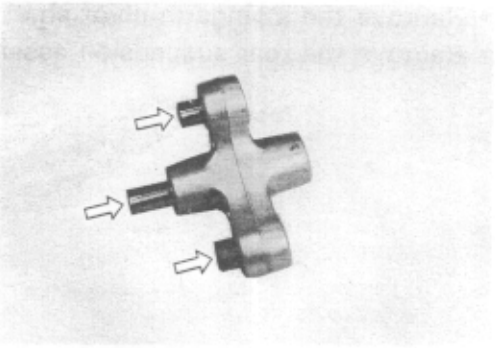
SPACER

- Remove the dust seals, washers and spacers from swingarm.
- Remove the spacers from the cushion lever.
- Inspect the spacers for any flaws or other damage. If any defects are found, replace the spacers with new ones.



⚠ CAUTION

The removed dust seals must be replaced with new ones.



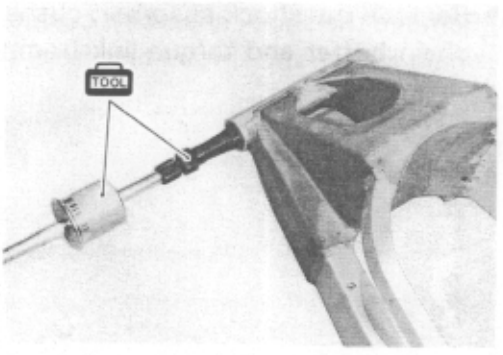
SWINGARM BEARING

Insert the spacer into bearing and check the play to move the spacer up and down.
If excessive play is noted, replace the bearing with a new one.



- Draw out the swingarm pivot bearings with the special tools.

TOOL 09941-64511: Bearing remover
09930-30102: Sliding shaft

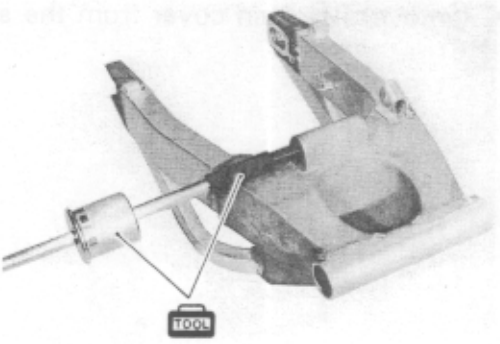


- Draw out the swingarm cushion rod upper side bearing with the special tools.

TOOL 09923-73210: Bearing remover
09930-30102: Sliding shaft

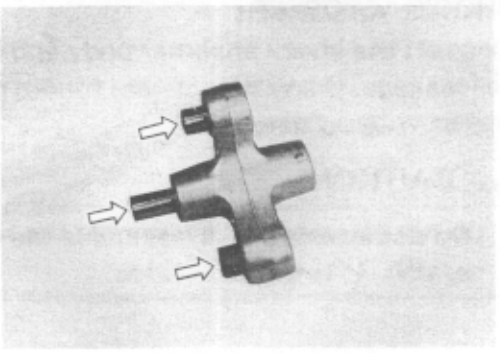
⚠ CAUTION

The removed bearings must be replaced with new ones.



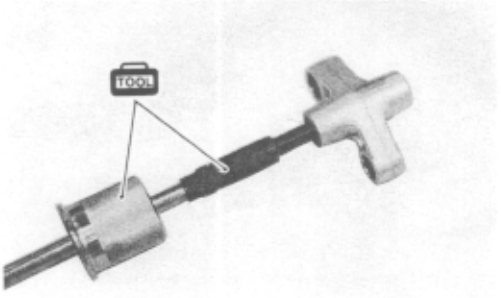
CUSHION LEVER BEARING

Insert the spacer into bearing and check the play to move the spacer up and down. If an excessive play is noted, replace the bearing with a new one.



- Draw out the cushion rod lower side and shock absorber lower side bearings with the special tools.

TOOL 09923-73210: Bearing remover
09930-30102: Sliding shaft

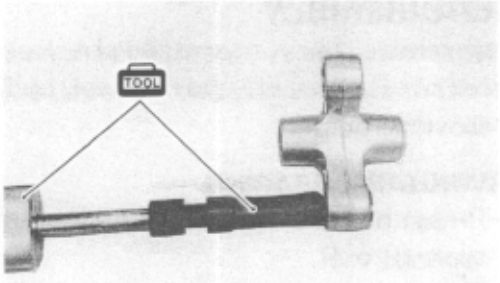


⚠ CAUTION

The removed bearings must be replaced with new ones.

- Draw out the cushion lever mounting bearing with special tools.

TOOL 09923-74510: Bearing remover
09930-30102: Sliding shaft

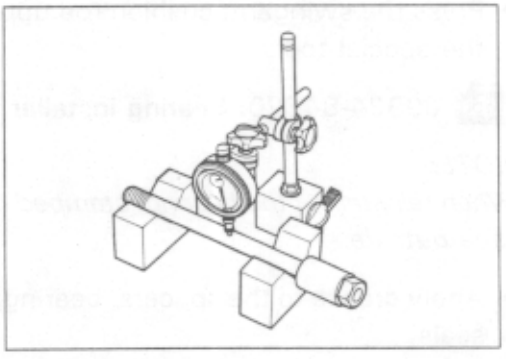


SWINGARM PIVOT SHAFT

Using a dial gauge, check the pivot shaft runout and replace it if the runout exceeds the limit.

TOOL 09900-20606: Dial gauge (1/100 mm, 10 mm)
09900-20701: Magnetic stand
09900-21304: V-block (100 mm)

Service limit: 0.3 mm (0.01 in)



CHAIN BUFFER

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

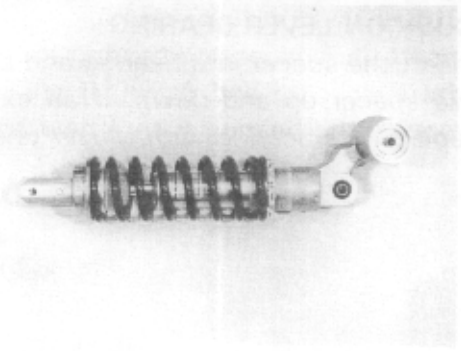


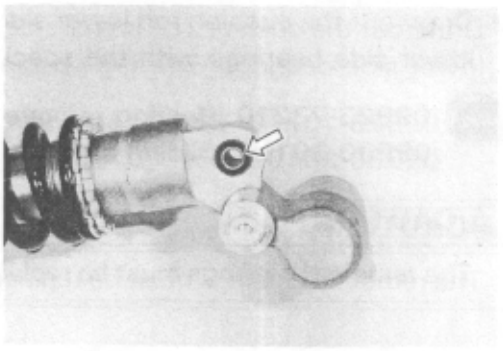
SHOCK ABSORBER

Inspect the shock absorber body and bush for damage and oil leakage. If any defects are found, replace the shock absorber with a new one.

⚠ CAUTION

Do not attempt to disassemble the rear shock absorber unit. It is unserviceable.





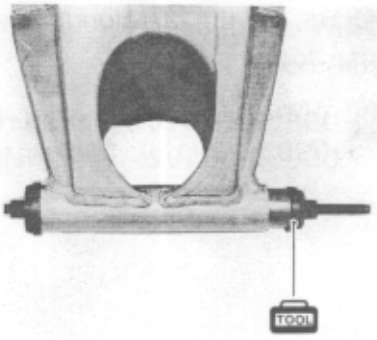
REASSEMBLY

Reassemble the swingarm and shock absorber in the reverse order of disassembly and removal, and pay attention to the following points:

SWINGARM BEARING

- Press the bearing into the swingarm pivot by using the special tool.

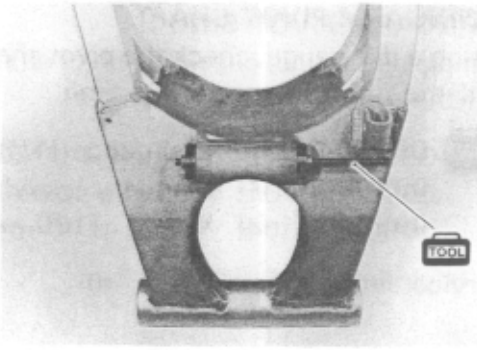
TOOL 09941-34513: Steering race installer



- Press the swingarm cushion rod upper side bearing with the special tool.

TOOL 09924-84520: Bearing installer

NOTE:
When reinstalling the bearing, stamped mark of bearing must face outside.



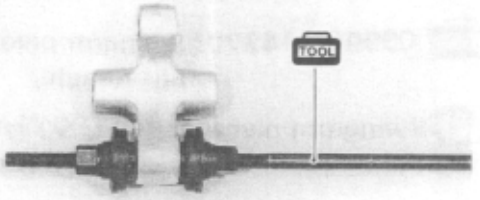
- Apply grease to the spacers, bearings, washers and dust seals.

A H99000-25030: SUZUKI SUPER GREASE "A"

CUSHION LEVER BEARING

- Press the bearings into the cushion lever with the special tool.

TOOL 09941-34513: Steering race installer

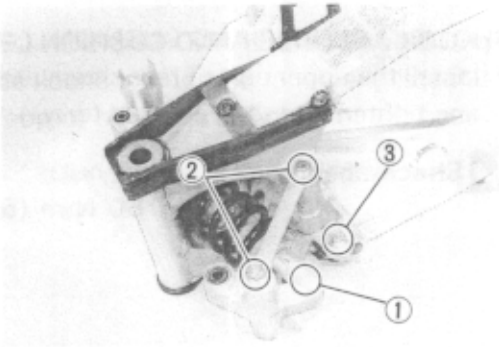


NOTE:
When installing the bearing, stamped mark of bearing must face outside.

- Apply grease to the spacers and bearings.

A H99000-25030: SUZUKI SUPER GREASE "A"

- Assemble the shock absorber, cushion lever and cushion rods onto the swingarm. (Refer to page 6-34.)



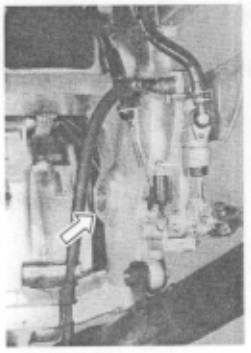
Shock absorber mounting nut ①:
50 N·m (5.0 kg-m, 36.0 lb-ft)
Cushion rod mounting nut ②:
78 N·m (7.8 kg-m, 56.5 lb-ft)

- Tighten the front torque link nut to the specified torque

Torque link nut (front) ③: 28 N·m (2.8 kg-m, 20.0 lb-ft)

REMOUNTING

Remount the swingarm and shock absorber in the reverse order of disassembly and removal, and pay attention to the following points.

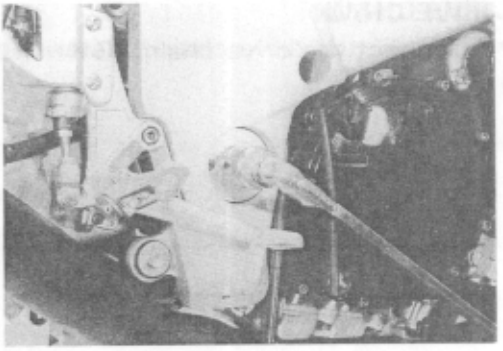




SWINGARM PIVOT BOSS AND HEIGHT ADJUSTER

- Tighten the swingarm pivot boss nut and height adjuster nut to the specified torque.

Swingarm pivot boss nut: 65 N·m (6.5 kg-m, 47.0 lb-ft)
Height adjuster nut: 85 N·m (8.5 kg-m, 61.5 lb-ft)

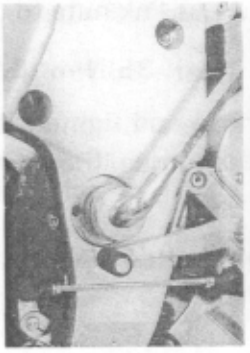


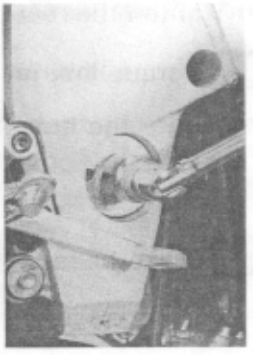
SWINGARM PIVOT THRUST CLEARANCE ADJUSTMENT

Adjust swingarm pivot thrust clearance as following procedure. (Refer to page 6-34 for the illustration.)

- Insert the swingarm pivot shaft and tighten it to the specified torque.

Swingarm pivot shaft: 15 N·m (1.5 kg-m, 11.0 lb-ft)

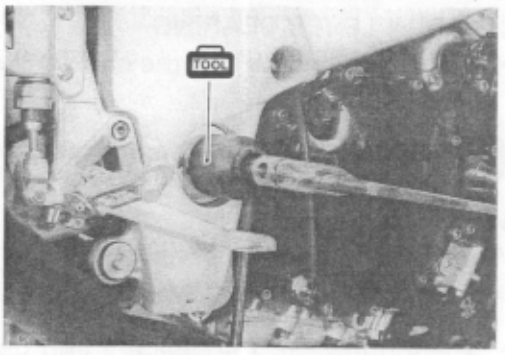




- Hold the swingarm pivot shaft with a 27 mm socket wrench and tighten the swingarm pivot nut with a 36 mm socket wrench to the specified torque.

Swingarm pivot nut: 100 N·m (10.0 kg-m, 72.5 lb-ft)

- Tighten the swingarm pivot lock nut to the specified torque with the special tool.



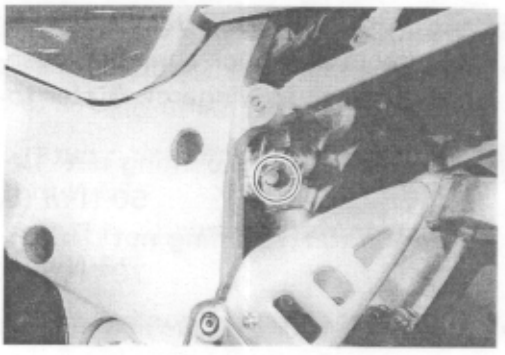
TOOL **09940-14970: Swingarm pivot thrust adjuster lock nut wrench**

Swingarm pivot lock nut: 90 N·m (9.0 kg-m, 65.0 lb-ft)

NOTE:
After tightening the swingarm pivot lock nut, be sure to check the swingarm operation.

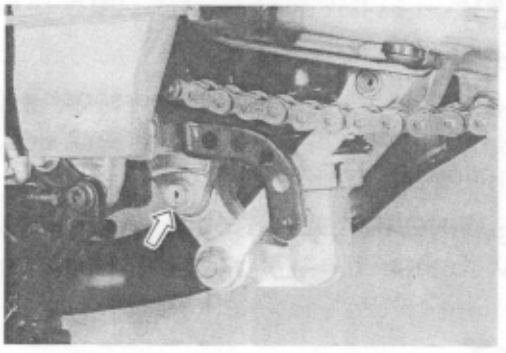
SHOCK ABSORBER AND CUSHION LEVER MOUNTING NUT

- Install the upper part of rear shock absorber onto the frame and tighten it to the specified torque. (Refer to page 6-34.)



Shock absorber mounting nut: 50 N·m (5.0 kg-m, 36.0 lb-ft)

- Install the front of cushion lever onto the frame.

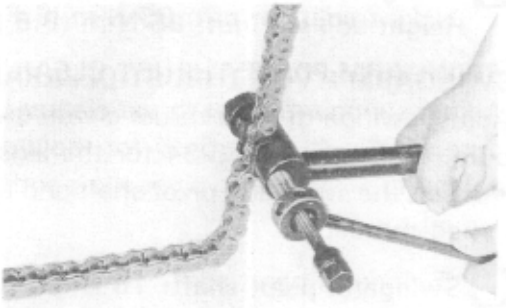


Cushion lever mounting nut: 78 N·m (7.8 kg-m, 56.5 lb-ft)

NOTE:
Install the washers between cushion lever and frame.

DRIVE CHAIN

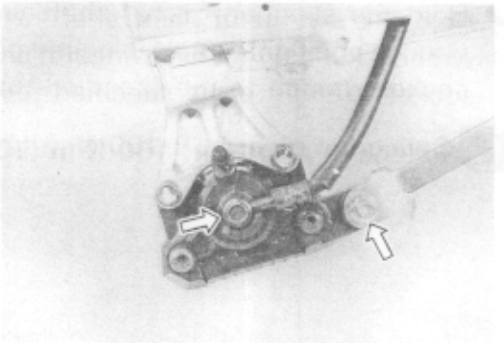
- Connect the drive chain. (Refer to page 6-63.)



- Tighten the rear torque link nuts to the specified torque.

Torque link nut (rear): 35 N·m (3.5 kg-m, 25.5 lb-ft)

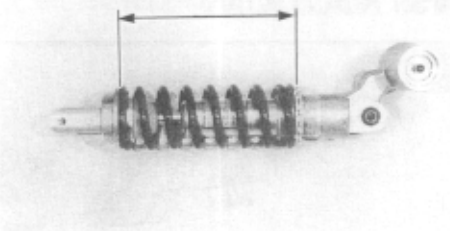
- Route the brake hose and tighten the brake hose union bolt to the specified torque. (Refer to page 8-21 for brake hose routing.)



Brake hose union bolt: 23 N·m (2.3 kg-m, 16.5 lb-ft)

SUSPENSION SETTING

After installing the rear suspension, adjust the spring pre-load and damping force as follows.



SPRING PRE-LOAD ADJUSTMENT

The set length 189.8 mm provides the maximum spring pre-load.
The set length 198.9 mm provides the minimum spring pre-load.
(STD length: 193.9 mm)

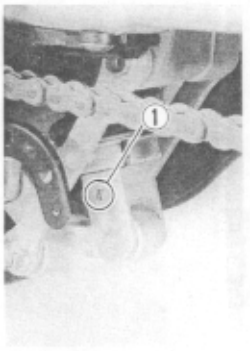
DAMPING FORCE ADJUSTMENT

(Rebound side)

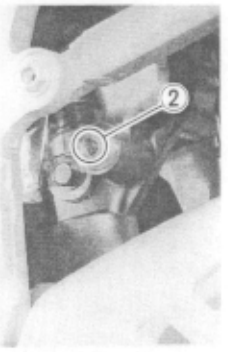
Fully turn the damping force adjuster ① clockwise. It is at stiffest position and turn it out to standard setting position.
(STD position is 1 turn out.)

(Compression side)

Fully turn the damping force adjuster ② clockwise. It is at stiffest position and turn it out to standard setting position.
(STD position is 5/6 turn out.)



Rebound side



Compression side

STANDARD SUSPENSION SETTING

		REAR		
		Spring set length	Damping force adjuster	
			Rebound	Compression
Solo riding	Softer	193.9 mm (7.6 in)	1 turn out	13/12 turns out
	Standard	193.9 mm (7.6 in)	1 turn out	5/6 turn out
	Stiffer	193.9 mm (7.6 in)	3/4 turn out	7/12 turn out
Dual riding		193.9 mm (7.6 in)	1 turn out	5/6 turn out

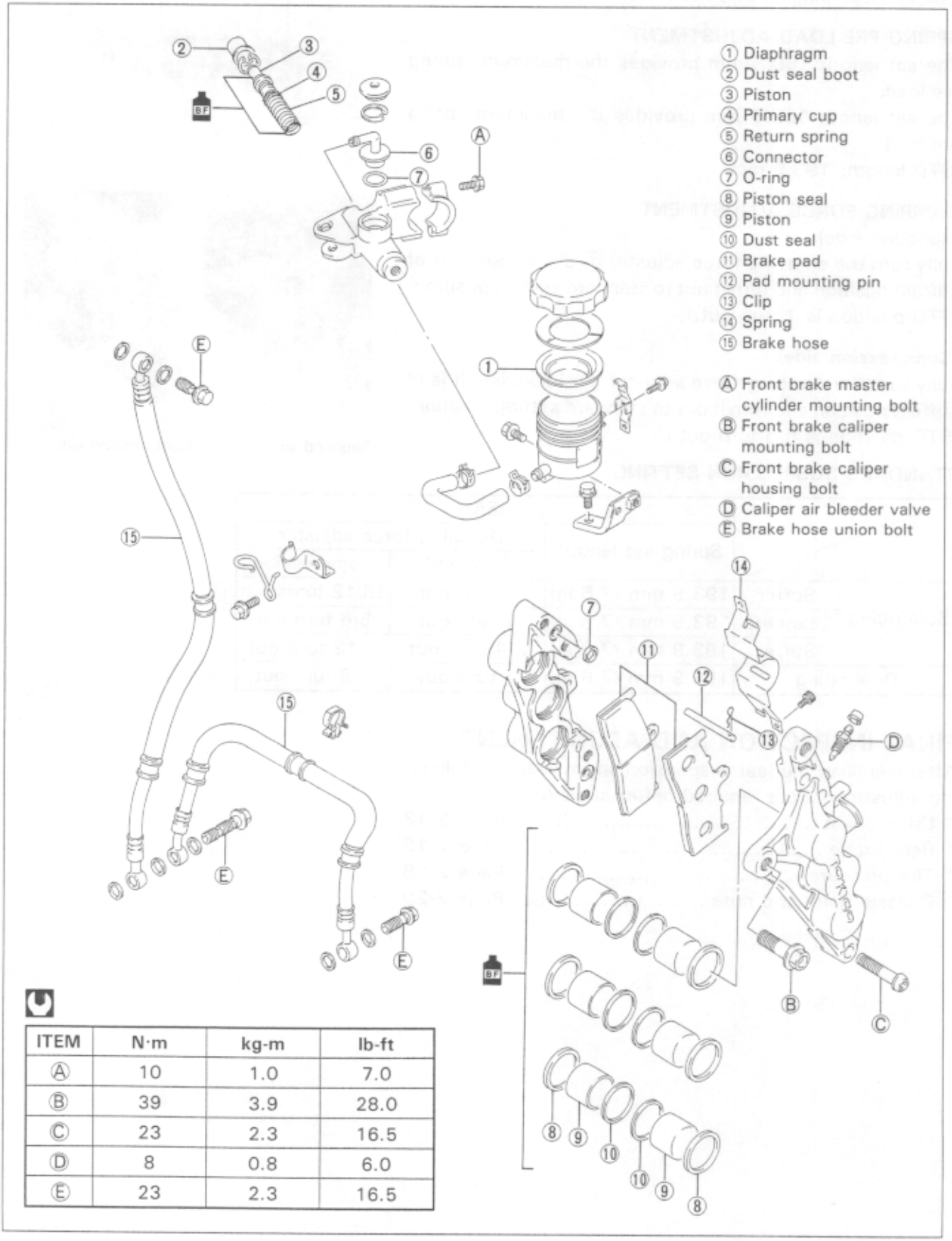
FINAL INSPECTION AND ADJUSTMENT

After installing the rear suspension and wheel, the following adjustments are required before driving.

* Drive chain ..... Page 2-13
* Rear brake ..... Page 2-15
* Tire pressure ..... Page 2-18
* Chassis bolts and nuts ..... Page 2-20

FRONT BRAKE

CONSTRUCTION



ITEM	N·m	kg-m	lb-ft
Ⓐ	10	1.0	7.0
Ⓑ	39	3.9	28.0
Ⓒ	23	2.3	16.5
Ⓓ	8	0.8	6.0
Ⓔ	23	2.3	16.5

⚠ WARNING

* This brake system is filled with a ethylene glycol-based DOT 4 brake fluid. Do not use or mix different types of fluid such as silicone-based or petroleum-based.
* Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for long periods.
* When storing the brake fluid, seal the container completely and keep away from children.
* When replenishing brake fluid, take care not to get dust into fluid.
* When washing brake components, use fresh brake fluid. Never use cleaning solvent.
* A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the disc with high quality brake cleaner or neutral detergent.

⚠ CAUTION

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

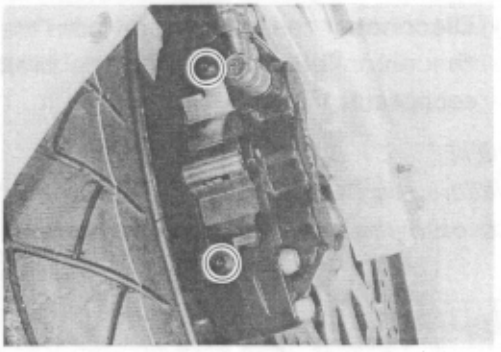
SPECIFICATIONS

Unit: mm (in)

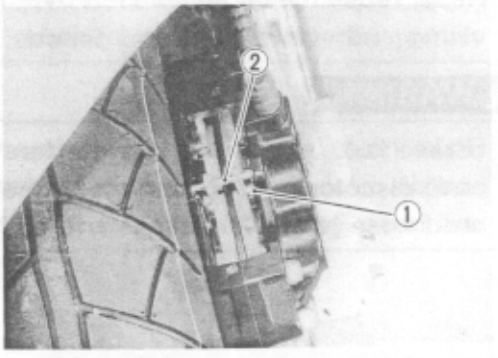
ITEM		STANDARD		LIMIT
Brake disc thickness		Front	4.5±0.2 (0.177±0.008)	4.0 (0.16)
Brake disc runout		———		0.30 (0.012)
Master cylinder bore		Front	15.870–15.913 (0.6248–0.6265)	———
Master cylinder piston diam.		Front	15.827–15.854 (0.6231–0.6242)	———
Brake caliper cylinder bore	Leading	Front	24.000–24.076 (0.9449–0.9479)	———
	Trailing		27.000–27.076 (1.0630–1.0660)	———
Brake caliper piston diam.	Leading	Front	23.925–23.975 (0.9419–0.9439)	———
	Trailing		26.920–26.970 (1.0598–1.0618)	———

BRAKE PAD REPLACEMENT

- Remove the brake pad spring by removing bolts.



- Remove the clip ① and the brake pad mounting pin ②.
- Remove the brake pads.

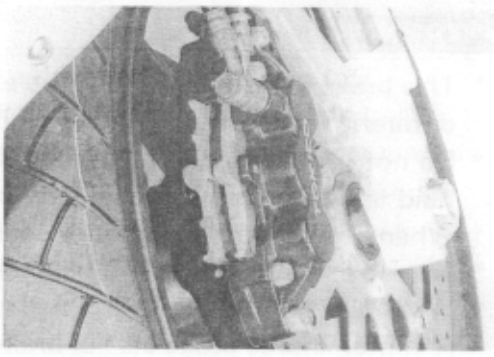


⚠ CAUTION

* Do not operate the brake lever while dismounting the pads.
* Replace the brake pads as a set, otherwise braking performance will be adversely affected.

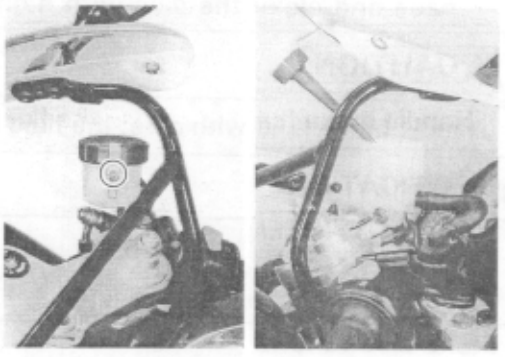
- Install the new pads.

NOTE:
After replacing the brake pads, pump with the brake lever few times to operate the brake correctly and then check the brake fluid level.

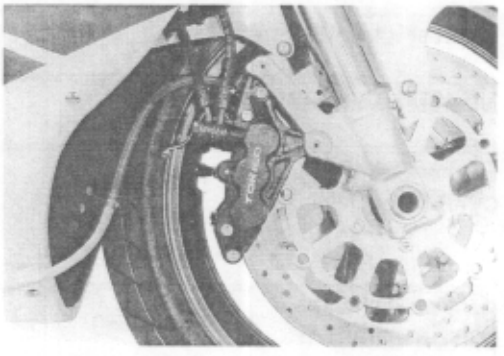


BRAKE FLUID REPLACEMENT

- Place the motorcycle on a level surface and keep the handlebars straight.
- Remove the master cylinder reservoir tank cap and diaphragm.
- Suck up the old brake fluid as much as possible.
- Fill the reservoir with fresh brake fluid.



- Connect a cleaner hose to the air bleeder valve, and insert the free end of hose into a receptacle.
- Loosen the bleeder valve and pump the brake lever until no more old brake fluid flows out of the bleeder valve.
- Close the air bleeder valve, and disconnect a clear hose. Fill the reservoir with fresh brake fluid to the upper end of the inspection window.



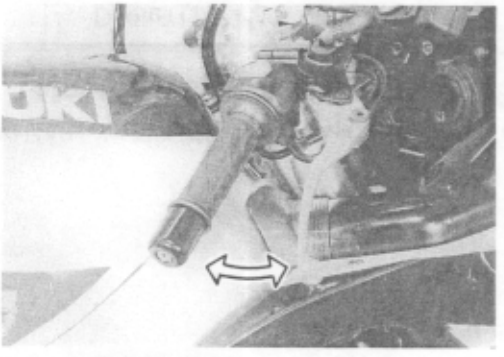
⚠ CAUTION

Bleed air in the brake fluid circuit. (Refer to page 2-17.)

CALIPER REMOVAL AND DISASSEMBLY

- Disconnect the brake hose from the caliper by removing the union bolt and catch the brake fluid in a suitable receptacle.

NOTE:
Place a rag underneath the union bolt on the brake caliper to catch the spilled drops of brake fluid.

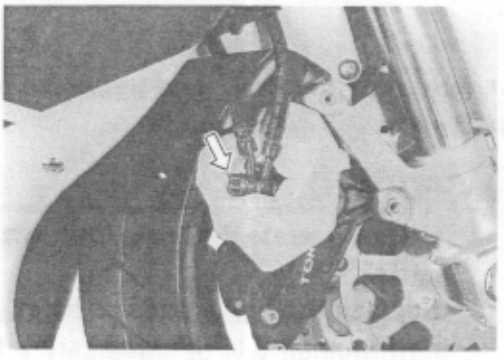


⚠ CAUTION

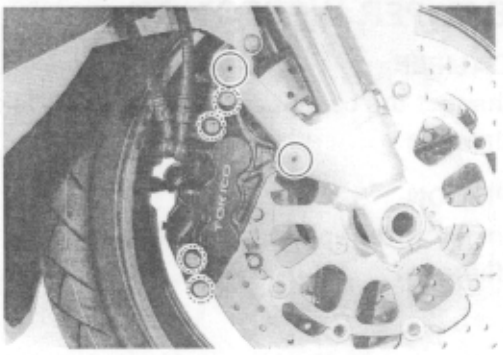
Never reuse the brake fluid left over from previous servicing and stored for long periods.

⚠ 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.



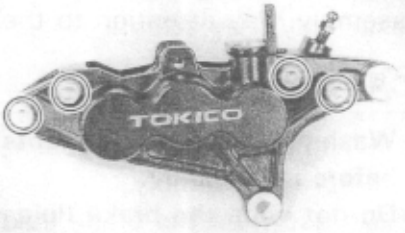
- Remove the caliper mounting bolts and take off the caliper.



NOTE:
Slightly loosen the caliper housing bolts before removing the caliper mounting bolts to facilitate later disassembly.

- Remove the brake pads. (Refer to page 6-44.)

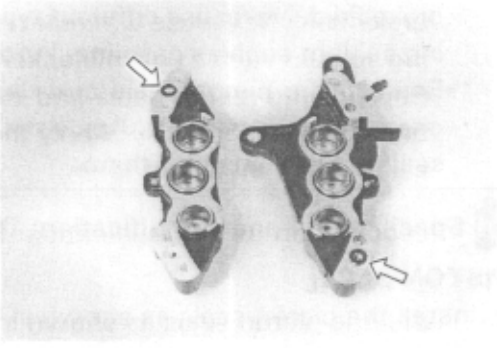
- Separate the caliper halves to remove the caliper housing bolts.



- Remove the O-rings.

⚠ CAUTION

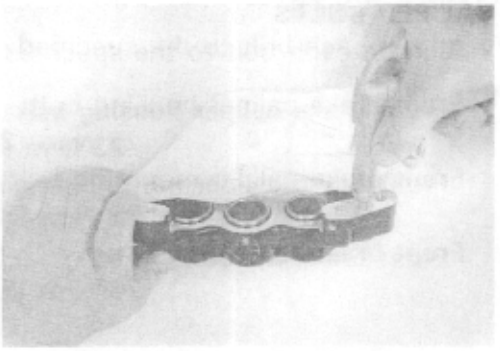
Replace the O-rings with new ones.



- Place a rag over the piston to prevent its popping out and push out the piston with an air gun.

⚠ CAUTION

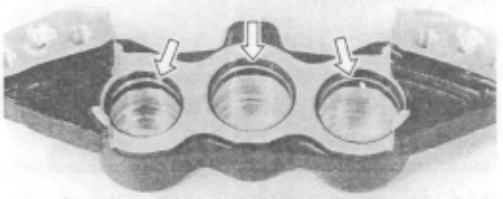
Do not use high pressure air to prevent piston damage.



- Remove the dust seals and piston seals.

⚠ CAUTION

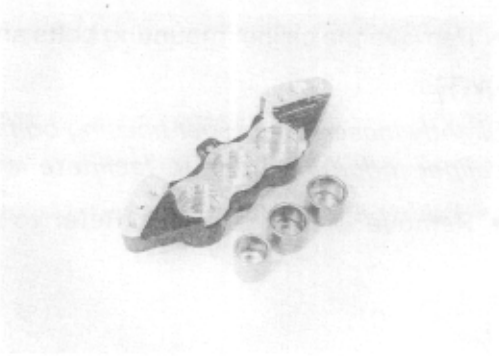
Do not reuse the dust seals and piston seals to prevent fluid leakage.



CALIPER INSPECTION

CALIPER

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



PISTON

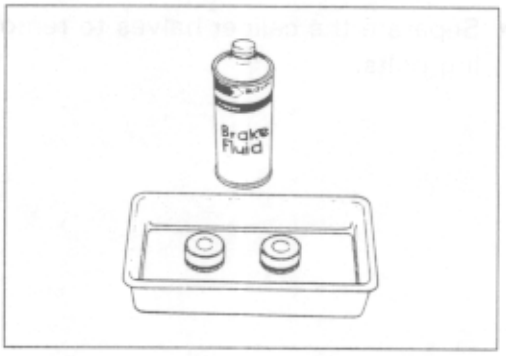
Inspect the piston surface for any scratches or other damage.

CALIPER REASSEMBLY AND REMOUNTING

Reassemble the caliper in the reverse order of removal and disassembly. Pay attention to the following points:

⚠ CAUTION

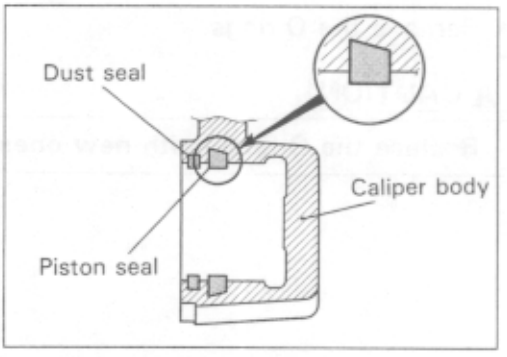
*** Wash the caliper components with fresh brake fluid before reassembly.**
*** Do not wipe the brake fluid off after washing the components.**
*** When washing the components, use the specified brake fluid. Never use different types of fluid or cleaning solvent such as gasoline, kerosine or the others.**
*** Replace the piston seals and dust seals with new ones when reassembly. Apply the brake fluid to both seals when installing them.**



Specification and Classification: DOT 4

PISTON SEAL

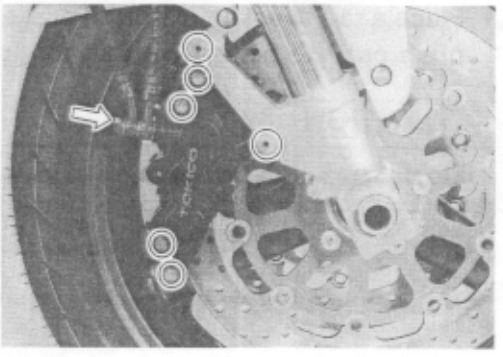
- Install the piston seals as shown in the right illustration.



CALIPER BOLTS

- Tighten each bolt to the specified.

Front brake caliper housing bolt:
23 N·m (2.3 kg-m, 16.5 lb-ft)
Front brake caliper mounting bolt:
39 N·m (3.9 kg-m, 28.0 lb-ft)
Front brake hose union bolt:
23 N·m (2.3 kg-m, 16.5 lb-ft)



NOTE:
Before remounting the caliper, push the piston all the way into the caliper.

⚠ CAUTION

Bleed air from the system after reassembling the caliper. (Refer to page 2-17.)

Refer to page 8-20 for the brake hose routing.

DISC SERVICING

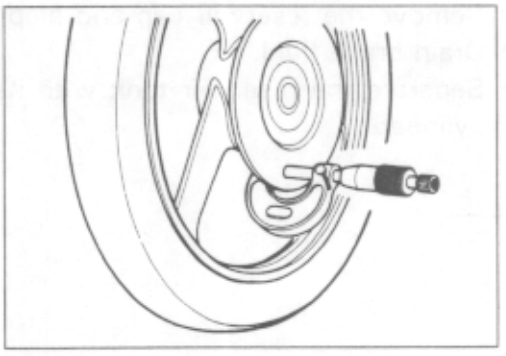
- Remove the wheel. (Refer to pages 6-7 and 29.)
- Remove the disc. (Refer to pages 6-8 and 30.)
- Install the disc. (Refer to pages 6-9 and 32.)

DISC INSPECTION

Using a micrometer, check the disc for wear, its thickness can be checked with disc and wheel in place. The service limits for the thickness of the discs are shown below.

TOOL **09900-20205: Micrometer (0—25 mm)**

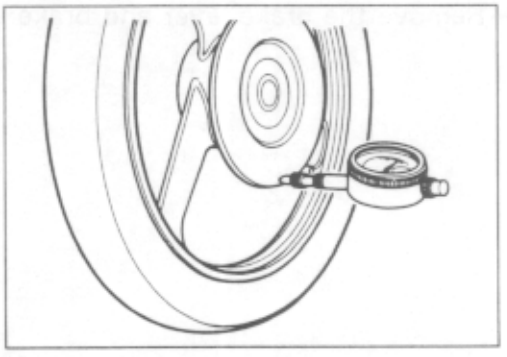
Service Limit (Front): 4.0 mm (0.16 in)
(Rear) : 4.5 mm (0.18 in)



With the disc mounted on the wheel, check the disc for face runout with a dial gauge, as shown.

TOOL **09900-20606: Dial gauge (1/100 mm)**
09900-20701: Magnetic stand

Service Limit: 0.30 mm (0.012 in)



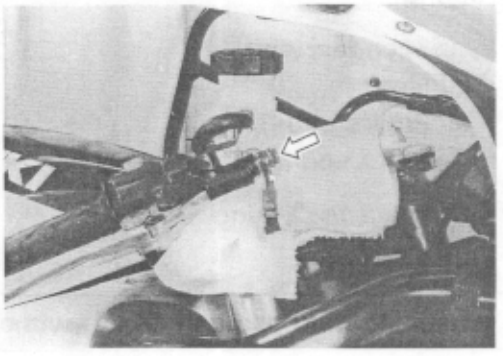
MASTER CYLINDER REMOVAL AND DISASSEMBLY

- Remove the front brake light switch lead wires.
- Place a rag underneath the union bolt on the master cylinder to catch any spilled drops of brake fluid. Remove the union bolt.

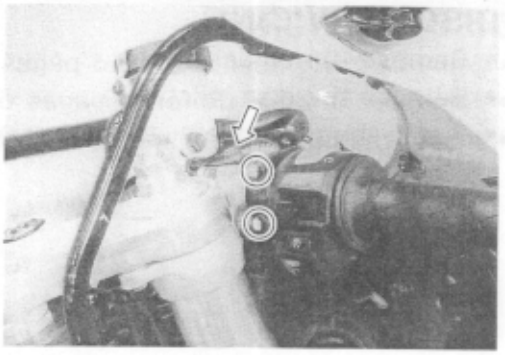
⚠ CAUTION

Immediately and completely wipe off any brake fluid contacting any parts of the motorcycle. The fluid reacts chemically with paint, plastics and rubber materials, etc. and will damage them severely.

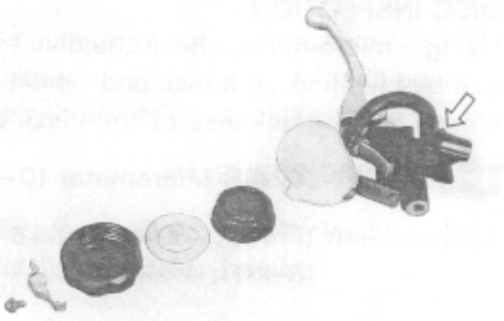




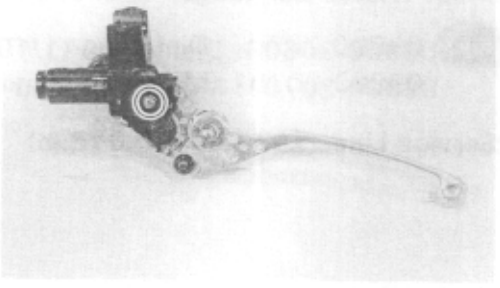
- Remove the master cylinder assembly along with the reservoir tank.



- Remove the reservoir cap and diaphragm.
- Drain brake fluid.
- Separate the reservoir tank with its hose from master cylinder.

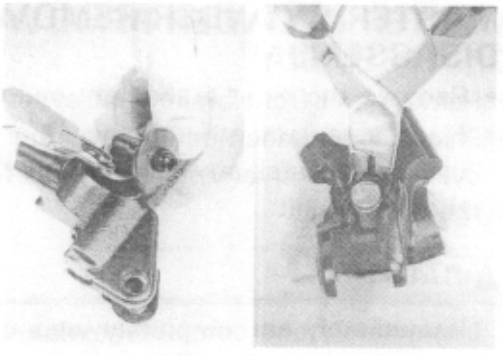


- Remove the brake lever and brake light switch.



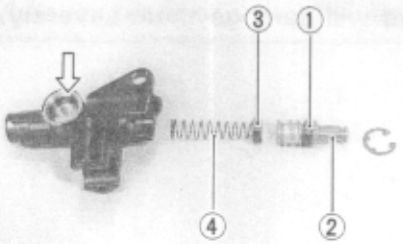
- Remove the connector by removing the circlip with the special tool.
- Remove the dust seal boot.
- Use the special tool to remove the circlip.

TOOL **09900-06108: Snap ring pliers**



- Remove the piston, secondary cup, primary cup and spring.

① Secondary cup
② Piston
③ Primary cup
④ Return spring



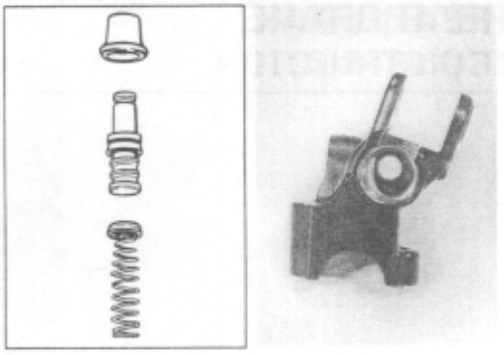
- Remove the O-ring.

⚠ CAUTION

Replace the cups and O-ring with new ones.

MASTER CYLINDER INSPECTION

Inspect the master cylinder bore for any scratches or other damage.
Inspect the piston surface for any scratches or other damage.
Inspect the primary cup, secondary cup and dust seal for wear or damage.

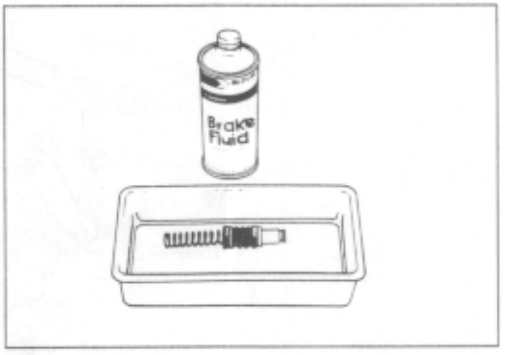


MASTER CYLINDER REASSEMBLY AND REMOUNTING

Reassemble the master cylinder in the reverse order of removal and disassembly. Pay attention to the following points:

⚠ CAUTION

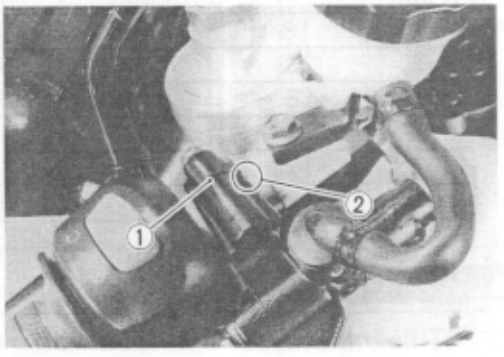
*** Wash the master cylinder components with fresh brake bluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
*** Apply brake fluid to the cylinder bore and all the component to be inserted into the bore.**



BF Specification and Classification: DOT 4

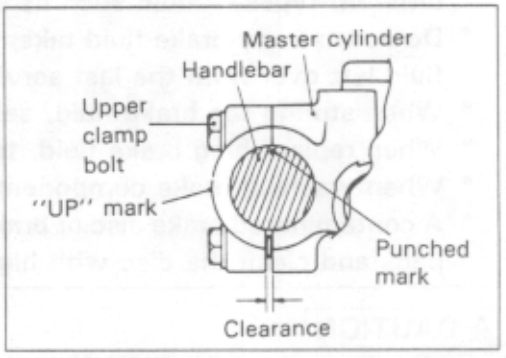
- When remounting the master cylinder on the handlebar, align the master cylinder holder's mating surface ① with punched mark ② on the handlebar and tighten the upper clamp bolt first as shown.

Front brake master cylinder mounting bolt:
10 N·m (1.0 kg-m, 7.0 lb-ft)

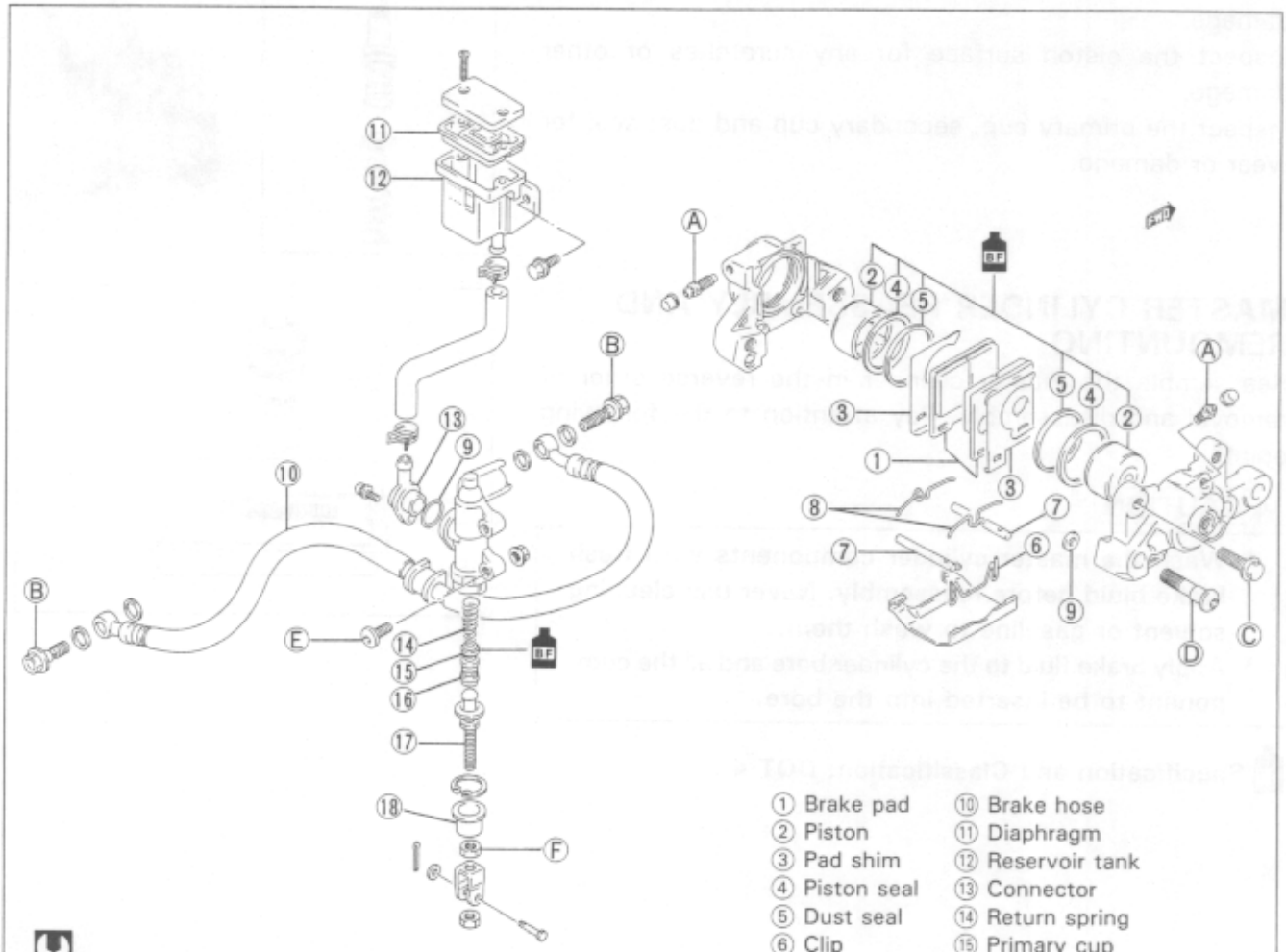


⚠ CAUTION

Bleed air from the system after reassembling master cylinder. (Refer to page 2-17.)



REAR BRAKE
CONSTRUCTION



ITEM	N·m	kg-m	lb-ft
Ⓐ	8	0.8	6.0
Ⓑ	23	2.3	16.5
Ⓒ	26	2.6	19.0
Ⓓ	33	3.3	24.0
Ⓔ	10	1.0	7.0
Ⓕ	18	1.8	13.0

① Brake pad
② Piston
③ Pad shim
④ Piston seal
⑤ Dust seal
⑥ Clip
⑦ Pin
⑧ Spring
⑨ O-ring
⑩ Brake hose
⑪ Diaphragm
⑫ Reservoir tank
⑬ Connector
⑭ Return spring
⑮ Primary cup
⑯ Piston
⑰ Push rod
⑱ Dust seal boot

Ⓐ Caliper air bleeder valve
Ⓑ Brake hose union bolt
Ⓒ Rear brake caliper mounting bolt
Ⓓ Rear brake caliper housing bolt
Ⓔ Rear brake master cylinder mounting bolt
Ⓕ Rear brake master cylinder rod lock nut

⚠ WARNING

* This brake system is filled with a ethylene glycol-based DOT 4 brake fluid. Do not use or mix different types of fluid such as silicone-based or petroleum-based.
* Do not use any brake fluid taken from old, used or unsealed containers. Never reuse brake fluid left over from the last servicing or stored for long periods.
* When storing the brake fluid, seal the container completely and keep away from children.
* When replenishing brake fluid, take care not to get dust into fluid.
* When washing brake components, use fresh brake fluid. Never use cleaning solvent.
* A contaminated brake disc or brake pad reduces braking performance. Discard contaminated pads and clean the disc with high quality brake cleaner or neutral detergent.

⚠ CAUTION

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

SPECIFICATIONS

Unit: mm (in)

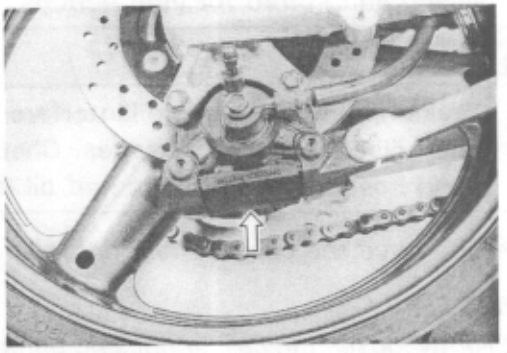
ITEM	STANDARD		LIMIT
Rear brake pedal height	55 (2.2)		———
Brake disc thickness	Rear	5.0±0.2 (0.197±0.008)	4.5 (0.18)
Brake disc runout	———		0.30 (0.012)
Master cylinder bore	Rear	12.700–12.743 (0.5000–0.5017)	———
Master cylinder piston diam.	Rear	12.657–12.684 (0.4983–0.4994)	———
Brake caliper cylinder bore	Rear	38.180–38.256 (1.5031–1.5061)	———
Brake caliper piston diam.	Rear	38.098–38.148 (1.4999–1.5019)	———

BRAKE PAD REPLACEMENT

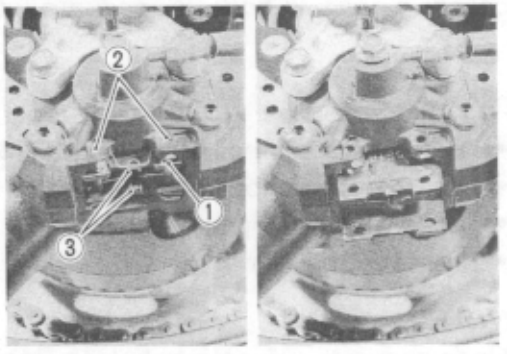
- Remove the brake pad cover.

⚠ CAUTION

*** Do not operate the brake pedal while dismounting the pads.**
*** Replace the brake pad as a set, otherwise braking performance will be adversely affected.**



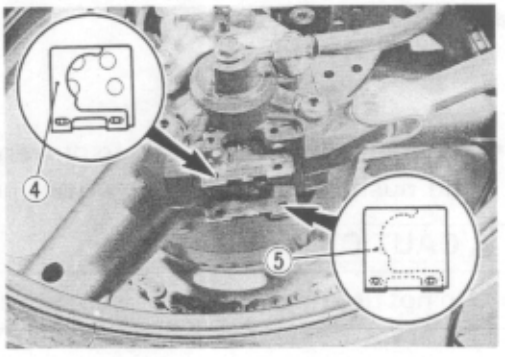
- Remove the clip ①.
- Draw out the pins ② and remove the springs ③.
- Remove the pads and shims.



- Remount the new brake pads and shims.

⚠ CAUTION

Be sure to install the shims (④, ⑤) properly as shown in the right illustration.



NOTE:
After replacing the brake pads, pump with the brake pedal few times to operate the brake correctly and then check the brake fluid level.

BRAKE FLUID REPLACEMENT

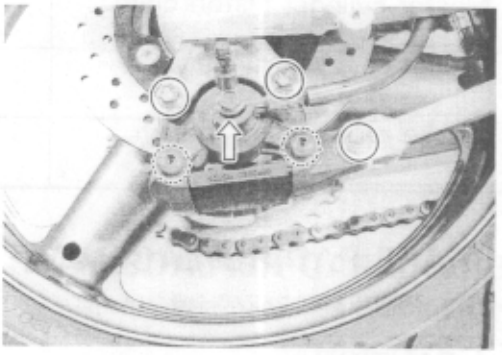
- Remove the seats. (Refer to page 6-3.)
- Remove the frame cover. (Refer to page 6-4.)
- Replace the brake fluid in the same manner of the front brake. (Refer to page 6-45.)

⚠ CAUTION

Bleed air in the brake fluid circuit. (Refer to page 2-17.)

CALIPER REMOVAL AND DISASSEMBLY

- Remove the union bolt and catch the brake fluid in a suitable receptacle.



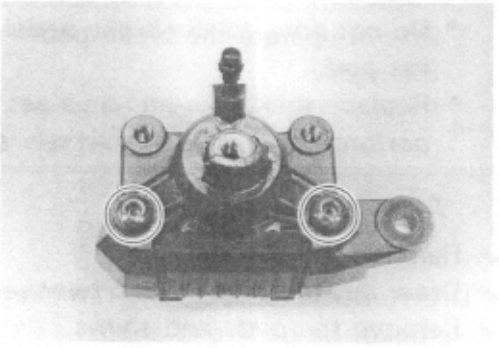
⚠ CAUTION

Never reuse the brake fluid left over from previous servicing and stored for long periods.

⚠ WARNING

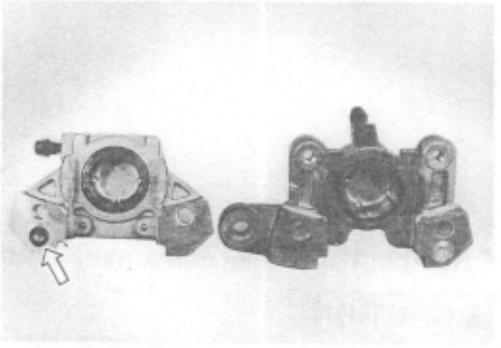
Brake fluid, if it leaks, will interfere with safe running and discolor painted surfaces. Check the brake hose and hose joints for cracks and oil leakage.

- Remove the caliper mounting bolts and torque link nut.



NOTE:
Slightly loosen the caliper housing bolts before removing the caliper mounting bolts to facilitate later disassembly.

- Remove the pads. (Refer to page 6-52.)
- Remove the caliper housing bolts.
- Separate the caliper halves.
- Remove the O-ring.



NOTE:
Once separate the caliper halves, replace the O-ring with a new one.

- Place a rag over the piston to prevent it from popping out and push out the piston by using an air gun.



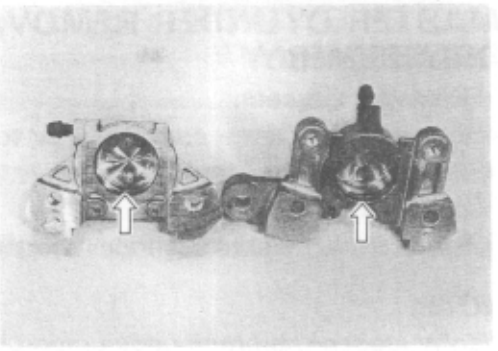
⚠ CAUTION

Do not use high pressure air to prevent piston damage.

• Remove the dust seals and piston seals.

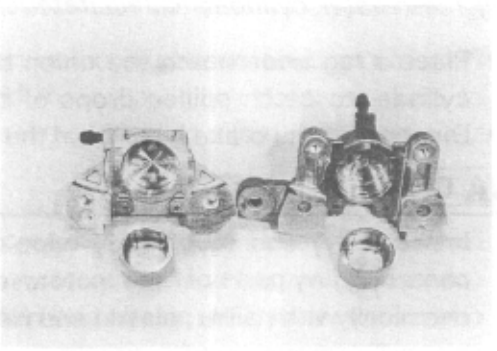
⚠ CAUTION

Do not reuse the dust seals and piston seals to prevent fluid leakage.



CALIPER INSPECTION

CALIPER ..... Refer to page 6-47.
PISTON ..... Refer to page 6-47.

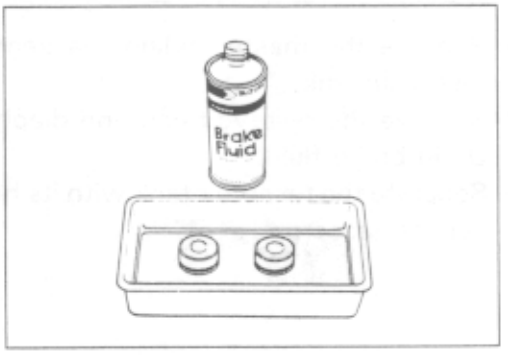


CALIPER REASSEMBLY AND REMOUNTING

Reassemble and remount the caliper in the reverse order of removal and disassembly. Pay attention to the following points:

⚠ CAUTION

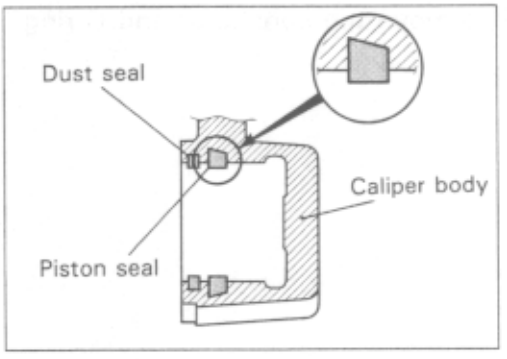
*** Wash the caliper components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
*** Apply brake fluid to the caliper bore and piston to be inserted into the bore.**



BF Specification and classification: DOT 4

PISTON SEAL

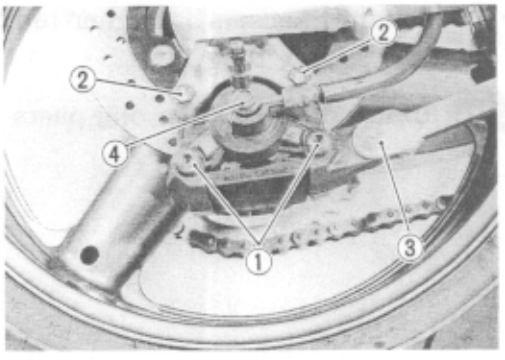
• Install the piston seals as shown in the right illustration.



CALIPER BOLTS

• Tighten each bolt to the specified torque.

Rear brake caliper housing bolt ① : 33 N·m (3.3 kg-m, 24.0 lb-ft)
Rear brake caliper mounting bolt ② : 26 N·m (2.6 kg-m, 19.0 lb-ft)
Torque link nut (Rear) ③ : 35 N·m (3.5 kg-m, 25.5 lb-ft)
Brake hose union bolt ④ : 23 N·m (2.3 kg-m, 16.5 lb-ft)



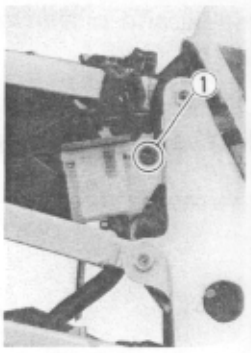
⚠ CAUTION

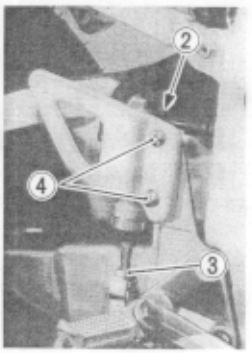
Bleed air from the system after reassembling the caliper. (Refer to page 2-17.)

• Refer to page 8-21 for brake hose routing.

MASTER CYLINDER REMOVAL AND DISASSEMBLY

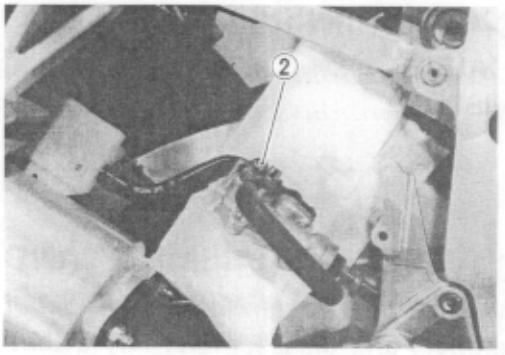
- Remove the seats.
- Remove the frame cover. (Refer to page 6-4.)
- Free the reservoir tank to remove its mounting bolt ①.
- Loosen the lock nut ③.
- Remove the master cylinder mounting bolts ④.





NOTE:
Slightly loosen the brake hose union bolt ② before removing the master cylinder to facilitate later disassembly.

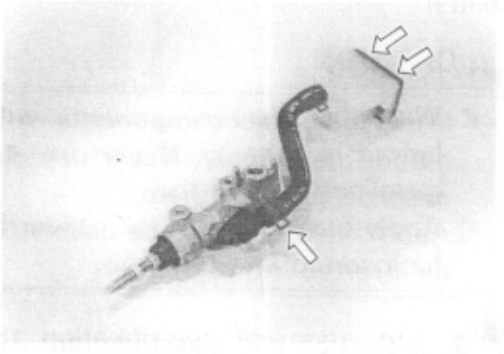
- Place a rag underneath the union bolt ② on the master cylinder to catch spilled drops of brake fluid.
- Disconnect the brake hose from the master cylinder joint.



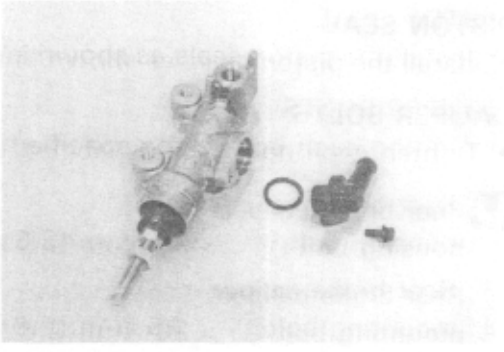
⚠ CAUTION

Immediately and completely wipe off any brake fluid contacting any parts of the motorcycle. The fluid reacts chemically with paint, plastic and rubber materials, etc. and will damage them severely.

- Remove the master cylinder assembly along with the reservoir tank.
- Remove the reservoir cap and diaphragm.
- Drain brake fluid.
- Separate the reservoir tank with its hose from the master cylinder assembly.

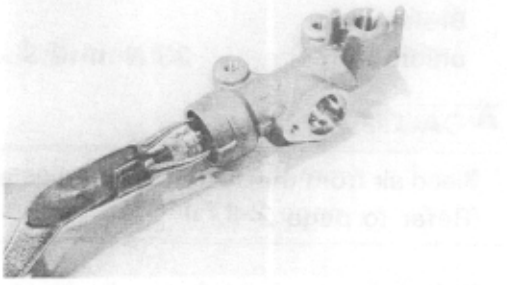


- Remove the connector and O-ring.

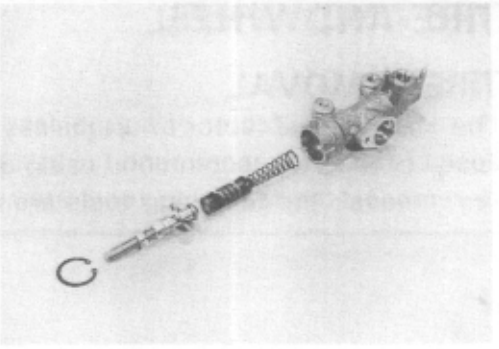


- Pull out the dust seal boot, then remove the circlip by using the special tool.

TOOL **09900-06108: Snap ring pliers**



- Remove the push rod, piston/primary cap and spring.



MASTER CYLINDER INSPECTION

CYLINDER, PISTON AND CUP SET

- Inspect the cylinder bore wall for any scratches or other damage.
- Inspect the piston surface for any scratches or other damage.
- Inspect the cup set and each rubber part for damage.

DISC SERVICING

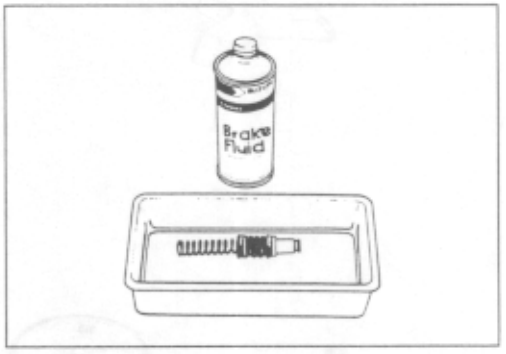
Refer to page 6-48.

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

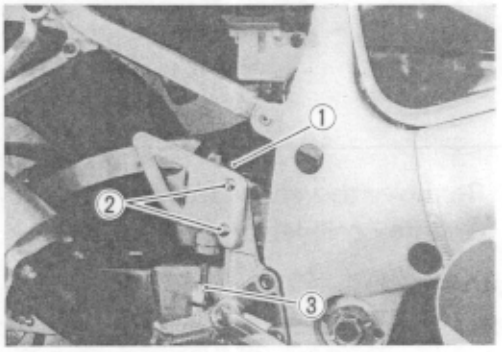
*** Wash the master cylinder components with fresh brake fluid before reassembly. Never use cleaning solvent or gasoline to wash them.**
*** Apply brake fluid to the cylinder bore and all the component to be inserted into the bore.**



BF Specification and Classification: DOT 4

MASTER CYLINDER BOLTS

- Tighten each bolt to the specified torque.



Brake hose union bolt ①: 23 N·m (2.3 kg-m, 16.5 lb-ft)
Rear brake master cylinder mounting bolt ②: 10 N·m (1.0 kg-m, 7.0 lb-ft)
Rear brake master cylinder rod lock nut ③: 18 N·m (1.8 kg-m, 13.0 lb-ft)

⚠ CAUTION

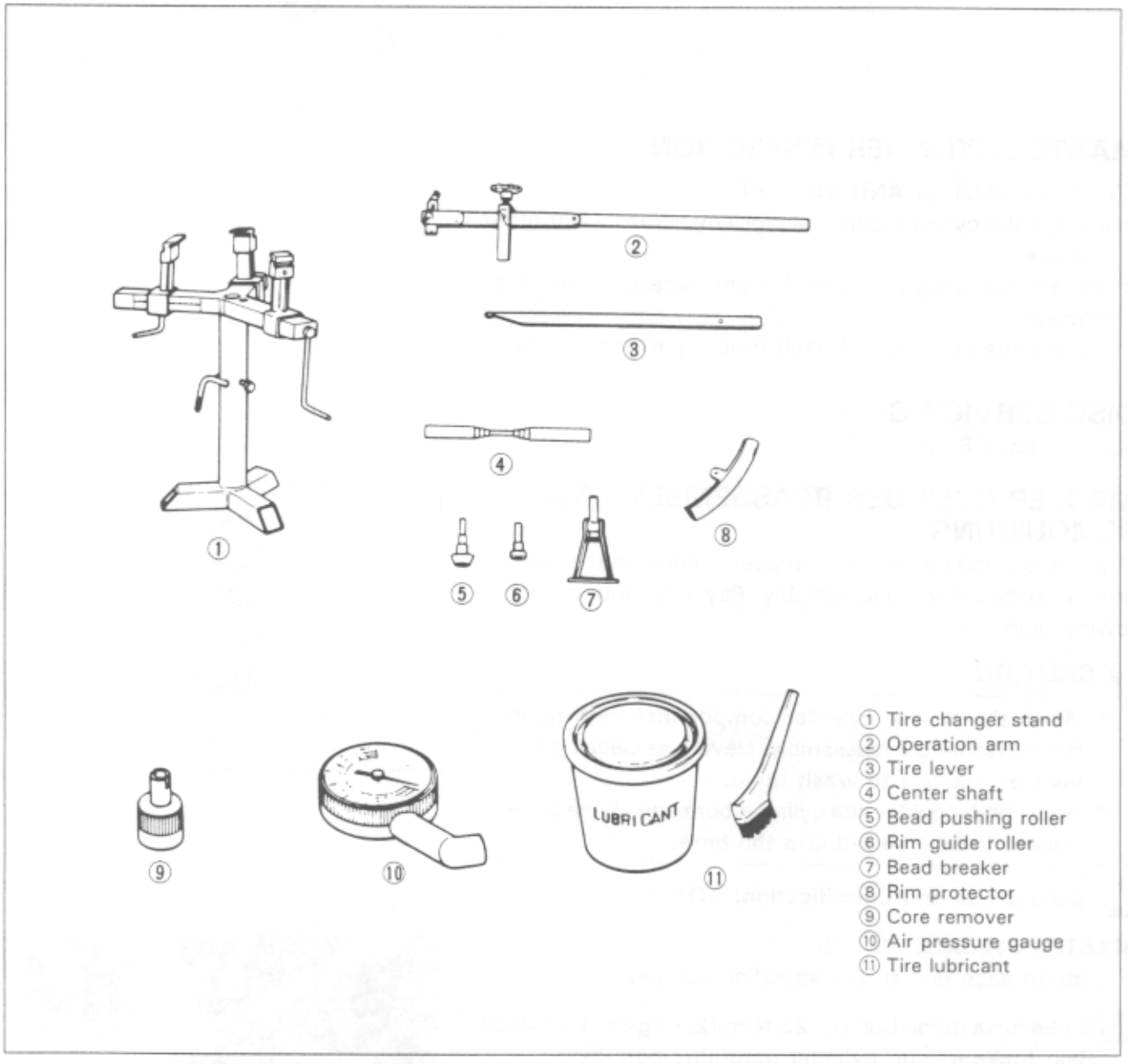
Bleed air from the system after reassembling master cylinder. (Refer to page 2-17.)

- After installing the rear brake master cylinder, adjust the brake pedal height. (Refer to page 2-16.)

TIRE AND WHEEL

TIRE REMOVAL

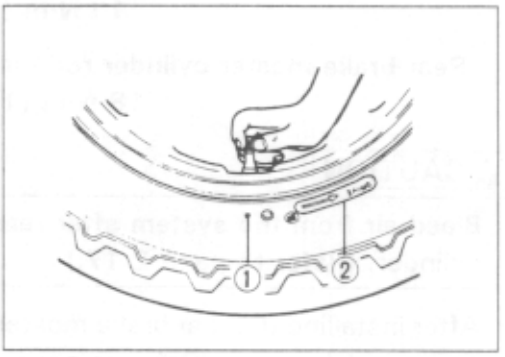
The most critical factor of a tubeless tire is the seal between the wheel rim and the tire beed. Because of this, we recommend using a tire changer which is also more efficient than tire levers. For tire removal, the following tools are required.



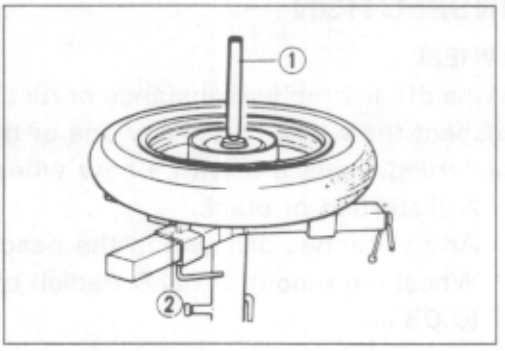
① Tire changer stand
② Operation arm
③ Tire lever
④ Center shaft
⑤ Bead pushing roller
⑥ Rim guide roller
⑦ Bead breaker
⑧ Rim protector
⑨ Core remover
⑩ Air pressure gauge
⑪ Tire lubricant

- Remove the valve core from the valve stem, and deflate the tire completely.

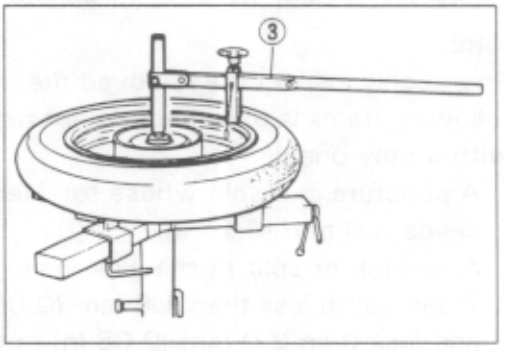
NOTE:
Mark the tire with chalk to note the position ① of the tire on the rim and rotational direction ② of the tire.



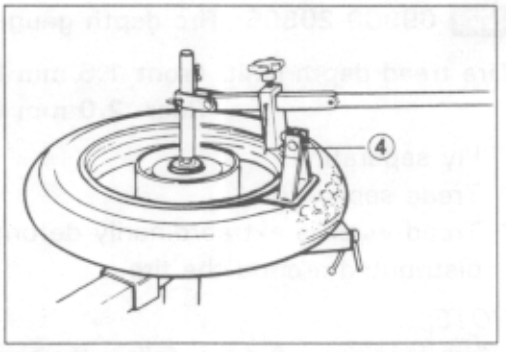
- Place the center shaft ① to the wheel, and fix the wheel with the rim holder ②.



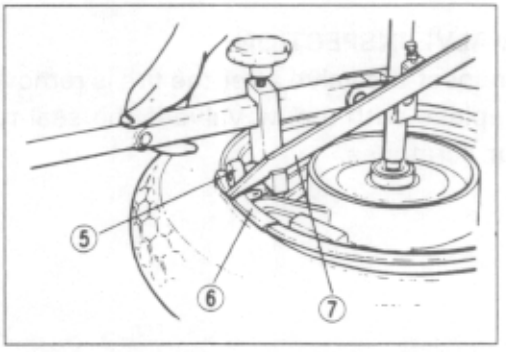
- Attach the operation arm ③ to the center shaft.



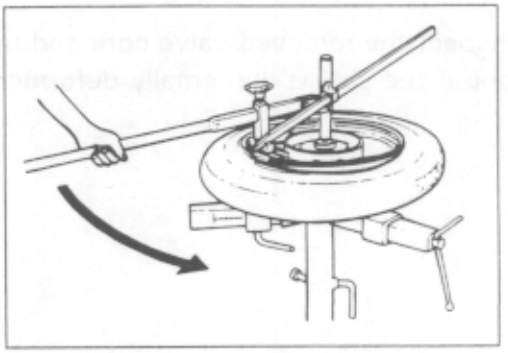
- Attach the bead breaker ④ to the operation arm, and dismount the bead from the rim. Turn the wheel over and dismount the other bead from the rim.



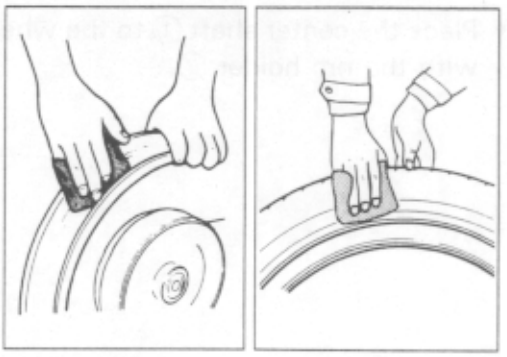
- Install the rim guide roller ⑤.
- Install the rim protector ⑥, and raise the bead with the tire lever ⑦.



- Set the tire lever against the operation arm, and rotate the lever around the rim. Repeat this procedure to remove the other bead from the rim.



INSPECTION

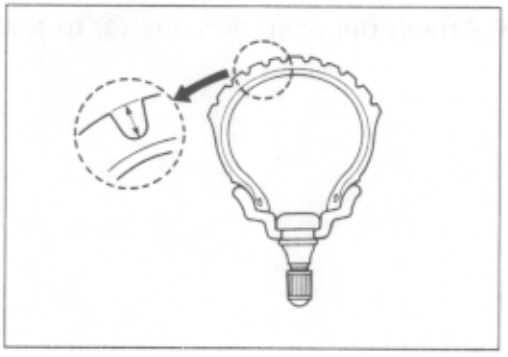


WHEEL

Wipe off any rubber substance or rust from the wheel, and inspect the wheel rim. If any one of the following items is observed, replace it with a new wheel.

* A distortion or crack.
* Any scratches or flaws in the bead seating area.
* Wheel rim runout (Axial & Radial) of more than 2.0 mm (0.08 in).

Wheel rim runout (Axial and Radial): 2.0 mm (0.08 in)



TIRE

Thoroughly inspect the removed tire, and if any one of the following items is observed, do not repair the tire. Replace with a new one.

* A puncture or a split whose total length or diameter exceeds 6.0 mm (0.24 in).
* A scratch or split at the side wall.
* Tread depth less than 1.6 mm (0.06 in) in the front tire and less than 2.0 mm (0.08 in) in the rear tire.

TOOL **09900-20805: Tire depth gauge**

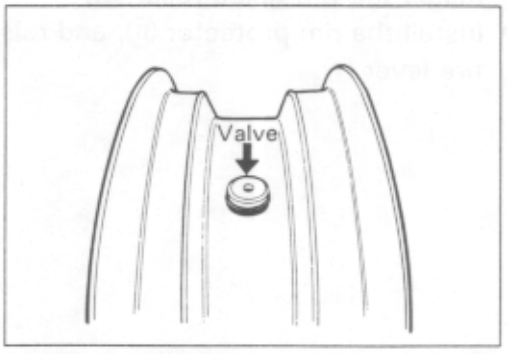
Tire tread depth limit: Front 1.6 mm (0.06 in)
Rear 2.0 mm (0.08 in)

* Ply separation.
* Tread separation.
* Tread wear is extraordinarily deformed or distributed around the tire.
* Scratches at the bead.
* Cord is cut.
* Damage from skidding (flat spots).
* Abnormality in the inner liner.

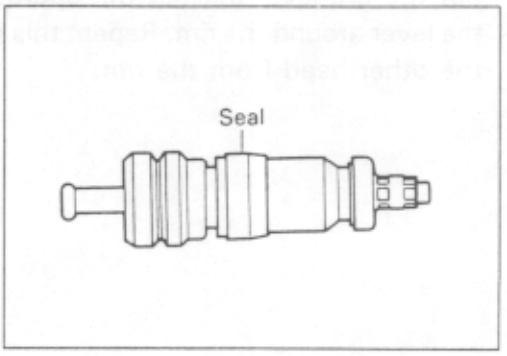
NOTE:
When repairing a flat tire, follow the repair instructions and use only recommended repairing materials.

VALVE INSPECTION

Inspect the valve after the tire is removed from the rim, and replace with a new valve if the seal rubber has any splits or scratches.



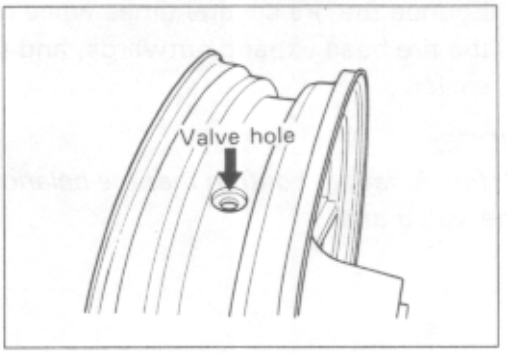
Inspect the removed valve core and replace with the new one if the seal is abnormally deformed or worn.



VALVE INSTALLATION

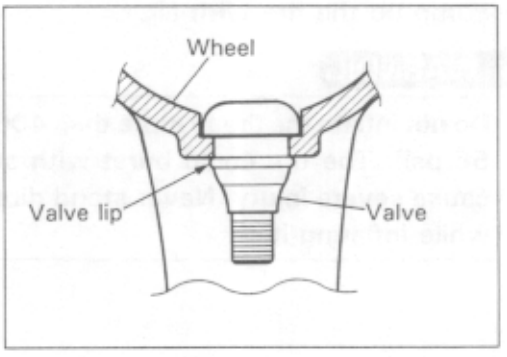
Any dust or rust around the valve hole must be cleaned off. Then install the valve in the rim.

NOTE:
To properly install the valve into the valve hole, apply a special tire luburicant or neutral soapy liquid to the valve.



⚠ CAUTION

Be careful not to damage the lip of valve.

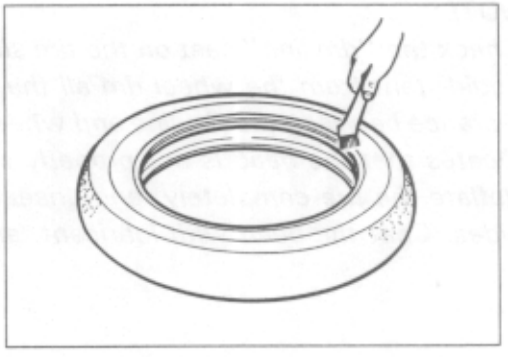


TIRE INSTALLATION

- Apply a special tire lubricant or neutral soapy liquid to the tire bead.

⚠ CAUTION

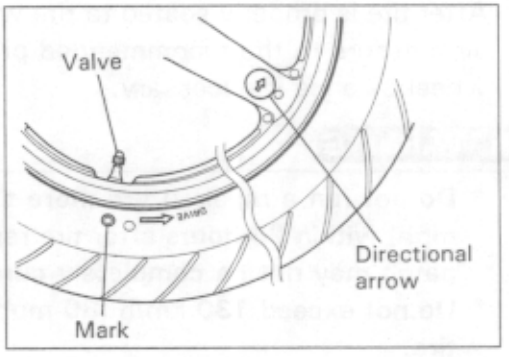
Never apply grease, oil or gasoline to the tire bead.



- When installing the tire, align the balancing mark of the tire with the valve as shown.

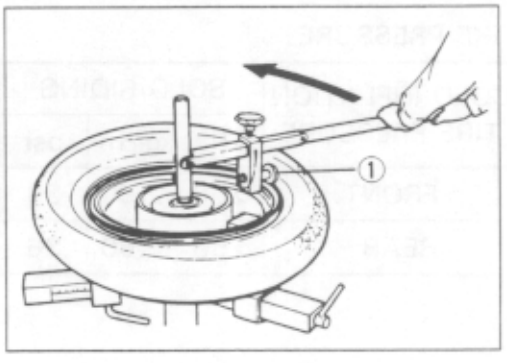
⚠ CAUTION

Face the tire directional arrow to the direction of wheel directional arrow, when installing the tire.

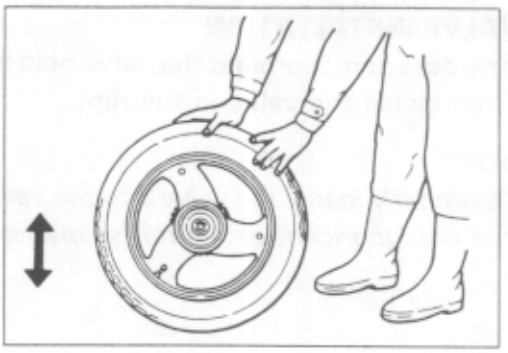


- Set the bead pushing roller ①.
- Rotate the operation arm around the rim to mount the bead completely. Do the bottom bead first, then the upper bead.
- Remove the wheel from the tire changer, and install the valve core in the valve stem.

NOTE:
Before installing the valve core, inspect the core.

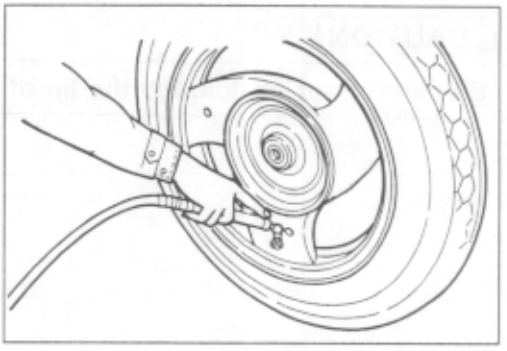


- Bounce the tire several times while rotating. This makes the tire bead expand outwards, and thus makes inflation easier.



NOTE:
Before inflating, confirm that the balance mark lines up with the valve stem.

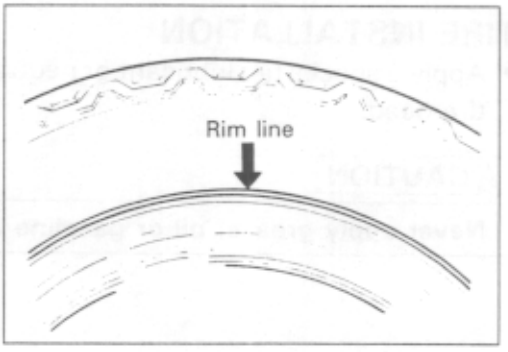
- Pump up the tire with air.



⚠ WARNING

Do not inflate the tire to more than 400 kPa (4.0 kg/cm², 56 psi). The tire could burst with sufficient force to cause severe injury. Never stand directly over the tire while inflating it.

NOTE:
Check the "rim line" cast on the tire side walls. It must be equidistant from the wheel rim all the way around. If the distance between the rim line and wheel rim varies, this indicates that the bead is not properly seated. If this is so, deflate the tire completely, and unseat the bead for both sides. Coat the bead with lubricant, and try again.



- After tire is properly seated to the wheel rim, adjust the air-pressure to the recommended pressure. Correct the wheel balance if necessary.

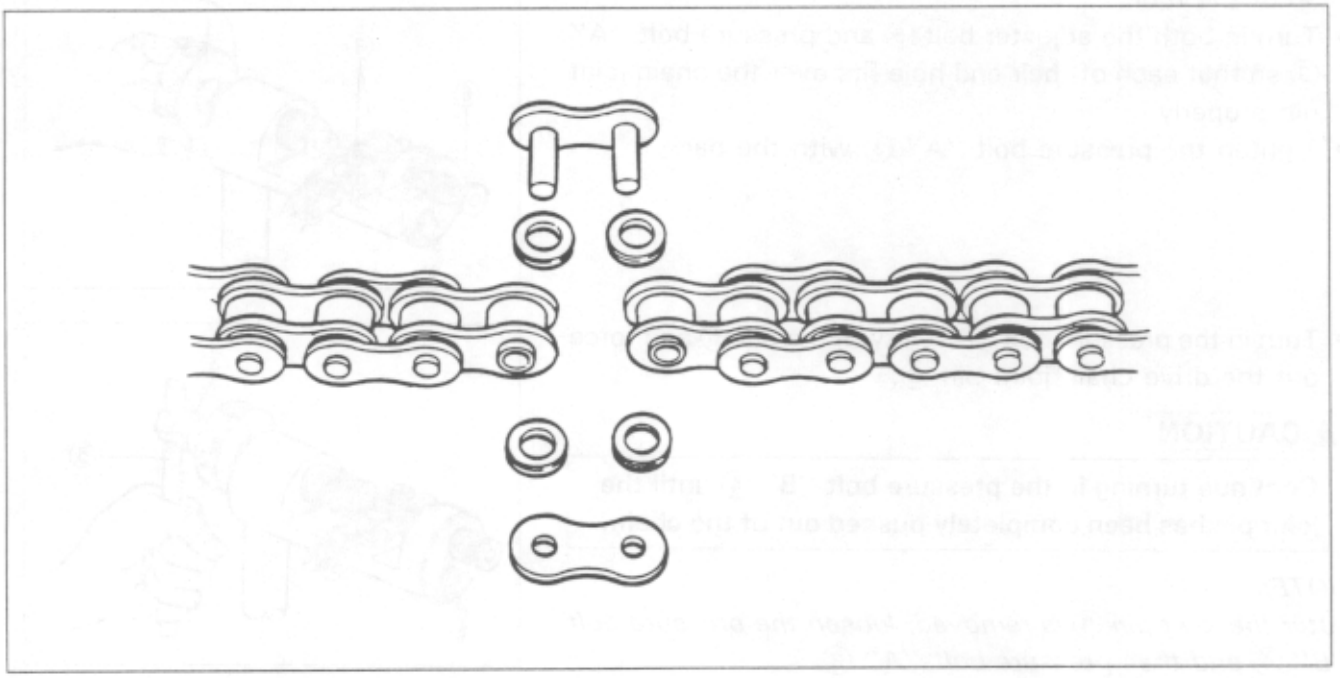
⚠ WARNING

*** Do not run a repaired tire more than 50 km/h (30 mph) within 24 hours after tire repairing, since the patch may not be completely cured.**
*** Do not exceed 130 km/h (80 mph) with a repaired tire.**

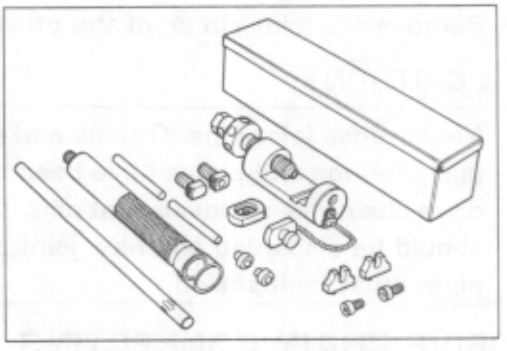
TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	250	2.50	36	250	2.50	36
REAR	250	2.50	36	250	2.50	36

DRIVE CHAIN



Use the special tool in the following procedures, to cut and rejoin the drive chain.

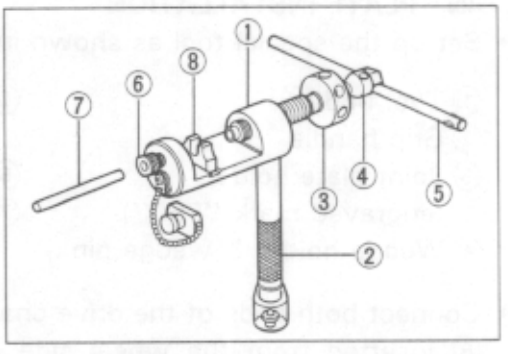


TOOL 09922-22711: Drive chain cutting and joining tool set

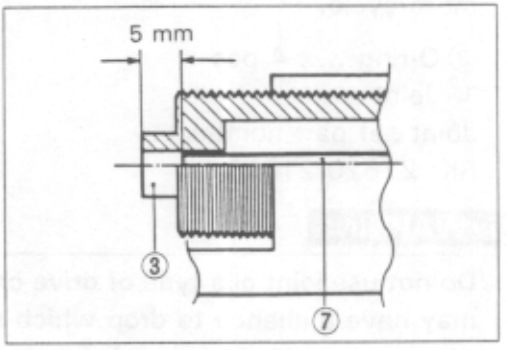
NOTE:
When using the special tool, apply a small quantity of grease to the threaded parts of the special tool.

DRIVE CHAIN CUTTING

- Set up the special tool as shown in the illustration.

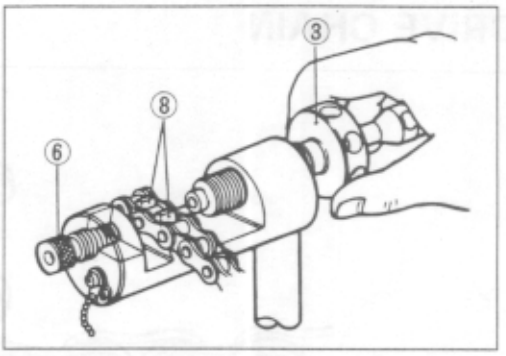


① Tool body
② Grip handle
③ Pressure bolt "A"
④ Pressure bolt "B"
⑤ Bar
⑥ Adjuster bolt (with through hole)
⑦ Pin remover
⑧ Chain holder (engraved mark 532) with reamer bolt M5 × 10



NOTE:
The tip of pin remover ⑦ should be positioned inside approximatery 5 mm (0.2 in) from the end face of pressure bolt "A" ③ as shown in the illustration.

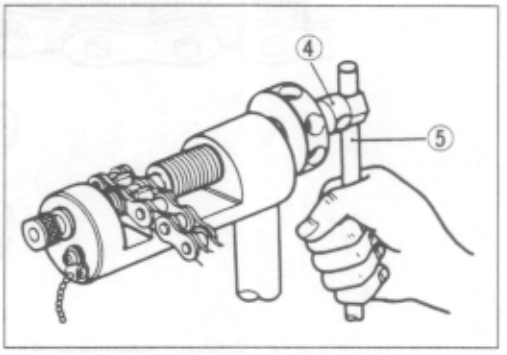
- Place the drive chain link being disjoined on the holder part ⑧ of the tool.
- Turn in both the adjuster bolt ⑥ and pressure bolt "A" ③ so that each of their end hole fits over the chain joint pin properly.
- Tighten the pressure bolt "A" ③ with the bar.



- Turn in the pressure bolt "B" ④ with the bar ⑤ and force out the drive chain joint pin ⑨.

⚠ CAUTION

Continue turning in the pressure bolt "B" ④ until the joint pin has been completely pushed out of the chain.

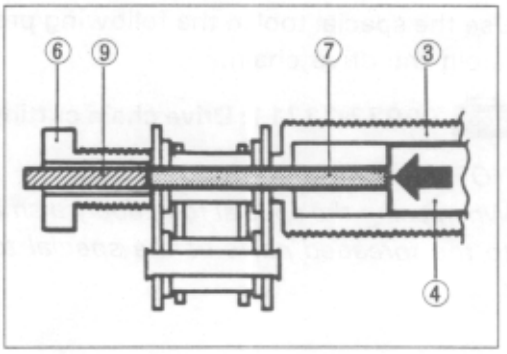


NOTE:
After the joint pin ⑨ is removed, loosen the pressure bolt "B" ④ and then pressure bolt "A" ③.

- Remove the joint pin ⑨ of the other side of joint plate.

⚠ CAUTION

Never reuse joint pins, O-rings and plates. After joint pins, O-rings and plates have been removed from the drive chain, the removed joint pins, O-rings and plates should be discarded and new joint plate, O-rings and plate must be installed.

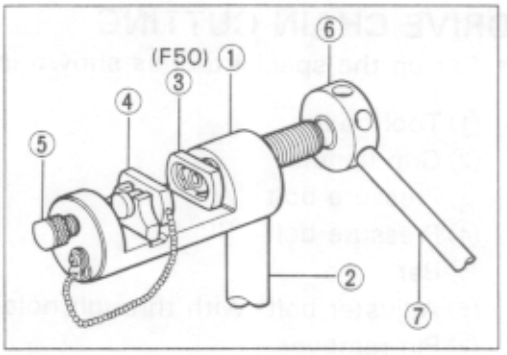


DRIVE CHAIN CONNECTING

JOINT PLATE INSTALLATION

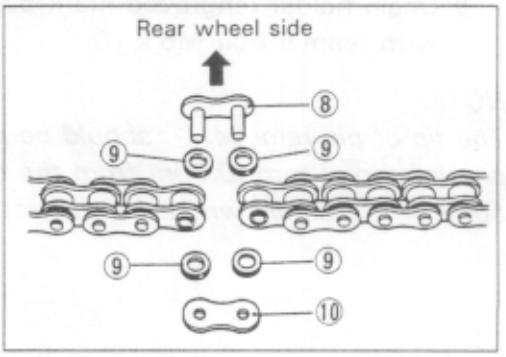
- Set up the special tool as shown in the illustration.

① Tool body
② Grip handle
③ Joint plate holder (engraved mark "F50")
④ Wedge holder & wedge pin
⑤ Adjuster bolt (without hole)
⑥ Pressure bolt "A"
⑦ Bar



- Connect both ends of the drive chain with the joint pin ⑧ inserted from the wheel side as installed on the motorcycle.

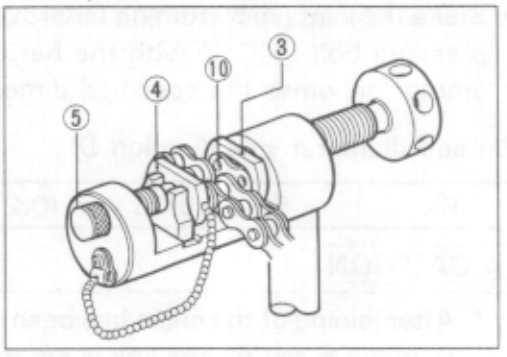
⑨ O-ring ..... 4 pcs
⑩ Joint plate
Joint set part number
RK: 27620-21E10



⚠ WARNING

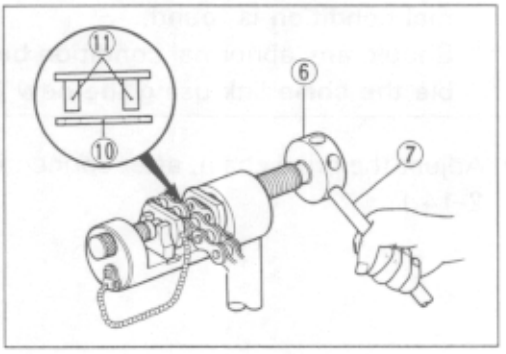
Do not use joint clip type of drive chain. The joint clip may have a chance to drop which may cause severe damage to motorcycle and severe injury.

- Apply grease on the recessed portion of the joint plate holder ③ and set the joint plate ⑩.



NOTE:
When positioning the joint plate ⑩ on the tool, bring its stamp mark on the joint plate holder ③ side.

- Set the drive chain on the tool as illustrated and turn in the adjuster bolt ⑤ to secure the wedge holder & wedge pin ④.
- Turn in the pressure bolt "A" ⑥ and align two joint pins ⑪ properly with the respective holes in joint plate ⑩.
- Turn in the pressure bolt "A" ⑥ further using the bar ⑦ to press the joint plate over the joint pins.



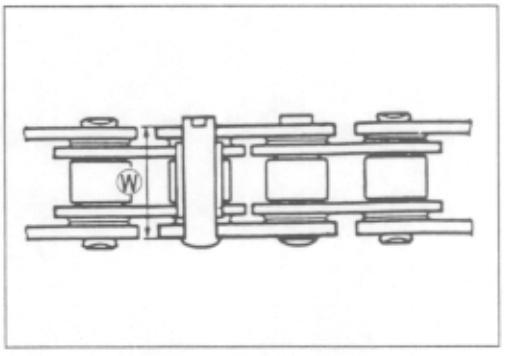
- Continue pressing the joint plate unitl the distance between the two joint plates comes to the specification.

Joint plate distance specification Ⓦ

RK	21.85—22.15 mm (0.860—0.872 in)

⚠ CAUTION

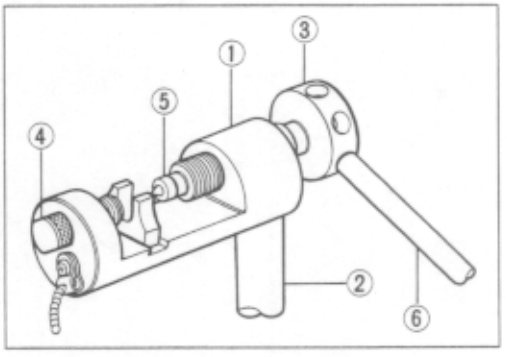
Should pressing of the joint plate be made excessively beyond the specified dimension, the work should be redone using the new joint parts.



JOINT PIN STAKING

- Set up the special tool as shown in the illustration.

① Tool body
② Grip handle
③ Pressure bolt "A"
④ Adjuster bolt (without hole)
⑤ Staking pin (stowed inside grip handle behind rubber cap)
⑥ Bar



NOTE:
Before staking the joint pin, apply a small quantity of grease of the staking pin ⑤.

- Stake the joint pin by turning (approximately 7/8 turn) the pressure bolt "A" ③ with the bar until the pin end diameter becomes the specified dimension.

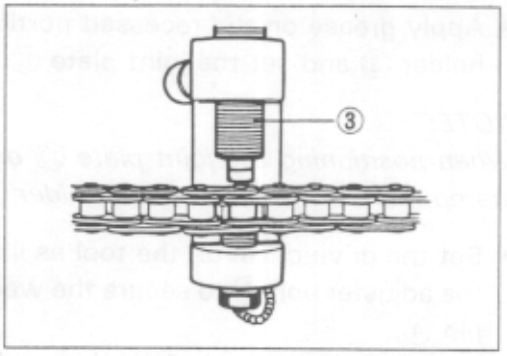
Pin end diameter specification Ⓓ

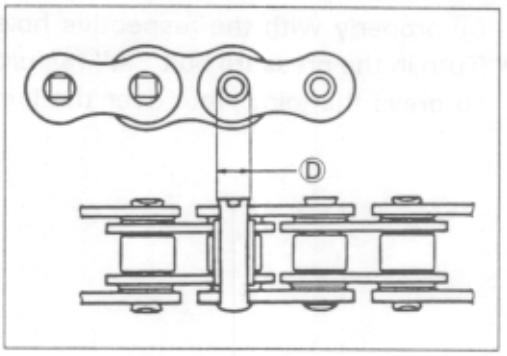
RK	5.45—5.85 mm (0.215—0.230 in)

⚠ CAUTION

*** After joining of the chain has been completed, check to make sure that the link is smooth and no abnormal condition is found.**
*** Should any abnormal condition be found, reassemble the chain link using the new joint parts.**

- Adjust the drive chain, after connecting it. (Refer to page 2-14.)





ELECTRICAL SYSTEM

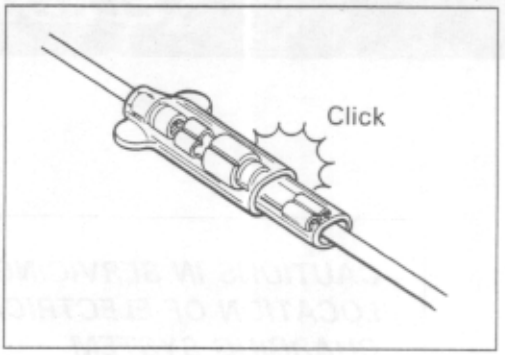
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CAUTIONS IN SERVICING

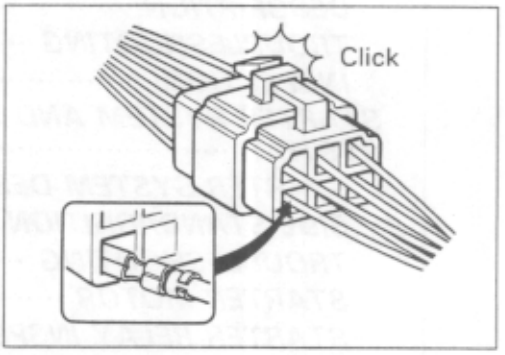
CONNECTOR

- When connecting a connector, be sure to push it in untill a click is felt.
- Inspect the connector for corrosion, contamination and breakage in its cover.



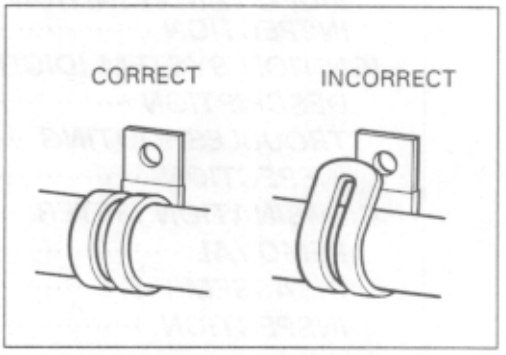
COUPLER

- With a lock type coupler, be sure to release the lock before disconnecting it and push it in fully till the lock works when connecting it.
- 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.



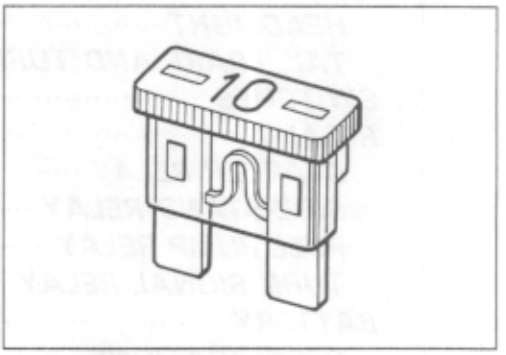
CLAMP

- Clamp the wire harness at such positions as indicated in "WIRE HARNESS ROUTING" (Refer to page 8-13, -14 and -15.).
- 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.



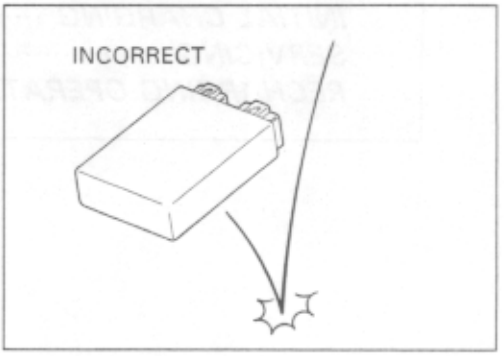
FUSE

- 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.



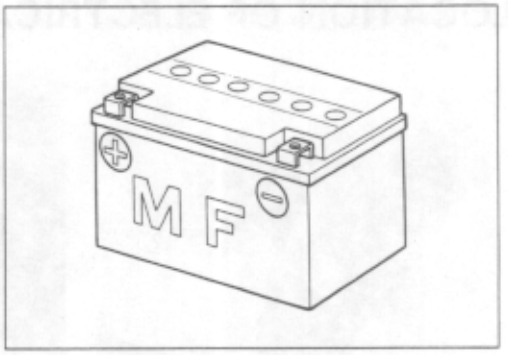
SEMI-CONDUCTOR EQUIPPED PART

- Be careful not to drop the part with a semi-conductor built in such as a ignitor unit.
- When inspecting this part, follow inspection instruction strictly. Neglecting proper procedure may cause damage to this part.



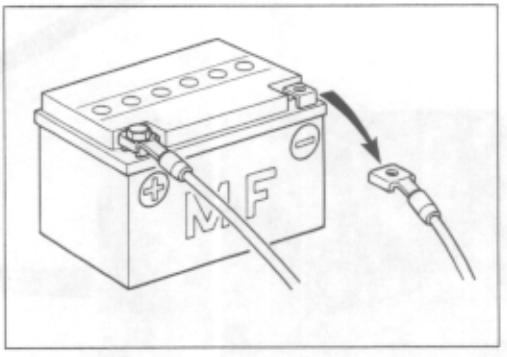
BATTERY

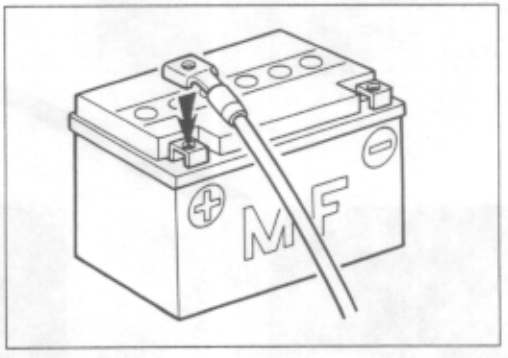
- The MF battery used in this vehicle does not require maintenance as inspection of electrolyte level and replenishment of water.
- No hydrogen gas is produced during normal charging of the battery, but such gas may be produced when it is overcharged. Therefore, do not bring fire near the battery while it is being charged.
- Note that the charging system for the MF battery is different from that of an ordinary battery. Do not replace with an ordinary battery.



CONNECTING BATTERY

- When disconnecting terminals from the battery for disassembly or servicing, be sure to disconnect the negative (⊖) terminal first.
- When connecting terminals to the battery, be sure to connect the positive (⊕) terminal first.
- If the terminal is found corroded, remove the battery, pour warm water over it and clean with a wire brush.
- Upon completion of connection, apply grease lightly.
- Put a cover over the positive (⊕) terminal.



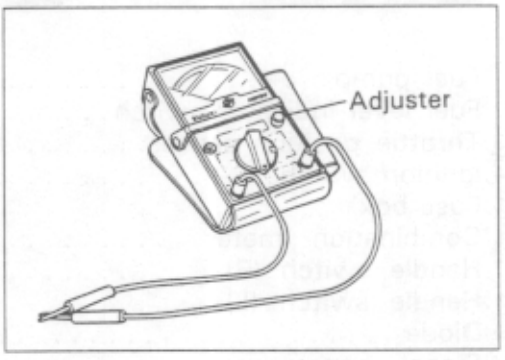


WIRING PROCEDURE

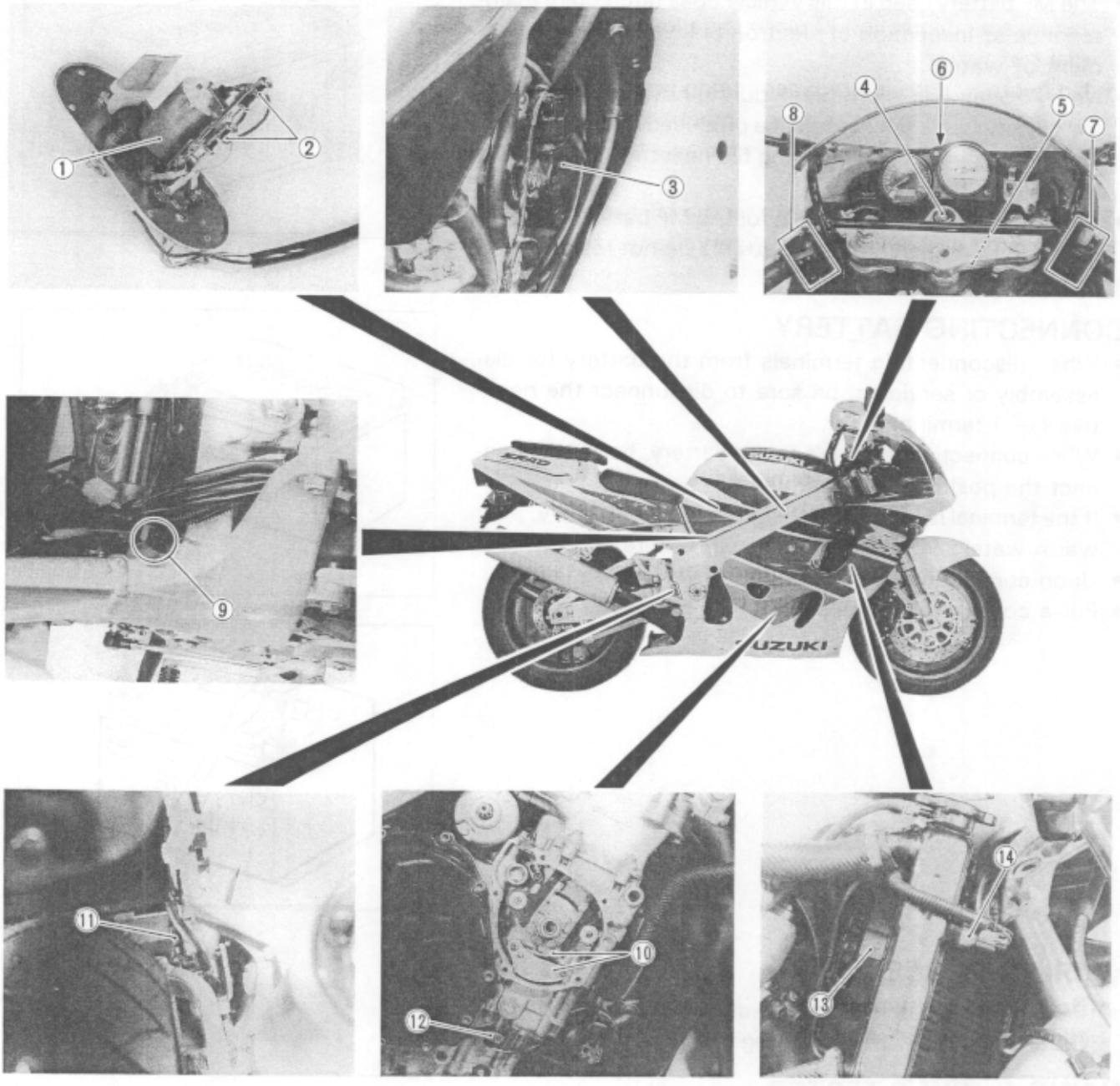
- Route the wire harness properly according to "WIRE HARNESS ROUTING" (Refer to page 8-13, -14 and -15.).

USING POCKET TESTER

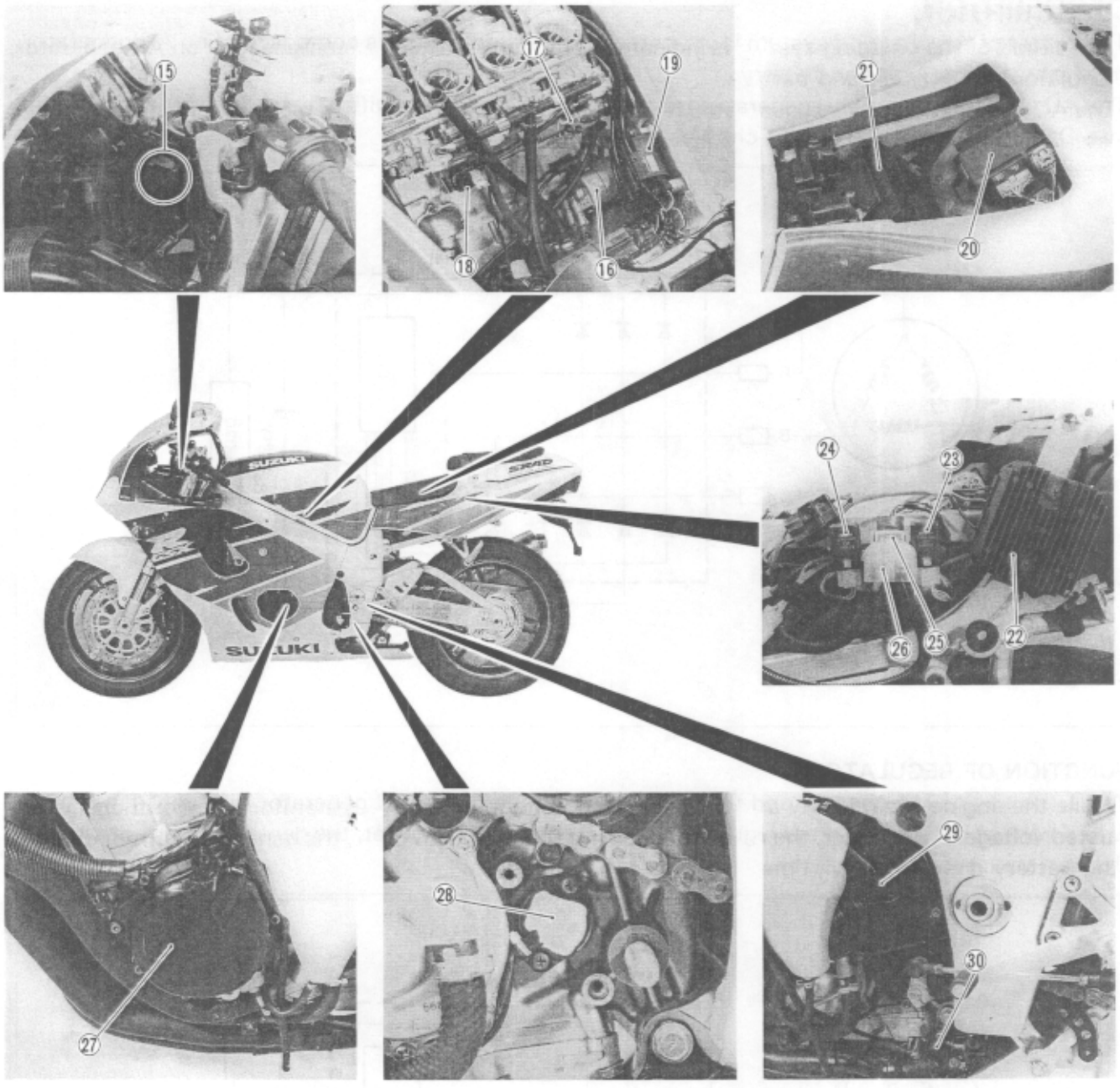
- Be sure to use positive (⊕) and negative (⊖) probes of the tester properly. Their false use may cause damage in the tester.
- If the voltage and current values are not known, start measuring in the higher range.
- Before measuring the resistance and after changing the resistance range, always perform 0 Ω adjustment.
- Taking a measurement where voltage is applied in the resistance range may cause damage in the tester. When measuring resistance, check to make sure that no voltage is applied there.
- After using the tester, turn the switch to the OFF position.



LOCATION OF ELECTRICAL COMPONENTS



	See page
①Fuel pump	4-4 and -5
②Fuel level indicator switch	7-32
③Throttle position senser	4-23
④Ignition switch	7-36
⑤Fuse box	
⑥Combination meter	7-28 through -33
⑦Handle switch (R)	7-36
⑧Handle switch (L)	7-36
⑨Diode	7-18
⑩Signal generator	7-24 and -25
⑪Rear brake light switch	7-36
⑫Oil pressure switch	7-36
⑬Cooling fan	5-6 and -7
⑭Cooling fan thermo-switch	5-7 and -8



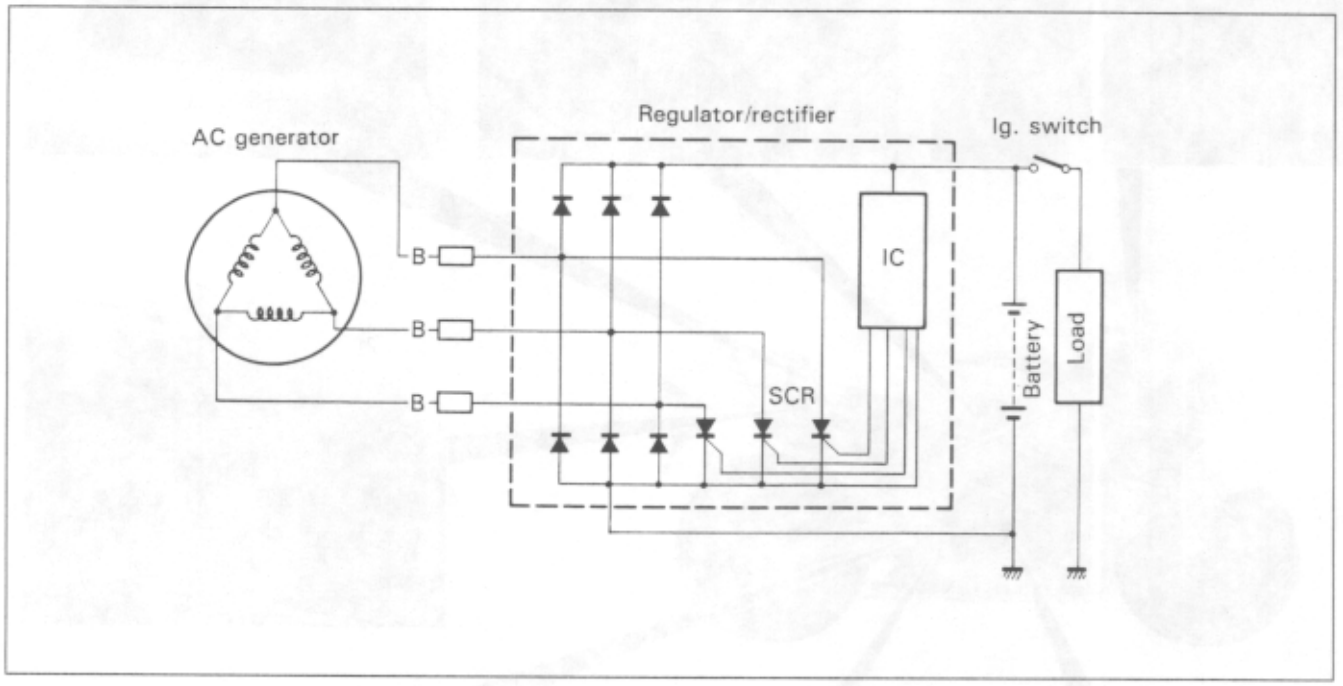
	See page
⑮Turn signal relay	7-37
⑯Starter motor	7-14, -15 and -16
⑰Engine coolant temperature gauge	5-9 and -10
⑱Solenoid valve	4-22
⑲Ignition coil	7-23 and -24
⑳Ignitor	7-26 and -27
㉑Battery	7-37, -38 and -39
㉒Regulator/rectifier	7-10
㉓Fuel pump relay	4-6
㉔Side-stand relay	7-19
㉕Main fuse	
㉖Starter relay	7-17
㉗Generator	7-8 and -9
㉘Neutral switch	7-18
㉙Speed sensor	7-33
㉚Side-stand switch	7-19

CHARGING SYSTEM

DESCRIPTION

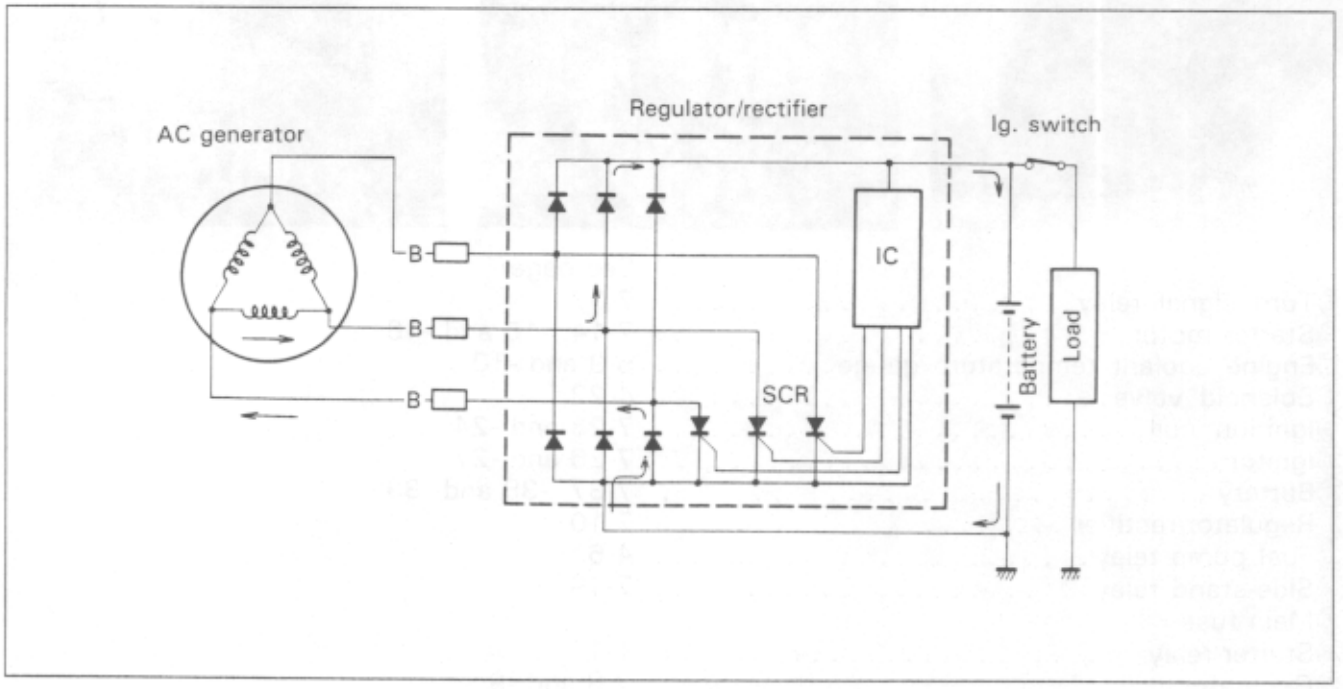
The circuit of the charging system is indicated in the figure, which is composed of an AC generator, regulator/rectifier unit and battery.

The AC (Alternating current) generated from the AC generator is rectified by the rectifier and is turned into DC (Direct current), then it charges the battery.

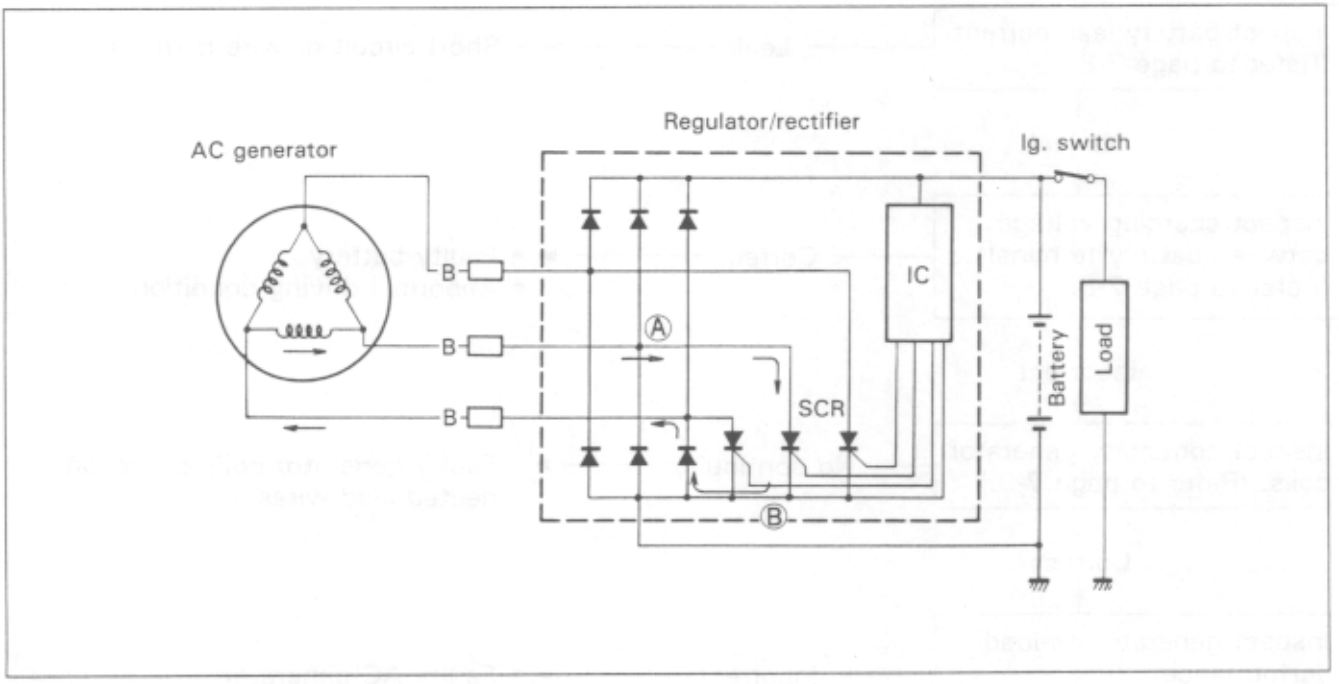


FUNCTION OF REGULATOR

While the engine r/min is low and the generated voltage of the AC generator is lower than the adjusted voltage of Regulator, the regulator does not function. However, the generated current charges the battery directly at this time.



When the engine r/min becomes higher, the generated voltage of the AC generator also becomes higher and the voltage between the battery terminals becomes high accordingly. When it reaches the adjusted voltage of the I.C., (Integrated Circuit) and it is turned "ON", a signal will be sent to the SCR (Thyristor) gate probe and the SCR will be turned "ON".
Then, the SCR becomes conductive in the direction from point Ⓐ to point Ⓑ. At this time, the current generated from the AC generator gets through the SCR without charging the battery and returns to AC generator again. At the end of this state, since the AC generated from AC generator flows to point Ⓑ, the reverse current tends to flow to SCR. Then, the circuit of SCR turns to the OFF mode and begins to charge the battery again. Thus these repetitions maintain charging voltage and current to the battery constant and protect it from overcharging.



TROUBLESHOOTING

Battery runs down quickly.

Check accessories which excessively waste electric power.
- Installed → • Remove accessories.

Not installed

Inspect battery leak current. (Refer to page 7-8.)
- Leak → • Short circuit of wire harness

No leak

Inspect charging voltage between battery terminals. (Refer to page 7-8.)
- Correct → • Faulty battery
  • Abnormal driving condition

Incorrect

Inspect continuity generator coils. (Refer to page 7-9.)
- No continuity → • Faulty generator coils or disconnected lead wires

Correct

Inspect generator no-load performance. (Refer to page 7-9.)
- Incorrect → • Faulty AC generator

Correct

Inspect regulator/rectifier. (Refer to page 7-10.)
- Incorrect → • Faulty regulator/rectifier

Correct

Inspect wirings.
- Incorrect → • Short circuit of wire harness
  • Poor contact of couplers

Correct

→ • Faulty battery

Others

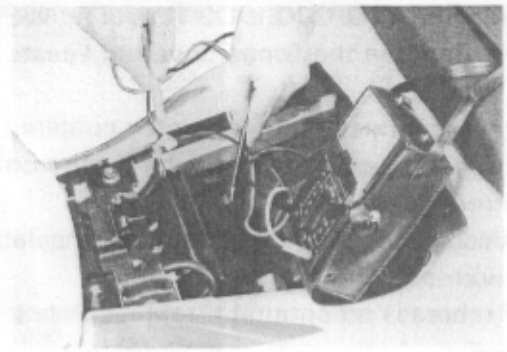
Battery overcharge	• Faulty regulator/rectifier • Faulty battery • Poor contact of generator lead wire coupler

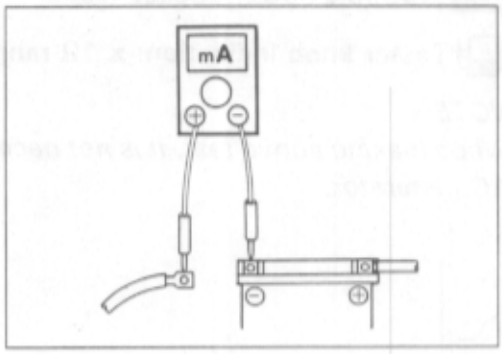
INSPECTION

BATTERY LEAK CURRENT INSPECTION

- Remove the front seat. (Refer to page 6-3.)
- Turn the ignition switch to the OFF position.
- Disconnect the battery ⊖ lead wire.

Note that leakage is indicated if the needle swings even a little when the milliampare meter of the pocket tester is connected between a ⊖ terminal and the lead wire of the battery as shown.





TOOL **09900-25002: Pocket tester**

⚠ CAUTION

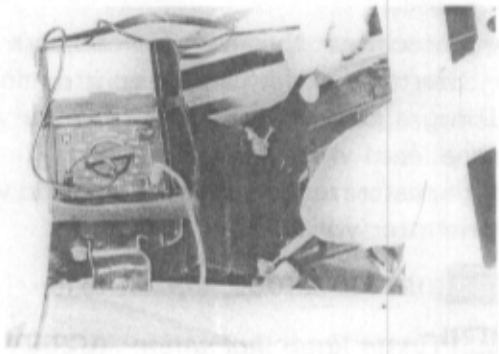
*** Because the leak current might be large, turn the tester to high range first when connecting an ammeter.**
*** Do not turn the ignition switch to the ON position when measuring current.**

When leakage is found, look for the part where the pointer does not swing through the couplers and connectors are removed one by one.

CHARGING OUTPUT INSPECTION

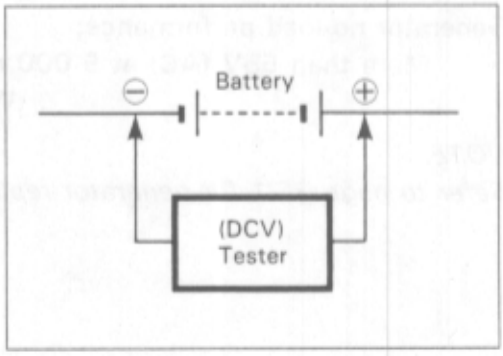
- Remove the front seat. (Refer to page 6-3.)
- Remove the battery ⊕ terminal cover.
- Start the engine and keep it running at 5 000 r/min. with lighting switch turned ON and dimmer switch turned HI position.

Measure the DC voltage between the battery terminals ⊕ and ⊖ with a pocket tester. If the tester reads under 13.5V or over 15.0V, inspect the generator coil and regulator/rectifier.



⚠ CAUTION

If a voltage is applied across the test probes of the pocket tester during the current or the resistance measurement, the tester will be damaged. Set the pocket tester knob to the proper position before measurement.



NOTE:
When making this test, be sure that the battery is fully-charged condition.

TOOL **09900-25002: Pocket tester**

Tester knob indication: DC 25V

Charging output (Regulated voltage)
Standard: 13.5—15.0V at 5 000 r/min.

GENERATOR COIL CONTINUITY INSPECTION

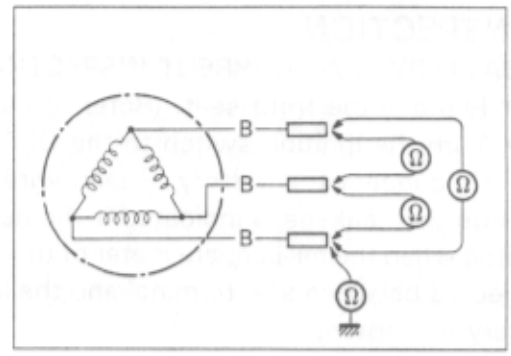
- Remove the frame cover and seats. (Refer to pages 6-3 and -4.)
- Disconnect the generator couplers ①.

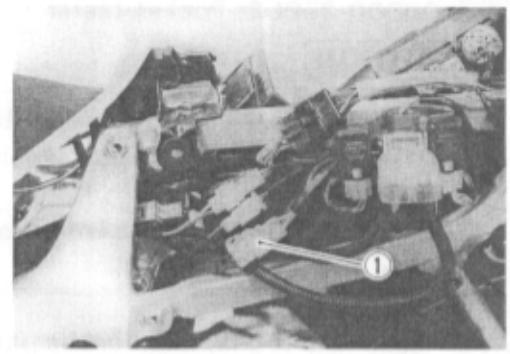
Using a pocket tester, inspect the continuity between the three lead wires.
Also check that the stator core is insulated between the lead wire and the ground.
If there is no continuity, replace the stator with a new one.

09900-25002: Pocket tester

Tester knob indication: x 1Ω range

NOTE:
When making above test, it is not necessary to remove the AC generator.





GENERATOR NO-LOAD PERFORMANCE INSPECTION

- Remove the frame cover and seats. (Refer to pages 6-3 and 4.)
- Disconnect the generator couplers ①.
- Start the engine and keep it running at 5 000 r/min.

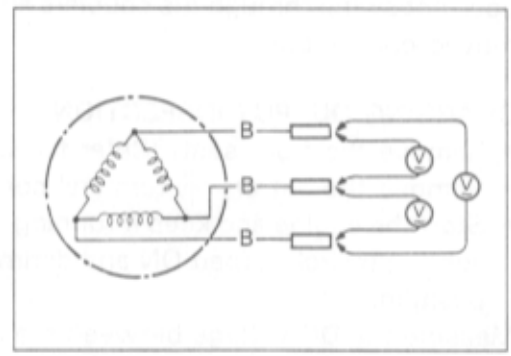
Using a pocket tester, measure the voltage between the three lead wires.
If the tester reads under the specified value, replace the AC generator with a new one.

09900-25002: Pocket tester

Tester knob indication: AC250V

Generator no-load performance:
More than 55V (AC) at 5 000 r/min
(When engine is cold)

NOTE:
Refer to page 3F-1 for generator replacing.



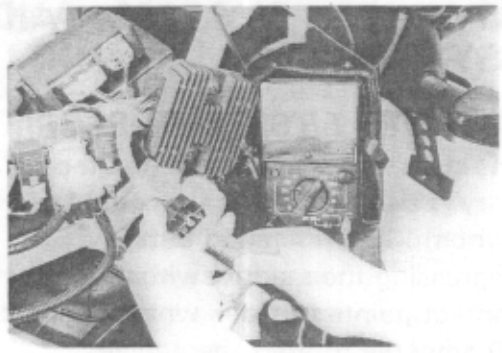
REGULATOR/RECTIFIER (Checking with Pocket Tester)

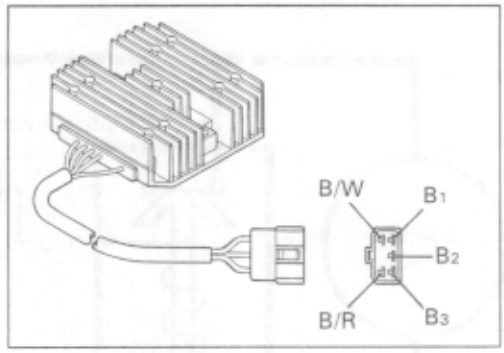
- Remove the seats and the frame cover. (Refer to pages 6-3 and -4.)
- Disconnect the regulator/rectifier couplers.

Using a pocket tester, measure the resistance between the lead wires in the following table.
If resistance is incorrect, replace the regulator/rectifier.

TOOL 09900-25002: Pocket tester

Tester knob indication: x 1kΩ range





Unit: kΩ

⊖ Probe of tester to: / ⊕ Probe of tester to:	B/R	B1	B2	B3	B/W
B/R		∞	∞	∞	∞
B1	1 ~ 10		∞	∞	∞
B2	1 ~ 10	∞		∞	∞
B3	1 ~ 10	∞	∞		∞
B/W	1 ~ 20	1 ~ 10	1 ~ 10	1 ~ 10	

B: Black, B/R: Black with Red tracer, B/W: Black with White tracer

NOTE:
As diodes, thyristors are used inside this regulator/rectifier, the resistance values will differ when and ohmmeter other than the SUZUKI pocket tester is used.

REGULATOR/RECTIFIER (Checking with Multi Circuit Tester)

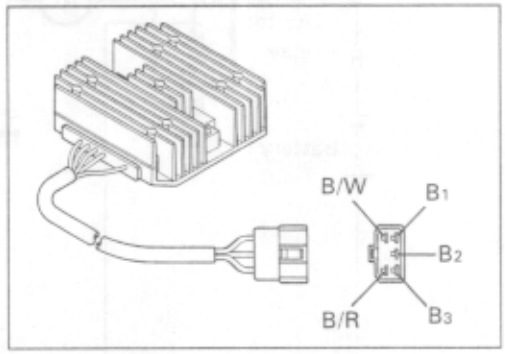
- Remove the seats and the frame cover. (Refer to pages 6-3 and -4.)
- Disconnect the regulator/rectifier couplers.

Using a multi circuit tester, measure the voltage between the lead wires in the following table. If the voltage is incorrect, replace the regulator/rectifier.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Diode test (⊣◀—)





⚠ CAUTION

When using the multi circuit tester, follow the instruction manual.

Unit: V

⊖ Probe of tester to: / ⊕ Probe of tester to:	B/R	B1	B2	B3	B/W
B/R		0.4 ~ 0.7	0.4 ~ 0.7	0.4 ~ 0.7	0.5 ~ 1.2
B1	Approx. 1.5		Approx. 1.5	Approx. 1.5	0.4 ~ 0.7
B2	Approx. 1.5	Approx. 1.5		Approx. 1.5	0.4 ~ 0.7
B3	Approx. 1.5	Approx. 1.5	Approx. 1.5		0.4 ~ 0.7
B/W	Approx. 1.5	Approx. 1.5	Approx. 1.5	Approx. 1.5	

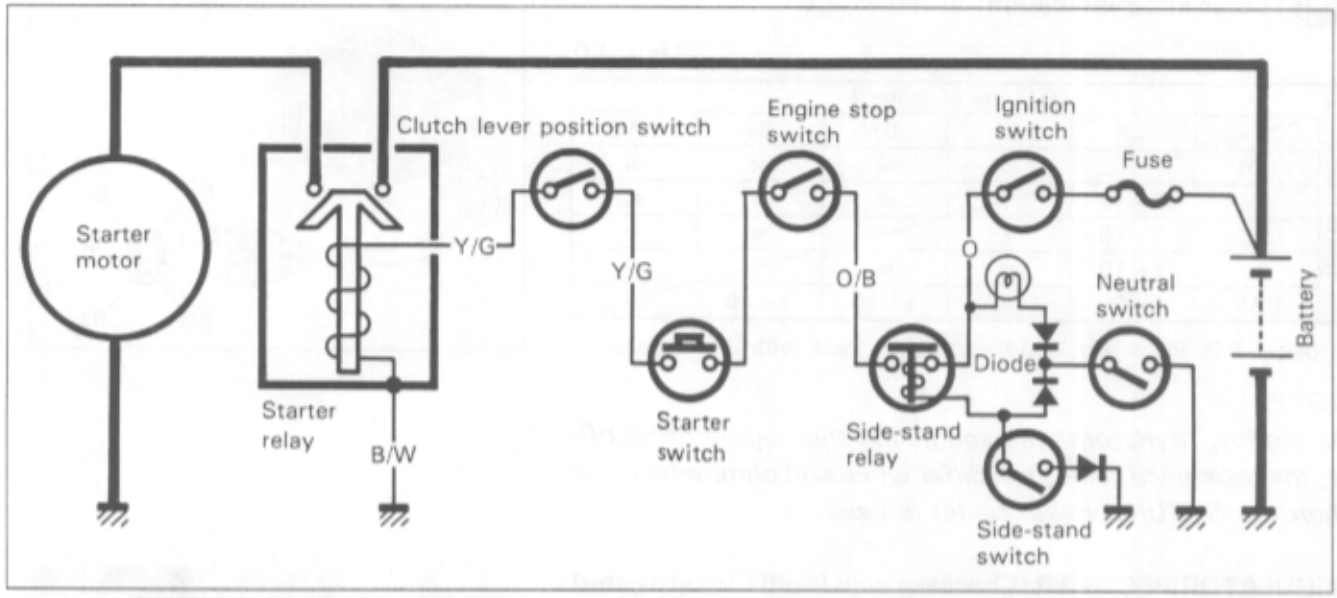
B: Black, B/R: Black with Red tracer, B/W: Black with White tracer

STARTER SYSTEM AND SIDE-STAND/IGNITION INTERLOCK SYSTEM

STARTER SYSTEM DESCRIPTION

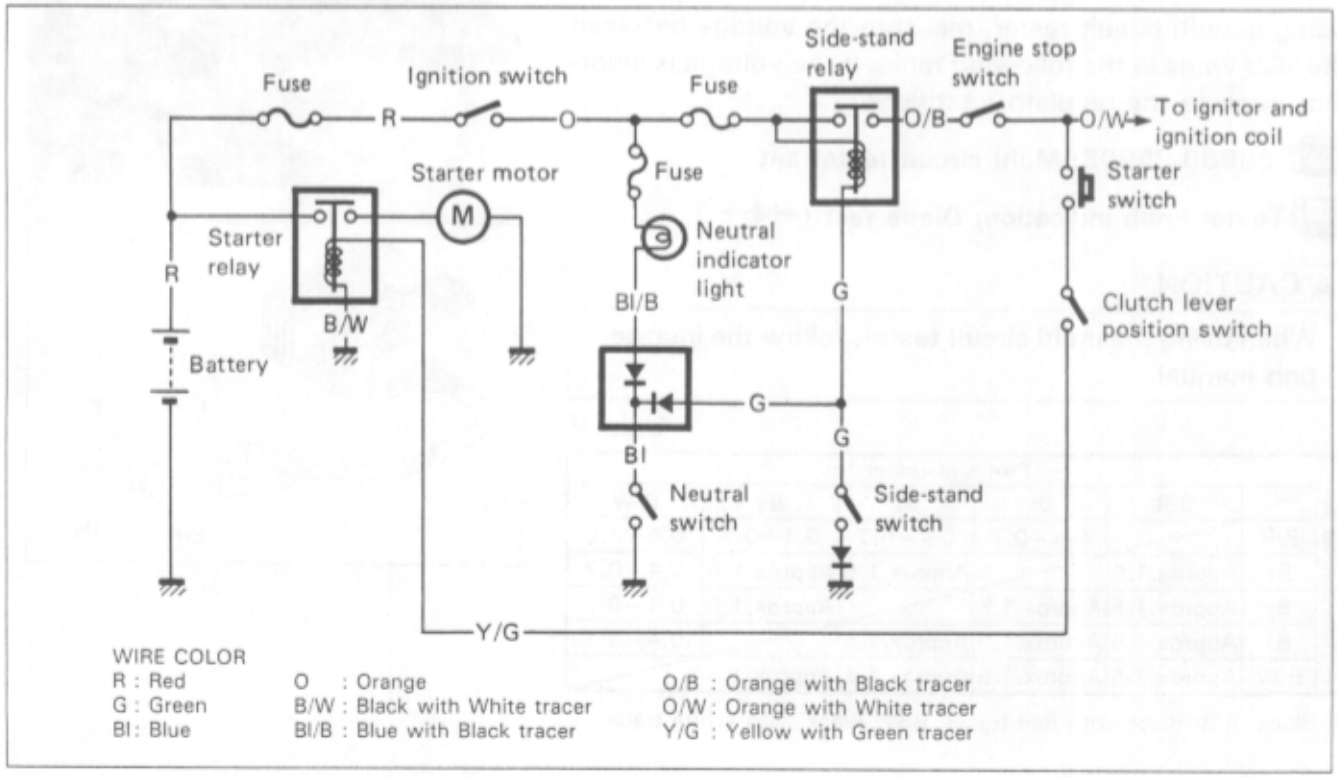
The starter system is shown in the diagram below: namely, the starter motor, starter relay, side-stand relay, side-stand switch, neutral switch, clutch lever position switch, starter switch, engine stop switch, IG switch and battery.

Depressing the starter switch (on the right handlebar switch box) energizes the relay, causing the contact points to close which connects the starter motor to the battery. The motor draws about 80 amperes to start the engine.



SIDE-STAND/IGNITION INTERLOCK SYSTEM DESCRIPTION

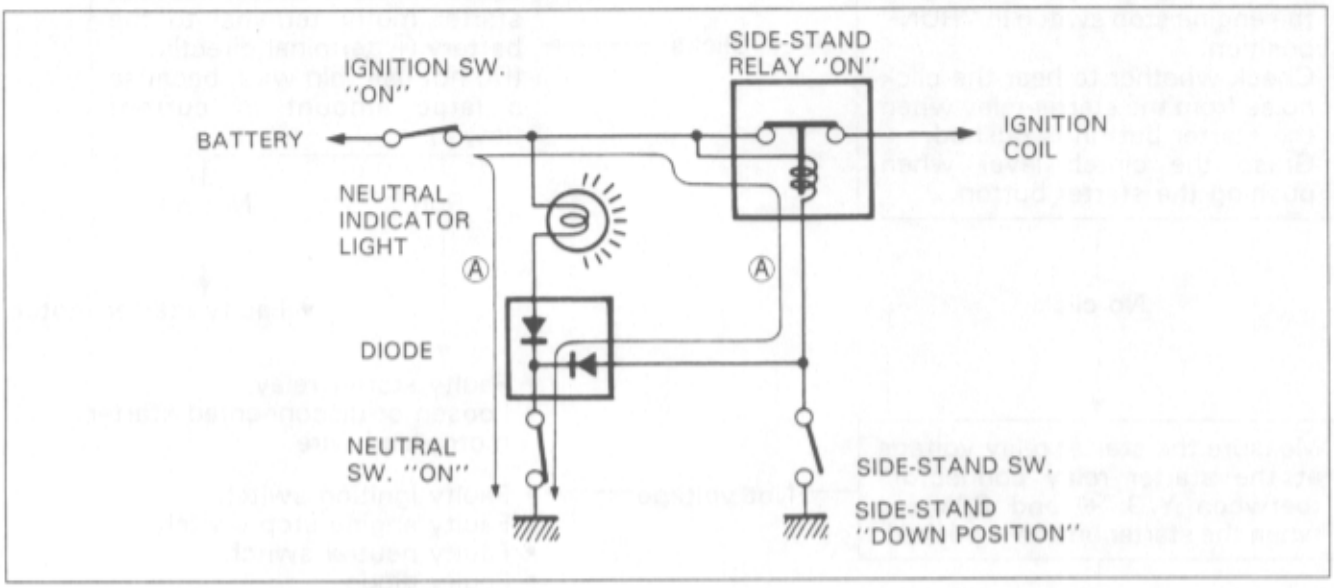
This side-stand/ignition interlock system is to prevent starting the motorcycle with the side-stand left down. The system is operated by an electric circuit provided between the battery and ignition coil.



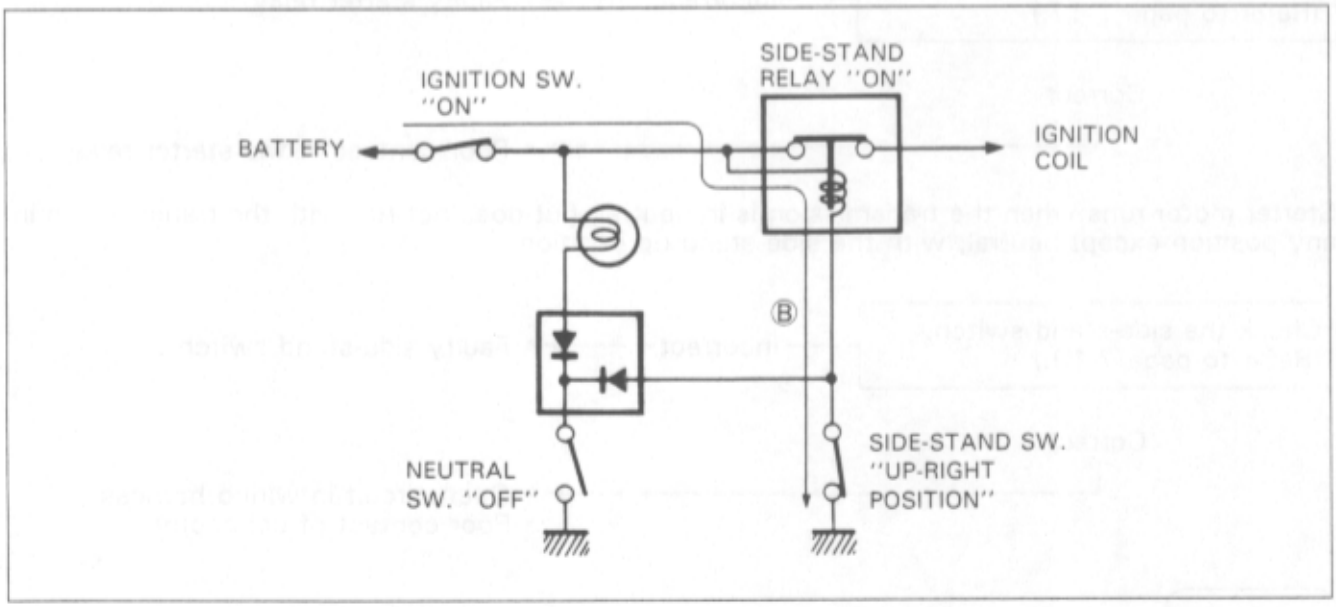
The circuit consists of relay, lamp, diode and switches and decides to live the ignition coil depending on the position of the TRANSMISSION and SIDE-STAND with the neutral and side-stand switches working mutually.

The ignition coil lives only in two situations as follows.

1. Transmission: "NEUTRAL (ON)" Side-stand: "DOWN (OFF)"
   The current flow Ⓐ turns "ON" the relay and the ignition coil lives even the side-stand is kept down. This is or warming up the engine.



2. Side-stand: "UP-RIGHT (ON)"
   The current flow Ⓑ turns "ON" the relay and the ignition coil lives. The engine can be easily started at any transmission position.



TROUBLESHOOTING

Starter motor will not run.

The transmission is in neutral.
Turn on the ignition switch with the engine stop switch in "RUN" position.
Check whether to hear the click noise from the starter relay when the starter button is pushed.
Grasp the clutch lever when pushing the starter button.

- Clicks → Check whether to run the starter motor when connect the starter motor terminal to the battery ⊕ terminal directly. (Do not use thin wire, because a large amount of current flows.)
  - Run
    - • Faulty starter relay
    - • Loosen or disconnected starter motor lead wire
  - Not run
    - • Faulty starter motor
- No click

Measure the starter relay voltage at the starter relay connectors (between Y/G ⊕ and B/W ⊖) when the starter button is pushed.

- Not voltage
  - • Faulty ignition switch
  - • Faulty engine stop switch
  - • Faulty neutral switch
  - • Faulty diode
  - • Faulty side-stand relay/switch
  - • Faulty starter button
  - • Faulty clutch lever position switch
  - • Poor contact of connector
  - • Open circuit in wiring harness
- Voltage measured

Check the starter relay. (Refer to page 7-17.)

- Incorrect
  - • Faulty starter relay
- Correct
  - • Poor contact of the starter relay

Starter motor runs when the transmission is in neutral, but does not run with the transmission in any position except neutral, with the side-stand up position.

Check the side-stand switch. (Refer to page 7-19.)

- Incorrect
  - • Faulty side-stand switch
- Correct
  - • Open circuit in wiring harness
  - • Poor contact of connector

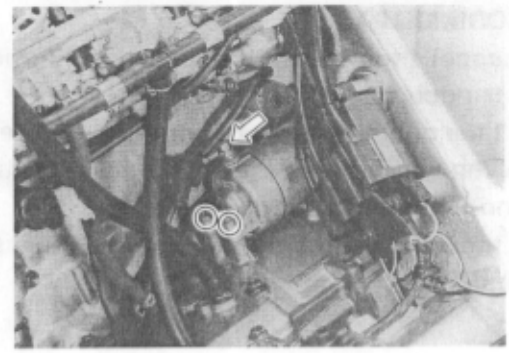
Others

Engine does not turn though starter motor runs.	• Faulty starter clutch

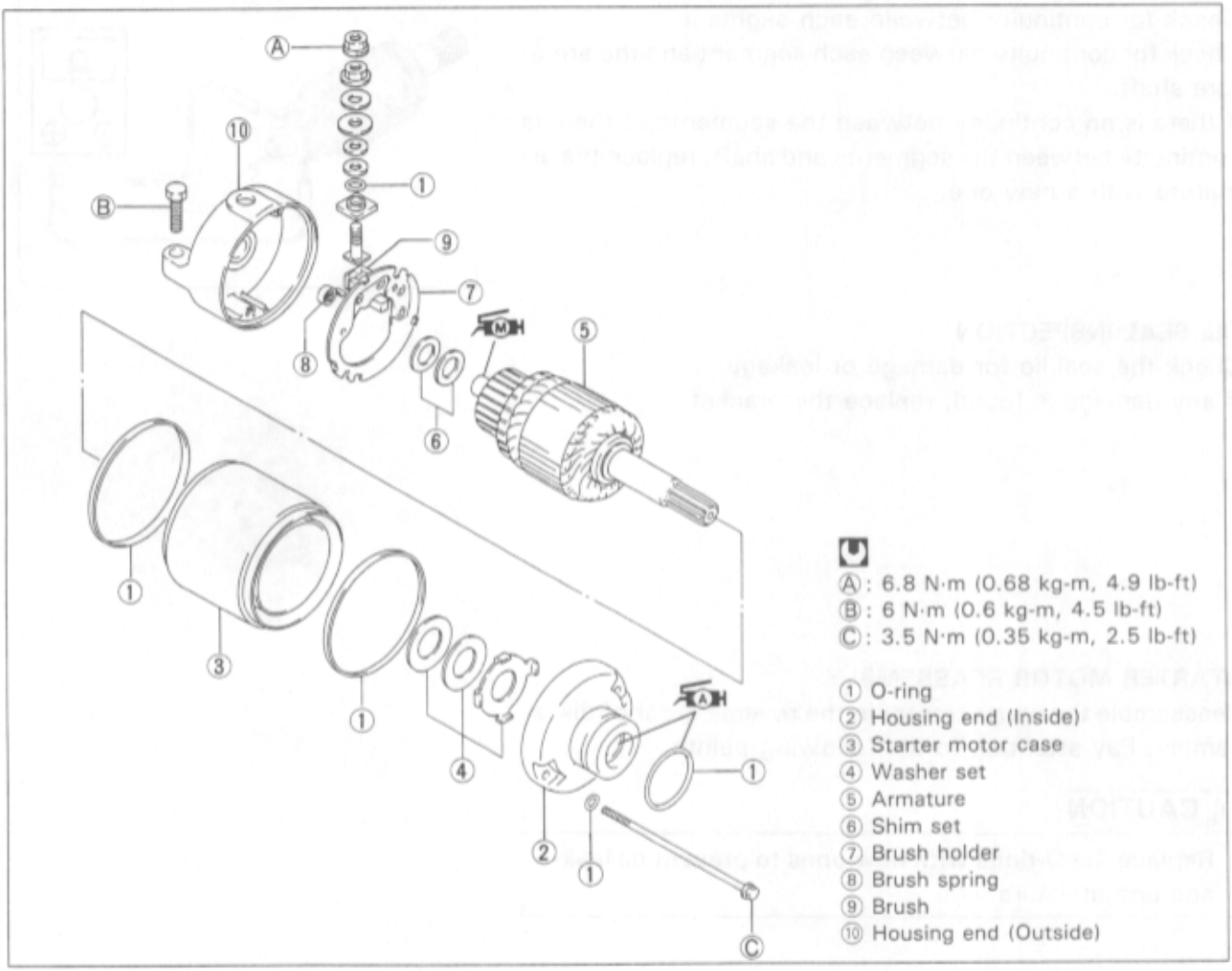
STARTER MOTOR

REMOVAL AND DISASSEMBLY

- Remove the front seat. (Refer to page 6-3.)
- Remove the fuel tank. (Refer page 4-2.)
- Disconnect the starter motor lead wire and remove the starter motor by removing the mounting bolts.



- Disassemble the starter motor as shown in the illustration.



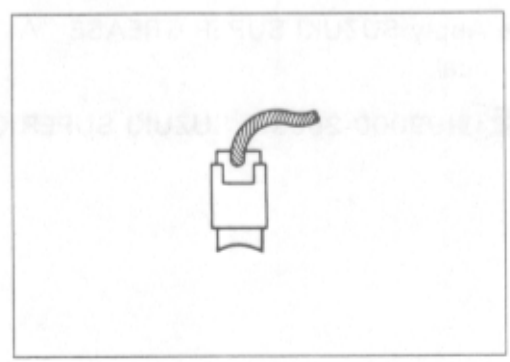
Ⓐ: 6.8 N·m (0.68 kg-m, 4.9 lb-ft)
Ⓑ: 6 N·m (0.6 kg-m, 4.5 lb-ft)
Ⓒ: 3.5 N·m (0.35 kg-m, 2.5 lb-ft)

① O-ring
② Housing end (Inside)
③ Starter motor case
④ Washer set
⑤ Armature
⑥ Shim set
⑦ Brush holder
⑧ Brush spring
⑨ Brush
⑩ Housing end (Outside)

STARTER MOTOR INSPECTION

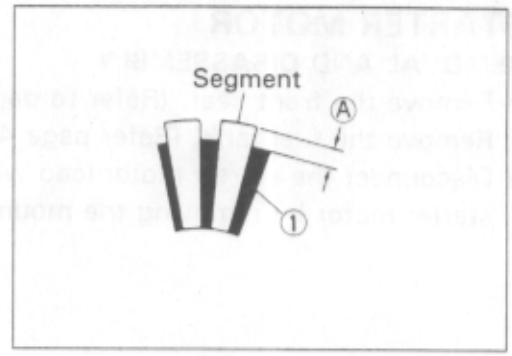
CARBON BRUSH

Inspect the brushed for abnormal wear, crack or smoothness in the brush holder.
If the brush has failed, replace the brush sub assy.



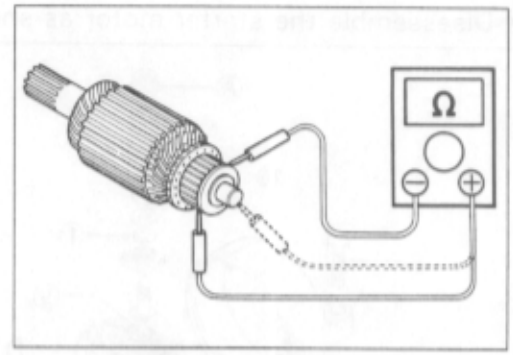
COMMUTATOR

Inspect the commutator for discoloration, abnormal wear or undercut Ⓐ.
If the commutator is abnormally worn, replace the armature.
When surface is descolored, polish it with #400 sand paper and clean it with dry cloth.
If there is no undercut, scrape out the insulator ① with saw blade.



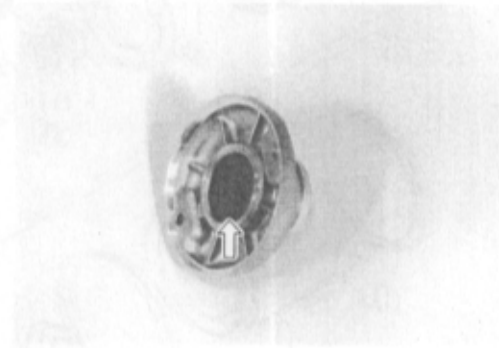
ARMATURE COIL INSPECTION

Check for continuity between each segment.
Check for continuity between each segment and the armature shaft.
If there is no continuity between the segments or there is continuity between the segments and shaft, replace the armature with a new one.



OIL SEAL INSPECTION

Check the seal lip for damage or leakage.
If any damage is found, replace the bracket.



STARTER MOTOR REASSEMBLY

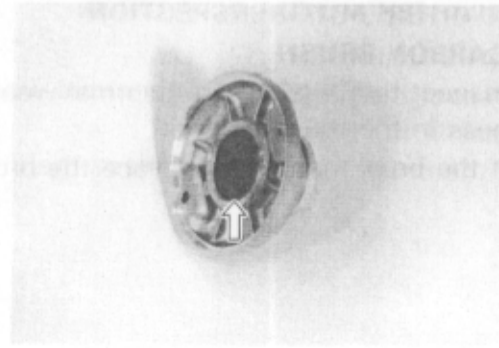
Reassemble the starter motor in the reverse order of disassembly. Pay attention to the following points:

⚠ CAUTION

Replace the O-rings with new ones to prevent oil leakage and moisture.

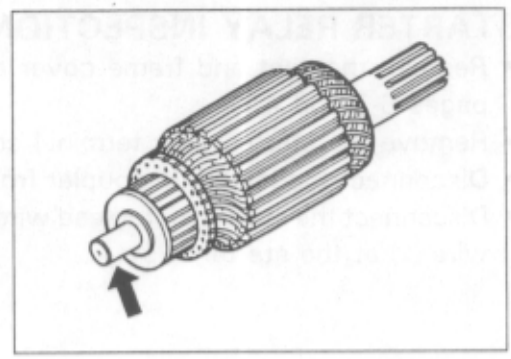
- Apply SUZUKI SUPER GREASE "A" to the lip of the oil seal.

Ⓐ 99000-25030: SUZUKI SUPER GREASE "A"



- Apply a small quantity of MOLY PASTE to the armature shaft.

99000-25140: SUZUKI MOLY PASTE

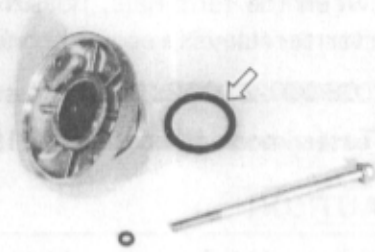


- Apply SUZUKI SUPER GREASE "A" to the O-ring.

99000-25030: SUZUKI SUPER GREASE "A"

- Tighten the starter motor housing bolts to the specified torque.

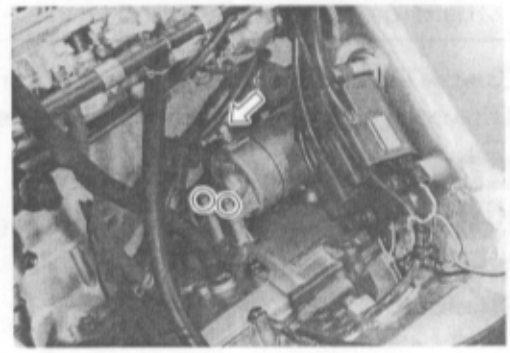
Starter motor housing bolt: 3.5 N·m (0.35 kg-m, 2.5 lb-ft)



- Tighten the starter motor mounting bolts and its lead wire nut to the specified torque.

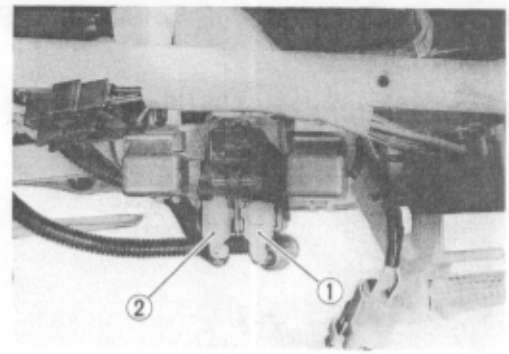
Starter motor mounting bolt: 6 N·m (0.6 kg-m, 4.5 lb-ft)

Starter motor lead wire nut: 6.8 N·m (0.68 kg-m, 4.9 lb-ft)



STARTER RELAY INSPECTION

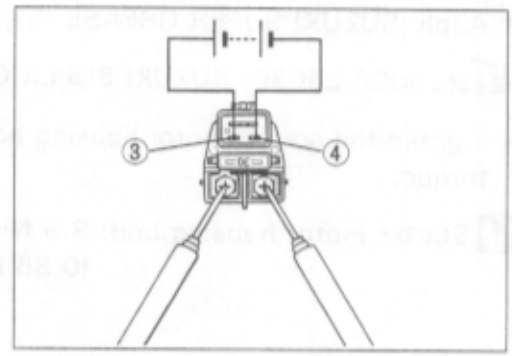
- Remove the seat and frame cover assembly. (Refer to pages 6-3 and 4.)
- Remove the starter relay terminal cover.
- Disconnect the lead wire coupler from the starter relay.
- Disconnect the starter motor lead wire ① and battery lead wire ② at the starter relay.



Apply 12 volts to ③ and ④ terminals, inspect the continuity between the terminals, positive and negative.
If the starter relay is in sound condition, continuity is found.

TOOL 09900-25002: Pocket tester

Tester knob indication: X 1Ω range



⚠ CAUTION

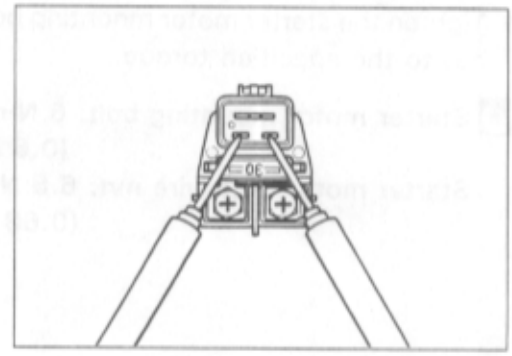
Do not apply a battery voltage more than 5 seconds to the starter relay as it may overheat and cause damage to the relay coil.

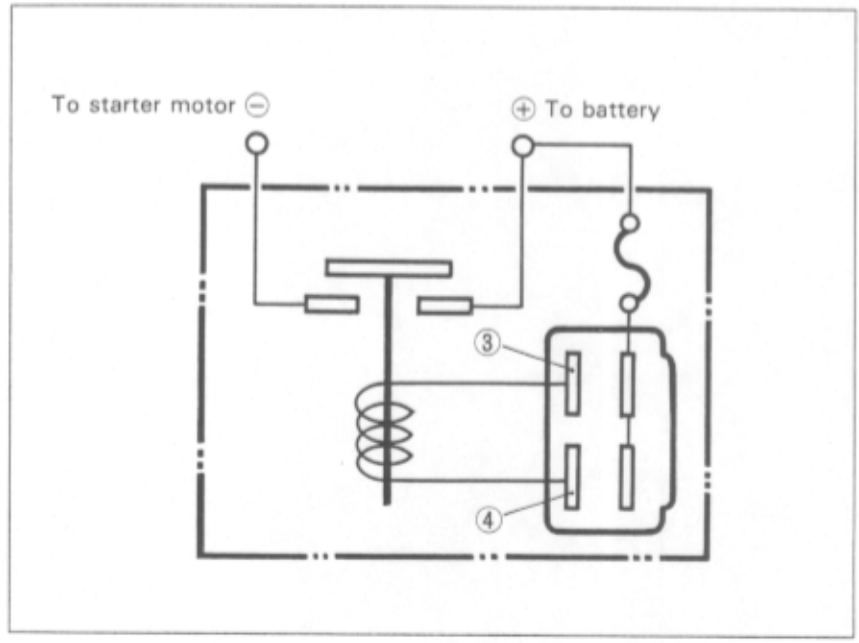
Check the coil for "open", "ground" and ohmic resistance.
The coil is in good condition if the resistance is as follows.

TOOL 09900-25002: Pocket tester

Tester knob indication: X 1Ω range

Starter relay resistance
Standard: 3—5Ω





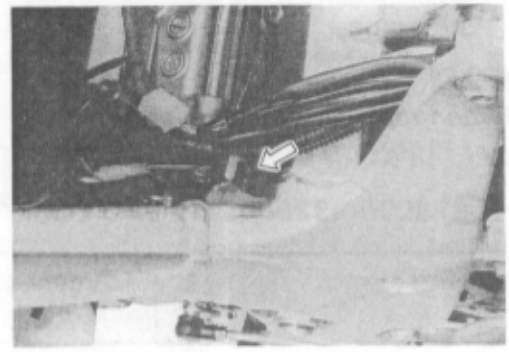
SIDE-STAND/IGNITION INTERLOCK SYSTEM PART INSPECTION

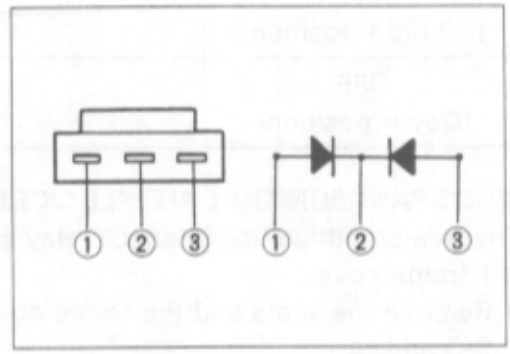
If the interlock system does not operate properly, check each component. If any abnormality is found, replace the component with a new one.

TOOL **09900-25002: Pocket tester**

DIODE

The diode is located under the fuel tank.
The diode will pass current only in one direction.
Check the continuity between ① and ②. If one way continuity the diode is in good condition.
Also check the continuity between ② and ③ as required.

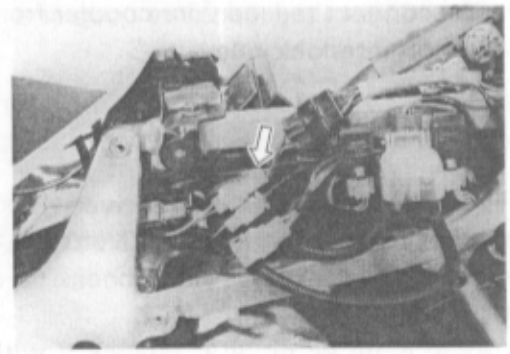




NEUTRAL SWITCH

The neutral lead wire coupler is located behind the left frame cover.

- Remove the seats and the frame cover. (Refer to pages 6-3 and -4.)
- Disconnect the neutral switch lead wire coupler and check the continuity between Blue terminal and Ground with the transmission in "NEUTRAL".



Color / Position	Blue	Ground
NEUTRAL	○———	———○
•		

SIDE-STAND SWITCH

The side-stand switch lead wire coupler is located behind the left frame cover.

- Remove the seats and the frame cover. (Refer to pages 6-3 and -4.)
- Disconnect the lead wire coupler.
- Check the continuity between Green (⊖ probe) and Black/White (⊕ probe) with the side-stand switch in Up-right position. If any abnormality is found, replace it with a new one.



NOTE:
When replacing the side-stand switch, apply small quantity of THREAD LOCK SUPER "1342" to its mounting bolts.



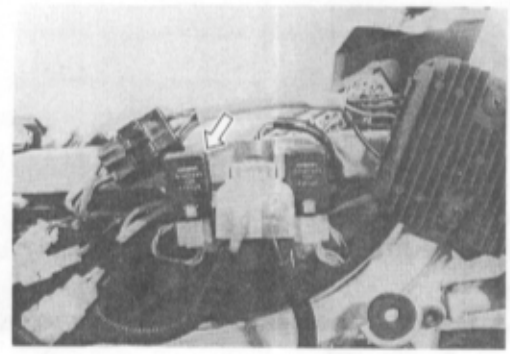
99000-32050: THREAD LOCK "1342"

	Green (⊖ Probe)	Black/White (⊕ Probe)
ON (UP-right position)	○———	———○
OFF (Down position)		

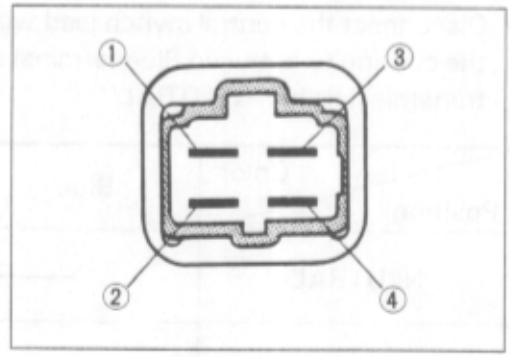
SIDE-STAND/IGNITION INTERLOCK RELAY

The side-stand/ignition interlock relay is located behind the left frame cover.

- Remove the seats and the frame cover. (Refer to pages 6-3 and -4.)
- Disconnect the lead wire coupler from the side-stand/ignition interlock relay.



First, check the insulation between ① and ② terminals with pocket tester. Then apply 12 volts to ③ and ④ terminals, ⊕ to ③ and ⊖ to ④ , and check the continuity between ① and ② .
If there is no continuity, replace it with a new one.



09900-25002: Pocket tester

Tester knob indication: X 1Ω range

IGNITION SYSTEM (DIGITAL IGNITOR)

DESCRIPTION

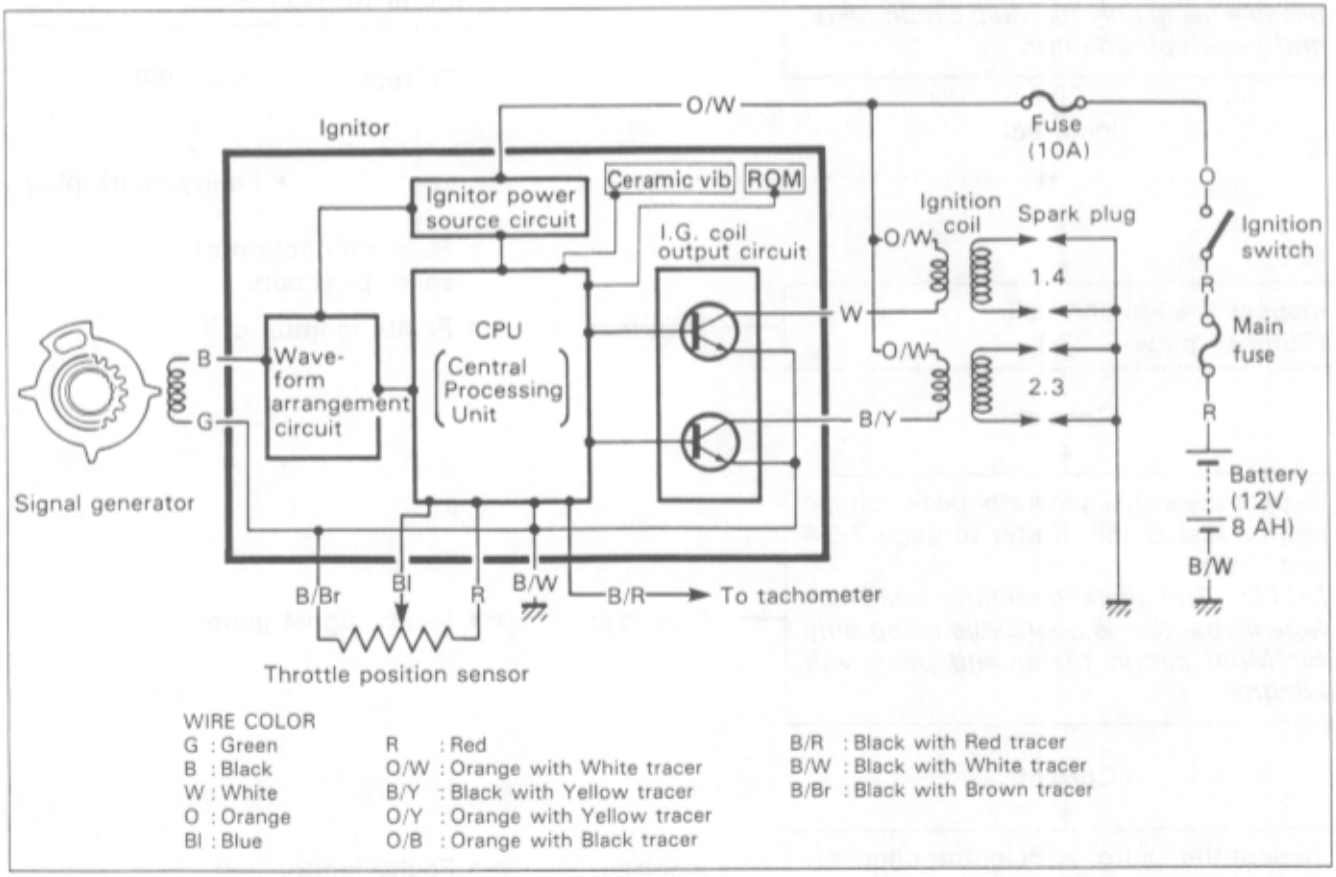
The fully transistorized ignition system consists of a signal generator, ignitor unit (including 8-BIT MICROCOMPUTER and CERAMIC 10MHZ VIBRATOR), throttle position sensor, ignition coils and spark plugs. The characteristic of the ignition timing is programmed and stored in the "ROM" (READ ONLY MEMORY) of the ignitor unit.

The signal generator mounted at the right end of the crankshaft comprises the rotor tip and pickup coil. The throttle position sensor is mounted at the right end of the carburetor assembly. The induced signal in the signal generator is sent to wave-form arrangement circuit, and CPU receives this signal and calculates the best ignition timing from the signal of ceramic vibrator, throttle position sensed by throttle position sensor and data stored in the ROM. The CPU outputs signal to the transistor of the I.G. coil output circuit which is connected to the primary windings of the ignition coil which is turned OFF and ON accordingly, thus it induces the secondary current on the ignition coil secondary windings and produce the spark between spark plug gaps.

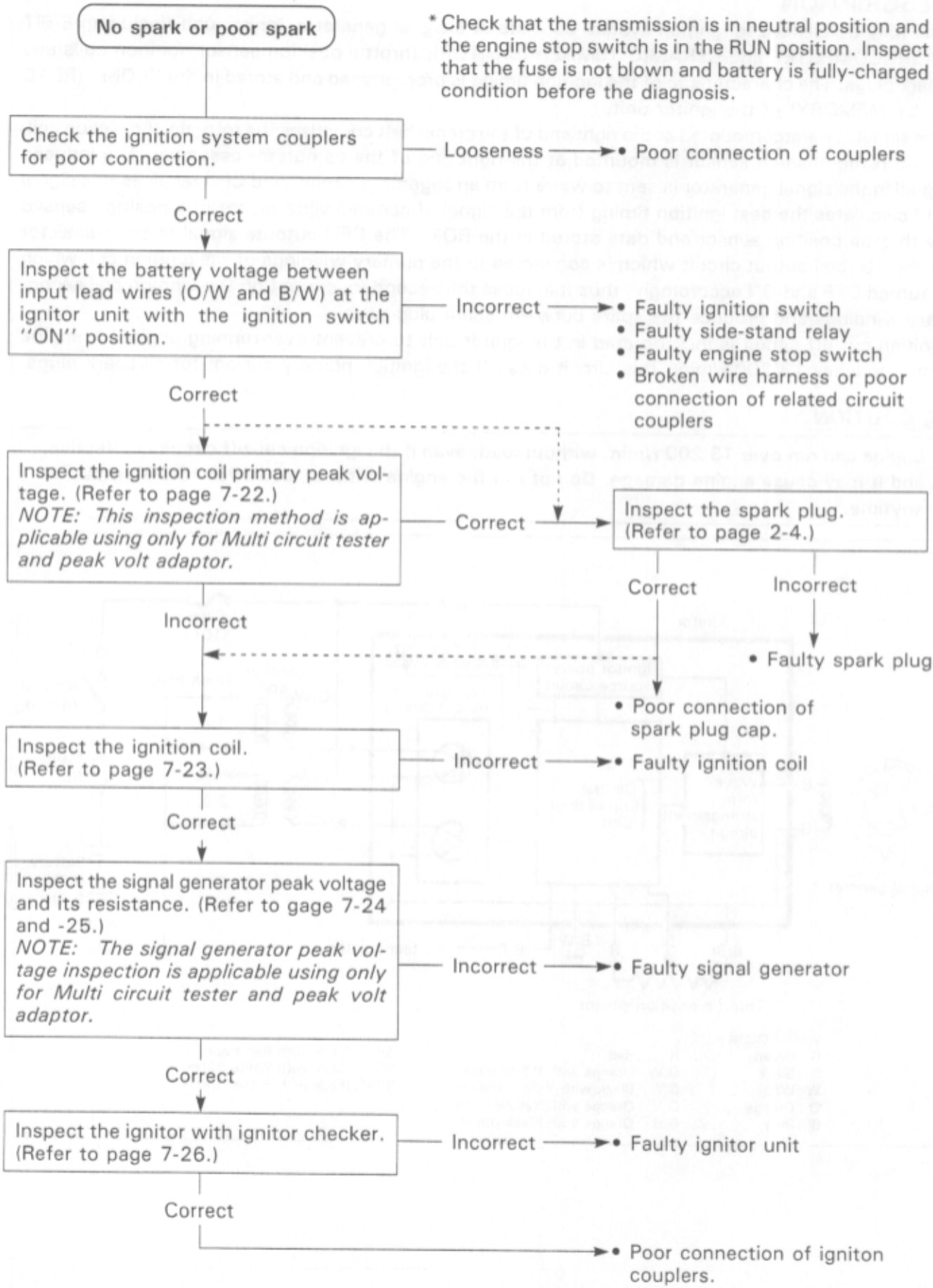
Ignition cut-off circuit is incorporated in the ignitor unit to prevent over-running engine. If engine r/min. reaches 13 200 r/min., this circuit cuts off the ignition primary current for all spark plugs.

⚠ CAUTION

Engine can run over 13 200 r/min. without load, even if the ignition cut-off circuit is effective, and it may cause engine damage. Do not run the engine without load over 13 200 r/min. at anytime.



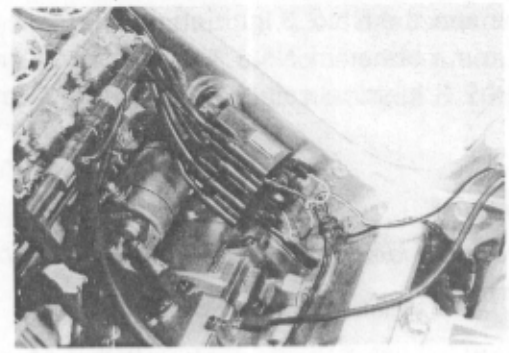
TROUBLESHOOTING



INSPECTION

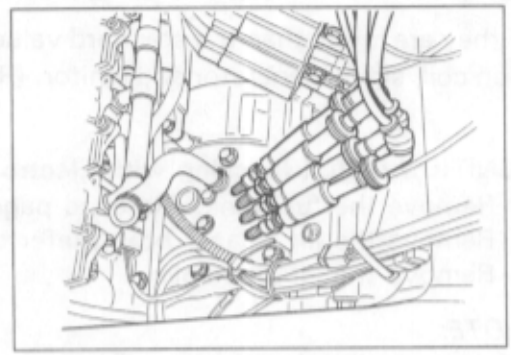
IGNITION COIL PRIMARY PEAK VOLTAGE

- Remove the front and rear seats. (Refer to page 6-3.)
- Remove the fuel tank. (Refer to page 4-2.)
- Remove the air cleaner box. (Refer to page 4-14.)
- Remove all the spark plug caps.
- Connect new four spark plugs to the each spark plug cap and ground them to the crankcase.



⚠ CAUTION

Avoid grounding the spark plugs and suppling the electrical shock to the magnesium parts (cylinder head cover, clutch cover, starter clutch cover, starter idle gear cover and generator cover) to prevent the damage of the magnesium material.

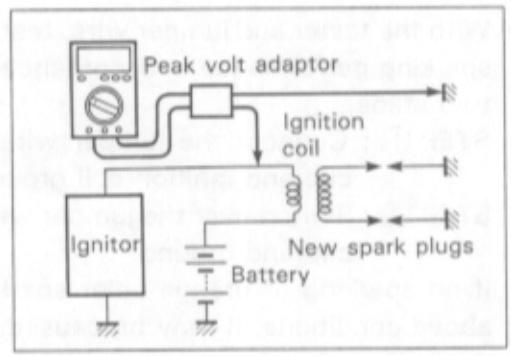


NOTE:
Be sure that all couplers and spark plugs are connected properly and the battery used is in fully-charged condition.

Inspect the No.1,4 ignition coil primary peak voltage in the following procedure.

- Connect the multi circuit tester with peak voltage adaptor as follow.

No.1,4 ignition coil: White terminal—Ground
(⊕ Probe) (⊖ Probe)

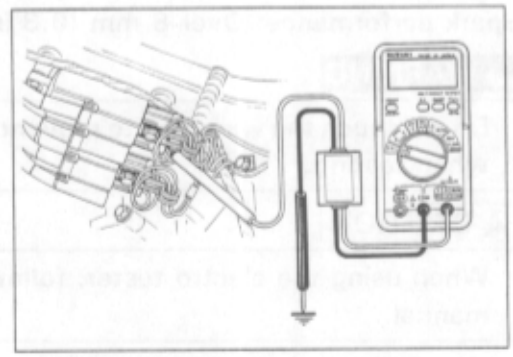


NOTE:
Do not disconnect the ignition coil primary wire.

TOOL 09900-25008: Multi circuit tester set

⚠ CAUTION

When using the multi circuit tester and peak volt adaptor, follow the instruction manual.



- Shift the transmission into the neutral and turn ignition switch "ON".
- Crank the engine a few seconds with starter motor by depressing starter button and then check the ignition coil primary peak voltage.
- Repeat the above inspection a few times and measure the highest ignition coil primary peak voltage.

Tester knob indication: DCV

Ignition coil primary peak voltage: More than 140 V

⚠ WARNING

Do not touch the tester probes and spark plugs to prevent an electric shock while testing.

Inspect the No.2,3 ignition coil primary peak voltage in the same manner of No.1,4 ignition coil inspection.
No.2,3 ignition coil: B/Y terminal—Ground
(⊕ Probe) (⊖ Probe)
B/Y: Black with Yellow tracer

NOTE:
Do not disconnect the ignition coil primary wire.

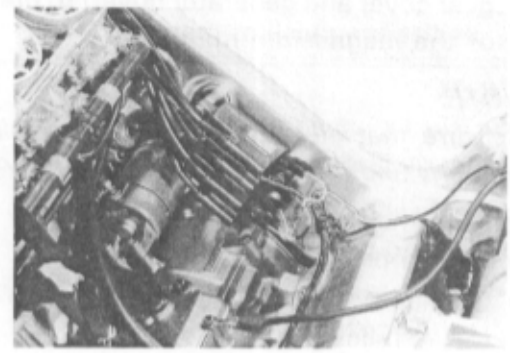
Tester knob indication: DCV

Ignition coil primary peak voltage: More than 140 V

If they are lower than the standard values, inspect the ignition coil, signal generator and ignitor. (Refer to page 7-21.)

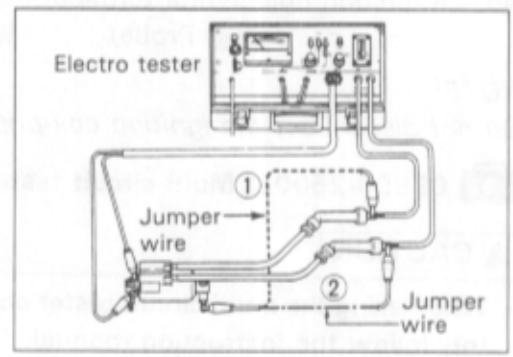
IGNITION COIL (Checking with Electro Tester)

- Remove the fuel tank. (Refer to page 4-2.)
- Remove the air cleaner box. (Refer to page 4-14.)
- Remove the ignition coils.



NOTE:
Make sure that the three-needle sparking distance of electro tester is set at 8 mm (0.3 in).

- With the tester and jumper wire, test the ignition coil for sparking performance in accordance with the following two steps.
  STEP ① : Connect the jumper wire to the spark plug cap and ignition coil ground.
  STEP ② : Switch over the jumper wire to the other plug cap and ground.
  If no sparking or orange color sparking occures in the above conditions, it may be caused by defective coil.



09900-28108: Electro tester

Spark performance: Over 8 mm (0.3 in)

⚠ WARNING

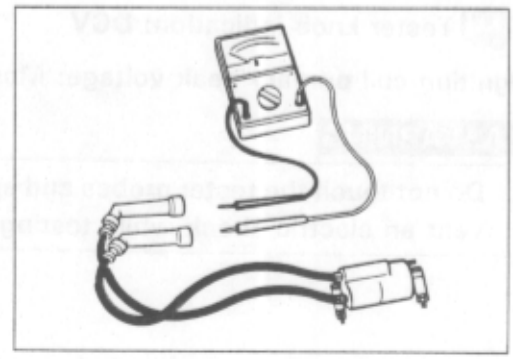
Do not touch the wire clips to prevent an electric shock when testing.

⚠ CAUTION

When using the electro tester, follow the instruction manual.

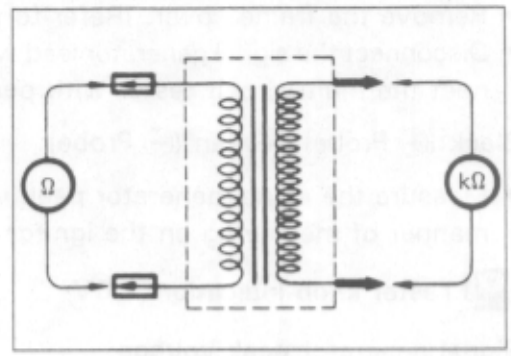
IGNITION COIL (Checking with Pocket Tester)

- A SUZUKI pocket tester or an ohm meter may be used, instead of the electro tester. In either case, the ignition coil is to be checked for continuity in both primary and secondary windings. Exact ohmic readings are not necessary, but, if the windings are in sound condition, their continuity will be noted with these approximate ohmic values.



09900-25002: Pocket tester

Ignition coil resistance
Primary: 2.3—3.3Ω (⊕ tap—⊖ tap)
Tester knob indication: X 1Ω range
Secondary: 30—40 kΩ (Plug cap—Plug cap)
Tester knob indication: X 1 kΩ range

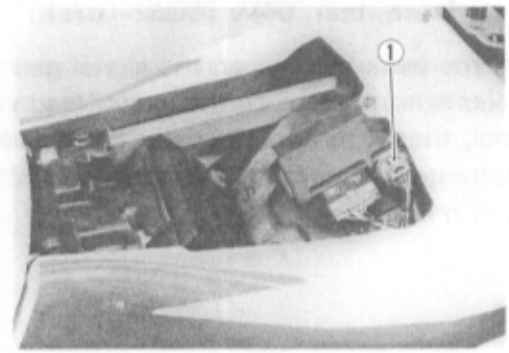


SIGNAL GENERATOR (Checking with Multi Circuit Tester)

- Remove the front seat. (Refer to page 6-3).

NOTE:
Be sure that all couplers are connected properly and the battery used is in fully-charged condition.

- Disconnect the ignitor lead wire coupler ① at the ignitor unit.

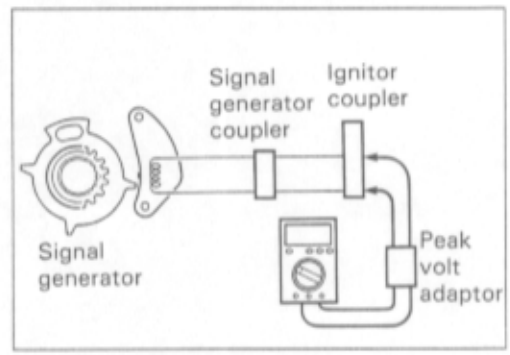


Inspect the signal generator peak voltage between Black and Green lead wires on the ignitor coupler.

- Connect the multi circuit tester with peak volt adaptor as follow.

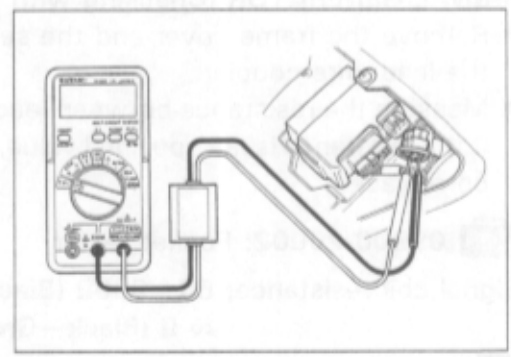
Black (⊕ Probe)—Green (⊖ Probe)

TOOL 09900-25008: Multi circuit tester set



⚠ CAUTION

When using multi circuit tester and peak volt adaptor, follow the instruction manual.



- Shift the transmission into the neutral and turn ignition switch "ON".
- Crank the engine a few seconds with starter motor by depressing starter button and then check the signal generator peak voltage.
- Repeat the above test procedure a few times and measure the highest signal generator peak voltage.

Tester knob indication: DCV

Signal generator peak voltage:
More than 0.4V (Black—Green)

If the peak voltage measured on the ignitor lead wire coupler is lower than the standard value, check the peak voltage on the signal generator lead wire coupler in the following procedure.

- Remove the frame cover. (Refer to page 6-4.)
- Disconnect the signal generator lead wire coupler and connect the multi circuit tester with peak volt adaptor.

Black (⊕ Probe)—Green (⊖ Probe)

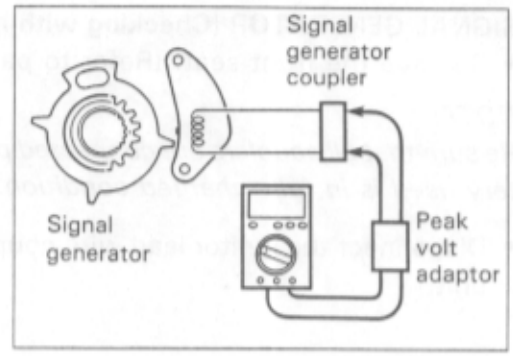
- Measure the signal generator peak voltage in the same manner of measuring on the ignitor lead wire coupler.

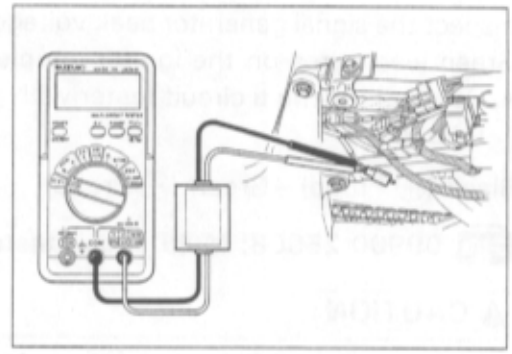
Tester knob indication: DCV

Signal generator peak voltage:
More than 0.4V (Black—Green)

If the peak voltage on the signal generator lead wire coupler is normal but on the ignitor lead wire coupler is abnormal, the wire harness must be replaced. If the both peak voltage is abnormal, the signal generator must be replaced and recheck.







SIGNAL GENERATOR (Checking with Pocket Tester)

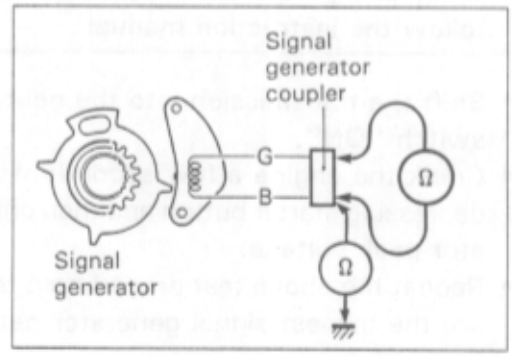
- Remove the frame cover and the seats and disconnect the lead wire coupler.
- Measure the resistance between lead wires and ground. If the resistance is not specified value, the signal coil must be replaced.

09900-25002: Pocket tester

Signal coil resistance: 50—200Ω (Black—Green)
∞ Ω (Black—Ground)

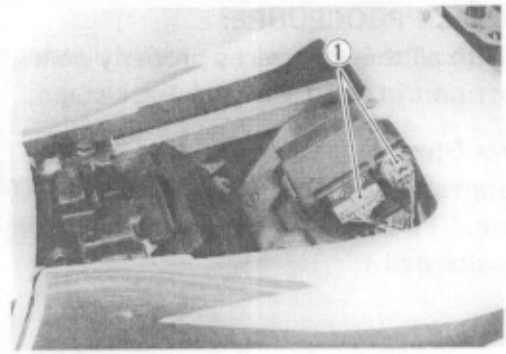
Tester knob indication: X 100Ω range

NOTE:
Refer to page 3H-4 for signal generator replacing.



IGNITOR UNIT (Checking with Digital Ignitor Checker)

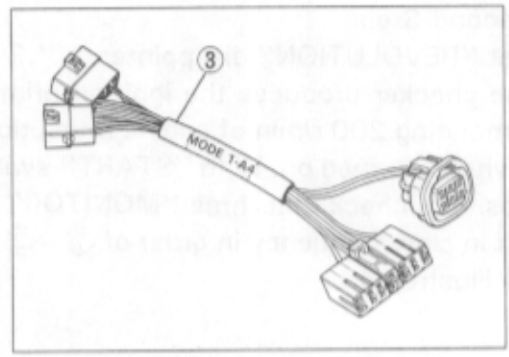
This section explains the checking procedure for the ignitor unit using Digital Ignitor Checker (special tool).
With this checker, the ignitor unit can be checked either on the machine or off the machine. The following explains the checking procedure on the machine.



TOOL 09931-94490: Digital ignitor checker
09931-61750: Lead wire "MODE 1-A4"

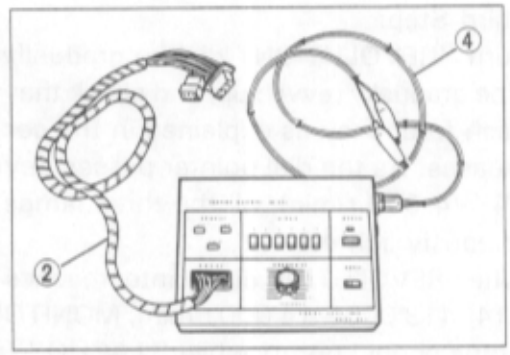
WIRING PROCEDURE:

- Remove the front seat. (Refer to page 6-3.)
- Disconnect two ignitor lead wire couplers ① at the ignitor unit.
- Connect the lead wire "MODE 1-A" ②, lead wire "MODE 1-A4" ③ and power source leads ④ as shown in following illustration.

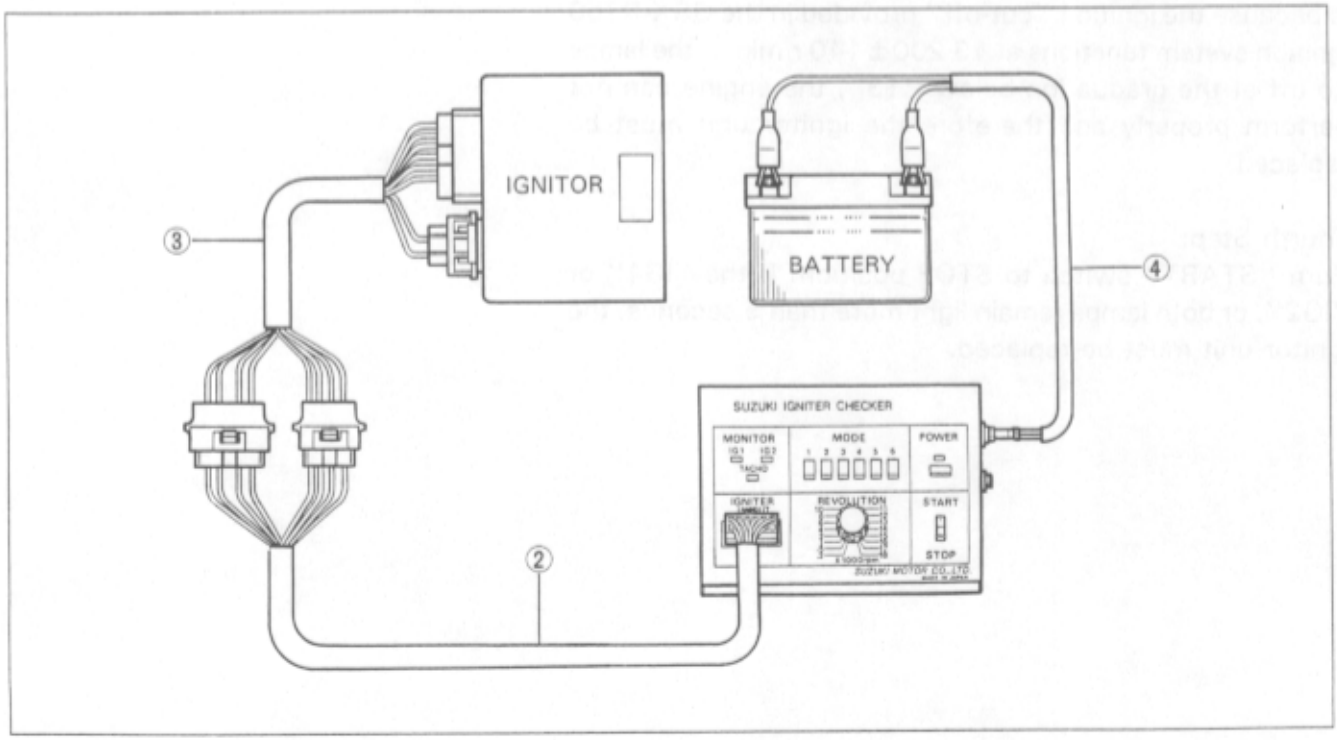


⚠ CAUTION

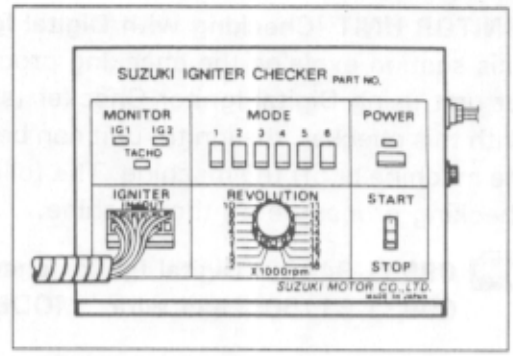
*** Be sure that the BLACK lead is connected to the battery ⊖ terminal and RED lead to the ⊕ terminal.**
*** Before connecting the power source leads, make sure that both "POWER" button and "START" switch are in "off" position (POWER button not depressed).**



NOTE:
Be sure that the battery used is in fully-charged condition.

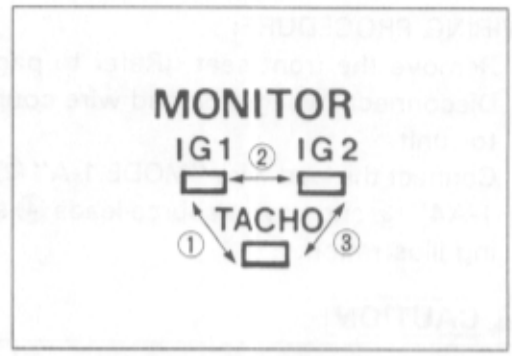


CHECK PROCEDURE:
With all the lead wires properly connected, check the ignitor unit in the following Four steps.

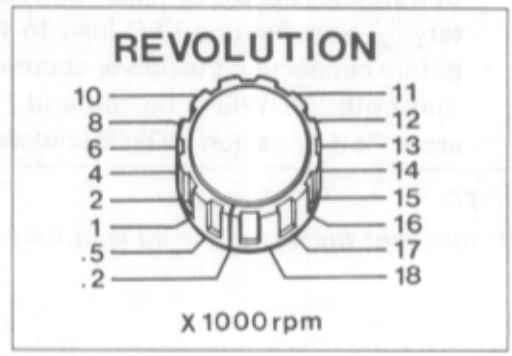


First Step:
Depress "MODE 1" button then "POWER" button. This time, "POWER" lamp should come on, if not, battery is undercharged.

Second Step:
Set "REVOLUTION" dial pointer to ".2" position in which the checker produces the ignition primary current pulses simulating 200 r/min of engine revolution when "START" switch is turned on. With "START" switch is turned to ON position, check that three "MONITOR" lamps turn on and off in slow frequency in order of ①—②—③ or ①—③—② as illustrated.



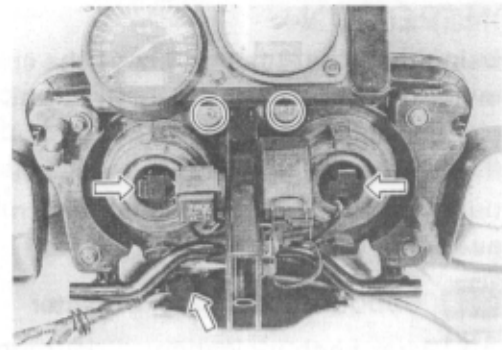
Third Step:
Turn "REVOLUTION" dial up gradually (assuming the engine gradually revved up) and check that the MONITOR lamp flash frequency as explained in the second step above increases. As the dial pointer passes beyond the graduation "4" (4 000 r/min), all the three lamps should show continuously lighted.
When REVOLUTION dial pointer reaches between "13" and "14" (13 000—14 000 r/min), MONITOR "IG1" and "IG2" lamps should go off while "TACHO" lamp stays on. This is because the ignition "cut-off" provided in the GSX-R750 ignition system functions at 13 200 ± 140 r/min. If the lamps go off at the graduation below "13", the engine can not perform properly and therefore the ignitor unit must be replaced.



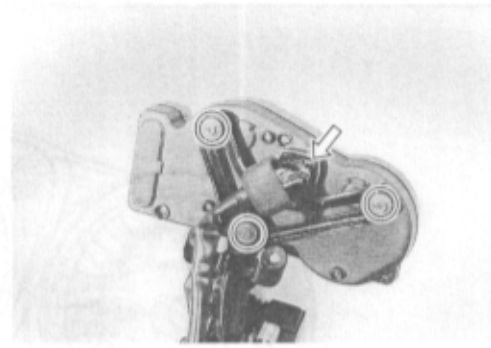
Fourth Step:
Turn "START" switch to STOP position. If the "IG1" or "IG2", or both lamps remain light more than 5 seconds, the ignitor unit must be replaced.

COMBINATION METER

REMOVAL



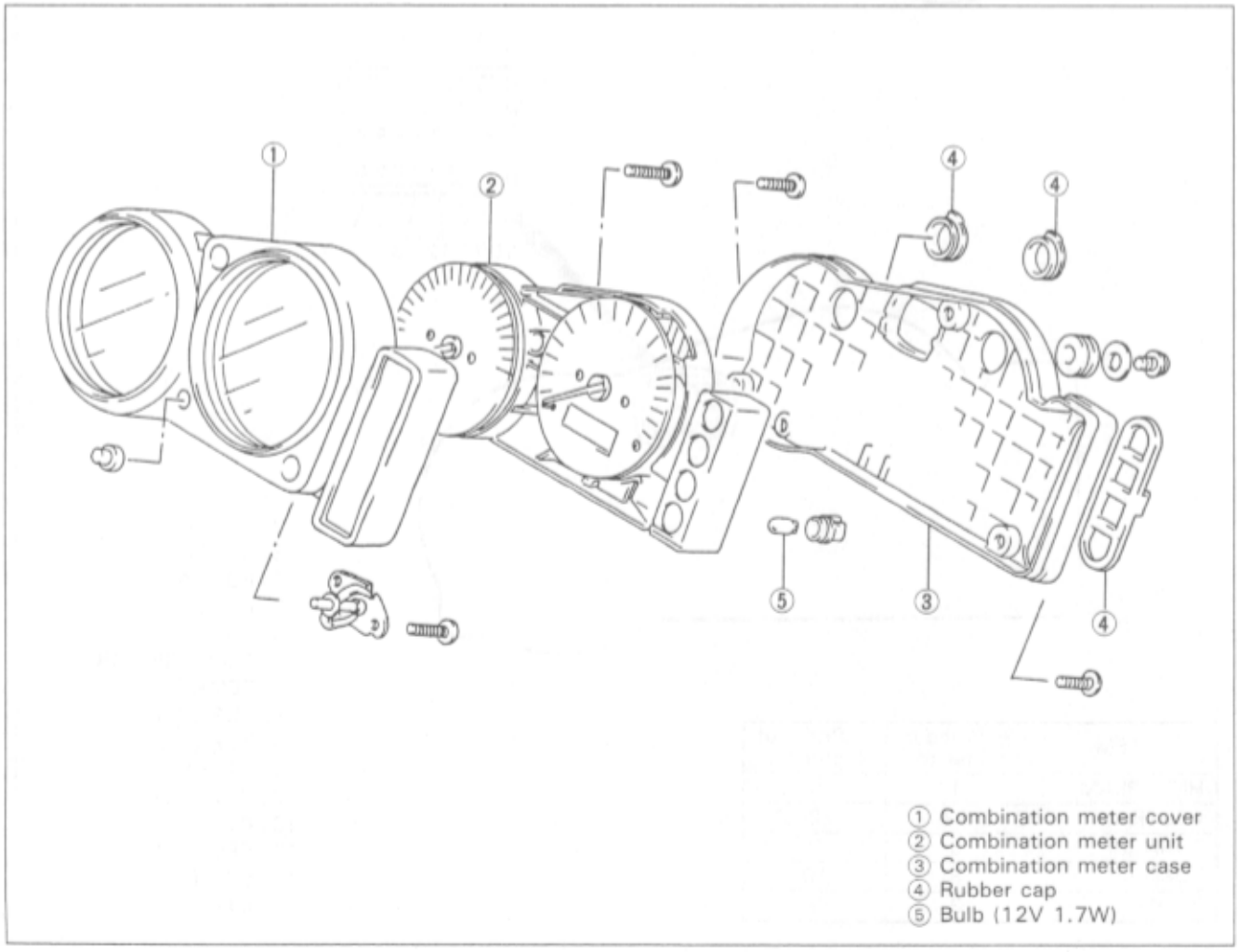
- Remove the upper fairing with fairing brace. (Refer to pages 6-2 and -3.)
- Disconnect two sockets.
- Disconnect the position light lead wire coupler. (Except for U.S.A..)
- Remove the fairing brace by removing screws.



- Disconnect the combination meter lead wire coupler.
- Remove the combination meter by removing its mounting three bolts.

DISASSEMBLY

- Disassemble the combination meter as follows.

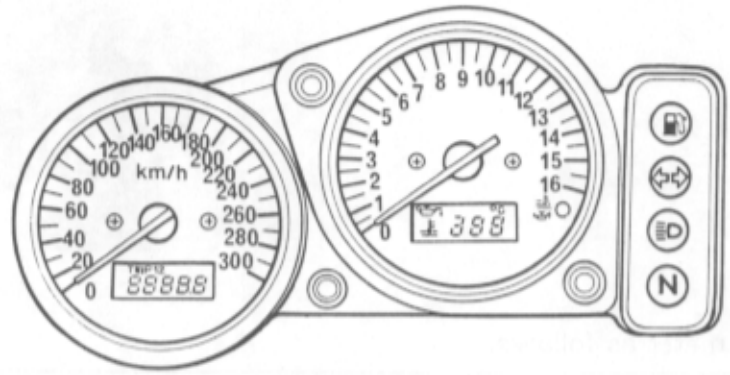


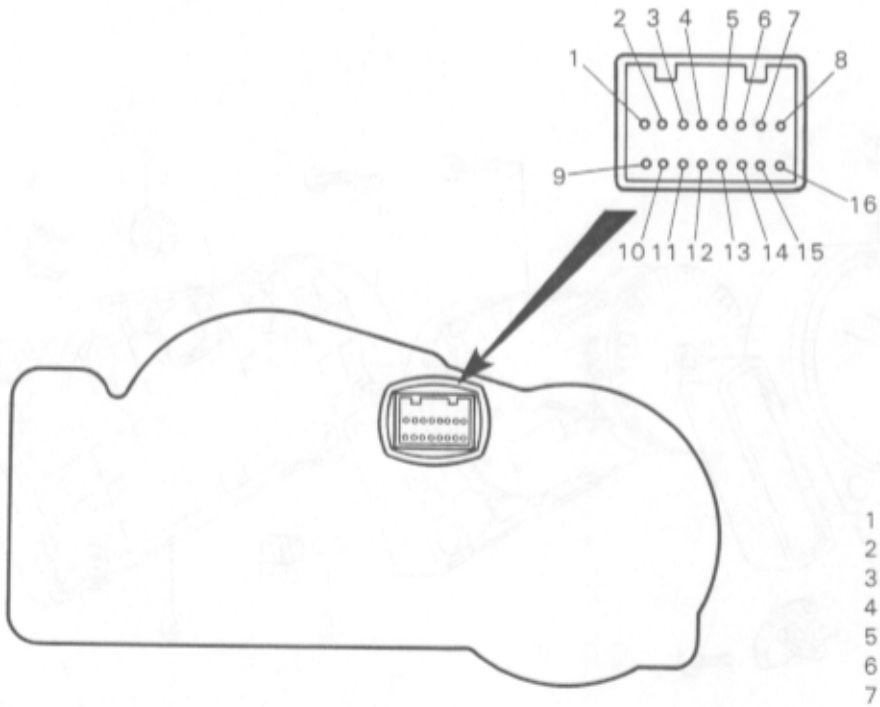
INSPECTION

Using the pocket tester, check the continuity between terminals in the following diagram. If the continuity measured is incorrect, remove and check the bulb.
If the bulb is failure, install the new bulb and check the continuity again. If the bulb is correct, replace the unit with a new one.

09900-25002: Pocket tester

Tester knob indication: X 1Ω range



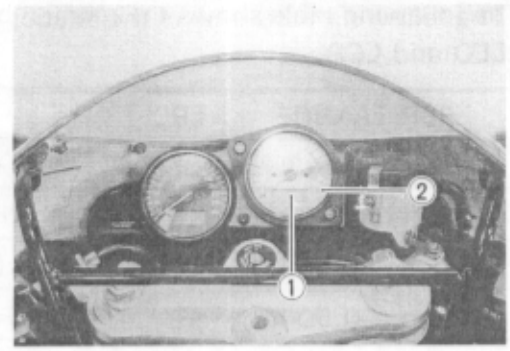


ITEM	⊕ Probe of tester to:	⊖ Probe of tester to:
HIGH BEAM	1	8
NEUTRAL	12	2
TURN (R)	8	9
TURN (L)	8	10
ILLUMI	3	8

1: HIGH BEAM ⊕
2: NEUTRAL ⊖
3: ILLUMI ⊕
4: FUEL A
5: FUEL B
6: OIL
7: TEMP SENSOR
8: TEMP ⊖
9: TURN (R) ⊕
10: TURN (L) ⊕
11: TACHO
12: IGNITION
13: Blank
14: SPEED PLUS
15: SPEED SENSOR ⊕
16: Blank

ENGINE COOLANT TEMPERATURE METER AND INDICATOR INSPECTION

The LCD ① (Liquid crystal display) and LED ②(Light Emiting Diode) in the tachometer indicate the engine coolant temperature information. The checking procedure of these system are explained as following four steps:



First step:

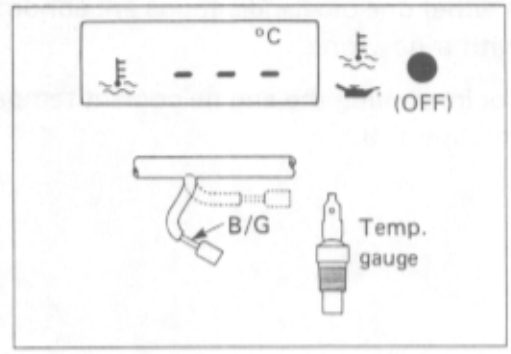
- Lift and support the fuel tank by prop. (Refer to page 4-2.)
- Disconnect the oil pressure switch G/Y lead wire coupler.

  G/Y: Green with Yellow tracer

- Disconnect the B/G lead wire from the engine coolant temperature gauge.

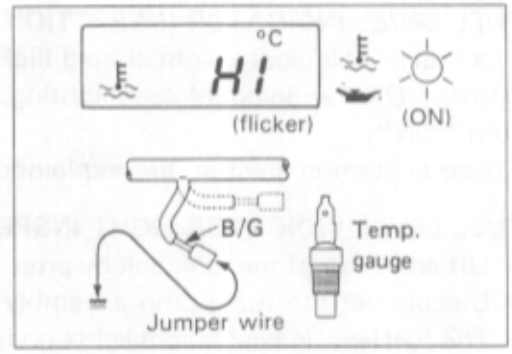
  B/G: Black with Green tracer

- Turn the ignition switch on, then the LCD should not indicate figure but "– – –".



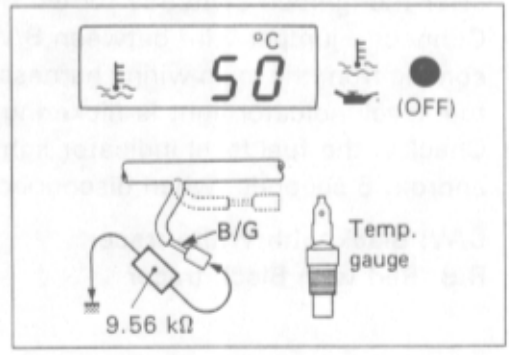
Second step:

- Connect a jumper wire between B/G lead coming from the main wiring harness and engine ground, the LED should light and the LCD should keep flickering "HI".



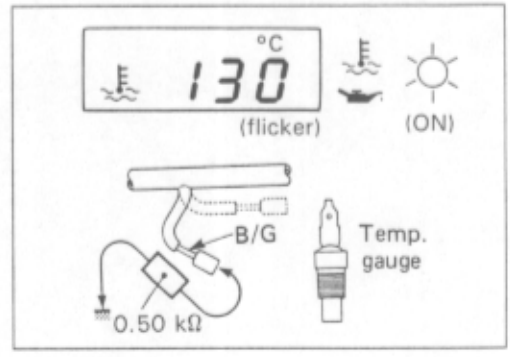
Third step:

- Connect a approx. 9.56 kΩ resistor between B/G lead coming from the main wiring harness and engine ground, the LED should go out and the LCD should indicate "50" °C ("122" °F).



Fourth step:

- Change the resistor to approx. 0.50 kΩ, the LED should light and LCD should keep flickering "130" °C ("266" °F).

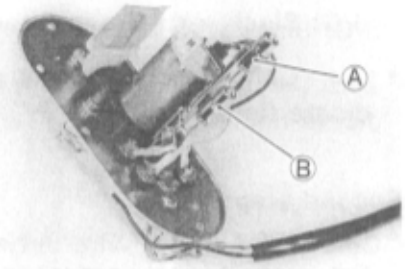


The following table shows the relation between resistance, LED and LCD.

RESISTANCE	LED	LCD	
∞	OFF	"– – –"	ON
Less than 0.36 kΩ	ON	"HI"	flicker
Approx. 9.56 kΩ	OFF	"50"°C ("122"°F)	ON
Approx. 0.50 kΩ	ON	"130"°C ("266"°F)	flicker

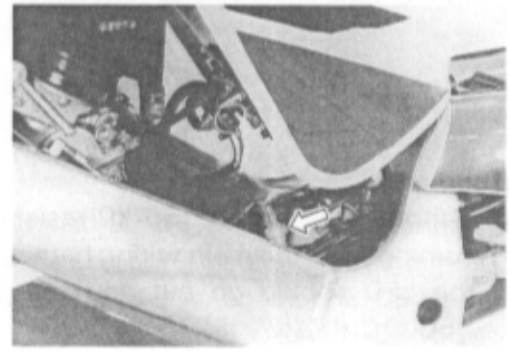
If either one or all indications are abnormal, replace the unit with a new one.

For inspecting the engine coolant temperature gauge, refer to page 5-9.



FUEL LEVEL INDICATOR INSPECTION

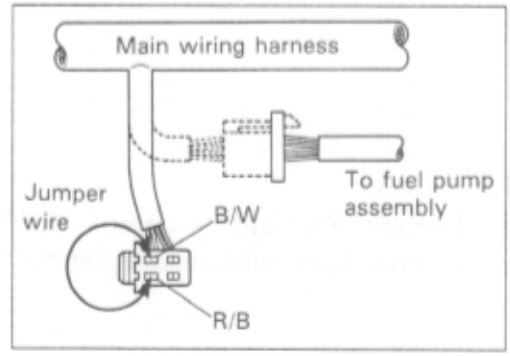
The fuel level indicator light should flicker, when its switch Ⓐ turn "ON" and should keep lighting, when its switch Ⓑ turn "ON".
These system inspection are explained as follows.



FUEL LEVEL INDICATOR LIGHT INSPECTION

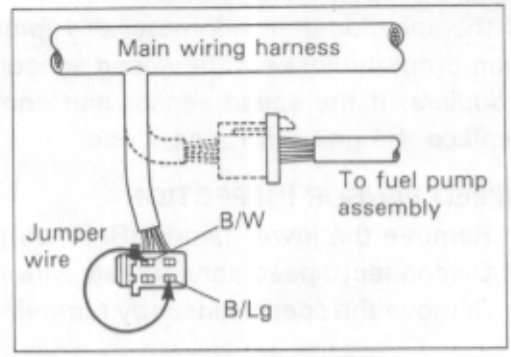
- Lift and support the fuel tank by prop. (Refer to page 4-2.)
- Disconnect the fuel pump assembly lead wire coupler.
- The fuel level indicator light lights up for appox. 3 seconds after the ignition switch is turned on.
- Connect a jumper wire between B/W lead and R/B lead coming from the main wiring harness and check whether fuel level indicator light is flickering.
- Check if the fuel level indicator light will go out within approx. 6 seconds, when disconnecting a jumper wire.

B/W: Black with White tracer
R/B: Red with Black tracer



- Connect a jumper wire between B/W lead and B/Lg lead coming from the main wiring harness and check whether the fuel level indicator light comes on
- Check if the fuel level indicator light will go out within approx. 6 seconds, when disconnecting a jumper wire.

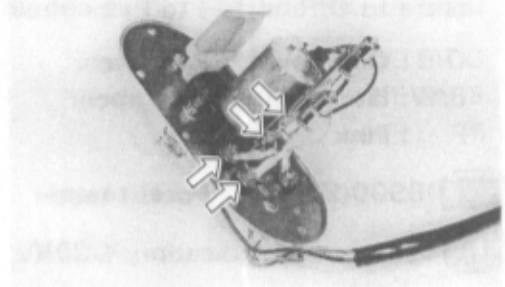
B/W: Black with White tracer
B/Lg: Black with Light green tracer



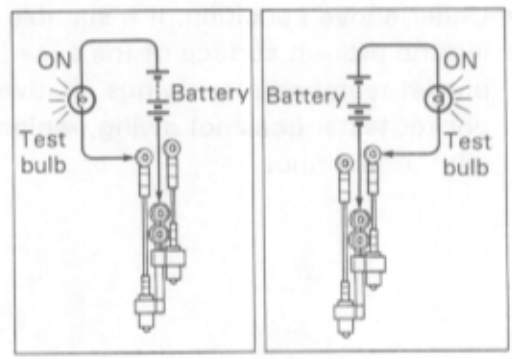
If the fuel level indicator light does not function properly check the bulb. If the bulb is in good condition, replace the unit with a new one.

FUEL LEVEL INDICATOR SWITCH INSPECTION

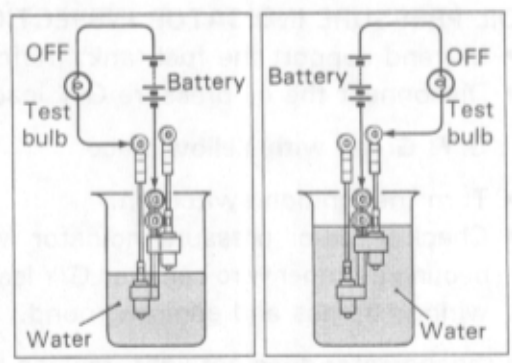
- Remove and disassemble the fuel pump assembly. (Refer to page 4-5.)



- Connect 12V battery and test bulb (12V, 3.4W) to the fuel level indicator switch as shown in the right illustlations. The bulb should come on after several seconds if the switch is in good condition.

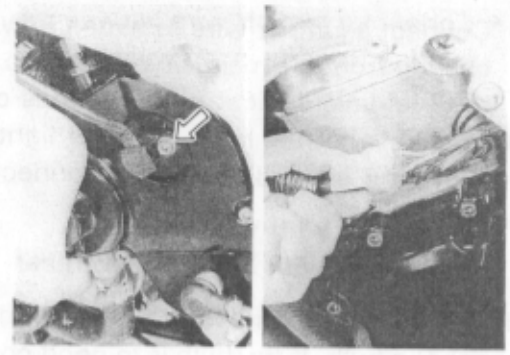


- When the switch is immersed in water under the above condition, the bulb should go out. If the bulb remains lit, replace the unit with a new one.



SPEEDOMETER INSPECTION

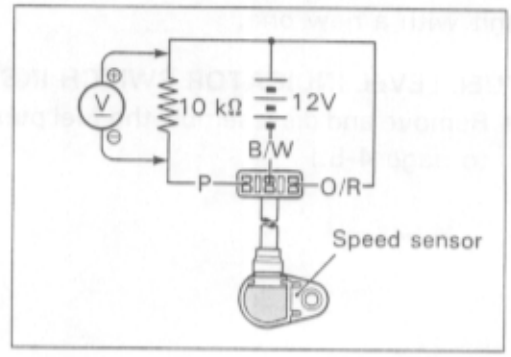
If the speedometer, odometer or tripmeter does not function properly. Inspect the speed sensor and connection of couplers. If the speed sensor and connection is all right, replace the unit with a new one



SPEED SENSOR INSPECTION

- Remove the lower fairing (Refer to page 6-2.)
- Disconnect speed sensor lead wire coupler.
- Remove the speed sensor by removing its mounting bolt.
- Connect 12V battery (between O/R and B/W), 10 kΩ resistor (between O/R and P) and pocket tester (⊕ probe of teste to O/R and ⊖ to P) as shown right illustration.

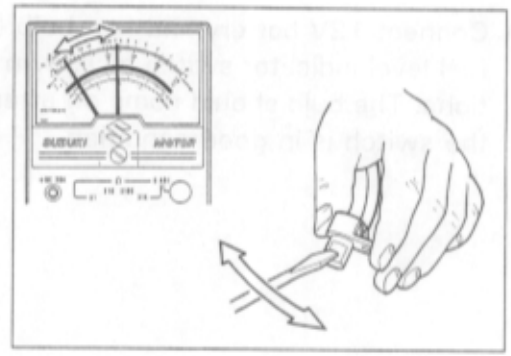
O/R : Orange with Red tracer
B/W: Black with White tracer
P : Pink



09900-25002: Pocket tester

Tester knob indication: DC25V

- Under above condition, if a suitable screwdriver touching the pick-up surface of the speed sensor moves, the pocket tester pointer swings relatively. If the pointer of pocket tester does not swing, replace the speed sensor with a new one.



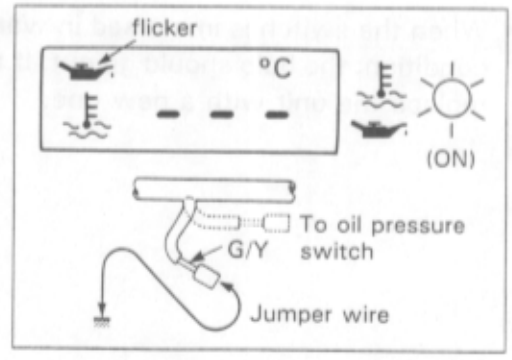
OIL PRESSURE INDICATOR INSPECTION

- Lift and support the fuel tank. (Refer to page 4-2.)
- Disconnect the oil pressure G/Y lead wire coupler.

G/Y: Green with Yellow tracer

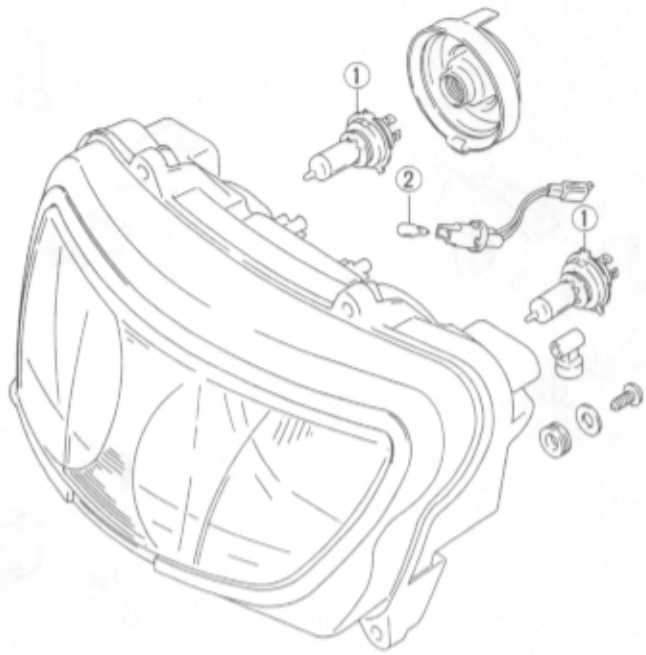
- Turn the ignition switch on.
- Check if the oil pressure indicator will light, when connecting a jumper wire between G/Y lead coming from main wiring harness and engine ground.

If the indicator does not light, replace the unit with a new one after checking connecting couplers.



LAMPS

HEADLIGHT

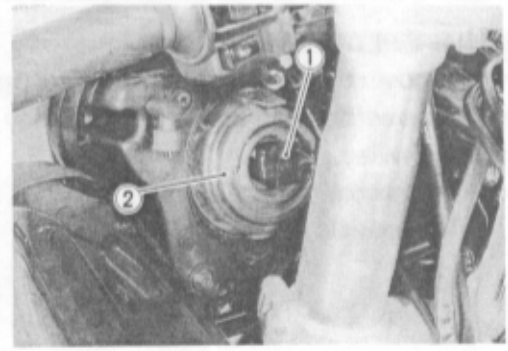


Headlight bulb ①: 12V 55/50W x 2 (For E-02,03,24,28 and 33)
12V 55W + 12V 55W (For the other models)
Position light bulb ②: 12V 5W (Except for E-03, 24, 28 and 33)

NOTE:
Adjust the headlight, both vertical and horizontal, after reassembling.

BULB REPLACEMENT

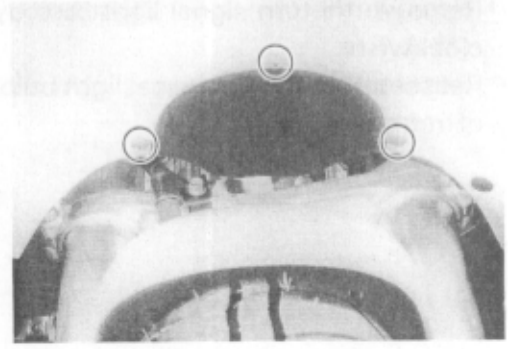
- Disconnect the socket ① and remove the rubber cap ②.
- Remove the headlight bulb by removing the bulb holder spring.
- Reassemble the headlight bulb in the reverse order of removal.



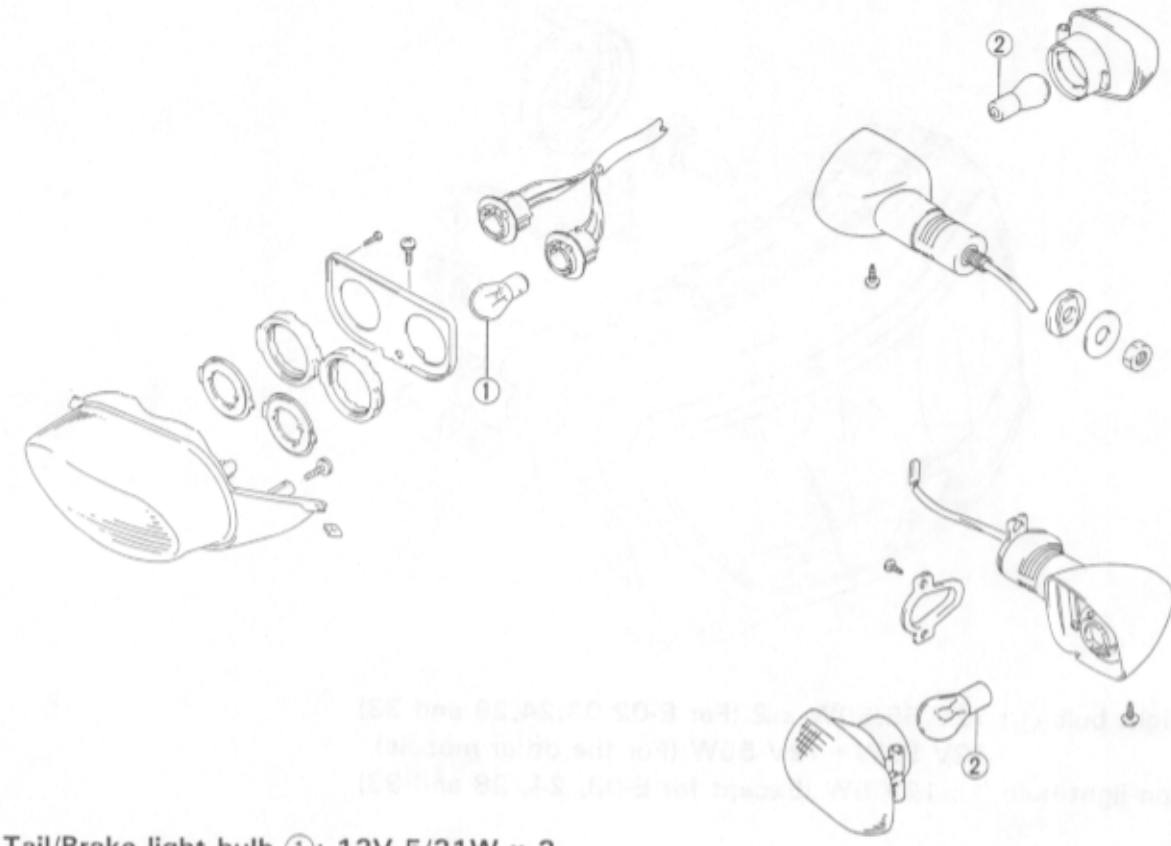
⚠ CAUTION

If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol or soapy water to prevent early failure.

- Remove the panel.
- Remove the position light bulb by turning it counterclockwise.
- Reassemble the position light bulb in the reverse order of removal.



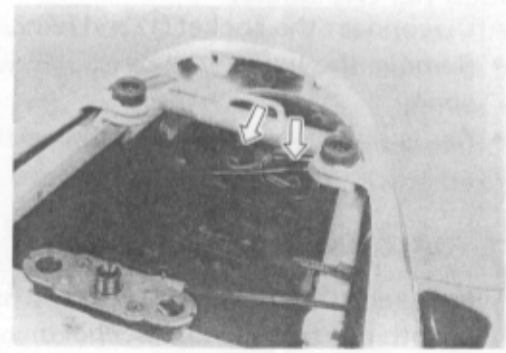
TAIL/BRAKE AND TURN SIGNAL LIGHT



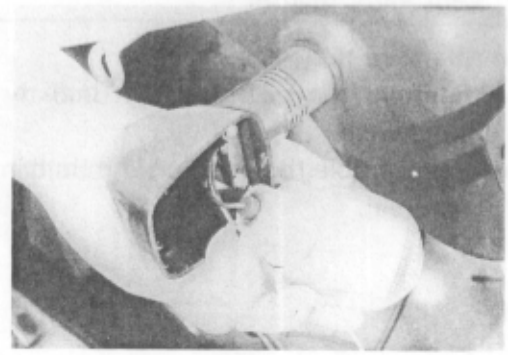
Tail/Brake light bulb ①: 12V 5/21W x 2
Turn signal light bulb ②: 12V 21W

BULB REPLACEMENT

- Remove the rear seat. (Refer to page 6-3.)
- Remove the tail/brake light bulb by turning it counter-clookwise.
- Reassemble the tail/brake light bulb in the reverse order of removal.



- Remove the screw and take off the lens.
- Remove the turn signal light bulb by turning it counter-clockwise.
- Reassemble the turn signal light bulb in the reverse order of removal.



SWITCHES

Inspect each switch for continuity with the pocket tester. If any abnormality is found, replace the respective switch assemblies with new ones.

09900-25002: Pocket tester

Tester knob indication: X 1Ω range

IGNITION SWITCH

(For Australia)

Position \ Color	R	O	O/Y	B/W
OFF				
ON	○——	——○	○——	——○

(For Others)

Position \ Color	R	O	Gr	Br	G/Y	B/W
OFF						
ON	○——	——○	○——	——○	○——	——○
P	○——	——	——	——○		

LIGHTING SWITCH

(Except for Australia, Canada and U.S.A.)

Position \ Color	O/Bl	Gr	O/R	Y/W
OFF				
•	○——	——○		
ON	○——	——○	○——	——○

DIMMER SWITCH

Position \ Color	Y/W	W	Y
HI	○——	——	——○
LO	○——	——○	

TURN SIGNAL SWITCH

Position \ Color	Lg	Lbl	B
L		○——	——○
PUSH			
R	○——	——○	

PASSING LIGHT SWITCH

(Except for Canada and U.S.A.)

Position \ Color	O/R	Y
•		
PUSH	○——	——○

ENGINE STOP SWITCH

Position \ Color	O/B	O/W
OFF		
RUN	○——	——○

STARTER BUTTON

Position \ Color	O/W	Y/G
•		
PUSH	○——	——○

HORN BUTTON

Position \ Color	B/Bl	B/W
•		
PUSH	○——	——○

FRONT BRAKE SWITCH

Position \ Color	B	B/R
OFF		
ON	○——	——○

REAR BRAKE LIGHT SWITCH

Position \ Color	O/G	W/B
OFF		
ON	○——	——○

CLUTCH LEVER POSITION SWITCH

Position \ Color	B/Y	B/Y
OFF		
ON	○——	——○

OIL PRESSURE SWITCH

Position \ Color	G/Y	Ground
ON (engine is stopped)	○——	——○
OFF (engine is running)		

NOTE: Before inspecting the oil pressure switch, check if the engine oil level is enough. (Refer to page 2-9).

WIRE COLOR

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

RELAY

STARTER RELAY

The starter relay is located behind the left frame cover. (Refer to page 7-17 for details.)

SIDE-STAND RELAY

The side-stand relay is located behind the left frame cover. (Refer to page 7-19 for details.)

FUEL PUMP RELAY

The fuel pump relay is located behind the left frame cover. (Refer to page 4-6 for details).



TURN SIGNAL RELAY

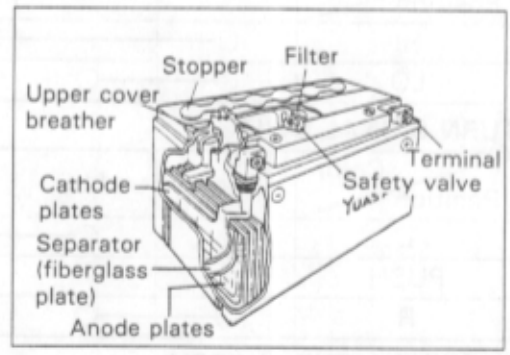
The turn signal relay is located left side of fairing brace. If the turn signal light does not light, inspect the bulb, turn signal switch and circuit connection.
If the bulb, turn signal switch and circuit connection checked are all right, the turn signal relay may be faulty, replace it with a new one.

NOTE:
Be sure that the battery used is in fully-charged condition.

BATTERY

SPECIFICATIONS

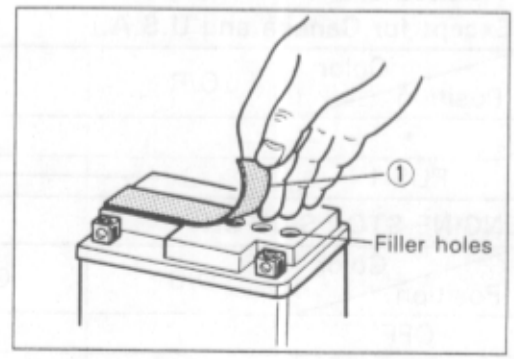
Type designation	FTX9-BS
Capacity	12V, 28.8 kC (8 Ah)/10HR
Standard electrolyte S.G.	1.320 at 20°C (68°F)



INITIAL CHARGING

Filling electrolyte

- Remove the aluminum tape ① sealing the battery electrolyte filler holes.

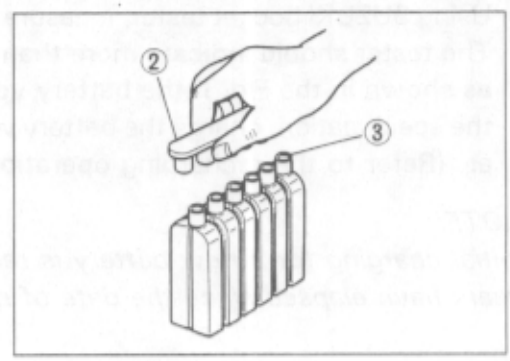


- Remove the caps ② .

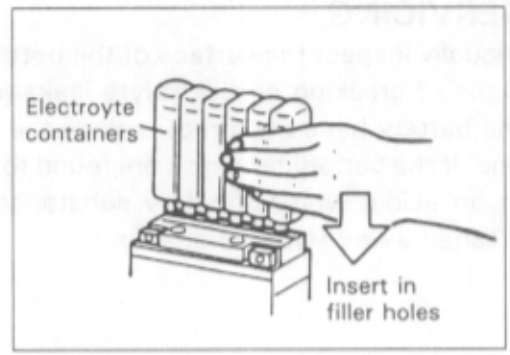
NOTE:

* *After filling the electrolyte completely, use the removed cap ② as the sealed caps of battery-filler holes.*

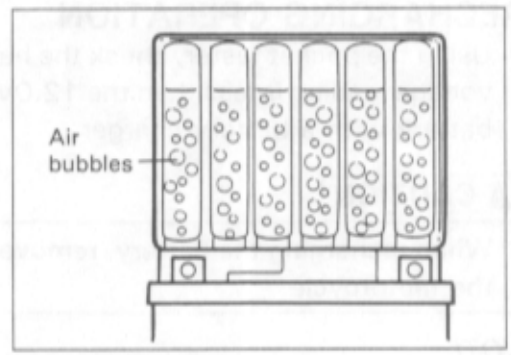
* *Do not remove or pierce the sealed areas ③ of the electrolyte container.*



- Insert the nozzles of the electrolyte container 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.



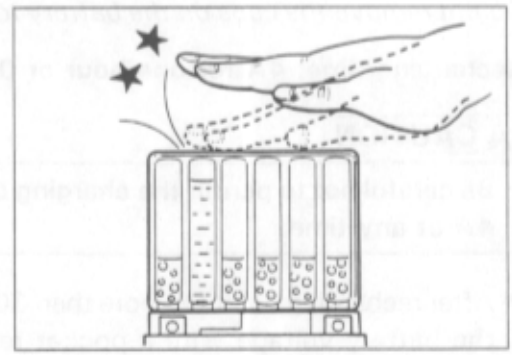
- Make sure air bubbles are coming up each electrolyte container, and leave in this position for about more than 20 minutes.



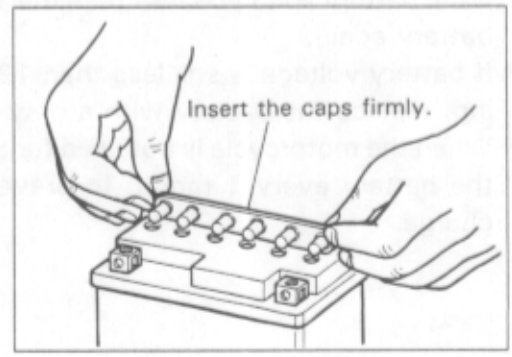
NOTE:

If no air bubbles are coming up from a filler port, tap the bottom of the 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 around 20 minutes.
- Insert the caps 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.

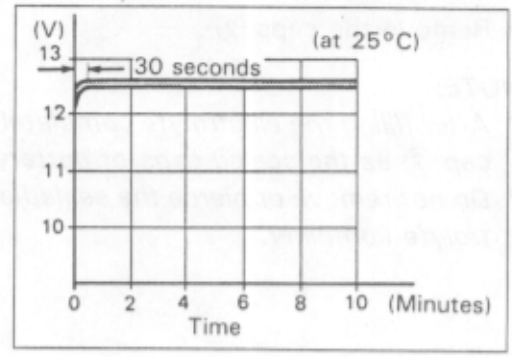


⚠ CAUTION

*** Never use anything except the specified battery.**

*** Once install the caps to the battery; do not remove the caps.**

- Using SUZUKI pocket tester, measure the battery voltage. The tester should indicate more than 12.5 – 12.6V (DC) as shown in the Fig. If the battery voltage is lower than the specification, charge the battery with a battery charger. (Refer to the recharging operation.)



NOTE:
Initial charging for a new battery is recommended if two years have elapsed since the date of manufacture.

SERVICING

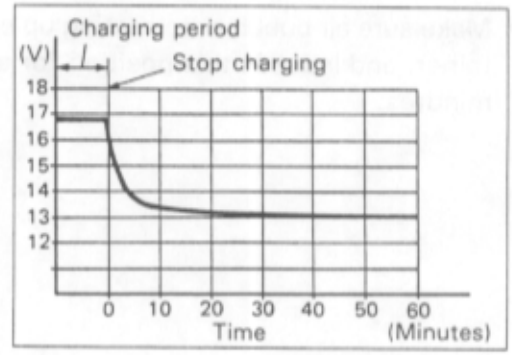
Visually inspect the surface of the battery container. If any signs of cracking or electrolyte leakage from the sides of the battery have occurred, replace the battery with a new one. If the battery terminals are found to be coated with rust or an acidic white powdery substance, then this can be cleaned away with sandpaper.

RECHARGING OPERATION

- Using the pocket tester, check the battery voltage. If the voltage reading is less than the 12.0V (DC), recharge the battery with a battery charger.

⚠ CAUTION

When recharging the battery, remove the battery from the motorcycle.

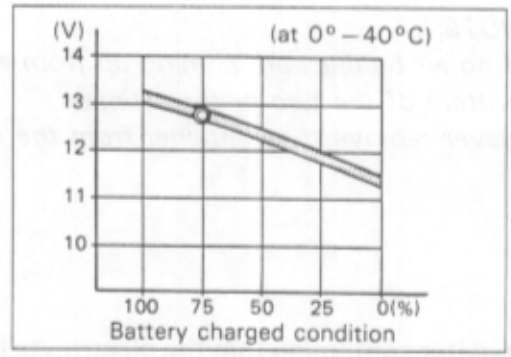


NOTE:
Do not remove the caps on the battery top while recharging.

Recharging time: 4A for one hour or 0.9A for 5 hours

⚠ CAUTION

Be careful not to permit the charging current to exceed 4A at any time.



- After recharging, wait for more than 30 minutes and check the battery voltage with a pocket tester.
- If the battery voltage is less than the 12.5V, recharge the battery again.
- If battery voltage is still less than 12.5V, after recharging, replace the battery with a new one.
- When the motorcycle 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

ENGINE

Complaint	Symptom and possible causes	Remedy
Engine will not start, or is hard to start.	**Compression too low**	
	1. Out of adjustment tappet clearance.	Adjust.
	2. Worn valve guides or poor seating of valves.	Repair or replace.
	3. Mistiming valves.	Adjust.
	4. Excessively worn piston rings.	Replace.
	5. Worn-down cylinder bores.	Replace or rebore.
	6. Too slowly starter motor cranks.	See electrical section.
	7. Poor seating of spark plugs.	Retighten.
	Plugs not sparking	
	1. Fouled spark plugs.	Clean.
	2. Wet spark plugs.	Clean and dry.
	3. Defective ignition coil.	Replace.
	4. Open or short in high-tension cords.	Replace.
	5. Defective signal generator or ignitor unit.	Replace.
	No fuel reaching the carburetors	
	1. Clogged fuel tank air breather hose.	Clean or replace.
	2. Clogged or defective vacuum fuel valve.	Clean or replace.
	3. Defective fuel pump, fuel pump relay or ignitor unit.	Replace.
	4. Defective carburetor needle valve.	Replace.
	5. Clogged fuel hose or fuel filter.	Clean or replace.
Engine stalls easily.	1. Fouled spark plugs.	Clean.
	2. Defective signal generator or ignitor unit.	Replace.
	3. Clogged fuel hose.	Clean.
	4. Clogged jets in carburetors.	Clean.
	5. Out of adjustment tappet clearance.	Adjust.
Noisy engine.	**Excessive valve chatter**	
	1. Too large tappet clearance.	Adjust.
	2. Weakened or broken valve springs.	Replace.
	3. Worn tappet or camsurface.	Replace.
	4. Worn and burnt camshaft journal.	Replace.
	Noise seems to come from piston	
	1. Worn down pistons or cylinders.	Replace.
	2. Fouled with carbon combustion chambers.	Clean.
	3. Worn piston pins or piston pin bore.	Replace.
	4. Worn piston rings or ring grooves.	Replace.
	Noise seems to come from timing chain	
	1. Stretched chain.	Replace.
	2. Worn sprockets.	Replace.
	3. Not working tension adjuster.	Repair or replace.
	Noise seems to come from clutch	
	1. Worn splines of countershaft or hub.	Replace.
	2. Worn teeth of clutch plates.	Replace.
	3. Distorted clutch plates, driven and drive.	Replace.
	4. Worn clutch release bearing.	Replace.
	5. Weakened clutch dampers.	Replace the primary driven gear.

Complaint	Symptom and possible causes	Remedy
Noisy engine.	**Noise seems to come from crankshaft**	
	1. Due to wear rattling bearings.	Replace.
	2. Worn and burnt big-end bearings.	Replace.
	3. Worn and burnt journal bearings.	Replace.
	4. Too large thrust clearance.	Replace thrust bearing.
	Noise seems to come from transmission	
	1. Worn or rubbing gears.	Replace.
	2. Badly worn splines.	Replace.
	3. Worn or rubbing primary gears.	Replace.
	4. Badly worn bearings.	Replace.
	Noise seems to come from water pump	
	1. Too much play on pump shaft bearing.	Replace.
	2. Worn or damaged mechanical seal.	Replace.
	3. Touches pump case and impeller.	Replace.
Slipping clutch.	1. Out of adjustment or loss of play clutch control.	Adjust.
	2. Weakened diaphragm clutch springs.	Replace.
	3. Worn or distorted pressure plate.	Replace.
	4. Distorted clutch plates, driven and drive.	Replace.
Dragging clutch.	1. Out of adjustment or loss of play clutch control.	Adjust.
	2. Diaphragm clutch springs weakened.	Replace.
	3. Distorted pressure plate or clutch plate.	Replace.
Transmission will not shift.	1. Broken gearshift cam.	Replace.
	2. Distorted gearshift forks.	Replace.
	3. Worn gearshift pawl.	Replace.
Transmission will not shift back.	1. Broken return spring on shift shaft.	Replace.
	2. Rubbing or stickly shift shaft.	Repair or replace.
	3. Distorted or worn gearshift forks.	Replace.
Transmission jumps out of gear.	1. Worn shifting gears on driveshaft or countershaft.	Replace.
	2. Distorted or worn gearshift forks.	Replace.
	3. Weakened stopper spring on gearshift stopper.	Replace.
	4. Worn gearshift pawl.	Replace.
Engine idles poorly.	1. Out of adjustment tappet clearance.	Adjust.
	2. Poor seating of valves.	Replace or repair.
	3. Defective valve guides.	Replace.
	4. Worn tappet or camsurface.	Replace.
	5. Too wide spark plug gaps.	Adjust or replace.
	6. Defective ignition coil.	Replace.
	7. Defective signal generator or ignitor unit.	Replace.
	8. Out of adjustment in carburetors float-chamber fuel level.	Adjust.
	9. Clogged jets or imbalance of carburetors.	Clean or adjust.
	10. Defective fuel pump, fuel pump relay or ignitor unit.	Replace.

Complaint	Symptom and possible causes	Remedy
Engine runs poorly in high speed range.	1. Weakened valve springs.	Replace.
	2. Worn camshafts.	Replace.
	3. Valve timing out of adjustment.	Adjust.
	4. Too narrow spark plug gaps.	Adjust.
	5. Ignition not advanced sufficiently due to poorly working timing advance circuit.	Replace ignitor unit.
	6. Defective ignition coil.	Replace.
	7. Defective signal generator or ignitor unit.	Replace.
	8. Too low float-chamber fuel level.	Adjust.
	9. Clogged air cleaner element.	Clean.
	10. Clogged fuel hose, resulting in inadequate fuel supply to carburetors.	Clean and prime.
	11. Defective fuel pump, fuel pump relay or ignitor unit.	Replace.
Dirty or heavy exhaust smoke.	1. Too much engine oil in the engine.	Check with inspection window drain out excess oil.
	2. Worn piston rings or cylinders.	Replace.
	3. Worn valve guides.	Replace.
	4. Scored or scuffed cylinder walls.	Replace.
	5. Worn valves stems.	Replace.
	6. Defective stem seal.	Replace.
	7. Worn oil ring side rails.	Replace.
Engine lacks power.	1. Loss of tappet clearance.	Adjust.
	2. Weakened valve springs.	Replace.
	3. Out of adjustment valve timing.	Adjust.
	4. Worn piston rings or cylinders.	Replace.
	5. Poor seating of valves.	Repair.
	6. Fouled spark plug.	Clean or replace.
	7. Incorrect spark plug.	Adjust or replace.
	8. Clogged jets in carburetors.	Clean.
	9. Out of adjustment float-chamber fuel level.	Adjust.
	10. Clogged air cleaner element.	Clean.
	11. Loose carburetor balancing screw.	Retighten.
	12. Sucking air from intake pipe.	Retighten or replace.
	13. Too much engine oil.	Drain out excess oil.
	14. Defective fuel pump, fuel pump relay or ignitor unit.	Replace.
Engine overheats.	1. Heavy carbon deposit on piston crowns.	Clean.
	2. Not enough oil in the engine.	Add oil.
	3. Defective oil pump or clogged oil circuit.	Replace or clean.
	4. Too low in float chambers fuel level.	Adjust.
	5. Sucking air from intake pipes.	Retighten or replace.
	6. Use incorrect engine oil.	Change.
	7. Defective cooling system.	See radiator section.

RADIATOR

Complaint	Symptom and possible causes	Remedy
Engine overheats.	1. Not enough cooling water.	Add coolant.
	2. Clogged with dirt or trashes radiator core.	Clean.
	3. Erratic thermostat, stuck in closed position.	Replace.
	4. Faulty cooling fan.	Repair or replace.
	5. Defective thermo-switch.	Replace.
	6. Clogged water passage.	Clean.
	7. Air trapped in the cooling circuit.	Bleed out air.
	8. Defective water pump.	Replace.
	9. Use incorrect coolant.	Replace.
Engine overcools.	1. Erratic thermostat, stuck in full-open position.	Replace.
	2. Defective thermo-switch.	Replace.
	3. Extremely cold weather.	Put on the radiator cover.

CARBURETOR

Complaint	Symptom and possible causes	Remedy
Trouble with starting.	1. Clogged starter jet.	Clean.
	2. Clogged starter pipe.	Clean.
	3. Air leaking from a joint between starter body and carburetor.	Check starter body and carburetor for tightness, adjust and replace gasket.
	4. Air leaking from carburetor's joint or vacuum nipple cap.	Check and adjust.
	5. Not operation properly starter plunger.	Check and adjust.
Idling or low-speed trouble.	1. Clogged or loose pilot jet, pilot air jet.	Check and clean.
	2. Air leaking from carburetor's joint, vacuum nipple cap, or starter.	Check and adjust.
	3. Clogged pilot outlet or bypass.	Check and clean.
	4. Not fully closed starter plunger.	Check and adjust.
Medium-or high speed trouble.	1. Clogged main jet or main air jet.	Check and clean.
	2. Clogged needle jet.	Check and clean.
	3. Not operating properly throttle valve.	Check throttle valve for operation.
	4. Clogged fuel filter.	Check and clean.
Overflow and fuel level fluctuations.	1. Worn or damaged needle valve.	Replace.
	2. Broken spring in needle valve.	Replace.
	3. Not working properly float.	Check and adjust.
	4. Foreign matter has adhered to needle valve.	Clean.
	5. Too high or low fuel level.	Adjust float height.
	6. Defective fuel pump, fuel pump relay or ignitor unit.	Replace.

CHASSIS

Complaint	Symptom and possible causes	Remedy
Heavy steering.	1. Overtightened steering stem nut. 2. Broken bearing in steering stem. 3. Distorted steering stem. 4. Not enough pressure in tires.	Adjust. Replace. Replace. Adjust.
Wobbly handlebars.	1. Loss of balance between right and left front forks. 2. Distorted front fork. 3. Distorted front axle or crooked tire.	Replace. Repair or replace. Replace.
Wobby front wheel.	1. Distorted wheel rim. 2. Worn front wheel bearings. 3. Defective or incorrect tire. 4. Loose axle, axle nut or axle pinch bolts. 5. Incorrect front fork oil level.	Replace. Replace. Replace. Retighten. Adjust.
Front suspension too soft.	1. Weakened springs. 2. Not enough fork oil. 3. Improperly set front fork spring adjuster.	Replace. Replenish. Adjust.
Front suspension too stiff.	1. Too viscous fork oil. 2. Too much fork oil. 3. Improperly set front fork spring adjuster.	Replace. Drain excess oil. Adjust.
Noisy front suspension.	1. Not enough fork oil. 2. Loose bolts on suspension.	Replenish. Retighten.
Wobbly rear wheel.	1. Distorted wheel rim. 2. Worn rear wheel bearing or swingarm bearings. 3. Defective or incorrect tire. 4. Worn swingarm and rear cushion related bearings. 5. Loose nuts or bolts on rear suspensions.	Replace. Replace. Replace. Replace. Retighten.
Rear suspension too soft.	1. Weakened shock absorber spring. 2. Improperly set rear suspension adjuster. 3. Leakage oil of shock absorber. 4. Leakage gas of shock absorber.	Replace. Adjust. Replace. Replace.
Rear suspension too stiff.	1. Improperly set rear suspension adjuster. 2. Bent shock absorber shaft. 3. Bent swingarm. 4. Worn swingarm and rear cushion related bearings.	Adjust. Replace. Replace. Replace.
Noisy rear suspension.	1. Loose nuts or bolts on rear suspension. 2. Worn swingarm and rear cushion related bearings.	Retighten. Replace.

BRAKES

Complaint	Symptom and possible causes	Remedy
Insufficient brake power.	1. Leakage of brake fluid from hydraulic system. 2. Worn pads. 3. Oil adhesion of engaging surface of pads. 4. Worn disc. 5. Air in hydraulic system.	Repair or replace. Replace. Clean disc and pads. Replace. Bleed air.
Brake squeaking.	1. Carbon adhesion on pad surface. 2. Tilted pad. 3. Damaged wheel bearing. 4. Loosen front-wheel axle or rear-wheel axle. 5. Worn pads. 6. Foreign material in brake fluid. 7. Clogged return port of master cylinder.	Repair surface with sandpaper. Modify pad fitting or replace. Replace. Tighten to specified torque. Replace. Replace brake fluid. Disassemble and clean master cylinder.
Excessive brake lever stroke.	1. Air in hydraulic system. 2. Insufficient brake fluid. 3. Improper quality of brake fluid.	Bleed air. Replenish fluid to specified level; bleed air. Replace with correct fluid.
Leakage of brake fluid.	1. Insufficient tightening of connection joints. 2. Cracked hose. 3. Worn piston and/or cup.	Tighten to specified torque. Replace. Replace piston and/or cup.

ELECTRICAL

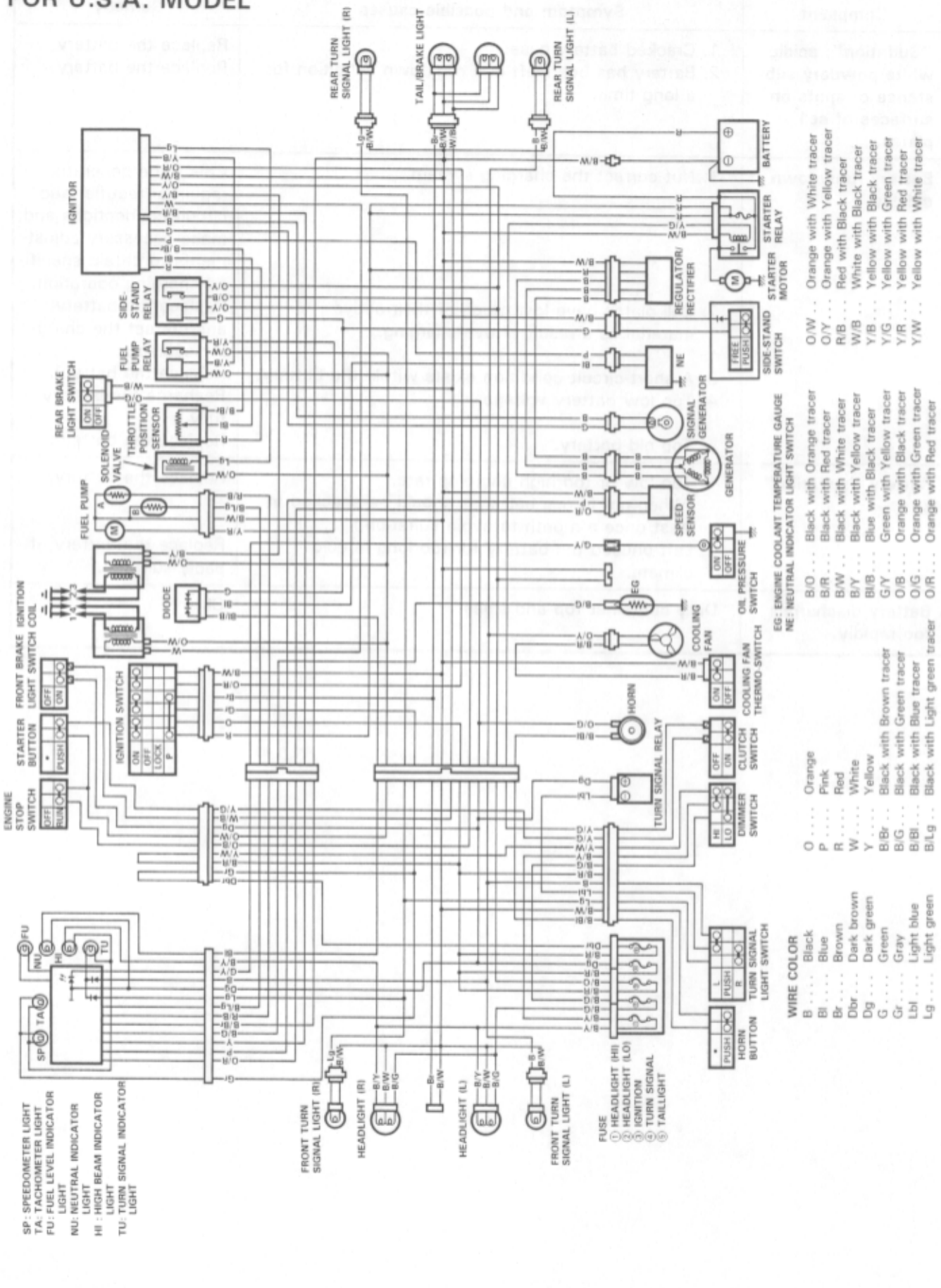
Complaint	Symptom and possible causes	Remedy
No sparking or poor sparking.	1. Defective ignition coil. 2. Defective spark plugs. 3. Defective signal generator or ignitor unit.	Replace. Replace. Replace.
Spark plug soon become fouled with carbon.	1. Mixture too rich. 2. Idling speed set too high. 3. Incorrect gasoline. 4. Dirty element in air cleaner. 5. Too cold spark plugs.	Adjust carburetors. Adjust carburetors. Change. Clean. Replace with hot type plugs.
Spark plugs become fouled too soon.	1. Worn piston rings. 2. Worn piston or cylinders. 3. Excessive clearance of valve stems in valve guides. 4. Worn stem oil seal.	Replace. Replace. Replace. Replace.
Spark plug electrodes overheat or burn.	1. Too hot spark plugs. 2. Overheated the engine. 3. Loose spark plugs. 4. Too lean mixture.	Replace with cold type plugs. Tune up. Retighten. Adjust carburetors.
Generator does not charge.	1. Open or short lead wires, or loose lead connections. 2. Shorted, grounded or open generator coils. 3. Shorted or panctured regulator/rectifiers.	Repair or replace or retighten. Replace. Replace.
Generator does charge, but charging rate is below the specification.	1. Lead wires tend to get shorted or open-circuited or loosely connected at terminals. 2. Grounded or open-circuited stator coils or generator. 3. Defective regulator/rectifier. 4. Defective cell plates in the battery.	Repair or retighten. Replace. Replace. Replace the battery.
Generator overcharges.	1. Internal short-circuit in the battery. 2. Damaged or defective resistor element in the regulator/rectifier. 3. Poorly grounded regulator/rectifier.	Replace the battery. Replace. Clean and tighten ground connection.
Unstable charging.	1. Lead wire insulation frayed due to vibration, resulting in intermittent shorting. 2. Internally shorted generator. 3. Defective regulator/rectifier.	Repair or replace. Replace. Replace.
Starter button is not effective.	1. Run down battery. 2. Defective switch contacts. 3. Not seating properly brushes on commutator in starter motor. 4. Defective starter relay/starter interlock switch.	Repair or replace. Replace. Repair or replace. Replace.

BATTERY

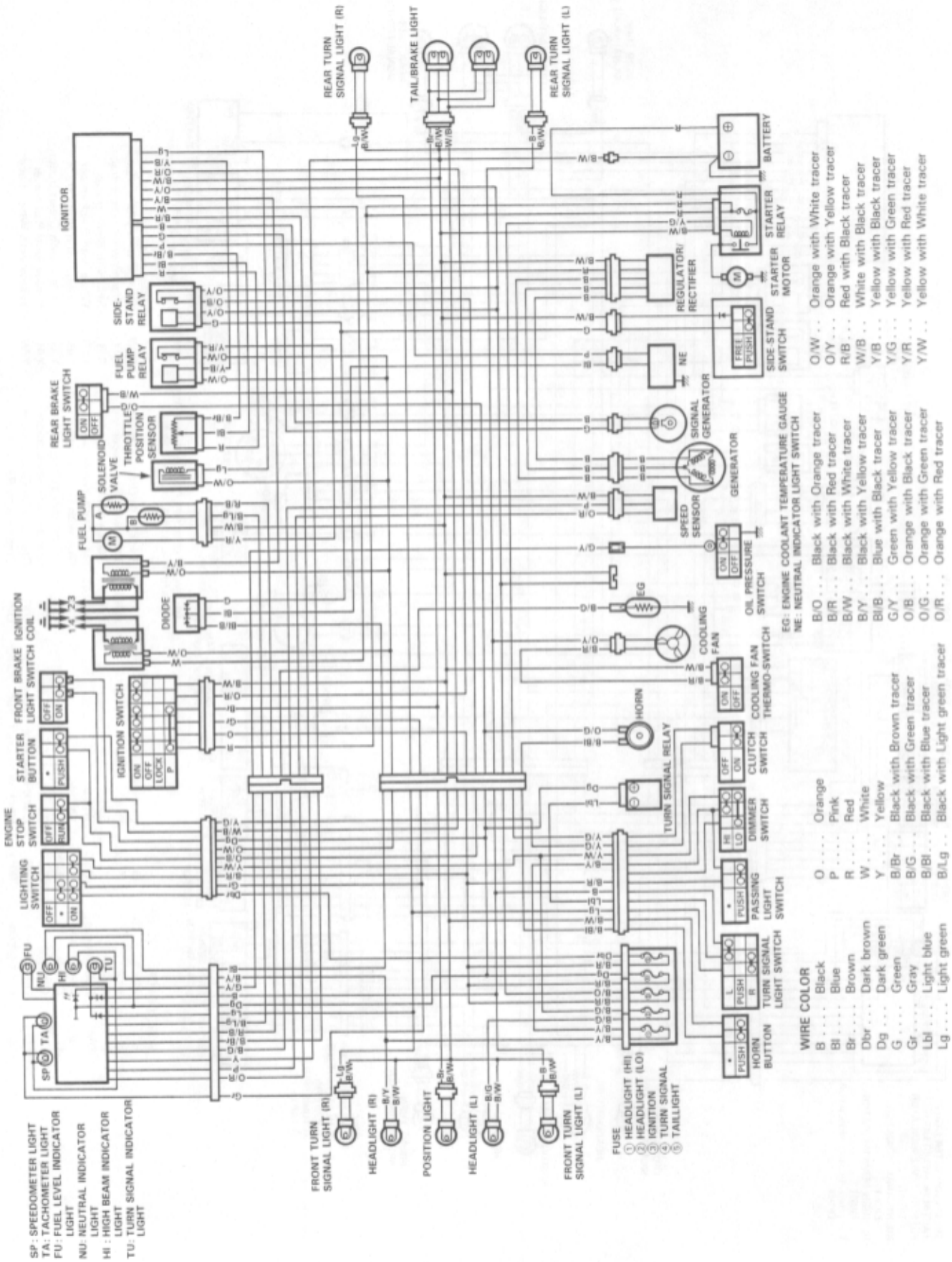
Complaint	Symptom and possible causes	Remedy
"Sulfation", acidic white powdery substance or spots on surfaces of cell plates.	1. Cracked battery case. 2. Battery has been left in a run-down condition for a long time.	Replace the battery. Replace the battery.
Battery runs down quickly.	1. Not correct the charging system. 2. Cell plates have lost much of their active material as a result of overcharging. 3. A short-circuit condition exists within the battery. 4. Too low battery voltage. 5. Too old battery.	Check the generator, regulator/rectifier and circuit connections and make necessary adjustments to obtain specified charging operation. Replace the battery, and correct the charging system. Replace the battery. Recharge the battery fully. Replace the battery.
Battery "sulfation".	1. Too low or too high charging rate. (When not in use batteries should be checked at least once a month to avoid sulfation.) 2. Left unused the battery for too long in cold climate.	Replace the battery. Replace the battery, if badly sulfated.
Battery discharges too rapidly.	Dirty container top and sides.	Clean.

WIRING DIAGRAM

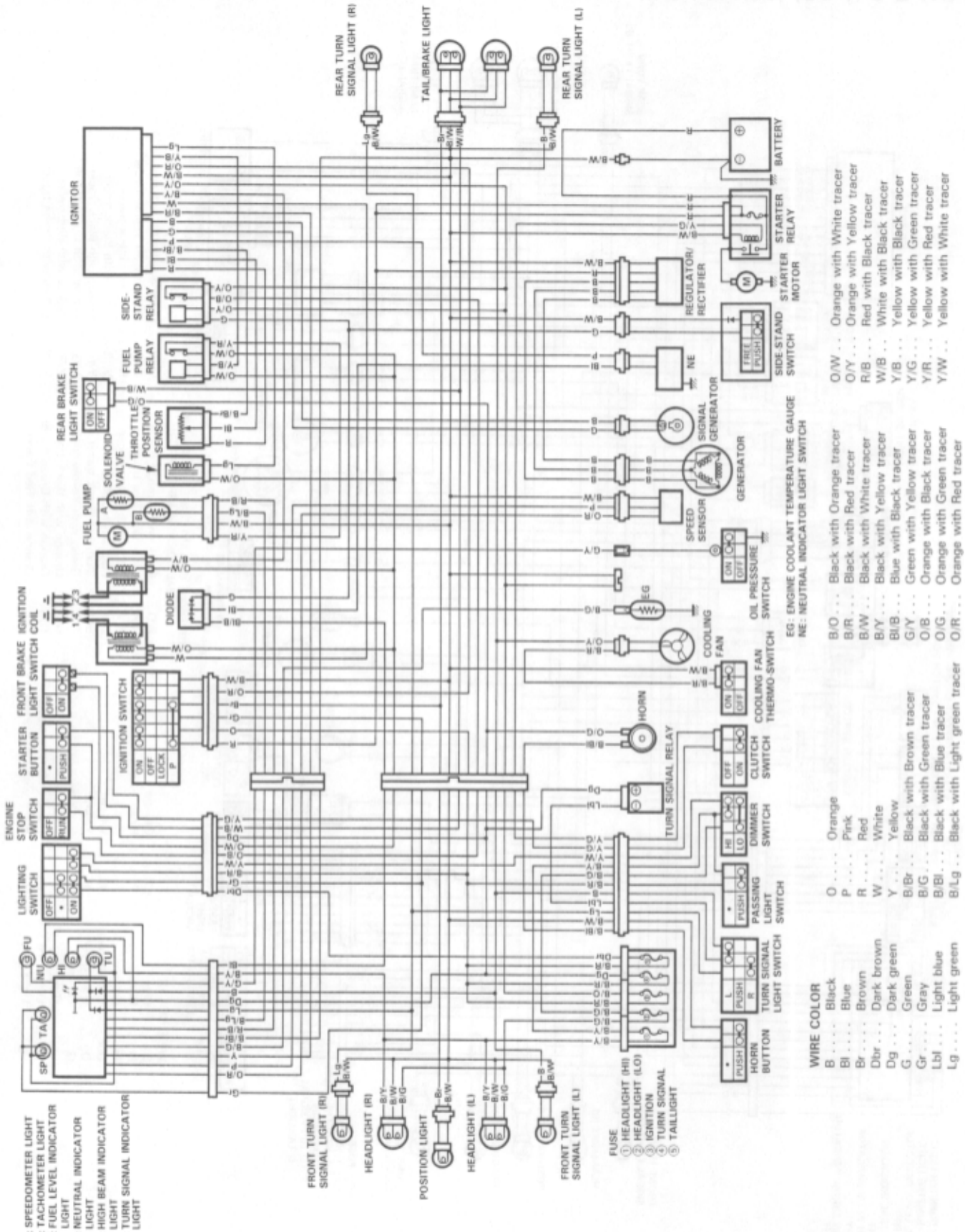
FOR U.S.A. MODEL



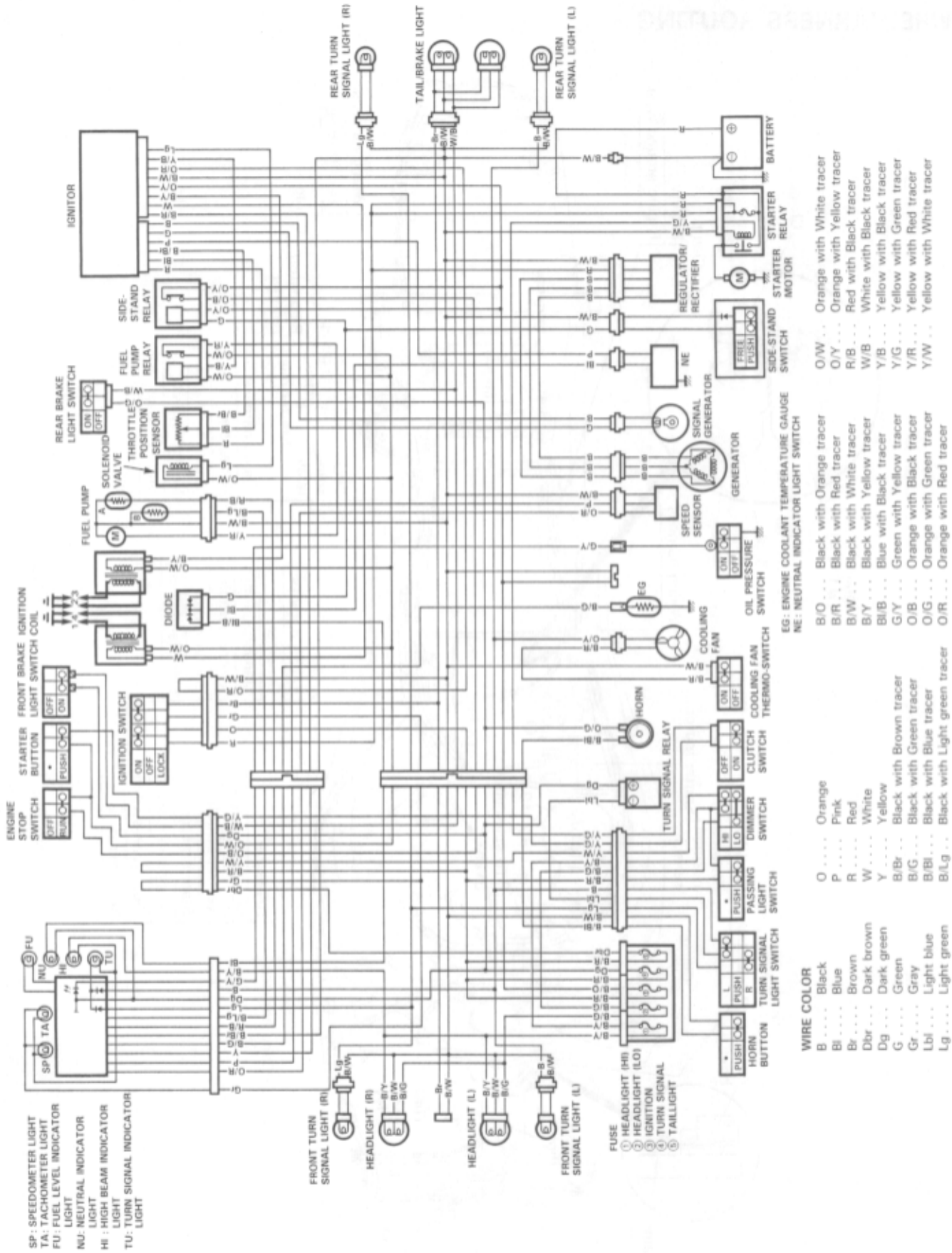
FOR E-04, 18, 21, 22, 25, 34, 37, 39, AND 53 MODELS



FOR E-02 MODEL

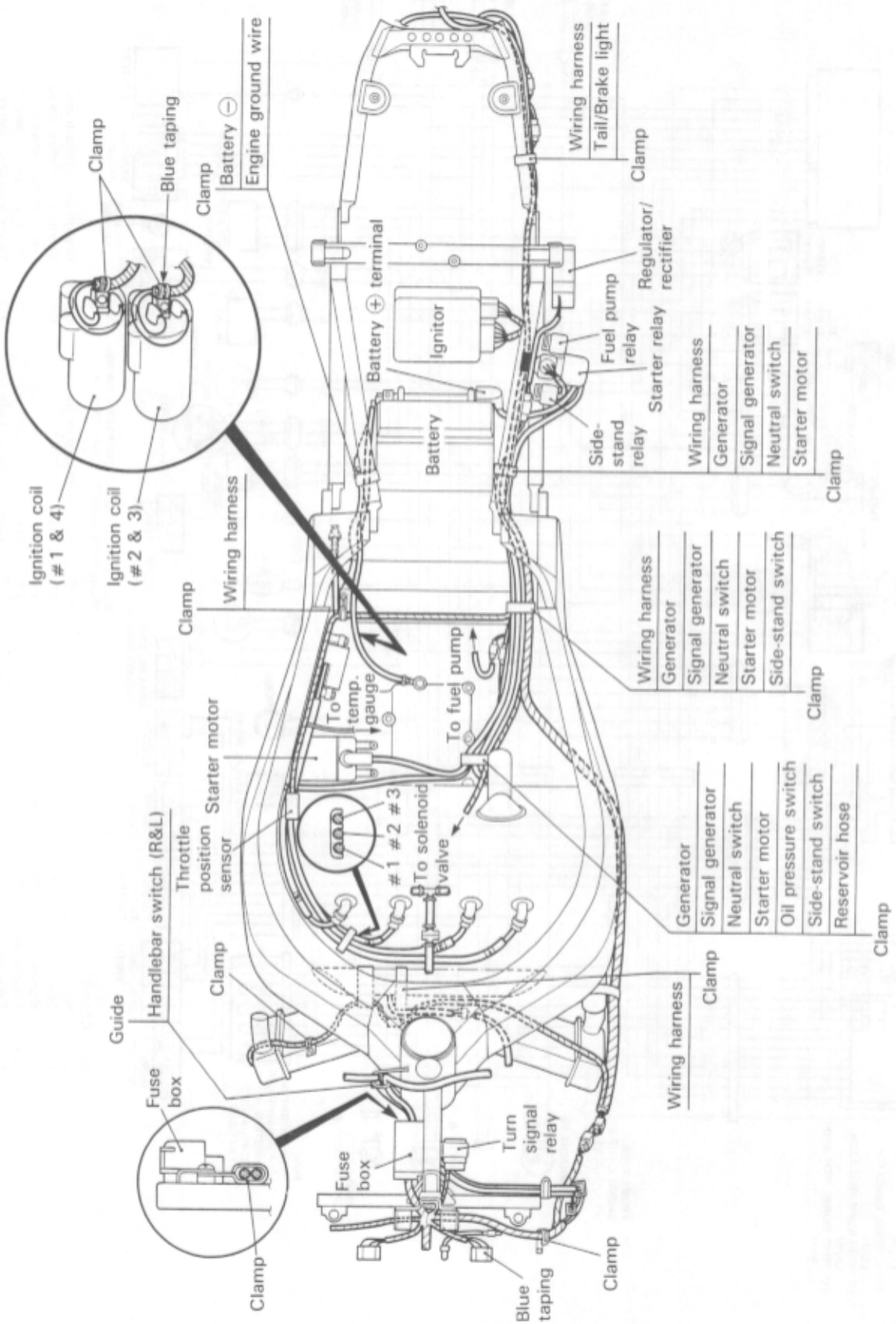


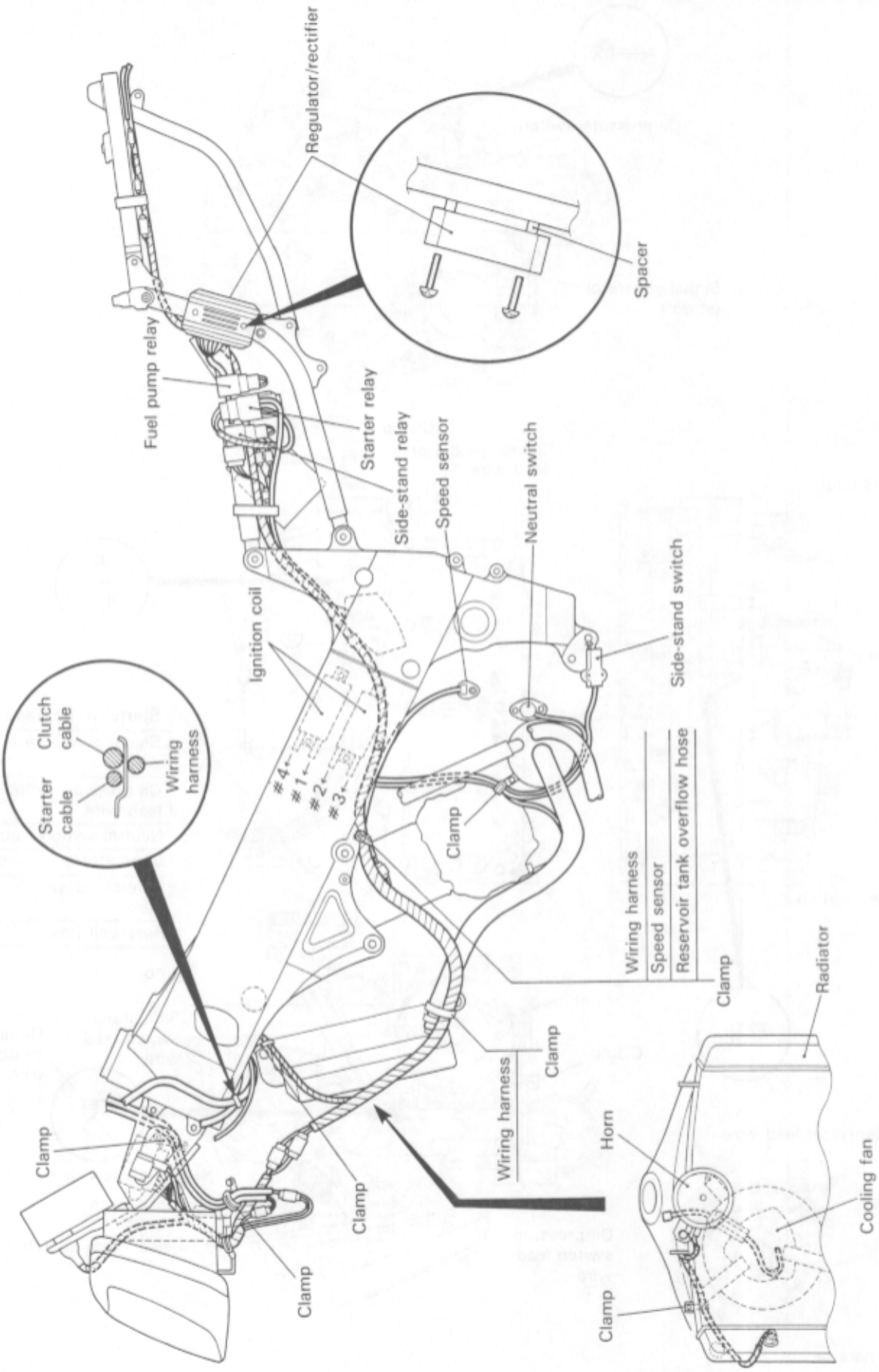
FOR E-24 MODEL

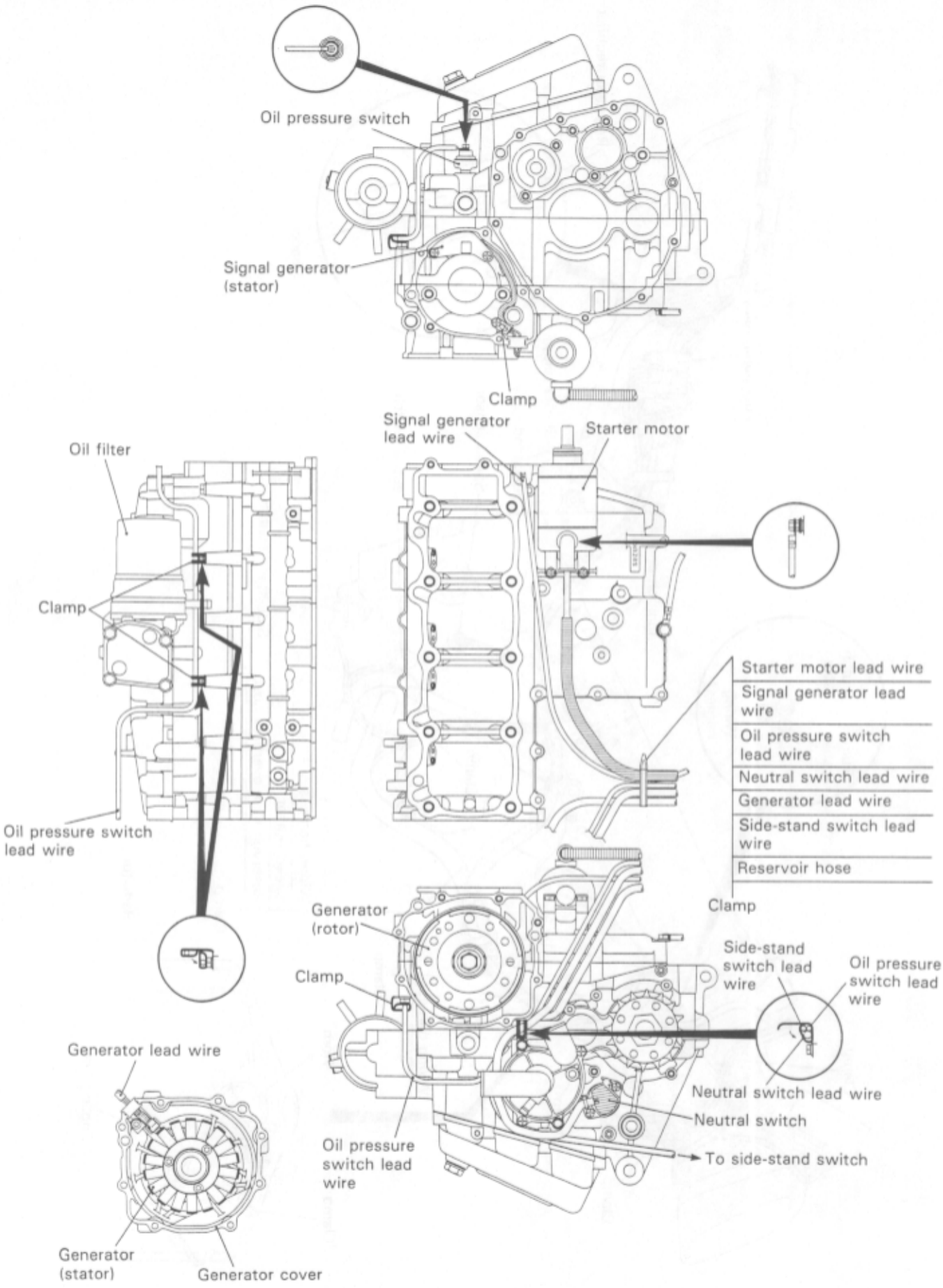


WIRE HARNESS, CABLE AND HOSE ROUTING

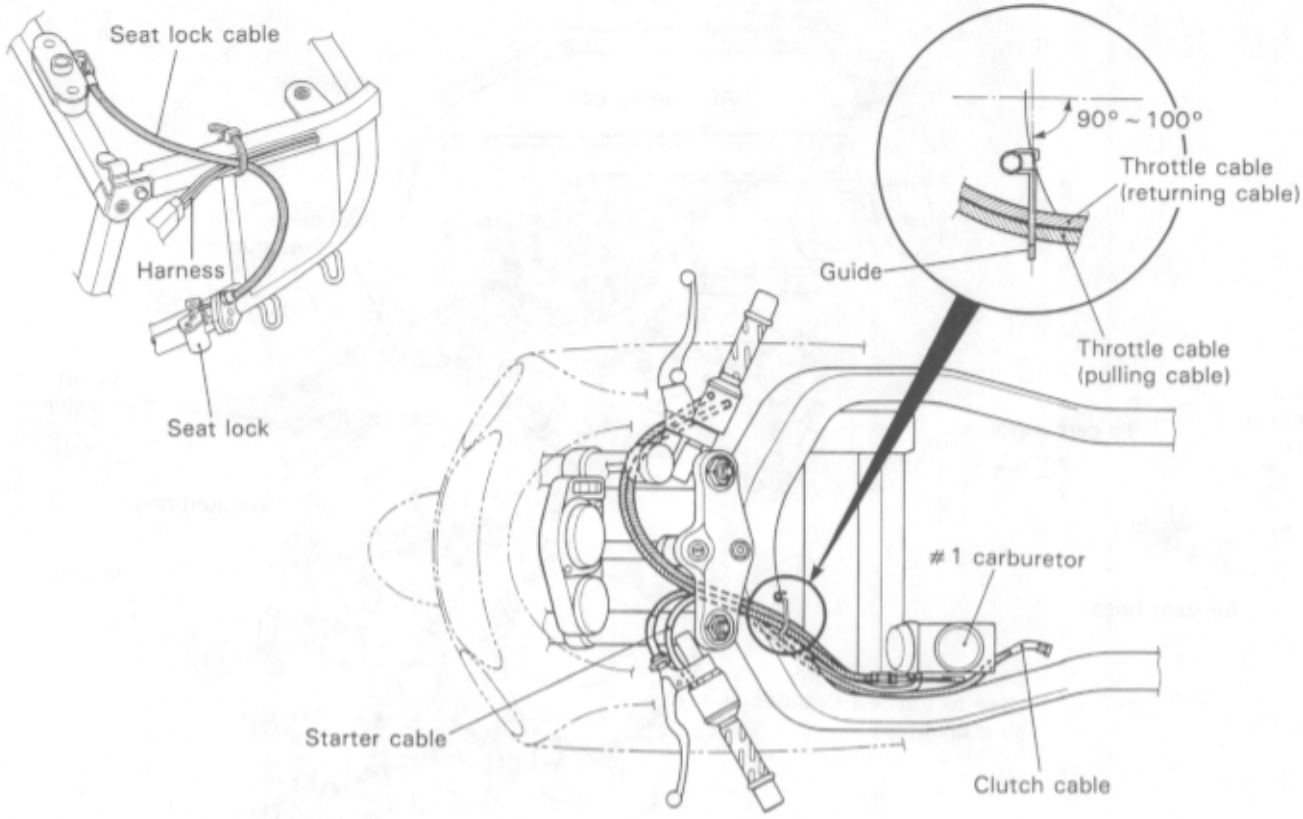
WIRE HARNESS ROUTING

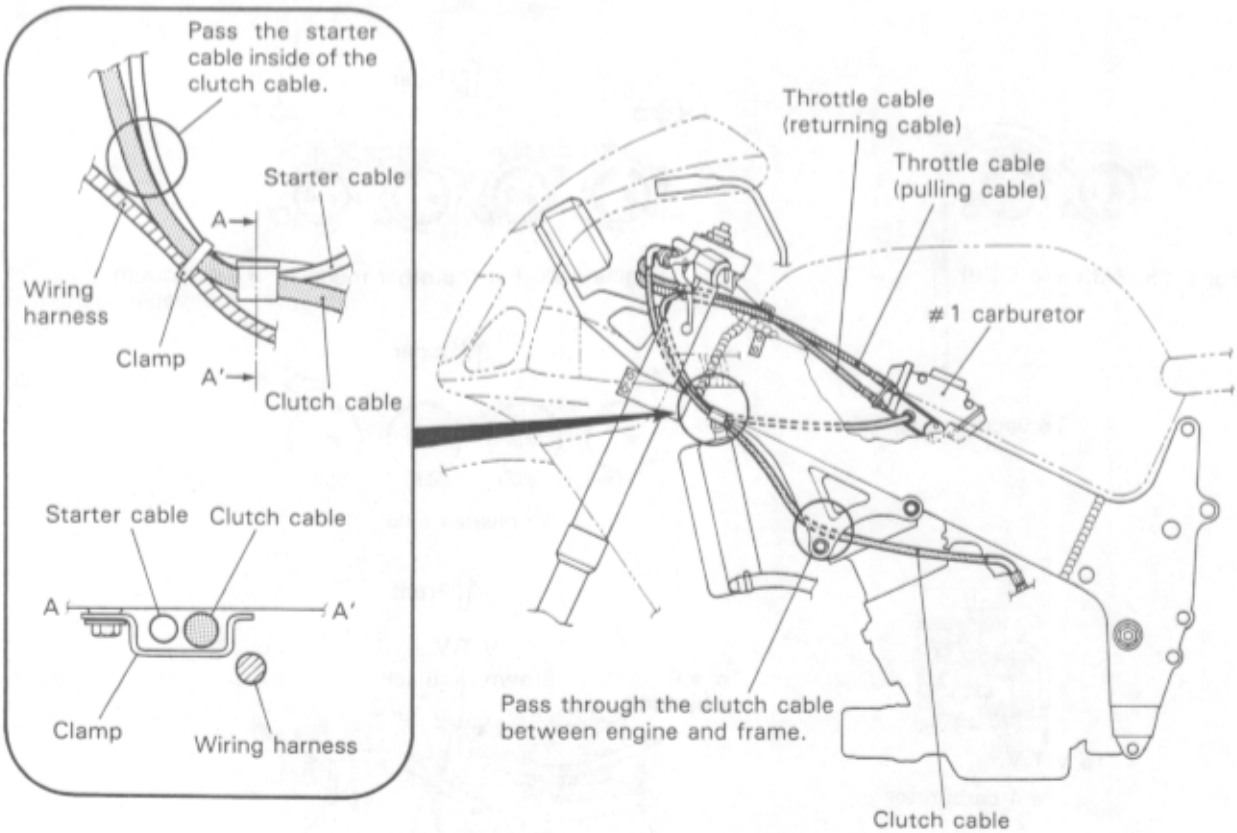



Regulator/rectifier
Spacer
Fuel pump relay
Starter relay
Side-stand relay
Speed sensor
Neutral switch
Side-stand switch
Ignition coil
#4
#1
#2
#3
Clutch cable
Starter cable
Wiring harness
Clamp
Wiring harness
Speed sensor
Reservoir tank overflow hose
Clamp
Wiring harness
Clamp
Clamp
Clamp
Clamp
Clamp
Horn
Radiator
Cooling fan

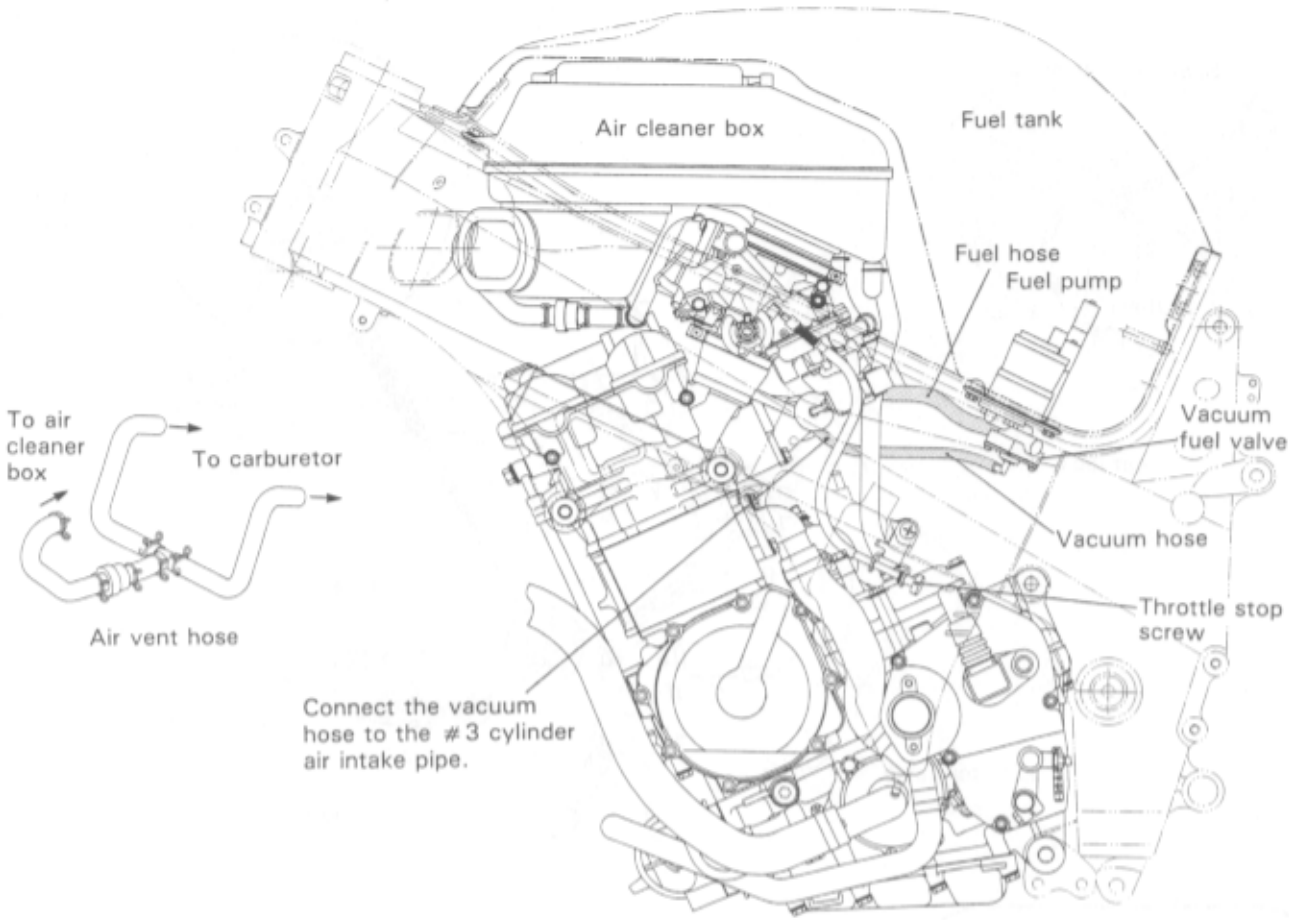

Oil pressure switch
Signal generator (stator)
Clamp
Signal generator lead wire
Starter motor
Oil filter
Clamp
Oil pressure switch lead wire
Starter motor lead wire
Signal generator lead wire
Oil pressure switch lead wire
Neutral switch lead wire
Generator lead wire
Side-stand switch lead wire
Reservoir hose
Clamp
Generator (rotor)
Clamp
Side-stand switch lead wire
Oil pressure switch lead wire
Neutral switch lead wire
Neutral switch
To side-stand switch
Oil pressure switch lead wire
Generator lead wire
Generator (stator)
Generator cover

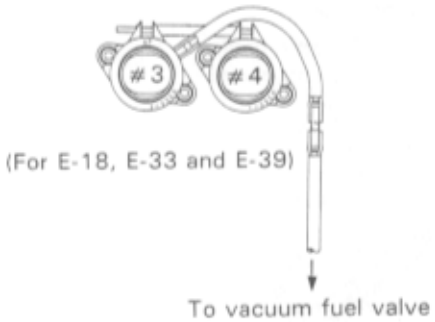
CABLE ROUTING

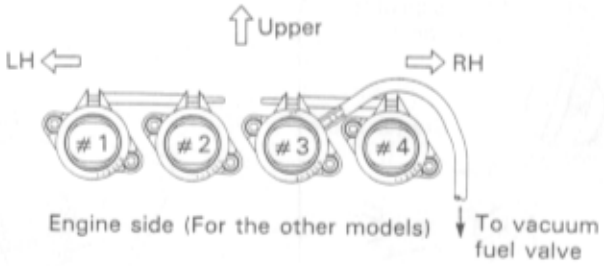




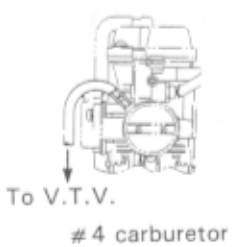
FUEL SYSTEM HOSE ROUTING

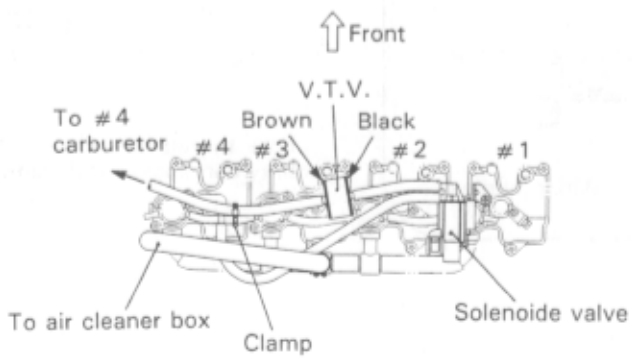






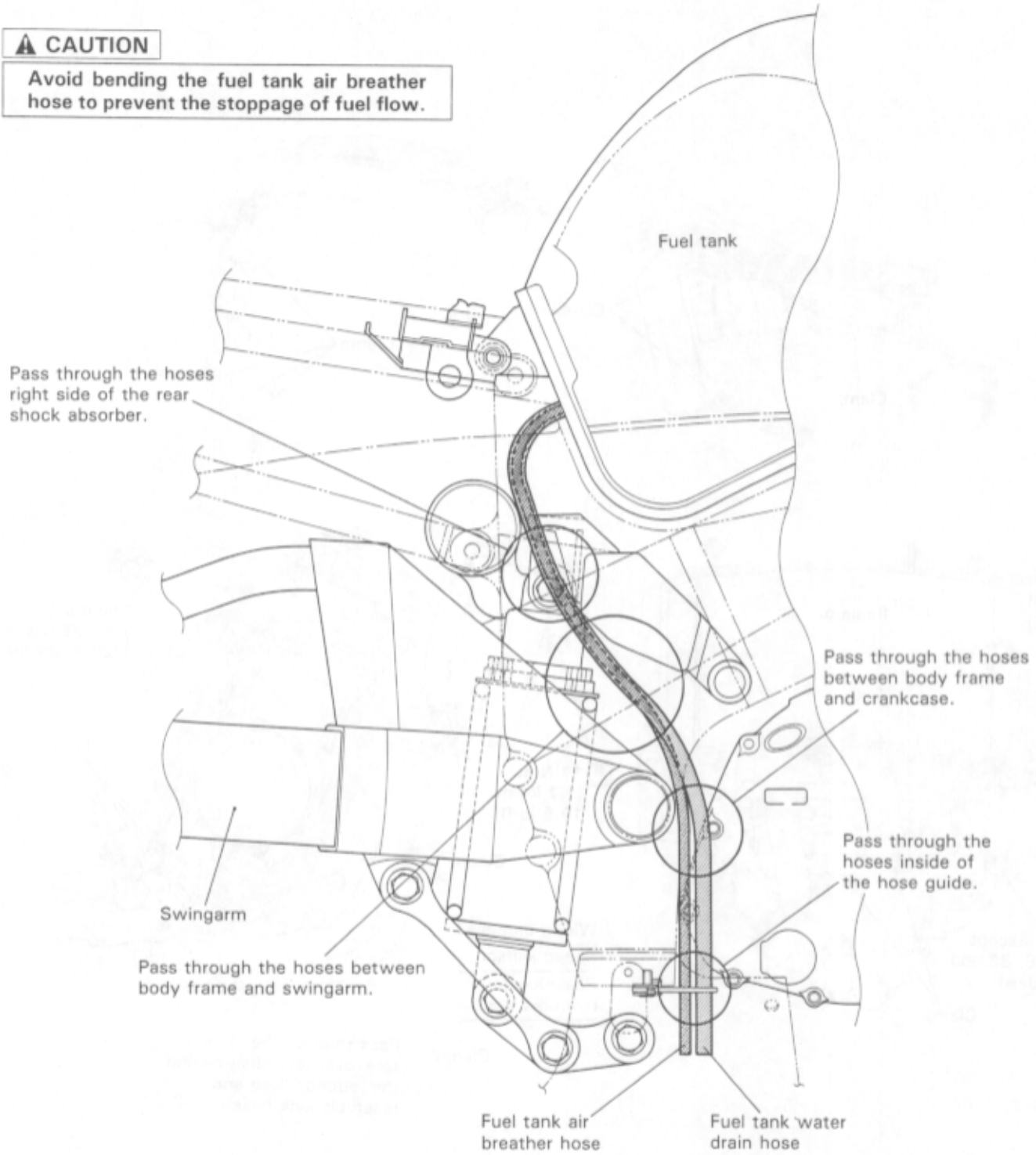




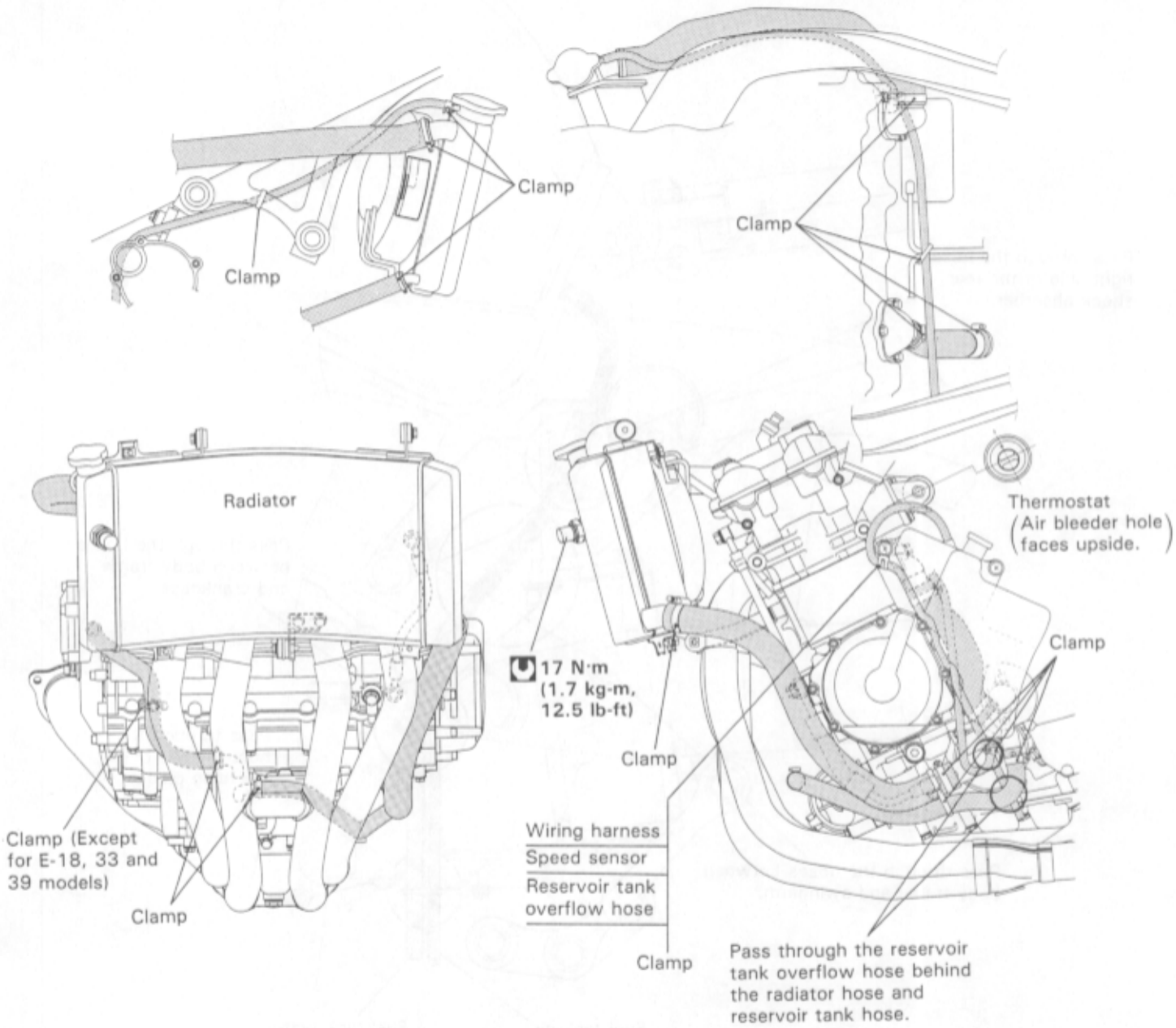


⚠ CAUTION

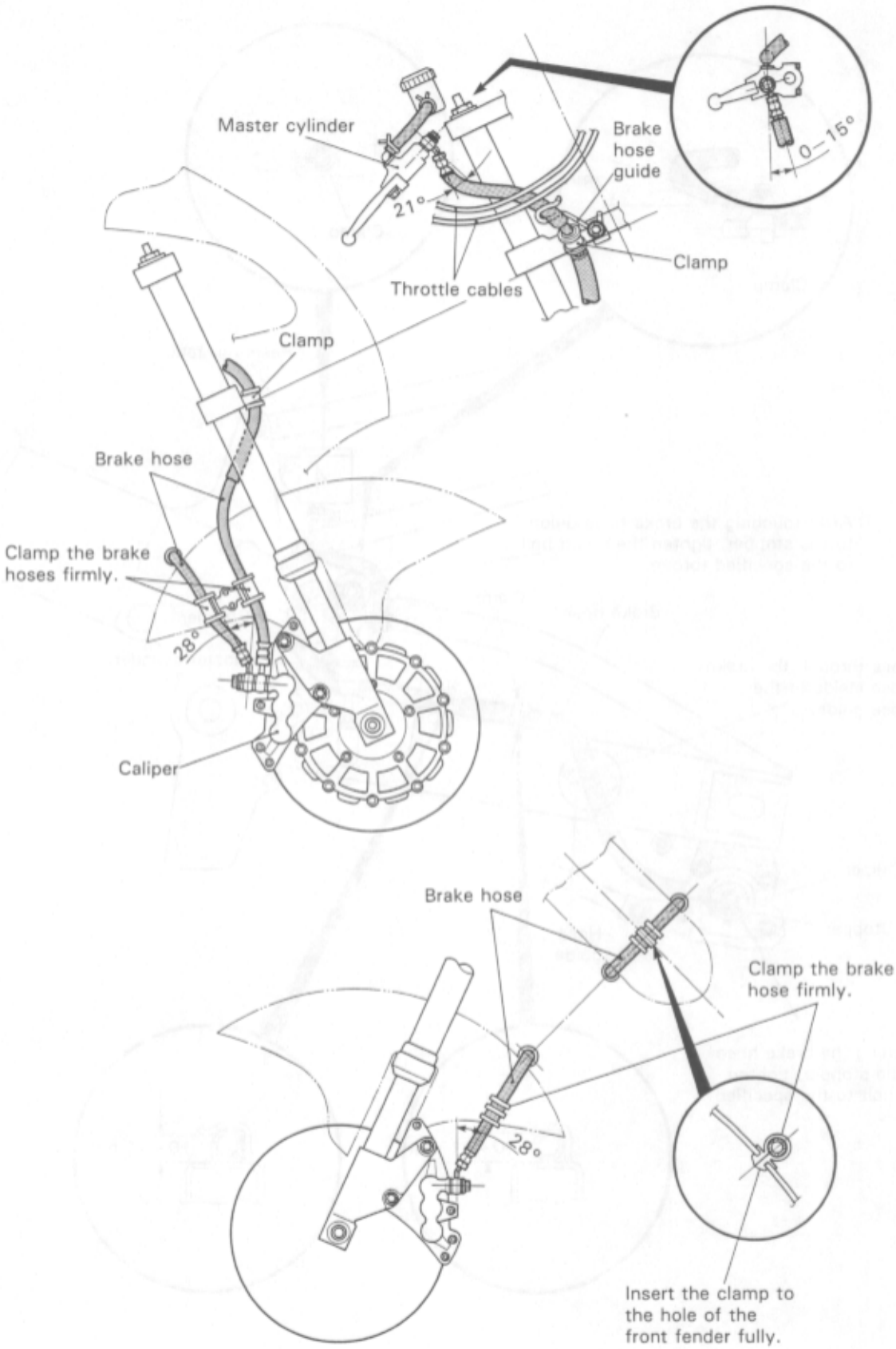
Avoid bending the fuel tank air breather hose to prevent the stoppage of fuel flow.



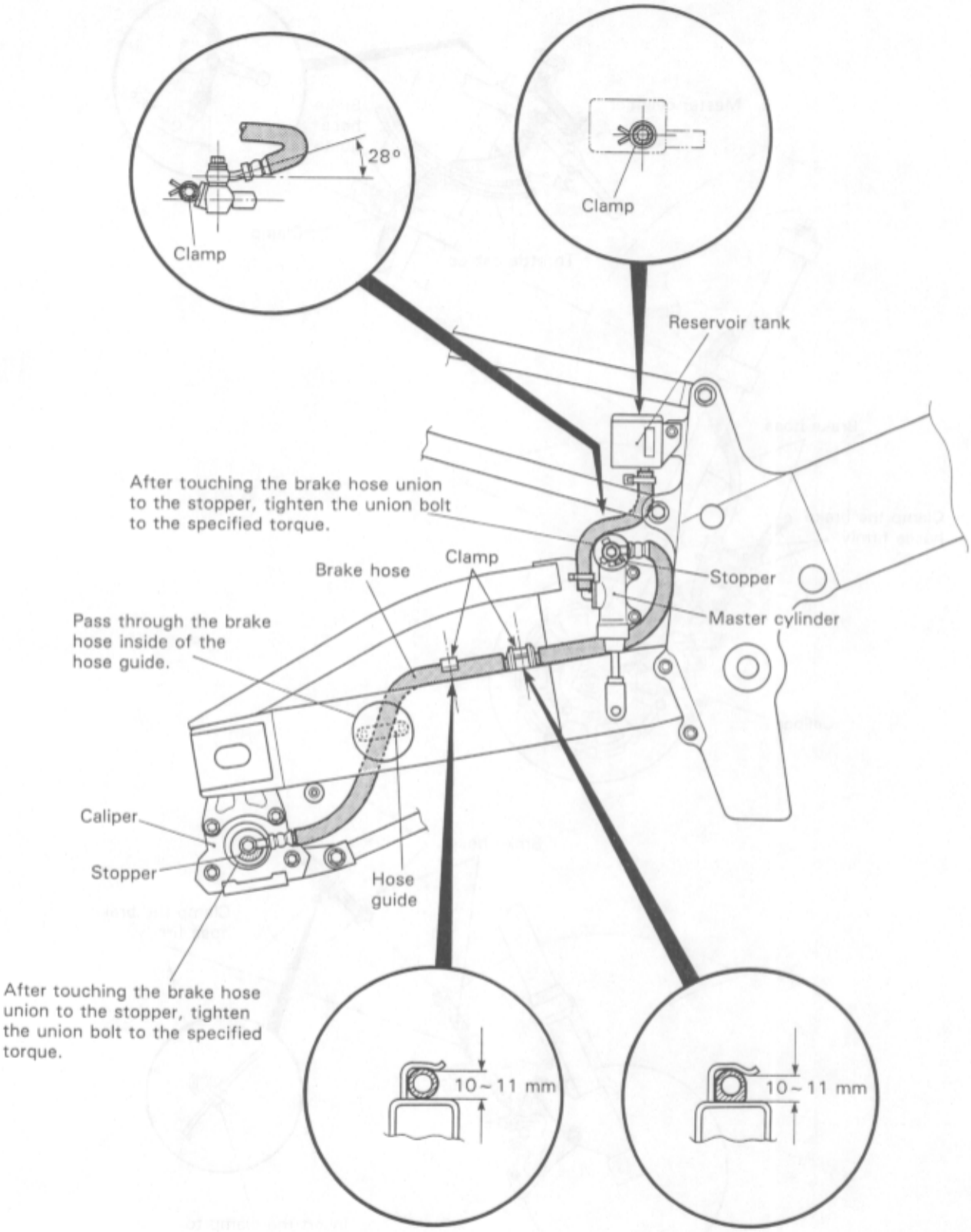
COOLING SYSTEM HOSE ROUTING



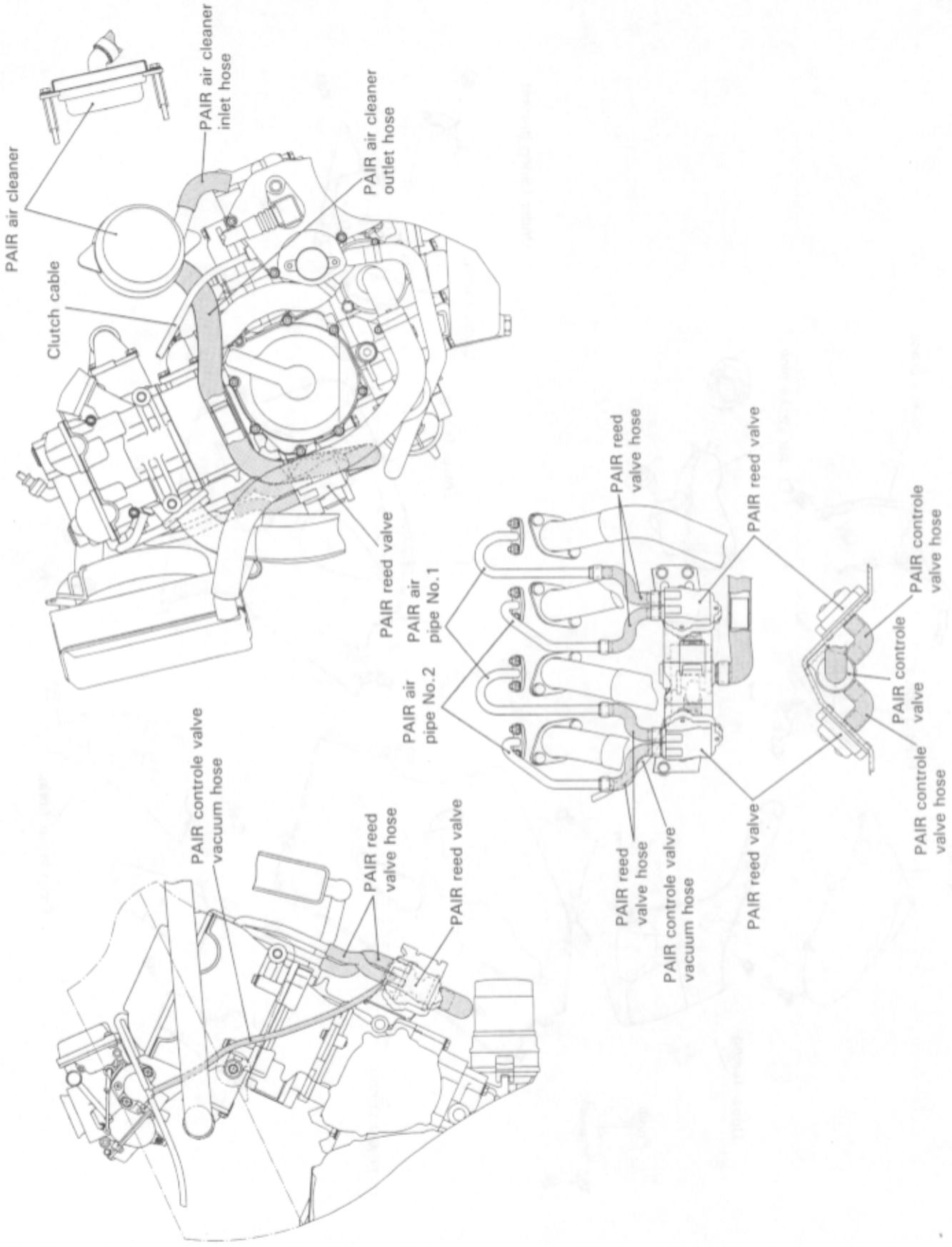
FRONT BRAKE HOSE ROUTING



REAR BRAKE HOSE ROUTING

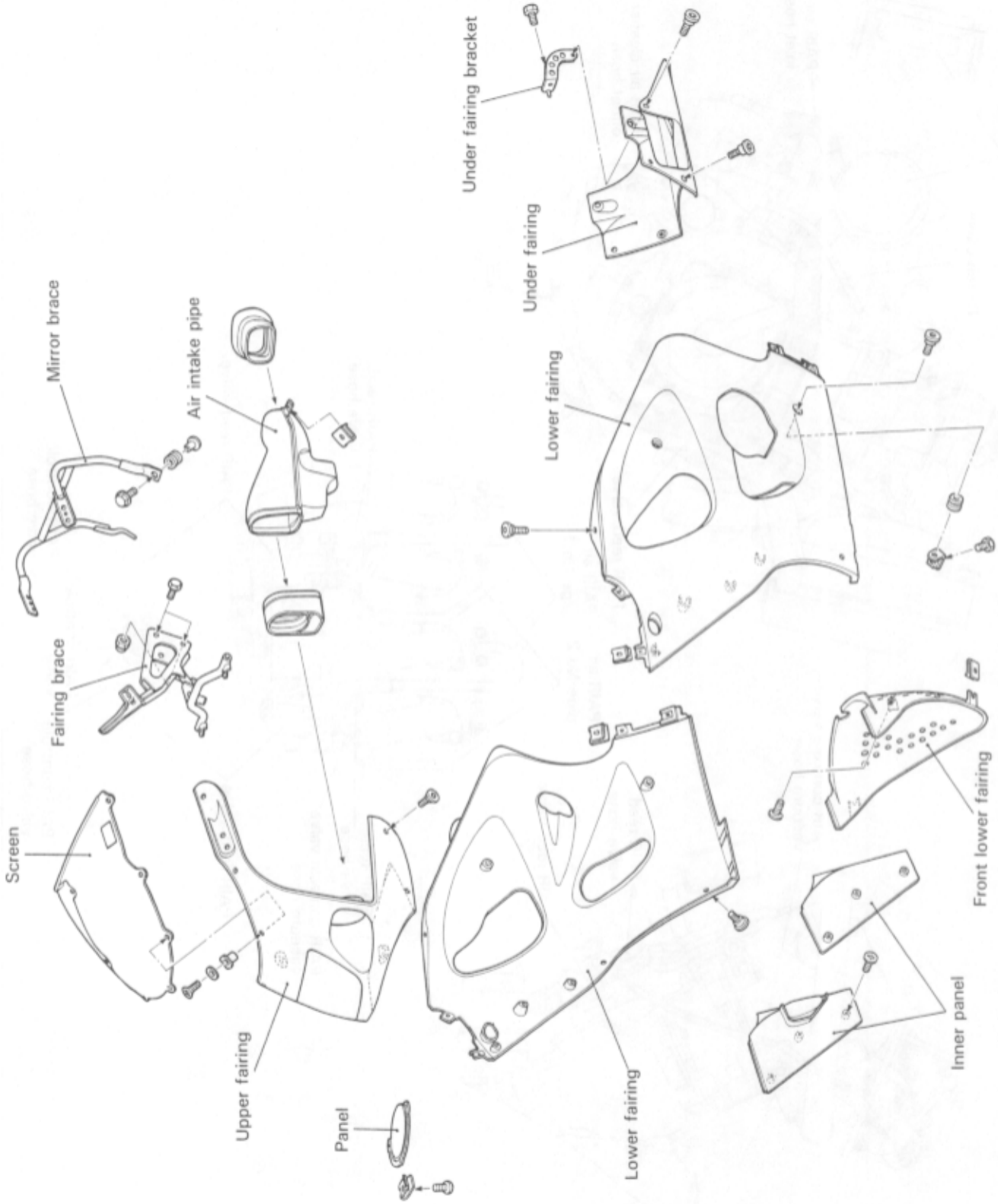


PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING (FOR CALIFORNIA model)

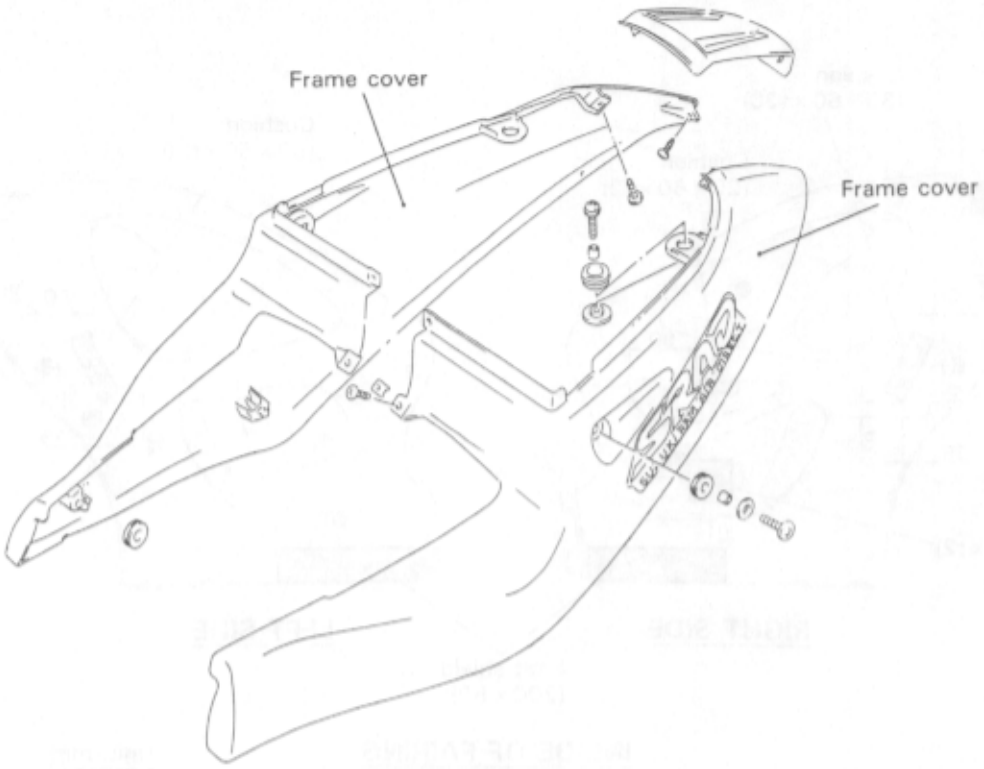


FAIRING AND FRAME COVER SET UP

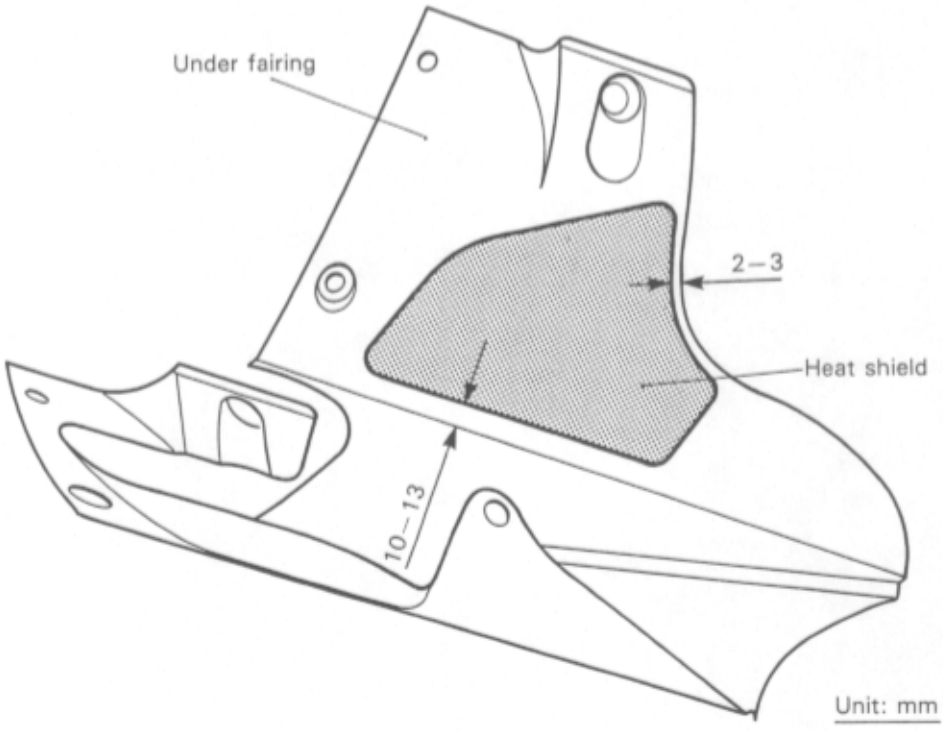
FAIRING SET UP



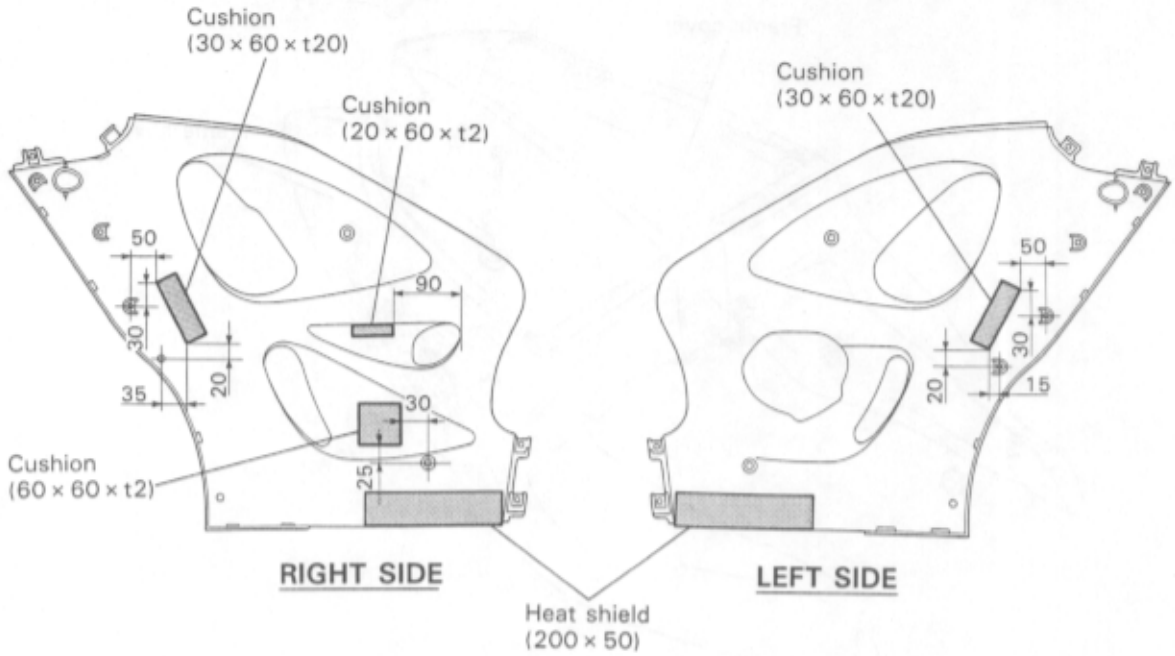
FRAME COVER SET UP



UNDER FAIRING HEAT SHIELD



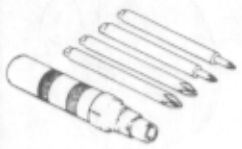
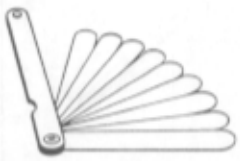
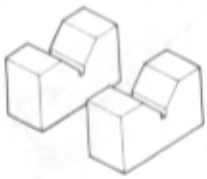
LOWER FAIRING CUSHION AND HEAT SHIELD

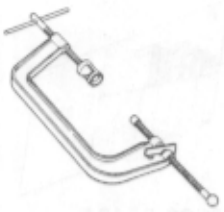
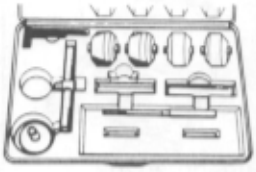
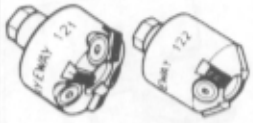


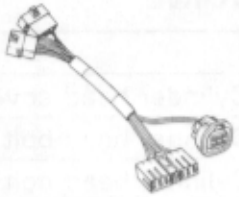
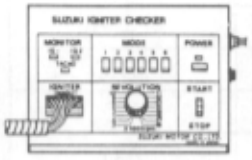
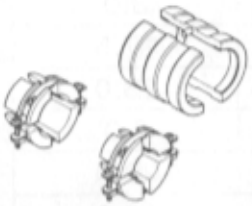
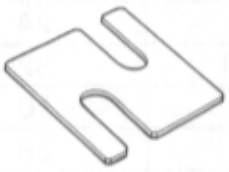
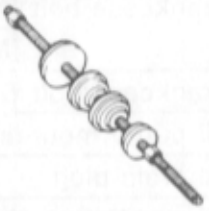
INSIDE OF FAIRING

Unit: mm

SPECIAL TOOLS

 09900-00401 "L" type hexagon wrench set	 09900-00410 Hexagon wrench set	 09900-06107 Snap ring pliers	 09900-06108 Snap ring pliers	 09900-09004 Impact driver set
 09900-20102 Vernier calipers (1/20 mm, 200 mm)	 09900-20202 Micrometer (1/100 mm, 25—50 mm)	 09900-20203 Micrometer (1/100 mm, 50—75 mm)	 09900-20205 Micrometer (1/1000 mm, 0—25 mm)	 09900-20508 Cylinder gauge set (1/100 mm, 40—80 mm)
 09900-20602 Dial gauge (1/1000 mm, 1 mm)	 09900-20605 Dial calipers (1/100 mm, 10—34 mm)	 09900-20606 Dial gauge (1/100 mm, 10 mm)	 09900-20701 Magnetic stand	 09900-20803 Thickness gauge
 09900-20805 Tire depth gauge	 09900-21304 V-block set (100 mm)	 09900-22301 Plastigauge	 09900-22401 Small bore gauge (10—18 mm)	 09900-25002 Pocket tester
 09900-25008 Multi circuit tester set	 09900-28108 Electro tester	 09911-73730 "T" type hexagon wrench (5 mm)	 09911-74520 Long socket (12 mm)	 09913-10760 Fuel level gauge
 09913-13121 Carburetor balancer	 09913-50121 Oil seal remover	 09913-75520 Bearing installer	 09913-75821 Bearing installer	 09914-24510 T-handle

 09915-40610 Oil filter wrench	 09915-64510 Compression gauge 09913-10750 (Adaptor)	 09915-74510 Oil pressure gauge 09915-77330 (for high pressure meter)	 09915-74540 Oil pressure gauge adaptor	 09916-14510 Valve lifter
 09916-14521 Valve lifter attachment	 09916-20640 Solid pilot (N-100-4.5)	 09916-21110 Valve seat cutter set	 See page 3A-11. Valve seat cutter head (N-111, 116, 120, 121, 122,126)	 09916-33210 Valve guide reamer (4.5 mm)
 09916-34542 Valve guide reamer handle	 09916-34580 Valve guide reamer (10.8 mm)	 09916-43210 Valve guide remover/ installer	 09916-53330 Attachment	 09916-74521 Piston ring compressor body
 09916-74540 Piston ring compressor band (63—75 mm)	 09916-84511 Tweezers	 09917-47910 Vacuum pump gauge	 09920-34820 Clutch pressure plate holder	 09920-34830 Starter clutch holder
 09921-20200 Bearing remover	 09921-20210 Bearing remover	 09922-22711 Drive chain cutting and joining tool	 09923-73210 Bearing puller (17—20 mm)	 09923-74510 Bearing puller (20—35 mm)
 09924-84510 Bearing installer set	 09925-18010 Steering bearing installer	 09930-10121 Spark plug socket wrench set	 09930-11920 Torx bit	 09930-11940 Bit holder

 09930-14530 Universal joint	 09930-30102 Sliding shaft	 09930-30450 Generator remover	 09930-44530 Generator rotor holder	 09931-61750 Lead wire "MODE 1-A4"
 09931-94490 Ignitor checker (Digital type)	 09940-14911 09940-14960 Steering stem nut wrench and socket	 09940-14970 Swingarm pivot thrust adjster socket wrench	 09940-14980 Engine mounting thrust adjuster socket wrench	 09940-52841 Front fork inner rod holder
 09940-52861 Front fork oil seal installer	 09940-92720 Spring scale	 00940-94921 Stopper plate	 09940-94930 Front fork spacer holder	 09941-34513 Steering outer race installer
 09941-64511 Bearing remover	 09943-74111 Front fork oil level gauge	 09943-88211 Bearing installer		

NOTE:
When ordering the special tool, please confirm whether it is available or not.

TIGHTENING TORQUE

ENGINE

ITEM	N·m	kg-m	lb-ft
Cylinder head cover bolt	14	1.4	10.0
Cylinder head bolt [M: 10]	43	4.3	31.0
Cylinder head bolt [M: 6]	10	1.0	7.0
Cylinder base nut	10	1.0	7.0
Camshaft journal holder bolt	10	1.0	7.0
Top cam chain guide mounting bolt	10	1.0	7.0
Oil hose union bolt [Upper side]	20	2.0	14.5
Oil hose union bolt [Lower side]	25	2.5	18.0
Cam chain tensioner mounting bolt	10	1.0	7.0
Cam chain tension adjuster bolt	10	1.0	7.0
Conrod bearing cap bolt	67	6.7	48.5
Starter clutch bolt	54	5.4	39.0
Crankcase bolt [M: 6]	11	1.1	8.0
[M: 8]	24	2.4	17.5
Crankcase bolt & Crankshaft bolt [M: 9]	32	3.2	23.0
Oil pump mounting bolt	10	1.0	7.0
Oil drain plug	28	2.8	20.0
Oil pan bolt	14	1.4	10.0
Gearshift cam stopper bolt	10	1.0	7.0
Gearshift cam stopper plate bolt	10	1.0	7.0
Gearshift arm stopper bolt	19	1.9	13.5
Clutch sleeve hub nut	150	15.0	108.5
Exhaust pipe bolt	23	2.3	16.5
Muffler mounting bolt	23	2.3	16.5
Engine sprocket nut	120	12.0	87.0
Speedometer sensor rotor bolt	13	1.3	9.5
Engine mounting bolt [L: 45, 55, 185 and 200]	79	7.9	57.0
Engine mounting thrust adjuster	10	1.0	7.0
Engine mounting thrust adjuster lock nut	45	4.5	32.5
Engine mounting pinch bolt [L: 30]	23	2.3	16.5
Generator rotor bolt	120	12.0	87.0
Oil cooler union bolt	73	7.3	53.0
Oil pressure regulator	28	2.8	20.0
Oil pressure switch	14	1.4	10.0
Oil gallery plug [M: 16]	40	4.0	29.0
[M: 14]	28	2.8	20.0
Starter clutch cover cap	11	1.1	8.0
Valve timing inspection cap	23	2.3	16.5
Cooling fan thermo-switch	17	1.7	12.5
Engine coolant temperature gauge	9	0.9	6.5

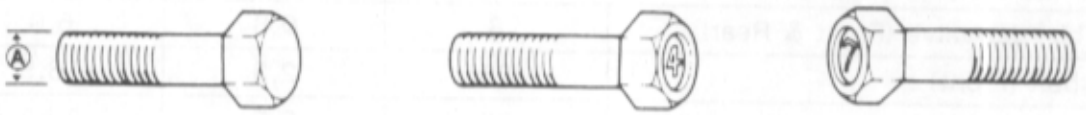
CHASSIS

Item	N·m	kg-m	lb-ft
Steering stem head nut	90	9.0	65.0
Steering stem lock nut	80	8.0	58.0
Front fork upper clamp bolt	23	2.3	16.5
Front fork lower clamp bolt	23	2.3	16.5
Front fork cap bolt	35	3.5	25.5
Front axle	100	10.0	72.5
Front axle pinch bolt	23	2.3	16.5
Handlebar set bolt	10	1.0	7.0
Handlebar clamp bolt	23	2.3	16.5
Front brake master cylinder mounting bolt	10	1.0	7.0
Front brake caliper mounting bolt	39	3.9	28.0
Front brake caliper housing bolt	23	2.3	16.5
Brake hose union bolt (Front & Rear)	23	2.3	16.5
Caliper air bleeder valve (Front & Rear)	8	0.8	6.0
Brake disc bolt (Front)	23	2.3	16.5
Brake disc bolt (Rear)	35	3.5	25.5
Rear brake caliper mounting bolt	26	2.6	19.0
Rear brake caliper housing bolt	33	3.3	24.0
Rear brake master cylinder mounting bolt	10	1.0	7.0
Rear brake master cylinder rod lock nut	18	1.8	13.0
Front footrest bracket mounting bolt	39	3.9	28.0
Swingarm pivot nut	100	10.0	72.5
Swingarm pivot lock nut	90	9.0	65.0
Torque link bolt and nut (front)	28	2.8	20.0
Torque link bolt and nut (Rear)	35	3.5	25.5
Rear suspension height adjuster nut	85	8.5	61.5
Rear shock absorber mounting bolt/nut (Upper & Lower)	50	5.0	36.0
Rear cushion lever/rod mounting nut	78	7.8	56.5
Rear axle nut	100	10.0	72.5
Rear sprocket nut	60	6.0	43.5

TIGHTENING TORQUE CHART

For other bolts and nuts listed previously, refer to this chart:

Bolt Diameter Ⓐ (mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
4	1.5	0.15	1.0	2	0.2	1.5
5	3	0.3	2.0	5	0.5	3.5
6	6	0.6	4.5	10	1.0	7.0
8	13	1.3	9.5	23	2.3	16.5
10	29	2.9	21.0	50	5.0	36.0
12	45	4.5	32.5	85	8.5	61.5
14	65	6.5	47.0	135	13.5	97.5
16	105	10.5	76.0	210	21.0	152.0
18	160	16.0	115.5	240	24.0	173.5



Conventional bolt "4" marked bolt "7" marked bolt

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	29 (1.14)	—
	EX.	24 (0.94)	—
Tappet clearance (when cold)	IN.	0.10–0.20 (0.004–0.008)	—
	EX.	0.20–0.30 (0.008–0.012)	—
Valve guide to valve stem clearance	IN.	0.010–0.037 (0.0004–0.0015)	—
	EX.	0.030–0.057 (0.0012–0.0022)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	4.500–4.512 (0.1772–0.1776)	—
Valve stem O.D.	IN.	4.475–4.490 (0.1762–0.1768)	—
	EX.	4.455–4.470 (0.1754–0.1760)	—
Valve stem 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.)	INNER	—	36.80 (1.45)
	OUTER	—	38.60 (1.52)
Valve spring tension (IN. & EX.)	INNER	4.5 kg (9.9 lbs) at length 29.9 mm (1.18 in)	—
	OUTER	15.5 kg (34.17 lbs) at length 33.4 mm (1.31 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	IN.	E-04, 18,33	33.992–34.048 (1.3383–1.3405)	33.70 (1.327)
		Others	36.502–36.558 (1.4371–1.4393)	36.21 (1.426)
	EX.	E-04,18,33 and others	35.692–35.748 (1.4052–1.4074)	35.40 (1.394)
Camshaft journal oil clearance	IN. & EX.	0.032–0.066 (0.0013–0.0026)		0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	24.012–24.025 (0.9454–0.9459)		—
Camshaft journal O.D.	IN. & EX.	23.959–23.980 (0.9433–0.9441)		—
Camshaft runout	IN. & EX	—		0.10 (0.004)
Cam chain pin (at arrow "3")	15th pin			—
Cylinder head distortion	—			0.20 (0.008)

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	1 100–1 500 kPa (11–15 kg/cm², 156–213 psi)		900 kPa (9 kg/cm², 128 psi)
Compression pressure difference	—		200 kPa (2 kg/cm², 28 psi)
Piston to cylinder clearance	0.040–0.050 (0.0016–0.0020)		—
Cylinder bore	72.000–72.015 (2.8346–2.8352)		Nicks or Scratches
Piston diam.	71.955–71.970 (2.8329–2.8335) Measure at 15 mm (0.6 in) from the skirt end.		71.880 (2.8299)
Cylinder distortion	—		0.20 (0.008)
Piston ring free end gap	1st	Approx. 6.9 (0.27)	5.5 (0.22)
	2nd	Approx. 8.7 (0.34)	6.9 (0.27)
Piston ring end gap	1st	0.10–0.25 (0.004–0.010)	0.5 (0.02)
	2nd	0.10–0.25 (0.004–0.010)	0.5 (0.02)
Piston ring to groove clearance	1st	—	0.18 (0.007)
	2nd	—	0.18 (0.007)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.01–1.03 (0.040–0.041)	—
	2nd	0.81–0.83 (0.032–0.033)	—
	Oil	1.51–1.53 (0.059–0.060)	—
Piston ring thickness	1st	0.97–0.99 (0.038–0.039)	—
	2nd	0.77–0.79 (0.030–0.031)	—
Piston pin bore	16.002–16.008 (0.6210–0.6302)		16.030 (0.6311)
Piston pin O.D.	15.995–16.000 (0.6297–0.6299)		15.980 (0.6291)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD		LIMIT
Conrod small end I.D.	16.010–16.018 (0.6303–0.6306)		16.040 (0.6315)
Conrod big end side clearance	0.10–0.20 (0.004–0.008)		0.30 (0.010)
Conrod big end width	20.95–21.00 (0.825–0.827)		—
Crank pin width	21.10–21.15 (0.831–0.833)		—
Conrod big end oil clearance	0.032–0.056 (0.0013–0.0022)		0.080 (0.0031)
Crank pin O.D.	33.976–34.000 (1.3376–1.3386)		—
Crankshaft journal oil clearance	0.020–0.044 (0.0008–0.0017)		0.080 (0.0031)
Crankshaft journal O.D.	33.976–34.000 (1.3376–1.3386)		—
Crankshaft thrust clearance	0.055–0.110 (0.0022–0.0043)		—
Crankshaft thrust bearing thickness	Right side	2.425–2.450 (0.0955–0.0965)	—
	Left side	2.350–2.500 (0.0925–0.0984)	—
Crankshaft runout	—		0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.911 (72/41 x 37/34)	—
Oil pressure (at 60°C, 140°F)	Above 200 kPa (2.0 kg/cm², 28 psi) Below 500 kPa (5.0 kg/cm², 71 psi) at 3 000 r/min.	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch lever play	3—13 (0.12—0.51)	—
Drive plate thickness	2.92—3.08 (0.115—0.121)	—
Drive plate claw width	—	13.0 (0.51)
Clutch release screw	1-¼ turns back	—
Driven plate distortion	—	0.10 (0.004)
Clutch spring free height	—	2.9 (0.11)

THERMOSTAT + RADIATOR + FAN

ITEM		STANDARD	LIMIT
Thermostat valve opening temperature		74.5—78.5°C (166.1—173.3°F)	—
Thermostat valve lift		Over 7 mm (0.28 in) at 90°C (194°F)	—
Radiator cap valve opening pressure		110 kPa (1.1 kg/cm², 15.6 psi)	—
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 105°C (221°F)	—
	ON→OFF	Approx. 100°C (212°F)	—
Engine coolant temperature gauge resistance	50°C (122°F)	Approx. 9.56 kΩ	—
	100°C (212°F)	Approx. 2.78 kΩ	—
	120°C (248°F)	Approx. 0.69 kΩ	—
	130°C (266°F)	Approx. 0.50 kΩ	—

TRANSMISSION + DRIVE CHAIN

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Primary reduction ratio		1.756 (72/41)	—
Final reduction ratio		2.687 (43/16)	—
Gear ratios	Low	2.866 (43/15)	—
	2nd	2.058 (35/17)	—
	3rd	1.650 (33/20)	—
	4th	1.428 (30/21)	—
	5th	1.260 (29/23)	—
	Top	1.120 (28/25)	—
Shift fork to groove clearance		0.1—0.3 (0.004—0.012)	0.50 (0.020)
Shift fork groove width		5.0—5.1 (0.197—0.201)	—
Shift fork thickness		4.8—4.9 (0.189—0.193)	—

ITEM	STANDARD		LIMIT
Drive chain	Type	RK50MFOZ1	———
	Links	108 links, ENDLESS	———
	20-pitch length	———	319.4 (12.6)
Drive chain slack	20—30 (0.8—1.2)		———
Gearshift lever height	55 (22)		———

CARBURETOR

ITEM	SPECIFICATION		
	E-02,04,21, 25,28,34,53	E-03,18,24	E-22
Carburetor type	BDSR39	←	←
Bore size	39 mm	←	←
I.D. No.	33E0	33E1	33E4
Idle r/min.	1 200 ± 100 r/min	1 200 ± 100 r/min ... E-03,24 1 200 $^{+100}_{-50}$ r/min ... E-18	1 200 ± 100 r/min
Float height	7.0 ± 1.0 mm (0.28 ± 0.04 in)	←	←
Main jet (M.J.)	Nos.1&4: #127.5 Nos.2&3: #125	Nos.1&4: #127.5 Nos.2&3: #125	Nos.1&4: #127.5 Nos.2&3: #125
Jet needle (J.N.)	6E38-54-3	6E41-55	6E38-54-3
Needle jet (N.J.)	P-0	P-0M	P-0
Throttle valve (Th.V.)	#100	#105	#100
Pilot jet (P.J.)	#12.5	#12.5	#12.5
Pilot screw (P.S.)	PRE-SET (2 turns back)	PRE-SET	PRE-SET (2-1/8 turns back)
Throttle cable play	0.5—1.0 mm (0.02—0.04 in)	←	←

CARBURETOR

ITEM	SPECIFICATION		
	E-33	E-37	E-39
Carburetor type	BDSR39	←	←
Bore size	39 mm	←	←
I.D. No.	33E7	33E8	33E9
Idle r/min.	1 200 ± 100 r/min.	←	←
Float height	7.0 ± 1.0 mm (0.28 ± 0.04 in)	←	←
Main jet (M.J.)	Nos.1&4: #127.5 Nos.2&3: #125	Nos.1&4: #127.5 Nos.2&3: #125	←
Jet needle (J.N.)	6E39-55	6E38-54-3	6E41-55
Needle jet (N.J.)	P-0M	P-0	P-0M
Throttle valve (Th.V.)	#105	#100	#105
Pilot jet (P.J.)	#12.5	#12.5	←

ITEM	SPECIFICATION		
	E-33	E-37	E-39
Pilot screw (P.S.)	PRE-SET	PRE-SET (2 turns back)	PRE-SET (Nos.1&4: 4 turns back, Nos.2&3: 3-3/8 turns back)
Throttle cable play	0.5–1.0 mm (0.02–0.04 in)	←	←

ELECTRICAL

Unit: mm (in)

ITEM			SPCIFICATION	NOTE
Ignition timing			4° B.T.D.C. at 1 500 r/min.	
Firing order			1·2·4·3	
Spark plug		Type	NGK: CR9E ND: U27ESR-N	
		Gap	0.7–0.8 (0.028–0.032)	
Spark performance			Over 8 (0.3) at 1 atm.	
Signal coil resistance			Approx. 50–200 Ω (B–G)	Tester range: (x 100 Ω)
Ignition coil resistance		Primary	2.3–3.3 Ω (⊕ tap– ⊖ tap)	Tester range: (x 1 Ω)
		Secondary	30–40 kΩ (Plug cap–Plug cap)	Tester range: (x 1 kΩ)
Generator coil resistance			Approx 0.3 Ω (B–B)	Tester range: (x 1 Ω)
Generator no-load voltage (When engine is cold)			Move than 55 V (AC) at 5 000 r/min.	
Regulated voltage			13.5–15.0 V at 5 000 r/min.	
Starter relay resistance			3–5 Ω	
Battery	Type designation		FTX9-BS	
	Capacity		12 V 28.8 kC (8 Ah)/10 HR	
	Standard electrolyte S.G.		1.320 at 20°C (68°F)	
Fuse size	Headlight	HI	15 A	
		LO	15 A	
	Turn signal		15 A	
	Ignition		10 A	
	Taillight		10 A	
	Main		30 A	

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03,24,28,33	E-04,18,21,22,25, 34,37,39,53	E-02
Headlight	HI	55 x 2	55	55 x 2
	LO	50 x 2	55	50 x 2
Position light			5	←
Tail/Brake light		5/21 x 2	←	←
Turn signal light		21	←	←
Tachometer light		1.7	←	←
Speedometer light		1.7	←	←
Turn signal indicator light		1.7	←	←
High beam indicator light		1.7	←	←
Neutral indicator light		1.7	←	←
Fuel indicator right		1.7	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD		LIMIT
Rear brake pedal height			55 (2.2)	———
Brake disc thickness		Front	4.5±0.2 (0.117±0.008)	4.0 (0.16)
		Rear	5.0±0.2 (0.197±0.008)	4.5 (0.18)
Brake disc runout (Front & Rear)			———	0.30 (0.012)
Master cylinder bore		Front	15.870–15.913 (0.6248–0.6265)	———
		Rear	12.700–12.743 (0.5000–0.5017)	———
Master cylinder piston diam.		Front	15.827–15.854 (0.6231–0.6242)	———
		Rear	12.657–12.684 (0.4983–0.4994)	———
Brake caliper cylinder bore	Leading	Front	24.000–24.076 (0.9449–0.09479)	———
	Trailing		27.000–27.076 (1.0630–1.0660)	———
		Rear	38.180–38.256 (1.5031–1.5061)	———
Brake caliper piston diam.	Leading	Front	23.925–23.975 (0.9419–0.9439)	———
	Trailing		26.920–26.970 (1.0598–1.0618)	———
		Rear	38.098–38.148 (1.4999–1.5019)	———

ITEM	STANDARD		LIMIT
Wheel rim runout (Front & Rear)	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	J17 x MT 3.50	—
	Rear	J17 x MT 6.00	—
Tire size	Front	120/70 ZR17	—
	Rear	190/50 ZR17	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD		LIMIT
Front fork stroke	120 (4.7)		—
Front fork spring free length	—		250 (9.9)
Front fork oil level	105 (4.1)		—
Front fork spring adjuster	4th groove from top		—
Front fork damping force adjuster	Rebound	At punch mark (about 9/8 turns out)	—
	Compression	At punch mark (about 1 turn out)	—
Rear shock absorber gas pressure (N_2 gas)	1 000 kPa (10 kg/cm², 142 psi)		—
Rear shock absorber spring set length	193.9 (7.6)		—
Rear shock absorber damping force adjuster	Rebound	At punch mark (about 1 turn out)	—
	Compression	At punch mark (about 5/6 turn out)	—
Rear wheel travel	133 (5.2)		—
Swingarm pivot shaft runout	—		0.3 (0.01)

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	250	2.50	36	250	2.50	36
REAR	250	2.50	36	250	2.50	36

FUEL + OIL + ENGINE COOLANT

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) 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-03,33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline used should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	18.0 L (4.8/4.0 US/Imp gal)		
Engine oil type	SAE 10W/40, API SE, SF or SG		
Engine oil capacity	Change	2 600 ml (2.7/2.3 US/Imp qt)	
	Filter change	2 800 ml (3.0/2.5 US/Imp qt)	
	Overhaul	3 500 ml (3.7/3.1 US/Imp qt)	
Front fork oil type	Frok oil #10		
Front fork oil capacity (each leg)	480 ml (16.2/16.9 US/Imp oz)		
Brake fluid type	DOT 4		
Engine coolant type	Use an anti-freeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		
Engine coolant including reserve	2 550 ml (2.7/2.2 US/Imp qt)		

EMISSION CONTROL INFORMATION

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EMISSION CONTROL CARBURETOR COMPONENTS

GSX-R750 motorcycles are equipped with precision, manufactured carburetors for emission level control.
These carburetors require special mixture control components and other precision adjustments to function properly.

There are several carburetor mixture control components in each carburetor assembly. Three (3) of these components are machined to much closer tolerances than standard machined carburetor jets. These three (3) particular jets—MAIN JET, NEEDLE JET, PILOT JET—must not be replaced by standard jets. To aid in identifying these three (3) jets a different design of letter and number are used. If replacement of these close tolerance jets becomes necessary, be sure to replace them with the same type close tolerance jets marked as in the examples shown below.

The jet needle is also of special manufacture. Only one clip position is provided on the jet needle. If replacement becomes necessary the jet needle may only be replaced with an equivalent performing replacement component. Suzuki recommends that Genuine Suzuki Parts be utilized whenever possible for the best possible performance and durability.

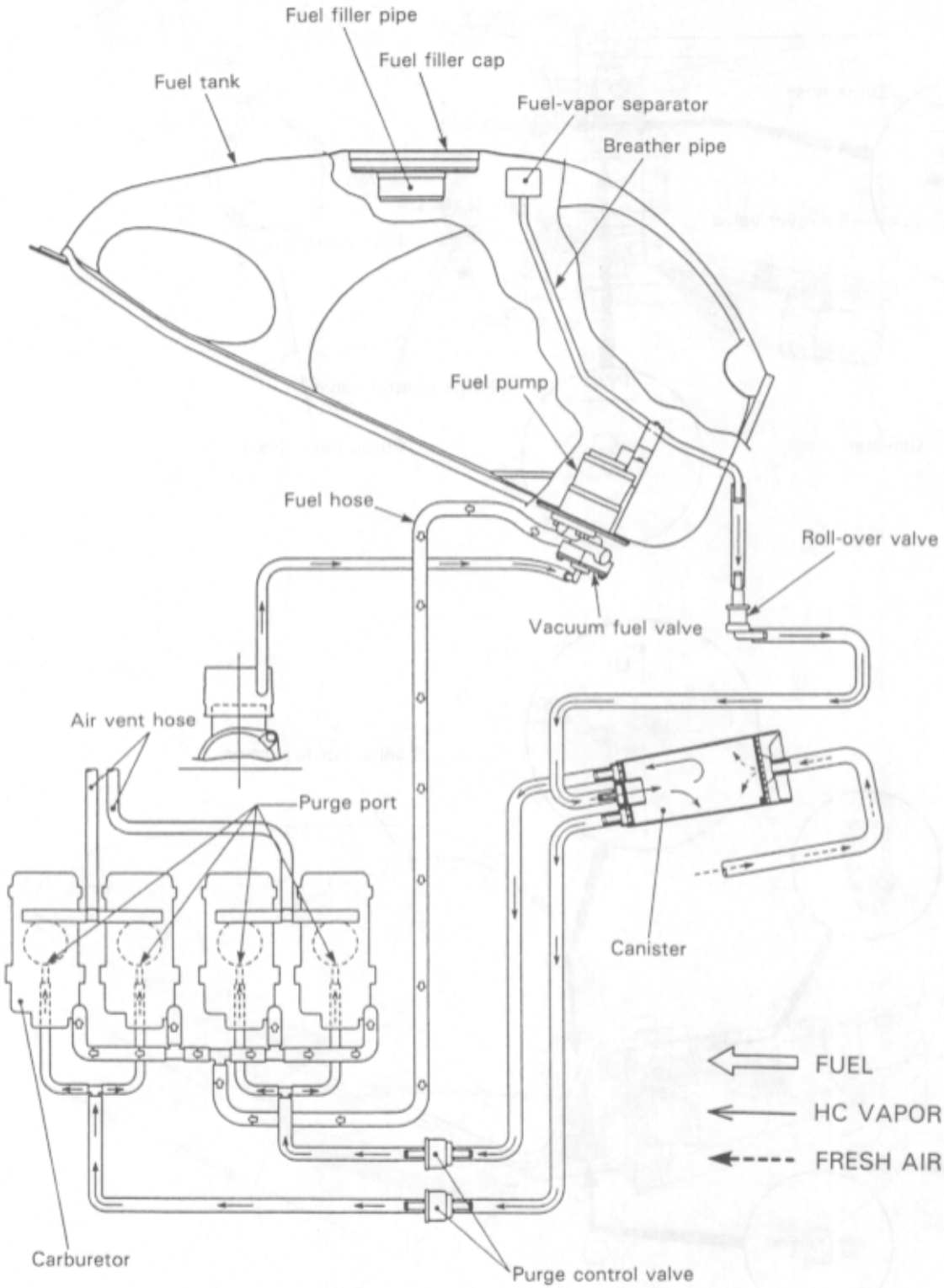
Conventional Figures Used on Standard Tolerance Jet Components	1 2 3 4 5 6 7 8 9 0
Emission Type Figures Used on Close Tolerance Jet Components	1 2 3 4 5 6 7 8 9 0

The carburetor specifications for the emission-controlled GSX-R750 are as follows.

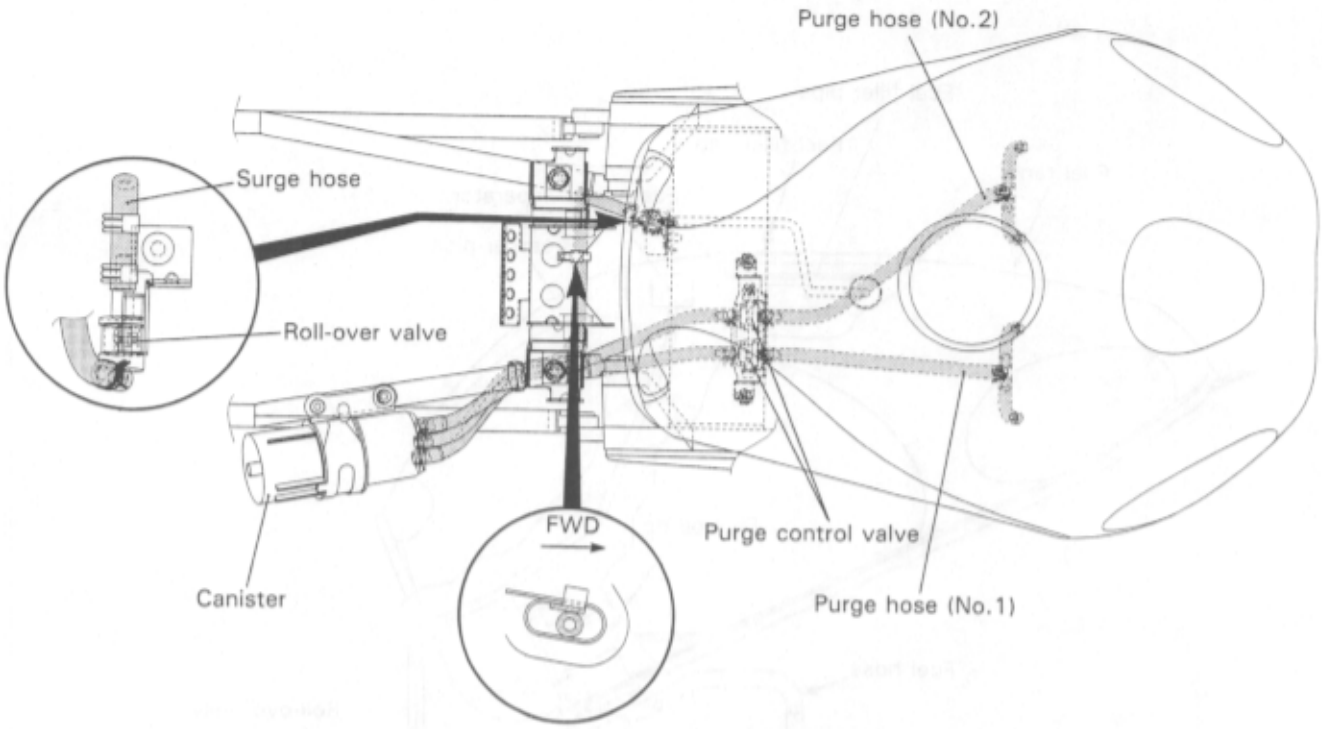
Carburetor I.D. No.	Main Jet	Needle Jet	Jet Needle	Pilot Jet	Pilot Screw
33E7 (California model only)	Nos.1and4: #127.5 Nos.2and3: #125	P-0M	6E39-55	#12.5	PRE-SET DO NOT ADJUST
33E1	Nos.1and4: #127.5 Nos.2and3: #125	P-0M	6E41-55	#12.5	

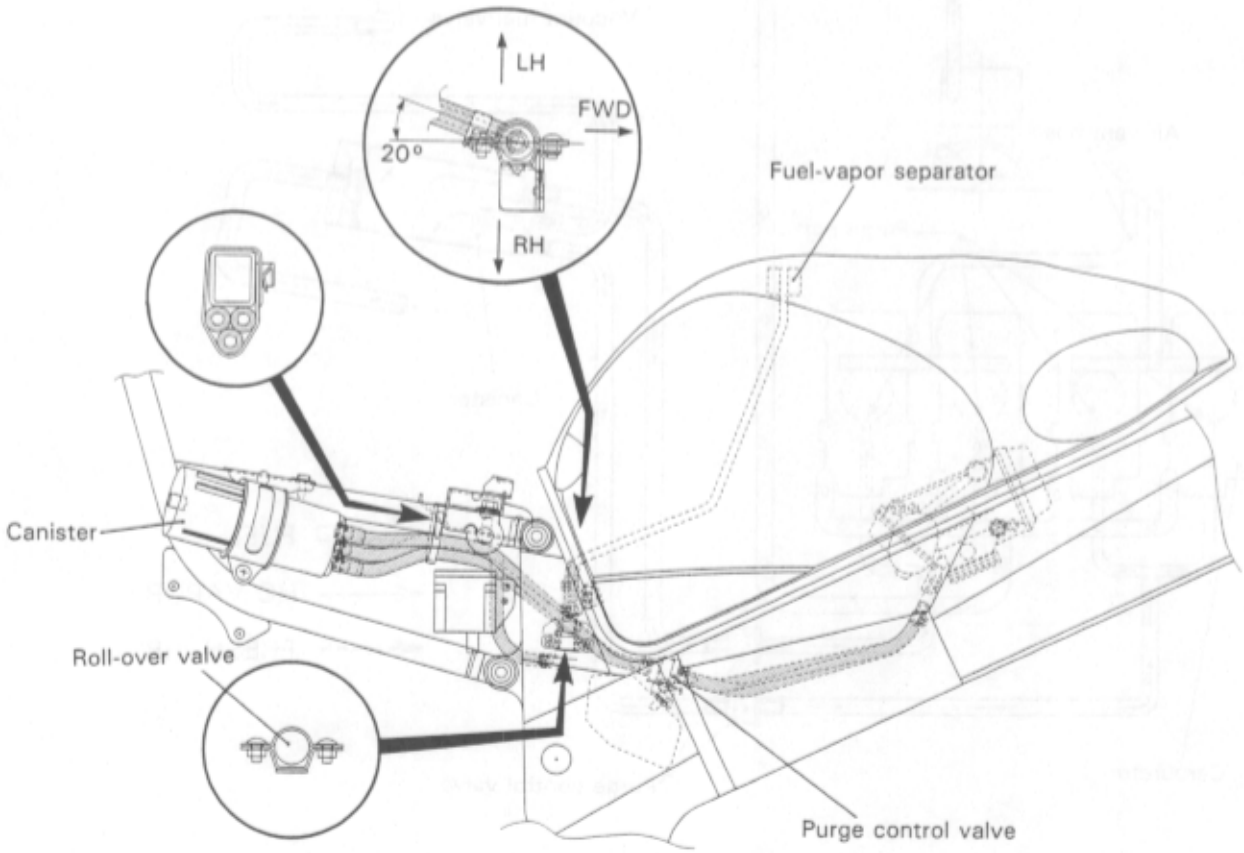
Adjusting, interferring with, improper replacement, or resetting of any of the carburetor components may adversely affect carburetor performance and cause the motorcycle to exceed the exhaust emission level limits. If unable to effect repairs, contact the distributors representative for further technical information and assistance.

EVAPORATIVE EMISSION CONTROL SYSTEM
(California model only)

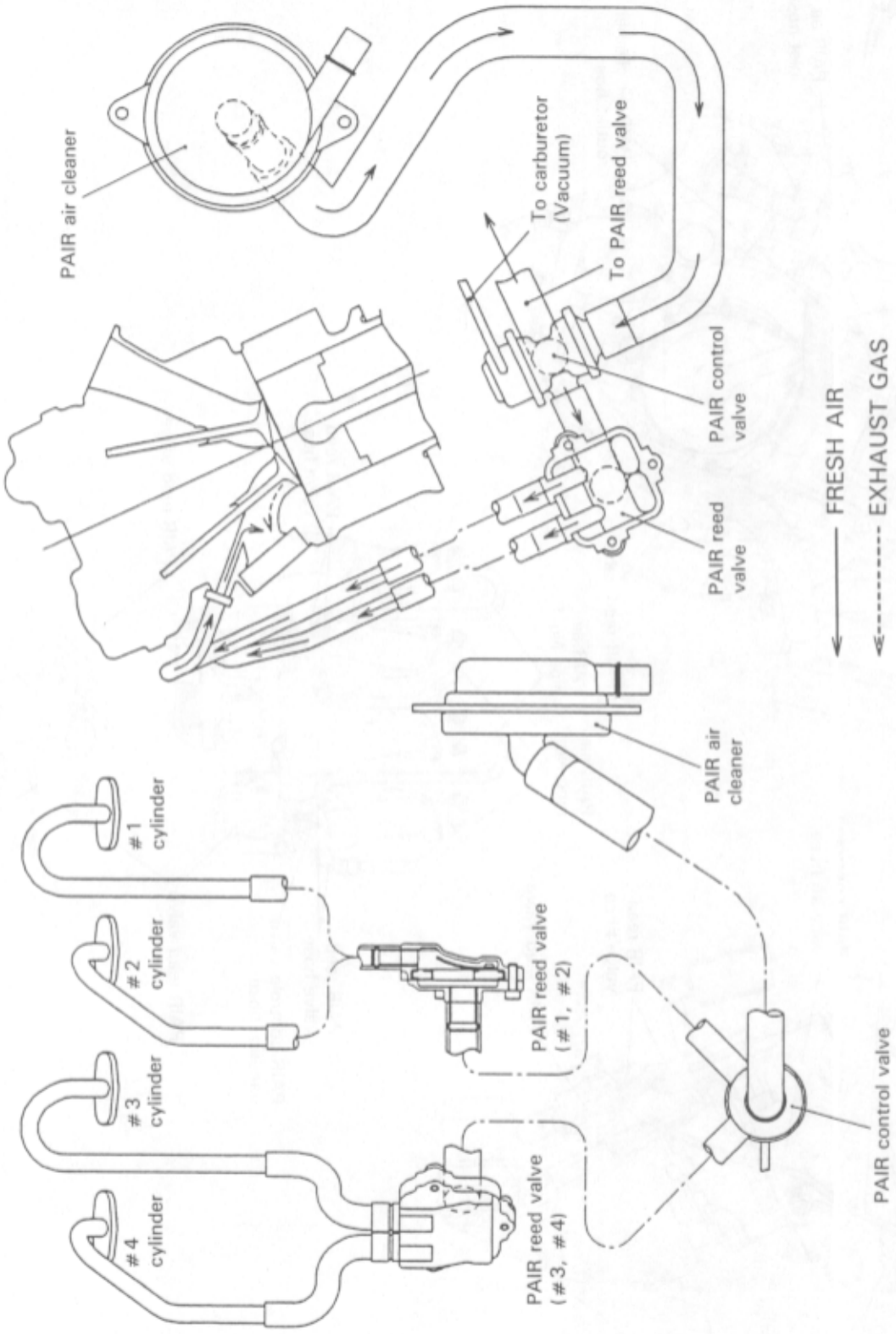


CANISTER HOSE ROUTING (California model only)

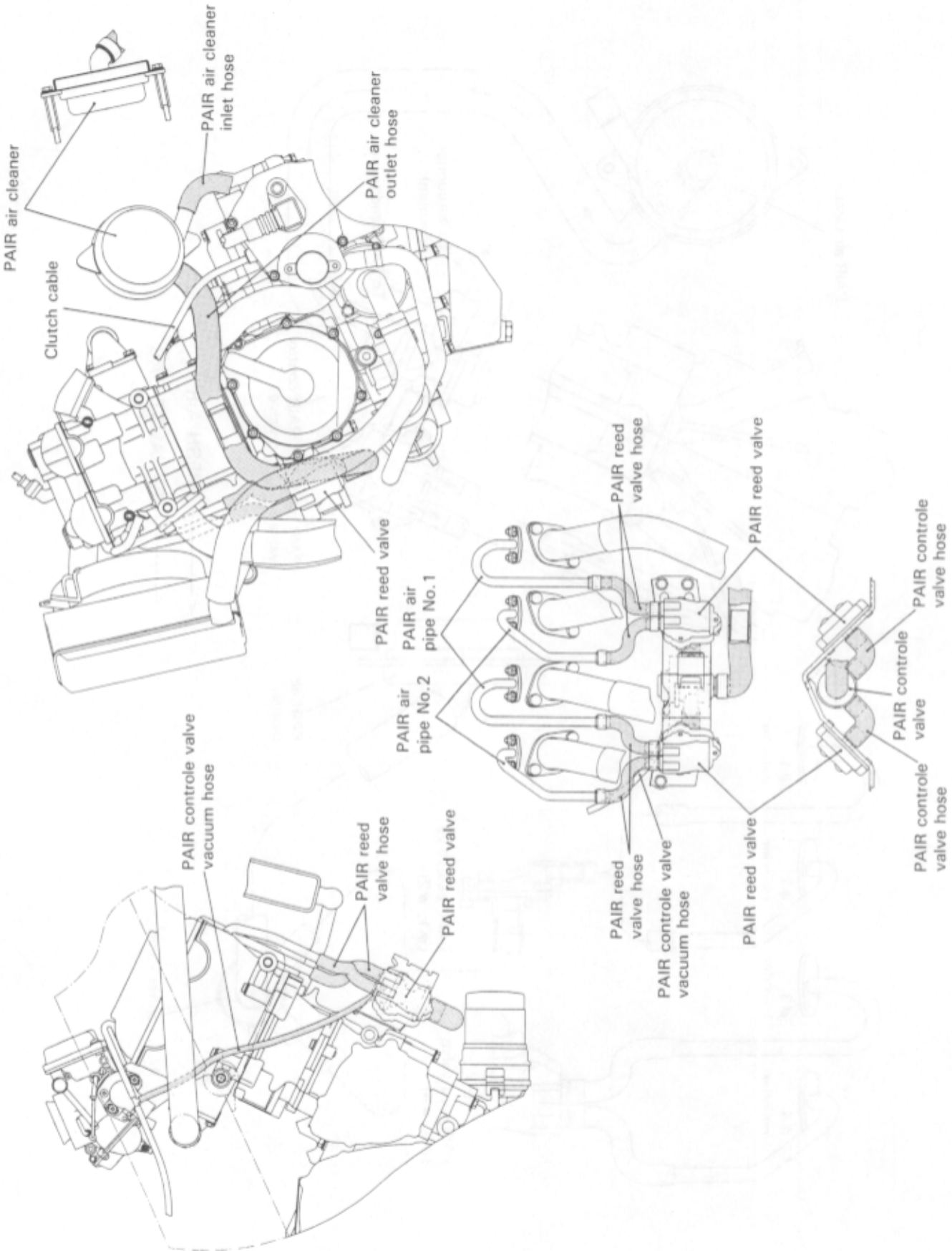




PAIR (AIR SUPPLY) SYSTEM DIAGRAM (California model only)



PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



GSX-R750V ('97-MODEL)

FOREWORD

This chapter describes service data, service specifications and servicing procedures which differ from those of the GSX-R750T ('96-model).

NOTE:
- *Any differences between GSX-R750T ('96-model) and GSX-R750V ('97-model) in specifications and service data are clearly indicated with the asterisk marks (*).*
- *Please refer to the chapters 1 through 9 for details which are not given in this chapter.*

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SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 100 mm (82.7 in)	For E-18,22,24,39 models
	2 055 mm (80.9 in)	For other models
Overall width	720 mm (28.3 in)	
Overall height	1 135 mm (44.7 in)	
Wheelbase	1 400 mm (55.1 in)	
Ground clearance	130 mm (5.1 in)	
Seat height	830 mm (32.7 in)	
Dry mass	180 kg (396 lbs)	For E-18,33,39 models
	179 kg (394 lbs)	For other models

ENGINE

Type	Four-stroke, Liquid-cooled, DOHC, TSCC
Number of cylinders	4
Tappet clearance, IN	0.10—0.20 mm (0.004—0.008 in)
EX	0.20—0.30 mm (0.008—0.012 in)
Bore	72.0 mm (2.834 in)
Stroke	46.0 mm (1.811 in)
Piston displacement	749 cm^3 (45.7 cu. in)
Compression ratio	11.8 : 1
Carburetor	MIKUNI BDSR39
Air cleaner	Non-woven fabric element
Starter system	Electric starter
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	6-speed constant mesh
Gearshift pattern	1-down, 5-up
Primary reduction ratio	1.756 (72/41)
Gear ratios, Low	2.866 (43/15)
2nd	2.058 (35/17)
3rd	1.650 (33/20)
4th	1.428 (30/21)
5th	1.260 (29/23)
Top	1.120 (28/25)
Final reduction ratio	2.687 (43/16)
Drive chain	TAKASAGO RK50MFOZ1, 108 links

CHASSIS

Front suspension	Inverted telescopic, coil spring, oil damped, spring pre-load fully adjustable, rebound and compression damping force fully adjustable.
Rear suspension	Link type system, gas/oil damped, coil spring, spring pre-road fully adjustable, rebound damping force and compression damping force fully adjustable.
Front fork stroke	120 mm (4.7 in)
Rear wheel travel	133 mm (5.2 in)
Steering angle	30° (right & left)
Caster	66°
Trail	96 mm (3.8 in)
Turning radius	3.1 mm (10.2 ft)
Front brake	Disc brake, twin, hydraulically operated
Rear brake	Disc brake, hydraulically operated
Front tire size	120/70 ZR17, tubeless
Rear tire size	190/50 ZR17, tubeless

ELECTRICAL

Ignition type	Electronic ignition (Transistorized)
Ignition timing	4° B.T.D.C. at 1 500 r/min
Spark plug	N.G.K. CR9E, NIPPONDENSO U27ESR-N
Battery	12V 28.8 kC (8 Ah)/10HR
Generator	Three-phase A.C. Generator
Main fuse	30A
Fuse	15/15/10/15/10A
Headlight	12V 55/50W × 2 ..... E-02,03,24,28,33 models 12V 55W + 12V 55W ..... For other models
Turn signal light	12V 21W
Front position light	12V 5W ..... Except for E-03,24,28,33 models
Tail/Brake light	12V 5/21W × 2
Speedometer light	12V 1.7W
Tachometer light	12V 1.7W
Neutral indicator light	12V 1.7W
High beam indicator light	12V 1.7W
Turn signal indicator light	12V 1.7W
Fuel indicator light	12V 1.7W

CAPACITIES

Fuel tank, including reserve	18.0 L (4.8/4.0 US/Imp gal)
Engine oil, oil change	2 600 ml (2.7/2.3 US/Imp qt)
with filter change	2 800 ml (3.0/2.5 US/Imp qt)
overhaul	3 500 ml (3.7/3.1 US/Imp qt)
Coolant	2 550 ml (2.7/2.2 US/Imp qt)

These specifications are subject to change without notice.

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	29 (1.14)	—
	EX.	24 (0.94)	—
Tappet clearance (when cold)	IN.	0.10–0.20 (0.004–0.008)	—
	EX.	0.20–0.30 (0.008–0.012)	—
Valve guide to valve stem clearance	IN.	0.010–0.037 (0.0004–0.0015)	—
	EX.	0.030–0.057 (0.0012–0.0022)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	4.500–4.512 (0.1772–0.1776)	—
Valve stem O.D.	IN.	4.475–4.490 (0.1762–0.1768)	—
	EX.	4.455–4.470 (0.1754–0.1760)	—
Valve stem 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.)	INNER	—	36.80 (1.45)
	OUTER	—	38.60 (1.52)
Valve spring tension (IN. & EX.)	INNER	4.5 kg (9.9 lbs) at length 29.9 mm (1.18 in)	—
	OUTER	15.5 kg (34.17 lbs) at length 33.4 mm (1.31 in)	—

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD			LIMIT
Cam height	IN.	E-04, 18,33	33.992–34.048 (1.3383–1.3405)	33.70 (1.327)
		Others	36.502–36.558 (1.4371–1.4393)	36.21 (1.426)
	EX.	E-04,18,33 and others	35.692–35.748 (1.4052–1.4074)	35.40 (1.394)
Camshaft journal oil clearance	IN. & EX.	0.032–0.066 (0.0013–0.0026)		0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	24.012–24.025 (0.9454–0.9459)		—
Camshaft journal O.D.	IN. & EX.	23.959–23.980 (0.9433–0.9441)		—
Camshaft runout	IN. & EX	—		0.10 (0.004)
Cam chain pin (at arrow "3")	15th pin			—
Cylinder head distortion	—			0.20 (0.008)

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	1 100–1 500 kPa (11–15 kg/cm², 156–213 psi)		900 kPa (9 kg/cm², 128 psi)
Compression pressure difference	—		200 kPa (2 kg/cm², 28 psi)
Piston to cylinder clearance	0.040–0.050 (0.0016–0.0020)		—
Cylinder bore	72.000–72.015 (2.8346–2.8352)		Nicks or Scratches
Piston diam.	71.955–71.970 (2.8329–2.8335) Measure at 15 mm (0.6 in) from the skirt end.		71.880 (2.8299)
Cylinder distortion	—		0.20 (0.008)
Piston ring free end gap	1st	Approx. 6.9 (0.27)	5.5 (0.22)
	2nd	Approx. 8.7 (0.34)	6.9 (0.27)
Piston ring end gap	1st	0.10–0.25 (0.004–0.010)	0.5 (0.02)
	2nd	0.10–0.25 (0.004–0.010)	0.5 (0.02)
Piston ring to groove clearance	1st	—	0.18 (0.007)
	2nd	—	0.18 (0.007)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.01—1.03 (0.040—0.041)	—
	2nd	0.81—0.83 (0.032—0.033)	—
	Oil	1.51—1.53 (0.059—0.060)	—
Piston ring thickness	1st	0.97—0.99 (0.038—0.039)	—
	2nd	0.77—0.79 (0.030—0.031)	—
Piston pin bore	16.002—16.008 (0.6210—0.6302)		16.030 (0.6311)
Piston pin O.D.	15.995—16.000 (0.6297—0.6299)		15.980 (0.6291)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD		LIMIT
Conrod small end I.D.	16.010—16.018 (0.6303—0.6306)		16.040 (0.6315)
Conrod big end side clearance	0.10—0.20 (0.004—0.008)		0.30 (0.010)
Conrod big end width	20.95—21.00 (0.825—0.827)		—
Crank pin width	21.10—21.15 (0.831—0.833)		—
Conrod big end oil clearance	0.032—0.056 (0.0013—0.0022)		0.080 (0.0031)
Crank pin O.D.	33.976—34.000 (1.3376—1.3386)		—
Crankshaft journal oil clearance	0.020—0.044 (0.0008—0.0017)		0.080 (0.0031)
Crankshaft journal O.D.	33.976—34.000 (1.3376—1.3386)		—
Crankshaft thrust clearance	0.055—0.110 (0.0022—0.0043)		—
Crankshaft thrust bearing thickness	Right side	2.425—2.450 (0.0955—0.0965)	—
	Left side	2.350—2.500 (0.0925—0.0984)	—
Crankshaft runout	—		0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.911 (72/41 x 37/34)	—
Oil pressure (at 60°C, 140°F)	Above 200 kPa (2.0 kg/cm², 28 psi) Below 500 kPa (5.0 kg/cm², 71 psi) at 3 000 r/min.	—

CLUTCH

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch lever play	3–13 (0.12–0.51)	—
Drive plate thickness	2.92–3.08 (0.115–0.121)	—
Drive plate claw width	—	13.0 (0.51)
Clutch release screw	*¼ turns back	—
Driven plate distortion	—	0.10 (0.004)
Clutch spring free height	—	2.9 (0.11)

THERMOSTAT + RADIATOR + FAN

ITEM		STANDARD	LIMIT
Thermostat valve opening temperature		74.5–78.5°C (166.1–173.3°F)	—
Thermostat valve lift		Over 7 mm (0.28 in) at 90°C (194°F)	—
Radiator cap valve opening pressure		110 kPa (1.1 kg/cm², 15.6 psi)	—
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 105°C (221°F)	—
	ON→OFF	Approx. 100°C (212°F)	—
Engine coolant temperature gauge resistance	50°C (122°F)	Approx. 9.56 kΩ	—
	100°C (212°F)	Approx. 2.78 kΩ	—
	120°C (248°F)	Approx. 0.69 kΩ	—
	130°C (266°F)	Approx. 0.50 kΩ	—

TRANSMISSION + DRIVE CHAIN

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Primary reduction ratio		1.756 (72/41)	—
Final reduction ratio		2.687 (43/16)	—
Gear ratios	Low	2.866 (43/15)	—
	2nd	2.058 (35/17)	—
	3rd	1.650 (33/20)	—
	4th	1.428 (30/21)	—
	5th	1.260 (29/23)	—
	Top	1.120 (28/25)	—
Shift fork to groove clearance		0.1–0.3 (0.004–0.012)	0.50 (0.020)
Shift fork groove width		5.0–5.1 (0.197–0.201)	—
Shift fork thickness		4.8–4.9 (0.189–0.193)	—

ITEM	STANDARD		LIMIT
Drive chain	Type	RK50MFOZ1	———
	Links	108 links, ENDLESS	———
	20-pitch length	———	319.4 (12.6)
Drive chain slack	20—30 (0.8—1.2)		———
Gearshift lever height	55 (2.2)		———

CARBURETOR

ITEM	SPECIFICATION		
	E-02,04,21, 25,34,53	E-03,18,24,28	E-22
Carburetor type	BDSR39	←	←
Bore size	39 mm	←	←
I.D. No.	33E0	33E1	33E4
Idle r/min.	1 200 ± 100 r/min	1 200 ± 100 r/min ... E-03,24,28 1 200 $^{+100}_{-50}$ r/min ... E-18	1 200 ± 100 r/min
Float height	7.0 ± 1.0 mm (0.28 ± 0.04 in)	←	←
Main jet (M.J.)	Nos.1&4: #127.5 Nos.2&3: #125	Nos.1&4: #127.5 Nos.2&3: #125	Nos.1&4: #127.5 Nos.2&3: #125
Jet needle (J.N.)	6E38-54-3	6E41-55	6E38-54-3
Needle jet (N.J.)	P-0	P-0M	P-0
Throttle valve (Th.V.)	#100	#105	#100
Pilot jet (P.J.)	#12.5	#12.5	#12.5
Pilot screw (P.S.)	PRE-SET (2 turns back)	PRE-SET (Nos.1&4: 4-1/8 turns back, Nos.2&3: 2-5/8 turns back)	PRE-SET (2-1/8 turns back)
Throttle cable play	0.5—1.0 mm (0.02—0.04 in)	←	←

CARBURETOR

ITEM	SPECIFICATION		
	E-33	P-37	E-39
Carburetor type	BDSR39	←	←
Bore size	39 mm	←	←
I.D. No.	33E7	33E8	33E9
Idle r/min.	1 200 ± 100 r/min.	←	←
Float height	7.0 ± 1.0 mm (0.28 ± 0.04 in)	←	←
Main jet (M.J.)	Nos.1&4: #127.5 Nos.2&3: #125	Nos.1&4: #127.5 Nos.2&3: #125	←
Jet needle (J.N.)	6E39-55	6E38-54-3	6E41-55
Needle jet (N.J.)	P-0M	P-0	P-0M
Throttle valve (Th.V.)	#105	#100	#105
Pilot jet (P.J.)	#12.5	#12.5	←

ITEM	SPECIFICATION		
	E-33	P-37	E-39
Pilot screw (P.S.)	PRE-SET	PRE-SET (2 turns back)	PRE-SET (Nos.1&4: 4 turns back, Nos.2&3: 3-3/8 turns back)
Throttle cable play	0.5—1.0 mm (0.02—0.04 in)	←	←

ELECTRICAL

Unit: mm (in)

ITEM			SPCIFICATION	NOTE
Ignition timing			4° B.T.D.C. at 1 500 r/min.	
Firing order			1·2·4·3	
Spark plug		Type	NGK: CR9E ND: U27ESR-N	
		Gap	0.7—0.8 (0.028—0.032)	
Spark performance			Over 8 (0.3) at 1 atm.	
Signal coil resistance			Approx. 50—200 Ω (B—G)	Tester range: (x 100 Ω)
Ignition coil resistance		Primary	2.3—3.3 Ω (⊕ tap— ⊖ tap)	Tester range: (x 1 Ω)
		Secondary	30—40 kΩ (Plug cap—Plug cap)	Tester range: (x 1 kΩ)
Generator coil resistance			Approx 0.3 Ω (B—B)	Tester range: (x 1 Ω)
Generator Max. output			Approx. 378 W at 5 000 r/min.	
Generator no-load voltage (When engine is cold)			Move than 55 V (AC) at 5 000 r/min.	
Regulated voltage			13.5—15.0 V at 5 000 r/min.	
Starter relay resistance			3—5 Ω	
Battery	Type designation		FTX9-BS	
	Capacity		12 V 28.8 kC (8 Ah)/10 HR	
	Standard electrolyte S.G.		1.320 at 20°C (68°F)	
Fuse size	Headlight	HI	15 A	
		LO	15 A	
	Turn signal		15 A	
	Ignition		10 A	
	Taillight		10 A	
	Main		30 A	

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03,24,28,33	E-04,18,21,22,25, 34,37,39,53	E-02
Headlight	HI	55 x 2	55	55 x 2
	LO	50 x 2	55	50 x 2
Position light			5	←
Tail/Brake light		5/21 x 2	←	←
Turn signal light		21	←	←
Tachometer light		1.7	←	←
Speedometer light		1.7	←	←
Turn signal indicator light		1.7	←	←
High beam indicator light		1.7	←	←
Neutral indicator light		1.7	←	←
Fuel indicator right		1.7	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD		LIMIT
Rear brake pedal height			55 (2.2)	———
Brake disc thickness		Front	4.5±0.2 (0.117±0.008)	4.0 (0.16)
		Rear	5.0±0.2 (0.197±0.008)	4.5 (0.18)
Brake disc runout (Front & Rear)			———	0.30 (0.012)
Master cylinder bore		Front	15.870–15.913 (0.6248–0.6265)	———
		Rear	12.700–12.743 (0.5000–0.5017)	———
Master cylinder piston diam.		Front	15.827–15.854 (0.6231–0.6242)	———
		Rear	12.657–12.684 (0.4983–0.4994)	———
Brake caliper cylinder bore	Leading	Front	24.000–24.076 (0.9449–0.09479)	———
	Trailing		27.000–27.076 (1.0630–1.0660)	———
		Rear	38.180–38.256 (1.5031–1.5061)	———
Brake caliper piston diam.	Leading	Front	23.925–23.975 (0.9419–0.9439)	———
	Trailing		26.920–26.970 (1.0598–1.0618)	———
		Rear	38.098–38.148 (1.4999–1.5019)	———

ITEM	STANDARD		LIMIT
Wheel rim runout (Front & Rear)	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	J17 x MT 3.50	—
	Rear	J17 x MT 6.00	—
Tire size	Front	120/70 ZR17	—
	Rear	190/50 ZR17	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD		LIMIT
Front fork stroke	120 (4.7)		—
Front fork spring free length	—		250 (9.9)
Front fork oil level	105 (4.1)		—
Front fork spring adjuster	4th groove from top		—
Front fork damping force adjuster	Rebound	At punch mark (about 9/8 turns out)	—
	Compression	At punch mark (about 1 turn out)	—
Rear shock absorber gas pressure (N_2 gas)	1 000 kPa (10 kg/cm², 142 psi)		—
Rear shock absorber spring set length	193.9 (7.6)		—
Rear shock absorber damping force adjuster	Rebound	At punch mark (about 1 turn out)	—
	Compression	At punch mark (about 5/6 turns out)	—
Rear wheel travel	133 (5.2)		—
Swingarm pivot shaft runout	—		0.3 (0.01)

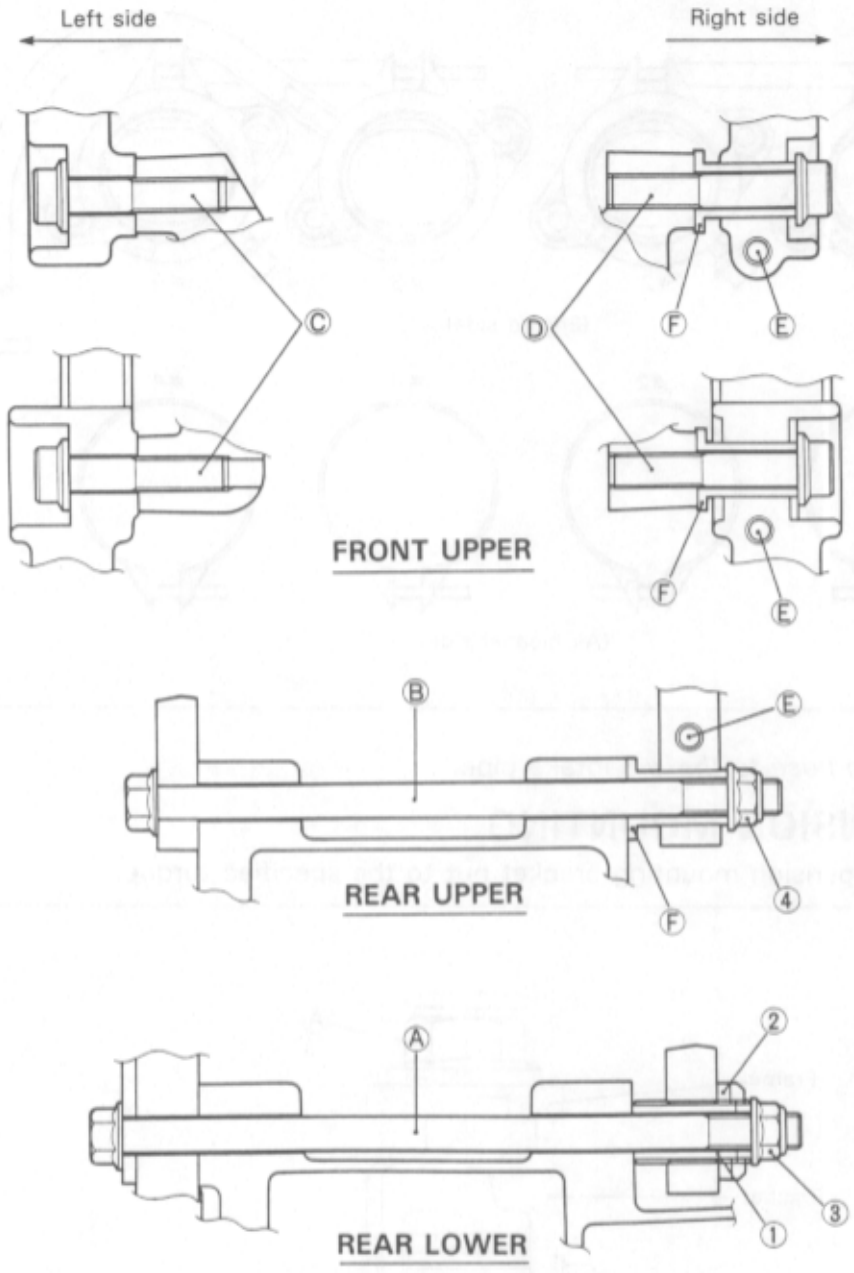
TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm²	psi	kPa	kg/cm²	psi
FRONT	250	2.50	36	250	2.50	36
REAR	250	2.50	36	250	2.50	36

FUEL + OIL + ENGINE COOLANT

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) 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-03,33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline used should be graded 85-95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	18.0 L (4.8/4.0 US/Imp gal)		
Engine oil type	SAE 10W/40, API SE, SF or SG		
Engine oil capacity	Change	2 600 ml (2.7/2.3 US/Imp qt)	
	Filter change	2 800 ml (3.0/2.5 US/Imp qt)	
	Overhaul	3 500 ml (3.7/3.1 US/Imp qt)	
Front fork oil type	Frok oil #10		
Front fork oil capacity (each leg)	480 ml (16.2/16.9 US/Imp oz)		
Brake fluid type	DOT 4		
Engine coolant type	Use an anti-freeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50:50.		
Engine coolant including reserve	2 550 ml (2.7/2.2 US/Imp qt)		

ENGINE MOUNTING BOLT AND NUT



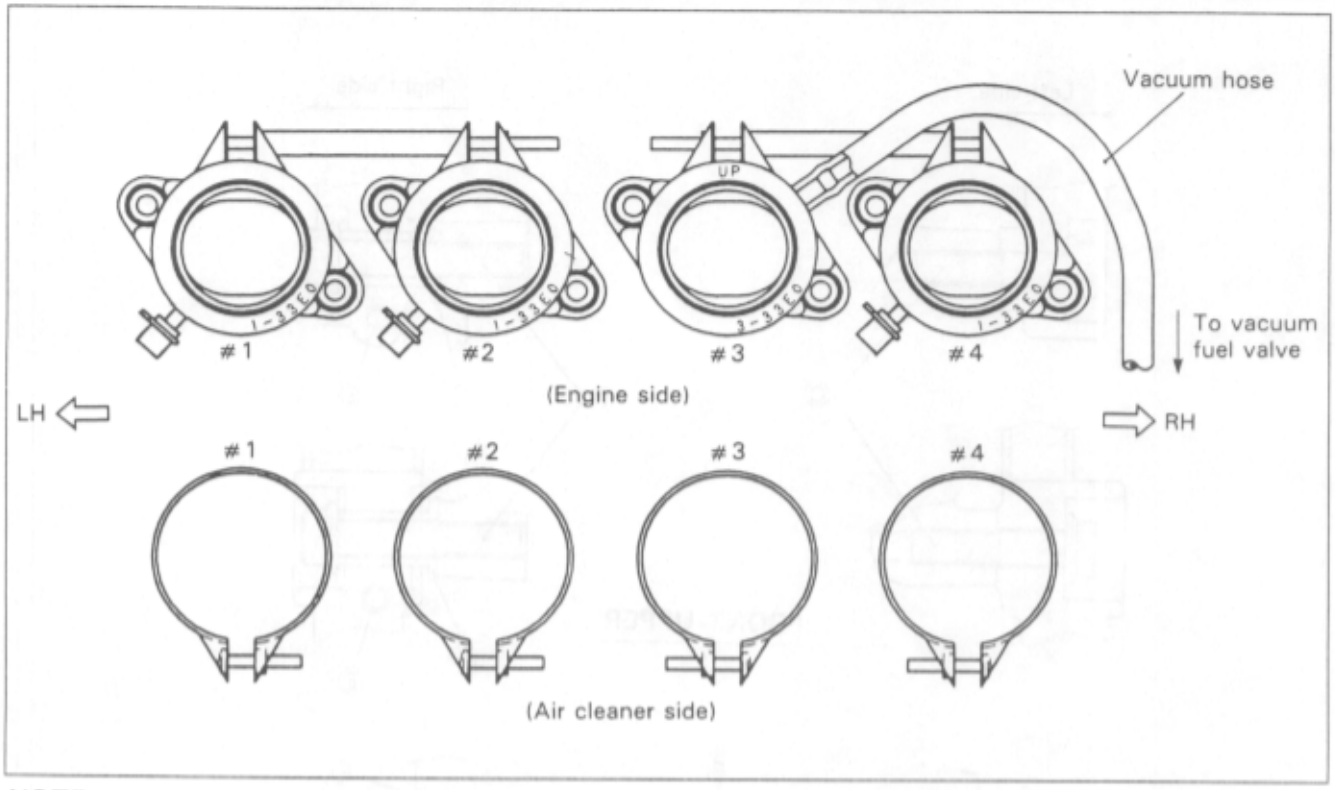
ITEM	N·m	kg-m	lb-ft
①	10	1.0	7.0
②	45	4.5	32.5
③, ④, Ⓒ, Ⓓ	79	7.9	57.0
Ⓔ	23	2.3	16.5

LENGTH

*Bolt Ⓐ	*205 mm (8.1 in)
Bolt Ⓑ	185 mm (7.3 in)
Bolt Ⓒ	45 mm (1.8 in)
Bolt Ⓓ	55 mm (2.2 in)
Bolt Ⓔ	30 mm (1.1 in)
Spacer Ⓕ	30.5 mm (1.2 in)

CARBURETOR CLAMPS

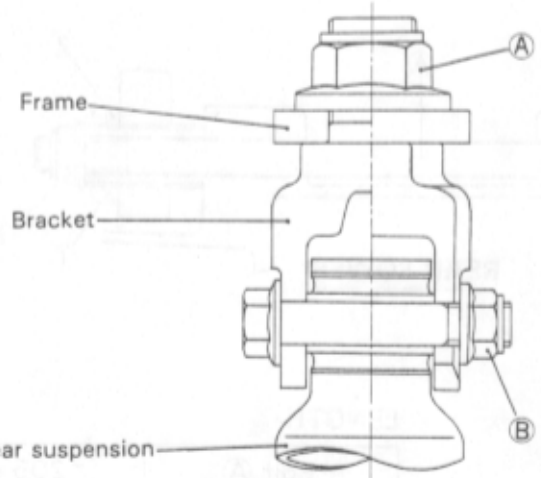
Locate the carburetor clamps as shown in the following illustration.



NOTE:
Connect the vacuum hose to the #3 intake pipe.

REAR SUSPENSION MOUNTING

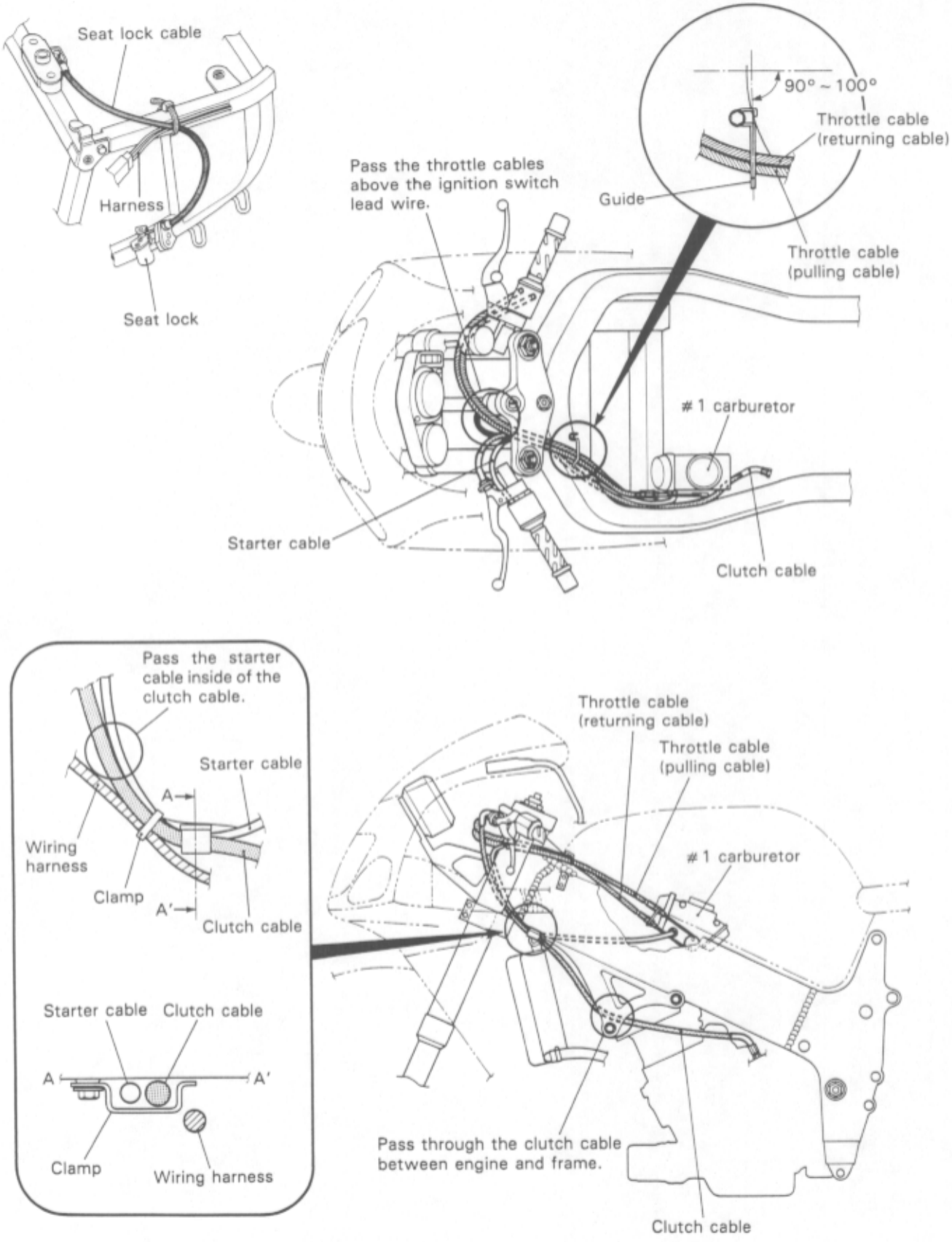
Tighten the rear suspension mounting bracket nut to the specified torque.



ITEM	N·m	kg-m	lb-ft
Ⓐ	*115	*11.5	*83.0
Ⓑ	50	5.0	36.0

NOTE:
The white mark of rear shock absorber bracket faces the frame side.

CABLE ROUTING





GSX-R750W ('98-MODEL)

FOREWORD

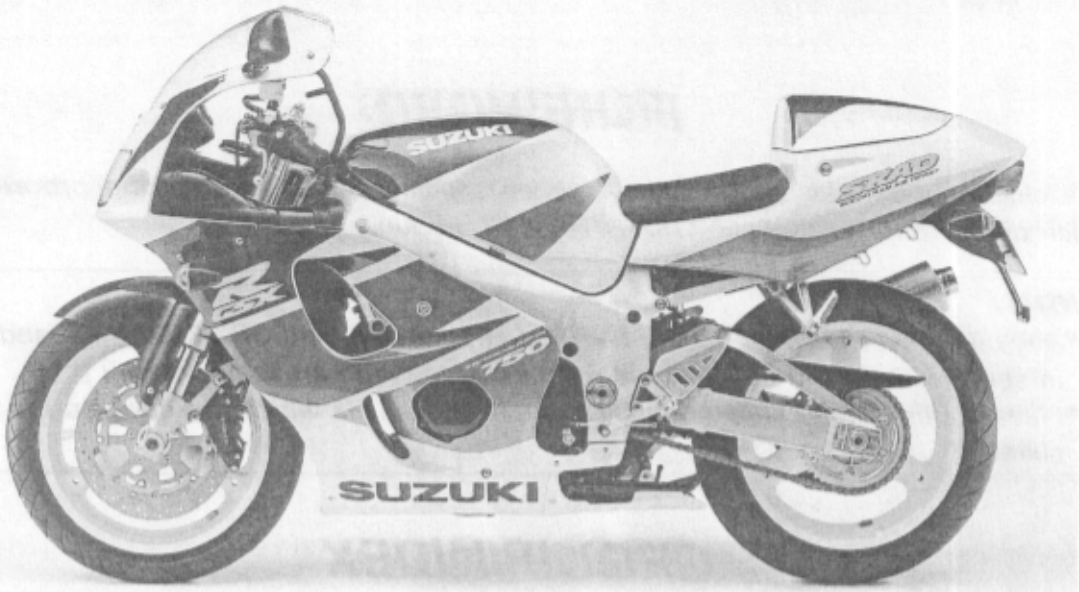
This chapter describes service data, service specifications and servicing procedures which differ from those of the GSX-R750V ('97-model).

NOTE:

- *Any differences between the GSX-R750V ('97-model) and GSX-R750W ('98-model) in specifications and service data are indicated with an asterisk mark (*).*
- *Please refer to the chapters 1 through 10 for details which are not given in this chapter.*

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SUZUKI
SUZUKI


SUZUKI
SUZUKI

ABBREVIATIONS MAY BE USED IN THIS MANUAL

A

ACL	: Air Cleaner, Air Cleaner Box
ATDC	: After Top Dead Center
ATM Pressure	: Atmospheric Pressure Atmospheric Pressure Sensor (APS)
API	: American Petroleum Institute
AC	: Alternating Current
ABDC	: After Bottom Dead Center
A/F	: Air Fuel Mixture

B

B+	: Battery Positive Voltage
BTDC	: Before Top Dead Center
BBDC	: Before Bottom Dead Center

C

CKT	: Circuit
CKP Sensor	: Crankshaft Position Sensor (CKPS)
CMP Sensor	: Camshaft Position Sensor (CMPS)
CO	: Carbon Monoxide
CLP Switch	: Clutch Lever Position Switch (Clutch Switch)
CPU	: Central Processing Unit

D

DC	: Direct Current
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)
EVAP	: Evaporative Emission
EVAP Canister	: Evaporative Emission Canister (Canister)

F

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

G

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

H

HC	: Hydrocarbons

I

IAC Valve Actuator	: Intake Air Control Valve Actuator
IAT Sensor	: Intake Air Temperature Sensor (IATS)
IAP Sensor	: Intake Air Pressure Sensor (IAPS)
IG	: Ignition

L

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

M

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

N

NOx	: Nitrogen Oxides

O

OHC	: Over Head Camshaft
OPS	: Oil Pressure Switch

P

PCV	: Positive Crankcase Ventilation (Crankcase Breather)

R

RH	: Right Hand
ROM	: Read Only Memory

S

SAE	: Society of Automotive Engineers

T

TO Sensor	: Tip Over Sensor (TOS)
TP Sensor	: Throttle Position Sensor (TPS)

V

VCSV	: Vacuum Control Solenoid Valve
VD	: Vacuum Damper
VTV	: Vacuum Transmitting Valve

SAE-TO-FORMER SUZUKI TERM (ONLY FOR U.S.A.)

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

SAE TERM		FORMER SUZUKI TERM
FULL TERM	ABBREVIATION	
A		
Air Cleaner	ACL	Air Cleaner, Air Cleaner Box
B		
Barometric Pressure	BARO	Barometric Pressure, Atmospheric Pressure
Battery Positive Voltage	B+	Battery Voltage, +B
C		
Camshaft Position Sensor	CMP Sensor	Camshaft Position Sensor (CMPS)
Crankshaft Position Sensor	CKP Sensor	Crankshaft Position Sensor (CKPS), Crank Angle
D		
Data Link Connector	DLC	Dealer Mode Coupler
Diagnostic Test Mode	DTM	———
Diagnostic Trouble Code	DTC	Diagnostic Code, Malfunction Code
E		
Electronic Ignition	EI	———
Engine Control Module	ECM	Engine Control Module (ECM) FI Control Unit, Engine Control Unit (ECU)
Engine Coolant Level	ECL	Coolant Level
Engine Coolant Temperature	ECT	Coolant Temperature, Engine Coolant Temperature Water Temperature
Engine Speed	RPM	Engine Speed (RPM)
Evaporative Emission	EVAP	Evaporative Emission
Evaporative Emission Canister	EVAP Canister	——— (Canister)
Purge Valve	Purge Valve	Purge Valve (SP Valve)
F		
Fan Control	FC	———
Fuel Level Sensor	———	Fuel Level Sensor, Fuel Level Gauge
Fuel Pump	FP	Fuel Pump (FP)
G		
Generator	GEN	Generator
Ground	GND	Ground (GND, GRD)

SAE TERMS		FORMER SUZUKI TERM
FULL TERM	ABBREVIATION	
I		
Idle Speed Control	ISC	———
Ignition Control	IC	Electronic Spark Advance (ESA)
Ignition Control Module	ICM	———
Intake Air Temperature	IAT	Intake Air Temperature (IAT), Air Temperature
M		
Malfunction Indicator Lamp	MIL	LED Lamp Malfunction Indicator Lamp (MIL)
Manifold Absolute Pressure	MAP	Intake Air Pressure, Intake Vacuum
Mass Air Flow	MAF	Air Flow
O		
On-Board Diagnostic	ODB	Self-Diagnosis Function Diagnostic
Open Loop	OL	———
P		
Programmable Read Only Memory	PROM	———
Pulsed Secondary Air Injection	PAIR	Pulse Air Control (PAIR)
R		
Random Access Memory	RAM	———
Read Only Memory	ROM	ROM
S		
Secondary Air Injection	AIR	———
T		
Throttle Body	TB	Throttle Body (TB)
Throttle Body Fuel Injection	TBI	Throttle Body Fuel Injection (TBI)
Throttle Position Sensor	TP Sensor	TP Sensor (TPS)
V		
Voltage Regulator	VR	Voltage Regulator
Volume Air Flow	VAF	Air Flow

GENERAL INFORMATION

CONTENTS

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COUNTRY AND AREA CODES 11-1- 3

SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 100 mm (82.7 in)	For E-18,22,24,39 models
	*2 065 mm (81.3 in)	For other models
Overall width	720 mm (28.3 in)	
Overall height	*1 165 mm (45.9 in)	
Wheelbase	*1 395 mm (54.9 in)	
Ground clearance	130 mm (5.1 in)	
Seat height	830 mm (32.7 in)	
Dry mass	180 kg (396 lbs)	For E-18,33,39 models
	179 kg (394 lbs)	For other models

ENGINE

Type	Four-stroke, Liquid-cooled, DOHC, TSCC
Number of cylinders	4
Tappet clearance, IN	0.10–0.20 mm (0.004–0.008 in)
EX	0.20–0.30 mm (0.008–0.012 in)
Bore	72.0 mm (2.834 in)
Stroke	46.0 mm (1.811 in)
Piston displacement	749 cm^3 (45.7 cu. in)
Compression ratio	11.8 : 1
Fuel system	*Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric starter
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	6-speed constant mesh
Gearshift pattern	1-down, 5-up
Primary reduction ratio	1.756 (72/41)
Gear ratios, Low	*2.625 (42/16)
2nd	*1.950 (39/20)
3rd	*1.565 (36/23)
4th	*1.363 (30/22)
5th	*1.227 (27/22)
Top	1.120 (28/25)
Final reduction ratio	*2.750 (44/16)
Drive chain	*RK525ROZ2, 108 links

CHASSIS

Front suspension	Inverted telescopic, coil spring, oil damped, spring pre-load fully adjustable, rebound and compression damping force fully adjustable.
Rear suspension	Link type system, gas/oil damped, coil spring, spring pre-load fully adjustable, rebound damping force and compression damping force fully adjustable.
Front fork stroke	120 mm (4.7 in)
Rear wheel travel	133 mm (5.2 in)
Steering angle	30° (right & left)
Caster	24°
Trail	96 mm (3.8 in)
Turning radius	3.1 m (10.2 ft)
Front brake	Disc brake, twin, hydraulically operated
Rear brake	Disc brake, hydraulically operated
Front tire size	120/70 ZR17 (58W), tubeless
Rear tire size	190/50 ZR17 (73W), tubeless

ELECTRICAL

Ignition type	Electronic ignition (CDI)
Ignition timing	4° B.T.D.C. at 1 500 r/min
Spark plug	N.G.K. CR9E, DENSO U27ESR-N
Battery	12V 28.8 kC (8 Ah)/10HR
Generator	Three-phase A.C. Generator
Main fuse	30A
Fuse	15/15/10/15/10A
Headlight	*12V 60/55W × 2 ..... E-02,03,24,28,33 models 12V 55W + 12V 55W ..... For other models
Turn signal light	12V 21W
Front position light	12V 5W ..... Except for E-03,24,28,33 models
Brake light/Taillight	12V 21/5W × 2
Speedometer light	12V 1.7W
Tachometer light	12V 1.7W
Neutral indicator light	12V 1.7W
High beam indicator light	12V 1.7W
Turn signal indicator light	12V 1.7W
Fuel indicator light	12V 1.7W

CAPACITIES

Fuel tank, including reserve	18.0 L (4.8/4.0 US/Imp gal)
Engine oil, oil change	2 600 ml (2.7/2.3 US/Imp qt)
with filter change	2 800 ml (3.0/2.5 US/Imp qt)
overhaul	3 500 ml (3.7/3.1 US/Imp qt)
Coolant	2 550 ml (2.7/2.2 US/Imp qt)

Specifications marked with asterisks (*) are exclusive to GSX-R750W.
These specifications are subject to change without notice.

COUNTRY AND AREA CODES

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

CODE	COUNTRY/AREA
E-02	U.K.
E-03	U.S.A. (except California)
E-04	France
E-18	Switzerland
E-22	Germany
E-24	Australia
E-25	Netherlands
E-28	Canada
E-33	California (U.S.A.)
E-34	Italy, Belgium (E-21), Spain (E-53)
E-39	Austria
P-37	Brazil

PERIODIC MAINTENANCE

CONTENTS

PERIODIC MAINTENANCE SCHEDULE 11-2- 1
PERIODIC MAINTENANCE CHART 11-2- 1
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TAPPET CLEARANCE 11-2- 3
FUEL HOSE 11-2- 3
THROTTLE CABLE PLAY 11-2- 4
THROTTLE VALVE SYNCHRONIZATION 11-2- 5
TIRE 11-2- 5

PERIODIC MAINTENANCE SCHEDULE

IMPORTANT: The periodic maintenance intervals and service requirements have been established in accordance with EPA regulations. Following these instructions will ensure that the motorcycle will not exceed emission standards and it will also ensure the reliability and performance of the motorcycle. The chart below lists the recommended intervals for all the required periodic service work necessary to keep the motorcycle operating at peak performance and economy. Mileages are expressed in terms of kilometer, miles and time for your convenience.

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

PERIODIC MAINTENANCE CHART

Item \ Interval	km	1 000	6 000	12 000	18 000	24 000
	miles	600	4 000	7 500	11 000	15 000
	months	1	6	12	18	24
Air cleaner element		–	I	I	R	I
Spark plugs		–	I	R	I	R
Tappet clearance		–	–	–	–	I
Fuel hoses		–	I	I	I	I
		Replace every four years.				
Engine oil		R	R	R	R	R
Engine oil filter		R	–	–	R	–
Engine idle speed		I	I	I	I	I
Throttle cable play		I	I	I	I	I
*Throttle valve synchronization		I (CA. only)	–	I	–	I
*Evaporative emission control system (California model only)		–	–	I	–	I
		Replace vapor hoses every four years.				
*PAIR (AIR SUPPLY) system		–	–	I	–	I
Clutch		–	I	I	I	I
Radiator hose		–	I	I	I	I
Engine coolant		Replace every two years.				
Drive chain		I	I	I	I	I
		Clean and lubricate every 1 000 km (600 miles).				
Brakes		I	I	I	I	I
Brake hose		–	I	I	I	I
		Replace every four years.				
Brake fluid		–	I	I	I	I
		Replace every two years.				
Tires		–	I	I	I	I
Steering		I	–	I	–	I
Front forks		–	–	I	–	I
Rear suspension		–	–	I	–	I
Exhaust pipe bolts and muffler bolts		T	–	T	–	T
Chassis bolts and nuts		T	T	T	T	T

NOTE: I=Inspect and clean, adjust, replace or lubricate as necessary; R=Replace; T=Tighten

NOTE:

* *Item marked with asterisk (*) is exclusive to GSX-R750W.*
* *(California model only) and (CA. only) means that the items or the maintenance interval is to be applied only for the California model.*

MAINTENANCE AND TUNE-UP PROCEDURES

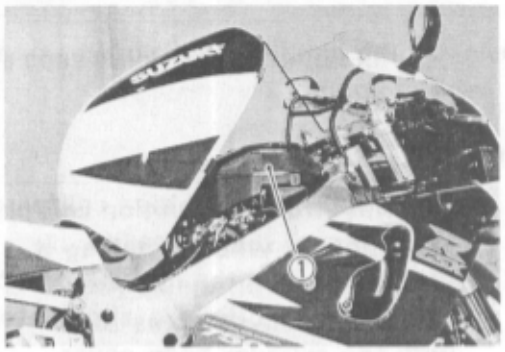
This section describes the servicing procedures for each Periodic Maintenance item which differ from those of the GSX-R750V ('97-model).
For details other than the following items, refer to the section 2.

SPARK PLUG

Inspect every 6 000 km (4 000 miles, 6 months) and Replace every 12 000 km (7 500 miles, 12 months).

SPARK PLUG AND IGNITION COIL/PLUG CAP REMOVAL

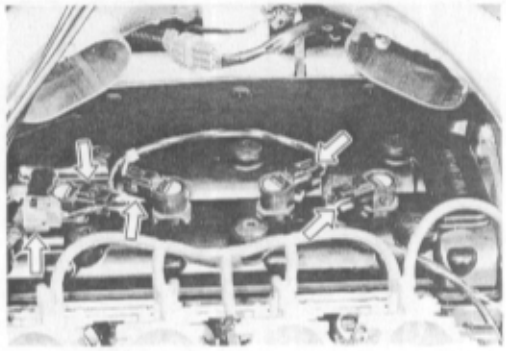
- Remove the front seat.
- Lift and support the fuel tank. (See p. 11-4-49.)
- Remove the air cleaner box ①. (See p. 11-4-54.)



- Disconnect all of the lead wire couplers from each ignition coil/plug cap and camshaft position sensor.

⚠ CAUTION

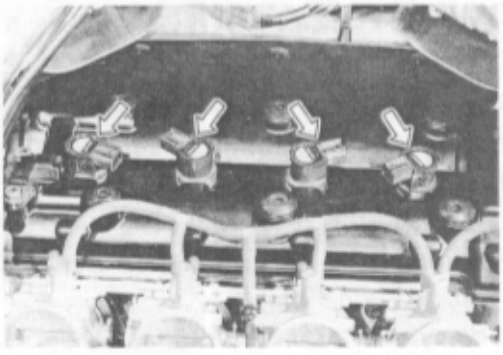
Do not remove the ignition coil/plug cap before disconnecting its lead wire coupler.



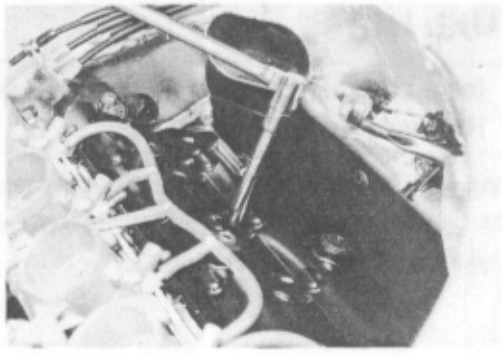
- Remove all of the ignition coils/plug caps.

⚠ CAUTION

*** Do not pry up the ignition coil/plug cap with a driver or a bar to avoid its damage.**
*** Be careful not to drop the ignition coil/plug cap to prevent the short or open the circuit of its.**



- Remove the spark plugs with the spark plug wrench.



SPARK PLUG INSPECTION

Refer to the section 2 for spark plug inspection.

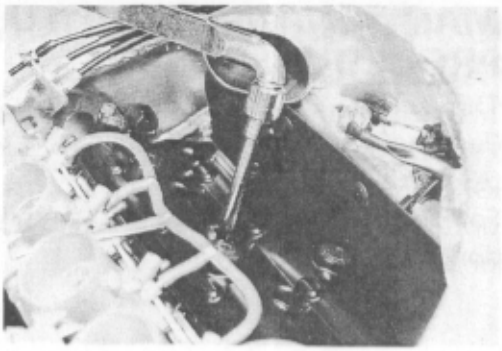
SPARK PLUG AND IGNITION COIL/PLUG CAP INSTALLATION

- Install the spark plugs to the cylinder head by finger tight, and then tighten them to the specified torque.

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

⚠ CAUTION

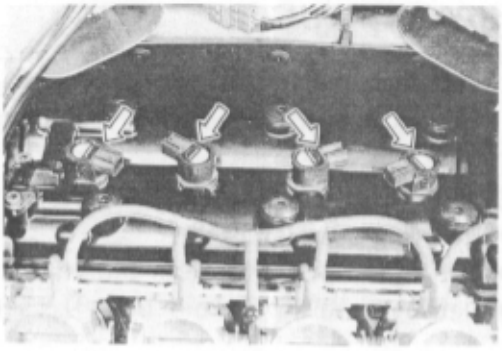
Before using a spark plug wrench, carefully turn the spark plug by finger into the threads of the cylinder head to prevent damage the aluminum threads.

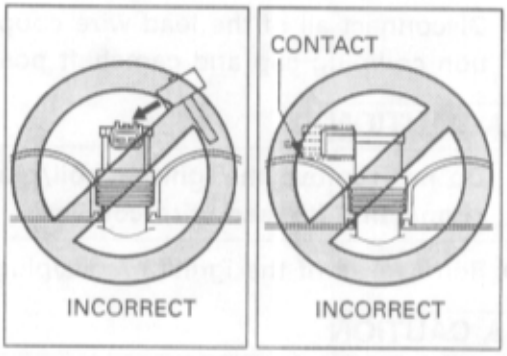


- Install the ignition coils/plug caps and connect their lead wire couplers.

⚠ CAUTION

*** Do not strike the ignition coil/plug cap with a plastic hammer when installing it.**
*** When installing the ignition coil/plug cap, place its coupler each other as shown to prevent contact with the cylinder head cover.**





TAPPET CLEARANCE

Inspect every 24 000 km (15 000 miles, 24 months).

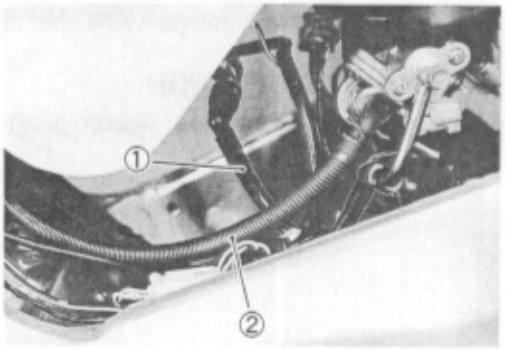
For details other than the following, refer to the page 2-5 through -8.

- Remove the fuel tank. (See p. 11-4-49.)
- Remove the air cleaner box and the throttle body. (See pp. 11-4-54 ff..)
- Remove the spark plugs. (See p. 11-2-2.)

FUEL HOSE

Inspect every 6 000 km (4 000 miles, 6 months).
Replace every 4 years.

Inspect the fuel feed hose ① and the fuel return hose ② for damage and fuel leakage. If any defects are found, the fuel hose must be replaced.



THROTTLE CABLE PLAY

Inspect initially at 1 000 km (600 miles, 1 month) and every 6 000 km (4 000 miles, 6 months) thereafter.

MINOR ADJUSTMENT

Adjust the throttle cable play Ⓐ with the following three steps.

First step:
- Loosen the lock nut ③ of the throttle returning cable ① and turn in the adjuster ④ fully into the threads.

Second step:
- Loosen the lock nut ⑤ of the throttle pulling cable ②.
- Turn the adjuster ⑥ in or out until the throttle cable play Ⓐ should be 2.0–4.0 mm (0.08–0.16 in) at the throttle grip.
- Tighten the lock nut ⑤ while holding the adjuster ⑥.

Third step:
- While holding the throttle grip at the fully closed position, slowly turn out the adjuster ④ of the throttle returning cable ① to feel resistance.
- Tighten the lock nut ③ while holding the adjuster ④.

Throttle cable play Ⓐ: 2.0–4.0 mm (0.08–0.16 in)

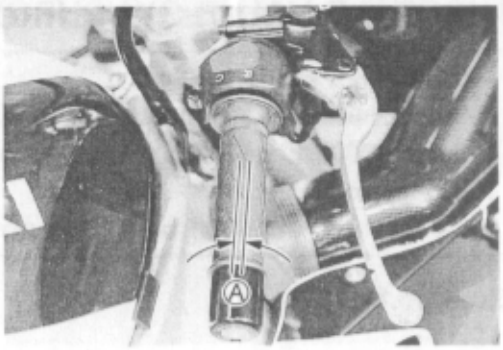
⚠WARNING

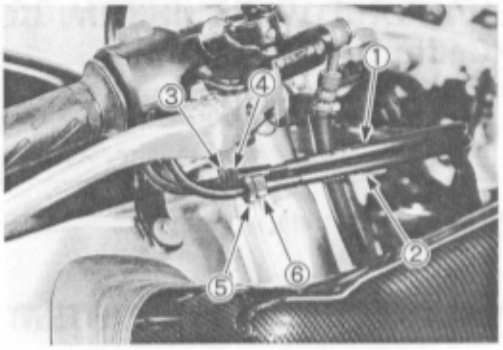
After the adjustment is completed, check that handlebar movement does not raise the engine idle speed and that the throttle grip returns smoothly and automatically.

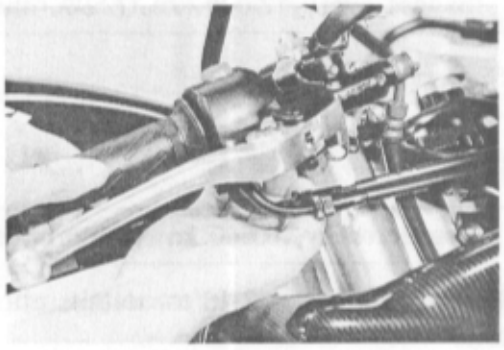
NOTE:
Major adjustment can be made by the throttle body side adjuster.

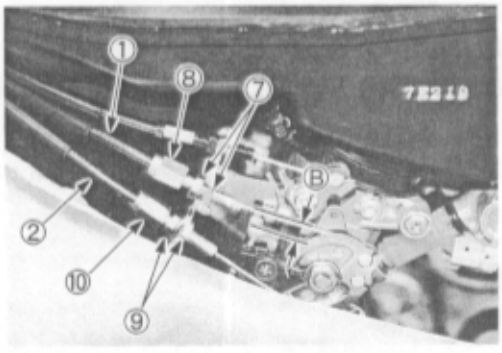
MAJOR ADJUSTMENT

Lift and support the fuel tank with its prop stay. (See p. 4-49)
- Loosen the lock nuts ⑦ of the throttle returning cable ①.
- Turn the returning cable adjuster ⑧ to obtain proper cable play.
- Loosen the lock nuts ⑨ of the throttle pulling cable ②.
- Turn the pulling cable adjuster ⑩ in or out until the throttle cable play Ⓐ should be 2.0–4.0 mm (0.08–0.16 in) at the throttle grip.
- Tighten the lock nuts ⑨ securely while holding the adjuster ⑩.
- While holding the throttle grip at the fully closed position, slowly turn the returning cable adjuster ⑧ to obtain a cable slack Ⓑ of 1.0 mm (0.04 in).
- Tighten the lock nuts ⑦ securely.











THROTTLE VALVE SYNCHRONIZATION

(California model only)
Inspect initially at 1 000 km (600 miles, 1 month) and every 12 000 km (7 500 miles, 12 months) thereafter.
(Other model)
Inspect every 12 000 km (7 500 miles, 12 months).

(See pp. 11-4-65 ff..)

EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

Inspect every 12 000 km (7 500 miles, 12 months).
Replace vapor hoses every 4 years.

(See pp. 11-9-1 ff..)

PAIR (AIR SUPPLY) SYSTEM

Inspect every 12 000 km (7 500 miles, 12 months).

(See pp. 11-9-4 ff..)

TIRE

Inspect every 6 000 km (4 000 miles, 6 months).

Refer to the page 2-18 for details other than the following data.

TIRE TYPE
DUNLOP (Front ..... *D207FJ, rear ..... *D207)
METZELER (Front ..... *MEZ3 FRONT RACING, rear ..... *MEZ3 RACING)

ENGINE

CONTENTS

ENGINE COMPONENTS REMOVABLE WITH ENGINE IN PLACE .. 11-3-1
ENGINE REMOVAL AND INSTALLATION 11-3-2
ENGINE REMOVAL 11-3-2
ENGINE INSTALLATION 11-3-4
CAMSHAFT/CYLINDER HEAD 11-3A-1
CAMSHAFT/CYLINDER HEAD REMOVAL 11-3A-2
CAMSHAFT/CYLINDER HEAD INSPECTION AND SERVICE .. 11-3A-2
CYLINDER HEAD COVER SERVICE 11-3A-3
CAMSHAFT/CYLINDER HEAD INSTALLATION 11-3A-4
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PISTON INSTALLATION 11-3B-1
CLUTCH 11-3C-1
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ENGINE LUBRICATION SYSTEM 11-3D-1
OIL PUMP INSTALLATION 11-3D-1
STARTER SYSTEM/SIGNAL GENERATOR 11-3E-1
STARTER CLUTCH REMOVAL AND INSTALLATION 11-3E-2
CRANKCASE/TRANSMISSION/CRANKSHAFT/CONROD 11-3H-1
ENGINE REMOVAL 11-3H-2
ENGINE DISASSEMBLY 11-3H-2
LOWER CRANKCASE/TRANSMISSION INSTALLATION 11-3H-3
UPPER AND MIDDLE CRANKCASE/CRANKSHAFT/CONROD INSTALLATION 11-3H-4

ENGINE COMPONENTS REMOVABLE WITH ENGINE IN PLACE

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

ENGINE LEFT SIDE

PARTS	REMOVAL	INSTALLATION
Gearshift lever	3-5	3-10, 3G-0
Engine sprocket cover	11-3-3	11-3-4
Speedometer sensor	3-5	3-10
Engine sprocket and drive chain	3-5	3-10
Gear position switch body	11-3H-2	11-3H-2
Water pump	5-13	5-15
Generator	3F-1	3F-2

ENGINE RIGHT SIDE

PARTS	REMOVAL	INSTALLATION
Clutch	3C-1	3C-4
Primary driven gear	3C-2	3C-4
Oil pump drive and driven gear	3D-1	11-3D-1
Oil pump	3D-1	3D-2
Gearshift linkage	3G-1	3G-2
Starter clutch	11-3E-2	11-3E-2
Starter motor	3E-5	3E-5
Signal generator	3E-2	3E-3
Oil pressure switch	3D-8	3D-8

ENGINE CENTER

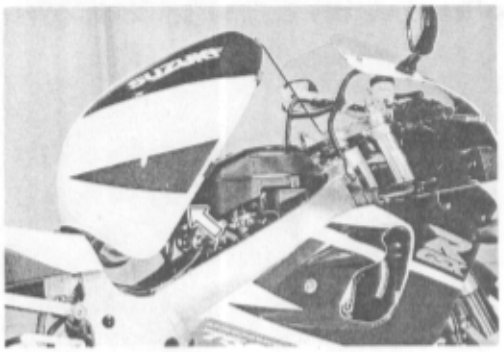
PARTS	REMOVAL	INSTALLATION
Throttle body	4-54	11-4-63
Cylinder head cover	3A-1	3A-19
Camshafts	11-3A-2	11-3A-4
Cylinder head	11-3A-2	11-3A-4
Cylinder	3B-1	3B-6
Pistons	3B-1	11-3B-1
Cam chain tension adjuster	3A-1	3A-18
Cam chain tensioner	3A-6, 3H-4	3A-7
Cam chain guide	3A-6, 3B-1	3A-14, 3A-18
Thermostat	5-11	5-12
Oil filter	3D-4	3D-4
Oil cooler	3D-5	3D-5
Oil pan	3D-6	3D-7
Oil pressure regulator	3D-6	3D-7
Oil sump filter	3D-6	3D-7

ENGINE REMOVAL AND INSTALLATION

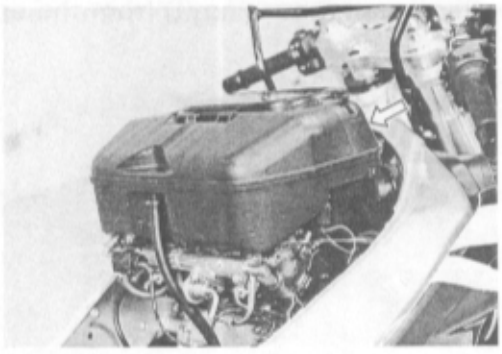
ENGINE REMOVAL

This section describes the engine removal procedure which differ from that of the GSX-R750V ('97-MODEL). For details other than the following, refer to the section 3.

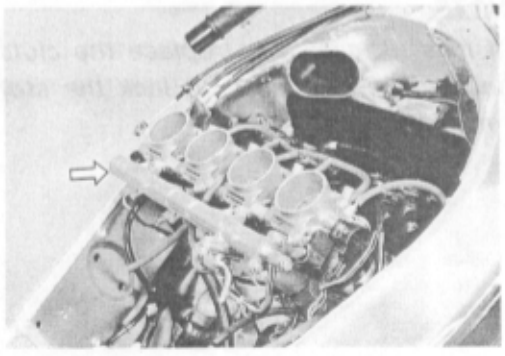
- Remove the fuel tank. (See p. 11-4-49.)



- Remove the air cleaner box. (See p. 11-4-54.)



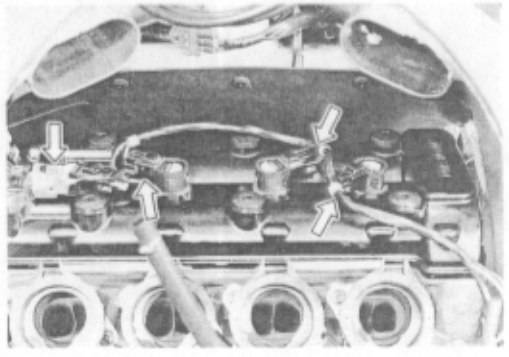
- Remove the throttle body. (See pp. 11-4-54 ff..)



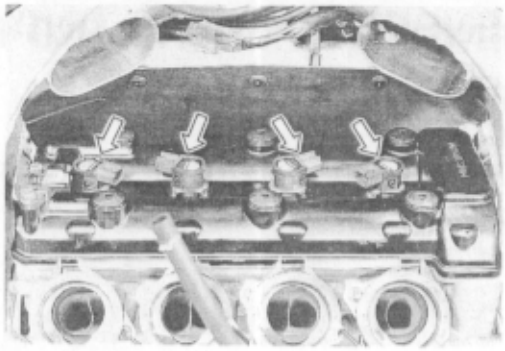
- Disconnect the ignition coil/plug cap and the camshaft position sensor lead wire couplers.

⚠ CAUTION

Do not remove the ignition coil/plug cap before disconnecting its lead wire coupler.



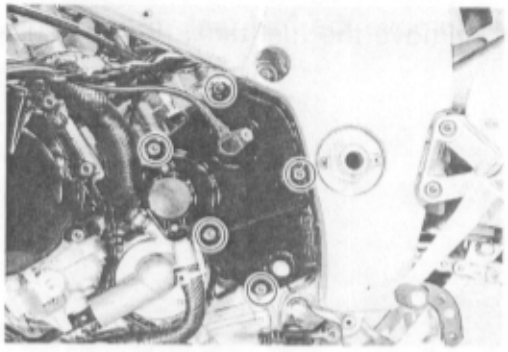
- Remove all the ignition coils/plug caps.



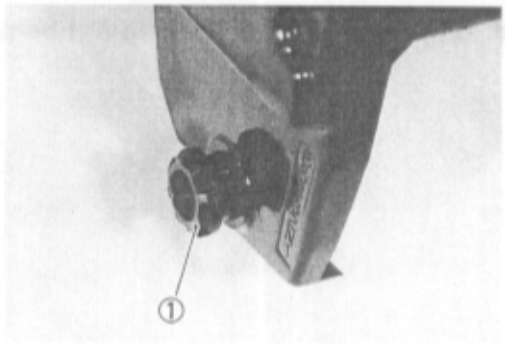
⚠ CAUTION

*** Do not pry up the ignition coil/plug cap with a driver or a bar to avoid its damage.**
*** Be careful not to drop the ignition coil/plug cap to prevent the short or open the circuit of its.**

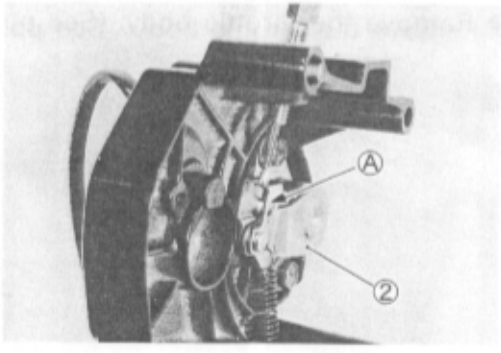
- Remove the engine sprocket cover and dowel pins.



- Remove the bushing ① from the engine sprocket cover.



NOTE:
If it is necessary to replace the clutch cable or clutch release lever, unlock and lock the stopper Ⓐ of the clutch release lever ②.

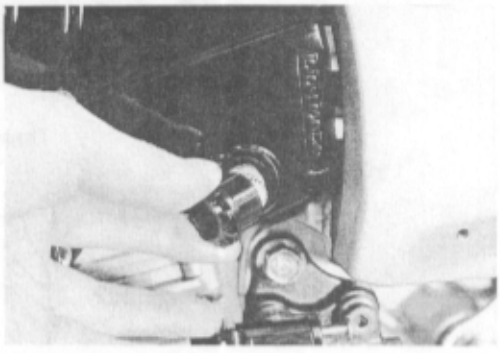


ENGINE INSTALLATION

This section describes the engine installation procedure which differ from that of the GSX-R750V ('97-MODEL). For details other than the following, refer to the section 3.

- Install the bushing onto the gearshift shaft.

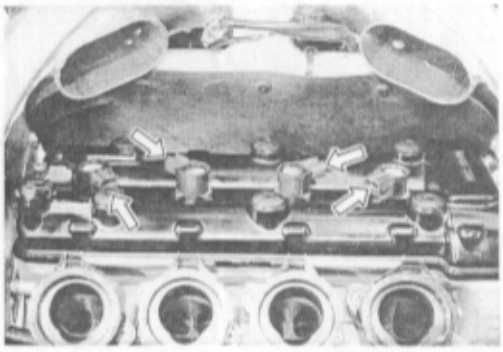
NOTE:
Before installing the bushing, clean it and gearshift shaft. It is not necessary to apply grease to the bushing.

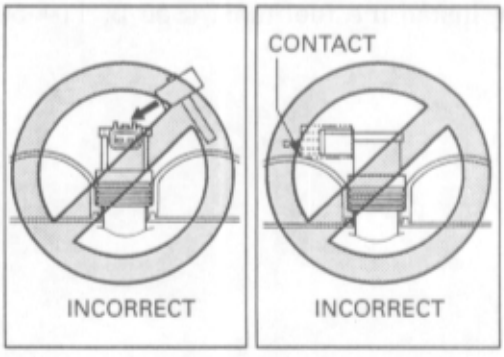


- Install the ignition coils/spark plug caps.

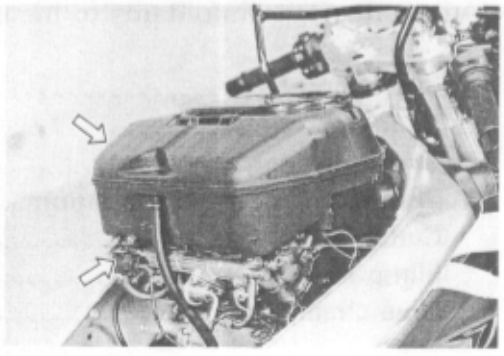
⚠ CAUTION

*** Do not strike the ignition coil/spark plug cap with a plastic hammer when fitting it.**
*** When installing the ignition coil/spark plug cap, place its coupler as shown to prevent contact with the cylinder head cover.**

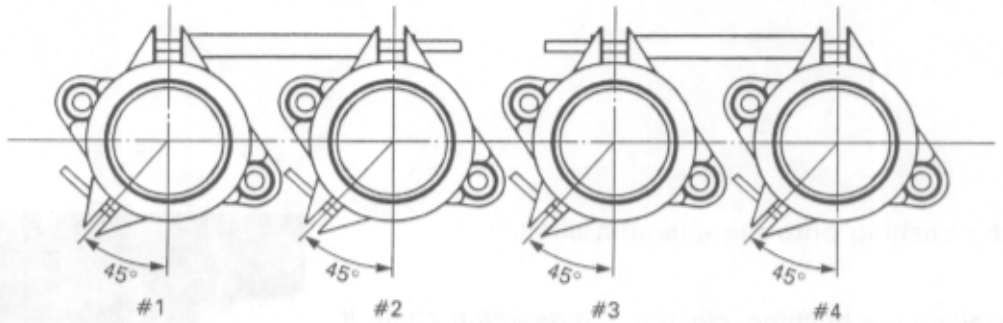




- Install the throttle body and the air cleaner box. (See pp. 11-4-63 f..)

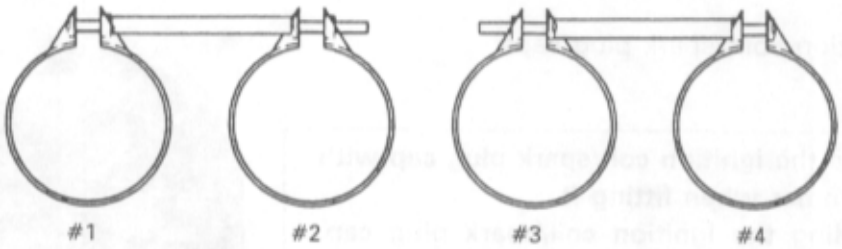


- Locate the throttle body clamps, as shown in the illustration.



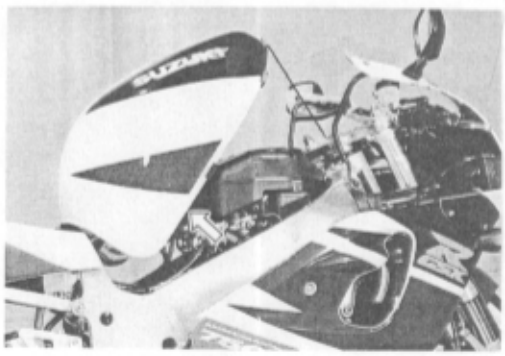
Throttle body clamp position (Engine side)

L.H ← → R.H



Throttle body clamp position (Air cleaner side)

- Install the fuel tank. (See p. 11-4-50.)



- Adjust the following items to the specification.

	page
* Engine coolant	2-12
* Engine oil	2-9
* Throttle cable play	11-2-4
* Throttle valve synchronization	11-4-65, -66 and -67
* Clutch lever play	2-11
* Idling adjustment	2-10
* Drive chain slack	2-14

CAMSHAFT/CYLINDER HEAD



'97-MODEL

'97-MODEL

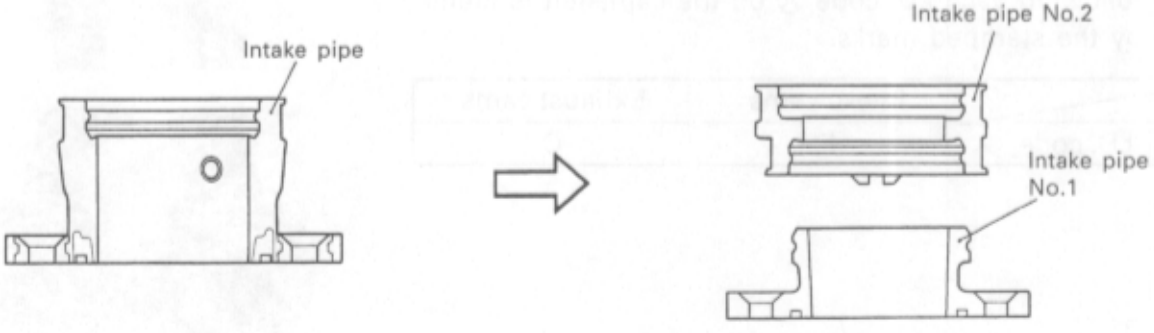
'98-MODEL

NOTE: When installing this type camshafts, use the cam chain holder set (09921-31810) to prevent the cam chain disengagement.



'97-MODEL

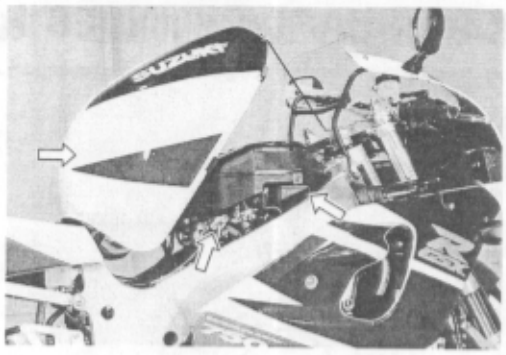
'98-MODEL



'97-MODEL

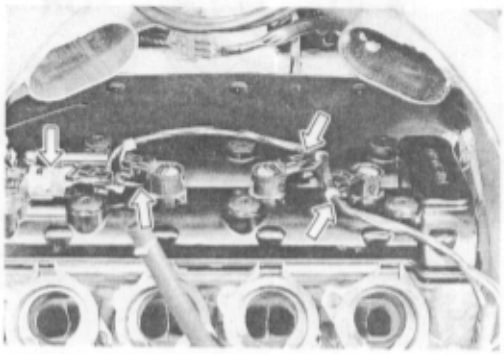
'98-MODEL

This section describes the servicing procedures for the camshaft and cylinder head which differ from those of the GSX-R750V ('97-MODEL).
For details other than the following, refer to the section 3A.



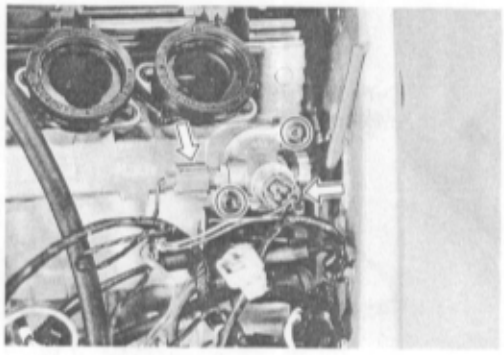
CAMSHAFT/CYLINDER HEAD REMOVAL

- Remove the fuel tank. (See p. 11-4-49.)
- Remove the lower fairing assembly.
- Remove the air cleaner box. (See p. 11-4-54.)
- Remove the throttle body. (See pp. 11-4-54ff..)
- Remove the ignition coils/plug caps. (See pp. 11-2-2.)



- Remove the thermostat cover and thermostat.

NOTE:
For the other removal details, refer to the section 3A.

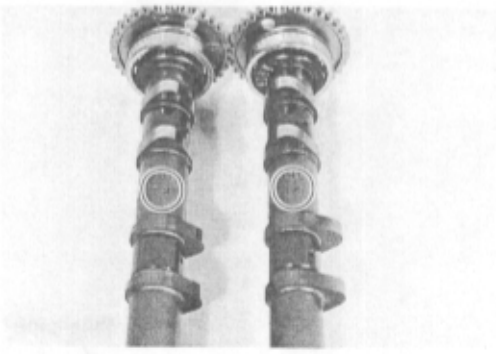


CAMSHAFT/CYLINDER HEAD INSPECTION AND SERVICE

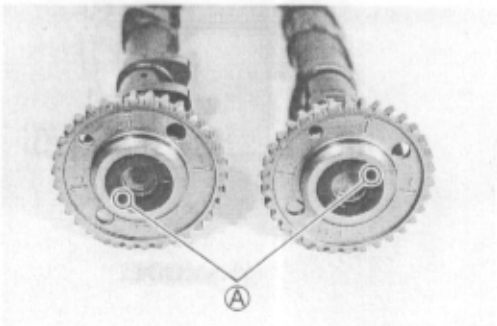
CAMSHAFT

The exhaust camshaft can be distinguished from that of the intake by the embossed letters "EX" (for exhaust) as against letters "IN" (for intake).

The following each I.D. code Ⓐ on the camshaft is identified by the stamped marks.



	Intake cams	Exhaust cams
I.D. code	E	C



VALVE GUIDE SERVICING

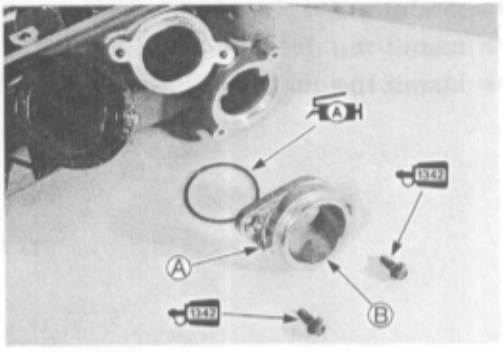
- Only oversized valve guides are available as replacement parts. (Part No. 11115-18D72)

NOTE:
For details other than the above, refer to the section 3A.

INTAKE PIPE

- When installing the intake pipe No.1, apply grease to the O-ring.

99000-25030: SUZUKI SUPER GREASE "A"

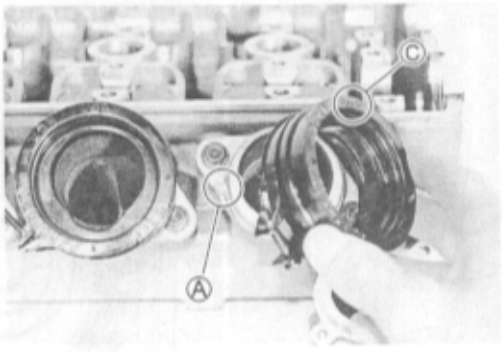


⚠ CAUTION

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

- When installing the intake pipe screws, apply a small quantity of THREAD LOCK "1342" to the screws.

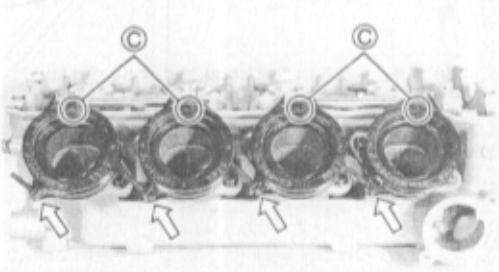
1342 99000-32050: THREAD LOCK "1342"



NOTE:
Make sure that the projection Ⓐ comes left side and also the groove Ⓑ comes downward.

- Install the intake pipe No.2 and tighten the clamp at the correct angle position. (See p. 11-3-5.)

NOTE:
Make sure that the "UP" mark Ⓒ comes upward.

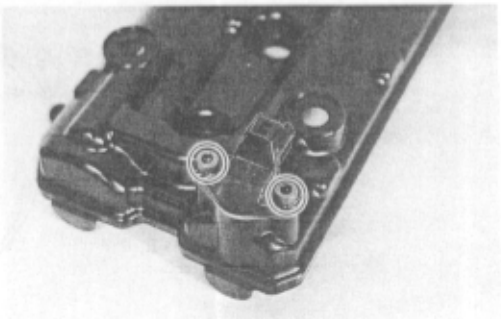


CYLINDER HEAD COVER SERVICE

CAMSHAFT POSITION SENSOR

- When replacing the camshaft position sensor, tighten its mounting bolt to the specified torque.

Camshaft position sensor mounting bolt:
8 N·m (0.8 kg-m, 6.0 lb-ft)

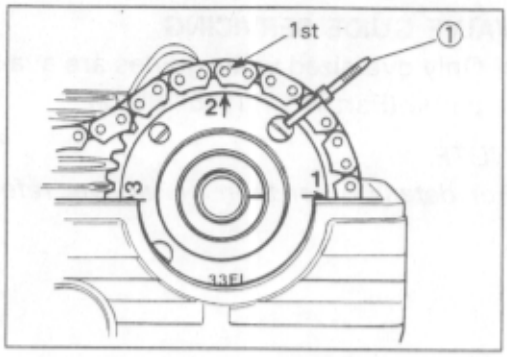


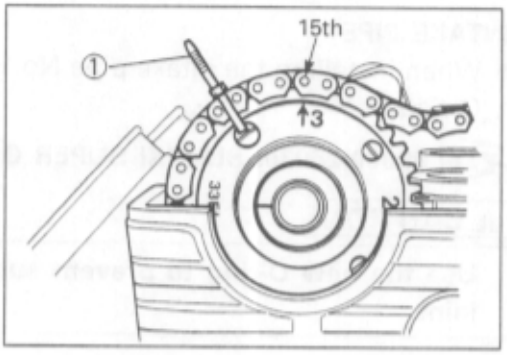
CAMSHAFT/CYLINDER HEAD INSTALLATION

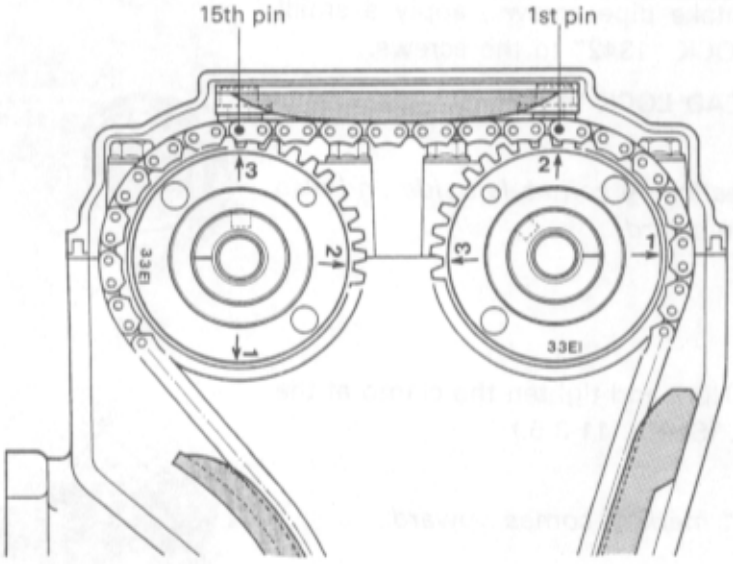
For details other than the following, refer to the section 3A.

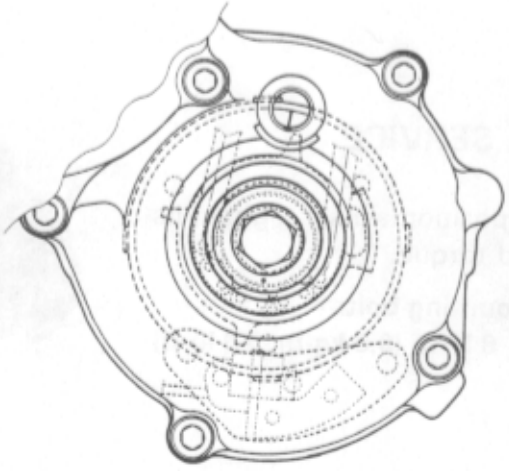
NOTE:
Bind the cam chain and each cam sprocket with a proper wire clamp ① to prevent the cam chain disengagement while installing the camshaft journal holders. Be careful not to disturb the crankshaft until the camshaft journal holders and cam chain tension adjuster are secured.

- Install the ignition coils/spark plug caps. (See p. 11-2-3.)
- Install the throttle body. (See pp. 11-4-63 f..)
- Install the air cleaner box.
- Install the fuel tank. (See p. 11-4-50.)

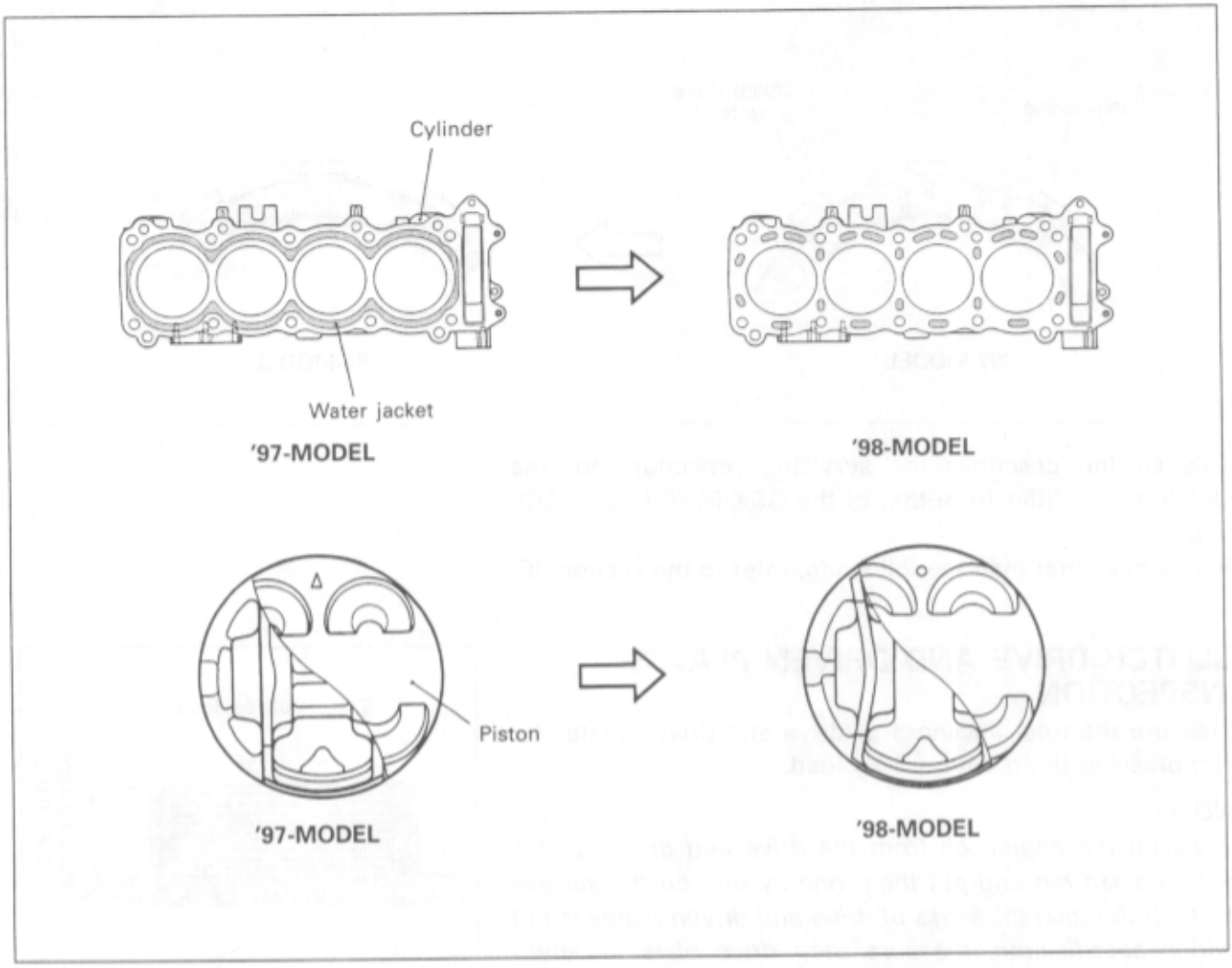








CYLINDER/PISTON

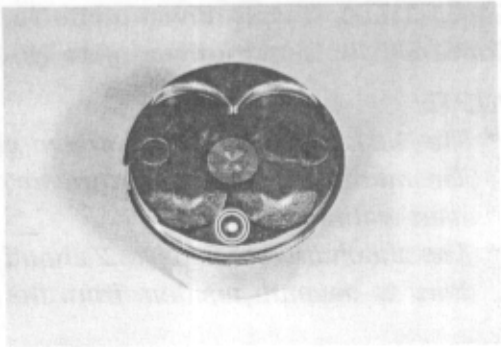


This section describes the servicing procedure for the piston which differ from that of the GSX-R750V ('97-MODEL). For details other than the following, refer to the section 3B.

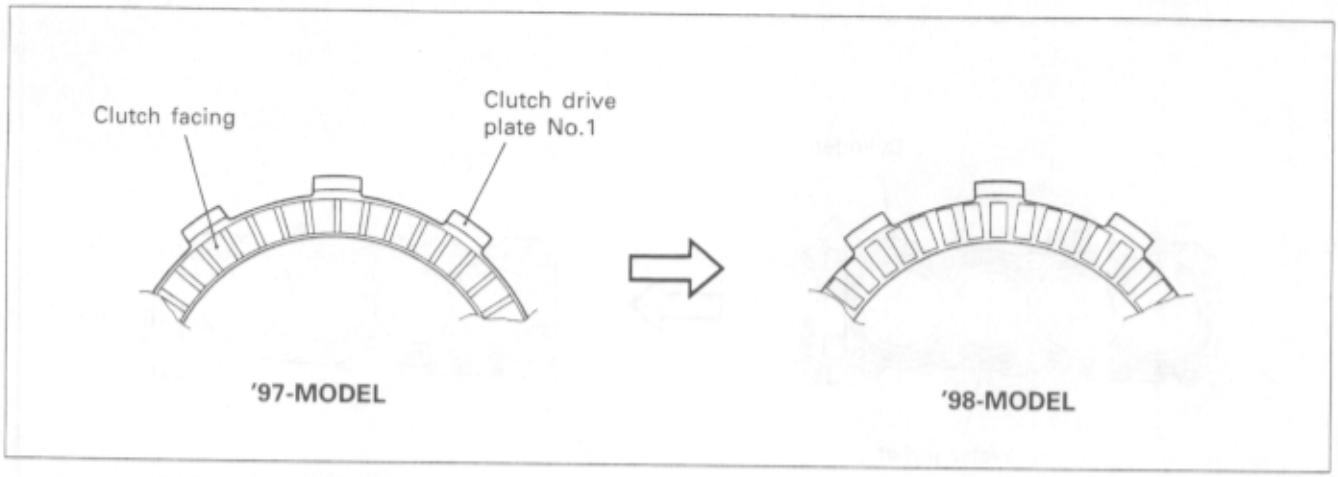
CYLINDER/PISTON INSTALLATION

- When fitting the piston, turn the punched mark on the piston head to exhaust side.

NOTE:
For the other installation details, refer to the section 3B.



CLUTCH

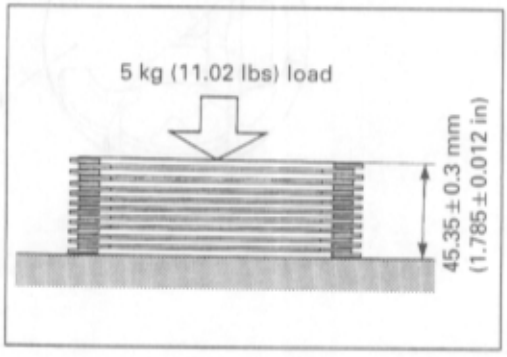


This section describes the servicing procedure for the clutch which differ from that of the GSX-R750V ('97-MODEL).
For details other than the following, refer to the section 3C.

CLUTCH DRIVE AND DRIVEN PLATES INSPECTION

Measure the total thickness of drive and driven plates by compressing them with a 5 kg load.

NOTE:
Wipe off the engine oil from the drive and driven plates with a clean rag and put them one by one on the surface plate. If the total thickness of drive and driven plates is not within specification, measure each drive plate thickness and driven plate distortion. To adjust the total thickness, replace the clutch plates with new ones or vary the number of clutch driven plate No.2 in the combination.



Total thickness of drive and driven plates	45.35 ± 0.3 mm at 5 kg load (1.785 ± 0.012 in at 11.02 lbs load)

PARTS SUPPLY DATA
21441-31E50: Clutch drive plate No.1 (9 pcs)
21442-31E00: Clutch drive plate No.2 (1 pc)
21451-31E00: Clutch driven plate No.1 (5–8 pcs)
21451-31E10: Clutch driven plate No.2 (4–1 pcs)

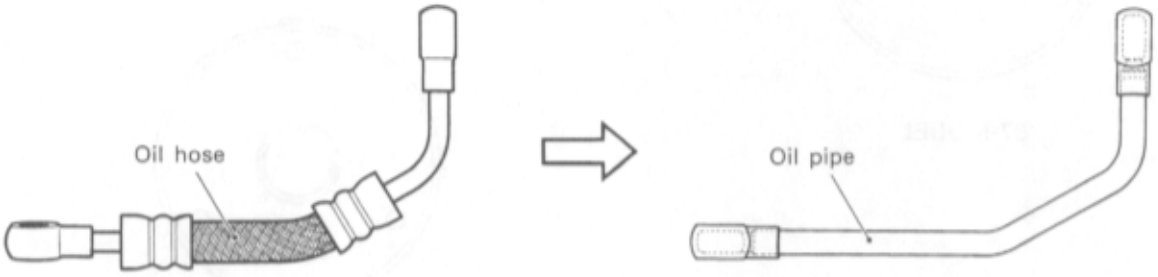
NOTE:
* *The No.1 and No.2 clutch driven plates are 9 in number. The number of the clutch driven plate No.2 should be used within 4 pcs.*
* *The clutch driven plate No.2 should be installed between third to seventh position from the pressure plate.*

ENGINE LUBRICATION SYSTEM

The number of the oil pump driven gear washer has been changed as follows.



'97-MODEL '98-MODEL

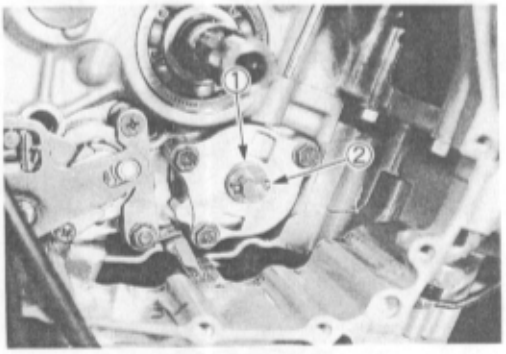


'97-MODEL '98-MODEL

This section describes the servicing procedure for the oil pump which differ from that of the GSX-R750V ('97-MODEL).
For details other than the following, refer to the section 3D.

OIL PUMP INSTALLATION

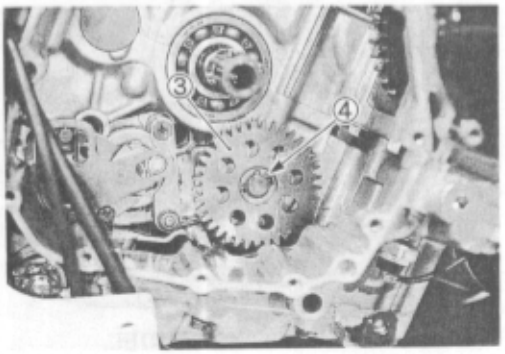
- Install the washer ① and the pin ②.



- Fix the oil pump driven gear ③ with the circlip ④.

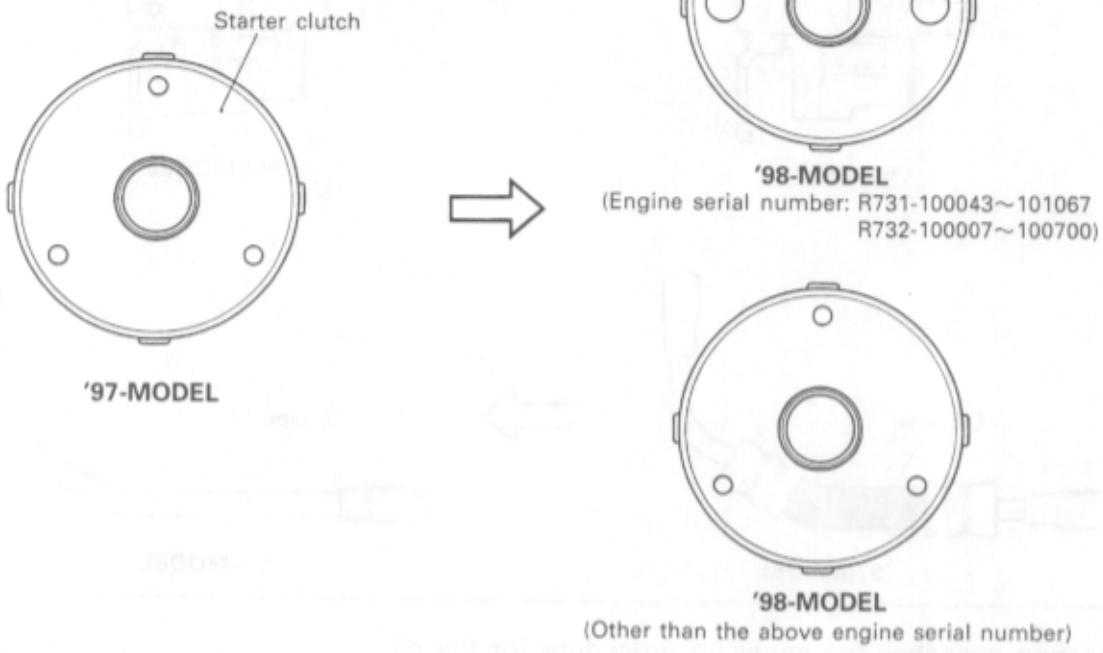
09900-06107: Snap ring pliers

NOTE:
For the other installation details, refer to the section 3D.



STARTER SYSTEM/SIGNAL GENERATOR

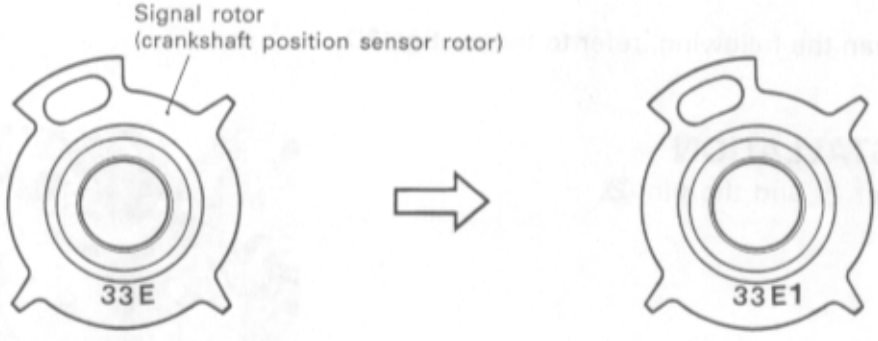
The starter clutch, starter clutch cover and crankshaft position sensor rotor have been changed as follows.



'97-MODEL

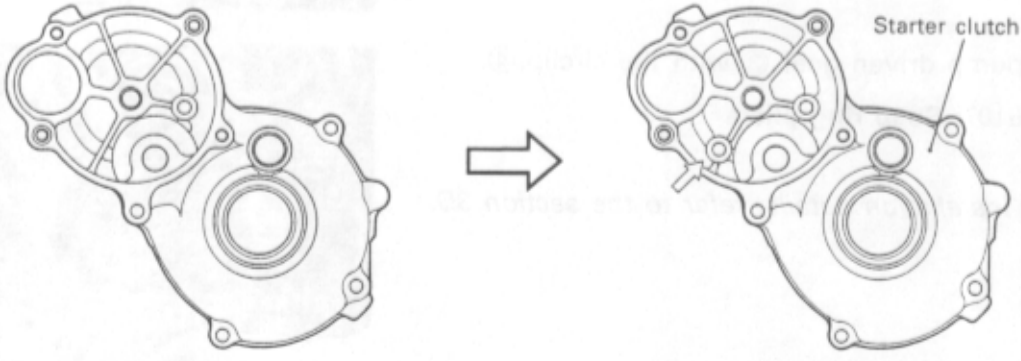
'98-MODEL
(Engine serial number: R731-100043~101067
R732-100007~100700)

'98-MODEL
(Other than the above engine serial number)



'97-MODEL

'98-MODEL



'97-MODEL

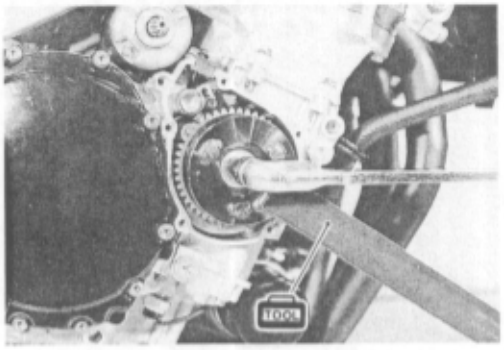
'98-MODEL

This section describes the servicing procedures for the starter system and signal generator which differ from those of the GSX-R750V ('97-MODEL).
For details other than the following, refer to the section 3E.

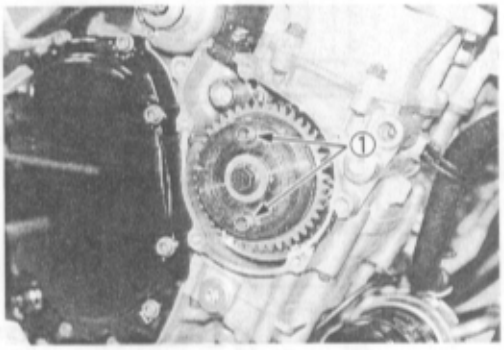
STARTER CLUTCH REMOVAL AND INSTALLATION

- When removing or tightening the starter clutch bolt, hold the starter clutch with the special tool.

TOOL **09920-34830: Starter clutch holder**

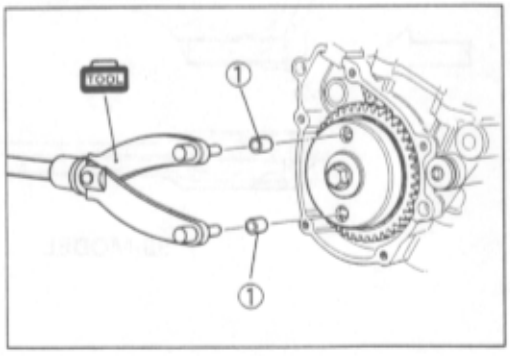


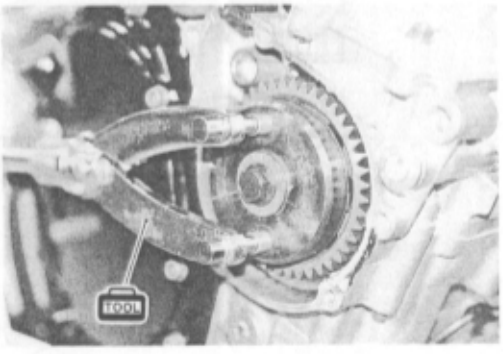
NOTE:
When the following engine serial numbers are stamped, use the special tool and the spacers as follows.
(R731-100043~101067
R732-100007~100700)



- Install the spacers (Part No. 09180-08140) ① or a suitable size spacers to the starter clutch.
- Hold the starter clutch with the rotor holder.

TOOL **09930-40113: Rotor holder**

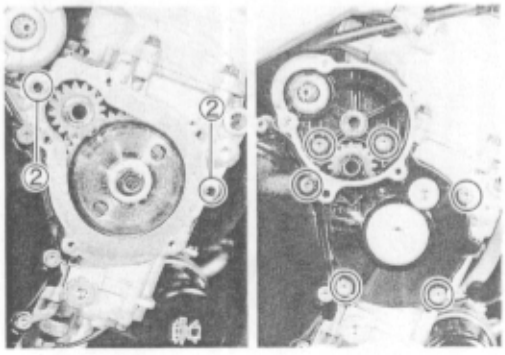




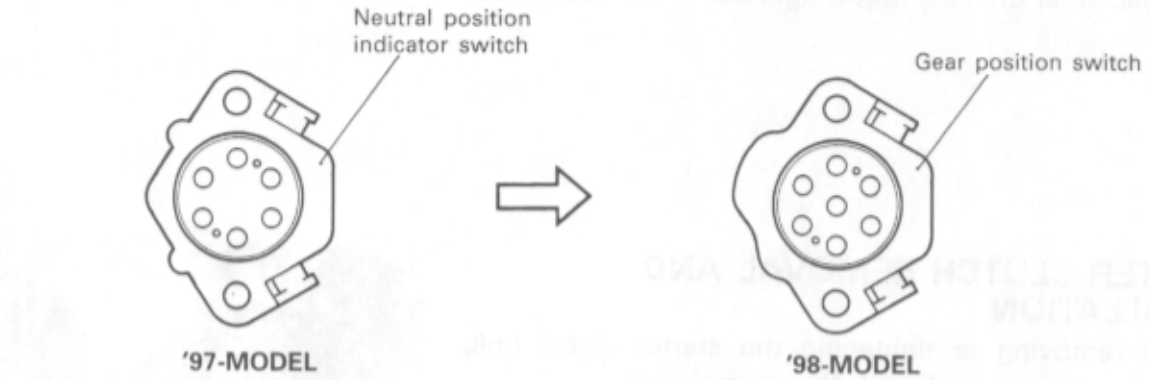
- When installing the starter clutch cover, install the dowel pins ② and tighten its bolts securely.

⚠ CAUTION

Use a new gasket to prevent oil leakage.



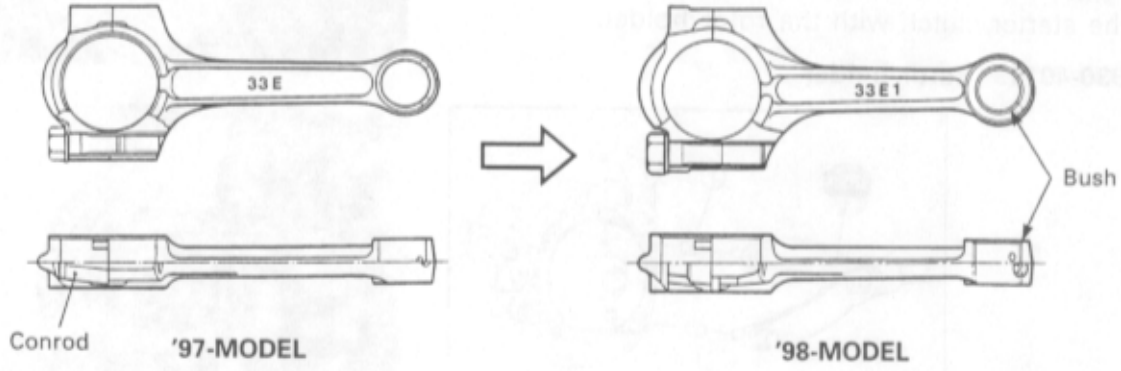
CRANKCASE/TRANSMISSION/CRANKSHAFT/CONROD



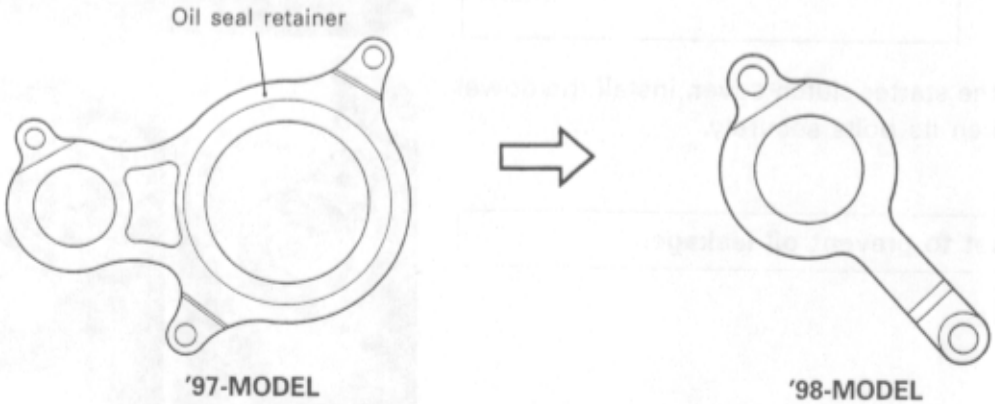
'97-MODEL '98-MODEL



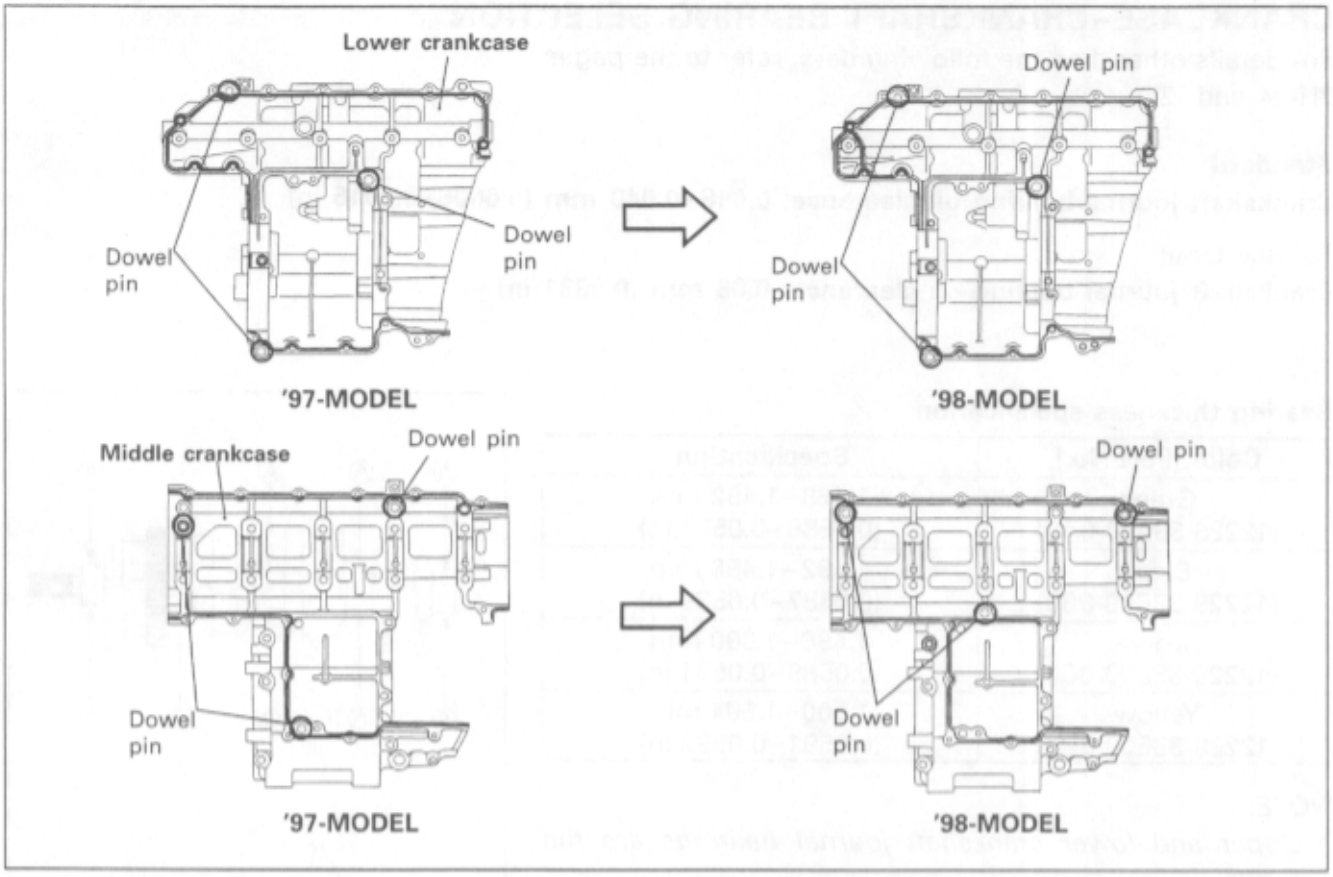
'97-MODEL '98-MODEL



'97-MODEL '98-MODEL



'97-MODEL '98-MODEL



This section describes the servicing procedures for the crankcase, transmission, crankshaft and conrod which differ from those of the GSX-R750V ('97-MODEL).

ENGINE REMOVAL

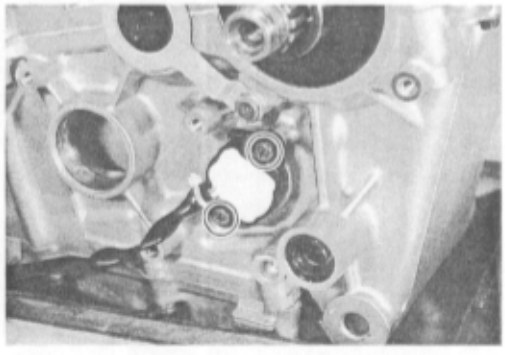
See pp. 11-3-2 ff..
See pp. 3-2 ff..

ENGINE DISASSEMBLY

For details other than the following, refer to the section 3H.

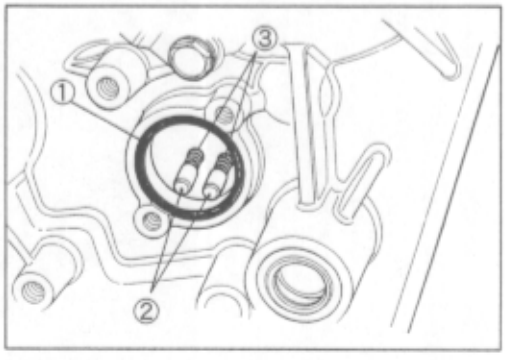
GEAR POSITION SWITCH REMOVAL

- Remove the gear position switch.



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

NOTE:
Do not lose the O-ring ①, switch contacts ② and springs ③.



CRANKCASE–CRANKSHAFT BEARING SELECTION

For details other than the following data, refer to the pages 3H-24 and -25.

Standard

Crankshaft journal bearing oil clearance: 0.016–0.040 mm (0.0006–0.0016 in)

Service Limit

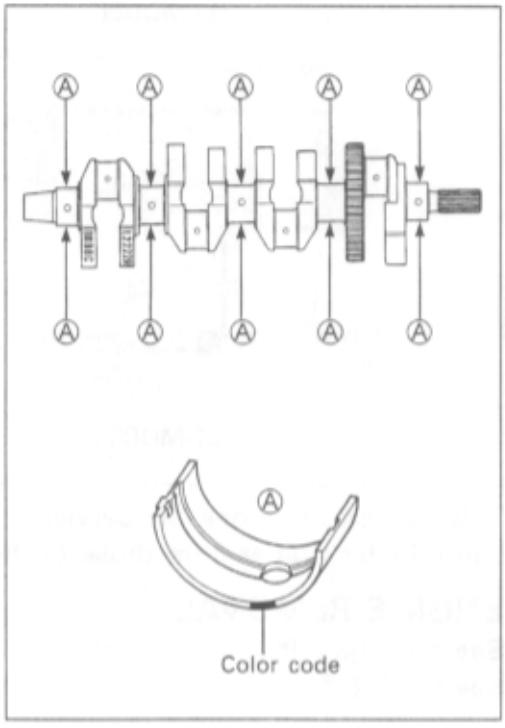
Crankshaft journal bearing oil clearance: 0.08 mm (0.0031 in)

Bearing thickness specification

Color (Part No.)	Specification
Green (12229-33E00-0A0)	1.488–1.492 mm (0.0586–0.0587 in)
Black (12229-33E00-0B0)	1.492–1.496 mm (0.0587–0.0589 in)
Brown (12229-33E00-0C0)	1.496–1.500 mm (0.0589–0.0591 in)
Yellow (12229-33E00-0D0)	1.500–1.504 mm (0.0591–0.0592 in)

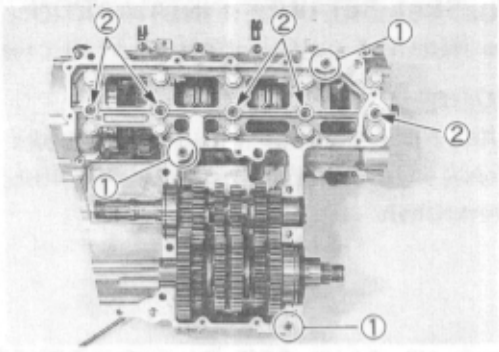
NOTE:

* *Upper and lower crankshaft journal bearings are the same.*
* *Refer to page 3H-28 for bearing installation.*



LOWER CRANKCASE/TRANSMISSION INSTALLATION

For details other than the following, refer to the section 3H.

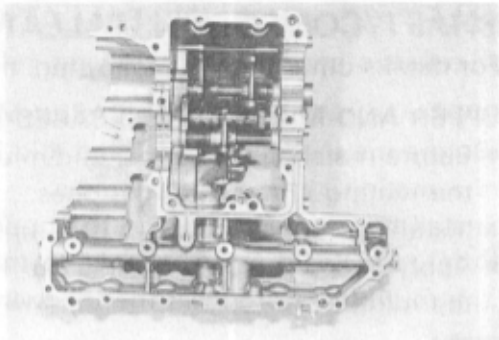


LOWER AND MIDDLE CRANKCASES MATCHING

- Before matching the middle and lower crankcases, clean the mating surfaces of the ones.
- Install the dowel pins ① to the middle crankcase.
- Fit the O-rings ② to the correct positions.

⚠ CAUTION

Replace the O-rings with new ones to prevent oil leakage.



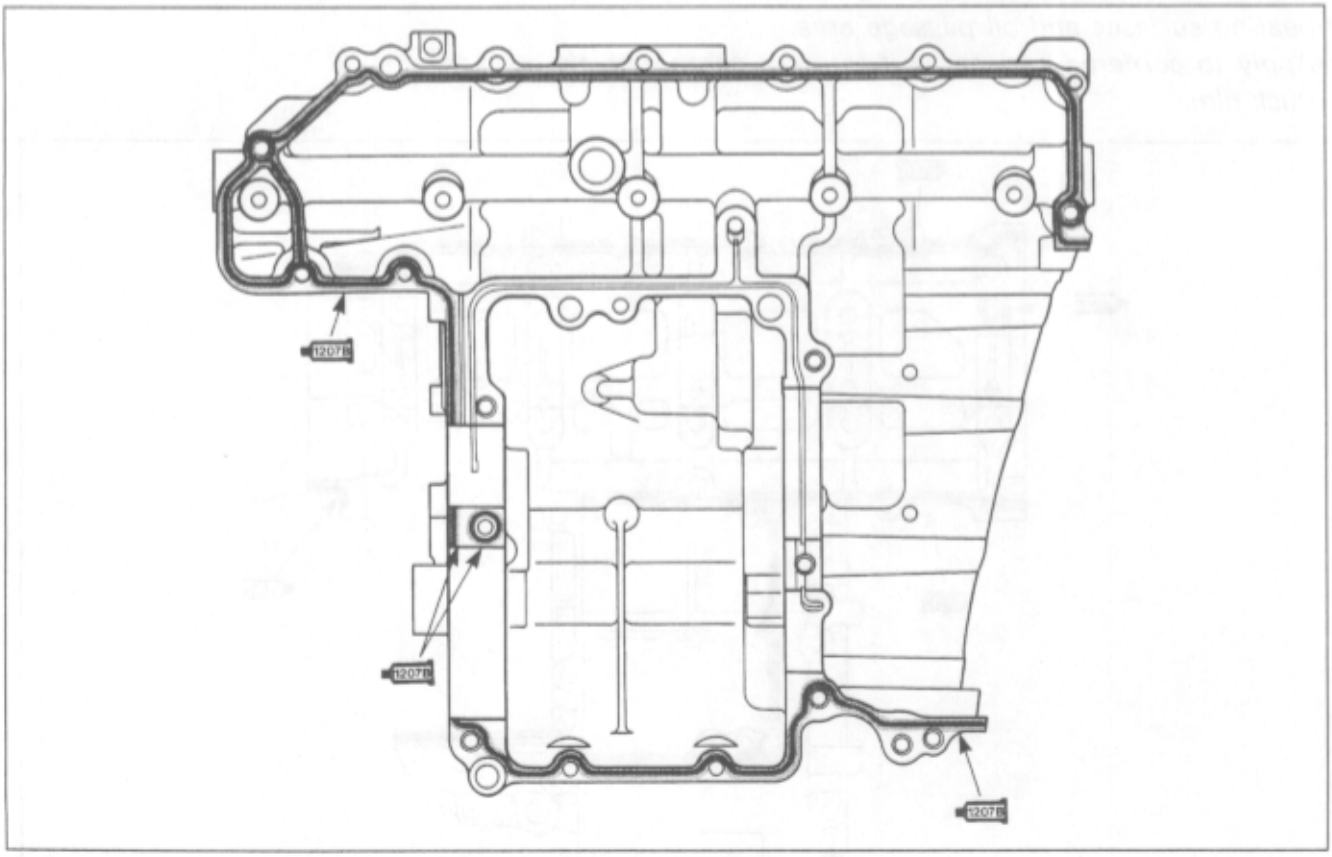
- Apply SUZUKI BOND "1207B" to the mating surface of the lower crankcase in the following procedure.

1207B 99104-31140: SUZUKI BOND "1207B"

NOTE:

Use of SUZUKI BOND "1207B" is as follows:

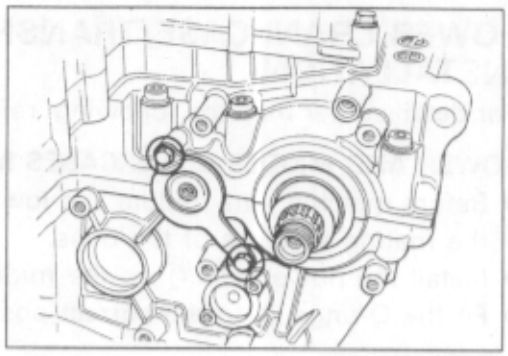
* *Make surfaces free from moisture, oil, dust and other foreign materials.*
* *Spread on surfaces thinly to form an even layer, and assemble the cases within few minutes.*
* *Take extreme care not to apply any BOND "1207B" to the bearing surfaces and oil passage area.*
* *Apply to cornered surface as it forms a comparatively thick film.*



OIL SEAL RETAINER INSTALLATION

- Install the oil seal retainer with two bolts.

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



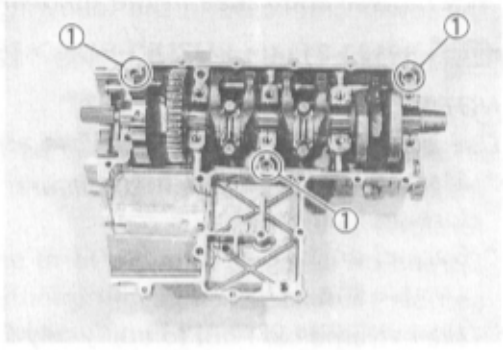
UPPER AND MIDDLE CRANKCASES/CRANKSHAFT/CONROD INSTALLATION

For details other than the following, refer to the section 3H.

UPPER AND MIDDLE CRANKCASES MATCHING

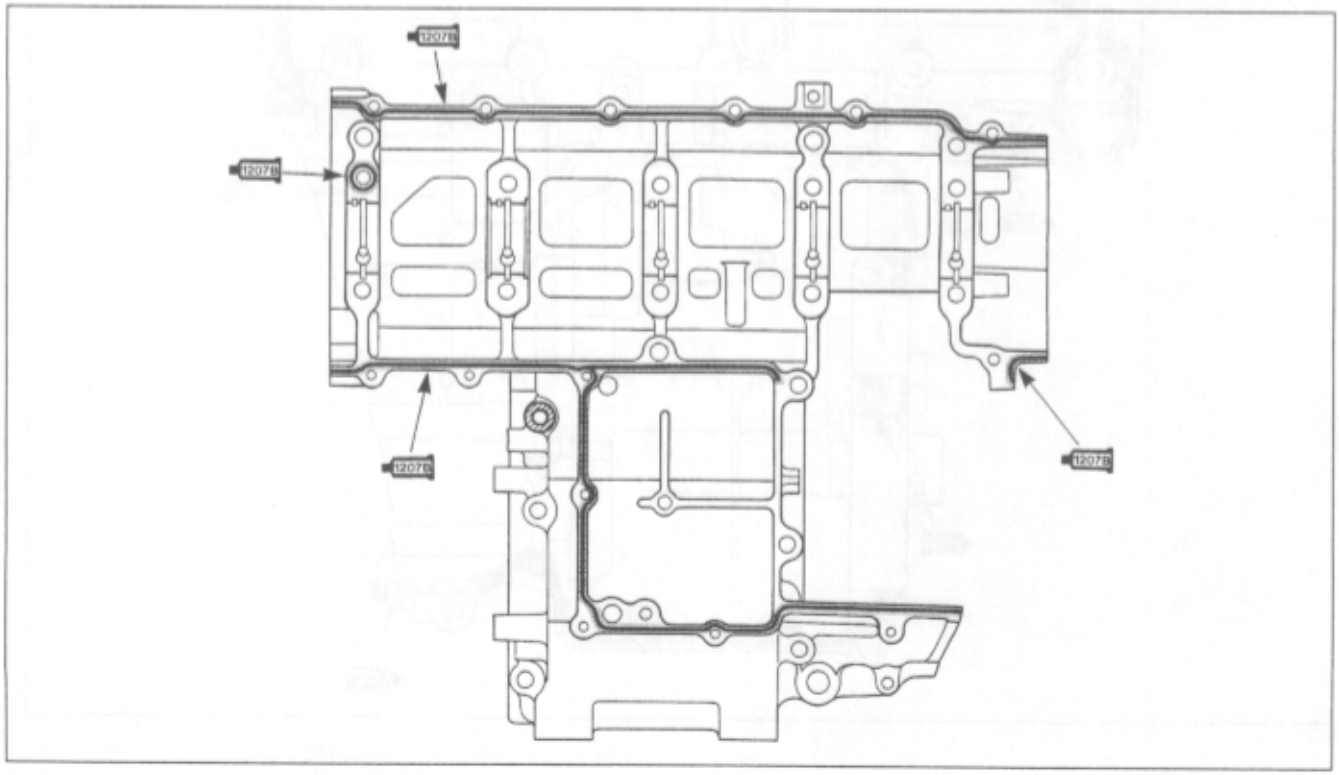
- Before matching the upper and middle crankcases, clean the mating surfaces of the ones.
- Install the dowel pins ① to the upper crankcase.
- Apply SUZUKI BOND "1207B" to the mating surface of the middle crankcase in the following procedure.

1207B **99104-31140: SUZUKI BOND "1207B"**



NOTE:
Use of SUZUKI BOND "1207B" is as follows:

* *Make surfaces free from moisture, oil, dust and other foreign materials.*
* *Spread on surfaces thinly to form an even layer, and assemble the cases within few minutes.*
* *Take extreme care not to apply any BOND "1207B" to the bearing surfaces and oil passage area.*
* *Apply to cornered surface as it forms a comparatively thick film.*



FI SYSTEM AND INTAKE AIR SYSTEM

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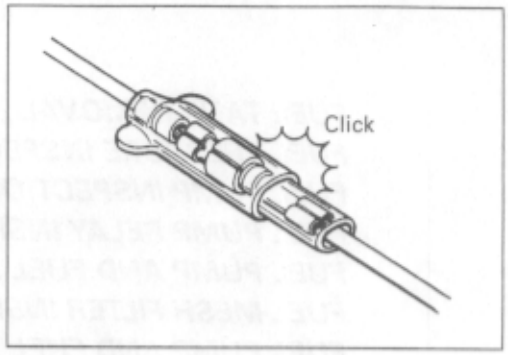
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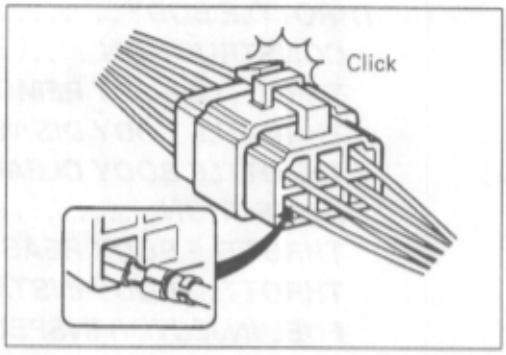
PRECAUTIONS IN SERVICING

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

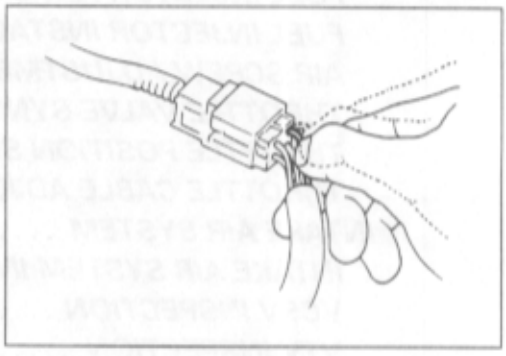
CONNECTOR/COUPLER

- 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 before disconnecting it and push it in fully till the lock works when connecting it.
- When disconnecting the coupler, be sure to hold the coupler itself and do not pull the lead wires.
- Inspect each terminal on the connector/coupler for being loose or bent.
- Inspect each terminal for corrosion and contamination. Dirt or corrosion on the terminals. The terminals must be clean and free of any foreign material which could impede proper terminal contact.

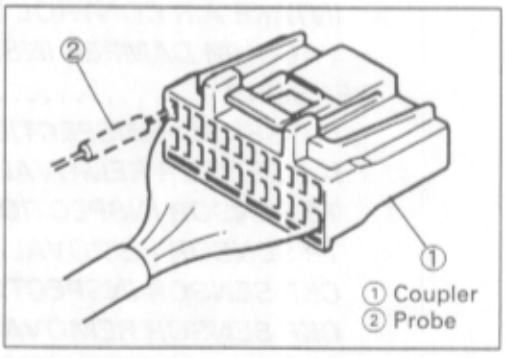




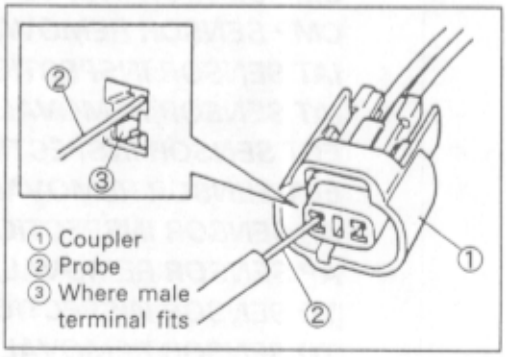
- Inspect each wire harness in problem circuits for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



- 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.

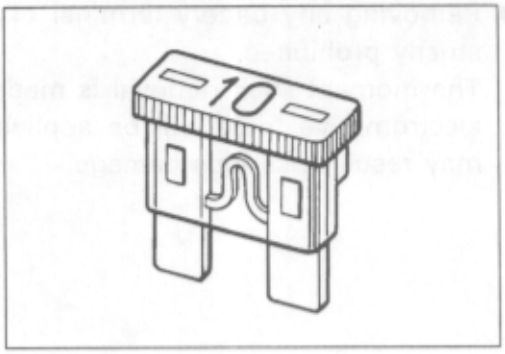


- When connecting meter probe from the terminal side of the coupler because it can't be connected from the harness side, use extra care not to bend the male terminal of the coupler of force its female terminal open for connection.
  In case of such coupler as shown connect probe as shown to avoid opening female terminal.
  Never connect probe where male terminal is supposed to fit.
- When checking the connection of the terminals, check its male half for bend and female half for excessive opening and both for locking (looseness), corrosion, dust, etc.



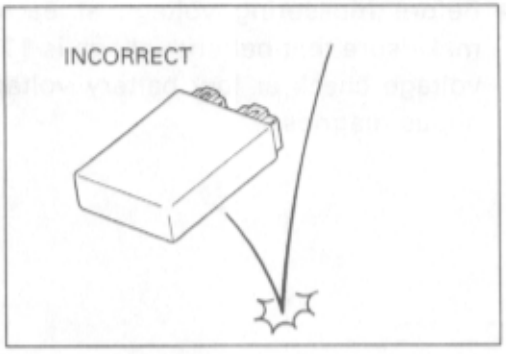
FUSE

- 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.

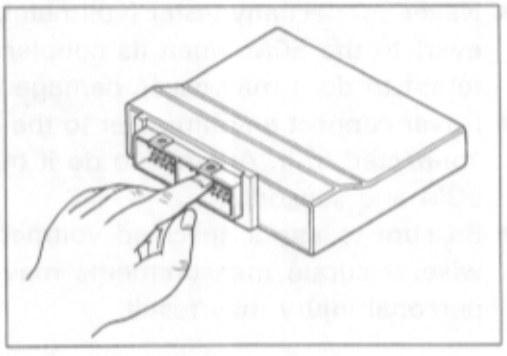


ECM/VARIOUS SENSORS

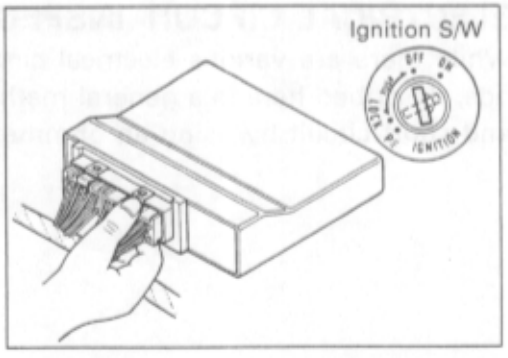
- Since each component is a high-precision part, great care should be taken not to apply any sharp impacts during removal and installation.



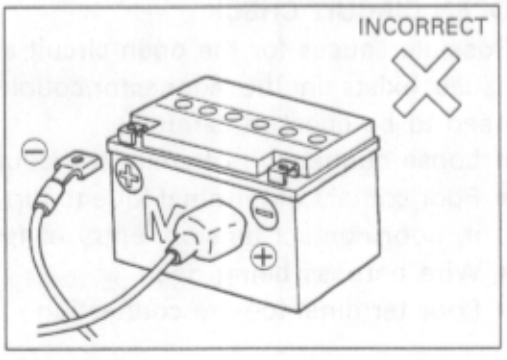
- Be careful not to touch the electrical terminals of the ECM. The static electricity from your body may damage this part.



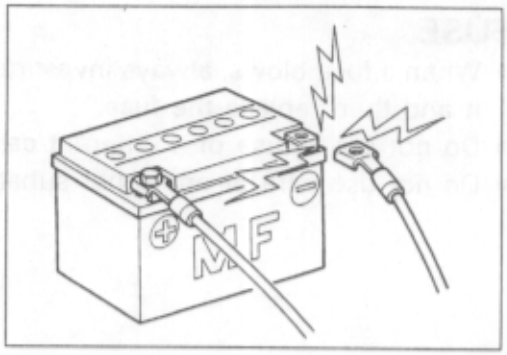
- When disconnecting and connecting the ECM couplers, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



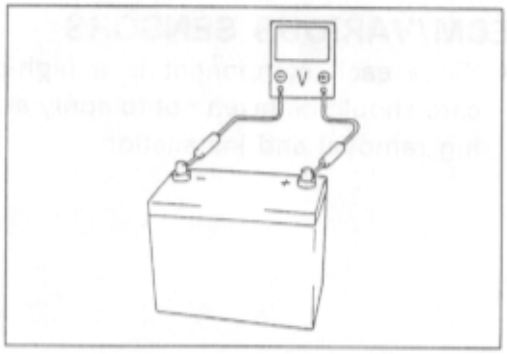
- Battery connection in reverse polarity is strictly prohibited. Such wrong connection will damage the components of the FI system instantly when reverse power is applied.



- 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 11V or higher. Terminal voltage check at low battery voltage will lead to erroneous diagnosis.



- Never connect any tester (voltmeter, ohmmeter, or whatever) to the ECM when its coupler is disconnected. Attempt to do it may cause damage to it.
- Never connect an ohmmeter to the ECM with its coupler connected to it. Attempt to do it may cause damage to ECM and sensors.
- Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be obtained or personal injury may result.

ELECTRICAL CIRCUIT INSPECTION PROCEDURE

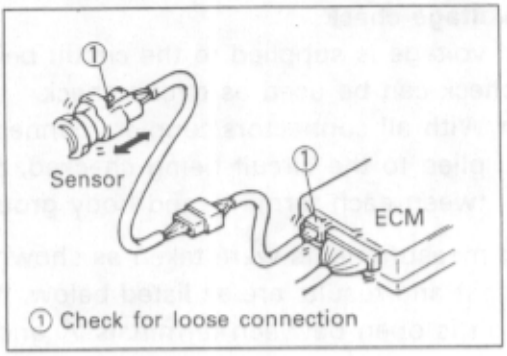
While there are various electrical circuit inspection methods, described here is a general method to check its open and short circuit by using an ohmmeter and a voltmeter.

OPEN CIRCUIT CHECK

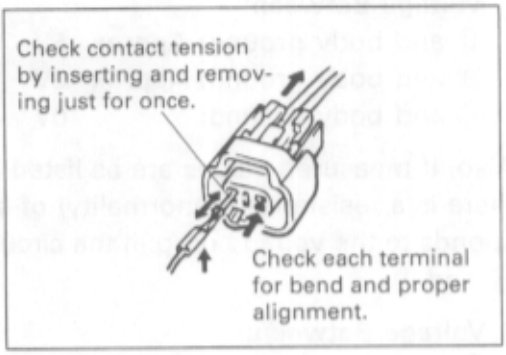
Possible causes for the open circuit are as follows. As the cause exists in the connector/coupler or terminal. They need to be checked carefully.

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

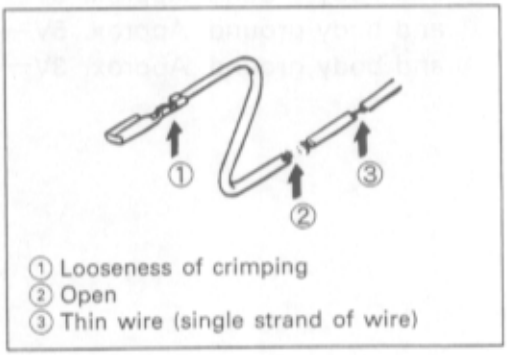
- Disconnect the negative cable from the battery.
- Check each connector/coupler at both ends of the circuit being checked for loose connection. Also check lock condition of the coupler if equipped with coupler lock.



- Using a test male terminal, check both terminals of the circuit being checked for contact tension of its female terminal.
  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 locked in the coupler fully.
  If contact tension is not enough, reform it to increase contact tension or replace.
  Dirt or corrosion on the terminals. The terminals must be clean and free of any foreign material which could impede proper terminal contact.

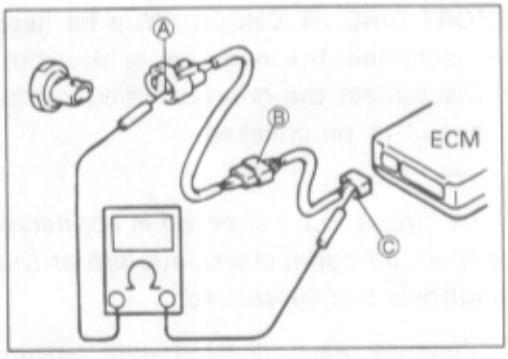


- Using continuity check or voltage check procedure as described below, check the wire harness for open circuit and poor connection with its terminals. Locate abnormality, if any.

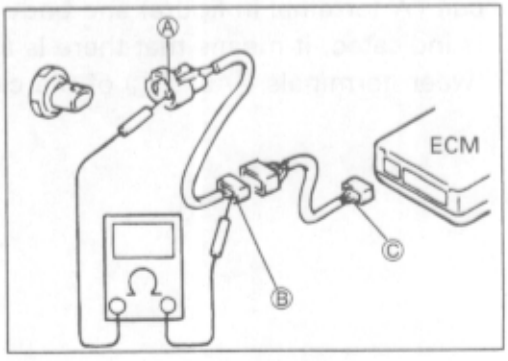


Continuity check

- Measure resistance between coupler terminals at both ends of the circuit being checked (between Ⓐ and Ⓒ in the figure).
  If no continuity is indicated (infinity or over limit), that means that the circuit is open between terminals Ⓐ and Ⓒ.



- Disconnect the coupler included in the circuit (coupler Ⓑ in the figure) and measure resistance between terminals Ⓐ and Ⓑ.
  If no continuity is indicated, that means that the circuit is open between terminals Ⓐ and Ⓑ. If continuity is indicated, there is an open circuit between terminals Ⓑ and Ⓒ or an abnormality in coupler Ⓑ.



Voltage check

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

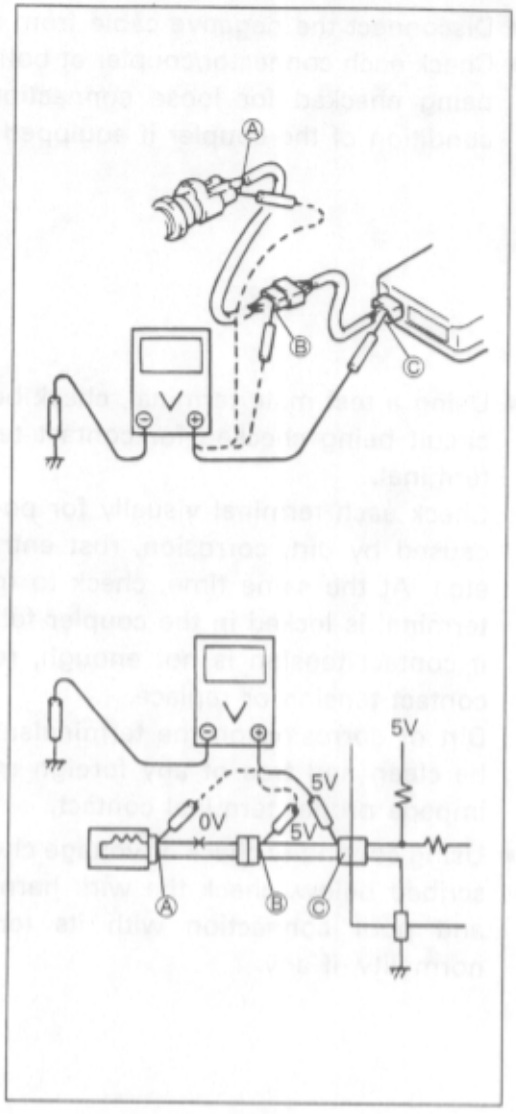
- With all connectors/couplers connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.

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

Also, if measured values are as listed below, it means that there is a resistance (abnormality) of such level that corresponds to the voltage drop in the circuit between terminals Ⓐ and Ⓑ.

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

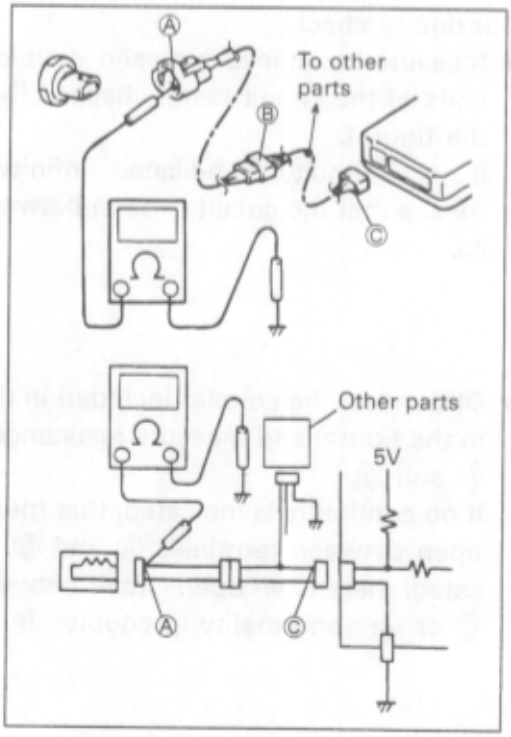


SHORT CIRCUIT CHECK (Wire harness to ground)

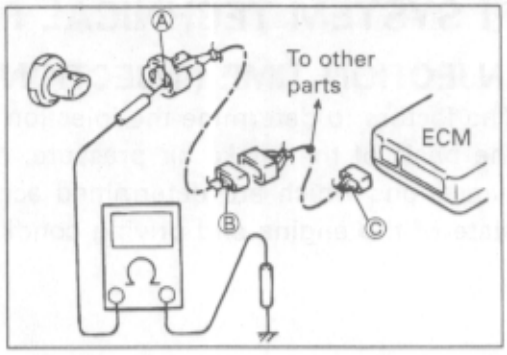
- Disconnect the negative cable from the battery.
- Disconnect the connectors/couplers at both ends of the circuit to be checked.

NOTE:
If the circuit to be checked is connected to other parts, 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, it means that there is a short to ground between terminals Ⓐ and Ⓒ of the circuit.



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



USING TESTERS

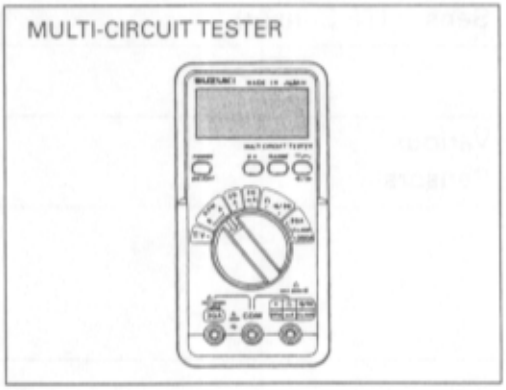
- Use the Suzuki multi-circuit tester (09900-25008).
- Use well-charged batteries in the tester.
- Be sure to set the tester to the correct testing range.
- Since the resistance may differ depending on the tester used and the temperature, the resistance should be set to the specification.

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, also measure the resistance with no-load. Subtract that resistance from the resistance measured under load in order to get the true resistance.

(Measured resistance) − (No-load resistance) = (True resistance)

- When measuring the resistance with the multi-circuit tester, ∞ becomes 10.00MΩ 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 it off.



Multi-circuit tester: 09900-25008

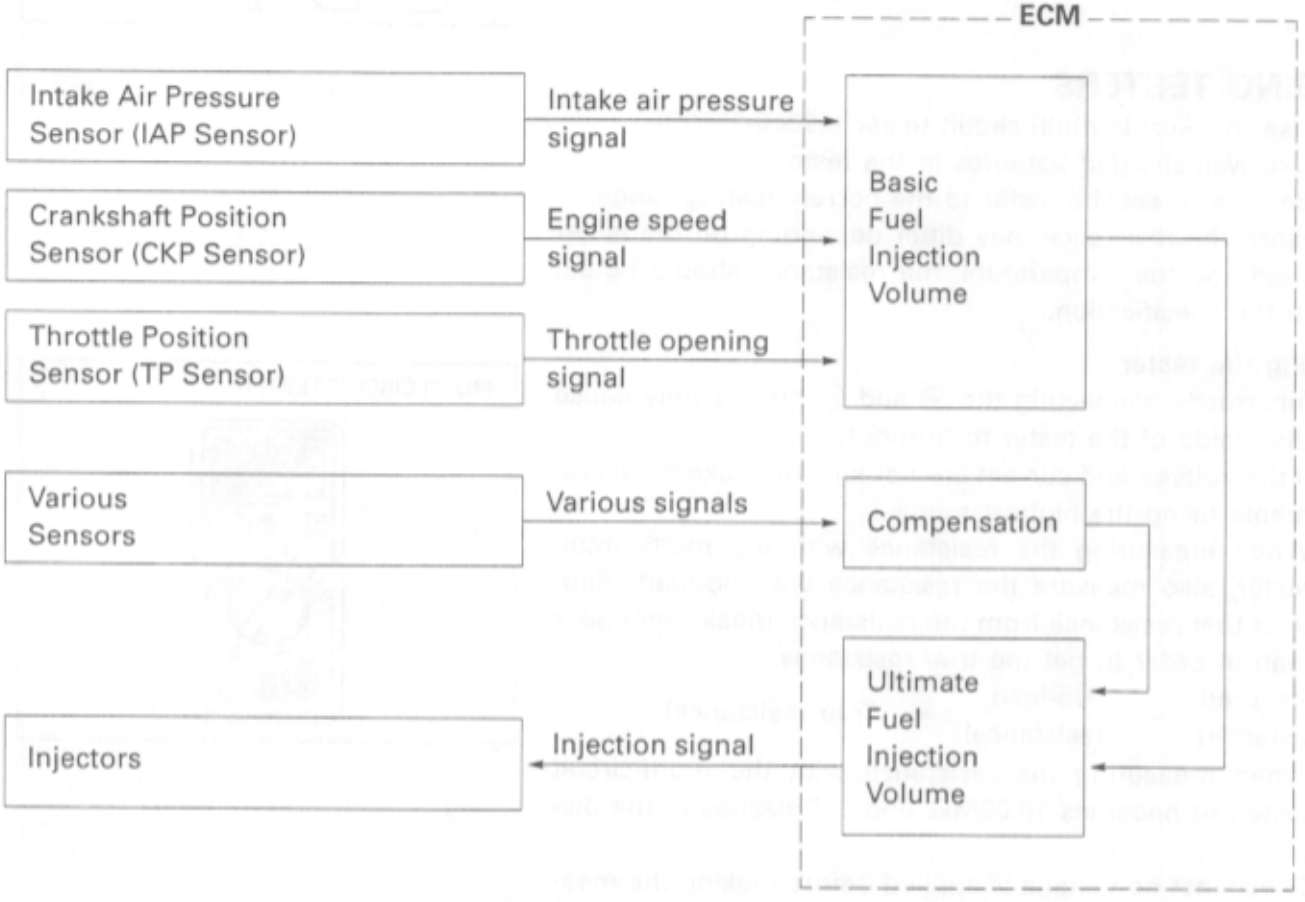
NOTE:

* *When connecting the multi-circuit tester, install the copper stings (O.D is below 0.5 mm) to the back side of the lead wire coupler and connect the probes of tester to them.*
* *Use the copper sting, its outer diameter is below 0.5 mm, to prevent damaging the rubber of the water proof coupler.*

FI SYSTEM TECHNICAL FEATURES

INJECTION TIME (INJECTION VOLUME)

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



COMPENSATION OF THE INJECTION TIME (VOLUME)

The various sensors to make compensations in the fuel injection time (volume) according to the following signals.

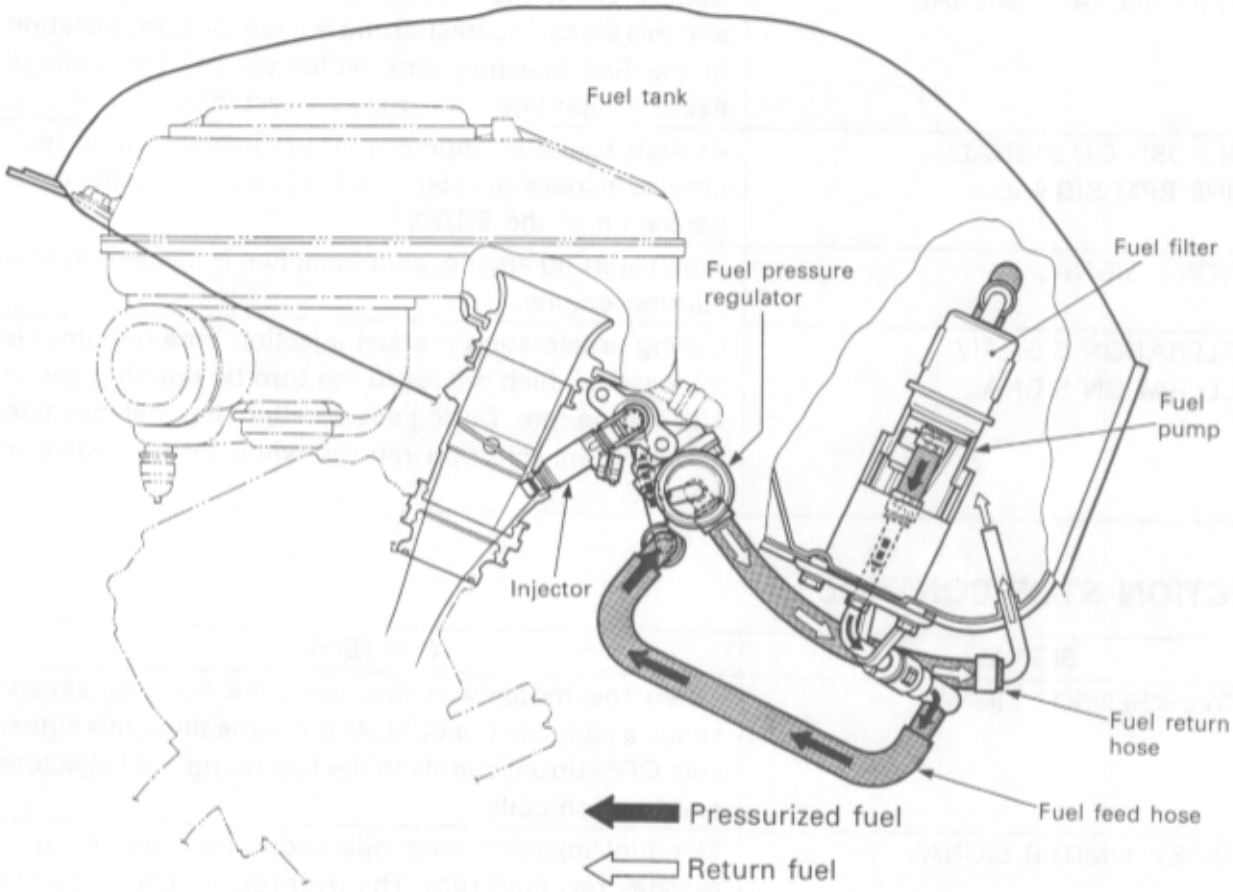
SIGNAL	CONTENTS
ATMOSPHERIC PRESSURE SENSOR SIGNAL	When atmospheric pressure is low, the sensor sends the signal to the ECM and reduce the injection time (volume).
ENGINE COOLANT TEMPERATURE SENSOR SIGNAL	When engine coolant temperature is low, injection time (volume) is increased.
INTAKE AIR TEMPERATURE SENSOR SIGNAL	When intake air temperature is low, injection time (volume) is increased.
BATTERY VOLTAGE SIGNAL	Battery voltage is supplied to the ECM for operation, and this signal is detected and is used for compensation of the fuel injection time (volume). The low voltage needs longer injection time to adjust injection volume.
GEAR POSITION SIGNAL/ ENGINE RPM SIGNAL	At high speed of engine rpm, the injection time (volume) is increasing at 5th and 6th gears. This is the compensation of the SRAD.
STARTING SIGNAL	When starting engine, additional fuel is injected during starting engine.
ACCELERATION SIGNAL/ DECELERATION SIGNAL	During acceleration the fuel injection time (volume) is increased, which relates to the throttle opening speed and engine rpm. During deceleration, the fuel injection is cut. Then, injection returns when throttle valve is opened.

INJECTION STOP CONTROL

SIGNAL	CONTENTS
TIP OVER SENSOR SIGNAL	When the motorcycle tips over, the tip over sensor sends a signal to the ECM. At the same time, this signal cuts OFF current supply to the fuel pump, fuel injectors and ignition coils.
OVER-REV. LIMITER SIGNAL	The fuel injectors stop operation when engine rpm reaches rev. limit rpm. The over-rev. limiter stops the ignition system, and after that the injection stop signal is sent from the ECM.

FUEL DELIVERY SYSTEM

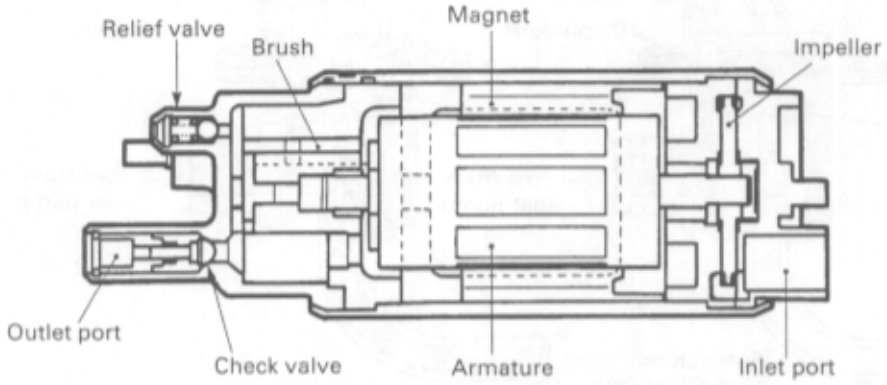
The fuel delivery system consists of the fuel tank, fuel pump, fuel filter, fuel feed hose, fuel delivery pipe (including fuel injectors), fuel pressure regulator and fuel return hose. The fuel in the fuel tank is pumped up by the fuel pump and pressurized fuel to flow into the injector installed in the fuel delivery pipe. As the fuel pressure applied to the fuel injector (the fuel pressure in the fuel delivery pipe) is always kept a certain amount higher than the vacuum pressure in the throttle body by the fuel pressure regulator, the fuel is injected into the throttle body in conic dispersion when the injector opens according to the injection signal from the ECM.
The fuel relieved by the fuel pressure regulator returns through the fuel return hose to the fuel tank.



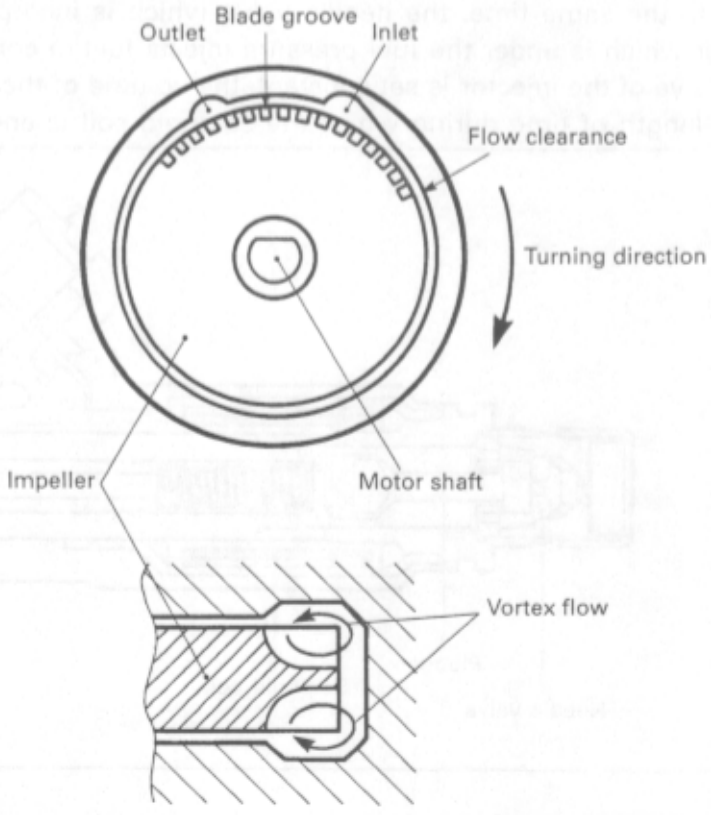
FUEL PUMP

The electric fuel pump located in the fuel tank consists of the armature, magnet, impeller, brush, check valve and relief valve. The ECM controls its ON/OFF operation as controlled under the FUEL PUMP CONTROL SYSTEM.

When electrical energy is supplied to the fuel pump, the motor in the pump runs and so does the impeller. This causes a pressure difference to occur between both sides of the impeller as there are many grooves around it. Then the fuel is drawn through the inlet port, and with its pressure increases, it is discharged through the outlet port. The fuel pump has a check valve to keep some pressure in the fuel feed hose even when the fuel pump is stopped and also the relief valve is equipped in the fuel pump, which controls when the outlet of the fuel pressure increases upto 4.5–6.5 kg/cm^2 (450–650 kPa, 64–92 psi), the relief valve opens and pressurized fuel is released to the fuel tank.



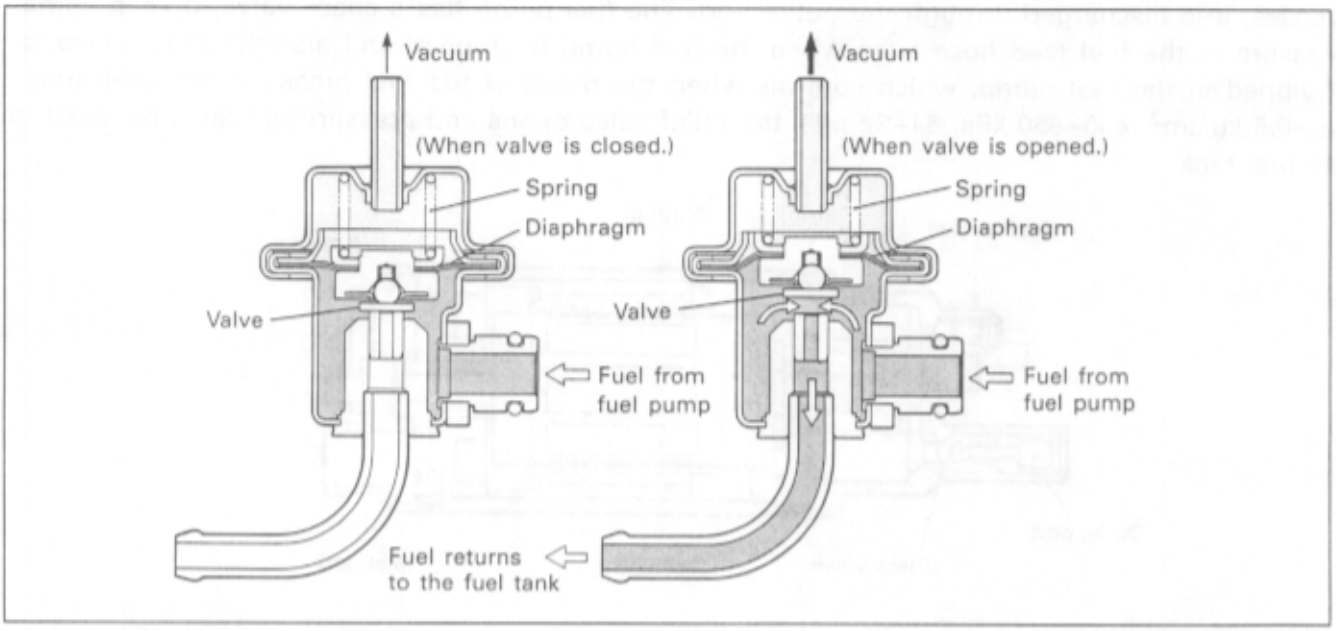
When the impeller is driven by the motor, pressure differential occurs between the front part and the rear part of the blade groove as viewed in angular direction due to fluid friction. This process continuously takes place causing fuel pressure to be built up. The pressurized fuel is then let out from the pump chamber and discharged through the motor section and the check valve.



FUEL PRESSURE REGULATOR

The fuel pressure regulator is diaphragm-operated relief valve consisting of the diaphragm, spring and valve. It keeps the fuel pressure applied to the injector 2.9 kg/cm^2 (290 kPa, 41 psi) higher than that in the throttle body at all times.

When the fuel pressure rises more than 2.9 kg/cm^2 (290 kPa, 41 psi) higher than the throttle body pressure, the fuel pushes the valve in the regulator open and excess fuel returns to the fuel tank via the fuel return hose.

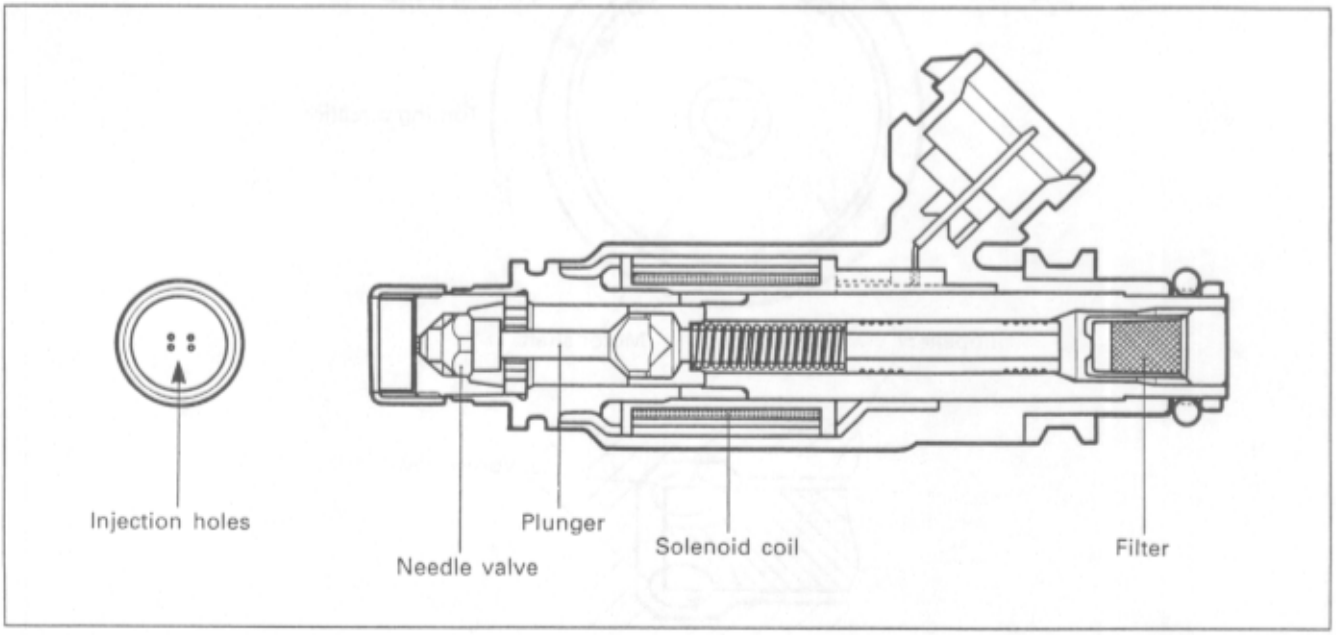


FUEL INJECTOR

The fuel injector consists of the solenoid coil, plunger, needle valve and filter.

It is an electromagnetic type injection nozzle which injects fuel in the throttle body according to the signal from the ECM.

When the solenoid coil of the injector is energized by the ECM, it becomes an electromagnet and attracts the plunger. At the same time, the needle valve which is incorporated with the plunger opens and the injector which is under the fuel pressure injects fuel in conic dispersion. As the lift stroke of the needle valve of the injector is set constant, the volume of the fuel injected at one time is determined by the length of time during which the solenoid coil is energized (injection time).



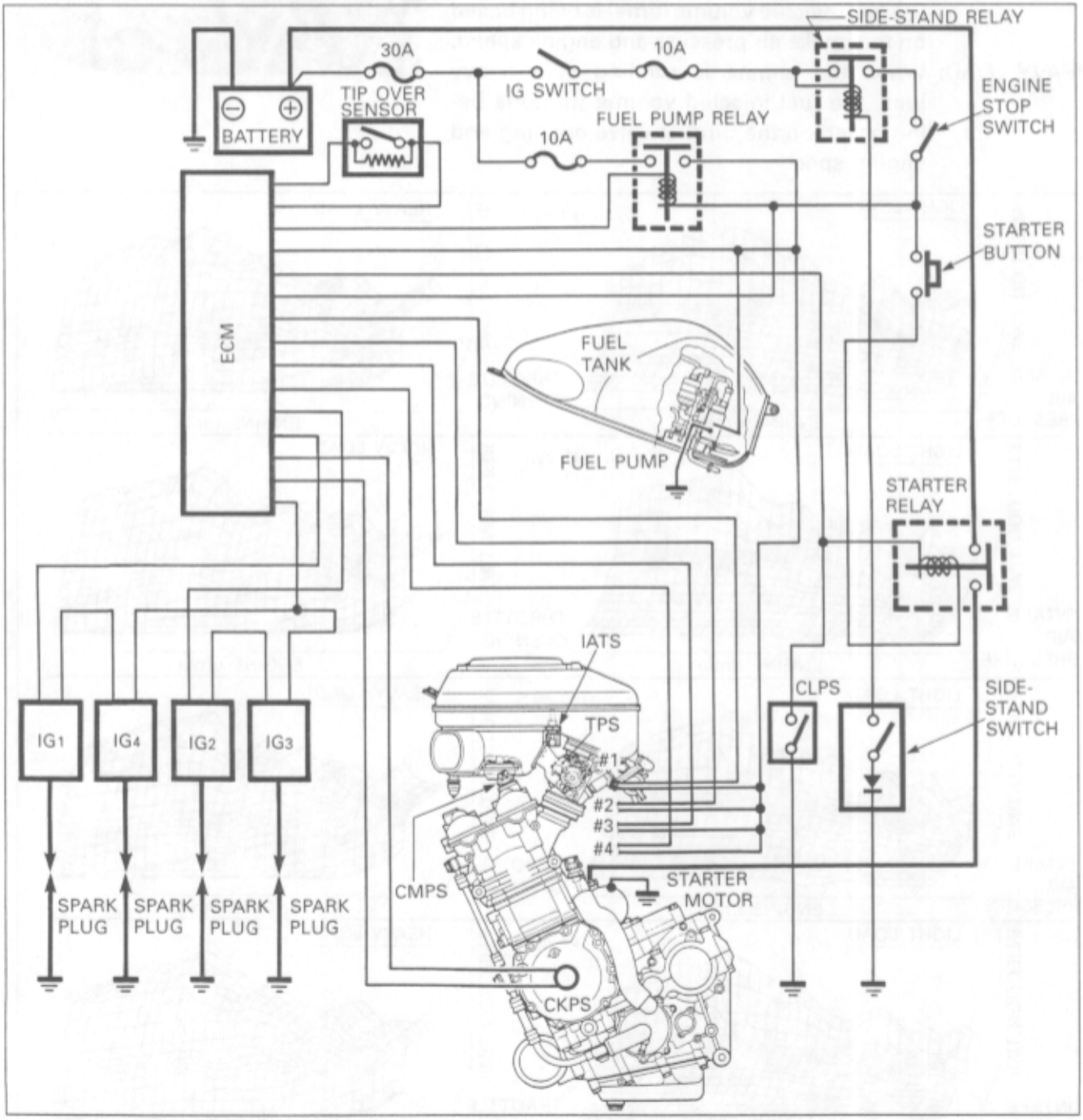
FUEL PUMP CONTROL SYSTEM

When the ignition switch is turned on, current from the battery flows to the fuel pump motor through the side-stand relay and the fuel pump relay causing the motor to turn.

Since the ECM has a timer function, the fuel pump motor stops turning in three seconds after the switch has been turned on.

Thereafter, when the crankshaft is turned by the starter motor or the engine has been started, the engine revolving signal is input to the ECM. Then, current flows to the fuel pump motor from the battery through the side-stand relay and the fuel pump relay so that the pump continues to function.

A tip over sensor is provided in the fuel pump control circuit. By this provision, anytime the motorcycle tips over, the tip over sensor sends a signal to the ECM to turn off power to the fuel pump relay, causing the fuel pump motor to stop. At the same time, current to the fuel injectors as well as the ignition coil is interrupted, which then stops the engine.



ECM (FI CONTROL UNIT)

The ECM is located under the seat.

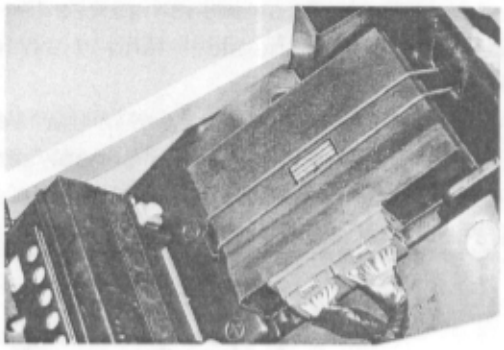
The ECM consists of CPU (Central Processing Unit), memory (ROM) and I/O (Input/Output) sections. The signal from each sensor is sent to the input section and then sent to CPU. On the basis of signal information received, CPU calculates the volume of fuel necessary for injection using maps programmed for varying engine conditions. Then, the operation signal of the fuel injection is sent from the output section to the fuel injector.

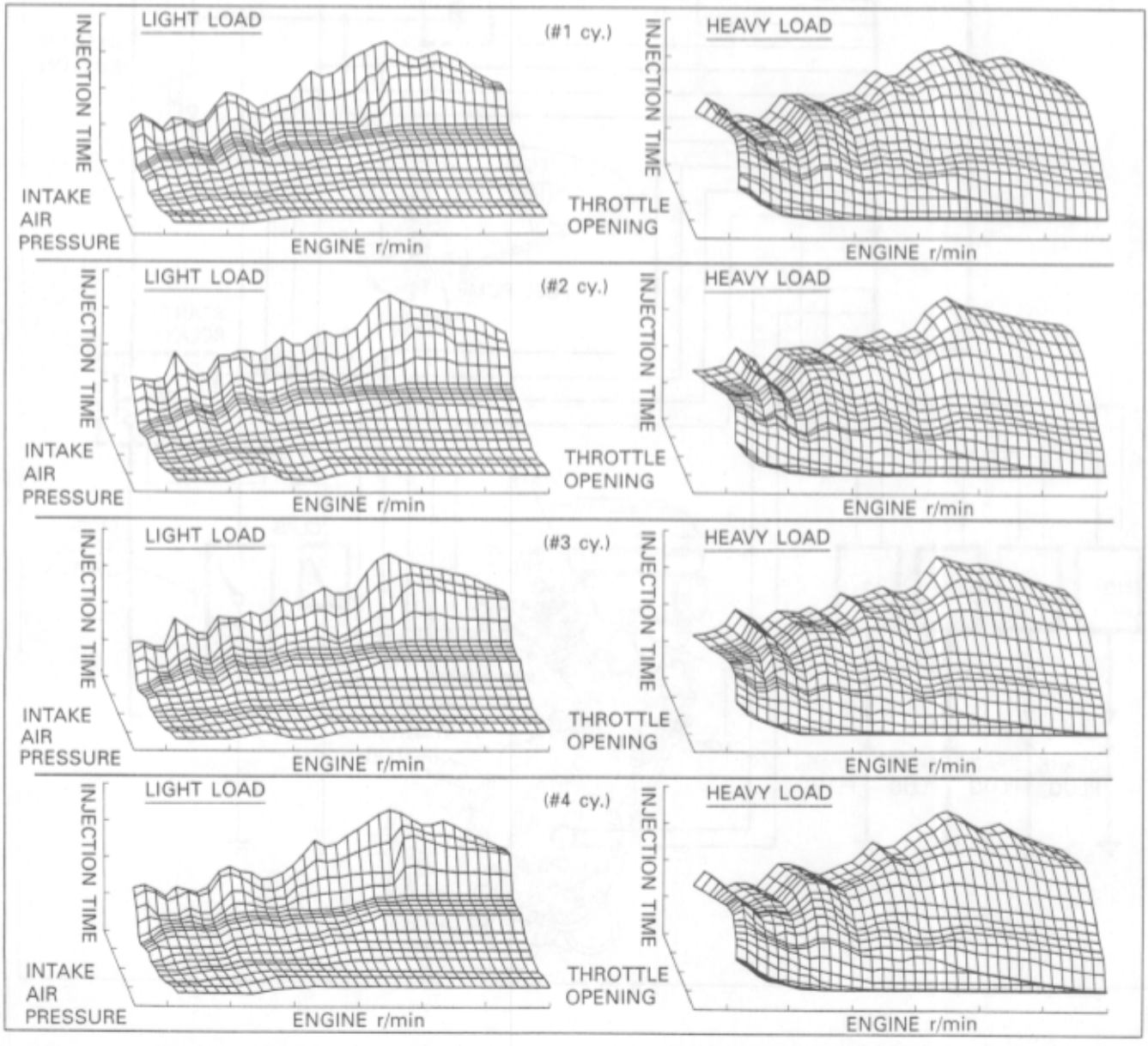
The eight kinds of independent program maps are programmed in the ROM.

These eight kinds of maps are designed to compensate for differences of the intake/exhaust systems and cooling performance.

LIGHT LOAD: When the engine is running in a light load, the fuel injected volume (time) is being based on the intake air pressure and engine speed.

HEAVY LOAD: When the engine is running in a heavy load, the fuel injected volume (time) is being based on the throttle valve opening and engine speed.



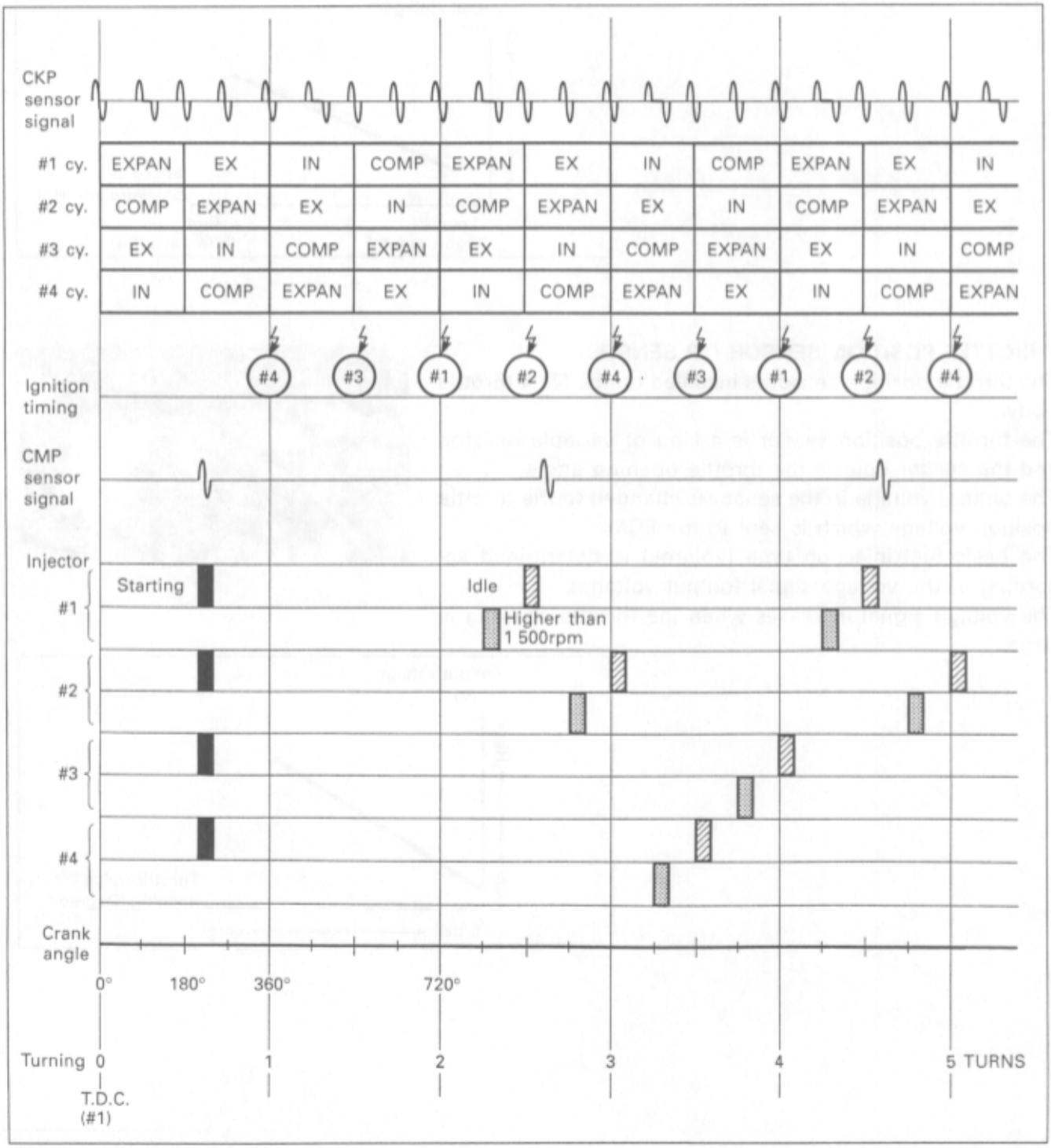


INJECTION TIMING

The system employs a sequential, four-cylinder independent injection type, using the crankshaft position sensor (signal generator) to determine the piston position (injection timing and ignition timing) and the camshaft position sensor to identify the cylinder during operation, and these information are sent to the ECM. This makes it possible to inject the optimum volume of fuel in the best timing for the engine operating conditions.

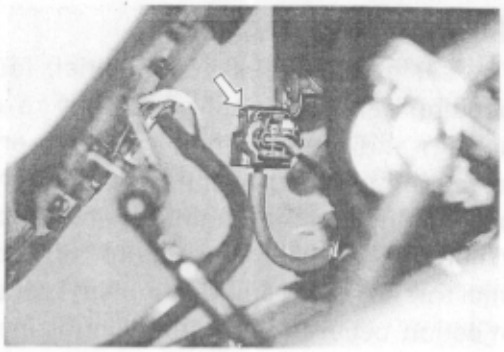
When the crankshaft begins to turn at the time of starting, the ECM sends the signals to the four injectors, #1, #2, #3 and #4, inject fuel simultaneously. From the second turn onward, the sequential injection occurs for a four-cylinder independent injection as explained above.

When the ECM detects engine revolution higher than 1 500 rpm which will shift the injection timing to early injection mode. Also, when the engine revolution drops, shift the injection timing to idle mode.

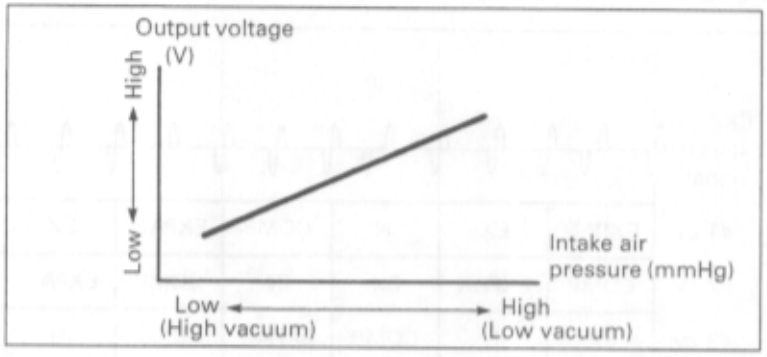


SENSORS

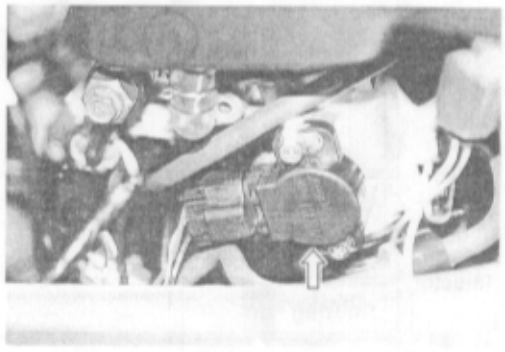
INTAKE AIR PRESSURE SENSOR (IAP SENSOR)



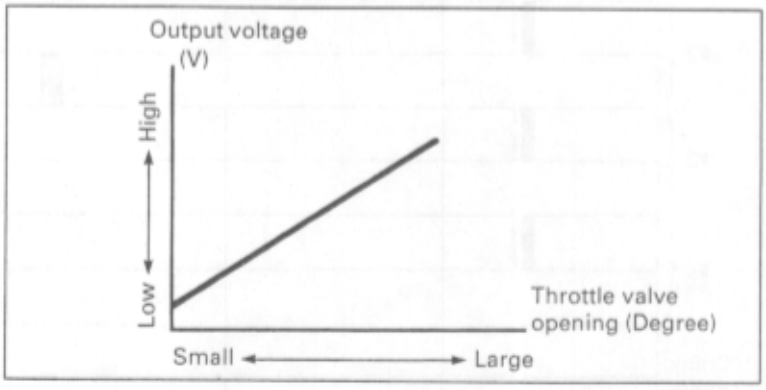
The intake air pressure sensor is located at the rear side of the air cleaner box and vacuum hose is connected to the throttle body.
The sensor detects the intake air pressure, the detected pressure is converted into voltage signal and sent to the ECM.
The basic fuel injection time (volume) is determined according to the voltage signal (output voltage).
The voltage signal increases when the intake air pressure is high.



THROTTLE POSITION SENSOR (TP SENSOR)

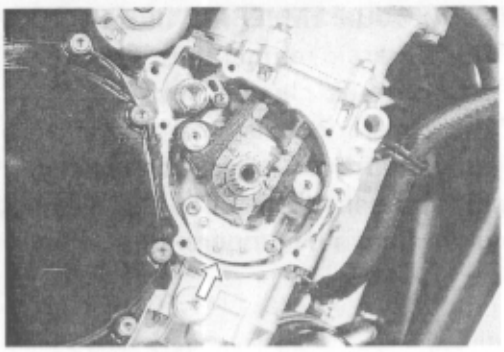


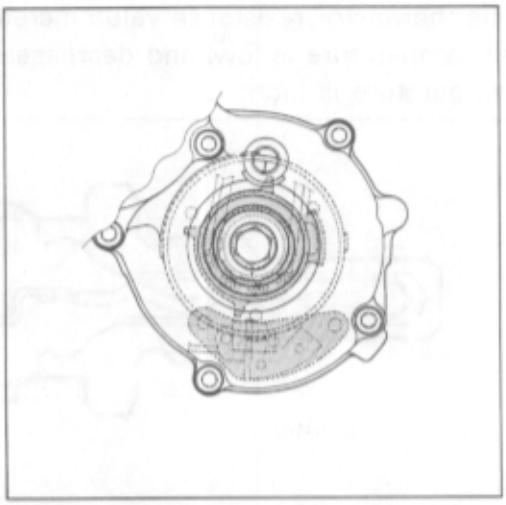
The throttle position sensor is installed on the No.4 throttle body.
The throttle position sensor is a kind of variable resistor, and the sensor detects the throttle opening angle.
The battery voltage in the sensor is changed to the throttle position voltage which is sent to the ECM.
The basic fuel injection time (volume) is determined according to the voltage signal (output voltage).
The voltage signal increases when the throttle opening is large.



CRANKSHAFT POSITION SENSOR (CKP SENSOR)

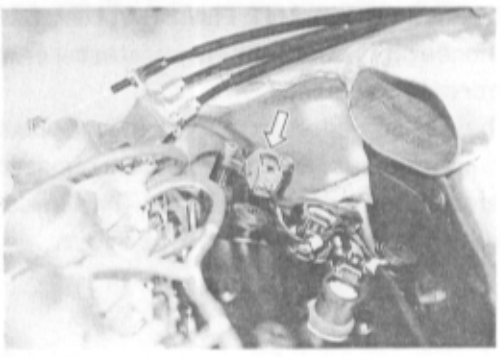
The signal rotor is mounted on the right end of the crankshaft, and the crankshaft position sensor (Pick-up coil) is installed on the crankcase.
The sensor generates the pick-up signal which is sent to the ECM.
The ECM calculates and decides the fuel injection timing and ignition timing.
The injection volume increases when the engine rpm is high.
The signal relates to the fuel pump operation.

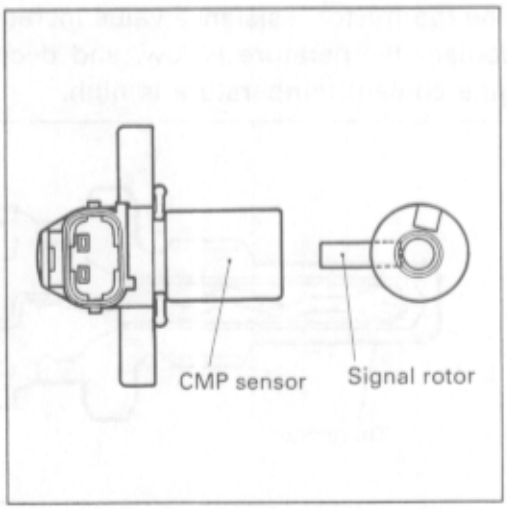




CAMSHAFT POSITION SENSOR (CMP SENSOR)

The signal rotor is installed on the intake camshaft, and the camshaft position sensor (Pick-up coil) is installed on the cylinder head cover.
The sensor generates the pick-up signal which is sent to the ECM.
The ECM calculates and decides the cylinder identity and sequential injection timing.

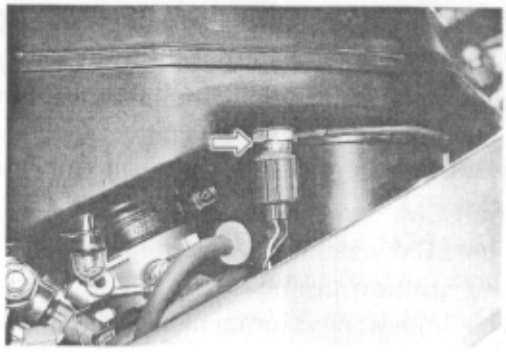




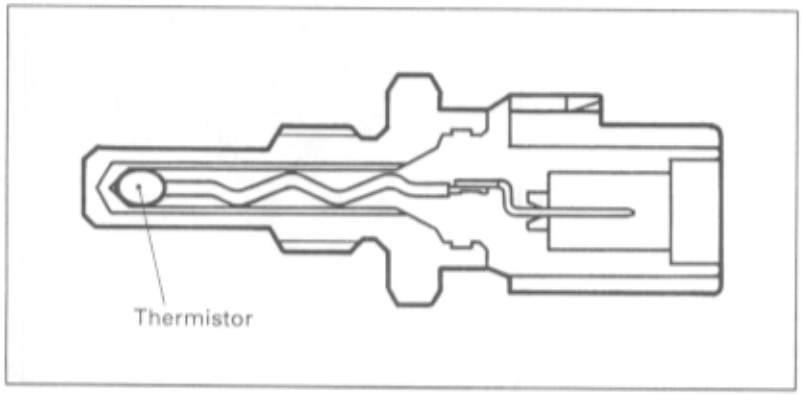
INTAKE AIR TEMPERATURE SENSOR (IAT SENSOR)

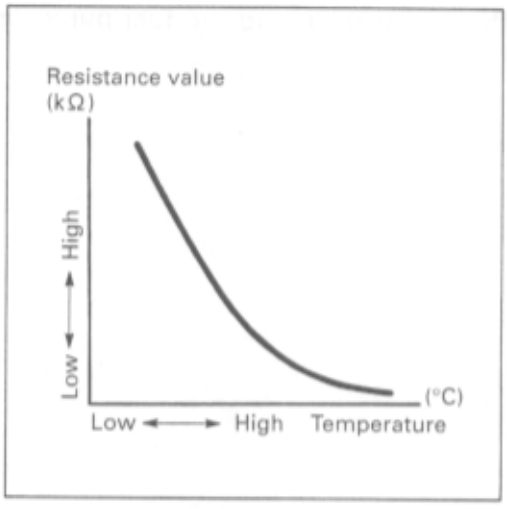
The intake air temperature sensor is installed at the right side of the air cleaner box.

The sensor detects the intake air temperature, which is converted from thermistor resistance value to voltage signal and sent to the ECM. The injection volume increases when intake air temperature is low.



The thermistor resistance value increases when the intake air temperature is low, and decreases when the intake air temperature is high.

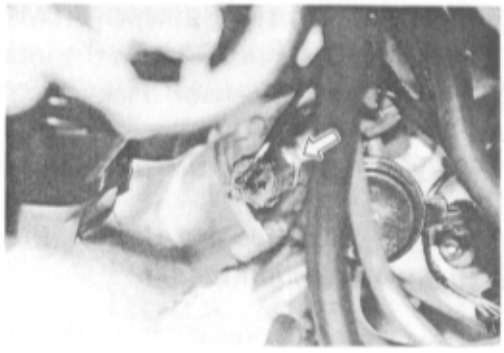




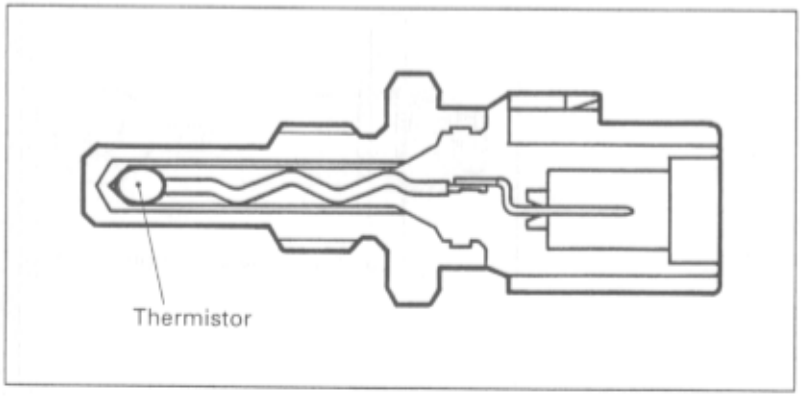
ENGINE COOLANT TEMPERATURE SENSOR (ECT SENSOR)

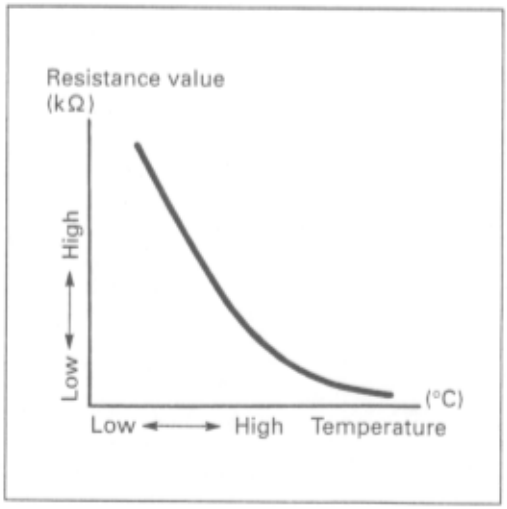
The engine coolant temperature sensor is installed at the thermostat case.

The sensor detects the engine coolant temperature, which is converted from thermistor resistance value to voltage signal and sent to the ECM. The injection volume increases when coolant temperature is low.

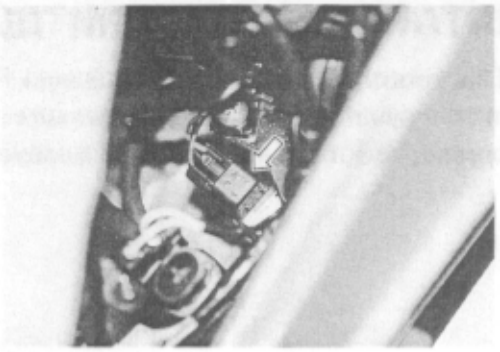


The thermistor resistance value increases when the engine coolant temperature is low, and decreases when the engine coolant temperature is high.



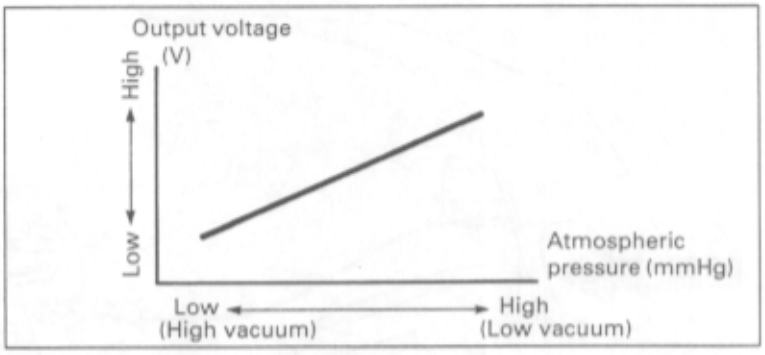


ATMOSPHERIC PRESSURE SENSOR (AP SENSOR)



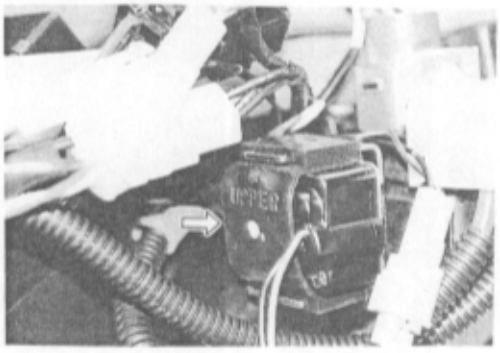
The atmospheric pressure sensor is located behind the right side of the main frame.
The sensor detects the atmospheric pressure, the detected pressure is converted into voltage signal and sent to the ECM.
The injection time (volume) is controlled according to the voltage signal (output voltage).

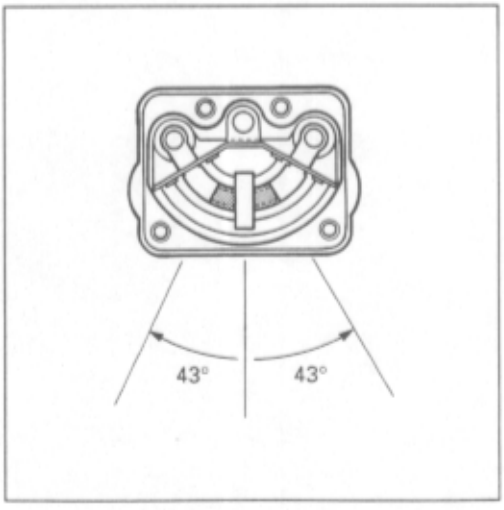
The voltage signal increases when the atmospheric pressure is high.



TIP OVER SENSOR (TO SENSOR)

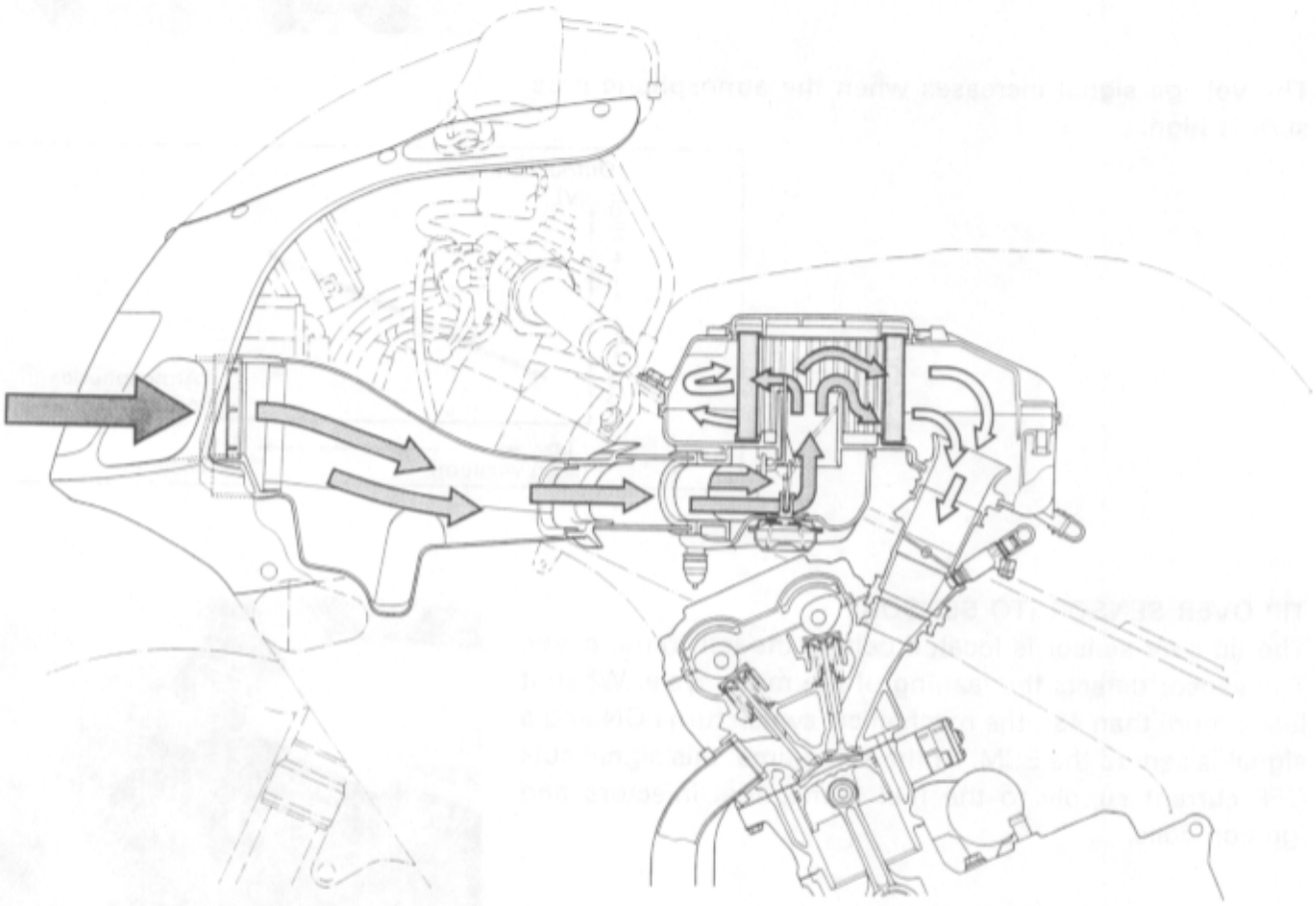
The tip over sensor is located behind the left frame cover. The sensor detects the leaning of the motorcycle. When it leans more than 43°, the mechanical switch turns ON and a signal is sent to the ECM. At the same time, this signal cuts OFF current supply to the fuel pump, fuel injectors and ignition coils.





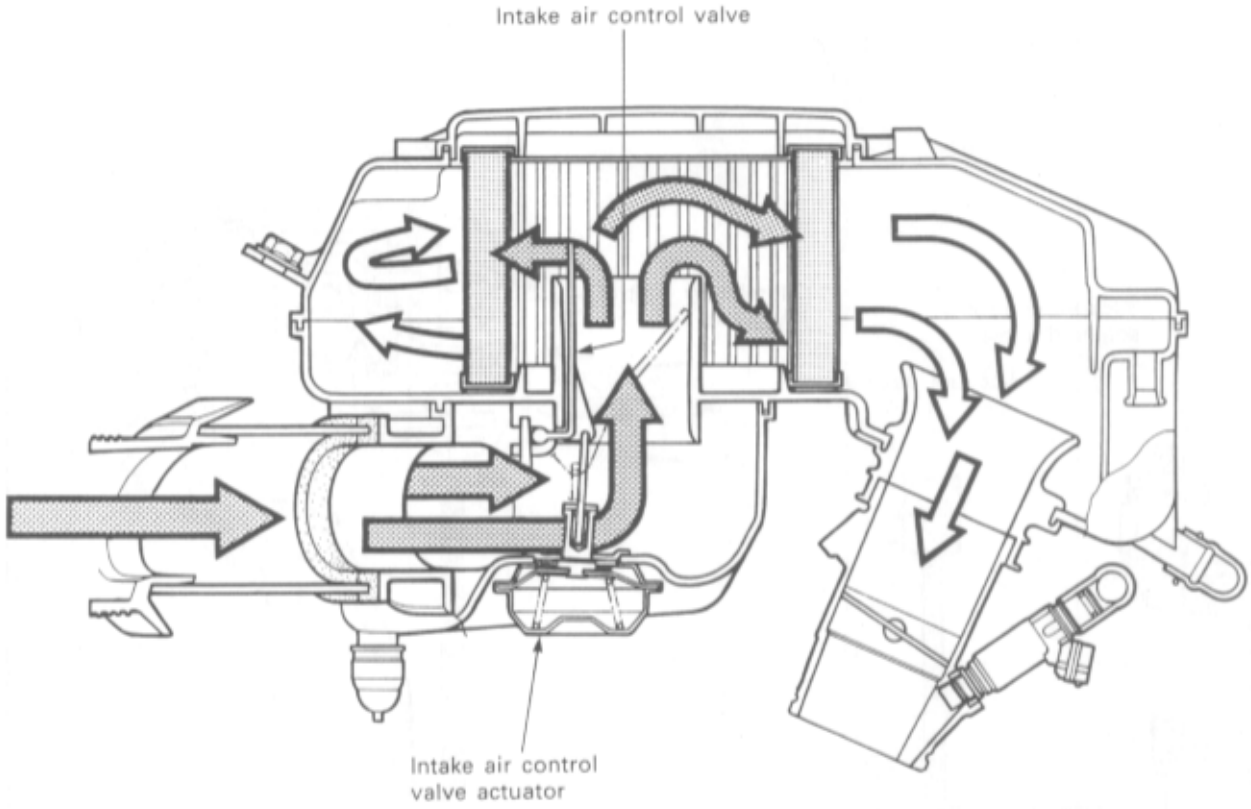
INTAKE AIR SYSTEM TECHNICAL FEATURES

This motorcycle uses SRAD (Suzuki Ram Air Direct induction) in the intake air system.
In this system, frontal wind pressure during running is guided into the air cleaner box in order to pressurize intake air, thereby improving intake efficiency for increased engine output.



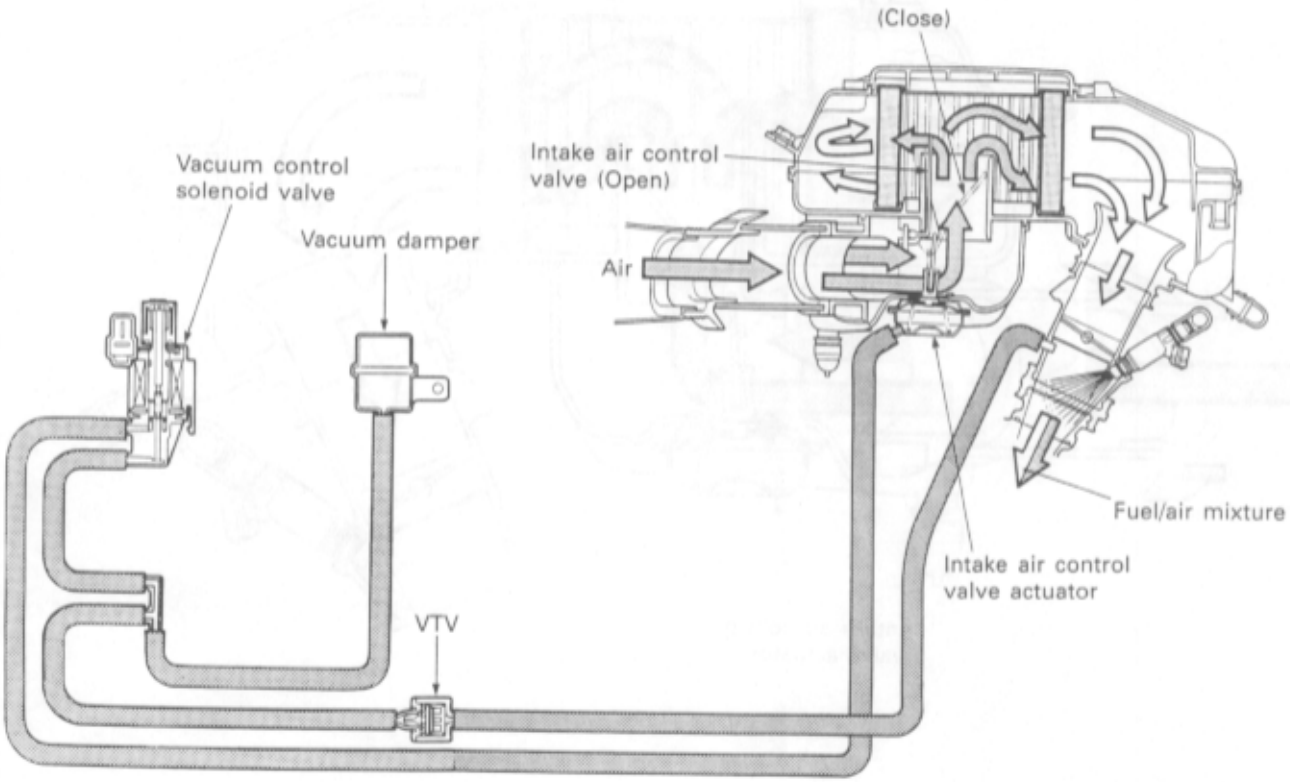
INTAKE AIR CONTROL VALVE

The intake air control valve is installed on the bottom part of the air cleaner box.
This system is designed to control the volume of intake air so as to improve engine output power. This is performed by opening or closing the air cleaner intake port according to the engine speed. When the engine is running in a low to medium speed range, the intake port is closed for controlled intake air volume. This improves the effect of intake air flow pulsation so that the engine can output higher power in this speed range.
When the engine is running in a medium to high speed range, the intake port is now fully open for guiding the maximum volume of air into the air cleaner box so that the engine can produce the maximum power in this speed range.

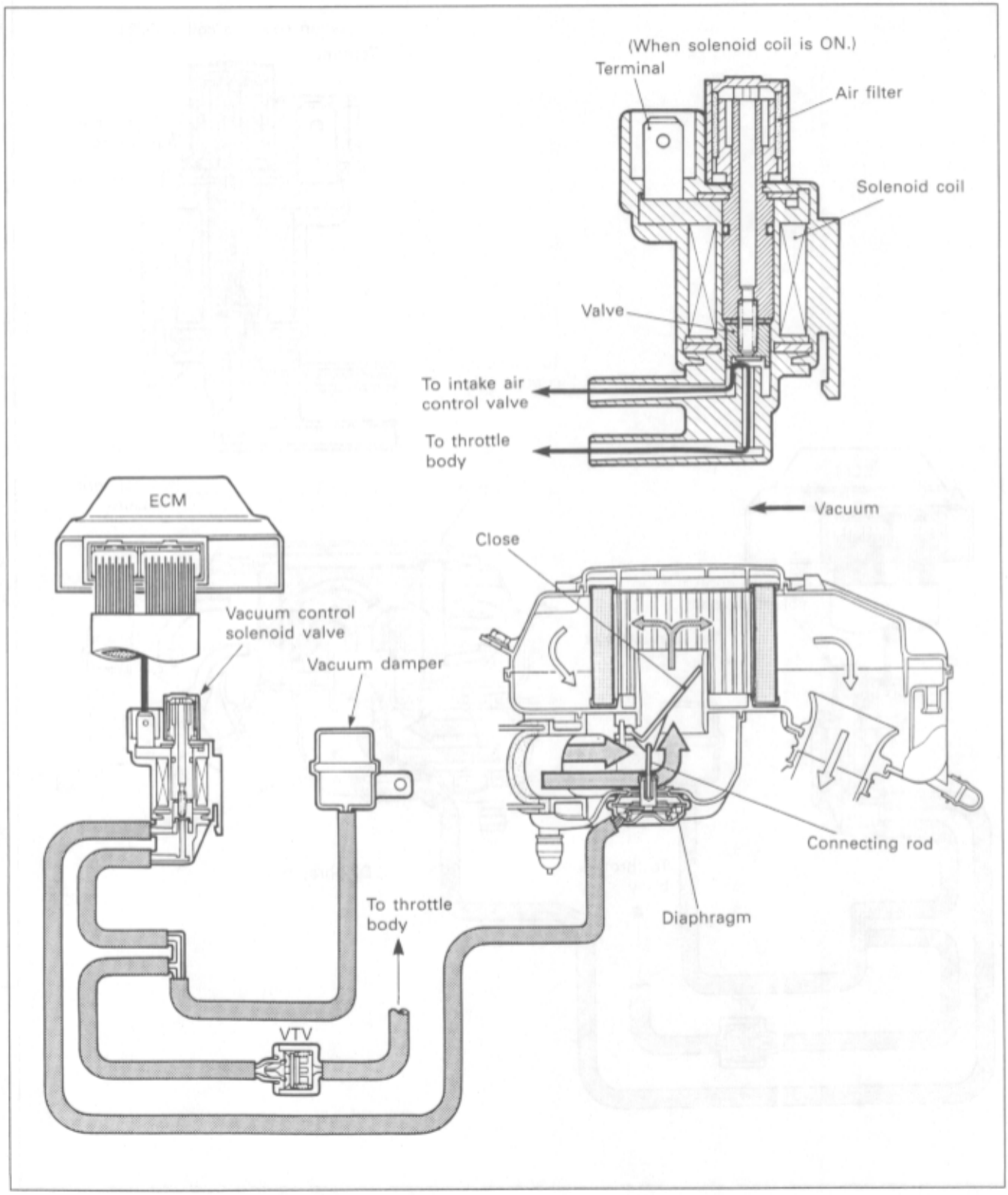


OPERATION

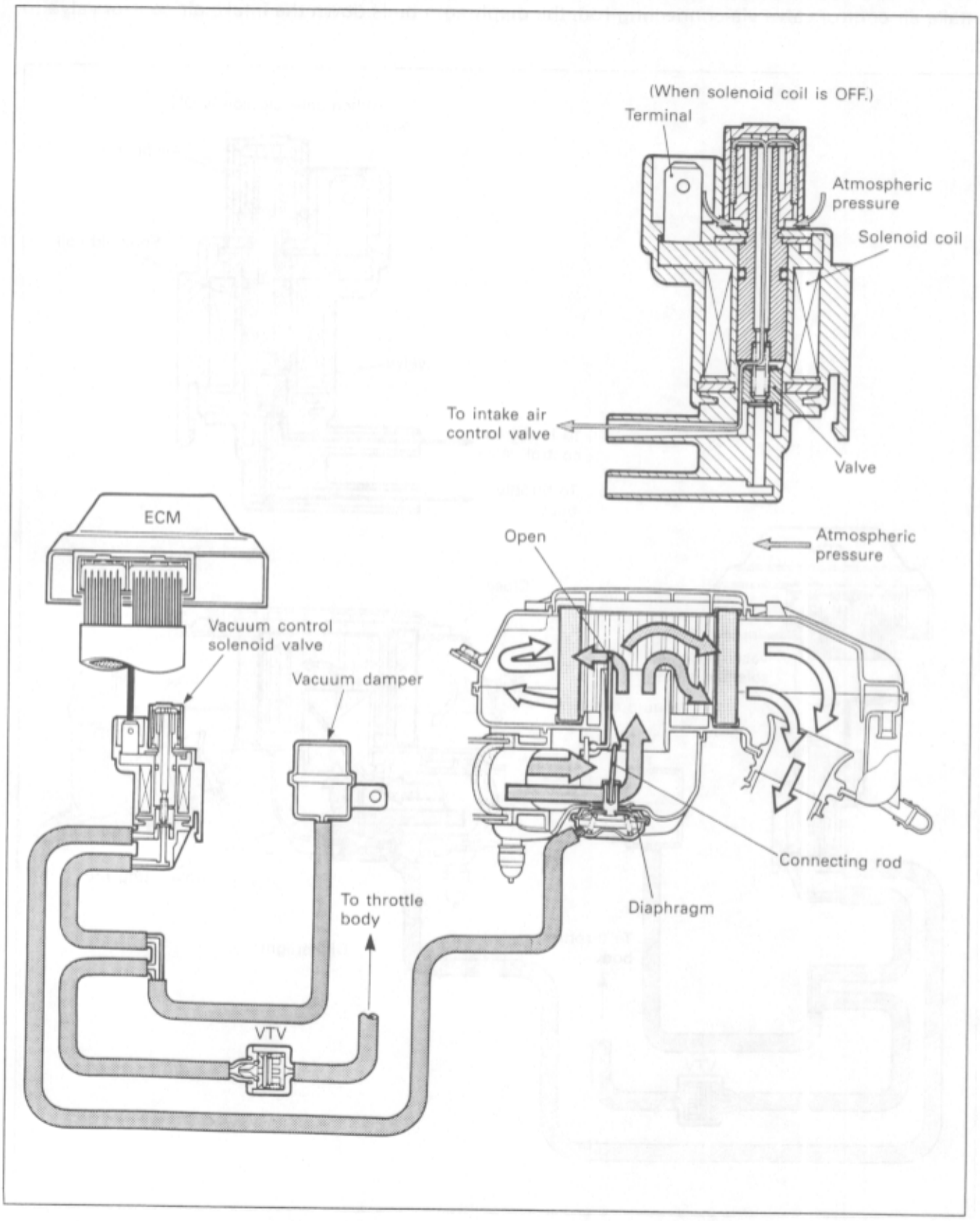
The intake air control valve system operates on the signal supplied from the ECM. The open/close operation of the air control valve is performed by an actuator which incorporates a vacuum operated diaphragm. The vacuum to operate this diaphragm is taken from the air stream inside the throttle body and transmitted through the vacuum transmitting valve and the vacuum control solenoid valve. (The vacuum control solenoid valve is located behind the right side of the main frame.) The vacuum control solenoid valve allows the vacuum line to open or close on the basis of electrical signal supplied from the ECM. The vacuum damper is also provided in the vacuum line for the purpose of suppressing and stabilizing vacuum fluctuation.



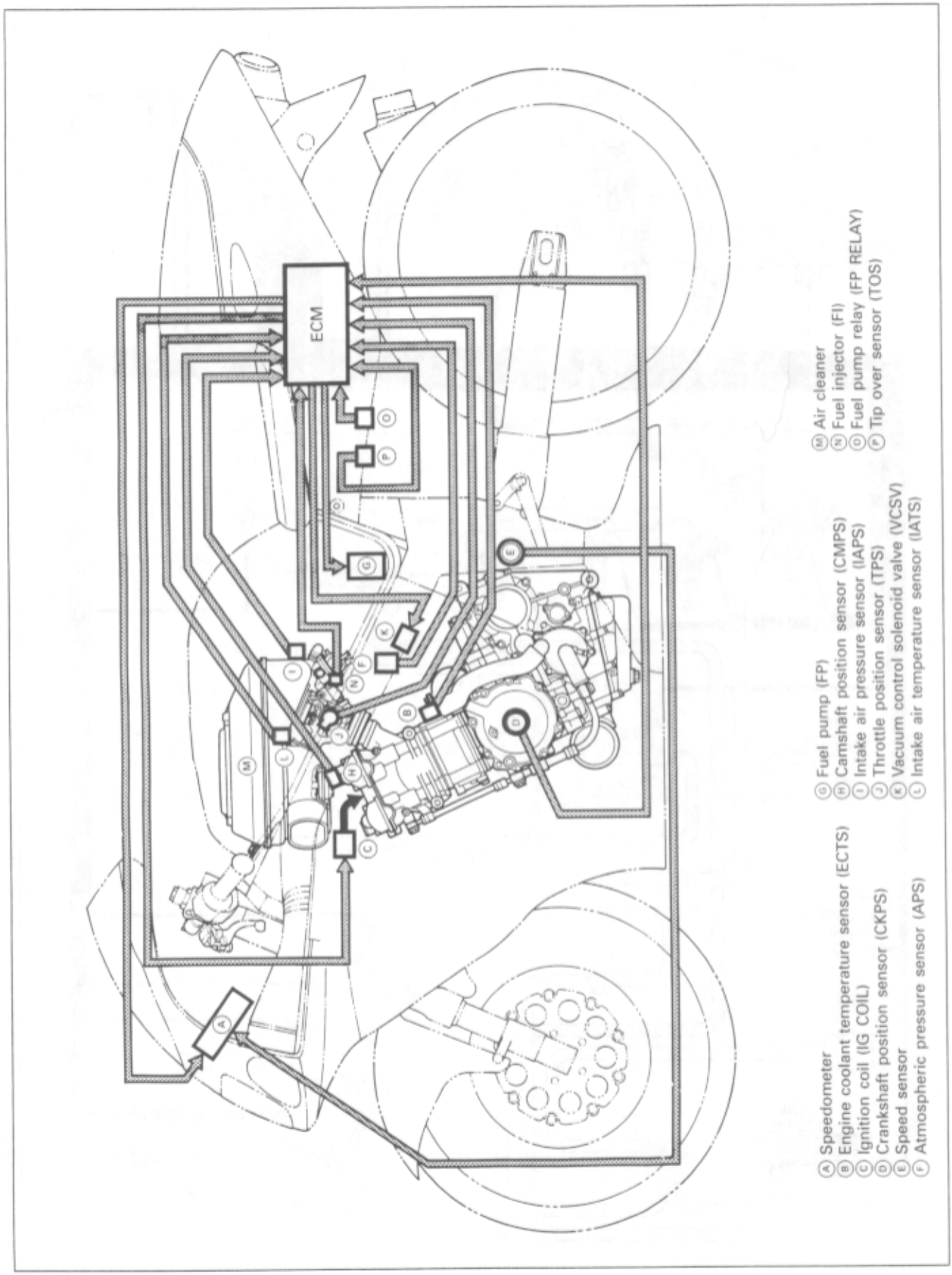
When the engine is running in a low to medium speed range, the electrical signal from the ECM energizes the solenoid coil in the vacuum control solenoid valve to create magnetism causing the valve to be pulled open. With the vacuum control solenoid valve open, the vacuum line on the throttle body side connects to that on the intake air control valve side allowing vacuum to transmit to the diaphragm to move downward. Since the diaphragm is mechanically connected with the intake air control valve via connecting rod, the diaphragm pulls down the intake air control valve to close.



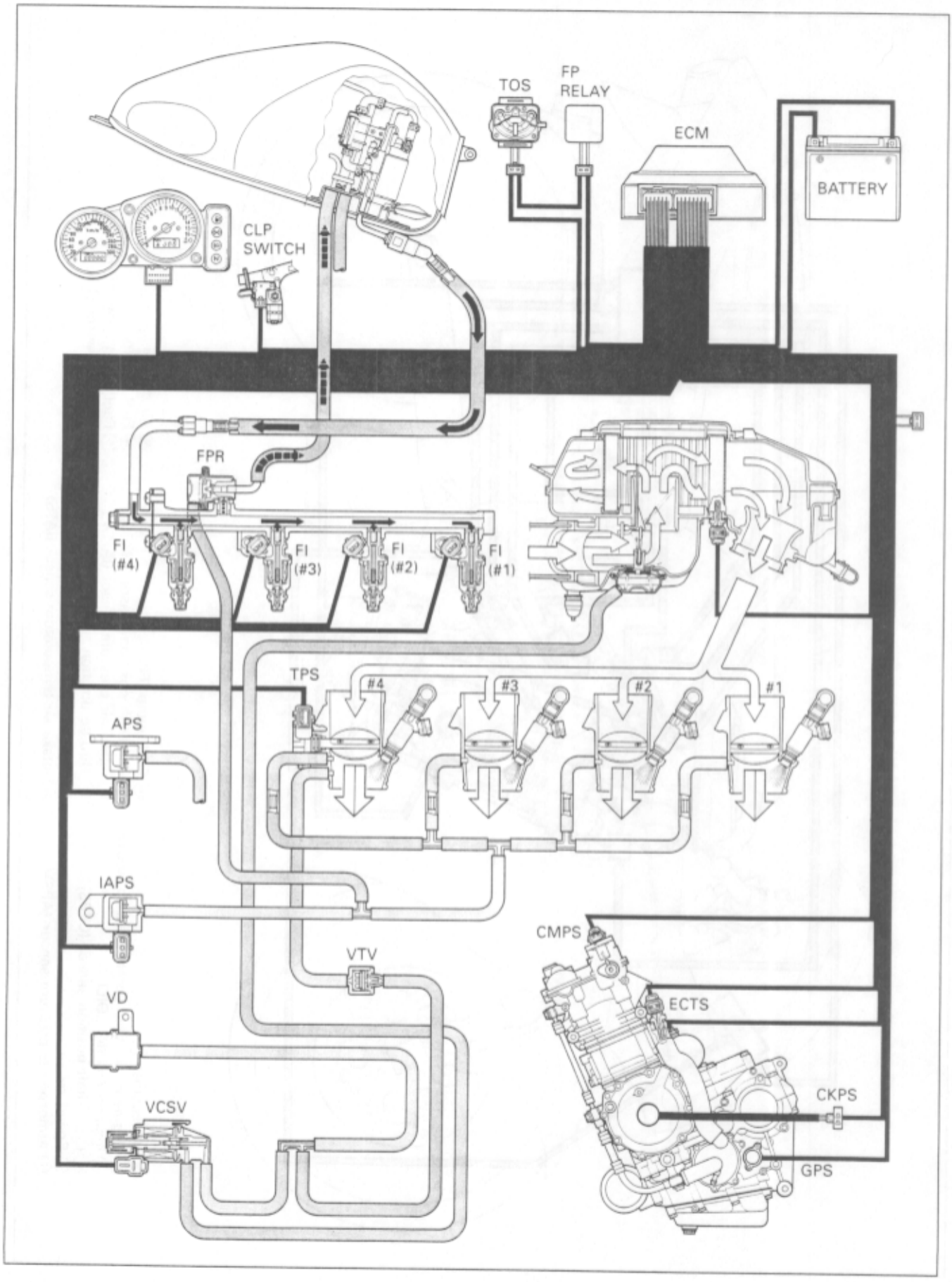
When the engine is running in a medium to high speed range, the signal from the ECM discontinues. Then, the solenoid coil is de-energized, causing vacuum on the throttle body side to stop being transmitted to the intake air control valve side. At the same time, the vacuum control solenoid valve let atmospheric pressure into the diaphragm side vacuum line, which deactivates the diaphragm and allows the spring to return and open the intake air control valve through the connecting rod.



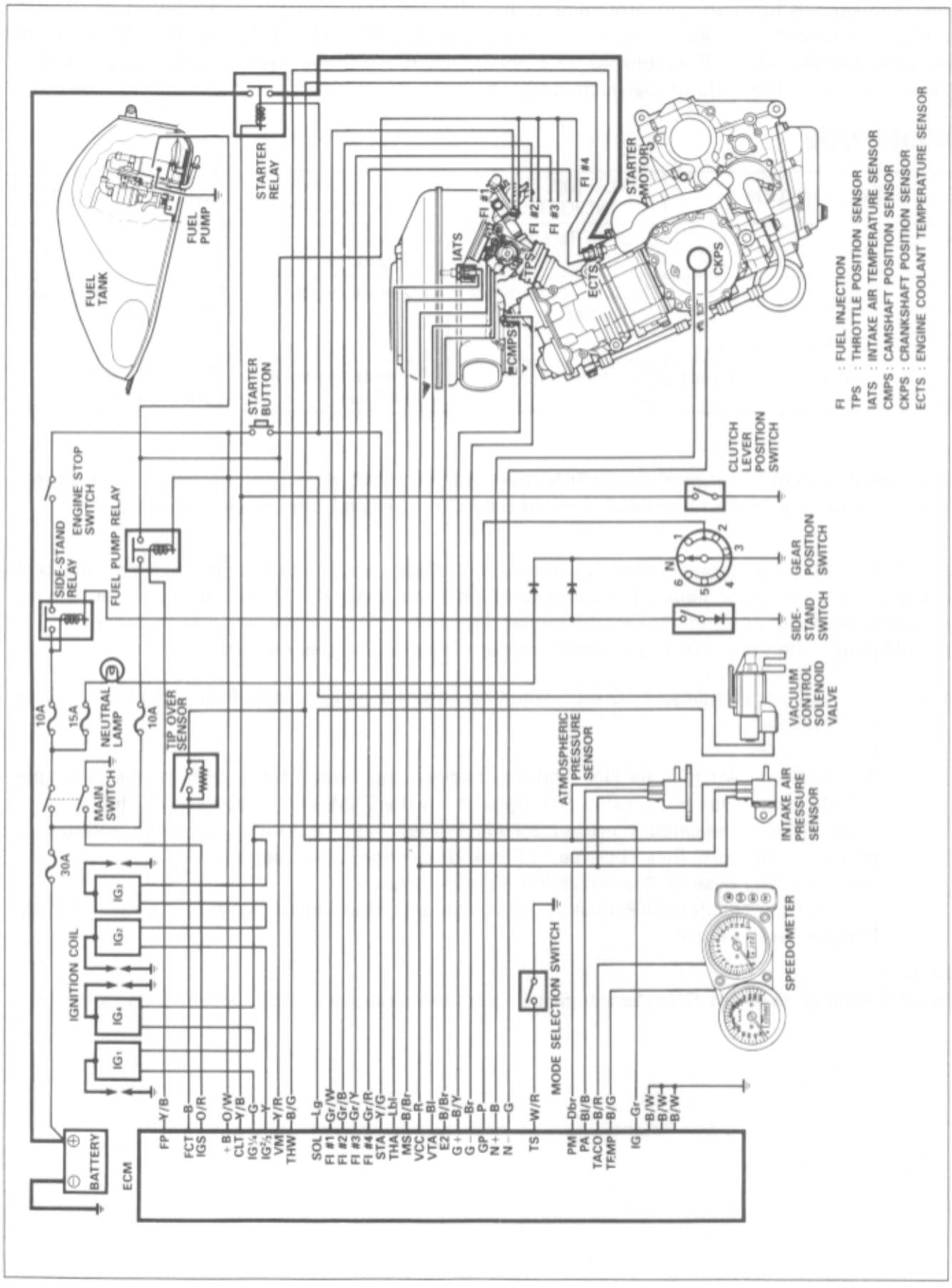
FI SYSTEM PARTS LOCATION



FI SYSTEM DIAGRAM



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 lamp. To check the function of the FI system devices, the dealer mode is prepared, and the special tool is necessary to read the code of the malfunction items.

USER MODE

MALFUNCTION	LCD (DISPLAY) INDICATION	LED LAMP INDICATION	INDICATION MODE
"NO"	Coolant Temp.	Coolant Temp./ Oil Pressure	———
"YES"	Coolant Temp. and "FI" letters *1	LED lamp turns ON.	Each 2 sec. Temp. or "FI" is indicated.
Engine can start			
Engine can not start	"FI" letter *2	LED lamp turns ON and blinks.	"FI" is indicated continuously.

*1
When one of signals is not received by ECM, the fail-safe circuit works and injection is not stopped. This case indicates "FI" and coolant temp. in the LCD panel and motorcycle can run.

*2
The injection signal is stopped, when the camshaft position sensor signal, crankshaft position sensor signal, tip over sensor signal , #1/#4 and #2/#3 ignition signals, #1, #2, #3 and #4 injector signals, fuel pump relay signal or ignition switch signal does not send to ECM. This case indicates "FI" in the LCD panel when depressing the starter button. Motorcycle does not run.

"CHEC": The LCD panel indicates "CHEC" when no communication signal from the ECM receives for 5 seconds.
For Example:
The ignition switch turns ON, and the engine stop switch turns OFF. In this case, the speedometer does not receive any signal from the ECM, and it indicates "CHEC".
If the CHEC is indicated, the trouble code can not indicate on the LCD. 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 OFF position. Side-stand/ignition inter-lock system is not working. Ignition fuse is burnt.

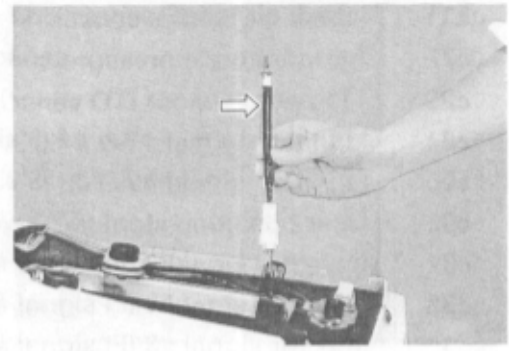
NOTE:
The LED lamp is also turn ON when engine coolant temperature is high, or oil pressure is low.

DEALER MODE

The defective function is memorized in the computer, and use the special tool's coupler 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, and the affected devices are indicated in the code form.

The special tool's coupler is connected to the dealer mode coupler.

09930-82710: Mode select switch



⚠ CAUTION

Before checking the malfunction code, do not disconnect the ECM lead wire couplers. If disconnect the couplers from the ECM, the malfunction code memory is erased and can not check the malfunction code.

MALFUNCTION	LCD (DISPLAY) INDICATION	LED LAMP INDICATION	INDICATION MODE
"NO"	c00	Operating as oil pressure indicator	———
"YES"	c✳✳ code is indicated from small code to large one.		Each 2 sec. code is indicated.

CODE	MALFUNCTION PART	REMARKS
c00	No	No defective part
c11	Camshaft position sensor (CMP sensor)	
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)	*3
c15	Engine coolant temp. sensor (ECT sensor)	
c21	Intake air temp. sensor (IAT sensor)	
c22	Atmospheric pressure sensor (AP sensor)	
c23	Tip over sensor (TO sensor)	
c24	Ignition signal #1 & #4 (IG signal #1 & #4)	For #1 & #4 cylinders
c25	Ignition signal #2 & #3 (IG signal #2 & #3)	For #2 & #3 cylinders
c31	Gear position signal (GP switch)	
c32	Injector signal #1 (FI signal #1)	For #1 cylinder
c33	Injector signal #2 (FI signal #2)	For #2 cylinder
c34	Injector signal #3 (FI signal #3)	For #3 cylinder
c35	Injector signal #4 (FI signal #4)	For #4 cylinder
c41	Fuel pump control system (FP control system)	Fuel pump, Fuel pump relay
c42	Ignition switch signal (IG switch signal)	Anti-theft

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

*3

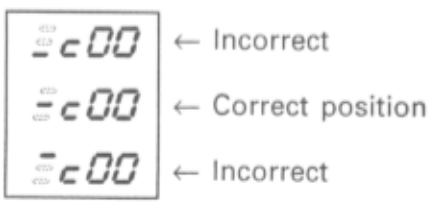
To get the proper signal from the throttle position sensor, the sensor basic position is indicated in the LCD (DISPLAY) panel. The malfunction code is indicated by three column. In front of the three column, one column indicates the position, upper, middle or lower line. If the indication is upper or lower line when engine rpm is 1 200 rpm, slightly turn the throttle position sensor and bring the line to middle.

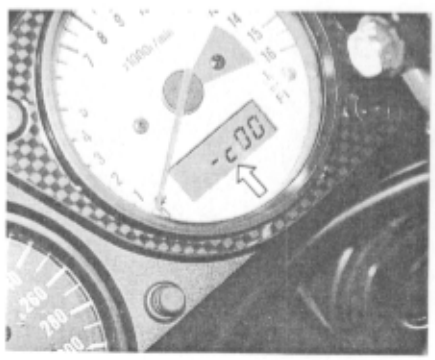
In the normal condition, the throttle valve stop screw pushes throttle valves slightly, and indication point is middle line.

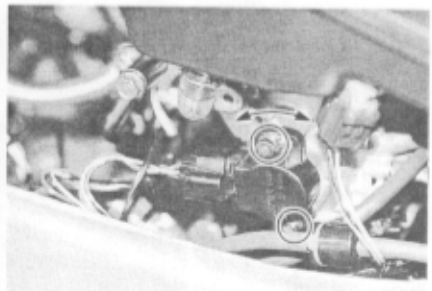
Setting procedure:

1. Connect the special tool (Mode select switch) to the dealer mode coupler at the wiring harness, and start the engine.
2. Adjust the engine rpm to 1 200 rpm.
3. If the throttle position sensor adjustment is necessary, loosen the screws and turn the throttle position sensor and bring the line to middle.
4. Then, tighten the screws to fix the throttle position sensor.

09930-11950: Torx wrench







The signal indicates 0.4 sec./time, and two times show the correct position, where it is fixed.

FAIL-SAFE FUNCTION

FI system is provided with fail-safe function to secure a starting ability and running ability when any malfunction is detected by the ECM.

ITEM		FAIL-SAFE VALUE	STARTING ABILITY	RUNNING ABILITY
Camshaft position sensor		When missing camshaft position signal during running, the ECM identifies cylinder just before missing cam signal.	"NO"	"YES"
			Motorcycle can run, but once engine stops, engine can not start.	
Crankshaft position sensor		The motorcycle stops.	"NO"	"NO"
Intake air pressure sensor		Intake air pressure fixed to 760 mmHg.	"YES"	"YES"
Throttle position sensor		The throttle opening is fixed to full open position. Ignition timing is also fixed.	"YES"	"YES"
Engine coolant temperature sensor		Engine coolant temperature value is fixed to 80°C.	"YES"	"YES"
Intake air temperature sensor		Intake air temperature value is fixed to 40°C.	"YES"	"YES"
Atmospheric pressure sensor		Atmospheric pressure value is fixed to 760 mmHg.	"YES"	"YES"
Ignition signal	#1 & #4	#1 & #4 Ignition-off	"YES"	"YES"
			#2 & #3 cylinders can run.	
	#2 & #3	#2 & #3 Ignition-off	"YES"	"YES"
			#1 & #4 cylinders can run.	
Injection signal	#1	#1 Fuel-cut	"YES"	"YES"
			#2, #3 & #4 cylinders can run.	
	#2	#2 Fuel-cut	"YES"	"YES"
			#1, #3 & #4 cylinders can run.	
	#3	#3 Fuel-cut	"YES"	"YES"
			#1, #2 & #4 cylinders can run.	
	#4	#4 Fuel-cut	"YES"	"YES"
			#1, #2 & #3 cylinders can run.	
Gear position signal		Gear position signal is fixed to 6th gear.	"YES"	"YES"

"Yes" means that 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 perfect and only emergency help (fail-safe circuit) is operating and it is necessary to bring the motorcycle to the workshop for complete repair.

FI SYSTEM TROUBLE SHOOTING

CUSTOMER COMPLAINT ANALYSIS

Record details of the problem (failure, complaint) and how it occurred as described by the customer. For this purpose, use of such an inspection form will facilitate collecting information to the point 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** ☐No cranking ☐No initial combustion ☐No combustion ☐Poor starting at (☐cold ☐warm ☐always) ☐Other_____	☐**Poor Driveability** ☐Hesitation on acceleration ☐Back fire/☐After fire ☐Lack of power ☐Surging ☐Abnormal knocking ☐Other_____
☐**Poor Idling** ☐Poor fast idle ☐Abnormal idling speed (☐High ☐Low)(r/min.) ☐Unstable ☐Hunting (r/min. to r/min.) ☐Other_____	☐**Engine Stall when** ☐Immediately after start ☐Throttle valve is opened ☐Throttle valve is closed ☐Load is applied ☐Other_____
☐OTHERS:	

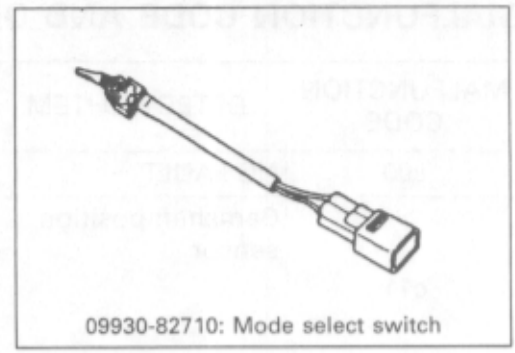
MOTORCYCLE/ENVIRONMENTAL CONDITION WHEN PROBLEM OCCURS	
Environmental condition	
Weather	☐Fair ☐Cloudy ☐Rain ☐Snow ☐Always ☐Other_____
Temperature	☐Hot ☐Warm ☐Cool ☐Cold (°F/ °C) ☐Always
Frequency	☐Always ☐Sometimes (times/ day, month) ☐Only once ☐Under certain condition
Road	☐Urban ☐Suburb ☐Highway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

NOTE:

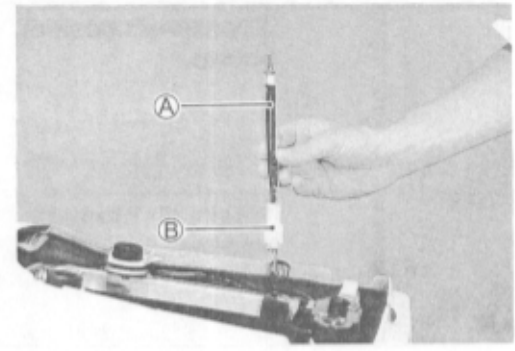
The above form is a standard sample. It should be modified according to conditions characteristic of each market.

SELF-DIAGNOSTIC PROCEDURES

- Don't disconnect couplers from ECM, battery cable from battery, ECM ground wire harness from engine or main fuse before confirming malfunction code (self-diagnostic trouble code) stored in memory. Such disconnection will erase 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" (See P. 11-4-27.) carefully to have good understanding as to what functions are available and how to use it.
- Be sure to read "PRECAUTIONS for Electrical Circuit Service" (See P. 11-4-3.) before inspection and observe what is written there.
- Remove the rear seat.
- Connect the special tool Ⓐ to the dealer mode coupler Ⓑ at the wiring harness, and start the engine or cranking the engine for more 4 seconds.
- Turn the special tool's switch ON and check the malfunction code and detect the malfunction part.



09930-82710: Mode select switch





SELF-DIAGNOSIS RESET PROCEDURE

- After repairing the trouble, turn OFF the ignition switch and turn ON again.
  If the malfunction code is indicated (c00), the malfunction is cleared.
- Disconnect the special tool from the dealer mode coupler.

MALFUNCTION CODE AND DEFECTIVE CONDITION

MALFUNCTION CODE	DETECTED ITEM	DETECTING FAILURE CONDITION CHECK FOR
c00	NO FAULT	—
c11	Camshaft position sensor	The signal does not reach to ECM for more than 2 sec. after receiving the starter signal.
		The camshaft position sensor wiring and mechanical parts. (Camshaft position sensor, intake cam pin, wiring/coupler connection)
c12	Crankshaft position sensor	The signal does not reach to ECM for more than 2 sec. after receiving the starter signal.
		The crankshaft position sensor wiring and mechanical parts. (Crankshaft position sensor, wiring/coupler connection)
c13	Intake air pressure sensor	The sensor produces following voltage. (0.25 V ≦ sensor voltage < 4.85 V) Without the above range, c13 is indicated.
		Intake air pressure sensor, wiring/coupler connection.
c14	Throttle position sensor	The sensor produces following voltage. (0.2 V ≦ sensor voltage < 4.8 V) Without the above range, c14 is indicated.
		Throttle position sensor, wiring/coupler connection.
c15	Engine coolant temperature sensor	The sensor voltage should be the following. (0.15 V ≦ sensor voltage < 4.85 V) Without the above range, c15 is indicated.
		Engine coolant temperature sensor, wiring/coupler connection.
c21	Intake air temperature sensor	The sensor voltage should be the following. (0.15 V ≦ sensor voltage < 4.85 V) Without the above range, c21 is indicated.
		Intake air temperature sensor, wiring/coupler connection.
c22	Atmospheric pressure sensor	The sensor voltage should be the following. (0.25 V ≦ sensor voltage < 4.85 V) Without the above range, c22 is indicated.
		Atm. pressure sensor, wiring/coupler connection.
c23	Tip over sensor	The sensor voltage is less than the following for more than 8 sec. after ignition switch turns ON. (sensor voltage < 4.85 V) Without the above value, c23 is indicated.
		Tip over sensor, wiring/coupler connection.
c24	Ignition signal #1/#4	Crankshaft position sensor (pick-up coil) signal is produced but signal from ignition coil is not produced continuous two times. In this case, the code c24 (for #1/#4 cylinder) is indicated. c25 is indicated if #2/#3 cylinder fails.
c25	Ignition signal #2/#3	Ignition coil, wiring/coupler connection, power supply from the battery.

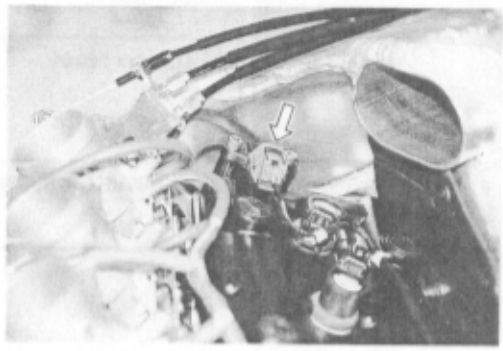
c31	Gear position signal	Gear position signal voltage should be higher than the following for more than 2 seconds. (Gear position sensor voltage > 0.60 V) Without the above value, c31 is indicated.
		Gear position sensor, wiring/coupler connection. Gear-shift cam etc.
c32, c33, c34 or c35	Fuel injector signal	Fuel injection signal stops, the c32, c33, c34 or c35 is indicated.
		Injector, wiring/coupler connection, power supply to the injector.
c41	Fuel pump relay signal	When no signal from fuel pump relay, c41 is indicated.
		Fuel pump relay, connecting lead, power source to fuel pump relay.
c42	Ignition switch signal	Ignition switch signal is not input in the ECM.
		Ignition switch, lead wire/coupler.

"C11" CMP SENSOR CIRCUIT MALFUNCTION

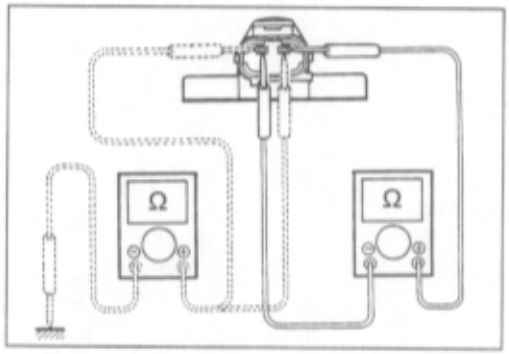
DETECTING CONDITION	POSSIBLE CAUSE
No CMP sensor signal for 2 seconds at engine cranking.	• No metal particles or foreign material being attached on the CMP sensor and rotor tip. • CMP sensor circuit open or short. • CMP sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Remove the air cleaner box. (See p. 11-4-54.)

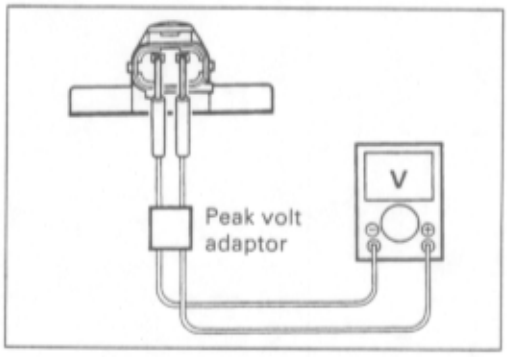


1 Turn the ignition switch OFF.
Check the CMP sensor coupler for loose or poor contacts.
If OK, then measure the CMP sensor resistance.
Disconnect the CMP sensor coupler and measure the resistance.
CMP sensor resistance: 0.9–1.3kΩ
(Terminal–Terminal)
If OK, then check the continuity between each terminal and ground.
CMP sensor continuity: ∞Ω (Infinity)
(Terminal–Ground)
09900-25008: Multi circuit tester
Tester knob indication: Resistance (Ω)



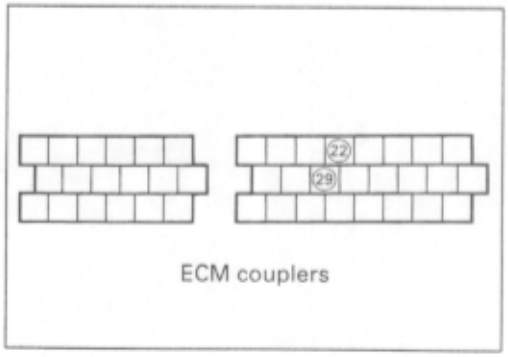
No → Replace the CMP sensor with a new one.
Yes ↓

2 Disconnect the CMP sensor coupler.
Crank the engine a few seconds with the starter motor, and measure the CMP sensor peak voltage at the sensor.
CMP sensor peak voltage: More than 0.8V
(B/Y–Br)
Repeat the above test procedure a few times and measure the highest peak voltage.
If OK, then measure the CMP sensor peak voltage at the ECM terminals. (G+/G− or ㉒/㉙)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)



No → Loose or poor contacts on the CMP sensor coupler or ECM coupler. Replace the CMP sensor with a new one.
Yes ↓

B/Y or Br wire open or shorted to ground, or poor ㉒ or ㉙ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)



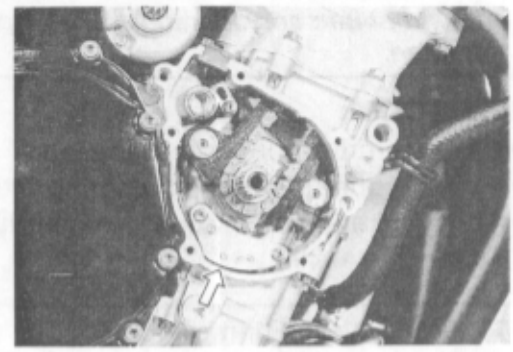
→ Replace the ECM with a new one, and inspect it again.

"C12" CKP SENSOR CIRCUIT MALFUNCTION

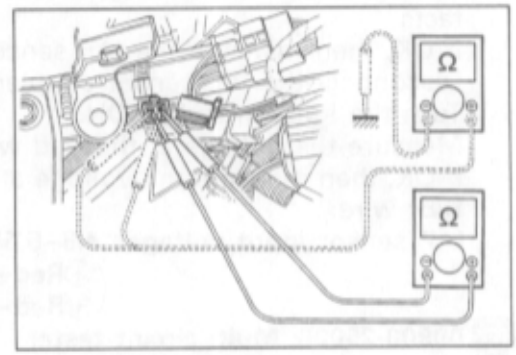
DETECTING CONDITION	POSSIBLE CAUSE
No CKP sensor signal for 2 seconds at engine cranking.	• No metal particles or foreign material being attached on the CKP sensor and rotor tips. • CKP sensor circuit open or short. • CKP sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the frame cover. (See p. 11-6-4.)



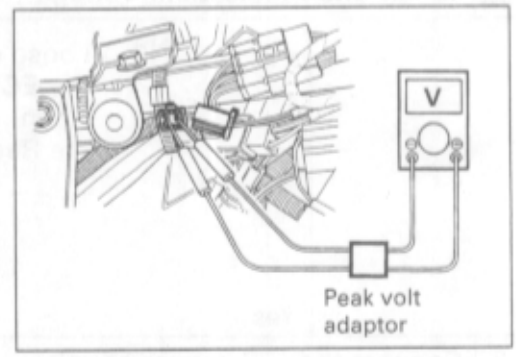
1 Turn the ignition switch OFF.
Check the CKP sensor coupler for loose or poor contacts.
If OK, then measure the CKP sensor resistance.
Disconnect the CKP sensor coupler and measure the resistance.
CKP sensor resistance: 50–200Ω (Black–Green)
If OK, then check the continuity between each terminal and ground.
CKP sensor continuity: ∞Ω (Infinity) (Black–Ground, Green–Ground)
09900-25008: Multi circuit tester
Tester knob indication: Resistance (Ω)



No → Replace the CKP sensor with a new one.

Yes

2 Disconnect the CKP sensor coupler.
Crank the engine a few seconds with the starter motor, and measure the CKP sensor peak voltage at the coupler.
CKP sensor peak voltage: More than 0.5V (Black–Green)
Repeat the above test procedure a few times and measure the highest peak voltage.
If OK, then measure the CKP sensor peak voltage at the ECM terminals. (N+/N− or ㉓/㉚)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)

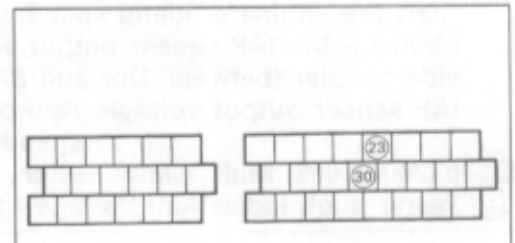


Peak volt adaptor

No → Loose or poor contacts on the CKP sensor coupler or ECM coupler. Replace the CKP sensor with a new one.

Yes

Black or Green wire open or shorted to ground, or poor ㉓ or ㉚ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)



ECM couplers

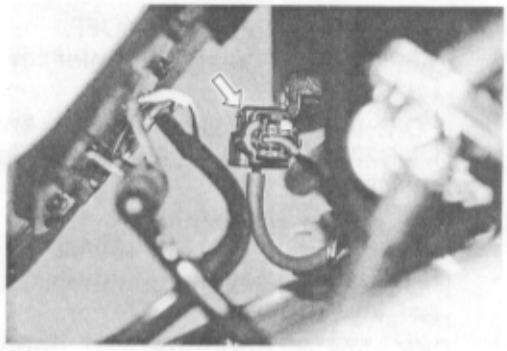
→ Replace the ECM with a new one, and inspect it again.

"C13" IAP SENSOR CIRCUIT MALFUNCTION

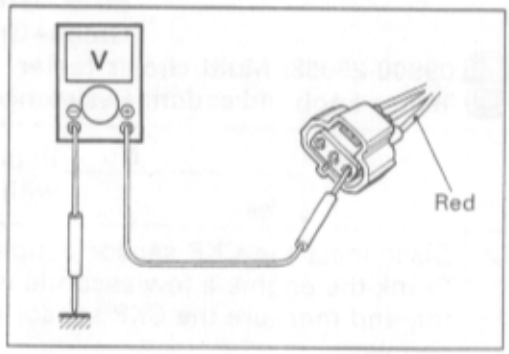
DETECTING CONDITION	POSSIBLE CAUSE
Low pressure and low voltage. High pressure and high voltage. (0.25V ≦ Sensor voltage < 4.85V without the above range.) *NOTE:* *Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.*	• Clogged vacuum passage between throttle body and IAP sensor. • Air being drawn from vacuum passage between throttle body and IAP sensor. • Red wire circuit open or shorted to ground. • B/Br or Dbr wire circuit shorted to ground. • IAP sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)



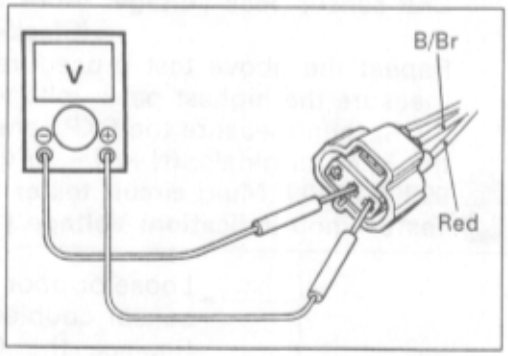
1 Turn the ignition switch OFF.
Check the IAP sensor coupler for loose or poor contacts.
If OK, then measure the IAP sensor input voltage.
Disconnect the IAP sensor coupler.
Turn the ignition switch ON.
Measure the voltage at the Red wire and ground.
If OK, then measure the voltage at the Red wire and B/Br wire.
IAP sensor input voltage: 4.5–5.5V
(⊕Red–⊖Ground)
(⊕Red–⊖B/Br)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)



No → Loose or poor contacts on the ECM coupler.
Open or short circuit in the Red wire or B/Br wire.

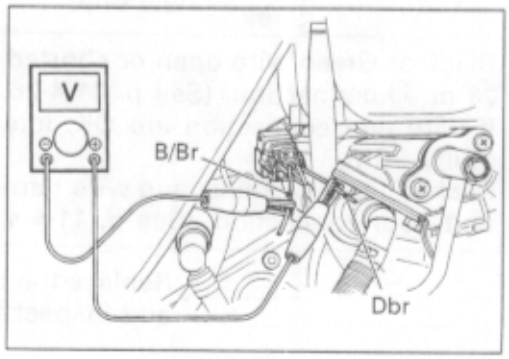
Yes

2 Connect the IAP sensor coupler.
Start the engine at idling speed.
Measure the IAP sensor output voltage at the wire side coupler (between Dbr and B/Br wires).
IAP sensor output voltage: Approx. 2.85V at idle speed (⊕Dbr–⊖B/Br)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)

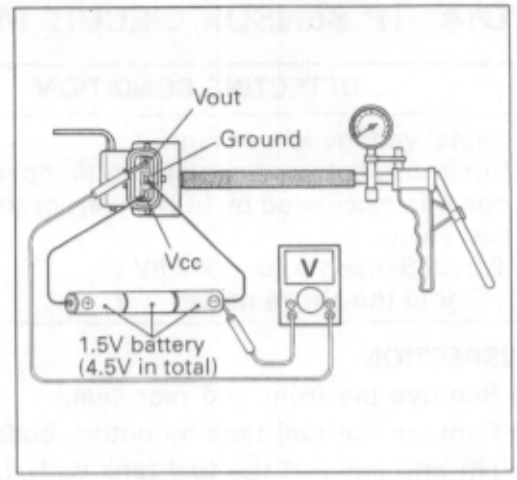


No → Check to see the vacuum hose for crack or damage.
Open or short circuit in the Dbr wire.
Replace the IAP sensor with a new one.

Yes



3 Remove the IAP sensor.
Connect the vacuum pump gauge to the vacuum port of the IAP sensor.
Arrange 3 new 1.5V batteries in series (check that total voltage is 4.5–5.0V) and connect ⊖ terminal to the ground terminal and ⊕ terminal to the Vcc terminal.
Check the voltage between Vout and ground. Also, check if voltage reduces when vacuum is applied up to 40 cmHg by using vacuum pump gauge. (See table below.)
09917-47010: Vacuum pump gauge
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)

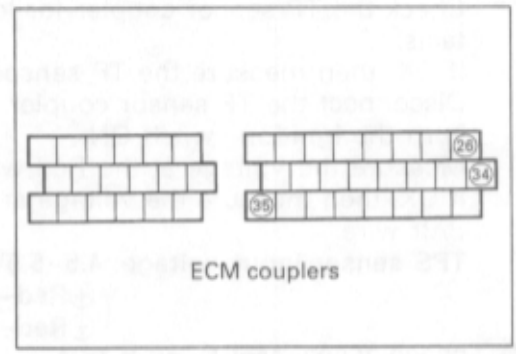


No → If check result is not satisfactory, replace IAP sensor with a new one.

Yes

Red, Dbr or B/Br wire open or shorted to ground, or poor ㉖, ㉞ or ㉟ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)

→ Replace the ECM with a new one, and inspect it again.



ECM couplers

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

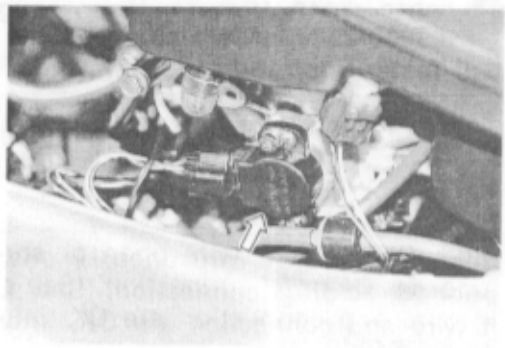
ALTITUDE (Reference)		ATMOSPHERIC PRESSURE		OUTPUT VOLTAGE
(ft)	(m)	(mmHg)	kPa	(V)
0 – 2 000	0 – 610	760 – 707	100 – 94	3.1–3.6
2 001 – 5 000	611 – 1 524	Under 707 Over 634	94 – 85	2.8–3.4
5 001 – 8 000	1 525 – 2 438	Under 634 Over 567	85 – 76	2.6–3.1
8 001 – 10 000	2 439 – 3 048	Under 567 Over 526	76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

"C14" TP SENSOR CIRCUIT MALFUNCTION

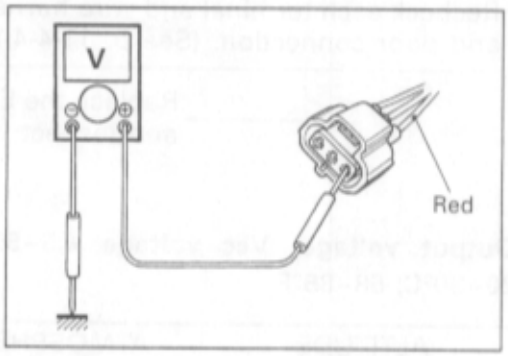
DETECTING CONDITION	POSSIBLE CAUSE
Signal voltage low or high. Difference between actual throttle opening and opening calculated by ECM in larger than specified value. (0.2V ≦ Sensor Voltage < 4.8V without the above range.)	• TP sensor maladjusted. • TP sensor circuit open or short. • TP sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)



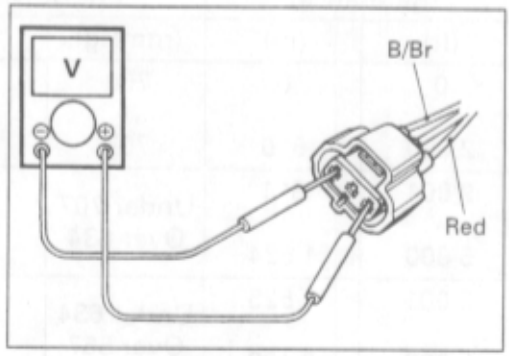
1 Turn the ignition switch OFF.
Check the TP sensor coupler for loose or poor contacts.
If OK, then measure the TP sensor input voltage.
Disconnect the TP sensor coupler.
Turn the ignition switch ON.
Measure the voltage at the Red wire and ground.
If OK, then measure the voltage at the Red wire and B/Br wire.
TPS sensor input voltage: 4.5–5.5V
(⊕Red–⊖Ground)
(⊕Red–⊖B/Br)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)



No → Loose or poor contacts on the ECM coupler.
Open or short circuit in the Red wire or B/Br wire.

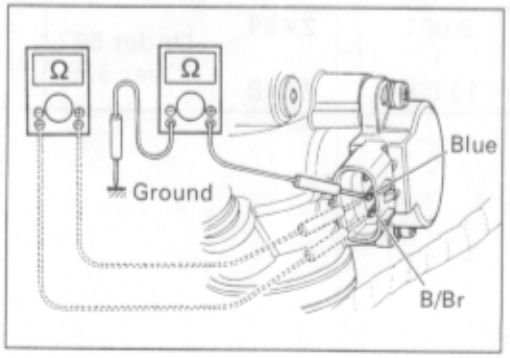
Yes ↓

2 Turn the ignition switch OFF.
Disconnect the TP sensor coupler.
Check the continuity between terminal (Blue wire) and ground.
TP sensor continuity: ∞Ω (Infinity)
(Terminal "Blue"–Ground)
If OK, then measure the TP sensor resistance at the sensor terminals (between Blue and B/Br wire's terminals).
Turn the throttle grip and measure the resistance.
TP sensor resistance
Throttle valve is closed: Approx. 1.2kΩ
Throttle valve is opened: Approx. 4.4kΩ
09900-25008: Multi circuit tester
Tester knob indication: Resistance (Ω)

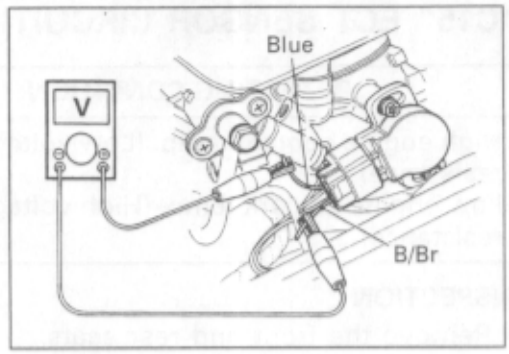


No → Reset the TP sensor position correctly.
Replace the TP sensor with a new one.

Yes ↓



3 Connect the TP sensor coupler.
Turn the ignition switch ON.
Measure the TP sensor output voltage at the wire side coupler (between Blue and B/Br wires) by turning the throttle grip.
TP sensor output voltage
Throttle valve is closed: Approx. 1.1V
Throttle valve is opened: Approx. 4.2V
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)

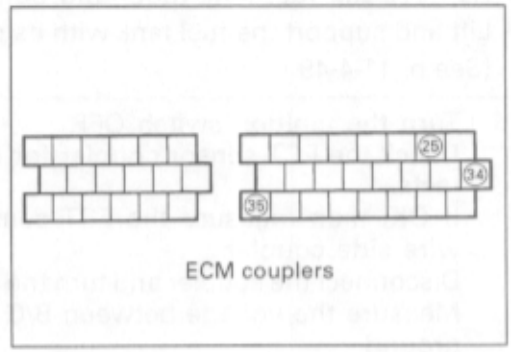


No → If check result is not satisfactory, replace TP sensor with a new one.

Yes

Red, Blue or B/Br wire open or shorted to ground, or poor ㉕, ㉞ or ㉟ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)

→ Replace the ECM with a new one, and inspect it again.



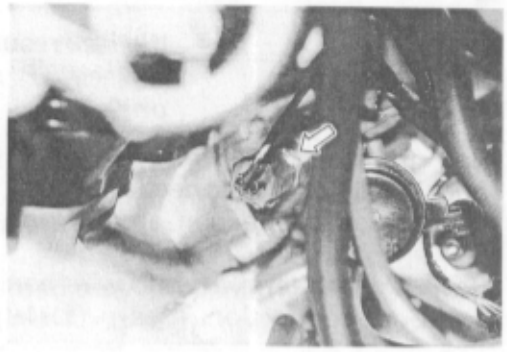
ECM couplers

"C15" ECT SENSOR CIRCUIT MALFUNCTION

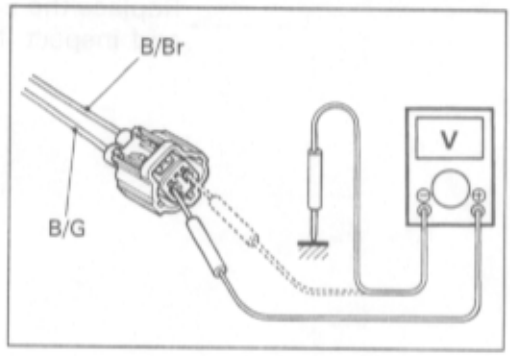
DETECTING CONDITION	POSSIBLE CAUSE
High engine coolant temp. (Low voltage–Low resistance) Low engine coolant temp. (High voltage–High resistance)	• B/G circuit shorted to ground. • B/Br circuit open. • ECT sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)



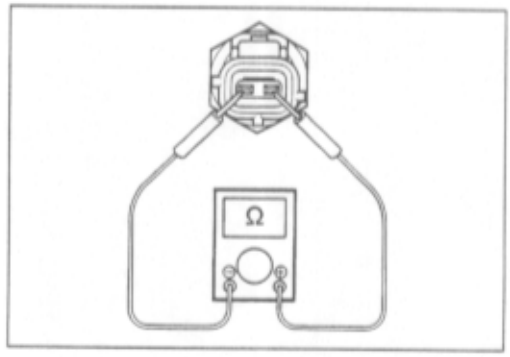
1 Turn the ignition switch OFF.
Check the ECT sensor coupler for loose or poor contacts.
If OK, then measure the ECT sensor voltage at the wire side coupler.
Disconnect the coupler and turn the ignition switch ON.
Measure the voltage between B/G wire terminal and ground.
If OK, then measure the voltage between B/G wire terminal and B/Br wire terminal.
ECT sensor voltage: 4.5–5.5V
(⊕B/G–⊖Ground)
(⊕B/G–⊖B/Br)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)



No → Loose or poor contacts on the ECM coupler.
Open or short circuit in the B/G wire or B/Br wire.

Yes

2 Turn the ignition switch OFF.
Measure the ECT sensor resistance.
ECT sensor resistance: 2.3–2.6kΩ at 20°C (68°F)
(Terminal–Terminal)
09900-25008: Multi circuit tester
Tester knob indication: Resistance (Ω)
Refer to page 5-2 for details.

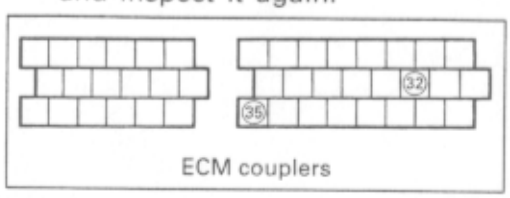


No → Replace the ECT sensor with a new one.

Yes

B/G or B/Br wire open or shorted to ground, or poor ㉜ or ㉟ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)

→ Replace the ECM with a new one, and inspect it again.



ECM couplers

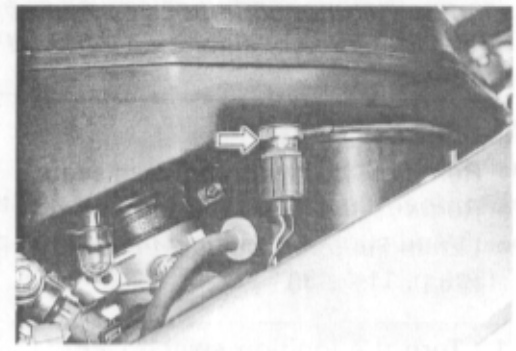
Engine Coolant Temp.	Resistance
20°C (68°F)	Approx. 2.45kΩ
50°C (122°F)	Approx. 0.811kΩ
80°C (176°F)	Approx. 0.318kΩ
110°C (230°F)	Approx. 0.142kΩ

"C21" IAT SENSOR CIRCUIT MALFUNCTION

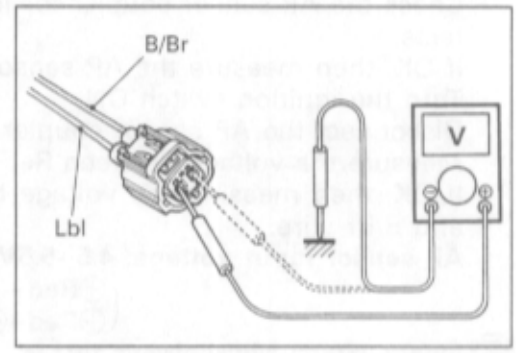
DETECTING CONDITION	POSSIBLE CAUSE
High intake air temp. (Low voltage–Low resistance) Low intake air temp. (High voltage–High resistance)	• Lbl circuit shorted to ground. • B/Br circuit open. • IAT sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)



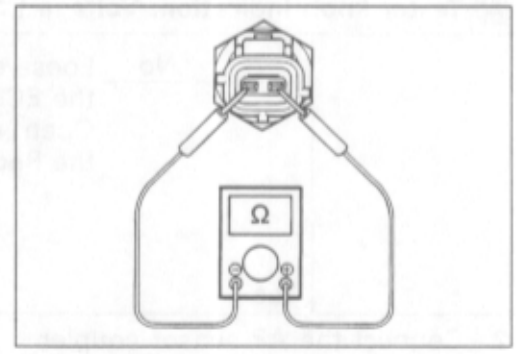
1 Turn the ignition switch OFF.
Check the IAT sensor coupler for loose or poor contacts.
If OK, then measure the IAT sensor voltage at the wire side coupler.
Disconnect the coupler and turn the ignition switch ON.
Measure the voltage between Lbl wire terminal and ground.
If OK, then measure the voltage between Lbl wire terminal and B/Br wire terminal.
IAT sensor voltage: 4.5–5.5V
(⊕Lbl–⊖Ground
⊕Lbl–⊖B/Br)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)



No → Loose or poor contacts on the ECM coupler.
Open or short circuit in the Lbl wire or B/Br wire.

Yes ↓

2 Turn the ignition switch OFF.
Measure the IAT sensor resistance.
IAT sensor resistance: 2.2–2.7kΩ at 20°C (68°F)
(Terminal–Terminal)
09900-25008: Multi circuit tester
Tester knob indication: Resistance (Ω)

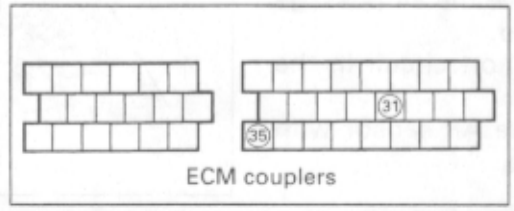


No → Replace the IAT sensor with a new one.

Yes ↓

Lbl or B/Br wire open or shorted to ground, or poor ㉛ or ㉟ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)

→ Replace the ECM with a new one, and inspect it again.



ECM couplers

Intake Air Temp.	Resistance
20°C (68°F)	Approx. 2.45kΩ
50°C (122°F)	Approx. 0.808kΩ
80°C (176°F)	Approx. 0.322kΩ
110°C (230°F)	Approx. 0.148kΩ

NOTE:
IAT sensor resistance measurement method is the same way as that of the ECT sensor, refer to page 5-2 for details.

"C22" AP SENSOR CIRCUIT MALFUNCTION

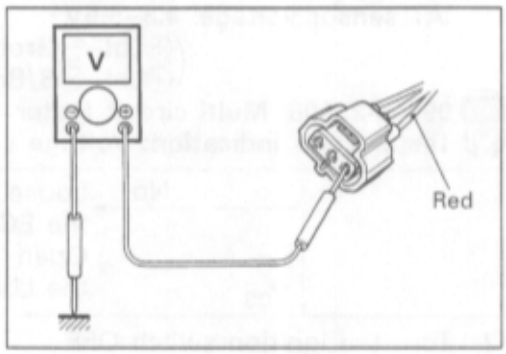
DETECTING CONDITION	POSSIBLE CAUSE
Low pressure and low voltage. High pressure and high voltage. (0.25V ≦ Sensor Voltage < 4.85V without the above range.) *NOTE:* *Note that atmospheric pressure varies depending on weather conditions as well as altitude. Take that into consideration when inspecting voltage.*	• Clogged air passage with dust. • Red wire circuit open or shorted to ground. • B/Br or Violet wire circuit shorted to ground. • AP sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)

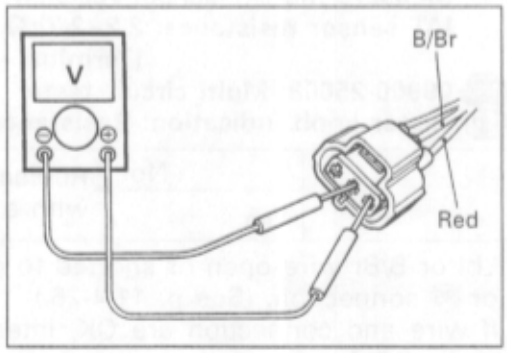


1 Turn the ignition switch OFF.
Check the AP sensor coupler for loose or poor contacts.
If OK, then measure the AP sensor input voltage.
Turn the ignition switch ON.
Disconnect the AP sensor coupler.
Measure the voltage between Red wire and ground.
If OK, then measure the voltage between Red wire and B/Br wire.
AP sensor input voltage: 4.5–5.5V
(⊕Red–⊖Ground)
(⊕Red–⊖B/Br)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)

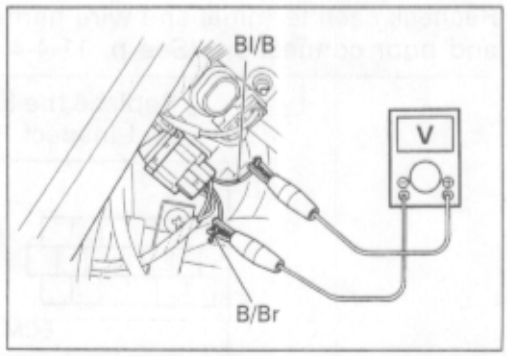


No → Loose or poor contacts on the ECM coupler.
Open or short circuit in the Red wire or B/Br wire.

Yes ↓



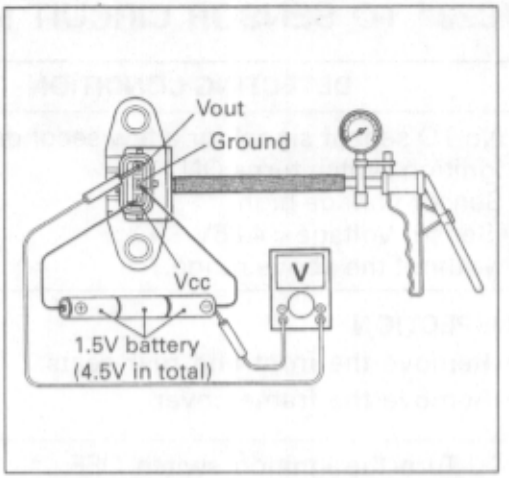
2 Connect the AP sensor coupler.
Turn the ignition switch ON.
Measure the AP sensor output voltage at the wire side coupler between Bl/B and B/Br wires.
AP sensor output voltage: Approx. 3.6V
at 760 mmHg (100kPa)
(⊕Bl/B–⊖B/Br)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)



No → Check to see the air passage for clogged.
Open or short circuit in the Bl/B wire.
Replace the AP sensor with a new one.

Yes ↓

3 Remove the AP sensor.
Connect the vacuum pump gauge to the air passage port of the AP sensor.
Arrange 3 new 1.5V batteries in series (check that total voltage is 4.5–5.0V) and connect ⊖ terminal to the ground terminal and ⊕ terminal to the Vcc terminal.
Check the voltage between Vout and ground. Also, check if voltage reduces when vacuum is applied up to 40 cmHg by using vacuum pump gauge. (See table below.)
09917-47010: Vacuum pump gauge
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)

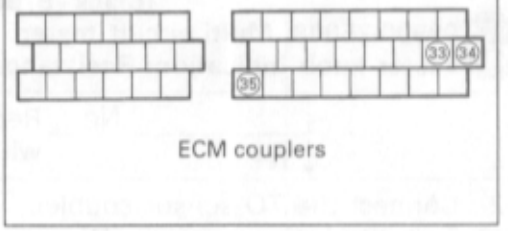


No → If check result is not satisfactory, replace AP sensor with a new one.

Yes

Red, Bl/B or B/Br wire open or shorted to ground, or poor ㉝, ㉞ or ㉟ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)

→ Replace the ECM with a new one, and inspect it again.



ECM couplers

Output voltage (Vcc voltage 4.5–5.0V, 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	Under 707 Over 634	94 – 85	2.8–3.4
5 001 – 8 000	1 525 – 2 438	Under 634 Over 567	85 – 76	2.6–3.1
8 001 – 10 000	2 439 – 3 048	Under 567 Over 526	76 – 70	2.4–2.9

"C23" TO SENSOR CIRCUIT MALFUNCTION

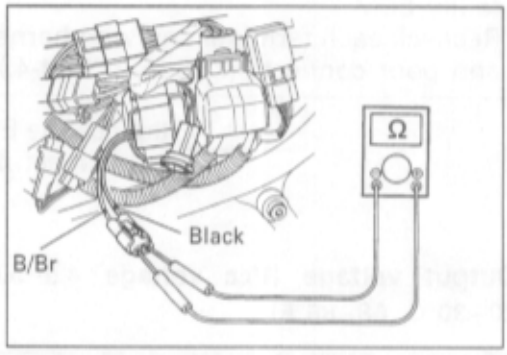
DETECTING CONDITION	POSSIBLE CAUSE
No TO sensor signal for a few seconds, after ignition switch turns ON. Sensor voltage high. (Sensor Voltage < 4.85V without the above range.)	• TO sensor circuit open or short. • TO sensor malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the frame cover.



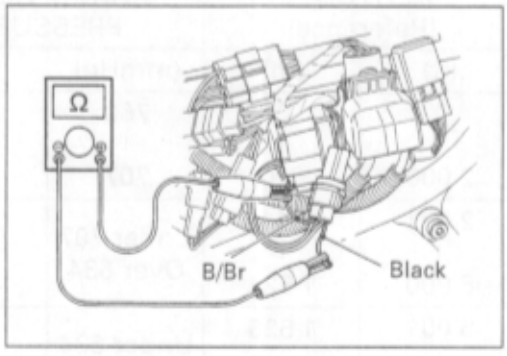
1 Turn the ignition switch OFF.
Check the TO sensor coupler for loose or poor contacts.
If OK, then measure the TO sensor resistance.
Disconnect the TO sensor coupler.
Measure the resistance between Black and B/Br wire terminals.
TO sensor resistance: 60–64kΩ (Black–B/Br)
09900-25008: Multi circuit tester
Tester knob indication: Resistance (Ω)



No → Replace the TO sensor with a new one.

Yes ↓

2 Connect the TO sensor coupler.
Turn the ignition switch ON.
Measure the voltage at the wire side coupler between Black and B/Br wires.
TO sensor voltage: Approx. 2.5V (Black–B/Br)
Also, measure the voltage when leaning of the motorcycle.
Dismount the TO sensor from its bracket and measure the voltage when it leans more than 43°, left and right, from the horizontal level.
TO sensor voltage: 0V (Black–B/Br)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)

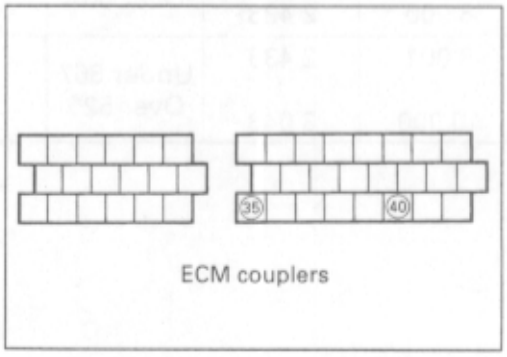


No → Loose or poor contacts on the ECM coupler.
Open or short circuit in the Black wire or B/Br wire.
Replace the TO sensor with a new one.

Yes ↓

Black or B/Br wire open or shorted to ground, or poor ㉟ or ㊵ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)

→ Replace the ECM with a new one, and inspect it again.



ECM couplers

"C24" or "C25" IGNITION SYSTEM MALFUNCTION

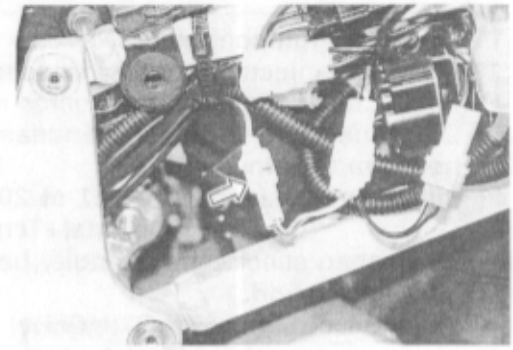
***Refer to the IGNITION SYSTEM for details. (See p. 11-7-2.)**

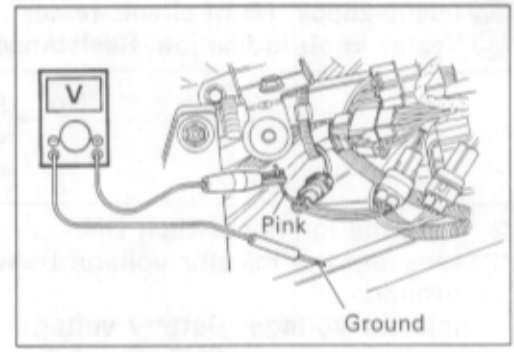
"C31" GEAR POSITION (GP) SWITCH CIRCUIT MALFUNCTION

DETECTING CONDITION	POSSIBLE CAUSE
No Gear Position switch voltage Switch voltage low. (Switch Voltage > 0.6V without the above range.)	• Gear Position switch circuit open or short. • Gear Position switch malfunction. • ECM malfunction.

INSPECTION

1 Turn the ignition switch OFF.
Check the GP switch coupler for loose or poor contacts.
If OK, then measure the GP switch voltage.
Support the motorcycle with a jack.
Turn the side-stand to up-right position.
Turn the engine stop switch ON.
Turn the ignition switch ON.
Measure the voltage at the wire side coupler between Pink wire and ground, when shifting the gear-shift lever from 1st to Top.
GP switch voltage: More than 0.6V (Pink–Ground)
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)



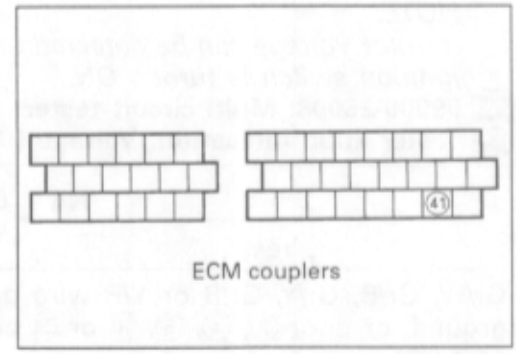


No → Open or short circuit in the Pink wire. Replace the GP switch with a new one.

Yes

Pink wire open or shorted to ground, or poor ㊶ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)

→ Replace the ECM with a new one, and inspect it again.



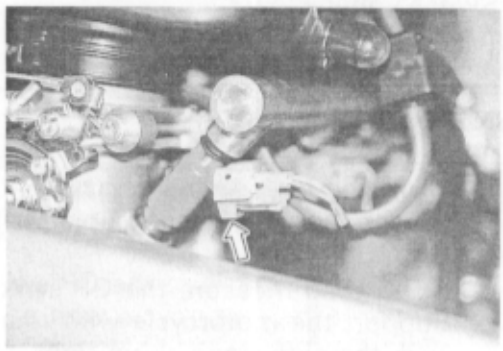
ECM couplers

"C32", "C33", "C34" and "C35" FUEL INJECTION MALFUNCTION

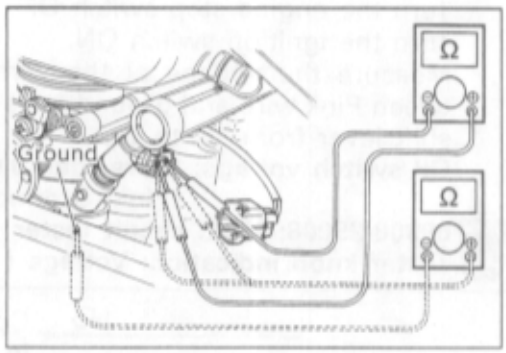
DETECTING CONDITION	POSSIBLE CAUSE
No injector current.	• Injector circuit open or short. • Injector malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)



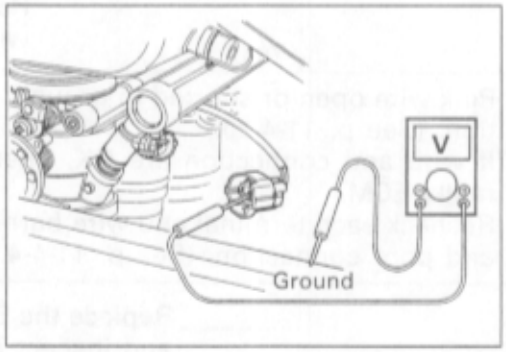
1 Turn the ignition switch OFF.
Check the injector coupler for loose or poor contacts.
If OK, then measure the injector resistance.
Disconnect the coupler and measure the resistance between terminals.
Injector resistance: 11–16Ω at 20°C (68°F)
(Terminal–Terminal)
If OK, then check the continuity between each terminal and ground.
Injector continuity: ∞Ω (Infinity)
(Terminal–Ground)
09900-25008: Multi circuit tester
Tester knob indication: Resistance (Ω)



No → Replace the injector with a new one. (See p. 11-4-62.)

Yes ↓

2 Turn the ignition switch ON.
Measure the injector voltage between Y/R wire and ground.
Injector voltage: Battery voltage
(Y/R–Ground)
NOTE:
Injector voltage can be detected only 3 seconds after ignition switch is turned ON.
09900-25008: Multi circuit tester
Tester knob indication: Voltage (⎓)

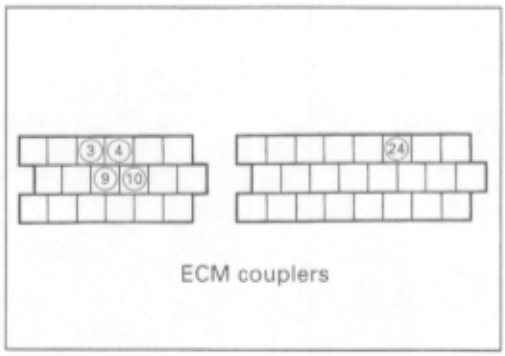


No → Open circuit in the Yellow/Red wire.

Yes ↓

Gr/W, Gr/B, Gr/Y, Gr/R or Y/R wire open or shorted to ground, or poor ③, ④, ⑨, ⑩ or ㉔ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)

→ Replace the ECM with a new one, and inspect it again.



ECM couplers

"C41" FP RELAY CIRCUIT MALFUNCTION

DETECTING CONDITION	POSSIBLE CAUSE
No signal from fuel pump relay.	• Fuel pump relay circuit open or short. • Fuel pump relay malfunction. • ECM malfunction.

INSPECTION

- Remove the front and rear seats.
- Remove the frame cover.

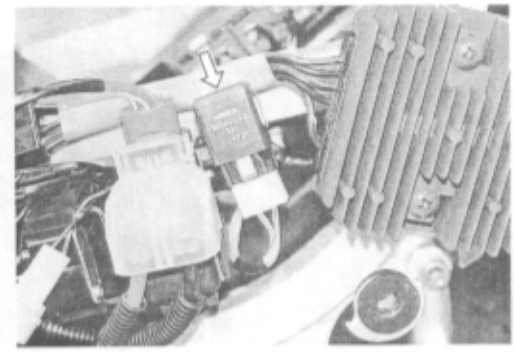
1 Turn the ignition switch OFF.
Check the FP relay coupler for loose or poor contacts.
If OK, then check the insulation and continuity, refer to page 11-4-51 for details.

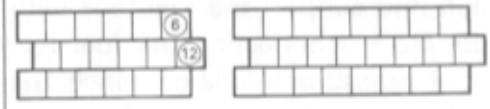
No → Replace the FP relay with a new one.

Yes

Y/B or O/W wire open or shorted to ground, or poor ⑥ or ⑫ connection. (See p. 11-4-26.)
If wire and connection are OK, intermittent trouble or faulty ECM.
Recheck each terminal and wire harness for open circuit and poor connection. (See p. 11-4-4.)

→ Replace the ECM with a new one, and inspect it again.



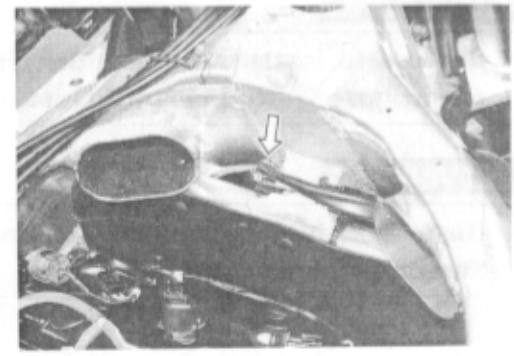


ECM couplers

"C42" IG SWITCH CIRCUIT MALFUNCTION

***Refer to the IGNITION SWITCH INSPECTION for details. (See p. 7-36.)**

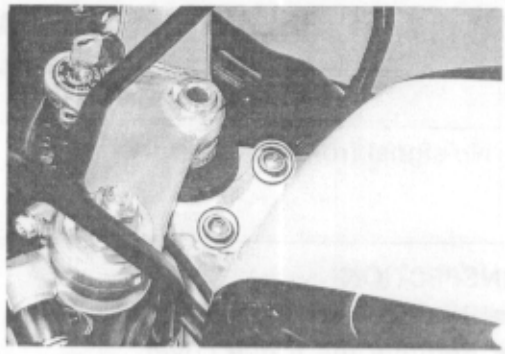
- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Remove the air cleaner box. (See pp. 11-4-54 f..)

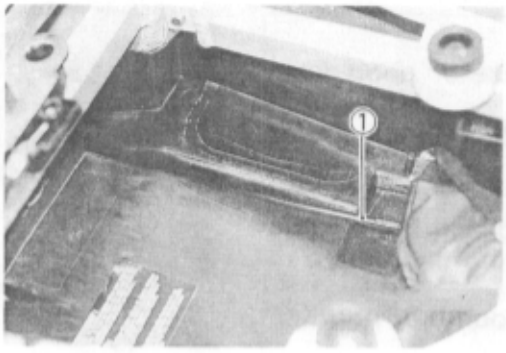


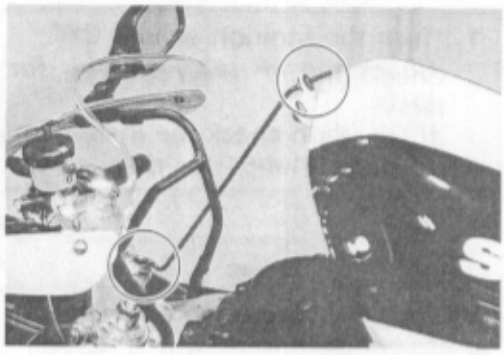
FUEL SYSTEM

FUEL TANK LIFT-UP

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Remove the fuel tank prop stay ① from the frame.
- Lift and support the fuel tank with its prop stay.

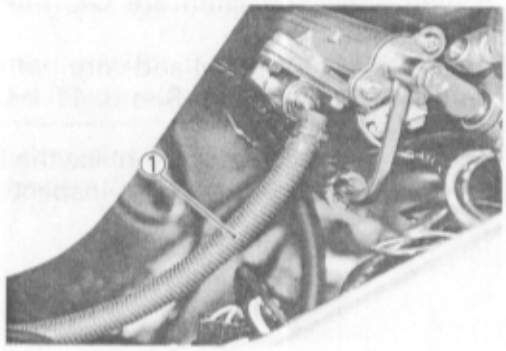






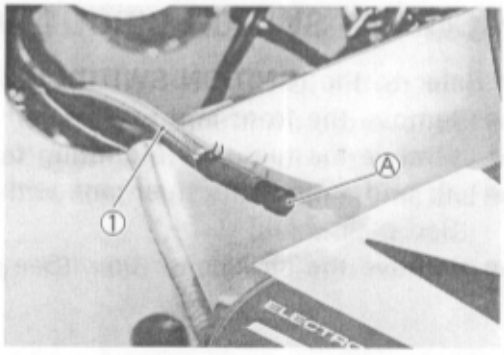
FUEL TANK REMOVAL

- Remove the front and rear seats.
- Remove the frame cover.
- Lift and support the fuel tank with its prop stay.
- Before disconnecting the fuel return hose ① from the fuel pressure regulator, pinch the fuel return hose ① with a soft clip to prevent fuel leakage from the fuel tank.
- Disconnect the fuel return hose ① and drain the fuel to the suitable container.
- Plug the fuel return hose ① with a proper plug Ⓐ.
- Disconnect the fuel feed hose ② and fuel pump lead wire coupler ③.



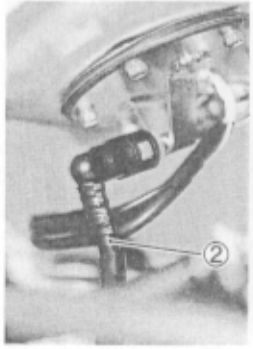
⚠WARNING

Be sure to install a proper fuel plug Ⓐ to the fuel return hose ① to prevent fuel leakage.



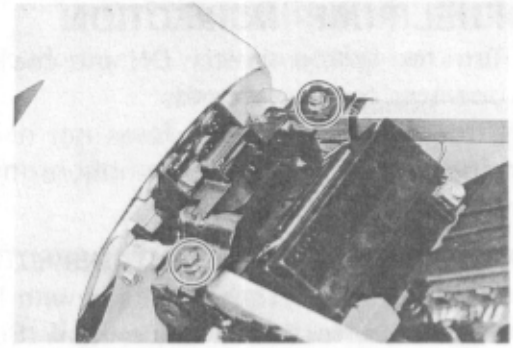
⚠WARNING

Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.



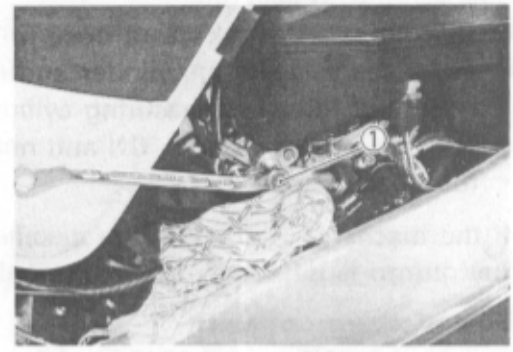


- Remove the fuel tank bracket mounting bolts.
- Remove the fuel tank.
- Installation is in the reverse order of removal.

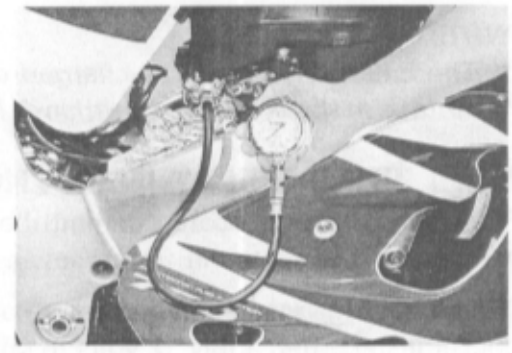


FUEL PRESSURE INSPECTION

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay.
- Place a rag under the fuel pressure check bolt ① and slowly loosen it and catch the remaining fuel using a suitable container.
- Remove the fuel pressure check bolt ① and install the special tools.



09940-40210: Fuel pressure gauge adaptor
09915-77330: Oil pressure gauge
09915-74520: Oil pressure gauge hose



Turn the ignition switch ON and check the fuel pressure.

Fuel pressure: 2.9 kg/cm^2 (290 kPa, 41 psi)

If the fuel pressure is lower than the specified, inspect the following items:

* Fuel hose leakage
* Clogged fuel filter
* Pressure regulator
* Fuel pump

If the fuel pressure is higher than the specified, inspect the following items:

* Clogged or pinched fuel return hose
* Fuel pump check valve
* Pressure regulator

⚠WARNING

*** Before removing the special tools, turn the ignition switch OFF position and release the fuel pressure slowly.**
*** Gasoline is highly flammable and explosive. Keep heat, sparks and flame away.**

⚠ CAUTION

Use a new gasket washer installed on the check bolt to prevent fuel leakage.

- Tighten the fuel pressure check bolt to the specified torque.

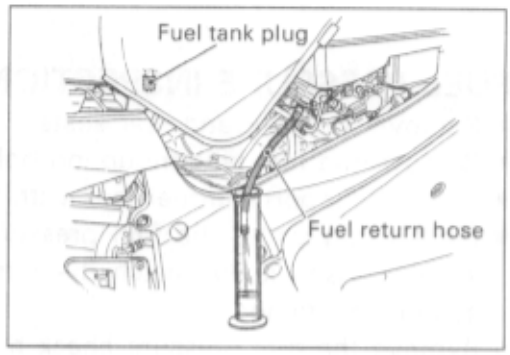
Fuel pressure check bolt: 10 N·m (1.0 kg-m, 7.0 lb-ft)

FUEL PUMP INSPECTION

Turn the ignition switch ON and check that the fuel pump operates for few seconds.
If the fuel pump motor does not make operating sound, replace the fuel pump assembly or inspect the fuel pump relay and tip over sensor.

FUEL DISCHARGE AMOUNT INSPECTION

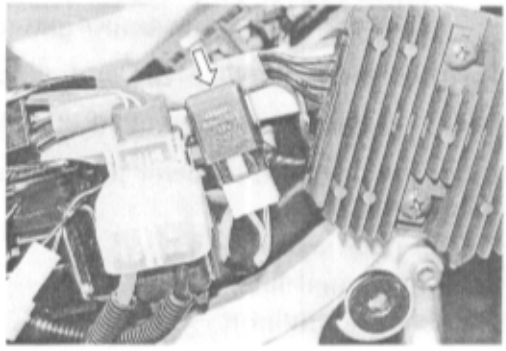
- Lift and support the fuel tank with its prop stay.
- Drain the fuel from the fuel tank. (See p. 11-4-49 for fuel tank removal section.)
- Disconnect the fuel return hose from the fuel tank.
- Place the measuring cylinder and insert the fuel return hose end into the measuring cylinder.
- Turn the ignition switch ON and measure the amount of fuel discharged.



If the discharge amount is not specified it means that the fuel pump is defective or that the fuel filter is clogged.

Fuel discharge amount:
26–30 ml/3 sec. (0.87/0.91–1.0/1.1 US/Imp oz)/3 sec.

NOTE:
** The battery must be fully charged condition.*
** Fill the fuel tank with more than 5 liters of gasoline.*

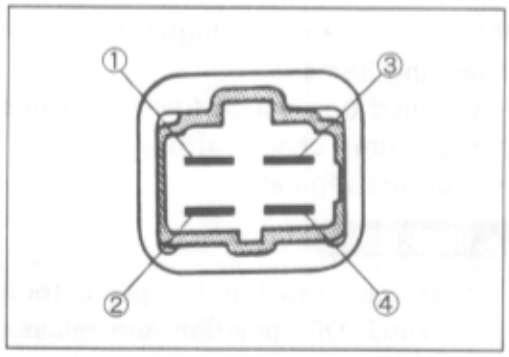


FUEL PUMP RELAY INSPECTION

Fuel pump relay is located behind the left frame cover.

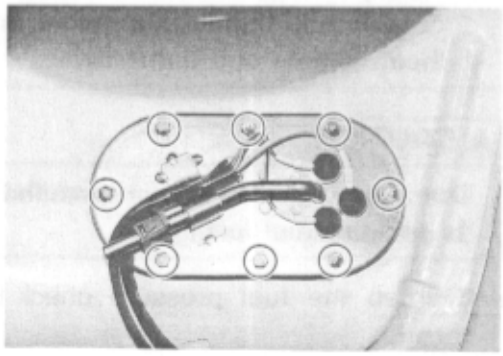
- Remove the seats and frame cover.

First, check the insulation between ① and ② terminals with pocket tester. Then apply 12 volts to ③ and ④ terminals, ⊕ to ③ and ⊖ to ④, and check the continuity between ① and ②.
If there is no continuity, replace it with a new one.



FUEL PUMP AND FUEL FILTER REMOVAL

- Remove the fuel tank. (See p. 11-4-49.)
- Remove the fuel pump assembly by removing its mounting bolts diagonally.

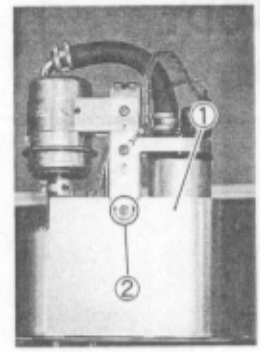


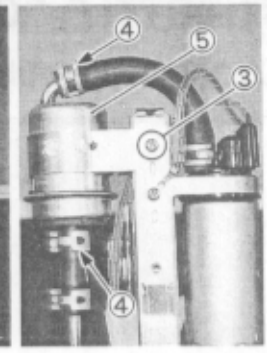
⚠ WARNING

Gasoline is highly flammable and explosive.
Keep heat, spark and flame away.

NOTE:
When inspecting the fuel level indicator switches, refer to page 7-32.

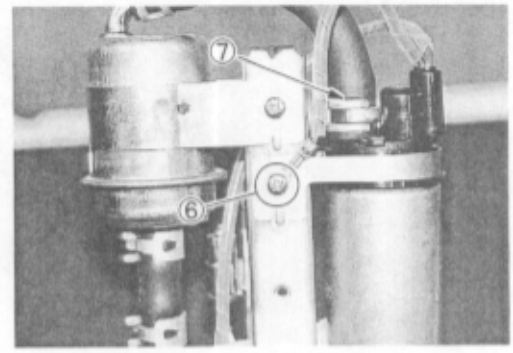
- Remove the fuel pump cover ① by removing the screw ②.
- Remove the both sides of the fuel filter mounting screws ③.
- Slide the fuel hose clamps ④ and remove the fuel filter ⑤.





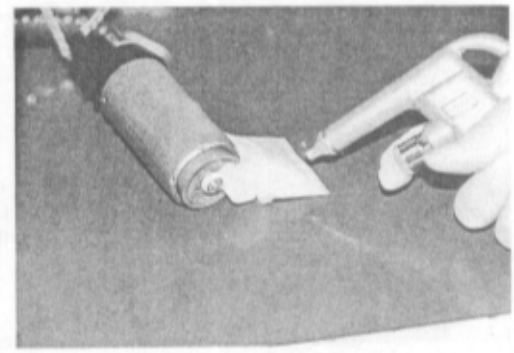
NOTE:
If the fuel mesh filter is clogged with many sediment or rust, replace the fuel filter cartridge with a new one.

NOTE:
If it is necessary to remove the fuel pump, remove the fuel pump mounting screw ⑥ and slide the fuel hose clamp ⑦.



FUEL MESH FILTER INSPECTION AND CLEANING

If the mesh filter is clogged with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Blow the fuel mesh filter with compressed air.

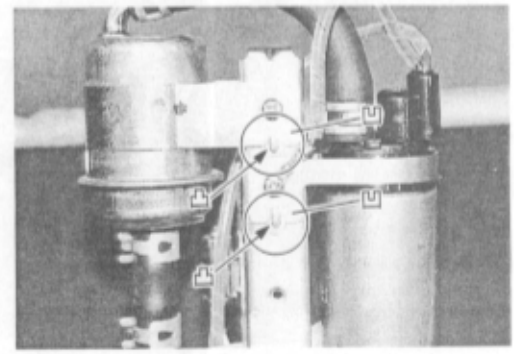


FUEL PUMP AND FUEL FILTER INSTALLATION

Install the fuel pump and fuel filter in the reverse order of removal, and pay attention to the following points:

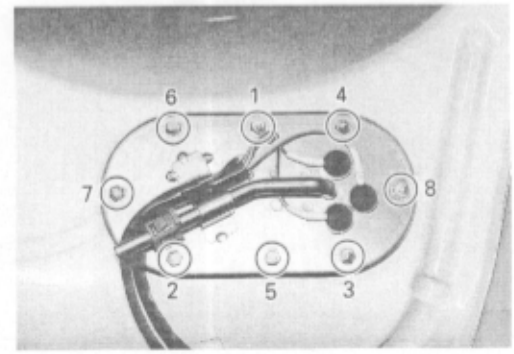
- Align the stopper with the slit when installing the fuel filter or fuel pump.
- When installing the fuel pump assembly, lightly tighten all the fuel pump assembly mounting bolts in the ascending order of numbers, and then tighten them to the specified torque in the above manner.

Fuel pump mounting bolt: 3 N·m (0.3 kg-m, 2.0 lb-ft)



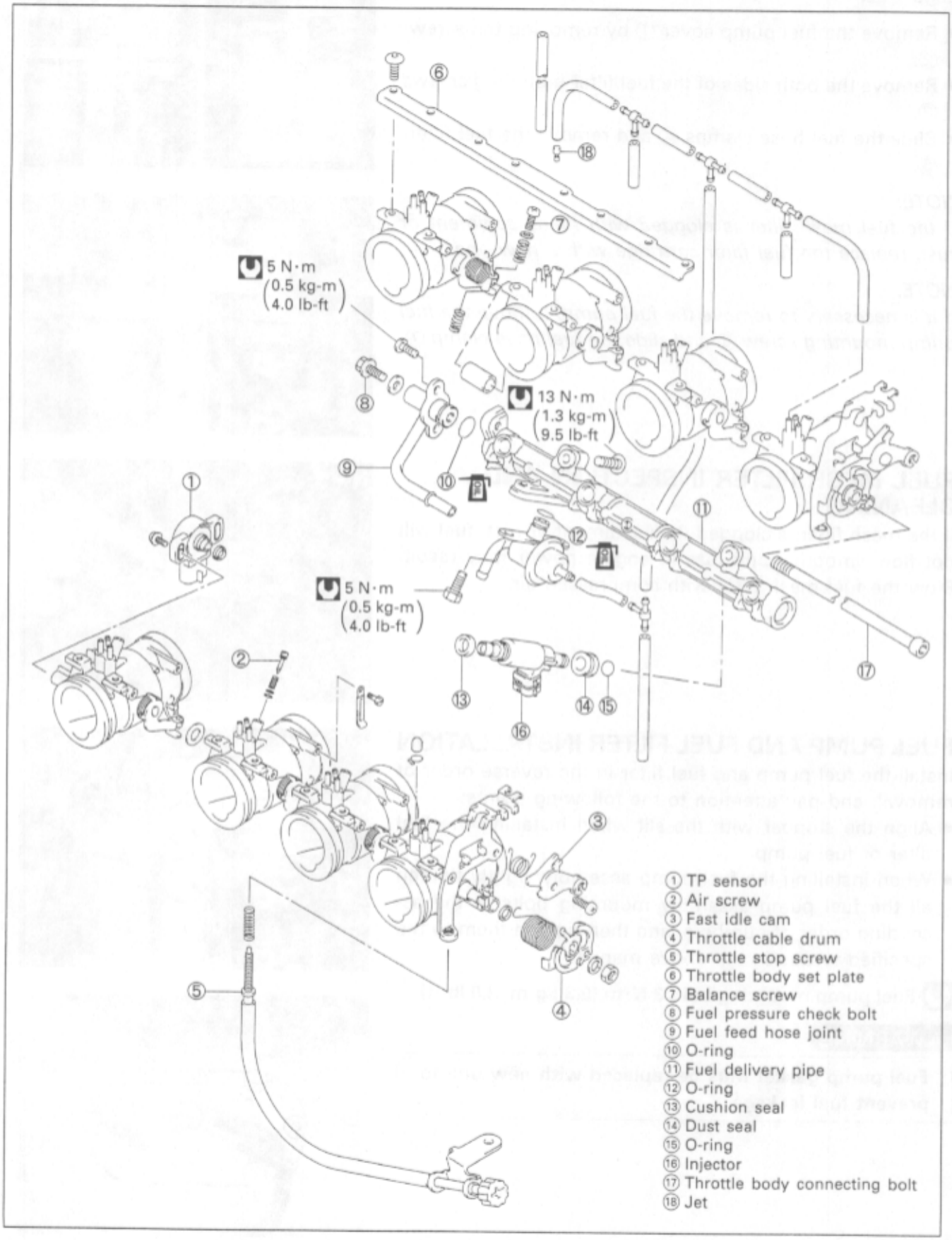
⚠WARNING

Fuel pump gasket mus be replaced with new one to prevent fuel leakage.



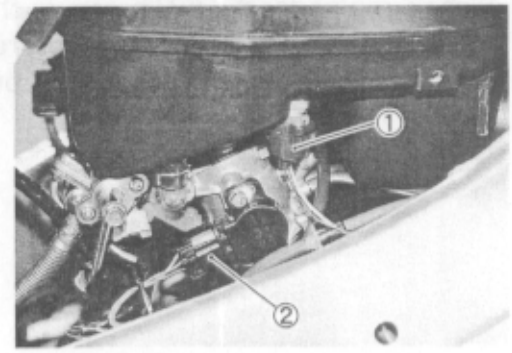
THROTTLE BODY

CONSTRUCTION

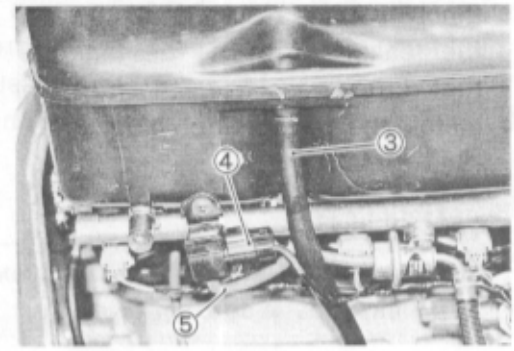


THROTTLE BODY REMOVAL

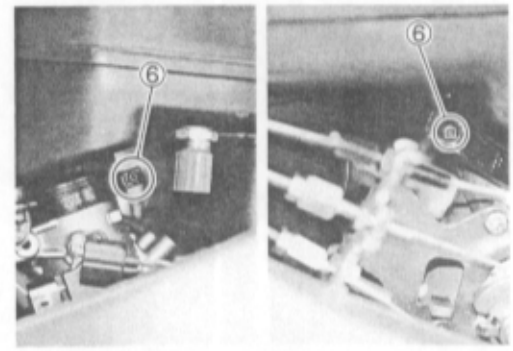
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Disconnect the IAT sensor coupler ① and TP sensor coupler ②.



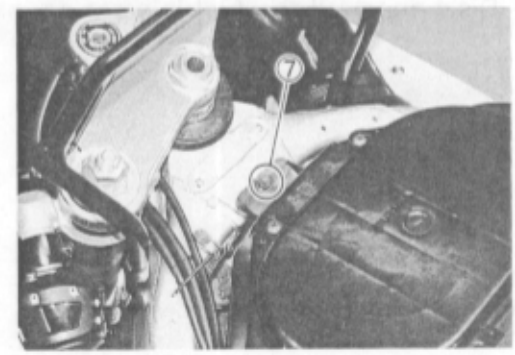
- Disconnect the crankcase breather hose ③.
- Disconnect the IAP sensor coupler ④ and vacuum hose ⑤.



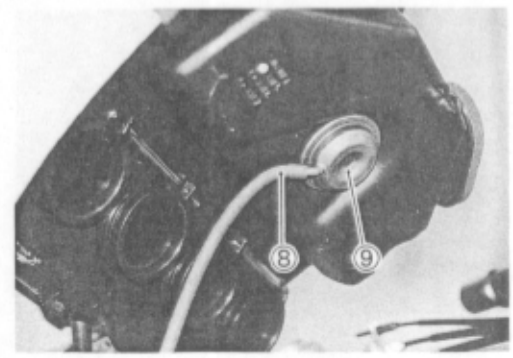
- Loosen the throttle body clamp screws ⑥ at the air cleaner box side.



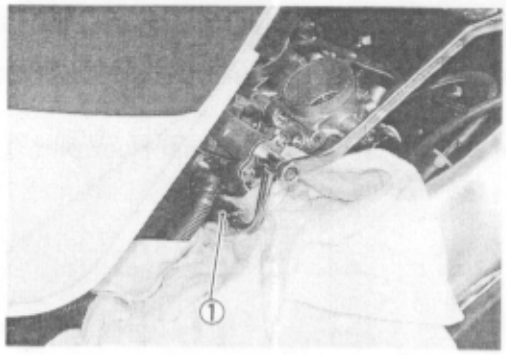
- Remove the air cleaner box mounting bolt ⑦.



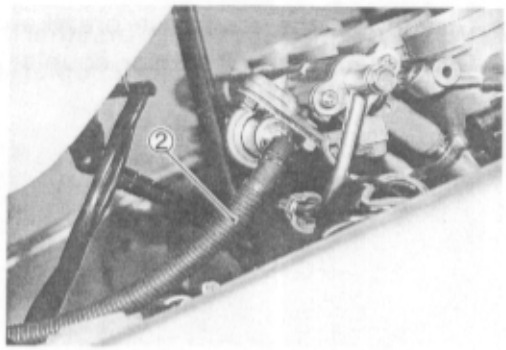
- Disconnect the vacuum hose ⑧ from the intake air control valve actuator ⑨.
- Remove the air cleaner box.



- Place a rag under the fuel pressure check bolt and slowly loosen it to release the fuel pressure.
- Disconnect the fuel feed hose ① from the delivery pipe side.

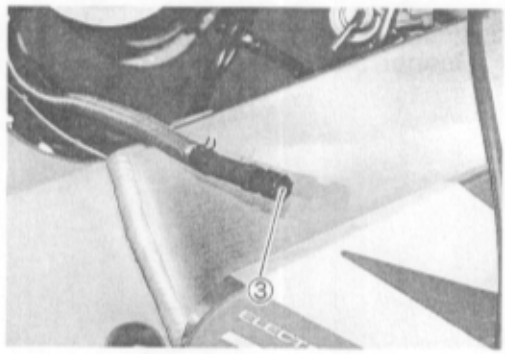


- Pinch the fuel return hose ② with a soft clip to prevent fuel leakage from the fuel tank before disconnecting the fuel return hose from the fuel pressure regulator.
- Install the proper fuel plug ③ to the fuel return hose. (See p. 4-49.)

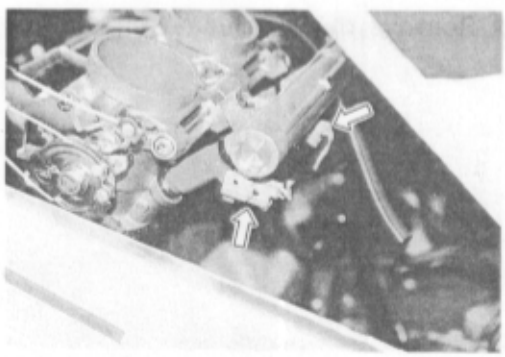


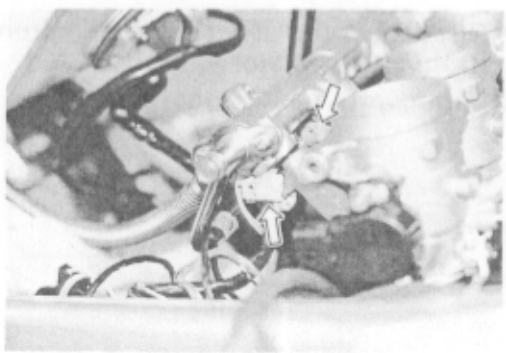
⚠WARNING

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Keep heat, spark and flame away.

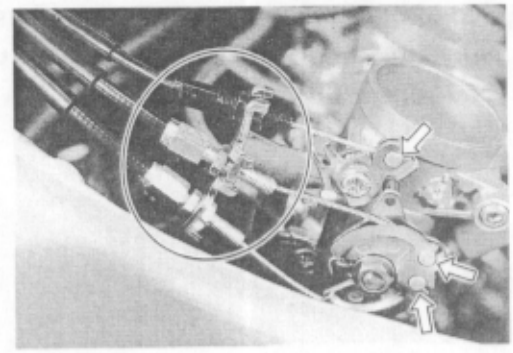


- Disconnect all the fuel injector couplers.





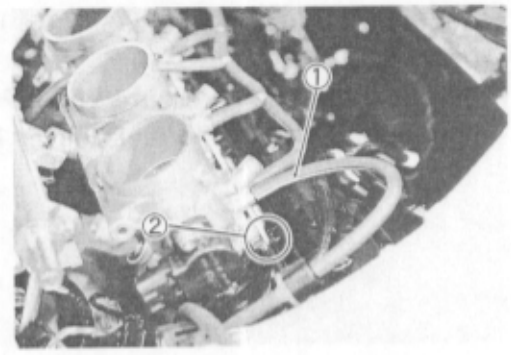
- Disconnect the throttle cables from their drum.
- Disconnect the fast idle cable from its cam.

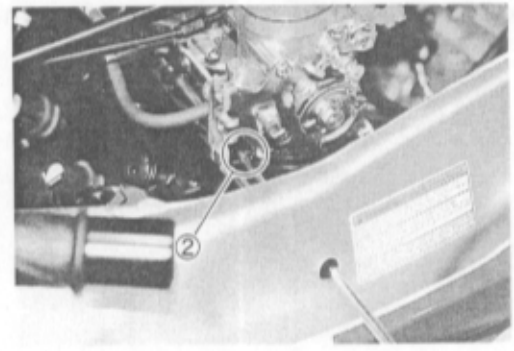


⚠ CAUTION

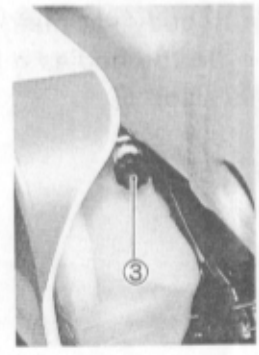
After disconnecting the throttle cables, do not snap the throttle valve from full open to full close. It may cause damage to the throttle valve and throttle body.

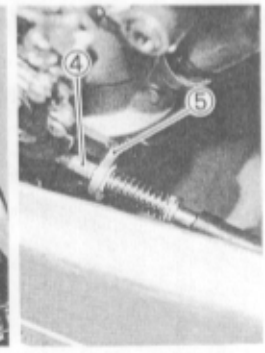
- Disconnect the vacuum hose ① from the No.4 throttle body.
- Loosen the throttle body clamp screws ② at the intake pipe side.





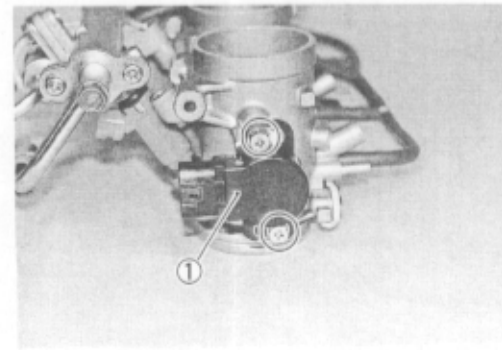
- Loosen the throttle stop screw ③ fully and set its threads ④ free from the cable guide ⑤.
- Remove the throttle body assembly.



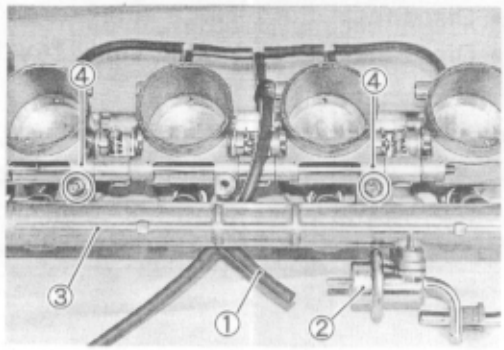


THROTTLE BODY DISASSEMBLY

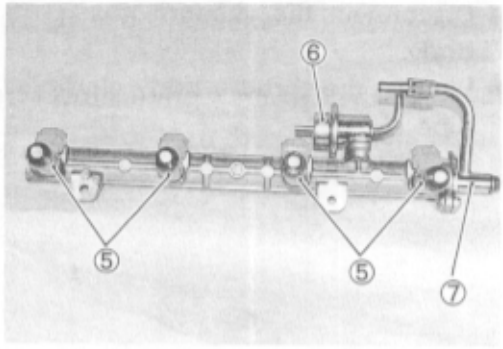
- Remove the TP sensor ①.



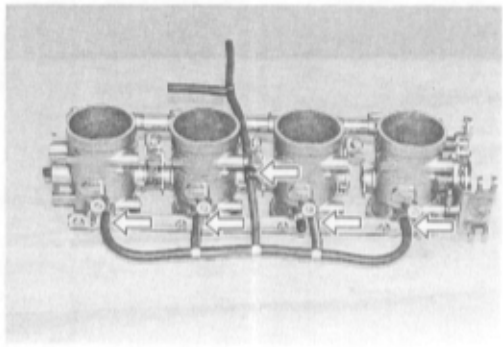
- After disconnecting the vacuum hose ① from the fuel pressure regulator ②, remove the fuel delivery pipe ③ by removing the bolts ④.



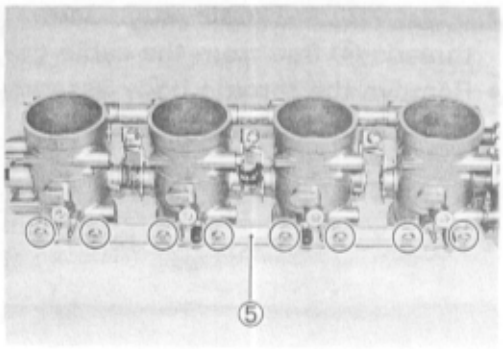
- Remove the fuel injectors ⑤ from the fuel delivery pipe or throttle body.
- Remove the fuel pressure regulator ⑥ and fuel feed hose joint ⑦ from the fuel delivery pipe.

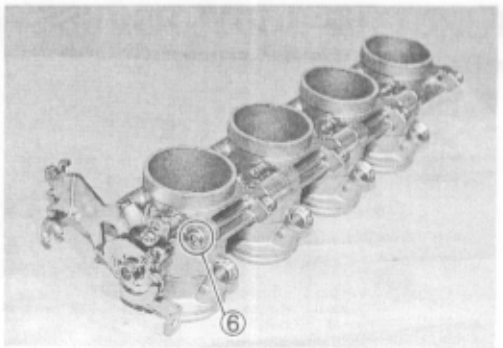


- Disconnect the respective vacuum hoses from each throttle body.

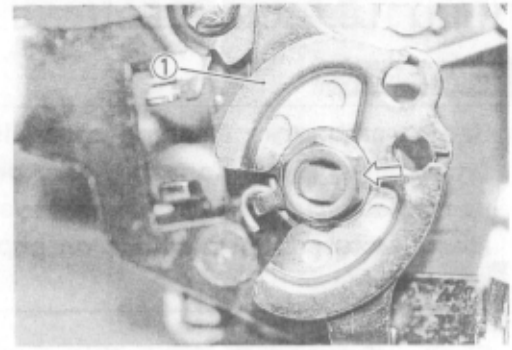


- Remove the throttle body set plate ⑤.
- Separate the four throttle bodies respectively by removing their connecting bolt ⑥.

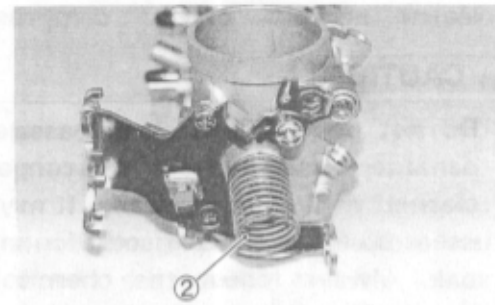




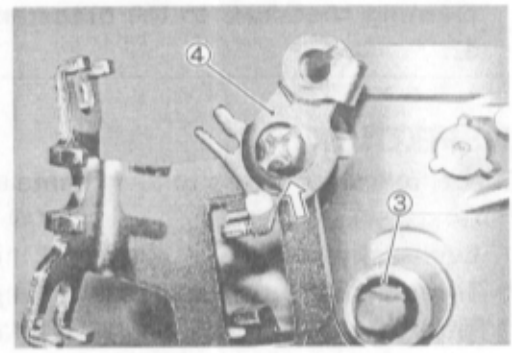
- If it is necessary to check the throttle valve shaft seal, remove the throttle cable drum ① by removing the nut.



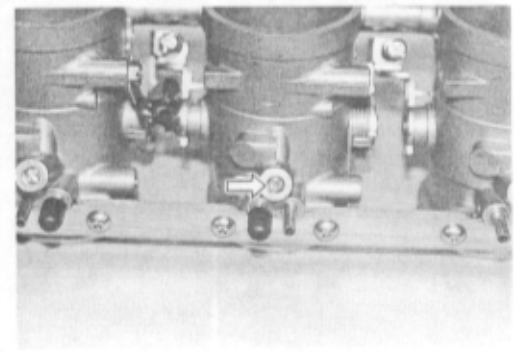
- Remove the throttle cable drum return spring ②.

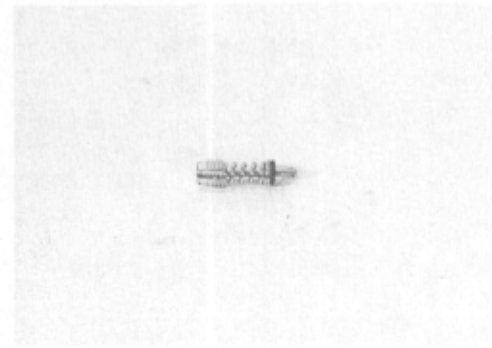


- Visually inspect the throttle valve shaft seal ③ for wear or damage.
- Remove the fast idle cam ④ by removing the screw.



- Remove the air screw plug from the throttle body.
- Slowly turn the air screw in clockwise and count the number of turns until the screw is lightly seated. Make a note of how many turns were made so the screw can be reset correctly after cleaning.
- Remove the air screw with the spring, washer and O-ring.





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 on proper use, handling and strage.

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

⚠ CAUTION

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

INSPECTION

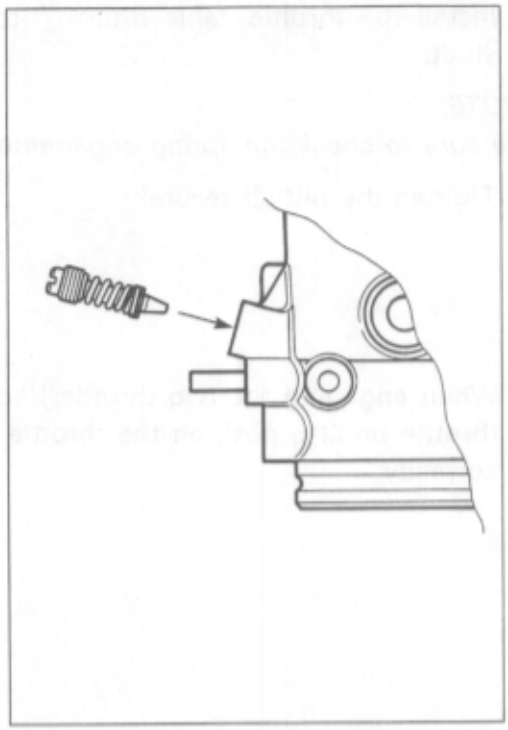
Check following items for any damage or clogging.

* Air screw
* Bypass air passage
* Throttle shaft bush and seal
* Throttle valve
* Fuel injector filter
* O-ring
* Injector cushion seal
* Injector dust seal
* Vacuum hoses
* Jet

THROTTLE BODY REASSEMBLY

- After cleaning, reinstall the air screw to the original setting by turning the screw in until it lightly seats, and then backing it out the same number of turns counted during disassembly.

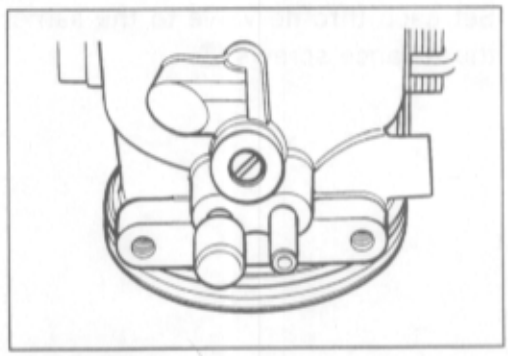
Air screw STD setting: Approx. 1/2 turn back



- Install the air screw plug.

⚠ CAUTION

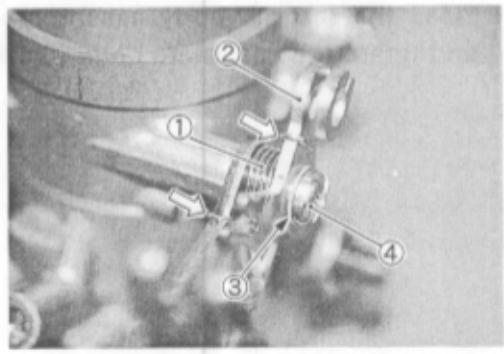
Replace the O-ring with a new one.



- Install the spring ①, fast idle cam ②, washer ③ and securing screw ④.

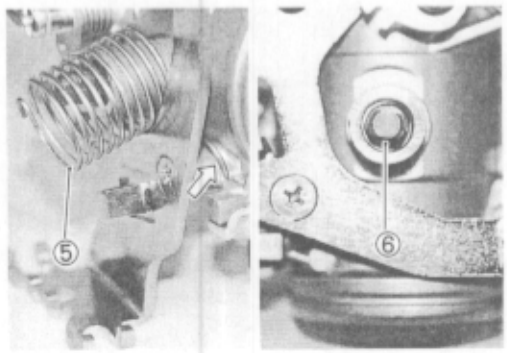
NOTE:
Be sure to check the spring engagement properly.
Apply a small quantity of THREAD LOCK "1342" to the fast idle cam securing screw ④.

1342 99000-32050: THREAD LOCK "1342"



- Install the spring ⑤.

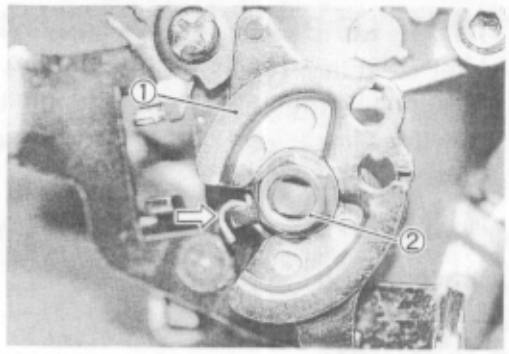
NOTE:
Before installing the throttle cable drum, apply thin coat of the grease "A" to the seal ⑥.



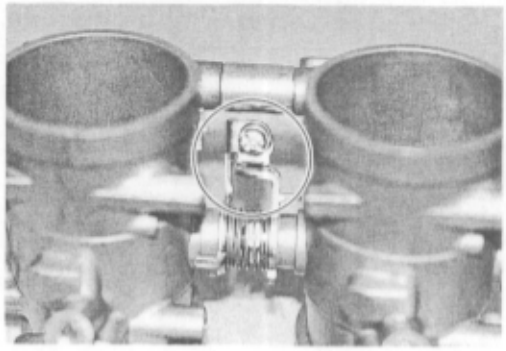
- Install the throttle cable drum ① to the throttle valve shaft.

NOTE:
Be sure to check the spring engagement properly.

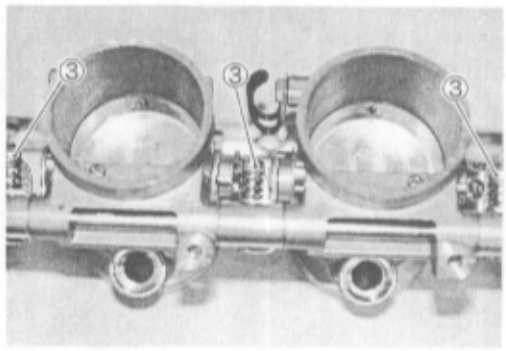
- Tighten the nut ② securely.



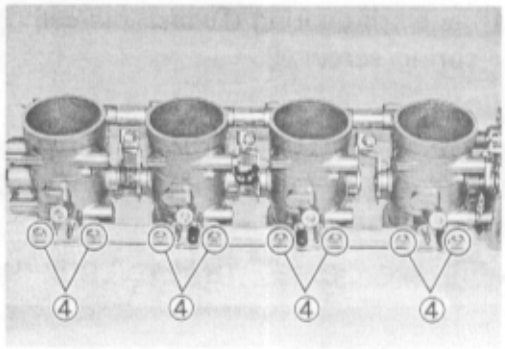
- When engaging the two throttle bodies or two pairs of throttle bodies, position the throttle valve control lever correctly.

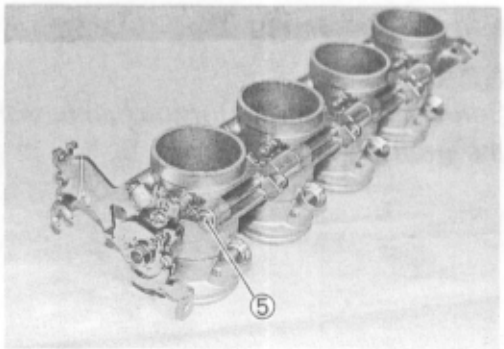


- Set each throttle valve to the same opening by turning the balance screws ③.

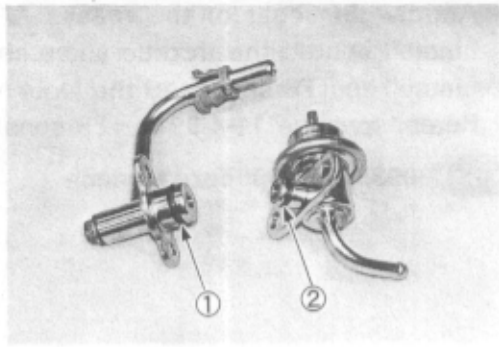


- Place the throttle body assembly on the surface plate and tighten the set plate bolts ④ and connecting bolt ⑤.





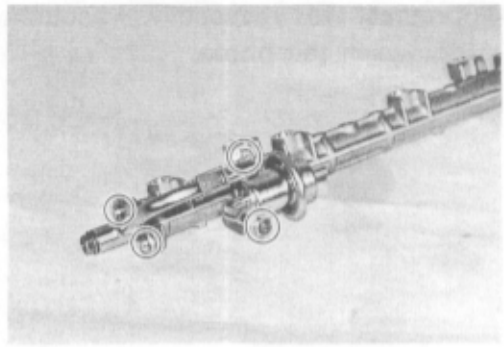
- Apply thin coat of the engine oil to the new O-rings, ① and ②.



⚠ CAUTION

Replace the O-ring with a new one.

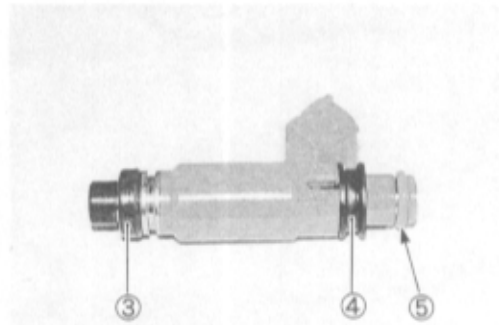
- Install the fuel pressure regulator and fuel feed hose joint to the fuel delivery pipe, and then tighten their mounting bolts and screws to the specified torque.



Fuel pressure regulator mounting bolt: 5 N·m (0.5 kg-m, 3.5 lb-ft)

Fuel feed hose joint mounting screw: 3 N·m (0.3 kg-m, 2.0 lb-ft)

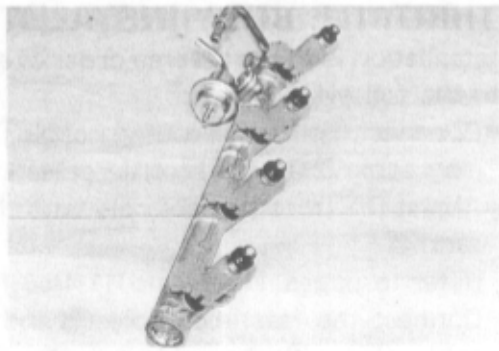
- Apply thin coat of the engine oil to the new fuel injector cushion seals ③, and install them to each fuel injector.



⚠ CAUTION

Replace the cushion seal with a new one.

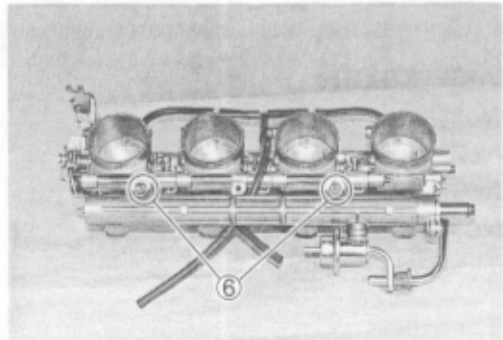
- Install the seals ④ and O-rings ⑤ to each fuel injector.
- Apply thin coat of the engine oil to the new O-rings ⑤.
- Install the fuel injectors by pushing them straight to the fuel delivery pipe or each throttle body.



⚠ CAUTION

Replace the dust seal and O-ring with the new ones.
Never turn the injector while pushing it.

- Install the fuel delivery pipe along with the fuel injectors to the throttle body assembly.



⚠ CAUTION

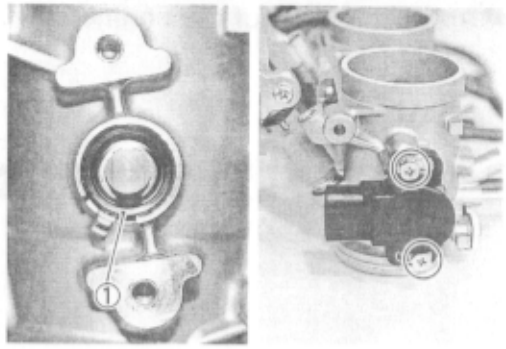
Never turn the fuel injectors while installing them.

- Tighten the fuel delivery pipe mounting bolts ⑥ to the specified torque.

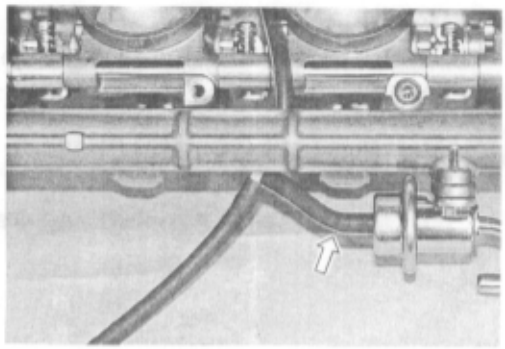
Fuel delivery pipe mounting bolt: 13 N·m (1.3 kg-m, 9.5 lb-ft)

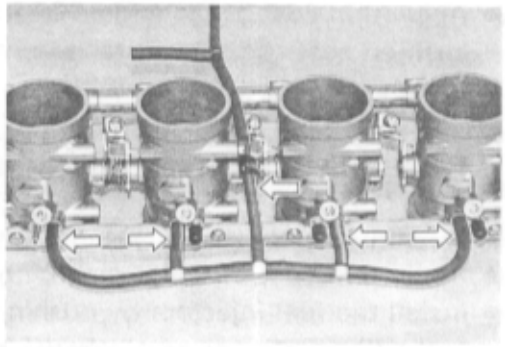
- Apply thin coat of the grease "A" to the seal ① and install it onto the throttle valve shaft.
- Install the TP sensor to the No.4 throttle body.
  Refer to page 11-4-29 for TP sensor setting procedure.

TOOL **09930-11950: Torx wrench**



- Connect the respective vacuum hoses correctly as shown in the photo.

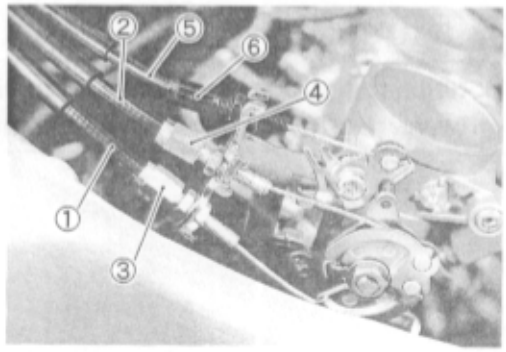




THROTTLE BODY INSTALLATION

Installation is in the reverse order of removal. Pay attention to the following points:

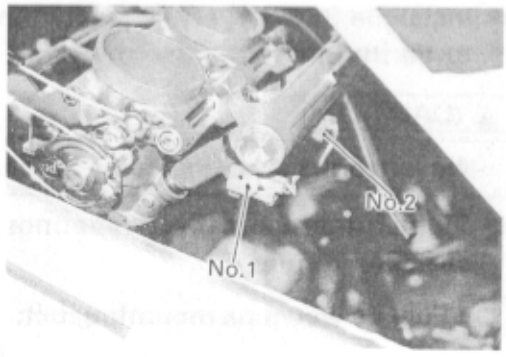
- Connect the throttle pulling cable ① and throttle returning cable ② to the throttle cable drum.
- Adjust the throttle cable play with the cable adjusters ③ and ④.
  Refer to pages 11-2-4 and 11-4-68 for details.
- Connect the fast idle cable ⑤ and adjust the fast idle cable play with the cable adjuster ⑥.

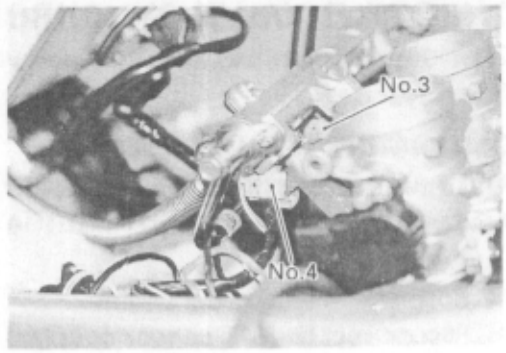


- Connect the fuel injector couplers to each fuel injector.

WIRE COLOR

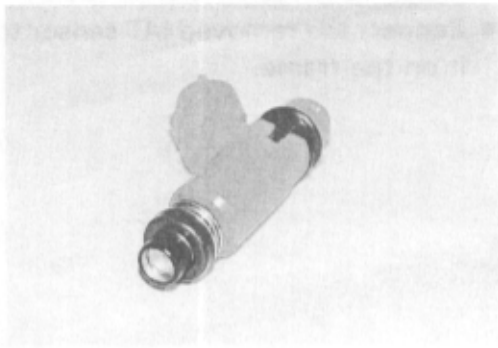
No.1 coupler: Gray/White
No.2 coupler: Gray/Black
No.3 coupler: Gray/Yellow
No.4 coupler: Gray/Red





FUEL INJECTOR INSPECTION

The fuel injector can be checked without removing it from the throttle body.
Refer to page 11-4-47 for details.



FUEL INJECTOR REMOVAL

- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Remove the air cleaner box. (See p. 11-4-54.)
- With battery negative cable disconnected, disconnect the injector couplers.
- Disconnect the fuel feed hose.
- Remove the fuel delivery pipe bolts. (See p. 11-4-57.)
- Remove the fuel injectors No.1, No.2, No.3 and No.4. (See p. 11-4-57.)

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.

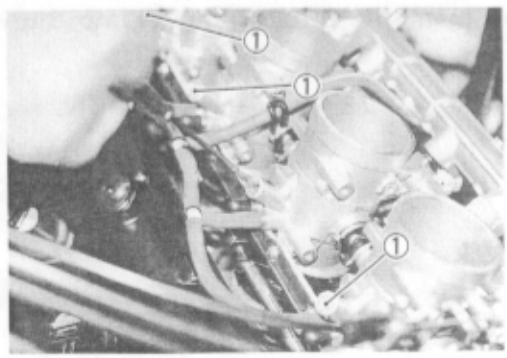
FUEL INJECTOR INSTALLATION

- Apply thin coat of the engine oil to new injector cushion seals and O-rings.
- Install the injector by pushing it straight to the throttle body. Never turn the injector while pushing it. (See p. 11-4-63.)

AIR SCREW ADJUSTMENT

If it is necessary to adjust the throttle valve synchronization, adjust the air screws to the specification.

- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Remove the air cleaner box. (See p. 11-4-54.)
- Remove each air screw plug and adjust the respective air screws ① to the specification by using screwdriver as shown.



Air screw STD setting: Approx. 1/2 turn back

⚠ CAUTION

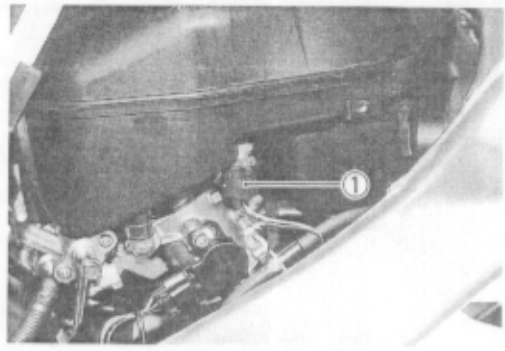
Do not overtighten the air screw.

THROTTLE VALVE SYNCHRONIZATION

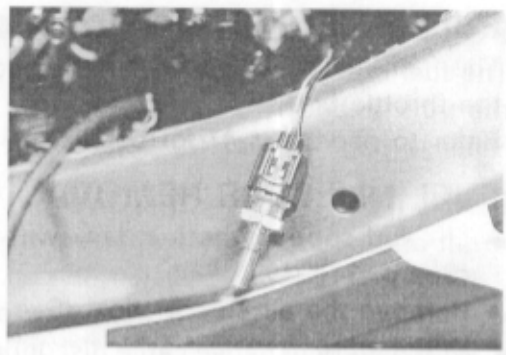
Check and adjust the throttle valve synchronization among four cylinders.

CALIBRATING EACH GAUGE

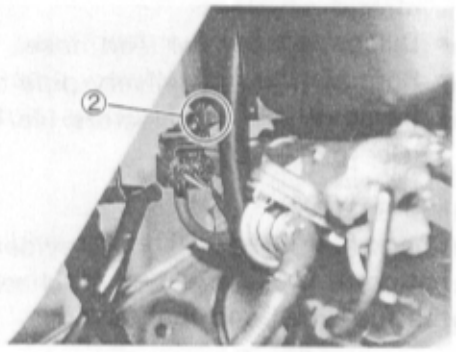
- Lift and support the fuel tank. (See p. 11-4-49.)
- Start up the engine and run it in idling condition for warming up.
- Stop the warmed-up engine.
- Disconnect the IAT sensor coupler ① and remove the IAT sensor from the air cleaner box.



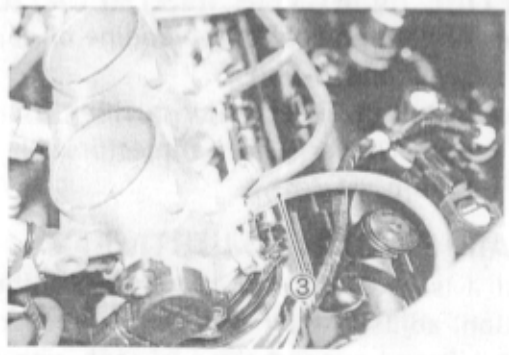
- Connect the removed IAT sensor to its coupler and place it on the frame.



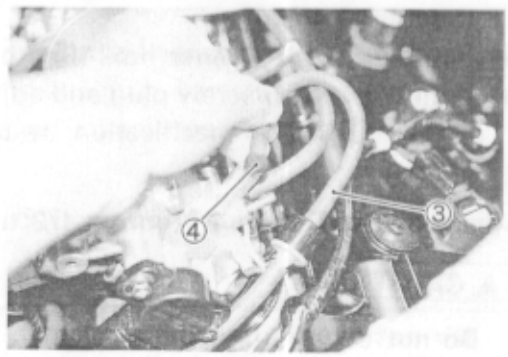
- Remove the IAP sensor mounting screw ②.
- Remove the air cleaner box. (See p. 11-4-54.)



- Disconnect the vacuum hose ③ from the No.4 throttle body.

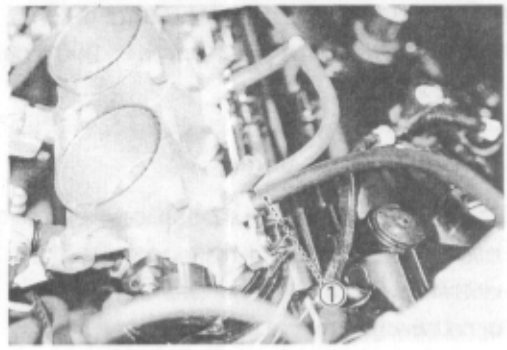


- Install the proper plug ④ into the vacuum hose ③.



- Connect one of the four rubber hoses of the vacuum balancer gauge to the nipple ① on the No.4 throttle body.

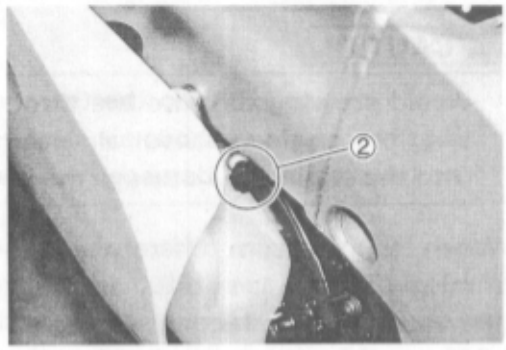
TOOL **09913-13121: Vacuum balancer gauge**



- Connect a tachometer.
- Start up the engine and keep it running at 1 200 rpm by turning throttle stop screw ②.

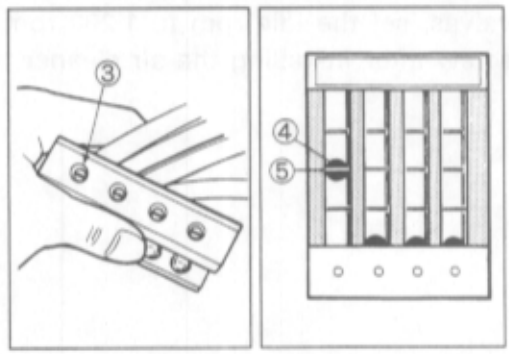
⚠ CAUTION

Avoid drawing dirt into the throttle body while running the engine without air cleaner box. Dirt drawn into the engine will damage the internal engine parts.



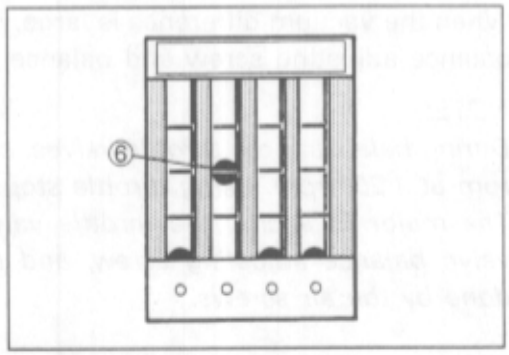
- Turn the air screw ③ of the gauge so that the vacuum acting on the tube of that hose will bring the steel ball ④ in the tube to the center line ⑤.

NOTE:
The vacuum gauge is positioned approx. 30° from the horizontal level.



- After making sure that the steel ball stays steady at the center line, disconnect the hose from the No.4 throttle body nipple and connect the next hose to this nipple.
- Turn air screw to bring the other steel ball ⑥ to the center line.
- Repeat the above process on the third and fourth hoses.

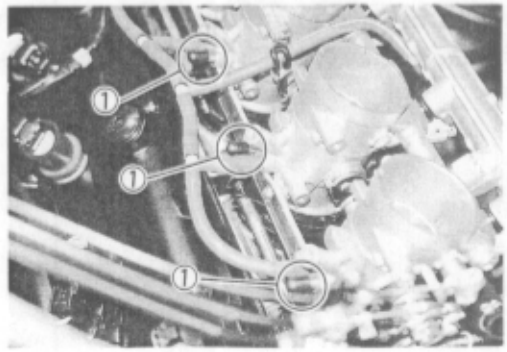
The balancer gauge is now ready for use in balancing the throttle valves.



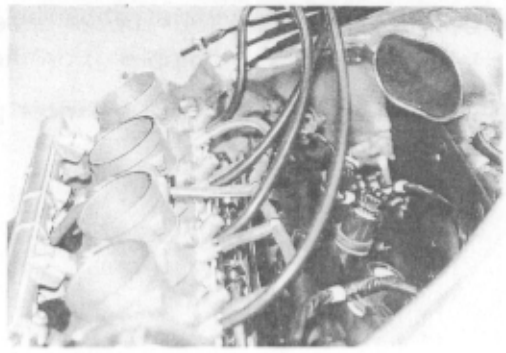
THROTTLE VALVE SYNCHRONIZATION

- To synchronize throttle valves, remove the rubber caps ① from each vacuum nipple and connect the vacuum balancer gauge hoses to the vacuum nipples respectively.

TOOL **09913-13121: Vacuum balancer gauge**



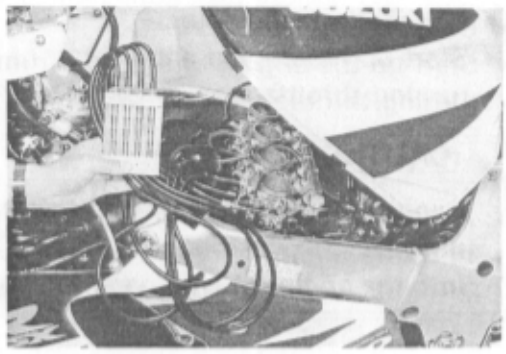
- Connect a tachometer and start up the engine.
- Bring the engine rpm to 1 200 rpm by the throttle stop screw.
- Check the vacuum of the four cylinders and balance the four throttle valves.



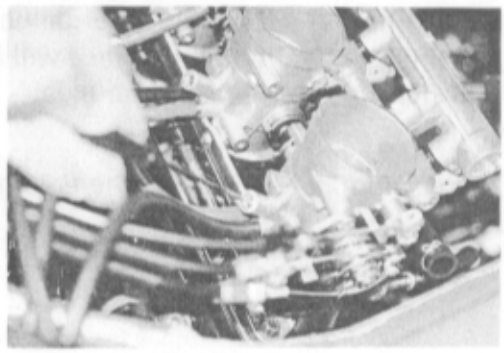
The vacuum gauge is positioned approx. 30° from the horizontal level, and in this position the four balls should be within one ball dia. If the difference is larger than one ball, turn the air screw on the throttle body and bring the ball to the same level.

⚠ CAUTION

Avoid drawing dirt into the throttle body while running the engine without air cleaner box. Dirt drawn into the engine will damage the internal engine parts.

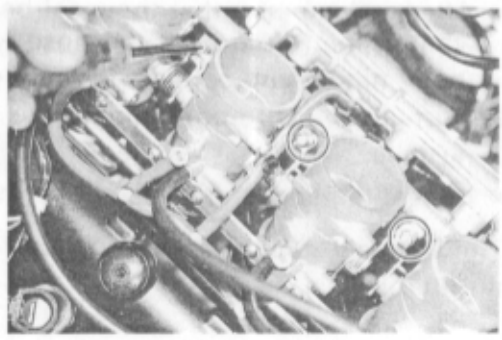


When the vacuum difference is small (less than 20 mmHg = approx. one ball), use the air screw and balance the vacuum. The standard setting position of the air screw 1/2 turn out from seating position. After balancing the four valves, set the idle rpm to 1 200 rpm by the throttle stop screw after installing the air cleaner box.

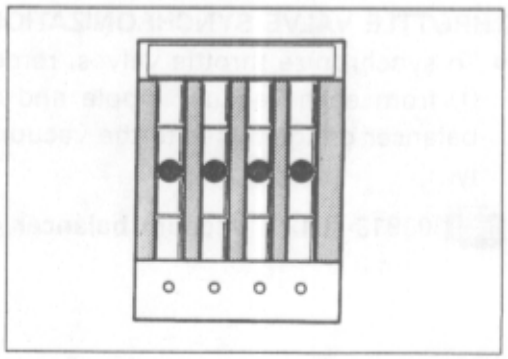


When the vacuum difference is large, use the throttle valve balance adjusting screw and balance the throttle valves.

NOTE:
During balancing the throttle valves, always set the engine rpm at 1 200 rpm, using throttle stop screw.
The major balancing the throttle valves, use the throttle valve balance adjusting screw, and minor adjustment is done by the air screws.

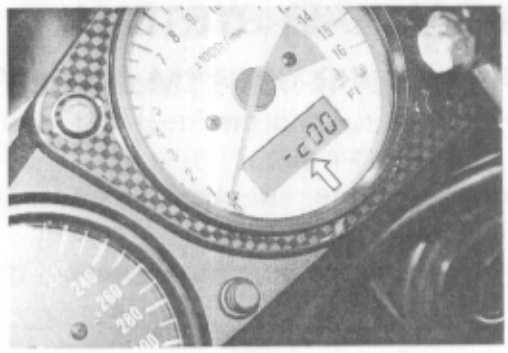


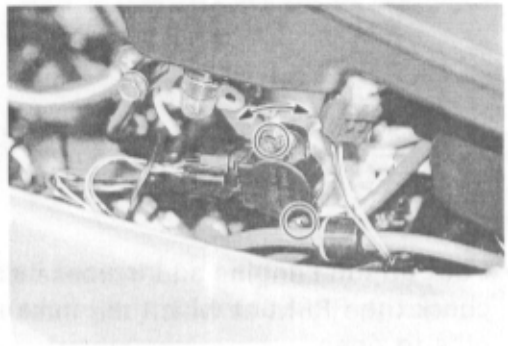
A correctly adjusted throttle valve synchronization has the balls in the Nos. 1 through 4 at the same level.



THROTTLE POSITION SENSOR (TPS) SETTING

After all adjustments are completed, check or adjust the TPS setting condition.
(Refer to page 11-4-29 for TPS setting procedure.)



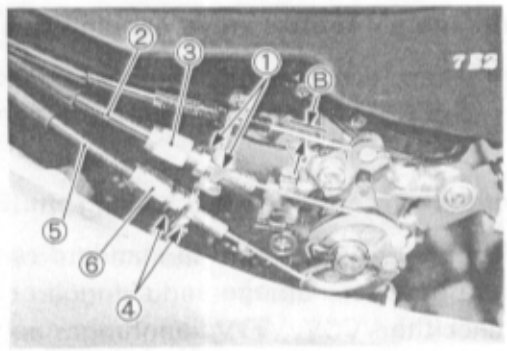


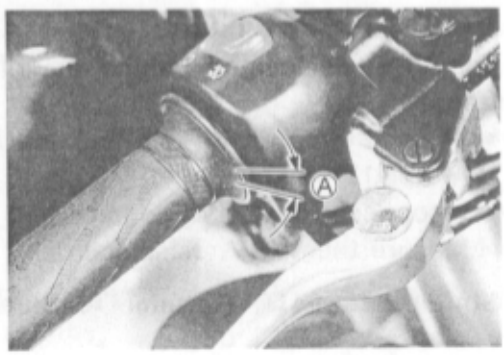
THROTTLE CABLE ADJUSTMENT

NOTE:
Minor adjustment can be made by the throttle grip side adjuster. (See p. 11-2-4.)

MAJOR ADJUSTMENT

- Loosen the lock nuts ① of the throttle returning cable ②.
- Turn the returning cable adjuster ③ to obtain proper cable play.
- Loosen the lock nuts ④ of the throttle pulling cable ⑤.
- Turn the pulling cable adjuster ⑥ in or out until the throttle cable play Ⓐ should be 2.0–4.0 mm (0.08–0.16 in) at the throttle grip.
- Tighten the lock nuts ④ securely while holding the adjuster ⑥.
- While holding the throttle grip at the fully closed position, slowly turn the returning cable adjuster ③ to obtain a cable slack Ⓑ of 1.0 mm (0.04 in).
- Tighten the lock nuts ① securely.

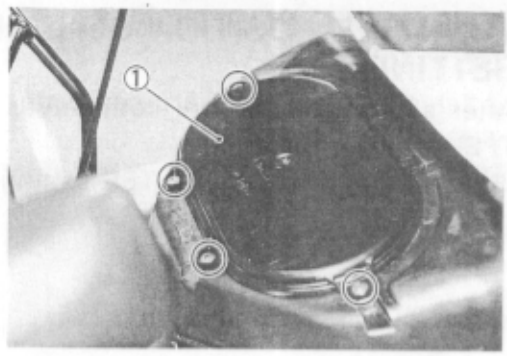


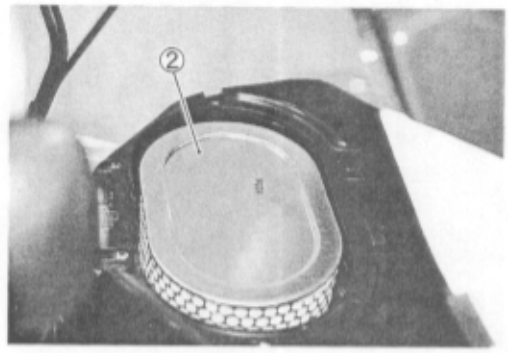


INTAKE AIR SYSTEM

INTAKE AIR SYSTEM INSPECTION

- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Remove the air cleaner cover ① by removing the screws.
- Remove the air cleaner element ②.



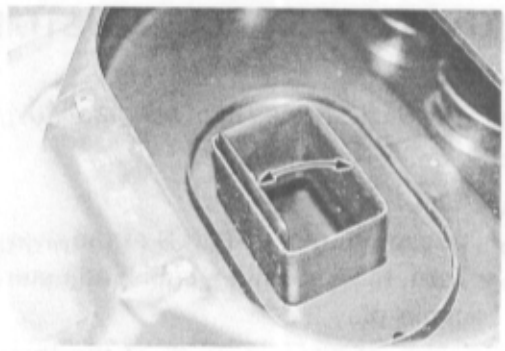


- Start up the engine and increase its speed gradually and check the RPM at which the intake air control valve begins to open.

Intake air control valve opening rpm: Above 5 400 rpm

- Then, decrease the engine speed gradually and check the RPM at which the intake air control valve begins to close.

Intake air control valve closing rpm: Below 5 200 rpm



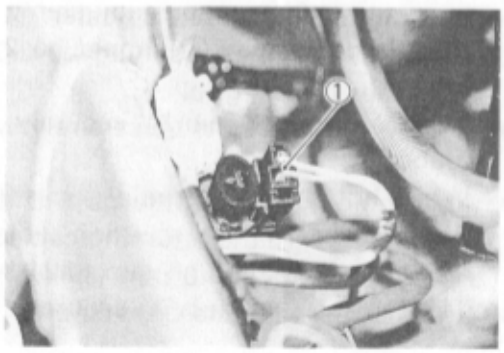
If they are not within the standard range, check the vacuum hoses for damage and clogged or pinched. If OK, then check the VCSV, VTV, diaphragm and vacuum damper.

VCSV INSPECTION

The VCSV is located behind the right side of the main frame.

- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Disconnect the VCSV coupler ①.
- Measure the VCSV resistance.

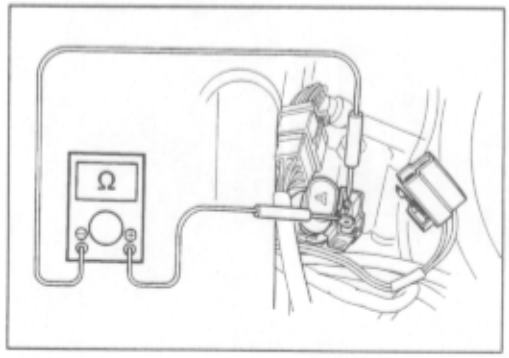
Standard: 36–44Ω (Terminal–Terminal)



If the resistance is incorrect, replace the VCSV with a new one.

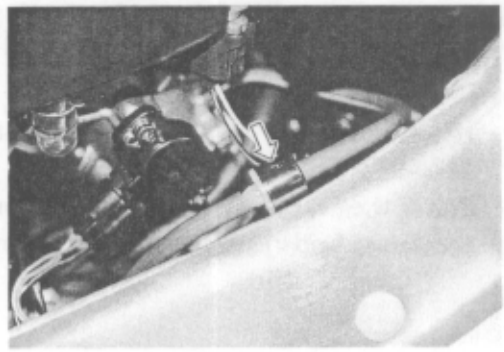
09900-25008: Multi circuit tester

Tester knob indication: Resistance (Ω)



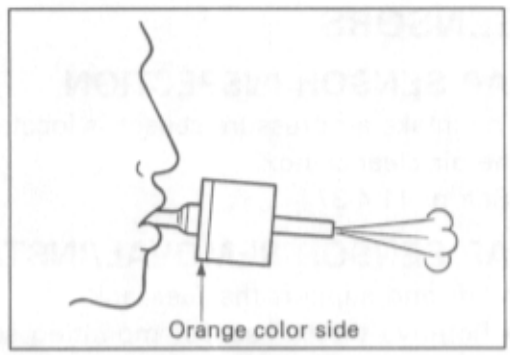
VTV INSPECTION

- Lift and support the fuel tank with its prop stay. (See p. 11-4-49)
- Remove the VTV by disconnecting the vacuum hoses.



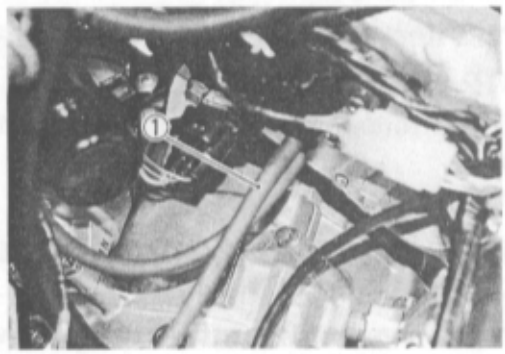
- Blow the VTV from the Orange color side. If air flow out, it is in sound condition.
- Also, blow the VTV from opposite side. If air does not flow out, it is in sound condition.

If the operation is incorrect, replace the VTV with a new one.

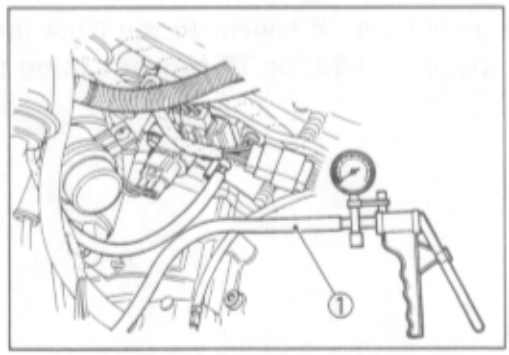


INTAKE AIR CONTROL VALVE ACTUATOR INSPECTION

- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Remove the air cleaner element. (See p. 11-4-69.)
- Disconnect the vacuum hose ① from the VCSV and connect the vacuum pump gauge to the disconnected vacuum hose ①.
- Apply vacuum with the vacuum pump gauge and check the intake air control valve operation.



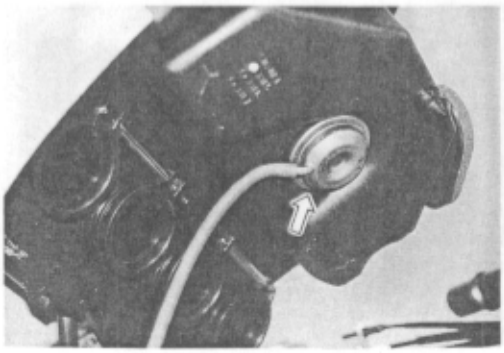
TOOL **09917-47010: Vacuum pump gauge**

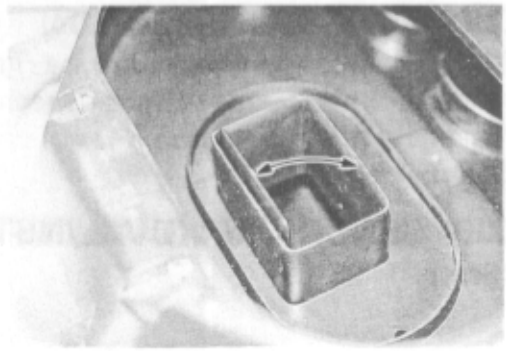


⚠ CAUTION

Use a hand operated vacuum pump. Do not apply high negative pressure (More than−180 mmHg) to prevent the diaphragm damage.

If the operation is incorrect, replace the intake air control valve actuator with a new one.



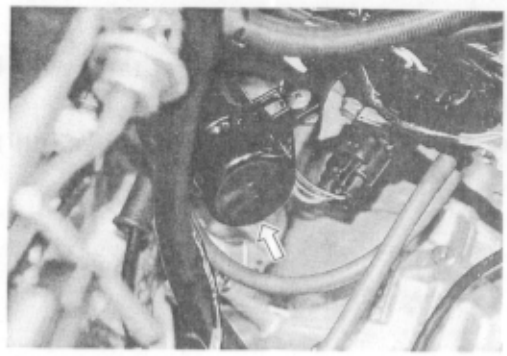


VACUUM DAMPER INSPECTION

The vacuum damper is located behind the right side of the main frame.

- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)

  Check the vacuum damper for damage and flaws or scratches, and replace it if necessary.



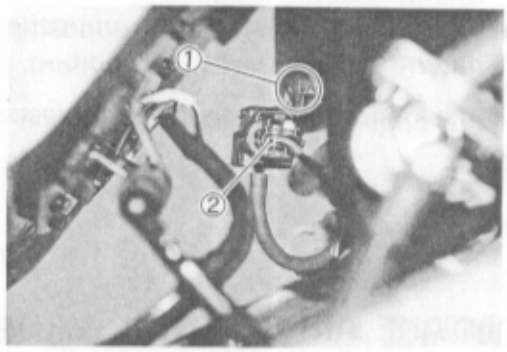
SENSORS

IAP SENSOR INSPECTION

The intake air pressure sensor is located at the rear side of the air cleaner box.
(See p. 11-4-37.)

IAP SENSOR REMOVAL/INSTALLATION

- Lift and support the fuel tank.
- Remove the IAP sensor mounting screw ① and disconnect the coupler ②.
- Installation is in the reverse order of removal.

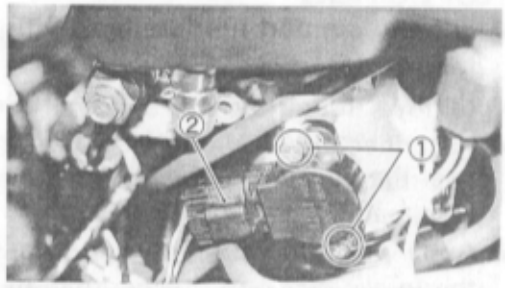


TP SENSOR INSPECTION

The throttle position sensor is installed on the No.4 throttle body.
(See p. 11-4-39.)

TP SENSOR REMOVAL/INSTALLATION

- Lift and support the fuel tank.
- Remove the TP sensor setting screws ① and disconnect the coupler ②.
- Install the TP sensor to the No.4 throttle body. Refer to page 11-4-29 for TP sensor setting procedure.

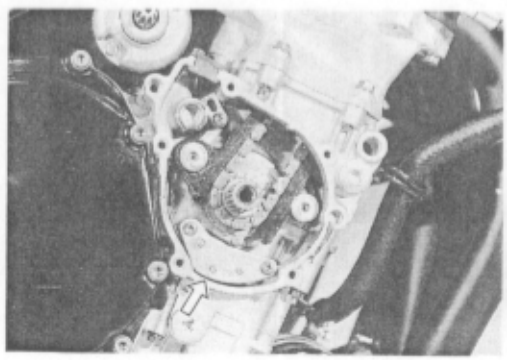


CKP SENSOR INSPECTION

The signal rotor is mounted on the right end of the crankshaft, and the crankshaft position sensor (Pick-up coil) is installed on the crankcase.
(See p. 11-4-36.)

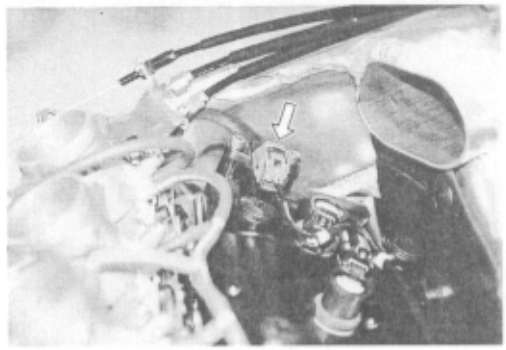
CKP SENSOR REMOVAL/INSTALLATION

(See p. 11-3E-1.)



CMP SENSOR INSPECTION

The signal rotor is installed on the intake camshaft, and the camshaft position sensor (Pick-up coil) is installed on the cylinder head cover.
(See p. 11-4-35.)

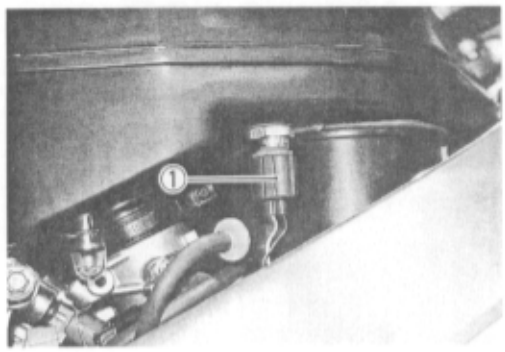


CMP SENSOR REMOVAL/INSTALLATION

- Lift and support the fuel tank. (See p. 11-4-49.)
- Remove the air cleaner box. (See p. 11-4-54.)

IAT SENSOR INSPECTION

The intake air temperature sensor is installed at the right side of the air cleaner box. (See p. 11-4-42.)



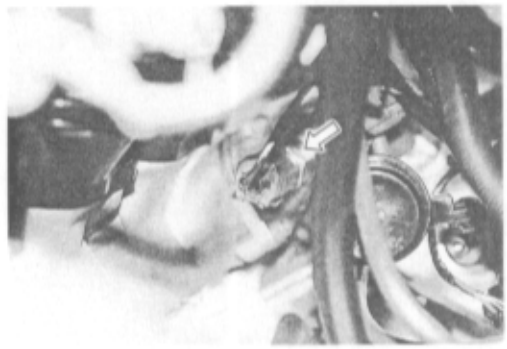
IAT SENSOR REMOVAL/INSTALLATION

- Lift and support the fuel tank.
- Disconnect the IAT sensor coupler ① and remove the IAT sensor from the air cleaner box.
- Installation is in the reverse order of removal.

IAT sensor: 18 N·m (1.8 kg-m, 13.0 lb-ft)

ECT SENSOR INSPECTION

The engine coolant temperature sensor is installed at the thermostat cover.
(See pp. 11-4-41 and 11-5-10.)

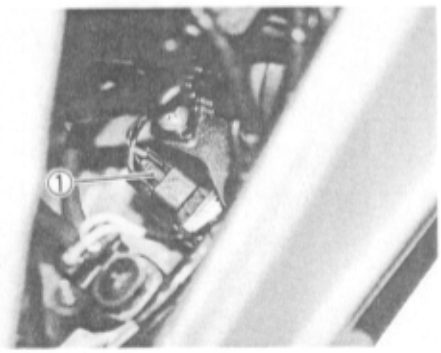


ECT SENSOR REMOVAL/INSTALLATION

(See pp. 11-5-10 and -11.)

AP SENSOR INSPECTION

The atmospheric pressure sensor is located behind the right side of the main frame.
(See p. 11-4-43.)



AP SENSOR REMOVAL/INSTALLATION

- Lift and support the fuel tank. (See p. 11-4-49.)
- Disconnect the coupler ① and remove the AP sensor from the frame.
- Installation is in the reverse order of removal.

TO SENSOR INSPECTION

The tip over sensor is located behind the left frame cover.



TO SENSOR REMOVAL/INSTALLATION

- Remove the seats and frame cover.
- Disconnect the coupler and remove the TO sensor from the frame.
- Installation is in the reverse order of removal.

NOTE:
When installing the TO sensor, bring the "UPPER" letter on it to the top.

COOLING SYSTEM

CONTENTS

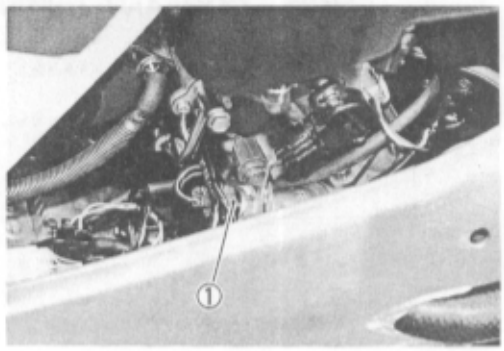
COOLING FAN THERMO-SWITCH 11-5- 1
REMOVAL 11-5- 1
INSPECTION 11-5- 1
INSTALLATION 11-5- 1
ENGINE COOLANT TEMPERATURE SENSOR 11-5- 2
REMOVAL 11-5- 2
INSPECTION 11-5- 2
INSTALLATION 11-5- 2

COOLING FAN THERMO-SWITCH

This section describes the servicing procedure for the cooling fan thermo-switch which differ from that of the GSX-R750V ('97-MODEL).
For details other than the following, refer to the section 5.

REMOVAL

- Drain engine coolant.
- Lift and support the fuel tank. (See p. 11-4-49.)
- Disconnect the cooling fan thermo-switch coupler.
- Remove the cooling fan thermo-switch ①.



INSPECTION

Refer to the section 5 for the cooling fan thermo-switch inspection.

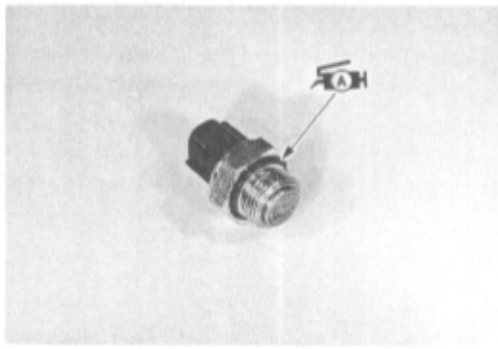
INSTALLATION

- Apply grease to the O-ring.

A H 99000-25030: SUZUKI SUPER GREASE "A"

- Tighten the cooling fan thermo-switch to the specified torque.

Cooling fan thermo-switch: 18 N·m (1.8 kg-m, 13.0 lb-ft)



⚠ CAUTION

Take special care when handling the thermo-switch. It may cause damage if it gets a sharp impact. Replace the O-ring with a new one.

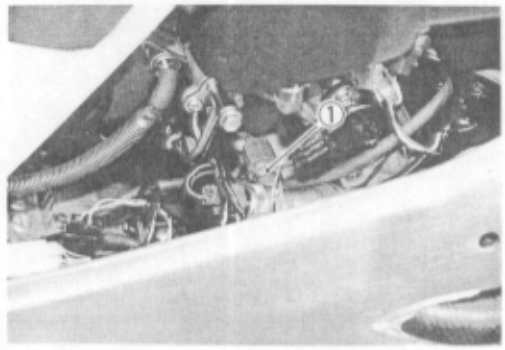
- After installing the cooling fan thermo-switch, be sure to add engine coolant.

ENGINE COOLANT TEMPERATURE SENSOR

This section describes the servicing procedure for the engine coolant temperature sensor which differ from that of the GSX-R750V ('97-MODEL).

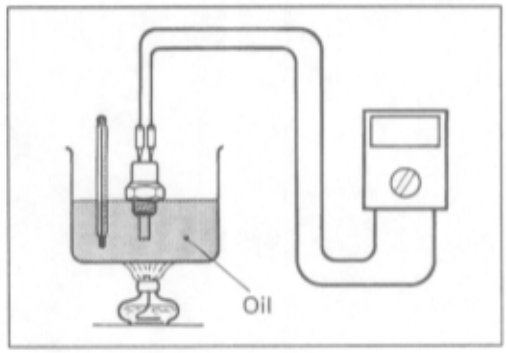
REMOVAL

- Drain engine coolant.
- Lift and support the fuel tank. (See p. 11-4-49.)
- Disconnect the engine coolant temperature sensor coupler.
- Remove the engine coolant temperature sensor ①.



INSPECTION

Test the temperature gauge sensor at the bench to see if its ohmic value changes, as specified, with temperature. The test is to be run as follows: Connect the temperature sensor to the ohmmeter and place it in the oil contained in a pan, which is placed on a stove; heat the oil to raise its temperature slowly, reading the thermometer placed in the pan and also the ohmmeter. The temperature sensor whose ohmic value does not change in the proportion indicated in the table must be replaced.



Temperature sensor specification

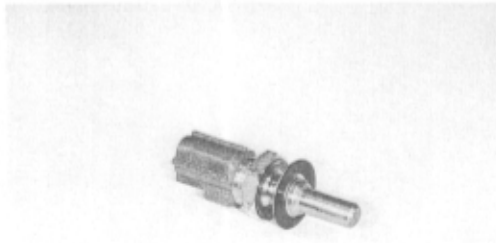
Temperature	Standard resistance
20°C (68°F)	Approx. 2.45 kΩ
50°C (122°F)	Approx. 0.811 kΩ
80°C (176°F)	Approx. 0.318 kΩ
110°C (230°F)	Approx. 0.142 kΩ
130°C (266°F)	Approx. 0.088 kΩ

If the resistance noted to show infinity or too much different resistance value, temperature sensor must be replaced.

INSTALLATION

- Tighten the engine coolant temperature sensor to the specified torque.

Engine coolant temperature sensor: 18 N·m (1.8 kg-m, 13.0 lb-ft)



⚠ CAUTION

Take special care when handling the temperature sensor. It may cause damage if it gets a sharp impact.

- After installing the engine coolant temperature sensor, be sure to add engine coolant.

CHASSIS

CONTENTS

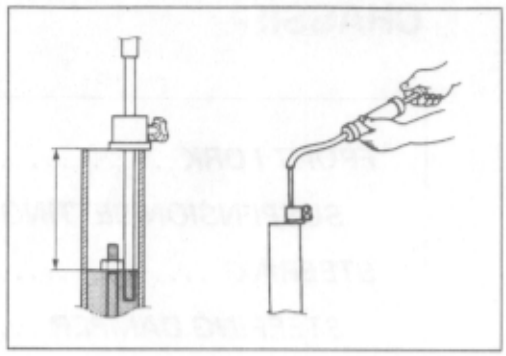
FRONT FORK 11-6- 1
SUSPENSION SETTING 11-6- 1
STEERING 11-6- 2
STEERING DAMPER 11-6- 2
REAR SUSPENSION 11-6- 4
SUSPENSION SETTING 11-6- 4
FRONT BRAKE 11-6- 5
FRONT BRAKE LEVER 11-6- 5

FRONT FORK

The following service data are different from those of the GSX-R750V ('97-MODEL).

Fork oil level: 99 mm (3.9 in)

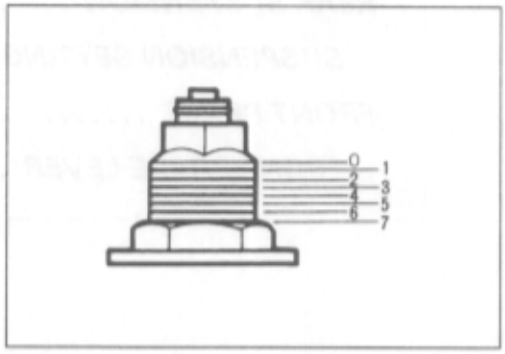
Fork oil capacity (each leg): 490 ml (16.6/17.3 US/Imp oz)



SUSPENSION SETTING

SPRING PRE-LOAD ADJUSTMENT

There are seven grooved lines on the side of the spring adjuster. Position 0 provides the maximum spring pre-load and position 7 provides the minimum spring pre-load.
(STD position: 4)



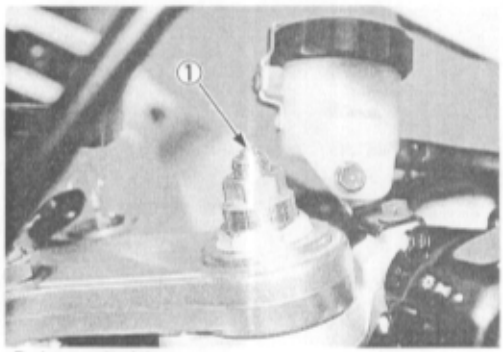
DAMPING FORCE ADJUSTMENT

(Rebound side)

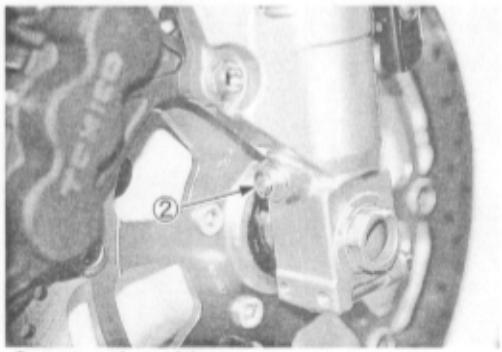
Fully turn the damping force adjuster ① clockwise. It is at stiffest position and turn it out to standard setting position.
(STD position: 1-¼ turns out)

(Compression side)

Fully turn the damping force adjuster ② clockwise. It is at stiffest position and turn it out to standard setting position.
(STD position: 1-3/8 turns out)



Rebound side



Compression side

FRONT SUSPENTION SETTING TABLE

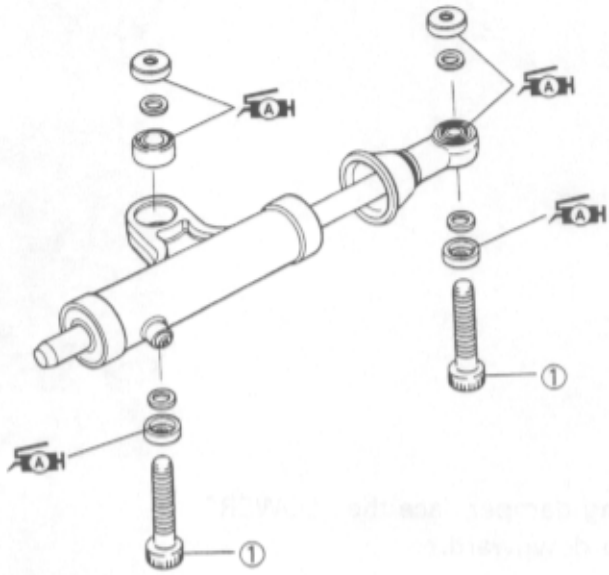
		FRONT FORK		
		Spring pre-load adjuster	Damping force adjuster	
			Rebound	Compression
Solo riding	Softer	4	1-2/4 turns out	1-5/8 turns out
	Standard	4	1-¼ turns out	1-3/8 turns out
	Stiffer	4	1 turn out	1-1/8 turns out
Dual riding		4	1-¼ turns out	1-3/8 turns out

⚠WARNING

Be sure to adjust the spring pre-load and damping force on both front fork legs equally.

STEERING

STEERING DAMPER

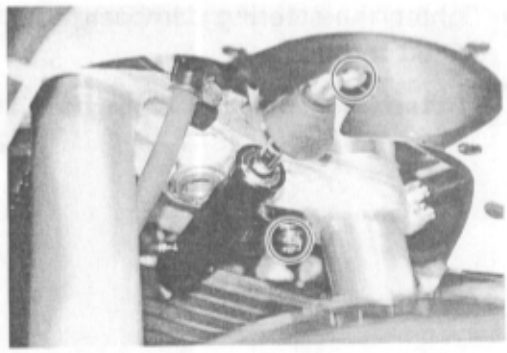


ITEM	N·m	kg-m	lb-ft
①	25	2.5	18.0

REMOVAL

- Remove the steering damper by removing the bolts.

TOOL **09900-00410: Hexagon wrench set**

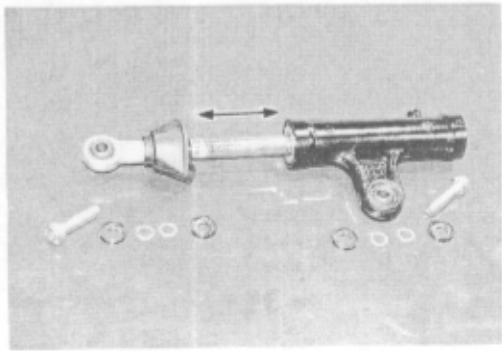


INSPECTION

Inspect the steering damper body, bearing and oil seal for damage and oil leakage.

Move the steering damper rod by hand to inspect for a smooth movement.

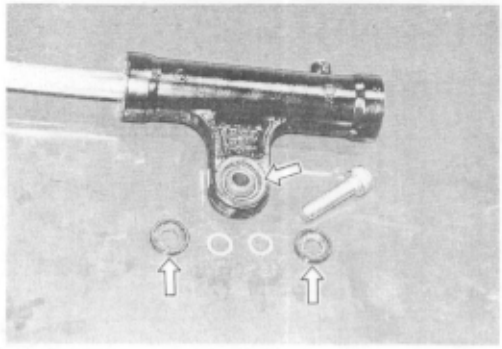
If any defects are found, replace the steering damper with a new one.

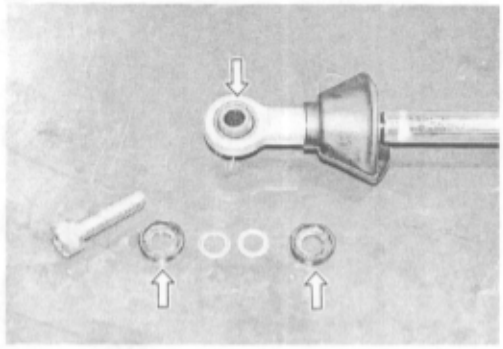


INSTALLATION

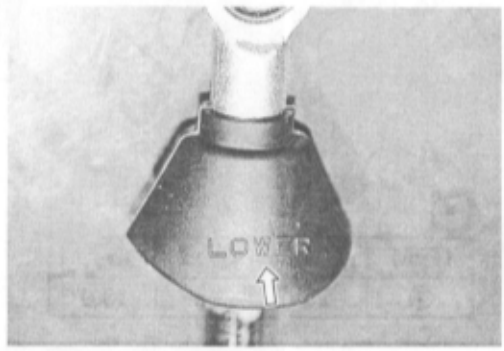
- Apply grease to the bearings and dust seals before installing.

99000-25030: SUZUKI SUPER GREASE "A"





- When installing the steering damper, face the "LOWER" letter on the dust cover to downward.



- Tighten the steering damper mounting bolts to the specified torque.

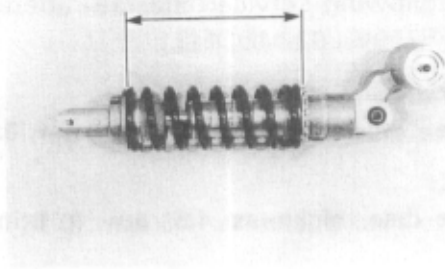
Steering damper mounting bolt: 25 N·m (2.5 kg-m, 18.0 lb-ft)



REAR SUSPENSION

SUSPENSION SETTING

SPRING PRE-LOAD ADJUSTMENT



The set length 188.9 mm provides the maximum spring pre-load.
The set length 198.9 mm provides the minimum spring pre-load.
(STD length: 193.9 mm)

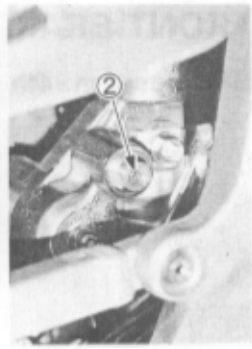
DAMPING FORCE ADJUSTMENT

(Rebound side)
Fully turn the damping force adjuster ① clockwise. It is at stiffest position and turn it out to standard setting position. (STD position is 1-$^{3}/_{8}$ turns out.)

(Compression side)
Fully turn the damping force adjuster ② clockwise. It is at stiffest position and turn it out to standard setting position. (STD position is 1-$^{3}/_{8}$ turns out.)



Rebound side



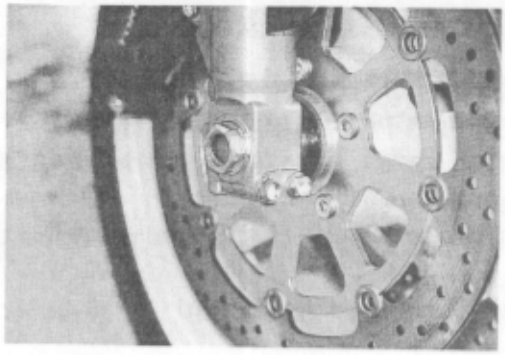
Compression side

REAR SUSPENSION SETTING TABLE

		REAR SHOCK ABSORBER		
		Spring set length	Damping force adjuster	
			Rebound	Compression
Solo riding	Softer	193.9 mm (7.6 in)	1-$^{3}/_{8}$ turns out	1-$^{5}/_{8}$ turns out
	Standard	193.9 mm (7.6 in)	1-$^{3}/_{8}$ turns out	1-$^{3}/_{8}$ turns out
	Stiffer	193.9 mm (7.6 in)	1-$^{1}/_{8}$ turns out	1-$^{1}/_{8}$ turns out
Dual riding		193.9 mm (7.6 in)	1-$^{3}/_{8}$ turns out	1-$^{3}/_{8}$ turns out

FRONT BRAKE

The following service data are different from those of the GSX-R750V ('97-MODEL).



Standard

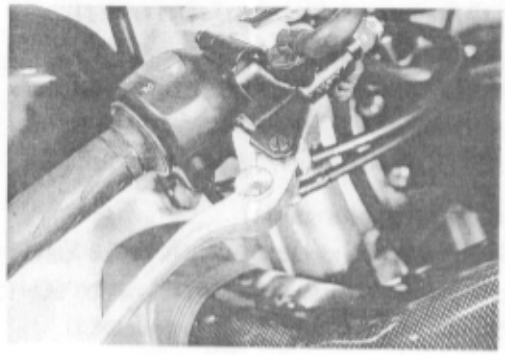
Brake disc thickness: 5.0 ± 0.2 mm (0.197 ± 0.008 in)

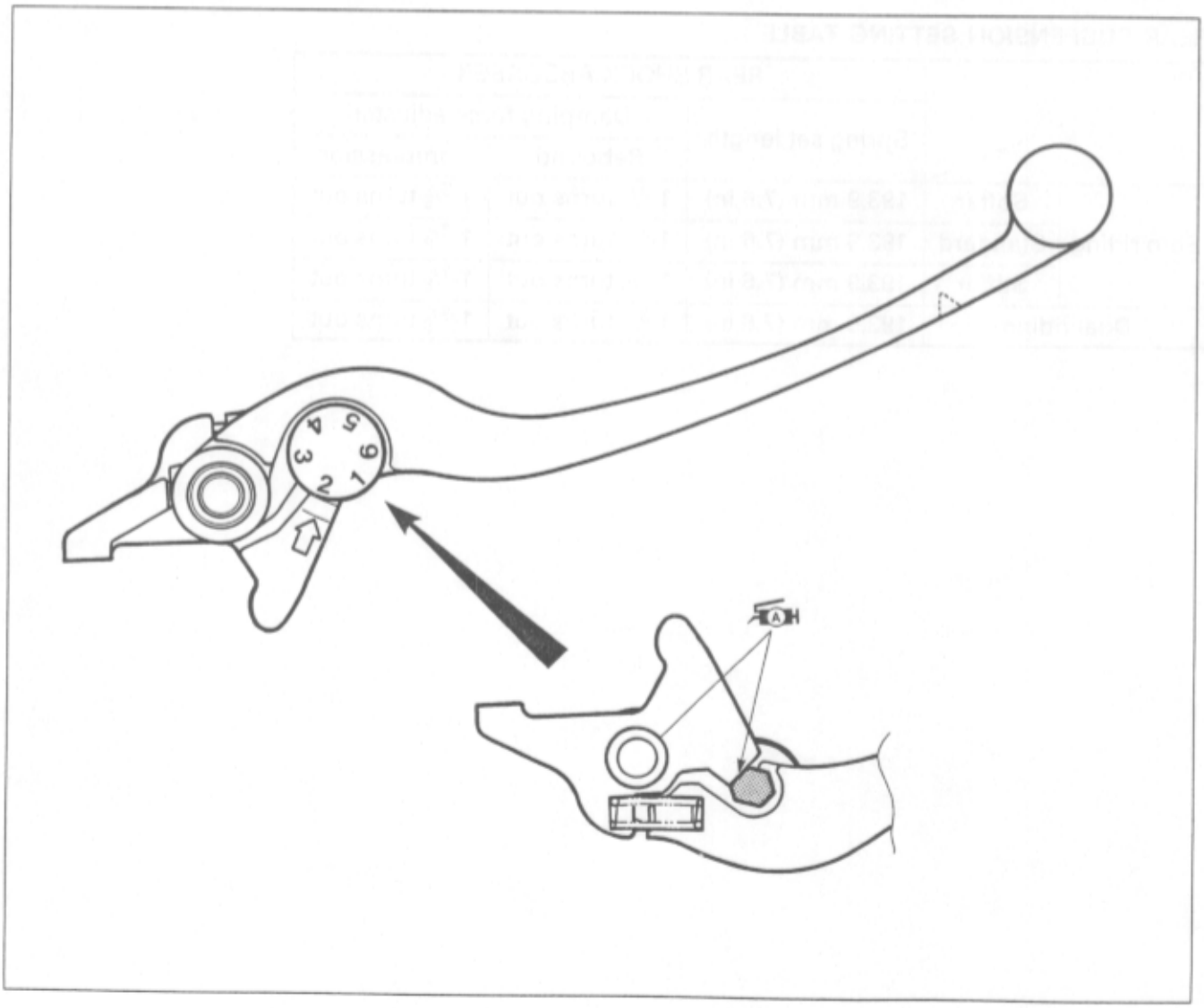
Limit

Brake disc thickness: 4.5 mm (0.18 in)

FRONT BRAKE LEVER

STD position: 4th





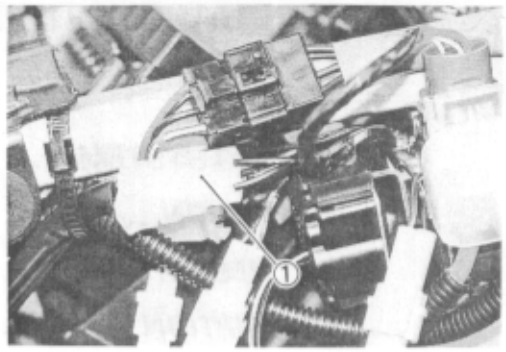
ELECTRICAL SYSTEM

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CHARGING SYSTEM

INSPECTION



GENERATOR COIL RESISTANCE INSPECTION

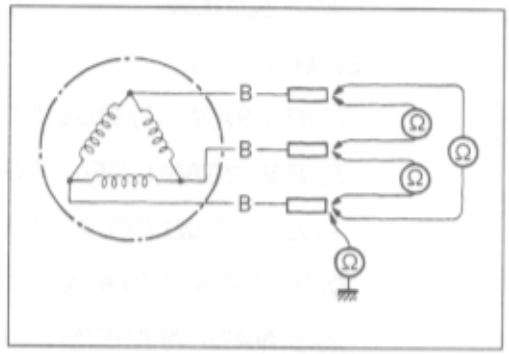
- Remove the seats and frame cover. (See pp. 6-3 f..)
- Disconnect the generator coupler ①.

Using the multi circuit tester, inspect the resistance between the three lead wires.
Also check that the stator core is insulated between the lead wire and the ground.
If the resistance is incorrect, replace the stator with a new one.

TOOL 09900-25008: Multi circuit tester set

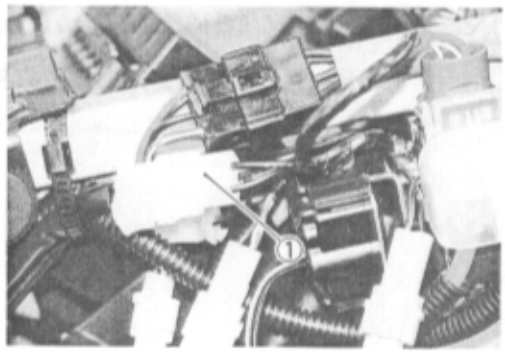
Tester knob indication: Resistance (Ω)

Generator coil resistance : 0.24–0.36 Ω (Black–Black)
: ∞ (Black–Ground)



⚠ CAUTION

When using the multi circuit tester, follow the instruction manual.



GENERATOR NO-LOAD PERFORMANCE INSPECTION

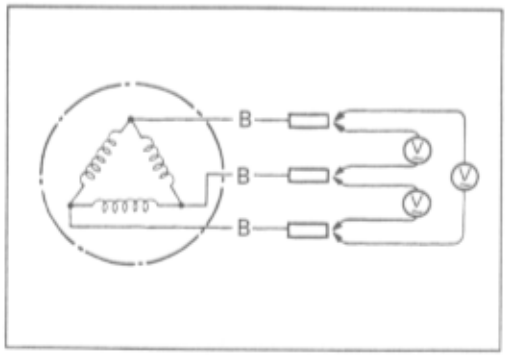
- Remove the seats and frame cover. (See pp. 6-3 f..)
- Disconnect the generator coupler ①.
- Start the engine and keep it running at 5 000 r/min.

Using multi circuit tester, measure the voltage between the three lead wires.
If the tester reads under the specified value, replace the AC generator with a new one.

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Voltage (⎓)

Generator no-load performance:
More than 70V (AC) at 5 000 r/min
(When engine is cold)



⚠ CAUTION

When using the multi circuit tester, follow the instruction manual.

IGNITION SYSTEM

DESCRIPTION

The ignition system is controlled by the ECM. The system is digital CDI system to decide accurate ignition timing according to the engine rpm, gear position and throttle position.

This system consists of the crankshaft position sensor (pick up coil), ECM, ignition coils/spark plug caps and spark plugs.

1. The ignition coil power source is supplied through the side-stand relay from the battery, which means that the ignition coil power source is controlled by the side-stand and gear position switch.
2. The ignition timing is accurately controlled by the throttle position and engine rpm.
   In addition to this basic map, the engine coolant temp. sensor affects the ignition timing when the engine coolant temperature is low and engine starts, using fast idle system.
3. The ignition timing is also changed due to the gear position and throttle position.

To stop or to operate the ignition system, the following devices affects the ignition timing.

Crankshaft position sensor:
The pick up coil is provided at the right end of the crankshaft, which produces signal wave form when meeting with the protrusion on the generator rotor.
The generated wave is sent to the ECM that calculates the engine rpm.
This signal decides the ignition timing and signal flows to the tachometer.

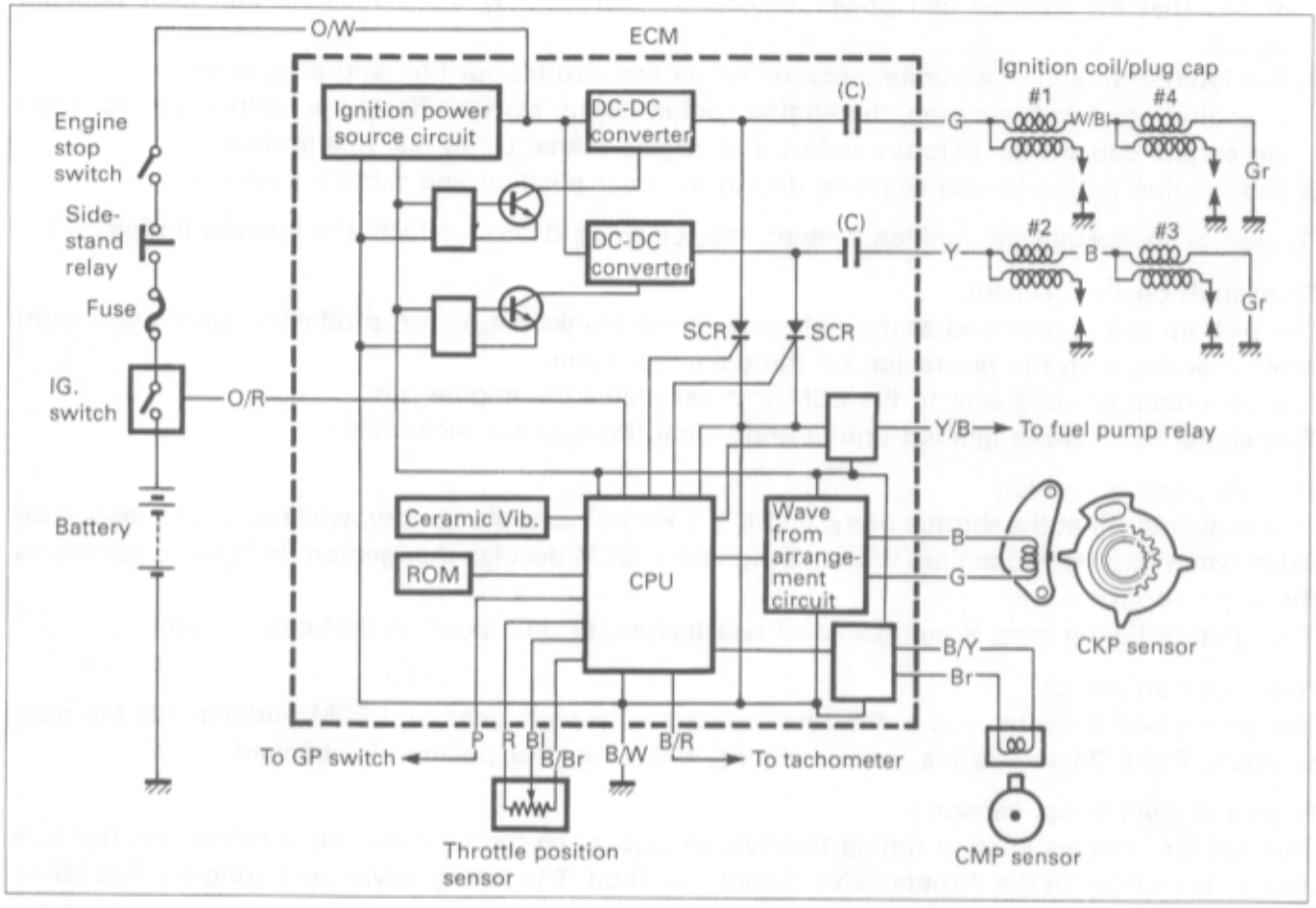
Throttle position sensor:
This sensor is set at the throttle body, and it is a kind of variable resistor, which changes resistance value when throttle is opening. With this signal the ECM decides the ignition timing in response to the engine rpm.
The ignition timing map is composed of two factors, throttle position and engine rpm.

Gear position switch:
The gear position switch has a different resistance for each gear, and ECM understands the gear position. The ECM selects the ignition timing when the gear position is changed.

Engine coolant temp. sensor:
This sensor changes ignition timing to advance side when the temperature is below and fast idle system is working in the throttle valve closed condition. The timing advances during the fast idling condition, and gradually returns to the basic map when engine coolant temperature is increasing.

OPERATION

The DC-DC converters in the CDI unit step up the battery voltage to a higher voltage and charge the capacitors (C). An SCR connected to the capacitor becomes conductive (turns on) when a forward voltage signal is sent to SCR gate allowing the electric energy stored in the capacitor (C) to discharge instantly to the ignition primary coil. This then causes a high voltage to be induced in the secondary coil and a hot spark jumps across the spark plug gap. This ignition timing is controlled by the CPU which calculate and process the signal generator pulses and data stored in "ROM" to form an SCR gate signal. The signal is then sent to the SCR just when the crankshaft has reached the best ignition timing for the current engine revolutions.



NOTE:

The ignition cut-off circuit is incorporated in this ECM to prevent over-running engine. If engine rpm reaches 13 400 r/min., this circuit cuts off the ignition primary current for all spark plugs.

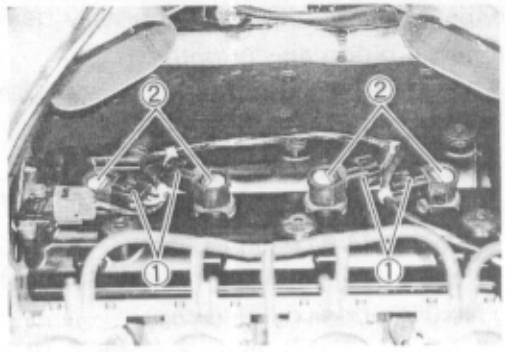
⚠ CAUTION

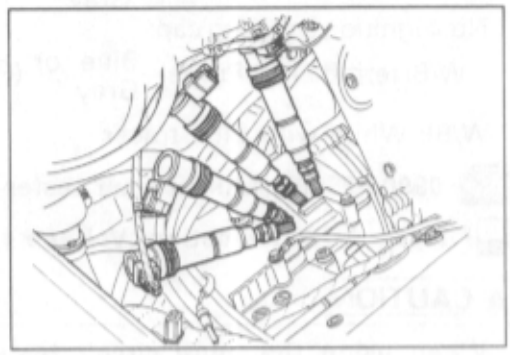
Engine can run over 13 400 r/min. without load, even if the ignition cut-off circuit is effective, and it may cause engine damage. Do not run the engine without load over 13 400 r/min. at anytime.

INSPECTION

IGNITION COIL PRIMARY PEAK VOLTAGE

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Remove the air cleaner box. (See p. 11-4-54.)
- Disconnect all the ignition coil/plug cap lead wire couplers ① before removing the ignition coils/plug caps ②.
- Remove all the ignition coils/plug caps ②.





⚠ CAUTION

*** Do not remove the ignition coil/plug cap before disconnecting the lead wire coupler, or the lead wire will be damaged.**
*** Do not pry up the ignition coil/plug cap with a screwdriver or a bar to avoid it damage.**
*** Be careful not to drop the ignition coil/plug cap as it may open or short in a circuit.**

- Connect new four spark plugs to each ignition coil/plug cap.
- Connect all the ignition coil/plug cap lead wire couplers to the ignition coils/plug caps respectively, and ground them on the crankcase.

⚠ CAUTION

Avoid grounding the spark plugs and suppling the electrical shock to the magnesium parts (cylinder head cover, clutch cover, starter clutch cover, starter idle gear cover and generator cover) to prevent the damage of the magnesium material.

NOTE:
Be sure that all couplers and spark plugs are connected properly and the battery used is in fully-charged condition.

Inspect each ignition coil primary peak voltage at the ignition coil/plug cap coupler.

- Connect the multi circuit tester with peak voltage adaptor as follows.

  No.1 ignition coil/plug cap:
  Green terminal (⊕ Probe)–W/Bl (⊖ Probe) terminal

  No.2 ignition coil/plug cap:
  Yellow terminal (⊕ Probe)–Black (⊖ Probe) terminal

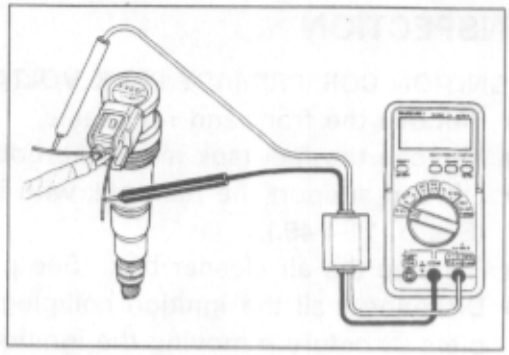
  No.3 ignition coil/plug cap:
  Black terminal (⊕ Probe)–Blue or Gray (⊖ Probe) terminal

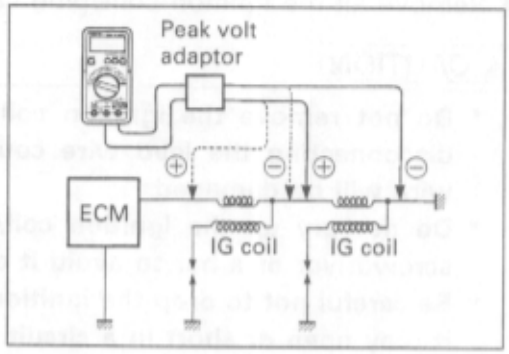
  No.4 ignition coil/plug cap:
  W/Bl terminal (⊕ Probe)–Blue or Gray (⊖ Probe) terminal

  W/Bl: White with Blue tracer

TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Voltage (⎓)





⚠ CAUTION

When using the multi circuit tester and peak volt adaptor, follow the instruction manual.

NOTE:

* *When connecting the multi circuit tester, insert the stings (O.D is below 0.5 mm) to the back side of the ignition coil lead wire coupler and connect the tester probes to them.*
* *Use the sting, its outer diameter is below 0.5 mm, to prevent damaging the rubber of the water proof coupler.*

- Shift the transmission into the neutral and turn ignition switch "ON".
- Crank the engine a few seconds with the starter motor by depressing starter button and check the ignition coil primary peak voltage.
- Repeat the above inspection a few times and measure the highest peak voltage.

Ignition coil primary peak voltage:
More than 90 V at the ignition coil/plug cap coupler

⚠ WARNING

Do not touch the tester probes and spark plugs to prevent an electric shock while testing.

If the peak voltage is lower than the standard range, check the peak voltage at the ECM coupler.

While grounding the spark plugs, inspect each ignition coil primary peak voltage at the ECM coupler.

- Connect the multi circuit tester with peak volt adaptor as follows.
  Nos.1 and 4 ignition coil/plug cap:
  Green (⊕ Probe) terminal–Ground (⊖ Probe)
  Nos.2 and 3 ignition coil/plug cap:
  Yellow (⊕ Probe) terminal–Ground (⊖ Probe)

09900-25008: Multi circuit tester set

Tester knob indication: Voltage (⎓)

⚠ CAUTION

When using the multi circuit tester and peak volt adaptor, follow the instruction manual.

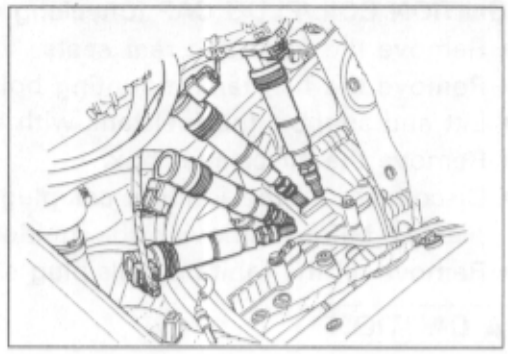
- Shift the transmission into the neutral and turn ignition switch "ON".
- Crank the engine a few seconds with starter motor by depressing starter button and check the ignition coil primary peak voltage.
- Repeat the above test procedure a few times and measure the highest peak voltage.

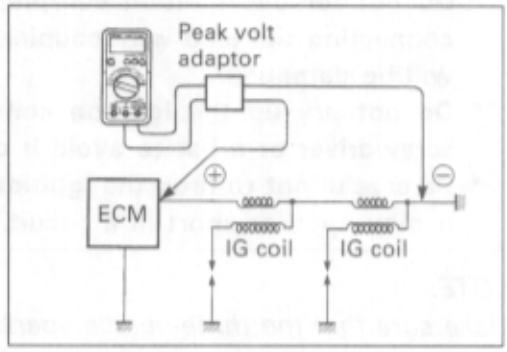
Ignition coil primary peak voltage:
More than 190 V at the ECM coupler

⚠WARNING

Do not touch the tester probes and spark plugs to prevent an electric shock while testing.

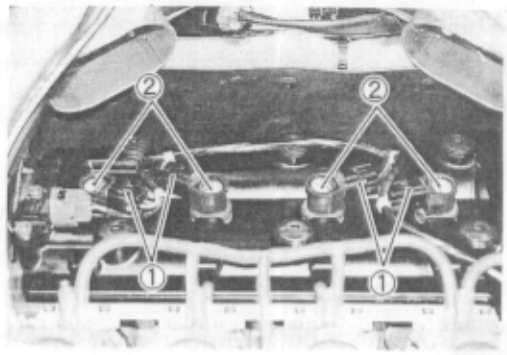
If they are lower than the standard range, inspect the ignition coil/plug cap, signal generator and ECM.





IGNITION COIL/PLUG CAP (Checking with Electro Tester)

- Remove the front and rear seats.
- Remove the fuel tank mounting bolts.
- Lift and support the fuel tank with its prop stay.
- Remove the air cleaner box.
- Disconnect all the ignition coil/plug cap lead wire couplers ① before removing the ignition coils/plug caps ②.
- Remove all the ignition coils/plug caps ②.

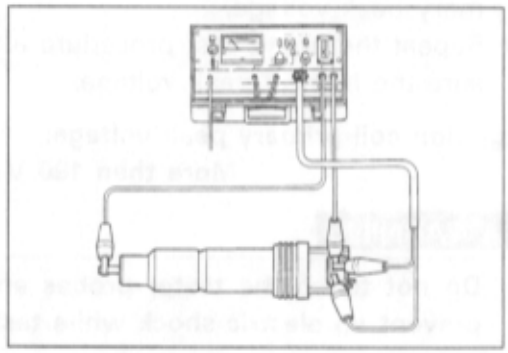


⚠ CAUTION

*** Do not remove ignition coil/plug cap before disconnecting the lead wire coupler, or the lead wire will be damaged.**
*** Do not pry up the ignition coil/plug cap with a screwdriver or a bar to avoid it damage.**
*** Be careful not to drop the ignition coil/plug cap as it may open or short in a circuit.**

NOTE:
Make sure that the three-needle sparking distance of electro tester is set at 8 mm (0.3 in).

- Check the ignition coil/plug cap for sparking performance in accordance with the right illustration.
  If no sparking or orange color sparking occurs in the above conditions, it may be caused by defective coil.



TOOL 09900-28108: Electro tester

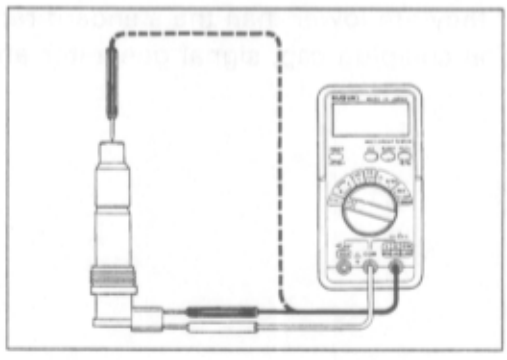
Spark performance: Over 8 mm (0.3 in)

⚠ WARNING

Do not touch the wire clips to prevent an electric shock when testing.

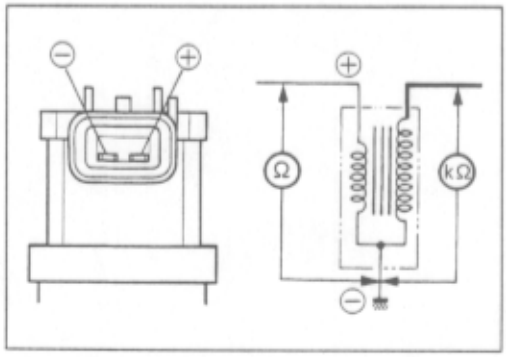
⚠ CAUTION

*** When using the electro tester, follow the instruction manual.**
*** Be careful not to drop the ignition coil/plug cap as it may open or short in a circuit.**



IGNITION COIL/PLUG CAP
(Checking with Multi circuit Tester)

- Check the ignition coil/plug cap for resistance in both primary and secondary windings. If the resistance is not within the standard range, replace the ignition coil/plug cap with a new one.



TOOL 09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

Ignition coil/plug cap resistance
Primary : 0.07–0.11 Ω (⊕ tap–⊖ tap)
Secondary: 4.5–6.9 kΩ (Plug cap–⊖ tap)

CKP SENSOR PEAK VOLTAGE

(Checking with Multi Circuit Tester)

- Remove the front and rear seats.

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 Black and Green lead wires at the ECM coupler.

Black (⊕ Probe)–Green (⊖ Probe)

09900-25008: Multi circuit tester set

Tester knob indication: Voltage (⎓)

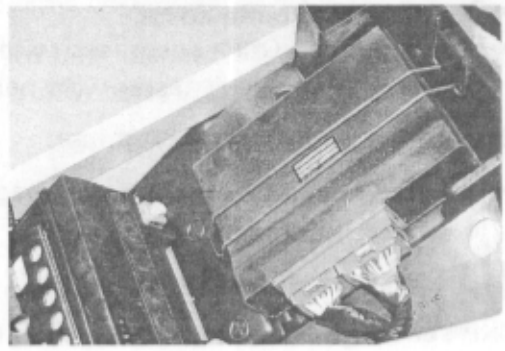
⚠ CAUTION

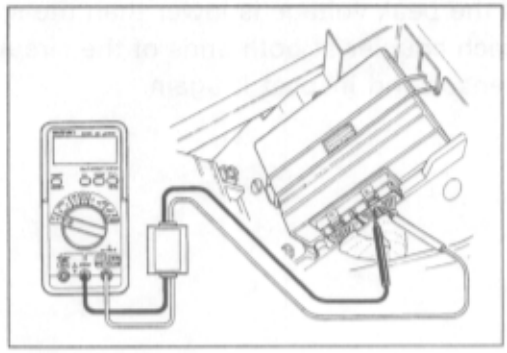
When using the multi circuit tester and peak volt adaptor, follow the instruction manual.

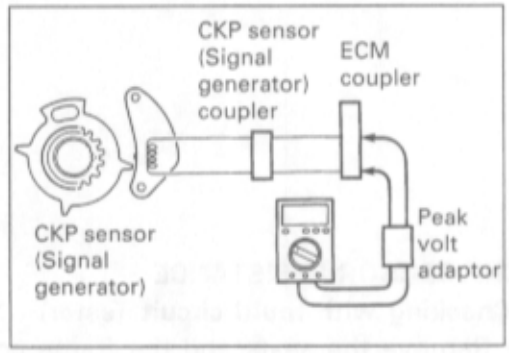
- Shift the transmission into the neutral and turn ignition switch "ON".
- Crank the engine a few seconds with the starter motor by depressing starter button and check the CKP sensor peak voltage.
- Repeat the above test procedure a few times and measure the highest peak voltage.

CKP sensor peak voltage: More than 0.5V (Black–Green)

If the peak voltage is lower than the standard range, check the peak voltage at the signal generator lead wire coupler.







- Remove the frame cover.
- Disconnect the CKP sensor lead wire coupler ① and connect the multi circuit tester with peak volt adaptor.

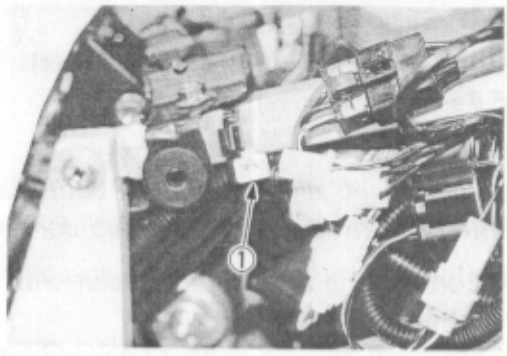
Black (⊕ Probe)–Green (⊖ Probe)

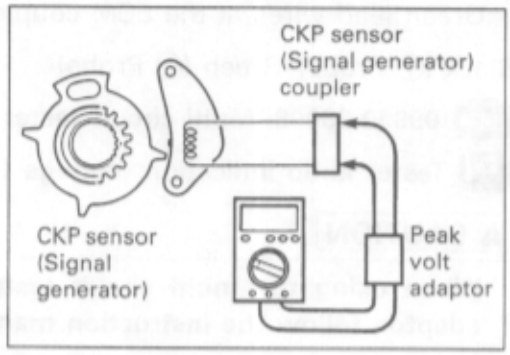
- Measure the CKP sensor peak voltage at the CKP sensor lead wire coupler.

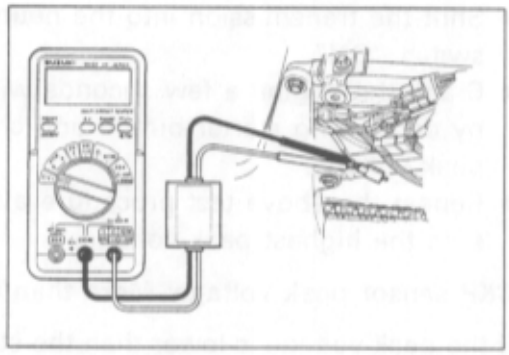
Tester knob indication: Voltage (⎓)

CKP sensor peak voltage: More than 0.5V (Black–Green)

If the peak voltage is lower than the standard range, check each coupler at both ends of the circuit or replace the CKP sensor and inspect it again.







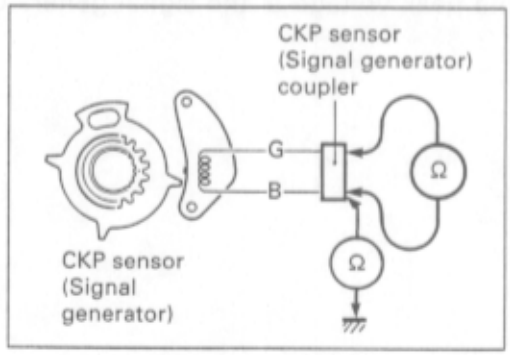
CKP SENSOR RESISTANCE
(Checking with multi circuit Tester)

- Remove the seats and the frame cover and disconnect the lead wire coupler.
- Measure the resistance between lead wires and ground. If the resistance is not specified value, the signal coil must be replaced.

09900-25008: Multi circuit tester set

Tester knob indication: Resistance (Ω)

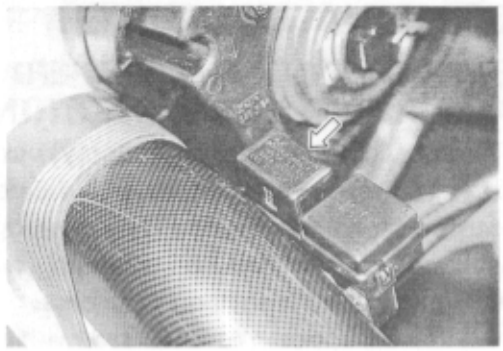
Signal coil resistance: 50–200Ω (Black–Green)
∞ Ω (Black–Ground)



RELAY

TURN SIGNAL/SIDE-STAND RELAY

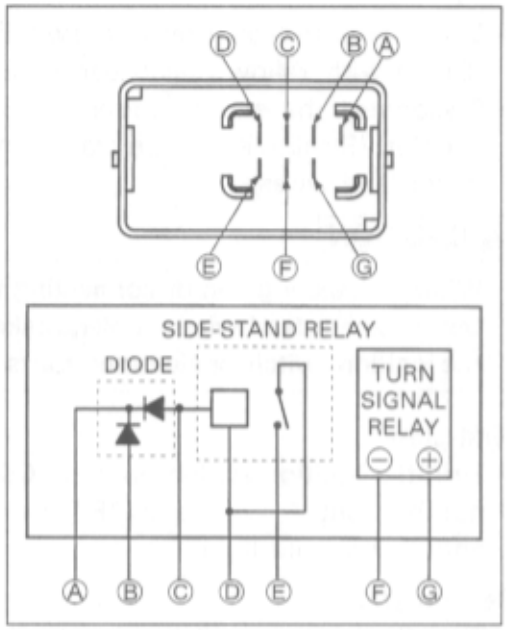
The turn signal relay is combined with the side-stand relay and diode which is located at the left air intake duct.



TURN SIGNAL RELAY OPERATION CHECK

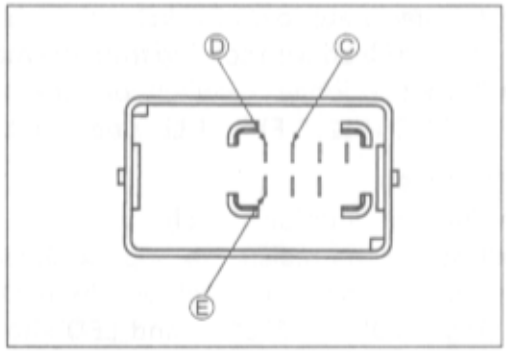
If the turn signal light does not light, inspect the bulb, turn signal switch and circuit connection.
If the bulb, turn signal switch and circuit connection checked are all right, the turn signal relay may be faulty, replace turn signal/side-stand relay with a new one.

NOTE:
Be sure that the battery used is in fully-charged condition.



SIDE-STAND RELAY INSPECTION

First, check the insulation between Ⓓ and Ⓔ terminals with a tester. Then apply 12 volts to Ⓓ and Ⓒ terminals, ⊕ to Ⓓ and ⊖ to Ⓒ, and check the continuity between Ⓓ and Ⓔ. If there is no continuity, replace turn signal/side-stand relay with a new one.

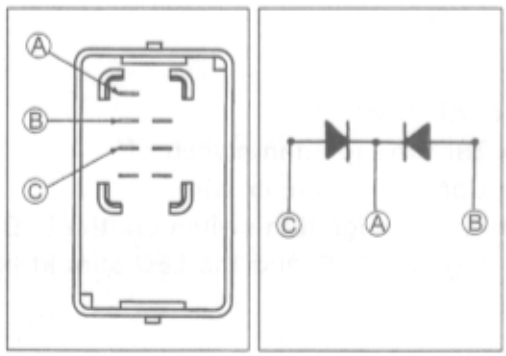


DIODE INSPECTION

Using a multi circuit tester, measure the voltage between the terminals in the following table.

Unit: V

⊖ Probe of tester to: \ ⊕ Probe of tester to:	Ⓒ, Ⓑ	Ⓐ
Ⓒ, Ⓑ		1.4–1.5
Ⓐ	0.4–0.6	



09900-25008: Multi circuit tester set

Tester knob indication: Diode test (⊣◀)

NOTE:
If the tester reads under 1.4V, replace the battery of multi circuit tester when do not connecting the tester probes.

COMBINATION METER

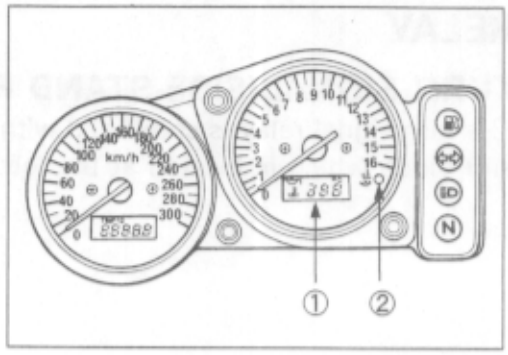
ENGINE COOLANT TEMPERATURE METER AND INDICATOR INSPECTION

The LCD ① (Liquid crystal display) and LED ② (Light Emitting Diode) in the tachometer indicate the engine coolant temperature information. The checking procedure of these system are explained as following four steps:

- Remove the front and rear seats.
- Lift and support the fuel tank with its prop stay. (See p. 11-4-49.)
- Disconnect the oil pressure switch lead wire coupler. (Green with Yellow tracer lead wire)
- Disconnect the engine coolant temp. sensor lead wire coupler. (Black with Green tracer and Black with Brown tracer lead wires)

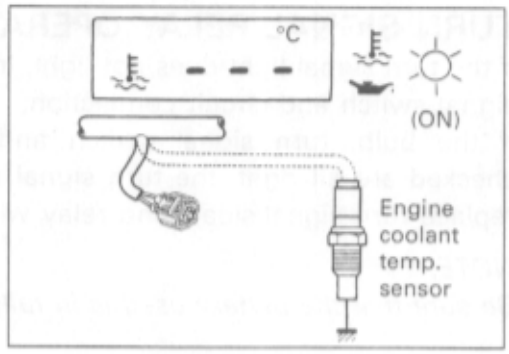
⚠ CAUTION

When connecting and disconnecting the engine coolant temp. sensor lead wire coupler, make sure to turn OFF the ignition switch, or electronic parts may get damaged.



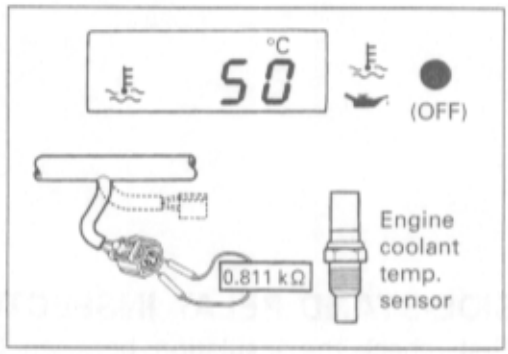
First step:

- Turn the ignition switch on, the LCD does not indicate a number but "– – –" and "FI" are indicated alternately and LED should light.



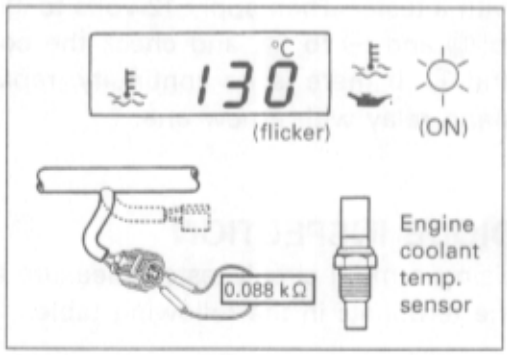
Second step:

- Turn the ignition switch off.
- Connect a approx. 0.811 kΩ resistor between B/Br lead wire and B/G lead wire coming from the main wiring harness.
- Turn the ignition switch on, the LCD should indicate "50"°C ("122"°F) and LED not light.



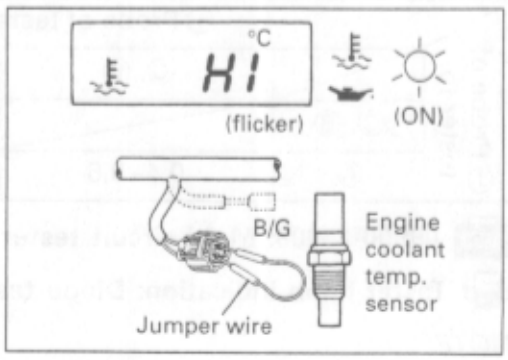
Third step:

- Turn the ignition switch off.
- Change the resistor to approx. 0.088 kΩ
- Turn the ignition switch on, the LCD should keep flickering "130"°C ("266"°F) and LED should light.



Fourth step:

- Turn the ignition switch off.
- Connect a jumper wire.
- Turn the ignition switch on, the LCD should keep flickering "HI"/"FI" and the LED should light.



The following table shows the relation of the resistance, LED and LCD.

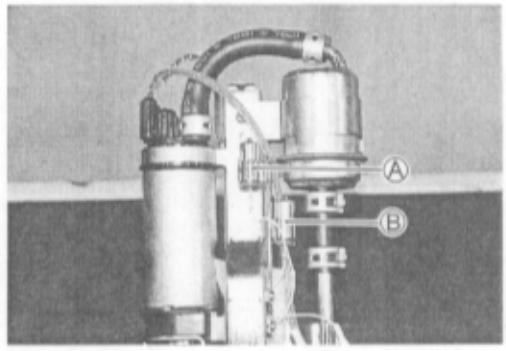
RESISTANCE	LED	LCD	
∞	ON	"– – –"	ON
Approx. 0.811 kΩ	OFF	"50"°C ("122"°F)	ON
Approx. 0.088 kΩ	ON	"130"°C ("266"°F)	flicker
Use the jumper wire	ON	"HI"	flicker

If either one or all indications are abnormal, replace the meter with a new one.

For inspecting the engine coolant temp. sensor, refer to page 11-5-2.

FUEL LEVEL INDICATOR INSPECTION

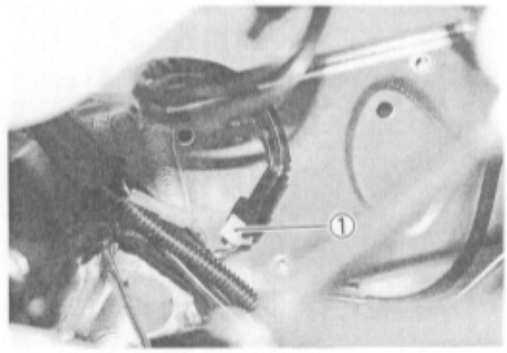
The fuel level indicator light should flicker when its switch Ⓐ turns "ON" and should keep lighting when its switch Ⓑ turns "ON".
These system inspection are explained as follows.

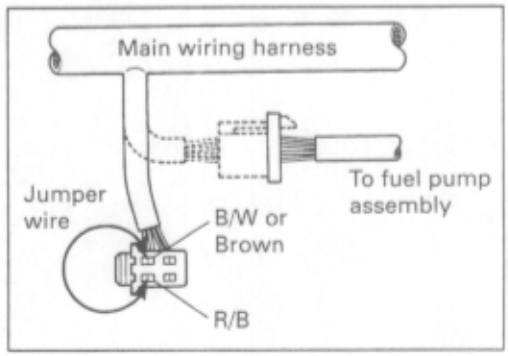


FUEL LEVEL INDICATOR LIGHT INSPECTION

- Lift the fuel tank and support it by prop. (See p. 11-4-49.)
- The fuel indicator light lights up for approx. 3 seconds after the ignition switch is turned on, then the indicator light should go out.
- Disconnect the fuel pump lead wire coupler ①.
- Connect a jumper wire between B/W lead and R/B lead coming from the main wiring harness and check whether fuel indicator light is flickering.
- Check if the fuel indicator light will go out within approx. 30 seconds, when disconnecting a jumper wire.

B/W: Black with White tracer
R/B : Red with Black tracer

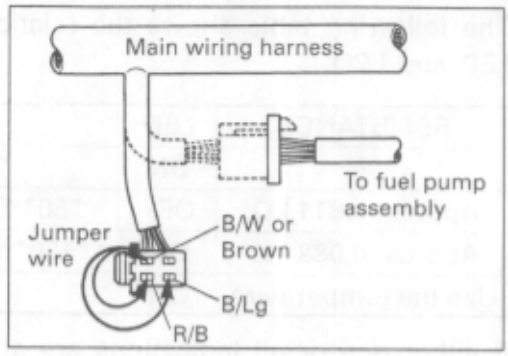




- Connect jumper wires between B/W lead and R/B lead and B/W lead and B/Lg lead coming from the main wiring harness and check whether the fuel indicator light comes on.
- Check if the fuel indicator light will go out within approx. 30 seconds, when disconnecting jumper wires.

B/W: Black with White tracer
B/Lg: Black with Light green tracer

If the fuel indicator light does not function properly, check the bulb. If the bulb is in good condition, replace the meter with a new one.



FUEL LEVEL INDICATOR SWITCH INSPECTION

Refer to page 7-32.

SERVICING INFORMATION

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CABLE ROUTING 11-8-11

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SPECIAL TOOLS 11-8-14

SERVICE DATA 11-8-15

TROUBLESHOOTING

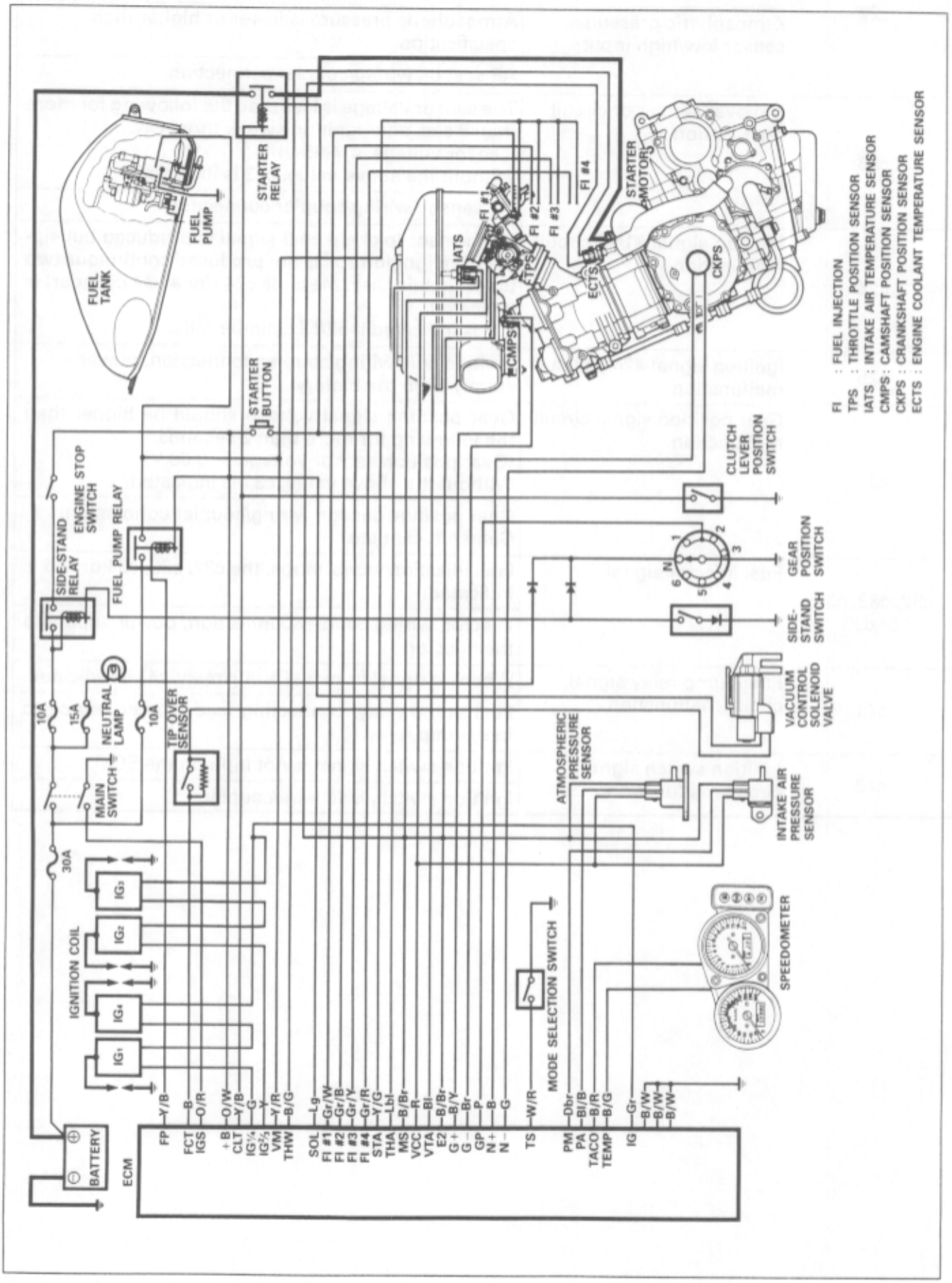
FI SYSTEM MALFUNCTION CODE AND DEFECTIVE CONDITION

MALFUNCTION CODE	DETECTED ITEM	DETECTING FAILURE CONDITION CHECK FOR
c00	NO FAULT	—
c11	Camshaft position sensor or circuit malfunction	The signal does not reach to ECM for more than 2 sec. after receiving the starter signal.
		The CMP sensor wiring and mechanical parts. (CMP sensor, intake cam pin, wiring/coupler connection)
c12	Crankshaft position sensor or circuit malfunction	The signal does not reach to ECM for more than 2 sec. after receiving the starter signal.
		The CKP sensor wiring and mechanical parts. (CKP sensor, wiring/coupler connection)
c13	Intake air pressure sensor malfunction	The sensor produces following voltage. (0.25 V ≦ sensor voltage < 4.85 V) Without the above range, c13 is indicated.
	Intake air pressure sensor circuit low input	Low pressure – high vacuum – low voltage (or IAP sensor circuit shorted to ground)
	Intake air pressure sensor circuit high input	High pressure – low vacuum – high voltage (or IAP sensor circuit open)
		IAP sensor, wiring/coupler connection.
c14	Throttle position sensor malfunction	The sensor produces following voltage. (0.2 V ≦ sensor voltage < 4.8 V) Without the above range, c14 is indicated.
	Throttle position circuit low input	Low voltage (or TP sensor circuit shorted to ground)
	Throttle position circuit high input	High voltage (or TP sensor circuit open)
		TP sensor, wiring/coupler connection.
c15	Engine coolant temp. sensor malfunction	The sensor voltage should be the following. (0.15 V ≦ sensor voltage < 4.85 V) Without the above range, c15 is indicated.
	Engine coolant temp. circuit low input	High temperature – low voltage (or ECT sensor circuit shorted to ground)
	Engine coolant temp. circuit high input	Low temperature – high voltage (or ECT sensor circuit open)
		ECT sensor, wiring/coupler connection.
c21	Intake air temp. sensor malfunction	The sensor voltage should be the following. (0.15 V ≦ sensor voltage < 4.85 V) Without the above range, c21 is indicated.
	Intake air temp. circuit low input	High temperature – low voltage (or IAT sensor circuit shorted to ground)
	Intake air temp. circuit high input	Low temperature – high voltage (or IAT sensor circuit open)
		IAT sensor, wiring/coupler connection.

c22	Atmospheric pressure sensor malfunction	The sensor voltage should be the following. (0.25 V ≦ sensor voltage < 4.85 V) Without the above range, c22 is indicated.
	Atmospheric pressure sensor low/high input	Atmospheric pressure is lower or higher than specification.
		AP sensor, wiring/coupler connection.
c23	Tip over sensor or circuit malfunction	The sensor voltage is less than the following for more than 8 sec. after ignition switch turns ON. (sensor voltage < 4.85 V) Without the above value, c23 is indicated.
		TO sensor, wiring/coupler connection.
c24	Ignition signal #1/#4 circuit malfunction	CKP sensor (pick-up coil) signal is produced but signal from ignition coil is not produced continuous two times. In this case, the code c24 (for #1/#4 cylinder) is indicated. c25 is indicated if #2/#3 cylinder fails.
c25	Ignition signal #2/#3 circuit malfunction	Ignition coil, wiring/coupler connection, power supply from the battery.
c31	Gear position signal circuit malfunction	Gear position signal voltage should be higher than the following for more than 2 seconds. (Gear position sensor voltage > 0.60 V) Without the above value, c31 is indicated.
		Gear position sensor, wiring/coupler connection. Gearshift cam etc.
c32, c33, c34 or c35	Fuel injector signal	Fuel injection signal stops, the c32, c33, c34 or c35 is indicated.
		Injector, wiring/coupler connection, power supply to the injector.
c41	Fuel pump relay signal circuit malfunction	When no signal from fuel pump relay, c41 is indicated.
		Fuel pump relay, connecting lead, power source to fuel pump relay.
c42	Ignition switch signal circuit malfunction	Ignition switch signal is not input in the ECM.
		Ignition switch, lead wire/coupler.

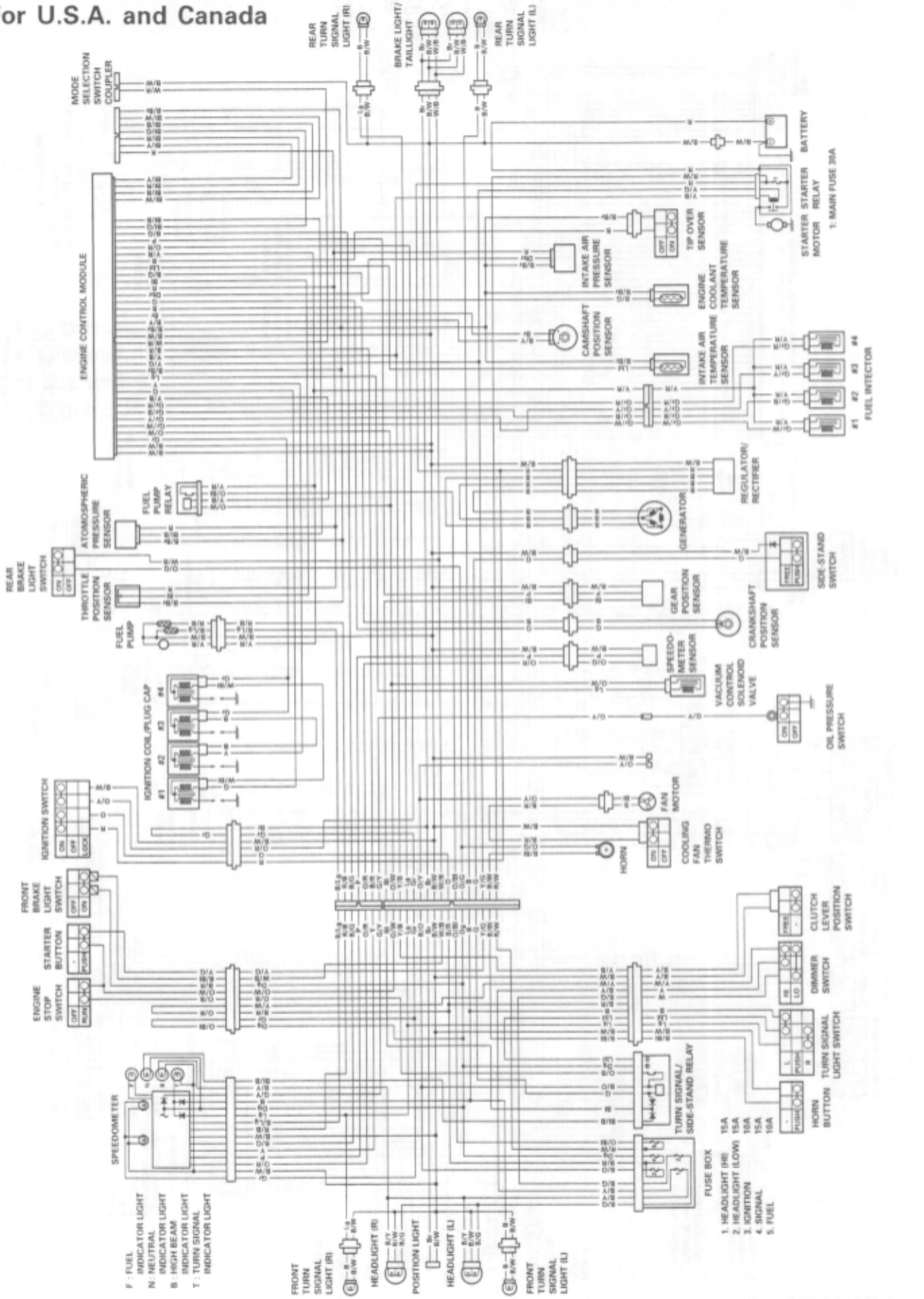
WIRING DIAGRAM

FI SYSTEM WIRING DIAGRAM

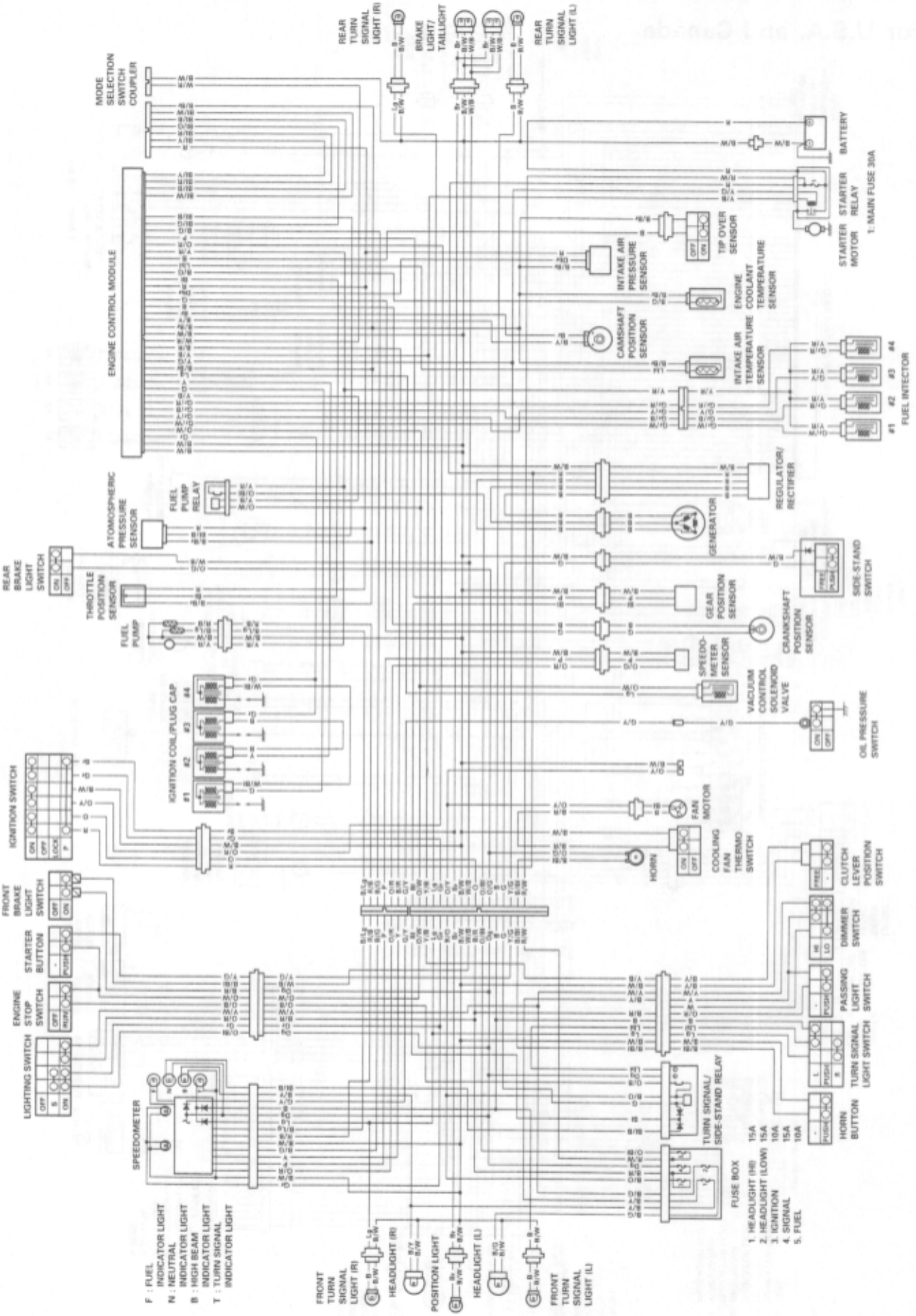


WIRING DIAGRAM

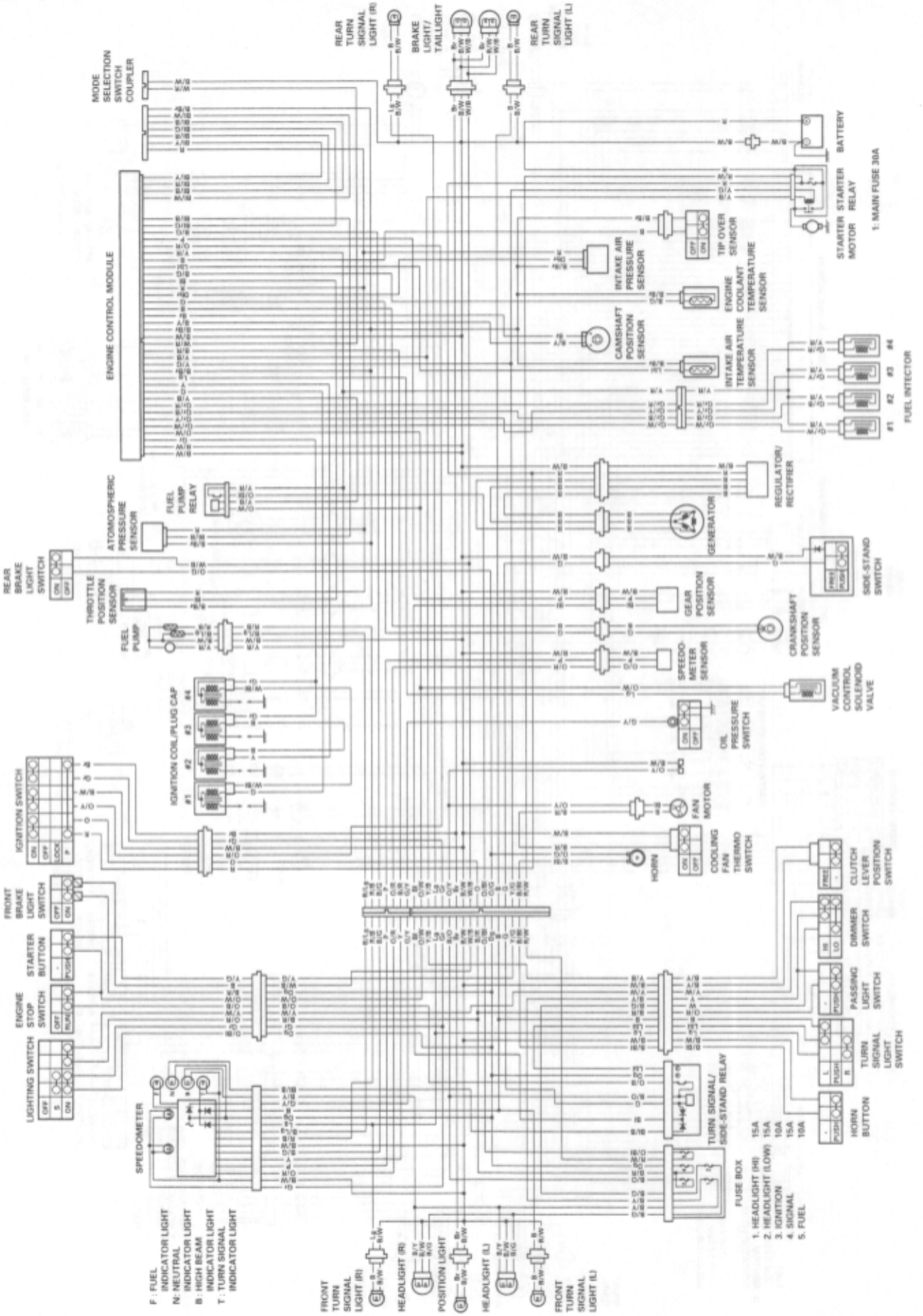
For U.S.A. and Canada



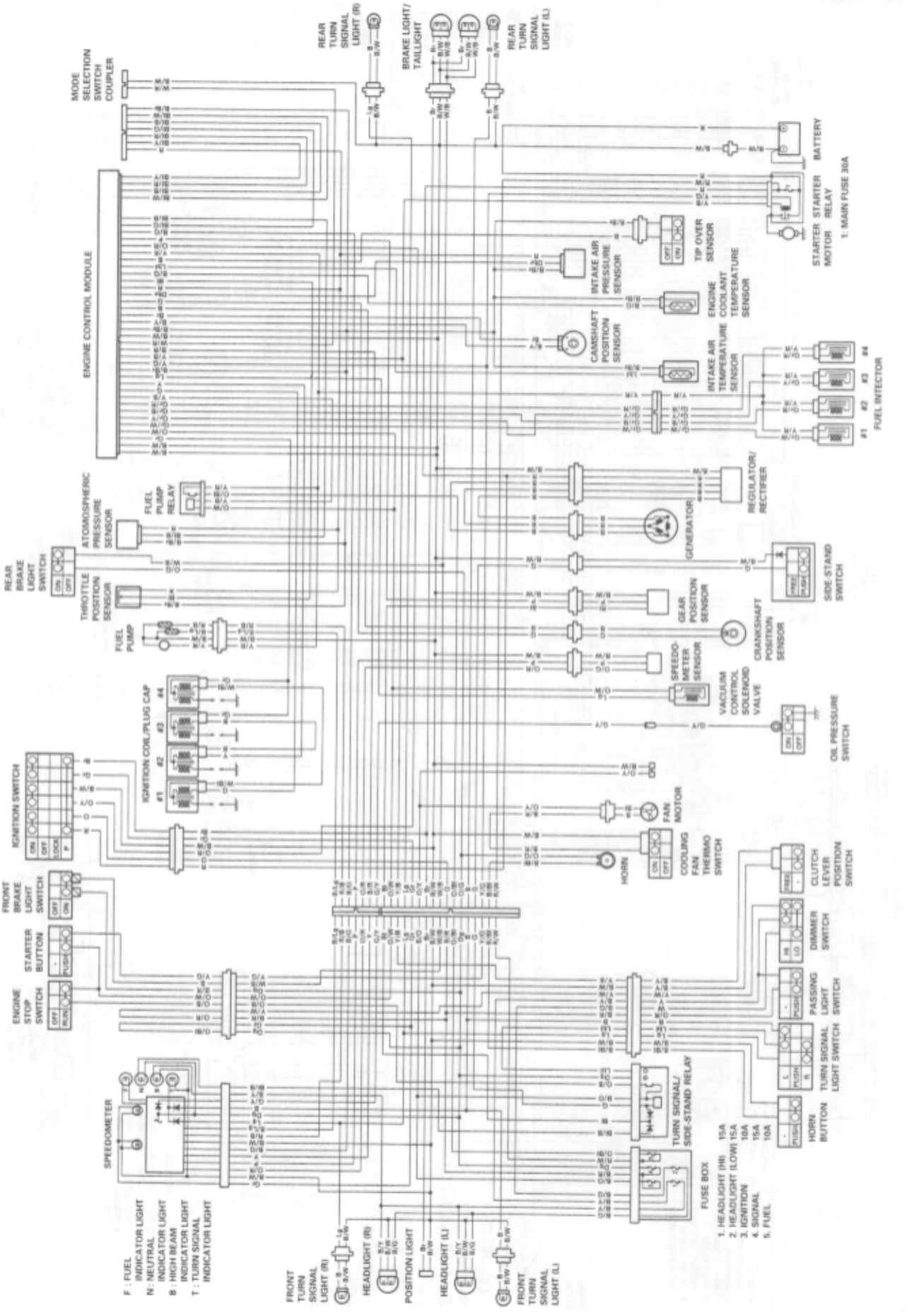
For E-04, 18, 22, 25, 34, 39, P-37



For U.K.


REAR TURN SIGNAL LIGHT (R)
BRAKE LIGHT/ TAILLIGHT
REAR TURN SIGNAL LIGHT (L)
MODE SELECTION SWITCH COUPLER
ENGINE CONTROL MODULE
BATTERY
STARTER RELAY
STARTER MOTOR
1: MAIN FUSE 30A
TIP OVER SENSOR
INTAKE AIR PRESSURE SENSOR
ENGINE COOLANT TEMPERATURE SENSOR
CAMSHAFT POSITION SENSOR
INTAKE AIR TEMPERATURE SENSOR
FUEL INJECTOR
#1 #2 #3 #4
REGULATOR/ RECTIFIER
GENERATOR
ATOMOSPHERIC PRESSURE SENSOR
FUEL PUMP RELAY
REAR BRAKE LIGHT SWITCH
THROTTLE POSITION SENSOR
FUEL PUMP
SIDE-STAND SWITCH
GEAR POSITION SENSOR
CRANKSHAFT POSITION SENSOR
SPEEDO METER SENSOR
VACUUM CONTROL SOLENOID VALVE
OIL PRESSURE SWITCH
IGNITION COIL/PLUG CAP
#4 #3 #2 #1
IGNITION SWITCH
FAN MOTOR
HORN
COOLING FAN THERMO SWITCH
FRONT BRAKE LIGHT SWITCH
CLUTCH LEVER POSITION SWITCH
STARTER BUTTON
DIMMER SWITCH
ENGINE STOP SWITCH
PASSING LIGHT SWITCH
LIGHTING SWITCH
TURN SIGNAL LIGHT SWITCH
HORN BUTTON
TURN SIGNAL/ SIDE-STAND RELAY
SPEEDOMETER
FUSE BOX
1. HEADLIGHT (HI) 15A
2. HEADLIGHT (LOW) 15A
3. IGNITION 10A
4. SIGNAL 15A
5. FUEL 10A
F : FUEL INDICATOR LIGHT
N: NEUTRAL INDICATOR LIGHT
B : HIGH BEAM INDICATOR LIGHT
T : TURN SIGNAL INDICATOR LIGHT
FRONT TURN SIGNAL LIGHT (R)
HEADLIGHT (R)
POSITION LIGHT
HEADLIGHT (L)
FRONT TURN SIGNAL LIGHT (L)

For Australia

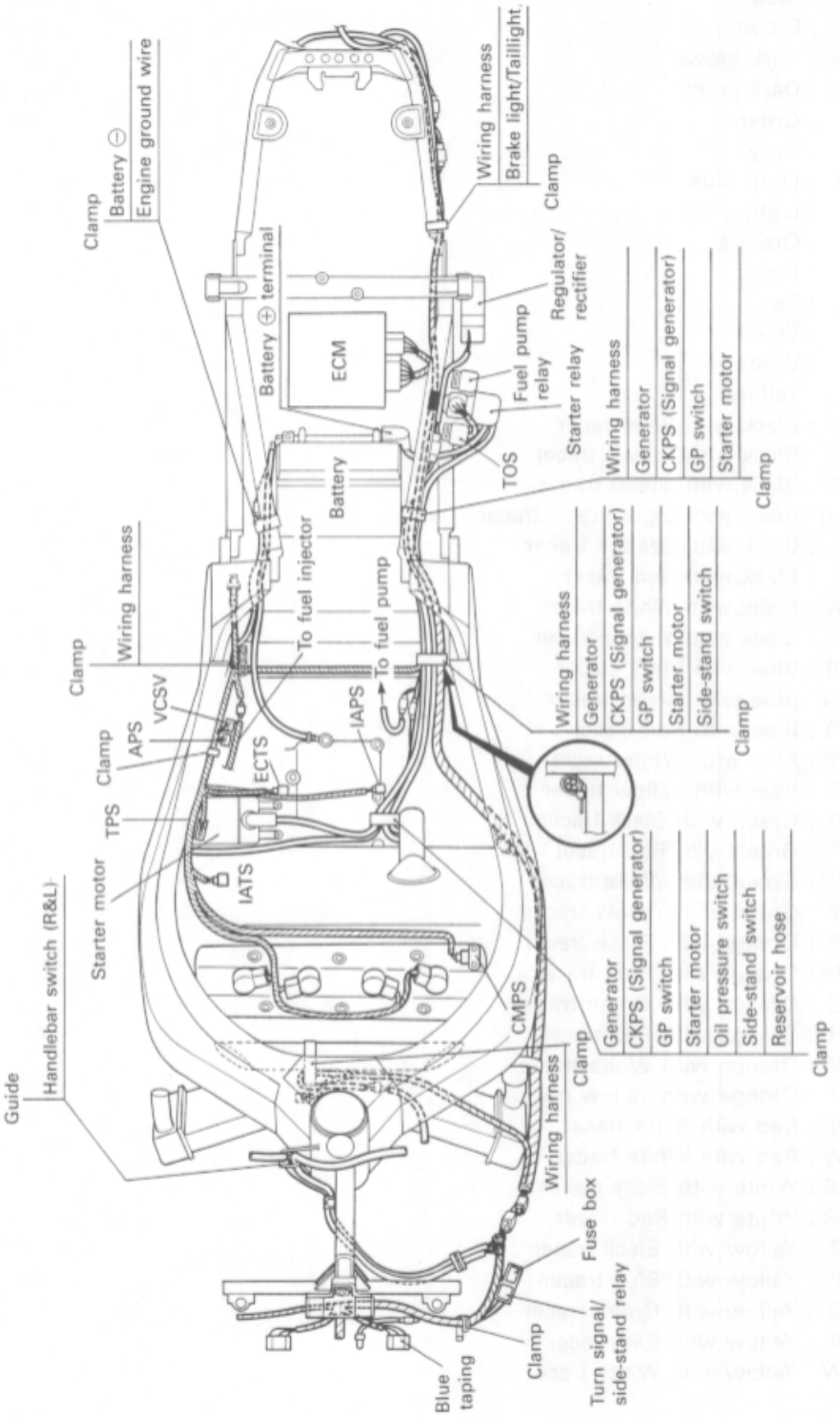


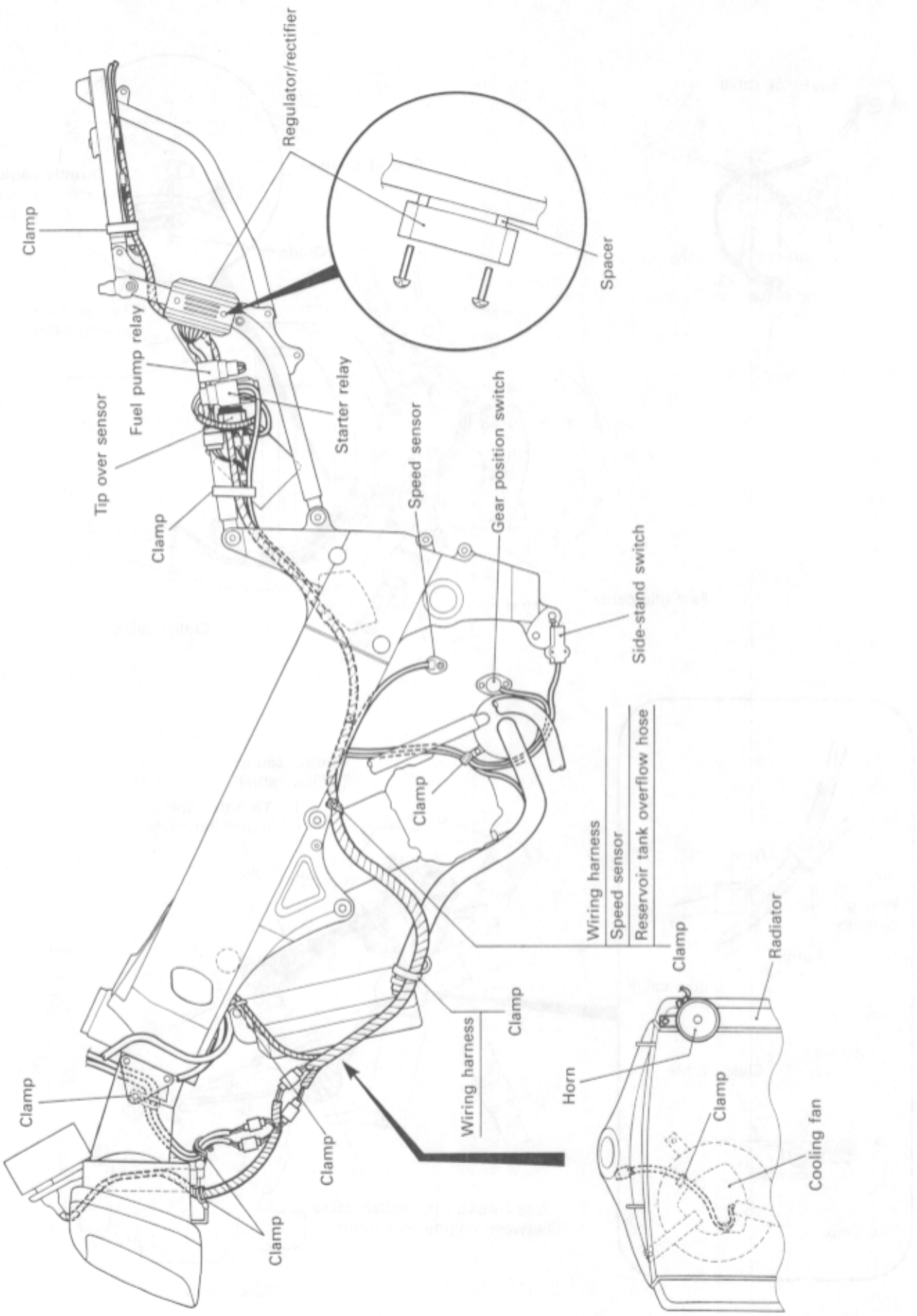
WIRE COLOR

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

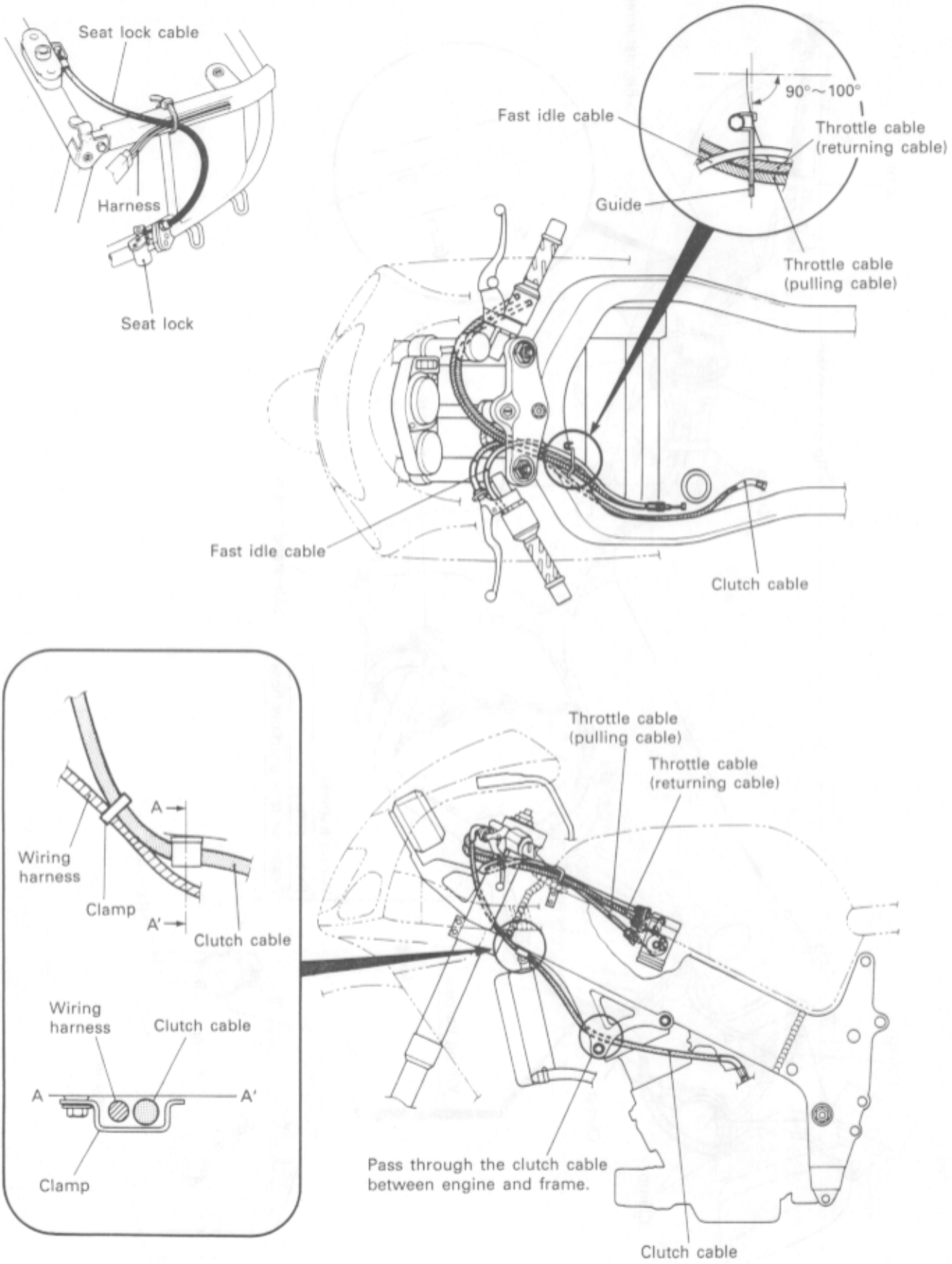
WIRE HARNESS, CABLE AND HOSE ROUTING

WIRE HARNESS ROUTING

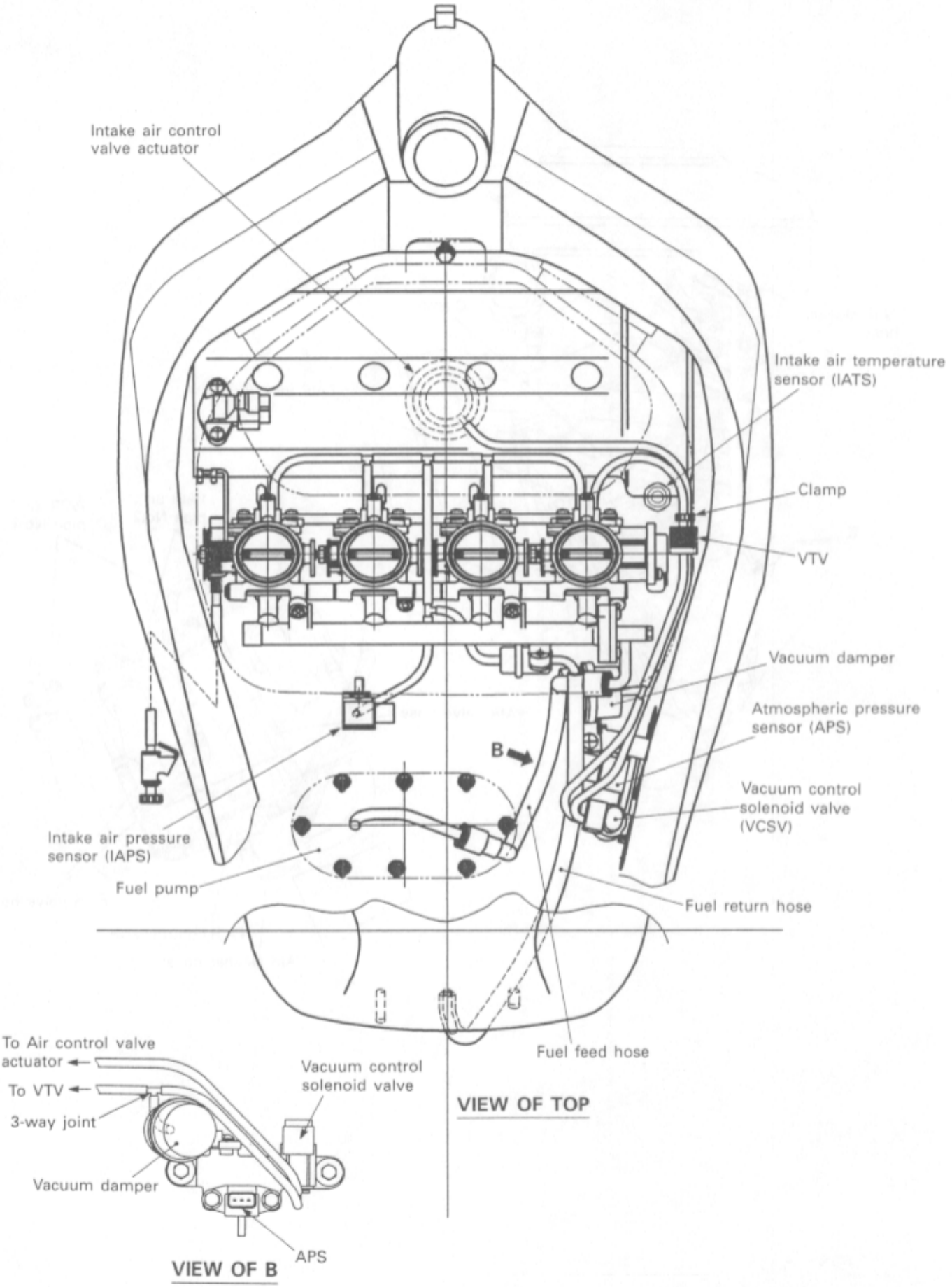



Regulator/rectifier
Clamp
Spacer
Fuel pump relay
Tip over sensor
Starter relay
Speed sensor
Gear position switch
Clamp
Side-stand switch
Clamp
Wiring harness
Speed sensor
Reservoir tank overflow hose
Clamp
Radiator
Clamp
Wiring harness
Clamp
Horn
Clamp
Clamp
Clamp
Cooling fan

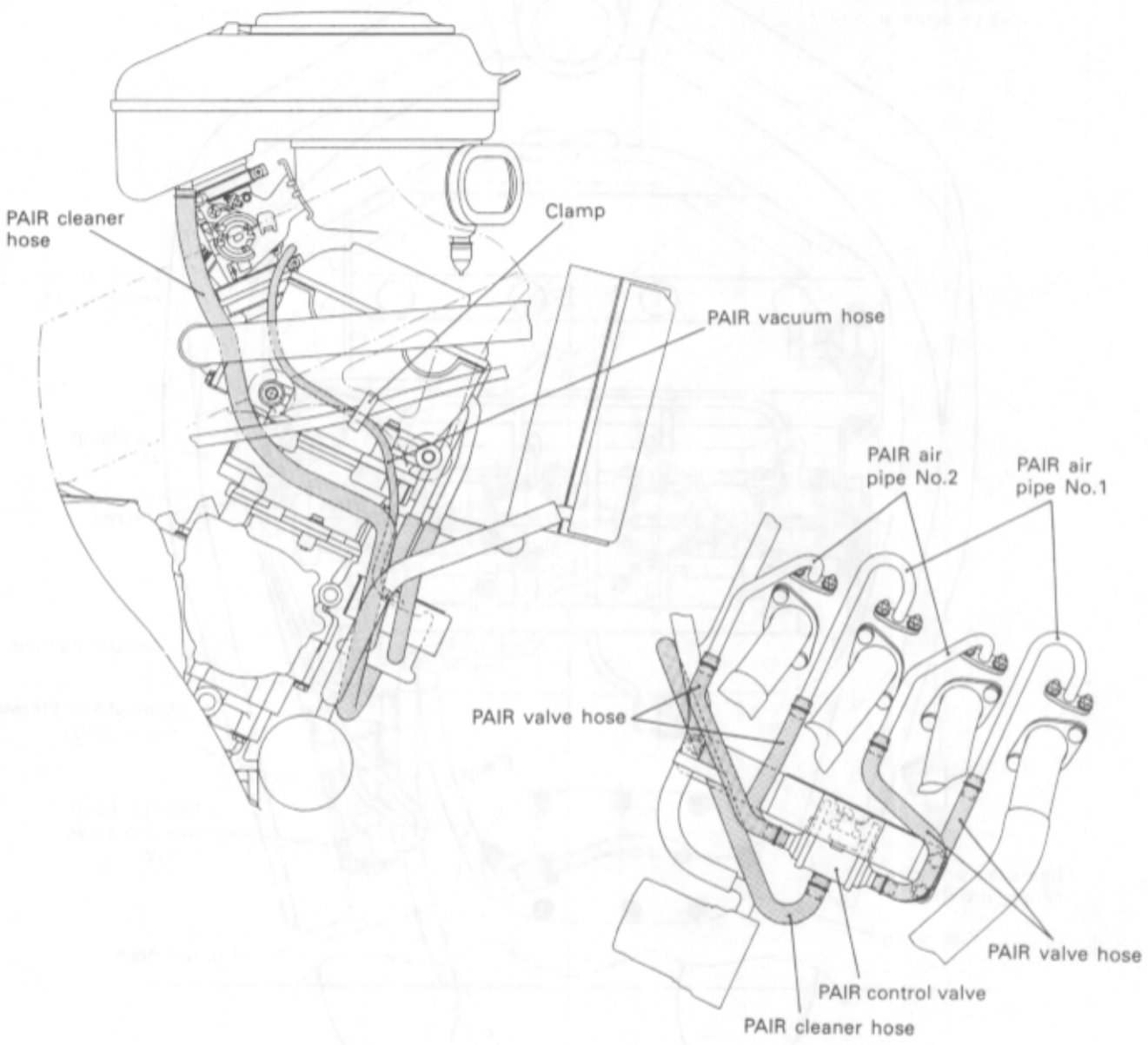
CABLE ROUTING



FUEL SYSTEM HOSE ROUTING



PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING (FOR E-03, 18, 28, 33 AND -39 MODELS)



SPECIAL TOOLS

		
09930-11950 Torx wrench	09930-82710 Mode selection switch	09940-40210 Fuel pressure gauge adaptor

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM		STANDARD	LIMIT
Valve diam.	IN.	29 (1.14)	———
	EX.	24 (0.94)	———
Tappet clearance (when cold)	IN.	0.10–0.20 (0.004–0.008)	———
	EX.	0.20–0.30 (0.008–0.012)	———
Valve guide to valve stem clearance	IN.	0.010–0.037 (0.0004–0.0015)	———
	EX.	0.030–0.057 (0.0012–0.0022)	———
Valve stem deflection	IN. & EX.	———	0.35 (0.014)
Valve guide I.D.	IN. & EX.	4.500–4.512 (0.1772–0.1776)	———
Valve stem O.D.	IN.	4.475–4.490 (0.1762–0.1768)	———
	EX.	4.455–4.470 (0.1754–0.1760)	———
Valve stem 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.)	INNER	———	36.80 (1.45)
	OUTER	———	38.60 (1.52)
Valve spring tension (IN. & EX.)	INNER	4.5 kg (9.9 lbs) at length 29.9 mm (1.18 in)	———
	OUTER	18.3 kg (40.34 lbs) at length 33.4 mm (1.31 in)	———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM		STANDARD	LIMIT
Cam height	IN.	*36.660–36.728 (1.4433–1.4460)	*33.36 (1.431)
	EX.	*35.280–35.348 (1.3890–1.3917)	*34.98 (1.377)
Camshaft journal oil clearance	IN. & EX.	0.032–0.066 (0.0013–0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	24.012–24.025 (0.9454–0.9459)	———
Camshaft journal O.D.	IN. & EX.	23.959–23.980 (0.9433–0.9441)	———

ITEM	STANDARD		LIMIT
Camshaft runout	IN. & EX.	———	0.10 (0.004)
Cam chain pin (at arrow "3")	15th pin		———
Cylinder head cover distortion	———		0.20 (0.008)

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM		STANDARD	LIMIT
Compression pressure		1 100–1 500 kPa (11–15 kg/cm^2, 156–213 psi)	900 kPa (9 kg/cm^2, 128 psi)
Compression pressure difference		———	200 kPa (2 kg/cm^2, 28 psi)
Piston to cylinder clearance		*0.025–0.035 (0.0010–0.0014)	———
Cylinder bore		72.000–72.015 (2.8346–2.8352)	Nicks or Scratches
Piston diam.		*71.970–71.985 (2.8335–2.8340) Measure at 15 mm (0.6 in) from the skirt end.	71.880 (2.8299)
Cylinder distortion		———	0.20 (0.008)
Piston ring free end gap	1st	Approx. * 7.2 (0.28)	* 5.7 (0.22)
	2nd	Approx. * 8.5 (0.33)	* 6.8 (0.27)
Piston ring end gap	1st	0.10–0.25 (0.004–0.010)	0.5 (0.02)
	2nd	0.10–0.25 (0.004–0.010)	0.5 (0.02)
Piston ring to groove clearance	1st	———	0.18 (0.007)
	2nd	———	0.18 (0.007)
Piston ring groove width	1st	1.01–1.03 (0.040–0.041)	———
	2nd	0.81–0.83 (0.032–0.033)	———
	Oil	1.51–1.53 (0.059–0.060)	———
Piston ring thickness	1st	0.97–0.99 (0.038–0.039)	———
	2nd	0.77–0.79 (0.030–0.031)	———
Piston pin bore		16.002–16.008 (0.6210–0.6302)	16.030 (0.6311)
Piston pin O.D.		15.995–16.000 (0.6297–0.6299)	15.980 (0.6291)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD		LIMIT
Corod small end I.D.	16.010–16.018 (0.6303–0.6306)		16.040 (0.6315)
Conrod big end side clearance	0.10–0.20 (0.004–0.008)		0.30 (0.010)
Conrod big end width	20.95–21.00 (0.825–0.827)		———
Crank pin width	21.10–21.15 (0.831–0.833)		———
Conrod big end oil clearance	0.032–0.056 (0.0013–0.0022)		0.080 (0.0031)
Crank pin O.D.	33.976–34.000 (1.3376–1.3386)		———
Crankshaft journal oil clearance	*0.016–0.040 (0.0006–0.0016)		0.080 (0.0031)
Crankshaft journal O.D.	33.976–34.000 (1.3376–1.3386)		———
Crankshaft thrust clearance	0.055–0.110 (0.0022–0.0043)		———
Crankshaft thrust bearing thickness	Right side	2.425–2.450 (0.0955–0.0965)	———
	Left side	2.350–2.500 (0.0925–0.0984)	———
Crankshaft runout	———		0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.911 (72/41 × 37/34)	———
Oil pressure (at 60°C, 140°F)	Above 200 kPa (2.0 kg/cm^2, 28 psi) Below 500 kPa (5.0 kg/cm^2, 71 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch lever play	3–13 (0.12–0.51)	———
Drive plate thickness	2.92–3.08 (0.115–0.121)	2.62 (0.103)
Drive plate claw width	———	13.0 (0.51)
Clutch release screw	¼ turn back	———
Driven plate distortion	———	0.10 (0.004)
Clutch spring free height	———	2.9 (0.11)

THERMOSTAT + RADIATOR + FAN

ITEM		STANDARD	LIMIT
Thermostat valve opening temperature		74.5–78.5°C (166.1–173.3°F)	———
Thermostat valve lift		Over 7 mm (0.28 in) at 90°C (194°F)	———
Radiator cap valve opening pressure		110 kPa (1.1 kg/cm^2, 15.6 psi)	———
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 105°C (221°F)	———
	ON→OFF	Approx. 100°C (212°F)	———
Engine coolant temperature 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	———
	130°C (226°F)	*Approx. 0.088 kΩ	———

TRANSMISSION + DRIVE CHAIN

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Primary reduction ratio		1.756 (72/41)	———
Final reduction ratio		*2.750 (44/16)	———
Gear ratios	Low	*2.625 (42/16)	———
	2nd	*1.950 (39/20)	———
	3rd	*1.565 (36/23)	———
	4th	*1.363 (30/22)	———
	5th	*1.227 (27/22)	———
	Top	1.120 (28/25)	———
Shift fork to groove clearance		0.1–0.3 (0.004–0.012)	0.50 (0.020)
Shift fork groove width		5.0–5.1 (0.197–0.201)	———
Shift fork thickness		4.8–4.9 (0.189–0.193)	———
Drive chain	Type	*RK525ROZ2	———
	Links	108 links, ENDLESS	———
	20-pitch length	———	319.4 (12.6)
Drive chain slack		20–30 (0.8–1.2)	———
Gearshift lever height		55 (2.2)	———

*INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11–16 Ω at 20°C (68°F)	
Fuel pump discharge amount	Approx. 1 L (1.1/0.9 US/Imp qt) for 1 minute at 2.9 kg/cm^2 (290 kPa, 41 psi)	
Fuel pressure regulator operating set pressure	Approx. 2.9 kg/cm^2 (290 kPa, 41 psi)	

*FI-SENSORS + INTAKE AIR CONTROL VALVE

ITEM		SPECIFICATION		NOTE
CMP sensor resistance		0.9–1.3 kΩ		
CMP sensor peak voltage		More than 0.8V		
CKP sensor resistance		50–200 Ω		
CKP sensor peak voltage		More than 0.5V		
IAP sensor input voltage		4.5–5.5V		
IAP sensor output voltage		Approx. 2.85V at idle speed		
TP sensor input voltage		4.5–5.5V		
TP sensor resistance	(Closed)	Approx. 1.2 kΩ		
	(Opened)	Approx. 4.4 kΩ		
TP sensor output voltage	(Closed)	Approx. 1.1V		
	(Opened)	Approx. 4.2V		
ECT sensor input voltage		4.5–5.5V		
ECT sensor resistance		2.3–2.6 kΩ at 20°C (68°F)		
IAT sensor input voltage		4.5–5.5V		
IAT sensor resistance		2.2–2.7 kΩ at 20°C (68°F)		
AP sensor input voltage		4.5–5.5V		
AP sensor output voltage		Approx. 3.6V at 760 mmHg (100 kPa)		
TO sensor resistance		60–64 kΩ		
TO sensor voltage		Approx. 2.5V		
GP sensor voltage		More than 0.6V (From 1st to Top)		
Injector voltage		Battery voltage		
Ignition coil primary peak voltage		More than 90V (When cranking)		at each ignition coil/plug cap
VCSV resistance		36–44 kΩ		
Intake air control valve operating rpm		Opening rpm	Above 5 400 rpm	
		Closing rpm	Below 5 200 rpm	

*THROTTLE BODY

ITEM	SPECIFICATION	
	E-18	Others
Air screw STD setting	Approx. ½ turn out	←
Idle r/min	1 200 ± 50 r/min.	1 200 ± 100 r/min.
Throttle cable play	2.0–4.0 mm (0.08–0.16 in)	←

ELECTRICAL

Unit: mm (in)

ITEM			SPECIFICATION	NOTE
Ignition timing			4° B.T.D.C. at 1 500 r/min.	
Firing order			1·2·4·3	
Spark plug		Type	NGK: CR9E DENSO: U27ESR-N	
		Gap	0.7–0.8 (0.028–0.031)	
Spark performance			Over 8 (0.3) at 1 atm.	
Crankshaft position sensor resistance			50–200 Ω	Black–Green
Ignition coil resistance		Primary	*0.07–0.11 Ω	⊕ tap – ⊖ tap
		Secondary	*4.5–6.9 kΩ	⊖ tap– Plug cap
Crankshaft position sensor peak voltage			*More than 0.5V	
Ignition coil primary peak voltage			*More than 90V	at each ignition coil/plug cap
Generator coil resistance			*0.24–0.36 Ω	Black–Black
Generator Max. output			*Approx. 406W at 5 000 r/min.	
Generator no-load voltage (When engine is cold)			*More than 70V (AC) at 5 000 r/min.	
Regulated voltage			13.5–15V at 5 000 r/min.	
Starter relay resistance			3–5 Ω	
Battery	Type designation		FTX9-BS	
	Capacity		12V 28.8 kC (8 Ah)/10 HR	
	Standard electrolyte S.G.		1.320 at 20°C (68°F)	
Fuse size	Headlight	HI	15A	
		LO	15A	
	Turn signal		15A	
	Ignition		10A	
	*Fuel		10A	
	Main		30A	

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03,24,28,33	E-04,18,21,22,25, 34,37,39,53	E-02
Headlight	HI	*60 × 2	55	*60 × 2
	LO	*55 × 2	55	*55 × 2
Parking or position light			5	←
Brake light/Taillight		21/5 × 2	←	←
Turn signal light		21	←	←
Tachometer light		1.7	←	←
Speedometer light		1.7	←	←
Turn signal indicator light		1.7	←	←
High beam indicator light		1.7	←	←
Neutral indicator light		1.7	←	←
Fuel indicator light		1.7	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM			STANDARD	LIMIT
Rear brake pedal height			55 (2.2)	———
Brake disc thickness		Front	*5.0 ± 0.2 (0.197 ± 0.008)	*4.5 (0.18)
		Rear	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
Brake disc runout (Front & Rear)			———	0.30 (0.012)
Master cylinder bore		Front	15.870–15.913 (0.6248–0.6265)	———
		Rear	12.700–12.743 (0.5000–0.5017)	———
Master cylinder piston diam.		Front	15.827–15.854 (0.6231–0.6242)	———
		Rear	12.657–12.684 (0.4983–0.4994)	———
Brake caliper cylinder bore	Leading	Front	24.000–24.076 (0.9449–0.09479)	———
	Trailing	Rear	27.000–27.076 (1.0630–1.0660)	———
		Rear	38.180–38.256 (1.5031–1.5061)	———
Brake caliper piston diam.	Leading	Front	23.925–23.975 (0.9419–0.9439)	———
	Trailing		26.920–26.970 (1.0598–1.0618)	———
		Rear	38.098–38.148 (1.4999–1.5019)	———
Wheel rim runout (Front & Rear)		Axial	———	2.0 (0.08)
		Radial	———	2.0 (0.08)
Wheel axle runout		Front	———	0.25 (0.010)
		Rear	———	0.25 (0.010)
Wheel rim size		Front	J17 × MT 3.50	———
		Rear	J17 × MT 6.00	———
Tire size		Front	120/70 ZR17 (58W)	———
		Rear	190/50 ZR17 (73W)	———
Tire tread depth		Front	———	1.6 (0.06)
		Rear	———	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD		LIMIT
Front fork stroke	120 (4.7)		———
Front fork spring free length	———		250 (9.9)
Front fork oil level	*99 (3.9)		———
Front fork spring adjuster	4th groove from top		———
Front fork damping force adjuster	Rebound	*At punch mark (about 1-¼ turns out)	———
	Compression	*At punch mark (about 1-3/8 turns out)	———
Rear shock absorber gas pressure (N_2 gas)	1 000 kPa (10 kg/cm^2, 142 psi)		———
Rear shock absorber spring set length	193.9 (7.6)		———
Rear shock absorber damping force adjuster	Rebound	*At punch mark (about 1-3/8 turns out)	———
	Compression	*At punch mark (about 1-3/8 turns out)	———
Rear wheel travel	133 (5.2)		———
Swingarm pivot shaft runout	———		0.3 (0.01)

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm^2	psi	kPa	kg/cm^2	psi
FRONT	250	2.50	36	250	2.50	36
REAR	250	2.50	36	250	2.50	36

FUEL + OIL + COOLANT

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) 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-03, 33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline used should be graded 85–95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	18.0 L (4.8/4.0 US/Imp gal)		
Engine oil type	SAE 10W/40, API, SF or SG		
Engine oil capacity	Change	2 600 ml (2.7/2.3 US/Imp qt)	
	Filter change	2 800 ml (3.0/2.5 US/Imp qt)	
	Overhaul	3 500 ml (3.7/3.1 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	*490 ml (16.6/17.3 US/Imp oz)		
Brake fluid type	DOT 4		
Engine coolant type	Use an anti-freeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50 : 50.		
Engine coolant including reserve	2 550 ml (2.7/2.2 US/Imp qt)		

EMISSION CONTROL INFORMATION

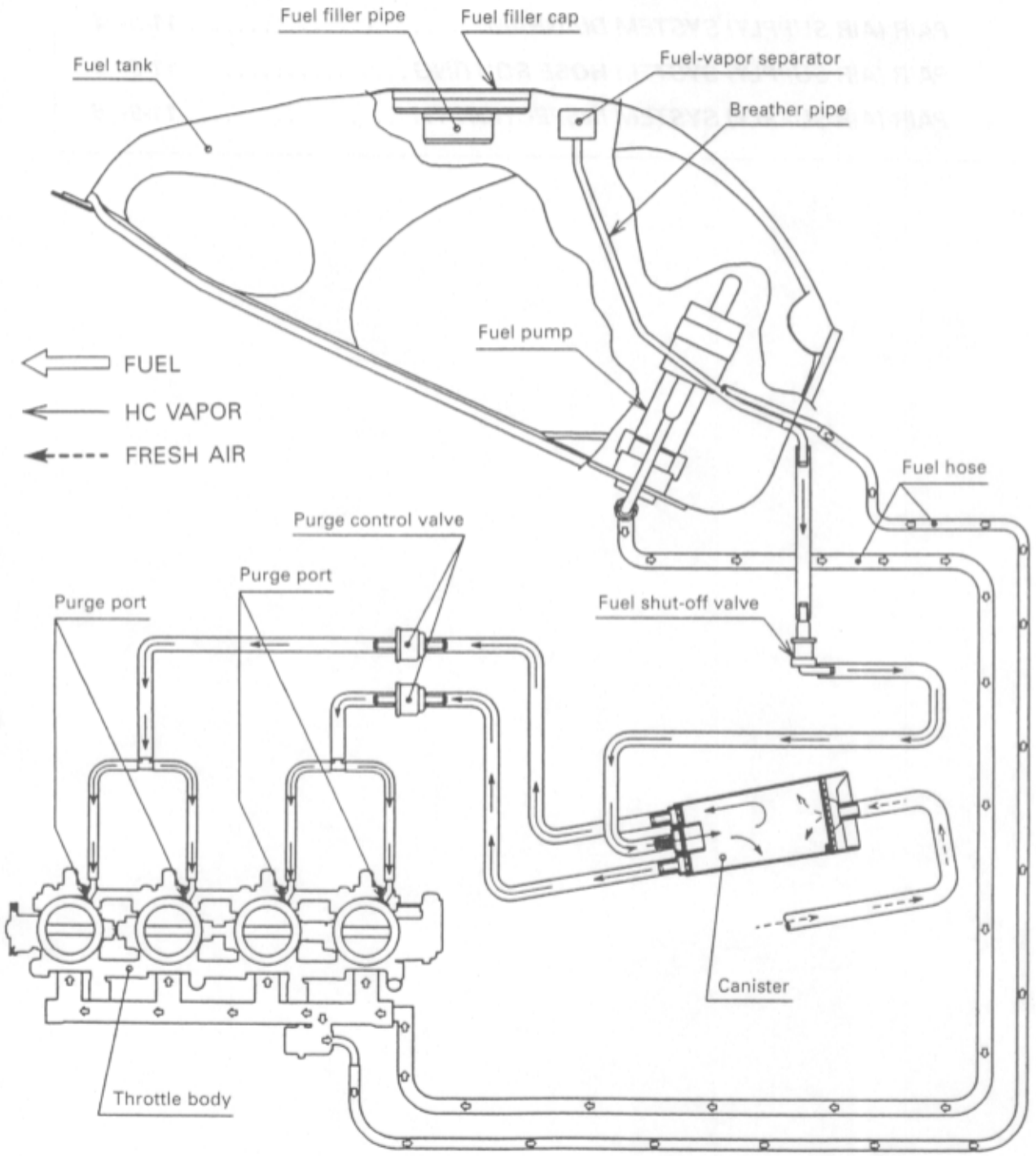
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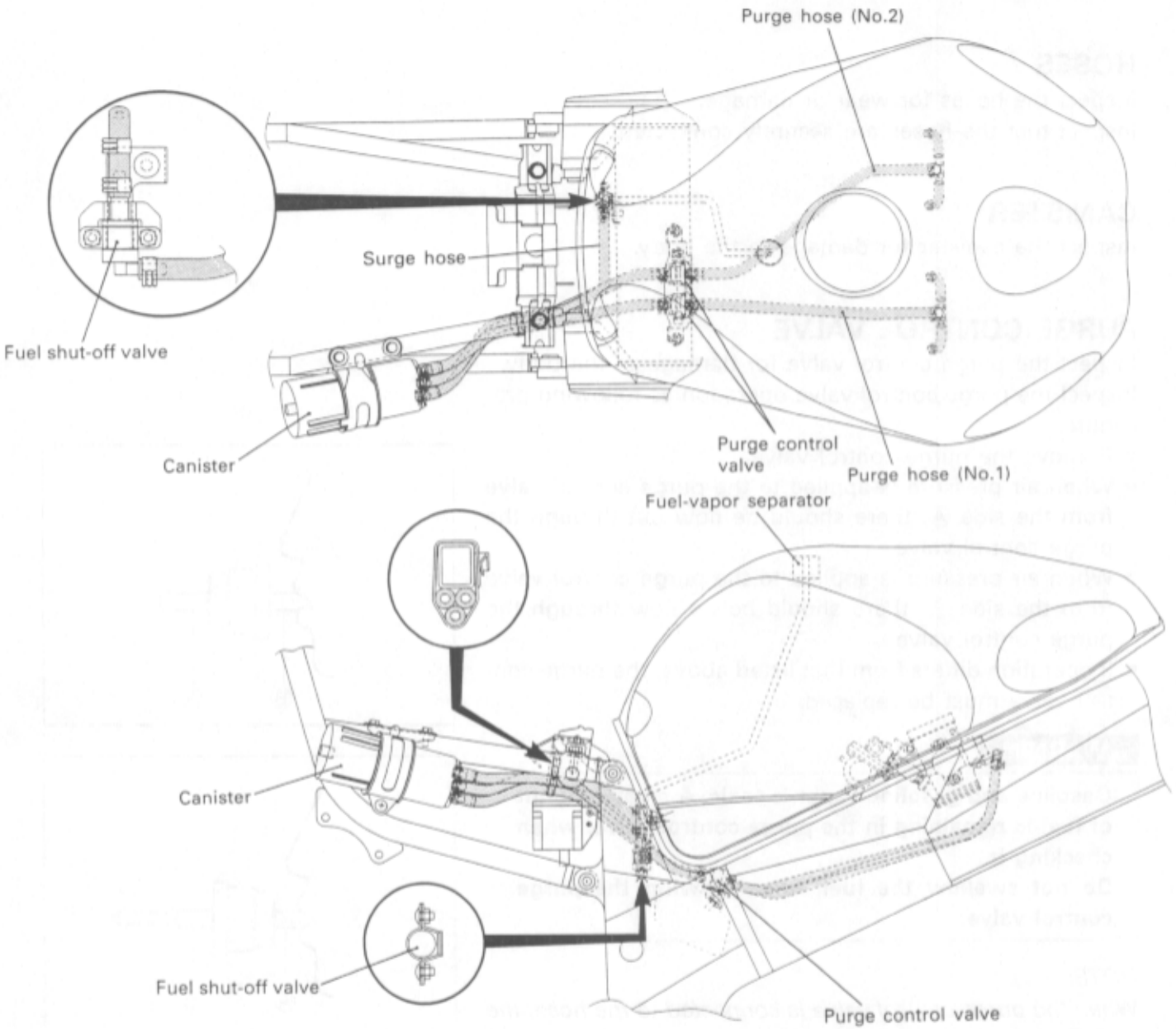
FUEL INJECTION SYSTEM

GSX-R750W motorcycles are equipped with a fuel injection system for emission level control. This fuel injection system is precision designed, manufactured and adjusted to comply with the applicable emission limits.

EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)



CANISTER HOSE ROUTING (California model only)



EVAPORATIVE EMISSION CONTROL SYSTEM INSPECTION (California model only)

- Remove the seats and frame cover.
- Remove the fuel tank. (See p. 11-4-49.)

HOSES

Inspect the hoses for wear or damage.
Inspect that the hoses are securely connected.

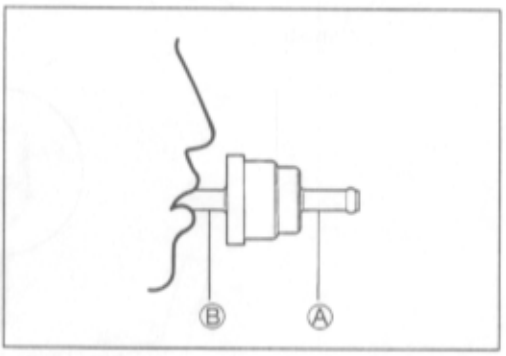
CANISTER

Inspect the canister for damage to the body.

PURGE CONTROL VALVE

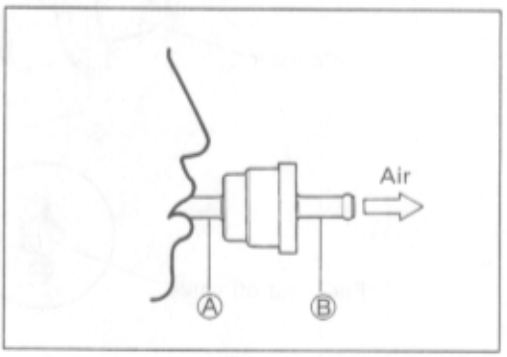
Inspect the purge control valve for damage of the body.
Inspect the purge control valve operation as following procedure.

- Remove the purge control valve.
- When air pressure is applied to the purge control valve from the side Ⓐ, there should be flow out through the purge control valve.
- When air pressure is applied to the purge control valve from the side Ⓑ, there should be no flow through the purge control valve.
- If operation differs from that listed above, the purge control valve must be replaced.



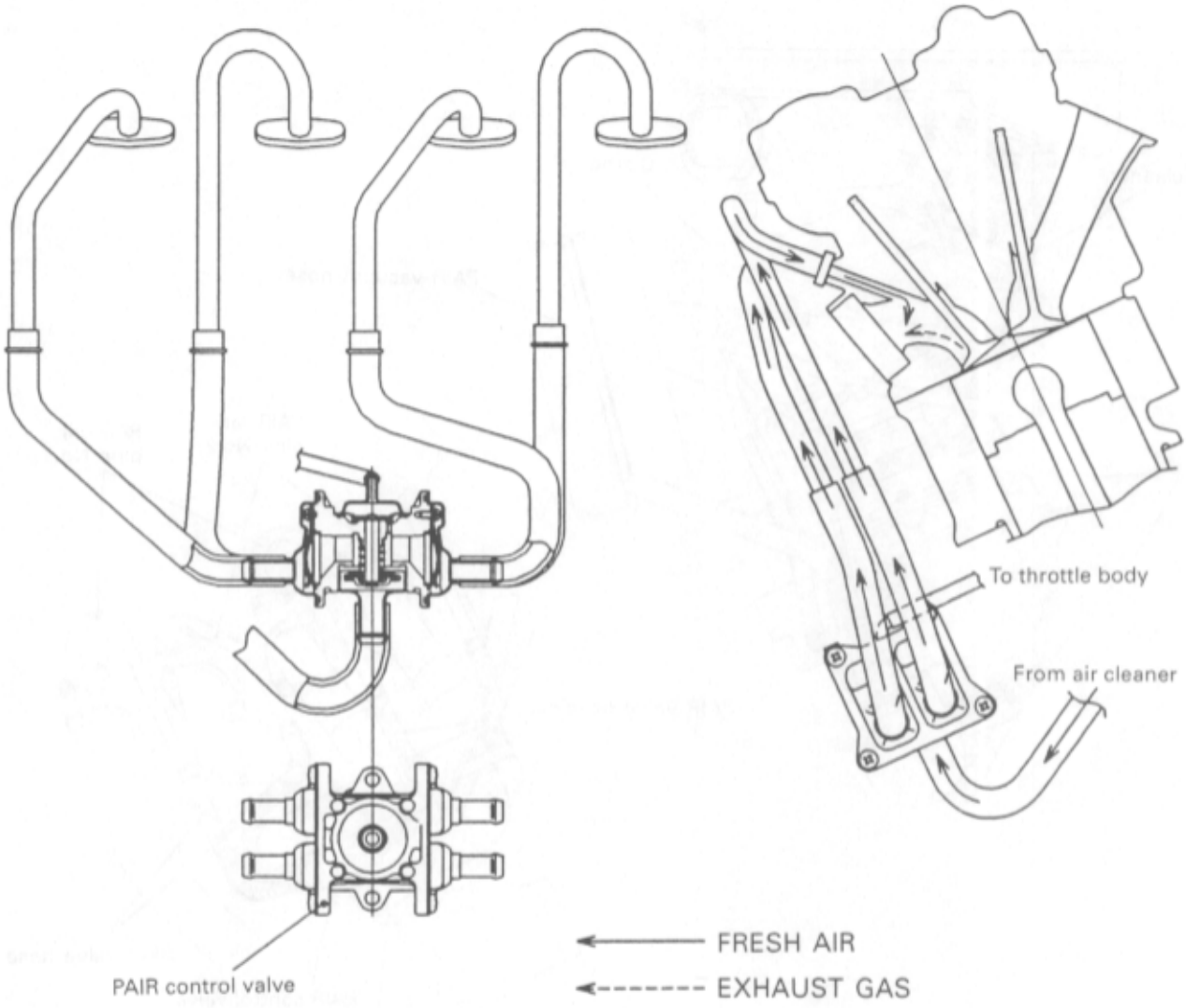
⚠ WARNING

Gasoline and gasoline vapor is toxic. A small amount of fuel is remaining in the purge control valve, when checking it.
Do not swallow the fuel when blowing the purge control valve.

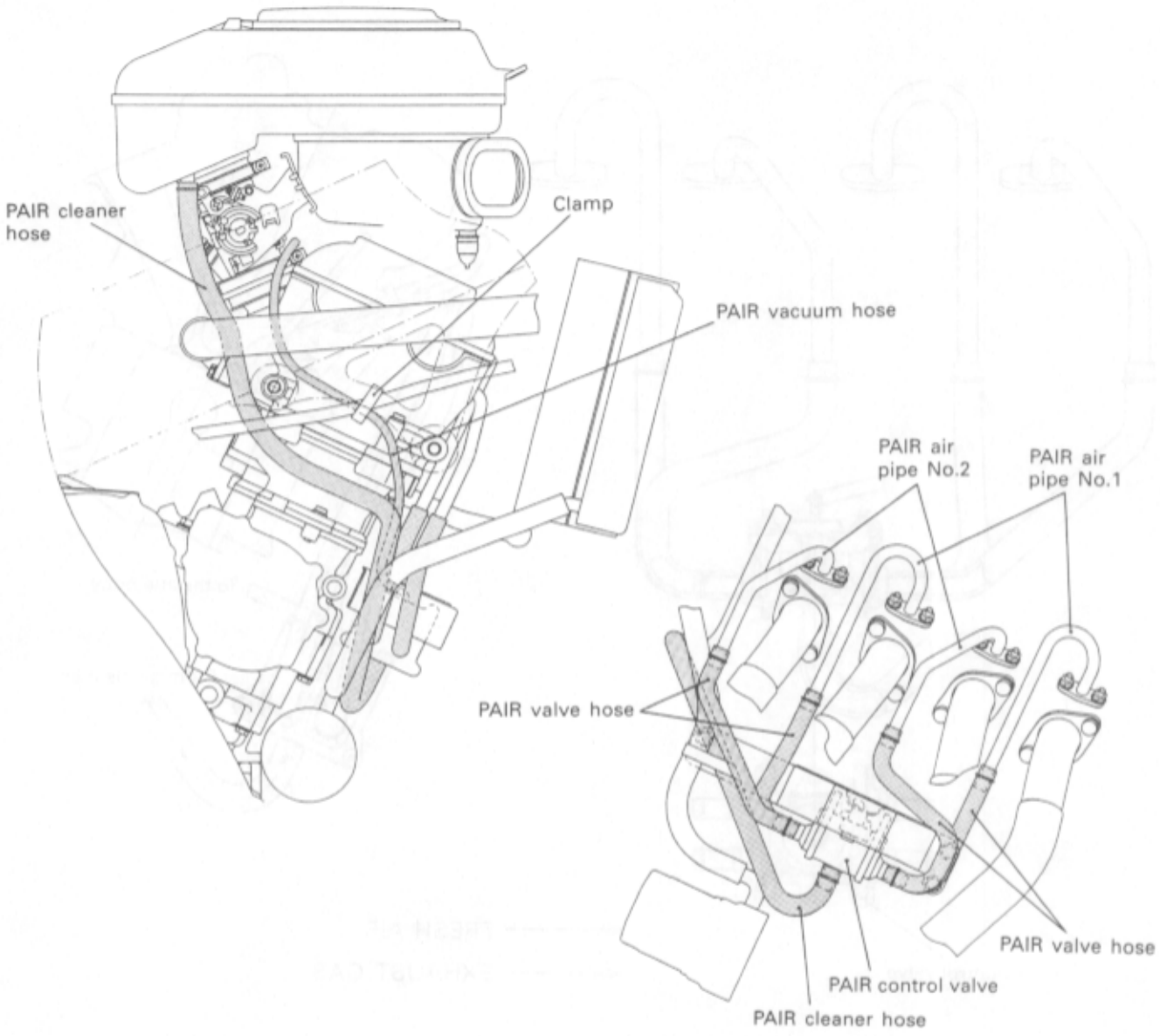


NOTE:
When the purge control valve is connected to the hose, the side Ⓑ should be pointed toward the carburetor side, and the side Ⓐ should be pointed toward the canister side.

PAIR (AIR SUPPLY) SYSTEM DIAGRAM



PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING



PAIR (AIR SUPPLY) SYSTEM INSPECTION

- Remove the frame cover.
- Lift and support the fuel tank. (See p. 11-4-49.)

HOSES AND PIPES

Inspect the hoses and pipes for wear or damage.
Inspect that the hoses and pipes are securely connected.

PAIR CONTROL VALVE

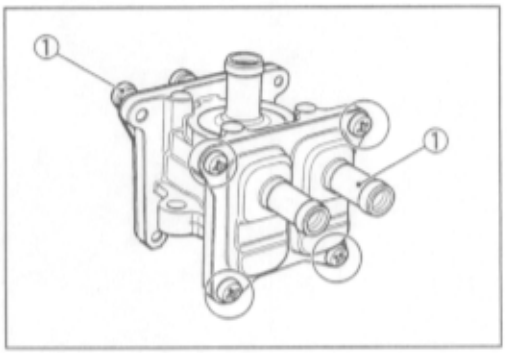
Inspect the PAIR control valve for damage of the body.

PAIR CLEANER

Inspect the PAIR cleaner for damage of the body.

REED VALVE OF PAIR CONTROL VALVE

- Remove the PAIR control valve.
- Remove the both reed valve covers ①.

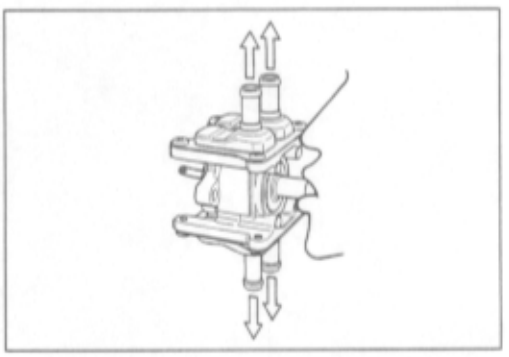


Inspect the reed valves.
If the carbon deposit is found in the reed valve, replace the PAIR control valve with a new one.

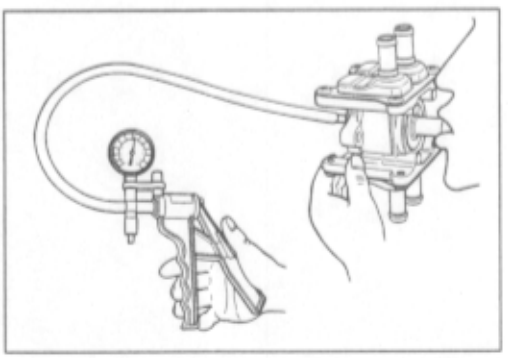
PAIR CONTROL VALVE

- Remove the PAIR control valve.

Blow the air inlet port of the control valve as shown in the illustration. If air does not flow out, replace the control valve with a new one.



Connect the vacuum pump to the vacuum port of the control valve as shown in the illustration. Apply negative pressure slowly to the control valve and blow the above manner. If air does not become flow out within the specification, the control valve is normal condition.
If the control valve does not function within the specification, replace the control valve with a new one.



Negative pressure range: 36–60 kPa (270–450 mmHg)

09917-47910: Vacuum pump gauge

⚠ CAUTION

Use a hand operated vacuum pump to prevent the control valve damage.

FOREWORD

This section describes service data, service specifications and servicing procedures which differ from those of the GSX-R750W ('98-model).

NOTE:
- *Any differences between the GSX-R750W ('98-model) and GSX-R750X ('99-model) in specifications and service data are indicated with an asterisk mark (*).*
- *Please refer to the sections 1 through 11 for details which are not given in this section.*

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SPECIFICATIONS

DIMENSIONS AND DRY MASS

Overall length	2 100 mm (82.7 in)	For E-18,22,24,39 models
	2 065 mm (81.3 in)	For other models
Overall width	720 mm (28.3 in)	
Overall height	1 165 mm (45.9 in)	
Wheelbase	1 395 mm (54.9 in)	
Ground clearance	130 mm (5.1 in)	
Seat height	830 mm (32.7 in)	
Dry mass	180 kg (396 lbs)	For E-18,33,39 models
	179 kg (394 lbs)	For other models

ENGINE

Type	Four-stroke, Liquid-cooled, DOHC, TSCC
Number of cylinders	4
Tappet clearance, IN	0.10–0.20 mm (0.004–0.008 in)
EX	0.20–0.30 mm (0.008–0.012 in)
Bore	72.0 mm (2.834 in)
Stroke	46.0 mm (1.811 in)
Piston displacement	749 cm^3 (45.7 cu. in)
Compression ratio	11.8 : 1
Fuel system	Fuel injection
Air cleaner	Non-woven fabric element
Starter system	Electric starter
Lubrication system	Wet sump

TRANSMISSION

Clutch	Wet multi-plate type
Transmission	6-speed constant mesh
Gearshift pattern	1-down, 5-up
Primary reduction ratio	1.756 (72/41)
Gear ratios, Low	2.625 (42/16)
2nd	1.950 (39/20)
3rd	1.565 (36/23)
4th	1.363 (30/22)
5th	1.227 (27/22)
Top	1.120 (28/25)
Final reduction ratio	2.750 (44/16)
Drive chain	*RK525ROZ2, 108 links

CHASSIS

Front suspension	Inverted telescopic, coil spring, oil damped, spring pre-load fully adjustable, rebound and compression damping force fully adjustable.
Rear suspension	Link type system, gas/oil damped, coil spring, spring pre-load fully adjustable, rebound damping force and compression damping force fully adjustable.
Front fork stroke	120 mm (4.7 in)
Rear wheel travel	133 mm (5.2 in)
Steering angle	30° (right & left)
Caster	24°
Trail	96 mm (3.8 in)
Turning radius	3.1 m (10.2 ft)
Front brake	Disc brake, twin, hydraulically operated
Rear brake	Disc brake, hydraulically operated
Front tire size	120/70 ZR17 (58W), tubeless
Rear tire size	190/50 ZR17 (73W), tubeless

ELECTRICAL

Ignition type	Electronic ignition (CDI)
Ignition timing	4° B.T.D.C. at 1 500 r/min
Spark plug	N.G.K. CR9E, DENSO U27ESR-N
Battery	12V 28.8 kC (8 Ah)/10HR
Generator	Three-phase A.C. Generator
Main fuse	30A
Fuse	15/15/10/15/10A
Headlight	12V 60/55W×2 ..... E-02,03,24,28,33 models 12V 55W+12V 55W ..... For other models
Turn signal light	12V 21W
Front position light	12V 5W ..... Except for E-03,24,28,33 models
Brake light/Taillight	12V 21/5W×2
Speedometer light	12V 1.7W
Tachometer light	12V 1.7W
Neutral indicator light	12V 1.7W
High beam indicator light	12V 1.7W
Turn signal indicator light	12V 1.7W
Fuel indicator light	12V 1.7W

CAPACITIES

Fuel tank, including reserve	18.0 L (4.8/4.0 US/Imp gal)
Engine oil, oil change	2 600 ml (2.7/2.3 US/Imp qt)
with filter change	2 800 ml (3.0/2.5 US/Imp qt)
overhaul	3 500 ml (3.7/3.1 US/Imp qt)
Coolant	2 550 ml (2.7/2.2 US/Imp qt)

These specifications are subject to change without notice.

SERVICE DATA

VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	29 (1.14)	———
	EX.	24 (0.94)	———
Tappet clearance (when cold)	IN.	0.10–0.20 (0.004–0.008)	———
	EX.	0.20–0.30 (0.008–0.012)	———
Valve guide to valve stem clearance	IN.	0.010–0.037 (0.0004–0.0015)	———
	EX.	0.030–0.057 (0.0012–0.0022)	———
Valve stem deflection	IN. & EX.	———	0.35 (0.014)
Valve guide I.D.	IN. & EX.	4.500–4.512 (0.1772–0.1776)	———
Valve stem O.D.	IN.	4.475–4.490 (0.1762–0.1768)	———
	EX.	4.455–4.470 (0.1754–0.1760)	———
Valve stem 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.)	INNER	———	36.80 (1.45)
	OUTER	———	38.60 (1.52)
Valve spring tension (IN. & EX.)	INNER	4.5 kg (9.9 lbs) at length 29.9 mm (1.18 in)	———
	OUTER	18.3 kg (40.34 lbs) at length 33.4 mm (1.31 in)	———

CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.660–36.728 (1.4433–1.4460)	33.36 (1.431)
	EX.	35.280–35.348 (1.3890–1.3917)	34.98 (1.377)
Camshaft journal oil clearance	IN. & EX.	0.032–0.066 (0.0013–0.0026)	0.150 (0.0059)
Camshaft journal holder I.D.	IN. & EX.	24.012–24.025 (0.9454–0.9459)	———
Camshaft journal O.D.	IN. & EX.	23.959–23.980 (0.9433–0.9441)	———

ITEM	STANDARD		LIMIT
Camshaft runout	IN. & EX.	———	0.10 (0.004)
Cam chain pin (at arrow "3")	15th pin		———
Cylinder head cover distortion	———		0.20 (0.008)

CYLINDER + PISTON + PISTON RING

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	1 100–1 500 kPa (11–15 kg/cm², 156–213 psi)		900 kPa (9 kg/cm², 128 psi)
Compression pressure difference	———		200 kPa (2 kg/cm², 28 psi)
Piston to cylinder clearance	0.025–0.035 (0.0010–0.0014)		———
Cylinder bore	72.000–72.015 (2.8346–2.8352)		Nicks or Scratches
Piston diam.	71.970–71.985 (2.8335–2.8340) Measure at 15 mm (0.6 in) from the skirt end.		71.880 (2.8299)
Cylinder distortion	———		0.20 (0.008)
Piston ring free end gap	1st	Approx. 7.2 (0.28)	5.7 (0.22)
	2nd	Approx. 8.5 (0.33)	6.8 (0.27)
Piston ring end gap	1st	0.10–0.25 (0.004–0.010)	0.5 (0.02)
	2nd	0.10–0.25 (0.004–0.010)	0.5 (0.02)
Piston ring to groove clearance	1st	———	0.18 (0.007)
	2nd	———	0.18 (0.007)
Piston ring groove width	1st	1.01–1.03 (0.040–0.041)	———
	2nd	0.81–0.83 (0.032–0.033)	———
	Oil	1.51–1.53 (0.059–0.060)	———
Piston ring thickness	1st	0.97–0.99 (0.038–0.039)	———
	2nd	0.77–0.79 (0.030–0.031)	———
Piston pin bore	16.002–16.008 (0.6210–0.6302)		16.030 (0.6311)
Piston pin O.D.	15.995–16.000 (0.6297–0.6299)		15.980 (0.6291)

CONROD + CRANKSHAFT

Unit: mm (in)

ITEM	STANDARD		LIMIT
Corod small end I.D.	16.010–16.018 (0.6303–0.6306)		16.040 (0.6315)
Conrod big end side clearance	0.10–0.20 (0.004–0.008)		0.30 (0.010)
Conrod big end width	20.95–21.00 (0.825–0.827)		———
Crank pin width	21.10–21.15 (0.831–0.833)		———
Conrod big end oil clearance	0.032–0.056 (0.0013–0.0022)		0.080 (0.0031)
Crank pin O.D.	33.976–34.000 (1.3376–1.3386)		———
Crankshaft journal oil clearance	0.016–0.040 (0.0006–0.0016)		0.080 (0.0031)
Crankshaft journal O.D.	33.976–34.000 (1.3376–1.3386)		———
Crankshaft thrust clearance	0.055–0.110 (0.0022–0.0043)		———
Crankshaft thrust bearing thickness	Right side	2.425–2.450 (0.0955–0.0965)	———
	Left side	2.350–2.500 (0.0925–0.0984)	———
Crankshaft runout	———		0.05 (0.002)

OIL PUMP

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	1.911 (72/41 × 37/34)	———
Oil pressure (at 60°C, 140°F)	Above 200 kPa (2.0 kg/cm^2, 28 psi) Below 500 kPa (5.0 kg/cm^2, 71 psi) at 3 000 r/min.	———

CLUTCH

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch lever play	3–13 (0.12–0.51)	———
Drive plate thickness	2.92–3.08 (0.115–0.121)	2.62 (0.103)
Drive plate claw width	———	13.0 (0.51)
Clutch release screw	¼ turn back	———
Driven plate distortion	———	0.10 (0.004)
Clutch spring free height	———	2.9 (0.11)

THERMOSTAT + RADIATOR + FAN

ITEM		STANDARD	LIMIT
Thermostat valve opening temperature		74.5–78.5°C (166.1–173.3°F)	———
Thermostat valve lift		Over 7 mm (0.28 in) at 90°C (194°F)	———
Radiator cap valve opening pressure		110 kPa (1.1 kg/cm^2, 15.6 psi)	———
Cooling fan thermo-switch operating temperature	OFF→ON	Approx. 105°C (221°F)	———
	ON→OFF	Approx. 100°C (212°F)	———
Engine coolant temperature 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	———
	130°C (226°F)	Approx. 0.088 kΩ	———

TRANSMISSION + DRIVE CHAIN

Unit: mm (in) Except ratio

ITEM		STANDARD	LIMIT
Primary reduction ratio		1.756 (72/41)	———
Final reduction ratio		2.750 (44/16)	———
Gear ratios	Low	2.625 (42/16)	———
	2nd	1.950 (39/20)	———
	3rd	1.565 (36/23)	———
	4th	1.363 (30/22)	———
	5th	1.227 (27/22)	———
	Top	1.120 (28/25)	———
Shift fork to groove clearance		0.1–0.3 (0.004–0.012)	0.50 (0.020)
Shift fork groove width		5.0–5.1 (0.197–0.201)	———
Shift fork thickness		4.8–4.9 (0.189–0.193)	———
Drive chain	Type	RK525ROZ2	———
	Links	108 links, ENDLESS	———
	20-pitch length	———	319.4 (12.6)
Drive chain slack		20–30 (0.8–1.2)	———
Gearshift lever height		55 (2.2)	———

INJECTOR + FUEL PUMP + FUEL PRESSURE REGULATOR

ITEM	SPECIFICATION	NOTE
Injector resistance	11–16 Ω at 20°C (68°F)	
Fuel pump discharge amount	Approx. 1 L (1.1/0.9 US/Imp qt) for 1 minute at 2.9 kg/cm^2 (290 kPa, 41 psi)	
Fuel pressure regulator operating set pressure	Approx. 2.9 kg/cm^2 (290 kPa, 41 psi)	

FI-SENSORS + INTAKE AIR CONTROL VALVE

ITEM		SPECIFICATION		NOTE
CMP sensor resistance		0.9–1.3 kΩ		
CMP sensor peak voltage		More than 0.8V		
CKP sensor resistance		50–200 Ω		
CKP sensor peak voltage		More than 0.5V		
IAP sensor input voltage		4.5–5.5V		
IAP sensor output voltage		Approx. 2.85V at idle speed		
TP sensor input voltage		4.5–5.5V		
TP sensor resistance	(Closed)	Approx. 1.2 kΩ		
	(Opened)	Approx. 4.4 kΩ		
TP sensor output voltage	(Closed)	Approx. 1.1V		
	(Opened)	Approx. 4.2V		
ECT sensor input voltage		4.5–5.5V		
ECT sensor resistance		2.3–2.6 kΩ at 20°C (68°F)		
IAT sensor input voltage		4.5–5.5V		
IAT sensor resistance		2.2–2.7 kΩ at 20°C (68°F)		
AP sensor input voltage		4.5–5.5V		
AP sensor output voltage		Approx. 3.6V at 760 mmHg (100 kPa)		
TO sensor resistance		60–64 kΩ		
TO sensor voltage		Approx. 2.5V		
GP sensor voltage		More than 0.6V (From 1st to Top)		
Injector voltage		Battery voltage		
Ignition coil primary peak voltage		More than 90V (When cranking)		at each ignition coil/plug cap
VCSV resistance		36–44 Ω		
Intake air control valve operating rpm		Opening rpm	Above 5 400 rpm	
		Closing rpm	Below 5 200 rpm	

THROTTLE BODY

ITEM	SPECIFICATION	
	E-18	Others
Air screw STD setting	Approx. ½ turn out	←
Idle r/min	1 200 ± 50 r/min.	1 200 ± 100 r/min.
Throttle cable play	2.0–4.0 mm (0.08–0.16 in)	←

ELECTRICAL

Unit: mm (in)

ITEM			SPECIFICATION	NOTE
Ignition timing			4° B.T.D.C. at 1 500 r/min.	
Firing order			1·2·4·3	
Spark plug		Type	NGK: CR9E DENSO: U27ESR-N	
		Gap	0.7–0.8 (0.028–0.031)	
Spark performance			Over 8 (0.3) at 1 atm.	
Crankshaft position sensor resistance			50–200 Ω	Black–Green
Ignition coil resistance		Primary	0.07–0.11 Ω	⊕ tap – ⊖ tap
		Secondary	4.5–6.9 kΩ	⊖ tap– Plug cap
Crankshaft position sensor peak voltage			More than 0.5V	
Ignition coil primary peak voltage			More than 90V	at each ignition coil/plug cap
Generator coil resistance			0.24–0.36 Ω	Black–Black
Generator Max. output			Approx. 406W at 5 000 r/min.	
Generator no-load voltage (When engine is cold)			More than 70V (AC) at 5 000 r/min.	
Regulated voltage			13.5–15V at 5 000 r/min.	
Starter relay resistance			3–5 Ω	
Battery	Type designation		FTX9-BS	
	Capacity		12V 28.8 kC (8 Ah)/10 HR	
	Standard electrolyte S.G.		1.320 at 20°C (68°F)	
Fuse size	Headlight	HI	15A	
		LO	15A	
	Turn signal		15A	
	Ignition		10A	
	Fuel		10A	
	Main		30A	

WATTAGE

Unit: W

ITEM		SPECIFICATION		
		E-03,24,28,33	E-04,18,21,22,25, 34,37,39,53	E-02
Headlight	HI	60×2	55	60×2
	LO	55×2	55	55×2
Parking or position light			5	←
Brake light/Taillight		21/5×2	←	←
Turn signal light		21	←	←
Tachometer light		1.7	←	←
Speedometer light		1.7	←	←
Turn signal indicator light		1.7	←	←
High beam indicator light		1.7	←	←
Neutral indicator light		1.7	←	←
Fuel indicator light		1.7	←	←

BRAKE + WHEEL

Unit: mm (in)

ITEM		STANDARD		LIMIT
Rear brake pedal height			55 (2.2)	———
Brake disc thickness		Front	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
		Rear	5.0 ± 0.2 (0.197 ± 0.008)	4.5 (0.18)
Brake disc runout (Front & Rear)			———	0.30 (0.012)
Master cylinder bore		Front	15.870–15.913 (0.6248–0.6265)	———
		Rear	12.700–12.743 (0.5000–0.5017)	———
Master cylinder piston diam.		Front	15.827–15.854 (0.6231–0.6242)	———
		Rear	12.657–12.684 (0.4983–0.4994)	———
Brake caliper cylinder bore	Leading	Front	24.000–24.076 (0.9449–0.09479)	———
	Trailing		27.000–27.076 (1.0630–1.0660)	———
		Rear	38.180–38.256 (1.5031–1.5061)	———
Brake caliper piston diam.	Leading	Front	23.925–23.975 (0.9419–0.9439)	———
	Trailing		26.920–26.970 (1.0598–1.0618)	———
		Rear	38.098–38.148 (1.4999–1.5019)	———
Wheel rim runout (Front & Rear)		Axial	———	2.0 (0.08)
		Radial	———	2.0 (0.08)
Wheel axle runout		Front	———	0.25 (0.010)
		Rear	———	0.25 (0.010)
Wheel rim size		Front	J17 × MT 3.50	———
		Rear	J17 × MT 6.00	———
Tire size		Front	120/70 ZR17 (58W)	———
		Rear	190/50 ZR17 (73W)	———
Tire tread depth		Front	———	1.6 (0.06)
		Rear	———	2.0 (0.08)

SUSPENSION

Unit: mm (in)

ITEM	STANDARD		LIMIT
Front fork stroke	120 (4.7)		———
Front fork spring free length	———		250 (9.9)
Front fork oil level	99 (3.9)		———
Front fork spring adjuster	4th groove from top		———
Front fork damping force adjuster	Rebound	At punch mark (about 1-¼ turns out)	———
	Compression	At punch mark (about 1-$^3/_8$ turns out)	———
Rear shock absorber gas pressure (N_2 gas)	1 000 kPa (10 kg/cm^2, 142 psi)		———
Rear shock absorber spring set length	193.9 (7.6)		———
Rear shock absorber damping force adjuster	Rebound	At punch mark (about 1-$^3/_8$ turns out)	———
	Compression	At punch mark (about 1-$^3/_8$ turns out)	———
Rear wheel travel	133 (5.2)		———
Swingarm pivot shaft runout	———		0.3 (0.01)

TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm^2	psi	kPa	kg/cm^2	psi
FRONT	250	2.50	36	250	2.50	36
REAR	250	2.50	36	250	2.50	36

FUEL + OIL + COOLANT

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$) 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-03, 33
	Use only unleaded gasoline of at least 87 pump octane ($\frac{R+M}{2}$ method) or 91 octane or higher rated by the Research Method.		E-28
	Gasoline used should be graded 85–95 octane or higher. An unleaded gasoline is recommended.		The others
Fuel tank including reserve	18.0 L (4.8/4.0 US/Imp gal)		
Engine oil type	SAE 10W/40, API, SF or SG		
Engine oil capacity	Change	2 600 ml (2.7/2.3 US/Imp qt)	
	Filter change	2 800 ml (3.0/2.5 US/Imp qt)	
	Overhaul	3 500 ml (3.7/3.1 US/Imp qt)	
Front fork oil type	Fork oil #10		
Front fork oil capacity (each leg)	490 ml (16.6/17.3 US/Imp oz)		
Brake fluid type	DOT 4		
Engine coolant type	Use an anti-freeze/coolant compatible with aluminum radiator, mixed with distilled water only, at the ratio of 50 : 50.		
Engine coolant including reserve	2 550 ml (2.7/2.2 US/Imp qt)		

TIGHTENING TORQUE

ENGINE

ITEM	N·m	kg-m	lb-ft
Cylinder head cover bolt	14	1.4	10.0
Cylinder head bolt [M: 10]	43	4.3	31.0
Cylinder head bolt [M: 6]	10	1.0	7.0
Cylinder base nut	10	1.0	7.0
Camshaft journal holder bolt	10	1.0	7.0
Top cam chain guide mounting bolt	10	1.0	7.0
Oil hose union bolt [Upper side]	20	2.0	14.5
Oil hose union bolt [Lower side]	25	2.5	18.0
Cam chain tensioner mounting bolt	10	1.0	7.0
Cam chain tension adjuster bolt	10	1.0	7.0
Conrod bearing cap bolt	67	6.7	48.5
Starter clutch bolt	54	5.4	39.0
Crankcase bolt [M: 6]	11	1.1	8.0
[M: 8]	24	2.4	17.5
Crankcase bolt & Crankshaft bolt [M: 9]	32	3.2	23.0
Oil pump mounting bolt	10	1.0	7.0
Oil drain plug	28	2.8	20.0
Oil pan bolt	14	1.4	10.0
Gearshift cam stopper bolt	10	1.0	7.0
Gearshift cam stopper plate bolt	10	1.0	7.0
Gearshift arm stopper bolt	19	1.9	13.5
Clutch sleeve hub nut	150	15.0	108.5
Exhaust pipe bolt	23	2.3	16.5
Muffler mounting bolt	23	2.3	16.5
Engine sprocket nut	120	12.0	87.0
Speedometer sensor rotor bolt	13	1.3	9.5
Engine mounting bolt [L: 45, 55, 185 and 200]	79	7.9	57.0
Engine mounting thrust adjuster	10	1.0	7.0
Engine mounting thrust adjuster lock nut	45	4.5	32.5
Engine mounting pinch bolt [L: 30]	23	2.3	16.5
Generator rotor bolt	120	12.0	87.0
Oil cooler union bolt	*70	*7.0	*50.5
Oil pressure regulator	28	2.8	20.0
Oil pressure switch	14	1.4	10.0
Oil gallery plug [M: 16]	40	4.0	29.0
[M: 14]	28	2.8	20.0
Starter clutch cover cap	11	1.1	8.0
Valve timing inspection cap	23	2.3	16.5
Cooling fan thermo-switch	18	1.8	13.0
Engine coolant temperature sensor	18	1.8	13.0

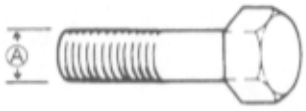
CHASSIS

ITEM	N·m	kg-m	lb-ft
Steering stem head nut	90	9.0	65.0
Steering stem lock nut	80	8.0	58.0
Front fork upper clamp bolt	23	2.3	16.5
Front fork lower clamp bolt	23	2.3	16.5
Front fork cap bolt	35	3.5	25.5
Front axle	100	10.0	72.5
Front axle pinch bolt	23	2.3	16.5
Handlebar set bolt	10	1.0	7.0
Handlebar clamp bolt	23	2.3	16.5
Front brake master cylinder mounting bolt	10	1.0	7.0
Front brake caliper mounting bolt	39	3.9	28.0
Front brake caliper housing bolt	23	2.3	16.5
Brake hose union bolt (Front & Rear)	23	2.3	16.5
Caliper air bleeder valve (Front & Rear)	8	0.8	6.0
Brake disc bolt (Front)	23	2.3	16.5
Brake disc bolt (Rear)	35	3.5	25.5
Rear brake caliper mounting bolt	26	2.6	19.0
Rear brake caliper housing bolt	33	3.3	24.0
Rear brake master cylinder mounting bolt	10	1.0	7.0
Rear brake master cylinder rod lock nut	18	1.8	13.0
Front footrest bracket mounting bolt	39	3.9	28.0
Swingarm pivot nut	100	10.0	72.5
Swingarm pivot lock nut	90	9.0	65.0
Torque link bolt and nut (Front)	28	2.8	20.0
Torque link bolt and nut (Rear)	35	3.5	25.5
Rear suspension height adjuster nut	85	8.5	61.5
Rear shock absorber mounting bolt/nut (Upper & Lower)	50	5.0	36.0
Rear cushion lever/rod mounting nut	78	7.8	56.5
Rear axle nut	100	10.0	72.5
Rear sprocket nut	60	6.0	43.5

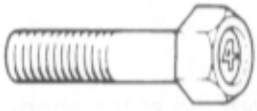
TIGHTENING TORQUE CHART

For other bolts and nuts listed previously, refer to this chart:

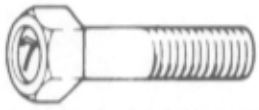
Bolt Diameter Ⓐ (mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
4	1.5	0.15	1.0	2	0.2	1.5
5	3	0.3	2.0	5	0.5	3.5
6	6	0.6	4.5	10	1.0	7.0
8	13	1.3	9.5	23	2.3	16.5
10	29	2.9	21.0	50	5.0	36.0
12	45	4.5	32.5	85	8.5	61.5
14	65	6.5	47.0	135	13.5	97.5
16	105	10.5	76.0	210	21.0	152.0
18	160	16.0	115.5	240	24.0	173.5



Conventional bolt



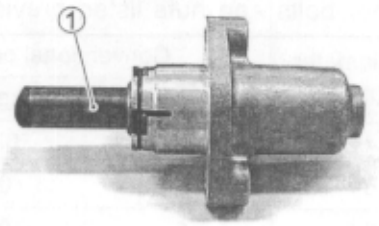
"4" marked bolt



"7" marked bolt

CAM CHAIN TENSION ADJUSTER

The cam chain tension adjuster has been changed. Before installing the cam chain tension adjuster, shorten the push rod ① and hold it using the new special tool.

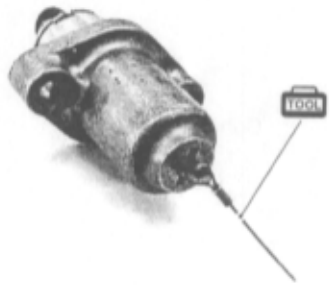


- Remove the cam chain tension adjuster bolt.
- Insert the ⊖ screwdriver into the slot and turn it clockwise to shorten the push rod ①.

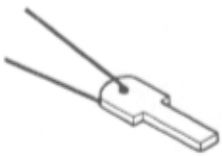


- Insert the new special tool to hold the push rod at the shortened position.

TOOL **09917-62430: Cam chain tension adjuster locking tool**



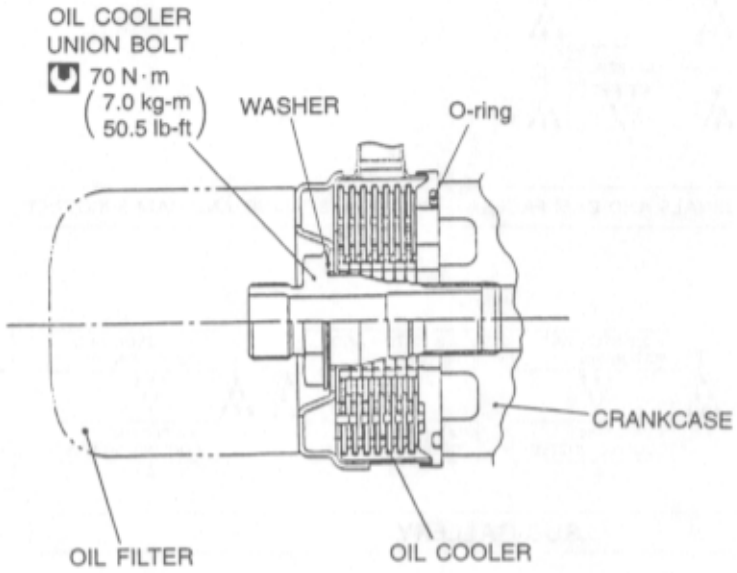
SPECIAL TOOL

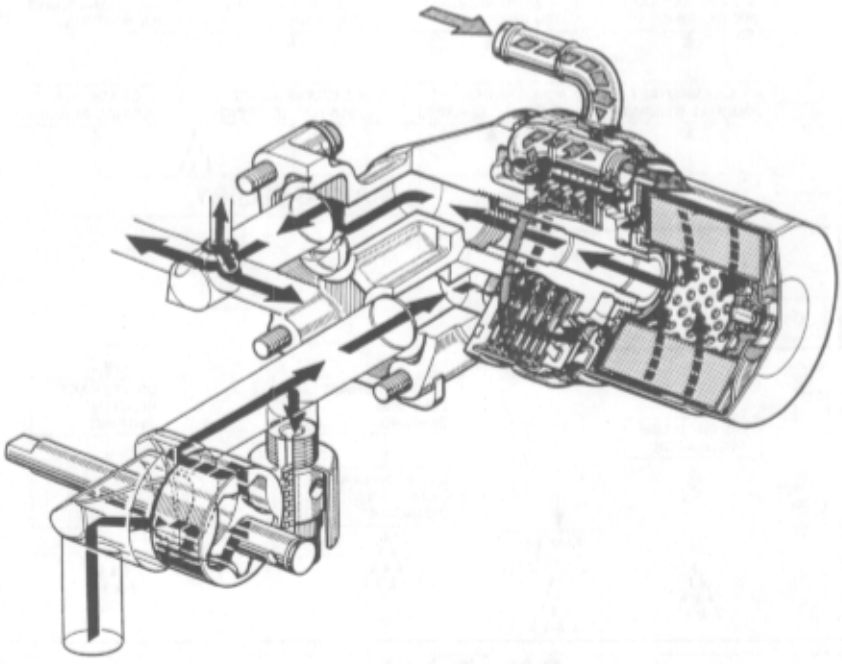


09917-62430
Cam chain tension adjuster locking tool

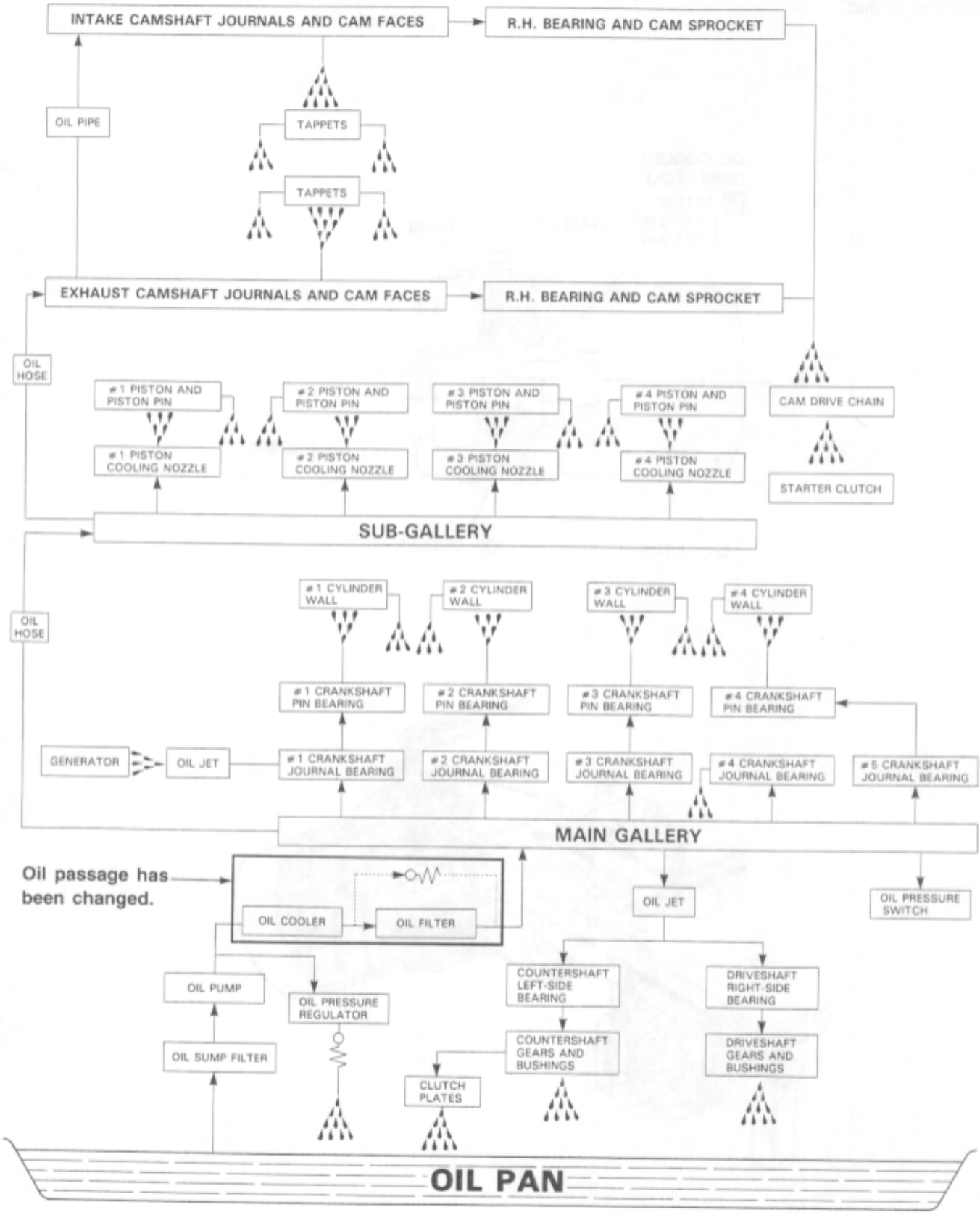
ENGINE OIL COOLING SYSTEM

The oil cooler has been changed as follows. When installing the oil cooler, tighten its union bolt to the specified torque.

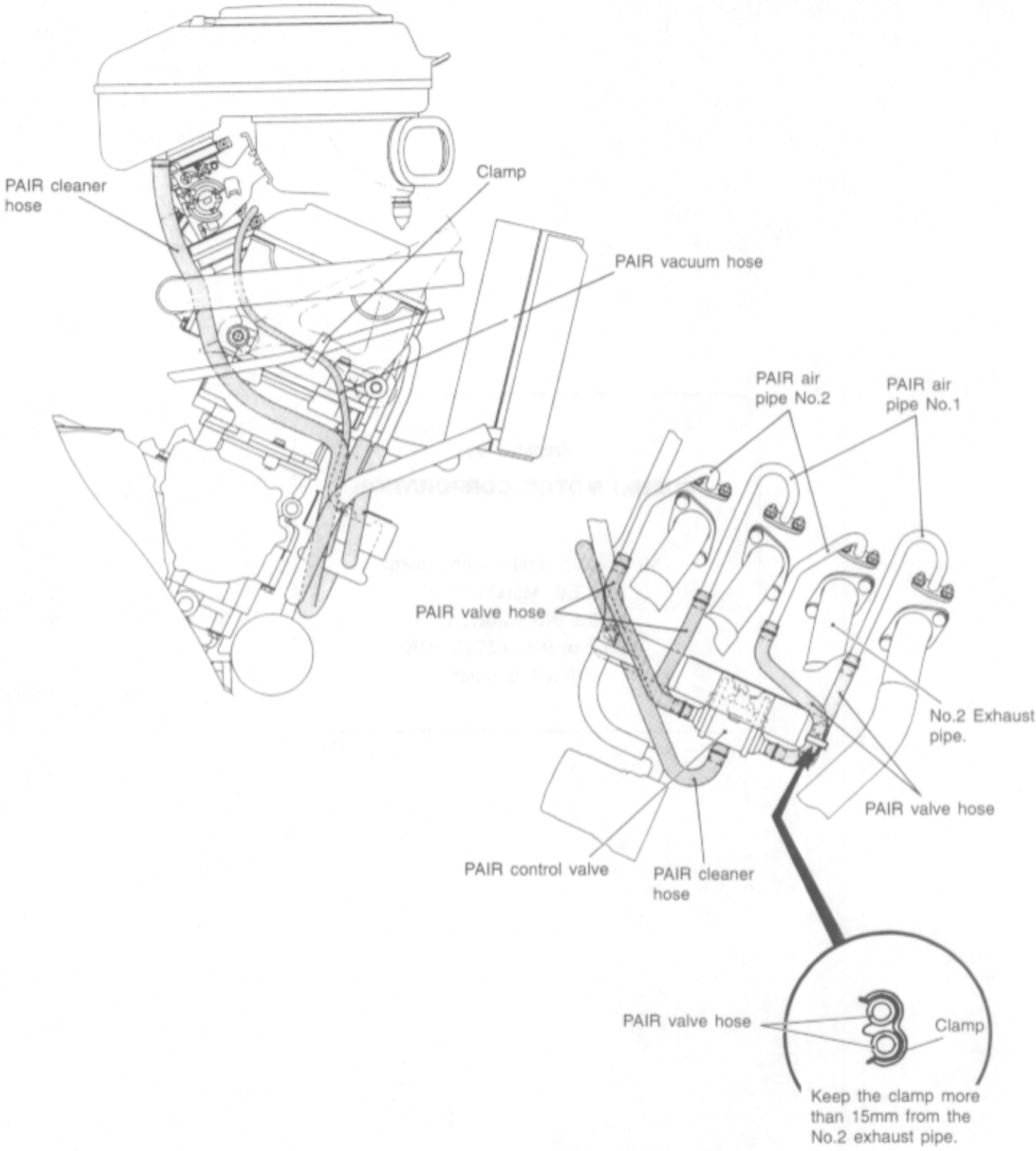




ENGINE LUBRICATION SYSTEM CHART



PAIR (AIR SUPPLY) SYSTEM HOSE ROUTING (FOR E-03, -18, -28, -33 AND -39 MODELS)



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