

## **FOREWORD**

*The SUZUKI LS650 was designed to offer superior performance through lightweight design, four stroke-power (TSCC engine), engine counter balancer and electrical controlled automatic de-compression system.*

*This service manual has been produced primarily for experienced mechanics whose job is to inspect, adjust, repair and service Suzuki Motorcycles. Apprentice mechanics and do-it-yourself mechanics will also find this manual to be an extremely useful repair guide. This manual contains up-to-date information at the time of publication. The rights are reserved to update or make corrections to this manual at any time.*

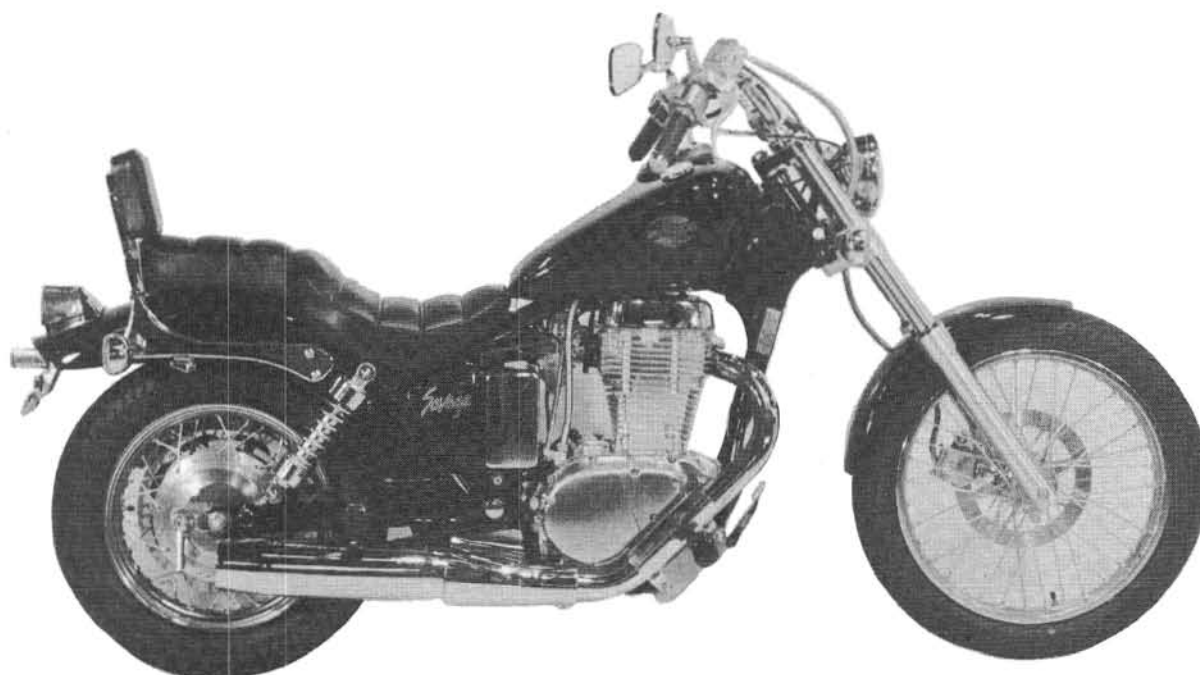
## **IMPORTANT**

*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.*

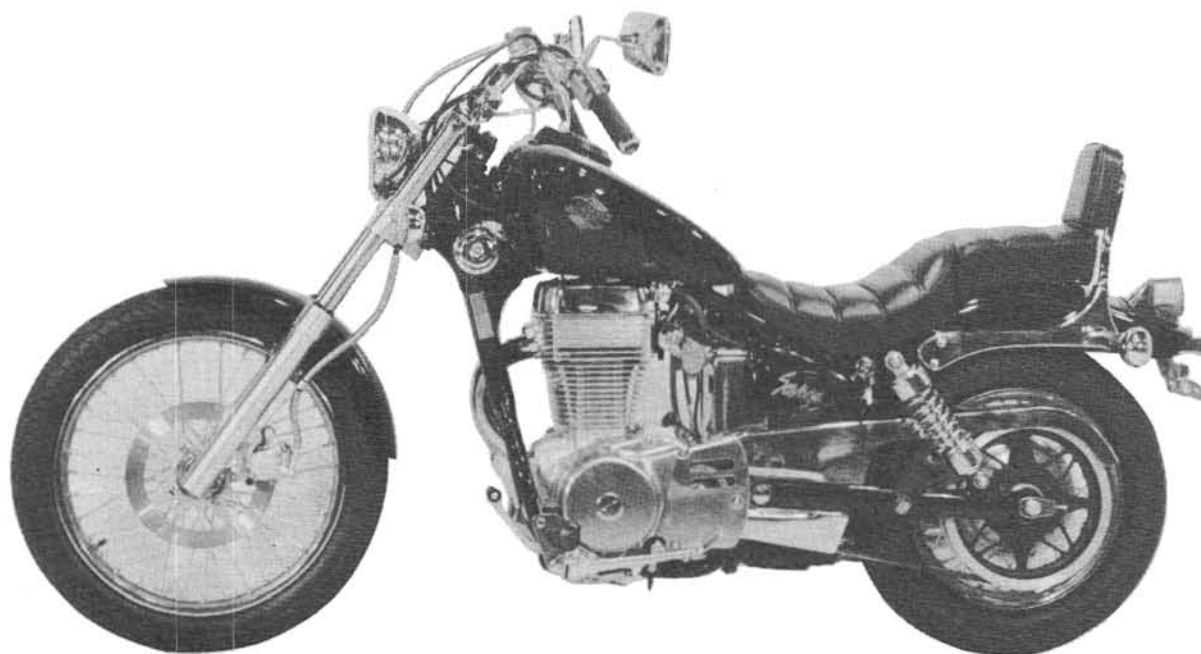
*This manual includes specific information required to properly inspect and service the LS650 in accordance with all EPA regulations. It is strongly recommended that the chapter on Emission Control, Periodic Servicing and Carburetion be thoroughly reviewed before any type of service work is performed.*

*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.*

## VIEW OF LS650



RIGHT SIDE



LEFT SIDE



## ***GROUP INDEX***

<b><i>GENERAL INFORMATION</i></b>	<b><i>1</i></b>
<b><i>PERIODIC MAINTENANCE AND TUNE-UP PROCEDURES</i></b>	<b><i>2</i></b>
<b><i>ENGINE</i></b>	<b><i>3</i></b>
<b><i>FUEL AND LUBRICATION SYSTEM</i></b>	<b><i>4</i></b>
<b><i>EMISSION CONTROL INFORMATION</i></b>	<b><i>5</i></b>
<b><i>ELECTRICAL SYSTEM</i></b>	<b><i>6</i></b>
<b><i>CHASSIS</i></b>	<b><i>7</i></b>
<b><i>SERVICING INFORMATION</i></b>	<b><i>8</i></b>



## SUPPLEMENTS

<b><i>LS650H ('87 MODEL)</i></b>	<b>9</b>
<b><i>LS650J ('88 MODEL)</i></b>	<b>10</b>
<b><i>LS650S ('95 MODEL)</i></b>	<b>11</b>
<b><i>LS650T ('96 MODEL)</i></b>	<b>12</b>
<b><i>LS650V/W/X/Y/K1/K2/K3 ('97/'98/'99/'00/'01/'02/'03 MODELS)</i></b>	<b>13</b>
<b><i>LS650K4 ('04 MODEL)</i></b>	<b>14</b>
<b><i>LS650K5 ('05 MODEL)</i></b>	<b>15</b>
<b><i>LS650K6 ('06 MODEL)</i></b>	<b>16</b>
<b><i>LS650K7 ('07 MODEL)</i></b>	<b>17</b>
<b><i>LS650K8 ('08 MODEL)</i></b>	<b>18</b>
<b><i>LS650K9 ('09 MODEL)</i></b>	<b>19</b>

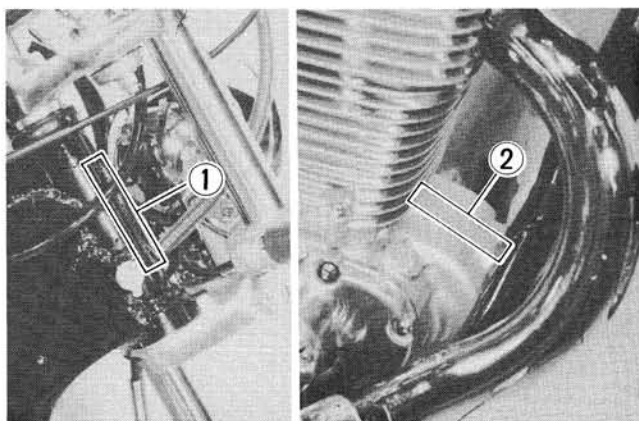


## CONTENTS

<b>SERIAL NUMBER LOCATIONS</b> .....	<b>1- 1</b>
<b>FUEL AND OIL RECOMMENDATIONS</b> .....	<b>1- 1</b>
<b>BREAKING-IN PROCEDURES</b> .....	<b>1- 1</b>
<b>SPECIAL MATERIALS</b> .....	<b>1- 2</b>
<b>PRECAUTIONS AND GENERAL INSTRUCTIONS</b> .....	<b>1- 4</b>
<b>SPECIFICATIONS</b> .....	<b>1- 5</b>

## SERIAL NUMBER LOCATIONS

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



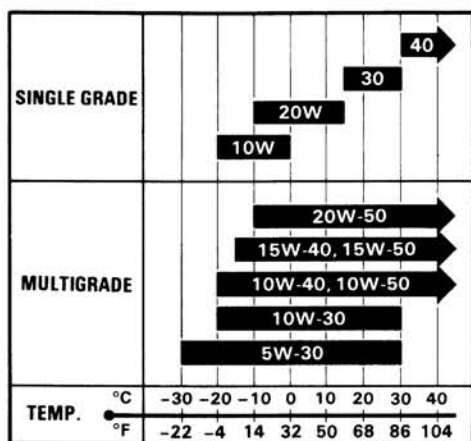
## FUEL AND OIL RECOMMENDATIONS

### FUEL

Use only unleaded or low-lead type gasoline of at least 85 – 95 pump octane ( $\frac{R+M}{2}$  method) or 89 octane or higher rated by the Research method.

### ENGINE OIL

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



### FRONT FORK OIL

Use fork oil # 15.

### BRAKE FLUID

Specification and classification:

DOT 3 or 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 the previous servicing and stored for a long period.

## BREAKING-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.

1. Keep to this break-in throttle position.



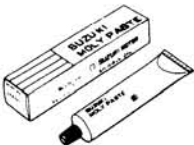


Up to 1 600 km  
(1 000 miles)

Below 4/5 throttle





2. After the engine has been operated for 1 600 km (1 000 miles) the motorcycle can be subjected to full throttle operation for short periods of time.

## SPECIAL MATERIALS

The materials listed below are needed for maintenance work on the LS650, and should be kept on hand for ready use. They supplement such standard materials as cleaning fluids, lubricants, emery cloth and the like. How to use them and where to use them are described in the text of this manual.

Material	Part	Page	Part	Page
 SUZUKI SUPER GREASE "A" 99000-25030	<ul style="list-style-type: none"> <li>• Clutch pushrod</li> <li>• Oil seals</li> <li>• Throttle grip</li> <li>• Brake pedal shaft</li> <li>• Gearshift lever and shaft</li> <li>• Speedometer cable and dust seal</li> <li>• Starter motor housing end</li> </ul>	3-38 3-45 3-49     6-11	<ul style="list-style-type: none"> <li>• Wheel bearings</li> <li>• Steering stem bearings</li> <li>• Pulley drum bearing</li> <li>• Brake cam and pin</li> <li>• Swingarm dust seals, spacers and bearings</li> </ul>	7-4, 28 7-21 7-28 7-28 7-31
 SUZUKI SILICONE GREASE 99000-25100	<ul style="list-style-type: none"> <li>• Caliper axle</li> </ul>	7-8		
 SUZUKI MOLY PASTE 99000-25140	<ul style="list-style-type: none"> <li>• Valve stems</li> <li>• De-comp. camshaft</li> <li>• Countershaft and drive-shaft</li> <li>• Piston pin</li> <li>• Camshaft journals</li> <li>• Rocker arm shafts</li> <li>• De-comp. shaft</li> </ul>	3-28 3-37 3-41  3-52 3-55		
 SUZUKI BOND No. 1207B 99104-31140	<ul style="list-style-type: none"> <li>• Mating surfaces of left and right halves of crankcase</li> <li>• Generator lead wire grommet</li> </ul>	3-47		
 THREAD LOCK SUPER "1303" 99000-32030	<ul style="list-style-type: none"> <li>• Oil pump screw</li> <li>• Starter clutch Allen bolt</li> <li>• Crankcase bearing retainer screws</li> <li>• Gearshift arm stopper</li> <li>• Generator rotor bolt</li> <li>• Cam sprocket bolts</li> </ul>	3-37 3-37 3-44  3-49 3-50 3-54		

## 1-3 GENERAL INFORMATION

Material	Part	Page	Part	Page
 <p>THREAD LOCK "1342" 99000-32050</p>	<ul style="list-style-type: none"> <li>• Engine mounting bracket bolt</li> <li>• Generator stator set screws</li> <li>• Engine oil pump mounting screws</li> <li>• Gearshift cam stopper bolt</li> <li>• Gearshift cam guide/pawl lifter screws and nuts</li> <li>• Counter balancer bolt</li> </ul>	<p>3-8</p> <p>3-36</p> <p>3-47</p> <p>3-48</p> <p>3-48</p> <p>3-50</p>	<ul style="list-style-type: none"> <li>• Throttle valve screw</li> <li>• Throttle cable holder screw</li> <li>• Starter motor housing screws</li> <li>• Front fork damper rod bolt</li> <li>• Handlebar holder bolt and nut</li> </ul>	<p>4-7</p> <p>4-7</p> <p>6-11</p> <p>7-15</p> <p>7-22</p>
 <p>THREAD LOCK SUPER "1360" 99000-32130</p>	<ul style="list-style-type: none"> <li>• Disc mounting bolts</li> </ul>	<p>7-4</p>		
 <p>SUZUKI Bond No. 1216 99104-31160</p>	<ul style="list-style-type: none"> <li>• Cylinder head cover</li> </ul>	<p>2-4</p> <p>3-55</p>		
 <p>THREAD LOCK SUPER "1333B" 99000-32020</p>	<ul style="list-style-type: none"> <li>• Muffler support stay bolt</li> </ul>	<p>3-7</p>		



## PRECAUTIONS AND GENERAL INSTRUCTIONS

Observe the following items without fail when servicing, disassembling and reassembling motorcycles.

- Do not run engine indoors with little or no ventilation.
- Be sure to replace packings, gaskets, circlips, O-rings and cotter pins with new ones.

### CAUTION:

**Never reuse a circlip after a circlip has been removed from a shaft, it should be discarded and 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.**

- Tighten cylinder head and case bolts and nuts beginning with larger diameter and ending with smaller diameter, and from inside to out-side diagonally, to the specified tightening torque.
- Use special tools where specified.
- Use genuine parts and recommended oils.
- When 2 or more persons work together, pay attention to the safety of each other.
- After the reassembly, check parts for tightness and operation.
- Treat gasoline, which is extremely flammable and highly explosive, with greatest care. Never use gasoline as cleaning solvent.

Warning, Caution and Note are included in this manual occasionally, describing the following contents.

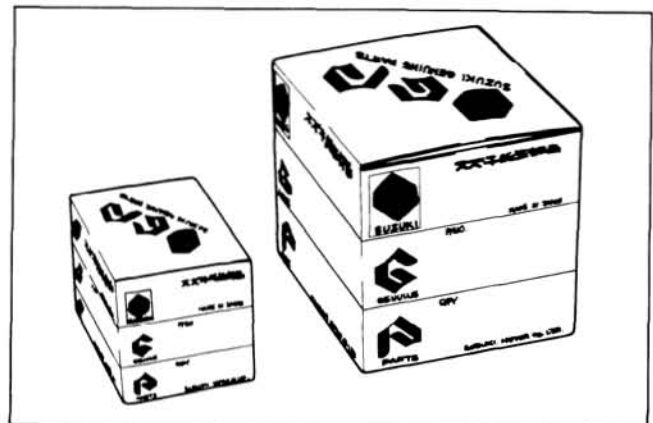
**WARNING** .....When personal safety of the rider is involved, disregard of the information could result in injury.

**CAUTION** .....For the protection of the motorcycle, the instruction or rule must be strictly adhered to.

**NOTE** .....Advice calculated to facilitate the use of the motorcycle is given under this heading.

## USE OF GENUINE SUZUKI PARTS

To replace any part of the machine, use a genuine SUZUKI replacement part. Imitation parts or parts supplied from any other source than SUZUKI, if used to replace SUZUKI parts can reduce the machine's performance and, even worse, could induce costly mechanical troubles.



## SPECIFICATIONS

### DIMENSIONS AND DRY MASS

Overall length	2180 mm (85.8 in)
Overall width	685 mm (27.0 in) . . . . F 760 mm (29.9 in) . . . . P
Overall height	1090 mm (42.9 in) . . . . F 1130 mm (44.5 in) . . . . P
Wheelbase	1485 mm (58.5 in)
Ground clearance	130 mm (5.1 in)
Dry mass	159 kg (351 lbs) . . . . F 160 kg (353 lbs) . For CA 160 kg (353 lbs) . . . . P 161 kg (355 lbs) . For CA

### ENGINE

Type	Four-stroke, air-cooled, OHC, TSCC
Number of cylinders	1
Bore	94.0 mm (3.70 in)
Stroke	94.0 mm (3.70 in)
Piston displacement	652 cm <sup>3</sup> (39.8 cu. in)
Compression ratio	8.5 : 1
Carburetor	MIKUNI BS40SS, Single
Air cleaner	Polyester fiber element
Starter system	Electric
Lubrication system	Wet sump

### TRANSMISSION

Clutch	Wet multi-plate type
Transmission	4-speed constant mesh
Gearshift pattern	1-down, 3-up
Primary reduction	1.888 (68/36)
Final reduction	2.956 (68/23)
Gear ratios, Low	2.214 (31/14)
2nd	1.500 (27/18)
3rd	1.095 (23/21)
Top	0.875 (21/24)
Final drive	Belt drive

### CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swinging arm, oil damped, spring pre-load 5-way adjustable
Steering angle	42° (right & left)
Caster	55°
Trail	147 mm (5.8 in)
Turning radius	2.6 m (8.5 ft)
Front brake	Disc brake, hydraulically operated
Rear brake	Internal expanding
Front tire size	100/90-19 57H
Rear tire size	140/80-15 67H
Front fork stroke	140 mm (5.5 in)
Rear wheel travel	80 mm (3.1 in)

### ELECTRICAL

Ignition type	Transistorized
Ignition timing	5° B.T.D.C. below 2000 r/min and 30° B.T.D.C. above 4000 r/min
Spark plug	N.G.K.: DP8EA-9 N.D.: X24EP-U9
Battery	12V 50.4 kC (14 Ah)/ 10HR
Generator	Three phase A.C. Generator
Fuse	20A

### CAPACITIES

Fuel tank including reserve	9.5 L (2.51 US gal)
reserve	2.5 L (2.6 US qt)
Engine oil (without filter change)	1800 ml (1.9 US qt)
Front fork oil	441 ml (14.91 US oz)

These specifications are subject to change without notice.

# PERIODIC MAINTENANCE AND TUNE-UP PROCEDURES

2

## CONTENTS

<b>PERIODIC MAINTENANCE SCHEDULE .....</b>	<b>2- 1</b>
<b>PERIODIC MAINTENANCE CHART .....</b>	<b>2- 1</b>
<b>OILING POINTS .....</b>	<b>2- 2</b>
<b>MAINTENANCE AND TUNE-UP PROCEDURES .....</b>	<b>2- 3</b>
<b>BATTERY .....</b>	<b>2- 3</b>
<b>CYLINDER HEAD NUTS, EXHAUST PIPE BOLTS     AND MUFFLER CONNECTIONS .....</b>	<b>2- 4</b>
<b>AIR CLEANER ELEMENT .....</b>	<b>2- 5</b>
<b>AUTOMATIC DE-COMPRESSION CABLE .....</b>	<b>2- 6</b>
<b>VALVE CLEARANCE .....</b>	<b>2- 6</b>
<b>SPARK PLUG .....</b>	<b>2- 8</b>
<b>FUEL LINE .....</b>	<b>2- 9</b>
<b>ENGINE OIL AND OIL FILTER .....</b>	<b>2- 9</b>
<b>CARBURETOR .....</b>	<b>2-10</b>
<b>CLUTCH .....</b>	<b>2-11</b>
<b>DRIVE BELT .....</b>	<b>2-11</b>
<b>BRAKES .....</b>	<b>2-12</b>
<b>TIRES .....</b>	<b>2-15</b>
<b>STEERING .....</b>	<b>2-16</b>
<b>FRONT FORK .....</b>	<b>2-17</b>
<b>REAR SUSPENSION .....</b>	<b>2-17</b>
<b>CHASSIS BOLTS AND NUTS .....</b>	<b>2-18</b>

## 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.

**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.

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

### PERIODIC MAINTENANCE CHART

INTERVAL: THIS INTERVAL SHOULD BE JUDGED BY ODOMETER READING OR MONTHS WHICHEVER COMES FIRST	km	1 000	6 000	12 000	18 000	24 000
	mile	600	4 000	7 500	11 000	15 000
	months	2	12	24	36	48
Battery (Specific gravity of electrolyte)		—	I	I	I	I
Cylinder head nuts and exhaust pipe bolts & muffler connections		T	T	T	T	T
Air cleaner		Clean every 2 000 miles (3 000 km) and Replace every 7 500 miles (12 000 km)				
Automatic de-compression cable		I	I	I	I	I
Valve clearance		I	I	I	I	I
Spark plug		—	I	R	I	R
Fuel line		I	I	I	I	I
Vapor hose (California model only) & Fuel line		Replace every four years				
Engine oil and oil filter		R	R	R	R	R
Engine idle rpm		I	I	I	I	I
Clutch		I	I	I	I	I
Drive belt		Inspect every 2 000 miles (3 000 km)				
Brake hoses		I	I	I	I	I
		Replace every four years				
Brake fluid		I	I	I	I	I
		Change every two years				
Brakes		I	I	I	I	I
Tires		I	I	I	I	I
Steering		I	I	I	I	I
Front fork		I	—	I	—	I
Rear suspension		I	—	I	—	I
Chassis bolts and nuts		T	T	T	T	T

NOTE: I = Inspect, T = Tighten, R = Replace

## OILING POINTS

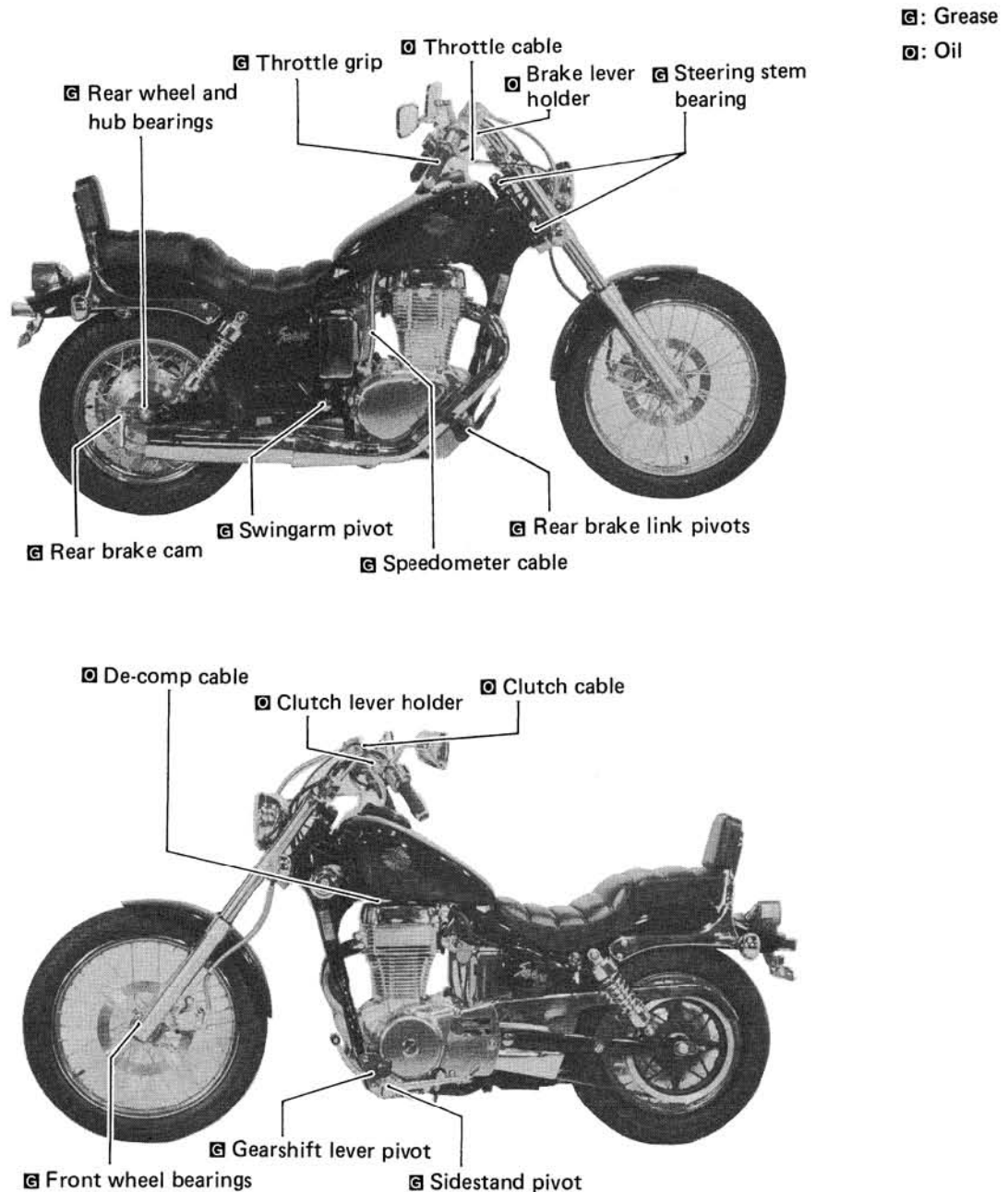
Proper lubrication is important for smooth operation and long life of each working part. Major oiling points are indicated below.

### NOTE:

Before lubricating each part, clean off any rusty spots and wipe off any grease, oil, dirt or grime.

### WARNING:

Be careful not to apply too much grease to the brake cam shaft. If grease gets on the linings, brake slippage will result.



## MAINTENANCE AND TUNE-UP PROCEDURES

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

### BATTERY

4 000, 7 500, 11 000, 15 000 mi  
6 000, 12 000, 18 000, 24 000 km

- Unlock the tool holder cover and remove the battery cover.
- Remove the battery  $\ominus$  and  $\oplus$  lead wires.
- Check electrolyte for level and specific gravity. Add distilled water, as necessary to keep the surface of the electrolyte above the MIN. level line but not above the MAX. level line.
- For checking specific gravity, use a hydrometer to determine the charged condition.

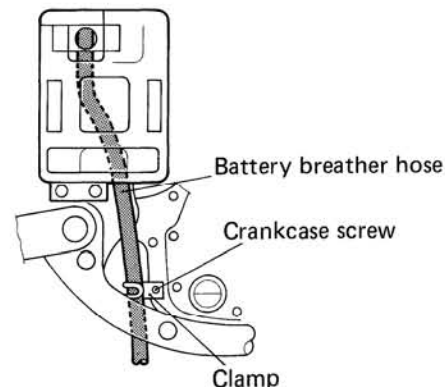
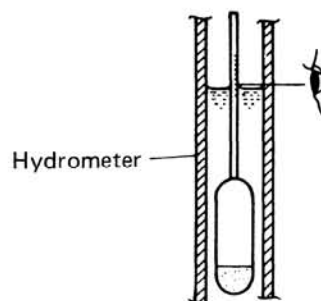
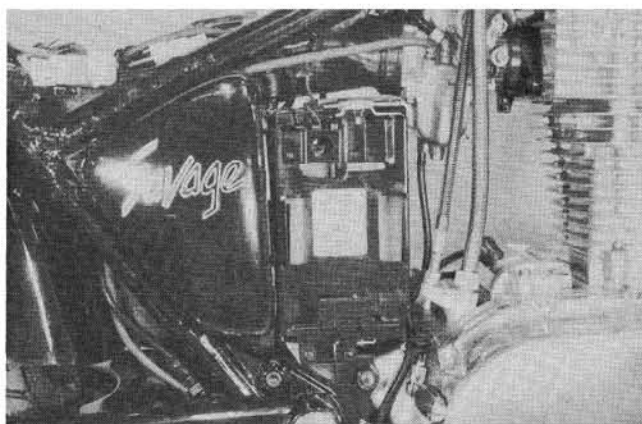
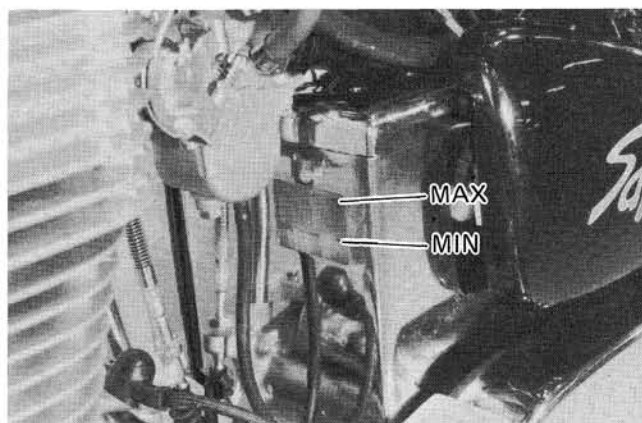
09900-28403	Hydrometer
Standard specific gravity	1.28 at 20°C (68°F)

An S.G. reading of 1.22 (at 20°C) or under means that the battery needs recharging. Remove the battery from the motorcycle and charge it with a battery charger.

#### CAUTION:

- \* When removing the battery from the motorcycle, be sure to disconnect the  $\ominus$  lead wire first.
- \* Never charge a battery while still in the motorcycle as damage may result to the battery or regulator/rectifier.
- \* Be careful not to bend, obstruct, or change the routing of the breather pipe from the battery, make certain that the breather pipe is attached to the battery vent fitting and that the opposite end is always open.
- \* When installing the battery lead wires, fix the  $\oplus$  lead first and  $\ominus$  lead last.

- Make sure that the breather pipe is tightly secured and undamaged, and is routed as shown in the figure.





## CYLINDER HEAD NUTS, EXHAUST PIPE BOLTS AND MUFFLER CONNECTIONS

600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km

### CYLINDER HEAD

- Remove the seat and fuel tank. (Refer to page 3-3.)
- Remove the cylinder head side covers and cylinder head cover. (Refer to page 3-11.)
- Disconnect the automatic de-compression cable. (Refer to page 3-5.)
- Apply engine oil to the four 9 mm nuts and retighten the four 9 mm ① and two 8 mm ② nuts to the specified torque with a torque wrench sequentially in diagonally with the engine cold.
- Fit the plug to the position (A) to prevent oil leakage.

Tightening torque	9 mm Diam. ①	29 – 33 N·m ( 2.9 – 3.3 kg-m ) ( 21.0 – 24.0 lb-ft )
	8 mm Diam. ②	23 – 27 N·m ( 2.3 – 2.7 kg-m ) ( 16.5 – 19.5 lb-ft )

- After firmly tightening the six nuts, tighten the two 6 mm nuts (indicated as ③) to the torque value below:

Tightening torque ③	8 – 12 N·m ( 0.8 – 1.2 kg-m ) ( 6.0 – 8.5 lb-ft )
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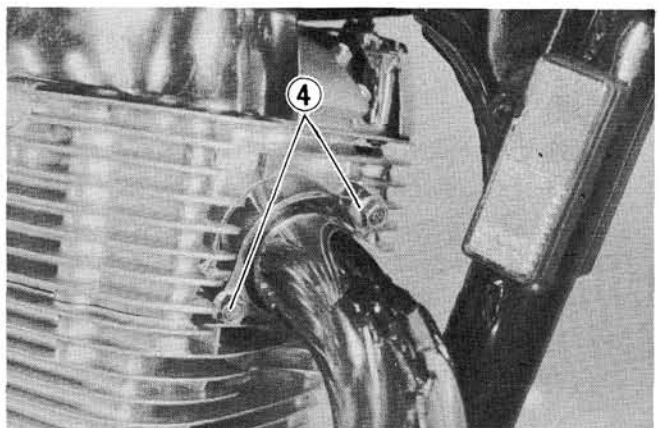
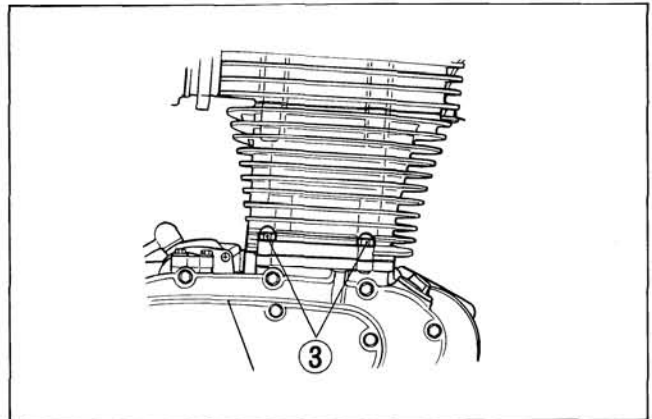
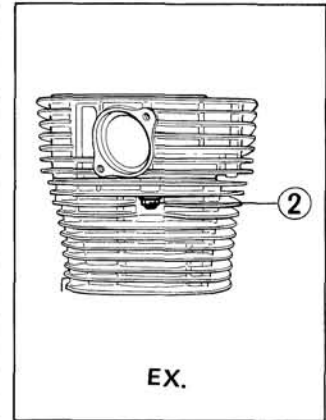
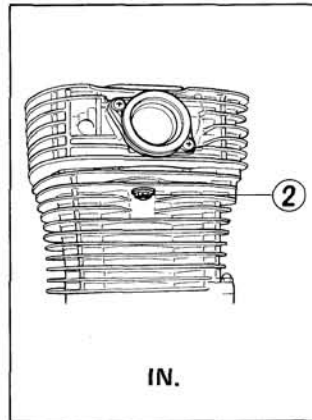
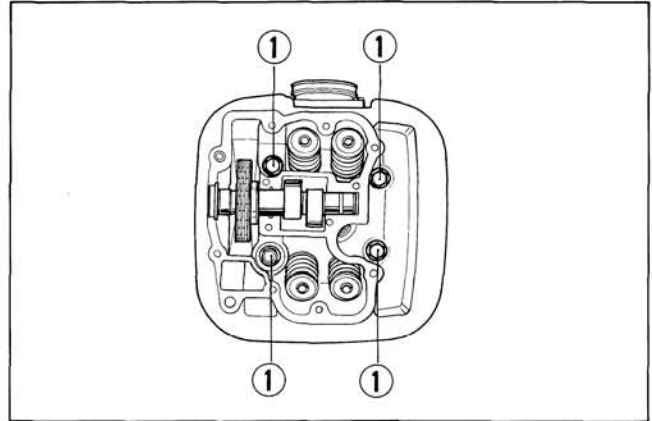
- When installing the cylinder head cover, apply SUZUKI Bond No. 1216 to the mating surface. (Refer to page 3-55.)

### EXHAUST PIPE AND MUFFLER

- Tighten the exhaust pipe bolts, muffler connection bolt and muffler mounting nuts to the specified torque with a torque wrench.

#### Tightening torque

Exhaust pipe bolt ④	18 – 28 N·m ( 1.8 – 2.8 kg-m ) ( 13.0 – 20.0 lb-ft )
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Muffler connection and  
muffler mounting nuts

⑤

18 – 28 N·m  
( 1.8 – 2.8 kg-m )  
13.0 – 20.0 lb-ft

### AIR CLEANER ELEMENT

Clean Every 2 000 mi (3 000 km)

Replace Every 7 500 mi (12 000 km)

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

Check and clean the element in the following manner.

- Remove the right frame cover. (Refer to page 3-3.)
- Remove the air cleaner case cover by loosening screw ①.
- Remove the screw ② and take off the air cleaner element.
- Carefully use an air to blow the dust from carburetor side of the cleaner element.

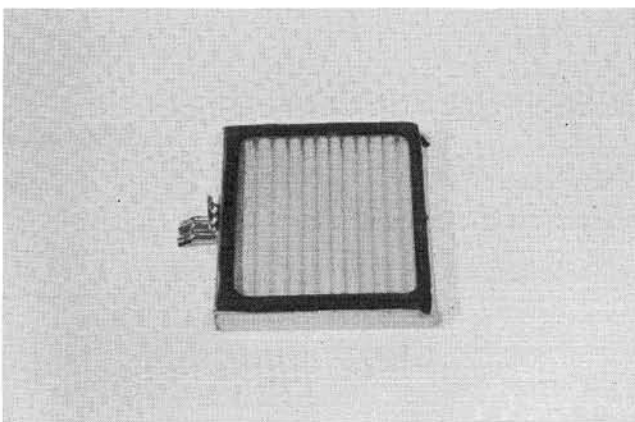
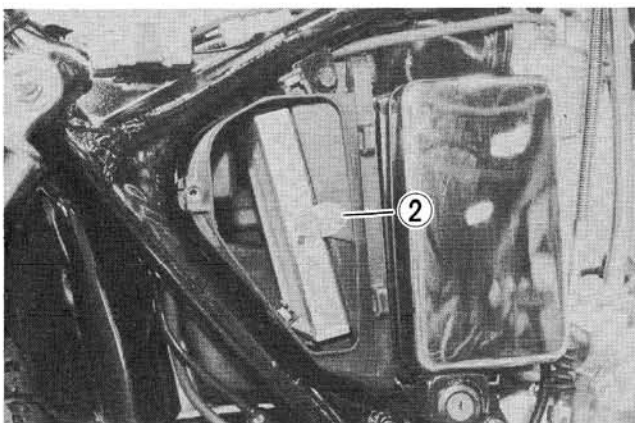
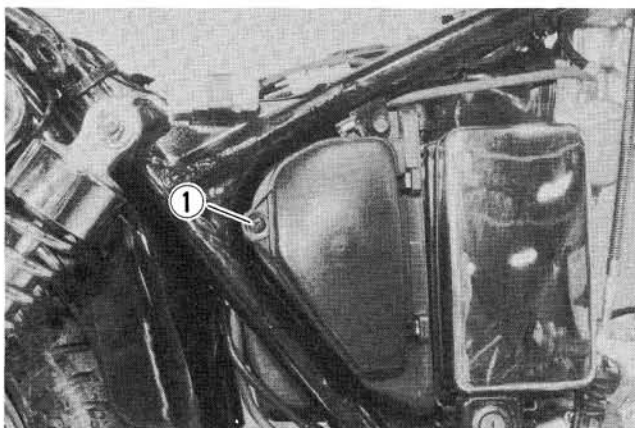
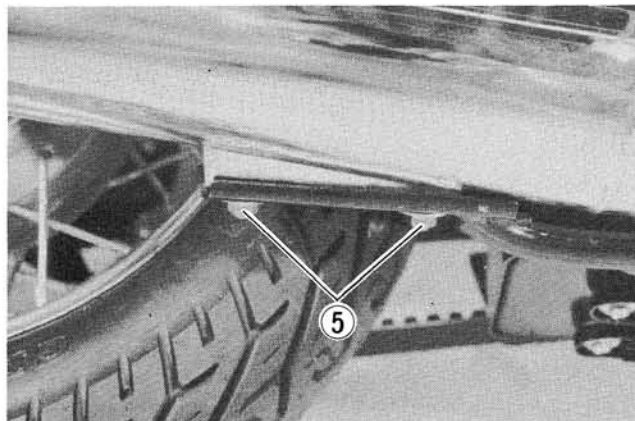
#### CAUTION:

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

- Reinstall the cleaned or new cleaner element in the reverse order of removal.
- When installing the air cleaner element in the cleaner case, make sure that the polyurethane seal touches cleaner case properly.

#### CAUTION:

If driving under dusty conditions, clean the air cleaner element more frequently. The surest way to accelerate engine wear is to run 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!





## AUTOMATIC DE-COMPRESSION CABLE

600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km

Incorrect adjustment of the cable free play may result in starting difficulties or engine damage. Check the cable free play and if necessary, adjust as follows:

- Remove the seat and fuel tank.
- Remove the spark plug and valve timing inspection plug.
- Turn the crankshaft counterclockwise with the box wrench to set the piston at T.D.C. on the compression stroke. (Refer to page 2-7.)
- Pull the actuator body and check the end length <sup>Ⓐ</sup> of the shaft.
- Loosen both lock nuts <sup>①</sup> on the cable adjuster.
- Locate the adjuster <sup>②</sup> to provide the specified play.
- Tighten the both lock nuts <sup>①</sup>.

When the de-compression cable play is properly adjusted, the actuator shaft should draw 3 – 5 mm <sup>Ⓐ</sup> from the body with the piston at T.D.C. on the compression stroke.

De-compression cable play <sup>Ⓐ</sup>	3 – 5 mm (0.12 – 0.20 in)
--	---------------------------

## VALVE CLEARANCE

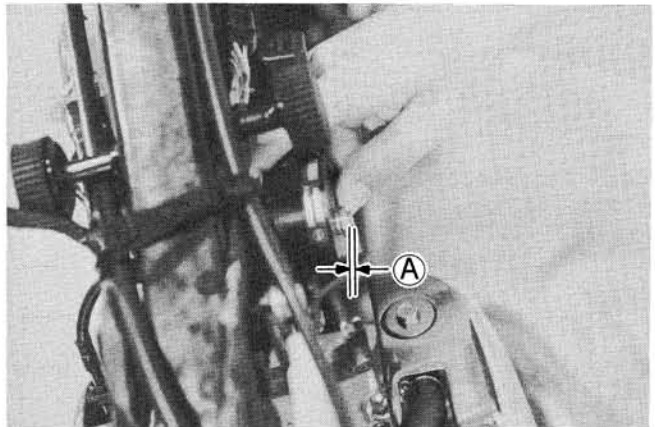
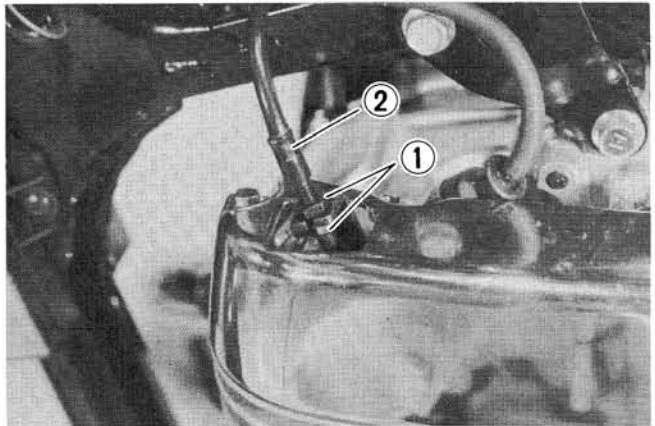
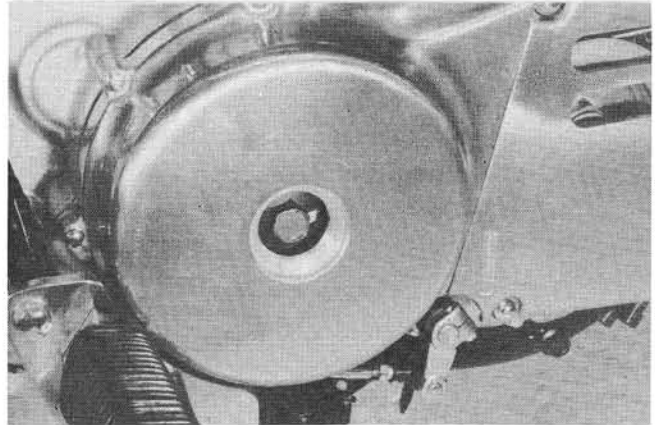
600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km

Excessive valve clearance results in valve noise and insufficient valve clearance results in valve damage and reduced power. At the distances indicated above, check and adjust the clearance to the specification.

The procedure for adjusting the valve clearance is as follows:

### CAUTION:

Before adjusting the valve clearance, check or adjust the automatic de-compression cable play.



### NOTE:

Valve clearance is to be checked when the engine is cold.

Both the intake and exhaust valves must be checked and adjusted when the piston is at Top—Dead—Center (TDC) on the compression stroke.

- Remove the seat and fuel tank. (Refer to page 3-3)
- Remove the spark plug and valve inspection caps, intake and exhaust. (Refer to page 3-11.)
- Remove the valve timing inspection plug ①.
- Turn the crankshaft counterclockwise with the box wrench to set the piston at T.D.C. on the compression stroke. (Turn the crankshaft until the "engraved" line A on the left end of the generator rotor is aligned with the notch B of hole on the generator cover.)
- Insert the thickness gauge into the clearance between the valve stem end and the adjusting screw on the rocker arm.

09900-20803

Thickness gauge

- If clearance is off the specification, bring it into the specified range by using the screw driver.

### Valve clearance specifications

IN. and EX.

0.08 – 0.13 mm  
(0.003 – 0.005 in)

- Securely tighten the lock nut after adjustment is completed.

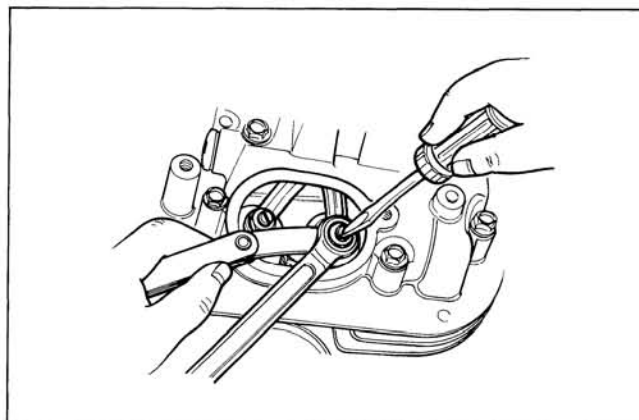
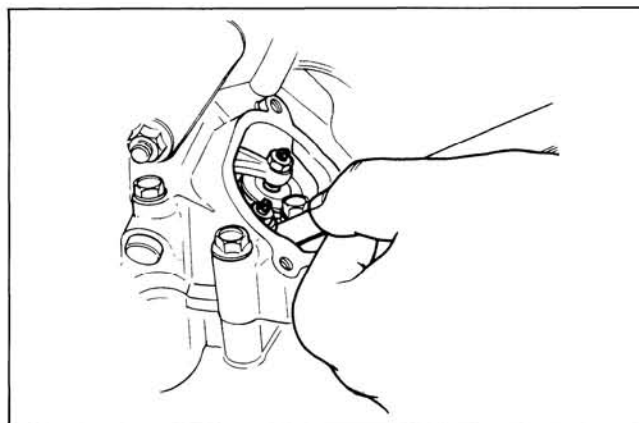
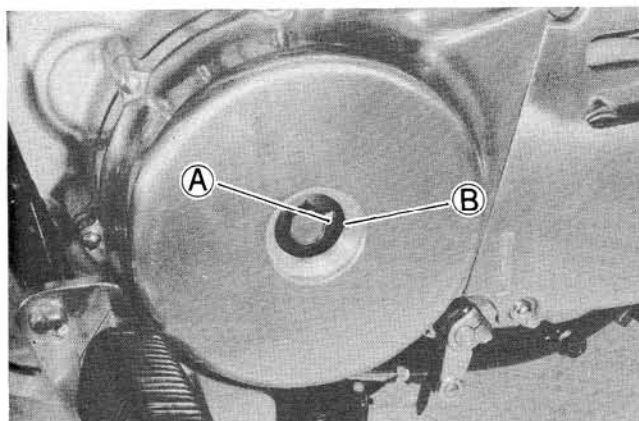
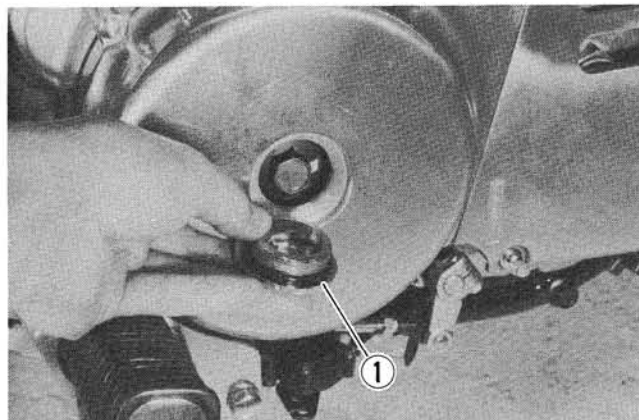
### CAUTION:

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

### NOTE:

Make sure to re-check the automatic decompression cable play, after valve clearance adjustment is made.

- Reinstall the spark plug, valve inspection caps and generator cover cap.



## SPARK PLUG

**Inspect Every 4 000 miles (6 000 km) and  
Replace Every 7 500 miles (12 000 km)**

The plug gap is adjusted to 0.8 – 0.9 mm (0.031 – 0.035 in). The gap is correctly adjusted using a thickness gauge. When carbon is deposited on the spark plug, remove the carbon with a tool with a pointed end. If electrodes are extremely worn or burnt, replace the plug. Also replace the plug if it has a broken insulator, damaged thread, etc.

NGK DP8EA-9 or NIPPON DENSO X24EP-U9 listed in the table should be used as the standard plug. However, the heat range of the plug should be selected to meet the requirements of speed, actual load, fuel, etc. If the plug needs to be replaced, it is recommended that the standard plug listed in the table be selected. Remove the plug and inspect the insulator. Proper heat range would be indicated if insulator was light brown in color.

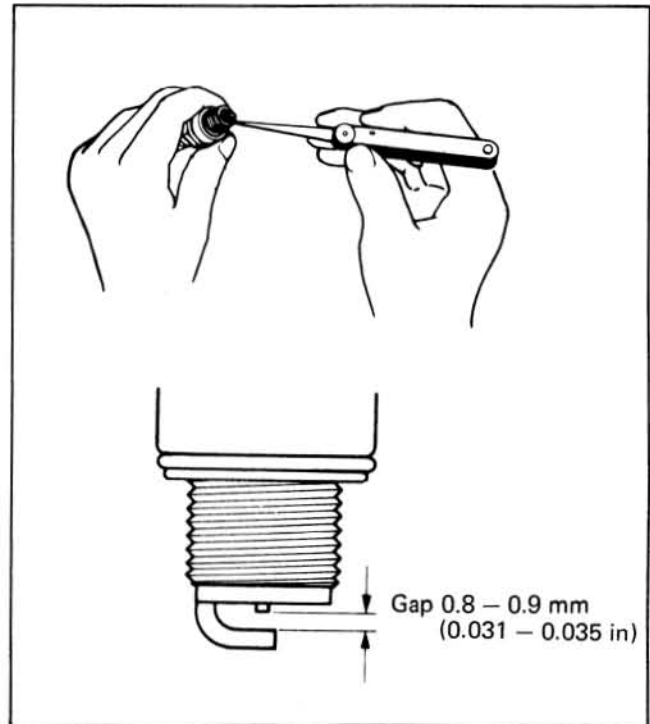
If it is blackened by carbon, it should be replaced by a hot type NGK DP7EA-9 or NIPPON DENSO X22EP-U9.

### NOTE:

To check the spark plug, first make sure that the fuel tank contains unleaded gasoline, and after a test ride if the plug is either sooty with carbon or burnt white, replace it.

### NOTE:

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.

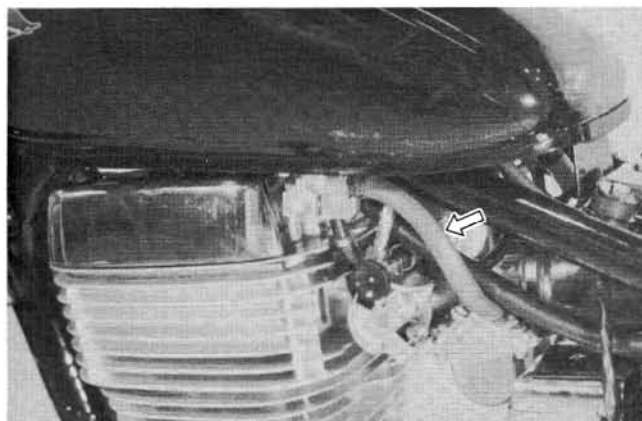


NGK	NIPPON DENSO	REMARKS
DP7EA-9	X22EP-U9	If the standard plug is apt to get wet, replace it with this hot type plug.
DP8EA-9	X24EP-U9	Standard

## FUEL LINE VAPOR HOSE (ONLY FOR CA MODEL)

600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km  
Replace Every 4 years

Inspect the fuel line for damage and fuel leakage. If any defects are found, the fuel line must be replaced. Replace fuel hose and vapor hose every four years.



## ENGINE OIL AND OIL FILTER

600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km

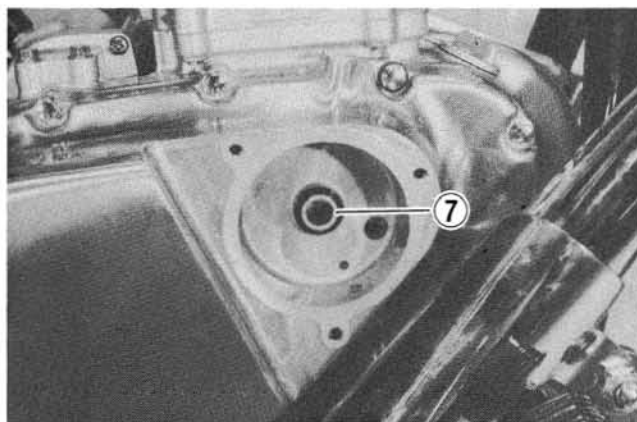
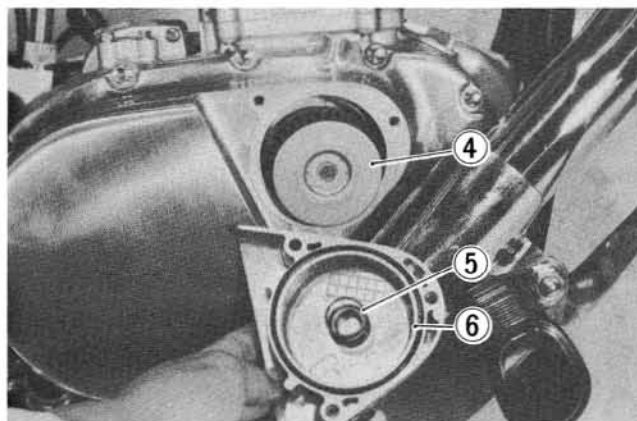
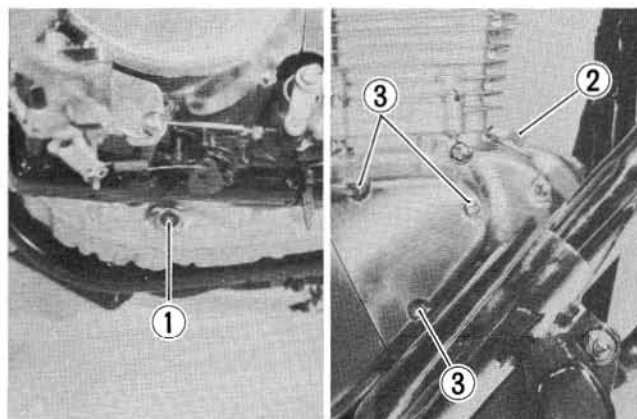
The oil should be changed while the engine is hot. Oil filter replacement at the above intervals should be done together with engine oil change.

- Keep the motorcycle upright, supported by jack.
- Place an oil pan below the engine and remove the engine oil drain plug ① and oil filler cap ② to drain engine oil.
- Remove the oil filter cap by removing the three bolts ③.
- Pull out the old filter ④ and install a new one.
- Replace the filter cap and tighten the nuts ③ securely.

### NOTE:

Before installing the oil filter and filter cap, check to be sure that the spring ⑤ and new O-rings (⑥ and ⑦) are installed correctly.

- Tighten the oil drain plug ① securely, and add fresh oil through the oil filler. The engine will hold about 2 400 ml (2.5 US qt.) of oil. Use an API classification of SE or SF oil with SAE 10W/40 viscosity when replacing the oil filter.
- 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 ⑧. If the level is below mark "F", add oil to that level.

### NECESSARY AMOUNT OF ENGINE OIL

Oil change	1 800 ml (1.9 US qt)
Filter change	2 400 ml (2.5 US qt)
Overhaul engine	2 400 ml (2.5 US qt)

### CARBURETOR

600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km

### IDLE RPM (Idling adjustment)

#### NOTE:

Make this adjustment when the engine is hot.

- Connect a tachometer.
- Start up the engine and set its speed at anywhere between 1 000 and 1 200 r/min by turning throttle stop screw ①.
- After this adjustment, recheck the idling speed and adjust to between 1 000 and 1 200 r/min with throttle stop screw if necessary.

### THROTTLE CABLE PLAY

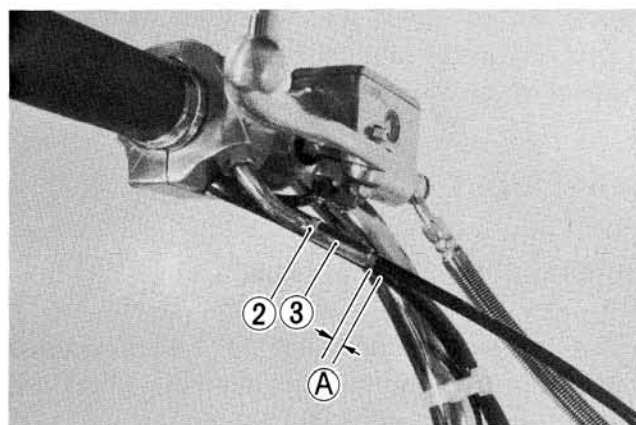
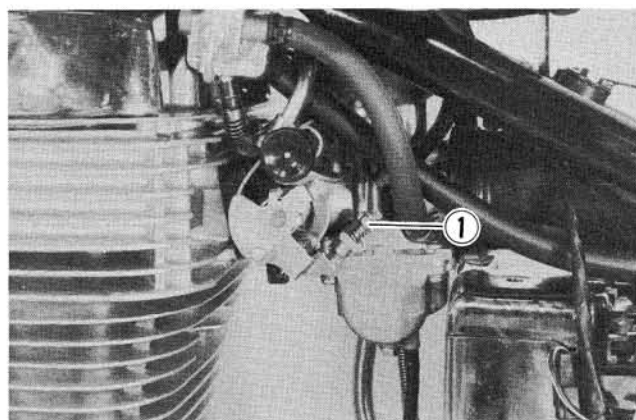
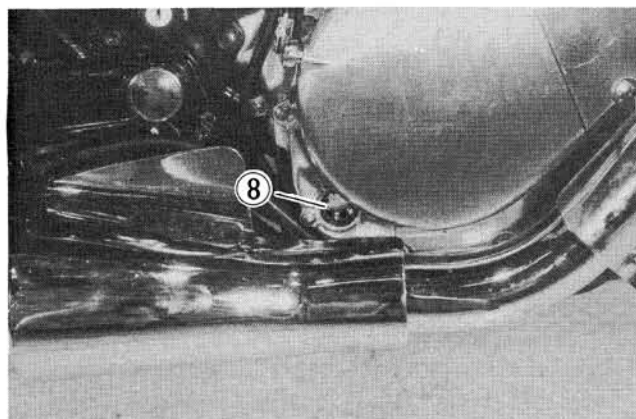
The throttle cable should be adjusted to have a play ① of 0.5 – 1.0 mm (0.02 – 0.04 in).

If the adjustment is necessary, adjust the play in the following way:

- Loosen the lock nut ② and turn the adjuster ③ in or out to obtain the correct play ① 0.5 – 1.0 mm (0.02 – 0.04 in).
- After adjusting the play, tighten the lock nut ②.

#### WARNING:

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



## CLUTCH

600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km

Clutch play (A) should be 3 mm (0.12 in) as measured at the clutch lever holder before the clutch begins to disengage. If the play in the clutch is incorrect, adjust it in the following way:

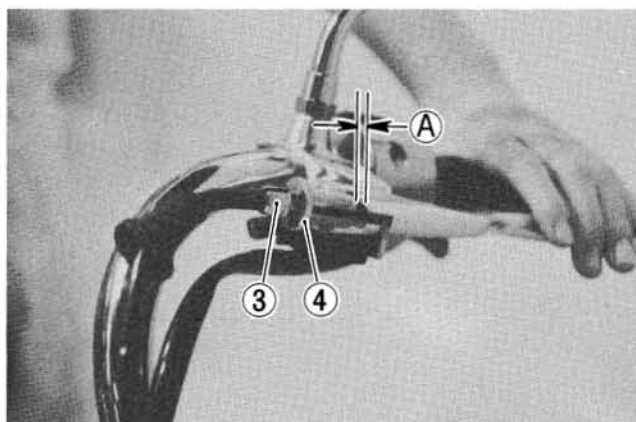
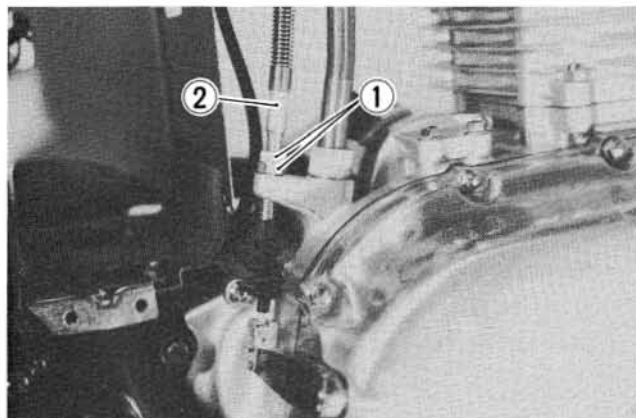
- Loosen the clutch cable adjuster lock nuts (1) and slide the clutch cable adjuster (2) up or down to acquire the specified play.
- Tighten the lock nuts.

Clutch cable play (A)	3 mm (0.12 in)
-----------------------	-------------------

### NOTE:

Minor adjustment can be made by the adjuster (3) after loosening the lock nut (4). At the same intervals, lubricate the clutch cable with motor oil.

- When installing the clutch cable to the clutch arm, securely bend the locking tab. If this tab is broken, install a new cotter pin through the holes of the connector.



## DRIVE BELT

Inspect Every 2 000 mi (3 000 km)

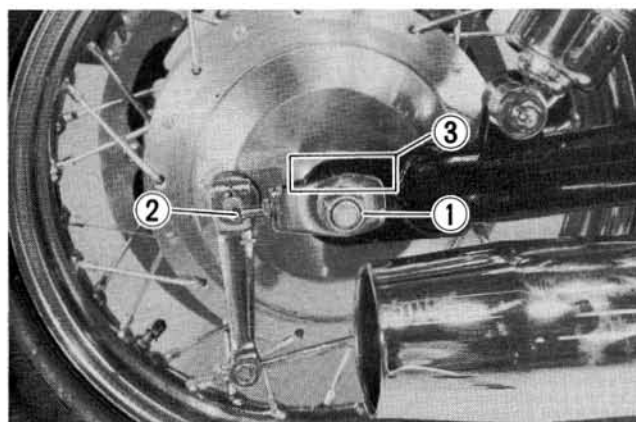
Visually inspect the drive belt for the below listed possible malconditions. (Lift the rear wheel and place a jack or block under the engine, and turn the rear wheel slowly by hand, with the transmission in NEUTRAL.)

- \* Wear of the teeth
- \* Damage or cut on the belt
- \* Crack on the belt

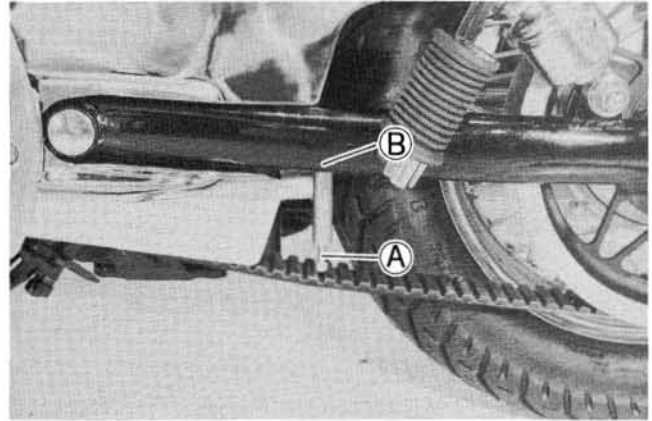
If any defects are found, the drive belt must be replaced.

### CHECKING AND ADJUSTING

- Loosen axle nut (1).
- Set the belt tensioner adjuster which is located in the tool bag as shown in the figure.



- Turn both belt adjusters ② until the belt has specified tension on the tensioner graduation (middle line A of the tensioner adjuster) at the specified point B between engine and rear pulleys. The mark ③ on both belt adjusters must be at the same position to ensure that the front and rear wheels are correctly aligned. Use the side stand for accurate adjustment.
- After adjusting the drive belt, tighten the axle nut ① to the specified torque. (Refer to page 2-18.)
- Tighten the belt adjuster lock nuts securely.



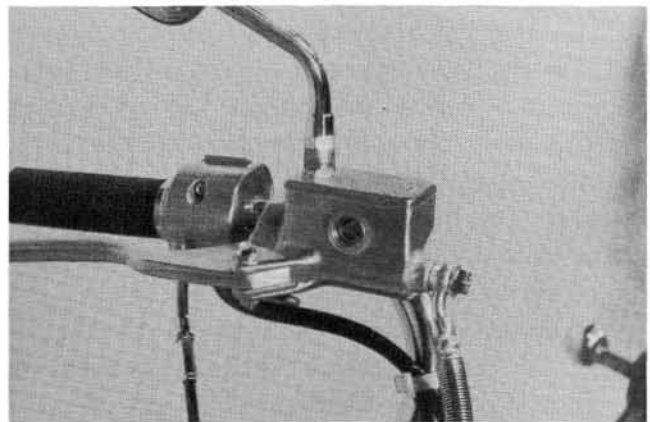
## BRAKES

600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km  
Replace hoses Every 4 years  
Change fluid Every 2 years

### FRONT BRAKE

#### Brake fluid level

- Support the motorcycle by jack or block, and place the handlebars straight.
- Check the brake fluid level by observing the lower limit mark on the brake fluid reservoir.
- When the level is below the lower limit mark, replenish with brake fluid that meets the following specification.

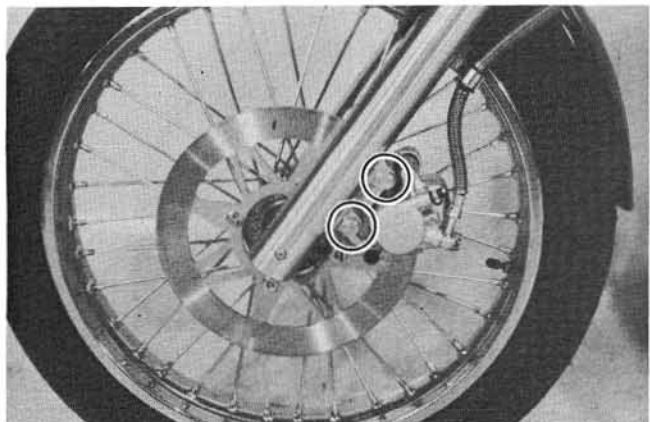


Specification and  
classification

DOT 3 or 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 and petroleum-based. Do not use any brake fluid taken from old, used or unsealed containers. Never re-use the brake fluid left over from the last servicing and stored for long periods.



### WARNING:

Brake fluid, if it leaks, will interfere with safe running and immediately discolor painted surfaces.

Check the brake hoses for cracks and hose joints for leakage before riding.

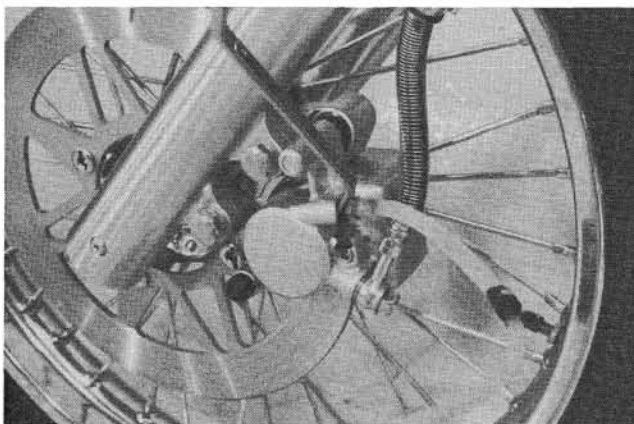
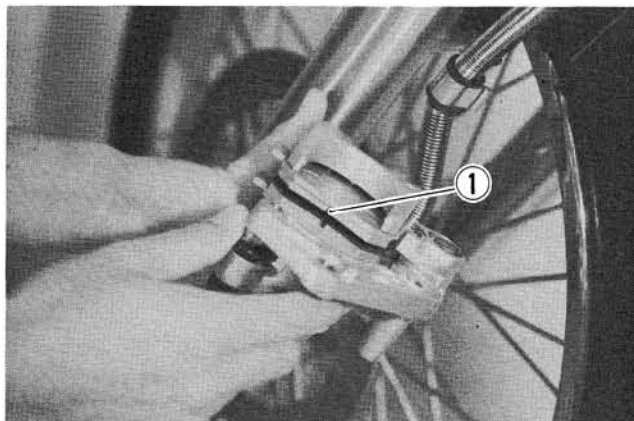
### Brake pads

Wearing condition of brake pads can be checked by observing the groove ① marked on the pad. When the wear exceeds the groove, replace the pads with new ones. (See page 7-5.)

### Bleeding air from 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 end of the inspection window. Replace the reservoir cap to prevent entry of dirt.
- Attach a pipe to the caliper bleeder valve, and insert the free end of the pipe into a receptacle.
- 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 handlebars 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.
- Close the bleeder valve, and disconnect the pipe. Fill the reservoir to the upper end in the inspection window.



### NOTE:

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

### CAUTION:

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

Bleeder valve  
tightening torque

6 – 9 N·m  
(0.6 – 0.9 kg·m)  
(4.5 – 6.5 lb·ft.)



## REAR BRAKE

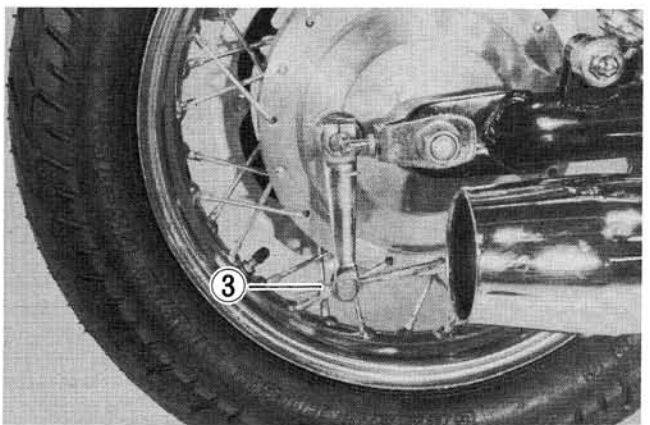
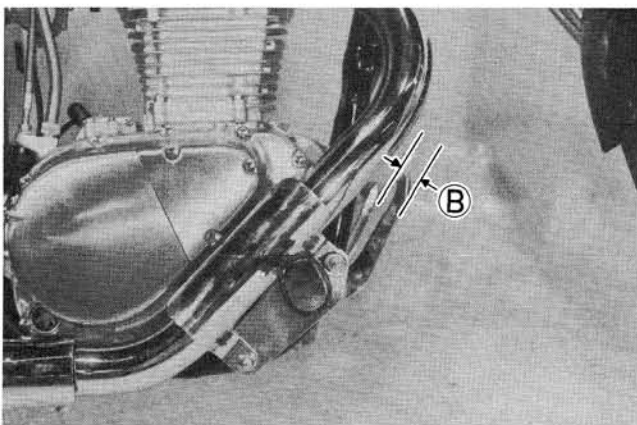
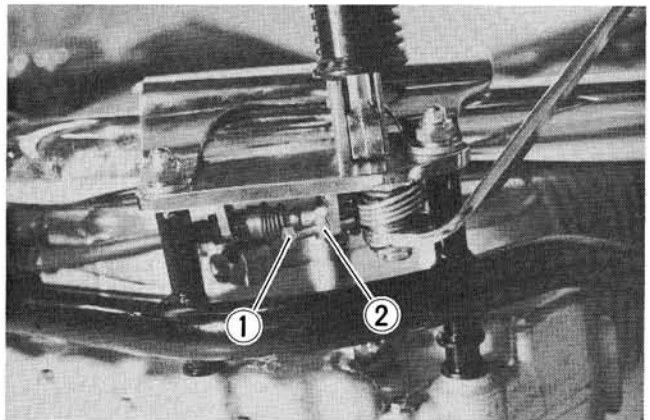
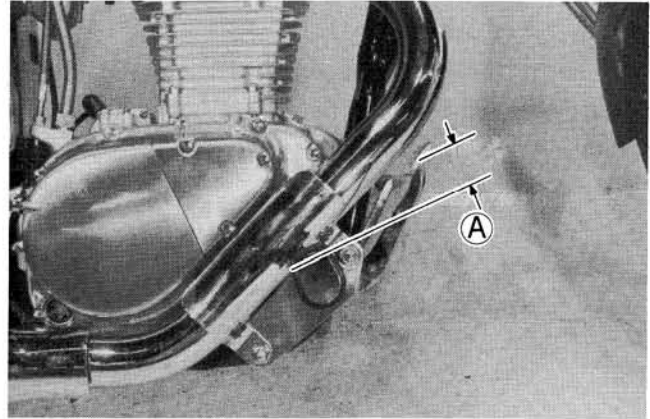
### Brake pedal height and free travel

Bring the brake pedal to a position about 60 mm (2.4 in) **A** above the footrest as shown in photo. This is effected by turning the pedal stopper bolt **1**.

Be sure to tighten the lock nut **2** securely after setting the bolt.

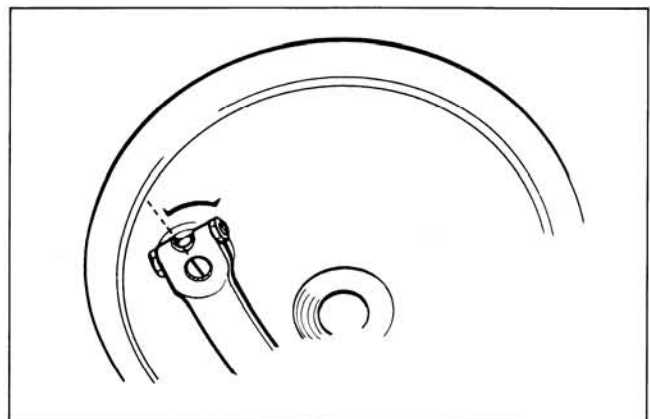
By repositioning the adjusting nut **3** on the brake cable, set the pedal play to between 20 and 30 mm **B** as measured at pedal tip.

Brake pedal height <b>A</b>	60 mm (2.4 in)
Brake pedal free travel <b>B</b>	20 – 30 mm (0.8 – 1.2 in)



### Brake shoe wear

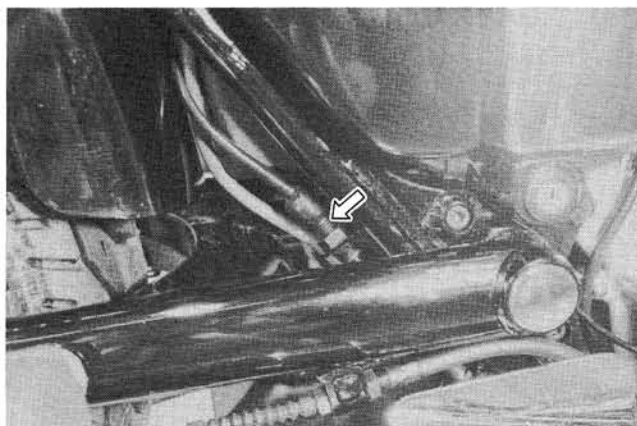
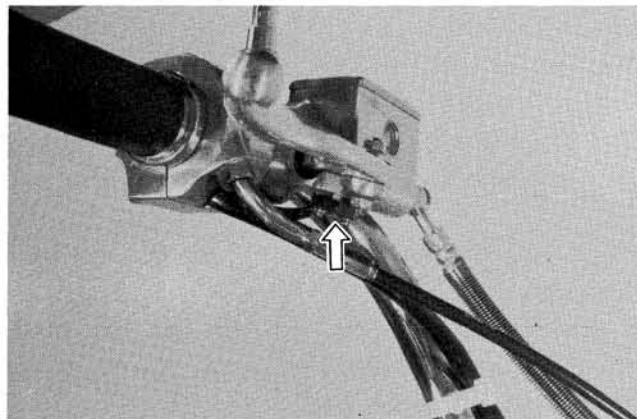
This motorcycle is equipped with brake lining wear limit indicator on the rear brake panel as shown in Fig. At the condition of normal lining wear, the extension line of the index mark on the brake cam shaft should be within the range embossed on the brake panel with brake on.



The extension line of the index mark is within the range.

### BRAKE LIGHT SWITCHES

Adjust both brake light switches, front and rear, so that brake light will come on just before a pressure is felt when the brake lever is squeezed, or the brake pedal is depressed.



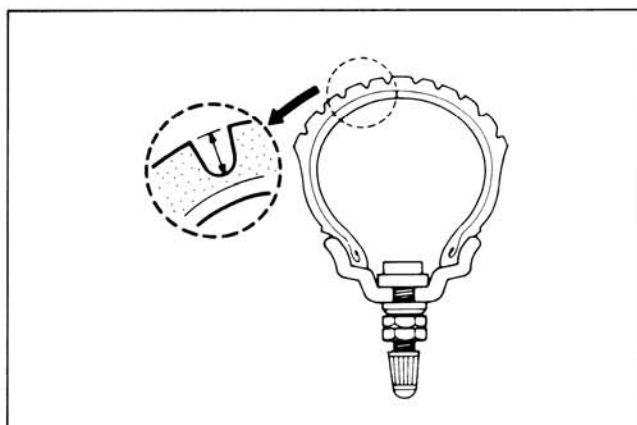
### TIRES

600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km

#### 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 the tire when the remaining depth of tire tread reaches the following specifications.

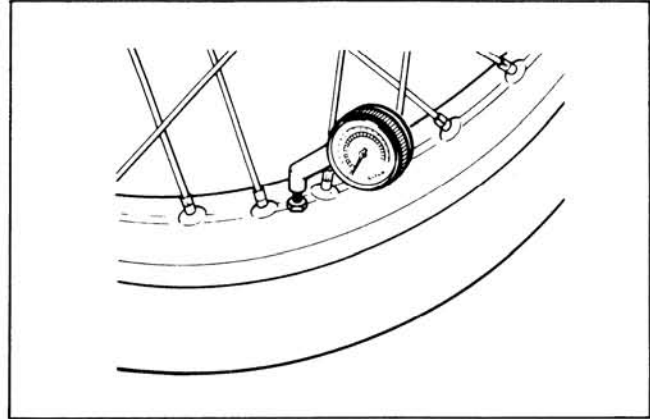
TIRE TREAD DEPTH LIMIT	
FRONT	1.6 mm (0.06 in)
REAR	2.0 mm (0.08 in)



## 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.

	Solo riding			Dual riding		
	kPa	kg/cm <sup>2</sup>	psi	kPa	kg/cm <sup>2</sup>	psi
FRONT	200	2.00	28	200	2.00	28
REAR	225	2.25	32	250	2.50	36



### CAUTION:

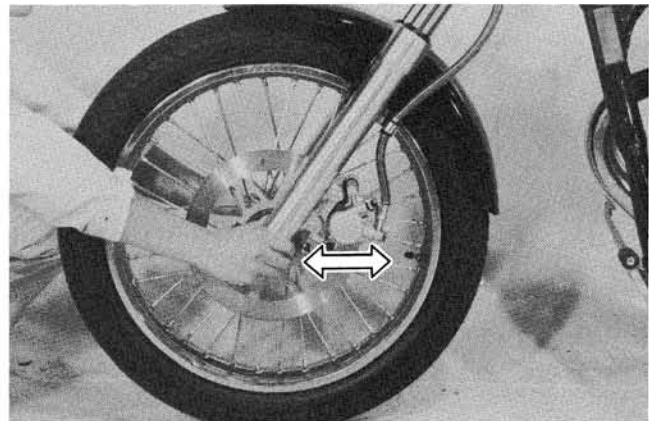
The standard tire fitted on this motorcycle is 100/90-19 57H for front and 140/80-15 67H for rear. The use of a tire other than the standard may cause instability. It is highly recommended to use a SUZUKI Genuine Tire.

## STEERING

600, 4 000, 7 500, 11 000, 15 000 mi  
1 000, 6 000, 12 000, 18 000, 24 000 km

Steering should be adjusted properly for smooth turning of handlebar and safe running. Too stiff steering prevents smooth turning of handlebar and too loose steering will cause the handlebar to vibrate.

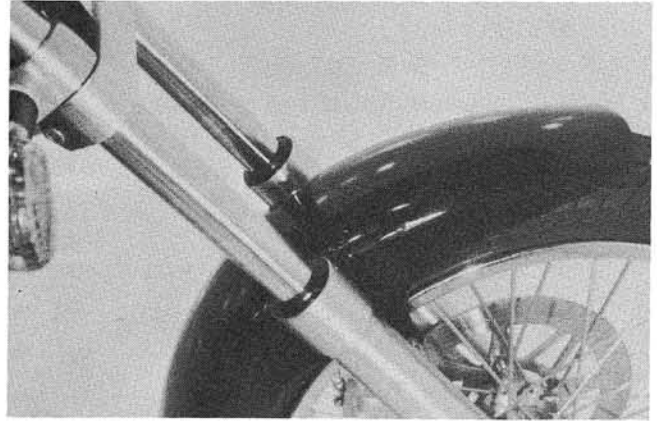
Check that there is no play in the front fork assembly by supporting the motorcycle so that the front wheel is off the ground, with wheel straight ahead, grasp lower fork tubes near the axle and pull forward. If play is found, perform steering bearing adjustment as described in page 7-22 of this manual.



### FRONT FORK

600, 7 500, 15 000 mi 1 000, 12 000, 24 000 km
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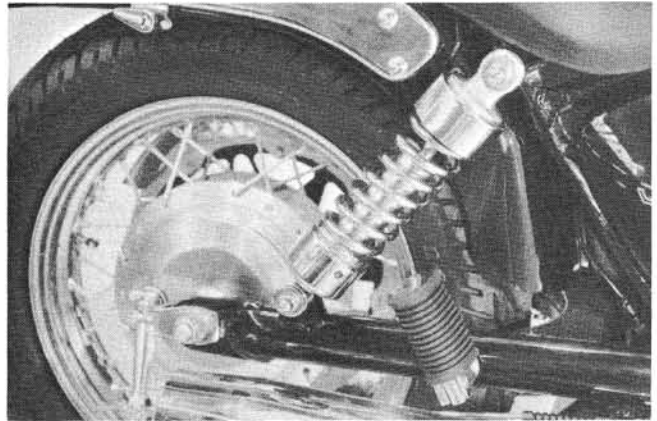
Inspect the front forks oil leakage, scoring and scratches on the outer surface of the inner tubes. Replace any defective parts, if necessary.



### REAR SUSPENSION

600, 7 500, 15 000 mi 1 000, 12 000, 24 000 km
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Inspect the rear shock absorber for oil leakage. Replace the rear shock absorber if leakage has found.

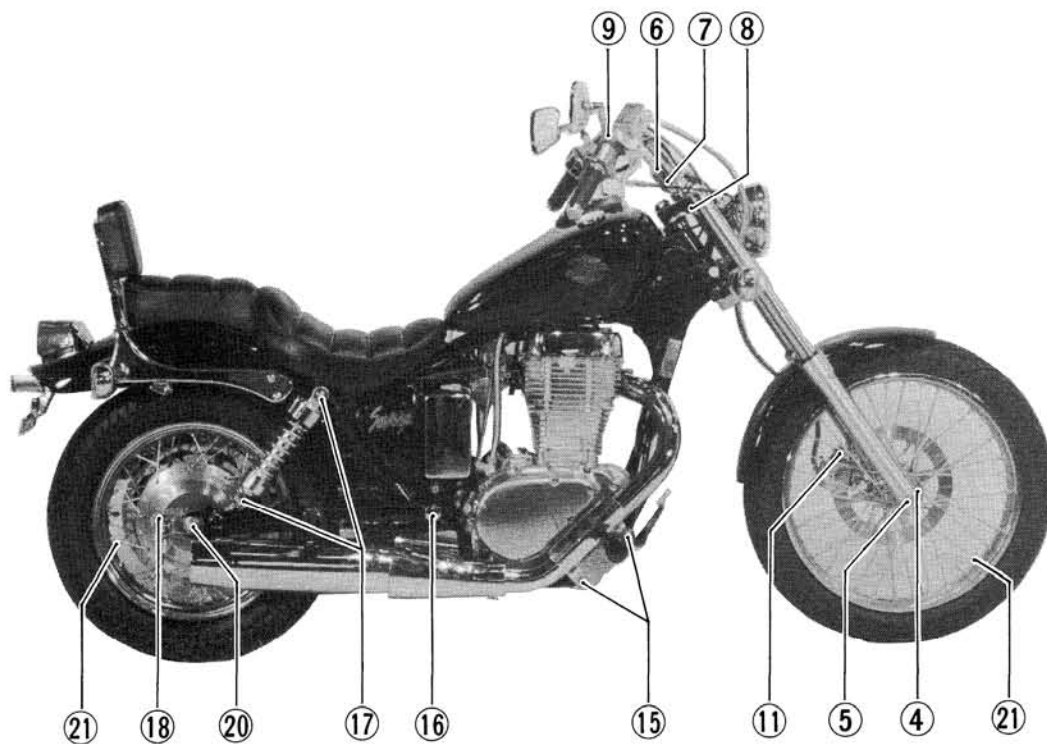
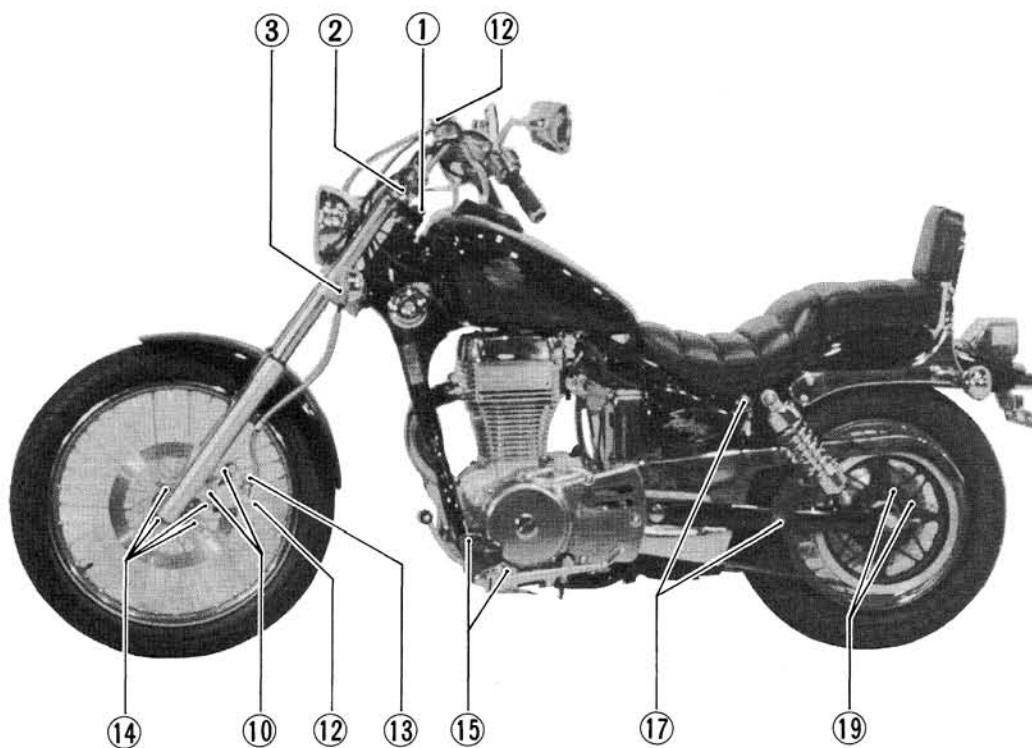


## CHASSIS BOLTS AND NUTS

**Tighten Initial 600 miles (1 000 km) and  
Every 4 000 miles (6 000 km)**

The nuts and bolts listed below are important safety parts. They must be retightened when necessary to the specified torque with a torque wrench. (Refer to page 2-19 for the locations of the following nuts and bolts on the motorcycle.)

	Item	N·m	kg·m	lb·ft
①	Steering stem head nut	30 – 40	3.0 – 4.0	21.5 – 29.0
②	Front fork cap bolt	35 – 55	3.5 – 5.5	35.5 – 40.0
③	Front fork lower clamp bolt	25 – 35	2.5 – 3.5	18.0 – 25.5
④	Front axle clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
⑤	Front axle	36 – 52	3.6 – 5.2	26.0 – 37.5
⑥	Handlebar clamp bolt	12 – 20	1.2 – 2.0	8.5 – 14.5
⑦	Handlebar holder mounting bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
⑧	Handlebar holder mounting nut	20 – 30	2.0 – 3.0	14.5 – 21.5
⑨	Front brake master cylinder mounting bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
⑩	Front brake caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
⑪	Front brake pad mounting bolt	15 – 20	1.5 – 2.0	11.0 – 14.5
⑫	Brake hose union bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
⑬	Air bleeder valve	6 – 9	0.6 – 0.9	4.5 – 6.5
⑭	Front disc mounting bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
⑮	Front footrest bolt (Engine mounting nut)	70 – 88	7.0 – 8.8	50.5 – 63.5
⑯	Swingarm pivot shaft nut	50 – 80	5.0 – 8.0	36.0 – 58.0
⑰	Shock absorber mounting nut (Upper & Lower)	20 – 30	2.0 – 3.0	14.5 – 21.5
⑱	Rear brake cam lever bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
⑲	Rear pulley mounting nut	50 – 70	5.0 – 7.0	36.0 – 50.5
⑳	Rear axle nut	55 – 88	5.5 – 8.8	40.0 – 63.0
㉑	Spoke nipple	4 – 5	0.4 – 0.5	3.0 – 3.5





# ENGINE

## CONTENTS

<b>COMPRESSION PRESSURE .....</b>	<b>3- 1</b>
<b>ENGINE COMPONENTS REMOVABLE WITH THE ENGINE IN PLACE .....</b>	<b>3- 2</b>
<b>ENGINE REMOVAL AND REMOUNTING .....</b>	<b>3- 3</b>
<b>ENGINE DISASSEMBLY .....</b>	<b>3-10</b>
<b>ENGINE COMPONENTS INSPECTION AND SERVICING .....</b>	<b>3-20</b>
<b>CYLINDER HEAD .....</b>	<b>3-20</b>
<b>ROCKER ARM .....</b>	<b>3-22</b>
<b>VALVE .....</b>	<b>3-23</b>
<b>CAMSHAFT .....</b>	<b>3-29</b>
<b>CAM DRIVE CHAIN .....</b>	<b>3-31</b>
<b>CYLINDER .....</b>	<b>3-31</b>
<b>PISTON .....</b>	<b>3-32</b>
<b>PISTON RING .....</b>	<b>3-32</b>
<b>CONROD .....</b>	<b>3-35</b>
<b>CRANKSHAFT .....</b>	<b>3-35</b>
<b>GENERATOR AND PICK-UP COIL .....</b>	<b>3-36</b>
<b>STARTER CLUTCH .....</b>	<b>3-36</b>
<b>CLUTCH .....</b>	<b>3-38</b>
<b>TRANSMISSION .....</b>	<b>3-40</b>
<b>ENGINE REASSEMBLY .....</b>	<b>3-45</b>
<b>OIL SEALS .....</b>	<b>3-45</b>
<b>CRANKSHAFT .....</b>	<b>3-45</b>
<b>CRANKCASE .....</b>	<b>3-47</b>
<b>GEARSHIFT CAM STOPPER .....</b>	<b>3-48</b>
<b>CAM DRIVEN GEAR .....</b>	<b>3-48</b>
<b>FLYWHEEL .....</b>	<b>3-49</b>
<b>RING AND PISTON .....</b>	<b>3-51</b>
<b>CYLINDER HEAD COVER .....</b>	<b>3-55</b>
<b>CAM CHAIN TENSIONER .....</b>	<b>3-56</b>
<b>CLUTCH .....</b>	<b>3-57</b>
<b>OIL FILTER .....</b>	<b>3-59</b>

## COMPRESSION PRESSURE

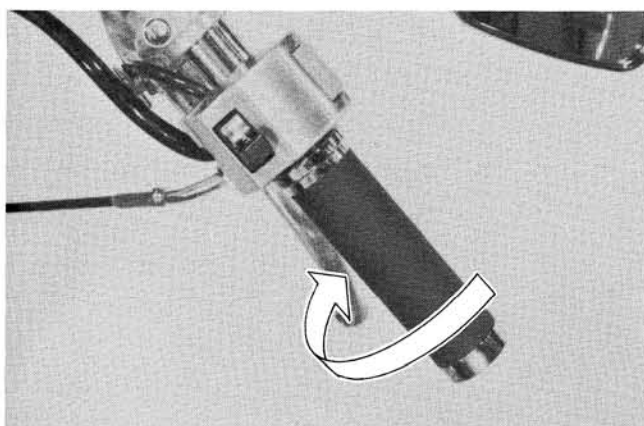
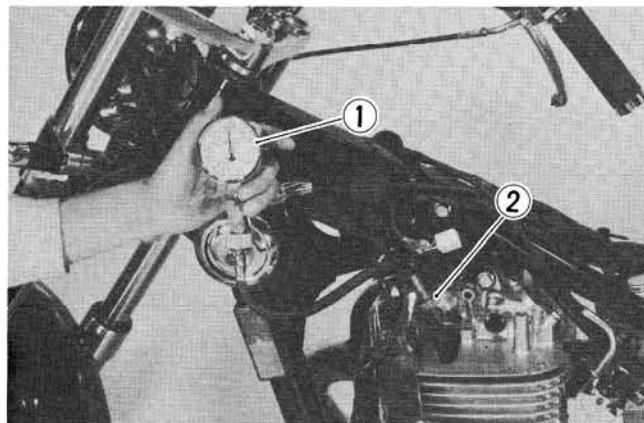
### COMPRESSION PRESSURE

#### NOTE:

- \* Before testing the engine for compression pressure, make sure that the cylinder head nuts and bolts are tightened to the specified torque values and valves are properly adjusted.
- \* Have the engine warmed up by idling before testing it.

- Remove the seat, fuel tank and left head cover.
- Remove the spark plug.
- Fit the compression gauge set ① and ② to the plug hole, taking care to make the connection absolutely tight.
- Turn the throttle grip into wide-open position.
- Crank the engine a few seconds with the starter, and read the highest gauge indication as the compression of the cylinder.

①	09915-64510	Compression gauge
②	09915-63210	Adapter



#### Compression pressure

Standard	Limit
1 000 – 1 400 kPa ( 10 – 14 kg/cm <sup>2</sup> ) ( 142 – 200 psi )	800 kPa ( 8 kg/cm <sup>2</sup> ) ( 114 psi )

A low compression pressure may indicate any of the following malfunctions:

- \* Excessively worn cylinder wall
- \* Worn piston or piston rings
- \* Piston rings stuck in the grooves
- \* Poor seating contact of valves
- \* Defective cylinder head gasket

When the compression pressure noted is down to or below the limit indicated above, the engine must be disassembled, inspected and repaired as required, with these five malconditions in mind.



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

**ENGINE LEFT SIDE**

	See page
Engine pulley .....	3- 6
Gearshift lever .....	3- 6
Generator cover .....	3-13
Generator stator .....	3-13
Starter idle gear .....	3-13
Generator rotor .....	3-16
Starter clutch .....	3-16
Flywheel .....	3-17
Gearshift cam driven gear .....	3-18
Gearshift cam stopper .....	3-18

**ENGINE CENTER**

	See page
Cylinder head cover.....	3-11
Camshaft.....	3-14
Cam drive chain guide .....	3-14
Cylinder head .....	3-15
Cylinder .....	3-15
Piston .....	3-15
Cam drive chain.....	3-15
Starter motor .....	3-16

**ENGINE RIGHT SIDE**

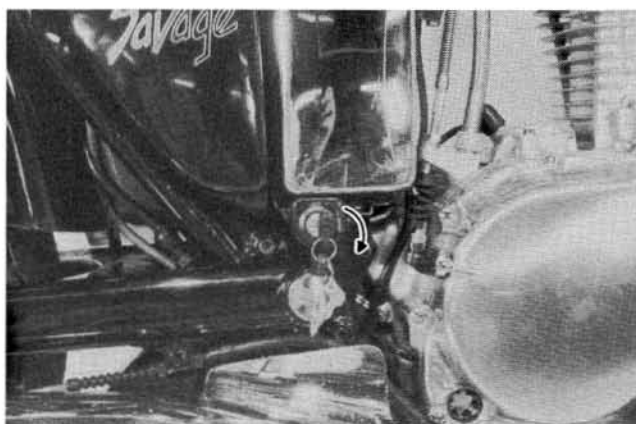
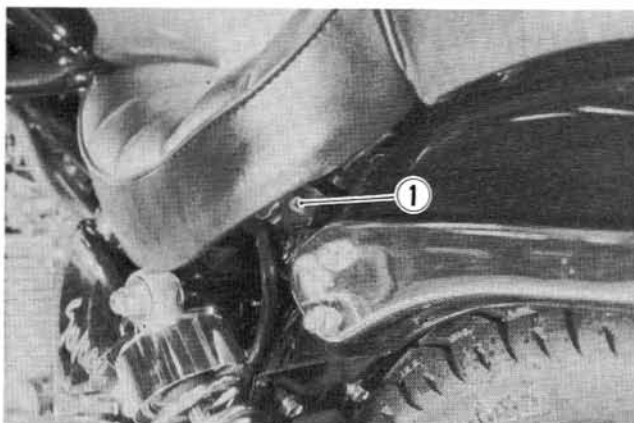
	See page
Oil filter .....	3-11
Clutch cover .....	3-11
Clutch assembly .....	3-12
Primary driven gear assembly .....	3-12
Primary drive gear and cam drive sprocket .....	3-13
Oil pump driven gear.....	3-13
Cam drive chain tensioner adjuster ....	3-14

## ENGINE REMOVAL AND REMOUNTING

### ENGINE REMOVAL

Before taking the engine out of the frame, thoroughly clean the engine with a suitable cleaner. The procedure of engine removal is sequentially explained in the following steps.

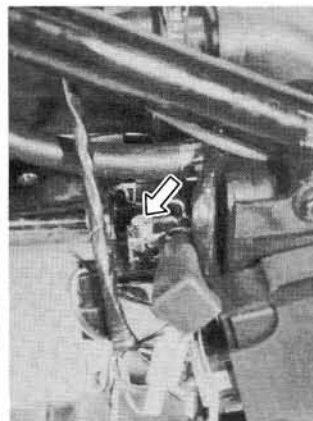
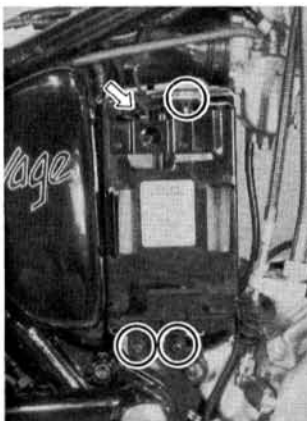
- Remove the seat by removing the bolts ①.
- Remove the left frame cover.
- Using the ignition key and remove the battery case cover.



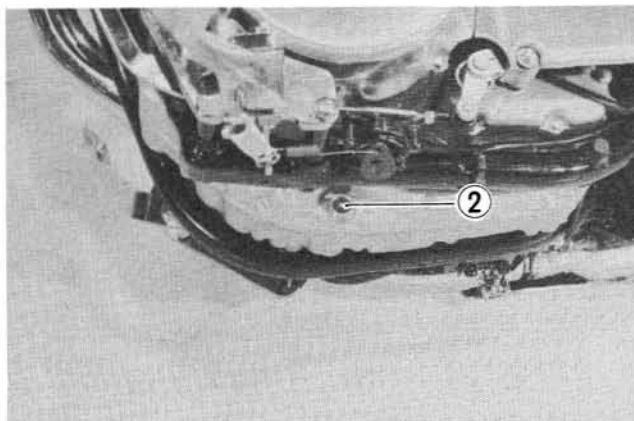
- Remove the battery holder screws and disconnect the battery  $\ominus$  and  $\oplus$  lead wires from the battery terminals.

#### CAUTION:

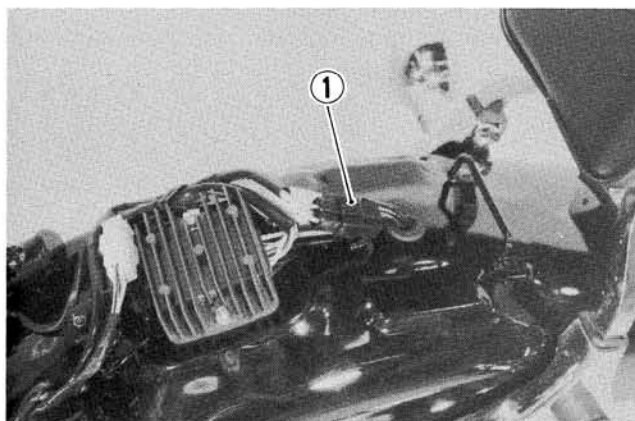
Be sure to disconnect the  $\ominus$  lead wire first.



- Remove the engine oil drain plug ② and filler cap.
- Drain engine oil.



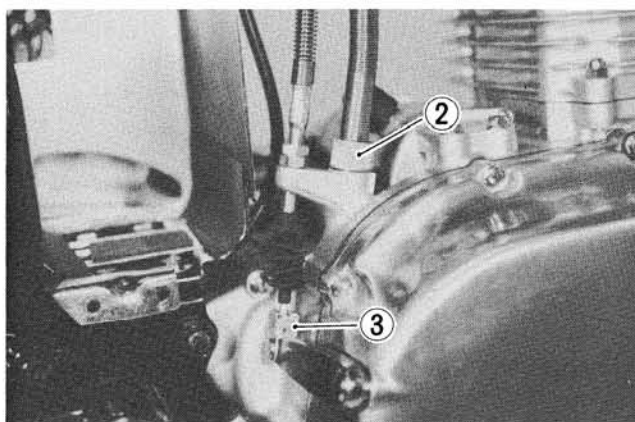
- Remove the pillion seat and disconnect the generator lead wire coupler ①.



- Disconnect the speedometer cable ②.
- Loosen the clutch cable adjuster lock nut and disconnect the clutch cable ③ from the lever.

**NOTE:**

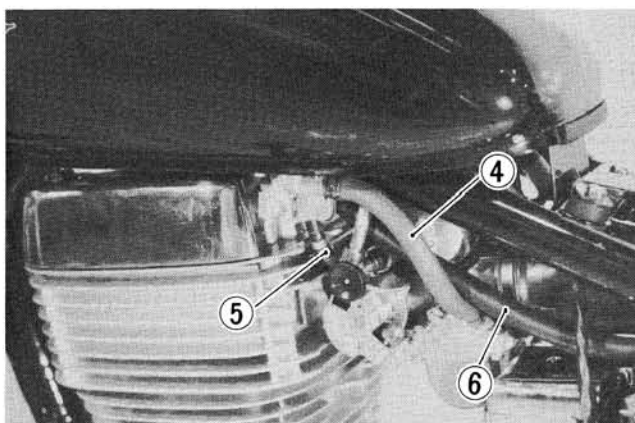
When disconnecting the clutch cable, bend the locking tab. If this locking tab is broken, install a new cotter pin through the holes of the connector.



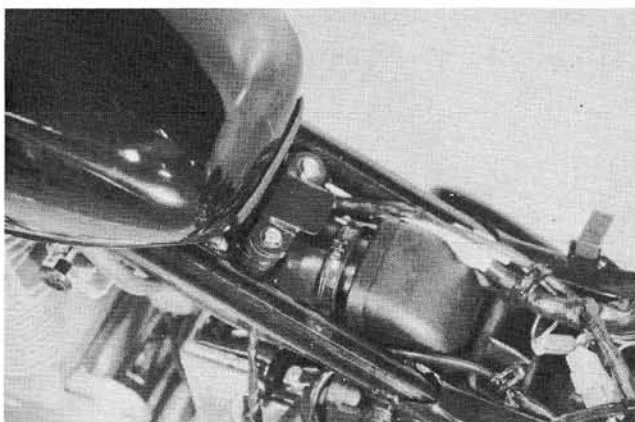
- Turn the fuel cock lever to the "OFF" position and disconnect the fuel ④ and vacuum ⑤ hoses from the carburetor.
- Remove the breather hose ⑥ from the air cleaner case.

**NOTE:**

Disconnect the vapor hoses from the fuel tank. (Only for CA model)



- Remove the fuel tank mounting bolts and draw the fuel tank backward.



- Disconnect the speedometer lead wire coupler.

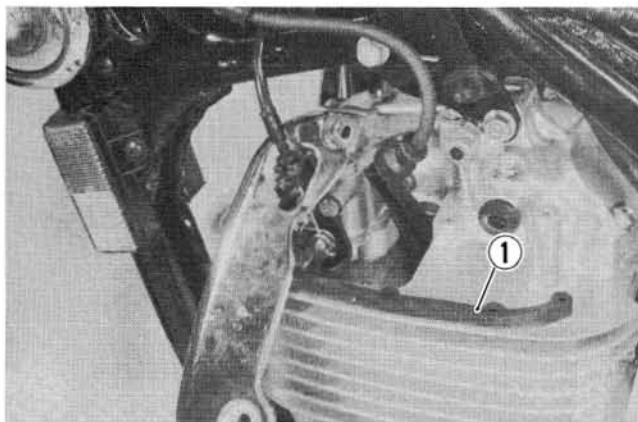


- Remove the cylinder head left cover bolts and remove the spark plug cap.

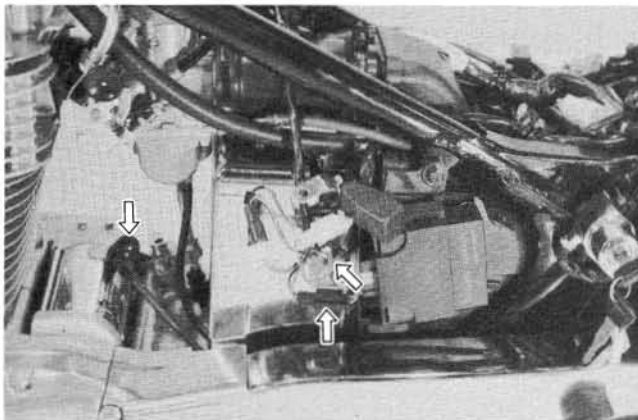
**NOTE:**

Rubber damper ① is provided between left cover and cylinder head cover.

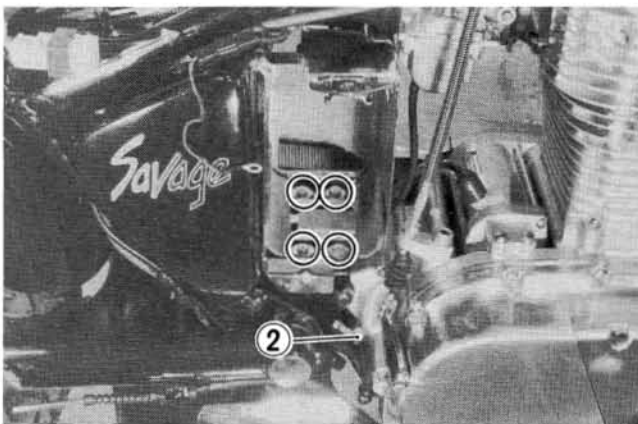
- Loosen the automatic de-compression cable adjuster nuts and disconnect the de-compression cable from the lever.



- Disconnect the pick-up coil coupler.
- Disconnect the neutral indicator switch lead.
- Remove the starter motor ⊕ lead wire at the starter motor terminal.



- Remove the battery case.
- Disconnect the engine ground lead wire ②.

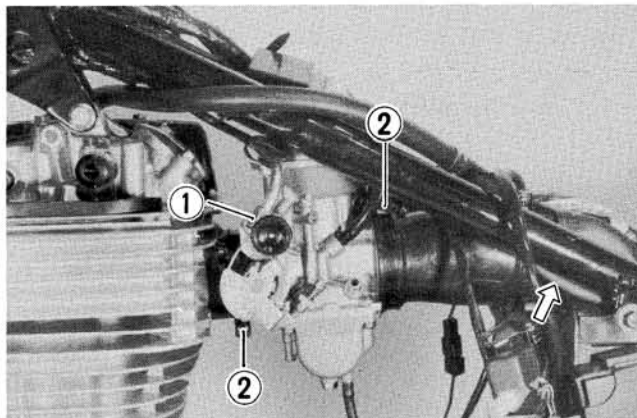


- Turn the clip ① and disconnect the throttle cable from the carburetor.

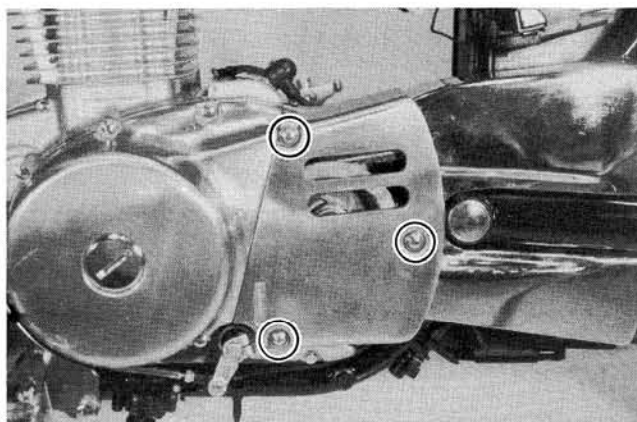
**NOTE:**

Disconnect the vapor hose from the carburetor. (Only for CA model)

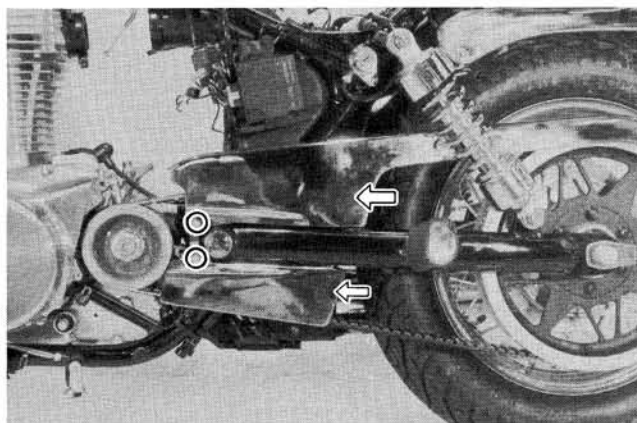
- Loosen the two clamp screws ② and remove the carburetor.



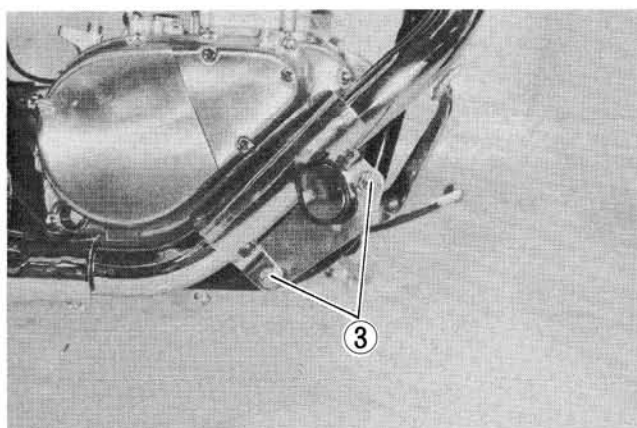
- Remove the gearshift lever linkage, engine pulley cover and belt guards.
- Unlock the engine pulley nut lock washer.
- Loosen the engine pulley nut while applying the rear brake.



- Loosen the rear axle nut and drive belt tension adjuster bolts.
- Push the rear wheel forward and remove the engine pulley from the drive shaft.

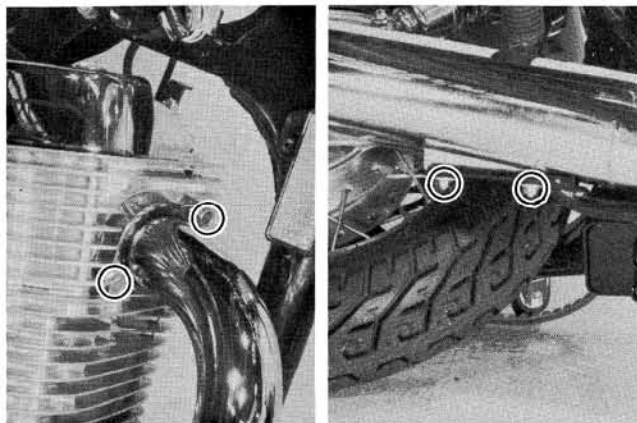


- Remove the engine mounting nuts ③ and remove the exhaust pipe cover, rear brake pedal bracket and right footrest.





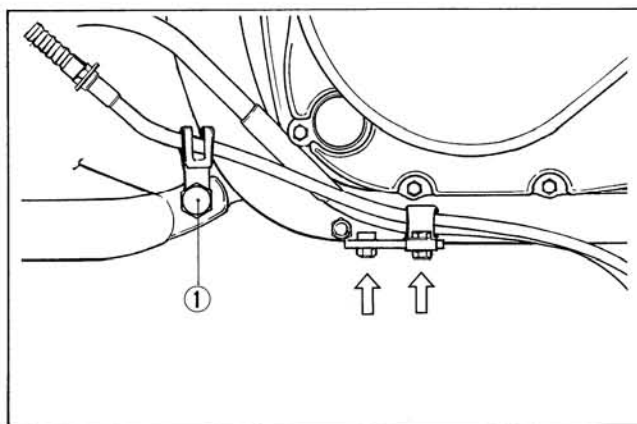
- Remove the exhaust pipe clamp bolts and the muffler mounting nuts.
- Remove the exhaust pipe and muffler assembly.



- Remove the rear brake cable and switch cable guide.

**NOTE:**

When tightening the muffler stay bolt ①, install a clamp and apply thread lock 1333B to the bolt.

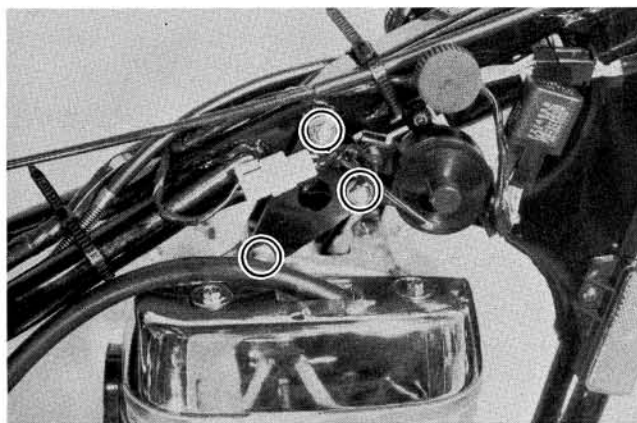


Tightening Torque	28–33 N.m ( 2.8–3.3 kg-m ) ( 20.0–24.0 lb-ft )
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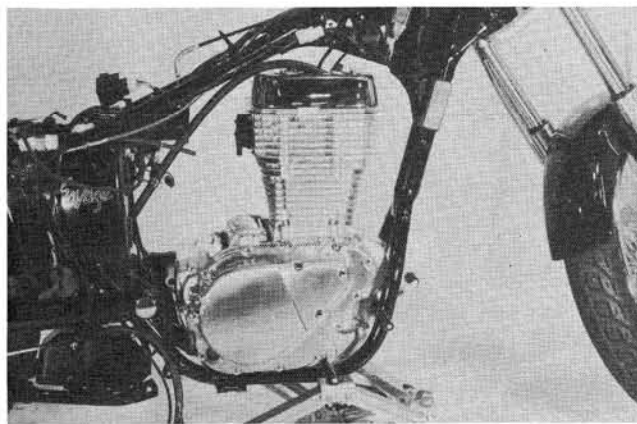
- Loosen and remove the engine mounting bolts and engine mounting bracket bolts.

**CAUTION:**

When removing the engine mounting front bolts, hold the motorcycle body in the up-right condition.



- After removing all mounting bolts and nuts, dismount the engine assembly from the right side.





## ENGINE REMOUNTING

The engine can be mounted in the reverse order of removal.

- Insert the engine mounting bolts from left side. Install the bolts and spacer properly as shown in the following illustration.

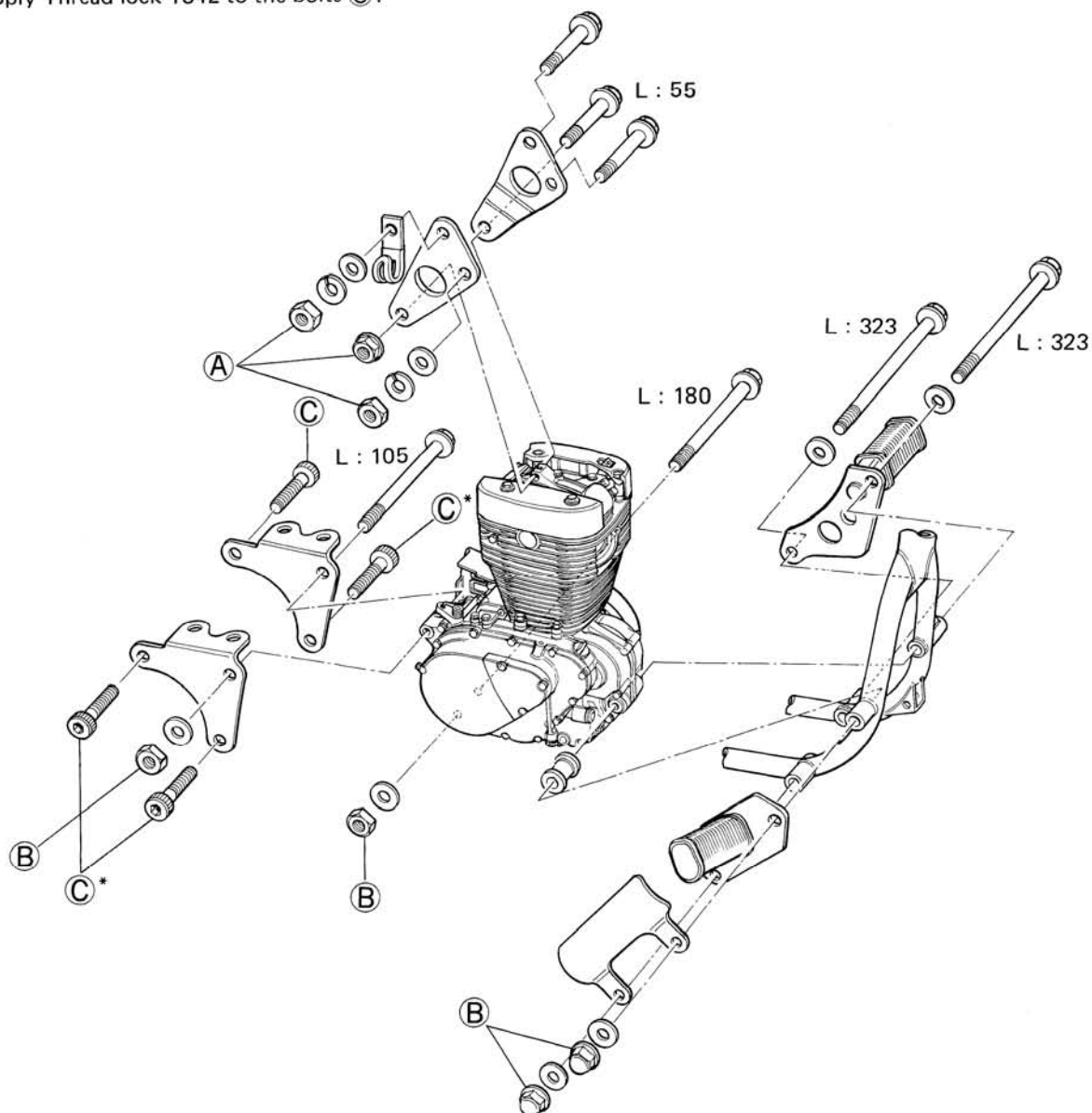
### NOTE:

The engine mounting nuts are self-locking nut. 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.

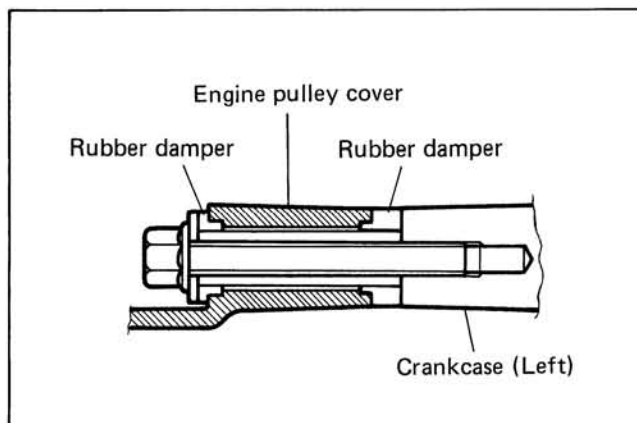
## TIGHTENING TORQUE

ITEM	N·m	kg-m	lb-ft
Cylinder head Ⓐ	37 – 45	3.7 – 4.5	27.0 – 32.5
The other mounting bolt & nut Ⓑ	70 – 88	7.0 – 8.8	50.5 – 63.5
Engine mounting bracket bolt Ⓒ	20 – 30	2.0 – 3.0	14.5 – 21.5

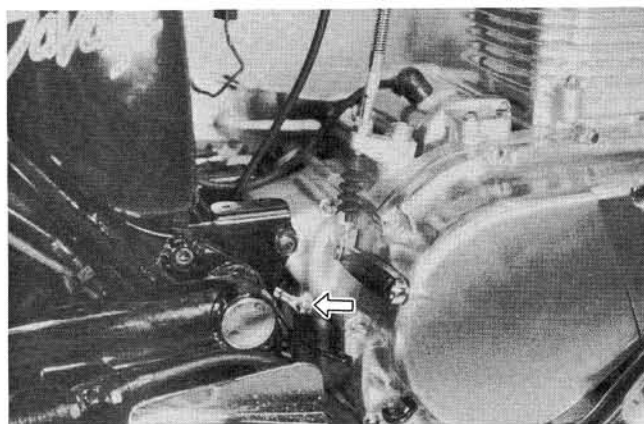
\* Apply Thread lock 1342 to the bolts Ⓒ.



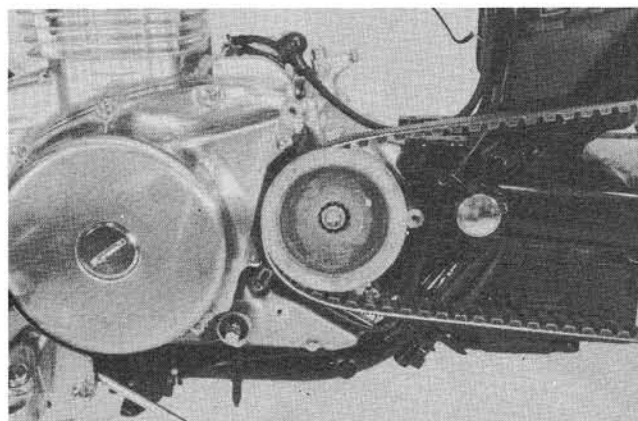
- When reinstalling the engine pulley cover, install the rubber dampers to the pulley cover as shown in the illustration.



- Install the engine ground lead wire to the proper position as shown in the figure.



- The engine pulley should be installed on the driveshaft as shown in the figure at the same time of the installation of drive belt. Face the boss of the pulley inside so that the boss touches the drive shaft spacer. If it is difficult to assemble the engine pulley, loosen the axle nut to push the rear wheel forward, and give the drive belt some play. After completing tightening of the engine mounting bolts, adjust tension of the drive belt. (See page 2-11.)



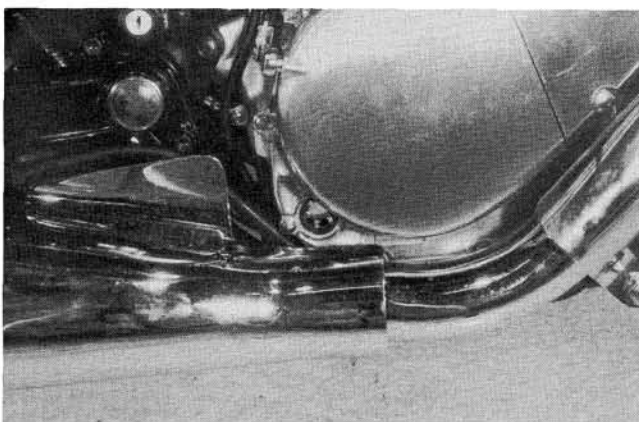
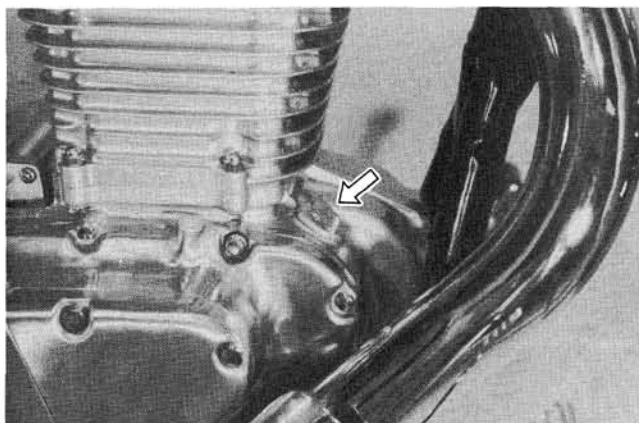
#### TIGHTENING TORQUE

ITEM	N·m	kg-m	lb-ft
Engine pulley mounting bolt	100 – 130	10.0 – 13.0	72.5 – 94.0
Rear axle nut	55 – 88	5.5 – 8.8	40.0 – 63.0
Exhaust pipe bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
Muffler connection bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
Muffler mounting nut	18 – 28	1.8 – 2.8	13.0 – 20.0

- Pour 2 400 ml (2.5 US qt) of engine oil SAE 10W/40 graded SE or SF into the engine after overhauling engine.
- Start up the engine and allow it run for several seconds at idle speed. About one minute after stopping engine, check oil level. If the level is below the "F" mark, add oil until the level reaches the "F" mark.

Change	1 800 ml (1.9 US qt)
Filter change	2 400 ml (2.5 US qt)
Overhaul	2 400 ml (2.5 US qt)

- After remounting the engine, following adjustments are necessary.
  - \* De-compression cable play . . . . . (Page: 2- 6)
  - \* Throttle cable . . . . . (Page: 2-10)
  - \* Idling speed . . . . . (Page: 2-10)
  - \* Clutch cable . . . . . (Page: 2-11)
  - \* Drive belt tension . . . . . (Page: 2-11)
  - \* Rear brake pedal height and pedal free play . . . . . (Page: 2-14)
  - \* Rear brake switch . . . . . (Page: 2-15)
  - \* Side stand switch

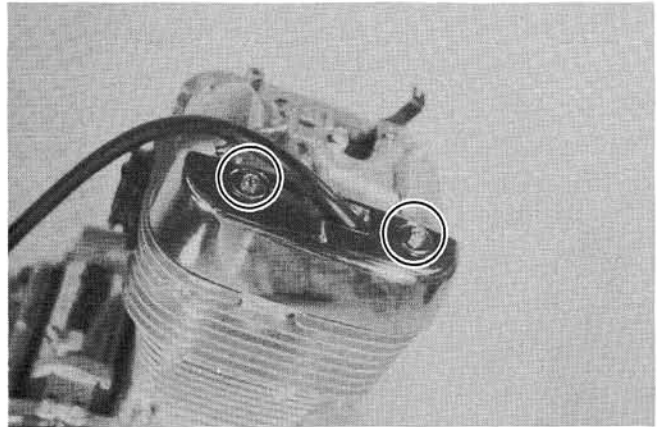


## ENGINE DISASSEMBLY

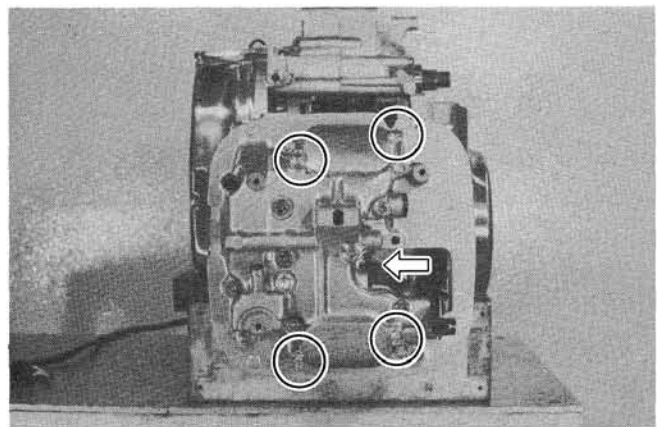
- Remove the right cover from the cylinder head cover.

**NOTE:**

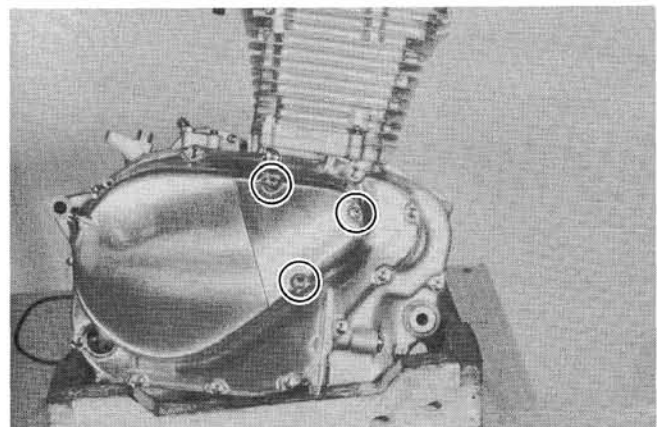
Two damper rubbers are provided between right cover and cylinder head.



- Remove the spark plug and valve inspection caps.



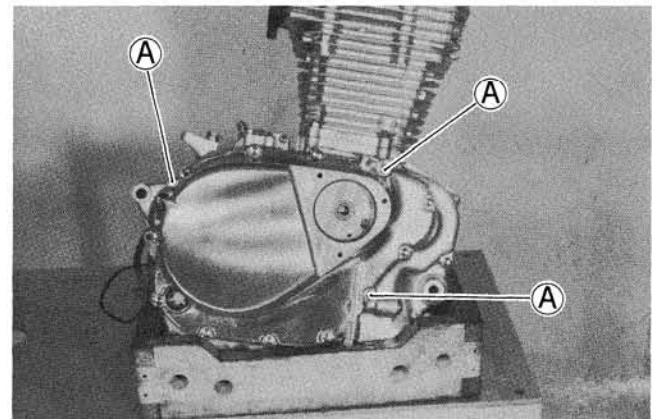
- Remove the oil filter cap, spring, oil filter and O-ring.



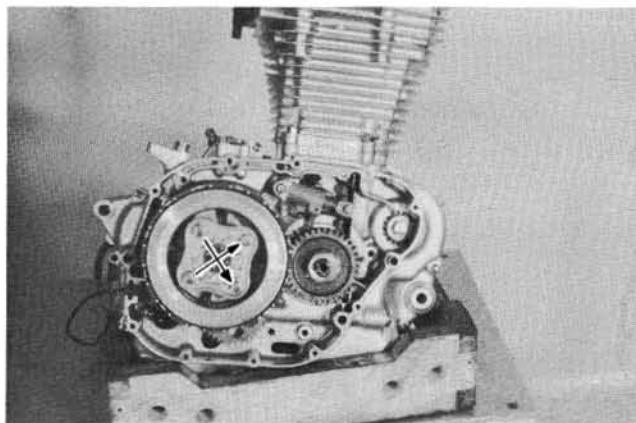
- Remove the clutch cover.

**NOTE:**

Gaskets are provided on the bolts (A) .



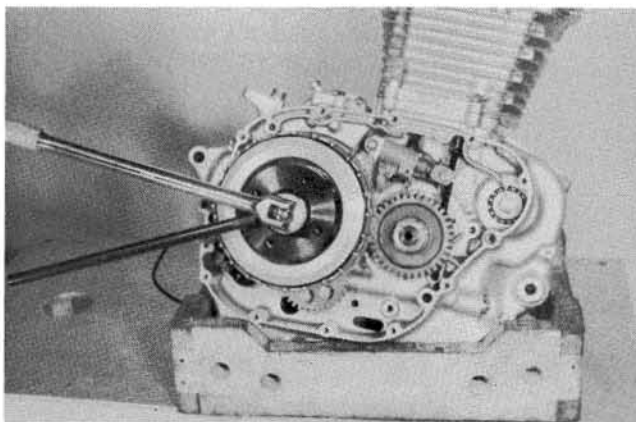
- Remove the clutch spring mounting bolts diagonally while holding the primary drive gear nut with a wrench.



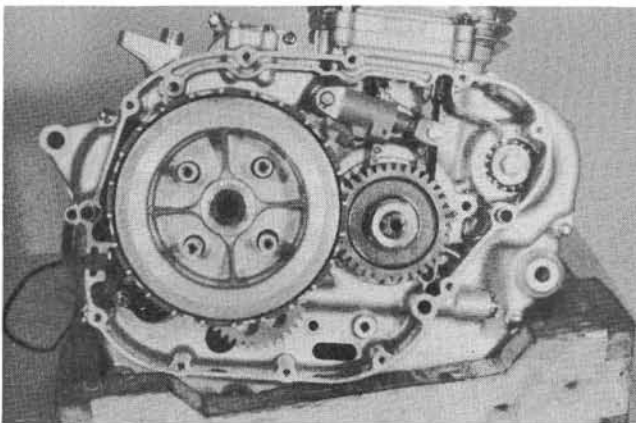
- Flatten the lock washer and remove the clutch sleeve hub nut by using the special tool.

09920-53722

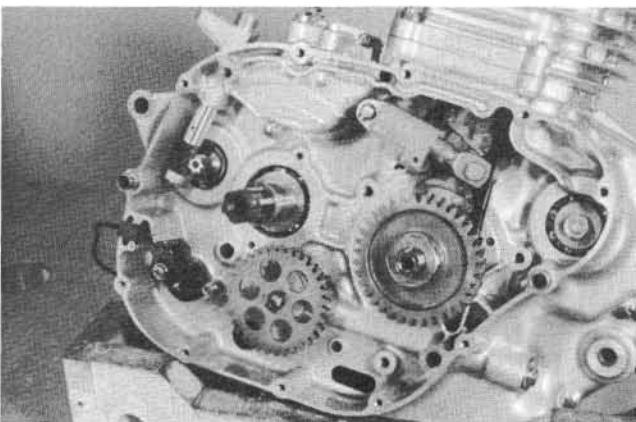
Clutch sleeve hub holder



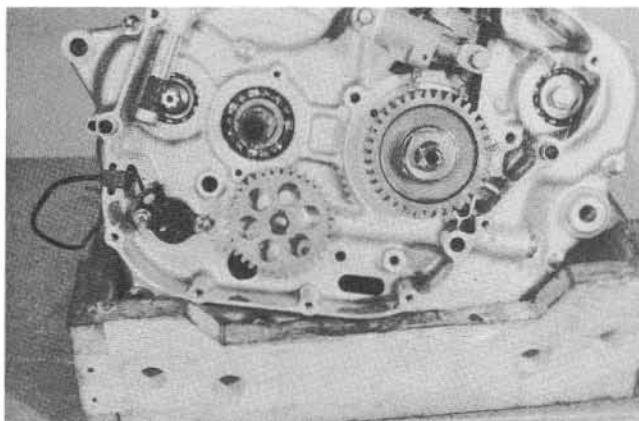
- Remove the clutch sleeve hub, clutch plates and pressure plate along with the primary driven gear assembly and oil pump drive gear.



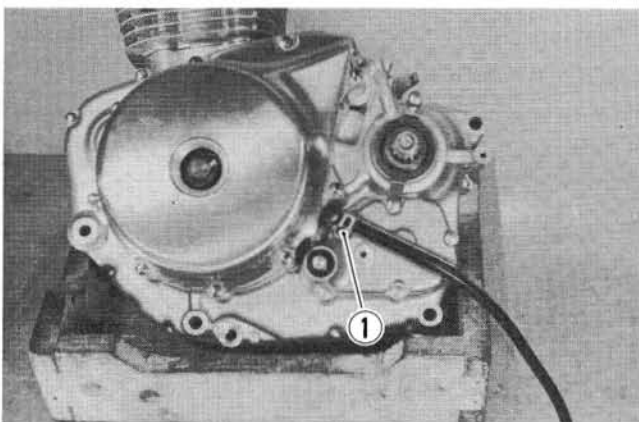
- Remove the primary driven gear spacer and washer from the countershaft.



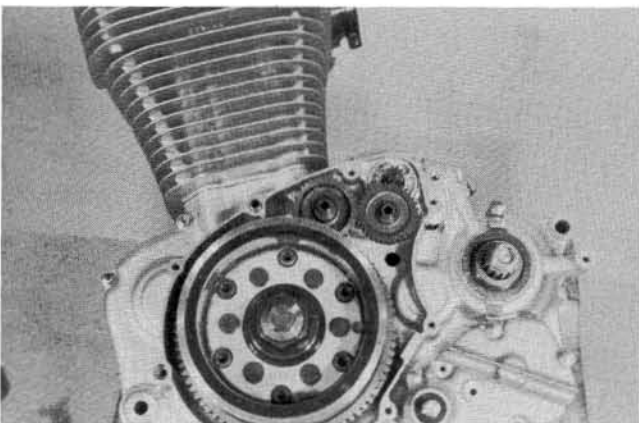
- Remove the oil pump driven gear by removing the circlip.
- Remove the neutral switch body, switch contact and spring.



- Remove the generator lead wire clamp ① and remove the generator cover.



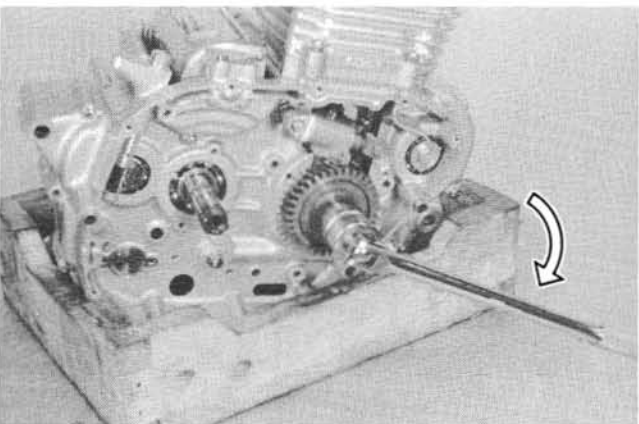
- Remove the starter idle gears and shafts.



- Hold the generator rotor with 36 mm offset wrench and remove the primary drive gear nut.

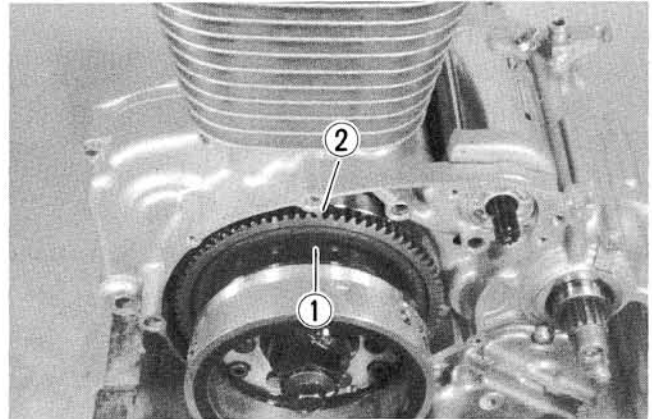
**NOTE:**

Primary drive gear nut has a left-hand thread.





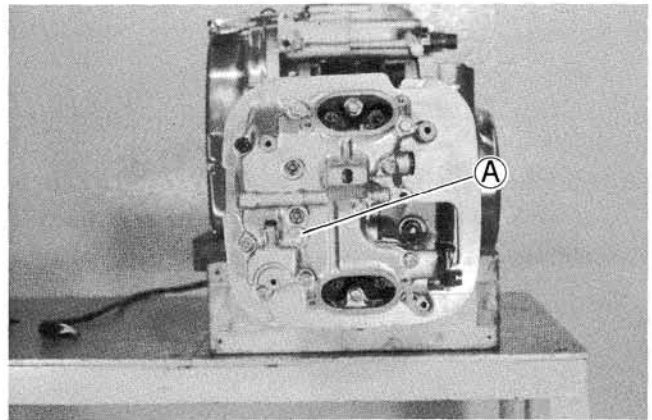
- Turn the crankshaft and bring the piston to the T.D.C of the compression stroke. Align the mark ① on the rotor with ② on the crankcase.



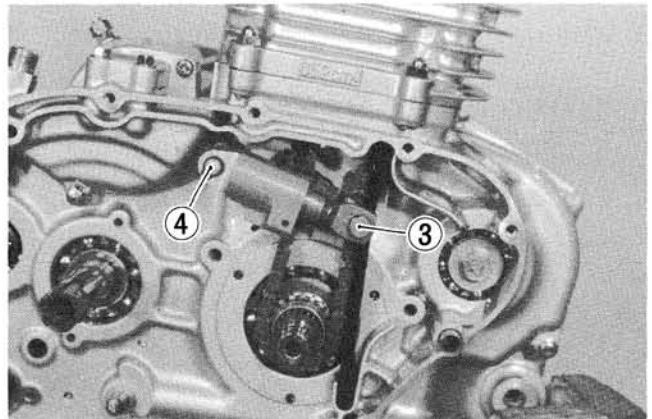
- Loosen the cylinder head cover bolts and detach the cylinder head cover.

**NOTE:**

When removing the cylinder head cover, do not remove the conically recessed top bolt ①.



- Remove the cam chain tensioner adjuster bolt ③ and circlip ④.

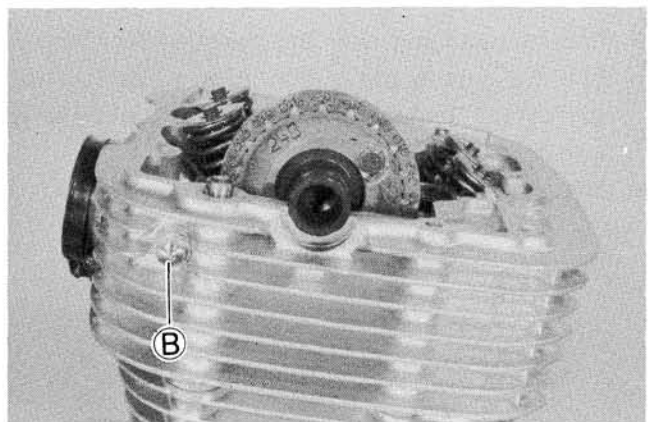


- Detach the camshaft end cap.
- Flatten the lock washer and remove the camshaft sprocket bolts.
- Remove the camshaft and sprocket.

**NOTE:**

The cam chain tensioner bolt ② is to be removed when removing cylinder head.

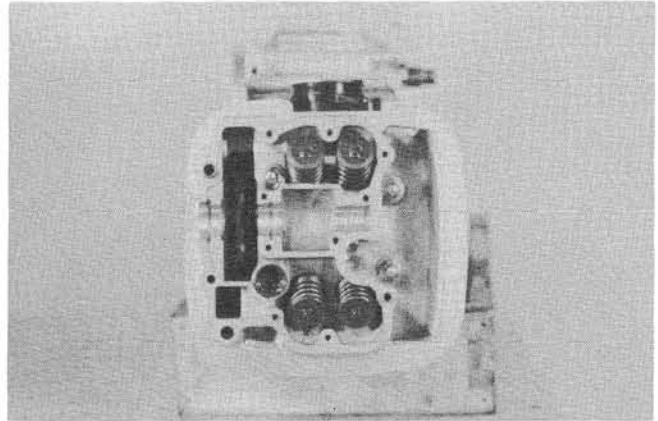
- Remove the cam chain drive sprocket from the crankshaft.



- Loosen the six cylinder head nuts diagonally, then detach the cylinder head.

**NOTE:**

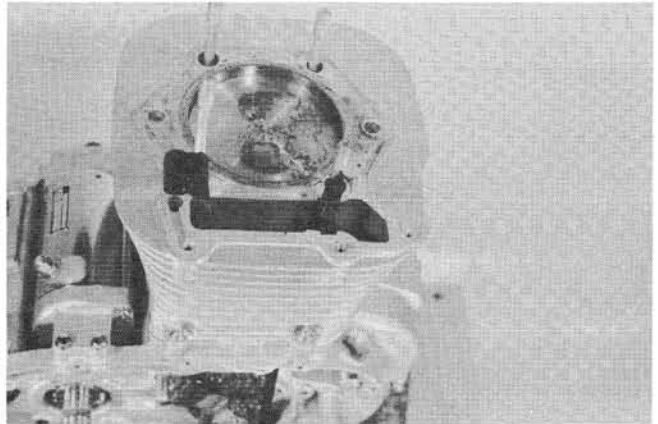
If it is difficult to remove the cylinder head, gently pry it off while tapping the finless portion of the cylinder head with a plastic hammer. Be careful not to break the fins.



- Remove the cam chain guides and cam drive chain.

**NOTE:**

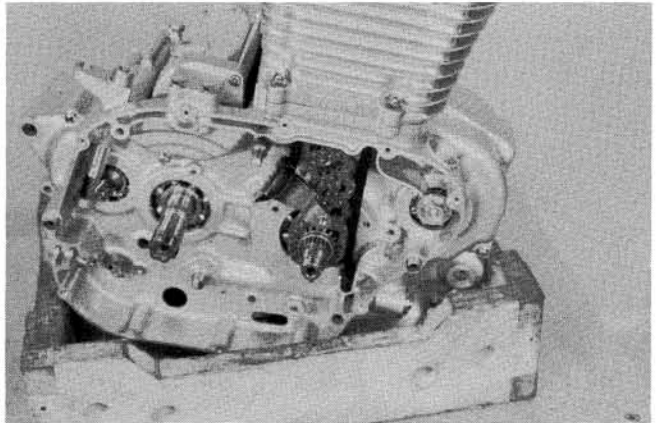
The front and rear chain guides can be removed only when the cylinder head has been removed.



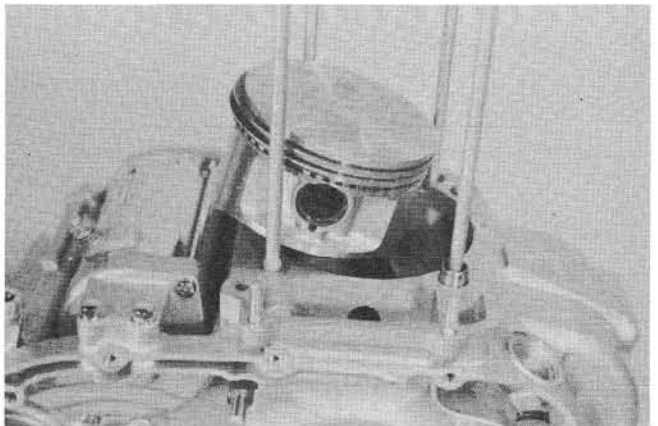
- Remove the cylinder base nuts and cylinder.

**CAUTION:**

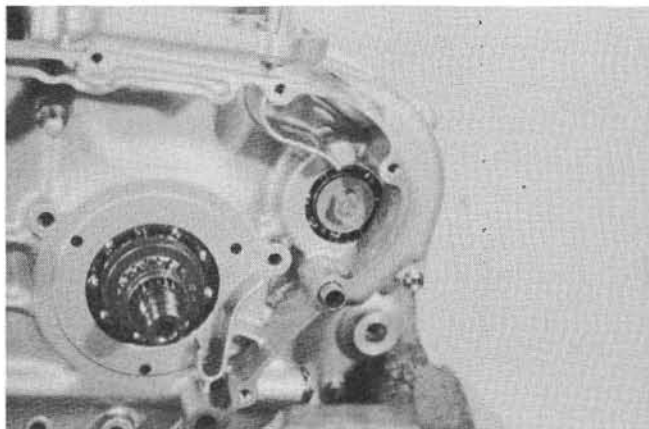
If tapping with a plastic hammer is necessary, do not break the fins.



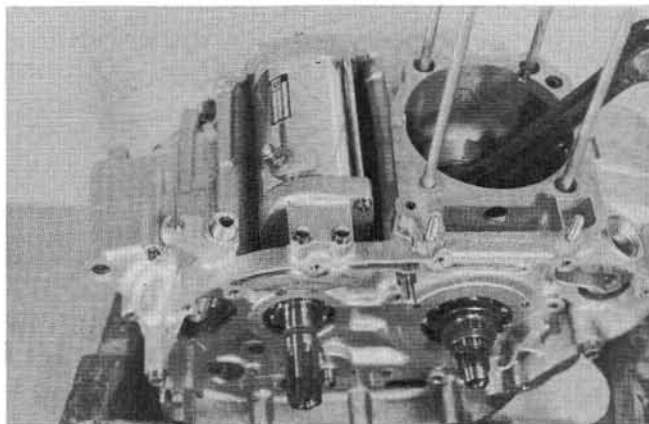
- Place a clean rag over the cylinder base to prevent the piston pin circlip from dropping into crankcase. Remove the piston pin circlip with long-nose pliers.
- Drive out the piston pin by using an appropriate drift.



- Remove the counter balancer bolt and washer.



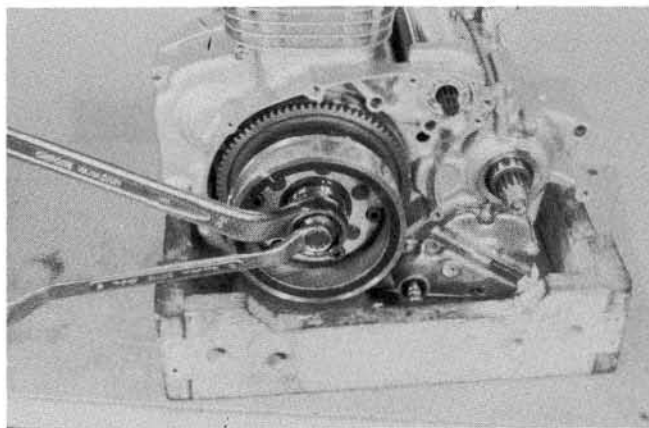
- Remove the starter motor from the crankcase.



- Using 36 mm off-set wrench, loosen the rotor securing bolt by several turns.

**NOTE:**

When removing the generator rotor, do not remove the generator rotor bolt after loosening the bolt. The generator rotor bolt is used in conjunction with the rotor remover.



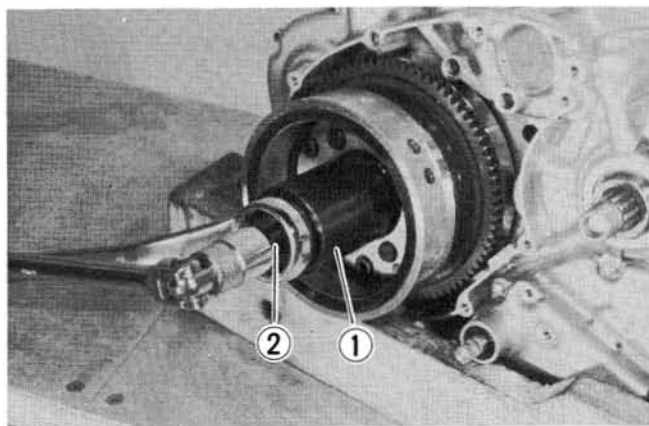
- Install the rotor remover ① into the boss of rotor and remove the rotor by turning the center bolt ② while holding the remover with 36 mm off-set wrench.
- Remove the rotor remover from the rotor and remove the rotor securing bolt.
- After removing the generator rotor, remove the key from the crankshaft.

09930-30720

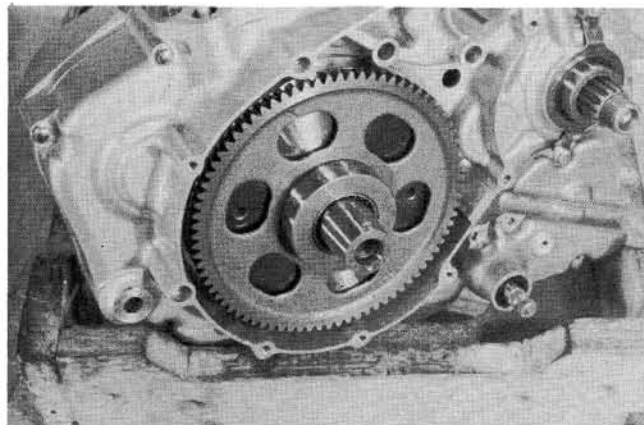
Rotor remover

**NOTE:**

Do not hit the rotor with a hammer.

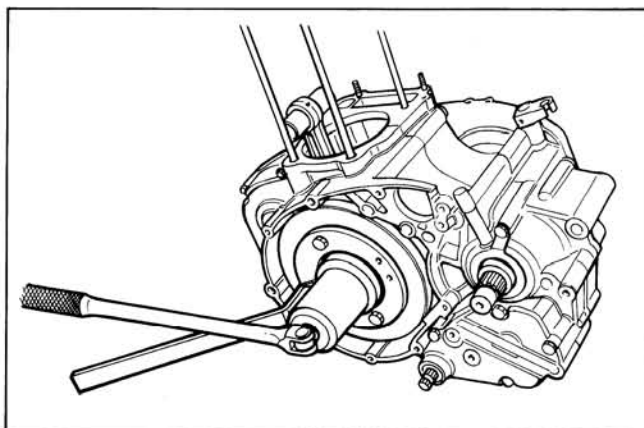


- Remove the starter driven gear from the crankshaft.

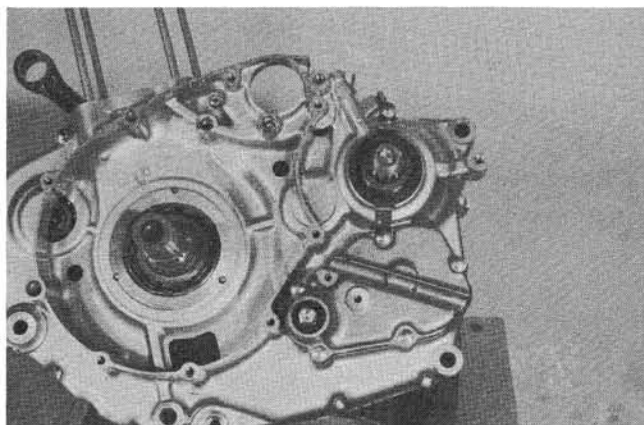


- Hold the crankshaft with the flywheel holder and remove the flywheel nut by using the special tools.

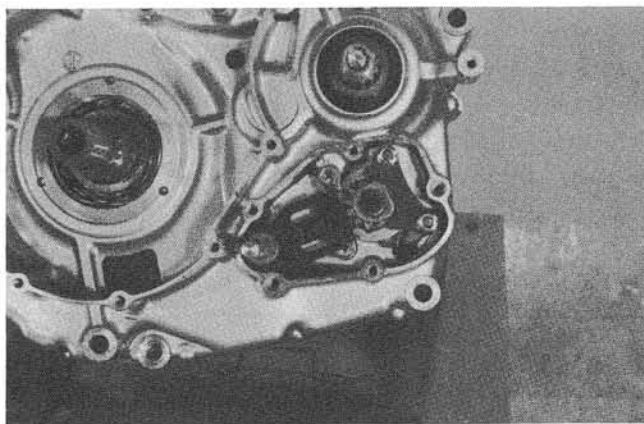
09923-12410	46 mm socket
09930-32410	Flywheel holder



- Remove the flywheel.
- Remove the drive shaft oil seal retainer and spacer.

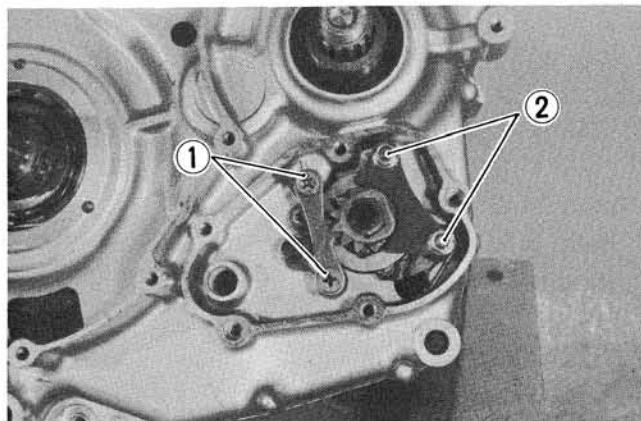


- Remove the gearshift shaft cap.
- Remove the gearshift shaft.





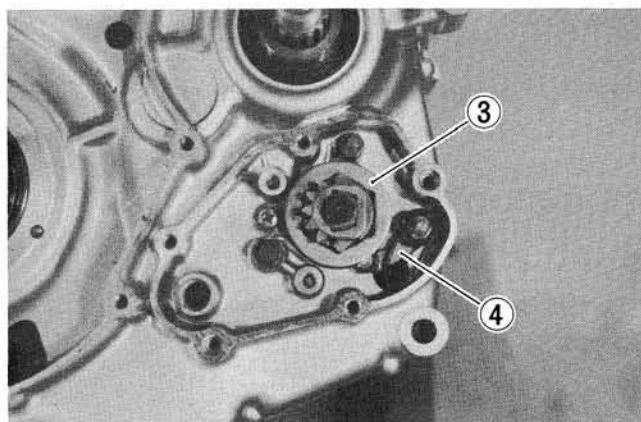
- Remove the gearshift cam guide screws ① and pawl lifter nuts ②.



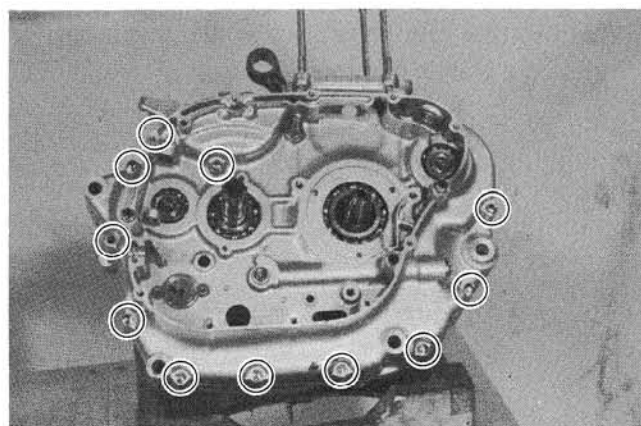
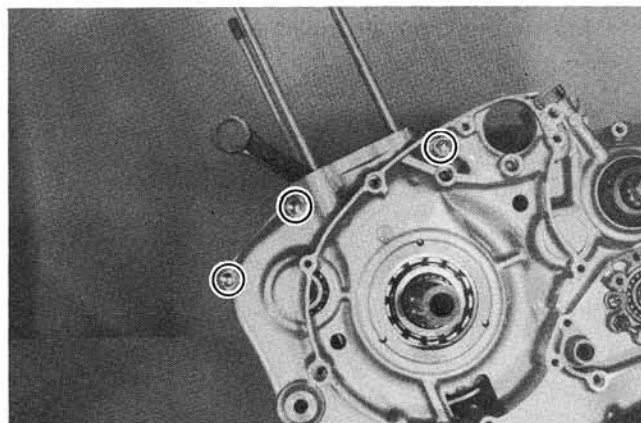
- Remove the gearshift cam driven gear, housing ③ and spacer.
- Unhook the gearshift cam stopper spring and remove the stopper ④ and washer.

**NOTE:**

When removing the cam driven gear, do not lose gear shifting pawl, pin and spring.



- Remove the crankcase securing bolts.



- Separate the crankcase into 2 parts, right and left, with a crankcase separating tool.

09920-13120

Crankcase separating tool

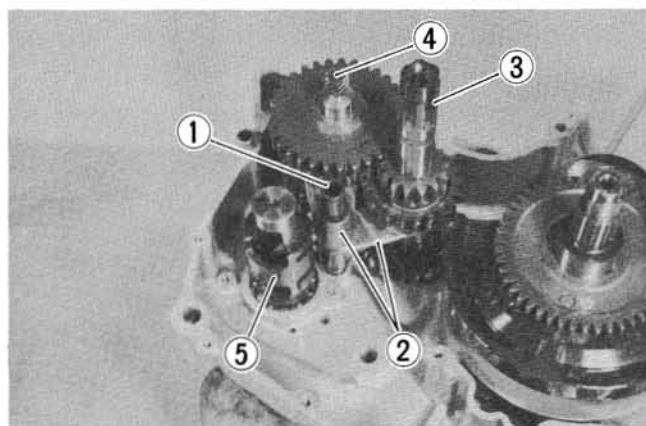
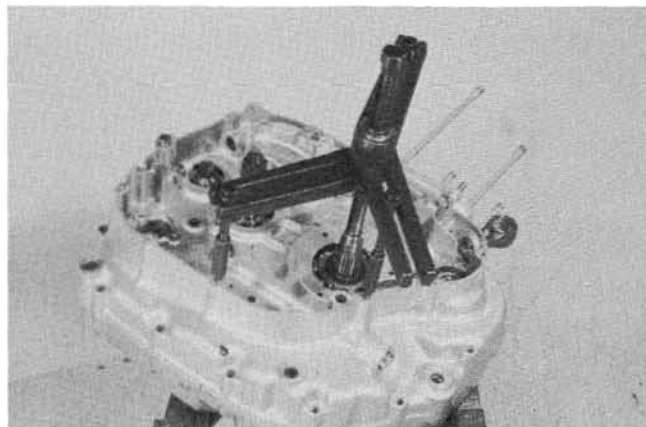
**CAUTION:**

Make sure that all bolts are removed before using the crankcase separating tool.

**NOTE:**

Fit the crankcase separating tool, so that the tool plate is parallel with the end face of the crankcase.

- Draw out the gearshift fork shaft ①, and then remove the gearshift forks ②, countershaft assembly ③, driveshaft assembly ④ and gearshift cam ⑤.



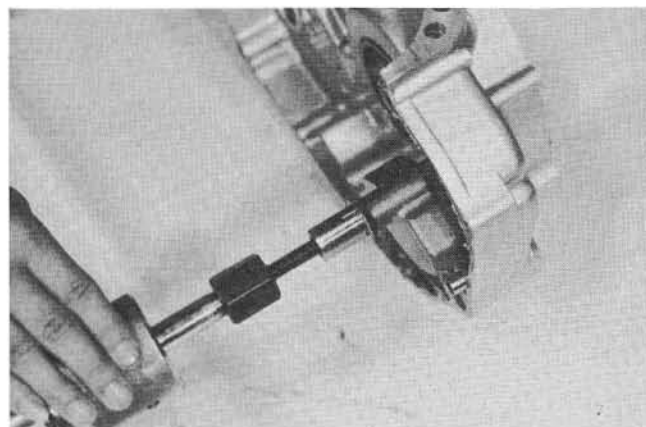
- Remove the counter balancershaft by using the special tools.

09930-30141

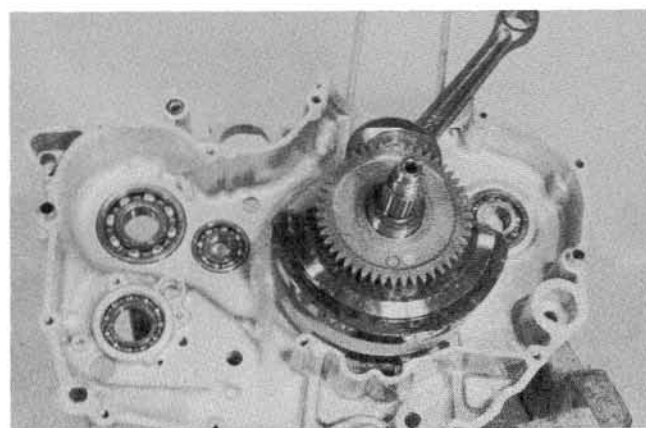
Attachment "A"

09930-30102

Sliding shaft



- Remove the crankshaft from the crankcase by tapping a plastic hammer.





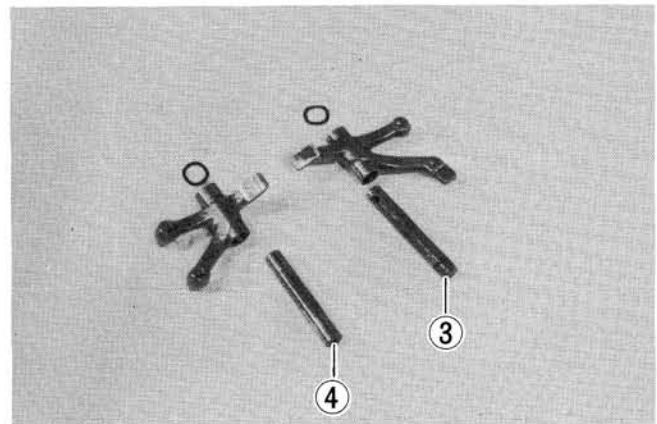
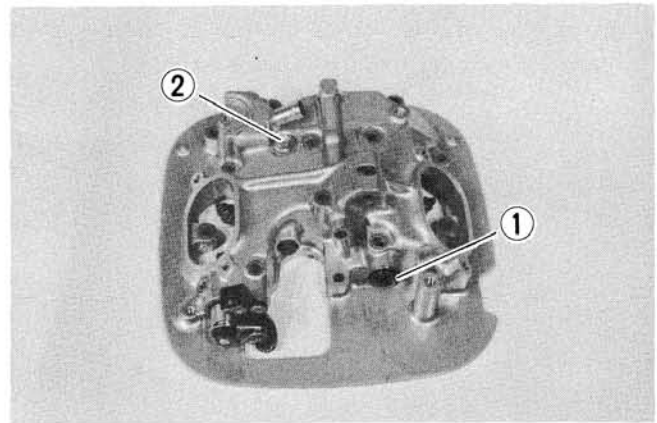
# ENGINE COMPONENTS INSPECTION AND SERVICING

## CYLINDER HEAD SERVICING

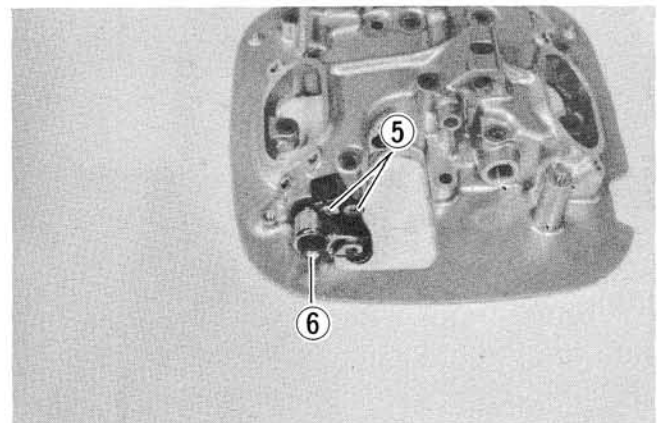
### CAUTION:

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

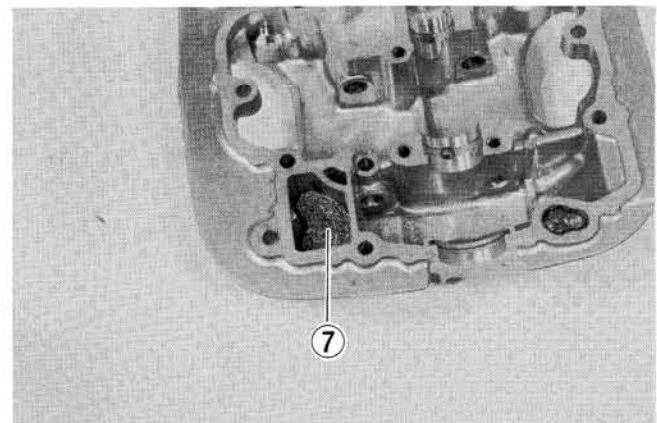
- Remove the intake rocker arm shaft set bolt ① and exhaust rocker arm shaft bolt ②.
- Pull out the exhaust rocker arm shaft ③ using pliers.
- Pull out the intake rocker arm shaft ④ with a 6 mm bolt.



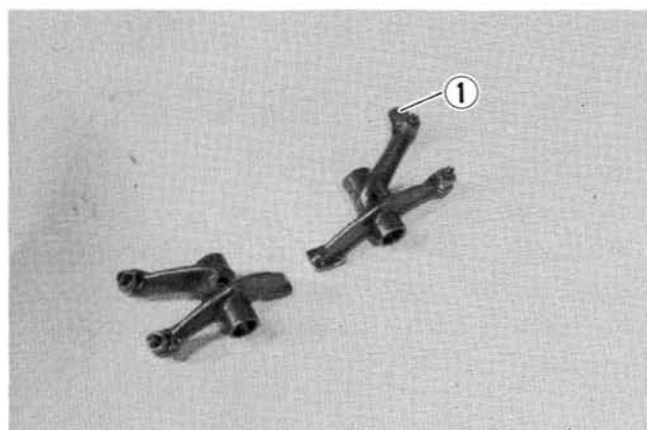
- Remove the de-compression cable bracket by removing the screws ⑤, then pull out the de-compression shaft ⑥.



- Remove the iron meshes ⑦ from the head cover.

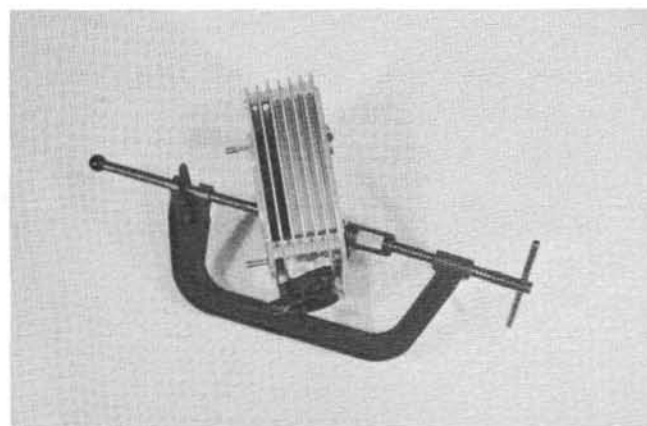


- The exhaust rocker arm can be distinguished from that of the intake by the de-compression shaft contacting surface ① (for exhaust).



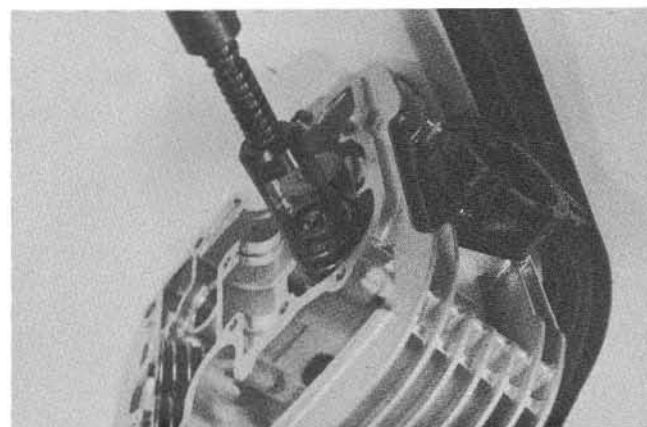
- Compress the valve spring with a valve spring compressor.

09916-14510	Valve spring compressor
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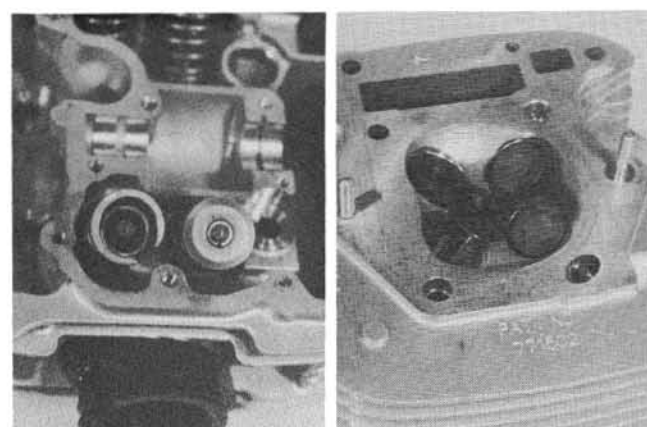


- Take off the valve cotters from the valve stem.

09916-84510	Tweezers
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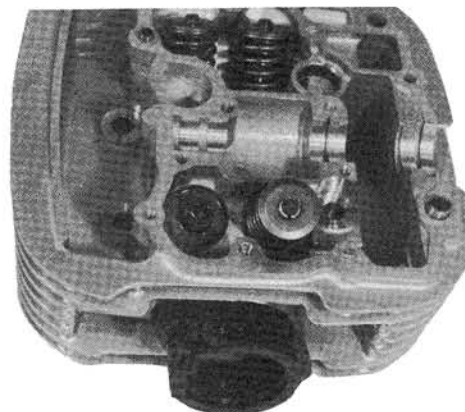
- Take out the valve spring retainer, inner spring and outer spring.
- Pull out the valve from the other side.



- Remove the oil seal by using a long-nose pliers.
- Take out the lower spring seat.

**NOTE:**

Removal of the valves completes ordinary disassembling work. If valve guides have to be removed for replacement after inspecting related parts, carry out the steps shown in valve guide servicing.

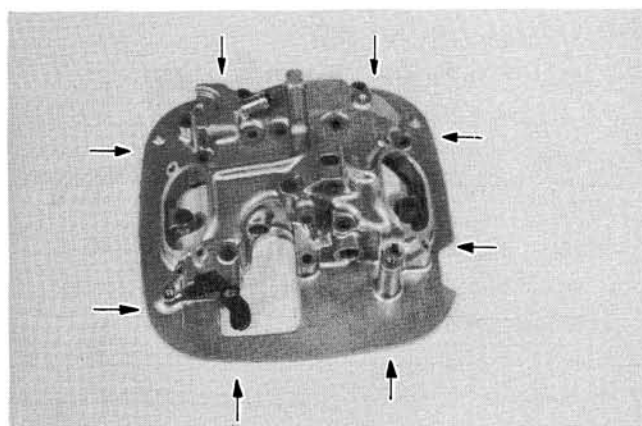


## CYLINDER HEAD COVER DISTORTION

After removing sealant (SUZUKI BOND No. 1216) from the fitting surface of the cylinder head cover, place the cylinder head cover on a surface plate and check for distortion with a thickness gauge. Check points are shown in the illustration.

Service Limit	0.05 mm (0.002 in)
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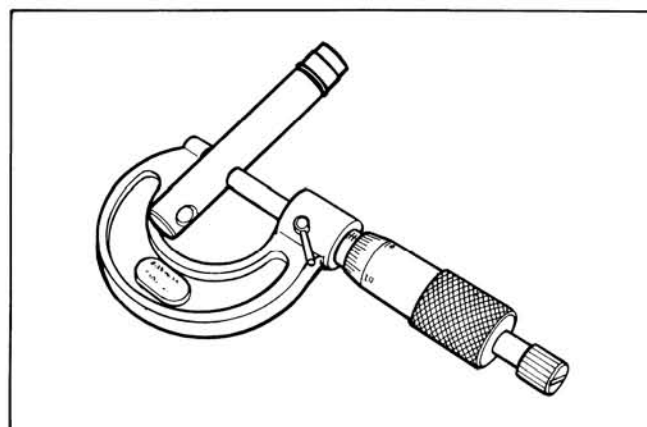
If the distortion exceeds the limit, replace the cylinder head cover.



## ROCKER ARM SHAFT O.D.

Measure the diameter of rocker arm shaft with a micrometer.

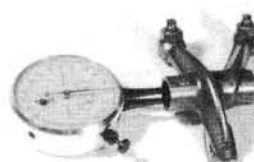
Standard	11.966 – 11.984 mm (0.4711 – 0.4718 in)
09900-20205	Micrometer (0 – 25 mm)



## ROCKER ARM I.D.

When checking the valve rocker arm, the inside diameter of the valve rocker arm and wear of the camshaft contacting surface should be checked.

Standard	12.000 – 12.018 mm (0.4724 – 0.4731 in)
09900-20605	Dial calipers (Not available in U.S.A.)

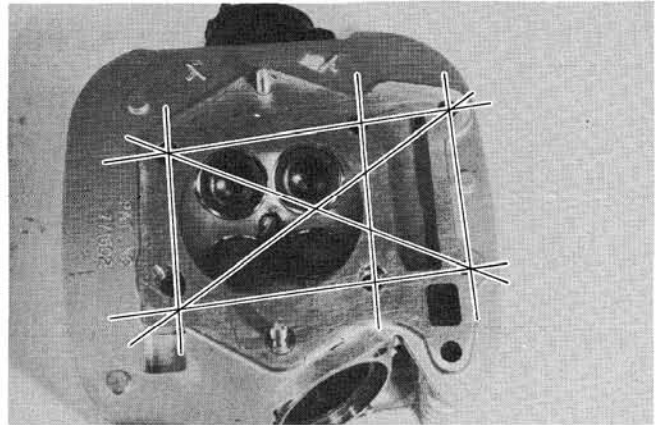


## CYLINDER HEAD DISTORTION

Decarbon combustion chamber.

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

Service Limit	0.05 mm (0.002 in)
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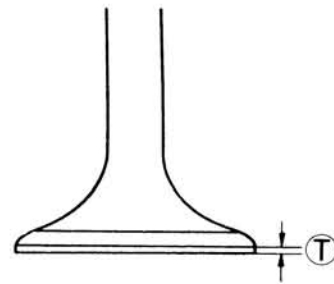
## VALVE FACE WEAR

Measure the thickness ① and, if the thickness is found to have been reduced to the limit, replace the valve.

### NOTE:

Visually inspect each valve for wear of its seating face. Replace any valve with an abnormally worn face.

Service Limit	0.5 mm (0.02 in)
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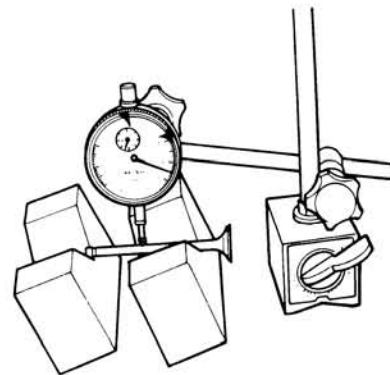


## VALVE STEM RUNOUT

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.

Service Limit	0.05 mm (0.002 in)
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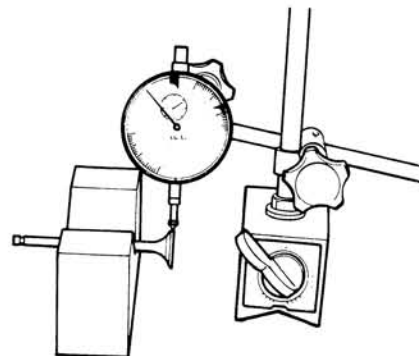
09900-20701	Magnetic stand
09900-20606	Dial gauge (1/100 mm)



## VALVE HEAD RADIAL RUNOUT

Place the dial gauge at right angles to the valve head, and measure the valve head radial runout. If it measures more than limit, replace the valve.

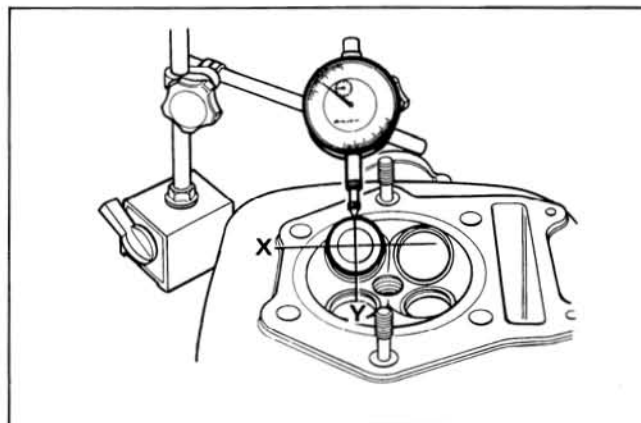
Service Limit	0.03 mm (0.001 in)
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## VALVE GUIDE-VALVE STEM CLEARANCE

Measure the clearance in two directions, "X" and "Y", perpendicular to each other, by rigging up the dial gauge as shown. If the clearance measured exceeds the limit specified below, then determine whether the valve or the guide should be replaced to reduce the clearance to within the standard range:

	Standard	Service Limit
IN.	0.025 – 0.055 mm (0.0010 – 0.0022 in)	0.35 mm (0.014 in)
EX.	0.040 – 0.070 mm (0.0016 – 0.0028 in)	0.35 mm (0.014 in)

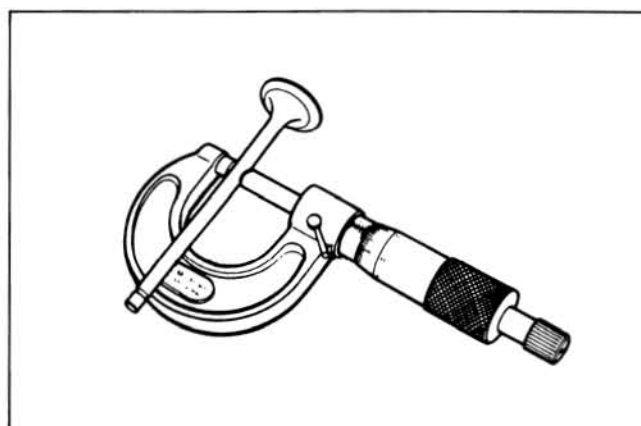


## VALVE STEM WEAR

If the valve stem is worn down to the limit, when measured with a micrometer, and the clearance is found to be in excess of the limit indicated previously, replace the valve, if the stem is within the limit, then replace the guide. After replacing valve or guide, be sure to re-check the clearance.

09900-20205

Micrometer (0 – 25 mm)



### Valve stem O.D.

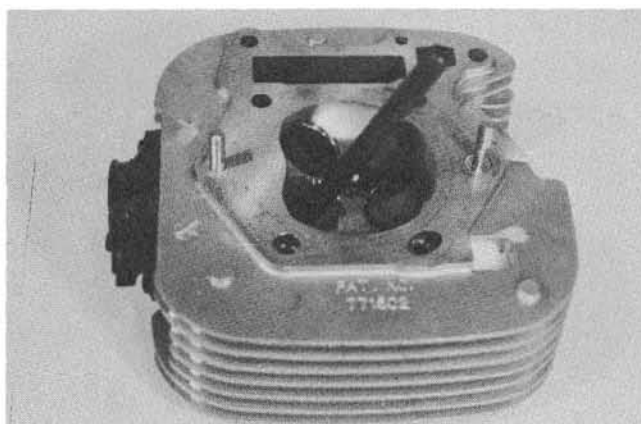
	Standard
IN.	6.960 – 6.975 mm (0.2740 – 0.2746 in)
EX.	6.945 – 6.960 mm (0.2734 – 0.2740 in)

## VALVE GUIDE SERVICING

- Remove the valve guide with the valve guide remover.

09916-44511

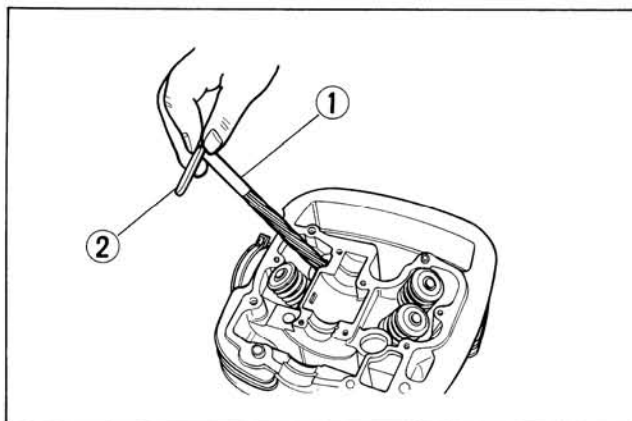
Valve guide remover



- Re-finish the valve guide holes in cylinder head with a 12.3 mm reamer ① and handle ②.

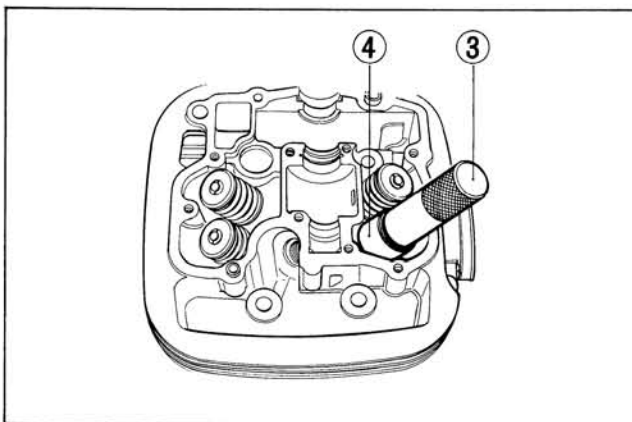
09916-34531	12.3 mm reamer
09916-34541	Handle

- Fit a ring to each valve guide. Be sure to use new rings and valve guides. Rings and valve guides removed in disassembly must be discarded.



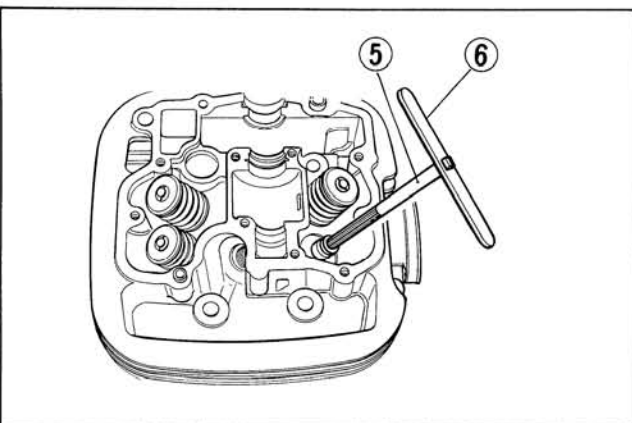
- Lubricate each valve guide, and drive the guide into the guide hole using the valve guide installer handle ③ and valve guide installer attachment ④.

09916-57320	Valve guide installer handle
09916-57311	Attachment

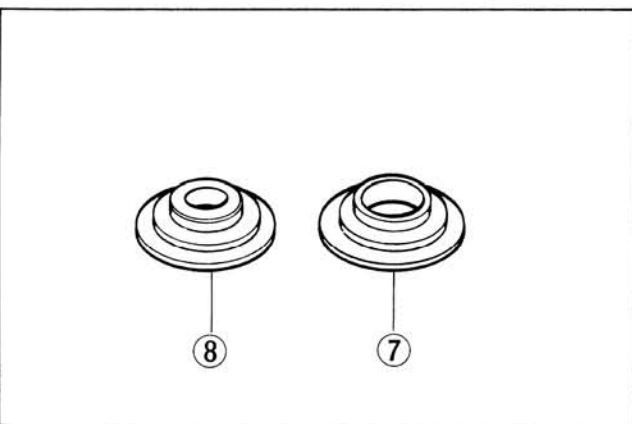


- After fitting the valve guides, re-finish their guiding bores with a 7 mm reamer ⑤ and handle ⑥. Be sure to clean and oil the guides after reaming.

09916-34520	7 mm reamer
09916-34541	Handle



- Install the valve spring lower seat ⑦. Be careful not to confuse the lower seat with the spring retainer ⑧.





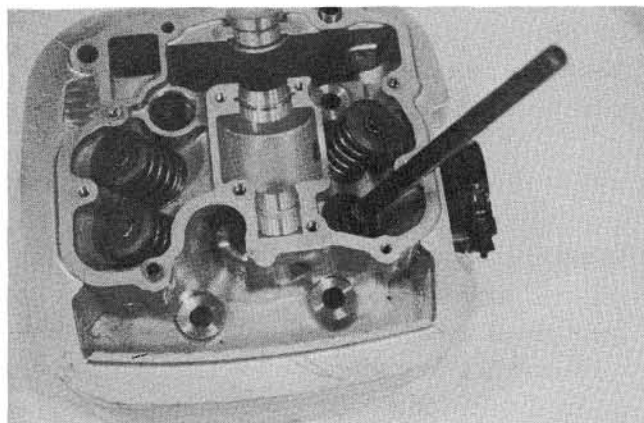
- Lubricate each seal, and drive them into position with the valve guide remover.

**CAUTION:**

Do not reuse the oil seals.

09916-44511

Valve guide remover



## VALVE AND SEAT CONDITION

### VALVE SEAT WIDTH

Coat the valve seat with prussian blue uniformly. 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 specification.

**Valve seat width**

STD. (W)

1.0 – 1.2 mm  
(0.039 – 0.047 in)

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

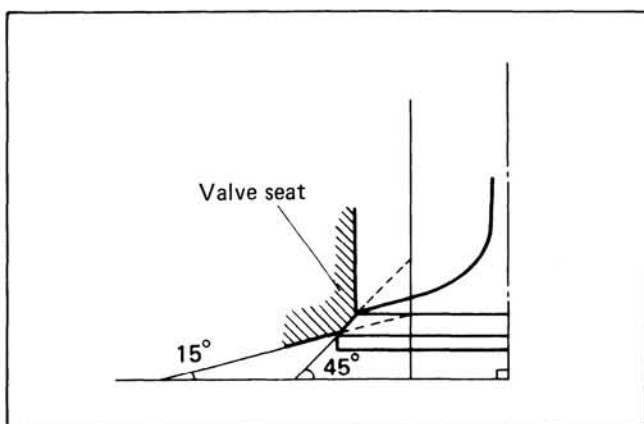
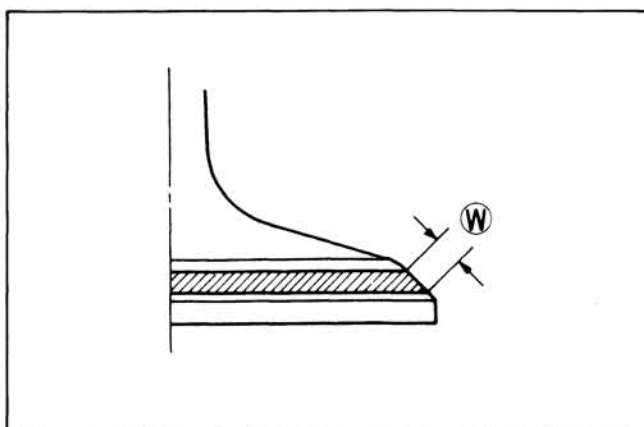
**VALVE SEAT SERVICING**

The valve seats for both intake and exhaust valves are angled to present two bevels, 15° and 45°.

	Intake side	Exhaust side
45°	N-615	N-615
15°	N-615	N-615

Valve seat cutter (N-615)

Solid pilot (6.98)



## NOTE:

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

1. Insert with a slight rotation, the solid pilot that gives a snug fit.
2. Using the 45° cutter, descale and clean up the seat with one or two turns.
3. Inspect the seat by the previous seat width measurement procedure. If the seat is pitted or burned, additional seat conditioning with the 45° cutter is required.

## CAUTION:

Cut the minimum amount necessary from the seat to prevent the possibility of the valve stem becoming too close to the rocker arm for correct valve contact angle.

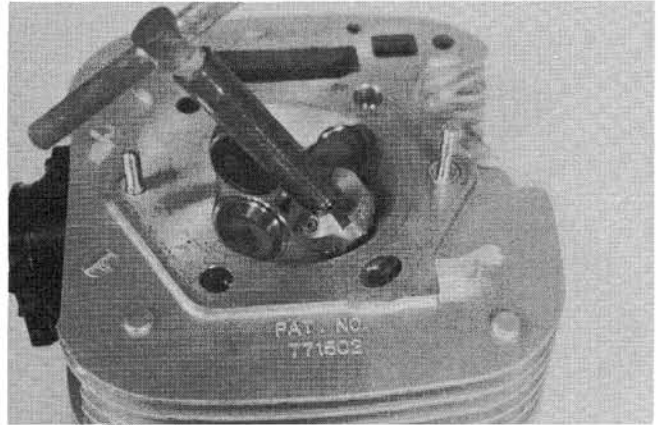
4. After the desired seat position and width is achieved, use the 45° cutter very lightly to clean up any burrs caused by the previous cutting operations. DO NOT use lapping compound after the final cut is made. The finished valve seat should have a velvety smooth finish and not a highly polished or 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.
5. Clean and assemble the head and valve components. Fill the intake and exhaust ports with gasoline to check for leaks. If any leaks occur, inspect the valve seat and face for burrs or other things that could prevent the valve from sealing.

## WARNING:

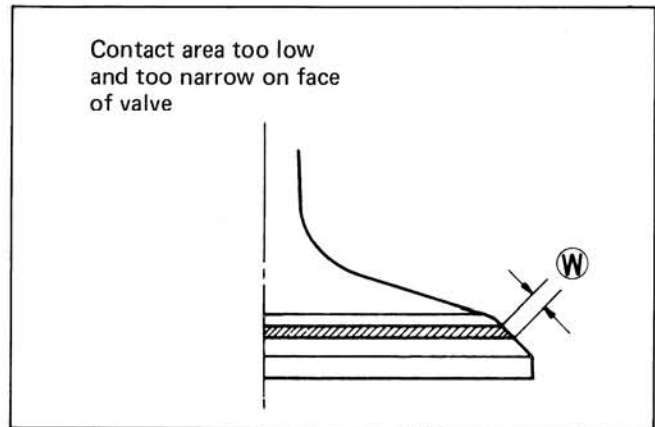
Always use extreme caution when handling gasoline.

## NOTE:

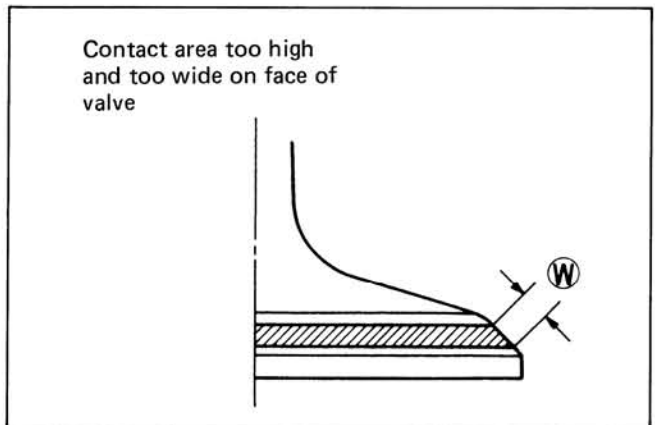
Be sure to adjust the valve clearance after re-assembling the engine.



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

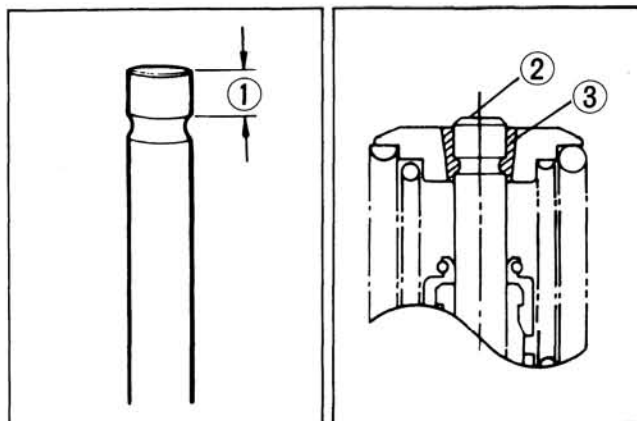


If the contact area is too high or too wide, use the 15° cutter to lower and narrow the contact area.



## VALVE STEM END CONDITION

Inspect the valve stem end face for pitting and wear. If pitting or wear of the stem end face are present, the valve stem end may be resurfaced, providing that the length ① will not be reduced to less than 2.9 mm (0.11 in). If this length becomes less than 2.9 mm (0.11 in), the valve must be replaced. After installing a valve whose stem end has been ground off as above, check to ensure that the face ② of the valve stem end is above the cotters ③.



## VALVE SPRINGS

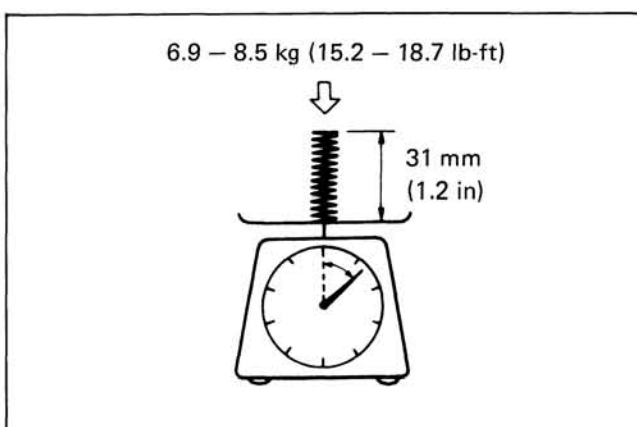
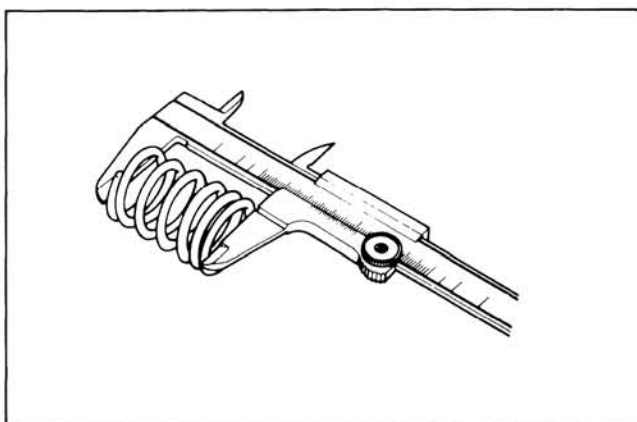
Check the springs for strength by measuring their free lengths and also the force required to compress them. If the limit indicated below is exceeded by the free length reading or if the measured force does not fall within the range specified, replace both the inner and outer springs as a set.

### Valve spring free length

Spring	Service Limit
INNER	35.6 mm (1.40 in)
OUTER	40.4 mm (1.59 in)

### Valve spring tension

Spring	Standard
INNER	6.9 – 8.5 kg/31 mm (15.2 – 18.7 lbs/1.2 in)
OUTER	16.4 – 18.8 kg/33 mm (36.2 – 41.4 lbs/1.3 in)



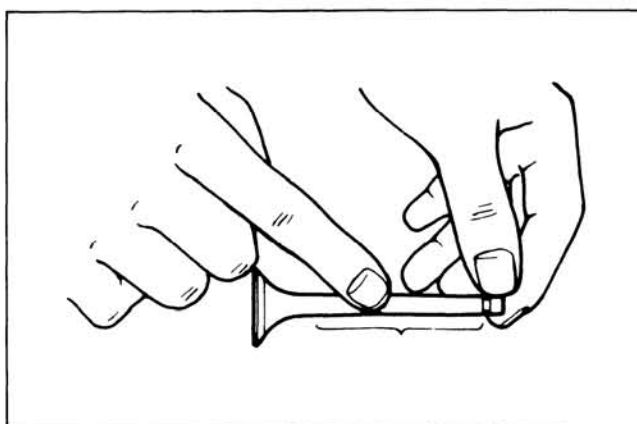
## REASSEMBLY

- Insert the valves, with their stems coated with (SUZUKI MOLY PASTE) all around and along the full stem length without any break. Similarly oil the lip of the stem seal.

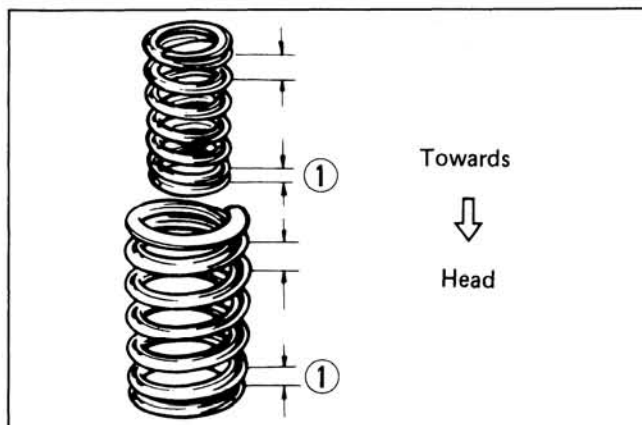
99000-25140	SUZUKI moly paste
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### CAUTION:

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

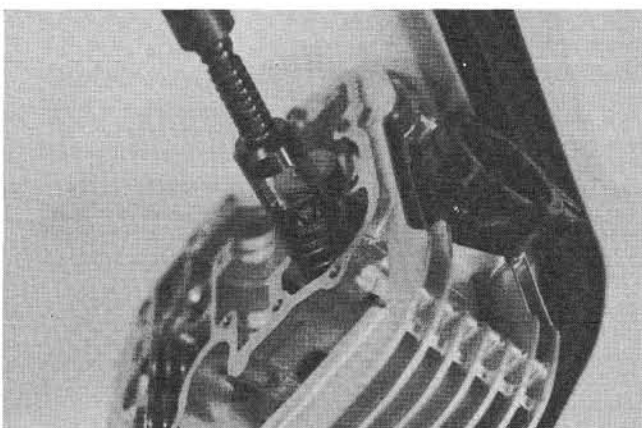


- Install the valve springs, making sure that the close-pitch end ① of each spring goes in first to rest on the head. The coil pitch of both the inner and outer springs vary: the pitch decreases from top to bottom, as shown in the illustration.



- Fit a valve spring retainer, compress the springs with a valve spring compressor and fit the cotter halves to the stem end.

09916-14510	Valve spring compressor
09916-84510	Tweezers



## CAMSHAFT

The camshaft should be checked for runout and also for wear of cams and journals if the engine has been noted to produce abnormal noise or vibration or to lack power output. Any of these malconditions could be caused by a worn camshaft.

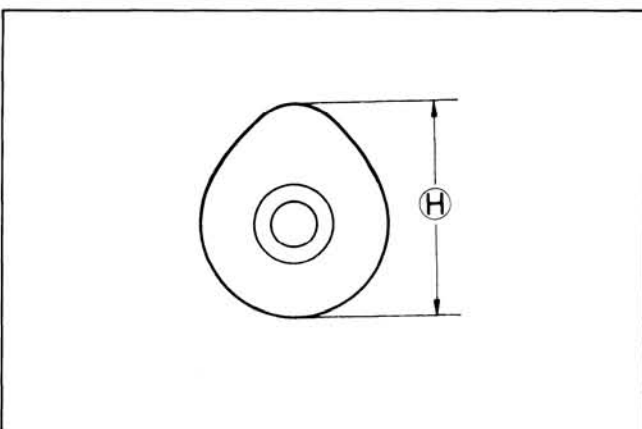
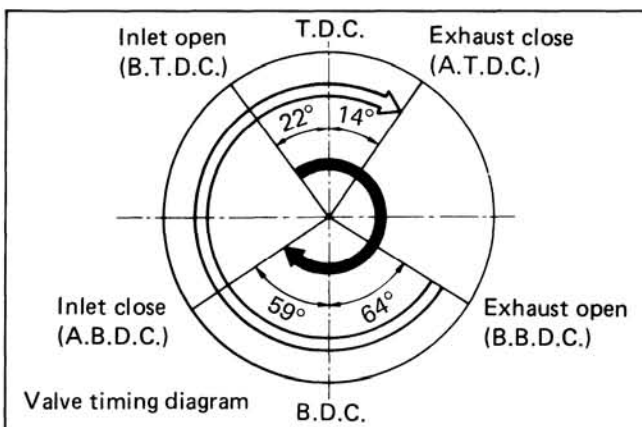
## CAMSHAFT CAM WEAR

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  $\textcircled{H}$ , which is to be measured with a micrometer. Replace camshaft if found it worn down to the limit.

09900-20202	Micrometer (25 – 50 mm)
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### Cam height

Height $\textcircled{H}$	Service Limit
Intake cam	35.880 mm (1.4126 in)
Exhaust cam	36.120 mm (1.4220 in)



## CAMSHAFT JOURNAL WEAR

Determine whether each journal is worn down to the limit or not by measuring camshaft journal oil clearance with the camshaft installed. Use plasti-gauge to read the clearance, which is specified as follows:

### Camshaft journal oil clearance

Service Limit	0.150 mm (0.0060 in)
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- Tighten the cylinder head cover bolts evenly and diagonally to the specified torque.

### Cylinder head cover tightening torque

Tightening torque	8 – 12 N·m (0.8 – 1.2 kg·m) (6.0 – 8.5 lb·ft)
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09900-22301	Plastigauge (Not available in U.S.A.)
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If the camshaft journal oil clearance measured exceeds the limit, measure the outside diameter of camshaft.

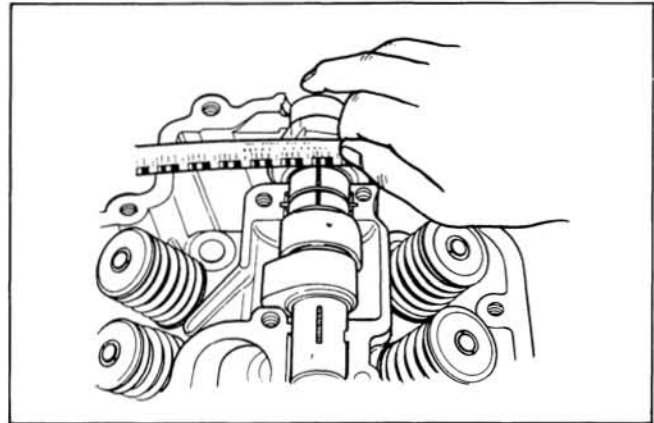
Replace either the cylinder head set or the camshaft if the clearance is incorrect.

09900-20205	Micrometer (0 – 25 mm)
Camshaft journal O.D. (Right & Center)	24.959 – 24.976 mm (0.9826 – 0.9833 in)
Camshaft journal O.D. (Left)	19.959 – 19.976 mm (0.7858 – 0.7865 in)

## CAMSHAFT RUNOUT

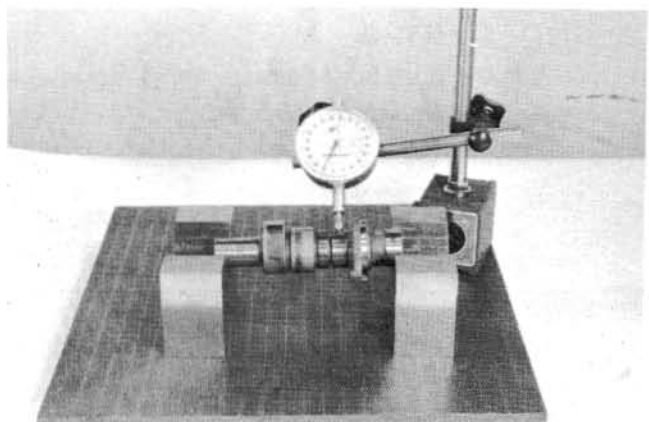
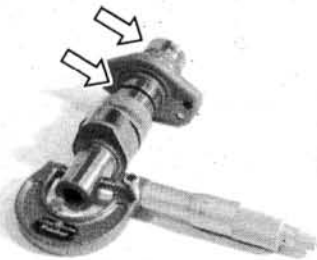
Measure the runout with a dial gauge. Replace the camshaft if the runout exceeds the limit.

Service Limit	0.10 mm (0.004 in)
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### NOTE:

To properly measure the oil clearance with plasti-gauge, all gasket material must be removed from fitting surfaces of cylinder head and cover. Do not apply SUZUKI BOND No. 1216 until after the oil clearance has been determined.

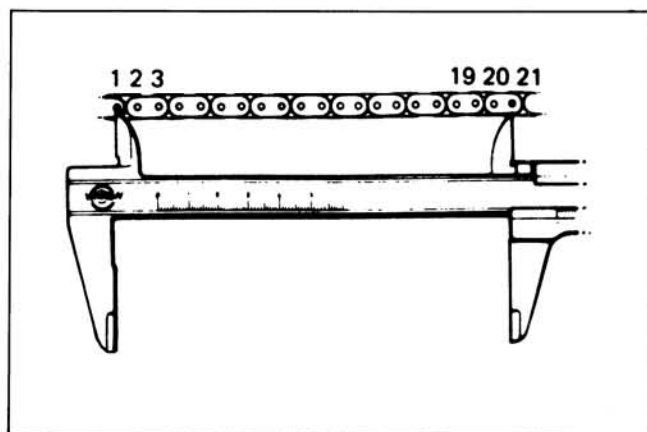




### CAM DRIVE CHAIN 20-PITCH LENGTH

Pull the chain tight to remove any slack, then using vernier calipers, measure the 20-pitch (21 pins) length of chain. If it measures more than the limit, replace the chain.

Service Limit	128.9 mm (5.07 in)
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### CAM CHAIN TENSIONER

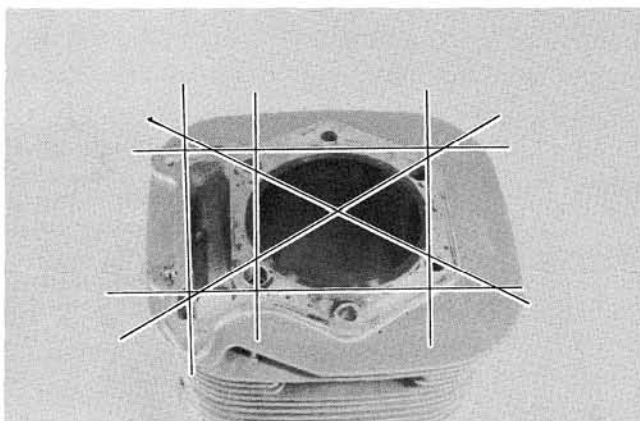
Unlock the ratchet mechanism, and move the push-rod in place to see if it slides smoothly. If any stickiness is noted or ratchet mechanism is faulty, replace the chain tensioner assembly with a new one.



### CYLINDER DISTORTION

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

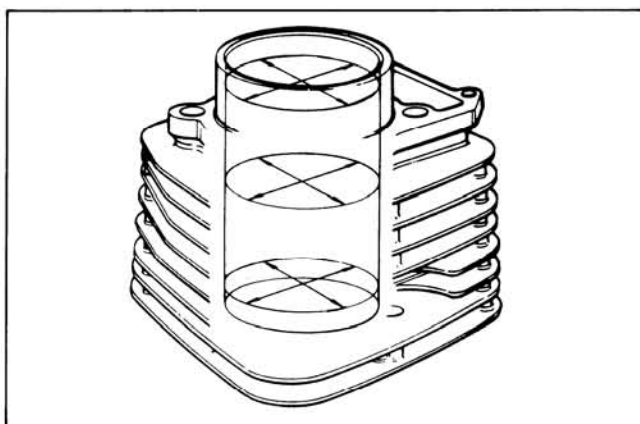
Service Limit	0.05 mm (0.002 in)
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### CYLINDER BORE

Measure the cylinder bore diameter at six places. If any one of the measurements exceeds the limit, overhaul the cylinder and replace the piston with an oversize, or replace the cylinder.

Service Limit	94.080 mm (3.7039 in)
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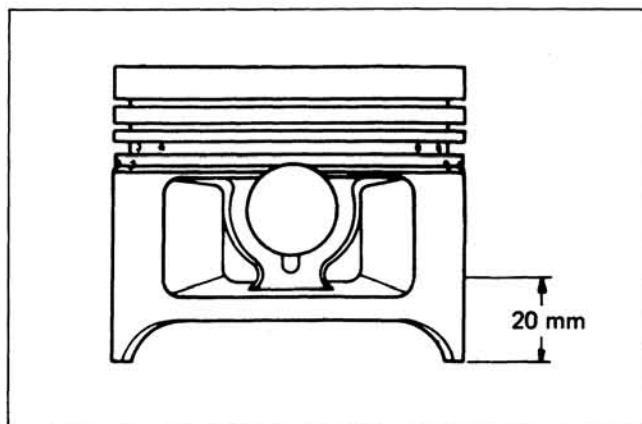




## PISTON DIAMETER

Using a micrometer, measure the piston outside diameter at the place 20 mm (0.8 in) from the skirt end as shown in Fig. If the measurement is less than the limit, replace the piston.

09900-20203	Micrometer (50 – 75 mm)
Service Limit	93.880 mm (3.6961 in)
Piston oversize	0.5, 1.0 mm



## PISTON-CYLINDER CLEARANCE

As a result of the previous measurement, if the piston to cylinder clearance exceeds the limit shown in the table below, overhaul the cylinder and use an oversize piston, or replace both cylinder and piston.

Service Limit	0.120 mm (0.0047 in)
---------------	----------------------

## PISTON RING-GROOVE CLEARANCE

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

09900-20803	Thickness gauge
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### Piston ring-groove clearance

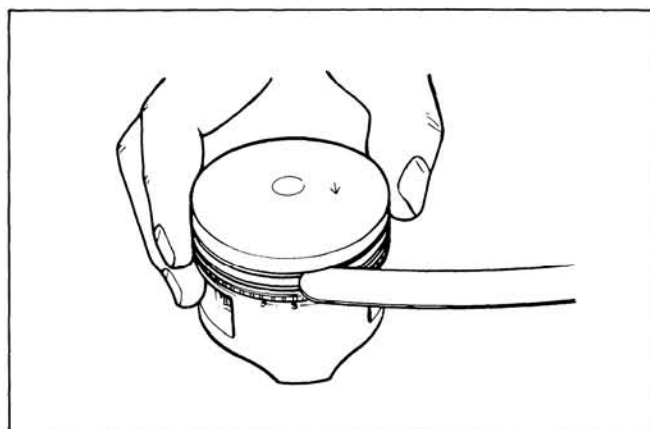
Piston ring	Service Limit
1st	0.180 mm (0.007 in)
2nd	0.150 mm (0.006 in)

### Piston ring groove width

Piston ring	Standard
1st	1.23 – 1.25 mm (0.0484 – 0.0492 in)
2nd	1.21 – 1.23 mm (0.0476 – 0.0484 in)
Oil	2.81 – 2.83 mm (0.1106 – 0.1114 in)

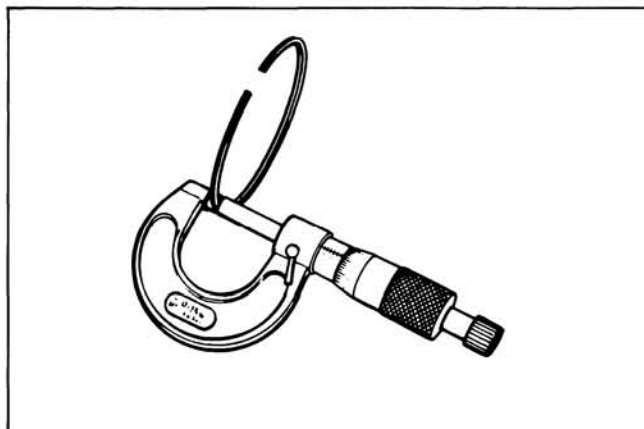
### NOTE:

Using a soft-metal scraper, decarbon the crown of the piston. Clean the ring grooves similarly.



**Piston ring thickness**

Piston ring	Standard
1st and 2nd	1.175 – 1.190 mm (0.0463 – 0.0469 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 end gap, replace the ring.

**Piston ring free end gap**

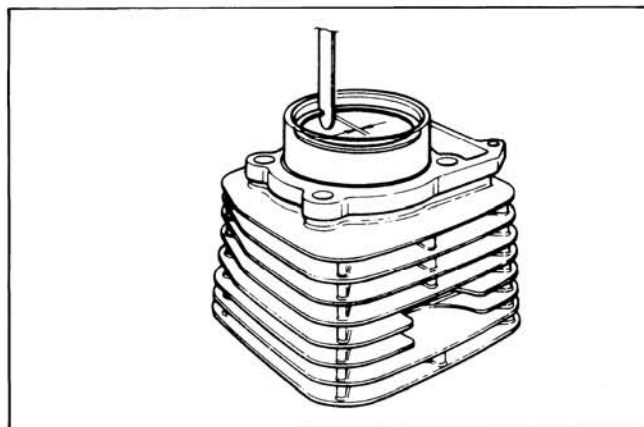
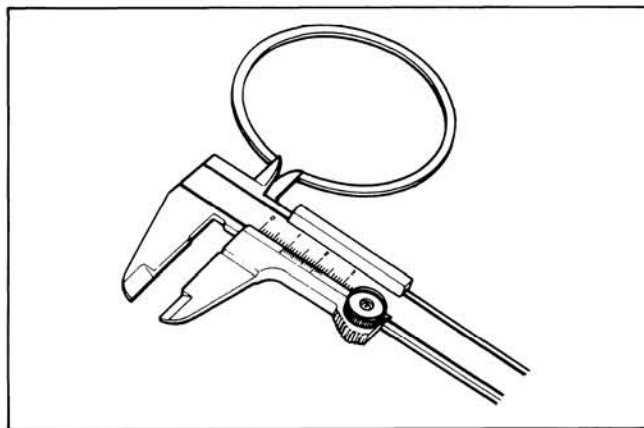
Piston ring	Service Limit
1st	9.2 mm (0.36 in)
2nd	11.2 mm (0.44 in)

09900-20101	Vernier calipers
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**Piston ring end gap**

Piston ring	Service Limit
1st and 2nd	1.00 mm (0.039 in)

09900-20803	Thickness gauge
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## OVERSIZE RINGS

### ● Oversize piston rings

The following two types of oversize piston rings are used. They bear the following identification numbers.

Piston ring	1st	2nd
0.5 mm O.S.	50	50
1.0 mm O.S.	100	100

### ● Oversize oil rings

The following two types of oversize oil rings are used. They bear the following identification marks.

SIZE	COLOR CODE
Standard	Painted red
0.5 mm O.S.	Painted blue
1.0 mm O.S.	Painted yellow

### ● Oversize side rail

Just measure outside diameter to identify the side rail as there is no mark or numbers on it.

## PISTON PIN AND PIN BORE

Using a caliper 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.

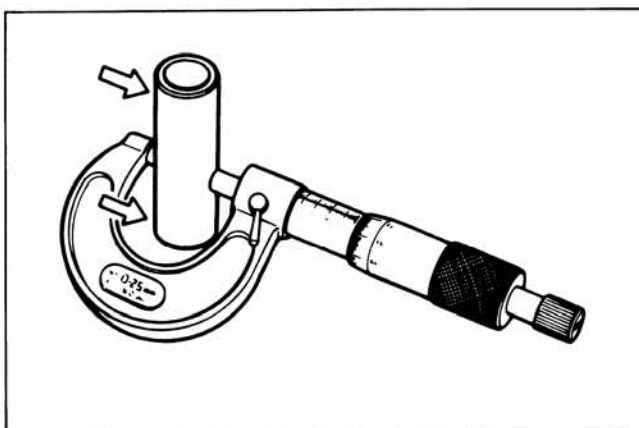
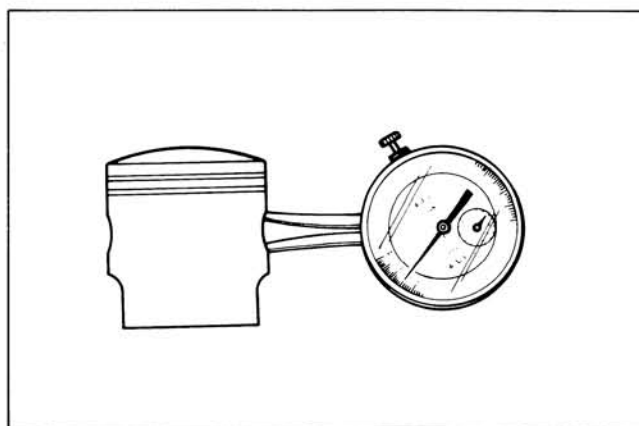
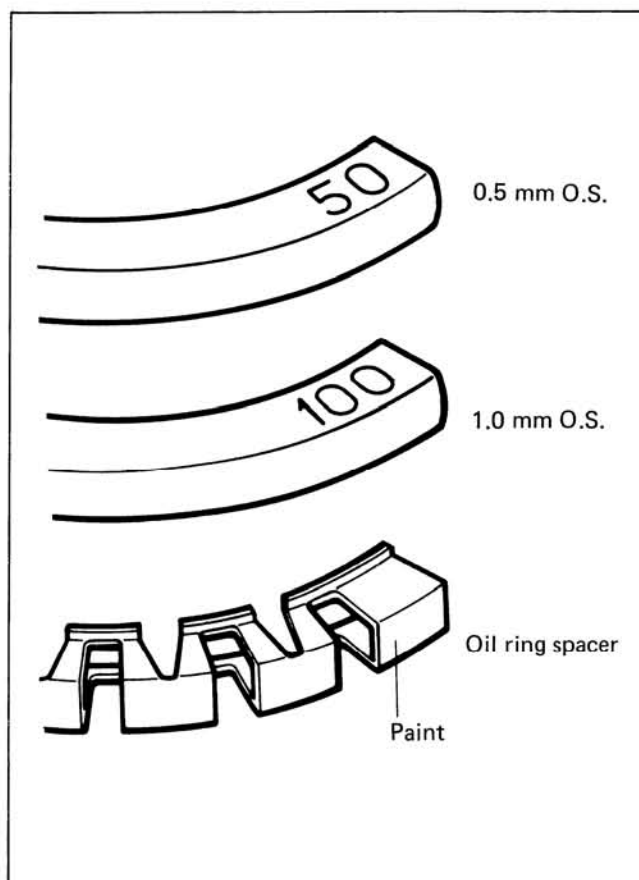
09900-20605	Dial calipers (Not available in U.S.A.)
09900-20205	Micrometer (0 – 25 mm)

### Piston pin bore

Service Limit	23.030 mm (0.9067 in)
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### Piston pin O.D.

Service Limit	22.980 mm (0.9047 in)
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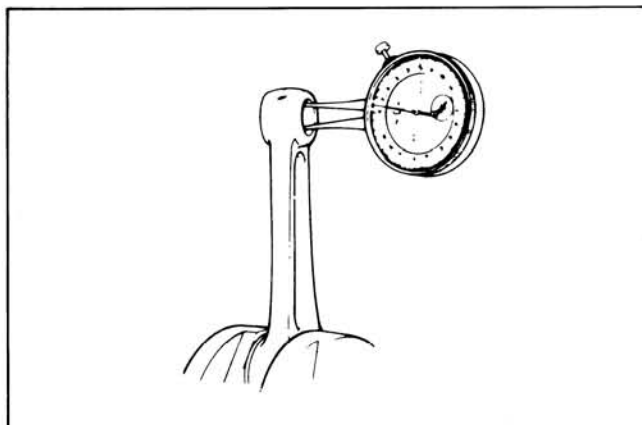


**CONROD SMALL END I.D.**

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

Service Limit	23.040 mm (0.9071 in)
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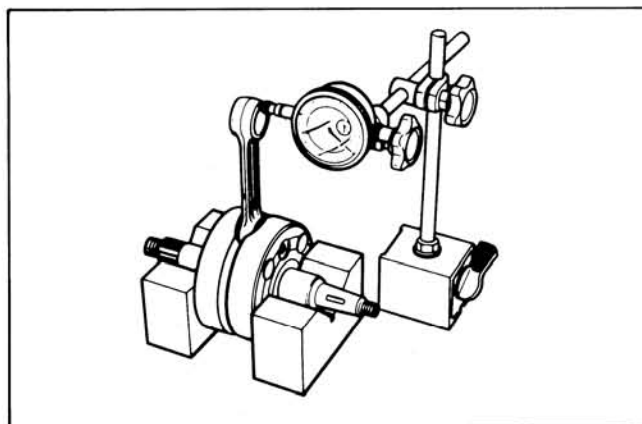
If the conrod small end bore inside diameter exceeds the limit, replace the conrod.

**CONROD DEFLECTION AND CONROD BIG END SIDE CLEARANCE**

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

Service Limit	3.0 mm (0.12 in)
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09900-20606	Dial guage (1/100 mm)
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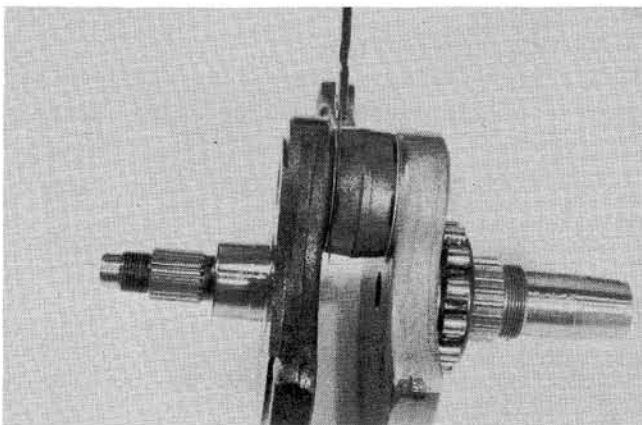


Push the big end of the conrod to one side and measure the side clearance with a thickness gauge.

09900-20803	Thickness gauge
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Standard	Service Limit
0.10 – 0.65 mm (0.004 – 0.026 in)	1.00 mm (0.039 in)

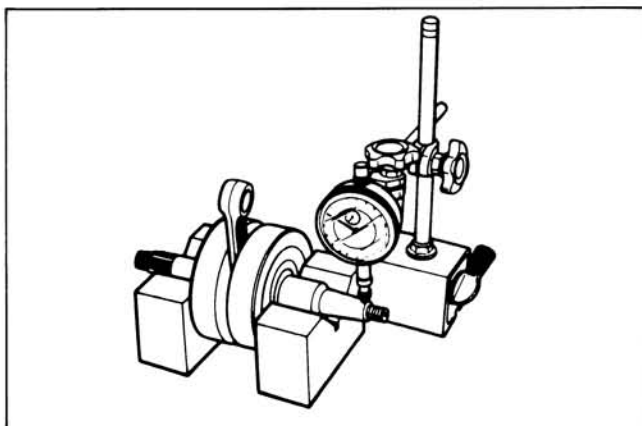
Where the limit is exceeded, replace crankshaft assembly or reduce the deflection and the side clearance to within the limit by replacing the worn parts – conrod, big end bearing and crankpin etc.

**CRANKSHAFT RUNOUT**

Support the crankshaft with "V" blocks as shown, with the two end journals resting on the blocks. Position the dial gauge, as shown, and rotate the crankshaft slowly to read the runout.

Correct or replace the crankshaft if the runout is greater than the limit.

Service Limit	0.05 mm (0.002 in)
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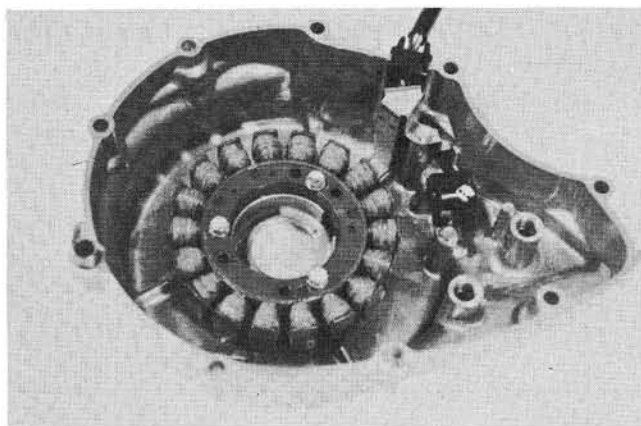
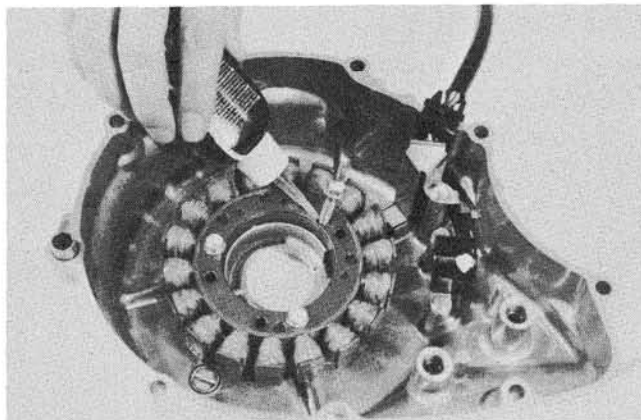
## GENERATOR AND PICK-UP COIL

- Apply THREAD LOCK "1342" (99000-32050) to the stator set screws and its lead wire guide screws.

### NOTE:

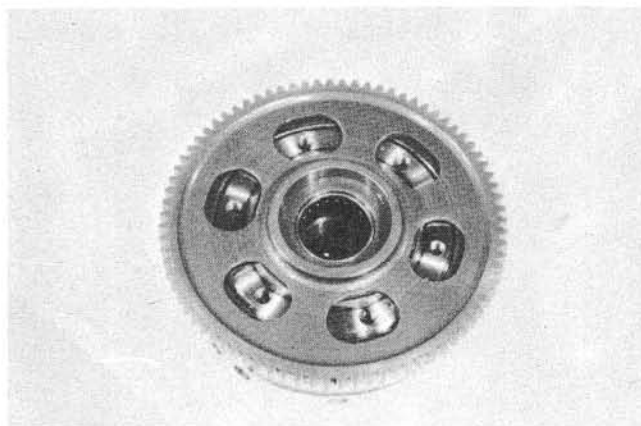
Wipe off oil or grease on screw completely, and then apply the screw lock.

- Mount the lead wire clamp as shown in the figure.



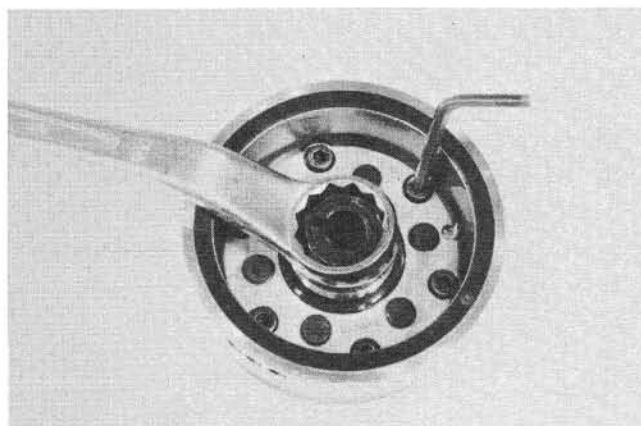
## STARTER CLUTCH

- Install the starter driven gear to the starter clutch and check that the starter driven gear should turn freely, and not turn in the opposite direction. If the driven gear turns both direction or is locked, replace the driven gear and starter clutch.



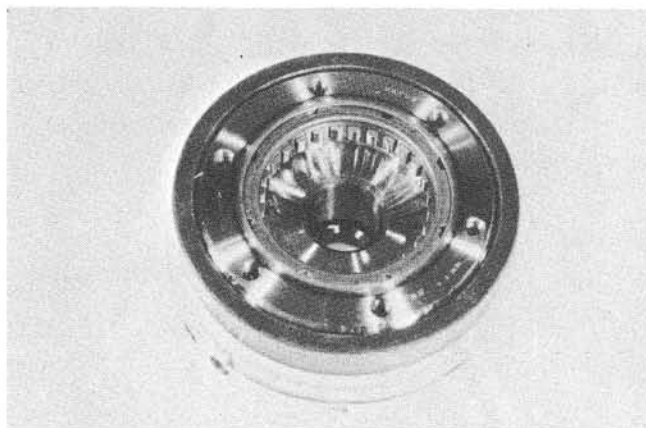
## DISASSEMBLY

- Hold the rotor with a 36-mm offset wrench and remove the six bolts to separate the starter clutch.



## REASSEMBLY

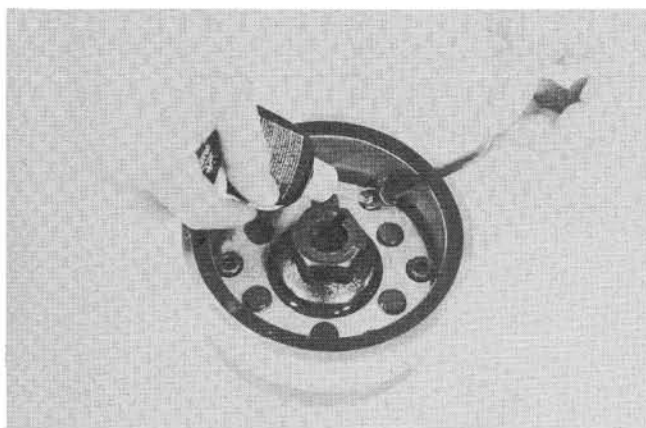
- When fitting the one-way clutch to the bracket, position flange side of the one-way clutch to the rotor side.



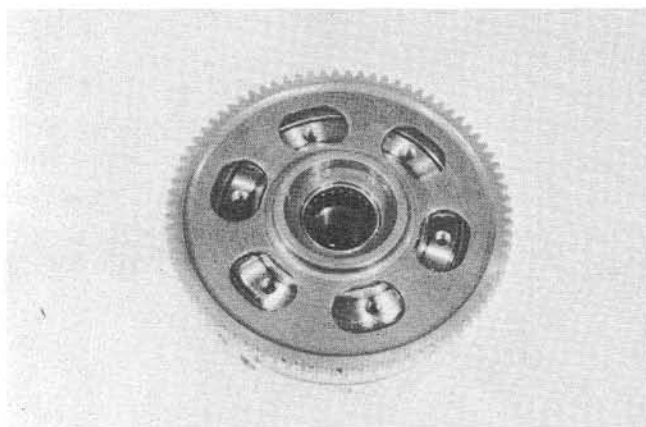
- Apply thread lock super "1303" to the six Allen bolts.
- Tighten them to the specified torque while holding the rotor with 36-mm off-set wrench.

99000-32030	Thread lock super "1303"
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Tightening torque	$23 - 28 \text{ N}\cdot\text{m}$ $(2.3 - 2.8 \text{ kg}\cdot\text{m})$ $(16.5 - 20.0 \text{ lb}\cdot\text{ft})$
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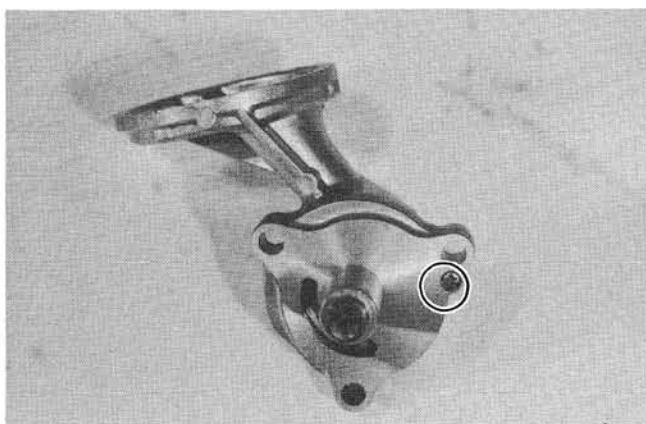
- Finally check the operation of the starter clutch.



## OIL PUMP

### WARNING:

Oil pump case securing screw is applied SUZUKI LOCK SUPER "1303". If attempt is made to overhaul the oil pump assembly, the screw may be damaged. As a replacement, only the oil pump unit is available.





## CLUTCH DRIVEN PLATE

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

09900-20803	Thickness gauge
Service Limit	0.1 mm (0.004 in)

## CLUTCH SPRING FREE LENGTH

Measure the free length of each coil spring with a vernier calipers, and determine the elastic strength of each. Replace any spring not within the limit.

09900-20101	Vernier calipers
Service Limit	33.0 mm (1.30 in)

## CLUTCH RELEASE BEARING

Inspect the 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 much on the condition of this bearing.

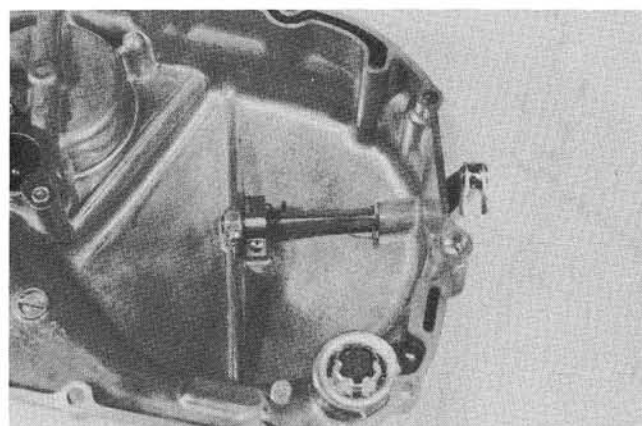
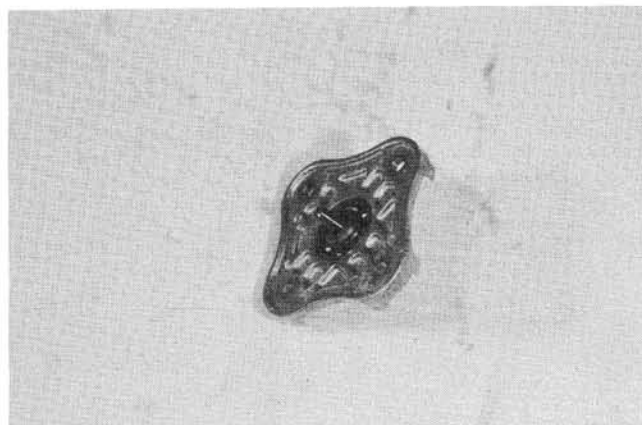
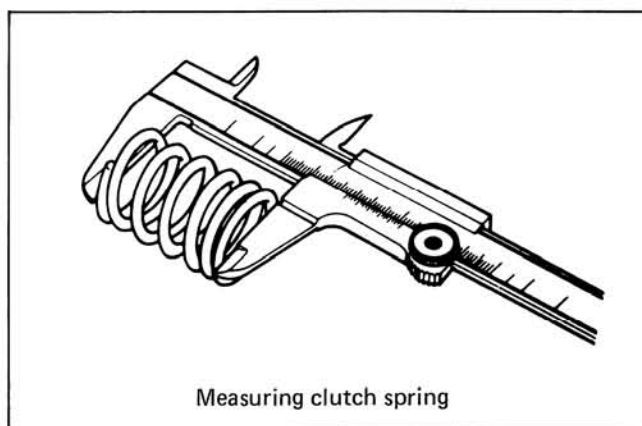
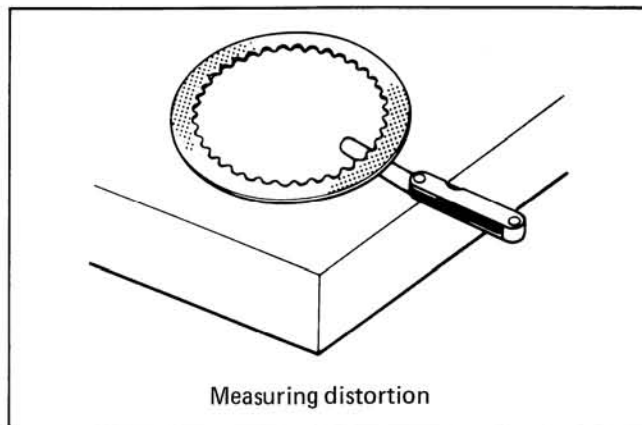
## CLUTCH PUSH ROD AND RELEASE SHAFT

Inspect the clutch push rod and release shaft for damage or wear. If the defect is found, replace it. When installing the pushrod to the pushpiece, apply SUZUKI super grease "A" to the pushrod.

99000-25030	SUZUKI super grease "A"
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When replacing the clutch push rod, measure the length of the present push rod and select the proper length one from the following table.

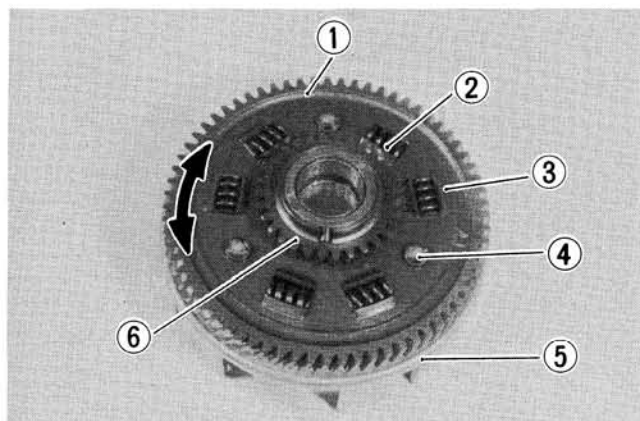
Part No.	Length
23111-24B00-445	44.5 mm (1.75 in)
23111-24B00-455	45.5 mm (1.79 in)
23111-24B00-465	46.5 mm (1.83 in)



## PRIMARY DRIVEN GEAR ASSEMBLY

If the internal damper wears, play is generated between gear and housing, causing abnormal noise. If the play is extreme, replace the primary driven gear assembly with a new one.

- |                       |                       |
|-----------------------|-----------------------|
| ① Primary driven gear | ④ Rivet               |
| ② Damper spring       | ⑤ Clutch housing      |
| ③ Plate               | ⑥ Oil pump drive gear |

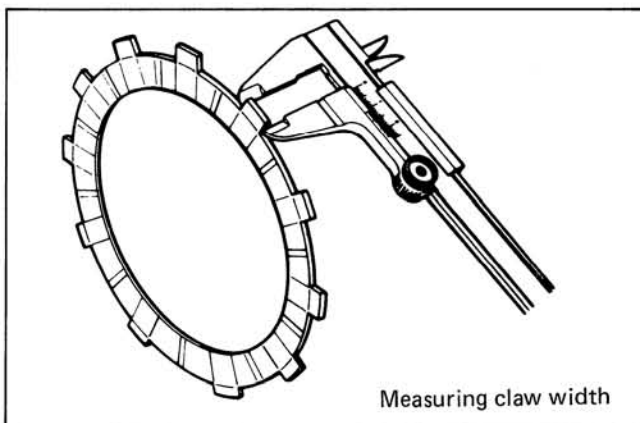
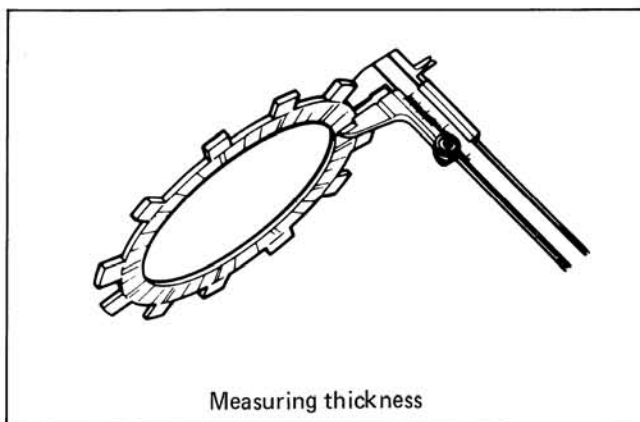


## CLUTCH DRIVE PLATE

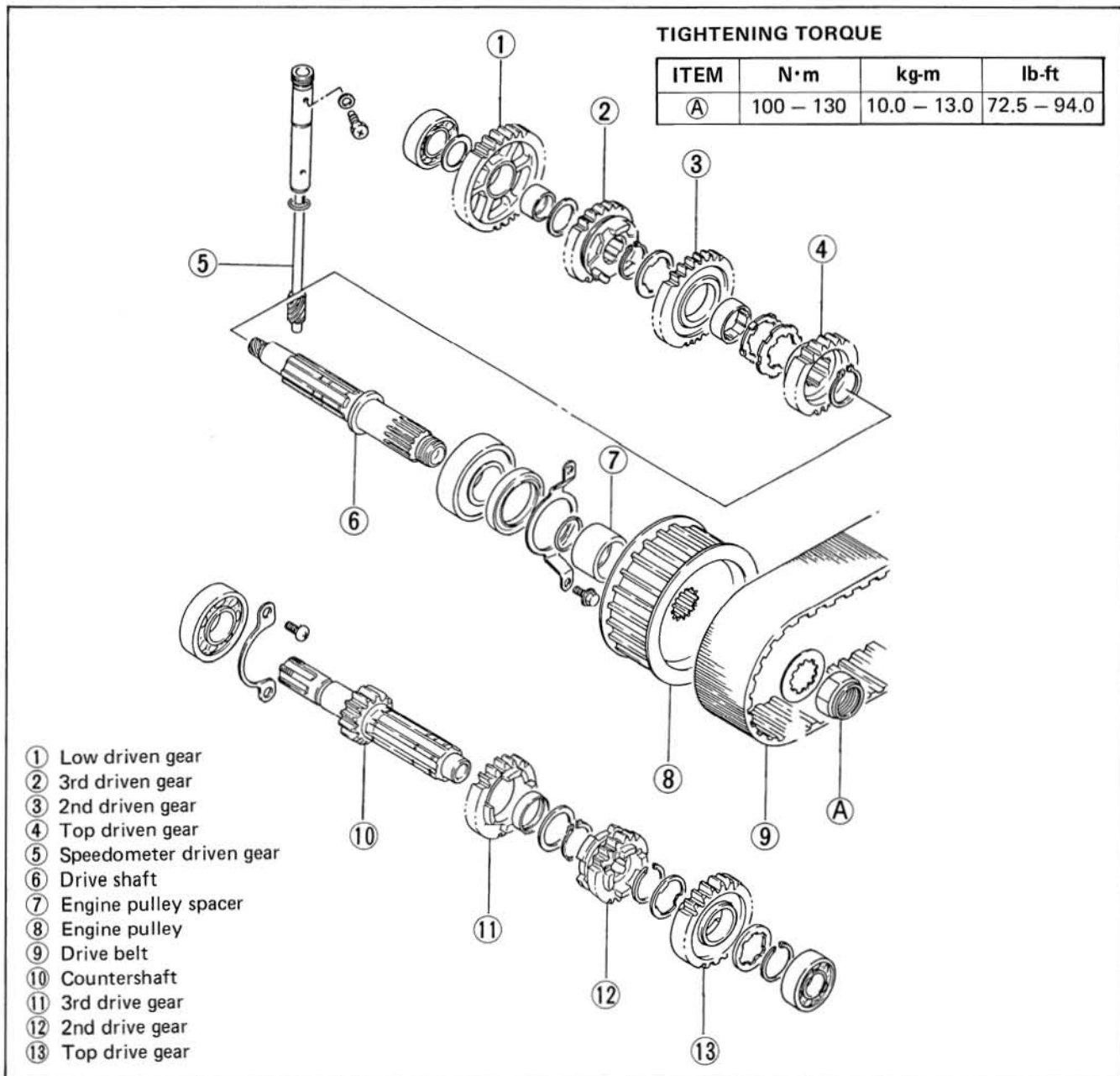
Measure the thickness and claw width of each drive plate with vernier calipers. Replace drive plates found to have worn down to the limit.

09900-20101	Vernier calipers
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Item		Standard	Service Limit
Thickness	No.1	2.92 – 3.08 mm (0.115 – 0.121 in)	2.62 mm (0.103 in)
	No.2	3.45 – 3.55 mm (0.136 – 0.140 in)	3.15 mm (0.124 in)
Claw width	No.1	15.8 – 16.0 mm (0.622 – 0.630 in)	15.0 mm (0.591 in)
	No.2	15.9 – 16.0 mm (0.626 – 0.630 in)	15.1 mm (0.594 in)



## TRANSMISSION GEARS AND RELATED PARTS



## COUNTERSHAFT

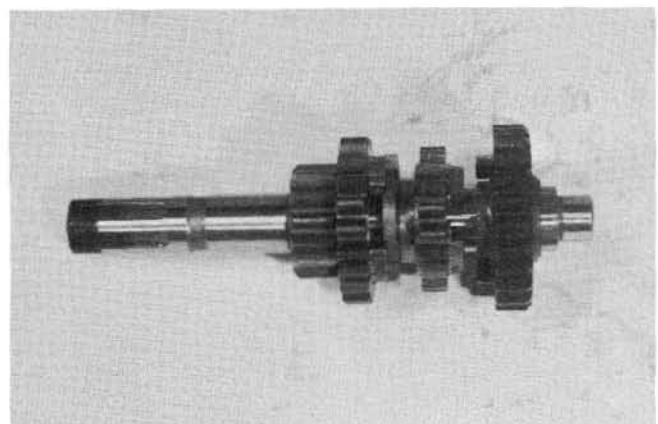
## DISASSEMBLY

- Remove the Top drive gear circlip.

09900-06107

Snapping pliers

- After removing the 2nd drive gear, remove the each drive gear by using the snap ring pliers.



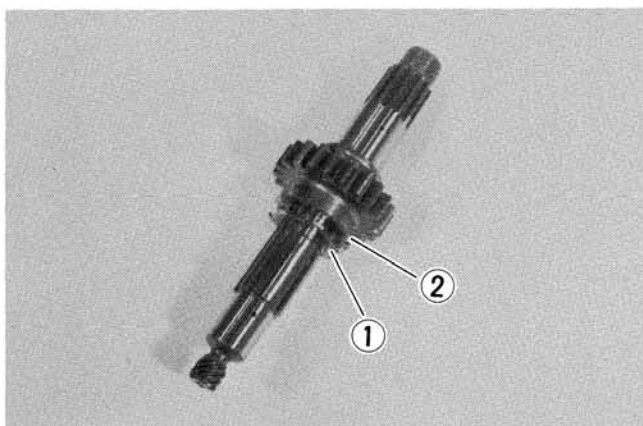
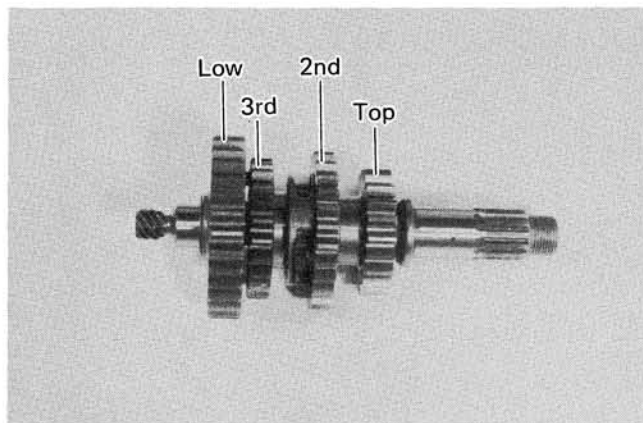
**DRIVESHAFT****DISASSEMBLY**

- After removing the Low driven gear and 3rd driven gear, remove the 2nd driven gear circlip.

09900-06107

Snapping pliers

- Remove the Top driven gear by removing the lock washers, ① and ②.

**COUNTERSHAFT AND DRIVESHAFT REASSEMBLY**

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

**NOTE:**

Always use new circlips.

**NOTE:**

Before installing the gears, coat lightly moly paste or engine oil to the driveshaft and countershaft.

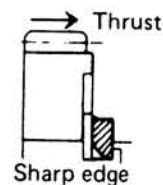
99000-25140

SUZUKI moly paste

- 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 figure.

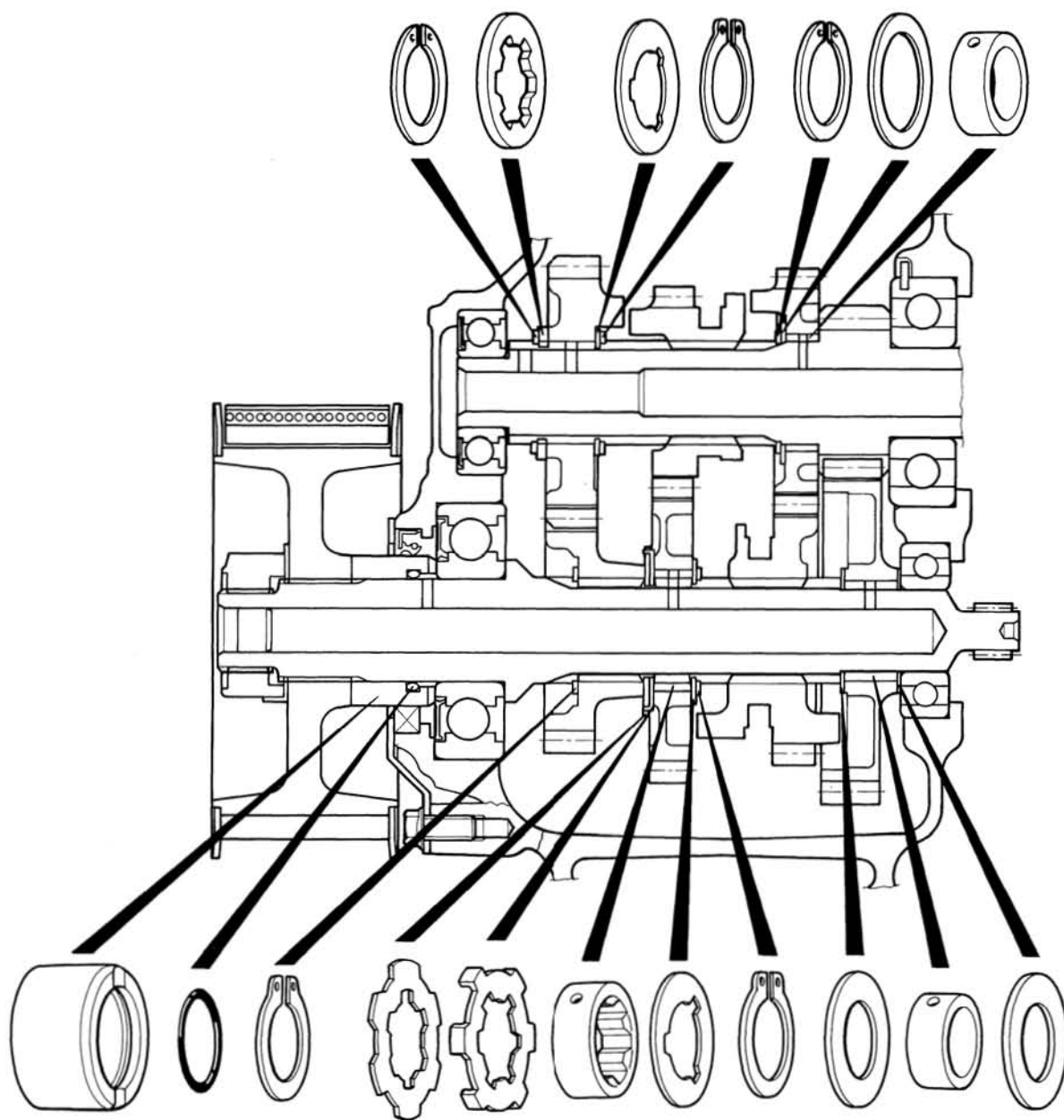
**CAUTION:**

- \* Never reuse a circlip. After a circlip has been removed from a shaft, it should be discarded and 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.



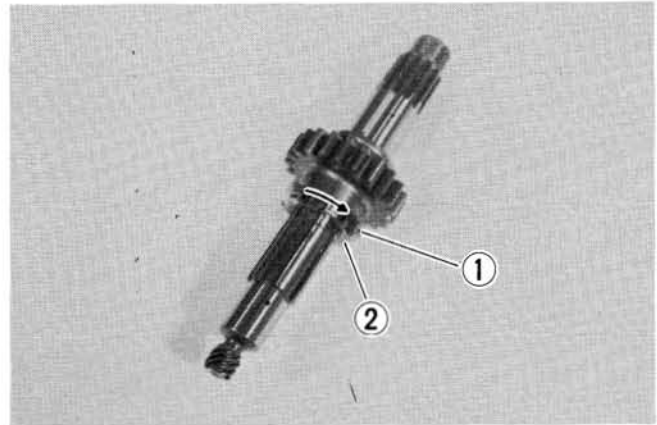
**NOTE:**

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.

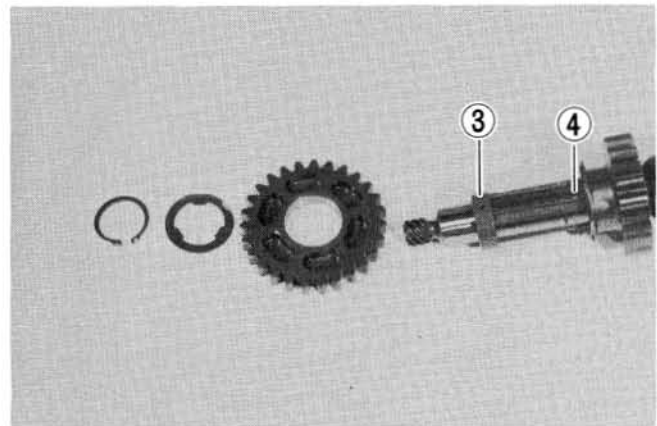


**TOP DRIVEN GEAR LOCK WASHERS**

- When mounting the Top driven gear onto the driveshaft, install the lock washer ① onto the driveshaft, and turn it to fit into the groove. Then install the lock washer ② in the lock washer ①.

**SECOND DRIVEN GEAR BUSHING**

- When installing the 2nd driven gear bushing onto the driveshaft, align the oil hole ③ of the bushing with the oil hole ④ of the driveshaft.

**SHIFT FORK-GROOVE CLEARANCE**

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

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

**Shift fork-Groove clearance**

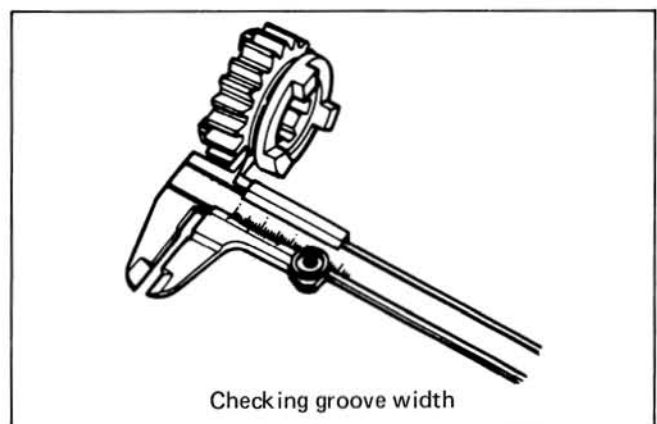
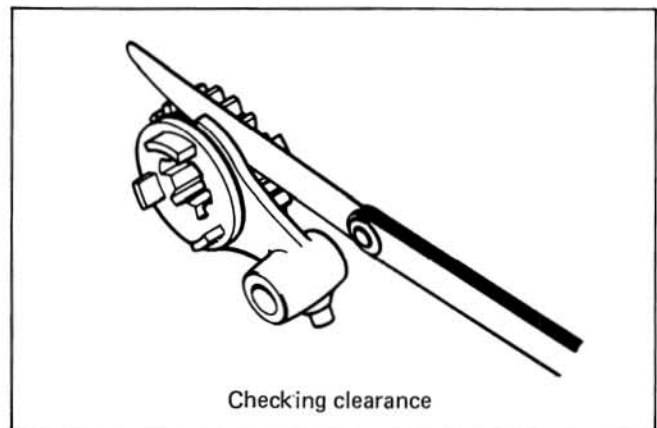
Standard	Service Limit
0.10 – 0.30 mm (0.004 – 0.012 in)	0.50 mm (0.020 in)

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

09900-20803	Thickness gauge
09900-20101	Vernier calipers

**Shift fork groove width**

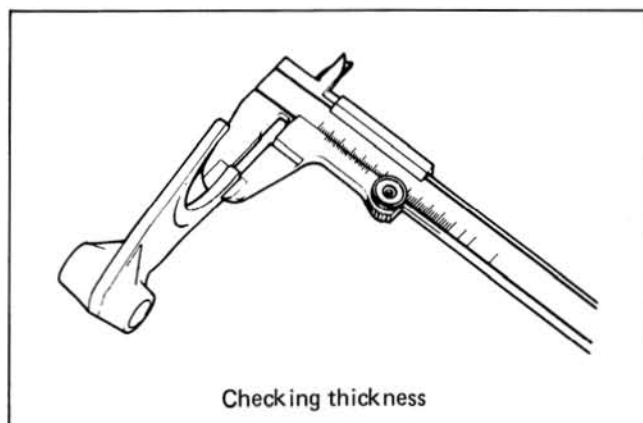
Standard	5.50 – 5.60 mm (0.217 – 0.220 in)
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**Shift fork thickness**

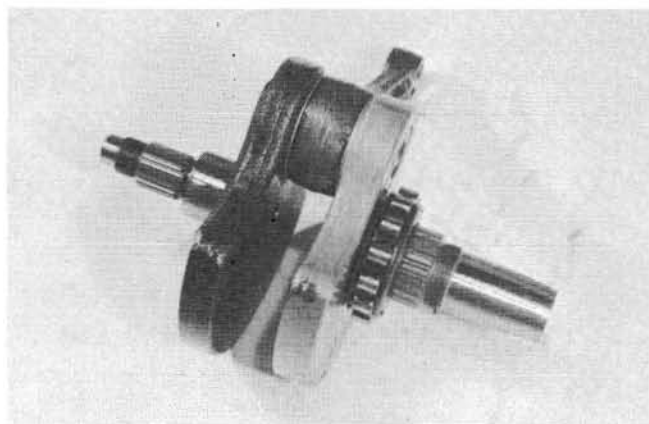
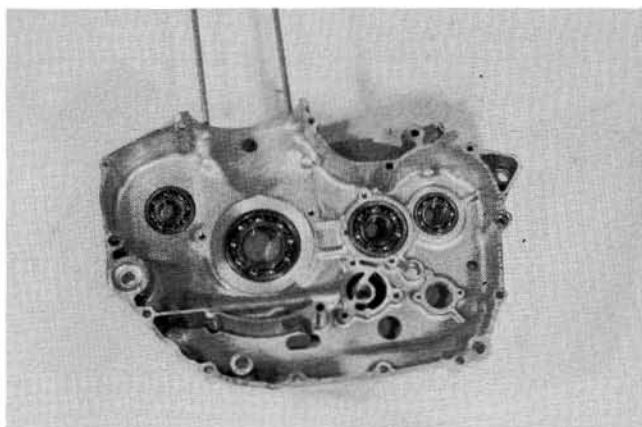
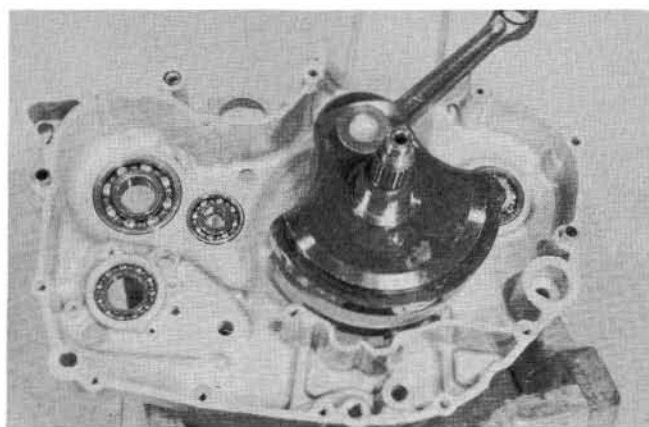
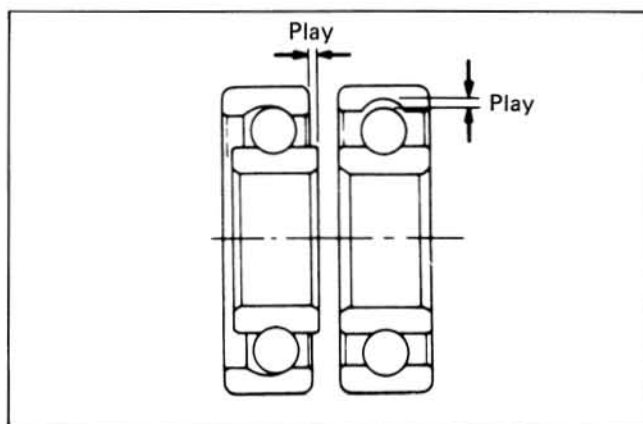
Standard	5.30 – 5.40 mm (0.209 – 0.213 in)
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**CRANKCASE BEARINGS**

Inspect the play of the crankcase bearing inner race by hand while it is in the case. Rotate the crankcase bearing inner race by hand to inspect for abnormal noise and smooth rotation. Replace the bearing if there is anything unusual.

**NOTE:**

When reassembling the bearing retainer, apply a small quantity of **THREAD LOCK "1303"** to the bearing retainer screws and bolts.



## ENGINE REASSEMBLY

Reassembly is generally performed in the reverse order to disassembly, but there are a number of reassembling steps that demand or deserve detailed explanation or emphasis. These steps will be taken up for respective parts and components.

### NOTE:

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

## OIL SEALS

- Fit the oil seals to the cylinder head cover, crankcase, clutch cover and gearshifter cover.
- Coat SUPER GREASE "A" to the lip of oil seals.

99000-25030

SUZUKI super grease "A"

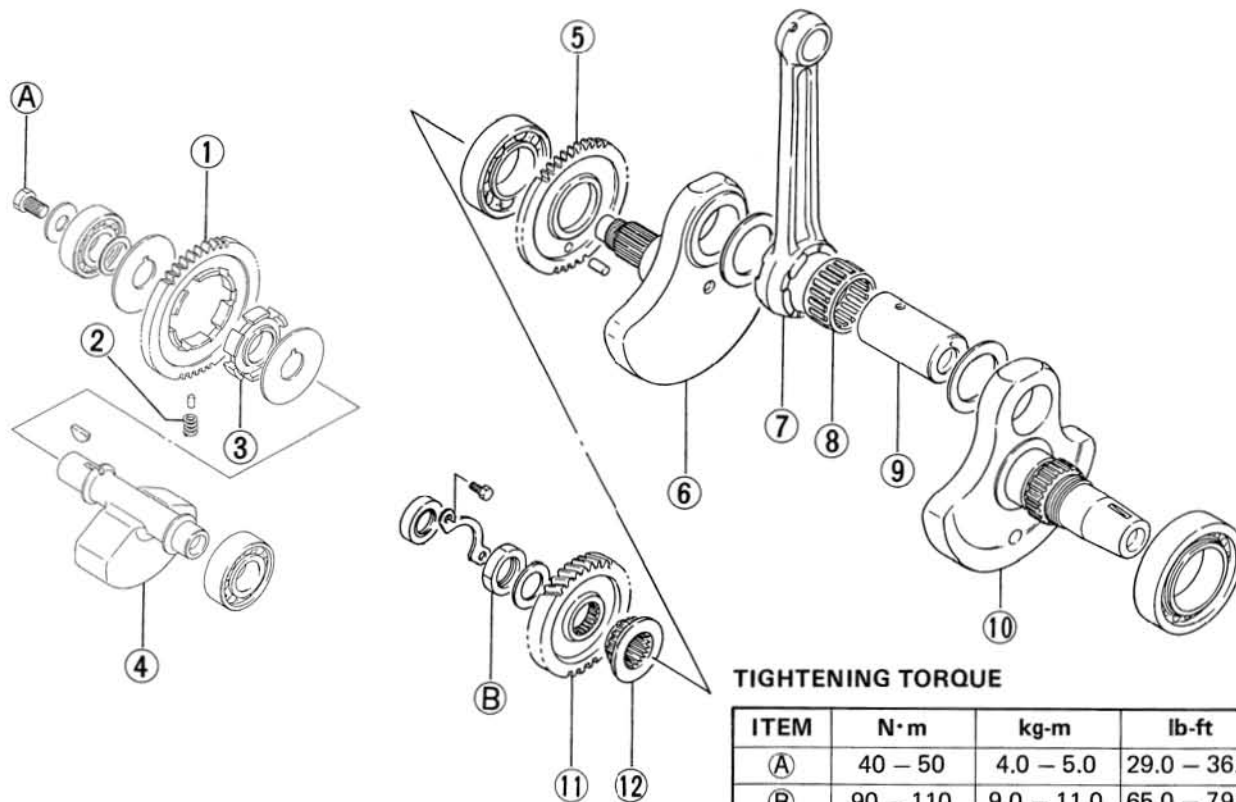
### CAUTION:

Replace the oil seals with new ones every disassembly to prevent oil leakage.

## CRANKSHAFT



- ① Counterbalancer driven gear
- ② Damper spring
- ③ Counterbalancer inner race
- ④ Counterbalancer
- ⑤ Counterbalancer drive gear
- ⑥ Right crank web
- ⑦ Conrod
- ⑧ Conrod big end bearing
- ⑨ Crank pin
- ⑩ Left crank web
- ⑪ Primary drive gear
- ⑫ Cam chain drive sprocket

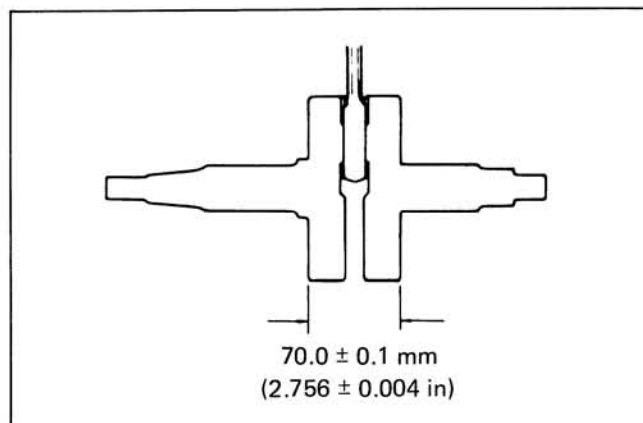


### TIGHTENING TORQUE

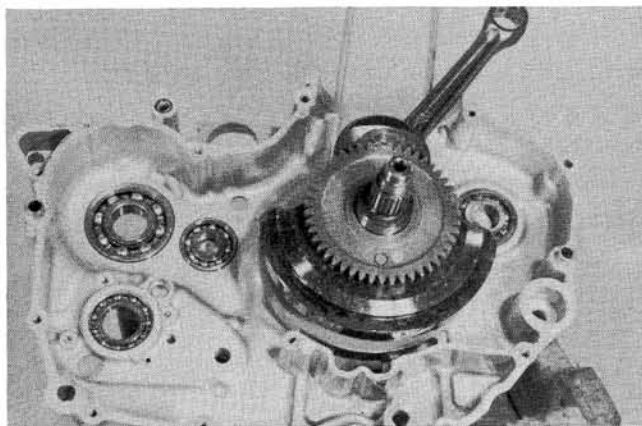
ITEM	N·m	kg-m	lb-ft
A	40 – 50	4.0 – 5.0	29.0 – 36.0
B	90 – 110	9.0 – 11.0	65.0 – 79.5

- Decide the width between the webs referring to the figure at right when rebuilding the crankshaft.

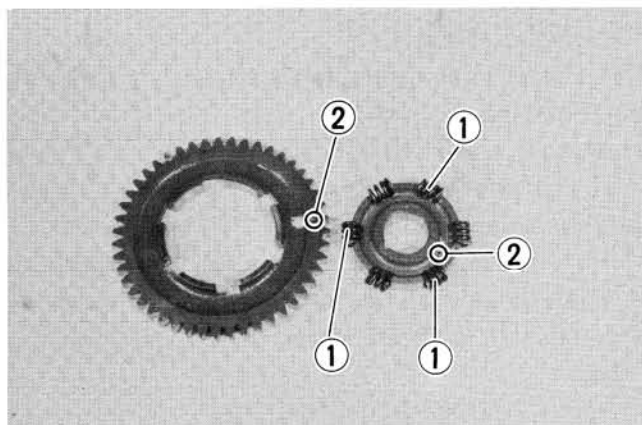
STD width between webs	$70.0 \pm 0.1 \text{ mm}$ ( $2.756 \pm 0.004 \text{ in}$ )
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- Install the crankshaft to the left crankcase.
- Install the counter-balancer drive gear to the crankshaft.



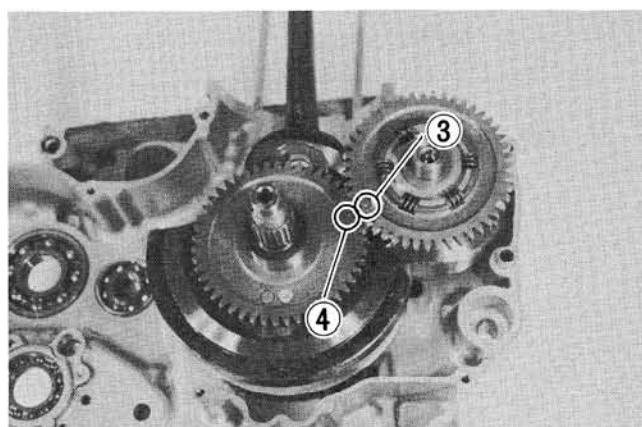
- Properly assemble the counter-balancer driven gear, springs and locking pins ① as shown in the photo.
- Align the two punched marks ② each other.



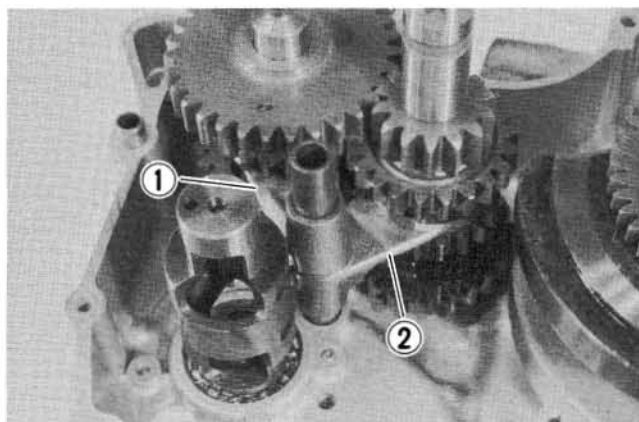
- Install the counter-balancer to the crankcase.
- Align the punch mark ③ on the counter-balancer driven gear with the mark ④ on the drive gear.

**NOTE:**

Install the key to the counter-balancer and two washers on both side of the driven gear.



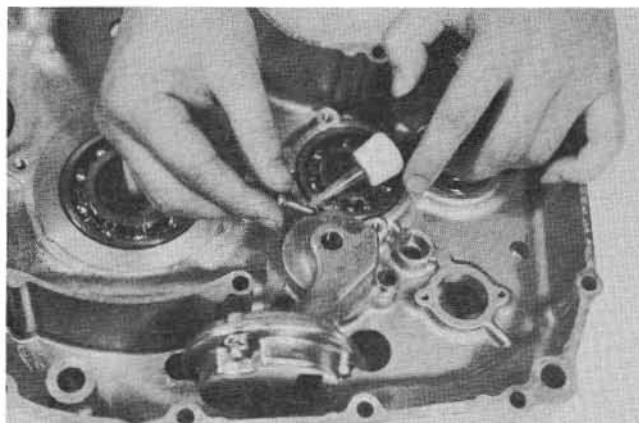
- After installing the gearshift cam, countershaft assembly and driveshaft assembly into the left crankcase, fit the gearshift forks ① and ② into the gearshift fork grooves.
- Install the gearshift fork shaft.
- Turn the gearshift cam and bring it to the neutral position, and make sure that the drive shaft and countershaft turn freely.



- Apply Thread lock 1342 to the oil pump screws.
- Install the oil pump to the right crankcase.

## NOTE:

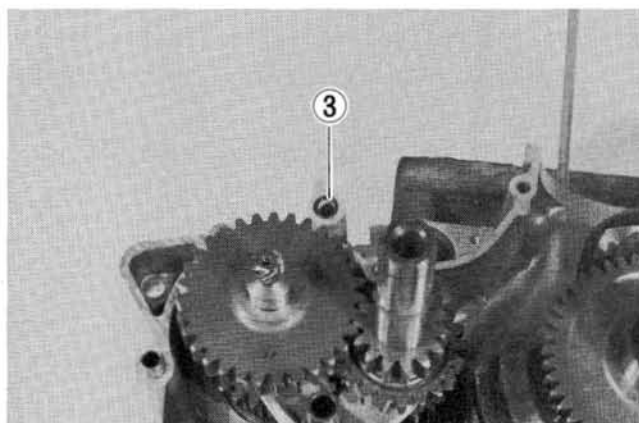
Make sure that the oil sump filter cover is properly installed.



## CRANKCASE

When reassembling the crankcase, pay attention to the following.

- Remove sealant material on the mating surfaces of right and left halves of crankcase and thoroughly remove oil stains.
- Fit the O-ring ③ and dowel pins on the left half.
- Apply engine oil to the conrod big end of the crankshaft and all parts of the transmission gears.
- Apply SUZUKI BOND No. 1207B uniformly to the mating surface of the right half of the crankcase, and assemble the cases within few minutes.



99104-31140

SUZUKI bond No. 1207B

- Install a new gasket to the bolt (A) and tighten it to the specified torque.

Tightening torque	$9 - 13 \text{ N}\cdot\text{m}$ $(0.9 - 1.3 \text{ kg}\cdot\text{m})$ $6.5 - 9.5 \text{ lb}\cdot\text{ft}$
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- After the crankcase bolts have been tightened, check if driveshaft and countershaft rotate smoothly.
- If a large resistance is felt to rotation, try to free the shafts by tapping the driveshaft or countershaft with a plastic hammer.

### GEARSHIFT CAM STOPPER

- Apply thread lock "1342" to the bearing retainer screw and cam stopper bolt.

99000-32050	Thread lock "1342"
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#### NOTE:

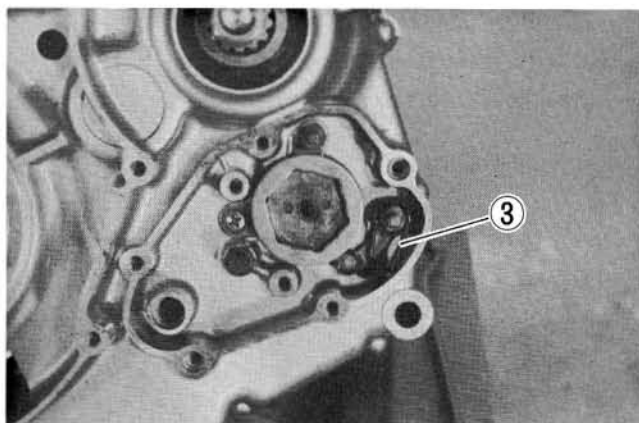
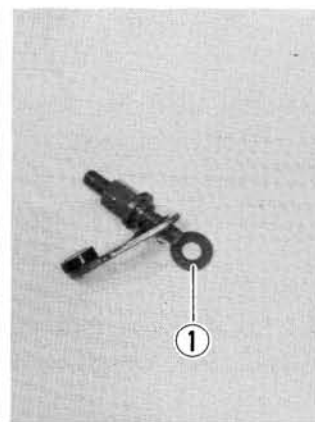
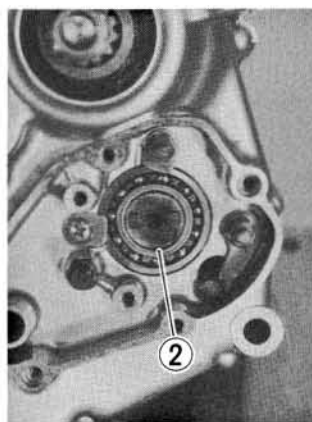
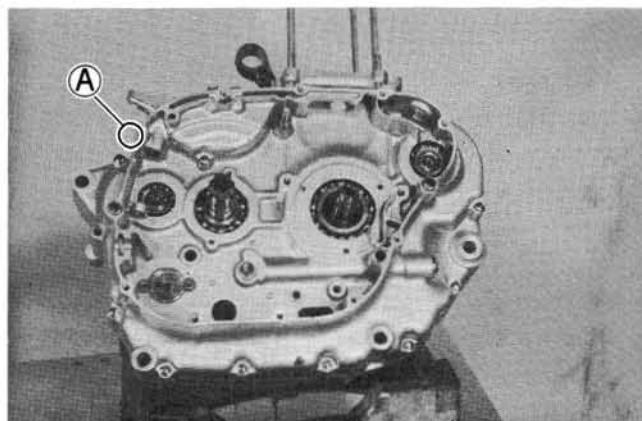
Install the washer (1) under the cam stopper.

- Install the spacer (2) to the gearshift cam.
- Tighten the gearshift cam stopper bolt lightly.
- Install the gearshift cam stopper spring (3).

#### NOTE:

After installing the cam stopper make sure that the cam stopper moves freely.

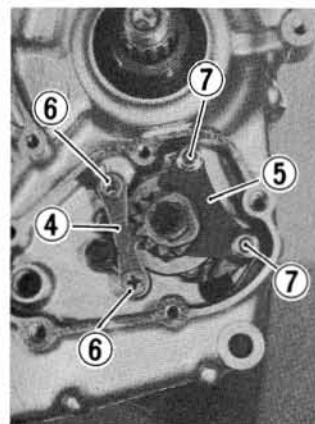
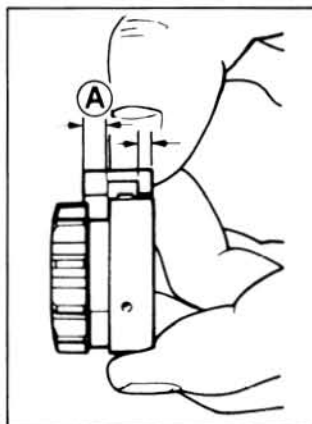
- Install the gearshift pawl housing.



### CAM DRIVEN GEAR

- Install the gear shifting pawls into the cam driven gear. The large shoulder (A) must face to the outside as shown in the illustration.
- When installing the cam guide (4) and pawl lifter (5), apply a small quantity of THREAD LOCK "1342" to the securing screws (6) and nuts (7).

99000-32050	Thread lock "1342"
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## GEARSHIFT SHAFT

- Fit a spring to the gearshift shaft correctly.
- Install the gearshift shaft. Match the center teeth of the gear on the gearshift shaft with the center teeth on the cam driven gear as shown.
- Install the washer to the gearshift shaft.

### NOTE:

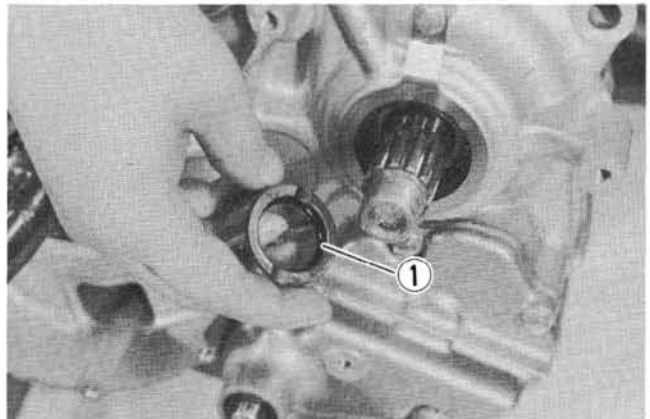
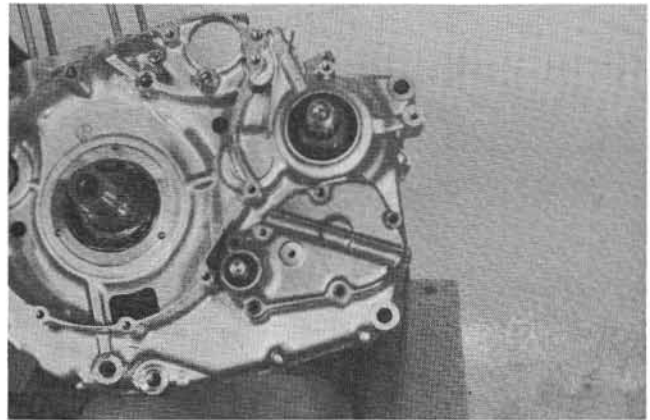
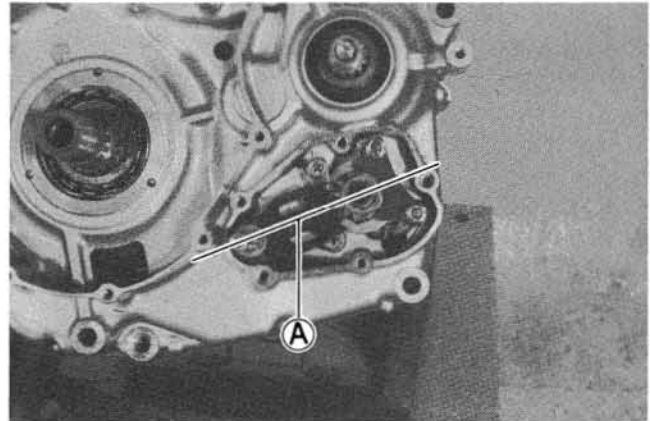
When replacing the gearshift arm stopper **A**, apply a small quantity of **THREAD LOCK SUPER "1303"** to the threaded part of the stopper and tighten it to the specified torque. (See page 8-18.)

- Apply SUZUKI super grease "A" to the gearshift shaft oil seal.
- Fit the gearshift cover and oil seal retainer and tighten the bolts diagonally.

### NOTE:

After the gearshift cover and gearshift lever have been fitted, confirm that gear change is normal while turning the countershaft and driveshaft. If gear change is not obtained, it means that assembly of gears or installation of gearshift fork is incorrect. If this is the case, disassemble and trace the mistake.

- Use a new O-ring **①** and apply grease to the oil seal.
- Install the engine pulley spacer to the drive shaft.

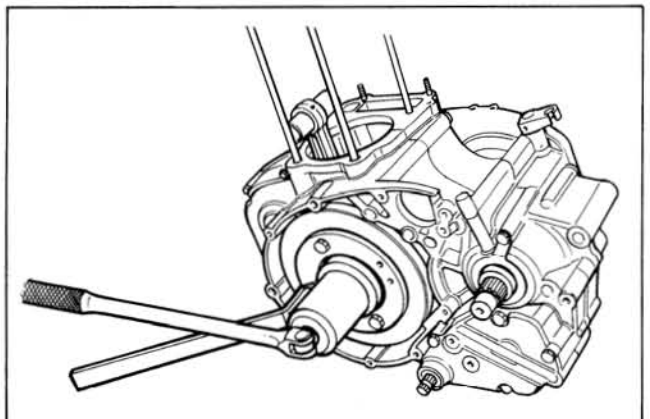


## FLYWHEEL

- Install the flywheel and spring washer to the crankshaft.
- Tighten the flywheel nut using the special tools to the specified torque.

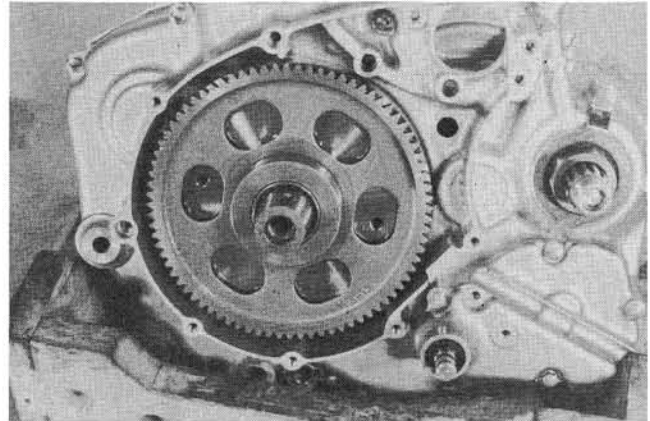
09930-32410	Flywheel holder
09923-12410	46-mm socket

Tightening torque	140 – 160 N·m ( 14.0 – 16.0 kg-m ) ( 101.5 – 115.5 lb-ft )
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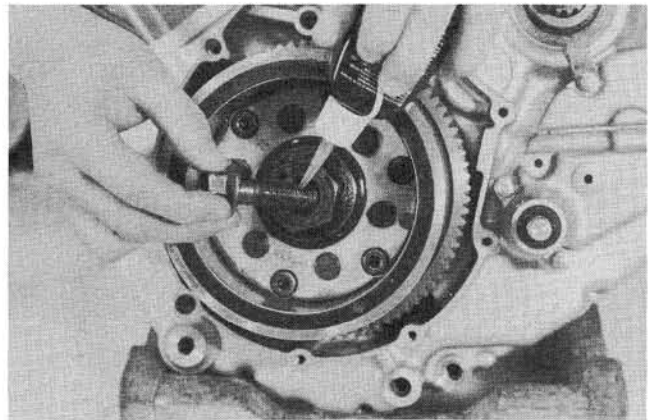
- Install the starter driven gear to the crankshaft.
- Fit the key in the key slot on the crankshaft, then install the generator rotor.



- Apply a small quantity of THREAD LOCK SUPER "1303" to the threaded part of rotor bolt.
- Tighten the generator rotor bolt to the specified torque by using the 36-mm offset wrench and torque wrench.

99000-32030	Thread lock super "1303"
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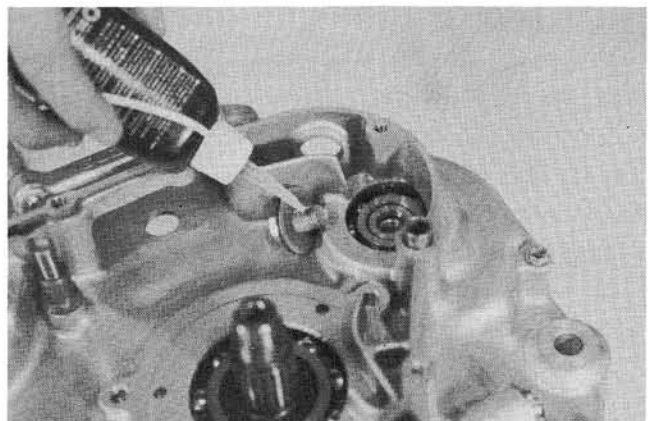
Tightening torque	$140 - 160 \text{ N}\cdot\text{m}$ $(14.0 - 16.0 \text{ kg}\cdot\text{m})$ $(101.5 - 115.5 \text{ lb}\cdot\text{ft})$
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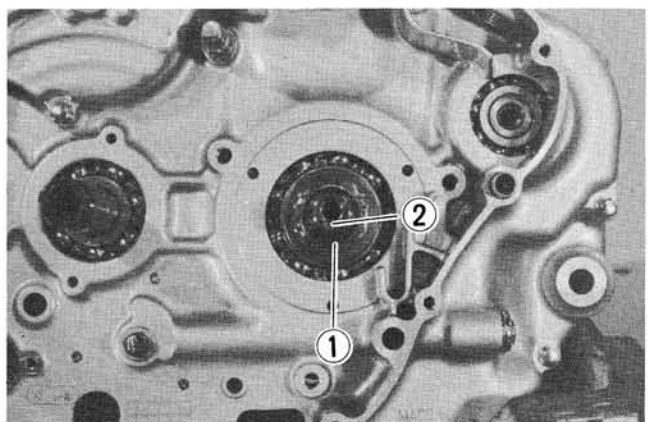
- Apply Thread lock "1342" to the counter-balancer bolt and tighten it to the specified torque while holding the generator rotor with 36-mm wrench.

99000-32050	Thread lock 1342
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Tightening torque	$40 - 50 \text{ N}\cdot\text{m}$ $(4.0 - 5.0 \text{ kg}\cdot\text{m})$ $(29.0 - 36.0 \text{ lb}\cdot\text{ft})$
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- Align the dot mark ① of the cam drive sprocket with the dot mark ② on the right end of the crankshaft.
- Install the drive sprocket to the crankshaft.



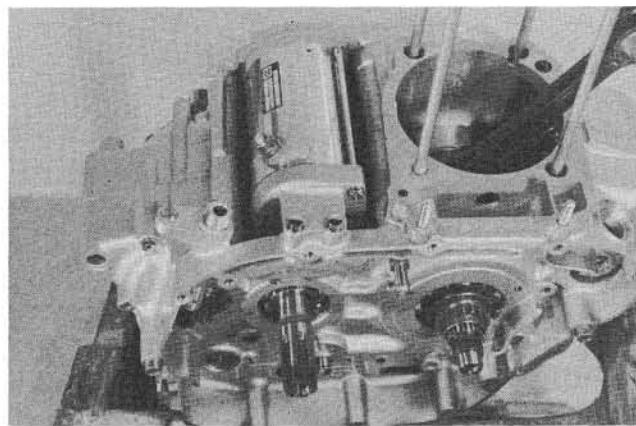
## SPEEDOMETER DRIVE GEAR

- Mount the speedometer drive gear and its sleeve to the right crankcase. Use a new O-ring and screw gasket.
- Align the hole of the sleeve with the screw hole.



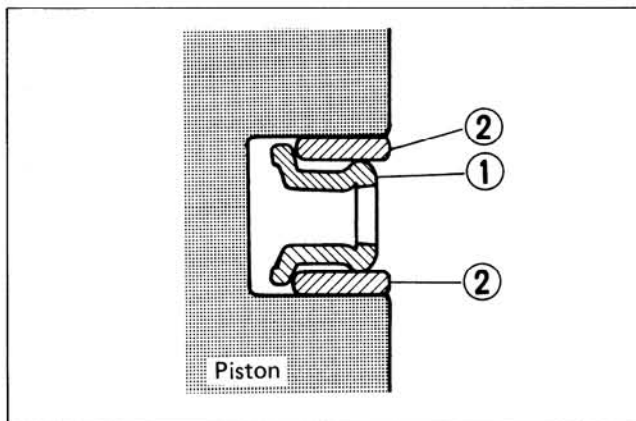
## STARTER MOTOR

- Mount the starter motor on the crankcase. Use a new O-ring.



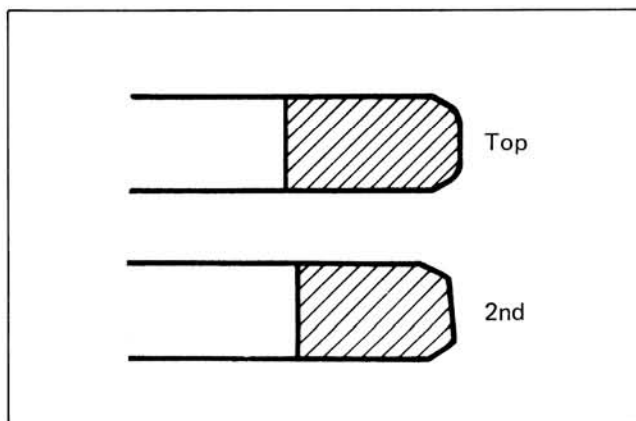
## OIL RING

Install the spacer ① into the oil ring groove first. Then, install both side rails ②, one on each side of the spacer. The spacer and side rails do not have a specific top or bottom when they are new. When reassembling used parts, install them in their original place and direction.

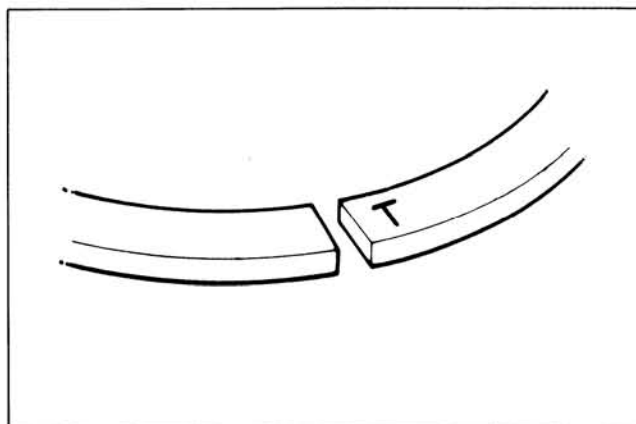


## TOP RING AND 2ND RING

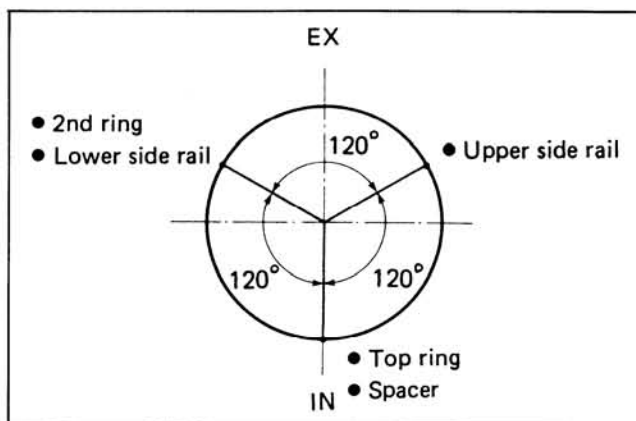
Top ring and 2nd ring differ in the shape of ring face, and the face of top ring is chrome-plated whereas that of 2nd ring is not. The color of 2nd ring appears darker than that of the top one.



Top and 2nd rings have the letter "T" marked on the top. Be sure to bring the marked side to the top when fitting them to the piston.



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



## PISTON

The followings are reminders for piston installation:

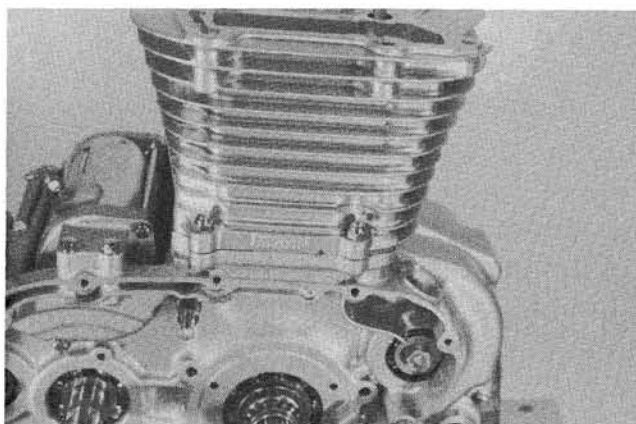
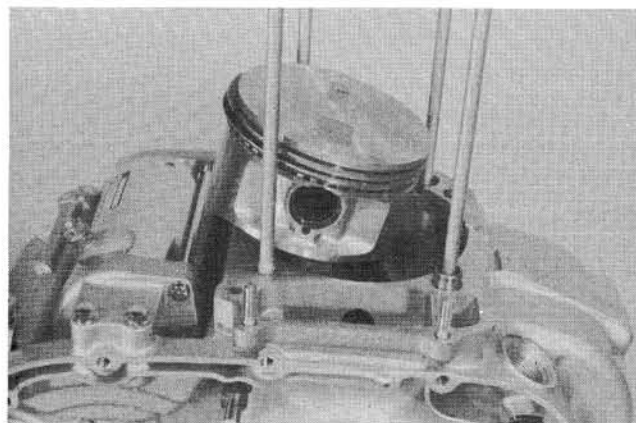
- Rub a small quantity of SUZUKI MOLY PASTE onto the piston pin.
- Place a clean rag over the cylinder base to prevent the piston pin circlips from dropping into the crankcase.
- When fitting the piston, turn arrow mark on the piston head to exhaust side.
- Fit the piston pin circlips with long-nose pliers.

### CAUTION:

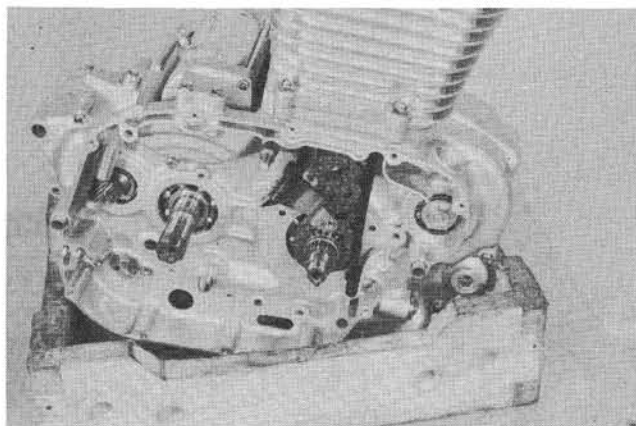
Use new piston pin circlip to prevent circlip failure which will occur with a bent one.

- Hold each piston ring with proper position, and insert the piston into the cylinder.
- Fit the dowel pins to the crankcase and attach a new gasket.
- Tighten the cylinder base nuts to the specified torque.

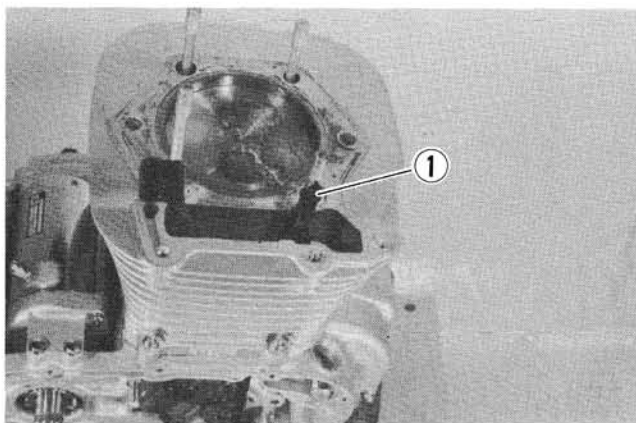
Tightening torque	$8 - 12 \text{ N}\cdot\text{m}$ $(0.8 - 1.2 \text{ kg}\cdot\text{m})$ $6.0 - 8.5 \text{ lb}\cdot\text{ft}$
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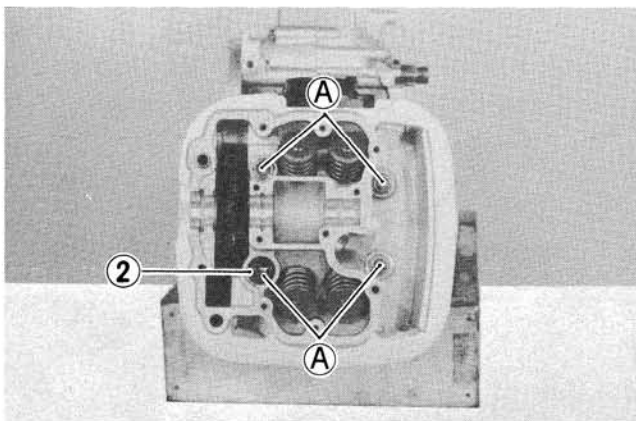
- Engage the cam drive chain onto the cam drive sprocket.
- Install the front chain guide from the upside and rear chain tensioner from the bottom.



- Fit the front chain guide ① to the proper position.
- Fit the dowel pins to the cylinder head and attach a new gasket.

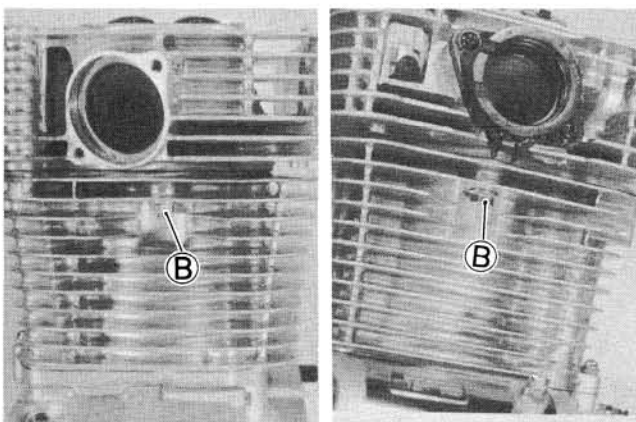


- Install the small diam. copper washer to the position ②.
- Apply engine oil lightly to the nut thread.
- Tighten the cylinder head nuts to the specified torque in the criss-cross manner.
- Fit a rubber cap to the position ② to prevent oil leakage.



#### Cylinder head nuts tightening torque

9 mm Diam. Ⓐ	29 – 33 N·m ( 2.9 – 3.3 kg-m ) ( 21.0 – 24.0 lb-ft )
8 mm Diam. Ⓑ	23 – 27 N·m ( 2.3 – 2.7 kg-m ) ( 16.5 – 19.5 lb-ft )





- Turn the crankshaft and bring the piston to the T.D.C.
- Align the "T" mark ① on the rotor with the index mark ② of the crankcase.

**NOTE:**

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

- Engage the chain on the cam sprocket with the locating pin hole ③ at one o'clock position.

**NOTE:**

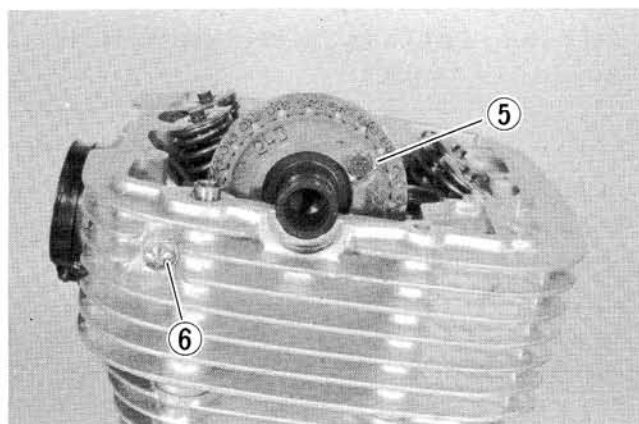
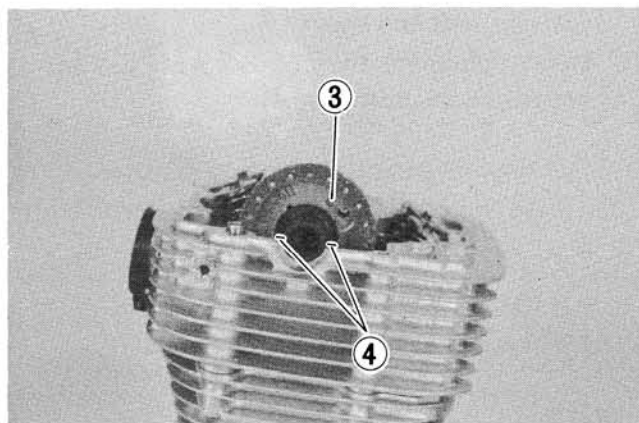
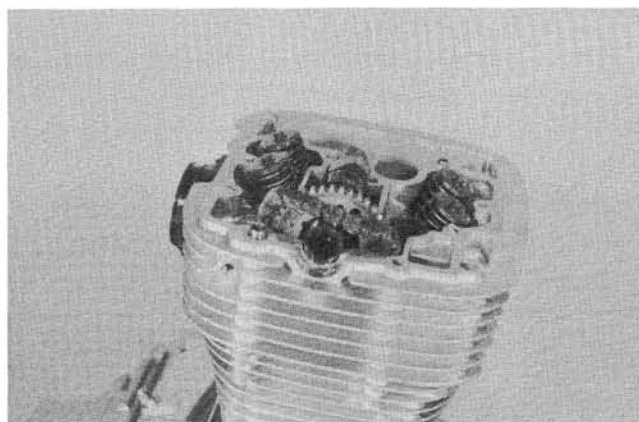
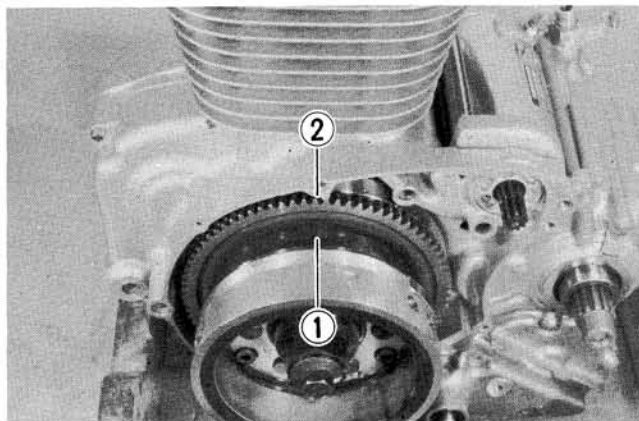
Do not rotate the magneto rotor while doing this. When the sprocket is not positioned correctly, turn the sprocket. When installing the camshaft into the cam sprocket, pay attention not to dislodge the locating pin or it may fall into the crankcase.

- Align the engraved line mark ④ on the camshaft so it is parallel with the surface of the cylinder head.
- Install the C-ring into the ring groove of the cylinder head.
- Fit the lock washer ⑤ so that it is covering the locating pin.
- Apply THREAD LOCK SUPER "1303" to the bolts and tighten them to the specified torque.

Tightening torque	14 – 16 N·m
	( 1.4 – 1.6 kg-m ) ( 10.0 – 11.5 lb-ft )

99000-32030	Thread lock super "1303"
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- Use a new gasket and tighten the cam chain tensioner bolt ⑥ to the cylinder head.
- Bend up the washer tongue positively to lock the bolts.

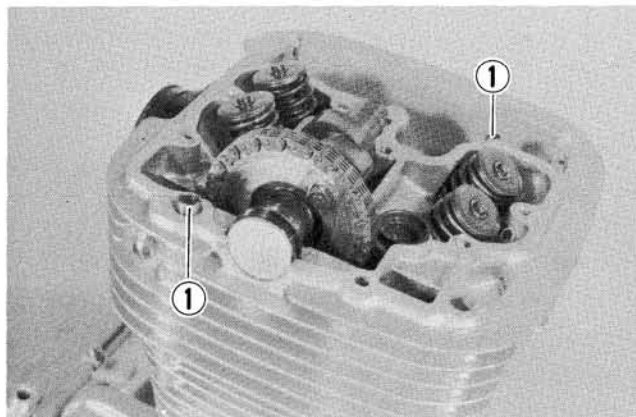


- Apply SUZUKI MOLY PASTE to the camshaft journals.

99000-25140

SUZUKI moly paste

- Apply oil to the cam surface and valves.



## CYLINDER HEAD COVER

- Thoroughly wipe off oil from the fitting surfaces of cylinder head and cover.
- Fit the two dowel pins ① to the cylinder head side.
- Uniformly apply SUZUKI BOND No. 1216 to the cylinder head and head cover mating surfaces.

99104-31160

SUZUKI bond No. 1216

### NOTE:

- \* Do not apply SUZUKI BOND No. 1216 to the camshaft end cap.
- \* When tightening the L65 bolt, use nut for tightening the bolt properly.

- Fit the seven gaskets (indicated by \* mark) to the head cover bolts correctly as shown in the Fig.

### CAUTION:

Use a new gasket to prevent oil leakage.

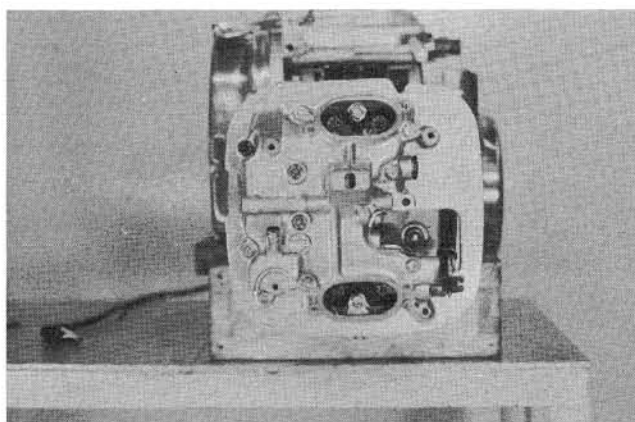
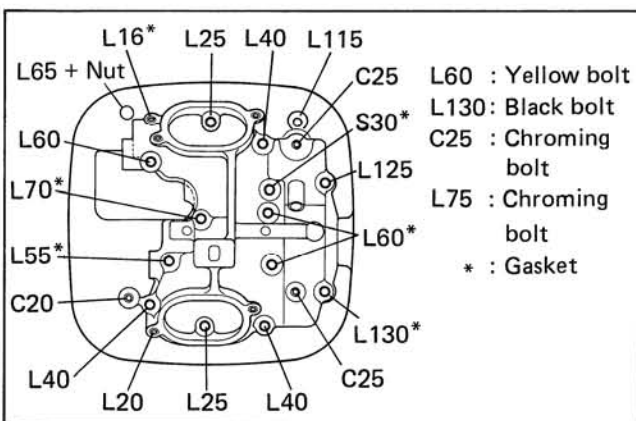
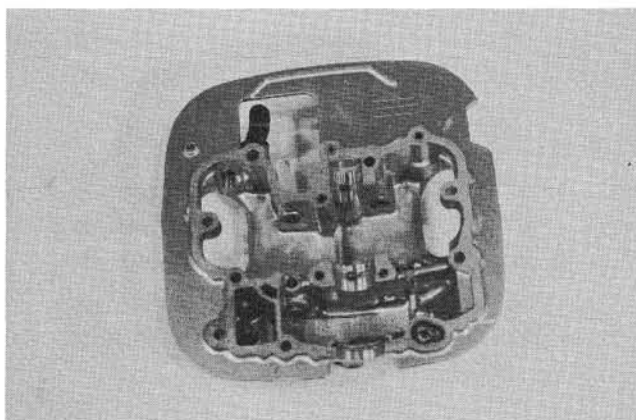
### NOTE:

When tightening the cylinder head cover bolts, the piston must be at top dead center on the compression stroke.

- Lightly tighten the cylinder head cover bolts diagonally and then, if everything is satisfactory, tighten securely with a torque wrench to the specified torque.

Tightening torque

8 – 12 N·m  
( 0.8 – 1.2 kg·m )  
( 6.0 – 8.5 lb·ft )

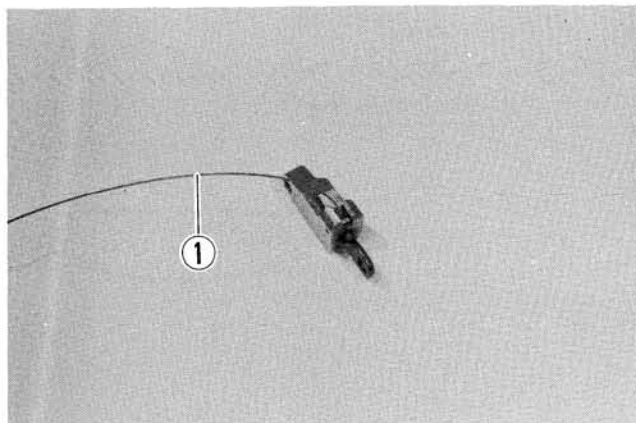




## CAM CHAIN TENSIONER ADJUSTER

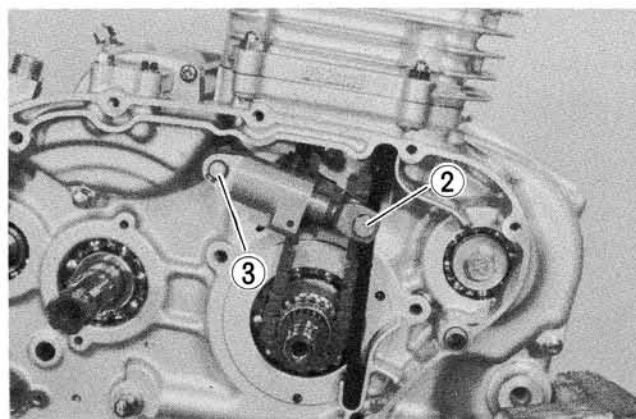
- Release the ratchet and fully push-in the push-rod.
- Install the ratchet locking tool ① as shown in the photo.

09917-62410	Cam chain tensioner locking tool
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- Install the cam chain tensioner adjuster to the proper position and direction.
- Tighten the bolt ② to the specified torque and install the circlip ③.

Tightening torque	$8 - 12 \text{ N}\cdot\text{m}$ $(0.8 - 1.2 \text{ kg}\cdot\text{m})$ $(6.0 - 8.5 \text{ lb}\cdot\text{ft})$
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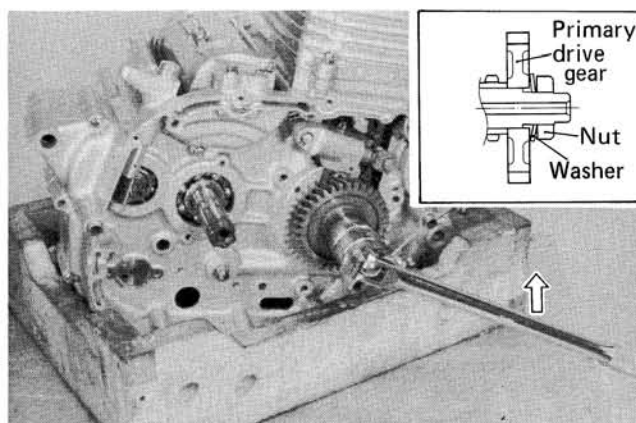


- After setting the tensioner adjuster pull the ratchet locking tool and release the ratchet.
- Make sure that the cam drive chain has no play.

## PRIMARY DRIVE GEAR

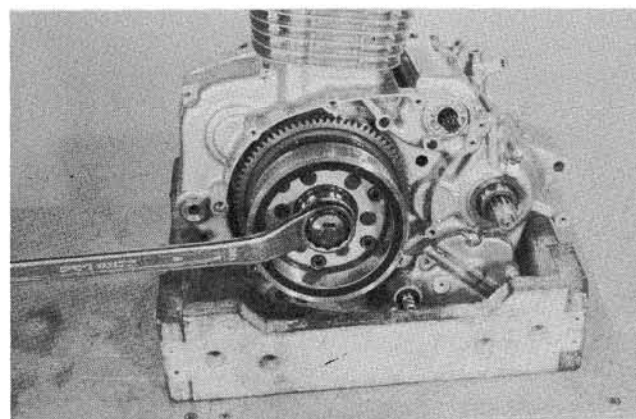
- Install the concaved washer to the primary drive-gear.
- Hold generator rotor with 36-mm wrench and tighten the primary drive gear nut to the specified torque.

Tightening torque	$90 - 110 \text{ N}\cdot\text{m}$ $(9.0 - 11.0 \text{ kg}\cdot\text{m})$ $(65.0 - 79.5 \text{ lb}\cdot\text{ft})$
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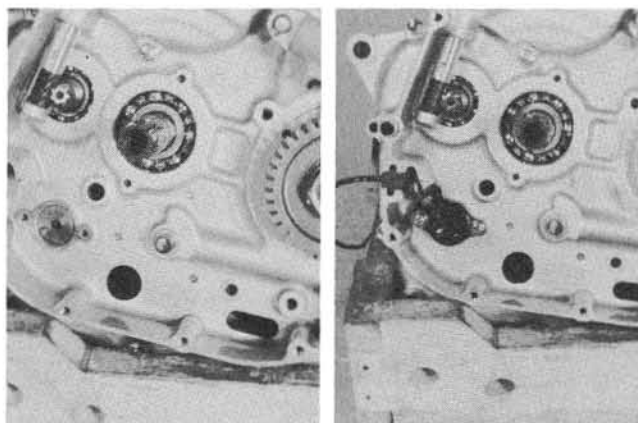
### NOTE:

This nut has left-hand thread. Turn it counter-clockwise when tightening.



## NEUTRAL SWITCH

- Install the spring and switch contact to the gear-shift cam and install the switch body to the right crankcase.

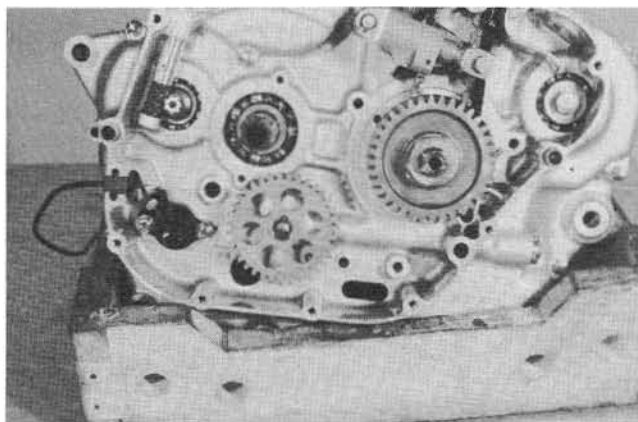


## OIL PUMP DRIVEN GEAR

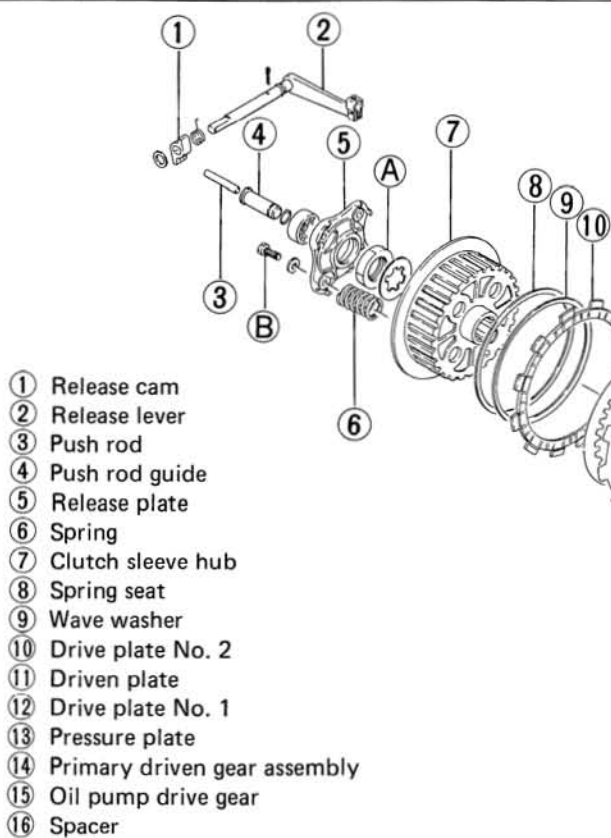
- Install the washer, drive pin, oil pump driven gear and circlip to the oil pump shaft.

### NOTE:

After installing the oil pump driven gear, rotate the pump gear by hand to see if it turns smoothly.



## CLUTCH



### TIGHTENING TORQUE

ITEM	N·m	kg·m	lb·ft
(A)	50 – 70	5.0 – 7.0	36.0 – 50.5
(B)	11 – 13	1.1 – 1.3	8.0 – 9.5

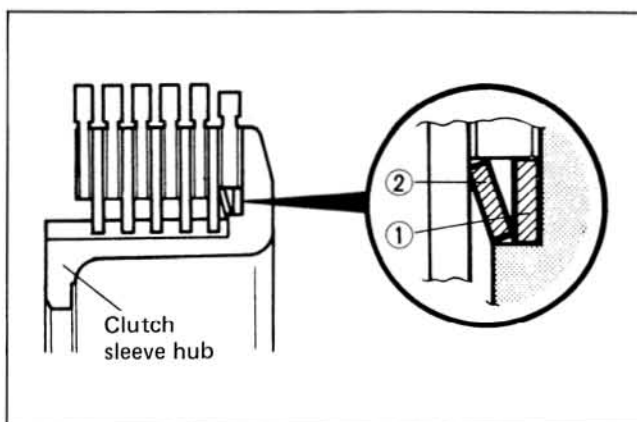
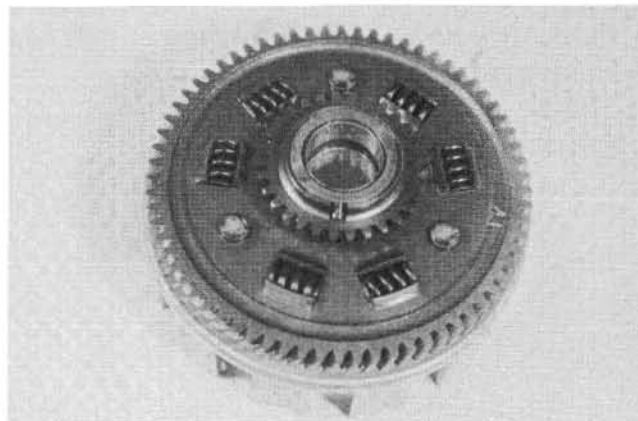
- ① Release cam
- ② Release lever
- ③ Push rod
- ④ Push rod guide
- ⑤ Release plate
- ⑥ Spring
- ⑦ Clutch sleeve hub
- ⑧ Spring seat
- ⑨ Wave washer
- ⑩ Drive plate No. 2
- ⑪ Driven plate
- ⑫ Drive plate No. 1
- ⑬ Pressure plate
- ⑭ Primary driven gear assembly
- ⑮ Oil pump drive gear
- ⑯ Spacer

- Fit the oil pump drive gear to the primary driven gear.
- Install the washer, primary driven gear spacer and primary driven gear to the countershaft.

**NOTE:**

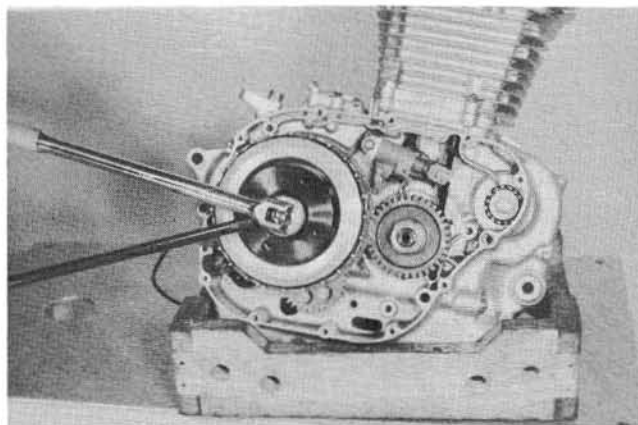
When inserting the spacer into the primary driven gear, apply a small quantity of engine oil to both inside and outside of the spacer.

- Before installing the clutch drive and driven plates onto the clutch sleeve hub, check to be sure that the wave washer seat ① and wave washer ② are properly installed.
- Install the wave washer properly.



- Use the special tool and tighten the clutch sleeve hub nut to the specified torque.

09920-53722	Clutch sleeve hub holder
Tightening torque	$50 - 70 \text{ N}\cdot\text{m}$ $(5.0 - 7.0 \text{ kg}\cdot\text{m})$ $(36.0 - 50.5 \text{ lb}\cdot\text{ft})$

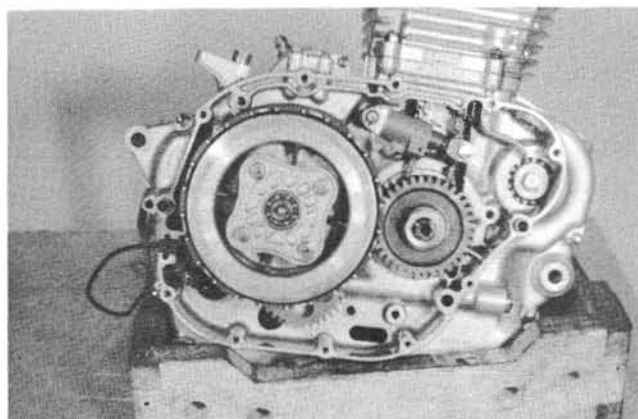


- Tighten the clutch spring mounting bolts diagonally to the specified torque.

Tightening torque	$11 - 13 \text{ N}\cdot\text{m}$ $(1.1 - 1.3 \text{ kg}\cdot\text{m})$ $(8.0 - 9.5 \text{ lb}\cdot\text{ft})$
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**NOTE:**

After tightening the clutch bolts, make sure that all the clutch plates seat each other.

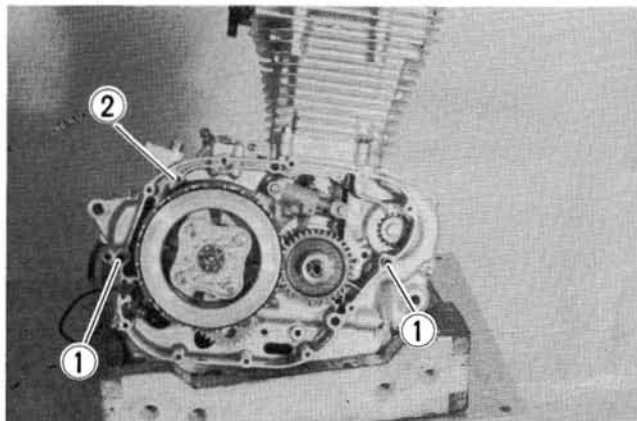


- Fit the two dowel pins ① to the crankcase and attach a new gasket.

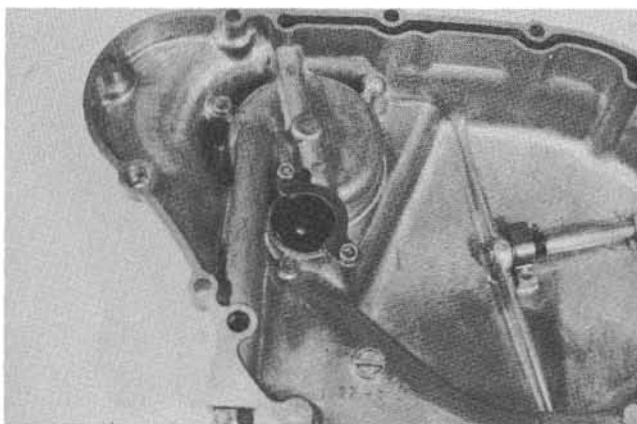
**CAUTION:**

Use a new gasket to prevent oil leakage.

- Install the oil jet to the hole ②.



- When fitting the clutch cover, inspect the oil seal of the crankshaft for wear or damage.



- When reassembling the clutch cover, fit a new gasket to the bolts (A).

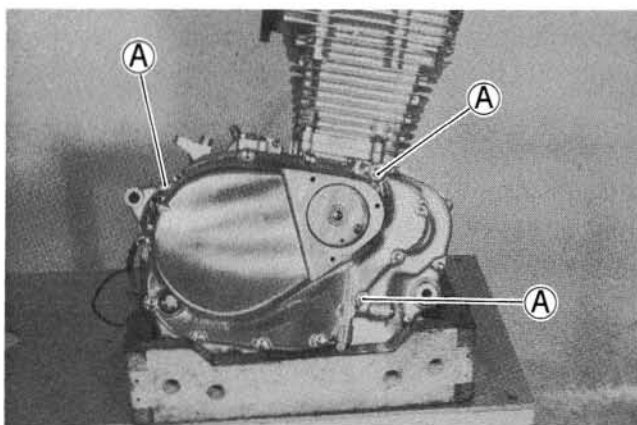
**CAUTION:**

Use a new gasket to prevent oil leakage.

**NOTE:**

After installing the clutch cover, check whether the clutch lever is properly positioned or not by referring to the mark on the right crankcase.

If the lever is not properly positioned, disassemble the clutch cover and select the proper size of the clutch push rod in the table of page 3-38.



## OIL FILTER

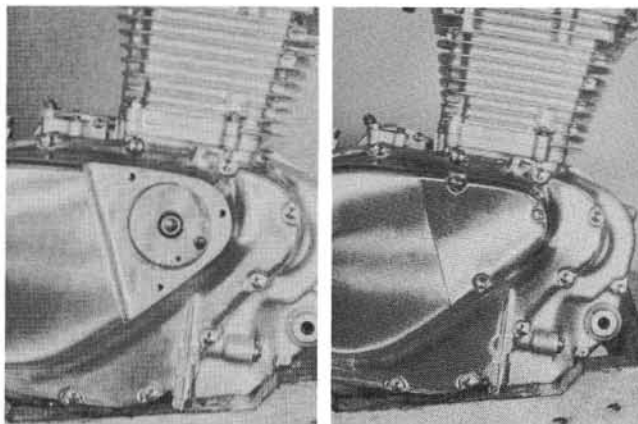
- Before installing the oil filter, check to be sure that the O-ring and spring are installed correctly.

**CAUTION:**

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

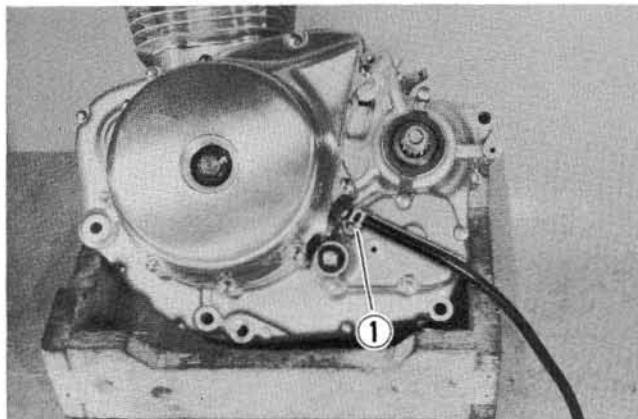
**NOTE:**

Coat the O-ring of filter cap with grease.

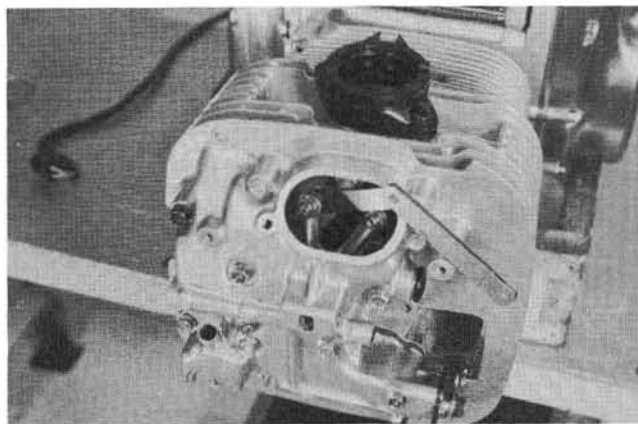


## GENERATOR COVER

- Install a new gasket and dawl pins to the proper position and install the generator cover.
- Route the generator lead wire properly and clamp it with a screw ①.



- Finally adjust the valve clearance to the specification. (Refer to page 2-6.)





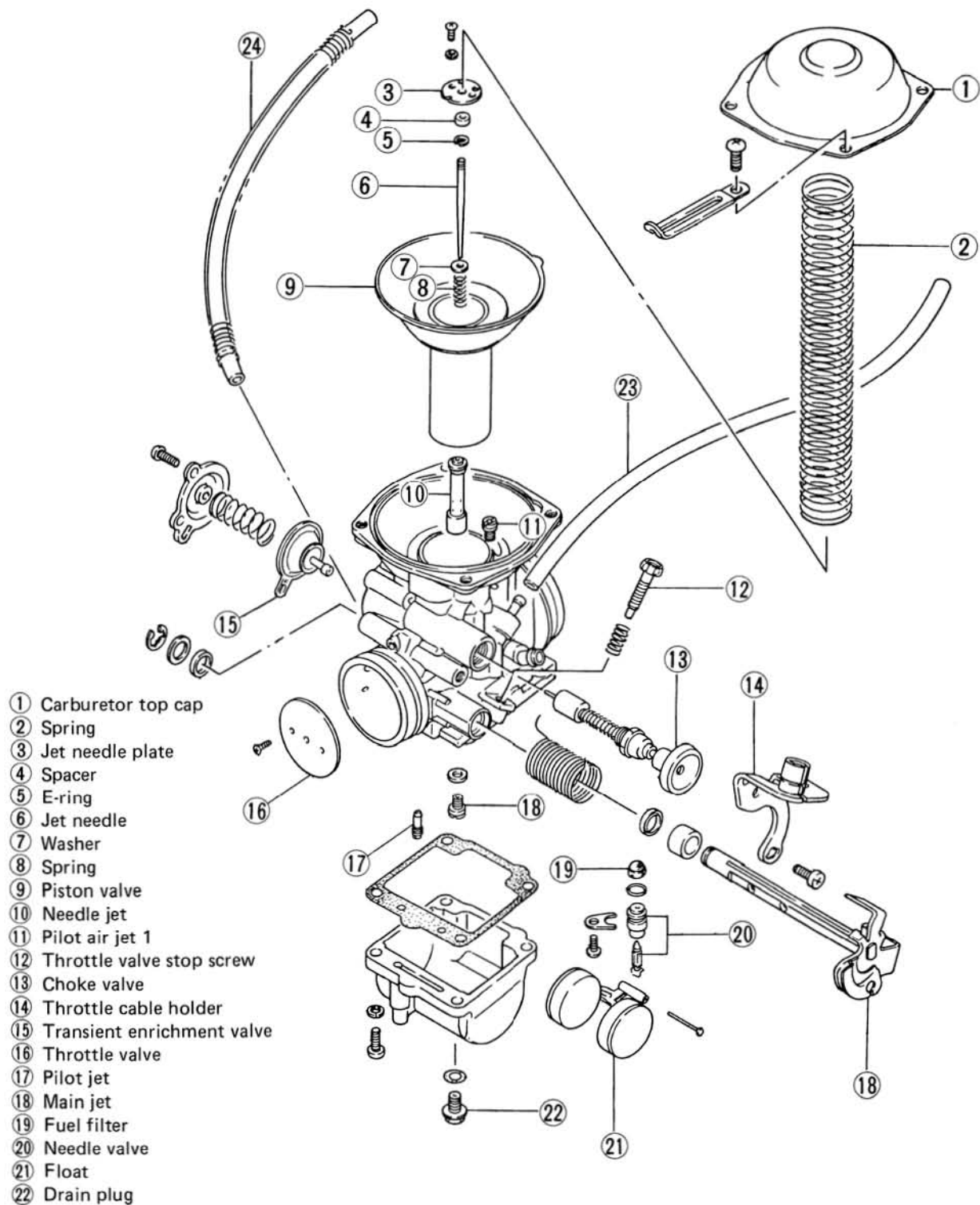


# **FUEL AND LUBRICATION SYSTEM**

## **CONTENTS**

<b>CARBURETOR CONSTRUCTIONS</b> .....	<b>4- 1</b>
<b>SPECIFICATIONS</b> .....	<b>4- 2</b>
<b>FUEL COCK</b>	
<b>INSPECTION AND CLEANING</b> .....	<b>4- 3</b>
<b>CARBURETOR</b>	
<b>DISASSEMBLY</b> .....	<b>4- 3</b>
<b>INSPECTION</b> .....	<b>4- 6</b>
<b>NEEDLE VALVE INSPECTION</b> .....	<b>4- 6</b>
<b>FLOAT HEIGHT ADJUSTMENT</b> .....	<b>4- 6</b>
<b>REASSEMBLY</b> .....	<b>4- 6</b>
<b>CARBURETOR REMOUNTING</b> .....	<b>4- 7</b>
<b>LUBRICATION SYSTEM</b> .....	<b>4- 8</b>
<b>OIL PRESSURE</b> .....	<b>4- 8</b>
<b>LUBRICATION SYSTEM CHART</b> .....	<b>4- 9</b>

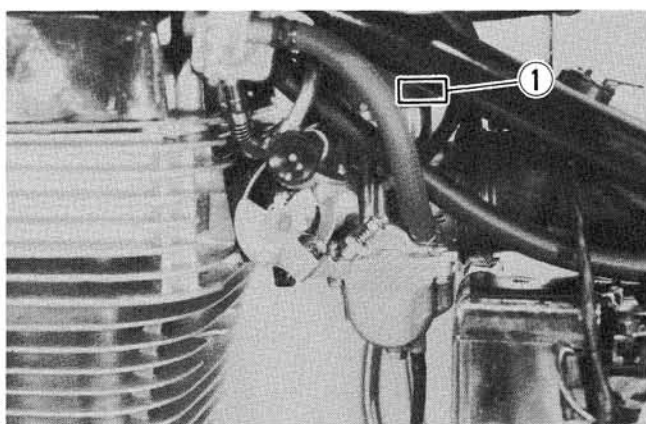
# CARBURETOR CONSTRUCTIONS



## SPECIFICATIONS

ITEM	SPECIFICATION	
		California model only
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm (1.6 in)	←
I.D. No.	24B00	24B20
Idle r/min.	1 100 ± 100 r/min.	←
Fuel level	7.0 ± 0.5 mm (0.276 ± 0.02 in)	←
Float height	27.95 ± 1.0 mm (1.10 ± 0.04 in)	←
Main jet (M.J.)	#155	←
Main air jet (M.A.J.)	0.6 mm	←
Jet needle (J.N.)	5C17	←
Needle jet (N.J.)	X-6	←
Pilot jet (P.J.)	#47.5	←
By-pass (B.P.)	1.1, 1.1, 1.1 mm	←
Pilot outlet (P.O.)	1.3 mm	←
Valve seat (V.S.)	2.8 mm	←
Starter jet (G.S.)	#22.5	←
Pilot screw (P.S.)	PRE-SET	←
Pilot air jet 1 (P.A.J. 1)	#67.5	←
Pilot air jet 2 (P.A.J. 2)	2.0 mm	←
Throttle cable play	0.5 – 1.0 mm (0.02 – 0.04 in)	←

## I.D. NO. LOCATION



### FUEL COCK

#### INSPECTION AND CLEANING

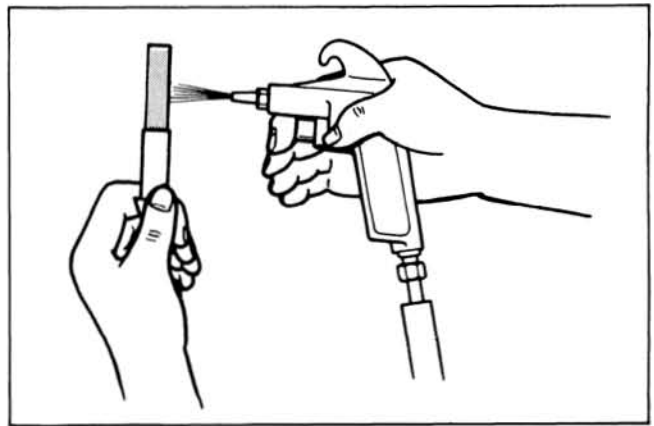
If the fuel strainer is dirty with sediment or rust, fuel will not flow smoothly and loss in engine power may result. Clean the fuel strainer in the following manner:

- Turn the fuel cock to ON or RES position.
- Shift the fuel hose clip sideways and disconnect the fuel hose from the fuel cock.
- Turn the fuel cock to PRI position and drain the fuel.
- Remove the fuel cock assembly by removing the two bolts.
- Clean the fuel strainer with compressed air.

#### WARNING:

Gasoline is very explosive. Extreme care must be taken.

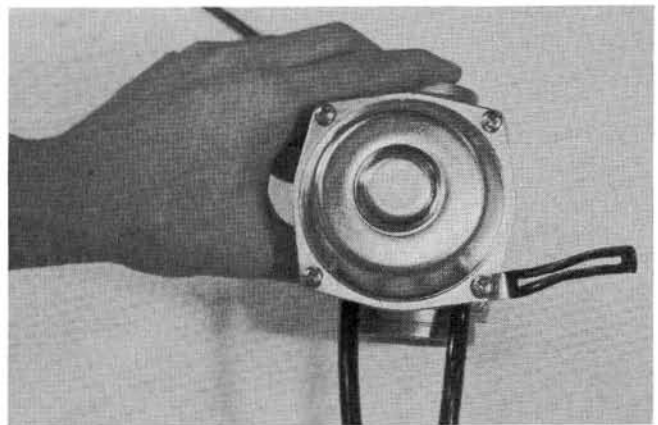
Gaskets must be replaced with new ones to prevent fuel leakage.



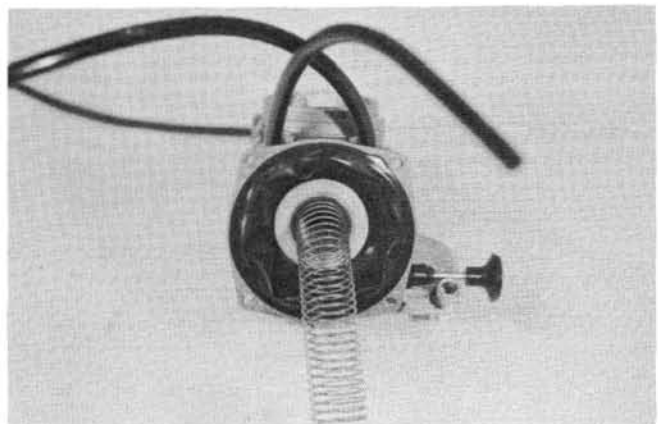
### CARBURETOR

#### DISASSEMBLY

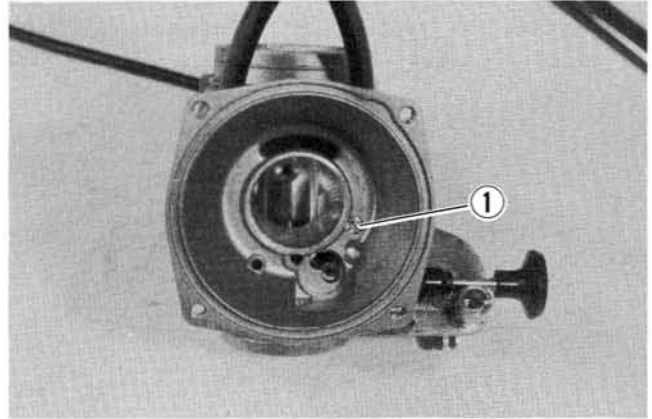
- Take off the carburetor from the motorcycle. (Refer to page 3-6.)
- Remove the carburetor top cap by removing the four screws.



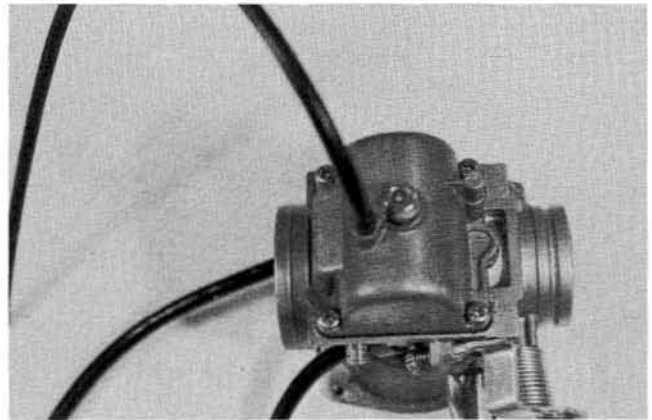
- Pull out the spring and diaphragm assembly.



- Remove the pilot air jet ①.



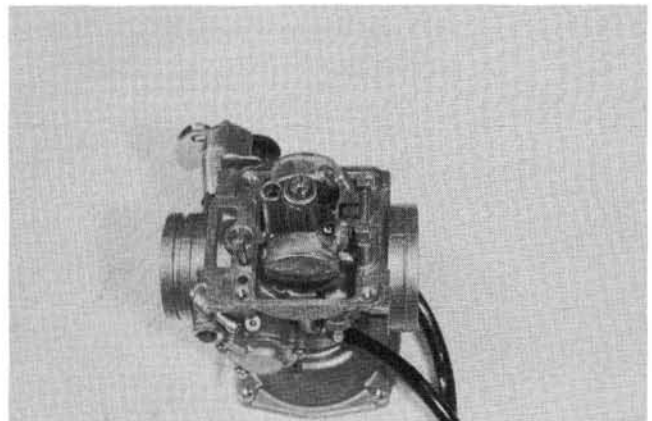
- Remove the float chamber body by removing the four screws.



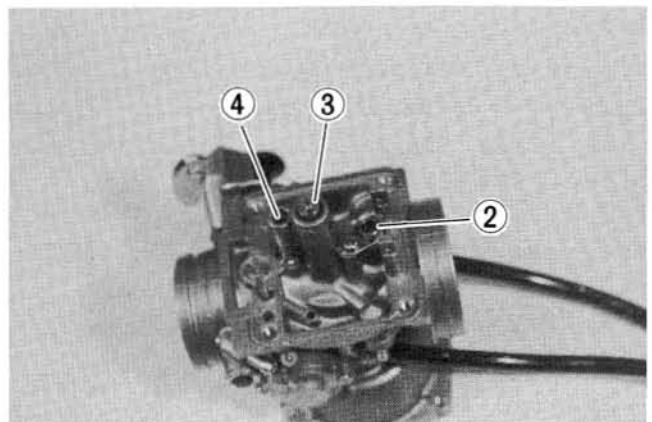
- Pull out the float pin and remove the float.

**CAUTION:**

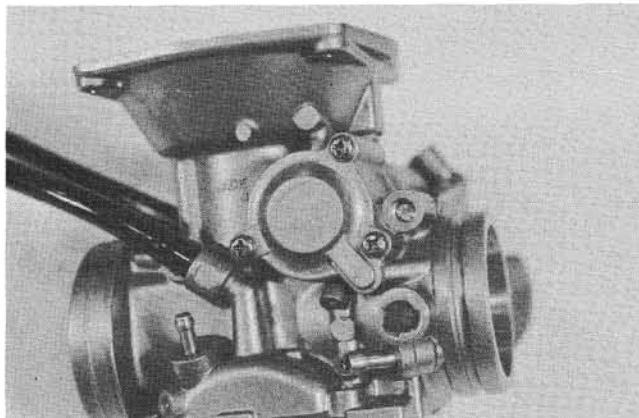
When removing the float pin, be careful not to damage the carburetor body.



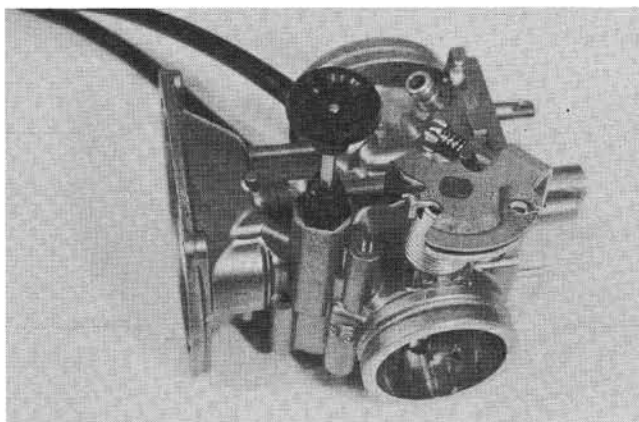
- Remove the needle valve ②, main jet ③ (needle jet) and pilot jet ④.



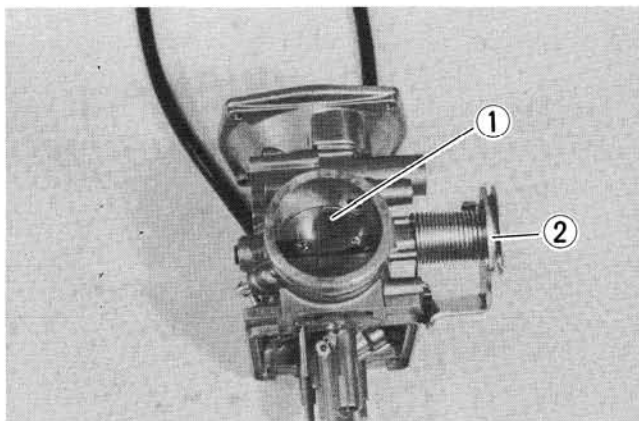
- Remove the transient enrichment valve cover, spring and valve.



- Remove the starter plunger assembly.



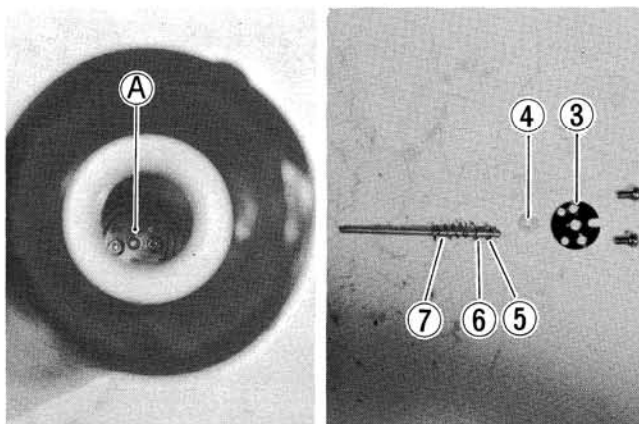
- Remove the two screws, and pull out the throttle valve ① by turning the throttle valve shaft ②.



- Remove the jet needle stopper screws and remove the lock plate ③, spacer ④, E-ring ⑤, washer ⑥, spring ⑦ and needle jet.

### CAUTION:

- \* When re-installing the lock plate, align the holes of the lock plate with the piston holes.
- \* Re-install the lock plate so that the protrusion A on the plate pushes spacer ④.





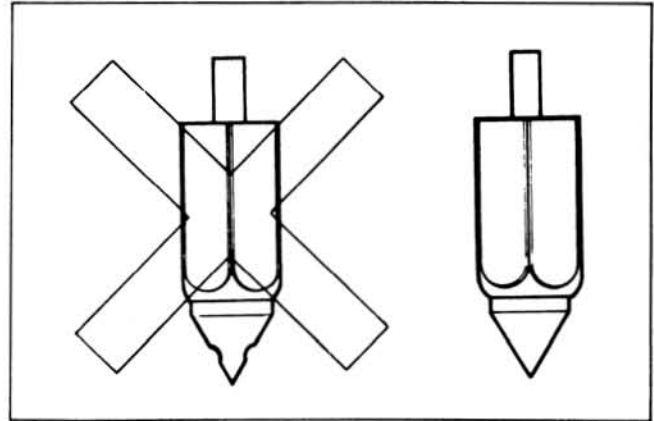
## INSPECTION

Check following items for any damage or clogging.

- \* Pilot jet
- \* Main jet
- \* Main air jet
- \* Pilot air jet
- \* Needle jet air bleeding hole
- \* Float
- \* Needle valve mesh
- \* Diaphragm
- \* Gasket
- \* Throttle valve shaft oil seal
- \* Drain plug gasket
- \* Pilot outlet and bypass holes

## 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.



## FLOAT HEIGHT ADJUSTMENT

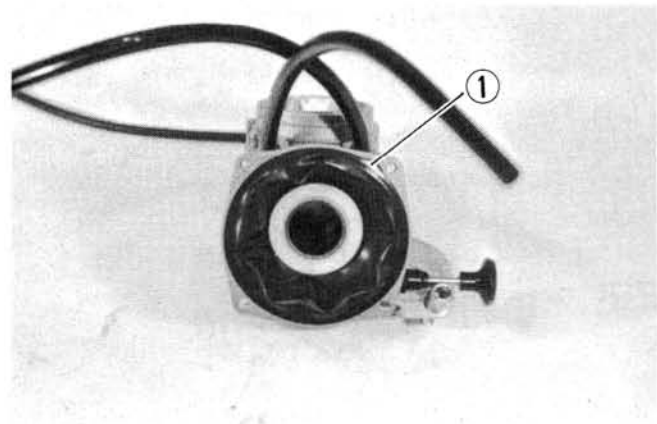
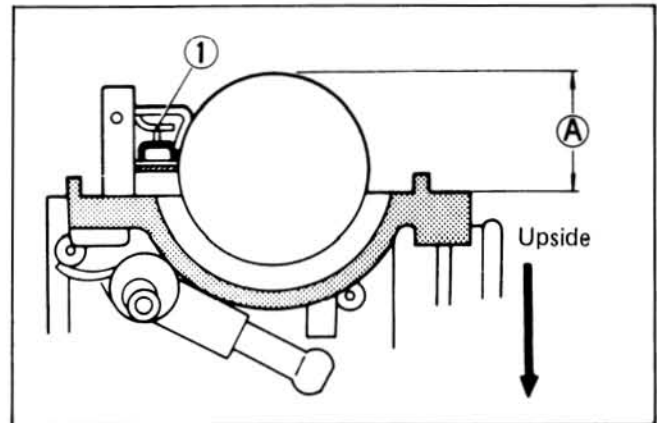
To check the float height, invert the carburetor body, with the float arm kept free, measure the height **A** while float arm is just in contact with needle valve by using calipers.

Bend the tongue **①** as necessary to bring the height **A** to this value.

Float height <b>A</b>	$27.95 \pm 1.0$ mm ( $1.10 \pm 0.04$ in)
09900-20101	Vernier calipers

### NOTE:

When measuring float height, be sure to remove the gasket.



## REASSEMBLY

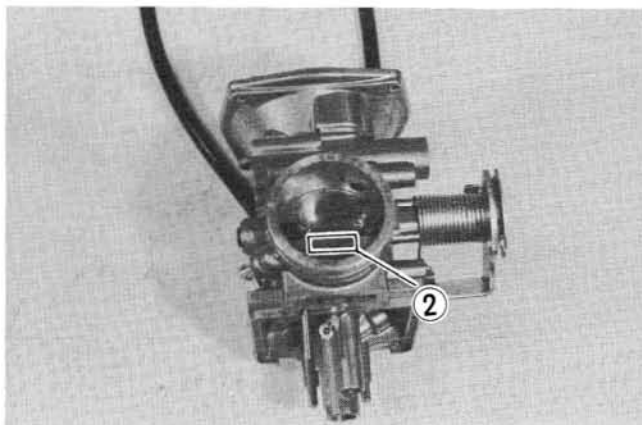
Reassemble the carburetor in the reverse order of disassembly.

Pay attention to the following points:

- Place the tongue **①** of diaphragm to the carburetor body properly.

- While turning the throttle valve shaft, place the throttle valve in the groove so that the I.D. number ② of the throttle valve faces down-side. Tighten the throttle valve securing screws with applying thread lock "1342."

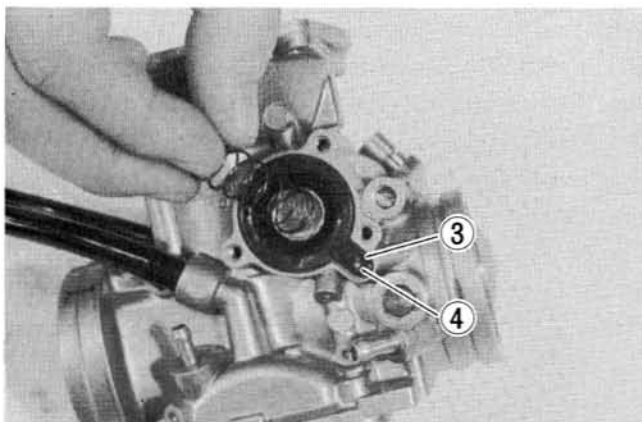
99000-32050	Thread lock "1342"
-------------	--------------------



- Install the transient enrichment valve and spring to the proper position.

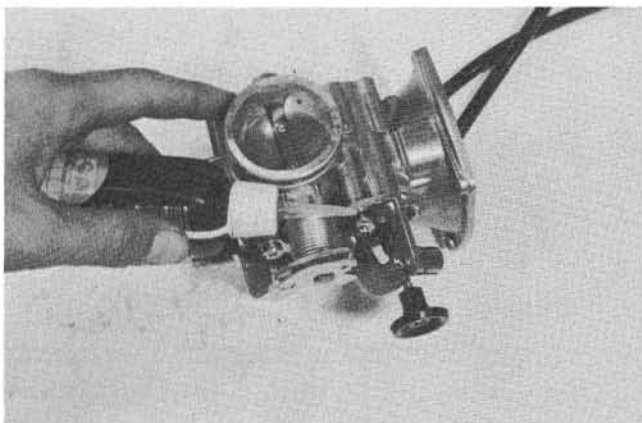
**NOTE:**

Do not block the vacuum hole ③ with the diaphragm tab ④.



- Apply thread lock "1342" to the throttle cable holder screws.

99000-32050	Thread lock "1342"
-------------	--------------------



## CARBURETOR REMOUNTING

Remount the carburetor by reversing the sequence of removal steps, and following adjustments and inspection are necessary after remounting the carburetor.

- \* Throttle cable play (Refer to page 2-10.)
- \* Idling adjustment (Refer to page 2-10.)

## LUBRICATION SYSTEM

### OIL PRESSURE

- Connect an electric tachometer to the engine.
- Install the oil pressure gauge ① in the position shown in the Fig.
- Warm up the engine as follows.  
Summer approx. 10 min. at 2 000 r/min.  
Winter approx. 20 min. at 2 000 r/min.
- After the warming up operation, increase the engine speed to 3 000 r/min, and read the oil pressure gauge.

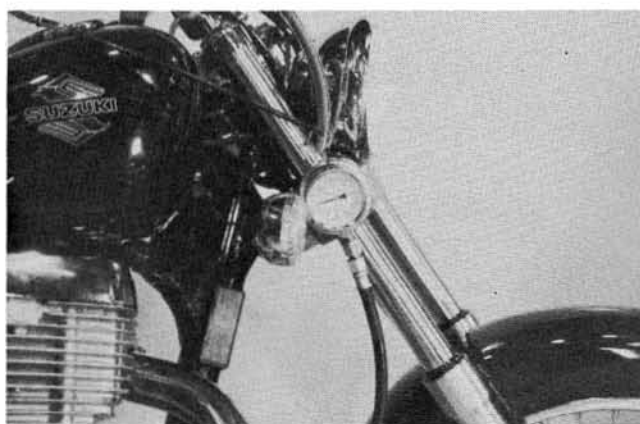
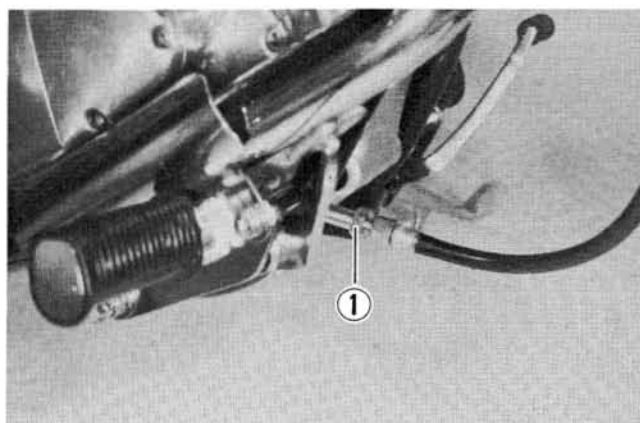
#### NOTE:

Engine oil must be warmed up to 60°C (140°F) when checking the oil pressure.

09915-74510	Oil pressure gauge
09915-72410	Pressure gauge attachment

#### Oil pressure specification

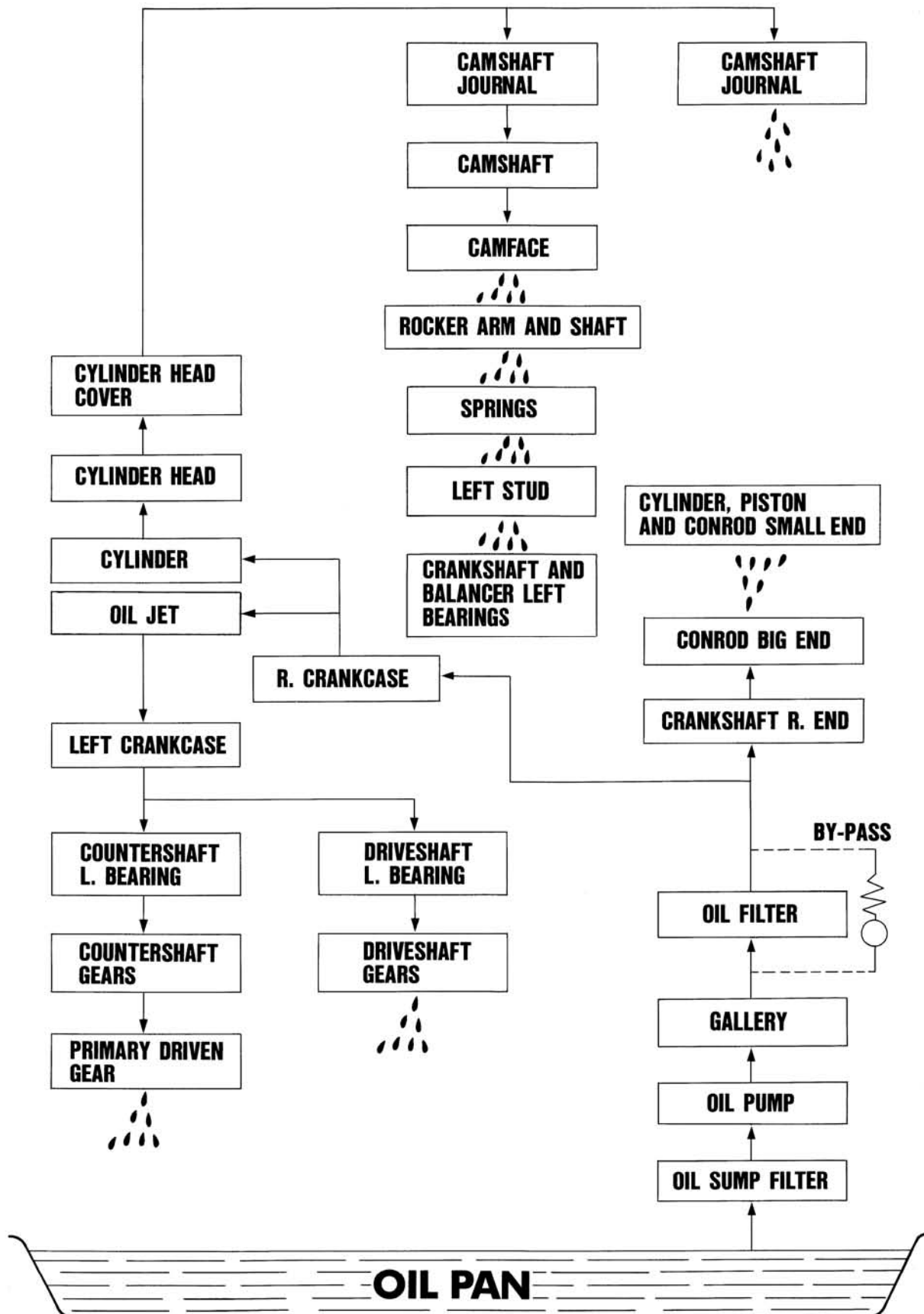
Above 50 kPa, 0.50 kg/cm<sup>2</sup> (7.1 psi),  
Below 75 kPa, 0.75 kg/cm<sup>2</sup> (10.7 psi)  
at 3 000 r/min. Oil temp. at 60°C (140°F)

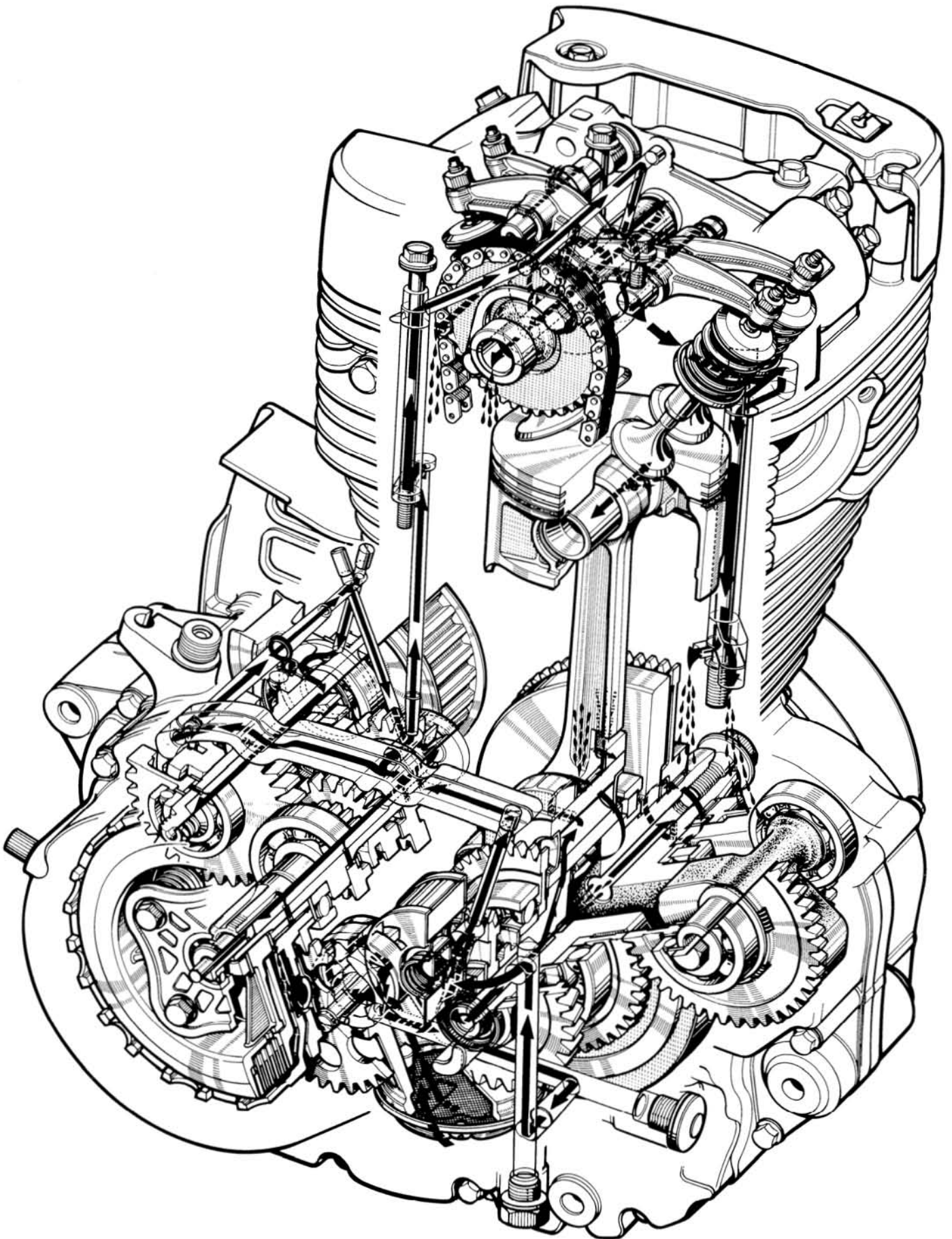


If the oil pressure is lower or higher than the specifications, several causes may be considered.

- \* Low oil pressure is usually the result of a clogged oil filter, oil leakage from the oil passageway, damaged oil seal, a defective oil pump or a combination of these items.
- \* High oil pressure is usually caused by a engine oil which is too heavy a weight, a clogged oil passage, improper installation of the oil filter or a combination of these items.

## LUBRICATION SYSTEM CHART









# ***EMISSION CONTROL INFORMATION***

## ***CONTENTS***

<b><i>EMISSION CONTROL CARBURETOR COMPONENTS .....</i></b>	<b><i>5- 1</i></b>
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## EMISSION CONTROL CARBURETOR COMPONENTS

LS650 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	<i>1 2 3 4 5 6 7 8 9 0</i>

The carburetor specification for the emission-controlled LS650 are as follows.

Carburetor I.D. No.	Main Jet	Needle Jet	Jet Needle	Pilot Jet	Pilot Screw
24B00 24B20 (for CA.)	#155	X-6	5C17	#47.5	PRE-SET DO NOT ADJUST

The pilot screw is pre-set by the factory utilizing specialized testing and adjusting procedures. The pilot screw is not adjustable as the idle circuit is "sealed" after factory adjustment. Adjusting, interfering 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 persons, who are unaware of these special carburetor servicing requirements tamper with the carburetors the Suzuki dealer should restore the carburetors to their original condition or if unable to effect repairs, contact the distributors representative for further technical information and assistance.

# ***ELECTRICAL SYSTEM***

## ***CONTENTS***

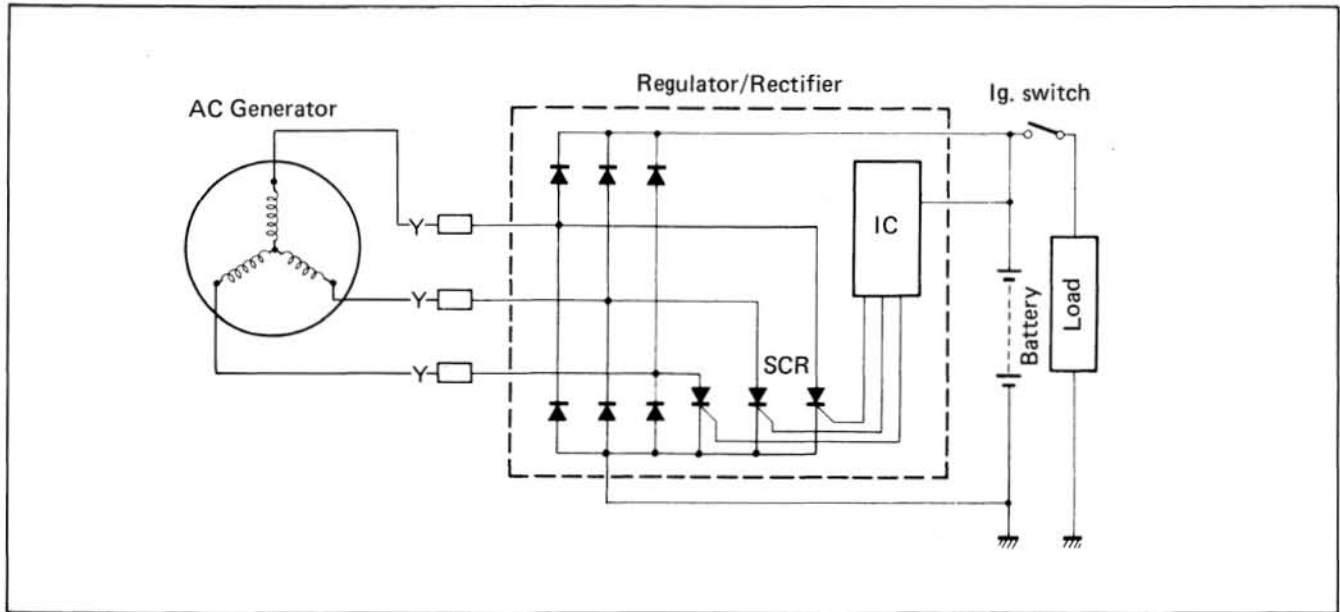
<b><i>CHARGING SYSTEM</i></b> .....	<b><i>6- 1</i></b>
<b><i>DESCRIPTION</i></b> .....	<b><i>6- 1</i></b>
<b><i>INSPECTION</i></b> .....	<b><i>6- 3</i></b>
<b><i>IGNITION SYSTEM</i></b> .....	<b><i>6- 5</i></b>
<b><i>DESCRIPTION</i></b> .....	<b><i>6- 5</i></b>
<b><i>INSPECTION</i></b> .....	<b><i>6- 6</i></b>
<b><i>AUTOMATIC DE-COMPRESSION CONTROL AND STARTER SYSTEM</i></b> .....	<b><i>6- 8</i></b>
<b><i>COMBINATION METER</i></b> .....	<b><i>6-14</i></b>
<b><i>REMOVAL AND DISASSEMBLY</i></b> .....	<b><i>6-14</i></b>
<b><i>INSPECTION</i></b> .....	<b><i>6-15</i></b>
<b><i>LAMPS</i></b> .....	<b><i>6-16</i></b>
<b><i>SWITCHES</i></b> .....	<b><i>6-17</i></b>
<b><i>BATTERY</i></b> .....	<b><i>6-18</i></b>

## CHARGING SYSTEM

### DESCRIPTION

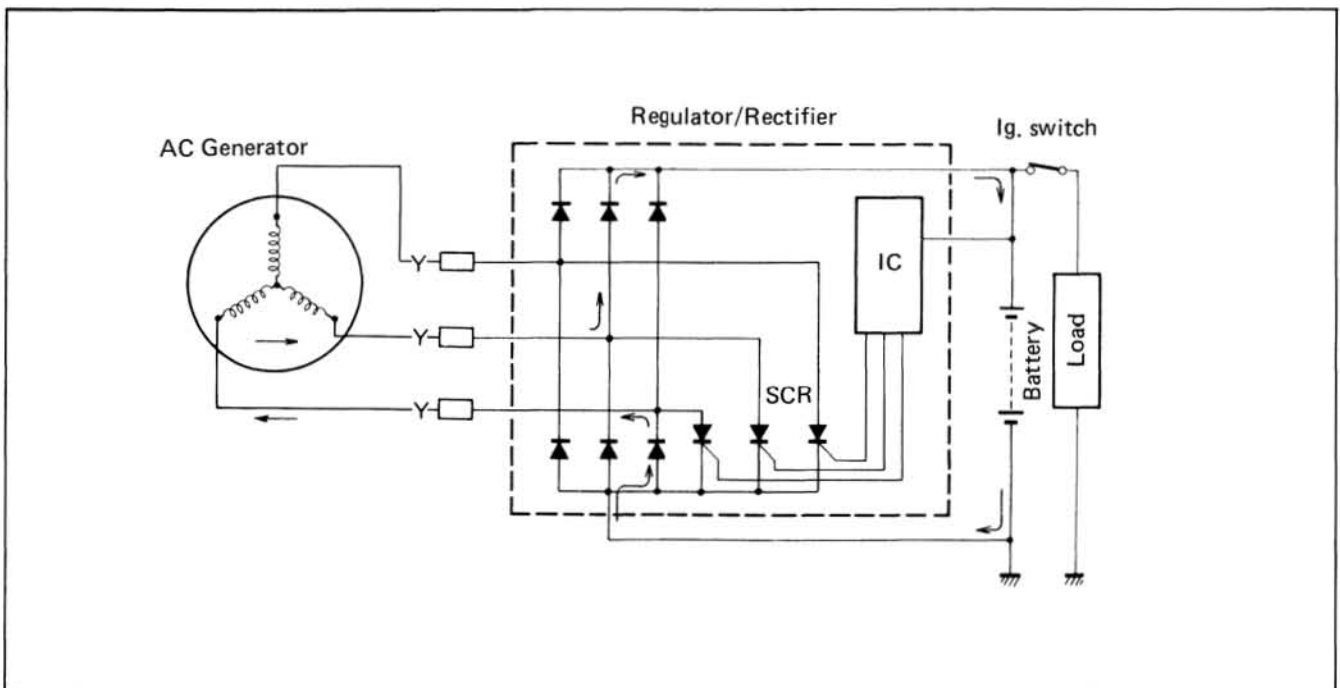
The circuit of the charging system is indicated in the figure, which is composed of an AC generator, regulator/rectifier unit and battery.

The AC current generated from the AC generator is rectified by the rectifier and is turned into DC current, then it charges the battery.



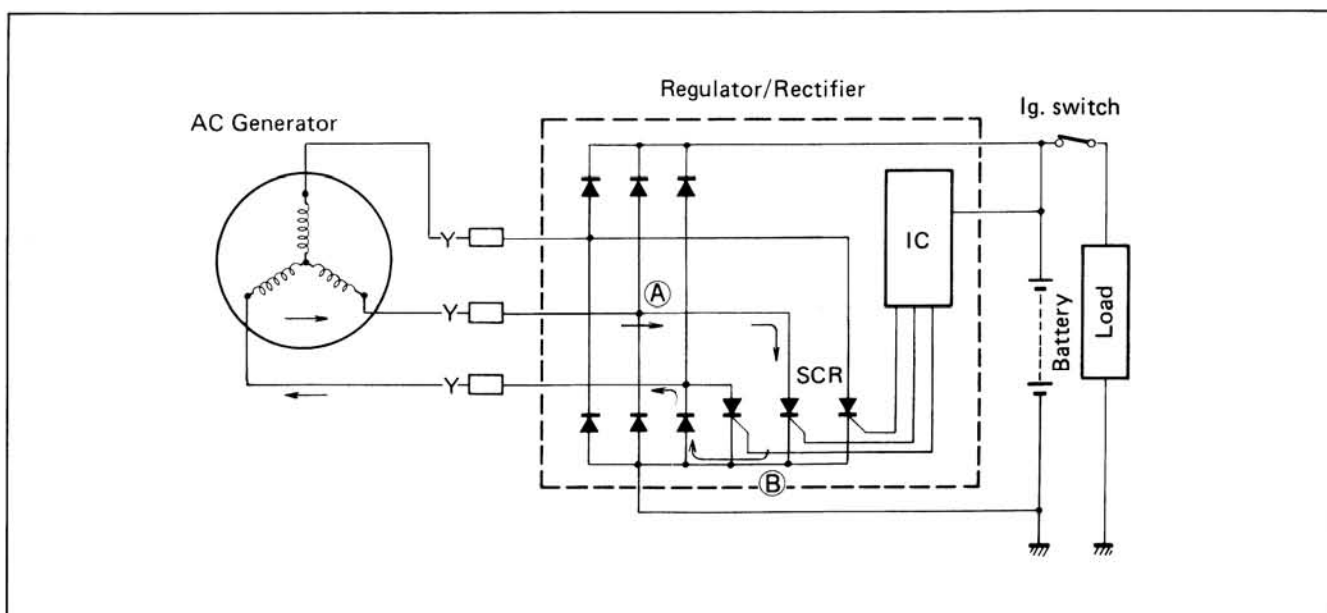
### Function of Regulator

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 (A) to point (B). 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 current generated from AC generator flows to point (B), 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.



## INSPECTION

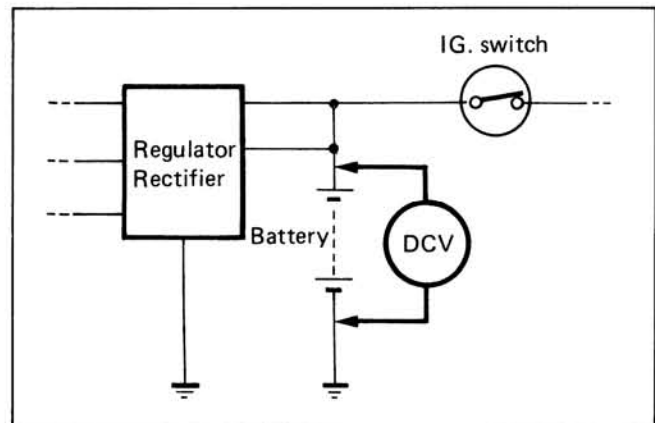
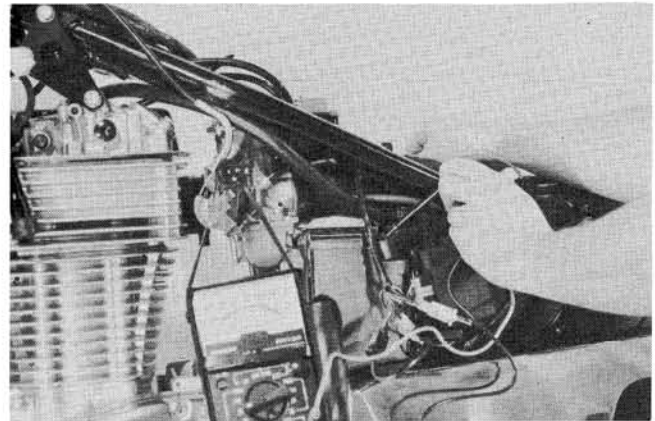
### CHARGING OUTPUT CHECK

- Remove the seat, right and left frame covers.
- Install a electric tachometer to the high tension cord.
- Start the engine and keep it running at 5 000 r/min with dimmer switch turned HI position.
- Using the pocket tester, measure the DC voltage between the battery terminal  $\oplus$  and  $\ominus$ .  
If the tester reads under 14.0V or over 15.5V, check the AC generator no-load performance and regulator/rectifier.

#### NOTE:

When making this test, be sure that the battery is fully-charged condition.

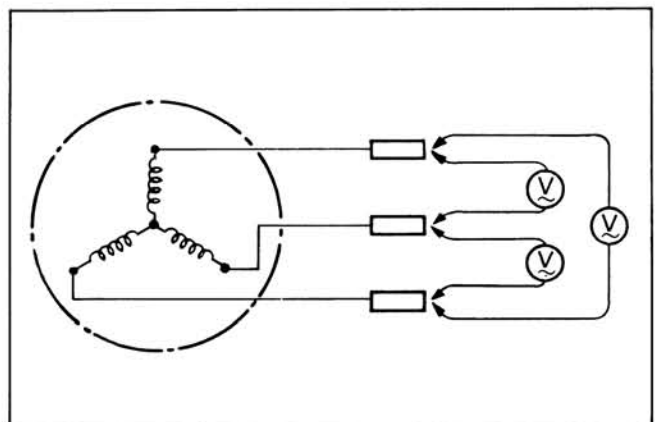
STD charging output	14.0 – 15.5 (DC) at 5 000 r/min
09900-25002	Pocket tester



### AC GENERATOR NO-LOAD PERFORMANCE

- Remove the seat and pillion seat.
- Disconnect the AC generator lead wire.
- Start the engine and keep it running at 5 000 r/min.
- Using the pocket tester, measure the AC voltage between the three yellow lead wires.  
If the tester reads under 100V, the AC generator is faulty.

STD No-load performance	More than 100V (AC) at 5 000 r/min
09900-25002	Pocket tester





**AC GENERATOR CONTINUITY CHECK**

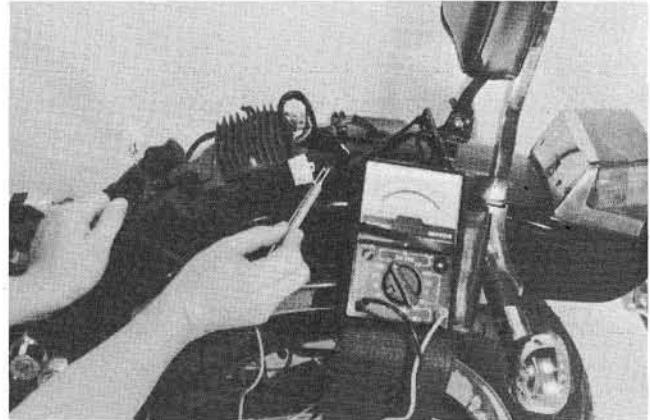
- Using the pocket tester, check the continuity between the lead wires of the stator.
- Also check that the stator core is insulated.

**NOTE:**

When making this test, it is not necessary to remove the AC generator.

09900-25002

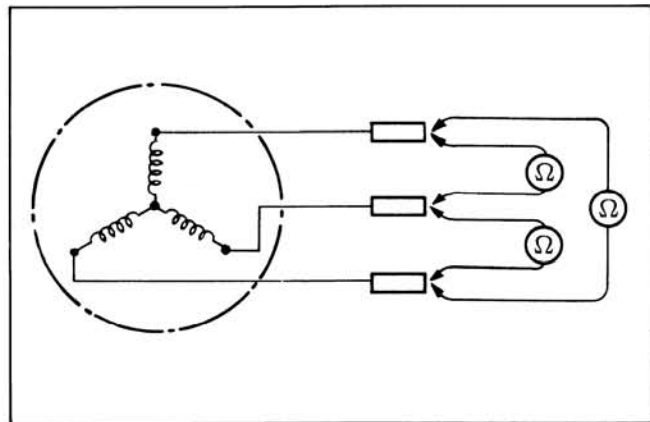
Pocket tester

**REGULATOR/RECTIFIER**

- Remove the seat and pillion seat.
  - Using the pocket tester ( $\times 1\text{k}\Omega$  range), measure the resistance between the lead wires in the following table.
- If the resistance checked is incorrect, replace the regulator/rectifier.

09900-25002

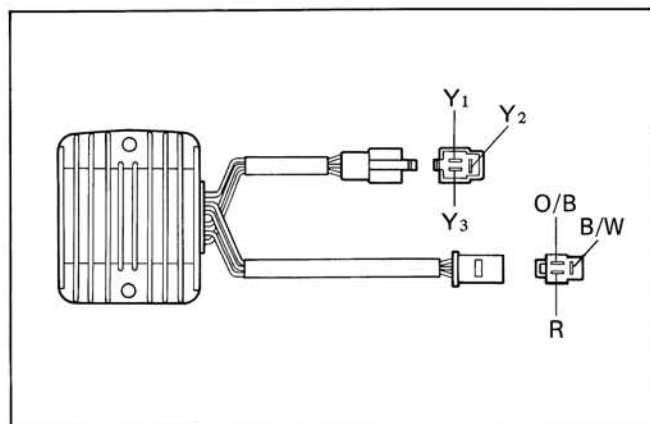
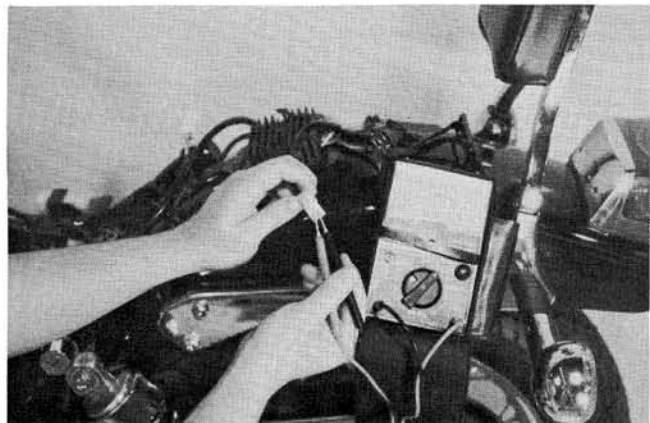
Pocket tester

Unit: Approx.  $\text{k}\Omega$ 

		⊕ Probe of tester to:					
		R	Y 1	Y 2	Y 3	B/W	O/B
⊖ Probe of tester to:	R		$\infty$	$\infty$	$\infty$	$\infty$	$\infty$
	Y 1	3.0		$\infty$	$\infty$	$\infty$	$\infty$
	Y 2	3.0	$\infty$		$\infty$	$\infty$	$\infty$
	Y 3	3.0	$\infty$	$\infty$		$\infty$	$\infty$
	B/W	7.5	3.0	3.0	3.0		4.5
	O/B	60	40	40	40	28	

**CAUTION:**

As transistors, capacitors, Zener diodes, etc. are used inside this regulator/rectifier, the resistance values will differ when an ohmmeter other than the SUZUKI pocket tester is used.



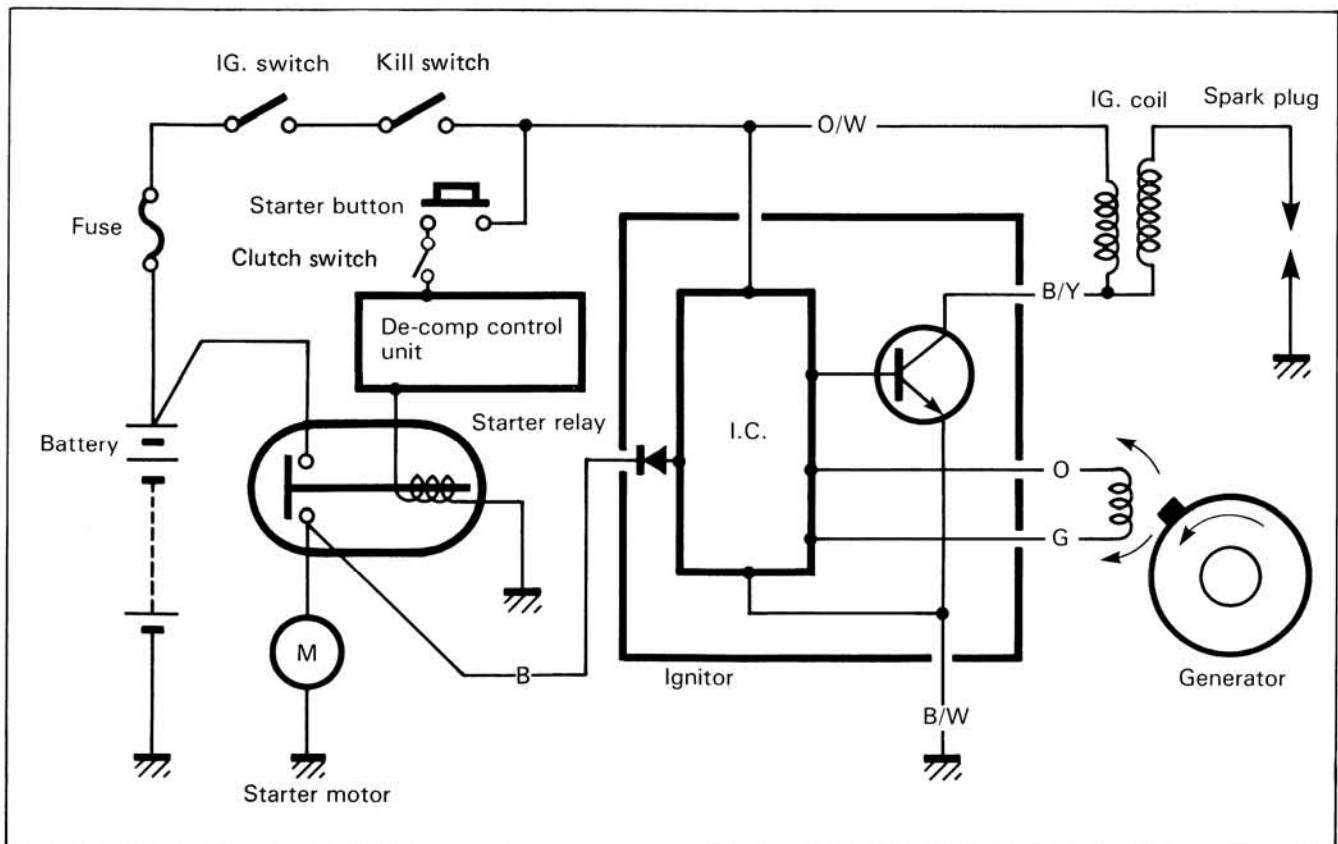
## IGNITION SYSTEM

### DESCRIPTION

The fully transistorized ignition system consists of a signal generator, ignitor, ignition coil, and spark plug. The signal generator comprises one rotor tip and one pick-up coil.

The signal generator coil is mounted on the generator cover. The output of the signal generator goes to the ignitor unit, where it turns ON and OFF the transistor alternately. As the transistor is turned ON and OFF, the current passing through the primary windings of the ignition coil is also turned ON and OFF accordingly. Thus, it induces the secondary current in the ignition coil secondary windings and produces the spark between spark plug gap.

Ignition cut-off circuit is incorporated in the ignitor unit. If the engine turns in the reverse direction and reverse current is produced by the starter motor, this circuit works on the transistor not to cut off the primary current of the ignition coil. It causes no sparking between spark plug gap.



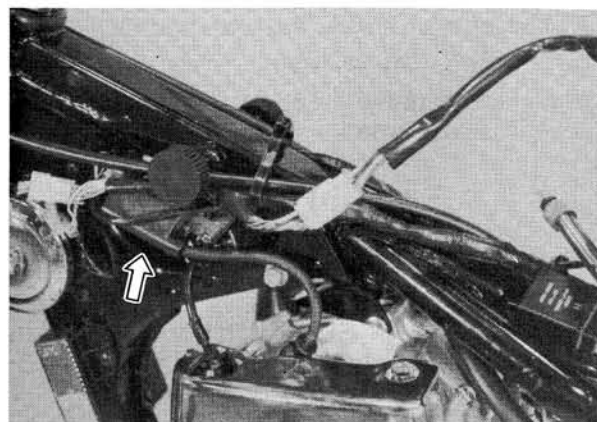
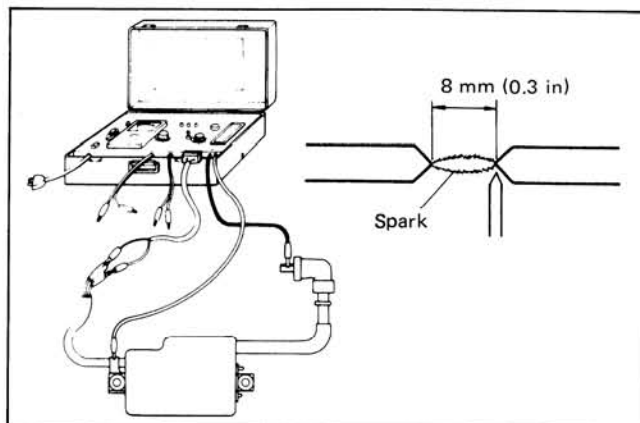
## INSPECTION

### IGNITION COILS (Checking with Electro Tester)

- Remove the ignition coil from the frame.
- Using the electro tester, test each ignition coil for sparking performance. The test connection is as indicated. Make sure that the three-needle sparking distance is at least 8 mm.

If no sparking or orange color sparking occurs with this much gap, then it is defective and must be replaced.

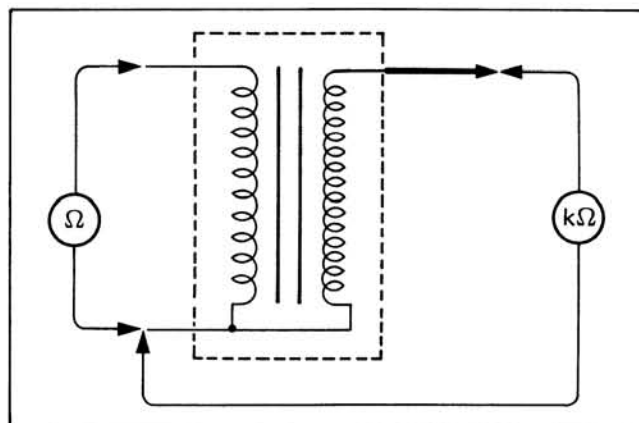
09900-28106	Electro tester
STD Spark performance	8 mm (0.3 in)



### 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	1 – 7 $\Omega$
Secondary	10 – 25 k $\Omega$



### PICK-UP COIL (Checking with Pocket Tester)

- Remove the seat and left frame cover.
- Measure the resistance between lead wires. If the resistance is infinity or less than the specifications, the pick-up coil must be replaced.

09900-25002	Pocket tester
STD resistance	220 $\pm$ 20% $\Omega$ (Orange – Green)

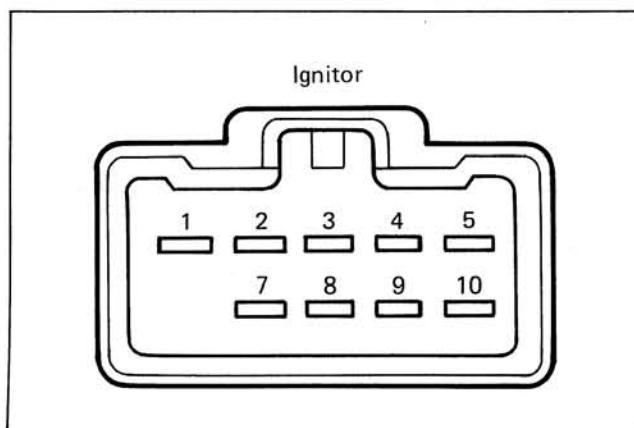


**IGNITOR UNIT (Checking with Pocket Tester)**

- Remove the seat and left frame cover.
- Remove the ignitor unit from the frame.
- Use the SUZUKI pocket tester, bring the  $\oplus$  probe and the  $\ominus$  probe into contact with each lead wire of the ignitor unit, check for continuity, and measure the resistance value.
- When the continuity and the resistance values are as shown in the following table, it can be judged that the ignitor unit is normal.

**CAUTION:**

As capacitors, diodes, etc. are used inside this ignitor unit, the resistance values will differ when an ohmmeter other than SUZUKI pocket tester is used.



1. Orange : to pick-up coil
- 2, 3, 4 . . . . . No connection
5. Black/Yellow : to ignition coil primary winding
7. Black : to starter relay
8. Green : to pick-up coil
9. Orange/White : to ignition switch
10. Black/White : Ground

Unit: Approx.  $k\Omega$ 

		$\oplus$ Probe of tester to:					
		1	5	7	8	9	10
$\ominus$ Probe of tester to:	1		20	45	150	11	7
	5	$\infty$		$\infty$	$\infty$	$\infty$	$\infty$
	7	300	30		100	17	20
	8	500	20	45		11	7
	9	200	4.5	18	75		2.4
	10	200	2.6	17	75	2.4	

# AUTOMATIC DE-COMPRESSION CONTROL AND STARTER SYSTEM

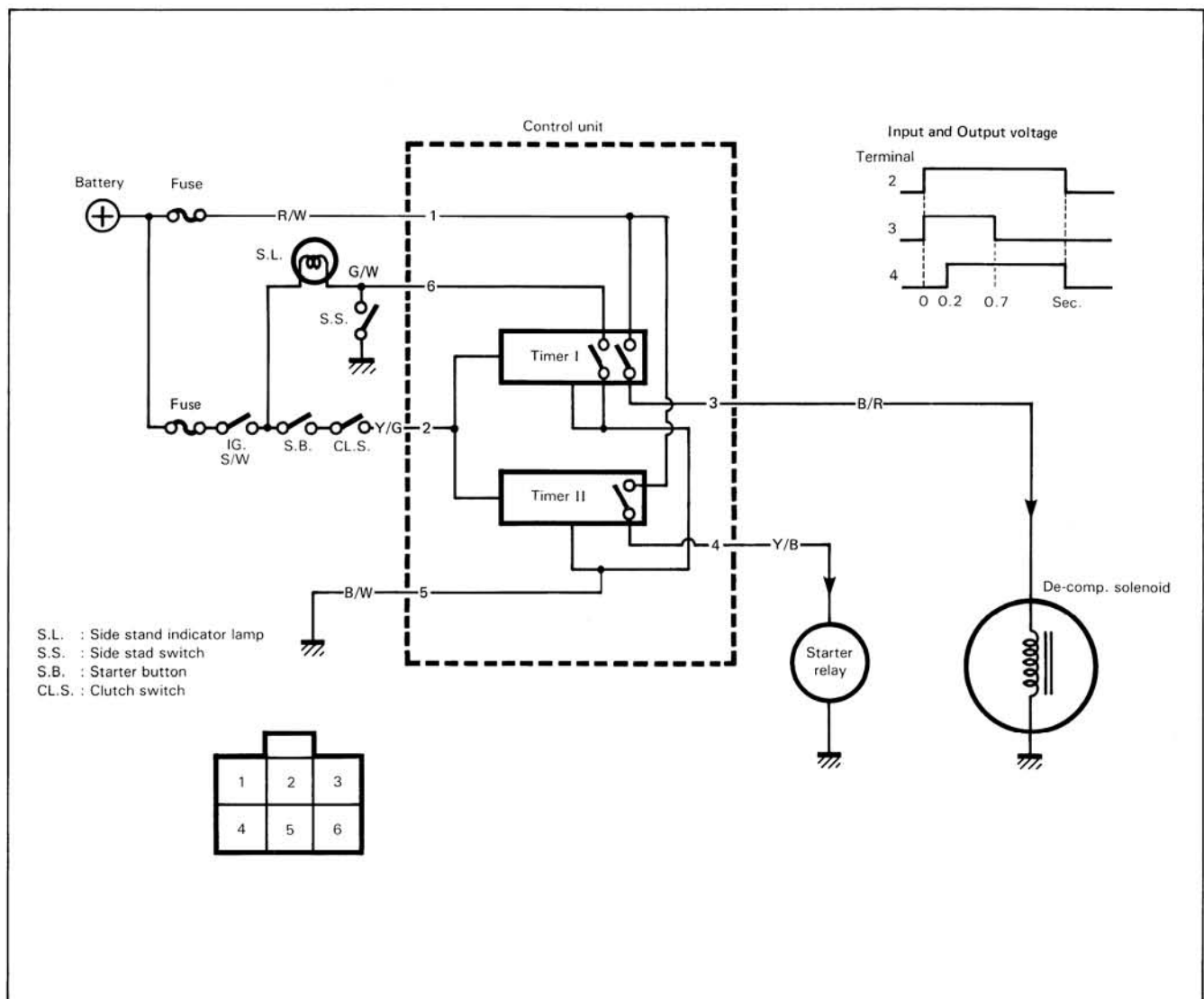
## DESCRIPTION

This system consists of the de-comp. solenoid, starter relay and control unit. It facilitates operation of the starter motor by lifting up the de-comp. lever by means of the electric solenoid.

The control unit has two built-in timers, one of which controls the timing of letting the de-comp. lever up and down (timer I) and the other controls the start timing of the starter motor (timer II).

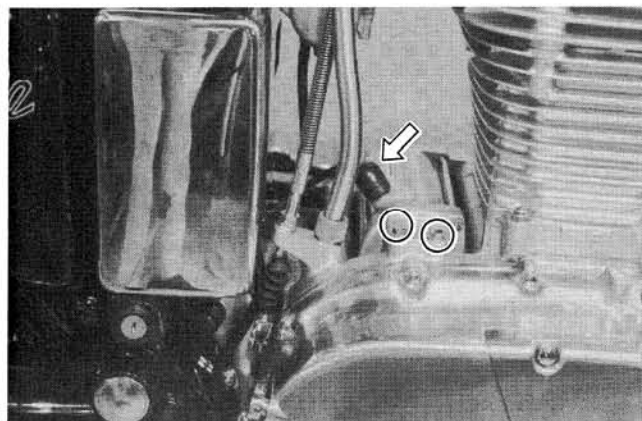
## OPERATION

When the ignition switch, clutch switch and starter button are turned ON, a 12V voltage is applied to the terminal 2 of the control unit. As the timer I starts operating at the same time, a 12V output voltage comes out at the terminal 3. This output voltage activates the de-comp. solenoid to lift up the de-comp. lever. When the timer II operates 0.2 second after the starter button is pushed, a 12V output voltage comes out at the terminal 4, whereby the starter relay turns ON and thus the starter motor starts to run. As the operation time of the timer I is 0.7 second, the de-comp. solenoid turns OFF 0.5 second after the starter motor starts to run and the de-comp. lever returns to the normal position.

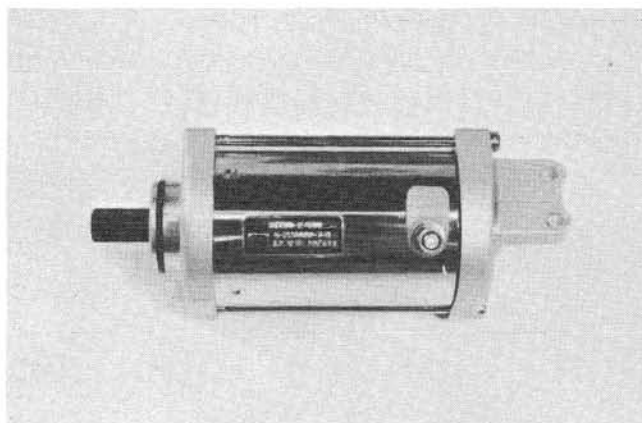


## STARTER MOTOR REMOVAL AND DISASSEMBLY

- Disconnect the starter motor lead wire by removing the nut, then remove the starter motor by removing the mounting bolts.



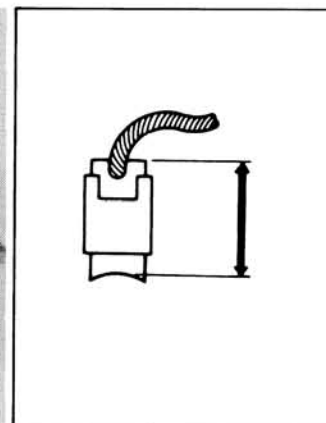
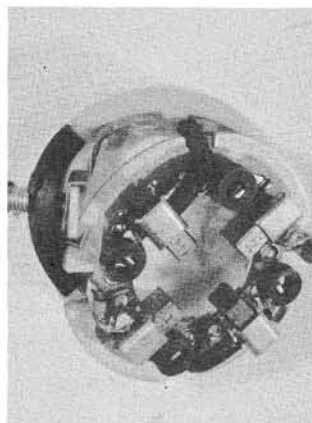
- Disassemble the starter motor by removing the two screws.



## STARTER MOTOR INSPECTION CARBON BRUSHES

When the brushes are worn, the motor will be unable to produce sufficient torque, and the engine will be difficult to turn over. To prevent this, periodically, inspect the length of the brushes, replacing them when they are too short or chipping.

Service Limit	9 mm (0.35 in)
---------------	----------------

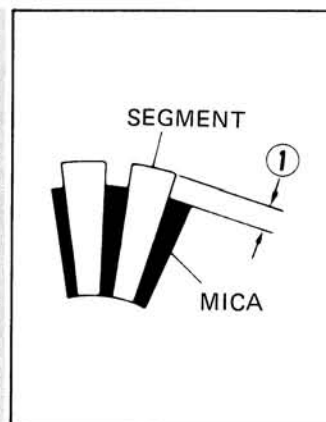
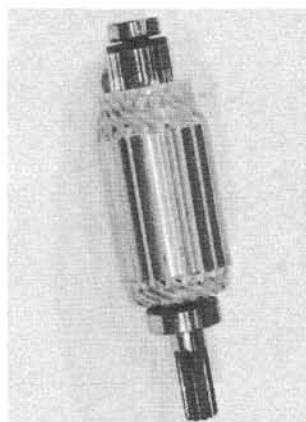


## COMMUTATOR

If the commutator surface is dirty, starting performance decreases. Polish the commutator with #400 or similar fine emery paper when it is dirty. After polishing it, wipe the commutator with a clean dry cloth.

Measure the commutator under-cut ①.

Service Limit	0.2 mm (0.008 in)
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## BEARINGS

Inspect the play of the bearings by hand. Replace the bearing if there is anything unusual.



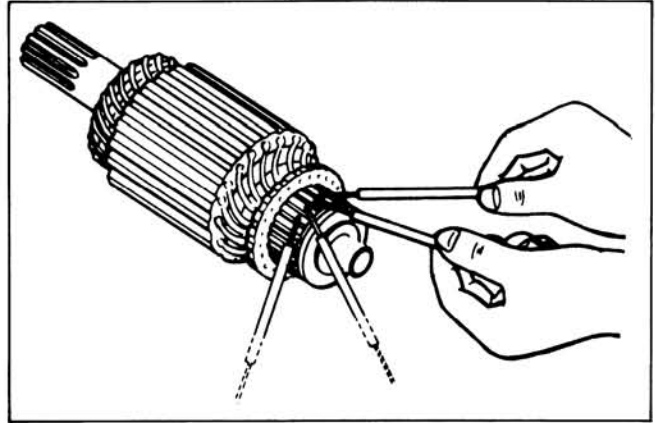
**ARMATURE COIL**

Using a pocket tester, check the coil for open and ground by placing probe pins on each commutator segment and rotor core (to test for ground) and on any two segments at various places (to test for open), with the brushes lifted off the commutator surface.

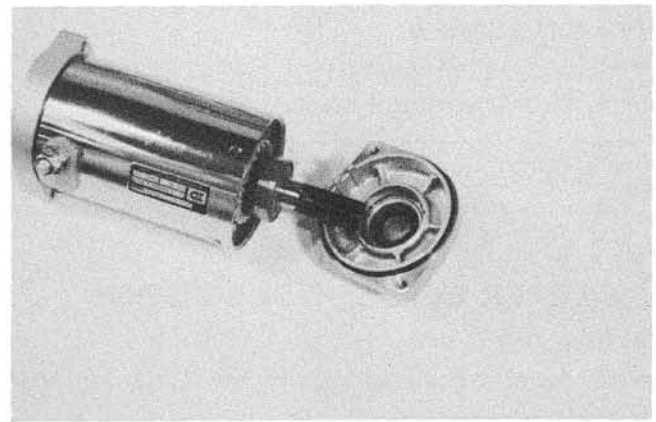
If the coil is found to be open-circuited or grounded, replace the armature. Continuous use of a defective armature will cause the starter motor to suddenly fail.

09900-25002

Pocket tester

**OIL SEAL**

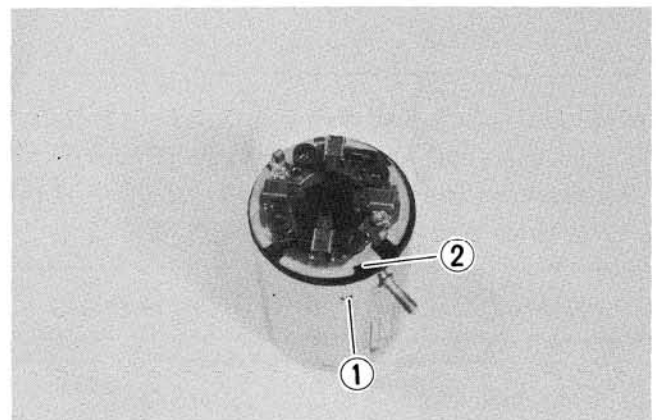
Check the seal lip for damage, wear or sign of oil leakage. If any damage is found, replace it.

**STARTER MOTOR REASSEMBLY**  
**O-RING**

- Install new O-rings on the correct positions as shown in Fig.



- When installing the housing end, align the protrusion ① of starter motor case with the groove ② of the brushes mounting plate.

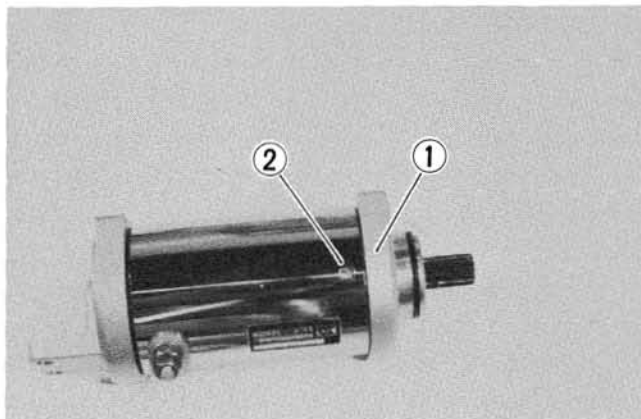


### HOUSING END (Inside)

- Apply grease to the lip of oil seal.

99000-25030	SUZUKI Super grease "A"
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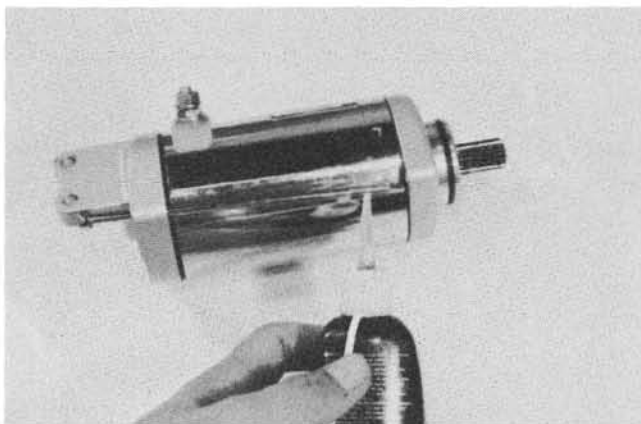
- When installing the housing end, align the line ① on the housing end with line ② of the housing.



### HOUSING SCREW

- Apply a small quantity of Thread Lock "1342" to the starter motor housing screws.

99000-32050	Thread Lock "1342"
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## STARTER RELAY INSPECTION

- Remove the seat.
- Disconnect the lead wire of the starter motor at the starter relay.

### CAUTION:

When removing the lead wire from the starter relay terminal, do not touch the wrench to the other terminal.

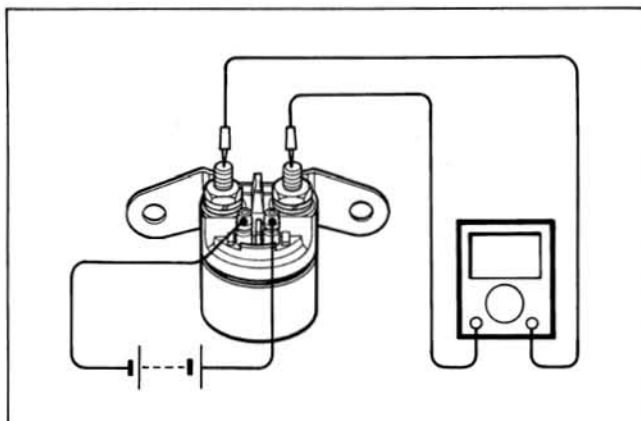
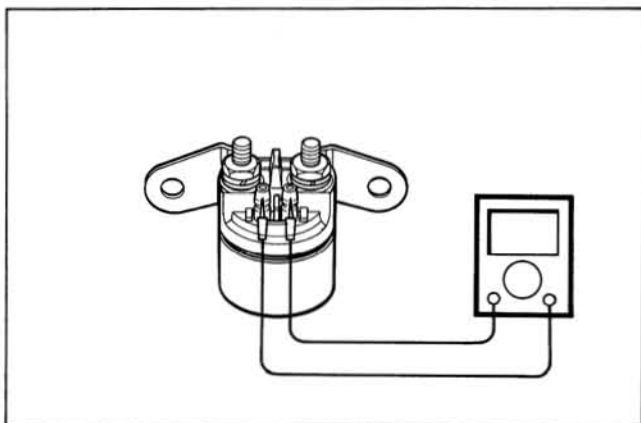
- Turn on the ignition switch, inspect the continuity between the positive (from the battery) and negative terminals, when squeezing the clutch lever and pushing the starter button. If the starter relay is in sound condition, continuity is found.

09900-25002	Pocket tester
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- Disconnect the lead wire coupler of starter relay.
- Check the coil for "open", "ground" and ohmic resistance. The coil is in good condition if the resistance is as follows.

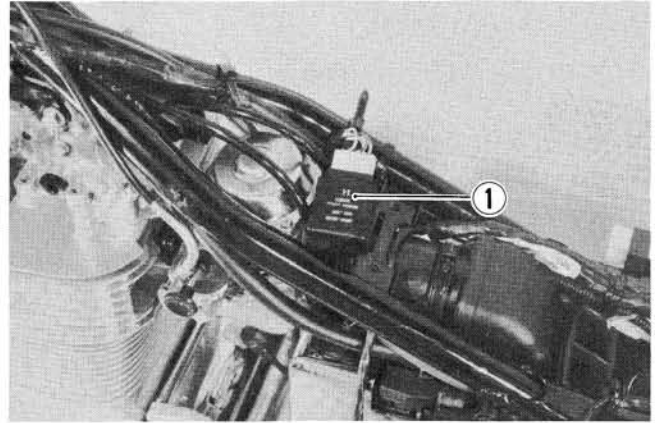
09900-25002	Pocket tester
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STD resistance	2 – 6 $\Omega$
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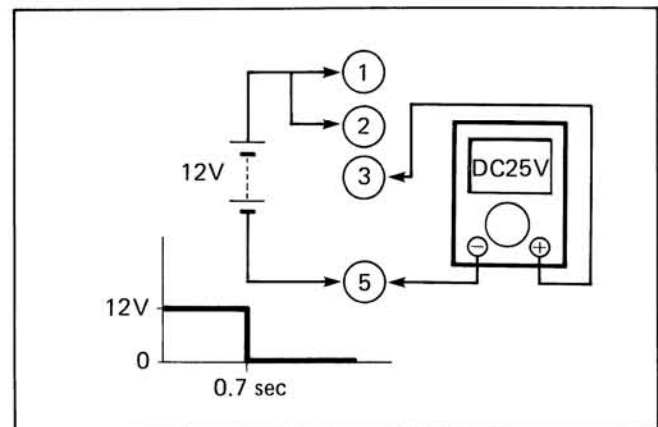
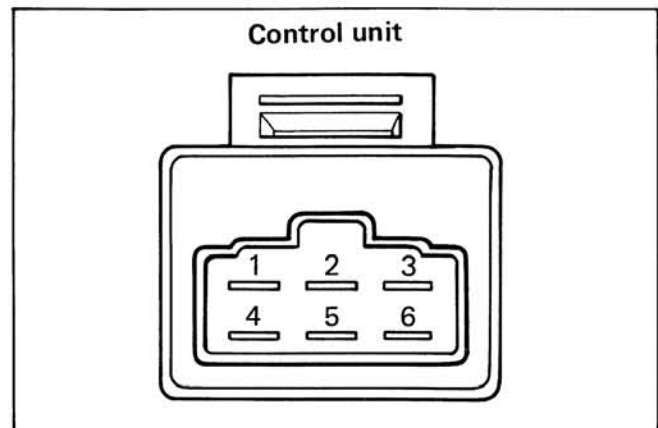
## DECOMPRESSION SOLENOID CONTROL UNIT

- Remove the control unit ①.
- Inspect the control unit in the following manner.
- Replace the control unit if it fails one of following two inspection.



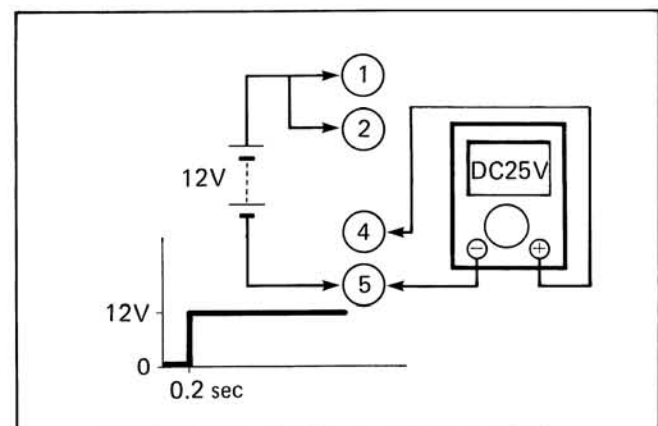
### TIMER I INSPECTION

- Set the pocket tester to DC 25V range.
- Connect the  $\oplus$  probe to the terminal 3 and  $\ominus$  to 5.
- Connect the  $\oplus$  terminal of 12V battery to the terminals 1 and 2, and  $\ominus$  to the terminal 5.
- If the pocket tester shows 12V for 0.7 sec and returns to the 0V, timer I is in good condition.



### TIMER II INSPECTION

- Change the  $\oplus$  probe of tester to the terminal 4.
- Connect the battery to the terminals in the same manner as the above inspection.
- If the pocket tester shows 0V for first 0.2 sec. and 12V thereafter, timer II is in good condition.

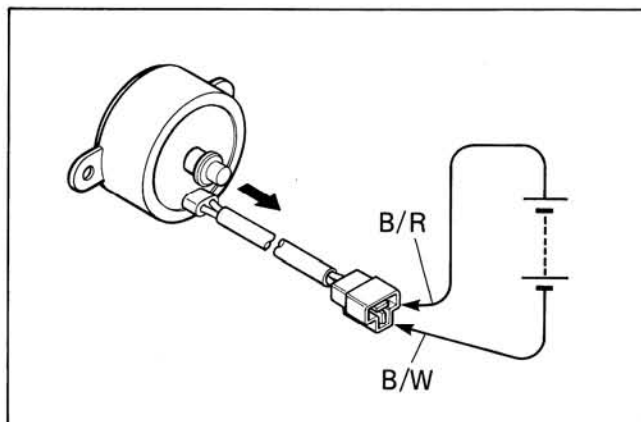
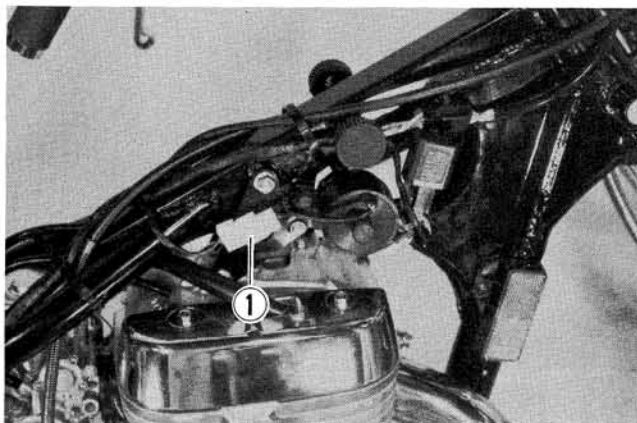


**DE-COMP. SOLENOID**

- Turn the ignition switch ON and turn the starter motor.
- Make sure that the de-comp. solenoid pulls de-compression cable properly when turning the starter motor.
- If the de-comp. solenoid does not work properly, disconnect the coupler ① and check the continuity between the two lead wire with a pocket tester.

Solenoid resistance	0.1 – 1.0 $\Omega$
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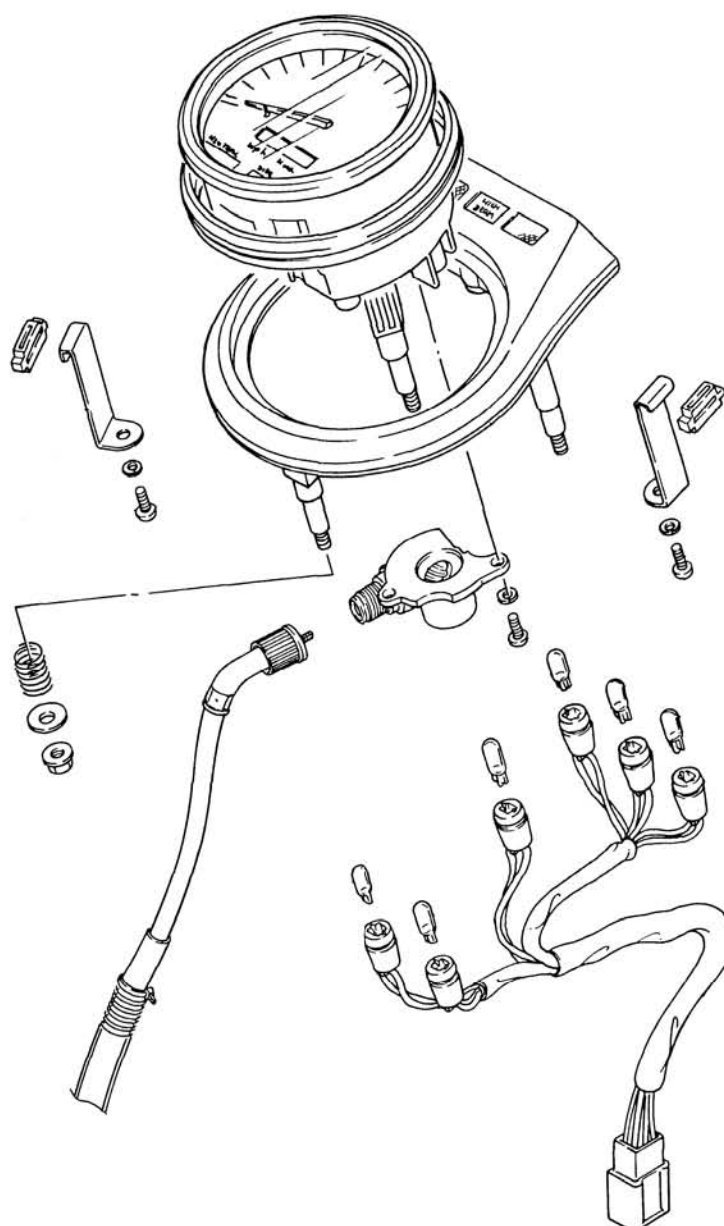
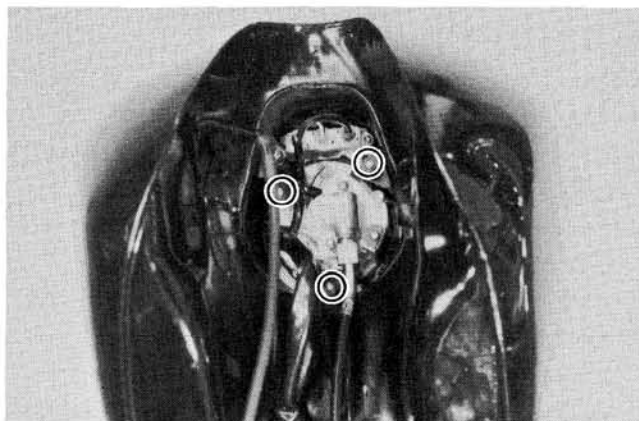
- Apply DC 12V to the solenoid,  $\oplus$  to the B/R lead and  $\ominus$  to the B/W lead.
- If the solenoid does not work properly, replace the solenoid unit with a new one.
- When re-installing the solenoid, refer to page 2-6 for adjusting cable play.



## COMBINATION METER

### REMOVAL AND DISASSEMBLY

- Remove the fuel tank. (Refer to page 3-4.)
- Remove the combination meter from the fuel tank.
- Disassemble the combination meter as follows.



## INSPECTION

Using the pocket tester, check the continuity between lead wires in the following diagram.

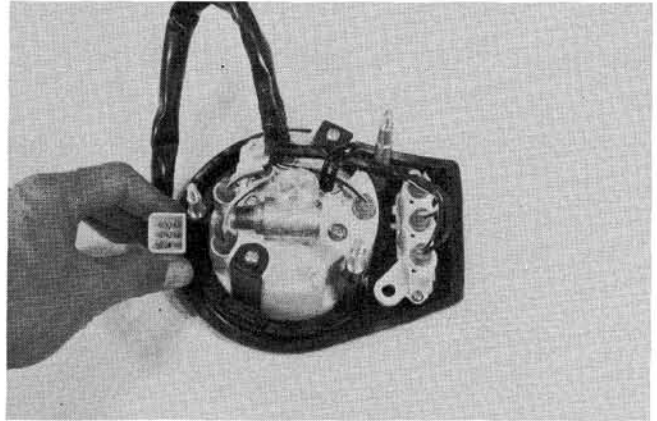
If the continuity measured is incorrect, replace the respective parts.

09900-25002

Pocket tester

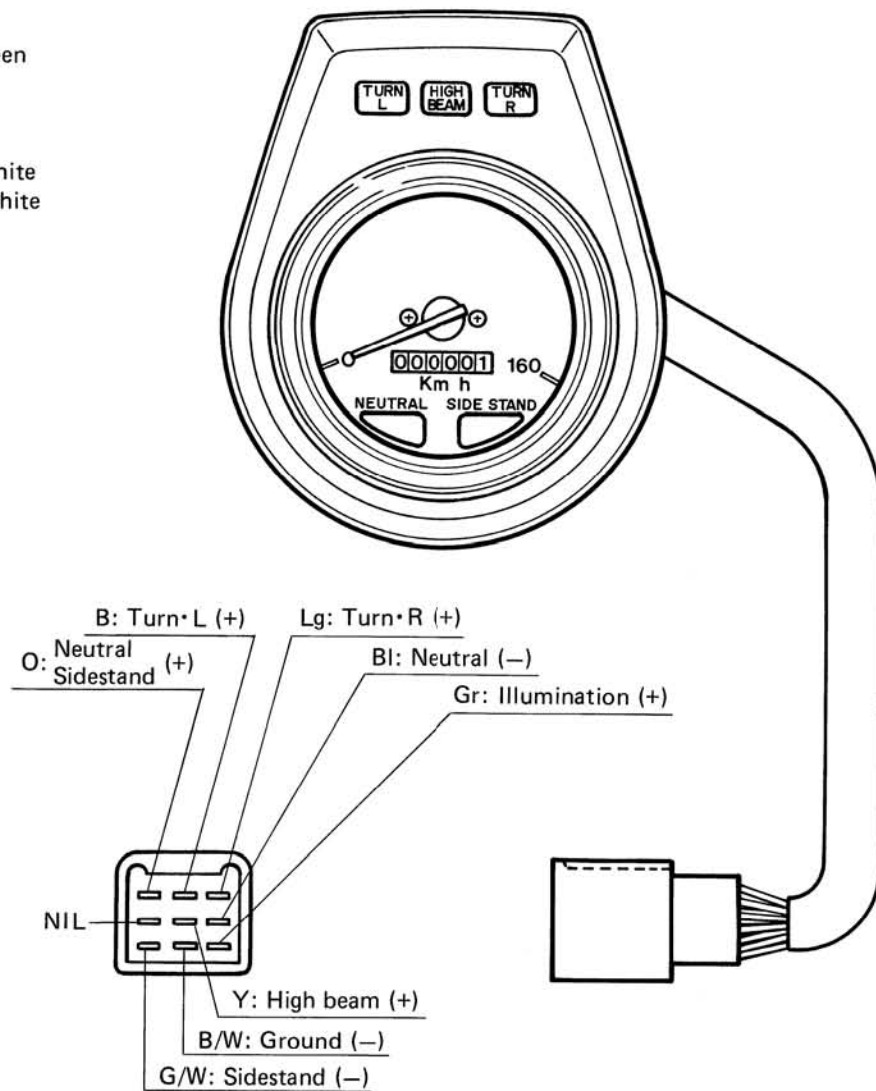
### NOTE:

When making this test, it is not necessary to remove the combination meter.



### WIRE COLOR

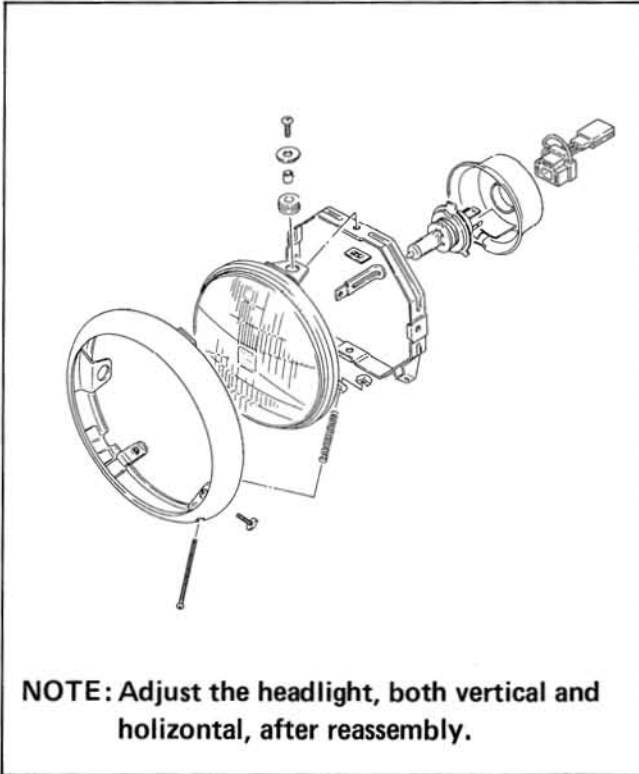
B: Black  
 O: Orange  
 Lg: Light green  
 Bl: Blue  
 Gr: Gray  
 Y: Yellow  
 B/W: Black/White  
 G/W: Green/White



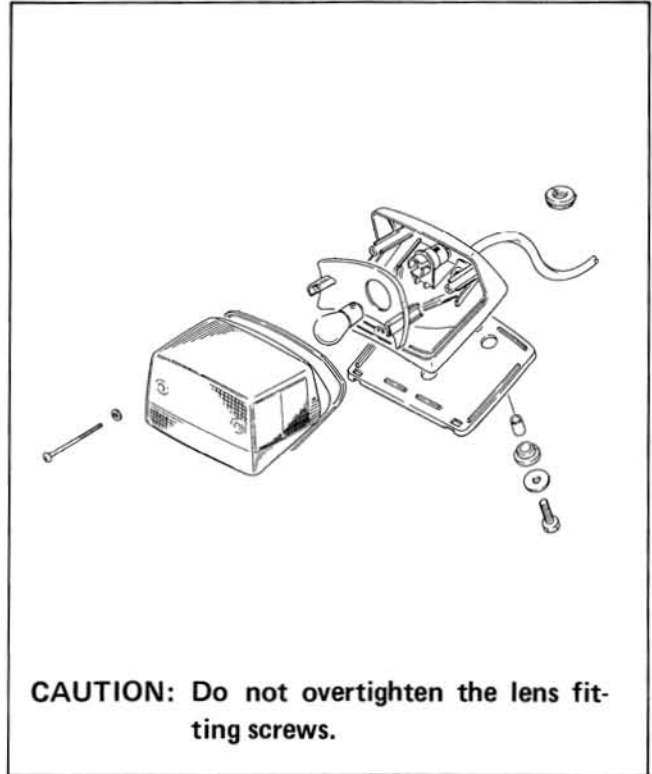


## LAMPS

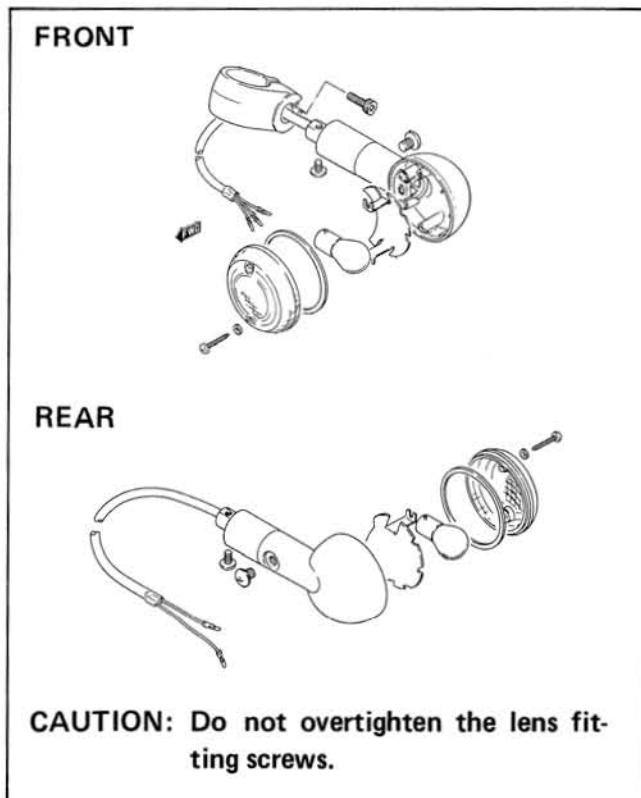
### HEADLIGHT



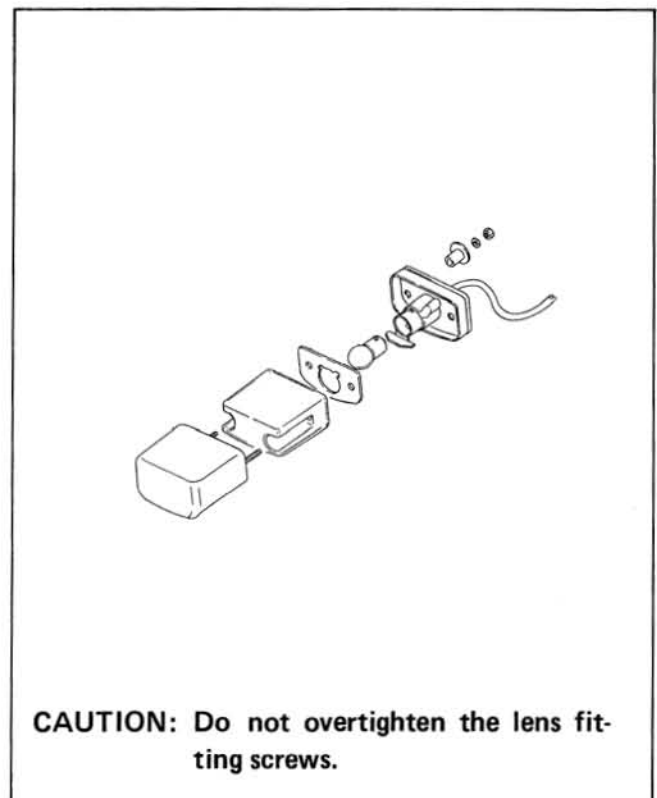
### TAIL / BRAKE LIGHT



### TURN SIGNAL LIGHT



### LICENSE LIGHT



## SWITCHES

Inspect each switch for continuity with the pocket tester referring to the chart. If any abnormality is found, replace the respective switch assemblies with new ones.

09900-25002	Pocket tester
-------------	---------------

### IGNITION SWITCH

	R	O	Gr	Br
OFF				
ON	○	○	○	○
P	○			○

### DIMMER SWITCH

	W	Y	Y/W
HI		○	○
LO	○		○

### TURN SIGNAL SWITCH

	B	Lbl	Lg
R		○	○
•			
L	○	○	

### HORN SWITCH

	Dg	B/W
ON (Push)	○	○
OFF		

### SIDE STAND SWITCH

	G/W	B/W
ON (Down position)	○	○
OFF (Upright position)		

### ENGINE STOP AND START SWITCH

	O	O/W	Y/G
OFF			
RUN	○	○	
START (Push)		○	○

### CLUTCH SWITCH

(STARTER INTERLOCK SWITCH)

	Y/G	Y/G
ON (Squeeze lever)	○	○
OFF		

### FRONT BRAKE SWITCH

	O	W
ON (Squeeze lever)	○	○
OFF		

### NEUTRAL INDICATOR SWITCH

	Bl	Ground
Neutral	○	○

### REAR BRAKE SWITCH

	O	W/B
ON (Depress pedal)	○	○
OFF		

## BATTERY

### SPECIFICATIONS

Type designation	FB14L-B2
Capacity	12V, 50.4 kC (14 Ah)/10HR
Standard electrolyte S.G.	1.28 at 20°C (68°F)

In fitting the battery to the motorcycle, connect the breather pipe to the battery vent.

### INITIAL CHARGING

#### Filling electrolyte

Remove the short sealed tube before filling electrolyte. Fill the battery with electrolyte (dilute sulfuric acid solution with acid concentration of 35.0% by weight, having a specific gravity of 1.28 at 20°C (68°F)) up to indicated MAX. LEVEL. Electrolyte should be always cooled below 30°C (86°F) before filling into battery. Leave the battery standing for half an hour after filling. Add additional electrolyte if necessary.

Charge the battery with current as described in the tables shown below.

Maximum charging current	1.4A
--------------------------	------

#### Charging time

The charging time for a new battery is determined by the number of months that have elapsed since the date of manufacture.

#### Confirmation for date of manufacture

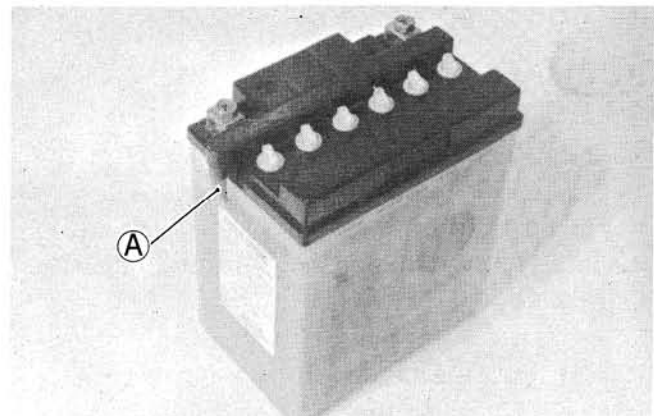
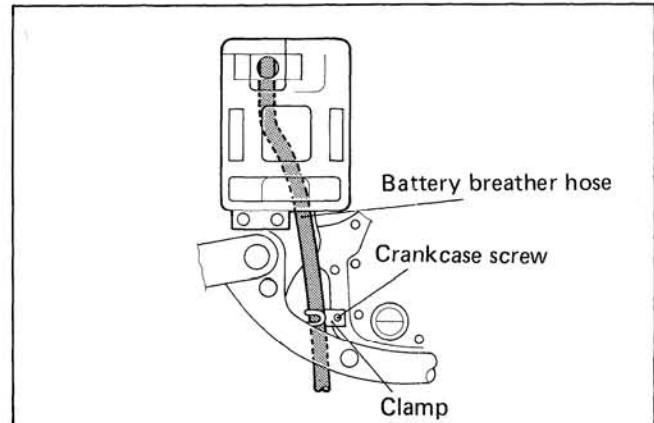
Date of manufacture is indicated by a three-part number ①, as shown in the photograph, each indicating month, date and year.

Near the end of charging period, adjust the specific gravity of electrolyte to value specified. After charging, adjust the electrolyte level to the MAX. LEVEL with DISTILLED WATER.

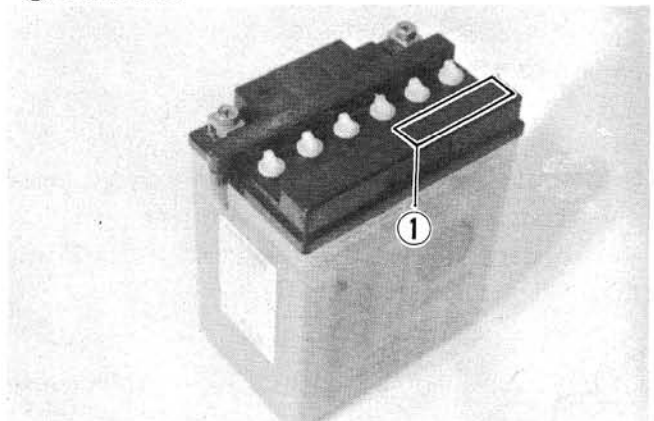
### SERVICING

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.



Ⓐ Sealed tube



Months after manufacturing	Within 6	Within 9	Within 12	Over 12
Necessary charging hours	20	30	40	60

Check the electrolyte level and add distilled water, as necessary to raise the electrolyte to each cell's MAX. level.

Check the battery for proper charge by taking an electrolyte S.G. reading. If the reading is 1.22 or less, as corrected to 20°C (68°F), it means that the battery is still in a run-down condition and needs recharging.

## RECHARGING OPERATION BASED ON S.G. READING

To read the S.G. on the hydrometer, bring the electrolyte in the hydrometer to eye level and read the graduations on the float scale bordering on the meniscus (curved-up portion of electrolyte surface), as shown in figure.

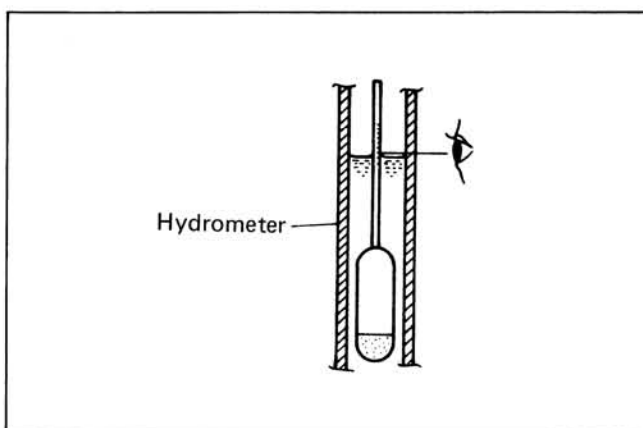
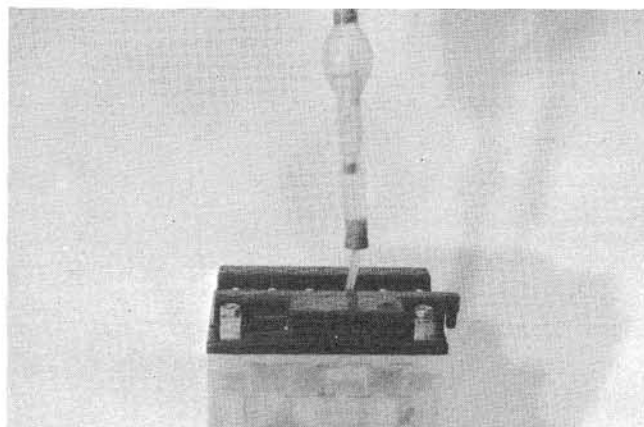
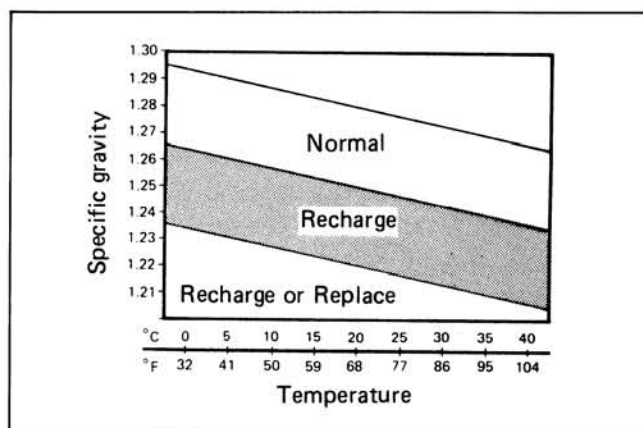
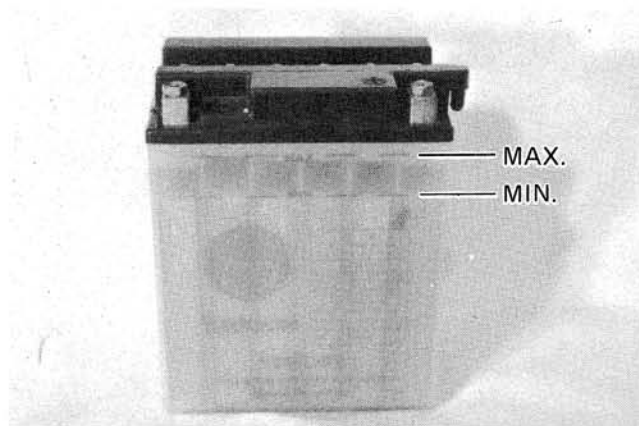
Check the reading (as corrected to 20°C) with chart to determine the recharging time in hour by constant-current charging at a charging rate of 1.4 amperes (which is tenth of the capacity of the present battery).

Be careful not to permit the electrolyte temperature to exceed 45°C (113°F), at any time, during the recharging operation. Interrupt the operation, as necessary, to let the electrolyte cool down. Recharge the battery to the specification.

Electrolyte specific gravity	1.28 at 20°C (68°F)
------------------------------	---------------------

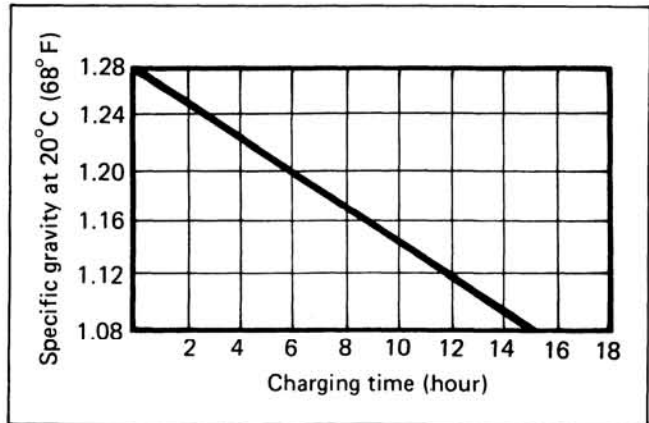
### CAUTION:

Constant-voltage charging, otherwise called "quick" charging, is not recommendable for it could shorten the life of the battery.



09900-28403

Hydrometer



## SERVICE LIFE

Lead oxide is applied to the pole plates of the battery which will come off gradually during the service. When the bottom of the battery case becomes full of the sediment, the battery cannot be used any more. If the battery is not charged for a long time, lead sulfate is generated on the surface of the pole plates and will deteriorate the performance (sulfation). Replace the battery with new one in such a case.

When a battery is left for a long term without using, it is apt to subject to sulfation. When the motorcycle is not used for more than 1 month (especially during the winter season), recharge the battery once a month at least.

### WARNING:

- \* Before charging a battery, remove the seal cap from each cell.
- \* Keep fire and sparks away from a battery being charged.
- \* When removing a battery from the motorcycle, be sure to remove the (—) terminal first.



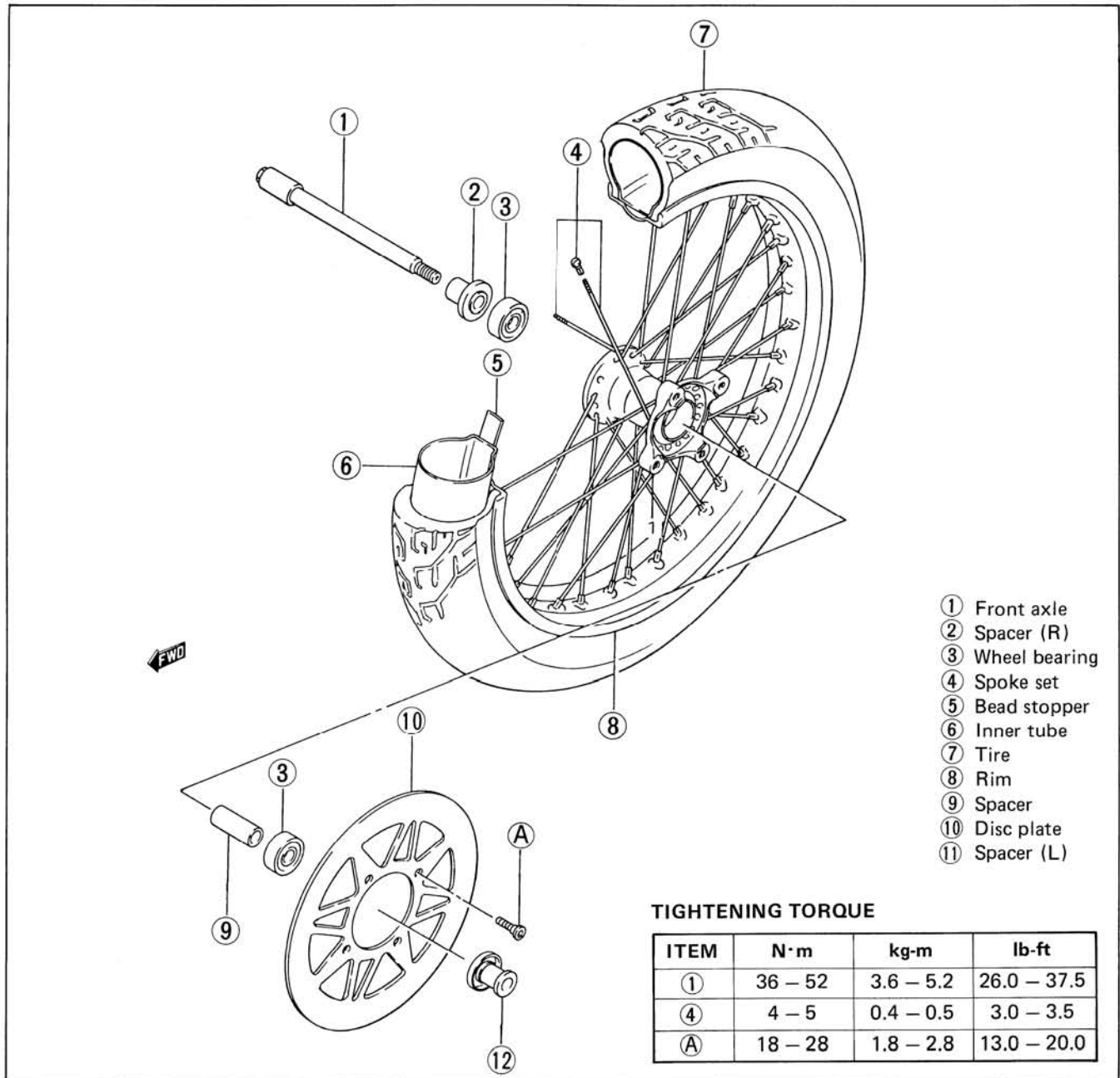


# CHASSIS

## CONTENTS

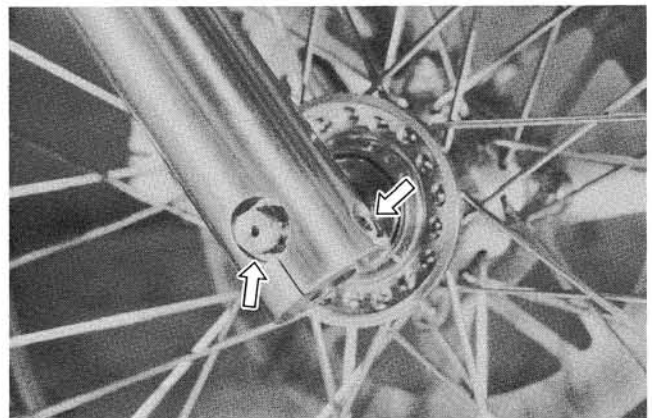
<i>FRONT WHEEL</i> .....	<i>7- 1</i>
<i>FRONT BRAKE</i> .....	<i>7- 5</i>
<i>FRONT FORK</i> .....	<i>7-11</i>
<i>STEERING</i> .....	<i>7-18</i>
<i>REAR WHEEL AND BRAKE</i> .....	<i>7-23</i>
<i>REAR SUSPENSION</i> .....	<i>7-29</i>

## FRONT WHEEL



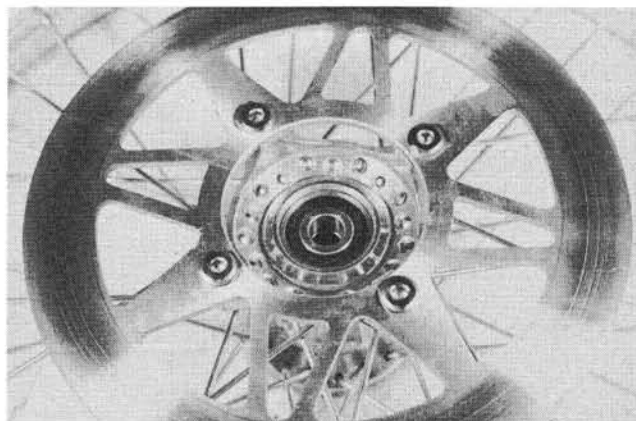
### REMOVAL AND DISASSEMBLY

- Support the motorcycle by using jack with wooden block.
- Loosen the axle clamp bolt.
- Remove the axle shaft and take off the wheel.



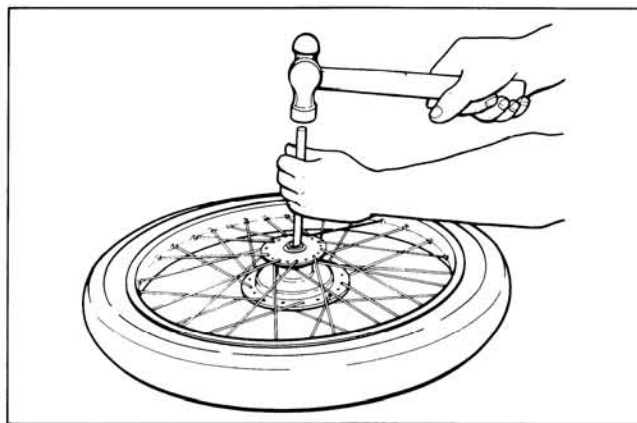
**BRAKE DISC**

Remove the securing bolts and separate the disc plate from the wheel.

**WHEEL BEARING**

Drive out the right and left wheel bearings by using the special tool in the following procedure.

- Insert the adapter into the wheel bearing.
- After inserting the wedge bar from the opposite side, lock the wedge bar in the slit of the adapter.



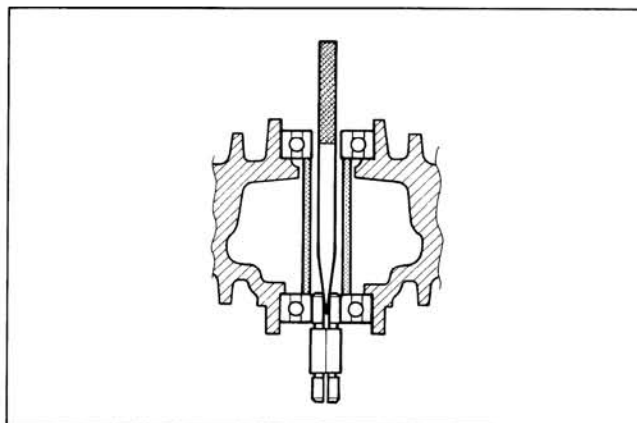
- Drive out the wheel bearing by knocking the wedge bar.

**CAUTION:**

The removed bearings should be replaced with new ones.

09941-50110

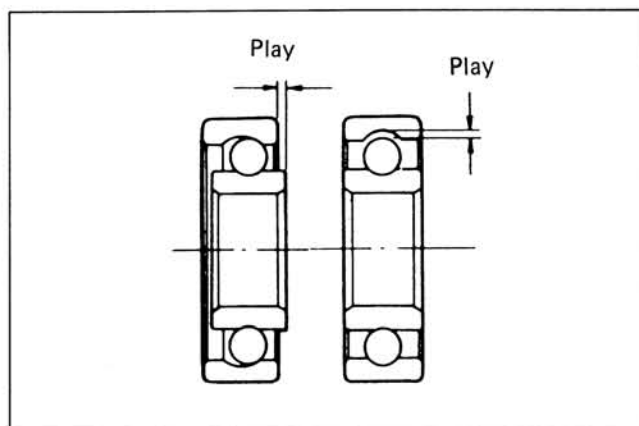
Bearing remover

**INSPECTION****WHEEL BEARINGS**

Inspect the play of wheel bearing inner race by hand while fixing it in the wheel.

Rotate the inner race by hand to inspect whether abnormal noise occurs or rotating smoothly.

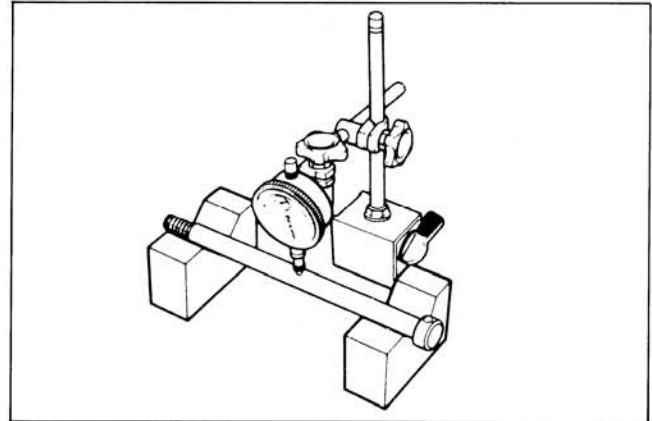
Replace the bearing if there is something unusual.



**AXLE SHAFT**

Using a dial gauge, check the axle shaft for runout and replace it if the runout exceeds the limit.

09900-20606	Dial gauge (1/100)
09900-20701	Magnetic stand (Not available in U.S.A.)
Service Limit	0.25 mm (0.010 in.)

**WHEEL RIM**

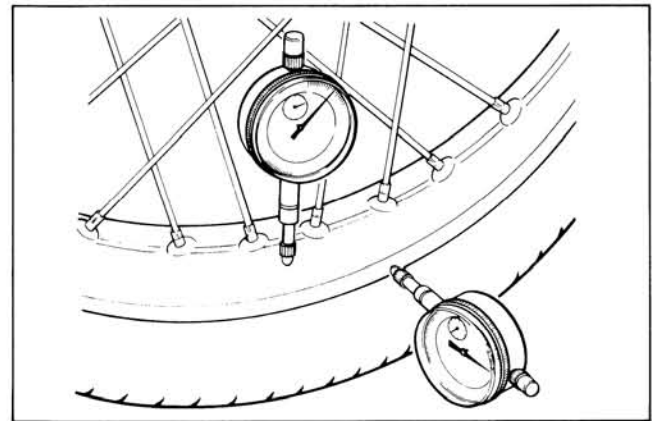
Make sure that the wheel rim runout does not exceed the service limit when checked as shown. An excessive amount of runout is usually due to loose spokes or bent rim.

If properly tightening the spokes will not correct the runout, replace the wheel rim.

**NOTE:**

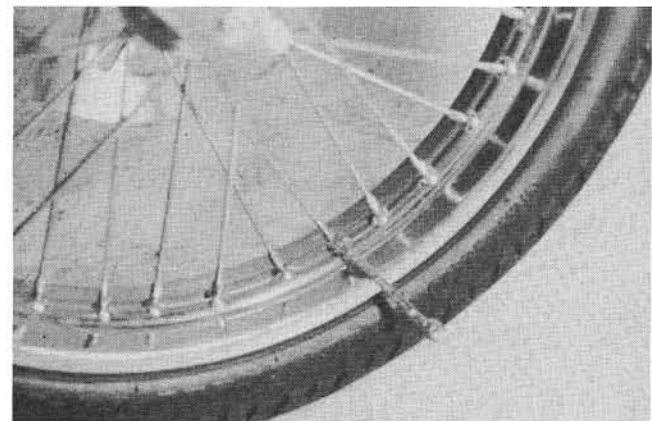
**Worn or loose wheel bearings must be replaced before attempting to true a wheel rim.**

Service Limit (Axial and Radial)	2.0 mm (0.08 in)
-------------------------------------	------------------

**SPOKE NIPPLE**

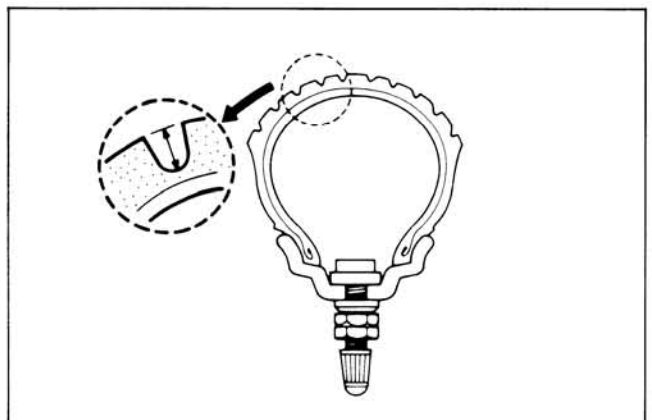
Check to be sure that all nipples are tight, and re-tighten them as necessary by using 6 mm open end wrench.

Tightening torque	4 – 5 N·m (0.4 – 0.5 kg·m) (3.0 – 3.5 lb·ft)
-------------------	--

**TIRE**

For proper braking and riding stability, the tire should have sufficient groove depth from the tread surface. If the groove depth, measured as shown in the figure, reaches the wear limit, replace the tire.

	Service Limit
Front	1.6 mm (0.06 in)
Rear	2.0 mm (0.08 in)



## REASSEMBLY AND REMOUNTING

Reassemble and remount the front wheel in the reverse order of disassembly and removal, and also carry out the following steps:

### WHEEL BEARING

- Apply grease before installing the bearings.

99000-25030	SUZUKI Super grease "A"
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- Install the wheel bearings as follows by using the special tool.

#### CAUTION:

First install the wheel bearing for left side.

09924-84510	Bearing installer set
-------------	-----------------------

### BRAKE DISC

Make sure that the brake disc is clean and free of any greasy matter. Apply thread lock "1360" to the disc bolts and tighten the disc bolts to the specified torque.

99000-32130	Thread lock "1360"
-------------	--------------------

Tightening torque	18 – 28 N·m
	( 1.8 – 2.8 kg-m )
	( 13.0 – 20.0 lb-ft )

### TIRE

When remounting the tire to the rim, be sure that the embossed arrow mark on the tire faces toward the rotational direction of the wheel.

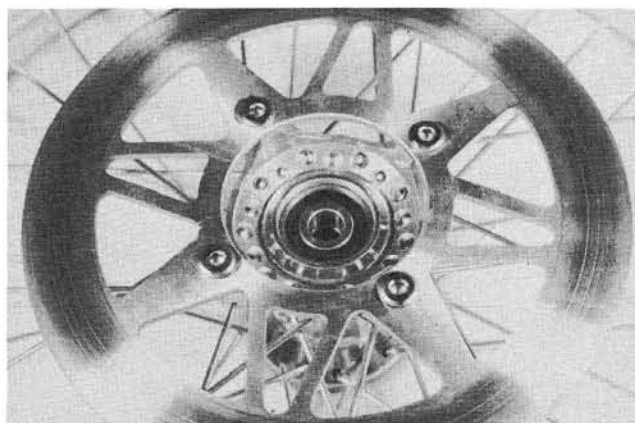
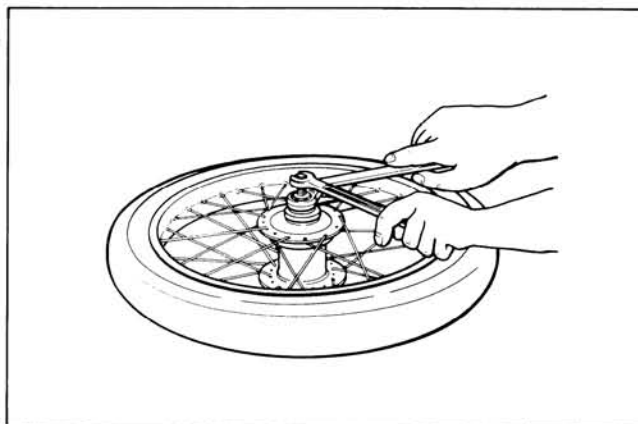
#### NOTE:

An arrow mark is provided on the front and rear tires.

### TIGHTENING TORQUE

Tighten the bolt and nut to the specified torque.

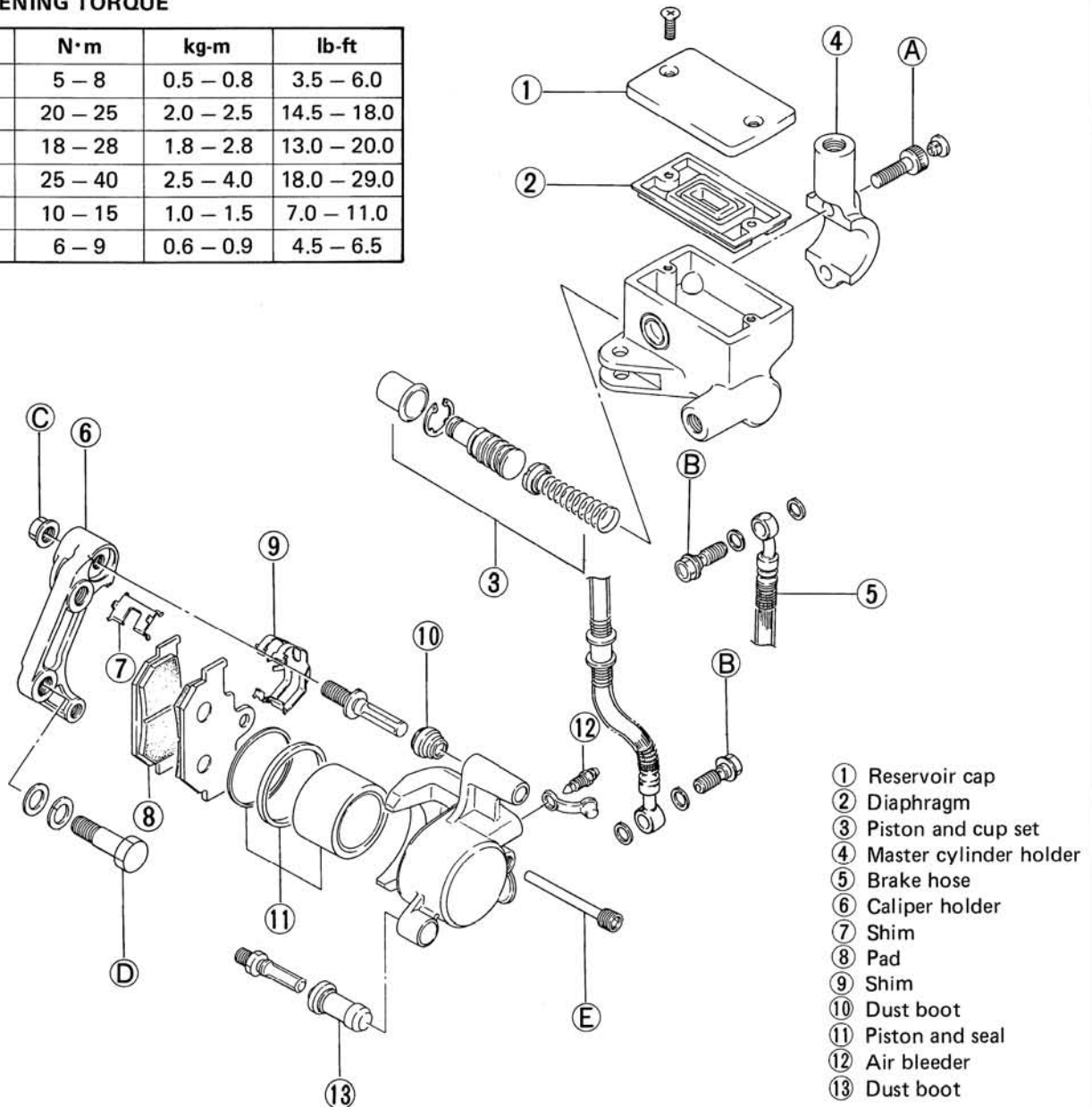
	N·m	kg-m	lb-ft
Axle nut	36 – 52	3.6 – 5.2	26.0 – 37.5
Axle clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0



## FRONT BRAKE

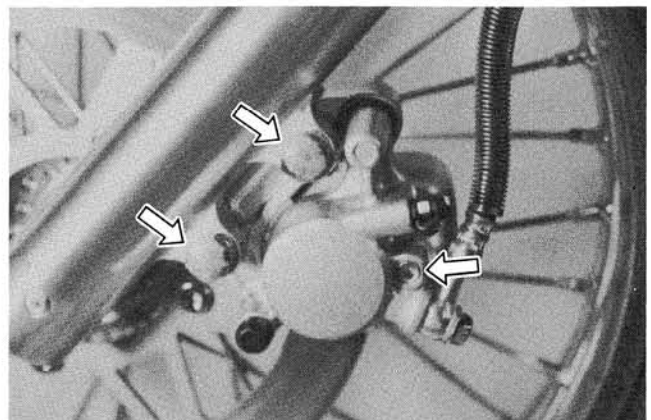
### TIGHTENING TORQUE

ITEM	N·m	kg-m	lb-ft
(A)	5 - 8	0.5 - 0.8	3.5 - 6.0
(B)	20 - 25	2.0 - 2.5	14.5 - 18.0
(C)	18 - 28	1.8 - 2.8	13.0 - 20.0
(D)	25 - 40	2.5 - 4.0	18.0 - 29.0
(E)	10 - 15	1.0 - 1.5	7.0 - 11.0
(12)	6 - 9	0.6 - 0.9	4.5 - 6.5



### BRAKE PAD REPLACEMENT

- Remove the pad mounting bolt.
- Remove the caliper mounting bolts and take off the caliper.

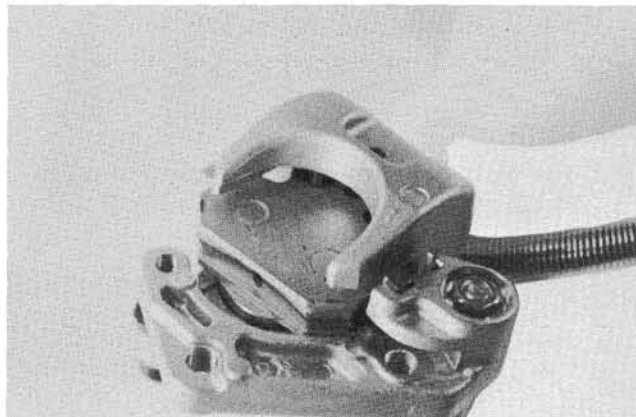




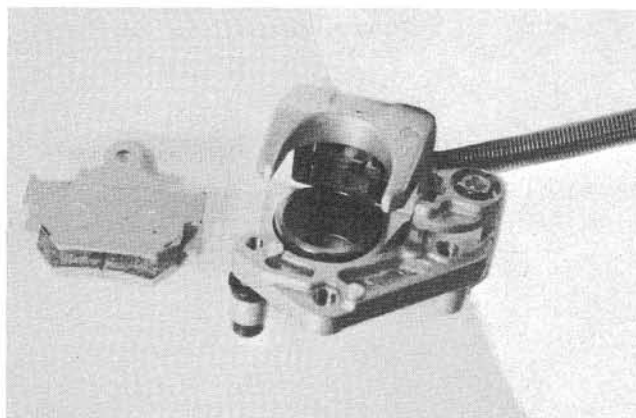
- Push down the caliper holder and remove the pads.

**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.



- When installing pads, locate the pads and its spring properly.

**CALIPER REMOVAL AND DISASSEMBLY**

- Disconnect the brake hose, and catch the brake fluid in a suitable receptacle.

**CAUTION:**

Never re-use the brake fluid left over from the last 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 joint for cracks or leakage before riding.

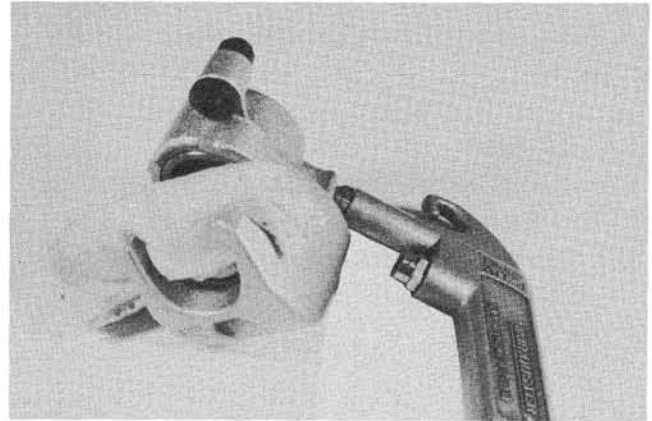
- Remove the caliper mounting bolts and pads.
- Remove the caliper holder.



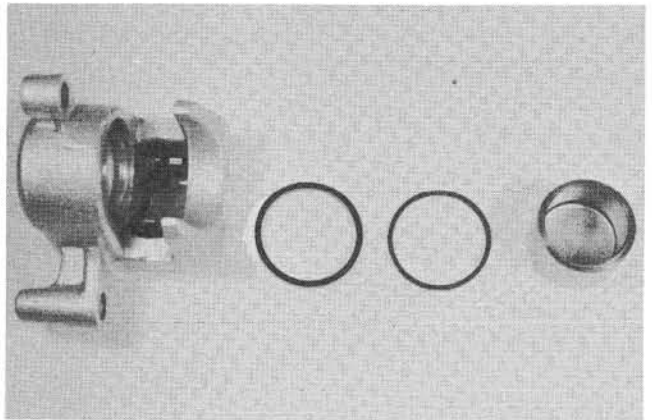
- Place a rag over the piston to prevent popping up. Force out the piston by using air gun.

**CAUTION:**

Do not use high pressure air to prevent piston damage.

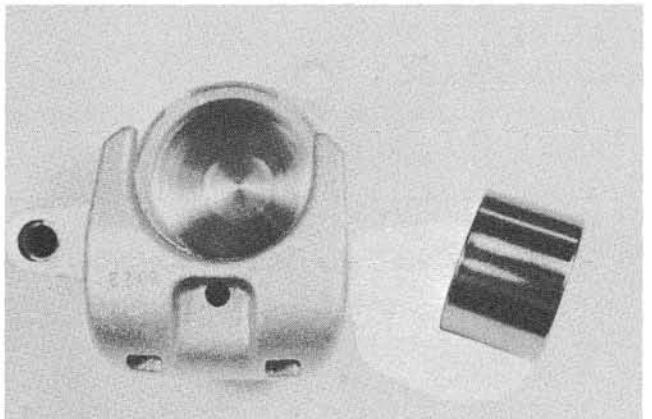


- Remove the piston, piston seal and wiper seal.



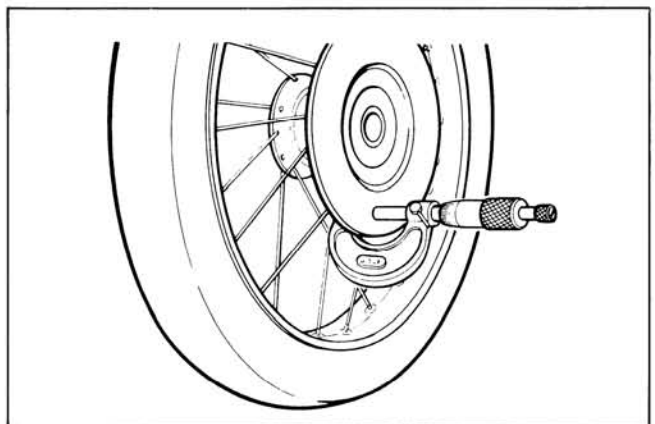
### CALIPER AND DISC INSPECTION

- Inspect the caliper bore wall for nicks, scratches or other damage.
- Inspect each of the rubber parts for damage and wear.
- Inspect the piston surface for any scratches or other damage.



- Check the disc for wear by using a micrometer. Its thickness can be checked with disc and wheel in place. Replace the disc if the thickness exceeds the service limit.

09900-20205	Micrometer (0 – 25 mm)
Service Limit	4.0 mm (0.16 in)



- With the disc mounted on the wheel, check the disc for face runout with a dial gauge, as shown. Replace the disc if the runout exceeds the service limit.

09900-20606	Dial gauge (1/100 mm)
09900-20701	Magnetic stand (Not available in U.S.A.)
Service Limit	0.30 mm (0.012 in)

## CALIPER REASSEMBLY AND REMOUNTING

Reassemble and remount the caliper in the reverse order of removal and disassembly, and also carry out the following steps:

### 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.

- Apply SUZUKI silicone grease to the caliper axles.

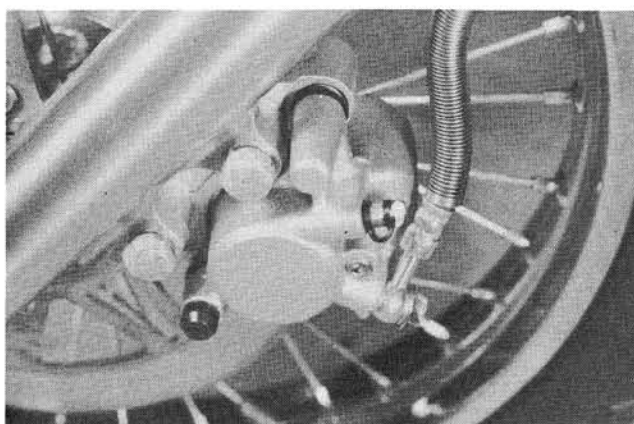
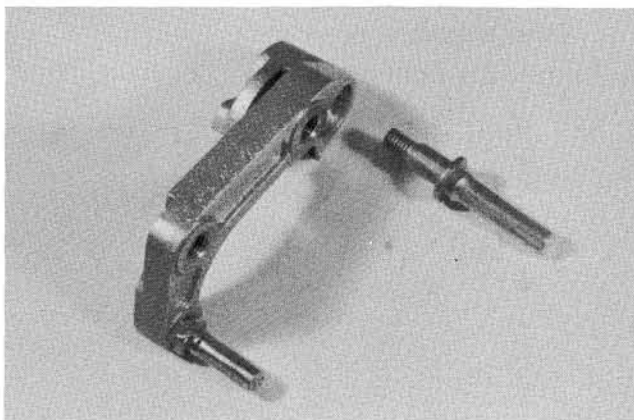
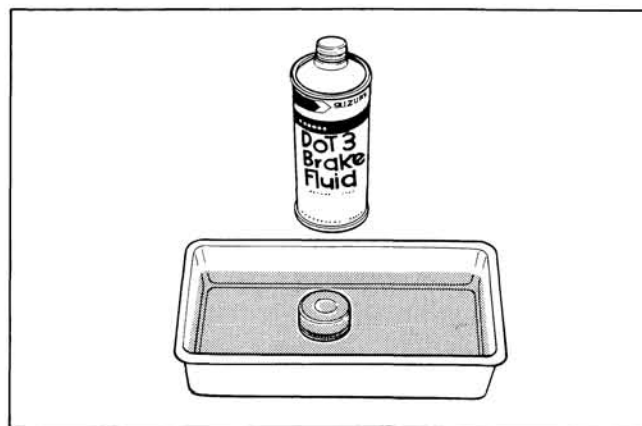
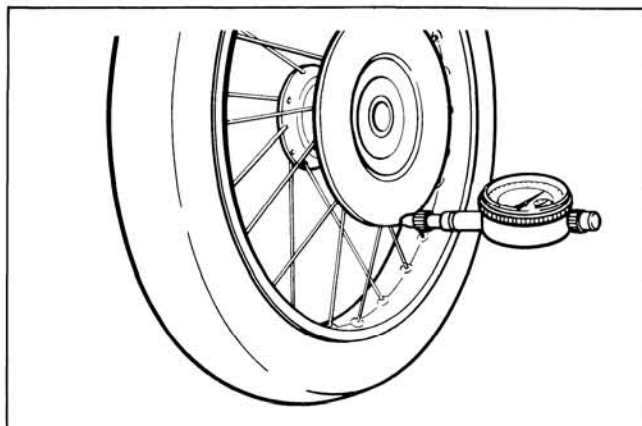
99000-25100	SUZUKI silicone grease
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- Tighten the bolts to the specified torque.

Item	N·m	kg-m	lb-ft
Union bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
Caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Caliper pad mounting bolt	10 – 15	1.0 – 1.5	7.0 – 11.0

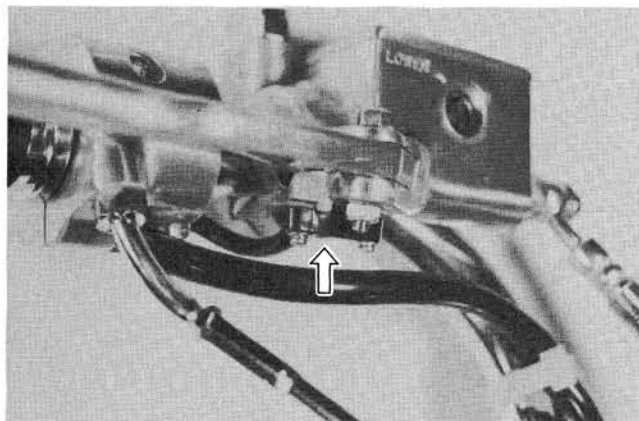
### WARNING:

Bleed the air after reassembling caliper. (Refer to page 2-13.)



## MASTER CYLINDER REMOVAL AND DISASSEMBLY

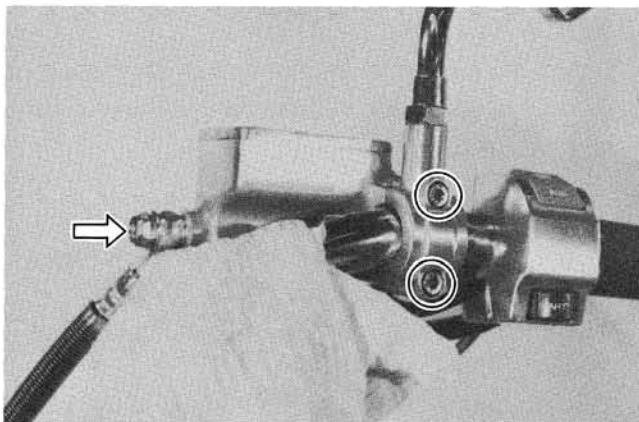
- Remove the front brake light switch.



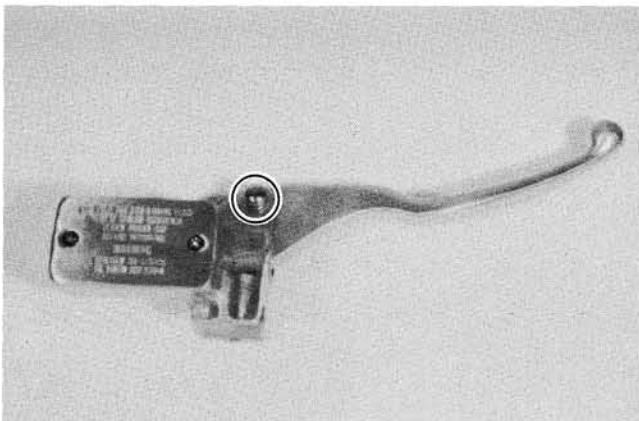
- Place a cloth underneath the union bolt on the master cylinder to catch spilled drops of brake fluid. Unscrew the union bolt and disconnect the brake hose/master cylinder joint.

### CAUTION:

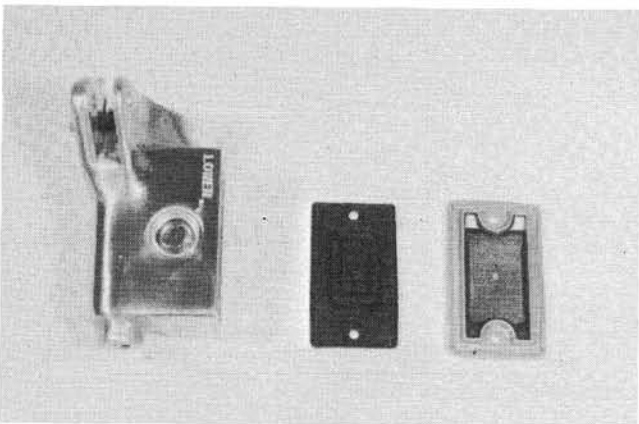
Completely wipe off any brake fluid adhering to any part of motorcycle. The fluid reacts chemically with paint, plastics, rubber materials, etc.



- Remove two clamp bolts and take off the master cylinder assembly.
- Remove the front brake lever.



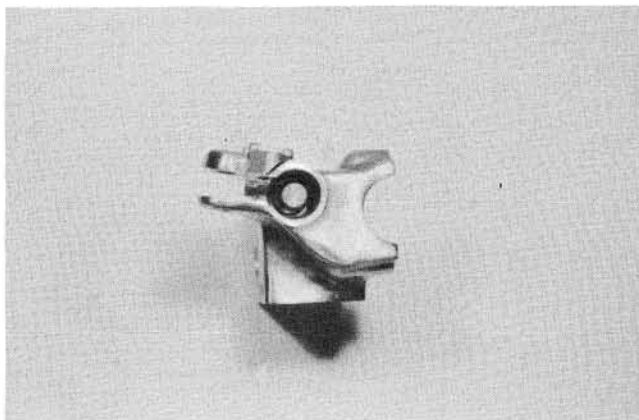
- Remove reservoir cap and diaphragm.
- Drain brake fluid.



- Pull off dust boot.
- Remove circlip by using the special tool.
- Remove piston, primary cup and spring.

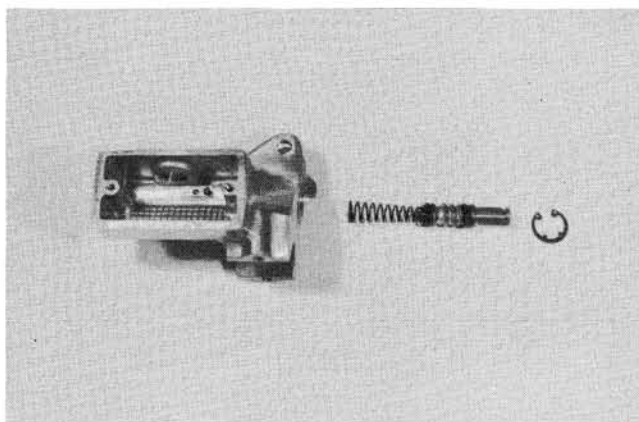
09900-06108

Snap ring pliers



## MASTER CYLINDER INSPECTION

- Inspect the master cylinder bore for any scratches or other damage.
- Inspect the piston surface for scratches or other damage.
- Inspect the primary cup, secondary cup and dust boot for wear or damage.

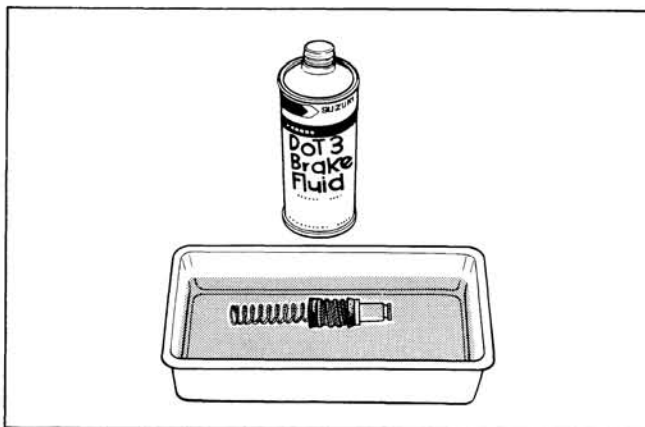


## MASTER CYLINDER REASSEMBLY AND REMOUNTING

Reassemble and remount the master cylinder in the reverse order of removal and disassembly, and also carry out the following steps:

### 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 internals to be inserted into the bore.



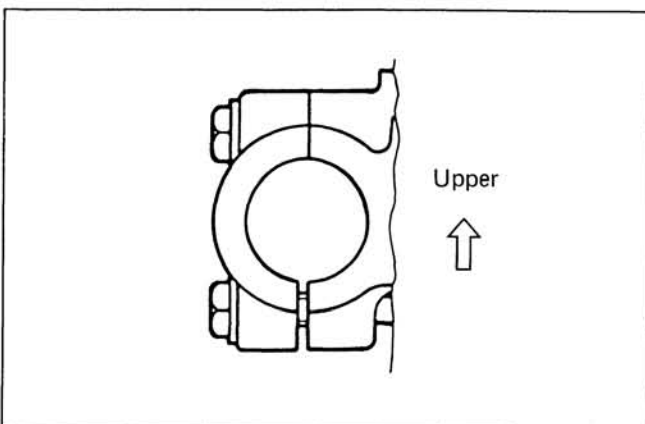
Remount the master cylinder on the handlebar as shown in the illustration, tighten the upper bolt first.

Tightening torque

5 – 8 N·m  
( 0.5 – 0.8 kg·m )  
( 3.5 – 6.0 lb·ft )

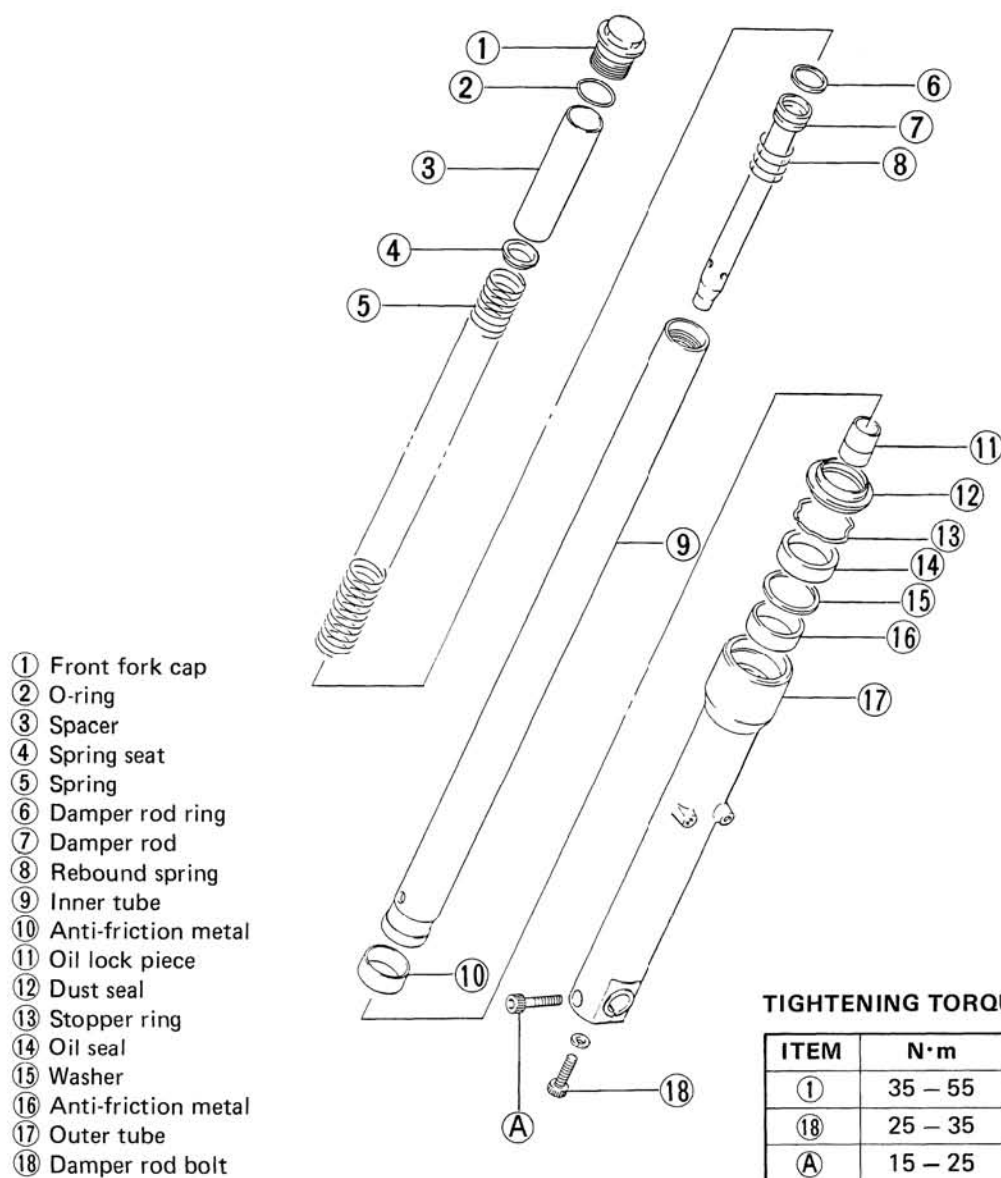
### CAUTION:

Bleed the air after reassembling master cylinder. (Refer to page 2-13.)





## FRONT FORK

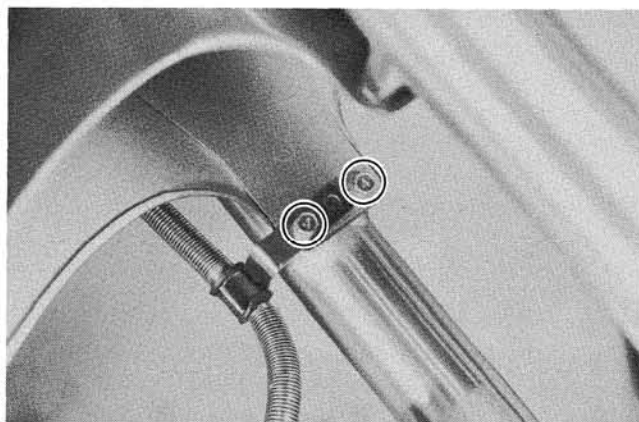


### TIGHTENING TORQUE

ITEM	N·m	kg-m	lb-ft
①	35 – 55	3.5 – 5.5	25.5 – 40.0
⑱	25 – 35	2.5 – 3.5	18.0 – 25.5
A	15 – 25	1.5 – 2.5	11.0 – 18.0

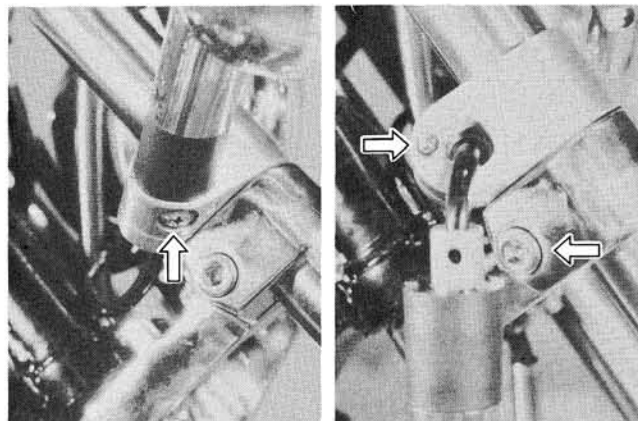
### REMOVAL AND DISASSEMBLY

- Remove the front wheel. (Refer to page 7-1.)
- Take off the caliper. (Refer to page 7-6.)
- Remove the front fender.

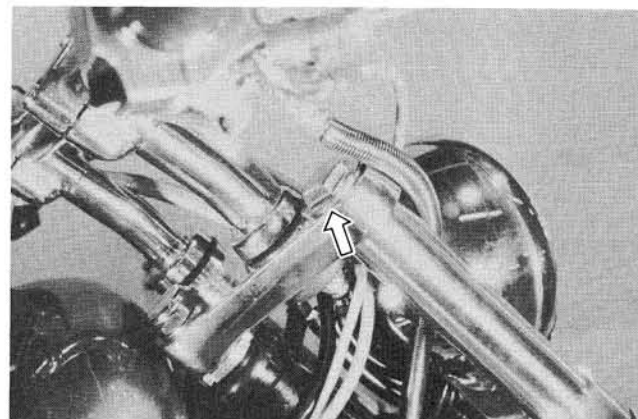




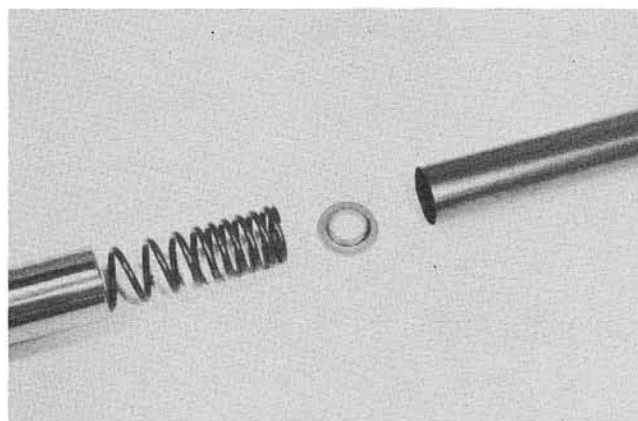
- Remove the turn signal lamp hold screw and loosen the turn signal lamp clamp screw.
- Loosen the lower clamp bolt.



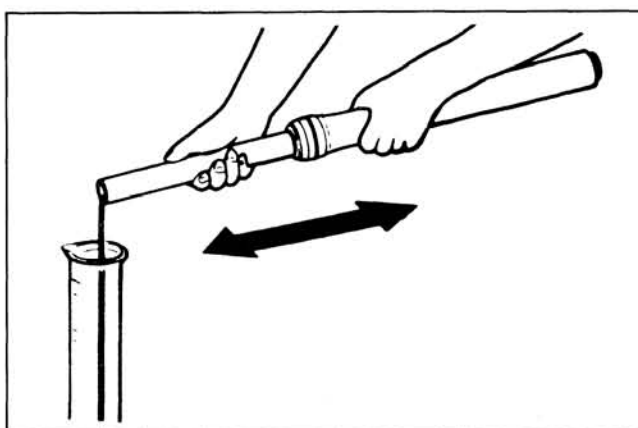
- Remove the front fork cap bolt.
- Pull off the front fork.



- Remove the spacer, spring seat and spring.

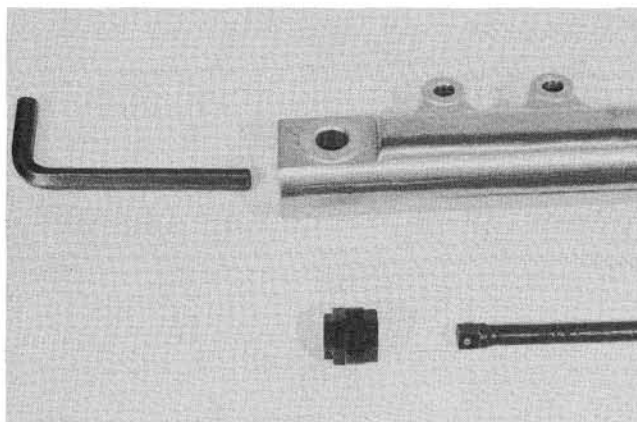


- Invert the fork and stroke it several times to let out the fork oil.
- Under the condition (inverted condition), hold the fork for a few minutes.

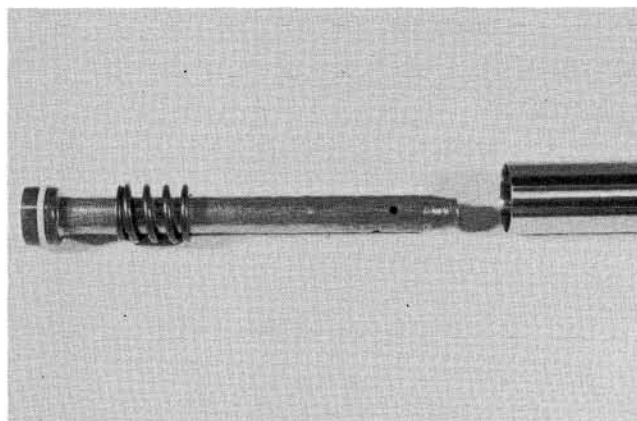


- Remove the damper rod securing bolt by using the special tools.

09940-34520	"T" handle
09940-34592	Attachment "G"
09900-00401	"L" type hexagon wrench set



- Remove the damper rod and rebound spring.



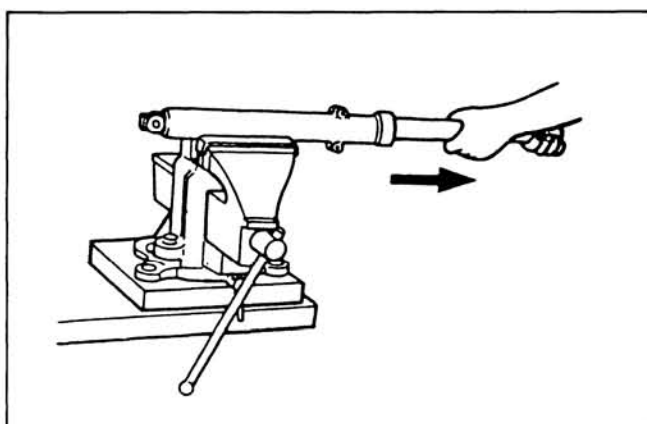
- Remove the dust seal and snapping.



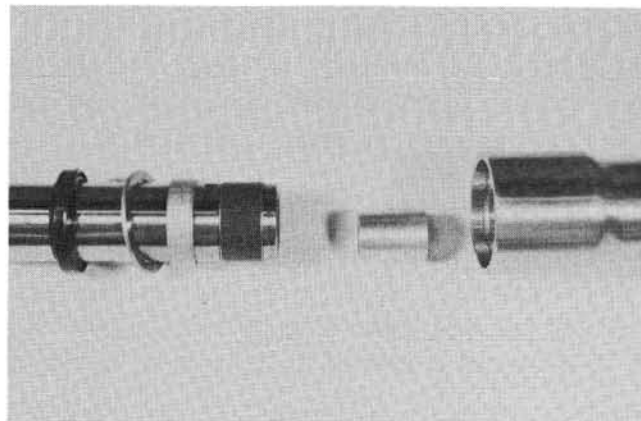
- While holding the caliper mounting or axle holder portion of the outer tube by vise, separate the inner tube from the outer tube as shown.

**NOTE:**

When separating the inner tube from the outer tube, both anti-friction metals may be damaged and replace them with new ones.



- Remove the oil lock piece.

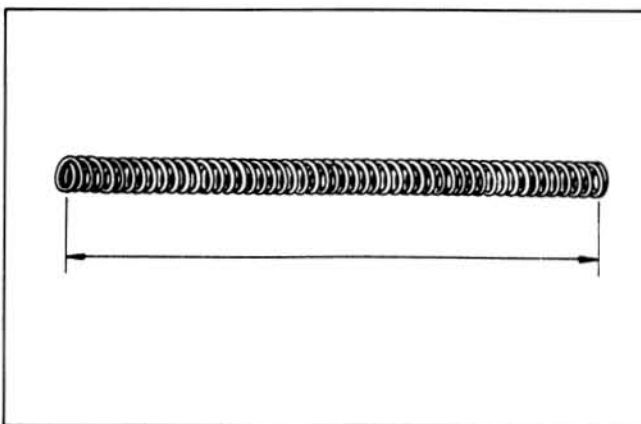


## INSPECTION

### FORK SPRING

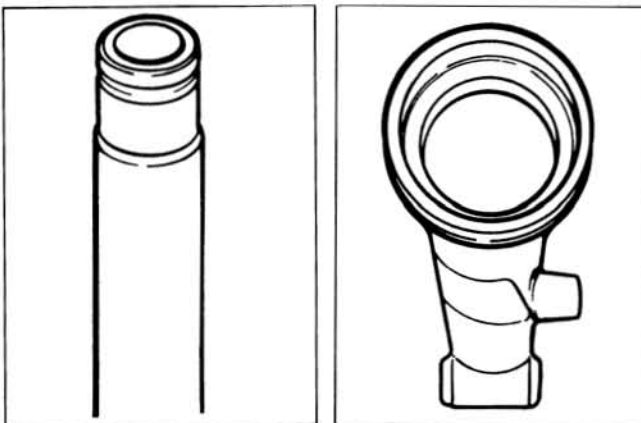
Measure the fork spring free length. If it is shorter than the service limit, replace it.

Service Limit	392.5 mm (15.45 in)
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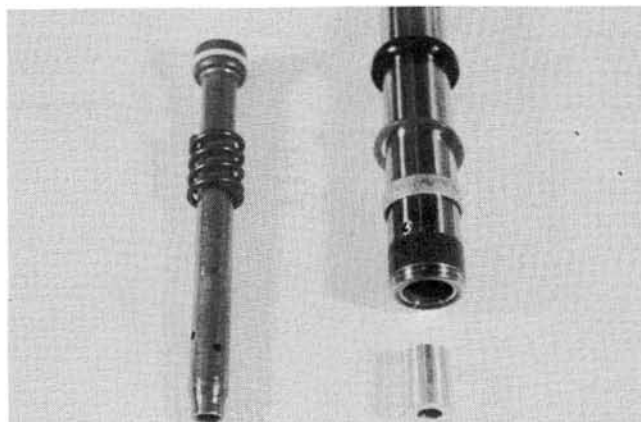
### INNER TUBE AND OUTER TUBE

Inspect inner tube sliding surface for any scuffing and check for bend. Inspect outer tube sliding surface for any scuffing.



### DAMPER ROD AND OIL LOCK PIECE

Inspect the damper rod ring and oil lock piece for wear or damage.



## REASSEMBLY AND REMOUNTING

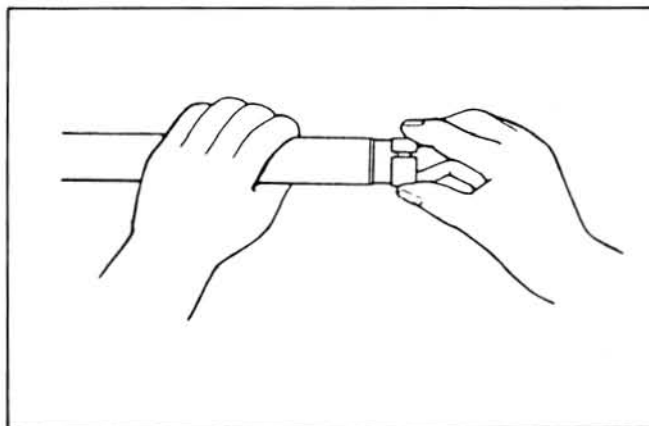
Reassemble and remount the front fork in the reverse order of disassembly and removal and also carry out the following steps:

### INNER TUBE METAL

- Hold the inner tube vertically and clean the metal groove.
- Clean the new metal inner surface and install it to the metal groove of the inner tube as shown.

#### CAUTION:

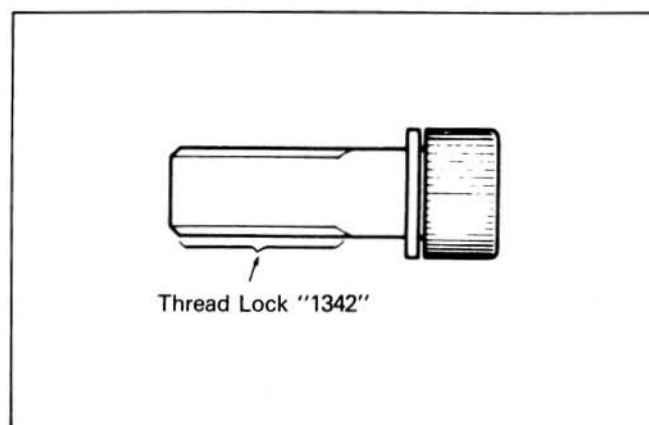
Use special care to prevent damage to the Teflon coated surface of the Anti-friction metal when mounting it.



### DAMPER ROD BOLT

- Apply Thread lock "1342" to the damper rod bolt.
- Tighten the damper rod bolt to the specified torque.

99000-32050	Thread lock "1342"
Tightening torque	$25 - 35 \text{ N}\cdot\text{m}$ $\left( \begin{array}{l} 2.5 - 3.5 \text{ kg}\cdot\text{m} \\ 18.0 - 25.5 \text{ lb}\cdot\text{ft} \end{array} \right)$



### OUTER TUBE METAL AND DUST SEAL

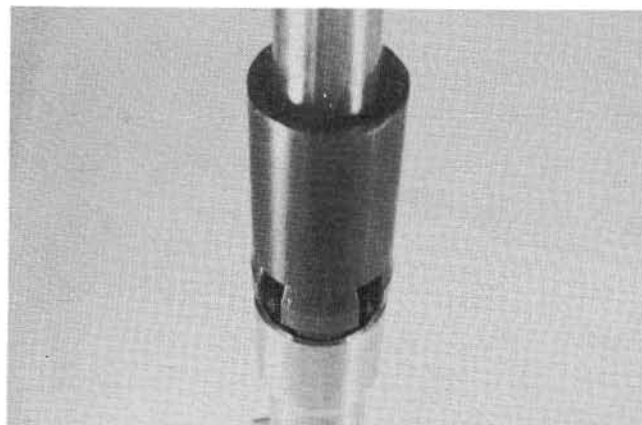
Clean the metal groove of outer tube and new metal outer surface.

Install the outer tube metal, washer and dust seal.

#### CAUTION:

Use special care to prevent damage to the Teflon coated surface of the Anti-friction metal when mounting it.

09940-50112	Front fork oil seal installer
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**FORK OIL**

- For the fork oil, be sure to use a front fork oil whose viscosity rating meets specifications below.

99000-99044-15G	SUZUKI Fork oil #15
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Fork oil capacity	441 ml (14.91 US oz)
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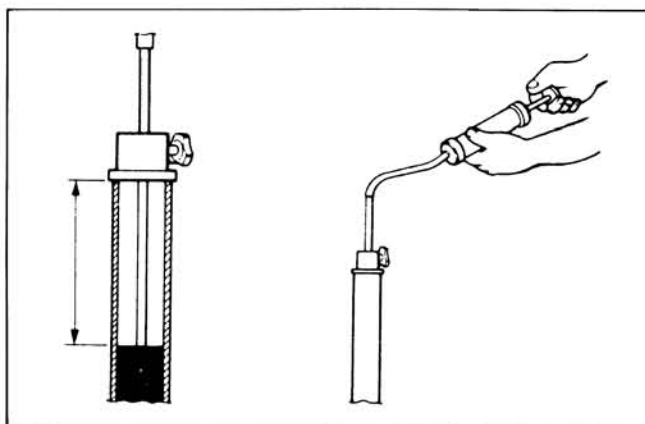
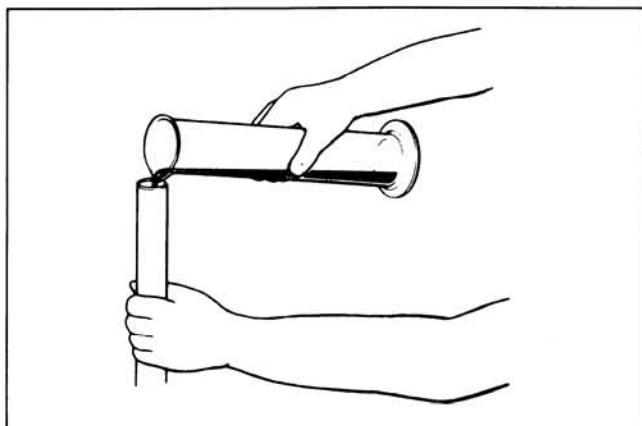
- Hold the front fork vertical and adjust the fork oil level with the special tool.

**NOTE:**

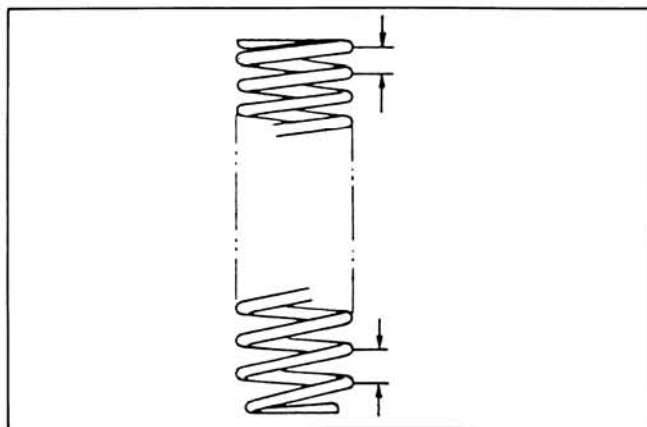
When adjusting oil level, remove the fork spring and compress the inner tube fully.

09943-74111	Fork oil level gauge
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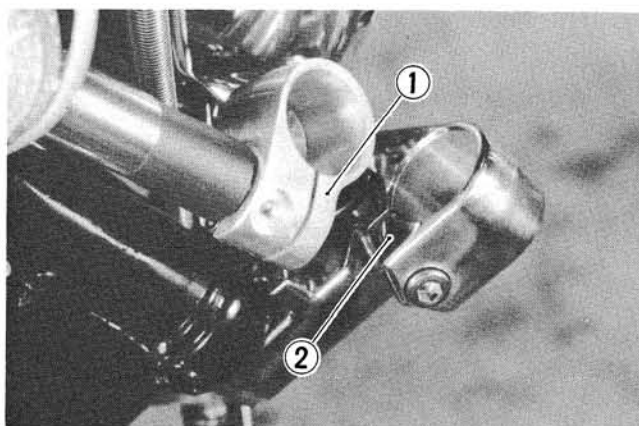
STD oil level	75.0 mm (2.95 in.)
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**FORK SPRING**

When reinstalling the fork spring large pitch end should position in bottom.

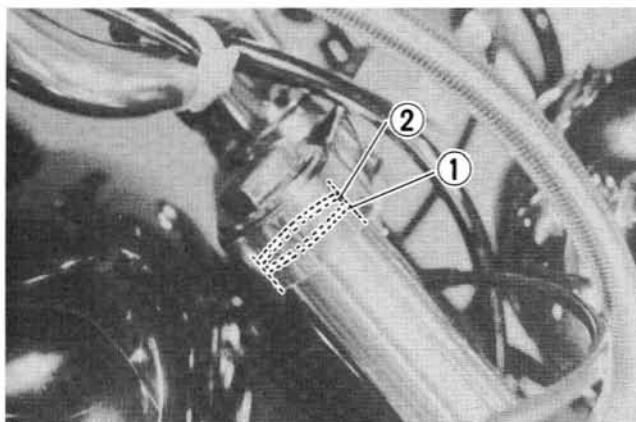
**TURN SIGNAL**

When installing the front fork, align the turn signal holder boss ① to the recess ② of the lower bracket.



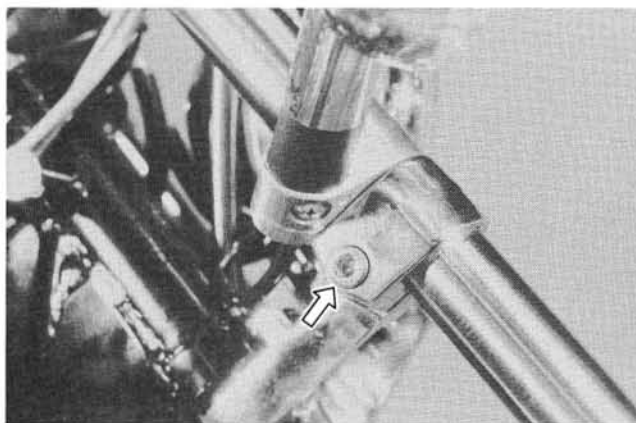
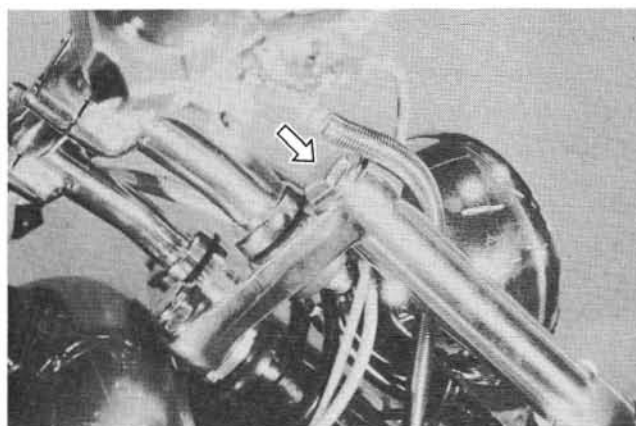
**INNER TUBE**

Install the front fork assembly aligning upper surface ① of the inner tube with the stopper part ② of the upper bracket.

**TIGHTENING TORQUE**

Tighten the lower and cap bolts to the specified torque.

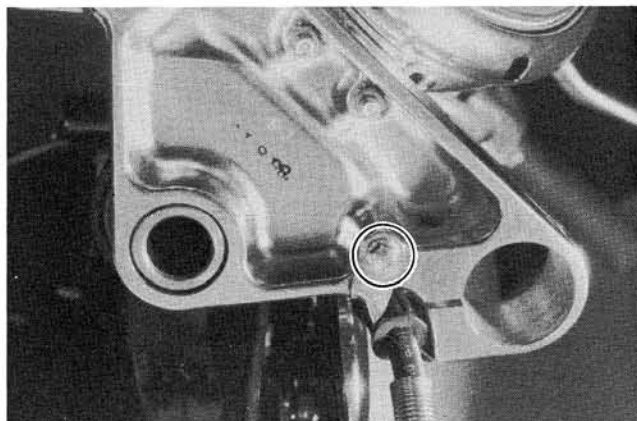
Item	N·m	kg·m	lb·ft
Front fork cap bolt	35 – 55	3.5 – 5.5	25.5 – 40.0
Front fork lower clamp bolt	25 – 35	2.5 – 3.5	18.0 – 25.5



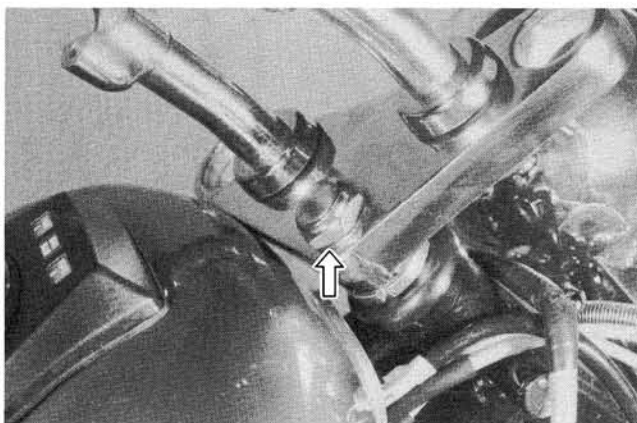




- Remove the brake hose clamp bolt.



- Remove the steering stem head nut and dismount the steering stem head.



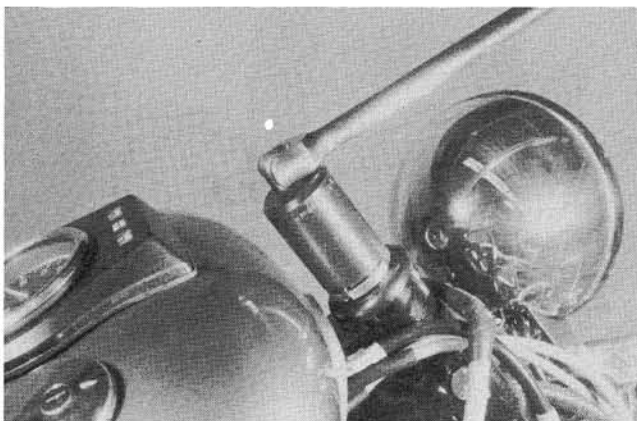
- Remove the steering stem nut by using the special tool.

**NOTE:**

Hold the steering stem lower bracket by hand to prevent dropping.

09940-14911

Steering nut socket wrench



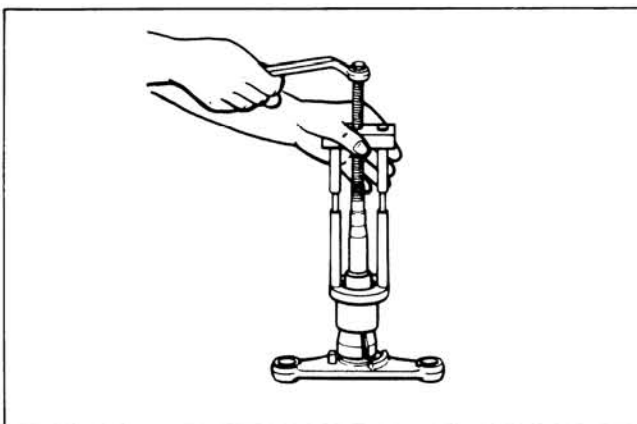
- Draw out the lower steering stem bearing by using the special tool.

**CAUTION:**

The removed bearing should be replaced with a new one.

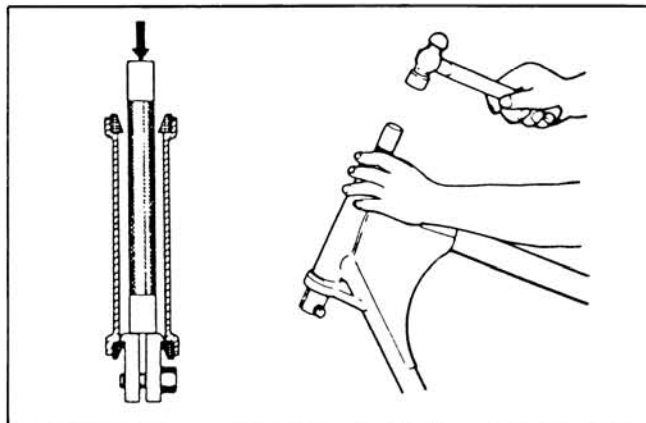
09941-84510

Bearing inner race remover

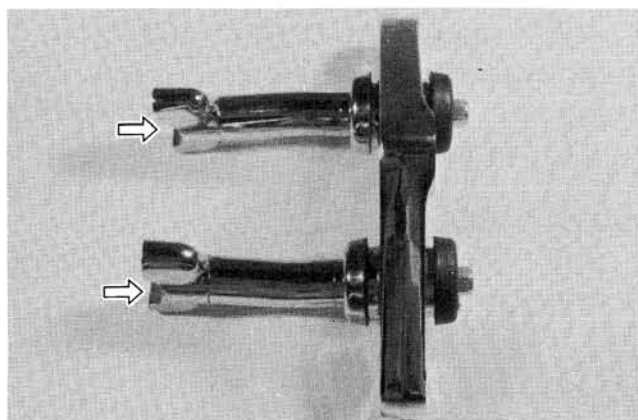


- Push out the steering stem bearing outer races, upper and lower, by using the special tools.

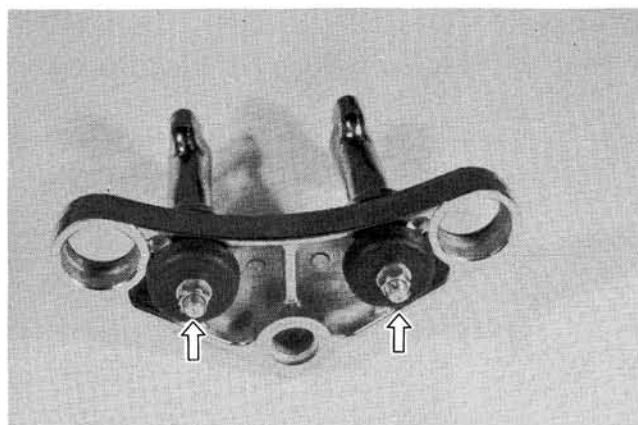
09941-54911	Bearing outer race remover
09941-74910	Steering bearing installer



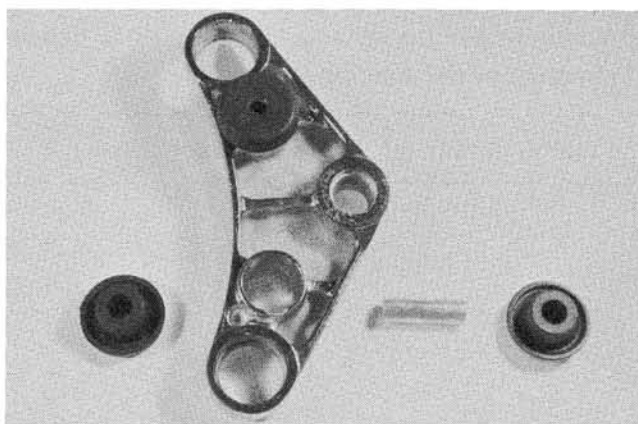
- Disassemble the handlebar holder. (Only for flat handle model)



- Take off the cotter pin.
- Remove the handlebar holder.



- Remove the pair of handlebar damper rubbers from the steering stem head.



## INSPECTION

Inspect and check the removed parts for the following abnormalities.

- \* Handlebar distortion.
- \* Handlebar clamp and damper rubber wear.
- \* Race wear and brinelling.
- \* Distortion of steering stem.

## REASSEMBLY AND REMOUNTING

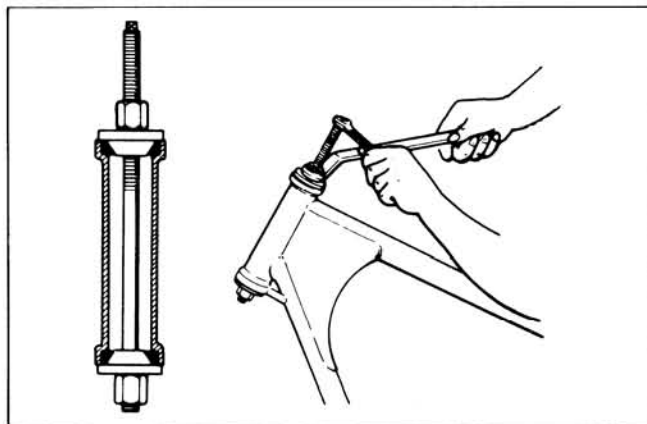
Reassemble and remount the steering stem in the reverse order of disassembly and removal and also carry out the following steps.

### OUTER RACES

Press in the upper and lower outer races by using the special tool.

09941-34513

Steering race and swing arm bearing installer

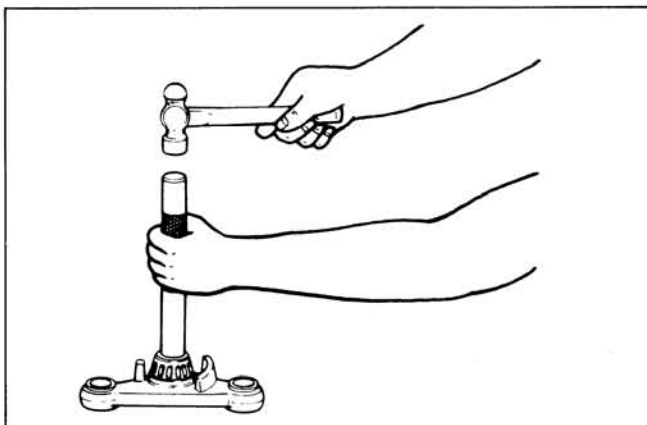


### BEARING

- Press in the lower bearing by using the special tool.

09941-74910

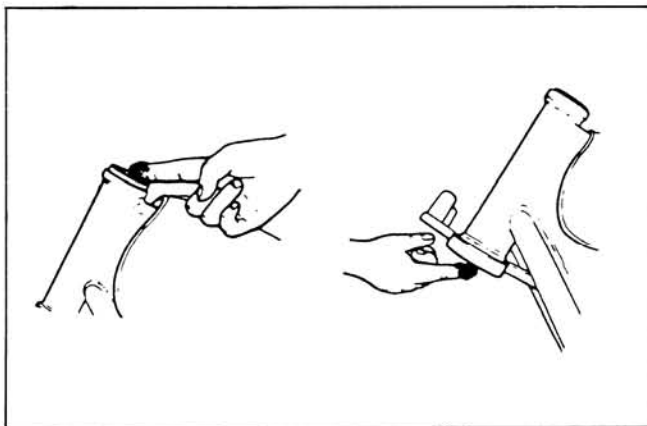
Steering bearing installer



- Apply grease upper and lower bearings before remounting the steering stem.

99000-25030

SUZUKI super grease "A"



**STEM NUT**

Tighten the steering stem nut to the specified torque.

Tightening torque	40 – 50 N·m ( 4.0 – 5.0 kg-m ) ( 29.0 – 36.0 lb-ft )
09940-14911	Steering nut socket wrench

Turn the steering stem bracket about five or six times to the left and right until it locks in position so that the taper roller bearing will be seated properly.

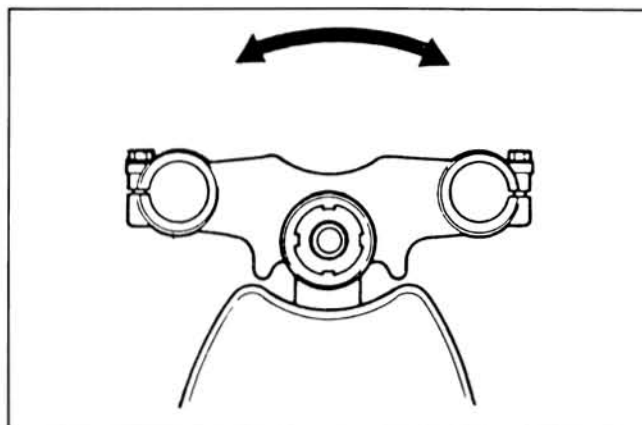
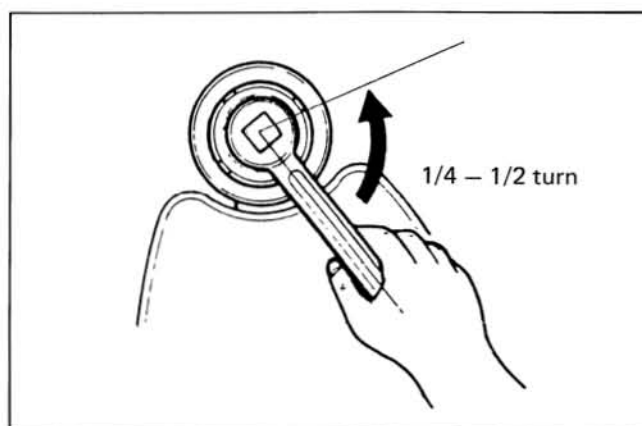
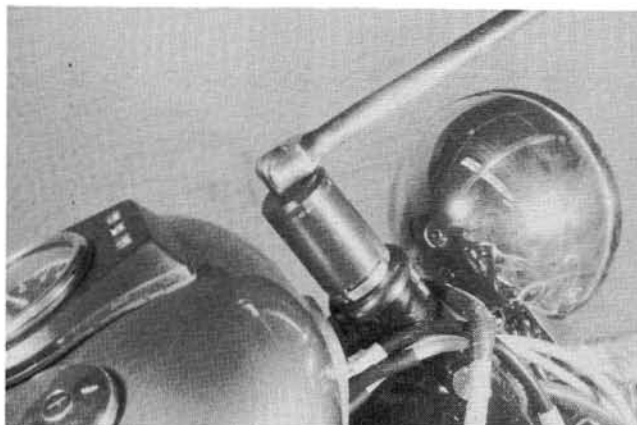
Turn back the stem nut by 1/4 – 1/2 turn.

**NOTE:**

This adjustment will vary from motorcycle to motorcycle.

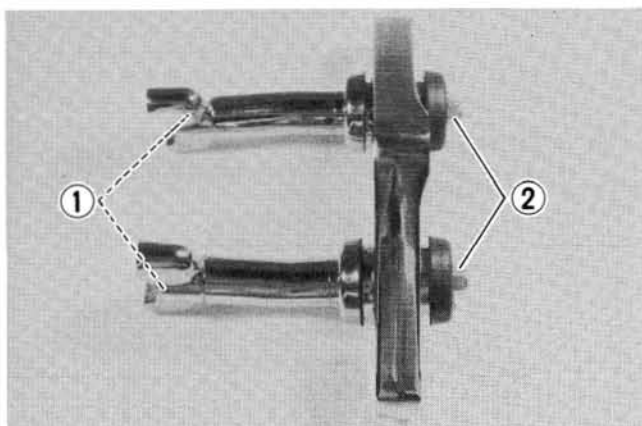
**CAUTION:**

After performing the adjustment and installing the steering stem upper bracket, "rock" the front wheel assembly forward and back to ensure that there is no play and that the procedure was accomplished correctly. Finally check to be sure that the steering stem moves freely from left to right with its own weight. If play or stiffness is noticeable, re-adjust the steering stem nut.

**HANDLEBAR HOLDER**

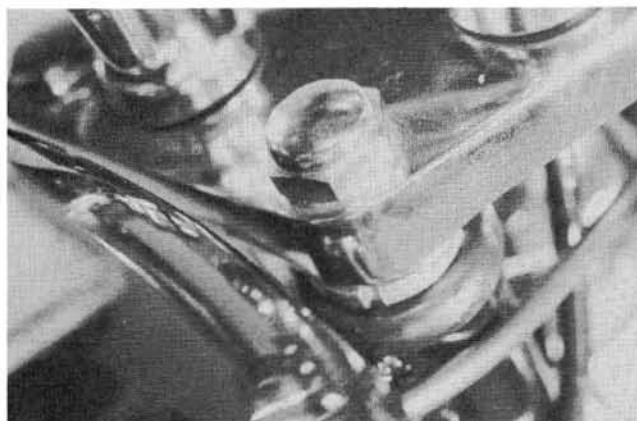
- Apply thread lock "1342" to the handlebar holder bolt ① and tighten it to the specification. (Only for flat handle model)
- Re-mount the handlebar holder on the steering stem head. Apply thread lock "1342" to the nut ②.

99000-32050	Thread lock "1342"
Tightening torque ① and ②	20 – 30 N·m ( 2.0 – 3.0 kg-m ) ( 14.5 – 21.5 lb-ft )



- Tighten the steering stem head nut.

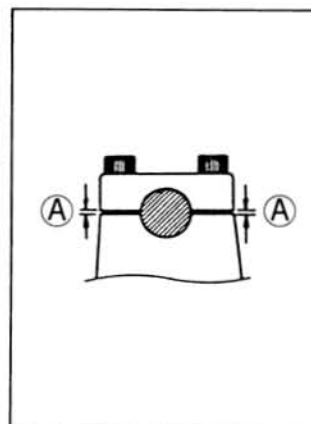
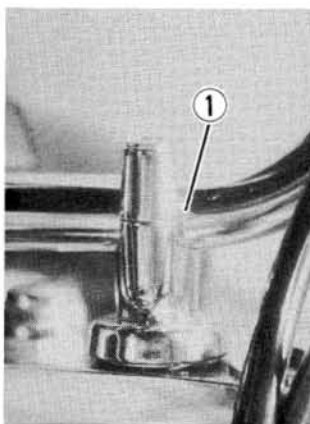
Tightening torque	$30 - 40 \text{ N}\cdot\text{m}$ $(3.0 - 4.0 \text{ kg}\cdot\text{m})$ $21.5 - 29.0 \text{ lb}\cdot\text{ft}$
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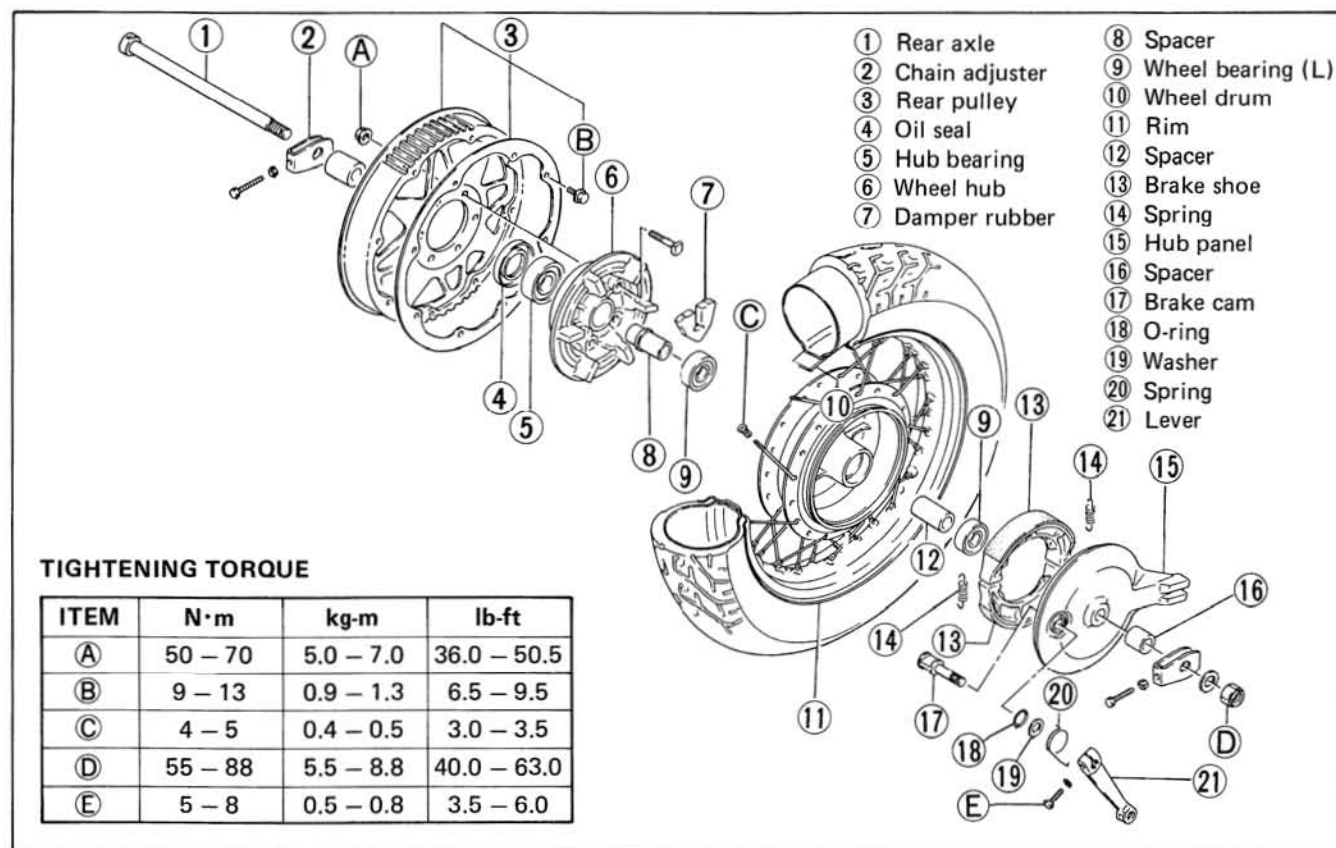
## HANDLEBARS

- Set the handlebars to match its punched mark ① to the mating face of the holder.
- Secure the handlebars clamp in such a way that the clearance ① ahead of and behind the handlebars are equalized.

Tightening torque	$12 - 20 \text{ N}\cdot\text{m}$ $(1.2 - 2.0 \text{ kg}\cdot\text{m})$ $8.5 - 14.5 \text{ lb}\cdot\text{ft}$
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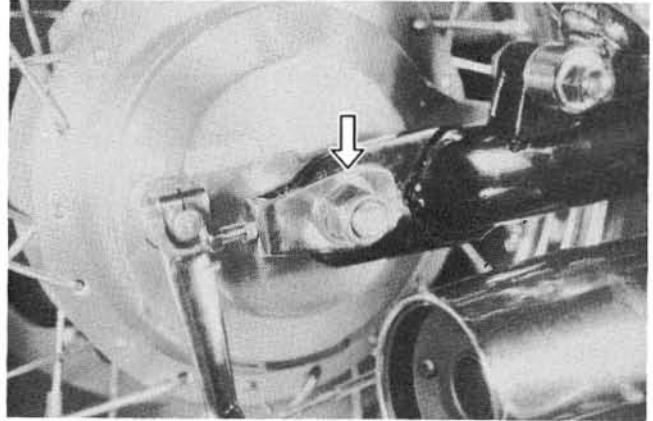
## REAR WHEEL AND BRAKE



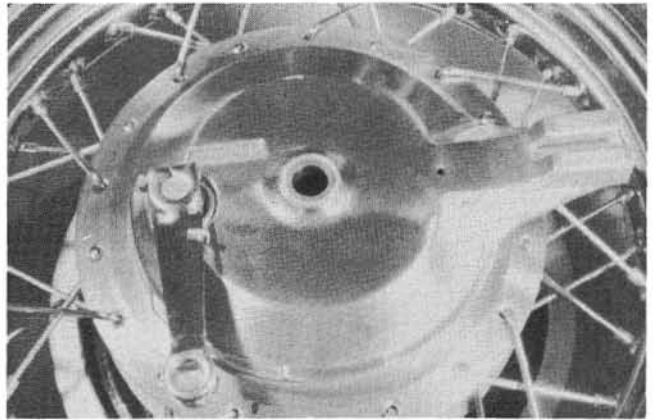


## REMOVAL AND DISASSEMBLY

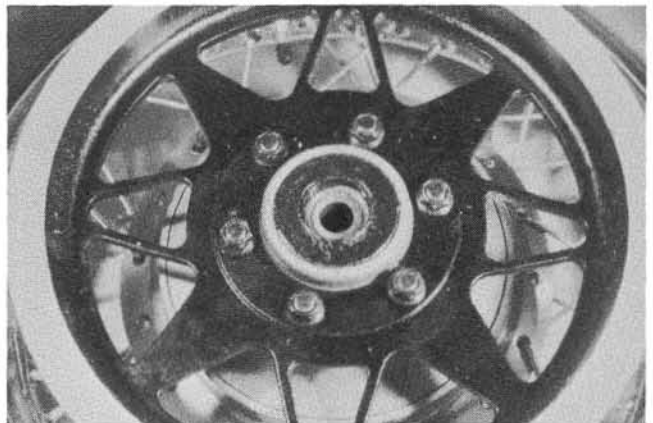
- Support the machine by using jack and wooden block.
- Remove the rear brake adjuster nut.
- Remove the rear axle nut by holding the axle with a rod.
- Remove the rear wheel.



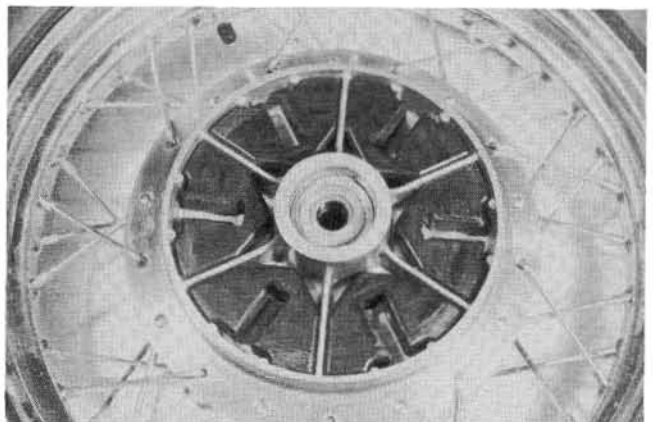
- Remove the brake panel.



- Draw out the rear pulley mounting drum.



- Remove the cushions.



- Remove the rear pulley.

Tightening torque	50 – 70 N·m ( 5.0 – 7.0 kg-m ) ( 36.0 – 50.5 lb-ft )
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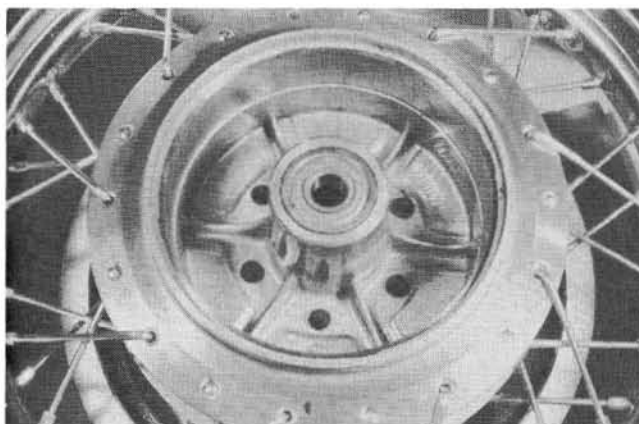
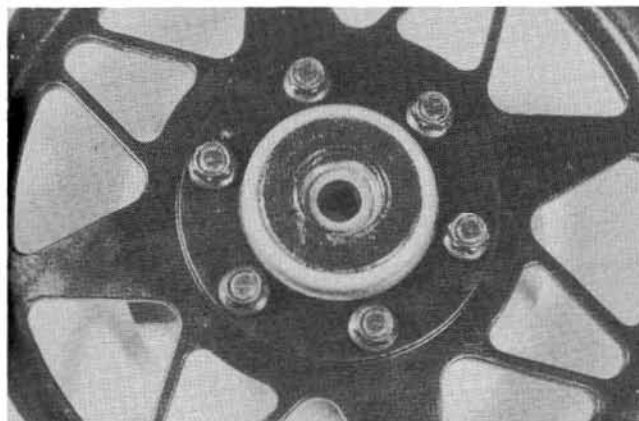
- Remove the rear pulley side plate.

Tightening torque	9 – 13 N·m ( 0.9 – 1.3 kg-m ) ( 6.5 – 9.5 lb-ft )
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- Remove the wheel bearings with same manner as that of front bearing. (Refer to page 7-2)

**CAUTION:**

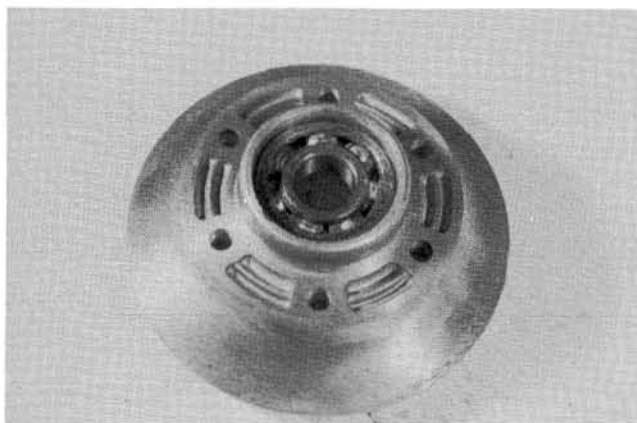
The removed bearings should be replaced with new ones.



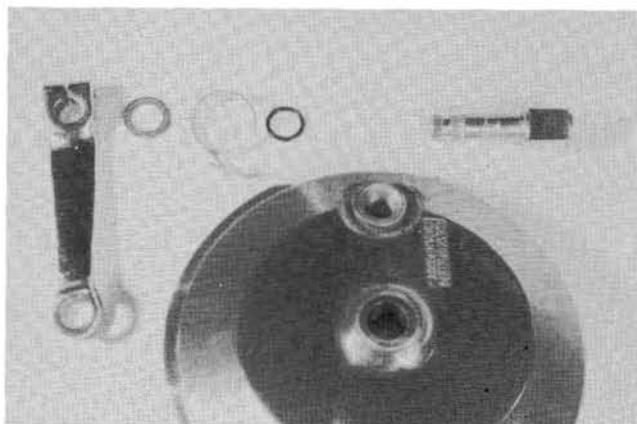
- Remove the rear pulley mounting drum bearing.

**CAUTION:**

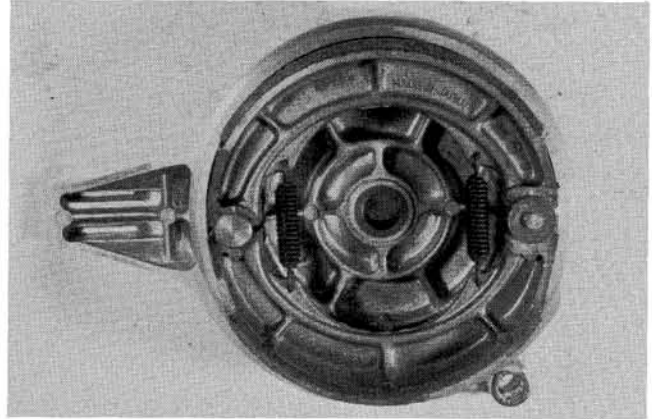
The removed bearing should be replaced with new one.



- Remove the rear brake cam lever.



- Remove the brake shoe.

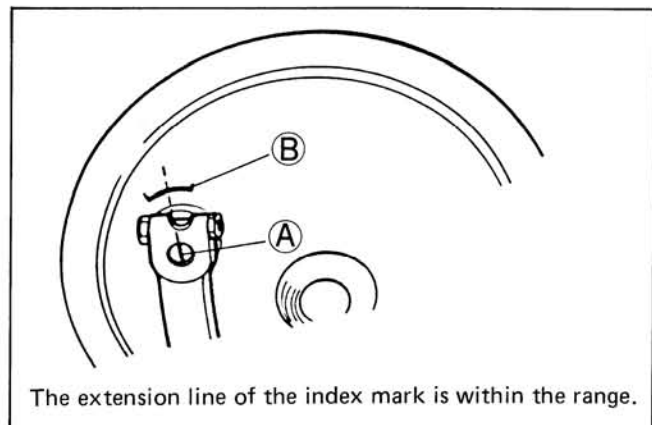


## INSPECTION

WHEEL BEARING .....	Refer to page 7-2
AXLE SHAFT .....	Refer to page 7-3
SPOKE NIPPLE .....	Refer to page 7-3
WHEEL RIM .....	Refer to page 7-3
TIRE TREAD DEPTH .....	Refer to page 7-3

## BRAKE SHOE

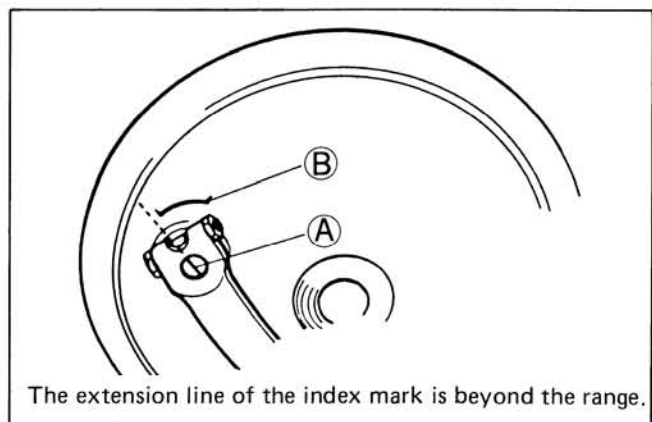
Brake panel incorporate a brake lining wear limit range. If the lining condition is normal, the brake shoe wear indicator (A), when extended, will fall within the range (B) embossed on the brake panel (when brake is on).



- First check that the brake system is properly adjusted. (Refer to page 2-14.)
  - Then check the indicator extension line; the brake should be on at this time.
- If the extended line falls outside the indicated range, replace the brake shoe assembly.

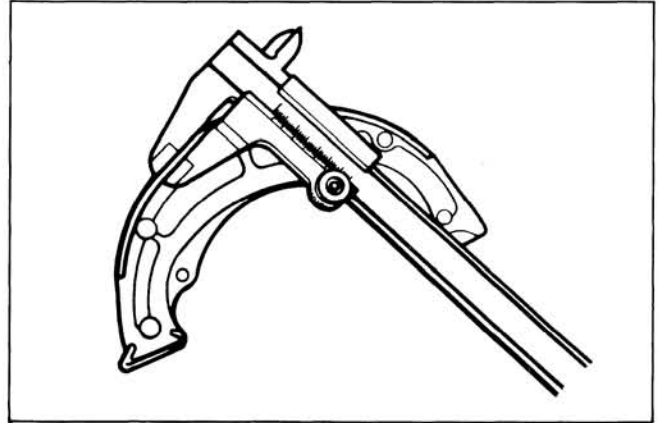
### CAUTION:

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



- Check the brake shoe and decide whether it should be replaced or not from the thickness of the brake shoe lining.

Service Limit	1.5 mm (0.06 in.)
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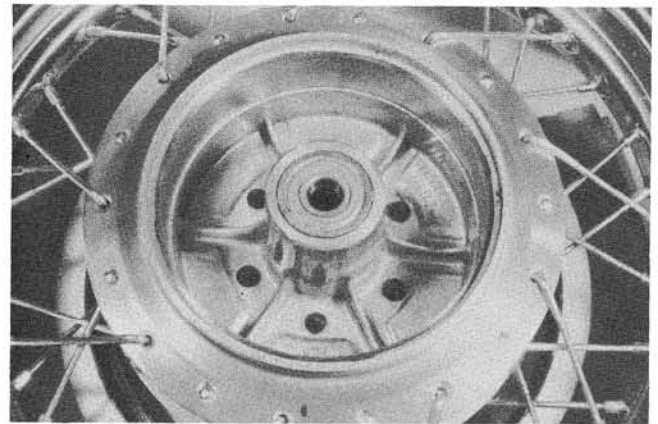


### BRAKE DRUM

Measure the brake drum I.D. to determine the extent of wear and, if the limit is exceeded by the wear noted, replace the drum. The value of this limit is indicated inside the drum.

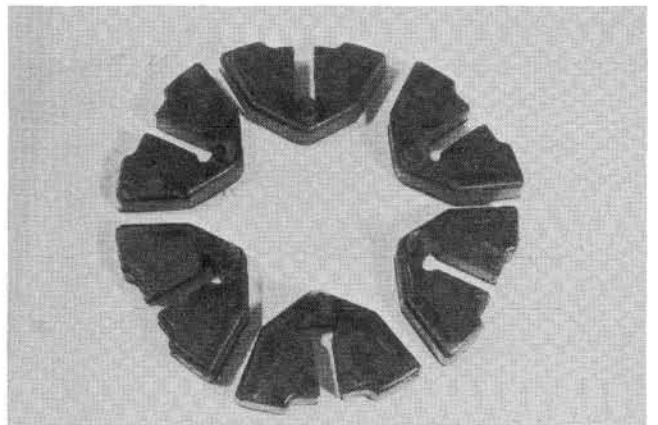
Service Limit	160.7 mm (6.33 in.)
---------------	---------------------

Inspect the drum inside surface for scratch marks. If the inside surface is scratched or otherwise roughened, smoothen it with sandpaper.



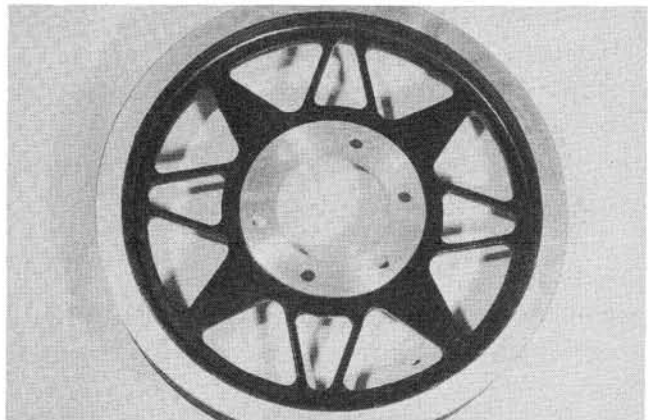
### CUSHION

Inspect the cushions for wear or damage.



### REAR PULLEY

Inspect the pulley for wear or damage.



## REASSEMBLY AND REMOUNTING

Reassemble and remount the rear wheel in the reverse order of removal and disassembly, and also carry out the following steps:

### WHEEL AND MOUNTING DRUM BEARINGS

Apply grease to the bearings before installing.

99000-25030

SUZUKI Super grease "A"



### WHEEL BEARINGS

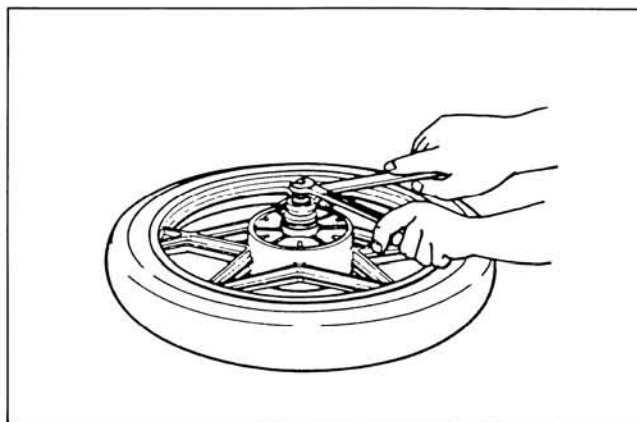
Install the wheel bearing by using the special tool.

09924-84510

Bearing installer set

#### NOTE:

First install the bearing for right side.

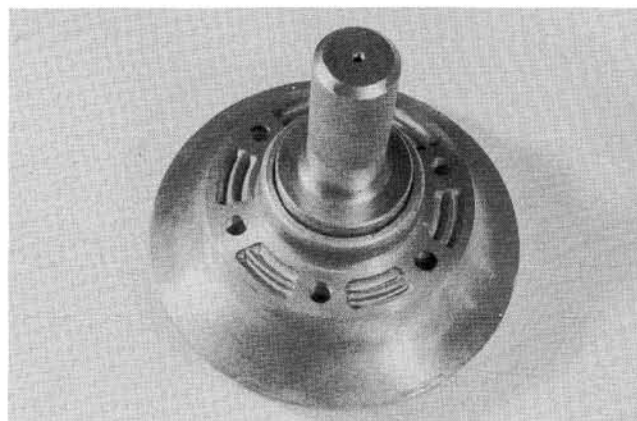


### REAR PULLEY MOUNTING DRUM BEARING

Install the bearing by using the special tool.

09913-75520

Bearing installer



### BRAKE CAMSHAFT

- Apply grease to the brake camshaft.

99000-25030

SUZUKI Super grease "A"

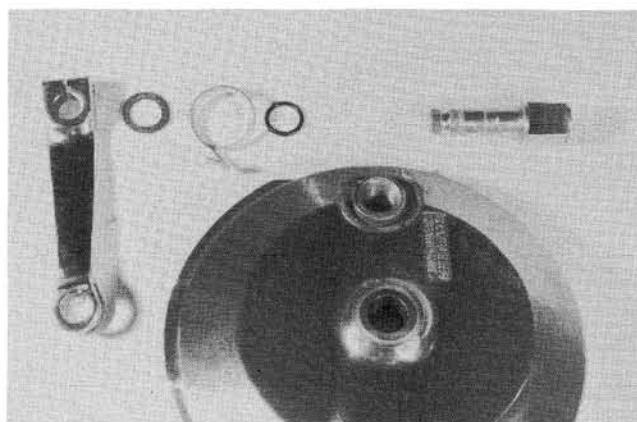
#### WARNING:

Be careful not to apply too much grease to the brake cam shaft.

- Install the brake cam lever and tighten the bolt to the specification.

Tightening torque

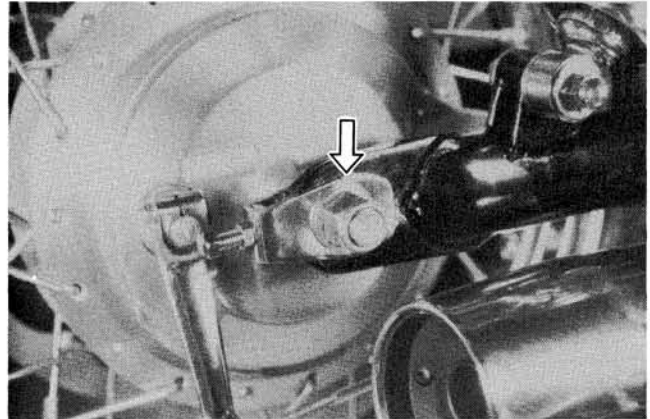
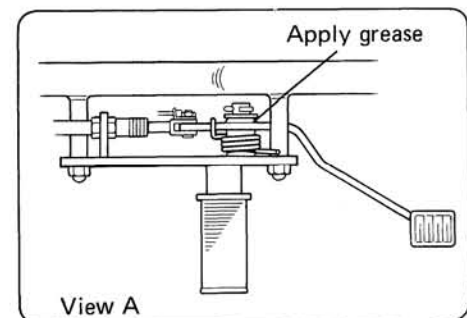
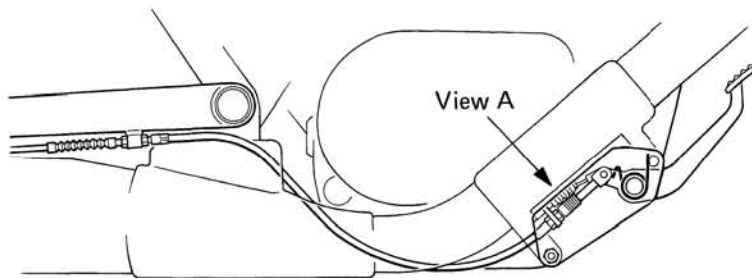
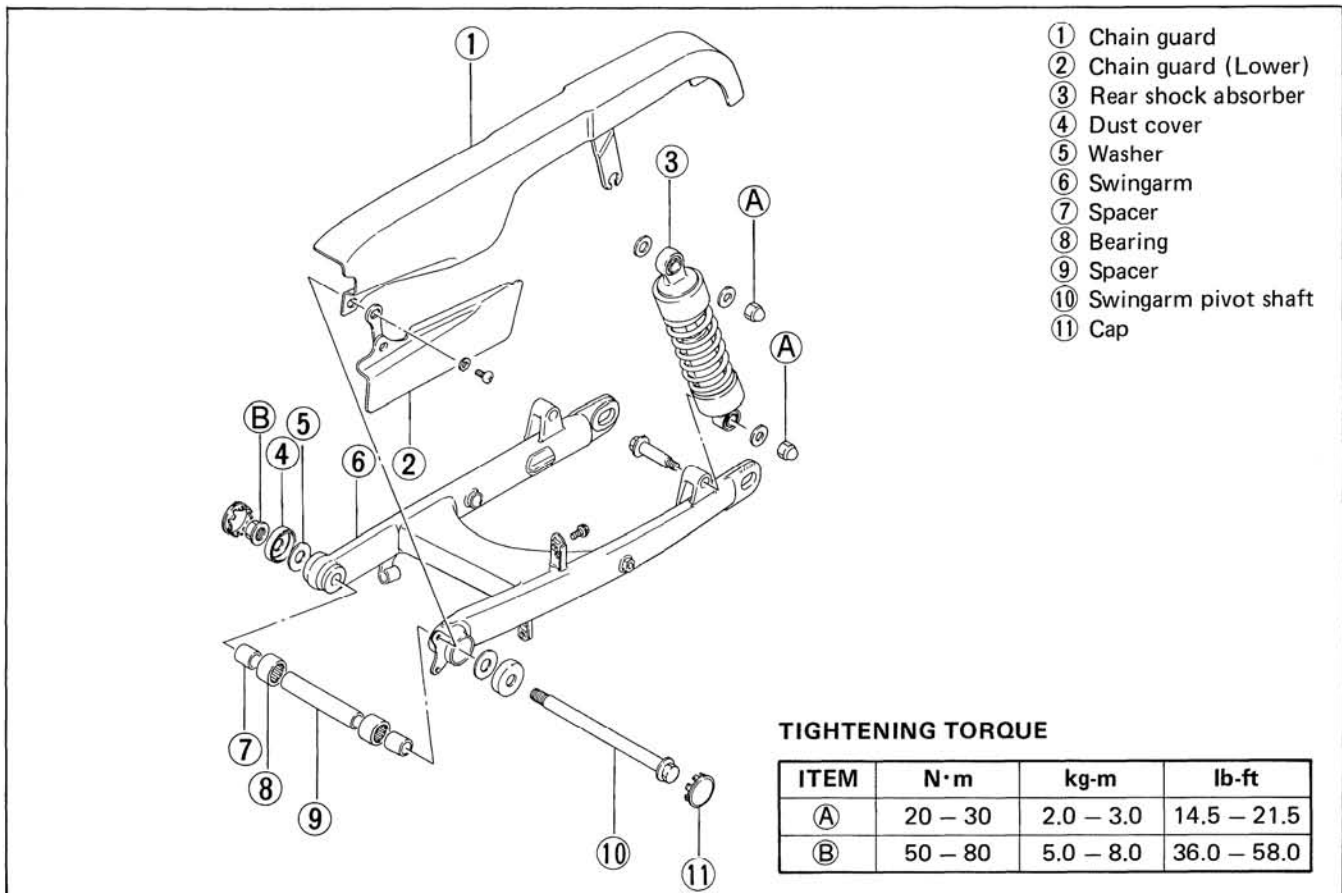
5 – 8 N·m  
( 0.5 – 0.8 kg-m )  
( 3.5 – 6.0 lb-ft )



**REAR AXLE**

- When tightening the rear axle nut, hold the axle shaft with a suitable rod.

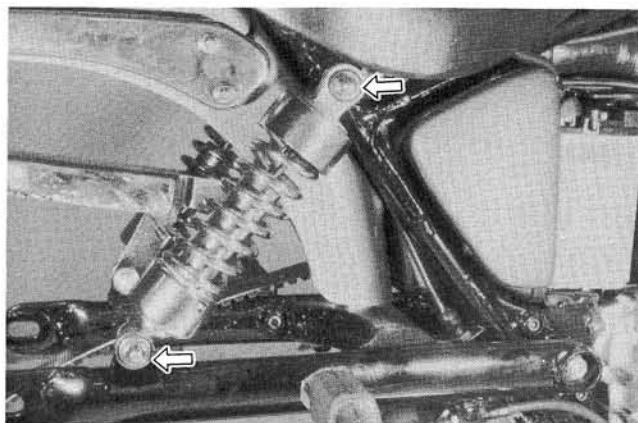
Tightening torque	55 – 88 N·m
	( 5.5 – 8.8 kg-m )
	( 40.0 – 63.0 lb-ft )

**REAR BRAKE CONSTRUCTION****REAR SUSPENSION**



## REMOVAL AND DISASSEMBLY

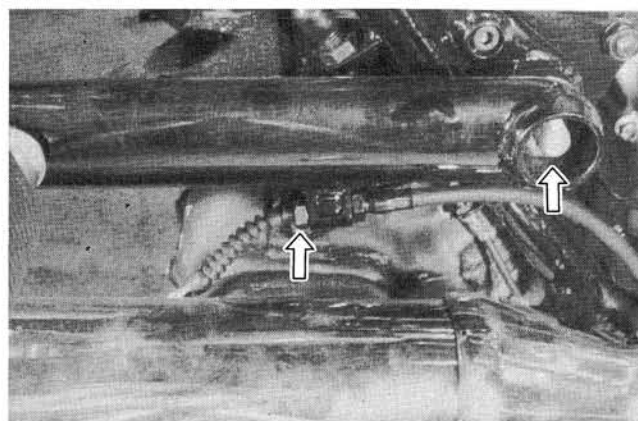
- Remove the rear wheel. (Refer to page 7-23.)
- Remove the right and left rear shock absorbers.



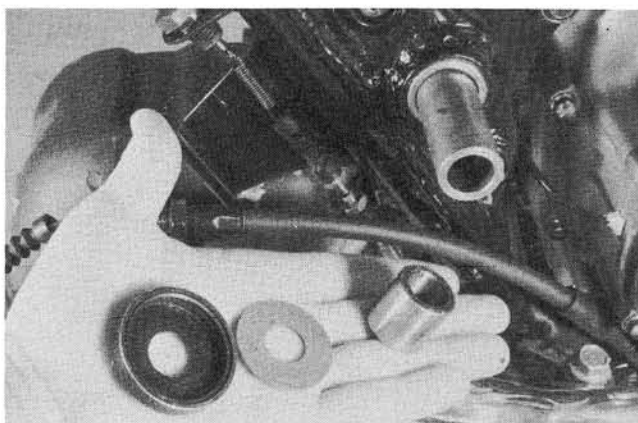
- Remove the brake cable locknut.
- Remove the pivot shaft.
- Take off the swingarm.

### CAUTION:

Be careful not to damage the brake cable.



- Remove the dust seal, washer and spacers.

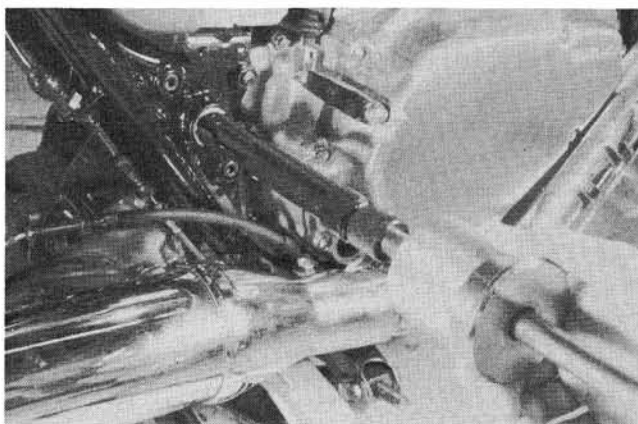


- Remove the pivot bearings by using the special tools.

09923-73210	Bearing puller
09930-30102	Sliding shaft

### CAUTION:

The removed bearings should be replaced with new ones.



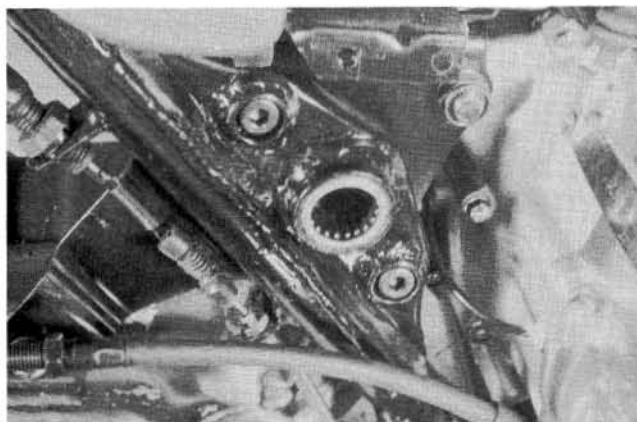
## INSPECTION

### BEARING

Inspect the play of bearing by hand while fixing the spacer in the swingarm pivoting hole.

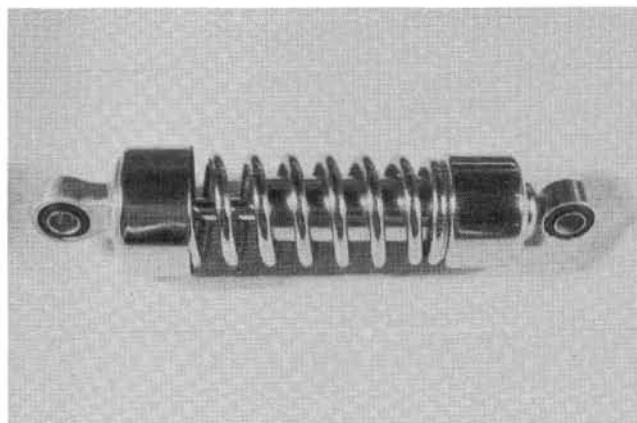
### DUST SEAL

Inspect the dust seal, if they are found to be damaged, replace them with new ones.



### REAR SHOCK ABSORBER

Inspect the rear shock absorber unit for oil leakage or damage. If there is any defect, replace the unit with a new one.



## REASSEMBLY AND REMOUNTING

Reassemble and remount the swingarm and rear shock absorber in the reverse order of disassembly and removal, and also carry out the following steps:

### SWINGARM BEARING

- Press the bearing by using the special tool.

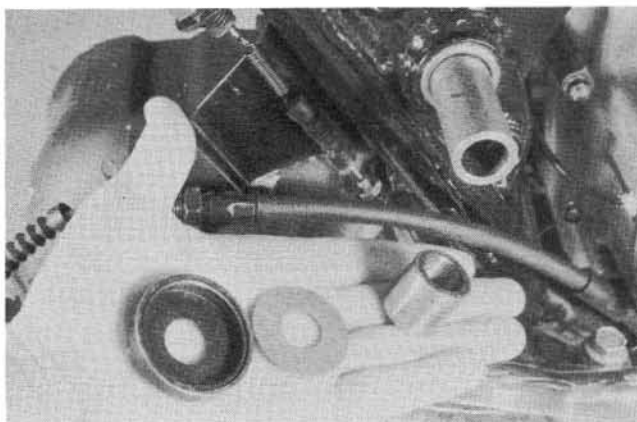
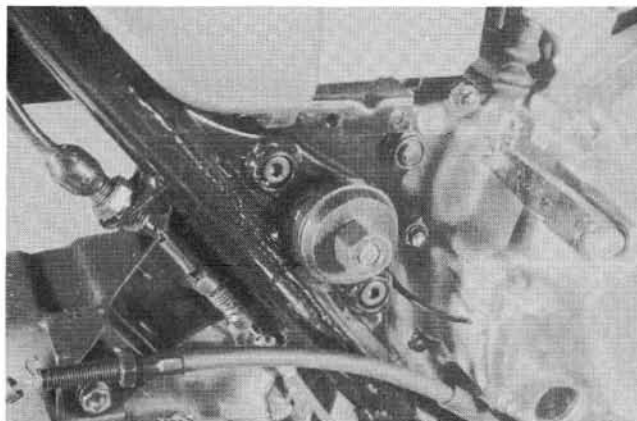
09941-34513	Steering outer race installer
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#### NOTE:

When reinstalling the bearing, stamped mark of bearing is positioned outside.

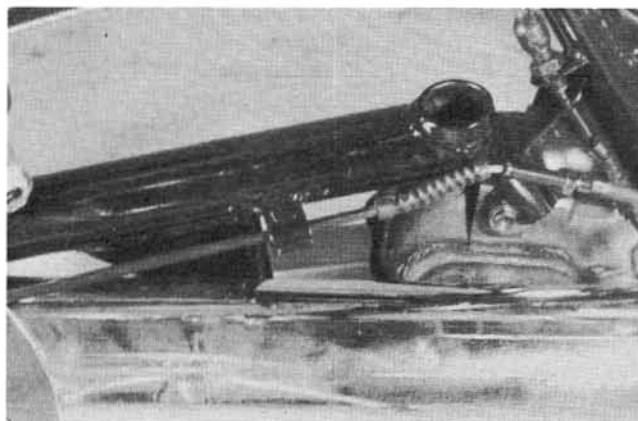
- Apply grease to the spacer, bearing, washer and dust seal.

99000-25030	SUZUKI Super grease "A"
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**SWINGARM**

When remounting the swingarm, carefully install the brake cable.

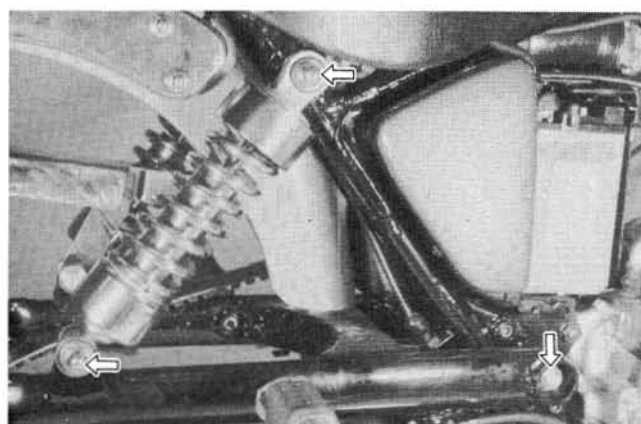
**TIGHTENING TORQUE**

Tighten the nuts to the specified torque.

Item	N·m	kg-m	lb-ft
Shock absorber upper and lower mounting nuts	20 – 30	2.0 – 3.0	14.5 – 21.5
Pivot nut	50 – 80	5.0 – 8.0	36.0 – 58.0

**NOTE:**

When remounting the shock absorber, set the absorber adjusting hole to the outside.



Standard set position	3rd position
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**FINAL INSPECTION AND ADJUSTMENT**

After installing rear swingarm, shock absorbers, brake cable and rear wheel, following adjustments are required before driving the motorcycle.

- \* Drive belt ..... Page 2-11
- \* Rear brake ..... Page 2-14
- \* Tire pressure ..... Page 2-16
- \* Chassis bolts and nut ..... Page 2-18



# ***SERVICING INFORMATION***

## ***CONTENTS***

<b><i>TROUBLESHOOTING</i></b> .....	<b><i>8- 1</i></b>
<b><i>WIRING DIAGRAM</i></b> .....	<b><i>8- 9</i></b>
<b><i>WIRE, CABLE AND HOSE ROUTING</i></b> .....	<b><i>8-10</i></b>
<b><i>SPECIAL TOOLS</i></b> .....	<b><i>8-14</i></b>
<b><i>TIGHTENING TORQUE</i></b> .....	<b><i>8-18</i></b>
<b><i>SERVICE DATA</i></b> .....	<b><i>8-21</i></b>

# TROUBLESHOOTING

## ENGINE

Complaint	Symptom and possible causes	Remedy
Engine will not start or is hard to start.	<p><b>Compression too low</b></p> <ol style="list-style-type: none"> <li>1. Valve clearance out of adjustment.</li> <li>2. Worn valve guides or poor seating of valves.</li> <li>3. Valves mistiming.</li> <li>4. Piston rings excessively worn.</li> <li>5. Worn-down cylinder bore.</li> <li>6. Poor seating of spark plug.</li> <li>7. Starter motor cranks but too slowly.</li> <li>8. Improperly adjusted de-comp cable.</li> <li>9. Defective de-comp solenoid or control unit.</li> </ol> <p><b>Plug not sparking</b></p> <ol style="list-style-type: none"> <li>1. Fouled spark plug.</li> <li>2. Wet spark plug.</li> <li>3. Defective pick-up coil.</li> <li>4. Defective ignitor unit.</li> <li>5. Defective ignition coil.</li> <li>6. Open or short circuit in high-tension cord.</li> </ol> <p><b>No fuel reaching the carburetor</b></p> <ol style="list-style-type: none"> <li>1. Clogged fuel tank vent hose.</li> <li>2. Clogged or defective fuel cock.</li> <li>3. Defective carburetor float valve.</li> <li>4. Clogged fuel hose.</li> <li>5. Clogged fuel filter.</li> <li>6. Clogged or damaged vacuum pipe.</li> </ol>	<p>Adjust. Repair or replace. Adjust. Replace. Replace or rebore. Retighten. Consult "electrical complaints." Adjust. Replace.</p> <p>Clean or replace. Clean and dry. Replace. Replace. Replace. Replace.</p> <p>Clean. Clean or replace. Replace. Clean or replace. Clean or replace. Clean or replace.</p>
Engine stalls easily.	<ol style="list-style-type: none"> <li>1. Fouled spark plug.</li> <li>2. Defective pick-up coil.</li> <li>3. Defective ignitor unit or ignition coil.</li> <li>4. Clogged fuel hose.</li> <li>5. Clogged jets in carburetor.</li> <li>6. Valve clearance out of adjustment.</li> <li>7. Clogged or defective vacuum hose.</li> </ol>	<p>Clean. Replace. Replace. Clean. Clean. Adjust. Clean or replace.</p>
Noisy engine.	<p><b>Excessive valve chatter</b></p> <ol style="list-style-type: none"> <li>1. Valve clearance too large.</li> <li>2. Weakened or broken valve springs.</li> <li>3. Worn down rocker arm or rocker arm shaft.</li> <li>4. Camshaft journal worn or burnt.</li> </ol> <p><b>Noise appears to come from piston</b></p> <ol style="list-style-type: none"> <li>1. Piston or cylinder worn down.</li> <li>2. Combustion chamber fouled with carbon.</li> <li>3. Piston pin or piston pin bore worn.</li> <li>4. Piston rings or ring groove worn.</li> </ol> <p><b>Noise seems to come from timing chain</b></p> <ol style="list-style-type: none"> <li>1. Stretched chain.</li> <li>2. Worn sprockets.</li> <li>3. Chain tensioner not working.</li> </ol>	<p>Adjust. Replace. Replace. Replace.</p> <p>Replace. Clean. Replace. Replace.</p> <p>Replace. Replace. Repair or replace.</p>



Complaint	Symptom and possible causes	Remedy
Noisy engine.	<p><b>Noise seems to come from clutch</b></p> <ol style="list-style-type: none"> <li>1. Worn splines of countershaft or hub.</li> <li>2. Worn teeth of clutch plates.</li> <li>3. Distorted clutch plates, driven and drive.</li> <li>4. Worn clutch release bearing.</li> <li>5. Clutch dampers weakened.</li> <li>6. Worn/Damaged clutch pushrod.</li> </ol> <p><b>Noise seems to come from crankshaft</b></p> <ol style="list-style-type: none"> <li>1. Worn or burnt bearings.</li> <li>2. Big-end bearing worn or burnt.</li> <li>3. Big-end thrust clearance too large.</li> </ol> <p><b>Noise seems to come from transmission</b></p> <ol style="list-style-type: none"> <li>1. Gears worn or rubbing.</li> <li>2. Badly worn splines.</li> <li>3. Primary gears worn or rubbing.</li> <li>4. Badly worn bearings.</li> </ol>	<p>Replace. Replace. Replace. Replace. Replace the primary driven gear. Replace.</p> <p>Replace. Replace. Replace.</p> <p>Replace. Replace. Replace. Replace.</p>
Slipping clutch.	<ol style="list-style-type: none"> <li>1. Clutch control out of adjustment or loss of play on cable.</li> <li>2. Weakened clutch springs.</li> <li>3. Worn or distorted pressure plate.</li> <li>4. Distorted clutch plates, driven and drive.</li> </ol>	<p>Adjust. Replace. Replace. Replace.</p>
Dragging clutch.	<ol style="list-style-type: none"> <li>1. Clutch control out of adjustment or too much play on cable.</li> <li>2. Some clutch springs weakened while others are not.</li> <li>3. Distorted pressure plate or clutch plates.</li> <li>4. Worn pushrod.</li> </ol>	<p>Adjust.</p> <p>Replace. Replace. Replace.</p>
Transmission will not shift.	<ol style="list-style-type: none"> <li>1. Broken gearshift cam.</li> <li>2. Distorted gearshift forks.</li> <li>3. Worn gearshift pawl/guide.</li> <li>4. Too much play on gearshift lever linkage.</li> </ol>	<p>Replace. Replace. Replace. Adjust.</p>
Transmission will not shift back.	<ol style="list-style-type: none"> <li>1. Broken return spring on shift shaft.</li> <li>2. Gearshift fork shaft is rubbing or sticky.</li> <li>3. Distorted or worn gearshift forks.</li> </ol>	<p>Replace. Repair or replace. Replace.</p>
Transmission jumps out of gear.	<ol style="list-style-type: none"> <li>1. Worn shifting gears on dirveshaft or countershaft.</li> <li>2. Distorted or worn gearshift forks.</li> <li>3. Weakened cam stopper spring of gearshift cam.</li> <li>4. Worn gearshift pawl.</li> </ol>	<p>Replace. Replace. Replace. Replace.</p>
Engine idles poorly.	<ol style="list-style-type: none"> <li>1. Valve clearance out of adjustment.</li> <li>2. Poor seating of valves.</li> <li>3. Defective valve guides.</li> <li>4. Worn rocker arms or arm shafts.</li> <li>5. Defective pick-up coil.</li> <li>6. Defective ignitor unit.</li> <li>7. Spark plug gap too wide.</li> <li>8. Spark plug too cold.</li> <li>9. Defective ignition coil resulting in weak sparking.</li> <li>10. Float chamber fuel level out of adjustment in carburetor.</li> <li>11. Clogged jets in carburetor.</li> </ol>	<p>Adjust. Replace. Replace. Replace. Replace. Replace. Adjust or replace. Replace by hot type plug. Replace. Adjust. Clean.</p>

### 8-3 SERVICING INFORMATION

Complaint	Symptom and possible causes	Remedy
Engine runs poorly in high speed range.	<ol style="list-style-type: none"><li>1. Valve springs weakened.</li><li>2. Valve timing out of adjustment.</li><li>3. Worn cams or rocker arms.</li><li>4. Spark plug gap too narrow.</li><li>5. Defective ignition coil.</li><li>6. Defective pick-up coil or ignitor unit.</li><li>7. Float chamber fuel level too low.</li><li>8. Clogged air cleaner element.</li><li>9. Clogged fuel hose resulting in inadequate fuel supply to carburetor.</li><li>10. Clogged jets in carburetor.</li></ol>	<p>Replace. Adjust. Replace. Adjust or replace. Replace. Replace. Adjust. Clean or replace. Clean and prime. Clean.</p>
Dirty or heavy exhaust smoke.	<ol style="list-style-type: none"><li>1. Too much engine oil in the engine.</li><li>2. Worn piston rings or cylinder.</li><li>3. Worn valve guides.</li><li>4. Cylinder wall scored or scuffed.</li><li>5. Worn valve stems.</li><li>6. Defective stem seals.</li></ol>	<p>Check with inspection window, drain out excess oil. Replace. Replace. Replace. Replace. Replace.</p>
Engine lacks power.	<ol style="list-style-type: none"><li>1. Loss of valve clearance.</li><li>2. Weakened valve springs.</li><li>3. Valve timing out of adjustment.</li><li>4. Worn piston ring or cylinder.</li><li>5. Poor seating of valves.</li><li>6. Fouled spark plug.</li><li>7. Worn rocker arms or shafts.</li><li>8. Spark plug gap incorrect.</li><li>9. Clogged jets in carburetor.</li><li>10. Float-chamber fuel level out of adjustment.</li><li>11. Clogged air cleaner element.</li><li>12. Too much engine oil.</li><li>13. Sucking air from intake pipe.</li></ol>	<p>Adjust. Replace. Adjust. Replace. Repair. Clean or replace. Replace. Adjust or replace. Clean. Adjust. Clean. Drain out excess oil. Retighten or replace.</p>
Engine overheats.	<ol style="list-style-type: none"><li>1. Heavy carbon deposit on piston crown.</li><li>2. Not enough oil in the engine.</li><li>3. Defective oil pump or clogged oil circuit.</li><li>4. Fuel level too low in float chamber.</li><li>5. Air leak from intake pipe.</li><li>6. Use of incorrect engine oil.</li></ol>	<p>Clean. Add oil. Repair or clean. Adjust. Retighten or replace. Change.</p>

## CARBURETOR

Complaint	Symptom and possible causes	Remedy
<b>Trouble with starting.</b>	<ol style="list-style-type: none"> <li>1. Starter jet is clogged.</li> <li>2. Starter pipe is clogged.</li> <li>3. Air leaking from a joint between starter body and carburetor.</li> <li>4. Starter plunger is not operating properly.</li> </ol>	Clean. Clean. Check starter body and carburetor for tightness, adjust and replace gasket. Check and adjust.
<b>Idling or low-speed trouble.</b>	<ol style="list-style-type: none"> <li>1. Pilot jet, pilot air jet are clogged or loose.</li> <li>2. Pilot outlet or by-pass is clogged.</li> <li>3. Starter plunger is not fully closed.</li> </ol>	Check and clean. Check and clean. Check and adjust.
<b>Medium- or high-speed trouble.</b>	<ol style="list-style-type: none"> <li>1. Main jet or main air jet is clogged.</li> <li>2. Needle jet is clogged.</li> <li>3. Throttle valve is not operating properly.</li> <li>4. Fuel filter is clogged.</li> </ol>	Check and clean. Check and clean. Check throttle valve for operation. Check and clean.
<b>Overflow and fuel level fluctuations.</b>	<ol style="list-style-type: none"> <li>1. Needle valve is worn or damaged.</li> <li>2. Spring in needle valve is broken.</li> <li>3. Float is not working properly.</li> <li>4. Foreign matter has adhered to needle valve.</li> <li>5. Fuel level is too high or low.</li> </ol>	Replace. Replace. Check and adjust. Clean. Adjust float height.

**ELECTRICAL**

Complaint	Symptom and possible causes	Remedy
No sparking or poor sparking.	<ol style="list-style-type: none"> <li>1. Defective ignition coil.</li> <li>2. Defective spark plug.</li> <li>3. Defective pick-up coil.</li> <li>4. Defective ignitor unit.</li> </ol>	Replace. Replace. Replace. Replace.
Spark plug soon becomes fouled with carbon.	<ol style="list-style-type: none"> <li>1. Mixture too rich.</li> <li>2. Idling speed set too high.</li> <li>3. Incorrect gasoline.</li> <li>4. Dirty element in air cleaner.</li> <li>5. Spark plug too cold.</li> </ol>	Adjust carburetor. Adjust carburetor. Change. Clean. Replace by hot type plug.
Spark plug becomes fouled with oil.	<ol style="list-style-type: none"> <li>1. Worn piston rings.</li> <li>2. Piston or cylinder worn.</li> <li>3. Excessive clearance of valve stems in valve guides.</li> <li>4. Worn stem oil seals.</li> </ol>	Replace. Replace. Replace. Replace.
Spark plug electrodes overheat or burn.	<ol style="list-style-type: none"> <li>1. Spark plug too hot.</li> <li>2. The engine overheats.</li> <li>3. Spark plug loose.</li> <li>4. Mixture too lean.</li> <li>5. Defective pick-up coil or ignitor unit.</li> </ol>	Replace by cold type plug. Tune up. Retighten. Adjust carburetor. Replace.
Generator does not charge.	<ol style="list-style-type: none"> <li>1. Open or short in lead wires, or loose lead connections.</li> <li>2. Shorted, grounded or open generator coils.</li> <li>3. Shorted or punctured regulator/rectifier.</li> </ol>	Repair, replace or retighten. Replace. Replace.
Generator does charge, but charging rate is below the specification.	<ol style="list-style-type: none"> <li>1. Lead wires tend to get shorted or open-circuited or loosely connected at terminals.</li> <li>2. Grounded or open-circuited stator coils of generator.</li> <li>3. Defective regulator/rectifier.</li> <li>4. Not enough electrolyte in the battery.</li> <li>5. Defective cell plates in the battery.</li> </ol>	Repair or retighten. Replace. Replace. Add distilled water to the MAX. level. Replace the battery.
Generator overcharges.	<ol style="list-style-type: none"> <li>1. Internal short-circuit in the battery.</li> <li>2. Resistor element in the regulator/rectifier damaged or defective.</li> <li>3. Regulator/rectifier poorly grounded.</li> </ol>	Replace the battery. Replace. Clean and tighten ground connection.
Unstable charging.	<ol style="list-style-type: none"> <li>1. Lead wire insulation frayed due to vibration, resulting in intermittent shorting.</li> <li>2. Generator internally shorted.</li> <li>3. Defective regulator/rectifier.</li> </ol>	Repair or replace. Replace. Replace.
Starter button is not effective.	<ol style="list-style-type: none"> <li>1. Battery run down.</li> <li>2. Defective switch contact.</li> <li>3. Brushes not seating properly on commutator, in starter motor.</li> <li>4. Defective starter relay.</li> <li>5. Defective de-comp control unit.</li> </ol>	Recharge or replace. Replace. Repair or replace. Replace. Replace.

## BATTERY

Complaint	Symptom and possible causes	Remedy
"Sulfation", acidic white powdery substance or spots on surfaces of cell plates.	<ol style="list-style-type: none"> <li>1. Not enough electrolyte.</li> <li>2. Battery case is cracked.</li> <li>3. Battery has been left in a run-down condition for a long time.</li> <li>4. Contaminated electrolyte (Foreign matter has entered the battery and become mixed with the electrolyte).</li> </ol>	<p>Add distilled water, if the battery has not been damaged and "sulfation" has not advanced too far, and recharge. Replace the battery. Replace the battery.</p> <p>If "sulfation" has not advanced too far, try to restore the battery by replacing the electrolyte, recharging it fully with the battery detached from the motorcycle and then adjusting electrolyte S.G.</p>
Battery runs down quickly.	<ol style="list-style-type: none"> <li>1. The charging method is not correct.</li> <li>2. Cell plates have lost much of their active material as a result of over-charging.</li> <li>3. A short-circuit condition exists within the battery due to excessive accumulation of sediments caused by the high electrolyte S.G.</li> <li>4. Electrolyte S.G. is too low.</li> <li>5. Contaminated electrolyte.</li> <li>6. Battery is too old.</li> </ol>	<p>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.</p> <p>Recharge the battery fully and adjust electrolyte S.G. Replace the electrolyte, recharge the battery and then adjust S.G. Replace the battery.</p>
Reversed battery polarity.	The battery has been connected the wrong way round in the system, so that it is being charged in the reverse direction.	Replace the battery and be sure to connect the battery properly.
Battery "sulfation".	<ol style="list-style-type: none"> <li>1. Charging rate too low or too high. (When not in use batteries should be recharged at least once a month to avoid sulfation.)</li> <li>2. Battery electrolyte excessive or insufficient, or its specific gravity too high or too low.</li> <li>3. The battery left unused for too long in cold climate.</li> </ol>	<p>Replace the battery.</p> <p>Keep the electrolyte up to the prescribed level, or adjust the S.G. by consulting the battery maker's directions. Replace the battery, if badly sulfated.</p>
Battery discharges too rapidly.	<ol style="list-style-type: none"> <li>1. Dirty container top and sides.</li> <li>2. Impurities in the electrolyte or electrolyte S.G. is too high.</li> </ol>	<p>Clean. Change the electrolyte by consulting the battery maker's directions.</p>

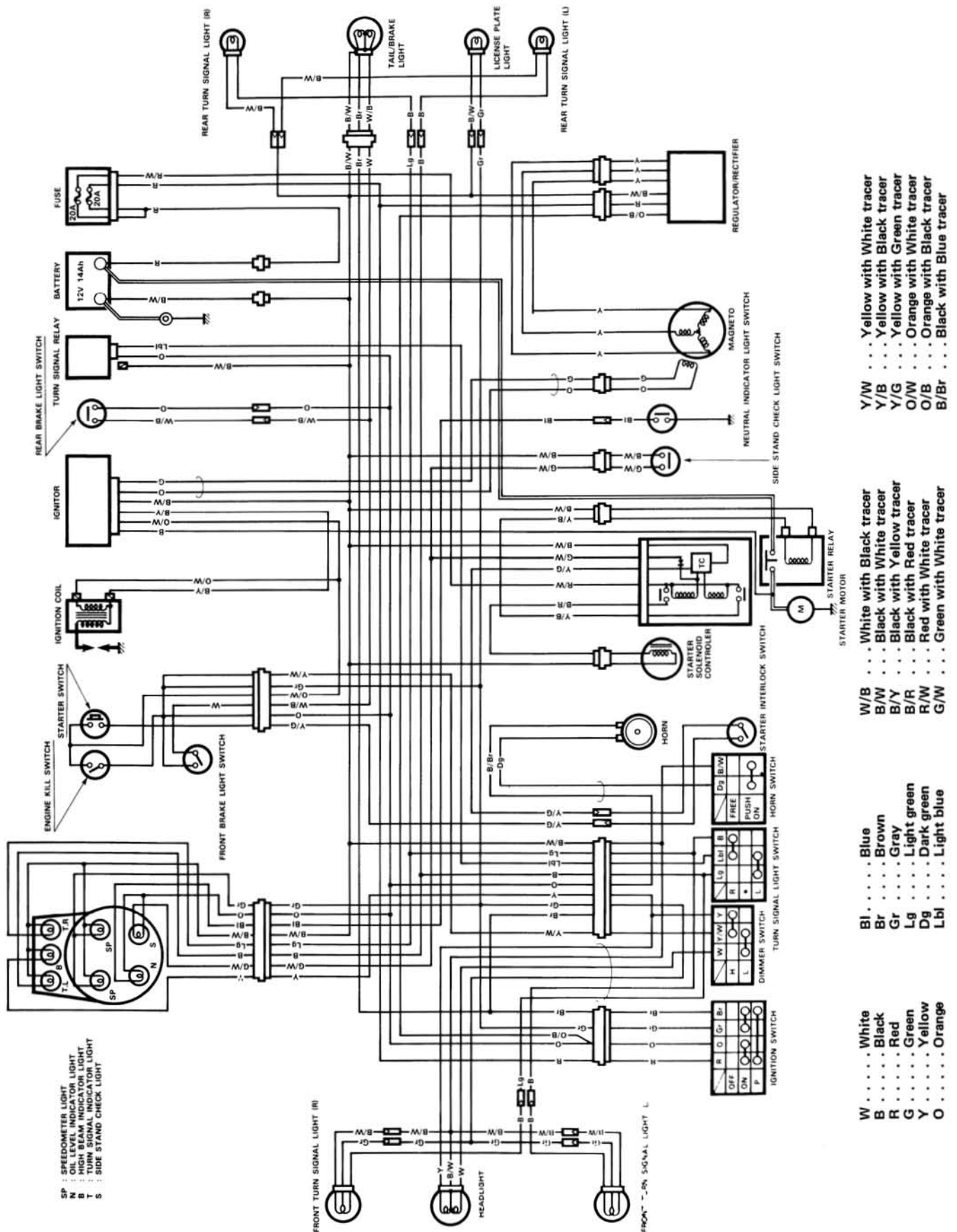
## CHASSIS

Complaint	Symptom and possible causes	Remedy
Heavy steering	<ol style="list-style-type: none"> <li>1. Steering stem nut overtightened.</li> <li>2. Broken bearing in steering stem.</li> <li>3. Distorted steering stem.</li> <li>4. Not enough pressure in tires.</li> </ol>	Adjust. Replace. Replace. Adjust.
Wobbly handle.	<ol style="list-style-type: none"> <li>1. Loss of balance between right and left front forks.</li> <li>2. Distorted front fork.</li> <li>3. Distorted front axle or crooked tire.</li> <li>4. Loose steering stem bearings.</li> <li>5. Worn or incorrect tires or wrong tire pressure.</li> </ol>	Replace. Repair or replace. Replace. Adjust. Replace or adjust.
Wobbly front wheel.	<ol style="list-style-type: none"> <li>1. Distorted wheel rim.</li> <li>2. Worn-down front wheel bearings.</li> <li>3. Defective or incorrect tire.</li> <li>4. Loose nut on axle.</li> <li>5. Incorrect front fork oil.</li> </ol>	Replace. Replace. Replace. Retighten. Replace.
Front suspension too soft.	<ol style="list-style-type: none"> <li>1. Weakened springs.</li> <li>2. Not enough fork oil.</li> <li>3. Wrong weight fork oil.</li> </ol>	Replace. Refill. Change.
Front suspension too stiff.	<ol style="list-style-type: none"> <li>1. Fork oil too viscous.</li> <li>2. Too much fork oil.</li> <li>3. Front axle bent.</li> <li>4. Fork tubes not adjusted evenly in fork stem and steering stem head.</li> </ol>	Replace. Drain excess oil. Replace. Adjust.
Noisy front suspension.	<ol style="list-style-type: none"> <li>1. Not enough fork oil.</li> <li>2. Loose nuts on suspension.</li> </ol>	Refill. Retighten.
Wobbly rear wheel.	<ol style="list-style-type: none"> <li>1. Distorted wheel rim.</li> <li>2. Worn-down rear wheel bearings or swingarm bearings.</li> <li>3. Defective or incorrect tire.</li> <li>4. Worn swingarm related bearings.</li> <li>5. Loose nuts on rear suspension.</li> <li>6. Loose nut on axle.</li> <li>7. Loss of balance between right and left suspension.</li> <li>8. Not enough tire pressure.</li> </ol>	Replace. Replace. Replace. Replace. Retighten. Retighten. Adjust. Change.
Rear suspension too soft.	<ol style="list-style-type: none"> <li>1. Weakened shock absorber spring.</li> <li>2. Rear suspension adjuster improperly set.</li> <li>3. Oil leakage of shock absorber.</li> </ol>	Replace. Reset. Replace.
Rear suspension too stiff.	<ol style="list-style-type: none"> <li>1. Rear suspension adjuster improperly set.</li> <li>2. Shock absorber shaft bent.</li> <li>3. Swingarm bent.</li> <li>4. Worn swingarm related bearings.</li> </ol>	Reset. Replace. Replace. Replace.
Noisy rear suspension.	<ol style="list-style-type: none"> <li>1. Loose nuts or bolts on rear suspension.</li> <li>2. Worn swingarm related bearings.</li> </ol>	Retighten. Replace.



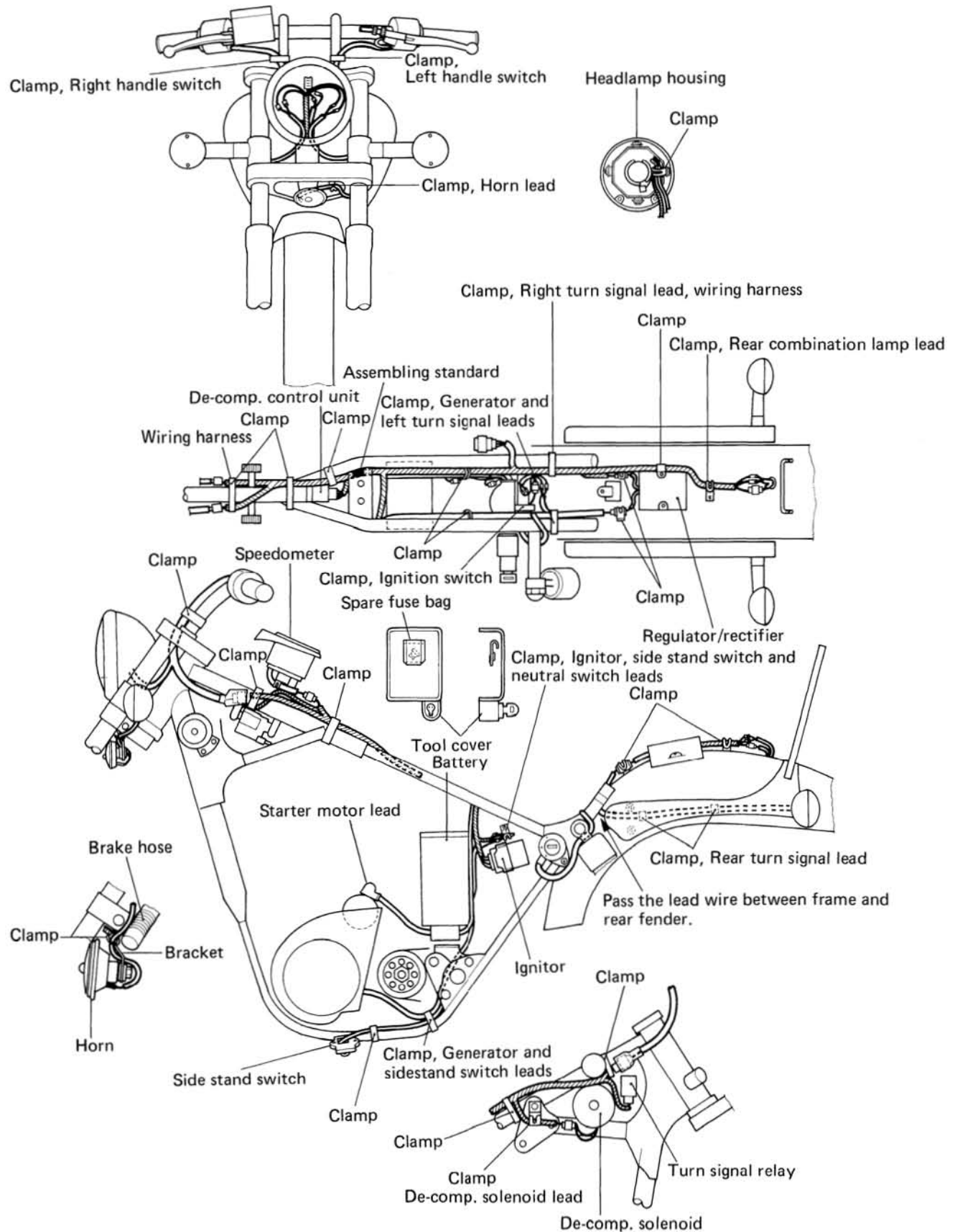
## BRAKES

Complaint	Symptom and possible causes	Remedy
Poor braking. (FRONT)	<ol style="list-style-type: none"> <li>1. Not enough brake fluid in the reservoir.</li> <li>2. Air trapped in brake fluid circuit.</li> <li>3. Pads worn down.</li> </ol>	Refill to level mark. Bleed air out. Replace.
Poor braking. (REAR)	<ol style="list-style-type: none"> <li>1. Linings worn down.</li> <li>2. Too much play on brake pedal.</li> </ol>	Replace. Adjust.
Insufficient brake power.	<ol style="list-style-type: none"> <li>1. Leakage of brake fluid from hydraulic system.</li> <li>2. Worn pads/lining.</li> <li>3. Oil adhesion on engaging surface of pads/lining.</li> <li>4. Worn disc/drum.</li> <li>5. Air entered into hydraulic system.</li> </ol>	Repair or replace. Replace. Clean disc/pads or drum/shoes. Replace. Bleed air.
Brake squeaking.	<ol style="list-style-type: none"> <li>1. Carbon adhesion on pad/lining surface.</li> <li>2. Tilted pad.</li> <li>3. Damaged wheel bearings.</li> <li>4. Loose front wheel axle or rear wheel axle.</li> <li>5. Worn pads/linings.</li> <li>6. Foreign material in brake fluid.</li> <li>7. Clogged return port of master cylinder.</li> <li>8. Wrongly fixed pad shim, retainer or spring.</li> <li>9. Caliper binding on caliper axles.</li> </ol>	Repair surface with sandpaper. Modify pad fitting. Replace. Tighten to specified torque. Replace. Replace brake fluid. Disassemble and clean master cylinder. Set correctly. Clean and lubricate.
Excessive brake lever stroke.	<ol style="list-style-type: none"> <li>1. Air entered into hydraulic system.</li> <li>2. Worn brake lever cam.</li> <li>3. Insufficient brake fluid.</li> <li>4. Improper quality of brake fluid.</li> </ol>	Bleed air. Replace brake cam. Replenish fluid to specified level; bleed air. Replace with correct fluid.
Leakage of brake fluid.	<ol style="list-style-type: none"> <li>1. Insufficient tightening of connection joints.</li> <li>2. Cracked hose.</li> <li>3. Worn piston and/or cup.</li> </ol>	Tighten to specified torque. Replace. Replace piston and/or cup.

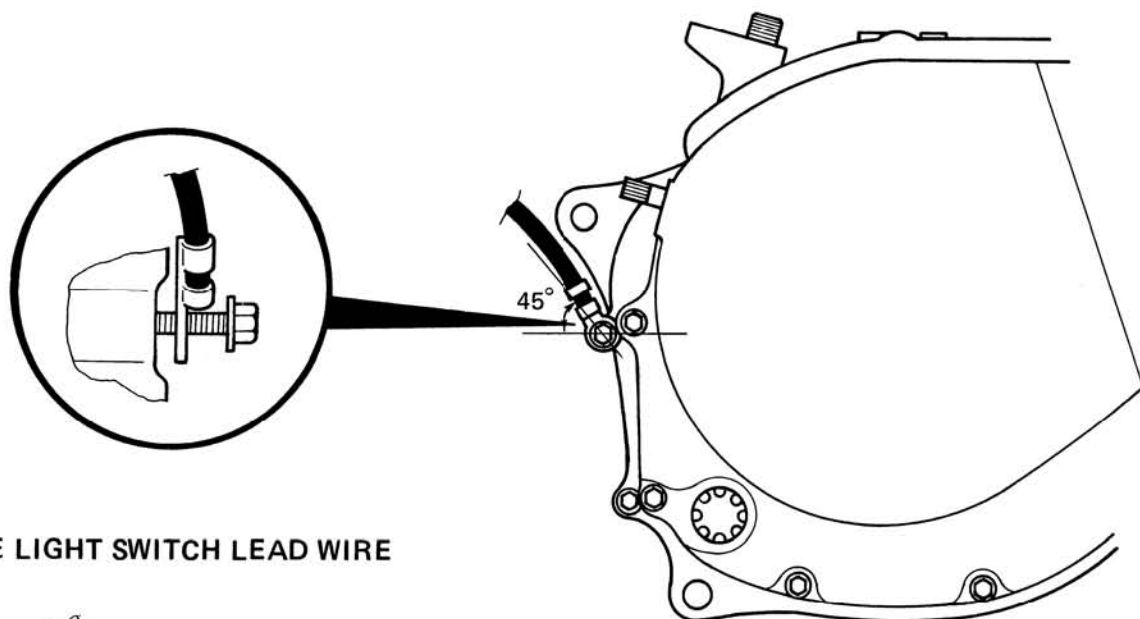


# WIRE, CABLE AND HOSE ROUTING

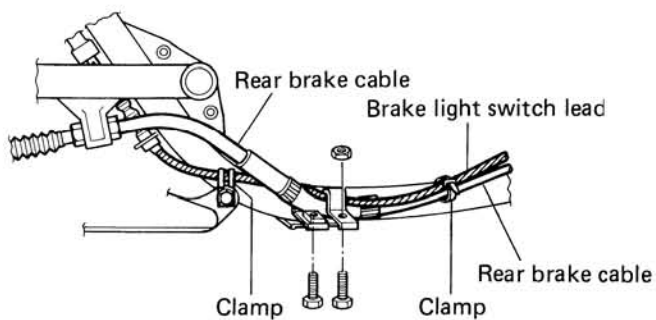
## WIRE ROUTING



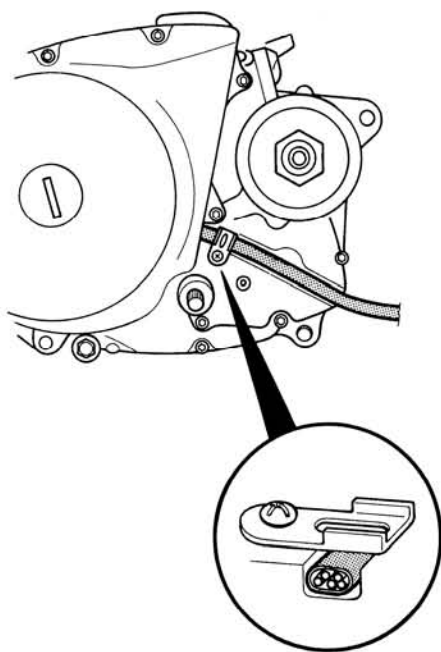
ENGINE GROUND LEAD WIRE



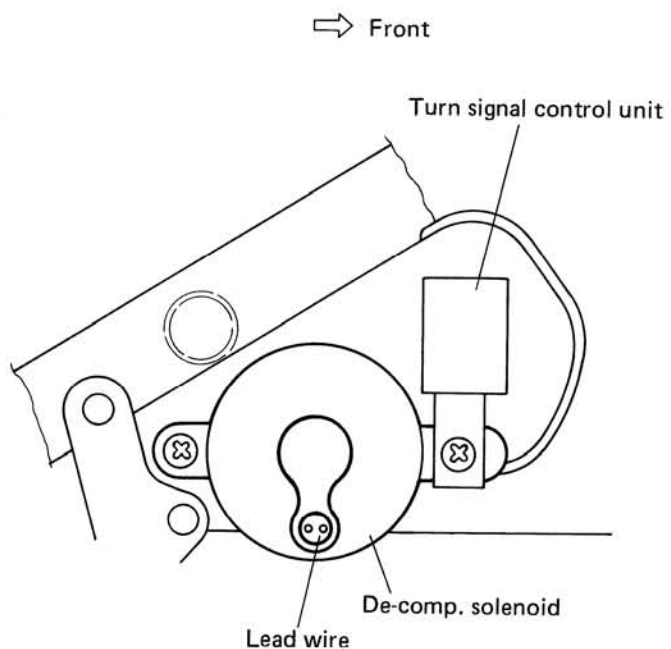
BRAKE LIGHT SWITCH LEAD WIRE



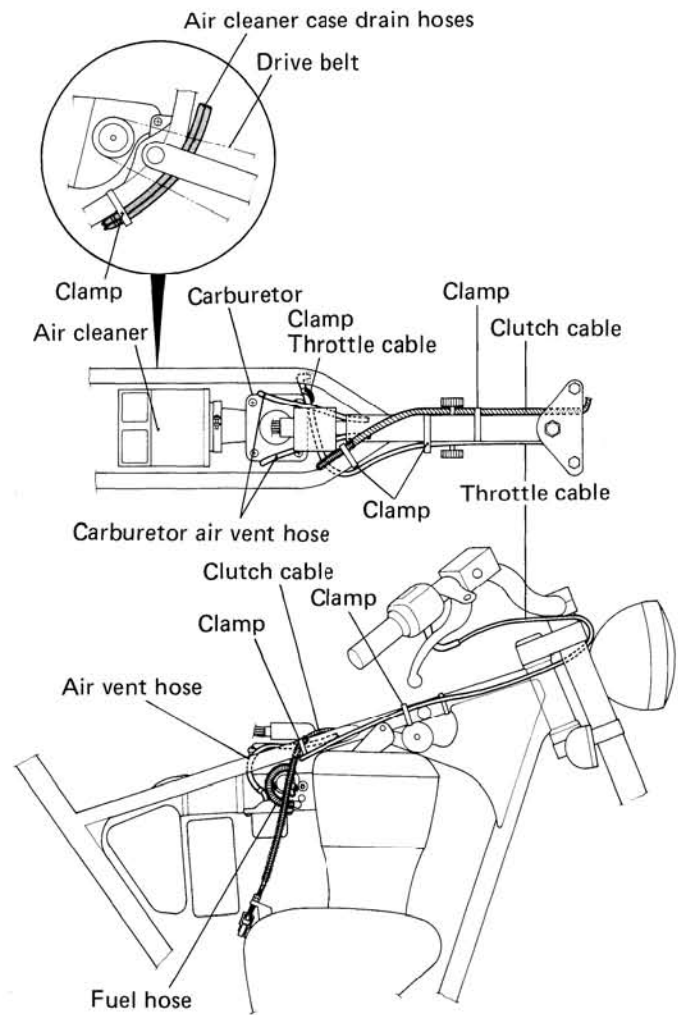
GENERATOR LEAD WIRE



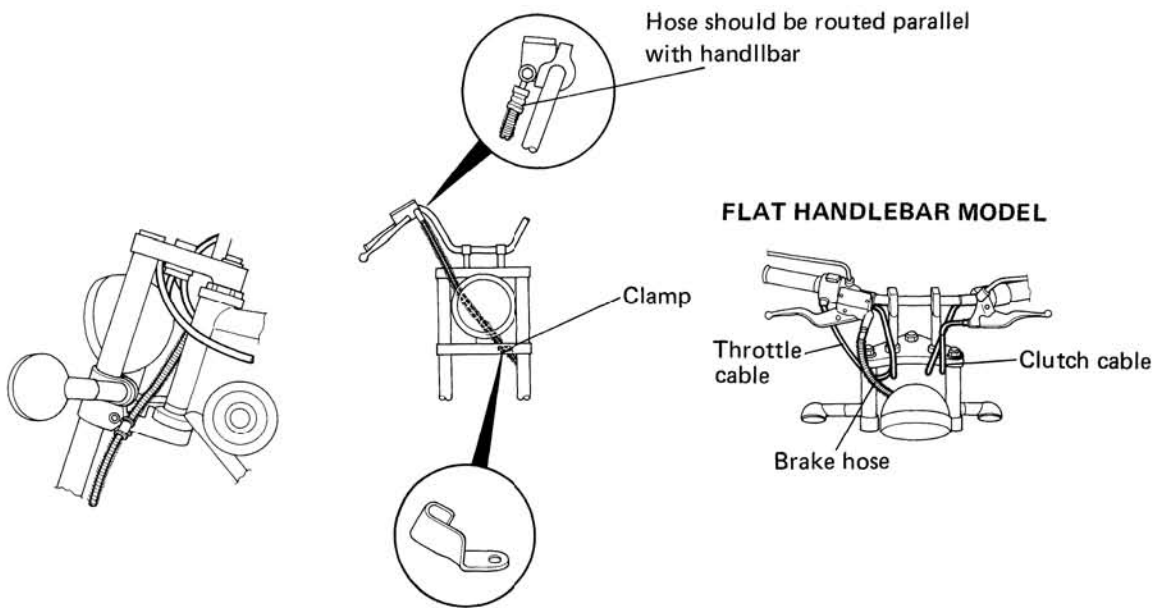
DE-COMP. SOLENOID LEAD WIRE



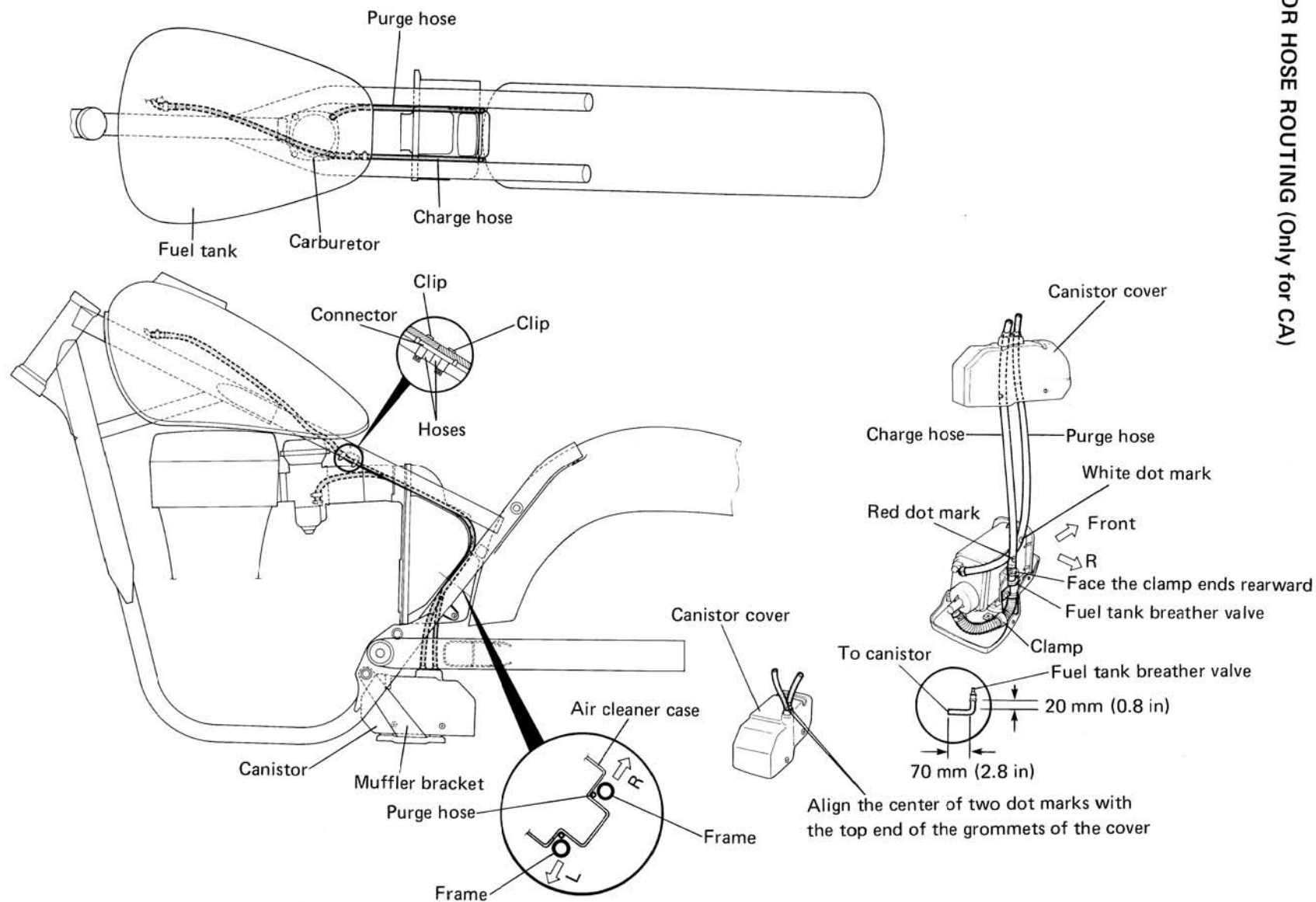
HOSE ROUTING



BRAKE HOSE ROUTING



## VAPOR HOSE ROUTING (Only for CA)



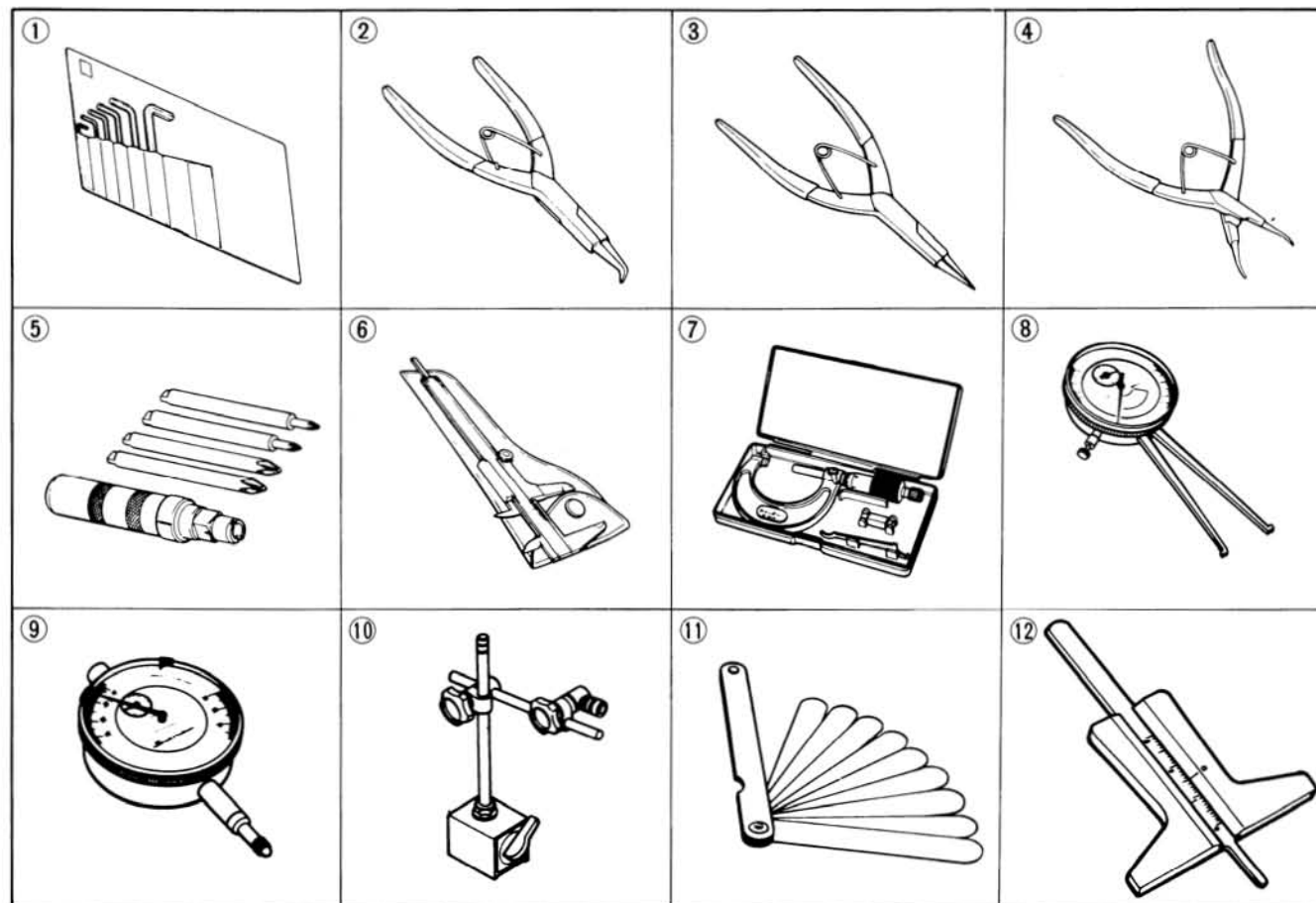


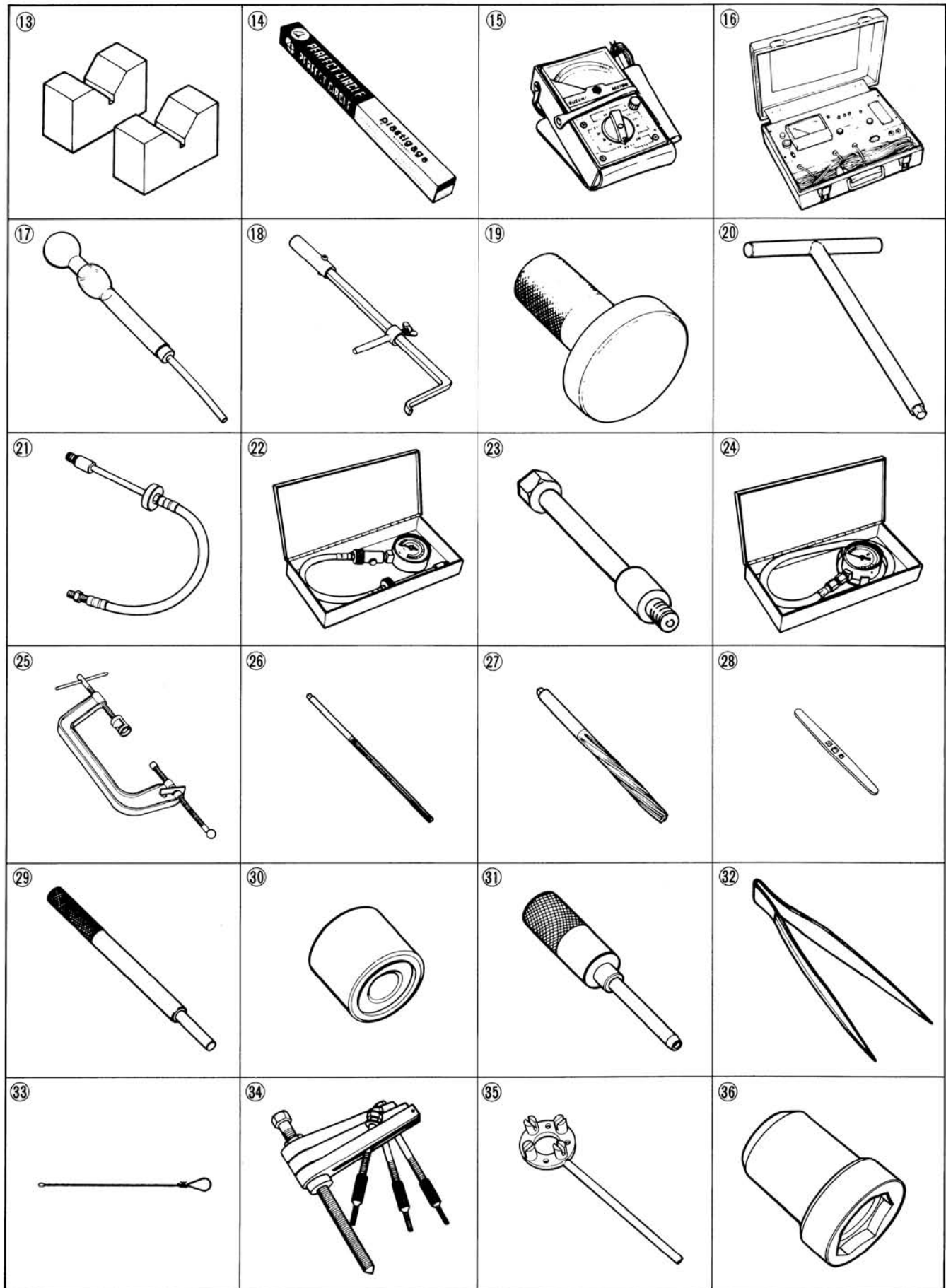
## SPECIAL TOOLS

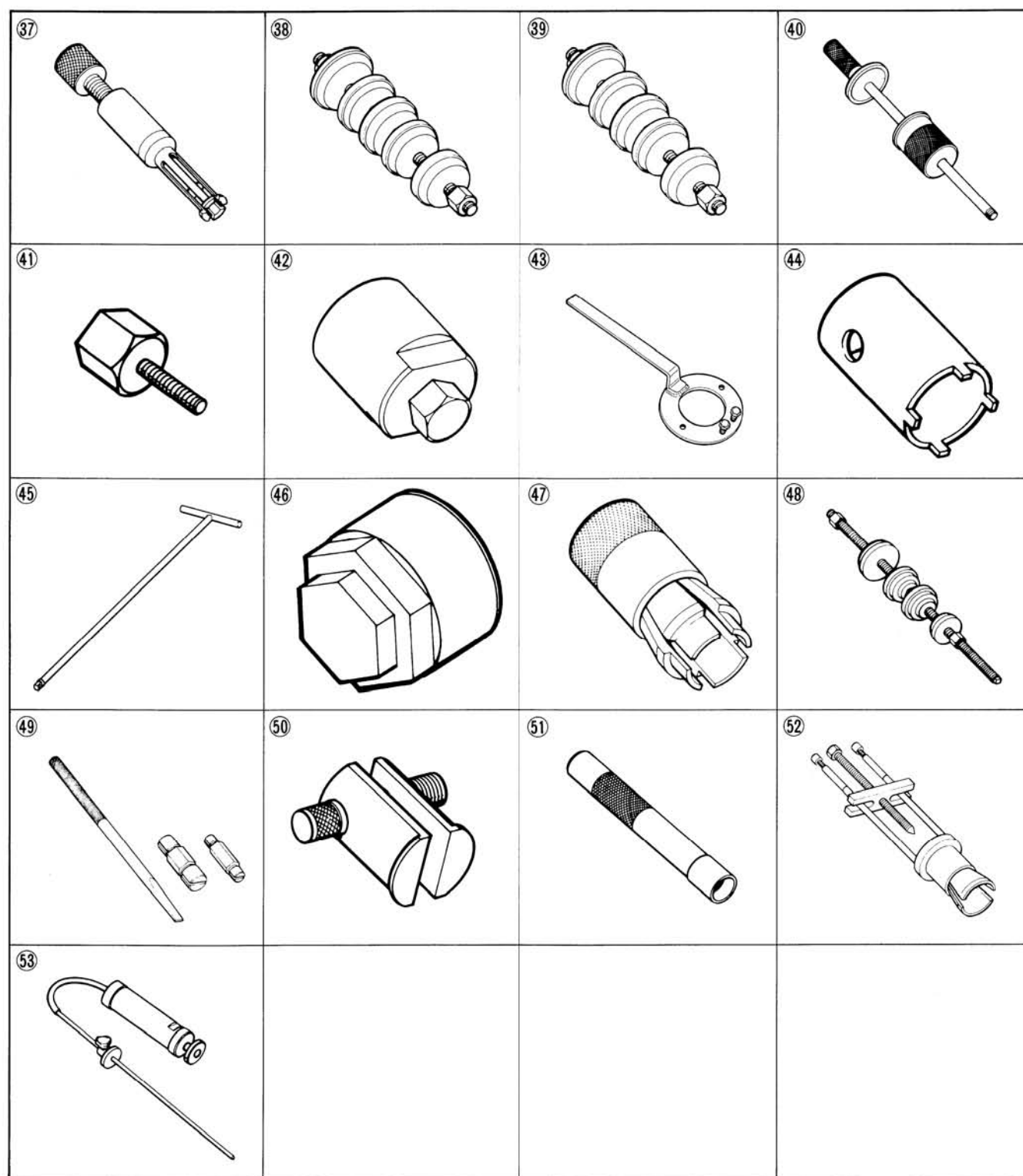
ITEM	PART NO.	PART NAME
①	09900-00401	L type hexagon wrench set
②	09900-06104	Snap ring pliers
③	09900-06107	Snap ring pliers
④	09900-06108	Snap ring pliers
⑤	09900-09003	Impact driver set
⑥	09900-20101	Vernier caliper (150 mm)
⑦	09900-20202	Micrometer (25 – 50 mm)
	09900-20203	Micrometer (50 – 75 mm)
	09900-20205	Micrometer (0 – 25 mm)
⑧	09900-20605	Dial calipers (Not available in U.S.A.)
⑨	09900-20606	Dial gauge (1/100 mm)
⑩	09900-20701	Magnetic stand
⑪	09900-20803	Thickness gauge
⑫	09900-20805	Tire depth gauge
⑬	09900-21304	V-block (100 mm)
⑭	09900-22301	Plastigauge (Not available in U.S.A.)
⑮	09900-25002	Pocket tester
⑯	09900-28106	Electro tester
⑰	09900-28403	Hydrometer
⑱	09913-50121	Oil seal remover
⑲	09913-75520	Bearing installer
⑳	09914-25811	T type hexagon wrench (6 mm)
㉑	09915-63210	Adaptor
㉒	09915-64510	Compression gauge
㉓	09915-72410	Pressure gauge attachment
㉔	09915-74510	Oil pressure gauge
㉕	09916-14510	Valve spring compressor
㉖	09916-34520	7 mm reamer
㉗	09916-34531	12.3 mm reamer
㉘	09916-34541	Reamer handle
㉙	09916-44511	Valve guide remover
㉚	09916-57311	Valve guide installer attachment
㉛	09916-57320	Valve guide installer handle
㉜	09916-84510	Tweezers
㉝	09917-62410	Cam chain tensioner locking tool
㉞	09920-13120	Crankcase separating tool/crankshaft remover
㉟	09920-53722	Clutch sleeve hub holder
㊱	09923-12410	46 mm socket
㊲	09923-73210	Bearing puller
㊳	09924-84510	Bearing installer set
㊴	09924-84520	Bearing installer
㊵	09930-30102	Sliding shaft
㊶	09930-30141	Attachment "A"

## 8-15 SERVICING INFORMATION

ITEM	PART NO.	PART NAME
④②	09930-30720	Rotor remover
④③	09930-32410	Flywheel holder
④④	09940-14911	Steering stem nut socket wrench
④⑤	09940-34520	Fork tool "T"-handle
④⑥	09940-34592	Fork tool attachment "G"
④⑦	09940-50112	Oil seal installer
④⑧	09941-34513	Bearing installer
④⑨	09941-50110	Bearing remover
⑤①	09941-54911	Bearing outer race remover
⑤②	09941-74910	Steering stem bearing installer
⑤③	09941-84510	Bearing inner race remover
⑤④	09943-74111	Fork oil level gauge







## TIGHTENING TORQUE

### ENGINE

ITEM	N·m	kg-m	lb-ft
Cylinder head cover bolt	8 – 12	0.8 – 1.2	6.0 – 8.5
Camshaft sprocket bolt	14 – 16	1.4 – 1.6	10.0 – 11.5
Cylinder head nut 9 mm Diam.	29 – 33	2.9 – 3.3	21.0 – 24.0
Cylinder head nut 8 mm Diam.	23 – 27	2.3 – 2.7	16.5 – 19.5
Cylinder base nut	8 – 12	0.8 – 1.2	6.0 – 8.5
Cam drive chain tensioner set bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
Generator rotor bolt	140 – 160	14.0 – 16.0	101.5 – 115.5
Primary drive gear nut	90 – 110	9.0 – 11.0	65.0 – 79.5
Clutch spring mounting bolt	11 – 13	1.1 – 1.3	8.0 – 9.5
Clutch sleeve hub nut	50 – 70	5.0 – 7.0	36.0 – 50.5
Gearshift arm stopper	15 – 23	1.5 – 2.3	11.0 – 16.5
Oil filter cap nut and oil sump filter cap bolt	6 – 8	0.6 – 0.8	4.5 – 6.0
Engine pulley nut	100 – 130	10.0 – 13.0	72.5 – 94.0
Engine mounting nut (cylinder head)	37 – 45	3.7 – 4.5	27.0 – 32.5
Engine mounting nut	70 – 88	7.0 – 8.8	50.5 – 63.5
Engine mounting bracket bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Exhaust pipe bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
Muffler mounting nut	18 – 28	1.8 – 2.8	13.0 – 20.0
Crankcase bolt 6 mm	9 – 13	0.9 – 1.3	6.5 – 9.5
Oil gallery plug 14 mm	20 – 25	2.0 – 2.5	14.5 – 18.0
Oil gallery plug 10 mm	12 – 18	1.2 – 1.8	8.5 – 13.0
Crankshaft hole plug 36 mm	12 – 18	1.2 – 1.8	8.5 – 13.0
Engine oil drain plug 12 mm	18 – 23	1.8 – 2.3	13.0 – 16.5
Starter clutch Allen bolt	23 – 28	2.3 – 2.8	16.5 – 20.0
Flywheel nut	140 – 160	14.0 – 16.0	101.5 – 115.5
Counter balancer set bolt	40 – 50	4.0 – 5.0	29.0 – 36.0
Crankshaft right end oil seal retainer bolt	5 – 6	0.5 – 0.6	3.5 – 4.5
Cam chain tensioner plate bolt	8 – 12	0.8 – 1.2	6.0 – 8.5
Exhaust rocker arm shaft set bolt	8 – 10	0.8 – 1.0	6.0 – 7.0
Cylinder head cover plug	25 – 30	2.5 – 3.0	18.0 – 21.5
De-comp lever nut	15 – 20	1.5 – 2.0	11.0 – 14.5
Tappet adjuster lock nut	13 – 16	1.3 – 1.6	9.5 – 11.5
Driveshaft oil seal retainer bolt	9 – 13	0.9 – 1.3	6.5 – 9.5

**CHASSIS**

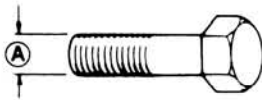
ITEM	N·m	kg-m	lb-ft
Front axle	36 – 52	3.6 – 5.2	26.0 – 37.5
Front axle clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Front fork damper rod bolt	25 – 35	2.5 – 3.5	18.0 – 25.5
Front fork lower clamp bolt	25 – 35	2.5 – 3.5	18.0 – 25.5
Front fork cap bolt	35 – 55	3.5 – 5.5	25.5 – 40.0
Steering stem head nut	30 – 40	3.0 – 4.0	21.5 – 29.0
Handlebar clamp bolt	12 – 20	1.2 – 2.0	8.5 – 14.5
Handlebar holder bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Handlebar holder nut	20 – 30	2.0 – 3.0	14.5 – 21.5
Front brake master cylinder mounting bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
Front brake caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Front brake pad mounting bolt	10 – 15	1.0 – 1.5	7.0 – 11.0
Brake hose union bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
Air bleeder valve	6 – 9	0.6 – 0.9	4.5 – 6.5
Front disc mounting bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
Swingarm pivot nut	50 – 80	5.0 – 8.0	36.0 – 58.0
Front footrest bolt (6 mm)	8 – 12	0.8 – 1.2	6.0 – 8.5
Rear shock absorber mounting nut (Upper & Lower)	20 – 30	2.0 – 3.0	14.5 – 21.5
Rear axle nut	55 – 88	5.5 – 8.8	40.0 – 63.0
Rear pulley plate bolt	9 – 13	0.9 – 1.3	6.5 – 9.5
Rear pulley mounting nut	50 – 70	5.0 – 7.0	36.0 – 50.5
Rear brake cam lever bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
Spoke nipple	4 – 5	0.4 – 0.5	3.0 – 3.5
Muffler stay mounting bolt	28–33	2.8–3.3	20.0–24.0
Front footrest mounting nut	50–80	5.0–8.0	36.0–58.0



## TIGHTENING TORQUE CHART

For other bolts and nuts not listed prescribed, refer to this chart.

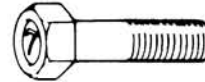
Bolt Diameter Ⓐ (mm)	Conventional or "4" marked bolt			"7" marked bolt		
	N·m	kg·m	lb·ft	N·m	kg·m	lb·ft
4	1.0 – 2.0	0.1 – 0.2	0.7 – 1.5	1.5 – 3.0	0.15 – 0.3	1.0 – 2.0
5	2.0 – 4.0	0.2 – 0.4	1.5 – 3.0	3.0 – 6.0	0.3 – 0.6	2.0 – 4.5
6	4.0 – 7.0	0.4 – 0.7	3.0 – 5.0	8.0 – 12.0	0.8 – 1.2	6.0 – 8.5
8	10.0 – 16.0	1.0 – 1.6	7.0 – 11.5	18.0 – 28.0	1.8 – 2.8	13.0 – 20.0
10	22.0 – 35.0	2.2 – 3.5	16.0 – 25.5	40.0 – 60.0	4.0 – 6.0	29.0 – 43.5
12	35.0 – 55.0	3.5 – 5.5	25.5 – 40.0	70.0 – 100.0	7.0 – 10.0	50.5 – 72.5
14	50.0 – 80.0	5.0 – 8.0	36.0 – 58.0	110.0 – 160.0	11.0 – 16.0	79.5 – 115.5
16	80.0 – 130.0	8.0 – 13.0	58.0 – 94.0	170.0 – 250.0	17.0 – 25.0	123.0 – 181.0
18	130.0 – 190.0	13.0 – 19.0	94.0 – 137.5	200.0 – 280.0	20.0 – 28.0	144.5 – 202.5



Conventional bolt



"4" marked bolt



"7" marked bolt

# SERVICE DATA

## VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 ( 1.3 )	—
	EX.	28 ( 1.1 )	—
Valve lift	IN.	8.5 ( 0.33 )	—
	EX.	8.5 ( 0.33 )	—
Valve clearance (when cold)	IN. & EX.	0.08–0.13 ( 0.003–0.005 )	—
Valve guide to valve stem clearance	IN.	0.025–0.055 ( 0.0010–0.0022 )	0.35 ( 0.014 )
	EX.	0.040–0.070 ( 0.0016–0.0028 )	0.35 ( 0.014 )
Valve guide I.D.	IN. & EX.	7.000–7.015 ( 0.2756–0.2762 )	—
Valve stem O.D.	IN.	6.960–6.975 ( 0.2740–0.2746 )	—
	EX.	6.945–6.960 ( 0.2734–0.2740 )	—
Valve stem runout	IN. & EX.	—	0.05 ( 0.002 )
Valve head thickness	IN. & EX.	—	0.5 ( 0.02 )
Valve stem end length	IN. & EX.	—	2.9 ( 0.11 )
Valve seat width	IN. & EX.	1.0–1.2 ( 0.039–0.047 )	—
Valve head radial runout	IN. & EX.	—	0.03 ( 0.001 )
Valve spring free length (IN. & EX.)	INNER	—	35.6 ( 1.40 )
	OUTER	—	40.4 ( 1.59 )
Valve spring tension (IN. & EX.)	INNER	6.9–8.5 kg ( 15.2–18.7 lbs ) at length 31.0 mm ( 1.2 in )	—
	OUTER	16.4–18.8 kg ( 36.2–41.4 lbs ) at length 33.0 mm ( 1.3 in )	—

## CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174–36.214 ( 1.4242–1.4257 )	35.880 ( 1.4126 )
	EX.	36.419–36.459 ( 1.4338–1.4354 )	36.120 ( 1.4220 )
Camshaft journal oil clearance	0.032–0.066 ( 0.0013–0.0026 )		0.150 ( 0.0060 )

ITEM	STANDARD		LIMIT
Camshaft journal holder I.D.	Left	20.012–20.025 ( 0.7879–0.7884 )	—
	Right & Center	25.012–25.025 ( 0.9847–0.9852 )	—
Camshaft journal O.D.	Left	19.959–19.976 ( 0.7858–0.7865 )	—
	Right & Center	24.959–24.976 ( 0.9826–0.9833 )	—
Camshaft runout	IN. & EX.	—	0.10 ( 0.004 )
Cam chain 20-pitch length	—		128.9 ( 5.07 )
Rocker arm I.D.	IN. & EX.	12.000–12.018 ( 0.4724–0.4731 )	—
Rocker arm shaft O.D.	IN. & EX.	11.966–11.984 ( 0.4711–0.4718 )	—
Cylinder head distortion	—		0.05 ( 0.002 )
Cylinder head cover distortion	—		0.05 ( 0.002 )
De-comp. cable play	3–5 ( 0.12–0.20 )		—

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD			LIMIT
Compression pressure	1 000–1 400 kPa ( 10–14 kg/cm <sup>2</sup> ) ( 142–200 psi )			800 kPa ( 8 kg/cm <sup>2</sup> ) ( 114 psi )
Piston to cylinder clearance	0.050–0.060 ( 0.0020–0.0024 )			0.120 ( 0.0047 )
Cylinder bore	94.000–94.015 ( 3.7008–3.7014 )			94.080 ( 3.7039 )
Piston diam.	93.945–93.960 ( 3.6986–3.6992 ) Measure at 20 mm (0.8 in) from the skirt end.			93.880 ( 3.6961 )
Cylinder distortion	—			0.05 ( 0.002 )
Piston ring free end gap	1st	T	Approx. 11.5 ( 0.45 )	9.2 ( 0.36 )
	2nd	T	Approx. 14.0 ( 0.55 )	11.2 ( 0.44 )
Piston ring end gap	1st	0.30–0.45 ( 0.012–0.018 )		1.00 ( 0.039 )
	2nd	0.25–0.40 ( 0.010–0.016 )		1.00 ( 0.039 )
Piston ring to groove clearance	1st	—		0.18 ( 0.007 )
	2nd	—		0.15 ( 0.006 )

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23–1.25 ( 0.0484–0.0492 )	—
	2nd	1.21–1.23 ( 0.0476–0.0484 )	—
	Oil	2.81–2.83 ( 0.1106–0.1114 )	—
Piston ring thickness	1st	1.175–1.190 ( 0.0463–0.0469 )	—
	2nd	1.175–1.190 ( 0.0463–0.0469 )	—
Piston pin bore	23.000–23.006 ( 0.9055–0.9057 )		23.030 ( 0.9067 )
Piston pin O.D.	22.996–23.000 ( 0.9054–0.9055 )		22.980 ( 0.9047 )

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006–23.014 ( 0.9057–0.9061 )	23.040 ( 0.9071 )
Conrod deflection	—	3.0 ( 0.12 )
Conrod big end side clearance	0.10–0.65 ( 0.004–0.026 )	1.0 ( 0.039 )
Conrod big end width	24.95–25.00 ( 0.982–0.984 )	—
Crank web to web width	70.0 ± 0.1 ( 2.756 ± 0.004 )	—
Crankshaft runout	—	0.05 ( 0.002 )
Balancer spring free length	—	10.0 ( 0.39 )

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 ( 68/36 × 35/30 )	—
Oil pressure (at 60°C, 140°F)	Above 50 kPa ( 0.50 kg/cm <sup>2</sup> , 7.1 psi ) Below 75 kPa ( 0.75 kg/cm <sup>2</sup> , 10.7 psi ) at 3 000 r/min.	—

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch cable play	3 ( 0.12 )	—
Drive plate thickness	No.1 2.92–3.08 ( 0.115–0.121 )	2.62 ( 0.103 )
	No.2 3.45–3.55 ( 0.136–0.140 )	3.15 ( 0.124 )
Drive plate claw width	No.1 15.8–16.0 ( 0.622–0.630 )	15.0 ( 0.591 )
	No.2 15.9–16.0 ( 0.626–0.630 )	15.1 ( 0.594 )

ITEM	STANDARD	LIMIT
Driven plate distortion	—	0.1 ( 0.004 )
Clutch spring free length	—	33.0 ( 1.30 )

**TRANSMISSION + DRIVE BELT**

Unit: mm (in) Except ratio

ITEM	STANDARD	LIMIT
Primary reduction ratio	1.888 ( 68/36 )	—
Final reduction ratio	2.956 ( 68/23 )	—
Gear ratios	Low	2.214 ( 31/14 )
	2nd	1.500 ( 27/18 )
	3rd	1.095 ( 23/21 )
	Top	0.875 ( 21/24 )
Shift fork to groove clearance	0.10–0.30 ( 0.004–0.012 )	0.50 ( 0.020 )
Shift fork groove width	2nd drive gear	5.50–5.60 ( 0.217–0.220 )
	3rd driven gear	5.50–5.60 ( 0.217–0.220 )
Shift fork thickness	No.1 & No.2	5.30–5.40 ( 0.209–0.213 )
Drive belt	Type	BANDO: 133U-14M 40.0
	Number of teeth	133
Gearshift lever height	60 ( 2.4 )	—

**CARBURETOR**

ITEM	SPECIFICATION	
	For U.S.A.	For CA
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm ( 1.57 in )	←
I.D. No.	24B00	24B20
Idle r/min.	1 000–1 200 r/min.	←
Fuel level	7 ± 0.5 mm ( 0.276 ± 0.02 in )	←
Float height	27.95 ± 1.0 mm ( 1.10 ± 0.04 in )	←
Main jet (M.J.)	#155	←
Main air jet (M.A.J.)	0.6 mm	←
Jet needle (J.N.)	5C17	←
Needle jet (N.J.)	X-5	←
Throttle valve (Th.V.)	#125	←
Pilot jet (P.J.)	#47.5	←

ITEM	SPECIFICATION	
	For U.S.A.	For CA
By-pass (B.P.)	1.1, 1.1, 1.1 mm	←
Pilot outlet (P.O.)	1.3 mm	←
Valve seat (V.S.)	2.8 mm	←
Starter jet (G.S.)	#22.5	←
Pilot screw (P.S.)	PRE-SET ( 3.0 )	←
Pilot air jet 1 (P.A.J.1)	#67.5	←
Pilot air jet 2 (P.A.J.2)	2.0 mm	←
Throttle cable play	0.5—1.0 mm ( 0.02—0.04 in )	←

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION	NOTE
Ignition timing		5° ± 2° B.T.D.C. at 2 000 r/min. and 30° ± 2° B.T.D.C. at 4 000 r/min.	
Spark plug	Type	N.D.: DP8EA-9 NGK: X24EP-U9	
	Gap	0.8—0.9 ( 0.031—0.035 )	
Spark performance		Over 8 (0.3) at 1 atm.	
Solenoid resistance		0.1—1.0 Ω	—
Pick-up coil resistance		220 ± 44Ω	
Ignition coil resistance	Primary	1—7 Ω	Plug cap— Ground
	Secondary	10—25 kΩ	
Generator no-load voltage		More than 100 V (AC) at 5 000 r/min.	
Regulated voltage		14.0—15.5 V at 5 000 r/min.	
Starter motor brush length	Limit:	9 ( 0.35 )	
	commutator under-cut	Limit: 0.2 ( 0.008 )	
Starter relay resistance		2—6 Ω	
Battery	Type designation	FB14L-B2	
	Voltage	12 V	
	Capacity	50.4 kC (14 Ah)/10 HR	
	Standard electrolyte S.G.	1.28 at 20°C (68°F)	
Fuse size		20 A	

**WATTAGE**

Unit: W

ITEM		SPECIFICATION
Headlight	HI	60
	LO	55
Tail/Brake light		8/23
Turn signal light		23



ITEM	SPECIFICATION
Speedometer light	3
Turn signal indicator light	3
High beam indicator light	1.7
Neutral indicator light	3
Side stand check light	3
License light	8
Front position light	8

**BRAKE + WHEEL**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20–30 ( 0.8–1.2 )		—
Rear brake pedal height	60 ( 2.4 )		—
Brake drum I.D.	Rear	—	160.7 ( 6.33 )
Brake lining thickness	Rear	—	1.5 ( 0.06 )
Brake disc thickness	Front	$4.5 \pm 0.2$ ( $0.18 \pm 0.01$ )	4.0 ( 0.16 )
Brake disc runout	Front	—	0.30 ( 0.012 )
Master cylinder bore	Front	12.700–12.743 ( 0.4999–0.5017 )	—
Master cylinder piston diam.	Front	12.657–12.684 ( 0.4983–0.4994 )	—
Brake caliper cylinder bore	Front	42.850–42.926 ( 1.6870–1.6900 )	—
Brake caliper piston diam.	Front	42.770–42.820 ( 1.6839–1.6858 )	—
Wheel rim runout	Axial	—	2.0 ( 0.08 )
	Radial	—	2.0 ( 0.08 )
Wheel axle runout	Front	—	0.25 ( 0.010 )
	Rear	—	0.25 ( 0.010 )
Tire size	Front	100/90-19 57H	—
	Rear	140/80-15 67H	—
Tire tread depth	Front	—	1.6 ( 0.06 )
	Rear	—	2.0 ( 0.08 )

**SUSPENSION**

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 ( 5.5 )	—	
Front fork spring free length	—	392.5 ( 15.45 )	
Front fork oil level	75.0 ( 2.95 )	—	
Rear wheel travel	80 ( 3.1 )	—	
Swingarm pivot shaft runout	—	0.3 ( 0.001 )	

**TIRE PRESSURE**

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm <sup>2</sup>	psi	kPa	kg/cm <sup>2</sup>	psi
FRONT	200	2.00	28	200	2.00	28
REAR	225	2.25	32	250	2.50	36

**FUEL + OIL**

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded or low-lead type gasoline of at least 85-95 pump octane ( <sup>R+M</sup> / <sub>2</sub> method) or 89 octane or higher rated by the Research Method.		
Fuel tank including reserve	9.5 L ( 2.51 US gal )		
reserve	2.5 L ( 2.6 US qt )		
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	1 800 ml ( 1.9 US qt )	
	Filter change	2 400 ml ( 2.5 US qt )	
	Overhaul	2 400 ml ( 2.5 US qt )	
Front fork oil type	Fork oil #15		
Front fork oil capacity (each leg)	441 ml ( 14.91 US oz )		
Brake fluid type	DOT3 or DOT4		

*This section describes the '87-model service data and servicing procedures which differ from those of the LS650G('86-model).*

**NOTE:**

*Refer to the section 1 through 8 for details which are not given in this section.*

## CONTENTS

<b>SPECIFICATIONS</b> .....	<b>9- 1</b>
<b>SERVICE DATA</b> .....	<b>9- 2</b>
<b>TIGHTENING TORQUE</b> .....	<b>9- 9</b>
<b>ELECTRICAL SYSTEM</b> .....	<b>9-11</b>
<b>COMBINATION METER</b> .....	<b>9-11</b>
<b>SIDE-STAND/ IGNITION INTERLOCK SYSTEM</b> .....	<b>9-12</b>
<b>WIRING DIAGRAM</b> .....	<b>9-15</b>
<b>HARNESS ROUTING</b> .....	<b>9-16</b>
<b>APPENDIX</b> .....	<b>9-18</b>

## SPECIFICATIONS

### DIMENSIONS AND DRY MASS

Overall length	2180 mm (85.8 in)
Overall width	760 mm (29.9 in)
Overall height	1130 mm (44.5 in)
Wheelbase	1485 mm (58.5 in)
Ground clearance	130 mm (5.1 in)
Dry mass	161 kg (355 lbs)

### ENGINE

Type	Four-stroke, air-cooled, OHC, TSCC
Number of cylinders	1
Bore	94.0 mm (3.70 in)
Stroke	94.0 mm (3.70 in)
Piston displacement	652 cm <sup>3</sup> (39.8 cu. in)
Compression ratio	8.5 : 1
Carburetor	MIKUNI BS40SS, Single
Air cleaner	Polyester fiber element
Starter system	Electric
Lubrication system	Wet sump

### TRANSMISSION

Clutch	Wet multi-plate type
Transmission	4-speed constant mesh
Gearshift pattern	1-down, 3-up
Primary reduction	1.888 (68/36)
Final reduction	2.956 (68/23)
Gear ratios, Low	2.214 (31/14)
2nd	1.500 (27/18)
3rd	1.095 (23/21)
Top	0.875 (21/24)
Final drive	Belt drive

### CHASSIS

Front suspension	Telescopic, coil spring, oil damped
Rear suspension	Swinging arm, oil damped, spring pre-load 5-way adjustable

Steering angle	42° (right & left)
Caster	55°
Trail	147 mm (5.8 in)
Turning radius	2.6 m (8.5 in)
Front brake	Disc brake, hydraulically operated
Rear brake	Internal expanding
Front tire size	100/90-19 57H
Rear tire size	140/80-15 67H
Front fork stroke	140 mm (5.5 in)
Rear wheel travel	80 mm (3.1 in)

### ELECTRICAL

Ignition type	Transistorized
Ignition timing	5° B.T.D.C. below 2000 r/min and 30° B.T.D.C. above 4000 r/min
Spark plug	N.G.K.: DP8EA-9 N.D.: X24EP-U9
Battery	12V 50.4 kC (14 Ah)/10HR
Generator	Three phase A.C. generator
Fuse	20A

### CAPACITIES

Fuel tank including reserve	9.5 L (2.51 US gal)
reserve	2.5 L (2.64 US qt)
Engine oil without filter change	1800 ml (1.9 US qt)
Front fork oil	447 ml (15.1 US oz)
Spacer L: 135 mm	

These specifications are subject to change without notice.

## SERVICE DATA

### VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 ( 1.3 )	—
	EX.	28 ( 1.1 )	—
Valve lift	IN.	8.5 ( 0.33 )	—
	EX.	8.5 ( 0.33 )	—
Valve clearance (when cold)	IN. & EX.	0.08—0.13 ( 0.003—0.005 )	—
Valve guide to valve stem clearance	IN.	0.025—0.055 ( 0.0010—0.0022 )	0.35 ( 0.014 )
	EX.	0.040—0.070 ( 0.0016—0.0028 )	0.35 ( 0.014 )
Valve guide I.D.	IN. & EX.	7.000—7.015 ( 0.2756—0.2762 )	—
Valve stem O.D.	IN.	6.960—6.975 ( 0.2740—0.2746 )	—
	EX.	6.945—6.960 ( 0.2734—0.2740 )	—
Valve stem runout	IN. & EX.	—	0.05 ( 0.002 )
Valve head thickness	IN. & EX.	—	0.5 ( 0.02 )
Valve stem end length	IN. & EX.	—	2.9 ( 0.11 )
Valve seat width	IN. & EX.	1.0—1.2 ( 0.039—0.047 )	—
Valve head radial runout	IN. & EX.	—	0.03 ( 0.001 )
Valve spring free length (IN. & EX.)	INNER	—	35.6 ( 1.40 )
	OUTER	—	40.4 ( 1.59 )
Valve spring tension (IN. & EX.)	INNER	6.9—8.5 kg ( 15.2—18.7 lbs ) at length 31.0 mm ( 1.2 in )	—
	OUTER	16.4—18.8 kg ( 36.2—41.4 lbs ) at length 33.0 mm ( 1.3 in )	—

### CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174—36.214 ( 1.4242—1.4257 )	35.880 ( 1.4126 )
	EX.	36.419—36.459 ( 1.4338—1.4354 )	36.120 ( 1.4220 )
Camshaft journal oil clearance	0.032—0.066 ( 0.0013—0.0026 )		0.150 ( 0.0060 )

ITEM	STANDARD		LIMIT
Camshaft journal holder I.D.	Left	20.012–20.025 ( 0.7879–0.7884 )	—
	Right & Center	25.012–25.025 ( 0.9847–0.9852 )	—
Camshaft journal O.D.	Left	19.959–19.976 ( 0.7858–0.7865 )	—
	Right & Center	24.959–24.976 ( 0.9826–0.9833 )	—
Camshaft runout	—		0.10 ( 0.004 )
Cam chain 20-pitch length	—		128.9 ( 5.07 )
Rocker arm I.D.	IN. & EX.	12.000–12.018 ( 0.4724–0.4731 )	—
Rocker arm shaft O.D.	IN. & EX.	11.966–11.984 ( 0.4711–0.4718 )	—
Cylinder head distortion	—		0.05 ( 0.002 )
Cylinder head cover distortion	—		0.05 ( 0.002 )
De-comp. cable play	3–5 ( 0.12–0.20 )		—

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD			LIMIT
Compression pressure	1 000–1 400 kPa ( 10–14 kg/cm <sup>2</sup> ) ( 142–200 psi )			800 kPa ( 8 kg/cm <sup>2</sup> ) ( 114 psi )
Piston to cylinder clearance	0.050–0.060 ( 0.0020–0.0024 )			0.120 ( 0.0047 )
Cylinder bore	94.000–94.015 ( 3.7008–3.7014 )			94.080 ( 3.7039 )
Piston diam.	93.945–93.960 ( 3.6986–3.6992 ) Measure at 20 mm (0.8 in) from the skirt end.			93.880 ( 3.6961 )
Cylinder distortion	—			0.05 ( 0.002 )
Piston ring free end gap	1st	T	Approx. 11.5 ( 0.45 )	9.2 ( 0.36 )
	2nd	T	Approx. 14.0 ( 0.55 )	11.2 ( 0.44 )
Piston ring end gap	1st	0.30–0.45 ( 0.012–0.018 )		1.00 ( 0.039 )
	2nd	0.25–0.40 ( 0.010–0.016 )		1.00 ( 0.039 )
Piston ring to groove clearance	1st	—		0.18 ( 0.007 )
	2nd	—		0.15 ( 0.006 )



ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23–1.25 ( 0.0484–0.0492 )	—
	2nd	1.21–1.23 ( 0.0476–0.0484 )	—
	Oil	2.81–2.83 ( 0.1106–0.1114 )	—
Piston ring thickness	1st	1.175–1.190 ( 0.0463–0.0469 )	—
	2nd	1.175–1.190 ( 0.0463–0.0469 )	—
Piston pin bore	23.000–23.006 ( 0.9055–0.9057 )		23.030 ( 0.9067 )
Piston pin O.D.	22.996–23.000 ( 0.9054–0.9055 )		22.980 ( 0.9047 )

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006–23.014 ( 0.9057–0.9061 )	23.040 ( 0.9071 )
Conrod deflection	—	3.0 ( 0.12 )
Conrod big end side clearance	0.10–0.65 ( 0.004–0.026 )	1.0 ( 0.039 )
Conrod big end width	24.95–25.00 ( 0.982–0.984 )	—
Crank web to web width	70.0 ± 0.1 ( 2.756 ± 0.004 )	—
Crankshaft runout	—	0.05 ( 0.002 )
Balancer spring free length	—	10.0 ( 0.39 )

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 ( 68/36 × 35/30 )	—
Oil pressure (at 60°C, 140°F)	Above 50 kPa ( 0.50 kg/cm <sup>2</sup> , 7.1 psi ) Below 75 kPa ( 0.75 kg/cm <sup>2</sup> , 10.7 psi ) at 3 000 r/min.	—

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch cable play	3 ( 0.12 )	—
Drive plate thickness	No.1 2.92–3.08 ( 0.115–0.121 )	2.62 ( 0.103 )
	No.2 3.45–3.55 ( 0.136–0.140 )	3.15 ( 0.124 )
Drive plate claw width	No.1 15.8–16.0 ( 0.622–0.630 )	15.0 ( 0.591 )
	No.2 15.9–16.0 ( 0.626–0.630 )	15.1 ( 0.594 )

ITEM	STANDARD	LIMIT
Driven plate distortion	—	0.1 ( 0.004 )
Clutch spring free length	—	33.0 ( 1.30 )

**TRANSMISSION + DRIVE BELT**

Unit: mm (in) Except ratio

ITEM	STANDARD	LIMIT
Primary reduction ratio	1.888 ( 68/36 )	—
Final reduction ratio	2.956 ( 68/23 )	—
Gear ratios	Low	2.214 ( 31/14 )
	2nd	1.500 ( 27/18 )
	3rd	1.095 ( 23/21 )
	Top	0.875 ( 21/24 )
Shift fork to groove clearance	0.10–0.30 ( 0.004–0.012 )	0.50 ( 0.020 )
Shift fork groove width	2nd drive gear	5.50–5.60 ( 0.217–0.220 )
	3rd driven gear	5.50–5.60 ( 0.217–0.220 )
Shift fork thickness	No.1 & No.2	5.30–5.40 ( 0.209–0.213 )
Drive belt	Type	BANDO: 133U-14M 40.0
	Number of teeth	133
Gearshift lever height	60 ( 2.4 )	—

**CARBURETOR**

ITEM	SPECIFICATION	
	For U.S.A.	For CA
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm ( 1.57 in )	←
I.D. No.	24B00	24B20
Idle r/min.	1 000–1 200 r/min.	←
Fuel level	7 ± 0.5 mm ( 0.276 ± 0.02 in )	←
Float height	27.95 ± 1.0 mm ( 1.10 ± 0.04 in )	←
Main jet (M.J.)	#155	←
Main air jet (M.A.J.)	0.6 mm	←
Jet needle (J.N.)	5C17	←
Needle jet (N.J.)	X-B	←
Throttle valve (Th.V.)	#125	←
Pilot jet (P.J.)	#47.5	←

ITEM	SPECIFICATION	
	For U.S.A.	For CA
By-pass (B.P.)	1.1, 1.1, 1.1 mm	←
Pilot outlet (P.O.)	1.3 mm	←
Valve seat (V.S.)	2.8 mm	←
Starter jet (G.S.)	#22.5	←
Pilot screw (P.S.)	PRE-SET ( 3.0 )	←
Pilot air jet 1 (P.A.J.1)	#67.5	←
Pilot air jet 2 (P.A.J.2)	2.0 mm	←
Throttle cable play	0.5–1.0 mm ( 0.02–0.04 in )	←

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION	NOTE
Ignition timing		5° ± 2° B.T.D.C. at 2 000 r/min. and 30° ± 2° B.T.D.C. at 4 000 r/min.	
Spark plug	Type	N.D.: DP8EA-9 NGK: X24EP-U9	
	Gap	0.8–0.9 ( 0.031–0.035 )	
Spark performance		Over 8 (0.3) at 1 atm.	
Solenoid resistance		0.1–1.0 Ω	—
Pick-up coil resistance		170–270 Ω	O–G
Ignition coil resistance	Primary	1–7 Ω	O/W–Ground
	Secondary	10–25 kΩ	Plug cap–Ground
Generator no-load voltage		More than 100 V (AC) at 5 000 r/min.	
Regulated voltage		14.0–15.5 V at 5 000 r/min.	
Starter motor brush length	Limit:	9 ( 0.35 )	
	Limit:	0.2 ( 0.008 )	
Starter relay resistance		2–6 Ω	
Battery	Type designation	FB14L-B2	
	Voltage	12 V	
	Capacity	50.4 kC (14 Ah)/10 HR	
	Standard electrolyte S.G.	1.28 at 20°C (68°F)	
Fuse size		20 A	

**WATTAGE**

Unit: W

ITEM		SPECIFICATION
Headlight	HI	60
	LO	55
Tail/Brake light		8/23
Turn signal light		23

ITEM	SPECIFICATION
Speedometer light	3
Turn signal indicator light	3
High beam indicator light	1.7
Neutral indicator light	3
License light	8
Front position light	8

**BRAKE + WHEEL**

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal free travel		20–30 ( 0.8–1.2 )	—
Rear brake pedal height		60 ( 2.4 )	—
Brake drum I.D.	Rear	—	160.7 ( 6.33 )
Brake lining thickness	Rear	—	1.5 ( 0.06 )
Brake disc thickness	Front	$4.5 \pm 0.2$ ( $0.18 \pm 0.01$ )	4.0 ( 0.16 )
Brake disc runout	Front	—	0.30 ( 0.012 )
Master cylinder bore	Front	12.700–12.743 ( 0.4999–0.5017 )	—
Master cylinder piston diam.	Front	12.657–12.684 ( 0.4983–0.4994 )	—
Brake caliper cylinder bore	Front	42.850–42.926 ( 1.6870–1.6900 )	—
Brake caliper piston diam.	Front	42.770–42.820 ( 1.6839–1.6858 )	—
Wheel rim runout	Axial	—	2.0 ( 0.08 )
	Radial	—	2.0 ( 0.08 )
Wheel axle runout	Front	—	0.25 ( 0.010 )
	Rear	—	0.25 ( 0.010 )
Tire size	Front	100/90-19 57H	—
	Rear	140/80-15 67H	—
Tire tread depth	Front	—	1.6 ( 0.06 )
	Rear	—	2.0 ( 0.08 )

**SUSPENSION**

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 ( 5.5 )	—	
Front fork spring free length	—	392.5 ( 15.45 )	
Front fork oil level	75.0 ( 2.95 )	—	
Rear wheel travel	80 ( 3.1 )	—	
Swingarm pivot shaft runout	—	0.3 ( 0.001 )	

**TIRE PRESSURE**

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm <sup>2</sup>	psi	kPa	kg/cm <sup>2</sup>	psi
FRONT	200	2.00	28	200	2.00	28
REAR	225	2.25	32	250	2.50	36

**FUEL + OIL**

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded or low-lead type gasoline of at least 85-95 pump octane ( $\frac{R+M}{2}$ method) or 89 octane or higher rated by the Research Method.		
Fuel tank including reserve	9.5 L ( 2.51 US gal )		
reserve	2.5 L ( 2.6 US qt )		
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	1 800 ml ( 1.9 US qt )	
	Filter change	2 400 ml ( 2.5 US qt )	
	Overhaul	2 400 ml ( 2.5 US qt )	
Front fork oil type	Fork oil #15		
Front fork oil capacity (each leg)	447 ml ( 15.11 US oz )		Spacer L:135mm
Brake fluid type	DOT3 or DOT4		

## TIGHTENING TORQUE

### ENGINE

ITEM	N-m	kg-m	lb-ft
Cylinder head cover bolt	8 – 12	0.8 – 1.2	6.0 – 8.5
Camshaft sprocket bolt	14 – 16	1.4 – 1.6	10.0 – 11.5
Cylinder head nut 9 mm Diam.	29 – 33	2.9 – 3.3	21.0 – 24.0
Cylinder head nut 8 mm Diam.	23 – 27	2.3 – 2.7	16.5 – 19.5
Cylinder base nut	8 – 12	0.8 – 1.2	6.0 – 8.5
Cam drive chain tensioner set bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
Generator rotor bolt	140 – 160	14.0 – 16.0	101.5 – 115.5
Primary drive gear nut	90 – 110	9.0 – 11.0	65.0 – 79.5
Clutch spring mounting bolt	11 – 13	1.1 – 1.3	8.0 – 9.5
Clutch sleeve hub nut	50 – 70	5.0 – 7.0	36.0 – 50.5
Gearshift arm stopper	15 – 23	1.5 – 2.3	11.0 – 16.5
Oil filter cap nut and oil sump filter cap bolt	6 – 8	0.6 – 0.8	4.5 – 6.0
Engine pulley nut	100 – 130	10.0 – 13.0	72.5 – 94.0
Engine mounting nut (cylinder head)	37 – 45	3.7 – 4.5	27.0 – 32.5
Engine mounting nut	70 – 88	7.0 – 8.8	50.5 – 63.5
Engine mounting bracket bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Exhaust pipe bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
Muffler mounting nut	18 – 28	1.8 – 2.8	13.0 – 20.0
Crankcase bolt 6 mm	9 – 13	0.9 – 1.3	6.5 – 9.5
Oil gallery plug 14 mm	20 – 25	2.0 – 2.5	14.5 – 18.0
Oil gallery plug 10 mm	12 – 18	1.2 – 1.8	8.5 – 13.0
Crankshaft hole plug 36 mm	12 – 18	1.2 – 1.8	8.5 – 13.0
Engine oil drain plug 12 mm	18 – 23	1.8 – 2.3	13.0 – 16.5
Starter clutch Allen bolt	23 – 28	2.3 – 2.8	16.5 – 20.0
Flywheel nut	140 – 160	14.0 – 16.0	101.5 – 115.5
Counter balancer set bolt	40 – 50	4.0 – 5.0	29.0 – 36.0
Crankshaft right end oil seal retainer bolt	5 – 6	0.5 – 0.6	3.5 – 4.5
Cam chain tensioner plate bolt	8 – 12	0.8 – 1.2	6.0 – 8.5
Exhaust rocker arm shaft set bolt	8 – 10	0.8 – 1.0	6.0 – 7.0
Cylinder head cover plug	25 – 30	2.5 – 3.0	18.0 – 21.5
De-comp lever nut	15 – 20	1.5 – 2.0	11.0 – 14.5
Tappet adjuster lock nut	13 – 16	1.3 – 1.6	9.5 – 11.5
Driveshaft oil seal retainer bolt	9 – 13	0.9 – 1.3	6.5 – 9.5



**CHASSIS**

ITEM	N·m	kg-m	lb-ft
Front axle	36 – 52	3.6 – 5.2	26.0 – 37.5
Front axle clamp bolt	15 – 25	1.5 – 2.5	11.0 – 18.0
Front fork damper rod bolt	25 – 35	2.5 – 3.5	18.0 – 25.5
Front fork lower clamp bolt	25 – 35	2.5 – 3.5	18.0 – 25.5
Front fork cap bolt	35 – 55	3.5 – 5.5	25.5 – 40.0
Steering stem head nut	30 – 40	3.0 – 4.0	21.5 – 29.0
Handlebar clamp bolt	12 – 20	1.2 – 2.0	8.5 – 14.5
Handlebar holder bolt	20 – 30	2.0 – 3.0	14.5 – 21.5
Handlebar holder nut	20 – 30	2.0 – 3.0	14.5 – 21.5
Front brake master cylinder mounting bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
Front brake caliper mounting bolt	25 – 40	2.5 – 4.0	18.0 – 29.0
Front brake pad mounting bolt	10 – 15	1.0 – 1.5	7.0 – 11.0
Brake hose union bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
Air bleeder valve	6 – 9	0.6 – 0.9	4.5 – 6.5
Front disc mounting bolt	18 – 28	1.8 – 2.8	13.0 – 20.0
Swingarm pivot nut	50 – 80	5.0 – 8.0	36.0 – 58.0
Front footrest bolt (6 mm)	8 – 12	0.8 – 1.2	6.0 – 8.5
Rear shock absorber mounting nut (Upper & Lower)	20 – 30	2.0 – 3.0	14.5 – 21.5
Rear axle nut	55 – 88	5.5 – 8.8	40.0 – 63.0
Rear pulley mounting nut	50 – 70	5.0 – 7.0	36.0 – 50.0
Rear pulley plate bolt	9 – 13	0.9 – 1.3	6.5 – 9.5
Rear brake cam lever bolt	5 – 8	0.5 – 0.8	3.5 – 6.0
Spoke nipple	4 – 5	0.4 – 0.5	3.0 – 3.5
Muffler stay mounting bolt	28 – 33	2.8 – 3.3	20.0 – 24.0
Front footrest mounting nut	50 – 80	5.0 – 8.0	36.0 – 58.0

## ELECTRICAL SYSTEM

### COMBINATION METER INSPECTION

Using the pocket tester, check the continuity between lead wires in the following diagram.

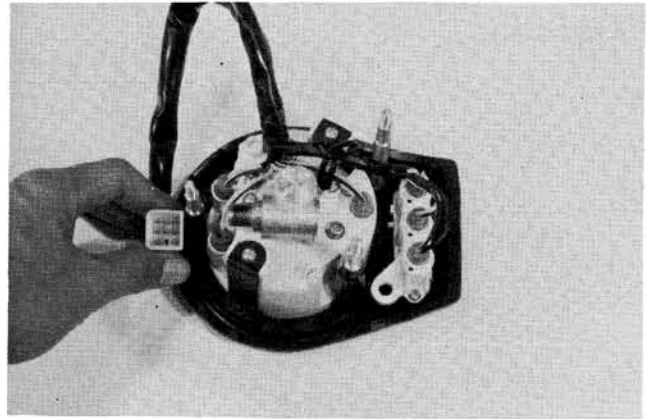
If the continuity measured is incorrect, replace the respective parts.

09900-25002

Pocket tester

**NOTE:**

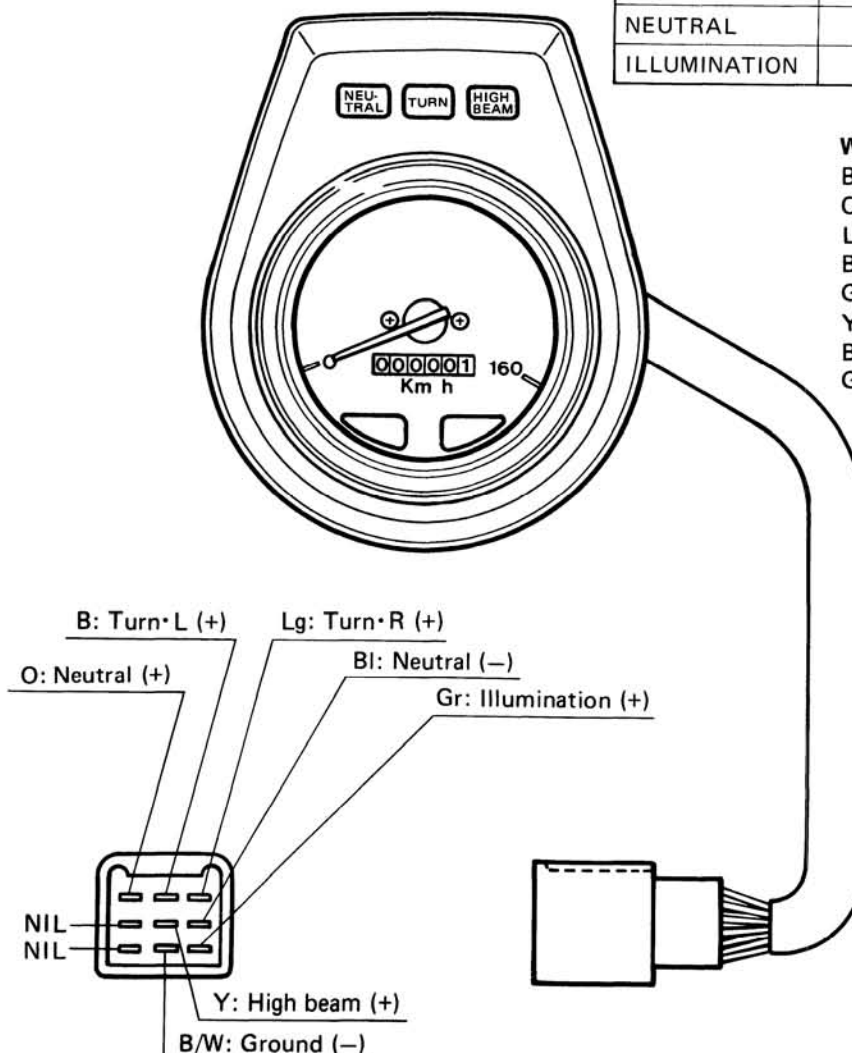
When making this test, it is not necessary to remove the combination meter.



ITEM	⊕ Probe to	⊖ Probe to
TURN (R)	Lg	B/W
TURN (L)	B	B/W
HIGH BEAM	Y	B/W
NEUTRAL	O	BI
ILLUMINATION	Gr	B/W

**WIRE COLOR**

B: Black  
 O: Orange  
 Lg: Light green  
 BI: Blue  
 Gr: Gray  
 Y: Yellow  
 B/W: Black/White  
 G/W: Green/White



## SIDE-STAND/IGNITION INTERLOCK SYSTEM

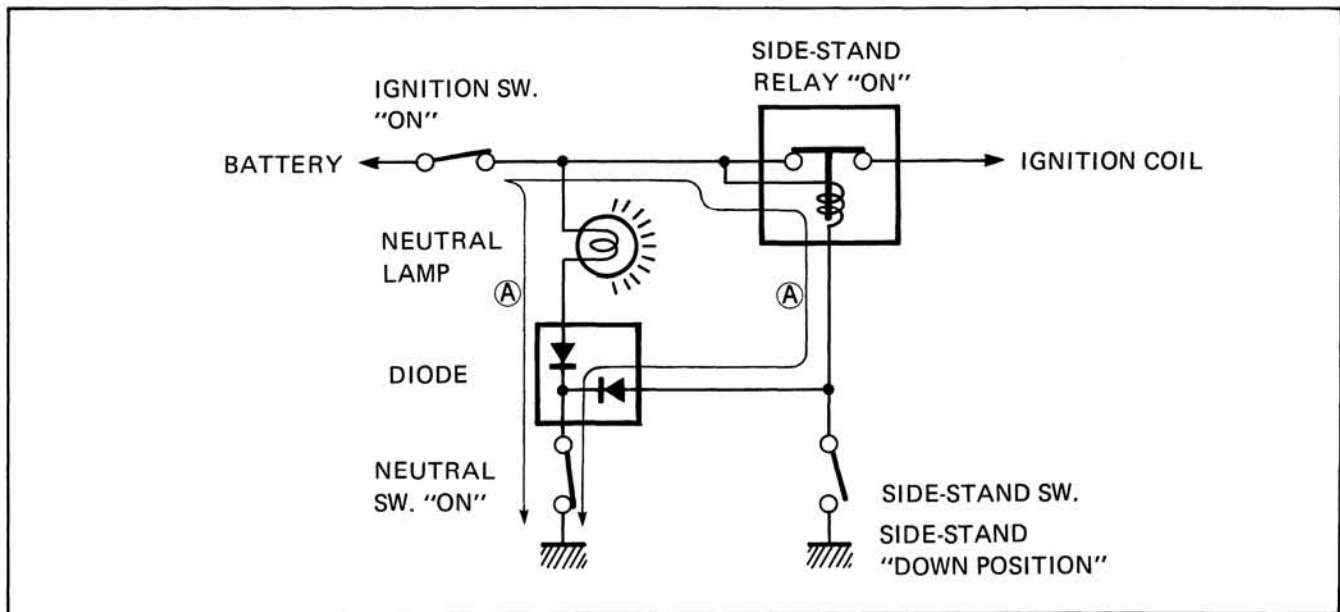
This side-stand/ignition interlock system has newly been adopted to prevent starting the motorcycle with the side-stand left down. The system is operated by an electric circuit provided between the battery and ignition coil.

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 transmission and side-stand switch working mutually.

The ignition coil is live only in two situations as follows:

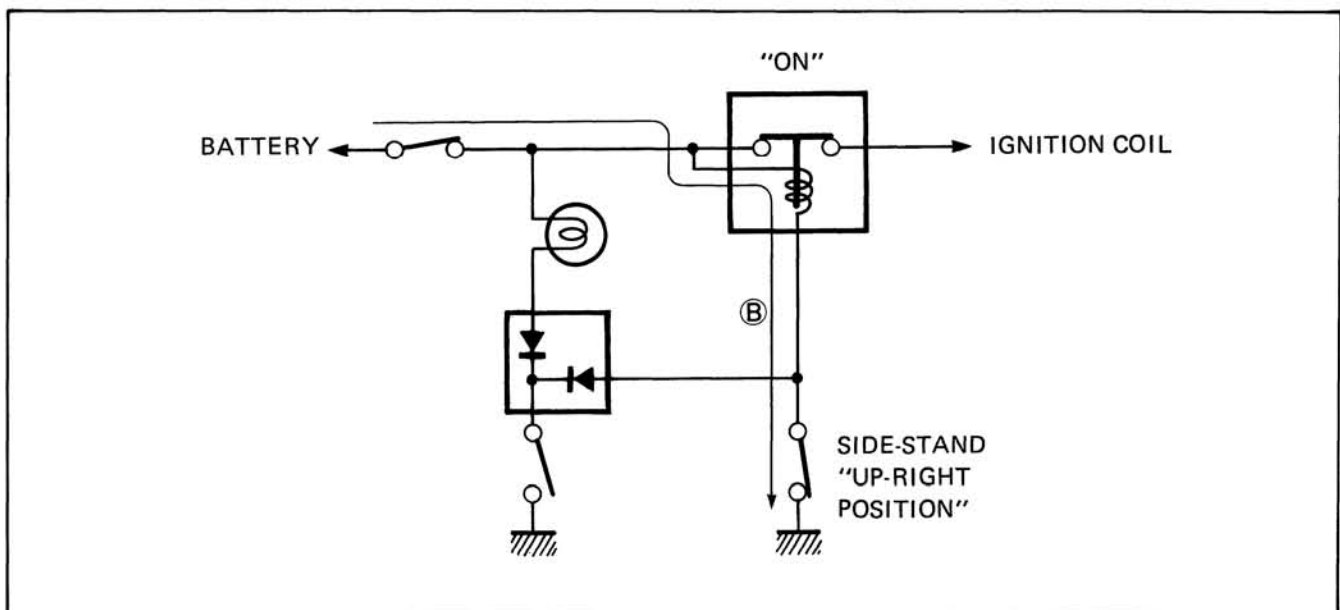
1. Transmission: "NEUTRAL (ON)" Side-stand: "DOWN (OFF)"

The current flow (A) turns "ON" the relay and the ignition coil is live even the side-stand is kept down. This is for warming up the engine.



2. Side-stand: "UP-RIGHT (ON)"

The current flow (B) turns "ON" the relay and the ignition coil is live. The engine can be easily started at any transmission position.



## INTERLOCK SYSTEM INSPECTION

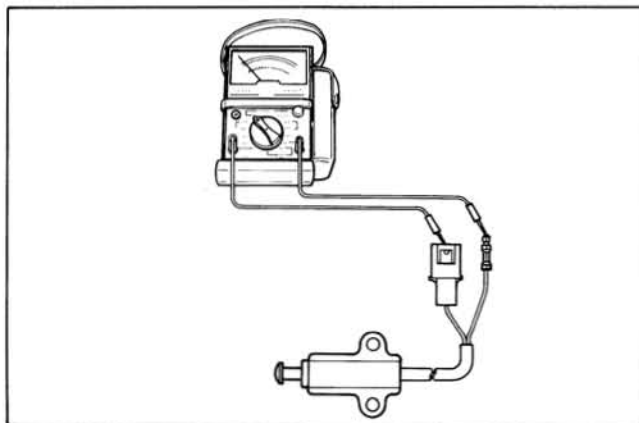
If the system does not operate properly, check each component with a pocket tester as follows. If any abnormality is found, replace it with a new one.

09900-25002	Pocket tester
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### SIDE-STAND SWITCH

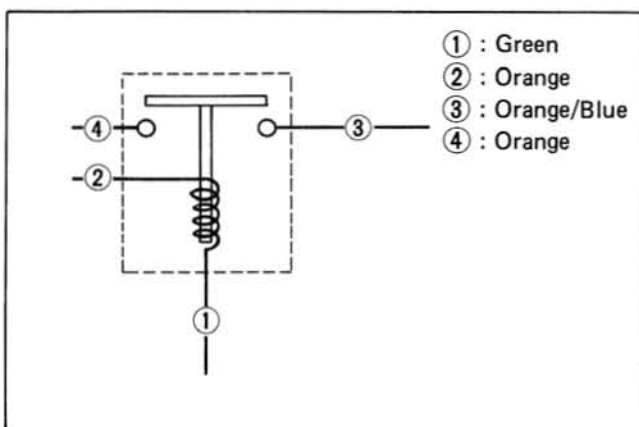
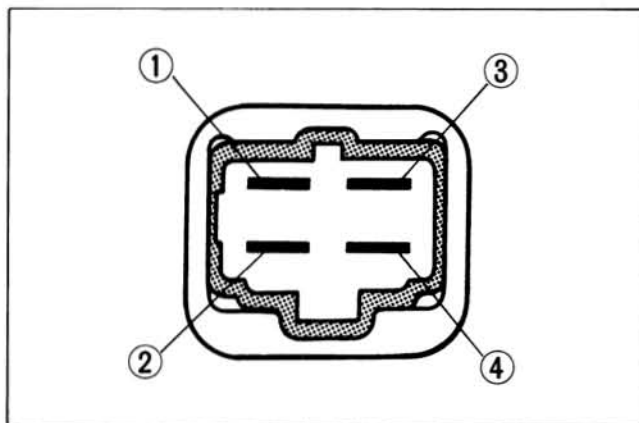
- Remove the seat and left frame cover.
- Disconnect the coupler and check the continuity between G/W – B/W lead wires.

SIDE-STAND	TESTER
Down	OFF
Up-right	ON



### SIDE-STAND RELAY

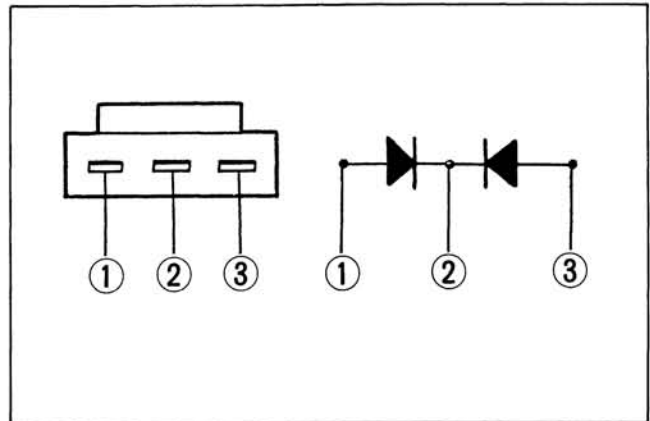
- Remove the coupler at the left frame.
- Apply 12 volts to ① and ② terminals,  $\oplus$  to ② and  $\ominus$  to ①, and check the continuity between ③ and ④ with a pocket tester. If there is no continuity, replace the neutral relay assembly with a new one.



**DIODE**

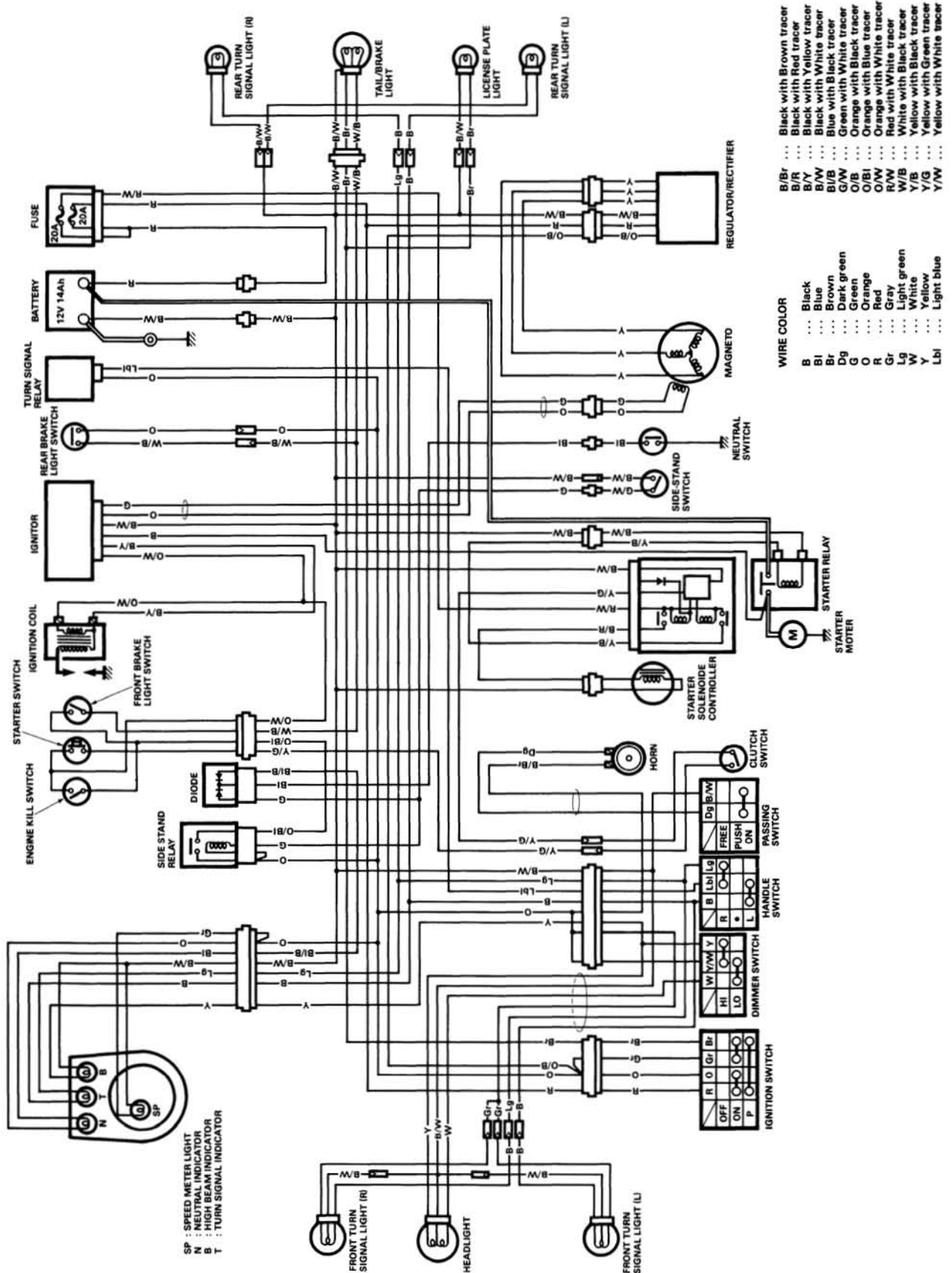
The diode can pass current only in one direction.

- 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**

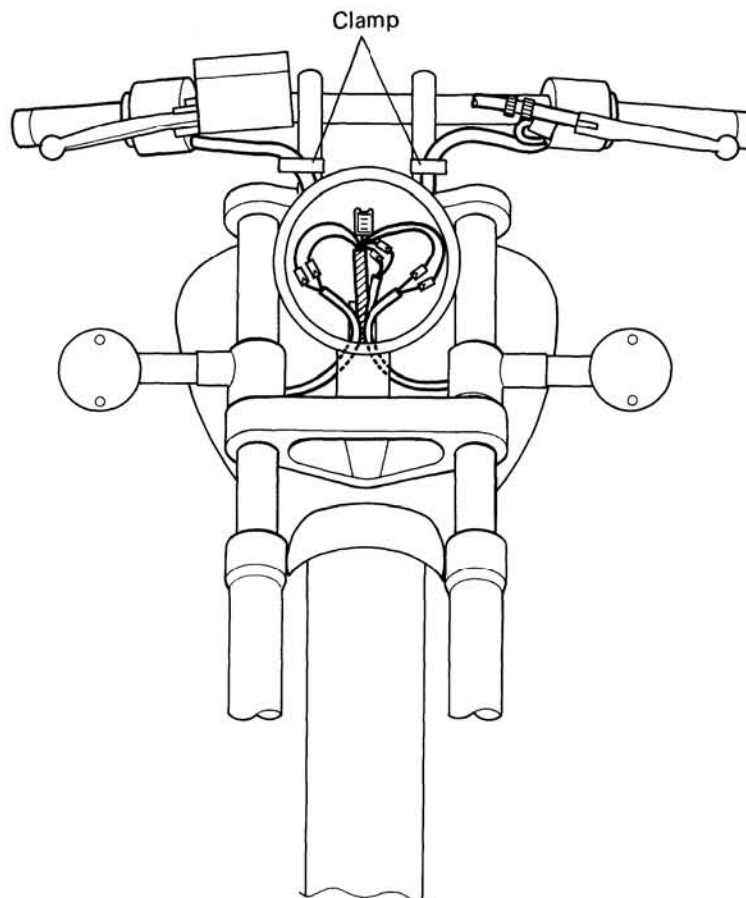
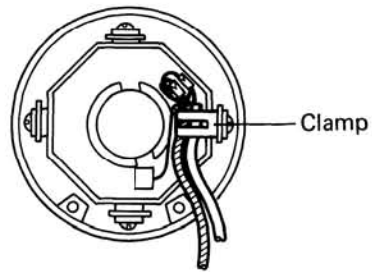
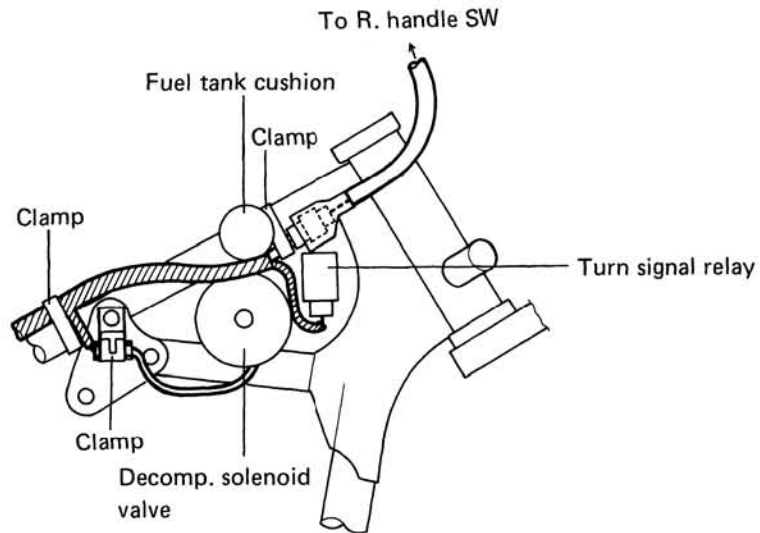
- Disconnect the neutral switch lead and check the continuity between BI and ground with the transmission in "NEUTRAL".

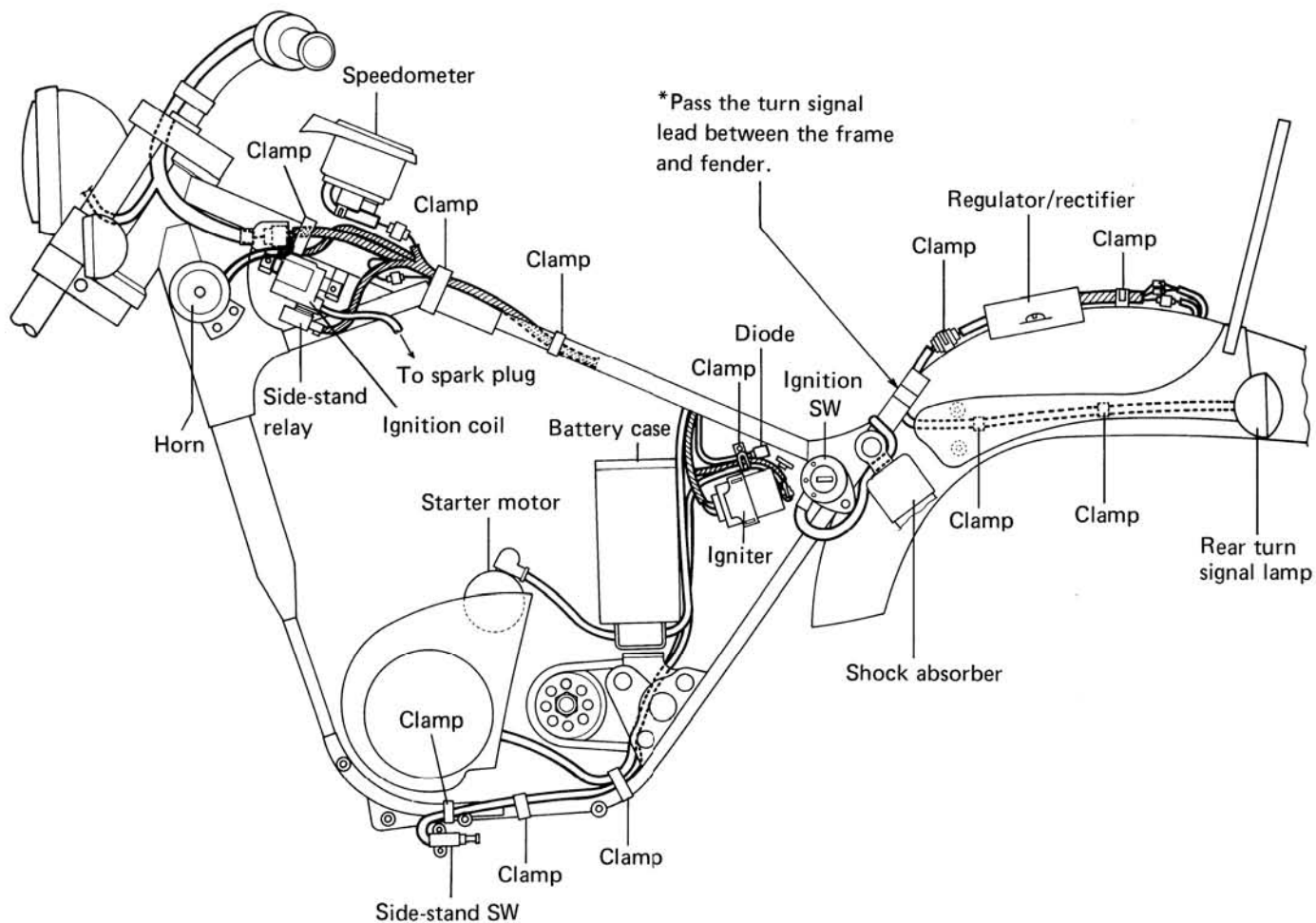
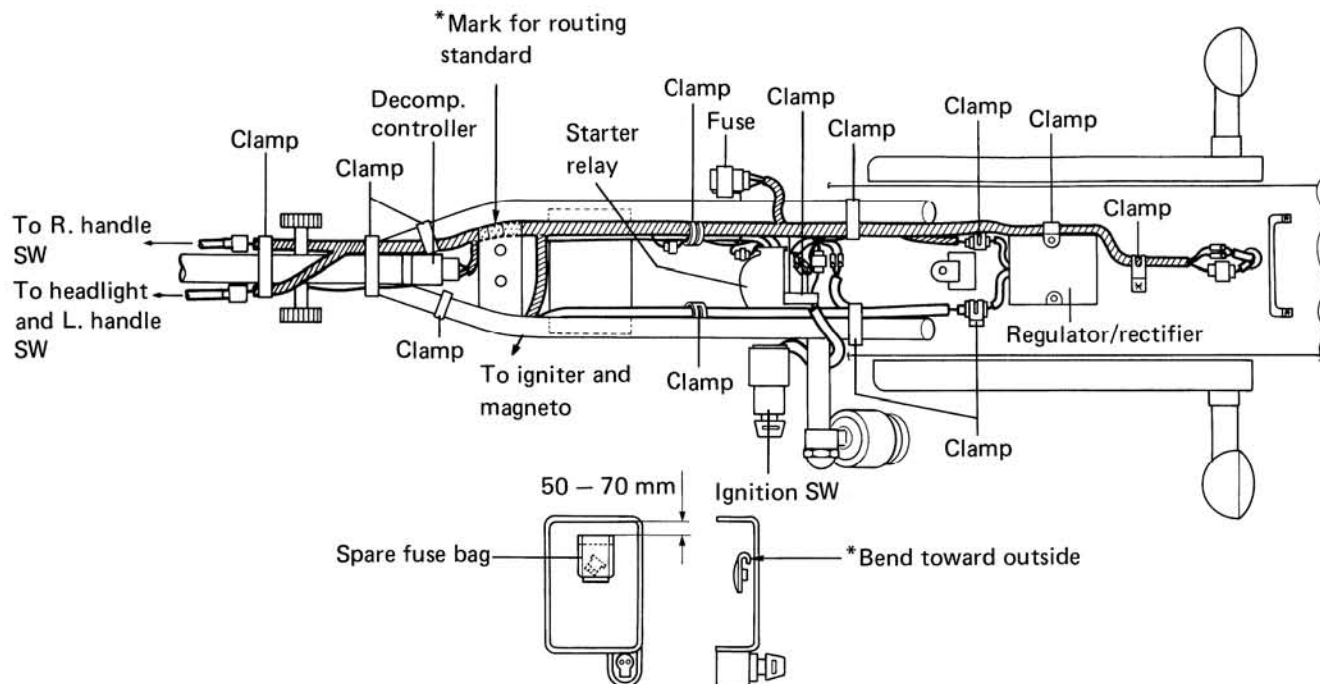
## WIRING DIAGRAM





## HARNESS ROUTING





## APPENDIX

### CLUTCH COVER GASKET

The clutch cover gasket is modified and the part numbers of the gasket and gasket set are changed.

The sealant coating is applied on the upper part of the late type gasket as follows. The purpose of this sealant is to more thoroughly provide oil-tight of the gasket.

#### PARTS SUPPLY DATA

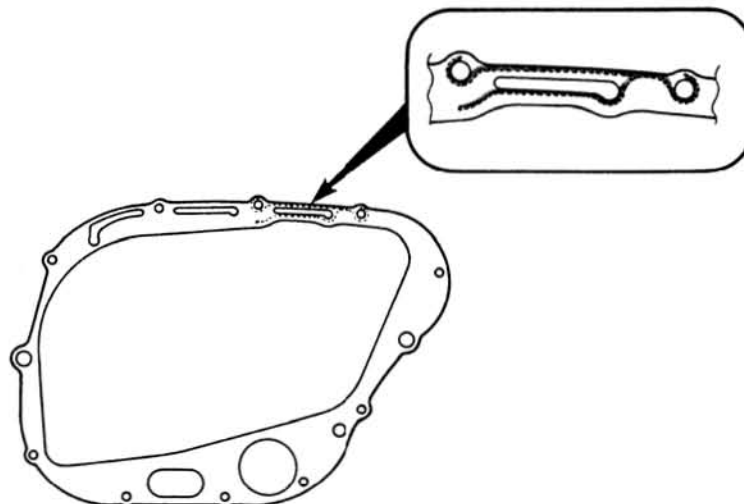
PART NAME	PART NO. (EARLY)	PART NO. (LATE)
Clutch cover gasket	11482-24B01	11482-24B02
Gasket set	11400-24852	11400-24853

INTERCHANGEABILITY : EARLY  $\xrightarrow{\text{No}}$  LATE  
 $\xleftarrow{\text{Yes}}$

PARTS AVAILABILITY : Only late type gasket is available.

NOTE: When using the EARLY type gasket on hand, apply BOND NO. 1215 to the upper part of the gasket, this procedure is the same as that of the LATE one.

99000-31110	BOND NO. 1215
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# ***LS650J('88-MODEL)***

## **CONTENTS**

<i><b>LS650J SERVICE DATA .....</b></i>	<i><b>10-1</b></i>
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# SERVICE DATA

## VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 ( 1.3 )	—
	EX.	28 ( 1.1 )	—
Valve lift	IN.	8.5 ( 0.33 )	—
	EX.	8.5 ( 0.33 )	—
Valve clearance (when cold)	IN. & EX.	0.08–0.13 ( 0.003–0.005 )	—
Valve guide to valve stem clearance	IN.	0.025–0.055 ( 0.0010–0.0022 )	0.35 ( 0.014 )
	EX.	0.040–0.070 ( 0.0016–0.0028 )	0.35 ( 0.014 )
Valve guide I.D.	IN. & EX.	7.000–7.015 ( 0.2756–0.2762 )	—
Valve stem O.D.	IN.	6.960–6.975 ( 0.2740–0.2746 )	—
	EX.	6.945–6.960 ( 0.2734–0.2740 )	—
Valve stem runout	IN. & EX.	—	0.05 ( 0.002 )
Valve head thickness	IN. & EX.	—	0.5 ( 0.02 )
Valve stem end length	IN. & EX.	—	2.9 ( 0.11 )
Valve seat width	IN. & EX.	1.0–1.2 ( 0.039–0.047 )	—
Valve head radial runout	IN. & EX.	—	0.03 ( 0.001 )
Valve spring free length (IN. & EX.)	INNER	—	35.6 ( 1.40 )
	OUTER	—	40.4 ( 1.59 )
Valve spring tension (IN. & EX.)	INNER	6.9–8.5 kg ( 15.2–18.7 lbs ) at length 31.0 mm ( 1.2 in )	—
	OUTER	16.4–18.8 kg ( 36.2–41.4 lbs ) at length 33.0 mm ( 1.3 in )	—

## CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174–36.214 ( 1.4242–1.4257 )	35.880 ( 1.4126 )
	EX.	36.419–36.459 ( 1.4338–1.4354 )	36.120 ( 1.4220 )
Camshaft journal oil clearance	0.032–0.066 ( 0.0013–0.0026 )		0.150 ( 0.0060 )



ITEM	STANDARD		LIMIT
Camshaft journal holder I.D.	Left	20.012–20.025 ( 0.7879–0.7884 )	—
	Right & Center	25.012–25.025 ( 0.9847–0.9852 )	—
Camshaft journal O.D.	Left	19.959–19.976 ( 0.7858–0.7865 )	—
	Right & Center	24.959–24.976 ( 0.9826–0.9833 )	—
Camshaft runout	—		0.10 ( 0.004 )
Cam chain 20-pitch length	—		128.9 ( 5.07 )
Rocker arm I.D.	IN. & EX.	12.000–12.018 ( 0.4724–0.4731 )	—
Rocker arm shaft O.D.	IN. & EX.	11.966–11.984 ( 0.4711–0.4718 )	—
Cylinder head distortion	—		0.05 ( 0.002 )
Cylinder head cover distortion	—		0.05 ( 0.002 )
De-comp. cable play	3–5 ( 0.12–0.20 )		—

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD			LIMIT
Compression pressure	1 000–1 400 kPa ( 10–14 kg/cm <sup>2</sup> ) ( 142–200 psi )			800 kPa ( 8 kg/cm <sup>2</sup> ) ( 114 psi )
Piston to cylinder clearance	0.050–0.060 ( 0.0020–0.0024 )			0.120 ( 0.0047 )
Cylinder bore	94.000–94.015 ( 3.7008–3.7014 )			94.080 ( 3.7039 )
Piston diam.	93.945–93.960 ( 3.6986–3.6992 ) Measure at 20 mm (0.8 in) from the skirt end.			93.880 ( 3.6961 )
Cylinder distortion	—			0.05 ( 0.002 )
Piston ring free end gap	1st	T	Approx. 11.5 ( 0.45 )	9.2 ( 0.36 )
	2nd	T	Approx. 14.0 ( 0.55 )	11.2 ( 0.44 )
Piston ring end gap	1st	0.30–0.45 ( 0.012–0.018 )		1.00 ( 0.039 )
	2nd	0.25–0.40 ( 0.010–0.016 )		1.00 ( 0.039 )
Piston ring to groove clearance	1st	—		0.18 ( 0.007 )
	2nd	—		0.15 ( 0.006 )

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23–1.25 ( 0.0484–0.0492 )	—
	2nd	1.21–1.23 ( 0.0476–0.0484 )	—
	Oil	2.81–2.83 ( 0.1106–0.1114 )	—
Piston ring thickness	1st	1.175–1.190 ( 0.0463–0.0469 )	—
	2nd	1.175–1.190 ( 0.0463–0.0469 )	—
Piston pin bore	23.000–23.006 ( 0.9055–0.9057 )		23.030 ( 0.9067 )
Piston pin O.D.	22.996–23.000 ( 0.9054–0.9055 )		22.980 ( 0.9047 )

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006–23.014 ( 0.9057–0.9061 )	23.040 ( 0.9071 )
Conrod deflection	—	3.0 ( 0.12 )
Conrod big end side clearance	0.10–0.65 ( 0.004–0.026 )	1.0 ( 0.039 )
Conrod big end width	24.95–25.00 ( 0.982–0.984 )	—
Crank web to web width	70.0 ± 0.1 ( 2.756 ± 0.004 )	—
Crankshaft runout	—	0.05 ( 0.002 )
Balancer spring free length	—	10.0 ( 0.39 )

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 ( 68/36 × 35/30 )	—
Oil pressure (at 60°C, 140°F)	Above 50 kPa ( 0.50 kg/cm <sup>2</sup> , 7.1 psi ) Below 75 kPa ( 0.75 kg/cm <sup>2</sup> , 10.7 psi ) at 3 000 r/min.	—

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch cable play	3 ( 0.12 )	—
Drive plate thickness	No.1 2.92–3.08 ( 0.115–0.121 )	2.62 ( 0.103 )
	No.2 3.45–3.55 ( 0.136–0.140 )	3.15 ( 0.124 )
Drive plate claw width	No.1 15.8–16.0 ( 0.622–0.630 )	15.0 ( 0.591 )
	No.2 15.9–16.0 ( 0.626–0.630 )	15.1 ( 0.594 )

ITEM	STANDARD	LIMIT
Driven plate distortion	—	0.1 ( 0.004 )
Clutch spring free length	—	33.0 ( 1.30 )

**TRANSMISSION + DRIVE BELT**

Unit: mm (in) Except ratio

ITEM	STANDARD	LIMIT
Primary reduction ratio	1.888 ( 68/36 )	—
Final reduction ratio	2.956 ( 68/23 )	—
Gear ratios	Low	2.214 ( 31/14 )
	2nd	1.500 ( 27/18 )
	3rd	1.095 ( 23/21 )
	Top	0.875 ( 21/24 )
Shift fork to groove clearance	0.10–0.30 ( 0.004–0.012 )	0.50 ( 0.020 )
Shift fork groove width	2nd drive gear	5.50–5.60 ( 0.217–0.220 )
	3rd driven gear	5.50–5.60 ( 0.217–0.220 )
Shift fork thickness	No.1 & No.2	5.30–5.40 ( 0.209–0.213 )
Drive belt	Type	BANDO: 133U-14M 40.0
	Number of teeth	133
Gearshift lever height	60 ( 2.4 )	—

**CARBURETOR**

ITEM	SPECIFICATION	
	E-03	E-33
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm ( 1.57 in )	←
I.D. No.	24B00	24B20
Idle r/min.	1 000–1 200 r/min.	←
Fuel level	7 ± 0.5 mm ( 0.276 ± 0.02 in )	←
Float height	27.95 ± 1.0 mm ( 1.10 ± 0.04 in )	←
Main jet (M.J.)	#155	←
Main air jet (M.A.J.)	0.6 mm	←
Jet needle (J.N.)	5C17	←
Needle jet (N.J.)	X-5	←
Throttle valve (Th.V.)	#125	←
Pilot jet (P.J.)	#47.5	←

ITEM	SPECIFICATION	
	E-03	E-33
By-pass (B.P.)	1.1, 1.1, 1.1 mm	←
Pilot outlet (P.O.)	1.3 mm	←
Valve seat (V.S.)	2.8 mm	←
Starter jet (G.S.)	#22.5	←
Pilot screw (P.S.)	PRE-SET ( 3.0 )	←
Pilot air jet 1 (P.A.J.1)	#67.5	←
Pilot air jet 2 (P.A.J.2)	2.0 mm	←
Throttle cable play	0.5–1.0 mm ( 0.02–0.04 in )	←

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION	NOTE
Ignition timing		5° ± 2° B.T.D.C. at 2 000 r/min. and 30° ± 2° B.T.D.C. at 4 000 r/min.	
Spark plug	Type	N.D.: DP8EA-9 NGK: X24EP-U9	
	Gap	0.8–0.9 ( 0.031–0.035 )	
Spark performance		Over 8 (0.3) at 1 atm.	
Solenoid resistance		0.1–1.0 Ω	—
Pick-up coil resistance		170–270 Ω	O–G
Ignition coil resistance	Primary	1–7 Ω	O/W–Ground
	Secondary	10–25 kΩ	Plug cap–Ground
Generator no-load voltage		More than 100 V (AC) at 5 000 r/min.	
Regulated voltage		14.0–15.5 V at 5 000 r/min.	
Starter motor brush length	Limit:	9 ( 0.35 )	
	Limit:	0.2 ( 0.008 )	
Starter relay resistance		2–6 Ω	
Battery	Type designation	FB14L-B2	
	Voltage	12 V	
	Capacity	50.4 kC (14 Ah)/10 HR	
	Standard electrolyte S.G.	1.28 at 20°C (68°F)	
Fuse size		20 A	

**WATTAGE**

Unit: W

ITEM		SPECIFICATION
Headlight	HI	60
	LO	55
Tail/Brake light		5/21
Turn signal light		21

ITEM	SPECIFICATION
Speedometer light	3.4
Turn signal indicator light	3.4
High beam indicator light	1.7
Neutral indicator light	3.4
License light	8
Running light (within front turn signal light)	5

**BRAKE + WHEEL**

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal free travel		20–30 ( 0.8–1.2 )	—
Rear brake pedal height		60 ( 2.4 )	—
Brake drum I.D.	Rear	—	160.7 ( 6.33 )
Brake lining thickness	Rear	—	1.5 ( 0.06 )
Brake disc thickness	Front	$4.5 \pm 0.2$ ( $0.18 \pm 0.01$ )	4.0 ( 0.16 )
Brake disc runout	Front	—	0.30 ( 0.012 )
Master cylinder bore	Front	12.700–12.743 ( 0.4999–0.5017 )	—
Master cylinder piston diam.	Front	12.657–12.684 ( 0.4983–0.4994 )	—
Brake caliper cylinder bore	Front	42.850–42.926 ( 1.6870–1.6900 )	—
Brake caliper piston diam.	Front	42.770–42.820 ( 1.6839–1.6858 )	—
Wheel rim runout	Axial	—	2.0 ( 0.08 )
	Radial	—	2.0 ( 0.08 )
Wheel axle runout	Front	—	0.25 ( 0.010 )
	Rear	—	0.25 ( 0.010 )
Tire size	Front	100/90-19 57H	—
	Rear	140/80-15 67H	—
Tire tread depth	Front	—	1.6 ( 0.06 )
	Rear	—	2.0 ( 0.08 )

**SUSPENSION**

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 ( 5.5 )	—	
Front fork spring free length	—	392.5 ( 15.45 )	
Front fork oil level	75.0 ( 2.95 )	—	
Rear wheel travel	80 ( 3.1 )	—	
Swingarm pivot shaft runout	—	0.3 ( 0.001 )	

**TIRE AIR PRESSURE**

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm <sup>2</sup>	psi	kPa	kg/cm <sup>2</sup>	psi
FRONT	200	2.00	28	200	2.00	28
REAR	225	2.25	32	250	2.50	36

**FUEL + OIL**

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded or low-lead type gasoline of at least 85-95 pump octane ( $\frac{R+M}{2}$ method) or 89 octane or higher rated by the Research Method.		
Fuel tank including reserve	9.5 L ( 2.51 US gal )		
reserve	2.5 L ( 2.6 US qt )		
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	1 800 ml ( 1.9 US qt )	
	Filter change	2 400 ml ( 2.5 US qt )	
	Overhaul	2 400 ml ( 2.5 US qt )	
Front fork oil type	Fork oil #15		
Front fork oil capacity (each leg)	447 ml ( 15.11 US oz )		Spacer L:135mm
Brake fluid type	DOT3 or DOT4		

# LS650S ('95-MODEL)

*This section describes service data, service specifications and servicing procedures which differ from those of the LS650J ('88-model).*

**NOTE:**

- Any differences between LS650J ('88-model) and LS650S ('95-model) in specifications and service data are clearly indicated with the asterisk marks (\*).
- Please refer to the sections 1 through 10 for details which are not given in this section.

**11**

## CONTENTS

<b>SPECIFICATIONS .....</b>	<b>11- 1</b>
<b>SERVICE DATA .....</b>	<b>11- 2</b>
<b>SERVICE INFORMATION .....</b>	<b>11- 9</b>
<b>TRANSMISSION .....</b>	<b>11- 9</b>
<b>CARBURETOR .....</b>	<b>11-11</b>
<b>WIRING DIAGRAM .....</b>	<b>11-12</b>
<b>REAR BRAKE CABLE .....</b>	<b>11-13</b>



## SPECIFICATIONS

### DIMENSIONS AND DRY MASS

Overall length.....	2 180 mm (85.8 in)
Overall width.....	760 mm (29.9 in)
Overall height.....	1 150 mm (45.3 in)
Wheelbase.....	1 485 mm (58.5 in)
Ground clearance.....	130 mm ( 5.1 in)
Seat height.....	700 mm (27.6 in)
Dry mass.....	160 kg (352 lbs)
	161 kg (355 lbs) ... Calif. model

### ENGINE

Type.....	Four-stroke, air-cooled, OHC, TSCC
Valve clearance (IN & EX).....	0.08—0.13 mm (0.003—0.005 in)
Number of cylinder.....	1
Bore .....	94.0 mm (3.701 in)
Stroke .....	94.0 mm (3.701 in)
Piston displacement.....	652 cm <sup>3</sup> (39.8 cu. in)
Compression ratio.....	8.5 : 1
Carburetor.....	BS40, single
Air cleaner.....	Non-woven fabric element
Starter system.....	Starter motor
Lubrication system.....	Wet sump

### TRANSMISSION

Clutch.....	Wet multi-plate type
Transmission .....	5-speed constant mesh
Gearshift pattern.....	1-down, 4-up
Primary reduction ratio.....	* 1.810 (67/37)
Gear ratios, Low .....	* 2.333 (35/15)
2nd .....	* 1.578 (30/19)
3rd .....	* 1.142 (24/21)
4th .....	* 0.956 (22/23)
Top .....	* 0.884 (23/26)
Final reduction ratio.....	2.956 (68/23)
Drive system.....	Belt drive

### CHASSIS

Front suspension.....	Telescopic, coil spring, oil damped
Rear suspension.....	Swingarm, oil damped, spring pre-load 5-way adjustable
Front suspension stroke.....	140 mm (5.5 in)
Rear wheel travel.....	80 mm (3.1 in)
Caster.....	55°
Trail.....	147 mm (5.79 in)
Steering angle.....	42° (right & left)
Turning radius.....	2.6 m (8.5 ft)
Front brake.....	Disc brake, hydraulically operated
Rear brake.....	Internal expanding
Front tire size.....	100/90-19 57H
Rear tire size.....	140/80-15 M/C 67H

### ELECTRICAL

Ignition type.....	Electronic ignition (Transistorized)
Ignition timing.....	5° B.T.D.C. below 2 000 r/min and 30° B.T.D.C. above 4 000 r/min
Spark plug.....	* NGK DPR8EA-9 or NIPPONDENSO X24EPR-U9
Battery.....	12V 50.4 kC (14 Ah)/10 HR
Generator.....	Three phase A.C. generator
Fuses.....	20A
Headlight.....	12V 60/55W
Running/Turn signal light.....	12V 5/21W
Tail/Brake light.....	12V 5/21W
License plate light.....	12V 8W
Speedometer light.....	12V 3.4W
Neutral indicator light.....	12V 3.4W
High beam indicator light.....	12V 1.7W
Turn signal indicator light.....	12V 3.4W

### CAPACITIES

Fuel tank including reserve.....	* 10.5 L (2.8/2.3 US/Imp gal)
Reserve.....	2.5 L (0.6/0.5 US/Imp gal)
Engine oil, oil change.....	1 800 ml (1.9/1.6 US/Imp qt)
with filter change.....	2 400 ml (2.5/2.1 US/Imp qt)

## SERVICE DATA

### VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	28 (1.1)	—
Valve lift	IN.	8.5 (0.33)	—
	EX.	8.5 (0.33)	—
Valve clearance (when cold)	IN. & EX.	0.08–0.13 (0.003–0.005)	—
Valve guide to valve stem clearance	IN.	0.025–0.055 (0.0010–0.0022)	—
	EX.	0.040–0.070 (0.0016–0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	7.000–7.015 (0.2756–0.2762)	—
Valve stem O.D.	IN.	6.960–6.975 (0.2740–0.2746)	—
	EX.	6.945–6.960 (0.2734–0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.9 (0.11)
Valve seat width	IN. & EX.	1.0–1.2 (0.039–0.047)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (IN. & EX.)	INNER	—	35.6 (1.40)
	OUTER	—	40.4 (1.59)
Valve spring tension (IN. & EX.)	INNER	6.9–8.5 kg (15.2–18.7 lbs) at length 31.0 mm (1.2 in)	—
	OUTER	16.4–18.8 kg (36.2–41.4 lbs) at length 33.0 mm (1.3 in)	—

### CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174–36.214 (1.4242–1.4257)	35.880 (1.4126)
	EX.	36.419–36.459 (1.4338–1.4354)	36.120 (1.4220)

ITEM	STANDARD		LIMIT
Camshaft journal oil clearance	0.032–0.066 (0.0013–0.0026)		0.150 (0.0060)
Camshaft journal holder I.D.	Left	20.012–22.025 (0.7879–0.7884)	—
	Right & Center	25.012–25.025 (0.9847–0.9852)	—
Camshaft journal O.D.	Left	19.959–19.976 (0.7858–0.7865)	—
	Right & Center	24.959–24.976 (0.9826–0.9833)	—
Camshaft runout	—		0.10 (0.004)
Rocker arm I.D.	IN. & EX.	12.000–12.018 (0.4724–0.4731)	—
Rocker arm shaft O.D.	IN. & EX.	11.966–11.984 (0.4711–0.4718)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
De-comp. cable play	3–5 (0.12–0.20)		—

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	1 000–1 400 kPa (10–14 kg/cm <sup>2</sup> ) (142–200 psi)		800 kPa (8 kg/cm <sup>2</sup> ) (114 psi)
Piston to cylinder clearance	0.050–0.060 (0.0020–0.0024)		0.120 (0.0047)
Cylinder bore	94.000–94.015 (3.7008–3.7014)		94.080 (3.7039)
Piston diam.	93.945–93.960 (3.6986–3.6992) Measure at 20 (0.8) from the skirt end.		93.880 (3.6961)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st	T Approx. 11.5 (0.45)	9.2 (0.36)
	2nd	T Approx. 14.0 (0.55)	11.2 (0.44)
Piston ring end gap	1st	0.30–0.45 (0.012–0.018)	1.00 (0.039)
	2nd	0.25–0.40 (0.010–0.016)	1.00 (0.039)
Piston ring to groove clearance	1st	—	0.18 (0.007)
	2st	—	0.15 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23–1.25 (0.0484–0.0492)	—
	2nd	1.21–1.23 (0.0476–0.0484)	—
	Oil	2.81–2.83 (0.1106–0.1114)	—
Piston ring thickness	1st	1.175–1.190 (0.0463–0.0469)	—
	2nd	1.175–1.190 (0.0463–0.0469)	—
Piston pin bore	23.000–23.006 (0.9055–0.9057)		23.030 (0.9067)
Piston pin O.D.	22.996–23.000 (0.9054–0.9055)		22.980 (0.9047)

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006–23.014 (0.9057–0.9061)	23.040 (0.9071)
Conrod deflection	—	3.0 (0.12)
Conrod big end side clearance	0.10–0.65 (0.004–0.026)	1.0 (0.039)
Conrod big end width	24.95–25.00 (0.982–0.984)	—
Crank web to web width	70.0±0.1 (2.756±0.004)	—
Crankshaft runout	—	0.05 (0.002)
Balancer spring free length	—	10.0 (0.39)

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 (68/36 x 35/30)	—
Oil pressure (at 60°C, 140°F)	Above 50 kPa (0.50 kg/cm <sup>2</sup> , 7.1 psi) Below 75 kPa (0.75 kg/cm <sup>2</sup> , 10.7 psi) at 3 000 r/min.	—

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Clutch lever play	10–15 (0.4–0.6)	—
Drive plate thickness	No.1	2.92–3.08 (0.115–0.121)
	No.2	3.45–3.55 (0.136–0.140)

ITEM	STANDARD		LIMIT
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.0 (0.591)
	No.2	15.9—16.0 (0.626—0.630)	15.1 (0.594)
Driven plate distortion	—		0.1 (0.004)
Clutch spring free length	—		33.0 (1.30)

**TRANSMISSION + DRIVE BELT**

Unit: mm (in) Except ratio

ITEM	STANDARD		LIMIT
Primary reduction ratio	*1.810 (67/37)		—
Final reduction ratio	2.956 (68/23)		—
Gear ratios	Low	*2.333 (35/15)	—
	2nd	*1.578 (30/19)	—
	3rd	*1.142 (24/21)	—
	4th	*0.956 (22/23)	—
	Top	*0.884 (23/26)	—
Shift fork to groove clearance	0.10—0.30 (0.004—0.012)		0.50 (0.020)
Shift fork groove width	3rd drive gear	5.50—5.60 (0.217—0.220)	—
	4th driven gear	5.50—5.60 (0.217—0.220)	—
	Top driven gear	5.50—5.60 (0.217—0.220)	—
Shift fork thickness	No.1, No.2 & No.3	5.30—5.40 (0.209—0.213)	—
Drive belt	Type	BANDO: 133U-14M 40.0	—
	Number of teeth	133	—
Gearshift lever height	60 (2.4)		—

**\*CARBURETOR**

ITEM	SPECIFICATION	
	E-03	E-33
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm	←
I.D. No.	24C4	24C5
Idle r/min.	1 100 ± 100 r/min	←
Float height	27.95 ± 1.0 mm (1.1 ± 0.04 in)	←
Main jet (M.J.)	#145	←
Main air jet (M.A.J.)	0.6 mm	←
Jet needle (J.N.)	5C39	←
Needle jet (N.J.)	X-7M	←
Throttle valve (Th.V.)	#120	←
Pilot jet (P.J.)	#52.5	←
Starter jet (G.S.)	#22.5	←
Pilot screw (P.S.)	PRE-SET	←
Throttle cable play	3—6 mm (0.1—0.2 in)	

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		5° ± 2° B.T.D.C. at 2 000 r/min. and 30° ± 2° B.T.D.C. at 4 000 r/min.		
Spark plug	Type	*NGK: DPR8EA-9 *N.D.: X24EPR-U9		
	Gap	0.8—0.9 (0.031—0.035)		
Spark performance		Over 8 (0.3) at 1 atm.		
Solenoid resistance		0.1—1.0 Ω		
Pick-up coil resistance		170—270 Ω		O/G
Ignition coil resistance	Primary	1—7 Ω		O/W—Ground
	Secondary	10—25 kΩ		Plug cap— Ground
Generator no-load voltage		More than 100 V (AC) at 5 000 r/min.		
Regulated voltage		14.0—15.5 V at 5 000 r/min.		
Starter relay resistance		2—6 Ω		
Battery	Type designation	YB14L-B2		
	Voltage	12V		
	Capacity	50.4 kC (14 Ah)/10 HR		
	Standard electrolyte S.G.	1.28 at 20°C (68°F)		
Fuse size		20A		

**WATTAGE**

Unit:W

ITEM		SPECIFICATION
Headlight	HI	60
	LO	55
Tail/Brake light		5/21
Turn signal light		21
Running light (within front turn signal light)		5
Speedometer light		*3.4
Turn signal indicator light		*3.4
High beam indicator light		1.7
Neutral indicator light		*3.4
License light		8

**BRAKE + WHEEL**

Unit: mm (in)

ITEM		STANDARD	LIMIT
Rear brake pedal free travel		20—30 (0.8—1.2)	—
Rear brake pedal height		60 (2.4)	—
Brake drum I.D.	Rear	—	160.7 (6.33)
Brake lining thickness	Rear	—	1.5 (0.06)
Brake disc thickness	Front	4.5±0.2 (0.18±0.01)	4.0 (0.16)
Brake disc runout	Front	—	0.30 ( 0.012 )
Master cylinder bore	Front	12.700—12.743 (0.4999—0.5017)	—
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	—
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	—
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Tire size	Front	100/90-19 57H	—
	Rear	140/80-15 M/C 67H	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)



**SUSPENSION**

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 (5.5)	—	
Front fork spring free length	—	392.5 (15.45)	
Front fork oil level	75.0 (2.95)	—	
Rear wheel travel	80 (3.1)	—	
Swingarm pivot shaft runout	—	0.3 (0.001)	

**TIRE PRESSURE**

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm <sup>2</sup>	psi	kPa	kg/cm <sup>2</sup>	psi
FRONT	200	2.00	28	200	2.00	28
REAR	225	2.25	32	250	2.50	36

**FUEL + OIL**

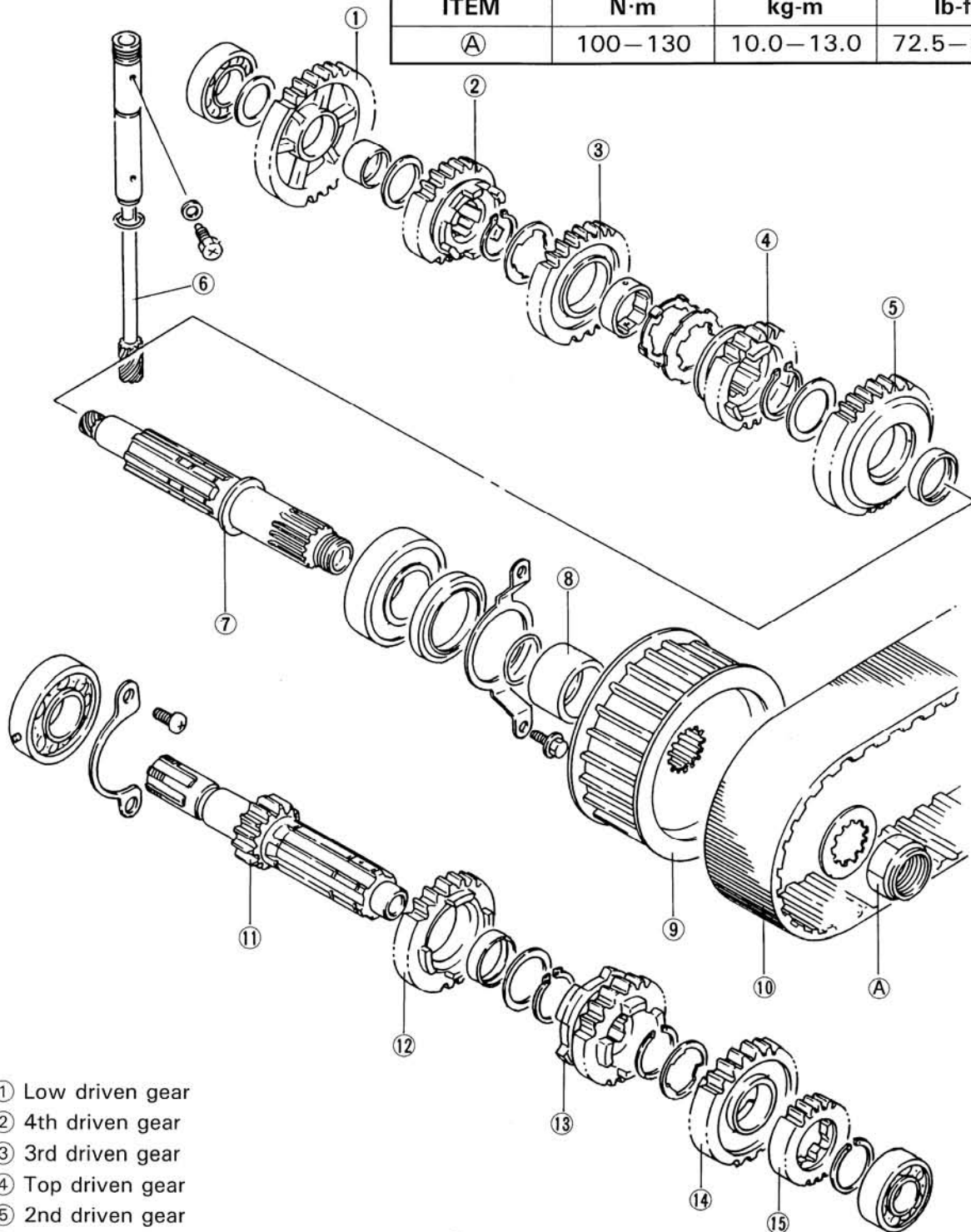
ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 85 pump octane ( $\frac{R+M}{2}$ ) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		
Fuel tank including reserve	*10.5 L (2.8/2.3 US/Imp gal)		
reserve	2.5 L (0.66/0.55 US/Imp gal)		
Engine oil type	SAE 10W/40, API SE or SF		
Engine oil capacity	Change	1 800 ml (1.9/1.6 US/Imp qt)	
	Filter change	2 400 ml (2.5/2.1 US/Imp qt)	
	Overhaul	2 400 ml (2.5/2.1 US/Imp qt)	
Front fork oil type	Fork oil # 15		
Front fork oil capacity (each leg)	447 ml (15.11/15.74 US/Imp oz)		spacer L:135 mm
Brake fluid type	DOT4		

## SERVICE INFORMATION

### TRANSMISSION GEARS

TIGHTENING TORQUE

ITEM	N·m	kg·m	lb·ft
Ⓐ	100—130	10.0—13.0	72.5—94.0



① Low driven gear

② 4th driven gear

③ 3rd driven gear

④ Top driven gear

⑤ 2nd driven gear

⑥ Speedometer driven gear

⑦ Driveshaft/Speedometer drive gear

⑧ Engine pulley spacer

⑨ Engine pulley

⑩ Drive belt

Ⓐ Counterhaft/Low drive gear

⑪ Countershaft/Low drive gear

⑫ 4th drive gear

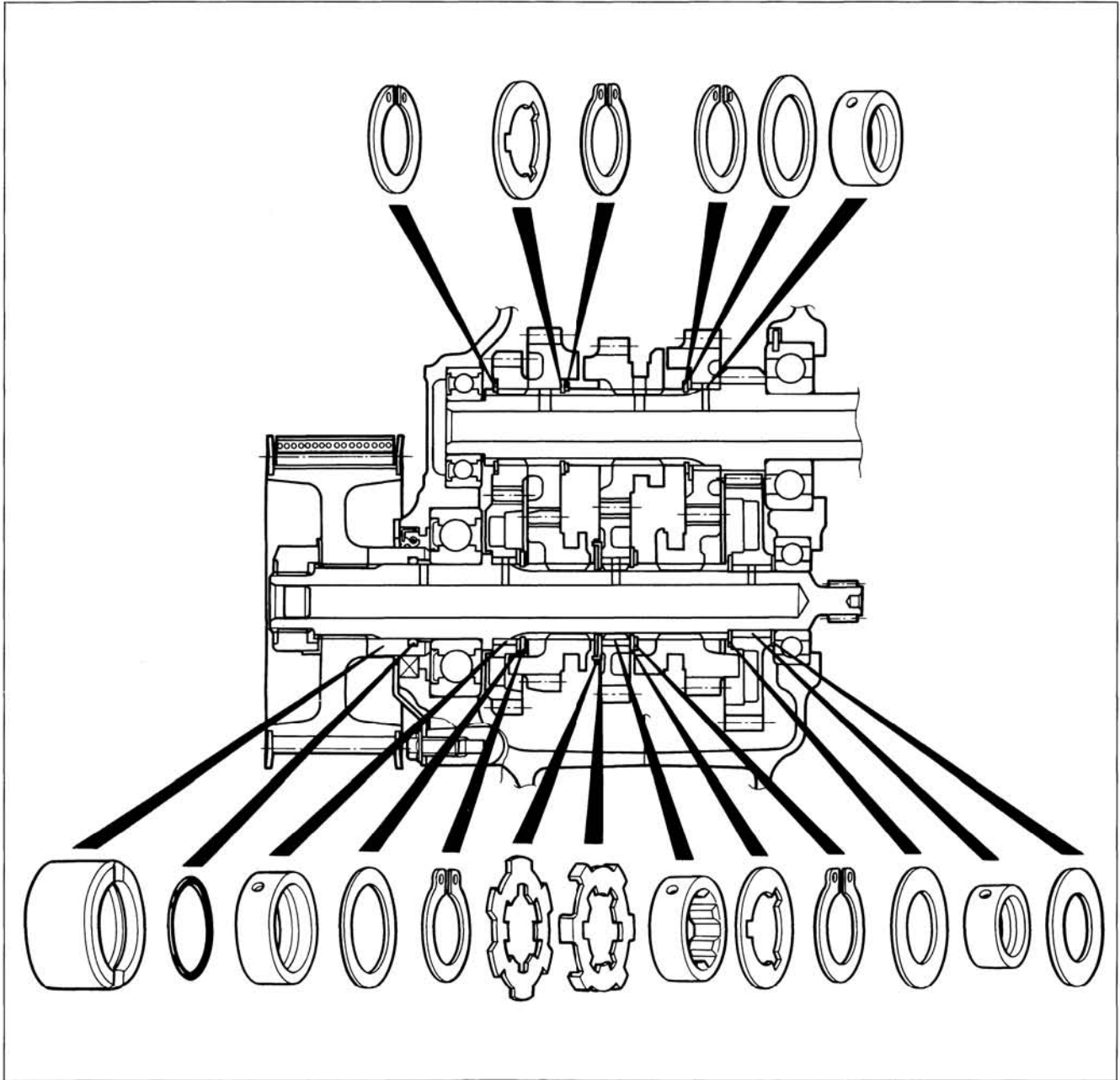
⑬ 3rd drive gear

⑭ Top drive gear

⑮ 2nd drive gear

**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.*



## CARBURETOR

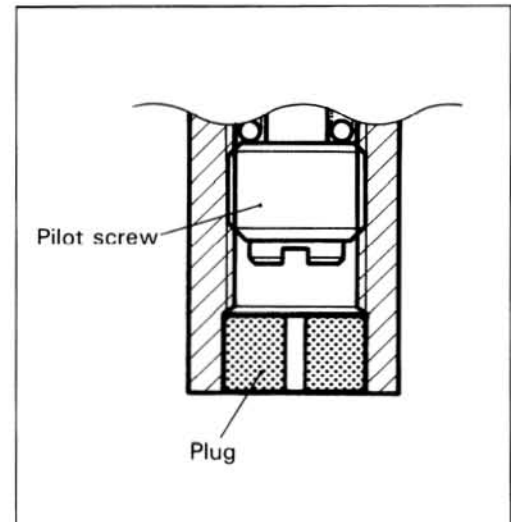
### PILOT SCREW REMOVAL AND INSTALLATION

- Remove the plug by carefully punching a hole in it using an awl or suitable tool.
- Before removing the pilot screw, determine the setting by slowly turning it clockwise and count the number of turns required to lightly seat the screw. Turn the screw counterclockwise to remove it.

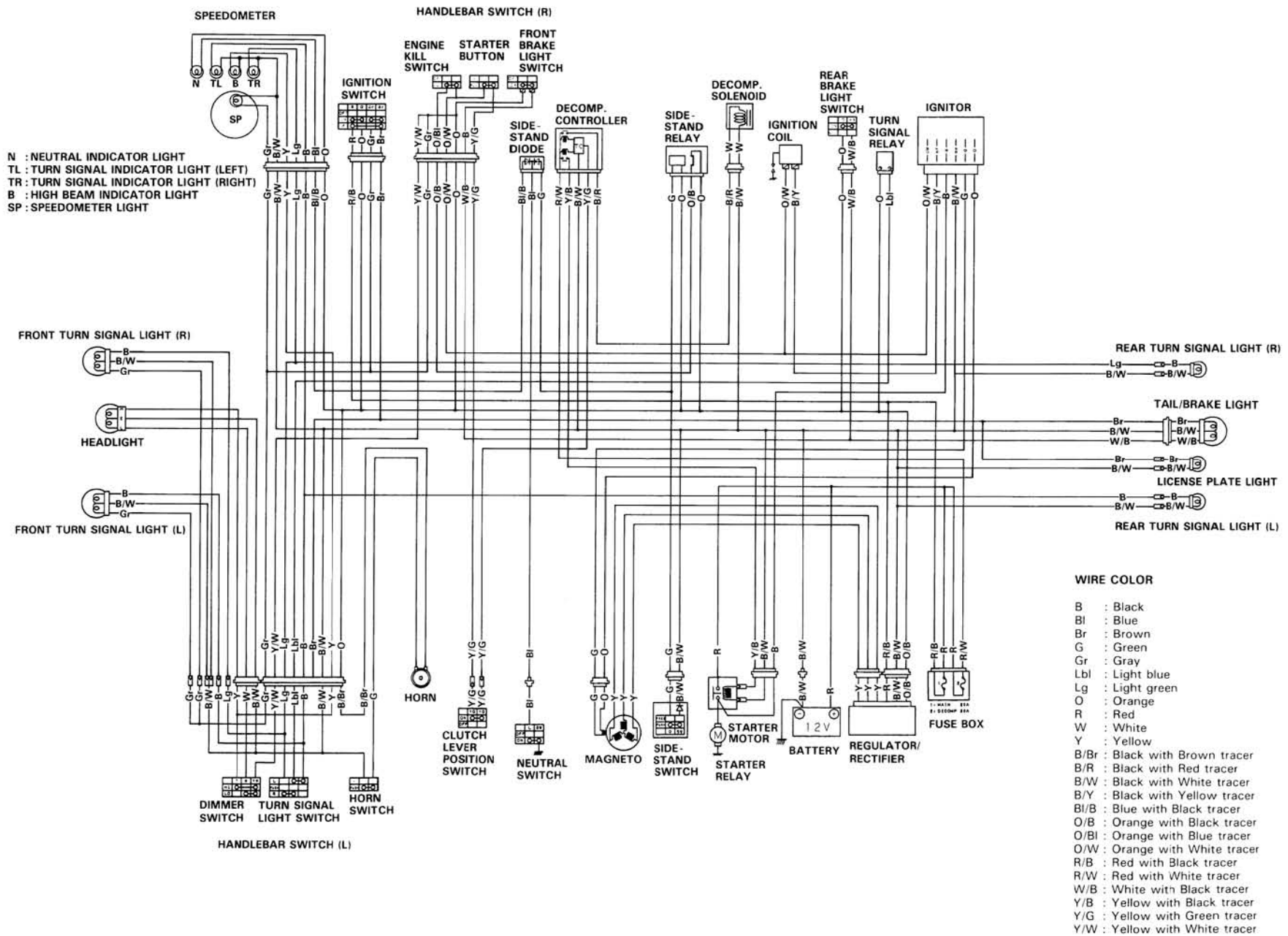
**NOTE:**

*This counted number is important when reassembling pilot screw to original position.*

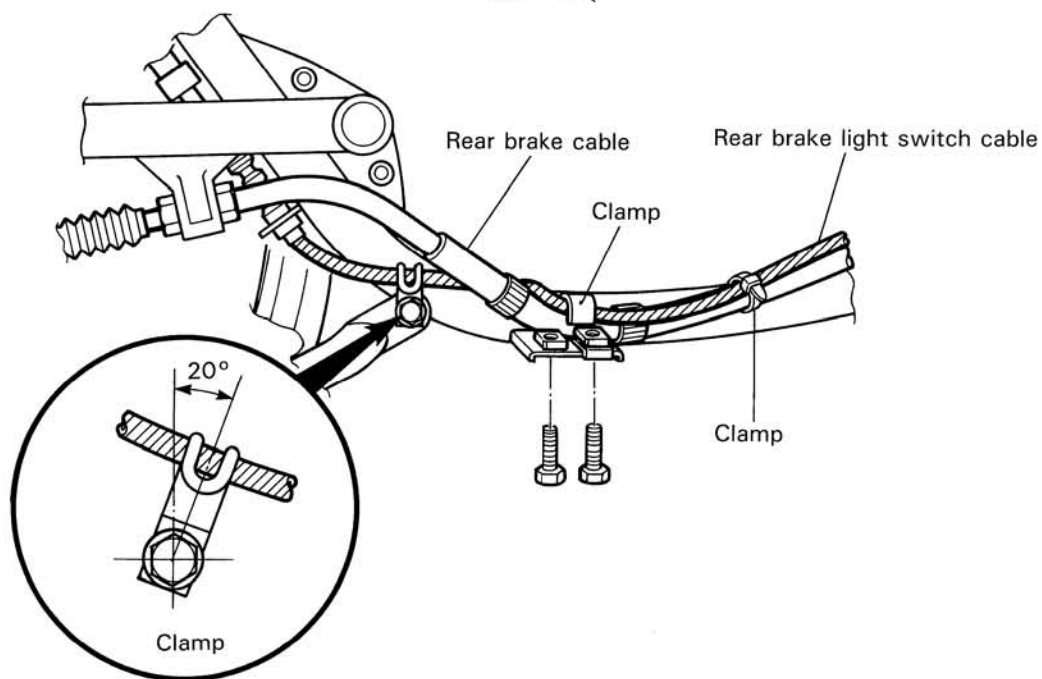
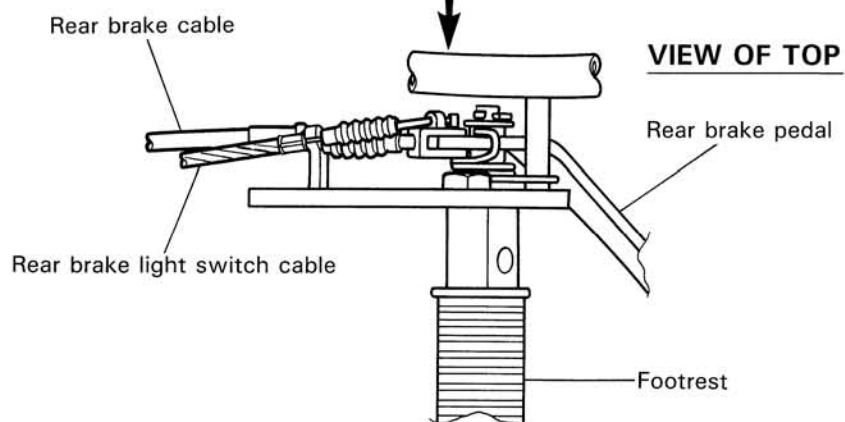
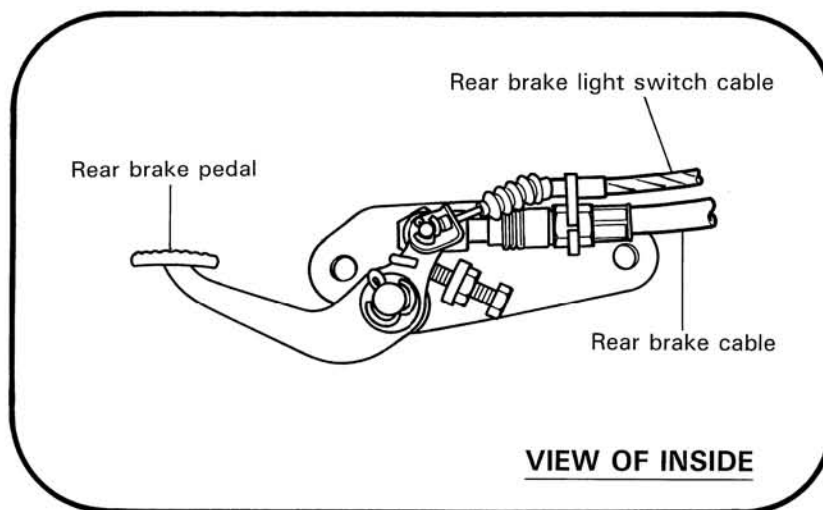
- When installing the pilot screw, turn it in fully but not tightly. From that position turn it out the same number as counted during removal.
- Install the new plug in the pilot screw hole.



# WIRING DIAGRAM



## REAR BRAKE CABLE ROUTING



# LS650T ('96-MODEL)

*This section describes service data, service specifications and servicing procedures which differ from those of the LS650S ('95-model).*

**NOTE:**

- Any differences between LS650S ('95-model) and LS650T ('96-model) in specifications and service data are clearly indicated with the asterisk marks (\*).
- Please refer to the sections 1 through 11 for details which are not given in this section.

**12**

## CONTENTS

<b>SPECIFICATIONS .....</b>	<b>12- 1</b>
<b>SERVICE DATA .....</b>	<b>12- 2</b>
<b>SERVICE INFORMATION .....</b>	<b>12-10</b>
<b>STARTER TORQUE LIMITER .....</b>	<b>12-10</b>
<b>IGNITOR UNIT .....</b>	<b>12-11</b>
<b>WIRING DIAGRAM .....</b>	<b>12-13</b>
<b>WIRE HARNESS ROUTING .....</b>	<b>12-14</b>



## SPECIFICATIONS

### DIMENSIONS AND DRY MASS

Overall length.....	2 180 mm (85.8 in) ... E-18,22
Overall width.....	*2 190 mm (86.2 in) ... Others
Overall height.....	* 775 mm (30.5 in)
Wheelbase.....	1 150 mm (45.3 in)
Ground clearance.....	*1 480 mm (58.3 in)
Seat height.....	130 mm ( 5.1 in)
Dry mass.....	700 mm (27.6 in)
	160 kg (352 lbs)
	161 kg (355 lbs) ... E-33

### ENGINE

Type.....	Four-stroke, air-cooled, OHC, TSCC
Valve clearance (IN & EX).....	0.08—0.13 mm (0.003—0.005 in)
Number of cylinder.....	1
Bore .....	94.0 mm (3.701 in)
Stroke .....	94.0 mm (3.701 in)
Piston displacement.....	652 cm <sup>3</sup> (39.8 cu. in)
Compression ratio.....	8.5 : 1
Carburetor.....	BS40, single
Air cleaner.....	Non-woven fabric element
Starter system.....	Starter motor
Lubrication system.....	Wet sump

### TRANSMISSION

Clutch.....	Wet multi-plate type
Transmission.....	5-speed constant mesh
Gearshift pattern.....	1-down, 4-up
Primary reduction ratio.....	1.810 (67/37)
Gear ratios, Low.....	2.333 (35/15)
2nd .....	1.578 (30/19)
3rd .....	1.142 (24/21)
4th .....	0.956 (22/23)
Top .....	0.884 (23/26)
Final reduction ratio.....	2.956 (68/23)
Drive system.....	Belt drive

### CHASSIS

Front suspension.....	Telescopic, coil spring, oil damped
Rear suspension.....	Swingarm, oil damped, spring pre-load 5-way adjustable
Front suspension stroke.....	140 mm (5.5 in)
Rear wheel travel.....	80 mm (3.1 in)
Caster.....	55°
Trail .....	147 mm (5.79 in)
Steering angle.....	42° (right & left)
Turning radius.....	2.6 m (8.5 ft)
Front brake.....	Disc brake, hydraulically operated
Rear brake.....	Internal expanding
Front tire size.....	100/90-19 57H
Rear tire size.....	140/80-15 M/C 67H

### ELECTRICAL

Ignition type.....	Electronic ignition (Transistorized)
Ignition timing.....	5° B.T.D.C. below 2 000 r/min and 30° B.T.D.C. above 4 000 r/min
Spark plug.....	NGK DPR8EA-9 or NIPPONDENSO X24EPR-U9
Battery.....	12V 50.4 kC (14 Ah)/10 HR
Generator.....	Three phase A.C. generator
Fuses.....	20A
Headlight.....	12V 60/55W
Parking or city light.....	12V 3.4W ... E-02
	12V 4W ... Others (Except E-03,28,33)
Running/Turn signal light.....	12V 5/21W ... E-03,28,33
Turn signal light.....	12V 21W ... Others
Tail/Brake light.....	12V 5/21W
License plate light.....	12V 8W
Speedometer light.....	12V 3.4W
Neutral indicator light.....	12V 3.4W
High beam indicator light.....	12V 1.7W
Turn signal indicator light.....	12V 3.4W

### CAPACITIES

Fuel tank including reserve.....	10.5 L (2.8/2.3 US/Imp gal)
Reserve.....	2.5 L (0.6/0.5 US/Imp gal)
Engine oil, oil change.....	1 800 ml (1.9/1.6 US/Imp qt)
with filter change.....	2 400 ml (2.5/2.1 US/Imp qt)

**SERVICE DATA****VALVE + GUIDE**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	28 (1.1)	—
Valve lift	IN.	8.5 (0.33)	—
	EX.	8.5 (0.33)	—
Valve clearance (when cold)	IN. & EX.	0.08–0.13 (0.003–0.005)	—
Valve guide to valve stem clearance	IN.	0.025–0.055 (0.0010–0.0022)	—
	EX.	0.040–0.070 (0.0016–0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	7.000–7.015 (0.2756–0.2762)	—
Valve stem O.D.	IN.	6.960–6.975 (0.2740–0.2746)	—
	EX.	6.945–6.960 (0.2734–0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.9 (0.11)
Valve seat width	IN. & EX.	1.0–1.2 (0.039–0.047)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (IN. & EX.)	INNER	—	35.6 (1.40)
	OUTER	—	40.4 (1.59)
Valve spring tension (IN. & EX.)	INNER	6.9–8.5 kg (15.2–18.7 lbs) at length 31.0 mm (1.2 in)	—
	OUTER	16.4–18.8 kg (36.2–41.4 lbs) at length 33.0 mm (1.3 in)	—

**CAMSHAFT + CYLINDER HEAD**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174–36.214 (1.4242–1.4257)	35.880 (1.4126)
	EX.	36.419–36.459 (1.4338–1.4354)	36.120 (1.4220)

ITEM	STANDARD		LIMIT
Camshaft journal oil clearance	0.032–0.066 (0.0013–0.0026)		0.150 (0.0060)
Camshaft journal holder I.D.	Left	20.012–20.025 (0.7879–0.7884)	—
	Right & Center	25.012–25.025 (0.9847–0.9852)	—
Camshaft journal O.D.	Left	19.959–19.976 (0.7858–0.7865)	—
	Right & Center	24.959–24.976 (0.9826–0.9833)	—
Camshaft runout	—		0.10 (0.004)
Rocker arm I.D.	IN. & EX.	12.000–12.018 (0.4724–0.4731)	—
Rocker arm shaft O.D.	IN. & EX.	11.966–11.984 (0.4711–0.4718)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
De-comp. cable play	3–5 (0.12–0.20)		—

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	1 000–1 400 kPa (10–14 kg/cm <sup>2</sup> ) (142–200 psi)		800 kPa (8 kg/cm <sup>2</sup> ) (114 psi)
Piston to cylinder clearance	0.050–0.060 (0.0020–0.0024)		0.120 (0.0047)
Cylinder bore	94.000–94.015 (3.7008–3.7014)		94.080 (3.7039)
Piston diam.	93.945–93.960 (3.6986–3.6992) Measure at 20 (0.8) from the skirt end.		93.880 (3.6961)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st	T Approx. 11.5 (0.45)	9.2 (0.36)
	2nd	T Approx. 14.0 (0.55)	11.2 (0.44)
Piston ring end gap	1st	0.30–0.45 (0.012–0.018)	1.00 (0.039)
	2nd	0.25–0.40 (0.010–0.016)	1.00 (0.039)
Piston ring to groove clearance	1st	—	0.18 (0.007)
	2st	—	0.15 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23–1.25 (0.0484–0.0492)	—
	2nd	1.21–1.23 (0.0476–0.0484)	—
	Oil	2.81–2.83 (0.1106–0.1114)	—
Piston ring thickness	1st	1.175–1.190 (0.0463–0.0469)	—
	2nd	1.175–1.190 (0.0463–0.0469)	—
Piston pin bore	23.000–23.006 (0.9055–0.9057)		23.030 (0.9067)
Piston pin O.D.	22.996–23.000 (0.9054–0.9055)		22.980 (0.9047)

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006–23.014 (0.9057–0.9061)	23.040 (0.9071)
Conrod deflection	—	3.0 (0.12)
Conrod big end side clearance	0.10–0.65 (0.004–0.026)	1.0 (0.039)
Conrod big end width	24.95–25.00 (0.982–0.984)	—
Crank web to web width	70.0±0.1 (2.756±0.004)	—
Crankshaft runout	—	0.05 (0.002)
Balancer spring free length	—	10.0 (0.39)

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 (68/36 x 35/30)	—
Oil pressure (at 60°C, 140°F)	Above 50 kPa (0.50 kg/cm <sup>2</sup> , 7.1 psi) Below 75 kPa (0.75 kg/cm <sup>2</sup> , 10.7 psi) at 3 000 r/min.	—

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10–15 (0.4–0.6)		—
Drive plate thickness	No.1	2.92–3.08 (0.115–0.121)	2.62 (0.103)
	No.2	3.45–3.55 (0.136–0.140)	3.15 (0.124)

ITEM	STANDARD		LIMIT
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.0 (0.591)
	No.2	15.9—16.0 (0.626—0.630)	15.1 (0.594)
Driven plate distortion	—		0.1 (0.004)
Clutch spring free length	—		33.0 (1.30)

**TRANSMISSION + DRIVE BELT**

Unit: mm (in) Except ratio

ITEM	STANDARD		LIMIT
Primary reduction ratio	1.810 (67/37)		—
Final reduction ratio	2.956 (68/23)		—
Gear ratios	Low	2.333 (35/15)	—
	2nd	1.578 (30/19)	—
	3rd	1.142 (24/21)	—
	4th	0.956 (22/23)	—
	Top	0.884 (23/26)	—
Shift fork to groove clearance	0.10—0.30 (0.004—0.012)		0.50 (0.020)
Shift fork groove width	3rd drive gear	5.50—5.60 (0.217—0.220)	—
	4th driven gear	5.50—5.60 (0.217—0.220)	—
	Top driven gear	5.50—5.60 (0.217—0.220)	—
Shift fork thickness	No.1, No.2 & No.3	5.30—5.40 (0.209—0.213)	—
Drive belt	Type	BANDO: 133U-14M 40.0	—
	Number of teeth	133	—
Gearshift lever height	60 (2.4)		—

**CARBURETOR**

ITEM	SPECIFICATION	
	E-03,28	E-33
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm	←
I.D. No.	24C4	24C5
Idle r/min.	1 100 ± 100 r/min	←
Float height	27.95 ± 1.0 mm (1.1 ± 0.04 in)	←
Main jet (M.J.)	#145	←
Jet needle (J.N.)	5C39	←
Needle jet (N.J.)	X-7M	←
Throttle valve (Th.V.)	#120	←
Pilot jet (P.J.)	#52.5	←
Pilot screw (P.S.)	PRE-SET	←
Throttle cable play	3—6 mm (0.1—0.2 in)	

**\*CARBURETOR**

ITEM	SPECIFICATION		
	E-02,04,25,53	E-17,22	E-18
Carburetor type	MIKUNI BS40SS	←	←
Bore size	40 mm	←	←
I.D. No.	24C6	24C7	24C2
Idle r/min.	1 100 ± 100 r/min	←	←
Float height	27.95 ± 1.0 mm (1.1 ± 0.04 in)	←	←
Main jet (M.J.)	#125	←	#130
Jet needle (J.N.)	5C40-2nd	←	5C16-2nd
Needle jet (N.J.)	X-7	←	X-6
Throttle valve (Th.V.)	#120	←	#125
Pilot jet (P.J.)	#47.5	←	←
Pilot screw (P.S.)	PRE-SET (1-¾ turns back)	PRE-SET (1-½ turns back)	PRE-SET (2-⅝ turns back)
Throttle cable play	3—6 mm (0.1—0.2 in)		

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		5° ± 2° B.T.D.C. at 2 000 r/min. and 30° ± 2° B.T.D.C. at 4 000 r/min.		
Spark plug		Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
		Gap	0.8–0.9 (0.031–0.035)	
Spark performance		Over 8 (0.3) at 1 atm.		
Solenoid resistance		0.1–1.0 Ω		
Pick-up coil resistance		170–270 Ω		O/G
Ignition coil resistance		Primary	1–7 Ω	O/W–Ground
		Secondary	10–25 kΩ	Plug cap– Ground
Generator no-load voltage		More than 100 V (AC) at 5 000 r/min.		
Regulated voltage		14.0–15.5 V at 5 000 r/min.		
Starter relay resistance		2–6 Ω		
Battery	Type designation	YB14L-B2		
	Voltage	12V		
	Capacity	50.4 kC (14 Ah)/10 HR		
	Standard electrolyte S.G.	1.28 at 20°C (68°F)		
Fuse size		20A		

**WATTAGE**

Unit:W

ITEM		SPECIFICATION		
		E-03,28,33	E-02	Others
Headlight	HI	60	←	←
	LO	55	←	←
Parking or City light		/	3.4	4
Tail/Brake light		5/21	←	←
Turn signal light		21	←	←
Running light (within front turn signal light)		5	/	/
Speedometer light		3	←	←
Turn signal indicator light		3	←	←
High beam indicator light		1.7	←	←
Neutral indicator light		3	←	←
License light		8	←	←



**BRAKE + WHEEL**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20–30 (0.8–1.2)		—
Rear brake pedal height	60 (2.4)		—
Brake drum I.D.	Rear	—	160.7 (6.33)
Brake lining thickness	Rear	—	1.5 (0.06)
Brake disc thickness	Front	$4.5 \pm 0.2$ ( $0.18 \pm 0.01$ )	4.0 (0.16)
Brake disc runout	Front	—	0.30 (0.012)
Master cylinder bore	Front	12.700–12.743 (0.4999–0.5017)	—
Master cylinder piston diam.	Front	12.657–12.684 (0.4983–0.4994)	—
Brake caliper cylinder bore	Front	42.850–42.926 (1.6870–1.6900)	—
Brake caliper piston diam.	Front	42.770–42.820 (1.6839–1.6858)	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Tire size	Front	100/90-19 57H	—
	Rear	140/80-15 M/C 67H	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

**SUSPENSION**

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 (5.5)	—	
Front fork spring free length	—	392.5 (15.45)	
Front fork oil level	75.0 (2.95)	—	
Rear wheel travel	80 (3.1)	—	
Swingarm pivot shaft runout	—	0.3 (0.001)	

**TIRE PRESSURE**

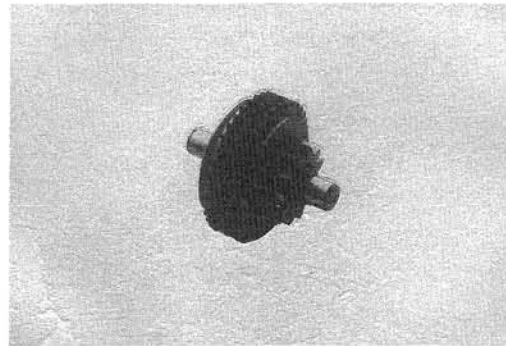
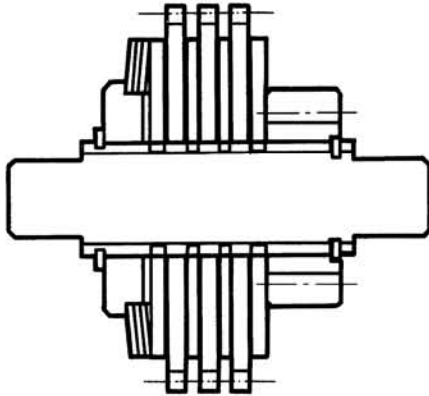
COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm <sup>2</sup>	psi	kPa	kg/cm <sup>2</sup>	psi
FRONT	200	2.00	28	200	2.00	28
REAR	225	2.25	32	250	2.50	36

**FUEL + OIL**

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 85 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.		Others
Fuel tank including reserve	10.5 L (2.8/2.3 US/lmp gal)		
reserve	2.5 L (0.66/0.55 US/lmp gal)		
Engine oil type	SAE 10W/40, API SE, SF or SG		
Engine oil capacity	Change	1 800 ml (1.9/1.6 US/lmp qt)	
	Filter change	2 400 ml (2.5/2.1 US/lmp qt)	
	Overhaul	2 400 ml (2.5/2.1 US/lmp qt)	
Front fork oil type	Fork oil # 15		
Front fork oil capacity (each leg)	447 ml (15.11/15.74 US/lmp oz)		spacer L:135 mm
Brake fluid type	DOT4		

## SERVICE INFORMATION

### STARTER TORQUE LIMITER



#### INSPECTION

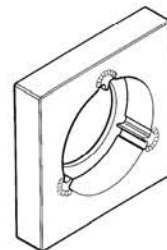
- Check the slip torque with the special tools.



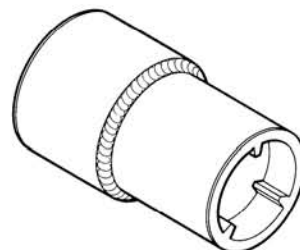
**\*09930-73130: Starter torque limiter holder**

**\*09930-73140: Starter torque limiter socket**

Asterisk mark indicates the new special tool.



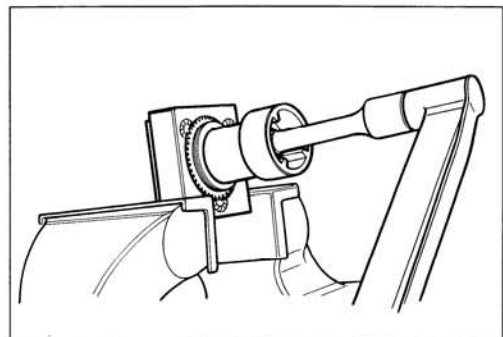
09930-73130



09930-73140

- Set the starter torque limiter to the special tools and vise as shown in the illustration.
- If the slip torque is not within the specification, replace the starter torque limiter with a new one.

**Slip torque: 20–40 N·m (2.0–4.0 kg-m, 14.5–29.0 lb-ft)**



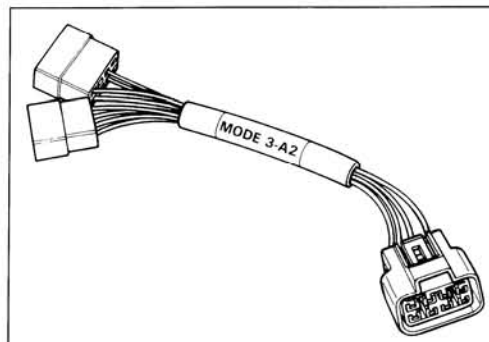
## IGNITOR UNIT

### INSPECTION (Checking with Digital Ignitor Checker)

This section explains the checking procedure for the ignitor unit using Digital Ignitor Checker (special tool).

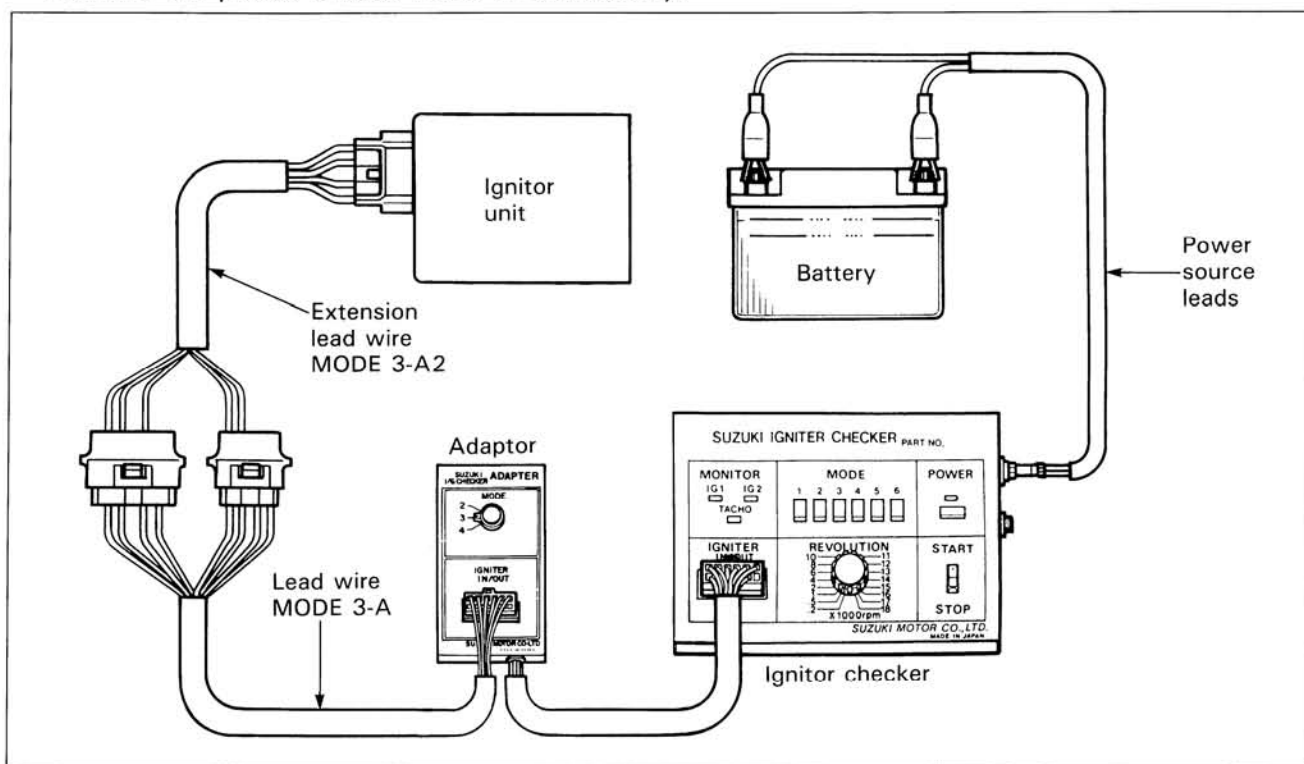
With this checker, the ignitor unit can be checked either on the machine or off the machine. The following explains the checking procedure on the machine.

- TOOL**
- 09931-94490: Digital ignitor checker
  - 09931-94460: Adaptor
  - \*09931-94450: Lead wire MODE 3-A
  - \*09931-61730: Extension lead wire MODE 3-A2
- Asterisk mark indicates the new special tool.



### WIRING PROCEDURE:

- Remove the seat and left frame cover.
- Disconnect the ignitor lead wire couplers at the ignitor unit.
- Connect the power source lead wire, ignitor checker lead wire "MODE 3-A", extension lead wire "MODE 3-A2" and adaptor as shown in the following illustration.
- Connect the power source leads to the battery.



### CAUTION

- \* Be sure that the **BLACK** lead is connected to the battery  $\ominus$  terminal and **RED** lead to the  $\oplus$  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**

Set the MODE switch on the adaptor to "3" position and depress "MODE 3" button then "POWER" button. This time, "POWER" lamp should come on, if not, battery is undercharged.

**Second Step:**

Set "REVOLUTION" dial pointer to ".5" position in which the checker produces the ignition primary current pulses simulating 500 r/min of engine revolution when "START" switch is turned on. With "START" switch is turned to ON position, check the MONITOR "IG2" lamp turn on and off in slow frequency as illustrated.

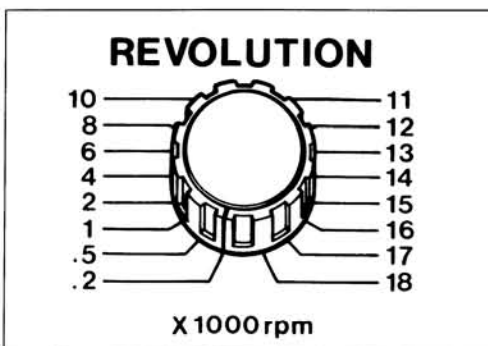
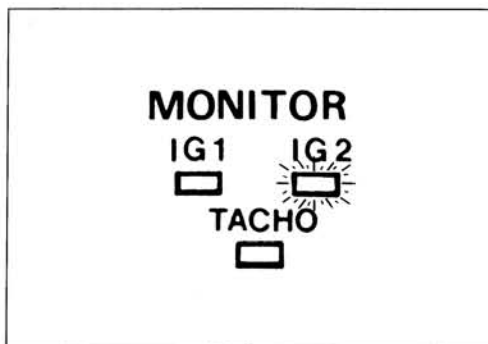
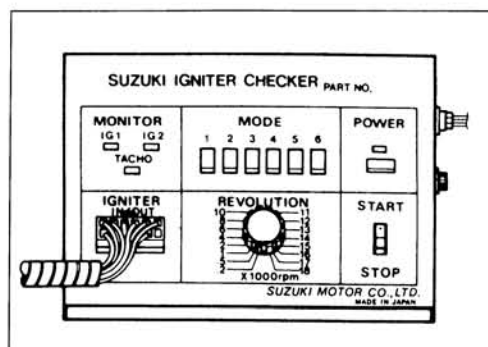
**Third Step:**

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), the IG2 lamp should show continuously lighted.

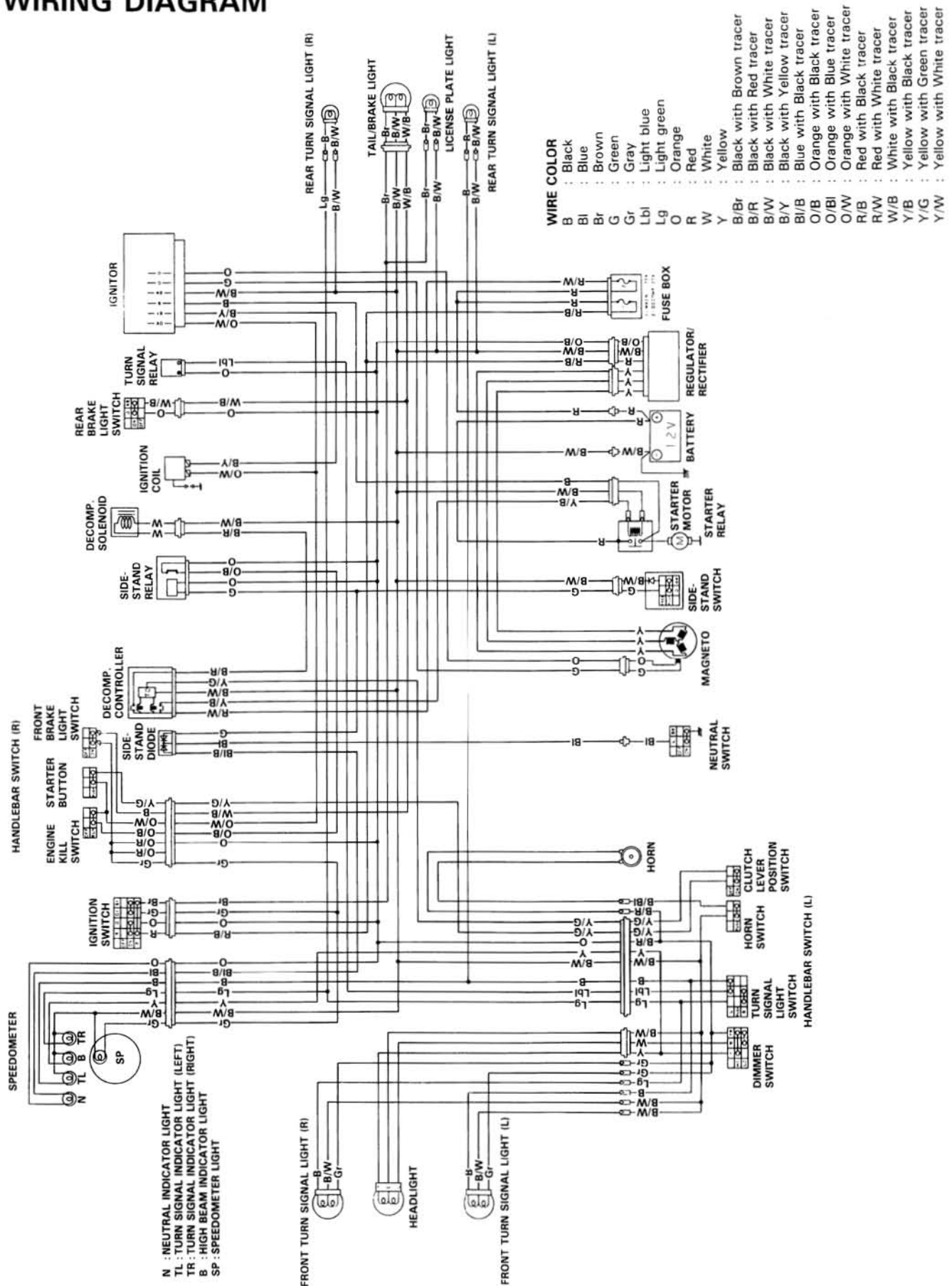
When REVOLUTION dial pointer reaches between "8" and "11" (8 000-11 000 r/min), MONITOR "IG2" lamp should go off. This is because the ignition "cut-off" provided in the LS650T ignition system functions at  $10\,000 \pm 100$  r/min. If the lamp go off at the graduation below "8", the engine can not perform properly and therefore the ignitor unit must be replaced.

**Fourth Step:**

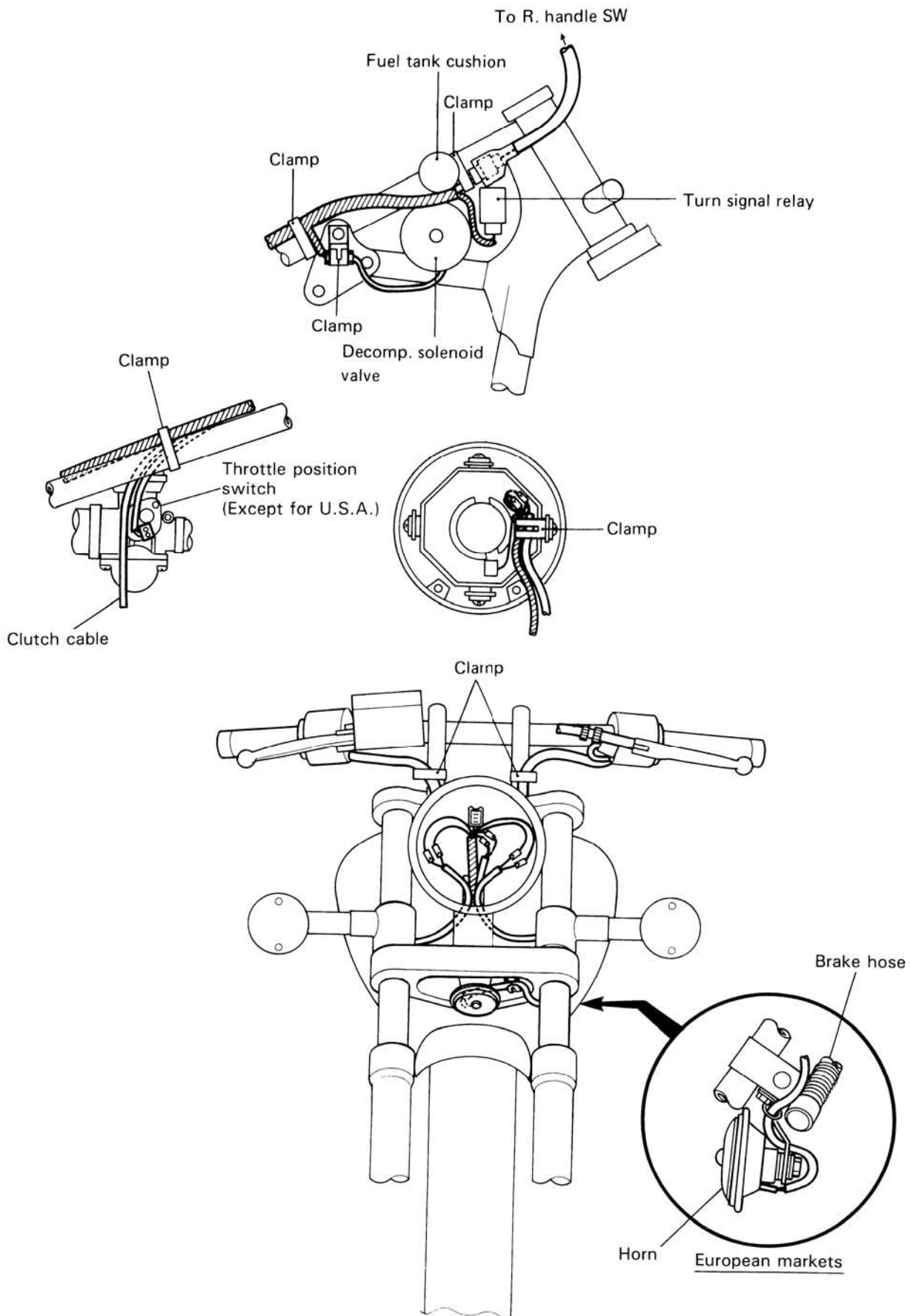
Set "REVOLUTION" dial pointer to ".5" position and turn "START" switch to STOP position. If the "IG2" lamp remain light more than 6 seconds, the ignitor unit must be replaced.



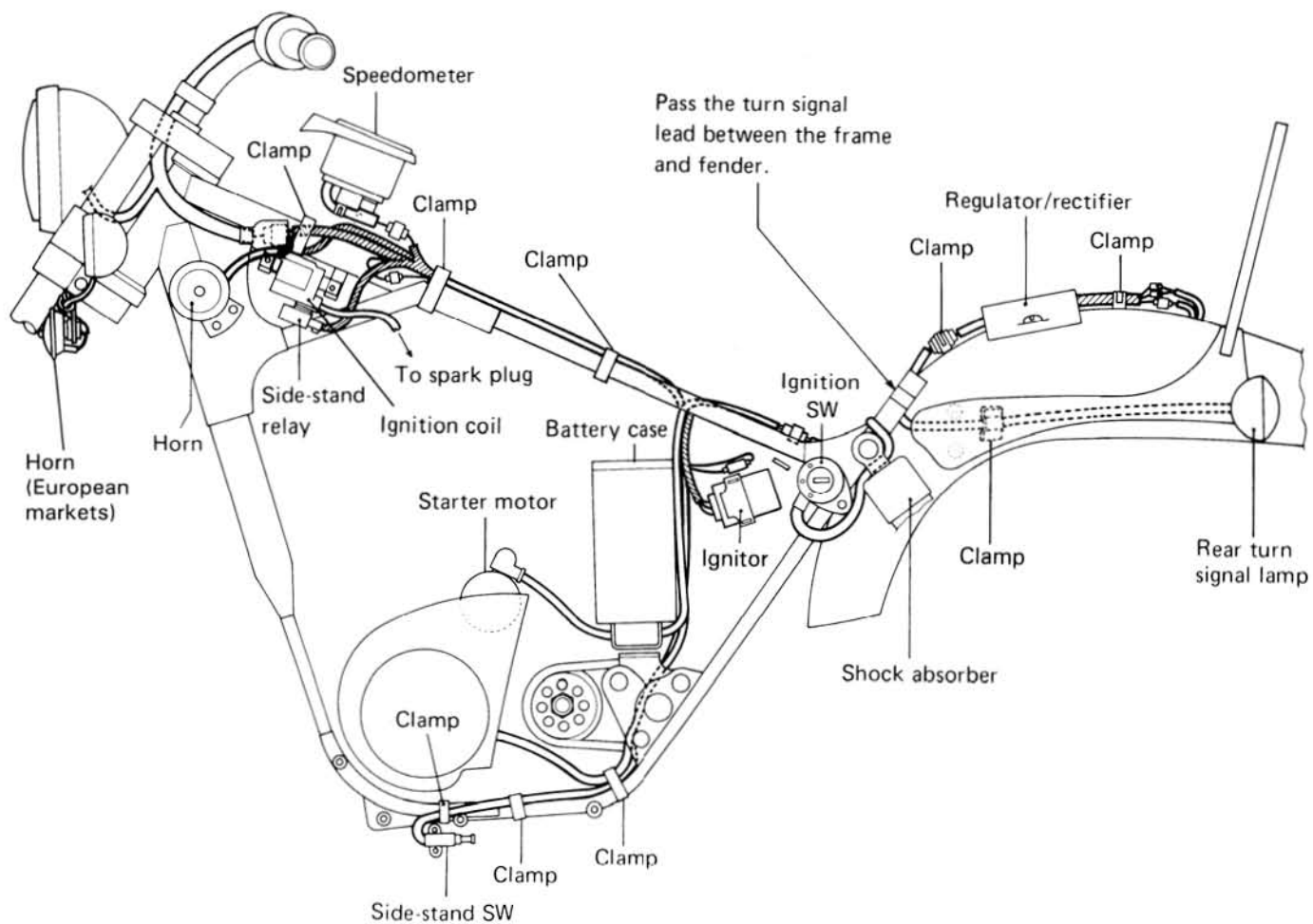
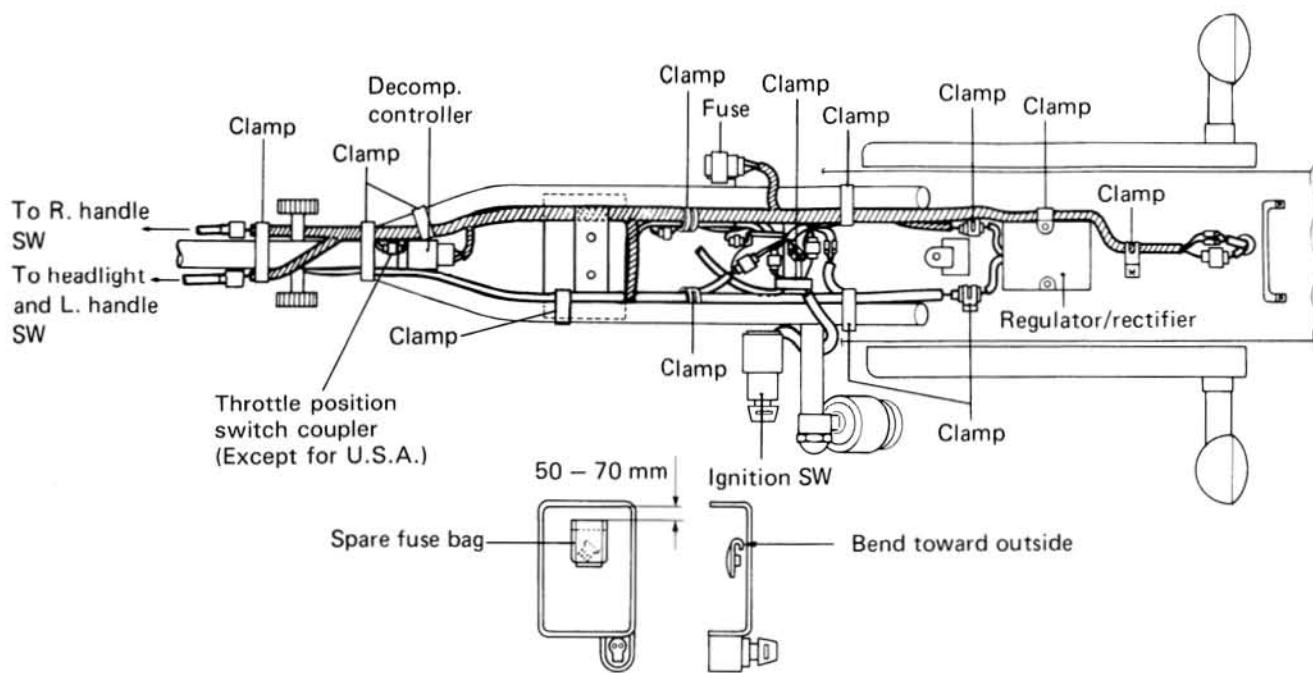
## WIRING DIAGRAM



## WIRE HARNESS ROUTING







# **LS650V/W/X/Y/K1/K2/K3 ( '97/'98/'99/'00/'01/'02/'03-MODELS)**

## **CONTENTS**

<b>SPECIFICATIONS . . . . .</b>	<b>13- 1</b>
<b>SERVICE DATA . . . . .</b>	<b>13- 2</b>

**NOTE:**

*The specifications and service data are the same as those of the T-MODEL.*

# SPECIFICATIONS

## DIMENSIONS AND DRY MASS

Overall length.....	2 190 mm (86.2 in) . . . . . E-17, 18, 22
	2 180 mm (85.8 in) . . . . . Others
Overall width.....	775 mm (30.5 in)
Overall height.....	1 150 mm (45.3 in)
Wheelbase.....	1 480 mm (58.3 in)
Ground clearance.....	135 mm ( 5.3 in)
Seat height.....	700 mm (27.6 in)
Dry mass.....	161 kg (355 lbs). . . . . E-33
	160 kg (352 lbs). . . . . Others

## ENGINE

Type.....	Four-stroke, air-cooled, OHC, TSCC
Valve clearance (IN & EX).....	0.08—0.13 mm (0.003—0.005 in)
Number of cylinder.....	1
Bore.....	94.0 mm (3.701 in)
Stroke.....	94.0 mm (3.701 in)
Displacement.....	652 cm <sup>3</sup> (39.8 cu. in)
Compression ratio.....	8.5 : 1
Carburetor.....	BS40, single
Air cleaner.....	Non-woven fabric element
Starter system.....	Starter motor
Lubrication system.....	Wet sump

## TRANSMISSION

Clutch.....	Wet multi-plate type
Transmission.....	5-speed constant mesh
Gearshift pattern.....	1-down, 4-up
Primary reduction ratio.....	1.810 (67/37)
Gear ratios, Low.....	2.333 (35/15)
2nd.....	1.578 (30/19)
3rd.....	1.142 (24/21)
4th.....	0.956 (22/23)
Top.....	0.884 (23/26)
Final reduction ratio.....	2.956 (68/23)
Drive system.....	Belt drive

## CHASSIS

Front suspension.....	Telescopic, coil spring, oil damped
Rear suspension.....	Swing arm, oil damped, spring preload 5-way adjustable
Front suspension stroke.....	140 mm (5.5 in)
Rear wheel travel.....	80 mm (3.1 in)
Caster.....	35°
Trail.....	147 mm (5.79 in)
Steering angle.....	42° (right & left)
Turning radius.....	2.6 m (8.5 ft)
Front brake.....	Disk brake
Rear brake.....	Drum brake
Front tire size.....	100/90-19 57H
Rear tire size.....	140/80-15 M/C 67H

## ELECTRICAL

Ignition type.....	Electronic ignition (Transistorized)
Ignition timing.....	5° B.T.D.C. below 2 000 r/min
Spark plug.....	NGK DPR8EA-9 or NIPPONDENSO X24EPR-U9
Battery.....	12V 50.4 kC (14 Ah)/10 HR
Generator.....	Three phase A.C. generator
Fuse.....	20A
Headlight.....	12V 60/55W
Turn signal light.....	12V 21W
Parking or city light.....	12V 3.4W . . . . . E-02
	12V 4W . . . . . Others (Except E-03, 28, 33)
Tail/Brake light.....	12V 5/21W
Running light.....	12V 5W . . . . . E-03, 28, 33
License plate light.....	12V 8W . . . . . E-03, 28, 33
	12V 5W . . . . . Others
Speedometer light.....	12V 3.4W
Neutral indicator light.....	12V 3.4W
High beam indicator light.....	12V 1.7W
Turn signal indicator light.....	12V 3.4W

## CAPACITIES

Fuel tank including reserve.....	10.5 L (2.8/2.3 US/Imp gal)
Reserve.....	2.5 L (0.6/0.5 US/Imp gal)
Engine oil, oil change.....	1 800 ml (1.9/1.6 US/Imp qt)
with filter change.....	2 400 ml (2.5/2.1 US/Imp qt)

## SERVICE DATA

### VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	28 (1.1)	—
Valve lift	IN.	8.5 (0.33)	—
	EX.	8.5 (0.33)	—
Valve clearance (when cold)	IN. & EX.	0.08–0.13 (0.003–0.005)	—
Valve guide to valve stem clearance	IN.	0.025–0.055 (0.0010–0.0022)	—
	EX.	0.040–0.070 (0.0016–0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	7.000–7.015 (0.2756–0.2762)	—
Valve stem O.D.	IN.	6.960–6.975 (0.2740–0.2746)	—
	EX.	6.945–6.960 (0.2734–0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.9 (0.11)
Valve seat width	IN. & EX.	1.0–1.2 (0.039–0.047)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (IN. & EX.)	INNER	—	35.6 (1.40)
	OUTER	—	40.4 (1.59)
Valve spring tension (IN. & EX.)	INNER	6.9–8.5 kg (15.2–18.7 lbs) at length 31.0 mm (1.2 in)	—
	OUTER	16.4–18.8 kg (36.2–41.4 lbs) at length 33.0 mm (1.3 in)	—

### CAMSHAFT + CYLINDER HEAD

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174–36.214 (1.4242–1.4257)	35.880 (1.4126)
	EX.	36.419–36.459 (1.4338–1.4354)	36.120 (1.4220)

ITEM	STANDARD		LIMIT
Camshaft journal oil clearance	0.032—0.066 (0.0013—0.0026)		0.150 (0.0060)
Camshaft journal holder I.D.	Left	20.012—22.025 (0.7879—0.7884)	—
	Right & Center	25.012—25.025 (0.9847—0.9852)	—
Camshaft journal O.D.	Left	19.959—19.976 (0.7858—0.7865)	—
	Right & Center	24.959—24.976 (0.9826—0.9833)	—
Camshaft runout	—		0.10 (0.004)
Rocker arm I.D.	IN. & EX.	12.000—12.018 (0.4724—0.4731)	—
Rocker arm shaft O.D.	IN. & EX.	11.966—11.984 (0.4711—0.4718)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
De-comp. cable play	3—5 (0.12—0.20)		—

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	1 000—1 400 kPa (10—14 kg/cm <sup>2</sup> ) (142—200 psi)		800 kPa (8 kg/cm <sup>2</sup> ) (114 psi)
Piston to cylinder clearance	0.050—0.060 (0.0020—0.0024)		0.120 (0.0047)
Cylinder bore	94.000—94.015 (3.7008—3.7014)		94.080 (3.7039)
Piston diam.	93.945—93.960 (3.6986—3.6992) Measure at 20 (0.8) from the skirt end.		93.880 (3.6961)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st	T Approx. 11.5 (0.45)	9.2 (0.36)
	2nd	T Approx. 14.0 (0.55)	11.2 (0.44)
Piston ring end gap	1st	0.30—0.45 (0.012—0.018)	1.00 (0.039)
	2nd	0.25—0.40 (0.010—0.016)	1.00 (0.039)
Piston ring to groove clearance	1st	—	0.18 (0.007)
	2nd	—	0.15 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23–1.25 (0.0484–0.0492)	—
	2nd	1.21–1.23 (0.0476–0.0484)	—
	Oil	2.81–2.83 (0.1106–0.1114)	—
Piston ring thickness	1st	1.175–1.190 (0.0463–0.0469)	—
	2nd	1.175–1.190 (0.0463–0.0469)	—
Piston pin bore	23.000–23.006 (0.9055–0.9057)		23.030 (0.9067)
Piston pin O.D.	22.996–23.000 (0.9054–0.9055)		22.980 (0.9047)

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006–23.014 (0.9057–0.9061)	23.040 (0.9071)
Conrod deflection	—	3.0 (0.12)
Conrod big end side clearance	0.10–0.65 (0.004–0.026)	1.0 (0.039)
Conrod big end width	24.95–25.00 (0.982–0.984)	—
Crank web to web width	70.0±0.1 (2.756±0.004)	—
Crankshaft runout	—	0.05 (0.002)
Balancer spring free length	—	10.0 (0.39)

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 (68/36 x 35/30)	—
Oil pressure (at 60°C, 140°F)	Above 50 kPa (0.50 kg/cm <sup>2</sup> , 7.1 psi) Below 75 kPa (0.75 kg/cm <sup>2</sup> , 10.7 psi) at 3 000 r/min.	—

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10–15 (0.4–0.6)		—
Drive plate thickness	No.1	2.92–3.08 (0.115–0.121)	2.62 (0.103)
	No.2	3.45–3.55 (0.136–0.140)	3.15 (0.124)

ITEM	STANDARD		LIMIT
Drive plate claw width	No.1	15.8—16.0 (0.622—0.630)	15.0 (0.591)
	No.2	15.9—16.0 (0.626—0.630)	15.1 (0.594)
Driven plate distortion	—		0.1 (0.004)
Clutch spring free length	—		33.0 (1.30)

**TRANSMISSION + DRIVE BELT**

Unit: mm (in) Except ratio

ITEM	STANDARD		LIMIT
Primary reduction ratio	1.810 (67/37)		—
Final reduction ratio	2.956 (68/23)		—
Gear ratios	Low	2.333 (35/15)	—
	2nd	1.578 (30/19)	—
	3rd	1.142 (24/21)	—
	4th	0.956 (22/23)	—
	Top	0.884 (23/26)	—
Shift fork to groove clearance	0.10—0.30 (0.004—0.012)		0.50 (0.020)
Shift fork groove width	3rd drive gear	5.50—5.60 (0.217—0.220)	—
	4th driven gear	5.50—5.60 (0.217—0.220)	—
	Top driven gear	5.50—5.60 (0.217—0.220)	—
Shift fork thickness	No.1, No.2 & No.3	5.30—5.40 (0.209—0.213)	—
Drive belt	Type	BANDO: 133U-14M 40.0	—
	Number of teeth	133	—
Gearshift lever height	60 (2.4)		—



**CARBURETOR**

ITEM	SPECIFICATION	
	E-03,28	E-33
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm	←
I.D. No.	24C4	24C5
Idle r/min.	1 100 ± 100 r/min	←
Float height	27.95 ± 1.0 mm (1.1 ± 0.04 in)	←
Main jet (M.J.)	#145	←
Jet needle (J.N.)	5C39	←
Needle jet (N.J.)	X-7M	←
Throttle valve (Th.V.)	#120	←
Pilot jet (P.J.)	#52.5	←
Pilot screw (P.S.)	PRE-SET	←
Throttle cable play	3—6 mm (0.1—0.2 in)	

**CARBURETOR**

ITEM	SPECIFICATION		
	E-02,04,25,53	E-17,22	E-18
Carburetor type	MIKUNI BS40SS	←	←
Bore size	40 mm	←	←
I.D. No.	24C6	24C7	24C2
Idle r/min.	1 100 ± 100 r/min	←	1 250 <sup>+100</sup> / <sub>-100</sub> r/min
Float height	27.95 ± 1.0 mm (1.1 ± 0.04 in)	←	←
Main jet (M.J.)	#125	←	#130
Jet needle (J.N.)	5C40-2nd	←	5C16-2nd
Needle jet (N.J.)	X-7	←	X-6
Throttle valve (Th.V.)	#120	←	#125
Pilot jet (P.J.)	#47.5	←	←
Pilot screw (P.S.)	PRE-SET (1-¾ turns back)	PRE-SET (1-½ turns back)	PRE-SET (2-⅝ turns back)
Throttle cable play	3—6 mm (0.1—0.2 in)		

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION		NOTE
Ignition timing		5° ± 2° B.T.D.C. at 2 000 r/min. and 30° ± 2° B.T.D.C. at 4 000 r/min.		
Spark plug	Type	NGK: DPR8EA-9 N.D.: X24EPR-U9		
	Gap	0.8—0.9 (0.031—0.035)		
Spark performance		Over 8 (0.3) at 1 atm.		
Solenoid resistance		0.1—1.0 Ω		
Pick-up coil resistance		170—270 Ω		O/G
Ignition coil resistance	Primary	1—7 Ω		O/W—Ground
	Secondary	10—25 kΩ		Plug cap— Ground
Generator no-load voltage		More than 100 V (AC) at 5 000 r/min.		
Regulated voltage		14.0—15.5 V at 5 000 r/min.		
Starter relay resistance		2—6 Ω		
Battery	Type designation	YB14L-B2		
	Voltage	12V		
	Capacity	50.4 kC (14 Ah)/10 HR		
	Standard electrolyte S.G.	1.28 at 20°C (68°F)		
Fuse size		20A		

**WATTAGE**

Unit:W

ITEM		SPECIFICATION		
		E-03,28,33	E-02	Others
Headlight	HI	60	←	←
	LO	55	←	←
Parking or City light			3.4	4
Tail/Brake light		5/21	←	←
Turn signal light		21	←	←
Running light (within front turn signal light)		5		
Speedometer light		3.4	←	←
Turn signal indicator light		3.4	←	←
High beam indicator light		1.7	←	←
Neutral indicator light		3.4	←	←
License light		8	5	←

**BRAKE + WHEEL**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20—30 (0.8—1.2)		—
Rear brake pedal height	60 (2.4)		—
Brake drum I.D.	Rear	—	160.7 (6.33)
Brake lining thickness	Rear	—	1.5 (0.06)
Brake disc thickness	Front	$4.5 \pm 0.2$ ( $0.18 \pm 0.01$ )	4.0 (0.16)
Brake disc runout	Front	—	0.30 (0.012)
Master cylinder bore	Front	12.700—12.743 (0.4999—0.5017)	—
Master cylinder piston diam.	Front	12.657—12.684 (0.4983—0.4994)	—
Brake caliper cylinder bore	Front	42.850—42.926 (1.6870—1.6900)	—
Brake caliper piston diam.	Front	42.770—42.820 (1.6839—1.6858)	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	J19 × 2.15	—
	Rear	J15M/C × 2.75	—
Tire size	Front	100/90-19 57H	—
	Rear	140/80-15 M/C 67H	—
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

**SUSPENSION**

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 (5.5)	—	
Front fork spring free length	—	392.5 (15.45)	
Front fork oil level	75.0 (2.95)	—	
Rear wheel travel	80 (3.1)	—	
Swingarm pivot shaft runout	—	0.3 (0.001)	

**TIRE PRESSURE**

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kg/cm <sup>2</sup>	psi	kPa	kg/cm <sup>2</sup>	psi
FRONT	200	2.00	28	200	2.00	28
REAR	225	2.25	32	250	2.50	36

**FUEL + OIL**

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 85 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.		Others
Fuel tank including reserve	10.5 L (2.8/2.3 US/lmp gal)		
reserve	2.5 L (0.66/0.55 US/lmp gal)		
Engine oil type	SAE 10W/40, API SF or SG		
Engine oil capacity	Change	1 800 ml (1.9/1.6 US/lmp qt)	
	Filter change	2 400 ml (2.5/2.1 US/lmp qt)	
	Overhaul	2 400 ml (2.5/2.1 US/lmp qt)	
Front fork oil type	Fork oil # 15		
Front fork oil capacity (each leg)	447 ml (15.11/15.74 US/lmp oz)		spacer L:135 mm
Brake fluid type	DOT4		

# LS650K4 ('04 MODEL)

NOTE:  
The specifications and service data are the same as K3-MODEL.

CONTENTS	
SPECIFICATIONS.....	14- 2
SERVICE DATA.....	14- 3
REAR SUSPENSION.....	14- 10
WIRING DIAGRAM.....	14- 11

# SPECIFICATIONS

## DIMENSIONS AND DRY MASS

Overall length .....	2 180 mm (85.8in)
Overall width .....	775 mm (30.5 in)
Overall height .....	1 150 mm (45.3 in)
Wheelbase .....	1 480 mm (58.3 in)
Ground clearance .....	135 mm (5.3 in)
Seat height .....	700 mm (27.6 in)
Dry mass .....	161 kg (355 lbs) .....E-33
	160 kg (352 lbs) .....Others

## ENGINE

Type .....	Four stroke, air-cooled, OHC
Number of cylinders .....	1
Bore .....	94.0 mm (3.701 in)
Stroke .....	94.0 mm (3.701 in)
Displacement .....	652 cm <sup>3</sup> (39.8 cu. in)
Compression ratio .....	8.5 : 1
Carburetor .....	MIKUNI BS40, single
Air cleaner .....	Non-woven fabric element
Starter system .....	Electric
Lubrication system .....	Wet sump
Idle speed .....	1 100 – 100 r/min

## DRIVE TRAIN

Clutch .....	Wet multi-plate type
Transmission .....	5-speed constant mesh
Gearshift pattern .....	1-down, 4-up
Primary reduction ratio .....	1.810 (67/37)
Gear ratios, Low .....	2.333 (35/15)
2nd .....	1.578 (30/19)
3rd .....	1.142 (24/21)
4th .....	0.956 (22/23)
Top .....	0.884 (23/26)
Final reduction ratio .....	2.956 (68/23)
Drive system .....	Belt drive

## CHASSIS

Front suspension .....	Telescopic, coil spring, oil damped
Rear suspension .....	Swingarm, coil spring, oil damped
Front suspension stroke .....	140 mm (5.5 in)
Rear wheel travel .....	80 mm (3.1 in)
Caster .....	35
Trail .....	147 mm (5.79 in)
Steering angle .....	42 (right and left)
Turning radius .....	2.6 m (8.5 ft)
Front brake .....	Disc brake
Rear brake .....	Drum brake
Front tire size .....	100/90-19 M/C 57H, tube type
Rear tire size .....	140/80-15 M/C 67H, tube type

## ELECTRICAL

Ignition type .....	Electronic ignition (Transistorized)
Ignition timing .....	5 B.T.D.C. at 1 100 r/min
Spark plug .....	NGK DPR8EA-9 or DENSO X24EPR-U9
Battery .....	12V 50.4 kC (14 Ah)/10 HR
Generator .....	Three-phase A.C. generator
Fuse .....	20A/20A
Headlight .....	12V 60/55W
Turn signal light Front .....	12V 21/5W
Rear .....	12V 21W
Brake light/Taillight .....	12V 21/5W
Running light .....	12V 5W
License plate light .....	12V 8W
Speedometer light .....	12V 3W
Neutral indicator light .....	12V 3W
High beam indicator light .....	12V 1.7W
Turn signal indicator light .....	12V 3W 2

## CAPACITIES

Fuel tank, including reserve .....	10.5 L (2.8/2.3 US/Imp gal)
Reserve .....	2.5 L (0.6/0.5 US/Imp gal)
Engine oil, oil change .....	1 800 ml (1.9/1.6 US/Imp qt)
with filter change .....	2 000 ml (2.1/1.8 US/Imp qt)
overhaul .....	2 400 ml (2.5/2.1 US/Imp qt)



# SERVICE DATA

## VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	
	EX.	28 (1.1)	
Valve lift	IN.	8.5 (0.33)	
	EX.	8.5 (0.33)	
Valve clearance (when cold)	IN. & EX.	0.08 0.13 (0.003 0.005)	
Valve guide to valve stem clearance	IN.	0.025 0.055 (0.0010 0.0022)	
	EX.	0.040 0.070 (0.0016 0.0028)	
Valve stem deflection	IN. & EX.		0.35 (0.014)
Valve guide I.D.	IN. & EX.	7.000 7.015 (0.2756 0.2762)	
Valve stem O.D.	IN.	6.960 6.975 (0.2740 0.2746)	
	EX.	6.945 6.960 (0.2734 0.2740)	
Valve stem runout	IN. & EX.		0.05 (0.002)
Valve head thickness	IN. & EX.		0.5 (0.02)
Valve stem end length	IN. & EX.		2.9 (0.11)
Valve seat width	IN. & EX.	1.0 1.2 (0.039 0.047)	
Valve head radial runout	IN. & EX.		0.03 (0.001)
Valve spring free length (IN. & EX.)	INNER		35.6 (1.40)
	OUTER		40.4 (1.59)
Valve spring tension (IN. & EX.)	INNER	6.9 8.5 kgf (15.2 18.7 lbs) at length 31.0 mm (1.2 in)	
	OUTER	16.4 18.8 kgf (36.2 41.4 lbs) at length 33.0 mm (1.3 in)	



**CAMSHAFT + CYLINDER HEAD**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174 36.228 (1.4242 1.4263)	35.880 (1.4126)
	EX.	36.419 36.473 (1.4338 1.4359)	36.120 (1.4220)
Camshaft journal oil clearance		0.032 0.066 (0.0013 0.0026)	0.150 (0.0060)
Camshaft journal holder I.D.	Left	20.012 22.025 (0.7879 0.7884)	
	Right & Center	25.012 25.025 (0.9847 0.9852)	
Camshaft journal O.D.	Left	19.959 19.976 (0.7858 0.7865)	
	Right & Center	24.959 24.976 (0.9826 0.9833)	
Camshaft runout			0.10 (0.004)
Rocker arm I.D.	IN. & EX.	12.000 12.018 (0.4724 0.4731)	
Rocker arm shaft O.D.	IN. & EX.	11.966 11.984 (0.4711 0.4718)	
Cylinder head distortion			0.05 (0.002)
Cylinder head cover distortion			0.05 (0.002)
De-comp. cable play		3 5 (0.12 0.20)	

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure		1 000 1 400 kPa (10 14 kgf/cm <sup>2</sup> , 142 200 psi)	800 kPa (8 kgf/cm <sup>2</sup> , 114 psi)
Piston to cylinder clearance		0.050 0.060 (0.0020 0.0024)	0.120 (0.0047)
Cylinder bore		94.000 94.015 (3.7008 3.7014)	94.080 (3.7039)
Piston diam.		93.945 93.960 (3.6986 3.6992) Measure at 20 mm (0.8 in) from the skirt end.	93.880 (3.6961)
Cylinder distortion			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 11.5 (0.45)
	2nd	T	Approx. 14.0 (0.55)
Piston ring end gap	1st		0.30 0.45 (0.012 0.018)
	2nd		0.25 0.40 (0.010 0.016)
Piston ring to groove clearance	1st		0.18 (0.007)
	2nd		0.15 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23 1.25 (0.0484 0.0492)	
	2nd	1.21 1.23 (0.0476 0.0484)	
	Oil	2.81 2.83 (0.1106 0.1114)	
Piston ring thickness	1st	1.175 1.190 (0.0463 0.0469)	
	2nd	1.175 1.190 (0.0463 0.0469)	
Piston pin bore		23.000 23.006 (0.9055 0.9057)	23.030 (0.9067)
Piston pin O.D.		22.996 23.000 (0.9054 0.9055)	22.980 (0.9047)

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Conrod small end I.D.		23.006 23.014 (0.9057 0.9061)	23.040 (0.9071)
Conrod deflection			3.0 (0.12)
Conrod big end side clearance		0.10 0.65 (0.004 0.026)	1.0 (0.039)
Conrod big end width		24.95 25.00 (0.982 0.984)	
Crank web to web width		70.0 – 0.1 (2.756 – 0.004)	
Crankshaft runout			0.05 (0.002)
Balancer spring free length			10.0 (0.39)

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 (68/36 3 5/30)	
Oil pressure (at 60 °C, 140 °F)	Above 50 kPa (0.50 kgf/cm <sup>2</sup> , 7.1 psi) Below 75 kPa (0.75 kgf/cm <sup>2</sup> , 10.7 psi) at 3 000 r/min	

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play		10 15 (0.4 0.6)	
Drive plate thickness	No. 1	2.92 3.08 (0.115 0.121)	2.62 (0.103)
	No. 2	3.45 3.55 (0.136 0.140)	3.15 (0.124)

ITEM	STANDARD		LIMIT
Drive plate claw width	No. 1	15.8 1 6.0 (0.622 0 .630)	15.0 (0.591)
	No. 2	15.9 1 6.0 (0.626 0 .630)	15.1 (0.594)
Driven plate distortion			0.1 (0.004)
Clutch spring free length			33.0 (1.30)

**DRIVE TRAIN**

Unit: mm (in) Except ratio

ITEM	STANDARD		LIMIT
Primary reduction ratio	1.810 (67/37)		
Final reduction ratio	2.956 (68/23)		
Gear ratios	Low	2.333 (35/15)	
	2nd	1.578 (30/19)	
	3rd	1.142 (24/21)	
	4th	0.956 (22/23)	
	Top	0.884 (23/26)	
Shift fork to groove clearance	0.10 0 .30 (0.004 0 .012)		0.50 (0.020)
Shift fork groove width	3rd drive gear	5.50 5.60 (0.217 0.220)	
	4th driven gear	5.50 5.60 (0.217 0.220)	
	Top driven gear	5.50 5.60 (0.217 0.220)	
Shift fork thickness	No. 1, No. 2 & No. 3	5.30 5.40 (0.209 0.213)	
Drive belt	Type	BANDO: 133U-14M 40.0	
	Number of teeth	133	
Gearshift lever height	60 (2.4)		

**CARBURETOR**

ITEM	SPECIFICATION	
	E-03, 28	E-33
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm	←
I.D. No.	24C9	24CA
Idle r/min	1 100 – 100 r/min	←
Float height	27.95 – 1.0 mm (1.1 – 0.04 in)	←
Main jet (M.J.)	#145	←
Jet needle (J.N.)	5C39	←
Needle jet (N.J.)	X-7M	←
Throttle valve (Th.V.)	#120	←
Pilot jet (P.J.)	#52.5	←
Pilot screw (P.S.)	PRE-SET (1-½ turns back)	←
Throttle cable play	2.0 4.0 mm (0.08 0.16 in)	←

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION	NOTE
Spark plug	Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
	Gap	0.8 0.9 (0.031 0.035)	
Spark performance	Over 8 (0.3) at 1 atm.		
Solenoid resistance	0.1 1.0 Ω		
Pick-up coil resistance	170 27 0 Ω		O/G
Ignition coil resistance	Primary	1 7 Ω	O/W Ground
	Secondary	10 25 kΩ	Plug cap Ground
Generator no-load voltage	More than 100 V (AC) at 5 000 r/min		
Regulated voltage	14.0 1 5.5 V at 5 000 r/min		
Starter relay resistance	2 6 Ω		
Battery	Type designation	YB14L-B2	
	Voltage	12 V	
	Capacity	50.4 kC (14 Ah)/10 HR	
	Standard electrolyte S.G.	1.28 at 20 °C (68 °F)	
Fuse size	20 A		



**WATTAGE**

Unit: W

ITEM		SPECIFICATION
Headlight	HI	60
	LO	55
Parking or City light		
Brake light/Taillight		21/5
Turn signal light		21
Running light (within front turn signal light)		5
Speedometer light		3
Turn signal indicator light		3
High beam indicator light		1.7
Neutral indicator light		3
License light		8

**BRAKE + WHEEL**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20 30 (0.8 1.2)		
Rear brake pedal height	60 (2.4)		
Brake drum I.D.	Rear		160.7 (6.33)
Brake lining thickness	Rear		1.5 (0.06)
Brake disc thickness	Front	4.5 – 0.2 (0.18 – 0.01)	4.0 (0.16)
Brake disc runout	Front		0.30 (0.012)
Master cylinder bore	Front	12.700 12.743 (0.4999 0.5017)	
Master cylinder piston diam.	Front	12.657 12.684 (0.4983 0.4994)	
Brake caliper cylinder bore	Front	42.850 42.926 (1.6870 1.6900)	
Brake caliper piston diam.	Front	42.770 42.820 (1.6839 1.6858)	
Wheel rim runout	Axial		2.0 (0.08)
	Radial		2.0 (0.08)
Wheel axle runout	Front		0.25 (0.010)
	Rear		0.25 (0.010)
Wheel rim size	Front	19 2.15	
	Rear	15M/C 2.75	
Tire size	Front	100/90-19M/C 57H	
	Rear	140/80-15 M/C 67H	
Tire tread depth	Front		1.6 (0.06)
	Rear		2.0 (0.08)

**SUSPENSION**

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 (5.5)		
Front fork spring free length		392.5 (15.45)	
Front fork oil level	75.0 (2.95)		
Rear wheel travel	80 (3.1)		
Swingarm pivot shaft runout		0.3 (0.001)	

**TIRE PRESSURE**

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kgf/cm <sup>2</sup>	psi	kPa	kgf/cm <sup>2</sup>	psi
FRONT	200	2.00	29	200	2.00	29
REAR	225	2.25	33	250	2.50	36

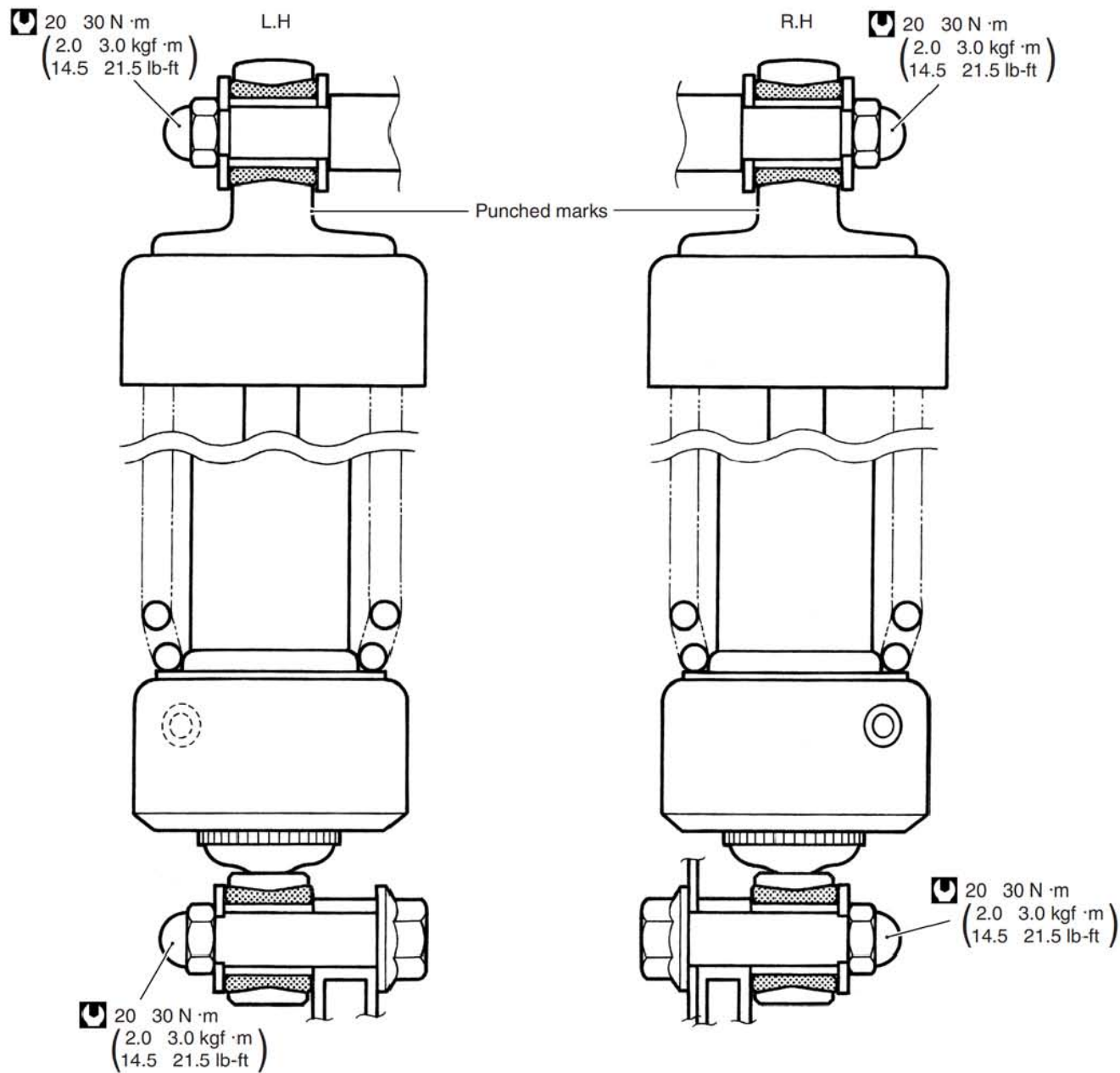
**FUEL + OIL**

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the reserch method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
Fuel tank capacity	Including reserve	10.5 L (2.8/2.3 US/Imp gal)	
	Only reserve	2.5 L (0.66/0.55 US/Imp gal)	
Engine oil type	SAE 10W-40, API SF or SG		
Engine oil capacity	Oil change	1 800 ml (1.9/1.6 US/Imp qt)	
	Oil and filter change	2 000 ml (2.1/1.8 US/Imp qt)	
	Engine overhaul	2 400 ml (2.5/2.1 US/Imp qt)	
Front fork oil type	Fork oil #15		
Front fork oil capacity (each leg)	447 ml (15.11/15.74 US/Imp oz)		Spacer L: 135 mm
Brake fluid type	DOT 4		

## REAR SUSPENSION

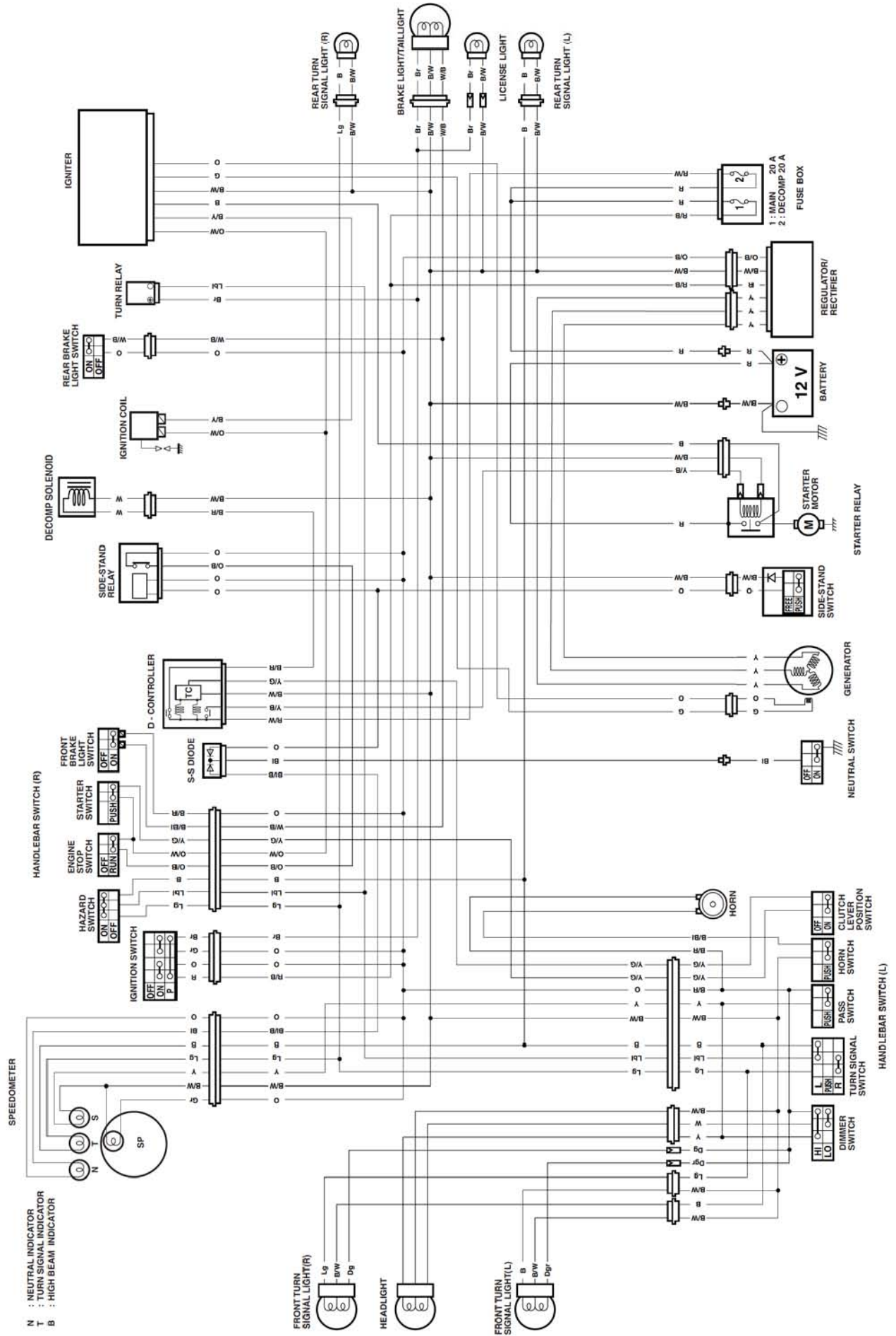
**NOTE:**

The punched marks should face each other.





## WIRING DIAGRAM





# LS650K5 ('05 MODEL)

**NOTE:**

Asterisk mark (\*) indicates the new K5-model specifications and service data..

## CONTENTS

<b>SPECIFICATIONS.....</b>	<b>15- 2</b>
<b>SERVICE DATA.....</b>	<b>15- 3</b>
<b>TIGHTENING TORQUE.....</b>	<b>15- 10</b>
<b>HANDLEBAR HOLDER INSTALLATION.....</b>	<b>15- 11</b>
<b>WIRING DIAGRAM.....</b>	<b>15-12</b>
<b>WIRING HARNESS ROUTING.....</b>	<b>15-13</b>
<b>HOSE AND CABLE ROUTING.....</b>	<b>15-15</b>
<b>FRONT BRAKE HOSE ROUTING.....</b>	<b>15-16</b>

# SPECIFICATIONS

## DIMENSIONS AND DRY MASS

Overall length .....	2 180 mm (85.8in)
Overall width .....	* 720 mm (28.3 in)
Overall height .....	* 1 105 mm (43.5in)
Wheelbase .....	1 480 mm (58.3 in)
Ground clearance .....	135 mm (5.3 in)
Seat height .....	700 mm (27.6 in)
Dry mass .....	161 kg (355 lbs) ..... E-33
	160 kg (352 lbs) ..... Others

## ENGINE

Type .....	Four stroke, air-cooled, OHC
Number of cylinders .....	1
Bore .....	94.0 mm (3.701 in)
Stroke .....	94.0 mm (3.701 in)
Displacement .....	652 cm <sup>3</sup> (39.8 cu. in)
Compression ratio .....	8.5 : 1
Carburetor .....	MIKUNI BS40, single
Air cleaner .....	Non-woven fabric element
Starter system .....	Electric
Lubrication system .....	Wet sump
Idle speed .....	1 100 ± 100 r/min

## DRIVE TRAIN

Clutch .....	Wet multi-plate type
Transmission .....	5-speed constant mesh
Gearshift pattern .....	1-down, 4-up
Primary reduction ratio .....	1.810 (67/37)
Gear ratios, Low .....	2.333 (35/15)
2nd .....	1.578 (30/19)
3rd .....	1.142 (24/21)
4th .....	0.956 (22/23)
Top .....	0.884 (23/26)
Final reduction ratio .....	2.956 (68/23)
Drive system .....	Belt drive

## CHASSIS

Front suspension .....	Telescopic, coil spring, oil damped
Rear suspension .....	Swingarm, coil spring, oil damped
Front suspension stroke .....	140 mm (5.5 in)
Rear wheel travel .....	80 mm (3.1 in)
Caster .....	35°
Trail .....	147 mm (5.79 in)
Steering angle .....	42° (right and left)
Turning radius .....	2.6 m (8.5 ft)
Front brake .....	Disc brake
Rear brake .....	Drum brake
Front tire size .....	100/90-19 M/C 57H, tube type
Rear tire size .....	140/80-15 M/C 67H, tube type

## ELECTRICAL

Ignition type .....	Electronic ignition (Transistorized)
Ignition timing .....	5° B.T.D.C. at 1 100 r/min
Spark plug .....	NGK DPR8EA-9 or DENSO X24EPR-U9
Battery .....	12 V 50.4 kC (14 Ah)/10 HR
Generator .....	Three-phase A.C. generator
Fuse .....	20 A/20 A
Headlight .....	12 V 60/55 W
Turn signal light, Front .....	12 V 21/5 W
Rear .....	12 V 21 W
Brake light/Taillight .....	12 V 21/5 W
Running light .....	12 V 5 W
License plate light .....	12 V 8 W
Speedometer light .....	12 V 3 W
Neutral indicator light .....	12 V 3 W
High beam indicator light .....	12 V 1.7 W
Turn signal indicator light .....	12 V 3 W × 2

## CAPACITIES

Fuel tank, including reserve .....	10.5 L (2.8/2.3 US/Imp gal)
Reserve .....	2.5 L (0.6/0.5 US/Imp gal)
Engine oil, oil change .....	1 800 ml (1.9/1.6 US/Imp qt)
with filter change .....	2 000 ml (2.1/1.8 US/Imp qt)
overhaul .....	2 400 ml (2.5/2.1 US/Imp qt)

# SERVICE DATA

## VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	28 (1.1)	—
Valve lift	IN.	8.5 (0.33)	—
	EX.	8.5 (0.33)	—
Valve clearance (when cold)	IN. & EX.	0.08 – 0.13 (0.003 – 0.005)	—
Valve guide to valve stem clearance	IN.	0.025 – 0.055 (0.0010 – 0.0022)	—
	EX.	0.040 – 0.070 (0.0016 – 0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	7.000 – 7.015 (0.2756 – 0.2762)	—
Valve stem O.D.	IN.	6.960 – 6.975 (0.2740 – 0.2746)	—
	EX.	6.945 – 6.960 (0.2734 – 0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.9 (0.11)
Valve seat width	IN. & EX.	1.0 – 1.2 (0.039 – 0.047)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (IN. & EX.)	INNER	—	35.6 (1.40)
	OUTER	—	40.4 (1.59)
Valve spring tension (IN. & EX.)	INNER	68 – 83 N (6.9 – 8.5 kgf, 15.2 – 18.7 lbs) at length 31.0 mm (1.2 in)	—
	OUTER	160 – 184 N (16.4 – 18.8 kgf, 36.2 – 41.4 lbs) at length 33.0 mm (1.3 in)	—



**CAMSHAFT + CYLINDER HEAD**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174 – 36.228 (1.4242 – 1.4263)	35.880 (1.4126)
	EX.	36.419 – 36.473 (1.4338 – 1.4359)	36.120 (1.4220)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)		0.150 (0.0060)
Camshaft journal holder I.D.	Left	20.012 – 22.025 (0.7879 – 0.7884)	—
	Right & Center	25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Left	19.959 – 19.976 (0.7858 – 0.7865)	—
	Right & Center	24.959 – 24.976 (0.9826 – 0.9833)	—
Camshaft runout	—		0.10 (0.004)
Rocker arm I.D.	IN. & EX.	12.000 – 12.018 (0.4724 – 0.4731)	—
Rocker arm shaft O.D.	IN. & EX.	11.966 – 11.984 (0.4711 – 0.4718)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
De-comp. cable play	3 – 5 (0.12 – 0.20)		—

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD			LIMIT
Compression pressure	1 000 – 1 400 kPa (10 – 14 kgf/cm <sup>2</sup> , 142 – 200 psi)			800 kPa (8 kgf/cm <sup>2</sup> , 114 psi)
Piston to cylinder clearance	0.050 – 0.060 (0.0020 – 0.0024)			0.120 (0.0047)
Cylinder bore	94.000 – 94.015 (3.7008 – 3.7014)			94.080 (3.7039)
Piston diam.	93.945 – 93.960 (3.6986 – 3.6992) Measure at 20 mm (0.8 in) from the skirt end.			93.880 (3.6961)
Cylinder distortion	—			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 11.5 (0.45)	9.2 (0.36)
	2nd	T	Approx. 14.0 (0.55)	11.2 (0.44)
Piston ring end gap	1st	0.30 – 0.45 (0.012 – 0.018)		1.00 (0.039)
	2nd	0.25 – 0.40 (0.010 – 0.016)		1.00 (0.039)
Piston ring to groove clearance	1st	—		0.18 (0.007)
	2nd	—		0.15 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23 – 1.25 (0.0484 – 0.0492)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.81 – 2.83 (0.1106 – 0.1114)	—
Piston ring thickness	1st	1.175 – 1.190 (0.0463 – 0.0469)	—
	2nd	1.175 – 1.190 (0.0463 – 0.0469)	—
Piston pin bore	23.000 – 23.006 (0.9055 – 0.9057)		23.030 (0.9067)
Piston pin O.D.	22.996 – 23.000 (0.9054 – 0.9055)		22.980 (0.9047)

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006 – 23.014 (0.9057 – 0.9061)	23.040 (0.9071)
Conrod deflection	—	3.0 (0.12)
Conrod big end side clearance	0.10 – 0.65 (0.004 – 0.026)	1.0 (0.039)
Conrod big end width	24.95 – 25.00 (0.982 – 0.984)	—
Crank web to web width	70.0 ± 0.1 (2.756 ± 0.004)	—
Crankshaft runout	—	0.05 (0.002)
Balancer spring free length	—	10.0 (0.39)

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 (68/36 × 35/30)	—
Oil pressure (at 60 °C, 140 °F)	Above 50 kPa (0.50 kgf/cm <sup>2</sup> , 7.1 psi) Below 75 kPa (0.75 kgf/cm <sup>2</sup> , 10.7 psi) at 3 000 r/min	—

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Drive plate thickness	No. 1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No. 2	3.45 – 3.55 (0.136 – 0.140)	3.15 (0.124)



ITEM	STANDARD		LIMIT
Drive plate claw width	No. 1	15.8 – 16.0 (0.622 – 0.630)	15.0 (0.591)
	No. 2	15.9 – 16.0 (0.626 – 0.630)	15.1 (0.594)
Driven plate distortion	—		0.1 (0.004)
Clutch spring free length	—		33.0 (1.30)

**DRIVE TRAIN**

Unit: mm (in) Except ratio

ITEM	STANDARD		LIMIT
Primary reduction ratio	1.810 (67/37)		—
Final reduction ratio	2.956 (68/23)		—
Gear ratios	Low	2.333 (35/15)	—
	2nd	1.578 (30/19)	—
	3rd	1.142 (24/21)	—
	4th	0.956 (22/23)	—
	Top	0.884 (23/26)	—
Shift fork to groove clearance	0.10 – 0.30 (0.004 – 0.012)		0.50 (0.020)
Shift fork groove width	3rd drive gear	5.50 – 5.60 (0.217 – 0.220)	—
	4th driven gear	5.50 – 5.60 (0.217 – 0.220)	—
	Top driven gear	5.50 – 5.60 (0.217 – 0.220)	—
Shift fork thickness	No. 1, No. 2 & No. 3	5.30 – 5.40 (0.209 – 0.213)	—
Drive belt	Type	BANDO: 133U-14M 40.0	—
	Number of teeth	133	—
Gearshift lever height	60 (2.4)		—

**CARBURETOR**

ITEM	SPECIFICATION	
	E-03, 28	E-33
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm	←
I.D. No.	24C9	24CA
Idle r/min	1 100 ± 100 r/min	←
Float height	27.95 ± 1.0 mm (1.1 ± 0.04 in)	←
Main jet (M.J.)	#145	←
Jet needle (J.N.)	5C39	←
Needle jet (N.J.)	X-7M	←
Throttle valve (Th.V.)	#120	←
Pilot jet (P.J.)	#52.5	←
Pilot screw (P.S.)	PRE-SET (1 and 1/2 turns back)	←
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)	←

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION	NOTE
Spark plug	Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
	Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance		Over 8 (0.3) at 1 atm.	
Solenoid resistance		0.1 – 1.0 Ω	
Pick-up coil resistance		170 – 270 Ω	O/G
Ignition coil resistance	Primary	1 – 7 Ω	O/W – Ground
	Secondary	10 – 25 kΩ	Plug cap – Ground
Generator no-load voltage		More than 100 V (AC) at 5 000 r/min	
Regulated voltage		14.0 – 15.5 V at 5 000 r/min	
Starter relay resistance		2 – 6 Ω	
Battery	Type designation	YB14L-B2	
	Voltage	12 V	
	Capacity	50.4 kC (14 Ah)/10 HR	
	Standard electrolyte S.G.	1.28 at 20 °C (68 °F)	
Fuse size		20 A	

**WATTAGE**

Unit: W

ITEM		SPECIFICATION
Headlight	HI	60
	LO	55
Parking or City light		
Brake light/Taillight		21/5
Turn signal light		21
Running light (within front turn signal light)		5
Speedometer light		3
Turn signal indicator light		3
High beam indicator light		1.7
Neutral indicator light		3
License light		8

**BRAKE + WHEEL**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20 – 30 (0.8 – 1.2)		—
Rear brake pedal height	60 (2.4)		—
Brake drum I.D.	Rear	—	160.7 (6.33)
Brake lining thickness	Rear	—	1.5 (0.06)
Brake disc thickness	Front	4.5 ± 0.2 (0.18 ± 0.01)	4.0 (0.16)
Brake disc runout	Front	—	0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.4999 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4994)	—
Brake caliper cylinder bore	Front	42.850 – 42.926 (1.6870 – 1.6900)	—
Brake caliper piston diam.	Front	42.770 – 42.820 (1.6839 – 1.6858)	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	19 × 2.15	—
	Rear	15M/C × 2.75	—
Tire size	Front	100/90-19M/C 57H	—
	Rear	140/80-15 M/C 67H	—

ITEM	STANDARD		LIMIT
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

## SUSPENSION

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 (5.5)	—	
Front fork spring free length	—	401 (15.79)	
Front fork oil level	75.0 (2.95)	—	
Rear wheel travel	80 (3.1)	—	
Swingarm pivot shaft runout	—	0.3 (0.001)	

## TIRE PRESSURE

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kgf/cm <sup>2</sup>	psi	kPa	kgf/cm <sup>2</sup>	psi
FRONT	200	2.00	29	200	2.00	29
REAR	225	2.25	33	250	2.50	36

## FUEL + OIL

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
Fuel tank capacity	Including reserve	10.5 L (2.8/2.3 US/Imp gal)	
	Only reserve	2.5 L (0.66/0.55 US/Imp gal)	
Engine oil type	SAE 10W-40, API SF or SG		
Engine oil capacity	Oil change	1 800 ml (1.9/1.6 US/Imp qt)	
	Oil and filter change	2 000 ml (2.1/1.8 US/Imp qt)	
	Engine overhaul	2 400 ml (2.5/2.1 US/Imp qt)	
Front fork oil type	Fork oil #15		
Front fork oil capacity (each leg)	447 ml (15.11/15.74 US/Imp oz)		Spacer L: 135 mm
Brake fluid type	DOT 4		

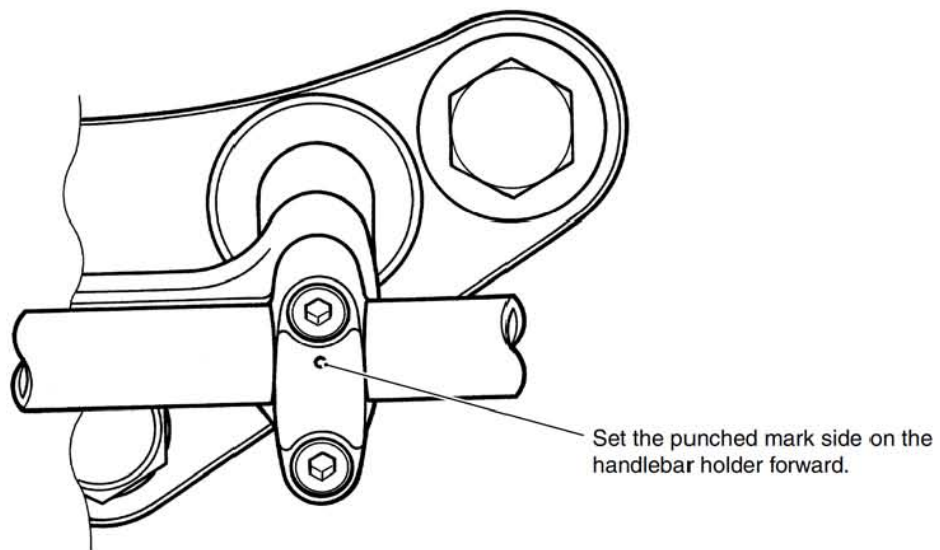
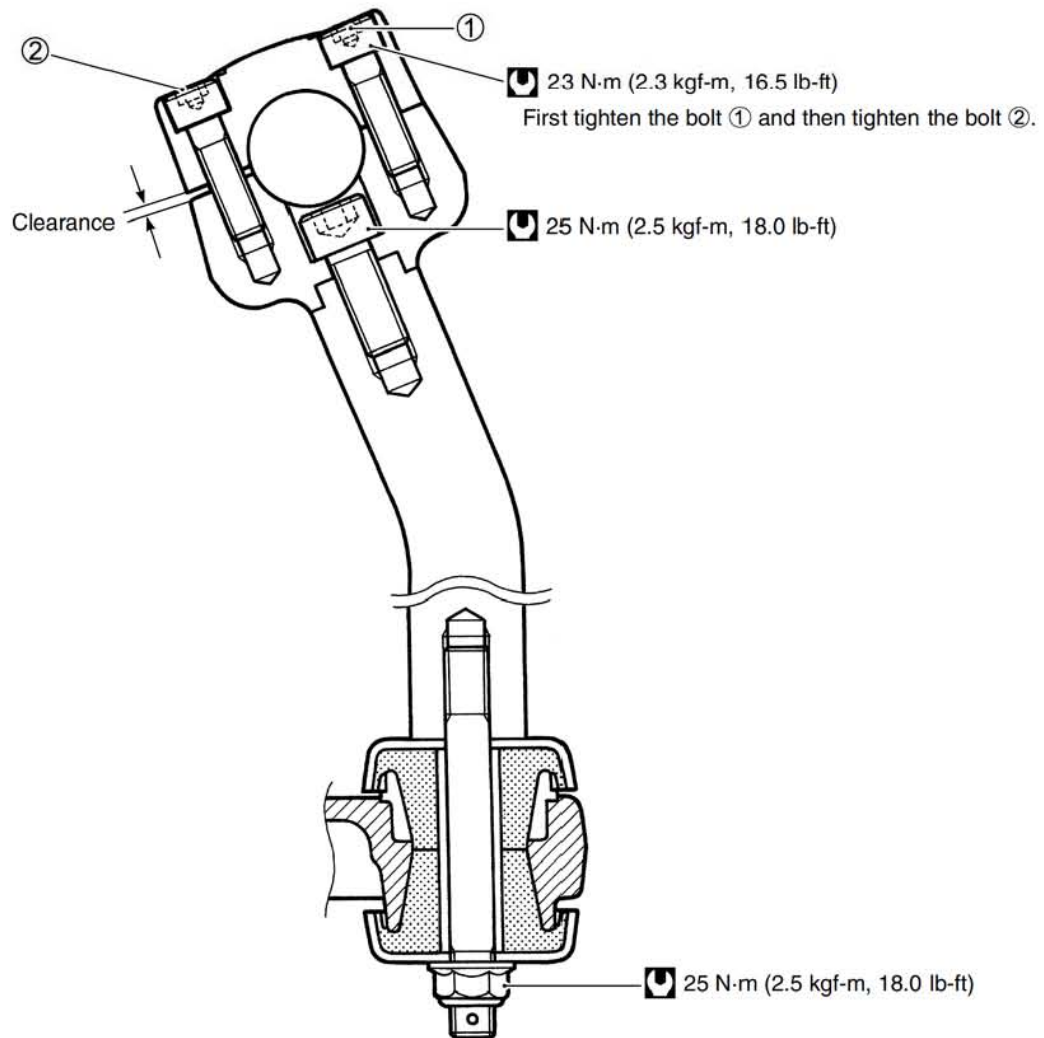


## TIGHTENING TORQUE

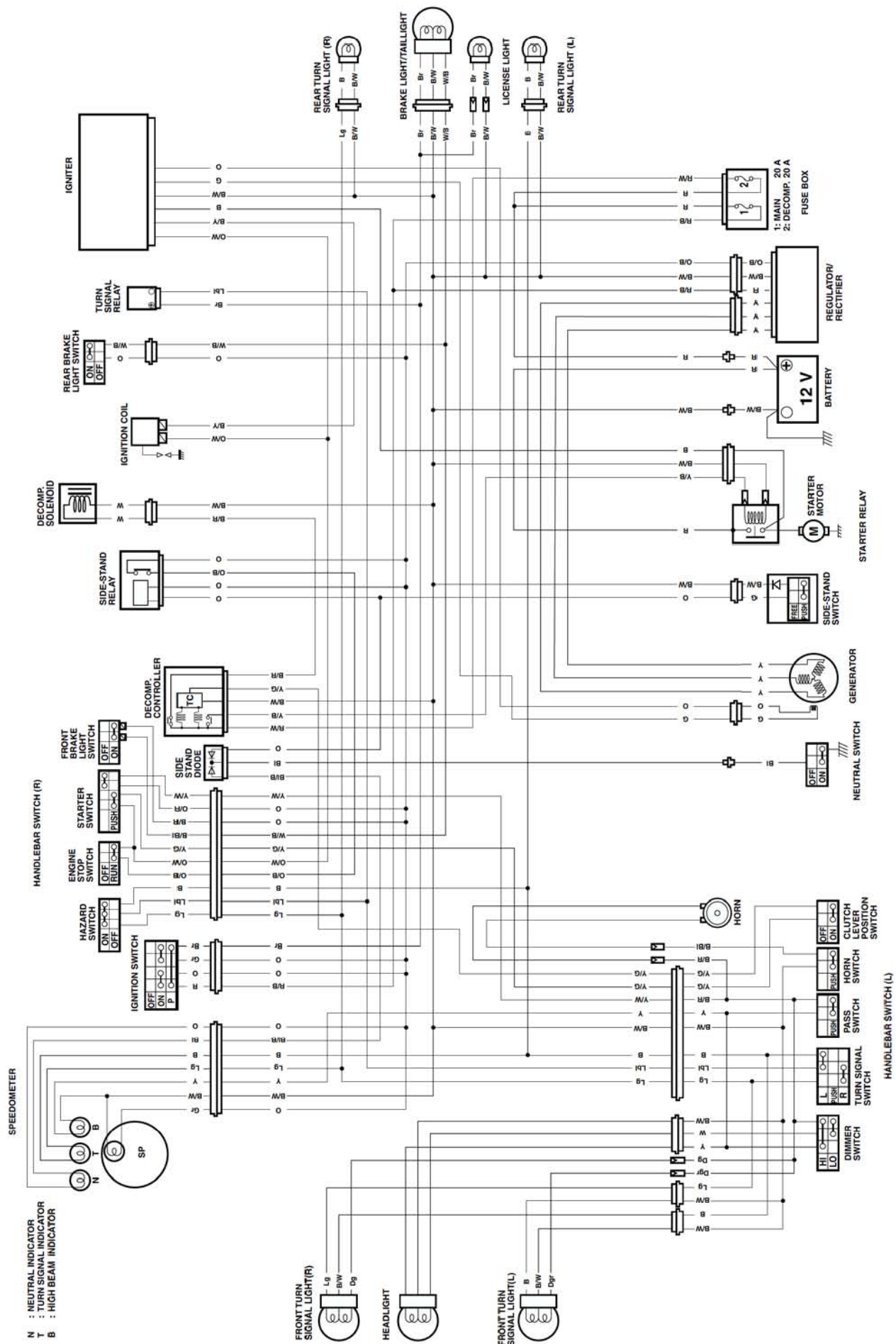
### CHASSIS

ITEM	N•m	kgf-m	lb-ft
Front axle	44	4.4	32.0
Front axle pinch bolt	* 23	* 2.3	* 16.5
Front fork damper rod bolt	30	3.0	21.5
Front fork lower clamp bolt	33	3.3	24.0
Front fork cap bolt	45	4.5	32.5
Steering stem head nut	* 65	* 6.5	* 47.0
Handlebar clamp bolt	* 23	* 2.3	* 16.5
Handlebar holder nut	* 25	* 2.5	* 18.0
Front brake master cylinder mounting nut	* 10	* 1.0	* 7.0
Front brake caliper mounting nut	* 35	* 3.5	* 25.5
Front brake pad mounting bolt	* 18	* 1.8	* 13.0
Brake hose union bolt	23	2.3	16.5
Air bleeder valve	* 6	* 0.6	* 4.5
Front disc mounting bolt	23	2.3	16.5
Swingarm pivot nut	78	7.8	56.5
Front footrest bolt (6 mm)	10	1.0	7.3
Front footrest mounting bolt	65	6.5	47.0
Rear shock absorber mounting nut (Upper & Lower)	29	2.9	21.0
Rear axle nut	72	7.2	52.0
Rear pulley mounting nut	60	6.0	43.5
Rear pulley plate bolt	11	1.1	8.0
Rear brake cam lever bolt	7	0.7	5.0
Spoke nipple	5	0.5	3.7
Muffler stay bolt	31	3.1	22.5

## HANDLEBAR HOLDER INSTALLATION

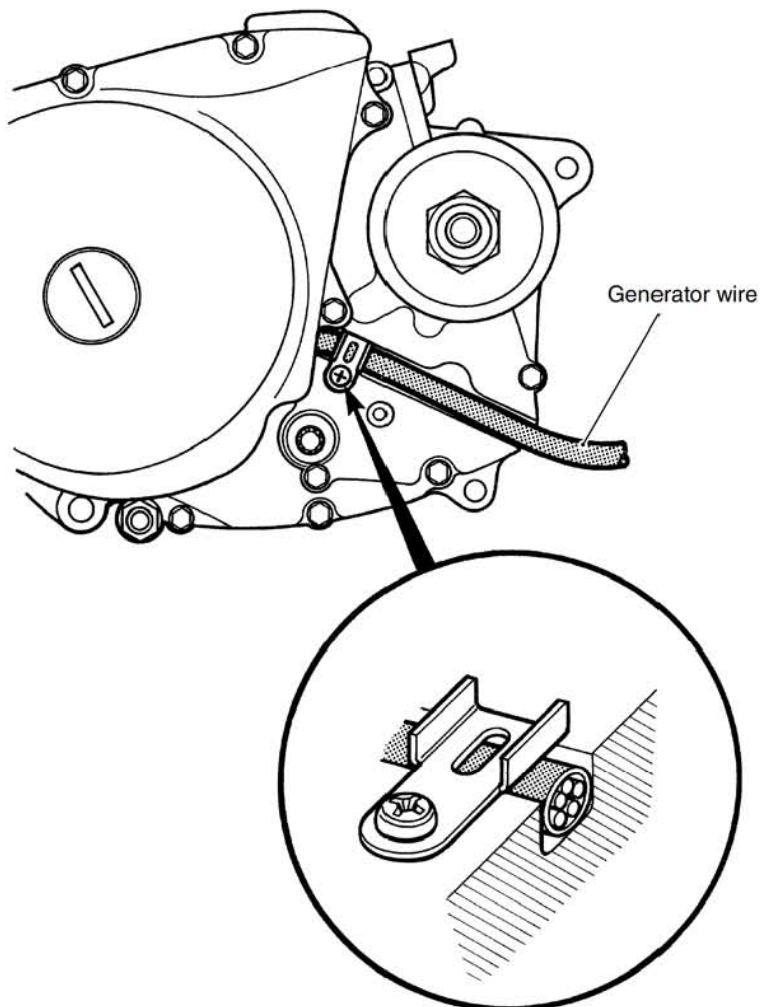
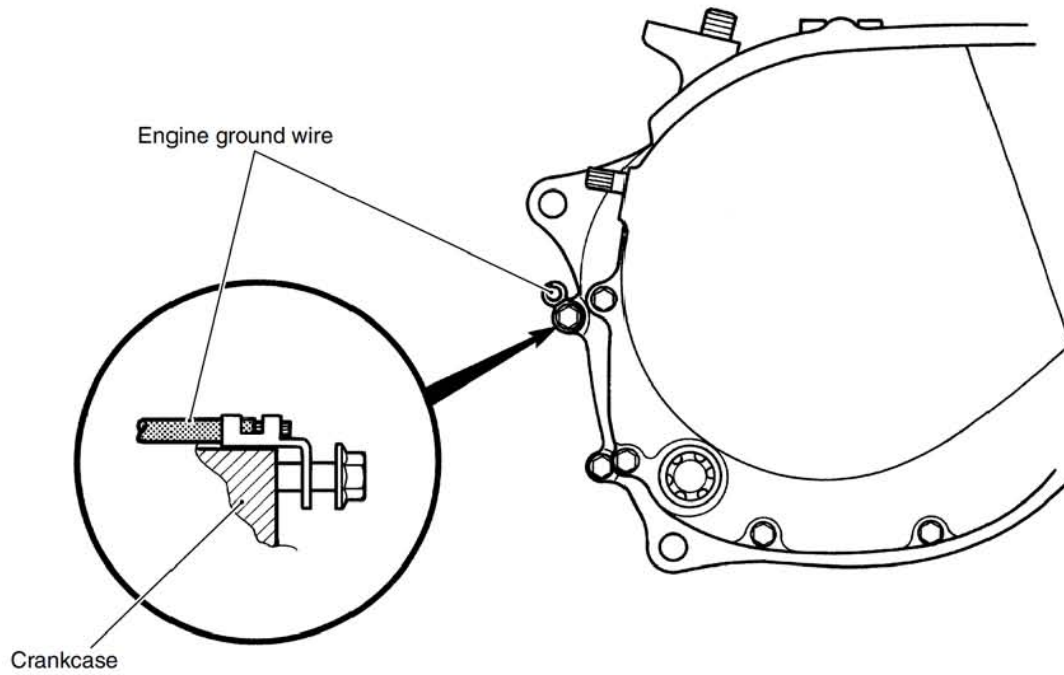


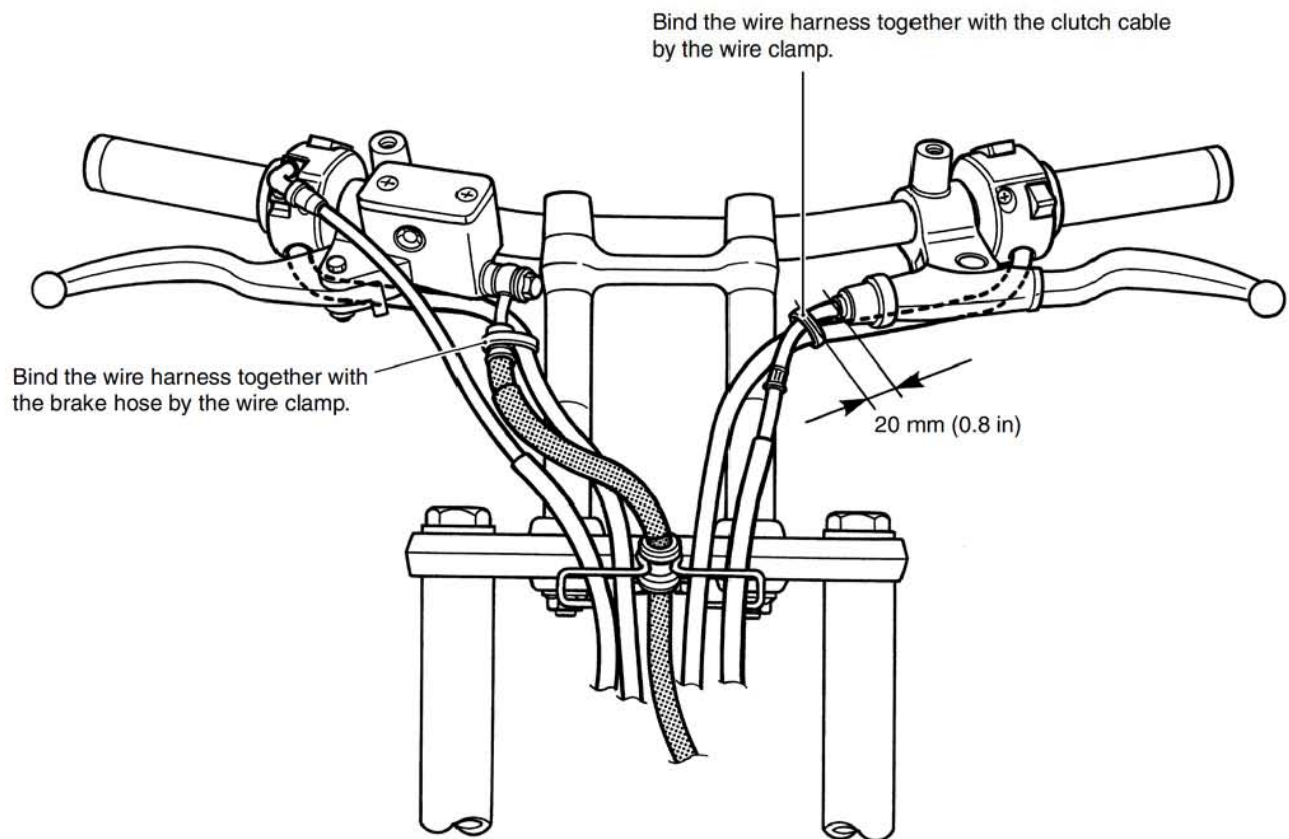
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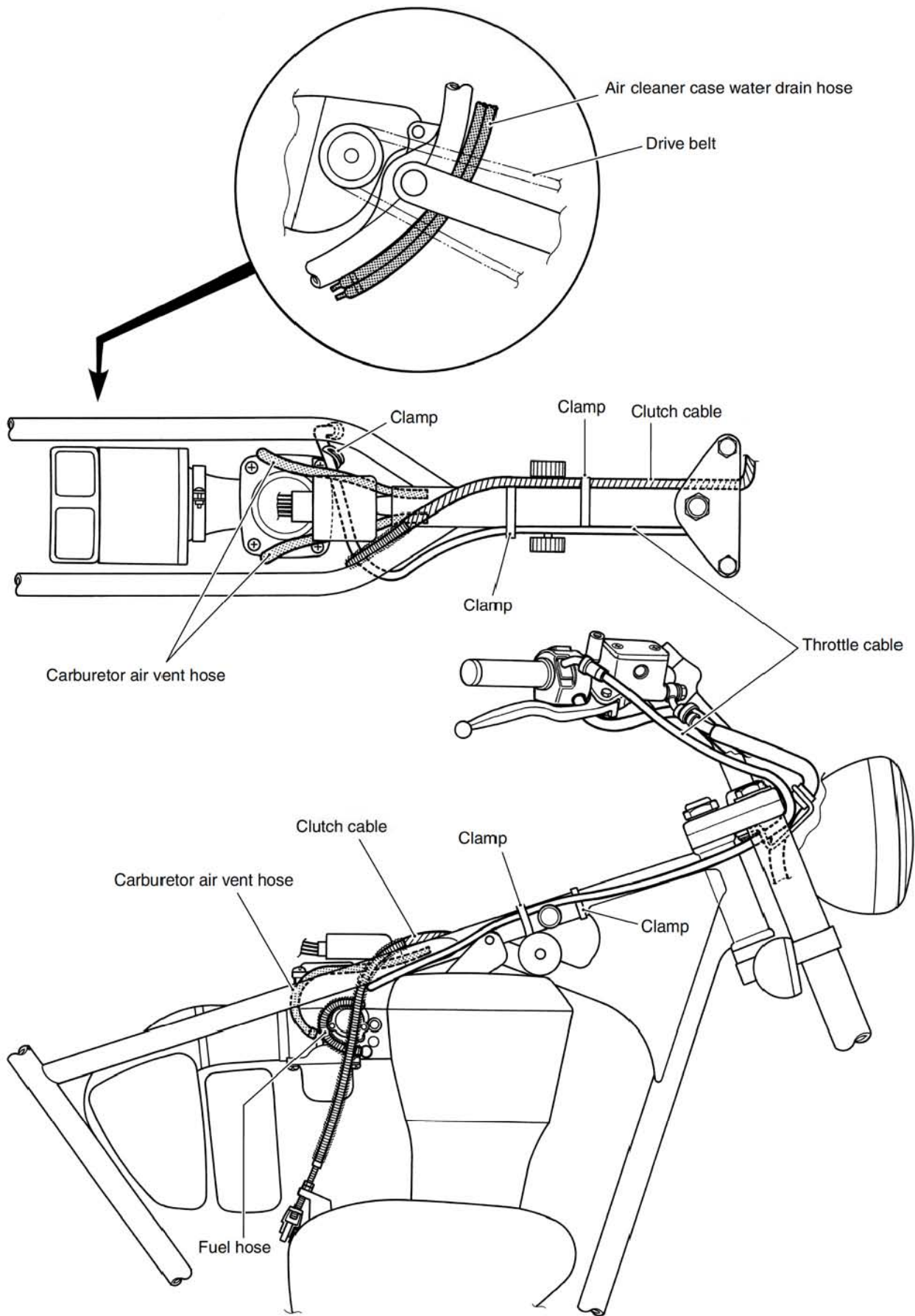


## WIRING HARNESS ROUTING

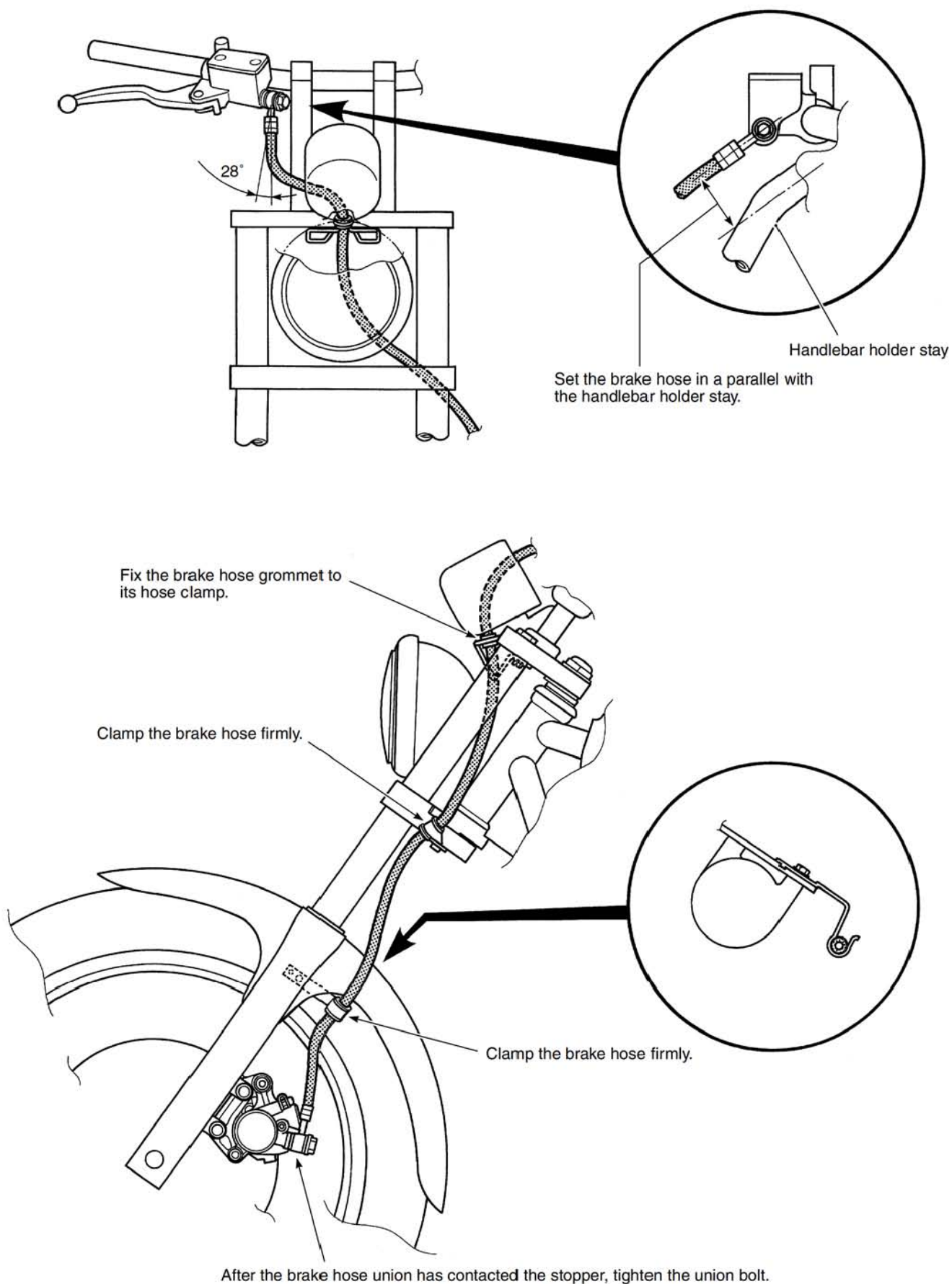




## HOSE AND CABLE ROUTING



## FRONT BRAKE HOSE ROUTING



# LS650K6 ('06 MODEL)

**NOTE:**

Asterisk mark (\*) indicates the new K6-model service data..

**CONTENTS**

<b>SPECIFICATIONS.....</b>	<b>16- 2</b>
<b>SERVICE DATA.....</b>	<b>16- 3</b>



# SPECIFICATIONS

## DIMENSIONS AND DRY MASS

Overall length .....	2 180 mm (85.8 in)
Overall width .....	720 mm (28.3 in)
Overall height .....	1 105 mm (43.5 in)
Wheelbase .....	1 480 mm (58.3 in)
Ground clearance .....	135 mm (5.3 in)
Seat height .....	700 mm (27.6 in)
Dry mass .....	161 kg (355 lbs) ..... E-33
	160 kg (352 lbs) ..... Others

## ENGINE

Type .....	Four stroke, air-cooled, OHC
Number of cylinders .....	1
Bore .....	94.0 mm (3.701 in)
Stroke .....	94.0 mm (3.701 in)
Displacement .....	652 cm <sup>3</sup> (39.8 cu. in)
Compression ratio .....	8.5 : 1
Carburetor .....	MIKUNI BS40, single
Air cleaner .....	Non-woven fabric element
Starter system .....	Electric
Lubrication system .....	Wet sump
Idle speed .....	1 100 ± 100 r/min

## DRIVE TRAIN

Clutch .....	Wet multi-plate type
Transmission .....	5-speed constant mesh
Gearshift pattern .....	1-down, 4-up
Primary reduction ratio .....	1.810 (67/37)
Gear ratios, Low .....	2.333 (35/15)
2nd .....	1.578 (30/19)
3rd .....	1.142 (24/21)
4th .....	0.956 (22/23)
Top .....	0.884 (23/26)
Final reduction ratio .....	2.956 (68/23)
Drive system .....	Belt drive

## CHASSIS

Front suspension .....	Telescopic, coil spring, oil damped
Rear suspension .....	Swingarm, coil spring, oil damped
Front suspension stroke .....	140 mm (5.5 in)
Rear wheel travel .....	80 mm (3.1 in)
Caster .....	35°
Trail .....	147 mm (5.79 in)
Steering angle .....	42° (right and left)
Turning radius .....	2.6 m (8.5 ft)
Front brake .....	Disc brake
Rear brake .....	Drum brake
Front tire size .....	100/90-19 M/C 57H, tube type
Rear tire size .....	140/80-15 M/C 67H, tube type

## ELECTRICAL

Ignition type .....	Electronic ignition (Transistorized)
Ignition timing .....	5° B.T.D.C. at 1 100 r/min
Spark plug .....	NGK DPR8EA-9 or DENSO X24EPR-U9
Battery .....	12 V 50.4 kC (14 Ah)/10 HR
Generator .....	Three-phase A.C. generator
Fuse .....	20 A/20 A
Headlight .....	12 V 60/55 W
Turn signal light, Front .....	12 V 21/5 W
Rear .....	12 V 21 W
Brake light/Tailight .....	12 V 21/5 W
Running light .....	12 V 5 W
License plate light .....	12 V 8 W
Speedometer light .....	12 V 3 W
Neutral indicator light .....	12 V 3 W
High beam indicator light .....	12 V 1.7 W
Turn signal indicator light .....	12 V 3 W × 2

## CAPACITIES

Fuel tank, including reserve .....	10.5 L (2.8/2.3 US/Imp gal)
Reserve .....	2.5 L (0.6/0.5 US/Imp gal)
Engine oil, oil change .....	1 800 ml (1.9/1.6 US/Imp qt)
with filter change .....	2 000 ml (2.1/1.8 US/Imp qt)
overhaul .....	2 400 ml (2.5/2.1 US/Imp qt)

**SERVICE DATA****VALVE + GUIDE**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	28 (1.1)	—
Valve lift	IN.	8.5 (0.33)	—
	EX.	8.5 (0.33)	—
Valve clearance (when cold)	IN. & EX.	0.08 – 0.13 (0.003 – 0.005)	—
Valve guide to valve stem clearance	IN.	0.025 – 0.055 (0.0010 – 0.0022)	—
	EX.	0.040 – 0.070 (0.0016 – 0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	7.000 – 7.015 (0.2756 – 0.2762)	—
Valve stem O.D.	IN.	6.960 – 6.975 (0.2740 – 0.2746)	—
	EX.	6.945 – 6.960 (0.2734 – 0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.9 (0.11)
Valve seat width	IN. & EX.	1.0 – 1.2 (0.039 – 0.047)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (IN. & EX.)	INNER	—	35.6 (1.40)
	OUTER	—	40.4 (1.59)
Valve spring tension (IN. & EX.)	INNER	68 – 83 N (6.9 – 8.5 kgf, 15.2 – 18.7 lbs) at length 31.0 mm (1.2 in)	—
	OUTER	160 – 184 N (16.4 – 18.8 kgf, 36.2 – 41.4 lbs) at length 33.0 mm (1.3 in)	—



**CAMSHAFT + CYLINDER HEAD**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174 – 36.228 (1.4242 – 1.4263)	35.880 (1.4126)
	EX.	36.419 – 36.473 (1.4338 – 1.4359)	36.120 (1.4220)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)		0.150 (0.0060)
Camshaft journal holder I.D.	Left	20.012 – 22.025 (0.7879 – 0.7884)	—
	Right & Center	25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Left	19.959 – 19.976 (0.7858 – 0.7865)	—
	Right & Center	24.959 – 24.976 (0.9826 – 0.9833)	—
Camshaft runout	—		0.10 (0.004)
Rocker arm I.D.	IN. & EX.	12.000 – 12.018 (0.4724 – 0.4731)	—
Rocker arm shaft O.D.	IN. & EX.	11.966 – 11.984 (0.4711 – 0.4718)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
De-comp. cable play	3 – 5 (0.12 – 0.20)		—

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Compression pressure	1 000 – 1 400 kPa (10 – 14 kgf/cm <sup>2</sup> , 142 – 200 psi)		800 kPa (8 kgf/cm <sup>2</sup> , 114 psi)
Piston to cylinder clearance	0.050 – 0.060 (0.0020 – 0.0024)		0.120 (0.0047)
Cylinder bore	94.000 – 94.015 (3.7008 – 3.7014)		94.080 (3.7039)
Piston diam.	93.945 – 93.960 (3.6986 – 3.6992) Measure at 20 mm (0.8 in) from the skirt end.		93.880 (3.6961)
Cylinder distortion	—		0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 11.5 (0.45)
	2nd	T	Approx. 14.0 (0.55)
Piston ring end gap	1st		0.30 – 0.45 (0.012 – 0.018)
	2nd		0.25 – 0.40 (0.010 – 0.016)
Piston ring to groove clearance	1st		— 0.18 (0.007)
	2nd		— 0.15 (0.006)

ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23 – 1.25 (0.0484 – 0.0492)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.81 – 2.83 (0.1106 – 0.1114)	—
Piston ring thickness	1st	1.175 – 1.190 (0.0463 – 0.0469)	—
	2nd	1.175 – 1.190 (0.0463 – 0.0469)	—
Piston pin bore	23.000 – 23.006 (0.9055 – 0.9057)		23.030 (0.9067)
Piston pin O.D.	22.996 – 23.000 (0.9054 – 0.9055)		22.980 (0.9047)

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD	LIMIT
Conrod small end I.D.	23.006 – 23.014 (0.9057 – 0.9061)	23.040 (0.9071)
Conrod deflection	—	3.0 (0.12)
Conrod big end side clearance	0.10 – 0.65 (0.004 – 0.026)	1.0 (0.039)
Conrod big end width	24.95 – 25.00 (0.982 – 0.984)	—
Crank web to web width	70.0 ± 0.1 (2.756 ± 0.004)	—
Crankshaft runout	—	0.05 (0.002)
Balancer spring free length	—	10.0 (0.39)

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 (68/36 × 35/30)	—
Oil pressure (at 60 °C, 140 °F)	Above 50 kPa (0.50 kgf/cm <sup>2</sup> , 7.1 psi) Below 75 kPa (0.75 kgf/cm <sup>2</sup> , 10.7 psi) at 3 000 r/min	—

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Drive plate thickness	No. 1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No. 2	3.45 – 3.55 (0.136 – 0.140)	3.15 (0.124)

ITEM	STANDARD		LIMIT
Drive plate claw width	No. 1	15.8 – 16.0 (0.622 – 0.630)	15.0 (0.591)
	No. 2	15.9 – 16.0 (0.626 – 0.630)	15.1 (0.594)
Driven plate distortion	—		0.1 (0.004)
Clutch spring free length	—		33.0 (1.30)

**DRIVE TRAIN**

Unit: mm (in) Except ratio

ITEM	STANDARD		LIMIT
Primary reduction ratio	1.810 (67/37)		—
Final reduction ratio	2.956 (68/23)		—
Gear ratios	Low	2.333 (35/15)	—
	2nd	1.578 (30/19)	—
	3rd	1.142 (24/21)	—
	4th	0.956 (22/23)	—
	Top	0.884 (23/26)	—
Shift fork to groove clearance	0.10 – 0.30 (0.004 – 0.012)		0.50 (0.020)
Shift fork groove width	3rd drive gear	5.50 – 5.60 (0.217 – 0.220)	—
	4th driven gear	5.50 – 5.60 (0.217 – 0.220)	—
	Top driven gear	5.50 – 5.60 (0.217 – 0.220)	—
Shift fork thickness	No. 1, No. 2 & No. 3	5.30 – 5.40 (0.209 – 0.213)	—
Drive belt	Type	BANDO: 133U-14M 40.0	—
	Number of teeth	133	—
Gearshift lever height	60 (2.4)		—

**CARBURETOR**

ITEM	SPECIFICATION	
	E-03, 28	E-33
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm	←
I.D. No.	24C9	24CA
Idle r/min	1 100 ± 100 r/min	←
Float height	27.95 ± 1.0 mm (1.1 ± 0.04 in)	←
Main jet (M.J.)	#145	←
Jet needle (J.N.)	5C39	←
Needle jet (N.J.)	X-7M	←
Throttle valve (Th.V.)	#120	←
Pilot jet (P.J.)	#52.5	←
Pilot screw (P.S.)	PRE-SET (1 and 1/2 turns back)	←
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)	←

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION	NOTE
Spark plug	Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
	Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance		Over 8 (0.3) at 1 atm.	
Solenoid resistance		0.1 – 1.0 Ω	
Pick-up coil resistance		170 – 270 Ω	O/G
Ignition coil resistance	Primary	1 – 7 Ω	O/W – Ground
	Secondary	10 – 25 kΩ	Plug cap – Ground
Generator no-load voltage		More than 100 V (AC) at 5 000 r/min	
Regulated voltage		14.0 – 15.5 V at 5 000 r/min	
Starter relay resistance		2 – 6 Ω	
Battery	Type designation	YB14L-B2	
	Voltage	12 V	
	Capacity	50.4 kC (14 Ah)/10 HR	
	Standard electrolyte S.G.	1.28 at 20 °C (68 °F)	
Fuse size		20 A	



**WATTAGE**

Unit: W

ITEM		SPECIFICATION
Headlight	HI	60
	LO	55
Parking or City light		
Brake light/Taillight		21/5
Turn signal light		21
Running light (within front turn signal light)		5
Speedometer light		3
Turn signal indicator light		3
High beam indicator light		1.7
Neutral indicator light		3
License light		8

**BRAKE + WHEEL**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20 – 30 (0.8 – 1.2)		—
Rear brake pedal height	60 (2.4)		—
Brake drum I.D.	Rear	—	160.7 (6.33)
Brake lining thickness	Rear	—	1.5 (0.06)
Brake disc thickness	Front	4.5 ± 0.2 (0.18 ± 0.01)	4.0 (0.16)
Brake disc runout	Front	—	0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.4999 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4994)	—
Brake caliper cylinder bore	Front	42.850 – 42.926 (1.6870 – 1.6900)	—
Brake caliper piston diam.	Front	42.770 – 42.820 (1.6839 – 1.6858)	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	19 × 2.15	—
	Rear	15M/C × 2.75	—
Tire size	Front	100/90-19M/C 57H	—
	Rear	140/80-15 M/C 67H	—

ITEM	STANDARD		LIMIT
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

**SUSPENSION**

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 (5.5)	—	
Front fork spring free length	—	401 (15.79)	
Front fork oil level	75.0 (2.95)	—	
Rear wheel travel	80 (3.1)	—	
Swingarm pivot shaft runout	—	0.3 (0.001)	

**TIRE PRESSURE**

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kgf/cm <sup>2</sup>	psi	kPa	kgf/cm <sup>2</sup>	psi
FRONT	200	2.00	29	200	2.00	29
REAR	225	2.25	33	250	2.50	36

**FUEL + OIL**

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
Fuel tank capacity	Including reserve	10.5 L (2.8/2.3 US/Imp gal)	
	Only reserve	2.5 L (0.66/0.55 US/Imp gal)	
Engine oil type	* SAE 10W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Oil change	1 800 ml (1.9/1.6 US/Imp qt)	
	Oil and filter change	2 000 ml (2.1/1.8 US/Imp qt)	
	Engine overhaul	2 400 ml (2.5/2.1 US/Imp qt)	
Front fork oil type	Fork oil #15		
Front fork oil capacity (each leg)	447 ml (15.11/15.74 US/Imp oz)		Spacer L: 135 mm
Brake fluid type	DOT 4		





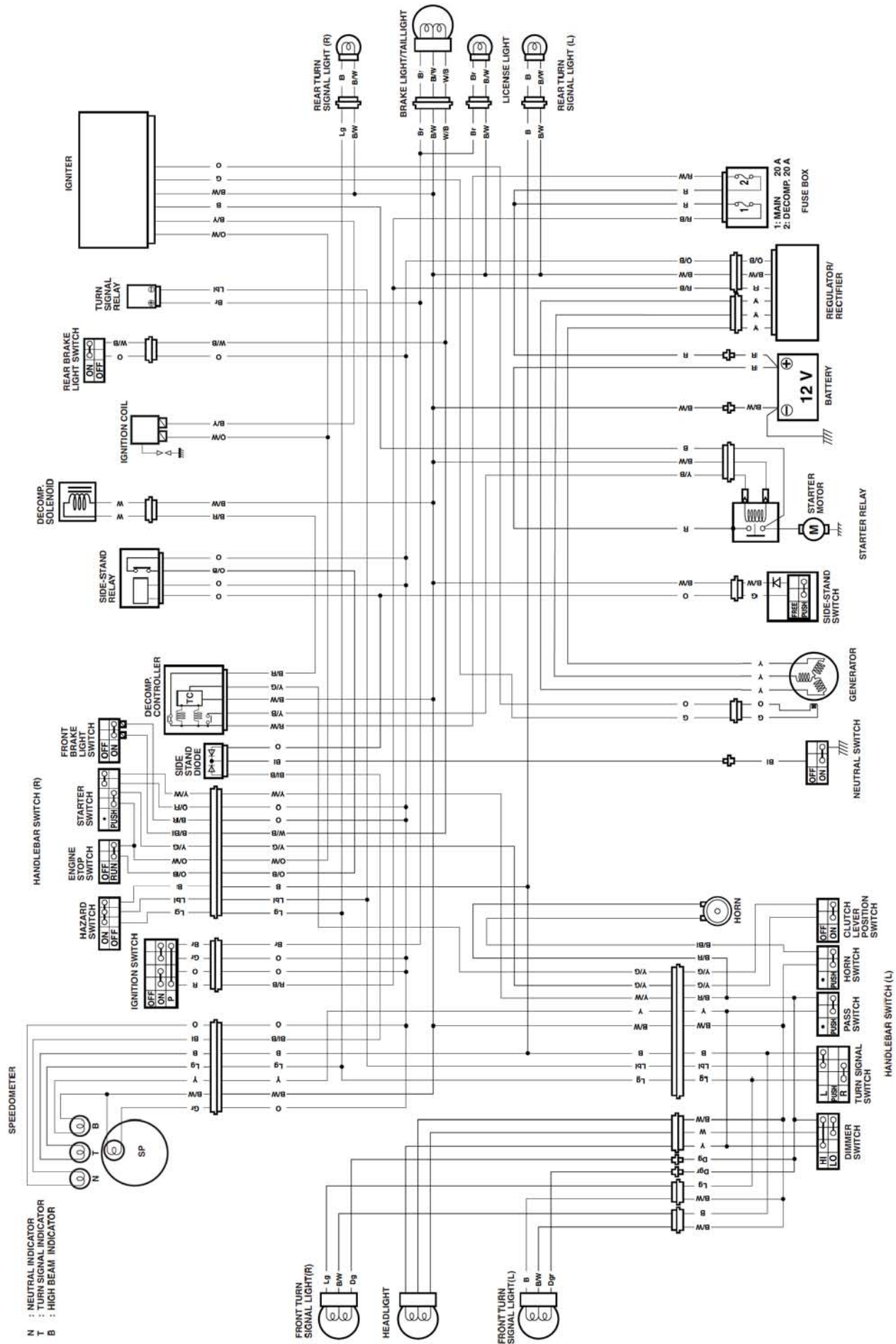
# LS650K7 ('07 MODEL)

**NOTE:**

*The specifications and service data are the same as the K6-MODELS.*

**CONTENTS**

**WIRING DIAGRAM .....17- 2**



# LS650K8 ('08 MODEL)

**NOTE:**

*The specifications and service data are the same as the K7-MODEL.*

**CONTENTS**

<b>SERVICE DATA .....</b>	<b>18- 2</b>
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# SERVICE DATA

## VALVE + GUIDE

Unit: mm (in)

ITEM	STANDARD		LIMIT
Valve diam.	IN.	33 (1.3)	—
	EX.	28 (1.1)	—
Valve lift	IN.	8.5 (0.33)	—
	EX.	8.5 (0.33)	—
Valve clearance (when cold)	IN. & EX.	0.08 – 0.13 (0.003 – 0.005)	—
Valve guide to valve stem clearance	IN.	0.025 – 0.055 (0.0010 – 0.0022)	—
	EX.	0.040 – 0.070 (0.0016 – 0.0028)	—
Valve stem deflection	IN. & EX.	—	0.35 (0.014)
Valve guide I.D.	IN. & EX.	7.000 – 7.015 (0.2756 – 0.2762)	—
Valve stem O.D.	IN.	6.960 – 6.975 (0.2740 – 0.2746)	—
	EX.	6.945 – 6.960 (0.2734 – 0.2740)	—
Valve stem runout	IN. & EX.	—	0.05 (0.002)
Valve head thickness	IN. & EX.	—	0.5 (0.02)
Valve stem end length	IN. & EX.	—	2.9 (0.11)
Valve seat width	IN. & EX.	1.0 – 1.2 (0.039 – 0.047)	—
Valve head radial runout	IN. & EX.	—	0.03 (0.001)
Valve spring free length (IN. & EX.)	INNER	—	35.6 (1.40)
	OUTER	—	40.4 (1.59)
Valve spring tension (IN. & EX.)	INNER	68 – 83 N (6.9 – 8.5 kgf, 15.2 – 18.7 lbs) at length 31.0 mm (1.2 in)	—
	OUTER	160 – 184 N (16.4 – 18.8 kgf, 36.2 – 41.4 lbs) at length 33.0 mm (1.3 in)	—

**CAMSHAFT + CYLINDER HEAD**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Cam height	IN.	36.174 – 36.228 (1.4242 – 1.4263)	35.880 (1.4126)
	EX.	36.419 – 36.473 (1.4338 – 1.4359)	36.120 (1.4220)
Camshaft journal oil clearance	0.032 – 0.066 (0.0013 – 0.0026)		0.150 (0.0060)
Camshaft journal holder I.D.	Left	20.012 – 22.025 (0.7879 – 0.7884)	—
	Right & Center	25.012 – 25.025 (0.9847 – 0.9852)	—
Camshaft journal O.D.	Left	19.959 – 19.976 (0.7858 – 0.7865)	—
	Right & Center	24.959 – 24.976 (0.9826 – 0.9833)	—
Camshaft runout	—		0.10 (0.004)
Rocker arm I.D.	IN. & EX.	12.000 – 12.018 (0.4724 – 0.4731)	—
Rocker arm shaft O.D.	IN. & EX.	11.966 – 11.984 (0.4711 – 0.4718)	—
Cylinder head distortion	—		0.05 (0.002)
Cylinder head cover distortion	—		0.05 (0.002)
De-comp. cable play	3 – 5 (0.12 – 0.20)		—

**CYLINDER + PISTON + PISTON RING**

Unit: mm (in)

ITEM	STANDARD			LIMIT
Compression pressure	1 000 – 1 400 kPa (10 – 14 kgf/cm <sup>2</sup> , 142 – 200 psi)			800 kPa (8 kgf/cm <sup>2</sup> , 114 psi)
Piston to cylinder clearance	0.050 – 0.060 (0.0020 – 0.0024)			0.120 (0.0047)
Cylinder bore	94.000 – 94.015 (3.7008 – 3.7014)			94.080 (3.7039)
Piston diam.	93.945 – 93.960 (3.6986 – 3.6992) Measure at 20 mm (0.8 in) from the skirt end.			93.880 (3.6961)
Cylinder distortion	—			0.05 (0.002)
Piston ring free end gap	1st	T	Approx. 11.5 (0.45)	9.2 (0.36)
	2nd	T	Approx. 14.0 (0.55)	11.2 (0.44)
Piston ring end gap	1st	0.30 – 0.45 (0.012 – 0.018)		1.00 (0.039)
	2nd	0.25 – 0.40 (0.010 – 0.016)		1.00 (0.039)
Piston ring to groove clearance	1st	—		0.18 (0.007)
	2nd	—		0.15 (0.006)



ITEM	STANDARD		LIMIT
Piston ring groove width	1st	1.23 – 1.25 (0.0484 – 0.0492)	—
	2nd	1.21 – 1.23 (0.0476 – 0.0484)	—
	Oil	2.81 – 2.83 (0.1106 – 0.1114)	—
Piston ring thickness	1st	1.175 – 1.190 (0.0463 – 0.0469)	—
	2nd	1.175 – 1.190 (0.0463 – 0.0469)	—
Piston pin bore	23.000 – 23.006 (0.9055 – 0.9057)		23.030 (0.9067)
Piston pin O.D.	22.996 – 23.000 (0.9054 – 0.9055)		22.980 (0.9047)

**CONROD + CRANKSHAFT + BALANCER**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Conrod small end I.D.	23.006 – 23.014 (0.9057 – 0.9061)		23.040 (0.9071)
Conrod deflection	—		3.0 (0.12)
Conrod big end side clearance	0.10 – 0.65 (0.004 – 0.026)		1.0 (0.039)
Conrod big end width	24.95 – 25.00 (0.982 – 0.984)		—
Crank web to web width	70.0 ± 0.1 (2.756 ± 0.004)		—
Crankshaft runout	—		0.05 (0.002)
Balancer spring free length	—		10.0 (0.39)

**OIL PUMP**

ITEM	STANDARD	LIMIT
Oil pump reduction ratio	2.203 (68/36 × 35/30)	—
Oil pressure (at 60 °C, 140 °F)	Above 50 kPa (0.50 kgf/cm <sup>2</sup> , 7.1 psi) Below 75 kPa (0.75 kgf/cm <sup>2</sup> , 10.7 psi) at 3 000 r/min	—

**CLUTCH**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Clutch lever play	10 – 15 (0.4 – 0.6)		—
Drive plate thickness	No. 1	2.92 – 3.08 (0.115 – 0.121)	2.62 (0.103)
	No. 2	3.45 – 3.55 (0.136 – 0.140)	3.15 (0.124)



ITEM	STANDARD		LIMIT
Drive plate claw width	No. 1	15.8 – 16.0 (0.622 – 0.630)	15.0 (0.591)
	No. 2	15.9 – 16.0 (0.626 – 0.630)	15.1 (0.594)
Driven plate distortion	—		0.1 (0.004)
Clutch spring free length	—		33.0 (1.30)

**DRIVE TRAIN**

Unit: mm (in) Except ratio

ITEM	STANDARD		LIMIT
Primary reduction ratio	1.810 (67/37)		—
Final reduction ratio	2.956 (68/23)		—
Gear ratios	Low	2.333 (35/15)	—
	2nd	1.578 (30/19)	—
	3rd	1.142 (24/21)	—
	4th	0.956 (22/23)	—
	Top	0.884 (23/26)	—
Shift fork to groove clearance	0.10 – 0.30 (0.004 – 0.012)		0.50 (0.020)
Shift fork groove width	3rd drive gear	5.50 – 5.60 (0.217 – 0.220)	—
	4th driven gear	5.50 – 5.60 (0.217 – 0.220)	—
	Top driven gear	5.50 – 5.60 (0.217 – 0.220)	—
Shift fork thickness	No. 1, No. 2 & No. 3	5.30 – 5.40 (0.209 – 0.213)	—
Drive belt	Type	BANDO: 133U-14M 40.0	—
	Number of teeth	133	—
Gearshift lever height	60 (2.4)		—

**CARBURETOR**

ITEM	SPECIFICATION	
	E-03, 28	E-33
Carburetor type	MIKUNI BS40SS	←
Bore size	40 mm	←
I.D. No.	24C9	24CA
Idle r/min	1 100 ± 100 r/min	←
Float height	27.95 ± 1.0 mm (1.1 ± 0.04 in)	←
Main jet (M.J.)	#145	←
Jet needle (J.N.)	5C39	←
Needle jet (N.J.)	X-7M	←
Throttle valve (Th.V.)	#120	←
Pilot jet (P.J.)	#52.5	←
Pilot screw (P.S.)	PRE-SET * (1 and 1/8 turns back)	* ←
Throttle cable play	2.0 – 4.0 mm (0.08 – 0.16 in)	←

**ELECTRICAL**

Unit: mm (in)

ITEM		SPECIFICATION	NOTE
Spark plug	Type	NGK: DPR8EA-9 N.D.: X24EPR-U9	
	Gap	0.8 – 0.9 (0.031 – 0.035)	
Spark performance		Over 8 (0.3) at 1 atm.	
Solenoid resistance		0.1 – 1.0 Ω	
Pick-up coil resistance		170 – 270 Ω	O/G
Ignition coil resistance	Primary	1 – 7 Ω	O/W – Ground
	Secondary	10 – 25 kΩ	Plug cap – Ground
Generator no-load voltage		More than 100 V (AC) at 5 000 r/min	
Regulated voltage		14.0 – 15.5 V at 5 000 r/min	
Starter relay resistance		2 – 6 Ω	
Battery	Type designation	YB14L-B2	
	Voltage	12 V	
	Capacity	50.4 kC (14 Ah)/10 HR	
	Standard electrolyte S.G.	1.28 at 20 °C (68 °F)	
Fuse size		20 A	

**WATTAGE**

Unit: W

ITEM		SPECIFICATION
Headlight	HI	60
	LO	55
Parking or City light		
Brake light/Taillight		21/5
Turn signal light		21
Running light (within front turn signal light)		5
Speedometer light		3
Turn signal indicator light		3
High beam indicator light		1.7
Neutral indicator light		3
License light		8

**BRAKE + WHEEL**

Unit: mm (in)

ITEM	STANDARD		LIMIT
Rear brake pedal free travel	20 – 30 (0.8 – 1.2)		—
Rear brake pedal height	60 (2.4)		—
Brake drum I.D.	Rear	—	160.7 (6.33)
Brake lining thickness	Rear	—	1.5 (0.06)
Brake disc thickness	Front	4.5 ± 0.2 (0.18 ± 0.01)	4.0 (0.16)
Brake disc runout	Front	—	0.30 (0.012)
Master cylinder bore	Front	12.700 – 12.743 (0.4999 – 0.5017)	—
Master cylinder piston diam.	Front	12.657 – 12.684 (0.4983 – 0.4994)	—
Brake caliper cylinder bore	Front	42.850 – 42.926 (1.6870 – 1.6900)	—
Brake caliper piston diam.	Front	42.770 – 42.820 (1.6839 – 1.6858)	—
Wheel rim runout	Axial	—	2.0 (0.08)
	Radial	—	2.0 (0.08)
Wheel axle runout	Front	—	0.25 (0.010)
	Rear	—	0.25 (0.010)
Wheel rim size	Front	19 × 2.15	—
	Rear	15M/C × 2.75	—
Tire size	Front	100/90-19M/C 57H	—
	Rear	140/80-15 M/C 67H	—

ITEM	STANDARD		LIMIT
Tire tread depth	Front	—	1.6 (0.06)
	Rear	—	2.0 (0.08)

**SUSPENSION**

Unit: mm (in)

ITEM	STANDARD	LIMIT	NOTE
Front fork stroke	140 (5.5)	—	
Front fork spring free length	—	401 (15.79)	
Front fork oil level	75.0 (2.95)	—	
Rear wheel travel	80 (3.1)	—	
Swingarm pivot shaft runout	—	0.3 (0.001)	

**TIRE PRESSURE**

COLD INFLATION TIRE PRESSURE	SOLO RIDING			DUAL RIDING		
	kPa	kgf/cm <sup>2</sup>	psi	kPa	kgf/cm <sup>2</sup>	psi
FRONT	200	2.00	29	200	2.00	29
REAR	225	2.25	33	250	2.50	36

**FUEL + OIL**

ITEM	SPECIFICATION		NOTE
Fuel type	Use only unleaded gasoline of at least 87 pump octane (R/2 + M/2) or 91 octane or higher rated by the research method. Gasoline containing MTBE (Methyl Tertiary Butyl Ether), less than 10% ethanol, or less than 5% methanol with appropriate cosolvents and corrosion inhibitor is permissible.		E-03, 28, 33
Fuel tank capacity	Including reserve	10.5 L (2.8/2.3 US/Imp gal)	
	Only reserve	2.5 L (0.66/0.55 US/Imp gal)	
Engine oil type	SAE 10W-40, API SF/SG or SH/SJ with JASO MA		
Engine oil capacity	Oil change	1 800 ml (1.9/1.6 US/Imp qt)	
	Oil and filter change	2 000 ml (2.1/1.8 US/Imp qt)	
	Engine overhaul	2 400 ml (2.5/2.1 US/Imp qt)	
Front fork oil type	Fork oil #15		
Front fork oil capacity (each leg)	447 ml (15.11/15.74 US/Imp oz)		Spacer L: 135 mm
Brake fluid type	DOT 4		

# LS650K9 ('09 MODEL)

CONTENTS	
	PAGE
SPECIFICATIONS.....	19-2

NOTE:  
\* Asterisk mark (\*) indicates the New K9-model specification.  
\* The service data is the same as the K8-model.

# SPECIFICATIONS

## DIMENSIONS AND CURB MASS

Overall length .....	2 180 mm (85.8 in)
Overall width .....	720 mm (28.3 in)
Overall height .....	1 105 mm (43.5 in)
Wheelbase .....	1 480 mm (58.3 in)
Ground clearance .....	135 mm (5.3 in)
Seat height .....	700 mm (27.6 in)
* Curb mass .....	173 kg (381 lbs)

## ENGINE

Type .....	Four stroke, air-cooled, OHC
Number of cylinders .....	1
Bore .....	94.0 mm (3.701 in)
Stroke .....	94.0 mm (3.701 in)
Displacement .....	652 cm <sup>3</sup> (39.8 cu. in)
Compression ratio .....	8.5 : 1
Carburetor .....	MIKUNI BS40, single
Air cleaner .....	Non-woven fabric element
Starter system .....	Electric
Lubrication system .....	Wet sump
Idle speed .....	1 100 ± 100 r/min

## DRIVE TRAIN

Clutch .....	Wet multi-plate type
Transmission .....	5-speed constant mesh
Gearshift pattern .....	1-down, 4-up
Primary reduction ratio .....	1.810 (67/37)
Gear ratios, Low .....	2.333 (35/15)
2nd .....	1.578 (30/19)
3rd .....	1.142 (24/21)
4th .....	0.956 (22/23)
Top .....	0.884 (23/26)
Final reduction ratio .....	2.956 (68/23)
Drive system .....	Belt drive

## CHASSIS

Front suspension .....	Telescopic, coil spring, oil damped
Rear suspension .....	Swingarm, coil spring, oil damped
Front suspension stroke .....	140 mm (5.5 in)
Rear wheel travel .....	80 mm (3.1 in)
Caster .....	35°
Trail .....	147 mm (5.79 in)
Steering angle .....	42° (right and left)
Turning radius .....	2.6 m (8.5 ft)
Front brake .....	Disc brake
Rear brake .....	Drum brake
Front tire size .....	100/90-19 M/C 57H, tube type
Rear tire size .....	140/80-15 M/C 67H, tube type

## ELECTRICAL

Ignition type .....	Electronic ignition (Transistorized)
Ignition timing .....	5° B.T.D.C. at 1 100 r/min
Spark plug .....	NGK DPR8EA-9 or DENSO X24EPR-U9
Battery .....	12 V 50.4 kC (14 Ah)/10 HR
Generator .....	Three-phase A.C. generator
Fuse .....	20 A/20 A
Headlight .....	12 V 60/55 W
Turn signal light, Front .....	12 V 21/5 W
Rear .....	12 V 21 W
Brake light/Tailight .....	12 V 21/5 W
Running light .....	12 V 5 W
License plate light .....	12 V 8 W
Speedometer light .....	12 V 3 W
Neutral indicator light .....	12 V 3 W
High beam indicator light .....	12 V 1.7 W
Turn signal indicator light .....	12 V 3 W × 2

## CAPACITIES

Fuel tank, including reserve .....	10.5 L (2.8/2.3 US/Imp gal)
Reserve .....	2.5 L (0.6/0.5 US/Imp gal)
Engine oil, oil change .....	1 800 ml (1.9/1.6 US/Imp qt)
with filter change .....	2 000 ml (2.1/1.8 US/Imp qt)
overhaul .....	2 400 ml (2.5/2.1 US/Imp qt)